ELECTRONIC TECHNICIAN

104 TV - RADIO Schematics

OVER 30 MANUFACTURERS

Covers Hundreds of CHASSIS & MODEL Numbers

Volume 4
ELECTRONIC CIRCUIT SYMBOLS

Graphical representation of electronic and related components provides an efficient shortcut in conveying technical information. To establish a universal meaning for each of these symbols, a set of standards have been developed jointly by the Institute of Radio Engineers (IS4IRE2151) and the American Standards Association (Y32.2—1954). Presented here are more than 175 symbols selected from the 67 major categories included in the IRE-ASA standards. These symbols represent those most frequently used in the electronic industries, and may be considered the building blocks of the complete set of standards.
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Chassis CT2138: Models 21T351, 21TCC92, 292

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TV Chassis V-237B-183
TV Chassis V23731-1, -2, Models H21-K272, 273, 274, 275, 276; H21-KU272, 273, 274, 275, 276

FISHER

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DEWALD

FM Table Radio Model P-705

PHILCO

FM-AM Stereo Receiver Model 600

TV Chassis V-237B-183
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WESTINGHOUSE

TV Chassis V-237B-183

DEWALD

FM Table Radio Model P-705

PHILCO

FM-AM Stereo Receiver Model 600

RADIO

ADMLR

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BLONDER-TONGUE

AM-FM Tuner Model T-88

GRANCO

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MAGNAVOX

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HOFFMAN

Stereo AM-FM Receiver Chassis 1130: Models 8007 Series

MOTOROLA

Auto Radio, transistorized, Model 04MA

DEWALD

FM Table Radio Model P-705

PILOT

HiFi AM-FM Tuner: Model FA-680

RA C

Transistor Radio 1-14 Series

SONY, JAPAN

Transistor Radio TR63

WESTINGHOUSE

FM Radio Chassis V-2400-1: Models H715, H715T

Stereopanograph Console w/AM Radio, Chassis V-2509-2: Models H1200 to H1204 incl.

ZENITH

Transistor Portable Radio Mod- el 600

GENERAL ELECTRIC

Transistor Radio Model P776A

DELCO

Pontiac 986978

DEWALD

FM Table Radio Model P-705

ZENITH

Transistor Portable Radio Mod- el 600

PILOT

HiFi AM-FM Tuner: Model FA-680

RA C

Transistor Radio 1-14 Series

SONY, JAPAN

Transistor Radio TR63

WESTINGHOUSE

FM Radio Chassis V-2400-1: Models H715, H715T

Stereopanograph Console w/AM Radio, Chassis V-2509-2: Models H1200 to H1204 incl.

ZENITH

Transistor Portable Radio Mod- el 600
WARNING:
The chassis of this receiver is connected directly to one side of the 117 volt, 60 cycle power line.

SCHEMATIC NOTE:
(A) (B) (C), etc., indicate alignment points and alignment connections.

Tube Locations of 1723DBM and 1723DBN Chassis Showing Heater Wiring on Opposite Side.

TUBE COMPLEMENT:
- V401-6CG7 V701-68Z7
- V402-6SH4A V702-556
- V403-6CG7 V404-12DJ6Q
- V405-12AX4GTA V406-163Q9T
- V201-3AU6 V202-3AL5 or V203-12CA5
- V204-SAN8 V205-23CPA4A
- V206-3AM8

PRODUCTION CHANGES:
- Horizontal Sync Discriminator Replaced with SA6 TUN
- To prevent radiation interference, horizontal sync added to video detector circuit.
- Diode 93AS-4

CHANGE TO IMPROVE VIDEO RESPONSE AND CONTRAST

Vertical Blanking Couple Replaced by Separate Components, Speaker Plug and Socket Deleted.

To simplify circuitry, the vertical blanking capacitor, 24402 (0.1uf) was replaced by individual components. 0431 1.067 ml), coo.

Ideal IF Response Curve.
DEFLECTION YOKE
YOKE RETAINING SPRING
To correct picture tilt, press ends of yoke retaining spring together while rotating yoke until picture is straight.

ION TRAP
VERY CAREFULLY adjust for maximum brightness and best focus. If maximum brightness is found in two positions on neck, use position closest to tube base.

VERTICAL LINEARITY
To correct improper picture height or vertical linearity, alternately adjust HEIGHT and VERT. LIN.

HORIZONTAL ADJUSTMENT
Rotate shaft to the left or right until picture remains in horizontal sync when switching channels.

PICTURE CENTERING TABS
Move tabs closer together or farther apart to center picture.

SPEAKER SOCKET
Used on Run 10 through Run 14 only.

