RCA VICTOR

SERVICE DATA

VOLUME VII

1951

RADIO RECEIVERS

PHONOGRAPHS

TELEVISION

RADIO CORPORATION OF AMERICA

RCA Victor Division Harrison, N. J., U. S. A.

RCA VICTOR

SERVICE DATA

- TELEVISION RECEIVERS
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This volume is a compilation of Service Data previously issued for the year 1951 with the latest changes and corrections.

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RCA VICTOR DIVISION
HARRISON, N. J., U. S. A.

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RADIOS AND PHONOGRAPHS

RECORD CHANGERS

TELEVISION

MISCELLANEOUS

SUPPLEMENTARY INFORMATION

RADIO

1X51 Series

Change in Volume Control Knob:

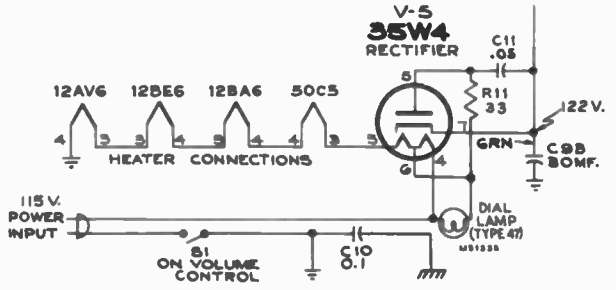
The original volume control knob had a smooth outer edge. The knob used in late production has a dimpled edge. The Stock Nos. of the new knobs are listed below.

77140 Knob—Volume control knob—maroon—Model 1X51
77235 Knob—Volume control knob—ivory —Model 1X52
77237 Knob—Volume control knob—green —Model 1X53
77238 Knob—Volume control knob—tan —Model 1X54
77239 Knob—Volume control knob—blue —Model 1X55
77240 Knob—Volume control knob—red —Model 1X56
77236 Knob—Volume control knob—white —Model 1X57

X551, X552 (RC-1089B, RC-1089C)

Addition of Resistor:

A 33 ohm resistor has been added between pin #5 and pin #6 of the rectifier tube socket. This resistor minimizes the current surge which occurs if the set is turned on immediately after having been turned off. Dial lamp and tube life is lengthened by the addition of this resistor. The revised rectifier circuit is illustrated below.



Additions to Parts List:

CHASSIS ASSEMBLIES

514033 Resistor—Fixed composition, 33 ohms ±20%, 1 watt (R11)

MISCELLANEOUS

77230 Button—Plug button—maroon—for phono attachment socket—Model X551
77231 Button—Plug button—ivory—for phono attachment socket—Model X552

9Y510

Alternate Speaker:

In some receivers speakers stamped 92585-5 have been used instead of the specified 92585-1 speaker.

SPEAKER ASSEMBLY

77270 Speaker—5" x 7" P.M. speaker complete with cone and voice coil.

A-106, 9W106

Correction to Parts List:

CHASSIS ASSEMBLIES

The Stock No. of the F.M. oscillator coil is incorrectly listed as 73817. The correct Stock No. is 74817.

240X1 Radio-Phono Switch

Alternate Color of Lead Wires:

Instructions for the use of Type 240X1 switch indicate BLACK and BLACK-BROWN colors of leads. Alternate colors used are BLUE and WHITE respectively.

BLACK or BLUE } Radio input to switch

BLACK-BROWN or WHITE } Audio output from switch

PX600

Addition to Parts List:

MISCELLANEOUS

76726 Emblem—"RCA Victor" emblem

1X591, 1X592 (RC-1079K, RC-1079L)

Change in Parts List:

The Service Data for these models lists only one emblem. The listed emblem (Stock No. 76588) is correct for Model 1X591 only and is maroon color. The correct emblem for Model 1X592 is Stock No. 74782 and is gold finish.

Change in Control Knob:

Late production of these models use control knobs with a dimpled edge.

The stock Nos. of the dimpled knobs are as follows:

77234 Knob—Control knob—maroon—for Model 1X591
77235 Knob—Control knob—ivory—for Model 1X592

X551, X552, 1X51 Series 9Y510, 45EY3

Change in Emblem:

Original production of the above receivers used a plastic emblem which was secured to the cabinet by heat—sealing the plastic studs. Present production uses a die-cast metal emblem which is secured to the cabinet with three speed nuts.

Additions to Parts Lists:

77033 Emblem—"RCA Victor" emblem (metal)
77351 Nut—Speed nut to fasten #77033 emblem to cabinet

TELEVISION

9T57, 9T77, 9T79

Change in Parts List:

Change: MISCELLANEOUS

75624 Pull

to read:

75624 Pull—Door pull for lower doors (Model 9T79)
Note: Prongs on Bail mount from outer sides of Escutcheon.

Add:

76641 Pull—Door pull for lower doors (Model 9T79)
Note: Prongs on Bail mount from inner side of Escutcheon.

KRK5, KRK5A, KRK5B, R. F. Unit

Additions to Parts List:

Refer to all models using subject units and add the following:—

75995 Strip—Mounting strip for switch segments and coil forms for L9, L13, L31 (center)
76861 Strip—Mounting strip for switch segments complete with two (2) terminals (R. H.)
76862 Strip—Mounting strip for switch segments (L. H.)

4T101, 4T141

Addition to Parts List:

RF UNIT ASSEMBLIES

76754 Plate—Front plate and shaft bearing

CONTINUED ON PAGE XIV

HIGH PASS FILTER FOR REJECTION OF INTERFERING SIGNALS BELOW 50 MC.

If interference is experienced due to the presence of strong signals below 50 mc. it can usually be eliminated by the use of a high pass filter. To be effective, the filter must be installed at the r-f units with as short leads as possible and the case of the filter connected to the r-f unit chassis.

Figure 5 shows the method of attaching the antenna input connectors to the filter so that it can be "plugged" directly into the antenna matching units employed with KRK5, KRK7 and KRK8 r-f tuners.

Figure 6 shows the method of mounting the filter on receivers employing KRK2 r-f units.

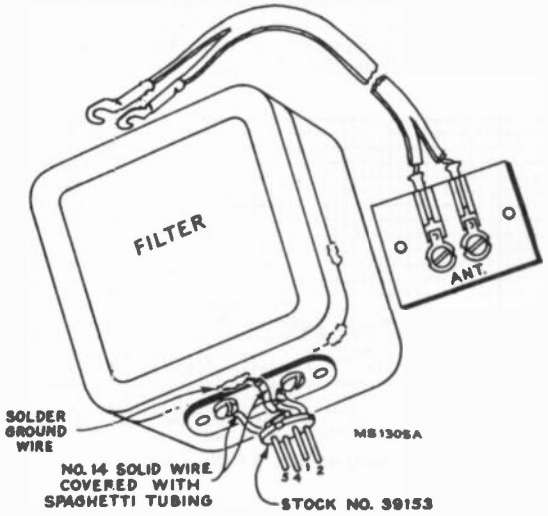


Figure 5—Filter for KRK5, KRK7 and KRK8 R-F Units

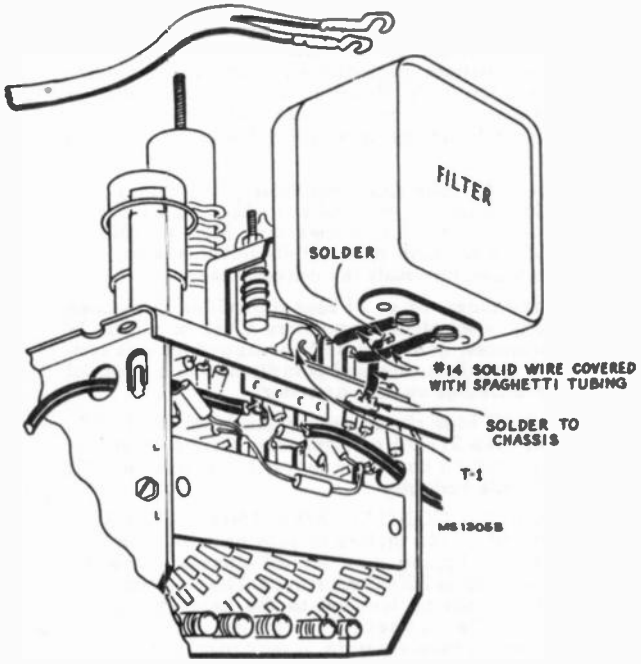


Figure 6—Filter for KRK2 R-F Units

NEW TYPE ELECTRON GUN IN 10BP4, 12LP4 AND 16AP4 KINESCOPES

All RCA tubes of these types now being manufactured have a new type of electron gun similar to the one employed in the RCA type 16GP4 kinescopes. In most cases it will be found that the EM ion trap magnet or the two ring PM type ion trap magnets originally employed with these tubes will also operate satisfactorily with the tubes employing the new guns. However if trouble should be experienced, it can be eliminated by the use of the single PM ion trap magnet employed with 16GP4 kinescopes.

DEFLECTION YOKES FOR 7T103 AND 17T153 SERIES RECEIVERS

In production, yoke, Stock No. 74952 was used for magnetic focused Model 7T103, and electrostatic focused Model 7T103B receivers.

Likewise, in production, yoke, Stock No. 76616 was employed for electrostatic focused Model 17T153 and magnetic focused 17T172K and 17T150 series receivers.

Magnetic focus causes the picture to be rotated about 5 degrees from the position which the same yoke would produce on an electrostatic focused kinescope. This rotation of the picture can be corrected by rotating the yoke around the neck of the kinescope in the proper direction. However, only a limited range of adjustment is provided by the wing screw on the yoke.

In production, the yoke was positioned within the retaining strap so that the picture was straight when the wing screw adjustment was in the center of its range. Naturally this yoke position varied depending on whether the yoke was to be used with a magnetic or electrostatic focused kinescope.

The yokes stocked by the Replacement Parts Dept. may have been adjusted for either electrostatic or magnetic focused kinescopes depending upon which was in production at the time of ordering. In the event of yoke failure, when the yoke is replaced, it may be necessary to adjust the yoke within its strap in order to straighten the picture.

HIGH VOLTAGE ARCS AT KINESCOPES

During days of humid weather, difficulty may be experienced with arcing across the bell of metal cone picture tubes due to a collection of dust and moisture around this area.

In the past, many remedies have been suggested, all of which have been helpful for a short period of time. The best field remedy found to date has been an application of "Car-Plate", mfd. by S. C. Johnson & Son, Racine, Wis.

The following procedure should be employed:

1. Remove the entire coating on glass bell, using methanol or acetone.
2. Wash the glass bell thoroughly with a good detergent.
3. Dry the glass bell thoroughly.
4. Apply a good coating of Johnson's "Car-Plate". Allow to dry, then wipe off the white residue. Brush application is satisfactory.

CORONA INTERFERENCE—MODEL 9T57, SERIES RECEIVERS

An interference pattern consisting of narrow vertical bars at the left-hand side of the raster, may be the result of internal corona, or arcing, within the 4.7 mmfd capacitor (C198) located in the plate circuit of the horizontal sweep output tube.

This interference may be mistaken for Barkhausen oscillation, but none of the normal Barkhausen preventative methods such as adjusting the drive, placing a magnet over the 6BG6, etc., will be effective in eliminating the interference.

If such a condition is encountered, the capacitor should be replaced.

FIXED COMPOSITION RESISTOR STOCK NO. CODE

The RCA six digit stock number for fixed composition resistors.

The first digit will always be 5.

The second digit is to indicate the wattage. 0 = ½ watt, 1 = 1 watt, 2 = 2 watt.

The third digit is to indicate the resistor tolerance. 2 = 5%, 3 = 10%, 4 = 20%.

The fourth digit is for the number of zeros following the significant figures of the resistor value.

The fifth and sixth digits are for the significant figures of the resistor value.

Example 503268 is the stock number of a ½ watt, fixed composition resistor, 6800 ohms ±10%.

A few resistors are still being listed in the Service Data under four or five digit stock numbers. This is because there are still some of these resistors in stock packaged under the old stock numbers. However, as these are depleted, the new stock will be carried under the six digit stock number system.

Wire wound or other special resistors will continue to carry four or five digit stock numbers.

NOTES ON 17T153, 17T154, 17T155, 17T160, 17T162, 17T163, 17T172, 17T172K, 17T173, 17T173K, 17T174, 17T174K, 21T159, 21T165, 21T176, 21T177, 21T178 AND 21T179 TELEVISION RECEIVERS

SEPARATION OF SOUND AND PICTURE IN WEAK SIGNAL AREAS—Normally the picture carrier falls at 50% on the slope of the overall response curve as shown below. When receiving signals of less than 50 microvolts, on intercarrier receivers, it is common practice to adjust the fine tuning control so as to move the picture carrier up the slope to improve the signal to noise ratio. The actual amount which the carrier is moved depends upon the signal strength. On extremely weak signals, the picture carrier may be moved as high as 80% to 90% on the slope of the curve. This may represent a change of as much as .75 megacycles of all frequencies being passed through the pix i-f amplifier. Under such conditions the sound may become weak and noisy even on intercarrier receivers. The reason for this is shown in figure 1 below.

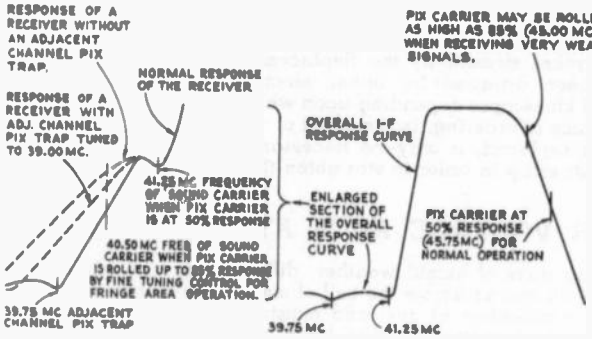


Figure 1—Details of Overall Response Curves

When the picture carrier is rolled up the slope and lowered in frequency by .75 mc., the sound carrier is also lowered in frequency by .75 mc. to become 40.50 mc. As can be seen by the enlarged section of the response curve, the sound carrier begins to fall into the adjacent channel picture trap with a consequent reduction of sound output. Receiver designs which do not incorporate an adjacent channel picture trap may avoid this difficulty at the expense of adjacent channel picture rejection.

It is possible to overcome the above described difficulty in many cases by a simple adjustment which can be made in the field without the aid of test equipment. When the picture carrier is rolled up the slope by .75 mc., the adjacent channel picture carrier is lowered in frequency to 39.00 mc. and no longer falls into the adjacent channel picture trap. If the trap is returned to 39.00 mc. it will permit the response at 40.50 mc. to rise somewhat and produce stronger sound and will produce greater adjacent channel picture rejection under the actual operating condition. If a strong signal is available on another channel and the fine tuning is adjusted to roll the picture carrier down the slope to the normal 50% point, the adjacent channel picture trap will appear mistuned. However, it is not likely that adjacent channel picture interference will be experienced on strong signals.

In addition to the above adjustment, T107, normally peaked at 41.8 mc., may be lowered in frequency to provide improved sound gain. Care should be taken in making this adjustment not to lower its frequency any more than necessary as it reduces adjacent channel picture rejection somewhat and might cause difficulty from sound in the picture if a strong signal is available on another channel.

The above adjustments may be made without removing the chassis from the cabinet. First, tune in the desired channel and adjust the fine tuning control for best picture. Then, since the adjacent channel picture trap is under the kinescope, disconnect the high voltage lead at the chassis to prevent getting a shock. Turn the T104 top core clockwise, approximately ½ turn if it is a threaded core type or approximately 1½ turn clockwise if it employs a brass stud extending from the transformer shield. Restore the kinescope high voltage connection. Then, from the top of the chassis, adjust T107 clockwise ½ turn or less.

If adjacent channel picture interference is a severe problem, it may be necessary to remove the chassis from the cabinet and adjust T104 top core while observing the picture for minimum interference.

R-F AND I-F BIAS RATIOS—In medium field strength areas an occasional receiver may show some snow on signals in the 300 to 1000 microvolt signal range due to an improper ratio of r-f and i-f bias. If the r-f bias is high with respect to the i-f bias, the picture becomes snowy. If the i-f bias is too high with respect to r-f bias, the receiver may overload on strong signals.

To determine whether or not the biases are of the correct ratio, tune in a signal and measure the r-f bias, the i-f bias and the AGC amplifier plate voltage with a "VoltOhmyst". The signal must be steady during these measurements. Plot these points on the accompanying graph. The values should fall within the range of the dotted lines.

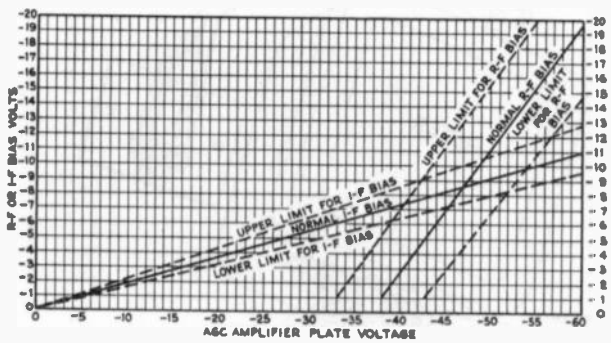


Figure 2—Chart of R-F, I-F Bias Ratios

According to the graph, when the AGC amplifier plate measures —45 volts, the i-f bias should be —8.2 volts. If the i-f bias actually measured —10 volts, it indicates that R143 or R145 is too low in value and/or R144 or R150 is too high. If, however, the i-f bias actually measured —6 volts it indicates R143 or R145 is too high in value and/or R144 or R150 is too low. The resistors originally employed in production were 10% tolerance units. However, if R143 and R145 are at one limit of their tolerance and R144 and R150 are at the other limit of their tolerance, a considerable error in i-f bias is produced.

Similarly at —45 volts AGC amplifier plate voltage the r-f bias should measure —6.8 volts. If the i-f bias should measure say —12 volts, it indicates that R128 or R129 is too low or R127 is too high or the R145 volt bus is too low. If the bias is too low, obviously the converse is true.

In several instances, r-f or i-f bias difficulties have been traced to leaky electrolytic capacitors C124 or C138. In two known instances, one of these two capacitors was connected into the circuit in reversed polarity due to a reversal of the polarity markings on the capacitor.

The above AGC bias circuit description is for the 17T153 series receivers. The 21T176 receivers are similar except for slight differences which cause the biases to occur at slightly different AGC plate voltages.

AGC THRESHOLD CONTROL ADJUSTMENT—The AGC control is adjusted at the factory to provide maximum possible gain without clipping sync for all signals above the receiver threshold up to 25000 microvolts. The adjustment of this control should not be touched in the field unless it is definitely known to be incorrect. If the control is misadjusted so as to increase the receiver gain, it may overload when a strong signal is received or when a weak signal temporarily increases in strength due to unusual propagation conditions. On the other hand, if the receiver gain is lowered by the AGC control, the sync noise immunity is reduced.

In order to reduce the prominence of snow on weak signals it is important that the picture control not be operated at its maximum clockwise position. Such an adjustment will provide a higher contrast picture but at the same time may produce an apparent poorer signal to noise ratio due to the fact that an excessive amount of signal on the kinescope grid causes the snow to bloom or defocus thus causing the flake particle to become larger and more prominent than normal. At the same time it is equally important that the receiver be focused to obtain the appearance of the least amount of

NOTES ON 17T153, 17T154, 17T155, 17T160, 17T162, 17T172, 17T172K, 17T173, 17T173K, 17T174, 17T174K, 21T159, 21T165, 21T176, 21T177, 21T178 AND 21T179 TELEVISION RECEIVERS

snow in the picture. To do this, focus the receiver by the method directed in the Service Data. As a final adjustment, adjust the focus control for the appearance of minimum snow in the picture.

Only under two conditions can it be considered permissible to adjust the AGC control. In an area where the signal is so weak that the snow practically obscures the picture after having taken all the above precautions, then the AGC control may be adjusted to give the best signal to noise ratio. It should be recognized however, that trouble from loss of sync noise immunity might be experienced.

The other condition which would justify adjustment of the AGC control is where a signal of over 25,000 microvolts is received. Under this condition the AGC control should be adjusted until the receiver no longer overloads.

NOTES ON GERMANIUM CRYSTAL DETECTOR CR101—Several different types and makes of crystals are used, such as 1N60, 1N64 and CK706. These crystals have slightly different characteristics and may not be directly interchangeable. In production, these differences are taken care of by varying the value of R154 which is located in T109. This resistor is normally 10K. However, to take care of different crystals, this resistor may vary from 5600 ohms to 10K ohms.

If the crystal is to be replaced, it should be replaced by one of the same make and type. However, if desired, the entire T109 transformer and matching resistor may be installed. In any event, if T109 or CR101 is replaced, the over-all response should be checked.

If a crystal is replaced, care should be taken to get it connected in the proper polarity. Since germanium crystals are marked differently than selenium rectifiers, confusion may result. Selenium rectifiers are marked + and — to show the polarity of the d-c output voltage. Germanium crystals are marked to show the polarity of voltage that must be applied to obtain maximum current flow. The cathode end of a germanium crystal may be coded with green paint or marked —. The anode end may not be coded or may be coded +. In schematic symbols, the anode is shown as an arrow (◀) and the cathode as a flat bar. In T109, the anode (+) end is connected to terminal A and the cathode (—) end to terminal D. Care should also be taken not to overheat the crystal with the soldering iron as damage to the crystal may result.

As a protection against damage to the crystal detector, a 220 ohm, ½ watt resistor has been added in series with the screen of V110, the 6AG7 video amplifier. This resistor is designated as R174 in both 17 and 21 inch receivers and is carried under stock number 503122. It is shown in the latest editions of the receiver Service Data.

T104 FREQUENCY CHANGE—In late production receivers, the adjacent channel picture trap in T104 has been tuned to 39.25 mc. rather than 39.75 mc. This results in slightly more sound sensitivity when operating the receiver in fringe areas. It also provides slightly higher adjacent channel picture rejection when the fine tuning is adjusted so as to roll the picture carrier up on the slope of the i-f response as is done in receiving weak signals. This change, suggested as a field adjustment, was covered more fully in RPT Tip, Volume II, Issue 9, dated November 19, 1951.

KRK11 OSCILLATOR INJECTION VOLTAGE—If low oscillator injection voltage is encountered in KRK11 r-f unit, it may be necessary to select a 6X8 tube which will give proper injection when the r-f unit is properly aligned. Recent changes in the circuit and parts makes it easier to obtain sufficient injection with average 6X8 tubes. R-F units in which these changes are made are marked M1. The parts list of the 17 inch receiver Service Data lists parts for early and late production units.

FUSE CHANGE—Early production receivers employed a 0.25 ampere fuse. This was later changed to a 0.20 ampere slow blow type. The latest production receivers have reverted to the regular type 0.25 ampere fuse, stock number 73600. If a fuse requires replacement, it is recommended that the regular type be employed.

LEAD DRESS IN KRK11—In several early production units, difficulty has been reported due to the shield of the cable from T1 shorting against C28. When working on one of these units, take care not to disturb the dress of this cable so as to make this short more likely to happen in service. It may also be a worthwhile precaution to wrap the shield of the cable with several turns of tape at the point where it passes C28. In late production units, this lead has been dressed so that a short cannot occur.

VERTICAL SYNC AND HOLD IN 17T153 SERIES—In a few cases it has been found that C172 has changed value with time and temperature requiring resetting the vertical hold control during initial warm-up and causing the control to be operated at the extreme clockwise position. If such a condition is encountered, replace C172 with another capacitor which will permit normal operation of the control.

Several cases have been reported from the field that R191 was connected to the cathode side of R266 instead of the junction of R265 and R266. This results in 70 to 80 volts on the cathode pin 6 of V113 instead of the normal 100 volts, causing unstable vertical sync.

KCS68 VERTICAL SYNC INSTABILITY DUE TO REFLECTIONS—In some cases, reflections may cause vertical sync to be unstable. The following changes to KCS68 chassis are suggested as a possible cure for this condition at a slight detrement of sync noise immunity on weak signals.

1. Change R185 to 1.0 meg, ±10%, ½ watt, Stock No. 503510.

2. Change R186 to 3.9 meg, ±10%, ½ watt, Stock No. 503539.

3. Change R189 to 22K, ±10%, ½ watt, Stock No. 503322.

4. Change C160 to .056 mfd, 400 volts, Stock No. 73791.

5. Add a 100 mmf capacitor, Stock No. 39628 from pin 4 of V113 to ground.

The above changes apply only to KCS68 and are not applicable to KCS66 series chassis.

SOCKET CONNECTIONS TO 1B3GT RECTIFIER (KCS66 SERIES)—In some KCS66 series chassis, the 1B3GT socket, terminal 5 has been used as a tie point. It has been found that some brands of tubes have an internal connection in the tube between pins 5 and 7. Such tubes will not operate in KCS66 series chassis which are wired as noted above.

When replacing the 1B3GT tube in the field, the serviceman may employ one of the three following methods to avoid difficulty.

1. Use a tube which does not employ a connection between pins 5 and 7. RCA tubes do not have this connection.

2. Rewire the 1B3GT tube socket so that terminal 4 is employed as the tie point instead of terminal 5.

3. If the tube has a connection between pins 5 and 7, clip pin 5 off of the tube base.

DEFLECTION TROUBLE SYMPTOMS IN 21-INCH RECEIVERS—Fold over or white bar in center of raster. This trouble may be caused by low screen voltage on the 6CD6 tube due to R253 or R235 being open.

Low brilliance, change in pix size and linearity, etc. This may be caused by a defective L106.

Poor interlace—To prevent coupling between the vertical and horizontal sweep circuits, thus causing poor interlace, dress the red lead from the yoke socket to the HV transformer under the lance on the side of the high voltage cage. To prevent parasitic oscillations in the horizontal sweep circuit, C185 should be connected from pin 2 of V116 to ground instead of from the nearby terminal board to ground.

17CP4, 21AP4 AND 17QP4 KINESCOPES—If certain kinescope "electron gun" parts become magnetized, "poor focus" may result. To demagnetize these tubes, connect a 630TS receiver EM focus coil to 110 volts a-c and pass the coil slowly over the kinescope neck, past the "gun" and slowly withdraw.

R-F TUNERS

The attached information lists the differences between the various types of KRK2, KRK5, KRK7 and KRK8 series r-f tuners. This information should be helpful in adapting one type of unit to another in event the correct type is not available.

KRK2 SERIES TUNERS

Receiver Model	R-F Unit	Detent Stock No.	Converter Transformer Tap	Conv. Trans. Cap.
621TS	KRK2	71463 (Short)	3rd or 4th Turn Down	62 mmf.
630TS	KRK2	71463 (Short)	4th Turn Down	68 mmf.
630TCS	KRK2	71463 (Short)	4th Turn Down	68 mmf.
641TV	KRK2	71463 (Short)	4th Turn Down	68 mmf.
648PTK	KRK2A	71463 (Short)	4th Turn Down	68 mmf.
648PV	KRK2A	71463 (Short)	4th Turn Down	68 mmf.
721TS	KRK2B-1	72743 (Long)	3rd Turn Down	62 mmf.
721TCS	KRK2B-1	72743 (Long)	3rd Turn Down	62 mmf.
730TV1 & 2	KRK2B-1	72743 (Long)	3rd Turn Down	62 mmf.
741PCS	KRK2A	71463 (Short)	4th Turn Down	68 mmf.
8TS30	KRK2	72743 (Long)	4th Turn Down	68 mmf.
8PCS41	KRK2A	71463 (Short)	4th Turn Down	68 mmf.
8TV41	KRK2	71463 (Short)	4th Turn Down	68 mmf.
9PC41	KRK2A	71463 (Short)	4th Turn Down	68 mmf.

NOTE #1—Converter transformers using 62 mmf. capacitors are aligned on the primary side to 22.8 mcs. and are recognized by a painted dot on top. All others are aligned to 21.8 mcs.

NOTE #2—There is no difference between the KRK2 and the KRK2A, except that "2A" unit is used in the projection receivers.

NOTE #3—Using the 621TS (KRK2) r-f unit in the 630TS or 8TS30 without the modification indicated may result in i-f oscillation. Using the 630TS (KRK2) r-f unit in the 621TS without modification indicated may result in insufficient sound.

NOTE #4—The KRK2 unit can be changed to a KRK2B-1 by changing the detent, tap on converter transformer, and converter shunt capacitor as listed above. All other parts are identical.

KRK5 AND KRK7 SERIES TUNERS

Receiver Model	R-F Unit	Front Plate	Chan. Sel. Shaft	Actuating Shaft	Shaft Length
8T241	KRK5	73436	73437	73439	Short
8TV321-3	KRK5	73436	73437	73439	Short
8T270	KRK5A	74166	74168	74167	Long
8TK320	KRK5A	74166	74168	74167	Long
8TR29, 8TK29	KRK5	73436	73437	73439	Short
9T240	KRK5	73436	73437	74439	Short
9TC240	KRK5A	74166	74168	74167	Long
9TC245-47-49	KRK5	73436	73437	73439	Short
9T246	KRK7	74572	74573	74574 / 74577	—
9T256	KRK7	74572	74573	74574 / 74577	—
9T270, 9TC272-5	KRK5A	74166	74168	74167	Long
9TW309	KRK5	73436	73437	73439	Short
9TW333	KRK5	73436	73437	73439	Short
9TW390	KRK5A	74166	74168	74167	Long
T100	KRK7	74572	74573	74574 / 74577	—
T120	KRK5	73436	73437	73439	Short
T121	KRK5	73436	73437	73439	Short
TC124-5-7	KRK5	73436	73437	73439	Short
TA128	KRK5	73436	73437	73439	Short
TA129	KRK5	73436	73437	73439	Short
T164, TC165-6-7-8	KRK5B	73436	73437	73439	Short
TA169	KRK5B	73436	73437	73439	Short
S1000	KRK5A	74166	74168	74167	Long
6T72	KRK5B	73436	73437	73439	Short

NOTE #1—KRK5 units may be converted to KRK5A by the replacement of the front plate, fine tuning shaft, and channel selector shaft. (Parts No. 73436, 73437 and 73439 are replaced by Parts No. 74166, 74167 and 74168.)

NOTE #2—KRK5, KRK5A and KRK5B* units may be converted to KRK7 by discarding the following parts:

Stock Number	Description
73465	Belt, fine tuning
73441	Cam, fine tuning
73634	Nut, speed nut
73436	Front Plate and Bushing
73464	Pulley, fine tuning
14343	Retainer for chan. sel. shaft
73437	Shaft, channel sel.
73438	Shaft, fine tuning
73439	Shaft, actuating
73454	Shield for belt
73456	Spring, belt tension
**74166	Front Plate and Bushing
**74167	Shaft, actuating
**74168	Shaft, channel selector

and replace with the following Parts:

Stock Number	Description
74572	Front Plate and Bushing
74573	Shaft—Channel Selector
74574	Shaft—Fine tuning and Cam Assembly
74577	Spring Washer

*The KRK5B unit is the same as the KRK5, except the inside front corner of the tuner shield is cut off diagonally.

**These parts used with KRK5A only.

KRK8 SERIES TUNERS

Receiver Model	R-F Unit	Chan. Sel. Shaft	Fine Tuning Shaft & Cam	Insulating Washer	Front Plate
2T51-60	KRK8	75159	75160	73466 (Round)	—
2T81	KRK8	75159	75160	73466 (Round)	—
4T101	KRK8C	76133	76134	73466 (Round)	76754
4T141	KRK8C	76133	76134	73466 (Round)	76754
6T53-54-64-65-71-74-75-76	KRK8B	75159	75160	75607 (Hex)	76135
6T84-86-87	KRK8B	75159	75160	76507 (Hex)	76135
7T103-103B-104-104B-111B-112-112B-122-122B-123-123B-124-125B-132	KTK8B	75159	75160	75607 (Hex)	76135
7T143	KRK8B	75159	75160	75607 (Hex)	76153
9T57-77-79	KTK8B	75159	75160	75607 (Hex)	76135
9T89	KRK8B	75159	75160	75607 (Hex)	76135
9T105-126-128	KRK8B	75159	75160	75607 (Hex)	76135
9T147	KRK8B	75159	75160	75607 (Hex)	76135
16T152	KRK8B	75159	75160	75607 (Hex)	76135

NOTE #1—Any KRK8 series r-f tuner can be changed from a KRK8 to a KRK8B or 8C, or vice-versa, by installing the proper parts as listed above for each unit. All other parts are identical.

NOTE #2—Front plate No. 76135 is for the KRK11 tuner, but can be used on the KRK8B tuner.

OSCILLATOR SWITCH WAFERS

Some switches have a wax treated wafer. Heat, due to soldering operations, melts the wax and loosens the switch terminal on which the inductances are mounted. Operation of the switch causes variations in inductance during switching operations. Tuning will vary, depending on the direction of approach of the channel selector switch. This is the result of compression and expansion of the coils mounted on the loose switch contacts. Therefore, when repairing r-f units, take care not to overheat the oscillator switch wafer. If the wafer is thus damaged, replacement of the wafer is the most practical solution.

R-F UNIT OSCILLATOR TRACKING

The frequency of the r-f unit oscillator is a function of the circuit inductance and capacity, and since the steps of inductance are fairly well fixed on Channels 7 to 12, inclusive, the only sizeable variables that are available are (1) the capacity and (2) Channel 13 inductance.

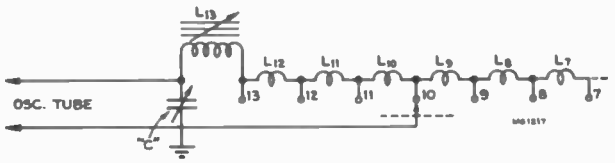


Figure 3—Simplified Schematic of R-F Oscillator.

On KRK2, "C" consists of stray capacity, fine tuning capacity and (in some units only a "gimmic", a piece of insulated wire about 1/4 inch long) between the plate pins on the tube socket.

On KRK5, KRK7 and new KRK8, "C" is composed of stray capacity and a real adjustable capacitor.

On KRK2, "C" becomes less with a counter-clockwise rotation of the fine tuning control.

On KRK5, KRK7 and KRK8, a clockwise rotation of the fine tuning control gives less capacity.

To properly track an r-f unit oscillator on the high channels, the following process may prove helpful:

1. Make sure that the adjustment screws for Channels 7 to 12, inclusive, are spaced about 1/32 of an inch (1½ turns from full in position) away from the rivets holding the inductance strap.
2. Tune for correct Channel 13 oscillator frequency by using the readily available adjustments for the purpose (a capacity trimmer on the KRK8 and an inductance slug on the KRK5.)
3. Without moving the fine tuning control, turn the detent to Channel 7 position and note the oscillator frequency.
4. If the noted frequency is higher than it should be, the Channel 13 capacity should be increased and the Channel 13 inductance should be decreased. Go back to Channel 13 and make the necessary changes to give both the correct frequency and an approximation of tracking correction. See Chart below.
5. If, on the other hand, the Channel 7 oscillator frequency is lower than it should be, the Channel 13 capacity should be decreased and the inductance increased. See Chart below.

KRK2

To Increase Channel 13 Capacity	To Decrease Channel 13 Capacity
1. Pick oscillator tube to give lower frequency.	1. Pick oscillator tube to give higher frequency.
2. Add a "gimmic" between oscillator tube socket plate pins or move the existing "gimmic" closer. (Use a production sample for reference—some units already have a "gimmic".)	2. Move "gimmic" away from plate pins.
3. Check cross feed capacitors for correctness of value.	3. Check cross feed capacitors for value.
To Increase Channel 13 Inductance	**To Decrease Channel 13 Inductance**
The Channel 13 slugs are brass and normally inserted through the coil. If the slug screws stick out about ⅜ of an inch, they are in their minimum inductance position and any tuning, either in or out, gives a change toward the maximum inductance position.	
1. Move Channel 13 slug in if the stud protrudes ⅜ of an inch, or less. Move out if they protrude more than ⅜ of an inch.	1. Move Channel 13 slug out if the stud protrudes ⅜ of an inch, or less. Move in if they protrude more than ⅜ of an inch.

KRK5 AND KRK7

To Increase Channel 13 Inductance	To Decrease Channel 13 Inductance
1. Screw brass slug out of L1 and L2.	1. Screw brass slug into L1 and L2.
These slugs are available from the bottom of the r-f unit chassis and are normally cemented lightly.	

KRK8

To Increase Channel 13 Inductance	To Decrease Channel 13 Inductance
1. Screw brass slug out of coil.	1. Screw brass slug into coil.
This slug is available from front of unit only.	

On the KRK5, KRK7 and KRK8, the Channel 13 capacity adjustment is fairly obvious. Screwing the stud out gives less capacity; in, gives more capacity.

After the proper adjustments have been made to give oscillator tracking within 1.0 mc. or so from 13 to 7, each channel can be individually aligned by using the available screw trimmers.

For field use in areas having two or more high channel stations, a slightly different approach may be taken:

1. If the highest high channel is aligned with the fine tuning centered and the lowest high channel calls for a clockwise rotation of the fine tuning control, Step 4 applies for KRK2 and Step 5 for all other units.
2. If the highest high channel is aligned with the fine tuning centered and the lowest high channel calls for a counter-clockwise rotation of the fine tuning, Step 5 applies for KRK2 and Step 4 for other units.

   Step 4 means an increase of Channel 13 capacity and a decrease of inductance.

   Step 5 means a decrease of Channel 13 capacity and an increase of inductance.

USE OF WR39A & WR39B TELEVISION CALIBRATORS

In some instances it may be difficult to hear the heterodyne beat between the variable oscillator and the crystal standard in subject instruments, particularly at the high frequencies.

If the audio system of the receiver under test is in good condition, it is suggested that an audio lead can be run from the head phone jack of the calibrator to the "high" side of the volume control of the television receiver, thus utilizing the additional audio amplification available in the television chassis.

CORRECTING PIX I-F RESPONSE OF RECEIVERS USING KRK5, KRK7 or KRK8 R-F UNITS

Curve "A" below illustrates a normal pix i-f response. Curves "B" and "C" below, illustrate results that are obtained in some cases due to abnormal conditions in the i-f system.

"Correcting" Curve "B", by using the adjusting slugs, usually results in placing the pix carrier minus .75 mc. point at the top of the curve which, again, is not the proper alignment. "Correcting" Curve "C", usually results in very much reduced gain and an excessive amount of adjacent channel response.

To correct Curve "B" with the minimum amount of bad effects, the turns of the second pix I-F trap (T-102) should be moved away from the primary of the same transformer. Moving the whole trap coil about two or three nicks up the coil form is usually sufficient.

To correct Curve "C", the following must be checked:

1. Make sure that the cathode sound trap is not shorting.
2. Check the sound I-F alignment.
3. Check sweep and scope response by removing "blanking" on the sweep and checking for response overlap. (A defective scope cable or input can cause overshoot on this side of the response curve.)
4. If none of the above results in a satisfactory curve, then the sound take-off trap coil (T-103) should be moved up and away from T-103 primary. One notch on the coil form is usually sufficient.

Figure 4—Overall Response Curves

TELEVISION RECEIVER MODELS AND CHASSIS

Receiver Models	Television Chassis	Radio Chassis	Record Changer	Kine-scope	R-F Tuner	Speaker Size	Television Power Supply	Audio Amplifier
TT5 (PRE WAR) TRK5 (PRE WAR)	KC-3 or KC-3B† KC-3A or KC-3C†	— RC429 & RS89A		5BP4 5BP4	5 channels 5 channels	None 12" EM		
TRK9 (PRE WAR) TRK90 (PRE WAR) TRK12 (PRE WAR) TRK120 (PRE WAR)	KC-4A or KC-4C† KC-4H KC-4 or KC-4B† KC-4F or KC-4J†	RC427A & RS83E RC427G & RS83E RC427 & RS83E RC427F & RS83E		9AP4 9AP4 12AP4 12AP4	5 channels 5 channels 5 channels 5 channels	12" EM 12" EM 12" EM 12" EM	KK-7A or KK-7E† KK-7H KK-7 or KK-7D† KK-7F or KK-7J†	
621TS	KCS21			7DP4	KRK2	4"x6" EM		
630TS	KCS20A or KCS20C-2†			10BP4	KRK2	5" EM		
630TCS	KCS20B or KCS20D-2†			10BP4	KRK2	12" EM		
641TV	KCS25A-1 or KCS25C-2†	RK117A	960001 (78 RPM)	10BP4	KRK2	12" EM		RS123A
648PTK	KCS24-1* KRS20-1** KRK1-1***	RK121A		5TP4	KRK2A	12" EM	KRS21	RS123A
648PV	KCS24A-1* KRS20-1** KRK1A***	RK121A	RP176 (78 RPM)	5TP4	KRK2A	12" EM	KRS21A-1	RS123B
721TS	KCS26-1 or KCS26-2†			10BP4	KRK2B-1	4"x6" EM		
721TCS	KCS26A-1 or KCS26A-2†			10BP4	KRK2B-1	12" EM		
730TV1 730TV2	KCS27-1 or KCS27-2†	RC610A RC610B	RP177 RP177	10BP4 10BP4	KRK2B-1 KRK2B-1	12" PM 12" PM		
741PCS	KCS24B-1* KRS20A-1** KRK1A-1***			5TP4	KRK2A	12" EM	KRS21A-1	RS123C
8PCS41	KCS24B-1* KRS20A-1** KRK1A-1***			5TP4	KRK2A	12" EM	KRS21A-1	RS123C
8PCS41B	KCS24C-1* KRS20B-1** KRK4***			5TP4	KRK2A	12" EM	KRS21A-1	RS123C
8PCS41C	KCS24C-1* KRS20A-1** KRK1A-1***			5TP4	KRK2A	12" EM	KRS21A-1	RS123C
8TS30	KCS20J-1 or KCS20K-2†			10BP4	KRK2	5"x7" PM		
8TV41	KCS25D-1 or KCS25E-2†	RK117A	RP177A (78 RPM)	10BP4	KRK2	12" EM		RS123A
8T241, 8T243, 8T244	KCS28			10BP4	KRK5	5"x7" PM		
8T270 8TC270, 8TC271	KCS29 KCS29A			16AP4 16AP4	KRK5A KRK5A	8" PM 8" PM		
8TR29 8TK29	KCS32 or 32B KCS32A or 32C	RK135 or 135A RK135 or 135A		10BP4 10BP4	KRK5 KRK5	5"x7" PM 12" PM		
8TK320	KCS33A-1	RK135A-1		16AP4	KRK5A	12" PM		
8TV321 8TV323	KCS30-1 KCS30-1	RC616C or K RC616B or J	RP178 RP178	10BP4 10BP4	KRK5 KRK5	12" PM 12" PM		
9PC41(a)	KCS24C-1* KRS20B-1** KRK4***			5TP4	KRK2A	12" EM	KRS21A-1	RS123A
9PC41(b), 9PC41(c)	KCS24D* KRS20B-1** KRK4***			5TP4	KRK2A	12" EM	KRS21A-1	RS123A
9T240 9T240K 9TC240	KCS28 KCS28A KCS28B			10BP4 10BP4 10BP4	KRK5 KRK5 KRK5A	5"x7" PM 5"x7" PM 12" PM		
9TC245, 9TC247, 9TC249	KCS34B or KCS34 in some 247 & 249			12LP4	KRK5	12" PM		
9T246	KCS28C or KCS38			10BP4 10BP4	KRK7 KRK7	5"x7" PM 5"x7" EM		
9T256	KCS38C			10BP4	KRK7	5"x7" EM		
9T270 9TC272, 9TC275	KCS29 KCS29C			16AP4 16AP4	KRK5A KRK5A	8" PM 12" PM		
9TW309	KCS41-1	RK135C	RP178 (78 RPM) RP168A-1(45RPM)	12LP4	KRK5	12" PM		

TELEVISION RECEIVER MODELS AND CHASSIS

Receiver Models	Television Chassis	Radio Chassis	Record Changer	Kine-scope	R-F Tuner	Speaker Size	Television Power Supply	Audio Amplifier
9TW333	KCS30-1	RC616N	RP178 (78 RPM) RP168A-1(45RPM)	10BP4	KRK5	12" PM		
9TW390	KCS31-1	RC617A	RP177B (78 RPM) RP168A-1(45RPM)	16AP4	KRK5A	12" PM		
T100	KCS38			10BP4	KRK7	5"x7" EM		
T120, T121	KCS34C			12LP4	KRK5	5"x7" PM		
TC124, TC125, TC127	KCS34B			12LP4	KRK5	12" PM		
TA128	KCS42A	RK135D	960282 (33 78) RP168 (45 RPM)	12LP4	KRK5	12" PM		
TA129	KCS41A-1	RK135D	960282 (33, 78) RP168C (45 RPM)	12LP4	KRK5	12" PM		
T164 TC165, 166, 167, 168	KCS40 KCS40A			16GP4 16GP4	KRK5B KRK5B	8" PM 12" PM		
TA169	KCS43	RK135D	960285 (33 /78) RP168C (45 RPM)	16GP4	KRK5B	12" PM		
S1000	KCS31-1	RC617B	960285 (33 /78) RP168C (45 RPM)	16AP4	KRK5A	12" PM		
2T51 2T60	KCS45 KCS45A			12LP4 12LP4	KRK8 KRK8	5"x7" EM 12" PM		
2T81	KCS46	RC1090	960282 (33/78) RP168 (45 RPM)	12LP4	KRK8	12" PM		
4T101	KCS61			14EP4	KRK8C	5"x7" PM		
4T141	KCS62	RC1090	960282 (33/78) RP190-2 (45 RPM)	14EP4	KRK8C	12" PM		
6T72	KCS40B			16GP4	KRK5B	12" PM		
6T53, 6T54 6T64, 65, 71, 74, 75, 76	KCS47 or 47T KCS47A or 47AT			16GP4 16GP4	KRK8B KRK8B	8" PM 12" PM		
6T84 6T86, 6T87	KCS48 or 48T KCS48 or 48T	RC1090 RC1092	960282 or 284 RP168 or 190 960282 or 284 RP168 or 190	16GP4 16GP4	KRK8B KRK8B	12" PM 12" PM		
7T103, 7T104 7T103B, 7T104B 7T112, 122, 123, 124 7T112B, 122B, 123B, 125B 7T112B, 122B, 123B 7T111B 7T132	KCS47B KCS47F KCS47C KCS47G or GF KCS47GF-2 KCS47GF-2 KCS47D		 RP190	17CP4 17GP4 17GP4 17GP4 17GP4 17GP4 17CP4	KRK8B KRK8B KRK8B KRK8B KRK8B KRK8B KRK8B	8" PM 8" PM 12 ' PM 12" PM 12" PM 8" PM 12" PM		
7T143	KCS48A	RC1092	960284 (33 78) RP190 (45 RPM)	17CP4	KRK8B	12" PM		
9T57 9T77, 9T79	KCS49 or 49T KCS49A or 49AT			19AP4A 19AP4A	KRK8B KRK8B	8" PM 12" PM		
9T89	KCS60 or 60T	RC1092	960284 (33 78) RP168 or 190	19AP4A	KRK8B	12" PM		
9T105 9T126, 9T128	KCS49B, 49BF or 49BF-2 KCS49C, 49CF or 49CF-2			19AP4A 19AP4A	KRK8B KRK8B	8" PM 12" PM		
9T147	KCS60A	RC1092	960284 (33 78) RP190 (45 RPM)	19AP4A	KRK8B	12 ' PM		
16T152	KCS47E			16GP4	KRK8B	8" PM		
17T153, 154, 155, 160 17T162, 17T174 17T172, 17T173 17T172K, 17T173K 17T174K	KCS66 KCS66A KCS66A KCS66D KCS66D			17GP4 17GP4 17GP4 17CP4 17CP4	KRK11 KRK11 KRK11 KRK11 KRK11	8" PM 8" PM 12" PM 12" PM 8" PM		
21T159 21T165 21T176, 177, 178, 179	KCS68E KCS68E KCS68C			21AP4 21AP4 21AP4	KRK11 KRK11 KRK11	8" PM 12" PM 12" PM		

†50 Cycle Chassis *R-F, I-F, Video Chassis **Deflection & HV Chassis ***Optical Barrel

RCA CRYSTAL PICKUP DATA

CRYSTAL CARTRIDGE DRAWING CODE

"A" Top Needle Hole
"B" Viscoloid Damper
"C" Thick (5/16-in.) Mtg. Hole
"D" Thin (7/32-in.) Mtg. Hole
"E" Grounded Lug
"F" Small Weight
"G" Large Weight
"H" Large "Cut" Weight
"J" 5/8-in. Needle Screw
"K" 11/16-in. Needle Screw
"L" 13/16-in. Needle Screw
"M" 15/16-in. Needle Screw

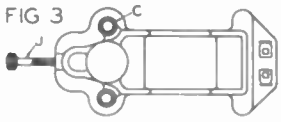
FIG. 1

MS 1151 A

FIG 2

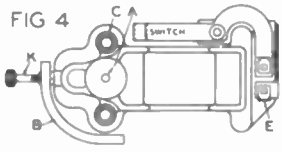
MS 1151 B

FIG 3



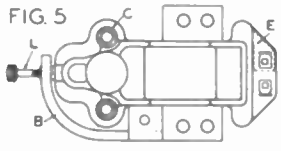
MS 1151 C

FIG 4



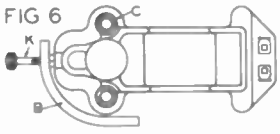
MS 1151 D

FIG. 5



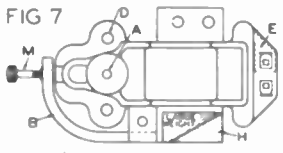
MS 1151 E

FIG 6



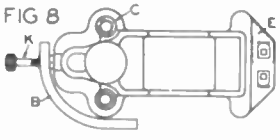
MS 1151 F

FIG 7



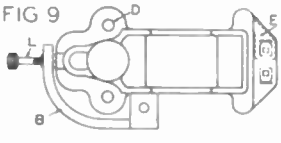
MS 1151 G

FIG 8



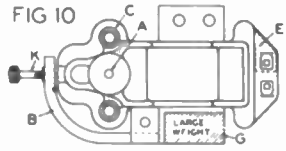
MS 1151 H

FIG 9



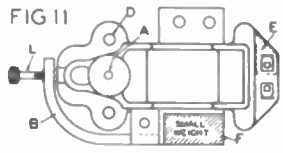
MS 1151 I

FIG 10



MS 1151 J

FIG 11



MS 1151 K

FIG. 12

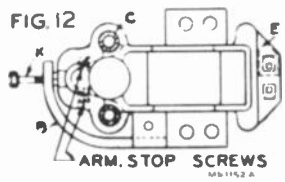


FIG. 13

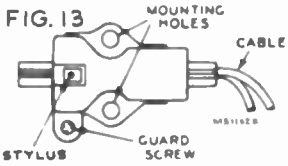


FIG. 14

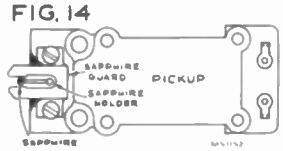


FIG. 15

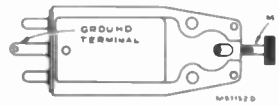


FIG. 16

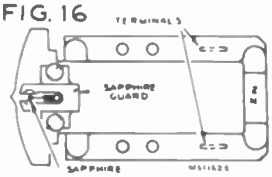


FIG. 17

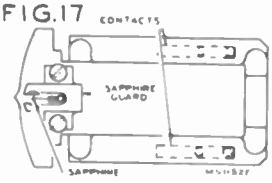


FIG. 18

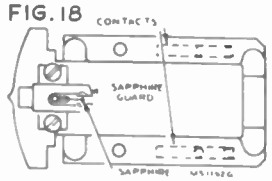


FIG. 19

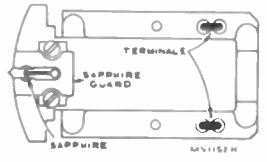


FIG. 20

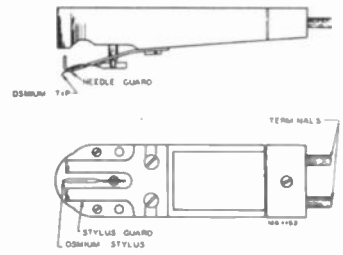


FIG. 21

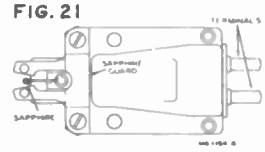


FIG. 22

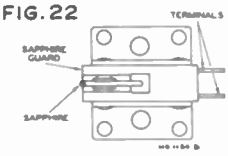


FIG. 23

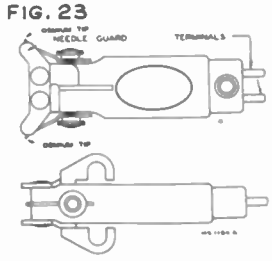


FIG. 24

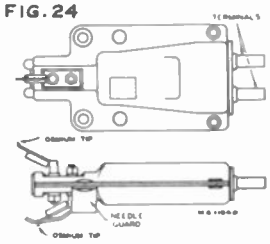


FIG. 25

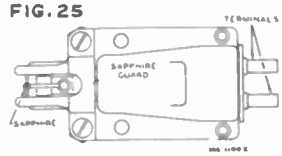


FIG. 26

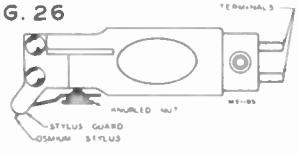


FIG. 27

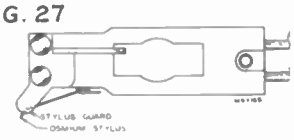


FIG. 28

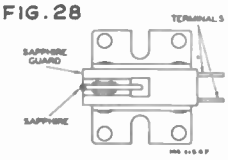


FIG. 29

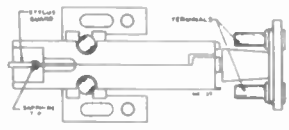
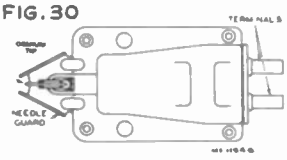


FIG. 30



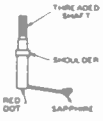


Fig. 101

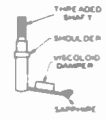


Fig. 102

Fig. 103

Fig. 104

Fig. 105

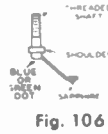


Fig. 106

Fig. 107

Fig.108

Fig. 109

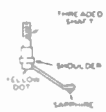


Fig. 110

Fig. 111

Fig. 112

MODEL vs. PICKUP CARTRIDGE

Model	Record Changer	Cartridge Stock No.
A-55	RP-168	* 74625
	960282-1	† 75044
A-78	RP-168	* 74625
	960282-1	† 75044
A-82	RP-168	* 74625
	RP-190-2	* 75575
	960282-4 or -5	† 75475
A-91	RP-168	* 74625
	RP-190-2	* 75575
	960284-1 or -2	† 75475
A-101	RP-190-2	* 75575
	960282-4 or -5 or 960284-1 or -2	† 75475
A-106	RP-168	* 74625
	960285-1	† 75044
A-108	RP-168	* 74625
	RP-190-2	* 75575
	960284-1 or -2	† 75475
O-50		33217
QEY-3	RP-168	74984
QEY-4	RP-190-5	76297
QEY-5	RP-190-5	76297
QJY	RP-168	74984
QJY-2	RP-190-5	76297
QU-2C		33905
QU-3C		33905
QU-5C	RP-145E	33905
QU-51C	RP-145E	35171
QU-52C	RP-152S	35171
QU-56C		33122
QU-61	960001-4	39851
QU-62	960001-4	39851
QU-68	960001-4	39851
QU-72		39851
QU-72A		39851
R-56		39686
R-60		33122
R-89		31050
R-91		31050
R-93B		31050
R-93C		31050
R-93F		33122
R-94B		31050
R-98		31156
R-100		33122
R-103S		33122
R-560P		33122
R-566P	RP-162	38610
S-1000	RP-168	* 74625
	960285-1	† 75044
TA-128	RP-168	* 74625
	960282-1	† 75044
TA-129	RP-168	* 74625
	960282-1	† 75044
TA-169	RP-168	* 74625
	960285-1	† 75044
U-8		33122
U-9		33122
U-10		33122
U-12		33905
U-20		33905
U-25	RP-132M	31156
U-26	RP-132M	31156
U-30	RP-132M	31156
U-40	RP-139A	35171
U-42	RP-145	35171
U-43	RP-145	35171
U-44	RP-145	35171
U-45	RP-139A	35171
U-46	RP-140	33905
U-50		33217
U-104		31050
U-106	RP-129B (9820)	14820
U-107	RP-129A (9820)	14820
U-108	RP-129 (9820)	14820
U-109	RP-129 (9820)	14820
U-111		31050
U-112		31050
U-115		31050
U-119		31156
U-121		31050
U-122E		31156
UY-122E		31156
U-123	RP-139B	31156
U-124		31156
UY-124		31156
U-125	RP-132C	31156
U-126		31156
U-127E		31050
U-128	RP-132	31156
U-129	RP-132F	31156
U-130	RP-132C	31156
U-132	RP-132B	32632
U-134	RP-132B	32632
V-100		33122
V-101		33122
V-102		33905
V-105		33122
V-135	RP-162	38610
V-140	RP-162	38610
V-170	RP-152	35171
V-175	RP-158	38610
V-200	RP-152A	35171
V-201	RP-152A	35171
V-205	RP-152B	37158
V-209	RP-158	38610
V-210	RP-158	38610
V-215	RP-160	38453, 39550
V-219	RP-160	38453, 39550
V-221	RP-160	38453, 39550
V-225	RP-151 Top	38453
	RP-151 Bott.	38598
V-300	RP-152J	37158
V-301	RP-153	33905
V-302	RP-153	33905
V-405	RP-152J	37158
VA-15	RP-152	35171
VA-20		31050
VA-21		33122
VA-22	RP-139D	31156
VA-22A	RP-145C	33905
VA-24	RP-145C	33905
VHR-202	RP-155	37158
VHR-207	RP-155	37158
VHR-212	RP-161	38610
VHR-307	RP-155	37158
VHR-407	RP-155	37158
2-S7-ED		73839
2-T-81	RP-168	* 74625
	RP-190-2	* 75575
	960282-4 or-5	† 75475
4-QV-8C	RP-168	* S-5578
	960282-2	† S-5652
4-T-141	RP-190-2	* 75575
	960282-4 or-5	† 75475
6-J		70338
6-JM		70338
6-QU		33122
6-QU-3	RP-178-3	72551
6-QU-3Y	RP-168	74984
6-QV-3	RP-178-3	72551
6-T-84	RP-168	* 74625
	RP-190-2	* 75575
	960282-4 or-5	† 75475
6-T-86	RP-168	* 74625
	RP-190-2	* 75575
	960284-1 or-2	† 75475
6-T-87	RP-168	* 74625
	RP-190-2	* 75575
	960284-1 or-2	† 75475
7-QV-5	960001-4	39851
7-T-132	RP-190-2	75575
7-T-143	RP-190-2	* 75575
	960284-1 or-2	† 75475
8-QU-5C		34307
8-TV-41	RP-177A	72551
8-TV-321	RP-178	72551
8-TV-323	RP-178	72551
8-V-7	RP-178	72551
8-V-90	RP-178	72551
8-V-91	RP-178	72551
8-V-112	RP-178	72551
8-V-151	RP-177B	70339
9-EY-3	RP-168	74067
9-EYM-3	RP-168	74067
9-EY-31	RP-168	74625
9-EY-32	RP-168	74625
9-EY-35	RP-168	74067
9-EY-36	RP-168	74067
9-JY	RP-168	74067
9-JYM	RP-168	74067
9-QV-5	RP-168	* S-5578
	960282-2	† S-5652
9-T-89	RP-168	* 74625
	RP-190-2	* 75575
	960284-1 or-2	† 75475
9-T-147	RP-190-2	* 75575
	960284-1 or-2	† 75475
9-TW-309	RP-168	* 74625
	RP-178	‡ 72551
9-TW-333	RP-168	* 74067
	RP-177	‡ 72551
9-TW-390	RP-168	* 74067
	RP-177	‡ 72551
9-W-51	RP-168	74625
9-W-78	RP-168	* 74625
	RP-178	‡ 72551
9-W-101	RP-168	74067
9-W-102	RP-168	74067
9-W-103	RP-168	74067
9-W-105	RP-168	* 74067
	RP-178	‡ 72551
9-W-106	RP-168	* 74625
	RP-178	‡ 72551
9-Y-7	RP-168	74067
9-Y-51	RP-168	74625
9-Y-510	RP-190-1 or-4	75476, 76318
9-Y-511	RP-168	74625
11-QU	RP-132A	31156
12-QU	RP-132A	31156
45-EY	RP-168	74067, 74625
45-EY-1	RP-168	74067
45-EY-2	RP-190-1 or-4	75476, 76318
45-EY-3	RP-190-1 or-3	75476, 76318
45-EY-15	RP-168	74067
45-J	RP-168	74067
45-J-2	RP-190-1 or-4	75476, 76318
45-J-2	RP-190-6	74067
45-J-3	RP-193	76257
45-W-9	RP-190-2	75575
45-W-10	RP-190-2	75575
55-U, 55-AU	960015	71173, 70338
58-V, 58-AV	960001-1	39851
59-V-1	960001-2	70332
59-AV-1	960001-2	70332
62-1	960260-2	70338
63-E		70338
63-EM		70338
65-U	960260-2	70338
65-AU	960260-2	70338
65-AU-1	960260-2	70338
66-E		70332
66-ED		70332
66-E-1		70332
67-V-1	960260-1	70338
67-AV-1	960260-1	70338
75-ZU	RP-178 or 960276	72551, 70338
77-V	RP-178	72551
77-V-1	960260-1	70338
77-V-2	960260-1	70338
610-V-1	960001-5or-6 or RP-177	39851, 72551
610-V-2	960001-5 or-6 or RP-177	39851, 72551
612-V-1	RP-176A or RP-176B	70339
612-V-3	RP-176 or RP-176B	70339
612-V-4	RP-176 or RP-176B	70339
641-TV	960001-1 or-6	39851
648-PV	RP-176	70339
710-V-2	RP-177 or RP-177A	72551
711-V-1	960001-5	39851
711-V-2	960001-5	39851
711-V-3	960001-5	39851
730-TV-1	RP-177 or RP-177A	72551
730-TV-2	RP-177 or RP-177A	72551

*=45 r.p.m.
†=78/33 r.p.m.
‡=78 r.p.m.

PICKUP CARTRIDGES WITH NEEDLE SCREW

Stock No.	Fig. No.
14820	1
30708▲	2
31050	3
31156	4
32632▲	4
33122▲	5
33217▲	6
33905▲	7
34225	8
34307	9
34710	10
35171▲	7
37158	11
39686▲	12
71173	15

▲Discontinued:
30708→use 14820
32632→use 31156
33122→use 9890
33217→use 9890
33905→use 37158
35171→use 37158
39686→use 9890

PICKUPS WITH REPLACEABLE STYLUS

Pickup Stock No.	Pickup Fig. No.	Stylus Stock No.	Stylus Fig. No.
9890	16-ZN	39863▲	101
38453▲	17-AL	38449▲	102
38598	18	38449▲	
38610	13	39564	103
39851▲	19-ZN	39863▲	101
39550	17-ZN	38449▲	102
39919	17-AL	38449▲	102
70332▲	19-AL	38449▲	102
70338	14-AL	72345	101
70339	14-AL	70915	102
72551	14-ZN	72345	101
73839	20	73840	104
74067	21	74068	105
74625	21	74818	106
74984■▲	22	74985	107
75044	23	75045①	108
		75046②	108
75475	24	75496①	109
		75497②	109
75575	25	75770	110
75976	16-ZN	39863▲	101
76257	26	76374③	111
	27	76323④	112
76297■	28	74985	107
76318▲	21	75496	109
S-5652■	23	75045③	108
		75046④	108

PICKUPS WITH FIXED STYLUS

Stock No.	Fig. No.
S-5578■	29
75476▲	30

ZN=Zinc case.
AL=Aluminum case
■Ceramic type pickup
▲Discontinued:
38449→use 70915
38453→use 39919
39851→use 75976
39863→use 73345
70332→use 75976
74984→use 76297
75476→use 74067
76318→use 74067
①33⅓ r.p.m.—RED
②78 r.p.m.—PLAIN
③For pickups marked 988370-1
④For pickups marked 988370-2
S-5652 and S-5578 are available only thru RCA International Div.

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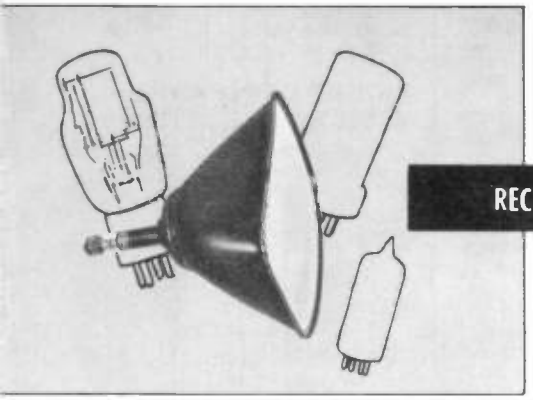

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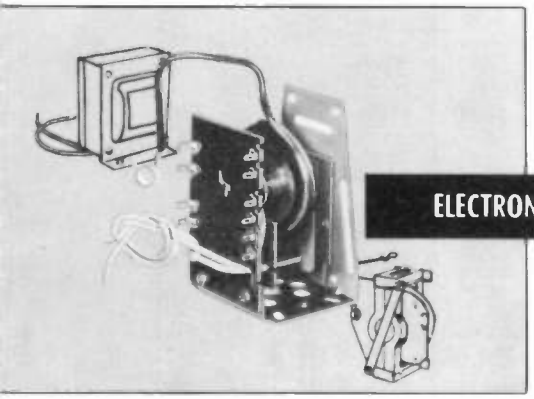

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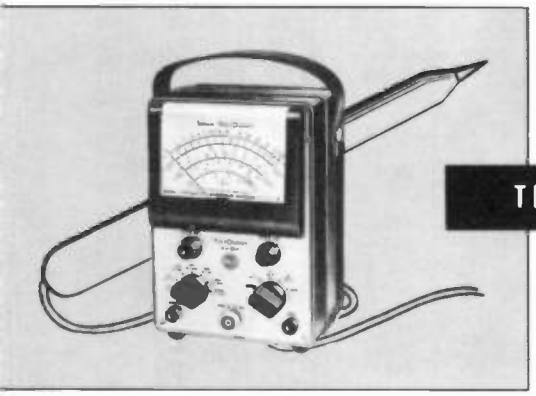

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INDEX TO CHASSIS NO'S

Identification numbers beginning with R (RC, RS, etc.) are used with all radios and some television receivers.
Identification numbers beginning with K (KCS, KRS, etc.) are used exclusively with television.

RADIO CHASSIS

Chassis No.	*Model*
RK-117	711V1, 711V2, 711V3, R-F/I-F Chassis
RK-117A	641TV, 8TV41 Radio R-F/I-F Chassis
RK-121	612-V1, 612V3, 612V4, R-F/I-F Chassis
RK-121A	648 PTK, 648PV Radio R-F/I-F Chassis
RK-121C	8V151, R-F/I-F Chassis
RK-135	8TR29, 8TK29 Radio Section
RK-135A	8TR29, 8TK29, 8TK320 Radio Section
RK-135C	9TW309 Radio Section
RK-135D	TA128, TA129, TA169 Radio Section
RC-315B	86T6
RC-315C	5Q1
RC-318	8M
RC-319	87K2, 87T2
RC-319B	U-106
RC-320	8M1
RC-320A	8M2
RC-321	8M3
RC-321A	8M4
RC-323	95T, 95T1
RC-325C	5Q2
RC-325D	5Q2X
RC-331	HF-8, HF-8A
RC-331A	HF-6
RC-331B	U-134, U-134A
RC-331C	U-132
RC-332	94X
RC-333	94BK, 94BT
RC-333A	94BT6
RC-333B	94BT1, 94BK1
RC-333C	94BT61
RC-335	911K
RC-335A	98K
RC-335B	99K
RC-335C	11Q4, 11QK
RC-335D	U-126, U-128
RC-335E	11QU
RC-335F	910KG
RC-335H	99T
RC-335K	U-129
RC-335KR	U-30
RC-336	8QB, 8QBK Tuner Unit
RC-337	8Q1 Tuner Unit
RC-337A	8Q4 Tuner Unit
RC-337B	10Q1 Tuner Unit
RC-338	12Q4, 12QK Tuner Unit
RC-338A	12QU Tuner Unit
RC-339	HF-1
RC-340	94X-1, 94X-2
RC-341	U-111
RC-341C	U-112
RC-345C	95X-1
RC-345D	95X
RC-345E	95XL
RC-345F	95XLW
RC-345H	U-104
RC-348	95T5
RC-348A	96T
RC-348C	96E
RC-348D	96T1
RC-348E	U-115
RC-348F	95T5LW
RC-348H	U-123 (1 band)
RC-348J	U-121
RC-348L	U-127E
RC-349	97X
RC-350	9X to 9X-4
RC-350A	9X6, 9X-11 to 9X-14
RC-351	96K, 96T2
RC-351A	97E, 97KG, 97T
RC-351B	96K2, 96T3
RC-351C	U-124
RC-351D	U-122E
RC-351E	U-119
RC-351F	97K
RC-351K	97K2, 97T2
RC-351L	96E2, 96K5, 96K6, 96T7
RC-352	98EY, 98X, 98YG
RC-352A	97Y
RC-352B	UY-122E
RC-352C	UY-124
RC-352D	98T2
RC-354	U-130
RC-354A	HF-4
RC-354B	HF-2
RC-357	9M1
RC-357A	9M2
RC-357J	M-50
RC-357K	M-60
RC-366	5Q4
RC-381	95X-11
RC-381A	95X-6
RC-386	U-125
RC-386A	98K2, 98T
RC-386B	U-25, U-26
RC-390	94BK2, 94BT2
RC-392	96BK6, 96BT6 Tuner Unit
RC-394	M-70 Tuner Unit
RC-396	5Q5, 5Q55, 5Q56
RC-396B	5Q8
RC-396D	5Q12
RC-396E	5Q12A
RC-399	96T4, 96T5
RC-399A	96T6
RC-400	96X-1 to 96X-4
RC-400A	96X-11 to 96X-14
RC-401	9TX-1 to 9TX-5
RC-403	9TX-21, 9TX-22
RC-403A	9TX-23
RC-404A	U-8
RC-405	9TX-31
RC-405A	9TX-32
RC-405B	9TX-33
RC-405C	40X-30
RC-405D	40X-31
RC-406	5X5-W
RC-406A	5X5-1
RC-407	94BP-1 Series (94BP-61, -62, -64, -66, -80, -81)
RC-407B	94BP-1 (2nd Prod.) (94BP-61, -62, -64, -66)
RC-408	BT-40
RC-408A	BT-42
RC-408C	BK-42
RC-410	94BP4, -B, -C, -R
RC-414	6QU
RC-414A	6Q7
RC-414B	6Q8, 6QK8
RC-414C	U-50
RC-415	K-60
RC-415A	K-80
RC-415B	K-60 (Loop), K-62
RC-415C	K-80 (Loop), K-81, K-82
RC-415D	K-80 (Loop)
RC-416	T-64, T-65
RC-416A	T-80
RC-418	T-55, T-55-S, T-56
RC-418A	K-50
RC-418B	U-10
RC-421	U-123 (2 bands)
RC-425	T-60
RC-425A	U-12
RC-425D	T-62
RC-427	TRK-12 Radio Tuner Unit
RC-427A	TRK-9 Radio Tuner Unit
RC-427F	TRK-120 Radio Tuner Unit
RC-427G	TRK-90 Radio Tuner Unit
RC-429	TRK-5 Radio Tuner Unit
RC-435	9TX-50, 9TX-50M
RC-435A	45E, 45E-M, 45E-W
RC-436	40X-50 to 40X-57
RC-440	4QB
RC-440A	4QB4
RC-441	6Q1
RC-441A	6Q4
RC-442	6Q4X
RC-443	8Q2
RC-443B	8QU5-C, 8QU5-M
RC-444	9Q1
RC-444A	9QK
RC-449	BK-41, BT-41
RC-453	40X-52, 40X-55 (2nd Prod.)
RC-454	9TX-50, 9TX-50M (2nd Prod.)
RC-455	BP-55, -56, -85
RC-456	46X-11, 46X-12
RC-456A	46X-13
RC-457	45X-1, 45X-2
RC-457A	45X-1, 45X-2 (2nd Prod.)
RC-457D	45X-5, 45X-6
RC-457E	45X-3, 45X-4
RC-459	45X-11, 45X-12
RC-459A	45X-13
RC-459B	46X-1, 46X-2
RC-459C	46X-3
RC-459D	45X-11, 45X-12 (2nd Prod.)
RC-459E	45X-13 (2nd Prod.)
RC-459F	46X-1, 46X-2 (2nd Prod.)
RC-459H	46X-3 (2nd Prod.)
RC-459J	45X-111, 45X-112, Radiola 510
RC-459K	45X-113
RC-459L	45X
RC-459M	45X-16, 45X-17
RC-459T	45X-11, 45X-12 (3rd Prod.)
RC-461	46X-24
RC-461A	46X-23
RC-461B	46X-21
RC-462	15X
RC-462A	16X-1, 16X-2, 36X
RC-462B	16X-3
RC-462C	16X-4
RC-464	Radiola 500, 501
RC-464A	Radiola 511
RC-464B	Radiola 512, 513
RC-465	Radiola P-5
RC-465A	Radiola P-5
RC-472F	T-63
RC-473A	X-55
RC-474D	X-60
RC-476	K-105
RC-477	5Q5 (2nd Prod.), Q18
RC-477A	5Q6
RC-477B	5Q8 (2nd Prod.)
RC-477C	5Q66
RC-478	9Q4
RC-478A	7Q4
RC-478B	7QK4
RC-482B	U-9
RC-482C	U-9 (2nd Prod.)
RC-486B	U-44 Tuner Unit
RC-486C	U-45 Tuner Unit
RC-490	96X-5
RC-496	7QB, 7QBK Tuner Unit
RC-497	K-50 (2nd Prod.)
RC-498	U-20

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RC-498B	U-42 Tuner Unit
RC-498E	U-43
RC-498F	K-61
RC-501	U-46 Tuner Unit
RC-501A	K-130 Tuner Unit
RC-502	7Q4X
RC-507	Q22, Q22A, Q32, Q121 (EM)
RC-507A	Q25
RC-507B	QK23
RC-507C	QU2C
RC-507D	QU2M
RC-507F	QU3C
RC-507H	QU3M
RC-507J	Q26
RC-507K	Q27
RC-507L	QU52C
RC-507N	QU52M
RC-507U	Q121 (PM)
RC-508	Q24
RC-509	16T4
RC-509A	16T3
RC-509B	16T2
RC-509C	16K
RC-509F	16T4 (2nd Prod.)
RC-509H	16T3 (2nd Prod.)
RC-509J	16T2 (2nd Prod.)
RC-511	18T
RC-512	17K
RC-512A	19K
RC-513	110K, 110K2
RC-513A	111K
RC-514	Q20, Q21
RC-517	V-100
RC-517C	V-105
RC-517F	Radiola R-560P
RC-517H	V-135
RC-517J	Radiola R-566P
RC-518	V-300 Tuner Unit
RC-518A	V-301, V-302 Tuner Unit
RC-519	V-200
RC-521	V-205
RC-521B	V-405
RC-522	V-201
RC-523	V-170
RC-524	V-102
RC-525	14BT-1
RC-525A	14BT-2
RC-525B	14BK
RC-526	15BT
RC-527	15BP-1, -2, -4, -6
RC-527A	15BP-3, -5
RC-527C	15BP-7
RC-527D	25BP
RC-529	QB2
RC-529A	QB1, QB11, QB12 Tuner Unit
RC-529D	QB6
RC-529H	QB9 Tuner Unit
RC-530	QU5 Tuner Unit
RC-531	Q44
RC-538B	Q30
RC-538C	Q31
RC-539	Q33
RC-539D	QB-3
RC-539E	Q34
RC-540	V-101
RC-541C	45X18
RC-544	BP-10
RC-547	VHR-207
RC-547A	VHR-407
RC-548	VHR-202
RC-551	QU7, QU8 Tuner Unit
RC-555	VHR-307 Tuner Unit
RC-559	26BP
RC-561	Q-16
RC-561A	Q-17
RC-561C	Q-16E
RC-563A	QB5, QB55
RC-563B	Q12
RC-563C	Q12
RC-563D	Q12
RC-563E	Q11
RC-563F	Q11
RC-563K	QB55X
RC-564	V-215, V-221
RC-564A	V-219
RC-564B	V-225
RC-566	Q14, Q15
RC-566A	QU56C, QU56M
RC-566B	Q14E, Q15E
RC-567	27K
RC-568	QU51C, QU51M
RC-568A	QU55
RC-568B	QU61
RC-569	28T
RC-570	29K
RC-570C	29K2
RC-570D	29K2 (2nd Prod.)
RC-571	211K
RC-572A	V-140
RC-573	V-209
RC-573A	V-210
RC-574	VHR-212
RC-582	V175
RC-585	Q36
RC-589	54B1
RC-589A	54B2
RC-589B	54B3
RC-589D	54B1-N
RC-589U	54B1 2nd Prod.
RC-589UA	54B2 2nd Prod.
RC-589UB	54B3 2nd Prod.
RC-589UE	54B6
RC-592	Q23
RC-594C	Q10, Q10A, Q10-2, Q10A-2, Q10-3, Q110
RC-594D	Radiola 61-6, 61-7
RC-601	Q122 (EM)
RC-601A	Q122X (EM)
RC-601B	7QV5, QU68
RC-601D	Q122 (PM)
RC-601E	Q122X (PM)
RC-602	Q109
RC-602A	Q109X
RC-602B	QU62
RC-604	58V, 58AV
RC-605	59V1, 59AV1
RC-606	67V1, 67AV1
RC-606C	67V1, 67AV1 2nd Prod., 77V2
RC-607	QB60
RC-608	68R1, 68R2, 68R3, 68R4
RC-610	610V1, 610V2
RC-610A	730TV1 Radio Section
RC-610B	730TV2 Radio Section
RC-610C	610V1. 610V2 2nd Prod.
RC-612	QB-13 Tuner Unit
RC-613A	710V2
RC-614	9Q53
RC-614C	9QV5 R-F/I-F Chassis
RC-614D	9QV5 R-F/I-F Chassis
RC-615	77V1, 8V7
RC-616	8V112
RC-616A	8V91
RC-616B	8TV321 Radio Section
RC-616C	8TV323 Radio Section
RC-616F	8V112 2nd Prod.
RC-616H	8V91 2nd Prod.
RC-616J	8TV321 2nd Prod. Radio Section
RC-616K	8TV323 2nd Prod. Radio Section
RC-616N	9TW333 Radio Section
RC-617A	9TW390 Radio Chassis
RC-618	8V90
RC-618A	8V90 2nd Prod.
RC-618B	9W101, 9W103
RC-618C	9W105
RC-618D	9W102
RC-620A	4QV8C R-F/I-F Chassis
RC-620B	Q641 (50/60 cy.)
RC-620C	Q641 (25 cy.)
RC-620D	4QV8C R-F/I-F Chassis
RC-622	9W106, A106
RC-1000	16X11
RC-1000A	16X13
RC-1000B	16X14
RC-1000C	Radiola 515
RC-1001	10X
RC-1001A	11X1
RC-1001B	12X, 12X2
RC-1001B	10X (2nd Prod.)
RC-1001C	12AX, 12A2, 35X, Radiola 516, 517, 522
RC-1001D	14X, 14X2
RC-1001E	14AX, 14AX2, 34X, Radiola 526, 527
RC-1002	28X
RC-1002A	28X5
RC-1003	1X, 1X2, 25X
RC-1003A	1AX, 1AX2
RC-1003B	Radiola 510 (2nd Prod.), 511 (2nd Prod.)
RC-1003C	55X
RC-1003D	Radiola 510 (3rd Prod.), 520
RC-1004A	25BT2
RC-1004B	25BK, 25BT3
RC-1004D	Radiola B-52
RC-1004E	55F, 65F
RC-1004F	24BT1, 24BT2
RC-1004H	Radiola B-50
RC-1011	15X (2nd Prod.), 36X (2nd Prod.) 56X2, 56X3, Radiola 61-1, 61-2, 61-3
RC-1011A	56X, 56X2, 56X3, Radiola 61-1, 61-2, 61-3 2nd Prod.
RC-1011B	56X, 56X2, 56X3, Radiola 61-1, 61-2, 61-3 3rd Prod.
RC-1013	6X2
RC-1014	26X1
RC-1014A	26X3, Radiola 515 (2nd Prod.)
RC-1014B	26X4
RC-1017	55U, 55AU
RC-1017A	65U, 65AU, 65U-1, Radiola 62-1
RC-1017B	65U, 65AU (50 cycle)
RC-1020	25BP (2nd Prod.)
RC-1020B	Radiola P-5 (2nd Prod.)
RC-1022	34X (2nd Prod.)
RC-1022A	12X (2nd Prod.), 35X (2nd Prod.), Radiola 522 (2nd Prod.)
RC-1023	56X5, Radiola 615
RC-1023A	56X11
RC-1023B	56X10, Radiola 61-10, Postone (PX) 61-10
RC-1023C	Radiola 61-10 2nd Prod.
RC-1034	65X1, 65X2, 65X8, 65X9, Radiola 61-8, 61-9
RC-1035	QU72, QU72A
RC-1037	64F1, 64F2
RC-1037A	64F3
RC-1037B	8F43
RC-1038	66X1, 66X2
RC-1038A	66X3, 66X7, 66X8, 66X9
RC-1040	66BX (3Q4 output)
RC-1040A	66BX (3V4 output)
RC-1040B	66BX (Selenium rect.)
RC-1040C	8BX6, 8BX65
RC-1040D	8BX6 2nd Prod.
RC-1044	Q103, Q103A, Q103-2, Q103A-2

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Chassis No.	Model
RC-1044A	Q103X, Q103AX, Q103X-2, Q103AX-2
RC-1045	65BR9, Radiola R65BR9
RC-1046	66X12
RC-1046A	66X11
RC-1046B	66X13
RC-1046C	66X11 2nd Prod.
RC-1046D	66X12 2nd Prod.
RC-1046E	66X13 2nd Prod.
RC-1047	54B5
RC-1050	75X11, 75X12
RC-1050A	75X11, 75X12 2nd Prod., 75X14, 75X15
RC-1050B	75X11 3rd Prod., 75X14 2nd Prod., 75X16, 75X17, 75X18, 75X19
RC-1053	5Q21, 5Q22, 5Q27
RC-1053A	5Q21 2nd Prod. (117 v.)
RC-1053B	5Q1 2nd Prod. (234 v.)
RC-1054	5Q31
RC-1054A	6Q33
RC-1054B	6Q33X
RC-1054C	6QU3
RC-1054D	6QV3
RC-1054E	5Q31X
RC-1054F	6QU3Y
RC-1054G	Q531
RC-1054J	QA531
RC-1055	7Q51 (PM)
RC-1055C	7Q51 (EM)
RC-1055D	7Q51X
RC-1057A	77U
RC-1057B	9Y7
RC-1058	Radiola 76ZX11, 76ZX12
RC-1058A	Radiola 76ZX11, 76ZX12 2nd Prod.
RC-1059	8BX5, 8BX54, 8BX55
RC-1059A	8BX5, 8BX54, 8BX55 2nd Prod.
RC-1059B	9BX5
RC-1059C	9BX5 2nd Prod.
RC-1060	8R71, 8R74, 8R75
RC-1060A	8R72, 8R76
RC-1061	8X681, 8X682
RC-1063A	Radiola 75ZU
RC-1063B	Radiola 75ZU 2nd Prod.
RC-1064	65X1, 65X2, Radiola 61-8, 61-9 2nd Prod., 8X53
RC-1065	8X541, 8X544, 8X545
RC-1065A	8X542, 8X546, 8X547
RC-1065B	8X541, 8X544, 8X545 2nd Prod.
RC-1065C	8X542, 8X546, 8X547 2nd Prod.
RC-1065F	8X541, 8X544, 8X545 3rd Prod.
RC-1065H	8X542, 8X546, 8X547 3rd Prod.
RC-1065J	8X541 4th Prod.
RC-1065K	8X542, 8X547 4th Prod.
RC-1065L	8X541 5th Prod.
RC-1065M	8X542, 8X547 5th Prod.
RC-1066	8X521
RC-1066A	8X522
RC-1067	6QP3
RC-1067A	QP63
RC-1068	9BX56
RC-1069	8B41
RC-1069A	8B42
RC-1069B	8B43
RC-1069C	8B46
RC-1070	8X71, 8X72
RC-1070A	X711
RC-1071	4QB3
RC-1071A	4QB3X
RC-1071B	QB431
RC-1072	5QA5
RC-1077	9Y51
RC-1077A	9Y510
RC-1077B	9Y511
RC-1077C	9Y510 2nd Prod.
RC-1079	9X571
RC-1079A	9X572
RC-1079B	9X561
RC-1079C	9X562
RC-1079D	9W51
RC-1079E	9X571 2nd Prod.
RC-1079F	9X572 2nd Prod.
RC-1079K	1X591
RC-1079L	1X592
RC-1080	9X641
RC-1080A	9X642
RC-1082	BX6
RC-1082A	BX6 2nd Prod.
RC-1084A	9W78, A78
RC-1085	9X651
RC-1085A	9X652
RC-1087	A55
RC-1088	BX55
RC-1088A	BX57
RC-1088B	BX55 2nd Prod.
RC-1088C	BX57 2nd Prod.
RC-1089B	X551
RC-1089C	X552
RC-1090	2T81, 4T141, 6T84 Radio Chassis
RC-1092	6T86, 6T87, 9T89 7T143, 9T147 Radio Chassis
RC-1094	A-82
RC-1095	A-91
RC-1095A	45-W-9
RC-1096	A-101, A-108
RC-1096A	45-W-10
RC-1096B	A-101, A-108 2nd Prod.
RC-1096C	45-W-10 2nd Prod.
RC-1098	B-411
RC-1098A	B-411 2nd Prod.
RC-1100	Q520 (117V.)
RC-1100A	Q520 (234V.)
RC-1101	QB421
RC-1102	1R81
RC-1102A	1R81
RC-1102B	1R81
RC-1102C	1R81
RC-1104	1X51
RC-1104-1	1X51
RC-1104A	1X52, 1X57
RC-1104A-1	1X52, 1X57
RC-1104B	1X53, 1X54, 1X55, 1X56
RC-1104B-1	1X53, 1X54, 1X55, 1X56
RC-1104C	1X51
RC-1104D	1X52, 1X57
RC-1104E	1X53, 1X54, 1X55, 1X56
RC-1110	PX600

AUDIO AMP. AND POWER UNITS

Chassis No.	Model
RA-79	9EY31. 9EY32
RS-77	R-98
RS-79B	CV-9 Electrifier
RS-83-1	PSU-8A
RS-83-2	PSU-8B
RS-83-3	PSU-8C
RS-83A-1	PSU-10A
RS-83A-2	PSU-10B
RS-83A-3	PSU-10C
RS-83C	CV-110 Electrifier
RS-83E	TRK-9, TRK-12, TRK-90, TRK-120 Radio Power Unit
RS-84	R-91
RS-85	PSU-8E
RS-85A	PSU-10E
RS-86	R-89
RS-89	CV-9X Electrifier
RS-89A	TRK-5 Radio Power Unit
RS-89B	U-42 Power Unit
RS-90	VA-21
RS-91A	O-50
RS-91B	R-60
RS-92	M-70 Power Unit
RS-94A	OSC-22
RS-95	CV-111 Electrifier
RS-98	CV-40 Electrifier
RS-102A	U-44 Power Unit
RS-102B	U-46 Power Unit
RS-102C	K-130 Power Unit
RS-102D	U-45 Power Unit
RS-102E	V-300, V-301, V-302 Power Unit
RS-110	QU5 Power Unit
RS-111	CV-112 Electrifier
RS-111A	CV-112X Electrifier
RS-112	QU8 Power Unit
RS-112A	QU7 Power Unit
RS-114A	VHR-307 Power Unit
RS-115	QB1, QB11, QB12, QB13, 6V. Power Unit
RS-115B	QB9 Power Unit
RS-119	R-56
RS-123	612V1, 612V3, 612V4, 711V1, 711V2, 711V3 Audio Amp. & Power Supply
RS-123A	64TV, 649PTK, 8TV41 Audio Amp. & Power Supply
RS-123B	648PV Audio Amp. & Power Supply
RS-123C	741PCS, 8PCS41, 9PC41 Audio Amp. & Power Supply
RS-123D	8V151 Audio Amp. & Power Supply
RS-126	66E, 66ED, 66E-1
RS-127	63E, 63EM
RS-130	9QV5 Power Unit
RS-130A	4QV8C Power Unit
RS-132	9EY3, 93Y3M, 9EY35, 9EY36, 45-EY
RS-132A	9EY35, 9EY36, 45-EY
RS-132C	QEY3
RS-132F	45-EY, 45-EY-1
RS-132H	45-EY-15
RS-136	45-EY-3
RS-136A	45-EY-3
RS-136B	QEY5
RS-136C	45-EY-3
RS-136D	QEY5
RS-136E	45-EY-3
RS-138A	45-EY-2
RS-138B	QEY4
RS-138E	QEY4
RS-138F	45-EY-2
RS-138H	45-EY-2
RS-138L	45-EY-26
RS-138M	45-EY-26
RS-139A	15E
RS-140	45-EY-4
RS-140A	QEY6
RS-1000	CV-42 Electrifier
RS-1001	CV-45 Electrifier

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TELEVISION CHASSIS

Chassis No.	Model
KC-3	TT-5
KC-3A	TRK-5 TV Chassis
KC-3B	TT-5 (50 cy.)
KC-3C	TRK-5 (50 cy.) TV Chassis
KC-4	TRK-12 TV Tuner
KC-4A	TRK-9 TV Tuner
KC-4B	TRK-12 (50 cy.) TV Tuner
KC-4C	TRK-9 (50 cy.) TV Tuner
KC-4F	TRK-120 TV Tuner
KC-4H	TRK-90 TV Tuner
KC-4J	TRK-120 (50 cy.) TV Tuner
KCS-20A	630TS
KCS-20B	630TCS
KCS-20C	630TS (50 cy.)
KCS-20D	630TCS (50 cy.)
KCS-20J	8TS30
KCS-20K	8TS30 (50 cy.)
KCS-21	621TS
KCS-24	648PTK TV R-F/I-F Chassis
KCS-24A	648PV TV R-F/I-F Chassis
KCS-24B	741PCS, 8PCS41 R-F/I-F Chassis
KCS-24C	8PCS41, 9PC41 R-F/I-F Chassis
KCS-24D	9PC41 R-F/I-F Chassis
KCS-25A	641TV TV Chassis
KCS-25C	641TV (50 cy.) TV Chassis
KCS-25D	8TV41 TV Chassis
KCS-25E	8TV41 (50 cy.) TV Chassis
KCS-26-1	721TS
KCS-26-2	721TS (50 cy.)
KCS-26A-1	721TCS
KCS-26A-2	721TCS (50 cy.)
KCS-27-1	730TV1, 730TV2 TV Chassis
KCS-27-2	730TV1, 730TV2 (50 cy.) TV Chassis
KCS-28	8T241, 8T243, 8T244, 9T240
KCS-28A	9T240
KCS-28B	9TC240
KCS-28C	9T246
KCS-29	8T270, 9T270
KCS-29A	8TC270, 8TC271
KCS-29C	9TC272, 9TC275
KCS-30	8TV321, 8TV323, 9TW333 TV Chassis
KCS-31	S1000, 9TW390 TV Chassis
KCS-32	8TR29
KCS-32A	8TK29
KCS-32B	8TR29
KCS-32C	8TK29
KCS-33A	8TK320
KCS-34	9TC247, 9TC249
KCS-34B	TC124, TC125, TC127, 9TC245, 9TC247, 9TC249
KCS-34C	T120, T121
KCS-38	T100, 9T246
KCS-38C	9T256
KCS-40	T164
KCS-40A	TC165, TC166, TC167, TC168
KCS-40B	6T72
KCS-41	9TW309
KCS-41A	TA129
KCS-42A	TA128
KCS-43	TA169
KCS-45	2T51
KCS-45A	2T60
KCS-46	2T81
KCS-47	6T53, 6T54
KCS-47T	6T53, 6T54
KCS-47A	6T64, 6T65, 6T71, 6T74, 6T75, 6T76
KCS-47AT	6T64, 6T65, 6T71, 6T74, 6T75, 6T76
KCS-47B	7T103, 7T104
KCS-47C	7T112, 7T122, 7T123, 7T124
KCS-47D	7T132
KCS-47E	16T152
KCS-47F	7T103B, 7T104B
KCS-47G	7T112B, 7T122B, 7T123B, 7T125B
KCS-47GF	7T112B, 7T122B, 7T123B, 7T125B
KCS-47GF-2	7T111B, 7T112B, 7T122B, 7T123B
KCS-47T	6T53, 6T54
KCS-48	6T84, 6T86, 6T87
KCS-48A	7T143
KCS-48T	6T84, 6T86, 6T87
KCS-49	9T57
KCS-49A	9T77, 9T79
KCS-49AT	9T77, 9T79
KCS-49B	9T105
KCS-49BF	9T105
KCS-49BF-2	9T105
KCS-49C	9T126, 9T128
KCS-49CF	9T126, 9T128
KCS-49CF-2	9T126, 9T128
KCS-60	9T89
KCS-60A	9T147
KCS-60T	9T89
KCS-61	4T101
KCS-62	4T141
KCS-66	17T153, 17T154, 17T155, 17T160
KCS-66A	17T162, 17T172, 17T173, 17T174
KCS-66D	17T172K, 17T173K, 17T174K
KCS-68C	21T176, 21T177, 21T178, 21T179
KCS-68E	21T159, 21T165
KK-7	TRK-12 TV Power Unit
KK-7A	TRK-9 TV Power Unit
KK-7D	TRK-12 (50-cy.) TV Power Unit
KK-7E	TRK-9 (50 cy.) TV Power Unit
KK-7F	TRK-120 TV Power Unit
KK-7J	TRK-90 TV Power Unit
KK-7H	TRK-120 (50 cy.) TV Power Unit
KRS-20	648PTK, 648PV Horiz. Defl. Chassis
KRS-20A	741PCS, 8PCS41 Horiz. Defl. Chassis
KRS-20B	8PCS41, 9PC41 Horiz. Defl. Chassis
KRS-21	648PTK, 648PV TV Power Supply
KRS-21A	741PCS, 8PCS41, 9PC41, TV Power Supply

MODEL vs. RECORD CHANGER (1943 to 1951 incl.)

Model	Record Changer
A55	RP 168 & 960282-1
A78	RP 168 & 960282-1
A-82	RP 168 or RP 190-2 & 960282-4 or -5
A-91	RP 168 or RP 190-2 & 960284-1 or -2
A-101	RP 190-2 & 960282-4 or -5 or 960284-1 or -2
A-106	RP 168 & 960285-1
A-108	RP 168 or RP 190-2 & 960284-1 or -2
QJY	RP 168
QEY3	RP 168
QU61	960001-4
QU62	960001-4
QU68	960001-4
S1000	RP 168 & 960285-1
TA128	RP 168 & 960282-1
TA129	RP 168 & 960282-1
TA169	RP 168 & 960285-1
2T81	RP 168 or RP 190-2 & 960282-4 or -5
4QV8C	RP 168 & 960282-2
4T141	RP 190-2 & 960282-4 or -5
6QU3	RP 178-3
6QU3Y	RP 168
6QV3	RP 178-3
6T84	RP 168 or RP 190-2 & 960282-4 or -5 or 960284-1 or -2
6T86	RP 168 or RP 190-2 & 960284-4 or -5
6T87	RP 168 or RP 190-2 & 960284-1 or -2
7QV5	960001-4
7T143	RP 190-2 & 960284-1 or -2
8TV41	RP 177A
8TV321	RP 178
8TV323	RP 178
8V7	RP 178
8V90	RP 178
8V91	RP 178
8V112	RP 178
8V151	RP 177B
9EY3	RP 168
9EY31	RP 168
9EY32	RP 168
9EY35	RP 168
9EY35U	RP 168
9EY36	RP 168
9EY36U	RP 168
9JY	RP 168
9QV5	RP 168 & 960282-2
9T89	RP 168 or RP 190-2 & 960284-1 or -2
9T147	RP 190-2 & 960284-1 or -2
9TW309	RP 168 & RP 178
9TW333	RP 168 & RP 178
9TW390	RP 168 & RP 177B
9W51	RP 168
9W78	RP 168 & RP 178
9W101	RP 168
9W102	RP 168
9W103	RP 168
9W105	RP 168 & RP 178
9W106	RP 188 & RP 178
9Y7	RP 168
9Y51	RP 168
9Y510	RP 190-1
9Y511	RP 168
15E	RP 190A-1 & Manual Turntable
45-EY	RP 168
45-EY-1	RP 168
45-EY-2	RP 190
45-EY-3	RP 190-1 or RP 190-3
45-EY-4	RP 190-2
45-EY-15	RP 168
45-EY-26	RP 190A-2
45-J	RP 168
45-J-2	RP 190-1
45-J-3	RP 193
45-W-9	RP 190-2
45-W-10	RP 190-2
55U, 55AU	960015
58V, 58AV	960001-1
59V1, 59AV1	960001-2
Rad. 62-1	960260-2
65U, 65AU	960260-2
65U-1	960280-2
67V1, 67AV1	960260-1
Rad. 75ZU	RP 178 or 960276
77U	RP 178
77V1	960260-1
77V2	960280-1
610V1	960001-5 or -6 or RP 177
610V2	960001-5 or -8 or RP 177
612V1	RP 176A or RP 176B
612V3	RP 176 or RP 176A
612V4	RP 176 or RP 176A
641TV	960001-4 or -6
648PV	RP 176
710V2	RP 177 or RP 177A
730TV1	RP 177 or RP 177A
730TV2	RP 177 or RP 177A
711VI	960001-5
711V2	960001-5
711V3	960001-5

COMPLETE INDEX OF MODELS

NOTES:

†denotes "Radiola"

♦denotes "Victor"

All others "RCA" or "RCA Victor"

Refer to the index of the listed Volume for additional information contained in that Volume.

VOL. I ..... 1923 to 1937
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MISCELLANEOUS

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AP-935	Uni-Recton Power Amp.
AP-937	Duo-Recton "B" Elim.
AP-1080	"B" Eliminator
AR-594	Radiola 44
AR-596	Radiola 46
AR-597	Radiola 46 D.C.
AR-598	Radiola 66
AR-742	Victor 7-11
AR-744	Victor 7-26
AR-745	Victor 9-16
AR-775	Victor 9-54
AR-775A	Victor 9-56
AR-776	Victor 9-18
AR-782	Radiola 41
AR-784	Radiola 33
AR-800	Radiola II
AR-804	Radiola 24
AR-805	Radiola III
AR-806	Radiola IIIA
AR-810	Radiola Super VIII
AR-871	Radiola 41 D.C.
AR-880	Radiola IV
AR-885A	Radiola V
AR-891	Radiola 18 D.C.
AR-892	Radiola 62
AR-894	Radiola 64
AR-895	Radiola VI
AR-904	Radiola 51
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AR-924	Radiola 16
AR-925	Radiola 32
AR-926	Radiola 30A
AR-927	Radiola 17
AR-928	Radiola 32 D.C.
AR-936	Radiola 18
AR-954	Radiola 60
AR-969	Radiola 28 D.C
AR-982	Radiola 62
AR-1050	Victor 9-25
AR-1055	Victor 9-55
AR-1058	Victor 7-10
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AR-1147	Radiola 47
AR-1168	Radiola 67
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AZ-781	Victor 10-50
AZ-1071	Victor 10-51
AZ-1073	Victor 10-70
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UZ-749	103 Loudspeaker
UZ-783	100-B Loudspeaker
UZ-913	102 Loudspeaker
UZ-914	104 Loudspeaker
UZ-915	100 Loudspeaker
UZ-1076	100-A Loudspeaker
UZ-1078	100-A Loudspeaker
UZ-1082	105 Loudspeaker

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Ashley	A-91
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Newport	6T53, 7T103
Northhampton	9T79
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Preston	17-T-155
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Randolph	9X561
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Rockingham	21T178
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Suffolk	21-T-176
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RCA VICTOR

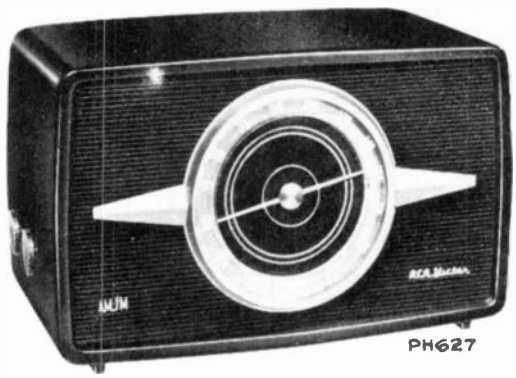
AM-FM Radio Receiver

MODEL 1R81

Chassis Nos. RC-1102, RC-1102A, RC-1102B, RC-1102C

SERVICE DATA

— 1951 No. 2 —



Model 1R81 "Livingston"

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tuning Ranges
Standard Broadcast (AM)..... 540-1,600 kc.
Frequency Modulation (FM) ..... 88-108 mc.

Intermediate Frequency.....AM—455 kc., FM—10.7 mc.

Tube Complement
(1) RCA 6AU6...Chassis RC-1102.....R. F. Amp.
RCA 6CB6...Chassis RC-1102A, RC-1102B, & RC-1102C .....R. F. Amp.
(2) RCA 6X8 ..... Mixer and Oscillator
(3) RCA 6BA6..... I. F. Amplifier
(4) RCA 6AU6..... Driver
(5) RCA 6AL5..... Ratio Detector
(6) RCA 6AV6..... AM Det.—AVC—A. F. Amp.
(7) RCA 6V6GT..... Output
(8) RCA 5Y3GT..... Rectifier

Circuit Description

The receiver is provided with a tuned RF stage (V1 6AU6 or 6CB6) on both AM and FM bands.

The mixer section of the 6X8 tube (V2) operates as a pentode on AM reception and as a triode on FM reception. This provides best signal to noise ratio.

The range switch has five functions:

1. Selection of AM or FM tuning ranges.
2. Selection and distribution of AVC voltages. Full AVC is applied to V1, V2 and V3 in AM position. Delayed AVC is applied to V1 and V3 in FM position (V2 is not controlled).
3. Controls the application of B+ voltages to the plate and screen circuits of V1 and V2 (disconnected in phono position).
4. Controls audio input to volume control.
5. Switches mixer section of V2 (6X8) from pentode operation on AM to triode operation in FM position.

The driver V4 (6AU6) and ratio detector V5 (6AL5) circuits are similar to those used in other RCA Victor AM-FM receivers.

The audio voltage controlled by the volume control is amplified by V6 (6AV6) and V7 (6V6GT).

The rectifier (V8) is type 5Y3GT.

Power Supply Rating..... 115 volts, 60 cycles, 70 watts

Loudspeaker
Type.....8 in. P.M.
Voice coil impedance at 400 cycles..... 3.2 ohms

Tuning Drive Ratio.....7¼:1 (3⅝ turns of knob)

Dial Lamps (2)..... Type No. 44, 6-8 volts, 0.25 amp.

Power Output
Maximum .....3.5 watts
Undistorted .....2.5 watts

Cabinet Dimensions
Height..10 in. Width..16½ in. Depth..9 in.

Weight .....19½ lbs.

Antennas:

The receiver has a built-in Ferrite rod antenna for AM band and the FM antenna input is capacity coupled to power line.

Under average conditions the receiver does not require an external antenna. However, provision is made for the use of external antenna if desired—connect as indicated below:

AM antenna: Open the link (normally connects terminals #1 and #2). Connect a single wire antenna to terminal #1.

FM antenna: Remove the built-in antenna lead from #3 terminal. Connect the transmission line (300 ohm) from an external dipole antenna to terminals #2 and #3.

Ground: An external ground can be attached to terminal #2 if desired. Under some conditions an external ground is detrimental to FM reception.

NOTE: *For satisfactory reception on FM when using the built-in FM antenna the power cord must be fully extended and must not be coiled or hanked up.*

Alignment Procedure

Due to the use of separate I.F. transformers, there is little interaction between the 10.7 mc. and the 455 kc. adjustments.

There is a slight interaction of adjustments on the tuning condenser between AM and FM.

If a large amount of adjustment is required of any circuit, all others should be checked in the following order:

FM I.F.
AM I.F.
AM Osc., ant. and r.f.
FM Osc., ant. and r.f.

Alignment Indicators:

For measuring the developed d-c voltage across C29 during FM alignment an RCA VoltOhmyst or an equivalent meter should be used. An output meter connected across the voice coil is also needed to indicate minimum audio output during FM Ratio Detector alignment.

The RCA VoltOhmyst can also be used to indicate audio output voltage across the voice coil or developed voltage on the AVC bus.

Signal Generator:

For alignment operations connect the low side of the signal generator to the receiver chassis. The output of the signal generator should always be controlled to prevent over-loading or excessive AVC action.

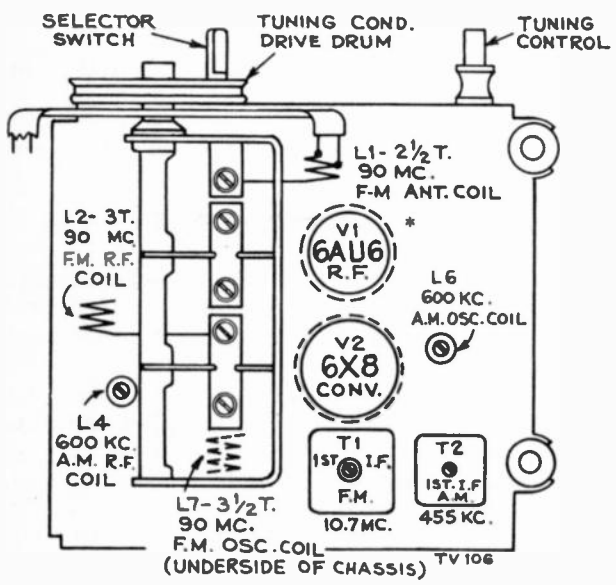
Oscilloscope Alignment:

It is preferable to use a sweep generator and oscilloscope for aligning I.F. and R.F. circuits to obtain a visual observation of curve shape during alignment.

With FM sweep generator connected between FM ant. (#3) terminal and chassis and oscilloscope connected between the junction of R28-C30 and chassis the overall FM response may be observed. There should be a peak to peak separation of not less than 180 kc. with 50,000 mv. input.

CRITICAL LEAD DRESS

1. Dress diode lead from second I. F. away from filament lead going to 6AV6 1st audio tube socket.
2. Lead from lug terminal "B" of the 1st FM transformer to rear switch wafer terminal #10 should not be changed from the original, 3 inches long plus or minus ¼" of #22 copper vinylite covered.
3. A.C. leads from power switch on volume control should be dressed as far as possible from the audio-leads and audio coupling condensers near or connecting to the volume control terminals.
4. Ground straps between the R.F. shelf and the main chassis should not be relocated.
5. The connection point of capacitor C10 is critical, therefore should not be altered. It must be connected to the function switch and not to the I.F. transformer.



*** 6AU6 is used as R.F. Amp. in RC-1102**
6CB6 is used as R.F. Amp. in RC-1102A, RC-1102B, RC-1102C

FM Coil Locations

AM Alignment

RANGE SWITCH IN AM POSITION

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Pin 1 of V3 6BA6 in series with .01 mfd.	455 kc.	Quiet point at low freq. end.	T4 bottom core (pri.). T4 top core (sec.).
2	Pin 7 of V2 6X8 in series with .01 mfd.			T2 top core (sec.). T2 bottom core (pri.).
3	No. 1 terminal on ant. input strip	1620 kc.	High freq. end of dial (min. cap.)	C1-5T
4		1400 kc.	1400 kc. signal	C1-2T ant. C1-3T r.f.
5		Shunt a 10,000 ohm resistor across the r.f. section of the gang.		
6		600 kc.	600 kc. signal	L6 osc.* (Rock gang.)
7		Remove the 10,000 ohm resistor and peak L4 r.f.*		
8	Repeat 3, 4, 5, 6 and 7			

* The correct adjustment of the OSC. (L6) core is that peak obtained with core fartherest away from the coil mounting clips. R.F. (L4) core should be set to the peak obtained (2 peaks are seldom obtainable) with core closest to the mounting clips.

FM Alignment

RANGE SWITCH IN FM POSITION — VOLUME CONTROL MAXIMUM

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 2 mfd. capacitor C29 and the common lead to chassis.			
2	Pin 1 of V4 6AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM	Quiet point at low freq. end.	T5 top core for max. d-c voltage across C29. T5 bottom core for min. audio output.*
3	Pin 1 of V3 6BA6 in series with .01 mfd.	Adjust to provide 3 to 4 volts indication on VoltOhmyst during alignment.		†† T3 top core (sec.). T3 bottom core (pri.).
4	Pin 7 of V2 6X8 in series with .01 mfd.			†† T1 top core (sec.). T1 bottom core (pri.).
5	#3 ant. term. in series with a 300 ohm resistor. (Remove ant. lead from #3 term.)	90 mc.	90 mc.	L7 osc.**
6		106 mc.	106 mc. signal	C1-1T ant. C1-4T r.f.
7		90 mc.	90 mc. signal	L1 ant.** L2 r.f.**
8	Repeat Steps 5, 6 and 7 until further adjustment does not improve calibration.			

* Two or more points may be found which lower the audio output. At the correct point the minimum audio output is approached rapidly and is much lower than at any incorrect point.

†† Alternate loading may be necessary to provide accurate observation of peaks.

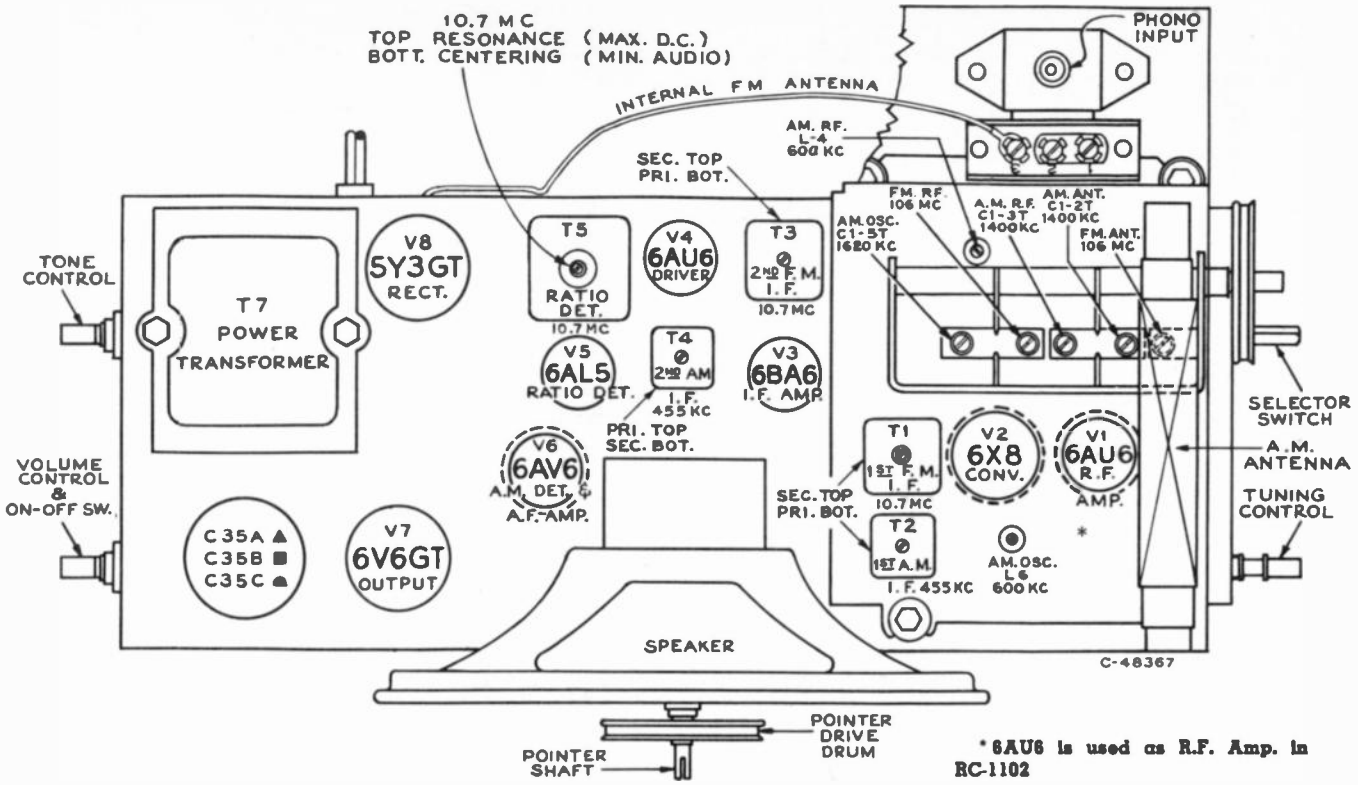
Alternate loading involves the use of a 680 ohm resistor to load the plate winding while the grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 680 ohm resistor after T3 and T1 have been aligned.

Oscillator frequency is above signal frequency on both AM and FM.

Extreme care should be used to avoid running the I.F. cores all the way through the winding and out the other end. Double peaks or serious overcoupling will result. The correct adjustment may be determined by starting the core all the way out (threads extended). The first peak obtained when tuning should be the correct peak.

** Note: FM antenna, mixer and oscillator coils are adjustable by increasing or decreasing the spacing between turns. The location of the tap on the antenna coil is ⅜ turn ± ⅛ turn from the ground end.

TUBE AND TRIMMER LOCATIONS—VOLTAGE DATA 1R81



Tube and Trimmer Locations

*6AU6 is used as R.F. Amp. in RC-1102

6CB6 is used as R.F. Amp. in RC-1102A, RC-1102B and RC-1102C

VOLTAGE CHART

Tube	Type	Elements	Pin No.	"A"	"FM"	Phono.
1	RF amp. 6AU6 (RC-1102)	Plate	5	195	178	—
		Screen	6	100	80	—
		Cathode	7	0.2	0.3	—
		Grid	1	−1.0	−0.6	—
	RF amp. 6CB6 (RC-1102A)	Plate	5	195	151	—
		Screen	6	84	64	—
		Cathode	2	0.4	0.45	—
		Grid	1	−0.4	−.5	—
2	Mixer 6X8	Plate	9	64	65	—
		Screen	8	64	65	—
		Grid	7	−3.1	−2.2	—
	Osc. 6X8	Plate	3	83	77	—
		Grid	2	−5.3	−1.1	—
3	IF amp. 6BA6	Plate	5	200	200	210
		Screen	6	122	110	124
		Cathode	7	0.7	0.9	0.9
		Grid	1	−1.4	−0.4	−0.7
4	Driver 6AU6	Plate	5	199	202	220
		Screen	6	130	138	150
		Cathode	7	1.2	1.2	1.6
5	Ratio Det. 6AL5	—	—	—	—	—
6	AF amp. 6AV6	Plate	7	72	72	75
		Grid	1	−0.8	−0.7	−0.7
7	Output 6V6GT	Plate	3	244	248	248
		Screen	4	200	210	230
		Cathode	8	10	10.5	12
8	Rectifier 5Y3GT	Fil.	8	260	262	265

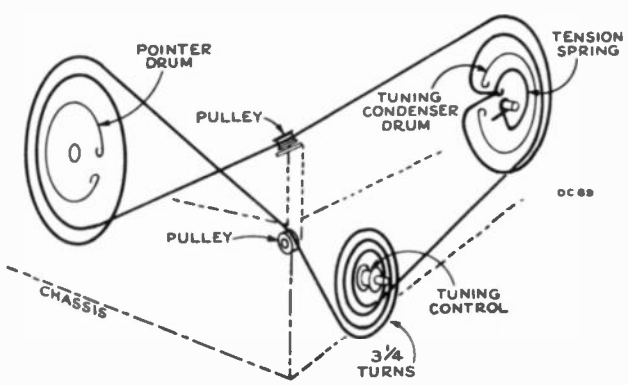
The heater voltage of the mixer/oscillator tube (6X8) is approx. .4 volt lower than other tubes in the same circuit. This is due to the filament choke coils L10 and L11.

Voltages and currents measured with tuning condenser closed and no signal input should hold within ±20% with rated line voltage.

RCA VoltOhmyst used for measuring all voltages.

CATHODE CURRENTS (MA)

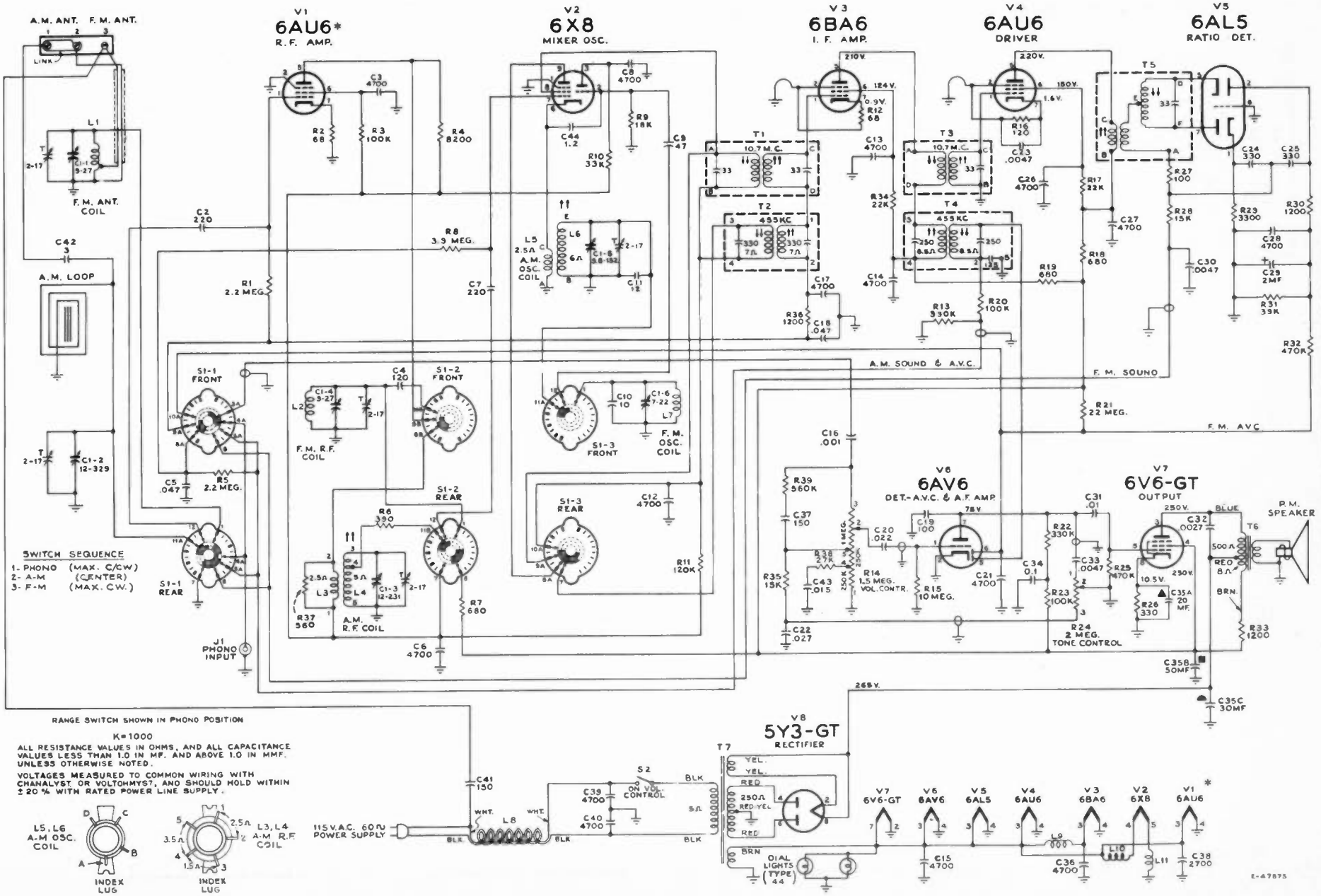
Tube		Terminal	A.M.	F.M.	Phono
	6AU6 (RC-1102)	7	2.9	4.0	—
	6CB6 (RC-1102A)	2	5.1	5.9	—
2	6X8	6	4.6	4.6	—
3	6BA6	7	11.6	13.2	13.6
4	6AU6	7	10.4	10.2	11.2
5	6AL5	—	—	—	—
6	6AV6	2	0.3	0.3	0.36
7	6V6GT	8	34	33.4	37
8	5Y3GT	8	65	66	63



Dial Cord and Drive Assembly

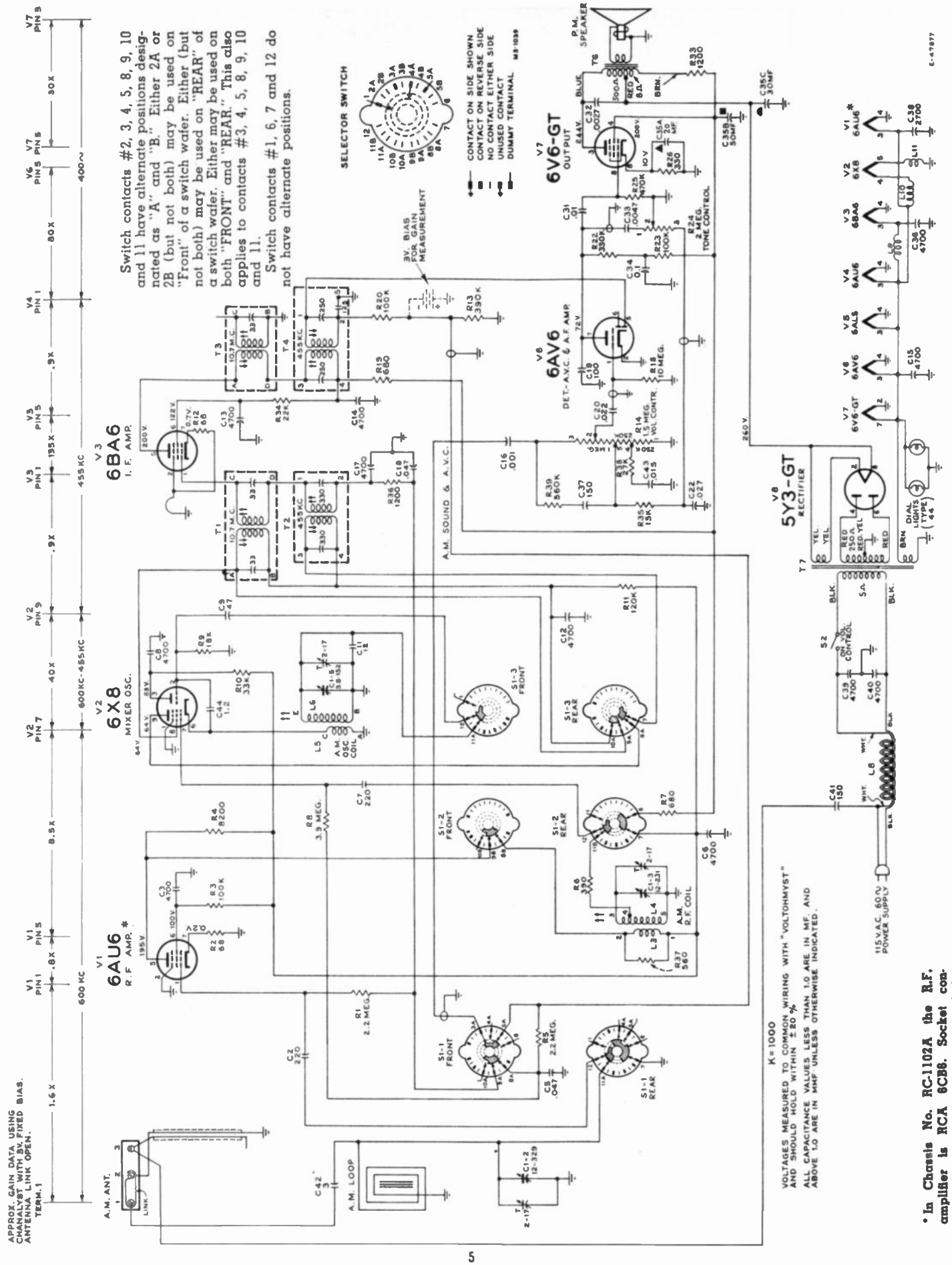
*In Chassis No. RC-1102A the R.F. amplifier is RCA 6CB6. Socket connections are different—see page 6 for details.

Note:
In PHONO operation the I.F. amplifier (6BA6) grid is "free floating" (not returned to ground) although plate and screen voltages are applied. However the grid cannot go positive due to its being tied to the R.F. amplifier grid thru R36 (1200 ohms) and R1 (2.2 meg.). This would cause the R.F. amplifier grid to conduct as a diode in the event of a positive voltage on it. It is desired to have the I.F. amplifier to draw current under all operating conditions to provide best voltage regulation.



Complete Schematic Diagram—Chassis No. RC-1102

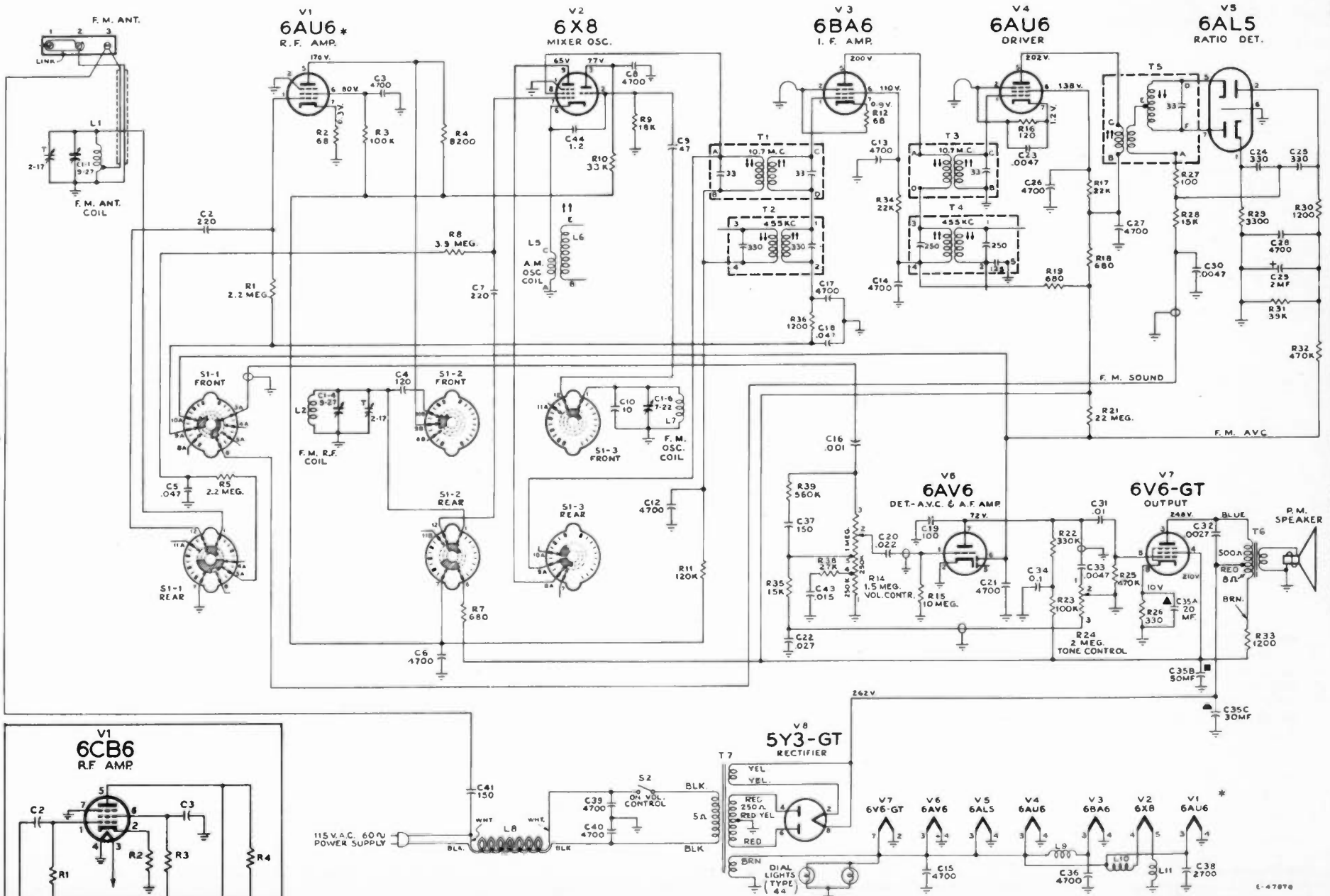
SIMPLIFIED SCHEMATIC DIAGRAM—"AM" 1R81



Simplified Schematic Diagram—"AM"—Chassis No. RC-1102

* In Chassis No. RC-1102A the R.F. amplifier is RCA 6CB6. Socket connections are different—see page 6 for details.

* In Chassis No. RC-1102A the R.F. amplifier is RCA 6CB6. Socket connections are different—see illustration below for details.



Simplified Schematic Diagram—"FM"—Chassis No. RC-1102

Note:
In PHONO operation the I.F. amplifier (6BA6) grid is "free floating" (not returned to ground) although plate and screen voltages are applied. However the grid cannot go positive due to its being tied to the R.F. amplifier grid thru R36 (1200 ohms) and R1 (2.2 meg.). This would cause the R.F. amplifier grid to conduct as a diode in the event of a positive voltage on it. It is desired to have the I.F. amplifier to draw current under all operating conditions to provide best voltage regulation.

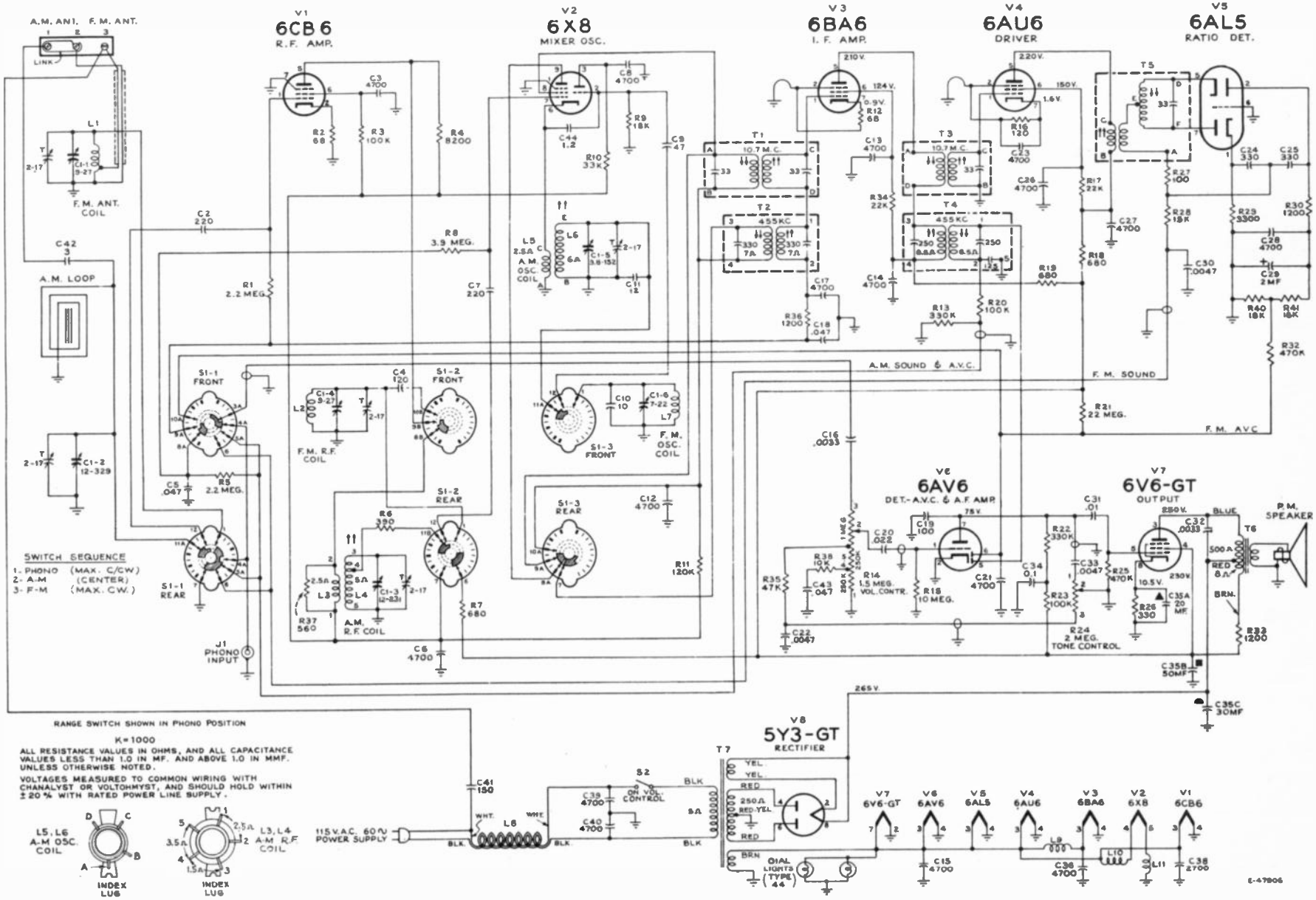
A few receivers were manufactured using a substitute I.F. transformer (T-3 2nd F.M.). The connections to this transformer differ from that shown in the schematic diagram as follows:

THE ORIGINAL TRANSFORMER IS STAMPED 971169-3.

IN TRANSFORMERS STAMPED 971169-2, CONNECTIONS TO TERMINALS B AND D ARE INTERCHANGED.

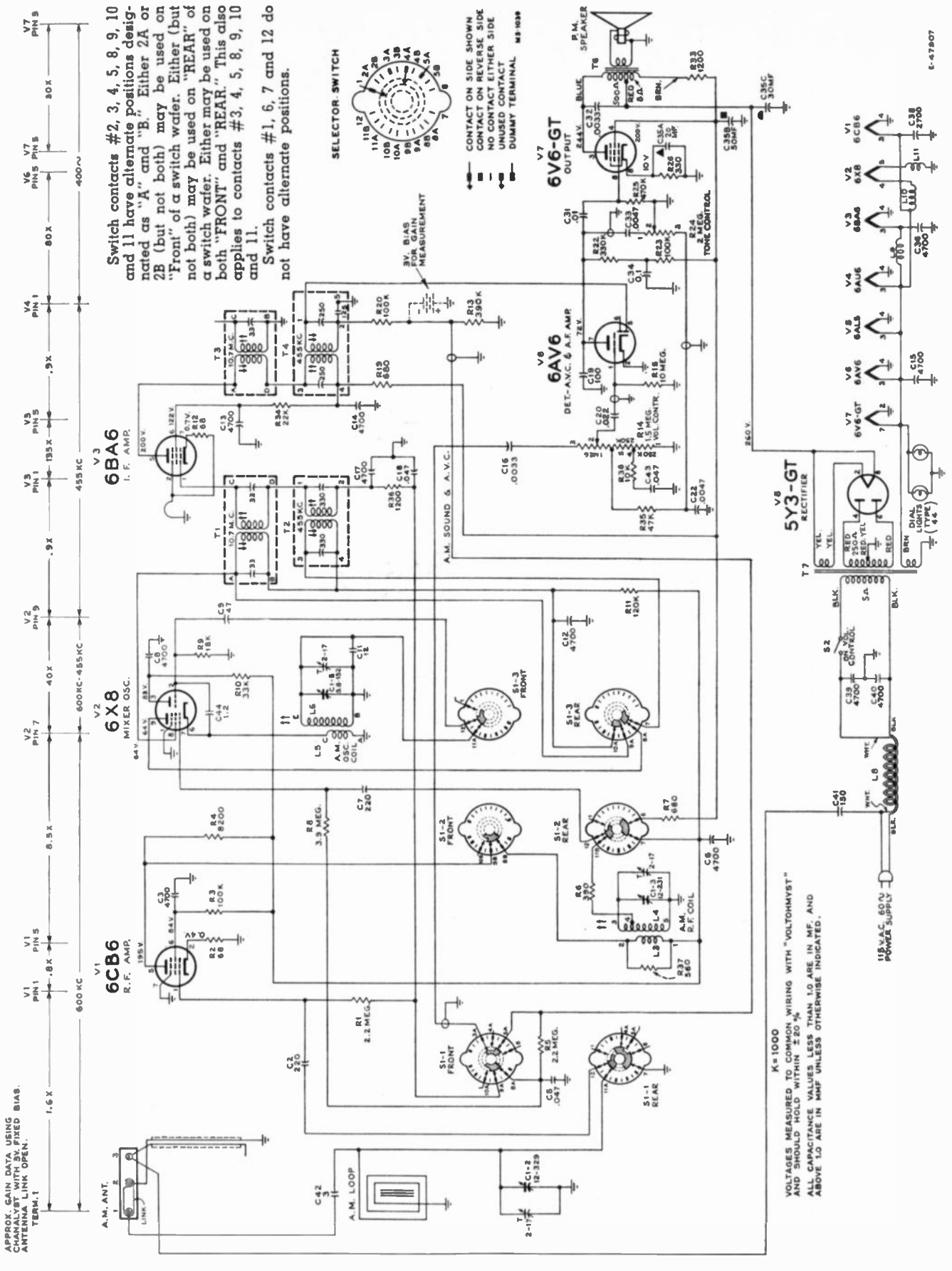
D IS CONNECTED TO CHASSIS.

B IS CONNECTED TO NO. 3 TERMINAL OF T4.



Complete Schematic Diagram—Chassis Nos. RC-1102B, RC-1102C

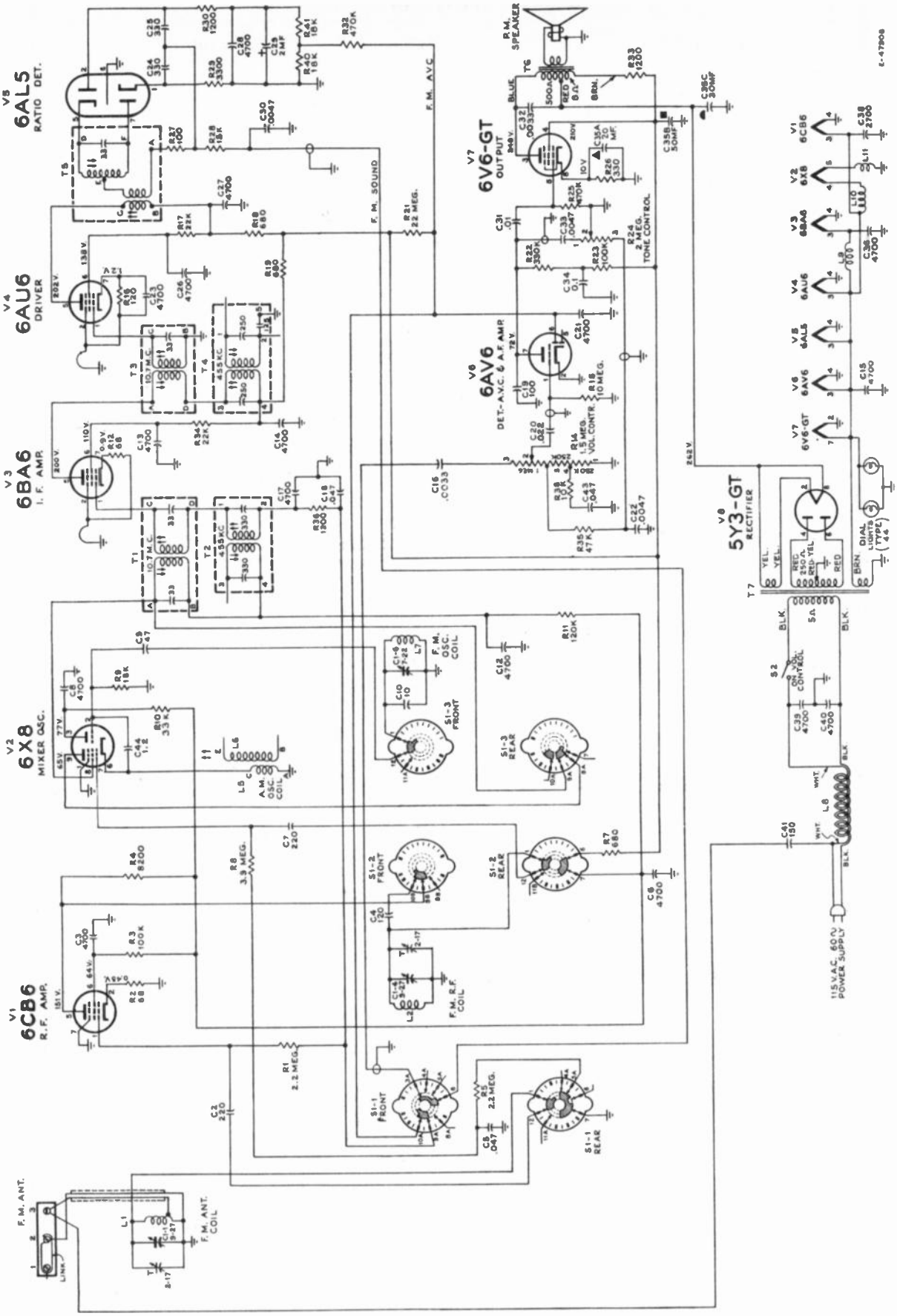
SIMPLIFIED SCHEMATIC DIAGRAM—"AM"



Simplified Schematic Diagram—"AM"—Chassis Nos. RC-1102B, RC-1102C

SIMPLIFIED SCHEMATIC DIAGRAM—"FM"

1R81



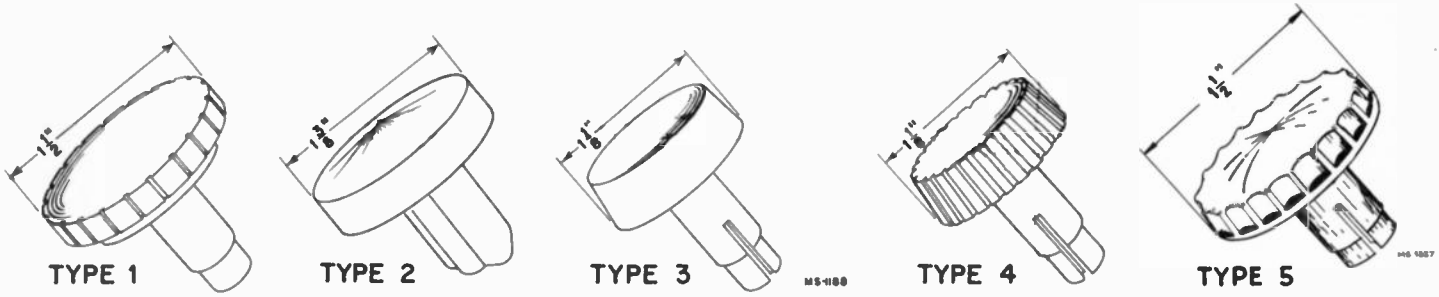
Simplified Schematic Diagram—"FM"—Chassis Nos. RC-1102B, RC-1102C

Replacement Parts

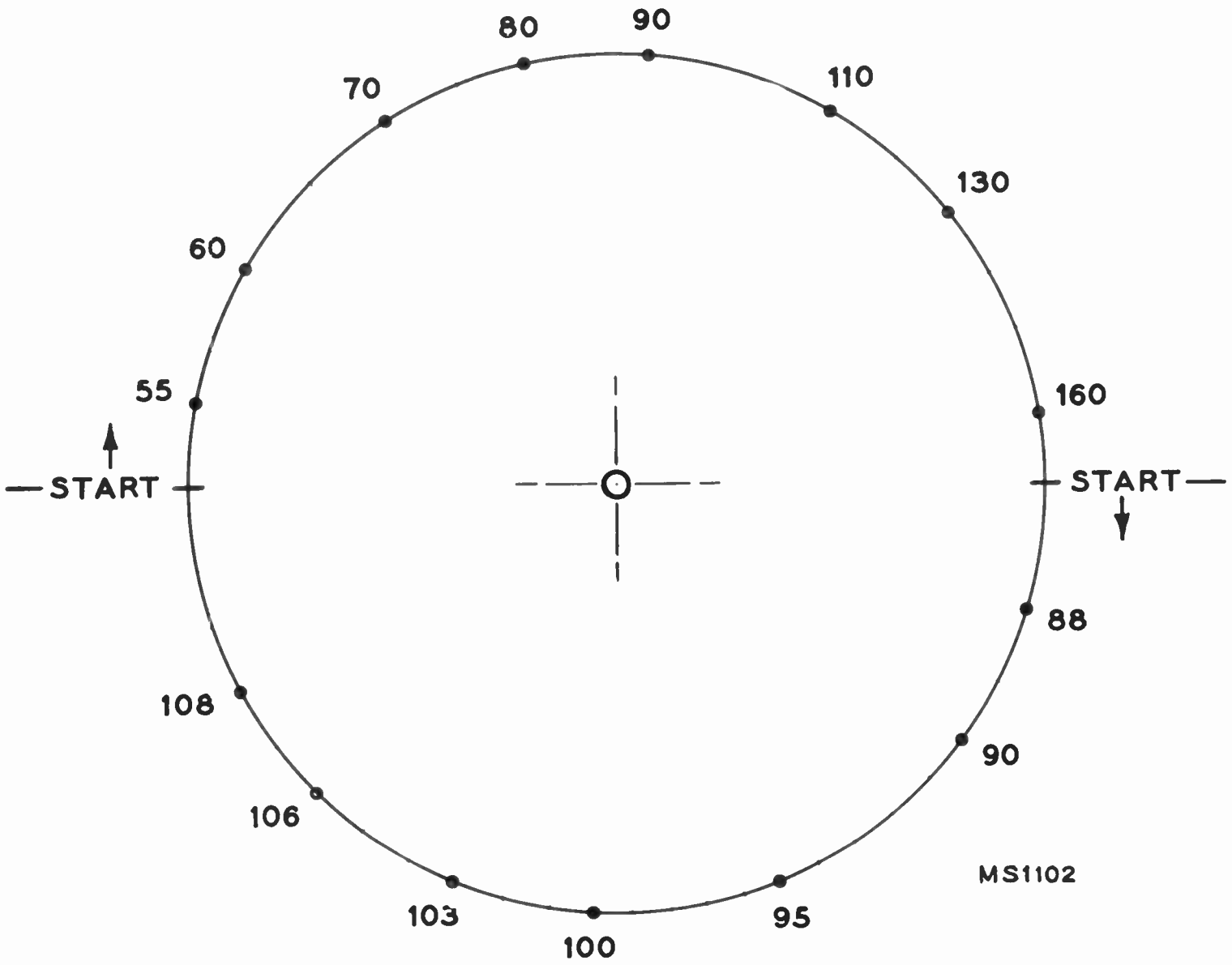
Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES **RC 1102, RC 1102A**
76343	Antenna—Ferrite rod antenna complete with coil less masonite support and grommets
12717	Board—Antenna terminal board
76325	Bracket—Drive cord pulley bracket with two (2) pulleys
76333	Capacitor—Variable tuning capacitor (C1-1, C1-2, C1-3, C1-4, C1-5, C1-6)
76677	Capacitor—Ceramic, 1.2 mmf. (C44)
57090	Capacitor—Ceramic, 3 mmf. (C42)
76350	Capacitor—Ceramic, 10 mmf. (C10)
76349	Capacitor—Ceramic, 12 mmf. (C11)
76348	Capacitor—Ceramic, 47 mmf. (C9)
75437	Capacitor—Ceramic, 100 mmf. (C19)
44202	Capacitor—Ceramic, 150 mmf. (C37 in RC-1102, RC-1102A)
39632	Capacitor—Mica, 150 mmf. (C41)
75611	Capacitor—Ceramic, 220 mmf. (C2, C7)
39640	Capacitor—Mica, 330 mmf. (C24, C25)
39662	Capacitor—Mica, 2700 mmf. (C38)
73473	Capacitor—Ceramic, 4700 mmf. (C3, C6, C8, C13, C14, C15, C17, C21) (C23 in RC-1102B, RC-1102C) (C26, C27, C28, C36, C39, C40)
39668	Capacitor—Mica, 4700 mmf. (C12)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C29)
76330	Capacitor—Electrolytic comprising 1 section of 30 mfd., 350 volts, 1 section of 50 mfd., 300 volts and 1 section of 20 mfd., 25 volts (C35A, C35B, C35C)
75249	Capacitor—Tubular, paper, .001 mf., 600V (C16 in RC-1102, RC-1102A)
73818	Capacitor—Tubular, paper, .0027 mf., 1600V (C32 in RC-1102, RC-1102A)
73795	Capacitor—Tubular, paper, .0033 mf., 600V (C16 in RC-1102B, RC-1102C)
73819	Capacitor—Tubular, paper, .0033 mf. 1600V (C32 in RC-1102B, RC-1102C)
73920	Capacitor—Tubular, paper, .0047 mf., 600V (C22 in RC-1102B, RC-1102C) (C23 in RC-1102, RC-1102A) (C30, C33)
73561	Capacitor—Tubular, paper, .01 mfd., 400 volts (C31)
73797	Capacitor—Tubular, paper, .015 mf., 600V (C43 in RC-1102, RC-1102A)
73562	Capacitor—Tubular, paper, .022 mfd., 400 volts (C20)
73554	Capacitor—Tubular, paper, .027 mf., 400V (C22 in RC-1102, RC-1102A)
73558	Capacitor—Tubular, paper, .047 mf., 200V (C5, C18) (C43 in RC-1102B, RC-1102C)
73935	Clip—Mounting clip for A.M.—I.F. transformers
76337	Coil—Oscillator coil—A.M.—complete with adjustable core (L5, L6)
76338	Coil—RF coil—A.M.—complete with adjustable core (L3, L4)
76352	Coil—Oscillator coil—F.M. (L7)
76353	Coil—RF coil—F.M. (L2)
76354	Coil—Antenna coil—F.M. (L1)
71942	Coil—Filament choke coil (L9)
76351	Coil—Filament choke coil (L10, L11)
70342	Control—Volume control and power switch (R14, S2)
75538	Control—Tone control (R24)
70392	Cord—Power cord and plug
†72953	Cord—Drive cord (approx. 51" overall length required)
74839	Fastener—Push fastener for RF shelf mounting (4 req'd)
74838	Grommet—Power cord strain relief (1 set)
16058	Grommet—Rubber grommet for RF shelf (4 req'd)
76344	Grommet—Rubber grommet for mounting ferrite rod antenna to masonite support (2 req'd)
76345	Insert—Hard rubber insert for antenna mounting grommets (2 req'd)
76340	Pan—Speaker pan assembly complete less station selector pointer shaft and pulley
76341	Pulley—Station selector pointer shaft and pulley
76346	Resistor—Wire wound, 1200 ohms, 4 watts (R33)
	Resistors—Fixed, composition:
503068	68 ohms, ±10%, ½ watt (R2, R12)
503110	100 ohms, ±10%, ½ watt (R27)
503112	120 ohms, ±10%, ½ watt (R16)
513133	330 ohms, ±10%, 1 watt (R26)
503139	390 ohms, ±10%, ½ watt (R6)
503156	560 ohms, ±10%, ½ watt (R37)
503168	680 ohms, ±10%, ½ watt (R7, R18, R19)
503212	1,200 ohms, ±10%, ½ watt (R30, R36)
503233	3,300 ohms, ±10%, ½ watt (R29)
503282	8,200 ohms, ±10%, ½ watt (R4)
503310	10,000 ohms, ±10%, ½ watt (R38 in RC-1102B, RC-1102C)
503315	15,000 ohms, ±10%, ½ watt (R28) (R35 in RC-1102, RC-1102A)
503318	18,000 ohms, ±10%, ½ watt (R9) (R40, R41, in RC-1102B, RC-1102C)
503322	22,000 ohms, ±10%, ½ watt (R17, R34)
503327	27,000 ohms, ±10%, ½ watt (R38 in RC-1102, RC-1102A)
513333	33,000 ohms, ±10%, 1 watt (R10)
503339	39,000 ohms, ±10%, ½ watt (R31 in RC-1102, RC-1102A)
503347	47,000 ohms, ±10%, ½ watt (R35 in RC-1102B, RC-1102C)
503410	100,000 ohms, ±10%, ½ watt (R3, R20, R23)
503412	120,000 ohms, ±10%, ½ watt (R11)
503433	330,000 ohms, ±10%, ½ watt (R22)
503439	390,000 ohms, ±10%, ½ watt (R13)
504447	470,000 ohms, ±20%, ½ watt (R25, R32)
503456	560,000 ohms, ±10%, ½ watt (R39 in RC-1102, RC-1102A)
504522	2.2 megohm, ±20%, ½ watt (R1, R5)
503539	3.9 megohm, ±10%, ½ watt (R8)
504610	10 megohm, ±20%, ½ watt (R15)
504622	22 megohm, ±20%, ½ watt (R21)
76339	Shaft—Tuning knob shaft
73584	Shield—Tube shield for V1, V6
76331	Shield—Tube shield for V2
35787	Socket—Phono input socket (J1)
73117	Socket—Tube socket, 7 pin, miniature
70827	Socket—Tube socket, octal, wafer
76336	Socket—Tube socket, 9 pin, miniature, saddle mounted
35574	Socket—Dial lamp socket
76332	Spring—Drive cord spring
76342	Support—Antenna support (masonite) only
76334	Switch—Function switch (S1-1, S1-2, S1-3)
76326	Transformer—Power transformer 117 volt 60 cycle (T7)
76327	Transformer—Output transformer (T6)
73743	Transformer—Ratio detector transformer (T5)
76335	Transformer—First I.F. transformer—A.M. (T2)
75559	Transformer—First I.F. transformer—F.M. (T1)
76328	Transformer—Second I.F. transformer—A.M. (T4)
76329	Transformer—Second I.F. transformer—F.M. (T3)
33726	Washer—"C" washer for tuning knob shaft or for station selector shaft and pulley
	SPEAKER ASSEMBLIES Stamped 92586-6W, 92586-7W or 92586-8W RMA 274
75023	Cap—Dust cap
75024	Cone—Cone and voice coil assembly (3.2 ohms)
76392	Speaker—8" P.M. (92586-7W) speaker complete with cone and voice coil
74664	Speaker—3" P.M. speaker (92586-8W) complete with cone and voice coil
	MISCELLANEOUS
76359	Back—Cabinet back
76355	Bezel—Decorative bezel—round—for front of cabinet
Y2328	Cabinet—Plastic cabinet—maroon
76678	Clip—Spring clip for cabinet back
76363	Decal—Control function decal—early type (below knobs)
76767	Decal—Control function decal—late type (above knobs)
76356	Dial—Polystyrene dial scale
74782	Emblem—"RCA Victor" emblem
76360	Knob—Function switch knob—type #1
73378	Knob—Function switch knob—type #2
75712	Knob—Function switch knob—type #3
76765	Knob—Function switch knob—type #4
76361	Knob—tuning control, tone control or volume control and power switch knob—type #1
74711	Knob—tuning control, tone control or volume control and power switch knob—type #2
75714	Knob—tuning control, tone control or volume control and power switch knob—type #3
76766	Knob—tuning control, tone control or volume control and power switch knob—type #4
11891	Lamp—Dial lamp—Mazda 44
76425	Nameplate—"AM-FM" nameplate (tenite)
72765	Nut—Speed nut to fasten bezel assembly (4 req'd)
76362	Pointer—Station selector pointer
76357	Reflector—Dial scale reflector
76358	Screen—Grille screen
74734	Spring—Retaining spring for knobs—types #1, #3, and #4
14270	Spring—Retaining spring for knobs—type #2

†Stock No. 72953 is a reel containing 250 feet of cord.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACMENT PARTS



Differing Types of Knobs—Model 1R81



Dial Scale

The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

SHIELDING

The box shield over the RF and Converter tubes and the under chassis shielding of the function switch reduces the FM oscillator radiation of Model 1R81 to a point within the limits recently established by the Federal Communications Commission.

If either of these shields should be left off after servicing, the receiver may (in strong signal areas) apparently still function normally but the FM oscillator radiation will be greatly increased. This radiation will have an adverse effect on nearby television receivers and other FM radios.

ALWAYS REPLACE ALL SHIELDS

Additions to Parts List:

CHASSIS ASSEMBLIES

76958	Capacitor—Ceramic, 120 mmf (C4)
73551	Capacitor, Tubular, paper, 0.1 mf, 400 volts (C34)

MISCELLANEOUS

77232	Knob—Function switch knob—type 5
77233	Knob—Tuning control, tone control or volume control and power switch knob—type 5

RCA VICTOR

AC-DC Radio Receivers

1X51 Series

Chassis No. RC 1104, PC 1104A, RC 1104B RC 1104-1, RC 1104A-1, RC 1104B-1 RC 1104C, RC 1104D, RC 1104E

SERVICE DATA

— 1951 No. 8 —

1X51 SERIES:

1X51 (Maroon) *1X52 (Ivory)* *1X53 (Green)*
1X54 (Tan) *1X55 (Blue)* *1X56 (Red)*
1X57 (White)

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tuning Range ..... 540-1600 kc
Intermediate Frequency ..... 455 kc

Tube Complement

CHASSIS NO. RC 1104, RC 1104A, RC 1104B

(1) RCA 12SA7 ..... Converter
(2) RCA 12BA6 ..... I.F. Amplifier
(3) RCA 12SQ7 ..... Det.—A.V.C.—A.F Amp.
(4) RCA 50L6GT ..... Output
(5) RCA 35Z5GT ..... Rectifier

CHASSIS NO. RC 1104-1, RC 1104A-1, RC 1104B-1

Same as above except rectifier is RCA 35W4 instead of RCA 35Z5GT.

CHASSIS NO. RC 1104C, RC 1104D, RC 1104E

(1) RCA 12BE6 ..... Converter
(2) RCA 12BA6 ..... I.F. Amplifier
(3) RCA 12AV6 ..... Det.—A.V.C.—A.F. Amp.
(4) RCA 50C5 ..... Output
(5) RCA 35W4 ..... Rectifier

Dial Lamp ..... Type 47, 6-8 volts, 0.15 amp.

Chassis Identification

Model No.	1X51	1X52 1X57	1X53, 1X54 1X55, 1X56
Chassis No.	RC 1104 RC 1104-1 RC 1104C	RC 1104A RC 1104A-1 RC 1104D	RC 1104B RC 1104B-1 RC 1104E

Power Supply Rating
115 volts, AC, 50 or 60 cycles, or DC ..... 30 watts

Loudspeaker
Size and Type ..... 4-inch PM
V.C. Impedance ..... 3.2 ohms at 400 cycles

Power Output
Undistorted ..... 1.1 watts
Maximum ..... 1.4 watts

Dimensions (Overall)
Height..... 7⅝" Width..... 11 9/16" Depth..... 6¾"

Weight ..... 6 lbs. net

Dial Centering

If the mounting of the tuning condenser has been disturbed, it may be necessary to adjust its position after replacing the chassis in the cabinet. This may be done in the following manner:

1. Replace tuning knob.
2. Install chassis and tighten the mounting screws.
3. Loosen the two screws which hold the tuning condenser mounting bracket to the chassis.
4. Adjust the position of the tuning condenser mounting bracket so that the tuning knob may be rotated without binding on the cabinet.
5. The two screws should then be tightened to maintain this position.

Power Supply Polarity

For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Replacement of Dial Lamp

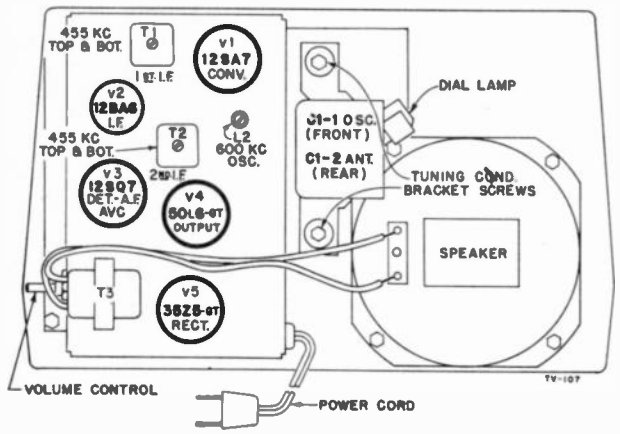
To replace the dial lamp the back cover must be removed. It is secured to the cabinet with four spring clips. Use care to avoid breaking the lead wires from the back cover to the chassis. The dial lamp socket is located at the upper left corner of the speaker and may be removed by pulling diagonally up and to the right.

If higher than normal line voltage causes repeated burning out of the dial light, it may be replaced with a type #44 lamp instead of the specified type #47. Type #44 will provide less illumination than type #47, but it will last longer,

Alignment Procedure

Critical Lead Dress

1. Dress all capacitors down against chassis. Connect outside foil of all capacitors as indicated in schematic diagram.
2. Locate C-10 in its mounting clip so that it butts against end of chassis.
3. Dress all circuit wiring against chassis.
4. Dress R-11 away from R-4.
5. Dress junction of R-2 and C-2 to prevent short circuits to chassis and dial back plate.



Tube and Trimmer Locations
Chassis No. RC 1104, RC 1104A, RC 1104B

For Chassis No. RC 1104-1, RC 1104A-1 and RC-1104B-1 the rectifier tube is type 35W4 instead of 35Z5GT.

Test-Oscillator

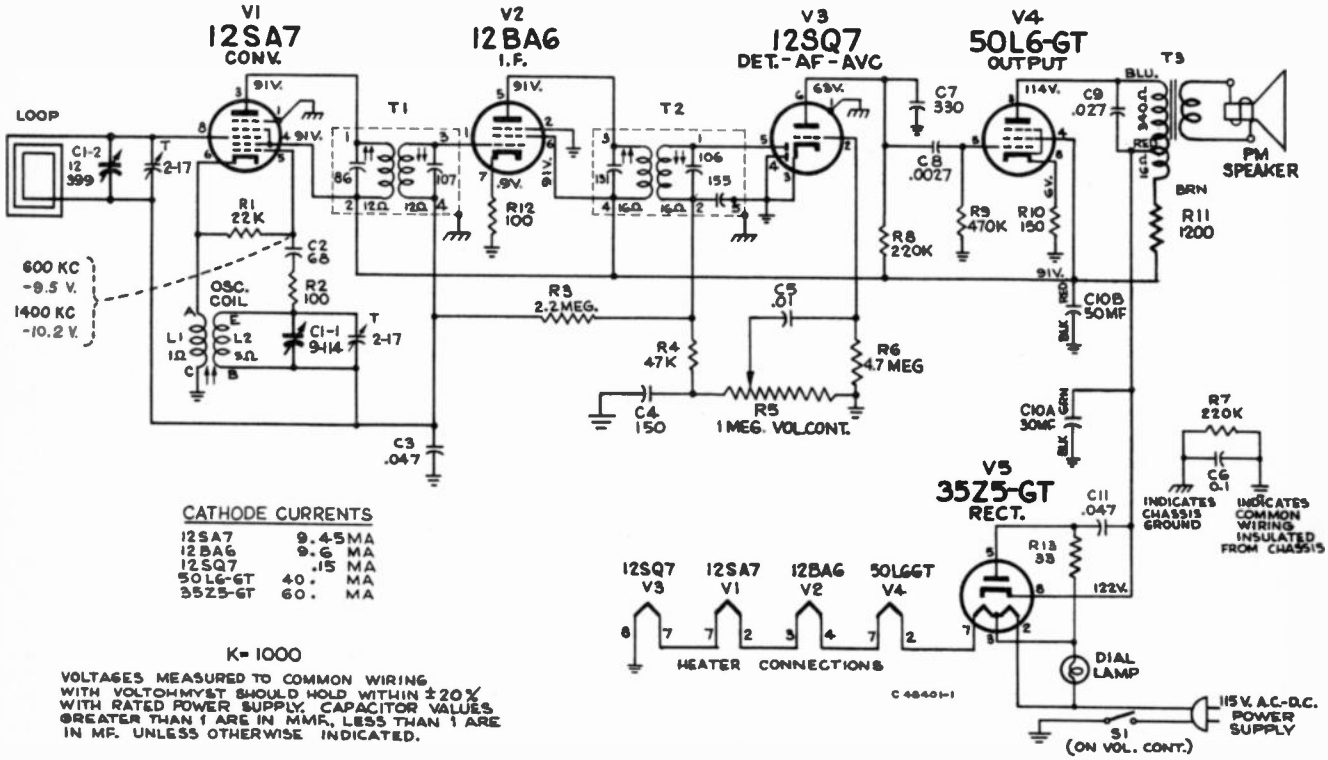
For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

On AC operation an isolation transformer (115 v./115 v.) may be necessary for the receiver if the test oscillator is also AC operated.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. output
1	12BA6 I-F grid through .01 mfd. capacitor	455 kc	Quiet-point 1600 kc. end of dial	*T2 (top and bottom) 2nd I-F trans.
2	Stator of C1-2 through .01 mfd.			T1 (top and bottom) 1st I-F trans.
3	Short wire placed near loop to radiate signal	1620 kc	Extreme clockwise (plates fully open)	osc. trimmer
4		1400 kc	1400 kc signal	†ant. trimmer
5		600 kc	600 kc signal	L2 (osc.) Rock gang
6		Repeat steps 3, 4 and 5.		

* Do not readjust T2 when test oscillator is connected to C1-2.

† When adjusting ant. trimmer it is necessary to have the loop in the same position and spacing as it will have when assembled in the cabinet. This spacing is approximately 5½" from dial back plate to loop.



CATHODE CURRENTS

12SA7	9.45MA
12BA6	9.6 MA
12SQ7	.15 MA
50L6-GT	40. MA
35Z5-GT	60. MA

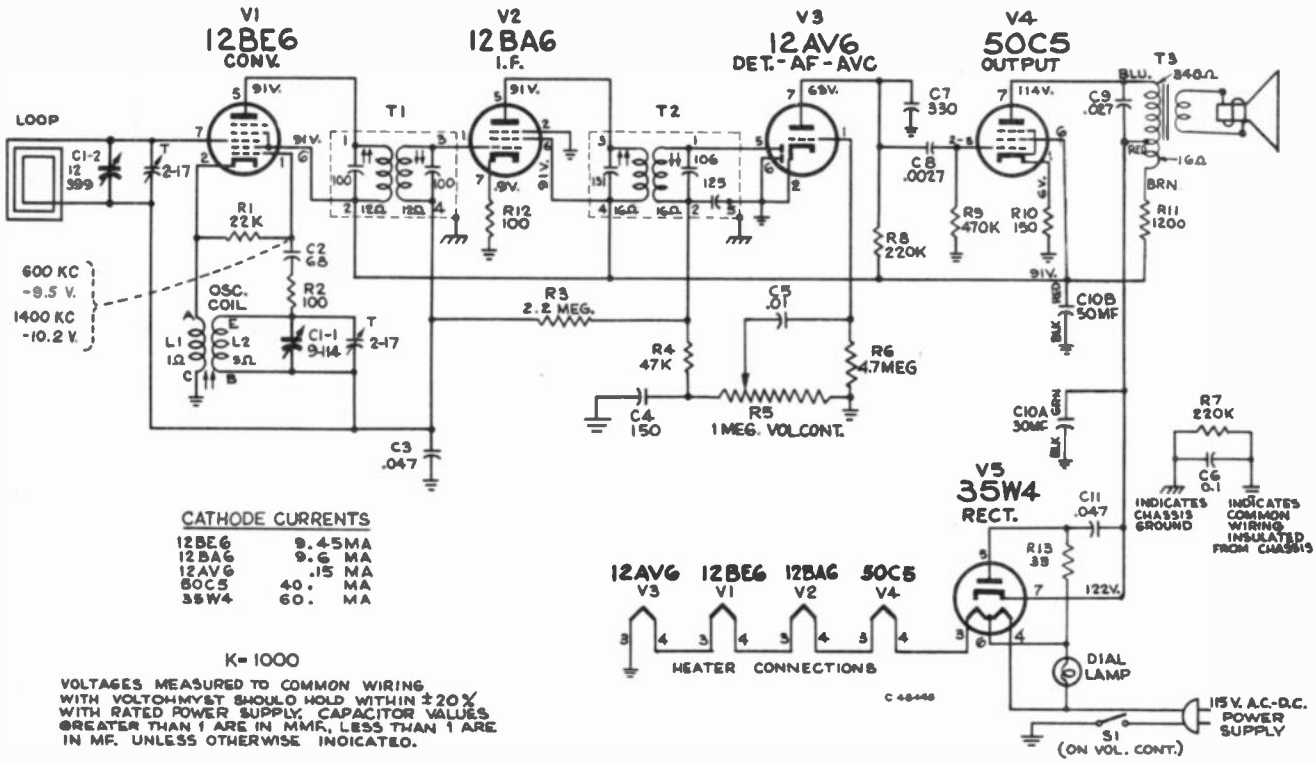
K= 1000

VOLTAGES MEASURED TO COMMON WIRING WITH VOLTOHMYST SHOULD HOLD WITHIN ±20% WITH RATED POWER SUPPLY. CAPACITOR VALUES GREATER THAN 1 ARE IN MMF, LESS THAN 1 ARE IN MF. UNLESS OTHERWISE INDICATED.

CHASSIS NO. RC 1104, RC 1104A, RC 1104B

Schematic Circuit Diagram

For Chassis No. RC 1104-1, RC 1104A-1 and RC-1104B-1 the rectifier tube is type 35W4 instead of 35Z5GT.



Schematic Circuit Diagram

CHASSIS NO. RC 1104C, RC 1104D, RC 1104E

Production Changes

In early production RC 1104, RC 1104A and RC 1104B:

R3 was 3.3 megohm (now 2.2 meg.).

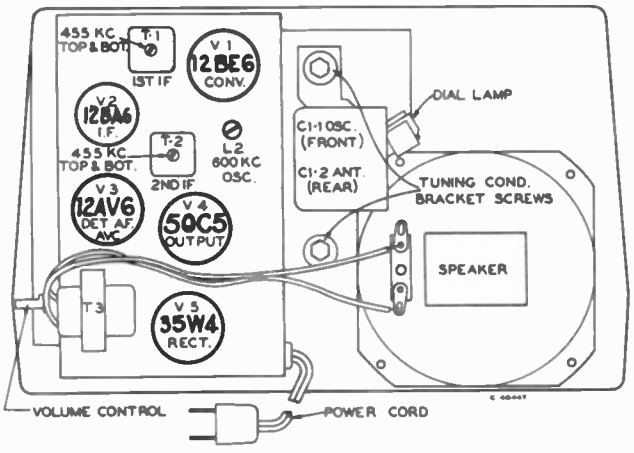
R6 was 10 megohm (now 4.7 meg.).

R13 was omitted (plate circuit of rectifier tube).

A few 1st I.F. transformers (T1) were used which had an incorrect primary capacitor. To permit the use of these transformers, two 5 mmf. ceramic capacitors were added across the primary (Term. #1 to Term. #2).

In early production RC 1104-1, RC 1104A-1, and RC 1104B-1:
R13 was omitted (plate circuit of rectifier tube).

In late production of RC-1104C, RC-1104D and RC-1104E the power line attachment cord enters the chassis close to the volume control.



