sams

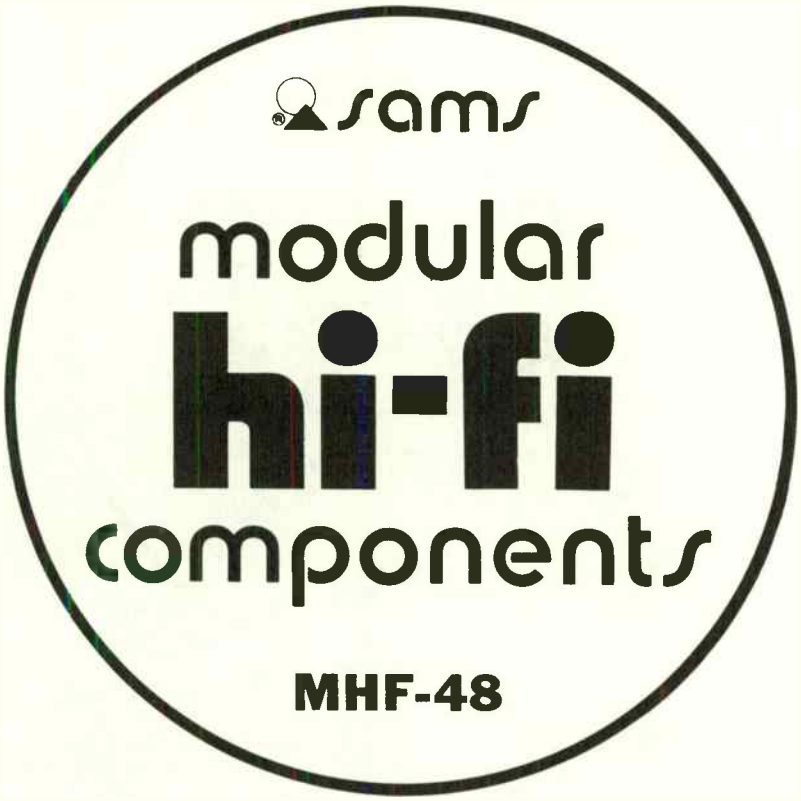
modular hi-fi components

MHF-48

for

Fisher 203, 213, 295
Harman-Kardon Nocturne, Seven Twenty
Hitachi SP-2812, SP-2812(C)
Lafayette SQR-20 (99-02856W)
Lafayette SR-30 (99-02891W) — Lloyd's Ch. B620-37A, B651-37A, 2B40-37A — Magnavox 1V9284 (Ch. R283-01-AA)
Panasonic SD-209, SE-2090 — Pioneer TX-600 / FVZW, FW, KW
RCA RK364A, VYC210W — Teledyne Packard-Bell K50, T50
Wards Airline GEN-6204A — Zenith E441W

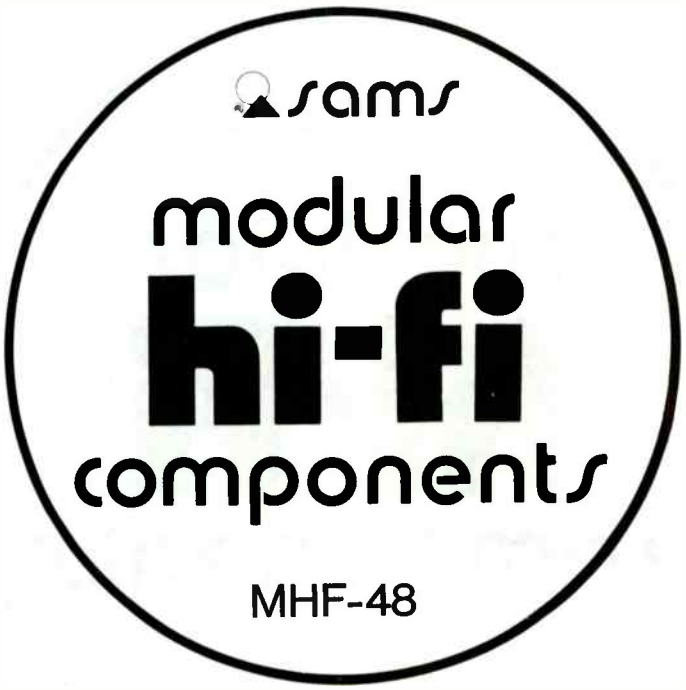
$4.25
$5.10 IN CANADA
Cat. No. MHF-48



REPRODUCED THROUGH THE COURTESY OF THE MANUFACTURER

HOWARD W. SAMS & CO., INC.
INDIANAPOLIS, INDIANA

First Edition
First Printing-April, 1974



Library of Congress Catalog Card Number 72-77606

modular hi-fi components

TABLE OF CONTENTS

GENERAL SERVICING INFORMATION

The following information applies to all players in this volume, and should be followed before any adjustments are made or trouble diagnosis is attempted. Any exceptions or additions will be found in the detailed servicing procedures for each player.

POWER SOURCES

Many players require full supply voltage for proper operation. Be sure the supply voltage is maintained at the rated value under load while making adjustments.

CLEANING

Head faces should be cleaned with head cleaner to remove dust and accumulated oxide. (An applicator may be fashioned from absorbent cotton.) Do not use a screwdriver or any metallic object near the head faces.

CAUTION: *Avoid getting head cleaner on any plastic surface.*

Clean capstans, pressure rollers, and tape guides with alcohol using a soft lint-free cloth. Also use alcohol to remove oil and grease from drive belts and other driving surfaces.

LUBRICATING

Clean all surfaces before lubricating. Apply a few drops of #20 machine oil to all bearings and rotating bushings. Apply a thin film of light, nonhardening grease to all cam surfaces and pawls, if they have been factory lubricated. Always wipe excess oil or grease from parts that have been lubricated.

CAUTION: *Oil and grease must be kept off all driving surfaces as well as any parts which may transfer oil or grease to them.*

DEMAGNETIZING

Heads require demagnetizing at regular intervals to maintain high-frequency response, dynamic range, and low distortion. (Follow instructions included with the demagnetizing unit.) After demagnetizing the heads, keep all screwdrivers and other metallic objects away from the head faces. Tape guides may also require occasional demagnetizing.

IMPORTANT: *Be sure to demagnetize the heads after making resistance measurements in the head circuits.*

CARTRIDGES

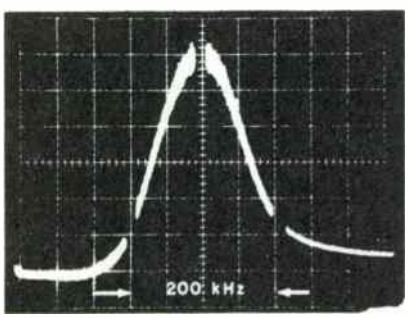
Many problems associated with tape players result from defective cartridges. Always try a cartridge known to be good before attempting repairs.

FM ALIGNMENT – SELECTOR to FM, MODE to MONO, MUTING to OFF, VOLUME to 0, FM ATTEN to NORMAL

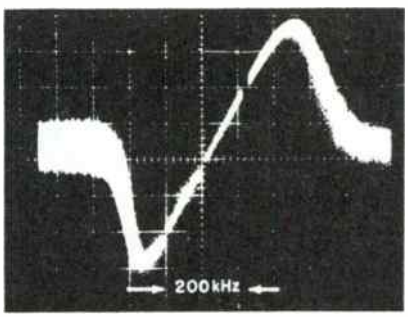
Maintain generator output as low as possible for suitable indication.

ITEM	GENERATOR	DIAL SETTING	INDICATION	PROCEDURE
1. IF	Connect 10.7 MHz sweep through 1pF capacitor to TP1 on FM RF board, gnd to pin 1E.	Position of non-interference near 88 MHz.	Scope vert input through 100K to pin 2T on AM-FM IF board, gnd to 2B.	Detune T04 top (ratio detector). Adjust the following for max gain and symmetry: AM FM IF board – T01, T02, and T03 top and bottom. FM RF board – T02 top and bottom. See FM IF illustration.
2. DETECTOR	"	"	Scope vert input and DC VTVM to pin 20, gnd to 2L.	Set VR01 to max. Adjust T04 bottom, then top for max gain and symmetry. Use lowest VTVM scale to adjust for zero. See FM DETECTOR illustration.
NOTE: Use 120-ohm composition resistors in series with each lead from RF generator to match 50-ohm output to 300-ohm input impedances. Generator output is reduced to one-half at ant terminals. Signal voltages are generator output levels, *not* antenna voltages.				
3. FM RF		Tuning knob fully CCW.		Center pointer on 0 and cement.
4.	FM generator to FM ANT terminals through 120-ohm resistors. Set to 90 MHz. Set output for approx 2.5 on signal meter.	Center of 90 MHz calibration mark on dial.	Front panel signal meter.	Adjust L03, T01, and L01 on FM RF board for max meter deflection. Reduce generator output to keep meter at approx 2.5.
5.	Set to 106 MHz.	Center of 106 MHz calibration mark on dial.	"	Adjust TC1, TC2, and TC4 on on FM RF board for max meter reading. Reduce generator output to keep meter at approx 2.5. Repeat steps 4 and 5 for max gain and accurate dial calibration.
NOTE: The neutralization adjustment of step 6 should be performed only if FET 01 is replaced or the signal meter shows a reading with no signal at the input terminals.				
6.	Disconnect generator and connect a 270-ohm resistor across FM ANT terminals.	Tune to high end of dial.	"	Adjust TC3 on FM RF board for 0 reading with no signal input. Reconnect generator and repeat steps 4 and 5.
7. SIGNAL METER	FM generator to position of non-interference near 100 MHz. Set output for 2 mV.	Tune to generator.	"	Adjust VR04 on AM-FM IF board for reading between 4 and 4.5.
8. FM LEVEL	Modulate generator with 400 Hz, ±22.5 kHz deviation. Set output for 2mV.	"	AC VTVM to L RCDR OUT jack.	Adjust VR01 on AM, FM IF board for 350 mV.

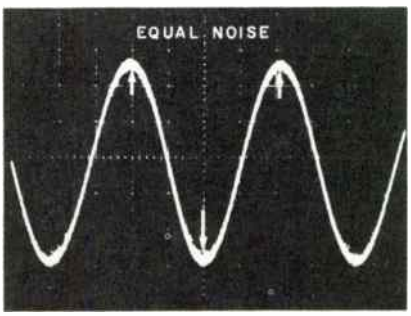
ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
9. MUTING	Modulate generator with 19 kHz, ±6 kHz deviation. Set output for 2mV.	"	STEREOBEACON lamp.	Adjust VR05 so that STEREOBEACON lamp just lights.
10.	Set generator to 90 MHz, 1 mV output. Modulate with 19 kHz, ±6 kHz deviation.	"	Scope vert input and AC VTVM to L RCDR OUT jack.	Set MODE to MONO. Adjust L3 on multiplex board for min output. on scope trace. Set MUTING to OFF.
11. 19 kHz TRAP	Set generator to 90 MHz, 1 mV output. Modulate with 19 kHz, ±6kHz deviation.	"	"	Adjust L1 on multiplex board for min output.
12. 67 kHz TRAP	Modulate generator with 67 kHz. Adjust deviation for signal visible on scope.	"	"	Adjust L2 on Multiplex board for min output.
13. 71 kHz TRAP	Modulate generator with 71 kHz. Adjust deviation for signal visible on scope.	"	"	Adjust L2 on multiplex board for min output.
14. 19 kHz PILOT	Set FM generator to 90 MHz with composite multiplex signal at EXTERNAL MODULATION input. Modulate with 19 kHz pilot, ±7.5 kHz deviation (no audio modulation).	"	DC VTVM to TP3 on multiplex board, gnd to pin C.	Set MODE switch to STEREO. Adjust T1 and T2 for max deflection on VTVM.
15. SEPARATION	Modulate generator with 19 kHz pilot (10%) 1 kHz audio (90%), left channel only. Set deviation to ±42.5 kHz.	"	Scope vert input and AC VTVM to L RCDR OUT jack, gnd to chassis.	Adjust T3 on multiplex board for max output. Note reading on VTVM.
16.	Modulate generator with 19 kHz pilot (10%).	"	AC VTVM to R RCDR OUT jack, gnd to chassis.	Adjust VR2 on multiplex board for best separation (min) on on VTVM.
17. STEREO BEACON	Set Generator to 90 MHz and set output to 10 uV. Modulate with 19 kHz pilot, ±6.5 kHz deviation (no audio).	"	STEREOBEACON light.	Adjust VR1 on multiplex board so that STEREOBEACON lamp goes on with generator output between 7uV and 12uV.



FM IF



FM DETECTOR



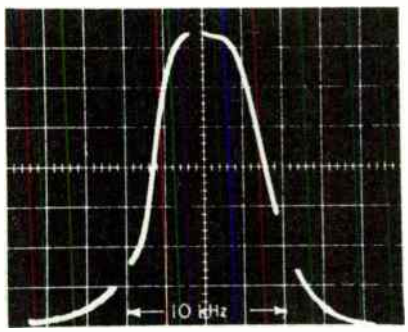
SYMMETRICAL TUNING

TUNER ALIGNMENT

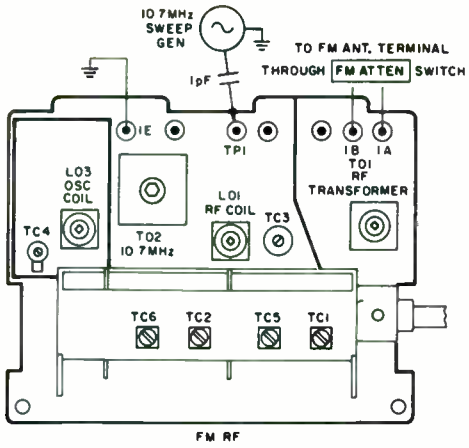
AM ALIGNMENT – SELECTOR to AM, VOLUME to 0

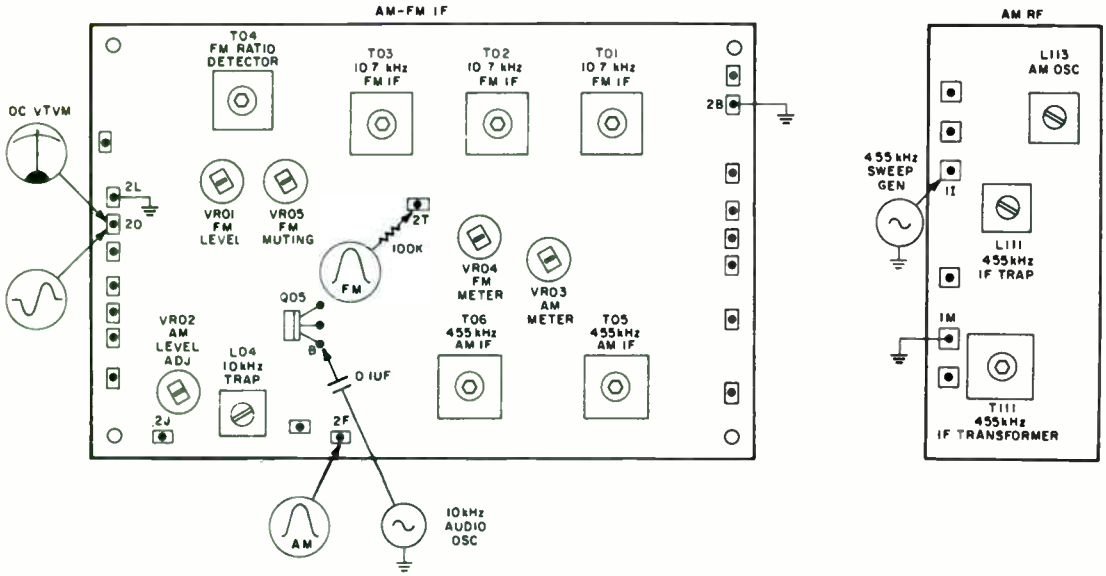
Maintain generator output as low as possible for suitable indication.

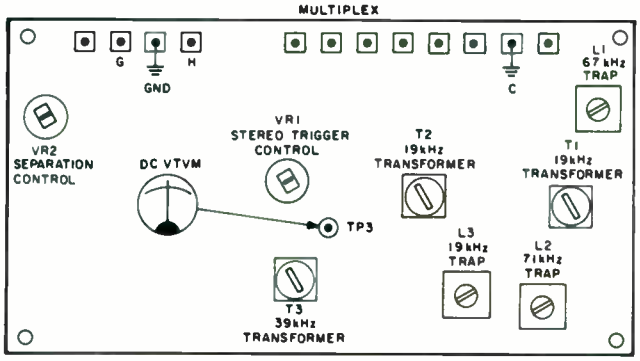
	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
1. IF	455 kHz sweep generator to pin 11 on AM RF board. Adjust output for pattern on scope.	Position of non-interference.	Scope vert input to pin 2F on AM-FM IF board, gnd to chassis.	Detune L111 on AM RF board. Adjust T111 top and bottom on AM RF board and T05 and T06 on AM FM IF board for max gain and symmetry. Readjust L111 for min output.
2. AM RF	AM signal generator to EXT AM ANT through 220pF capacitor. Set generator to 600 kHz. Modulate with 400 Hz, 30% modulation.	Center of 600 kHz calibration mark on dial.	Front panel signal meter.	Adjust L113 on AM RF board for max. Remove tape from ferrite antenna case and adjust slide for max signal. Retape slide in place. Reduce generator output to keep meter at approx 2.5.
3.	Set generator to 1400 kHz.	Center of 1400 kHz calibration mark on dial.	"	Adjust TC5 and TC6 on FM RF board for max signal. Repeat steps 2 and 3 for max gain and accurate dial calibration.
4. 10 kHz TRAP	Audio oscillator through 0.1uF capacitor to base of transistor Q05 on AM FM IF board. Set osc to 10 kHz.	Position of non-interference.	AC VTVM to L RCDR OUT jack.	Adjust L04 on AM FM IF board for min indication.
5.	Set generator to 1 MHz. Modulate with 400 Hz 30% modulation. Set output to 1 mV.	"	Front panel signal meter.	Adjust VR03 on AM FM IF board for meter reading between 4 and 4 5.
6.	Set generator for 10 mV output.	"	AC VTVM to L RCDR OUT jack, gnd to chassis.	Adjust VR02 on AM FM IF board for 350 mV.