FUSIBLE RESISTOR

HORIZONTAL DRIVE
Turn screw in until just snug. If drive line shows in picture, turn screw out until line just disappears.

View Through Hole in Glass and Mask in Models Using 17Z3DB Chassis, Knobs and Glass Retainer Disc Removed.

ADMIRAL TV Chassis 17Z3DBM, 17Z3DBN
Electronic Technician CIRCUIT DIGEST

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**PRODUCTION CHANGES**

**CHANGE TO PREVENT HORIZONTAL SYNC INSTABILITY AT HIGH SIGNAL LEVELS**

16X1 Chassis Stamped Rev 12

To reduce possibility of horizontal sync instability and resulting horizontal line instability at extremely high signal level, C416 changed to 22MF.

**DIFFERENT CIRCUIT FOR V401 STAGE USED**

16X1 and 16AX1 Chassis Stamped Rev 15

To improve immunity of external noise interference, R347 (68K), C104 (2000pF) and Super Range Finder emitter B401 (1000pF) added.

**CHANGE IN VERTICAL OUTPUT CIRCUIT**

16X1 and 16AX1 Chassis Stamped Rev 13

To reduce pulse voltage at V403, series network consisting of C415 (1000pF), 2KV1 and 2KV2 added from point of V403 to out lead of Vertical Output Transformer (T601), C435 (470pF) removed.

**CHANGE TO MINIMIZE HORIZONTAL PULSE INTERACTION IN VERTICAL OUTPUT CIRCUIT**

16X1 and 16AX1 Chassis Stamped Rev 14

C401 (100pF) added between pins 4 and 8 of Vertical Output Transformer (T601) to minimize horizontal pulse interaction in Vertical Output circuit.

---

**VIEW OF WIRING SIDE OF PRINTED WIRING BOARD**

Gray area represents printed wiring; black symbols and lines represent components and connections on opposite side.

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CLOSED IN ORE

DOM ETUNED TRANSFORMERS.

526C are new MINI-TURRET tuners which require
VHF tuners 471225 and 471226 used in
POSOINT
VHF SECTION
VHF SECTION
7
USED IN CHASSIS

UHF-VHF TUNER ASSEMBLIES

VHF TUNERS

PRINTED CIRCUIT BOARD

TUNER ADJUSTMENTS

UHF tuners 471225 and 471226 used in chassis 120519C, 5200 and 5500 are new 15L-TUNER tuners which require the use of an alignment tool with a tip no wider than 1/8" for adjustment of the local oscillator.
More Data on Reverse Side
**PRODUCTION CHANGES:**

- **NO** CODE: *No code* schematic applies as printed.
- **Z** CODE: *No code* schematic applies with the following change.
  - To increase vertical size R504 location changed to provide 6 volts to V113 from E instead of from A.
- **X** CODE: *No code* schematic including *Z* and *Y* changes applies with the following changes.
  - To reduce drive lines 150K resistor added in parallel with R410 39K resistor.
- **Y** CODE: *No code* schematic including *Z* and *Y* changes and the following changes.
  - To reduce current through vertical linearity control 1K resistor R133 added from Pin 9 of 681 to chassis.
  - R1134 changed from 33 ohms to 180 ohms.
  - L503 in filament string changed from 2.2p to 2.0p.

- **U** CODE: *No code* schematic applies with the following changes.
  - To reduce 60 cycle hum in Audio. 5200 deleted. R14-470 ohms 2 watts added. C504A reconnected to point A. Location changed to read A.

- ***Z* CODE: *No code* schematic applies with the following changes.
  - Connections of R513 (501 in M504 "No code" schematic) and C501 reversed to connect R513 directly to switch S501 and capacitor C501 directly to pin 6 of V1001 +230V, and C501 reversed to connect R513 directly to pin 6 of V1001 +230V.

- **S** CODE: *No code* schematic applies including "U" and "T" and the following changes.
  - To prevent spurious vertical synchronization, C308 330mmf micro capacitor deleted.

- ***R* CODE: *No code* schematic applies with "U", "R" and "S" and the following changes.
  - To improve stability of Audio LF and detector alignment. R102 - value changed from 6K to 220K.

- **U** CODE: *No code* schematic applies with the following changes.
  - To reduce 60 cycle hum in Audio. 5150 deleted. R14-470 ohms 2 watts added. C504A reconnected to point A. Location changed to read A.

- ***R* CODE: *No code* schematic applies with "U", "R" and "S" and the following changes.
  - To prevent spurious vertical synchronization, C308 330mmf micro capacitor deleted.

- **U** CODE: *No code* schematic applies with the following changes.
  - To reduce 60 cycle hum in Audio. 5150 deleted. R14-470 ohms 2 watts added. C504A reconnected to point A. Location changed to read A.
4 ENCLOSED LETTERS ARE REFERRED TO IN ALIGNMENT INFORMATION.