Tube and Trimmer Locations

Chassis No. RC 1104C, RC 1104D, RC 1104E

1X51 Series

Replacement Parts

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1104, RC 1104-1, RC 1104C Model 1X51
	RC 1104A, RC 1104A-1, RC 1104D Models 1X52, 1X57
	RC 1104B, RC 1104B-1, RC 1104E Models 1X53, 1X54, 1X55, 1X56
76712	Antenna—Antenna loop and back cover for Models 1X51, 1X53, 1X54, 1X55 and 1X56
76730	Antenna—Antenna loop and back cover for Models 1X52 and 1X57
76715	Capacitor—Variable tuning capacitor (C1-1, C1-2)
39624	Capacitor—Mica, 68 mmf. (C2)
39632	Capacitor—Mica, 150 mmf. (C4)
72571	Capacitor—Mica, 330 mmf. (C7)
76718	Capacitor—Electrolytic comprising 1 section of 50 mfd., 150 volts and 1 section of 30 mfd., 150 volts (C10A, C10B)
73599	Capacitor—Tubular, paper, .0027 mfd., 600 volts (C8)
73561	Capacitor—Tubular, paper, .01 mfd., 400 volts (C5)
73554	Capacitor—Tubular, paper, .027 mfd., 400 volts (C9)
73553	Capacitor—Tubular, paper, .047 mfd., 400 volts (C3, C11)
73551	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd., 400 volts (C6)
73935	Clip—Mounting clip for I.F. transformer
74448	Coil—Oscillator coil complete with adjustable core (L1, L2)
74285	Control—Volume control and power switch (R5, S1)
70392	Cord—Power cord and plug
74838	Grommet—Power cord strain relief (1 set)
72283	Grommet—Rubber grommet for mounting variable capacitor
76713	Knob—Tuning control knob
31480	Lamp—Dial lamp—Mazda #47
	Resistors—Fixed, composition:—
514033	33 ohms, ±20%, 1 watt (R13)
504110	110 ohms, ±20%, ½ watt (R2, R12)
503115	150 ohms, ±10%, ½ watt (R10)
513212	1200 ohms, ±10%, 1 watt (R11)
504322	22,000 ohms, ±20%, ½ watt (R1)
504347	47,000 ohms, ±20%, ½ watt (R4)
504422	220,000 ohms, ±20%, ½ watt (R7, R8)
504447	470,000 ohms, ±20%, ½ watt (R9)
504522	2.2 megohm, ±20%, ½ watt (R3)
504547	4.7 megohm, ±20%, ½ watt (R6)
76802	Shield—Dial lamp shield for Models 1X52, 1X53, 1X54, 1X55, 1X56 and 1X57
73584	Shield—Tube shield for 12AV6 tube
76723	Socket—Dial lamp socket complete with leads
76716	Socket—Tube socket, 7 pin miniature, wafer with center shield for 12BE6, 12BA6 and 12AV6 tubes
74822	Socket—Tube socket, 7 pin miniature, wafer less center shield for 50C5 and 35W4 tubes

Stock No.	DESCRIPTION
74734	Spring—Spring clip for tuning control knob
54414	Socket—Tube socket, octal, moulded, saddle-mounted for 12SA7 and 12SQ7 tubes
70827	Socket—Tube socket, octal, wafer for 35Z5GT and 50L6GT tubes
76714	Transformer—Output transformer (T3)
75486	Transformer—First I.F. transformer (T1)
75487	Transformer—Second I.F. transformer (T2)
	SPEAKER ASSEMBLIES
	971495-1
76391	Speaker—4" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
Y2379	Cabinet—BLUE plastic cabinet less "RCA Victor" emblem for Model 1X55
Y2377	Cabinet—GREEN plastic cabinet less "RCA Victor" emblem for Model 1X53
Y2375	Cabinet—IVORY plastic cabinet less "RCA Victor" emblem for Model 1X52
Y2373	Cabinet—MAROON plastic cabinet less "RCA Victor" emblem for Model 1X51
Y2380	Cabinet—RED plastic cabinet less "RCA Victor" emblem for Model 1X56
Y2378	Cabinet—TAN plastic cabinet less "RCA Victor" emblem for Model 1X54
Y2376	Cabinet—WHITE plastic cabinet less "RCA Victor" emblem for Model 1X57
76798	Clip—Speed clip for dial back plate (lower) (2 req'd) for Models 1X51, 1X53, 1X54, 1X55, 1X56
76799	Clip—Speed clip for dial back plate (lower) (2 req'd) for Models 1X52, 1X57
76797	Clip—Speed clip for dial back plate (upper) (2 req'd)
73494	Clip—Spring clip to fasten antenna and back assembly to cabinet (4 req'd)
76720	Dial—Polystyrene dial scale
74782	Emblem—"RCA Victor" emblem
76760	Knob—Volume control knob—BLUE—for Model 1X55
76758	Knob—Volume control knob—GREEN—for Model 1X53
74667	Knob—Volume control knob—IVORY—for Model 1X52
76719	Knob—Volume control knob—MAROON—for Model 1X51
76761	Knob—Volume control knob—RED—for Model 1X56
76759	Knob—Volume control knob—TAN—for Model 1X54
74007	Knob—Volume control knob—WHITE—for Model 1X57
76721	Ring—Decorative ring for tuning knob (fastens to cabinet)
74734	Spring—Spring clip for volume control knob

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES ON REPLACEMENT PARTS

RCA VICTOR

AC-DC Radio Receiver

MODELS 1X591, 1X592

Chassis No. RC 1079K, RC 1079L

SERVICE DATA

— 1951 No. 3 —

1X591
Maroon

1X592
Ivory

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tuning Range ..... 540-1600 kc

Intermediate Frequency ..... 455 kc

Tube Complement

(1) RCA 12SA7 ..... Converter
(2) RCA 12SK7 ..... I-F Amplifier
(3) RCA 12SQ7 ..... Det.—A.V.C.—A-F Amp.
(4) RCA 50L6GT ..... Output
(5) RCA 35Z5GT ..... Rectifier

Power Supply Rating

115 volts a.c., 50 to 60 cycles or d.c. ..... 30 watts

Power Output

Undistorted ..... .85 watts
Maximum ..... 1.1 watts

Dial Lamps (2) ..... Mazda type 1490, 3.2 volts, .16 amp.

Loudspeaker

Size and Type ..... 8 in. PM
Voice Coil Impedance ..... 3.2 ohms at 400 cycles

Cabinet Dimensions

Height ..... 9½" Width ..... 12½" Depth ..... 8½"

Weight ..... 9 lbs.

Tuning Drive Ratio ..... 9 to 1 (4½ turns of knob)

Replacement Parts

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES **RC 1079K—1X591** **RC 1079L—1X592**
76584	Antenna—Antenna loop and back cover (L1)
74653	Capacitor—Variable tuning capacitor (C1, C2, C3, C4)
71924	Capacitor—Ceramic, 56 mmf. (C5)
75198	Capacitor—Ceramic, 470 mmf. (C14)
74662	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 150 volts, and 1 section of 50 mfd., 150 volts (C16A, C16B)
75643	Capacitor—Tubular, paper, .001 mfd., 1000 volts (C9)
73595	Capacitor—Tubular, paper, .0022 mfd., 600 volts (C15)
73789	Capacitor—Tubular, paper, .0068 mfd., 400 volts (C12)
73561	Capacitor—Tubular, paper, .01 mfd., 400 volts (C17)
73562	Capacitor—Tubular, paper, .022 mfd., 400 volts (C13)
73553	Capacitor—Tubular, paper, .047 mfd., 400 volts (C8, C18)
73551	Capacitor—Tubular, paper, 0.1 mfd., 400 volts (C6, C19)
73935	Clip—Mounting clip for I.F. transformer
74448	Coil—Oscillator coil complete with adjustable core (L2, L3)
35787	Connector—Phono input connector (socket)
75474	Connector—Single contact male connector for speaker cable
74133	Control—Volume control and power switch (R10, S1)
†72953	Cord—Drive cord (approx. 43" overall length required)
70392	Cord—Power cord and plug
73693	Grommet—Power cord strain relief (1 set)
72283	Grommet—Rubber grommet for mounting variable tuning capacitor
71116	Lamp—Dial lamp, Mazda #1490
76585	Pointer—Station selector pointer
72602	Pulley—Drive cord pulley
	Resistors—Fixed, composition:
504015	15 ohms, ±20%, ½ watt (R16)
503082	82 ohms, ±10%, ½ watt (R17)
503115	150 ohms, ±10%, ½ watt (R14)
513210	1000 ohms, ±10%, 1 watt (R15)
503322	22,000 ohms, ±10%, ½ watt (R2)
503347	47,000 ohms, ±10%, ½ watt (R9)
503358	56,000 ohms, ±10%, ½ watt (R4)
503422	220,000 ohms, ±10%, ½ watt (R12, R18)
503433	330,000 ohms, ±10%, ½ watt (R6)
503447	470,000 ohms, ±10%, ½ watt (R13)
503533	3.3 megohm, ±10%, ½ watt (R5)
503610	10 megohm, ±10%, ½ watt (R11)
74659	Shaft—Tuning knob shaft and pulley
74697	Socket—Dial lamp socket
31251	Socket—Tube socket, octal, wafer
76368	Spring—Drive cord spring
33634	Switch—Radio-phono switch (S2)
74654	Transformer—Output transformer (T3)
74918	Transformer—First I.F. transformer (T1)
73037	Transformer—Second I.F. transformer (T2)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES **92586-5W** **RL 105 C13** **RMA 274**
75023	Cap—Dust cap
75024	Cone—Cone and voice coil
76392	Speaker—8" P.M. speaker complete with cone and voice coil NOTE:—If stamping on speaker in instrument does not agree with above speaker numbers, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
Y2358	Cabinet—Plastic cabinet—maroon—for Model 1X591
Y2359	Cabinet—Plastic cabinet—Ivory—for Model 1X592
X3231	Cloth—Grille cloth only
76586	Dial—Polystyrene dial scale
76588	Emblem—"RCA Victor" emblem
76587	Grille—Speaker grille and cloth assy.
74666	Knob—Control knob—maroon—for Model 1X591
74667	Knob—Control knob—Ivory—for Model 1X592
74734	Spring—Retaining spring for knob

† Stock No. 72953 is a reel containing 250 feet of cord.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

Lead Dress

1. Dress all heater leads down to chassis and away from all audio grid and plate wiring.
2. Dress power cord against chassis base.
3. Dress capacitor C18 against back apron.
4. Dress capacitor C13 down to base alongside of shielded lead.
5. Dress output transformer leads down to chassis.
6. Dress capacitors C9 and C15 as direct as possible.
7. Dress dial lamp leads on top of chassis between 12SQ7 and 50L6GT tubes; below chassis, as short as possible to rectifier socket.
8. Dress excess loop leads away from tubes and clear of tuning condenser.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

On AC operation an isolation transformer (115 v./115 v.) may be necessary for the receiver if the test oscillator is also AC operated.

Dial Calibration

With the tuning condenser fully meshed, the dial pointer should be set to the first score mark at the left-hand end of the dial back plate. The four score marks represent:

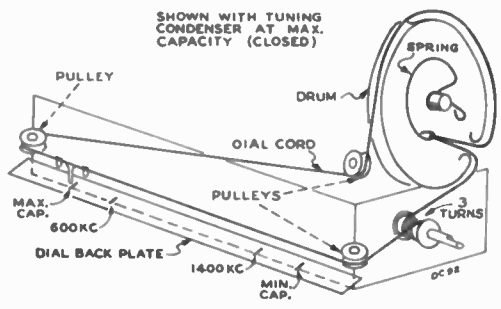
Max cap. 600 kc 1400 kc min. cap.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. output
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1500 kc end of dial	T2 (top and bottom) 2nd I-F trans.
2	Stator of C1 through 0.1 mfd.			*T1 (top and bottom) 1st I-F trans.
3	Short wire placed near loop to radiate signal	1620 kc	Min. cap.	C4 (osc.)
4		1400 kc	1400 kc signal	†C2 (ant.)
5		600 kc	600 kc signal	L3 (osc.) Rock gang
6		Repeat steps 3, 4 and 5.		

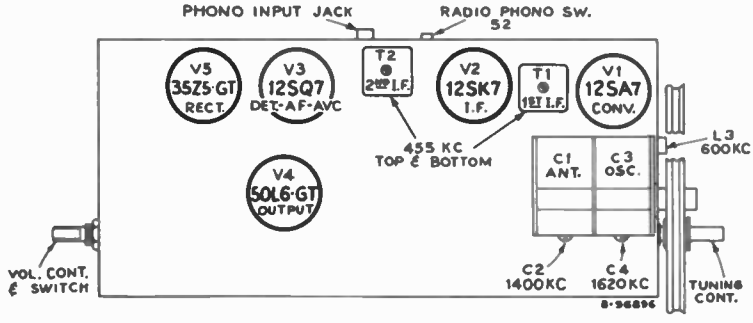
* Do not readjust T2 when test oscillator is connected to C1.

† When adjusting C2 (ant. trimmer) it is necessary to have the speaker and loop in the same position and spacing as they will have when assembled in the cabinet.

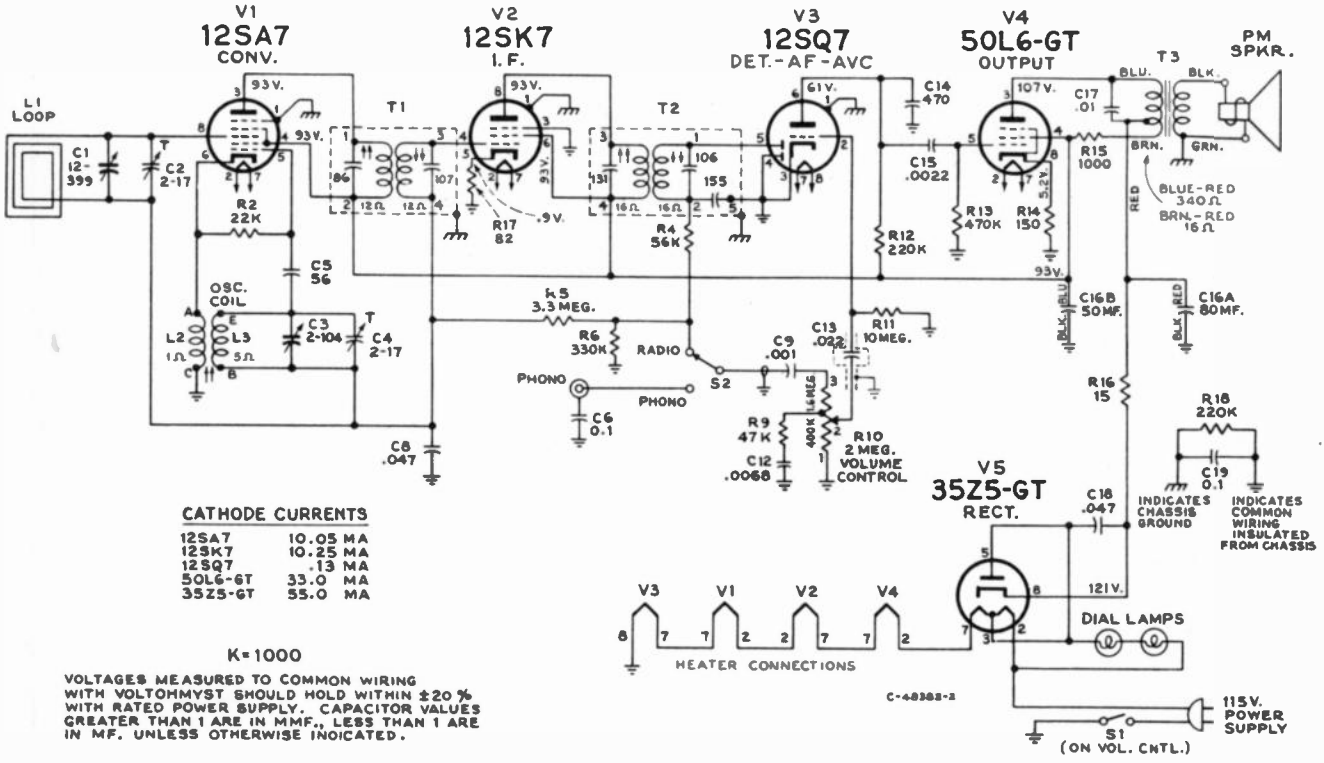
POWER SUPPLY POLARITY.—For operation on d.c., the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a.c., reversal of the plug may reduce hum.



Dial Indicator and Drive Cord



Tube and Trimmer Locations



CATHODE CURRENTS	
12SA7	10.05 MA
12SK7	10.25 MA
12SQ7	.13 MA
50L6-GT	33.0 MA
35Z5-GT	55.0 MA

K=1000

VOLTAGES MEASURED TO COMMON WIRING WITH VOLTOHMYST SHOULD HOLD WITHIN ±20% WITH RATED POWER SUPPLY. CAPACITOR VALUES GREATER THAN 1 ARE IN MMF., LESS THAN 1 ARE IN MF. UNLESS OTHERWISE INDICATED.

Schematic Circuit Diagram

In late production R16 is 33 ohms.

514033 Resistor—33 ohms, 1 watt, 20%

RCA VICTOR

Record Demonstrator

MODEL 15E

Chassis No. RS-139A,
Record Changer RP-190A-1
and Two Speed Manual Turntable

SERVICE DATA

— 1951 No. 7 —

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tube Complement
1. RCA 6SQ7 ..... A.F. Amplifier
2. RCA 6SQ7 ..... Ph. Inverter
3. RCA 6V6GT ..... Output
4. RCA 6V6GT ..... Output
5. RCA 5Y3GT ..... Rectifier

Power Supply Rating
115 volts, 60 cycles ..... 80 watts

Power Output
Undistorted ..... 10 watts Maximum ..... 11 watts

Loudspeaker
Size and type ..... 12 inch P.M.
Voice coil impedance ..... 3.2 ohms @ 400 cycles

Pilot Lamp ..... Mazda #51, 6-8 volts, .2 amp.

Weight ..... 43 lbs. net

Cabinet Dimensions (overall)
Height ....17⅞" Width ....21½" Depth ....19⅞"

Record Players

Automatic (RP-190A-1)
Record capacity ..... up to 14 records
Type of records ..... RCA "45"
Pickup (Stock No. 75770) ..... crystal
Turntable speed ..... 45 r.p.m.

Manual
Record capacity ..... 1 record
Type of records ..... up to 12 inch diameter
Pickup (Stock No. 75475) ..... dual stylus crystal
Turntable speed ..... 33⅓ or 78 r.p.m.

RP-190A-1 Record Changer:

The record changer will play up to fourteen 45 r.p.m. records having a 1½ inch center hole. It is identical to RP-190-2a record changer except for the omission of the power switch.

FOR RECORD CHANGER SERVICE DATA — REFER TO RP-190 SERIES SERVICE DATA.

Manual Turntable:

The manual turntable will play one 33⅓ or 78 r.p.m. record up to twelve inches in diameter. The speed is controlled by a knob on the motorboard. The correct stylus is selected by a lever knob on the end of the pickup arm.

VOLUME CONTROL STOP

This instrument is provided with a volume control stop to provide a pre-determined "maximum" volume level and yet allow normal volume control operation up to the pre-determined "maximum."

Adjusting "Maximum" Volume Level:

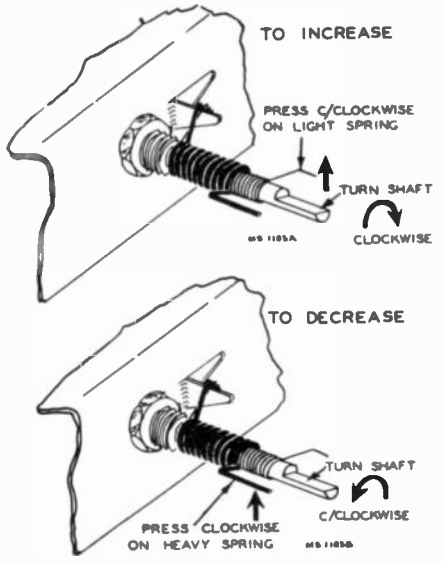
With the instrument operating, remove the volume control knob. Note the extending ends of two coil springs (one light and one heavy) on the volume control shaft.

TO INCREASE

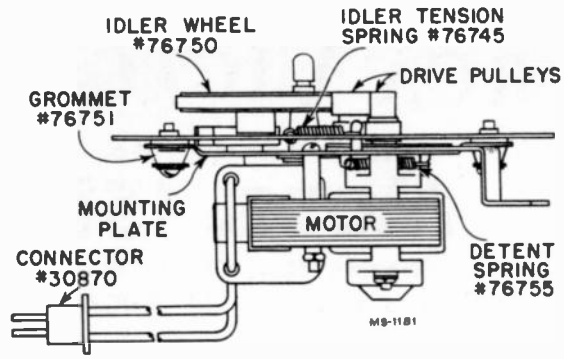
Turn control fully clockwise and then, with end of a pencil or similar item, press counterclockwise on the end of the LIGHT spring. Rotate control shaft clockwise until desired level is reached. Release pressure on the spring and replace knob.

TO DECREASE

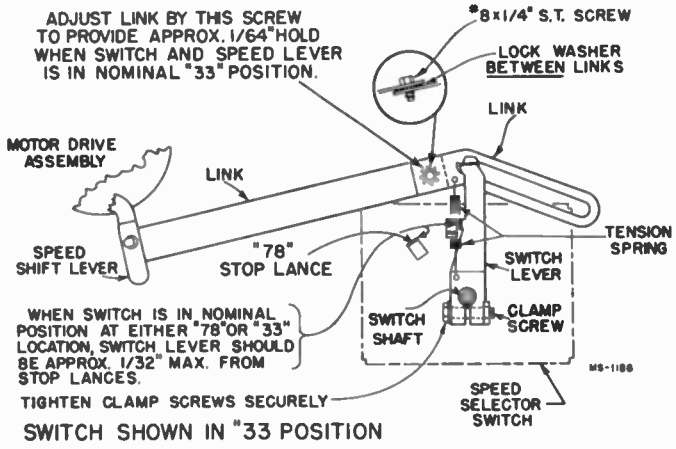
Turn control fully clockwise and then, with the end of a pencil or similar item, press clockwise on the end of the HEAVY spring. Rotate control counterclockwise to a very low level. Increase volume to desired level as described above.



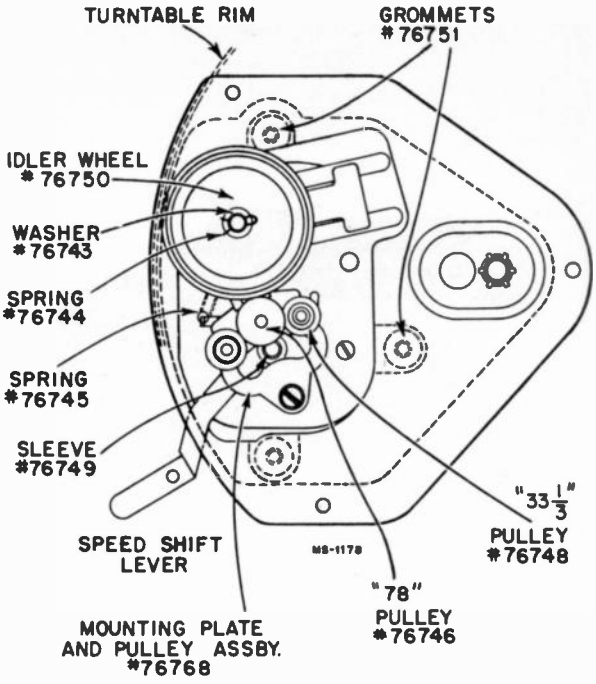
15E

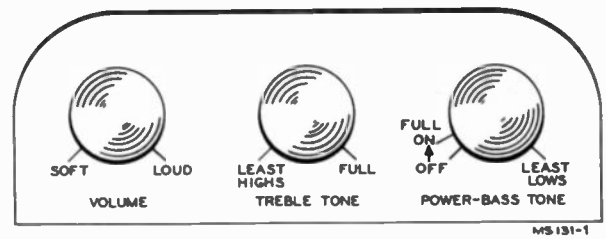


Manual Motorboard — Motor Assembly

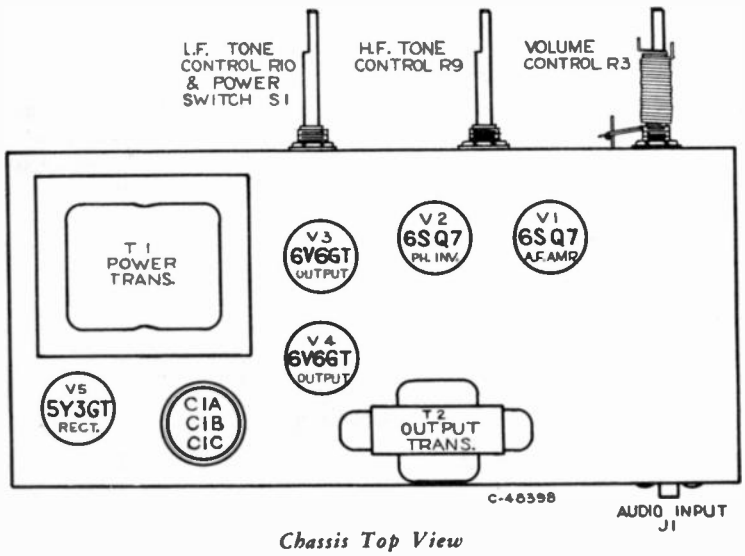


Speed Control Lever Assembly

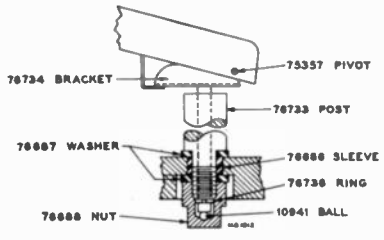




Controls



Chassis Top View



Pickup Arm Mounting — Manual Motorboard

MANUAL MOTORBOARD SERVICE HINTS

(a) Stylus force of pickup arm should be 8 to 10 grams. Insufficient force resulting from use of incorrect spring or pickup may allow stylus to jump grooves. Excessive force may cause distortion and record wear.

(b) Pickup arm pivots should be adjusted to provide a minimum of side play — yet allowing free vertical movement. Binding may cause stylus to jump groove.

(c) Inner surface of turntable rim must be clean and smooth. Idler wheel and drive pulleys must have no rough spots and be free of oil and grease. Roughness may cause rumble — oil may cause wow.

(d) Lubricate idler wheel and drive pulleys with a good quality light oil — one or two drops for each is sufficient.

(e) The pickup arm pivot shaft may be lubricated with a film of light oil. The pivot post rubber mounting should not be excessively compressed. The bearing nut should be tightened only enough to elevate the pivot shaft 1/32" above the post with the steel ball in place. This ball must be in place to permit free lateral pickup arm movement.

CRITICAL LEAD DRESS

1. Dress all filament leads next to chassis.
2. Dress power cord lead, from strain relief grommet to on-off switch, along side apron.
3. Dress A.C. leads at ON-OFF switch away from all audio components.
4. Dress output tube plate leads next to chassis.
5. Dress C8 next to chassis and wire with as short leads as practical.
6. Dress lead from arm of low frequency tone control to grid of V-3 away from A.C. leads at ON-OFF switch.

MODIFICATION

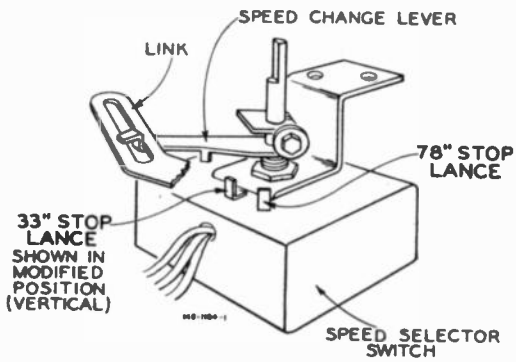
Although designed and assembled for 3-speed operation, provision is made for modification of this instrument for 33 and 45 rpm performance only. To eliminate the use of the 78 SPEED control and 78 stylus, proceed as follows:

To alter SPEED SELECTOR control

Tie both pickup arms to their rests and place the instrument on its left side (not on control knobs) on a table. Through the opening in the bottom of the cabinet, disconnect the black power plug and the phono plug from its chassis connection. While supporting the top panel, remove the hex head screw and washer, centrally located beneath the top panel at the back of the cabinet.

Place cabinet upright, move **SPEED SELECTOR** to **45** position, then lift off top panel assembly.

From the back, the switch can be viewed from beneath the top panel and conversion effected as shown below. Bend the 33 stop to the vertical position of the adjacent 78 stop. The speed change lever (on left) should now halt against the vertical 33 stop, eliminating the 78 speed position.



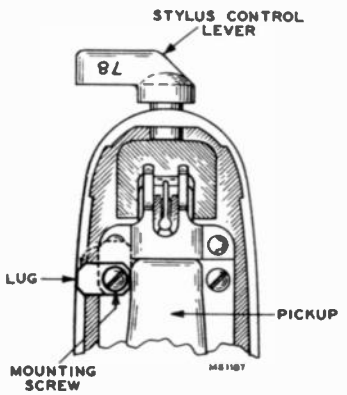
Replace top panel (rubber supporting grommets must be in place) and the hex head screw and washer.

NOTE: It is important that screw be tightened until top panel can be lifted approximately 1/16 inch only. The board should float freely on its mounts; there must be no restriction of movement.

Reconnect the black power plug and insert phono plug in the chassis socket. Place the instrument in the upright position and untie pickup arms.

To adapt STYLUS CONTROL LEVER —

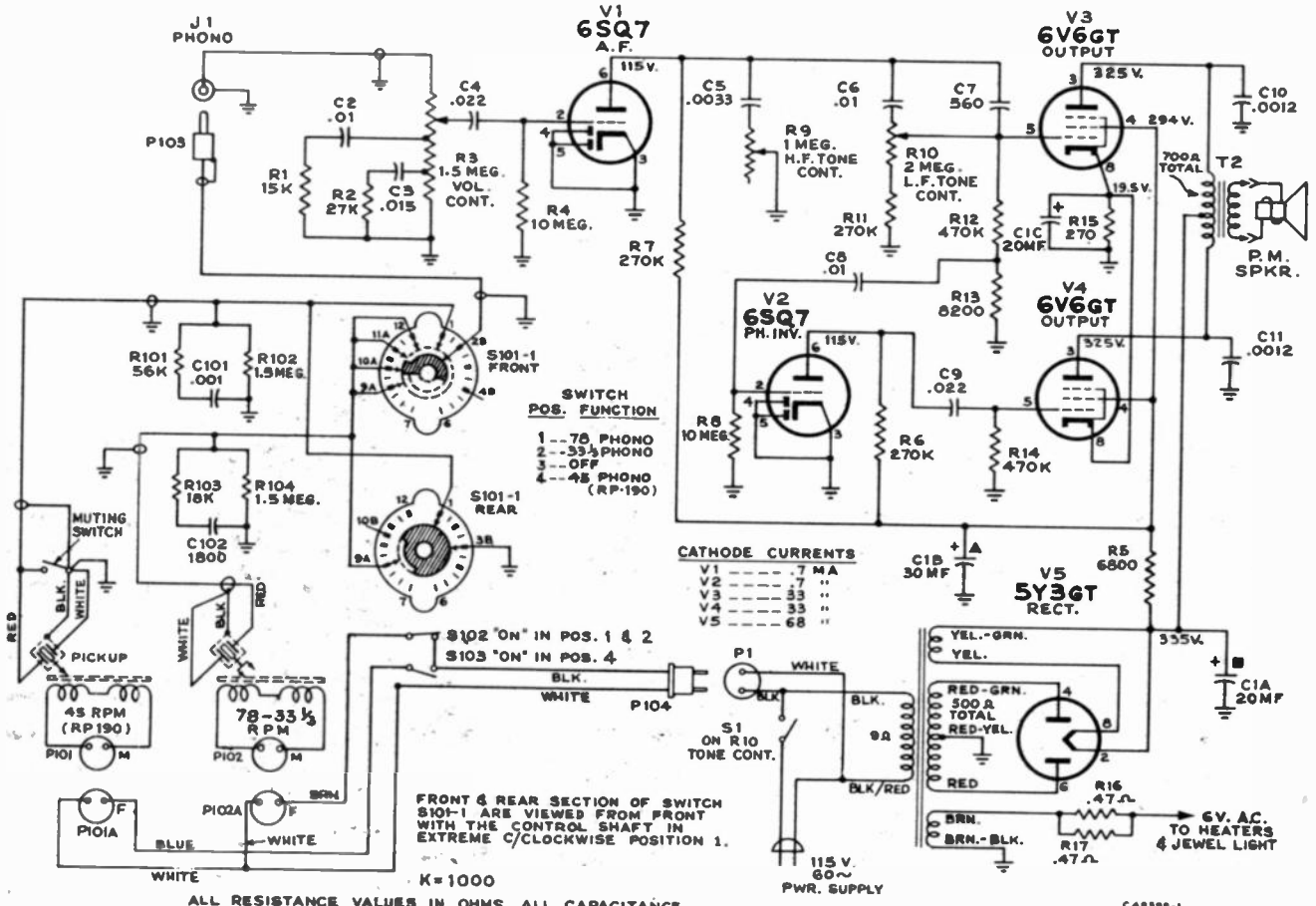
With lever in 33 position, loosen left holding screw just enough to turn lug to the position shown below and tighten screw. This will prevent the 78 stylus from being turned for use.



Before Operation —

Remove **SPEED SELECTOR** knob and turn over the **CIRCULAR PLATE** which will now show only **33 OFF 45** positions. Replace knob on shaft.

Reverse the left **INSTRUCTIONS PLATE** to read for 33 operation *only*.



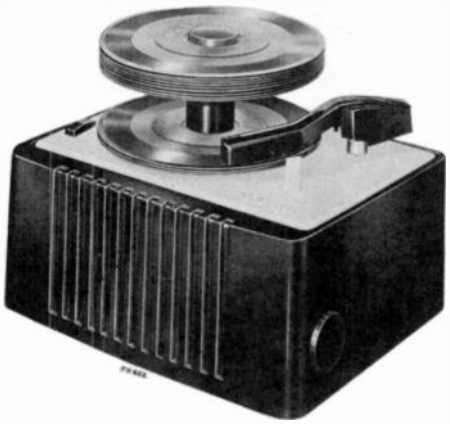
Schematic Diagram

Replacement Parts

STOCK No.	DESCRIPTION
	TWO SPEED MANUAL TURNTABLE
	Pickup Arm Assembly
76731	Arm—Pickup arm shell—less cartridge, mount, and cable
76734	Bracket—Pickup arm mounting bracket complete with pivot pin and counterbalance spring
76737	Cable—3 wire pickup arm cable complete with connectors
76738	Knob—Stylus selector knob complete with screw
76732	Mount—Pickup mount and swivel assembly
74230	Nut—#00-112 nut and washer to mount stylus
75475	Pickup—Dual stylus pickup crystal cartridge complete with two stylus
75366	Pin—Pivot pin for counterbalance spring
75357	Pivot—Pickup arm pivot (2 req'd)
76733	Post—Pickup arm pivot post and stop pin
76736	Ring—Retaining ring for pickup arm mounting bracket
71097	Screw—#4 x ¼" self tapping screw for pickup mount and swivel (4 req'd)
76735	Spring—Counterbalance spring
75497	Stylus—Osmium tip stylus for 78 RPM (not coded)
75496	Stylus—Osmium tip stylus for 33⅓ RPM (coded red)
	Motor and Turntable Assembly
30870	Connector—2 contact male connector for motor leads
76751	Grommet—Rubber grommet to mount motor (3 req'd)
76753	Motor—117 volt 60 cycle motor complete with mounting plate—less #76768 plate and idler wheel
76768	Plate—Speed control pulley mounting plate complete with pulleys
76746	Pulley—78 RPM pulley
76747	Pulley—33⅓ RPM pulley
76749	Sleeve—Spring sleeve for motor shaft
76755	Spring—Detent spring (below motor mounting plate)
76744	Spring—Hairpin spring to retain idler wheel
76745	Spring—Idler wheel tension spring (above motor mounting plate)
76752	Turntable—Finished turntable (9" dia.)
76743	Washer—Flat fibre washer for idler wheel
35969	Washer—"C" washer to retain turnable on shaft
76750	Wheel—Idler wheel
	45 R.P.M. AUTOMATIC RECORD CHANGER
	RP 190A-1
	Same as listed for RP 190-2a in RP 190 Series Service Data except for the omission of the on-off switch and switch housing
	AMPLIFIER ASSEMBLIES
	RS139A
76685	Capacitor—Ceramic, 560 mmf. C7
71976	Capacitor—Electrolytic comprising 1 section of 20 mfd., 450 volts, 1 section of 30 mfd., 350 volts and 1 section of 20 mfd., 25 volts C1A, C1B, C1C
73850	Capacitor—Tubular, paper, oil impregnated, .0012 mfd., 1000 volts C10, C11
73795	Capacitor—Tubular, paper, .0033 mfd., 600 volts .. C5
73561	Capacitor—Tubular, paper, .01 mfd., 400 volts C2, C6, C8
73797	Capacitor—Tubular, paper, .015 mfd., 600 volts ... C3
73562	Capacitor—Tubular, paper, .022 mfd., 400 volts C4, C9
35787	Connector—Phono input connector (socket) J1
72776	Connector—Single contact male connector for speaker leads (2 req'd)
30868	Connector—2 contact female connector for motor power P1
38405	Control—H.F. tone control R9
38402	Control—L.F. tone control and power switch .. R10, S1
71980	Control—Volume control—less stop R3
74838	Grommet—Power cord strain relief (1 set)

STOCK No.	DESCRIPTION
76684	Resistor—Wire wound, 0.47 ohms, 1 watt ... R16, R17
	Resistors—Fixed, composition:—
523127	270 ohms, ±10%, 2 watts R15
523268	6800 ohms, ±10%, 2 watts R5
503282	8200 ohms, ±10%, ½ watt R13
503315	15,000 ohms, ±10%, ½ watt R1
503327	27,000 ohms, ±10%, ½ watt R2
503427	270,000 ohms, ±10%, ½ watt R6, R7, R11
503447	470,000 ohms, ±10%, ½ watt R12, R14
504610	10 megohm, ±20%, ½ watt R4, R8
31364	Socket—pilot lamp socket
54414	Socket—Tube socket
71979	Stop—Volume control adjustable stop (two springs)
76695	Transformer—Output transformer T2
75566	Transformer—Power transformer, 117 volt 60 cycle .. T1
	FUNCTION SWITCH ASSEMBLY
72437	Cable—Shielded audio cable complete with pin plug (switch to amplifier) P103
74850	Capacitor—Ceramic, 1800 mmf. C102
75643	Capacitor—Tubular, paper, .001 mf., 1000 volts .. C101
30868	Connector—Two contact female connector for motor cables P101A, P102A
30870	Connector—Two contact male connector for motor power cable P104
76693	Lever—Speed change lever (mounted on switch shaft)
	Resistors—Fixed composition:
503318	18,000 ohms, ±10%, ½ watt R103
503356	56,000 ohms, ±10%, ½ watt R101
503515	1.5 megohm, ±10%, ½ watt R102, R104
76694	Switch—Function switch—less speed change lever S101, S102, S103
	SPEAKER ASSEMBLIES
	971494-2W
	RL111B1
	RMA274
75023	Cap—Dust cap
76296	Cone—Cone and voice coil (3.2 ohms)
76389	Speaker—12" P.M. speaker complete with cone and voice coil (3.2 ohms)
	NOTE:—If stamping on speaker instrument does not agree with above speaker number, order replacement parts by referring to model number stamped on speaker and full description of part required.
	MISCELLANEOUS
X3240	Baffle—Baffle board and grille cloth
10941	Ball—Steel ball (⅛" dia.) for pickup arm mounting
71599	Bracket—Pilot lamp bracket
13103	Cap—Pilot lamp cap.
72113	Foot—Rubber foot (4 req'd)
75697	Grommet—Rubber grommet for mounting 45 RPM changer (3 req'd)
72856	Grommet—Rubber grommet for motor board (4 req'd)
74979	Knob—Selector switch knob—tan
72118	Knob—Tone control or volume control knob—brown
11765	Lamp—Pilot lamp—Mazda 51
76692	Link—Motor speed change link (bent-end section only)
76691	Link—Motor speed change link (slotted section only)
76688	Nut—Pickup arm pivot shaft bearing nut
73634	Nut—Speed nut for speaker mounting screws (4 req'd)
76689	Rest—Pickup arm rest (for 33⅓-78 RPM arm)
76686	Sleeve—Rubber sleeve (39/64 O.D. x 7/16" I.D. x 11/32") for pickup arm pivot post
14270	Spring—Retaining spring for knob 74057
30900	Spring—Retaining spring for knob 72118
76690	Spring—Speed change link and lever tension spring
76687	Washer—Rubber washer (13/16" O.D. x 7/16" I.D. x ⅛") for pickup arm pivot post (2 req'd)

RCA VICTOR



Automatic Record Player

MODEL 45-EY-2

Chassis No. RS-138A, RS-138F, RS-138H

SERVICE DATA

— 1950 No. 33 —

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

FOR RECORD CHANGER SERVICE INFORMATION — REFER TO RP-190 SERIES SERVICE DATA.

Specifications

Tube Complement for RS-138A and RS-138H

1. RCA 12SQ7 ..... Amplifier
2. RCA 50L6-GT ..... Power amp. (Output)
3. RCA 35W4 ..... Rectifier

Tube Complement for RS-138F

1. RCA 12AV6 ..... Amplifier
2. RCA 50B5 or 50C5* ..... Power amp. (Output)
3. RCA 35W4 ..... Rectifier

*Refer to Instrument Label for Correct Replacement.

Loudspeaker

Size and type ..... 4x6" P.M.
Voice coil impedance ..... 3.2 ohms at 400 cycles

Power Supply Rating

115 volts, 60 cycles A.C. ..... 50 watts

Power Output

Undistorted ..... 1.2 watts Maximum ..... 1.5 watts

Dimensions (over-all)

Height, 8⅜" Width, 10⅝" Depth, 8⅝"

Record Changer (RP-190-1, RP-190-4 or RP-190-6)

Turntable speed ..... 45 r.p.m
Records used ..... RCA-Type 7-inch fine groove
Record capacity ..... 12 records
Pickup ..... Crystal (medium output)

Note: Three types of pickups have been used. Use Stock No. 74067 for replacement.

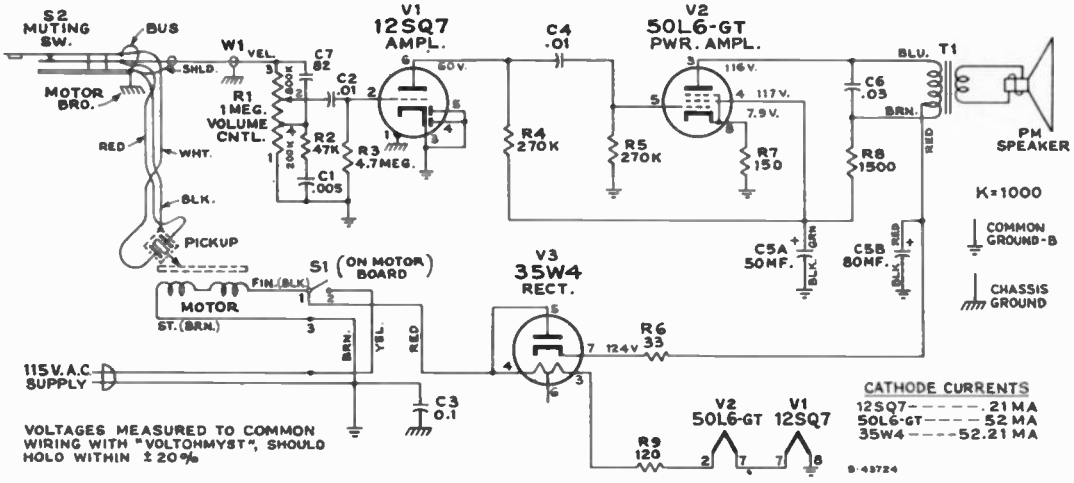
REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	AMPLIFIER ASSEMBLIES RS-138A, RS-138F, RS-138H
76202	Baffle—Speaker baffle and grille cloth
76406	Bracket—Speaker mounting brackets complete with screws—for rim mounted speakers
39626	Capacitor—Mica, 82 mmf C7
75980	Capacitor—Electrolytic comprising 1 section of 50 mfd, 150 volts, and 1 section of 80 mfd, 150 volts C5A, C5B
73920	Capacitor—Tubular, paper, .005 mfd, 400 volts C1
73561	Capacitor—Tubular, paper, .01 mfd, 400 volts C2, C4
70613	Capacitor—Tubular, paper, .03 mfd, 400 volts C6
73551	Capacitor—Tubular, paper, 0.1 mfd, 400 volts C3
76201	Control—Volume control R1
70392	Cord—Power cord and plug
74838	Grommet—Power cord strain relief (1 set)
73693	Grommet—Output transformer leads strain relief
72314	Resistor—Wire wound, 120 ohms, 5 watts R9
	Resistor—Fixed, composition:—
	33 ohms, ±20%, 1 watt R6
	150 ohms, ±10%, ½ watt R7
	1500 ohms, ±10%, ½ watt R8
	47,000 ohms, ±10%, ½ watt R2
	270,000 ohms, ±10%, ½ watt R4, R5
	4.7 megohm, ±20%, ½ watt R3

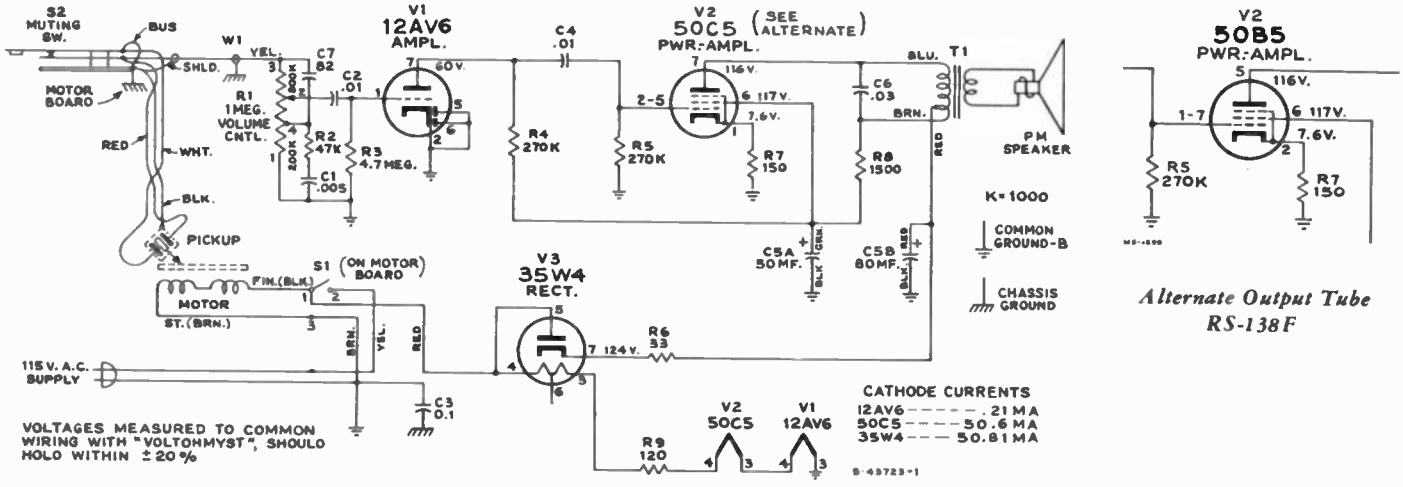
STOCK No.	DESCRIPTION
73117	Socket—Tube socket, 7 pin, miniature
70827	Socket—Tube socket, octal, wafer
75939	Transformer—Output transformer T1
	SPEAKER ASSEMBLIES 922258-4
75979	Speaker—4" x 6" P.M. speaker complete with cone and voice coil (pot mounted speaker)
	SPEAKER ASSEMBLIES 922258-5
76407	Speaker—4" x 6" P.M. speaker complete with cone and voice coil (rim mounted speaker)
	MISCELLANEOUS
Y2325	Cabinet—Plastic cabinet—maroon—less bottom cover
76203	Cover—Bottom cover for cabinet—burgundy—complete with feet
75697	Grommet—Rubber grommet to mount changer mechanism (3 req'd)
77139	Knob—Volume control knob
76204	Screw—#10-32 x ⅞" round head machine screw to mount changer mechanism (3 req'd)
76205	Screw #6-32 x 5/16" hex washer head machine screw for securing bottom cover (4 req'd)
74734	Spring—Spring clip for volume control knob

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

45-EY-2

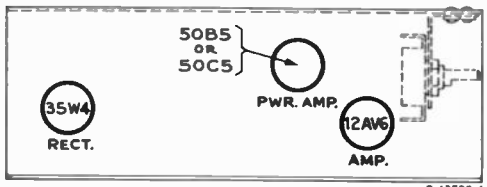


Schematic Diagram RS-138A and RS-138H

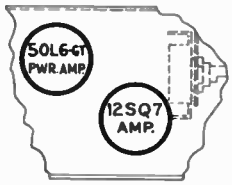


Schematic Diagram RS-138F

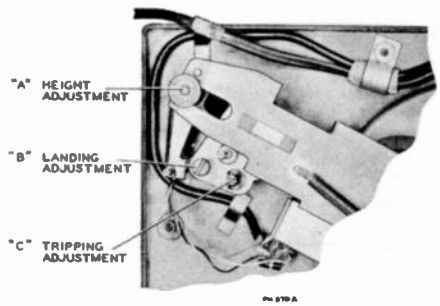
Alternate Output Tube RS-138F



RS-138F



RS-138A, RS-138H



Alternate Output Tube

Type 50B5 tube has been used as an alternate for type 50C5 tube. THE TWO TYPES ARE NOT DIRECT SUBSTITUTES. REFER TO INSTRUMENT LABEL FOR CORRECT REPLACEMENT. CHECK SOCKET WIRING IF IN DOUBT.

Critical Lead Dress

1. Dress all leads away from R6 and R9
2. Dress electrolytic capacitor away from R6 and R9
3. Dress filament leads down to chassis
4. Solder braid of W-1 such that it acts as a strain relief

Pickup Height Adjustment

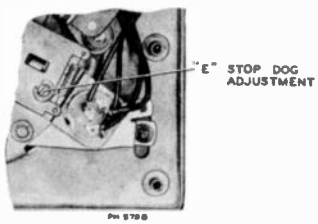
Adjust knurled nut (A) until the distance (during change cycle) between the top of the turntable and the stylus point is approximately 1⅛".

Pickup Landing Adjustment

Adjust the screw driver landing adjustment stud "B" so the stylus lands 2⅝" ± ¼₄" from the side of the center post.

Tripping Adjustment

Adjust the eccentric tripping stud (C) until the mechanism trips when the stylus is 1¹⁹⁄₃₂" from the side of the center post.



Stop Dog Adjustment

Turn the eccentric screw (E) until the record drops to the turntable without striking the pickup arm.

FOR RECORD CHANGER SERVICE INFORMATION — REFER TO RP-190 SEIES SERVICE DATA.

RCA VICTOR

Automatic Record Player

MODEL 45-EY-3

Chassis No. RS-136, RS-136A, RS-136C, RS-136E

SERVICE DATA

— 1950 No. 25 —

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tube Complement for RS-136

1. RCA 6SQ7 ..... Amplifier
2. RCA 25L6-GT ..... Output

Tube Complement for RS-136A, RS-136C

1. RCA 12SQ7 ..... Amplifier
2. RCA 50L6-GT ..... Output
3. RCA 35Z5-GT ..... Rectifier

Tube Complement for RS-136E

1. RCA 12AV6 ..... Amplifier
2. RCA 50C5 ..... Output
3. RCA 35W4 ..... Rectifier

Loudspeaker

Size and type ..... 4 x 6" P.M.
Voice coil impedance ..... 3.2 ohms at 400 cycles

Dimensions (over-all)

Height 7⅜" Width, 11½" Depth, 12⅛"

Weight ..... 13 lbs. net

Power Supply Rating

With RS-136 amplifier and RP-190-3 record changer 115 volts, 60 cycles A.C. ..... 45 watts

With RS-136A, RS-136C or RS-136E amplifier and RP-190-1, RP-190-4 or RP-190-6 record changer 115 volts, 60 cycles A.C. ..... 50 watts

Power Output

Undistorted 1.2 watts Maximum 1.5 watts

Record Changer { (RP-190-1, RP-190-3, RP-190-4 or RP-190-6.

NOTE: RP-190-3 used only in conjunction with RS-136 amplifier.

Turntable speed ..... 45 r.p.m.
Records used ..... RCA-Type 7-inch fine groove
Record capacity ..... 12 records
Pickup ..... Crystal (medium output)

NOTE: Three different pickups have been used. Use Stock No. 74067 for replacement.

Chassis Identification

Chassis stamped RS-136 use two octal base tubes and a selenium rectifier. The speaker is pot mounted.

NOTE: The record changer (RP-190-3) used in conjunction with this chassis has a special motor (85v, 300 ma) to obtain the proper filament voltages.

Chassis stamped RS-136A use three octal base tubes. The speaker is pot mounted.

Chassis stamped RS-136C use three octal base tubes. The speaker is rim mounted.

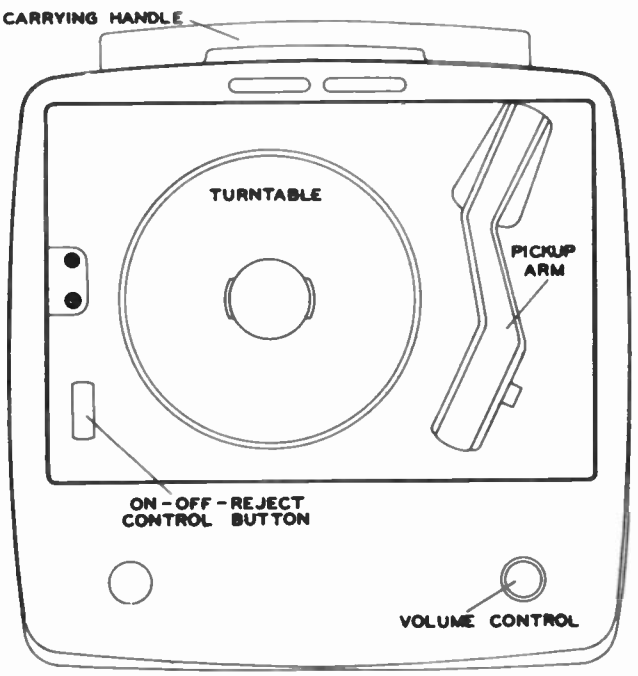
Chassis stamped RS-136E use three miniature type tubes. The speaker is rim mounted.

Access to Tubes

To gain access to tubes, remove the four screws which hold the bottom cover to the case.

Critical Lead Dress

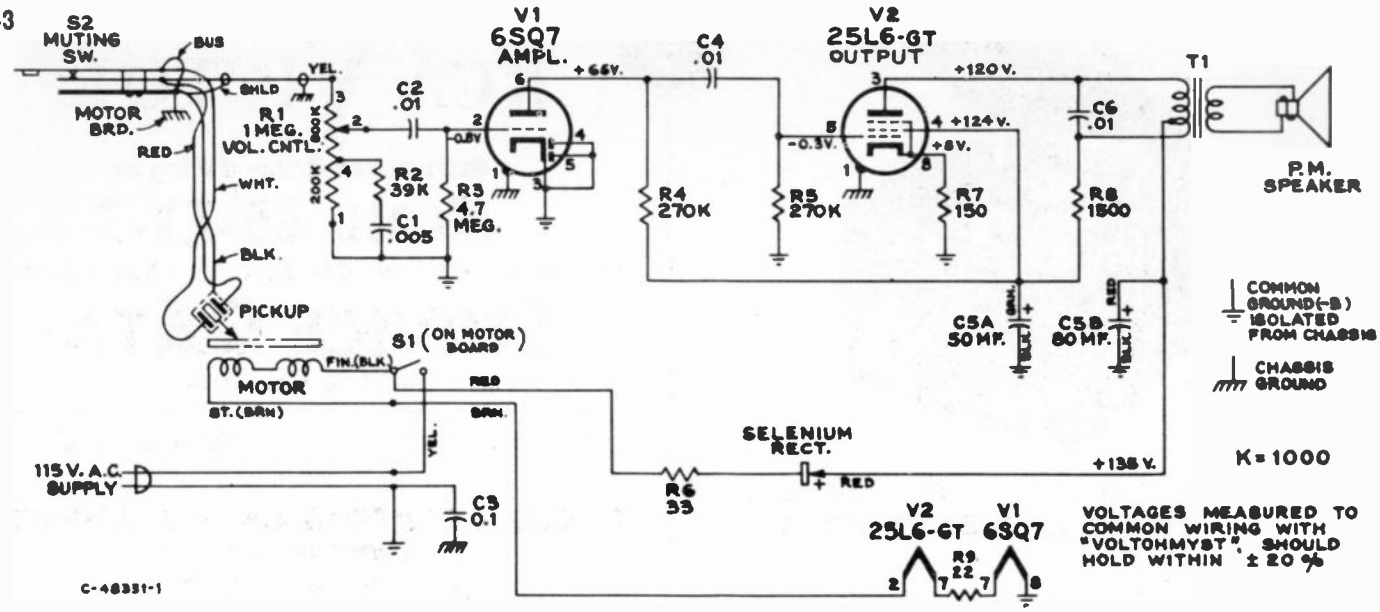
1. Dress R6 and R9 up and away from socket and all other parts.
2. Dress C6 up and away from output tube socket.
3. Dress C3 away from rectifier socket.
4. Dress all wiring down against chassis.
5. Use caution when installing chassis in cabinet so that leads on back of speaker will not be pinched.



Controls

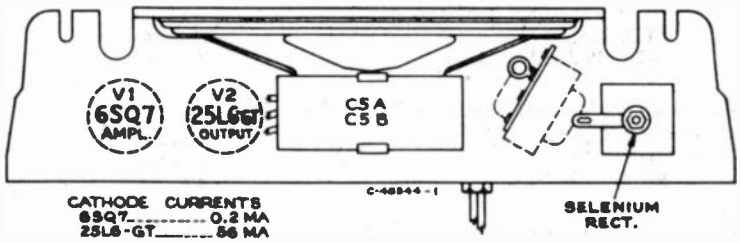
Printed in U. S. A.

45-EY-3

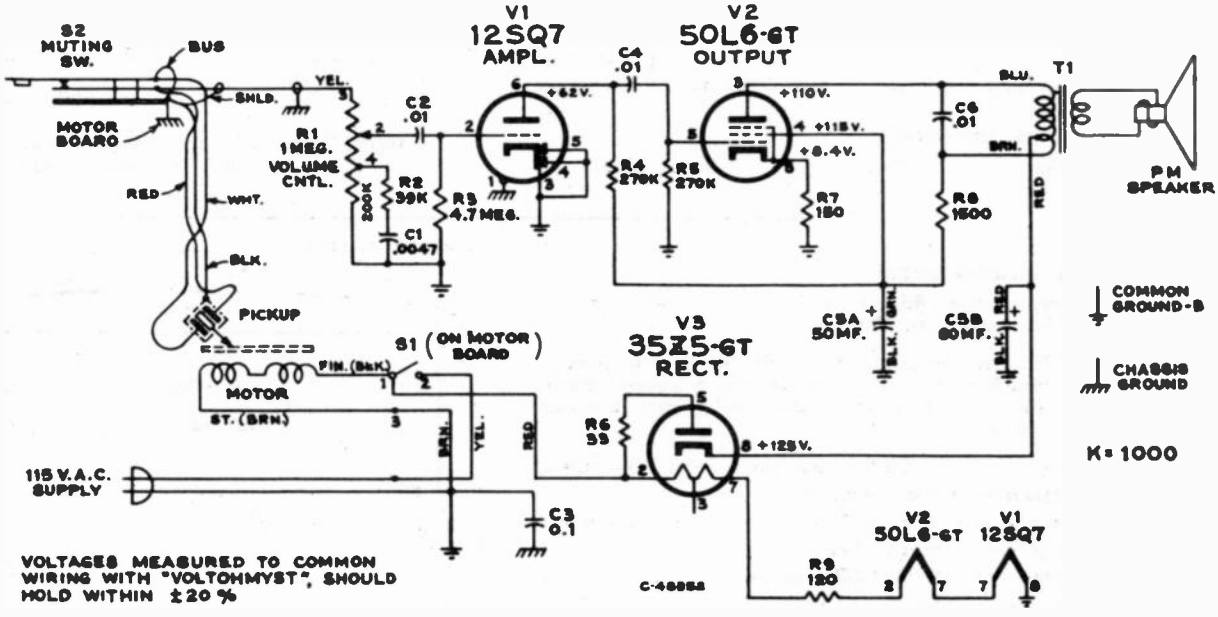


Schematic Diagram RS-136

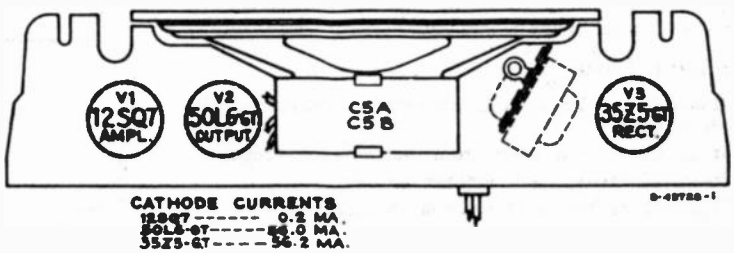
NOTE: The record changer (RP-190-3) used in conjunction with this chassis has a special motor (85v, 300 ma) to obtain the proper filament voltages.



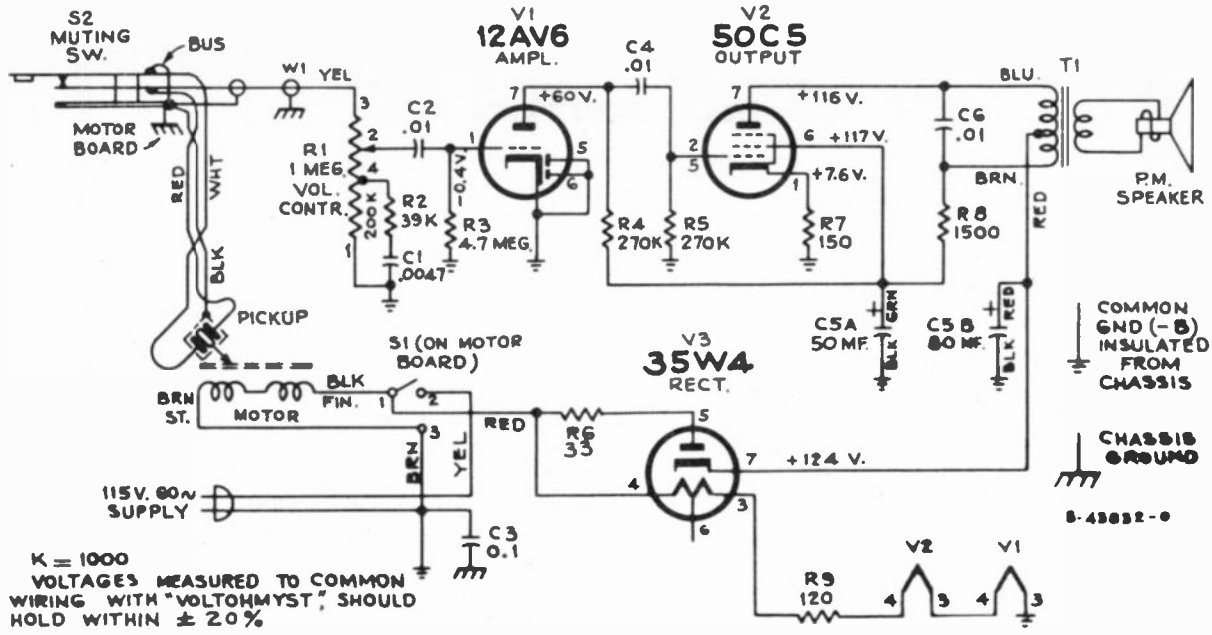
Tube Locations (Bottom View)



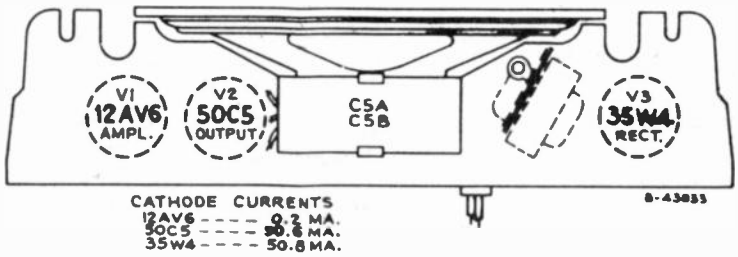
Schematic Diagram RS-136A and RS-136C



Tube Locations (Bottom View)



Schematic Diagram RS-136E



Tube Locations (Bottom View)

RECORD CHANGER ADJUSTMENTS

Pickup Height Adjustment

Adjust knurled nut (A) until the distance (during change cycle) between the top of the turntable and the stylus point is approximately 1⅛".

Pickup Landing Adjustment

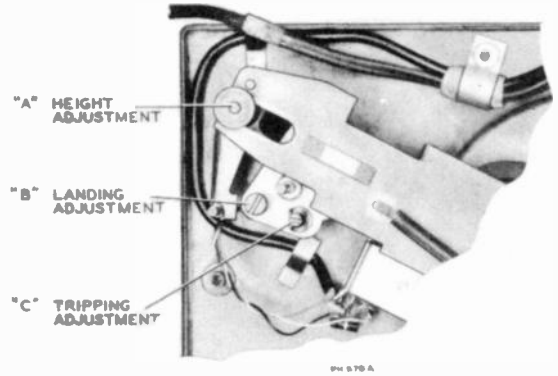
Adjust the screw driver landing adjustment stud "B" so the stylus lands 2⅝" ±1/64" from the side of the center post.

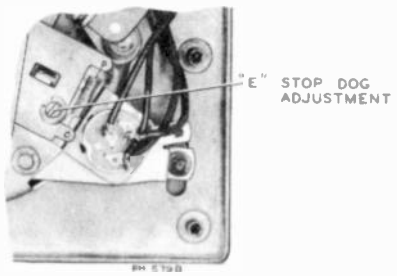
Tripping Adjustment

Adjust the eccentric tripping stud (C) until the mechanism trips when the stylus is 1 19/32" from the side of the center post.

Stop Dog Adjustment

Turn the eccentric screw (E) until the record drops to the turntable without striking the pickup arm.



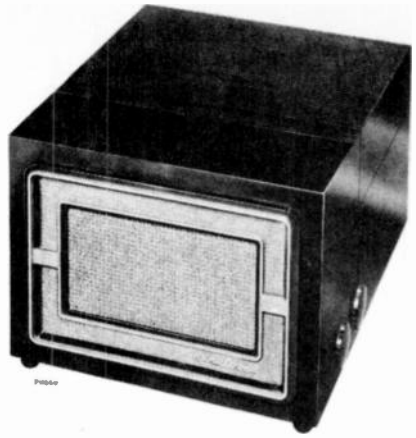


REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	AMPLIFIER ASSEMBLIES RS-136, RS-136A, RS-136C, RS-136E
76408	Bracket—Speaker mounting brackets complete with screws (1 set) for rim mounted speakers
75980	Capacitor—Electrolytic comprising 1 section of 50 50 mfd., 150 volts and 1 section of 80 mfd., 150 volts (C5A, C5B)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd., 400 volts, for RS-136A, RS-136C and RS-136E, also as replacement for .005 mf. in RS-136 (C1)
73561	Capacitor—Tubular, paper, oil impregnated, .01 mfd., 400 volts (C2, C4, C6)
73551	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd., 400 volts (C3)
38407	Control—Volume control (R1)
70392	Cord—Power cord and plug
74838	Grommet—Power cord strain relief (1 set)
75941	Grommet—Rubber grommet for motor and pickup leads protection
73693	Grommet—Output transformer leads strain relief (1 set)
75940	Rectifier Selenium rectifier for RS-136
33378	Resistor—Wire wound, 22 ohms, 2 watts, used in RS-136 (R9)
73237	Resistor—Wire wound, 33 ohms, fuse type (R6)
72314	Resistor—Wire wound, 120 ohms, 5 watts, used in RS-136A, RS-136C and RS-136E (R9)
503115	150 ohms, ±10%, ½ watt (R7)
503215	1500 ohms, ±10%, ½ watt (R8)
503339	39,000 ohms, ±10%, ½ watt (R2)
503427	270,000 ohms, ±10%, ½ watt (R4, R5)
503547	4.7 megohm, ±10%, ½ watt (R3)
54414	Socket—Tube socket, octal, moulded, saddle type
70827	Socket—Tube socket, octal, wafer
74822	Socket—Tube socket, 7 pin miniature, wafer
75939	Transformer—Output transformer (T1)
	SPEAKER ASSEMBLIES 922258-4
75979	Speaker—4" x 6" P.M. speaker complete with cone and voice coil (pot mounted speaker)
	SPEAKER ASSEMBLIES 922258-5
76407	Speaker—4" x 6" P.M. speaker complete with cone and voice coil (rim mounted speaker)

STOCK No.	DESCRIPTION
	MISCELLANEOUS
75942	Baffle—Speaker baffle board and screen
75926	Case—Plastic case with "RCA Victor" emblem—less bottom cover, top lid, "Victrola" decal, hinges, catch mechanism, and striker plate
75948	Catch—Cabinet catch mechanism complete — less striker plate
75954	Cover—Bottom cover for cabinet (plastic)
74273	Decal—Trademark decal (Victrola)
74782	Emblem—"RCA Victor" emblem
75697	Grommet—Rubber grommet to mount record changer (3 req'd)
75956	Handle—Carrying handle—top section only
75957	Handle—Carrying handle—bottom section only
75955	Hinge—Cabinet lid hinge (2 req'd)
75945	Knob—Volume control knob—maroon
75953	Lid—Top lid for cabinet—less "Victrola" decal and hinges
75958	Link—Carrying handle link (2 req'd)
74788	Nut—Speed nut to fasten ventilating screen (2 req'd)
75944	Plate—Mounting plate for carrying handle (2 req'd)
75949	Plate—Striker plate for catch mechanism.
75913	Screw—#10-32 x ¾" round head machine screw to mount record changer (3 req'd)
75951	Screw—#4-40 x ¼" flat head machine screw to fasten catch mechanism (2 req'd) or striker plate (2 req'd) or hinge (4 req'd)
75952	Screw—#6-32 x 3/16" round head machine screw for lid support (4 req'd)
75959	Screw—#4 x 7/16" cross-recessed fillister head screw to mount carrying handle (4 req'd)
75950	Spacer—Metal spacer to mount record changer (3 req'd)
76674	Spring—Handle return spring
14270	Spring—Retaining spring for volume control knob
75946	Spring—Pickup arm hold-down spring
75978	Stud—Tapped stud for handle mounting plate screw
75943	Support—Cabinet lid support
75947	Support—Plastic support for lid support and power cord (located on inside of cabinet)

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS



RCA VICTOR

Automatic Record Player

MODEL 45-EY-4

Chassis No. RS 140

SERVICE DATA

— 1952 No. 1 —

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

FOR RECORD CHANGER SERVICE INFORMATION — REFER TO RP-190 SERIES SERVICE DATA.

Tube Complement

1. RCA 12SC7 ..... Amplifier and Phase Invert.
2. RCA 35L6-GT (2 tubes) ..... Push-Pull Output
3. RCA 35Z5-GT ..... Rectifier

Loudspeaker (92586-6W or 92586-9W)

Size and type ..... 8" P.M.
Voice coil impedance ..... 3.2 ohms at 400 cycles

Power Supply Rating

115 volts, 60 cycles A.C. ..... 50 watts

Power Output

Undistorted .... 2.3 watts Maximum ... 3.2 watts

Dimensions (over-all)

Height, 8⅜" Width, 11½" Depth, 13½"

Record Changer RP190-2

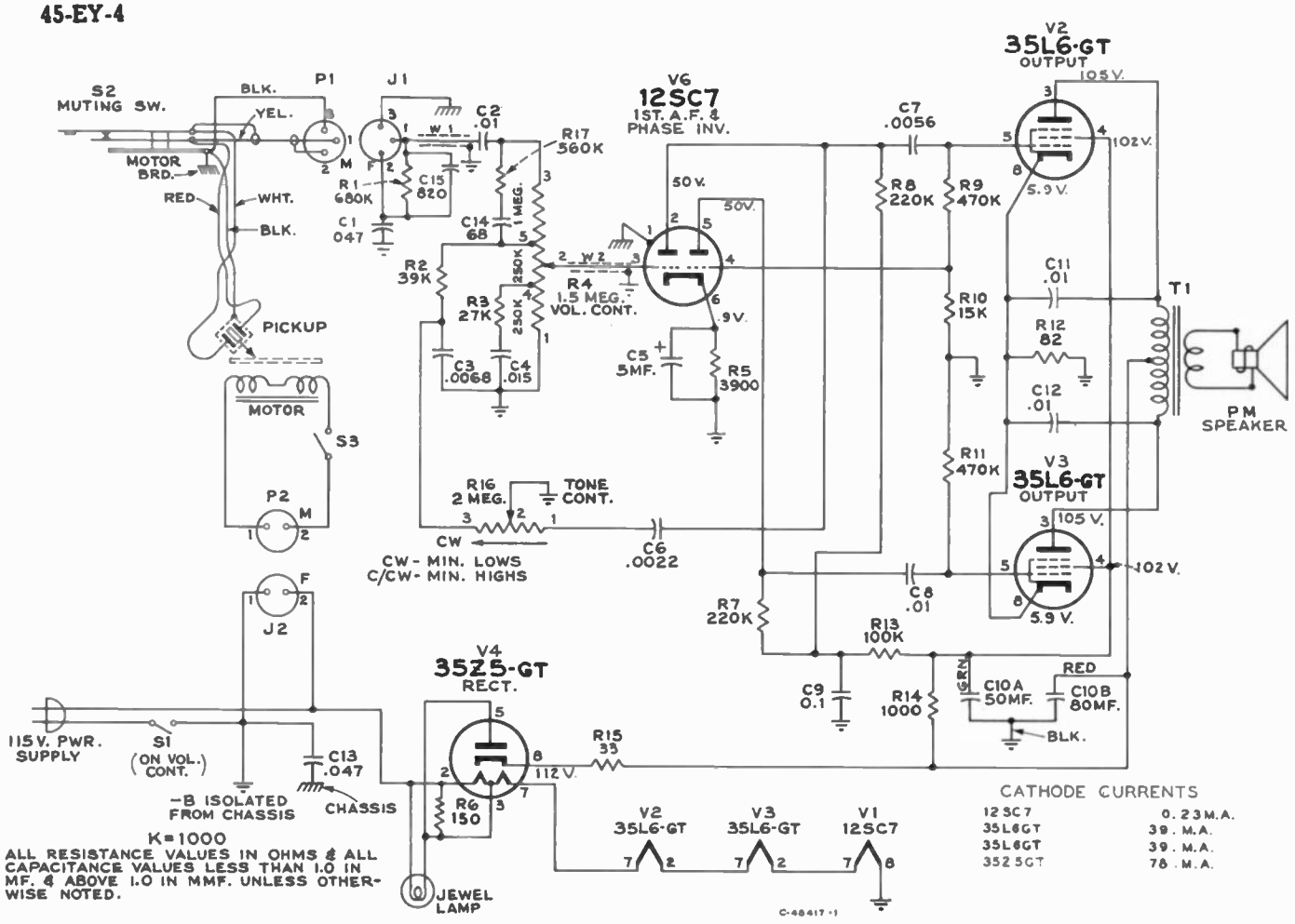
Turntable speed ..... 45 r.p.m.
Records used ..... RCA-Type 7-inch fine groove
Record capacity ..... Up to 14 records
Pickup ..... Crystal

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	AMPLIFIER ASSEMBLIES
	RS140
76782	Bracket—Lamp bracket
93514	Capacitor—Ceramic, 68 mmf. (C14)
74521	Capacitor—Electrolytic, 5 mfd., 50 volts (C5)
75980	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts and 1 section of 80 mfd., 150 volts (C10A, C10B)
73595	Capacitor—Tubular, paper, .0025 mfd., 600 volts (C6)
73788	Capacitor—Tubular, paper, .0056 mfd., 400 volts (C7)
73789	Capacitor—Tubular, paper, .0068 mfd., 400 volts (C3)
73561	Capacitor—Tubular, paper, .01 mfd., 400 volts (C2, C8, C11, C12)
73797	Capacitor—Tubular, paper, .015 mfd., 600 volts (C4)
73553	Capacitor—Tubular, paper, .047 mfd., 400 volts (C1, C13)
73551	Capacitor—Tubular, paper, .0.1 mfd., 400 volts (C9)
38975	Connector—2 contact female connector for motor cable (J2)
36422	Connector—3 contact female connector for pickup cable (J1)
75538	Control—Tone control (R16)
70342	Control—Volume control and power switch (R4, S1)
75575	Crystal—Cartridge complete with stylus
74838	Grommet—Power cord strain relief (1 set)
11765	Lamp—Pilot lamp—Mazda 51
	Resistor—Fixed, composition:—
513082	82 ohms, ±10%, 1 watt (R12)
503115	150 ohms, ±10%, ½ watt (R6)
514210	1000 ohms, ±20%, 1 watt (R14)
503239	3900 ohms, ±10%, ½ watt (R5)
503315	15,000 ohms, ±10%, ½ watt (R10)
503327	27,000 ohms, ±10%, ½ watt (R3)
503339	39,000 ohms, ±10%, ½ watt (R2)
504410	100,000 ohms, ±20%, ½ watt (R13)
503422	220,000 ohms, ±10%, ½ watt (R7, R8)
503447	470,000 ohms, ±10%, ½ watt (R9, R11)
503456	560,000 ohms, ±10%, ½ watt (R17)
76783	Shield—Lamp shield
76723	Socket—Pilot lamp socket and leads
54414	Socket—Tube socket
73008	Transformer—Output transformer (T1)
	SPEAKER ASSEMBLIES
	92586-6W
	RL105C14
75024	Cone—cone and voice coil (3.2 ohms)
76392	Speaker—8" P.M. speaker complete with cone and voice coil (3.2 ohms)
	SPEAKER ASSEMBLIES
	92586-9W
	RL105F2
75024	Cone—cone and voice coil (3.2 ohms)
74664	Speaker—8" P.M. speaker complete with cone and voice coil (3.2 ohms)
	MISCELLANEOUS
76786	Board—Speaker baffle board and grille cloth
76791	Bumper—Rubber bumper for cabinet lid (2 req'd)
76778	Cabinet—Plastic cabinet—maroon—complete with polystyrene escutcheon, rubber feet, baffle board and ventilating screens less lid, lid support and hinges
76789	Cap—Pilot lamp cap
74273	Decal—"Victrola" decal
76793	Escutcheon—Polystyrene escutcheon complete with "RCA Victor" emblem
76787	Foot—Rubber foot (4 req'd)
75697	Grommet—Rubber grommet for mounting changer (3 req'd)
75955	Hinge—Cabinet lid hinge
76784	Lid—Plastic lid for cabinet less "Victrola" decal
76790	Nut—Speed nut to fasten pilot lamp cap
76788	Screen—Ventilating screen (2 req'd)
76792	Screw—#4-40 x ¼" cross recessed flat head machine screw for lid hinge
76204	Screw—#10-32 x ⅞" round head machine screw for mounting changer (3 req'd)
74734	Spring—Spring clip for control knob
76785	Support—Lid support

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

45-EY-4



Schematic Diagram RS-140

Production Changes:

In early production R1 was 2.2 megohm and C15 was omitted. A capacitor C15 (820 mmf) and a resistor (820K) was connected (in parallel) at the muting switch of the record changer. IF R1 IS 680K AND C15 IS USED IN THE CHASSIS, THERE SHOULD BE NO RESISTOR AND CAPACITOR ON THE RECORD CHANGER.

R15 was 15 ohms in early production.

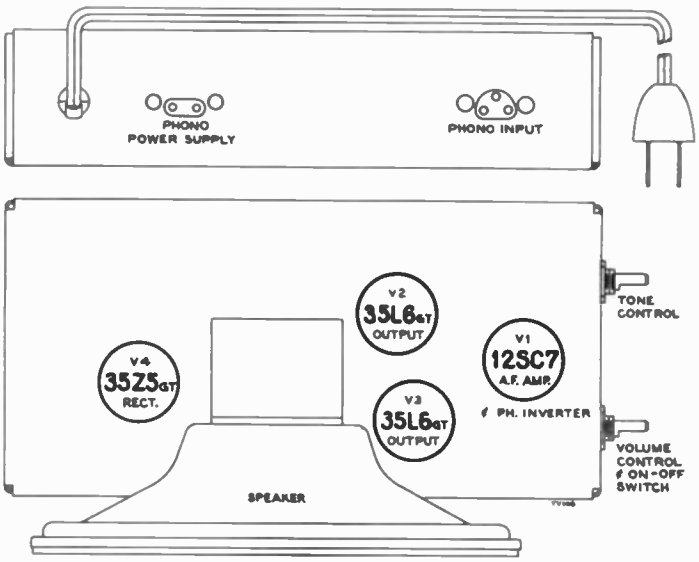
Additions to Parts List:

CHASSIS ASSEMBLY

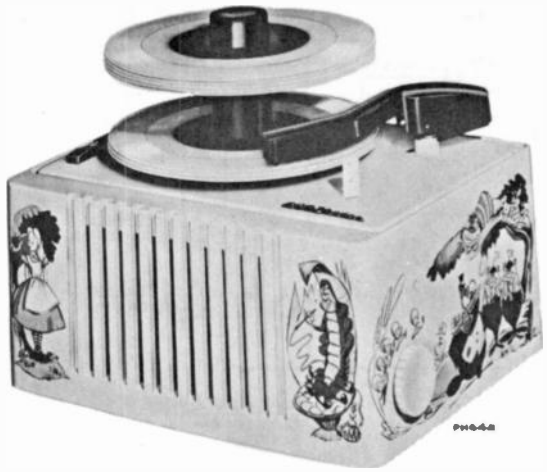
76864	Capacitor—Ceramic, 820 mmf (C15)
514033	Resistor—Fixed, composition, 33 ohms, ± 20%, 1 watt (R15)
503468	Resistor—Fixed, composition, 680,000 ohms, ± 10%, ½ watt (R1)

MISCELLANEOUS

77140	Knob—Control knob



Top View



RCA VICTOR

Automatic Record Player

MODEL 45-EY-26

Chassis No. RS-138L, RS-138M
Record Changer RP 190A-2

SERVICE DATA

— 1951 No. 6 —

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tube Complement for RS-138L

1. RCA 12SQ7 ..... Amplifier
2. RCA 50L6-GT ..... Output
3. RCA 35W4 ..... Rectifier

Tube Complement for RS-138M

1. RCA 12AV6 ..... Amplifier
2. RCA 50C5 ..... Output
3. RCA 35W4 ..... Rectifier

Power Supply Rating

115 volts, 60 cycles A.C. ..... 50 watts

Power Output

Undistorted ..... 1.2 watts Maximum ..... 1.5 watts

NOTE:
This instrument uses a special screw (Holt type) to attach the chassis base to the cabinet. This was done as a safety measure because the instrument was designed for use by children.

This type of screw can not be removed by either a common or a Phillips type of screw driver. A common screw driver may be modified for use with these screws by grinding a "V" in the end. Refer to the illustration at right.

Loudspeaker (922258-5)

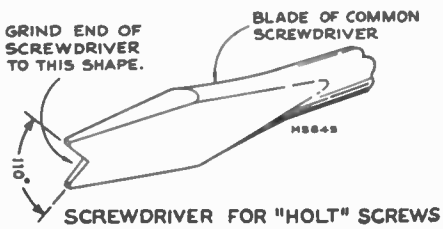
Size and type ..... 4"x6" P.M.
Voice coil impedance ..... 3.2 ohms at 400 cycles

Dimensions (over-all)

Height, 8⅜" Width, 10⅝" Depth, 8⅝"

Record Changer RP 190A-2

Turntable speed ..... 45 r.p.m.
Records used ..... RCA-Type 7-inch fine groove
Record capacity ..... up to 14 records
Pickup, Crystal (medium output) ..... Stock No. 76318
(Use Stock No. 74067 for replacement)



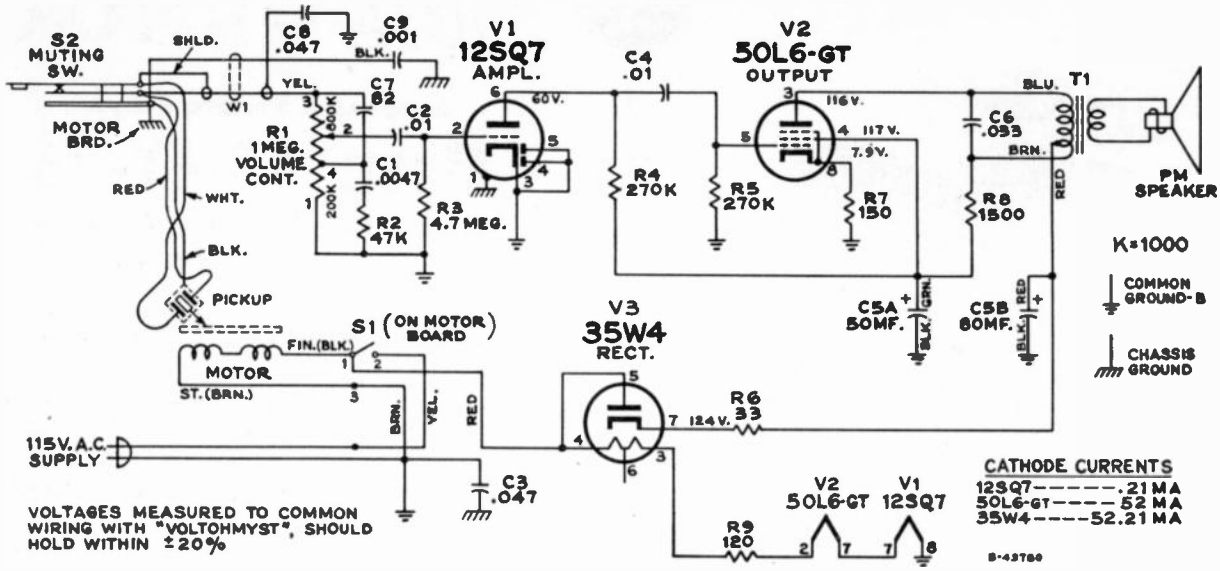
SCREWDRIVER FOR "HOLT" SCREWS

REPLACEMENT PARTS

STOCK No.	DESCRIPTION	
	AMPLIFIER ASSEMBLIES RS-138L, RS-138M	
76202	Baffle—Speaker baffle and grille cloth	
39626	Capacitor—Mica, 82 mmf.	C7
75980	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts and 1 section of 80 mfd., 150 volts	C5A, C5B
75643	Capacitor—Tubular, paper, .001 mfd., 1000 volts	C9
73920	Capacitor—Tubular, paper, .0047 mfd., 600 volts	C1
73561	Capacitor—Tubular, paper, .01 mfd., 400 volts	C2, C4
73552	Capacitor—Tubular, paper, .033 mfd., 400 volts	C6
73553	Capacitor—Tubular, paper, .047 mfd., 400 volts	C3, C8
76201	Control—Volume control	R1
70392	Cord—Power cord and plug	
73693	Grommet—Power cord or transformer lead strain relief (1 set)	
72314	Resistor—Wire wound, 120 ohms, 5 watts	R9
513033	Resistors—Fixed composition— 33 ohms, ±10%, 1 watt	R6
503115	150 ohms, ±10%, ½ watt	R7
503215	1500 ohms, ±10%, ½ watt	R8
503347	47,000 ohms, ±10%, ½ watt	R2
503427	270,000 ohms, ±10%, ½ watt	R4, R5
503547	4.7 megohm, ±10%, ½ watt	R3
70827	Socket—Tube socket, octal, wafer	
74822	Socket—Tube socket, 7 pin, miniature, for 12AV6 and 50C5 tubes	
73117	Socket—Tube socket, 7 pin, miniature for 35W4 tube	
75939	Transformer—Output transformer	T1
	SPEAKER ASSEMBLIES 922258-5	
76407	Speaker—4" x 6" P.M. speaker complete with cone and voice coil (3.2 ohms)	
	MISCELLANEOUS	
Y2374	Cabinet—Plastic cabinet	
74734	Clip—Spring clip for knob	
76722	Cover—Bottom cover—ivory—complete with feet	
75697	Grommet—Rubber grommet for mounting changer mechanism (3 req'd)	
77234	Knob—Control knob with spring clip—ivory	
76205	Screw—#6-32 x 5/16" hex washer head machine screw for bottom cover (4 req'd)	
76204	Screw—#10-32 x 7/8" round head machine screw for mounting changer mechanism (3 req'd)	

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

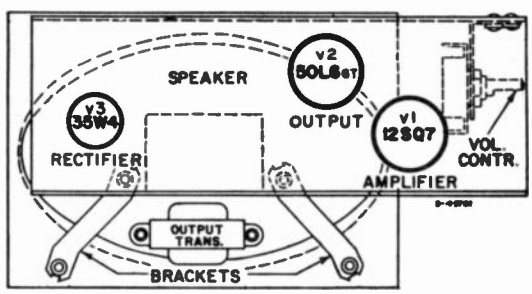
45-EY-26



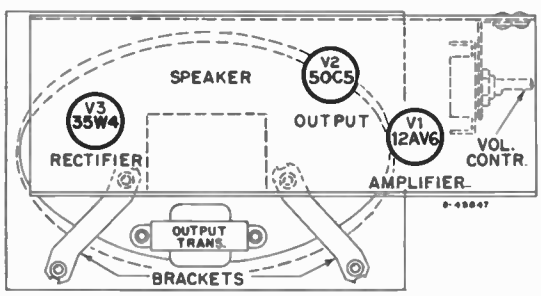
Schematic Diagram RS-138L

Critical Lead Dress

1. Dress all leads away from R6 and R9
2. Dress electrolytic capacitor away from R6 and R9
3. Dress filament leads down to chassis
4. Solder braid of W-1 such that it acts as a strain relief

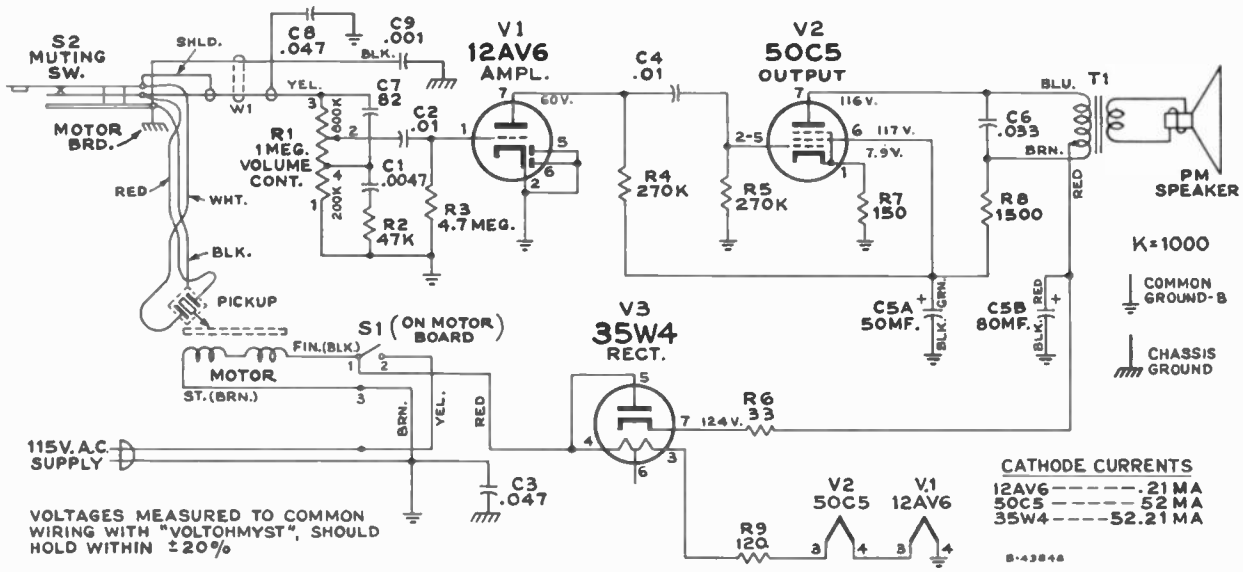


Tube Locations RS-138L



Tube Locations RS-138M

FOR RECORD CHANGER SERVICE INFORMATION—REFER TO RP-190 SERIES SERVICE DATA.



Schematic Diagram RS-138M

RCA VICTOR

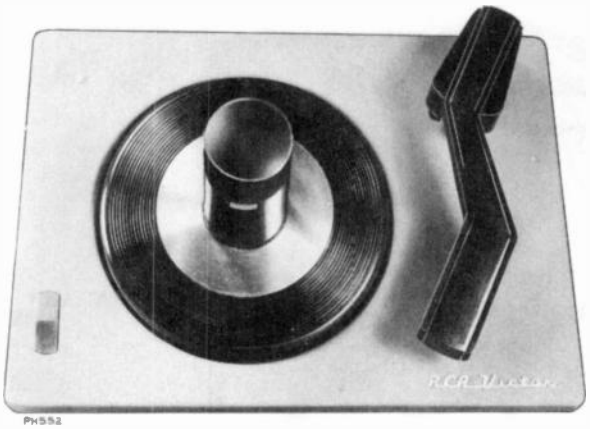
RP-190 Series

45 R.P.M. Automatic Record Changer

SERVICE DATA

—1950 No. 14—

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.



PK552

MODEL IDENTIFICATION

RP-190-1 RP-190-1a	Uses crystal pickup Stock No. 75476* or 76318.* Models 45-EY-2, 45-EY-3, 45-J-2 and 9Y510.
RP-190-2 RP-190-2a	Uses crystal pickup Stock No. 75575. Models A-82, A-91, A-101, A-108, 45-EY-4, 45-W-9, 45-W-10, 2T81, 4T141, 6T84, 6T86, 6T87, 7T143, 9T89 and 9T147.
RP-190-3 RP-190-3a	Uses crystal pickup Stock No. 75476* or 76318* and special motor (85 volts). Model 45-EY-3.
RP-190-4 RP-190-4a	Uses crystal pickup Stock No. 75476* or 76318* and different "On-Off" switch, otherwise same as RP-190-1 and RP-190-1a.
RP-190-5	Uses ceramic pickup Stock No. 76297, different counterbalance spring and motor suitable for 50 cycle conversion. Otherwise same as RP-190-4a. Models QEY4, QEY5 QJY2.
RP-190-6	Uses crystal pickup Stock No. 74067. Otherwise same as RP-190-4a.
RP-190A-1	Uses crystal pickup Stock No. 75575. Does not use "On-Off" switch. Otherwise same as RP-190-2a.
RP-190A-2	Uses crystal pickup Stock No. 76318.* Five parts differ in color only. Otherwise same as RP-190-1a.

*Use Stock No. 74067 for replacement.

NOTE: RP-190-1 vs. RP-190-1a.
RP-190-2 vs. RP-190-2a, etc.

Two types of cycling slides and counterbalance assemblies have been used. The "a" in the identification indicates the use of the late type assemblies. See Page 10 for details.

CAUTION

1. Avoid handling the pickup arm when the mechanism is in cycle.
2. Do not use force to release a jam.
3. Do not try to remove the records on the turntable if the turntable is stopped in cycle.
4. If the separator knives protrude from the center post when the mechanism is out of cycle, push the "start-reject" knob to reject and the condition should be corrected automatically.

AUTOMATIC OPERATION

1. Place a stack of records over the center post, with the desired selections upward, the last record to be played on top.
2. Pull the "start-reject" knob to "start" (forward) and release. The mechanism will automatically play in sequence one side of each record stacked on the separator shelves.
3. To reject a record being played, pull the "start-reject" knob.
4. At conclusion of playing and as the last record is being repeated, lift the pickup arm and place on its rest. Turn off the power to the drive motor by pushing back on control knob.
5. Remove the stack of records by lifting them straight up.

SPECIFICATIONS

Turntable speed	45 r.p.m.
Records used	RCA type seven-inch fine groove
Record capacity	Up to 14 records
Pickup force	Approx. 5 grams
Stylus tip radius	.001 inch
Power supply	105-125 volts, 60 cycle, a.c.

(RP-190-3 uses 85 volt, 60 cycle motor.)

(RP-190-5 may be converted to 50 cycle operation.)

LUBRICATION

A light machine oil (SAE No. 10) should be used to oil the bearings of the drive motor.

On all bearing surfaces, excepting the motor bearings, Houghton STA-PUT No. 320, or equivalent, should be used. On all other sliding surfaces, STA-PUT No. 512, or equivalent, is recommended. STA-PUT can be purchased from E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia, Pa.

(Do not oil or grease record separator shelves.)

It is important that the drive motor spindle and the rubber tire on the idler wheel be kept clean and free from oil or grease, dirt, or any foreign material at all times. Carbon tetrachloride or naphtha is satisfactory for cleaning these parts.

INDEX

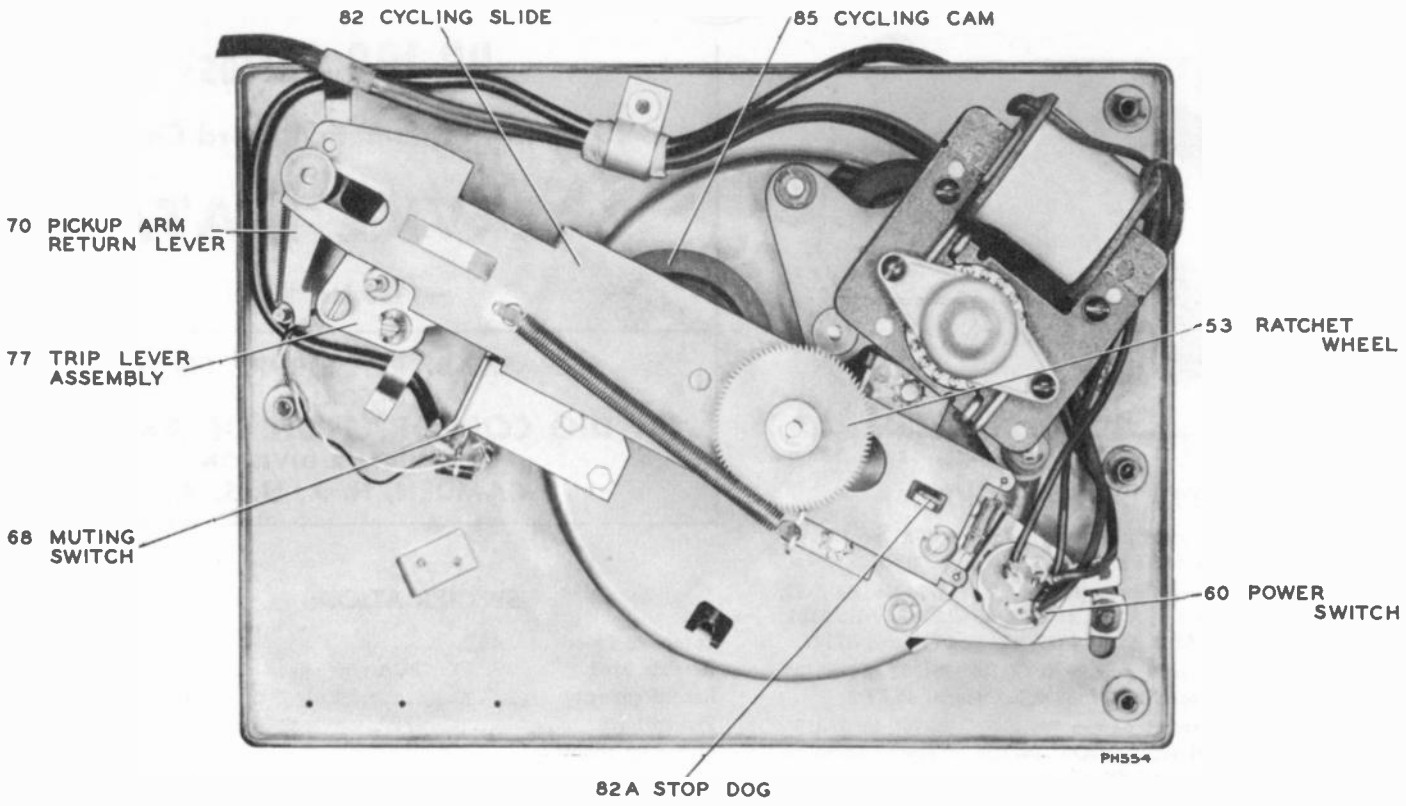

82 CYCLING SLIDE
85 CYCLING CAM
70 PICKUP ARM RETURN LEVER
77 TRIP LEVER ASSEMBLY
68 MUTING SWITCH
53 RATCHET WHEEL
60 POWER SWITCH
82A STOP DOG
PH554

Fig. 1

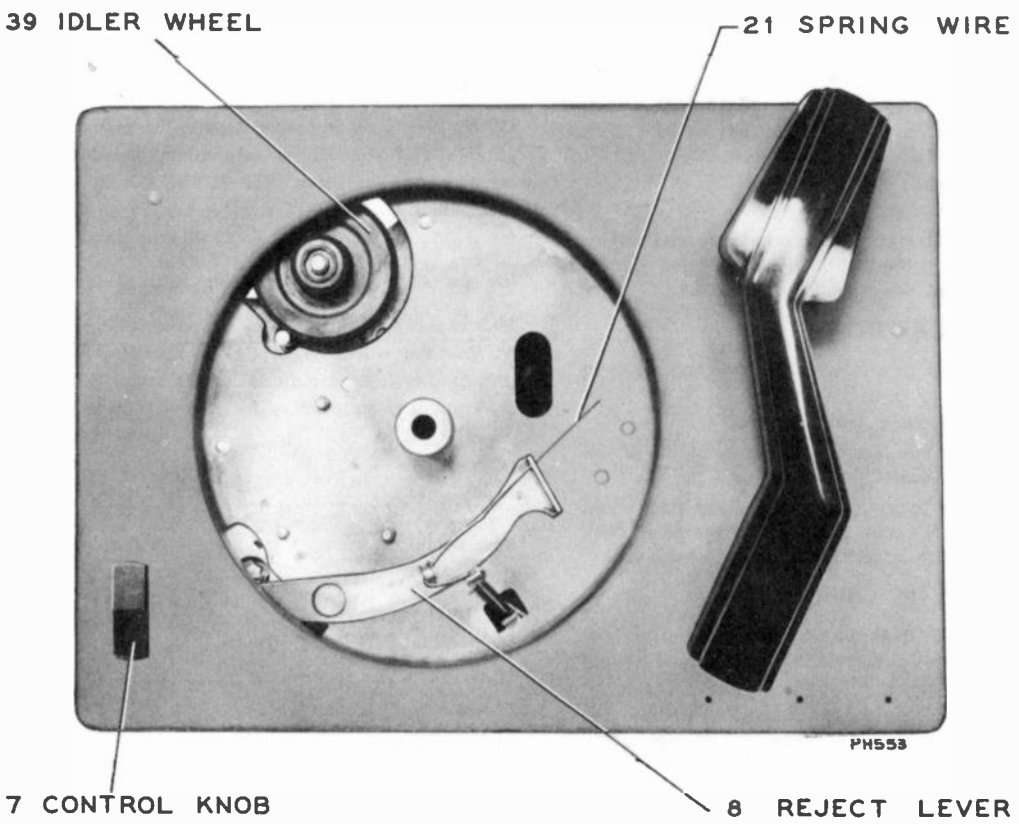

39 IDLER WHEEL
21 SPRING WIRE
7 CONTROL KNOB
8 REJECT LEVER
PH553

Fig. 2

Function of Principal Parts

Trip Lever (77)

The trip lever is mounted on the bottom end of the pickup arm vertical pivot shaft. The function is to transfer the movement of the pickup arm to parts of the operating mechanism below the motor board. The end of the trip lever contacts stud on cycling cam thereby starts tripping action.

Pickup Arm Return Lever (70)

The function of the pickup arm return lever is to provide a force necessary to push the pickup into landing position. The end of the pickup arm return lever is curved so as to provide a stop for trip lever. This stop determines landing position of the pickup.

Reject Lever (22)

The function of the reject lever is to transfer the action of the control knob to the cycling cam thereby starting a change cycle.

Muting Switch (68)

The function of the muting switch is to short the pickup leads to prevent amplifying of mechanical noise, of the merchanism during change cycle.

Cycling Cam (85)

The cycling cam is mounted on the cycling slide. The function of the cam is to transfer the rotary motion of the turntable shaft into sliding motion of the cycling slide.

Stop Dog (82A)

The stop dog is mounted on the end of cycling slide. The function of the stop dog is to engage the ratchet wheel on the separator shaft and prevent it from rotating, at the exact moment during change cycle.

Ratchet Wheel (53)

The function of the ratchet wheel located on the end of the separator shaft is to keep the separator shaft stationary at the proper time, so as to actuate the separator mechanism inside the centerpost.

Cycling Slide (82)

The cycling slide is the main connecting medium between the various moving parts.

Cycle of Operation

FUNCTION	EXPLANATION
Place a stack of records over centerpost.	1. Records rest on separator shelves protruding from either side of the centerpost.
Push control knob to reject.	1. The control first actuates the power switch applying power to the drive motor. This starts the turntable rotating. 2. Further movement of the control knob actuates the reject lever assembly (8) which contacts the stud mounted on the eccentric cycling cam and moves it slightly.
Cycling starts.	1. The slight movement of the eccentric cycling cam (85) is sufficient for engagement with the rotating knurled roller (62) mounted on turntable shaft. 2. The eccentric cycling cam which is mounted on the cycling slide (82) pushes the slide in the direction of the pickup arm pivot. In so doing tension is increased on the slide return spring (89). 3. The tab on the cycling slide moves back permitting muting switch to close.

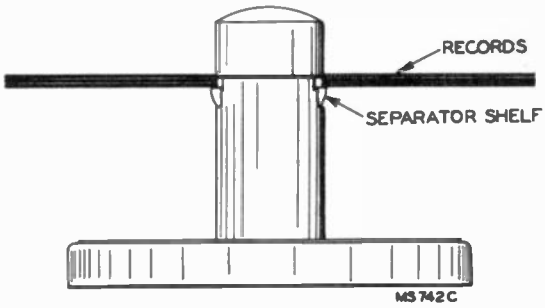


Fig. 3

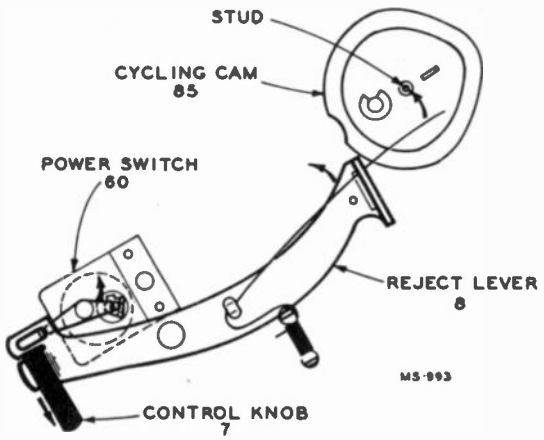


Fig. 4

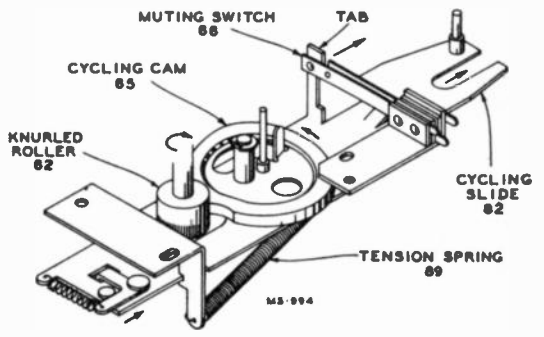


Fig. 5

Cycle of Operation—Continued

Pickup raises from the rest.

1. As the cycling slide continues to move in the direction of the pickup arm pivot the small incline pressed in the slide causes the elevating rod (74) to lift the pickup arm from the rest.
2. The raised pickup arm moves inward slightly from the inward force of the pickup arm return lever (70), until the stud on the trip lever (77) assembly comes against edge of the cycling slide.
3. The cycling slide continues to move further, which pushes the trip lever back. The eccentric landing adjustment stud (79) contacts and pushes the pickup arm return lever (70) against the tension of the return spring (69).

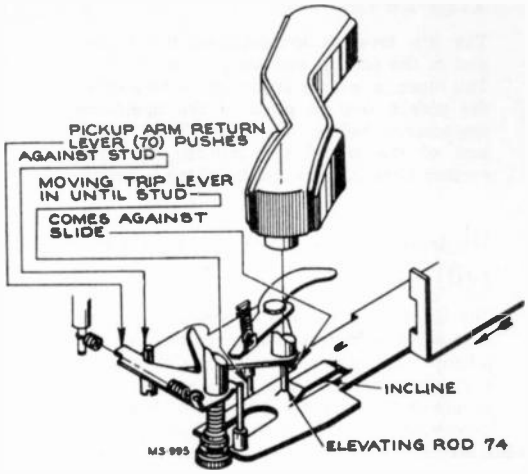


Fig. 7

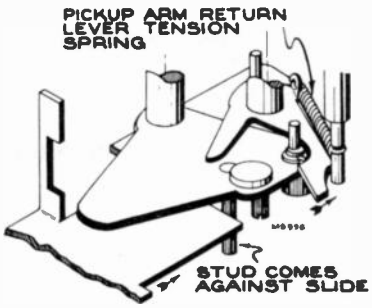


Fig. 6

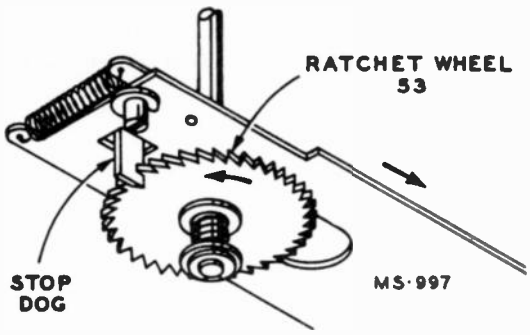


Fig. 8

Separator knives separate the lower record from the stack and the lower record drops to the turntable.

1. As the cycling slide reaches the limit in its movement in the direction of the pickup arm pivot, the stop dog mounted on the slide engages the rotating ratchet wheel (53).
2. The ratchet wheel and separator shaft (6) then remains stationary and the turntable continues to rotate.
3. The separator shelves and knives are coupled together in such a manner that the flattened end of the separator shaft pushes the knives out, which in turn pulls the opposite shelves in.
4. As the shelves recede, the separator knives mounted above the shelves move out and separate the lower record of the stack and support the remaining records while the lower record drops to the turntable.

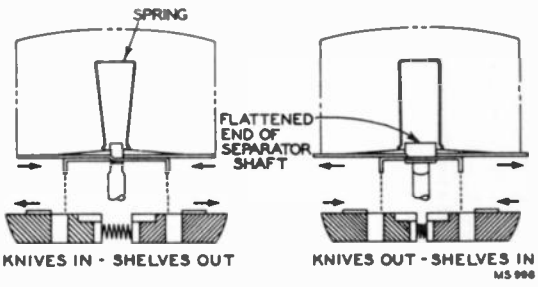


Fig. 9

Pickup moves in for landing.

1. The cycling slide moves away from the pickup arm pivot, due to the force produced by the tension spring (89) keeping the eccentric cycling cam against the rotating knurled roller (62). The knurled roller at this time is returning to the smaller diameter of the cam.
2. The stud on trip lever assembly follows the slide due to the force produced by the action of the pickup arm return lever.
3. After the slide has moved back a short distance the stud on the trip lever assembly no longer follows the slide since the landing adjustment stud comes against the curved stop on the end of the pickup arm return lever. At this moment the pickup is directly above the point of landing.
4. As the cycling slide completes the return movement the elevating rod slides down the incline which lowers the stylus on the record.

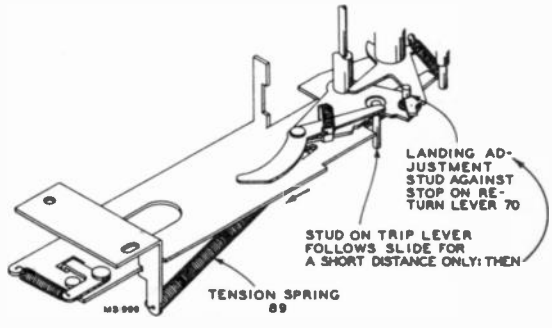


Fig. 10

Cycle of Operation—Continued

Cycle completed and the record plays.

1. The tab on the cycling slide contacts and opens the muting switch.
2. The stud on the cycling slide pushes pickup arm return lever back to permit free motion of the pickup arm.
3. The change cycle is completed as the cycling slide comes against the stop bracket, at which time the knurled roller rotates in the cut away section of the cam.
4. As the record plays and the pickup arm moves inward.
5. When the stylus reaches the end of the selection the end of the trip lever contacts the stud on the cycling cam, and pushes it slightly.
6. The slight movement of the cycling cam causes engagement with the rotating knurled roller, thereby starting a change cycle.
7. The mechanism repeats the preceding sequence of operations until the last record of the stack has dropped and has been played. This selection will be repeated until the pickup is lifted and placed on the rest.

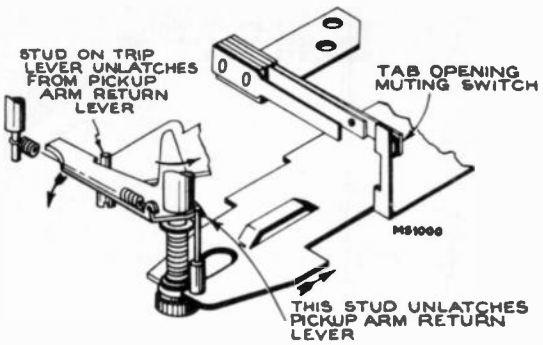


Fig. 11

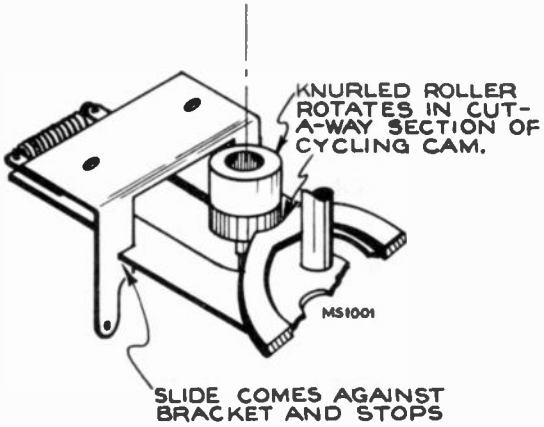


Fig. 12

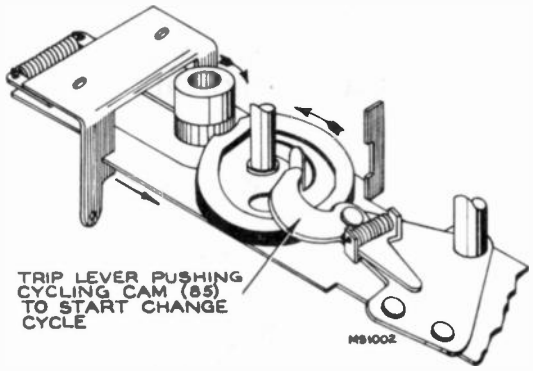


Fig. 13

DO YOU KNOW?

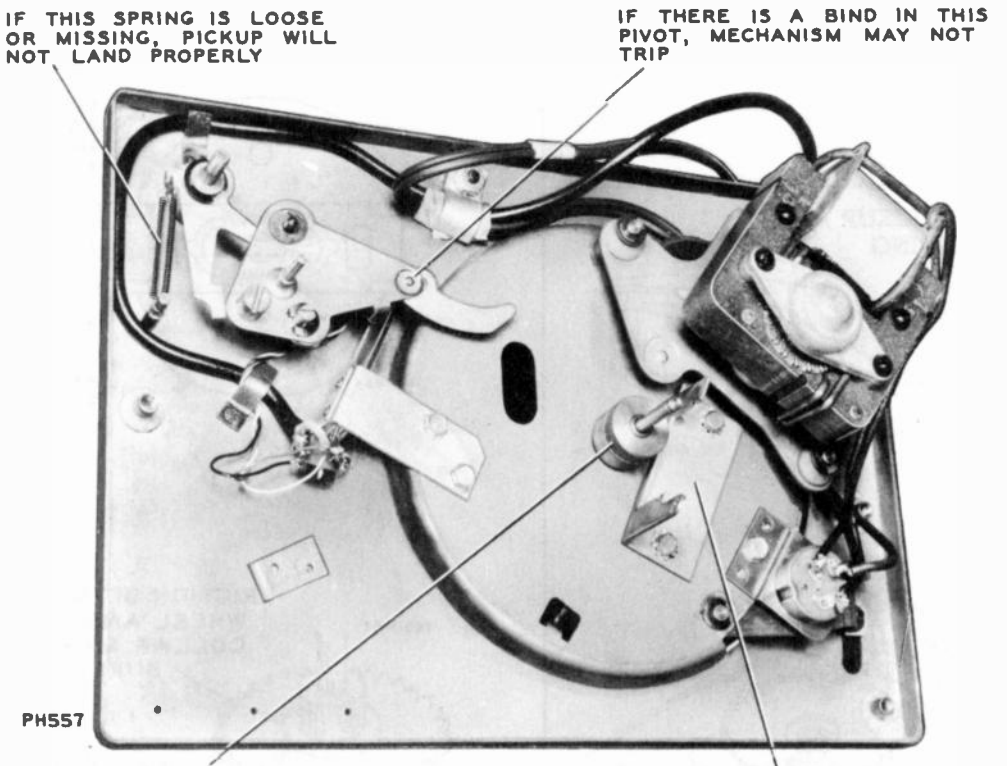


Fig. 14

DO YOU KNOW?—Continued

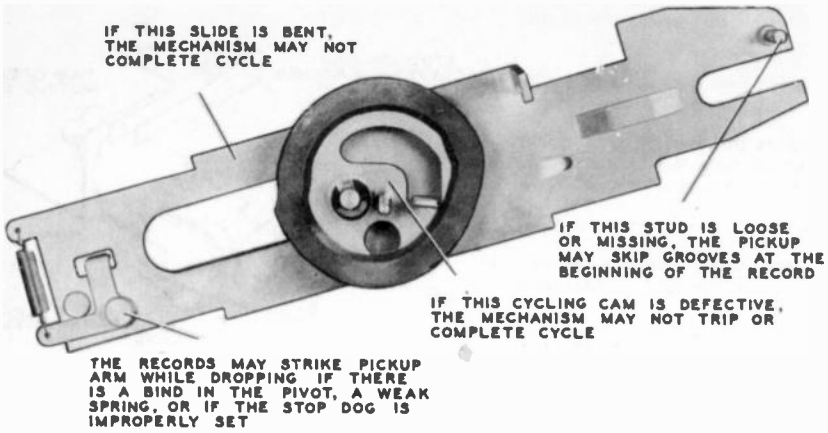
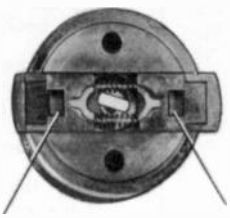


Fig. 15



IF THE SHELVES ARE GREASED, FOREIGN MATERIAL MAY COLLECT AND CAUSE BINDING. TENSION SPRINGS MAY NOT HAVE SUFFICIENT FORCE TO PUSH THE SHELVES OUT.

Fig. 16

SERVICE HINTS

REJECT CONTROL FAILS TO OPERATE

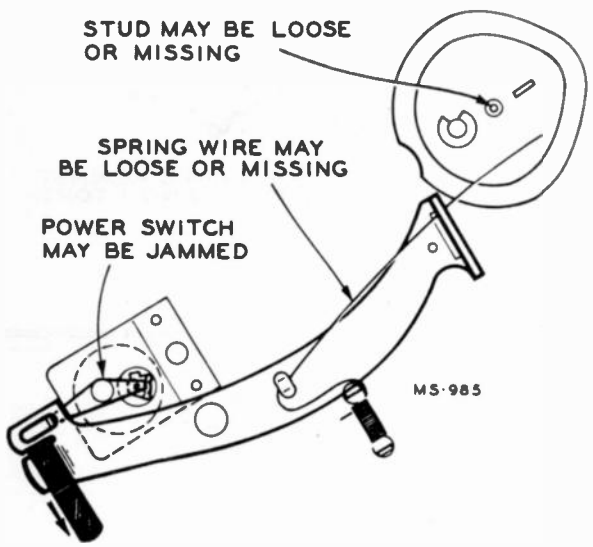
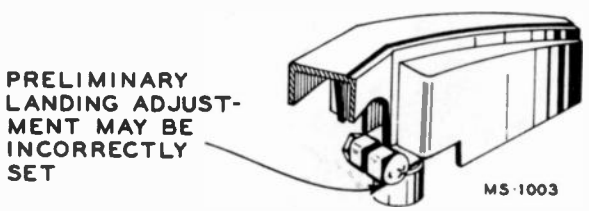


Fig. 17

RECORD STRIKES PICKUP ARM WHEN DROPPING



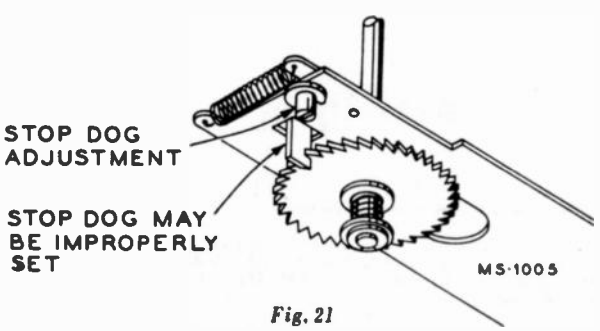


Fig. 21

MECHANISM FAILS TO SEPARATE RECORDS PROPERLY

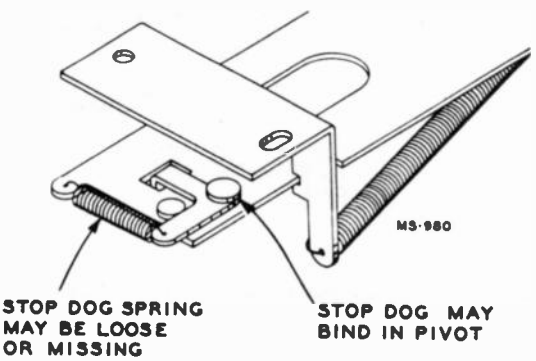


Fig. 18

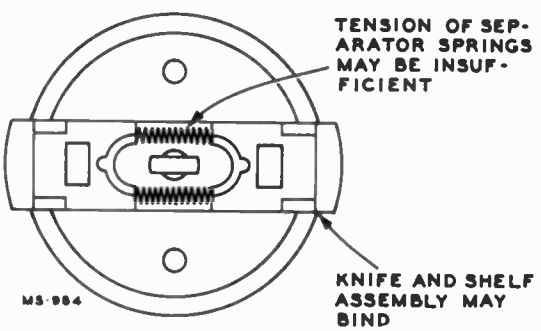


Fig. 19

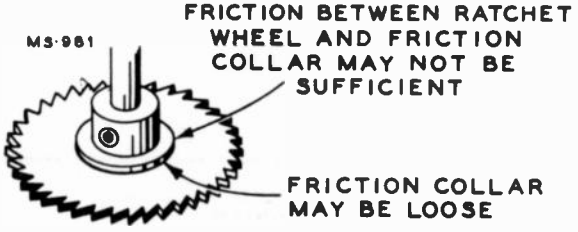


Fig. 20

PICKUP FAILS TO LAND PROPERLY

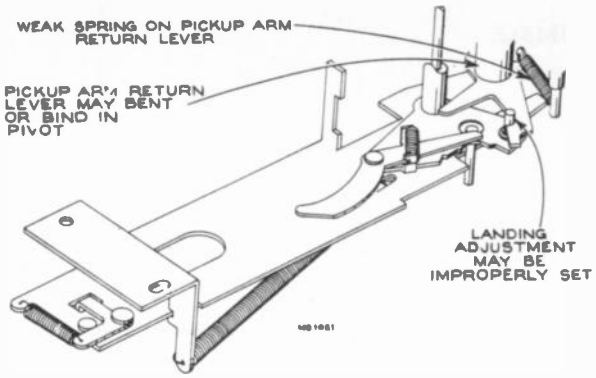


Fig. 22

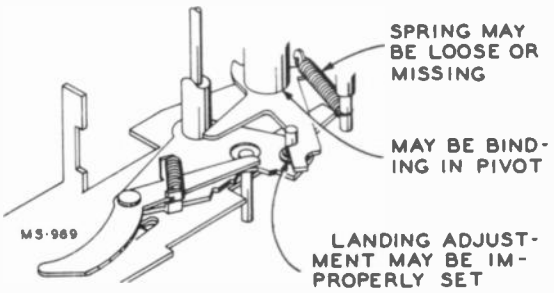


Fig. 23

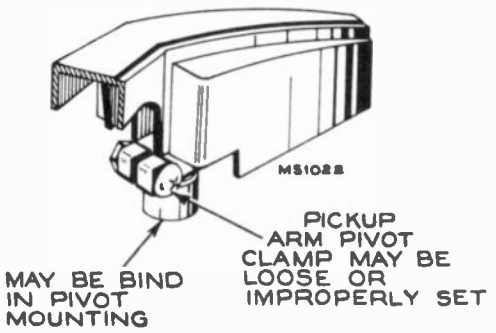


Fig. 24

DISTORTED OR NO OUTPUT

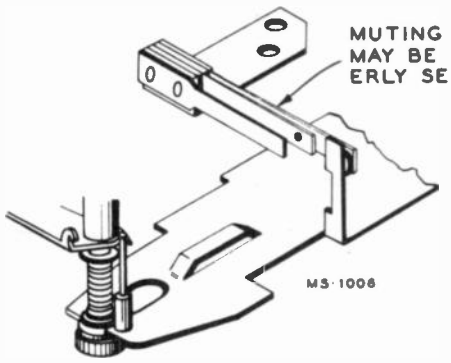


Fig. 28

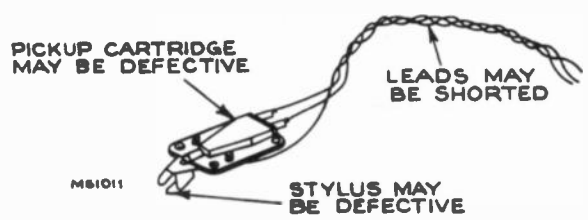


Fig. 29

PICKUP SKIPS GROOVES

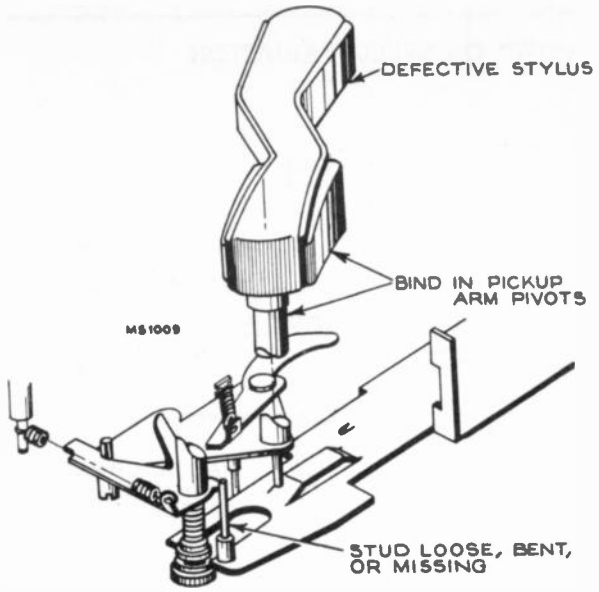


Fig. 25

MECHANISM FAILS TO TRIP

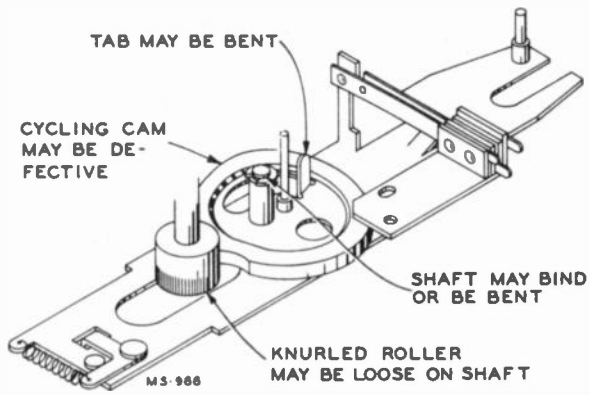


Fig. 26

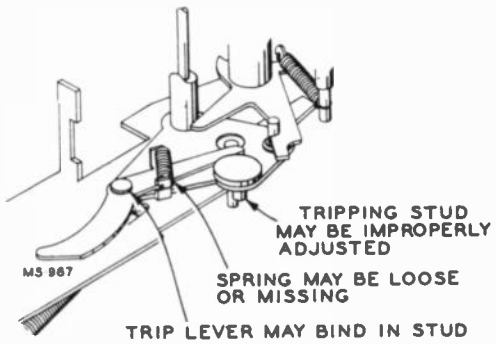


Fig. 27

PREMATURE TRIPPING

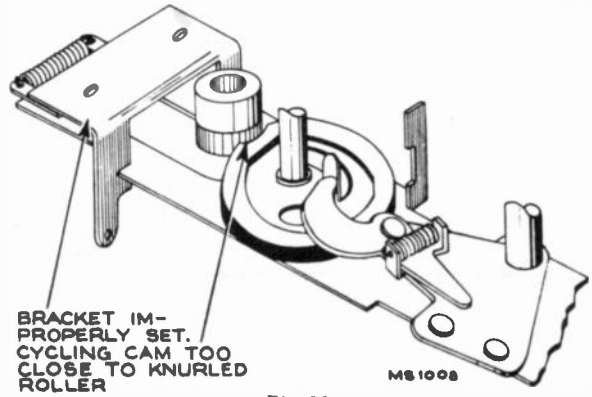


Fig. 30

"WOW" OR SPEED VARIATION

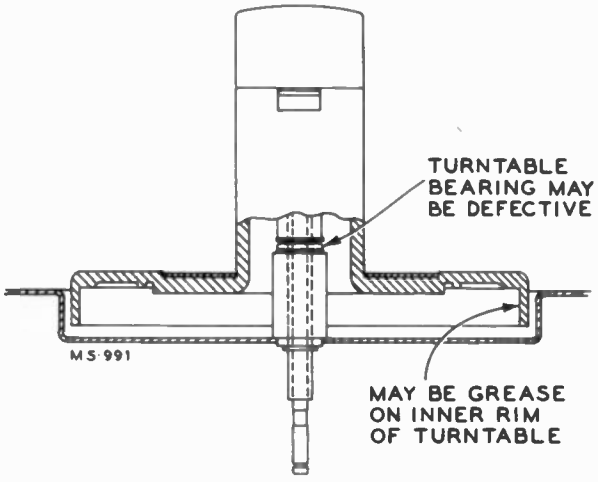


Fig. 31

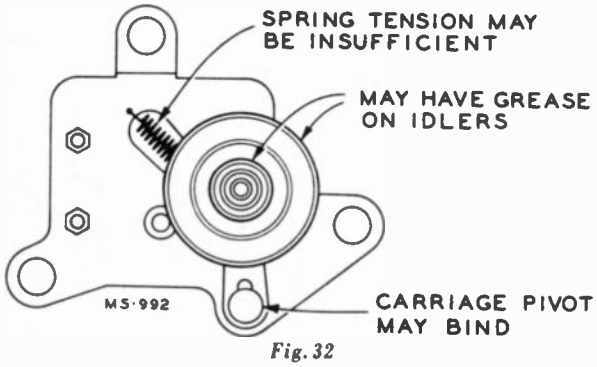


Fig. 32

CONTINUOUS TRIPPING

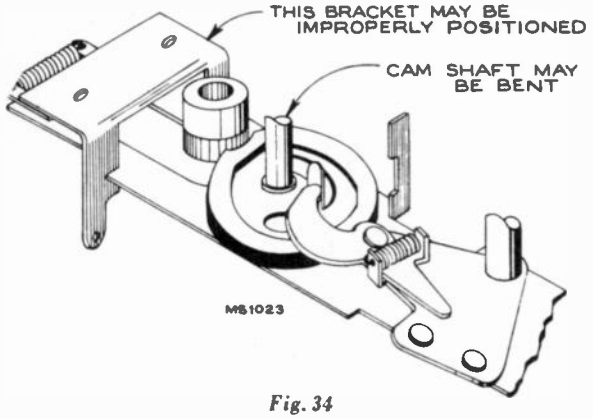


Fig. 34

RUMBLE

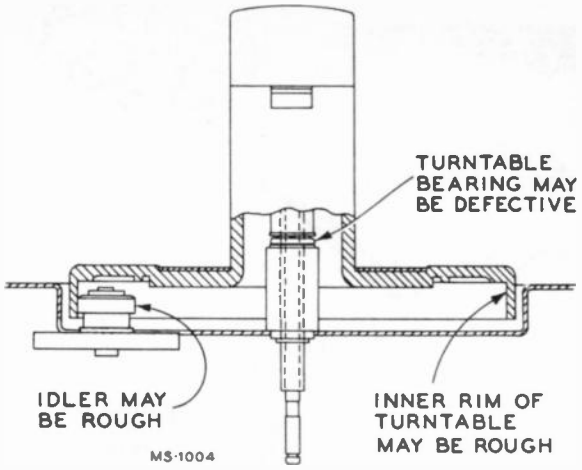


Fig. 33

MECHANISM FAILS TO COMPLETE CYCLE

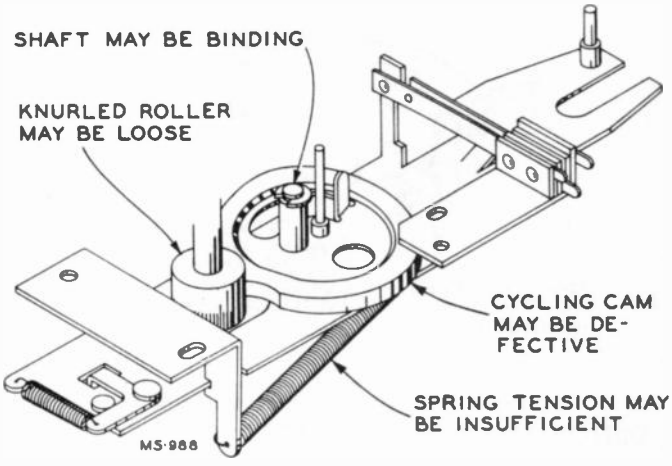


Fig. 35

ADJUSTMENTS

LANDING

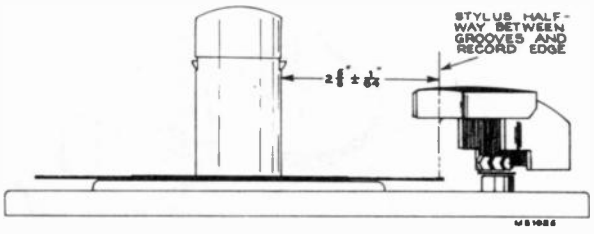


Fig. 36

TRIPPING

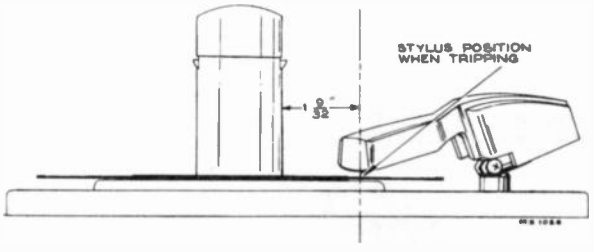


Fig. 37

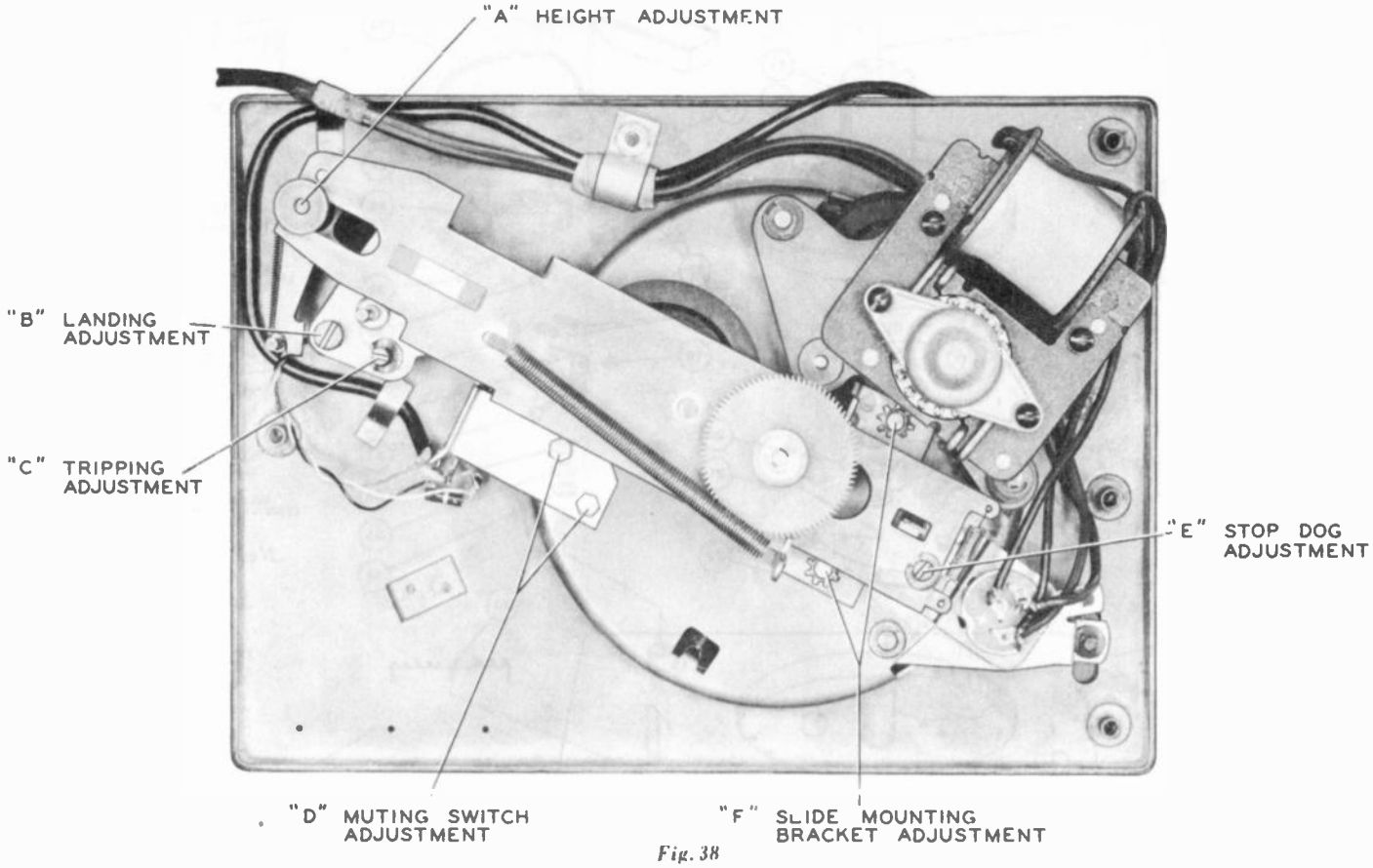


Fig. 38

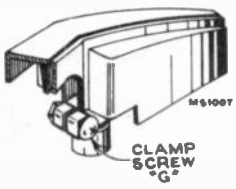


Fig. 39

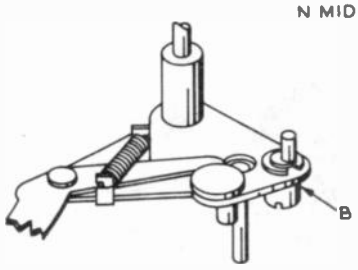


Fig. 40

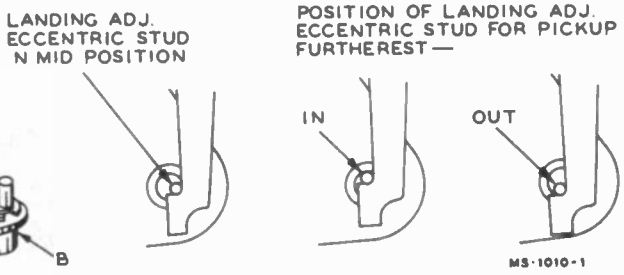


Fig. 41

Adjustments

Pickup Landing Adjustment:

Under ordinary conditions the landing adjustment is a screwdriver adjustment as shown. The adjustment of eccentric landing adjustment stud (B) gives approximately a ¼" movement. (See Figs. 38, 40.)

If, however, the pickup arm has been removed it is first necessary to make an approximate landing adjustment as follows:

1. With the mechanism out of cycle and the clamp screw (G) (Fig. 39) loose, place pickup arm on the rest and tighten clamp screw enough to prevent the clamp from slipping on the shaft.
2. Set the landing adjustment stud (B) as shown (mid-adjustment). (See Figs. 40, 41.)
3. With the power removed, push reject control to reject. Rotate turntable by hand in the correct direction until the pickup is about ready to land.
4. Loosen clamp screw (G) and move pickup arm so the stylus is approximately 2⅝" from side of centerpost. Tighten clamp screw. (See Figs. 36, 39.)
5. Exact landing adjustment can now be made by a screwdriver on stud (B). (See Fig. 38.)

Pickup Height Adjustment (See Fig. 38):

Adjust knurled nut (A) until the distance (during change cycle) between the top of the turntable and the stylus point is approximately 1⅛".

NOTE: If unable to adjust for sufficient height, it may be necessary to cut a few turns from the compression spring to allow more space on the shaft.

Tripping Adjustment (See Figs. 37, 38):

Adjust the eccentric tripping stud (C) until the mechanism trips when the stylus is 1 9/32" from the side of the centerpost.

Mounting Bracket Adjustment (See Fig. 38):

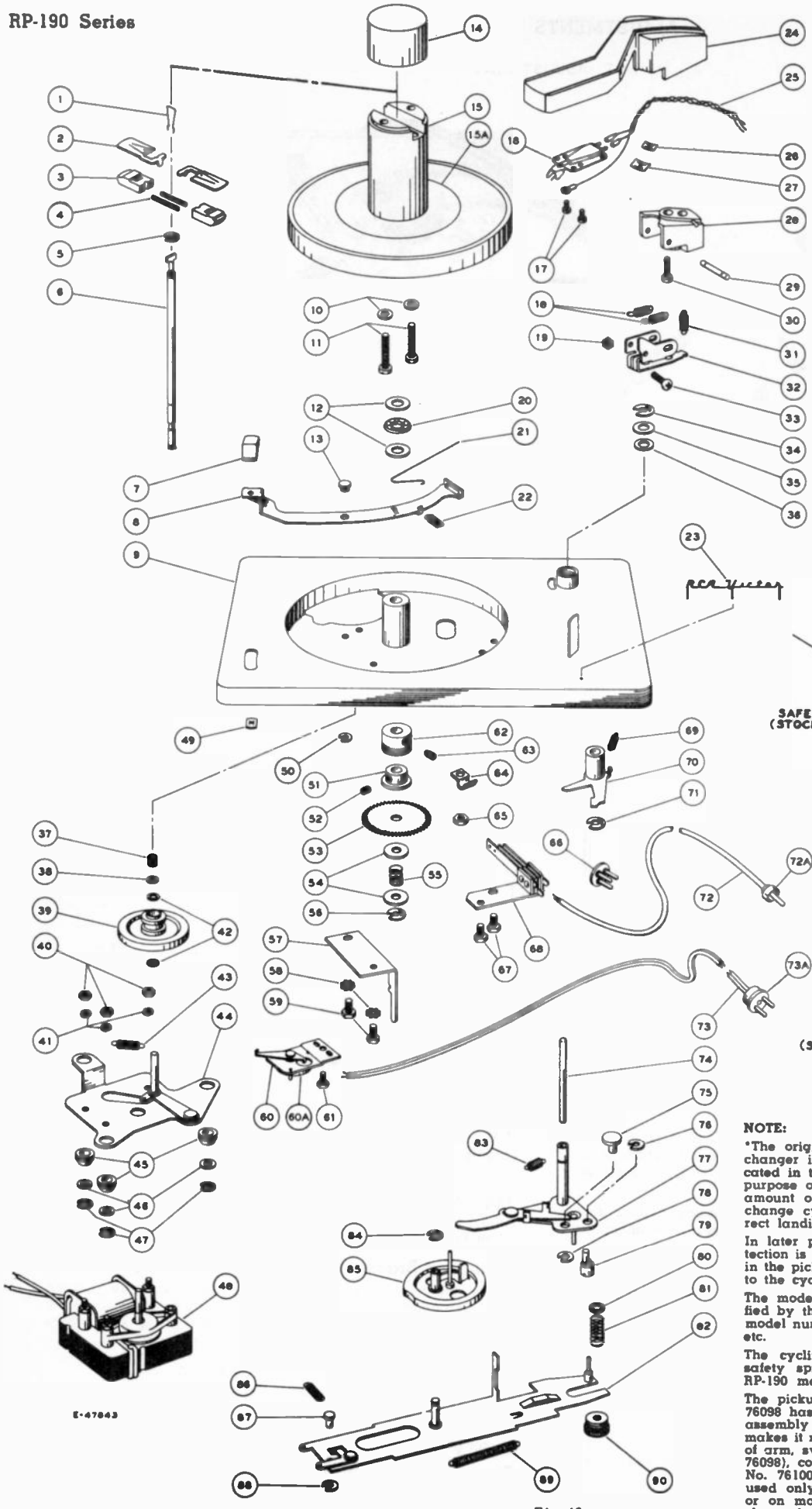
Loosen the two screws (F) and move the bracket so it is as near perpendicular to the slide as possible. Move back or forward until the cut away section of the cycling cam clears the knurled roller approximately 1/16". Tighten screws.

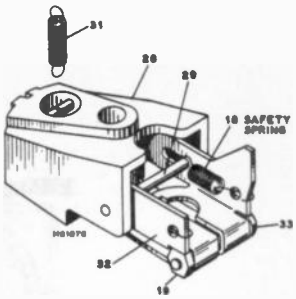
Muting Switch Adjustment (See Fig. 38):

Loosen the two screws (D) and adjust the position of the switch so the contacts are approximately 1/32 to 1/16 inches apart when the mechanism is out of cycle. If the mounting screws do not give sufficient adjustment, bend tab on slide slightly.

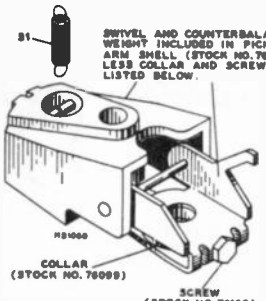
Stop Dog Adjustment (See Fig. 38):

Turn the eccentric screw (E) until the record drops to the turntable without striking the pickup arm.

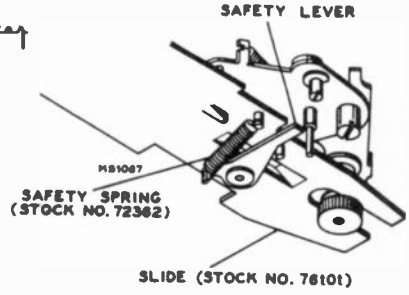




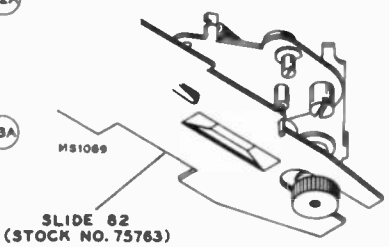
Original counterbalance and swivel assembly



New counterbalance and swivel assembly part of pickup arm



New cycling slide



Original cycling slide

NOTE:

*The original production of Model RP-190 record changer is provided with two safety springs located in the rear portion of the pickup arm. The purpose of these springs is to provide a limited amount of movement of the pickup arm during change cycle and continue to maintain the correct landing position.

In later production of the RP-190 the same protection is maintained by the removal of the springs in the pickup arm and adding a spring and lever to the cycling slide.

The models incorporating the change are identified by the addition of a small letter "a" to the model number. For example: RP-190-1a, RP-190-2a, etc.

The cycling slide Stock No. 76101 having the safety spring and lever can be used on any RP-190 mechanism.

The pickup arm and swivel assembly Stock No. 76098 has the swivel and counterbalance weight assembly cemented in the pickup arm shell. This makes it necessary to replace the entire assembly of arm, swivel, counterbalance weight (Stock No. 76098), collar (Stock No. 76099) and screw (Stock No. 76100) as a unit. This assembly should be used only in models marked with a small "a" or on models where the safety slide has been changed to the new type slide Stock No. 76101.

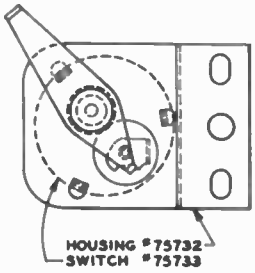
Fig. 42

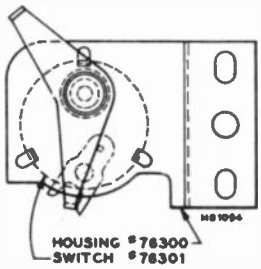
STOCK No.	ILL. No.	DESCRIPTION
74862	1	Spring—Spindle nose spring--formed
74864	2	Separator—Separator knife
74865	3	Shelf—Separator shelf
75756	4	Spring—Separator shelf return spring (.118" O.D. x ¾" — 16 turns)
33726	5	Washer—"C" washer to hold separator shaft and cam
75757	6	Shaft—Separator shaft with cam
75741	7	Knob—Control knob (maroon)
76725	7	Knob—Control knob (red)
75739	8	Lever—Reject lever complete with formed spring
75729	9	Board—Motorboard sub-assembly complete with welded and/or staked studs and rest
76724	9	Board—Motorboard (ivory) complete with welded and/or staked studs and rest
74869	10	Washer—No. 6 flat washer for under head of screws No. 75758
75758	11	Screw—No. 6-32 x 1" fillister head machine screw (holds nose to spindle)
74080	12	Washer—Thrust bearing washer
75748	13	Stud—Reject lever mounting stud
75755	14	Cap—Spindle nose cap—red
75753	15	Turntable—Turntable (black) and shaft assembly complete with finished disc
76727	15	Turntable—Turntable (red) and shaft complete with finished disc
75754	15A	Disc—Finished disc for turntable — part of No. 75753 and 76727
74067	16	Pickup—Crystal pickup cartridge complete with stylus (RMP 128-1) for RP-190 1, -3, -4, -6 and RP-190A-2
75575	16	Pickup—Crystal pickup cartridge complete with stylus (RMP 128-4) for RP-190-2 and RP-190A-1
76297	16	Pickup—Ceramic pickup cartridge complete with stylus for RP-190-5
74069	16A	Guard—Stylus guard for No. 74067 pickup
74819	16A	Guard—Stylus guard for No. 75575 pickup
74065	16B	Screw—No. 2-56 x 3/16" fillister head screw to mount No. 74069 or No. 74819 guard
74068	16C	Stylus—Replacement stylus and holder for No. 74067 pickup
75770	16C	Stylus—Replacement stylus and holder for No. 75575 pickup
74985	16C	Stylus—Replacement stylus for No. 76297 pickup
74230	16D	Nut—Nut and washer to mount No. 74068 or No. 75770 stylus
75722	17	Screw—No. 4 x ¼" fillister head screw to mount pickup
*75727	18	Spring—Shock absorbing spring (.187" O.D. x ¾") (see note)
*75725	19	Nut—No. 8-32 hex nut to mount pickup arm (see note)
72349	20	Bearing—Thrust bearing
75740	21	Spring—Reject lever spring (formed), part of reject lever
75742	22	Spring—Reject lever return spring (.180" O.D. x .535" — 21½ turns)
74782	23	Emblem—"RCA Victor" emblem (maroon)
76726	23	Emblem—"RCA Victor" emblem (red)
*75719	24	Arm—Pickup arm shell only (see note)
76098	24	Arm—Pickup arm (black) (late type) complete with counterbalance, swivel and pin — less collar, pickup and cable (see note)
76709	24	Arm—Pickup arm (red) complete with counterbalance, swivel and shaft—less pickup and cable
76099	24A	Collar—Pickup arm pivot shaft collar—less screw—for late type pickup arm
75728	25	Cable—3-wire twisted pickup arm cable complete with connectors for all models using crystal pickups
76298	25	Cable—3-wire twisted pickup arm cable complete with connectors for RP-190-5 using ceramic pickup
71095	26	Nut—Speed nut for cable—in rear of arm
72765	27	Nut—Speed nut for cable—in center of arm
*75721	28	Weight—Counterbalance weight—die cast (see note)
*75724	29	Pin—Pin for anchoring shock absorbing springs (see note)
*75723	30	Screw—No. 6 x 11/16" fillister head screw to fasten counterbalance (see note)
75886	31	Spring—Counterbalance spring (.180" O.D. x .600" — 30 turns for all models using crystal pickups
74060	31	Spring—Counterbalance spring (.171" O.D. x .695" — 43 turns for RP-190-5 using ceramic pickup
*75720	32	Swivel—Pickup arm swivel (see note)
*75726	33	Screw—No. 8-32 x ⅜" cross recessed pan head machine screw to mount pickup arm swivel No. 75720
76100	33	Screw—No. 6-32 x ¼" hex head machine screw for pivot shaft collar No. 76099
35969	34	Washer—"C" washer to mount trip lever
75752	35	Washer—Steel thrust washer
76005	36	Washer—Bearing washer for tone arm
74870	37	Retainer—Idler wheel retainer (spring sleeve type)
75887	38	Washer—Spring washer for idler wheel
74077	39	Wheel—Idler wheel
——	40	Nut—No. 6-32 hex nut for mounting motor to idler lever plate assembly
——	41	Lockwasher—No. 6 split lockwasher for No. 6-32 hex nut
74078	42	Washer—Dampening washer for idler wheel
75762	43	Spring—Idler wheel tension spring (.195" O.D. x 29/32" — 37½ turns)
75759	44	Plate—Motor mounting plate complete with idler lever
75761	45	Grommet—Rubber grommet for motor mounting plate
75749	46	Washer—Flat washer—metal (.0299" x .190" I.D. x ⅜" O.D.)—for mounting motor
33726	47	Washer—"C" washer to mount motor assembly

*SEE NOTE ON PAGE 10.

REPLACEMENT PARTS—Continued

STOCK No.	ILL. No.	DESCRIPTION
75760	48	Motor—117 volt, 60 cycle motor for all models except RP-190-3 and RP-190-5
75937	48	Motor—85 volt, 60 cycle motor for RP-190-3 (used in some Model 45-EY-3)
76299	43	Motor—117 volt, 60 cycle motor for RP-190-5 (less conversion spring)
76302	—	Spring—Conversion spring sleeve (60 to 50 cycle) for use on No. 76299 motor in RP-190-5
74212	49	Nut—Control knob speed nut
74431	50	Washer—Spring washer to mount reject lever mounting stud
75736	51	Collar—Friction collar
14974	52	Screw—No. 8-32 x 3/16" hex socket head—cup point—for friction collar
75738	53	Wheel—Ratchet wheel
75750	54	Washer—Flat washer—metal (.0299" x .180' I.D. x 9/16" O.D.)—for ratchet wheel, thrust spring
75743	55	Spring—Ratchet wheel thrust spring (5/16" O.D. x 7/16"—5½ turns)
33726	56	Washer—"C" washer to mount ratchet wheel
75735	57	Bracket—Mounting bracket for slide assembly
——	58	Lockwasher—No. 8 external teeth lockwasher for cycling slide mounting bracket
74670	59	Screw—No. 8 x ⅜" self-tapping hex head screw to mount slide assembly bracket
75732	60	Housing—"On-Off" switch housing and lever—less switch No. 75733
76300	60	Housing—"On-Off" switch housing and lever—less switch No. 76301





75733	60A	Switch—"On-Off" switch—less housing No. 75732
76301	60A	Switch—"On-Off" switch—less housing No. 76300
——	61	Screw—No. 8 x ¼" self-tapping hex head screw to mount "On-Off" switch
75737	62	Roller—Knurled roller
75751	63	Screw—No. 10-32 x 17/64" headless set screw—dog point—for knurled roller
——	64	Clamp—Cable clamp for audio cable
——	65	Nut—No. 8-32 hex nut to fasten cable clamp ILL. 64
74192	66	Connecter—3 contact male connector for audio cable
——	67	Same as 61
75730	68	Switch—Muting switch
76004	69	Spring—Pickup arm return lever spring (.195" O.D. x 1¼"—69 turns)
75734	70	Lever—Return lever
35969	71	Washer—"C" washer to mount return lever
——	72	Cable—Shielded audio cable (see Service Data for various instruments)
31048	72A	Plug—Pin plug for audio cable
——	73	Power cord (see Service Data for various instruments)
30870	73A	Connector—2 contact male connector for power cable
75731	74	Rod—Elevating rod
75768	75	Stud—Tripping adjustment stud
74431	76	Washer—Spring washer for adjusting studs
75767	77	Lever—Trip lever assembly—less spring and tripping and landing adjustment studs
74431	78	Washer—Spring washer for adjusting studs
75769	79	Stud—Landing adjustment stud
75749	80	Washer—Flat washer—metal (.0299" x .190" I.D. x ⅜" O.D.)—to mount sub-motorboard
75746	81	Spring—Height adjustment spring (.262" O.D. x 13/16"—8 turns)
*75763	82	Slide—Cycling slide assembly complete with stop dog—less cam wheel and stop dog adjusting stud (see note)
76101	82	Slide—Cycling slide (late type) complete with stop dog and safety lever—less cam wheel, safety spring, stop dog spring and stop dog adjusting stud
——	82A	Dog—Stop dog—part of Item 82
72362	82B	Spring—Safety lever actuating spring (.242" O.D. x 1"—19½ turns) for slide No. 76101
75742	83	Spring—Trip lever spring (.180" O.D. x .535"—21½ turns)
33726	84	Washer—"C" washer for cam wheel
75764	85	Wheel—Cam wheel and tire
75765	86	Spring—Stop dog tension spring (.195" O.D. x 11/16"—24½ turns)
75766	87	Stud—Adjusting stud for stop dog
74431	88	Washer—Spring washer for stop dog adjusting stud
75744	89	Spring—Slide assembly return spring (¼" O.D. x 2 23/32"—90 turns)
75747	90	Nut—Knurled nut for height adjustment

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA VICTOR

AC-DC-Battery Portable Receiver

MODEL PX 600

Chassis No. RC-1110

SERVICE DATA

— 1951 No. 4 —

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tuning Range ..... 540-1,600 kc

Intermediate Frequency ..... 455 kc

Power Supply Rating

Power Line Operation

115 volts, d. c. or 50 to 60 cycles a. c. ..... 15 watts

or

Battery Operated ..... using RCA VS 057 Battery

(Average battery life — 100 hrs. intermittent service)

Battery current ..... "A" 50 ma., "B" 13 ma.

Tube Complement

(1) RCA 1T4 ..... R.F. Amplifier
(2) RCA 1R5 ..... Converter
(3) RCA 1T4 ..... I.F.-Amplifier
(4) RCA 1U5 ..... Det. — AVC — 1st A.F.
(5) RCA 3V4 ..... Output

A selenium rectifier is used.

Weight (Approx.)
Without battery . . 5 lb. 10 oz. With battery . . 9 lb. 6 oz.

Power Output
Undistorted ..... .150 watt
Maximum ..... .325 watt

Loudspeaker ..... 4 in. P.M.
Voice coil impedance ..... 3.2 ohms at 400 cycles

Cabinet Dimensions
Height . . . . . 8⅝ in. Width . . . . 12¾ in. Depth . . . . . 5⅝ in.

To Remove Chassis:

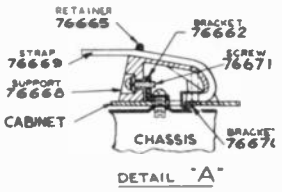
1. Pull out battery and disconnect battery plug.
2. Unsolder the two loop antenna leads.
3. Remove handle, remove the two large screws (under handle) in the top of the case.

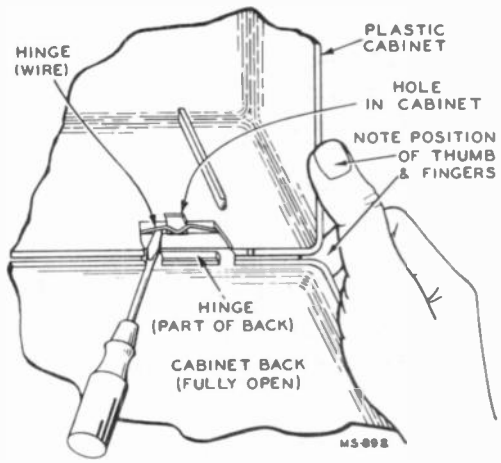
To Remove Hinges

Remove back from cabinet as described at right. Spread the hinge apart to remove it from the cabinet back.

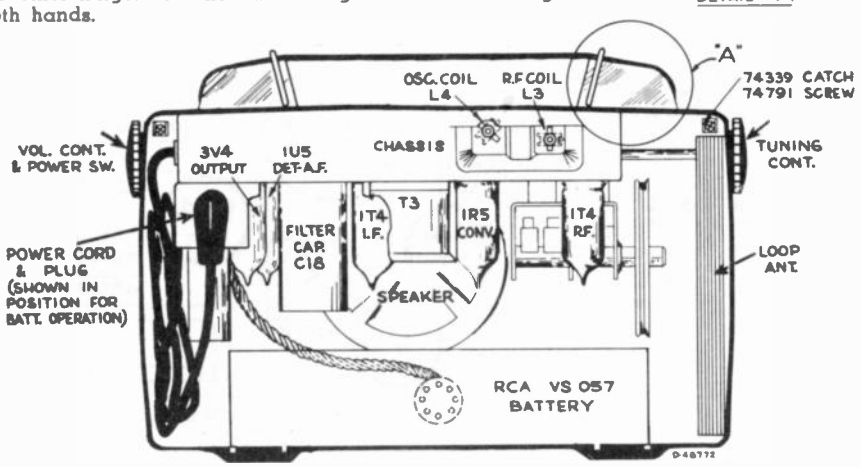
To Remove Cabinet Back

With the back fully open, grip the cabinet as illustrated. Insert a screwdriver under one hinge and pry the center of the hinge out of the opening in the cabinet while maintaining pressure on the back with the fingers and on the cabinet with the thumb. Repeat this procedure with the other hinge. Pull the back straight to the rear using both hands.





Removal of Cabinet Back



Rear View With Back Removed

PX 600

Alignment Procedure

Output Meter Alignment — If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator — For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possible to avoid AVC action.

Battery operation of the receiver is preferable during alignment; on AC operation an isolation transformer (117v./117v.) may be necessary for the receiver if the test oscillator is also AC operated.

Dial Pointer Position — With the tuning condenser fully meshed the center of the dial pointer should be in line with the score mark on the chassis.

Step	Connect High Side of Sig. Gen. to —	Sig. Gen. Output	Dial Pointer Setting	Adjust for Max. Output
1	Disconnect loop—remove chassis—remove bottom plate.			
2	Pin #6 of 1T4 I.F. Amplifier thru .005 mf.	455 kc	Quiet point near 1600 kc	2nd I.F. Trans. T2 Top & Bottom
3	Pin #6 of 1R5 Converter thru .005 mf.			1st I.F. Trans. T1 Top & Bottom
4	Replace bottom cover and install chassis in cabinet. Re-connect loop.			
5	Short wire placed near loop for radiated signal	1620 kc	min. cap.	1600 kc osc. trimmer C1-3T
6		1400 kc	1400 kc Signal	1400 kc r.f. & ant. trimmers*
7		Connect a 22,000 ohm resistor in parallel with r.f. tuning cond. C1-2		
8		600 kc	600 kc Signal	L4 osc. core* while rocking gang
9		Remove the 22,000 ohm resistor from r.f. tuning cond. C1-2.		
10		600 kc	600 kc Signal	L3 r.f. core
11	Repeat Steps 5, 6, 7, 8, 9 and 10.			

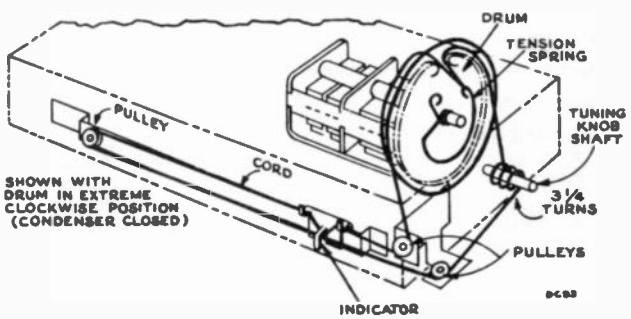
* The position of the battery affects loop inductance. The battery should be in place during steps 5 to 11.

Critical Lead Dress

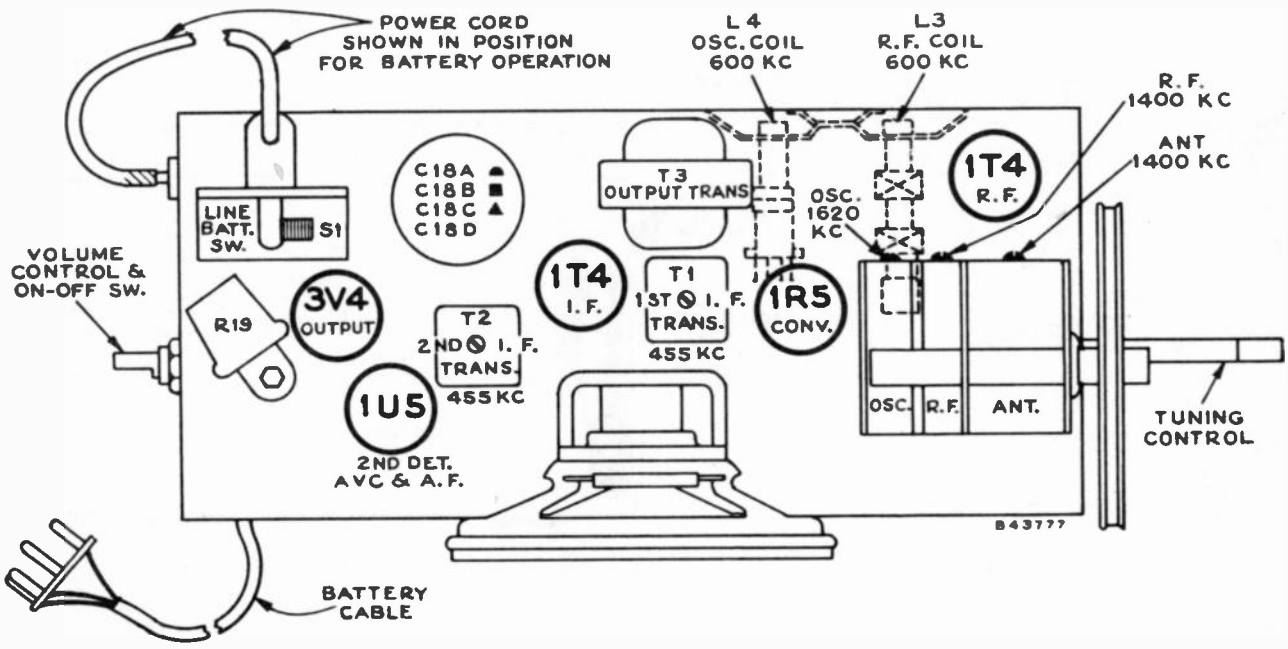
1. Dress all filament leads next to chassis.
2. Keep the leads short on the end of the three components (R1, R2, C2), which connect to the grid terminal (#6) of the r.f. socket.
3. Dress tuning condenser leads direct and avoid excess lead length.
4. Dress loop leads away from tuning drum and battery.
5. Dress r.f. plate lead against chassis base.
6. Dress a.v.c. lead against chassis base.
7. Dress +B lead to output transformer against chassis base.
8. Dress 1st a.f. plate resistor (R15) up and away from other wiring.
9. Dress all leads away from the ballast resistor (R19).
10. Dress 1st a.f. grid resistor (R12) close to chassis.
11. Dress capacitor C3 in air between end apron and r.f. coil with foil end to tuning condenser frame.

CAUTION.—

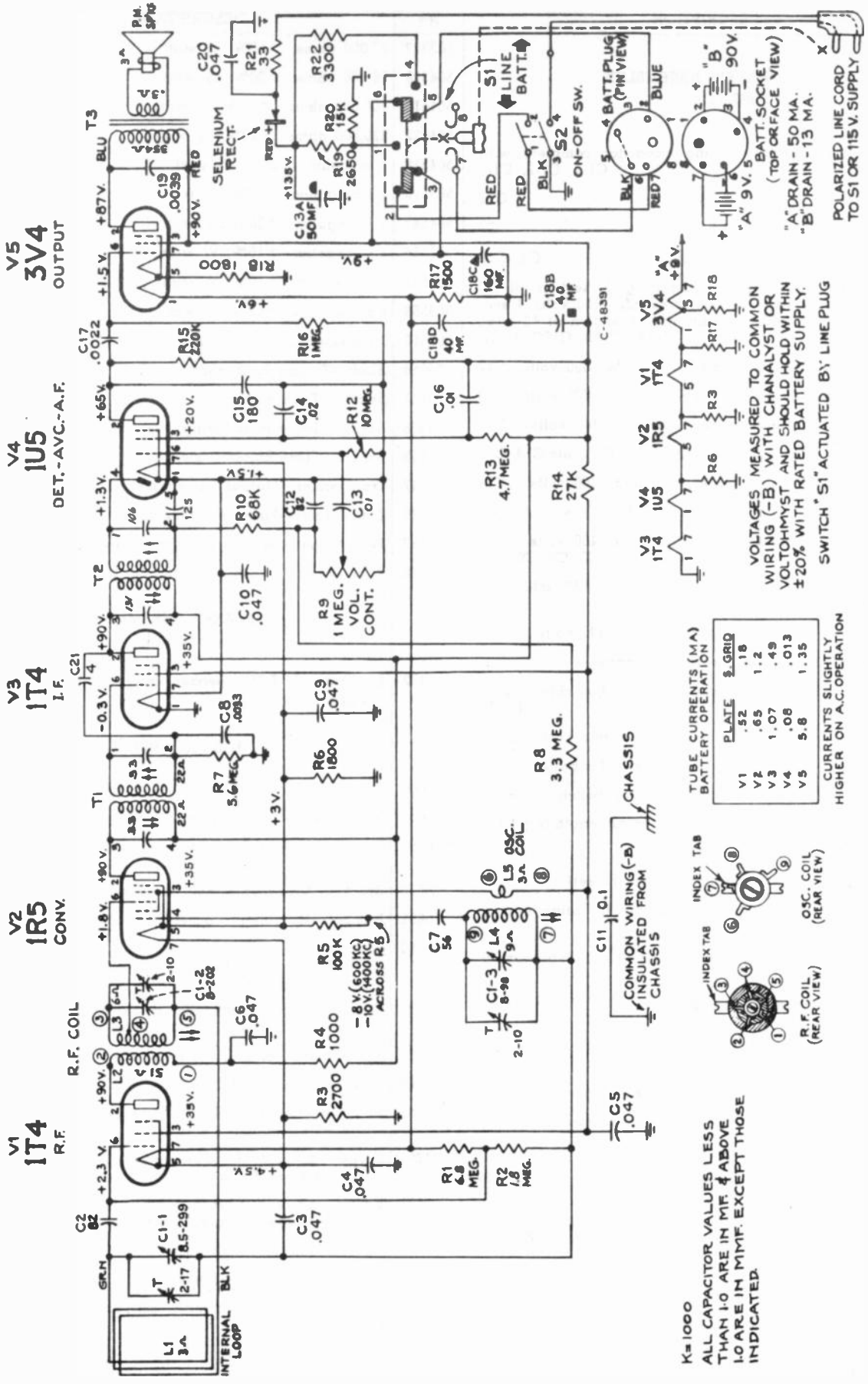
Do not remove any tubes from the chassis with the set operating and the plug connected to the power line. Damage to tubes may result.



Dial-Indicator and Drive Mechanism



Tube and Trimmer Locations



Schematic Diagram

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1110
76660	Capacitor—Variable tuning capacitor complete with drive drum C1-1, C1-2, C1-3
73153	Capacitor—Ceramic, 4 mmf. C21
39622	Capacitor—Mica, 56 mmf. C7
71514	Capacitor—Ceramic, 82 mmf. C2, C12
76659	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts, 1 section of 40 mfd., 150 volts, 1 section of 160 mfd., 25 volts and 1 section of 40 mfd., 25 volts C18A, C18B, C18C, C18D
73595	Capacitor—Tubular, paper, .0022 mfd., 600 volts..C17
73795	Capacitor—Tubular, paper, .0033 mfd., 600 volts...C8
73796	Capacitor—Tubular, paper, .0039 mfd., 600 volts...C19
73561	Capacitor—Tubular, paper, .01 mfd., 400 volts C13, C16
73562	Capacitor—Tubular, paper, .022 mfd., 400 volts...C14
73558	Capacitor—Tubular, paper, .047 mfd., 200 volts C4, C5
73553	Capacitor—Tubular, paper, .047 mfd., 400 volts C3, C6, C9, C10
75071	Capacitor—Tubular, moulded paper, .047 mfd., 400 volts C20
73551	Capacitor—Tubular, paper, 0.1 mfd., 400 volts... C11
73935	Clip—Mounting clip for I.F. transformers
73114	Coil—Oscillator coil complete with adjustable core L4, L5
74992	Coil—R.F. coil complete with adjustable core..L2, L3
71041	Connector—5 contact male connector for battery cable
74285	Control—Volume control and power switch....R9, S2
†72953	Cord—Drive cord (approx. 47" overall length required)
70022	Cord—Power cord and plug
74838	Grommet—Power cord strain relief (1 set)
72283	Grommet—Rubber grommet to mount tuning capacitor (3 required)
18469	Plate—Bakelite mounting plate for electrolytic capacitor
76656	Pointer—Station selector pointer
72602	Pulley—Drive cord pulley
74322	Rectifier—Selenium rectifier
74319	Resistor—Wire wound, 2650 ohms, 7 watts R19
73237	Resistor—Wire wound, 33 ohms, fuse type R21
	Resistors—Fixed, composition:
504210	1000 ohms, ±20%, ½ watt R4
503215	1500 ohms, ±10%, ½ watt R17
503218	1800 ohms, ±10%, ½ watt R6, R18
503227	2700 ohms, ±10%, ½ watt R3
513233	3300 ohms, ±10%, 1 watt R22
504315	15,000 ohms, ±20%, ½ watt R20
503327	27,000 ohms, ±10%, ½ watt R14
504368	68,000 ohms, ±20%, ½ watt R10
504410	100,000 ohms, ±20%, ½ watt R5
504422	220,000 ohms, ±20%, ½ watt R15
504510	1 megohm, ±20%, ½ watt R16
503518	1.8 megohm, ±10%, ½ watt R2
504547	4.7 megohm, ±20%, ½ watt R13
503556	5.6 megohm, ±10%, ½ watt R7
503533	3.3 megohm, ±10%, ½ watt R8
503568	6.8 megohm, ±10%, ½ watt R1
504610	10 megohm, ±20%, ½ watt R12
76658	Shaft—Tuning knob shaft
73117	Socket—Tube socket
76368	Spring—Drive cord spring
71039	Switch—"Line-Battery" switch S1
71047	Transformer—Output transformer T3
73129	Transformer—First I.F. transformer T1
75487	Transformer—Second I.F. transformer T2
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES 971495-2
76402	Speaker—4" P.M. speaker complete with cone and voice coil (3.2 ohms)
	MISCELLANEOUS
76664	Antenna—Antenna loop L1
76667	Back—Cabinet back complete with hinges
76661	Board—Antenna loop lead terminal board complete with clip
76670	Bracket—Carrying handle strap bracket
76662	Bracket—Mounting bracket for handle (2 required)
76666	Cabinet—Cabinet complete with escutcheon, dial, "RCA Victor" emblem, grille, baffle and loop—less back and hinges
74339	Catch—Cabinet back clip catch—fastens to cabinet front (2 required)
74790	Hinge—Cabinet hinge (2 required)
76663	Knob—Control knob
76665	Retainer—Retainer for carrying handle strap (2 required)
74791	Screw—#4 x 5/16" cross recessed pan head thread cutting screw for catch #74339
76671	Screw—#6 x ½" cross recessed round head thread cutting screw for carrying handle
74734	Spring—Spring clip for knob
76669	Strap—Carrying handle strap
76668	Support—Handle assembly support (polystyrene) (2 required)

†Stock No. 72953 is a reel containing 250 feet of cord.