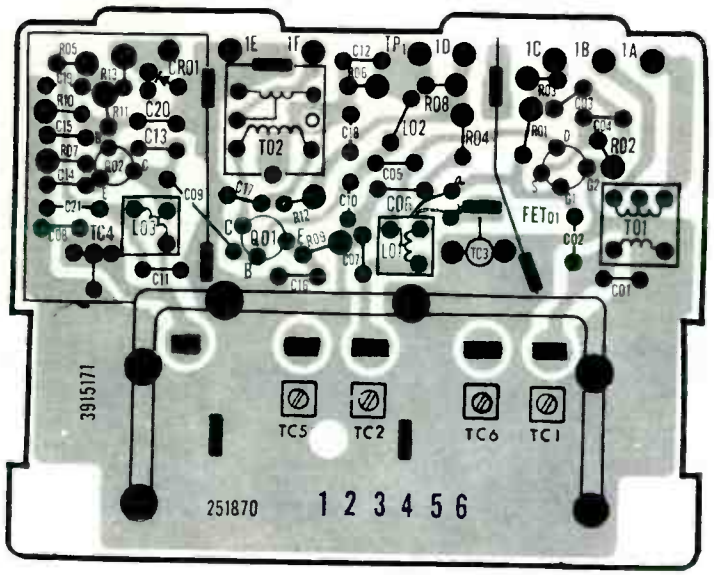


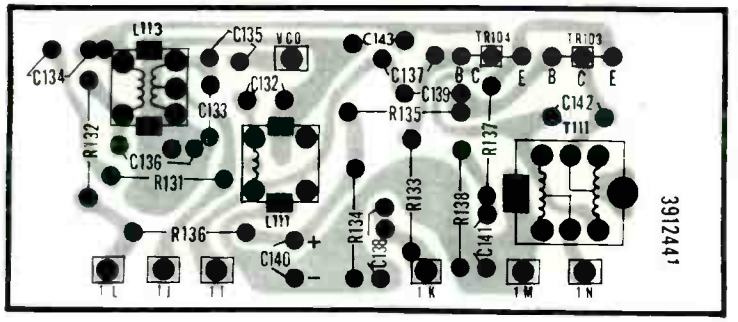
AM IF



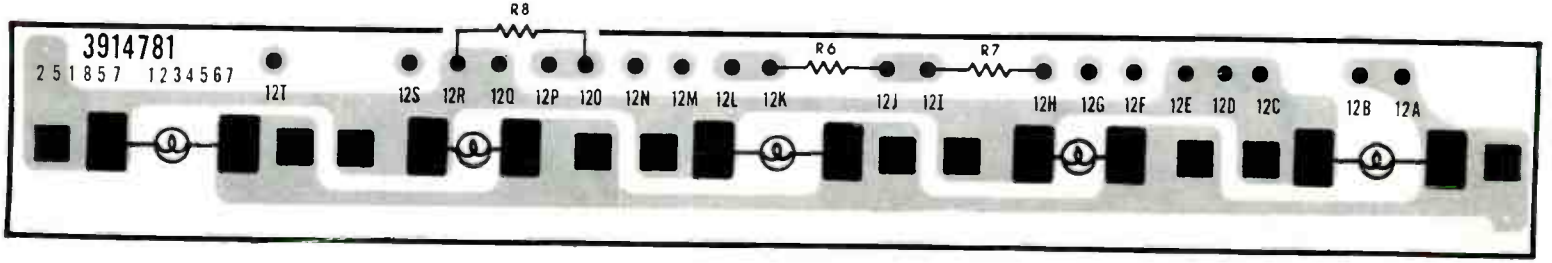






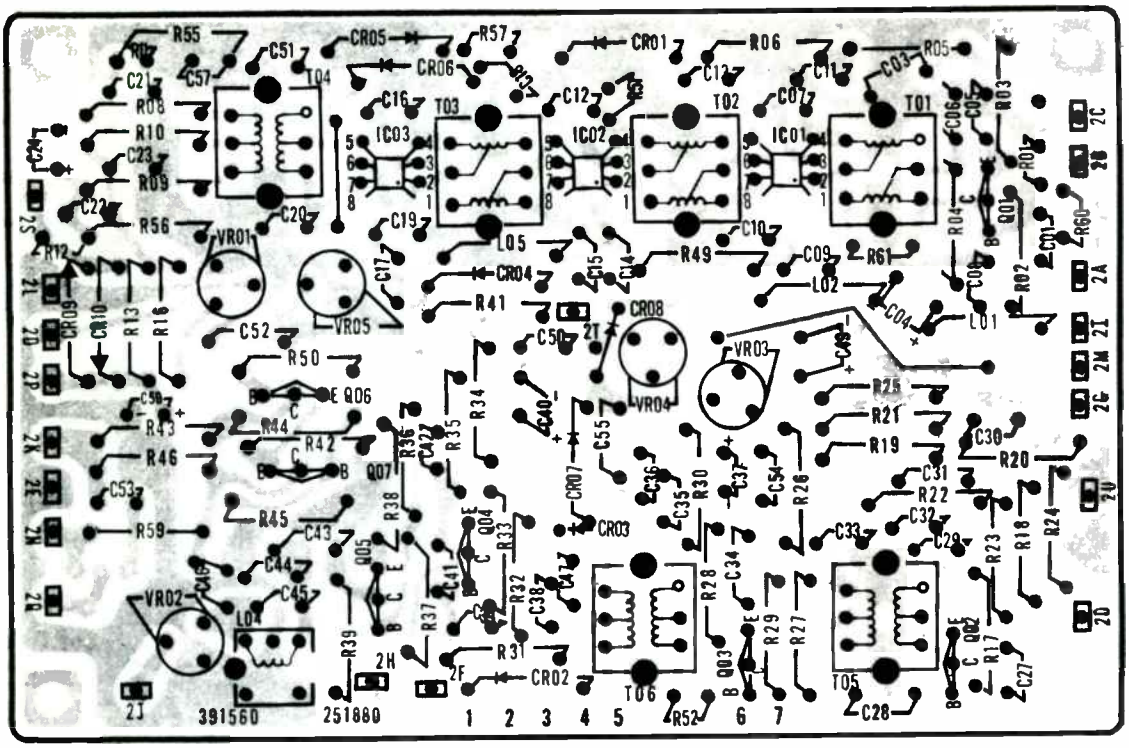


LAMP BOARD



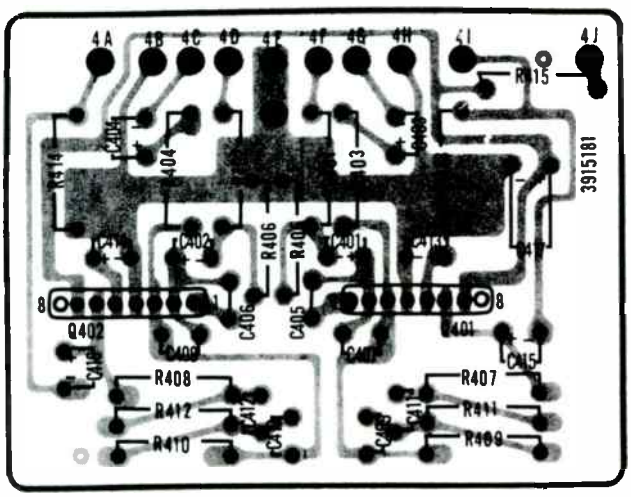
COPPER SIDE SHOWN

AM-FM IF



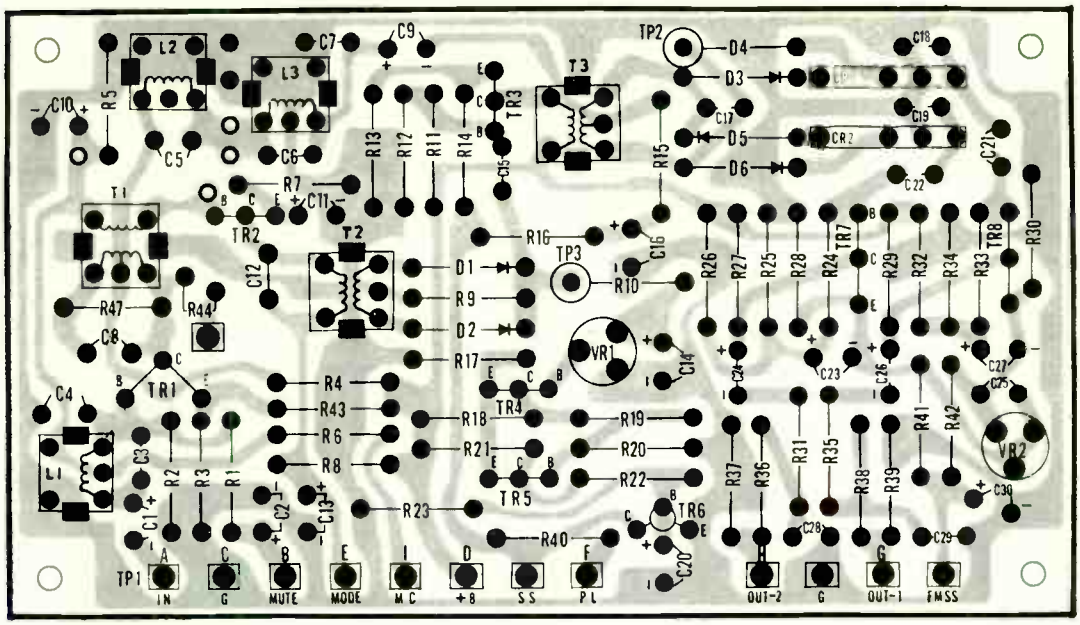
AL4084-III-3

PREAMPLIFIER

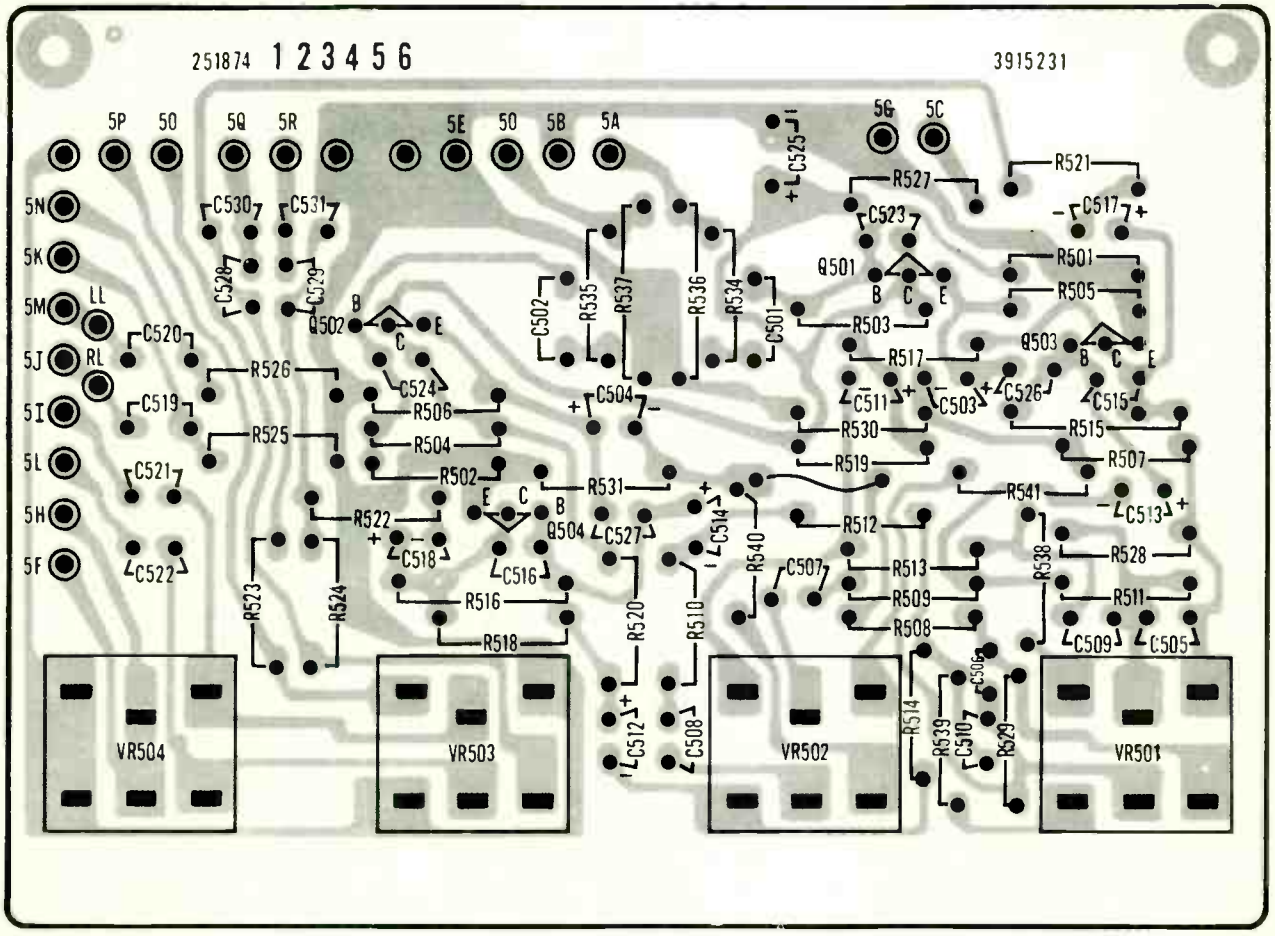


AL4084-III-5

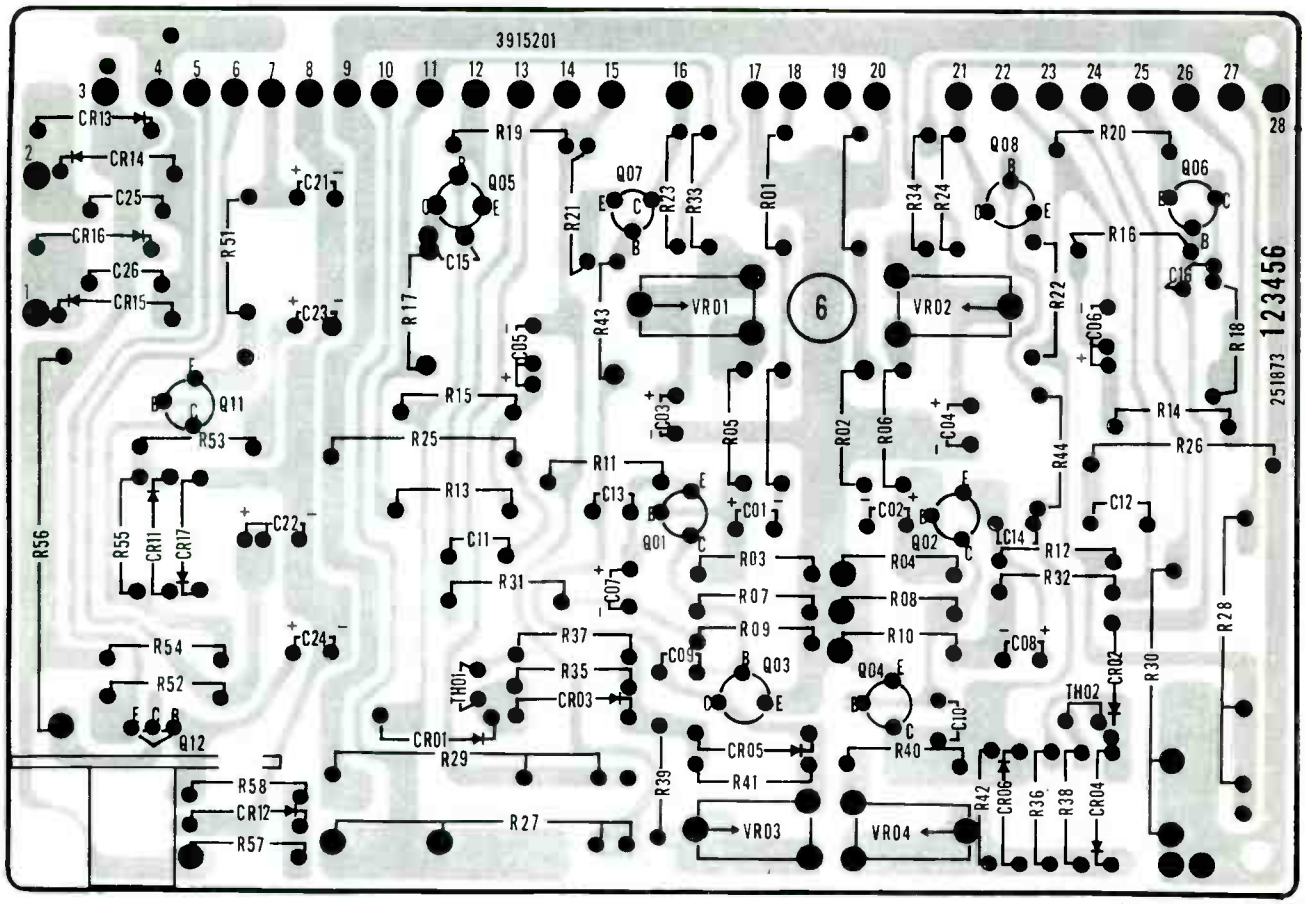
MULTIPLEX



CONTROL AMP



POWER AMP and POWER SUPPLY



DRIVE SYMMETRY ADJUSTMENT

CAUTION:

(A) Make measurements with both channels driven.

(B) Use a load resistor with a minimum rating of 50 watts.

(1) Connect 4-ohm load resistors between L MAIN SPKR and COM and R MAIN SPKR and COM terminals. Connect oscilloscope across 4-ohm load resistor between L MAIN SPKR and COM. Set SELECTOR switch to AUX 1.

(2) Connect a low-distortion sine wave signal generator between L AUX 1 IN jack and chassis ground. Set the signal generator frequency to 1000 Hz at a level of 250 mV.

(3) Observe the sine wave displayed on the oscilloscope. Turn the VOLUME control to increase the output until the sinewave clips. Adjust VR01 until the level of clipping is identical for each half-cycle.

(4) Connect an oscilloscope across the 4-ohm load resistor between R MAIN SPKR and COM.

(5) Connect a low-distortion sine wave generator between R AUX 1 IN jack and chassis ground. Set the signal generator frequency to 1000 Hz at a level of 250 mV.

(6) Observe the sine wave displayed on the oscilloscope. Turn the volume control to increase the output until the sine wave clips. Adjust VR02 until the level of clipping is identical for each half-cycle.

IDLE CURRENT ADJUSTMENT

NOTE: This adjustment is very sensitive to changes in ambient temperature. Allow set to operate for 10 minutes before attempting this adjustment.

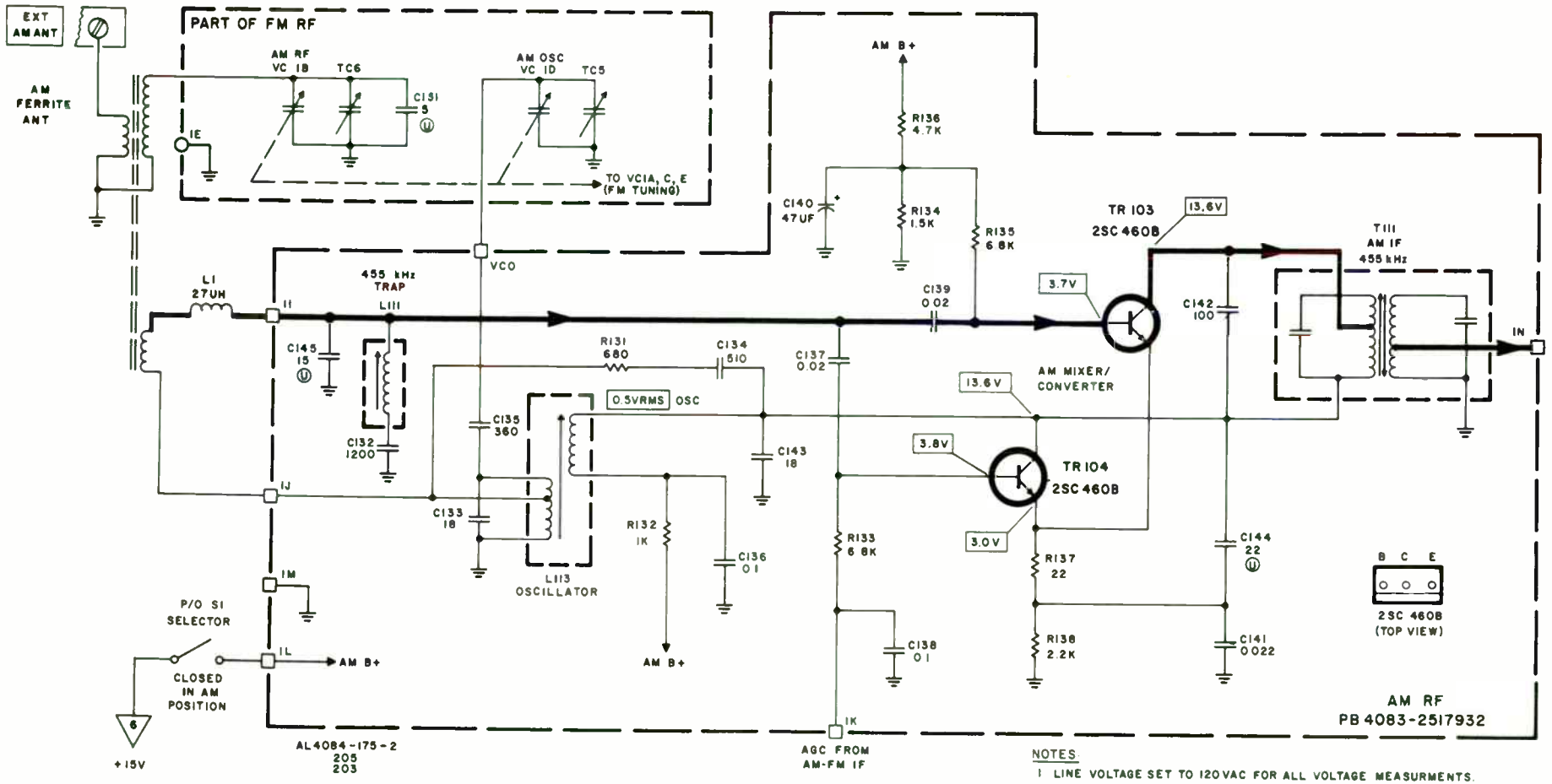
(1) Turn VOLUME control to minimum.

(2) Connect DC VTVM between terminals 9 and 14 on the Power Amplifier board.

(3) Adjust VR03 for an indication of 15-35 mV on the DC VTVM.

(4) Connect DC VTVM between terminals 24 and 28.

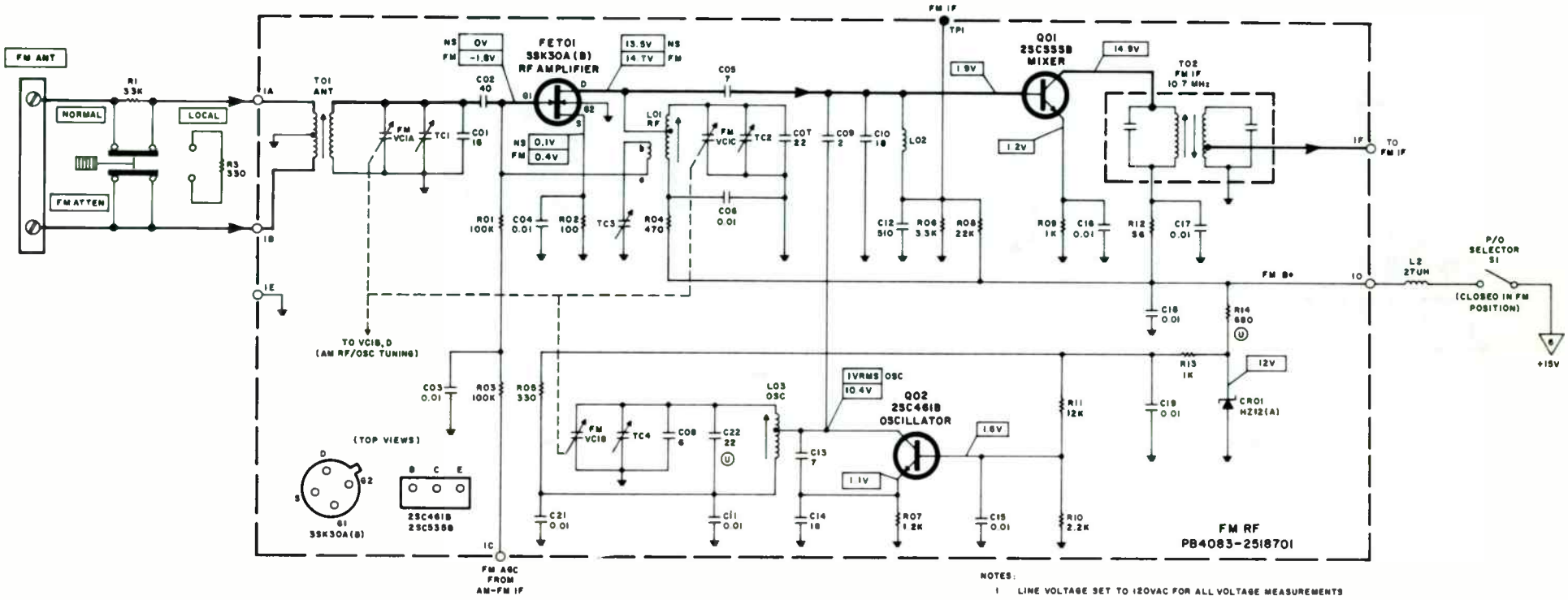
(5) Adjust VR04 for an indication of 15-35 mV on the DC VTVM.



NOTES:
1. LINE VOLTAGE SET TO 120 VAC FOR ALL VOLTAGE MEASURMENTS.
2. ALL VOLTAGES ARE ± 20%
3. ALL VOLTAGES ARE DC, MEASURED WITH A DC VTVM TO CHASSIS, WITH NO SIGNAL INPUT.
4. Ⓤ DENOTES PARTS MOUNTED ON UNDERSIDE OF BOARD.

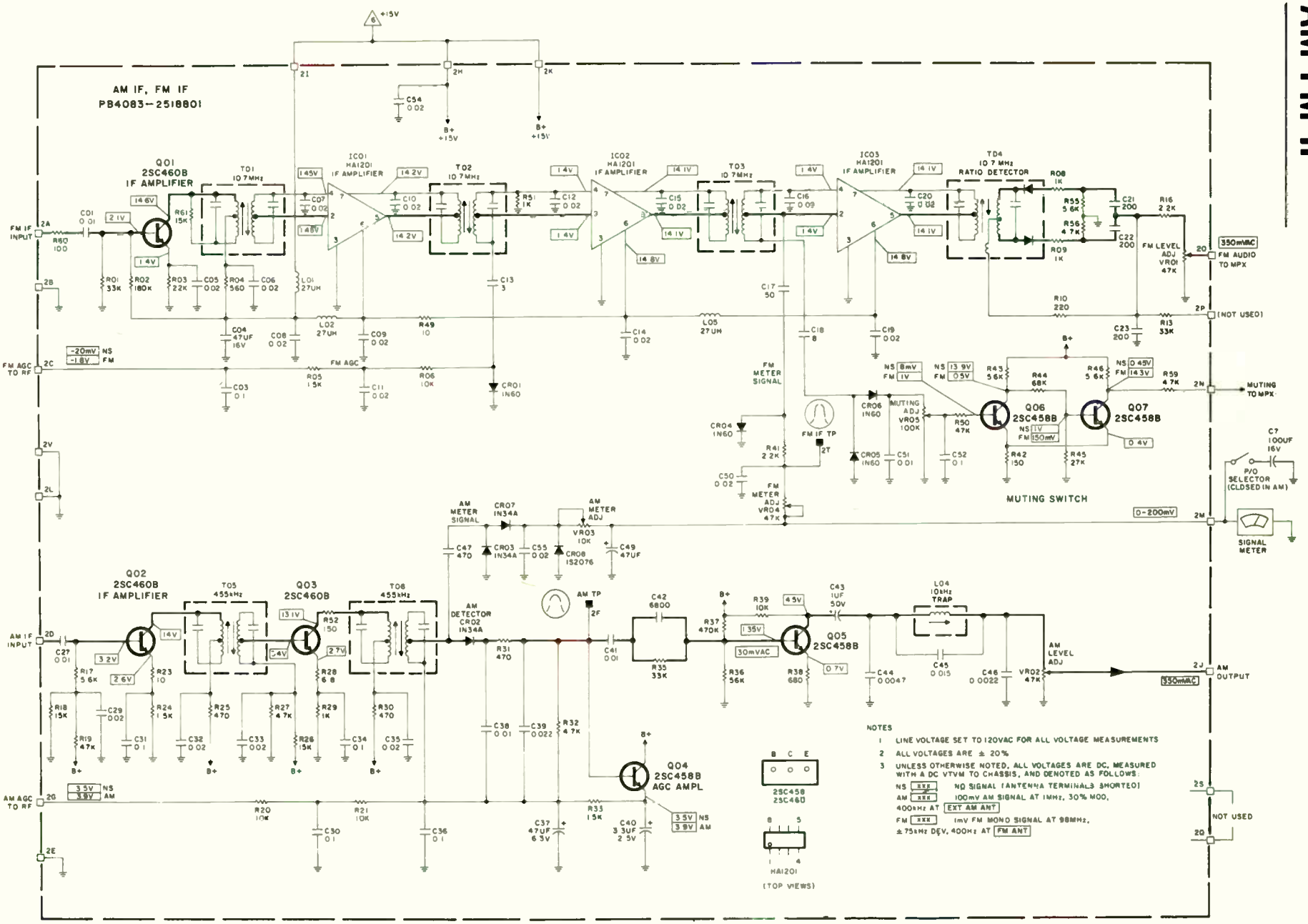
AM RF

FM RF

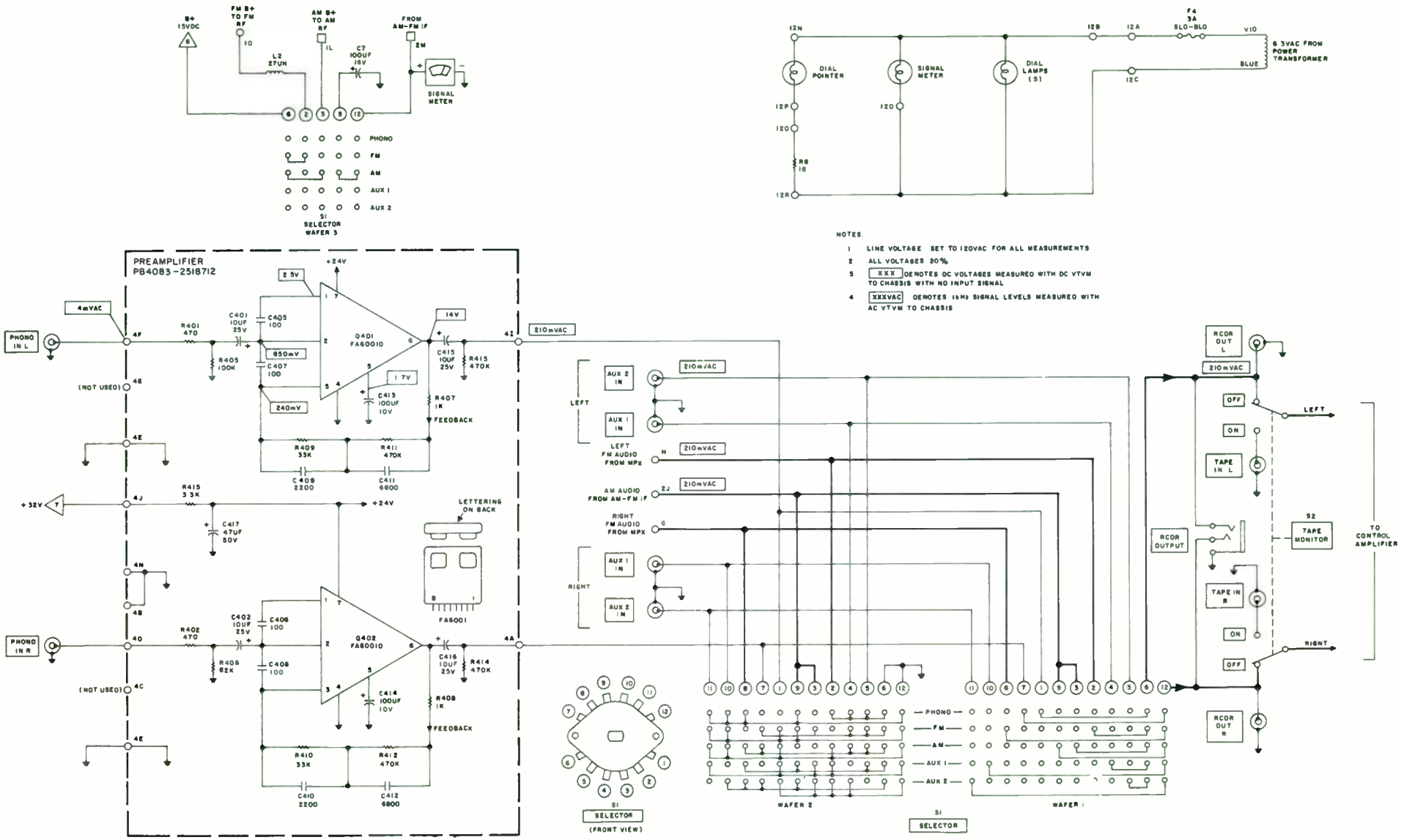


NOTES:

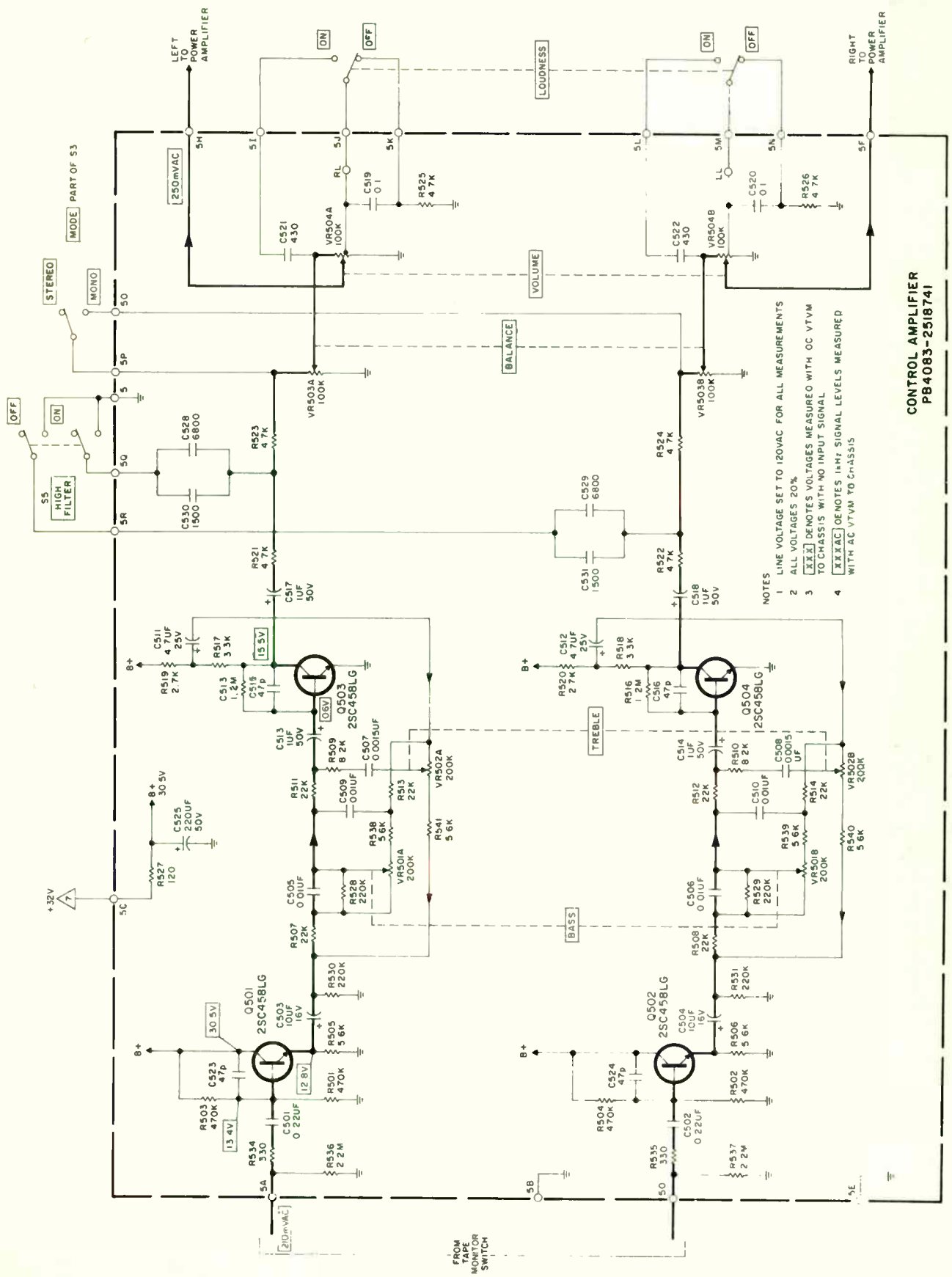
1. LINE VOLTAGE SET TO 120VAC FOR ALL VOLTAGE MEASUREMENTS
2. ALL VOLTAGES ARE ± 20%
3. ALL VOLTAGES ARE DC, MEASURED WITH A DC VTVM TO CHASSIS, AND DENOTED AS FOLLOWS
   NS [XXX] NO SIGNAL (ANTENNA TERMINAL SHORTED)
   FM [XXX] 1mV FM MONO SIGNAL AT 98MHz, ± 75kHz DEVIATION, 400Hz AT FM ANT
4. (U) DENOTES PARTS MOUNTED ON UNDERSIDE OF BOARD



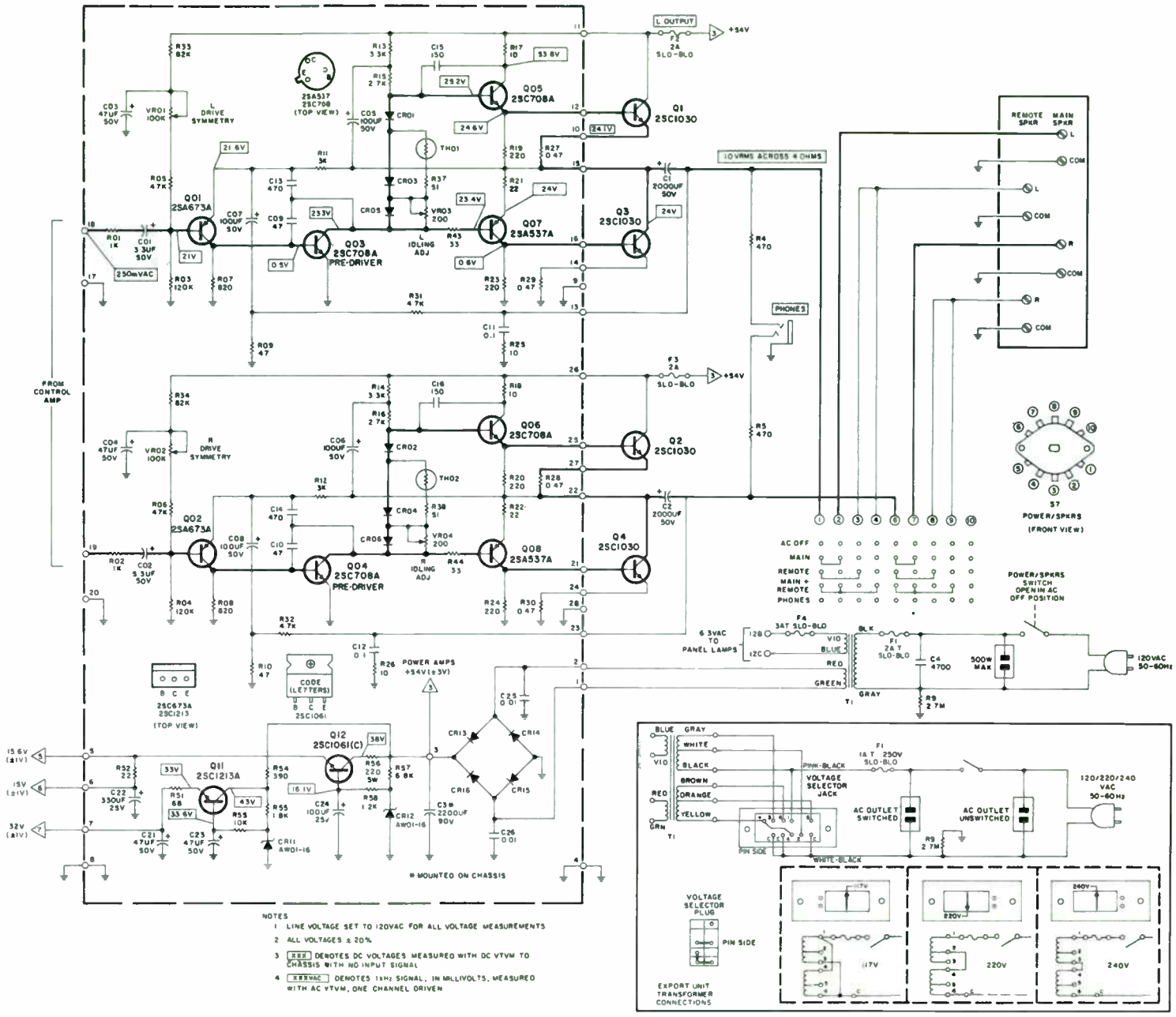
PREAMP and SELECTOR SWITCH



CONTROL AMP


CONTROL AMPLIFIER
PB4083-2518741
NOTES
1 LINE VOLTAGE SET TO 120VAC FOR ALL MEASUREMENTS
2 ALL VOLTAGES 20%
3 XXX DENOTES VOLTAGES MEASURED WITH OC VTVM TO CHASSIS WITH NO INPUT SIGNAL
4 XXXAC DENOTES 1kHz SIGNAL LEVELS MEASURED WITH AC VTVM TO CHASSIS
LEFT TO POWER AMPLIFIER
RIGHT TO POWER AMPLIFIER
LOUDNESS
VOLUME
BALANCE
TREBLE
BASS
MODE PART OF S3
STEREO
MONO
S5 HIGH FILTER
250mVAC
FROM TAPE MONITOR SWITCH
Q501 2SC458LG
Q502 2SC458LG
Q503 2SC458LG
Q504 2SC458LG

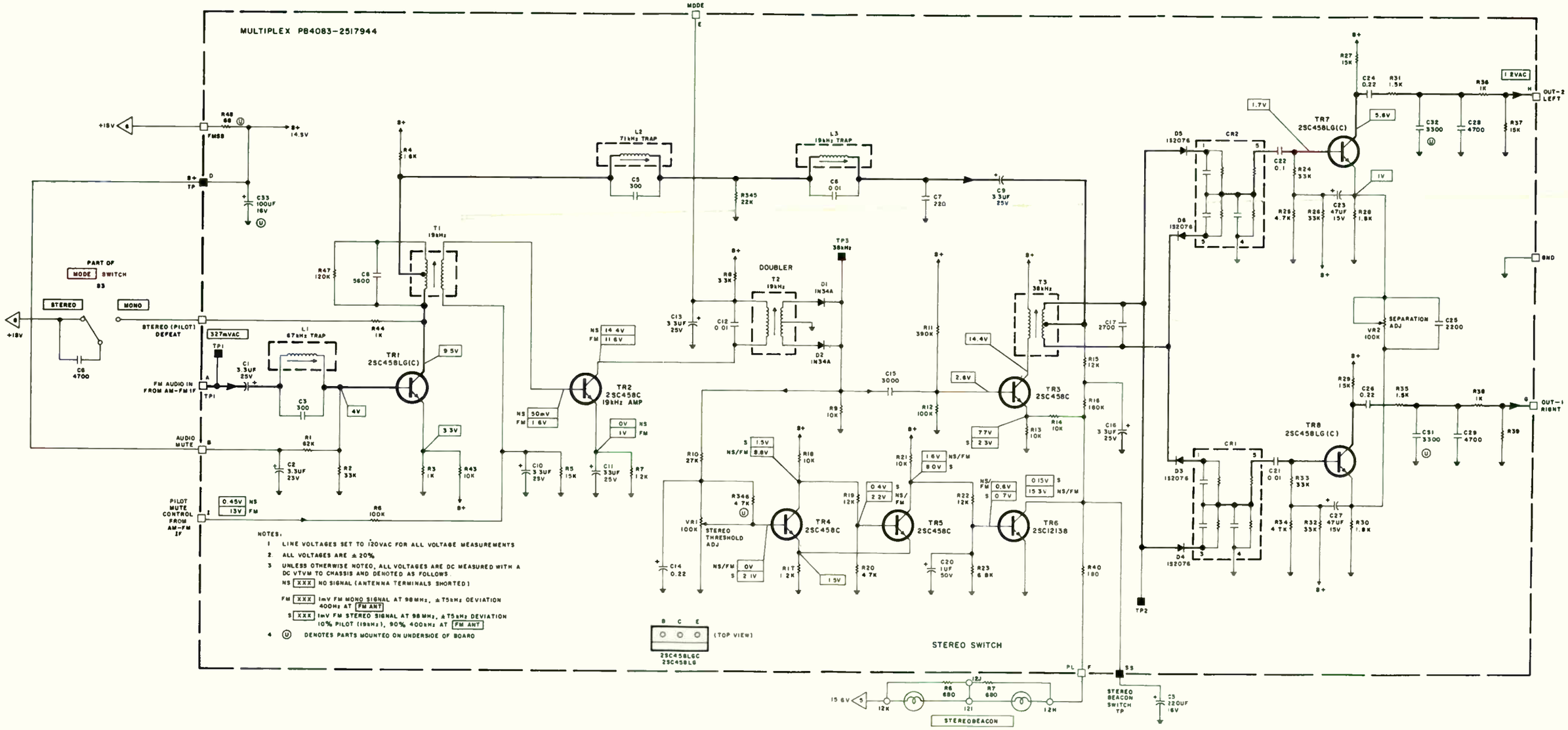
POWER AMP and POWER SUPPLY



NOTES

1. LINE VOLTAGE SET TO 120VAC FOR ALL VOLTAGE MEASUREMENTS
2. ALL VOLTAGES ± 20%
3. [xxx] DENOTES DC VOLTAGES MEASURED WITH DC VTVM TO CHASSIS WITH NO INPUT SIGNAL
4. [xxxVAC] DENOTES 1kHz SIGNAL, IN MILLIVOLTS, MEASURED WITH AC VTVM, ONE CHANNEL DRIVEN

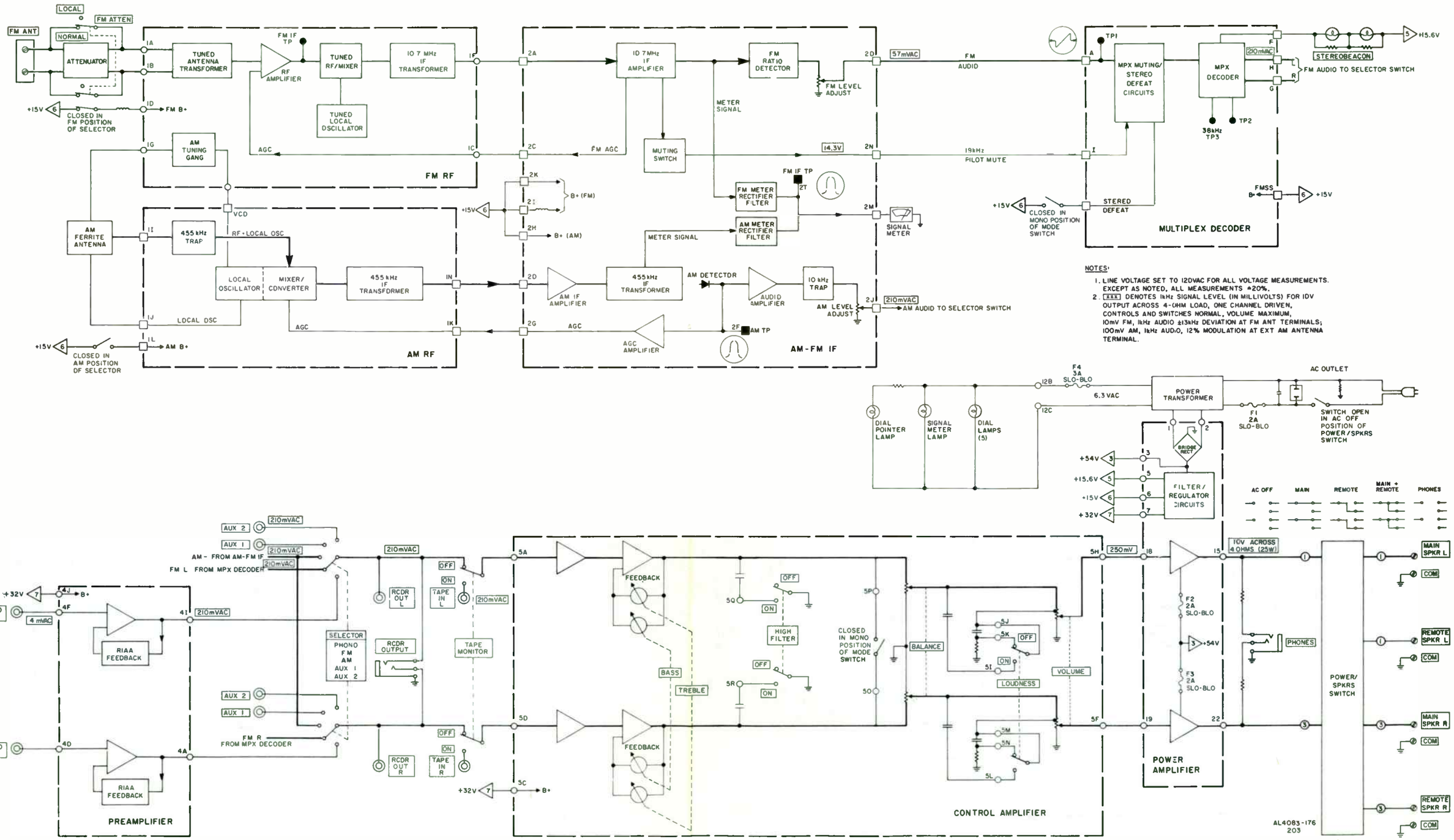
MULTIPLEX

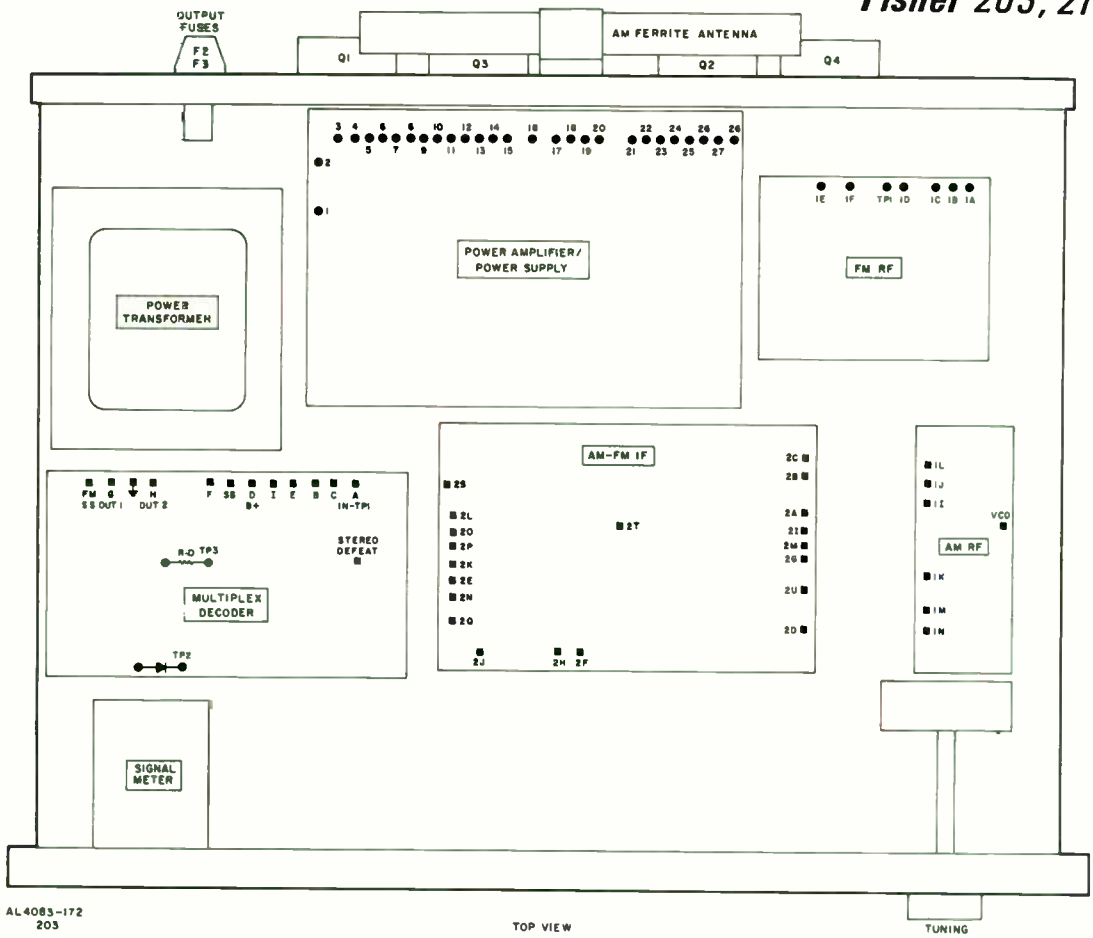


NOTES:

1. LINE VOLTAGES SET TO 120VAC FOR ALL VOLTAGE MEASUREMENTS
2. ALL VOLTAGES ARE ± 20%
3. UNLESS OTHERWISE NOTED, ALL VOLTAGES ARE DC MEASURED WITH A DC VTVM TO CHASSIS AND DENOTED AS FOLLOWS
   - NS [XXX] NO SIGNAL (ANTENNA TERMINALS SHORTED)
   - FM [XXX] 1mV FM MONO SIGNAL AT 98MHz, ±75kHz DEVIATION 400Hz AT [FM ANT]
   - S [XXX] 1mV FM STEREO SIGNAL AT 98MHz, ±75kHz DEVIATION 10% PILOT (19kHz), 90% 400Hz AT [FM ANT]
4. Ⓤ DENOTES PARTS MOUNTED ON UNDERSIDE OF BOARD