3. ARROWS ON POTENTIOMETERS INDICATE ROTATION.

2. ALL RESISTANCES ARE GIVEN IN OHMS: K = 1000, M = 1000,000.

I. ALL CAPACITIES SHOWN AS DECIMAL FRACTIONS ARE MICROFARADS AND NOTED.

- - - INDICATES ASSEMBLY; ---- INDICATES SHIELD.

SHOWN AS WHOLE NUMBERS ARE MICROFARADS UNLESS OTHERWISE NOTED.

C) VOLTAGES ± 20% OF THOSE SHOWN ARE NORMAL.

A) WAVEFORMS AND SOCKET PIN VOLTAGES Measured WITH RECEIVER UNDER AVERAGE SIGNAL CONDITIONS WITH CONTROLS ADJUSTED FOR NORMAL SETTING.

B) SOCKET PIN VOLTAGES MEASURED WITH A V.T.V.M. ± 20% OF SHOWN VALUES ARE PERMITTED.

D) MEASUREMENTS HERE MADE WITH REFERENCE TO GROUND AND ARE POSITIVE UNLESS OTHERWISE INDICATED.

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MAGNAVOX
TV Chassis 32 Series

Remove 3 Screws

Remove 4 Bolts

Remove

CIRCUIT DIGEST

ELECTRONIC
TECHNICIAN

Remove 4 Bolts

Remove

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DC SOCKET VOLTAGES

All DC socket voltages shown on the schematic are measured with a high impedance VTVM and under zero signal conditions.
NOTE-In UHF receivers the filament voltages in the tuner and above the tuner in the heater string will be slightly greater because of the filament voltages of the tuner tubes.
ELECTRONIC TECHNICIAN
CIRCUIT DIGEST

Chassis Changes
A-01 TO IMPROVE VERTICAL SYNC STABILITY: R-502 (100K) moved from ground to pin #1 of V-10 (6C57 -Horiz Phase Det).
R-502 (100K) changed to 470K.
DESIGN CHANGE: C-125 (470 mmf) removed.
The plate of V-9A (3BU8) is now connected to junction of C-513 (150) and C-514 (.001).

A-02 TO REDUCE NOISE LEVEL: R-121 (390K) changed to 470K.

TT-121C TO MINIMIZE RESPONSE CURVE TILT ON CHANNEL 5: C-2 (470) changed to .0022 mf.
This change reduces parasitic oscillation creating the tilt.

R-502 (100K) moved from ground to pin #1 of V-10 (6C57 -Horiz Phase Det).
R-502 (100K) changed to 470K.
DESIGN CHANGE: C-125 (470 mmf) removed.
The plate of V-9A (3BU8) is now connected to junction of C-513 (150) and C-514 (.001).
A-02 TO REDUCE NOISE LEVEL: R-121 (390K) changed to 470K.

TT-121C TO MINIMIZE RESPONSE CURVE TILT ON CHANNEL 5: C-2 (470) changed to .0022 mf.
This change reduces parasitic oscillation creating the tilt.
More Data on Reverse Side

CHASSIS PRODUCTION CHANGES

TX-564A-00 thru A-11

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The original chassis A-01, 02, 03, etc... Mechanical differences from A-01, 02, etc... to A-10, 11, etc... include:

1. A new assembly number is listed for T-301 which includes the new capacitor.
2. To improve the noise ratio on moderately strong signals: R-122 (2.2 meg) changed to 1.5 meg, R-124 (1.5 meg) changed to 10 meg. This change improves the noise factor by increasing the gain in the tuner without increasing the noise factor in the IF system.
3. To facilitate video IF alignment: C-102 (100 mmf) removed.
4. R-102 (100 ohm) changed to 8.8 ohm.
5. To reduce the possibility of regeneration in the IF tuner: L-601 (diamond coil) added between plate and grid (lower power cable socket), and ground. R-313 (100 K) added between screen and plate, and grid (lower power cable socket).
6. To reduce the effect of high humidity on the module: R-601 and the vertical module (E-001) have additional wax impregnations.
7. To reduce drift of the sound detector with temperature changes: C-105 (0.5 mmf) replaced with a capacitor of improved temperature characteristics. C-205 is part of the assembly comprising the IF amplifier and IF transformer.
8. To increase the UHF tuner stability by reducing the effect of temperature change: C-305 is an equivalent to module No. 51C753673 when the 5.6 meg resistor (located between riser wire 4 and B+ point) is included.
9. To decrease the effect of high voltage on the module: C-104 and C-405 (180 VDC) changed to 220 VDC.
10. A new structure is added to the module: C-104 and C-405 (180 VDC) changed to 220 VDC.
OBSEVE THE FOLLOWING PRECAUTIONS

1. Antenna isolation networks are located on terminal strips for all VHF tuners. This network consists of 330K OHM ± 10%, 1/2 Watt resistors in parallel with 6700MF ± 10%, 1600V AC capacitors. One pair is installed in series with each antenna lead. These are for protection of the user against shock hazard. If any work is done on tuners, always check antenna terminals to check for resistance. This must be 330K OHM ± 10%. UHF tuners have built in isolation networks but should also be checked for failure of this protective circuit.