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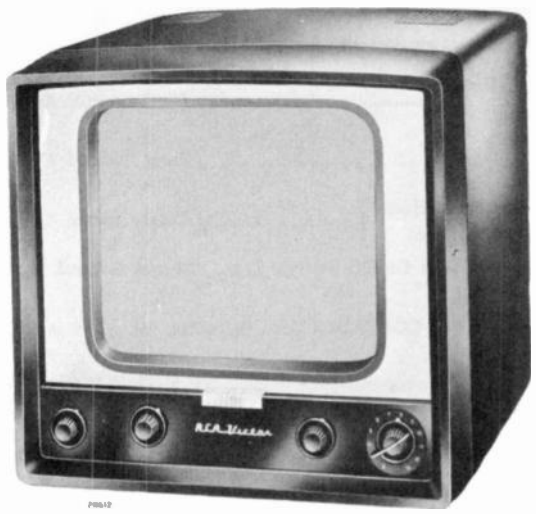

Model 4T101
"Bentley"
Mahogany Finish

RCA VICTOR

TELEVISION RECEIVER MODEL 4T101

Chassis No. KCS61

— Mfr. No. 274 —

SERVICE DATA

— 1951 No. T1 —

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Model 4T101 receivers employ nineteen tubes plus rectifier and a 14EP4 kinescope.

Features of the television unit are: full twelve channel coverage; FM sound system; improved picture brilliance; picture A-G-C; A-F-C horizontal hold; stabilized vertical hold; two stages of video amplification; noise saturation circuits; improved sync separator and clipper; four mc. band width for picture channel and reduced hazard high voltage supply. An auxiliary audio input jack is provided to permit the use of an external record playing attachment.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE .....96 square inches on a 14EP4 Kinescope

R-F FREQUENCY RANGES

Channel Number	Channel Freq. Mc.	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.
2	54-60	55.25	59.75	80.750
3	60-66	61.25	65.75	86.750
4	66-72	67.25	71.75	92.750
5	76-82	77.25	81.75	102.750
6	82-88	83.25	87.75	108.750
7	174-180	175.25	179.75	200.750
8	180-186	181.25	185.75	206.750
9	186-192	187.25	191.75	212.750
10	192-198	193.25	197.75	218.750
11	198-204	199.25	203.75	224.750
12	204-210	205.25	209.75	230.750
13	210-216	211.25	215.75	236.750

VIDEO RESPONSE .....To 4 mc.

SWEEP DEFLECTION .....Magnetic

FOCUS .....Magnetic

POWER SUPPLY RATING .....115 volts, 60 cycles, 160 watts

AUDIO POWER OUTPUT RATING .....5 watts max.

LOUDSPEAKER (92585-2W) .....5" x 7" PM Dynamic. 3.2 ohms

DIMENSIONS (inches)	Width	Height	Depth
Cabinet (outside)	18 1/8	16 1/8	23 5/8

WEIGHT Model	Chassis with Tubes in Cabinet	Shipping Weight
4T101	73 lbs.	85 lbs.

RECEIVER ANTENNA INPUT IMPEDANCE

Choice: 300 ohms balanced or 72 ohms unbalanced.

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6CB6	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator and Mixer
(3)	RCA 6AU6	1st Sound I-F-Amplifier
(4)	RCA 6AU6	2nd Sound I-F Amplifier
(5)	RCA 6AL5	Sound Discriminator
(6)	RCA 6AV6	1st Audio Amplifier
(7)	RCA 6AQ5	Audio Output
(8)	RCA 6AU6	1st Picture I-F Amplifier
(9)	RCA 6CB6	2nd Picture I-F Amplifier
(10)	RCA 6AU6	3rd Picture I-F Amplifier
(11)	RCA 6CB6	4th Picture I-F Amplifier
(12)	RCA 6AL5	Picture 2nd Detector and AGC Detector
(13)	RCA 12AU7	1st and 2nd Video Amplifier
(14)	RCA 12AU7	DC Restorer and Sync Separator
(15)	RCA 6SN7GT	Sync. Amp. and Vertical Sweep Osc.
(16)	RCA 6AQ5	Vertical Sweep Output
(17)	RCA 6SN7GT	Horizontal Sweep Osc. and Control
(18)	RCA 6AU5GT	Horizontal Sweep Output
(19)	RCA 6W4GT	Damper
(20)	RCA 1B3-GT/8016	High Voltage Rectifier
(21)	RCA 14EP4	Kinescope

4T101 ELECTRICAL AND MECHANICAL SPECIFICATIONS

(Continued)

PICTURE INTERMEDIATE FREQUENCIES

Picture Carrier Frequency	25.50 Mc.
Adjacent Channel Sound Trap	27.00 Mc.
Accompanying Sound Traps	21.00 Mc.
Adjacent Channel Picture Carrier Trap	19.50 Mc.

SOUND INTERMEDIATE FREQUENCIES

Sound Carrier Frequency	21.00 Mc.
Sound Discriminator Band Width between peaks	400 kc
VIDEO RESPONSE	To 4 Mc.
FOCUS	Magnetic
SWEEP DEFLECTION	Magnetic
SCANNING	Interlaced, 525 line
HORIZONTAL SWEEP FREQUENCY	15,750 cps
VERTICAL SWEEP FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

OPERATING CONTROLS (front Panel)

Channel Selector, Fine Tuning	Dual Control Knobs
Picture, Brightness	Dual Control Knobs
Picture Horizontal Hold, Picture Vertical Hold	Dual Control Knobs
Sound Volume and On-Off Switch	Single Control Knob

NON-OPERATING CONTROLS (not including r-f & i-f adjustments)

Picture Centering	top chassis adjustment
Width	rear chassis adjustment
Height	rear chassis adjustment
Horizontal Linearity	rear chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis screwdriver adjustment
Horizontal Osc. Freq.	top chassis adjustment
Horizontal Osc. Waveform	bottom chassis adjustment
Horizontal Locking Range	rear chassis adjustment
Focus	top chassis adjustment
Ion Trap Magnet	top chassis adjustment
Deflection Coil	top chassis wing nut adjustment
AGC Control Switch	rear chassis adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT REMOVE THE RECEIVER CHASSIS, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES, AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For this reason, kinescope must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. During service if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA replacement kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver.

OPERATING INSTRUCTIONS

The following adjustments are necessary when turning the receiver on for the first time:

1. See that the TV-PH switch on the rear apron is in the "TV" position.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best sound fidelity and the SOUND VOLUME control for suitable volume.

5. Turn the BRIGHTNESS control fully counter-clockwise, then clockwise until a light pattern appears on the screen.

6. Adjust the VERTICAL hold control until the pattern stops vertical movement.

7. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

8. Adjust the PICTURE and brightness controls for suitable picture contrast and brightness.

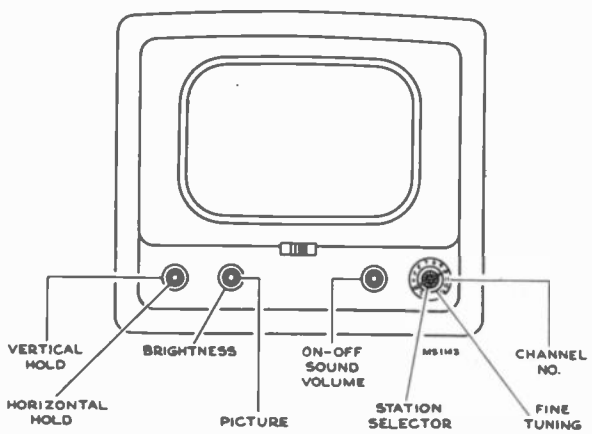

Figure 1—Receiver Operating Controls

9. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

10. In switching from one position to another, it may be necessary to repeat steps 4 and 8.

11. When the set is turned on again after an idle period it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 4 is generally sufficient.

12. If the positions of the controls have been changed, it may be necessary to repeat steps 2 through 9.

13. To use a record player, plug the record-player output cable into the PHONO jack on the rear apron, and set the TV-PH switch to "PH." Upon completion of the record program, set the TV-PH switch to TV position.

INSTALLATION INSTRUCTIONS

These receivers are shipped complete in cardboard cartons. The kinescope is shipped in place in the receiver.

Take the receiver out of the carton and remove all packing material.

Install the control knobs on the proper control shafts.

Make sure that all tubes are in place and are firmly seated in their sockets.

Check to see that the kinescope high voltage lead clip is in place.

Connect the antenna transmission line to the receiver antenna terminals. Plug a power cord into the 115 volt a-c power source and into the receiver interlock receptacle. Turn the receiver power switch to the "on" position, the brightness control fully clockwise, and the picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT.—Set the ion trap magnet approximately in the position shown in Figure 2. Starting from this position immediately adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Turn the focus control (shown in Figure 2) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches of this adjustment should be made with the brightness control at the maximum clockwise position with which good line focus can be maintained.

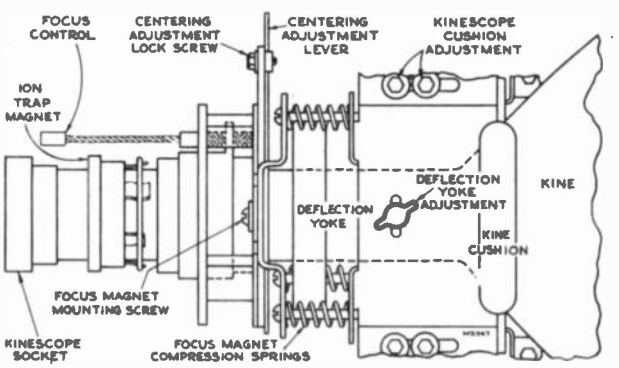

Figure 2—Yoke and Focus Magnet Adjustments

DEFLECTION YOKE ADJUSTMENT.—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS.—It will now be necessary to obtain a test pattern picture in order to make further adjustments.

If the Horizontal Oscillator and AGC System are operating properly, it should be possible to sync the picture at this point. However, if the AGC control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading, turn S105 on the rear apron (see Figure 3) counter-clockwise until the set operates normally and the picture can be synced.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT.—Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 2 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull-in should occur when the control is approximately 90 degrees from the extreme counter-clockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

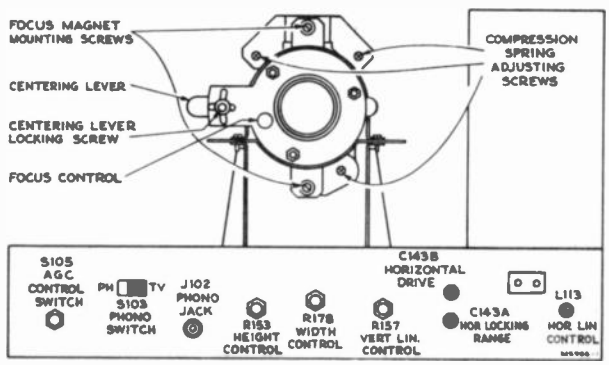

Figure 3—Rear Chassis Adjustments

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Focus Magnet Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR.—If in the above check the receiver failed to hold sync with the hold control at the extreme counter-clockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull-in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment.—Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T107 horizontal frequency adjustment on top of the chassis until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Locking Range Adjustment.—Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. The picture may remain in sync. If so turn the T107 top core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C143A slightly clockwise. If less than 2 bars are present, adjust C143A slightly counter-clockwise. Turn the picture control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure on page 11. For field purposes paragraph "A" under Horizontal Oscillator Waveform Adjustment may be omitted.

FOCUS MAGNET ADJUSTMENT.—The focus coil should be adjusted so that there is approximately three-eighths inch of space between the rear cardboard shell of the yoke and the flat of the front face of the focus magnet. This spacing gives best average focus over the face of the tube.

The axis of the hole through the magnet should be parallel with the axis of the kinescope neck with the kinescope neck through the middle.

CENTERING ADJUSTMENT.—No electrical centering controls are provided. Centering is accomplished by means of a separate plate on the focus magnet. Some centering plates include a locking screw which must be loosened before centering, and others are held in adjustment by friction. Up and down adjustment of the plate moves the picture side to side and sidewise adjustment moves the picture up and down.

If a corner of the raster is shadowed, check the position of the ion trap magnet. Reposition the magnet within the range of maximum raster brightness to eliminate the shadow and recenter the picture by adjustment of the focus magnet plate. In no case should the magnet be adjusted to cause any loss of brightness since such operation may cause immediate or eventual damage to the tube. In some cases it may be necessary to shift the position of the focus magnet in order to eliminate a corner shadow.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS.—Adjustment of the horizontal drive control affects the high voltage applied to the kinescope. In order to obtain the highest possible voltage hence the brightest and best focused picture, adjust horizontal drive counter-clockwise as far as possible without stretching the left side of the picture. As a first adjustment, set the horizontal drive trimmer C143B one-half turn out from maximum capacity.

Turn the horizontal linearity coil out until appreciable loss in width occurs, then in until nearly maximum width and the best linearity is obtained.

Adjust the width control R178 to obtain correct picture width.

A slight readjustment of these three controls may be necessary to obtain the best linearity.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.—Adjust the height control (R153 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R157 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

FOCUS.—Adjust the focus magnet for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

On focus magnets using two shunts, the one with the cable is the "fine adjustment" and the other is the "focus range" adjustment. In general, the two shunts should be adjusted to approximately equal positions.

Recheck the position of the ion trap magnet to make sure that maximum brightness is obtained.

Check to see that the yoke thumbscrew and the focus magnet mounting screws are tight.

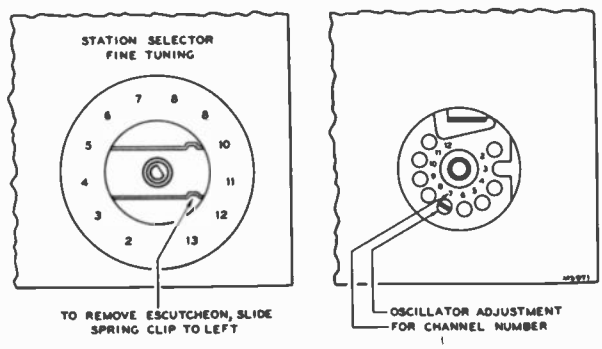

Figure 4—R-F Oscillator Adjustments

CHECK OF R-F OSCILLATOR ADJUSTMENTS.—Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 10. The adjustments for channels 2 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 4. Adjustment of channel 13 is on top of the chassis.

AGC CONTROL.—The AGC control switch is provided as an installation adjustment. The normal position for strong signal areas is with the switch in the number 1 or counter-clockwise position. If impulse type of interference is experienced, turn the switch to the number 2 or center position. In very weak signal areas in which impulse type interference is experienced, turn the switch to position number 3 or fully clockwise. In this position, all AGC is removed and the receiver will overload if the input signal exceeds 200 microvolts. However, for signals under 200 microvolts, this position of the AGC control switch gives best noise immunity of sync.

FM TRAP ADJUSTMENT.—In some instances interference may be encountered from a strong FM station signal. A trap is provided to eliminate this type of interference. To adjust the trap tune in the station on which the interference is observed and adjust the L203 core on top of the r-f unit for minimum interference in the picture.

CAUTION: In some receivers, the FM trap L203 will tune down into channel 6 or even into channel 5. Needless to say, such an adjustment will cause greatly reduced sensitivity on these channels. If channels 5 or 6 are to be received, check L203 to make sure that it does not affect sensitivity on these two channels.

Replace the cabinet back and reconnect the antenna leads to the cabinet back.

CABINET ANTENNA.—A cabinet antenna is provided in both model receivers and the leads are brought out near the antenna terminal board. The cabinet antenna may be employed in place of the outdoor antenna in areas where the signals are strong and no reflections are experienced.

RECEIVER LOCATION.—The owner should be advised of the importance of placing the receiver in the proper location in the room.

The location should be chosen—

—Away from bright windows and so that no bright light will fall directly on the screen. (Some illumination in the room is desirable, however.)

—To give easy access for operation and comfortable viewing.

—To permit convenient connection to the antenna.

—Convenient to an electrical outlet.

—To allow adequate ventilation

VENTILATION CAUTION.—The receiver is provided with adequate ventilation holes in the bottom and back of the cabinet. Care should be taken not to allow these holes to be covered or ventilation to be impeded in any way.

If the receiver is to be operated with the back of the cabinet near a wall, at least a two-inch clearance should be maintained between cabinet and wall.

CHASSIS REMOVAL.—To remove the chassis for repair or installation of a new kinescope, remove the cabinet back and the control knobs, unplug the speaker cable, and remove the four chassis bolts under the cabinet. Withdraw the chassis from the back of the cabinet. The kinescope is held on the chassis by means of a special strap, so that the chassis and the kinescope can be handled together, as a unit.

To remove the kinescope, remove the kinescope socket, the ion-trap magnet, and the second-anode connector. Loosen the cross-recessed head screw on the kinescope strap. Withdraw the kinescope toward the front of the chassis.

INSTALLATION OF KINESCOPE.—The kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is toward the high-voltage compartment.

Insert the neck of the kinescope through the deflection yoke and focus magnet. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

Slide the kinescope cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten.

Slip the ion trap magnet assembly over the neck of the kinescope.

Connect the kinescope socket to the tube base.

Connect the high voltage lead to the kinescope second anode socket.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks.

To replace the chassis in the cabinet, first tighten the cross-recessed head screw on the kinescope strap. Slide the chassis into the cabinet, then insert and tighten the four chassis bolts. Loosen the kinescope strap from the rear of the cabinet. Push the kinescope forward until the face of the tube is against the mask. Push the yoke cushion forward against the kinescope flare, then tighten the cushion adjusting screws. Tighten the kinescope strap. Then replace the knobs, and the cabinet back.

ANTENNAS.—The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to select the proper antenna to suit the particular local conditions, to install it properly and orient it correctly.

RCA Television Antenna, type No. 225A1 is designed for reception of all twelve television channels. The antenna uses the 300-ohm RCA "Bright Picture" television transmission line. The antenna, a dipole with reflector, is unidirectional on channels two through six. When used on these channels, the maximum signal is obtained when the antenna rods are broadside toward the transmitting antenna, with the antenna element between the reflector and the transmitting antenna.

If two or more stations are available between channels two and six and the two stations are in different directions, it may be possible to make a compromise orientation which will provide a satisfactory signal on all such channels.

When operated on channels seven through thirteen (174 to 216 Mc), the antenna has side lobes. On these channels, the maximum signal will be obtained when the antenna is rotated approximately 35 degrees in either direction from its broadside position toward the transmitting antenna. In many instances this effect may not cause any difficulties and it may be possible to make a compromise orientation which will permit satisfactory reception on all high and low channels. In some instances, however, this will not be the case due to reflections or to insufficient signal strength from one or more stations.

RCA antenna type 204A1 is available for use in locations in which it is desirable to eliminate side lobes and to have the antennas 7-13 directivity the same as 2-6 directivity.

For use in cases where it is desirable to have adjustable 7-13 directivity different from 2-6, RCA antenna type 206A1 is provided.

If it is impossible to obtain satisfactory results on one or more channels, it may become necessary either to provide means for tuning the antenna when switching channels or to install a separate antenna for one or more channels and to switch antennas when switching channels.

In weak signal areas it is possible to "stack" the type 204A1 antenna to obtain increased signal strength by employing one type 204A1 antenna and one type 208A1 stacking kit.

REFLECTIONS.—Multiple images sometimes known as echoes or ghosts, are caused by the signal arriving at the antenna by two or more routes. The second or subsequent image occurs when a signal arrives at the antenna after being reflected off a building, a hill or other object. In severe cases of reflections, even the sound may be distorted. In less severe cases, reflections may occur that are not noticeable as reflections but that will instead cause a loss of definition in the picture.

Depending upon the circumstances, it may be possible to eliminate the reflections by rotating the antenna or by moving it to a new location. In extreme cases, it may be impossible to eliminate the reflection.

INTERFERENCE.—Auto ignition, street cars, electrical machinery and diathermy apparatus may cause interference which spoils the picture. Whenever possible, the antenna location should be removed as far as possible from highways, hospitals, doctors' offices and similar sources of interference. In mounting the antenna, care must be taken to keep the antenna rods at least ¼ wave length (at least 6 feet) away from other antennas, metal roofs, gutters or other metal objects.

Short-wave radio transmitting and receiving equipment may cause interference in the picture in the form of moving ripples. In some instances it may be possible to eliminate the interference by the use of a trap in the antenna transmission line. However, if the interfering signal is on the same frequency as the television station, a trap will provide no improvement.

WEAK PICTURE.—When the installation is near the limit of the area served by the transmitting station, the picture may be speckled, having a "snow" effect, and may not hold steady on the screen. This condition is due to lack of signal strength from the transmitter.

4T101

CHASSIS TOP VIEW

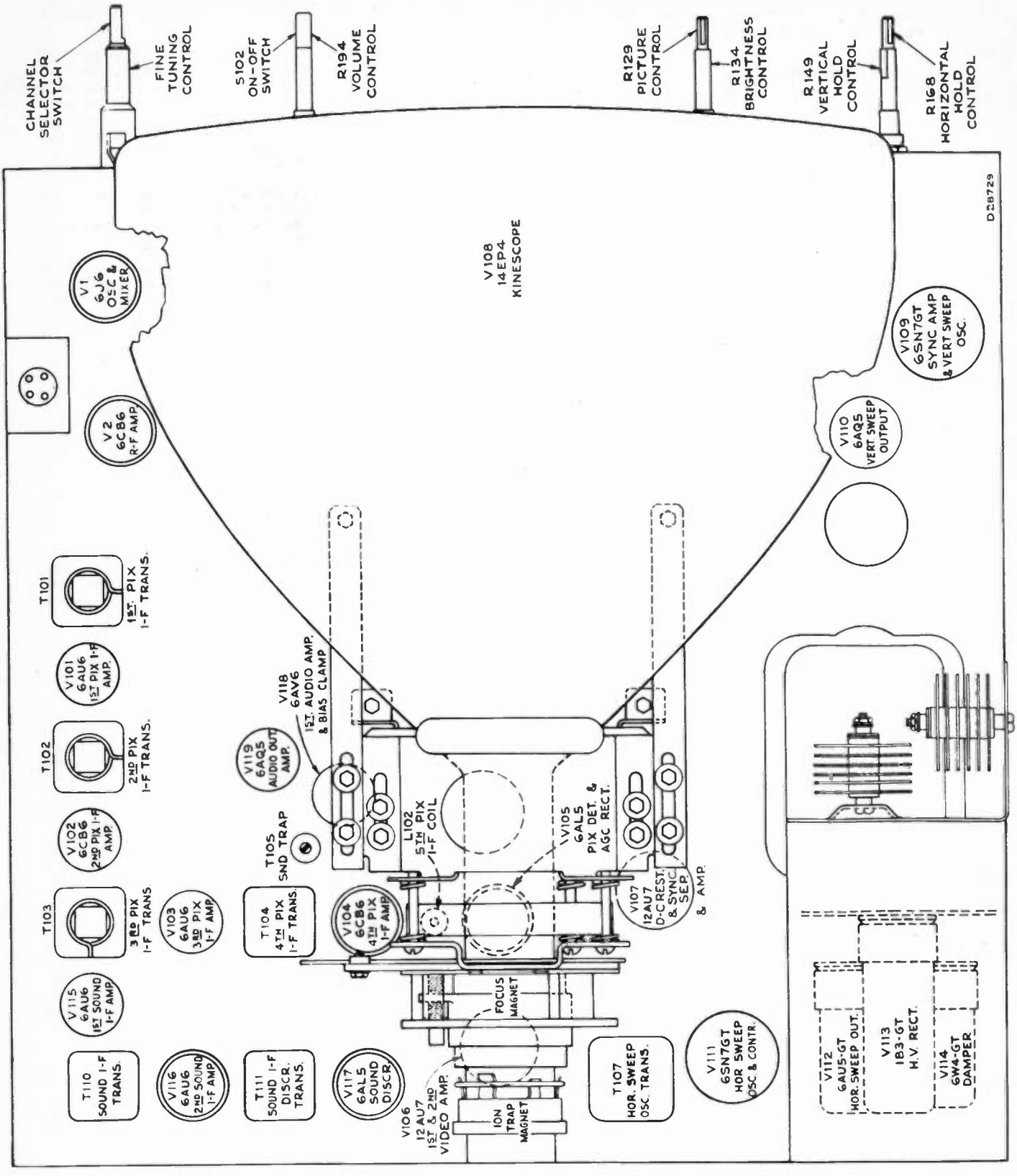

Figure 5—Chassis Top View

CHASSIS BOTTOM VIEW

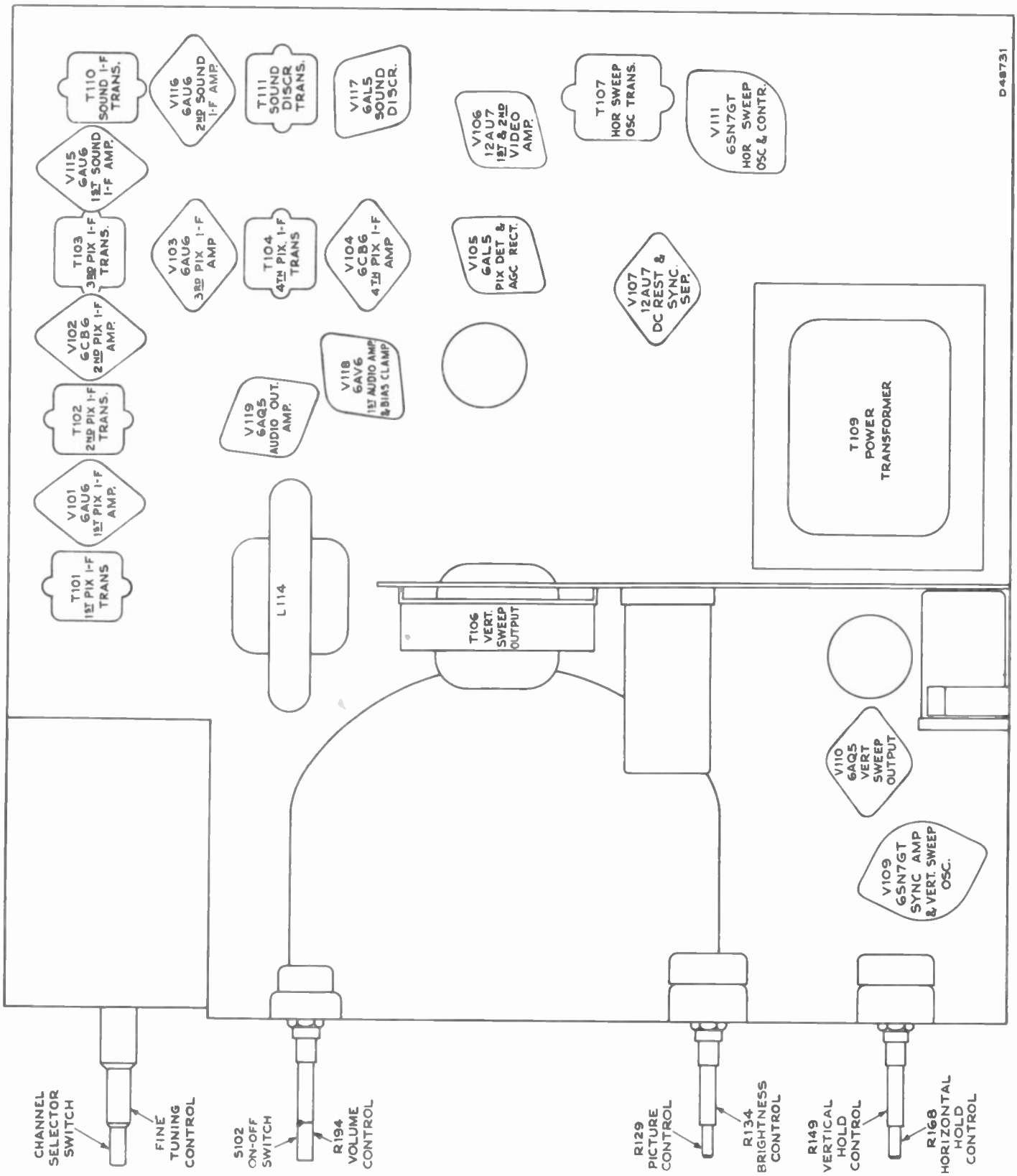

Figure 6—Chassis Bottom View

ALIGNMENT PROCEDURE

TEST EQUIPMENT.—To properly service the television chassis of this receiver, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency Ranges
- 20 to 30 mc., 1 mc. and 10 mc. sweep width
- 50 to 90 mc., sweep width
- 170 to 225 mc., 10 mc. sweep width

(b) Output adjustable with at least .1 volt maximum.

(c) Output constant on all ranges.

(d) "Flat" output on all attenuator positions.

Cathode-Ray Oscilloscope.—For alignment purposes, the oscilloscope employed must have excellent low frequency and phase response, and should be capable of passing a 60-cycle square wave without appreciable distortion. While this requirement is not met by many commercial instruments, RCA Oscilloscopes, types WO-55A, WO-57A, WO-58A, WO-79A, WO-79B and WO-60C fill the requirement and any of these may be employed.

For video and sync waveform observations, the oscilloscope must have excellent frequency and phase response from 10 cycles to at least two megacycles in all positions of the gain control. The RCA types WO-58A, WO-79A and WO-79B are ideally suited for this purpose.

Signal Generator to provide the following frequencies with crystal accuracy.

(a) Intermediate frequencies
- 19.50 mc. adjacent channel picture trap
- 21.00 mc. sound i-f and sound traps
- 22.3 and 25.4 mc. conv. and first pix i-f trans.
- 25.3 mc. second picture i-f transformer
- 22.5 mc. fourth picture i-f transformer
- 21.75 mc. third picture i-f transformer
- 24.35 mc. fifth picture i-f coil
- 25.50 mc. picture carrier
- 27.00 mc. adjacent channel sound trap

(b) Radio frequencies

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

(c) Output of these ranges should be adjustable and at least .1 volt maximum.

Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

Electronic Voltmeter of Junior "VoltOhmyst" type and a high voltage multiplier probe for use with this meter to permit measurements up to 10 kv.

Service Precautions.—If possible, the chassis should be serviced without the kinescope. However, if it is necessary to view the raster during servicing, make sure the kinescope retaining strap is secure, and the yoke cushion is up firmly against the flare of the tube.

CAUTION: Do not short the kinescope second anode lead. Its short circuit current is approximately 3 ma. This respresents approximately 9 watts dissipation and a considerable overload on the high voltage filter resistor R179.

Adjustments Required.—Normally, only the r-f oscillator and mixer lines will require the attention of the service technician. All other circuits are either broad or very stable and hence will seldom require readjustment.

ORDER OF ALIGNMENT.—When a complete receiver alignment is necessary, it can be most conveniently performed in the following order:

(1) Sound discriminator
(2) Sound i-f transformers
(3) Picture i-f traps
(4) Picture i-f transformers
(5) R.F. unit
(6) Overall picture i-f
(7) Horizontal oscillator
(8) Sensitivity check

SOUND DISCRIMINATOR ALIGNMENT.—Set the signal generator for approximately .1 volt output at 21.00 mc. and connect it to the second sound i-f grid, pin 1 of V116.

Detune T111 secondary (bottom) to the extreme counterclockwise position.

Set the "VoltOhmyst" on the 3-volt scale.

Connect the meter, in series with a one-megohm resistor, to pin 7 of V117.

Adjust the primary of T111 (top) for maximum output on the meter.

Connect the "VoltOhmyst" to the junction of R192 and S103. Adjust T111 secondary (bottom). It will be found that it is possible to produce a positive or negative voltage on the meter dependent upon this adjustment. Obviously to pass from a positive to a negative voltage, the voltage must go through zero. T111 (bottom) should be adjusted so that the meter indicates zero output as the voltage swings from positive to negative. This point will be called discriminator zero output.

Connect the sweep oscillator to the grid of the second sound i-f amplifier, pin 1 to V116.

Adjust the sweep band width to approximately 1 mc. with the center frequency at approximately 21.00 mc. and with an output of approximately .1 volt.

Connect the oscilloscope to the junction of R192 and S103. The pattern obtained should be similar to that shown in Figure 12. If it is not, adjust T111 (top) until the wave form is symmetrical.

The peak-to-peak band width of the discriminator should be approximately 400 kc. and the trace should be linear from 20.925 mc. to 21.075 mc.

Note.—The bottom core and stud in the discriminator transformer are at plus B potential.

SOUND I-F ALIGNMENT.—Connect the sweep oscillator to the first sound i-f amplifier grid, pin 1 of V115.

Insert a 21.00 mc. marker signal from the signal generator into the first sound i-f grid.

Connect the oscilloscope to the second sound i-f grid return (terminal A of T110) in series with a 33,000 ohm isolating resistor.

Adjust T110, top and bottom, for maximum gain and symmetry about the 21.00 mc. marker on the discriminator pattern. The pattern obtained should be similar to that shown in Figure 13.

The output level from the sweep should be set to produce approximately 0.3 volt peak-to-peak at the second sound i-f grid, when the final touches on the above adjustment are made. It is necessary that the sweep output voltage should not exceed the specified values otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals.

The band width at 70% response from the first sound i-f grid to the second i-f grid should be approximately 200 kc.

PICTURE I-F TRAP ADJUSTMENT.—Connect the "Volt-Ohmyst" to the junction of R102 and R103.

Obtain a 7.5 volt battery capable of withstanding appreciable current drain and connect the ends of a 1,000 ohm potentiometer across it. Connect the battery positive terminal to chassis and the potentiometer arm to the junction of R102 and R103. Adjust the potentiometer for –3.0 volts indication on the "VoltOhmyst."

Set the channel switch to the blank position between channels number 2 and 13.

Connect the "VoltOhmyst" to pin 2 of V106 and to ground.

Connect the output of the signal generator to terminal D of T101.

Set the generator to each of the following frequencies and with a thin fiber screwdriver tune the specified adjustment for minimum indication on the "VoltOhmyst." In each instance the generator should be checked against a crystal calibrator to insure that the generator is exactly on frequency.

(1) 21.00 mc.—T103 (top)
(2) 21.00 mc.—T105 (top)
(3) 27.00 mc.—T102 (top)
(4) 27.00 mc.—T104 (top)
(5) 19.50 mc.—T101 (top)

In the above transformers using threaded cores, it is possible to run the cores completely through the coils and secure two peaks or nulls. The correct position is with the cores in the outside ends of the coils. If the cores are not in the correct position, the coupling will be incorrect and it will be impossible to secure the correct response.

PICTURE I-F TRANSFORMER ADJUSTMENTS.—Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "Volt-Ohmyst." During alignment, reduce the input signal if necessary to prevent overloading.

24.35 mc.—L102
22.5 mc.—T104 (bottom)
21.75 mc.—T103 (bottom)
25.3 mc.—T102 (bottom)

R-F UNIT ALIGNMENT.—Disconnect the co-ax link from terminal 2 of the r-f unit terminal board and connect a 39 ohm composition resistor between lugs 1 and 2.

Detune T1 by backing the core all the way out of the coil.

In early production units in which L44 is adjustable, back the L44 core all the way out. Back L203 core all the way out.

In order to align the r-f tuner, it will first be necessary to set the channel 13-oscillator to frequency. The shield over the bottom of the r-f unit must be in place when making any adjustments.

The oscillator may be aligned by adjusting it to beat with a crystal-calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound carrier frequency and adjusting the oscillator for zero output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available. Regardless of which method of oscillator alignment is used, the frequency standard must be crystal controlled or calibrated.

If the receiver oscillator is to be adjusted by the heterodyne frequency meter method, couple the meter probe loosely to the receiver oscillator.

If the receiver oscillator is adjusted by feeding in the r-f sound carrier signal, connect the signal generator to the receiver antenna terminals. Connect the "VoltOhmyst" to the sound discriminator output (junction of R192 and S103). Also couple the link loosely to lug 2 of the r-f unit terminal board so as to permit measurement at sound discriminator.

Set the channel selector switch to 13.

Adjust the frequency standard to the correct frequency (236.75 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range.

Adjust C1 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator.

Now that the channel-13 oscillator is set to frequency, we may proceed with the r-f alignment.

Turn the AGC control to the counter-clockwise position.

Connect the bias box to terminal 3 of the r-f unit terminal board and adjust the bias box potentiometer for –3.5 volts.

Connect the oscilloscope to the test connection at R5 on top of the r-f unit.

Connect the r-f sweep oscillator to the receiver antenna terminals. The method of connection depends upon the output impedance of the sweep. The P300 connections for 300-ohm balanced or 72-ohm single-ended input are shown in the circuit schematic diagram on page 27. If the sweep oscillator has a 50-ohm single-ended output, 300-ohm balanced output can be obtained by connecting as shown in Figure 7.

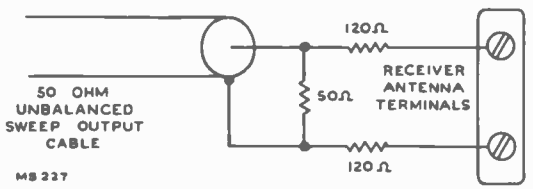

Figure 7—Unbalanced Sweep Cable Termination

Connect the signal generator loosely to the receiver antenna terminals.

Set the receiver channel switch to channel 8.

Set the sweep oscillator to cover channel 8.

Insert markers of channel 8 picture carrier and sound carrier, 181.25 mc. and 185.75 mc.

Adjust C9, C11, C16 and C22 for approximately correct curve shape, frequency, and band width as shown in Figure 16.

The correct adjustment of C22 is indicated by maximum amplitude of the curve midway between the markers. C16 tunes the r-f amplifier plate circuit and affects the frequency of the curve most noticeably. C9 tunes the converter grid circuit and affects the tilt of the curve most noticeably (assuming that C22 has been properly adjusted). C11 is the coupling adjustment and hence primarily affects the response band width.

Set the receiver channel switch to channel 6.

Adjust the frequency standard to the correct frequency (108.75 mc. for heterodyne frequency meter or 87.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range.

Adjust L5 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator.

Set the sweep generator to channel 6.

From the signal generator, insert channel 6 sound and picture carrier markers, 83.25 mc. and 87.75 mc.

Adjust L42, L45 and L49 for proper response as shown in Figure 16.

L42 is adjusted to give maximum amplitude of the curve between the markers. L45 primarily affects the tilt of the curve. L49 primarily affects the frequency of response.

Connect the "VoltOhmyst" to the r-f unit test point at R5.

Adjust C7 for –3.0 volts at the test point.

Retouch L42, L45 and L49 for proper response if necessary. If necessary, retouch C11 for proper band width on channel 6. Continue these retouching adjustments until proper response is obtained and –3.0 volts of oscillator injection are present at the test point.

Set the receiver channel selector switch to channel 8 and readjust C1 for proper oscillator frequency.

Set the sweep oscillator and signal generator to channel 8.

Readjust C9, C16 and C22 for correct curve shape, frequency and band width. Readjust C11 only if necessary.

Switch the receiver, the sweep oscillator and signal generator to channel 13.

Adjust L52 for maximum amplitude of the curve midway between markers and then overshoot the adjustment by turning the slug in the same direction from the initial setting a little more than the amount of turning required to reach maximum amplitude of response.

Adjust C22 for maximum amplitude of response.

Turn off the sweep generator. Adjust the L43 core for correct channel 13 oscillator frequency, then overshoot the adjustment by turning the slug a little more in the same direction from the initial setting. Reset the oscillator to proper frequency by adjustment of C1.

Turn the sweep oscillator back on.

Check the response of channels 7 through 13 by switching the receiver channel switch, sweep oscillator and marker oscillator to each of these channels and observing the response and oscillator injection obtained. See Figure 16 for typical response curves. It should be found that all these channels have the proper shaped response with the markers above 80% response.

If the markers do not fall within this requirement, switch to channel 8 and readjust C9, C11, C16 and C22 as necessary. If C22 required adjustment, the adjustment should be overshot a small amount and corrected by adjustment of L52 to give maximum amplitude of response between the sound and picture carrier markers. The antenna circuit (L52, C22) is broad so that tracking is not particularly critical.

If the valley in the top of the selectivity curves for the high channels is deeper than normal, the curve can be flattened somewhat by decreasing the inductance of L44 by turning the core stud in. Be sure to check for undesirable resonant suckouts on channels 7 and 8 if this is done. In later production units, L44 may be fixed and not require adjustment.

Turn the sweep oscillator off and check the receiver channel 8 r-f oscillator frequency. If the oscillator is off frequency overshoot the adjustment of C1 and correct by adjusting L43.

Turn the receiver channel selector switch to channel 6. Adjust L5 for correct oscillator frequency.

Turn the sweep oscillator on and to channel 6 and observe the response curve. If necessary readjust L42, L45 and L49. It should not be necessary to touch C11.

Check the oscillator injection voltage at the test point. If necessary adjust C7 to give –3 volts injection. If C7 is adjusted, switch to channel 8, and readjust C9 for proper curve shape, then recheck channel 6.

Switch the receiver through channel 6 down through channel 2 and check for normal response curve shapes and oscillator injection voltage.

Likewise check channels 7 through 13, stopping on 13 for the next step.

With the receiver on channel 13, check the receiver oscillator frequency. Correct by adjustment of C1 if necessary.

Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and adjusting the appropriate oscillator trimmer for the specified indication. It should be possible to adjust the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range.

Channel Number	Picture Freq. Mc. Carrier	Sound Freq. Mc. Carrier	Receiver Freq. Mc. R-F Osc.	Channel Oscillator Adjustment
2	55.25	59.75	80.750	L1
3	61.25	65.75	86.750	L2
4	67.25	71.75	92.750	L3
5	77.25	81.75	102.750	L4
6	83.25	87.75	108.750	L5
7	175.25	179.75	200.750	L6
8	181.25	185.75	206.750	L7
9	187.25	191.75	212.750	L8
10	193.25	197.75	218.750	L9
11	199.25	203.75	224.750	L10
12	205.25	209.75	230.750	L11
13	211.25	215.75	236.750	C1

Switch to channel 8 and observe the response.

Adjust T1 clockwise while watching the change in response. When T1 is properly adjusted, the selectivity curve will be slightly wider with a slightly deeper valley in its top.

Switch through all channels and observe response, oscillator injection and r-f oscillator frequency. Minor touch-ups of adjustments may be made at this time. However, if C7 or C9 are changed appreciably, then a recheck of the oscillator frequency on all channels should be made.

Reconnect the link from T101 to terminal 2 of the r-f unit terminal board.

Since T1 was adjusted during the r-f unit alignment it will be necessary to sweep the overall i-f response.

R-F UNIT TUBE CHANGES.—Since most of the circuits are low capacitance circuits the r-f unit may require readjustments when the tubes are changed.

If the 6CB6 r-f amplifier tube is changed, it may be necessary to readjust C16 and C22.

If the 6J6 oscillator and mixer tube is changed, then more extensive adjustments are required.

For good conversion efficiency, the oscillator injection to a triode mixer must be held reasonably close to the optimum value. Although there is some latitude in this level, it is nearly expended in the normal variation in injection from channel to channel. Consequently, the adjustment of C7 is limited primarily to establishing the conditions for good conversion. Since changes in oscillator injection affect conversion gain, it also affects the input capacity of the mixer, thus also affecting tracking of the mixer grid circuit. These tube variations with their consequent effect on circuit alignment thereby require readjustment of the r-f unit if maximum conversion efficiency is to be retained after the 6J6 tube is changed. It may be possible, however, to try several 6J6 tubes and select one which gives satisfactory performance without realignment.

SWEEP ALIGNMENT OF PIX I-F.—Set the r-f unit bias to –3.5 volts.

Connect a 47 ohm resistor across the link circuit at T101 terminals C and D.

Remove the second picture i-f tube.

With the oscilloscope connected to the r-f unit test connection and the sweep oscillator connected to the antenna terminals, set the sweep output to give 0.1 volt peak-to-peak on the oscilloscope.

Switch through the channels and select one that is essentially flat and with the two carriers at 90% response or higher. Channel 6 is usually the most desirable for this test.

Remove the 47 ohm resistor and replace V102

Connect the oscilloscope to terminal 2 of V106 socket.

Clip 330 ohm resistors across R107, R110, R115 and R119.

Connect the bias box to the junction of R102 and R103. Adjust the box for –1 volt.

Adjust the sweep oscillator output to give 0.5 volt peak-to-peak on the oscilloscope.

Connect the signal generator loosely to the i-f amplifier.

Adjust T1 and T101 bottom core to obtain the response curve shown in Figure 14.

Remove the 330 ohm resistors across R107, R110, R115 and R119.

Set the i-f bias to –4.5 volts.

Adjust the sweep output to give 3 volts peak-to-peak on the oscilloscope.

Retouch T1, T101 bottom, T102 bottom, T103 bottom, T104 bottom and L102 to obtain the response curve shown in Figure 15.

HORIZONTAL OSCILLATOR ADJUSTMENT.—Normally the adjustment of the horizontal oscillator is not considered to be a part of the alignment procedure, but since the oscillator waveform adjustment requires the use of an oscilloscope, it can not be done conveniently in the field. The waveform adjustment is made at the factory and normally should not require readjustment in the field. However, the waveform adjustment should be checked whenever the receiver is aligned or whenever the horizontal oscillator operation is improper.

Horizontal Frequency Adjustment.—With a clip lead, short circuit the coil between terminals C and D of the horizontal oscillator transformer T107. Tune in a television station and sync the picture if possible.

A.—Turn the horizontal hold control R168 to the extreme clockwise position. Adjust the T107 Frequency Adjustment (atop the chassis) so that the picture is just out of sync and the horizontal blanking appears in the picture as a vertical bar. The position of the bar is unimportant.

B.—Turn the hold control approximately one-quarter of a turn from the extreme clockwise position and examine the width and linearity of the picture. If picture width or linearity is incorrect, adjust the horizontal drive control C143B, the width control R178 and the linearity control L113 until the picture is correct. If C143B, R178 or L113 were adjusted, repeat step A above.

Horizontal Locking Range Adjustment.—Turn the horizontal hold control fully counter-clockwise. The picture may remain in sync. If so, turn the T107 top core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 9 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C143A slightly clockwise. If less than 7 bars are present, adjust C143A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 7 to 9 bars are present.

Horizontal Oscillator Waveform Adjustment.—Remove the shorting clip from terminals C and D of T107. Turn the horizontal hold control to the extreme clockwise position. With a thin fibre screwdriver, adjust the Oscillator Waveform Adjustment Core of T107 (under the chassis) until the horizontal blanking bar appears in the center.

A.—Connect the low capacity probe of an oscilloscope to terminal C of T107. Turn the horizontal hold control one-quarter turn from the clockwise position so that the picture is in sync. The pattern on the oscilloscope should be as shown in Figure 17. Adjust the Oscillator Waveform Adjustment Core of T107 until the two peaks are at the same height. During this adjustment, the picture must be kept in sync by readjusting the hold control if necessary.

This adjustment is very important for correct operation of the circuit. If the broad peak of the wave on the oscilloscope is lower than the sharp peak, the noise immunity becomes poorer, the stabilizing effect of the tuned circuit is reduced and drift of the oscillator becomes more serious. On the other hand, if the broad peak is higher than the sharp peak, the oscillator is overstabilized, the pull-in range becomes inadequate and the broad peak can cause double triggering of the oscillator when the hold control approaches the clockwise position.

Remove the oscilloscope upon completion of this adjustment.

Check of Horizontal Oscillator Adjustments.—Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C143A slightly clockwise. If less than 2 bars are present, adjust C143A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 bars are present.

Turn the horizontal hold control to the maximum clockwise position. The picture should be just out of sync to the extent that the horizontal blanking bar appears as a single vertical or diagonal bar in the picture. Adjust the T107 Frequency Adjustment until this condition is fulfilled.

SENSITIVITY CHECK.—A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained to that obtained on other receivers under the same conditions.

This weak signal can be obtained by connecting the shop antenna to the receiver through a ladder type attenuator pad. The number of stages in the pad depends upon the signal strength available at the antenna. A sufficient number of stages should be inserted so that a somewhat less than normal contrast picture is obtained when the picture control is at the maximum clockwise position. Only carbon type resistors should be used to construct the pad.

RESPONSE CURVES.—The response curves shown on page 14 and referred to throughout the alignment procedure were taken from a production set. Although these curves are typical, some variations can be expected.

The response curves are shown in the classical manner of presentation, that is with "response up" and low frequency to the left. The manner in which they will be seen in a given test set-up will depend upon the characteristics of the oscilloscope and the sweep generator. The curves may be seen inverted and/or switched from left to right depending on the deflection polarity of the oscilloscope and the phasing of the sweep generator.

NOTES ON R-F UNIT ALIGNMENT.—Because of the frequency spectrum involved and the nature of the device, many of the r-f unit leads and components are critical in some respects. Even the power supply leads form loops which couple to the tuned circuits, and if resonant at any of the frequencies involved in the performance of the tuner, may cause serious departures from the desired characteristics. In the design of the receiver these undesirable resonant loops have been shifted far enough away in frequency to allow reasonable latitude in their components and physical arrangement without being troublesome. When the r-f unit is aligned in the receiver, no trouble from resonant loops should be experienced. However, if the unit is aligned in a jig separate from the receiver, attention should be paid to insure that unwanted resonances do not exist which might present a faulty representation of r-f unit alignment.

A resonant circuit exists between the r-f tuner chassis and the outer shield box, which couples into the antenna and r-f plate circuits. The frequency of this resonance depends on the physical structure of the shield box, and the capacitance between the tuner chassis and the front plate. In the KRK8 units, this resonance should fall between 120 and 135 mc. and is controlled in the design by using insulating washers of different thicknesses (in the front plate to tuner chassis mounting) to compensate for differences in the shield boxes of different models of receivers. The performance of the tuner, particularly on channels 7 and 8 will be impaired if the proper washers for the particular shield box involved are not used. Obviously then, if the r-f unit is removed for service, the washers should be replaced in the correct order when the unit is replaced.

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ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 8 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLE IS ATTEMPTED

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
				DISCRIMINATOR AND SOUND I-F ALIGNMENT					
1	2nd sound i-f grid (pin 1, V116)	21.00 .1 volt output	Not used	—	Not used.	In series with 1 meg. to pin 7 of V117	Meter on 3 volt scale	Detune T111 (bot.) Adjust T111 (top) for max. on meter	Fig. 12 Fig. 9 Fig. 8
2	"	"	"	—	"	Junction of R192 & S103	Meter on 3 volt scale	T111 (bottom) for zero on meter	Fig. 12 Fig. 9
3	"	"	2nd sound i-f grid (pin 1, V116)	21.00 center .1 v. out	Junction of R192 & S103	Not used	Check for symmetrical response waveform (positive & negative). If not equal adjust T111 (top) until they are equal		Fig. 12 Fig. 9
4	1st sound i-f grid (pin, 1, V115)	21.00 reduced output	1st sound i-f grid (pin 1, V115)	21.00 reduced output	Terminal A of T110 in series with 33K	"	Sweep output reduced to provide 0.3 volt p-to-p on scope	T110 (top and bot.) for max. gain and symmetry of 21.00 mc.	Fig. 13 Fig. 10 Fig. 8
				PICTURE I-F AND TRAP ADJUSTMENT					
5	Not used		Not used	—	Not used	Junction of R102 & R103	Connect bias box to junction of R102 & R103 and to ground	Adjust potentiometer for −3.0 volts on meter	Fig. 10
6	Terminal D of T101	21.00	"	—	"	Pin 2 of V106 and to ground	Meter on 3 v. scale. Rec. between 2 & 13	T103 (top) for min. on meter	Fig. 10 Fig. 8
7	"	21.00	"	—	"	"	"	T105 (top) for min.	Fig. 8
8	"	27.00	"	—	"	"	"	T102 (top) for min.	"
9	"	27.00	"	—	"	"	"	T104 (top) for min.	"
10	"	19.50	"	—	"	"	"	T101 (top) for min.	"
11	"	24.35	"	—	"	"	"	L102 (top) for max.	"
12	"	22.5	"	—	"	"	"	T104 (bot.) for max.	Fig. 9
13	"	21.75	"	—	"	"	"	T103 (bot.) for max.	"
14	"	25.3	"	—	"	"	"	T102 (bot.) for max.	"

R-F UNIT ALIGNMENT

STEP. No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
15	Disconnect the co-ax link from terminal 2 of the r-f unit terminal board and connect a 39 ohm composition resistor between lugs 1 and 2. If the receiver oscillator is adjusted by feeding in the r-f sound carrier signal, couple the link loosely to lug 2 of the r-f unit terminal board so as to permit measurement at sound discriminator. In early production units in which L44 is adjustable, back the L44 core all the way out. Detune T1 by backing the core all the way out of the coil. In order to align the r-f tuner, it will first be necessary to set the channel 13 oscillator to frequency. The shield over the bottom of the r-f unit must be in place when making any adjustments.									
16	Antenna terminals	215.75 MC.	Not used		Loosely coupled to r-f oscillator	236.75 MC.	Junction of R192 & S103 for signal gen. method only	Fine tuning centered. Receiver on channel 13. Het. freq. meter coupled to osc. if used.	C1 for zero on meter or beat on het. freq. meter	Fig. 10 Fig. 8
17			"				Connect "Volt-Ohmyst" to terminal 3 of the r-f unit terminal board	Turn AGC control counter-clockwise. Connect bias box to terminal 3 of r-f unit term. board	Adjust the bias box potentiometer for −3.5 volts.	Fig. 10
18	Antenna terminal (loosely)	181.25 185.75	Antenna terminals (see text for precaution)	Sweeping channel 8	Not used	—	Not used	Rec. on chan. 8. Connect oscilloscope to test connection at R5 on top the r-f unit. Adjust C9, C11, C16 and C22. Correct curve shape, frequency, and band width. C22 is adjusted to give max. amplitude between markers. C9 primarily affects tilt and C16 primarily affects the frequency of response. C11 affects the response band width.		Fig. 16 (8)
19	"	87.75	"	Not used	Loosely coupled to r-f oscillator	108.75	Junction of R192 & S103 for signal gen. method only	Rec. on channel 6	L5 for zero on meter or beat on het. freq. meter	Fig. 8 Fig. 10 Fig. 11
20	"	83.25 87.75	"	Channel 6	Not used	—		Rec. on chan. 6. Adjust L42, L45 and L49 for proper response. L42 is adjusted to give max. amplitude between markers. L45 primarily affects tilt and L49 primarily affects freq. of response. If necessary, retouch C11 for proper width.		Fig. 16 (8)
21	Not used	—	Not used	—	Not used	—	Connect "Volt-Ohmyst" to r-f unit test point R5	Rec. on channel 6	Adjust C7 for −3.0 volts at the test point	Fig. 8 Fig. 9
22	Repeat steps 19, 20 and 21 until the specified conditions are obtained.									
23	Antenna terminal (loosely)	185.75	Not used	—	Loosely coupled to r-f oscillator	206.75	Junction of R192 & S103 for sig. gen. method only	Rec. on chan. 8	C1 for zero on meter or beat on het. freq. meter	Fig. 8 Fig. 10

ALIGNMENT TABLE

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STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER	HET. FREQ. METER MC.	CONNECT "VOLTOHMYST" TO	MISCELLLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
24	Antenna terminal (loosely)	181.25 185.75	Antenna terminals (see text for precaution)	Sweeping channel 8	Not used	—	Not used	Rec. on chan. 8. Readjust C9, C16 and C22 for correct curve shape, frequency and band width. Readjust C11 only if necessary.		Fig. 8 Fig. 9 Fig. 16 (8)
25	"	211.25 215.75	"	Sweeping channel 13	Not used	—	Not used	Rec. on chan. 13. Adjust L52 for max. amplitude between markers and then overshoot a little more than the amount of turning required to reach max. response. Adjust C22 to regain max. amplitude of response.		Fig. 9 Fig. 16 (13)
26	"	215.75	Not used	—	Loosely coupled to r-f oscillator	236.75	Junction of R192 & S103 for signal gen. method only	Fine tuning centered. Receiver on chan. 13. Adjust L43 for correct channel 13 osc. freq. then overshoot. Reset the osc. to proper freq. by adjustment of C1.		Fig. 10 Fig. 11
27	"	205.25 209.75	Antenna terminals (see text for precaution)	channel 12	Not used	—	Connect "Volt-Ohmyst" to r-f unit test point at R5	Rec. on chan. 12	Check to see that response is correct and −3.0 volts of osc. injection is present	Fig. 8 Fig. 16
28	"	199.25 203.75	"	channel 11	"	—	"	Rec. on chan. 11	"	Fig. 16 (11)
29	"	193.25 197.75	"	channel 10	"	—	"	Rec. on chan. 10	"	Fig. 16 (10)
30	"	187.25 191.75	"	channel 9	"	—	"	Rec. on chan. 9	"	Fig. 16 (9)
31	"	181.25 185.75	"	channel 8	"	—	"	Rec. on chan. 8	"	Fig. 16 (8)
32	"	175.25 179.75	"	channel 7	"	—	"	Rec. on chan. 7	"	Fig. 16 (7)
33	If the response of any channel (steps 27 through 32) is below 80% at either marker, repeat step 24 and adjust C9, C11, C16 and C22 as necessary to pull response up on the low channel yet maintain correct response on channel 8. If C22 required adjustment, the adjustment should be overshot a small amount and corrected by adjustment of L52 to give maximum amplitude of response between the sound and picture carrier markers.									
34	Repeat step 23. If the oscillator is off frequency overshoot the adjustment of C1 and correct by adjusting L43.									
35	Repeat steps 27 through 34 until all requirements are obtained.									
36	Antenna terminals (loosely)	87.75	Not used	—	Loosely coupled to r-f oscillator	108.75	Junction of R192 & S103 for sig. gen. method only	Rec. on chan. 6	L5 for zero on meter or beat on het. freq. meter	Fig. 10 Fig. 11
37	"	83.25 87.75	Ant. terminals (see text for precaution)	Sweeping channel 6	Not used	—	Not used	Observe response. If necessary readjust L42, L45 and L49. It should not be necessary to touch C11.		Fig. 8 Fig. 9 Fig. 16
38	Not used	—	Not used	—	Not used	—	Connect "Volt-Ohmyst" to the r-f unit test point at R5	Check osc. injection. If necessary adjust C7 to give −3 volts. If C7 is adjusted, switch to channel 8, and readjust C9 for proper response then repeat step. 37.		Fig. 9 Fig. 10
39	Antenna terminals (loosely)	77.25 81.75	Ant. terminals (see text for precaution)	channel 5	"	—	"	Rec. on chan. 5	Check to see that response is correct and −3.0 volts of osc. injection is present	Fig. 16 (5)
40	"	67.25 71.75	"	channel 4	"	—	"	Rec. on chan. 4		Fig. 16 (9)
41	"	61.25 65.75	"	channel 3	"	—	"	Rec. on chan. 3	"	Fig. 16 (3)
42	"	55.25 59.75	"	channel 2	"	—	"	Rec. on chan. 2	"	Fig. 16 (2)
43	Likewise check channels 7 through 13, as outlined in steps 32 back through 27, stopping on channel 13 for next step.									
44	Antenna terminals	215.75	Not used	—	Loosely coupled to r-f oscillator	236.75	Junction of R192 & S103 for sig. gen. method only	Fine tuning centered. Receiver on channel 13	C1 for zero on meter or beat on het. freq. meter	Fig. 8 Fig. 10
45	"	209.75	"	—	"	230.75	"	Rec. on chan. 12	L11 as above	Fig. 11
46	"	203.75	"	—	"	224.75	"	Rec. on chan. 11	L10 as above	Fig. 11
47	"	197.75	"	—	"	218.75	"	Rec. on chan. 10	L9 as above	Fig. 11
48	"	191.75	"	—	"	212.75	"	Rec. on chan. 9	L8 as above	Fig. 11
49	"	185.75	"	—	"	206.75	"	Rec. on chan. 8	L7 as above	Fig. 11
50	"	179.75	"	—	"	200.75	"	Rec. on chan. 7	L6 as above	Fig. 11
51	"	87.75	"	—	"	108.75	"	Rec. on chan. 6	L5 as above	Fig. 11
52	"	81.75	"	—	"	102.75	"	Rec. on chan. 5	L4 as above	Fig. 11
53	"	71.75	"	—	"	92.75	"	Rec. on chan. 4	L3 as above	Fig. 11
54	"	65.75	"	—	"	86.75	"	Rec. on chan. 3	L2 as above	Fig. 11
55	"	59.75	"	—	"	80.75	"	Rec. on chan. 2	L1 as above	Fig. 11
56	Repeat steps 44 through 55 as a check.									
57	Antenna terminals	181.25 185.75	Antenna terminals	Sweeping channel 8	Not used	—		Rec. on chan. 8. Oscilloscope at R5 test point. Adjust T1 clockwise. When properly adjusted, curve will be slightly wider with a slightly deeper valley in top.		Fig. 16 (8)
58	Switch through all channels and observe response, oscillator injection and r-f oscillator frequency. Minor touch-ups of adjustments may be made at this time. However, if C7 or C9 are changed appreciably, then a recheck of the oscillator frequency on all channels should be made.									
59	Remove 39 ohm resistor and reconnect link from T101 to terminal 2 of r-f unit terminal board. Proceed with sweep alignment of Pix I-F.									

ALIGNMENT TABLE

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STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
SWEEP ALIGNMENT OF PICTURE I-F AMPLIFIER									
60	Loosely coupled to i-f amplifier	22.3 25.4	Antenna terminals	Sweeping selected channel	Terminal 2 of V106 socket	Junction of R102 and R103	Select channel known to have good r-f response. Clip 330 ohm resistors across R107, R110, R115, R119. Connect bias box to junction R102, R103.	Adjust bias box for −1.0 v. Set sweep to give 0.5 v. p-p on oscilloscope. Adjust T1 and T101 for correct response.	Fig. 8 Fig. 9 Fig. 10 Fig. 14
61	"	21.85 24.75 25.50 26.25	"	"	"	"	Remove 330 ohm resistors. Set bias box for −4.5 v.	Set sweep to give 3.0 v. p-p on oscilloscope. Adjust T1, T101 bot., T102 bot., T103 bot., T104 bot. and L102 for desired response	Fig. 15

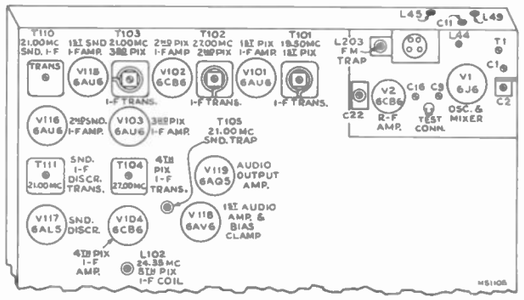


Figure 8—Top Chassis Adjustments

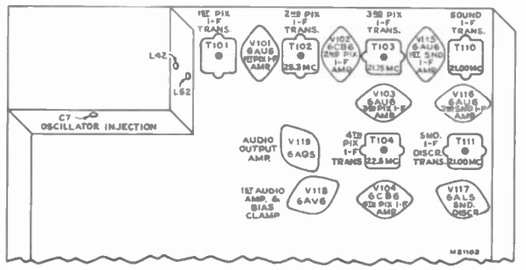


Figure 9—Bottom Chassis Adjustments

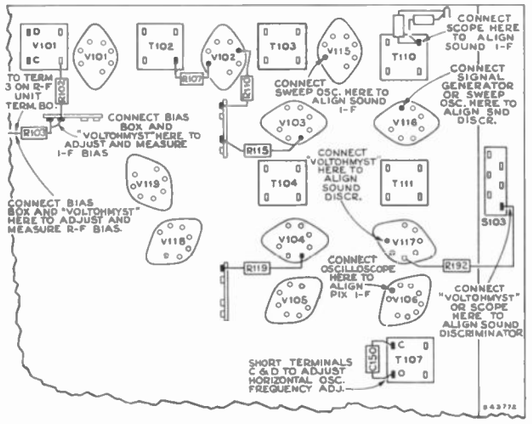


Figure 10—Test Connection Points

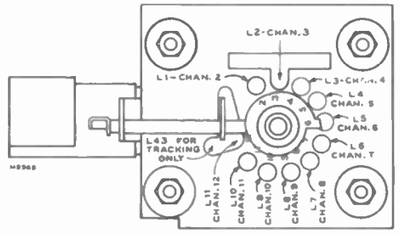


Figure 11—R-F Oscillator Adjustments

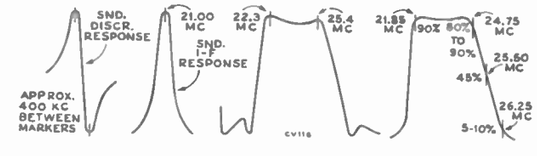


Figure 12 Discriminator Response — *Figure 13 Sound I-F Response* — *Figure 14 T1 and T101 Response* — *Figure 15 Overall I-F R-F Response*

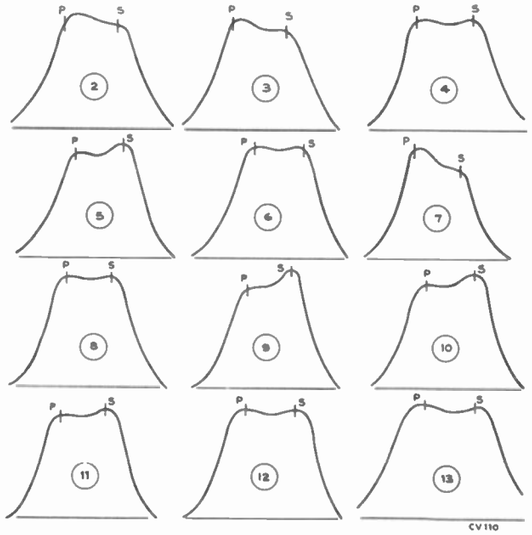


Figure 16—R-F Response

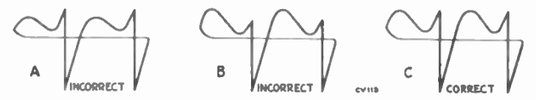


Figure 17—Horizontal Oscillator Waveforms

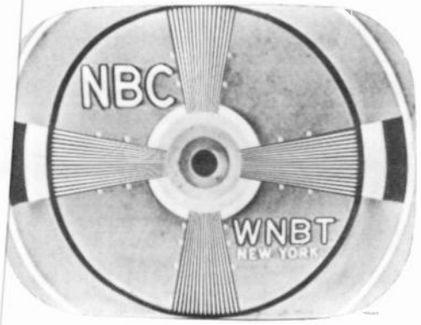


Figure 18—Normal Picture

Figure 19—Focus Magnet and Ion Trap Magnet Misadjusted

Figure 20—Horizontal Linearity Control Misadjusted (Picture Cramped in Middle)

Figure 21—Width Control Misadjusted

Figure 22—Horizontal Drive Control Misadjusted

Figure 23—Transients

Figure 24—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is in a Counter-clockwise Position—Just Before Pulling Into Sync

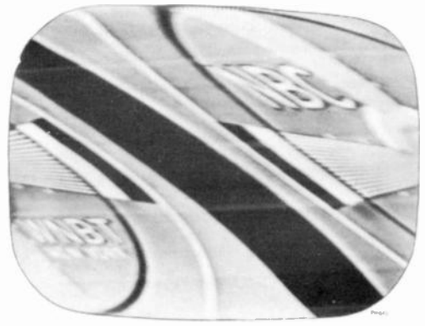


Figure 25—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is at the Maximum Clockwise Position

Following is a list of symptoms of possible failures and an indication of some of the possible faults:

NO RASTER ON KINESCOPE:

(1) Incorrect adjustment of ion trap magnet. Magnet reversed either front to back or top to bottom.

(2) V112 or V113 inoperative. Check waveforms on grids and plates.

(3) No high voltage—if horizontal deflection is operating as evidenced by the correct waveform on terminal 1 of high voltage transformer, the trouble can be isolated to the 1B3GT circuit. Either the T108 high voltage winding is open, the 1B3GT tube is defective, its filament circuit is open, C158 is shorted, or R179 is open.

(4) V111 circuit inoperative—Refer to schematic and waveform chart.

(5) Damper tube (V114) inoperative.

(6) Defective kinescope.

(7) R134 open.

(8) No receiver plate voltage—filter capacitor shorted—or filter choke open.

NO VERTICAL DEFLECTION:

(1) V109 or V110 inoperative. Check voltage and waveforms on grids and plates.

(2) T106 open.

(3) Vertical deflection coils open.

SMALL RASTER:

(1) Low Plus B or low line voltage.

(2) V112 defective.

POOR VERTICAL LINEARITY:

(1) If adjustments cannot correct, change V110.

(2) Vertical output transformer T106 defective.

(3) V109 defective—check voltage and waveforms on grid and plate.

(4) C141, R155, C132A or C132C defective.

(5) Low plate voltage—check rectifiers and capacitors in supply circuits.

(6) If height is insufficient, try changing V109.

POOR HORIZONTAL LINEARITY:

(1) If adjustments do not correct, change V112 or V114.

(2) T108 or L113 defective.

(3) C156 or C157 defective.

WRINKLES ON LEFT SIDE OF RASTER:

(1) C155, R160 or C123 defective.

(2) Defective yoke.

PICTURE OUT OF SYNC HORIZONTALLY:

(1) T107 incorrectly tuned.

(2) R167, R168 or R169 defective.

TRAPEZOIDAL OR NON SYMMETRICAL RASTER:

(1) Improper adjustment of focus magnet or ion trap magnet.

(2) Defective yoke.

RASTER AND SIGNAL ON KINESCOPE BUT NO SOUND:

(1) R-F oscillator off frequency.

(2) Sound i-f, discriminator or audio amplifier inoperative—check V115, V116, V117, V118, V119 and their socket voltages.

(3) T112 or C178 defective.

(4) Speaker defective.

SIGNAL AT KINESCOPE GRID BUT NO SYNC:

(1) AGC control switch S105 misadjusted.

(2) V107B, inoperative. Check voltage and waveforms at its grid and plate.

SIGNAL ON KINESCOPE GRID BUT NO VERTICAL SYNC:

(1) Check V109 and associated circuit—C140, R200, etc.

(2) Integrating network inoperative—Check.

(3) R148, R149, R150, R151, R152, R153, R154, R201, R202, C159 or C179 defective.

(4) Gas current, grid emission or grid cathode leakage in V109. Replace.

(5) If C188 is small or missing, interlace will be poor.

SIGNAL ON KINESCOPE GRID BUT NO HORIZONTAL SYNC:

(1) T107 misadjusted—readjust as instructed on page 11.

(2) V111 inoperative—check socket voltages and waveforms.

(3) T107 defective.

(4) C144, C143A, C145, C146, C147, C148, or C150 defective.

(5) If horizontal speed is completely off and cannot be adjusted check R167, R168, R169, R170, R171, R173 and R215.

SOUND AND RASTER BUT NO PICTURE OR SYNC:

(1) Picture i-f, detector or video amplifier inoperative—check V103, V104, V105 and V106—check socket voltages.

(2) Bad contact to kinescope grid.

PICTURE STABLE BUT POOR RESOLUTION:

(1) V105 or V106 defective.

(2) Peaking coils defective—check for specified resistance.

(3) Make sure that the focus control operates on both sides of proper focus.

(4) R-F and I-F circuits misaligned.

PICTURE SMEAR:

(1) R-F or I-F circuits misaligned.

(2) Open peaking coil.

(3) This trouble can originate at the transmitter—check on another station.

PICTURE JITTER:

(1) AGC control switch S105 misadjusted.

(2) If regular sections at the left picture are displaced change V112.

(3) Vertical instability may be due to loose connections or noise.

(4) Horizontal instability may be due to unstable transmitted sync.

RASTER BUT NO SOUND, PICTURE OR SYNC:

(1) Defective antenna or transmission line.

(2) R-F oscillator off frequency.

(3) R-F unit inoperative—check V1, V2.

PICTURE I-F RESPONSE.—At times it may be desirable to observe the individual i-f stage response. This can be achieved by the following method:

Shunt all i-f transformers and coils with a 330 ohm carbon resistor except the one whose response is to be observed.

Connect a wide band sweep generator to the converter grid and adjust it to sweep from 18 mc. to 30 mc.

DARK VERTICAL LINE ON LEFT OF PICTURE:

(1) Reduce horizontal drive and readjust width and horizontal linearity.

(2) Replace V112.

LIGHT VERTICAL LINE ON LEFT OF PICTURE:

(1) C155 defective.

(2) V114 defective.

Connect the oscilloscope across the picture detector load resistor and observe the overall response. The response obtained will be essentially that of the unshunted stage. The effects of the various traps are also visible on the stage response.

Figures 26 through 30 show the response of the various stages obtained in the above manner. The curves shown are typical although some variation between receivers can be expected. Relative stage gain is not shown.

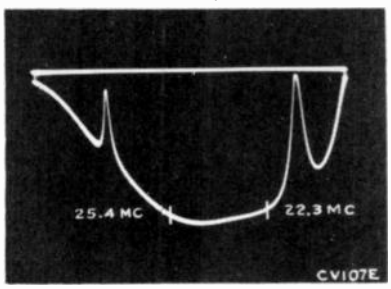


Figure 26—Response of Converter and First Pix I-F Transformer

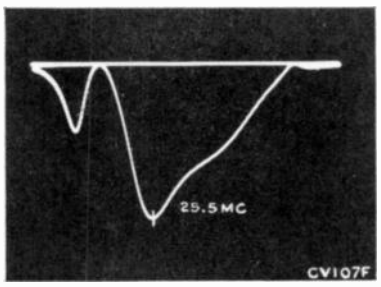


Figure 27—Response of Second Pix I-F Transformer

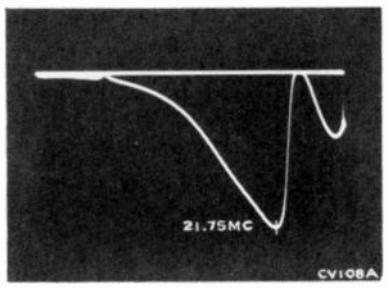


Figure 28—Response of Third Pix I-F Transformer

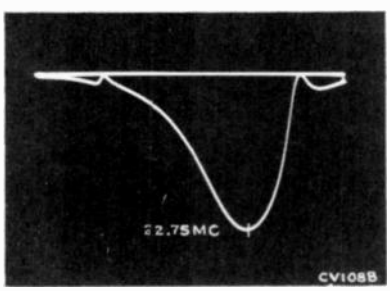


Figure 29—Response of Fourth Pix I-F Transformer

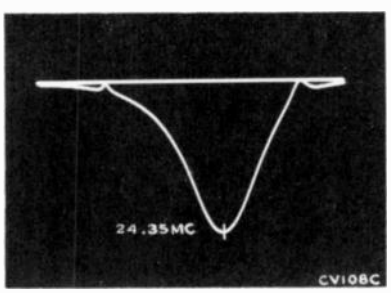


Figure 30—Response of Fifth Pix I-F Coil

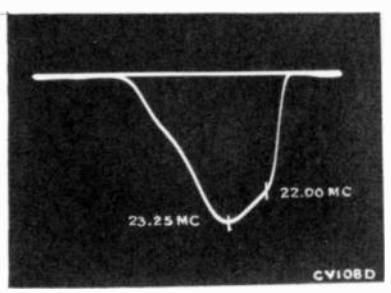


Figure 31—Response from First Pix I-F Grid to Pix Det.

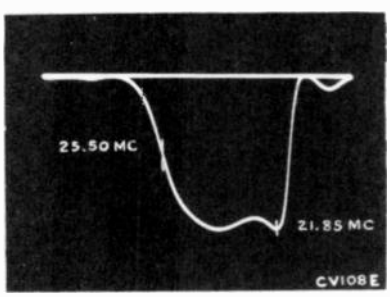


Figure 32—Overall Pix I-F Response

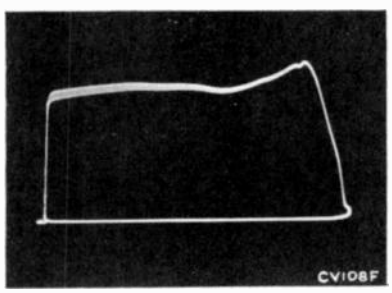


Figure 33—Video Response at Average Contrast

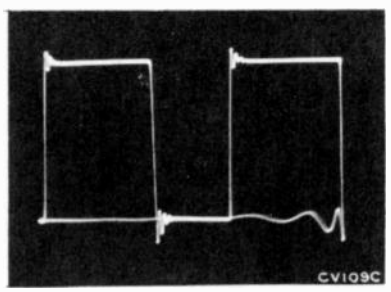


Figure 34—Video Response (100KC Square Wave)

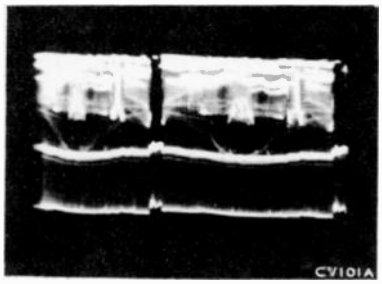
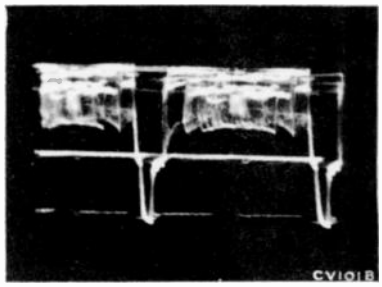
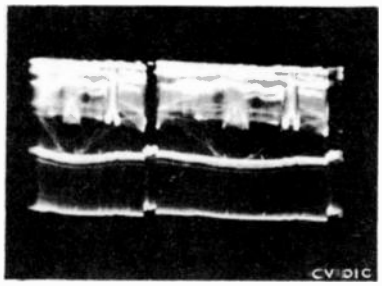


Plate of Picture Detector
(Pin 2 of V105) (6AL5)

Figure 35—Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (5.5 Volts PP)

Figure 36—Horizontal (Oscilloscope Synced to ½ of Vertical Sweep Rate) (5.5 Volts PP)

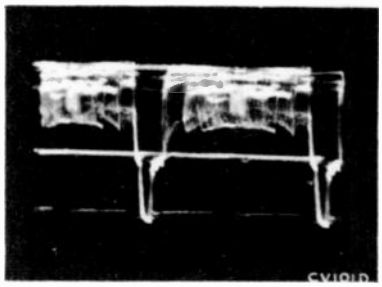




Grid of 1st Video Amplifier
(Pin 2 of V106) (12AU7)

Figure 37—Vertical (5.3 Volts PP)

Figure 38—Horizontal (5.3 Volts PP)



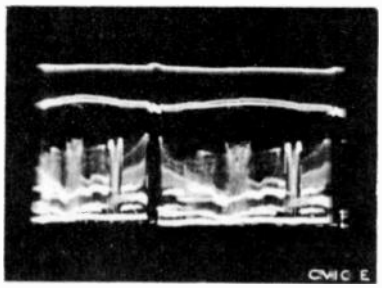
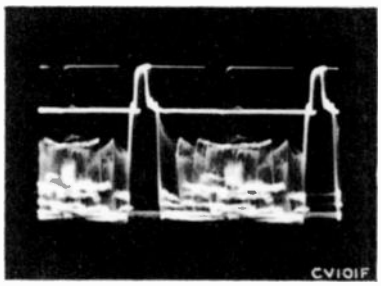
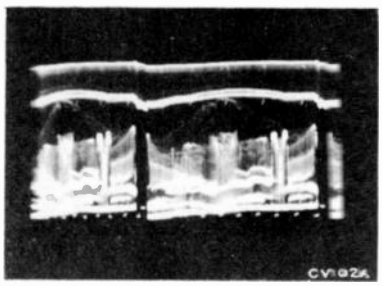


Plate of 1st Video Amplifier
(Pin 1 of V106) (12AU7)
Voltages depend on setting of Pix control

Figure 39—Vertical (2.18 Volts PP)

Figure 40—Horizontal (2.18 Volts PP)

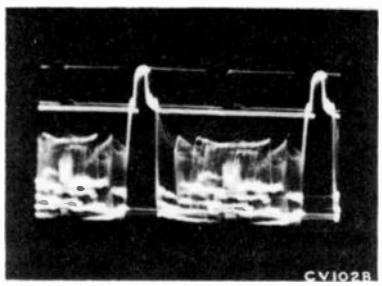




Grid of 2nd Video Amplifier
(Pin 7 of V106) (12AU7)
Voltages depend on setting of Pix control

Figure 41—Vertical (2.18 Volts PP)

Figure 42—Horizontal (2.18 Volts PP)



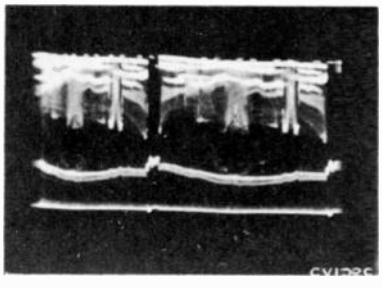
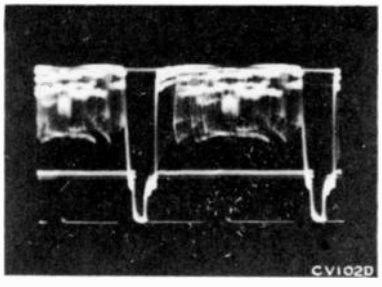
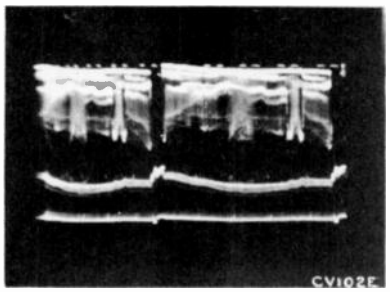


Plate of 2nd Video Amplifier
(Picture Max.)
(Pin 6 of V106) (12AU7)
Voltages depend on setting of Pix control

Figure 43—Vertical (15.90 Volts PP)

Figure 44—Horizontal (15.90 Volts PP)

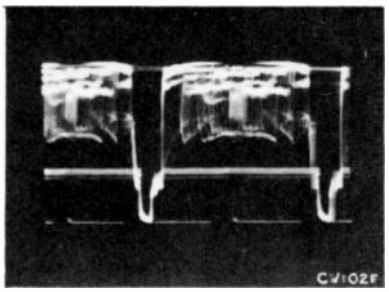


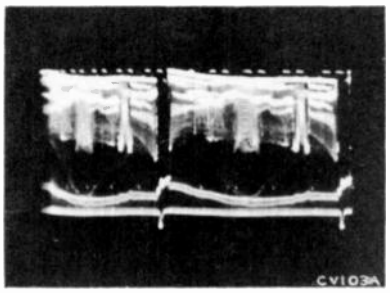


Input to Kinescope (Junction of R121 and C192) (Picture Max.)
Voltages depend on setting of Pix control

Figure 45—Vertical (15-90 Volts PP)

Figure 46—Horizontal (15-90 Volts PP)

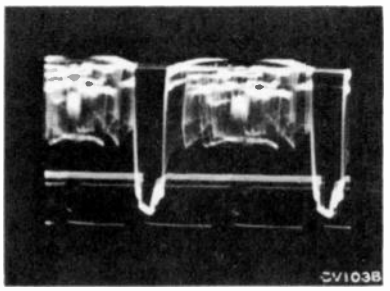


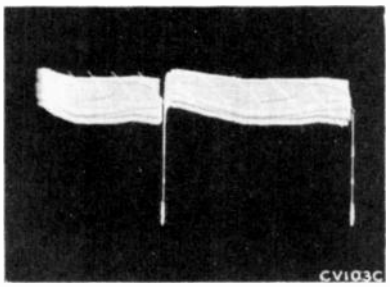


Cathode of D-C Restorer (Pin 3 of V107A) (12AU7)
Voltages depend on setting of Pix control

Figure 47—Vertical (11-80 Volts PP)

Figure 48—Horizontal (11-80 Volts PP)

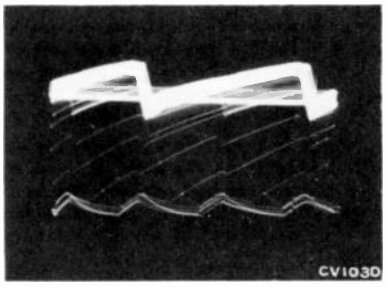


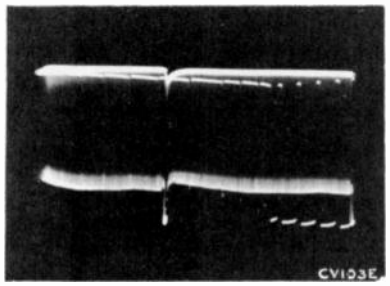


Grid of D-C Restorer (Pin 2 of V107A) (12AU7)
Voltages depend on setting of Pix control

Figure 49—Vertical (3-10 Volts PP)

Figure 50—Horizontal (3-10 Volts PP)

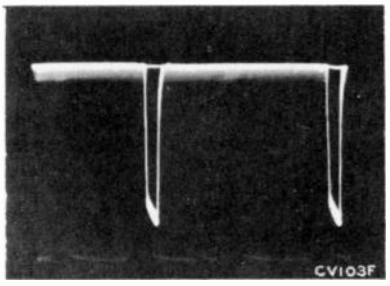




Grid of Sync Separator (Pin 4 of V109A) (6SN7GT)
Voltages depend on setting of Pix control

Figure 51—Vertical (11-14 Volts PP)

Figure 52—Horizontal (11-14 Volts PP)



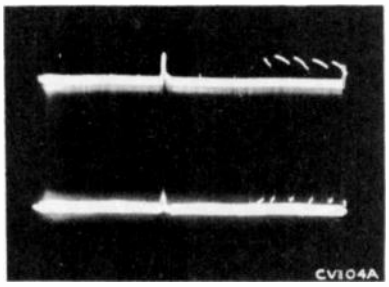
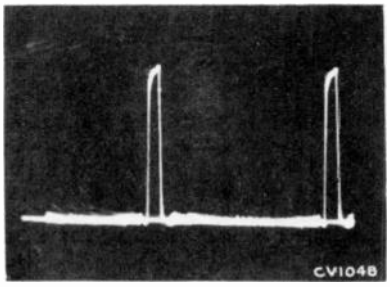
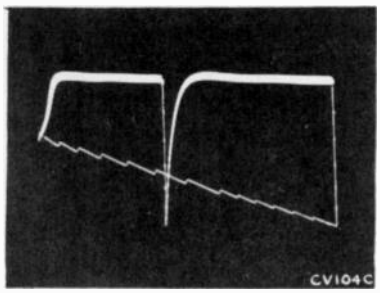


Plate of Sync Separator (Pin 5 of 109A) (6SN7GT)

Figure 53—Vertical (32 Volts PP)

Figure 54—Horizontal (32 Volts PP)

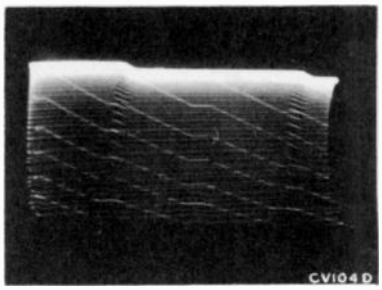




Cathode of Sync Separator (Pin 6 of V109A) (6SN7GT)

Figure 55—Vertical (1.2 Volts PP)

Figure 56—Horizontal (1.2 Volts PP)



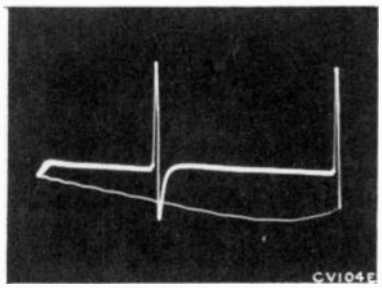
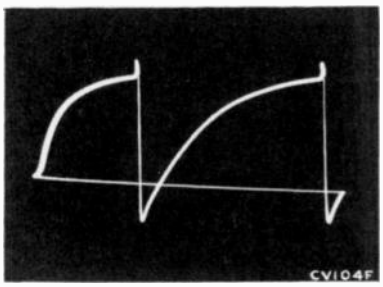


Figure 57—Output of Integrating Network (Junction of C139, C140 and R147) (8.5 Volts PP)

Figure 58—Grid of Vertical Oscillator (75 Volts PP) (Pin 1 of V109B) (6SN7GT)



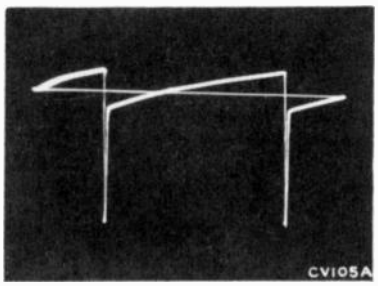
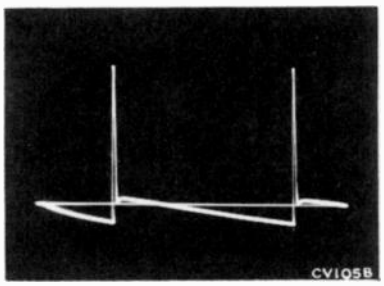


Figure 59—Grid of Vertical Output (110 Volts PP) (Pin 1 of V110) (6AQ5)

Figure 60—Plate of Vertical Output (700 Volts PP) (Pin 5 of V110) (6AQ5)



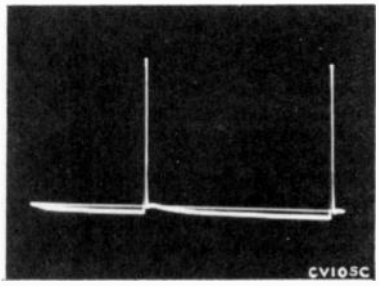
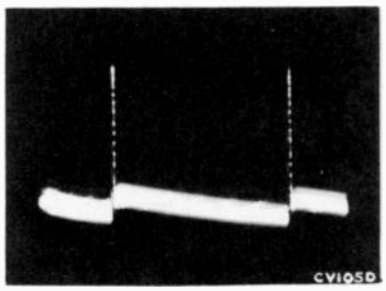


Figure 61—Junction of C159, C179 and R202 (275 Volts PP)

Figure 62—Input of Vertical Deflection Coils (20 Volts PP) (Junction of Green Lead of T106 and Green Lead of Yoke)



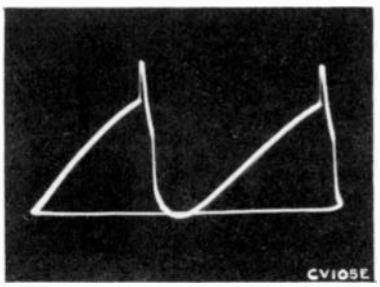
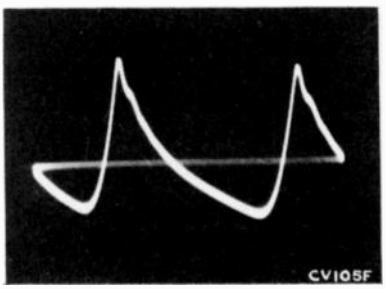


Figure 63—Grid of Horizontal Oscillator Control (27 Volts PP) (Pin 1 of V111) (6SN7GT)

Figure 64—Cathode of Horizontal Oscillator Control (1.0 Volts PP) (Pin 3 of V111) (6SN7GT)



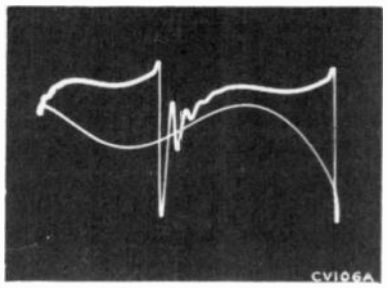


Figure 65—Junction of R163, R164 and R170 (70 Volts PP)

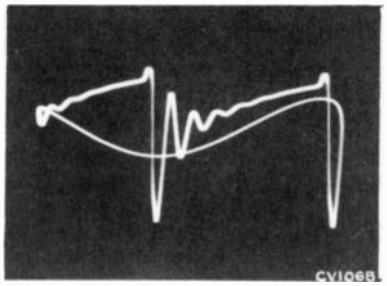


Figure 66—Grid of Horizontal Oscillator (290 Volts PP) (Pin 4 of V111) (6SN7GT)

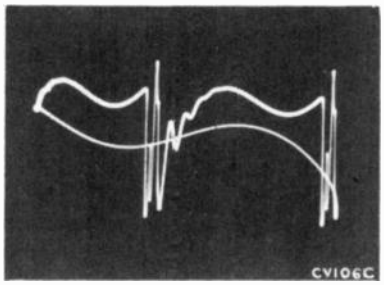


Figure 67—Plate of Horizontal Oscillator (150 Volts PP) (Pin 5 of V111) (6SN7GT)

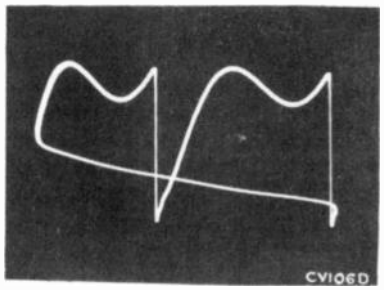


Figure 68—Terminal "C" of T107 (100 Volts PP)

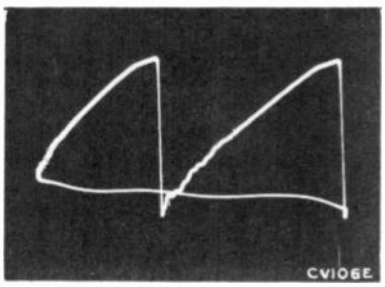


Figure 69—Input to Horizontal Output Tube (60-80 Volts PP) Depends on setting of drive control (Junction of C152 and C143B)

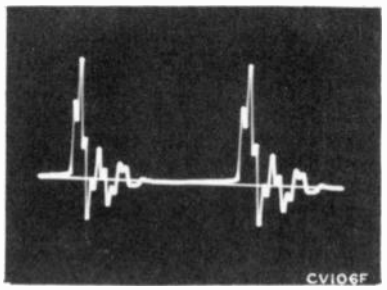


Figure 70—Plate of Horizontal Output (Approx. 5000 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V102 to Ground)

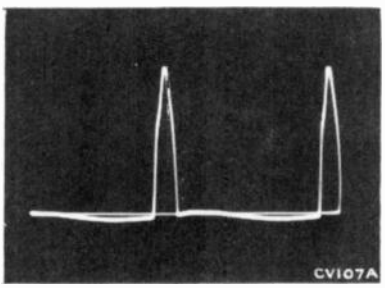


Figure 71—Cathode of Damper (2100-2700 Volts PP) Depends on setting of width control (Pin 3 of V114) (6W4GT)

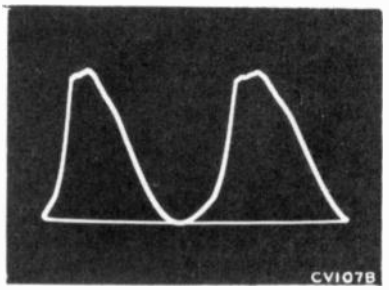


Figure 72—Plate of Damper (90-130 Volts PP) Depends on setting of width control (Pin 5 of V114) (6W4GT)

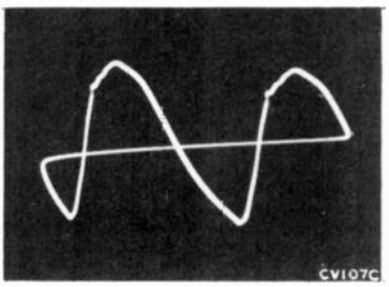


Figure 73—Junction of Yoke and Width Control (80-145 Volts PP) Depends on setting of width control

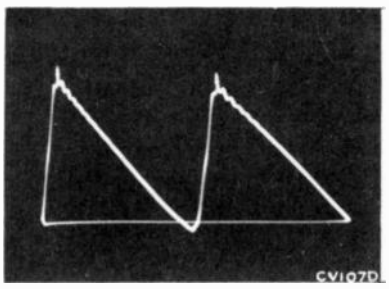


Figure 74—Voltage Across Width Control (0-85 Volts PP) Depends on setting of width control

4T101

VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition, a 2500 microvolt test pattern signal was fed into the receiver, the picture synchronized and the AGC control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are read with a "Senior VoltOhmyst" type WV97A between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c. The symbol < means less than.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6J6	Mixer	2500 Mu. V. Signal	2	135	—	—	7	0	5	−3.25	7.4	—	
			No Signal	2	130	—	—	7	0	5	−3.1	7.1	—	
V1	6J6	R-F Oscillator	2500 Mu. V. Signal	1	119	—	—	7	0	6	*−4.16	4.83	—	*Depending upon channel
			No Signal	1	104	—	—	7	0	6	*−2.37	4.6	—	
V2	6AG5	R-F Amplifier	2500 Mu. V. Signal	5	243	6	173	2	<0.1	1	−4.45	0.44	0.13	
			No Signal	5	197	6	114	2	0.28	1	−0.31	8.6	2.35	
V101	6AU6	1st Pix. I-F Amplifier	2500 Mu. V. Signal	5	205	6	232	7	0.15	1	−5.8	1.32	0.52	
			No Signal	5	112	6	152	7	1.0	1	−0.6	6.8	2.8	
V102	6CB6	2nd Pix. I-F Amplifier	2500 Mu. V. Signal	5	192	6	205	2	0.5	1	−5.8	4.4	0.8	
			No Signal	5	118	6	122	2	1.38	1	−0.6	9.8	2.5	
V103	6AU6	3d Pix. I-F Amplifier	2500 Mu. V. Signal	5	190	6	228	7	0.2	1	−0.6	1.28	0.55	
			No Signal	5	85	6	145	7	1.8	1	0	6.5	2.98	
V104	6CB6	4th Pix. I-F Amplifier	2500 Mu. V. Signal	5	159	6	250	2	1.8	1	0	9.3	2.7	
			No Signal	5	166	6	248	2	1.62	1	0	0.42	2.4	
V105	6AL5	Picture 2d Det.	2500 Mu. V. Signal	2	−2.3	—	—	5	0	—	—	8.2	—	
			No Signal	2	−0.52	—	—	5	0	—	—	<0.1	—	
V105	6AL5	AGC Rectifier	2500 Mu. V. Signal	7	−9.0	—	—	1	6.0	—	—	0.12	—	
			No Signal	7	−2.45	—	—	1	5.5	—	—	<0.1	—	
V106	12AU7	1st Video Amplifier	2500 Mu. V. Signal	1	100	—	—	3	1.0	2	−2.4	3.8	—	At maximum contrast
			No Signal	1	48	—	—	3	0.7	2	−0.38	2.7	—	
			2500 Mu. V. Signal	1	180	—	—	3	9.1	2	−2.9	0.69	—	At minimum contrast
			No Signal	1	100	—	—	3	5.9	2	−0.38	0.6	—	
V106	12AU7	2d Video Amplifier	2500 Mu. V. Signal	6	221	—	—	8	1.68	7	−1.3	7.5	—	At maximum contrast
			No Signal	6	191	—	—	8	2.6	7	−.9	11.1	—	
			2500 Mu. V. Signal	6	189	—	—	8	2.75	7	−.5	12.5	—	At minimum contrast
			No Signal	6	188	—	—	8	2.69	7	−.2	12.3	—	
V107	12AU7	D-C Rest. & Sync Sep.	2500 Mu. V. Signal	1	7.5	—	—	3	46.0	2	−4.6	<0.1	—	At maximum contrast
			No Signal	1	5.2	—	—	3	15.0	2	−1.0	<0.1	—	

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V107	12AU7	DC Rest Snyc Sep.	2500 Mu. V. Signal	6	8.6	—	—	8	58	7	0	—	—	At Maximum Contrast
			No Signal	6	6.2	—	—	8	14	7	0	—	—	
V108	14EP4	Kinescope	2500 Mu. V. Signal	Cap	*10,000	10	405	11	69	2	34	0.075	—	*Average Brightness
			No Signal	Cap	*10,000	10	405	11	40	2	9.5	0.04	—	*Average Brightness
V109A	6SN7GT	Sync Amplifier	2500 Mu. V. Signal	5	70	—	—	6	10.2	4	8.6	—	—	
			No Signal	5	18	—	—	6	8.2	4	6.2	—	—	
V109B	6SN7 GT	Vertical Oscillator	2500 Mu. V. Signal	2	132	—	—	3	0	1	−13.2	0.15	—	
			No Signal	2	132	—	—	3	0	1	−12.0	0.15	—	
V110	6AQ5	Vertical Output	2500 Mu. V. Signal	5	290	6	290	2	22	1	−0.5	13.9	1.20	
			No Signal	5	290	6	290	2	22	1	−0.5	13.8	1.20	
V111	6SN7 GT	Horizontal Osc. Control	2500 Mu. V. Signal	2	185	—	—	3	25.0	1	−2.0	.33	—	
			No Signal	2	181	—	—	3	16.3	1	−2.9	.31	—	
V111	6SN7 GT	Horizontal Oscillator	2500 Mu. V. Signal	5	161	—	—	6	0	4	−53	1.35	—	
			No Signal	5	158	—	—	6	0	4	−54	1.35	—	
V112	6AU5 GT	Horizontal Output	2500 Mu. V. Signal	5	*440	8	189	3	19.0	1	−8.0	77.0	11.2	*5000 volt pulse present
			No Signal	5	*435	8	185	3	18.6	1	−7.4	75.0	11.0	
V113	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	*10,100	—	—	0.075	—	*10,100 volt pulse present
			Brightness Average	Cap	*	—	—	2 & 7	*10,100	—	—	0.040	—	
V114	6W4 GT	Damper	2500 Mu. V. Signal	5	269	—	—	3	*430	—	—	88	—	*3000 volt pulse present
			No Signal	5	264	—	—	3	*429	—	—	87	—	
V115	6AU6	1st Sound I-F. Amp.	2500 Mu. V. Signal	5	234	6	188	7	0.98	1	0	8.1	3.24	
			No Signal	5	231	6	165	7	0.95	1	0	7.9	3.30	
V116	6AU6	2d Sound I-F Amp.	2500 Mu. V. Signal	5	200	6	73	7	0	1	−0.45	3.73	1.37	
			No Signal	5	198	6	75	7	0	1	−0.53	3.64	1.28	
V117	6AL5	Sound Discrim.	2500 Mu. V. Signal	2	−0.6	—	—	5	0.1	—	—	—	—	
			No Signal	2	−1.52	—	—	5	1.5	—	—	—	—	
V118	6AV6	1st Audio Amplifier	2500 Mu. V. Signal	7	96	—	—	2	0	1	−0.87	0.54	—	
			No Signal	7	95	—	—	2	0	1	−0.86	0.52	—	
V119	6AQ5	Audio Output	2500 Mu. V. Signal	5	257	6	271	2	19.8	7	0	28.5	1.97	
			No Signal	5	251	6	268	2	19.2	7	0	28.2	1.92	
SR101		Rectifier	2500 Mu. V. Signal	—	0	—	—	—	141	—	—	226	—	
			No Signal	—	0	—	—	—	140	—	—	245	—	
SR102		Rectifier	2500 Mu. V. Signal	—	141	—	—	—	282	—	—	226	—	
			No Signal	—	140	—	—	—	280	—	—	245	—	

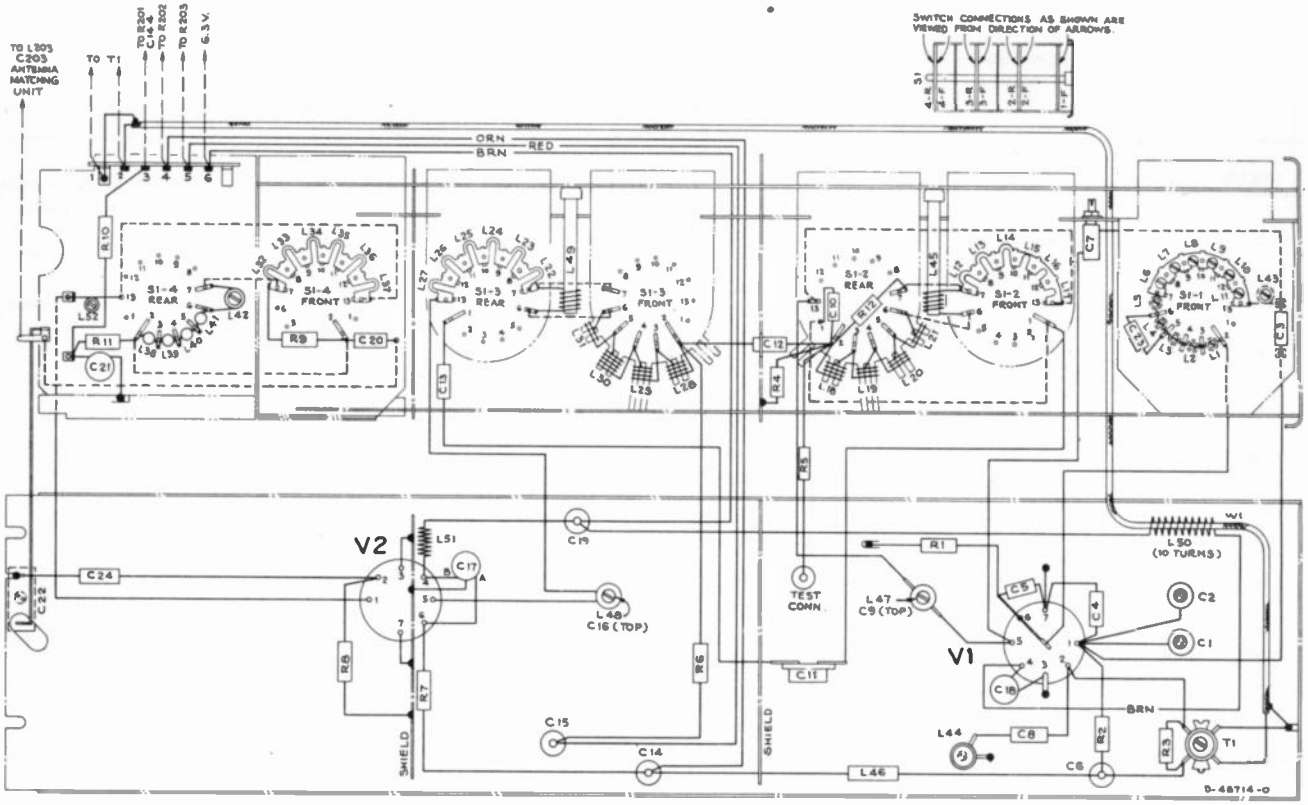


Figure 75—R-F Unit Wiring Diagram

CRITICAL LEAD DRESS:

1. All leads in the picture and sound i-f circuits must be dressed as short and direct as possible with the exception of C107, C11 and C117 which are to be dressed with enough slack so as not to have to move the body of the capacitor to align that particular stage.
2. Dress the yellow lead from pin 3 of V106 socket up in the air and away from V105 socket.
3. Dress all components connected to V106 socket up and away from the chassis except L103.
4. Keep the body and coded end of L103 as close to pin 2 of V105 socket as possible.
5. Keep the bus from pin 5 of V105 socket to L102 as short as possible and employ sleeving to prevent shorting.
6. Dress the red lead from kinescope socket away from V105 and V106 sockets and on power transformer side of terminal boards.
7. Dress the yellow lead from the kinescope socket along the rear apron between T107 and V111 socket, up between V107 socket and the power transformer to the terminal board.
8. The green lead from the kinescope socket should be dressed away from all other leads and components and away from V106.
9. Pin 7 of V116 socket should be soldered to the chassis as short as possible.
10. Dress fuse in high voltage compartment so as not to short circuit to ground.
11. Dress the two filament leads away from the T108 high voltage winding by pulling them up through hole so as to have all slack on the transformer side of the insulating board.
12. Keep V113 filament leads away from the metal side of the high voltage compartment shield.
13. Dress C158 on high voltage rectifier socket so as to keep the hot end of the capacitor away from the metal side of the high voltage compartment.
14. Keep all leads away from R177 for heat reasons.
15. Dress R210 and R211 away from all components on account of their heat.
16. Dress AC leads at S102 away from audio components on R194.
17. Clamp W105 in cable lance provided on rear apron.
18. Keep leads on C182 and C183 as short as possible.
19. Keep C133 dressed above leads.
20. Dress the body of C131 away from the chassis.
21. Keep C150 dressed away from the chassis.
22. Dress the orange lead from C160-C on the power transformer side of the terminal boards and around the rear apron side of V106 socket.
23. Dress the body of R119 as close to pin 5 on V104 socket as possible.
24. Dress the body of R124 as close to pin 2 on V105 socket as possible.
25. Keep the leads of C122 and C125 as short and direct as possible.
26. Keep the leads of C126 as short as possible.
27. Dress the leads of the AGC switch S105 next to the base in the chassis and away from sound components.
28. Solder terminal on can of C160 to bracket along with C134.

CHASSIS WIRING DIAGRAM

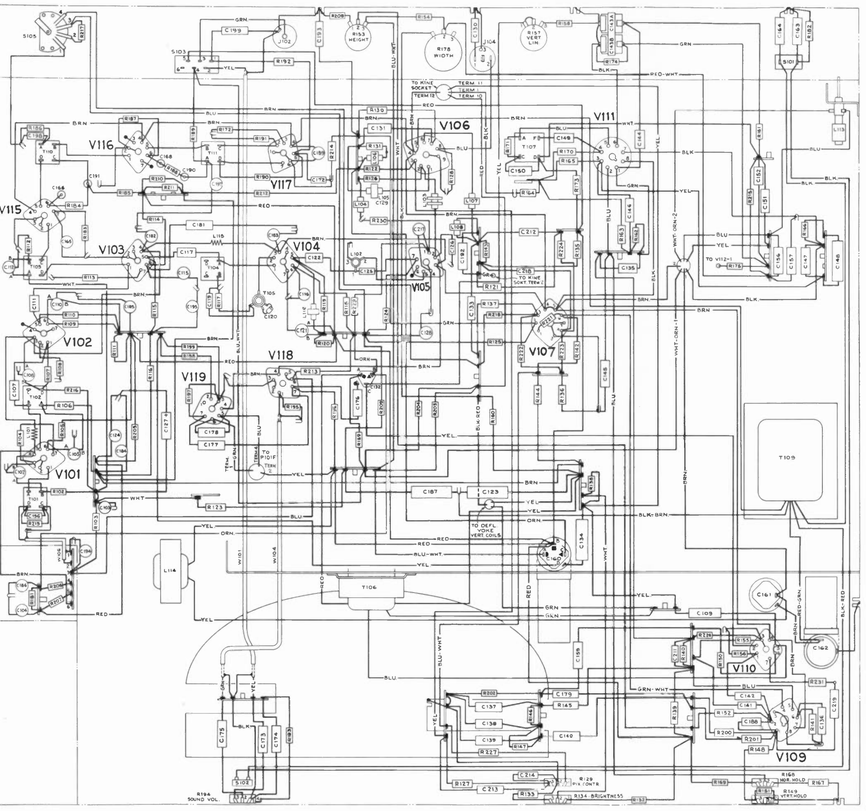
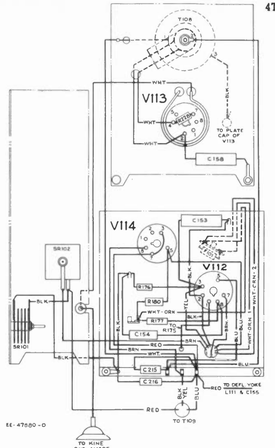
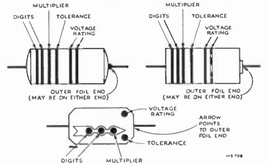


Figure 76—Chassis Wiring Diagram



EE-47680-D

COLOR CODES, MOULDED PAPER CAPACITORS



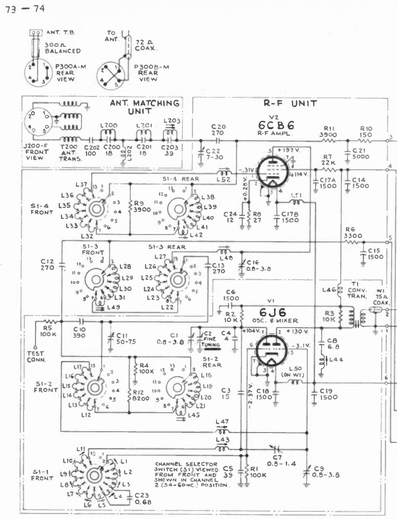
CAPACITY VALUE IN MMF

COLOR	DIGITS	MULTIPLIER
BLACK	0	1
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

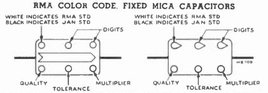
TOLERANCE

COLOR	TOLERANCE
BLACK BAND OR NONE	±20%
WHITE OR SILVER	±10%
YELLOW OR GOLD	±5%

The Voltage Rating is given in hundreds of volts. Only one band is employed for ratings under 1,000 volts. Two bands are employed for ratings over 1,000 volts. Use digit column to read voltage rating.



RMA COLOR CODE, FIXED MICA CAPACITORS



TOLERANCE		QUALITY			
COLOR	TOLERANCE	COLOR	CLASS	COLOR	CLASS
RED	±2%	BLACK	A	YELLOW	D
GREEN	±5%	BROWN	B	GRAY	I
SILVER	±10%	RED	C	WHITE	J
BLACK	±20%	ORANGE	D		

COLOR	DIGITS	MULTIPLIER
GOLD		.1
BLACK	0	1.
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

All resistance values in ohms. K = 1000.

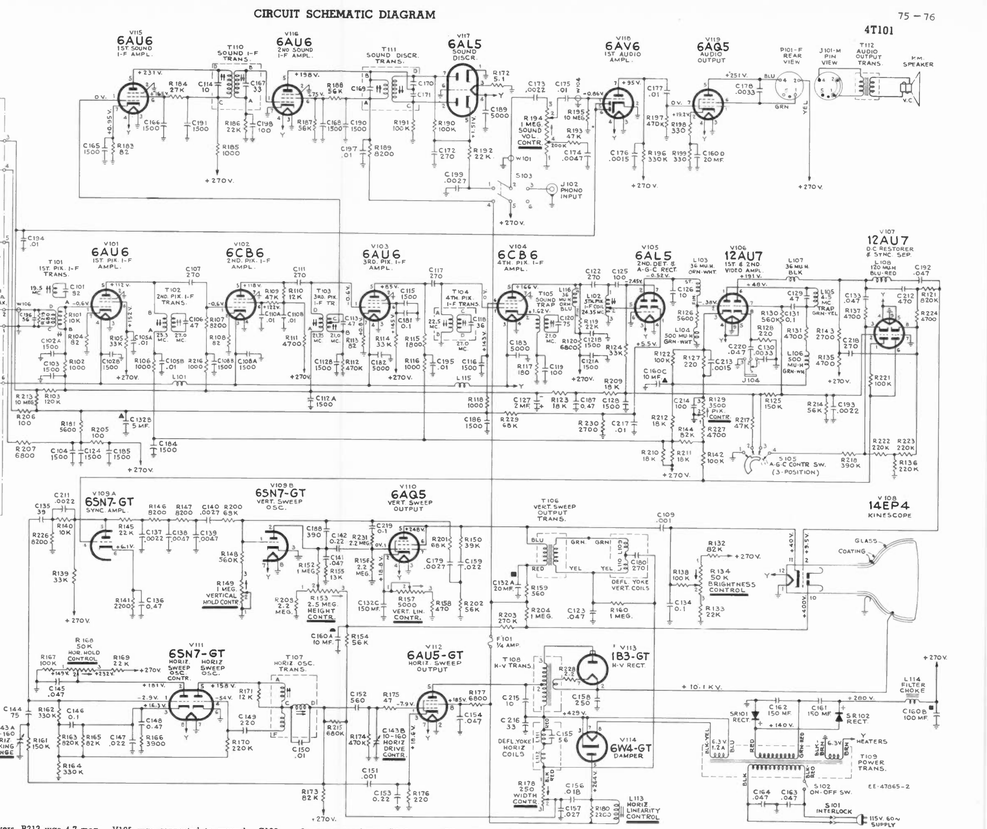
All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

Direction of arrows at controls indicates clockwise rotation.

In some receivers, R213 was 4.7 meg and was connected from R-F unit terminal 3 to junction of R207 and C104. R103 was 33K, C217 was omitted, R229 and R230 were omitted and pin 1 of V105 was connected to ground. C130 was .0015 mfd, R135 was 6800. L117 (500 muh) and R225 (10K) were removed and replaced by R143. C218 was omitted.

CIRCUIT SCHEMATIC DIAGRAM



In some receivers, R142 was 47K, R144 was 100K, R150 was 27K, R155 was 12K, R102 was 39K, R227 was 3300, C140 was .001 and C179 was .0047 mfd. R231 and C219 were omitted. R220, 100K connected between V107-1 and R142 and 1104-2 was connected to V106-8.

In some receivers, R179, 1 meg was employed as high voltage filter and was connected between V113-2 and the kinescope.

In some receivers, C220 was omitted and 1104-2 was connected to V106-8.

In some receivers, R151, 2.2 meg was connected between R149-3 and ground.

In some receivers, R182, 100K was connected from S101 to ground.

Figure 77—Circuit Schematic Diagram

REPLACEMENT PARTS 4T101

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLY KRK8C
75188	Board—Terminal board, 5 contact and ground
75067	Bracket—Vertical bracket for holding oscillator tube shield
75201	Cable—75 ohms, coax. cable (7¼") complete with coil (W1, L50)
75186	Capacitor—Ceramic, variable, for fine tuning—plunger type (C2)
75289	Capacitor—Ceramic, 4 mmf., ±0.5 mmf. (C4)
75189	Capacitor—Adjustable, 7-30 mmf. (C22)
75200	Capacitor—Ceramic, 12 mmf. (C24)
45465	Capacitor—Ceramic, 15 mmf. (C3)
75196	Capacitor—Ceramic, 39 mmf. (C5)
75174	Capacitor—Ceramic, trimmer, 50-75 mmf. (C11)
75199	Capacitor—Ceramic, 270 mmf. (C12, C13, C20)
75641	Capacitor—Ceramic, 390 mmf. (C10)
75166	Capacitor—Ceramic, 1500 mmf. (C6, C14, C15, C19)
75089	Capacitor—Ceramic, dual, 1500 mmf. (C17A, C17B)
73748	Capacitor—Ceramic, 1500 mmf. (C18)
73473	Capacitor—Ceramic, 5000 mmf. (C21)
75172	Capacitor—Tubular, steatite, adjustable, 0.65-1.2 mmf. (C7)
71504	Capacitor—Ceramic, 0.68 mmf. (C23)
75184	Capacitor—Ceramic, adjustable, 0.75-4 mmf. complete with adjusting stud (C1)
75197	Capacitor—Ceramic, 6.8 mmf. (C8)
75167	Clip—Tubular clip for mounting stand-off capacitors—RCA 75166
75182	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (screw adjustment) for converter section (C9, L47)
75183	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (screw adjustment for r-f section (L48, C16)
75185	Coil—Converter plate loading coil (L44)
75202	Coil—Choke coil, .56 muh (L46)
73477	Coil—Choke coil (L51)
75187	Core—Adjustable core for fine tuning capacitor (C2)
75162	Detent—Detent mechanism and fibre shaft
73453	Form—Coil form for L45 and L49
75165	Link—Link assembly for fine tuning
14343	Retainer—Fine tuning shaft retaining ring
	Resistor—Fixed, composition:—
503027	27 ohms, ±10%, ½ watt (R8)
504115	150 ohms, ±20%, ½ watt (R10)
503233	3300 ohms, ±10%, ½ watt (R6)
503239	3900 ohms, ±10%, ½ watt (R9, R11)
503282	8200 ohms, ±10%, ½ watt (R12)
3078	10,000 ohms, ±5%, ½ watt (R3)
504310	10,000 ohms, ±20%, ½ watt (R2)
503322	22,000 ohms, ±10%, ½ watt (R7)
504410	100,000 ohms, ±20%, ½ watt (R1, R4, R5)
75164	Rod—Actuating plunger rod (fibre for fine tuning link)
71476	Screw—#4-40 x ¼" binder head machine screw for adjusting L6, L7, L8, L9, L10, L11
75176	Screw—#4-40 x ⅜" fillister head screw for adjusting L5
75177	Screw—#4-40 x 5/16" fillister head screw for adjusting L1, L2, L3, L4, L43
74575	Screw—#4-40 x .359" adjusting screw for L42
73640	Screw—#4-40 x 7/16" adjusting screw for L52
76133	Shaft—Channel selector shaft and plate
76134	Shaft—Fine tuning shaft and cam
75168	Shield—Oscillator and converter sections shield for r-f unit—snap-on type
75193	Shield—Tube shield for V1
75192	Shield—Tube shield for V2
75088	Socket—Tube socket, 7 contact, miniature, ceramic, saddle mounted
75191	Spacer—Insulating spacer for front plate (4 req'd)
75163	Spring—Friction spring (formed) for fine tuning cam
75068	Spring—Retaining spring for oscillator tube shield
75478	Spring—Retaining spring for adjusting screws
73457	Spring—Return spring for fine tuning control
30340	Spring—Hair pin spring for fine tuning link
75175	Stator—Oscillator section stator complete with rotor, segment, coils, adjusting screws and capacitors (C3 and C23) (S1-1, C3, C23, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L43)
75178	Stator—Converter stator complete with rotor, coils, capacitors (C10 and C12) and resistors (R4 and R5) (S1-2, C10, C12, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L45, R4, R5, R12)
75179	Stator—R-F amplifier stator complete with rotor, coils, capacitor (C13) and resistor (R6) (S1-3, C13, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L49, R6)
75180	Stator—Antenna stator complete with rotor, coils, capacitors (C20 and C21) and resistors (R9, R10, R11) (S1-4, C20, C21, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L52, R9, R10, R11)
75169	Strip—Coil segment mounting strip—RH center
75170	Strip—Coil segment mounting strip—LH lower
75171	Strip—Coil segment mounting strip—LH upper less trimmer C7
75173	Stud—#6-32 x 13/16" adjusting stud for C7 trimmer
75446	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 uncoded and coded "ER"
75447	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 coded numerically and "Hi Q"
75181	Transformer—Converter transformer (T1)
75190	Washer—Insulating washer (neoprene) for capacitor C7
73466	Washer—Insulating washer (round)

4T101 REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES KCS 81
75235	Board—Hi-voltage shield terminal board (3 contact)
75228	Bracket—Focus magnet mounting bracket—upper
75229	Bracket—Focus magnet mounting bracket—bottom
53511	Capacitor—Ceramic, 10 mmf. (C126)
75217	Capacitor—Mica trimmer dual 10-160 mmf. (C143A, C143B)
76294	Capacitor—Ceramic, 10 mmf. H.V. (C215)
76295	Capacitor—Ceramic, 33 mmf. H.V. (C216)
75450	Capacitor—Ceramic, 39 mmf. (C203)
74726	Capacitor—Mica, 39 mmf. (C135)
71924	Capacitor—Ceramic, 56 mmf. (C196)
75247	Capacitor—Mica, 75 mmf. (C144)
75437	Capacitor—Ceramic, 100 mmf. (C202)
45469	Capacitor—Ceramic, 100 mmf. (C119)
39396	Capacitor—Ceramic, 100 mmf. (C125, C198, C214)
75248	Capacitor—Mica, 220 mmf. (C149)
75244	Capacitor—Ceramic, 270 mmf. (C172)
76303	Capacitor—Ceramic, 270 mmf. (C218)
73091	Capacitor—Mica, 270 mmf. (C107, C111, C117, C122)
73094	Capacitor—Mica, 390 mmf. (C188)
75198	Capacitor—Ceramic, 470 mmf. (C212)
74250	Capacitor—Mica, 560 mmf. (C152)
75166	Capacitor—Ceramic, 1500 mmf. (stand-off type) (C166, C168, C190, C191)
75089	Capacitor—Ceramic dual, 1500 mmf. (C102A, C102B, C105A, C108B, C112A, C112B, C121A, C121B)
73748	Capacitor—Ceramic, 1500 mmf. (C103, C104, C115, C116, C124, C126, C165, C184, C185, C186)
73473	Capacitor—Ceramic, 5000 mmf. (C182, C183, C189)
73960	Capacitor—Ceramic, 10,000 mmf. (C194, C195, C197, C217)
75877	Capacitor—Ceramic, dual, 10,000 mmf. (C105A, C105B, C110A, C110B)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C127)
75219	Capacitor—Electrolytic, comprising 1 section of 10 mfd., 450 volts, 1 section of 100 mfd., 350 volts, 1 section of 10 mfd., 350 volts and 1 section of 20 mfd., 25 volts (C160A, C160B, C160C, C160D)
76142	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 350 volts, 1 section of 5 mfd., 350 volts and 1 section of 150 mfd., 50 volts (C132A, C132B, C132C)
75220	Capacitor—Electrolytic, 150 mfd., 200 volts (C161, C162)
75250	Capacitor—Tubular, moulded paper, oil impregnated, .00025 mfd., 12,500 volts (C158)
75249	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd., 600 volts (C151)
75344	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd., 1000 volts (C109)
73598	Capacitor—Tubular, paper, oil impregnated, .0015 mfd., 600 volts (C176, C213)
73595	Capacitor—Tubular, paper, oil impregnated, .0022 mfd., 600 volts (C137, C173, C193, C211)
73599	Capacitor—Tubular, paper, oil impregnated, .0027 mfd., 600 volts (C140, C179, C199)
73795	Capacitor—Tubular, paper, oil impregnated, .0033 mfd., 600 volts (C130, C178)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd., 600 volts (C138, C139, C174)
73561	Capacitor—Tubular, paper, oil impregnated, .01 mfd., 400 volts (C175, C177)
73594	Capacitor, moulded paper, oil impregnated, .01 mfd., 600 volts (C150)
74727	Capacitor—Tubular, moulded paper, oil impregnated, .018 mfd., 1000 volts (C156)
73562	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 400 volts (C147)
73798	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 600 volts (C159)
73815	Capacitor—Tubular, moulded paper, oil impregnated, .027 mfd., 1000 volts (C157)
75071	Capacitor, moulded paper, .047 mfd., 400 volts (C163, C164)
73553	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 400 volts (C133, C145, C192, C220)
73592	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 600 volts (C141)
73597	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 1000 volts (C123, C154)
73551	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd., 400 volts (C131, C134, C146, C181, C219)
73560	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd., 200 volts (C153)
74957	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd., 600 volts (C142)
73787	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 200 volts (C136, C148, C187)
76140	Choke—Filter choke (L114)
76143	Clip—Tubular clip for mounting stand-off capacitor 75166
75224	Clip—Mounting clip for electrolytic 75220
76150	Clip—Anchor clip for ground braid
75210	Coil—Fifth pix, i-f coil complete with adjustable core (L102)
71449	Coil—Horizontal linearity coil (L113)
73591	Coil—Antenna matching coil (2 req'd) (Part of T200)
75241	Coil—Antenna shunt coil (L202)
73477	Coil—Filament choke coil (L101, L115)
75299	Coil—Peaking coil (36 muh) (L103)
71793	Coil—Peaking coil (36 muh) (L107)
76285	Coil—Peaking coil (36 muh) (L116, R119)
75253	Coil—Peaking coil (120 muh) (L108)
75252	Coil—Peaking coil (500 muh) (L104, L106)
35787	Connector—Phono input connector (J102)
74594	Connector—2 contact male connector for power cable
38853	Connector—4 contact female connector for antenna transformer (J200)
71789	Connector—Anode connector
5040	Connector—4 contact female connector for speaker cable (P101)
75237	Control—Volume control and power switch (R194, S102)
75215	Control—Horizontal and vertical hold control (R149, R168)

REPLACEMENT PARTS (Continued) 4T101

STOCK No.	DESCRIPTION
75216	Control—Picture and brightness control (R129, R134)
71441	Control—Vertical linearity control (R157)
71440	Control—Height control (R153)
74945	Control—Width control (R178)
71498	Core—Adjustable core and stud for F-M trap 75449
72772	Cover—Insulating cover for electrolytic 75220
74956	Cushion—Rubber cushion for deflection yoke hood (2 req'd)
74839	Fastener—Push fastener to mount ceramic tube socket (2 req'd)
73600	Fuse—0.25 amp., 250 volts (F101)
37396	Grommet—Rubber grommet to mount ceramic tube socket
16058	Grommet—Rubber grommet for 2nd anode lead exit
76138	Hood—Deflection yoke hood complete with cushions
75482	Jack—Video jack (J104)
76137	Magnet—Focus magnet complete with adjustable plate and stud
76141	Magnet—Ion trap magnet
76144	Pad—Rubber pad for kinescope mounting strap (bottom) (4 req'd)
18469	Plate—Bakelite mounting plate for electrolytic #75220
76153	Plate—Hi-voltage transformer mounting plate (bakelite) complete with tube socket less transformer
75221	Rectifier—Selenium rectifier (SR101, SR102)
72066	Resistor—Wire wound, 2.2 ohms, ½ watt (R228)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R172)
76410	Resistor—Wire wound, 220 ohms, 4 watts (R176)
76390	Resistor—Wire wound, 5600 ohms, 5 watts (R181)
	Resistor—Fixed, composition:—
504047	47 ohms, ±20%, ½ watt (R175)
503082	82 ohms, ±10%, ½ watt (R104, R108, R113, R183)
504110	100 oms, ±20%, ½ watt (R205, R206)
503118	180 ohms, ±10%, ½ watt (R117)
503122	220 ohms, ±10%, ½ watt (R127, R128)
513133	330 ohms, ±10%, 1 watt (R198, R199)
504147	470 ohms, ±20%, ½ watt (R158)
503156	560 ohms, ±10%, ½ watt (R159)
503168	680 ohms, ±10%, ½ watt (R219)
504210	1000 ohms, ±20%, ½ watt (R102, R106, R116, R118, R185, R216)
503218	1800 ohms, ±10%, ½ watt (R115)
504222	2200 ohms, ±20%, ½ watt (R141)
514222	2200 ohms, ±20%, 1 watt (R180)
503227	2700 ohms, ±10%, ½ watt (R143, R230)
503239	3900 ohms, ±10%, ½ watt (R166)
30494	4700 ohms, ±5%, ½ watt (R131)
503247	4700 ohms, ±10%, ½ watt (R137, R227)
513247	4700 ohms, ±10%, 1 watt (R111)
523247	4700 ohms, ±10%, 2 watts, (R135)
30734	5600 ohms, ±5%, ½ watt (R126)
523256	5600 ohms, ±10%, 2 watts (R181)
513268	6800 ohms, ±10%, 1 watt (R120)
523268	6800 ohms, ±10%, 2 watts (R177, R207)
14250	8200 ohms, ±5%, ½ watt (R107)
503282	8200 ohms, ±10%, ½ watt (R146, R147, R189, R226)
503310	10,000 ohms, ±10%, ½ watt (R140)
30436	12,000 ohms, ±5%, ½ watt (R171)
30866	12,000 ohms, ±5%, 1 watt (R110)
502313	13,000 ohms, ±5%, ½ watt (R155)
503318	18,000 ohms, ±10%, ½ watt (R123, R209)
513318	18,000 ohms, ±10%, 1 watt (R212)
523318	18,000 ohms, ±10%, 2 watts (R210, R211)
503322	22,000 ohms, ±10%, ½ watt (R133, R145, R186)
504322	22,000 ohms, ±20%, ½ watt (R192)
513322	22,000 ohms, ±10%, 1 watt (R169)
503327	27,000 ohms, ±10%, ½ watt (R184)
503333	33,000 ohms, ±10%, ½ watt (R105)
504333	33,000 ohms, ±20%, ½ watt (R114, R124)
523333	33,000 ohms, ±10%, 2 watts (R139)
513339	39,000 ohms, ±10%, 1 watt (R150)
503347	47,000 ohms, ±10%, ½ watt (R193, R217)
504347	47,000 ohms, ±20%, ½ watt (R109)
503356	56,000 ohms, ±10%, ½ watt (R154, R187, R188, R214)
513356	56,000 ohms, ±10%, 1 watt (R202)
504368	68,000 ohms, ±20%, ½ watt (R200, R201)
503368	68,000 ohms, ±10%, ½ watt (R229)
503382	82,000 ohms, ±10%, ½ watt (R132, R144)
513382	82,000 ohms, ±10%, 1 watt (R165, R173)
3252	100,000 ohms, ±5%, ½ watt, (R190, R191)
503410	100,000 ohms, ±10%, ½ watt (R138, R142, R221)
513410	100,000 ohms, ±10%, 1 watt (R122, R167)
503412	120,000 ohms, ±10%, ½ watt (R103)
503415	150,000 ohms, ±10%, ½ watt (R161)
504415	150,000 ohms, ±20%, ½ watt (R125)
503422	220,000 ohms, ±10%, ½ watt (R136, R222, R223)
54449	220,000 ohms, ±5%, 1 watt (R170)
503427	270,000 ohms, ±10%, ½ watt (R203)
503433	330,000 ohms, ±10%, ½ watt (R162, R196)
38892	330,000 ohms, ±5%, 1 watt (R164)
503439	390,000 ohms, ±10%, ½ watt (R218)
503447	470,000 ohms, ±10%, ½ watt (R174)
504447	470,000 ohms, ±20%, ½ watt (R112, R197)
503456	560,000 ohms, ±10%, ½ watt (R130, R148)
503468	Resistor—680,000 ohms, ±10%, ½ watt (R215)
503482	820,000 ohms, ±10%, ½ watt (R121, R163)
503510	1 megohm, ±10%, ½ watt (R152, R204)
504510	1 megohm, ±20%, ½ watt (R160)
503522	2.2 megohm, ±10%, ½ watt (R156)
504522	2.2 megohm, ±20%, ½ watt (R208, R231)
504610	10 megohm, ±20%, ½ watt (R195)
503610	10 megohms, ±10%, ½ watt (R213)
76151	Screw—#10-32 x 1" hex head screw to fasten kinescope retaining straps (2 req'd)
75083	Screw—#8-32 x 5/16" wing screw for mounting deflection yoke
76152	Screw—#10-32 x 1½" cross recessed round head screw for focus magnet adjustment

4T101 REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
75236	Screw—#8-32 x ⅜" cross recessed binder head screw for focus magnet mounting (2 req'd)
73521	Shield—Tube shield for V105, V117
73584	Shield—Tube shield for V104, V116
76147	Shield—RF unit shield
75222	Socket—Tube socket, octal, ceramic, plate mounted
73117	Socket—Tube socket, 7 pin, miniature
75223	Socket—Tube socket, 9 pin, miniature
60942	Socket—Tube socket, 6 contact, steatite
31251	Socket—Tube socket, octal, wafer
71508	Socket—Tube socket, 6 contact, moulded for V113
74834	Socket—Kinescope socket
74936	Spring—Suspension spring for kinescope leads
76148	Spring—Compression spring for focus magnet adjustment
76149	Spring—Suspension spring for 2nd anode lead
74038	Spring—Tension spring for ground braid
76145	Strap—Kinescope retaining strap—upper
76636	Stud—Adjusting stud complete with guard for focus magnet
33491	Switch—"TV-Phono" switch (S103)
76010	Switch—AGC switch (S105)
75207	Transformer—Power transformer, 117 volt, 60 cycle (T109)
76139	Transformer—Vertical output transformer (T106)
74589	Transformer—First pix, i-f transformer (T101, C101, R101)
74590	Transformer—Second pix, i-f transformer (T102, C106)
76264	Transformer—Third pix, i-f transformer (T103, C113)
73574	Transformer—Fourth pix, i-f transformer (T104, C118)
71424	Transformer—Sound i-f transformer (T110, C114 C167)
75212	Transformer—Sound discriminator transformer (T111, C169, C170, C171)
75213	Transformer—Horizontal oscillator transformer (T107)
75509	Transformer—Antenna matching transformer complete with connector, i-f and F-M traps and antenna shunt coil (T200, C200, C201, C202, C203, J200, L200, L201, L202, L203)
76154	Transformer—Hi-voltage transformer (T108)
71778	Trap—Sound trap (T105, C120)
75242	Trap—I-F trap (L200, L201, C200, C201)
75449	Trap—F-M trap complete with adjustable core and stud (L203, C203)
75251	Trap—4.5 mc trap (L105, C129)
75451	Tubing—Insulated tubing for kinescope strap (23")
76136	Yoke—Deflection yoke (L109, L110, L111, L112, C155, C180)
	SPEAKER ASSEMBLIES 92585-2W RL-109-2W RMA-274
X3128	Cloth—Speaker grille cloth
5039	Plug—4 contact male plug (J101)
76156	Transformer—Output transformer (T112)
76155	Speaker—5" x 7" P.M. speaker (.76 oz. magnet) complete with cone and voice coil (3.2 ohms) less output transformer and plug
	MISCELLANEOUS
76157	Back—Cabinet back complete with power cord and terminal board
76184	Board—"Ant" terminal board—part of back
76124	Bracket—Safety glass retaining bracket—bottom
76123	Bracket—Safety glass retaining bracket—upper
76125	Clip—Decorative clip for bottom retaining bracket
39153	Connector—4 contact male connector for antenna cable
75474	Connector—Single contact male connector for antenna cable (2 req'd)
71457	Cord—Power cord and plug
76209	Decal—Control function decal
74809	Emblem—"RCA Victor" emblem
75499	Escutcheon—Channel marker escutcheon
76122	Glass—Safety glass
74959	Knob—Fine tuning control knob (outer)
74960	Knob—Channel selector knob (inner)
74962	Knob—Brightness control or vertical hold control knob (outer)
74969	Knob—Volume control and power switch knob
74963	Knob—Picture control or horizontal hold control (inner)
33225	Nut—Speed nut to fasten antenna in cabinet
72845	Spring—Retaining spring for Knob #74959
14270	Spring—Retaining spring for Knobs #74960, 74962, 74969
30330	Spring—Retaining spring for knob #74963
73643	Spring—Spring clip for channel marker escutcheon
75500	Washer—Felt washer for back cover (3 req'd)

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA VICTOR

"Somervell"
Model 4T141, Walnut, Mahogany or Limed Oak

TELEVISION, RADIO PHONOGRAPH COMBINATION MODEL 4T141

Chassis Nos. KCS62 and RC1090
Record Changers RP190 and 960282

— Mfr. No. 274 —

SERVICE DATA

— 1951 No. T2 —

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Model 4T141 is a 14-inch television radio phonograph combination. Two record changers are provided to play 78, 33⅓ and 45 RPM records. The instrument employs 23 tubes plus 4 rectifiers and a 14EP4 kinescope.

Features of the television unit are full twelve channel coverage; FM sound system; improved picture brilliance; picture A-G-C; A-F-C horizontal hold; stabilized vertical hold; two stages of video amplification; noise saturation circuits; improved sync separator and clipper; four mc band width for picture channel and reduced hazard high voltage supply.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE..... 96 square inches on a 14EP4 kinescope

TELEVISION R-F FREQUENCY RANGE

All 12 television channels, 54 mc. to 88 mc., 174 mc. to 216 mc.
Fine Tuning Range..±250 kc. on chan. 2, ±650 kc. on chan. 13
Picture Carrier Frequency..... 25.50 mc.
Sound Carrier Frequency..... 21.00 mc.

RADIO TUNING RANGE..... 540-1,600 kc.

Radio Intermediate Frequency..... 455 kc.

POWER SUPPLY RATING..... 115 volts, 60 cycles, 235 watts

AUDIO POWER OUTPUT RATING..... 6.0 watts max.

CHASSIS DESIGNATIONS

Television Chassis.....KCS62
Radio Chassis..... RC1090
33⅓/78 RPM Record Changer..... 960282-4 or 5
45 RPM Record Changer..... RP190-2
Refer to Service Data 960282 or RP190 for information on the record changers.

LOUDSPEAKER—92569-9 (RL111-14)..... 12-inch PM Dynamic
Voice Coil Impedance..... 3.2 ohms at 400 cycles

WEIGHT

Chassis with Tubes in Cabinet..... 149 lbs.
Shipping Weight..... 183 lbs.

DIMENSIONS (inches)	Width	Height	Depth
Cabinet (outside).....	33¾	35	25
TV Chassis (overall).....	16	15	20¼

RECEIVER ANTENNA INPUT IMPEDANCE..300 ohms balanced

If necessary, the television chassis may be fed separately from either a 300-ohm balanced line or a 72-ohm co-ax.

RCA TUBE COMPLEMENT

Tube Used (Television Chassis)	Function
(1) RCA 6CB6.....	R-F Amplifier
(2) RCA 6J6.....	R-F Oscillator and Mixer
(3) RCA 6AU6.....	1st Sound I-F Amplifier
(4) RCA 6AU6.....	2nd Sound I-F Amplifier
(5) RCA 6AL5.....	Sound Discriminator
(6) RCA 6AU6.....	1st Picture I-F Amplifier
(7) RCA 6CB6.....	2nd Picture I-F Amplifier
(8) RCA 6AU6.....	3rd Picture I-F Amplifier
(9) RCA 6CB6.....	4th Picture I-F Amplifier
(10) RCA 6AL5.....	Picture 2nd Detector and AGC Detector
(11) RCA 12AU7.....	1st and 2nd Video Amplifier
(12) RCA 12AU7.....	DC Restorer and Sync Separator
(13) RCA 6SN7GT..	Sync. Amp. and Vertical Sweep Oscillator
(14) RCA 6AQ5.....	Vertical Sweep Output
(15) RCA 6SN7GT....	Horizontal Sweep Oscillator and Control
(16) RCA 6AU5GT.....	Horizontal Sweep Output
(17) RCA 6W4GT.....	Damper
(18) RCA 1B3-GT/8016.....	High Voltage Rectifier
(19) RCA 14EP4.....	Kinescope

(Radio Chassis)

(1) RCA 6BE6.....	Converter
(2) RCA 6BA6.....	I-F Amplifier
(3) RCA 6AV6.....	Detector and 1st Audio
(4) RCA 6C4.....	Phase Inverter
(5) RCA 6V6GT (2 tubes).....	Audio Output
(6) RCA 6X5GT.....	Rectifier

Specifications continued on page 2

PICTURE INTERMEDIATE FREQUENCIES

Picture Carrier Frequency	25.50 mc.
Adjacent Channel Sound Trap	27.00 mc.
Accompanying Sound Traps	21.00 mc.
Adjacent Channel Picture Carrier Trap	19.50 mc.

SOUND INTERMEDIATE FREQUENCIES

Sound Carrier Frequency	21.00 mc.
Sound Discriminator Band Width between peaks	400 kc.
VIDEO RESPONSE	To 4 mc.
FOCUS	Magnetic
SWEEP DEFLECTION	Magnetic

TV OPERATING CONTROLS (Front Panel)

Channel Selector / Fine Tuning	Dual Control Knobs
Picture / Brightness	Dual Control Knobs
Picture Horizontal Hold / Picture Vertical Hold	Dual Control Knobs
Escutcheon Light Switch	Single Control Knob
HORIZONTAL SWEEP FREQUENCY	15,750 cps
SCANNING	Interlaced, 525 line
VERTICAL SWEEP FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

REFER TO PAGES 56 TO 69 FOR TELEVISION ALIGNMENT PROCEDURE AND WAVEFORM PHOTOGRAPHS.

OPERATING INSTRUCTIONS

The following adjustments are necessary when turning the receiver on for the first time:

1. Turn the radio FUNCTION switch to TV.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best sound fidelity and the SOUND VOLUME control for suitable volume.

5. Turn the BRIGHTNESS control fully counter-clockwise, then clockwise until a light pattern appears on the screen.

6. Adjust the VERTICAL hold control until the pattern stops vertical movement.

7. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

8. Adjust the PICTURE and brightness controls for suitable picture contrast and brightness.

9. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

10. In switching from one channel to another, it may be necessary to repeat steps 4 and 8.

11. When the set is turned on again after an idle period it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step No. 4 is generally sufficient.

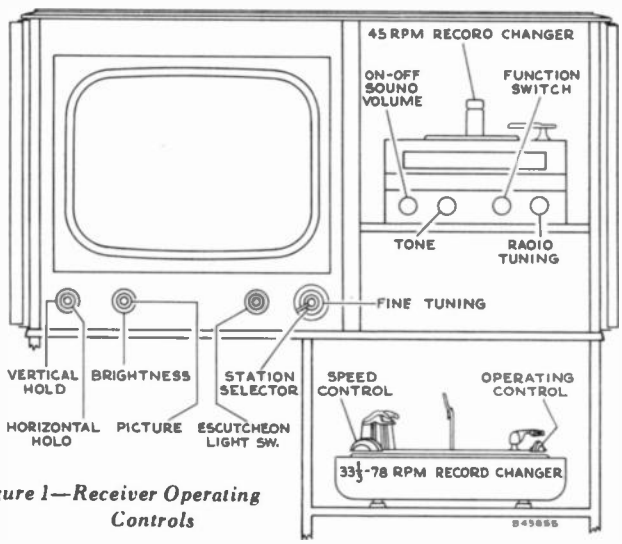


Figure 1—Receiver Operating Controls

12. If the positions of the controls have been changed, it may be necessary to repeat steps 1 through 8.

RADIO OPERATION

1. Turn the radio FUNCTION switch to AM.

2. Tune in the desired station with the TUNING control.

PHONOGRAPH OPERATION

1. Turn the radio FUNCTION switch to 78-33 for operation of the 78/33⅓ RPM changer or to 45 for operation of the 45 RPM changer.

2. Place a record on the appropriate changer and slip the changer power switch to "ON."

Make sure that all tubes are in place and are firmly seated in their sockets.

Check to see that the kinescope high voltage lead clip is in place.

Connect the antenna transmission line to the receiver antenna terminals. Plug a power cord into the 115-volt a-c power source and into the receiver interlock receptacle. Turn the receiver power switch to the "on" position, the brightness control fully clockwise, and the picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT. — Set the ion trap magnet approximately in the position shown in Figure 2. Starting from this position immediately adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Turn the focus control (shown in Figure 2) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches of this adjustment should be made with the brightness control at the maximum clockwise position with which good line focus can be maintained.

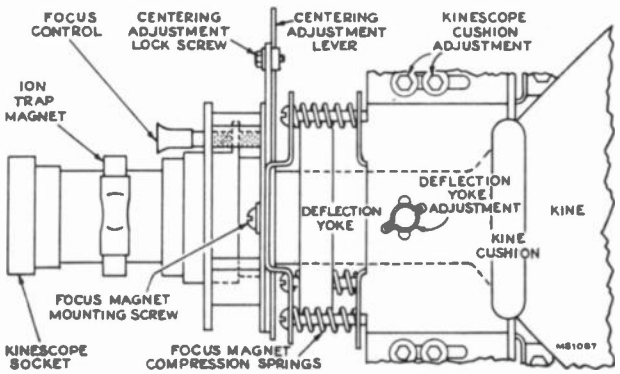


Figure 2—Yoke and Focus Magnet Adjustments

DEFLECTION YOKE ADJUSTMENT. — If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS. — It will now be necessary to obtain a test pattern picture in order to make further adjustments.

If the Horizontal Oscillator and AGC System are operating properly, it should be possible to sync the picture at this point. However, if the AGC control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading, turn S105 on the rear apron (see Figure 3) counter-clockwise until the set operates normally and the picture can be synced.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT. — Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 2 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull-in should occur when the control is approximately 90 degrees from the extreme counter-clockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Focus Magnet Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR. — If in the above check the receiver failed to hold sync with the hold control at the extreme counter-clockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull-in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment. — Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T107 horizontal frequency adjustment on top of the chassis until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Locking Range Adjustment. — Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. The picture may remain in sync. If so turn the T107 top core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C143A slightly clockwise. If less than 2 bars are present, adjust C143A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure. For field purposes paragraph "A" under Horizontal Oscillator Waveform Adjustment may be omitted.

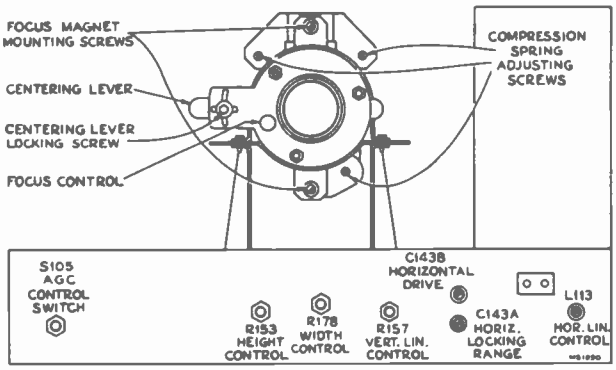


Figure 3—Rear Chassis Adjustments

FOCUS MAGNET ADJUSTMENT. — The focus coil should be adjusted so that there is approximately three-eighths inch of space between the rear cardboard shell of the yoke and the flat of the front face of the focus magnet. This spacing gives best average focus over the face of the tube.

The axis of the hole through the magnet should be parallel with the axis of the kinescope neck with the kinescope neck through the middle.

CENTERING ADJUSTMENT. — No electrical centering controls are provided. Centering is accomplished by means of a separate plate on the focus magnet. Some centering plates include a locking screw which must be loosened before centering, and others are held in adjustment by friction. Up and down adjustment of the plate moves the picture side to side and sidewise adjustment moves the picture up and down.

If a corner of the raster is shadowed, check the position of the ion trap magnet. Reposition the magnet within the range of maximum raster brightness to eliminate the shadow and

recenter the picture by adjustment of the focus magnet plate. In no case should the magnet be adjusted to cause any loss of brightness since such operation may cause immediate or eventual damage to the tube. In some cases it may be necessary to shift the position of the focus magnet in order to eliminate a corner shadow.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS. — Adjustment of the horizontal drive control affects the high voltage applied to the kinescope. In order to obtain the highest possible voltage hence the brightest and best focused picture, adjust horizontal drive counter-clockwise as far as possible without stretching the left side of the picture. As a first adjustment, set the horizontal drive trimmer C143B one-half turn out from maximum capacity.

Turn the horizontal linearity coil out until appreciable loss in width occurs, then in until nearly maximum width and the best linearity is obtained.

Adjust the width control R178 to obtain correct picture width.

A slight readjustment of these three controls may be necessary to obtain the best linearity.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS. — Adjust the height control (R153 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R157 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

FOCUS. — Adjust the focus magnet for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

Recheck the position of the ion trap magnet to make sure that maximum brightness is obtained.

Check to see that the yoke thumbscrew and the focus magnet mounting screws are tight.

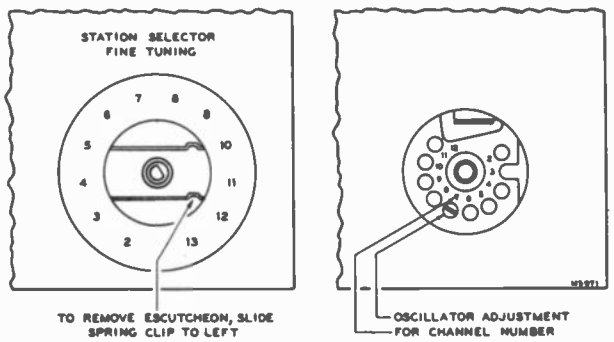


Figure 4—R-F Oscillator Adjustments

CHECK OF R-F OSCILLATOR ADJUSTMENTS. — Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 10. The adjustments for channels 2 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 4. Adjustment of channel 13 is on top of the chassis.

AGC CONTROL. — The AGC control switch is provided as an installation adjustment. The normal position for strong signal areas is with the switch in the number 1 or counter-clockwise position. If impulse type of interference is experienced, turn the switch to the number 2 or center position. In very weak signal areas in which impulse type interference is experienced, turn the switch to position number 3 or fully clockwise. In this position, all AGC is removed and the receiver will overload if the input signal exceeds 200 microvolts. However, for signals under 200 microvolts, this position of the AGC control switch gives best noise immunity of sync.

FM TRAP ADJUSTMENT. — In some instances interference may be encountered from a strong FM station signal. A trap is provided to eliminate this type of interference. To adjust the trap tune in the station on which the interference is observed and adjust the L203 core on top of the r-f unit for minimum interference in the picture.

CAUTION. — In some receivers, the FM trap L203 will tune down into channel 6 or even into channel 5. Needless to say, such an adjustment will cause greatly reduced sensitivity on these channels. If channels 5 or 6 are to be received, check L203 to make sure that it does not affect sensitivity on these two channels.

RADIO OPERATION. — Turn the receiver function switch to the AM position and check the radio for proper operation. In switching from radio to television or from television to radio, approximately 30 seconds warm-up time is required.

RECORD CHANGER OPERATION. — Turn the receiver function switch to each phono position and check each record player for proper operation.

Replace the cabinet back and make sure that the screws holding it are up tight, otherwise it may rattle or buzz when the receiver is operated at high volume.

CABINET ANTENNA. — A cabinet antenna is provided for use in strong signal areas in which no reflections are experienced. The leads from the antenna are brought out near the receiver antenna terminal board. To connect the cabinet antenna, attach the leads to the terminal board. If reception is satisfactory, no other antenna is necessary. However, if reception is unsatisfactory, it will be necessary to employ an outdoor antenna or an indoor antenna which can be oriented.

CHASSIS REMOVAL. — To remove the chassis for repair or installation of a new kinescope, remove the cabinet back and the control knobs, unplug the speaker cable, and remove the four chassis bolts under the cabinet. Withdraw the chassis from the back of the cabinet. The kinescope is held on the chassis by means of a special strap, so that the chassis and the kinescope can be handled together, as a unit.

To remove the kinescope, remove the kinescope socket, the ion-trap magnet, and the second-anode connector. Loosen the cross-recessed head screw on the kinescope strap. Withdraw the kinescope toward the front of the chassis.

INSTALLATION OF KINESCOPE. — The kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is toward the high-voltage compartment.

Insert the neck of the kinescope through the deflection yoke and focus magnet. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

Slide the kinescope cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten.

Slip the ion trap magnet assembly over the neck of the kinescope.

Connect the kinescope socket to the tube base.

Connect the high voltage lead to the kinescope second anode socket.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks.

To replace the chassis in the cabinet, first tighten the cross-recessed head screw on the kinescope strap. Slide the chassis into the cabinet, then insert and tighten the four chassis bolts. Loosen the kinescope strap from the rear of the cabinet. Push the kinescope forward until the face of the tube is against the mask. Push the yoke cushion forward against the kinescope flare, then tighten the cushion adjusting screws. Tighten the kinescope strap. Then replace the knobs, and the cabinet back.

VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition, a 2,500-microvolt test pattern signal was fed into the receiver, the picture synced and the AGC control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are read with "Senior VoltOhmyst" type WV97A between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c. The symbol < means less than.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6J6	Mixer	2500 Mu. V. Signal	2	135	—	—	7	0	5	−3.25	7.4	—	
			No Signal	2	130	—	—	7	0	5	−3.1	7.1	—	
V1	6J6	R-F Oscillator	2500 Mu. V Signal	1	119	—	—	7	0	6	*−4.16	4.83	—	*Depending upon channel
			No Signal	1	104	—	—	7	0	6	*−2.37	4.6	—	
V2	6AG5	R-F Amplifier	2500 Mu. V. Signal	5	243	6	173	2	<0.1	1	−4.45	0.44	0.13	
			No Signal	5	197	6	114	2	0.28	1	−0.31	8.6	2.35	
V101	6AU6	1st Pix. I-F Amplifier	2500 Mu. V. Signal	5	205	6	232	7	0.15	1	−5.8	1.32	0.52	
			No Signal	5	112	6	152	7	1.0	1	−0.6	6.8	2.8	
V102	6CB6	2nd Pix. I-F Amplifier	2500 Mu. V. Signal	5	192	6	205	2	0.5	1	−5.8	4.4	0.8	
			No Signal	5	118	6	122	2	1.38	1	−0.6	9.8	2.5	
V103	6AU6	3d Pix. I-F Amplifier	2500 Mu. V. Signal	5	190	6	226	7	0.2	1	−0.6	1.28	0.55	
			No Signal	5	85	6	145	7	1.8	1	0	6.5	2.98	
V104	6CB6	4th Pix. I-F Amplifier	2500 Mu. V. Signal	5	159	6	250	2	1.8	1	0	9.5	2.7	
			No Signal	5	166	6	248	2	1.62	1	0	0.42	2.4	
V105	6AL5	Picture 2d Det.	2500 Mu. V. Signal	2	−2.3	—	—	5	0	—	—	8.2	—	
			No Signal	2	−0.52	—	—	5	0	—	—	<0.1	—	
V105	6AL5	AGC Rectifier	2500 Mu. V. Signal	7	−9.0	—	—	1	6.0	—	—	0.12	—	
			No Signal	7	−2.45	—	—	1	5.5	—	—	<0.1	—	
V106	12AU7	1st Video Amplifier	2500 Mu. V. Signal	1	100	—	—	3	1.0	2	−2.4	3.8	—	At maximum contrast
			No Signal	1	48	—	—	3	0.7	2	−0.38	2.7	—	
			2500 Mu. V. Signal	1	180	—	—	3	9.1	2	−2.9	0.69	—	At minimum contrast
			No Signal	1	100	—	—	3	5.9	2	−0.38	0.6	—	
V106	12AU7	2d Video Amplifier	2500 Mu. V. Signal	6	221	—	—	8	1.68	7	−6.2	7.5	—	At maximum contrast
			No Signal	6	191	—	—	8	2.6	7	−1.0	11.1	—	
			2500 Mu. V. Signal	6	189	—	—	8	2.75	7	−2.6	12.5	—	At minimum contrast
			No Signal	6	188	—	—	8	2.69	7	−0.4	12.3	—	
V107	12AU7	D-C Rest. & Sync Sep.	2500 Mu. V. Signal	1	7.5	—	—	3	46	2	−4.6	<0.1	—	At maximum contrast
			No Signal	1	5.2	—	—	3	15	2	−1.0	<0.1	--	

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V107	12AU7	D-C Rest. & Sync Sep.	2500 Mu. V. Signal	6	8.6	—	—	8	58	7	0	—	—	At maximum contrast
			No Signal	6	8.2	—	—	8	14	7	0	—	—	
V108	14EP4	Kinescope	2500 Mu. V. Signal	Cap	*10,000	10	405	11	69	2	34	0.075	—	*Average Brightness
			No Signal	Cap	*10,000	10	405	11	40	2	9.5	0.04	—	*Average Brightness
V109A	6SN7	Sync. Amplifier	2500 Mu. V. Signal	5	70	—	—	6	10.2	4	8.6	—	—	
			No Signal	5	78	—	—	6	8.2	4	6.2	—	—	
V109B	6SN7GT	Vertical Oscillator	2500 Mu. V. Signal	2	132	—	—	3	0	1	−13.2	0.15	—	
			No Signal	2	132	—	—	3	0	1	−12	0.15	—	
V110	6AQ5	Vertical Output	2500 Mu. V. Signal	5	290	6	290	2	22	1	−0.5	13.9	1.20	
			No Signal	5	290	6	290	2	22	1	−0.5	13.8	1.20	
V111	6SN7 GT	Horizontal Osc. Control	2500 Mu. V. Signal	2	185	—	—	3	25.0	1	−2.0	.33	—	
			No Signal	2	181	—	—	3	16.3	1	−2.9	.31	—	
V111	6SN7 GT	Horizontal Oscillator	2500 Mu. V. Signal	5	161	—	—	6	0	4	−53	1.35	—	
			No Signal	5	158	—	—	6	0	4	−54	1.35	—	
V112	6AU5 GT	Horizontal Output	2500 Mu. V. Signal	5	*440	8	189	3	19.0	1	−8.0	77.0	11.2	*5000 volt pulse present
			No Signal	5	*435	8	185	3	18.6	1	−7.4	75.0	11.0	
V113	1B3GT /8018	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	*10,100	—	—	0.075	—	10,100 volt pulse present
			Brightness Average	Cap	*	—	—	2 & 7	*10,100	—	—	0.040	—	
V114	6W4 GT	Damper	2500 Mu. V. Signal	5	269	—	—	3	*430	—	—	88	—	*3000 volt pulse present
			No Signal	5	264	—	—	3	*429	—	—	87	—	
V115	6AU6	1st Sound I-F Amp.	2500 Mu. V. Signal	5	234	6	168	7	0.98	1	0	8.1	3.24	
			No Signal	5	231	6	165	7	0.95	1	0	7.9	3.30	
V116	6AU8	2d Sound I-F Amp.	2500 Mu. V. Signal	5	200	6	73	7	0	1	−0.45	3.73	1.37	
			No Signal	5	198	6	75	7	0	1	−0.53	3.64	1.28	
V117	6AL5	Sound Discrim.	2500 Mu. V. Signal	2	−0.6	—	—	5	0.1	—	—	--	—	
			No Signal	2	−1.52	—	—	5	1.5	—	—	--	—	
SR101		Rectifier	2500 Mu. V. Signal	—	0	—	—	—	141	—	—	226	—	
			No Signal	—	0	—	—	—	140	—	—	245	—	
SR102		Rectifier	2500 Mu. V. Signal	—	141	—	—	—	282	—	—	226	—	
			No Signal	—	140	—	—	—	280	—	—	245	—	

CHASSIS TOP VIEW

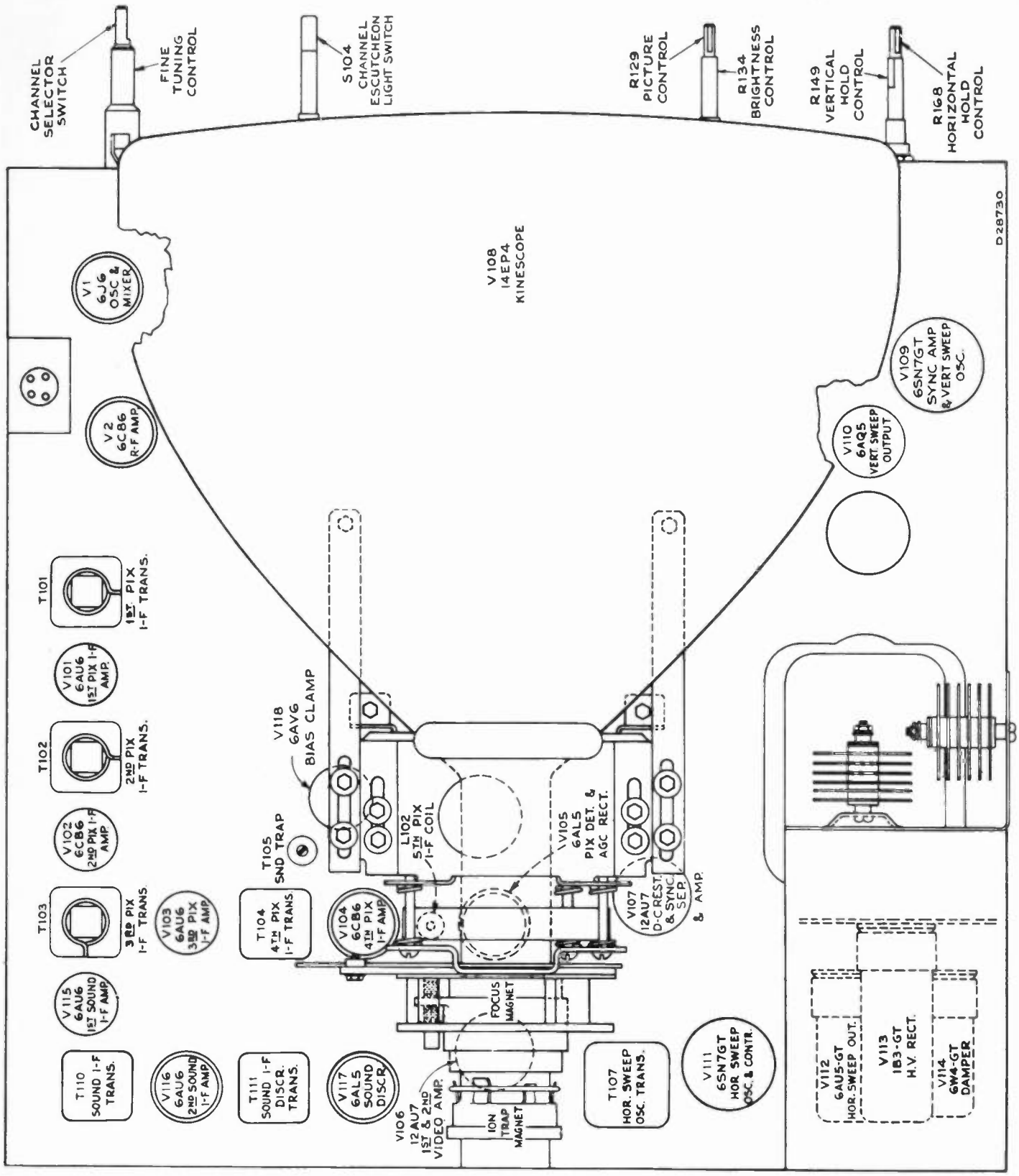


Figure 5—Chassis Top View

CHASSIS BOTTOM VIEW 4T141

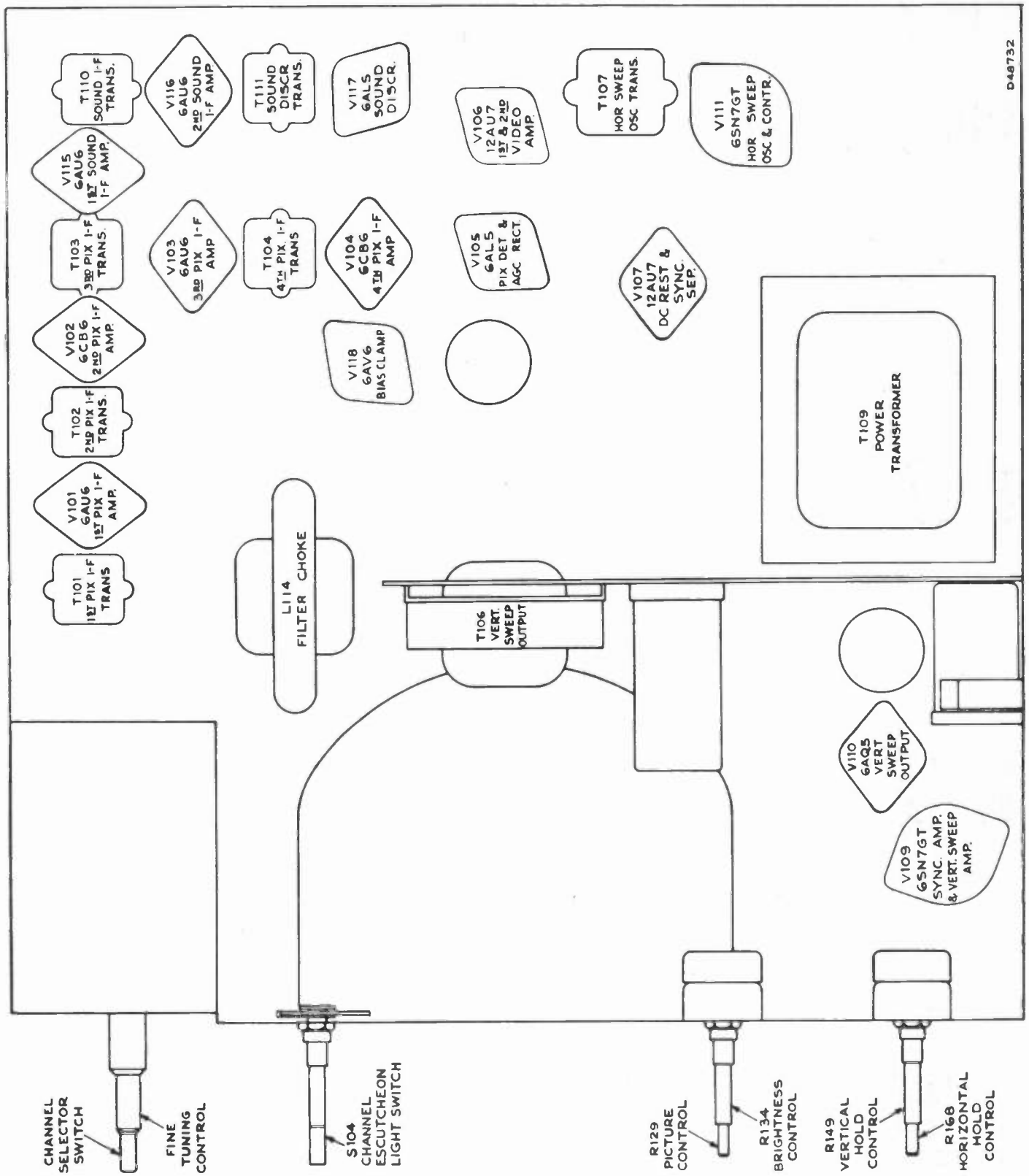


Figure 6—Chassis Bottom View

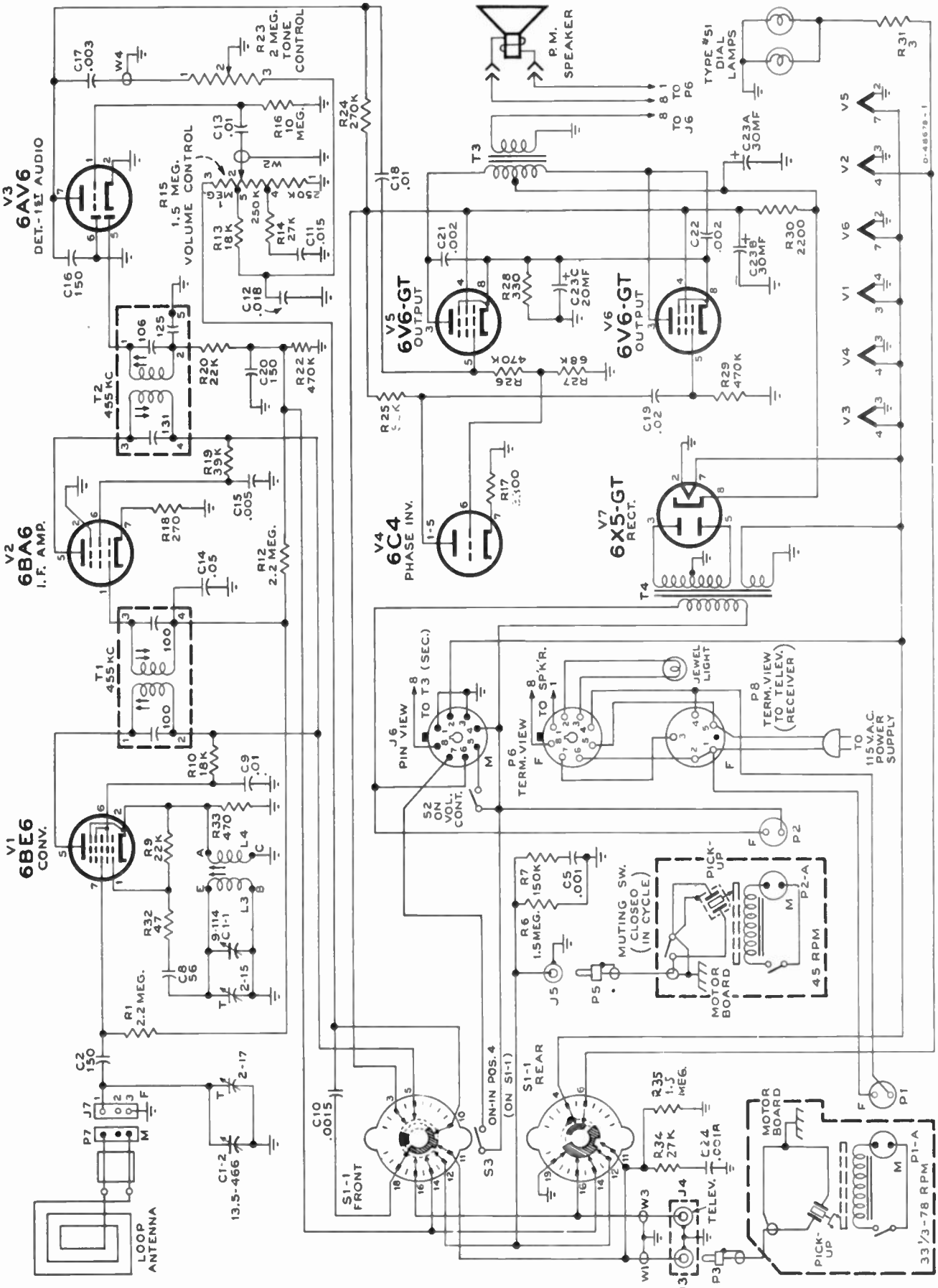


Figure 7—Radio Schematic Diagram

RADIO ALIGNMENT PROCEDURE

Test-Oscillator. — For all alignment operations, connect low side of the test-osc. to the receiver chassis, and keep the osc. output as low as possible to avoid a-v-c action. **Output Meter.** — Connect the meter across the speaker voice coil, and turn the receiver volume control to max. If any lead dressing is necessary, it should be done before aligning the receiver.