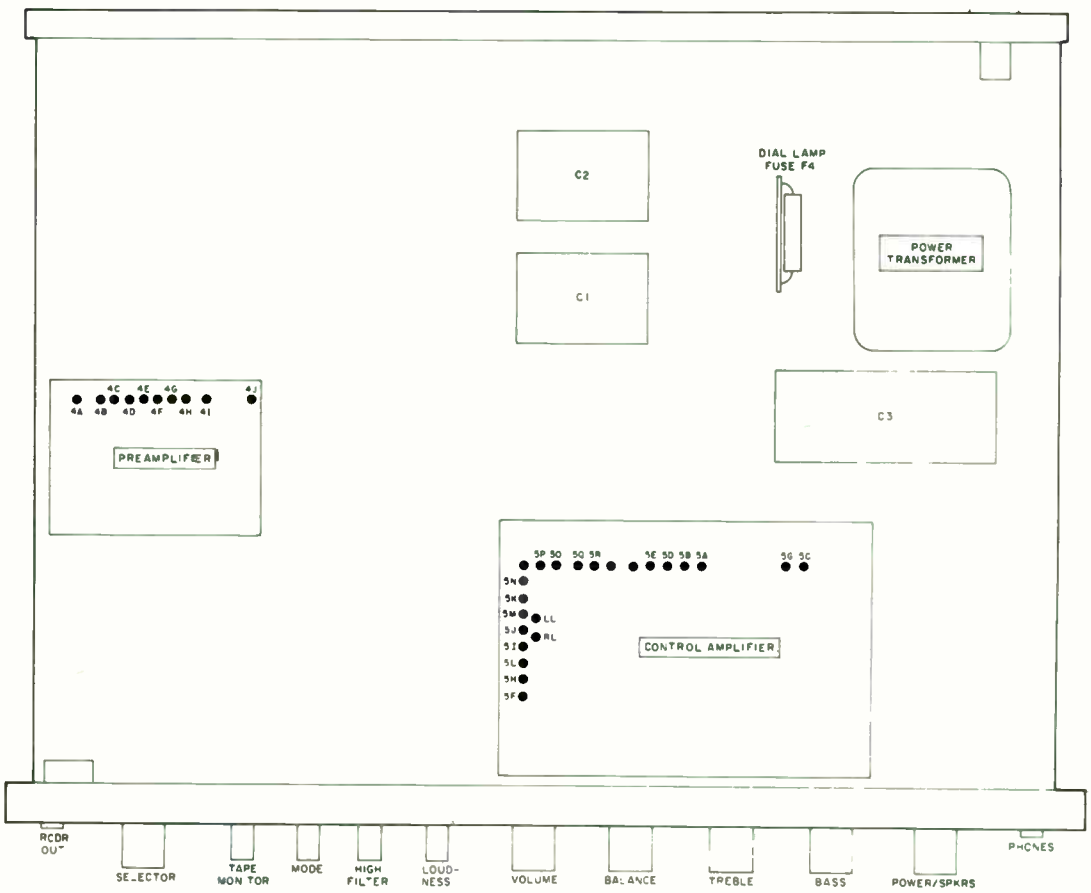
SIGNAL FLOW





AL4083-172
203

TOP VIEW



BOTTOM VIEW

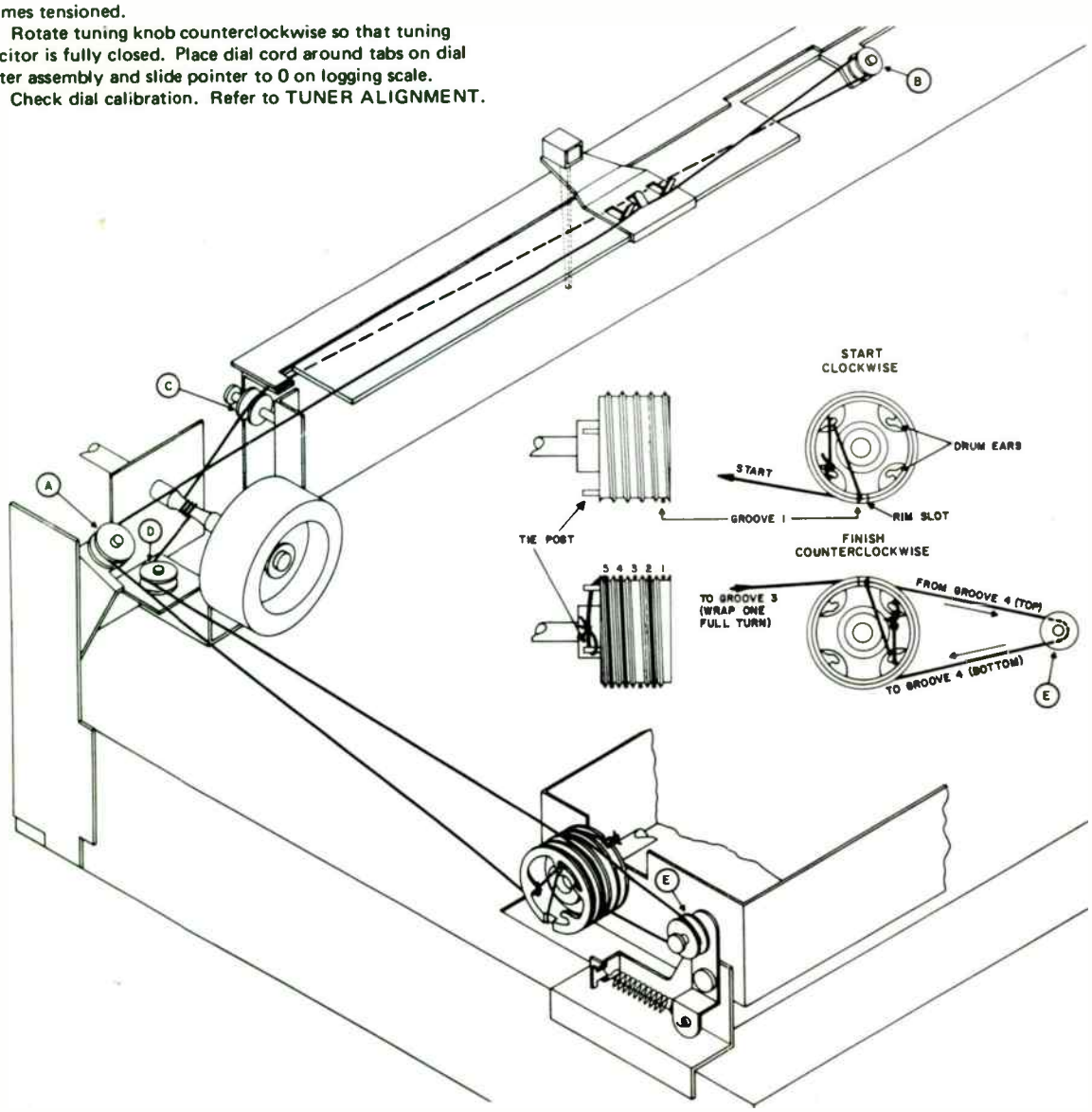
DIAL STRINGING

(1) Remove top cover from chassis.
(2) Rotate tuning capacitor fully clockwise (capacitor fully closed).
(3) Tie one end of dial cord around lower left ear on drum. See illustration.
(4) Run dial cord over the left drum ear and through rim slot onto groove 1. Guide cord around pulleys 'A' and 'B,' back under pointer guide bracket, and over pulley 'C.'
(5) Wrap 3½ turns clockwise around tuning shaft (as viewed from rear).
(6) Guide cord around pulley 'D.' Keep cord taut and rotate tuning capacitor fully open while allowing dial cord to wind on drum.
(7) Guide cord over groove 3 on drum and wrap one full turn around drum to top of groove 4.
(8) Guide cord around tension pulley and back onto drum at the bottom of groove 4.
(9) Wrap cord one-half turn around drum to end of groove 5, hook around upper tie post on inside of drum, and tie securely to lower tie post.
(10) Rotate drum clockwise and counterclockwise to distribute tension. Repeat several times so that spring becomes tensioned.
(11) Rotate tuning knob counterclockwise so that tuning capacitor is fully closed. Place dial cord around tabs on dial pointer assembly and slide pointer to 0 on logging scale.
(12) Check dial calibration. Refer to TUNER ALIGNMENT.

HARMONIC DISTORTION TEST

CAUTION:
(A) Measure one channel at a time.
(B) Limit measurements to 10 minutes.
(C) Use a load resistor with a minimum rating of 50 watts.

(1) Set BASS, MIDRANGE, and TREBLE controls flat (0), SELECTOR switch to AUX 1, and POWER/SPKRS switch to AC OFF.
(2) Connect a low-distortion sine wave signal generator between L AUX 1 IN jack and chassis ground. Set the signal generator frequency to 1000 Hz and output level to minimum.
(3) Connect the 4-ohm load resistor between L MAIN SPKR and COM terminals. Connect an AC VTVM, oscilloscope, and harmonic distortion analyzer across the 4-ohm load resistor.
(4) Set POWER/SPKRS switch to MAIN. Turn VOLUME control slowly to maximum.
(5) Adjust the signal generator output until the AC VTVM indicates 10 VRMS (25W). The HD analyzer should indicate less than 1% harmonic distortion.
(6) Repeat steps (1) through (5) for the right channel.



SEMICONDUCTORS

ITEM	PART NO.	TYPE
(AM RF)		
TR103	TR4031-0573486	2SC460B
TR104	TR4031-0573486	2SC460B
(FM RF)		
CR01	TR4083-2330241	HZ-12A
FET01	TR4083-2327132	3SK30A(B)
Q01	TR4031-0573510	2SC535B
Q02	TR4031-0573507	2SC461B
(AM-FM IF)		
CR01	TR4031-0575005	1N60
CR02	TR4031-0575002	1N34A
CR03	TR4031-0575002	1N34A
CR04	TR4031-0575005	1N60
CR05	TR4031-0575005	1N60
CR06	TR4031-0575005	1N60
CR07	TR4031-0575002	1N34A
CR08	TR4083-2337011	1S2076
IC01	TR4083-2327312	HA1201
IC02	TR4083-2327312	HA1201
IC03	TR4083-2327311	HA1201
Q01	TR4031-0573486	2SC460B
Q02	TR4031-0573486	2SC460B
Q03	TR4031-2320063	2SC458B
Q05	TR4031-2320063	2SC458B
Q06	TR4031-2320063	2SC458B
Q07	TR4031-2320063	2SC458B
(MPX)		
D1	TR4031-0575002	1N34A
D2	TR4031-0575002	1N34A
D3	TR4083-2337011	1S2076
D4	TR4083-2337011	1S2076
D5	TR4083-2337011	1S2076
D6	TR4083-2337011	1S2076
TR1	TR4031-2320073	2SC458LG(C)
TR2	TR4031-2320063	2SC458(C)
TR3	TR4031-2320063	2SC458(C)
TR4	TR4031-2320063	2SC458(C)
TR5	TR4031-2320063	2SC458(C)
TR6	TR4083-2327332	2SC1213B
TR7	TR4031-2320073	2SC458LG(C)
TR8	TR4031-2320073	2SC458LG(C)
(PREAMP)		
Q401	TR4083-2327301	FA6001D
Q402	TR4083-2327301	FA6001D
(CONTROL AMP)		
Q501	TR4031-2320073	2SC458LG
Q502	TR4031-2320073	2SC458LG
Q503	TR4031-2320073	2SC458LG
Q504	TR4031-2320073	2SC458LG
(POWER)		
CR01	TR4083-2337071	HV-26G
CR02	TR4083-2337071	HV-26G
CR03	TR4083-2337071	HV-26G
CR04	TR4083-2337071	HV-26G
CR05	TR4083-2337071	HV-26G
CR06	TR4083-2337071	HV-26G
CR11	TR4031-2327076	AW01-33
CR12	TR4031-2327077	AW01-16
CR13	TR4031-2327031	V03C
CR14	TR4031-2327031	V03C
CR15	TR4031-2327031	V03C
CR16	TR4031-2327031	V03C
Q01	TR4083-2327283	2SA673A
Q02	TR4083-2327283	2SA673A
Q03	TR4083-0573557	2SC708C
Q04	TR4083-0573557	2SC708C
Q05	TR4083-0573557	2SC708C
Q06	TR4083-0573557	2SC708C
Q07	TR4083-0573560	2SA537C
Q08	TR4083-0573560	2SA537C
Q11	TR4083-2327293	2SC1213A
Q12	TR4031-2327153	2SC1061C

ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
(AM RF)		
C140	CE4083-1252525	47 uF 16 V
VC1	CV4083-0281169	Tuning Gang
(FM RF)		
VC1	CV4083-0281169	Tuning Gang
TC3	CT4031-0283114	Trimmer
TC4	CT4031-0283118	Trimmer
(AM-FM IF)		
C04	CE4083-1252525	47 uF 16 V
C37	CE4031-0252225	47 uF 6.3 V
C40	CE4083-1252613	3.3 uF 25 V
C43	CE4083-1252811	1 uF 50 V
C49	CE4031-0252225	47 uF 6.3 V
(MPX)		
C1	CE4083-1252613	3.3 uF 25 V
C2	CE4083-1252613	3.3 uF 25 V
C9	CE4083-1252613	3.3 uF 25 V
C10	CE4083-1252613	3.3 uF 25 V
C11	CE4083-1252613	3.3 uF 25 V
C13	CE4083-1252613	3.3 uF 25 V
C16	CE4083-1252613	3.3 uF 25 V
C23	CE4083-1252525	47 uF 16 V
C27	CE4083-1252525	47 uF 16 V
(PREAMP)		
C401	CE4083-1252621	10 uF 25 V
C402	CE4083-1252621	10 uF 25 V
C413	CE4083-1252331	100 uF 10 V
C414	CE4083-1252331	100 uF 10 V
C415	CE4083-1252621	10 uF 25 V
C416	CE4083-1252621	10 uF 25 V
C417	CE4083-1252825	47 uF 50 V
(CONTROL AMP)		
C503	CE4083-1252521	10 uF 16 V
C504	CE4083-1252521	10 uF 16 V
C511	CE4083-1252615	4.7 uF 25 V
C512	CE4083-1252615	4.7 uF 25 V
C525	CE4083-1252832	220 uF 50 V
(POWER)		
C01	CE4083-1252813	3.3 uF 50 V
C02	CE4083-1252813	3.3 uF 50 V
C03	CE4083-1252825	47 uF 50 V
C04	CE4083-1252825	47 uF 50 V
C05	CE4083-1252831	100 uF 50 V
C06	CE4083-1252831	100 uF 50 V
C07	CE4083-1252831	100 uF 50 V
C08	CE4083-1252831	100 uF 50 V
C21	CE4083-1252825	47 uF 50 V
C22	CE4083-1252532	100 uF 25 V
C23	CE4083-1252825	47 uF 50 V
C24	CE4083-1252631	100 uF 25 V

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
(AM-FM IF)		
VR01	RV4083-0151253	47 K FM Level
VR02	RV4083-0151253	47 K AM Level
VR03	RV4083-0151252	10 K AM Meter
VR04	RV4083-0151253	47 K FM Meter
VR05	RV4083-0151254	100 K Muting
(CONTROL AMP)		
VR501	RV4083-156128	200 K Dual Treble
VR502	RV4083-156128	200 K Dual Bass
VR503	RV4083-0156564	100 K Dual Balance
VR504	RV4083-0153710	100 K Dual Volume
(POWER)		
TH01	RT4083-0576042	Thermistor, 15D26
TH02	RT4083-0576042	Thermistor, 15D26
VR01	RV4083-0151226	100 ohms Drive Symmetry
VR02	RV4083-0151226	100 ohms Drive Symmetry
VR03	RV4083-0151223	200 ohms Idle Current
VR04	RV4083-0151223	200 ohms Idle Current

COILS/TRANSFORMERS

ITEM	PART NO.
(AM RF)	
L111	LC4031-2140441
L113	LC4031-2134201
T111	ZZ4031-2154101
(FM RF)	
L01	LC4083-2134323
L02	LC4031-2134041
L03	LC4083-2134324
T01	LC4083-2134067
T02	ZZ4031-2140233
(AM-FM IF)	
L01	LC4031-2227035
L02	LC4031-2227035
L04	LB4031-5120145
L05	LC4031-2227035
T01	ZZ4031-2140233
T02	ZZ4031-2140238
T03	ZZ4031-2140238
T04	ZZ4031-2140242
T05	ZZ4031-2154102
T06	ZZ4031-2154103
(MPX)	
L1	LB4031-5120145
L2	LB4031-5120145
L3	LB4031-0324005
T1	ZZ4083-2134371
T2	ZZ4083-2134372
T3	ZZ4083-2134341
(POWER)	
Power	TD4083-2217441

MISCELLANEOUS

ITEM	NAME	PART NO.
	Switch, FM Attenuation	SS4031-2627012
	Switch, Selector	SR4084-2617004
	Switch, Tape Monitor	SU4083-2637171
(POWER)	Switch, Mode/High Filter/ Loudness	SU4083-2637171
F1	Fuse, 2A, 125 V Slo-Blo	FL51313-2
F2	Fuse, 2A, 125 V	FL51313-28
F3	Fuse, 3A, 125 V	FL4084-2727085

Pages 26-30 Courtesy of HARMAN-KARDON, INC.

NOTE: For replacement part numbers, refer to schematic.

ALIGNMENT PROCEDURES
Do not attempt alignment unless the following equipment is available.

EQUIPMENT DESCRIPTION
1. FM Signal Generator
2. Oscilloscope
3. AC VTVM
4. Audio Generator
5. Multiplex Stereo Generator

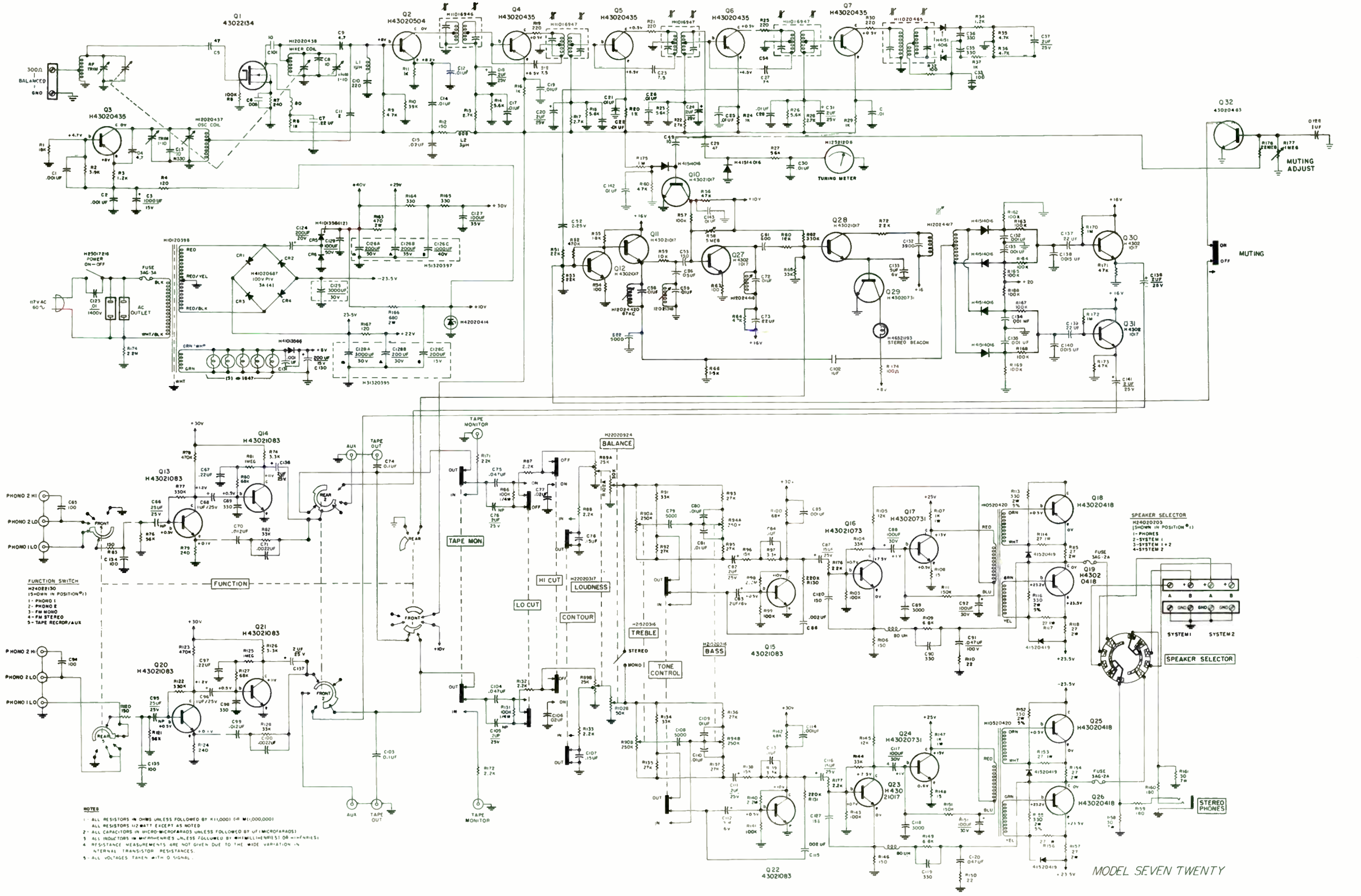
RF AND IF ALIGNMENT
Control Settings: Function Selector FM STEREOMATIC

STEP	CONNECT SIGNAL GENERATOR	GENERATOR FREQUENCY	DIAL SETTING	OUTPUT INDICATOR	ADJUST	ADJUST FOR	NOTES
1	To Antenna Terminals Through A 270 Ohm Resistor On Hot Side	10.7 MC 60 CPS MOD	Tuning Gang Wide Open (108 MC)	Scope At Output Tape Jack	1st, 2nd, 3rd, 4th IF Transformer. Primary of Ratio Detector Transformer	Maximum Gain & Symetrical IF Response	Convert Ratio Detector to AM Detector by Rotating Top Fully CCW. Use Weakest Input Signal.
2	Same	90 MC 60 CPS MOD	90 MC	Same	Osc. Coil, Mixer Coil, RF Coil	Maximum	Osc., Mixer & RF Coils Adjusted by Squeezing or Spreading until Dial Calibration is Correct and Output is Maximum.
3	Same	106 MC 60 CPS MOD	106 MC	Same	Osc. Trimmer Mixer Trimmer RF Trimmer	Maximum	
4	Repeat Steps 2 and 3						
5	Same	100 MC 60 CPS MOD	100 MC	Same	Ratio Detector Secondary (Top of Can)	Symetrical "S" Curve.	
					Ratio Detector Primary	Max. Gain	