2. The volume control, picture tube supports and all metal parts which the customer can touch are protected by isolation networks. Do not, under any circumstances, defeat these networks when you service the sets.

More Data on Reverse Side
PRODUCTION CHANGES
TO INCREASE WIDTH IN 110° 21" SETS

Electronic Technician
CIRCUIT DIGEST

FILAMENT DROPPING RESISTOR
All portables that have a 30 OHM ± 10% 15 Watt Wire Wound Resistor in the filament. Change to a 36 OHM ± 10%. 15 Watt Wire Wound Resistor. This is to eliminate possible hum on Horizontal Sync. Since our portables have no pilot light this is needed to lower the filament.

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CAUTION.

HOT CHASSIS

Chassis is connected to one side of AC line. Use an isolation transformer to connect power to set. Do not plug two sets into the same transformer.

Notes

Unless otherwise specified

Chassis is connected to one side of AC line. Use an isolation transformer to connect power to set. Do not plug two sets into the same transformer.
LIST OF ADJUSTMENTS:

1. IF on RF tuner
2. Sound I.F. coil, 50 ohm
3. Primary, sound I.F. 4.50 mc (bottom)
4. Secondary, sound I.F. 4.50 mc (top)
5. Quadrature coil
6. 1st picture I.F.
7. 2nd picture I.F.
8. 3rd picture I.F.
9. 4th picture I.F.
10. Trap, 4.50 mc
11. Horizontal hold
12. Vertical hold
13. Fine-tuning
14. Brightness
15. Volume & SW selector
16. Point A
17. Point B
18. Point C
19. Point D
20. Point E
21. Point F
22. Point G
23. Point H
24. Point I
25. Point J
26. Point K
27. Point L
28. Point M
29. Point N
30. Point O
31. Point P
32. Point Q
33. Point R
34. Point S
35. Point T
36. Point U
37. Point V
38. Point W
39. Point X
40. Point Y
41. Point Z
42. Point AA
43. Point BB
44. Point CC
45. Point DD
46. Point EE
47. Point FF
48. Point GG
49. Point HH
50. Point II
51. Point JJ
52. Point KK
53. Point LL
54. Point MM
55. Point NN
56. Point OO
57. Point PP
58. Point QQ
59. Point RR
60. Point SS
61. Point TT

More Data on Opposite Page
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More Data on Reverse Side
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All capacitor values greater than 1 are in MFD unless otherwise noted.
All capacitor values less than 1 are in uF unless otherwise noted.
Arrow through control indicates clockwise rotation.
Voltages are DC from point shown to chassis unless otherwise noted.
* Focus voltage optional for best focus.
* Indicates a rail resistance of less than .5 ohms. Resistance measured with rail in circuit. Voltages are dc from point shown to chassis. Voltages are read using a VTVM. Voltages were taken with no signal. The receiver was adjusted for a good quality picture, i.e., normal contrast, brightness, width, height, vertical lin. and sound, picture in sync, then signal is removed.
L1 Video output from video 2nd detector.
L2 Filament input from L27 of Deflection panel.
L3 Filament output to L22 of Video-Sound panel.
L4 I-F input link from tuner.

L5 140V B+.
L6 A.G.C.
L7 Lead from noise inverter grid coupling (C16) to junction of R52 and WR2 (B5-9).
L8 Lead from lug #1 of VR6, the contrast control.
L9 Video output to CRT cathode, pin 7.
L10 Lead to arm of brightness control, VR3.
L11 Lead to lug of R52 and WR2 (B5-9).
L12 140V B+ lead.
L13 Red lead of A.O.T. and B+ to audio output screen.
L14 Lead from R52 and WR2 (B5-9).
L15 Filament lead to L26 of Sweep panel.
L16 Lead to contrast control, VR6-3.
L17 Video input from 2nd detector, L1 of V.I.F. panel.
L18 Sync output to L23 of Sweep panel.
L19 Shielded lead to top of volume control.
L20 265V B+.
L21 Shielded lead from arm of volume control.
L22 Filament lead from L3 of V.I.F. panel.
L23 Sync input from Video-Sound panel (L18).
L24 Lead to top of brightness control, VR3-6.
L25 Lead from damper cathode to H.O.T. terminal 3 and yoke socket pin 2.
L26 Filament lead to 13DR7 pin 4 from L15 of Video-Sound panel.
L27 Filament lead from 17D4 pin 8 to V.I.F. panel lug, L2.
L28 Vertical output cathode, lead to E1-3 by-pass electrolytic.
L29 Vertical output plate, blue lead of V.O.T.
L30 Lead to top of vertical hold control, VR5-3.
L31 Vertical output bias, lead to Video-Sound panel (L11).
L32 Filament lead from pins 4 and 5 of 9AU7 to C.R.T. pin 1.