Steps	Connect the High Side of the Test Osc. to—	Tune Test Osc. to—	Function Switch	Turn Radio Dial to—	Adjust the following
1	Stator of C1-2 in series with .01 mfd.	455 kc. Modulated	AM	Low Freq. end of Dial	†Top and bot. cores of T1 and T2 (For max. voltage across voice coil.)
2	Short wire placed near loop for radiated signal	1,620 kc.	AM	Min. capacity	Osc. C1-1 for maximum output
3		1,400 kc.	AM	Tune to signal	Ant. C1-2 for maximum output
4		600 kc.	AM	600 kc.	††Osc. L3 for maximum output
5	Repeat steps 2, 3 and 4 for maximum output.				

†First peak T1 and T2 for maximum output. Then, starting with T2 use alternate loading. Connect a 47,000-ohm resistor across the primary to load the plate winding while the grid winding of the same transformer is being peaked. Then load the grid winding with the 47,000-ohm resistor while the plate winding is being peaked.
††"Rock" the gang condenser and adjust L3 for maximum output.

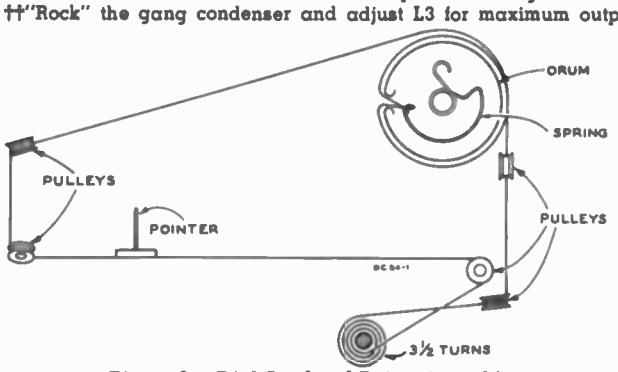


Figure 8—Dial Cord and Drive Assembly

CRITICAL LEAD DRESS

1. Dress all filament wiring down to the chassis and away from the audio coupling capacitors.
2. Dress the a-c power-switch leads away from all audio circuit components.
3. Dress all uninsulated bus wire so as to avoid short circuits.

VOLTAGE CHART

Tube	Type	Pin No.	Radio	Phono
V1	6BE6 Converter	Plate, Pin 5	208	—
		Screen, Pin 6	88	—
		Cathode, Pin 2	0	—
		Grid, Pin 7	–.77	—
V2	6BA6 I-F Amp.	Plate, Pin 5	208	—
		Screen, Pin 6	118	—
		Cathode, Pin 7	2.42	—
		Grid, Pin 1	–.68	—
V3	6AV6 Audio Amp.	Plate, Pin 7	84	94
		Grid, Pin 1	–.86	–.84
V4	6C4 Inverter	Plate, Pins 1 & 5	70	83
		Cathode, Pin 7	2.95	3.6
		Grid, Pin 6	.01	.04
V5 V6	6V6GT Audio Output	Plate, Pin 3	250	255
		Screen, Pin 4	208	250
		Cathode, Pin 8	13.1	17.3
		Grid, Pin 5	0	0
V7	6X5GT Rectifier	Cathode, Pin 8	255	260

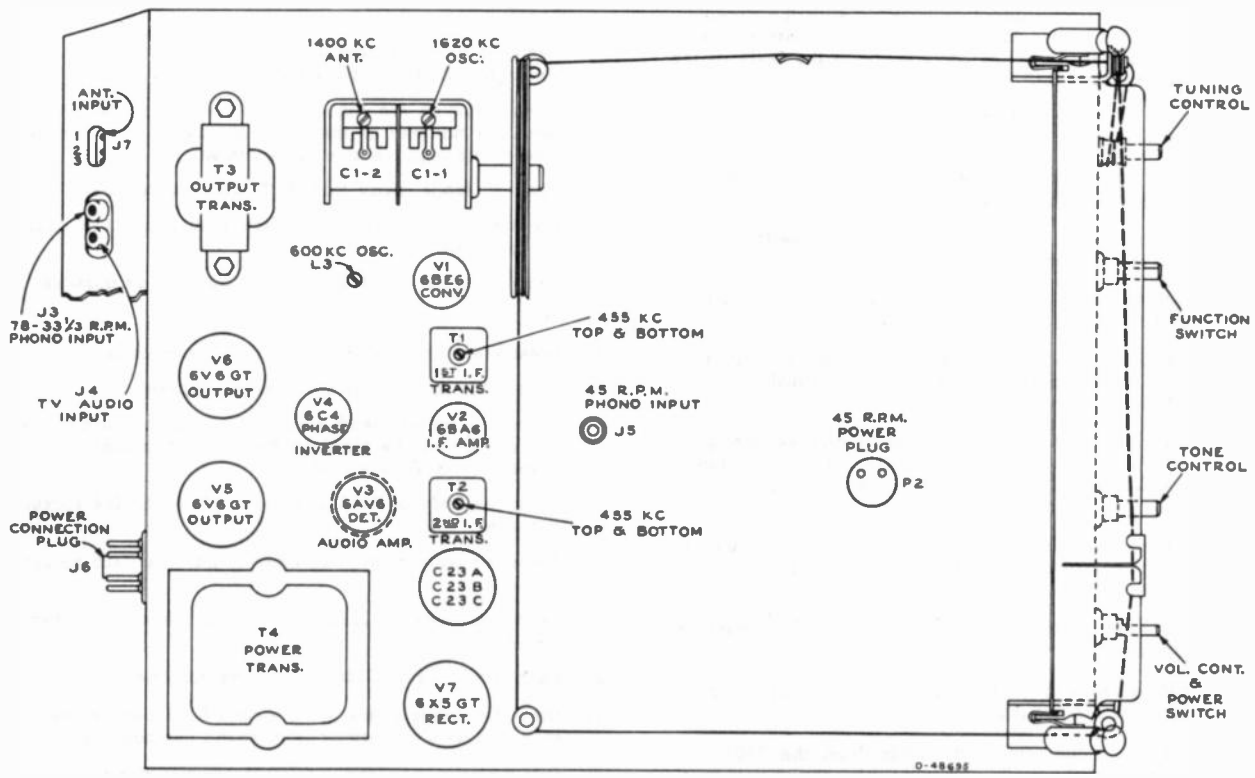


Figure 9—Chassis, Top View, Showing Adjustments

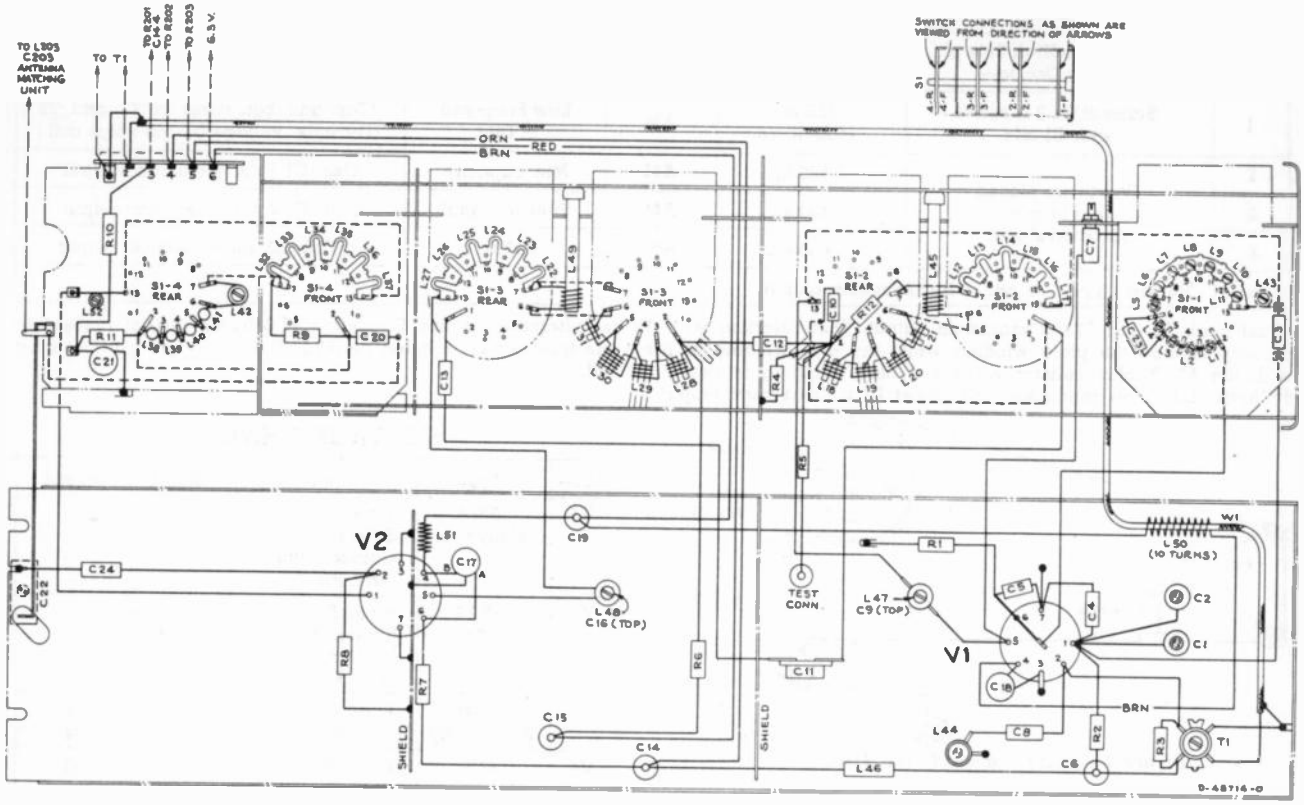


Figure 10—Television R-F Unit Wiring Diagram

TELEVISION CRITICAL LEAD DRESS

1. All leads in the picture and sound i-f circuits must be dressed as short and direct as possible with the exception of C107, C111 and C117 which are to be dressed with enough slack so as not to have to move the body of the capacitor to align that particular stage.
2. Dress the yellow lead from pin 3 of V106 socket up in the air and away from V105 socket.
3. Dress all components connected to V106 socket up and away from the chassis except L103.
4. Keep the body and coded end of L103 as close to pin 2 of V105 socket as possible.
5. Keep the bus from pin 5 of V105 socket to L102 as short as possible and employ sleeving to prevent shorting.
6. Dress the red lead from the kinescope socket away from V105 and V106 sockets and on the power transformer side of the terminal boards.
7. Dress the yellow lead from the kinescope socket along the rear apron between T107 and V111 socket, up between V107 socket and the power transformer to the terminal board.
8. The green lead from the kinescope socket should be dressed away from all other leads and components and away from V106.
9. Pin 7 of V116 socket should be soldered to the chassis as short as possible.
10. Dress the fuse in the high voltage compartment so as not to short circuit to ground.
11. Dress the two filament leads away from the T108 high voltage winding by pulling them up through the hole so as to have all slack on the transformer side of the insulating board.
12. Keep the V113 filament leads away from the metal side of the high voltage compartment shield.
13. Dress C158 on the high voltage rectifier socket so as to keep the hot end of the capacitor away from the metal side of the high voltage compartment.
14. Keep all leads away from R177 for heat reasons.
15. Dress R210 and R211 away from all components on account of their heat.
16. Keep the leads at C182 and C183 as short as possible.
17. Keep C133 dressed above leads.
18. Dress the body of C131 away from the chassis.
19. Keep C150 dressed away from the chassis.
20. Dress the orange lead from C160C on the power transformer side of the terminal boards and around the rear apron side of V106 socket.
21. Dress the body of R119 as close to pin 5 of V104 socket as possible.
22. Dress the body of R124 as close to pin 2 of V105 socket as possible.
23. Keep the leads of C122 and C125 as short and direct as possible.
24. Keep the leads at C126 as short as possible.
25. Dress the leads of the AGC switch S105 next to the base in the chassis and away from sound components.
26. Solder terminal on can of C160 to bracket along with C134.

TELEVISION CHASSIS WIRING DIAGRAM

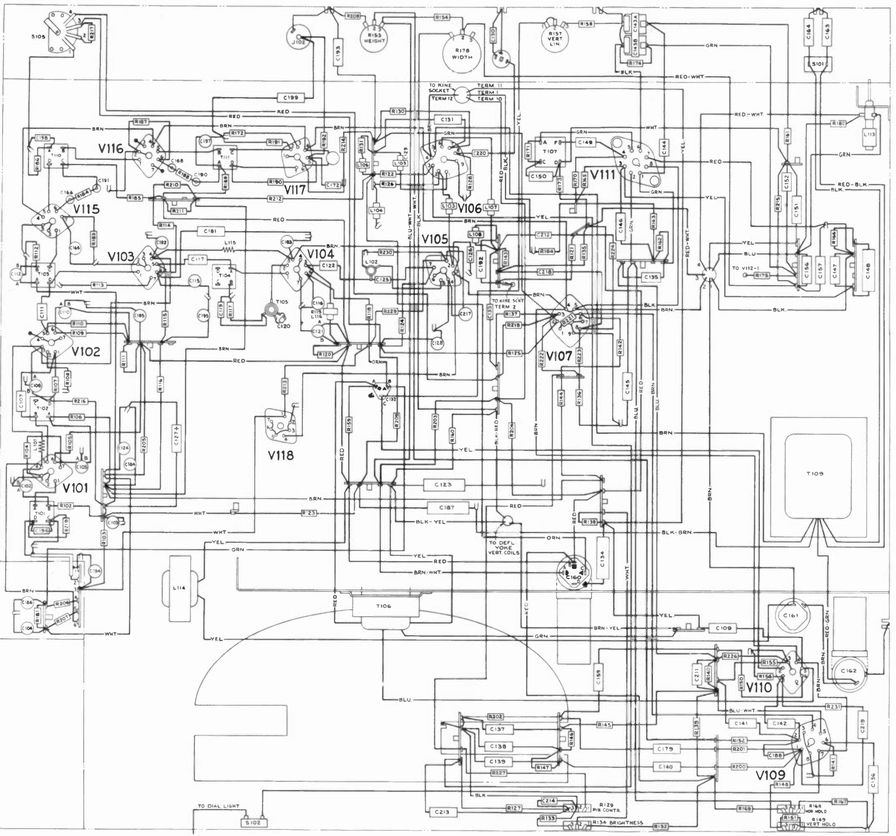
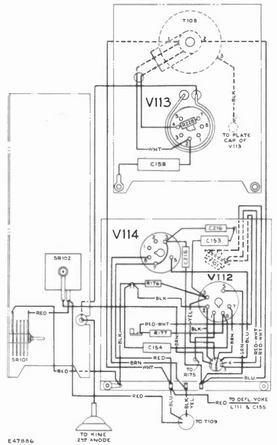
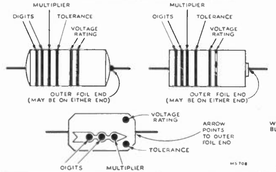


Figure 11—Chassis Wiring Diagram



COLOR CODES MOULDED PAPER CAPACITORS

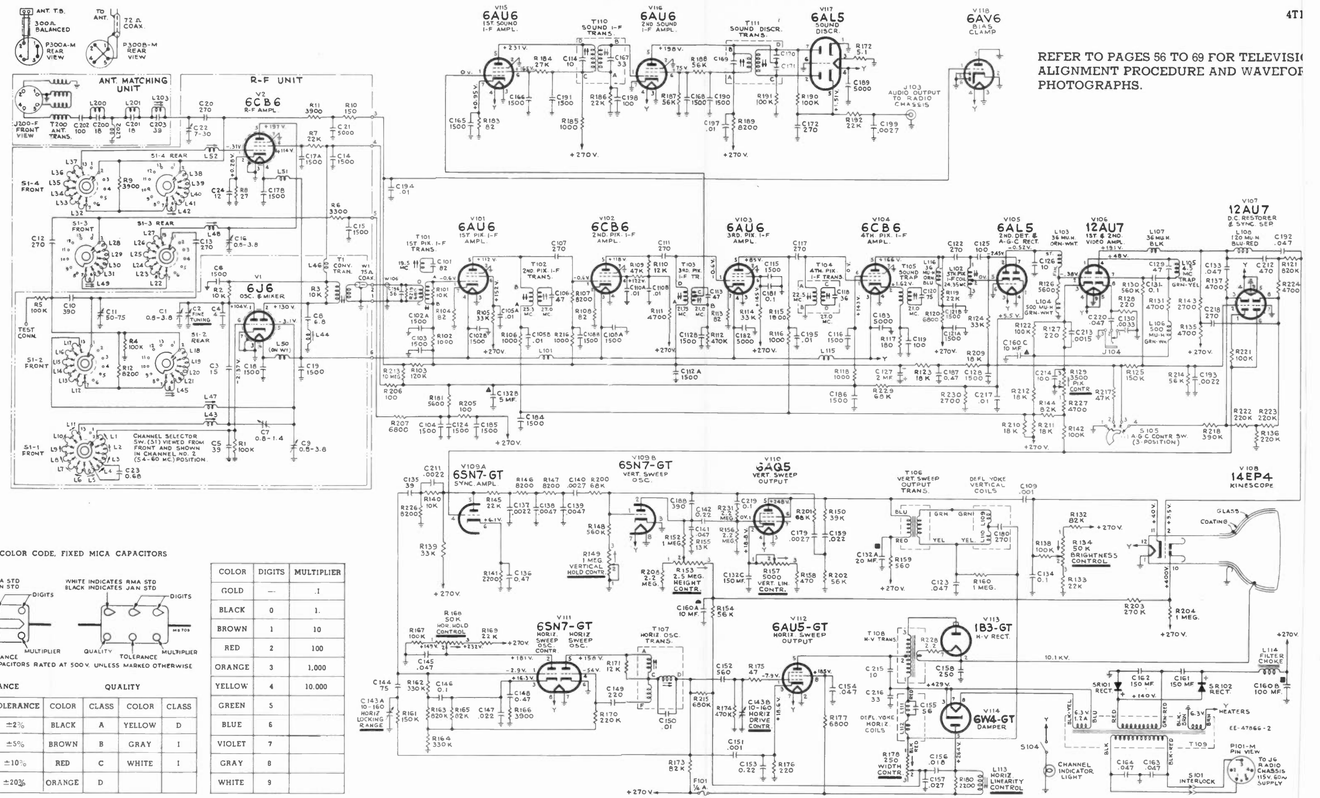


CAPACITY VALUE IN MMF		
COLOR	DIGITS	MULTIPLIER
BLACK	0	1
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

TOLERANCE	
COLOR	TOLERANCE
BLACK BAND OR NONE	±20%
WHITE OR SILVER	±10%
YELLOW OR GOLD	±5%

The Voltage Rating is given in hundreds of volts. Only one band is employed for ratings under 1,000 volts. Two bands are employed for ratings over 1,000 volts. Use digit column to read voltage rating.

TELEVISION CIRCUIT SCHEMATIC DIAGRAM



RMA COLOR CODE, FIXED MICA CAPACITORS

RMA FIXED MICA CAPACITORS RATED AT 500 V. UNLESS MARKED OTHERWISE

TOLERANCE		QUALITY			
COLOR	TOLERANCE	COLOR	CLASS	COLOR	CLASS
RED	±2%	BLACK	A	YELLOW	D
GREEN	±5%	BROWN	B	GRAY	I
SILVER	±10%	RED	C	WHITE	I
BLACK	±20%	ORANGE	D		

COLOR	DIGITS	MULTIPLIER
GOLD	—	.1
BLACK	0	1.
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

All resistance values in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

Direction of arrows at controls indicates clockwise rotation.

In some receivers, R213 was 4.7 meg and was connected from R-F unit terminal 3 to junction of R207 and C104. R103 was 33K, C217 was omitted, R229 and R230 were omitted and pin 1 of V105 was connected to ground. C130 was .0015 mfd, R135 was 6800. L117 (500 muh) and R225 (10K) were removed and replaced by R143. C218 was omitted.

In some receivers, R142 was 47K, R144 was 100K, R150 was 27K, R155 was 12K, R202 was 39K, R227 was 3300, C140 was .001 and C179 was .0047 mfd. R231 and C219 were omitted. R220, 100K connected between V107-1 and R142 was removed.

In some receivers, R179, 1 meg was employed as high voltage filter and was connected between V113-2 and the kinescope.

In some receivers, C220 was omitted and J104-2 was connected to V106-8.

In some receivers, R151, 2.2 meg was connected between R149-2 and ground.

In some receivers, R182, 100K was connected from S101 to ground.

REFER TO PAGES 56 TO 69 FOR TELEVISION ALIGNMENT PROCEDURE AND WAVEFORM PHOTOGRAPHS.

Figure 12—C Schematic Di

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLIES
	KK82C
75188	Board—Terminal board, 5 contact and ground
75067	Bracket—Vertical bracket for holding oscillator tube shield
75201	Cable—75 ohms, coax. cable (7¾") complete with coil (W1, L50)
75186	Capacitor—Ceramic, variable, for fine tuning—plunger type (C2)
75289	Capacitor—Ceramic, 4 mmf., ±0.5 mmf. (C4)
75189	Capacitor—Adjustable, 7-30 mmf. (C22)
75200	Capacitor—Ceramic, 12 mmf. (C24)
45465	Capacitor—Ceramic, 15 mmf. (C3)
75196	Capacitor—Ceramic, 39 mmf. (C5)
75176	Capacitor—Ceramic, trimmer, 50-75 mmf. (C11)
75199	Capacitor—Ceramic, 270 mmf. (C12, C13, C20)
75641	Capacitor—Ceramic, 390 mmf. (C10)
75166	Capacitor—Ceramic, 1500 mmf. (C6, C14, C15, C19)
75089	Capacitor—Ceramic, dual, 1500 mmf. (C17A, C17B)
73748	Capacitor—Ceramic, 1500 mmf. (C18)
73473	Capacitor—Ceramic, 5000 mmf. (C21)
75172	Capacitor—Tubular, steatite, adjustable, 0.65-1.2 mmf. (C7)
71504	Capacitor—Ceramic, 0.68 mmf. (C23)
75184	Capacitor—Ceramic, adjustable, 0.75-4 mmf., complete with adjusting stud (C1)
75197	Capacitor—Ceramic, 6.8 mmf. (C8)
75167	Clip—Tubular clip for mounting stand-off capacitors—RCA 75166
75182	Coil—Trimmer coil (1¼ turns) with adjustable inductance core and capacitor stud (screw adjustment) for converter section (C9, L47)
75183	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (screw adjustment) for r-f unit section (L48, C16)
75185	Coil—Converter plate loading coil (L44)
75202	Coil—Choke coil .56 muh (L46)
73477	Coil—Choke coil (L51)
75187	Core—Adjustable core for fine tuning capacitor C2
75162	Detent—Detent mechanism and fibre shaft
73453	Form—Coil form for L45 and L49
75165	Link—Link assembly for fine tuning
14343	Retainer—Fine tuning shaft retaining ring
	Resistor—Fixed, composition: —
503027	27 ohms, ±10%, ½ watt (R8)
504115	150 ohms, ±20%, ½ watt (R10)
502233	3300 ohms, ±10%, ½ watt (R6)
502282	8200 ohms, ±10%, ½ watt (R12)
3078	10,000 ohms, ±5%, ½ watt (R3)
504310	10,000 ohms, ±20%, ½ watt (R2)
503322	22,000 ohms, ±10%, ½ watt (R7)
504410	100,000 ohms, ±20%, ½ watt (R1, R4, R5)
75164	Rod—Actuating plunger rod (fibre) for fine tuning link
71476	Screw—2-40 x ¼" binder head machine screw for adjusting L5, L7, L8, L9, L10, L11
75176	Screw—2-40 x ¾" fillister head screw for adjusting L5
75177	Screw—2-40 x 5/16" fillister head screw for adjusting L1, L2, L3, L4, L43
74575	Screw—2-40 x .359" adjusting screw for L42
73640	Screw—2-40 x 7/16" adjusting screw for L52
76133	Shaft—Channel selector shaft and plate
76134	Shaft—Fine tuning shaft and cam
75168	Shield—Oscillator and converter sections shield for r-f unit—snap-on type
75193	Shield—Tube shield for V1
75192	Shield—Tube shield for V2
75088	Socket—Tube socket, 7 contact, miniature, ceramic, saddle mounted
75191	Spacer—Insulating spacer for front plate (4 req'd)
75163	Spring—Friction spring (formed) for fine tuning cam
75068	Spring—Retaining spring for oscillator tube shield
74578	Spring—Retaining spring for adjusting screws
73457	Spring—Return spring for fine tuning control
30340	Spring—Hair pin spring for fine tuning link
75175	Stator—Oscillator section stator complete with rotor, segment, coils, adjusting screws and capacitors C9 and C23 (S1-1, C2, C23, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L43)
75178	Stator—Converter stator complete with rotor, coils, capacitors (C10 and C12) and resistors (R4 and R5) (S1-2, C10, C12, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L45, R4, R5, R12)
75179	Stator—R-F amplifier stator complete with rotor, coils, capacitor (C13) and resistor (R6) (S1-3, C13, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L49, R6)
75180	Stator—Antenna stator complete with rotor, coils, capacitors (C20 and C21) and resistors (R9, R10, R11) (S1-4, C20, C21, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L52, R8, R10, R11)
75169	Strip—Coil segment mounting strip—RH center
75170	Strip—Coil segment mounting strip—LH lower
75171	Strip—Coil segment mounting strip—LH upper—less trimmer C7
75173	Stud—⅜-32 x 13/16" adjusting stud for C7 trimmer
75446	Stud—Capacitor stud—brass—⅜-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 uncoded and coded "ER"
75447	Stud—Capacitor stud—brass—⅜-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 coded numerically and "Hi Q"
75181	Transformer—Converter transformer (T1)
75190	Washer—Insulating washer (neoprene) for capacitor C7
73465	Washer—Insulating washer (round)
	CHASSIS ASSEMBLIES
	KC562
75235	Board—Hi-voltage shield terminal board (3 contact)
75228	Bracket—Focus magnet mounting bracket—upper
75229	Bracket—Focus magnet mounting bracket—bottom
53511	Capacitor—Ceramic, 10 mmf. (C126)
76294	Capacitor—Ceramic, 10 mmf., HV (C215)
75217	Capacitor—Mica trimmer dual 10-160 mmf. (C142A, C142B)
76295	Capacitor—Ceramic, 33 mmf., HV (C216)
75450	Capacitor—Ceramic, 39 mmf. (C203)
74725	Capacitor—Ceramic, 100 mmf. (C135)
71924	Capacitor—Ceramic, 56 mmf. (C196)
75247	Capacitor—Mica, 75 mmf. (C144)
75437	Capacitor—Ceramic, 100 mmf. (C202)
45469	Capacitor—Ceramic, 100 mmf. (C119)
39396	Capacitor—Ceramic, 100 mmf. (C125, C198, C214)
73248	Capacitor—Mica, 220 mmf. (C149)
75244	Capacitor—Ceramic, 270 mmf. (C172)
73091	Capacitor—Mica, 270 mmf. (C107, C111, C117, C122)
76303	Capacitor—Ceramic, 270 mmf. (C218)
73094	Capacitor—Mica, 330 mmf. (C188)
75198	Capacitor—Ceramic, 470 mmf. (C212)
74250	Capacitor—Ceramic—Mica, 560 mmf. (C152)
75166	Capacitor—Ceramic, 1500 mmf. (stand-off type) (C166, C168, C190, C191)
75089	Capacitor—Ceramic, dual, 1500 mmf. (C102A, C102B, C108A, C108B, C122A, C122B, C121A, C121B)
73748	Capacitor—Ceramic, 1500 mmf. (C103, C104, C115, C116, C124, C128, C165, C184, C185, C186)
73473	Capacitor—Ceramic, 5000 mmf. (C182, C183, C189)
75877	Capacitor—Ceramic, dual 10,000 mmf. (C105A, C105B, C110A, C110B)
73960	Capacitor—Ceramic, 10,000 mmf. (C194, C195, C197, C217)
73747	Capacitor—Electrolytic, 2 mfd, 50 volts (C127)
75219	Capacitor—Electrolytic, comprising 1 section of 10 mfd, 450 volts, 1 section of 100 mfd, 350 volts, 1 section of 10 mfd, 350 volts and 1 section of 20 mfd, 25 volts (C160A, C160B, C160C)
76142	Capacitor—Electrolytic, comprising 1 section of 20 mfd, 350 volts, 1 section of 5 mfd, 350 volts and 1 section of 150 mfd, 50 volts (C122A, C122B, C123C)
75220	Capacitor—Electrolytic, 150 mfd, 200 volts (C161, C162)

STOCK No.	DESCRIPTION
75250	Capacitor—Tubular, moulded paper, oil impregnated, .00025 mfd, 12,500 volts (C158)
75249	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd, 600 volts (C151)
75344	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd, 1000 volts (C109)
73598	Capacitor—Tubular, paper, oil impregnated, .0015 mfd, 600 volts (C213)
73595	Capacitor—Tubular, paper, oil impregnated, .0022 mfd, 600 volts (C137, C193, C211)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd, 600 volts (C136, C159)
73594	Capacitor—Tubular, moulded paper, oil impregnated, .01 mfd, 600 volts (C150)
74727	Capacitor—Tubular, moulded paper, oil impregnated, .018 mfd, 1000 volts (C156)
73562	Capacitor—Tubular, paper, oil impregnated, .022 mfd, 400 volts (C147)
73798	Capacitor—Tubular, paper, oil impregnated, .022 mfd, 600 volts (C159)
73599	Capacitor—Tubular, paper, oil impregnated, .0027 mfd, 600 volts (C140, C179, C195)
73811	Capacitor—Tubular, moulded paper, oil impregnated, .027 mfd, 1000 volts (C157)
73795	Capacitor—Tubular, paper, oil impregnated, .0033 mfd., 600 volts (C130)
75071	Capacitor—Tubular, moulded paper, .047 mfd, 400 volts (C163, C164)
73553	Stud—Capacitor stud—brass—⅜-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 uncoded and coded "ER"
73592	Capacitor—Tubular, paper, oil impregnated, .047 mfd, 400 volts (C141)
73597	Capacitor—Tubular, paper, oil impregnated, .047 mfd, 1000 volts (C123, C154)
73551	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd, 400 volts (C131, C134, C146, C181, C219)
73560	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd, 200 volts (C153)
74957	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd, 600 volts (C142)
73787	Capacitor—Tubular, paper, oil impregnated, 0.47 mfd, 200 volts (C145, C148, C187)
76140	Choke—Filter choke (L114)
76143	Clip—Tubular clip for mounting stand-off capacitor 75166
75224	Clip—Mounting clip for electrolytic #75220
76150	Clip—Anchor clip for ground braid
75210	Coil—Fifth pix. i-f coil complete with adjustable core (L102)
71449	Coil—Horizontal linearity coil (L113)
75241	Coil—Antenna shunt coil (L202)
73591	Coil—Antenna matching coil (req'd) (Part of T200)
73477	Coil—Filament choke coil (L101, L115)
71793	Coil—Peaking coil (36 muh) (L107)
75299	Coil—Peaking coil (36 muh) (L103)
	Coil—Peaking coil (36 muh) (L116, R119)
75253	Coil—Peaking coil (120 muh) (L108)
75252	Coil—Peaking coil (500 muh) (L104, L106)
33787	Connector—Single contact audio output connector (J103)
74594	Connector—2 contact male connector for power cable
38853	Connector—4 contact female connector for antenna transformer (J200)
71789	Connector—Anode connector
75215	Control—Horizontal and vertical hold control (R149, R168)
75216	Control—Picture and brightness control (R129, R134)
71441	Control—Vertical linearity control (R157)
71440	Control—Height control (R153)
74945	Control—Width control (R178)
71498	Core—Adjustable core and stud for F-M trap #75449
72772	Cover—Insulating cover for electrolytic #75220
74956	Cushion—Rubber cushion for deflection yoke hood (2 req'd)
74829	Fastener—Push fastener to mount ceramic tube socket (2 req'd)
73600	Fuse—6.25 amp., 250 volts (F101)
37396	Grommet—Rubber grommet to mount ceramic tube socket
76058	Grommet—Rubber grommet for 2cd anode lead exit
76138	Hood—Deflection yoke hood complete with cushions
75482	Jack—Video jack (J104)
76137	Magnet—Focus magnet complete with adjustable plate and stud
76141	Magnet—Ion trap magnet
76144	Pad—Rubber pad for kinescope mounting strap (bottom) (4 req'd)
18469	Plate—Bakelite mounting plate for electrolytic #75220
76153	Plate—Hi-voltage transformer mounting plate (bakelite) complete with tube socket less transformer
75221	Rectifier—Selenium rectifier (SR101, SR102)
72066	Resistor—Wire wound, 2.2 ohms, 1/3 watt (R228)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R172)
76410	Resistor—Wire wound, 220 ohms, 4 watts (R176)
76390	Resistor—Wire wound, 5600 ohms, 5 watts (R181)
	Resistor—Fixed, composition: —
504047	47 ohms, ±20%, ½ watt (R175)
503082	82 ohms, ±10%, ½ watt (R104, R108, R113, R183)
504110	100 ohms, ±20%, ½ watt (R205, R206)
503118	180 ohms, ±10%, ½ watt (R154)
503122	220 ohms, ±10%, ½ watt (R127, R128)
504147	470 ohms, ±20%, ½ watt (R158)
503156	560 ohms, ±10%, ½ watt (R159)
503168	680 ohms, ±10%, ½ watt (R219)
504210	1000 ohms, ±20%, ½ watt (R102, R106, R116, R118, R185, R216)
503218	1800 ohms, ±10%, ½ watt (R115)
504222	2200 ohms, ±20%, ½ watt (R141)
514222	2200 ohms, ±20%, 1 watt (R180)
503227	2700 ohms, ±10%, ½ watt (R143, R230)
503239	3900 ohms, ±10%, ½ watt (R166)
30494	4700 ohms, ±5%, ½ watt (R131)
503247	4700 ohms, ±10%, ½ watt (R137, R224, R227)
513247	4700 ohms, ±10%, 1 watt (R111)
523247	4700 ohms, ±10%, 2 watts (R135)
30734	5600 ohms, ±5%, ½ watt (R126)
512338	6800 ohms, ±10%, 1 watt (R120)
523268	6800 ohms, ±10%, 2 watts (R177, R207)
14250	8200 ohms, ±5%, ½ watt (R107)
502282	8200 ohms, ±10%, ½ watt (R146, R147, R189, R226)
503310	10,000 ohms, ±10%, ½ watt (R140)
30436	12,000 ohms, ±5%, ½ watt (R171)
30866	12,000 ohms, ±5%, 1 watt (R110)
502313	13,000 ohms, ±5%, ½ watt (R155)
503318	18,000 ohms, ±10%, ½ watt (R123, R209)
513318	18,000 ohms, ±10%, 1 watt (R212)
523318	18,000 ohms, ±10%, 2 watts (R210, R211)
503322	22,000 ohms, ±10%, ½ watt (R133, R145, R186)
504322	22,000 ohms, ±20%, ½ watt (R192)
513322	22,000 ohms, ±10%, 1 watt (R169)
503327	27,000 ohms, ±10%, ½ watt (R184)
503333	33,000 ohms, ±10%, ½ watt (R105)
504333	33,000 ohms, ±20%, ½ watt (R114, R124)
523333	33,000 ohms, ±10%, 2 watts (R139)
513339	39,000 ohms, ±10%, 1 watt (R150)
503347	47,000 ohms, ±10%, ½ watt (R217)
504347	47,000 ohms, ±20%, ½ watt (R109)
503356	56,000 ohms, ±10%, ½ watt (R154, R187, R183, R214)
513356	56,000 ohms, ±10%, 1 watt (R202)
503368	68,000 ohms, ±20%, ½ watt (R200, R201)
503368	68,000 ohms, ±10%, ½ watt (R229)
503382	82,000 ohms, ±10%, ½ watt (R132, R144)
513382	82,000 ohms, ±10%, 1 watt (R165, R173)
3252	100,000 ohms, ±5%, ½ watt (R190, R191)
504410	100,000 ohms, ±10%, ½ watt (R138, R142, R221)
513410	100,000 ohms, ±10%, 1 watt (R122, R167)
503412	120,000 ohms, ±10%, ½ watt (R103)
503415	150,000 ohms, ±10%, ½ watt (R161)
504415	150,000 ohms, ±20%, ½ watt (R125)
503422	220,000 ohms, ±10%, ½ watt (R136, R222, R223)
54449	220,000 ohms, ±5%, 1 watt (R170)
503427	270,000 ohms, ±10%, ½ watt (R203)
503433	330,000 ohms, ±5%, ½ watt (R162)
38892	330,000 ohms, ±5%, 1 watt (R164)
503439	390,000 ohms, ±10%, ½ watt (R218)
503447	470,000 ohms, ±10%, ½ watt (R174)
504447	470,000 ohms, ±20%, ½ watt (R112)
503456	560,000 ohms, ±10%, ½ watt (R130, R148)
503468	Resistor—680,000 ohms, ±10%, ½ watt (R215)
503482	820,000 ohms, ±10%, ½ watt (R121, R163)
503510	1 megohm, ±10%, ½ watt (R152, R204)

STOCK No.	DESCRIPTION
504510	1 megohm, ±20%, ½ watt (R160)
503522	2.2 megohm, ±10%, ½ watt (R156)
504522	2.2 megohm, ±20%, ½ watt (R208, R231)
503610	10 megohm, ±10%, ½ watt (R213)
76151	Screw—#10-32 x 1" hex head screw to fasten kinescope retaining straps
75083	Screw—#8-32 x 5/16" wing screw for mounting deflection yoke
76152	Screw—#10-32 x 1½" cross recessed round head screw for focus magnet adjustment (3 req'd)
75236	Screw—#8-32 x ¾" cross recessed binder head screw for focus magnet mounting (2 req'd)
73721	Shield—Tube shield for V105, V117
73584	Shield—Tube shield for V104, V116
76147	Shield—R-F unit shield
73117	Socket—Tube socket, 7 pin, miniature
75222	Socket—Tube socket, octal, ceramic, plate mounted
75223	Socket—Tube socket, 9 pin, miniature
31251	Socket—Tube socket, octal, wafer
60942	Socket—Tube socket, 6 contact, steatite
71508	Socket—Tube socket, 6 contact, moulded
74834	Socket—Kinescope socket
75718	Socket—Channel indicator lamp socket
74936	Spring—Suspension spring for kinescope leads
76148	Spring—Compression spring for focus magnet adjustment (3 req'd)
76149	Spring—Suspension spring for 2nd anode lead
74038	Spring—Tension strap for ground braid
76145	Strap—Kinescope retaining strap—upper
76636	Stud—Adjusting stud complete with guard for focus magnet
75590	Switch—Channel indicator light switch (S104)
76010	Switch—AGC switch (S105)
75207	Transformer—Power transformer, 117 volt, 60 cycle (T109)
76139	Transformer—Vertical output transformer (T106)
74589	Transformer—First pix. i-f transformer (T101, C101, R101)
74590	Transformer—Second pix. i-f transformer (T102, C106)
76264	Transformer—Third pix. i-f transformer (T103, C113)
73574	Transformer—Fourth pix. i-f transformer (T104, C118)
71424	Transformer—Sound i-f transformer (T110, C114, C167)
75213	Transformer—Sound discriminator transformer (T111, C169, C170, C171)
75213	Transformer—Horizontal oscillator transformer (T107)
75214	Transformer—Antenna matching transformer complete with connector, i-f and F-M traps and antenna shunt coil (T200, C200, C201, C202, C203, J200, L200, L201, L202, L203)
76154	Transformer—Hi-voltage transformer (T108)
71778	Trap—Sound trap (T105, C120)
75242	Trap—i-f trap (L200, L201, C200, C201)
75449	Trap—FM trap complete with adjustable core and stud (L202, C202)
75251	Trap—4.5 mc trap (L105, C129)
75451	Tuning—Insulated tubing for rotating deflection yoke (23")
76136	Yoke—Deflection yoke (L109, L110, L111, L112, C155, C180)
	RADIO CHASSIS ASSEMBLIES
	RC1000
75541	Bracket—Pulley bracket complete with drive cord pulley
75534	Capacitor—Variable tuning capacitor complete with drive drum (C1-1, C1-2)
71924	Capacitor—Tubular, 56 mmf. (C8)
39632	Capacitor—Mica, 150 mmf. (C2, C16, C20)
73372	Capacitor—Electrolytic comprising 1 section of 20 mfd, 350 volts, 1 section of 20 mfd, 350 volts and 1 section of 20 mfd, 25 volts (C23A, C23B, C23C)
73801	Capacitor—Tubular, paper, .001 mfd, 400 volts (C5)
71394	Capacitor—Tubular, paper, .0015 mfd, 600 volts (C10)
73851	Capacitor—Tubular, paper, oil impregnated, .0018 mfd, 1000 volts (C24)
72803	Capacitor—Tubular, paper, .002 mfd, 1000 volts (C21, C22)
70803	Capacitor—Tubular, paper, .003 mfd, 400 volts (C17)
73920	Capacitor—Tubular, paper, .005 mfd, 400 volts (C15)
73561	Capacitor—Tubular, paper, .01 mfd, 400 volts (C9, C12, C18)
73797	Capacitor—Tubular, paper, .015 mfd, 400 volts (C11)
58476	Capacitor—Tubular, paper, oil impregnated, .018 mfd, 200 volts (C12)
73562	Capacitor—Tubular, paper, .02 mfd, 400 volts (C19)
73553	Capacitor—Tubular, paper, .05 mfd, 400 volts (C14)
75627	Clip—Clip for main cable—on rear apron of chassis
73935	Clip—Mounting clip for i-f transformer
75485	Coil—Oscillator coil complete with adjustable core and stud (L3, L4)
35787	Connector—Single contact female connector for 45 RPM pick-up cable (J5)
75542	Connector—8 contact male connector for power input cable (J6)
75542	Connector—2 contact female connector for 45 RPM changer (P2)
74879	Connector—2 contact (polarized) female connector for antenna leads (J7)
33514	Connector—Dual two contact female connector for 33/78 RPM pick-up cable and television cable (J3, J4)
75537	Control—Volume control and power switch (R15, S2)
75538	Control—Tone control (R23)
72953	Cord—Drive cord (approx. 60" overall)
75547	Grommet—Rubber grommet to mount slides to bottom—rear (2 req'd)
75548	Grommet—Rubber grommet to mount slides to bottom—front (2 req'd)
11765	Lamp—Dial lamp—Mazda 51
75544	Nut—Rivnut to fasten screw for mounting chassis (4 req'd)
75535	Plate—Dial back plate complete with three (3) pulleys
75536	Pointer—Station selector pointer
72602	Pulley—Drive cord pulley
72323	Resistor—Wire wound, 2 ohms, ½ watt (R31)
73637	Resistor—Wire wound, 1200 ohms, 5 watts (R30)
	Resistor—Fixed composition: —
504047	47 ohms, ±20%, ½ watt (R32)
503127	270 ohms, ±10%, ½ watt (R18)
513133	330 ohms, ±10%, 1 watt (R28)
504147	470 ohms, ±20%, ½ watt (R33)
30733	3300 ohms, ±5%, ½ watt (R17)
503318	18,000 ohms, ±10%, ½ watt (R13)
513318	18,000 ohms, ±10%, 1 watt (R12)
503322	22,000 ohms, ±10%, ½ watt (R9, R20)
503327	27,000 ohms, ±10%, ½ watt (R14, R34)
503339	39,000 ohms, ±10%, ½ watt (R19)
503368	68,000 ohms, ±10%, ½ watt (R27)
503382	82,000 ohms, ±10%, ½ watt (R25)
503415	150,000 ohms, ±10%, ½ watt (R7)
503427	270,000 ohms, ±10%, ½ watt (R24)
503447	470,000 ohms, ±10%, ½ watt (R22, R26, R29)
503515	1.5 megohm, ±10%, ½ watt (R6, R35)
504522	2.2 megohm, ±20%, ½ watt (R1, R12)
X3144	10 megohm, ±20%, ½ watt (R16)
X3089	Shaft—Tuning knob shaft
73584	Shield—Tube shield
75546	Slide—Slide mechanism complete for radio chassis bottom
31251	Socket—Tube socket, octal, wafer
73117	Socket—Tube socket, 7 pin, miniature
31364	Socket—Dial lamp socket
76332	Spring—Drive cord tension spring
75539	Switch—Function switch (S1, S3)
75486	Transformer—First i-f transformer (T1)
75487	Transformer—Second i-f transformer (T2)
73636	Transformer—Output transformer (T3)
70127	Transformer—Power transformer, 117 volt, 60 cycle (T4)
32726	Washer—"C" washer for tuning knob shaft
	RADIO ROLLOUT CARRIAGE
	RK156
76163	Button—Plug button—maroon—for mounting frame for mahogany or walnut instruments
76164	Button—Plug button—light brown—for mounting frame for oak instruments
75552	Decal—Function decal for radio controls
75550	Dial—Polystyrene dial scale
76161	Frame—Moulded frame—maroon—for mounting radio chassis and 45 RPM changer for mahogany or walnut instruments

STOCK No.	DESCRIPTION
76162	Frame—Moulded frame—light brown—for mounting radio chassis and 45 RPM changer for oak instruments
75551	Handle—Metal pull-out handle for mounting frame
75555	Screw—#8-32 x ¾" cross-recessed pan head screw to mount radio chassis
	SPEAKER ASSEMBLIES
	92569-9W
	RL111-14
	RMA-274
13867	Cap—Dust cap
74901	Cone—Cone and voice coil assembly (3.2 ohms)
74974	Speaker—12" P.M. speaker complete with cone and voice coil
	SPEAKER ASSEMBLIES
	92569-9B
75875	Cone—Cone and voice coil assembly (3.2 ohms) Note:—If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
75706	Antenna—Radio antenna loop complete less cable
76158	Back—Back cover—maroon—for radio—45 RPM compartment for mahogany or walnut instruments—assembled to rollout
76159	Back—Back cover—light brown—for radio—45 RPM compartment for oak instrument—assembled to rollout
75798	Back—Back cover—maroon—for 33⅓/78 RPM phono compartment for mahogany or walnut instruments—assembled to rollout
75799	Back—Back cover—light brown—for 33⅓/78 RPM phono compartment for oak instruments—assembled to rollout
76160	Back—Television chassis back cover complete with power cord and terminal board
76184	Board—Television antenna terminal board (2 contact)
75694	Bracket—Rollout mechanisms stop bracket less rubber cushion
71599	Bracket—Pilot lamp bracket
75696	Bumper—Rubber bumper for rollout mechanism stop bracket
72447	Cable—Shielded audio cable complete with two (2) pin plugs
72437	Cable—Shielded pickup cable complete with pin plug for 45 RPM changer (P3)
74296	Cable—Shielded pickup cable complete with pin plug for 33⅓/78 RPM changer (P3)
13103	Cap—Pilot lamp cap
71892	Catch—Bullet catch and strike for cabinet doors
X3144	Cloth—Grille cloth for mahogany or walnut instruments
X3089	Cloth—Grille cloth for oak instruments
30870	Connector—2 contact male connector for AC power cable (2 for 45 RPM changer (P2A)
75703	Connector—5 contact male connector less shell for television power cord (P101)
39153	Connector—4 contact male connector for TV antenna cable
75474	Connector—Single contact male connector for TV antenna cable (2 req'd)
74882	Connector—2 contact (polarized) male connector for radio antenna loop cable (P7)
75709	Connector—8 contact female connector less shell for main cable (P6)
75710	Connector—5 contact female connector less shell for main cable (P8)
30868	Connector—2 contact female connector for main cable (P1)
75474	Connector—Single contact male connector for speaker (2 req'd)
75702	Cord—Television power cord complete with two (2) contact female connector less five (5) contact male connector
70092	Cord—Power cord and plug
76167	Cushion—Vinylite cushion for masking panel
75640	Decal—Control function decal for mahogany or walnut instruments
75680	Decal—Control function decal for oak instruments
71884	Decal—Trade mark decal (RCA Victor)
74273	Decal—Trade mark decal (Victrola)
74809	Emblem—"RCA Victor" emblem
75455	Escutcheon—Channel marker escutcheon—dark—for mahogany or walnut instruments
75456	Escutcheon—Channel marker escutcheon—light—for oak instruments
75889	Glass—Safety glass
37395	Grommet—Rubber grommet for speaker mounting (4 req'd)
74838	Grommet—Power cord strain relief (1 set)
75597	Grommet—Rubber grommet for mounting 45 RPM changer (3 req'd)
75551	Handle—Metal pullout handle for 33⅓/78 RPM changer mounting frame
74308	Hinge—Cabinet door hinge (1 set)
74959	Knob—Television fine tuning control knob—maroon—for mahogany or walnut instruments (outer)
73995	Knob—Television fine tuning knob—tan—for oak instruments (outer)
72996	Knob—Television channel selector knob—maroon—for mahogany or walnut instruments (inner)
73997	Knob—Television channel selector knob—tan—for oak instruments (inner)
74962	Knob—Television brightness control or television vertical hold control knob—maroon—for mahogany or walnut instruments (outer)
73379	Knob—Television brightness control or television vertical hold control knob—tan—for oak instruments (outer)
74959	Knob—Television channel marker light switch knob—maroon—for mahogany or walnut instruments
74003	Knob—Television channel marker light switch knob—tan—for oak instruments
74963	Knob—Television picture control or television horizontal hold control knob—maroon—for mahogany or walnut instruments (inner)
74001	Knob—Television picture control or television horizontal hold knob—tan—for oak instruments
73712	Knob—Radio tone control, tuning control or volume control and power switch knob—maroon—for mahogany or walnut instruments
75713	Knob—Radio tone control, tuning control or volume control and power switch knob—tan—for oak instruments
75714	Knob—Function switch knob—maroon—for mahogany or walnut instruments
75157	Knob—Function switch knob—tan—for oak instruments
11765	Lamp—Pilot lamp—for channel indicator lamp—Mazda 51
75460	Mask—Channel indicator light mask—gold—for oak instruments
75459	Mask—Channel indicator light mask—burgundy—for mahogany or walnut instruments
76166	Mask—Polystyrene masking panel
73034	Nut—Speed nut for speaker mounting screws
75888	Pull—Door pull
74269	Screw—#8-32 x ¾" trimit head screw for door pull
75704	Shell—Shell for 5 contact male connector #75703
75708	Shell—Shell for 8 contact female connector #75709
75711	Shell—Shell for 5 contact female connector #75710
75546	Slide—33⅓/78 RPM changer frame slide mechanism (2 req'd)
31364	Socket—Pilot lamp socket
72845	Spring—Retaining spring for knobs #73995 & 74959
14270	Spring—Retaining spring for knobs #73996, 73997, 73999, 74003, 74962 & 74963
30330	Spring—Retaining spring for knobs #74001 & 74963
74734	Spring—Retaining spring for knobs #75712, 75713, 75714 & 75715
73643	Spring—Spring clip for channel marker escutcheon
75691	Spring—Suspension spring (coil type) for main cable
72936	Stop—Cabinet door stop
75457	Washer—Felt washer—dark brown—between knob and channel marker escutcheon for mahogany or walnut instruments
75523	Washer—Felt washer—tan—between knob and channel marker escutcheon for oak instruments

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Model 7T103 "Newport"
Mahogany Finish Metal

Model 7T104 "Kent"
Mahogany Finish Metal →

Model 7T111B "Haywood"
Walnut, Mahogany, Limed Oak

Model 7T112 "Highland"
Walnut, Mahogany, Limed Oak

RCA VICTOR
TELEVISION RECEIVERS

MODELS 7T103, 7T103B, 7T104, 7T104B, 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132

Chassis Nos. KCS47B, KCS47C, KCS47D, KCS47F, KCS47G, KCS47GF or KCS47GF-2

— Mfr. No. 274 —

SERVICE DATA

— 1951 No. T3 —

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Model 7T122 "Fairfield"
Walnut, Mahogany, Limed Oak

Model 7T123 "Regency"
Walnut, Mahogany

Model 7T124 "Modern"
Walnut, Mahogany, Limed Oak

Model 7T125B "Provincial"
Mahogany, Natural Walnut, Maple

Model 7T132 "Winston"
Walnut or Mahogany

GENERAL DESCRIPTION

Early production of the above listed receivers employed a magnetic focus kinescope type 17CP4. Late production receivers employed an electrostatic focus kinescope type 17GP4. To identify receivers, those employing electrostatic focus kinescopes have a letter "B" following the model number. The chassis in the "B" series of receivers is different from early production units only to the extent of the changes necessary to operate the new kinescope. There are minor differences in the installation adjustments. Instructions for both series of chassis are given.

All 7T111B and some 7T112B, 7T122B and 7T123B receivers were converted to intercarrier sound by the factory. The chassis in these receivers was marked KCS47GF-2. Additional receivers of all models may have been converted to intercarrier sound in the field. The sound portion of field converted receivers should be the same as that shown in the KCS47GF-2 schematic. However, it is possible that other production changes listed on page 43 may not have been made. A separate alignment procedure is given for the intercarrier receivers.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE..146 sq. inches on a 17CP4 or 17GP4 Kinescope

TELEVISION R-F FREQUENCY RANGE
All 12 television channels, 54 mc. to 88 mc., 174 mc. to 216 mc.

POWER SUPPLY
115 volts, 60 cycles..7T132, 230 watts, all others 205 watts

AUDIO POWER OUTPUT
7T132, 10 watts max., all others 3.5 watts

Record Changer RP190-2 (45 RPM).....Model 7T132 only
Refer to Service Data RP190 for information on the changer.

CHASSIS DESIGNATIONS

KCS47B..... In Models 7T103 and 7T104
KCS47F..... In Models 7T103B and 7T104B
KCS47C..... In Models 7T112, 7T122, 7T123 and 7T124
KCS47G, KCS47GF Models 7T112B, 7T122B, 7T123B and 7T125B
KCS47D..... In Model 7T132
KCS47GF-2. In some Models 7T111B, 7T112B, 7T122B and 7T123B

WEIGHT (lbs.) AND DIMENSIONS (inches)

Model	Net Weight	Shipping Weight	Width	Height	Depth
7T103, 7T103B	91	104	21½	21	21⅜
7T104, 7T104B	92	105	21½	37⅞	21⅜
7T111B	92	111	22⅞	36 1/16	19
7T112, 7T112B	97	117	27¼	37¾	21⅛
7T122, 7T122B	111	137	28	36¾	22⅞
7T123, 7T123B	116	137	27¼	36¼	23¼
7T124	125	150	23½	41	22⅜
7T125B	112	138	28	37	23½
7T132	130	168	38⅝	34⅝	23½

RECEIVER ANTENNA INPUT IMPEDANCE
Choice: 300 ohms balanced or 72 ohms unbalanced.

RCA TUBE COMPLEMENT

Tube Used	Function
(1) RCA 6CB6	R-F Amplifier
(2) RCA 6J6	R-F Oscillator and Mixer
(3) RCA 6AU6	1st Sound I-F Amplifier
(4) RCA 6AU6	2nd Sound I-F Amplifier
(5) RCA 6AL5	Sound Discriminator or Ratio Detector
(6) RCA 6AV6	1st Audio Amplifier
(7) RCA 6K6GT	Audio Output
(8) RCA 6AU6	1st Picture I-F Amplifier
(9) RCA 6CB6	2nd Picture I-F Amplifier
(10) RCA 6AU6	3rd Picture I-F Amplifier
(11) RCA 6CB6	4th Picture I-F Amplifier
(12) RCA 6AL5	Picture 2nd Detector and AGC Detector
(13) RCA 12AU7	1st and 2nd Video Amplifier
(14) RCA 12AU7	DC Restorer and Sync Separator
(15) RCA 6SN7GT	Sync Separator and Vertical Sweep Osc.
(16) RCA 6K6GT	Vertical Sweep Output
(17) RCA 6S67GT	Horizontal Sweep Oscillator and Control
(18) RCA 6BG6G	Horizontal Sweep Output
(19) RCA 6W4GT	Damper
(20) RCA 1B3-GT/8016	High Voltage Rectifier
(21) RCA 17CP4 or 17GP4	Kinescope
(22) RCA 5U4G	Rectifier
(23) RCA 1V2 (In B models only)	Focus Rectifier

7T103, 7T103B, 7T104, 7T104B, 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132 ELECTRICAL AND MECHANICAL SPECIFICATIONS

(Continued)

PICTURE INTERMEDIATE FREQUENCIES

Picture Carrier Frequency	25.50 mc.
Adjacent Channel Sound Trap	27.00 mc.
Accompanying Sound Traps	21.00 mc.
Adjacent Channel Picture Carrier Trap	19.50 mc.

SOUND INTERMEDIATE FREQUENCIES

Sound Carrier Frequency	21.00 mc.

Intercarrier chassis have 4.5 mc. sound i-f.

VIDEO RESPONSE	To 4 mc.
FOCUS	17CP4 is Magnetic, 17GP4 is Electrostatic
SWEEP DEFLECTION	Magnetic
SCANNING	Interlaced, 525 line
HORIZONTAL SWEEP FREQUENCY	15,750 cps
VERTICAL SWEEP FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

OPERATING CONTROLS (Front Panel)

Channel Selector, Fine Tuning	Dual Control Knobs
Picture Brightness	Dual Control Knobs
Picture Horizontal Hold, Picture Vertical Hold	Dual Control Knobs
Sound Volume and On-Off Switch, Tone Control	Dual Control Knobs

NON-OPERATING CONTROLS (not including r-f and i-f adjustments)

Picture Centering	top chassis adjustment
Width	rear chassis adjustment
Height	rear chassis adjustment
Horizontal Linearity	rear chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis screwdriver adjustment
Horizontal Oscillator Frequency	top chassis adjustment
Horizontal Oscillator Waveform	bottom chassis adjustment
Horizontal Locking Range	rear chassis adjustment
Focus	top chassis adjustment
Ion Trap Magnet	top chassis adjustment
Deflection Coil	top chassis wing nut adjustment
AGC Control Switch	rear chassis adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT REMOVE THE RECEIVER CHASSIS, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES, AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For this reason, the kinescope must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb — particularly that part at the rim of the viewing surface — must not be struck, scratched or subjected to more than moderate pressure at any time. During service if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA replacement kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver.

OPERATING INSTRUCTIONS

The following adjustments are necessary when turning the receiver on for the first time.

1. See that the TV-PH switch on the rear apron is in the "TV" position.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best sound fidelity (or best pix in intercarrier sets) and the SOUND VOLUME control for suitable volume.

5. Turn the BRIGHTNESS control fully counter-clockwise, then clockwise until a light pattern appears on the screen.

6. Adjust the VERTICAL hold control until the pattern stops vertical movement.

7. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

8. Adjust the PICTURE and BRIGHTNESS controls for suitable picture contrast and brightness.

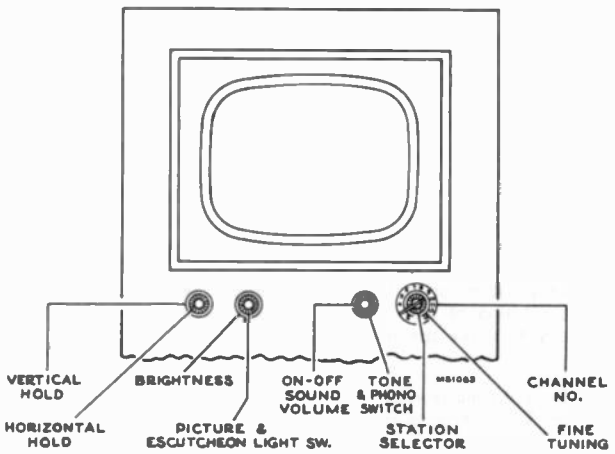


Figure 1—Receiver Operating Controls

9. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

10. In switching from one channel to another, it may be necessary to repeat steps 4 and 8.

11. When the set is turned on again after an idle period it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 4 is generally sufficient.

12. If the positions of the controls have been changed, it may be necessary to repeat steps 2 through 8.

13. To use a record player, plug the record-player output cable into the PHONO jack on the rear apron, and set the TV-PH switch to "PH."

14. On console type receivers, to turn on station escutcheon light, pull out on picture control knob, and push in to turn off.

INSTALLATION INSTRUCTIONS

Early production RCA Victor 17-inch television receivers employed a magnetic focus kinescope type 17CP4. Late production receivers employed an electrostatic focus kinescope type 17GP4. To identify receivers, those employing electrostatic focus kinescopes have a letter "B" following the model number. The chassis in the "B" series of receivers is different from early production units only to the extent of the changes necessary to operate the new kinescope. Both series of chassis operate equally well.

There are minor differences in the installation adjustments. Instructions for both series of chassis are given in the following procedure:

UNPACKING. — These receivers are shipped complete in cardboard cartons. The kinescope is shipped in place in the receiver.

Take the receiver out of the carton and remove all packing material.

Install the control knobs on the proper control shafts.

Make sure that all tubes are in place and are firmly seated in their sockets.

Check to see that the kinescope high voltage lead clip is in place.

Connect the antenna transmission line to the receiver antenna terminals. Plug a power cord into the 115 volt a-c power source and into the receiver interlock receptacle. Turn the receiver power switch to the "on" position, the brightness control fully clockwise, and the picture control counter-clockwise.

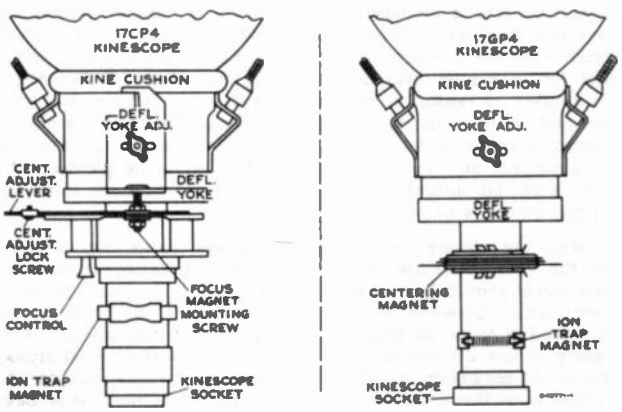


Figure 2—Yoke and Focus Magnet Adjustments

ION TRAP MAGNET ADJUSTMENT. — Set the ion trap magnet approximately in the position shown in Figure 2. Starting from this position immediately adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Turn the focus control (shown in Figure 2) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches of this adjustment should be made with the brightness control at the maximum clockwise position with which good line focus can be maintained.

DEFLECTION YOKE ADJUSTMENT. — If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS. — It will now be necessary to obtain a test pattern picture in order to make further adjustments.

If the Horizontal Oscillator and AGC System are operating properly, it should be possible to sync the picture at this point. However, if the AGC control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading, turn S106 on the rear apron (see Figure 3) counter-clockwise until the set operates normally and the picture can be synced.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT. — Turn the horizontal hold control to the extreme counter-clock-

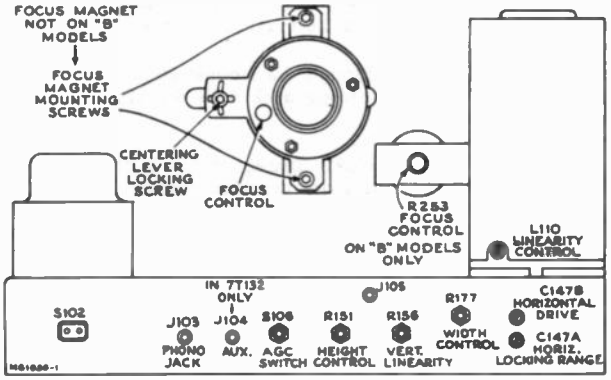


Figure 3—Rear Chassis Adjustments

wise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 2 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull-in should occur when the control is approximately 90 degrees from the extreme counter-clockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Focus Magnet Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR. — If in the above check the receiver failed to hold sync with the hold control at the extreme counter-clockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull-in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment. — Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T108 horizontal frequency adjustment on top of the chassis until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Locking Range Adjustment. — Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. The picture may remain in sync. If so turn the T108 top core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C147A slightly clockwise. If less than 2 bars are present, adjust C147A slightly counter-clockwise. Turn the horizontal hold control counterclockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure on page 11. For field purposes paragraph "A" under Horizontal Oscillator Waveform Adjustment may be omitted..

FOCUS MAGNET ADJUSTMENTS (Disregard for B Models). The focus magnet should be adjusted so that there is approximately three-eighths inch of space between the rear cardboard shell of the yoke and the flat of the front face of the focus magnet. This spacing gives best average focus over the face of the tube.

The axis of the hole through the magnet should be parallel with the axis of the kinescope neck with the kinescope neck through the middle.

CENTERING ADJUSTMENT (Disregard for B Models). — No electrical centering controls are provided. Centering is accomplished by means of a separate plate on the focus magnet. The centering plate includes a locking screw which must be loosened before centering. Up and down adjustment of the plate moves the picture side to side and sidewise adjustment moves the picture up and down.

If a corner of the raster is shadowed, check the position of the ion trap magnet. Reposition the magnet within the range of maximum raster brightness to eliminate the shadow and recenter the picture by adjustment of the focus magnet plate. In no case should the magnet be adjusted to cause any loss of brightness since such operation may cause immediate or eventual damage to the tube. In some cases it may be necessary to shift the position of the focus magnet in order to eliminate a corner shadow.

CENTERING ADJUSTMENT (For B Models). — Receivers employing electrostatic kinescopes are provided with special centering magnets. These magnets are in the form of two wire rings mounted on a non-magnetic tube which is placed around the neck of the kinescope at a distance of about three-fourths of an inch in back of the deflection yoke. When the magnets are rotated on the tube so that the gaps in the rings are together, maximum centering effect is produced. To shift the picture, rotate one of the magnets with respect to the other. To shift the picture in the desired direction rotate the entire centering magnet assembly on the neck of the kinescope. By alternately rotating one magnet with respect to the other, then rotating the entire assembly around the neck of the tube, proper centering of the picture can be obtained.

It is important that the centering magnets not be operated too close to the yoke as the a-c field from the yoke may cause the centering magnets to become demagnetized.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS. — Adjustment of the horizontal drive control affects the high voltage applied to the kinescope. In order to obtain the highest possible voltage hence the brightest and best focused picture, adjust horizontal drive counter-clockwise as far as possible without stretching the left side of the picture. As a first adjustment, set the horizontal drive trimmer C147B one-half turn out from maximum capacity.

Turn the horizontal linearity coil out until appreciable loss in width occurs, then in until nearly maximum width and the best linearity is obtained.

Adjust the width control R177 to obtain correct picture width.

A slight readjustment of these three controls may be necessary to obtain the best linearity.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS. —Adjust the height control (R151 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R156 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

FOCUS. — Adjust the focus magnet for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

Recheck the position of the ion trap magnet to make sure that maximum brightness is obtained.

Check to see that the yoke thumbscrew and the focus magnet mounting screws are tight.

FOCUS (For B Models only). — Set the brightness control for average brightness. Set the focus control slightly counter-clockwise from the position of best focus. Adjust the ion trap magnet for maximum brightness. Within the range of maximum brightness, a region of best focus will occur. Set the ion trap magnet within this region of best focus. This adjustment is critical if optimum focus is to be obtained. Do not use the ion trap magnet as a centering adjustment. Center the picture with the centering magnet. Repeat the above procedure until no improvement is obtained.

With the picture at average brightness, focus the receiver on the vertical wedge of a test pattern. The horizontal lines of the raster should be in focus or nearly so. If it is necessary to compromise between wedge focus and raster line focus, favor the wedge focus as long as the raster lines are visible. Normally at low brightness the center of the picture is in sharpest focus. At maximum useable brightness, best focus will be obtained near the edges of the picture. This condition gives best average focus with changes in brightness.

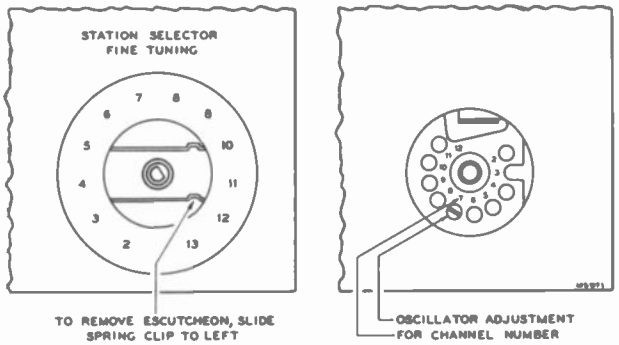


Figure 4--R-F Oscillator Adjustments

CHECK OF R-F OSCILLATOR ADJUSTMENTS. — Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 10. The adjustments for channels 2 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 4. Adjustment of channel 13 is on top of the chassis.

AGC CONTROL. — The AGC control switch is provided as an installation adjustment. The normal position for strong signal areas is with the switch in the number 1 or counterclockwise position. If impulse type of interference is experienced, turn the switch to the number 2 or center position. In very weak signal areas in which impulse type interference is experienced, turn the switch to position number 3 or fully clockwise. In this position, all AGC is removed and the receiver will overload if the input signal exceeds 200 microvolts. However, for signals under 200 microvolts, this position of the AGC control switch gives best noise immunity of sync.

FM TRAP ADJUSTMENT. — In some instances interference may be encountered from a strong FM station signal. A trap is provided to eliminate this type of interference. To adjust the trap tune in the station on which the interference is observed and adjust the L203 core on top of the r-f unit for minimum interference in the picture.

CAUTION. — In some receivers, the FM trap L203 will tune down into channel 6 or even into channel 5. Needless to say, such an adjustment will cause greatly reduced sensitivity on these channels. If channels 5 or 6 are to be received, check L203 to make sure that it does not affect sensitivity at these two channels.

Replace the cabinet back and reconnect the antenna leads to the cabinet back.

CABINET ANTENNA. — A cabinet antenna is provided in all except models 7T103 and 7T104 series receivers and the leads are brought out near the antenna terminal board. The cabinet antenna may be employed in place of the outdoor antenna in areas where the signals are strong and no reflections are experienced.

SCREEN CLEANING. — In the event that it becomes necessary to clean the face of the kinescope, this may be accomplished without removal of the chassis on models 7T103 and 7T104 series. Pry off the small ornamental clip just below the glass and take out the screws which hold the glass retainer in place. Take out the safety glass. Replace it by a reversal of this procedure.

CHASSIS REMOVAL. — To remove the chassis from the cabinet for repair or installation of a new kinescope, remove the control knobs, the cabinet back, unplug the speaker cable, the kinescope socket, the antenna cable, the pilot light cable on console models, the yoke and high voltage cable. Remove the yoke frame grounding strap on the wooden cabinet models. Take out the four chassis bolts under the cabinet. Withdraw the chassis from the back of the cabinet.

KINESCOPE HANDLING PRECAUTION. — Do not install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling.

To remove the kinescope from the cabinet, loosen the two nuts and disengage the rods alongside the kinescope. Remove the wing screw which holds the yoke frame to the cabinet. Remove the kinescope, the yoke frame with yoke and focus or centering magnet as an assembly.

INSTALLATION OF KINESCOPE. — Handle this tube by the metal rim at the edge of the screen. Do not cover the glass bell of the tube with fingermarks as it will produce leakage paths which may interfere with reception. If this portion of the tube has inadvertently been handled, wipe it clean with a soft cloth moistened with "dry" carbon tetrachloride.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and fingermarks with a soft cloth moistened with "Windex" or similar cleaning agent.

Turn the tube so that the key on the base of the tube will be down and insert the neck of the kinescope through the deflection coil and focus magnet. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

Replace the kinescope and yoke frame assembly in the cabinet. Insert the wing screw and tighten. Engage the two side rods into the yoke frame and tighten the two nuts. Slide the deflection yoke as far forward as possible. If this is not done, difficulty will be encountered in adjusting the ion trap and focus magnet because of shadows on the corner of the raster.

Slide the chassis into the cabinet, then insert and tighten the four chassis bolts.

Slip the ion trap magnet over the neck of the kinescope.

Connect the kinescope socket to the tube base and connect the high voltage lead from the rim of the kinescope into the high voltage bushing on the high voltage compartment.

Reconnect all other cables. Do not forget to replace the yoke frame grounding strap. Perform the entire set-up procedure beginning with Ion Trap Magnet Adjustment.

ANTENNAS. — The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to select the proper antenna to suit the particular local conditions, to install it properly and orient it correctly.

RCA Television Antenna, type No. 225A1 is designed for reception of all twelve television channels. The antenna uses the 300 ohm RCA "Bright Picture" television transmission line. The antenna, a dipole with reflector, is unidirectional on channels two through six. When used on these channels, the maximum signal is obtained when the antenna rods are broadside toward the transmitting antenna, with the antenna element between the reflector and the transmitting antenna.

If two or more stations are available between channels two and six and the two stations are in different directions, it may be possible to make a compromise orientation which will provide a satisfactory signal on all such channels.

When operated on channels seven through thirteen (174 to 216 mc.), the antenna has side lobes. On these channels, the maximum signal will be obtained when the antenna is rotated approximately 35 degrees in either direction from its broadside position toward the transmitting antenna. In many instances this effect may not cause any difficulties and it may be possible to make a compromise orientation which will permit satisfactory reception on all high and low channels. In some instances, however, this will not be the case due to reflections or to insufficient signal strength from one or more stations.

RCA antenna type 204A1 is available for use in locations in which it is desirable to eliminate side lobes and to have the antennas 7-13 directivity the same as 2-6 directivity.

For use in cases where it is desirable to have adjustable 7-13 directivity different from 2-6, RCA antenna type 206A1 is provided.

If it is impossible to obtain satisfactory results on one or more channels, it may become necessary either to provide means for tuning the antenna when switching channels or to install a separate antenna for one or more channels and to switch antennas when switching channels.

In weak signal areas it is possible to "stack" the type 204A1 antenna to obtain increased signal strength by employing one type 204A1 antenna and one type 208A1 stacking kit.

7T103, 7T103B, 7T104, 7T104B, 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132

CHASSIS TOP VIEW

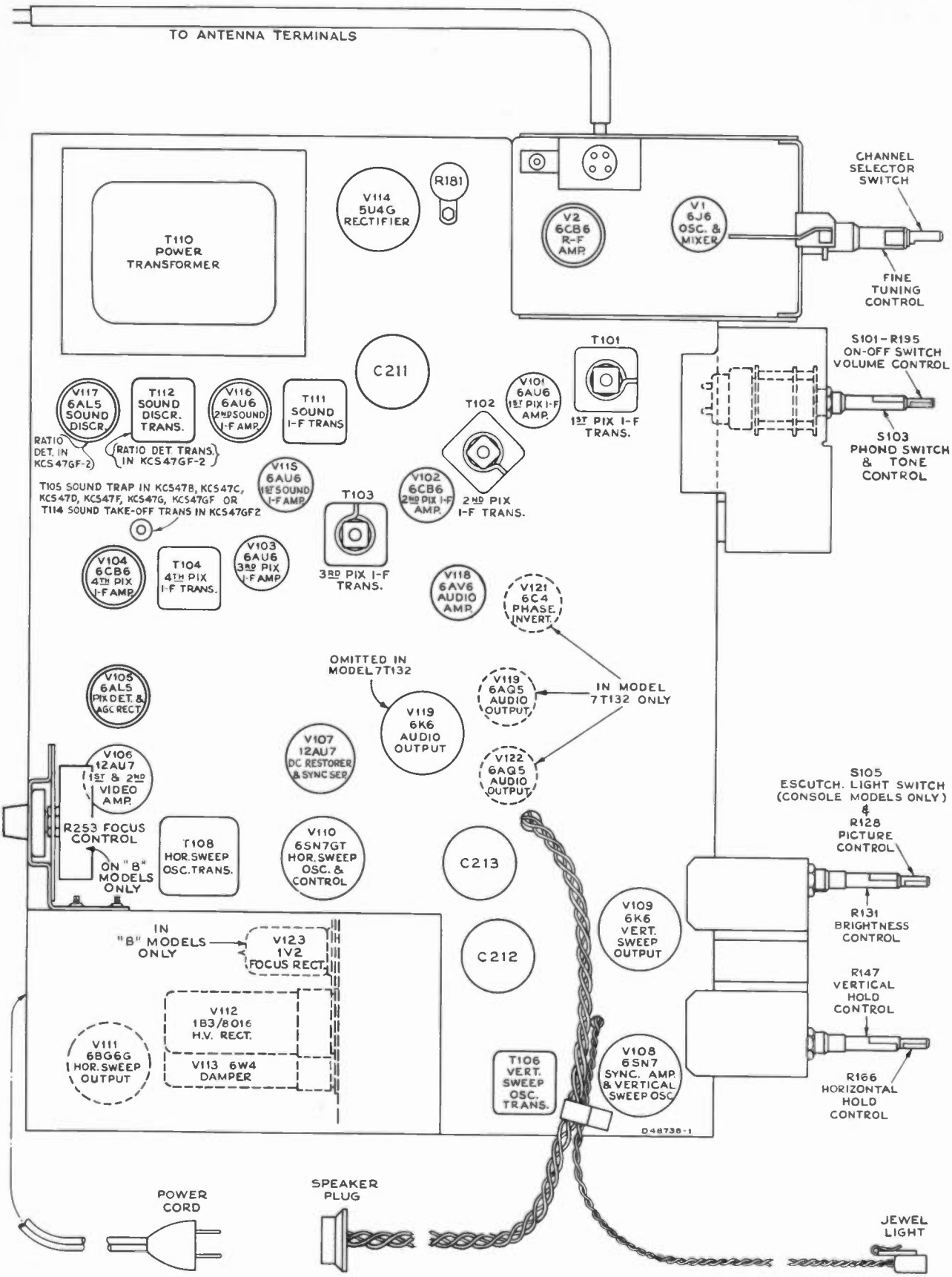


Figure 5—Chassis Top View

CHASSIS BOTTOM VIEW

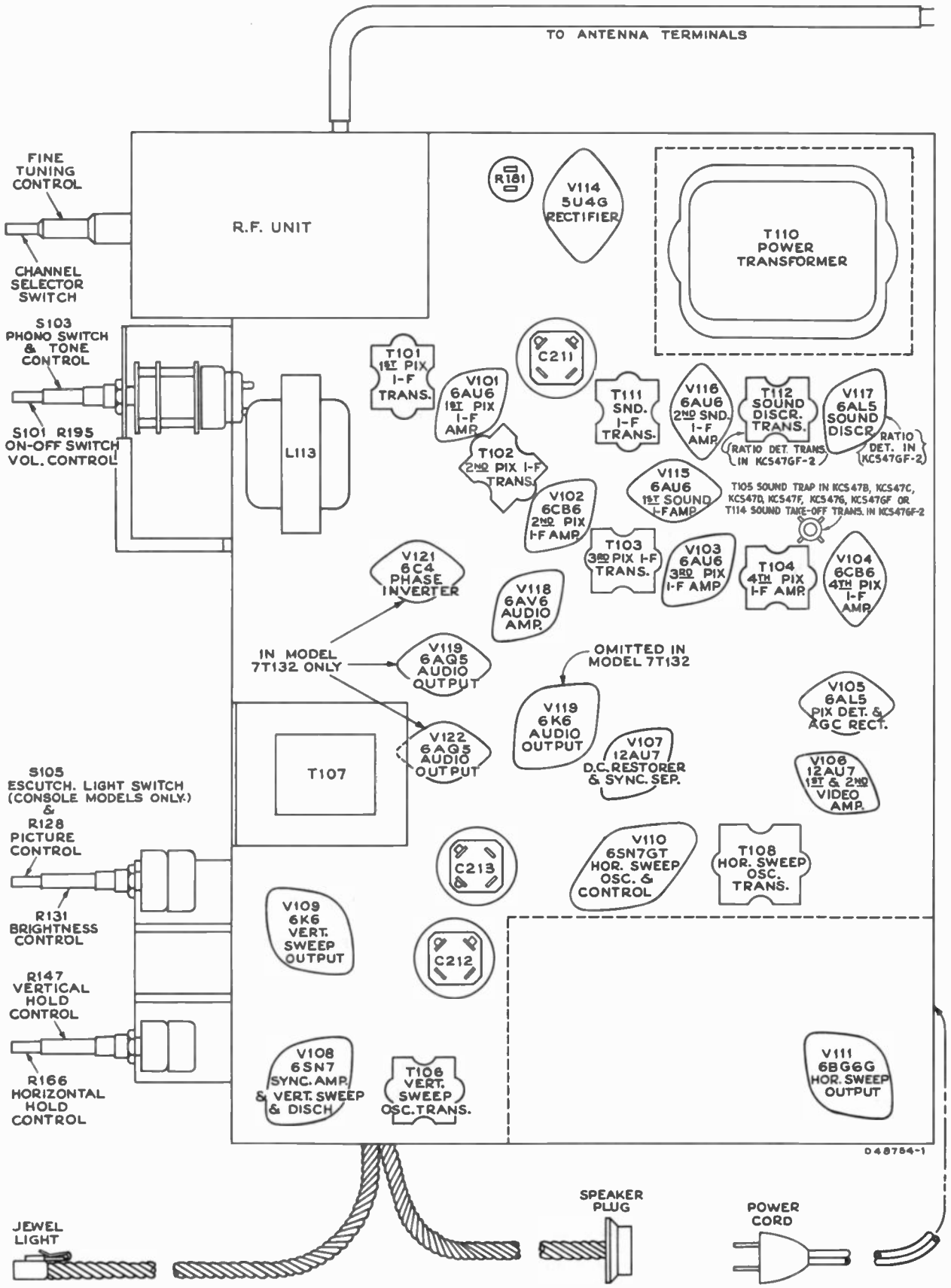


Figure 6 –Chassis Bottom View

KCS47B, KCS47C, KCS47D, KCS47F, KCS47G KCS47GF ALIGNMENT PROCEDURE

TEST EQUIPMENT. — To properly service the television chassis of this receiver, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency Ranges

20 to 30 mc., 1 mc. and 10 mc. sweep width
50 to 90 mc., sweep width
170 to 225 mc., 10 mc. sweep width

(b) Output adjustable with at least .1 volt maximum.

(c) Output constant on gll ranges.

(d) "Flat" output on all attenuator positions.

Cathode-Ray Oscilloscope. — For alignment purposes, the oscilloscope employed must have excellent low frequency and phase response, and should be capable of passing a 60-cycle square wave without appreciable distortion. While this requirement is not met by many commercial instruments, RCA Oscilloscopes, types WO-55A, WO-57A, WO-58A, WO-79A, WO-79B and WO-60C fill the requirement and any of these may be employed.

For video and sync waveform observations, the oscilloscope must have excellent frequency and phase response from 10 cycles to at least two megacycles in all positions of the gain control. The RCA types WO-58A, WO-79A and WO-79B are ideally suited for this purpose.

Signal Generator to provide the following frequencies with crystal accuracy.

(a) Intermediate frequencies

19.50 mc. adjacent channel picture trap
21.00 mc. sound i-f and sound traps
22.3 and 25.4 mc. conv. and first pix i-f trans.
25.3 mc. second picture i-f transformer
22.5 mc. fourth picture i-f transformer
21.75 mc. third picture i-f transformer
24.35 mc. fifth picture i-f coil
25.50 mc. picture carrier
27.00 mc. adjacent channel sound trap

(b) Radio frequencies

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

(c) Output of these ranges should be adjustable and at least .1 volt maximum.

Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

Electronic Voltmeter of Junior or Senior "VoltOhmyst" type and a high voltage multiplier probe for use with this meter to permit measurements up to 15 kv.

Service Precautions. — If possible, the chassis should be serviced without the kinescope. However, if it is necessary to view the raster during servicing, it would be a great convenience to have a set of yoke, focus magnet, kinescope socket, high voltage and speaker extension cables.

CAUTION. — Do not short the kinescope second anode lead. Its short circuit current presents a considerable overload on the high voltage rectifier V112.

Adjustments Required. — Normally only the r-f oscillator and mixer lines will require the attention of the service technician. All other circuits are either broad or very stable and hence will seldom require readjustment.

ORDER OF ALIGNMENT. — When a complete receiver alignment is necessary, it can be most conveniently performed in the following order:

(1) Sound discriminator
(2) Sound i-f transformers
(3) Picture i-f traps
(4) Picture i-f transformers
(5) R.F. unit
(6) Overall picture i-f
(7) Horizontal oscillator
(8) Sensitivity check

SOUND DISCRIMINATOR ALIGNMENT. — Set the signal generator for approximately .1 volt output at 21.00 mc. and connect it to the second sound i-f grid, pin 1 of V116.

Detune T112 secondary (bottom) to the extreme counterclockwise position.

Set the "VoltOhmyst" on the 3-volt scale.

Connect the meter, in series with a 1-megohm resistor, to pin 7 of V117.

Adjust the primary of T112 (top) for maximum output on the meter.

Connect the "VoltOhmyst" to the junction of R192 and S103. Adjust T112 secondary (bottom). It will be found that it is possible to produce a positive or negative voltage on the meter dependent upon this adjustment. Obviously to pass from a positive to a negative voltage, the voltage must go through zero. T112 (bottom) should be adjusted so that the meter indicates zero output as the voltage swings from positive to negative. This point will be called discriminator zero output.

Connect the sweep oscillator to the grid of the second sound i-f amplifier, pin 1 to V116.

Adjust the sweep band width to approximately 1 mc. with the center frequency at approximately 21.00 mc. and with an output of approximately .1 volt.

Connect the oscilloscope to the junction of R192 and S103. The pattern obtained should be similar to that shown in Figure 12. If it is not, adjust T112 (top) until the wave form is symmetrical.

The peak-to-peak band width of the discriminator should be approximately 400 kc. and the trace should be linear from 20.925 mc. to 21.075 mc.

Note. — The bottom core and stud in the discriminator transformer are at plus B potential.

SOUND I-F ALIGNMENT. — Connect the sweep oscillator to the first sound i-f amplifier grid, pin 1 of V115.

Insert a 21.00 mc. marker signal from the signal generator into the first sound i-f grid.

Connect the oscilloscope to the second sound i-f grid return (terminal A of T111) in series with a 33,000-ohm isolating resistor.

Adjust T111 (top and bottom) for maximum gain and symmetry about the 21.00 mc. marker. The pattern obtained should be similar to that shown in Figure 13.

The output level from the sweep should be set to produce approximately .3 volt peak-to-peak at the second sound i-f grid return when the final touches on the above adjustment are made. It is necessary that the sweep output voltage should not exceed the specified values otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals.

The band width at 70% response from the first sound i-f grid to the second i-f grid should be approximately 200 kc.

KCS47B, KCS47C, KCS47D, KCS47F, KCS47G KCS47GF ALIGNMENT PROCEDURE

PICTURE I-F TRAP ADJUSTMENT. — Connect the "Volt-Ohmyst" to the junction of R102 and R201.

Obtain a 7.5 volt battery capable of withstanding appreciable current drain and connect the ends of a 1,000 ohm potentiometer across it. Connect the battery positive terminal to chassis and the potentiometer arm to the junction of R102 and R201. Adjust the potentiometer for −3.0 volts indication on the "VoltOhmyst."

Set the channel switch to the blank position between channels number 2 and 13.

Connect the "VoltOhmyst" to pin 2 of V106 and to ground.

Connect the output of the signal generator to terminal D of T101.

Set the generator to each of the following frequencies and with a thin fiber screwdriver tune the specified adjustment for minimum indication on the "VoltOhmyst." In each instance the generator should be checked against a crystal calibrator to insure that the generator is exactly on frequency.

(1) 21.00 mc.—T103 (top)
(2) 21.00 mc.—T105 (top)
(3) 27.00 mc.—T102 (top)
(4) 27.00 mc.—T104 (top)
(5) 19.50 mc.—T101 (top)

In the above transformers using threaded cores, it is possible to run the cores completely through the coils and secure two peaks or nulls. The correct position is with the cores in the outside ends of the coils. If the cores are not in the correct position, the coupling will be incorrect and it will be impossible to secure the correct response.

PICTURE I-F TRANSFORMER ADJUSTMENTS. — Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "Volt-Ohmyst." During alignment, reduce the input signal if necessary to prevent overloading.

*24.35 mc.—L103
*22.5 mc.—T104 (bottom)
*21.75 mc.—T103 (bottom)
*25.3 mc.—T102 (bottom)

***NOTE—KCS47GF (7T112, etc.), KCS49BF (9T105) and KCS49CF (9T126, 9T128) chassis are aligned to different frequencies. See note on page 41.**

R-F UNIT ALIGNMENT. — Disconnect the co-ax link from terminal 2 of the r-f unit terminal board and connect a 39 ohm composition resistor between lugs 1 and 2.

Detune T1 by backing the core all the way out of the coil.

In early production units in which L44 is adjustable, back the L44 core all the way out. Back L203 core all the way out.

In order to align the r-f tuner, it will first be necessary to set the channel-13 oscillator to frequency. The shield over the bottom of the r-f unit must be in place when making any adjustments.

The oscillator may be aligned by adjusting it to beat with a crystal-calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound carrier frequency and adjusting the oscillator for zero output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available. Regardless of which method of oscillator alignment is used, the frequency standard must be crystal controlled or calibrated.

If the receiver oscillator is to be adjusted by the heterodyne frequency meter method, couple the meter probe loosely to the receiver oscillator.

If the receiver oscillator is adjusted by feeding in the r-f sound carrier signal, connect the signal generator to the receiver antenna terminals. Connect the "VoltOhmyst" to the sound discriminator output (junction of R192 and S103). Also couple the link loosely to lug 2 of the r-f unit terminal board so as to permit measurement of sound discriminator.

Set the channel selector switch to 13.

Adjust the frequency standard to the correct frequency (236.75 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range.

Adjust C1 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator.

Now that the channel-13 oscillator is set to frequency, we may proceed with the r-f alignment.

Turn the AGC control to the counter-clockwise position.

Connect the bias box to terminal 3 of the r-f unit terminal board and adjust the bias box potentiometer for −3.5 volts.

Connect the oscilloscope to the test connection at R5 on top of the r-f unit.

Connect the r-f sweep oscillator to the receiver antenna terminals. The method of connection depends upon the output impedance of the sweep. The P300 connections for 300-ohm balanced or 72-ohm single-ended input are shown in the circuit schematic diagram. If the sweep oscillator has a 50-ohm single-ended output, 300-ohm balanced output can be obtained by connecting as shown in Figure 7.

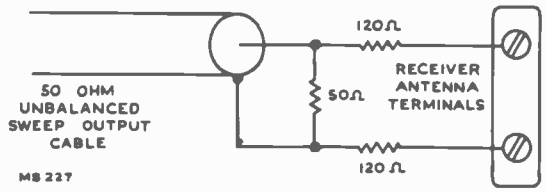


Figure 7—Unbalanced Sweep Cable Termination

Connect the signal generator loosely to the receiver antenna terminals.

Set the receiver channel switch to channel 8.

Set the sweep oscillator to cover channel 8.

Insert markers of channel 8 picture carrier and sound carrier, 181.25 mc. and 185.75 mc.

Adjust C9, C11, C16 and C22 for approximately correct curve shape, frequency, and band width as shown in Figure 16.

The correct adjustment of C22 is indicated by maximum amplitude of the curve midway between the markers. C16 tunes the r-f amplifier plate circuit and affects the frequency of the curve most noticeably. C9 tunes the converter grid circuit and affects the tilt of the curve most noticeably (assuming that C22 has been properly adjusted). C11 is the coupling adjustment and hence primarily affects the response band width.

Set the receiver channel switch to channel 6.

Adjust the frequency standard to the correct frequency (108.75 mc. for heterodyne frequency meter or 87.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range.

Adjust L5 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator.

Set the sweep generator to channel 6.

From the signal generator, insert channel 6 sound and picture carrier markers, 83.25 mc. and 87.75 mc.

Adjust L42, L45 and L49 for proper response as shown in Figure 16.

L42 is adjusted to give maximum amplitude of the curve between the markers. L45 primarily affects the tilt of the curve. L49 primarily affects the frequency of response.

Connect the "VoltOhmyst" to the r-f unit test point at R5.

Adjust C7 for −3.0 volts at the test point.

Retouch L42, L45 and L49 for proper response if necessary. If necessary, retouch C11 for proper band width on channel 6. Continue these retouching adjustments until proper response is obtained and −3.0 volts of oscillator injection are present at the test point.

Set the receiver channel selector switch to channel 8 and readjust C1 for proper oscillator frequency.

Set the sweep oscillator and signal generator to channel 8.

Readjust C9, C16 and C22 for correct curve shape, frequency and band width. Readjust C11 only if necessary.

Switch the receiver, the sweep oscillator and signal generator to channel 13.

Adjust L52 for maximum amplitude of the curve midway between markers and then overshoot the adjustment by turning the slug in the same direction from the initial setting a little more than the amount of turning required to reach maximum amplitude of response.

Adjust C22 for maximum amplitude of response.

Turn off the sweep generator. Adjust the L43 core for correct channel 13 oscillator frequency, then overshoot the adjustment by turning the slug a little more in the same direction from the initial setting. Reset the oscillator to proper frequency by adjustment of C1.

Turn the sweep oscillator back on.

Check the response of channels 7 through 13 by switching the receiver channel switch, sweep oscillator and marker oscillator to each of these channels and observing the response and oscillator injection obtained. See Figure 16 for typical response curves. It should be found that all these channels have the proper shaped response with the markers above 80% response.

If the markers do not fall within this requirement, switch to channel 8 and readjust C9, C11, C16 and C22 as necessary. If C22 required adjustment, the adjustment should be overshot a small amount and corrected by adjustment of L52 to give maximum amplitude of response between the sound and picture carrier markers. The antenna circuit (L52, C22) is broad so that tracking is not particularly critical.

If the valley in the top of the selectivity curves for the high channels is deeper than normal, the curve can be flattened somewhat by decreasing the inductance of L44 by turning the core stud in. Be sure to check for undesirable resonant suckouts on channels 7 and 8 if this is done. In later production units, L44 may be fixed and not require adjustment.

Turn the sweep oscillator off and check the receiver channel 8 r-f oscillator frequency. If the oscillator is off frequency overshoot the adjustment of C1 and correct by adjusting L43.

Turn the receiver channel selector switch to channel 6. Adjust L5 for correct oscillator frequency.

Turn the sweep oscillator on and to channel 6 and observe the response curve. If necessary readjust L42, L45 and L49. It should not be necessary to touch C11.

Check the oscillator injection voltage at the test point. If necessary adjust C7 to give −3 volts injection. If C7 is adjusted, switch to channel 8, and readjust C9 for proper curve shape, then recheck channel 6.

Switch the receiver through channel 6 down through channel 2 and check for normal response curve shapes and oscillator injection voltage.

Likewise check channels 7 through 13, stopping on 13 for the next step.

With the receiver on channel 13, check the receiver oscillator frequency. Correct by adjustment of C1 if necessary.

Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and adjusting the appropriate oscillator trimmer for the specified indication. It should be possible to adjust the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range.

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.	Channel Oscillator Adjustment
2	55.25	59.75	80.750	L1
3	61.25	65.75	86.750	L2
4	67.25	71.75	92.750	L3
5	77.25	81.75	102.750	L4
6	83.25	87.75	108.750	L5
7	175.25	179.75	200.750	L6
8	181.25	185.75	206.750	L7
9	187.25	191.75	212.750	L8
10	193.25	197.75	218.750	L9
11	199.25	203.75	224.750	L10
12	205.25	209.75	230.750	L11
13	211.25	215.75	236.750	C1

Switch to channel 8 and observe the response.

Adjust T1 clockwise while watching the change in response. When T1 is properly adjusted, the selectivity curve will be slightly wider with a slightly deeper valley in its top.

Switch through all channels and observe response, oscillator injection and r-f oscillator frequency. Minor touch-ups of adjustments may be made at this time. However, if C7 or C9 are changed appreciably, then a recheck of the oscillator frequency on all channels should be made.

Reconnect the link from T101 to terminal 2 of the r-f unit terminal board.

Since T1 was adjusted during the r-f unit alignment it will be necessary to sweep the overall i-f response.

R-F UNIT TUBE CHANGES. — Since most of the circuits are low capacitance circuits the r-f unit may require readjustments when the tubes are changed.

If the 6CB6 r-f amplifier tube is changed, it may be necessary to readjust C16 and C22.

If the 6J6 oscillator and mixer tube is changed, then more extensive adjustments are required.

For good conversion efficiency, the oscillator injection to a triode mixer must be held reasonably close to the optimum value. Although there is some latitude in this level, it is nearly expended in the normal variation in injection from channel to channel. Consequently, the adjustment of C7 is limited primarily to establishing the conditions for good conversion. Since changes in oscillator injection affect conversion gain, it also affects the input capacity of the mixer, thus also affecting tracking of the mixer grid circuit. These tube variations with their consequent effect on circuit alignment thereby require readjustment of the r-f unit if maximum conversion efficiency is to be retained after the 6J6 tube is changed. It may be possible, however, to try several 6J6 tubes and select one which gives satisfactory performance without realignment.

SWEEP ALIGNMENT OF PIX I-F. — Set the r-f unit bias to −3.5 volts.

Connect a 47 ohm resistor across the link circuit at T101 terminals C and D.

Remove the second picture i-f tube.

With the oscilloscope connected to the r-f unit test connection and the sweep oscillator connected to the antenna terminals, set the sweep output to give 0.1 volt peak-to-peak on the oscilloscope.

Switch through the channels and select one that is essentially flat and with the two carriers at 90% response or higher. Channel 6 is usually the most desirable for this test.

Remove the 47 ohm resistor and replace V102.

Connect the oscilloscope to terminal 2 of V106 socket.

Clip 330 ohm resistors across R106, R108, R113 and R119.

Connect the bias box to the junction of R102 and R201. Adjust the box for −1 volt.

Adjust the sweep oscillator output to give 0.5 volt peak-to-peak on the oscilloscope.

Connect the signal generator loosely to the i-f amplifier.

Adjust T1 and T101 bottom core to obtain the response curve shown in Figure 14.

Remove the 330 ohm resistors across R106, R108, R113 and R119.

Set the i-f bias to −4.5 volts.

Adjust the sweep output to give 3 volts peak-to-peak on the oscilloscope.

Retouch T1, T101 bottom, T102 bottom, T103 bottom, T104 bottom and L103 to obtain the response curve shown in Figure 15.

KCS47B, KCS47C, KCS47D, KCS47F, KCS47G KCS47GF ALIGNMENT PROCEDURE

HORIZONTAL OSCILLATOR ADJUSTMENT. — Normally the adjustment of the horizontal oscillator is not considered to be a part of the alignment procedure, but since the oscillator waveform adjustment requires the use of an oscilloscope, it can not be done conveniently in the field. The waveform adjustment is made at the factory and normally should not require readjustment in the field. However, the waveform adjustment should be checked whenever the receiver is aligned or whenever the horizontal oscillator operation is improper.

Horizontal Frequency Adjustment. — With a clip lead, short circuit the coil between terminals C and D of the horizontal oscillator transformer T108. Tune in a television station and sync the picture if possible.

A. — Turn the horizontal hold control R166 to the extreme clockwise position. Adjust the T108 Frequency Adjustment (atop the chassis) so that the picture is just out of sync and the horizontal blanking appears in the picture as a vertical bar. The position of the bar is unimportant.

B. — Turn the hold control approximately one-quarter of a turn from the extreme clockwise position and examine the width and linearity of the picture. If picture width or linearity is incorrect, adjust the horizontal drive control C147B, the width control R177 and the linearity control L110 until the picture is correct. If C147B, R177 or L110 were adjusted, repeat step A above.

Horizontal Locking Range Adjustment. — Turn the horizontal hold control fully counter-clockwise. The picture may remain in sync. If so, turn the T108 top core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 9 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C147A slightly clockwise. If less than 7 bars are present, adjust C147A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 7 to 9 bars are present.

Horizontal Oscillator Waveform Adjustment. — Remove the shorting clip from terminals C and D of T108. Turn the horizontal hold control to the extreme clockwise position. With a thin fibre screwdriver, adjust the Oscillator Waveform Adjustment Core of T108 (under the chassis) until the horizontal blanking bar appears in the center.

A. — Connect the low capacity probe of an oscilloscope to terminal C of T108. Turn the horizontal hold control one-quarter turn from the clockwise position so that the picture is in sync. The pattern on the oscilloscope should be as shown in Figure 17. Adjust the Oscillator Waveform Adjustment Core of T108 until the two peaks are at the same height. During this adjustment, the picture must be kept in sync by readjusting the hold control if necessary.

This adjustment is very important for correct operation of the circuit. If the broad peak of the wave on the oscilloscope is lower than the sharp peak, the noise immunity becomes poorer, the stabilizing effect of the tuned circuit is reduced and drift of the oscillator becomes more serious. On the other hand, if the broad peak is higher than the sharp peak, the oscillator is overstabilized, the pull-in range becomes inadequate and the broad peak can cause double triggering of the oscillator when the hold control approaches the clockwise position.

Remove the oscilloscope upon completion of this adjustment.

Check of Horizontal Oscillator Adjustments. — Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C147A slightly clockwise. If less than 2 bars are present, adjust C147A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 bars are present.

Turn the horizontal hold control to the maximum clockwise position. The picture should be just out of sync to the extent that the horizontal blanking bar appears as a single vertical or diagonal bar in the picture. Adjust the T108 Frequency Adjustment until this condition is fulfilled.

SENSITIVITY CHECK. — A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained to that obtained on other receivers under the same conditions.

This weak signal can be obtained by connecting the shop antenna to the receiver through a ladder type attenuator pad. The number of stages in the pad depends upon the signal strength available at the antenna. A sufficient number of stages should be inserted so that a somewhat less than normal contrast picture is obtained when the picture control is at the maximum clockwise position. Only carbon type resistors should be used to construct the pad.

RESPONSE CURVES. — The response curves shown on page 14 and referred to throughout the alignment procedure were taken from a production set. Although these curves are typical, some variations can be expected.

The response curves are shown in the classical manner of presentation, that is with "response up" and low frequency to the left. The manner in which they will be seen in a given test set-up will depend upon the characteristics of the oscilloscope and the sweep generator. The curves may be seen inverted and/or switched from left to right depending on the deflection polarity of the oscilloscope and the phasing of the sweep generator.

NOTES ON R-F UNIT ALIGNMENT. — Because of the frequency spectrum involved and the nature of the device, many of the r-f unit leads and components are critical in some respects. Even the power supply leads form loops which couple to the tuned circuits, and if resonant at any of the frequencies involved in the performance of the tuner, may cause serious departures from the desired characteristics. In the design of the receiver these undesirable resonant loops have been shifted far enough away in frequency to allow reasonable latitude in their components and physical arrangement without being troublesome. When the r-f unit is aligned in the receiver, no trouble from resonant loops should be experienced. However, if the unit is aligned in a jig separate from the receiver, attention should be paid to insure that unwanted resonances do not exist which might present a faulty representation of r-f unit alignment.

A resonant circuit exists between the r-f tuner chassis and the outer shield box, which couples into the antenna and r-f plate circuits. The frequency of this resonance depends on the physical structure of the shield box, and the capacitance between the tuner chassis and the front plate. In the KRK8 units, this resonance should fall between 120 and 135 mc. and is controlled in the design by using insulating washers of different thicknesses (in the front plate to tuner chassis mounting) to compensate for differences in the shield boxes of different models of receivers. The performance of the tuner, particularly on channels 7 and 8 will be impaired if the proper washers for the particular shield box involved are not used. Obviously then, if the r-f unit is removed for service, the washers should be replaced in the correct order when the unit is replaced.

KCS47B, KCS47C, KCS47D, KCS47F, KCS47G KCS47GF ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 8 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLE IS ATTEMPTED

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
				DISCRIMINATOR AND SOUND I-F ALIGNMENT					
1	2nd sound i-f grid (pin 1, V116)	21.00 .1 volt output	Not used		Not used	In series with 1 meg. to pin 7 of V117	Meter on 3 volt scale	Detune T112 (bot.) Adjust T112 (top) for max. on meter	Fig. 12 Fig. 9 Fig. 8
2	"	"	"		"	Junction of R192 & S103	Meter on 3 volt scale	T112 (bottom) for zero on meter	Fig. 12 Fig. 9
3	"	"	2nd sound i-f grid (pin 1, V116)	21.00 center .1 v. out	Junction of R192 & S103	Not used	Check for symmetrical response waveform (positive & negative). If not equal adjust T112 (top) until they are equal.		Fig. 12 Fig. 9
4	1st sound i-f grid (pin 1, V115)	21.00	1st sound i-f grid (pin 1, V115)	21.00 reduced output	Terminal "A" of T111 in series with 33K.	"	Sweep output reduced to provide 0.3 volt p-to-p on scope	T111 (top and bot.) for max. gain at 21.00 mc.	Fig. 13 Fig. 10 Fig. 9
				PICTURE I-F AND TRAP ADJUSTMENT					
5	Not used		Not used	—	Not used	Junction of R102 & R201	Connect bias box to junction of R102 & R201 and to ground	Adjust potentiometer for −3.0 volts on meter	Fig. 10
6	Terminal D of T101	21.00	"	—	"	Pin 2 of V106 and to ground	Meter on 3v scale. Rec. between 2 & 13	T103 (top) for min. on meter	Fig. 10 Fig. 8
7	"	21.00	"	—	"	"	"	T105 (top) for min.	Fig. 8
8	"	27.00	"	—	"	"	"	T102 (top) for min.	"
9	"	27.00	"	—	"	"	"	T104 (top) for min.	"
10	"	19.50	"	—	"	"	"	T101 (top) for min.	"
11	"	*24.35	"	—	"	"	"	L103 (top) for max.	"
12	"	*22.5	"	—	"	"	"	T104 (bot.) for max.	Fig. 9
13	"	*21.75	"	—	"	"	"	T103 (bot.) for max.	"
14	"	*25.3	"	—	"	"	"	T102 (bot.) for max.	"

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
				R-F UNIT ALIGNMENT						
15	Disconnect the co-ax link from terminal 2 of the r-f unit terminal board and connect a 39 ohm composition resistor between lugs 1 and 2. If the receiver oscillator is adjusted by feeding in the r-f sound carrier signal, couple the link loosely to lug 2 of the r-f unit terminal board so as to permit measurement at sound discriminator. In early production units in which L44 is adjustable, back the L44 core all the way out. Detune T1 by backing the core all the way out of the coil. In order to align the r-f tuner, it will first be necessary to set the channel 13 oscillator to frequency. The shield over the bottom of the r-f unit must be in place when making any adjustments.									
16	Antenna terminals	215.75 mc.	Not used		Loosely coupled to r-f oscillator	236.75 mc.	Junction of R192 & S103 for signal gen. method only	Fine tuning centered. Receiver on channel 13. Het. freq. meter coupled to osc. if used.	C1 for zero on meter or beat on het. freq. meter	Fig. 10 Fig. 8
17			"				Connect "Volt-Ohmyst" to terminal 3 of the r-f unit terminal board	Turn AGC control counter - clockwise. Connect bias box to terminal 3 of r-f unit term. board.	Adjust the bias box potentiometer for −3.5 volts.	Fig. 10
18	Antenna terminal (loosely)	181.25 185.75	Antenna terminals (see text for precaution)	Sweeping channel 8	Not used	—	Not used	Rec. on chan. 8. Connect oscilloscope to test connection at R5 on top the r-f unit. Adjust C9, C11, C16 and C22. Correct curve shape, frequency, and band width. C22 is adjusted to give max. amplitude between markers. C9 primarily affects tilt and C16 primarily affects the frequency of response. C11 affects the response band width.		Fig. 16 (8)
19	"	87.75	"	Not used	Loosely coupled to r-f oscillator	108.75	Junction of R192 & S103 for signal gen. method only	Rec. on channel 6	L5 for zero on meter or beat on het. freq. meter	Fig. 8 Fig. 10 Fig. 11
20	"	83.25 87.75	"	Channel 6	Not used	—		Rec. on chan. 6. Adjust L42, L45 and L49 for proper response. L42 is adjusted to give max. amplitude between markers. L45 primarily affects tilt and L49 primarily affects freq. of response. If necessary, retouch C11 for proper width.		Fig. 16 (6)
21	Not used	—	Not used	—	Not used	—	Connect "Volt-Ohmyst" to r-f unit test point R5	Rec. on channel 6	Adjust C7 for −3.0 volts at the test point	Fig. 8 Fig. 9
22	Repeat steps 19, 20 and 21 until the specified conditions are obtained.									
23	Antenna terminal (loosely)	185.75		—	Loosely coupled to r-f oscillator	206.75	Junction of R192 & S103 for sig. gen. method only	Rec. on channel 8	C1 for zero on meter or beat on het. freq. meter	Fig. 8 Fig. 10

*NOTE—KCS47GF (7T112, etc.), KCS49BF (9T105) and KCS49CF (9T126, 9T128) chassis are aligned to different frequencies. See note on page 41.

KCS47GF-2, KCS47E, KCS49BF-2, KCS49CF-2 ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 18 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLE IS ATTEMPTED.

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
	RATIO DETECTOR, SOUND I-F AND SOUND TAKE-OFF ALIGNMENT								
1	2od sound i-f grid (pin 1, V116) OR WR39B or C connect to grid of 4th pix i-f amp. Pin 1, V104	4.5 mc. 400 cy. mod OR 25.5 mc. mod. by 4.5 mc.	Not used	—	Across speaker voice coil, volume control at max.	Junction of R279 and R281	Set C287 at min. capacity Adjust signal input level to produce 5 volts on meter	Adjust T112 (top) for max. dc on meter Adjust T112 (bot.) for min. output on scope. Repeat until no improvements are obtained	Fig. 18 Fig. 19
2	"	"	"	—	"	Junction of R192 & S103	If the meter reads more than ±1.5 volts, adjust C287 for zero on the meter and readjust T112 (bot.) for min. output on scope. Repeat steps 1 and 2 until all conditions are satisfied.		
3	Sig. Gen. to 1st snd. i-f grid or WR39 as above	"	1st sound i-f grid (pin 1, V115)	4.5 mc. 1 mc. wide	In series with 10,000 ohms to T111-A	Not used	Sweep output reduced to provide 1 volt p-to-p on scope	T111 (top and bot.) for max. gain and symmetry at 4.5 mc.	Fig. 18 Fig. 19 Fig. 23
4	"	"	"	"	Junction of R192 and S103	"	Check for symmetrical response waveform (positive & negative).		Fig. 18 Fig. 22
5	Sig. Gen. in series with 1000 ohms to T114-D OR WR39 connected across T101 C & D	4.5 mc. OR 25.50 mc. 4.5 mc. mod.	Not used	—	—	Connect through crystal probe to pin 6 of V108	If signal generator is used, instead of WR39, short pin 1 of V109 to ground	Adjust T114 for minimum output on "VoltOhmyst"	Fig. 18
	PICTURE I-F AND TRAP ADJUSTMENT								
6	Not used		Not used	—	Not used	Junction of R102 & R201	Connect bias box to junction of R102 & R201 and to ground	Adjust potentiometer for −3.0 volts on meter	Fig. 20
7	Terminal D of T101	21.00	"	—	"	Pin 2 of V108 and to ground	Meter on 3v scale. Rec. between 2 & 13	T103 (top) for min. on meter	Fig. 20 Fig. 18
8	"	27.00	"	—	"	"	"	T102 (top) for min.	"
9	"	27.00	"	—	"	"	"	T104 (top) for min.	"
10	"	19.50	"	—	"	"	"	T101 (top) for min.	"
11	"	23.7	"	—	"	"	"	L103 (top) for max.	"
12	"	25.35	"	—	"	"	"	T104 (bot.) for max.	Fig. 19
13	"	21.95	"	—	"	"	"	T103 (bot.) for max.	"
14	"	22.5	"	—	"	"	"	T102 (bot.) for max.	"
	R-F UNIT ALIGNMENT								
STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
15	Disconnect the co-ax link from terminal 2 of the r-f unit terminal board and connect a 39 ohm composition resistor between lugs 1 and 2. If the receiver oscillator is adjusted by feeding in the r-f sound carrier signal, couple the link loosely to lug 2 of the r-f unit terminal board so as to permit measurement at sound discriminator. In early production units in which L44 is adjustable, back the L44 core all the way out. Detune T1 by backing the core all the way out of the coil. In order to align the r-f tuner, it will first be necessary to set the channel 13 oscillator to frequency. The shield over the bottom of the r-f unit must be in place when making any adjustments.									
16	Not used		Not used		Loosely coupled to r-f oscillator	236.75 mc.	Not used	Fine tuning centered. Receiver on channel 13. Het. freq. meter coupled to osc.	C1 for beat on het. freq. meter	Fig. 20 Fig. 18
17			"				Connect "Volt-Ohmyst" to terminal 3 of the r-f unit terminal board	Turn AGC control counter - clockwise. Connect bias box to terminal 3 of r-f unit term. board.	Adjust the bias box potentiometer for −3.5 volts.	Fig. 20
18	Antenna terminal (loosely)	181.25 185.75	Antenna terminals (see text for precaution)	Sweeping channel 8	Not used	—	Not used	Rec. on chan. 8. Connect oscilloscope to test connection at R5 on top the r-f unit. Adjust C9, C11, C16 and C22. Correct curve shape, frequency, and band width. C22 is adjusted to give max. amplitude between markers. C9 primarily affects tilt and C16 primarily affects the frequency of response. C11 affects the response band width.		Fig. 26 (8)
19	"	87.75	"	Not used	Loosely coupled to r-f oscillator	108.75	Not used	Rec. on channel 6	L5 for beat on het. freq. meter	Fig. 18 Fig. 20 Fig. 21
20	"	83.25 87.75	"	Channel 6	Not used	—		Rec. on chan. 8. Adjust L42, L45 and L49 for proper response. L42 is adjusted to give max. amplitude between markers. L45 primarily affects tilt and L49 primarily affects freq. of response. If necessary, retouch C11 for proper width.		Fig. 26 (6)
21	Not used	—	Not used	—	Not used	—	Connect "Volt-Ohmyst" to r-f unit test point R5	Rec. on channel 6	Adjust C7 for −3.0 volts at the test point	Fig. 18 Fig. 19
22	Repeat steps 19, 20 and 21 until the specified conditions are obtained.									

KCS47GF-2, KCS47E, KCS49BF-2, KCS49CF-2 ALIGNMENT TABLE

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
23	Not used			—	Loosely coupled to r-f oscillator	206.75	Not used	Rec. on channel 8	C1 for beat on het. freq. meter	Fig. 18 Fig. 20
24	Antenna terminal (loosely)	181.25 185.75	Antenna terminals (see text for precaution)	Sweeping channel 8	Not used	—	Not used	Rec. on chan. 8. Readjust C9, C16 and C22 for correct curve shape, frequency and band width. Readjust C11 only if necessary.		Fig. 18 Fig. 19 Fig. 26 (8)
25	"	211.25 215.75	"	Sweeping channel 13	Not used	—	Not used	Rec. on chan. 13. Adjust L52 for max. amplitude between markers and then overshoot a little more than the amount of turning required to reach max. response. Adjust C22 to regain max. amplitude of response.		Fig. 18 Fig. 26 (13)
26	Not used		Not used	—	Loosely coupled to r-f oscillator	238.75	Not used	Fine tuning centered. Receiver on chan. 13. Adjust L43 for correct channel 13 osc. freq. then overshoot. Reset the osc. to proper freq. by adjustment of C1.		Fig. 18 Fig. 21
27	Antenna terminal (loosely)	205.25 209.75	Antenna terminals (see text for precaution)	channel 12	Not used	—	Connect "Volt-Ohmyst" to r-f unit test point at R5	Rec. on channel 12	Check to see that response is correct and −3.0 volts of osc. injection is present	Fig. 20 Fig. 26
28	"	199.25 203.75		channel 11	"	—	"	Rec. on channel 11	"	Fig. 26 (11)
29	"	193.25 197.75	"	channel 10	"	—	"	Rec. on channel 10	"	Fig. 26 (10)
30	"	187.25 191.75	"	channel 9	"	—	"	Rec. on channel 9	"	Fig. 26 (9)
31	"	181.25 185.75	"	channel 8	"	—	"	Rec. on channel 8	"	Fig. 26 (8)
32	"	175.25 179.75	"	channel 7	"	—	"	Rec. on channel 7	"	Fig. 26 (7)
33	If the response of any channel (steps 27 through 32) is below 80% at either marker, repeat step 24 and adjust C9, C11, C16 and C22 as necessary to pull response up on the low channel yet maintain correct response on channel 8. If C22 required adjustment, the adjustment should be overshot a small amount and corrected by adjustment of L52 to give maximum amplitude of response between the sound and picture carrier markers.									
34	Repeat step 23. If the oscillator is off frequency overshoot the adjustment of C1 and correct by adjusting L43.									
35	Repeat steps 27 through 34 until all adjustments are obtained.									
36	Not used		Not used	—	Loosely coupled to r-f oscillator	108.75	Not used	Rec. on channel 6	L5 for beat on het. freq. meter	Fig. 20 Fig. 21
37	Antenna terminal (loosely)	83.25 87.75	Ant. terminals (see text for precaution)	Sweeping channel 6	Not used	—	Not used	Observe response. If necessary readjust L42, L45 and L49. It should not be necessary to touch C11.		Fig. 18 Fig. 19 Fig. 26
38	Not used	—	Not used	—	Not used	—	Connect "Volt-Ohmyst" to the r-f unit test point at R5	Check osc. injection. If necessary adjust C7 to give −3 volts. If C7 is adjusted, switch to channel 8, and readjust C9 for proper response then repeat step 37.		Fig. 19 Fig. 20
39	Antenna terminals (loosely)	77.25 81.75	Ant. terminals (see text for precaution)	channel 5	"	—	"	Rec. on channel 5	Check to see that response is correct and −3.0 volts of osc. injection is present	Fig. 26 (5)
40	"	67.25 71.75	"	channel 4	"	—	"	Rec. on channel 4		Fig. 26 (9)
41	"	61.25 65.75	"	channel 3	"	—	"	Rec. on channel 3	"	Fig. 26 (3)
42	"	55.25 59.75	"	channel 2	"	—	"	Rec. on channel 2	"	Fig. 26 (2)
43	Likewise check channels 7 through 13, as outlined in steps 32 back through 27, stopping on channel 13 for next step.									
44	Not used		Not used	—	Loosely coupled to r-f oscillator	236.75	Not used	Fine tuning centered. Receiver on channel 13	C1 for beat on het. freq. meter	Fig. 18 Fig. 20
45	"		"	—	"	230.75	"	Rec. on channel 12	L11 as above	Fig. 21
46	"		"	—	"	224.75	"	Rec. on channel 11	L10 as above	Fig. 21
47	"		"	—	"	218.75	"	Rec. on channel 10	L9 as above	Fig. 21
48	"		"	—	"	212.75	"	Rec. on channel 9	L8 as above	Fig. 21
49	"		"	—	"	205.75	"	Rec. on channel 8	L7 as above	Fig. 21
50	"		"	—	"	200.75	"	Rec. on channel 7	L6 as above	Fig. 21
51	"		"	—	"	108.75	"	Rec. on channel 6	L5 as above	Fig. 21
52	"		"	—	"	102.75	"	Rec. on channel 5	L4 as above	Fig. 21
53	"		"	—	"	92.75	"	Rec. on channel 4	L3 as above	Fig. 21
54	"		"	—	"	86.75	"	Rec. on channel 3	L2 as above	Fig. 21
55	"		"	—	"	80.75	"	Rec. on channel 2	L1 as above	Fig. 21
56	Repeat steps 44 through 55 as a check.									
57	Antenna terminals	181.25 185.75	Antenna terminals	Sweeping channel 8	Not used	—		Rec. on chan. 8. Oscilloscope at R5 test point. Adjust T1 clockwise. When properly adjusted, curve will be slightly wider with a slightly deeper valley in top.		Fig. 26 (8)
58	Switch through all channels and observe response, oscillator injection and r-f oscillator frequency. Minor touch-ups of adjustments may be made at this time. However, if C7 or C9 are changed appreciably, then a recheck of the oscillator frequency on all channels should be made.									
59	Remove 39 ohm resistor and reconnect link from T101 to terminal 2 of r-f unit terminal board. Proceed with sweep alignment of Pix I-F.									

KCS47B, KCS47C, KCS47D, KCS47F, KCS47G KCS47GF ALIGNMENT TABLE

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
24	Antenna terminal (loosely)	181.25 185.75	Antenna terminals (see text for pre-caution)	Sweeping channel 8	Not used	—	Not used	Rec. on chan. 8. Readjust C9, C16 and C22 for correct curve shape, frequency and band width. Readjust C11 only if necessary.		Fig. 8 Fig. 9 Fig. 16 (8)
25	"	211.25 215.75	"	Sweeping channel 13	Not used	—	Not used	Rec. on chan. 13. Adjust L52 for max. amplitude between markers and then overshoot a little more than the amount of turning required to reach max. response. Adjust C22 to regain max. amplitude of response.		Fig. 9 Fig. 16 (13)
26	"	215.75	Not used	—	Loosely coupled to r-f oscillator	236.75	Junction of R192 & S103 for signal gen. method only	Fine tuning centered. Receiver on chan. 13. Adjust L43 for correct channel 13 osc. freq. then overshoot. Reset the osc. to proper freq. by adjustment of C1.		Fig. 8 Fig. 11
27	"	205.25 209.75	Antenna terminals (see text for pre-caution)	channel 12	Not used	—	Connect "Volt-Ohmyst" to r-f unit test point at R5	Rec. on channel 12	Check to see that response is correct and −3.0 volts of osc. injection is present	Fig. 10 Fig. 16
28	"	199.25 203.75	"	channel 11	"	—	"	Rec. on channel 11	"	Fig. 16 (11)
29	"	193.25 197.75	"	channel 10	"	—	"	Rec. on channel 10	"	Fig. 16 (10)
30	"	187.25 191.75	"	channel 9	"	—	"	Rec. on channel 9	"	Fig. 16 (9)
31	"	181.25 185.75	"	channel 8	"	—	"	Rec. on channel 8	"	Fig. 16 (8)
32	"	175.25 179.75	"	channel 7	"	—	"	Rec. on channel 7	"	Fig. 16 (7)
33	If the response of any channel (steps 27 through 32) is below 80% at either marker, repeat step 24 and adjust C9, C11, C16 and C22 as necessary to pull response up on the low channel yet maintain correct response on channel 8. If C22 required adjustment, the adjustment should be overshot a small amount and corrected by adjustment of L52 to give maximum amplitude of response between the sound and picture carrier markers.									
34	Repeat step 23. If the oscillator is off frequency overshoot the adjustment of C1 and correct by adjusting L43.									
35	Repeat steps 27 through 34 until all adjustments are obtained.									
36	Antenna terminals (loosely)	87.75	Not used	—	Loosely coupled to r-f oscillator	106.75	Junction of R192 & S103 for sig. gen. method only	Rec. on channel 6	L5 for zero on meter or beat on het. freq. meter	Fig. 10 Fig. 11
37	"	83.25 87.75	Ant. terminals (see text for pre-caution)	Sweeping channel 6	Not used	—	Not used	Observe response. If necessary readjust L42, L45 and L49. It should not be necessary to touch C11.		Fig. 8 Fig. 9 Fig. 16
38	Not used	—	Not used	—	Not used	—	Connect "Volt-Ohmyst" to the r-f unit test point at R5	Check osc. injection. If necessary adjust C7 to give −3 volts. If C7 is adjusted, switch to channel 8, and readjust C9 for proper response then repeat step 37.		Fig. 9 Fig. 10
39	Antenna terminals (loosely)	77.25 81.75	Ant. terminals (see text for pre-caution)	channel 5	"	—	"	Rec. on channel 5	Check to see that response is correct and −3.0 volts of osc. injection is present	Fig. 16 (5)
40	"	67.25 71.75	"	channel 4	"	—	"	Rec. on channel 4		Fig. 16 (9)
41	"	61.25 65.75	"	channel 3	"	—	"	Rec. on channel 3	"	Fig. 16 (3)
42	"	55.25 59.75	"	channel 2	"	—	"	Rec. on channel 2	"	Fig. 16 (2)
43	Likewise check channels 7 through 13, as outlined in steps 32 back through 27, stopping on channel 13 for next step.									
44	Antenna terminals	215.75	Not used	—	Loosely coupled to r-f oscillator	236.75	Junction of R192 & S103 for sig. gen. method only	Fine tuning centered. Receiver on channel 13	C1 for zero on meter or beat on het. freq. meter	Fig. 8 Fig. 10
45	"	209.75	"	—	"	230.75	"	Rec. on channel 12	L11 as above	Fig. 11
46	"	203.75	"	—	"	224.75	"	Rec. on channel 11	L10 as above	Fig. 11
47	"	197.75	"	—	"	218.75	"	Rec. on channel 10	L9 as above	Fig. 11
48	"	191.75	"	—	"	212.75	"	Rec. on channel 9	L8 as above	Fig. 11
49	"	185.75	"	—	"	206.75	"	Rec. on channel 8	L7 as above	Fig. 11
50	"	179.75	"	—	"	200.75	"	Rec. on channel 7	L6 as above	Fig. 11
51	"	87.75	"	—	"	108.75	"	Rec. on channel 6	L5 as above	Fig. 11
52	"	81.75	"	—	"	102.75	"	Rec. on channel 5	L4 as above	Fig. 11
53	"	71.75	"	—	"	92.75	"	Rec. on channel 4	L3 as above	Fig. 11
54	"	65.75	"	—	"	86.75	"	Rec. on channel 3	L2 as above	Fig. 11
55	"	59.75	"	—	"	80.75	"	Rec. on channel 2	L1 as above	Fig. 11
56	Repeat steps 44 through 55 as a check.									
57	Antenna terminals	181.25 185.75	Antenna terminals	Sweeping channel 8	Not used	—		Rec. on chan. 8. Oscilloscope at R5 test point. Adjust T1 clockwise. When properly adjusted, curve will be slightly wider with a slightly deeper valley in top.		Fig. 16 (8)
58	Switch through all channels and observe response, oscillator injection and r-f oscillator frequency. Minor touch-ups of adjustments may be made at this time. However, if C7 or C9 are changed appreciably, then a recheck of the oscillator frequency on all channels should be made.									
59	Remove 39 ohm resistor and reconnect link from T101 to terminal 2 of r-f unit terminal board. Proceed with sweep alignment of Pix I-F.									

KCS47B, KCS47C, KCS47D, KCS47F, KCS47G KCS47GF-2 ALIGNMENT TABLE

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
SWEEP ALIGNMENT OF PICTURE I-F AMPLIFIER									
60	Loosely coupled to i-f amplifier	22.3 25.4	Antenna terminals	Sweeping selected channel	Terminal 2 of V106 socket	Junction of R102 & R201	Select channel known to have good r-f response. Clip 330 ohm resistors across R106, R108, R113, R119. Connect bias box to junction R102, R201.	Adjust bias box for −1.0 v. Set sweep to give 0.5 v. p-p on oscilloscope. Adjust T1 and T101 for correct response.	Fig. 8 Fig. 9 Fig. 10 Fig. 14
61	"	21.85 24.75 25.50 26.25	"	"	"	"	Remove 330 ohm resistors. Set bias box for −4.5 v.	Set sweep to give 3.0 v. p-p on oscilloscope. Adjust T1, T101 bot., T102 bot., T103 bot., T104 bot. and L103 for desired response.	Fig. 15

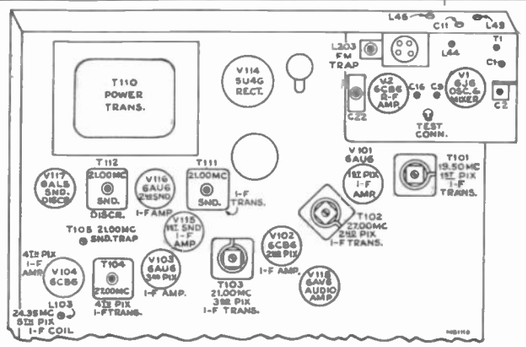


Figure 8—Top Chassis Adjustments

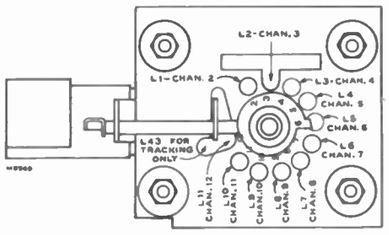


Figure 11—R-F Oscillator Adjustments

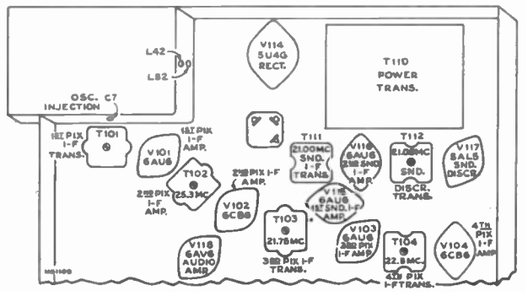


Figure 9—Bottom Chassis Adjustments

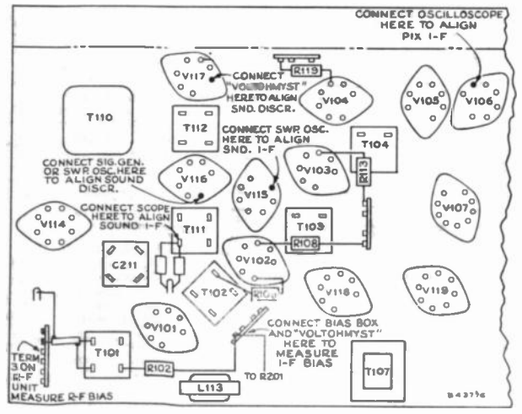


Figure 10—Test Connection Points

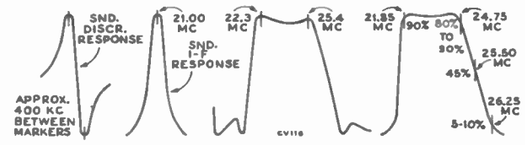


Figure 12 Discriminator Response — *Figure 13 Sound I-F Response* — *Figure 14 T1 and T101 Response* — *Figure 15 Overall I-F R-F Response*

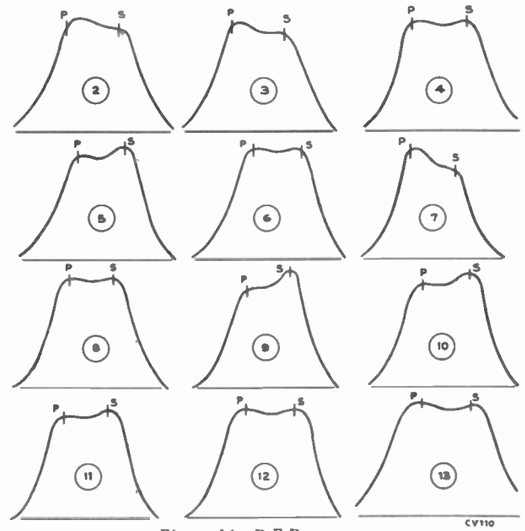


Figure 16—R-F Response

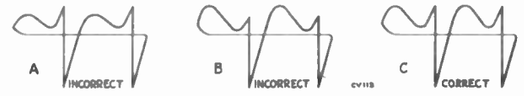


Figure 17—Horizontal Oscillator Waveforms

KCS47GF-2, KCS47E, KCS49BF-2, KCS49CF-2 ALIGNMENT TABLE

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
SWEEP ALIGNMENT OF PICTURE I-F AMPLIFIER									
60	Loosely coupled to i-f amplifier	22.2 25.4	Antenna terminals	Sweeping selected channel	Terminal 2 of V108 socket	Junction of R102 & R201	Select channel known to have good r-f response. Clip 330 ohm resistors across R108, R108, R113, R119. Connect bias box to junction R102, R201.	Adjust bias box for −1.0 v. Set sweep to give 0.5 v. p-p on oscilloscope. Adjust T1 and T101 for correct response.	Fig. 18 Fig. 19 Fig. 20 Fig. 24
61	"	21.85 24.75 25.50 26.25	"	"	"	"	Remove 330 ohm resistors. Set bias box for −4.5 v.	Set sweep to give 3.0 v. p-p on oscilloscope. Adjust T1, T101 bot., T102 bot., T103 bot., T104 bot. and L103 for desired response.	Fig. 25

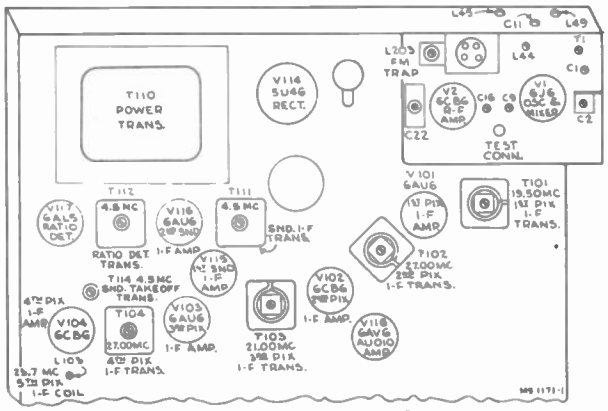


Figure 18—Top Chassis Adjustments

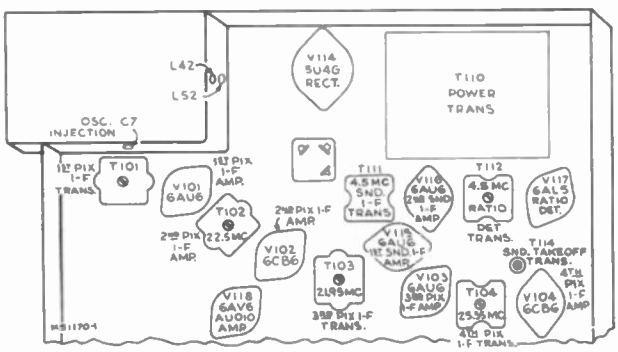


Figure 19—Bottom Chassis Adjustments

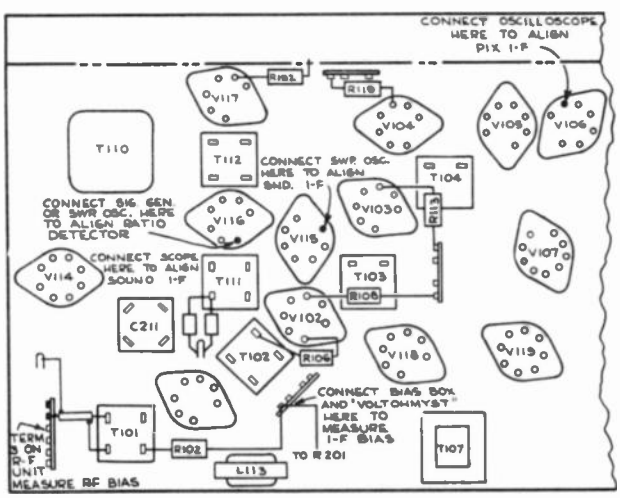


Figure 20—Test Connection Points

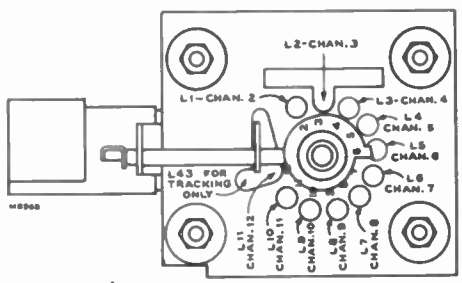


Figure 21—R-F Oscillator Adjustments

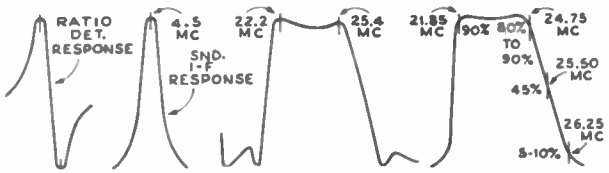


Figure 22 Ratio Det. Response | *Figure 23 Sound I-F Response* | *Figure 24 T1 and T101 Response* | *Figure 25 Overall I-F R-F Response*

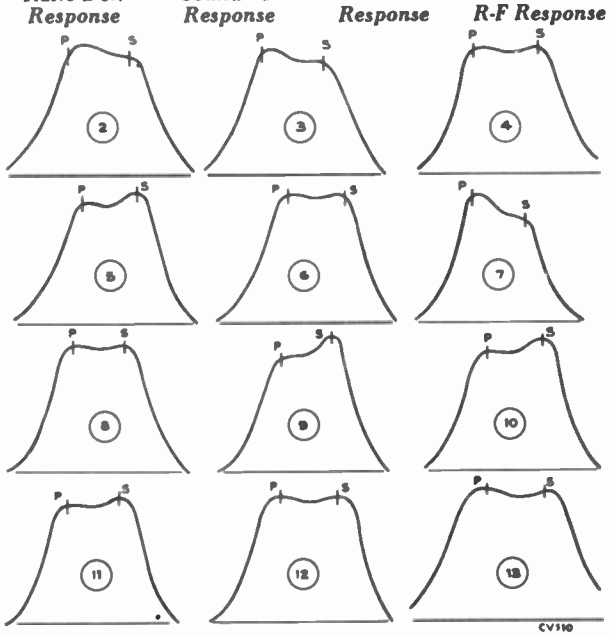


Figure 26—R-F Response

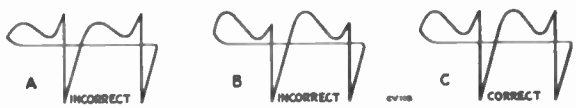


Figure 27—Horizontal Oscillator Waveforms

KCS47GF-2, KCS47E, KCS49BF-2, KCS49CF-2 ALIGNMENT PROCEDURE

TEST EQUIPMENT. — To properly service the television chassis of this receiver, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency Ranges

20 to 30 mc., 1 mc. and 10 mc. sweep width
50 to 90 mc., sweep width
170 to 225 mc., 10 mc. sweep width

(b) Output adjustable with at least .1 volt maximum.

(c) Output constant on all ranges.

(d) "Flat" output on all attenuator positions.

Cathode-Ray Oscilloscope. — For alignment purposes, the oscilloscope employed must have excellent low frequency and phase response, and should be capable of passing a 60-cycle square wave without appreciable distortion. While this requirement is not met by many commercial instruments, RCA Oscilloscopes, types WO-55A, WO-57A, WO-58A, WO-79A, WO-79B and WO-60C fill the requirement and any of these may be employed.

For video and sync waveform observations, the oscilloscope must have excellent frequency and phase response from 10 cycles to at least two megacycles in all positions of the gain control. The RCA types WO-58A, WO-79A and WO-79B are ideally suited for this purpose.

Signal Generator to provide the following frequencies with crystal accuracy.

(a) Intermediate frequencies

19.50 mc. adjacent channel picture trap
21.00 mc. sound i-f and sound traps
22.2 and 25.4 mc. conv. and first pix i-f trans.
22.53 mc. second picture i-f transformer
25.35 mc. fourth picture i-f transformer
21.95 mc. third picture i-f transformer
23.7 mc. fifth picture i-f coil
25.50 mc. picture carrier
27.00 mc. adjacent channel sound trap

(b) Radio frequencies

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

(c) Output of these ranges should be adjustable and at leas .1 volt maximum.

Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

Electronic Voltmeter of Junior or Senior "VoltOhmyst" type and a high voltage multiplier probe for use with this meter to permit measurements up to 15 kv.

Service Precautions. — If possible, the chassis should be serviced without the kinescope. However, if it is necessary to view the raster during servicing, it would be a great convenience to have a set of yoke, focus magnet, kinescope socket, high voltage and speaker extension cables.

CAUTION. — Do not short the kinescope second anode lead. Its short circuit current presents a considerable overload on the high voltage rectifier V112.

Adjustments Required. — Normally, only the r-f oscillator and mixer lines will require the attention of the service technician. All other circuits are either broad or very stable and hence will seldom require readjustment.

ORDER OF ALIGNMENT. — When a complete receiver alignment is necessary, it can be most conveniently performed in the following order:

(1) Ratio detector
(2) Sound i-f transformers
(3) Sound Take-off transformer
(4) Picture i-f traps
(5) Picture i-f transformers
(6) R-F unit
(7) Overall picture i-f
(8) Horizontal oscillator

RATIO DETECTOR ALIGNMENT. — Set the signal generator at 4.5 mc. and connect it to the second sound i-f grid, pin 1 of V116. Set the generator for 30% 400 cycle modulation.

As an alternate source of signal, the RCA WR39B or WR39C calibrator may be employed. In such a case, connect the calibrator to the grid of the fourth pix i-f amplifier, pin 1 of V104.

Set the frequency of the calibrator to 25.50 mc. (pix carrier) and modulate with 4.5 mc. crystal. The 4.5 mc. signal will be picked off at T114 and amplified through the sound i-f amplifier.

Connect the "VoltOhmyst" to the junction of R279 and R281.

Connect the oscilloscope across the speaker voice coil and turn the volume control for maximum output.

Set the trimmer C287 (on the bottom of the V117 socket) for minimum capacity.

Tune the ratio detector primary, T112 top core for maximum d-c output on the "VoltOhmyst." Adjust the signal level from the signal generator for 5 volts on the "VoltOhmyst" when finally peaked. This is approximately the operating level of the ratio detector for average signals.

Tune the ratio detector secondary T112 bottom core for minimum AM output on the oscilloscope.

Repeat adjustments of T112 top for maximum d-c and T112 bottom for minimum output on the oscilloscope making final adjustments with the 4.5 mc. input level adjusted to produce 5 volts d-c on the "VoltOhmyst."

Connect the "VoltOhmyst" to the junction of R192 and S103 and note the amount of d-c present. If this voltage exceeds ±1.5 volts, adjust C287 by turning the core in until zero d-c is obtained. Readjust the T112 bottom core for minimum output on the oscilloscope. Repeat the adjustments of C287 and T112 bottom core until the voltage at R192 and S103 is less than ±1.5 volts when T112 bottom core is set for minimum indication on the oscilloscope.

Connect the "VoltOhmyst" to the junction of R279 and R281 and repeak the T112 top core for maximum d-c on the meter and again reset the generator so that the meter reads minus 5 volts.

Repeat the adjustments in the above two paragraphs until the voltage at R192 and S103 is less than ±1.5 volts when the T112 top core is set for maximum d-c at the junction of R279 and R281 and the T112 bottom core is set for minimum indication on the oscilloscope.

SOUND I-F ALIGNMENT. — Connect the sweep generator to the first sound i-f amplifier grid, pin 1 of V115. Adjust the generator for a sweep width of 1 mc. at a center frequency of 4.5 mc.

Insert a 4.5 mc. marker signal from the signal generator into the first sound i-f grid.

Connect the oscilloscope in series with a 10,000-ohm resistor to terminal A of T111.

Adjust T111 top and bottom cores for maximum gain and symmetry about the 4.5 mc. marker on the i-f response. The pattern obtained should be similar to that shown in Figure 23.

The output level from the sweep should be set to produce approximately 1.0 volt peak-to-peak at terminal A of T111 when the final touches on the above adjustment are made. It is necessary that the sweep output voltage should not exceed the specified values otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals.

Connect the oscilloscope to the junction of R192 and S103 and check the linearity of the response. The pattern obtained should be similar to that shown in Figure 22.

KCS47GF-2, KCS47E, KCS49BF-2, KCS49CF-2 ALIGNMENT PROCEDURE

SOUND TAKE-OFF ALIGNMENT. — Connect the 4.5 mc. generator in series with a 1,000-ohm resistor to terminal "D" of T114. The input signal should be approximately 0.5 volts.

Short the fourth pix i-f grid to ground, pin 1 V104, to prevent noise from masking the output indication.

As an alternate source of signal the RCA WR39B or WR39C calibrator may be used. In such a case, disregard the above two paragraphs.

Connect calibrator across link circuit, T101 C, D, and modulate 25.50 carrier with 4.5 mc. crystal.

Connect the crystal diode probe of a "VoltOhmyst" to the plate of the video amplifier, pin 6 of V106.

Adjust the core of T114 for minimum output on the meter.

Remove the short from pin 1 V104 to ground if used.

PICTURE I-F TRAP ADJUSTMENT. — Connect the "VoltOhmyst" to the junction of R102 and R201.

Obtain a 7.5 volt battery capable of withstanding appreciable current drain and connect the ends of a 1,000 ohm potentiometer across it. Connect the battery positive terminal to chassis and the potentiometer arm to the junction of R102 and R201. Adjust the potentiometer for −3.0 volts indication on the "VoltOhmyst."

Set the channel switch to the blank position between channels number 2 and 13.

Connect the "VoltOhmyst" to pin 2 of V106 and to ground.

Connect the output of the signal generator to terminal D of T101.

Set the generator to each of the following frequencies and with a thin fiber screwdriver tune the specified adjustment for minimum indication on the "VoltOhmyst." In each instance the generator should be checked against a crystal calibrator to insure that the generator is exactly on frequency.

(1) 21.00 mc.—T103 (top)
(2) 27.00 mc.—T102 (top)
(3) 27.00 mc.—T104 (top)
(4) 19.50 mc.—T101 (top)

In the above transformers using threaded cores, it is possible to run the cores completely through the coils and secure two peaks or nulls. The correct position is with the cores in the outside ends of the coils. If the cores are not in the correct position, the coupling will be incorrect and it will be impossible to secure the correct response.

PICTURE I-F TRANSFORMER ADJUSTMENTS. — Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "VoltOhmyst." During alignment, reduce the input signal if necessary to prevent overloading.

23.7 mc.—L103
25.35 mc.—T104 (bottom)
21.95 mc.—T103 (bottom)
22.53 mc.—T102 (bottom)

R-F UNIT ALIGNMENT. — Disconnect the co-ax link from terminal 2 of the r-f unit terminal board and connect a 39 ohm composition resistor between lugs 1 and 2.

Detune T1 by backing the core all the way out of the coil.

In early production units in which L44 is adjustable, back the L44 core all the way out. Back L203 core all the way out.

In order to align the r-f tuner, it will first be necessary to set the channel-13 oscillator to frequency. The shield over the bottom of the r-f unit must be in place when making any adjustments.

The oscillator may be aligned by adjusting it to beat with a crystal-calibrated heterodyne frequency meter. Couple the meter probe loosely to the receiver oscillator.

Set the channel selector switch to 13.

Set the fine tuning control to the middle of its range.

Adjust the heterodyne frequency meter to the correct frequency (236.75 mc.).

Adjust C1 for an audible beat on the heterodyne frequency meter.

Now that the channel-13 oscillator is set to frequency, we may proceed with the r-f alignment.

Turn the AGC control to the counter-clockwise position.

Connect the bias box to terminal 3 of the r-f unit terminal board and adjust the bias box potentiometer for −3.5 volts.

Connect the oscilloscope to the test connection at R5 on top of the r-f unit.

Connect the r-f sweep oscillator to the receiver antenna terminals. The method of connection depends upon the output impedance of the sweep. The P300 connections for 300-ohm balanced or 72-ohm single-ended input are shown in the circuit schematic diagram. If the sweep oscillator has a 50-ohm single-ended output, 300-ohm balanced output can be obtained by connecting as shown in Figure 28.

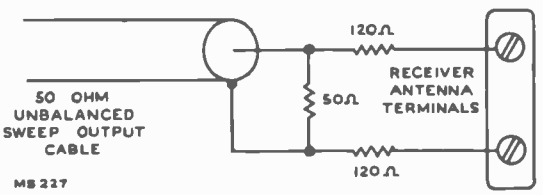


Figure 28—Unbalanced Sweep Cable Termination

Connect the signal generator loosely to the receiver antenna terminals.

Set the receiver channel switch to channel 8.

Set the sweep oscillator to cover channel 8.

Insert markers of channel 8 picture carrier and sound carrier, 181.25 mc. and 185.75 mc.

Adjust C9, C11, C16 and C22 for approximately correct curve shape, frequency, and band width as shown in Figure 16.

The correct adjustment of C22 is indicated by maximum amplitude of the curve midway between the markers. C16 tunes the r-f amplifier plate circuit and affects the frequency of the curve most noticeably. C9 tunes the converter grid circuit and affects the tilt of the curve most noticeably (assuming that C22 has been properly adjusted). C11 is the coupling adjustment and hence primarily affects the response band width.

Set the receiver channel switch to channel 6.

Adjust the heterodyne frequency meter to the correct frequency (108.75 mc.).

Set the fine tuning control to the middle of its range.

Adjust L5 for an audible beat on the heterodyne frequency meter.

Set the sweep generator to channel 6.

From the signal generator, insert channel 6 sound and picture carrier markers, 83.25 mc. and 87.75 mc.

Adjust L42, L45 and L49 for proper response as shown in Figure 26.

L42 is adjusted to give maximum amplitude of the curve between the markers. L45 primarily affects the tilt of the curve. L49 primarily affects the frequency of response.

Connect the "VoltOhmyst" to the r-f unit test point at R5.

Adjust C7 for −3.0 volts at the test point.

KCS47GF-2, KCS47E, KCS49BF-2, KCS49CF-2 ALIGNMENT PROCEDURE

Retouch L42, L45 and L49 for proper response if necessary. If necessary, retouch C11 for proper band width on channel 6. Continue these retouching adjustments until proper response is obtained and −3.0 volts of oscillator injection are present at the test point.

Set the receiver channel selector switch to channel 8 and readjust C1 for proper oscillator frequency.

Set the sweep oscillator and signal generator to channel 8.

Readjust C9, C16 and C22 for correct curve shape, frequency and band width. Readjust C11 only if necessary.

Switch the receiver, the sweep oscillator and signal generator to channel 13.

Adjust L52 for maximum amplitude of the curve midway between markers and then overshoot the adjustment by turning the slug in the same direction from the initial setting a little more than the amount of turning required to reach maximum amplitude of response.

Adjust C22 for maximum amplitude of response.

Turn off the sweep generator. Adjust the L43 core for correct channel 13 oscillator frequency, then overshoot the adjustment by turning the slug a little more in the same direction from the initial setting. Reset the oscillator to proper frequency by adjustment of C1.

Turn the sweep oscillator back on.

Check the response of channels 7 through 13 by switching the receiver channel switch, sweep oscillator and marker oscillator to each of these channels and observing the response and oscillator injection obtained. See Figure 26 for typical response curves. It should be found that all these channels have the proper shaped response with the markers above 80% response.

If the markers do not fall within this requirement, switch to channel 8 and readjust C9, C11, C16 and C22 as necessary. If C22 required adjustment, the adjustment should be overshot a small amount and corrected by adjustment of L52 to give maximum amplitude of response between the sound and picture carrier markers. The antenna circuit (L52, C22) is broad so that tracking is not particularly critical.

If the valley in the top of the selectivity curves for the high channels is deeper than normal, the curve can be flattened somewhat by decreasing the inductance of L44 by turning the core stud in. Be sure to check for undesirable resonant suckouts on channels 7 and 8 if this is done. In later production units, L44 may be fixed and not require adjustment.

Turn the sweep oscillator off and check the receiver channel 8 r-f oscillator frequency. If the oscillator is off frequency overshoot the adjustment of C1 and correct by adjusting L43.

Turn the receiver channel selector switch to channel 6. Adjust L5 for correct oscillator frequency.

Turn the sweep oscillator on and to channel 6 and observe the response curve. If necessary readjust L42, L45 and L49. It should not be necessary to touch C11.

Check the oscillator injection voltage at the test point. If necessary adjust C7 to give −3 volts injection. If C7 is adjusted, switch to channel 8, and readjust C9 for proper curve shape, then recheck channel 6.

Switch the receiver through channel 6 down through channel 2 and check for normal response curve shapes and oscillator injection voltage.

Likewise check channels 7 through 13, stopping on 13 for the next step.

With the receiver on channel 13, check the receiver oscillator frequency. Correct by adjustment of C1 if necessary.

Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and adjusting the appropriate oscillator trimmer for the specified indication. It should be possible to adjust the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range.

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.	Channel Oscillator Adjustment
2	55.25	59.75	80.750	L1
3	61.25	65.75	86.750	L2
4	67.25	71.75	92.750	L3
5	77.25	81.75	102.750	L4
6	83.25	87.75	108.750	L5
7	175.25	179.75	200.750	L6
8	181.25	185.75	206.750	L7
9	187.25	191.75	212.750	L8
10	193.25	197.75	218.750	L9
11	199.25	203.75	224.750	L10
12	205.25	209.75	230.750	L11
13	211.25	215.75	236.750	C1

Switch to channel 8 and observe the response.

Adjust T1 clockwise while watching the change in response. When T1 is properly adjusted, the selectivity curve will be slightly wider with a slightly deeper valley in its top.

Switch through all channels and observe response, oscillator injection and r-f oscillator frequency. Minor touch-ups of adjustments may be made at this time. However, if C7 or C9 are changed appreciably, then a recheck of the oscillator frequency on all channels should be made.

Reconnect the link from T101 to terminal 2 of the r-f unit terminal board.

Since T1 was adjusted during the r-f unit alignment it will be necessary to sweep the overall i-f response.

R-F UNIT TUBE CHANGES. — Since most of the circuits are low capacitance circuits the r-f unit may require readjustments when the tubes are changed.

If the 6CB6 r-f amplifier tube is changed, it may be necessary to readjust C16 and C22.

If the 6J6 oscillator and mixer tube is changed, then more extensive adjustments are required.

For good conversion efficiency, the oscillator injection to a triode mixer must be held reasonably close to the optimum value. Although there is some latitude in this level, it is nearly expended in the normal variation in injection from channel to channel. Consequently, the adjustment of C7 is limited primarily to establishing the conditions for good conversion. Since changes in oscillator injection affect conversion gain, it also affects the input capacity of the mixer, thus also affecting tracking of the mixer grid circuit. These tube variations with their consequent effect on circuit alignment thereby require readjustment of the r-f unit if maximum conversion efficiency is to be retained after the 6J6 tube is changed. It may be possible, however, to try several 6J6 tubes and select one which gives satisfactory performance without realignment.

SWEEP ALIGNMENT OF PIX I-F. — Set the r-f unit bias to −3.5 volts.

Connect a 47 ohm resistor across the link circuit at T101 terminals C and D.

Remove the second picture i-f tube.

With the oscilloscope connected to the r-f unit test connection and the sweep oscillator connected to the antenna terminals, set the sweep output to give 0.1 volt peak-to-peak on the oscilloscope.

Switch through the channels and select one that is essentially flat and with the two carriers at 90% response or higher. Channel 6 is usually the most desirable for this test.

Remove the 47 ohm resistor and replace V102.

Connect the oscilloscope to terminal 2 of V106 socket.

Clip 330 ohm resistors across R106, R108, R113 and R119.

Connect the bias box to the junction of R102 and R201. Adjust the box for −1 volt.

Adjust the sweep oscillator output to give 0.5 volt peak-to-peak on the oscilloscope.

Connect the signal generator loosely to the i-f amplifier.

Adjust T1 and T101 bottom core to obtain the response curve shown in Figure 24.

KCS47GF-2, KCS47E, KCS49BF-2, KCS49CF-2 ALIGNMENT PROCEDURE

Remove the 330 ohm resistors across R106, R108, R113 and R119.

Set the i-f bias to −4.5 volts.

Adjust the sweep output to give 3 volts peak-to-peak on the oscilloscope.

Retouch T1, T101 bottom, T102 bottom, T103 bottom, T104 bottom and L103 to obtain the response curve shown in Figure 25.

HORIZONTAL OSCILLATOR ADJUSTMENT. — Normally the adjustment of the horizontal oscillator is not considered to be a part of the alignment procedure, but since the oscillator waveform adjustment requires the use of an oscilloscope, it can not be done conveniently in the field. The waveform adjustment is made at the factory and normally should not require readjustment in the field. However, the waveform adjustment should be checked whenever the receiver is aligned or whenever the horizontal oscillator operation is improper.

Horizontal Frequency Adjustment. — With a clip lead, short circuit the coil between terminals C and D of the horizontal oscillator transformer T108. Tune in a television station and sync the picture if possible.

A. — Turn the horizontal hold control R166 to the extreme clockwise position. Adjust the T108 Frequency Adjustment (atop the chassis) so that the picture is just out of sync and the horizontal blanking appears in the picture as a vertical bar. The position of the bar is unimportant.

B. — Turn the hold control approximately one-quarter of a turn from the extreme clockwise position and examine the width and linearity of the picture. If picture width or linearity is incorrect, adjust the horizontal drive control C147B, the width control R177 and the linearity control L110 until the picture is correct. If C147B, R177 or L110 were adjusted, repeat step A above.

Horizontal Locking Range Adjustment. — Turn the horizontal hold control fully counter-clockwise. The picture may remain in sync. If so, turn the T108 top core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 9 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C147A slightly clockwise. If less than 7 bars are present, adjust C147A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 7 to 9 bars are present.

Horizontal Oscillator Waveform Adjustment. — Remove the shorting clip from terminals C and D of T108. Turn the horizontal hold control to the extreme clockwise position. With a thin fibre screwdriver, adjust the Oscillator Waveform Adjustment Core of T108 (under the chassis) until the horizontal blanking bar appears in the center.

A. — Connect the low capacity probe of an oscilloscope to terminal C of T108. Turn the horizontal hold control one-quarter turn from the clockwise position so that the picture is in sync. The pattern on the oscilloscope should be as shown in Figure 27. Adjust the Oscillator Waveform Adjustment Core of T108 until the two peaks are at the same height. During this adjustment, the picture must be kept in sync by readjusting the hold control if necessary.

This adjustment is very important for correct operation of the circuit. If the broad peak of the wave on the oscilloscope is lower than the sharp peak, the noise immunity becomes poorer, the stabilizing effect of the tuned circuit is reduced and drift of the oscillator becomes more serious. On the other hand, if the broad peak is higher than the sharp peak, the oscillator is overstabilized, the pull-in range becomes inadequate and the broad peak can cause double triggering of the oscillator when the hold control approaches the clockwise position.

Remove the oscilloscope upon completion of this adjustment.

Check of Horizontal Oscillator Adjustments. — Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C147A slightly clockwise. If less than 2 bars are present, adjust C147A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 bars are present.

Turn the horizontal hold control to the maximum clockwise position. The picture should be just out of sync to the extent that the horizontal blanking bar appears as a single vertical or diagonal bar in the picture. Adjust the T108 Frequency Adjustment until this condition is fulfilled.

SENSITIVITY CHECK. — A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained to that obtained on other receivers under the same conditions.

This weak signal can be obtained by connecting the shop antenna to the receiver through a ladder type attenuator pad. The number of stages in the pad depends upon the signal strength available at the antenna. A sufficient number of stages should be inserted so that a somewhat less than normal contrast picture is obtained when the picture control is at the maximum clockwise position. Only carbon type resistors should be used to construct the pad.

RESPONSE CURVES. — The response curves shown on page 17 and referred to throughout the alignment procedure were taken from a production set. Although these curves are typical, some variations can be expected.

The response curves are shown in the classical manner of presentation, that is with "response up" and low frequency to the left. The manner in which they will be seen in a given test set-up will depend upon the characteristics of the oscilloscope and the sweep generator. The curves may be seen inverted and/or switched from left to right depending on the deflection polarity of the oscilloscope and the phasing of the sweep generator.

NOTES ON R-F UNIT ALIGNMENT. — Because of the frequency spectrum involved and the nature of the device, many of the r-f unit leads and components are critical in some respects. Even the power supply leads form loops which couple to the tuned circuits, and if resonant at any of the frequencies involved in the performance of the tuner, may cause serious departures from the desired characteristics. In the design of the receiver these undesirable resonant loops have been shifted far enough away in frequency to allow reasonable latitude in their components and physical arrangement without being troublesome. When the r-f unit is aligned in the receiver, no trouble from resonant loops should be experienced. However, if the unit is aligned in a jig separate from the receiver, attention should be paid to insure that unwanted resonances do not exist which might present a faulty representation of r-f unit alignment.

A resonant circuit exists between the r-f tuner chassis and the outer shield box, which couples into the antenna and r-f plate circuits. The frequency of this resonance depends on the physical structure of the shield box, and the capacitance between the tuner chassis and the front plate. In the KRK8 units, this resonance should fall between 120 and 135 mc. and is controlled in the design by using insulating washers of different thicknesses (in the front plate to tuner chassis mounting) to compensate for differences in the shield boxes of different models of receivers. The performance of the tuner, particularly on channels 7 and 8 will be impaired if the proper washers for the particular shield box involved are not used. Obviously then, if the r-f unit is removed for service, the washers should be replaced in the correct order when the unit is replaced.