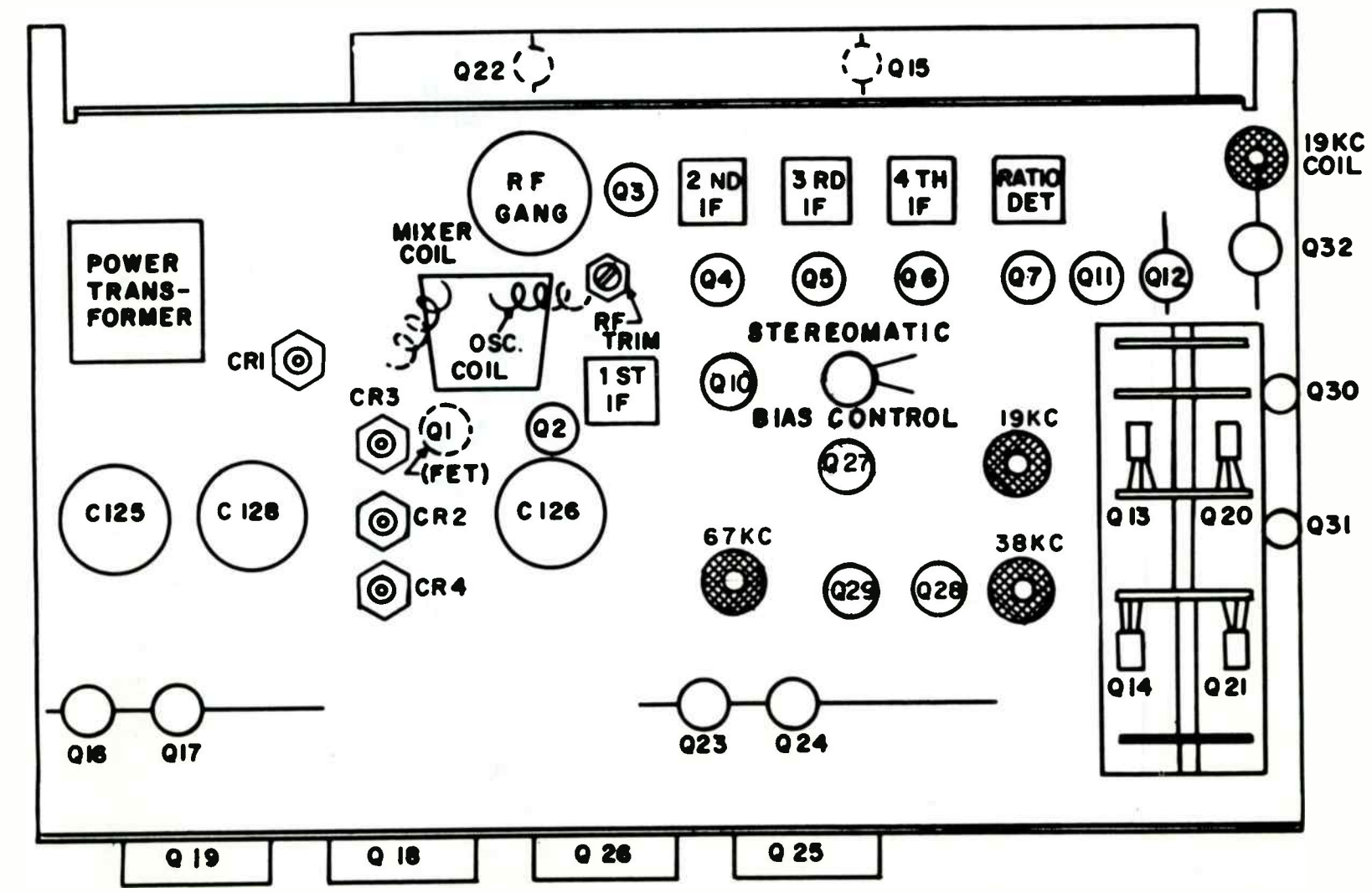
MULTIPLEX ALIGNMENT PROCEDURE

DO NOT ATTEMPT ALIGNMENT UNLESS THE FOLLOWING EQUIPMENT IS AVAILABLE

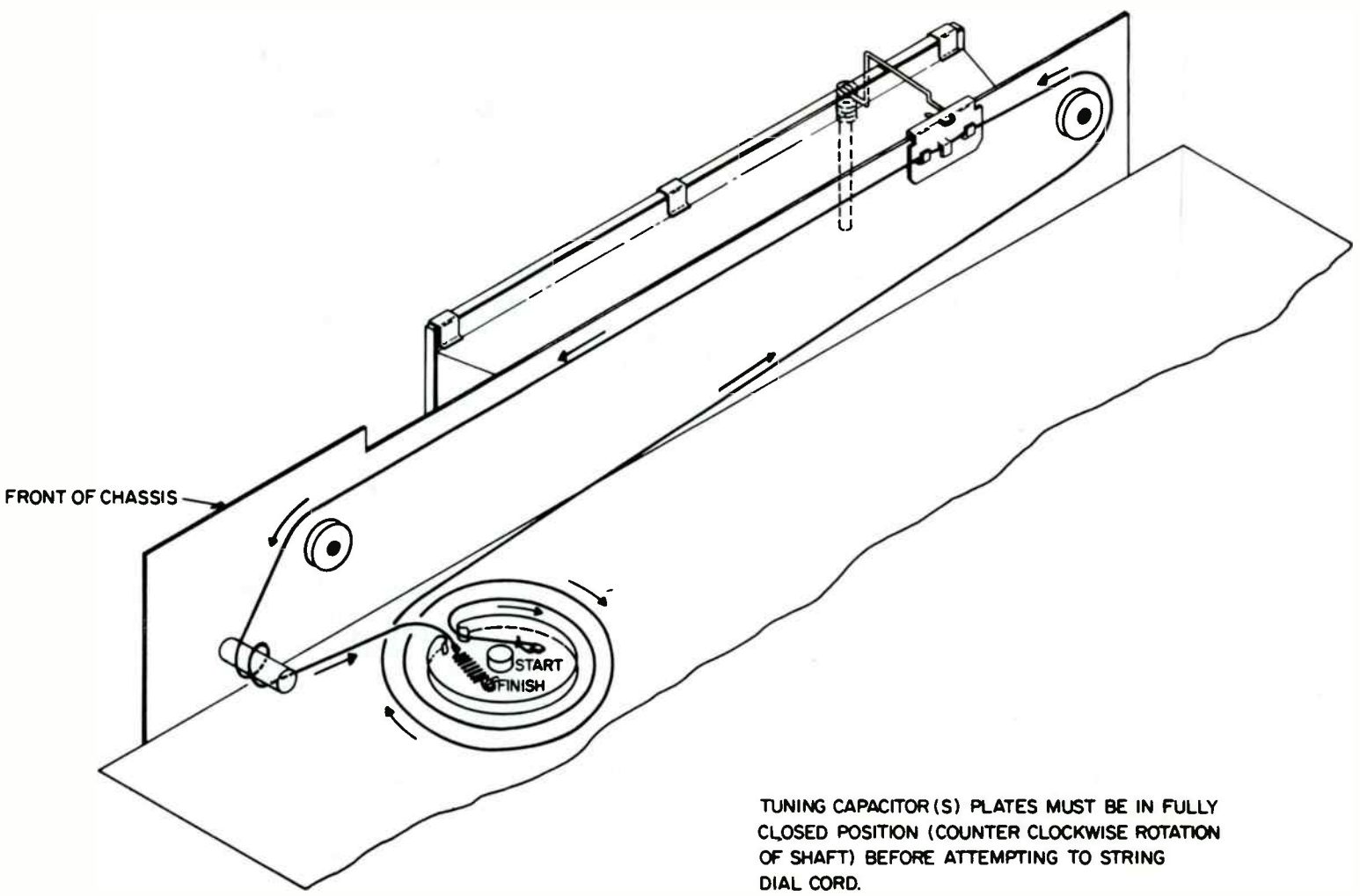
STEP	CONNECT SIGNAL GENERATOR	GENERATOR FREQUENCY	DIAL SETTING	OUTPUT INDICATOR	ADJUST	ADJUST FOR	NOTES
1	Antenna Terminals Through Dummy Resistor	100 MC Modulated by 67 KC 100%	100 MC	AC-VTVM at Tape Out Jack	67 KC SCA Trap	Minimum Output	FM Stereomatic
2	Same	100 MC Modulated 100% by Stereo Generator	100 MC	VTVM at Collector of 19 KC Amp	Stereomatic Bias Adjust	10 Volts D.C.	IK uv Input From Generator
3	Same	Same	Same	Scope at Collector of 38 KC Amp	Adjust 19 KC Coils and 38 KC Coil	Maximum Output	Stereo Beacon Should Be Lit After This Adjustment
4	Same	Same	Same	AC-VTVM and Scope at Tape Out Jacks	Slightly Re-Adjust 19 KC Coil	Maximum Separation Between Ch A & Ch B	



CHASSIS LAYOUT



STRINGING DIAGRAM



TUNING CAPACITOR(S) PLATES MUST BE IN FULLY CLOSED POSITION (COUNTER CLOCKWISE ROTATION OF SHAFT) BEFORE ATTEMPTING TO STRING DIAL CORD.

Pages 31-38 Courtesy of HITACHI SALES CORP. OF AMERICA

DIAL CORD STRINGING

Referring to Fig. 7, loop the dial cord in the direction of arrows.

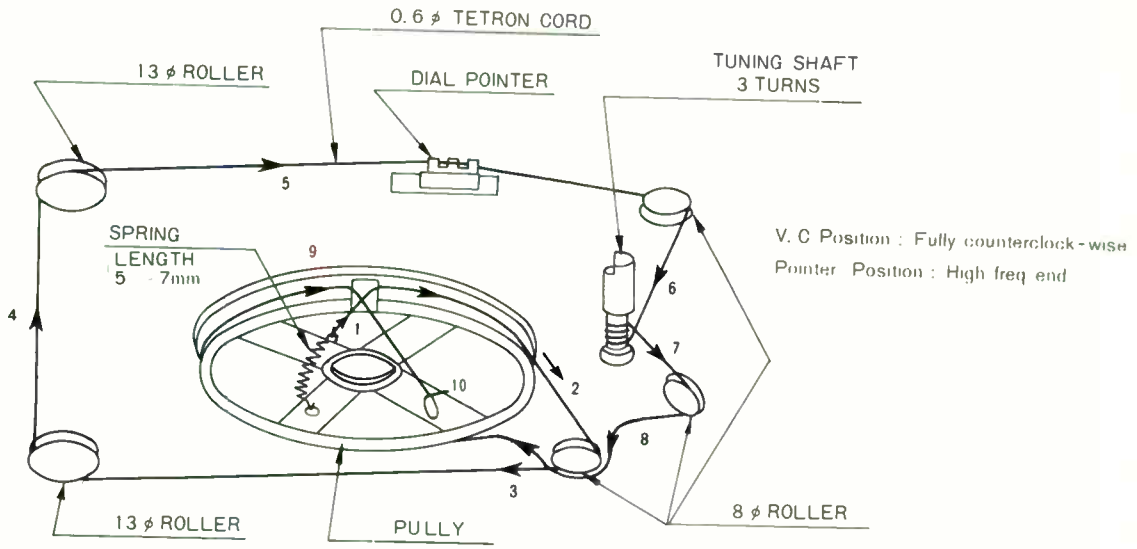


Fig. 7

ALIGNMENT PROCEDURE

◦ **Instrument Reguiered**

Signal

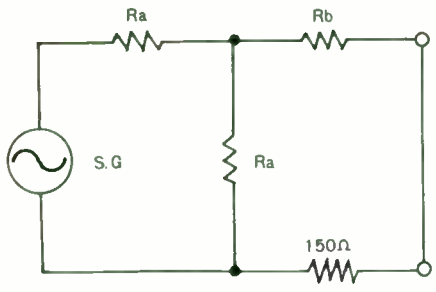
1) RF Signal Generator (FM, AM)
2) IF Sweep Generator (Centered 455kHz for AM and 10.7MHz for FM)
3) Marker Generator

Output Indicator

1) V.T.V.M.
2) Oscilloscope

◦ **General Preparation**

1. Insert power cord plug into AC outlet (120V, 60Hz). Check power supply voltage.
2. Turn the volume control knob to maximum. (**Note**; During FM-IF and FM DISC. alignment, turn the volume to minimum.)
3. Turn the tone control knob to maximum.
4. Turn the balance control knob to medium.
5. During AM alignment, connect output of signal generator (modulated by 400Hz or 1,000Hz 30%) to a loop antenna (4 inches in diameter, 2 or 3 turns) and couple the loop antenna to the ferrite-core antenna. Connect the V.T.V.M (AC 3V or less scale) to the speaker terminals.
6. During FM-IF and FM DISC. alignment, connect output of sweep generator to R105 thru 0.001μF coupling capacitor, the marker generator loosely couple to sweep generator. Connect the vert. terminal of high gain oscilloscope to IC301 Pin ③.
7. During FM-RF alignment, connect output of signal generator to FM antenna terminal using a dummy antenna as shown in Fig. 10.
8. Adjust with an insulated screw driver to prevent body effect.
9. The order of adjustment is shown below. As the reading of V.T.V.M. rises in proportion to adjustment, adjust the output of speaker terminal may not exceed 3V at maximum.



Ra ·····S.G's output impedance

Rb ·····(150 - $\frac{Ra}{2}$)ohms

Fig. 10

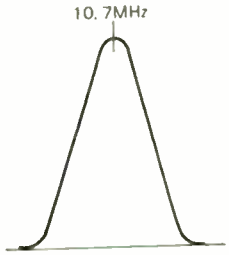


Fig. 11

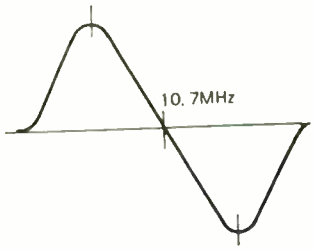


Fig. 12

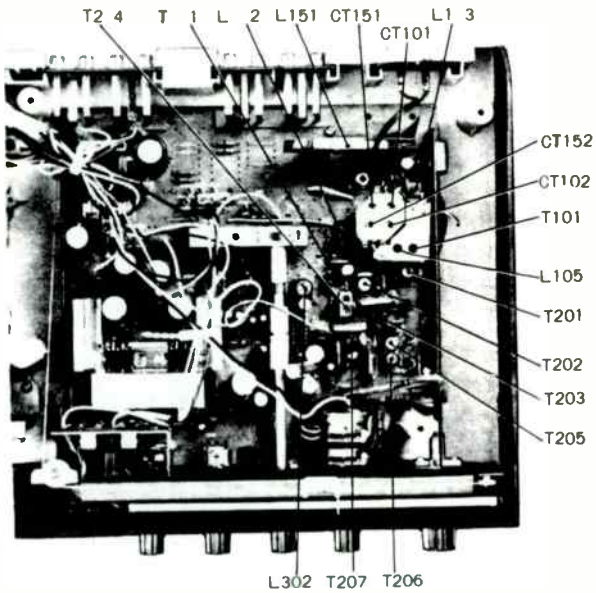


Fig. 13

Step	Adjustment Position	Adjustment Parts	Order of Adjustment
①	AM-IF	T151, T204, T207	• Set the dial pointer to maximum point. • Adjust as follows to maximum output at 455kHz.
			Repeat step ①
②	AM-RF	L152	• Adjust as follows to maximum output at 520kHz.
		CT151	• Adjust as follows to maximum output at 1,400kHz
		CT152	• Adjust as follows to maximum output at 1,650kHz
			Repeat step ②
③	FM-IF	T101, T201, T202, T203, T205	• Detune T206 core. • Adjust as indicated until the waveform as shown in Fig. 11 is obtained.
			Repeat step ③
④	FM DISCRI	T206	• "S" curve characteristic as shown in Fig. 12.

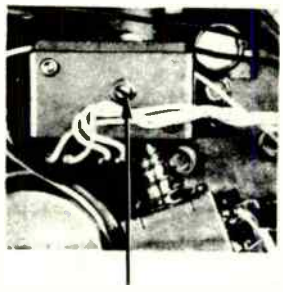
Step	Adjustment Position	Adjustment Parts	Order of Adjustment
⑤	FM-RF	L105	• Adjust as follows to maximum output at 87MHz
		CT102	• Adjust as follows to maximum output at 109MHz
		L103	• Adjust as follows to maximum output at 90MHz
		CT101	• Adjust as follows to maximum output at 106MHz
			Repeat step ⑤

ADJUSTMENT OF TAPE DECK

Head height adjustment (and angle adjustment)

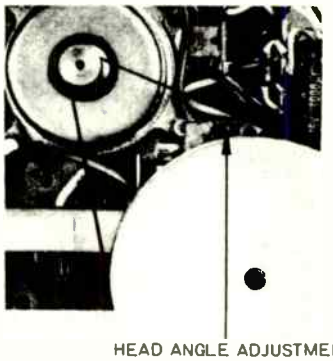
Insert the test cartridge No. 321 (made by RCA) and play back track No. 2 (left side). Adjust the height adjustment screw so that the output 1,000Hz of track No. 2 side (left side) is minimized as shown in Fig. 14. Then, Playback track No. 6 (right side) and adjust the angle adjustment screw so that the output 8,000Hz of track No. 6 side (right side) is maximized as shown in Fig. 15.

At this time the head height is a little moved, repeat the head height adjustment and angle adjustment.



HEAD HEIGHT ADJUSTMENT SCREW

Fig. 14



HEAD ANGLE ADJUSTMENT SCREW

Fig. 15

SEMICONDUCTORS

ITEM	PART NO.	TYPE
D101	5330261	HV-80
D151	0575001	1N34A
D201	0575005	1N60
D202	5330261	HV80
D203	0575019	1N60(P)
D204	0575019	1N60(P)
D205	0575001	1N34A
D601	5330104	V06A
D602	5330104	V06A
D603	5330372	SV02A
D604	5330371	SV01A
D605	5330104	V06A
D801	7070692	10D2
IC301	5351042	SN76110
IC501	5350136	HA1308
Q101	0573507	2SC461B
Q102	0573510	2SC535B
Q151	0573486	2SC460B
Q201	0573486	2SC460B
Q202	0573487	2SC460C
Q203	0573487	2SC460C
Q401	5320023	2SC458LG-C
Q901	7071021	2SC732BL
Q902	7071021	2SC732BL
Q903	7071031	2SC733
Q904	7071031	2SC733

ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C113	0252531	100 uF 16 V
C212	0252613	3.3 uF 25 V
C215	0252613	3.3 uF 25 V
C216	0252613	3.3 uF 25 V
C308	0252613	3.3 uF 25 V
C309	0252613	3.3 uF 25 V
C312	0252535	470 uF 16 V
C403	0252613	3.3 uF 25 V
C407	0252625	47 uF 50 V
C501	0252613	3.3 uF 25 V
C502	0252613	3.3 uF 25 V
C506	0252535	100 uF 16 V
C507	0252535	470 uF 16 V
C601	0256104	2200 uF 10 V
C602	0256010	1000 uF 16 V
C603	0256110	2200 uF 25 V
C606	0256010	1000 uF 16 V
C807	0256010	1000 uF 16 V
C809	0252535	470 uF 16 V
C901	0252615	4.7 uF 25 V
C902	0252615	4.7 uF 25 V
C905	0252525	47 uF 16 V
C906	0252621	10 uF 25 V
C907	0252621	10 uF 25 V
C910	0252615	4.7 uF 25 V
C911	0252615	4.7 uF 25 V
CT101		
CT102		
CT151		
CT152	0282606	Tuning Gang
CV101		
CV102		
CV151		
CV152		

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
RT301	0151882	470 ohms
RV401	5000041	20 K Dual Tone
RV402	0151461	50 K Balance
RV403	5018021	100 K Dual Volume/Switch

COILS/TRANSFORMERS

ITEM	PART NO.
L101	0318543
L102	5123271
L103	5126006
L104	5123271
L105	5126007
L106	5152012
L151	5110137
L152	5120275
L301	5120183
L302	5120189
T001	5211306
T101	5140017
T151	5130037
T201	5140018
T202	5140021
T203	5140019
T204	5136016
T205	5148033
T206	5148034
T207	5130033

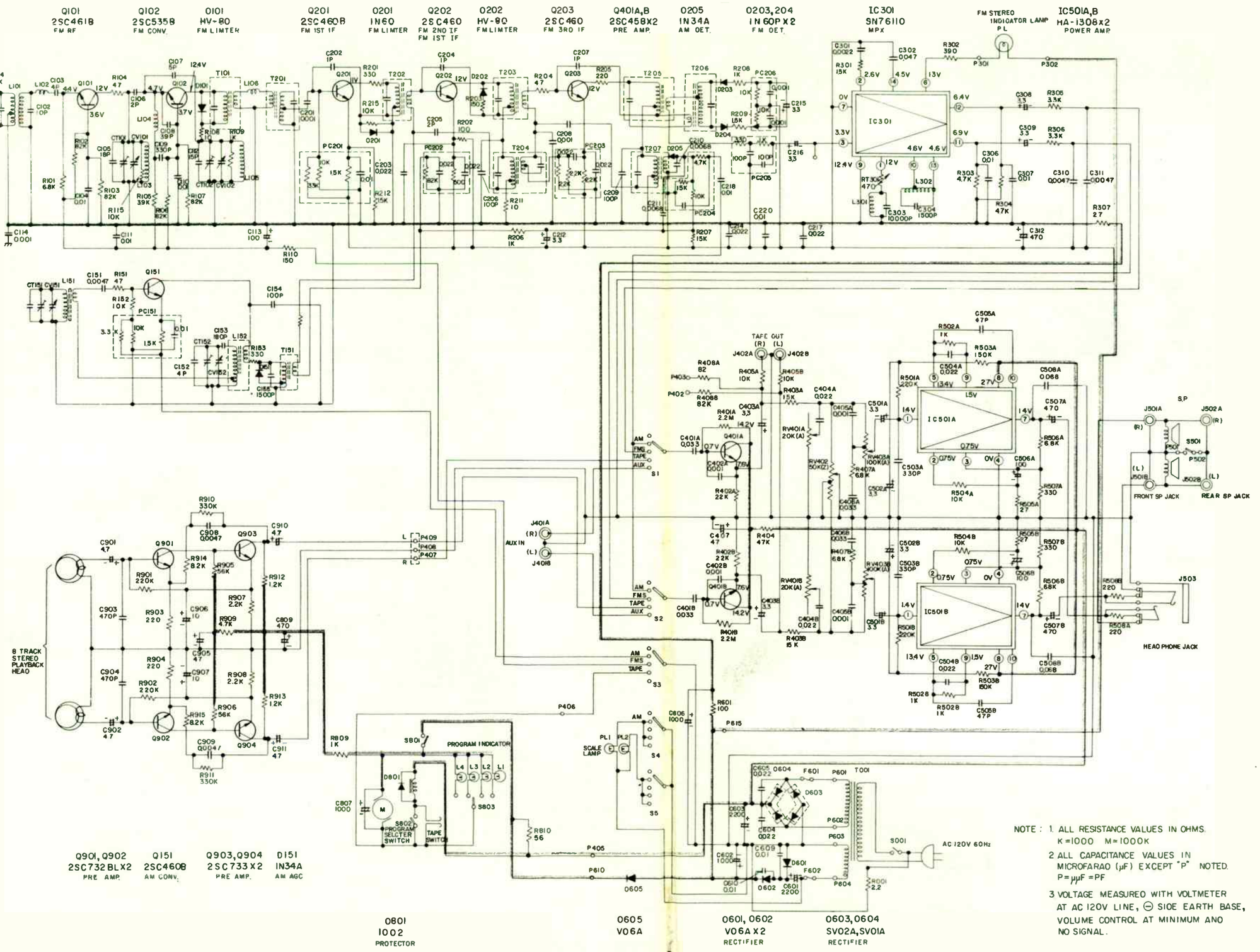
MISCELLANEOUS

ITEM	NAME	PART NO.
F601	Fuse, 2A	0591138
F602	Fuse, 2A	0591138
M	Motor, Tape Drive	7070661
PC151	Component Combination	0186358
PC201	Component Combination	0186358
PC202	Component Combination	0186359
PC203	Component Combination	0186355
PC204	Component Combination	0186356
PC205	Component Combination	0186386
PC206	Component Combination	0186385
S1-5	Switch, Function	5613021
S801	Switch, Motor Power	7070724
S802	Switch, Channel Select	5632131
	Belt, Tape Drive	7070871
	Head, Play	7070761
	Solenoid, Track Change	7070831
	Speaker, 12 cm	5411421

CABINET PARTS

NAME	PART NO.
Assembly, Cabinet (Model SP-2812, Yellow)	6130808
Assembly, Cabinet (Model SP-2812, White)	6130807
Assembly, Cabinet (Model SP-2812C)	6130809
Knob, Balance/Tone/Function	6280381
Knob, Volume	6280382
Knob, Tuning	6280383
Box, Speaker (Model SP-2812, Yellow)	6131003
Box, Speaker (Model SP-2812, White)	6131001
Box, Speaker (Model SP-2812C)	6131003

SCHEMATIC DIAGRAM

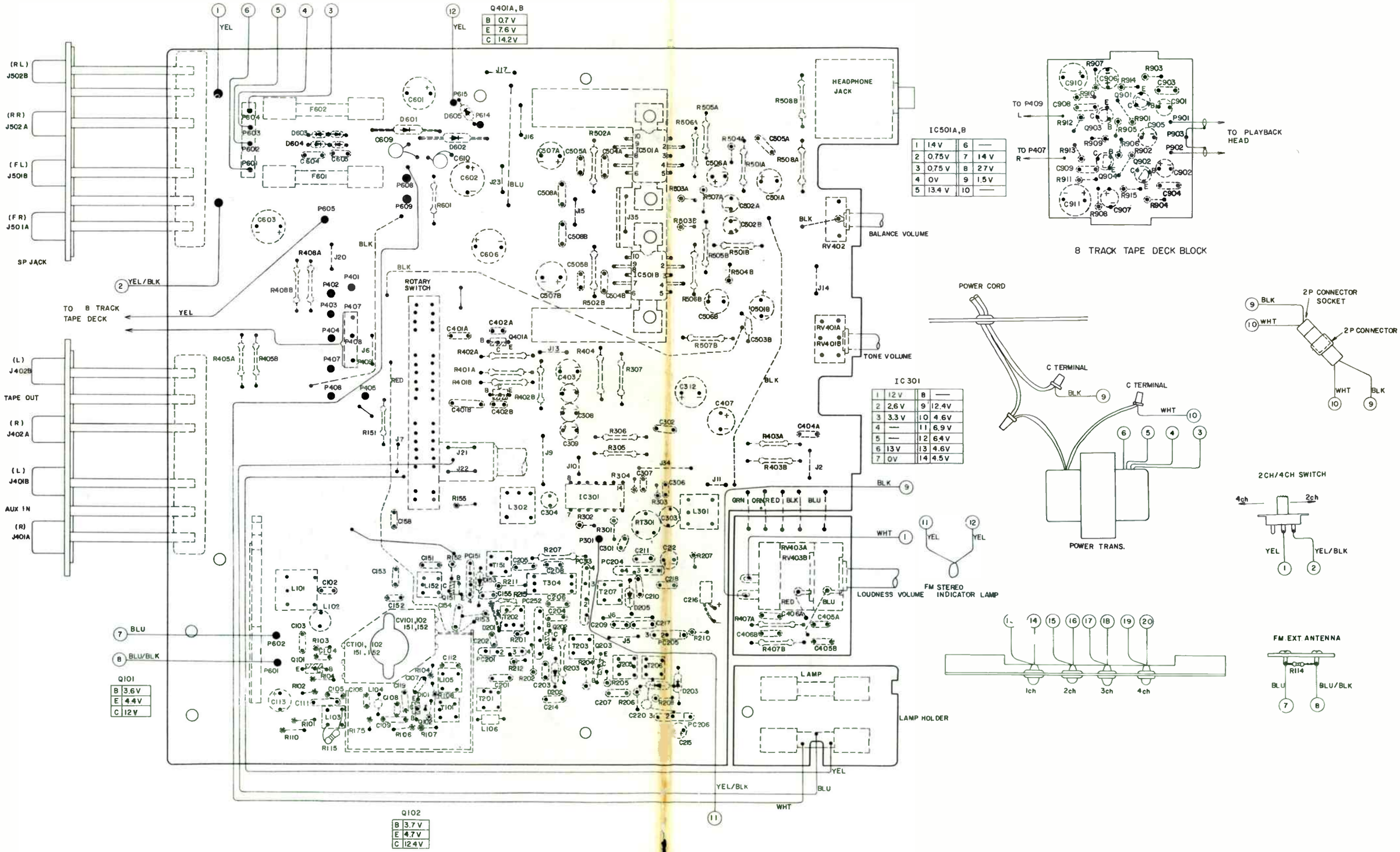


NOTE : 1. ALL RESISTANCE VALUES IN OHMS.
K=1000 M=1000K

2 ALL CAPACITANCE VALUES IN MICROFARAD (μF) EXCEPT "P" NOTED.
P=μμF =PF

3 VOLTAGE MEASUREO WITH VOLTMETER AT AC 120V LINE, ⊖ SIOE EARTH BASE, VOLUME CONTROL AT MINIMUM ANO NO SIGNAL.

CIRCUIT BOARD DIAGRAM



ALIGNMENT INSTRUCTIONS

CAUTION: Use isolation transformer or observe polarity when connecting test equipment.
Maintain line voltage at 120VAC. Allow a 15-minute warm-up period.
Use only enough generator output to obtain a suitable indication.