L27 Filament lead from 17D4 pin 8 to V.I.F. panel lug, L2.
L24 Lead to top of brightness control, VR3-6.
L25 Lead from damper cathode to H.O.T. terminal 3 and yoke socket pin 2.
L26 Filament lead to 13DR7 pin 4 from L15 of Video-Sound panel.
L27 Filament lead from 17D4 pin 8 to V.I.F. panel lug, L2.
L28 Vertical output cathode, lead to E1-3 by-pass electrolytic.
L29 Vertical output plate, blue lead of V.O.T.
L30 Lead to top of vertical hold control, VR5-3.
L31 Vertical output bias, lead to Video-Sound panel (L11).
L32 Filament lead from pins 4 and 5 of 9AU7 to C.R.T. pin 1.
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All voltages measured with "Volt-Charts" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

*Measured with 1 megohm ½ watt resistor in series with meter probe.
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 "Volt-Ohm-Volt" and with no signal input. Voltages should hold within ±20%, with 117 v. a-c supply.

*Measured with 1 megohm ½ watt resistor in series with meter probe.
All capacitance values less than 1 in MMF unless otherwise noted.

*Measured with 1 megohm, 1/2 watt resistor in series with meter probe.

All voltage values measured with "Volt-Ohmset" and with no signal input. Voltages should hold within ±10% with ±17
V AC supply.

Safety Glass Removal
1. Pull top trim downward off retainers starting at extreme end.
2. Remove screws holding glass and trim retainers.
3. Tilt top of glass outward and lift up and out off bottom channel.
Models 23523, 23524

CIRCUIT DIGEST

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HTR 5CG8, PIN 4
IF OUTPUT
L4, MIXER
OUTPUT
OFINE TUNING
SHAFT & CAM ASSY
B
VHF ANTENNA
INPUT ASSY
0
REAR COVER ASSY
OSC ADJ HOLE
V12
C7
RF TRIM
C16 MIXER TRIM
V13 SAT B MIXER OSC.
L2, 40-46 MC TRAP
HTR 2BN4, PIN 3
SCG8, MIX - OSC
2BN4, RF AMP
L2, 40-46 MC TRAP
TRIM
HTR 2BN4, PIN 3
SCG8, MIX - OSC
470V059H02 tuner, exploded view.
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C7
RF TRIM
C16 MIXER TRIM
V13 SAT B MIXER OSC.
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HTR 2BN4, PIN 3
A FIELD INSTALLATION.

A MONOURAL CARTRIDGE IS NORMALLY SUPPLIED. THE STEREO CAMPHORIC WILL SET FOR NORMAL PICTURES.

DC VOLTAGES MEASURED WITH VTual FROM TV ORONO SWITCH ACTUATED ET PICTURE CONTROL. (R219)

TAKEN WITH CONTRAST CONT. SET FOR 25 VOLT PEAK TO PEAK SIGNAL PEAK TO PEAK WAVE FORMS WERE

R S J L7MMF WITH 470V0 59!402

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Models H-17C287, 288, 289, 290, 291; H-17CU287, 288, 289, 290, 291

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An Editorial Service of ELECTRONIC TECHNICIAN, INC.  480 Lexington Ave., New York 17, N.Y.
After receiver repair, check resistance between the B-side of the receiver and the control mounting bracket (line cord disconnected). A resistance of less than 300,000 ohms indicates a short circuit (or leakage) to metal parts which are accessible. Remove the cause of leakage before the set is released.
TROUBLESHOOTING
1. Isolate trouble to portable section or car unit by pulling portable section out of car.
   A. If it fails to operate as a portable, trouble is in portable unit.
   B. If it operates as a portable but not in the car, trouble is in car unit or car antenna.
   C. If it operates in car but not as a portable, check batteries, portable antenna and interconnecting socket (Illus. 101).