7T103, 7T103B, 7T104, 7T104B, 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132

WAVEFORM PHOTOGRAPHS

Taken from RCA WO58A Oscilloscope

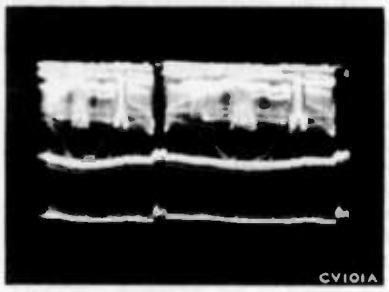
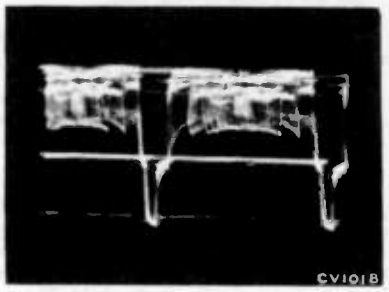
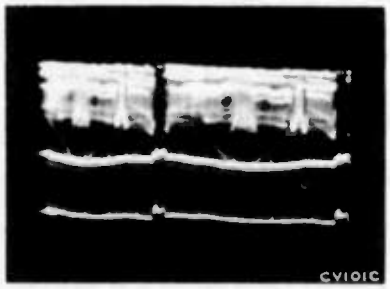


Plate of Picture Detector (Pin 7 of V105) (6AL5)

Figure 29—Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (5.5 Volts PP)

Figure 30—Horizontal (Oscilloscope Synced to ½ of Horizontal Sweep Rate) (5.5 Volts PP)

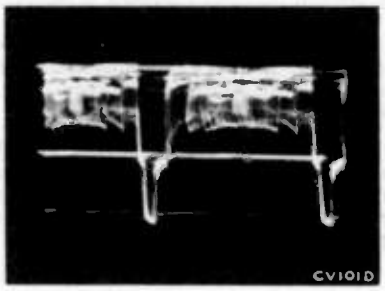




Grid of 1st Video Amplifier (Pin 2 of V106) (12AU7)

Figure 31—Vertical (5.3 Volts PP)

Figure 32—Horizontal (5.3 Volts PP)



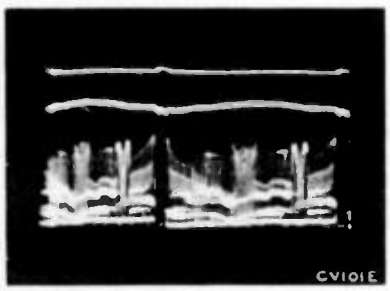
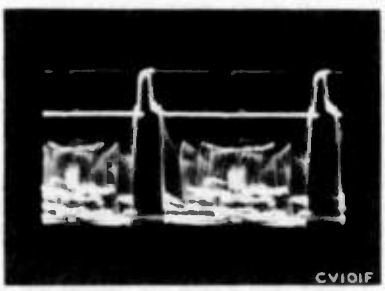
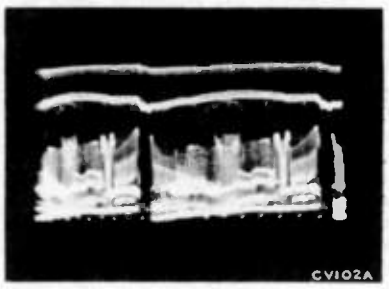


Plate of 1st Video Amplifier (Pin 1 of V106) (12AU7) Voltage depends on setting of picture control

Figure 33—Vertical (3.18 Volts PP)

Figure 34—Horizontal (3.18 Volts PP)

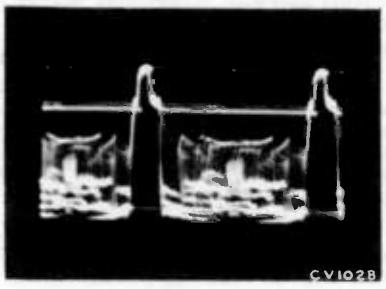




Grid of 2nd Video Amplifier (Pin 7 of V106) (12AU7) Voltage depends on setting of picture control

Figure 35—Vertical (3.18 Volts PP)

Figure 36—Horizontal (3.18 Volts PP)



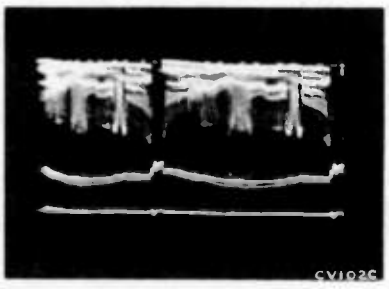
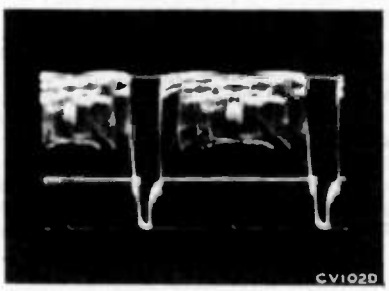


Plate of 2nd Video Amplifier (Picture Max.) (Pin 6 of V106) (12AU7) Voltage depends on setting of picture control

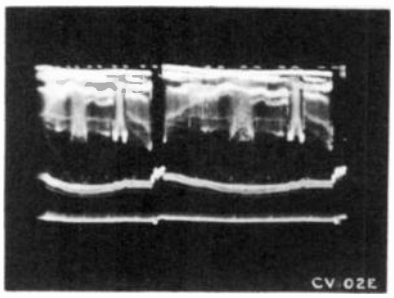
Figure 37—Vertical (25.90 Volts PP)

Figure 38—Horizontal (25.90 Volts PP)



WAVEFORM PHOTOGRAPHS

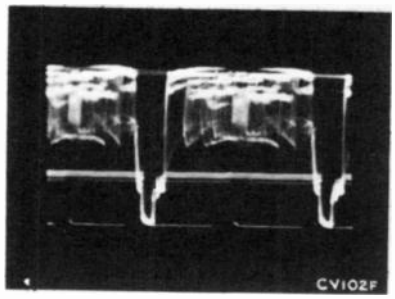
Taken from RCA WO58A Oscilloscope

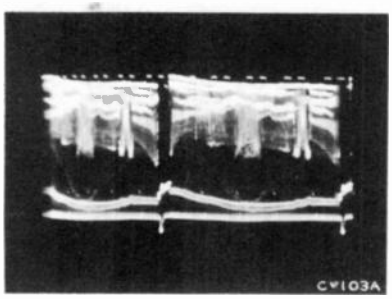


Input to Kinescope (Junction of L109 and R135) (Picture Max.) Voltage depends on setting of picture control

Figure 39—Vertical (25-90 Volts PP)

Figure 40—Horizontal (25-90 Volts PP)

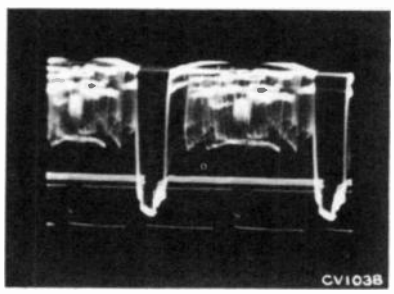


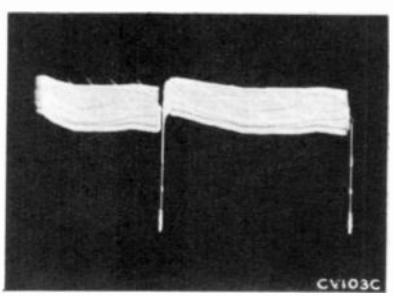


Cathode of D-C Restorer (Pin 3 of V107) (12AU7) Voltage depends on setting of picture control

Figure 41—Vertical (20-80 Volts PP)

Figure 42—Horizontal (20-80 Volts PP)

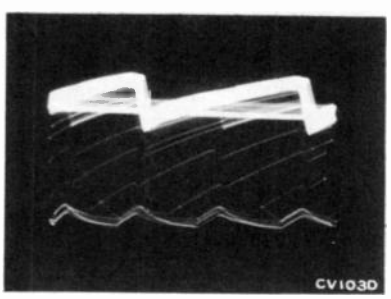


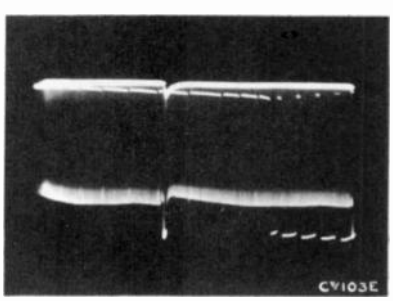


Grid of D-C Restorer (Pin 2 of V107) (12AU7) Voltage depends on setting of picture control

Figure 43—Vertical (3-10 Volts PP)

Figure 44—Horizontal (3-10 Volts PP)

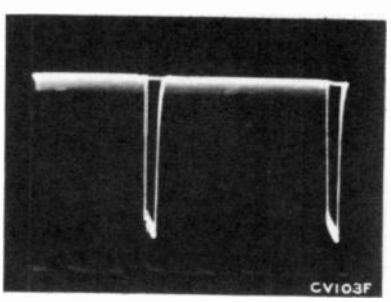




Grid of Sync Separator (Pin 4 of V108A) Voltage depends on setting of picture control

Figure 45—Vertical (6-8 Volts PP)

Figure 46—Horizontal (6-8 Volts PP)



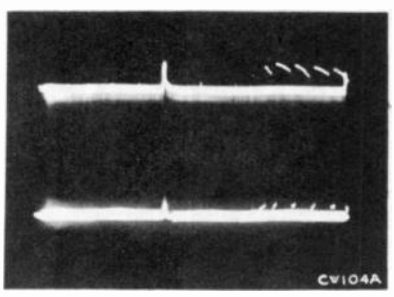
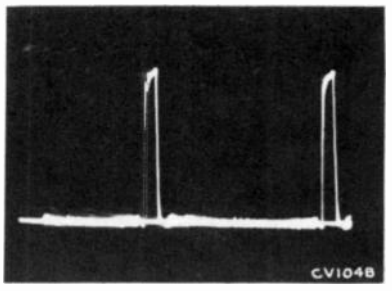


Plate of Sync Separator (Pin 5 of V108A) Voltage depends on setting of picture control

Figure 47—Vertical (14-16 Volts PP)

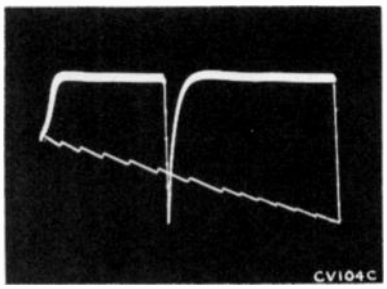
Figure 48—Horizontal (14-16 Volts PP)



7T103, 7T103B, 7T104, 7T104B, 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132

WAVEFORM PHOTOGRAPHS

Taken from RCA WO58A Oscilloscope



Cathode of Sync Separator (Pin 6 of V108A) Voltage depends on setting of picture control

Figure 49—Vertical (.8-1.0 Volt PP)

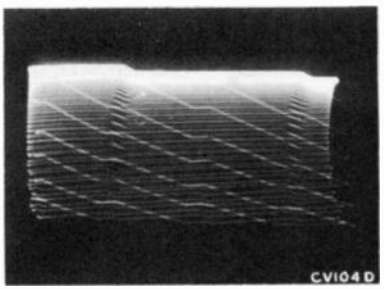


Figure 50—Horizontal (.8-1.0 Volt PP)

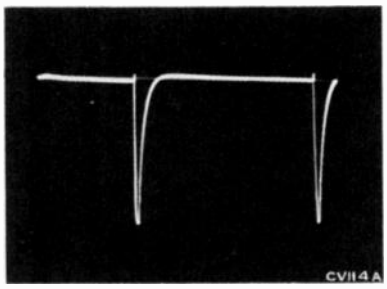


Figure 51—Output of Integrating Network (Junction of C139, C140 and R146) (45 Volts PP)

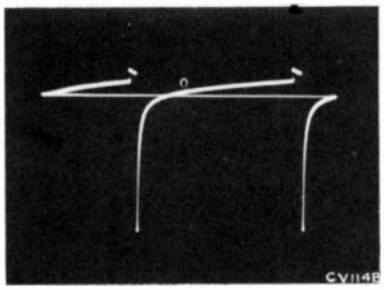


Figure 52—Grid of Vertical Oscillator (Pin 1 of V108B) (180 Volts PP)

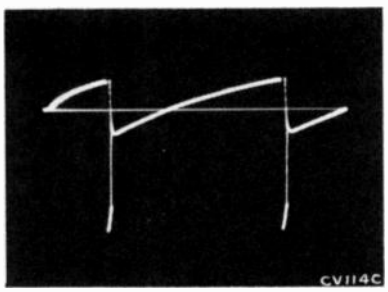


Figure 53—Plate of Vertical Oscillator (Pin 2 of V108B) (120 Volts PP)

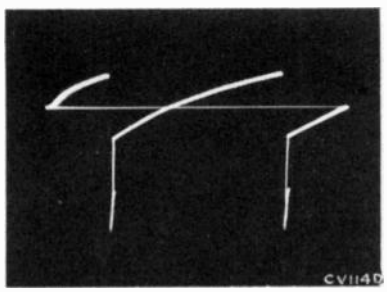


Figure 54—Grid of Vertical Output (190 Volts PP) (Pin 5 of V109) (6K6GT)

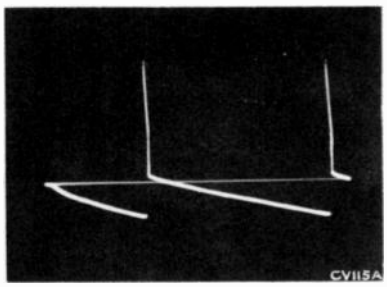


Figure 55—Plate of Vertical Output (1300 Volts PP) (Pin 3 of V109) (6K6GT)

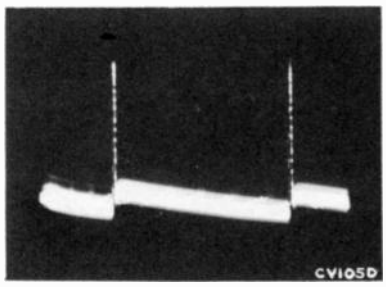


Figure 56—Input of Vertical Deflection Coils (15 Volts PP) (Voltage Across Pins 1 and 2 of J101F)

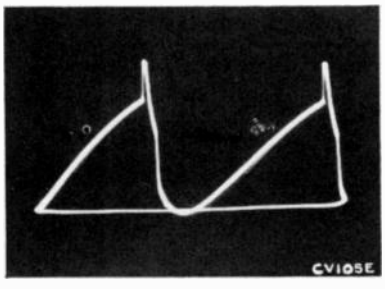


Figure 57—Grid of Horizontal Oscillator Control (22 Volts PP) (Pin 1 of V110) (6SN7GT)

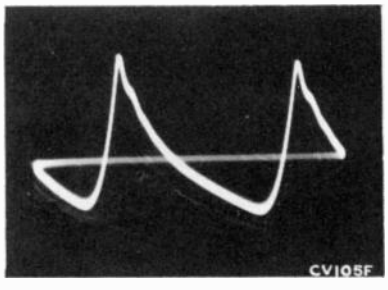


Figure 58—Cathode of Horizontal Oscillator Control (1.0 Volt PP) (Pin 3 of V110) (6SN7GT)

WAVEFORM PHOTOGRAPHS

Taken from RCA WO58A Oscilloscope

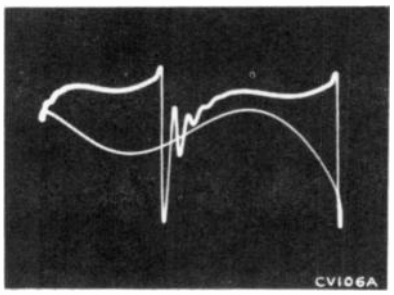


Figure 59—Junction of R126, R163 and R170 (52 Volts PP)

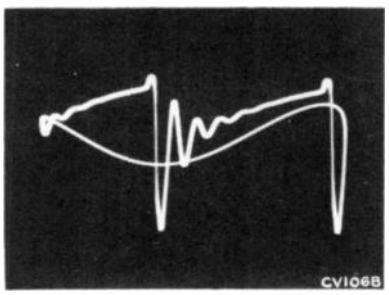


Figure 60—Grid of Horizontal Oscillator (340 Volts PP) (Pin 4 of V110) (6SN7GT)

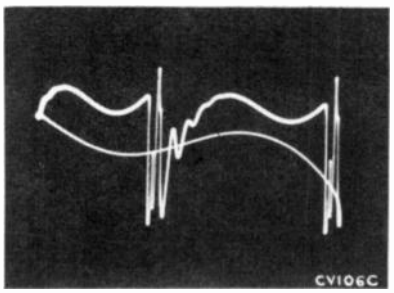


Figure 61—Plate of Horizontal Oscillator (190 Volts PP) (Pin 5 of V110) (6SN7GT)

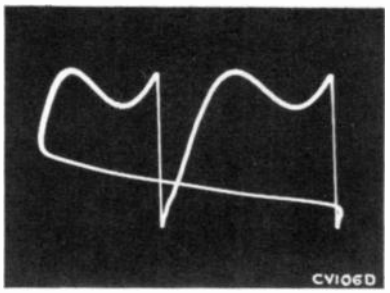


Figure 62—Terminal "C" of T108 (120 Volts PP)

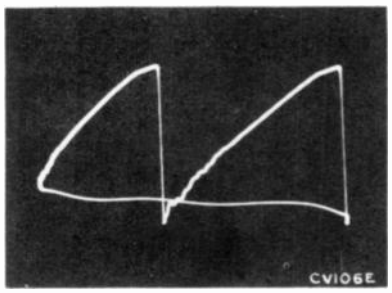


Figure 63—Input to Horizontal Output Tube (80-110 Volts PP) (Junction of C155 and C147B)

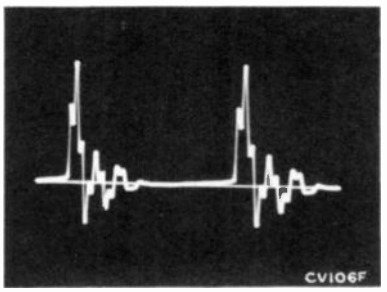


Figure 64—Plate of Horizontal Output (Approx. 6,000 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V111 to Ground)

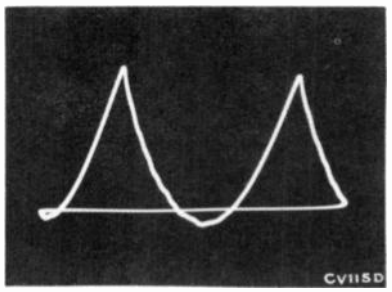


Figure 65—Cathode of Horizontal Output Tube (9-12 Volts PP) (Pin 3 of V111) (6BG6G)

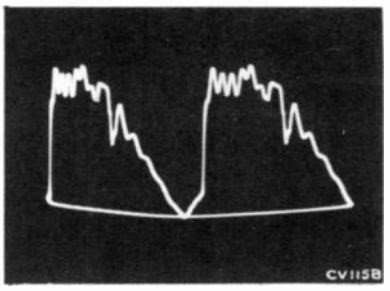


Figure 66—Screen of Horizontal Output Tube (5-120 Volts PP) (Pin 8 of V111) (6BG6G)

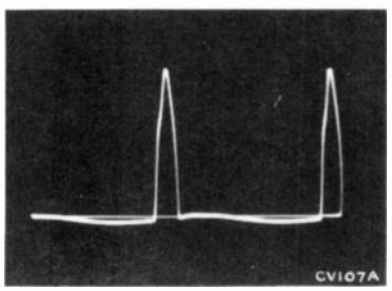


Figure 67—Cathode of Damper (3000 Volts PP) (Pin 3 of V113) (6W4GT)

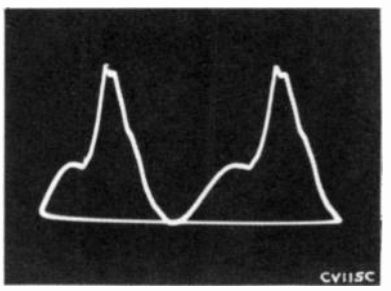


Figure 68—Plate of Damper (140 Volts PP) (Pin 5 of V113) (6W4GT)

7T103, 7T103B, 7T104, 7T104B, 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132 VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition, a 2500 microvolt test pattern signal was fed into the receiver, the picture synced and the AGC control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are read with a WV97A Senior "VoltOhmyst" between the indicted terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c. The symbol < means less than.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	
V1	6J6	Mixer	2500 Mu. V. Signal	2	180	—	—	7	0	5	−2.3	
			No Signal	2	160	—	—	7	0	5	−2.1	
V1	6J6	R-F Oscillator	2500 Mu. V. Signal	1	100	—	—	7	0	6	−3.0	Depending upon channel
			No Signal	1	90	—	—	7	0	6	−2.7	
V2	6CB6	R-F Amplifier	2500 Mu. V. Signal	5	220	6	160	2	0.1	1	−3.4	
			No Signal	5	150	6	100	2	0.4	1	−0.2	
V101	6AU6	1st Pix. I-F Amplifier	2500 Mu. V. Signal	5	195	6	222	7	0.3	1	−5.0	
			No Signal	5	90	6	115	7	0.6	1	−1.0	
V102	6CB6	2nd Pix. I-F Amplifier	2500 Mu. V. Signal	5	222	6	203	2	0.3	1	−5.0	
			No Signal	5	115	6	95	2	0.5	1	−1.0	
V103	6AU6	3rd Pix. I-F Amplifier	2500 Mu. V. Signal	5	185	6	225	7	0.2	1	−5.0	
			No Signal	5	100	6	115	7	0.6	1	−1.0	
V104	6CB6	4th Pix. I-F Amplifier	2500 Mu. V. Signal	5	165	6	142	2	2.2	1	0	
			No Signal	5	130	6	110	2	1.7	1	0	
V105	6AL5	Picture 2nd Det.	2500 Mu. V. Signal	7	*−3.5	—	—	1	0	—	—	*Depends on picture
			No Signal	7	*−0.8	—	—	1	0	—	—	*Depends on noise
V105	6AL5	AGC Rectifier	2500 Mu. V. Signal	2	*−9.0	—	—	5	6.0	—	—	*Depends on picture
			No Signal	2	*−1.3	—	—	5	5.8	—	—	*Depends on noise
V106	12AU7	1st Video Amplifier	2500 Mu. V. Signal	1	100	—	—	3	1.2	2	−2.3	At maximum contrast
			No Signal	1	50	—	—	3	0.6	2	−0.8	
			2500 Mu. V. Signal	1	190	—	—	3	9.0	2	−3.6	At minimum contrast
			No Signal	1	102	—	—	3	6.3	2	−0.8	
V106	12AU7	2nd Video Amplifier	2500 Mu. V. Signal	6	310	—	—	8	125	7	115	At maximum contrast
			No Signal	6	275	—	—	8	120	7	105	
			2500 Mu. V. Signal	6	286	—	—	8	135	7	120	At minimum contrast
			No Signal	6	265	—	—	8	121	7	105	
V107	12AU7	DC Rest. & Sync. Sep.	2500 Mu. V. Signal	1	9.8	—	—	3	52	2	−5.2	At maximum contrast
			No Signal	1	5.8	—	—	3	14.5	2	−1.0	
			2500 Mu. V. Signal	6	8.0	—	—	8	52	7	0	At maximum contrast
			No Signal	6	5.7	—	—	8	14.5	7	0	

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	
V108A	6SN7GT	Sync. Amplifier	2500 Mu. V. Signal	5	42	—	—	6	8.5	4	8.0	At maximum contrast
			No Signal	5	44	—	—	6	6.5	4	5.7	
V108	6SN7GT	Vertical Oscillator	2500 Mu. V. Signal	2	*300	—	—	3	0	1	*–60	*Depends on setting of height control
			No Signal	2	*300	—	—	3	0	1	*–58	
V109	6K6GT	Vertical Output	2500 Mu. V. Signal	3	370	4	370	8	51	5	0	
			No Signal	3	370	4	370	8	51	5	0	
V110	6SN7GT	Horizontal Osc. Control	2500 Mu. V. Signal	2	*160	—	—	3	*1.5	1	*–20	*Depends on setting of hold control and osc. adjustments
			No Signal	2	*160	—	—	3	*–11.0	1	–21	
V110	6SN7GT	Horizontal Oscillator	2500 Mu. V. Signal	5	230	—	—	6	0	4	–82	
			No Signal	5	225	—	—	6	0	4	–85	
V111	6BG6G	Horizontal Output	2500 Mu. V. Signal	Cap	*610	8	340	3	8.8	5	–33	*6000 volt pulse present
			No Signal	Cap	*610	8	330	3	8.8	5	–33	
V112	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	*11,000	—	—	*12,000 volt pulse present
			Brightness Maximum	Cap	*	—	—	2 & 7	*12,200	—	—	
V113	6W4GT	Damper	2500 Mu. V. Signal	5	380	—	—	3	610	—	—	*3000 volt pulse present
			No Signal	5	375	—	—	3	610	—	—	
V114	5U4G	Rectifier	2500 Mu. V. Signal	4 & 6	*368	—	—	2 & 8	390	—	—	*AC measured with AC voltmeter
			No Signal	4 & 6	*367	—	—	2 & 8	385	—	—	
V115	6AU6	1st Sound I-F Amp.	2500 Mu. V. Signal	5	120	6	120	7	0.5	1	–0.5	
			No Signal	5	110	6	110	7	0.6	1	–0.1	
V116	6AU6	2nd Sound I-F Amp.	2500 Mu. V. Signal	5	115	6	80	7	—	1	–19	
			No Signal	5	110	6	75	7	—	1	–1.0	
V117	6AL5	Sound Discrim.	2500 Mu. V. Signal	2	–7.2	—	—	5	0	—	—	Sound Discriminator in all chassis but KCS47GF-2
			No Signal	2	–10.0	—	—	5	0	—	—	
V117	6AL5	Ratio Detector	2500 Mu. V. Signal	2	1.2	—	—	5	8.8	—	—	Ratio Detector Used in KCS47GF-2 Only
			No Signal	2	0.4	—	—	5	7.8	—	—	
V118	6AV6	1st Audio Amplifier	2500 Mu. V. Signal	7	86	—	—	2	0	1	–0.8	
			No Signal	7	78	—	—	2	0	1	–0.8	
V119	6K6GT	Audio Output	2500 Mu. V. Signal	3	350	4	360	8	145	5	118	
			No Signal	3	350	4	360	8	135	5	110	
V120	17CP4 17GP4	Kinescope	2500 Mu. V. Signal	Cone	11,000	10	380	11	100	2	46	
			No Signal	Cone	12,200	10	375	11	74	2	8.3	

7T103, 7T103B, 7T104, 7T104B, 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132 **R-F UNIT WIRING DIAGRAM**

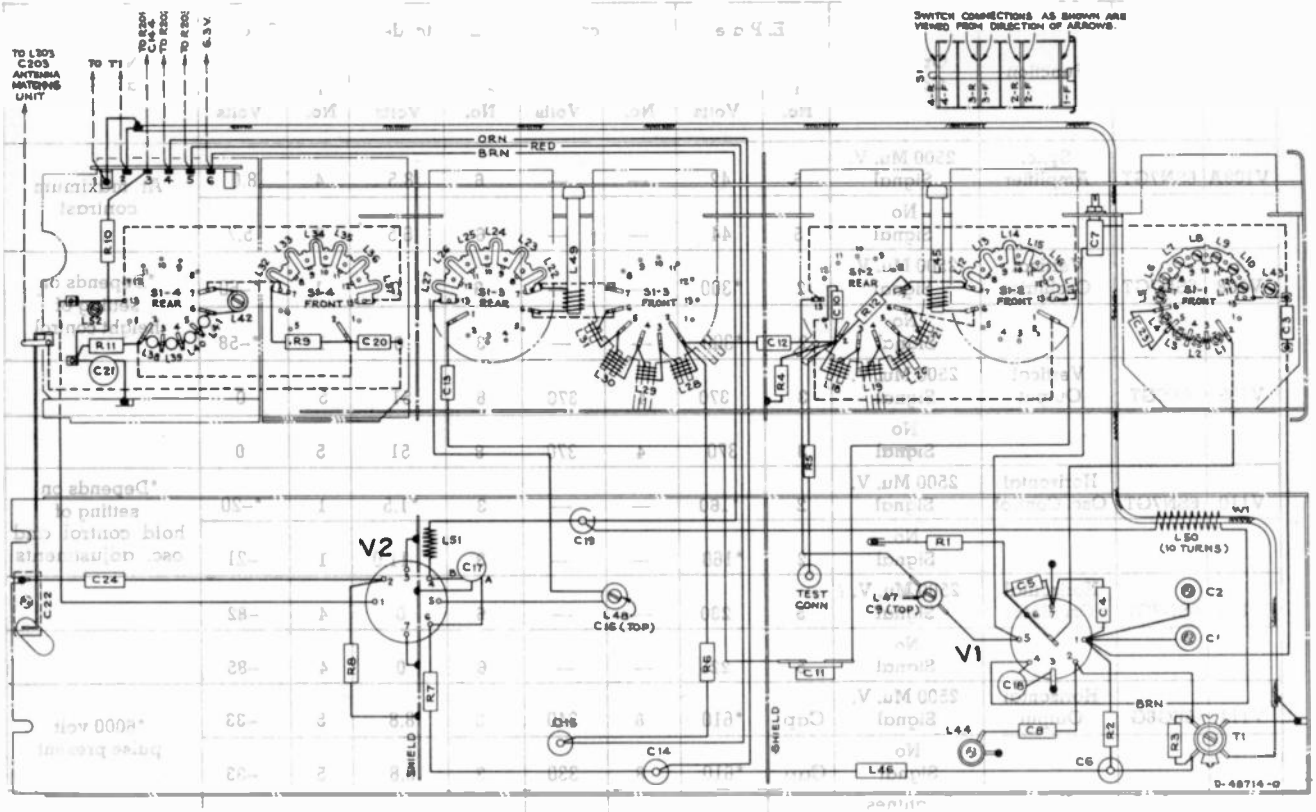


Figure 69—R-F Unit Wiring Diagram

CRITICAL LEAD DRESS:

1. All leads in the picture and sound i-f circuits must be dressed as short and direct as possible with the exception of C106, C107, C110 and C117, which are to be dressed with enough slack so as not to have to move the body of the capacitor to align that particular stage.
2. Dress all 1,500 mmf, .005 mfd and .01 mfd capacitors in the i-f section with leads as short as possible.
3. Dress all wires between T101 and the r-f unit in clamp.
4. Dress C185 to act as shield for lead between pin 5 of V115 socket to T111D and picture i-f circuits.
5. Dress the bodies of resistors R106, R108, R113, R119, R191, R192 and capacitor C176 as close to tube pin as possible.
6. Dress L114 with coded end as close to pin 2 of V105 socket as possible.
7. The length of the bus wire from pin 2 of V118 to ground should not be shortened or rerouted.
8. Dress R194 as close to chassis with leads as short as possible.
9. Dress C199 with leads as short as possible and away from S106.
10. Keep the leads on C126 as short and direct as possible.
11. Dress all components connected to V106 socket up and away from the chassis except L104.
12. Keep the body and coded end of L104 as close to pin 2 of V105 socket as possible.
13. Dress the 4.5 mc. trap L107 up and away from the chassis base.
14. Dress C132 up in the air and towards V105 socket.
15. Dress R125 with body as close as possible to pin 2 of U106 socket.
16. Keep body of R123 as close as possible to pin 2 of V105 socket.
17. Dress C133 and C190 away from C132, C151 and C153.
18. Dress the white wire from picture control R128-3 away from the chassis.
19. Dress all slack on kinescope socket leads under chassis. Dress brown wire away from any components associated with V105 or V106.
20. The green lead from the kinescope socket should be dressed away from all other leads and components and away from V106.
21. Dress R133 towards chassis rear apron.
22. Dress all leads in clamps on rear apron away from V117, V104, V105, V106 sockets and S103.
23. Dress green wire from C147A up and away from chassis.
24. Dress blue wire of T107 toward front apron of chassis.
25. Dress C153 down next to the chassis base.
26. Dress blue/white wire from height control R151-3 under R180.
27. Dress R161, R162, R163, R164 and R170 up and away from the chassis and with a half-inch clearance from the soldering point.
28. Dress the yellow wire from pin 3 of V110 socket over C153.
29. Dress both leads of C198 away from the body of the capacitor.
30. Dress fuse in high voltage compartment so as not to short circuit to ground.
31. Dress blue and blue/yellow wire from power transformer in 3 clamps on chassis base and away from S103 and video section.
32. Dress both wires on S106 away from blue/yellow damper leads of T110.
33. Dress the brown wire from pin 8 of V114 socket away from V118 socket.
34. Dress all 2 watt resistors away from each other and away from all wires and other components.

KCS47GF-2 CHASSIS WIRING DIAGRAM

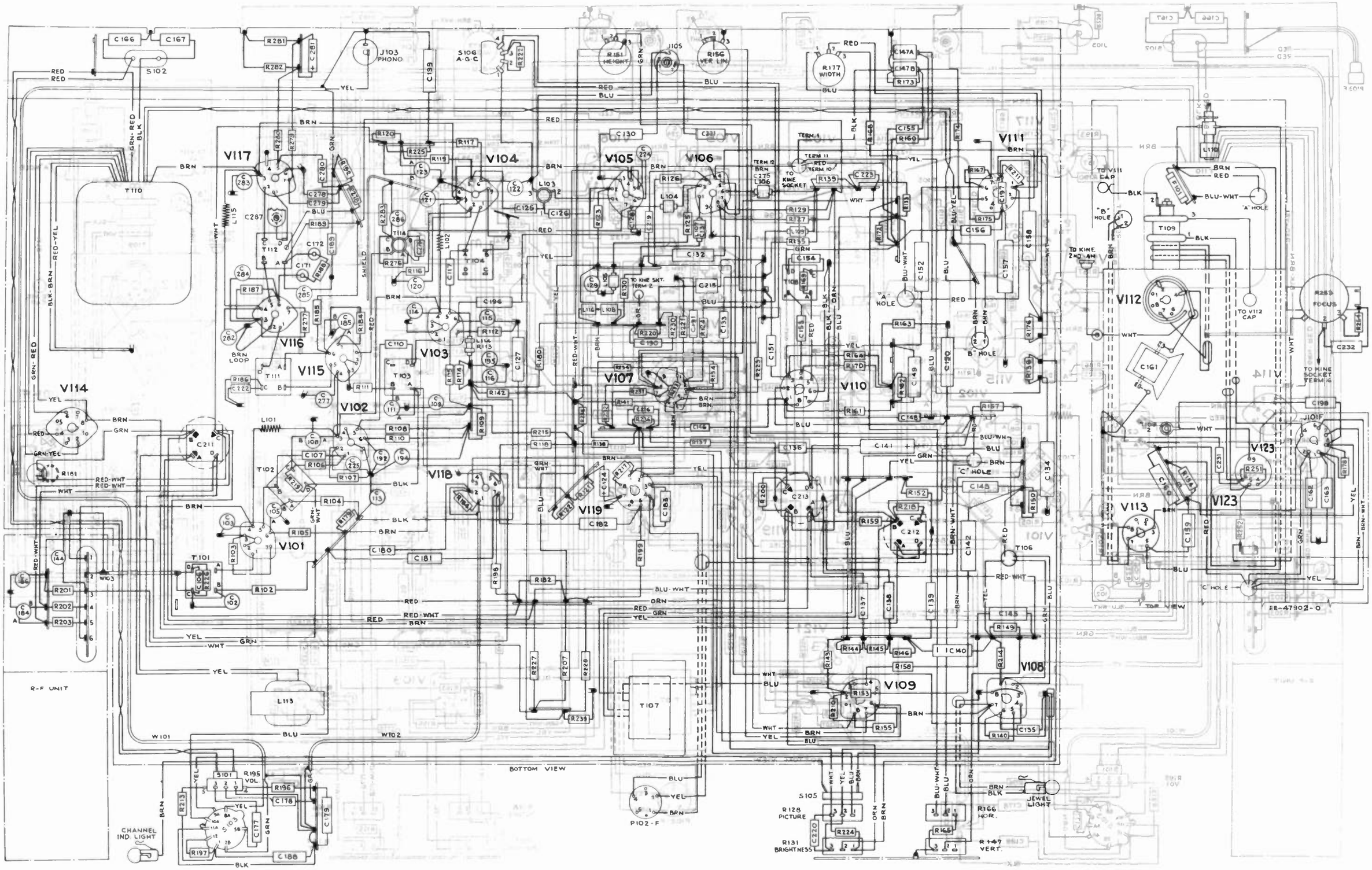


Figure 70— Chassis Wiring Diagram

KCS47D CHASSIS WIRING DIAGRAM

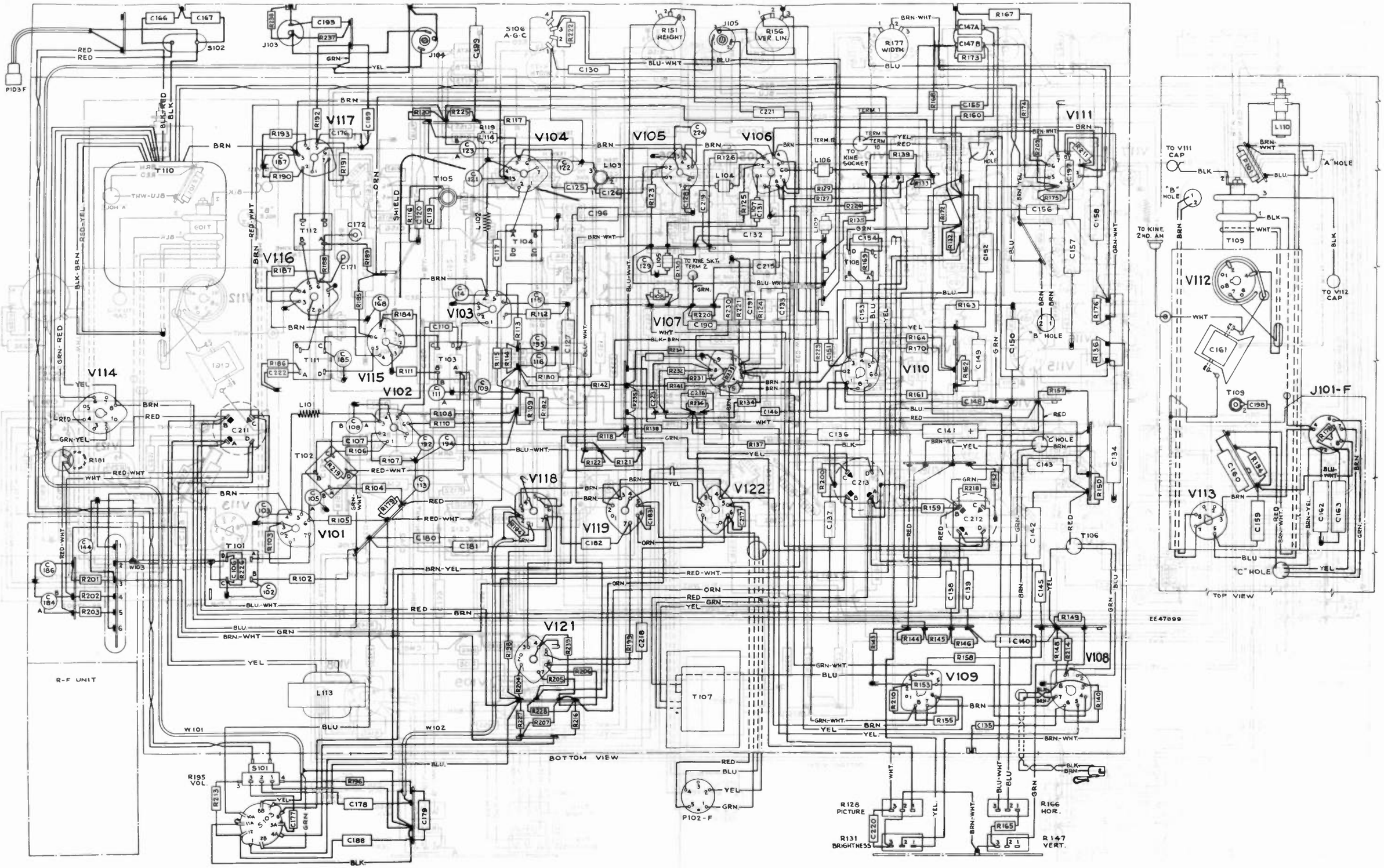


Figure 71--KCS47D Chassis Wiring Diagram

KCS47GF-2 CIRCUIT SCHEMATIC DIAGRAM

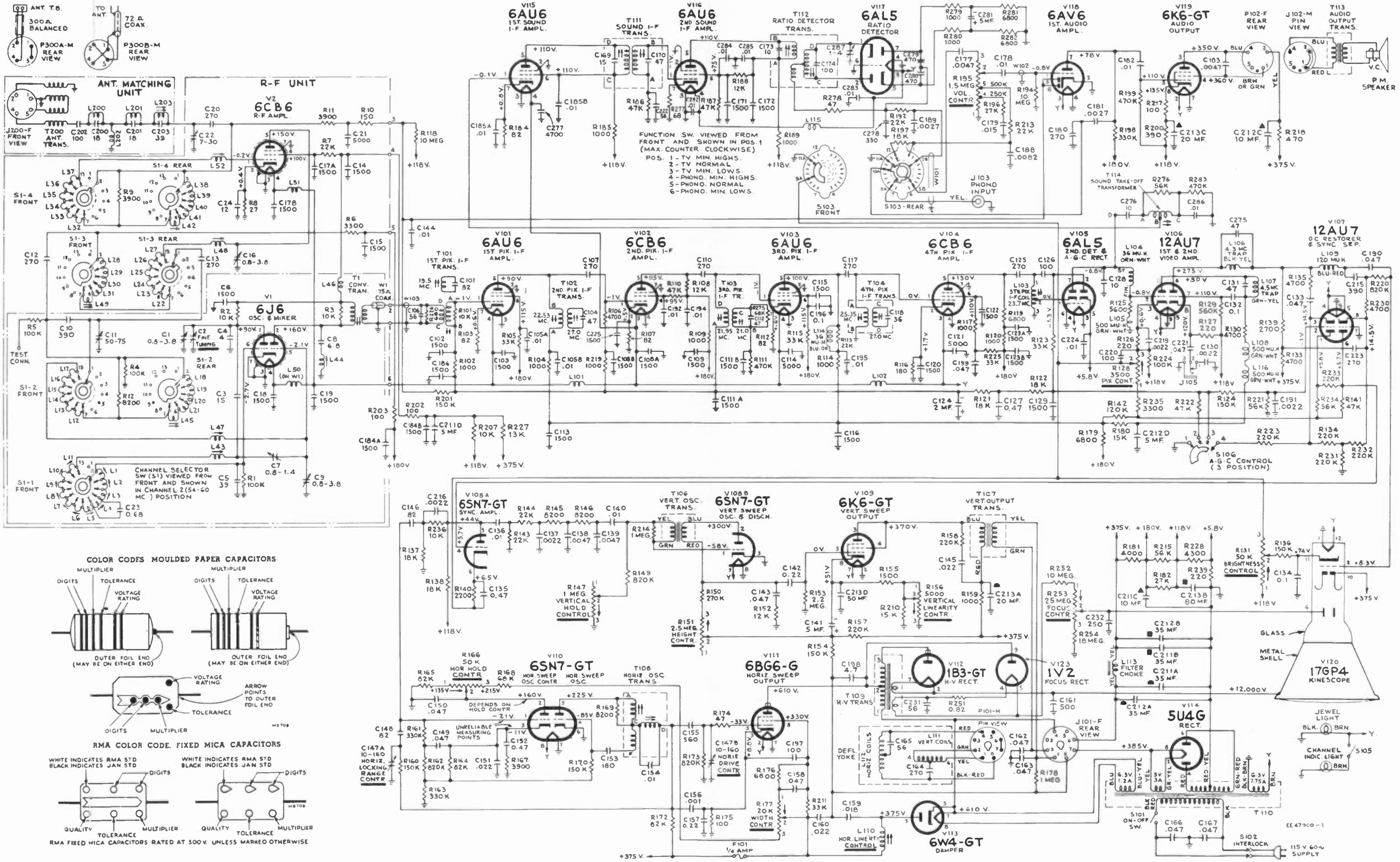


Figure 73—Schematic Diagram
KCS47GF-2

A number of KCS47 chassis of various vintages were converted to intercarrier in the field.

The sound section of field converted receivers is as shown above. However, those receivers may not include the modifications listed on page 43.

All resistance values in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Coil resistance values less than 1 ohm are not shown.

Direction of arrows at controls indicates clockwise rotation.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

KCS47B, KCS47C CHASSIS WIRING DIAGRAM

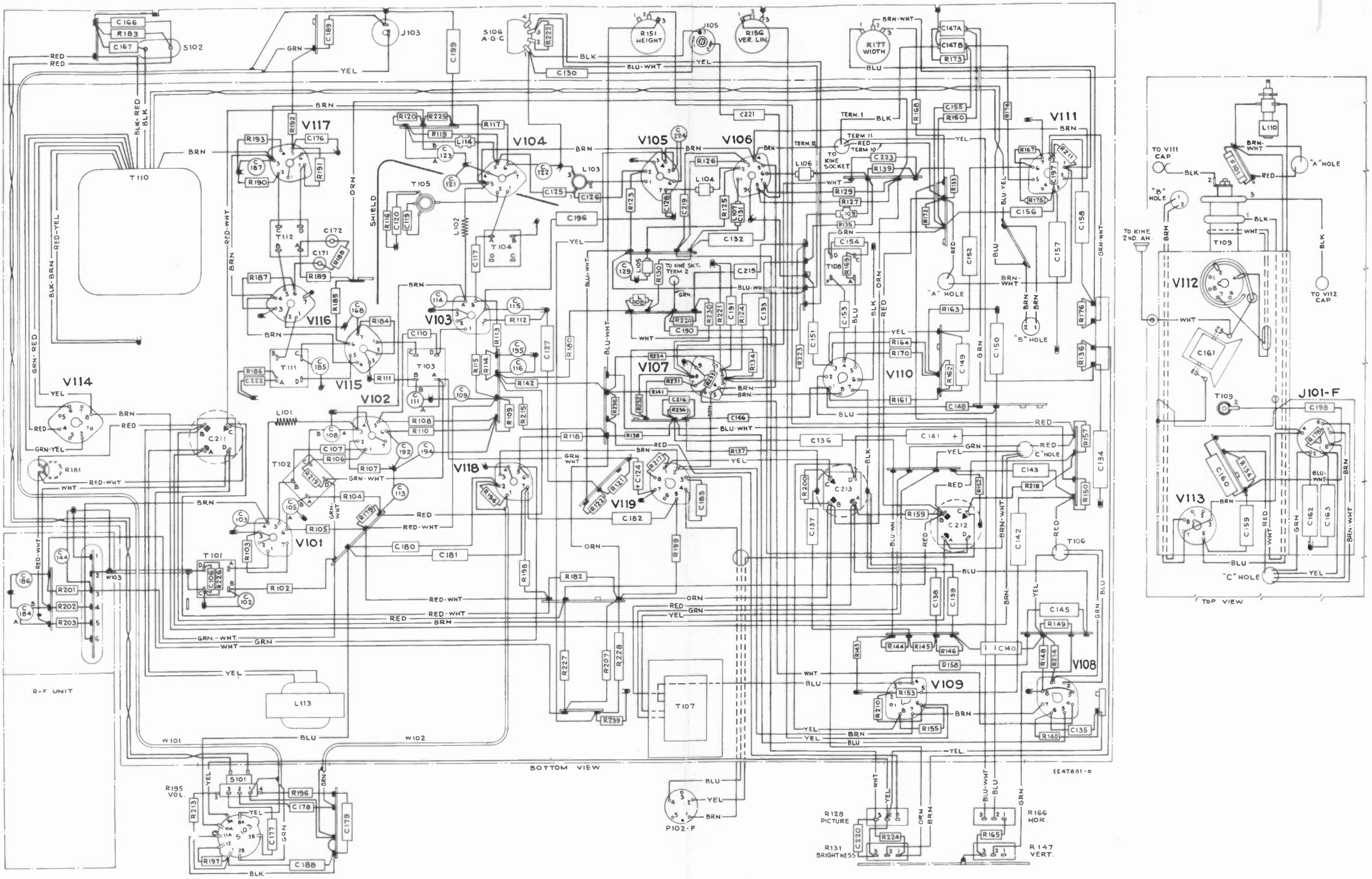


Figure 74—KCS47B and KCS47C Chassis Wiring Diagram

KCS47F, KCS47G CHASSIS WIRING DIAGRAM

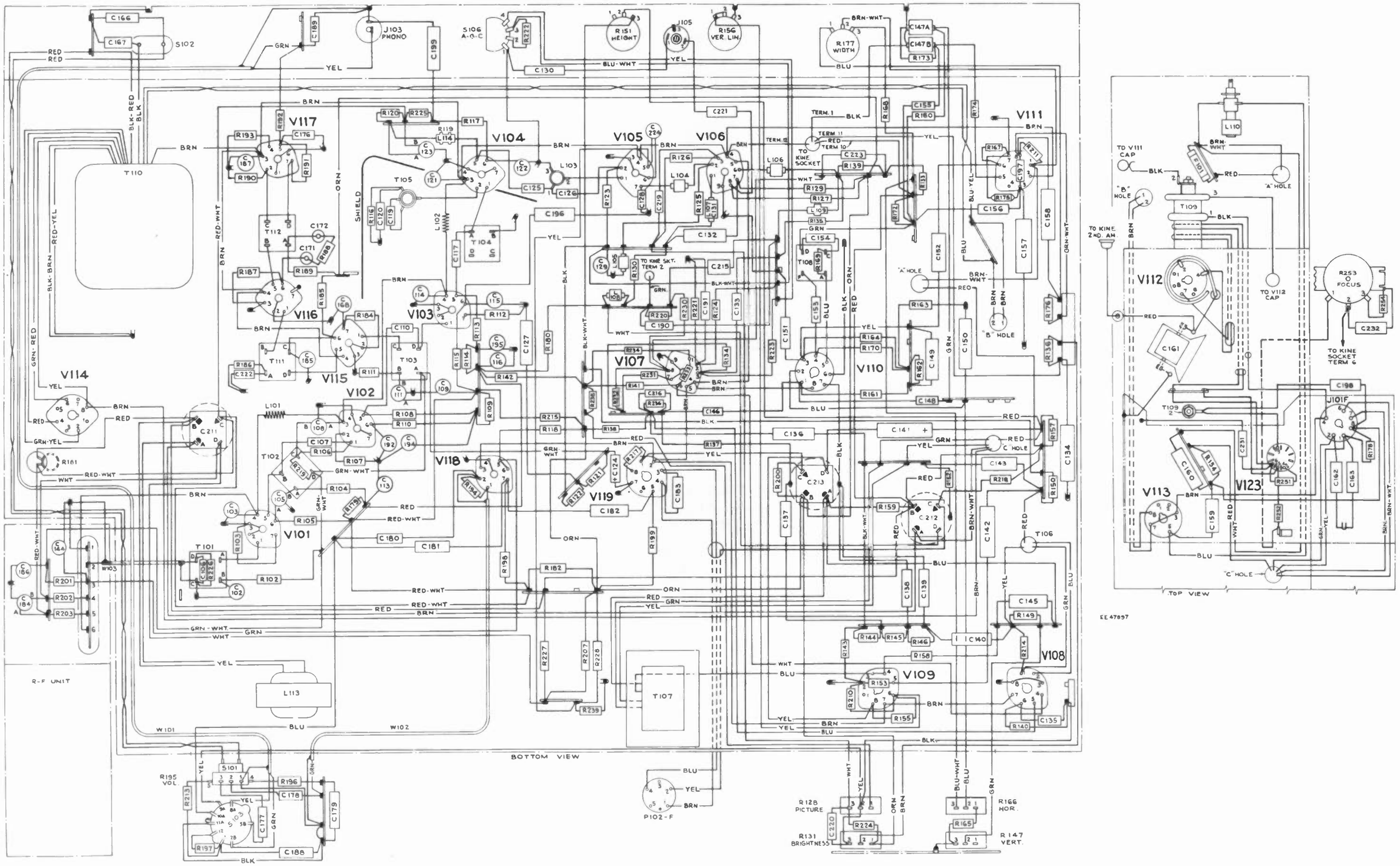
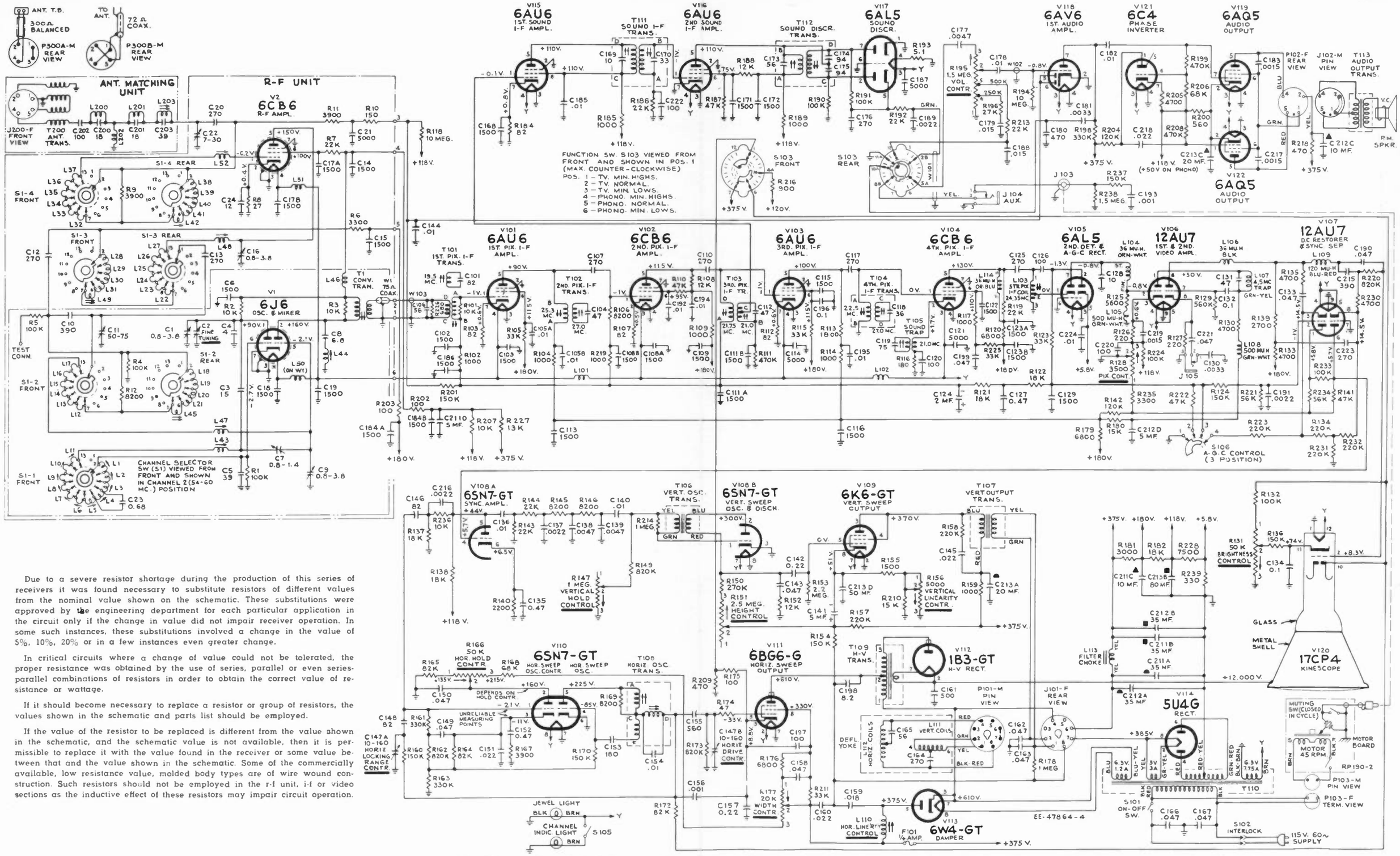


Figure 75—KCS47F and KCS47G Chassis Wiring Diagram

KCS47D CIRCUIT SCHEMATIC DIAGRAM



Due to a severe resistor shortage during the production of this series of receivers it was found necessary to substitute resistors of different values from the nominal value shown on the schematic. These substitutions were approved by the engineering department for each particular application in the circuit only if the change in value did not impair receiver operation. In some such instances, these substitutions involved a change in the value of 5%, 10%, 20% or in a few instances even greater change.

In critical circuits where a change of value could not be tolerated, the proper resistance was obtained by the use of series, parallel or even series-parallel combinations of resistors in order to obtain the correct value of resistance or wattage.

If it should become necessary to replace a resistor or group of resistors, the values shown in the schematic and parts list should be employed.

If the value of the resistor to be replaced is different from the value shown in the schematic, and the schematic value is not available, then it is permissible to replace it with the value found in the receiver or some value between that and the value shown in the schematic. Some of the commercially available, low resistance value, molded body types are of wire wound construction. Such resistors should not be employed in the r-f unit, i-f or video sections as the inductive effect of these resistors may impair circuit operation.

All resistance values in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Coil resistance values less than 1 ohm are not shown.

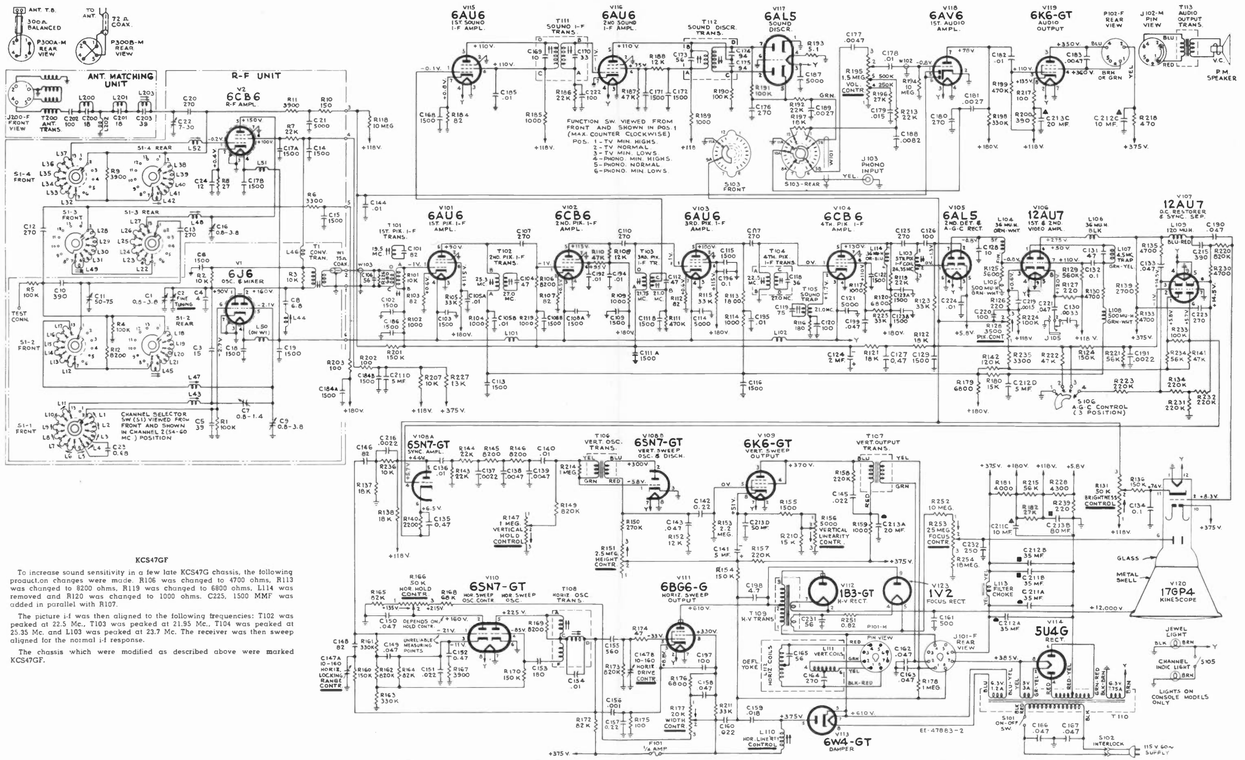
Direction of arrows at controls indicates clockwise rotation.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

Figure 72—KCS47D Schematic Diagram

KCS47F, KCS47G AND KCS47GF CIRCUIT SCHEMATIC DIAGRAM



KCS47GF

To increase sound sensitivity in a few late KCS47G chassis, the following proauct.on changes were made. R106 was changed to 4700 ohms, R113 was changed to 8200 ohms, R119 was changed to 6800 ohms, L114 was removed and R120 was changed to 1000 ohms. C225, 1500 MMF was added in parallel with R107.

The picture i.f was then aligned to the following frequencies: T102 was peaked at 22.5 Mc., T103 was peaked at 21.95 Mc., T104 was peaked at 25.35 Mc. and L103 was peaked at 23.7 Mc. The receiver was then sweep aligned for the normal i-f response.

The chassis which were modified as described above were marked KCS47GF.

All resistance values in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Coil resistance values less than 1 ohm are not shown.

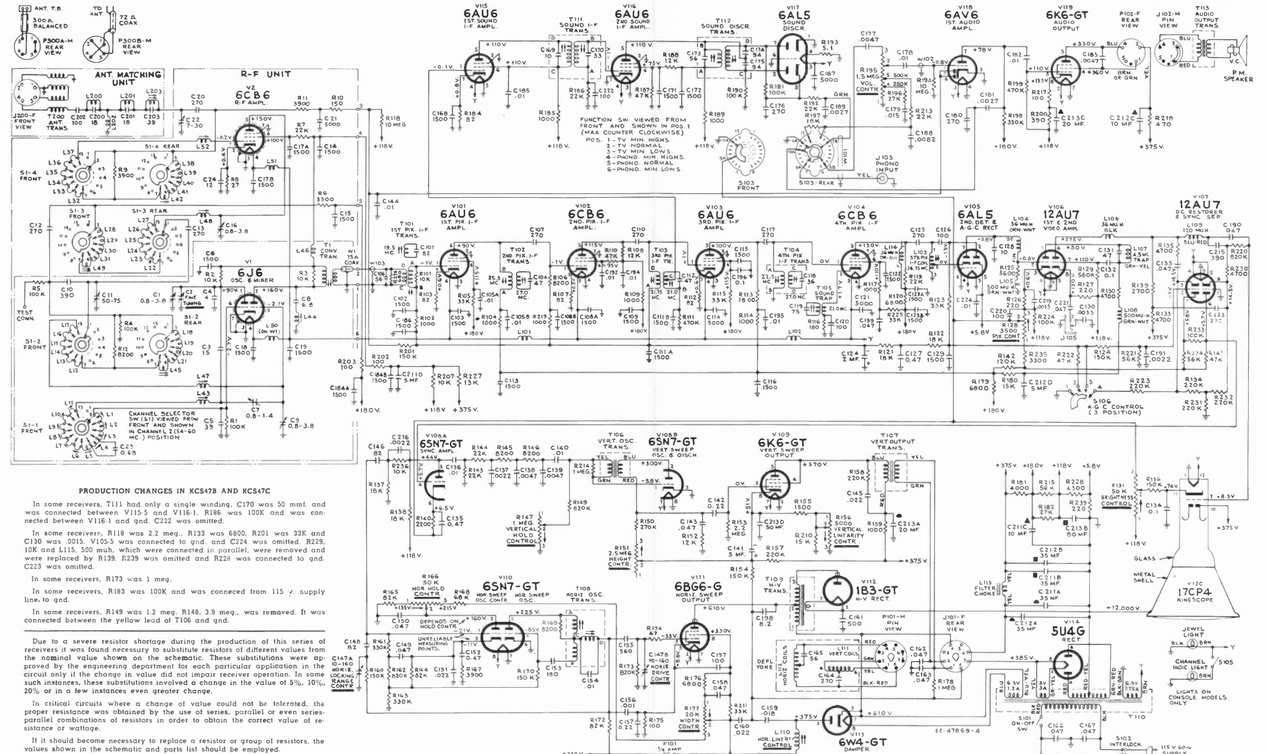
Direction of arrows at controls indicates clockwise rotation.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

Figure 76—KCS47F, KCS47G and KCS47GF Schematic Diagram

KCS47B AND KCS47C CIRCUIT SCHEMATIC DIAGRAM



PRODUCTION CHANGES IN KCS47B AND KCS47C

In some receivers, T111 had only a single winding, C170 was 50 mmf. and was connected between V116-1 and V116-1. R186 was 100K and was connected between V116-1 and gnd. C222 was omitted.

In some receivers, R118 was 2.2 meg., R133 was 6800, R201 was 33K and C130 was .0015. V105-5 was connected to gnd. and C224 was omitted. R229, 10K and L115, 500 muh, which were connected in parallel, were removed and were replaced by R139, E239 was omitted and R229 was connected to gnd. C223 was omitted.

In some receivers, R173 was 1 meg.

In some receivers, R183 was 100K and was connected from 115 v. supply line.to grid of V116-1.

In some receivers, R149 was 1.2 meg. R148, 3.9 meg., was removed. It was connected between the yellow lead of T106 and gnd.

Due to a severe resistor shortage during the production of this series of receivers it was found necessary to substitute resistors of different values from the nominal value shown on the schematic. These substitutions were approved by the engineering department for each particular application in the circuit only if the change in value did not impair receiver operation. In some such instances, these substitutions call for a change in the value of 5%, 10%, 20% or in a few instances even greater change.

In critical circuits where a change of value could not be tolerated, the proper resistance was obtained by the use of series, parallel or even series-parallel combinations of resistors in order to obtain the correct value of resistance or wattage.

It it should become necessary to replace a resistor or group of resistors, the values shown in the schematic and parts list should be employed.

If the value of the resistor to be replaced is different from the value shown in the schematic, and the schematic value is not available, then it is permissible to replace it with the value found in the receiver or some value between that and the value shown in the schematic. Some of the commercially available, low resistance value, molded body types are of wire wound construction. Such resistors should not be employed in the r-f unit, i-f or video sections as the inductive effect of these resistors may impair circuit operation.

All resistance values in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Direction of arrows at controls indicates clockwise rotation.

Coil resistance values less than 1 ohm are not shown.

In some receivers, substitutions have caused changes in component lead color codes. in electrolytic capacitor values and their lug identification markings.

All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

Figure 77—KCS47B and KCS47C Schematic Diagram

7T103B, 7T104B, 7T112B, 7T122B, 7T123B, 7T125B

7T103, 7T104, 7T112, 7T122, 7T123, 7T124

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLY KRK8B
75188	Board—Terminal board, 5 contact and ground
75067	Bracket—Vertical bracket for holding oscillator tube shield
75201	Cable—75 ohms, coax. cable (7¼") complete with coil (W1, L50)
75186	Capacitor—Ceramic, variable for fine tuning—plunger type (C2)
75289	Capacitor—Ceramic, 4 mmf., ±0.5 mmf. (C4)
75189	Capacitor—Adjustable, 7-30 mmf. (C22)
75200	Capacitor—Ceramic, 12 mmf. (C24)
45465	Capacitor—Ceramic, 15 mmi. (C3)
75196	Capacitor—Ceramic, 39 mmf. (C5)
75174	Capacitor—Ceramic, trimmer, 50-75 mmf. (C11)
75199	Capacitor—Ceramic, 270 mmf. (C12, C13, C20)
75641	Capacitor—Ceramic, 390 mmf. (C10)
75166	Capacitor—Ceramic, 1500 mmf. (C6, C14, C15, C19)
75089	Capacitor—Ceramic, dual, 1500 mmf. (C17A, C17B)
73748	Capacitor—Ceramic, 1500 mmf. (C18)
73473	Capacitor—Ceramic, 5000 mmf. (C21)
75172	Capacitor—Tubular, steatite, adjustable, 0.65-1.2 mmf. (C7)
71504	Capacitor—Ceramic, 0.68 mmf. (C23)
75184	Capacitor—Ceramic, adjustable, 0.75-4 mmf., complete with adjusting stud (C1)
75197	Capacitor—Ceramic, 6.8 mmf. (C8)
75167	Clip—Tubular clip for mounting stand-off capacitors—RCA 75166
75182	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (screw adjustment) for converter section (C9, L47)
75183	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (screw adjustment) for r-f section (L48, C16)
75185	Coil—Converter plate loading coil (L44)
75202	Coil—Choke coil .56 muh (L46)
73477	Coil—Choke coil (L51)
75187	Core—Adjustable core for fine tuning capacitor C2
75162	Detent—Detent mechanism and fibre shaft
73453	Form—Coil form for L45 and L49
75165	Link—Link assembly for fine tuning
76135	Plate—Front plate and shaft bearing
14343	Retainer—Fine tuning shaft retaining ring
	Resistor—Fixed, composition:—
503027	27 ohms, ±10%, ½ watt (R8)
504115	150 ohms, ±20%, ½ watt (R10)
503233	3300 ohms, ±10%, ½ watt (R6)
503239	3900 ohms, ±10%, ½ watt (R9, R11)
503282	8200 ohms, ±10%, ½ watt (R12)
3078	10,000 ohms, ±5%, ½ watt (R3)
504310	10,000 ohms, ±20%, ½ watt (R2)
503322	22,000 ohms, ±10%, ½ watt (R7)
504410	100,000 ohms, ±20%, ½ watt (R1, R4, R5)
75164	Rod—Actuating plunger rod (fibre) for fine tuning link
71476	Screw—#4-40 x ¼" binder head machine screw for adjusting L6, L7, L8, L9, L10, L11
75176	Screw—#4-40 x ⅜" fillister head screw for adjusting L5
75177	Screw—#4-40 x 5/16" fillister head screw for adjusting L1, L2, L3, L4, L43
74575	Screw—#4-40 x .359" adjusting screw for L42
73640	Screw—#4-40 x 7/16" adjusting screw for L52
75159	Shaft—Channel selector shaft and plate
75160	Shaft—Fine tuning shaft and cam
75168	Shield—Oscillator and converter sections shield for r-f unit—snap-on type
75193	Shield—Tube shield for V1
75192	Shield—Tube shield for V2
75088	Socket—Tube socket, 7 contact, miniature, ceramic, saddle mounted
75191	Spacer—Insulating spacer for front plate (4 req'd)
75163	Spring—Friction spring (formed) for fine tuning cam
75068	Spring—Retaining spring for oscillator tube shield
74578	Spring—Retaining spring for adjusting screws
73457	Spring—Return spring for fine tuning control
30340	Spring—Hair pin spring for fine tuning link
75175	Stator—Oscillator section stator complete with rotor, segment, coils, adjusting screws and capacitors C3 and C23 (S1-1, C3, C23, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L43)
75178	Stator—Converter stator complete with rotor, coils, capacitors (C10 and C12) and resistors (R4 and R5) (S1-2, C10, C12, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L45, R4, R5, R12)
75179	Stator—R-F amplifier stator complete with rotor, coils, capacitor (C13) and resistor (R6) (S1-3, C13, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L49, R6)

STOCK No.	DESCRIPTION
75180	Stator—Antenna stator complete with rotor, coils, capacitors (C20 and C21) and resistors (R9, R10, R11) (S1-4, C20, C21, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L52, R9, R10, R11)
75169	Strip—Coil segment mounting strip—RH center
75170	Strip—Coil segment mounting strip—LH lower
75171	Strip—Coil segment mounting strip—LH upper—less trimmer C7
75173	Stud—#6-32 x 13/16" adjusting stud for C7 trimmer
75446	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for timmer coils L47, L48 and capacitor C1 uncoded and coded "ER"
75447	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 coded numerically and "Hi Q"
75181	Transformer—Converter transformer (T1)
75190	Washer—Insulating washer (neoprene) for capacitor C7
75607	Washer—Insulating washer (hex)
	Chassis Assemblies KCS47B or KCS47F—Table models KCS47C KCS47G or KCS47GF-2—Console models KCS47D—2 way combination
75515	Bracket—Channel indicator lamp bracket for KCS47C, KCS47D & KCS47G
76532	Capacitor—Adjustable trimmer, steatite, 1-4 mmf. (C287 KCS47GF-2)
75646	Capacitor—Ceramic, 4.7 mmf. (C198 for KCS47F & KCS47G)
76009	Capacitor—Ceramic, 8.2 mmf. (C198 for KCS47B, KCS47C & KCS47D)
53511	Capacitor—Ceramic, 10 mmf. (C128)
75217	Capacitor—Mica trimmer, dual 10-160 mmf. (C147A, C147B)
75450	Capacitor—Ceramic, 39 mmf. (C203)
71924	Capacitor—Ceramic, 56 mmf. (C106)
76384	Capacitor—Ceramic, 56 mmf. (C231 for KCS47F & KCS47G)
71924	Capacitor—Ceramic, 56 mmf. (C222) (KCS47GF-2)
73090	Capacitor—Mica, 82 mmf. (C146, C148)
75437	Capacitor—Ceramic, 100 mmf. (C202)
45469	Capacitor—Ceramic, 100 mmf. (C120) (KCS47 B, C, D, F and G)
45233	Capacitor—Ceramic, 100 mmf. (C126, C197, C220) (C222 KCS47 B, C, D, F and G)
73102	Capacitor—Mica, 180 mmf. (C153)
75250	Capacitor—Tubular, moulded paper, oil impregnated, 250 mmf., 12,500 volts (C232 for KCS47F and KCS47G)
76303	Capacitor—Ceramic, 270 mmf. (C223)
75244	Capacitor—Ceramic, 270 mmf. (C176) (KCS47 B, C, D, F and G)
76303	Capacitor—Ceramic, 270 mmf. (C223 for KCS47F & KCS47G)
39638	Capacitor—Mica, 270 mmf. (C180 for KCS47B, KCS47C)
73091	Capacitor—Mica, 270 mmf. (C107, C110, C117, C125)
39638	Capacitor—Mica, 270 mmf. (C130 for KCS47F & KCS47G)
76473	Capacitor—Mica, 330 mmf. (C278) (KCS47GF-2)
73094	Capacitor—Mica; 390 mmf. (C215)
39644	Capacitor—Mica, 470 mmf. (C180 for KCS47D)
39644	Capacitor—Mica, 470 mmf. (C279, C280) (KCS47GF-2)
74947	Capacitor—Ceramic, 500 mmf., 20,000 volts (C161)
74250	Capacitor—Mica, 560 mmf. (C155)
75166	Capacitor—Ceramic, 1500 mmf. (stand-off) (C171, C172)
73748	Capacitor—Ceramic, 1500 mmf. (C102, C103, C109, C113, C115, C116, C122, C129, C186) (C168 KCS47 B, C, D, F and G)
75089	Capacitor—Ceramic, dual 1500 mmf. (C108A, C108B, C111A, C111B, C123A, C123B, C184, C184B)
73748	Capacitor—Ceramic, 1500 mmf. (C120) (KCS47GF-2)
73473	Capacitor—Ceramic, 4700 mmf. (C277) (KCS47GF-2)
73473	Capacitor—Ceramic, 5000 mmf. (C114, C121) (C187, KSC47 B, C, D, F and G)
75877	Capacitor—Ceramic, dual 10,000 mmf. (C105A, C105B)
73960	Capacitor—Ceramic, 10,000 mmf. (C144, C192, C194, C195, C224) (C185 KCS47 B, C, D, F and G)
73960	Capacitor—Ceramic, 10,000 mmf. (C282, C283, C284, C285, C286) (KCS47GF-2)
75877	Capacitor—Ceramic, dual 10,000 mmf. (C185A, C185B) (KCS47GF-2)
73747	Capacitor—Electrolytic, 2 mfd, 50 volts (C124)
28417	Capacitor—Electrolytic, 5 mfd, 450 volts (C141)
74521	Capacitor—Electrolytic, 5 mfd., 50 volts (C281) (KCS47GF-2)
75511	Capacitor—Electrolytic comprising 1 section of 20 mfd, 450 volts, 1 section of 80 mfd, 200 volts, 1 section of 20 mfd, 200 volts and 1 section of 50 mfd, 50 volts (C213A, C213B, C213C, C213D)
75510	Capacitor—Electrolytic comprising 2 sections of 35 mfd, 450 volts, 1 section of 10 mfd, 450 volts and 1 section of 5 mfd, 450 volts (C211A, C211B, C211C, C211D, C212A, C212B, C212C, C212D)
75249	Capacitor—Tubular, paper, oil impregnated, .001 mfd, 600 volts (C193 for KCS47D)
75643	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd, 1000 volts (C156)
73598	Capacitor—Tubular, paper, oil impregnated, .0015 mfd, 600 volts (C219) (C183, C217 for KCS47D)
73802	Capacitor—Tubular, paper, oil impregnated, .0015 mfd, 1000 volts (C219 for KCS47F & KCS47G)

STOCK No.	DESCRIPTION
73595	Capacitor—Tubular, paper, oil impregnated, .0022 mfd, 600 volts (C130, C137, C191, C216)
73595	Capacitor—Tubular, paper, oil impregnated, .0022 mfd., 600 volts (C219) (KCS47GF-2)
73599	Capacitor—Tubular, paper, oil impregnated, .0027 mfd, 600 volts (C181 for KCS47B, KCS47C, KCS47F & KCS47G) (C189 for KCS47B, KCS47C, KCS47D, KCS47F & KCS47G)
73795	Capacitor—Tubular, paper, oil impregnated, .0033 mfd, 600 volts (C181 for KCS47D)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd, 600 volts (C138, C139, C177) (C183 for KCS47B, KCS47C, KCS47F & KCS47G)
73808	Capacitor—Tubular, paper, oil impregnated, .0082 mfd, 1000 volts (C188 for KCS47B, KCS47C, KCS47F & KCS47G)
73561	Capacitor—Tubular, paper, oil impregnated, .01 mfd, 400 volts (C136, C178, C182)
73594	Capacitor—Tubular, moulded paper, oil impregnated, .01 mfd, 600 volts (C140, C154)
73797	Capacitor—Tubular, paper, oil impregnated, .015 mfd, 600 volts (C179) (C188 for KCS47D)
74727	Capacitor—Tubular, paper, oil impregnated, .018 mfd, 1000 volts (C159)
73562	Capacitor—Tubular, paper, oil impregnated, .022 mfd, 400 volts (C145, C151) (C218 for KCS47D)
73810	Capacitor—Tubular, paper, oil impregnated, .022 mfd, 1000 volts (C160)
73553	Capacitor—Tubular, paper, oil impregnated, .047 mfd, 400 volts (C149, C199, C221)
75071	Capacitor—Tubular, moulded paper, .047 mfd, 400 volts (C166, C167)
73592	Capacitor—Tubular, paper, oil impregnated, .047 mfd, 600 volts (C133, C150, C190)
73597	Capacitor—Tubular, paper, oil impregnated, .047 mfd, 1000 volts (C158, C162, C163) (C143 for KCS47F & KCS47G)
73551	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd, 400 volts (C132, C196)
73557	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd, 600 volts (C134)
73794	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd, 400 volts (C157)
74957	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd, 600 volts (C142)
73787	Capacitor—Tubular, paper, oil impregnated, 0.47 mfd, 200 volts (C127, C135, C152)
76284	Choke—Filter choke (L113)
76143	Clip—Tubular clip for mounting stand-off capacitor #75166
75210	Coil—Fifth pix, i-f coil complete with adjustable core (L103)
73477	Coil—Choke coil (L115) (KCS47GF-2)
71449	Coil—Horizontal linearity coil (L110)
73591	Coil—Antenna matching coil (2 req'd) (Part of T200)
75241	Coil—Antenna shunt coil (L202)
73477	Coil—Choke coil (L101, L102)
75299	Coil—Peaking coil (36 muh) (L104)
71793	Coil—Peaking coil (36 muh) (L106) (KCS47 B, C, D, F and G)
76285	Coil—Peaking coil (36 muh) (L114, R119)
76285	Coil—Peaking coil (36 muh) (L114, R113) (KCS47GF-2)
75253	Coil—Peaking coil (120 muh) (L109)
75252	Coil—Peaking coil (500 muh) (L105, L108)
75252	Coil—Peaking coil (500 muh) (L116) (KCS47GF-2)
74594	Connector—2 contact male connector for power cord
35787	Connector—Phono input connector (J103)
30868	Connector—2 contact female connector for motor cable for KCS47D (P103)
35383	Connector—8 contact male connector—part of deflection yoke (P101)
75482	Connector—Auxiliary phono input connector for Model 7T132 (J104)
68592	Connector—8 contact female connector for deflection yoke leads (J101)
38853	Connector—4 contact female connector for antenna transformer (J200)
5040	Connector—4 contact female connector for speaker cable (P102)
75517	Contact—Anode connector contact only
75215	Control—Horizontal and vertical hold control (R147, R166)
75216	Control—Picture and brightness control for KCS47B (R128, R131)
71441	Control—Vertical linearity control (R156)
71440	Control—Height control (R151)
75516	Control—Width control (R177)
75514	Control—Picture control, brightness control and channel light switch for KCS47C and KCS47D (R128, R131, S105)
76171	Control—Volume control and power switch (R195, S101)
76503	Control—Focus control (R253 for KCS47F & KCS47G)
71498	Core—Adjustable core and stud for F-M trap #75449
74956	Cushion—Rubber cushion for deflection yoke hood
74839	Fastener—Push fastener to mount ceramic tube socket (2 req'd)
73600	Fuse—.25 amp., 250 volts (F101)
16058	Grommet—Rubber grommet for 2nd anode lead exit
37396	Grommet—Rubber grommet for mounting ceramic tube socket (2 req'd)

STOCK No.	DESCRIPTION
76169	Hood—Deflection yoke hood less rubber cushions for KCS47B, KCS47C & KCS47D
76376	Hood—Deflection yoke hood less rubber cushions for KCS47F & KCS47G
75644	Insulator—2nd anode insulator assembly
76377	Insulator—Focus control insulator for KCS47F & KCS47G
75482	Jack—Video jack (J105)
74969	Knob—Focus control knob for KCS47F & KCS47G
76375	Magnet—Centering magnet for KCS47F & KCS47G
76317	Magnet—Ion trap magnet (P.M.) for KCS47B, KCS47C, KCS47D
76141	Magnet—Ion trap magnet (P.M.) for KCS47F & KCS47G
76168	Magnet—Focus magnet complete with adjustable plate and stud for KCS47B, KCS47C & KCS47D
76728	Nut—Speed nut for trimmer capacitor (C287) (KCS47GF-2)
75518	Plate—Hi-voltage plate—bakelite—less transformer, capacitor and tube socket for KCS47B, KCS47C & KCS47D
76380	Plate—Hi-voltage plate—bakelite—less transformer, capacitor and tube socket for KCS47F & KCS47G
76382	Resistor—Wire wound, 0.82 ohms, 1/3 watt (R251 for KCS47F & KCS47G)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R193)
76304	Resistor—Wire wound, 220 ohms, ½ watt (R239 for KCS47B, KCS47C, KCS47F & KCS47G)
76305	Resistor—Wire wound, 330 ohms, ½ watt (R239 for KCS47D)
76260	Resistor—Wire wound, 470 ohms, 4 watts (R209 for KCS47D)
76261	Resistor—Wire wound, 900 ohms, 5 watts (R216 for KCS47D)
76267	Resistor—Wire wound, 3000 ohms, 15 watts (R181 for KCS47D)
75512	Resistor—Wire wound, 4000 ohms, 10 watts (R181 for KCS-47B, KCS47C, KCS47F & KCS47G)
76066	Resistor—Wire wound, 4300 ohms, 5 watts (R228 for KCS47B, KCS47C, KCS47F & KCS47G)
76266	Resistor—Wire wound, 7500 ohms, 10 watts (R228 for KCS47D)
76065	Resistor—Wire wound, 13,000 ohms, 5 watts (R227 for KCS47B, KCS47C, KCS47F & KCS47G)
76262	Resistor—Wire wound, 13,000 ohms, 10 watts (R227 for KCS47D)
76265	Resistor—Wire wound, 18,000 ohms, 10 watts (R182 for KCS47D)
	Resistor—Fixed, composition:—
504047	47 ohms, ±20%, ½ watt (R174)
503047	47 ohms, ±10%, ½ watt (R278) (KCS47GF-2)
34763	68 ohms, ±5%, ½ watt (R277) (KCS47GF-2)
503082	82 ohms, ±10%, ½ watt (R103, R107, R112, R184)
503110	100 ohms, ±10%, ½ watt (R217 for KCS47B, KCS47C KCS47F & KCS47G)
504110	100 ohms, ±20%, ½ watt (R202, R203)
523110	100 ohms, ±10%, 2 watts (R175)
503118	180 ohms, ±10%, ½ watt (R116)
503122	220 ohms, ±10%, ½ watt (R126, R127)
513139	390 ohms, ±10%, 1 watt (R200 for KCS47B, KCS47C, KCS-47F & KCS47G)
513147	470 ohms, ±10%, 1 watt (R218)
523156	560 ohms, ±10%, 2 watts (R200 for KCS47D)
503168	680 ohms, ±10%, ½ watt (R226)
504210	1000 ohms, ±20%, ½ watt (R102, R104, R109, R114, R117, R159, R185, R189, R219)
502210	1000 ohms, ±5%, ½ watt (R279, R280) (KCS47GF-2)
513215	1500 ohms, ±10%, 1 watt (R155)
503218	1800 ohms, ±10%, ½ watt (R113) (KCS47B, KCS47C)
504222	2200 ohms, ±20%, ½ watt (R140)
503227	2700 ohms, ±10%, ½ watt (R139)
503233	3300 ohms, ±10%, ½ watt (R235)
503239	3900 ohms, ±10%, ½ watt (R167)
30494	4700 ohms, ±5%, ½ watt (R130)
503247	4700 ohms, ±10%, ½ watt (R135, R230) (R205 for KCS47D)
513247	4700 ohms, ±10%, 1 watt (R133)
30734	5600 ohms, ±5%, ½ watt (R125)
513268	6800 ohms, ±10%, 1 watt (R120, R176)
523268	6800 ohms, ±10%, 2 watts (R179)
14659	6800 ohms, ±5%, ½ watt (R281, R282) (KCS47GF-2)
502282	8200 ohms, ±5%, ½ watt (R106, R169)
503282	8200 ohms, ±10%, ½ watt (R145, R146)
503310	10,000 ohms, ±10%, ½ watt (R236)
523310	10,000 ohms, ±10%, 2 watts (R207)
30436	12,000 ohms, ±5%, ½ watt (R152)
503312	12,000 ohms, ±10%, ½ watt (R188)
512312	12,000 ohms, ±5%, 1 watt (R108)
503315	15,000 ohms, ±10%, ½ watt (R210) (R213 for KCS47D)
513315	15,000 ohms, ±10%, 1 watt (R180)
503318	18,000 ohms, ±10%, ½ watt (R121, R122, R137) (R197 for KCS47B, KCS47C, KCS47F & KCS47G)
513318	18,000 ohms, ±10%, 1 watt (R138)
503322	22,000 ohms, ±10%, ½ watt (R143, R144) (R213 for KCS47B, KCS47C, KCS47F & KCS47G) (R186 KCS47 B, C, D, F and G)
504322	22,000 ohms, ±20%, ½ watt (R192)

STOCK No.	DESCRIPTION
503327	27,000 ohms, ±10%, ½ watt (R196)
523327	27,000 ohms, ±10%, 2 watts (R182 for KCS47B, KCS47C, KCS47F & KCS47G)
503333	33,000 ohms, ±10%, ½ watt (R105, R115, R211, R225)
504333	33,000 ohms, ±20%, ½ watt (R123)
503347	47,000 ohms, ±10%, ½ watt (R141, R187, R222)
504347	47,000 ohms, ±20%, ½ watt (R110)
503347	47,000 ohms, ±10%, ½ watt (R186) (KCS47GF-2)
503356	56,000 ohms, ±10%, ½ watt (R221, R234)
513356	56,000 ohms, ±10%, 1 watt (R215 for KCS47B, KCS47C, KCS47F & KCS47G)
503368	68,000 ohms, ±10%, ½ watt (R206 for KCS47D)
502368	68,000 ohms, ±5%, ½ watt (R275) (KCS47GF-2)
513368	68,000 ohms, ±10%, 1 watt (R168)
512382	82,000 ohms, ±5%, 1 watt (R172)
513382	82,000 ohms, ±10%, 1 watt (R164, R165)
3252	100,000 ohms, ±5%, ½ watt (R190, R191) (KCS47 B, C, D, F and G)
503410	100,000 ohms, ±10%, ½ watt (R224, R233)
513410	100,000 ohms, ±10%, 1 watt (R132 for KCS47D)
503412	120,000 ohms, ±10%, ½ watt (R142) (R204 for KCS47D)
503415	150,000 ohms, ±10%, ½ watt (R136, R154, R160, R201) (R237 for KCS47D)
504415	150,000 ohms, ±20%, ½ watt (R124)
31895	150,000 ohms, ±5%, 1 watt (R170)
503422	220,000 ohms, ±10%, ½ watt (R134, R157, R158, R223, R231, R232)
503427	270,000 ohms, ±10%, ½ watt (R150)
503433	330,000 ohms, ±10%, ½ watt (R161, R198)
512433	330,000 ohms, ±5%, 1 watt (R163)
503447	470,000 ohms, ±10%, ½ watt (R111)
504447	470,000 ohms, ±20%, ½ watt (R199) (R208 for KCS47D)
503447	470,000 ohms, ±10%, ½ watt (R283) (KCS47GF-2)
503456	560,000 ohms, ±10%, ½ watt (R129)
503482	820,000 ohms, ±10%, ½ watt (R149, R162, R173, R220)
504510	1 megohm, ±20%, ½ watt (R178, R214)
503515	1.5 megohm, ±10%, ½ watt (R238 for KCS47D)
503522	2.2 megohm, ±10%, ½ watt (R153)
503610	10 megohm, ±10%, ½ watt (R118)
504610	10 megohm, ±20%, ½ watt (R194)
523610	10 megohm, ±10%, 2 watts (R252 for KCS47F & KCS47G)
523618	18 megohm, ±10%, 2 watts (R254 for KCS47F & KCS47G)
71456	Screw—#8-32 x ⅜" wing screw to mount deflection yoke
73584	Shield—Tube shield
31251	Socket—Tube socket, octal, wafer
73117	Socket—Tube socket, 7 pin, miniature
75223	Socket—Tube socket, 9 pin, miniature
73249	Socket—Tube socket, octal, ceramic, plate mounted
31319	Socket—Tube socket, octal, moulded
68592	Socket—Tube socket, 6 contact, moulded
76379	Socket—Tube socket, 6 contact, miniature, plate mounted for KCS47F & KCS47G
71508	Socket—Tube socket, 6 contact, moulded for 1B3/8016
74834	Socket—Kinescope socket
31364	Socket—Pilot lamp socket for KCS47C, KCS47D, KCS47G
75718	Socket—Channel indicator lamp socket for KCS47C, KCS-47D & KCS47G
14270	Spring—Retaining spring for focus control knob for KCS-47F & KCS47G
76636	Stud—Adjusting stud complete with guard for focus magnet
75173	Stud—Adjusting stud for trimmer capacitor (C287) (KCS47GF-2)
75506	Support—Bakelite support only—part of high voltage shield for KCS47F & KCS47G
76010	Switch—AGC switch
76170	Switch—Tone control and phono switch less volume control and power switch (S103 for KCS47B, KCS47C, KCS-47F & KCS47G)
76172	Switch—Tone control and phono switch less volume control and power switch for KCS47D (S103)
76463	Terminal—Screw-type grounding terminal
75508	Transformer—Power transformer 117 volt, 60 cycle (T110)
74950	Transformer—Vertical output transformer (T107)
74144	Transformer—Vertical oscillator transformer (T106)
74589	Transformer—First pix, i-f transformer (T101, C101, R101)
74590	Transformer—Second pix, i-f transformer (T102, C104)
76264	Transformer—Third pix, i-f transformer (T103, C112)
73574	Transformer—Fourth pix, i-f transformer (T104, C118)
71424	Transformer—Sound i-f transformer (T111, C169, C170) (KCS47 B, C, D, F and G)
75212	Transformer—Sound discriminator transformer (T112, C173, C174, C175) (KCS47 B, C, D, F and G)
76702	Transformer — Ratio detector transformer (T112, C173, C174) (KCS47GF-2)
76438	Transformer — Sound i-f transformer (T111, C169, C170) (KCS47GF-2)
76703	Transformer—Sound take-off transformer (T114, C276, R276) (KCS47GF-2)
75213	Transformer—Horizontal oscillator transformer (T108)
75509	Transformer—Antenna matching transformer complete with antenna connector, i-f and F-M traps and antenna shunt coil (T200, C200, C201, C202, C203, J200, L200, L201, L202, L203)
76381	Transformer—Hi-voltage transformer (T109 for KCS47F & KCS47G)

STOCK No.	DESCRIPTION
75585	Transformer—Hi-voltage transformer (T109 for KCS47B, KCS47C, KCS47D)
71778	Trap—Sound trap (T105, C119) (KCS47B, C, D, F and G)
75242	Trap—I-F trap (L200, L201, C200, C201)
75449	Trap—F-M trap complete with adjustable core and stud (L203, C203)
75251	Trap—4.5 mc trap (L107, C131)
76704	Trap—4.3 mc. trap (L106, C275) (KCS47GF-2)
74952	Yoke—Deflection yoke (L111, L112, C164, C165)
	SPEAKER ASSEMBLIES 92580-4W RL-105C10 RMA-274 (For Models 7T103, 7T103B, 7T104, 7T104B and 7T111B)
75023	Cap—Dust cap
75024	Cone—Cone complete with voice coil (3.2 ohms)
5039	Connector—4 contact male connector (J102)
75022	Speaker—8" P.M. speaker complete with cone and voice coil less transformer and plug
75520	Transformer—Output transformer (T113)
	SPEAKER ASSEMBLIES 92580-4F RMA-150 (For Models 7T103, 7T104)
76120	Cone—Cone complete with voice coil (3.2 ohms)
	SPEAKER ASSEMBLIES 92569-11W RL-111A2 RMA-274 (For Models 7T112, 7T122, 7T123, 7T124)
13867	Cap—Dust cap
74901	Cone—Cone and voice coil assembly (3.2 ohms)
5039	Connector—4 contact male connector (J102)
74974	Speaker—12" P.M. speaker complete with cone and voice coil less transformer and plug
75520	Transformer—Output transformer (T113)
	SPEAKER ASSEMBLIES 971494-1W RL-111B2 RMA-274 (For Models 7T112B, 7T122B, 7T123B, 7T125B)
75023	Cap—Dust cap
76296	Cone—Cone and voice coil (3.2 ohms)
5039	Connector—4 contact male connector (J102)
76389	Speaker—12" P.M. speaker complete with cone and voice coil (3.2 ohms) less output transformer and plug
75520	Transformer—Output transformer (T113)
	SPEAKER ASSEMBLIES 92569-11B (For Models 7T112, 7T122, 7T123, 7T124)
75875	Cone—Cone and voice coil assembly (3.2 ohms)
	SPEAKER ASSEMBLIES 92569-11R RMA-285 (For Models 7T112, 7T122, 7T123, 7T124)
76121	Cone—Cone and voice coil assembly (3.2 ohms)
	SPEAKER ASSEMBLIES 92569-13-W RL-111A10 RMA-274 (For Model 7T132)
75682	Cone—Cone and voice coil (3.2 ohms)
5039	Connector—4 contact male connector (J102)
75681	Speaker—12" P.M. speaker complete with cone and voice coil less transformer and plug
73636	Transformer—Output transformer (T113) *NOTE:*—If stamping on speaker in instrument does not agree with above speaker numbers, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
76181	Back—Cabinet back complete with power cord and terminal board for Models 7T112, 7T122, 7T123
76182	Back—Cabinet back complete with power cord and terminal board for Model 7T124
76183	Back—Cabinet back complete with power cord and terminal board for Models 7T103, 7T104

STOCK No.	DESCRIPTION
76506	Back—Cabinet back complete with terminal board and power cord 7T111B
76319	Back—Cabinet back complete with power cord and terminal board for Model 7T132
76385	Back—Cabinet back complete with power cord and terminal board for Models 7T103B and 7T104B
76386	Back—Cabinet back complete with power cord and terminal board for Models 7T112B, 7T122B, 7T123B and 7T125B
76184	Board—"Ant" terminal board—2 contact—part of back
76178	Bracket—Suspension bracket for deflection yoke hood assembly for Models 7T103, 7T103B, 7T104, 7T104B, 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T125B, 7T132
76179	Bracket—Suspension bracket for deflection yoke hood assembly for Model 7T124
71599	Bracket—Pilot lamp bracket for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132
74579	Bumper—Rubber bumper for television compartment door for Model 7T132
74545	Cable—Shielded pickup cable complete with pin plug for 45 RPM changer for Model 7T132
13103	Cap—Pilot lamp cap for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132
71892	Catch—Bullet catch and strike for doors for Models 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132
X3123	Cloth—Grille cloth for mahogany or walnut instruments for Models 7T112, 7T112B, 7T122B, 7T123, 7T123B
X3199	Cloth—Grille cloth for mahogany or walnut instruments
X3089	Cloth—Grille cloth for oak instruments for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T132
X3120	Cloth—Grille cloth for mahogany or walnut instruments for Model 7T122
X3130	Cloth—Grille cloth for Models 7T125B, 7T132
X3129	Cloth—Grille cloth for Model 7T124
39153	Connector—4 contact male connector for antenna cable
75474	Connector—Single contact male connector for antenna cable (2 req'd)
30870	Connector—2 contact male connector for AC power cable for 45 RPM changer for Model 7T132
71457	Cord—Power cord and plug
75531	Cover—Control panel cover assembly including drop panel hinges and emblem for Model 7T104
75608	Cushion—Kinescope masking panel dust seal (rubber)
76127	Decal—Control panel function decal for mahogany or walnut instruments for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T125B, 7T132
76128	Decal—Control panel function decal for oak or maple instruments for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132.
71910	Decal—Trade mark decal for Models 7T122, 7T122B
71984	Decal—Trade mark decal for Models 7T123, 7T123B, 7T124, 7T132
76129	Decal—Control panel function decal for Models 7T103, 7T103B, 7T104, 7T104B
76003	Decal—Decorative decal (3 stripes) for Models 7T104, 7T104B
74273	Decal—Trade mark decal (Victrola) for Model 7T132
71768	Decal—Trade mark decal for Model 7T125B
74809	Emblem—"RCA Victor" emblem for Models 7T103, 7T103B, 7T104, 7T104B, 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132
75455	Escutcheon—Channel marker escutcheon—dark—for mahogany or walnut instruments for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132
75456	Escutcheon—Channel marker escutcheon—light—for oak or maple instruments for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132
75499	Escutcheon—Channel marker escutcheon—dark—for metal instruments for Models 7T103, 7T103B, 7T104, 7T104B
74889	Feet—Felt feet for cabinet (4 req'd) for Models 7T103, 7T103B, 7T104, 7T104B
74606	Glass—Safety glass for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132
76131	Glass—Safety glass for Models 7T103, 7T103B, 7T104, 7T104B
37396	Grommet—Rubber grommet for mounting speaker (4 req'd) for Models 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132
74308	Hinge—Cabinet door hinge for Models 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, and L.H. door for Model 7T132
76254	Hinge—Speaker compartment door hinge (1 set) for Model 7T132
76255	Hinge—Television compartment door center hinge (piano type) for Model 7T132
74959	Knob—Fine tuning knob—maroon—for metal, mahogany or walnut instruments (outer)
75461	Knob—Fine tuning knob—beige—for oak instruments (outer)
73995	Knob—Fine tuning knob—tan—for maple instruments (outer)
74960	Knob—Channel selector knob—maroon—for metal, mahogany or walnut instruments (inner)

STOCK No.	DESCRIPTION
75462	Knob—Channel selector knob—beige—for oak instruments (inner)
74961	Knob—Channel selector knob—tan—for maple instruments (inner)
74962	Knob—Brightness control or vertical hold control—maroon—for metal, mahogany or walnut instruments (outer)
75463	Knob—Brightness control or vertical hold control knob—beige—for oak instruments (outer)
73999	Knob—Brightness control or vertical hold control knob—tan—for maple instruments (outer)
76174	Knob—Tone control and phono switch knob—maroon—for metal, mahogany or walnut instruments (outer)
76175	Knob—Tone control and phono switch knob—beige—for oak instruments (outer)
74963	Knob—Picture control, horizontal hold control or volume control and power switch knob—maroon—for metal, mahogany or walnut instruments (inner)
75464	Knob—Picture control, horizontal hold control or volume control and power switch knob—beige—for oak instruments (inner)
74001	Knob—Picture control, horizontal hold control or volume control and power switch knob—tan—for maple instruments (inner)
11765	Lamp—Pilot or channel marker lamp—Mazda 51—for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132
75459	Mask—Channel marker escutcheon light mask—burgundy—for mahogany or walnut instruments for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T132
75460	Mask—Channel marker escutcheon light mask—gold—for oak or maple instruments for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T132
76126	Mask—Polystyrene masking panel for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132
76130	Mask—Polystyrene masking panel for Models 7T103, 7T103B, 7T104, 7T104B
75917	Nail—Rosette head nail for grille bars for Models 7T122, 7T122B
76177	Nut—#10-32 special nut for deflection yoke hood support rods (2 req'd)
73634	Nut—Speed nut for speaker mounting screws (4 req'd) for Models 7T111B, 7T112, 7T112B, 7T122, 7T122B, 7T123, 7T123B, 7T124, 7T125B, 7T132
74788	Nut—Speed nut to secure deflection yoke support rods
73634	Nut—Speed nut for speaker mounting
75526	Pull—Cabinet door pull (center of door) for Models 7T123, 7T123B
75527	Pull—Cabinet door pull (top of door) for Models 7T123, 7T123B
76185	Pull—Door pull for Models 7T122, 7T122B
76256	Pull—Door pull for Model 7T132
75528	Pull—Cabinet door pull—L.H.—for Model 7T125B
75529	Pull—Cabinet door pull—R.H.—for Model 7T125B
75533	Retainer—Snap-on moulding and retainer for safety glass for Models 7T103, 7T103B, 7T104, 7T104B
76176	Rod—"L" shape threaded rod to support deflection yoke hood assembly (2 req'd)
71456	Screw—#8-32 x ⅜" wing screw to fasten suspension bracket to deflection yoke hood
74307	Screw—#8-32 x 1⅛" trimit head screw for door pull for Model 7T123
74269	Screw—#8-32 x ¾" trimit head screw for door pull for Model 7T122
75623	Screw—#8-32 x ⅝" trimit head screw for door pull for Model 7T132
75038	Screw—#8-32 x ½" trimit head screw for door pulls for Model 7T125B
74835	Slide—Slide mechanism for record changer drawer for Model 7T132
73643	Spring—Spring clip for channel marker escutcheon
72845	Spring—Retaining spring for knobs #73995, 74959, 75461
14270	Spring—Retaining spring for knobs #73999, 74960, 74961, 74962, 75462, 75463
30330	Spring—Retaining spring for knobs #74001, 74963 and 75464
76180	Spring—Formed spring for kinescope masking panel (6 req'd)
76268	Spring—Conical spring for mounting record changer (3 req'd)
72936	Stop—Cabinet door stop for Models 7T122, 7T123, 7T124, 7T132
75457	Washer—Felt washer—dark brown—between knob and channel marker escutcheon for mahogany or walnut instruments for Models 7T112, 7T122, 7T123, 7T124, 7T132
75458	Washer—Felt washer—beige—between knob and channel marker escutcheon for oak instruments for Models 7T112, 7T122, 7T123, 7T124, 7T132
75500	Washer—Felt washer for cabinet back screws
75523	Washer—Felt washer—tan—between knob and channel marker escutcheon for Model 7T125B maple instruments

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS.

RCA VICTOR

TELEVISION, RADIO PHONOGRAPH COMBINATIONS MODEL 7T143

Chassis Nos. KCS48A and RC1092
45 Record Changer RP190
33⅓/78 Record Changer 960284

— Mfr. No. 274 —

SERVICE DATA

— 1951 No. T4 —

"Rutland"
Model 7T143, Walnut or Mahogany

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Model 7T143 is a 17-inch television, AM-FM radio phonograph combination. Two record changers are provided to play 78, 33⅓, and 45 RPM records. The instrument employs 27 tubes plus 3 rectifiers and a 17CP4 kinescope.

Features of the television unit are full twelve channel coverage; FM sound system; improved picture brilliance; picture A-G-C; A-F-C horizontal hold; stabilized vertical hold; two stages of video amplification; noise saturation circuits; improved sync separator and clipper; four mc band width for picture channel and reduced hazard high voltage supply.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE.....146 square inches on a 17CP4 kinescope

TELEVISION R-F FREQUENCY RANGE

All 12 television channels, 54 mc. to 88 mc., 174 mc. to 216 mc.
Fine Tuning Range, ±250 kc. on chan. 2, ±650 kc. on chan. 13

RADIO TUNING RANGE

AM .....540-1600 kc.
FM .....88-108 mc.

AUDIO POWER OUTPUT.....11 watts max.

POWER SUPPLY RATING

Model 7T143.....115 volts, 60 cycles, 315 watts max.

CHASSIS DESIGNATIONS

Television Chassis.....KCS48A
Radio Chassis.....RC1092
33⅓/78 RPM Record-Changer.....960284
45 RPM Record Changer.....RP190
Refer to Service Data 960284, or RP190 for information on the record changers.

LOUDSPEAKER—92569 ..... 12-inch PM Dynamic
Voice Coil Impedance ..... 3.2 ohms at 400 cycles

WEIGHT	Net Weight	Shipping Weight
7T143	180	222

DIMENSIONS (Cabinet Outside)	Width	Height	Depth
7T143	38½	39	23⅞

RECEIVER ANTENNA INPUT IMPEDANCE 300 ohms balanced.

If necessary, the television chassis may be fed separately from either a 300-ohm balanced line or a 72-ohm co-ax.

RCA TUBE COMPLEMENT

(1) RCA 6CB6 ..... R-F Amplifier
(2) RCA 6J6 ..... R-F Oscillator and Mixer
(3) RCA 6AU6 ..... 1st Sound I-F Amplifier
(4) RCA 6AU6 ..... 2nd Sound I-F Amplifier
(5) RCA 6AL5 ..... Sound Discriminator
(6) RCA 6AV6 ..... Bias Clamp
(7) RCA 6AU6 ..... 1st Picture I-F Amplifier
(8) RCA 6CB6 ..... 2nd Picture I-F Amplifier
(9) RCA 6AU6 ..... 3rd Picture I-F Amplifier
(10) RCA 6CB6 ..... 4th Picture I-F Amplifier
(11) RCA 6AL5 ..... Picture 2nd Detector and AGC Detector
(12) RCA 12AU7 ..... 1st and 2nd Video Amplifier
(13) RCA 12AU7 ..... DC Restorer and Sync Separator
(14) RCA 6SN7GT.....Sync. Amp. & Vert. Sweep Osc.
(15) RCA 6KSGT.....Vertical Sweep Output
(16) RCA 6SN7GT .... Horizontal Sweep Oscillator and Control
(17) RCA 6BG6G ..... Horizontal Sweep Output
(18) RCA 6W4GT ..... Damper
(19) RCA 1B3-GT/8016 ..... High Voltage Rectifier
(20) RCA 17CP4 ..... Kinescope
(21) RCA 5U4G ..... Rectifier

(RC1092 Radio Chassis)

(1) RCA 6CB6 ..... R-F Amplifier
(2) RCA 6J6 ..... Oscillator and Mixer
(3) RCA 6BA6 ..... I-F Amplifier
(4) RCA 6AU6 ..... Driver
(5) RCA 6AL5 ..... Ratio Detector
(6) RCA 6AV6 ..... AM Det., AVC and Audio Amplifier
(7) RCA 6C4 ..... Phase Inverter
(8) RCA 6V6GT (2 tubes) ..... Audio Output
(9) RCA 5Y3GT ..... Rectifier

Specifications continued on page 2

7T143 ELECTRICAL AND MECHANICAL SPECIFICATIONS (Continued)

PICTURE INTERMEDIATE FREQUENCIES

Picture Carrier Frequency	25.50 Mc.
Adjacent Channel Sound Trap	27.00 Mc.
Accompanying Sound Traps	21.00 Mc.
Adjacent Channel Picture Carrier Trap	19.50 Mc.

SOUND INTERMEDIATE FREQUENCIES

Sound Carrier Frequency	21.00 Mc.
Sound Discriminator Band Width between peaks	400 kc.
VIDEO RESPONSE	To 4 Mc.
FOCUS	Magnetic
SWEEP DEFLECTION	Magnetic

OPERATING CONTROLS (front Panel)

Channel Selector, Fine Tuning	Dual Control Knobs
Picture Brightness	Dual Control Knobs
Picture Horizontal Hold, Picture Vertical Hold	Dual Control Knobs
Chan. Selector Escutcheon Light Switch	Single Control Knob
SCANNING	Interlaced, 525 line
HORIZONTAL SWEEP FREQUENCY	15,750 cps
VERTICAL SWEEP FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

OPERATING INSTRUCTIONS

The following adjustments are necessary when turning the receiver on for the first time:

1. Turn the radio FUNCTION switch to TV.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best sound fidelity and the SOUND VOLUME control for suitable volume.

5. Turn the BRIGHTNESS control fully counter-clockwise, then clockwise until a light pattern appears on the screen.

6. Adjust the VERTICAL hold control until the pattern stops vertical movement.

7. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

8. Adjust the PICTURE and BRIGHTNESS controls for suitable picture contrast and brightness.

9. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

10. In switching from one channel to another, it may be necessary to repeat steps 4 and 8.

11. When the set is turned on again after an idle period it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step No. 4 is generally sufficient.

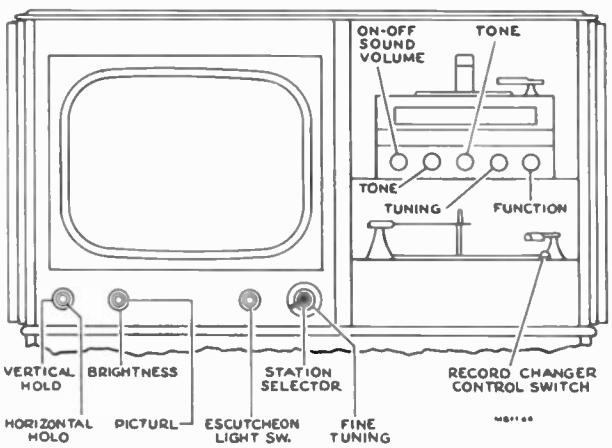


Figure 1—Receiver Operating Controls

12. If the positions of the controls have been changed, it may be necessary to repeat steps 1 through 8.

RADIO OPERATION

1. Turn the radio FUNCTION switch to AM.

2. Tune in the desired station with the TUNING control.

PHONOGRAPH OPERATION

1. Turn the radio FUNCTION switch to 78-33 for operation of the 78/33⅓ RPM changer or to 45 for operation of the 45 RPM changer.

2. Place a record on the appropriate changer and slip the changer power switch to "ON."

REFER TO PAGES 106 TO 112 FOR TELEVISION ALIGNMENT PROCEDURE AND 120 TO 123 FOR WAVEFORM PHOTOGRAPHS.

Make sure that all tubes are in place and are firmly seated in their sockets.

Check to see that the kinescope high voltage lead clip is in place.

Connect the antenna transmission line to the receiver antenna terminals. Plug a power cord into the 115-volt a-c power source and into the receiver interlock receptacle. Turn the receiver power switch to the "on" position, the brightness control fully clockwise, and the picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT.—Set the ion trap magnet approximately in the position shown in Figure 2. Starting from this position immediately adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Turn the focus control (shown in Figure 2) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches of this adjustment should be made with the brightness control at the maximum clockwise position with which good line focus can be maintained.

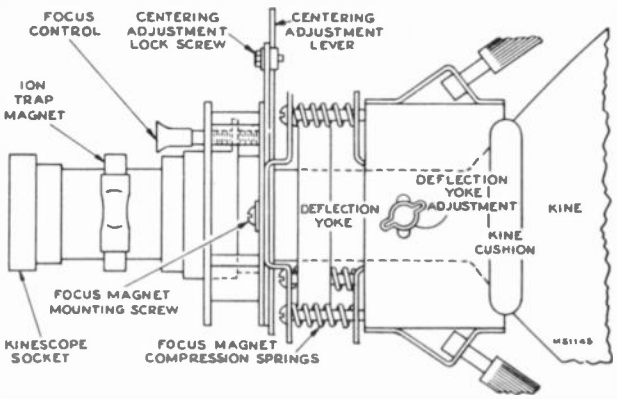


Figure 2—Yoke and Focus Magnet Adjustments

DEFLECTION YOKE ADJUSTMENT.—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS.—It will now be necessary to obtain a test pattern picture in order to make further adjustments.

If the Horizontal Oscillator and AGC System are operating properly, it should be possible to sync the picture at this point. However, if the AGC control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading, turn S105 on the rear apron (see Figure 3) counter-clockwise until the set operates normally and the picture can be synced.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT.—Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced, and when only 2 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull-in should occur when the control is approximately 90 degrees from the extreme counter-clockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Focus Magnet Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR.—If in the above check the receiver failed to hold sync with the hold control at the extreme counter-clockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull-in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment.—Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T108 horizontal frequency adjustment on top of the chassis until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Locking Range Adjustment.—Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. The picture may remain in sync. If so turn the T108 top core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C147A slightly clockwise. If less than 2 bars are present, adjust C147A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure For field purposes paragraph "A" under Horizontal Oscillator Waveform Adjustment may be omitted.

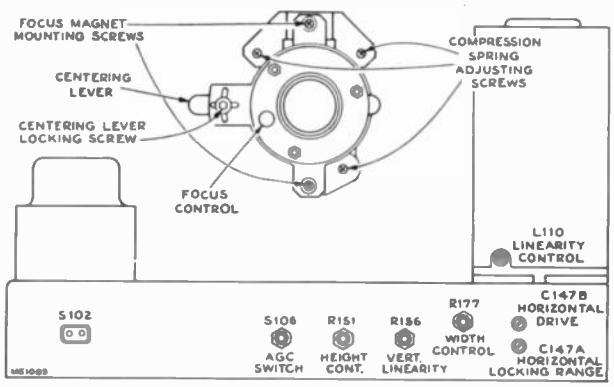


Figure 3—Rear Chassis Adjustments

FOCUS MAGNET ADJUSTMENT.—The focus coil should be adjusted so that there is approximately three-eighths inch of space between the rear cardboard shell of the yoke and the flat of the front face of the focus magnet. This spacing gives best average focus over the face of the tube.

The axis of the hole through the magnet should be parallel with the axis of the kinescope neck with the kinescope neck through the middle.

CENTERING ADJUSTMENT.—No electrical centering controls are provided. Centering is accomplished by means of a separate plate on the focus magnet. Some centering plates include a locking screw which must be loosened before centering, and others are held in adjustment by friction. Up and down adjustment of the plate moves the picture side to side and sidewise adjustment moves the picture up and down.

If a corner of the raster is shadowed, check the position of the ion trap magnet. Reposition the magnet within the range of maximum raster brightness to eliminate the shadow and recenter the picture by adjustment of the focus magnet plate.

In no case should the magnet be adjusted to cause any loss of brightness since such operation may cause immediate or eventual damage to the tube. In some cases it may be necessary to shift the position of the focus magnet in order to eliminate a corner shadow.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS.—Adjustment of the horizontal drive control affects the high voltage applied to the kinescope. In order to obtain the highest possible voltage hence the brightest and best focused picture, adjust horizontal drive counter-clockwise as far as possible without stretching the left side of the picture. As a first adjustment, set the horizontal drive trimmer C143B one-half turn out from maximum capacity.

Turn the horizontal linearity coil out until appreciable loss in width occurs, then in until nearly maximum width and the best linearity is obtained.

Adjust the width control R177 to obtain correct picture width.

A slight readjustment of these three controls may be necessary to obtain the best linearity.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.—Adjust the height control (R151 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R156 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

FOCUS.—Adjust the focus magnet for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

On focus magnets using two shunts, the one with the cable is the "fine adjustment" and the other is the "focus range" adjustment. In general, the two shunts should be adjusted to approximately equal positions.

Recheck the position of the ion trap magnet to make sure that maximum brightness is obtained.

Check to see that the yoke thumbscrew and the focus magnet mounting screws are tight.

CHECK OF R-F OSCILLATOR ADJUSTMENTS.—Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 10. The adjustments for channels 2 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 4. Adjustment of channel 13 is on top of the chassis.

AGC CONTROL.—The AGC control switch is provided as an installation adjustment. The normal position for strong signal areas is with the switch in the number 1 or counter-clockwise position. If impulse type of interference is experienced, turn the switch to the number 2 or center position. In very weak signal areas in which impulse type interference is experienced, turn the switch to position number 3 or fully clockwise. In this position, all AGC is removed and the receiver will overload if the input signal exceeds 200 microvolts. However, for signals under 200 microvolts, this position of the AGC control switch gives best noise immunity of sync.

FM TRAP ADJUSTMENT.—In some instances interference may be encountered from a strong FM station signal. A trap is provided to eliminate this type of interference. To adjust the trap tune in the station on which the interference is observed and adjust the L203 core on top of the r-f unit for minimum interference in the picture.

CAUTION.—In some receivers, the FM trap L203 will tune down into channel 6 or even into channel 5. Needless to say, such an adjustment will cause greatly reduced sensitivity on these channels. If channels 5 or 6 are to be received, check L203 to make sure that it does not affect sensitivity on these two channels.

RADIO OPERATION.—Turn the receiver function switch to the positions and check the radio for proper operation. In switching from radio to television or from television to radio, approximately 30 seconds warm-up time is required.

RECORD CHANGER OPERATION.—Turn the receiver function switch to each phono position and check each record player for proper operation.

Replace the cabinet back and connect the receiver antenna leads to the cabinet back. Make sure that the screws holding it are up tight, otherwise it may rattle or buzz when the receiver is operated at high volume.

CABINET ANTENNA.—A cabinet antenna is provided for use in strong signal areas in which no reflections are experienced. The leads from the antenna are brought out near the receiver antenna terminal board. To connect the cabinet antenna, attach the leads to the terminal board. If reception is satisfactory, no other antenna is necessary. However, if reception is unsatisfactory, it will be necessary to employ an outdoor antenna or an indoor antenna which can be oriented.

CHASSIS REMOVAL.—To remove the chassis from the cabinet for repair or installation of a new kinescope, remove the control knobs, the cabinet back, unplug the speaker cable, the kinescope socket, the antenna cable, the yoke and high voltage cable. Remove the yoke frame grounding strap and the interlock switch. Take out the four chassis bolts under the cabinet. Withdraw the chassis from the back of the cabinet.

KINESCOPE HANDLING PRECAUTION.—Do not install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling.

To remove the kinescope from the cabinet, loosen the two nuts and disengage the rods along side the kinescope. Remove the wing screw which holds the yoke frame to the cabinet. Remove the kinescope, the yoke frame with yoke and focus magnet as an assembly.

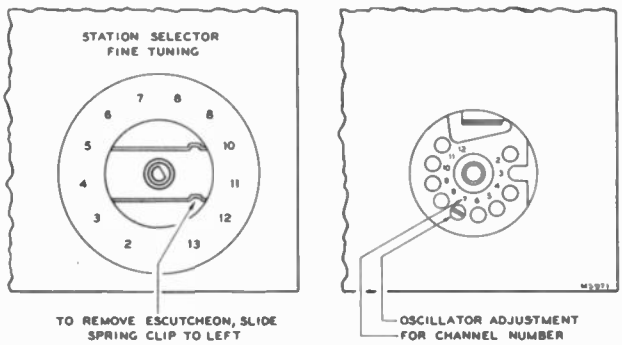


Figure 4—R-F Oscillator Adjustments

INSTALLATION OF KINESCOPE.—Handle this tube by the metal rim at the edge of the screen. Do not cover the glass bell of the tube with fingermarks as it will produce leakage paths which may interfere with reception. If this portion of the tube has inadvertently been handled, wipe it clean with a soft cloth moistened with "dry" carbon tetrachloride.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and fingermarks with a soft cloth moistened with "Windex" or similar cleaning agent.

Turn the tube so that the key on the base of the tube will be down and insert the neck of the kinescope through the deflection coil and focus magnet. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

Replace the kinescope and yoke frame assembly in the cabinet. Insert the wing screw and tighten. Engage the two side rods into the yoke frame and tighten the two nuts.

Slide the deflection yoke as far forward as possible. If this is not done, difficulty will be encountered in adjusting the ion trap and focus magnets because of shadows on the corner of the raster.

Slide the chassis into the cabinet, then insert and tighten the four chassis bolts.

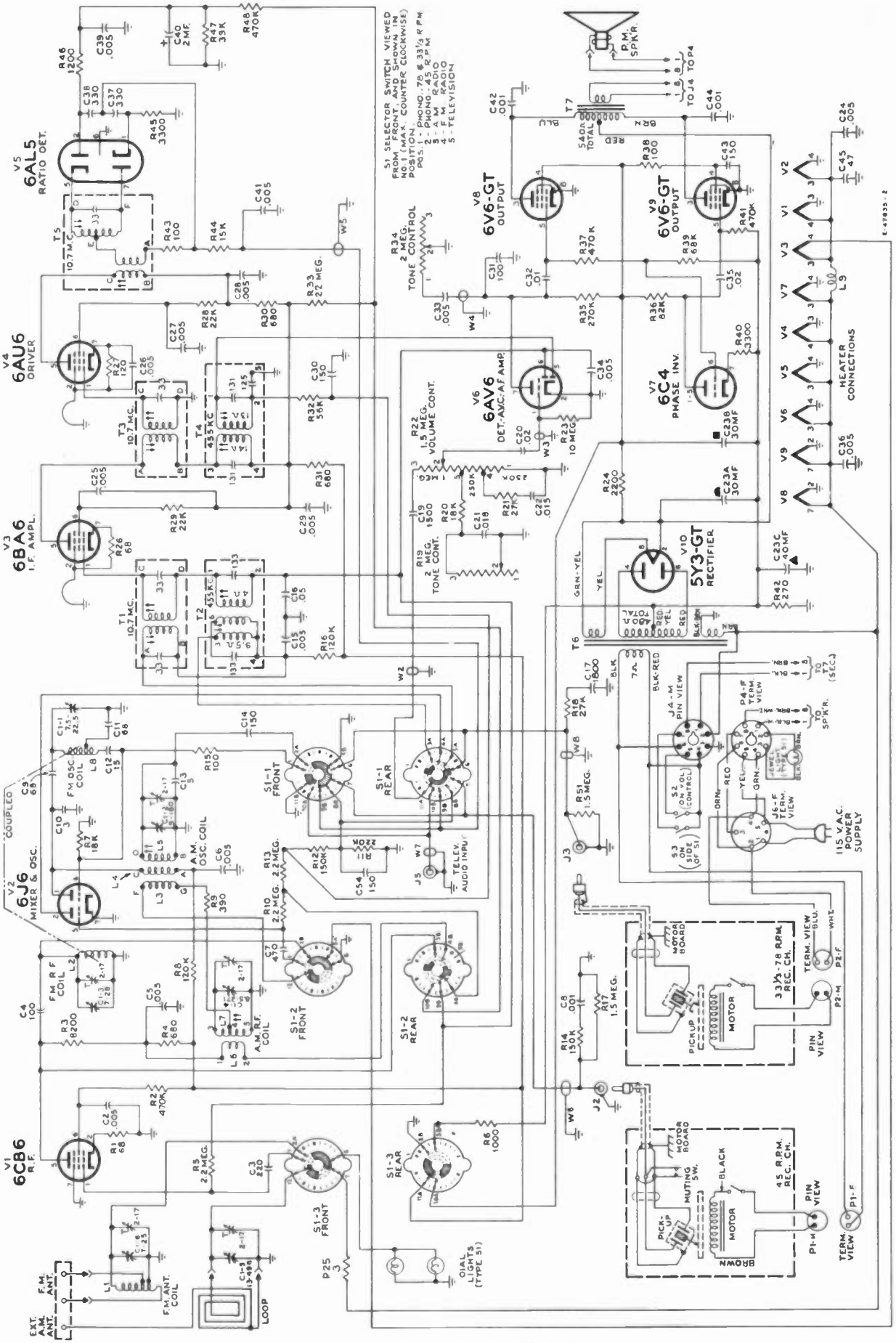
Slip the ion trap magnet over the neck of the kinescope.

Connect the kinescope socket to the tube base and connect the high voltage lead clip from the rim of the kinescope into the high voltage bushing on the high voltage compartment.

Reconnect all other cables. Perform the entire set-up procedure beginning with ion Trap Magnet Adjustment.

RADIO SCHEMATIC DIAGRAM

7T143



In some receivers C25 was connected from V3-6 to gnd. R8 was 33K and R16 was 39K.

The cathode loops of V3 and V4 are approx. 2 In. long. Do not alter length.

In some receivers R2 was 33K. In some receivers C17 and R18 were connected at R51 and J3 and W8 was omitted.

In some receivers C17 was 1500 and was connected between R18 & S1-1 to gnd. R18 was 100K and was connected between J3 and S1-1 rear. R51 was omitted.

Figure 5—Radio Schematic Diagram

7T143 RADIO ALIGNMENT PROCEDURE

If any lead dressing is necessary, it should be done before aligning the receiver. When making a complete alignment follow the table below in sequence. If only a portion of the circuit is to be aligned select the portion required and follow with the remaining steps in the section. Any adjustments made on the 455 kc. I-F's make it necessary to adjust the 10.7 mc. I-F's.

"AM" R-F—I-F ALIGNMENT

Test-Oscillator.—For all alignment operations, connect low side of the test-osc. to the receiver chassis, and keep the osc. output as low as possible to avoid a-v-c action. Output Meter.—Connect the meter across the speaker voice coil, and turn the receiver volume control to max. Turn tone controls for maximum highs and maximum lows. Before aligning set, completely mesh the gang and set the dial pointer to the mechanical max. calibration point at extreme left end of dial.

Steps	Connect the High Side of the Test Osc. to—	Tune Test Osc. to—	Function Switch	Turn Radio Dial to—	Adjust the following
1	Stator of C1-4	455 kc. Modulated	AM	Low Freq. end of Dial	†Top and bot. cores of T4 and T2. (For max. voltage across voice coil.)
2	Ant. terminal through dummy ant. of 200 mmfs.	1,620 kc.	AM	Min. capacity	Osc. C1-2T for maximum output.
3		1,400 kc.	AM	Tune to signal	C1-4T and C1-5T for max. output.
4		600 kc.	AM	600 kc.	‡Osc. L5 and R-FL7.
5	Repeat steps 2, 3 and 4 for maximum output at 600 kc. and 1,400 kc.				

† First peak T2 and T4 then starting with T4, use alternate loading. Connect a 47,000-ohm resistor across the primary to load the plate winding while the grid winding of the same transformer is being peaked. Then load the grid winding with the 47,000-ohm resistor while the plate winding is being peaked.

‡ With a 10,000-ohm resistor clipped across C1-4, peak the oscillator core L5, simultaneously "rocking" the gang condenser for maximum output. Then, remove the 10,000-ohm shunt resistor and peak L7 for maximum output.

FM ALIGNMENT PROCEDURE

Connect probe of "VoltOhmyst" to negative side of C40 and low side to chassis. Connect output meter across speaker voice coil. Turn the tone controls for maximum highs and lows.

Steps	Connect the High side of the Test Osc. to—	Tune Test Osc. to—	Function Switch	Radio Dial Tuned to—	Adjust
6	Pin No. 1 of 6AU6 (V4) in series with .01 mfd.	10.7 mc.	FM	———	Top of Driver Trans. T5 for maximum DC on "VoltOhmyst."
7	Pin No. 1 of 6AU6 (V4) in series with .01 mfd.	30% AM Modulated	FM	———	Bottom of Driver Trans. T5 for minimum audio output on meter.
8	Repeat steps 6 and 7 as necessary making final adjustment with r-f input level set to give approximately —4.0 volts d-c on "VoltOhmyst."				
9	Through 470 ohms to stator of C1-3, gang at max. Connect gnd. of cable close to V2 cathode ground on r-f shelf.	10.7 mc.	FM	88 mc.	*T3 then T1 for max. with r-f input set to give —3 volts on "VoltOhmyst" connected across C40.
10	Connect cable to antenna terminals through 120 ohms in each side of line.	90 mc.	FM	90 mc.	OSC, L8 for max. voltage across C40.
11		106 mc.	FM	Tune to signal	ANT, C1-3 and R-F C1-6 for max. voltage across C40.
12		90 mc.	FM	Tune to signal	ANT, L1 and R-F L2 for max. voltage across C40.
13	Repeat steps 10, 11 and 12 as required.				
14	Connect a sweep generator to the antenna terminals through 120 ohms in each side of line. Connect an oscilloscope to Junction of R44 and C41 and check response and linearity of FM band. Peak to peak separation should not be less than 180 kc.				

* Use a 680-ohm resistor to load the plate winding while the grid winding of the same transformer is being peaked. Then the grid winding is loaded with 680-ohm resistor while the plate winding is being peaked. When windings are loaded, it is necessary to increase the 10.7 mc. input, since gain will decrease and voltage across C40 will be less.

CRITICAL LEAD DRESS:

1. The 2.2 meg. mixer grid resistor should have a minimum practicable amount of lead extending on the grid end.
2. The first AM and first FM i-f plate leads should be dressed away from the range switch wafer.
3. The ground strap between the r-f shelf and the main chassis should be well soldered and kept as short as practicable.
4. Arrange wiring to prevent the filament wire between mixer and 1st i-f tubes from passing near the mixer grid, or the AVC wiring.
5. Dress filament wires away from 1st audio and inverter coupling condensers.
6. Dress ac power switch wires away from the audio coupling condenser which is wired to the volume control.
7. Dress the mixer grid coupling condenser away from the lugs on the front range switch wafer.
8. The 1st i-f tube AVC and screen by-pass condensers should ground at same point as cathode neutralizing loop.
9. The discriminator tube plate and screen by-pass condensers should ground at the same point as the neutralizing loop.
10. The mixer plate by-pass should ground as close to the r-f shelf ground strap as practicable.
11. The shielded audio leads connecting to the front function switch wafer should have a min. of exposed lead on the function switch end.

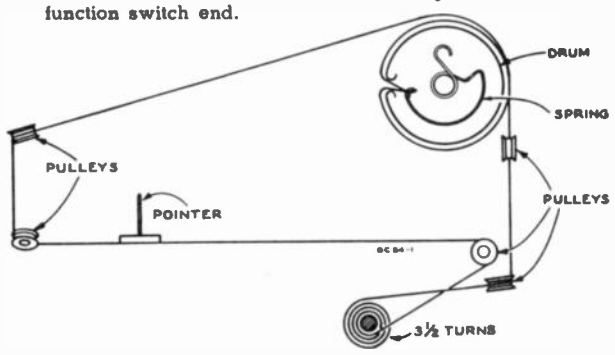


Figure 6—Dial and Drive Cord Assembly

VOLTAGE CHART

Voltages shown are as read with "Jr. VoltOhmyst" between the indicated terminal and chassis ground, with the receiver operating on 117 volts, 60 cycles, a-c and with no signal input.

Tube No.	Tube Type	Tube Function	Tube Element	Pin No.	AM	FM	Phono
V1	6CB6	R-F Amplifier	Plate Screen Cathode Grid	5 6 2 1	203 48 0.2 −1.1	132 39 0.2 −0.9	—— —— —— ——
V2	6J6	Oscillator and Mixer	Plate Grid Plate Grid	2 5 1 6	55 −1.4 33 −2.1	51 −1.2 27 −1.9	—— —— —— ——
V3	6BA6	I-F Amplifier	Plate Screen Cathode Grid	5 6 7 1	192 106 .93 −1.1	188 101 .25 −0.35	—— —— —— ——
V4	6AU6	Driver	Plate Screen Cathode Grid	5 6 7 1	186 122 1.05 0	180 120 1.07 0	—— —— —— ——
V5	6AL5	Radio Det.	———	—	——	——	——
V6	6AV6	Audio Amp.	Plate Grid	7 1	94 −0.7	93 −0.7	112 −0.7
V7	6C4	Inverter	Plate Cathode Grid	1 & 5 7 6	87 −11.4 −16.0	85 −11.4 −16	125 −11.1 −19.2
V8 V9	6V6GT 6V6GT	Audio Power Output	Plate Screen Grid	3 4 5	295 208 −16.0	298 204 −16	305 299 −19.2
V10	5Y3GT	Rectifier	Filament	2 & 8	313	313	314

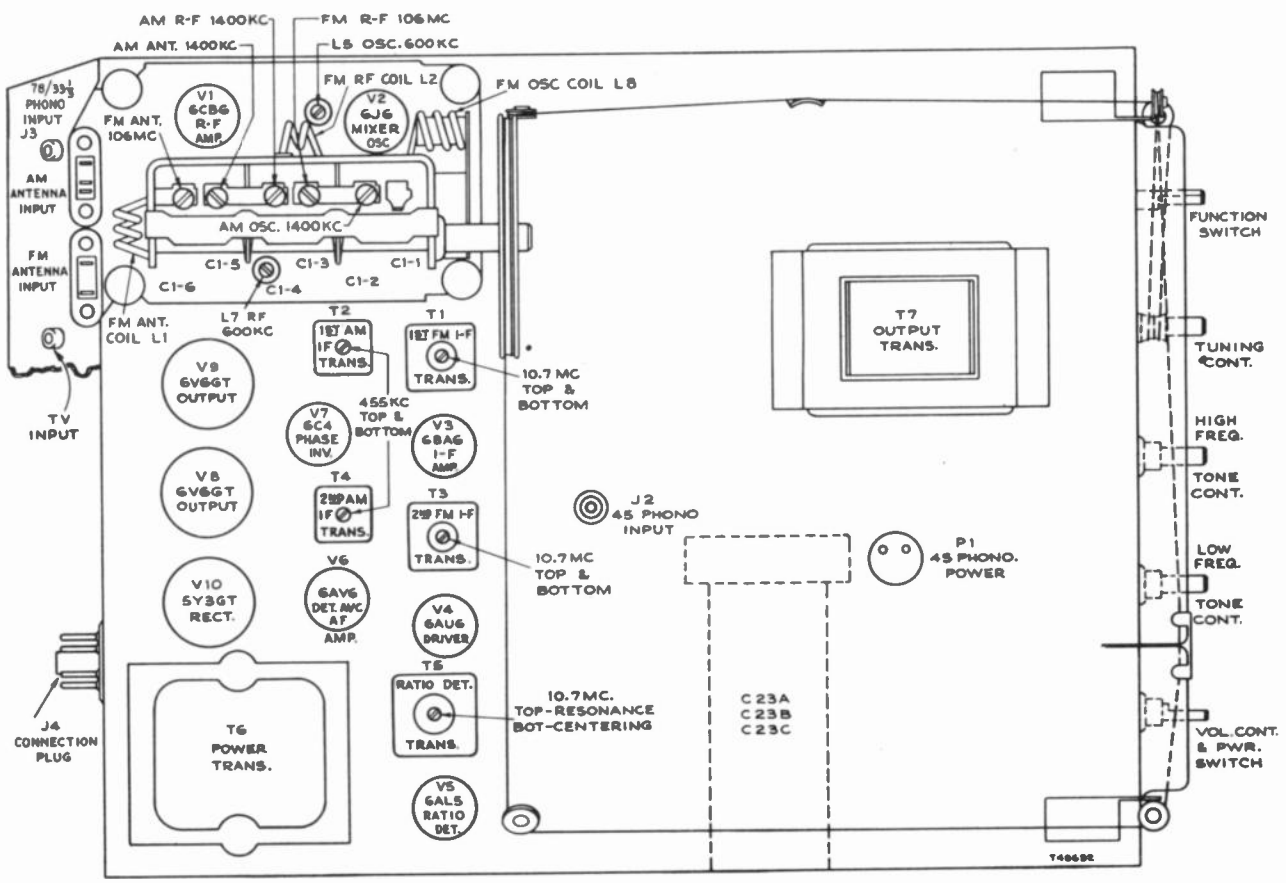
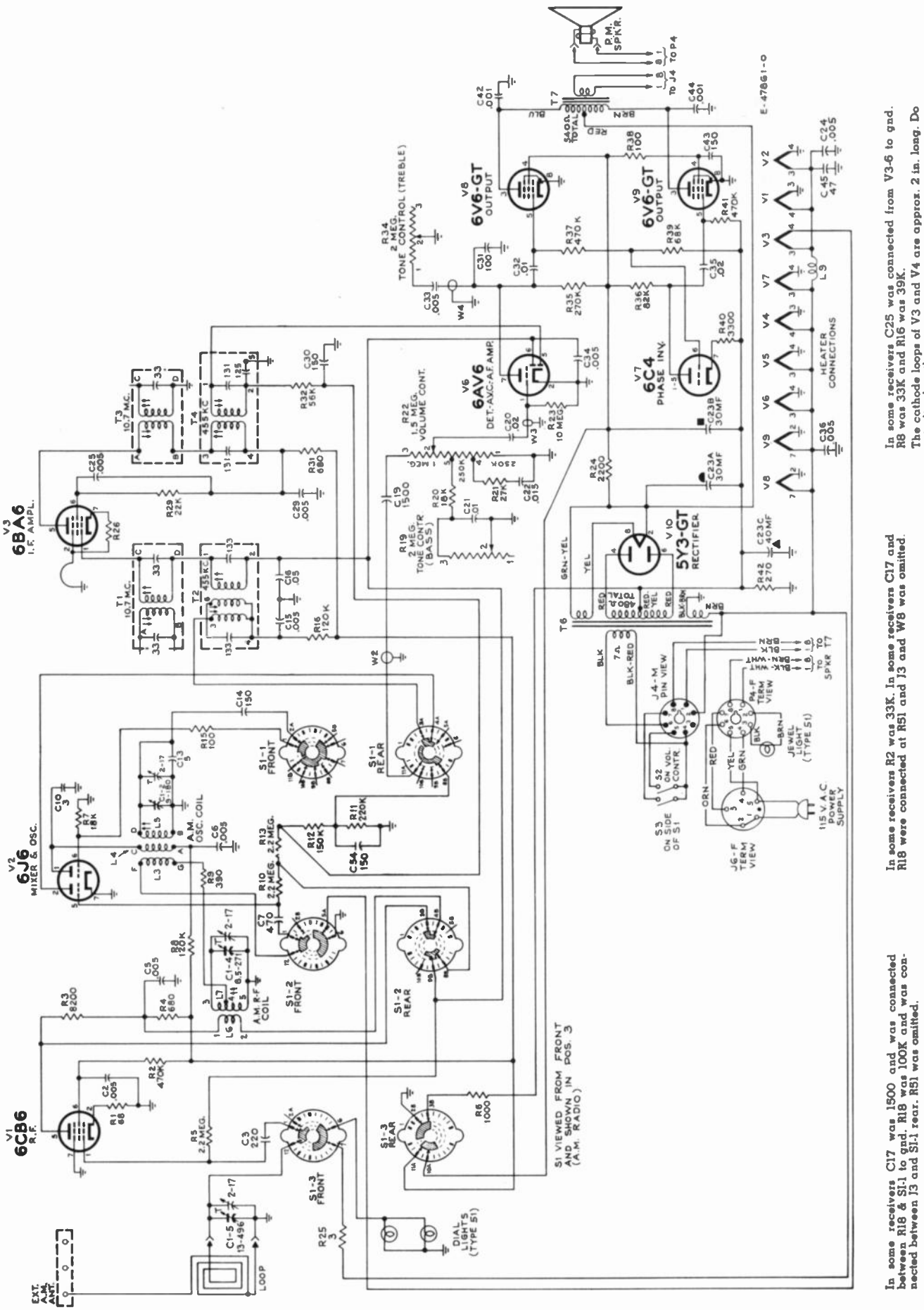


Figure 7—Chassis, Top View, Showing Adjustments

7T143

SIMPLIFIED RADIO SCHEMATIC DIAGRAM



In some receivers C17 was 1500 and was connected between R18 & S1-1 to gnd. R18 was 100K and was connected between J3 and S1-1 rear. R51 was omitted.

In some receivers R2 was 33K. In some receivers C17 and R18 were connected at R51 and J3 and W8 was omitted.

In some receivers C25 was connected from V3-6 to gnd. R8 was 33K and R16 was 39K. The cathode loops of V3 and V4 are approx. 2 in. long. Do not alter length.

Figure 8—RC1092 Simplified Schematic Diagram Showing Function Switch in AM Position

SIMPLIFIED RADIO SCHEMATIC DIAGRAM 7T143

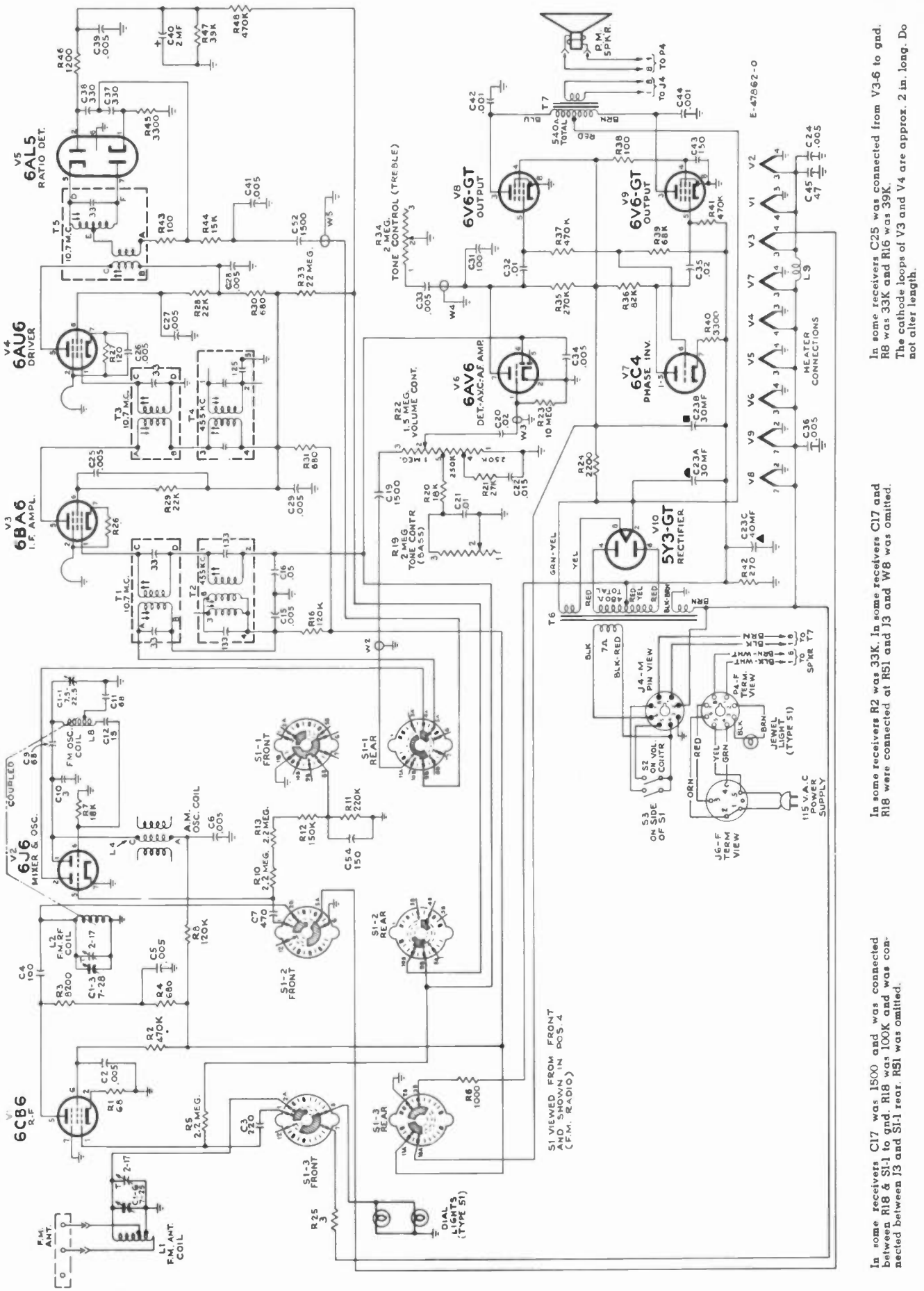


Figure 9—Simplified Radio Schematic Diagram Showing Function Switch in FM Position

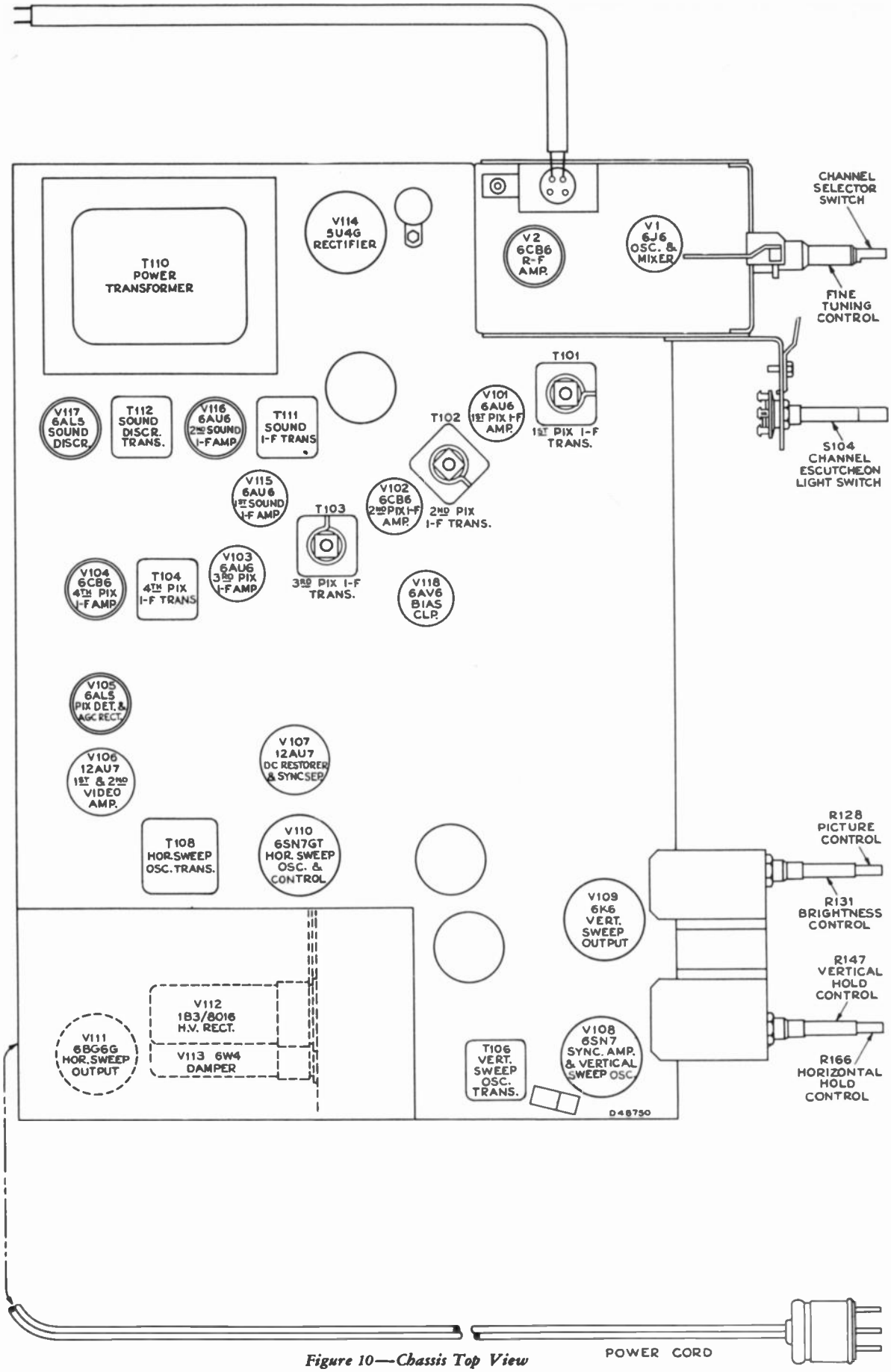


Figure 10—Chassis Top View

TELEVISION CHASSIS BOTTOM VIEW 7T143

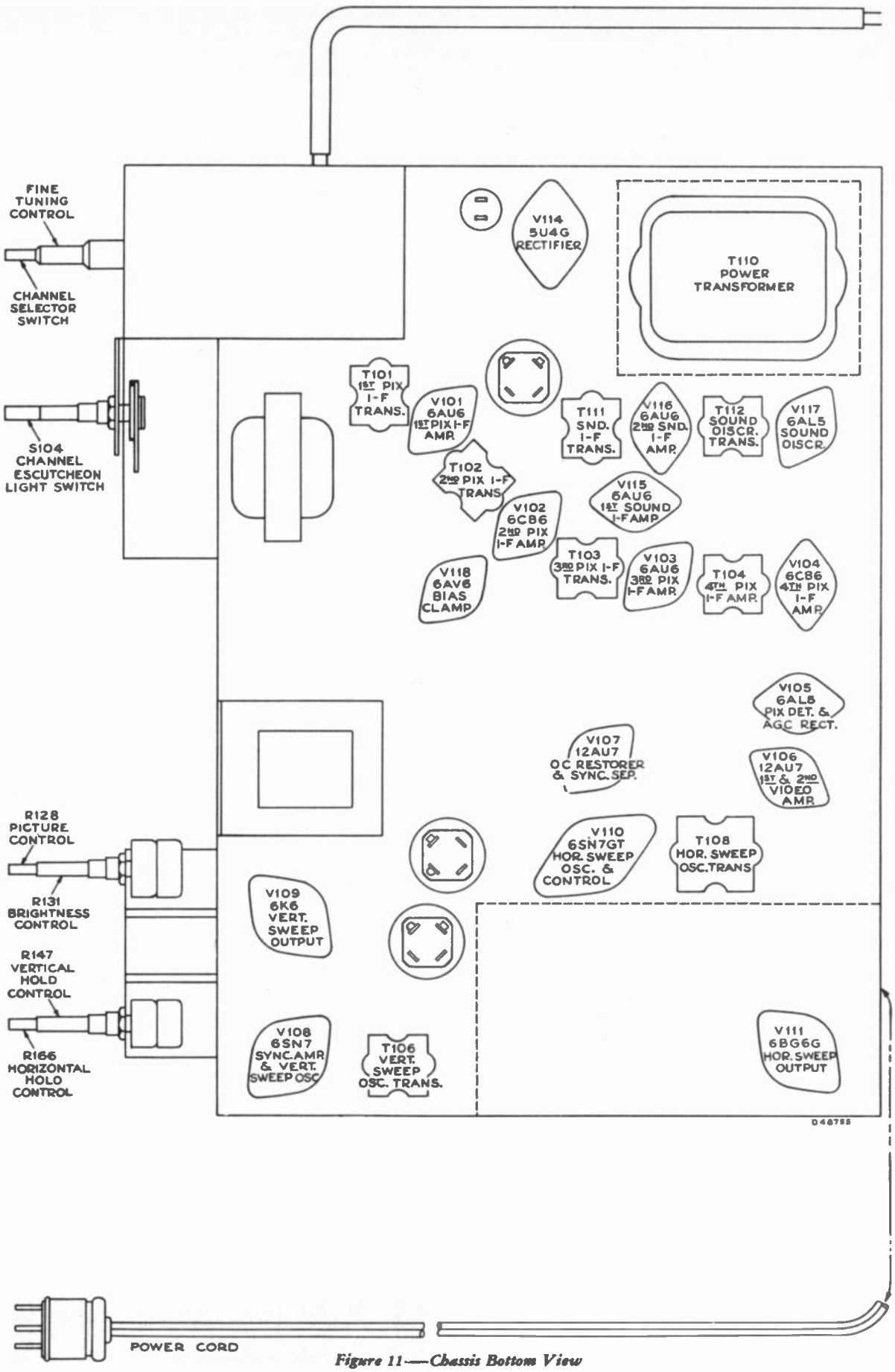


Figure 11—Chassis Bottom View

7T143

VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition, a 2500 microvolt test pattern signal was fed into the receiver, the picture synced and the AGC control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are read with a type WV97A senior "VoltOhmyst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c. The symbol < means less than.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6J6	Mixer	2500 Mu. V. Signal	2	144	—	—	7	0	5	–2.3	6.6	—	
			No Signal	2	135	—	—	7	0	5	–2.1	5.6	—	
V1	6J6	R-F Oscillator	2500 Mu. V. Signal	1	100	—	—	7	0	6	*–3.0	4.0	—	*Depending upon channel
			No Signal	1	96	—	—	7	0	6	*–2.7	3.9	—	
V2	6AG5	R-F Amplifier	2500 Mu. V. Signal	5	250	6	130	2	0.1	1	–3.4	3.0	0.6	
			No Signal	5	166	6	84	2	0.4	1	–0.2	10.3	2.3	
V101	6AU6	1st Pix. I-F Amplifier	2500 Mu. V. Signal	5	195	6	222	7	0.3	1	–5.0	1.7	0.8	
			No Signal	5	121	6	135	7	0.8	1	–0.8	5.2	2.2	
V102	6CB6	2nd Pix. I-F Amplifier	2500 Mu. V. Signal	5	222	6	203	2	0.3	1	–5.0	2.0	0.7	
			No Signal	5	124	6	112	2	0.8	1	–0.8	5.5	1.6	
V103	6AU6	3d Pix. I-F Amplifier	2500 Mu. V. Signal	5	185	6	225	7	0.2	1	–5.0	1.7	0.7	
			No Signal	5	94	6	132	7	0.5	1	–0.75	4.9	2.0	
V104	6CB6	4th Pix. I-F Amplifier	2500 Mu. V. Signal	5	165	6	142	2	2.25	1	0	9.6	3.1	
			No Signal	5	118	6	132	2	2.1	1	0	9.0	3.1	
V105	6AL5	Picture 2d Det.	2500 Mu. V. Signal	7	–2.0	—	—	1	0	—	—	0.3	—	
			No Signal	7	–0.5	—	—	1	0	—	—	<0.1	—	
V105	6AL5	AGC Rectifier	2500 Mu. V. Signal	2	–9.5	—	—	5	5.5	—	—	<0.1	—	
			No Signal	2	–2.0	—	—	5	5.5	—	—	<0.1	—	
V106	12AU7	1st Video Amplifier	2500 Mu. V. Signal	1	100	—	—	3	1.2	2	–2.3	3.6	—	At maximum contrast
			No Signal	1	54	—	—	3	0.9	2	–0.5	2.6	—	
			2500 Mu. V. Signal	1	190	—	—	3	9.0	2	–2.6	0.9	—	At minimum contrast
			No Signal	1	122	—	—	3	6.9	2	–0.5	0.6	—	
V106	12AU7	2d Video Amplifier	2500 Mu. V. Signal	6	330	—	—	8	125	7	118	9.3	—	At maximum contrast
			No Signal	6	295	—	—	8	121	7	110	13.6	—	
			2500 Mu. V. Signal	6	300	—	—	8	131	7	120	12.9	—	At minimum contrast
			No Signal	6	295	—	—	8	121	7	110	13.6	—	
V107	12AU7	DC Rest & Sync Sep	2500 Mu. V. Signal	1	10	—	—	3	45	2	–4.5	—	—	At Maximum Contrast
			No Signal	1	8	—	—	3	1.7	2	–0.4	—	—	
			2500 Mu. V. Signal	6	7.2	—	—	8	54	7	0	—	—	
			No Signal	6	7.0	—	—	8	—	7	0	—	—	

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I	I	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Plate (ma.)	Screen (ma.)	
V108A	6SN7GT	Sync Amp	2500 Mu. V. Signal	5	50	—	—	6	7.8	4	7.4	—	—	
			No Signal	5	46	—	—	6	7.0	4	7.0	—	—	
V108	6SN7GT	Vertical Oscillator	2500 Mu. V. Signal	2	*395	—	—	3	0	1	*–58	0.4	—	*Depends on Setting of height control
			No Signal	2	395	—	—	3	0	1	*–58	0.4	—	
V109	6K6GT	Vertical Output	2500 Mu. V. Signal	3	370	4	370	8	51	5	0	11.5	1.9	
			No Signal	3	365	4	365	8	51	5	0	11.4	1.9	
V110	6SN7GT	Horizontal Osc. Control	2500 Mu. V. Signal	2	*160	—	—	3	*–4.6	1	*–14.6	0.32	—	*Depends on Setting of hold control
			No Signal	2	*152	—	—	3	*–4.4	1	*–3.5	0.28	—	
V110	6SN7GT	Horizontal Oscillator	2500 Mu. V. Signal	5	230	—	—	6	0	4	–82	1.8	—	
			No Signal	5	225	—	—	6	0	4	–85	1.8	—	
V111	6BG6G	Horizontal Output	2500 Mu. V. Signal	5	*630	8	335	3	7.2	5	–33	67	5.0	*6000 volt pulse present
			No Signal	5	*630	8	329	3	7.2	5	–33	67.1	4.9	
V112	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	11,000	—	—	0	—	*12000 volt pulse present
			Brightness Max.	Cap	*	—	—	2 & 7	12,200	—	—	0.1	—	
V113	6W4 GT	Damper	2500 Mu. V. Signal	5	387	—	—	3	*	—	—	69	—	*3000 volt pulse present
			No Signal	5	380	—	—	3	*	—	—	70	—	
V114	5U4G	Rectifier	2500 Mu. V. Signal	4 & 6	*368	—	—	2 & 8	391	—	—	185	—	*AC measured with AC Voltmeter
			No Signal	4 & 6	*367	—	—	2 & 8	387	—	—	199	—	
V115	6AU6	1st Sound I-F. Amp.	2500 Mu. V. Signal	5	120	6	120	7	0.8	1	–0.2	6.8	2.9	
			No Signal	5	108	6	108	7	0.8	1	–0.1	6.2	2.8	
V116	6AU6	2d Sound I-F Amp.	2500 Mu. V. Signal	5	118	6	87	7	0	1	–1.3	4.9	2.8	
			No Signal	5	110	6	76	7	0	1	–0.5	6.9	3.1	
V117	6AL5	Sound Discrim.	2500 Mu. V. Signal	2	–7.2	—	—	5	0	—	—	<0.1	—	
			No Signal	2	–10.0	—	—	5	0	—	—	<0.1	—	
V118	6AV6	Bias Clamp	2500 Mu. V. Signal	7	0	—	—	2	0	1	–3.4	—	—	
			No Signal	7	0	—	—	2	0	1	–0.2	—	—	
V120	17CP4	Kinescope	2500 Mu. V. Signal	Cone	11,000	10	384	11	100	2	46	<0.1	<0.1	
			No Signal	Cone	12,200	10	375	11	74	2	8.3	<0.1	<0.1	

7T143 **TELEVISION R-F UNIT WIRING DIAGRAM**

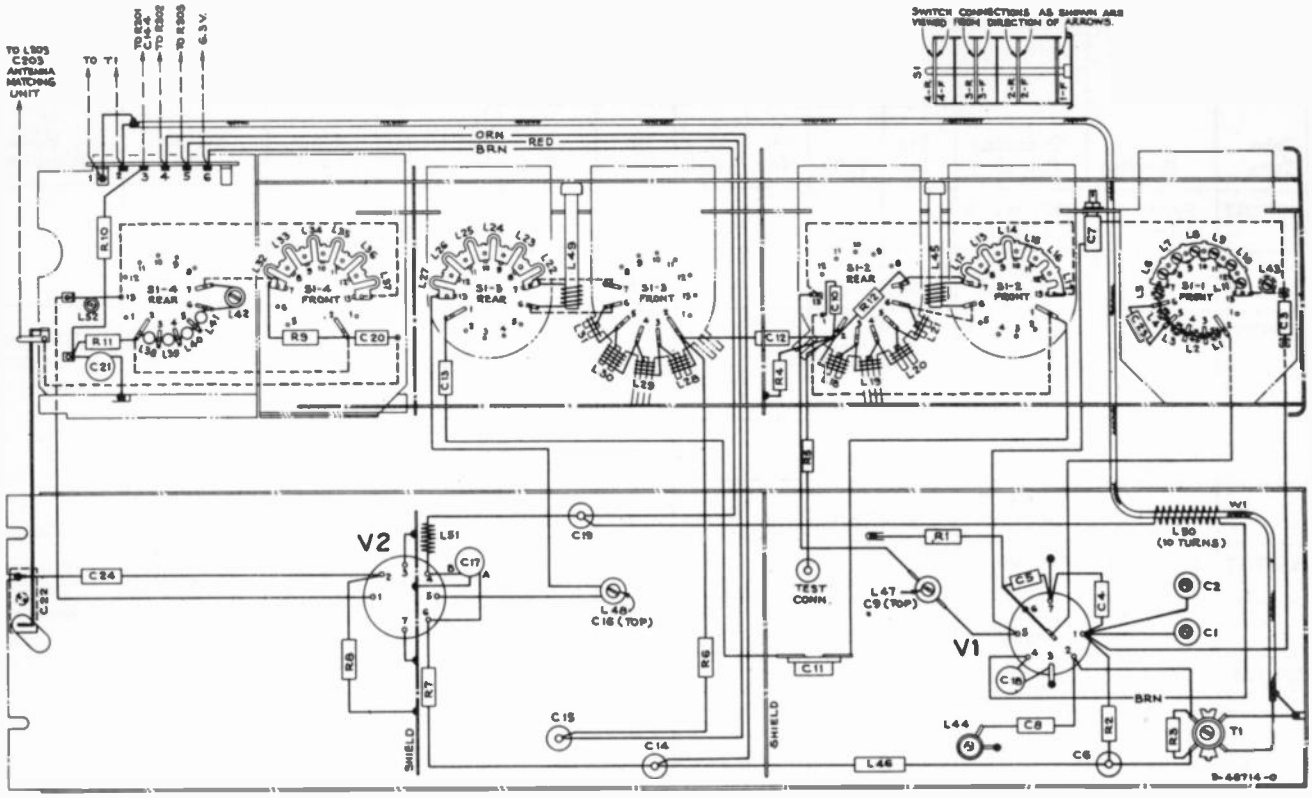


Figure 12 – Television R-F Unit Wiring Diagram

TELEVISION CRITICAL LEAD DRESS

1. All leads in the picture and sound i-f circuits must be dressed as short and direct as possible with the exception of C106, C107, C110 and C117 which are to be dressed with enough slack so as not to have to move the body of the capacitor to align that particular stage.
2. Dress all 1500 mmf .005 mfd and .01 mfd capacitors in the i-f section with leads as short as possible.
3. Dress all wires between T101 and the r-f unit in clamp.
4. Dress C185 to act as shield for lead between pin 5 of V115 socket to T111D and picture i-f circuits.
5. Dress the bodies of resistors R106, R108, R113, R119, R191, R192 and capacitor C176 as close to tube pin as possible.
6. Dress L114 with coded end as close to pin 2 of U105 socket as possible.
7. The length of the bus wire from pin 2 of V116 to ground should not be shortened or rerouted.
8. Dress R194 as close to chassis with leads as short as possible.
9. Keep the leads on C126 as short and direct as possible.
10. Dress all components connected to V106 socket up and away from the chassis except L104.
11. Keep the body and coded end of L104 as close to pin 2 of V105 socket as possible.
12. Dress the 4.5 mc. trap L107 up and away from the chassis base.
13. Dress C132 up in the air and towards V105 socket.
14. Dress R125 with body as close as possible to pin 2 of V106 socket.
15. Keep body of R123 as close as possible to pin 2 of V105 socket.
16. Dress C133 and C190 away from C132, C151 and C153.
17. Dress the white wire from picture control R128-3 away from the chassis.
18. Dress all slack on kine socket leads under chassis. Dress brown wire away from any components associated with V105 or V106.
19. The green lead from the kinescope socket should be dressed away from all other leads and components and away from V106.
20. Dress R133 towards chassis rear apron.
21. Dress all leads in clamps on rear apron away from V117, V104, V105, V106 sockets and S103.
22. Dress green wire from C147A up and away from chassis.
23. Dress blue wire of T107 toward front apron of chassis.
24. Dress C153 down next to the chassis base.
25. Dress blue/white wire from height control R151-3 under R180.
26. Dress R161, R162, R163, R164 and R170 up and away from the chassis and with a half inch clearance from the soldering point.
27. Dress the yellow wire from pin 3 of V110 socket over C153.
28. Dress both leads of C198 away from the body of the capacitor.
29. Dress fuse in high voltage compartment so as not to short circuit to ground.
30. Dress blue and blue/yellow wire from power transformer in 3 clamps on chassis base and away from S103 and video section.
31. Dress both wires on S106 away from blue/yellow damper leads of T110.
32. Dress all 2 watt resistors away from each other and away from all wires and other components.

RF UNIT ASSEMBLIES
KRK8B

STOCK No.	DESCRIPTION
75188	Board—Terminal board, 5 contact and ground
75067	Bracket—Vertical bracket for holding oscillator tube shield
75201	Cable—75 ohms, coax. cable (7¼") complete with coil (W1, L50)
75186	Capacitor—Ceramic, variable, for fine tuning—plunger type (C2)
75289	Capacitor—Ceramic, 4 mmf., ±0.5 mmf. (C4)
75189	Capacitor—Adjustable, 7-30 mmf. (C22)
75200	Capacitor—Ceramic, 12 mmf. (C24)
45465	Capacitor—Ceramic, 15 mmf. (C3)
75196	Capacitor—Ceramic, 39 mmf. (C5)
75174	Capacitor—Ceramic, trimmer, 50-75 mmf. (C11)
75199	Capacitor—Ceramic, 270 mmf. (C12, C13, C20)
75641	Capacitor—Ceramic, 390 mmf. (C10)
75166	Capacitor—Ceramic, 1500 mmf. (C6, C14, C15, C19)
75089	Capacitor—Ceramic, dual, 1500 mmf. (C17A, C17V)
73748	Capacitor—Ceramic, 1500 mmf. (C18)
73473	Capacitor—Ceramic, 5000 mmf. (C21)
75172	Capacitor—Tubular, steatite, adjustable, 0.65—1.2 mmf. (C7)
71504	Capacitor—Ceramic, 0.68 mmf. (C23)
75184	Capacitor—Ceramic, adjustable, 0.75—4 mmf., complete with adjusting stud (C1)
75197	Capacitor—Ceramic, 6.8 mmf. (C8)
75167	Clip—Tubular clip for mounting stand-off capacitors—RCA 75166
75182	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (screw adjustment) for converter section (C9, L47)
75183	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (screw adjustment) for r-f section (L48, C16)
75185	Coil—Converter plate loading coil (L44)
75202	Coil—Choke coil .56 muh (L46)
73477	Coil—Choke coil (L51)
75187	Core—Adjustable core for fine tuning capacitor C2
75162	Detent—Detent mechanism and fibre shaft
73453	Form—Coil form for L45 and L49
75165	Link—Link assembly for fine tuning
76135	Plate—Front plate and shaft bearing
14343	Retainer—Fine tuning shaft retaining ring
	Resistor—Fixed, composition:—
503027	27 ohms, ±10%, ½ watt (R8)
504115	150 ohms, ±20%, ½ watt (R10)
503233	3300 ohms, ±10%, ½ watt (R6)
503239	3900 ohms, ±10%, ½ watt (R9, R11)
503282	8200 ohms, ±10%, ½ watt (R12)
3078	10,000 ohms, ±5%, ½ watt (R3)
504310	10,000 ohms, ±20%, ½ watt (R2)
503322	22,000 ohms, ±10%, ½ watt (R7)
504410	100,000 ohms, ±20%, ½ watt (R1, R4, R5)
75164	Rod—Actuating plunger rod (fibre) for fine tuning link
71476	Screw—#4-40x ¼" binder head machine screw for adjusting L6, L7, L8, L9, L10, L11
75176	Screw—#4-40 x ⅜" fillister head screw for adjusting L5
75177	Screw—#4-40 x 5/16" fillister head screw for adjusting L1, L2, L3, L4, L43
74575	Screw—#4-40 x .359" adjusting screw for L42
73640	Screw—#4-40 x 7/16" adjusting screw for L52
75159	Shaft—Channel selector shaft and plate
75160	Shaft—Fine tuning shaft and cam
75168	Shield—Oscillator and converter sections shield for r-f unit—snap-on type
75193	Shield—Tube shield for V1
75192	Shield—Tube shield for V2.
75088	Socket—Tube socket, 7 contact, miniature, ceramic, saddle mounted
75191	Spacer—Insulating spacer for front plate (4 req'd)
75163	Spring—Friction spring (formed) for fine tuning cam
75068	Spring—Retaining spring for oscillator tube shield
74578	Spring—Retaining spring for adjusting screws
73457	Spring—Return spring for fine tuning control
30340	Spring—Hair pin spring for fine tuning link
75175	Stator—Oscillator section stator complete with rotor, segment, coils, adjusting screws and capacitors C3 and C23 (S1-1, C3, C23, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L43)
75178	Stator—Converter stator complete with rotor, coils, capacitors (C10 and C12) and resistors (R4 and R5) (S1-2, C10, C12, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L45, R4, R5, R12)
75179	Stator—R-F amplifier stator complete with rotor, coils, capacitor (C13) and resistor (R6) (S1-3, C13, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L49, R6)
75180	Stator—Antenna stator complete with rotor, coils, capacitors (C20 and C21) and resistors (R9, R10, R11) (S1-4, C20, C21, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L52, R9, R10, R11)
75169	Strip—Coil segment mounting strip—RH center
75170	Strip—Coil segment mounting strip—LH lower
75171	Strip—Coil segment mounting strip—LH upper—less trimmer C7
75173	Stud—#6-32 x 13/16" adjusting stud for C7 trimmer
75446	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 uncoded and coded "ER"
75447	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 coded numerically and "Hi Q"
75181	Transformer—Converter transformer (T1)
75190	Washer—Insulating washer (neoprene) for capacitor C7
75607	Washer—Insulating washer (hex)

TELEVISION CHASSIS ASSEMBLIES
KCS48A

STOCK No.	DESCRIPTION
75515	Bracket—Channel indicator lamp bracket
53511	Capacitor—Ceramic, 10 mmf. (C128)
75217	Capacitor—Mica trimmer, dual 10-160 mmf. (C147A, C147B)
75450	Capacitor—Ceramic, 39 mmf. (C203)
71924	Capacitor—Ceramic, 56 mmf. (C106)
73090	Capacitor—Mica, 82 mmf. (C146, C148)
75437	Capacitor—Ceramic, 100 mmf. (C202)
45469	Capacitor—Ceramic, 100 mmf. (C120)
39396	Capacitor—Ceramic, 100 mmf. (C126, C197, C220, C222)
73102	Capacitor—Mica, 180 mmf. (C153)
76303	Capacitor—Ceramic, 270 mmf. (C223)
75244	Capacitor—Ceramic, 270 mmf. (C176)
73091	Capacitor—Mica, 270 mmf. (C107, C110, C117, C125)
73094	Capacitor—Mica, 390 mmf. (C215)
74947	Capacitor—Ceramic, 500 mmf., 20,000 volts (C161)
74250	Capacitor—Mica, 560 mmf. (C155)
75166	Capacitor—Ceramic, 1500 mmf. (stand-off) (C171, C172)
73746	Capacitor—Ceramic, 1500 mmf. (C102, C103, C109, C113, C115, C116, C122, C129, C168, C186)
75089	Capacitor—Ceramic, dual, 1500 mmf. (C108A, C108B, C111A, C111B, C123A, C123B, C184A, C184B)
73473	Capacitor—Ceramic, 5000 mmf. (C114, C121, C187)
75877	Capacitor—Ceramic, dual, 10,000 mmf. (C105A, C105B
73960	Capacitor—Ceramic, 10,000 mmf. (C144, C185, C192, C194, C195, C224)
76009	Capacitor—Ceramic, 8.2 mmf. (C198)
73747	Capacitor—Electrolytic, 2 mfd, 50 volts (C124)
28417	Capacitor—Electrolytic, 5 mfd, 450 volts (C141)
75592	Capacitor—Electrolytic comprising 1 section of 20 mfd, 450 volts, 1 section of 80 mfd, 200 volts and 1 section of 50 mfd, 50 volts (C214A, C214B, C214C)
75510	Capacitor—Electrolytic comprising 2 sections of 35 mfd, 450 volts, 1 section of 10 mfd, 450 volts and 1 section of 5 mfd, 450 volts (C211A, C211B, C211C, C211D, C212A, C212B, C212C, C212D)
75643	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd, 1000 volts (C156)
73802	Capacitor—Tubular, paper, oil impregnated, .0015 mfd, 1000 volts (C129)
73595	Capacitor—Tubular, paper, oil impregnated, .0022 mfd, 600 volts (C137, C191, C216)
73599	Capacitor—Tubular, paper, oil impregnated, .0027 mfd, 600 volts (C189)
73795	Capacitor—Tubular, paper, oil impregnated, .0033 mfd, 600 volts (C130)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd, 600 volts (C138, C139)
73561	Capacitor—Tubular, paper, oil impregnated, .01 mfd, 400 volts (C136)
73594	Capacitor—Tubular, moulded paper, oil impregnated, .01 mfd, 600 volts (C140, C154)
74727	Capacitor—Tubular, paper, oil impregnated, .018 mfd, 1000 volts (C159)
73562	Capacitor—Tubular, paper, oil impregnated, .022 mfd, 400 volts (C145, C151)

STOCK No.	DESCRIPTION
73810	Capacitor—Tubular, paper, oil impregnated, .022 mfd, 1000 volts (C160)
73553	Capacitor—Tubular, paper, oil impregnated, .047 mfd, 400 volts (C149, C199, C221)
75071	Capacitor—Tubular, moulded paper, .047 mfd, 400 volts (C166, C167)
73592	Capacitor—Tubular, paper, oil impregnated, .047 mfd, 600 volts (C133, C150, C190)
73597	Capacitor—Tubular, moulded paper, oil impregnated, .047 mfd, 1000 volts (C143, C158, C162, C163)
73551	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd, 400 volts (C132, C196)
73557	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd, 600 volts (C134)
73794	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd, 400 volts (C157)
74957	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd, 600 volts (C142)
73787	Capacitor—Tubular, moulded paper, 0.47 mfd, 200 volts (C127, C135, C152)
76284	Choke—Filter choke (L113)
76143	Clip—Tubular clip for mounting stand-off capacitor 75166
75210	Coil—Fifth pix, i-f coil complete with adjustable core (L103)
73477	Coil—Choke coil (L101, L102)
71449	Coil—Horizontal linearity coil (L110)
73591	Coil—Antenna matching coil (2 req'd) (Part of T200)
75241	Coil—Antenna shunt coil (L202)
75299	Coil—Peaking coil (36 muh) (L104)
71793	Coil—Peaking coil (36 muh) (L106)
76285	Coil—Peaking coil (36 muh) (L114, R119)
75253	Coil—Peaking coil (120 muh) (L109)
75252	Coil—Peaking coil (500 muh) (L105, L108)
74594	Connector—2 contact male connector for power cord
35787	Connector—Audio input connector (J103)
35383	Connector—8 contact male connector—part of deflection yoke (P101)
68592	Connector—8 contact female connector for deflection yoke leads (J101)
38853	Connector—4 contact female connector for antenna transformer (J200)
75517	Contact—Anode connector contact only
75215	Control—Horizontal and vertical hold control (R147, R166)
75216	Control—Picture and brightness control (R128, R131)
71441	Control—Vertical linearity control (R156)
71440	Control—Height control (R151)
75516	Control—Width control (R177)
71498	Core—Adjustable core and stud for FM trap 75449
74956	Cushion—Rubber cushion for deflection yoke hood
74839	Fastener—Push fastener to mount ceramic tube socket (2 req'd)
73600	Fuse—.25 amp. 250 volts (F101)
16058	Grommet—Rubber grommet for 2nd. anode lead exit
37396	Grommet—Rubber grommet for mounting ceramic tube socket (2 req'd)
76169	Hood—Deflection yoke hood less rubber cushions
75644	Insulator—2nd. anode insulator
75482	Jack—Video Jack (J105)
76168	Magnet—Focus magnet complete with adjustable plate and stud (screw drive adjustment)
76317	Magnet—Ion trap magnet (P.M.)
75518	Plate—Hi-voltage plate—bakelite—less transformer, capacitor and tube socket
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R193)
76304	Resistor—Wire wound, 220 ohms, ½ watt (R239)
75512	Resistor—Wire wound, 4000 ohms, 10 watts (R181)
76066	Resistor—Wire wound, 4300 ohms, 5 watts (R228)
75593	Resistor—Wire wound, 8000 ohms, 10 watts (R212)
76065	Resistor—Wire wound, 13,000 ohms, 5 watts (R227)
	Resistor—Fixed, composition:—
504047	47 ohms, ±20%, ½ watt (R174)
503082	82 ohms, ±10%, ½ watt (R103, R107, R112, R184)
504110	100 ohms, ±20%, ½ watt (R202, R203)
523110	100 ohms, ±10%, 2 watts (R175)
503118	180 ohms, ±10%, ½ watt (R116)
503122	220 ohms, ±10%, ½ watt (R126, R127)
503168	680 ohms, ±10%, ½ watt (R226)
504210	1000 ohms, ±20%, ½ watt (R102, R104, R109, R114, R117, R159, R185, R189, R219)
513215	1500 ohms, ±10%, 1 watt (R156)
503218	1800 ohms, ±10%, ½ watt (R113)
504222	2200 ohms, ±20%, ½ watt (R140)
503227	2700 ohms, ±10%, ½ watt (R139)
503233	3300 ohms, ±10%, ½ watt (R235)
503239	3900 ohms, ±10%, ½ watt (R167)
30494	4700 ohms, ±5%, ½ watt (R130)
503247	4700 ohms, ±10%, ½ watt (R135, R230)
513247	4700 ohms, ±10%, 1 watt (R133)
30734	5600 ohms, ±5%, ½ watt (R125)
513268	6800 ohms, ±10%, 1 watt (R120, R176)
523268	6800 ohms, ±10%, 2 watt (R179)
502282	8200 ohms, ±5%, ½ watt (R106, R169)
503282	8200 ohms, ±10%, ½ watt (R145, R146)
503310	10,000 ohms, ±10%, ½ watt (R171, R236)
523310	10,000 ohms, ±10%, 2 watts (R207)
30436	12,000 ohms, ±5%, ½ watt (R152)
503312	12,000 ohms, ±10%, ½ watt (R188)
512312	12,000 ohms, ±5%, 1 watt (R108)
503315	15,000 ohms, ±10%, ½ watt (R210)
513315	15,000 ohms, ±10%, 1 watt (R180)
503318	18,000 ohms, ±10%, ½ watt (R121, R122, R137)
513318	18,000 ohms, ±10%, 1 watt (R138)
503322	22,000 ohms, ±10%, ½ watt (R143, R144, R186)
504322	22,000 ohms, ±20%, ½ watt (R192)
523327	27,000 ohms, ±10%, 2 watts (R182)
503333	33,000 ohms, ±10%, ½ watt (R105, R115, R211, R225)
504333	33,000 ohms, ±20%, ½ watt (R123)
503347	47,000 ohms, ±10%, ½ watt (R141, R187, R222)
504347	47,000 ohms, ±20%, ½ watt (R110)
503356	56,000 ohms, ±10%, ½ watt (R221, R234)
513356	56,000 ohms, ±10%, 1 watt (R215)
513368	68,000 ohms, ±10%, 1 watt (R168)
512382	82,000 ohms, ±5%, 1 watt (R172)
513382	82,000 ohms, ±10%, 1 watt (R164, R165)
3252	100,000 ohms, ±5%, ½ watt (R190, R191)
503410	100,000 ohms, ±10%, ½ watt (R224, R233)
524410	100,000 ohms, ±20%, 2 watts (R183)
503412	120,000 ohms, ±10%, ½ watt (R142)
503415	150,000 ohms, ±10%, ½ watt (R136, R154, R160, R201)
504415	150,000 ohms, ±20%, ½ watt (R124)
31895	150,000 ohms, ±5%, 1 watt (R170)
503422	220,000 ohms, ±10%, ½ watt (R134, R157, R158, R223, R231, R232)
503427	270,000 ohms, ±10%, ½ watt (R150)
503433	330,000 ohms, ±10%, ½ watt (R161)
512433	330,000 ohms, ±5%, 1 watt (R163)
503447	470,000 ohms, ±10%, ½ watt (R111)
503456	560,000 ohms, ±10%, ½ watt (R129)
503482	820,000 ohms, ±10%, ½ watt (R162, R173, R220)
504510	1 megohm, ±20%, ½ watt (R178, R214)
30162	1.2 megohm, ±5%, ½ watt (R149)
503522	2.2 megohm, ±10%, ½ watt (R153)
70249	3.9 megohm, ±5%, ½ watt (R148)
503610	10 megohm, ±10%, ½ watt (R118)
71456	Screw—#8-32 x ⅜" wing screw to mount deflection yoke
73584	Shield—Tube shield
31251	Socket—Tube socket, octal, wafer
73117	Socket—Tube socket, 7 pin, miniature
75223	Socket—Tube socket, 9 pin, miniature
73249	Socket—Tube socket, octal, ceramic, plate mounted
31319	Socket—Tube socket, octal, moulded
71508	Socket—Tube socket, 6 contact, moulded, for 1B3/8016
68592	Socket—Tube socket, 6 contact, moulded
75718	Socket—Channel indicator lamp socket
74834	Socket—Kinescope socket
76636	Stud—Adjusting stud complete with guard for focus magnet
75594	Switch—Indicator light switch (S104)
76010	Switch—AGC switch (S106)
75508	Transformer—Power transformer 117 volt, 60 cycle (T110)
74950	Transformer—Vertical output transformer (T107)
74144	Transformer—Vertical oscillator transformer (T106)

STOCK No.	DESCRIPTION
74589	Transformer—First pix, i-f transformer (T101, C101, R101)
74590	Transformer—Second pix, i-f transformer (T102, C104)
76264	Transformer—Third pix, i-f transformer (T103, C112)
73574	Transformer—Fourth pix, i-f transformer (T104, C118)
71424	Transformer—Sound i-f transformer (T111, C169, C170)
75212	Transformer—Sound discriminator transformer (T112, C173, C174, C175)
75213	Transformer—Horizontal oscillator transformer (T108)
75509	Transformer—Antenna matching transformer complete with antenna connector, i-f and FM traps and shunt coil (T200, C200, C201, C202, C203, J200, L200, L201, L202, L203)
75585	Transformer—Hi-voltage transformer (T109)
71778	Trap—Sound trap (T105, C119)
75242	Trap—I-F trap (L200, L201, C200, C201)
75449	Trap—FM trap complete with adjustable core and stud (L203, C203)
75251	Trap—4.5 mc trap (L107, C131)
74952	Yoke—Deflection yoke (L111, L112, C164, C165, P101)

RADIO CHASSIS ASSEMBLIES
RC1092

STOCK No.	DESCRIPTION
75567	Capacitor—Variable tuning capacitor complete with drive drum (C1-1, C1-2, C1-3, C1-4, C1-5, C1-6)
76423	Capacitor—Ceramic, 3 mmf. (C10)
75613	Capacitor—Ceramic, 5 mmf. (C13)
39044	Capacitor—Ceramic, 15 mmf. (C12)
75609	Capacitor—Ceramic, 47 mmf (C45)
75612	Capacitor—Ceramic, 68 mmf. (C9, C11)
75437	Capacitor—Ceramic, 100 mmf. (C31)
39396	Capacitor—Ceramic, 100 mmf. (C4)
75614	Capacitor—Ceramic, 150 mmf. (C14, C30, C43, C54)
75611	Capacitor—Ceramic, 220 mmf. (C3)
39640	Capacitor—Mica, 330 mmf. (C37, C38)
72571	Capacitor—Mica, 470 mmf. (C7)
75610	Capacitor—Ceramic, 1500 mmf. (C19)
74850	Capacitor—Ceramic, 1600 mmf. (C17)
76473	Capacitor—Ceramic, 5000 mmf. (C2, C5, C6, C15, C24, C25, C27, C28, C29, C34, C36)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C40)
72052	Capacitor—Electrolytic comprising 1 section of 30 mfd., 450 volts, 1 section of 30 mfd., 350 volts and 1 section of 40 mfd., 25 volts (C23A, C23B, C23C)
73801	Capacitor—Tubular, paper, .001 mfd., 400 volts (C8)
70642	Capacitor—Tubular, paper, .001 mfd., 1000 volts (C42, C44)
73920	Capacitor—Tubular, paper, .005 mfd., 400 volts (C26, C33, C39, C41)
73561	Capacitor—Tubular, paper, .01 mfd., 400 volts (C32)
70572	Capacitor—Tubular, paper, .015 mfd., 400 volts (C22)
58476	Capacitor—Tubular, paper, oil impregnated, .018 mfd., 200 volts (C21)
71928	Capacitor—Tubular, paper, .02 mfd., 200 volts (C20)
73562	Capacitor—Tubular, paper, .02 mfd., 400 volts (C35)
73553	Capacitor—Tubular, paper, .05 mfd., 400 volts (C16)
73935	Clip—Mounting clip for AM, i-f transformer
75627	Clip—Clip for main cable—on rear of chassis
75569	Coil—Oscillator coil—AM—complete with adjustable screw (L3, L4, L5)
75570	Coil—R-F coil—AM—complete with adjustable screws (L6, L7)
71942	Coil—Filament choke coil (L9)
75615	Coil—Antenna coil—FM (L1)
74815	Coil—R-F coil—FM (L2)
74817	Coil—Oscillator coil—FM (L8)
35787	Connector—Single contact female connector for pickup cables and television (J2, J3, J5)
75542	Connector—8 contact male connector for power input cable (J4)
75543	Connector—2 contact female connector for 45 RPM motor cable (P1)
74879	Connector—2 contact female connector for antenna leads
75537	Control—Volume control and power switch (R22, S2)
75561	Control—Tone control—L-F (R19)
75562	Control—Tone control—H-F (R34)
75564	Coupling—Spring coupling for function switch extension shaft
75586	Cover—Insulating cover for electrolytic #72052
72953	Cord—Drive cord (approx. 66" overall)
74839	Fastener—Push fastener for mounting r-f shelf (4 req'd)
16058	Grommet—Rubber grommet for mounting r-f shelf (4 required)
75547	Grommet—Rubber grommet to mount slides to bottom—rear—(2 required)
75548	Grommet—Rubber grommet to mount slides to bottom—front (2 required)
11765	Lamp—Dial lamp—Mazda 51
75544	Nut—Rivnut to fasten screw for mounting chassis (4 req'd)
18469	Plate—Bakelite mounting plate for electrolytic #72052
75535	Plate—Dial back plate complete with three (3) pulleys
75536	Pointer—Station selector pointer
72602	Pulley—Drive cord pulley
72323	Resistor—Wire wound, 3 ohms, ½ watt (R25)
73637	Resistor—Wire wound, 2200 ohms, 5 watts (R24)
	Resistor—Fixed, composition:—
503068	68 ohms, ±10%, ½ watt (R1, R26)
503110	100 ohms, ±10%, ½ watt (R15, R38, R43)
503112	120 ohms, ±10%, ½ watt (R27)
53099	270 ohms, ±5%, 2 watts (R42)
503139	390 ohms, ±10%, ½ watt (R9)
503168	680 ohms, ±10%, ½ watt (R4)
504168	680 ohms, ±20%, ½ watt (R30, R31)
503210	1000 ohms, ±10%, ½ watt (R6)
30731	1200 ohms, ±5%, ½ watt (R46)
30733	3300 ohms, ±5%, ½ watt (R40, R45)
513282	8200 ohms, ±10%, 1 watt (R3)
503315	15,000 ohms, ±10%, ½ watt (R44)
503318	18,000 ohms, ±10%, ½ watt (R7, R20)
503322	22,000 ohms, ±10%, ½ watt (R28, R29)
503327	27,000 ohms, ±10%, ½ watt (R18, R21)
30147	39,000 ohms, ±5%, ½ watt (R47)
503356	56,000 ohms, ±10%, ½ watt (R32)
503368	68,000 ohms, ±10%, ½ watt (R39)
503382	82,000 ohms, ±10%, ½ watt (R36)
503412	120,000 ohms, ±10%, ½ watt (R8, R16)
503415	150,000 ohms, ±10%, ½ watt (R12, R14)
504422	220,000 ohms, ±20%, ½ watt (R11)
503427	270,000 ohms, ±10%, ½ watt (R35)
503447	470,000 ohms, ±10%, ½ watt (R2, R37, R41, R48)
503515	1.5 megohm, ±10%, ½ watt (R17, R51)
504522	2.2 megohm, ±20%, ½ watt (R5, R10, R13)
504610	10 megohm, ±20%, ½ watt (R23)
504622	22 megohm, ±20%, ½ watt (R33)
75540	Shaft—Tuning knob shaft
75565	Shaft—Extension shaft for function switch
73584	Shield—Tube shield
75546	Slide—Slide mechanism complete for radio chassis bottom
31251	Socket—Tube socket, octal, wafer
73117	Socket—Tube socket, 7 pin, miniature
74179	Socket—Tube socket, 7 pin, miniature for V1 & V2
31364	Socket—Dial lamp socket
75563	Spring—Retaining spring for function switch extension shaft
76332	Spring—Drive cord tension spring
74847	Support—Polystyrene support for FM oscillator coil complete with mounting bracket
75568	Switch—Function switch (S1-1, S1-2, S3)
75557	Transformer—Output transformer (T7)
73743	Transformer—Ratio detector transformer (T5)
75558	Transformer—First i-f transformer—AM—complete with adjustable screw (T2)
73037	Transformer—Second i-f transformer—AM—complete with adjustable screw (T4)
75559	Transformer—First i-f transformer—FM—complete with adjustable cores (T1)
75560	Transformer—Second i-f transformer—FM—complete with adjustable cores (T3)
75566	Transformer—Power transformer, 115 volt, 60 cycle (T6)
33726	Washer—"C" washer for tuning knob shaft

RADIO ROLLOUT CARRIAGE
RK158

STOCK No.	DESCRIPTION
75573	Decal—Function decal for radio controls
75572	Dial—Polystyrene dial scale
76161	Frame—Moulded frame—maroon—for mounting radio chassis and 45 RPM changer for mahogany or walnut instruments
75551	Handle—Metal pullout handle for mounting frame
75555	Screw—No. 8-32 x ⅝" cross recessed pan head machine screw to mount radio chassis (4 required)

SPEAKER ASSEMBLIES
92569-12W
RL 111A1
RMA 274

STOCK No.	DESCRIPTION
13867	Cap—Dust cap
75682	Cone—Cone complete with voice coil (3.2 ohms)
75681	Speaker—12" P.M. speaker complete with cone and voice coil assembly (3.2 ohms)

SPEAKER ASSEMBLIES
971494-2W
RL—111B1
RMA—274

STOCK No.	DESCRIPTION
75023	Cap—Dust cap
76296	Cone—Cone and voice coil (3.2 ohms)
76389	Speaker—12" P.M. speaker complete with cone and voice coil (3.2 ohms)

NOTE:—If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number stamped on speaker and full description of part required.