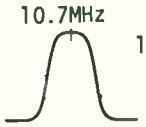


FIG. 1

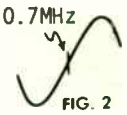


FIG. 2

AM ALIGNMENT—SELECTOR IN AM POSITION

Connect generator across loop fashioned of several turns of wire. Set volume at maximum.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
455kHz 400-hertz Modulation	Tuning gang fully open	Output meter across voice coil	L313, L312, L311	Adjust for maximum. Repeat until no further improvement is noted.
600kHz	Tune to signal	"	L310	Adjust for maximum.
1640kHz	"	"	AM Osc.Trimmer	Adjust for maximum.
1400kHz	"	"	AM Osc.Trimmer	Adjust for maximum. Repeat AM alignment until no further improvement is noted.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001mfd to point Jct. L302 & C305, low side to ground.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
10.7MHz Unmodulated	Point of non-interference	DC probe of VTVM to Cathode Q318, common to ground.	L309(Pri),L308, L307, L306, L305	Adjust for maximum.
"	"	DC probe of VTVM to Jct.R332 & C328 common to ground.	L309 (Sec)	Adjust for zero reading. A positive or negative reading will be obtained on either side of correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001mfd to point Jct. L302 & C305, low side to ground.
Use only enough marker signal for indication. Use 60-hertz frequency modulated signal with 450kHz sweep. Use 60-hertz sawtooth voltage in scope for horizontal deflection.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
10.7MHz 450kHz Sweep	Point of non-interference	Vert input of scope to Cathode Q318, low side to ground.	L309(Pri),L308, L307, L306, L305	Disconnect stabilizing capacitor C 329 Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C 329.
"	"	Vert input of scope to Jct. R332 & C338,low side to ground.	L309 (Sec)	Adjust L309 (Sec) to place marker at center of S curve similar to Fig. 2. Readjust L309(Pri) for maximum amplitude and straightness of line.

ALIGNMENT INSTRUCTIONS (Continued)

FM RF ALIGNMENT—SELECTOR IN FM POSITION

Connect generator across antenna terminals with 120-ohm carbon resistor in series with each lead. Adjustment of coils by bending should not be attempted unless the coil is deformed or replaced.

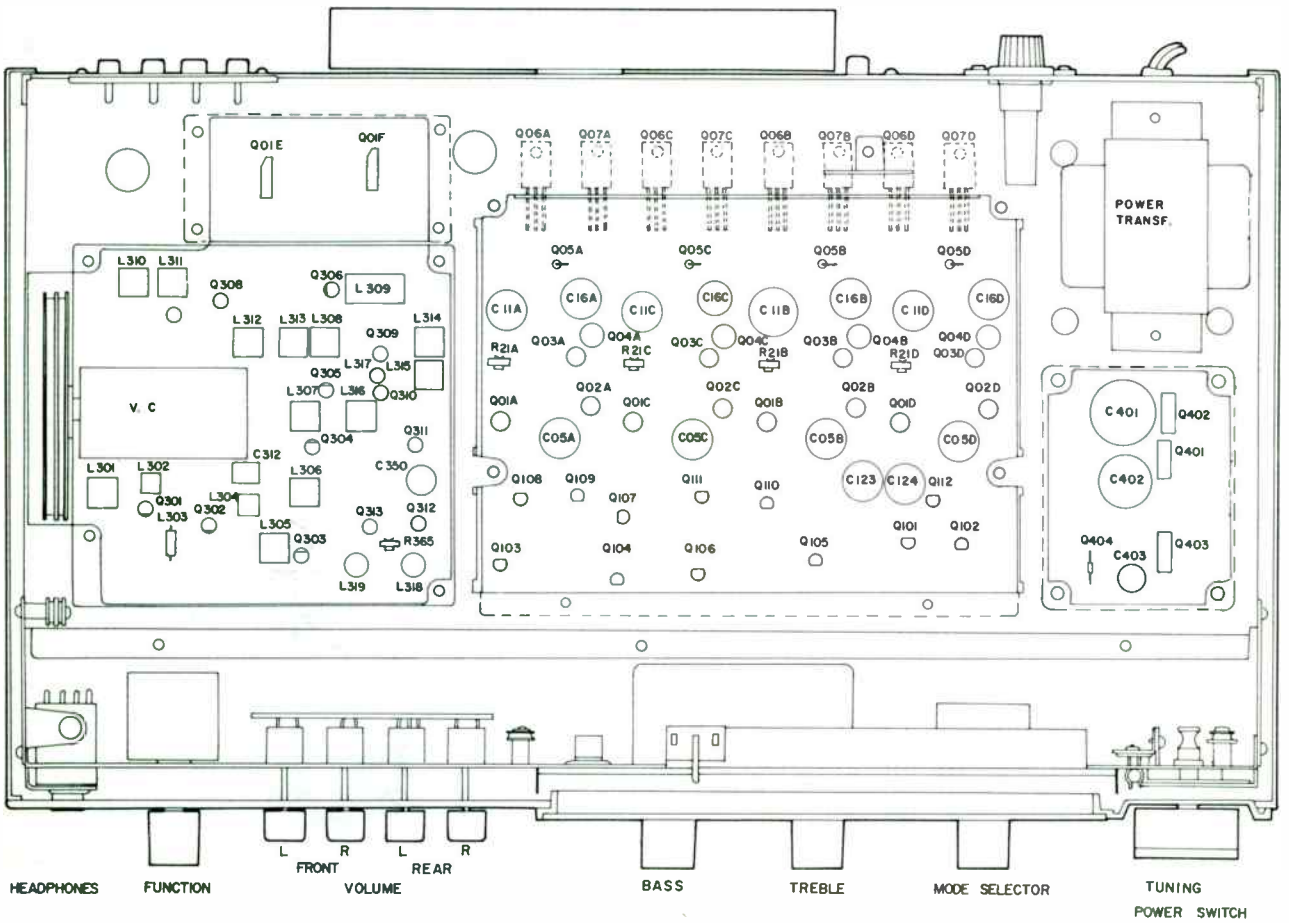
GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
88MHz Unmodulated	Low freq end	DC probe of VTVM to Cathode Q318, common to ground.	L304, L302, L301	Adjust for maximum.
108 MHz Unmodulated	Tune to signal	"	Osc.Trimmer 2nd RF Trimmer	Adjust for maximum. Repeat FM RF steps until no further improvement is noted.

FM STEREO MULTIPLEX ALIGNMENT USING FM STEREO SIGNAL GENERATOR (± .0001% ACCURACY)

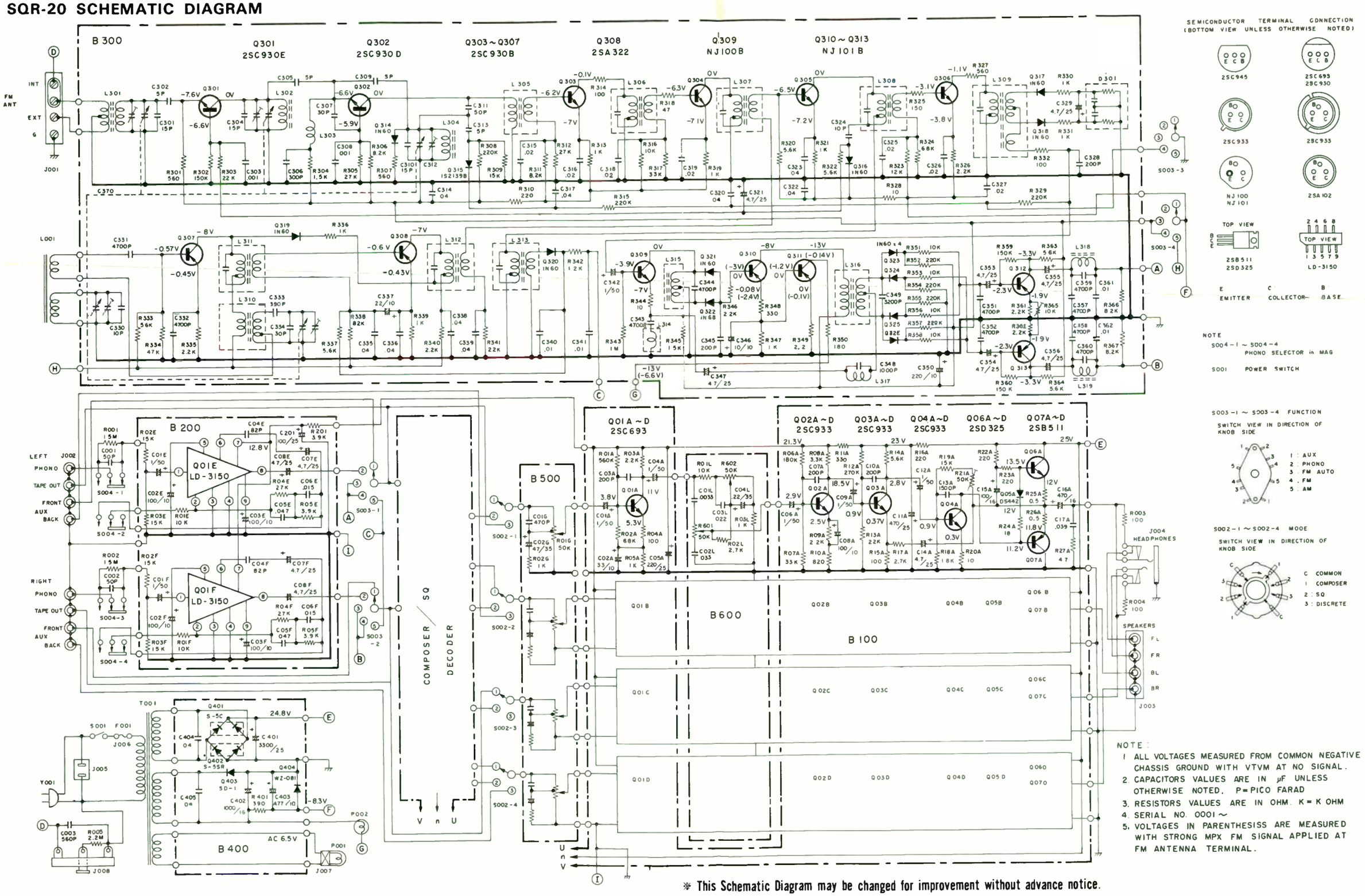
High side of generator thru 47K to point R332 & C328 low side to ground.

GENERATOR FREQUENCY	INDICATOR	ADJUST	REMARKS
19kHz	Vert input of scope thru 47K to Anode Q321, low side to ground.	L315	Adjust for maximum.
19kHz	Vert input of scope thru 47K to Cathode Q324, low side to ground.	L316	Adjust for maximum 38kHz response.
Modulated Left Channel	Vert input of scope to point B low side to ground.	R365	Adjust for MINIMUM. This step should require only slight adjustment.
Modulated Right Channel	Vert input of scope to point A low side to ground.		Check for MINIMUM. If necessary, make compromise adjustment of R365.

SQR-20 PARTS LOCATION



SQR-20 SCHEMATIC DIAGRAM



SEMICONDUCTOR TERMINAL CONNECTION
(BOTTOM VIEW UNLESS OTHERWISE NOTED)

NOTE

S004-1 ~ S004-4 PHONO SELECTOR in MAG

S001 POWER SWITCH

S003-1 ~ S003-4 FUNCTION

SWITCH VIEW IN DIRECTION OF KNOB SIDE

S002-1 ~ S002-4 MODE

SWITCH VIEW IN DIRECTION OF KNOB SIDE

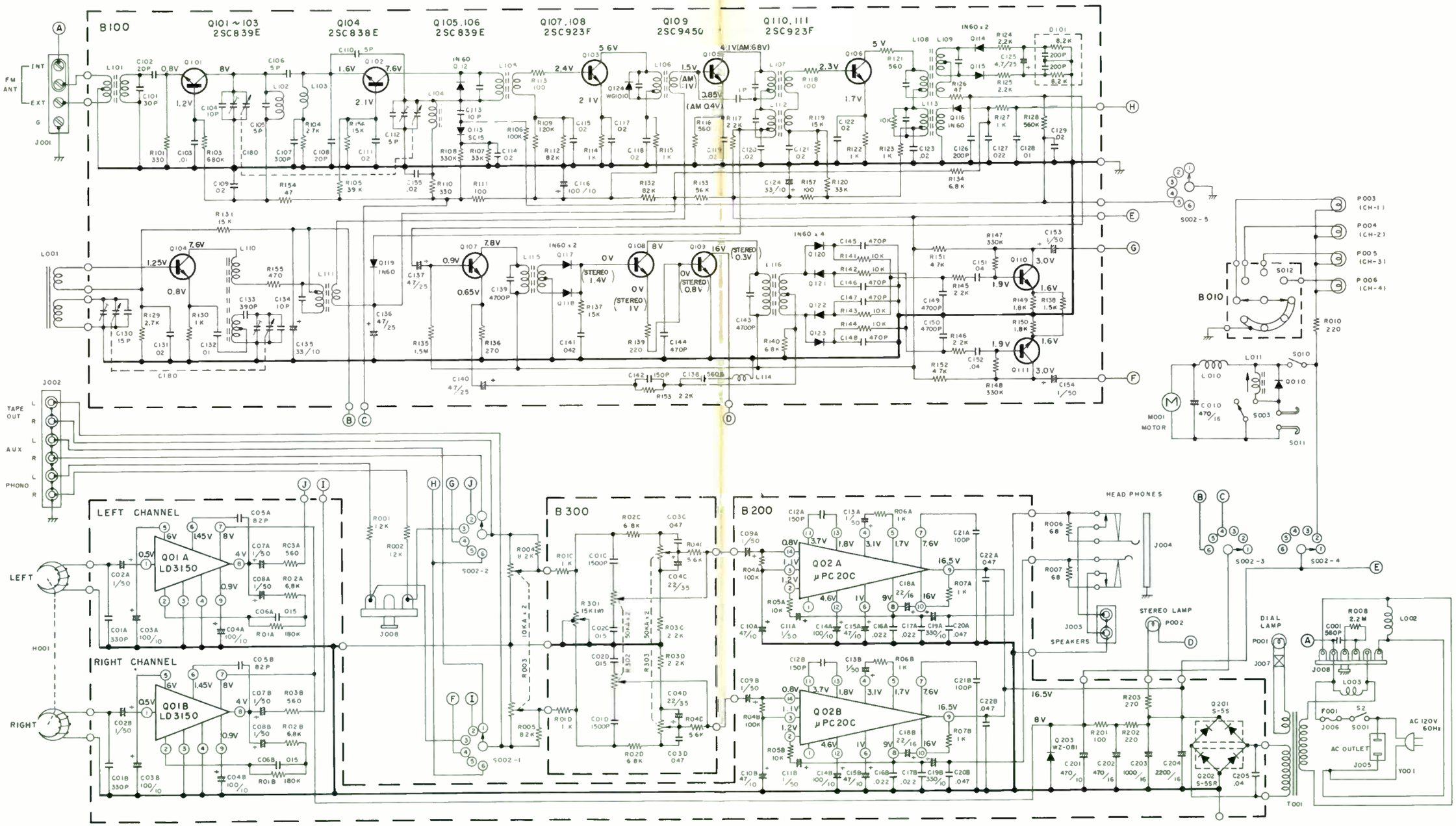
NOTE :

1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE CHASSIS GROUND WITH VTVM AT NO SIGNAL.
2. CAPACITORS VALUES ARE IN μF UNLESS OTHERWISE NOTED. P=PICO FARAD
3. RESISTORS VALUES ARE IN OHM. K=K OHM
4. SERIAL NO. 0001 ~
5. VOLTAGES IN PARENTHESISS ARE MEASURED WITH STRONG MPX FM SIGNAL APPLIED AT FM ANTENNA TERMINAL.

※ This Schematic Diagram may be changed for improvement without advance notice.

Pages 43-48 Courtesy of LAFAYETTE RADIO ELECTRONICS.

SR-30 SCHEMATIC DIAGRAM

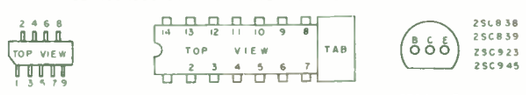


NOTE :

S002-1 ~ S002-5 FUNCTION SW
1. AUX
2. TAPE
3. PHONO
4. FM AFC
5. FM AUTO
6. AM

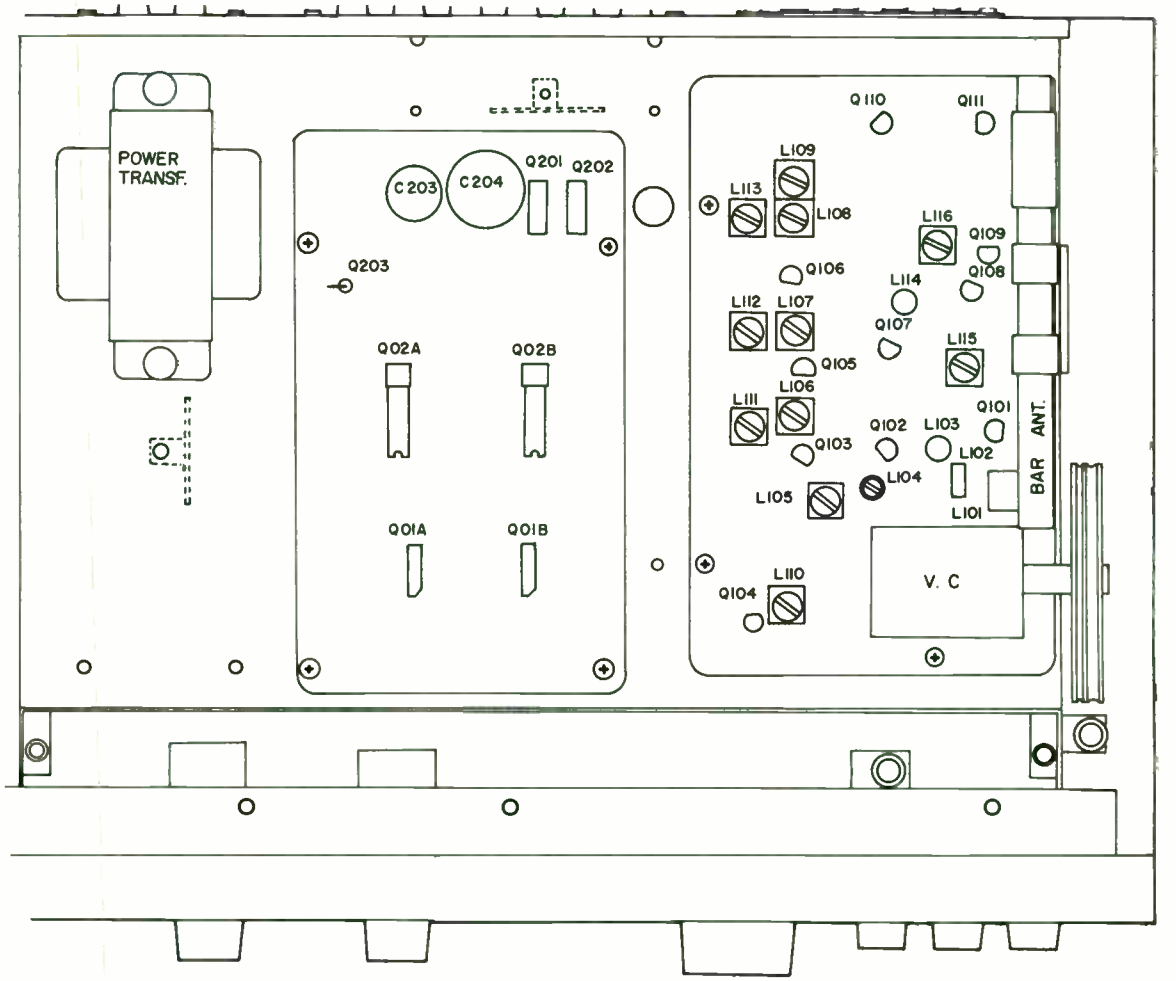
S001 POWER SW
S010 MOTOR SW
S011 PROGRAM SELECT SW (AUTO MATIC)
S003 PROGRAM SELECT SW
S012 PROGRAM LAMP SW

SEMICONDUCTOR TERMINAL CONNECTION



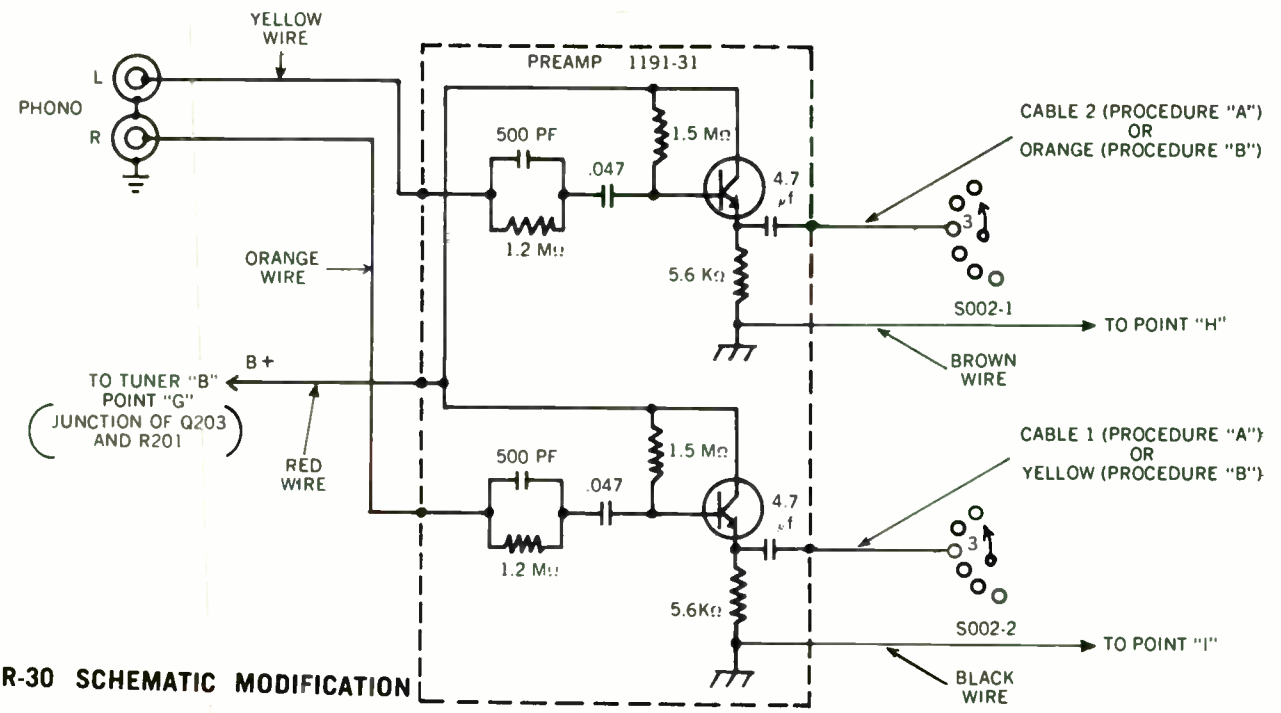
NOTE :
1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVF CHASSIS GROUND WITH VTVM AT NO SIGNAL.
2. CAPACITORS VALUES ARE IN μF UNLESS OTHERWISE NOTED. P = PICO FARAD
3. RESISTORS VALUES ARE IN OHM. K = K OHM
4. SERIAL NO. 0001 ~

※ This Schematic Diagram may be changed for improvement without advance notice.



SR-30 PARTS LOCATION

NOTE: Some versions of Model SR-30 may be modified as indicated below:



SR-30 SCHEMATIC MODIFICATION

ALIGNMENT INSTRUCTIONS

CAUTION: Use isolation transformer or observe polarity when connecting test equipment.
Maintain line voltage at 120VAC. Allow a 15-minute warm-up period.
Use only enough generator output to obtain a suitable indication.

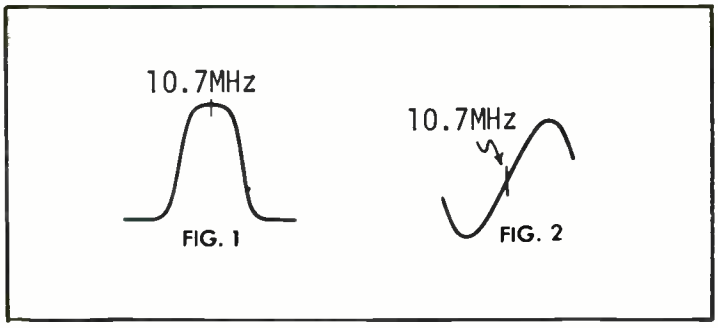


FIG. 1 FIG. 2

AM ALIGNMENT—SELECTOR IN AM POSITION

Connect generator across loop fashioned of several turns of wire. Set volume at maximum.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
455kHz 400-hertz Modulation	Tuning gang fully open	Output meter across voice coil	L113, L112, L111	Adjust for maximum. Repeat until no further improvement is noted.
600kHz	Tune to signal	"	L110	Adjust for maximum.
1640kHz	"	"	AM Osc Trimmer	Adjust for maximum.
1400kHz	"	"	RF Trimmer	Adjust for maximum. Repeat AM alignment until no further improvement is noted.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001mfd to point Jct. L102 & C106, low side to ground.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
10.7MHz Unmodulated	Point of non-interference	DC probe of VTVM to Cathode Q115, common to ground.	L108, L107, L106, L105	Adjust for maximum.
"	"	DC probe of VTVM to Jct.R126 & L109 common to ground.	L109	Adjust for zero reading. A positive or negative reading will be obtained on either side of correct setting.