2. Short cut procedure for checking dead portable.
   A. Check the battery voltage with portable turned on. If less than 5 volts, replace.
   B. Turn volume maximum and short pins B and E on interconnecting socket (Illus. 101) together. If oscillation is heard, audio stages are working; if not, trouble is in audio stages.
   C. Use click test to isolate stage (see Chart B.). Caution: Be sure to use 10 k or 12 k resistor between the click points and ground, or circuit components will be damaged.
IMPORTANT!

WHEN RADIO IS OPERATED ON BATTERY ELIMINATOR, 
THE TUNER MAY STOP SEEKING EVERY TIME A 
SOLENOID ENERGIZES, DUE TO VOLTAGE REGULATION.
**Before Measuring Transistor Voltages**

The shorting type speaker socket must be opened and a 4 ohm speaker connected if the transistor is replaced. Adjust bias potentiometer if specified.

**To Obtain Proper Collector Voltage**

With 12 volts input, the collector voltage should be adjusted to obtain proper operation.

**Electronics Technician Circuit Digest**

**Model AC-2978**

**General**

- **Mounting:** All 1960 Studebaker Cars.
- **Tubes:** Four.
- **Transistor:** One.
- **Speaker:** 4" x 8" Elliptical, Permanent Magnet.
- **Tuning:** Manual and 5 P. B. Mechanical.
- **Antenna Trimmer Compensation:** For antennas between 0.000050 - 0.000100 Mfd.
- **Tuning Range:** 540-1600 KC.

**Circuit Diagram**

The circuit board is shown in heavy lines. The printed circuit is marked with tubes, transistors, and other components.

**Output Transformer**

The output transformer will appear shorted if the shorting type speaker switch is not held open.
SERVICE PARTS LIST

<table>
<thead>
<tr>
<th>No.</th>
<th>Service Illus. Part No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1221138</td>
<td>Antenna</td>
</tr>
<tr>
<td>2</td>
<td>7255723</td>
<td>choke, antenna series</td>
</tr>
<tr>
<td>3</td>
<td>7209864</td>
<td>choke, r.f. plate</td>
</tr>
<tr>
<td>4</td>
<td>1221138</td>
<td>r.f.</td>
</tr>
<tr>
<td>5</td>
<td>1221263</td>
<td>oscillator</td>
</tr>
<tr>
<td>6</td>
<td>1221257</td>
<td>1st i.f. coil assembly</td>
</tr>
<tr>
<td>7</td>
<td>1221255</td>
<td>2nd i.f. coil assembly</td>
</tr>
<tr>
<td>8</td>
<td>1217846</td>
<td>choke, hash</td>
</tr>
<tr>
<td>9</td>
<td>7274348</td>
<td>choke, a' supply, input</td>
</tr>
</tbody>
</table>

**TUNER**

- 71 Bushing, drive shaft
- 72 Cord, dial
- 73 Core, tuning, powdered iron
- 74 Drive shaft, manual
- 76 Escutcheon Dial & Back plate
- 78 Grommet, ant. & r.f. coil
- 79 Pointer Assembly
- 80 Pulley, dial cord
- 82 Spring, dial cord

*Part first used in 1960.*

**Tubes and Transistors**

- *DS503*
- 12DZ6
- 12AD6
- 12EK6
- 12DS7

*Part first used in 1960.*

**VOLTAGES MEASURED TERMINAL TO CHASSIS**

WITH A VTVM - NO SIGNAL AND 12.0 VOLTS AT ILLUS. 21.

**OSCILLATOR GRID VOLTAGE**

TAKEN WITH SET TUNED TO 1000 KC.

**TOTAL "A" DRAIN AT 12 V.**

- 1.5 AMPS.

**TOLERANCE ON VOLTAGES**

+ 10%

**-_INDICATES LEAD FROM TUNER COIL ASS'Y._**

**II-BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED.**

**IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER (ILLUS. 51) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO.**

**- ILLUS. 44 IS A FUSE RESISTOR FOR THE TRANSISTOR.**

**SERIES CAPACITORS**

1. 0.1 Mfd. 12AD6 Grid (Pin #7)
2. 0.000082 Mfd. Antenna Connector
3. 0.000082 Mfd. Antenna Connector
4. 0.000082 Mfd. Antenna Connector

**CONNECT SIGNAL GENERATOR TO SIGNAL GENERATOR FREQUENCY**

1. 262 KC High Frequency Stop A, B, C, D
2. 1615 KC High Frequency Stop E, F, G
3. 600 KC Signal Generator Signal J, K
4. 1615 KC High Frequency Stop F, G