MISCELLANEOUS

STOCK No.	DESCRIPTION
75705	Antenna—Radio antenna loop complete less cable
75692	Back—Back cover—maroon—for radio—45 RPM phono compartment for mahogany or walnut instruments—assembled to rollout
75698	Back—Cabinet back cover for radio—45 RPM phono compartment—assembled to cabinet
75699	Back—Back cover—maroon—for 33⅓ 78 RPM changer compartment—assembled to rollout
76187	Back—Back cover complete with terminal board and power cord for television chassis
76184	Board—Television antenna terminal board (2 contact)
75707	Board—Radio (A-FM) antenna terminal board
75694	Bracket—Radio—45 RPM phono rollout mechanism stop bracket less rubber bumper
75695	Bracket—33⅓-78 RPM phono rollout mechanism stop bracket less rubber bumper
76179	Bracket—Suspension bracket for deflection yoke hood assembly
71599	Bracket—Pilot lamp bracket
75696	Bumper—Rubber bumper for rollout mechanism stop bracket
72447	Cable—Shielded audio cable complete with two (2) pin plugs
72437	Cable—Shielded pickup cable complete with pin plug for 45 RPM changer
74545	Cable—Shielded pickup cable complete with pin plug for 33⅓ 78 RPM changer
13103	Cap—Pilot lamp cap
71892	Catch—Bullet catch and strike for cabinet doors
X3130	Cloth—Grille cloth for mahogany or walnut instruments
75703	Connector—5 contact male connector less shell for television power cord (P103)
30870	Connector—2 contact male connector for AC power cable for 45 RPM changer
74882	Connector—2 contact (polarized) male connector for radio antenna loop cable
75709	Connector—8 contact female connector less shell for main cable
75710	Connector—5 contact female connector less shell for main cable
30868	Connector—2 contact female connector for main cable
75474	Connector—Single contact male connector for speaker (2 required) or for television antenna cable
74752	Connector—2 contact male connector for F-M antenna cable
39153	Connector—4 contact male connector for television antenna cable
75702	Cord—Television power cord complete with two (2) contact female connector less five (5) contact male connector
70392	Cord—Power cord and plug
75608	Cushion—Kinescope masking panel dust seal (rubber)
74273	Decal—Trade mark decal (Victrola)
75640	Decal—Television controls function decal for mahogany or walnut instruments
71984	Decal—Trade mark decal (RCA Victor)
74809	Emblem—"RCA Victor" emblem
75455	Escutcheon—Channel marker escutcheon—dark—for mahogany or walnut instruments
74606	Glass—Safety glass
37396	Grommet—Rubber grommet to mount speaker (4 req'd)
75697	Grommet—Rubber grommet for 45 RPM changer mounting (3 required)
74838	Grommet—Power cord strain relief (1 set)
75551	Handle—Metal pullout handle for 33⅓ 78 RPM changer mounting frame
74308	Hinge—Cabinet door hinge (1 set)
74959	Knob—Television fine tuning control knob—maroon—for mahogany or walnut instruments (outer)
73996	Knob—Television channel selector knob—maroon—for mahogany or walnut instruments (inner)
74962	Knob—Television brightness control or vertical hold control knob—maroon—for mahogany or walnut instruments (outer)
74969	Knob—Television channel marker escutcheon light switch knob—maroon—for mahogany or walnut instruments
74963	Knob—Television picture control or horizontal hold control knob—maroon—for mahogany or walnut instruments (inner)
75712	Knob—Radio tone control, tuning control or volume control and power switch knob—maroon—for mahogany or walnut instruments
75714	Knob—Function switch knob—maroon—for mahogany or walnut instruments
11765	Lamp—Pilot or channel indicator lamp—Mazda 51
75459	Mask—Channel indicator light mask—burgundy—for mahogany or walnut instruments
76126	Mask—Kinescope masking panel
76177	Nut—#10-32 special nut for deflection yoke hood support rods (2 required)
74768	Nut—Speed nut to secure deflection yoke support rods
75884	Nut—Speed nut for 33⅓ 78 RPM changer mounting screw
73634	Nut—Speed nut for speaker mounting screws
75677	Pull—Door pull for lower doors
75678	Pull—Door pull for upper doors
76176	Rod—"L" shaped threaded rod to support deflection yoke hood assembly (2 required)
71456	Screw—No. 8-32 x ⅜" wing screw for deflection yoke and focus magnet mounting support
75883	Screw—No. 10-24 x 2¼" round head machine screw to mount 33⅓ 78 RPM changer
74269	Screw—No. 8-32 x ¾" trimit head screw for door pulls
75704	Shell—Shell for 5 contact male connector #75703
75708	Shell—Shell for 8 contact female connector #75709
75711	Shell—Shell for 5 contact female connector #75710
75546	Slide—33⅓ 78 RPM changer mounting frame slide mechanism (2 required)
31364	Socket—Pilot lamp socket
72845	Spring—Retaining spring for knob 74959
14270	Spring—Retaining spring for knobs 73996, 74962 & 74969
30330	Spring—Retaining spring for knob 74963
74734	Spring—Retaining spring for knobs 75712, 75714
73643	Spring—Spring clip for channel marker escutcheon
75691	Spring—Suspension spring (coil type) for main cable
76180	Spring—Formed spring for kinescope masking panel (6 required)
72936	Stop—Door stop
75457	Washer—Felt washer—dark brown—between knob and channel marker escutcheon for mahogany or walnut instruments
75500	Washer—Felt washer for television chassis back cover

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS.

TELEVISION CHASSIS WIRING DIAGRAM

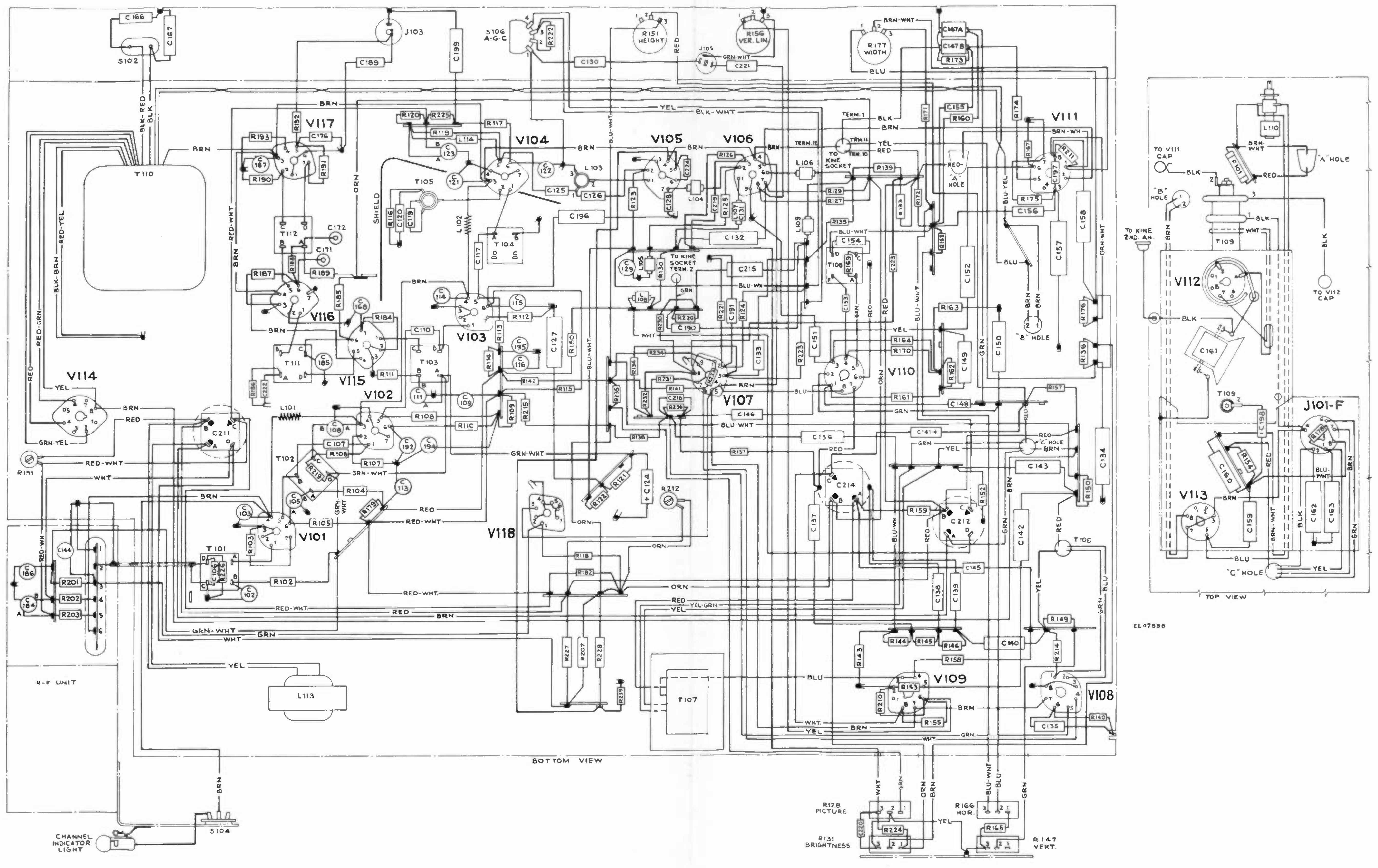
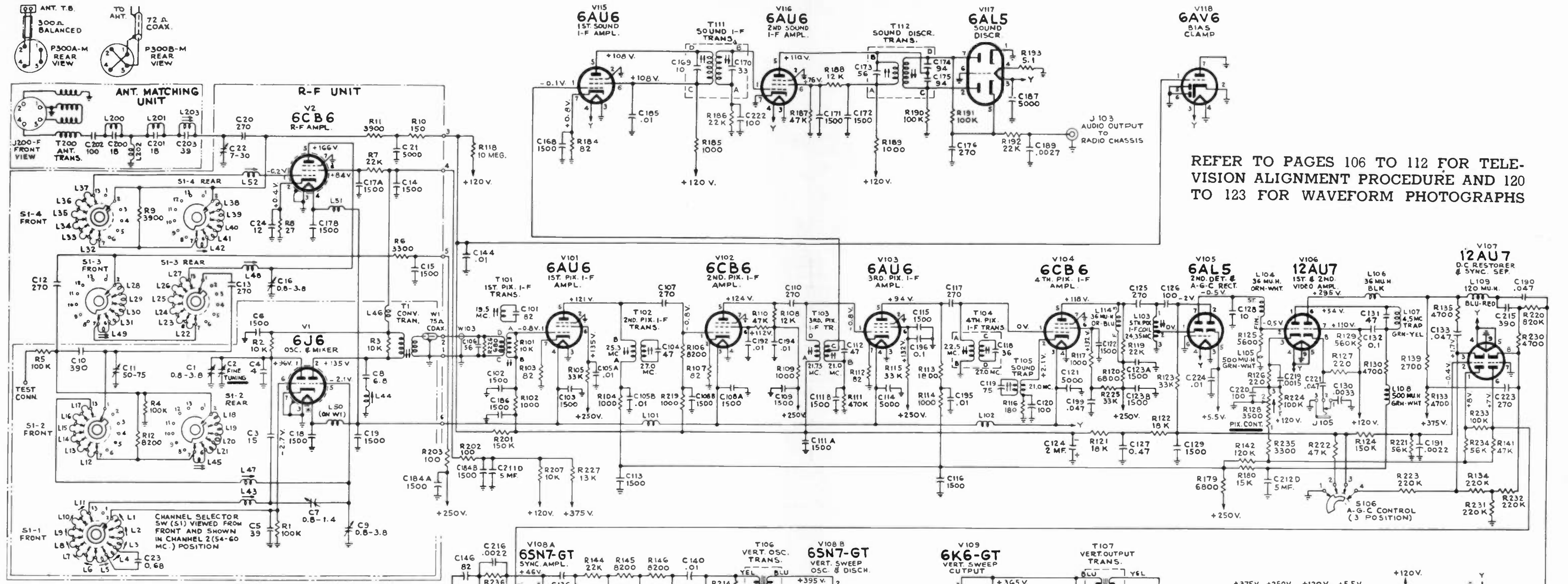
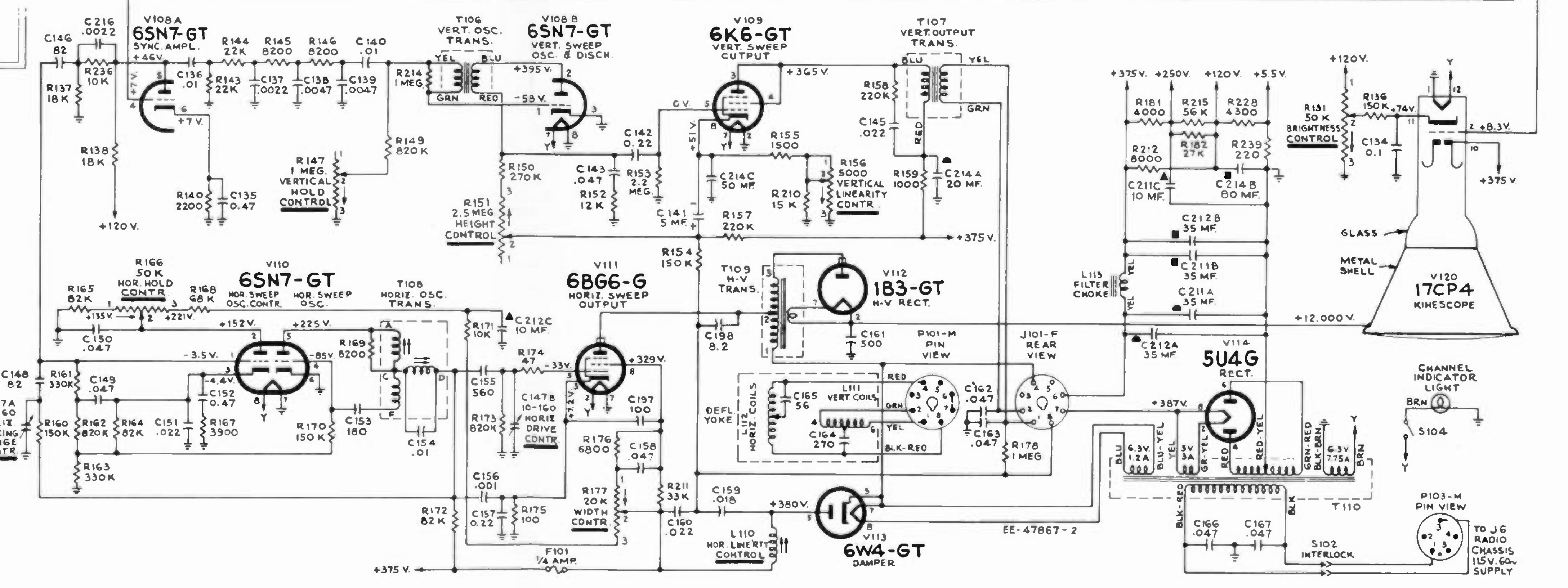


Figure 13
Television
Chassis Wiring Diagram

TELEVISION CIRCUIT SCHEMATIC DIAGRAM



REFER TO PAGES 106 TO 112 FOR TELEVISION ALIGNMENT PROCEDURE AND 120 TO 123 FOR WAVEFORM PHOTOGRAPHS



PRODUCTION CHANGES

In some receivers, T111 had only a single winding, C170 was 50 mmf and was connected between V115-5 and V116-1. R136 was 100K and was connected between V116-1 and gnd. C222 was omitted.

In some receivers, R118 was 2.2 meg, R133 was 6800, R201 was 33K and C130 was .0015. V105-5 was connected to gnd and C224 was omitted. R229, 10K and L115, 500 Muh which were connected in parallel, were removed and were replaced by R139. R239 was omitted and R228 was connected to gnd. C223 was omitted.

In some receivers, R173 was 1 meg.

In some receivers, R183 was 100K and was connected from the 115 volt a-c power line to gnd.

In some receivers, R149 was 1.2 meg. R148, 3.9 meg was removed. It was connected between the yellow lead of T106 and gnd.

Due to a severe resistor shortage during the production of this series of receivers it was found necessary to substitute resistors of different values from the nominal value shown on the schematic. These substitutions were approved by the engineering department for each particular application in the circuit only if the change in value did not impair receiver operation. In some such instances, these substitutions involved a change in value of 5%, 10%, 20% or in a few instances even greater change.

In critical circuits where a change of value could not be tolerated, the proper resistance was obtained by the use of series, parallel or even series-parallel combinations of resistors in order to obtain the correct value of resistance or wattage.

If it should become necessary to replace a resistor or group of resistors, the values shown in the schematic and parts list should be employed.

If the value of the resistor to be replaced is different from the value shown in the schematic, and the schematic value is not available, then it is permissable to replace it with the value found in the receiver or some value between that and the value shown in the schematic. Some of the commercially available, low resistance value, molded body types are of wire wound construction. Such resistors should not be employed in the r-f unit, i-f or video sections as the inductive affect of these resistors may impair circuit operation.

All resistance values in ohms. K=1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Coil resistance values less than 1 ohm are not shown.

Direction of arrows at controls indicates clockwise rotation.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

Figure 14 — Circuit Schematic Diagram

RCA VICTOR

TELEVISION RECEIVERS
MODELS 9T105, 9T126, 9T128

Chassis Nos. KCS49B, KCS49BF, KCS49C, KCS49CF, KCS49BF-2, or KCS49CF-2

—Mfr. No. 274—

SERVICE DATA

—1951 No. T5—

Model 9T105
"York"
Mahogany, Walnut or Oak

Model 9T126
"Hillsdale"
Walnut, Mahogany or Oak

Model 9T128
"Provincial"
Walnut, Mahogany or Maple

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

The majority of the above receivers were built with conventional 21.00 mc., sound i-f systems.

Chassis marked KCS49BF-2 or KCS49CF-2 were converted to intercarrier sound by the factory. Additional receivers of all models may have been converted in the field. The sound portion of the field converted receivers should be the same as that shown in the enclosed intercarrier schematic. However it is possible that other production changes listed on page 35 may not have been made in the field. A separate alignment procedure is given for the intercarrier receivers.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE. . 204 square inches on a 19AP4A Kinescope

TELEVISION R-F FREQUENCY RANGE

All 12 television channels, 54 mc. to 88 mc., 174 mc. to 216 mc.
Fine Tuning Range . ±250 kc. on chan. 2, ±650 kc. on chan. 13
Picture Carrier Frequency . . . . . 25.50 mc.
Sound Carrier Frequency . . . . . 21.00 mc.
Intercarrier receivers have 4.5 mc. sound I-F.

VIDEO RESPONSE . . . . . To 4 mc.

SWEEP DEFLECTION . . . . . Magnetic

FOCUS . . . . . Magnetic

POWER SUPPLY RATING . . 115 volts, 60 cycles, 205 watts

AUDIO POWER OUTPUT RATING . . . . . 3.5 watts max.

CHASSIS DESIGNATIONS

KCS49B Series . . . . . In Model 9T105
KCS49C Series . . . . . In Models 9T126 and 9T128

LOUDSPEAKERS

KCS49B Series . . . . . (92580-4) 8" PM Dynamic, 3.2 ohms
KCS49C Series . . . . . (92569-11) 12" PM Dynamic, 3.2 ohms

DIMENSIONS (inches)	Width	Height	Depth
Cabinet (outside), 9T105	24¼	23¼	26⅝
Cabinet (outside), 9T126	29	40¼	27⅞
Cabinet (outside), 9T128	29¼	40¼	26¾

WEIGHT Model	Chassis with Tubes in Cabinet	Shipping Weight
9T105	103	122
9T126	135	159
9T128	133	165

RECEIVER ANTENNA INPUT IMPEDANCE

Choice: 300 ohms balanced or 72 ohms unbalanced.

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6CB6	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator and Mixer
(3)	RCA 6AU6	1st Sound I-F Amplifier
(4)	RCA 6AU6	2nd Sound I-F Amplifier
(5)	RCA 6AL5	Sound Discriminator or Ratio Detector
(6)	RCA 6AV6	1st Audio Amplifier
(7)	RCA 6K6GT	Audio Output
(8)	RCA 6AU6	1st Picture I-F Amplifier
(9)	RCA 6CB6	2nd Picture I-F Amplifier
(10)	RCA 6AU6	3rd Picture I-F Amplifier
(11)	RCA 6CB6	4th Picture I-F Amplifier
(12)	RCA 6AL5	Picture 2nd Detector and AGC Detector
(13)	RCA 12AU7	1st and 2nd Video Amplifier
(14)	RCA 12AU7	DC Restorer and Sync Separator
(15)	RCA 6SN7GT	Sync Separator and Vertical Sweep Oscillator
(16)	RCA 6K6GT	Vertical Sweep Output
(17)	RCA 6SN7GT	Horizontal Sweep Oscillator and Control
(18)	RCA 6BG6G	Horizontal Sweep Output
(19)	RCA 6W4GT	Damper
(20)	RCA 1B3-GT/8016	High Voltage Rectifier
(21)	RCA 19AP4A	Kinescope
(22)	RCA 5U4G	Rectifier

Specifications continued on page 2

9T105, 9T126, 9T128 ELECTRICAL AND MECHANICAL SPECIFICATIONS

(Continued)

PICTURE INTERMEDIATE FREQUENCIES

Picture Carrier Frequency	25.50 Mc.
Adjacent Channel Sound Trap	27.00 Mc.
Accompanying Sound Traps	21.00 Mc.
Adjacent Channel Picture Carrier Trap	19.50 Mc.

SOUND INTERMEDIATE FREQUENCIES

Sound Carrier Frequency ..... 21.00 Mc.

Intercarrier chassis have 4.5 Mc. sound i-f

VIDEO RESPONSE ..... To 4 Mc.

FOCUS ..... Magnetic

SWEEP DEFLECTION ..... Magnetic

SCANNING ..... Interlaced, 525 line

HORIZONTAL SWEEP FREQUENCY ..... 15,750 cps

VERTICAL SWEEP FREQUENCY ..... 60 cps

FRAME FREQUENCY (Picture Repetition Rate) ..... 30 cps

OPERATING CONTROLS (front Panel)

Channel Selector Fine Tuning	Dual Control Knobs
Picture Brightness	Dual Control Knobs
Picture Horizontal Hold Picture Vertical Hold	Dual Control Knobs
Sound Volume and On-Off Switch Tone Control	Dual Control Knobs

NON-OPERATING CONTROLS (not including r-f & i-f adjustments)

Picture Centering	top chassis adjustment
Width	rear chassis adjustment
Height	rear chassis adjustment
Horizontal Linearity	rear chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis screwdriver adjustment
Horizontal Osc. Freq.	top chassis adjustment
Horizontal Osc. Waveform	bottom chassis adjustment
Horizontal Locking Range	rear chassis adjustment
Focus	top chassis adjustment
Ion Trap Magnet	top chassis adjustment
Deflection Coil	top chassis wing nut adjustment
AGC Control Switch	rear chassis adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT REMOVE THE RECEIVER CHASSIS, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES, AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For this reason, the kinescope must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. During service if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA replacement kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver.

The following adjustments are necessary when turning the receiver on for the first time:

1. See that the TV-PH switch on the rear apron is in the "TV" position.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best sound fidelity (or best pix in intercarrier sets) and the SOUND VOLUME control for suitable volume.

5. Turn the BRIGHTNESS control fully counter-clockwise, then clockwise until a light pattern appears on the screen.

6. Adjust the VERTICAL hold control until the pattern stops vertical movement.

7. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

8. Adjust the PICTURE and BRIGHTNESS controls for suitable picture contrast and brightness.

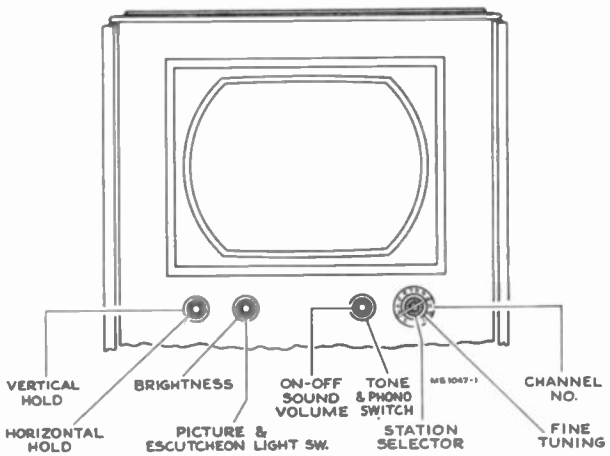


Figure 1—Receiver Operating Control

9. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

10. In switching from one channel to another, it may be necessary to repeat steps 4 and 8.

11. When the set is turned on again after an idle period it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 4 is generally sufficient.

12. If the positions of the controls have been changed, it may be necessary to repeat steps 2 through 8.

13. To use a record player, plug the record player output cable into the PHONO jack on the rear apron, and set the TV-PH switch to "PH."

14. On console type receivers, to turn on station escutcheon light, pull out on picture control knob, and push in to turn off.

INSTALLATION INSTRUCTIONS

These receivers are shipped complete in cardboard cartons. The kinescope is shipped in place in the receiver.

Take the receiver out of the carton and remove all packing material.

Install the control knobs on the proper control shafts.

Make sure that all tubes are in place and are firmly seated in their sockets.

Check to see that the kinescope high voltage lead clip is in place.

Connect the antenna transmission line to the receiver antenna terminals. Plug a power cord into the 115 volt a-c power source and into the receiver interlock receptacle. Turn the receiver power switch to the "on" position, the brightness control fully clockwise, and the picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT.—Set the ion trap magnet approximately in the position shown in Figure 2. Starting from this position immediately adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Turn the focus control (shown in Figure 2) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches of this adjustment should be made with the brightness control at the maximum clockwise position with which good line focus can be maintained.

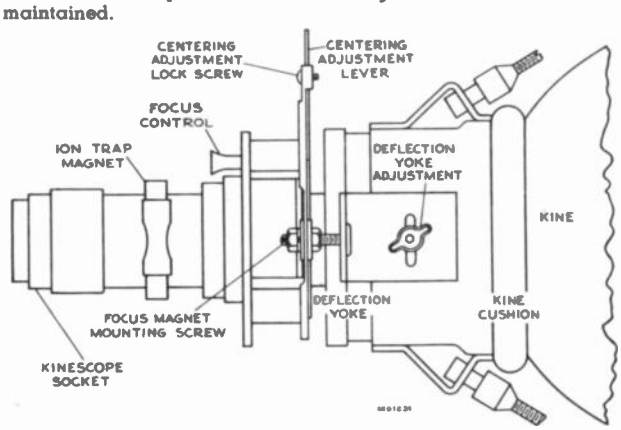


Figure 2—Yoke and Focus Magnet Adjustments

DEFLECTION YOKE ADJUSTMENT.—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS.—It will now be necessary to obtain a test pattern picture in order to make further adjustments.

If the Horizontal Oscillator and AGC System are operating properly, it should be possible to sync the picture at this point. However, if the AGC control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading, turn S106 on the rear apron (see Figure 3) counter-clockwise until the set operates normally and the picture can be synced.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT.—Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 2 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull-in should occur when the control is approximately 90 degrees from the extreme counter-clockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

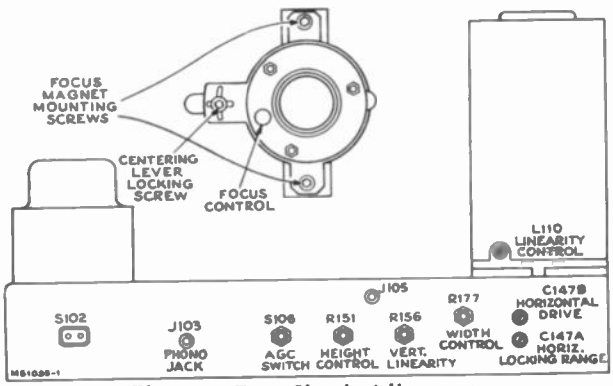


Figure 3—Rear Chassis Adjustments

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Focus Magnet Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR.—If in the above check the receiver failed to hold sync with the hold control at the extreme counter-clockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull-in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment.—Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T108 horizontal frequency adjustment on top of the chassis until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Locking Range Adjustment.—Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. The picture may remain in sync. If so turn the T108 top core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C147A slightly clockwise. If less than 2 bars are present, adjust C147A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure. For field purposes paragraph "A" under Horizontal Oscillator Waveform Adjustment may be omitted.

FOCUS MAGNET ADJUSTMENT.—The focus magnet should be adjusted so that there is approximately three-eighths inch of space between the rear cardboard shell of the yoke and the flat of the front face of the focus magnet. This spacing gives best average focus over the face of the tube.

The axis of the hole through the magnet should be parallel with the axis of the kinescope neck with the kinescope neck through the middle.

CENTERING ADJUSTMENT.—No electrical centering controls are provided. Centering is accomplished by means of a separate plate on the focus magnet. Some centering plates include a locking screw which must be loosened before centering, and others are held in adjustment by friction. Up and down adjustment of the plate moves the picture side to side and sidewise adjustment moves the picture up and down.

If a corner of the raster is shadowed, check the position of the ion trap magnet. Reposition the magnet within the range of maximum raster brightness to eliminate the shadow and recenter the picture by adjustment of the focus magnet plate. In no case should the magnet be adjusted to cause any loss of brightness since such operation may cause immediate or eventual damage to the tube. In some cases it may be necessary to shift the position of the focus magnet in order to eliminate a corner shadow.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS.—Adjustment of the horizontal drive control affects the high voltage applied to the kinescope. In order to obtain the highest possible voltage hence the brightest and best focused picture, adjust horizontal drive counter-clockwise as far as possible without stretching the left side of the picture. As a first adjustment, set the horizontal drive trimmer C147B one-half turn out from maximum capacity.

Turn the horizontal linearity coil out until appreciable loss in width occurs, then in until nearly maximum width and the best linearity is obtained.

Adjust the width control R177 to obtain correct picture width.

A slight readjustment of these three controls may be necessary to obtain the best linearity.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.—Adjust the height control (R151 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R156 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

FOCUS.—Adjust the focus magnet for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

On focus magnets using two shunts, the one with the cable is the "fine adjustment" and the other is the "focus range" adjustment. In general, the two shunts should be adjusted to approximately equal positions.

Recheck the position of the ion trap magnet to make sure that maximum brightness is obtained.

Check to see that the yoke thumbscrew and the focus magnet mounting screws are tight.

CHECK OF R-F OSCILLATOR ADJUSTMENTS.—Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 10. The adjustments for channels 2 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 4. Adjustment of channel 13 is on top of the chassis.

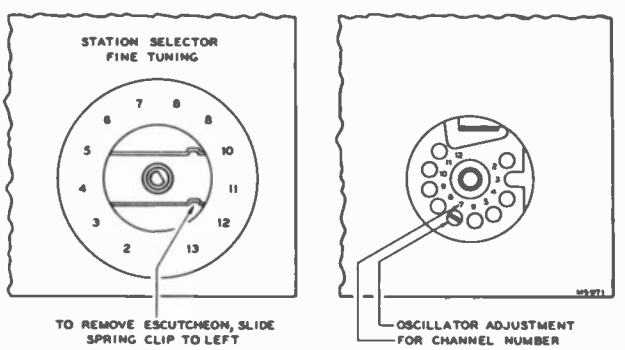


Figure 4—R-F Oscillator Adjustments

AGC CONTROL.—The AGC control switch is provided as an installation adjustment. The normal position for strong signal areas is with the switch in the number 1 or counter-clockwise position. If impulse type of interference is experienced, turn the switch to the number 2 or center position. In very weak signal areas in which impulse type interference is experienced, turn the switch to position number 3 or fully clockwise. In this position, all AGC is removed and the receiver will overload if the input signal exceeds 200 microvolts. However, for signals under 200 microvolts, this position of the AGC control switch gives best noise immunity of sync.

FM TRAP ADJUSTMENT.—In some instances interference may be encountered from a strong FM station signal. A trap is provided to eliminate this type of interference. To adjust the trap tune in the station on which the interference is observed and adjust the L203 core on top of the r-f unit for minimum interference in the picture.

Caution: In some receivers, the FM trap L203 will tune down into channel 6 or even into channel 5. Needless to say such an adjustment will cause greatly reduced sensitivity on these channels. If channels 5 or 6 are to be received, check L203 to make sure that it does not affect these two channels.

Replace the cabinet back and reconnect the receiver antenna leads to the cabinet back. Tighten the back retaining screws securely otherwise the back may rattle when the receiver is operated at high volume.

CABINET ANTENNA.—A cabinet antenna is provided in these receivers and the leads are brought out near the antenna terminal board. The cabinet antenna may be employed in place of the outdoor antenna in areas where the signals are strong and no reflections are experienced.

RECEIVER LOCATION.—The owner should be advised of the importance of placing the receiver in the proper location in the room.

The location should be chosen—

—Away from bright windows and so that no bright light will fall directly on the screen. (Some illumination in the room is desirable, however.)

—To give easy access for operation and comfortable viewing.

—To permit convenient connection to the antenna.

—Convenient to an electrical outlet.

—To allow adequate ventilation.

VENTILATION CAUTION.—The receiver is provided with adequate ventilation holes in the bottom and back of the cabinet. Care should be taken not to allow these holes to be covered or ventilation to be impeded in any way.

If the receiver is to be operated with the back of the cabinet near a wall, at least a two-inch clearance should be maintained between cabinet and wall.

CHASSIS REMOVAL.—To remove the chassis from the cabinet for repair or installation of a new kinescope, remove the control knobs, the cabinet back, unplug the speaker cable, the kinescope socket, the antenna cable, the pilot light cable on console models, the yoke and high voltage cable. Remove the yoke frame grounding strap on the console models. Take out the six chassis bolts under the cabinet. Withdraw the chassis from the back of the cabinet.

KINESCOPE HANDLING PRECAUTION.—Do not install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling.

To remove the kinescope from the cabinet, take out the four screws and one wing screw which hold the yoke frame to the cabinet. Remove the kinescope, the yoke frame with yoke and focus magnet as an assembly.

INSTALLATION OF KINESCOPE.—Handle this tube by the metal rim at the edge of the screen. Do not cover the glass bell of the tube with fingermarks as it will produce leakage paths which may interfere with reception. If this portion of the tube has inadvertently been handled, wipe it clean with a soft cloth moistened with "dry" carbon tetrachloride.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and fingermarks with a soft cloth moistened with "Windex" or similar cleaning agent.

Turn the tube so that the key on the base of the tube will be down and insert the neck of the kinescope through the deflection coil and focus magnet. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

Replace the kinescope and yoke frame assembly in the cabinet. Insert the four screws and wing screw and tighten.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible. If this is not done, difficulty will be encountered in adjusting the ion trap and focus magnets because of shadows on the corner of the raster.

Slide the chassis into the cabinet, then insert and tighten the six chassis bolts.

Slip the ion trap magnet over the neck of the kinescope.

Connect the kinescope socket to the tube base and connect the high voltage lead clip from the rim of kinescope into the high voltage bushing on the high voltage compartment.

Reconnect all other cables. Do not forget to replace the yoke frame grounding strap. Perform the entire set-up procedure beginning with Ion Trap Magnet Adjustment.

ANTENNAS.—The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to select the proper antenna to suit the particular local conditions, to install it properly and orient it correctly.

RCA Television Antenna, type No. 225A1 is designed for reception of all twelve television channels. The antenna uses the 300-ohm RCA "Bright Picture" television transmission line. The antenna, a dipole with reflector, is unidirectional on channels two through six. When used on these channels, the maximum signal is obtained when the antenna rods are broadside toward the transmitting antenna, with the antenna element between the reflector and the transmitting antenna.

If two or more stations are available between channels two and six and the two stations are in different directions, it may be possible to make a compromise orientation which will provide a satisfactory signal on all such channels.

When operated on channels seven through thirteen (174 to 216 Mc), the antenna has side lobes. On these channels, the maximum signal will be obtained when the antenna is rotated approximately 35 degrees in either direction from its broadside position toward the transmitting antenna. In many instances this effect may not cause any difficulties and it may be possible to make a compromise orientation which will permit satisfactory reception on all high and low channels. In some instances, however, this will not be the case due to reflections or to insufficient signal strength from one or more stations.

RCA antenna type 204A1 is available for use in locations in which it is desirable to eliminate side lobes and to have the antennas 7-13 directivity the same as 2-6 directivity.

For use in cases where it is desirable to have adjustable 7-13 directivity different from 2-6, RCA antenna type 206A1 is provided.

If it is impossible to obtain satisfactory results on one or more channels, it may become necessary either to provide means for tuning the antenna when switching channels or to install a separate antenna for one or more channels and to switch antennas when switching channels.

In weak signal areas it is possible to "stack" the type 204A1 antenna to obtain increased signal strength by employing one type 204A1 antenna and one type 208A1 stacking kit.

REFLECTIONS.—Multiple images sometimes known as echoes or ghosts, are caused by the signal arriving at the antenna by two or more routes. The second or subsequent image occurs when a signal arrives at the antenna after being reflected off a building, a hill or other object. In severe cases of reflections, even the sound may be distorted. In less severe cases, reflections may occur that are not noticeable as reflections but that will instead cause a loss of definition in the picture.

Depending upon the circumstances, it may be possible to eliminate the reflections by rotating the antenna or by moving it to a new location. In extreme cases, it may be impossible to eliminate the reflection.

INTERFERENCE.—Auto ignition, street cars, electrical machinery and diathermy apparatus may cause interference which spoils the picture. Whenever possible, the antenna location should be removed as far as possible from highways, hospitals, doctors' offices and similar sources of interference. In mounting the antenna, care must be taken to keep the antenna rods at least ¼ wave length (at least 6 feet) away from other antennas, metal roofs, gutters or other metal objects.

Short-wave radio transmitting and receiving equipment may cause interference in the picture in the form of moving ripples. In some instances it may be possible to eliminate the interference by the use of a trap in the antenna transmission line. However, if the interfering signal is on the same frequency as the television station, a trap will provide no improvement.

WEAK PICTURE.—When the installation is near the limit of the area served by the transmitting station, the picture may be speckled, having a "snow" effect, and may not hold steady on the screen. This condition is due to lack of signal strength from the transmitter.

9T105, 9T126, 9T128

CHASSIS TOP VIEW

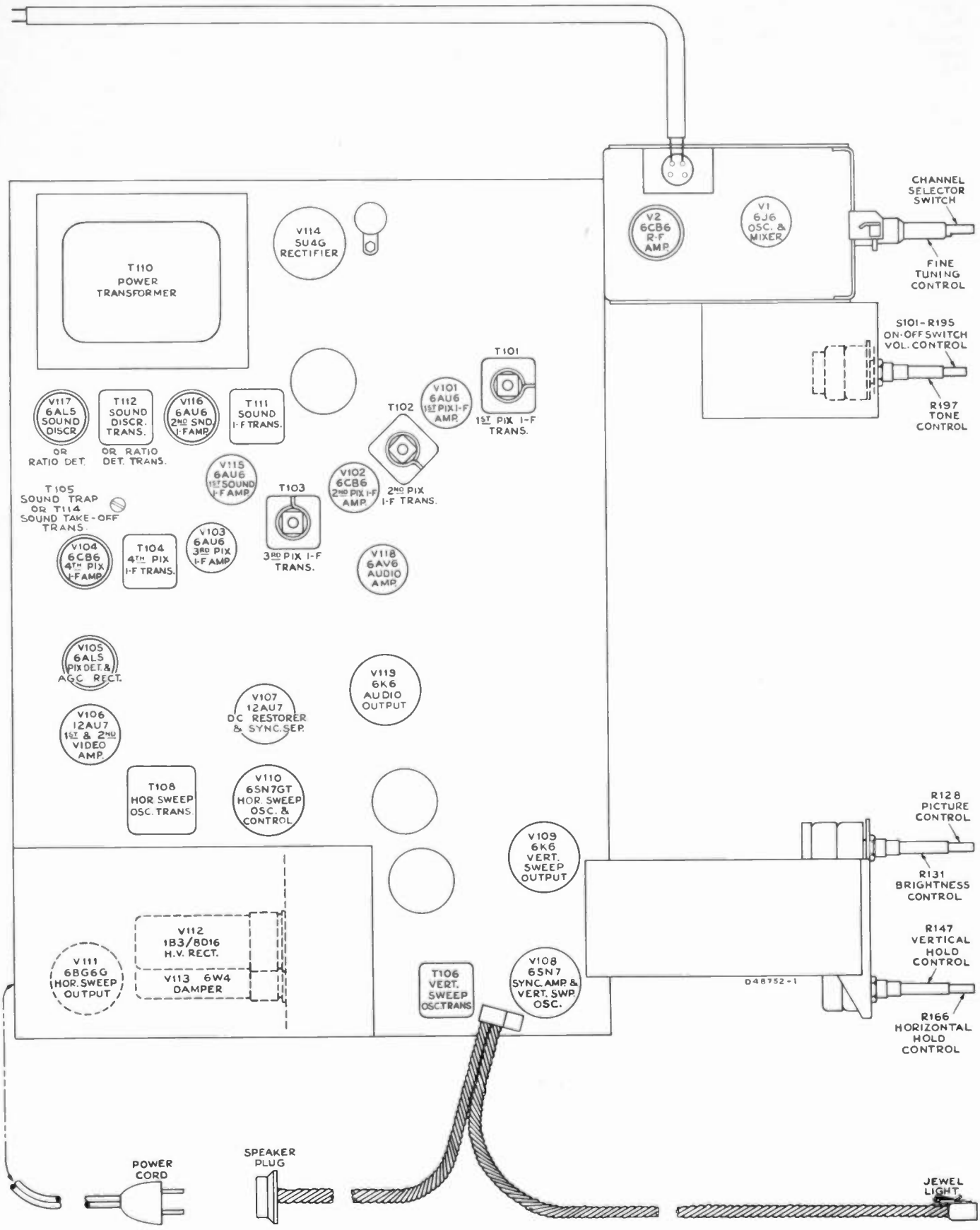


Figure 5—Chassis Top View

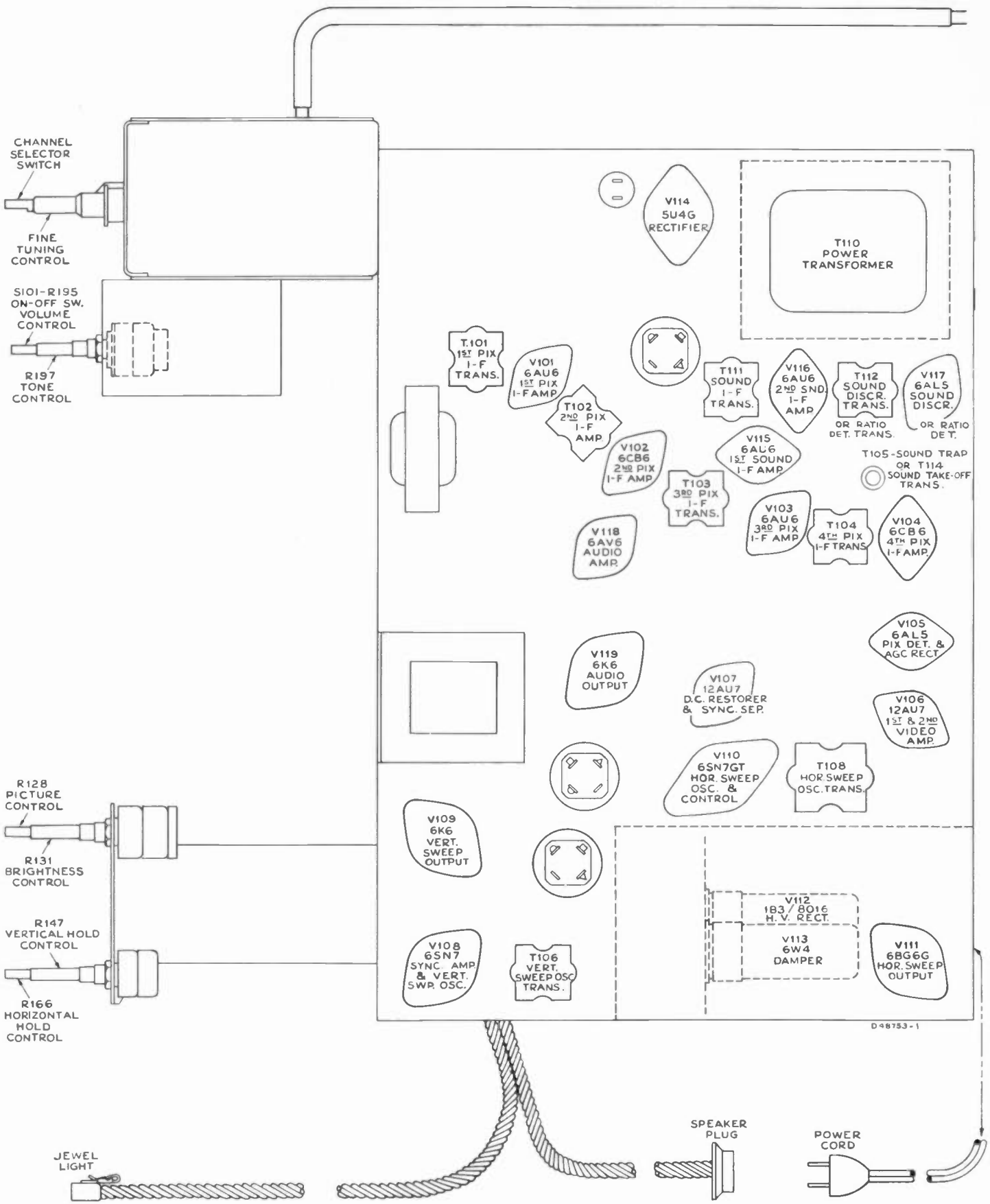


Figure 6—Chassis Bottom View

9T105, 9T126, 9T128 VOLTAGE CHART

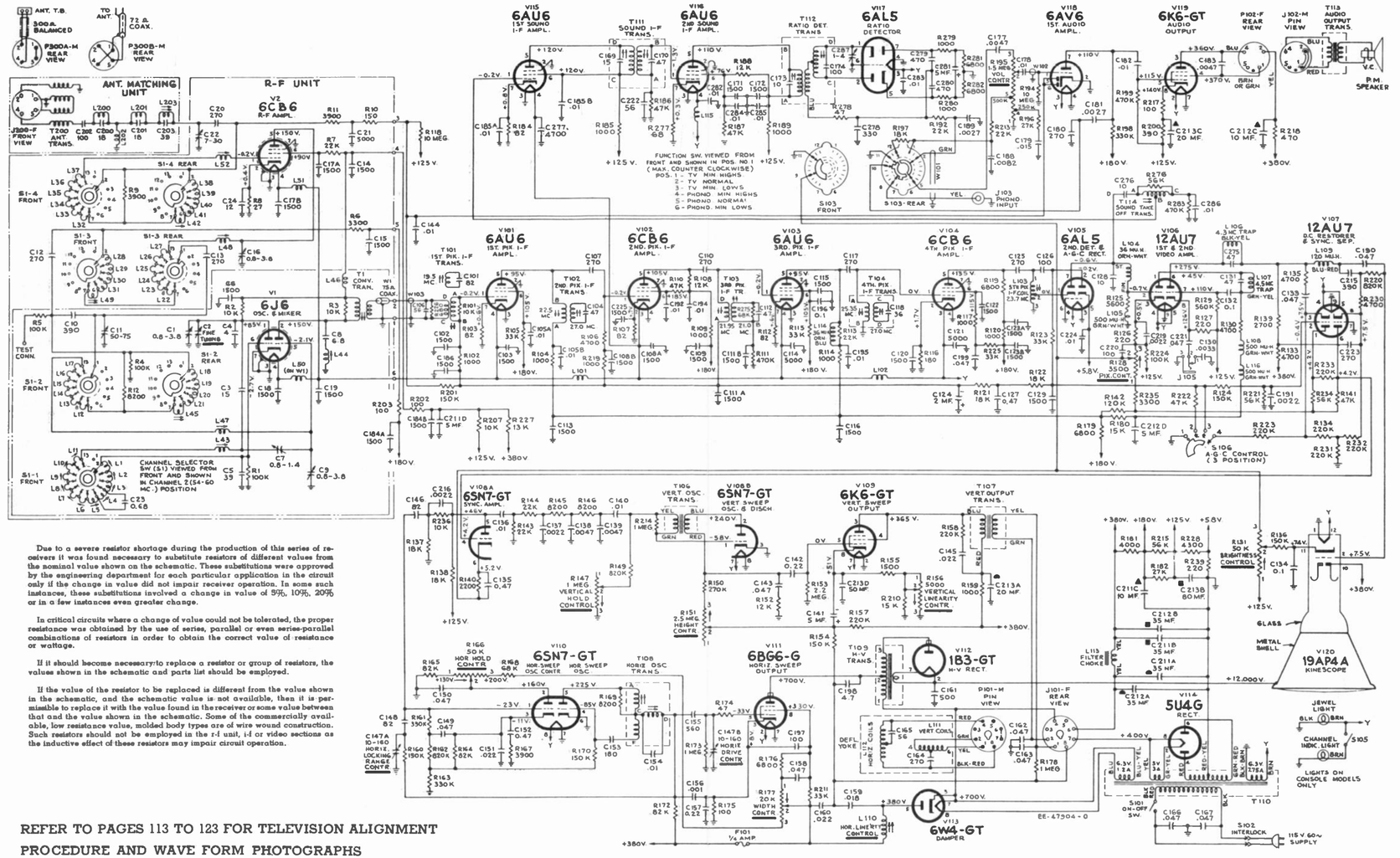
The following measurements represent two sets of conditions. In the first condition, a 2500 microvolt test pattern signal was fed into the receiver, the picture synced and the AGC control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are read with a type WV79A senior "VoltOhmyst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c. The symbol < means less than.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	
V1	6J6	Mixer	2500 Mu. V. Signal	2	155	—	—	7	0	5	–2.3	
			No Signal	2	150	—	—	7	0	5	–2.1	
V1	6J6	R-F Oscillator	2500 Mu. V. Signal	1	95	—	—	7	0	6	*–3.0	*Depending upon channel
			No Signal	1	85	—	—	7	0	6	*–2.7	
V2	6AG5	R-F Amplifier	2500 Mu. V. Signal	5	230	6	155	2	<0.1	1	–3.4	
			No Signal	5	150	6	90	2	0.4	1	–0.2	
V101	6AU6	1st Pix. I-F Amplifier	2500 Mu. V. Signal	5	195	6	222	7	0.3	1	–5.0	
			No Signal	5	95	6	105	7	0.6	1	–0.2	
V102	6CB6	2nd Pix. I-F Amplifier	2500 Mu. V. Signal	5	222	6	203	2	0.3	1	–5.0	
			No Signal	5	105	6	85	2	0.7	1	–0.2	
V103	6AU6	3d Pix. I-F Amplifier	2500 Mu. V. Signal	5	185	6	225	7	0.2	1	–5.0	
			No Signal	5	95	6	105	7	0.6	1	–0.2	
V104	6CB6	4th Pix. I-F Amplifier	2500 Mu. V. Signal	5	165	6	142	2	2.25	1	0	
			No Signal	5	135	6	115	2	1.7	1	0	
V105	6AL5	Picture 2d Det.	2500 Mu. V. Signal	7	–2.0	—	—	1	0	—	—	
			No Signal	7	–0.6	—	—	1	0	—	—	
V105	6AL5	AGC Rectifier	2500 Mu. V. Signal	2	–9.5	—	—	5	6.5	—	—	
			No Signal	2	–0.2	—	—	5	5.8	—	—	
V106	12AU7	1st Video Amplifier	2500 Mu. V. Signal	1	165	—	—	3	0.6	2	7.7	At maximum contrast
			No Signal	1	45	—	—	3	0.5	2	–0.7	
			2500 Mu. V. Signal	1	215	—	—	3	6.5	2	–7.8	At minimum contrast
			No Signal	1	90	—	—	3	5.2	2	–0.7	
V106	12AU7	2d Video Amplifier	2500 Mu. V. Signal	6	330	—	—	8	135	7	130	At maximum contrast
			No Signal	6	275	—	—	8	125	7	110	
			2500 Mu. V. Signal	6	300	—	—	8	150	7	130	At minimum contrast
			No Signal	6	275	—	—	8	126	7	110	
V107	12AU7	DC Rest Sync Sep.	2500 Mu. V. Signal	1	8	—	—	3	45	2	–5.0	At maximum contrast
			No Signal	1	4.2	—	—	3	7.5	2	–0.4	
			2500 Mu. V. Signal	6	6.6	—	—	8	35	7	0	At maximum contrast
			No Signal	6	4.2	—	—	8	7.5	7	0	

VOLTAGE CHART

9T105, 9T126, 9T128

Tube No.	Tube Type	Function	Operating Condition	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	Notes on Measurements
V108A	6SN7GT	Sync Amplifier	2500 Mu. V. Signal	5	50	—	—	6	7.4	4	6.8	At maximum contrast
			No Signal	5	46	—	—	6	5.2	4	4.2	
V108	6SN7GT	Vertical Oscillator	2500 Mu. V. Signal	2	*250	—	—	3	0	1	–50	*Depends on Setting of height control
			No Signal	2	*240	—	—	3	0	1	–50	
V109	6K6GT	Vertical Output	2500 Mu. V. Signal	3	370	4	370	8	51	5	0	
			No Signal	3	365	4	365	8	51	5	0	
V110	6SN7GT	Horizontal Osc. Control	2500 Mu. V. Signal	2	*160	—	—	3	–5.5	1	–25	*Depends on Setting of hold control
			No Signal	2	*160	—	—	3	–11.0	1	–23	
V110	6SN7GT	Horizontal Oscillator	2500 Mu. V. Signal	5	230	—	—	6	0	4	–82	
			No Signal	5	225	—	—	6	0	4	–85	
V111	6BG6G	Horizontal Output	2500 Mu. V. Signal	Cap	*700	8	340	3	8.2	5	–33	*6000 volt pulse present
			No Signal	Cap	*700	8	330	3	8.0	5	–33	
V112	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	*14500	—	—	*14500 volt pulse present
			Brightness Maximum	Cap	*	—	—	2 & 7	*12700	—	—	
V113	6W4GT	Damper	2500 Mu. V. Signal	5	390	—	—	3	*700	—	—	*3000 volt pulse present
			No Signal	5	390	—	—	3	*700	—	—	
V114	5U4G	Rectifier	2500 Mu. V. Signal	4 & 6	*368	—	—	2 & 8	400	—	—	*AC measured with AC Voltmeter
			No Signal	4 & 6	*367	—	—	2 & 8	400	—	—	
V115	6AU6	1st Sound I-F Amp.	2500 Mu. V. Signal	5	130	6	130	7	0.8	1	–0.2	
			No Signal	5	120	6	120	7	0.8	1	–0.2	
V116	6AU6	2d Sound I-F Amp.	2500 Mu. V. Signal	5	130	6	80	7	—	1	–19	
			No Signal	5	110	6	76	7	—	1	–1.3	
V117	6AL5	Sound Discrim.	2500 Mu. V. Signal	2	–7.2	—	—	5	0	—	—	Sound Discr. in KCS49B, KCS49BF, KCS49C and KCS49CF
			No Signal	2	–10.0	—	—	5	0	—	—	
V117	6AL5	Ratio Detector	2500 Mu. V. Signal	2	1.2	—	—	5	8.5	—	—	Ratio Det. in KCS49BF-2 and KCS49CF-2 only
			No Signal	2	0.4	—	—	5	7.5	—	—	
V118	6AV6	1st Audio Amplifier	2500 Mu. V. Signal	7	110	—	—	2	0	1	–0.6	
			No Signal	7	90	—	—	2	0	1	–0.6	
V119	6K6GT	Audio Output	2500 Mu. V. Signal	3	360	4	370	8	155	5	130	
			No Signal	3	360	4	370	8	140	5	115	
V120	19AP4	Kinescope	2500 Mu. V. Signal	Cone	14,000	10	384	11	100	2	46	
			No Signal	Cone	13,500	10	375	11	74	2	7.5	



Due to a severe resistor shortage during the production of this series of receivers it was found necessary to substitute resistors of different values from the nominal value shown on the schematic. These substitutions were approved by the engineering department for each particular application in the circuit only if the change in value did not impair receiver operation. In some such instances, these substitutions involved a change in value of 5%, 10%, 20% or in a few instances even greater change.

In critical circuits where a change of value could not be tolerated, the proper resistance was obtained by the use of series, parallel or even series-parallel combinations of resistors in order to obtain the correct value of resistance or wattage.

If it should become necessary to replace a resistor or group of resistors, the values shown in the schematic and parts list should be employed.

If the value of the resistor to be replaced is different from the value shown in the schematic, and the schematic value is not available, then it is permissible to replace it with the value found in the receiver or some value between that and the value shown in the schematic. Some of the commercially available, low resistance value, molded body types are of wire wound construction. Such resistors should not be employed in the r-f unit, i-f or video sections as the inductive effect of these resistors may impair circuit operation.

REFER TO PAGES 113 TO 123 FOR TELEVISION ALIGNMENT PROCEDURE AND WAVE FORM PHOTOGRAPHS

All resistance values in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Coil resistance values less than 1 ohm are not shown.

Direction of arrows at controls indicates clockwise rotation.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

Figure 7— Intercarrier Circuit Schematic Diagram KCS49BF-2 and KCS49CF-2

9T105, 9T126, 9T128 R-F UNIT WIRING DIAGRAM

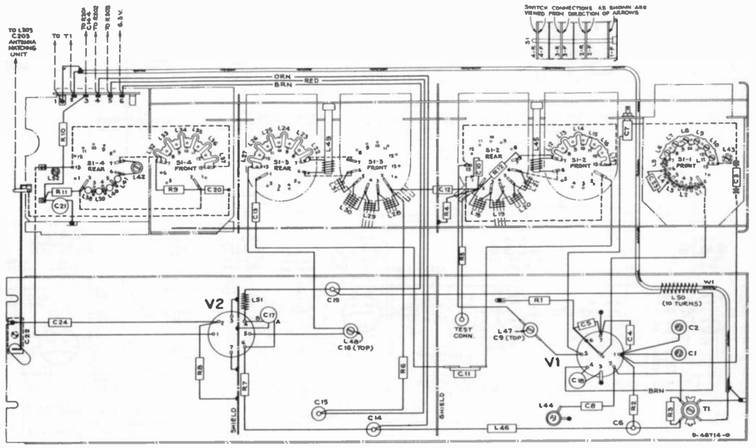
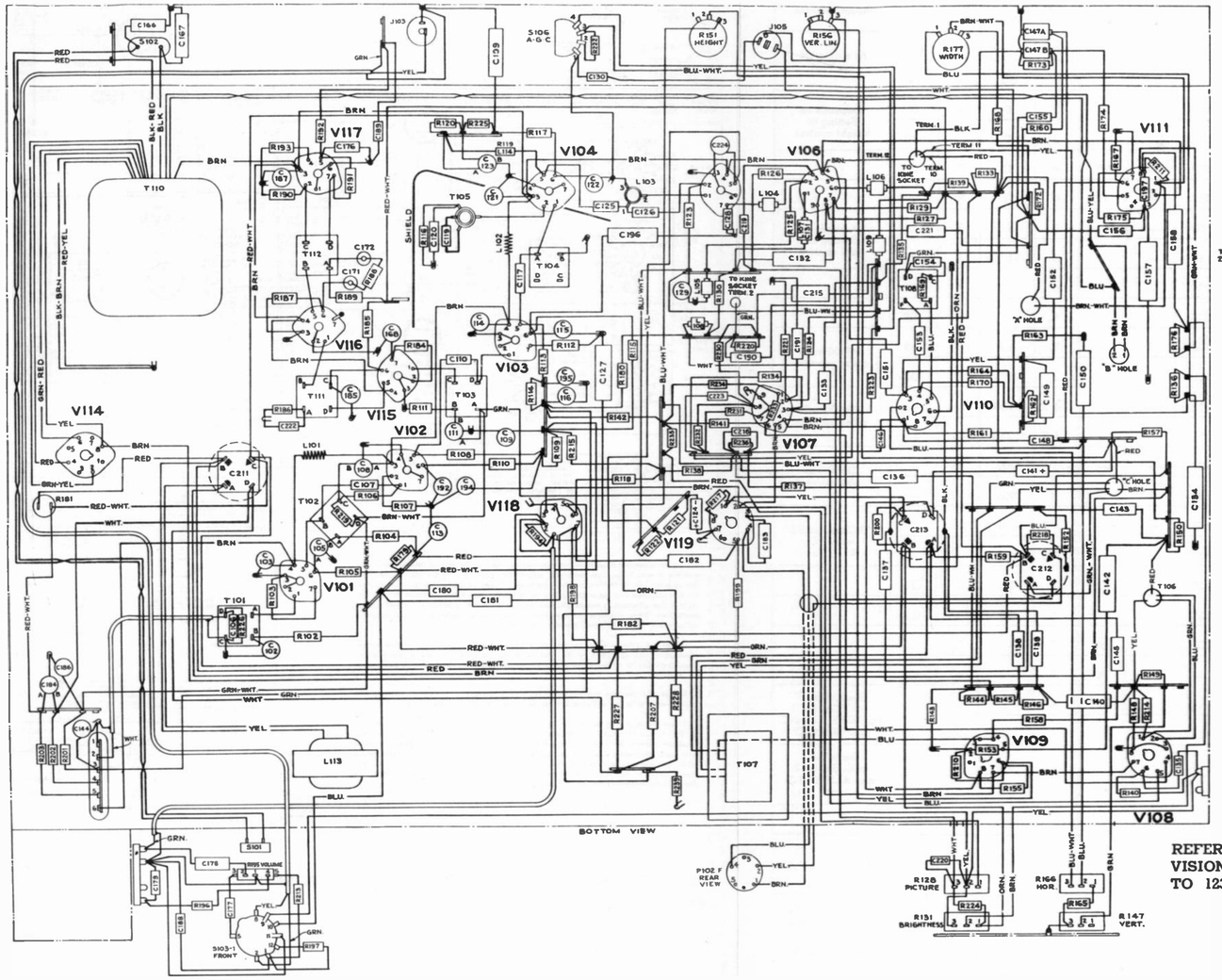


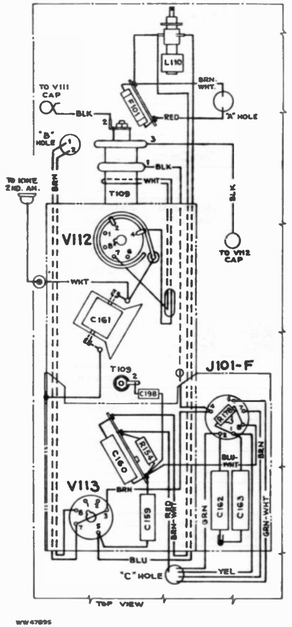
Figure 8—R-F Unit Wiring Diagram

CRITICAL LEAD DRESS:

1. All leads in the picture and sound i-f circuits must be dressed as short and direct as possible with the exception of C106, C107, C110 and C117 which are to be dressed with enough slack so as not to have to move the body of the capacitor to align that particular stage.
2. Dress all 1500 mmf .005 mfd and .01 mfd capacitors in the i-f section with leads as short as possible.
3. Dress all wires between T101 and the r-f unit in clamp.
4. Dress C185 to act as shield for lead between pin 5 of V115 socket to T111D and picture i-f circuits.
5. Dress the bodies of resistors R106, R108, R113, R119, R191, R192 and capacitor C176 as close to tube pin as possible.
6. Dress L114 with coded end as close to pin 2 of U105 socket as possible.
7. The length of the bus wire from pin 2 of V116 to ground should not be shortened or rerouted.
8. Dress R194 as close to chassis with leads as short as possible.
9. Dress C199 with leads as short as possible and away from S106.
10. Keep the leads on C126 as short and direct as possible.
11. Dress all components connected to V106 socket up and away from the chassis except L104.
12. Keep the body and coded end of L104 as close to pin 2 of V105 socket as possible.
13. Dress the 4.5 mc trap L107 up and away from the chassis base.
14. Dress C132 up in the air and towards V105 socket.
15. Dress R125 with body as close as possible to pin 2 of V106 socket.
16. Keep body of R123 as close as possible to pin 2 of V105 socket.
17. Dress C133 and C190 away from C132, C151 and C153.
18. Dress the white wire from picture control R128-3 away from the chassis.
19. Dress all slack on kine socket leads under chassis. Dress brown wire away from any components associated with V105 or V106.
20. The green lead from the kinescope socket should be dressed away from all other leads and components and away from V106.
21. Dress R133 towards chassis rear apron.
22. Dress all leads in clamps on rear apron away from V117, V104, V105, V106 sockets and S103.
23. Dress green wire from C147A up and away from chassis.
24. Dress blue wire of T107 toward front apron of chassis.
25. Dress C153 down next to the chassis base.
26. Dress blue/white wire from height control R151-3 under R180.
27. Dress R161, R162, R163, R164 and R170 up and away from the chassis and with a half inch clearance from the soldering point.
28. Dress the yellow wire from pin 3 of V110 socket over C153.
29. Dress both leads of C198 away from the body of the capacitor.
30. Dress fuse in high voltage compartment so as not to short circuit to ground.
31. Dress blue and blue/yellow wire from power transformer in 3 clamps on chassis base and away from S103 and video section.
32. Dress both wires on S106 away from blue/yellow damper leads of T110.
33. Dress the brown wire from pin 8 of V114 socket away from V118 socket.
34. Dress all 2 watt resistors away from each other and away from all wires and other components.

KCS49B, KCS49BF, KCS49C, KCS49CF CHASSIS WIRING DIAGRAM

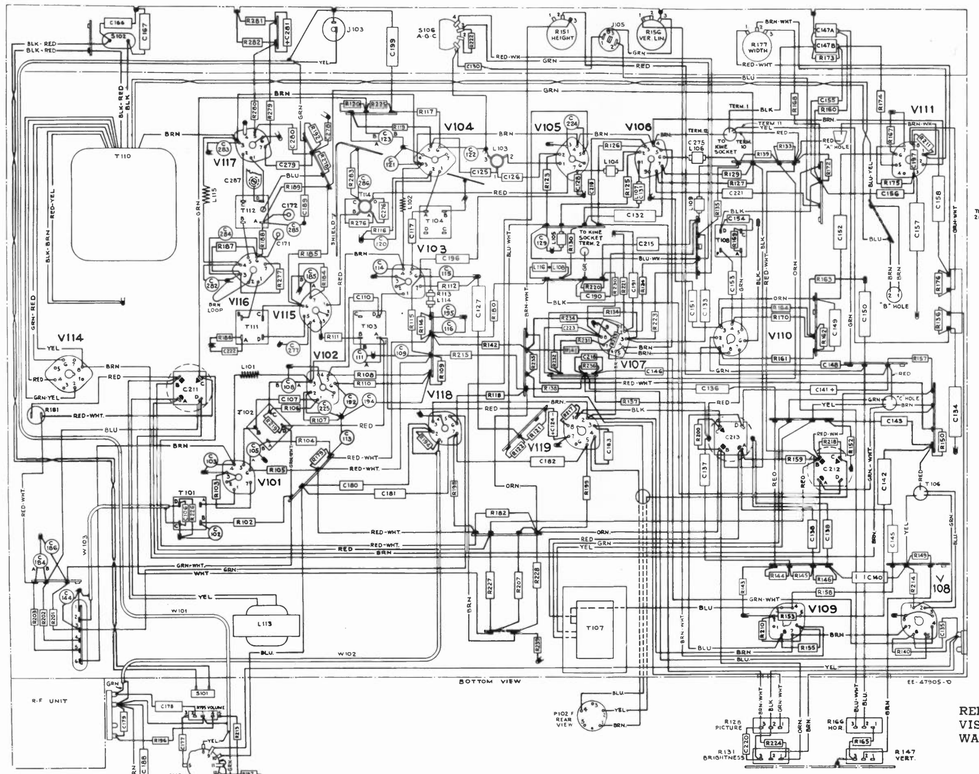


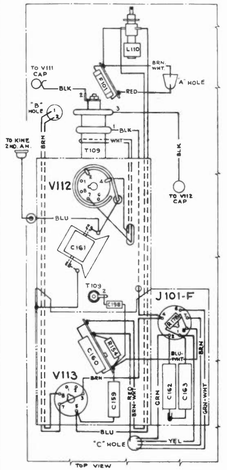


REFER TO PAGES 106 TO 112 FOR TELEVISION ALIGNMENT PROCEDURE AND 120 TO 123 FOR WAVEFORM PHOTOGRAPHS

Figure 9— Chassis Wiring Diagram

KCS49BF-2, KCS49CF-2 CHASSIS WIRING DIAGRAM

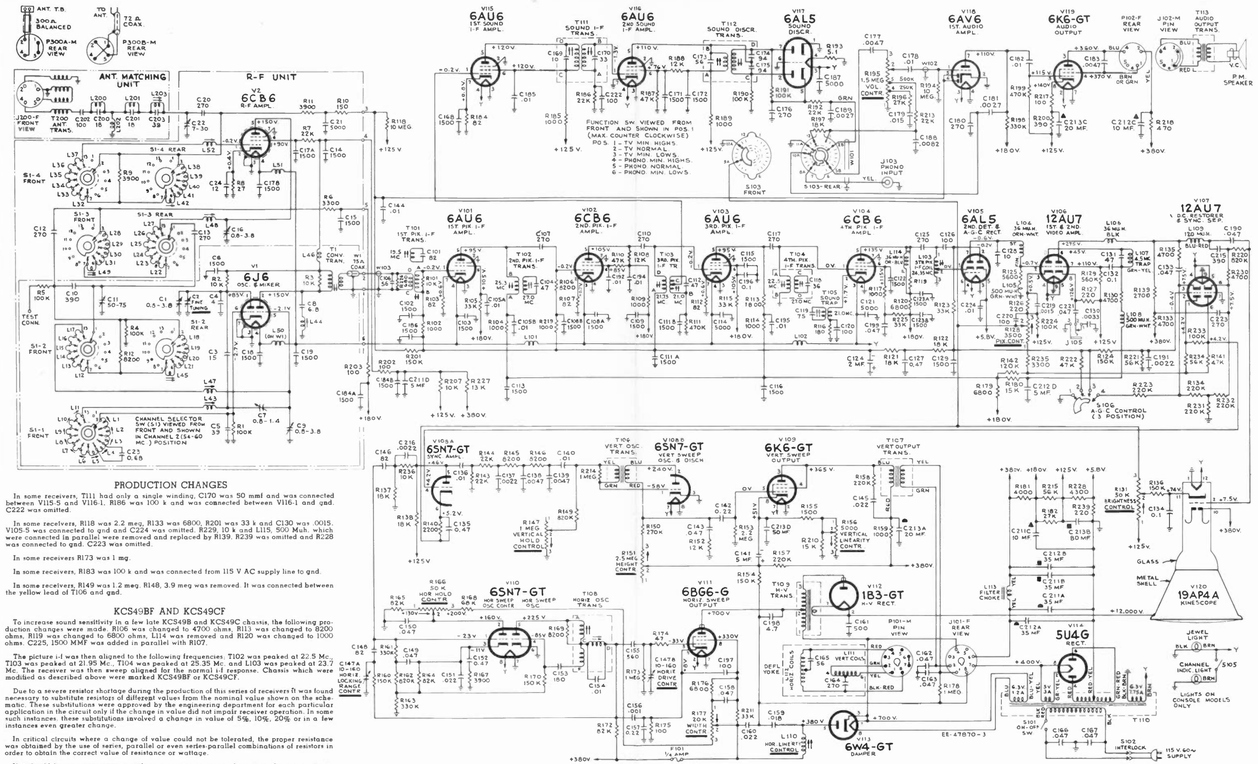




REFER TO PAGES 113 TO 123 FOR TELEVISION ALIGNMENT PROCEDURE AND WAVE FORM PHOTOGRAPHS

Figure 10— Chassis Wiring Diagram

KCS49B, KCS49BF, KCS49C, KCS49CF CIRCUIT SCHEMATIC DIAGRAM



PRODUCTION CHANGES

In some receivers, T111 had only a single winding, C170 was 50 mmf and was connected between V115-5 and V116-1. R186 was 100 k and was connected between V116-1 and gnd. C222 was omitted.

In some receivers, R118 was 2.2 meg, R133 was 6800, R201 was 33 k and C130 was .0015. V105-5 was connected to grd and C224 was omitted. R229, 10 k and L115, 500 MA, which were connected in parallel were removed and replaced by R139. R239 was omitted and R228 was connected to gnd. C223 was omitted.

In some receivers R173 was 1 meg.

In some receivers, R183 was 100 k and was connected from 115 V AC supply line to gnd.

In some receivers, R149 was 1.2 meg. R148, 3.9 meg was removed. It was connected between the yellow lead of T106 and gnd.

KCS49BF AND KCS49CF

To increase sound sensitivity in a few late KCS49B and KCS49C chassis, the following production changes were made. R106 was changed to 4700 ohms, R113 was changed to 8200 ohms, R119 was changed to 6800 ohms, L114 was removed and R120 was changed to 1000 ohms. C225, 1500 MMF was added in parallel with R107.

The picture i-f was then aligned to the following frequencies. T102 was peaked at 22.5 Mc., T103 was peaked at 21.95 Mc., T104 was peaked at 25.35 Mc. and L103 was peaked at 23.7 Mc. The receiver was then sweep aligned for normal i-f response. Chassis which were modified as described above were marked KCS49BF or KCS49CF.

Due to a severe resistor shortage during the production of this series of receivers it was found necessary to substitute resistors of different values from the nominal value shown on the schematic. These substitutions were approved by the engineering department for each particular application in the circuit only if the change in value did not impair receiver operation. In some such instances these substitutions involved a change in value of 5%, 10%, 20% or in a few instances even greater change.

In critical circuits where a change of value could not be tolerated, the proper resistance was obtained by the use of series, parallel or even series-parallel combinations of resistors in order to obtain the correct value of resistance or wattage.

If it should become necessary to replace a resistor or group of resistors, the values shown in the schematic and parts list should be employed.

If the value of the resistor to be replaced is different from the value shown in the schematic, and the schematic value is not available, then it is permissible to replace it with the value found in the receiver or some value between that and the value shown in the schematic. Some of the commercially available, low resistance value, molded body types are of wire wound construction. Such resistors should not be employed in the r-f unit, i-f or video sections as the inductive effect of these resistors may impair circuit operation.

All resistance values in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Coil resistance values less than 1 ohm are not shown.

Direction of arrows at controls indicates clockwise rotation.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

Figure 11—Circuit Schematic Diagram

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLIES KRK8B
75188	Board—Terminal board, 5 contact and ground
75067	Bracket—Vertical bracket for holding oscillator tube shield
75201	Cable—75 ohms, coax. cable (7¼") complete with coil (W1, L80)
75186	Capacitor—Ceramic, variable, for fine tuning—plunger type (C3)
75289	Capacitor—Ceramic, 4 mmf., ±0.5 mmf. (C4)
75189	Capacitor—Adjustable, 7-30 mmf. (C22)
75200	Capacitor—Ceramic, 12 mmf. (C24)
45465	Capacitor—Ceramic, 15 mmf. (C3)
75196	Capacitor—Ceramic, 39 mmf. (C5)
75174	Capacitor—Ceramic, trimmer, 50-75 mmf. (C11)
75198	Capacitor—Ceramic, 270 mmf. (C12, C13, C20)
75641	Capacitor—Ceramic, 390 mmf. (C10)
75166	Capacitor—Ceramic, 1500 mmf. (C6, C14, C15, C18)
75069	Capacitor—Ceramic, dual, 1500 mmf. (C17A, C17B)
73746	Capacitor—Ceramic, 1800 mmf. (C19)
73437	Capacitor—Ceramic, 5000 mmf. (C21)
75172	Capacitor—Tubular, steatite, adjustable, 0.65—1.2 mmf. (C7)
71504	Capacitor—Ceramic, 0.68 mmf. (C23)
75184	Capacitor—Ceramic, adjustable, 0.75-4 mmf., complete with adjusting stud (C1)
75197	Capacitor—Ceramic, 8.8 mmf. (C8)
75167	Clip—Tubular clip for mounting stand-off capacitors—RCA 75166
75182	Coil—Trimmer coil (1¼ turns) with adjustable inductance core and capacitor stud (screw adjustment) for converter section (C9, L47)
75183	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (screw adjustment) for r-f section (L48, C16)
75185	Coil—Converter plate loading coil (L44)
75202	Coil—Choke coil .56 muh (L46)
73477	Coil—Choke coil (L51)
75187	Core—Adjustable core for fine tuning capacitor C2
75162	Detent—Detent mechanism and fibre shaft
73453	Form—Coil form for L45 and L49
75165	Link—Link assembly for fine tuning
76138	Plate—Front plate and shaft bearing
74343	Retainer—Fine tuning shaft retaining ring
	Resistor—Fixed, composition:—
503027	27 ohms, ±10%, ½ watt (R1)
504115	150 ohms, ±20%, ½ watt (R10)
503233	3300 ohms, ±10%, ½ watt (R6)
503239	3900 ohms, ±10%, ½ watt (R9, R11)
503283	8200 ohms, ±10%, ½ watt (R13)
3078	10,000 ohms, ±5%, ½ watt (R3)
504310	10,000 ohms, ±20%, ½ watt (R2)
503322	22,000 ohms, ±10%, ½ watt (R7)
504410	100,000 ohms, ±20%, ½ watt (R1, R4, R5)
75164	Rod—Actuating plunger rod (fibre) for fine tuning link
71476	Screw—#4-40 x ¼" binder head machine screw for adjusting L6, L7, L8, L9, L10, L11
75176	Screw—#4-40 x ⅜" fillister head screw for adjusting L5
75177	Screw—#4-40 x 5/16" fillister head screw for adjusting L1, L2, L3, L4, L43
74575	Screw—#4-40 x .359" adjusting screw for L42
73640	Screw—#4-40 x 7/16" adjusting screw for L52
75139	Shaft—Channel selector shaft and plate
75180	Shaft—Fine tuning shaft and cam
75168	Shield—Oscillator and converter sections shield for RF unit—snap-on type
75193	Shield—Tube shield for V1
75192	Shield—Tube shield for V2
75088	Socket—Tube socket, 7 contact, miniature, ceramic, saddle mounted
75191	Spacer—Insulating spacer for front plate (4 req'd)
75163	Spring—Friction spring (formed) for fine tuning cam
75068	Spring—Retaining spring for oscillator tube shield
74578	Spring—Retaining spring for adjusting screws
73457	Spring—Return spring for fine tuning control
30340	Spring—Hairpin spring for fine tuning link

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
73747	Capacitor—Electrolytic, 2 mfd, 50 volts (C124)
28417	Capacitor—Electrolytic, 5 mfd, 450 volts (C141)
74521	Capacitor—Electrolytic, 5 mfd, 90 volts (C281) (KCS49BF-2, CF-2)
75811	Capacitor—Electrolytic comprising 1 section of 20 mfd, 450 volts, 1 section of 80 mfd, 200 volts, 1 section of 80 mfd, 200 volts and 1 section of 90 mfd, 90 volts (C213A, C213B, C213C, C213D)
75810	Capacitor—Electrolytic comprising 2 sections of 35 mfd, 450 volts, 1 section of 10 mfd, 450 volts and 1 section of 5 mfd, 450 volts (C211, C211B, C211C, C211D, C212A, C212B, C212C, C212D)
75643	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd, 1000 volts (C156)
73398	Capacitor—Tubular, paper, oil impregnated, .0015 mfd, 600 volts (C219) (KCS49B, BF, C, CF)
73395	Capacitor—Tubular, paper, oil impregnated, .0022 mfd, 600 volts (C137, C181, C218, C130) (C119, KCS49BF-2, CF-2)
73399	Capacitor—Tubular, paper, oil impregnated, .0027 mfd, 600 volts (C181, C189)
73795	Capacitor—Tubular, paper, oil impregnated, .0033 mfd, 600 volts (C136) (KCS49B, BF, C, CF)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd, 600 volts (C138, C136, C177, C183)
73808	Capacitor—Tubular, paper, oil impregnated, .0082 mfd, 600 volts (C188)
73561	Capacitor—Tubular, paper, oil impregnated, .01 mfd, 400 volts (C138, C178, C182)
73394	Capacitor—Tubular, moulded paper, oil impregnated, .01 mfd, 600 volts (C180, C154)
73797	Capacitor—Tubular, paper, oil impregnated, .015 mfd, 600 volts (C179)
74727	Capacitor—Tubular, paper, oil impregnated, .018 mfd, 1000 volts (C139)
73562	Capacitor—Tubular, paper, oil impregnated, .022 mfd, 400 volts (C145, C151)
73810	Capacitor—Tubular, paper, oil impregnated, .022 mfd, 1000 volts (C180)
75071	Capacitor—Tubular, moulded paper, .047 mfd, 400 volts (C186, C187)
73353	Capacitor—Tubular, paper, oil impregnated, .047 mfd, 400 volts (C149, C186, C221)
73392	Capacitor—Tubular, paper, oil impregnated, .047 mfd, 600 volts (C133, C150, C180)
73397	Capacitor—Tubular, paper, oil impregnated, .047 mfd, 1000 volts (C143, C159, C162, C163)
73351	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd, CF-2)
73357	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd, 600 volts (C134)
73794	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd, 400 volts (C187)
74957	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd, 600 volts (C142)
73787	Capacitor—Tubular, paper, oil impregnated, 0.47 mfd, 200 volts (C127, C135, C152)
73477	Coil—Choke coil (L115) (KCS49BF-2, CF-2)
76284	Coil—Filter choke (L113)
76143	Clip—Tubular clip for mounting stand-off capacitor 75166
75210	Coil—Fifth pix. i-f coil complete with adjustable coil (L103)
71449	Coil—Horizontal linearity coil (L110)
73891	Coil—Antenna matching coil (3 req'd) (Part of T200)
75241	Coil—Antenna shunt coil (L202)
73477	Coil—Choke coil (L101, L102)
75299	Coil—Peaking coil (36 muh) (L104)
71793	Coil—Peaking coil (56 muh) (L106) (KCS49B, BF, C, CF)
76285	Coil—Peaking coil (30 muh) (L114, R119) (KCS49B, BF, C, CF)
75253	Coil—Peaking coil (120 muh) (L109) (L114, R113, KCS49BF-2, CF-2)
75252	Coil—Peaking coil (500 muh) (L105, L108) (L116, KCS49BF-2, CF-2)
74594	Connector—2 contact male connector for power cord
35787	Connector—Phono input connector (J103)
35383	Connector—6 contact male connector—part of deflection yoke (P101)
68592	Connector—3 contact female connector for deflection yoke leads (J101)
38853	Connector—4 contact female connector for antenna transformer (J300)
5040	Connector—4 contact female connector for speaker cable (P102)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
78517	Contact—Anode connector contact only
75215	Control—Horisontal and vertical hold control (R147, R166)
75216	Control—Picture and brightness control for KCS49B (R128, R131)
71441	Control—Vertical linearity control (R156)
71440	Control—Height control (R151)
75516	Control—Width control (R177)
75514	Control—Picture control, brightness control and channel light switch for KCS49C (R126, R131, S105)
76171	Control—Volume control and power switch (R195, S101)
71498	Core—Adjustable core and stud for FM trap 75449
74956	Cushion—Rubber cushion for deflection yoke hood (2 req'd)
74839	Fastener—Push fastener to mount ceramic tube socket (2 req'd)
73600	Fuse—.25 amp. 250 volts (F101)
16058	Grommet—Rubber grommet for 2nd. anode lead exit
37396	Grommet—Rubber grommet to mount ceramic tube socket (2 req'd)
75445	Hood—Deflection yoke hood less rubber cushions
75644	Insulator—2nd. anode insulator
75482	Jack—Video Jack (J105)
76168	Magnet—Focus magnet complete with adjustable plate and stud (screw driver adjusting type)
74953	Magnet—Ion trap magnet (PM) for Model 9T105
75323	Magnet—Ion trap magnet (PM) for Models 9T126, 9T128
76728	Nut—Speed nut for trimmer capacitor C287 (KCS-49BF-2, CF-2)
75518	Plate—Hi-voltage plate—bakelite—less transformer, capacitor and tube socket
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R193) (KCS-49B, BF, C, CF)
76304	Resistor—Wire wound, 220 ohms, ½ watt (R239)
75512	Resistor—Wire wound, 4000 ohms, 10 watts (R181)
76066	Resistor—Wire wound, 4300 ohms, 5 watts (R228)
76065	Resistor—Wire wound, 13,000 ohms, 5 watts (R227)
504047	Resistor—Fixed, composition:— 47 ohms, ±20%, ½ watt (R174)
503047	47 ohms, ±10%, ½ watt (R278, KCS49BF-2, CF-2)
34783	68 ohms, ±5%, ½ watt (R277, KCS49BF-2, CF-2)
503082	82 ohms, ±10%, ½ watt (R103, R107, R112, R184)
503110	100 ohms, ±10%, ½ watt (R217)
504110	100 ohms, ±20%, ½ watt (R202, R203)
533110	100 ohms, ±10%, 2 watts (R175)
503118	180 ohms, ±10%, ½ watt (R116)
503122	220 ohms, ±10%, ½ watt (R126, R127)
511339	390 ohms, ±10%, 1 watt (R200)
513147	470 ohms, ±10%, 1 watt (R218)
503168	680 ohms, ±10%, ½ watt (R226)
504210	1000 ohms, ±20%, ½ watt (R104, R104, R108, R114, R117, R159, R185, R189, R219) (R120, KCS49BF-2, CF-2)
502210	1000 ohms, ±5%, ½ watt (R279, KCS49BF-2, CF-2)
513215	1500 ohms, ±10%, 1 watt (R185)
503218	1800 ohms, ±10%, ½ watt (R113) (KCS49B, BF, C, CF)
504222	2200 ohms, ±20%, ½ watt (R140)
503227	2700 ohms, ±10%, ½ watt (R139)
503233	3300 ohms, ±10%, ½ watt (R235)
503239	3900 ohms, ±10%, ½ watt (R167)
502247	4700 ohms, ±5%, ½ watt (R130) (R106, KCS49BF-2, CF-2)
503247	4700 ohms, ±10%, ½ watt (R133, R230)
513247	4700 ohms, ±10%, 1 watt (R133)
30374	5600 ohms, ±5%, ½ watt (R125)
14659	6800 ohms, ±5%, ½ watt (R281, R282, KCS49BF-2, CF-2)
513268	6800 ohms, ±10%, 1 watt (R176) (R120, KCS49B, BF, C, CF)
512268	6800 ohms, ±5%, ½ watt (R119, KCS49BF-2, CF-2)
523268	6800 ohms, ±10%, 2 watts (R179)
14250	8200 ohms, ±5%, ½ watt (R189) (R106, KCS49B, BF, C, CF)
503282	8200 ohms, ±10%, ½ watt (R145, R146)
503310	10,000 ohms, ±10%, ½ watt (R236)
523310	10,000 ohms, ±10%, 2 watts (R207)
30436	12,000 ohms, ±5%, ½ watt (R152)
503312	12,000 ohms, ±10%, ½ watt (R188)
30866	12,000 ohms, ±5%, 1 watt (R106)
503315	15,000 ohms, ±10%, ½ watt (R210)
513315	15,000 ohms, ±10%, 1 watt (R180)
503318	18,000 ohms, ±10%, ½ watt (R121, R122, R137, R197)
503318	18,000 ohms, ±10%, ½ watt (R121, R122, R137, R197)
513318	18,000 ohms, ±10%, 1 watt (R138)
503322	22,000 ohms, ±10%, ½ watt (R143, R144, R213) (R186, KCS49B, BF, C, CF)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
504322	22,000 ohms, ±20%, ½ watt (R192)
503327	27,000 ohms, ±10%, ½ watt (R196)
533327	27,000 ohms, ±10%, 2 watts (R182)
503333	33,000 ohms, ±10%, ½ watt (R105, R115, R211, R225)
504333	33,000 ohms, ±20%, ½ watt (R123)
503347	47,000 ohms, ±10%, ½ watt (R141, R187, R222) (R186, KCS49BF-2, CF-2)
504347	47,000 ohms, ±20%, ½ watt (R110)
503356	56,000 ohms, ±10%, ½ watt (R221, R234)
513356	56,000 ohms, ±10%, 1 watt (R215)
503368	68,000 ohms, ±5%, ½ watt (R275, KCS49BF-2, CF-2)
513368	68,000 ohms, ±10%, 1 watt (R168)
52809	82,000 ohms, ±5%, 1 watt (R172)
513382	82,000 ohms, ±10%, 1 watt (R148, R164)
3252	100,000 ohms, ±5%, ½ watt (R190, R191) (KCS49B, BF, C, CF)
503410	100,000 ohms, ±10%, ½ watt (R224, R233)
503412	120,000 ohms, ±10%, ½ watt (R142)
503415	150,000 ohms, ±10%, ½ watt (R138, R154, R160, R201)
504415	150,000 ohms, ±20%, ½ watt (R124)
31895	150,000 ohms, ±5%, 1 watt (R170)
503422	220,000 ohms, ±10%, ½ watt (R134, R157, R158, R223, R231, R232)
503427	270,000 ohms, ±10%, ½ watt (R150)
503433	330,000 ohms, ±10%, ½ watt (R181, R198)
38892	330,000 ohms, ±5%, 1 watt (R183)
503447	470,000 ohms, ±10%, ½ watt (R111, R199) (R283, KCS-49BF-2, CF-2)
503456	560,000 ohms, ±10%, ½ watt (R208)
503468	820,000 ohms, ±10%, ½ watt (R163, R230)
503510	1 megohm, ±10%, ½ watt (R173)
504510	1 megohm, ±20%, ½ watt (R178, R214)
503610	10 megohm, ±10%, ½ watt (R118)
30162	1.2 megohm, ±5%, ½ watt (R149)
503522	2.2 megohm, ±10%, ½ watt (R153)
70249	3.9 megohm, ±5%, ½ watt (R148)
504610	10 megohm, ±20%, ½ watt (R194)
503610	10 megohm, ±10%, ½ watt (R118)
74602	Screw—#10-32 x 1¼" round head machine screw for focus magnet adjustment (3 req'd)
75236	Screw—#8-32 x ⅜" pan head cross-recessed screw to mount focus magnet (2 req'd)
78083	Screw—#8-32 x ¼" wing screw for mounting deflection yoke
73584	Shield—Tube shield
31281	Socket—Tube socket, octal, wafer
73117	Socket—Tube socket, 7 pin, miniature
75223	Socket—Tube socket, 9 pin, miniature
73583	Socket—Tube socket, octal, ceramic, plate mounted
31319	Socket—Tube socket, octal, saddle
71808	Socket—Tube socket, 6 contact, moulded for 1B3/8016
68592	Socket—Tube socket, 6 contact
31364	Socket—Pilot lamp socket for KCS49C
78718	Socket—Channel selector indicator lamp socket for KCS49C
74634	Socket—Kinescope socket
75233	Spring—Compression spring for focus magnet adjustment (3 req'd)
74974	Speaker—12" P.M. speaker complete with cone and voice coil less transformer and plug
78536	Stud—Adjusting stud complete with guard for focus magnet
78173	Stud—Adjusting stud for trimmer capacitor C287 (KCS-49BF-2, CF-2)
78806	Support—Bakelite support only—part of hi-voltage shield
78010	Switch—AGC switch (S106)
76170	Switch—Tone control and phono switch S103
76483	Terminal—Screw type grounding terminal
75906	Transformer—Power transformer, 117 volt, 60 cycle (T110)
74950	Transformer—Vertical output transformer (T107)
74144	Transformer—Vertical oscillator transformer (T106)
74589	Transformer—First pix. i-f transformer (T101, C101, R101)
74982	Transformer—Second pix. i-f transformer (T102, C104)
76264	Transformer—Third pix. i-f transformer (T103, C112)
73874	Transformer—Fourth pix. i-f transformer (T104, C118)
71424	Transformer—Sound i-f transformer (T111, C169, C170) (KCS49B, BF, C, CF)
76436	Transformer—Sound i-f transformer (T111, C169, C170) (KCS49BF-2, CF-2)
76703	Transformer—Sound take-off transformer (T114, C276, R276) (KCS49BF-2, CF-2)
75212	Transformer—Sound discriminator transformer (T112, C173, C174, C175) (KCS49B, BF, C, CF)
76702	Transformer—Ratio detector transformer (T112, C173, C174) (KCS49BF-2, CF-2)
75213	Transformer—Horizontal oscillator transformer (T108)
75509	Transformer—Antenna matching transformer complete with antenna contactor i.f. and FM traps and shunt coil (T200, C200, C201, C202, C203, J200, L200, L201, L202, L203)
75585	Trap—Channel Hi-voltage transformer (T109)
71778	Trap—Sound trap (T105, C119) (KCS49B, BF, C, CF)
75242	Trap—I-F trap (L200, L201, C200, C201)
75449	Trap—FM trap complete with adjustable core and stud (L203, C203)
75251	Trap—4.5 mc trap (L107, C131)
76704	Trap, 4.3 mc. trap (L106, C275) (KCS49BF-2, CF-2)
74952	Yoke—Deflection yoke (L111, L112, C164, C165, P101)
	SPEAKER ASSEMBLIES 92S90-4W **RL 108C8** **RMA 274** (For Model 9T105)
75023	Cap—Duct cap
75024	Cone—Cone complete with voice coil (3.2 ohms)
5039	Connector—4 contact male connector (J102)
75025	Speaker—8" P.M. speaker complete with cone and voice coil less plug and transformer
78530	Transformer—Output transformer (T113)
	SPEAKER ASSEMBLIES 92S80-4F **RMA 150** (For Model 9T106)
76120	Cone—Cone complete with voice coil assembly (3.2 ohms)
	SPEAKER ASSEMBLIES 92S69-11W **RL 111A3** **RMA 274** (For Models 9T126, 9T128)
13867	Cap—Duct cap
75062	Cone—Cone complete with voice coil (3.2 ohms)
5039	Connector—4 contact male connector (J102)
74974	Speaker—12" P.M. speaker complete with cone and voice coil less transformer and plug
78530	Transformer—Output transformer (T113)
	SPEAKER ASSEMBLIES 92S69-11B **RMA 285** (For Models 9T126, 9T128)
76121	Cone—Cone and voice coil assembly (3.2 ohms)

NOTE:—If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.

STOCK No.	DESCRIPTION
	MISCELLANEOUS
76192	Back—Cabinet back complete with power cord and terminal board for Model 9T105
76184	Back—Cabinet back complete with power cord and terminal board for Models 9T126 and 9T128
76184	Board—"Antenna" terminal board
75465	Bracket—Suspension bracket for deflection yoke and focus magnet support assembly
71590	Bracket—Pilot lamp bracket for Model 9T126, 9T128
13103	Cap—Pilot lamp knob for Models 9T126, 9T128
71892	Catch—Bullet catch and strike for cabinet doors for Model 9T126
X1917	Cloth—Grille cloth for mahogany or walnut instruments for Model 9T105
X1918	Cloth—Grille cloth for oak instruments for Model 9T105
X3144	Cloth—Grille cloth for mahogany or walnut instruments for Model 9T126
X3093	Cloth—Grille cloth for oak instruments for Model 9T126
X3199	Cloth—Grille cloth for mahogany or walnut instruments for Model 9T128 and for maple instruments for Model 9T128
39153	Connector—4 contact male connector for antenna cable
75474	Connector—Single contact male connector for antenna cable (2 req'd)
71457	Cord—Power cord and plug
75608	Cushion—Dust seal cushion
76195	Decal—Control function decal for Model 9T105
71984	Decal—"RCA Victor" decal
76127	Decal—Control function decal for mahogany or walnut instruments for Models 9T126, 9T128
76128	Decal—Control function decal for oak or maple instruments for Models 9T126, 9T128
74809	Emblem—"RCA Victor" emblem
75499	Escutcheon—Channel marker escutcheon—dark—for mahogany or walnut instruments for Model 9T105
78501	Escutcheon—Channel marker escutcheon—light—for oak instruments for Model 9T105
75455	Escutcheon—Channel marker escutcheon—dark—for mahogany or walnut instruments for Models 9T126, 9T128
74279	Screw—#8-32 x ⅜" trimit head screw for door pull for Model 9T126
75456	Escutcheon—Channel marker escutcheon—light—for oak or maple instruments for Models 9T126, 9T128
75628	Screw—#8-32 x 1¼" trimit head screw for door pulls for lower doors for Model 9T128
72113	Foot—Rubber foot (4 req'd) for Model 9T105
75619	Glass—Safety glass
37396	Grommet—Rubber grommet for speaker mounting (4 req'd)
75621	Hinge—Control panel hinges (1 set) for Model 9T105
74306	Hinge—Cabinet door hinge (1 set) for Model 9T126
74959	Knob—Fine tuning knob—maroon—for mahogany or walnut instruments (outer)
75461	Knob—Fine tuning knob—beige—for oak instruments (outer) for Models 9T105, 9T126
74960	Knob—Channel selector knob—maroon—for mahogany or walnut instruments (inner)
75462	Knob—Channel selector knob—beige—for oak instruments (inner) for Models 9T105, 9T126
74962	Knob—Brightness control or vertical hold control—maroon—for mahogany or walnut instruments (outer)
75463	Knob—Brightness control or vertical hold control—beige—for oak instruments for Models 9T105, 9T126
76190	Knob—Tone control and phono switch knob—maroon—for mahogany or walnut instruments (outer)
76191	Knob—Tone control and phono switch knob—beige—for oak instruments (outer) for Models 9T105, 9T128
74963	Knob—Picture control, horisontal hold control or volume control and power switch knob—maroon—for mahogany or walnut instruments (inner)
75464	Knob—Picture control, horisontal hold control or volume control and power switch knob—beige—for oak instruments (inner) for Models 9T105, 9T126
73995	Knob—Fine tuning knob—tan—for maple instruments (outer) for Models 9T128
74961	Knob—Channel selector knob—tan—for maple instruments (inner) for Model 9T128
73999	Knob—Brightness control or vertical hold control knob—tan—for maple instruments (outer) for Model 9T128
76193	Knob—Tone control and phono switch knob—tan—for maple instruments (outer) for Model 9T128
74001	Knob—Picture control, horisontal hold control or volume control and power switch knob—tan—for maple instruments (inner) for Model 9T128
11765	Lamp—Pilot or channel marker lamp—Mazda 51—for Models 9T126, 9T128
75459	Mask—Channel marker escutcheon light mask—burgundy—for mahogany or walnut instruments for Models 9T126, 9T128
75460	Mask—Channel marker escutcheon light mask—gold—for oak or maple instruments for Models 9T126, 9T128
75620	Mask—Kinescope masking panel
73634	Nut—Speed nut for speaker mounting screws (4 req'd) for Models 9T126, 9T128
75622	Pull—Door pull for Model 9T126
76196	Pull—Door pull—L.H.—for upper door for Model 9T128
76197	Pull—Door pull—R.H.—for upper door for Model 9T128
76198	Pull—Door pull for lower doors for Model 9T128
71456	Screw—#8-32 x 7/16" wing screw for deflection yoke and focus magnet mounting support
75623	Screw—#8-32 x ⅝" trimit head screw for door pull for Model 9T126
74279	Screw—#8-32 x ⅜" trimit head screw for door pulls for upper doors for Model 9T128
75628	Screw—#8-32 x 1¼" trimit head screw for door pulls for lower doors for Model 9T128
78587	Spring—Formed spring for mounting kinescope masking panel
73643	Spring—Spring clip for channel marker escutcheons
72845	Spring—Retaining spring for knobs 74959, 73995 and 75461
14270	Spring—Retaining spring for knobs 73999, 74961, 74960, 74962, 75462, 75463
30330	Spring—Retaining spring for knobs 74001, 74963 and 75464
72836	Stop—Cabinet door stop for Model 9T126
75800	Washer—Felt washer for cabinet back screws
75457	Washer—Felt washer—dark brown—between knob and channel marker escutcheon for mahogany or walnut instruments for Models 9T126 and 9T128
78458	Washer—Felt washer—beige—between knob and channel marker escutcheon for oak instruments for Model 9T126
75823	Washer—Felt washer—tan—between knob and channel marker escutcheon for maple instruments for Model 9T126

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Model 9T147 "Sedgwick"
Walnut or Mahogany

RCA VICTOR

TELEVISION, AM-FM RADIO PHONOGRAPH COMBINATION MODEL 9T147

Chassis Nos. KCS60A and RC1092
Record Changers RP190 and 960284
— Mfr. No. 274 —

SERVICE DATA

— 1951 No. T6 —

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Model 9T147 is a deluxe television—AM-FM radio phonograph combination. The receiver employs 27 tubes plus 3 rectifiers and a 19 inch kinescope.

Two record changers are provided to play 45 and 78/33⅓ RPM records.

The receiver is provided with cabinet antennas for AM, FM and TV where local conditions permit their use.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE.....204 square inches on a 19AP4A kinescope

TELEVISION R-F FREQUENCY RANGE

All 12 television channels, 54 mc. to 88 mc., 174 mc. to 216 mc.
Fine Tuning Range....±250 kc. on chan. 2, ±650 kc. on chan. 13
Picture Carrier Frequency .....25.50 mc.
Sound Carrier Frequency .....21.00 mc.

RADIO TUNING RANGE

Broadcast .....540-1,600 kc.
Frequency Modulation .....88-108 mc.
Intermediate Frequency—AM .....455 kc.
Intermediate Frequency—FM .....10.7 mc.

POWER SUPPLY RATING .....115 volts, 60 cycles, 315 watts

AUDIO POWER OUTPUT RATING .....11 watts max.

CHASSIS DESIGNATIONS

Television Chassis KCS60A
Radio Chassis RC1092
78/33⅓ RPM Record Changer 960284
45 RPM Record Changer RP190
Refer to Service Data 960284 or RP190 for information on the record changers.

LOUDSPEAKER—92S69-12 .....12 inch PM Dynamic
Voice Coil Impedance .....3.2 ohms at 400 cycles

WEIGHT

Chassis with Tubes in Cabinet .....222 lbs.
Shipping Weight .....277 lbs.

DIMENSIONS (Inches)	Width	Height	Depth
Cabinet (outside)	43⅝	41½	28⅞
TV Chassis (Overall)	19¼	12	21

RECEIVER ANTENNA INPUT IMPEDANCE

Choice: 300 ohms balanced or 72 ohms unbalanced.

RCA TUBE COMPLEMENT

	Tube Used	Television Chassis	Function
(1)	RCA 6CB6		R-F Amplifier
(2)	RCA 6J6		R-F Oscillator and Mixer
(3)	RCA 6AU6		1st Sound I-F Amplifier
(4)	RCA 6AU6		2nd Sound I-F Amplifier
(5)	RCA 6AL5		Sound Discriminator
(6)	RCA 6AV6		Bias Clamp
(7)	RCA 6AU6		1st Picture I-F Amplifier
(8)	RCA 6CB6		2nd Picture I-F Amplifier
(9)	RCA 6AU6		3rd Picture I-F Amplifier
(10)	RCA 6CB6		4th Picture I-F Amplifier
(11)	RCA 6AL5		Picture 2nd Detector and AGC Detector
(12)	RCA 12AU7		1st and 2nd Video Amplifier
(13)	RCA 12AU7		DC Restorer and Sync Separator
(14)	RCA 6SN7GT		Sync. Amp. & Vert. Swp. Osc.
(15)	RCA 6K6GT		Vertical Sweep Output
(16)	RCA 6SN7GT		Horizontal Sweep Oscillator and Control
(17)	RCA 6BG6G		Horizontal Sweep Output
(18)	RCA 6W4GT		Damper
(19)	RCA 1B3-GT/8016		High Voltage Rectifier
(20)	RCA 19AP4A		Kinescope
(21)	RCA 5U4G		Rectifier
		(Radio Chassis)	
(1)	RCA 6CB6		R-F Amplifier
(2)	RCA 6J6		Mixer and Oscillator
(3)	RCA 6BA6		I-F Amplifier
(4)	RCA 6AU6		F-M Driver
(5)	RCA 6AL5		Ratio Detector
(6)	RCA 6AV6		AM Detector AVC and Audio Amplifier
(7)	RCA 6C4		Phase Inverter
(8)	RCA 6V6GT (2 tubes)		Audio Output
(9)	RCA 5Y3GT		Rectifier

Specifications continued on page 2

ELECTRICAL AND MECHANICAL SPECIFICATIONS

(Continued)

PICTURE INTERMEDIATE FREQUENCIES

Picture Carrier Frequency	25.50 Mc.
Adjacent Channel Sound Trap	27.00 Mc.
Accompanying Sound Traps	21.00 Mc.
Adjacent Channel Picture Carrier Traps	19.50 Mc.

SOUND INTERMEDIATE FREQUENCIES

Sound Carrier Frequency	21.00 Mc.
Sound Discriminator Band Width between peaks	400 kc.

VIDEO RESPONSE ..... To 4 Mc.

FOCUS ..... Magnetic

SWEEP DEFLECTION ..... Magnetic

SCANNING ..... Interlaced, 525 line

HORIZONTAL SWEEP FREQUENCY ..... 15,750 cps

VERTICAL SWEEP FREQUENCY ..... 60 cps

FRAME FREQUENCY (Picture Repetition Rate) ..... 30 cps

OPERATING CONTROLS (front Panel)

Channel Selector, Fine Tuning ..... Dual Control Knobs

Picture, Brightness ..... Dual Control Knobs

Picture Horizontal Hold, Picture Vertical Hold ..... Dual Control Knobs

Chan. Selector Escutcheon Light Switch .... Single Control Knob

NON-OPERATING CONTROLS (not including r-f and i-f adjustments)

Picture Centering	top chassis adjustment
Width	rear chassis adjustment
Height	rear chassis adjustment
Horizontal Linearity	rear chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis screwdriver adjustment
Horizontal Osc. Freq.	top chassis adjustment
Horizontal Osc. Waveform	bottom chassis adjustment
Horizontal Locking Range	rear chassis adjustment
Focus	top chassis adjustment
Ion Trap Magnet	top chassis adjustment
Deflection Coil	top chassis wing nut adjustment
AGC Control Switch	rear chassis adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT REMOVE THE RECEIVER CHASSIS, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES, AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For this reason, the kinescope must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. During service if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA replacement kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver.

The following adjustments are necessary when turning the receiver on for the first time:

1. Turn the radio FUNCTION switch to TV.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best sound fidelity and the SOUND VOLUME control for suitable volume.

5. Turn the BRIGHTNESS control fully counter-clockwise, then clockwise until a light pattern appears on the screen.

6. Adjust the VERTICAL hold control until the pattern stops vertical movement.

7. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

8. Adjust the PICTURE and BRIGHTNESS controls for suitable picture contrast and brightness.

9. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

10. In switching from one channel to another, it may be necessary to repeat steps 4 and 8.

11. When the set is turned on again after an idle period it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step No. 4 is generally sufficient.

12. If the positions of the controls have been changed, it may be necessary to repeat steps 1 through 8.

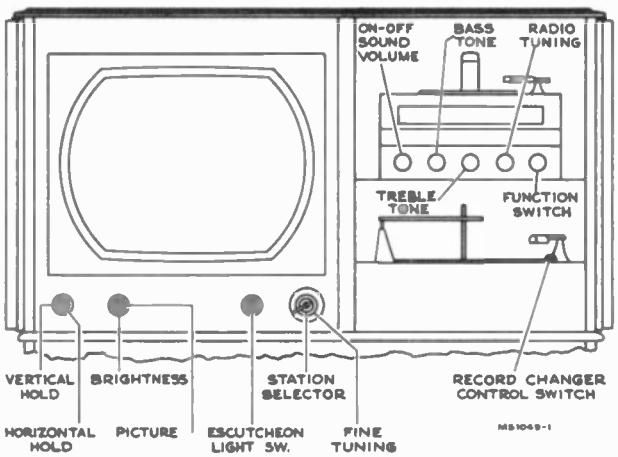


Figure 1—Receiver Operating Controls

RADIO OPERATION

1. Turn the radio FUNCTION switch to AM.

2. Tune in the desired station with the TUNING control.

PHONOGRAPH OPERATION

1. Turn the radio FUNCTION switch to 78-33 for operation of the 78/33⅓ RPM changer or to 45 for operation of the 45 RPM changer.

2. Place a record on the appropriate changer and slip the changer power switch to "ON."

REFER TO PAGES 151 TO 155 FOR RADIO SERVICE INFORMATION

REFER TO PAGES 106 TO 112 FOR TELEVISION ALIGNMENT PROCEDURE AND 120 TO 123 FOR WAVEFORM PHOTOGRAPHS.

INSTALLATION INSTRUCTIONS

Install the control knobs on the proper control shafts.

Make sure that all tubes are in place and are firmly seated in their sockets.

Check to see that the kinescope high voltage lead clip is in place.

Connect the antenna transmission line to the receiver antenna terminals. Plug a power cord into the 115-volt a-c power source and into the receiver interlock receptacle. Turn the receiver power switch to the "on" position, the brightness control fully clockwise, and the picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT.—Set the ion trap magnet approximately in the position shown in Figure 2. Starting from this position immediately adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Turn the focus control (shown in Figure 2) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches of this adjustment should be made with the brightness control at the maximum clockwise position with which good line focus can be maintained.

DEFLECTION YOKE ADJUSTMENT.—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

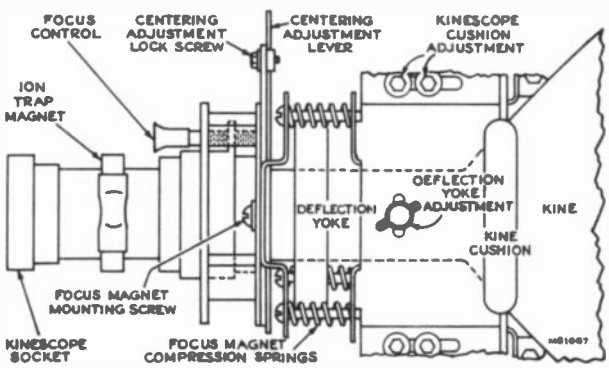


Figure 2—Yoke and Focus Magnet Adjustments

PICTURE ADJUSTMENTS.—It will now be necessary to obtain a test pattern picture in order to make further adjustments.

If the Horizontal Oscillator and AGC System are operating properly, it should be possible to sync the picture at this point. However, if the AGC control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading, turn S106 on the rear apron (see Figure 3) counter-clockwise until the set operates normally and the picture can be synced.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT.—Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 2 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull-in should occur when the control is approximately 90 degress from the extreme counter-clockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

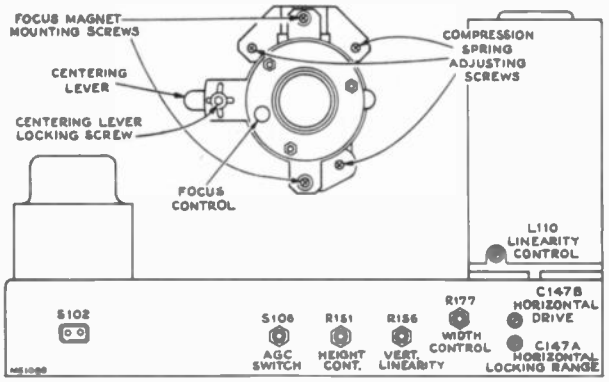


Figure 3—Rear Chassis Adjustments

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Focus Magnet Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR.—If in the above check the receiver failed to hold sync with the hold control at the extreme counter-clockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull-in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment.—Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T108 horizontal frequency adjustment on top of the chassis until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Locking Range Adjustment.—Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. The picture may remain in sync. If so turn the T108 top core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer **C147A** slightly clockwise. If less than 2 bars are present, adjust **C147A** slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure For field purposes paragraph "A" under Horizontal Oscillator Waveform Adjustment may be omitted.

FOCUS MAGNET ADJUSTMENT.—The focus coil should be adjusted so that there is approximately three-eighths inch of space between the rear cardboard shell of the yoke and the flat of the front face of the focus magnet. This spacing gives best average focus over the face of the tube.

The axis of the hole through the magnet should be parallel with the axis of the kinescope neck with the kinescope neck through the middle.

CENTERING ADJUSTMENT.—No electrical centering controls are provided. Centering is accomplished by means of a separate plate on the focus magnet. Some centering plates include a locking screw which must be loosened before centering, and others are held in adjustment by friction. Up and down adjustment of the plate moves the picture side to side and sidewise adjustment moves the picture up and down.

If a corner of the raster is shadowed, check the position of the ion trap magnet. Reposition the magnet within the range of maximum raster brightness to eliminate the shadow and recenter the picture by adjustment of the focus magnet plate. In no case should the magnet be adjusted to cause any loss of brightness since such operation may cause immediate or eventual damage to the tube. In some cases it may be necessary to shift the position of the focus magnet in order to eliminate a corner shadow.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS.—Adjustment of the horizontal drive control affects the high voltage applied to the kinescope. In order to obtain the highest possible voltage hence the brightest and best focused picture, adjust horizontal drive counter-clockwise as far as possible without stretching the left side of the picture As a first adjustment, set the horizontal drive trimmer **C147B** one-half turn out from maximum capacity.

Turn the horizontal linearity coil out until appreciable loss in width occurs, then in until nearly maximum width and the best linearity is obtained.

Adjust the width control **R177** to obtain correct picture width.

A slight readjustment of these three controls may be necessary to obtain the best linearity.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.—Adjust the height control (R151 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R156 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

FOCUS.—Adjust the focus magnet for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

On focus magnets using two shunts, the one with the cable is the "fine adjustment" and the other is the "focus range" adjustment. In general, the two shunts should be adjusted to approximately equal positions.

Recheck the position of the ion trap magnet to make sure that maximum brightness is obtained.

Check to see that the yoke thumbscrew and the focus magnet mounting screws are tight.

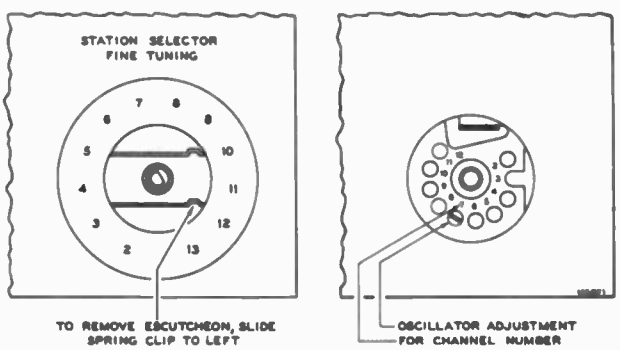


Figure 4—R-F Oscillator Adjustments

CHECK OF R-F OSCILLATOR ADJUSTMENTS.—Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 10. The adjustments for channels 2 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 4. Adjustment of channel 13 is on top of the chassis.

AGC CONTROL.—The AGC control switch is provided as an installation adjustment. The normal position for strong signal areas is with the switch in the number 1 or counter-clockwise position. If impulse type of interference is experienced, turn the switch to the number 2 or center position. In very weak signal areas in which impulse type interference is experienced, turn the switch to position number 3 or fully clockwise. In this position, all AGC is removed and the receiver will overload if the input signal exceeds 200 microvolts. However, for signals under 200 microvolts, this position of the AGC control switch gives best noise immunity of sync.

FM TRAP ADJUSTMENT.—In some instances interference may be encountered from a strong FM station signal. A trap is provided to eliminate this type of interference. To adjust the trap tune in the station on which the interference is observed and adjust the L203 core on top of the r-f unit for minimum interference in the picture.

CAUTION.—In some receivers, the FM trap L203 will tune down into channel 6 or even into channel 5. Needless to say, such an adjustment will cause greatly reduced sensitivity on these channels. If channels 5 or 6 are to be received, check L203 to make sure that it does not affect sensitivity on these two channels.

Replace the cabinet back and reconnect the receiver antenna leads to the cabinet back. Tighten the back retaining screws securely otherwise the back may rattle or buzz when the receiver is operated at high volume.

RADIO OPERATION.—Turn the receiver function switch to the AM and FM positions and check the radio for proper operation. In switching from radio to television or from television to radio, approximately 30 seconds warm-up time is required.

RECORD CHANGER OPERATION.—Turn the receiver function switch to each phono position and check each record player for proper operation.

CABINET ANTENNA.—A cabinet antenna is provided for use in strong signal areas in which no reflections are experienced. The leads from the antenna are brought out near the receiver antenna terminal board. To connect the cabinet antenna, attach the leads to the terminal board. If reception is satisfactory, no other antenna is necessary. However, if reception is unsatisfactory, it will be necessary to employ an outdoor antenna or an indoor antenna which can be oriented

RECEIVER LOCATION.—The owner should be advised of the importance of placing the receiver in the proper location in the room.

The location should be chosen—

—Away from bright windows and so that no bright light will fall directly on the screen. (Some illumination in the room is desirable, however.)

—To give easy access for operation and comfortable viewing.

—To permit convenient connection to the antenna.

—Convenient to an electrical outlet.

—To allow adequate ventilation.

VENTILATION CAUTION.—The receiver is provided with adequate ventilation holes in the bottom and back of the cabinet. Care should be taken not to allow these holes to be covered or ventilation to be impeded in any way.

If the receiver is to be operated with the back of the cabinet near a wall, at least a two-inch clearance should be maintained between cabinet and wall.

CHASSIS REMOVAL.—To remove the chassis from the cabinet for repair or installation of a new kinescope, remove the control knobs, the cabinet back, unplug the speaker cable, the kinescope socket, the antenna cable, the yoke and high voltage cable. Remove the yoke frame grounding strap. Take out the six chassis bolts under the cabinet. Withdraw the chassis from the back of the cabinet.

KINESCOPE HANDLING PRECAUTION.—Do not install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling.

To remove the kinescope from the cabinet, take out the four screws and one wing screw which hold the yoke frame to the cabinet. Remove the kinescope, the yoke frame with yoke and focus magnet as an assembly.

INSTALLATION OF KINESCOPE.—Handle this tube by the metal rim at the edge of the screen. Do not cover the glass bell of the tube with fingermarks as it will produce leakage paths which may interfere with reception. If this portion of the tube has inadvertently been handled, wipe it clean with a soft cloth moistened with "dry" carbon tetrachloride.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and fingermarks with a soft cloth moistened with "Windex" or similar cleaning agent.

Turn the tube so that the key on the base of the tube will be down and insert the neck of the kinescope through the deflection coil and focus magnet. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

Replace the kinescope and yoke frame assembly in the cabinet. Insert the four screws and wing screw and tighten.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible. If this is not done, difficulty will be encountered in adjusting the ion trap and focus magnets because of shadows on the corner of the raster.

Slide the chassis into the cabinet, then insert and tighten the six chassis bolts.

Slip the ion trap magnet over the neck of the kinescope.

Connect the kinescope socket to the tube base and connect the high voltage lead clip from the rim of the kinescope into the high voltage bushing on the high voltage compartment.

Reconnect all other cables. Perform the entire set-up procedure beginning with Ion Trap Magnet Adjustment.

REFLECTIONS.—Multiple images sometimes known as echoes or ghosts, are caused by the signal arriving at the antenna by two or more routes. The second or subsequent image occurs when a signal arrives at the antenna after being reflected off a building, a hill or other object. In severe cases of reflections, even the sound may be distorted. In less severe cases, reflections may occur that are not noticeable as reflections but that will instead cause a loss of definition in the picture. Depending upon the circumstances, it may be possible to eliminate the reflections by rotating the antenna or by moving it to a new location. In extreme cases, it may be impossible to eliminate the reflection.

INTERFERENCE.—Auto ignition, street cars, electrical machinery and diathermy apparatus may cause interference which spoils the picture. Whenever possible, the antenna location should be removed as far as possible from highways, hospitals, doctors' offices and similar sources of interference.

Short-wave radio transmitting equipment may cause interference in the picture in the form of moving ripples. In some instances it may be possible to eliminate the interference by the use of a trap in the antenna transmission line. However, if the interfering signal is on the same frequency as the television station, a trap will provide no improvement.

WEAK PICTURE.—When the installation is near the limit of the area served by the transmitting station, the picture may be speckled, having a "snow" effect, and may not hold steady on the screen. This condition is due to lack of signal strength from the transmitter.

9T147 **TELEVISION CHASSIS TOP VIEW**

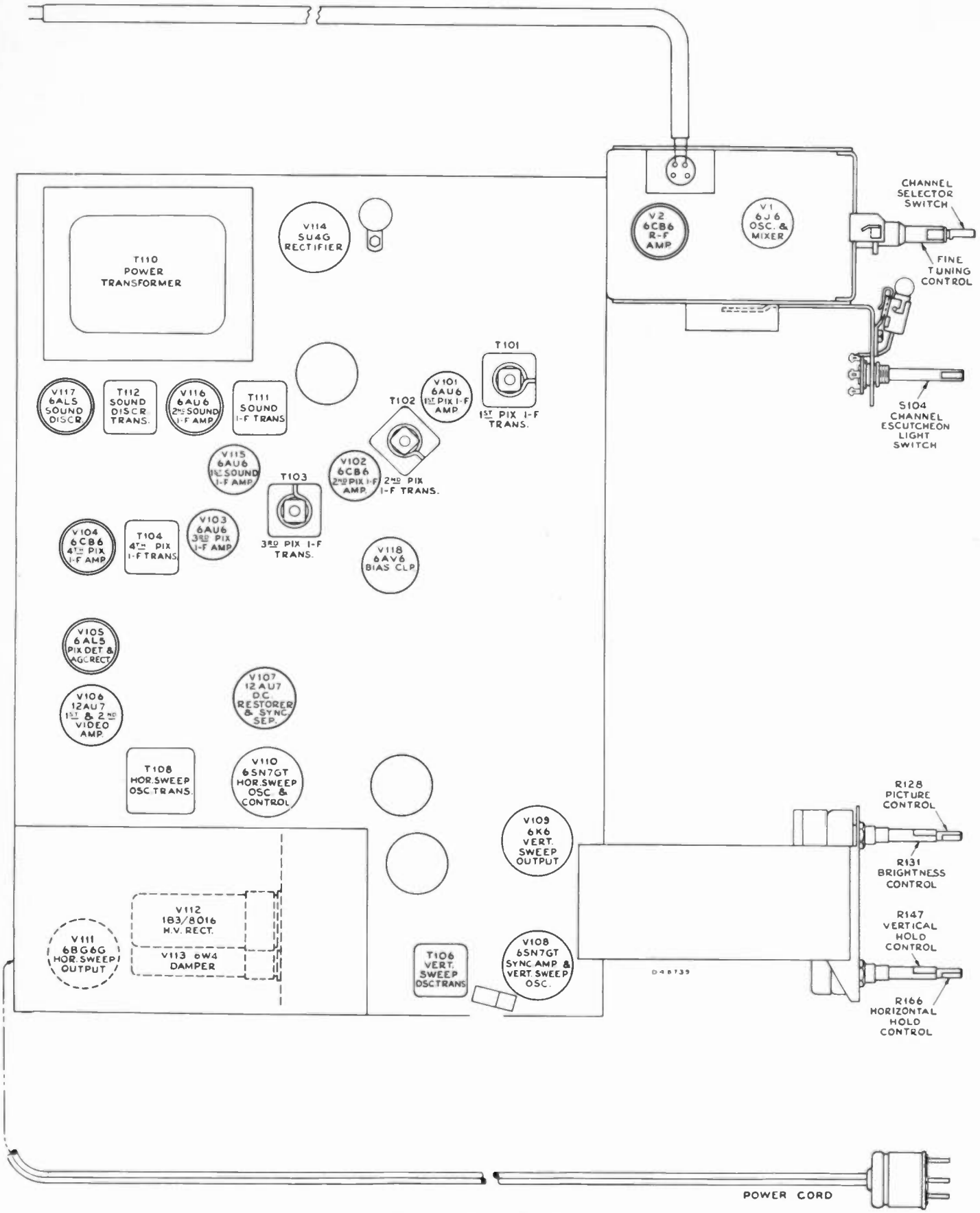


Figure 5—Chassis Top View

TELEVISION CHASSIS BOTTOM VIEW 9T147

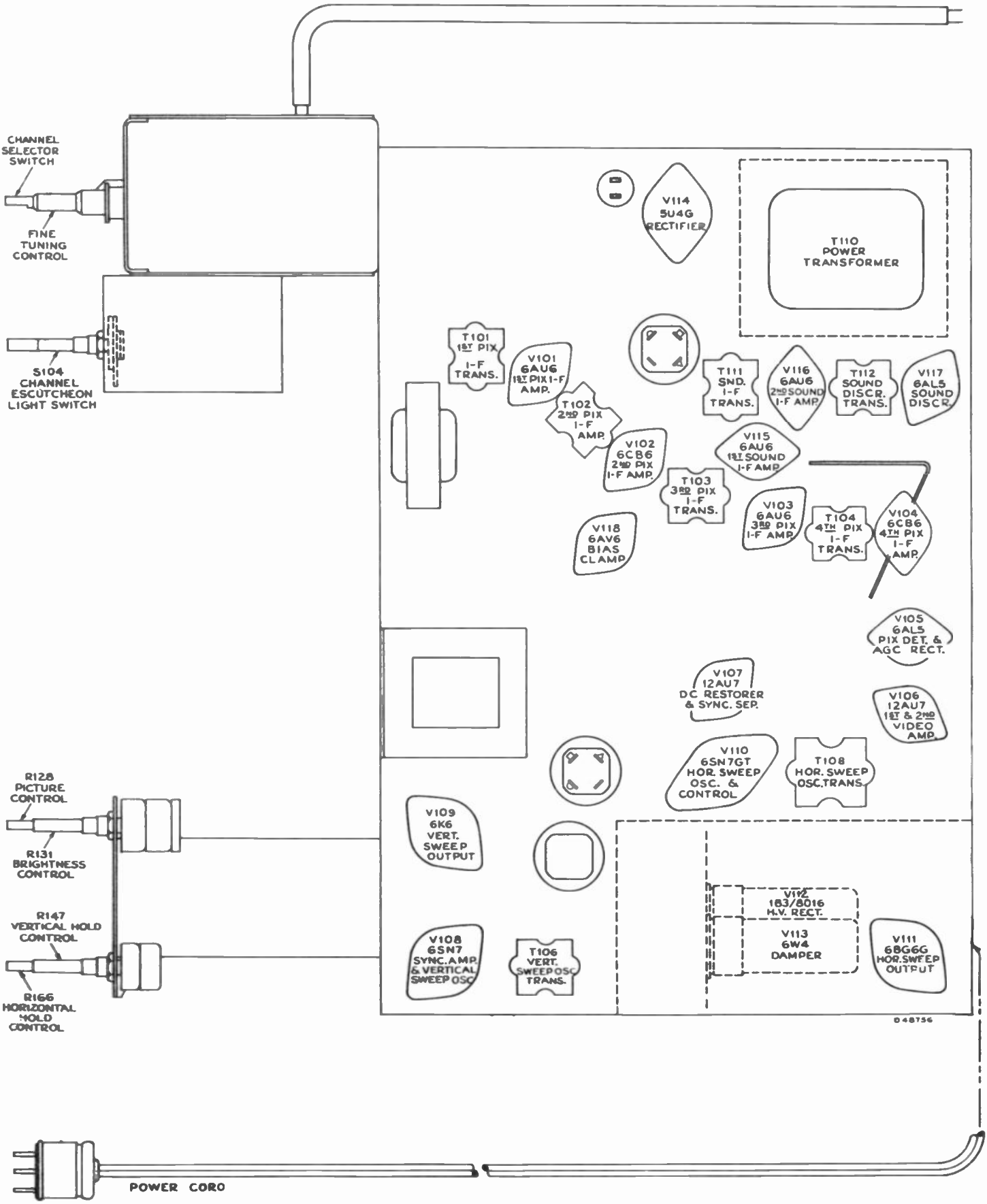


Figure 6 –Chassis Bottom View

9T147 VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition, a 2500 microvolt test pattern signal was fed into the receiver, the picture synced and the AGC control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are read with a WV97A Senior "VoltOhmyst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c. The symbol < means less than.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma).	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6J6	Mixer	2500 Mu. V. Signal	2	144	—	—	7	0	5	–2.3	6.8	—	
			No Signal	2	135	—	—	7	0	5	–2.1	5.6	—	
V1	6J6	R-F Oscillator	2500 Mu. V. Signal	1	100	—	—	7	0	6	–3.0	4.0	—	* Depending upon channel
			No Signal	1	95	—	—	7	0	6	–2.7	3.9	—	
V2	6AG5	R-F Amplifier	2500 Mu. V. Signal	5	250	6	130	2	0.1	1	–3.4	3.0	0.6	
			No Signal	5	166	6	84	2	0.4	1	–0.2	10.3	2.3	
V101	6AU6	1st Pix. I-F Amplifier	2500 Mu. V. Signal	5	195	6	222	7	0.3	1	–5.0	1.7	0.8	
			No Signal	5	121	6	135	7	0.8	1	–0.8	5.2	2.2	
V102	6CB6	2nd Pix. I-F Amplifier	2500 Mu. V. Signal	5	222	6	203	2	0.3	1	–5.0	2.0	0.7	
			No Signal	5	124	6	112	2	0.8	1	–0.8	5.5	1.6	
V103	6AU6	3d Pix. I-F Amplifier	2500 Mu. V. Signal	5	185	6	225	7	0.2	1	–5.0	1.7	0.7	
			No Signal	5	94	6	132	7	0.5	1	–0.75	4.9	2.0	
V104	6CB6	4th Pix. I-F Amplifier	2500 Mu. V. Signal	5	165	6	142	2	2.25	1	0	9.6	3.1	
			No Signal	5	118	6	132	2	2.1	1	0	9.0	3.1	
V105	6AL5	Picture 2d Det.	2500 Mu. V. Signal	7	–2.0	—	—	1	0	—	—	0.3	—	
			No Signal	7	–0.5	—	—	1	0	—	—	<0.1	—	
V105	6AL5	AGC Rectifier	2500 Mu. V. Signal	2	–9.5	—	—	5	5.5	—	—	<0.1	—	
			No Signal	2	–2.0	—	—	5	5.5	—	—	<0.1	—	
V106	12AU7	1st Video Amplifier	2500 Mu. V. Signal	1	100	—	—	3	1.2	2	–2.3	3.6	—	At maximum contrast
			No Signal	1	54	—	—	3	0.9	2	–0.5	2.6	—	
			2500 Mu. V. Signal	1	190	—	—	3	9.0	2	–2.6	0.9	—	At minimum contrast
			No Signal	1	122	—	—	3	6.9	2	–0.5	0.6	—	
V106	12AU7	2d Video Amplifier	2500 Mu. V. Signal	6	330	—	—	8	125	7	118	9.3	—	At maximum contrast
			No Signal	6	295	—	—	8	121	7	110	13.6	—	
			2500 Mu. V. Signal	6	300	—	—	8	131	7	120	12.9	—	At minimum contrast
			No Signal	6	295	—	—	8	121	7	110	13.6	—	
V107	12AU7	DC Rest & Sync Sep.	2500 Mu. V. Signal	1	10	—	—	3	45	2	–4.5	—	—	At maximum contrast
			No Signal	1	8	—	—	3	1.7	2	–0.4	—	—	

VOLTAGE CHART

9T147

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V107	12AU7	DC Rest & Sync Sep.	2500 Mu. V. Signal	6	7.2	—	—	8	54	7	0	—	—	
			No Signal	6	7.0	—	—	8		7	0	—	—	
V108 A	6SN7	Sync Amplifier	2500 Mu. V. Signal	5	50	—	—	6	7.8	4	7.4	—	—	
			No Signal	5	46	—	—	6	7.0	4	7.0	—	—	
V108	6SN7GT	Vertical Oscillator	2500 Mu. V. Signal	2	*395	—	—	3	0	1	*–58	0.4	—	*Depends on setting of height control
			No Signal	2	*395	—	—	3	0	1	*–58	0.4	—	
V109	6SN7GT	Vertical Output	2500 Mu. V. Signal	3	370	4	370	8	51	5	0	11.5	1.9	
			No Signal	3	365	4	365	8	51	5	0	11.4	1.9	
V110	6K6GT	Horizontal Osc. Signal	2500 Mu. V. Osc. Control	2	*160	—	—	3	*–4.6 25.0	1	*–14.6 –2.0	0.32	—	*Depends on setting of hold control
			No Signal	2	*152 181	—	—	3	*–4.4 16.3	1	*–3.5 –2.9	0.28	—	
V110	6SN7GT	Horizontal Oscillator	2500 Mu. V. Signal	5	230	—	—	6	0	4	–82	1.8	—	
			No Signal	5	225	—	—	6	0	4	–85	1.8	—	
V111	6BG6G	Horizontal Output	2500 Mu. V. Signal	5	*630	8	325	3	7.2	5	–33	67	5.0	*6000 volt pulse present
			No Signal	5	*630	8	329	3	7.2	5	–33	67.1	4.9	
V112	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2&7	*14,500	—	—	.0	—	*14,500 volt pulse present
			Brightness Maximum	Cap	*	—	—	2&7	*12,700	—	—	0.1	—	
V113	6W4 GT	Damper	2500 Mu. V. Signal	5	387	—	—	3	*	—	—	69	—	*3000 volt pulse present
			No Signal	5	380	—	—	3	*	—	—	70	—	
V114	5U4G	Rectifier	2500 Mu. V. Signal	4 & 6	*368	—	—	2 & 25	391	—	—	185	—	*AC measured with AC voltmeter
			No Signal	4 & 6	*367	—	—	2 & 8	387	—	—	199	—	
V115	6AU6	1st Sound I-F. Amp.	2500 Mu. V. Signal	5	120	6	120	7	0.8	1	–0.2	6.8	2.9	
			No Signal	5	108	6	108	7	0.8	1	–0.1	6.2	2.8	
V116	6AU6	2d Sound I-F Amp.	2500 Mu. V. Signal	5	118	6	87	7	0	1	–1.3	4.9	2.8	
			No Signal	5	110	6	76	5	0	1	–0.5	6.9	3.1	
V117	6AL5	Sound Discrim.	2500 Mu. V. Signal	2	–7.2	—	—	5	0	—	—	<0.1	—	
			No Signal	2	–10.0	—	—	5	0	—	—	<0.1	—	
V118	6AV6	Bias Clamp	2500 Mu. V. Signal	7	0	—	—	2	0	1	–3.4	—	—	
			No Signal	7	0	—	—	2	0	1	–0.2	—	—	
V120	19AP4	Kinescope	2500 Mu. V. Signal	Cone	14,000	10	384	11	100	2	46	<0.1	<0.1	
			No Signal	Cone	13,500	10	375	11	74	2	8.3	<0.1	<0.1	

9T147 **TELEVISION R-F UNIT WIRING DIAGRAM**

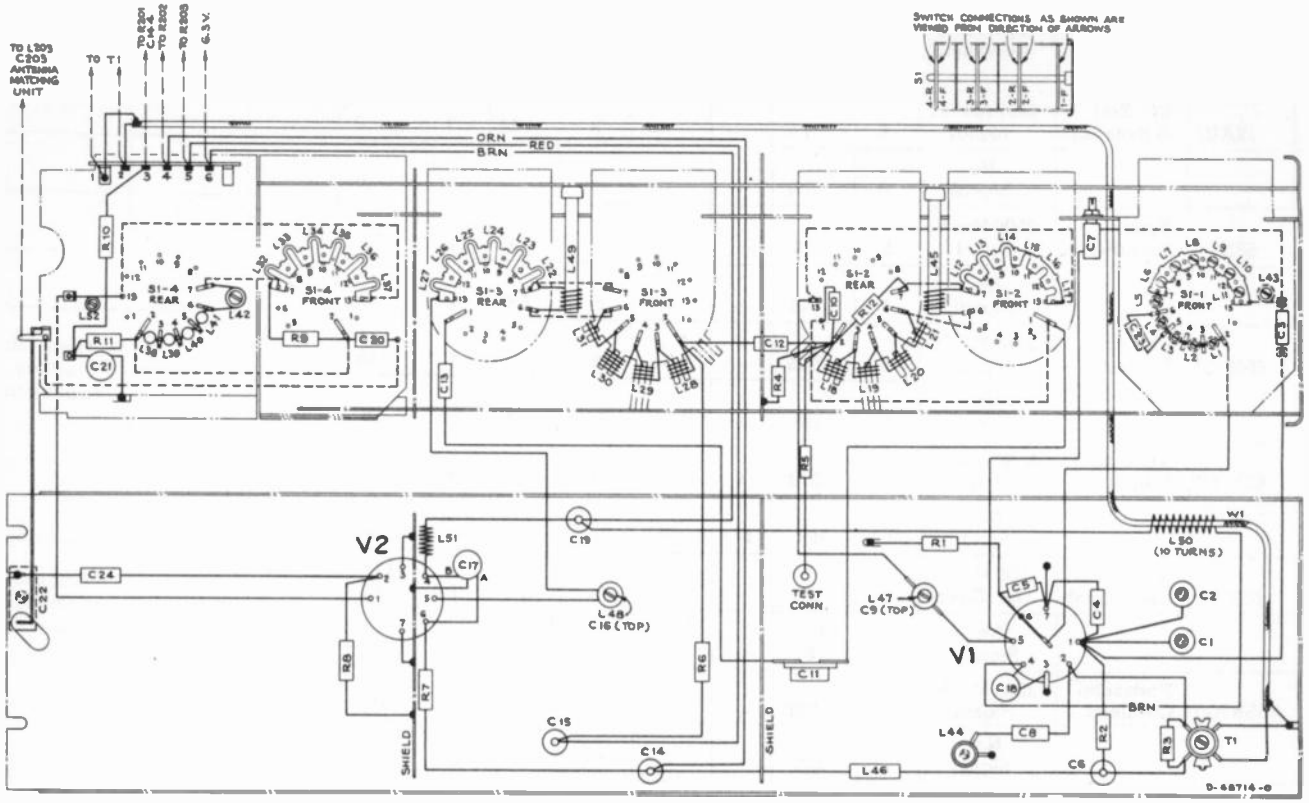
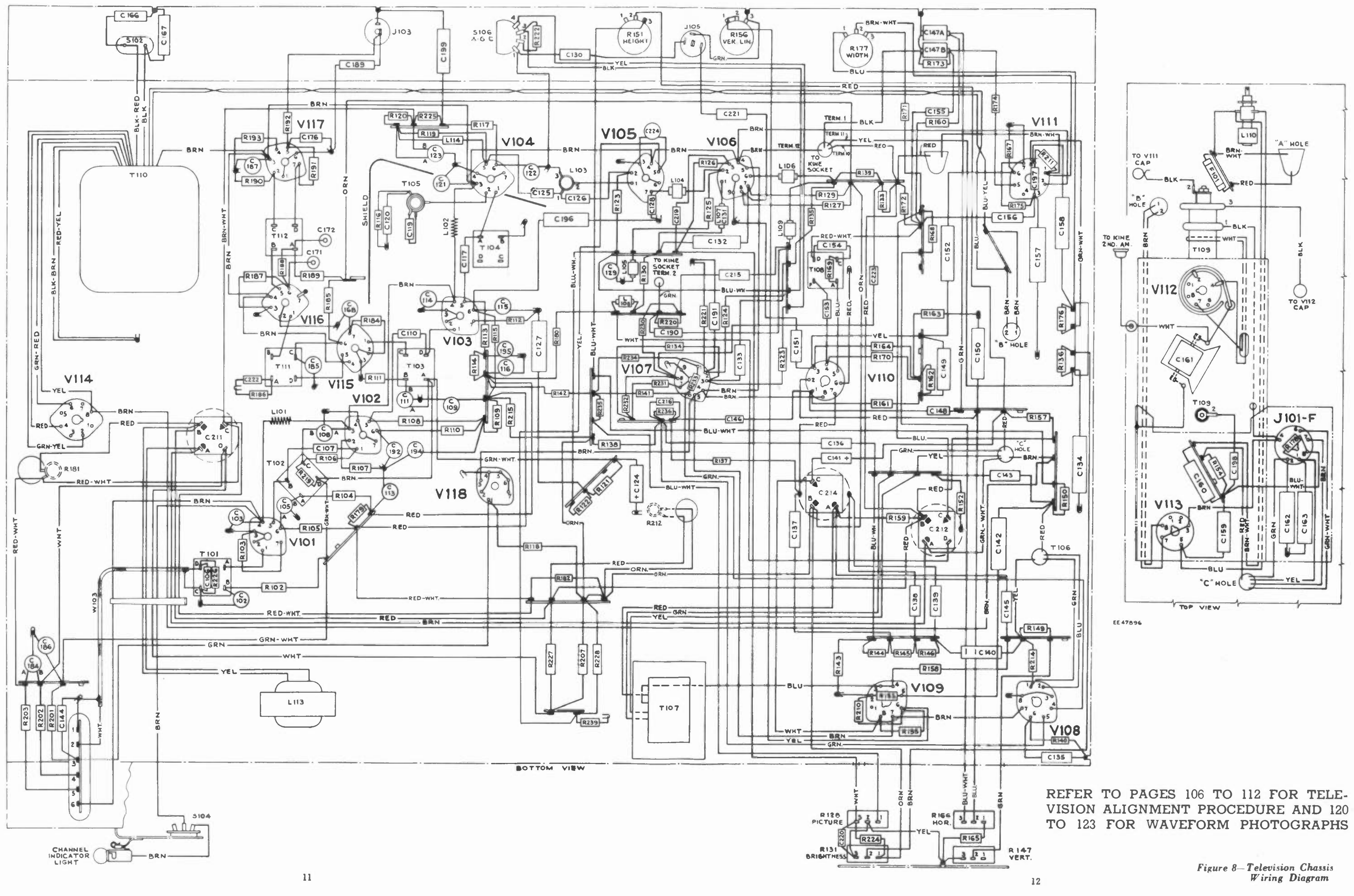


Figure 7—Television R-F Unit Wiring Diagram

TELEVISION CRITICAL LEAD DRESS

1. All leads in the picture and sound i-f circuits must be dressed as short and direct as possible with the exception of C106, C107, C110 and C117 which are to be dressed with enough slack so as not to have to move the body of the capacitor to align that particular stage.
2. Dress all 1500 mmf .005 mfd and .01 mfd capacitors in the i-f section with leads as short as possible.
3. Dress all wires between T101 and the r-f unit in clamp.
4. Dress C185 to act as shield for lead between pin 5 of V115 socket to T111D and picture i-f circuits.
5. Dress the bodies of resistors R106, R108, R113, R119, R191, R192 and capacitor C176 as close to tube pin as possible.
6. Dress L114 with coded end as close to pin 2 of U105 socket as possible.
7. The length of the bus wire from pin 2 of V118 to ground should not be shortened or rerouted.
8. Dress C199 with leads as short as possible and away from S106.
9. Keep the leads on C126 as short and direct as possible.
10. Dress all components connected to V108 socket up and away from the chassis except L104.
11. Keep the body and coded end of L104 as close to pin 2 of V105 socket as possible.
12. Dress the 4.5 mc trap L107 up and away from the chassis base.
13. Dress C132 up in the air and towards V105 socket.
14. Dress R125 with body as close as possible to pin 2 of U106 socket.
15. Keep body of R123 as close as possible to pin 2 of V105 socket.
16. Dress C133 and C190 away from C132, C151 and C153.
17. Dress the white wire from picture control R128-3 away from the chassis.
18. Dress all slack on kine socket leads under chassis. Dress brown wire away from any components associated with V105 or V106.
19. The green lead from the kinescope socket should be dressed away from all other leads and components and away from V106.
20. Dress R133 towards chassis rear apron.
21. Dress all leads in clamps on rear apron away from V117, V104, V105, V106 sockets and S103.
22. Dress green wire from C147A up and away from chassis.
23. Dress blue wire of T107 toward front apron of chassis.
24. Dress C153 down next to the chassis base.
25. Dress blue/white wire from height control R151-3 under R180.
26. Dress R161, R162, R163, R164 and R170 up and away from the chassis and with a half inch clearance from the soldering point.
27. Dress the yellow wire from pin 3 of V110 socket over C153.
28. Dress both leads of C198 away from the body of the capacitor.
29. Dress fuse in high voltage compartment so as not to short circuit to ground.
30. Dress blue and blue/yellow wire from power transformer in 3 clamps on chassis base and away from S103 and video section.
31. Dress both wires on S106 away from blue/yellow damper leads of T110.
32. Dress all 2 watt resistors away from each other and away from all wires and other components.

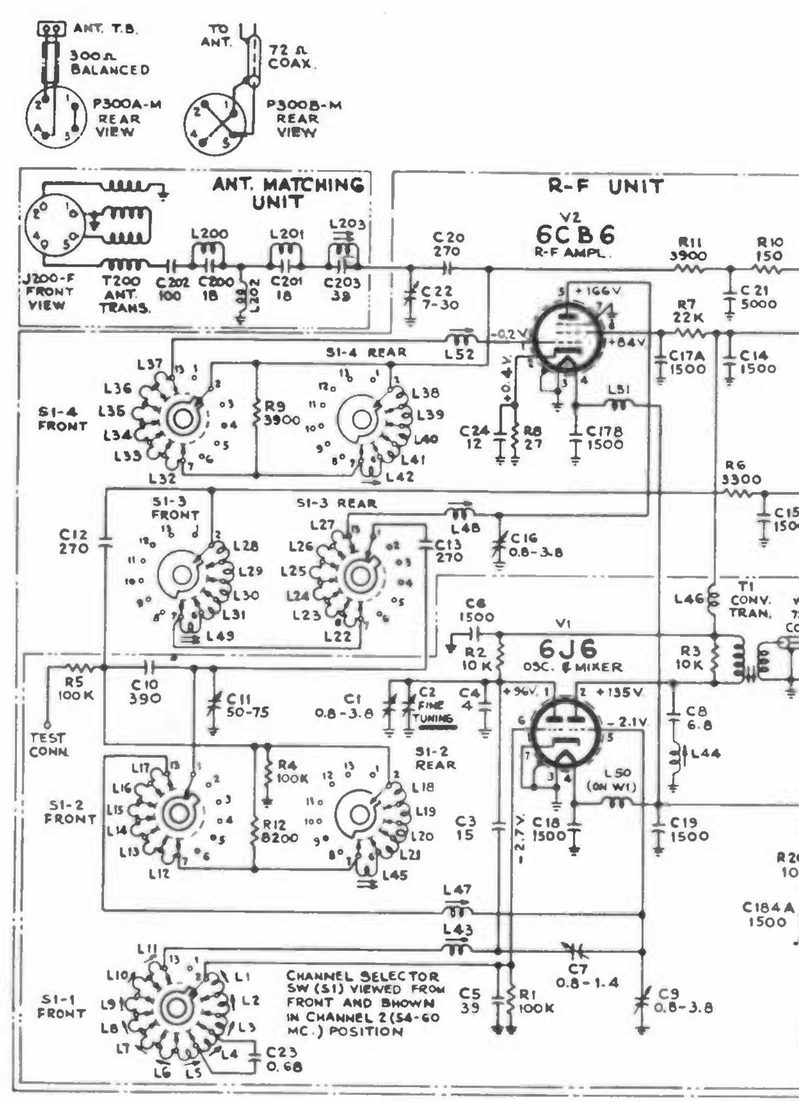
TELEVISION CHASSIS WIRING DIAGRAM

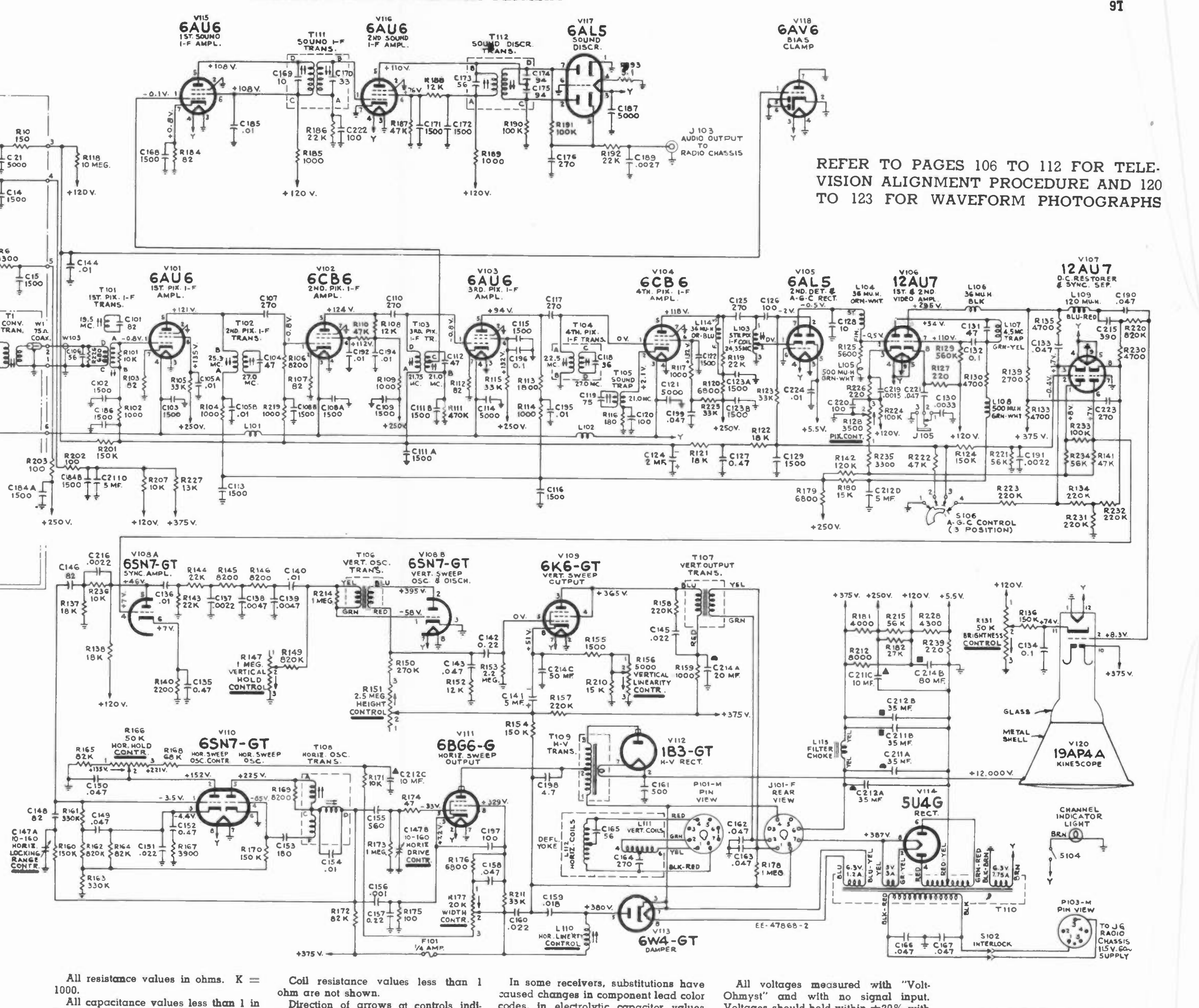


REFER TO PAGES 106 TO 112 FOR TELEVISION ALIGNMENT PROCEDURE AND 120 TO 123 FOR WAVEFORM PHOTOGRAPHS

Figure 8—Television Chassis Wiring Diagram

TELEVISION CIRCUIT SCHEMATIC DIAGRAM





REFER TO PAGES 106 TO 112 FOR TELEVISION ALIGNMENT PROCEDURE AND 120 TO 123 FOR WAVEFORM PHOTOGRAPHS

PRODUCTION CHANGES

In some receivers, T111 had only a single winding, C170 was 50 mmf and was connected between V115-5 and V116-1, R186 was 100K and was connected between V116-1 and gnd. C222 was omitted.

In some receivers, R118 was 2.2 meg, R133 was 6800, R201 was 33K and C130 was .0015. V105-5 was connected to gnd. and C224 was omitted. R229, 10K and L115, 500 Muh. which were connected in parallel were removed and replaced by R139. R239 was omitted and R228 was connected to gnd. C223 was omitted.

In some receivers, R173 was 1 meg.

In some receivers, R183 was 100K and was connected from 115V AC power line to gnd.

In some receivers, R149 was 1.2 meg. R148, 3.9 meg was removed. It was connected between the yellow lead of T106 and gnd.

Due to a severe resistor shortage during the production of this series of receivers it was found necessary to substitute resistors of different values from the nominal value shown on the schematic. These substitutions were approved by the engineering department for each particular application in the circuit only if the change in value did not impair receiver operation. In some such instances, these substitutions involved a change in the value of 5%, 10%, 20% or in a few instances even greater change.

In critical circuits where a change of value could not be tolerated, the proper resistance was obtained by the use of series, parallel or even series-parallel combinations of resistors in order to obtain the correct value of resistance or wattage.

If it should become necessary to replace a resistor or group of resistors, the values shown in the schematic and parts list should be employed.

If the value of the resistor to be replaced is different from the value shown in the schematic, and the schematic value is not available, then it is permissible to replace it with the value found in the receiver or some value between that and the value shown in the schematic. Some of the commercially available, low resistance value, molded body types are of wire wound construction. Such resistors should not be employed in the r-f unit, i-f or video sections as the inductive affect of these resistors may impair circuit operation.

All resistance values in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Coil resistance values less than 1 ohm are not shown.