**ADJUST IN SEQUENCE FOR MAX OUTPUT**

**SERVICE PARTS LIST**

- **Coils**
  - No. 1 1221138 Antenna
  - No. 2 7255723 Choke, antenna series
  - No. 3 7209864 Choke, r.f. plate
  - No. 4 1221138 R.f.
  - No. 5 1221263 Oscillator
  - No. 6 1221257 1st i.f. coil assembly
  - No. 7 1221255 2nd i.f. coil assembly
  - No. 8 1217846 Choke, hash
  - No. 9 7274348 Choke, "a" supply, input

**Manual Control**

- 15 36 11 CIRCUIT BOARD

**TONE CONTROL**

- 14 12 34 82 51 TUNER 76 TUNER 70 DIAL LIGHT

**EMITTER TERMINAL**

- 74 Grommet, ant. & r.f. coil

**COLLECTOR IS CASE**

**ELECTRONIC TECHNICIAN CIRCUIT DIGEST**

CHEVROLET 988062—PRINTED CIRCUIT SHOWN IN HEAVY LINES.
Important! Do not attempt to operate the TA-600 Receiver without first connecting both speakers or otherwise loading the speaker terminals.
COPPER SHORTING.

1. Cut a piece of copper two pieces.

2. Place the pieces of copper together respect to ground under no.

3. Cut a piece of copper-sidewa masking as per.

4. List parts views bottom in types shown. Order with.

5. Transistor chart:

<table>
<thead>
<tr>
<th>TR1</th>
<th>TR2</th>
<th>TR3</th>
<th>TR4</th>
<th>TR5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2n1609</td>
<td>2n135</td>
<td>2n1609</td>
<td>2n102</td>
<td>2n524a</td>
</tr>
<tr>
<td>2n222 (1297)</td>
<td>2n253</td>
<td>2n324</td>
<td>2n270</td>
<td></td>
</tr>
<tr>
<td>2n314</td>
<td>2n327</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Oscillator receiver inductively couple signal generator to.

7. Inductor 100 ohms (thermal.)

8. Connect a jumper wire between PC1 and.

9. Receiver TSW.

10. \( \text{C tourism = 10k} \)

11. Adopt notes I S.

12. Battery current at point marked 'A' in battery circuit.

13. Signal generator adjustable for max.

14. Unless otherwise noted.

15. Specifications more than 10 milli-

16. Resistors are 1/2 watt 1/2-

17. All voltage readings at minimum current in watts of source.

18. \( \text{R3} \) set to 220 ohms.

19. \( \text{R4} \) set to 1340 K.

20. \( \text{R5} \) set to 16.0 K.

21. \( \text{R6} \) set to 24.0 K.

22. \( \text{R7} \) set to 12.0 K.

23. \( \text{R8} \) set to 4.0 K.

24. \( \text{R9} \) set to 2.0 K.

25. \( \text{R10} \) set to 1.0 K.

26. \( \text{R11} \) set to 0.1 K.

27. \( \text{R12} \) set to 0.01 K.

28. \( \text{R13} \) set to 0.001 K.

29. \( \text{R14} \) set to 0.0001 K.

30. \( \text{R15} \) set to 0.00001 K.

31. \( \text{R16} \) set to 0.000001 K.

32. \( \text{R17} \) set to 0.0000001 K.

33. \( \text{R18} \) set to 0.00000001 K.

34. \( \text{R19} \) set to 0.000000001 K.

35. \( \text{R20} \) set to 0.0000000001 K.

36. \( \text{R21} \) set to 0.00000000001 K.

37. \( \text{R22} \) set to 0.000000000001 K.

38. \( \text{R23} \) set to 0.0000000000001 K.

39. \( \text{R24} \) set to 0.00000000000001 K.

40. \( \text{R25} \) set to 0.000000000000001 K.

41. \( \text{R26} \) set to 0.0000000000000001 K.

42. \( \text{R27} \) set to 0.00000000000000001 K.

43. \( \text{R28} \) set to 0.000000000000000001 K.

44. \( \text{R29} \) set to 0.0000000000000000001 K.
ANT RECEPT
C4 CONNECTIONS (LUG VIEW)

NOTES:
Capacitors - Decimal values in MF. All others in MMF unless otherwise specified.
Voltages - Measured from point indicated to chassis with a VTVM. No signal input.
Tolerance ±10%

Input Voltage - 14V DC
Tuning Range - 540 to 1610 KC
IF - 262.5 KC.

12BL6 RF AMP
C4D 300 NOM.
C4 CONNECTIONS (LUG VIEW)

PLATED PANEL WIRING LEGEND
■ = B+ □ = FILAMENT
□ = RF. AVC □ = IF. CONV AVC

2N176 PWR AMP

CAUTION
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.