Direction of arrows at controls indicates clockwise rotation.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

Figure 9—Television Circuit Schematic Diagram

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLIES
	KRK8B
75188	Board—Terminal board, 5 contact and ground
75067	Bracket—Vertical bracket for holding oscillator tube shield
75201	Cable—75 ohms., coax. cable (7¼") complete with coil (W1, L50)
75186	Capacitor—Ceramic, variable, for fine tuning—plunger type (C2)
75289	Capacitor—4 mmf., ±0.5 mmf. (C4)
75189	Capacitor—Adjustable, 7-30 mmf. (C22)
75200	Capacitor—Ceramic, 12 mmf. (C24)
45465	Capacitor—Ceramic, 15 mmf. (C3)
75196	Capacitor—Ceramic, 39 mmf. (C5)
75174	Capacitor—Ceramic, trimmer, 50-75 mmf. (C11)
75199	Capacitor—Ceramic, 270 mmf. (C12, C13, C20)
75641	Capacitor—Ceramic, 390 mmf. (C10)
75166	Capacitor—Ceramic, 1500 mmf. (C6, C14, C15, C19)
75089	Capacitor—Ceramic, dual, 1500 mmf. (C17A, C17B)
73748	Capacitor—Ceramic, 1500 mmf. (C18)
73473	Capacitor—Ceramic, 5000 mmf. (C21)
75172	Capacitor—Tubular, steatite, adjustable, 0.65-1.2 mmf. (C7)
71504	Capacitor—Ceramic, 0.68 mmf. (C23)
75184	Capacitor—Ceramic, adjustable, 0.75-4 mmf., complete with adjusting stud (C1)
75197	Capacitor—Ceramic, 6.8 mmf. (C8)
75167	Clip—Tubular clip for mounting stand-off capacitors—RCA 75166
75182	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (screw adjustment) for converter section (C9, L47)
75183	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (screw adjustment) for r-f section (L48, C16)
75185	Coil—Converter plate loading coil (L44)
75202	Coil—Choke coil .56 muh (L46)
73477	Coil—Choke coil (L51)
75187	Core—Adjustable core for fine tuning capacitor C2
75162	Detent—Detent mechanism and fibre shaft
73453	Form—Coil form for L45 and L49
75165	Link—Link assembly for fine tuning
76135	Plate—Front plate and shaft bearing
14343	Retainer—Fine tuning shaft retaining ring
	Resistor—Fixed, composition:—
503027	27 ohms, ±10%, ½ watt (R8)
504115	150 ohms, ±20%, ½ watt (R10)
503233	3300 ohms, ±10%, ½ watt (R6)
503239	3900 ohms, ±10%, ½ watt (R9, R11)
503282	8200 ohms, ±10%, ½ watt (R12)
3078	10,000 ohms, ±5%, ½ watt (R3)
504310	10,000 ohms, ±20%, ½ watt (R2)
503322	22,000 ohms, ±10%, ½ watt (R7)
504410	100,000 ohms, ±20%, ½ watt (R1, R4, R5)
75164	Rod—Actuating plunger rod (fibre) for fine tuning link
71476	Screw—#4-40 x ¼" binder head machine screw for adjusting L6, L7, L8, L9, L10, L11
75176	Screw—#4-40 x ⅜" fillister head screw for adjusting L5
75177	Screw—#4-40 x 5/16" fillister head screw for adjusting L1, L2, L3, L4, L43
74575	Screw—#4-40 x .359" adjusting screw for L42
73640	Screw—#4-40 x 7/16" adjusting screw for L52
75159	Shaft—Channel selector shaft and plate
75160	Shaft—Fine tuning shaft and cam
75168	Shield—Oscillator and converter sections shield for r-f unit—snap-on type
75193	Shield—Tube shield for V1
75192	Shield—Tube shield for V2
75088	Socket—Tube socket, 7 contact, miniature, ceramic, saddle mounted
75191	Spacer—Insulating spacer for front plate (4 req'd)
75163	Spring—Friction spring (formed) for fine tuning cam
75068	Spring—Retaining spring for oscillator tube shield
74578	Spring—Retaining spring for adjusting screws
73457	Spring—Return spring for fine tuning control
30340	Spring—Hair pin spring for fine tuning link
75175	Stator—Oscillator section stator complete with rotor, segment, coils, adjusting screws and capacitors C3 and C23 (S1-1, C3, C23, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L43)

STOCK No.	DESCRIPTION
75178	Stator—Converter stator complete with rotor, coils, capacitors (C-10 and C12) and resistors (R4 and R5) (S1-2, C10, C12, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L45, R4, R5, R12)
75179	Stator—R-F amplifier stator complete with rotor, coils, capacitor (C13) and resistor (R6) (S1-3, C13, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L49, R6)
75180	Stator—Antenna stator complete with rotor, coils, capacitors (C20 and C21) and resistors (R9, R10, R11) (S1-4, C20, C21, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L52, R9, R10, R11)
75169	Strip—Coil segment mounting strip—RH center
75170	Strip—Coil segment mounting strip—LH lower
75171	Strip—Coil segment mounting strip—LH upper—less trimmer C7
75173	Stud—#6-32 x 13/16" adjusting stud for C7 trimmer
75446	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 uncoded and coded "ER"
75447	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 coded numerically and "Hi Q"
75181	Transformer—Converter transformer (T1)
75190	Washer—Insulating washer (neoprene) for capacitor C7
75607	Washer—Insulating washer (hex)
	CHASSIS ASSEMBLIES
	KCS60A
75515	Bracket—Channel indicator lamp bracket
75228	Bracket—Focus magnet mounting bracket—lower
75229	Bracket—Focus magnet mounting bracket—upper
75217	Capacitor—Mica trimmer, dual 10-160 mmf. (C147A, C147B)
53511	Capacitor—Ceramic, 10 mmf. (C128)
75450	Capacitor—Ceramic, 39 mmf. (C203)
71924	Capacitor—Ceramic, 56 mmf. (C106)
73090	Capacitor—Mica, 82 mmf. (C146, C148)
75437	Capacitor—Ceramic, 100 mmf. (C202)
45469	Capacitor—Ceramic, 100 mmf. (C120)
39396	Capacitor—Ceramic, 100 mmf. (C126) C197, C220, C222)
73102	Capacitor—Mica, 180 mmf. (C153)
75244	Capacitor—Ceramic, 270 mmf. (C176)
76303	Capacitor—Ceramic, 270 mmf. (C223)
73091	Capacitor—Mica, 270 mmf. (C107, C110, C117, C215)
73094	Capacitor—Mica, 390 mmf. (C215)
74947	Capacitor—Ceramic, 500 mmf., 20,000 volts (C161)
74250	Capacitor—Mica, 560 mmf. (C155)
75166	Capacitor—Ceramic, 1500 mmf. (stand-off) (C171, C172)
73748	Capacitor—Ceramic, 1500 mmf. (C102, C103, C109, C113, C115, C116, C122, C129, C168, C186)
75089	Capacitor—Ceramic, dual 1500 mmf. (C108A, C108B, C111A, C111B, C123A, C123B, (C184,A, C184B)
73473	Capacitor—Ceramic, 5000 mmf. (C114, C121, C187)
75877	Capacitor—Ceramic, dual 10,000 mmf. (C105A, C105B)
73960	Capacitor—Ceramic, 10,000 mmf. (C144, C185, C192, C194, C195, C224)
75646	Capacitor—Ceramic, 4.7 mmf., 5000 volts (C198)
73747	Capacitor—Electrolytic, 2 mfd, 50 volts (C124)
28417	Capacitor—Electrolytic, 5 mfd, 450 volts (C141)
75592	Capacitor—Electrolytic comprising 1 section of 20 mfd, 450 volts, 1 section of 80 mfd, 200 volts and 1 section of 50 mfd, 50 volts (C214A, C214B, C214C)
75510	Capacitor—Electrolytic comprising 2 sections of 35 mfd, 450 volts, 1 section of 10 mfd, 450 volts and 1 section of 5 mfd, 450 volts (C211A, C211B, C211C, C211D, C212A, C212B, C212C, C212D)
75643	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd, 1000 volts (C156)
73598	Capacitor—Tubular, paper, oil impregnated, .0015 mfd, 600 volts (C219)
73595	Capacitor—Tubular, paper, oil impregnated, .0022 mfd, 600 volts (C137, C191, C216)
73599	Capacitor—Tubular, paper, oil impregnated, .0027 mfd, 600 volts (C189)
73795	Capacitor—Tubular, paper, oil impregnated, .0033 mfd, 600 volts (C130)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd, 600 volts (C138, C139)

STOCK No.	DESCRIPTION
73561	Capacitor—Tubular, puper, oil impregnated, .01 mfd, 400 volts (C136)
73594	Capacitor—Tubular, moulded paper, oil impregnated, .01 mfd, 600 volts (C140, C154)
74727	Capacitor—Tubular, paper, oil impregnated, .018 mfd, 1000 volts (C159)
73562	Capacitor—Tubular, paper, oil impregnated, .022 mfd, 400 volts (C145, C151)
73810	Capacitor—Tubular, paper, oil impregnated, .022 mfd, 1000 volts (C160)
75071	Capacitor—Tubular, moulded paper, .047 mfd, 400 volts (C166, C167)
73553	Capacitor—Tubular, paper, oil impregnated, .047 mfd, 400 volts (C149, C199, C221)
73592	Capacitor—Tubular, paper, oil impregnated, .047 mfd, 600 volts (C133, C150, C190)
73597	Capacitor—Tubular, moulded paper, oil impregnated, .047 mfd, 1000 volts (C143)
73551	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd, 400 volts (C132, C196)
73557	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd, 600 volts (C134)
73794	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd, 400 volts (C157)
74957	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd, 600 volts (C142)
73787	Capacitor—Tubular, moulded paper, 0.47 mfd, 200 volts (C127, C135, C152)
75167	Clip—Tubular clip for mounting stand-off capacitor 75166
75210	Coil—Fifth pix, i-f coil complete with adjustable core (L103)
71449	Coil—Horizontal linearity coil (L110)
73591	Coil—Antenna matching coil (2 req'd) (Part of T200)
75241	Coil—Antenna shunt coil (L202)
73477	Coil—Choke coil (L101, L102)
75299	Coil—Peaking coil (36 muh) (L104)
71793	Coil—Peaking coil (36 muh) (L106)
76285	Coil—Peaking coil (36 muh) (L114, R119)
75253	Coil—Peaking coil (120 muh) (L109)
75252	Coil—Peaking coil (500 muh) (L105, L108)
35787	Connector—Phono input connector (J103)
74594	Connector—2 contact male connector for power cord
35383	Connector—8 contact male connector—part of deflection yoke (P101)
68592	Connector—8 contact female connector for deflection yoke leads (J101)
38853	Connector—4 contact female connector for antenna transformer (J200)
75517	Contact—Anode connector contact only
75215	Control—Horizontal and vertical hold control (R147, R166)
75216	Control—Picture and brightness control (R128, R131)
71441	Control—Vertical linearity control (R156)
71440	Control—Height control (R151)
75516	Control—Width control (R177)
71498	Core—Adjustable core and stud for FM trap 75449
74956	Cushion—Rubber cushion for deflection yoke hood (2 req'd)
74839	Fastener—Push fastener to mount ceramic tube socket (2 req'd)
73600	Fuse—.25 amp., 250 volts (F101)
16058	Grommet—Rubber grommet for 2nd. anode lead exit
37396	Grommet—Rubber grommet for mounting ceramic, tube socket (2 req'd)
75445	Hood—Deflection yoke hood less rubber cushions
75644	Insulator—2nd. anode insulator
75482	Jack—Video jack (J105)
76322	Magnet—Ion trap magnet (P.M.)
76168	Magnet—Focus magnet complete with adjustable plate and stud
75518	Plate—Hi-voltage plate—bakelite—less transformer, capacitor and tube socket
76284	Reactor—Filter reactor (L113)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R193)
76304	Resistor—Wire wound, 220 ohms, ½ watt (R239)
75512	Resistor—Wire wound, 4000 ohms, 10 watts (R181)
76066	Resistor—Wire wound, 4300 ohms, 5 watts (R228)
75593	Resistor—Wire wound, 8000 ohms, 10 watts (R212)
76065	Resistor—Wire wound, 13,000 ohms, 5 watts (R227)
	Resistor—Fixed, composition:—
504047	47 ohms, ±20%, ½ watt (R174)
603082	82 ohms, ±10%, ½ watt (R103, R107, R112, R184)
523110	100 ohms, ±10%, 2 watts (R175)

STOCK No.	DESCRIPTION
504110	100 ohms, ±20%, ½ watt (R202, R203)
503118	180 ohms, ±10%, ½ watt (R116)
503122	220 ohms, ±10%, ½ watt (R126, R127)
503168	680 ohms, ±10%, ½ watt (R226)
504210	1000 ohms, ±20%, ½ watt (R102, R104, R109, R114, R117, R159, R185, R189, R219)
513215	1500 ohms, ±10%, 1 watt (R155)
503218	1800 ohms, ±10%, ½ watt (R113)
504222	2200 ohms, ±20%, ½ watt (R140)
503227	2700 ohms, ±10%, ½ watt (R139)
503233	3300 ohms, ±10%, ½ watt (R235)
503239	3900 ohms, ±10%, ½ watt (R167)
30494	4700 ohms, ±5%, ½ watt (R130)
503247	4700 ohms, ±10%, ½ watt (R135, R230)
513247	4700 ohms, ±10%, 1 watt (R133)
30734	5600 ohms, ±5%, ½ watt (R125)
513268	6800 ohms, ±10%, 1 watt (R120, R176)
523268	6800 ohms, ±10%, 2 watts (R179)
14250	8200 ohms, ±5%, ½ watt (R106, R169)
503282	8200 ohms, ±10%, ½ watt (R145, R146)
503310	10,000 ohms, ±10%, ½ watt (R171, R236)
523310	10,000 ohms, ±10%, 2 watts (R207)
30436	12,000 ohms, ±5%, ½ watt (R152)
503312	12,000 ohms, ±10%, ½ watt (R188)
30866	12,000 ohms, ±5%, 1 watt (R108)
503315	15,000 ohms, ±10%, ½ watt (R210)
513315	15,000 ohms, ±10%, 1 watt (R180)
503318	18,000 ohms, ±10%, ½ watt (R121, R122, R137)
513318	18,000 ohms, ±10%, 1 watt (R138)
503322	22,000 ohms, ±10%, ½ watt (R143, R144, R186)
504322	22,000 ohms, ±20%, ½ watt (R192)
523327	27,000 ohms, ±10%, 2 watts (R182)
503333	33,000 ohms, ±10%, ½ watt (R105, R115, R211, R225)
504333	33,000 ohms, ±20%, ½ watt (R123)
503347	47,000 ohms, ±10%, ½ watt (R141, R182, R222)
504347	47,000 ohms, ±20%, ½ watt (R110)
503356	56,000 ohms, ±10%, ½ watt R221, R234)
513356	56,000 ohms, ±10%, 1 watt (R215)
513368	68,000 ohms, ±10%, 1 watt (R168)
52609	82,000 ohms, ±5%, 1 watt (R172)
513382	82,000 ohms, ±10%, 1 watt (R164, R165)
3252	100,000 ohms, ±5%, ½ watt (R190, R191)
503410	100,000 ohms, ±10%, ½ watt (R224, R233)
503412	120,000 ohms, ±10%, ½ watt (R142)
504415	150,000, ±10% ½ watt (R136, R154, R160, R201)
504415	150,000 ohms, ±20%, ½ watt (R124)
31895	150,000 ohms, ±5%, 1 watt (R170)
503422	220,000 ohms, ±10%, ½ watt (R134, R157, R158, R223, R231, R232)
503427	270,000 ohms, ±10%, ½ watt (R150)
503433	330,000 ohms, ±10%, ½ watt (R161)
38892	330,000 ohms, ±5%, 1 watt (R163)
503447	470,000 ohms, ±10%, ½ watt (R111)
503456	560,000 ohms, ±10%, ½ watt (R129)
503482	820,000 ohms, ±10%, ½ watt (R162, R220)
503510	1 megohm, ±10%, ½ watt (R173)
504510	1 megohm, ±20%, ½ watt (R178, R214)
30162	1.2 megohm, ±5%, ½ watt (R149)
503522	2.2 megohm, ±10%, ½ watt (R153)
70249	3.9 megohm, ±5%, ½ watt (R148)
503610	10 megohm, ±10%, ½ watt (R118)
75083	Screw—#8-32 x ¼" wing screw for mounting deflection yoke
75236	Screw—#8-32 x ⅜" pan head cross recessed screw to mount focus magnet (2 req'd)
74602	Screw—#10-32 x 1¾" round head machine screw for focus magnet adjustment (3 req'd)
73584	Shield—Tube shield
31251	Socket—Tube socket, octal, wafer
73117	Socket—Tube socket, 7 pin, miniature
75223	Socket—Tube socket, 9 pin, miniature
73249	Socket—Tube socket, octal, ceramic, plate mounted
31319	Socket—Tube socket, octal, moulded
74834	Socket—Kinescope socket
75718	Socket—Channel indicator lamp socket
71508	Socket—Tube socket, 6 contact, moulded for 1B3/8016
68592	Socket—Tube socket, 6 contact, moulded for V113
75233	Spring—Compression spring for focus magnet adjustment (3 req'd)
76636	Stud—Adjusting stud complete with guard for focus magnet

STOCK No.	DESCRIPTION
75506	Support—Bakelite support only—part of hi-voltage shield
75594	Switch—Channel indicator lamp switch (S104)
76010	Switch—AGC Switch (S106)
75508	Transformer—Power transformer, 117 volt 60 cycle (T110)
74950	Transformer—Vertical output transformer (T107)
74144	Transformer—Vertical oscillator transformer (T106)
74589	Transformer—First pix, I-f transformer (T101, C101, R101)
74590	Transformer—Second pix, i-f transformer (T102, C104)
76264	Transformer—Third pix, i-f transformer (T103, C112)
73574	Transformer—Fourth pix, i-f transformer (T104, C118)
71424	Transformer—Sound i-f transformer (T111, C169, C170)
75212	Transformer—Sound discriminator transformer (T112, C173, C174, C175)
75213	Transformer—Horizontal oscillator transformer (T108)
75509	Transformer—Antenna matching transformer complete with antenna connector, i-f and F-M traps and shunt coil (T200, C200, C201, C202, C203, J200, L200, L201, L20, L203)
75585	Transformer—Hi-voltage transformer (T109)
71778	Trap—Sound trap (T105, C119)
75242	Trap—i-f trap (L200, L201, C200, C201)
75449	Trap—FM trap complete with adjustable core and stud (L203, C203)
75251	Trap—4.5 mc trap (L107, C131)
74952	Yoke—Deflection yoke (L111, L112, C164, C165, P101)
	RADIO CHASSIS ASSEMBLIES
	RC1092
75567	Capacitor—Variable tuning capacitor complete with drive drum (C1-1, C1-2, C1-3, C1-4, C1-5, C1-6)
76423	Capacitor—Ceramic, 3 mmf. (C10)
75613	Capacitor—Ceramic, 5 mmf. (C13)
39044	Capacitor—Ceramic, 15 mmf. (C12)
75609	Capacitor—Ceramic, 47 mmf. (C45)
75612	Capacitor—Ceramic, 68 mmf. (C9, C11)
75437	Capacitor—Ceramic, 100 mmf. (C31)
39396	Capacitor—Ceramic, 100 mmf. (C4)
75614	Capacitor—Ceramic, 150 mmf. (C14, C30, C43, C54)
75611	Capacitor—Ceramic, 220 mmf. (C3)
39640	Capacitor—Mica, 330 mmf. (C37, C38)
72571	Capacitor—Mica, 470 mmf. (C7)
75610	Capacitor—Ceramic, 1500 mmf. (C19)
74850	Capacitor—Ceramic, 1800 mmf. (C17)
73473	Capacitor—Ceramic, 5000 mmf. (C2, C5, C6, C15, C24, C25, C27, C28, C29, C34, C36)
73747	Capacitor—Electrolytic, 2 mfd, 50 volts (C40)
72052	Capacitor—Electrolytic comprising 1 section of 30 mfd., 450 volts, 1 section of 30 mfd., 350 volts and 1 section of 40 mfd, 25 volts (C23A, C23B, C23C)
73801	Capacitor—Tubular, paper, .001 mfd, 400 volts (C8)
70642	Capacitor—Tubular, paper, .001 mfd, 1000 volts (C42, C44)
73920	Capacitor—Tubular, paper, .005 mfd, 400 volts (C26, C33, C39, C41)
73561	Capacitor—Tubular, paper, .01 mfd, 400 volts (C32)
70572	Capacitor—Tubular, paper, .015 mfd, 400 volts (C22)
58476	Capacitor—Tubular, paper, oil impregnated, .018 mfd, 200 volts (C21)
71928	Capacitor—Tubular, paper, .02 mfd, 200 volts (C20)
73562	Capacitor—Tubular, paper, .02 mfd, 400 volts (C35)
73553	Capacitor—Tubular, paper, .05 mfd, 400 volts (C16)
73935	Clip—Mounting clip for AM, i-f transformer
75627	Clip—Clip for main cable—on rear of chassis
75569	Coil—Oscillator coil—AM—complete with adjustable screws (L3, L4, L5)
75570	Coil—R-F coil—AM—complete with adjustable screws (L6, L7)
71942	Coil—Filament choke coil (L9)
75615	Coil—Antenna coil—FM (L1)
74815	Coil—R-F coil—FM (L2)
74817	Coil—Oscillator coil—FM (L8)
35787	Connector—Single contact female connector for pickup cables and television (J2, J3, J5)
75542	Connector—8 contact male connector for power input cable (J4)
75543	Connector—2 contact female connector for 45 RPM motor cable (P1)
74879	Connector—2 contact female connector for antenna leads

STOCK No.	DESCRIPTION
75537	Control—Volume control and power switch (R22, S2)
75561	Control—Tone control—L-F (R19)
75562	Control—Tone control—H-F (R34)
75564	Coupling—Spring coupling for function switch extension shaft
75556	Cover—Insulating cover for electrolytic 72052
72953	Cord—Drive cord (approx. 66" overall)
74839	Fastener—Push fastener for mounting R-F shelf (4 req'd)
16058	Grommet—Rubber grommet for mounting R-F shelf (4 req'd)
75547	Grommet—Rubber grommet to mount slides to bottom—rear—(2 req'd)
75548	Grommet—Rubber grommet to mount slides to bottom—front (2 req'd)
11765	Lamp—Dial lamp—Mazda 51
75544	Nut—Rivnut to fasten screw for mounting chassis (4 req'd)
18469	Plate—Bakelite mounting plate for electrolytic 72052
75535	Plate—Dial back plate complete with three (3) pulleys
75536	Pointer—Station selector pointer
72602	Pulley—Drive cord pulley
72323	Resistor—Wire wound, 3 ohms, ½ watt (R25)
73637	Resistor—Wire wound, 2200 ohms, 5 watts (R24)
	Resistor—Fixed, composition:—
503068	68 ohms, ±10%, ½ watt (R1, R26)
503110	100 ohms, ±10%, ½ watt (R15, R38, R43)
503112	120 ohms, ±10%, ½ watt (R27)
53099	270 ohms, ±5%, 2 watts (R42)
503139	390 ohms, ±10%, ½ watt (R9)
503168	680 ohms, ±10%, ½ watt (R4)
504168	680 ohms, ±20%, ½ watt (R30, R31)
503210	1000 ohms, ±10%, ½ watt (R6)
30731	1200 ohms, ±5%, ½ watt (R46)
30733	3300 ohms, ±5%, ½ watt (R40, R45)
513282	8200 ohms, ±10%, 1 watt (R3)
503315	15,000 ohms, ±10%, ½ watt (R44)
503318	18,000 ohms, ±10%, ½ watt (R7, R20)
503322	22,000 ohms, ±10%, ½ watt (R28, R29)
503327	27,000 ohms, ±10%, ½ watt (R18, R21)
30147	39,000 ohms, ±5%, ½ watt (R47)
503356	56,000 ohms, ±10%, ½ watt (R32)
503368	68,000 ohms, ±10%, ½ watt (R39)
503382	82,000 ohms, ±10%, ½ watt (R36)
503412	120,000 ohms, ±10%, ½ watt (R8, R16)
503415	150,000 ohms, ±10%, ½ watt (R12, R14)
504422	220,000 ohms, ±20%, ½ watt (R11)
503427	270,000 ohms, ±10%, ½ watt (R35)
503447	470,000 ohms, ±10%, ½ watt (R2, R37, R41, R48)
503515	1.5 megohm, ±10%, ½ watt (R17, R51)
504522	2.2 megohm, ±20%, ½ watt (R5, R10, R13)
504610	10 megohm, ±20%, ½ watt (R23)
504622	22 megohm, ±20%, ½ watt (R33)
75540	Shaft—Tuning knob shaft
75565	Shaft—Extension shaft for function switch
73584	Shield—Tube shield
75546	Slide—Slide mechanism complete for radio chassis bottom
31251	Socket—Tube socket, octal, wafer
73117	Socket—Tube socket, 7 pin, miniature
74179	Socket—Tube socket, 7 pin, miniature for V1 & V2
31364	Socket—Dial lamp socket
75563	Spring—Retaining spring for function switch extension shaft
76332	Spring—Drive cord tension spring
74847	Support—Polystyrene support for FM oscillator coil complete with mounting bracket
75568	Switch—Function switch (S1-1, S1-2, S3)
75557	Transformer—Output transformer (T7)
73743	Transformer—Ratio detector transformer (T5)
75558	Transformer—First i-f transformer—AM—complete with adjustable screw (T2)
73037	Transformer—Second i-f transformer—AM—complete with adjustable screw (T4)
75559	Transformer—First i-f transformer—FM—complete with adjustable cores (T1)
75560	Transformer—Second i-f transformer—FM—complete with adjustable cores (T3)
75566	Transformer—Power transformer, 117 volt, 60 cycle (T6)
33726	Washer—"C" washer for tuning knob shaft

STOCK No.	DESCRIPTION
	RADIO ROLLOUT CARRIAGE
	RK158
75573	Decal—Function decal for radio controls
75572	Dial—Polystyrene dial scale
76161	Frame—Moulded frame—maroon—for mounting radio chassis and 45 RPM changer for mahogany or walnut instruments
75551	Handle—Metal pullout handle for mounting frame
75555	Screw—#8-32 x ⅝" cross recessed pan head machine screw to mount radio chassis (4 req'd)
	SPEAKER ASSEMBLIES
	92569-12W
	RMA 274
	RL 111-A1
13867	Cap—Dust cap
75682	Cone—Cone complete with voice coil (3.2 ohms)
75681	Speaker—12" P.M. speaker complete with cone and voice coil assembly (3.2 ohms)
	NOTE:—If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
75705	Antenna—Radio antenna loop complete less cable
75692	Back—Back cover—maroon—for radio—45 RPM phono compartment for mahogany or walnut instruments—assembled to rollout
75688	Back—Cabinet back cover—for radio—45 RPM phono compartment—assembled to cabinet
76199	Back—Back cover complete with terminal board and power cord for television chassis
75707	Board—Radio ("A-FM") antenna terminal board
76184	Board—Television antenna terminal board (2 contact)
75524	Bracket—Suspension bracket for deflection yoke and focus magnet support assembly
75694	Bracket—Radio—45 RPM phono rollout mechanism stop bracket less rubber bumper
71599	Bracket—Pilot lamp bracket
75696	Bumper—Rubber bumper for rollout mechanism stop bracket
72447	Cable—Shielded audio cable complete with two (2) pin plugs
74545	Cable—Shielded pickup cable complete with pin plug for 33⅓-78 RPM changer
72437	Cable—Shielded pickup cable complete with pin plug for 45 RPM changer
13103	Cap—Pilot lamp cap
71892	Catch—Bullet catch and strike for door
X3188	Cloth—Grille cloth
75709	Connector—8 contact female connector less shell for main cable
75710	Connector—5 contact female connector less shell for main cable
30868	Connector—2 contact female connector for main cable
75474	Connector—Single contact male connector for speaker or for television antenna cable (2 req'd)
74752	Connector—2 contact male connector for FM antenna cable
39153	Connector—4 contact male connector for television antenna cable
75703	Connector—5 contact male connector less shell for television power cord (P103)
30870	Connector—2 contact male connector for AC power cable for 45 RPM changer
74882	Connector—2 contact (polarized) male connector for radio antenna loop cable
70392	Cord—Power cord and plug
75702	Cord—Television power cord complete with two (2) contact female connector less five (5) contact male connector

STOCK No.	DESCRIPTION
75608	Cushion—Dust seal cushion
74273	Decal—Trade mark decal (Victrola)
75640	Decal—Television controls function decal
71984	Decal—Trade mark decal (RCA Victor)
74809	Emblem—"RCA Victor" emblem
75455	Escutcheon—Channel marker escutcheon dark—for mahogany or walnut instruments
37396	Grommet—Rubber grommet to mount speaker (4 req'd)
75697	Grommet—Rubber grommet for 45 RPM changer mounting (3 req'd)
74838	Grommet—Power cord strain relief (1 set)
75619	Glass—Safety glass
74308	Hinge—Cabinet door hinge (1 set) for radio-phono compartment, television compartment (L.H. door) or record storage compartments
36817	Hinge—Cabinet door hinge (1 set) for television compartment (R.H. door)
75636	Hinge—Cabinet door hinge (1 set) for speaker compartment—R.H.
75637	Hinge—Cabinet door hinge (1 set) for speaker compartment—L.H.
74959	Knob—Television fine tuning control knob—maroon—for mahogany or walnut instruments (outer)
73996	Knob—Television channel selector knob—maroon—for mahogany or walnut instruments (inner)
74962	Knob—Television brightness control or vertical hold control knob—maroon—for mahogany or walnut instruments (outer)
74969	Knob—Television channel marker escutcheon light switch knob—maroon—for mahogany or walnut instruments
74963	Knob—Television picture control or horizontal hold control knob—maroon—for mahogany or walnut instruments (inner)
75712	Knob—Radio tone control, tuning control or volume control and power switch knob—maroon—for mahogany or walnut instruments
75714	Knob—Function switch knob—maroon—for mahogany or walnut instruments
11765	Lamp—Pilot or channel indicator lamp—Mazda 51
75459	Mask—Channel indicator light mask—burgundy—for mahogany of walnut instruments
75620	Mask—Kinescope masking panel
73634	Nut—Speed nut for speaker mounting screws
75638	Pull—Door pull for upper doors
75639	Pull—Door pull for lower doors
71456	Screw—#8-32 x ⅜" wing screw for deflection yoke and focus magnet mounting support
75377	Screw—# ¼-28 x 1⅜" round head machine screw for mounting 33⅓-78 RPM changer
75623	Screw—#8-32 x ⅝" trimit head screw for door pull 75638
74279	Screw—#8-32 x ⅞" trimit head screw for door pull 75639
75708	Shell—Shell for 8 contact female connector 75709
75711	Shell—Shell for 5 contact female connector 75710
75704	Shell—Shell for 5 contact male connector 75703
74736	Slide—Slide mechanism complete for 33⅓-78 RPM changer drawer
31364	Socket—Pilot lamp socket
75587	Spring—Formed spring for mounting kinescope masking panel (8 req'd)
72845	Spring—Retaining spring for knob 74959
14270	Spring—Retaining spring for knobs 73996, 74962 and 74969
30330	Spring—Retaining spring for knob 74963
74734	Spring—Retaining spring for knobs 75712 and 75714
73643	Spring—Spring clip for channel marker escutcheon
75691	Spring—Suspension spring (coil type) for main cable
72936	Stop—Cabinet door stop
75457	Washer—Felt washer—dark brown—between knob and channel marker escutcheon for mahogany or walnut instruments
75500	Washer—Felt washer for television chassis back cover
75146	Washer—"C" washer for mounting 33⅓-78 RPM phono

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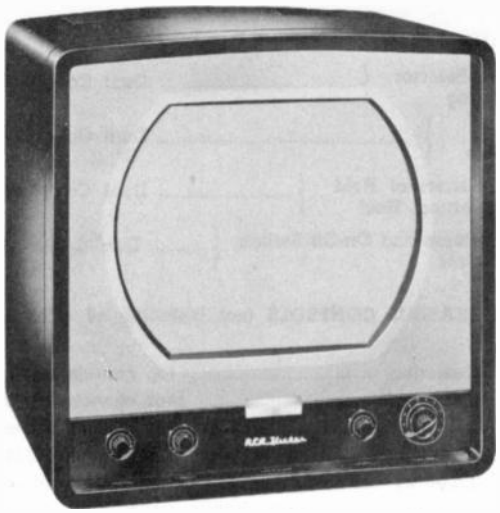


Model 16T152
"Talbot"
Mahogany Finish
Metal Cabinet

RCA VICTOR

TELEVISION RECEIVER MODEL 16T152

Chassis No. KCS47E

—Mfr. No. 274—

SERVICE DATA

—1951 No. T9—

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Model 16T152 is a "16 inch" television receiver.

Features of the television unit are: full twelve channel coverage; Intercarrier FM sound system; improved picture brilliance; picture A-G-C; A-F-C horizontal hold; stabilized vertical hold; two stages of video amplification; noise saturation circuits; improved sync separator and clipper; four mc. band width for picture channel and reduced hazard high voltage supply.

An auxiliary audio input jack is provided to permit the use of an external record playing attachment.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE.....146 square inches on a 16GP4 Kinescope

TELEVISION R-F FREQUENCY RANGE
All 12 television channels, 54 mc. to 88 mc., 174 mc. to 216 mc.
Fine Tuning Range..±250 kc. on chan. 2, ± 650 kc. on chan. 13
Picture Carrier Frequency .....25.50 mc.
Sound Carrier Frequency .....21.00 mc. and 4.5 mc.

VIDEO RESPONSE .....To 4 mc.

SWEEP DEFLECTION .....Magnetic

FOCUS .....Magnetic

POWER SUPPLY RATING .....115 volts, 60 cycles, 205 watts

AUDIO POWER OUTPUT RATING .....3.5 watts max.

CHASSIS DESIGNATION KCS47E

LOUDSPEAKER .....(92580-4) 8" PM Dynamic, 3.2 ohms

DIMENSIONS (inches)	Width	Height	Depth
Cabinet (outside)	21½	21	20

WEIGHT Model	Chassis with Tubes in Cabinet	Shipping Weight
16T152	92 lbs.	117 lbs.

RECEIVER ANTENNA INPUT IMPEDANCE
Choice: 300 ohms balanced or 72 ohms unbalanced.

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6CB6	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator and Mixer
(3)	RCA 6AU6	1st Sound I-F Amplifier
(4)	RCA 6AU6	2nd Sound I-F Amplifier
(5)	RCA 6AL5	Ratio Detector
(6)	RCA 6AV6	1st Audio Amplifier
(7)	RCA 6K6GT	Audio Output
(8)	RCA 6AU6	1st Picture I-F Amplifier
(9)	RCA 6CB6	2nd Picture I-F Amplifier
(10)	RCA 6AU6	3rd Picture I-F Amplifier
(11)	RCA 6CB6	4th Picture I-F Amplifier
(12)	RCA 6AL5	Picture 2nd Detector and AGC Detector
(13)	RCA 12AU7	1st and 2nd Video Amplifier
(14)	RCA 12AU7	DC Restorer and Sync Separator
(15)	RCA 6SN7GT	Sync Separator and Vertical Sweep Oscillator
(16)	RCA 6K6GT	Vertical Sweep Output
(17)	RCA 6SN7GT	Horizontal Sweep Oscillator and Control
(18)	RCA 6BG6G	Horizontal Sweep Output
(19)	RCA 6W4GT	Damper
(20)	RCA 1B3-GT/8016	High Voltage Rectifier
(21)	RCA 16GP4	Kinescope
(22)	RCA 5U4G	Rectifier

(Continued)

PICTURE INTERMEDIATE FREQUENCIES

Picture Carrier Frequency	25.50 Mc.
Adjacent Channel Sound Trap	27.00 Mc.
Accompanying Sound Traps	21.00 Mc.
Adjacent Channel Picture Carrier Trap	19.50 Mc.

SOUND INTERMEDIATE FREQUENCIES

Sound Carrier Frequency	4.5 Mc.
Sound Discriminator Band Width between peaks	400 kc
VIDEO RESPONSE	To 4 Mc.
FOCUS	Magnetic
SWEEP DEFLECTION	Magnetic
SCANNING	Interlaced, 525 line
HORIZONTAL SWEEP FREQUENCY	15,750 cps
VERTICAL SWEEP FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

OPERATING CONTROLS (front Panel)

Channel Selector Fine Tuning	Dual Control Knobs
Picture Brightness	Dual Control Knobs
Picture Horizontal Hold Picture Vertical Hold	Dual Control Knobs
Sound Volume and On-Off Switch Tone Control	Dual Control Knobs

NON-OPERATING CONTROLS (not including r-f & i-f adjustments)

Picture Centering	top chassis adjustment
Width	rear chassis adjustment
Height	rear chassis adjustment
Horizontal Linearity	rear chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis screwdriver adjustment
Horizontal Osc. Freq.	top chassis adjustment
Horizontal Osc. Waveform	bottom chassis adjustment
Horizontal Locking Range	rear chassis adjustment
Focus	top chassis adjustment
Ion Trap Magnet	top chassis adjustment
Deflection Coil	top chassis wing nut adjustment
AGC Control Switch	rear chassis adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT REMOVE THE RECEIVER CHASSIS, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES, AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For this reason, the kinescope must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. During service if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA replacement kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver.

The following adjustments are necessary when turning the receiver on for the first time:

1. See that the TV-PH switch on the rear apron is in the "TV" position.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best picture and the SOUND VOLUME control for suitable volume.

5. Turn the BRIGHTNESS control fully counter-clockwise, then clockwise until a light pattern appears on the screen.

6. Adjust the VERTICAL hold control until the pattern stops vertical movement.

7. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

8. Adjust the PICTURE and BRIGHTNESS controls for suitable picture contrast and brightness.

9. In switching from one channel to another, it may be necessary to repeat steps 4 and 8.

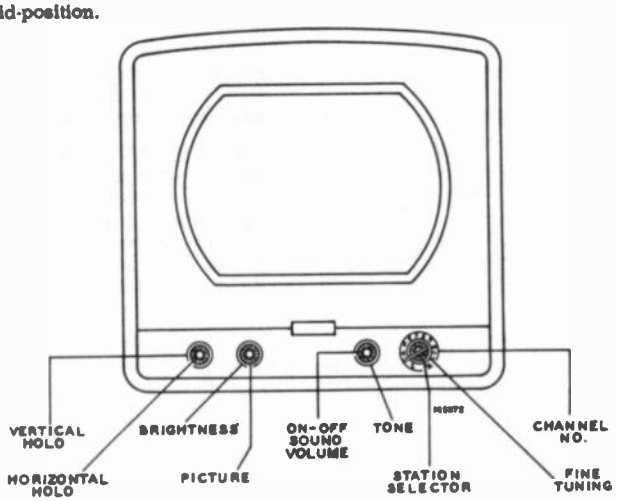


Figure 1—Receiver Operating Control

10. When the set is turned on again after an idle period it should not be necessary to repeat the adjustments if the positions of the controls have not been changed.

11. If the positions of the controls have been changed, it may be necessary to repeat steps 2 through 8.

12. To use a record player, plug the record player output cable into the PHONO jack on the rear apron, and set the TV-PH switch to "PH."

REFER TO PAGES 113 TO 123 FOR TELEVISION ALIGNMENT PROCEDURE AND WAVE FORM PHOTOGRAPHS

INSTALLATION INSTRUCTIONS

Make sure that all tubes are in place and are firmly seated in their sockets.

Check to see that the kinescope high voltage lead clip is in place.

Connect the antenna transmission line to the receiver antenna terminals. Plug a power cord into the 115 volt a-c power source and into the receiver interlock receptacle. Turn the receiver power switch to the "on" position, the brightness control fully clockwise, and the picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT.—Set the ion trap magnet approximately in the position shown in Figure 2. Starting from this position immediately adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Turn the focus control (shown in Figure 2) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches of this adjustment should be made with the brightness control at the maximum clockwise position with which good line focus can be maintained.

DEFLECTION YOKE ADJUSTMENT.—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS.—It will now be necessary to obtain a test pattern picture in order to make further adjustments.

If the Horizontal Oscillator and AGC System are operating properly, it should be possible to sync the picture at this point. However, if the AGC control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading, turn S106 on the rear apron (see Figure 3) counter-clockwise until the set operates normally and the picture can be synchronized.

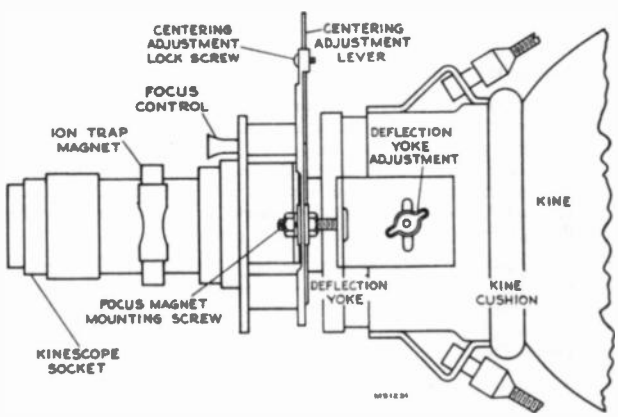


Figure 2—Yoke and Focus Magnet Adjustments

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT.—Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 2 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull-in should occur when the control is approximately 90 degrees from the extreme counter-clockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

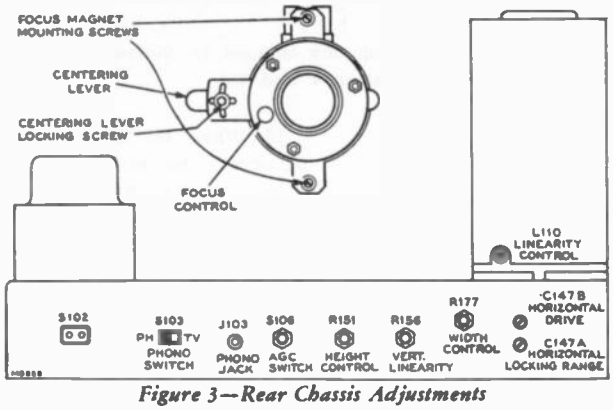


Figure 3—Rear Chassis Adjustments

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Focus Magnet Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR.—If in the above check the receiver failed to hold sync with the hold control at the extreme counter-clockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull-in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment.—Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T108 horizontal frequency adjustment on top of the chassis until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Locking Range Adjustment.—Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. The picture may remain in sync. If so turn the T108 top core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C147A slightly clockwise. If less than 2 bars are present, adjust C147A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure. For field purposes paragraph "A" under Horizontal Oscillator Waveform Adjustment may be omitted.

FOCUS MAGNET ADJUSTMENT.—The focus magnet should be adjusted so that there is approximately three-eighths inch of space between the rear cardboard shell of the yoke and the flat of the front face of the focus magnet. This spacing gives best average focus over the face of the tube.

The axis of the hole through the magnet should be parallel with the axis of the kinescope neck with the kinescope neck through the center of the opening.

CENTERING ADJUSTMENT.—No electrical centering controls are provided. Centering is accomplished by means of a separate plate on the focus magnet. Some centering plates include a locking screw which must be loosened before centering, and others are held in adjustment by friction. Up and down adjustment of the plate moves the picture side to side and sidewise adjustment moves the picture up and down.

If a corner of the raster is shadowed, check the position of the ion trap magnet. Reposition the magnet within the range of maximum raster brightness to eliminate the shadow and recenter the picture by adjustment of the focus magnet plate. In no case should the magnet be adjusted to cause any loss of brightness since such operation may cause immediate or eventual damage to the tube. In some cases it may be necessary to shift the position of the focus magnet in order to eliminate a corner shadow.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS.—Adjustment of the horizontal drive control affects the high voltage applied to the kinescope. In order to obtain the highest possible voltage hence the brightest and best focused picture, adjust horizontal drive counter-clockwise as far as possible without stretching the left side of the picture. As a first adjustment, set the horizontal drive trimmer C147B one-half turn out from maximum capacity.

Turn the horizontal linearity coil out until appreciable loss in width occurs, then in until nearly maximum width and the best linearity is obtained.

Adjust the width control R177 to obtain correct picture width.

A slight readjustment of these three controls may be necessary to obtain the best linearity.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.—Adjust the height control (R151 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R156 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

FOCUS.—Adjust the focus magnet for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

Recheck the position of the ion trap magnet to make sure that maximum brightness is obtained.

Check to see that the yoke thumbscrew and the focus magnet mounting screws are tight.

CHECK OF R-F OSCILLATOR ADJUSTMENTS.—Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 10. The adjustments for channels 2 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 4. Adjustment of channel 13 is on top of the chassis.

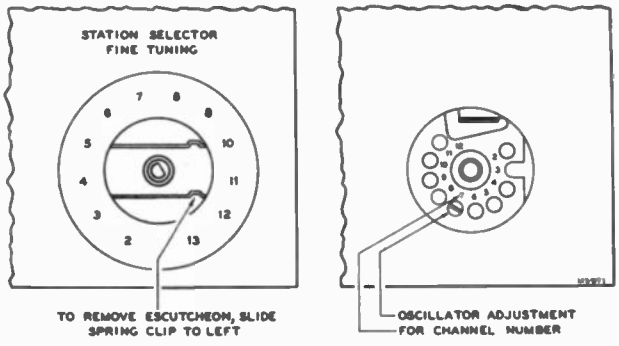


Figure 4—R-F Oscillator Adjustments

AGC CONTROL.—The AGC control switch is provided as an installation adjustment. The normal position for strong signal areas is with the switch in the number 1 or counter-clockwise position. If impulse type of interference is experienced, turn the switch to the number 2 or center position. In

very weak signal areas in which impulse type interference is experienced, turn the switch to position number 3 or fully clockwise. In this position, all AGC is removed and the receiver will overload if the input signal exceeds 200 microvolts. However, for signals under 200 microvolts, this position of the AGC control switch gives best noise immunity of sync.

FM TRAP ADJUSTMENT.—In some instances interference may be encountered from a strong FM station signal. A trap is provided to eliminate this type of interference. To adjust the trap tune in the station on which the interference is observed and adjust the L203 core on top of the r-f unit for minimum interference in the picture.

Caution: In some receivers, the FM trap L203 will tune down into channel 6 or even into channel 5. Needless to say such an adjustment will cause greatly reduced sensitivity on these channels. If channels 5 or 6 are to be received, check L203 to make sure that it does not affect these two channels.

Replace the cabinet back and reconnect the receiver antenna leads to the cabinet back. Tighten the back retaining screws securely otherwise the back may rattle when the receiver is operated at high volume.

INDOOR ANTENNA.—A cabinet antenna is not provided in these receivers since it would not operate properly inside the metal cabinet. However a separate indoor antenna may be employed in place of the outdoor antenna in areas where the signals are strong and no reflections are experienced.

RECEIVER SUPPORT CAUTION.—The complete receiver weighs approximately 92 pounds. This represents a considerably greater load than can usually be placed on the average small table. Only a very sturdy table should be used to support the receiver.

Due to the weight of the receiver, the cabinet should not be dragged or slid across the supporting table as damage to the table finish may result.

RECEIVER LOCATION.—The owner should be advised of the importance of placing the receiver in the proper location in the room.

The location should be chosen—

—Away from bright windows and so that no bright light will fall directly on the screen. (Some illumination in the room is desirable, however.)

—To give easy access for operation and comfortable viewing.

—To permit convenient connection to the antenna.

—Convenient to an electrical outlet.

—To allow adequate ventilation.

VENTILATION CAUTION.—The receiver is provided with adequate ventilation holes in the bottom and back of the cabinet. Care should be taken not to allow these holes to be covered or ventilation to be impeded in any way.

If the receiver is to be operated with the back of the cabinet near a wall, at least a two-inch clearance should be maintained between cabinet and wall.

CHASSIS REMOVAL.—To remove the chassis from the cabinet for repair or installation of a new kinescope, remove the control knobs, the cabinet back, unplug the speaker cable, the kinescope socket, the antenna cable, the yoke and high voltage cable. Take out the chassis bolts under the cabinet. Withdraw the chassis from the back of the cabinet.

KINESCOPE HANDLING PRECAUTION.—Do not install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling.

To remove the kinescope from the cabinet, loosen the two nuts and disengage the rods alongside the kinescope. Remove the wing screw which holds the yoke frame to the cabinet. Remove the kinescope, the yoke frame with yoke and focus magnet as an assembly.

INSTALLATION OF KINESCOPE.—Handle this tube by the metal rim at the edge of the screen. Do not cover the glass bell of the tube with fingermarks as it will produce leakage paths which may interfere with reception. If this portion of the tube has inadvertently been handled, wipe it clean with a soft cloth moistened with "dry" carbon tetrachloride.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and fingermarks with a soft cloth moistened with "Windex" or similar cleaning agent.

Turn the tube so that the key on the base of the tube will be down and insert the neck of the kinescope through the deflection coil and focus magnet. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

Replace the kinescope and yoke frame assembly in the cabinet. Insert the wing screw, connect the side rods and tighten.

Slide the deflection yoke as far forward as possible. If this is not done, difficulty will be encountered in adjusting the ion trap and focus magnets because of shadows on the corner of the raster.

Slide the chassis into the cabinet, then insert and tighten the chassis bolts.

Slip the ion trap magnet over the neck of the kinescope.

Connect the kinescope socket to the tube base and connect the high voltage lead clip from the rim of kinescope into the high voltage bushing on the high voltage compartment.

Reconnect all other cables. Perform the entire set-up procedure beginning with Ion Trap Magnet Adjustment.

REFLECTIONS.—Multiple images sometimes known as echoes or ghosts, are caused by the signal arriving at the antenna by two or more routes. The second or subsequent image occurs when a signal arrives at the antenna after being reflected off a building, a hill or other object. In severe cases of reflections, even the sound may be distorted. In less severe cases, reflections may occur that are not noticeable as reflections but that will instead cause a loss of definition in the picture.

Under certain extremely unusual conditions, it may be possible to rotate or position the antenna so that it receives the cleanest picture over a reflected path. If such is the case, the antenna should be so positioned. However, such a position may give variable results as the nature of reflecting surfaces may vary with weather conditions. Wet surfaces have been known to have different reflecting characteristics than dry surfaces.

Depending upon the circumstances, it may be possible to eliminate the reflections by rotating the antenna or by moving it to a new location. In extreme cases, it may be impossible to eliminate the reflection.

INTERFERENCE.—Auto ignition, street cars, electrical machinery and diathermy apparatus may cause interference which spoils the picture. Whenever possible, the antenna location should be removed as far as possible from highways, hospitals, doctors' offices and similar sources of interference. In mounting the antenna, care must be taken to keep the antenna rods at least ¼ wave length (at least 6 feet) away from other antennas, metal roofs, gutters or other metal objects.

Short-wave radio transmitting and receiving equipment may cause interference in the picture in the form of moving ripples. In some instances it may be possible to eliminate the interference by the use of a trap in the antenna transmission line. However, if the interfering signal is on the same frequency as the television station, a trap will provide no improvement.

WEAK PICTURE.—When the installation is near the limit of the area served by the transmitting station, the picture may be speckled, having a "snow" effect, and may not hold steady on the screen. This condition is due to lack of signal strength from the transmitter.

SCREEN CLEANING.—In the event that it becomes necessary to clean the face of the kinescope, this may be accomplished without removal of the chassis. Pry off the small ornamental clip just below the glass and take out the screws which hold the glass retainer in place. Take out the safety glass. Replace it by a reversal of this procedure.

16T152 **CHASSIS TOP VIEW**

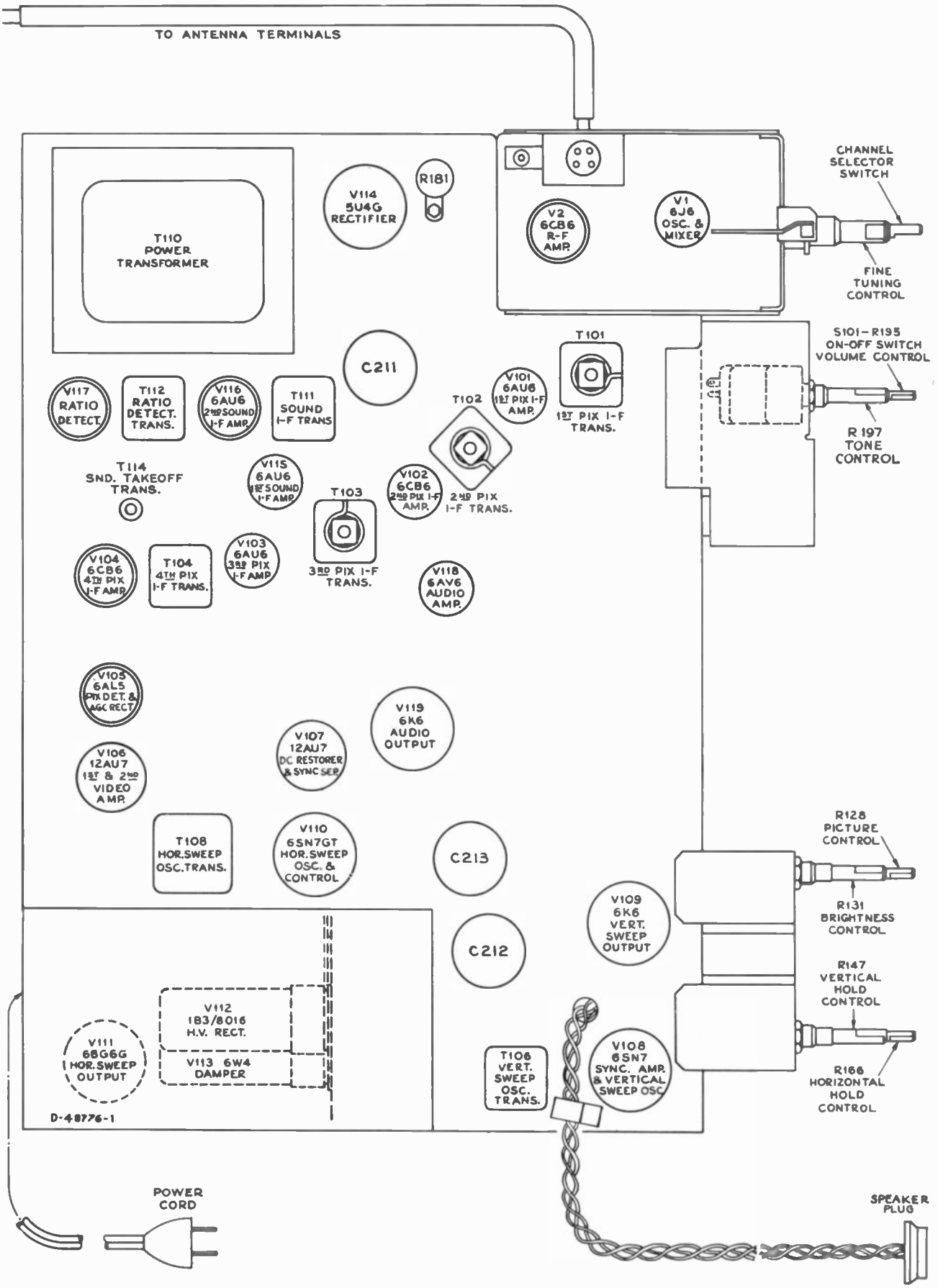


Figure 5—Chassis Top View

CHASSIS BOTTOM VIEW 16T152

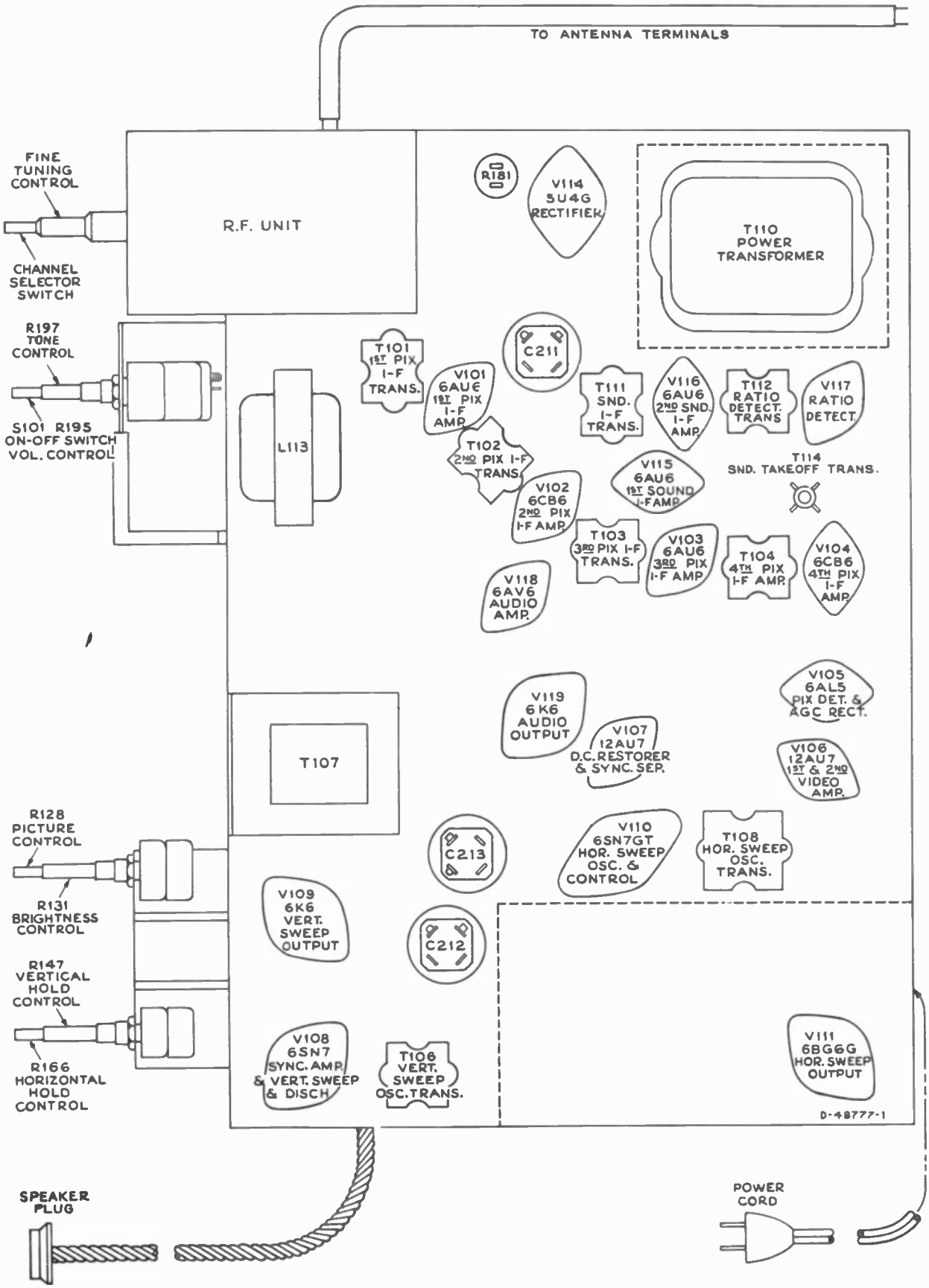


Figure 6—Chassis Bottom View

16T152 VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition, a 2500 microvolt test pattern signal was fed into the receiver, the picture synced and the AGC control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are read with a type WV79A senior "VoltOhmyst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c. The symbol < means less than.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	
V1	6J6	Mixer	2500 Mu. V. Signal	2	180	—	—	7	0	5	-2.3	
			No Signal	2	160	—	—	7	0	5	-2.1	
V1	6J6	R-F Oscillator	2500 Mu. V. Signal	1	100	—	—	7	0	6	*-3.0	*Depending upon channel
			No Signal	1	90	—	—	7	0	6	*-2.7	
V2	6CB6	R-F Amplifier	2500 Mu. V. Signal	5	220	6	160	2	< 0.1	1	-3.4	
			No Signal	5	150	6	100	2	0.4	1	-0.2	
V101	6AU6	1st Pix. I-F Amplifier	2500 Mu. V. Signal	5	195	6	222	7	0.3	1	-5.0	
			No Signal	5	90	6	115	7	0.6	1	-1.0	
V102	6CB6	2nd Pix. I-F Amplifier	2500 Mu. V. Signal	5	222	6	203	2	0.3	1	-5.0	
			No Signal	5	115	6	95	2	0.5	1	-1.0	
V103	6AU6	3d Pix. I-F Amplifier	2500 Mu. V. Signal	5	185	6	225	7	0.2	1	-5.0	
			No Signal	5	100	6	115	7	0.6	1	-1.0	
V104	6CB6	4th Pix. I-F Amplifier	2500 Mu. V. Signal	5	165	6	142	2	2.2	1	0	
			No Signal	5	130	6	110	2	1.7	1	0	
V105	6AL5	Picture 2d Det.	2500 Mu. V. Signal	7	*-3.5	—	—	1	0	—	—	*Depends on picture
			No Signal	7	*-0.8	—	—	1	0	—	—	*Depends on noise
V105	6AL5	AGC Rectifier	2500 Mu. V. Signal	2	*-9.0	—	—	5	6.0	—	—	*Depends on picture
			No Signal	2	*-1.3	—	—	5	5.8	—	—	*Depends on noise
V106	12AU7	1st Video Amplifier	2500 Mu. V. Signal	1	100	—	—	3	1.2	2	-2.3	At maximum contrast
			No Signal	1	50	—	—	3	0.6	2	-0.8	
			2500 Mu. V. Signal	1	190	—	—	3	9.0	2	-3.6	At minimum contrast
			No Signal	1	102	—	—	3	6.3	2	-0.8	
V106	12AU7	2d Video Amplifier	2500 Mu. V. Signal	6	310	—	—	8	125	7	115	At maximum contrast
			No Signal	6	275	—	—	8	120	7	105	
			2500 Mu. V. Signal	6	286	—	—	8	135	7	120	At minimum contrast
			No Signal	6	265	—	—	8	121	7	105	
V107	12AU7	DC Rest Sync Sep.	2500 Mu. V. Signal	1	9.8	—	—	3	52	2	-5.2	At maximum contrast
			No Signal	1	5.8	—	—	3	14.5	2	-1.0	
			2500 Mu. V. Signal	6	8.0	—	—	8	52	7	0	At maximum contrast
			No Signal	6	5.7	—	—	8	14.5	7	0	

VOLTAGE CHART

16T152

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	
V108A	6SN7GT	Sync Amplifier	2500 Mu. V. Signal	5	42	—	—	6	8.5	4	8.0	At maximum contrast
			No Signal	5	44	—	—	6	6.5	4	5.7	
V108B	6SN7GT	Vertical Oscillator	2500 Mu. V. Signal	2	*300	—	—	3	0	1	*–60	*Depends on Setting of height control
			No Signal	2	*300	—	—	3	0	1	*–58	
V109	6K6GT	Vertical Output	2500 Mu. V. Signal	3	370	4	370	8	51	5	0	
			No Signal	3	370	4	370	8	51	5	0	
V110	6SN7GT	Horizontal Osc.Control	2500 Mu. V. Signal	2	*160	—	—	3	*1.5	1	*–20	*Depends on Setting of hold control and osc adjustments
			No Signal	2	*160	—	—	3	*–11.0	1	–21	
V110	6SN7GT	Horizontal Oscillator	2500 Mu. V. Signal	5	230	—	—	6	0	4	–82	
			No Signal	5	225	—	—	6	0	4	–85	
V111	6BG6G	Horizontal Output	2500 Mu. V. Signal	Cap	*610	8	340	3	8.8	5	–33	*6000 volt pulse present
			No Signal	Cap	*610	8	330	3	8.8	5	–33	
V112	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	11,000	—	—	*14500 volt pulse present
			Brightness Maximum	Cap	*	—	—	2 & 7	12,200	—	—	
V113	6W4GT	Damper	2500 Mu. V. Signal	5	380	—	—	3	610	—	—	*3000 volt pulse present
			No Signal	5	375	—	—	3	610	—	—	
V114	5U4G	Rectifier	2500 Mu. V. Signal	4 & 6	*368	—	—	2 & 8	390	—	—	*AC measured with AC Voltmeter
			No Signal	4 & 6	*367	—	—	2 & 8	385	—	—	
V115	6AU6	1st Sound I-F Amp.	2500 Mu. V. Signal	5	120	6	120	7	0.5	1	–0.5	
			No Signal	5	110	6	110	7	0.6	1	–0.1	
V116	6AU6	2d Sound I-F Amp.	2500 Mu. V. Signal	5	115	6	80	7	0	1	–19	
			No Signal	5	110	6	75	7	0	1	–1.0	
V117	6AL5	Ratio Detector	2500 Mu. V. Signal	2	1.2	—	—	5	8.8	—	—	
			No Signal	2	0.4	—	—	5	7.8	—	—	
V118	6AV6	1st Audio Amplifier	2500 Mu. V. Signal	7	86	—	—	2	0	1	–0.8	
			No Signal	7	78	—	—	2	0	1	–0.8	
V119	6K6GT	Audio Output	2500 Mu. V. Signal	3	350	4	360	8	145	5	118	
			No Signal	3	350	4	360	8	135	5	110	
V120	16GP4	Kinescope	2500 Mu. V. Signal	Cone	11,000	10	380	11	100	2	46	
			No Signal	Cone	12,200	10	375	11	74	2	8.3	

16T152 **R-F UNIT WIRING DIAGRAM**

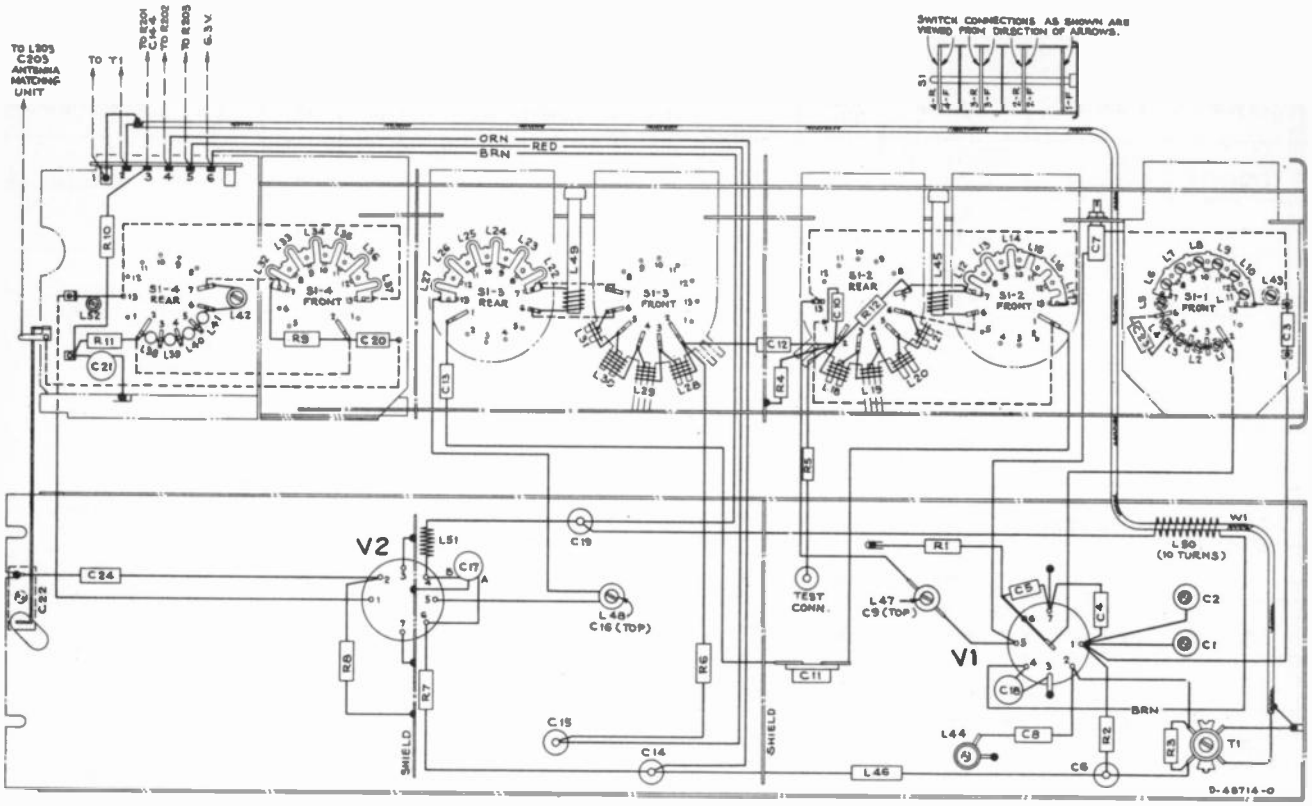
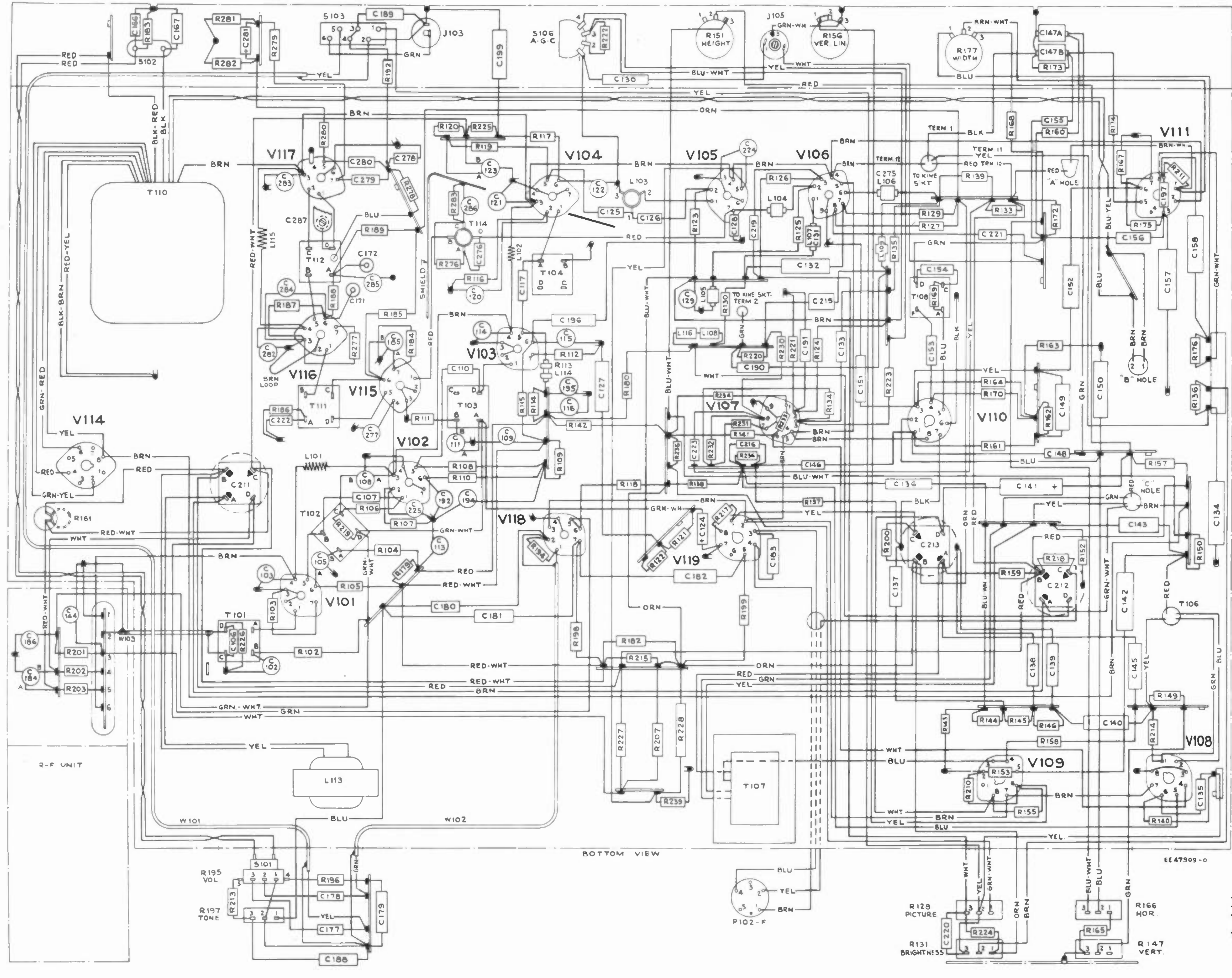


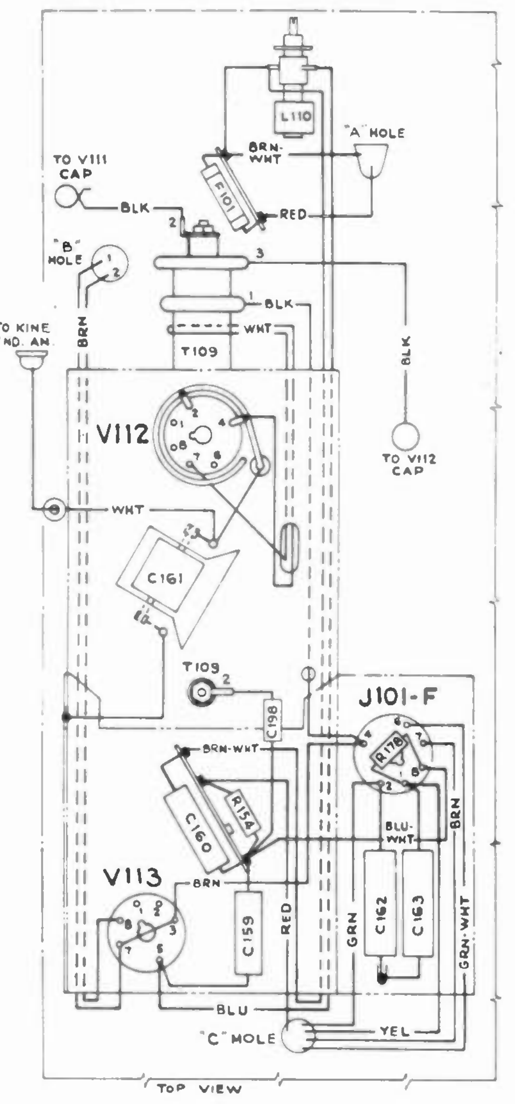
Figure 7—R-F Unit Wiring Diagram

CRITICAL LEAD DRESS:

1. All leads in the picture and sound i-f circuits must be dressed as short and direct as possible with the exception of C106, C107, C110 and C117 which are to be dressed with enough slack so as not to have to move the body of the capacitor to align that particular stage.
2. Dress all 1500 mmf .005 mfd and .01 mfd capacitors in the i-f section with leads as short as possible.
3. Dress all wires between T101 and the r-f unit in clamp.
4. Dress C185 to act as shield for lead between pin 5 of V115 socket to T111D and picture i-f circuits.
5. Dress the bodies of resistors R106, R108, R113, R119, R191, R192 and capacitor C176 as close to tube pin as possible.
6. Dress L114 with coded end as close to pin 2 of V105 socket as possible.
7. The length of the bus wire from pin 2 of V116 to ground should not be shortened or rerouted.
8. Dress R194 as close to chassis with leads as short as possible.
9. Dress C199 with leads as short as possible and away from S106.
10. Keep the leads on C126 as short and direct as possible.
11. Dress all components connected to V106 socket up and away from the chassis except L104.
12. Keep the body and coded end of L104 as close to pin 2 of V105 socket as possible.
13. Dress the 4.5 mc trap L107 up and away from the chassis base.
14. Dress C132 up in the air and towards V105 socket.
15. Dress R125 with body as close as possible to pin 2 of V106 socket.
16. Keep body of R123 as close as possible to pin 2 of V105 socket.
17. Dress C133 and C190 away from C132, C151 and C153.
18. Dress the white wire from picture control R128-3 away from the chassis.
19. Dress all slack on kine socket leads under chassis. Dress brown wire away from any components associated with V105 or V106.
20. The green lead from the kinescope socket should be dressed away from all other leads and components and away from V106.
21. Dress R133 towards chassis rear apron.
22. Dress all leads in clamps on rear apron away from V117, V104, V105, V106 sockets and S103.
23. Dress green wire from C147A up and away from chassis.
24. Dress blue wire of T107 toward front apron of chassis.
25. Dress C153 down next to the chassis base.
26. Dress blue/white wire from height control R151-3 under R180.
27. Dress R161, R162, R163, R164 and R170 up and away from the chassis and with a half inch clearance from the soldering point.
28. Dress the yellow wire from pin 3 of V110 socket over C153.
29. Dress both leads of C198 away from the body of the capacitor.
30. Dress fuse in high voltage compartment so as not to short circuit to ground.
31. Dress blue and blue/yellow wire from power transformer in 3 clamps on chassis base and away from S103 and video section.
32. Dress both wires on S106 away from blue/yellow damper leads of T110.
33. Dress the brown wire from pin 8 of V114 socket away from V118 socket.
34. Dress all 2 watt resistors away from each other and away from all wires and other components.

CHASSIS WIRING DIAGRAM

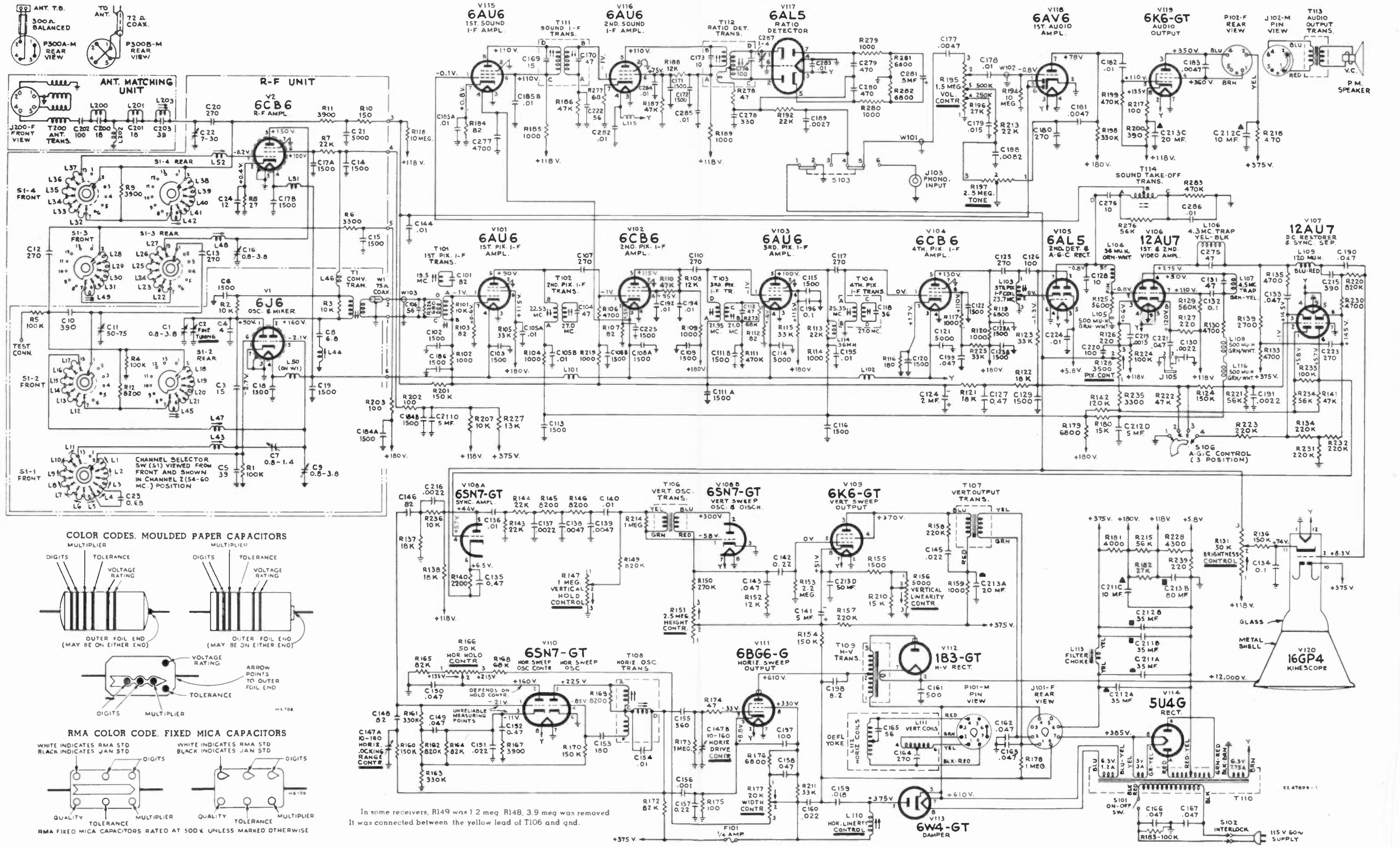




REFER TO PAGES 113 TO 123 FOR TELEVISION ALIGNMENT PROCEDURE AND WAVE FORM PHOTOGRAPHS

Figure 8— Chassis Wiring Diagram

CIRCUIT SCHEMATIC DIAGRAM



All resistance values in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Coil resistance values less than 1 ohm are not shown.

Direction of arrows at controls indicates clockwise rotation.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

Figure 9—Circuit Schematic Diagram

REPLACEMENT PARTS 16T152

STOCK No.	DESCRIPTION
	R-F Unit Assemblies KRK6B
75188	Board—Terminal board, 5 contact and ground
75067	Bracket—Vertical bracket for holding oscillator tube shield
75201	Cable—75 ohms, coax. cable (7¼") complete with coil (W), L50)
75186	Capacitor—Ceramic, variable, for fine tuning—plunger type (C2)
75289	Capacitor—Ceramic, 4 mmf., ± 0.5 mmf. (C4)
75189	Capacitor—Adjustable, 7-30 mmf. (C22)
75200	Capacitor—Ceramic, 12 mmf. (C24)
45465	Capacitor—Ceramic, 15 mmf. (C3)
75196	Capacitor—Ceramic, 39 mmf. (C5)
75174	Capacitor—Ceramic, trimmer, 50-75 mmf. (C11)
75199	Capacitor—Ceramic, 270 mmf. (C12, C13, C20)
75641	Capacitor—Ceramic, 390 mmf. (C10)
75166	Capacitor—Ceramic, 1500 mmf. (C6, C14, C15, C19)
75089	Capacitor—Ceramic, dual, 1500 mmf. (C17A, C17B)
73748	Capacitor—Ceramic, 1500 mmf. (C18)
73473	Capacitor—Ceramic, 5000 mmf. (C21)
75172	Capacitor—Tubular, steatite, adjustable 0.65—1.2 mmf. (C7)
71504	Capacitor—Ceramic, 0.68 mmf. (C23)
75184	Capacitor—Ceramic, adjustable, 0.75—4 mmf., complete with adjusting stud (C1)
75197	Capacitor—Ceramic, 6.8 mmf. (C8)
75167	Clip—Tubular clip for mounting stand-off capacitors—RCA 75166
73477	Coil—Choke coil (L51)
75202	Coil—Choke coil, .56 muh (L46)
75185	Coil—Converter plate loading coil (L44)
75182	Coil—Trimmer coil (1½turns) with adjustable inductance core and capacitor stud (screw adjustment) for converter section (C9, L47)
75183	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (screw adjustment) for r-f section (L48, C18)
75187	Core—Adjustable core for fine tuning capacitor C2
75162	Detent—Detent mechanism and fibre shaft
73453	Form—Coil form for L45 and L49
75165	Link—Link assembly for fine tuning
76135	Plate—Front plate and shaft bearing Resistor—Fixed, composition:—
503027	28 ohms, ± 10%, ½ watt (R8)
504115	150 ohms, ± 20%, ½ watt (R10)
503233	3300 ohms, ± 10%, ½ watt (R6)
503239	3900 ohms, ± 10%, ½ watt (R9, R11)
503282	8200 ohms, ± 10%, ½ watt (R12)
3078	10,000 ohms, ± 5%, ½ watt (R3)
504310	10,000 ohms, ± 20%, ½ watt (R2)
503322	22,000 ohms, ± 10%, ½ watt (R7)
504410	100,000 ohms, ± 20%, ½ watt (R1, R4, R5)
14343	Retainer—Fine tuning shaft retaining ring
75164	Rod—Actuating plunger rod (fibre) for fine tuning link
71476	Screw—#4-40 x ¼" binder head machine screw for adjusting L6, L7, L8, L9, L10, L11
75176	Screw—#4-40 x ⅜" fillister head screw for adjusting L5
75177	Screw—#4-40 x 5/16" fillister head screw for adjusting L1, L2, L3, L4, L43
74575	Screw—#4-40 x .359" adjusting screw for L42
73640	Screw—#4-40 x 7/16" adjusting screw for L52
75159	Shaft—Channel selector shaft and plate
75160	Shaft—Fine tuning shaft and cam
75168	Shield—Oscillator and converter sections shield for R-F unit—snap-on type
75193	Shield—Tube shield for V1
75192	Shield—Tube shield for V2
75088	Socket—Tube socket, 7 contact, miniature, ceramic, saddle mounted
75191	Spacer—Insulating spacer for front plate (4 req'd)
75163	Spring—Friction spring (formed) for fine tuning cam
30340	Spring—Hair pin spring for fine tuning link
74578	Spring—Retaining spring for adjusting screws
75068	Spring—Retaining spring for oscillator tube shield
73457	Spring—Return spring for fine tuning control
75180	Stator—Antenna stator complete with rotor, coils, capacitors (C20 and C21) and resistors (R9, R10, R11, S1-4, C20, C21, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L52, R9, R10, R11)
75178	Stator—Converter stator complete with rotor, coils, capacitors (C10 and C12) and resistors (R4, R5, S1-2, C10, C12, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L45, R4, R5, R12)
75175	Stator—Oscillator antenna stator complete with rotor, segment, coils, adjusting screws and capacitors C3 and C23 (S1-1, C3, C23, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L43)
75179	Stator—R-F amplifier stator complete with rotor, coils, capacitor (C13) and resistors (R6, S1-3, C13, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L49, R6)
75170	Strip—Coil segment mounting strip—LH lower
75171	Strip—Coil segment mounting strip—LH upper—less trimmer C7
75169	Strip—Coil segment mounting strip—RH center
75446	Stud—Capacitor stud—brass—# 4-40 x 13/18" with 3/64" screw driver slot for trimmer coils L47, L48, and capacitor C1 uncoded and coded "ER"
75447	Stud—Capacitor stud—brass—# 4-40 x 13/16" with 3/64" screw driver slot for trimmer coils L47, L48 and capacitor C1 coded numerically and "Hi Q"
75173	Stud—# 6-32 x 13/16" adjusting stud for C7 trimmer
75181	Transformer—I-F converter transformer (T1)

16T152 REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
75807	Washer—Insulating washer (hex)
75190	Washer—Insulating washer (neoprene) for capacitor C7
	CHASSIS ASSEMBLIES KCS47E
53511	Capacitor—Ceramic, 10 mmf. (C128)
75217	Capacitor—Mica, trimmer, dual 10-160 mmf. (C147A, C147B)
75450	Capacitor—Ceramic, 39 mmf. (C203)
71294	Capacitor—Ceramic, 56 mmf. (C106, C222)
73090	Capacitor—Mica, 82 mmf. (C146, C148)
75437	Capacitor—Ceramic, 100 mmf. (C202)
39396	Capacitor—Ceramic, 100 mmf. (C126, C197, C220)
73102	Capacitor—Mica, 180 mmf. (C153)
76303	Capacitor—Ceramic, 270 mmf. (C223)
39638	Capacitor—Mica, 270 mmf. (C180)
73091	Capacitor—Mica, 270 mmf. (C107, C110, C117, C125)
76473	Capacitor—Mica, 330 mmf. (C278)
73094	Capacitor—Mica, 390 mmf. (C215)
39644	Capacitor—Mica, 470 mmf. (C279, C280)
74947	Capacitor—Ceramic, 500 mmf., 20,000 volts (C161)
74250	Capacitor—Mica, 560 mmf. (C155)
75166	Capacitor—Ceramic, 1500 mmf. (stand-off) (C171, C172)
73748	Capacitor—Ceramic, 1500 mmf. (C102, C103, C109, C113, C115, C116, C120, C122, C129, C186, C225)
75089	Capacitor—Ceramic, dual 1500 mmf. (C108A, C108B, C111A, C111B, C123A, C123B, C184A, C184B)
73473	Capacitor—Ceramic, 4700 mmf. (C114, C121, C277)
73960	Capacitor—Ceramic, 10,000 mmf. (C144, C192, C194, C195, C224, C282, C283, C284, C285, C286)
75877	Capacitor—Ceramic, dual 10,000 mmf. (C105A, C105B, C185A, C185B)
76009	Capacitor—Ceramic, 8.2 mmf. (C198)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C124)
74521	Capacitor—Electrolytic, 5 mfd., 50 volts (C281)
28417	Capacitor—Electrolytic, 5 mfd., 450 volts (C141)
75811	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 450 volts, 1 section of 80 mfd., 200 volts, 1 section of 20 mfd., 200 volts, and 1 section of 50 mfd., 50 volts (C213A, C213B, C213C, C213D)
75510	Capacitor—Electrolytic, comprising 2 sections of 35 mfd., 450 volts, 1 section of 10 mfd., 450 volts and 1 section of 5 mfd., 450 volts (C211A, C211B, C211C, C211D, C212A, C212B, C212C, C212D)
75643	Capacitor—Tubular, moulded paper, oil impregnated, .001 mfd., 1000 volts (C158)
73595	Capacitor—Tubular, paper, oil impregnated, .0022 mfd., 600 volts (C137, C191, C216, C219)
73599	Capacitor—Tubular, paper, oil impregnated, .0027 mfd., 600 volts (C189)
73795	Capacitor—Tubular, paper, oil impregnated, .0033 mfd., 600 volts (C130)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd., 600 volts (C138, C139, C177, C181, C183)
73808	Capacitor—Tubular, paper, oil impregnated, .0062 mfd., 1000 volts (C188)
73561	Capacitor—Tubular, paper, oil impregnated, .01 mfd., 400 volts (C136, C178, C182)
73594	Capacitor—Tubular, moulded paper, oil impregnated, .01 mfd., 600 volts (C140, C154)
73797	Capacitor—Tubular, paper, oil impregnated, .015 mfd., 600 volts (C179)
74727	Capacitor—Tubular, paper, oil impregnated, .018 mfd., 1000 volts (C159)
73562	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 400 volts (C145, C151)
73910	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 1000 volts (C160)
73553	Capacitor—Tubular, moulded paper, oil impregnated, .047 mfd., 400 volts (C149, C199, C221)
75071	Capacitor—Tubular, moulded paper, .047 mfd., 400 volts (C166, C167)
73592	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 600 volts (C133, C150, C190)
73597	Capacitor—Tubular, moulded paper, oil impregnated, .047 mfd., 1000 volts (C143, C158, C162, C163)
73551	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd., 400 volts (C132, C196)
73557	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd., 600 volts (C174)
73794	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd., 400 volts (C157)
74957	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd., 600 volts (C142)
73787	Capacitor—Tubular, moulded paper, oil impregnated, 0.47 mfd., 400 volts (C127, C135, C152)
73154	Choke—Filter choke (L113)
76143	Clip—Tubular clip for mounting stand-off capacitor 75166
73591	Coil—Antenna matching coil (2 req'd) (Part of T200)
75241	Coil—Antenna shunt coil (L202)
73477	Coil—Choke coil (L101, L102, L115)
71449	Coil—Horizontal linearity coil (L110)
75210	Coil—Fifth pix i-f coil complete with adjustable core (L103)
75299	Coil—Peaking coil (36 muh) (L104)
76285	Coil—Peaking coil (36 muh) (L114, R213)
75253	Coil—Peaking coil (120 muh) (L109)
75252	Coil—Peaking coil (500 muh) (L105, L108, L116)
35787	Connector—Phono input connector (J103)
74594	Connector—2 contact male connector for power cord
5040	Connector—4 contact female connector for speaker cable (P102)

REPLACEMENT PARTS (Continued) 16T152

STOCK No.	DESCRIPTION
38853	Connector—4 contact female connector for antenna transformer (J200)
68592	Connector—8 contact female connector for deflection yoke leads (J101)
35383	Connector—8 contact male connector—part of deflection yoke (P101)
75517	Contact—Anode connector contact only
76448	Control—Height control (R151)
75215	Control—Horizontal and vertical hold control (R147, R166)
75216	Control—Picture and brightness control (R128, R131)
75513	Control—Tone control, volume control and power switch (R195, R197, S101)
76701	Control—Vertical linearity control (R156)
75516	Control—Width control (R177)
71498	Core—Adjustable core and stud for I.M. trap 75449
74956	Cushion—Rubber cushion for deflection yoke hood (2 req'd)
74839	Fastener—Push fastener for mounting ceramic tube socket
73600	Fuse—.25 amp., 250 volts (F101)
37396	Grommet—Rubber grommet for mounting ceramic tube socket
16058	Grommet—Rubber grommet for 2nd. anode lead exit
76169	Hood—Deflection yoke hood less rubber cushions
75644	Insulator—2nd. anode insulator assembly
75482	Jack—Video jack (J105)
76168	Magnet—Focus magnet
74953	Magnet—Ion trap magnet (P.M.)
75518	Plate—Hi-voltage plate—bakelite less transformer, capacitor and tube socket
76304	Resistor—Wire wound, 220 ohms, ½ watt (R239)
75512	Resistor—Wire wound, 4000 ohms, 10 watts (R181)
76066	Resistor—Wire wound, 4300 ohms, 5 watts (R228)
76065	Resistor—Wire wound, 13,000 ohms, 5 watts (R227)
	Resistor—Fixed, composition:—
503047	47 ohms, ± 10%, ½ watt (R278)
504047	47 ohms, ± 20%, ½ watt (R174)
34763	68 ohms, ± 5%, ½ watt (R277)
503082	82 ohms, ± 10%, ½ watt (R103, R107, R112, R184)
503110	100 ohms, ± 10%, ½ watt (R217)
504110	100 ohms, ± 20%, ½ watt (R202, R203)
523110	100 ohms, ± 10%, 2 watts (R175)
503118	180 ohms, ± 10%, ½ watt (R116)
503122	220 ohms, ± 10%, ½ watt (R126, R127)
513139	390 ohms, ± 10%, 1 watt (R200)
513147	470 ohms, ± 10%, 1 watt (R218)
503168	680 ohms, ± 10%, ½ watt (R226)
502210	1000 ohms, ± 5%, ½ watt (R280)
504210	1000 ohms, ± 20%, ½ watt (R102, R104, R109, R114, R117, R120, R159, R185, R189, R219)
502212	1200 ohms, ± 5%, ½ watt (R279)
513215	1500 ohms, ± 10%, 1 watt (R155)
504222	2200 ohms, ± 20%, ½ watt (R140)
503227	2700 ohms, ± 10%, ½ watt (R139)
503333	3300 ohms, ± 10%, ½ watt (R235)
507239	3900 ohms, ± 10%, ½ watt (R167)
502247	4700 ohms, ± 5%, ½ watt (R106, R130)
503247	4700 ohms, ± 10%, ½ watt (R135, R230)
513247	4700 ohms, ± 10%, 1 watt (R133)
502256	5600 ohms, ± 5%, ½ watt (R125)
14659	6800 ohms, ± 5%, ½ watt (R281, R282)
512268	6800 ohms, ± 5%, 1 watt (R119)
513268	6800 ohms, ± 10%, 1 watt (R176)
523268	6800 ohms, ± 10%, 2 watts (R179)
502282	8200 ohms, ± 5%, ½ watt (R169)
503282	8200 ohms, ± 10%, ½ watt (R145, R146)
503310	10,000 ohms, ± 10%, ½ watt (R236)
523310	10,000 ohms, ± 10%, 2 watts (R207)
30436	12,000 ohms, ± 5%, ½ watt (R152)
503312	12,000 ohms, ± 10%, ½ watt (R188)
512312	12,000 ohms, ± 5%, 1 watt (R108)
503315	15,000 ohms, ± 10%, ½ watt (R210)
513315	15,000 ohms, ± 10%, 1 watt (R180)
503318	18,000 ohms, ± 10%, ½ watt (R121, R122, R137)
513318	18,000 ohms, ± 10%, 1 watt (R138)
503322	22,000 ohms, ± 10%, ½ watt (R143, R144, R213)
504322	22,000 ohms, ± 20%, ½ watt (R192)
503327	27,000 ohms, ± 10%, ½ watt (R196)
523327	27,000 ohms, ± 10%, 2 watts (R182)
503333	33,000 ohms, ± 10%, ½ watt (R105, R115, R211, R225)
504333	33,000 ohms, ± 20%, ½ watt (R123)
503347	47,000 ohms, ± 10%, ½ watt (R141, R186, R187, R232)
504347	47,000 ohms, ± 20%, ½ watt (R110)
503356	56,000 ohms, ± 10%, ½ watt (R221, R234)
513356	56,000 ohms, ± 10%, 1 watt (R215)
502368	68,000 ohms, ± 5%, ½ watt (R275)
513368	68,000 ohms, ± 10%, 1 watt (R168)
512382	82,000 ohms, ± 5%, 1 watt (R172)
513382	82,000 ohms, ± 10%, 1 watt (R164, R165)
503410	100,000 ohms, ± 10%, ½ watt (R224, R233)
524410	100,000 ohms, ± 20%, 2 watts (R183)
503412	120,000 ohms, ± 10%, ½ watt (R142)
503415	150,000 ohms, ± 10%, ½ watt (R136, R154, R160, R201)
504415	150,000 ohms, ± 20%, ½ watt (R124)
512415	150,000 ohms, ± 5%, 1 watt (R170)
503422	220,000 ohms, ± 10%, ½ watt (R134, R157, R158, R223, R231, R232)
503427	270,000 ohms, ± 10%, ½ watt (R150)
503433	330,000 ohms, ± 10%, ½ watt (R161, R198)
512433	330,000 ohms, ± 5%, 1 watt (R163)
503447	470,000 ohms, ± 10%, ½ watt (R111, R283)
504447	470,000 ohms, ± 20%, ½ watt (R199)
503456	560,000 ohms, ± 10%, ½ watt (R129)
503482	820,000 ohms, ± 10%, ½ watt (R149, R162, R220)

16T152 REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
503510	1 megohm, ± 10%, ½ watt (R173)
504510	1 megohm, ± 20%, ½ watt (R178, R214)
503522	2.2 megohm, ± 10%, ½ watt (R153)
503610	10 megohm, ± 10%, ½ watt (R118)
504610	10 megohm, ± 20%, ½ watt (R194)
71456	Screw—#8-32 x 7/16" wing screw to mount deflection yoke
73584	Shield—Tube shield
74834	Socket—Kinescope socket
73249	Socket—Tube socket, octal, ceramic, plate mounted
31319	Socket—Tube socket, octal, moulded
31251	Socket—Tube socket, octal, wafer
68592	Socket—Tube socket, 6 contact, moulded
71508	Socket—Tube socket, 6 contact moulded for 1B3/8016
73117	Socket—Tube socket, 7 pin, miniature
75223	Socket—Tube socket, 9 pin, miniature
76836	Stud—Adjusting stud complete with guard for focus magnet
75506	Support—Bakelite support only—part of hi-voltage shield
76010	Switch—AGC switch (S106)
33491	Switch—Phono switch (S103)
76463	Terminal—Screw type grounding terminal
75509	Transformer—Antenna matching transformer complete with antenna connector, i-f and FM traps and antenna shunt coil (T200, C200, C201, C202, C203, L200, L201, L202, L203, J200)
75213	Transformer—Horizontal oscillator transformer (T108)
75519	Transformer—Hi-voltage transformer (T109)
75908	Transformer—Power transformer, 115 volt, 60 cycle (T110)
76702	Transformer—Ratio detector transformer complete with adjustable cores (T112, C173, C174)
76438	Transformer—Sound i-f transformer (T111, C169, C170)
76703	Transformer—Sound take-off transformer complete with adjustable core (T114, C276, R276)
74144	Transformer—Vertical oscillator transformer (T106)
74950	Transformer—Vertical output transformer (T107)
74589	Transformer—First pix, i-f transformer (T101, C101, R101)
74590	Transformer—Second pix, i-f transformer (T102, C104)
76284	Transformer—Third pix, i-f transformer (T103, C112)
73574	Transformer—Fourth pix, i-f transformer (T104, C118)
75242	Trap—I-F trap (L200, L201, C200, C201)
75449	Trap—F-M trap complete with adjustable core and stud (L203, C203)
76704	Trap—4.3 mc trap (L106, C275)
75251	Trap—4.5 mc trap (L107, C131)
74952	Yoke—Deflection yoke (L111, L112, C164, C165, P101)
	SPEAKER ASSEMBLIES 92S80-4W RLI0SC10 RMA 274
75023	Cap—Dust cap
75024	Cone—Cone and voice coil (3.2 ohms)
5039	Connector—4 contact male connector (J102)
75022	Speaker—8" P.M. speaker complete with cone and voice coil (3.2 ohms) less output transformer and plug
75520	Transformer—Output transformer (T113)
	NOTE:—If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
76705	Back—Cabinet back complete with terminal board and power cord
76184	Board—"Ant" terminal board—two contact—part of back
76590	Bracket—Hanger bracket for deflection yoke hood assembly
75474	Connector—Single contact male connector for antenna cable.
39153	Connector—4 contact male connector for antenna cable
71457	Cord—Power cord and plug
76631	Cushion—Kinescope masking panel dust seal (rubber)
75532	Decal—Control panel function decal
76708	Decal—Decorative decal for cabinet (3 bar type)
74809	Emblem—"RCA Victor" emblem
75456	Escutcheon—Channel marker escutcheon
74889	Feet—Felt feet for cabinet (4 req'd)
76595	Knob—Brightness control, vertical hold control or tone control knob—maroon (outer)
76770	Knob—Channel selector knob—maroon (inner)
76591	Knob—Fine tuning control knob—maroon (outer)
74963	Knob—Picture control, horizontal hold control or volume control and power switch knob—maroon (inner)
76706	Glass—Safety glass
75459	Mask—Channel marker escutcheon—light mask—burgundy
76707	Mask—Polystyrene masking panel
71455	Nut—#8-32 wing nut to fasten deflection yoke hood to hanger bracket
76177	Nut—#10-32 special nut for deflection yoke hood support rods (2 req'd)
75533	Retainer—Snap-on moulding and retainer for safety glass
76178	Rod—"L" shape threaded rod to support deflection yoke hood assembly
74966	Spring—Formed spring for kinescope masking panel (8 req'd)
72845	Spring—Retaining spring for knob 76591
14270	Spring—Retaining spring for knobs 76770 and 76595
30330	Spring—Retaining spring for knob 74963
73643	Spring—Spring clip for channel marker escutcheon
75500	Washer—Felt washer for cabinet back screws
75457	Washer—Felt washer—dark brown—between knob and channel marker escutcheon

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Model 17T153 "Bristol"
Mahogany Finish Metal

Model 17T154 "Whitfield"
Mahogany Grained Metal
Blonde Grained Metal

RCA VICTOR
TELEVISION RECEIVERS
MODELS 17T153, 17T154, 17T155, 17T160, 17T162, 17T172, 17T172K, 17T173, 17T173K, 17T174, 17T174K

Chassis Nos. KCS66 or KCS66A or KCS66D
—Mfr. No. 274—

SERVICE DATA

—1951 No. T7—

Model 17T155 "Preston"
Walnut, Mahogany, Limed Oak

Model 17T160 "Hampton"
Walnut, Mahogany, Limed Oak

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Model 17T162 "Caldwell"
Walnut, Mahogany, Limed Oak

Model 17T172 "Covington"
Walnut, Mahogany, Limed Oak

Model 17T173 "Calhoun"
Walnut, Mahogany

Model 17T174 "Kendall"
Walnut, Mahogany, Limed Oak

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE..146 sq. in. on a 17CP4 or 17GP4 Kinescope

TELEVISION R-F FREQUENCY RANGE
All 12 television channels, 54 mc. to 88 mc., 174 mc. to 216 mc.

Picture I-F Carrier Frequency.....45.75 mc.
Sound I-F Carrier Frequency.....41.25 mc. and 4.5 mc.

POWER SUPPLY RATING..115 volts, 60 cycles, 190 watts

AUDIO POWER OUTPUT RATING.....5.0 watts max.

CHASSIS DESIGNATIONS

KCS66.....In Models 17T153, 17T154, 17T155 & 17T160
KCS66A.....In Models 17T162, 17T172, 17T173 & 17T174
KCS66D.....In Models 17T172K, 17T173K & 17T174K

LOUDSPEAKERS

92569—14W, 12" PM Dynamic in Models 17T172, 17T172K, 17T173 & 17T173K

971494—1W, 12" PM Dynamic in Models 17T172 & 17T172K
971490—2W, 8" PM Dynamic in all other model receivers.

WEIGHT Model	Chassis with Tubes in cabinet	Shipping Weight
17T153	82 lbs.	94 lbs.
17T154	82 lbs.	94 lbs.
17T155	74 lbs.	94 lbs.
17T160	80 lbs.	103 lbs.
17T162	94 lbs.	116 lbs.
17T172	102 lbs.	129 lbs.
17T173	106 lbs.	130 lbs.
17T174	96 lbs.	121 lbs.

RECEIVER ANTENNA INPUT IMPEDANCE
Choice: 300 ohms balanced or 72 ohms unbalanced.

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6BQ7	R-F Amplifier
(2)	RCA 6X8	R-F Oscillator and Mixer
(3)	RCA 6AU6	1st Picture I-F Amplifier
(4)	RCA 6CB6	2nd Picture I-F Amplifier
(5)	RCA 6CB6	3rd Picture I-F Amplifier
(6)	RCA 6CB6	4th Picture I-F Amplifier
(7)	RCA 6AG7	Video Amplifier
(8)	RCA 6AU6	1st Sound I-F Amplifier
(9)	RCA 6AU6	2nd Sound I-F Amplifier
(10)	RCA 6AL5	Ratio Detector
(11)	RCA 6AV6	1st Audio Amplifier
(12)	RCA 6AQ5	Audio Output
(13)	RCA 6CB6	AGC Amplifier
(14)	RCA 6SN7GT	Sync Separator
(15)	RCA 6SN7GT	Vert Sync Amplifier and Vert Sweep Osc.
(16)	RCA 6AQ5	Vertical Sweep Output
(17)	RCA 6SN7GT	Horizontal Sync Amplifier
(18)	RCA 6SN7GT	Horizontal Sweep Oscillator and Control
(19)	RCA 6BQ6GT	Horizontal Sweep Output
(20)	RCA 6W4GT	Damper
(21)	RCA 1B3-GT/8016	High Voltage Rectifier
(22)	RCA 1V2 (in KCS66 & KCS66A)	Focus Rectifier
(23)	RCA 17GP4 (in KCS66 & KCS66A) or RCA 17CP4 (in KCS66D)	Kinescope Kinescope

ELECTRICAL AND MECHANICAL SPECIFICATIONS

(Continued)

PICTURE INTERMEDIATE FREQUENCIES

Picture Carrier Frequency	45.75 mc.
Adjacent Channel Sound Trap	47.25 mc.
Accompanying Sound Traps	41.25 mc.
Adjacent Channel Picture Carrier Trap	39.25 mc.

SOUND INTERMEDIATE FREQUENCIES

Sound Carrier Frequency	4.5 Mc.
Sound Discriminator Band Width between peaks	400 kc
VIDEO RESPONSE	To 4 Mc.
FOCUS	Magnetic
SWEEP DEFLECTION	Magnetic
SCANNING	Interlaced, 525 line
HORIZONTAL SWEEP FREQUENCY	15,750 cps
VERTICAL SWEEP FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

OPERATING CONTROLS (front Panel)

Channel Selector, Fine Tuning	Dual Control Knobs
Picture Brightness	Dual Control Knobs
Picture Horizontal Hold, Picture Vertical Hold	Dual Control Knobs
Sound Volume and On-Off Switch, Tone Control	Dual Control Knobs

NON-OPERATING CONTROLS (not including r-f & i-f adjustments)

Picture Centering	top chassis adjustment
Width	rear chassis adjustment
Height	rear chassis adjustment
Horizontal Linearity	rear chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis screwdriver adjustment
Horizontal Osc. Freq.	top chassis adjustment
Horizontal Osc. Waveform	bottom chassis adjustment
Horizontal Locking Range	rear chassis adjustment
Focus	top chassis adjustment
Ion Trap Magnet	top chassis adjustment
Deflection Coil	top chassis wing nut adjustment
AGC Control Switch	rear chassis adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT REMOVE THE RECEIVER CHASSIS, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES, AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For this reason, the kinescope must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. During service if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA replacement kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver.

OPERATING INSTRUCTIONS

The following adjustments are necessary when turning the receiver on for the first time:

1. See that the TV-PH switch is in the "TV" position.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best picture and the SOUND VOLUME control for suitable volume.

5. Turn the BRIGHTNESS control fully counter-clockwise, then clockwise until a light pattern appears on the screen.

6. Adjust the VERTICAL hold control until the pattern stops vertical movement.

7. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

8. Adjust the PICTURE and BRIGHTNESS controls for suitable picture contrast and brightness.

9. In switching from one channel to another, it may be necessary to repeat steps 4 and 8.

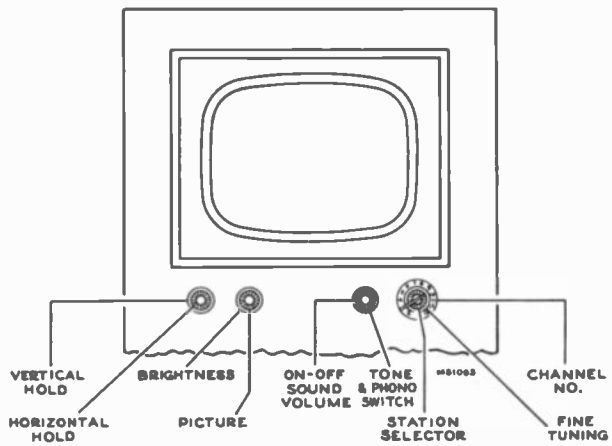


Figure 1—Receiver Operating Control

10. When the set is turned on again after an idle period it should not be necessary to repeat the adjustments if the positions of the controls have not been changed.

11. If the positions of the controls have been changed, it may be necessary to repeat steps 2 through 8.

12. To use a record player, plug the record player output cable into the PHONO jack on the rear apron, and set the TV-PH switch to "PH".

INSTALLATION INSTRUCTIONS

Early production of these RCA Victor 17-inch television receivers employed an electrostatic focus kinescope type 17GP4. Late production receivers employ a magnetic focus kinescope type 17CP4. To identify receivers, those employing magnetic focus kinescopes have a letter "K" following the mode number. The chassis in the "K" series of receivers is different from early production units only to the extent of the changes necessary to operate the other kinescope.

There are minor differences in the installation adjustments. Instructions for both series of chassis are given in the following procedure:

UNPACKING.—These receivers are shipped complete in cardboard cartons. The kinescope is shipped in place in the receiver.

Take the receiver out of the carton and remove all packing material.

Make sure that all tubes are in place and are firmly seated in their sockets.

Check to see that the kinescope high voltage lead clip is in place.

Connect the antenna transmission line to the receiver antenna terminals. Plug a power cord into the 115 volt a-c power source and into the receiver interlock receptacle. Turn the receiver power switch to the "on" position, the brightness control fully clockwise, and the picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT.—Set the ion trap magnet approximately in the position shown in Figure 2. Starting from this position immediately adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Turn the focus control until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches of this adjustment should be made with the brightness control at the maximum clockwise position with which good line focus can be maintained.

DEFLECTION YOKE ADJUSTMENT.—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS.—It will now be necessary to obtain a test pattern picture in order to make further adjustments. Connect the antenna transmission line to the receiver.

If the Horizontal Oscillator and AGC System are operating properly, it should be possible to sync the picture at this point. However, if the AGC control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading, turn R175 on the rear apron (see Figure 3) counter-clockwise until the set operates normally and the picture can be synced.

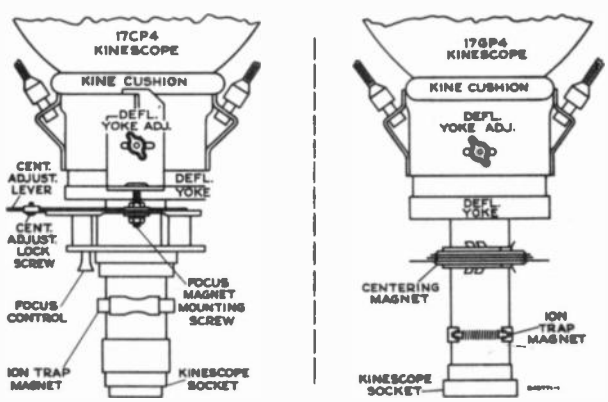


Figure 2—Ion Trap Magnet and Centering Adjustments

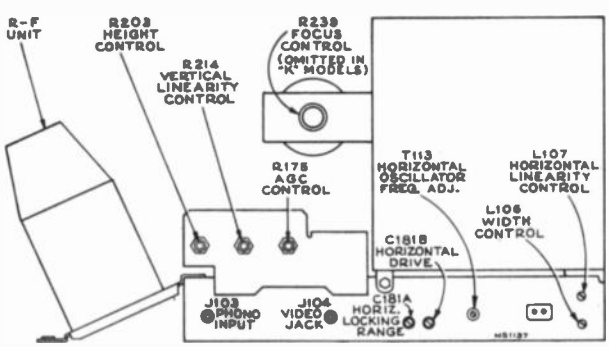


Figure 3—Rear Chassis Adjustments

INSTALLATION INSTRUCTIONS

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT.—Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 2 or 3 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull-in should occur before the control has been turned 120 degrees from the extreme counter-clockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should remain in sync and should not show a black bar in the picture.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Centering Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR.—If in the above check the receiver failed to hold sync with the hold control at the extreme counter-clockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull-in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment.—Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T113 horizontal frequency adjustment at the rear of the chassis until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster. Then turn the T113 core until the bar moves out of the picture leaving it in sync.

Horizontal Locking Range Adjustment.—Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. The picture may remain in sync. If so turn the T113 rear core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 3 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C181A slightly clockwise. If less than 2 bars are present, adjust C181A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 or 3 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure on page 11. For field purposes paragraph "B" under Horizontal Oscillator Waveform Adjustment may be omitted.

CENTERING ADJUSTMENT (Disregard for "K" Models).—The electrostatic focus kinescopes are provided with special centering magnets. These magnets are in the form of two wire rings mounted on a non-magnetic tube which is placed around the neck of the kinescope at a distance of about three-fourths of an inch in back of the deflection yoke. When the magnets are rotated on the tube so that the gaps in the rings are together, maximum centering effect is produced. To shift the picture, rotate one of the magnets with respect to the other. To shift the picture in the desired direction rotate the entire centering magnet assembly on the neck of the kinescope. By alternately rotating one magnet with respect to the other, then rotating the entire assembly around the neck of the tube, proper centering of the picture can be obtained.

It is important that the centering magnets not be operated too close to the yoke as the a-c field from the yoke may cause the centering magnets to become demagnetized.

FOCUS MAGNET ADJUSTMENTS (Disregard for electrostatic Models).—The focus magnet should be adjusted so that there is approximately three-eighths inch of space between the rear cardboard shell of the yoke and the flat of the front face of the focus magnet. This spacing gives best average focus over the face of the tube.

The axis of the hole through the magnet should be parallel with the axis of the kinescope neck with the kinescope neck through the middle.

CENTERING ADJUSTMENT (Disregard for electrostatic Models).—Centering is accomplished by means of a separate plate on the focus magnet. The centering plate includes a locking screw which must be loosened before centering. Up and down adjustment of the plate moves the picture side to side and sidewise adjustment moves the picture up and down.

If a corner of the raster is shadowed, check the position of the ion trap magnet. Reposition the magnet within the range of maximum raster brightness to eliminate the shadow and recenter the picture by adjustment of the focus magnet plate. In no case should the magnet be adjusted to cause any loss of brightness since such operation may cause immediate or eventual damage to the tube. In some cases it may be necessary to shift the position of the focus magnet in order to eliminate a corner shadow.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS.—Adjustment of the horizontal drive control affects the high voltage applied to the kinescope. In order to obtain the highest possible voltage hence the brightest and best focused picture, adjust horizontal drive trimmer C181B counter-clockwise until the picture begins to "wrinkle" in the middle then clockwise until the "wrinkle" disappears.

Turn the horizontal linearity control L107 clockwise until the picture begins to "wrinkle" on the right and then counter-clockwise until the "wrinkle" disappears and best linearity is obtained.

Adjust the width control L106 to obtain correct picture width.

A slight readjustment of these three controls may be necessary to obtain the best linearity.

Adjustments of the horizontal drive control affect horizontal oscillator hold and locking range. If the drive control was adjusted, recheck the oscillator alignment.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.—Adjust the height control (R203 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R214 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

FOCUS ADJUSTMENTS (Disregard for "K" Models).—Set the brightness control for average raster brightness. Set the focus control R239 (see Figure 3) slightly counter-clockwise from the best focus position. Adjust the ion trap magnet for maximum brightness. Within the range of maximum brightness, a region of best focus will occur. Set the ion trap magnet within this region of best focus. Do not use the ion trap magnet as a centering adjustment.

If the picture is not properly centered on the screen, readjust the centering magnet.

Adjust the focus control for best vertical wedge resolution consistent with good line focus. As a final check, turn the brightness control for low picture brightness. Best focus should occur in the center of the picture. Turn the brightness control for maximum useable brightness. Best focus should occur near the edge of the picture. This condition of adjustment gives the best average focus.

FOCUS (Disregard for electrostatic Models).—Adjust the focus magnet for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

Recheck the position of the ion trap magnet to make sure that maximum brightness is obtained.

Check to see that the cushion and yoke thumbscrews and the focus coil mounting screws are tight.

CHECK OF R-F OSCILLATOR ADJUSTMENTS.—Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 7. The adjustments for channels 2 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 4. Adjustment for channel 13 is on top of the chassis.

INSTALLATION INSTRUCTIONS

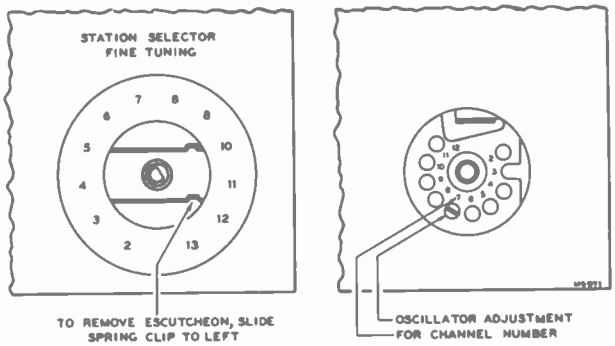


Figure 4—R-F Oscillator Adjustments

AGC THRESHOLD CONTROL.—The AGC threshold control R175 is adjusted at the factory and normally should not require readjustment in the field.

To check the adjustment of the AGC Threshold Control, tune in a strong signal and sync the picture. Momentarily remove the signal by switching off channel and then back. If the picture reappears immediately, the receiver is not overloading due to improper setting of R175. If the picture requires an appreciable portion of a second to reappear, or bends excessively, R175 should be readjusted.

Turn R175 fully counter-clockwise. The raster may be bent slightly. This should be disregarded. Turn R175 clockwise until there is a very, very slight bend or change of bend in the picture. Then turn R175 counter-clockwise just sufficiently to remove this bend or change of bend.

If the signal is weak, the above method may not work as it may be impossible to get the picture to bend. In this case, turn R175 clockwise until the snow in the picture becomes more pronounced, then counter-clockwise until the best signal to noise ratio is obtained.

The AGC control adjustment should be made on a strong signal if possible. If the control is set too far clockwise on a weak signal, then the receiver may overload when a strong signal is received.

FM TRAP ADJUSTMENT.—In some instances interference may be encountered from a strong FM station signal. A trap is provided to eliminate this type of interference. To adjust the trap tune in the station on which the interference is observed and adjust the L58 core on top of the antenna matching transformer for minimum interference in the picture.

CAUTION.—In some receivers, the FM trap L58 will tune down into channel 6 or even into channel 5. Needless to say, such an adjustment will cause greatly reduced sensitivity on these channels. If channels 5 or 6 are to be received, check L58 to make sure that it does not affect sensitivity on these two channels.

CABINET ANTENNA.—A cabinet antenna is provided in the receivers having wooden cabinets and the leads are brought out near the antenna terminal board. The cabinet antenna may be employed in place of the outdoor antenna in areas where the signals are strong and no reflections are experienced.

CHASSIS REMOVAL.—To remove the chassis from the cabinet for repair or installation of a new kinescope, remove the control knobs, the cabinet back, unplug the speaker cable, the kinescope socket, the antenna cable, the pilot light cable on console models, the yoke and high voltage cable. Take out the chassis bolts under the cabinet. Withdraw the chassis from the back of the cabinet.

KINESCOPE HANDLING PRECAUTION.—Do not install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling.

To remove the kinescope from the cabinet, loosen the two nuts and disengage the rods alongside the kinescope. Remove the wing screw which holds the yoke frame to the cabinet. Remove the kinescope, the yoke frame with yoke and focus or centering magnet as an assembly.

INSTALLATION OF KINESCOPE.—Handle this tube by the metal rim at the edge of the screen. Do not cover the glass bell of the tube with fingermarks as it will produce leakage paths which may interfere with reception. If this portion of the tube has inadvertently been handled, wipe it clean with a soft cloth moistened with "dry" carbon tetrachloride.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and fingermarks with a soft cloth moistened with "Windex" or similar cleaning agent.

Turn the tube so that the key on the base of the tube will be down and insert the neck of the kinescope through the deflection coil and focus magnet. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

Replace the kinescope and yoke frame assembly in the cabinet. Insert the wing screw and tighten. Engage the two side rods into the yoke frame and tighten the two nuts. Slide the deflection yoke as far forward as possible. If this is not done, difficulty will be encountered in adjusting the ion trap and focus magnet because of shadows on the corner of the raster.

Slide the chassis into the cabinet, then insert and tighten the chassis bolts.

Slip the ion trap magnet over the neck of the kinescope.

Connect the kinescope socket to the tube base and connect the high voltage lead clip from the rim of kinescope into the high voltage bushing on the high voltage compartment.

Reconnect all other cables. Perform the entire set-up procedure beginning with Ion Trap Magnet Adjustment.

ANTENNAS.—The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to select the proper antenna to suit the particular local conditions, to install it properly and orient it correctly.

If two or more stations are available and the stations are in different directions, it may be possible to make a compromise orientation which will provide a satisfactory signal on all such channels.

If it is impossible to obtain satisfactory results on one or more channels, it may become necessary either to provide means for turning the antenna when switching channels or to install a separate antenna for one or more channels and to switch antennas when switching channels.

REFLECTIONS.—Multiple images sometimes known as echoes or ghosts, are caused by the signal arriving at the antenna by two or more routes. The second or subsequent image occurs when a signal arrives at the antenna after being reflected off a building, a hill or other object. In severe cases of reflections, even the sound may be distorted. In less severe cases, reflections may occur that are not noticeable as reflections but that will instead cause a loss of definition in the picture.

Depending upon the circumstances, it may be possible to eliminate the reflections by rotating the antenna or by moving it to a new location. In extreme cases, it may be impossible to eliminate the reflection.

INTERFERENCE.—Auto ignition, street cars, electrical machinery and diathermy apparatus may cause interference which spoils the picture. Whenever possible, the antenna location should be removed as far as possible from highways, hospitals, doctors' offices and similar sources of interference. In mounting the antenna, care must be taken to keep the antenna rods at least ¼ wave length (at least 6 feet) away from other antennas, metal roofs, gutters or other metal objects.

Short-wave radio transmitting and receiving equipment may cause interference in the picture in the form of moving ripples. In some instances it may be possible to eliminate the interference by the use of a trap in the antenna transmission line. However, if the interfering signal is on the same frequency as the television station, a trap will provide no improvement.

WEAK PICTURE.—When the installation is near the limit of the area served by the transmitting station, the picture may be speckled, having a "snow" effect, and may not hold steady on the screen. This condition is due to lack of signal strength from the transmitter.

17T153, 17T154,
17T155, 17T160, 17T162,
17T172, 17T172K, 17T173,
17T173K, 17T174, 17T174K

CHASSIS TOP VIEW

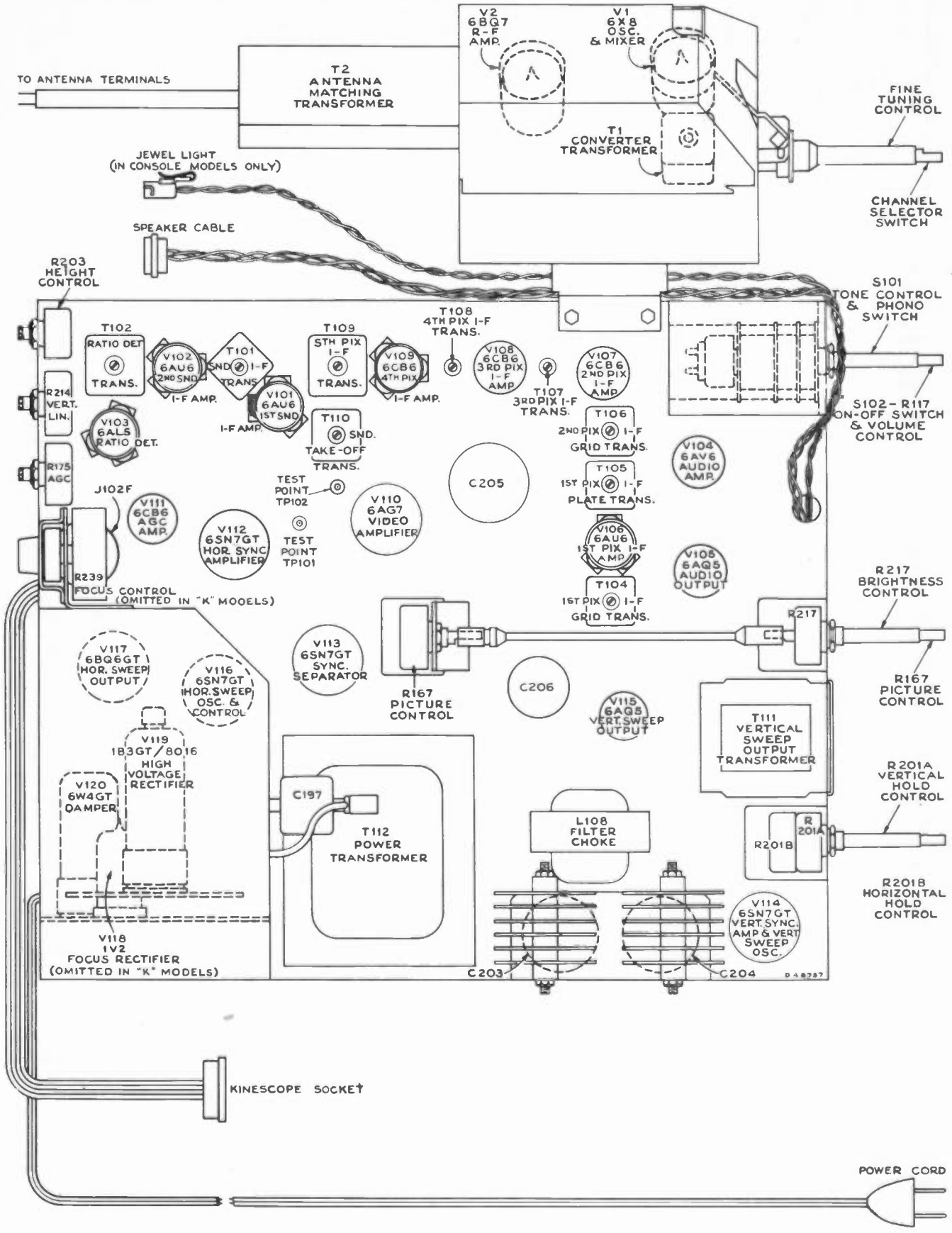


Figure 5—Chassis Top View

CHASSIS BOTTOM VIEW

17T153, 17T154,
17T155, 17T160, 17T162,
17T172, 17T172K, 17T173,
17T173K, 17T174, 17T174K

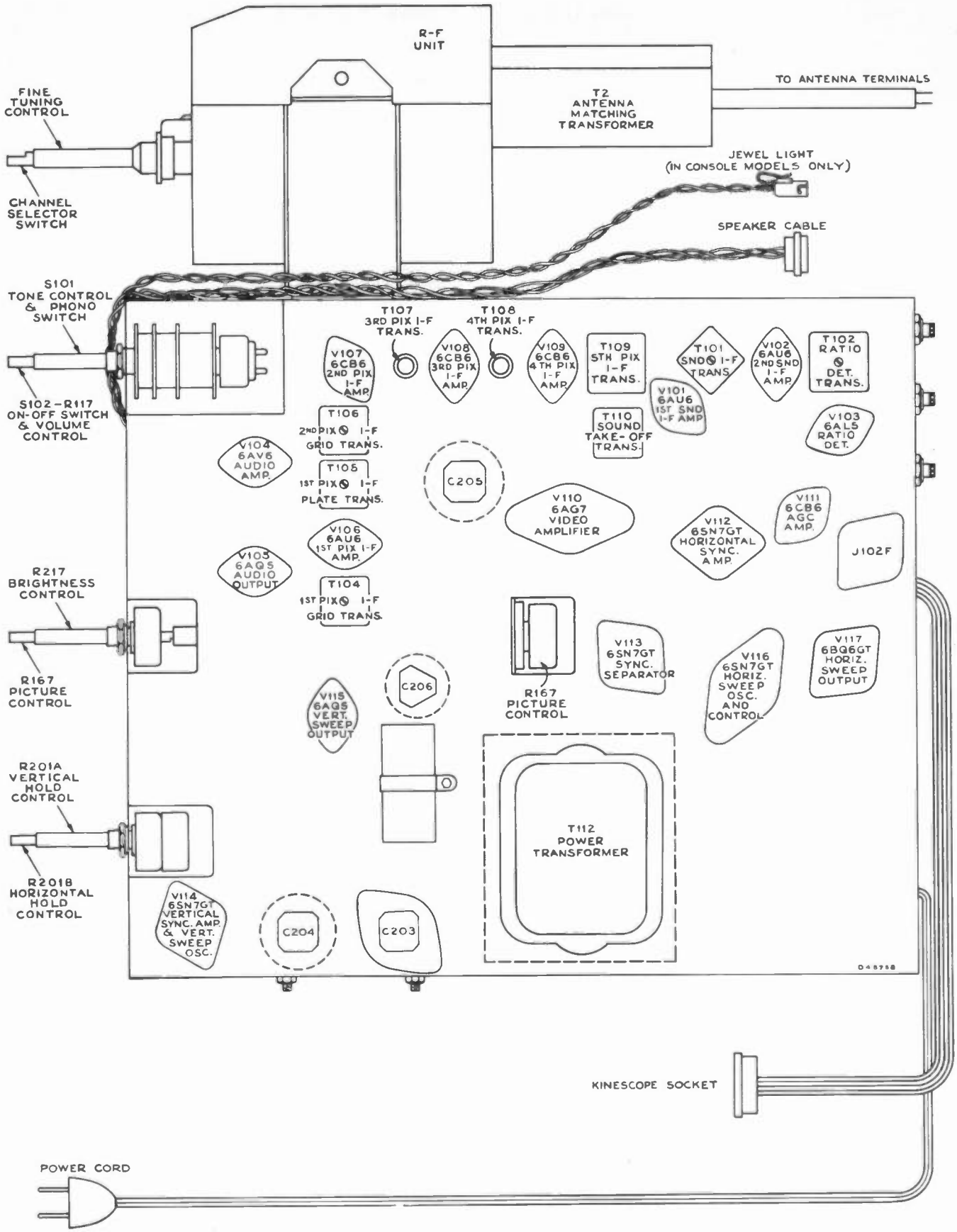


Figure 6—Chassis Bottom View

ALIGNMENT PROCEDURE

TEST EQUIPMENT.—To properly service the television chassis of this receiver, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency Ranges
35 to 90 mc., 1 mc. to 12 mc. sweep width
170 to 225 mc., 12 mc. sweep width

(b) Output adjustable with at least .1 volt maximum.

(c) Output constant on all ranges.

(d) "Flat" output on all attenuator positions.

Cathode-Ray Oscilloscope.—For alignment purposes, the oscilloscope employed must have excellent low frequency and phase response, and should be capable of passing a 60-cycle square wave without appreciable distortion.

For video and sync waveform observations, the oscilloscope must have excellent frequency and phase response from 10 cycles to at least two megacycles in all positions of the gain control.

Signal Generator to provide the following frequencies with crystal accuracy.

(a) Intermediate frequencies
4.5 mc. sound i-f transformer
39.25 mc. adjacent channel picture trap
41.25 mc. sound trap
45.75 mc. picture carrier
47.25 mc. adjacent channel sound trap

(b) Radio frequencies

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.
2	55.25	59.75	101
3	61.25	65.75	107
4	67.25	71.75	113
5	77.25	81.75	123
6	83.25	87.75	129
7	175.25	179.75	221
8	181.25	185.75	227
9	187.25	191.75	233
10	193.25	197.75	239
11	199.25	203.75	245
12	205.25	209.75	251
13	211.25	215.75	257

(c) Output of these ranges should be adjustable and at least .1 volt maximum.

Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

Electronic Voltmeter of Junior or Senior "VoltOhmyst" type and a high voltage multiplier probe for use with this meter to permit measurements up to 20 kv.

CAUTION: Do not short the kinescope second anode lead. Its short circuit current presents a considerable overload on the high voltage rectifier V119.

ORDER OF ALIGNMENT.—When a complete receiver alignment is necessary, it can be most conveniently performed in the following order:

(1) Ant. Matching Unit
(2) R-F Unit
(3) Ratio Detector
(4) Sound I-F Trans.
(5) Sound Take-Off Trans.
(6) Picture I-F Traps
(7) Picture I-F Trans.
(8) Sweep Alignment of I-F
(9) Horizontal Oscillator
(10) Sensitivity Check

ANTENNA MATCHING UNIT ALIGNMENT.—The antenna matching unit is accurately aligned at the factory. Adjustment of this unit should not be attempted in the customer's home since even slight misalignment may cause serious attenuation of the signal especially on channel 2. The r-f unit is aligned with a particular antenna matching transformer in place. If for any reason, a new antenna matching transformer is installed, the r-f unit should be realigned.

The F-M Trap which is mounted in the antenna matching unit may be adjusted without adversely affecting the alignment of the unit.

To align the antenna matching unit disconnect the lead from the FM trap L58 to the channel selector switch S5.

With a short jumper, connect the output of the matching unit through a 1000 mmf. capacitor to the grid of the second pix i-f amplifier, pin 1 of V107.

Replace the cover on the matching unit while making all adjustments.

Remove the first pix i-f amplifier tube V106.

Connect the positive terminal of a bias box to the chassis and the potentiometer arm to the junction of R143 and R144. Set the potentiometer to produce approximately –6.0 volts of bias at the test point TP101.

Connect an oscilloscope to the video test point TP102 and set the oscilloscope gain to maximum.

Connect a signal generator to the antenna input terminals. Modulate the signal generator 30% with an audio signal.

Tune the signal generator to 45.75 mc. and adjust the generator output to give an indication on the oscilloscope. Adjust L59 in the antenna matching unit for minimum audio indication on the oscilloscope.

Tune the signal generator to 41.25 mc. and adjust L60 for minimum audio indication on the oscilloscope.

Remove the jumper from the output of the matching unit.

Connect a 300 ohm ½ watt composition resistor from L58 to ground, keeping the leads as short as possible.

Connect an oscilloscope low capacity crystal probe from L58 to ground. The sensitivity of the oscilloscope should be approximately 0.03 volts per inch. Set the oscilloscope gain to maximum.

Connect the r-f sweep generator to the matching unit antenna input terminals. In order to prevent coupling reactance from the sweep generator into the matching unit, it is advisable to employ a resistance pad at the matching unit terminals. Figure 11 shows three different resistance pads for use with sweep generators with 50 ohm co-ax output, 72 ohm co-ax output or 300 ohm balanced output. Choose the pad to match the output impedance of the particular sweep employed.

Connect the signal generator loosely to the matching unit antenna terminals.

Set the sweep generator to sweep from 45 mc. to 54 mc. With RCA type WR59A sweep generators, this may be accomplished by retuning channel number 1 to cover this range. With WR59B sweep generators this may be accomplished by retuning channel number 2 to cover the range. In making these adjustments on the generator, be sure not to turn the core too far clockwise so that it becomes lost beyond the core retaining spring.

Adjust L61 and L62 to obtain the response shown in figure 12. L61 is most effective in locating the position of the shoulder of the curve at 52 mc. and L62 should be adjusted to give maximum amplitude at 53 mc. and above consistent with the specified shape of the response curve. The adjustments in the matching unit interact to some extent. Repeat the above procedure until no further adjustments are necessary.

Remove the 300 ohm resistor and crystal probe connections. Restore the connection between L58 and S5. Replace V106.

R-F UNIT ALIGNMENT.—An r-f unit which is operative and requires only touch up adjustments, requires no presetting of adjustments. For such units, skip the remainder of this paragraph. For units which are completely out of adjustment, preset all adjustments to the approximate center of their range with the following exceptions: Set C18 so that the screw head is approximately three-eighths of an inch above chassis. Set the T1 core for maximum inductance (core turned counter-clockwise). Set C11 near maximum capacity (one-quarter turn from tight). Do not change any of the adjustments in the antenna matching unit.

Disconnect the link from terminals "A" and "B" of T104 and terminate the link with a 39 ohm composition resistor.

The r-f unit is aligned with zero AGC bias. To insure that the bias will remain constant, take a clip lead and short circuit the r-f unit power terminal board terminal 3 to ground.

Connect the oscilloscope to the test point TP1 on top of the r-f unit. Set the oscilloscope gain to maximum.

Turn the receiver channel selector switch to channel 2.

ALIGNMENT PROCEDURE

Connect the output of the signal generator to the grid of the r-f amplifier, V2. To do this, remove the tube from the socket and fashion a clip by twisting one end of a small piece of wire around pin number 7. Replace the tube in the socket leaving the end of the wire protruding from under the tube. Connect the signal generator to this wire through a 1,500 mmf capacitor.

Tune the signal generator to 43.5 mc. and modulate it 30% with a 400 cycle sine wave. Adjust the signal generator for maximum output.

Adjust L65 on top of the r-f unit for minimum 400 cycle indication on the oscilloscope. If necessary, this adjustment can be retouched in the field to provide additional rejection to one specific frequency in the i-f band pass. However, in such cases, care should be taken not to adjust it so as to reduce sensitivity on channel 2.

Remove the wire clip from pin 7 of V2 and replace the tube and tube shield.

Set the channel selector switch to channel 8.

Turn the fine tuning control 30 degrees clockwise from the center of its mechanical range now and at all times when adjusting the oscillator frequency.

Adjust C1 for proper oscillator frequency, 227 mc. This may be done in several ways. The easiest way and the way which will be recommended in this procedure will be to use the signal generator as a heterodyne frequency meter and beat the oscillator against the signal generator. To do this, tune the signal generator to 227 mc. with crystal accuracy. Insert one end of a piece of insulated wire into the r-f unit through the hole provided for the adjustment for C11. Be careful that the wire does not touch any of the tuned circuits as it may cause the frequency of the r-f unit oscillator to shift. Connect the other end of the wire to the "r-f in" terminal of the signal generator. Adjust C1 to obtain an audio beat with the signal generator.

Connect the sweep generator through a suitable attenuator as shown in Figure 11 to the input terminals of the antenna matching unit.

Connect the signal generator loosely to the antenna terminals.

Set the sweep oscillator to cover channel 8.

Set the oscilloscope to maximum gain and use the minimum input signal which will produce a useable pattern on the oscilloscope. Excessive input can change oscillator injection during alignment and produce consequent misalignment even though the response as seen on the oscilloscope may look normal.

Insert markers of channel 8 picture carrier and sound carrier, 181.25 mc. and 185.75 mc.

Adjust C9, C11, C15 and C18 for approximately correct curve shape, frequency, and band width as shown in Figure 13.

The correct adjustment of C18 is indicated by maximum amplitude of the curve midway between the markers. C15 tunes the r-f amplifier plate circuit and affects the frequency of the pass band most noticeably. C9 tunes the mixer grid circuit and affects the tilt of the curve most noticeably (assuming that C18 has been properly adjusted). C11 is the coupling adjustment and hence primarily affects the response band width.

Set the receiver channel switch to channel 6.

Adjust the signal generator to the channel 6 oscillator frequency 129 mc.

Turn the fine tuning control 30 degrees clockwise from the center of its mechanical range.

Adjust L5 for an audible beat with the signal generator as before.

Set the sweep generator to channel 6.

From the signal generator, insert channel 6 sound and picture carrier markers, 83.25 mc. and 87.75 mc.

Adjust L48, L50 and L53 for proper response as shown in Figure 13.

L50 tunes the r-f amplifier plate circuit and primarily affects the frequency of the pass band. L53 tunes the r-f amplifier grid and is adjusted to give maximum amplitude of the curve between the markers. L48 affects the tilt of the curve but not quite the same as C9 adjustment. When the circuits are correctly adjusted and L48 is rocked on either side of its proper setting, the high frequency (sound carrier) end of the curve appears to remain nearly fixed in amplitude while the picture carrier end tilts above or below this point.

Turn off the sweep and signal generators.

Connect the "VoltOhmyst" to the r-f unit test point TP1.

Adjust the oscillator injection trimmer C8 for –3.5 volts or at maximum if –3.5 volts cannot be reached. This voltage should fall between –2.5 and –5.5 volts on all channels when the alignment of all circuits is completed.

Turn the sweep oscillator and signal generator back on and recheck channel 6 response. Readjust L48, L50 and L53 if necessary.

Set the receiver channel selector switch to channel 8 and readjust C1 for proper oscillator frequency, 227 mc.

Set the sweep oscillator and signal generator to channel 8.

Readjust C9, C11, C15 and C18 for correct curve shape, frequency and band width.

Turn off the sweep and signal generators, switch back to channel 6 and check the oscillator injection voltage at TP1 if C9 was adjusted in the recheck of channel 8 response.

If the initial setting of oscillator injection trimmer C8 was far off, it may be necessary to adjust the oscillator frequency and response on channel 8, adjust the oscillator injection on channel 6 and repeat the procedure several times before the proper setting is obtained.

Turn off the sweep generator and switch the receiver to channel 13.

Adjust the signal generator to the channel 13 oscillator frequency 257 mc.

Set the fine tuning control 30 degrees clockwise from the center of its mechanical range.

Adjust L46 to obtain an audible beat. Slightly overshoot the adjustment of L46 by turning the slug a little more in the same direction from the original setting, then reset the oscillator to proper frequency by adjusting C1 to again obtain the beat.

Check the response of channels 7 through 13 by switching the receiver channel switch, sweep oscillator and marker oscillator to each of these channels and observing the response and oscillator injection obtained. See Figure 13 for typical response curves. It should be found that all these channels have the proper shaped response with the markers above 80% response.

If the markers do not fall within this requirement, switch to channel 8 and readjust C9, C11, C15 and C18 as necessary.

Turn off the sweep generator and check the channel 8 oscillator frequency. If C1 has to be readjusted for channel 8, the principle of overshooting the adjustment and then correcting by adjusting L46 should be followed in order to establish the L/C ratio for the desired oscillator tracking.

Turn the receiver channel selector switch to channel 6. Adjust L5 for correct oscillator frequency, 129 mc.

Turn the sweep oscillator on and to channel 6 and observe the response curve. If necessary readjust L48, L50 and L53.

Switch the receiver through channel 6 down through channel 2 and check for normal response curve shapes and oscillator injection voltage.

If excessive tilt in the same direction occurs on channels 2, 3 and 4, adjust C18 on channel 2 to overshoot the correction of this tilt, then switch to channel 6 and adjust L53 for maximum amplitude of curve between markers. This adjustment should produce "flat" response on the low channels if the other adjustments especially L48 are correct.

Likewise check channels 7 through 13, stopping on 13 for the next step.

With the receiver on channel 13, check the receiver oscillator frequency. Correct by adjustment of C1 if necessary.

Adjust the oscillator to frequency on all channels by switching the receiver and the heterodyne freq. meter to each channel and adjusting the appropriate oscillator trimmer to obtain the audible beat. It should be possible to adjust the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range. When employing WR39 calibrators to adjust the receiver oscillator, tune the calibrator to one half the receiver oscillator frequency on channels 4, 5 and 6 and to one fourth the receiver oscillator frequency on channels 11, 12 and 13.

ALIGNMENT PROCEDURE

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.	Channel Oscillator Adjustment
2	55.25	59.75	101	L1
3	61.25	65.75	107	L2
4	67.25	71.75	113	L3
5	77.25	81.75	123	L4
6	83.25	87.75	129	L5
7	175.25	179.75	221	L6
8	181.25	185.75	227	L7
9	187.25	191.75	233	L8
10	193.25	197.75	239	L9
11	199.25	203.75	245	L10
12	205.25	209.75	251	L11
13	211.25	215.75	257	C1

Remove the 39 ohm resistor from the link and reconnect the link to terminals "A" and "B" of T104.

RATIO DETECTOR ALIGNMENT.—In order to obtain good ratio detector alignment an AM modulated signal generator that is exceptionally free from FM modulation must be employed. Set the signal generator at 4.5 mc. and connect it to the second sound i-f grid, pin 1 of V102. Set the generator for 30% 400 cycle modulation.

As an alternate source of signal, the RCA WR39B or WR39C calibrator may be employed. If used, connect its output cable to the grid of the 4th pix i-f amplifier, pin 1 of V109. Set the frequency of the calibrator to 45.75 (pix carrier) and modulate with 4.5 mc. crystal. Also turn on the internal AM audio modulation. The 4.5 mc. signal will be picked off at T110A and amplified through the sound i-f amplifier.

Connect the "VoltOhmyst" to the junction of R110 and R114.

Connect the oscilloscope across the speaker voice coil and turn the volume control for maximum output.

Set the trimmer C226 (on the bottom of the V103 socket) for minimum capacity.

Tune the ratio detector primary, T102 top core for maximum DC output on the "VoltOhmyst." Adjust the signal level from the signal generator for 10 volts on the "VoltOhmyst" when finally peaked. This is approximately the operating level of the ratio detector for average signals.

. Connect the "VoltOhmyst" to the junction of R112 and C113.

Adjust the T102 bottom core for zero d-c on the meter. Then, turn the core to the nearest minimum AM output on the oscilloscope.

Repeat adjustments of T102 top for maximum DC and T102 bottom for minimum output on the oscilloscope making final adjustment with the 4.5 mc. input level adjusted to produce 10 volts d-c on the "VoltOhmyst" at the junction of R110 and R114.

Connect the "VoltOhmyst" to the junction of R112 and C113 and note the amount of d-c present. If this voltage exceeds ±1.5 volts, adjust C226 by turning the core in until zero d-c is obtained. Readjust the T102 bottom core for minimum output on the oscilloscope. Repeat the adjustments of C226 and T102 bottom core until the voltage at R112 and C113 is less than ±1.5 volts when T102 bottom core is set for minimum indication on the oscilloscope.

Connect the "VoltOhmyst" to the junction of R110 and R114 and repeat the T102 top core for maximum d-c on the meter and again reset the generator output so that the meter reads minus 10 volts.

Repeat the adjustments in the above two paragraphs until the voltage at R112 and C113 is less than ±1.5 volts when the T102 top core is set for maximum d-c at the junction of R110 and R114 and the T102 bottom core is set for minimum indication on the oscilloscope.

SOUND I-F ALIGNMENT. — Connect the sweep generator to the first sound i-f amplifier grid, pin 1 of V101. Adjust the generator for a sweep width of 1 mc. at a center frequency of 4.5 mc.

Insert a 4.5 mc. marker signal from the signal generator into the first sound i-f grid. With the WR39B or WR39C calibrators the 4.5 mc. crystal signal may be obtained at the R-F out terminal by turning the variable osc. switch off, the calibrate switch to 4.5 mc. and the volume control with mod. off.

Connect the oscilloscope in series with a 10,000 ohm resistor to terminal A of T101.

Adjust T101 top and bottom cores for maximum gain and symmetry about the 4.5 mc. marker on the i-f response. The pattern obtained should be similar to that shown in Figure 14.

The output level from the sweep should be set to produce approximately 2.0 volt peak-to-peak at terminal A of T101 when the final touches on the above adjustment are made. It is necessary that the sweep output voltage should not exceed the specified values otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals.

Connect the oscilloscope to the junction of R112 and C113 and check the linearity of the response. The pattern obtained should be similar to that shown in Figure 15.

SOUND TAKE-OFF ALIGNMENT.—Connect the 4.5 mc. generator in series with a 1000 ohm resistor to terminal "C" of T110. The input signal should be approximately 0.5 volts.

Short the fourth pix i-f grid to ground, pin 1 V109, to prevent noise from masking the output indication.

As an alternate source of signal the RCA WR39B or WR39C calibrator may be used. In such a case, disregard the above two paragraphs. Connect calibrator across link circuit, T104 A, B, and modulate 45.75 carrier with 4.5 mc. crystal.

Connect the crystal diode probe of a "VoltOhmyst" to the plate of the video amplifier, pin 8 of V110.

Adjust the core of T110 for minimum output on the meter.

Remove the short from pin 1 V109 to ground, if used.

PICTURE I-F TRAP ADJUSTMENT.—Connect the i-f signal generator across the link circuit on terminals A and B of T104.

Connect the "VoltOhmyst" to test point TP101.

Obtain a 7.5 volt battery capable of withstanding appreciable current drain and connect the ends of a 1,000 ohm potentiometer across it. Connect the battery positive terminal to chassis and the potentiometer arm to the junction of R143 and R144.

Set the bias pot to produce approximately –1.0 volt of bias at test point TP101.

Connect the "VoltOhmyst" to test point TP102 at the picture detector.

Set the signal generator to each of the following frequencies and adjust the corresponding circuit for minimum d-c output at TP102. Use sufficient signal input to produce 1.0 volt of d-c on the meter when the final adjustment is made.

39.25 mc.	T104 top core
41.25 mc.	T105 bottom core
47.25 mc.	T106 bottom core

PICTURE I-F TRANSFORMER ADJUSTMENTS.—Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "VoltOhmyst." During alignment, reduce the input signal if necessary in order to produce 1.0 volt of d-c at test point TP102 with –1.0 volt of i-f bias at test point TP101.

43.7 mc.	T109
45.5 mc.	T108
41.8 mc.	T107

To align T105 and T106, connect the sweep generator to the first picture i-f grid, pin 1 of V106 through a 1000 mmf. ceramic capacitor. Shunt R141, R149 and terminals "A" and "F" of T109 with 330 ohm composition resistors. Set the i-f bias to –1.0 volt at test terminal TP101. Connect the oscilloscope to test point TP102.

Adjust T105 and T106 top cores for maximum gain and curve shape as shown in Figure 16. For final adjustments set the output of the sweep generator to produce 0.5 volts peak-to-peak at the oscilloscope terminals.

To align T1 and T104, connect the sweep generator to the mixer grid test point TP2. Use the shortest leads possible, with not more than one inch of unshielded lead at the end of the sweep cable.

Set the channel selector switch to channel 4.

Connect a 180 ohm composition resistor from terminal B of T105 to the junction of R135 and C132. Connect the oscilloscope diode probe to terminal B of T105 and to ground.

Couple the signal generator loosely to the diode probe in order to obtain markers.

In some receivers, C221 is variable and is provided as a bandwidth adjustment. Preset C221 to minimum capacity.

ALIGNMENT PROCEDURE

Adjust T1 (top) and T104 (bottom) for maximum gain at 43.5 mc. and with 45.75 mc. at 70% of maximum response.

Adjust C221 until 41.25 mc. is at 80% response with respect to the low frequency shoulder at approximately 41.9 mc. as shown in Figure 16.

In receivers in which C221 is fixed, adjust T1 (top) and T104 (bottom) for maximum gain and the response shown in Figure 17.

Disconnect the diode probe, the 180 ohm and three 330 ohm resistors.

SWEEP ALIGNMENT OF PIX I-F.—Connect the oscilloscope to the test point TP102.

Adjust the bias potentiometer to obtain –6.0 volts of bias as measured by a "VoltOhmyst" at test point TP101.

Leave the sweep generator connected to the mixer grid test point TP2 with the shortest leads possible and with not more than one inch of unshielded lead at the end of the sweep cable. If these precautions are not observed, the receiver may be unstable and the response curves obtained may be unreliable.

Adjust the output of the sweep generator to obtain 3.0 volts peak-to-peak on the oscilloscope.

Couple the signal generator loosely to the grid of the first pix i-f amplifier. Adjust the output of the signal generator to produce small markers on the response curve.

Retouch T108 and T109 to obtain the response shown in Figure 18. Do not adjust T107 unless absolutely necessary. If T107 is adjusted too low in frequency it will raise the level of the 41.25 mc. sound i-f carrier and may create interference in the picture. It will also cause poor adjacent channel picture rejection. If T107 is tuned too high in frequency, the level of the 41.25 mc. sound i-f carrier will be too low and may produce noisy sound in weak signal areas.

Remove the oscilloscope, sweep and signal generator connections.

Remove the bias box employed to provide bias for alignment.

HORIZONTAL OSCILLATOR ADJUSTMENT.—Normally the adjustment of the horizontal oscillator is not considered to be a part of the alignment procedure, but since the oscillator waveform adjustment may require the use of an oscilloscope, it can not be done conveniently in the field. The waveform adjustment is made at the factory and normally should not require readjustment in the field. However, the waveform adjustment should be checked whenever the receiver is aligned or whenever the horizontal oscillator operation is improper.

Horizontal Frequency Adjustment.—Tune in a station and sync the picture. If the picture cannot be synchronized with the horizontal hold control R201B, then adjust the T113 frequency core on the rear apron until the picture will synchronize. If the picture still will not sync, turn the T113 waveform adjustment core (under the chassis) out of the coil several turns from its original position and readjust the T113 frequency core until the picture is synchronized.

Examine the width and linearity of the picture. If picture width or linearity is incorrect, adjust the horizontal drive control C181B, the width control L106 and the linearity control L107 until the picture is correct.

Horizontal Oscillator Waveform Adjustment. — The horizontal oscillator waveform may be adjusted by either of two methods. The method outlined in paragraph A below may be employed in the field when an oscilloscope is not available. The service shop method outlined in paragraph B below requires the use of an oscilloscope.

A.—Turn the horizontal hold control completely clockwise. Place adjustment tools on both cores of T113 and be prepared to make simultaneous adjustments while watching the picture on the screen. First, turn the T113 frequency core (on the rear apron) until the picture falls out of sync and one diagonal black bar sloping down to the right appears on the screen. Then, turn the waveform adjustment core (under the chassis) into the coil while at the same time adjusting the frequency core so as to maintain one diagonal black bar on the screen. Continue this procedure until the oscillator begins to motorboat, then turn the wavefrom adjustment core out until the motorboating just stops. As a check, turn the T113 frequency core until the picture is synchronized then reverse the direction of rotation of the core until the picture begins to fall out of sync with the diagonal bar sloping down to the right. Continue to turn the frequency core in the same direction. Additional bars should not appear on the screen. Instead, the horizontal oscillator should begin to motorboat. Retouch the adjustment of the T113 waveform adjustment core if necessary until this condition is obtained.

B.—Connect the low capacity probe of an oscilloscope to terminal C of T113. Turn the horizontal hold control one-quarter turn from the clockwise position so that the picture is in sync. The pattern on the oscilloscope should be as shown in Figure 19. Adjust the waveform adjustment core of T113 until the two peaks are at the same height. During this adjustment, the picture must be kept in sync by readjusting the hold control if necessary.

This adjustment is very important for correct operation of the circuit. If the broad peak of the wave on the oscilloscope is lower than the sharp peak, the noise immunity becomes poorer, the stabilizing effect of the tuned circuit is reduced and drift of the oscillator becomes more serious. On the other hand, if the broad peak is higher than the sharp peak, the oscillator is overstabilized, the pull-in range becomes inadequate and the broad peak can cause double triggering of the oscillator when the hold control approaches the clockwise position.

Remove the oscilloscope upon completion of this adjustment.

Horizontal Locking Range Adjustment. — Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. The picture may remain in sync, If so turn the T113 frequency core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 3 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C181A slightly clockwise. If less than 2 bars are present, adjust C181A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 or 3 bars are present.

Turn the horizontal hold control to the maximum clockwise position. Adjust the T113 frequency core so that the diagonal bar sloping down to the right appears on the screen and then reverse the direction of adjustment so that bar just moves off the screen leaving the picture in synchronization.

SENSITIVITY CHECK.—A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained to that obtained on other receivers under the same conditions. This weak signal can be obtained by connecting the shop antenna to the receiver through a ladder type attenuator pad.

RESPONSE CURVES.—The response curves shown on page 14 are typical though some variations can be expected.

The response curves are shown in the classical manner of presentation, that is with "response up" and low frequency to the left. The manner in which they will be seen in a given test set-up will depend upon the characteristics of the oscilloscope and sweep generator.

NOTES ON R-F UNIT ALIGNMENT —Because of the frequency spectrum involved many of the r-f unit leads are critical in some respects. Even the power supply leads form loops which couple to the tuned circuits, and if resonant at any of the frequencies involved in the performance of the tuner, may cause serious departures from the desired characteristics. In the design of the receiver these undesirable resonant loops have been shifted far enough away in frequency to allow reasonable latitude in physical arrangement without being troublesome. When the r-f unit is aligned in the receiver, no trouble from resonant loops should be experienced. However, if the unit is aligned in a jig separate attention should be paid to insure that unwanted resonances do not exist which might present a faulty representation of alignment.

A resonant circuit exists between the r-f tuner chassis and the outer shield box, which couples into the antenna and r-f plate circuits. The frequency of this resonance depends on the structure of the shield box. This resonance is controlled by using insulating washers of proper thickness in the front plate to tuner chassis mounting. Obviously, if the r-f unit is removed for service, the washers should be replaced in the correct order.

17T153, 17T154, 17T155, 17T160, 17T162, 17T172, 17T172K, 17T173, 17T173K, 17T174, 17T174K

ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 8 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLE IS ATTEMPTED

Step No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT OSCILLOSCOPE TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
	ANTENNA MATCHING UNIT ALIGNMENT									
1	Do not adjust this unit unless fairly certain that it requires adjustment. Disconnect lead from LS8 to S5. Connect the output of the matching unit through 1000 mmf. to pin 1 of V107. Replace cover on the matching unit. Remove V106 from its socket. Connect a bias box to the junction of R143 and R144 and set it to produce -6 volts at TP 101.									
2	Antenna terminals	45.75 mc. 30% mod.	Not used	——	Not used	—	TP102. Scope gain to max.	—	L59 for min. audio on scope	Fig. 7
3	"	41.25 mc. 30% mod.	"	—	"	—	"	—	L60 for min. audio on scope	Fig. 7
4	Antenna terminals loosely		Antenna terminals through pad	45 to 54 mc.	"	—	Scope xtal probe to LS8	Remove 1000 mmf. Connect 300 ohms from LS8 to gnd.	L61 and L62 to obtain response of Fig. 12	Fig. 7 Fig. 11 Fig. 12
	R-F UNIT ALIGNMENT									
5	If unit is completely out of adjustment, preset all adjustments to center of range with following exceptions. Set C18 so that head is ⅜" above chassis. Set T1 max. counterclockwise. Set C11 ¼ turn from max. clockwise. Disconnect link from T104 and terminate with 39 ohms. Short r-f unit power terminal 3 to ground. Set fine tuning 30 degrees clockwise from mechanical center of its range for all oscillator adjustments.									
6	Grid, pin 7 of V2 through 1500 mmf.	43.5 mc. 30% mod. 400 cy.	Not used	—	Not used	—	TP1. Gain to maximum	Set r-f unit on channel 2	L65 for min. indication on scope	Fig. 7 Fig. 10
7	Not used	—	Not used	—	Loosely to r-f unit oscillator	227 mc.	Not used	R-F unit on channel 8	C1 for beat on het. freq. meter	Fig. 7
8	Antenna terminals loosely	181.25 and 185.75	Antenna terminals through pad	Channel 8	Not used	—	TP1. Gain to maximum	Use min. signal which will give useable pattern	C9, C11, C15 and C18 for response shown in Fig. 13	Fig. 7 Fig. 13
9	Not used	—	Not used	—	Loosely to r-f unit oscillator	129 mc.	Not used	R-F unit on channel 8	L5 for beat on het. freq. meter	Fig. 8
10	Antenna terminals loosely	83.25 and 87.75	Antenna terminals through pad	Channel 8	Not used	—	TP1. Gain to maximum	"	L48, L50 and L53 for response shown in Fig. 13	Fig. 7 Fig. 13
11	Not used	—	Not used	—	Not used	—	Not used	Rec. on channel 8. Connect "Volt-Ohmyst" to TP1	C8 for -3.5 volts on meter	Fig. 7
12	Antenna terminals loosely	83.25 and 87.75	Antenna terminals through pad	Channel 8	Not used	—	TP1. Gain to maximum	R-F unit on channel 6	Check response readjust L48, L50 and L53 if necessary	Fig. 7 Fig. 13
13	Not used	—	Not used	—	Loosely to r-f unit oscillator	227 mc.	Not used	R-F unit on channel 8	C1 for beat on het. freq. meter	Fig. 7
14	Antenna terminals loosely	181.25 and 185.75	Antenna terminals through pad	Channel 8	Not used	—	TP1. Gain to maximum	"	Check response adjust C9, C11, C15 and C18 if necessary	Fig. 7
15	If C9 was readjusted in step 14, repeat step 11, step 13 and step 14 until the conditions specified in each step are fulfilled without additional adjustments.									
16	Not used	—	Not used	—	Loosely to r-f unit oscillator	257 mc.	Not used	Rec. on channel 13	L46 for beat on het. freq. meter. Overshoot L46 slightly and adjust C1 for beat	Fig. 7
17	Antenna terminals loosely	211.25 215.75	Antenna terminals through pad	Channel 13	Not used	—	TP1. Gain to maximum	Rec. on channel 13 "VoltOhmyst" on TP1	Check to see that response is correct and -3.0 volts of osc. injection is present	Fig. 13
18	"	205.25 209.75	"	Channel 12	Not used	—	"	Rec. on channel 12	"	Fig. 13
19	"	199.25 203.75	"	Channel 11	"	—	"	Rec. on channel 11	"	Fig. 13
20	"	193.25 197.75	"	Channel 10	"	—	"	Rec. on channel 10	"	Fig. 13
21	"	187.25 191.75	"	Channel 9	"	—	"	Rec. on channel 9	"	Fig. 13
22	"	181.25 185.75	"	Channel 8	"	—	"	Rec. on channel 8	"	Fig. 13
23	"	175.25 179.75	"	Channel 7	"	—	"	Rec. on channel 7	"	Fig. 13
24	If the response of any channel (steps 17 through 23) is below 80% at either marker, adjust C9, C11, C15 and C18 as necessary to pull response up on the low channel yet maintain correct response on channel 8.									
25	Repeat step 13. If the oscillator is off frequency overshoot the adjustment of C1 and correct by adjusting L46.									
26	Repeat steps 18 through 25 until all adjustments are obtained.									
27	Not used	—	Not used	—	Loosely to r-f unit oscillator	129 mc.	Not used	Rec. on channel 8	L5 for beat on het. freq. meter	Fig. 7
28	Antenna terminals loosely	83.25 87.75	Antenna terminals through pad	Channel 6	Not used	—	TP1. Gain to maximum	Rec. on channel 6 "VoltOhmyst" on TP1	Check to see that response is correct and -3.0 volts of osc. injection is present	Fig. 7 Fig. 13
29	"	77.25 81.75	"	Channel 5	"	—	"	Rec. on channel 5	"	Fig. 13
30	"	67.25 71.75	"	Channel 4	"	—	"	Rec. on channel 4	"	Fig. 13
31	"	61.25 65.75	"	Channel 3	"	—	"	Rec. on channel 3	"	Fig. 13

TEST PATTERN PHOTOGRAPHS

Figure 20—Normal Picture

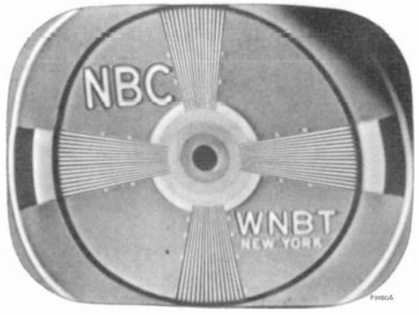


Figure 21—Focus Magnet and Ion Trap Magnet Misadjusted

Figure 22—Horizontal Linearity Control Misadjusted (Picture Cramped in Middle)

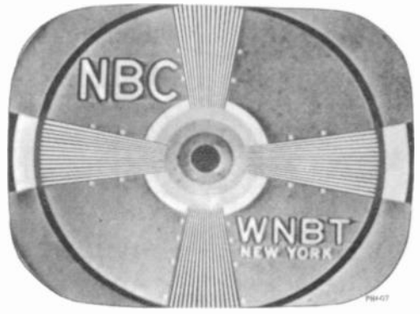


Figure 23—Width Control Misadjusted

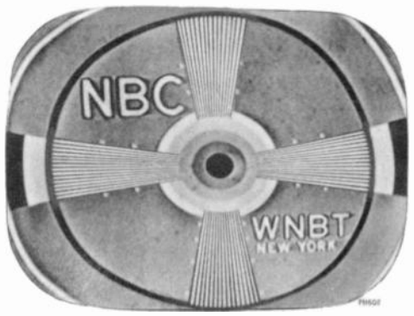


Figure 24—Horizontal Drive Control Misadjusted

Figure 25—Transients

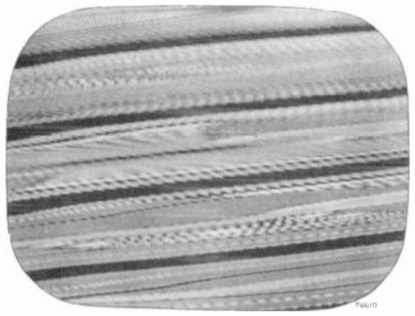


Figure 26—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control is in a Counter-clockwise Position—Just Before Pulling Into Sync

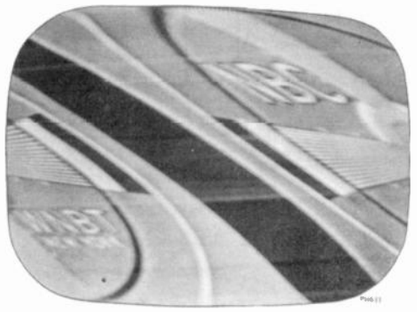


Figure 27—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is at the Maximum Clockwise Position

SERVICE SUGGESTIONS

Following is a list of symptoms of possible failures and an indication of some of the possible faults:

NO RASTER ON KINESCOPE:

(1) Incorrect adjustment of ion trap magnet. Magnet reversed either front to back or top to bottom.
(2) V116 or V117 inoperative. Check waveforms on grids and plates.
(3) No high voltage—if horizontal deflection is operating as evidenced by the correct waveform on terminal 1 of high voltage transformer, the trouble can be isolated to the 1B3GT circuit. Either the T114 high voltage winding is open, the 1B3GT tube is defective, its filament circuit is open or C197 is shorted.
(4) V110 circuit inoperative—Refer to schematic and waveform chart.
(5) Damper tube (V120) inoperative.
(6) Defective kinescope.
(7) R218 open.
(8) No receiver plate voltage—filter capacitor shorted—or filter choke open.

NO VERTICAL DEFLECTION:

(1) V114B or V115 inoperative. Check voltage and waveforms on grids and plates.
(2) T111 open.
(3) Vertical deflection coils open.

SMALL RASTER:

(1) Low Plus B or low line voltage.
(2) V117 defective.

POOR VERTICAL LINEARITY:

(1) If adjustments cannot correct, change V115.
(2) Vertical output transformer T111 defective.
(3) V114B defective—check voltage and waveforms on grid and plate.
(4) C168, C170, C171, C172, C173 or C174 defective.
(5) Low plate voltage—check rectifiers and capacitors in supply circuits.
(6) If height is insufficient, try changing V114.

POOR HORIZONTAL LINEARITY:

(1) If adjustments do not correct, change V117, or V120.
(2) T114 or L107 defective.
(3) C195 or C196 defective.

WRINKLES ON SIDE OF RASTER:

(1) C199 defective.
(2) Defective yoke.

PICTURE OUT OF SYNC HORIZONTALLY:

(1) T113 incorrectly tuned.
(2) R226, R227 or R201B defective.

TRAPEZOIDAL OR NON SYMMETRICAL RASTER:

(1) Improper adjustment of centering or focus magnet or ion trap magnet.
(2) Defective yoke.

RASTER AND SIGNAL ON KINESCOPE BUT NO SOUND:

(1) T110 defective.
(2) Sound i-f, ratio detector or audio amplifier inoperative—check V101, V102, V103 and their socket voltages.
(3) Audio system defective.
(4) Speaker defective.

SIGNAL AT KINESCOPE GRID BUT NO SYNC:

(1) AGC control R175 misadjusted.
(2) V111, inoperative. Check voltage and waveforms at its grid and plate.

SIGNAL ON KINESCOPE GRID BUT NO VERTICAL SYNC:

(1) Check V114B and associated circuit.
(2) Integrating network inoperative—Check.
(3) V113 or V114A defective or associated circuit defective.
(4) Gas current grid emission or grid cathode leakage in V114. Replace.

SIGNAL ON KINESCOPE GRID BUT NO HORIZONTAL SYNC:

(1) T113 misadjusted—readjust as instructed on page 11.
(2) V112 or V113 inoperative—check socket voltages and waveforms.
(3) T113 defective.
(4) C157, C181A, C182, C183, C184, C185, C186, C187 or C188 defective.
(5) If horizontal speed is completely off and cannot be adjusted check R226, R227, R201B, R229, R230 and R231.

SOUND AND RASTER BUT NO PICTURE OR SNYC:

(1) Picture, detector or video amplifier defective—check CR101 and V110—check socket voltages.
(2) Bad contact to kinescope cathode.

PICTURE STABLE BUT POOR RESOLUTION:

(1) CR101 or V110 defective.
(2) Peaking coils defective—check resistance.
(3) Make sure that the focus control operates on both sides of proper focus.
(4) R-F and I-F circuits misaligned.

PICTURE SMEAR:

(1) R-F or I-F circuits misaligned.
(2) Open peaking coil.
(3) This trouble can originate at the transmitter—check on another station.

PICTURE JITTER:

(1) AGC control R175 misadjusted.
(2) If regular sections at the left picture are displaced change V117.

ALIGNMENT TABLE

17T153, 17T154, 17T155, 17T160, 17T162, 17T172, 17T172K, 17T173, 17T173K, 17T174, 17T174K

Step No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT OSCILLOSCOPE TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
32	"	55.25 59.75	"	Channel 2	"	—	"	Rec. on channel 2	"	Fig. 13
33	If excessive tilt in the same direction occurs on channels 2, 3 and 4, adjust C18 on channel 2 to overshoot the correction of this tilt then switch to channel 6 and adjust L53 for max. amplitude of response between carrier markers.									
34	Check r-f response and oscillator injection on channels 7 through 13 steps 23 back up through step 17 stopping on channel 13 for the next step.									
35	Not used	—	Not used	—	Loosely coupled to r-f oscillator	257 mc.	TP1. Gain to maximum	Rec. on channel 13	C1 for beat on het. freq. meter	Fig. 7
36	"	—	"	—	"	251 mc.	"	Rec. on channel 12	L11 as above	Fig. 7
37	"	—	"	—	"	245 mc.	"	Rec. on channel 11	L10 as above	Fig. 7
38	"	—	"	—	"	239 mc.	"	Rec. on channel 10	L9 as above	Fig. 7
39	"	—	"	—	"	233 mc.	"	Rec. on channel 9	L8 as above	Fig. 7
40	"	—	"	—	"	227 mc.	"	Rec. on channel 8	L7 as above	Fig. 7
41	"	—	"	—	"	221 mc.	"	Rec. on channel 7	L6 as above	Fig. 7
42	"	—	"	—	"	129 mc.	"	Rec. on channel 6	L5 as above	Fig. 7
43	"	—	"	—	"	123 mc.	"	Rec. on channel 5	L4 as above	Fig. 7
44	"	—	"	—	"	113 mc.	"	Rec. on channel 4	L3 as above	Fig. 7
45	"	—	"	—	"	107 mc.	"	Rec. on channel 3	L2 as above	Fig. 7
46	"	—	"	—	"	101 mc.	"	Rec. on channel 2	L1 as above	Fig. 7
47	Repeat steps 35 through 46 as a check. On completion, remove 39 ohm resistor and reconnect link to terminals A and B of T104.									
	RATIO DETECTOR, SOUND I-F AND SOUND TAKE-OFF ALIGNMENT									
48	Grid 2nd Snd. I-F (pin 1, V102) or WR39B or C connect to grid 4th pix I-F (pin 1, V109)	4.5 mc. 400 cy. mod. or 45.75 mc. mod. by 4.5 mc. and 400 cy.	Not used	—	Not used	—	Across speaker voice coil. Volume control set for max. volume.	"VoltOhmyst" to junction of R110 and R114. Set C226 for min. capacity. Set signal gen. to give -10 V on meter.	T102 top core for max. d-c on meter. Connect "VoltOhmyst" to junction R112 and C113. Adjust T102 bottom core for zero d-c on meter then to nearest audio min. on the oscilloscope.	Fig. 9 Fig. 10
49	"	"	"	—	"	—	"	"VoltOhmyst" to junction R112 and C113. If the meter reads more than +1.5 volts, adjust C226 for zero on the meter and readjust T102 (bot.) for min. output on scope. Repeat steps 48 and 49 until all conditions are satisfied.		Fig. 9 Fig. 10
50	Sig. Gen. to 1st Snd. I-F	4.5 mc.	1st Sound I-F grid (pin 1, V101)	4.5 mc.	"	—	In series with 10,000 ohms to terminal A. of T101.	Sweep output reduced to provide 2 v p-p on scope.	T101 top and bot. cores for max. gain and symmetry at 4.5 mc.	Fig. 9 Fig. 10 Fig. 14
51	"	"	"	"	"	—	Junction of R112 and C113	Check for symmetrical response waveform (positive and negative).		Fig. 15
52	Sig. Gen. in series with 1000 ohms to T110-C or WR39 across T104 A and B	"	Not used	—	"	—		"VoltOhmyst" xtal probe to pin 8, V110. If sig. gen. is used short pin 1, V109 to ground.	Adjust T110 for minimum reading on "VoltOhmyst"	Fig. 9
	PICTURE I-F AND TRAP ADJUSTMENT									
53	Not used	—	Not used	—	Not used	—	Not used	Connect bias box to junction of R143 and R144 and to gnd. Adjust to give -1.0 v on "VoltOhmyst" at TP101.		
54	Sig. Gen. across T104 A and B	39.25 mc.	"	—	"	—	"	"VoltOhmyst" to TP102. Gen. output to give -1.0 volt d-c.	T104 top core to give min. d-c on meter.	Fig. 8
55	"	41.25 mc.	"	—	"	—	"	"	T105 bot. for min.	Fig. 10
56	"	47.25 mc.	"	—	"	—	"	"	T106 bot. for min.	Fig. 10
57	"	43.7 mc.	"	—	"	—	"	Sig. Gen. output to give -1.0 V d-c at TP102.	T109 for max.	Fig. 7
58	"	45.5 mc.	"	—	"	—	"	"	T108 for max.	Fig. 9
59	"	41.8 mc.	"	—	"	—	"	"	T107 for max.	Fig. 9
60	First pix i-f grid (pin 1, V106) loosely	Various See Fig. 16	First pix i-f grid pin 1, V106 through 1000 mmf.	40 to 48 mc.	"	—	To test point TP102	Shunt R141, R149 and terminals A and F of T109 with 330 ohms, 0.5 v p-p on scope.	Adjust T105 and T106 top cores for max. gain and response shown in Fig. 16.	Fig. 9 Fig. 16
61	Connected loosely to diode probe	Various See Fig. 17	Mixer grid test point TP2 with short lead	40 to 48 mc.	"	—	Scope diode probe to T105-B and to gnd.	Rec. on chan. 4. Connect 180 ohms from T105-B to junction R135 and C132. Upon completion disconnect scope and shunting resistors.	Set C221 to min. Adjust T1 top and T104 bot. for max. gain at 43.5 mc. and 45.75 mc. at 70%. Adjust C221 until 41.25 mc. is at 80%.	Fig. 9 Fig. 17
62	Connected loosely to grid of 1st pix i-f	Various See Fig. 18	"	"	"	—	Connect scope to TP102	"VoltOhmyst" to TP101. Set bias box for -6.0 volts at TP101. Set sweep output to produce 3.0 volts p-p on scope.	Retouch T108 and T109 to obtain response shown in Fig. 18. Do not adjust T107 unless absolutely necessary.	Fig. 18

ALIGNMENT DATA

17T153, 17T154, 17T155, 17T160, 17T162, 17T172, 17T172K, 17T173, 17T173K, 17T174, 17T174K

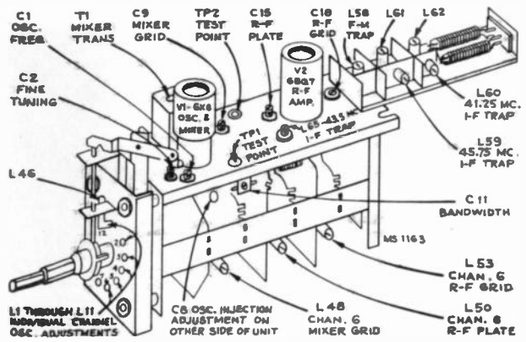


Figure 7—R-F Unit Adjustments

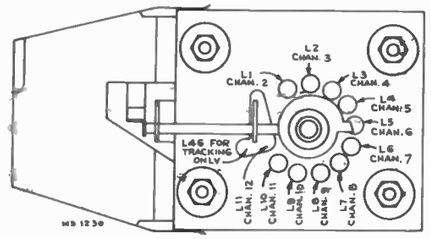


Figure 8—R-F Oscillator Adjustments

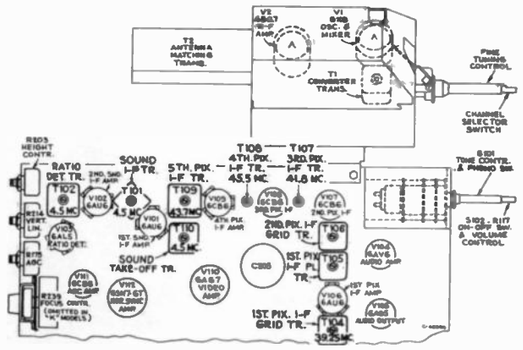


Figure 9—Top Chassis Adjustments

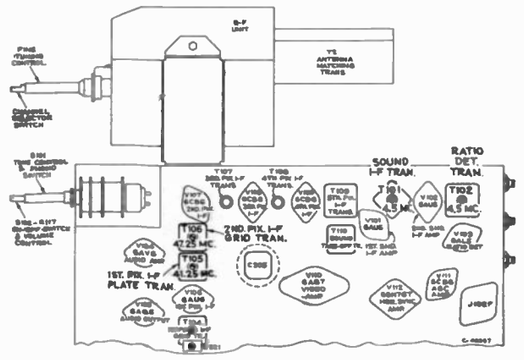


Figure 10—Bottom Chassis Adjustments

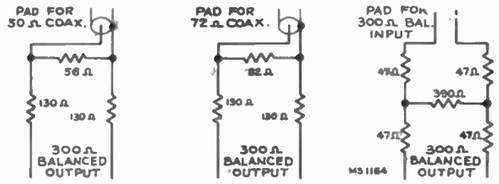


Figure 11—Sweep Attenuator Pads

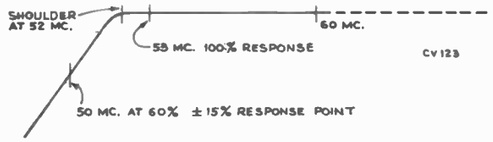


Figure 12—Antenna Matching Unit Response

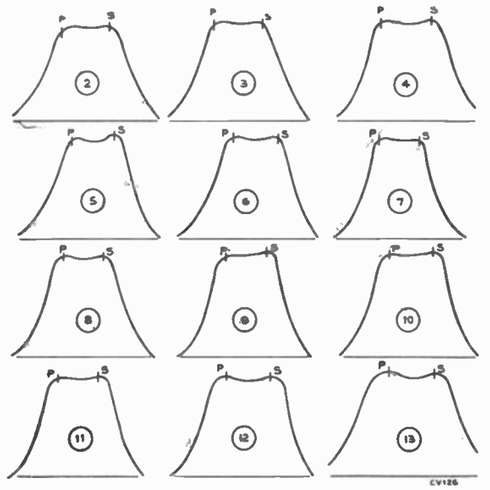


Figure 13—R-F Response

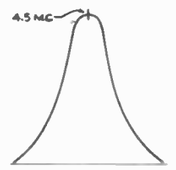


Figure 14 Sound I-F Response

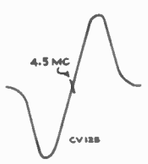


Figure 15 Ratio Det. Response

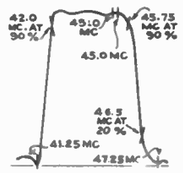


Figure 16 T105 and T106 Response

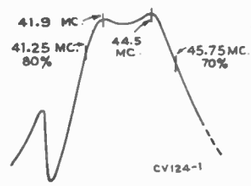


Figure 17 T1 and T104 Response

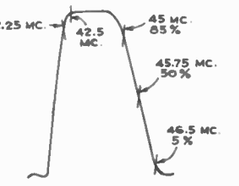


Figure 18 Over-all I-F Response

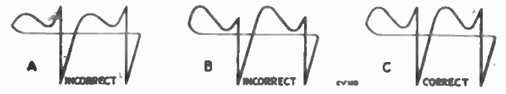


Figure 19—Horizontal Oscillator Wave Forms

SERVICE SUGGESTIONS

(3) Vertical instability may be due to loose connections or noise.

(4) Horizontal instability may be due to unstable transmitted sync.

RASTER BUT NO SOUND, PICTURE OR SYNC:

(1) Defective antenna or transmission line.

(2) R-F oscillator off frequency.

(3) R-F unit inoperative—check V1, V2.

DARK VERTICAL LINE ON LEFT OF PICTURE:

(1) Reduce horizontal drive and readjust width and horizontal linearity.

(2) Replace V117.

LIGHT VERTICAL LINE ON LEFT OF PICTURE:

(1) C193 defective.

(2) V120 defective.

PICTURE I-F RESPONSE.—At times it may be desirable to observe the individual i-f stage response. This can be achieved by the following method:

For T107, T108 or T109, shunt all i-f transformers with a 330 ohm carbon resistor except the one whose response is to be observed.

Connect a wide band sweep generator to the second pix i-f grid and adjust it to sweep from 38 mc. to 48 mc.

Connect the oscilloscope to test point TP102 and observe the overall response. The response obtained will be essentially that of the unshunted stage.

To see the response of transformers T1, T104 and T105, T106, follow the instructions given on page 10.

Figures 28 through 36 show the response of the various stages obtained in the above manner. The curves shown are typical although some variation between receivers can be expected. Relative stage gain is not shown.