ANT TRIM 1610 KC
TOP 2ND IF BOT 262.5 KC
TOP 1ST IF BOT 262.5 KC
OSC TRIM 1610 KC
RF TRIM 1610 KC

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**ELECTRONIC TECHNICIAN CIRCUIT DIGEST**

**MOTOROLA**
Transistor Radio Chassis HS-797 Model X16

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**Alignment Points and Parts Locations**

**MOTOROLA**
Home AM-Clock Radio Chassis HS-753

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PLATED CHASSIS BOARD WIRING AS VIEWED FROM BOTTOM WITH COMPONENTS AND TOP SIDE PLATING "PHANTOMED IN" TO ALLOW CIRCUIT TRACING.
ELECTRONIC TECHNICIAN
CIRCUIT DIGEST

MOTOROLA
Transistor Auto Radio
Model 406

OPERATES FROM -
6 volt storage battery

ALIGNMENT LOCATIONS

POLARITY WIRING DETAIL

DIAL STRINGING DETAIL

RED LEAD MUST BE SOLDERED TO TERMINAL NO. 1.
BLACK LEAD TO TERMINAL NO. 2.

RADIO WIRING FOR CARS WITH A NEGATIVE GROUND ELECTRICAL SYSTEM
RED LEAD TO TERMINAL NO. 1.
BLACK LEAD TO TERMINAL NO. 2.

RADIO WIRING FOR CARS WITH A POSITIVE GROUND ELECTRICAL SYSTEM
BLACK LEAD MUST BE SOLDERED TO TERMINAL NO. 1.
RED LEAD TO TERMINAL NO. 2.

POLLUTION WIRING DETAIL

DIAG STRINGING DETAIL

POLARITY WIRING DETAIL

DIAL STRINGING DETAIL

OPERATES FROM -
6 volt storage battery

ALIGNMENT LOCATIONS

POLARITY WIRING DETAIL

DIAL STRINGING DETAIL

ALL RESISTORS 1/2W, 10%, CARBON.
VOLTAGES MEASURED TO GROUND WITH
A 20,000 Ohm/Volt Meter UNDER
NO SIGNAL CONDITION.
COIL RESISTANCES READ WITH COIL IN CIRCUIT.

FIRST PRODUCTION - AUDIO OUT WAS 100 Ohm RED DOT.
SECOND SET - WAS 1000 OHM RED DOT.
RUN 50 - RII, VOL. CON., WAS 100K,
PART # 33-5583-10.
RUN 51 - RII CHANGED TO 30K,
PART # 33-5583-10.
RUN 52 - RII, 30K, 33-5583-10.

Figure 1: Printed Wiring Panel—Component Side Showing
Parts Location and Alignment Points
T-66, Code 126: TR1, Converter Transistor changed to T-1877, Part No. 34-6000-41.

T2, 1st i-f Transformer changed to Part No. 32-4800-2.
**Electronics Technician Circuit Digest**

**RCA Transistor Radio 1-T-4 Series**

**Transistor Complement**
1. RCA 2N412  
2. RCA 2N410  
3. RCA 2N410  
4. RCA 2N406  
5. RCA 2N406  
6. RCA 2N408  
7. RCA 2N408  
8. RCA 3458

- **Power Output**
  - Undistorted: 300 milliwatts
  - Maximum: 400 milliwatts

**Battery Installation**

- **1-T-4 Series** — The "Hawaiian" Model 1-T-4E — Antique White
- **Model 1-T-4A** — Light Turquoise
- **Model 1-T-4J** — Charcoal Gray

**Chassis Wiring and Components — View from Wiring Side**

- "The assembly represented above is viewed from the wiring side of the board."  
- "The printed wiring, on the rear side of the board, is presented in phantom view superimposed on the component layout of the reverse side."  

**Chassis Removal**

- Care must be used when removing the dial knob to prevent damage to the circuit board.  
- The knob can be removed only by first removing the three chassis mounting screws and then, gently pulling the chassis away from the case front.  
- Rock the chassis while pulling on the case and chassis assembly.
WESTINGHOUSE
FM Radio Chassis
V-2400-1
Models H-715T5, H-716T5

SPECIFICATIONS
Frequency Range ............................................. 88 to 108MC
Intermediate Frequency ................................. 10.7MC
Tube Complement
RF Amplifier-Converter 
12BA6
1st IF Amplifier
12BA6
2nd IF Amplifier
19T8
Detector-Audio Amplifier 
560T1
Audio Output 
Power Consumption
Maximum .................................. 2 watts
Undistorted ...................................... 1.3 watts
Speakers ........................................... 2-4" PM
Operating Voltage .......................... 105 to 120 volts 60 cycles AC

Bottom view of printed circuit chassis with components shown symbolically

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104 TV - RADIO Schematics

OVER 30 MANUFACTURERS

Covers Hundreds of CHASSIS & MODEL Numbers

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