RESPONSE PHOTOGRAPHS

Taken from RCA WO58A Oscilloscope

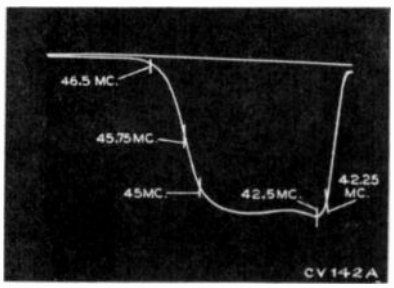


Figure 28—Overall Pix I-F Response

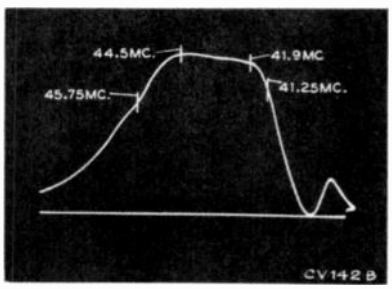


Figure 29—Response of T1-T104 Pix I-F Transformers

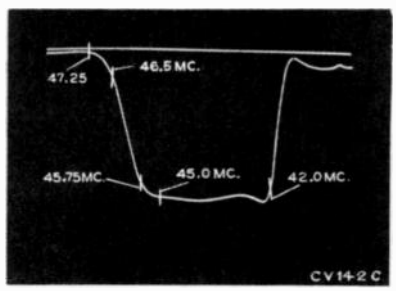


Figure 30—Response of T105-T106 Pix I-F Transformer

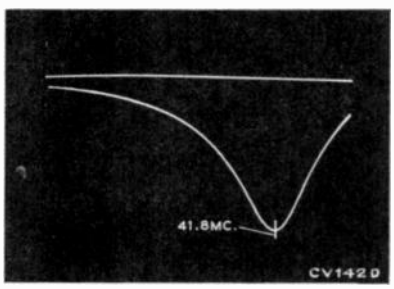


Figure 31—Response of T107 Pix I-F Transformer

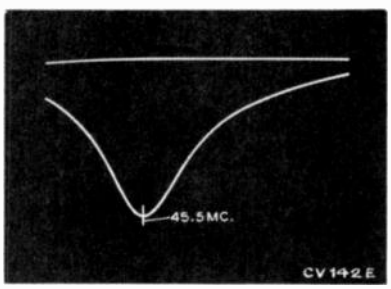


Figure 32—Response of T108 Pix I-F Coil

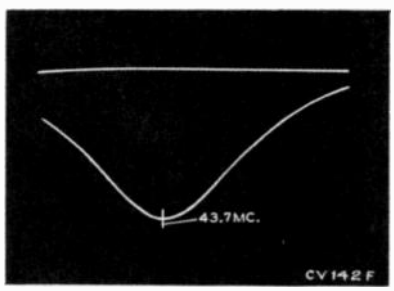


Figure 33—Response of T109 Pix I-F Coil

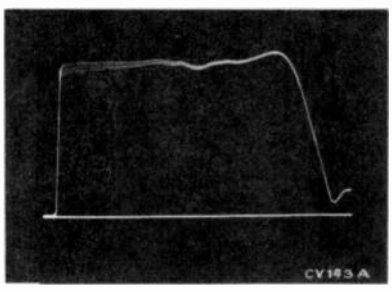


Figure 34—Video Response at Average Contrast

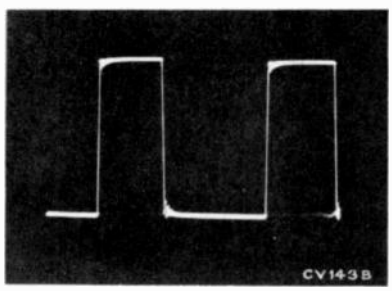


Figure 35—Video Response (100 KC Square Wave)

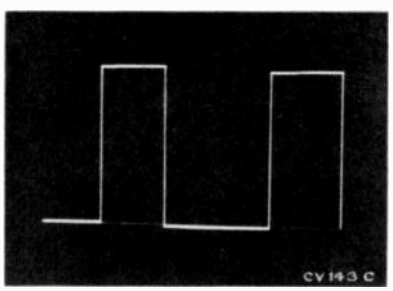
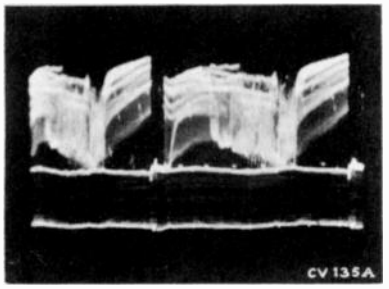


Figure 36—Video Response (60 Cycle Square Wave)

17T153, 17T154,
17T155, 17T160, 17T162,
17T172, 17T172K, 17T173,
17T173K, 17T174, 17T174K

WAVEFORM PHOTOGRAPHS

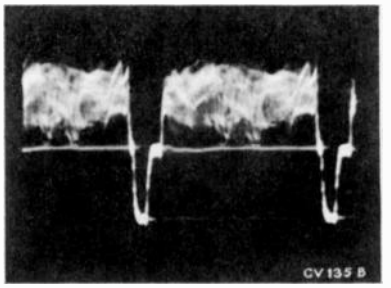
Taken from RCA WO58A Oscilloscope



Grid of 1st Video Amplifier
(Pin 4 of V110) (6AG7)
Voltage Depends on Picture

Figure 37—Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (6.0 Volts PP)

Figure 38—Horizontal (Oscilloscope Synced to ½ of Horizontal Sweep Rate) (6.0 Volts PP)



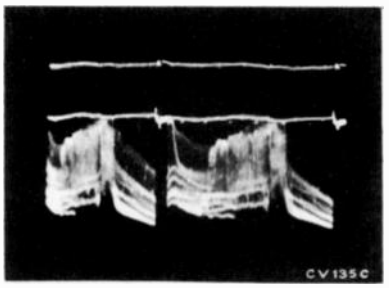
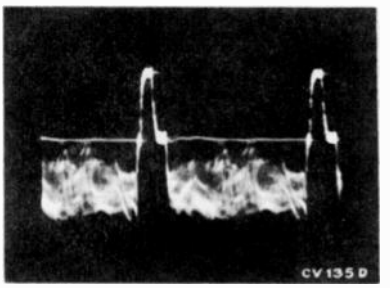
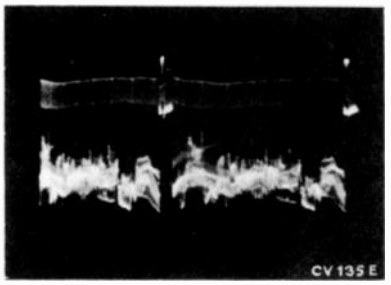


Plate of 1st Video Amplifier
(Pin 8 of V110) (6AG7)
Voltage depends on picture

Figure 39—Vertical (105 Volts PP)

Figure 40—Horizontal (105 Volts PP)

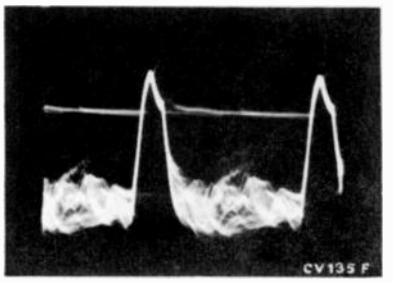




Grid of Sync Separator
(Pin 4 of V113) (6SN7)
Voltage depends on picture

Figure 41—Vertical (30 Volts PP)

Figure 42—Horizontal (30 Volts PP)



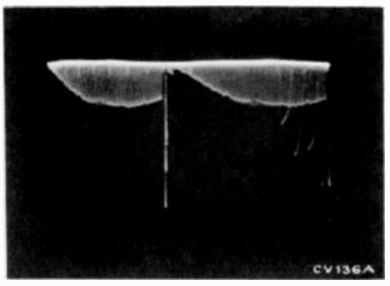
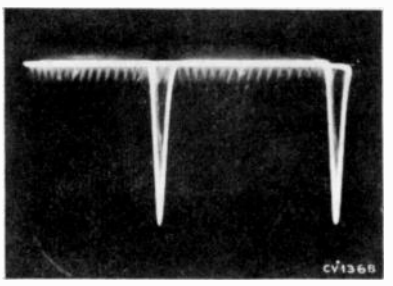
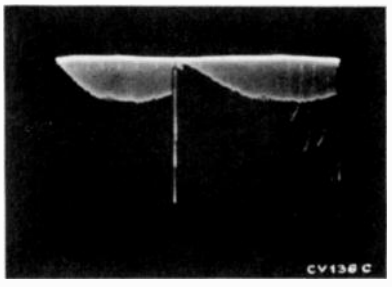


Plate of Sync Separator
(Pin 5 of V113) (6SN7)
(.25 mfd in series with probe)

Figure 43—Vertical (33 Volts PP)

Figure 44—Horizontal (8 Volts PP)

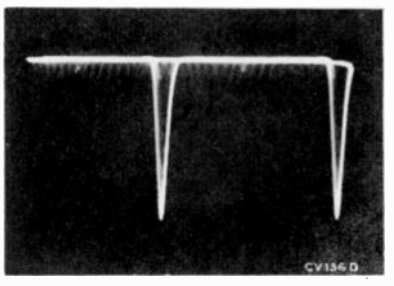




Grid of Vertical Sync Amp
(Pin 4 of V114A) (6SN7)

Figure 45—Vertical (12 Volts PP)

Figure 46—Horizontal (5 Volts PP)



WAVEFORM PHOTOGRAPHS

Taken from RCA WO58A Oscilloscope

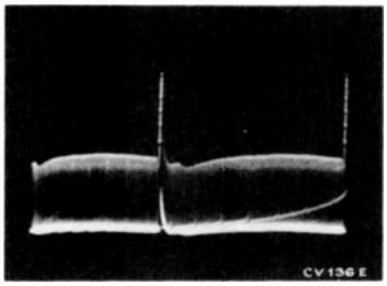
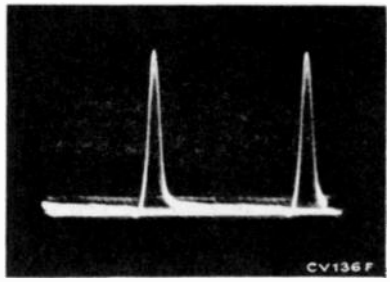


Plate of Vertical Sync Amp (Pin 5 of V114A) (6SN7)

Figure 47—Vertical (27 Volts PP)

Figure 48—Horizontal (16 Volts PP)



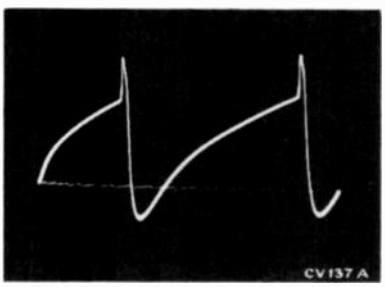
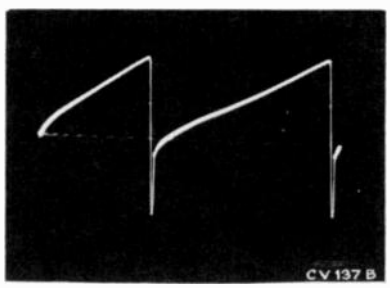


Figure 49—Grid of Vertical Sweep Osc. (Pin 1 of V114B) (6SN7) (25 Volts PP)

Figure 50—Plate of Vertical Sweep Osc. (Pin 2 of V114B) (30 Volts PP)



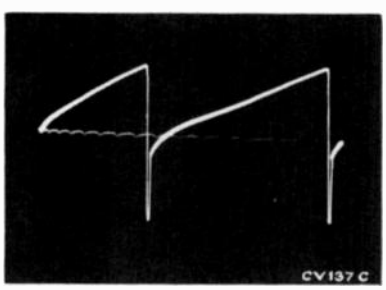
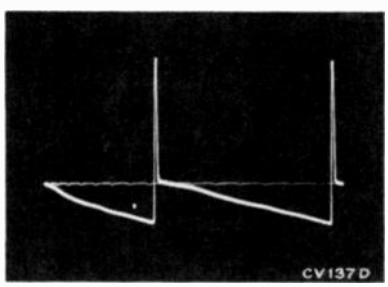
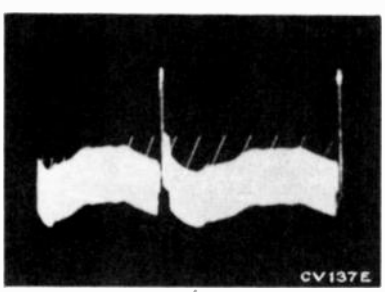


Figure 51—Grid of Vertical Sweep Output (Pin 1 of V115) (6AQ5) (35 Volts PP)

Figure 52—Plate of Vertical Sweep Output (Pin 5 of V115) (6AQ5) (800 Volts PP)

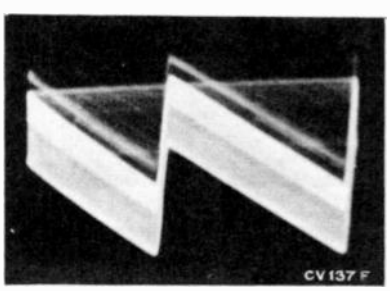


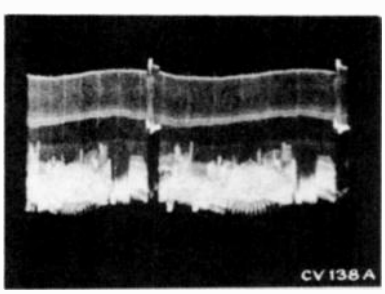


Cathode of Sync Separator (Pin 3 of V113) (6SN7)

Figure 53—Vertical (11 Volts PP)

Figure 54—Horizontal (6 Volts PP)

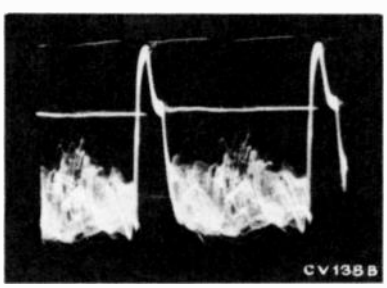




Grid of Sync Separator (Pin 1 of V113) (6SN7)

Figure 55—Vertical (40 Volts PP)

Figure 56—Horizontal (40 Volts PP)



WAVEFORM PHOTOGRAPHS

Taken from RCA WO58A Oscilloscope

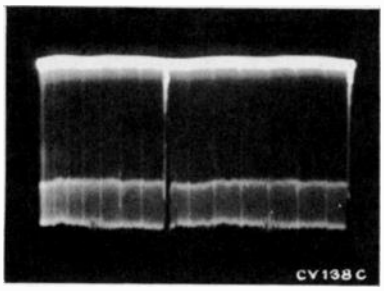
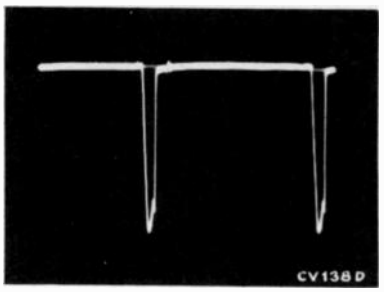
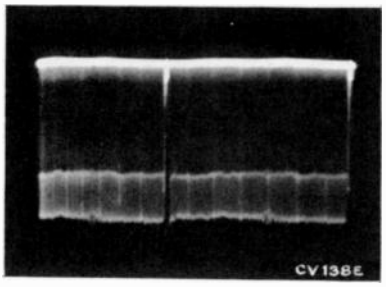


Plate of Sync Separator
(Pin 2 of V113) (6SN7)

Figure 57—Vertical (15 Volts PP)

Figure 58—Horizontal (15 Volts PP)

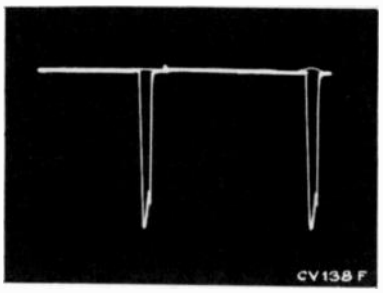




Grid of Hor. Sync Amp.
(Pin 4 of V112) (6SN7)

Figure 59—Vertical (15 Volts PP)

Figure 60—Horizontal (15 Volts PP)



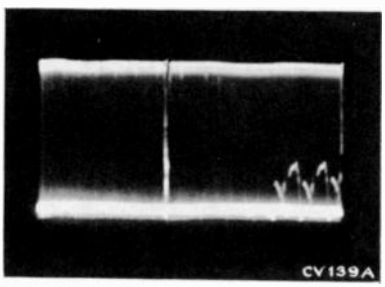
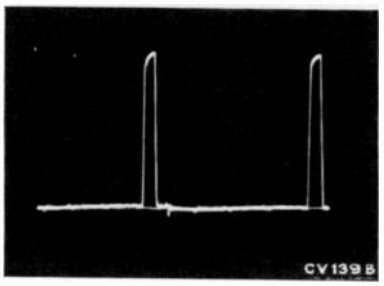
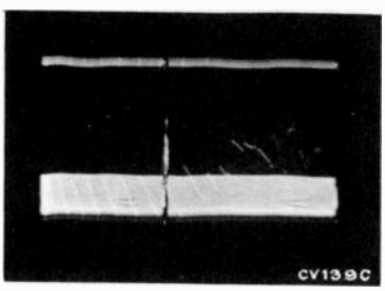


Plate of Hor. Sync Amp.
(Pin 5 of V112) (6SN7)

Figure 61—Vertical (70 Volts PP)

Figure 62—Horizontal (70 Volts PP)

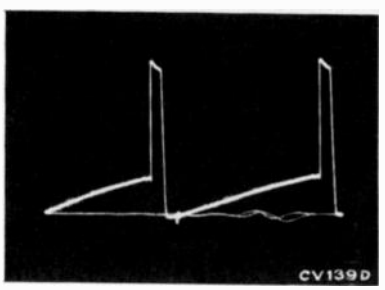


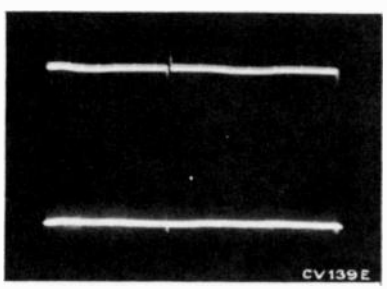


Grid of Hor. Sync Amp.
(Pin 1 of V112) (6SN7)

Figure 63—Vertical (65 Volts PP)

Figure 64—Horizontal (65 Volts PP)

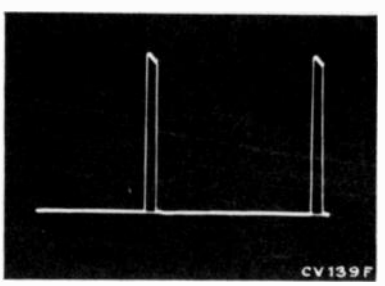




Cathode of Hor. Sync Amp.
(Pin 3 of V112) (6SN7)

Figure 65—Vertical (18 Volts PP)

Figure 66—Horizontal (18 Volts PP)



WAVEFORM PHOTOGRAPHS

Taken from RCA WO58A Oscilloscope

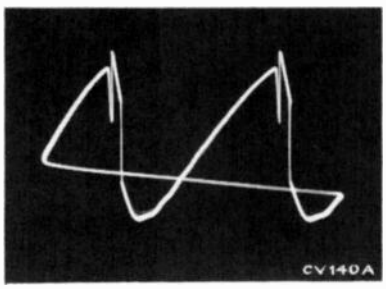
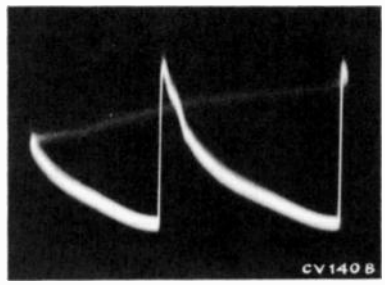


Figure 67—Grid of Horizontal Oscillator Control (Pin 1 of V116) (6SN7GT) (22 Volts PP)

Figure 68—Cathode of Horizontal Oscillator Control (Pin 3 of V116) (6SN7GT) (1.3 Volts PP)



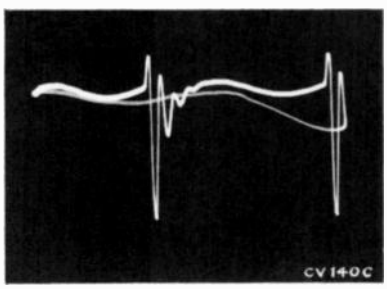
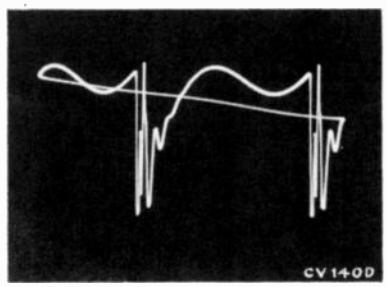


Figure 69—Grid of Horizontal Oscillator (Pin 4 of V116) (6SN7GT) (390 Volts PP)

Figure 70—Plate of Horizontal Oscillator (Pin 5 of V116) (6SN7GT) (140 Volts PP)



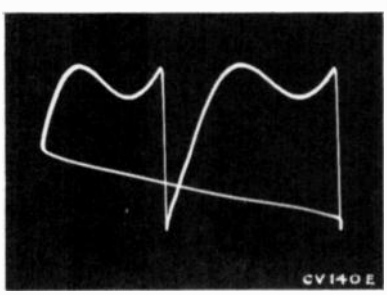
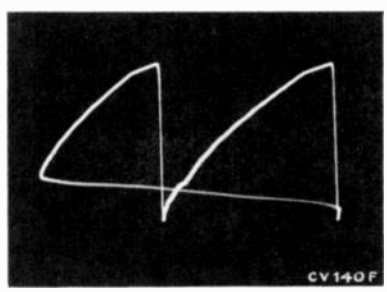


Figure 71—Terminal "C" of T113 (120 Volts PP)

Figure 72—Grid of Horizontal Output Tube (Pin 5 of V117) (6BQ6) (95 Volts PP)



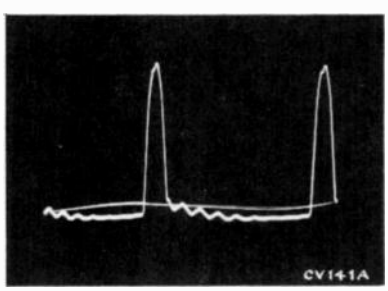
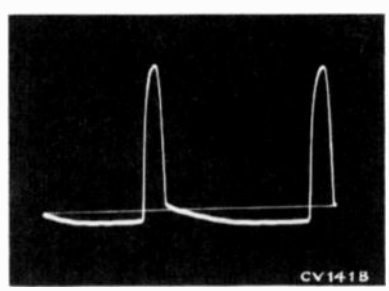


Figure 73—Plate of Horizontal Output (Approx. 4000 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V117 to Ground)

Figure 74— Cathode of Damper (Pin 3 of V120) (6W4GT) (2300 Volts PP)



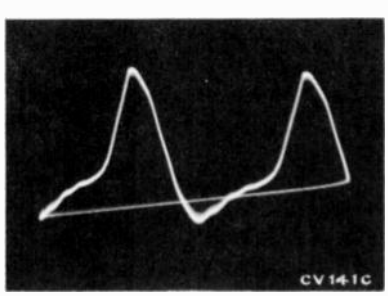
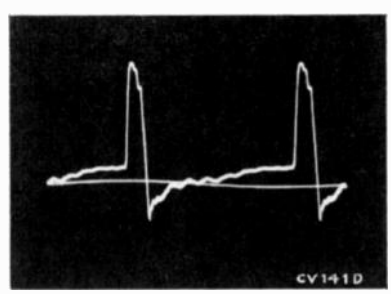


Figure 75—Plate of Damper (Pin 5 of V120) (6W4GT) (180 Volts PP)

Figure 76—Plate of AGC Amplifier (Pin 5 of V111) (6CB6) (600 Volts PP)



17T153, 17T154, 17T155, 17T160, 17T162, 17T172, 17T172K, 17T173, 17T173K, 17T174, 17T174K

VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition, a 5000 microvolt test pattern signal was fed into the receiver, the picture synced and the AGC control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are read with a type WV97A senior "VoltOhmyst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c. The symbol < means less than.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	
V1	6X8	Mixer	5000 Mu. V. Signal	9	—	8	—	6	0	7	—	
			No Signal	9	145 to 150	8	145 to 150	6	0	7	−2.8 to −3.5	Depending on channel
V1	6X8	R-F Oscillator	5000 Mu. V. Signal	3	—	—	—	6	0	2	—	
			No Signal	3	88 to 108	—	—	6	0	2	−3.0 to −5.1	Depending on channel
V2	6BQ7	R-F Amplifier	5000 Mu. V. Signal	6	—	—	—	8	—	7	—	
			No Signal	6	133 to 138	—	—	8	1.1	7	—	Depending on channel
V2	6BQ7	R-F Amplifier	5000 Mu. V. Signal	1	—	—	—	3	—	2	—	
			No Signal	1	260	—	—	3	133 to 138	2	—	Depending on channel
V101	6AU6	1st Sound I-F Amp.	5000 Mu. V. Signal	5	255	6	185	7	0.8	1	−1.0	
			No Signal	5	245	6	165	7	0.9	1	0	
V102	6AU6	2d Sound I-F Amp.	5000 Mu. V. Signal	5	260	6	52	7	0.17	1	−24	
			No Signal	5	255	6	54.0	7	0.12	1	*−1.5	*Unreliable measuring point. Voltage depends on noise.
V103	6AL5	Ratio Detector	5000 Mu. V. Signal	7	0.54	—	—	1	15.1	—	—	7.5 kc deviation at 400 cycles
			No Signal	7	-0.85	—	—	1	*6.85	—	—	*Unreliable measuring point. Voltage depends on noise.
V104	6AV6	1st Audio Amplifier	5000 Mu. V. Signal	7	102	—	—	2	0	1	−0.3	At min. volume
			No Signal	7	100	—	—	2	0	1	−0.3	At min. volume
V105	6AQ5	Audio Output	5000 Mu. V. Signal	5	245	6	254	2	17	7	0	At min. volume
			No Signal	5	240	6	250	2	17	7	0	At min. volume
V106	6AU6	1st Pix. I-F Amplifier	5000 Mu. V. Signal	5	248	6	255	7	0.2	1	−6.7	
			No Signal	5	150	6	120	7	1.0	1	*0	*Unreliable measuring point. Make measurement at T104-D.
V107	6CB6	2nd Pix. I-F Amplifier	5000 Mu. V. Signal	5	249	6	232	2	0.15	1	−6.7	
			No Signal	5	145	6	108	2	0.8	1	0	
V108	6CB6	3d Pix. I-F Amplifier	5000 Mu. V. Signal	5	145	6	135	2	1.2	1	0	
			No Signal	5	130	6	127	2	1.1	1	0	
V109	6CB6	4th Pix. I-F Amplifier	5000 Mu. V. Signal	5	215	6	150	2	2.1	1	0	
			No Signal	5	210	6	140	2	2.0	1	0	
V110	6AG7	Video Amplifier	5000 Mu. V. Signal	8	135	6	150	5	1.35	4	−3.0	
			No Signal	8	100	6	125	5	1.65	4	*−0.6	*Depends on noise
V111	6CB6	AGC Amplifier	5000 Mu. V. Signal	5	-35.8	6	238	2	120	1	120	AGC control set for normal operation
			No Signal	5	4.0	6	265	2	100	1	80	AGC control set for normal operation

VOLTAGE CHART

17T153, 17T154, 17T155, 17T160, 17T162, 17T172, 17T172K, 17T173, 17T173K, 17T174, 17T174K

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	
V112	6SN7GT	Hor. Sync Amplifier	5000 Mu. V. Signal	2	150	—	—	3	1.2	1	-38.0	
			No Signal	2	143	—	—	3	0.68	1	*-18	*Unreliable measurement point. Voltage depends on noise.
			5000 Mu. V. Signal	5	77	—	—	6	0	4	-1.3	
			No Signal	5	75	—	—	6	0	4	* 0.8	*Voltage depends on noise.
V113	6SN7GT	Hor. Sync Separator	5000 Mu. V. Signal	2	269	—	—	3	118	1	100	
			No Signal	2	263	—	—	3	*90	1	*80	*Unreliable measurement point. Voltage depends on noise.
V113	6SN7GT	Vert. Sync Separator	5000 Mu. V. Signal	5	450	—	—	6	125	4	100	
			No Signal	5	400	—	—	6	100	4	80	
V114A	6SN7GT	Vert. Sync Amplifier	5000 Mu. V. Signal	5	12.0	—	—	6	0	4	-0.13	
			No Signal	5	11.0	—	—	6	0	4	-0.05	
V114B	6SN7GT	Vertical Oscillator	5000 Mu. V. Signal	2	*53	—	—	3	0	1	* 14.8	*Depends on setting of Vert. hold control.
			No Signal	2	*53	—	—	3	0	1	* 14.1	Voltages shown are synced pix adjustment.
V115	6AQ5	Vertical Output	5000 Mu. V. Signal	5	245	6	259	2	21.5	1	0	
			No Signal	5	240	6	252	2	21.6	1	0	
V116	6SN7GT	Horizontal Osc. Control	5000 Mu. V. Signal	2	182	—	—	3	8.0	1	-12.5	
			No Signal	2	180	—	—	3	-3.0	1	-19.5	
			5000 Mu. V. Signal	2	135	—	—	3	8.8	1	-13.5	Hor. hold counter-clockwise
			5000 Mu. V. Signal	2	225	—	—	3	8.8	1	-12.5	Hor. hold clockwise
V116	6SN7GT	Horizontal Oscillator	5000 Mu. V. Signal	5	185	—	—	6	0	4	-58	
			No Signal	5	180	—	—	6	0	4	-67	
			5000 Mu. V. Signal	5	185	—	—	6	0	4	-58	Hor. hold counter-clockwise
			5000 Mu. V. Signal	5	185	—	—	6	0	4	-58	Hor. hold clockwise
V117	6BQ6GT	Horizontal Output	5000 Mu. V. Signal	Cap	*	4	168	8	18.0	5	-15.0	*High Voltage Pulse Present
			No Signal	Cap	*	4	168	8	18.5	5	-15.0	*High Voltage Pulse Present
V118	1V2	Focus Rectifier	5000 Mu. V. Signal	9	*	—	—	4 & 5	4280	—	—	*High Voltage Pulse Present
Omitted on "K" Models			No Signal	9	*	—	—	4 & 5	4220	—	—	*High Voltage Pulse Present
V119	1B3GT /8016	H. V. Rectifier	5000 Mu. V. Signal	Cap	*	—	—	2 & 7	13,500	—	—	*High Voltage Pulse Present
			No Signal	Cap	*	—	—	2 & 7	13,200	—	—	*High Voltage Pulse Present
V120	6W4GT	Damper	5000 Mu. V. Signal	5	266	—	—	3	*	—	—	*High Voltage Pulse Present
			No Signal	5	261	—	—	3	*	—	—	*High Voltage Pulse Present
V121	17GP4 or 17CP4	Kinescope	5000 Mu. V. Signal	Cone	13,500	10	475	11	140	2	90	At average Brightness
			No Signal	Cone	13,200	10	470	11	135	2	90	At average Brightness

KCS66D CHASSIS WIRING DIAGRAM

17T172K, 17T173K, 17T174K

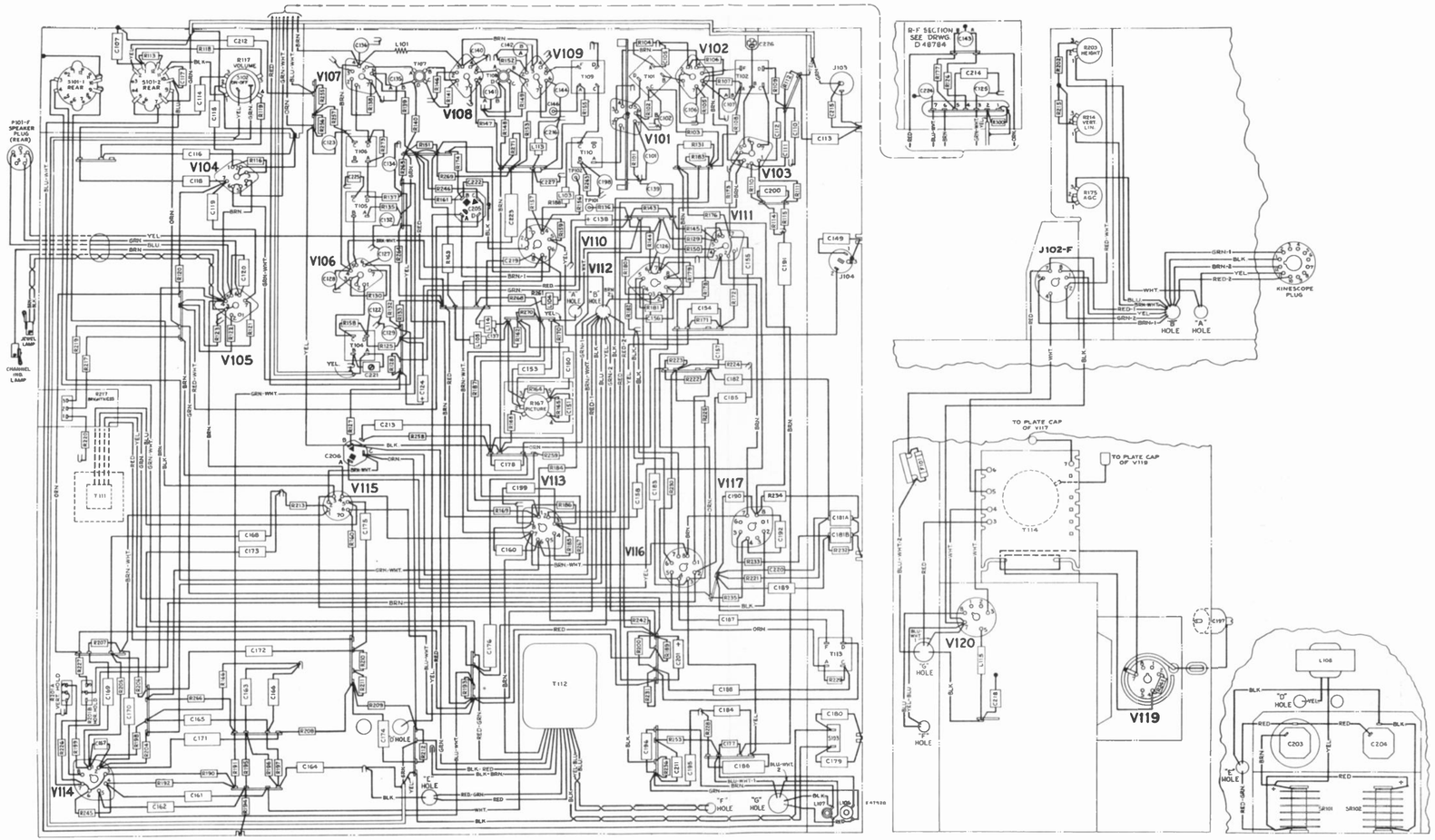


Figure 77—KCS66D Chassis Wiring Diagram

KCS66 AND KCS66A CHASSIS WIRING DIAGRAM

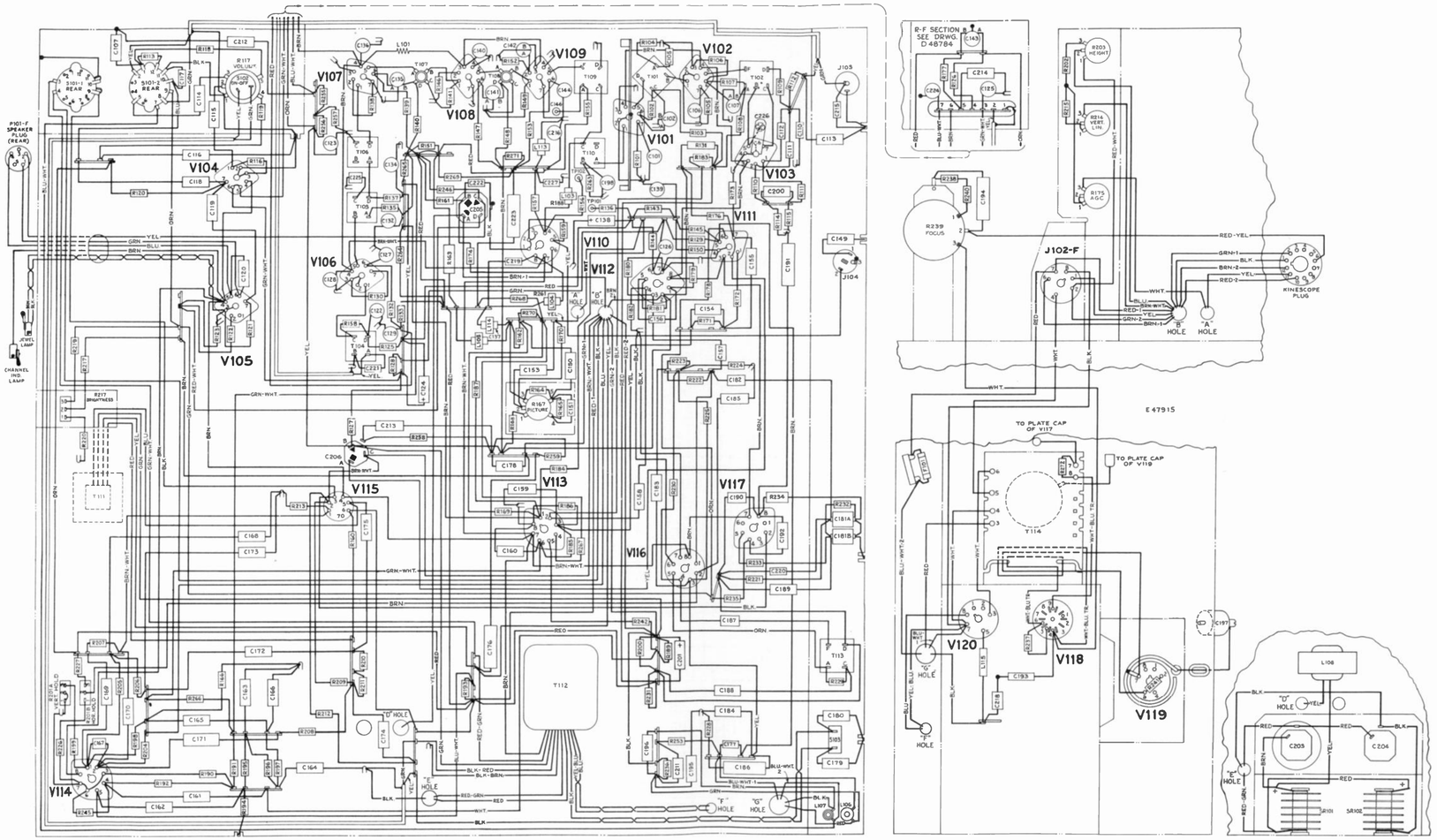


Figure 78—KCS66 and KCS66A Chassis Wiring Diagram

R-F UNIT WIRING DIAGRAM

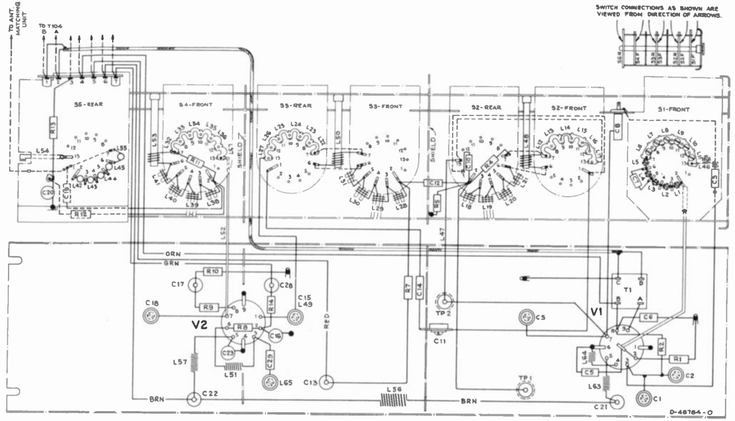


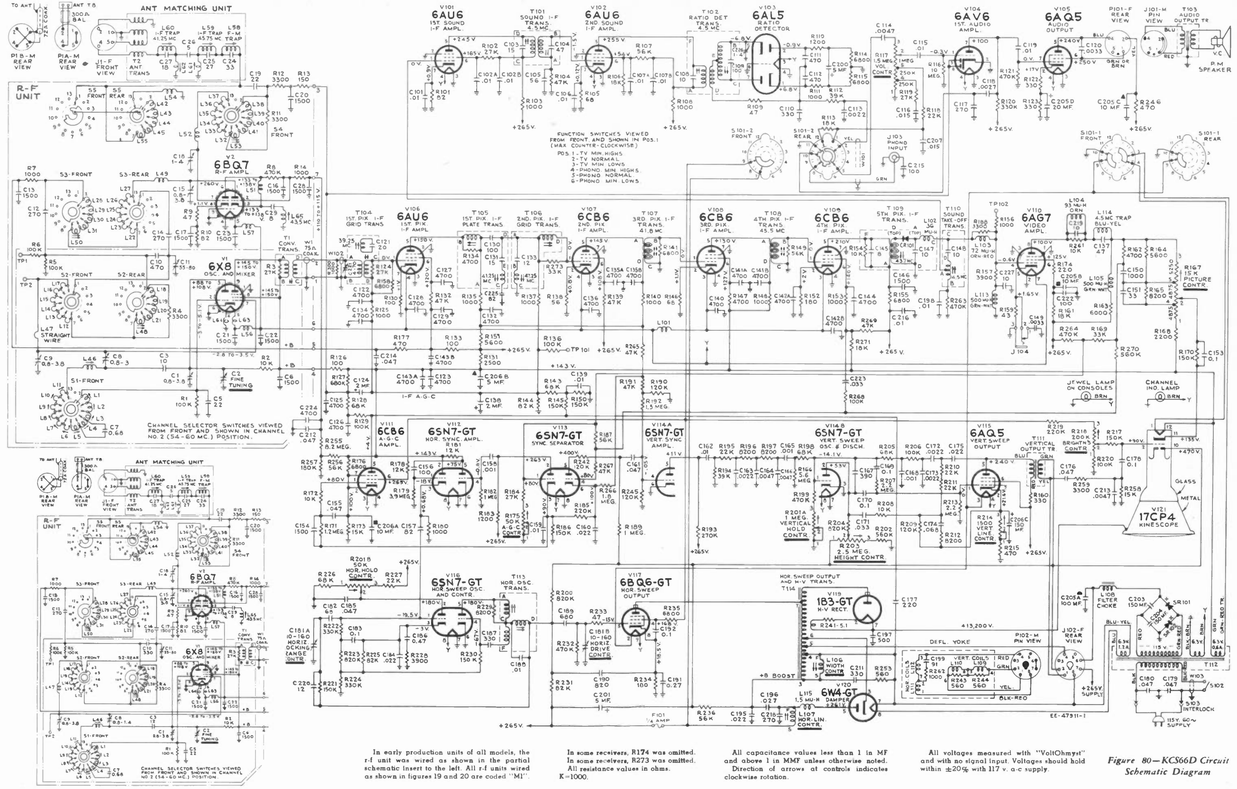
Figure 79—R-F Unit Wiring Diagram

CRITICAL LEAD DRESS:

1. Keep all wiring in the pix i-f, sound i-f and video circuits as short as possible.
2. Keep the leads on C110, C111, C112, C200, R109, R110, R111, R112, R114, R115 and R233 as short and direct as possible.
3. Do not change the bus wire connection to pin 2 of V101 and V102. Sleeving is used on these wires to insure length and to prevent shorting.
4. Dress C114 down between R117 (volume control) and wafer S101-2.
5. Ground R130 to pin 3 of V106 and R138 to pin 7 of V107.
6. Do not change the grounding of R141, R146 and R149.
7. Keep the bus wire from T109-A to C146 (plug in capacitor) short and direct.
8. Ground the filaments of sockets V107, V108 and V109 independently of the socket center pin. Use ground lances provided near each socket.
9. Dress C198 straight up to act as a shield between T101-A and V110-4.
10. Dress C153 and R170 (kine cathode) up in the air above the terminal board.
11. Keep the leads connected to T113-C and T113-D (synchoguide) down so that they will not short out when the chassis is placed in the cabinet.
12. Do not reroute any wires between T104 and the terminal board along-side it. Keep all leads on the foot side of the terminal board.
13. Dress all wires routed past T104, shielded wires W102 and W103 under the big lances near T104.
14. Dress all a-c leads to S102 under the large lances on the front apron.
15. Dress R116 close to the chassis with leads as short as possible.
16. Dress C212 and C221 up in the air and away from all other leads and components.
17. The blue lead from pin 5 of V111 to the terminal board under the high voltage cage should be routed between V117 socket and the rear apron.
18. Dress all 2 watt resistors away from each other and all other wires and components.
19. Dress all wires away from damper tube V120.
20. Blue wire from pin 5 V116 to T113-A should not be more than 5 inches long.
21. Dress all peaking coils up and away from the base.
22. Dress C193 at V118 socket about one half inch away from any component or metallic object.
23. Dress the lead from pin 4 of V118 socket to the focus pot R239 through the high voltage compartment between the insulating board, mounting V119 at the metal shield, then through the vent hole in the shield to the pot. Dress this lead clear of the tubes and other high voltage components.
24. Dress all leads in the high voltage compartment away from each other and away from the high voltage transformer.

KCS66D CIRCUIT SCHEMATIC DIAGRAM

17T172K, 17T173K, 17T174K



In early production units of all models, the r-f unit was wired as shown in the partial schematic insert to the left. All r-f units wired as shown in figures 19 and 20 are coded "M".

In some receivers, R174 was omitted.
In some receivers, R273 was omitted.
All resistance values in ohms. K=1000.

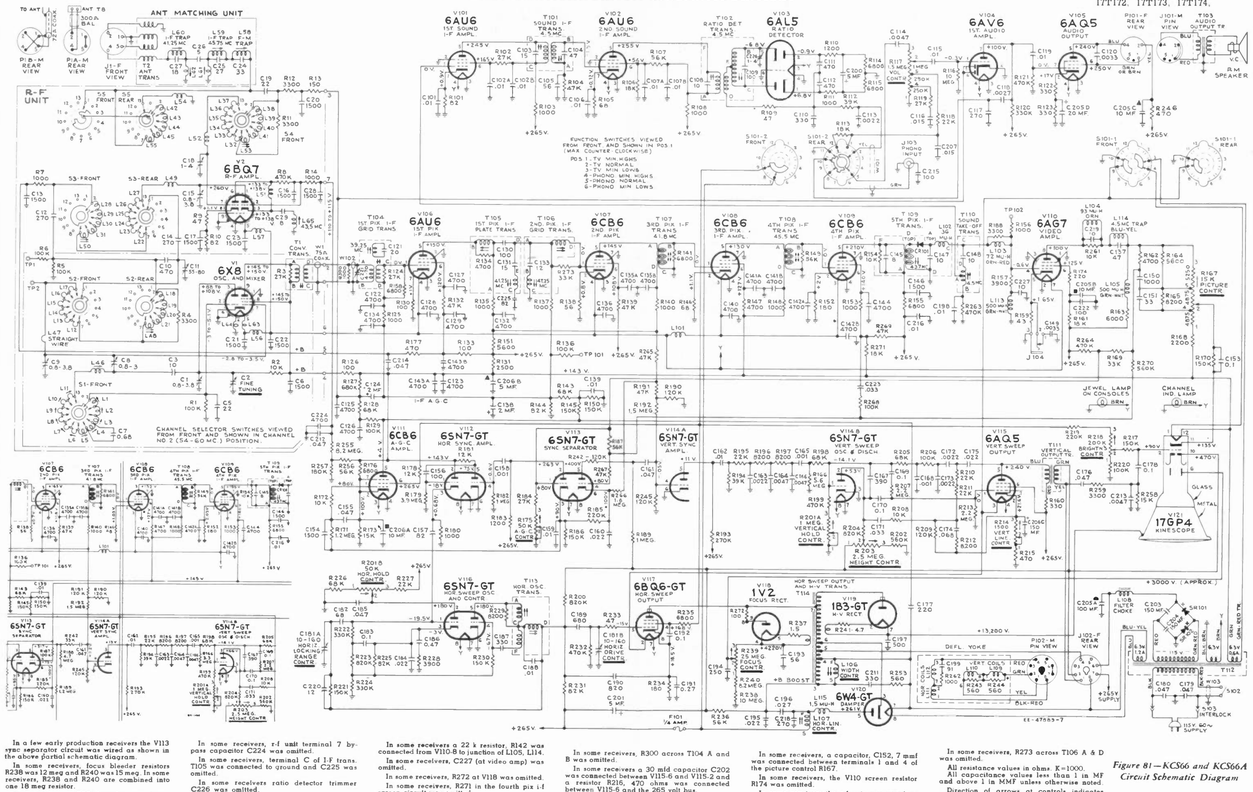
All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.
Direction of arrows at controls indicates clockwise rotation.

All voltages measured with "VoltOhmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a.c supply.

Figure 80—KCS66D Circuit Schematic Diagram

KCS66 AND KCS66A CIRCUIT SCHEMATIC DIAGRAM

17T153, 17T154, 17T155, 17T160, 17T162, 17T172, 17T173, 17T174,



In a few early production receivers the V113 sync separator circuit was wired as shown in the above partial schematic diagram.

In some receivers, focus bleeder resistors R238 was 12 meg and R240 was 15 meg. In some receivers, R238 and R240 are combined into one 18 meg resistor.

In some receivers, R264 (in video amp at sync take-off) was 220 k.

In some receivers, r-f unit terminal 7 bypass capacitor C224 was omitted.

In some receivers, terminal C of I-F trans. T105 was connected to ground and C225 was omitted.

In some receivers ratio detector trimmer C226 was omitted.

In some receivers, C193 was connected from V118-5 to ground.

In some receivers a 22 k resistor, R142 was connected from V110-8 to junction of L105, L114.

In some receivers, C227 (at video amp) was omitted.

In some receivers, R272 at V118 was omitted.

In some receivers, R271 in the fourth pix i-f screen circuit was omitted.

In some receivers integrator resistor R165 was 3.3 megs.

In some receivers, R300 across T104 A and B was omitted.

In some receivers a 30 mfd capacitor C202 was connected between V115-6 and V115-2 and a resistor R216, 470 ohms was connected between V115-6 and the 265 volt bus.

In some receivers, the Junction of R209 and R212 near V115 was connected to ground.

In some receivers, a capacitor, C152, 7 mmf was connected between terminals 1 and 4 of the picture control R167.

In some receivers, the V110 screen resistor R174 was omitted.

In some receivers the r-f unit was wired as shown in the partial schematic shown on page 13. R-F units wired as shown above are marked "M".

In some receivers, R273 across T106 A & D was omitted.

All resistance values in ohms. K=1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Direction of arrows at controls indicates clockwise rotation.

All voltages measured with "VoltOhmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a.c supply.

Figure 81—KCS66 and KCS66A Circuit Schematic Diagram

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLIES
	KRK11
76539	Board—Antenna matching transformer terminal board less coils L58, L59, L60 and less capacitors C24, C25, C26, C27
76531	Board—Terminal board, 5 contact and ground
76522	Bracket—Vertical bracket for holding oscillator-mixer tube shield (early production)
76845	Bracket—Vertical Bracket for holding oscillator-mixer tube shield (production marked "M1")
75166	Capacitor—Ceramic, variable, for fine tuning—plunger type (C2)
93056	Capacitor—Ceramic, 5 mmf. (C26)
70597	Capacitor—Ceramic, 8 mmf. (C29)
55326	Capacitor—Ceramic, 10 mmf. (C3) (production marked "M1")
76550	Capacitor—Ceramic, 12 mmf. (C3) (early production)
54207	Capacitor—Ceramic, 18 mmf. (C27)
76557	Capacitor—Ceramic, 22 mmf. (C19)
76558	Capacitor—Ceramic, 22 mmf. (C5)
70935	Capacitor—Ceramic, 27 mmf. (C25)
76739	Capacitor—Ceramic, 33 mmf. (C24)
76527	Capacitor—Mica trimmer, 55-80 mmf. (C11)
75199	Capacitor—Ceramic, 270 mmf. (C12, C14)
76552	Capacitor—Ceramic, 330 mmf. (C10) (early production)
75198	Capacitor—Ceramic, 470 mmf. (C10) (production marked "M1")
75166	Capacitor—Ceramic, 1500 mmf. (stand-off) (C13, C17, C21, C22, C28)
73748	Capacitor—Ceramic, 1500 mmf. (C16, C20, C23)
75610	Capacitor—Ceramic, 1500 mmf. (C6)
71088	Capacitor—Ceramic, 0.68 mmf. (C7)
75184	Capacitor—Ceramic, adjustable, 0.75-4 mmf. complete with adjusting stud (C1, C9)
76545	Capacitor—Tubular, steatite, adjustable 0.8-2.25 mmf. (C8) (early production)
76781	Capacitor—Tubular, steatite, adjustable 0.8-2.25 mmf. (C8) (production marked "M1")
76532	Capacitor—Adjustable trimmer, steatite, 1.0-4.0 mmf. (C18)
76143	Clip—Tubular, clip for mounting stand-off capacitors
73591	Coil—Antenna matching coil (2 req'd)
76560	Coil—Channel #13 converter coil (L47) (early production)
73477	Coil—Choke coil (L57)
76763	Coil—Filament choke coil (L63, L64)
76562	Coil—R-F amplifier coupling coil (L51)
76537	Coil—Shunt coil complete with adjustable core (L61)
76538	Coil—Shunt coil complete with adjustable core (L62)
76529	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (screw adjustment) for r-f section (L49, C15)
76559	Connector—Oscillator grid connector
38853	Connector—4 contact female connector—part of antenna matching transformer
76460	Contact—Test point contact
75187	Core—Adjustable core for fine tuning capacitor
76543	Core—Adjusting core for FM trap
76521	Detent—Detent mechanism and fibre shaft
73453	Form—Coil form for coils L48, L50 & L53
76524	Link—Link assembly for fine tuning
	Resistor—Fixed, composition:—
503047	47 ohms, ±10%, ½ watt (R9)
503082	82 ohms, ±10%, ½ watt (R10)
504115	150 ohms, ±20%, ½ watt (R13)
504210	1000 ohms, ±20%, ½ watt (R7, R14)
503233	3300 ohms, ±10%, ½ watt (R4, R11, R12)
504310	10,000 ohms, ±20%, ½ watt (R2)
504410	100,000 ohms, ±20%, ½ watt (R1, R5, R6)
504447	470,000 ohms, ±20%, ½ watt (R8)
14343	Retainer—Fine tuning shaft retaining ring
75164	Rod—Actuating plunger rod (fibre) for fine tuning link
76547	Screw— #4-40 x ¼" adjusting screw for coils L6, L7, L8, L9, L10, L11
76548	Screw— #4-40 x 5/16" adjusting screw for coils L1, L2, L3, L4, L46
76549	Screw— #4-40 x ⅜" adjusting screw for coil L5
76519	Shaft—Channel selector shaft and plate
76134	Shaft—Fine tuning shaft and cam
76518	Shield—Front shield complete with shaft bushing and bracket
76534	Shield—Tube shield plain for V2 (also V1 in M1 production)
76533	Shield—Tube shield (lead coated) for V1 (early production)

STOCK No.	DESCRIPTION
76336	Socket—Tube socket, 9 pin, miniature, bakelite, saddle mounted
76530	Socket—Tube socket, 9 pin, miniature, ceramic, saddle mounted
75191	Spacer—Insulating spacer for front plate (4 req'd)
75163	Spring—Friction spring (formed) for fine tuning cam
30340	Spring—Hairpin spring for fine tuning link
76523	Spring—Retaining spring for oscillator-mixer tube shield (early production)
75068	Spring—Retaining spring for oscillator-mixer tube shield (production marked "M1")
73457	Spring—Return spring for fine tuning control
76554	Stator—Antenna stator complete with rotor, coils, capacitor and resistor (S5, L42, L43, L44, L45, L54, L55, C20)
76551	Stator—Converter stator complete with rotor, coils, capacitors and resistors (S2, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L48, C10, C12, R4, R5, R6) (early production)
76780	Stator—Converter stator complete with rotor, coils, capacitors and resistors (S2, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L48, C10, C12, R4, R5, R6) (production marked "M1")
76546	Stator—Oscillator stator complete with rotor, coils, and capacitor (S1, C3, C7, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L46) (early production)
76779	Stator—Oscillator stator complete with rotor, coils, and capacitor (S1, C3, C7, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L46) (production marked "M1")
76566	Stator—R-F grid stator complete with rotor, coils and resistors (S4, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L53, C19, R11, R12)
76553	Stator—R-F plate stator complete with rotor, coils, capacitor and resistor (S3, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L50, C14, R7)
76561	Strap—Channel #13 r-f grid strap (L52)
76526	Strip—Coil segment mounting strip—L.H. lower
76544	Strip—Coil segment mounting strip—L.H. upper—less trimmer
76525	Strip—Coil segment mounting strip—R.H. center
75446	Stud—Capacitor stud—brass— #4-40 x 13/16" with 3/64" screw driver slot for trimmer coil L49, C15 uncoded and coded "ER"
75447	Stud—Capacitor stud—brass— #4-40 x 13/16" with 3/64" screw driver slot for trimmer coil L49, C15 coded numerically and "Hi Q"
76740	Stud—#6-32 x 1" adjusting stud for capacitor No. 76545 (early production)
75173	Stud—6-32 x 13/16" adjusting stud for capacitor No. 76781 (production marked "M1")
76536	Transformer—Antenna matching transformer complete (T2, C24, C25, C26, C27, L58, L59, L60, L61, L62, J1)
76528	Transformer—Converter transformer (T1, R3)
76540	Trap—FM trap complete with adjustable core (L58)
76535	Trap—I-F trap (L65)
76542	Trap—I-F trap (41.25 MC) complete with core (L60)
76541	Trap—I-F trap (45.75 MC) complete with core (L59)
75190	Washer—Insulating washer (neoprene) for mounting capacitor on coil strip
	CHASSIS ASSEMBLIES
	KCS 66—Models 17T153, 17T154, 17T155, 17T160
	KCS 66A— Models 17T172, 17T173, 17T174
	KCS 66D—Models 17T172K, 17T173K, 17T174K
76456	Bracket—Channel indicator lamp bracket
76454	Bracket—Mounting bracket complete with insulator for picture control
76800	Capacitor—Adjustable trimmer, steatite, 1-4 mmf. (C226)
71496	Capacitor—Adjustable
31709	Capacitor—Ceramic, 10 mmf. (C219, C227)
75217	Capacitor—Mica trimmer dual 10-180 mmf. (C181A, C181B)
33380	Capacitor—Ceramic, 12 mmf. (C220)
38868	Capacitor—Ceramic, 33 mmf. (C151)
71924	Capacitor—Ceramic, 56 mmf. (C105)
76384	Capacitor—Ceramic, 56 mmf., 7000 volts (C193) (KCS66 & KCS66A)
76475	Capacitor—Mica, 68 mmf. (C182)
76474	Capacitor—Mica, 82 mmf. (C157)
71514	Capacitor—Ceramic, 82 mmf. (C225)
39396	Capacitor—Ceramic, 100 mmf. (C156, C215)
75437	Capacitor—Ceramic, 100 mmf. (C222)
76673	Capacitor—Ceramic, 220 mmf. (C177)
47617	Capacitor—Ceramic, 270 mmf. (C117)
73091	Capacitor—Mica, 270 mmf. (C218)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
76473	Capacitor—Mica, 330 mmf. (C110)
76476	Capacitor—Mica, 330 mmf. (C187, C211)
73094	Capacitor—Mica, 390 mmf. (C167)
39644	Capacitor—Mica, 470 mmf. (C111, C112)
76461	Capacitor—Ceramic, 500 mmf., 20,000 volts (C197)
76477	Capacitor—Mica, 820 mmf. (C190)
75166	Capacitor—Ceramic, 1500 mmf. (stand-off) (C146)
76470	Capacitor—Ceramic, dual 4700 mmf. (C135A, C135B, C141A, C141B, C142A, C142B, C143A, C143B)
73473	Capacitor—Ceramic, 4700 mmf. (C122, C123, C125, C126, C127, C128, C129, C132, C134, C136, C140, C144, C224)
73960	Capacitor—Ceramic, 10,000 mf. (C101, C106, C139, C198, C216)
75877	Capacitor—Ceramic, dual 10,000 mmf. (C102A, C102B, C107A, C107B)
76742	Capacitor—Electrolytic, 2 mfd., 10 volts (C124, C138)
74521	Capacitor—Electrolytic, 5 mfd., 50 volts (C200)
28417	Capacitor—Electrolytic, 5 mfd., 450 volts (C201)
75218	Capacitor—Electrolytic comprising 1 section of 10 mfd., 350 volts, 1 section of 5 mfd., 350 volts and 1 section of 150 mfd., 50 volts (C206A, C206B, C206C)
76451	Capacitor—Electrolytic comprising 1 section of 100 mfd., 350 volts, 2 sections of 10 mfd., 350 volts and 1 section of 20 mfd., 50 volts (C205A, C205B, C205C, C205D)
75220	Capacitor—Electrolytic, 150 mfd., 200 volts (C203, C204)
75250	Capacitor—Tubular, moulded paper, oil impregnated, .00025 mfd., 12,500 volts (C194) (KCS66 & KCS66A)
76479	Capacitor—Tubular, moulded paper, oil impregnated, .00068 mfd., 600 volts (C189)
75643	Capacitor—Tubular, paper, oil impregnated, .001 mfd., 600 volts (C150, C158, C165)
73801	Capacitor—Tubular, paper, oil impregnated, .001 mfd., 1000 volts (C168)
73598	Capacitor—Tubular, paper, oil impregnated, .0015 mfd., 600 volts (C154)
73595	Capacitor—Tubular, paper, oil impregnated, .0022 mfd., 1000 volts (C113, C163, C173)
73803	Capacitor—Tubular, paper, oil impregnated, .0022 mfd., 1000 volts (C172)
73599	Capacitor—Tubular, paper, oil impregnated, .0027 mfd., 600 volts (C118)
73795	Capacitor—Tubular, paper, oil impregnated, .0033 mfd., 600 volts (C120, C149)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd., 600 volts (C114, C164, C166, C213)
73561	Capacitor—Tubular, paper, oil impregnated, .01 mfd., 400 volts (C115, C119, C159, C162)
73594	Capacitor—Tubular, moulded paper, oil impregnated, .01 mfd., 600 volts (C168)
73797	Capacitor—Tubular, paper, oil impregnated, .015 mfd., 600 volts (C116, C207)
73562	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 400 volts (C180, C184)
73798	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 600 volts (C175)
73810	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 1000 volts (C195)
73811	Capacitor—Tubular, paper, oil impregnated, .027 mfd., 1000 volts (C196)
73552	Capacitor—Tubular, paper, oil impregnated, .033 mfd., 400 volts (C223)
73596	Capacitor—Tubular, paper, oil impregnated, .033 mfd., 1000 volts (C171)
73558	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 200 volts (C155)
73553	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 400 volts (C212)
75071	Capacitor—Tubular, moulded paper, .047 mfd., 400 volts (C179, C180)
73592	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 600 volts (C161, C185, C214)
73564	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 1000 volts (C176)
73792	Capacitor—Tubular, paper, oil impregnated, .068 mfd., 400 volts (C174)
73784	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd., 200 volts (C153, C169)

STOCK No.	DESCRIPTION
73551	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd., 400 volts (C178, C183)
73557	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd., 600 volts (C170, C192)
73788	Capacitor—Tubular, paper, oil impregnated, 0.27 mfd., 200 volts (C191)
73787	Capacitor—Tubular, paper, oil impregnated, 0.47 mfd., 200 volts (C186)
76498	Choke—Filter choke (L108)
76143	Clip—Tubular clip to mount stand-off capacitor
73477	Coil—Choke coil (L101)
76442	Coil—Horizontal linearity coil complete with adjustable core (L107)
76646	Coil—Peaking coil (72 muh) (L103, R188)
72619	Coil—Peaking coil (93 muh) (L104, R261)
75252	Coil—Peaking coil (500 muh) (L105, L113)
76640	Coil—R-F choke (1.5 muh) (L115)
76441	Coil—Width coil complete with adjustable core (L106)
35787	Connector—Phono input connector (J103)
74594	Connector—2 contact male connector for power cord
5040	Connector—4 contact female connector for speaker cable (P101)
75542	Connector—6 contact male connector—part of deflection yoke (P102)
50367	Connector—6 contact female connector for deflection yoke leads (J102)
76457	Connector—2nd. anode lead connector—mounted on hi-voltage capacitor
76460	Contact—Test point contact
75517	Contact—2nd. anode connector contact only
76447	Control—AGC control (R175)
76444	Control—Brightness control (R218)
76503	Control—Focus control (R239) (KCS66 & KCS66A)
76448	Control—Height control (R203)
76443	Control—Horizontal and vertical hold control (R201A, R201B)
76445	Control—Picture control (R167)
76449	Control—Vertical linearity control (R214)
76171	Control—Volume control and power switch (R117)
	Crystal—See Rectifier—Crystal
74956	Cushion—Rubber cushion for deflection yoke hood (2 req'd)
74839	Fastener—Push fastener for mounting tube sockets
73600	Fuse—.25 amp. 250 volts (F101)
37396	Grommet—Rubber grommet for mounting tube sockets
76459	Grommet—Rubber grommet for 2nd. anode lead exit
76376	Hood—Deflection yoke hood less rubber cushions (KCS66 & KCS66A)
76169	Hood—Deflection yoke hood less rubber cushions (KCS66D)
76377	Insulator—Focus control insulator (KCS66 & KCS66A)
75482	Jack—Video jack (J104)
74969	Knob—Focus control knob (KCS66 & KCS66A)
76480	Lead—Anode lead complete with eyelet
76375	Magnet—Centering magnet (KCS66 & KCS66A)
76168	Magnet—Focus magnet complete (KCS66D)
76141	Magnet—Ion trap magnet (PM) (KCS66 & KCS66A)
76317	Magnet—Ion trap magnet (PM) (KCS66D)
76728	Nut—Speed nut for trimmer capacitor C226
18469	Plate—Bakelite mounting plate for electrolytic 75220
76484	Plate—Hi-voltage plate—bakelite—complete with tube socket and corona ring
75675	Rectifier—Picture Detector Crystal rectifier (CR101)
76452	Rectifier—Selenium rectifier (SR101, SR102)
76796	Resistor—Wire wound, 5.1 ohms, 1/3 watt (KCS66D)
76639	Resistor—Wire wound, 180 ohms, 2 watts (R234)
76465	Resistor—Wire wound, 330 ohms, 1 watt (R122, R123)
76468	Resistor—Wire wound, 1.5 ohms, 1/3 watt (R237) (KCS66 & KCS66A)
72633	Resistor—Wire wound, 4.7 ohms, 1/3 watt (R241) (KCS66 & KCS66A)
76469	Resistor—Wire wound, 2500 ohms, 10 watts (R131)
76390	Resistor—Wire wound, 5600 ohms, 5 watts (R151)
76638	Resistor—Wire wound, 6000 ohms, 10 watts (R163)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
	Resistor—Fixed, composition:—
502043	43 ohms, ±5%, ½ watt (R159)
30732	47 ohms, ±5%, ½ watt (R109)
504047	47 ohms, ±20%, ½ watt (R233)
502056	56 ohms, ±5%, ½ watt (R138)
34763	68 ohms, ±5%, ½ watt (R105, R146)
13961	82 ohms, ±5%, ½ watt (R101)
502110	100 ohms, ±5%, ½ watt (R130)
504110	100 ohms, ±20%, ½ watt (R126, R133)
503118	180 ohms, ±10%, ½ watt (R152)
503122	220 ohms, ±10%, ½ watt (R174)
503133	330 ohms, ±10%, ½ watt (R160)
503147	470 ohms, ±10%, ½ watt (R215)
513147	470 ohms, ±10%, 1 watt (R246)
504147	470 ohms, ±20%, ½ watt (R177)
513156	560 ohms, ±10%, 1 watt (R253)
34766	1000 ohms, ±5%, ½ watt (R111)
503210	1000 ohms, ±10%, ½ watt (R135, R137, R153, R180, R300)
504210	1000 ohms, ±20%, ½ watt (R103, R108, R125, R140, R148, R156)
30731	1200 ohms, ±5%, ½ watt (R110)
503212	1200 ohms, ±10%, ½ watt (R183)
503222	2200 ohms, ±10%, ½ watt (R168)
504233	3300 ohms, ±20%, ½ watt (R259)
30694	3900 ohms, ±5%, ½ watt (R157)
503239	3900 ohms, ±10%, ½ watt (R228)
503247	4700 ohms, ±10%, ½ watt (R162)
504247	4700 ohms, ±20%, ½ watt (R147)
503256	5600 ohms, ±10%, ½ watt (R164)
14659	6800 ohms, ±5%, ½ watt (R114, R115, R141)
503268	6800 ohms, ±10%, ½ watt (R158, R176)
513268	6800 ohms, ±10%, 1 watt (R155)
523268	6800 ohms, ±10%, 2 watts (R235)
502282	8200 ohms, ±5%, ½ watt (R229)
503282	8200 ohms, ±10%, ½ watt (R165, R196, R197, R212)
503310	10,000 ohms, ±10%, ½ watt (R208)
504310	10,000 ohms, ±20%, ½ watt (R172)
503312	12,000 ohms, ±10%, ½ watt (R178, R181)
503315	15,000 ohms, ±10%, ½ watt (R258)
523315	15,000 ohms, ±10%, 2 watts (R173)
503318	18,000 ohms, ±10%, ½ watt (R106, R113, R271)
523318	18,000 ohms, ±10%, 2 watts (R161)
503322	22,000 ohms, ±10%, ½ watt (R118, R195)
71989	22,000 ohms, ±5%, 1 watt (R210, R211)
513322	22,000 ohms, ±10%, 1 watt (R227)
503327	27,000 ohms, ±10%, ½ watt (R102, R119)
513327	27,000 ohms, ±10%, 1 watt (R184)
503333	33,000 ohms, ±10%, ½ watt (R242, R273)
513333	33,000 ohms, ±10%, 1 watt (R169)
503339	39,000 ohms, ±10%, ½ watt (R112, R194)
503347	47,000 ohms, ±10%, ½ watt (R104, R191, R265, R267)
513347	47,000 ohms, ±10%, 1 watt (R132, R139, R269)
502356	56,000 ohms, ±5%, ½ watt (R149)
503356	56,000 ohms, ±10%, ½ watt (R187, R236, R256)
513356	56,000 ohms, ±10%, 1 watt (R107)
503368	68,000 ohms, ±10%, ½ watt (R128, R143)
504368	68,000 ohms, ±20%, ½ watt (R198, R205)
513368	68,000 ohms, ±10%, 1 watt (R226)
8064	82,000 ohms, ±5%, ½ watt (R144)
512382	82,000 ohms, ±5%, 1 watt (R231)
513382	82,000 ohms, ±10%, 1 watt (R225)
503410	100,000 ohms, ±10%, ½ watt (R129, R206, R220, R268)
504410	100,000 ohms, ±20%, ½ watt (R136, R187)
30160	120,000 ohms, ±5%, ½ watt (R209)
503412	120,000 ohms, ±10%, ½ watt (R190, R191, R245)
503415	150,000 ohms, ±10%, ½ watt (R145, R150, R186, R221)
504415	150,000 ohms, ±20%, ½ watt (R170, R217)
512415	150,000 ohms, ±5%, 1 watt (R230)
503418	180,000 ohms, ±10%, ½ watt (R257)
503422	220,000 ohms, ±10%, ½ watt (R185, R219)
503427	270,000 ohms, ±10%, ½ watt (R193)
503433	330,000 ohms, ±10%, ½ watt (R120, R222)
512433	330,000 ohms, ±5%, 1 watt (R224)
503447	470,000 ohms, ±10%, ½ watt (R199, R232, R264)
504447	470,000 ohms, ±20%, ½ watt (R121, R263)
503456	560,000 ohms, ±10%, ½ watt (R202, R270)
30562	680,000 ohms, ±5%, ½ watt (R127)
503482	820,000 ohms, ±10%, ½ watt (R200, R204, R223)
503510	1 megohm, ±10%, ½ watt (R189) (KCS66D)
504510	1 megohm, ±20%, ½ watt (R182)

STOCK No.	DESCRIPTION
503512	1.2 megohm, ±10%, ½ watt (R171) (R189 in KCS66D)
503515	1.5 megohm, ±10%, ½ watt (R192)
11769	1.8 megohm, ±5%, ½ watt (R260) (KCS66D)
504522	2.2 megohm, ±20%, ½ watt (R207, R213)
503539	3.9 megohm, ±10%, ½ watt (R179)
503547	4.7 megohm, ±10%, ½ watt (R188) (KCS66 & KCS66A)
503556	5.6 megohm, ±10%, ½ watt (R166)
503582	8.2 megohm, ±10%, ½ watt (R255)
523582	8.2 megohm, ±10%, 2 watts (R240) (KCS66 & KCS66A)
504610	10 megohm, ±20%, ½ watt (R116)
523610	10 megohm, ±10%, 2 watts (R238) (KCS66 & KCS66A)
71456	Screw— #8-32 x 7 16" wing screw to mount deflection yoke
76455	Shaft—Connecting shaft (nylon) for picture and brightness controls
73584	Shield—Tube shield
75718	Socket—Channel indicator lamp socket and lead
74834	Socket—Kinescope socket
31364	Socket—Pilot lamp socket for KCS66A & KCS66D
75222	Socket—Tube socket, octal, ceramic, plate mounted
76453	Socket—Tube socket, octal, moulded bakelite, plate mounted
31251	Socket—Tube socket, octal, wafer
76462	Socket—Tube socket, noval, moulded saddle mounted
50367	Socket—Tube socket, 6 pin, moulded saddle mounted
73115	Socket—Tube socket, 7 pin, moulded plate mounted, miniature
73117	Socket—Tube socket, 7 pin, wafer miniature
71508	Socket—Tube socket for 1B3GT 8016
14270	Spring—Retaining spring for focus control knob (KCS66 & KCS66A)
75173	Stud—Adjusting stud for trimmer capacitor C226
76636	Stud—Adjusting stud complete with guard for focus magnet
76428	Support—Bakelite support only—part of hi-voltage shield
76446	Switch—Tone control and phono switch (S101)
76463	Terminal—Screw type grounding terminal
76432	Transformer—First pix i-f, grid transformer complete with adjustable cores (T104, C121, R124)
76434	Transformer—First pix i-f plate transformer complete with adjustable cores (T105, C130, C131, R134)
76435	Transformer—Second pix i-f grid transformer complete with adjustable cores (T106, C133)
76433	Transformer—Third or fourth pix i-f transformer (T107, T108)
76436	Transformer—Fifth pix i-f transformer (T109, C145, C147, L102, R154, CR101)
76430	Transformer—Hi-voltage transformer (T114, R272) (KCS66 & KCS66A)
76795	Transformer—Hi-voltage transformer T114 (KCS66D)
76440	Transformer—Horizontal oscillator transformer complete with adjustable cores (T113)
76429	Transformer—Power transformer, 115 volts, 60 cycle (T112)
76439	Transformer—Ratio detector transformer complete with adjustable cores (T102, C108, C109)
76437	Transformer—Sound take-off transformer complete with adjustable cores (T110, C148)
76438	Transformer—Sound i-f transformer complete with adjustable cores (T101, C103, C104)
76431	Transformer—Vertical output transformer (T111)
76482	Trap—4.5 mc trap (L114, C137)
76616	Yoke—Deflection yoke complete with 6 contact male connector (L109, L110, L111, L112, C199, R243, R244, R262, P102)
	SPEAKER ASSEMBLIES 971490-2W RL 105C18 RMA 274
75024	Cone—Cone and voice coil (3.2 ohms)
5039	Connector—4 prong male plug for speaker (J101)
75022	Speaker—8" P.M. speaker complete with cone and voice coil (3.2 ohms) less transformer and plug
75520	Transformer—Output transformer (T103)
	NOTE: If stamping on speaker in instrument does not agree with above speaker numbers, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	SPEAKER ASSEMBLIES 971490-2-R RMA-285
77129	Cone—Cone and voice coil
	SPEAKER ASSEMBLIES 92569-14-W RL-111A11 RMA-274 (For Model 17T172 & 17T173)
75682	Cone—Cone and voice coil (3.2 ohms)
5039	Connector—4 contact male connector

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
76833	Speaker—12" P.M. speaker complete with cone and voice coil less transformer and plug
75520	Transformer—Output transformer
	SPEAKER ASSEMBLIES 971494-1W RL-111B2 RMA-274 (For Model 17T172)
76296	Cone—Cone and voice coil (3.2 ohms)
5039	Connector—4 contact male connector
76389	Speaker—12" P.M. speaker complete with cone and voice coil (3.2 ohms) less output transformer and plug
75520	Transformer—Output transformer
	7CB4 STAND (Used with Model 17T155)
76097	Catch—Door catch and strike (1 set)
74308	Hinge—Lower hinge for door (consists of both L.H. and R.H. hinges)
76096	Hinge—Upper hinge for door (consists of both L.H. and R.H. hinges)
X3233	Pull—Door pull—mahogany
X3234	Pull—Door pull—walnut
X3235	Pull—Door pull—oak
76637	Screw— #10 x 1¼" cross recessed oval head wood screw for door pull
	7CB5 STAND (Used with Model 17T155)
76094	Pull—Door pull
	7CB6 STAND (Used with Model 17T153, 17T154)
X3241	Pull—Door pull—mahogany (1 set)
X3247	Pull—Door pull—blonde (1 set)
	MISCELLANEOUS
76605	Back—Cabinet back complete with power cord and terminal board for Model 17T153
76643	Back—Cabinet back complete with power cord and terminal board for Model 17T155
76644	Back—Cabinet back complete with power cord and terminal board for Model 17T160
76606	Back—Cabinet back complete with power cord for Model 17T162
76607	Back—Cabinet back complete with power cord for Model 17T172
76777	Back—Cabinet back complete with power cord for Model 17T173
76608	Back—Cabinet back complete with power cord for Model 17T174
76831	Back—Cabinet back complete with power cord for Model 17T172K
76835	Back—Cabinet back complete with power cord for Model 17T173K
76832	Back—Cabinet back complete with power cord for Model 17T174K
76184	Board—Antenna terminal board
76590	Bracket—Hanger bracket from cabinet top panel to support deflection yoke hood
76599	Bracket—"U" shape bracket to anchor "L" shape rods for kinescope mounting (2 req'd) for Models 17T155, 17T160, 17T162, 17T172, 17T173, 17T174
71599	Bracket—Pilot lamp bracket for Models 17T162, 17T172 & 17T174
13103	Cap—Pilot lamp cap for Models 17T162, 17T172, 17T174
71892	Catch—Bullet catch and strike for cabinet doors for Model 17T173, 17T174
X3232	Cloth—Baffle board and grille cloth for walnut and mahogany Model 17T174
X3239	Cloth—Baffle board and grille cloth for oak Model 17T174
X3120	Cloth—Grille cloth for Model 17T173
X1917	Cloth—Grille cloth for mahogany or walnut instruments for Models 17T155 & 17T160
X1918	Cloth—Grille cloth for oak instruments for Models 17T155 & 17T160
X3199	Cloth—Grille cloth for mahogany or walnut instruments for Models 17T162, 17T172
X3089	Cloth—Grille cloth for oak instruments for Models 17T162, 17T172
75474	Connector—Single contact male connector for television antenna cable (2 req'd)
39153	Connector—4 contact male connector for television antenna cable
71457	Cord—Power cord and plug
76631	Cushion—Rubber cushion for dust sealing the kinescope
76582	Cushion—Rubber cushion (channel) for safety glass for Model 17T153
76627	Cushion—Rubber cushion for safety glass (4 req'd) for Models 17T155, 17T160, 17T162, 17T172, 17T173, 17T174
76512	Decal—Control function decal for oak instruments
76511	Decal—Control function decal for Model 17T153 or for mahogany or walnut instruments
71984	Decal—Trade mark decal for Model 17T174
74809	Emblem—"RCA Victor" emblem

STOCK No.	DESCRIPTION
75456	Escutcheon—Channel marker escutcheon
74889	Feet—Felt feet for cabinet (4 req'd) for Model 17T153
72113	Foot—Rubber foot for cabinet (4 req'd) for Model 17T155
76581	Glass—Safety glass for Model 17T153
76615	Glass—Safety glass for mahogany or walnut Models 17T155, 17T160, 17T162, 17T172, 17T173 & 17T174
76680	Glass—Safety glass for oak Models 17T155, 17T160, 17T162, 17T172 & 17T174
37396	Grommet—Rubber grommet for mounting speaker (3 req'd) for Models 17T172, 17T173
74308	Hinge—Cabinet door hinge (1 set) for Models 17T172, 17T173 & 17T174
76596	Knob—Brightness control or vertical hold control—beige—for oak instruments (outer)
76595	Knob—Brightness control or vertical hold control knob—maroon—for mahogany or walnut instruments (outer)
76594	Knob—Channel selector knob—beige—for oak instruments (inner)
76593	Knob—Channel selector knob—maroon—for mahogany or walnut instruments (inner)
76592	Knob—Fine tuning control knob—beige—for oak instruments (outer)
76591	Knob—Fine tuning control knob—maroon—for mahogany or walnut instruments (outer)
75464	Knob—Picture control, horizontal hold control or volume control and power switch knob—beige—for oak instruments (inner)
74963	Knob—Picture control, horizontal hold control or volume control and power switch knob—maroon—for mahogany or walnut instruments (inner)
76598	Knob—Tone control and phono switch knob—beige—for oak instruments (outer)
76597	Knob—Tone control and phono switch knob—maroon—for mahogany or walnut instruments (outer)
11765	Lamp—Channel marker escutcheon or pilot lamp—Mazda #51
75459	Mask—Channel marker escutcheon, light mask—burgundy—for mahogany or walnut instruments
76589	Mask—Channel marker escutcheon light mask—medium dark beige—for oak instruments for Models 17T155, 17T160, 17T162, 17T172 & 17T174
76580	Mask—Polystyrene masking panel for kinescope for Model 17T153
76679	Mask—Polystyrene masking panel for Models 17T155, 17T160, 17T162, 17T172, 17T173 & 17T174
73634	Nut—Speed nut for speaker mounting screws (3 req'd) for Models 17T162, 17T172, 17T173 & 17T174
71455	Nut— #8-32 wing nut to mount yoke hood to hanger bracket
76177	Nut— #10-32 special nut for deflection yoke hood support rods (2 req'd)
76601	Pad—Kinescope edge support pad (2 req'd)
76515	Plate—Back plate for door pull (2 req'd) for Model 17T172
73034	Pull—Door pull (rosette design) (2 req'd) for Model 17T172
76513	Pull—Door pull (basket weave design) (2 req'd) for Model 17T172
76774	Pull—Door pull, upper for Model 17T173
76775	Pull—Door pull, lower for Model 17T173
76176	Rod—"L" shape threaded rod to support deflection yoke hood assembly (2 req'd)
74307	Screw—#8-32 x 1⅛" trimit head screw for door pull 73034
76514	Screw—#10-24 x 1⅛" trimit head screw for door pull 76513
76632	Screw— #8 x ⅝" self tapping hex head wood to mount polystyrene panel (12 req'd) or hanger bracket (2 req'd) for Models 17T155, 17T160, 17T162, 17T172 & 17T174
76776	Screw—#4-40 x 13/16" trimit head screw for door pull 76775
76180	Spring—Formed spring for kinescope masking panel (6 req'd)
30330	Spring—Retaining spring for knobs #74963 & 75464
72845	Spring—Retaining spring for knobs #76591 & 76592
14270	Spring—Retaining spring for knobs #76593, 76594, 76595, 76596, 76597, 76598
73643	Spring—Spring clip for channel marker escutcheon
72936	Stop—Cabinet door stop for Model 17T174
76600	Strap—Grounding strap (copper strip ½" x 18" long) for Models 17T155, 17T160 & 17T174
75457	Washer—Felt washer—dark brown—between knob and channel marker escutcheon for metal, mahogany or walnut instruments
75458	Washer—Felt washer—beige—between knob and channel marker escutcheon for oak instruments
75500	Washer—Felt washer for cabinet back screws (4 req'd)
76836	Washer—Cellulose washer—gold for knobs for Models 17T162, 17T172, 17T173 & 17T174

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RCA VICTOR

TELEVISION RECEIVERS
MODELS 21T159, 21T165, 21T176, 21T177, 21T178, 21T179

Chassis Nos. KCS68C or KCS68E

— Mfr. No. 274 —

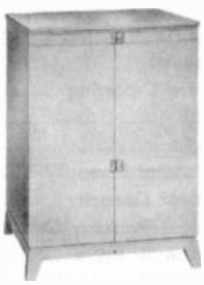
SERVICE DATA

— 1951 No. T8 —

Model 21T159 "Selfridge"
Walnut, Mahogany, Limed Oak

Model 21T165 "Meredith"
Walnut, Mahogany, Limed Oak

Model 21T176 "Suffolk"
Walnut, Mahogany, Limed Oak



Model 21T177 "Donley"
Walnut, Mahogany, Limed Oak

Model 21T178 "Rockingham"
Walnut, Mahogany

Model 21T179 "Clarendon"
Walnut, Mahogany, Maple

PREPARED BY RCA SERVICE CO., INC.
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Models 21T159, 21T165, 21T176, 21T177, 21T178, and 21T179 are deluxe "21 inch" television receivers. The receivers are identical except for cabinets, speakers and the use of pilot lights on some models.

Features of the television unit are: full twelve channel coverage; "totem" r-f amplifier; intercarrier FM sound system; ratio detector; 40 mc picture i-f; improved picture brilliance; pulsed picture A-G-C; A-F-C horizontal hold; stabilized vertical hold; compensated video gain control; noise saturation circuits; improved sync separator and clipper; four mc. band width for picture channel and reduced hazard high voltage supply. An auxiliary audio input jack is provided to permit the use of an external record playing attachment.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE 227 square inches on a 21AP4 Kinescope

TELEVISION R-F FREQUENCY RANGE

All 12 television channels, 54 mc. to 88 mc., 174 mc. to 216 mc.

Picture I-F Carrier Frequency	45.75 mc.
Sound I-F Carrier Frequency	41.25 mc. and 4.5 mc.
VIDEO RESPONSE	To 4 mc.
SWEEP DEFLECTION	Magnetic
FOCUS	Magnetic
POWER SUPPLY RATING	115 volts, 60 cycles, 300 watts
AUDIO POWER OUTPUT RATING	5.0 watts max.

LOUDSPEAKERS

Model 21T159	(971490-2) 8" PM Dynamic, 3.2 ohms
Model 21T165	(92569-14W) 12" PM Dynamic, 3.2 ohms
Models 21T176, 177, 178 and 179	(971494-1W) 12" PM Dynamic, 3.2 ohms

WEIGHT

Model	Chassis with Tubes in cabinet	Shipping Weight
21T159	107 lbs.	128 lbs.
21T165	111	149
21T176	128	159
21T177	143	174
21T178	134	164
21T179	142	173

RECEIVER ANTENNA INPUT IMPEDANCE

Choice: 300 ohms balanced or 72 ohms unbalanced.

RCA TUBE COMPLEMENT

Tube Used	Function
(1) RCA 6BQ7	R-F Amplifier
(2) RCA 6X8	R-F Oscillator and Mixer
(3) RCA 6AU6	1st Picture I-F Amplifier
(4) RCA 6CB6	2nd Picture I-F Amplifier
(5) RCA 6CB6	3rd Picture I-F Amplifier
(6) RCA 6CB6	4th Picture I-F Amplifier
(7) RCA 6AG7	Video Amplifier
(8) RCA 6AU6	1st Sound I-F Amplifier
(9) RCA 6AU6	2nd Sound I-F Amplifier
(10) RCA 6AL5	Ratio Detector
(11) RCA 6AV6	1st Audio Amplifier
(12) RCA 6AQ5	Audio Output
(13) RCA 6CB6	AGC Amplifier
(14) RCA 6SN7GT	Sync Separator
(15) RCA 6SN7GT	Vert Sync Amplifier and Vert Sweep Osc.
(16) RCA 6AQ5	Vertical Sweep Output
(17) RCA 6SN7GT	Horizontal Sync Amplifier
(18) RCA 6SN7GT	Horizontal Sweep Oscillator and Control
(19) RCA 6CD6G	Horizontal Sweep Output
(20) RCA 6W4GT (2 tubes)	Dampers
(21) RCA 1B3-GT/8016	High Voltage Rectifier
(22) RCA 5U4G (2 tubes)	Rectifiers
(23) RCA 21AP4	Kinescope

21T159, 21T165
21T176, 21T177
21T178, 21T179

ELECTRICAL AND MECHANICAL SPECIFICATIONS

(Continued)

PICTURE INTERMEDIATE FREQUENCIES

Picture Carrier Frequency ..... 45.75 mc.
Adjacent Channel Sound Trap ..... 47.25 mc.
Accompanying Sound Traps ..... 41.25 mc.
Adjacent Channel Picture Carrier Trap ..... 39.25 mc.

SOUND INTERMEDIATE FREQUENCIES

Sound Carrier Frequency ..... 41.25 mc. and 4.5 mc.

VIDEO RESPONSE ..... To 4 mc.

FOCUS ..... Magnetic

SWEEP DEFLECTION ..... Magnetic

SCANNING ..... Interlaced, 525 line

HORIZONTAL SWEEP FREQUENCY ..... 15,750 cps

VERTICAL SWEEP FREQUENCY ..... 60 cps

FRAME FREQUENCY (Picture Repetition Rate) ..... 30 cps

OPERATING CONTROLS (front Panel)

Channel Selector, Fine Tuning ..... Dual Control Knobs
Picture, Brightness ..... Dual Control Knobs
Picture Horizontal Hold, Picture Vertical Hold ..... Dual Control Knobs
Sound Volume and On-Off Switch, Tone Control and Phono Switch ..... Dual Control Knobs

NON-OPERATING CONTROLS (not including r-f and i-f adjustments)

Picture Centering ..... top chassis adjustment
Width ..... rear chassis adjustment
Height ..... rear chassis adjustment
Horizontal Linearity ..... rear chassis screwdriver adjustment
Vertical Linearity ..... rear chassis adjustment
Vertical Peaking Control ..... rear chassis adjustment
Horizontal Drive ..... rear chassis screwdriver adjustment
Horizontal Oscillator Frequency ..... rear chassis adjustment
Horizontal Oscillator Waveform ..... bottom chassis adjustment
Horizontal Locking Range ..... rear chassis adjustment
Focus ..... top chassis adjustment
Ion Trap Magnet ..... top chassis adjustment
Deflection Coil ..... top chassis wing nut adjustment
AGC Control ..... rear chassis adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT REMOVE THE RECEIVER CHASSIS, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES, AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For this reason, the kinescope must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. During service if the tube sticks or fails to slip smoothly into its socket or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA replacement kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver.

OPERATING INSTRUCTIONS

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The following adjustments are necessary when turning the receiver on for the first time.

1. See that the TV-PH switch is in the "TV" position.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best pix and the SOUND VOLUME control for suitable volume.

5. Turn the BRIGHTNESS control fully counter-clockwise, then clockwise until a light pattern appears on the screen.

6. Adjust the VERTICAL hold control until the pattern stops vertical movement.

7. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

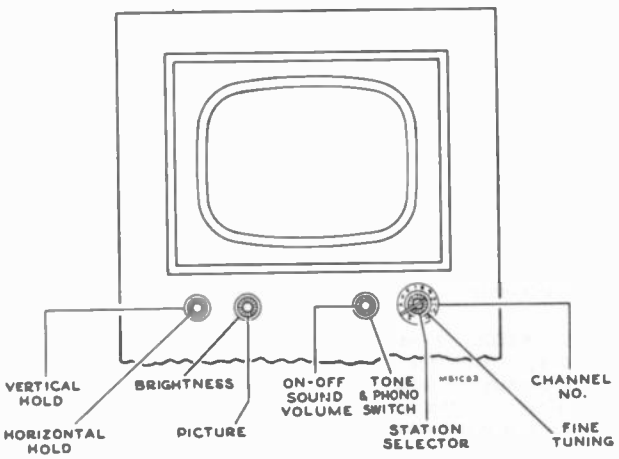

Figure 1—Receiver Operating Controls

8. Adjust the PICTURE and BRIGHTNESS controls for suitable picture contrast and brightness.

9. In switching from one channel to another, it may be necessary to repeat steps 4 and 8.

10. When the set is turned on again after an idle period it should not be necessary to repeat the adjustment if the positions of the controls have not been changed. If any adjustment is necessary, step number 4 is generally sufficient.

11. If the positions of the controls have been changed, it may be necessary to repeat steps 2 through 8.

12. To use a record player, plug the record-player output cable into the PHONO jack on the rear apron, and set the TV-PH switch to "PH."

REFER TO PAGES 234 TO 243 FOR TELEVISION ALIGNMENT PROCEDURE

INSTALLATION INSTRUCTIONS

Make sure that all tubes are in place and are firmly seated in their sockets.

Check to see that the kinescope high voltage lead clip is in place.

Plug a power cord into the 115 volt a-c power source and into the receiver interlock receptacle.

Turn the receiver power switch to the "on" position, the brightness control fully clockwise, and the picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT.—Set the ion trap magnet approximately in th position shown in Figure 2. Starting from this position immediately adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen.

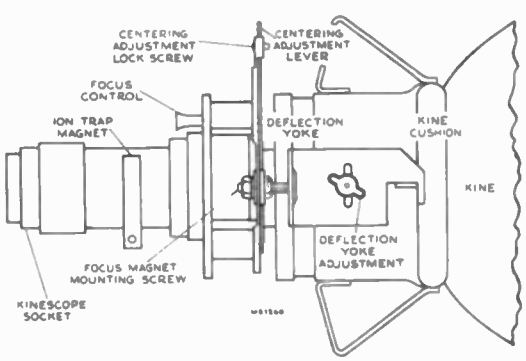

Figure 2 Ion Trap and Centering Magnet Adjustments

DEFLECTION YOKE ADJUSTMENT.—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS.—It will now be necessary to obtain a test pattern picture in order to make further adjustments. Connect the antenna transmission line to the receiver.

If the Horizontal Oscillator and AGC System are operating properly, it should be possible to sync the picture at this point. However, if the AGC control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading, turn R175 on the rear apron (see Figure 3) counter-clockwise until the set operates normally and the picture can be synchronized.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT.—Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 2 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull-in should occur before the control has been turned 120 degrees from the extreme counter-clockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should remain in sync and should not show a black bar in the picture.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Centering Adjustment."

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INSTALLATION INSTRUCTIONS

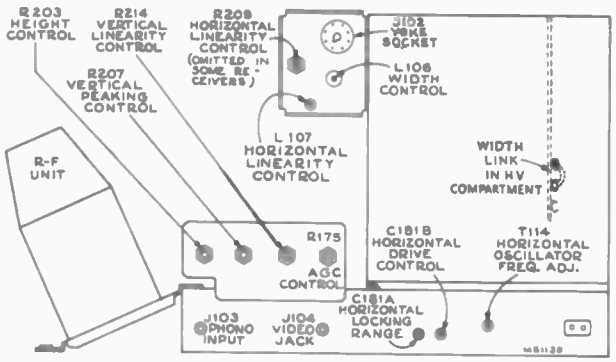

Figure 3—Rear Chassis Adjustments

ALIGNMENT OF HORIZONTAL OSCILLATOR.—If in the above check the receiver failed to hold sync with the hold control at the extreme counter-clockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull-in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment.—Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T114 horizontal frequency adjustment at the rear of the chassis until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster. Then turn the T114 core until the bar moves out of the picture leaving it in sync.

Horizontal Locking Range Adjustment.—Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. The picture may remain in sync. If so turn the T114 rear core slightly and momentarily switch off channel. Repeat until the picture falls out of sync with the diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 2 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C181A slightly clockwise. If less than 2 bars are present, adjust C181A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 2 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure For field purposes paragraph "B" under Horizontal Oscillator Waveform Adjustment may be omitted.

FOCUS MAGNET ADJUSTMENTS.—The focus magnet should be adjusted so that there is approximately three-eighths inch of space between the rear cardboard shell of the yoke and the flat of the front face of the focus magnet. This spacing gives best average focus over the face of the kinescope.

The axis of the hole through the magnet should be parallel with the axis of the kinescope neck with the kinescope neck through the middle.

CENTERING ADJUSTMENT.—No electrical centering controls are provided. Centering is accomplished by means of a separate plate on the focus magnet. The centering plate includes a locking screw which must be loosened before centering. Up and down adjustment of the plate moves the picture side to side and sidewise adjustment moves the picture up and down.

If a corner of the raster is shadowed, check the position of the ion trap magnet. Reposition the magnet within the range of maximum raster brightness to eliminate the shadow and recenter the picture by adjustment of the focus magnet plate. In no case should the ion trap magnet be adjusted to cause any loss of brightness since such operation may cause immediate or eventual damage to the tube. In some cases it may be necessary to shift the position of the focus magnet in order to eliminate a corner shadow.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS.—Adjustment of the horizontal drive control affects the high voltage applied to the kinescope. In order to obtain the highest possible voltage hence the brightest and best focused picture, adjust horizontal drive trimmer C181B for maximum drive (minimum capacity) consistent with a linear raster. Compression of the raster due to excessive drive can be seen as a white vertical bar or bars in the right half of the picture. Besides compression caused by excessive drive, another item to watch for is the change in linearity at the extreme left with changes of brightness control setting. By proper adjustment of the linearity coil, the changes in linearity with changes in brightness can be made negligible. In general, to achieve this condition, the linearity coil should be set slightly on the high inductance side (core slightly clockwise) of the optimum position and the linearity rheostat R209 should be as far clockwise as possible.

Note: In late production receivers, R209 has been omitted since it normally was operated at zero resistance.

Preset the following adjustments as directed:

A.—Place the width plug (P105) in the minimum width position (top).

B.—Set the width control coil L106 in approximately mid position.

C.—Set the linearity control coil L107 near minimum inductance (counter-clockwise).

D.—Set the linearity control rheostat near zero resistance (clockwise).

E.—Set the drive capacitor C181B in the maximum drive position (counter-clockwise).

If the raster is cramped or shows compression bars on the right half of the picture turn C181B clockwise until this condition is just eliminated.

Adjust the linearity control coil L107 clockwise until best linearity and maximum deflection or best compromise are obtained then turn one quarter turn clockwise from this position.

Retouch the drive trimmer C181B if necessary to obtain best linearity and maximum width.

Check the horizontal linearity at various settings of the brightness control R218. There should be no compression of the right half and no appreciable change of linearity especially at the extreme left of the picture. If objectional change does occur, turn linearity coil L107 slightly clockwise and repeat the test.

Adjust the width control L106 to fill the mask.

If the left side of the picture appears stretched, turn the linearity control rheostat R209 counter-clockwise. If the left side of the picture is cramped, turn R209 clockwise. Whenever possible, correct nonlinearity by adjustment of R209 rather than by reduction of drive.

If the line voltage is low and it becomes impossible to fill the mask, move the width plug P105 to the bottom position. The width coil L106 is inoperative in this position.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.—Adjust the height control (R203 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R214 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. If the top few lines of the picture are stretched or squeezed, adjust the vertical peaking control R207 until this condition is corrected.

FOCUS.—Adjust the focus magnet for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

Recheck the position of the ion trap magnet to make sure that maximum brightness is obtained.

If necessary readjust centering to align the picture with the mask.

CHECK OF R-F OSCILLATOR ADJUSTMENTS.—Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure The adjustments for channels 2 through 12 are available from the front of the cabinet by

removing the station selector escutcheon as shown in Figure 4. Adjustment for channel 13 is on top of the chassis.

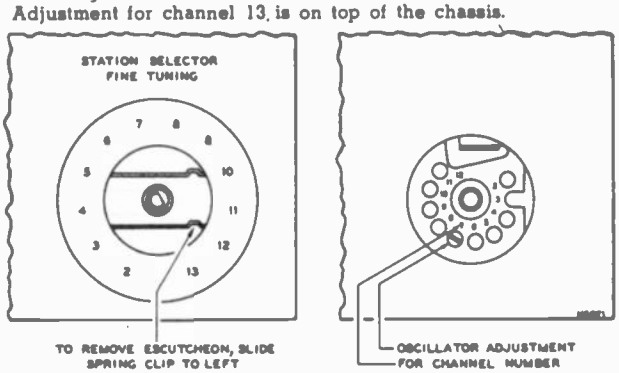

Figure 4—R-F Oscillator Adjustments

AGC THRESHOLD CONTROL.—The AGC threshold control R175 is adjusted at the factory and normally should not require readjustment in the field.

To check the adjustment of the AGC Threshold Control, tune in a strong signal and sync the picture. Momentarily remove the signal by switching off channel and then back. If the picture reappears immediately, the receiver is not overloading due to improper setting of R175. If the picture requires an appreciable portion of a second to reappear, or bends excessively, R175 should be readjusted

Turn R175 fully counter-clockwise. The raster may be bent slightly. This should be disregarded. Turn R175 clockwise until there is a very, very slight bend or change of bend in the picture. Then turn R175 counter-clockwise just sufficiently to remove this bend or change of bend.

If the signal is weak, the above method may not work as it may be impossible to get the picture to bend. In this case, turn R175 clockwise until the snow in the picture becomes more pronounced, then counter-clockwise until the best signal to noise ratio is obtained.

The AGC control adjustment should be made on a strong signal if possible. If the control is set too far clockwise on a weak signal, then the receiver may overload when a strong signal is received.

FM TRAP ADJUSTMENT.—In some instances interference may be encountered from a strong FM station signal. A trap is provided to eliminate this type of interference. To adjust the trap tune in the station on which the interference is observed and adjust the L58 core on top of the antenna matching transformer for minimum interference in the picture.

CAUTION.—In some receivers, the FM trap L58 will tune down into channel 6 or even into channel 5. Needless to say, such an adjustment will cause greatly reduced sensitivity on these channels. If channels 5 or 6 are to be received, check L58 to make sure that it does not affect sensitivity on these two channels.

Replace the cabinet back and connect the receiver antenna leads to the cabinet back. Make sure that the screws holding it are up tight, otherwise it may rattle or buzz when the receiver is operated at high volume.

KINESCOPE HANDLING PRECAUTION.—Do not install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling.

Handle this tube by the metal rim at the edge of the screen. Do not cover the glass bell of the tube with fingermarks as it will produce leakage paths which may interfere with reception. If this portion of the tube has inadvertently been handled, wipe it clean with a soft cloth moistened with "dry" carbon tetrachloride.

To remove the kinescope from the cabinet, loosen the two nuts and disengage the rods alongside the kinescope. Remove the wing screw which holds the yoke frame to the cabinet. Remove the kinescope, the yoke frame with yoke and focus or centering magnet as an assembly.

INSTALLATION OF KINESCOPE.—Handle this tube by the metal rim at the edge of the screen. Do not cover the glass bell of the tube with fingermarks as it will produce leakage paths which may interfere with reception. If this portion of the tube has inadvertently been handled, wipe it clean with a soft cloth moistened with "dry" carbon tetrachloride.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and fingermarks with a soft cloth moistened with "Windex" or similar cleaning agent.

Turn the tube so that the key on the base of the tube will be down and insert the neck of the kinescope through the deflection coil and focus magnet. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

Replace the kinescope and yoke frame assembly in the cabinet. Insert the wing screw and tighten. Engage the two side rods into the yoke frame and tighten the two nuts. Slide the deflection yoke as far forward as possible. If this is not done, difficulty will be encountered in adjusting the ion trap and focus magnet because of shadows on the corner of the raster.

Slide the chassis into the cabinet, then insert and tighten the four chassis bolts.

Slip the ion trap magnet over the neck of the kinescope.

Connect the kinescope socket to the tube base and connect the high voltage lead from the rim of the kinescope into the high voltage bushing on the high voltage compartment.

Reconnect all other cables. Do not forget to replace the yoke frame grounding strap. Perform the entire set-up procedure beginning with the Ion Trap Magnet Adjustment.

ANTENNAS.—The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to select the proper antenna to suit the particular local conditions, to install it properly and orient it correctly.

CABINET ANTENNA.—A cabinet antenna is provided in these receivers and the leads are brought out near the antenna terminal board. The cabinet antenna may be employed in place of the outdoor antenna in areas where the signals are strong and no reflections are experienced.

REFLECTIONS.—Multiple images sometimes known as echoes or ghosts, are caused by the signal arriving at the antenna by two or more routes. The second or subsequent image occurs when a signal arrives at the antenna after being reflected off a building, a hill or other object. In severe cases of reflections, even the sound may be distorted. In less severe cases, reflections may occur that are not noticeable as reflections but that will instead cause a loss of definition in the picture.

Under certain extremely unusual conditions, it may be possible to rotate or position the antenna so that it receives the cleanest picture over a reflected path. If such is the case, the antenna should be so positioned. However, such a position may give variable results as the nature of reflecting surfaces may vary with weather conditions. Wet surfaces have been known to have different reflecting characteristics than dry surfaces.

Depending upon the circumstances, it may be possible to eliminate the reflections by rotating the antenna or by moving it to a new location. In extreme cases, it may be impossible to eliminate the reflection.

INTERFERENCE.—Auto ignition, street cars, electrical machinery and diathermy apparatus may cause interference which spoils the picture. Whenever possible, the antenna location should be removed as far as possible from highways, hospitals, doctors' offices and similar sources of interference. In mounting the antenna, care must be taken to keep the antenna rods at least ¼ wave length (at least 6 feet) away from other antennas, metal roofs, gutters or other metal objects.

Short-wave radio transmitting and receiving equipment may cause interference in the picture in the form of moving ripples. In some instances it may be possible to eliminate the interference by the use of a trap in the antenna transmission line. However, if the interfering signal is on the same frequency as the television station, a trap will provide no improvement.

WEAK PICTURE.—When the installation is near the limit of the area served by the transmitting station, the picture may be speckled, having a "snow" effect, and may not hold steady on the screen. This condition is due to lack of signal strength from the transmitter.

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CHASSIS TOP VIEW

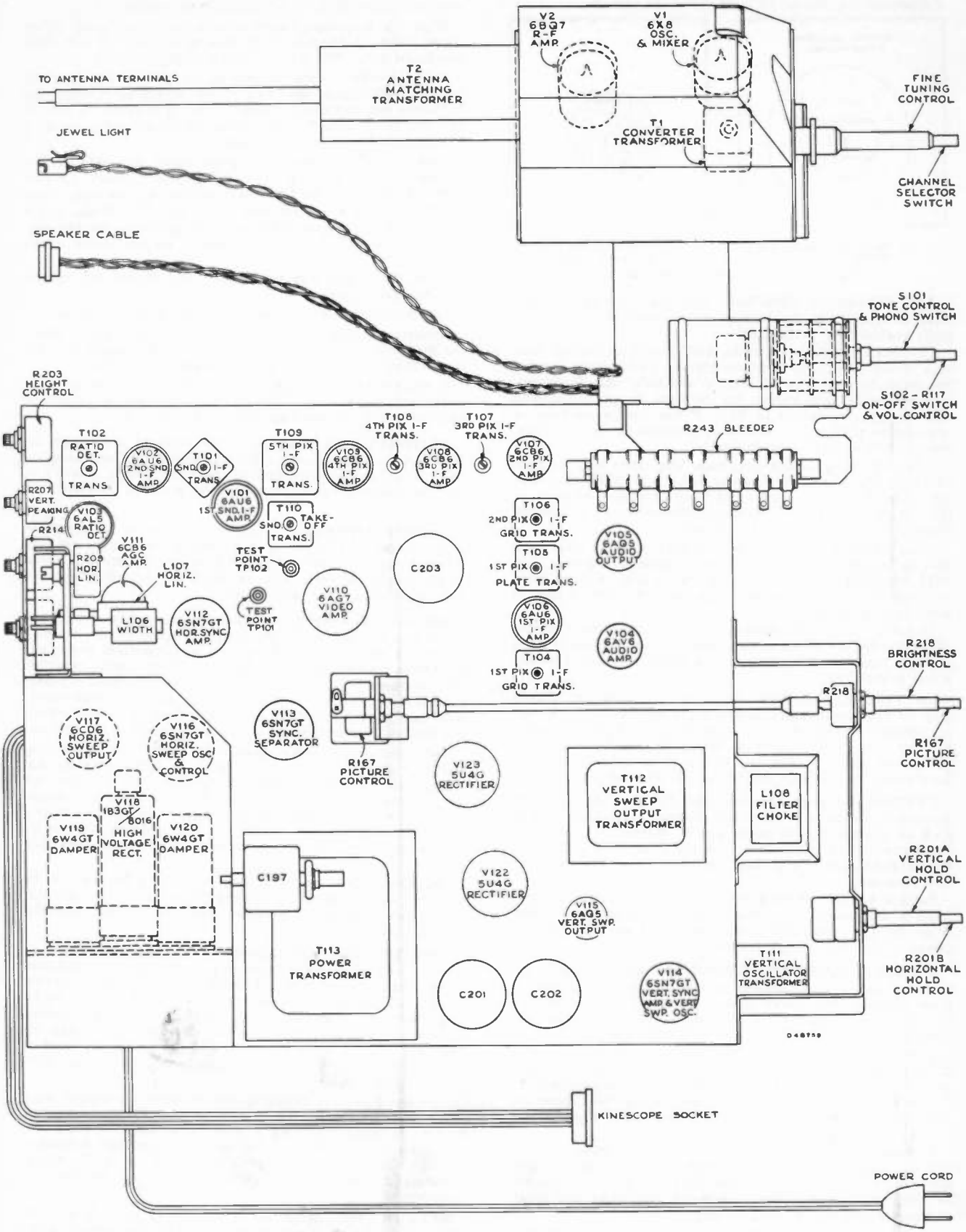


Figure 5—Chassis Top View

CHASSIS BOTTOM VIEW

21T159, 21T165
21T176, 21T177
21T178, 21T179

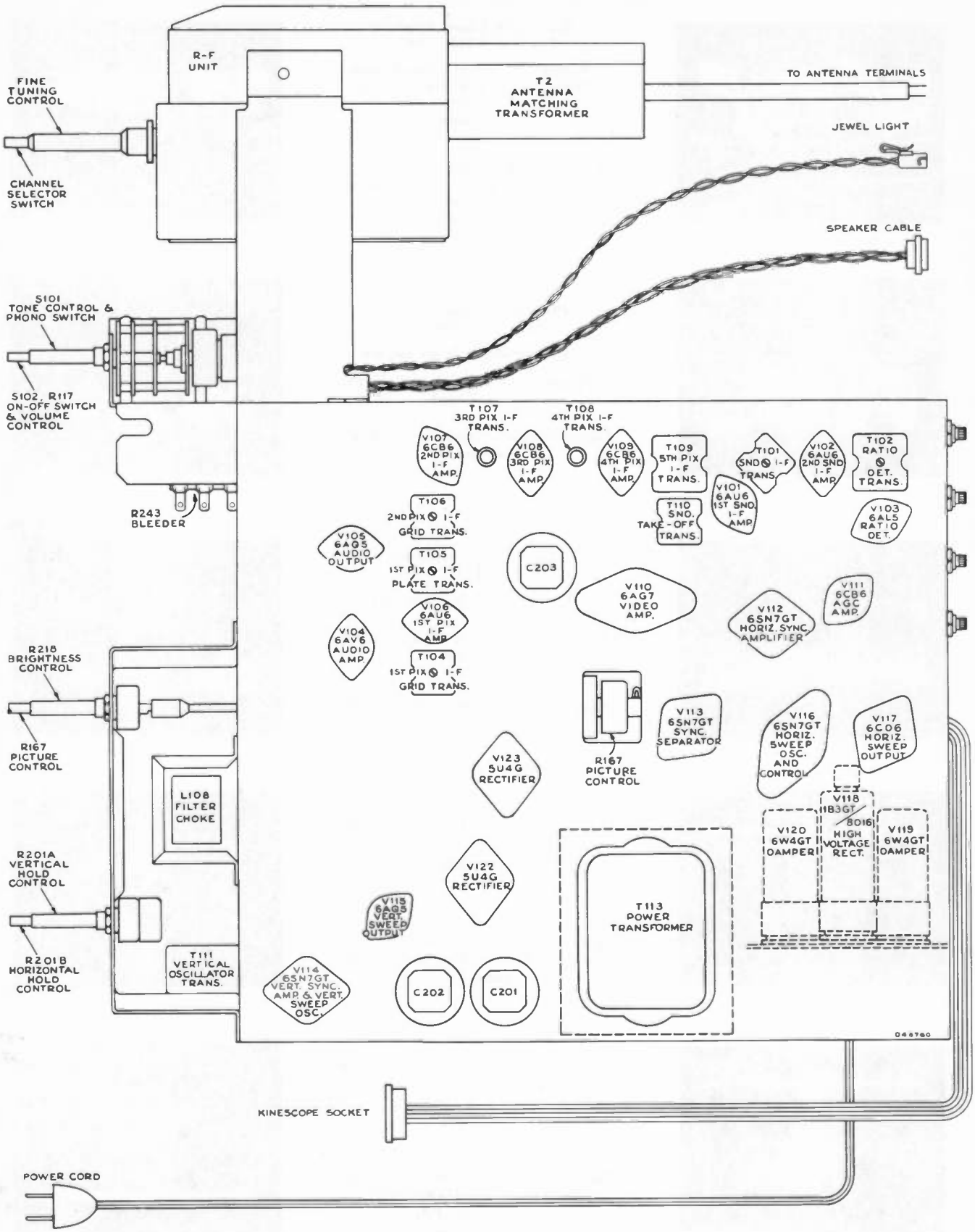
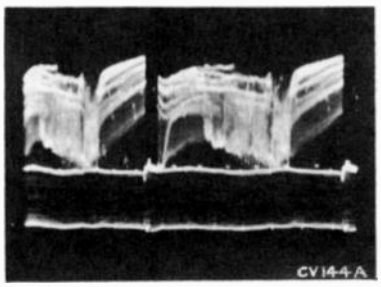


Figure 6—Chassis Bottom View

21T159, 21T165
21T176, 21T177
21T178, 21T179

WAVEFORM PHOTOGRAPHS

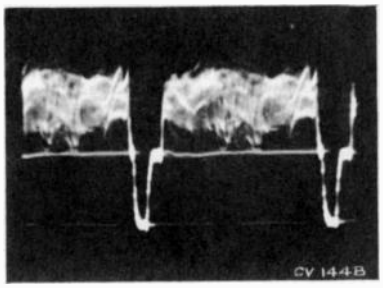
Taken from RCA WO58A Oscilloscope



Grid of 1st Video Amplifier (Pin 4 of V110) (6AG7)

Figure 7—Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (5.5 Volts PP)

Figure 8—Horizontal (Oscilloscope Synced to ½ of Horizontal Sweep Rate) (5.5 Volts PP)



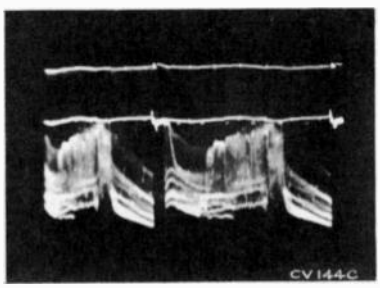
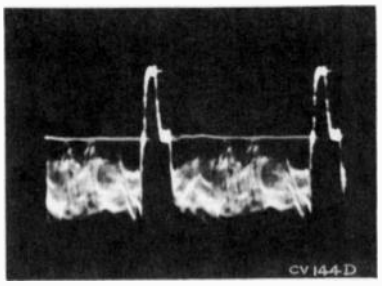


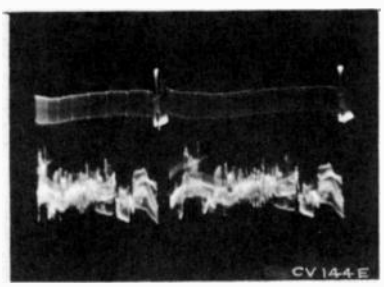
Plate of 1st Video Amplifier (Pin 8 of V110) (6AG7)

Voltage depends on picture

Figure 9—Vertical (110 Volts PP)

Figure 10—Horizontal (110 Volts PP)



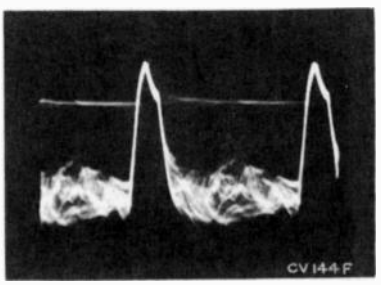


Grid of Sync Separator (Pin 4 of V113) (6SN7)

Voltage depends on picture

Figure 11—Vertical (75 Volts PP)

Figure 12—Horizontal (75 Volts PP)



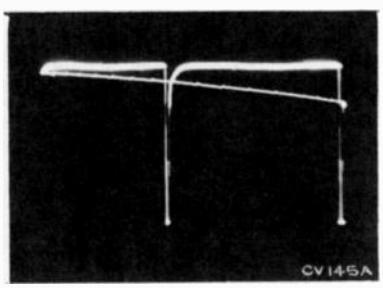
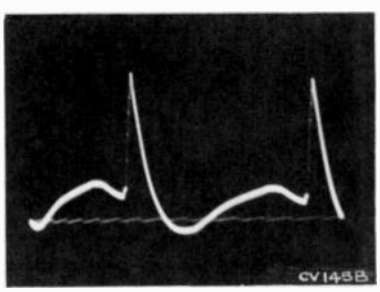


Figure 13—Plate of Sync Separator (Pin 5 of V113) (6SN7) (35 Volts PP) Voltage depends on picture

Figure 14—Cathode of Sync Separator (Pin 6 of V113) (6SN7) (10 Volts PP)



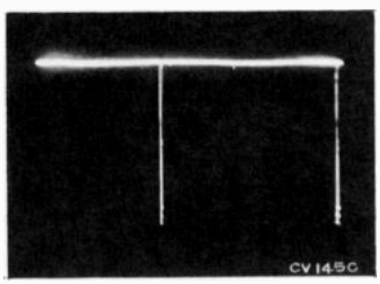
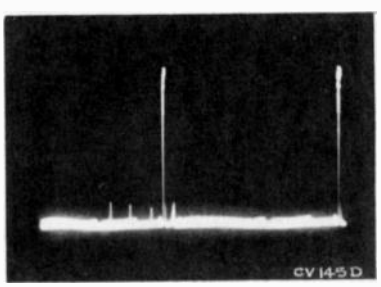


Figure 15—Grid of Vert. Sync Amplifier (Pin 4 of V114A) (6SN7) (12 Volts PP)

Figure 16—Plate of Vert Sync Amplifier (Pin 5 of V114A) (6SN7) (100 Volts PP)



WAVEFORM PHOTOGRAPHS

Taken from RCA WO58A Oscilloscope

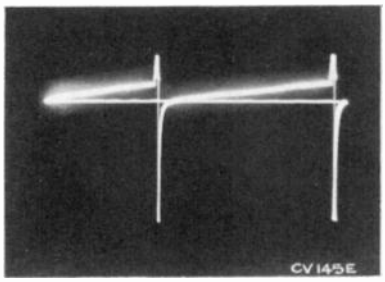


Figure 17—Grid of Vertical Oscillator (Pin 1 of V114B) (6SN7) (135 Volts PP)

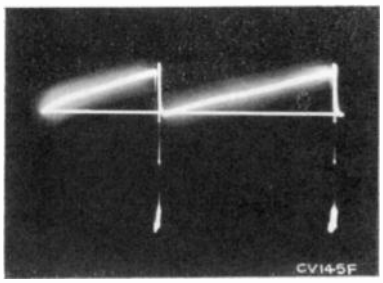


Figure 18—Plate of Vertical Oscillator (Pin 2 of V114B) (6SN7) (105 Volts PP)

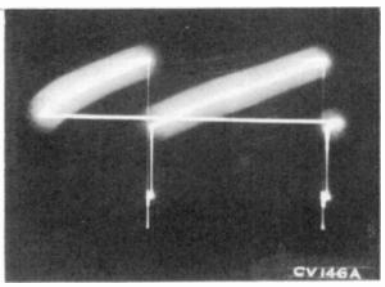


Figure 19—Grid of Vertical Output (105 Volts PP) (Pin 1 of V115) (6AQ5)

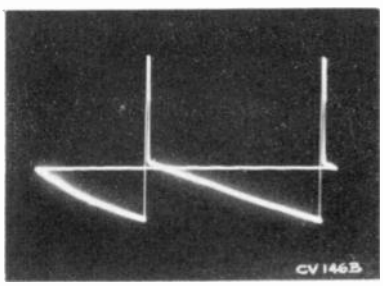


Figure 20—Plate of Vertical Output (900 Volts PP) (Pin 5 of V115) (6AQ5)

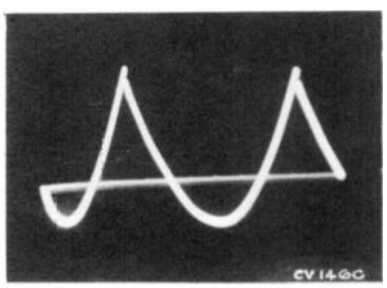


Figure 21—Cathode of Vertical Output (1.0 Volts PP) (Pin 2 of V115) (6AQ5)

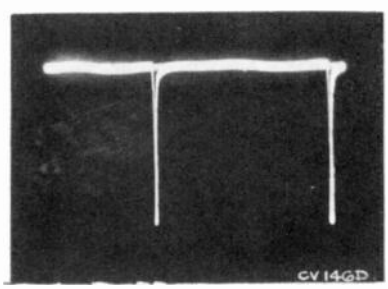
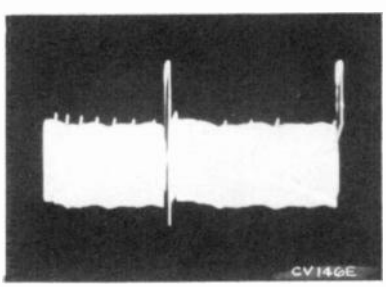


Figure 22—Grid of Kinescope (Pin 2 of V121) (12 Volts PP)



Cathode of Sync Separator (Pin 3 of V113) (6SN7)

Figure 23—Vertical (15 Volts PP)

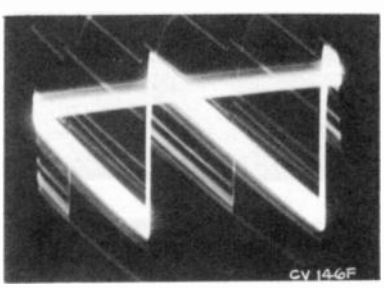
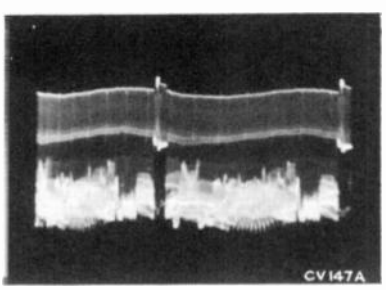


Figure 24—Horizontal (8 Volts PP)



Grid of Sync Separator (Pin 1 of V113) (6SN7)

Figure 25—Vertical (110 Volts PP)

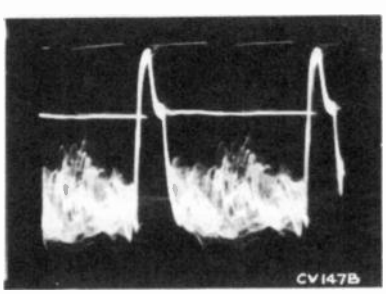


Figure 26—Horizontal (110 Volts PP)

21T159, 21T165
21T176, 21T177
21T178, 21T179

WAVEFORM PHOTOGRAPHS

Taken from RCA WO58A Oscilloscope

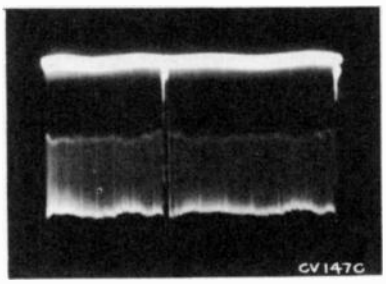
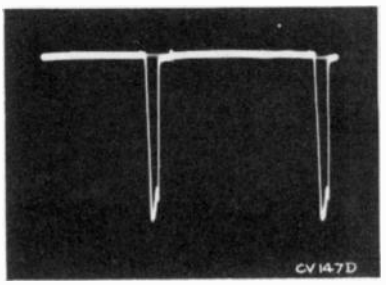
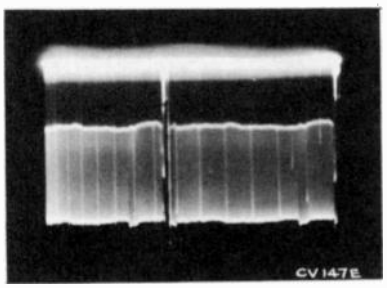


Plate of Sync Separator
(Pin 2 of V113)

Figure 27—Vertical (30 Volts PP)

Figure 28—Horizontal (30 Volts PP)

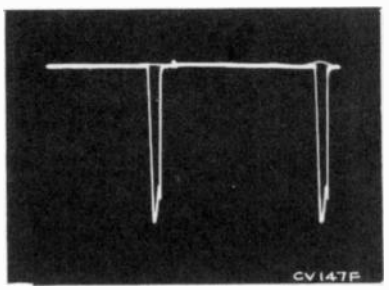




Grid of Hor Sync Amp
(Pin 4 of V112) (6SN7)

Figure 29—Vertical (30 Volts PP)

Figure 30—Horizontal (30 Volts PP)



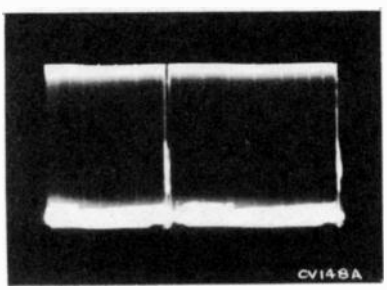
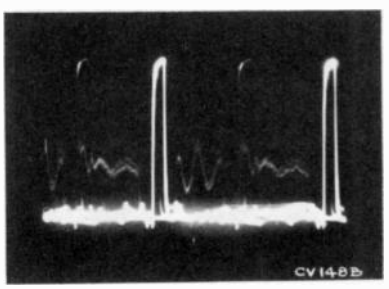
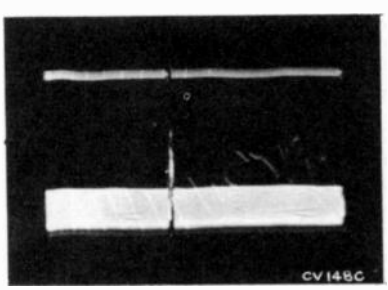


Plate of Hor Sync Amp
(Pin 5 of V112) (6SN7)

Figure 31—Vertical (85 Volts PP)

Figure 32—Horizontal (85 Volts PP)

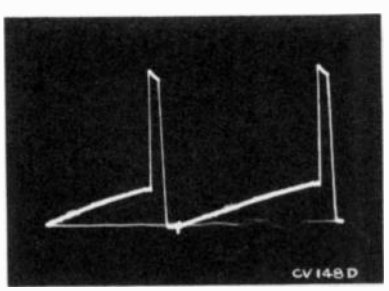


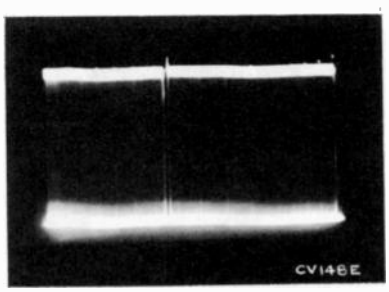


Grid of Hor Sync Amp
(Pin 1 of V112) (6SN7)

Figure 33—Vertical (75 Volts PP)

Figure 34—Horizontal (75 Volts PP)

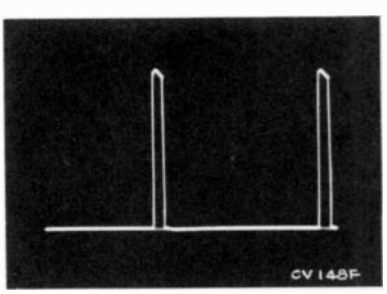




Cathode of Hor Sync Amp
(Pin 3 of V112) (6SN7)

Figure 35—Vertical (18 Volts PP)

Figure 36—Horizontal (18 Volts PP)



WAVEFORM PHOTOGRAPHS

Taken from RCA WO58A Oscilloscope

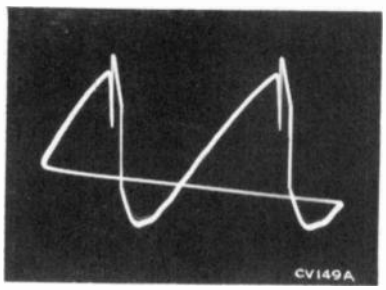
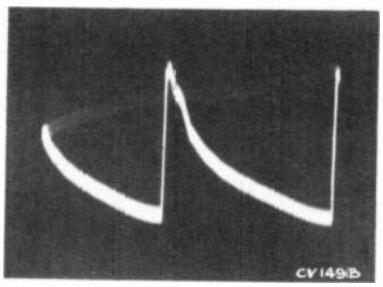


Figure 37—Grid of Horizontal Oscillator Control (25 Volts PP) (Pin 1 of V116) (6SN7GT)

Figure 38—Cathode of Horizontal Oscillator Control (1.3 Volts PP) (Pin 3 of V116) (6SN7GT)



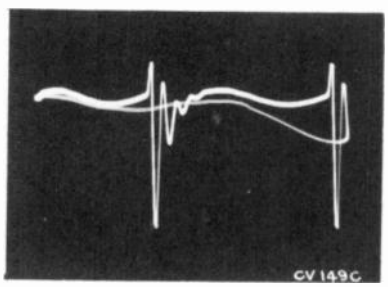
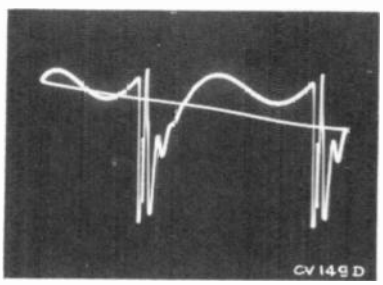


Figure 39—Grid of Horizontal Oscillator (550 Volts PP) (Pin 4 of V116) (6SN7GT)

Figure 40—Plate of Horizontal Oscillator (290 Volts PP) (Pin 5 of V116) (6SN7GT)



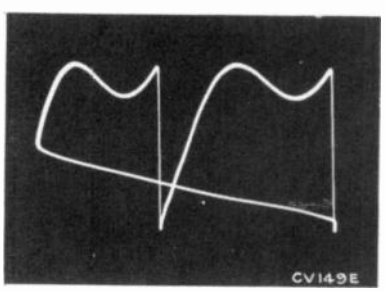
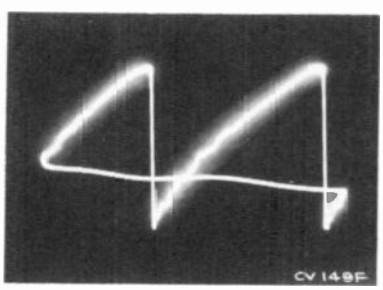


Figure 41—Terminal "C" of T114 (150 Volts PP)

Figure 42—Grid of Horizontal Output Tube (140 Volts PP) (Pin 5 of V117) (6CD6G)



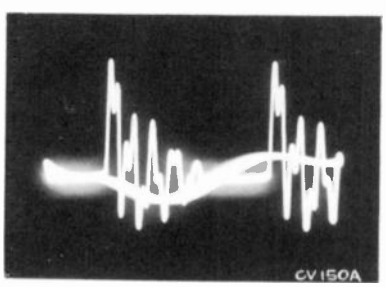
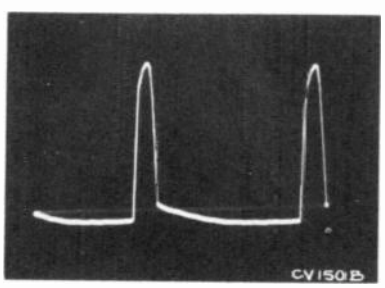


Figure 43—Plate of Horizontal Output (Approx. 5400 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V117 to Ground)

Figure 44—Cathode of Damper (2300 Volts PP) (Pin 3 of V119) (6W4GT)



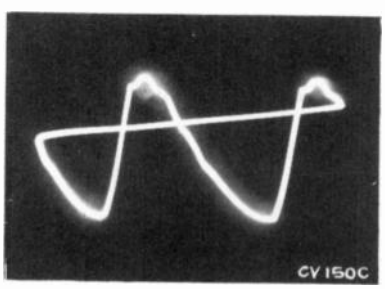
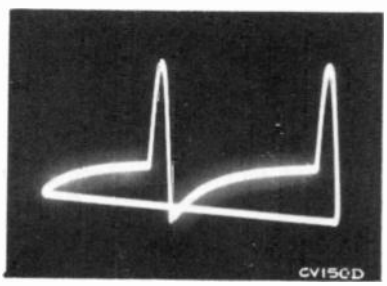


Figure 45—Plate of Damper (100 Volts PP) (Pin 5 of V119) (6W4GT)

Figure 46—Plate of AGC Amplifier (Pin 5 of V111) (6CB6) (700 Volts PP)



21T159, 21T165
21T176, 21T177
21T178, 21T179

VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition, a 5000 microvolt test pattern signal was fed into the receiver, the picture synchronized and the AGC control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are read with a type WV97A senior "VoltOhmyst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6X8	Mixer	5000 Mu. V. Signal	9	160	8	160	6	0	7	−2.4 to −3.0	—	—	
			No Signal	9	145	8	145	6	0	7	−2.8 to −3.5	—	—	
V1	6X8	R-F Oscillator	5000 Mu. V. Signal	3	95	—	—	6	0	2	−3.8 to −5.5	—	—	
			No Signal	3	90	—	—	6	0	2	−3.0 to −5.1	—	—	
V2	6BQ7	R-F Amplifier	5000 Mu. V. Signal	6	170	—	—	8	0.1	7		—	—	
			No Signal	6	133	—	—	8	1.1	7	0	—	—	
V2	6BQ7	R-F Amplifier	5000 Mu. V. Signal	1	270	—	—	3	170	2	—	—	—	
			No Signal	1	260	—	—	3	133	2	—	—	—	Depending on channel
V101	6AU6	1st Sound I-F Amp.	5000 Mu. V. Signal	5	127	6	124	7	0.7	1	−0.4	6.0	3.0	
			No Signal	5	126	6	123	7	0.5	1	−1.2	5.0	3.0	
V102	6AU6	2d Sound I-F Amp.	5000 Mu. V. Signal	5	132	6	60	7	0.14	1	−10	2.8	1.2	
			No Signal	5	131	6	65	7	0.14	1	−5	2.0	1.0	
V103	6AL5	Ratio Detector	5000 Mu. V. Signal	7	1.0	—	—	1	9.2	—	—	—	—	
			No Signal	7	0	—	—	1	8.0	—	—	—	—	
V104	6AV6	1st Audio Amplifier	5000 Mu. V. Signal	7	90	—	—	2	0	1	−0.7	0.45	—	At min. volume
			No Signal	7	86	—	—	2	0	1	−0.7	0.45	—	
V105	6AQ5	Audio Output	5000 Mu. V. Signal	5	350	6	360	2	150	7	116	30.0	2.0	At min. volume
			No Signal	5	346	6	356	2	145	7	114	30.0	2.0	
V106	6AU6	1st Pix. I-F Amplifier	5000 Mu. V. Signal	5	180	6	230	7	0.15	1	−6.5	1.5	0.3	
			No Signal	5	97	6	129	7	1.0	1	0	7.0	3.0	
V107	6CB6	2nd Pix. I-F Amplifier	5000 Mu. V. Signal	5	236	6	233	2	0.1	1	−6.5	1.5	0.14	
			No Signal	5	226	6	138	2	0,85	1	0	12.0	3.0	
V108	6CB6	3d Pix. I-F Amplifier	5000 Mu. V. Signal	5	149	6	144	2	0.9	1	0	11.0	3.0	
			No Signal	5	129	6	133	2	0.8	1	0	10.0	2.0	
V109	6CB6	4th Pix. I-F Amplifier	5000 Mu. V. Signal	5	178	6	163	2	2.2	1	0	8.9	2.1	
			No Signal	5	165	6	150	2	2.0	1	0	7.9	2.1	
V110	6AG7	Video Amplifier	5000 Mu. V. Signal	8	130	6	172	5	1.2	4	*−5.0	22.5	5.5	*Depends on picture
			No Signal	8	130	6	107	5	0.8	4	*−2.0	15.0	4.0	*Depends on picture

VOLTAGE CHART

21T159, 21T165
21T176, 21T177
21T178, 21T179

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V111	6CB6	AGC Amplifier	5000 Mu. V. Signal	5	–27	6	238	2	152	1	155	0.1	3.4	AGC control set for normal operation
			No Signal	5	4.5	6	218	2	135	1	118	0	0	
V112	6SN7GT	Hor. Sync Amplifier	5000 Mu. V. Signal	2	152	—	—	3	0.9	1	–44	1.1	—	
			No Signal	2	135	—	—	3	*0.4	1	*–30	0.5	—	*Depends on noise
			5000 Mu. V. Signal	5	86	—	—	6	0	4	–2.0	5.5	—	
			No Signal	5	50	—	—	6	0	4	–1.8	4.6	—	
V113	6SN7GT	Hor. Sync Separator	5000 Mu. V. Signal	2	374	—	—	3	216	1	155	1.2	—	
			No Signal	2	372	—	—	3	155	1	134	0.8	—	
V113	6SN7GT	Vert. Sync Separator	5000 Mu. V. Signal	5	345	—	—	6	205	4	135	<0.1	—	
			No Signal	5	340	—	—	6	160	4	130	<0.1	—	
V114A	6SN7GT	Vert. Sync Amplifier	5000 Mu. V. Signal	5	7.0	—	—	6	0	4	–0.2	0.6	—	
			No Signal	5	*7.0	—	—	6	0	4	*0	0.5	—	*Depends on noise
V114B	6SN7GT	Vertical Oscillator	5000 Mu. V. Signal	2	176	—	—	3	0	1	–27	0.2	—	
			No Signal	2	176	—	—	3	0	1	–27	0.2	—	
V115	6AQ5	Vertical Output	5000 Mu. V. Signal	5	359	6	359	2	30	1	0	17.3	1.2	
			No Signal	5	357	6	357	2	29	1	0	17.3	1.2	
V116	6SN7GT	Horizontal Osc. Control	No Signal	2	188	—	—	3	–24	1	–42	0.37	—	
			5000 Mu. V. Signal	2	145	—	—	3	–18	1	–42	0.4	—	Hor. hold counter-clockwise
			5000 Mu. V. Signal	2	230	—	—	3	–18	1	–42	0.4	—	Hor. hold clockwise
V116	6SN7GT	Horizontal Oscillator	5000 Mu. V. Signal	5	258	—	—	6	0	4	*–91	2.0	—	Depends on Oscillator Adjustment
			No Signal	5	256	—	—	6	0	4	*–94	2.0	—	
V117	6CD6G	Horizontal Output	5000 Mu. V. Signal	Cap	*700	8	165	3	12.5	5	–30	110	15.0	*High Voltage Pulse Present
			No Signal	Cap	*700	8	165	3	12.5	5	–30	110	15.0	
V118	1B3GT /8016	H. V. Rectifier	5000 Mu. V. Signal	Cap	*	—	—	2 & 7	16,000	—	—	0.2	—	*High Voltage Pulse Present
			No Signal	Cap	*	—	—	2 & 7	16,400	—	—	0.2	—	
V119 V120	6W4GT	Dampers	5000 Mu. V. Signal	5	355	—	—	3	*640	—	—	57	—	*High Voltage Pulse Present
			No Signal	5	353	—	—	3	*640	—	—	57	—	
V121	21AP4	Kinescope	5000 Mu. V. Signal	Cone	16,000	10	555	11	140	2	82	0.2	—	At average Brightness
			No Signal	Cone	16,400	10	550	11	132	2	76	0.2	—	
V122 V123	5U4G	Rectifiers	5000 Mu. V. Signal	4 & 6	388	—	—	2 & 8	389	—	—	*139	—	Per Tube
			No Signal	4 & 6	386	—	—	2 & 8	387	—	—	*145	—	

21T159, 21T165
21T176, 21T177
21T178, 21T179

R-F UNIT WIRING DIAGRAM

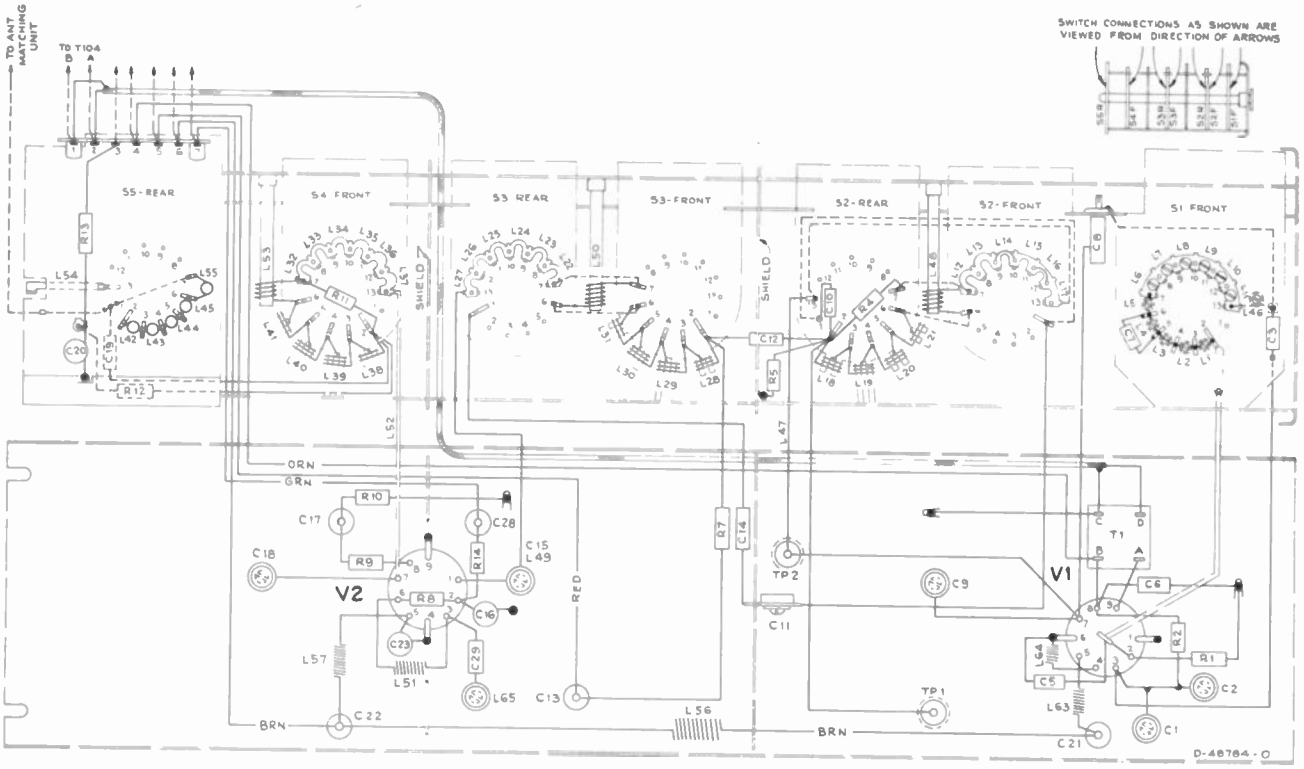


Figure 47— R-F Unit Wiring Diagram

CRITICAL LEAD DRESS:

1. Keep all wiring in the pix i-f, sound i-f and video circuits as short as possible.
2. Keep the leads on C110, C111, C112, C200, R109, R110, R111, R112, R114, R115 and R233 as short and direct as possible.
3. Do not change the bus wire connection to pin 2 of V101 and V102. Sleeving is used on these wires to insure length and to prevent shorting.
4. Dress C114 down between R117 (volume control) and wafer S101-2.
5. Ground R130 to pin 3 of V106 and R138 to pin 7 of V107.
6. Do not change the grounding of R141, R146 and R149.
7. Keep the bus wire from T109-A to C146 (plug in capacitor) short and direct.
8. Ground the filaments of sockets of V107, V108 and V109 independently of the socket center pin. Use ground lances provided near each socket.
9. Dress C198 straight up to act as a shield between T101-A and V110-4.
0. Dress C153 and R170 (kine cathode) up in the air above the terminal board.
11. Keep the leads connected to T114-C and T114-D (synchoguide) down so that they will not short out when the chassis is placed in the cabinet.
12. Do not reroute any wires between T104 and the terminal board along side it. Keep all leads on the foot side of the terminal board.
13. Dress all wires routed past T104, shielded wires W102 and W103 under the big lances near T104.
14. Dress all a-c leads to S102 under the large lances on the front apron and away from R243.
15. Dress R116 close to the chassis with leads as short as possible.
16. Dress C206, C221 and C212 up in the air and away from all other leads and components.
17. Dress all leads away from bleeder resistor R243.
18. The blue lead from pin 5 of V111 to the terminal board under the high voltage cage should be routed between V117 socket and the rear apron.
19. Keep leads on C214 as short and direct as possible.
20. Dress R206 away from all other wires and components to prevent excessive heating.
21. Keep the wire from the vertical output transformer T114 away from the 5U4G rectifier tubes.
22. Dress all 2 watt resistors away from each other and all other wires and components.
23. Dress all wires away from damper tubes V119 and V120.
24. Blue wire from pin 5 V116 to T114-A should not be more than 5 inches long.
25. Dress all peaking coils up and away from the base.

CHASSIS WIRING DIAGRAM

21T159, 21T165
21T176, 21T177
21T178, 21T179

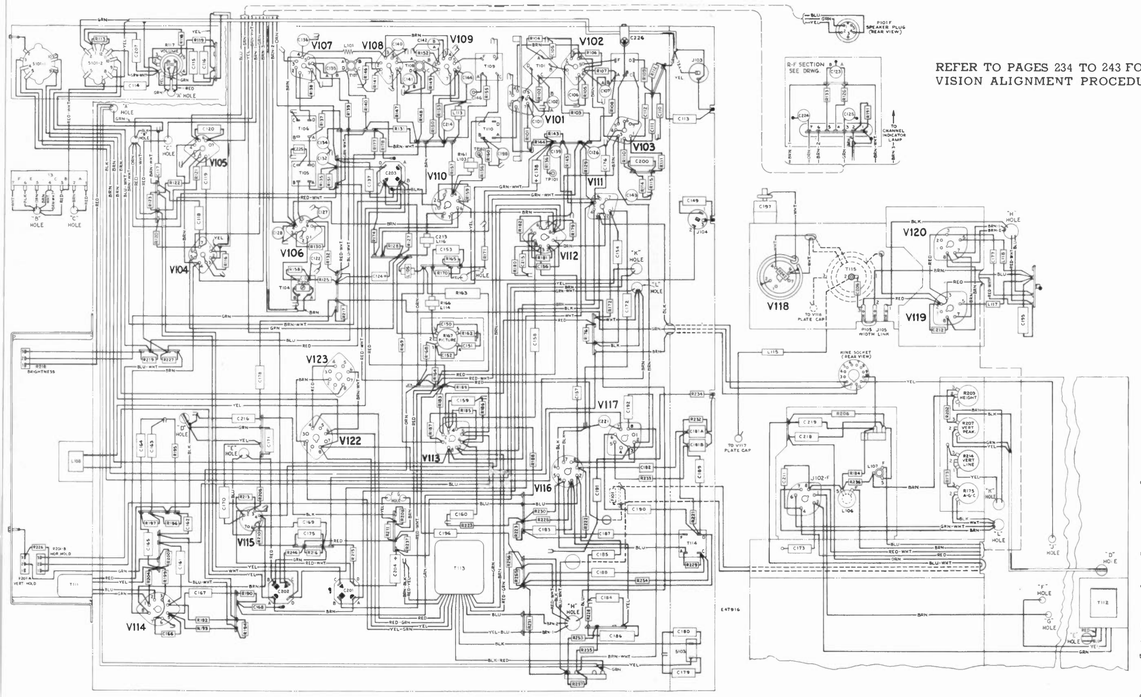
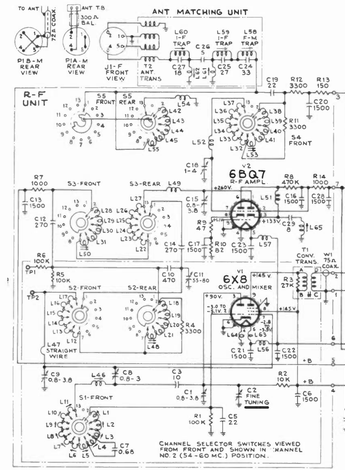


Figure 48—Chassis Wiring Diagram

REFER TO PAGES 234 TO 243 FOR TELEVISION ALIGNMENT PROCEDURE



The schematic is shown in the latest condition.
The notes below tell how early receivers differed from the schematic shown above.
In some receivers, terminal C of I-F trans. T105 was connected to ground and C225 was omitted.
In some receivers ratio detector trimmer C226 was omitted.
In some receivers C195 at damper plate was .082 mfd.
In some receivers R186 at V113-3 was 5.6 meg.
In some receivers R188 at V113-6 was 1 meg. and R190 and C168 were omitted.
In some receivers, fourth pix i-f screen resistor R153 was 33K and R150 was omitted.
In some receivers C120 at V105-5 was .0033 mfd.
In some receivers R163 at V121-11 was omitted.
In some receivers video peaking coil L113 was Grn-Orange and was shunted by a 6800 ohm resistor R174.
In some receivers video peaking coil L105 was 250 Muh and was coded Grn.
In some receivers C221 at V117-7 was omitted.
In some receivers a 1000 megohm bleeder resistor was connected from V118-2 to ground.
In some receivers R176 at the AGC control was 33K.
In some receivers R181 across T104 link was omitted.
In some receivers C220 across T104 link was 27 mmf. and was not adjustable.
In some receivers a 5 mfd. capacitor C222 was connected between brightness control R218-3 and ground.
In some receivers S102-1 was omitted and brightness control R218-1 was connected to ground.
In some receivers fourth pix i-f loading resistor R154 may be any valve between 5600 to 10K.
In some receivers R174 at V110-6 was omitted.
In some receivers F101 was a .25 amp. quick blow type fuse.
In some receivers C196 and C219 were connected to the junction of F101 and R253.
In some receivers a 270 mmf. capacitor C217 was connected from the junction of R253 and F101 to ground.
In early production r-f units, C10 was 330 mmf., C8 was 0.8 — 1.4 mmf., C3 was 12 mmf. and L47 was shown as a coil. TP2 was connected at the junction of L47 and C9. Early production r-f units are unmarked. Late production r-f units are marked M1. Replacement parts are affected.
All resistance values in ohms. K = 1000.
All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.
Direction of arrows at controls indicates clockwise rotation.
All voltages measured with "VoltOhmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a.c supply.

CIRCUIT SCHEMATIC DIAGRAM

21T159, 21T165
21T176, 21T177
21T178, 21T179

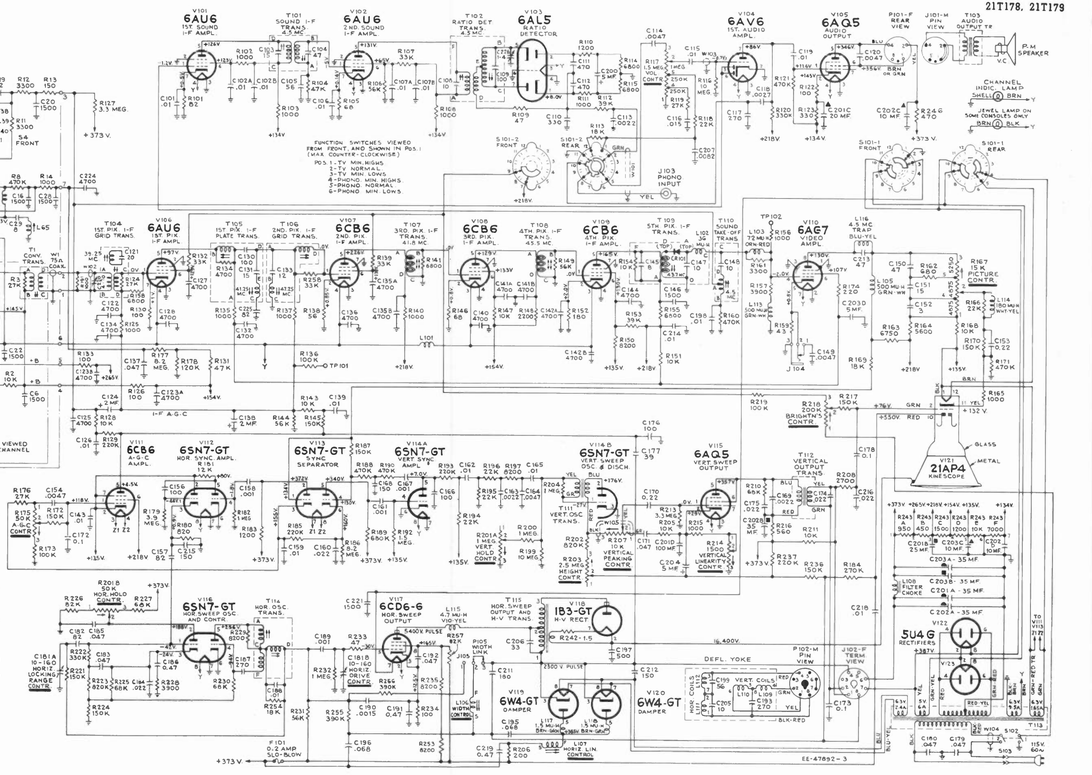


Figure 49—Circuit Schematic Diagram

21T159, 21T165
21T176, 21T177
21T178, 21T179

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	RF UNIT ASSEMBLIES
	KRK11
76539	Board—Antenna matching transformer terminal board less coils L58, L59, L60 and less capacitors C24, C25, C26, C27
76531	Board—Terminal board, 5 contact and ground
76522	Bracket—Vertical bracket for holding oscillator-mixer tube shield (early production)
76845	Bracket—Vertical bracket for holding oscillator-mixer tube shield (production marked "M1")
75186	Capacitor—Ceramic, variable for fine tuning—plunger
93056	Capacitor—Ceramic, 5 mmf. (C26)
70597	Capacitor—Ceramic, 8 mmf. (C29)
55326	Capacitor—Ceramic, 10 mmf. (C3) (production marked "M1")
76550	Capacitor—Ceramic, 12 mmf. (C3) (early production)
54207	Capacitor—Ceramic, 18 mmf. (C27)
76557	Capacitor—Ceramic, 22 mmf. (C19)
76558	Capacitor—Ceramic, 22 mmf. (C5)
70935	Capacitor—Ceramic, 27 mmf. (C25)
76729	Capacitor—Ceramic, 33 mmf. (C24)
76527	Capacitor—Mica trimmer, 55-80 mmf. (C11)
75199	Capacitor—Ceramic, 270 mmf. (C12, C14)
76552	Capacitor—Ceramic, 330 mmf. (C10) (early production)
75198	Capacitor—Ceramic, 470 mmf. (C10) (production marked "M1")
75166	Capacitor—Ceramic, 1500 mmf. (stand-off) (C13, C17, C21, C22, C28)
73748	Capacitor—Ceramic, 1500 mmf. (C16, C20, C23)
73610	Capacitor—Ceramic, 1500 mmf. (C6)
71088	Capacitor—Ceramic, 0.68 mmf. (C7)
75184	Capacitor—Ceramic, adjustable, 0.75-4 mmf., complete with adjusting stud (C1, C8)
76545	Capacitor—Tubular, steatite, adjustable, 0.8—2.25 mmf. (C8) (early production marked "M1")
76781	Capacitor—Tubular, steatite, adjustable 0.8—2.25 mmf. (C8) (production marked "M1")
76532	Capacitor—Adjustable trimmer, steatite, 1.0—4.0 mmf. (C18)
76143	Clip—Tubular clip for mounting stand-off capacitors
73591	Coil—Antenna matching coil (2 req'd)
76560	Coil—Channel #13 converter coil (L47) (early production)
73477	Coil—Choke coil (L57)
76763	Coil—Filament choke coil (L63, L64)
76562	Coil—R-F amplifier coupling coil (L51)
76537	Coil—Shunt coil complete with adjustable core (L61)
76538	Coil—Shunt coil complete with adjustable core (L62)
76529	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor shield (screw adjustment) for 1-I section (L49, C15)
76559	Connector—Oscillator grid connector
38853	Connector—4 contact female connector—part of antenna matching transformer
76460	Contact—Test point contact
75187	Core—Adjustable core for fine tuning capacitor
76543	Core—Adjusting core for FM trap
76521	Detent—Detent mechanism and shaft
73453	Form—Coil form for coils L48, L50 & L53
76524	Link—Link assembly for fine tuning
	Resistor—Fixed, compositions:—
503047	47 ohms, ± 10%, ½ watt (R9)
503082	82 ohms, ± 10%, ½ watt (R10)
504115	150 ohms, ± 20%, ½ watt (R18)
504210	1000 ohms, ± 20%, ½ watt (R7, R14)
503233	3300 ohms, ± 10%, ½ watt (R4, R11, R12)
504310	10,000 ohms, ± 20%, ½ watt (R2)
504410	100,000 ohms, ± 20%, ½ watt (R1, R5, R6)
504447	470,000 ohms, ± 20%, ½ watt (R8)
14343	Retainer—Fine tuning shaft retaining ring
75164	Rod—Actuating plunger rod (fibre) for fine tuning link
76547	Screw—#4-40 x ¼" adjusting screw for coils L6, L7, L8, L9, L10, L11
76548	Screw—#4-40 x 5/16" adjusting screw for coils L1, L2, L3, L4, L46
76549	Screw—#4-40 x ¾" adjusting screw for coil L5
76519	Shaft—Channel selector shaft and plate
76134	Shaft—Fine tuning shaft and cam
76518	Shield—Front shield complete with shaft bushing and bracket
76534	Shield—Tube shield for V2 (also V1 in M1 production)
76533	Shield—Tube shield (lead coated) for V1 (early production)
76336	Socket—Tube socket, 9 pin, miniature, bakelite, saddle mounted
76530	Socket—Tube socket, 9 pin, miniature, ceramic, saddle mounted
75191	Spacer—Insulating spacer for front plate (4 req'd)
75163	Spring—Friction spring (formed) for fine tuning cam
30340	Spring—Hairpin spring for fine tuning link
76523	Spring—Retaining spring for 6X8 tube shield (early production)
75068	Spring—Retaining spring for oscillator-mixer tube shield (production marked "M1")
73457	Spring—Return spring for fine tuning control
76554	Stator—Antenna stator complete with rotor, coils, capacitor and resistor (SS, L42, L43, L44, L45, L54, L55, C20)
76551	Stator—Converter stator complete with rotor, coils, capacitors and resistors (S2, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L48, C10, C12, R4, R5, R6 (early production)
76780	Stator—Converter stator complete with rotor, coils, capacitors and resistors (S2, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L48, C10, C12, R4, R5, R6) (production marked "M1")
76546	Stator—Oscillator stator complete with rotor, coils and capacitor (S1, C3, C7, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L46) (early production)
76779	Stator—Oscillator stator complete with rotor, coils, and capacitor (S1, C3, C7, L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L46) (production marked "M1")
76556	Stator—R-F grid stator complete with rotor, coils and resistors (S4, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L53, C19, R11, R12)
76553	Stator—R-F plate stator complete with rotor, coils, capacitor and resistor (S3, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L50, C14, R7)
76561	Strap—Channel #13 r-f grid strap (L52)
76526	Strip—Coil segment mounting strip—L.H. lower
76544	Strip—Coil segment mounting strip—L.H. upper—less trimmer
76525	Strip—Coil segment mounting strip—R.H. center
75446	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot for trimmer coil L49, C15 uncoded and coded "DR"
75447	Stud—Capacitor stud—brass—#4-40 x 13/16" with 3/64" screw driver slot (screw adjustment) for r-f section (L49, C15)
76740	Stud—#6-32 x 1" adjusting stud for capacitor No. 76545 (early production)
76536	Transformer—Antenna matching transformer complete (T2, C24, C25, C26, C27, L58, L59, L60, L61, L62, J1)
76528	Transformer—Converter transformer
76540	Trap—FM trap complete with adjustable core (L58)
76535	Trap—I-F trap (L65)
76542	Trap—I-F trap (41.25 mc.) complete with core (L60)
76541	Trap—I-F trap (45.75 mc.) complete with core (L59)
75190	Washer—Insulating washer (neoprene) for mounting capacitor on coil strip

CHASSIS ASSEMBLIES

KCS 68C in Models 21T176, 21T177, 21T178, 21T179
KCS 68E in Models 21T159, 21T165

76456	Bracket—Channel indicator lamp bracket
76490	Bracket—Mounting bracket complete with insulator for picture control
12118	Cap—6CD6 tube connector cap

21T159, 21T165
21T176, 21T177
21T178, 21T179

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
76800	Capacitor—Adjustable trimmer steatite 1-4 mmf. (C226)
76507	Capacitor—Ceramic, 3 mmf. (C152)
71496	Capacitor—Adjustable, 4-70 mmf. (C220)
75217	Capacitor—Mica trimmer, dual 10-160 mmf. (C181A, C181B)
39044	Capacitor—Ceramic, 15 mmf. (C151)
76577	Capacitor—Ceramic, 33 mmf. (C206)
76574	Capacitor—Ceramic, 39 mmf. (C177)
39042	Capacitor—Ceramic, 47 mmf. (C150)
71924	Capacitor—Ceramic, 56 mmf. (C105)
73090	Capacitor—Mica, 82 mmf. (C157, C182)
71514	Capacitor—Ceramic, 82 mmf. (C225)
45233	Capacitor—Ceramic, 100 mmf. (C156, C166)
76578	Capacitor—Mica, 100 mmf. (C176)
76576	Capacitor—Ceramic, 150 mmf. (C212)
44202	Capacitor—Ceramic, 150 mmf. (C168, C215)
76575	Capacitor—Ceramic, 180 mmf. (C211)
47617	Capacitor—Ceramic, 270 mmf. (C117)
76579	Capacitor—Mica, 270 mmf. (C187)
76473	Capacitor—Mica, 330 mmf. (C110)
39644	Capacitor—Mica, 470 mmf. (C111, C112)
76488	Capacitor—Ceramic, 500 mmf., 30,000 volts (C197)
75166	Capacitor—Ceramic, 1500 mmf. (stand-off) (C146)
73748	Capacitor—Ceramic, 1500 mmf. (C221)
73473	Capacitor—Ceramic, 4700 mmf. (C122, C125, C127, C128, C132, C134, C136, C140, C147, C224)
76470	Capacitor—Ceramic, dual 4700 mmf. (C123A, C123B, C135A, C135B, C141A, C141B, C142A, C142B)
73960	Capacitor—Ceramic, 10,000 mmf. (C101, C106, C126, C139, C143, C198, C214)
75877	Capacitor—Ceramic, dual 10,000 mmf. (C102A, C102B, C107A, C107B)
76742	Capacitor—Electrolytic, 2 mfd., 10 volts (C124, C138)
74521	Capacitor—Electrolytic, 5 mfd., 50 volts (C200)
28417	Capacitor—Electrolytic, 5 mfd., 450 volts (C204)
75510	Capacitor—Electrolytic, comprising 2 sections of 35 mfd., 450 volts, 1 section of 10 mfd., 450 volts and 1 section of 5 mfd., 40 volts (C202A, C202B, C202C, C202D)
76485	Capacitor—Electrolytic, comprising 2 sections of 35 mfd., 450 volts, 1 section of 10 mfd., 450 volts and 1 section of 10 mfd., 200 volts (C202A, C202B, C202C, C202D)
76486	Capacitor—Electrolytic, comprising 1 section of 35 mfd., 450 volts, 1 section of 25 mfd., 450 volts, 1 section of 20 mfd., 200 volts, and 1 section of 100 mfd., 50 volts (C201A, C201B, C201C, C201D)
75643	Capacitor—Tubular, paper, oil impregnated, .001 mfd., 600 volts (C158, C161, C187)
73801	Capacitor—Tubular, paper, oil impregnated, .001 mfd., 1000 volts (C189)
76508	Capacitor—Tubular, moulded, oil impregnated, .0015 mfd., 600 volts (C190)
73595	Capacitor—Tubular, paper, oil impregnated, .0022 mfd., 600 volts (C163)
73803	Capacitor—Tubular, paper, oil impregnated, .0022 mfd., 1000 volts (C169)
73599	Capacitor—Tubular, paper, oil impregnated, .0027 mfd., 600 volts (C118)
73920	Capacitor—Tubular, paper, oil impregnated, .0047 mfd., 600 volts (C144, C120, C149, C154, C164)
73808	Capacitor—Tubular, paper, oil impregnated, .0082 mfd., 600 volts (C207)
73561	Capacitor—Tubular, paper, oil impregnated, .01 mfd., 400 volts (C115, C119, C159, C162, C218)
73594	Capacitor—Tubular, moulded, oil impregnated, .01 mfd., 600 volts (C165, C188)
73797	Capacitor—Tubular, paper, oil impregnated, .015 mfd., 600 volts (C116)
73562	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 400 volts (C160, C174, C175, C184)
73798	Capacitor—Tubular, paper, oil impregnated, .022 mfd., 600 volts (C216)
73553	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 400 volts (C137, C183)
75071	Capacitor—Tubular, moulded, .047 mfd., 400 volts (C179, C180)
73592	Capacitor—Tubular, paper, oil impregnated, .047 mfd., 600 volts (C155, C171, C185, C192)
73815	Capacitor—Tubular, paper, oil impregnated, .068 mfd., 1000 volts (C195, C196)
73551	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd., 400 volts (C172, C178)
73557	Capacitor—Tubular, paper, oil impregnated, 0.1 mfd., 600 volts (C173)
73794	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd., 400 volts (C153)
74957	Capacitor—Tubular, paper, oil impregnated, 0.22 mfd., 600 volts (C170)
73787	Capacitor—Tubular, paper, oil impregnated, 0.47 mfd., 200 volts (C186, C191, C219)
76498	Choke—Filter choke (L108)
76143	Clip—Tubular clip for mounting stand-off capacitor #75166
73477	Coil—Choke coil (L101)
76672	Coil—Filament winding only for hi-voltage transformer
76483	Coil—Horizontal linearity coil complete with adjustable core (L107)
76484	Coil—Width coil complete with adjustable core (L106)
76646	Coil—Peaking coil (72 muh) (L103, R161)
76647	Coil—Peaking coil (180 muh) (L114, R166)
75252	Coil—Peaking coil (560 muh) (L105, L113)
76640	Coil—R-F choke coil (1.5 muh) (L117, L118)
76510	Coil—R-F choke coil (4.7 muh) (L115)
35787	Connector—Phono input connector (J103)
76457	Connector—2nd anode lead connector—mounted on hi-voltage capacitor
74594	Connector—2 contact male connector for power cord
5040	Connector—4 contact female connector for speaker cable (P101)
50367	Connector—6 contact female connector for yoke leads (J102)
75542	Connector—6 contact male connector—part of deflection yoke (P102)
75517	Contact—Cathode connector contact only
76460	Contact—Test point contact
76447	Control—AGC control (R175)
76444	Control—Brightness control (R218)
76448	Control—Height control (R203)
76443	Control—Horizontal and vertical hold control (R201A, R201B)
76445	Control—Picture control (R167)
76449	Control—Vertical linearity control (R214)
76803	Control—Volume control and power switch (R117, S102)
76497	Control—Vertical peaking control (R207)
74956	Cushion—Rubber cushion for deflection yoke hood (2 req'd)
74839	Fastener—Push fastener for mounting tube sockets
76801	Fuse—0.2 amp., 250 volts slow blow type (F101)
37396	Grommet—Rubber grommet for mounting tube sockets
76459	Grommet—Rubber grommet for 2nd anode lead exit
76654	Hood—Deflection yoke hood less rubber cushions
75482	Jack—Video jack (J104)
76497	Lead—Lead complete with eyelet
76n2	Magnet—Focus magnet complete (screw driver adjustment type)
76141	Magnet—Ion trap magnet (P.M. type)
76500	Plate—Hi-voltage plate (bakelite) complete less transformer socket and lead
76649	Radiator—Heat dissipating radiator for 6CD6 tube
76675	Rectifier—Picture detector crystal rectifier (CR101)
74015	Resistor—Wire wound, 100 ohms, 2 watts (R234)
76465	Resistor—Wire wound, 330 ohms, 1 watt (R123)
76499	Resistor—Wire wound comprising (R243A, R243B, R243C, R243D, R243E, R243F): 1 section of 950 ohms, 16 watts, 1 section of 450 ohms, 6 watts, 1 section of 1500 ohms, 5 watts, 1 section of 1200 ohms, 1 watt, 1 section of 10,000 ohms, 5 watts, and 1 section of 7000 ohms, 5 watts
76682	Resistor—Wire wound, 200 ohms, 5 watts (R206)
76642	Resistor—Wire wound, 6750 ohms, 10 watts (R163)

21T159, 21T165
21T176, 21T177
21T178, 21T179

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
504610	10 megohm, ± 20%, ½ watt (R116)
76650	Ring—Anchoring ring for radiator hold-down spring
71456	Screw—#8-32 x 7/16" wing screw to mount deflection yoke
76487	Shaft—Connecting shaft—nylon—for picture and brightness controls
73584	Shield—Tube shield
76743	Shield—Tube shield for vertical oscillator, V114
75718	Socket—Channel indicator lamp socket
74834	Socket—Kinescope socket
31364	Socket—Pilot light socket
73249	Socket—Tube socket, octal, ceramic, plate mounted
76453	Socket—Tube socket, octal, moulded bakelite, plate mounted
31251	Socket—Tube socket, octal, wafer
71508	Socket—Tube socket, 6 contact, moulded bakelite
503182	Socket—Tube socket, 9 pin, moulded, saddle mounted
74766	Socket—Tube socket, 7 pin, moulded, saddle mounted, miniature
73117	Socket—Tube socket, 7 pin, wafer, miniature
76651	Spring—Springs for securing 6CD6 radiator (3 req'd)
76636	Stud—Adjusting stud complete with guard for focus magnet
76428	Support—Bakelite support only—part of hi-voltage shield
76498	Switch—Tone control and phono switch (S101)
76463	Terminal—Screw type grounding terminal
76501	Transformer—Hi-voltage transformer less filament winding (T115)
76440	Transformer—Horizontal oscillator transformer complete with adjustable core (T114)
76495	Transformer—Power transformer, 115 volt, 60 cycle (T113)
76439	Transformer—Ratio detector transformer complete with adjustable cores (T102, C108, C109)
76438	Transformer—Sound i-f transformer complete with adjustable cores (T101, C103, C104)
76437	Transformer—Sound take-off transformer complete with adjustable cores (T110, C146)
76494	Transformer—Vertical output transformer (T112)
74144	Transformer—Vertical oscillator transformer (T111)
76432	Transformer—First pix i-f grid transformer complete with adjustable cores (T104, C121, R124)
76434	Transformer—First pix i-f plate transformer complete with adjustable cores (T105, C130, C131, R134)
76435	Transformer—Second pix i-f grid transformer complete with adjustable cores (T106, C142, R139)
76433	Transformer—Third or fourth pix i-f transformer (T107, T108)
76436	Transformer—Fifth pix i-f transformer (T109, C145, C147, CR101, L102, R154)
76482	Trap—4.5 mc. trap (L116, C213)
76653	Yoke—Deflection yoke complete with 6 contact male connector (L109, L110, L111, L112, CR153, C199, C205, P102)

SPEAKER ASSEMBLIES

971490-2 R
RMA 165
(For Model 21T159)

77129	Cone—Cone and voice coil

SPEAKER ASSEMBLIES

92569-14 W
RL-111A11
RMA 274

75682	Cone—Cone and voice coil (3.2 ohms)
5039	Connector—4 contact male connector
76833	Speaker—12" P.M. speaker complete with cone and voice coil less transformer and plug
75520	Transformer—Output transformer

21T159, 21T165
21T176, 21T177
21T178, 21T179

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
	SPEAKER ASSEMBLIES
	971494-1 W
	RL 111 B2
	RMA 274
76296	Cone—Cone and voice coil (3.2 ohms)
5039	Connector—4 contact male connector (J101)
76389	Speaker—12" P.M. speaker complete with cone and voice coil (3.2 ohms) less transformer and plug
75520	Transformer—Output transformer (T103)
	21CB9 CABINET BASE
	(For use with Model 21T159)
X3251	Pull—Door pull
	MISCELLANEOUS
76784	Back—Cabinet back complete with power cord for Model 21T159
76655	Back—Cabinet back complete with power cord for Models 21T165, 21T176, 21T177, 21T178, 21T179
76184	Board—Antenna terminal board
76629	Bracket—Ranger bracket from cabinet top panel to deflection yoke hood
76697	Bracket—Masking panel support bracket (2 req'd)
76698	Bracket—Pilot lamp bracket
76599	Bracket—"U" shape bracket for holding "L" shape support rods (2 req'd)
76699	Bumper—Rubber bumper for kinescope (as req'd)
13103	Cap—Pilot lamp cap
71892	Catch—Bullet catch and strike for doors
X1917	Cloth—Grille cloth for mahogany or walnut instruments for Model 21T159
X1918	Cloth—Grille cloth for oak instruments for Model 21T159
X3199	Cloth—Grille cloth for mahogany or walnut instruments for Models 21T165, 21T176, 21T177, 21T178, 21T179 or for mahogany instruments for Model 21T179 (4 req'd)
X3089	Cloth—Grille cloth for oak instruments for Model 21T176
X3222	Cloth—Grille cloth for oak instruments for Model 21T165 and 21T177
75474	Connector—Single contact male connector for antenna cable (21 req'd assembly (2))
39153	Connector—4 contact male connector for antenna cable
71457	Cord—Power cord and plug
76631	Cushion—Rubber cushion for dust sealing the kinescope
76627	Cushion—Rubber cushion for safety glass (4 req'd)
76698	Cushion—Rubber cushion for masking panel support bracket (2 req'd)
76566	Decal—Control function decal for mahogany or walnut instruments
76567	Decal—Control function decal for oak or maple instruments
71984	Decal—Trade mark decal
74809	Emblem—"RCA Victor" emblem
75456	Escutcheon—Channel selector escutcheon
72113	Foot—Rubber foot for Model 21T159 cabinet (4 req'd)
76822	Glass—Safety glass
77396	Grommet—Rubber grommet for mounting speaker (3 req'd)
74308	Hinge—Cabinet door hinge (1 set)
76595	Knob—Brightness control or vertical hold control knob—maroon—for mahogany or walnut instruments (outer)
76625	Knob—Brightness control or vertical hold control—tan—for maple instruments (outer)
76596	Knob—Brightness control or vertical hold control knob—beige—for oak instruments (outer)
76593	Knob—Channel selector knob—maroon—for mahogany or walnut instruments (inner)
76624	Knob—Channel selector knob—tan—for maple instruments (inner)
76594	Knob—Channel selector knob—beige—for oak instruments (inner)
76591	Knob—Fine tuning control knob—maroon—for mahogany or walnut instruments (outer)
76623	Knob—Fine tuning control knob—tan—for maple instruments (outer)
76592	Knob—Fine tuning control knob—beige—for oak instruments (outer)
74963	Knob—Picture control, horizontal hold control or volume control and power switch knob—maroon—for mahogany or walnut instruments (inner)
74001	Knob—Picture control, horizontal hold control or volume control and power switch knob—tan—for maple instruments (inner)
75464	Knob—Picture control, horizontal hold control or volume control and power switch knob—beige—for oak instruments (inner)
76597	Knob—Tone control and phono switch knob—maroon—for mahogany or walnut instruments (outer)
76626	Knob—Tone control and phono switch knob—tan—for maple instruments (outer)
76598	Knob—Tone control and phono switch knob—beige—for oak instruments (outer)
11765	Lamp—Channel marker escutcheon or pilot lamp—Mazda #51
75459	Mask—Channel marker escutcheon—light mask—burgundy—for mahogany or walnut instruments
76589	Mask—Channel marker escutcheon—light mask—medium dark beige—for oak or maple instruments
76696	Mask—Polystyrene masking panel for kinescope
76728	Nut—Speed nut for trimmer capacitor C22B
73634	Nut—Speed nut for speaker mounting screws
71455	Nut—#8-32 wing nut to mount yoke hood to hanger bracket
76177	Nut—#10-32 special nut for deflection yoke hood support rod (2 req'd)
76601	Pad—Kinescope edge pad (4 req'd)
76570	Plate—Back plate for center door pull for Model 21T178
76645	Pull—Door pull (2 req'd) for mahogany or walnut Model 21T159
76756	Pull—Door pull (2 req'd) for oak Model 21T176
76571	Pull—Door pull for Model 21T177
76569	Pull—Center door pull for Model 21T178 (2 req'd)
76568	Pull—Upper door pull for Model 21T178 (4 req'd)
76198	Pull—Upper door pull for lower door for Model 21T179
76196	Pull—Door pull for upper L.H. door for Model 21T179
76197	Pull—Door pull for upper R.H. door for Model 21T179
76628	Rod—"L" shape threaded rod to support deflection yoke cable (21 req'd assembly (2))
76632	Screw—#8 x ¾" self tapping hex head wood screw to mount kinescope panel (12 req'd) or hanger bracket (2 req'd)
74279	Screw—#8-32 x ¾" trimit head screw for Model 21T176 door pulls or Model 21T179 upper door pulls
74269	Screw—#8-32 x ¾" trimit head screw for upper door bracket (2 req'd)
74113	Screw—#8-32 x 1" trimit head screw for door pull for Model 21T177
74307	Screw—#8-32 x 1¼" trimit head screw for center door pull for Model 21T178
75626	Screw—#8-32 x 1½" trimit head screw for door pull for lower doors for Model 21T179
76630	Spring—Formed spring for kinescope masking panel (6 req'd)
30330	Spring—Retaining spring for knobs #74001, 74963 & 75464
72845	Spring—Retaining spring for knobs #76591, 76592 & 76623
14270	Spring—Retaining spring for knobs #76593, 76594, 76595, 76596, 76597, 76598, 76623, 76624, 76625 & 76626
73643	Spring—Spring clip for channel marker escutcheon
74936	Spring—Spring for kinescope socket leads
72936	Stop—Cabinet door stop
76600	Strap—Grounding strap (copper strip—½" x 18" long)
75457	Washer—Felt washer—dark brown—between knob and channel marker escutcheon for mahogany or walnut instruments
75523	Washer—Felt washer—tan—between knob and channel marker escutcheon for maple instruments
75458	Washer—Felt washer—beige—between knob and channel marker escutcheon for oak instruments
75500	Washer—Felt washer for cabinet back mounting screws (4 req'd)
76836	Washer—Cellulose washer—gold—for knobs

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