ALIGNMENT INSTRUCTIONS (Continued)

FM IF ALIGNMENT USING FM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001mfd to point Jct. L102 & C106, low side to ground. Use only enough marker signal for indication. Use 60-hertz frequency modulated signal with 450kHz sweep. Use 60-hertz sawtooth voltage in scope for horizontal deflection.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
10.7MHz 450kHz Sweep	Point of non-interference	Vert input of scope to Cathode Q115, low side to ground.	L108, L107, L106, L105	Disconnect stabilizing capacitor C 125. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C 125.
"	"	Vert input of scope to Jct. R126 & R128, low side to ground.	L109	Adjust L109 to place marker at center of S curve similar to Fig. 2. Readjust L108 for maximum amplitude and straightness of line.

FM RF ALIGNMENT—SELECTOR IN FM POSITION

Connect generator across antenna terminals with 120-ohm carbon resistor in series with each lead. Adjustment of coils by bending should not be attempted unless the coil is deformed or replaced.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
88MHz Unmodulated	Low freq end	DC probe of VTVM to Cathode Q115, common to ground.	L104, L102, L101	Adjust for maximum.
Unmodulated	Tune to signal	"	Osc.Trimmer 2 RF Trimmer	Adjust for maximum. Repeat FM RF steps until no further improvement is noted.

FM STEREO MULTIPLEX ALIGNMENT USING FM STEREO SIGNAL GENERATOR (± .0001% ACCURACY)

High side of generator thru 47K to point Jct. R126 & R128, low side to ground.

GENERATOR FREQUENCY	INDICATOR	ADJUST	REMARKS
19kHz	Vert input of scope thru 47K to Anode Q111, low side to ground.	L115	Adjust for maximum.
19kHz	Vert input of scope thru 47K to Cathode Q121, low side to ground.	L116	Adjust for maximum 38kHz response.

SEMICONDUCTORS

ITEM	PART NO.	TYPE
Q01	1019-25	LD3150
Q02	1020-25	UPC-20C
Q010	2206-17	SR-1K
Q101	1961-17	2SC839E
Q102	1961-17	2SC839E
Q103	1961-17	2SC839E
Q104	1835-17	2SC838E
Q105	1961-17	2SC839E
Q106	1961-17	2SC839E
Q107	2204-17	2SC923F
Q108	2204-17	2SC923F
Q109	2063-17	2SC945Q
Q110	2204-17	2SC923F
Q111	2204-17	2SC923F
Q112	1000-17	1N60
Q113	2205-17	SC15
Q114	1000-17	1N60
Q115	1000-17	1N60
Q116	1000-17	1N60
Q117	1000-17	1N60
Q118	1000-17	1N60
Q119	1000-17	1N60
Q120	1000-17	1N60
Q121	1000-17	1N60
Q122	1000-17	1N60
Q123	1000-17	1N60
Q124		WG1010
Q201	2199-17	S-5S
Q202	2200-17	S-5SR
Q203	2203-17	WZ-081

ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C02	3647-12	1 uF 50 V
C03	3648-12	100 uF 10 V
C010	3707-12	470 uF 16 V
C10	3672-12	47 uF 10 V
C18	3675-12	22 uF 16 V
C19	3676-12	330 uF 10 V
C124	3693-12	33 uF 10 V
C125	3652-12	4.7 uF 25 V
C180	3704-12	Tuning Gang
C181	3705-12	Trimmer
C201	3680-12	470 uF 10 V
C203	3681-12	1000 uF 16 V
C204	3654-12	2200 uF 16 V

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R003	1680-11	10 K Dual Volume
R301	1678-11	15 K Balance
R302	1679-11	50 K Dual Treble
R303	1679-11	50 K Dual Bass

COILS/TRANSFORMERS

ITEM	PART NO.
L010	2551-23
L101	2543-23
L102	2544-23
L103	2545-23
L104	2546-23
L105	2105-24
L106	2106-24
L107	2106-24
L108	2107-24
L109	2112-24
L110	2547-23
L111	2109-24
L112	2110-24
L113	2110-24
L114	2550-23
L115	2548-23
L116	2549-23
T001	1729-15

MISCELLANEOUS

ITEM	NAME	PART NO.
D101	Component Combination	3709-12
H001	Head, 8-Track	2542-23
L011	Solenoid, Track Change	1072-37
S001	Switch, Power	1900-14
S002	Switch, Function	1902-14
S003	Switch, Mode	1898-14
S010	Switch, Motor	1903-14
S011	Switch, Sensitivity	1904-14
S012	Switch, Assembly	1905-14
	Deck, Tape	1101-31
	Fuse, 0.7 A	4556-20
	Motor, Tape Drive	1055-40

CABINET PARTS

NAME	PART NO.
Case, Wooden	1087-29
Panel, Rear	8022-10
Panel, Front	4555-20
Scale Dial	4543-20
Knob, Tuning	1852-18
Knob, Function	1850-18
Knob, Slide Control	1851-18

Lloyd's D620, D651, D680, M146, M679, M745, M751, M764, M777, M788, M796, M869, M943, 2D40, 2M78, 3M18 (Ch. B620-37A, B651-37A, 2B40-37A)

Pages 49-58 Courtesy of LLOYD'S ELECTRONICS, INC.

ALIGNMENT INSTRUCTIONS

EQUIPMENT NEEDED

1. AM SIGNAL GENERATOR
2. FM SIGNAL GENERATOR
3. IF SWEEP GENERATOR
4. FM STEREO SIGNAL GENERATOR

GENERAL

1. For AM alignment, apply 1000Hz modulation on the signal generator and radiate signal via a loop.
2. Connect a VTVM and oscilloscope across the speaker output terminals. Adjust as in the tables below. When necessary, reduce the oscillator output so that meter reading does not exceed 0.5V.
3. Use only non-metallic alignment tools to insure proper alignment.

AM SECTION

Control Setting

Function Switch.....AM Volume Control.....Max.

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
IF	AM SIGNAL GENERATOR Radiated Signal via a loop. OUTPUT METER (VTVM) Connect across speaker voice coil.	1	455KHz (Mod.)	Tuning gang fully open	T5 (Black & T4 (Orange) Adjust for maximum output.
		2	"	"	Repeat until no further improvement can be made.
OSCILLATOR	"	3	525KHz (Mod.)	Tuning gang fully closed	L6 (AM Osc. coil-Red) Adjust for maximum output.
		4	1650KHz (Mod.)	Tuning gang fully open	TC4 (AM Osc. Trimmer) Adjust for maximum output.
		5	-	-	Repeat steps 3 & 4.
RF TRACKING	"	6	600KHz (Mod.)	Tune to Signal	L5 (AM Ant. coil) Adjust coil on ferrite core for maximum output.
		7	1400KHz (Mod.)	Tune to Signal	TC3 (AM Ant. Trimmer) Adjust for maximum output.
		8	-	-	Repeat steps 6 & 7.

OSCILLATOR	FM SIGNAL GENERATOR to FM ANT terminal and GROUND. Disconnect JUMPER for LINE ANT connection. OUTPUT METER (VTVM) across speaker JACK shunted with 8 ohm resistor.	5	87MHz (Mod.)	Tuning gang fully closed	L4 (FM Osc. coil) Adjust for maximum output.
		6	110MHz (Mod.)	Tuning gang fully open	TC2 (FM Osc. Trimmer) Adjust for maximum output.
		7	–	–	Repeat steps 5 & 6.
RF TRACKING		8	90MHz (Mod.)	Tune to Signal	L1 (FM RF Coil) Adjust for maximum output.
		9	106MHz (Mod.)	Tune to Signal	TC1 (FM, RF, Trimmer) Adjust for maximum output.
		10	–	–	Repeat steps 8 & 9 to obtain maximum sensitivity at 90MHz and 106MHz.

FM SECTION

Control Setting

Function Switch·····FM

Volume Control·····Adjust as necessary to keep output below 3V

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
IF	IF SWEEP GENERATOR High side through 10PF to Base of Q1, low side to ground. MARKER GENERATOR The same as Sweep Generator. OSCILLOSCOPE Across input of L7 & GND.	1	10.7MHz 100-200KHz Sweep	Tuning gang fully closed	TC2 (Blue) & T1 (Yellow) Adjust for maximum gain and symmetrical pattern on scope centered at 10.7MHz marker.
		2	–	–	Repeat step 1.
RATIO DET.		3	10.7MHz (Mod.)	Tuning gang fully closed	T3 (Pink) Adjust for Linear 'S' curve centered at 10.7MHz on scope.
		4	–	–	Repeat step 3.

Lloyd's D620, D651, D680, M146, M620, M679, M745, M751, M764, M777, M788, M796, M869, M943, 2D40, 2M78, 3M18 (Ch. B620-37A, B651-37A, 2B40-37A)

CONTROL SETTING

Function Switch.....FM MPX

FM STEREO SIGNAL GENERATOR to FM ANT terminal (Disconnect JUMPER for FM LINE antenna)

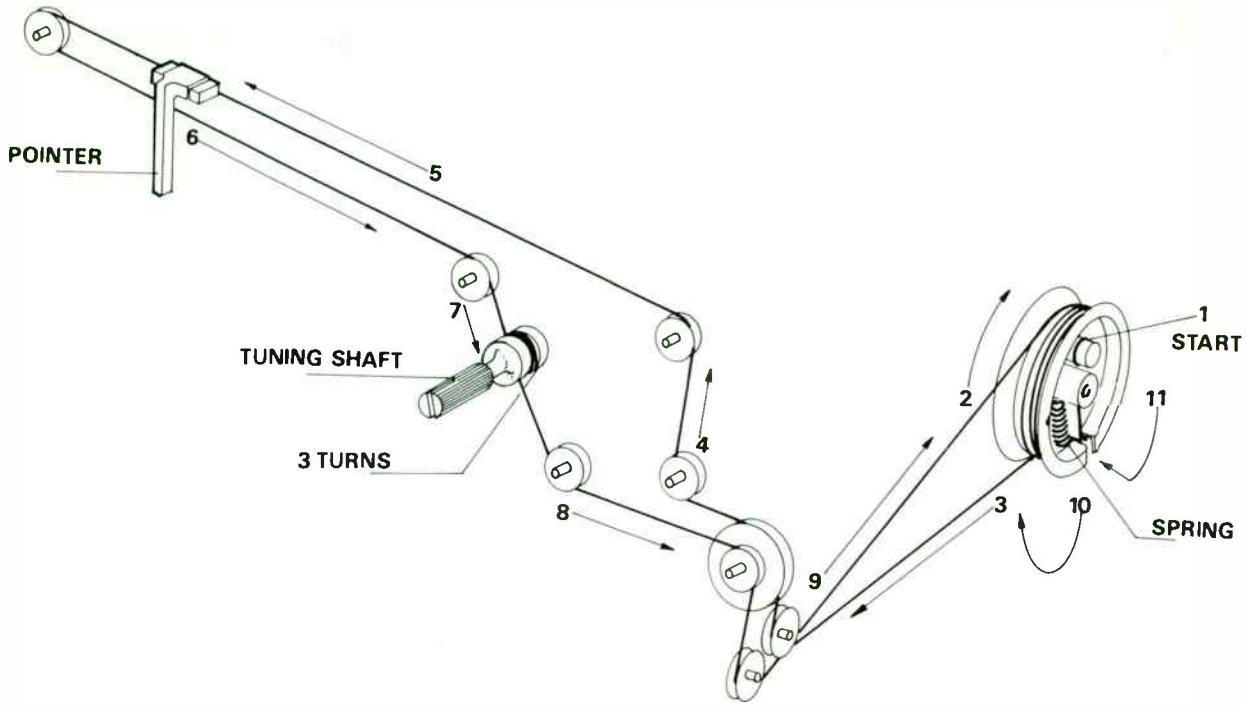
BALANCE control setting.....at center point

VOLUME control setting.....at maximum output

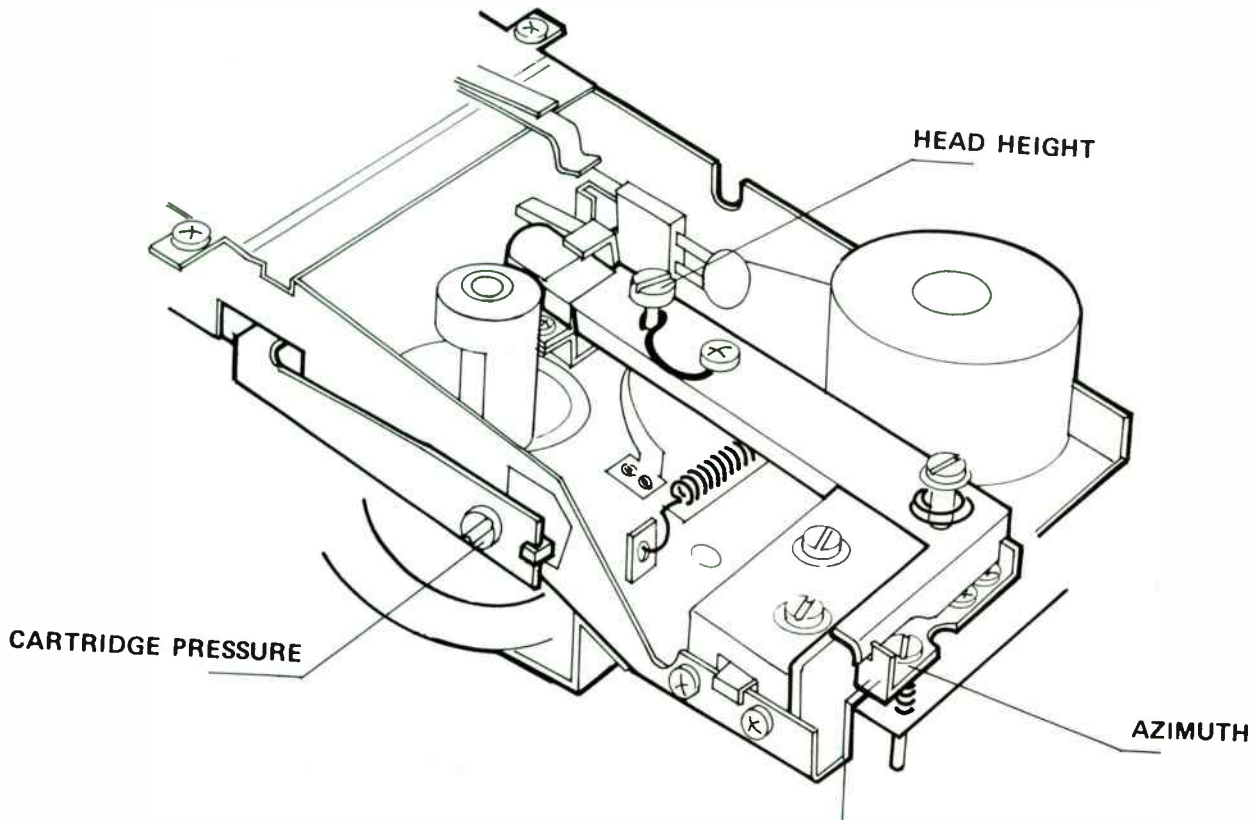
TREBLE & BASS control settings.....at mid-point

Tune the radio to 98MHz of STEREO SIGNAL GENERATOR

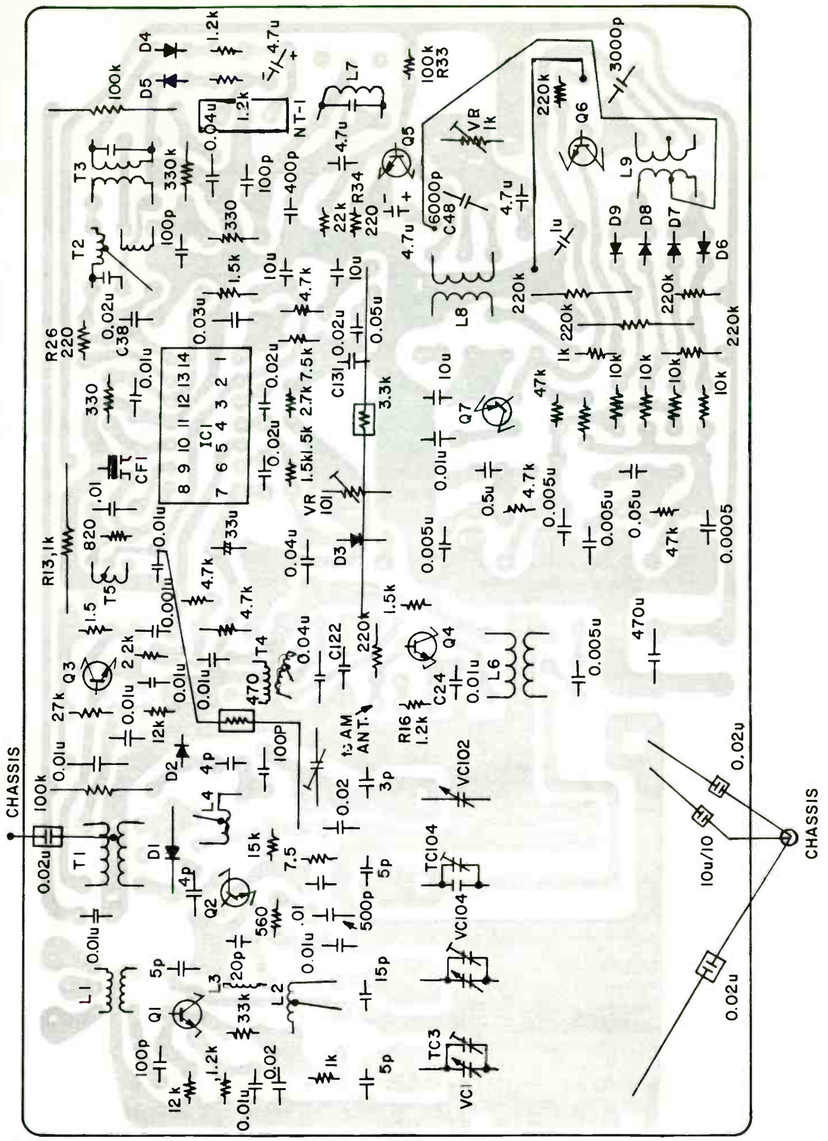
Step	FM STEREO SIGNAL GENERATOR			Connect Scope to	Adjust for
	Modulation	Function	Signal Level		
1	19KHz	Stereo LEFT	Start from high level, finally 20 to 30uV.	R36, 220 ohm	Adjust L8 for max. on scope; finally, PL9 must shine for signal level of 20 to 30uV.
2	"	"	1mV	R37, 220K ohm	L9 for maximum on scope.
3	400Hz	FM Stereo RIGHT	1mV	Across 'L' channel speaker output shunted with 8 ohm resistor	VR6, 1K ohm, for minimum on scope.
4	"	Stereo LEFT	1mV	Across 'R' channel speaker output shunted with 8 ohm resistor	VR6 for minimum on scope.
5	Repeat step 3 & 4 for minimum and equal on scope; If required re-adjust L9 very slightly				

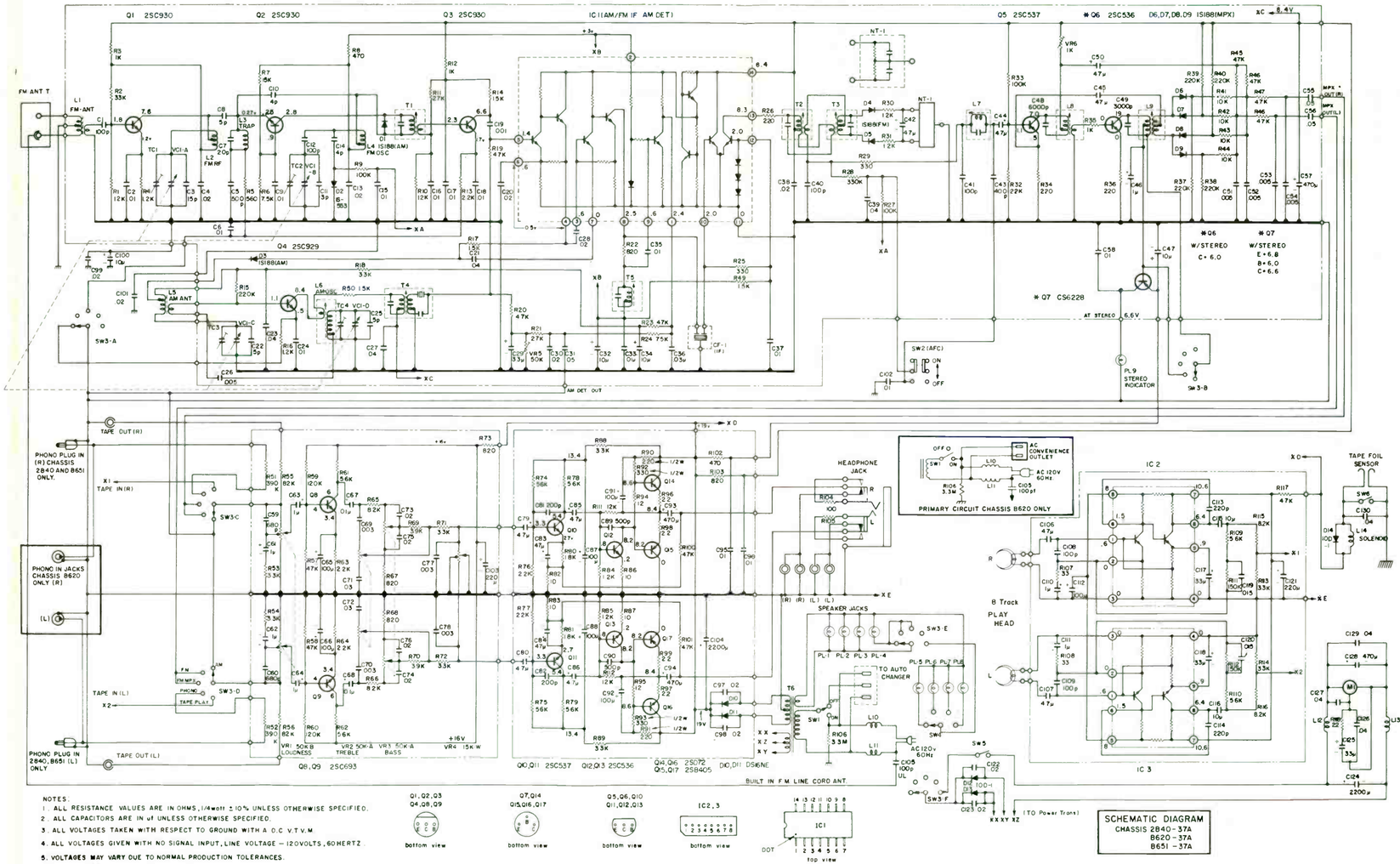


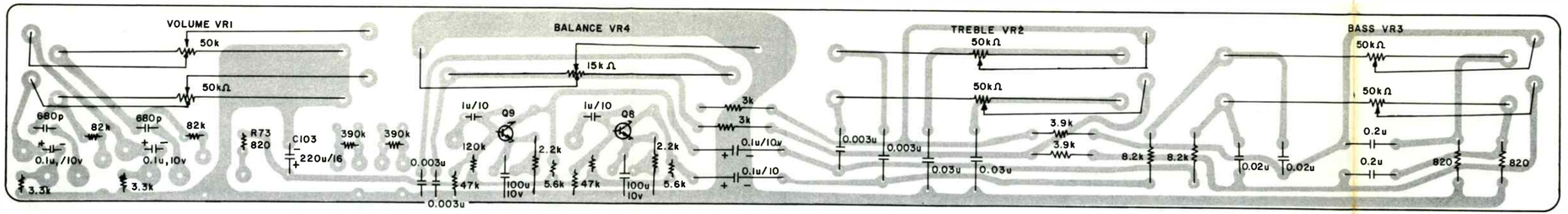
DIAL STRINGING DIAGRAM



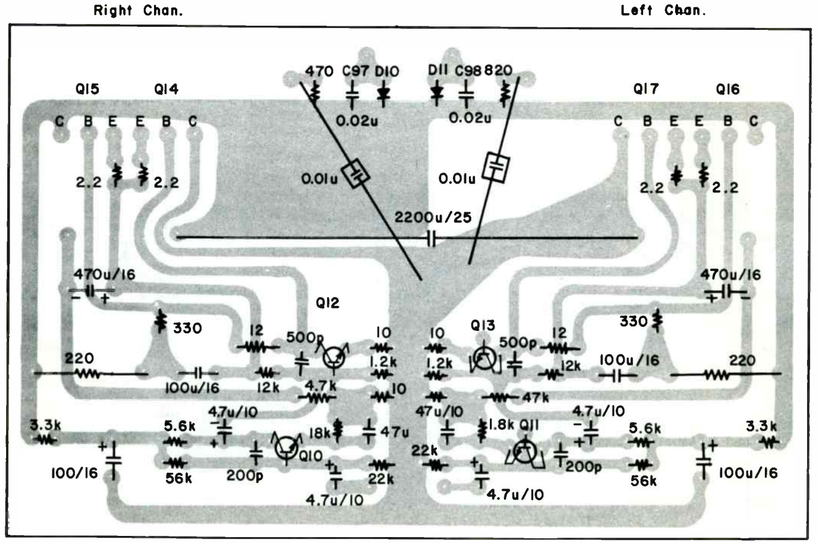
CARTRIDGE MECHANISM



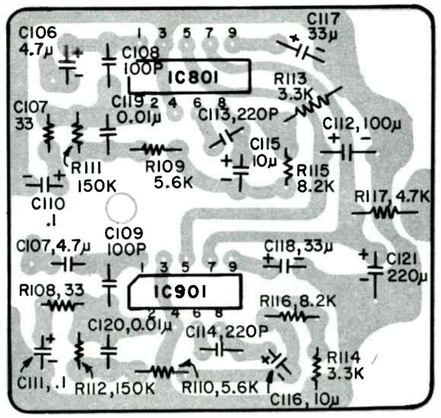




AUDIO PREAMP P C BOARD



AUDIO AMP P C BOARD



TAPE PREAMP PCB

SEMICONDUCTORS

ITEM	PART NO.	TYPE
D1	HE-10003	1S188(AM)
D2	HF-20007	1S553
D3	HE-10003	1S188(AM)
D4	HE-10003	1S188(FM)
D5	HE-10003	1S188(FM)
D6	HE-10003	1S188(MPX)
D7	HE-10003	1S188(MPX)
D8	HE-10003	1S188(MPX)
D9	HE-10003	1S188(MPX)
D10	JC-00014	DS16NE
D11	JC-00014	DS16NE
D12	JC-00012	10D1
D13	JC-00012	10D1
D14	JC-00012	10D1
IC1	PC-20003	LA-1201B
IC2	PC-20004	LD-3150C
IC3	PC-20004	LD-3150C
Q1	HC-00930	2SC930
Q2	HC-00930	2SC930
Q3	HC-00930	2SC930
Q4	HC-00929	2SC929
Q5	HC-00537	2SC537
Q6	HC-00536	2SC536
Q7	HS-40031	CS6228
Q8	HC-00693	2SC693
Q9	HC-00693	2SC693
Q10	HC-00537	2SC537
Q11	HC-00537	2SC537
Q12	HC-00536	2SC536
Q13	HC-00536	2SC536
Q14	HD-00072	2SD72
Q15	HB-00405	2SB405
Q16	HD-00072	2SD72
Q17	HB-00405	2SB405

ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C29	BJ-23337	33 uF 10 V
C32	BJ-23107	10 uF 10 V
C34	BJ-23107	10 uF 10 V
C42	BJ-23476	4.7 uF 10 V
C44	BJ-23476	4.7 uF 10 V
C45	BJ-23476	4.7 uF 10 V
C46	BJ-24106	1 uF 25 V
C47	BJ-24107	1 uF 25 V
C48	BG-24603	10 uF 25 V
C50	BJ-23476	4.7 uF 10 V
C57	BJ-23478	470 uF 10 V
C61	BJ-23105	.1 uF 10 V
C62	BJ-23105	.1 uF 10 V
C63	BJ-23106	1 uF 10 V
C64	BJ-23106	1 uF 10 V
C65	BJ-23108	100 uF 10 V
C66	BJ-23108	100 uF 10 V
C67	BJ-23105	.1 uF 10 V
C68	BJ-23105	.1 uF 10 V
C79	BJ-23476	4.7 uF 10 V
C80	BJ-23476	4.7 uF 10 V
C83	BJ-23447	47 uF 10 V
C84	BJ-23447	47 uF 10 V
C85	BJ-23476	4.7 uF 10 V
C86	BJ-23476	4.7 uF 10 V
C87	BJ-42108	10 uF 16 V
C88	BJ-42108	10 uF 16 V
C91	BJ-42108	10 uF 16 V
C92	BJ-42108	10 uF 16 V
C93	BJ-42478	470 uF 16 V
C94	BJ-42478	470 uF 16 V
C100	BJ-23107	10 uF 10 V
C103	BJ-42228	220 uF 16 V
C104	BI-24229	2200 uF 25 V
C106	BJ-42476	4.7 uF 16 V
C107	BJ-42476	4.7 uF 16 V
C110	BJ-23105	.1 uF 10 V
C111	BJ-23105	.1 uF 10 V
C112	BJ-23108	100 uF 10 V
C115	BJ-23107	10 uF 10 V
C116	BJ-23107	10 uF 10 V
C117	BJ-22337	33 uF 6.3 V
C118	BJ-22337	33 uF 6.3 V
C121	BJ-42228	220 uF 16 V
C124	BJ-42229	2200 uF 16 V
C125	BJ-22337	33 uF 6.3 V
C129	BJ-42478	470 uF 16 V
TC2	BM-00099	8 pF Trimmer
VC1	BT-20001	Tuning Gang

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R96	AA-08220	2.2 ohms 1/2W
R97	AA-08220	2.2 ohms 1/2W
R98	AA-08220	2.2 ohms 1/2W
R99	AA-08220	2.2 ohms 1/2W
VR1	AX-32001	50 K Dual Loudness
VR2	AX-32002	50 K Dual Treble
VR3	AX-32002	50 K Dual Bass
VR4	AW-31001	15 K Balance
VR5	AR-32001	50 K Level
VR6	AR-31003	1000 ohms Separation

COILS/TRANSFORMERS

ITEM	PART NO.
L1	DK-00631
L2	DK-00632
L3	DX-00633
L4	DK-00632
L5	DI-00634
L6	DM-00635
L7	DM-00637
L8	DM-00638
L9	DM-00639
L10	DR-00640
L11	DR-00640
L12	DQ-00650
L13	DQ-00650
T1	EN-00547
T2	EN-00603
T3	EM-00604
T4	DV-00636
T5	EM-00602
T6	EJ-00534

MISCELLANEOUS

ITEM	NAME	PART NO.
(COMMON)		
CF-1	Filter, Ceramic	BZ-00001
L14	Solenoid, Track Change	DH-80014
SW1	Switch, Power	FB-72015
SW3	Switch, Function	FA-71312
SW5	Switch, Motor Power	FB-72932
	Belt, Tape Drive	FK-05480
	Motor, Tape Drive	0D-40076
(CHASSIS 2B40-37A)		
	Assembly, Record Changer	(BSR) C129
(CHASSIS B651-37A)		
	Assembly, Record Changer	(BSR) C141

CABINET PARTS

NAME	PART NO.
(COMMON)	
Base, Cabinet	LA-02036
Button, Power	LH-01950
Knob, Selector	LH-01953
Knob, Tuning	LH-01954
Plate, Control	LK-02037
(CHASSIS 2B40-37A)	
Assembly, Cabinet	LA-02036
Cover, Dust	LB-9001
(CHASSIS B620-37A)	
Assembly, Cabinet	LA-02065
Lid, Rear	LF-02066
(CHASSIS B651-37A)	
Assembly, Cabinet	LA-02160
Cover, Dust	LB-9004
Case, Tape Storage	LB-02130

Pages 59-66 Courtesy of THE MAGNAVOX CO.

FM IF ALIGNMENT

1. Apply a 10.7 MHz signal, with a 250 KHz sweep through Figure 1, or equivalent circuit to the base of TR102.
2. Connect an oscilloscope through a 10K resistor to TP103.
3. Detune T107 fully counterclockwise.
4. Adjust T106, T105, T104, T103, T102 and T101 for maximum sweep response at 10.7 MHz.
5. Adjust T107 for best S-curve response with 10.7 MHz marker at crossover.

Note: Maximum amplitude may not coincide with best symmetry and marker location, but symmetry and marker location are more important than amplitude.

AM ALIGNMENT

1. Loosely couple signal generator to AM antenna.
2. Connect an AC volt meter across speaker output terminals.
3. Set signal generator at 455 KHz and tune radio until tuning capacitor is fully open.
4. Adjust T108, T109, and T110 for maximum deflection on meter.
5. Adjust generator and radio to 1600 KHz.
6. Adjust TC105 for maximum deflection on meter.
7. Adjust generator and radio to 540 KHz.
8. Adjust L107 for maximum deflection on meter.
9. Repeat steps 5 thru 8 for maximum deflection on meter.
10. Adjust generator and radio to 1400 KHz.
11. Adjust TC104 for maximum deflection on meter.

FM RF ALIGNMENT

1. Connect an RF signal generator to the FM Antenna terminals.
2. Connect a VTVM to tie point P120. Note: Tuning meter may be used.
3. Adjust generator and radio to 108 MHz and adjust TC103 for maximum reading on VTVM.
4. Adjust generator and radio to 88 MHz and adjust L105 for maximum reading on VTVM.
5. Repeat steps 3 and 4 for maximum VTVM reading and tracking.
6. Adjust generator and radio to 106 MHz and adjust TC101 and TC102 for maximum reading on VTVM.
7. Adjust generator and radio to 90 MHz and adjust L101 & L102 for maximum reading on VTVM.
8. Repeat steps 6 and 7 for maximum reading and tracking.

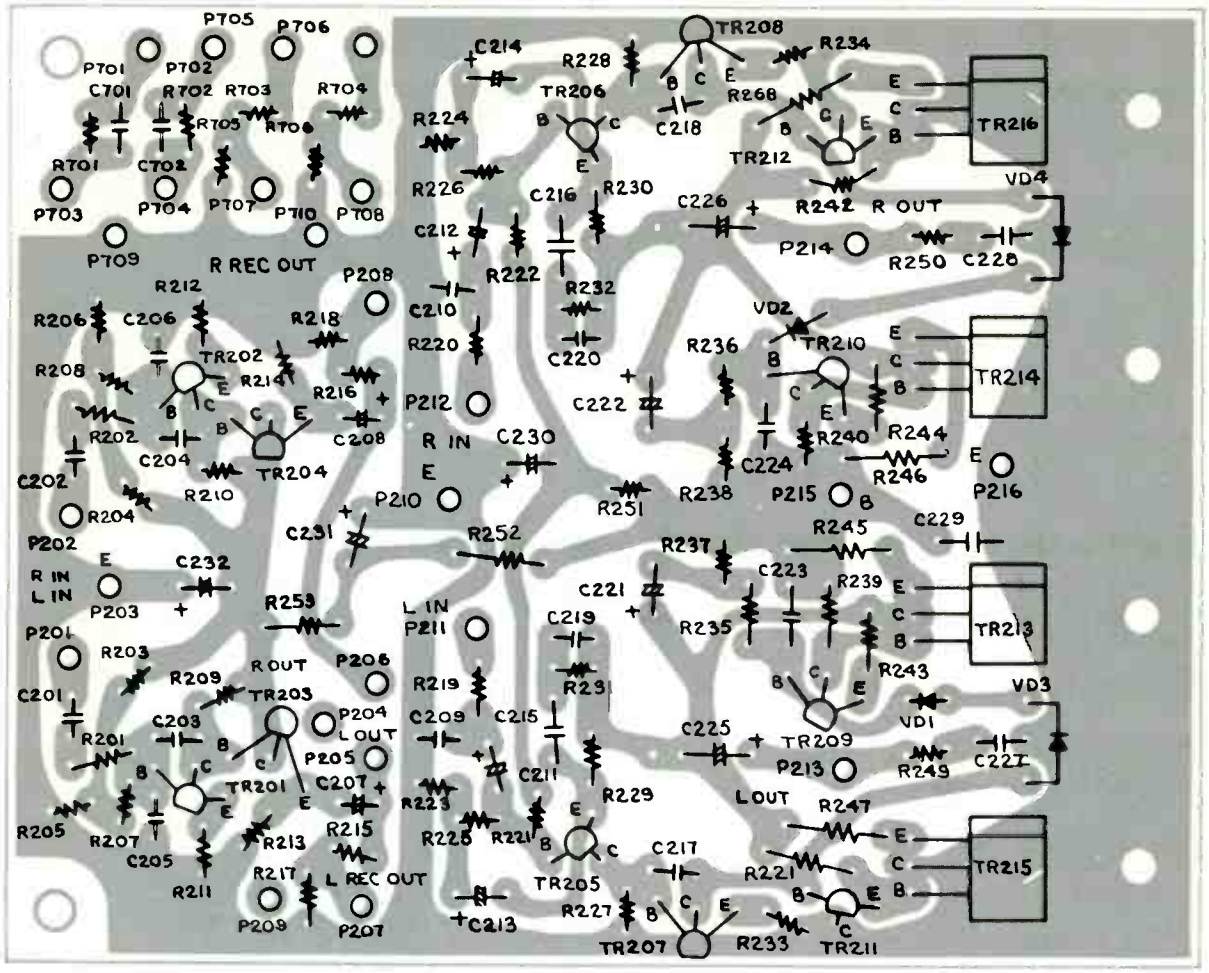
Note: Keep signal generator at a low level to avoid overloading. If signal is too high the VTVM will show no change when peaking.

FM MULTIPLEX ALIGNMENT

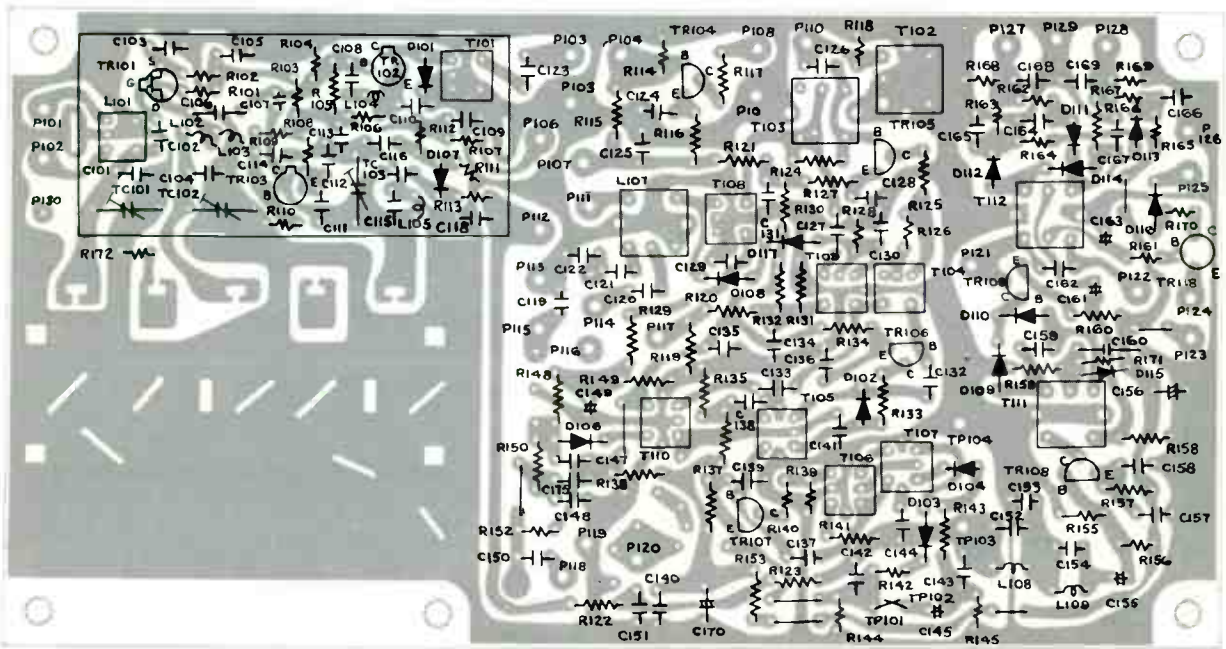
1. Connect a multiplex generator to the FM antenna terminals.
2. Connect an AC volt meter across the right channel speaker terminals.
3. Tune receiver to generator output frequency. Adjust generator for an input of 1 millivolt at 1 KHz stereo signal. Modulate left channel 30%.
4. Adjust L111 and L112 for minimum deflection on meter.
5. Disconnect AC meter from right channel and connect across the left channel terminals.
6. Repeat step 3, but switch generator from left to right channel and maintain same modulation.
7. Adjust L111 and L112 for minimum deflection on meter.

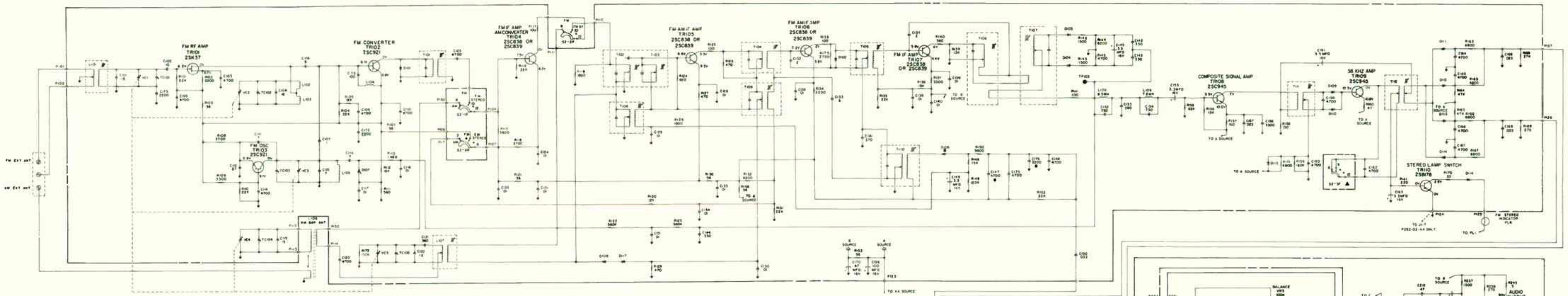
Note: Repeat above steps until a close balance is achieved.

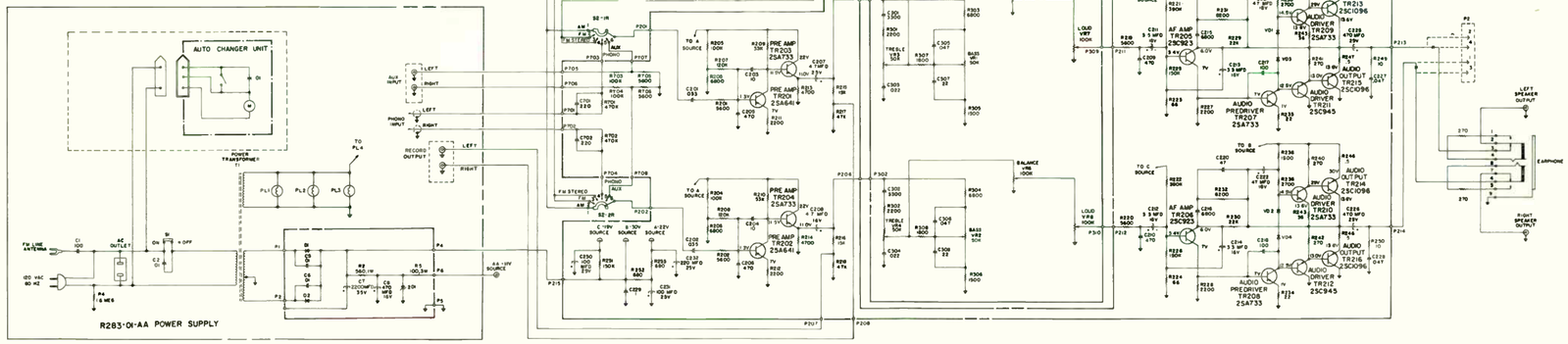
AF AMPLIFIER BOARD (VIEWED FROM COPPER SIDE)



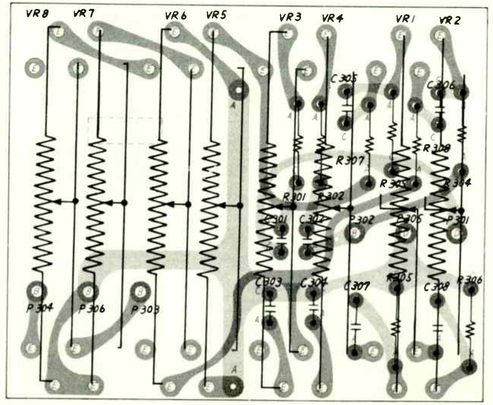
TUNER-IF BOARD (VIEWED FROM COPPER SIDE)



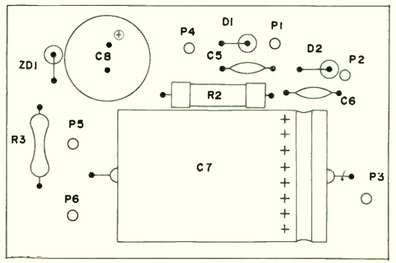




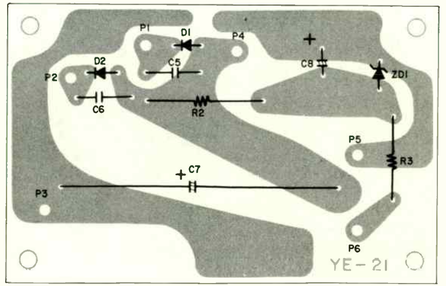
CONTROL BOARD



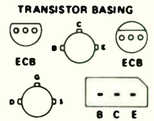
POWER SUPPLY BOARD TOP VIEW



POWER SUPPLY BOARD (VIEWED FROM COPPER SIDE)



TRANSISTOR BASING

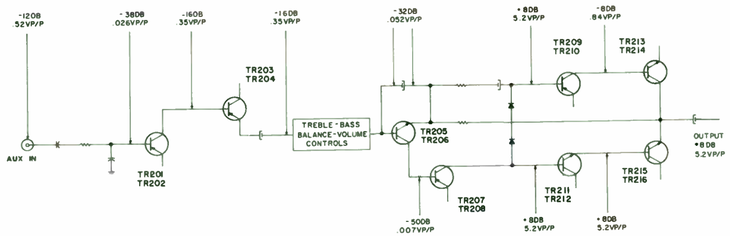


NOTES:

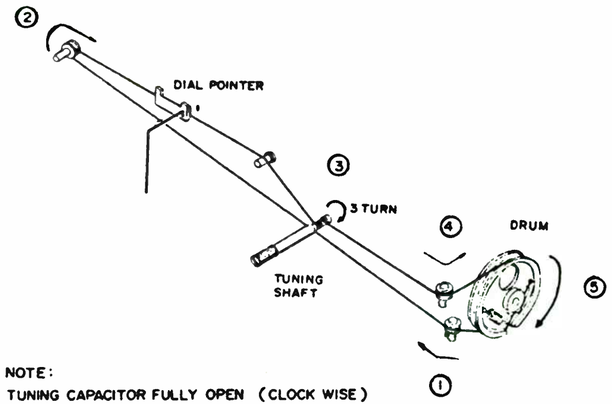
UNLESS OTHERWISE SPECIFIED:

1. ALL CAPACITANCE VALUES 1 OR GREATER ARE IN PICOFARADS.
2. ALL CAPACITANCE VALUES LESS THAN 1 ARE IN MICROFARADS.
3. RESISTORS ARE 1/4 WATT, 10%.
4. ▲ LOCATED OFF BOARD
5. ■ LOCATED COPPER SIDE OF BOARD.
6. ALL VOLTAGES ARE NEGATIVE WITH RESPECT TO GROUND.

AF AMPLIFIER GAIN CHART

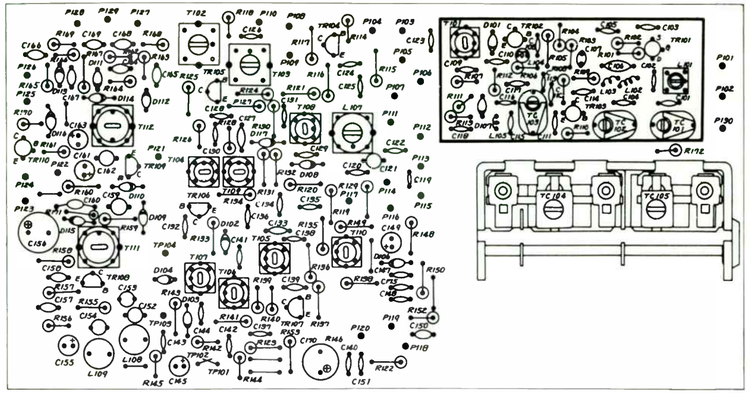


DIAL STRINGING

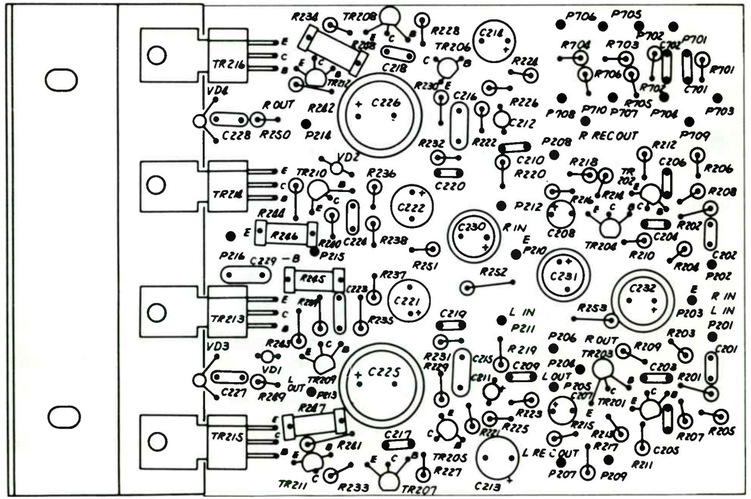


NOTE:
TUNING CAPACITOR FULLY OPEN (CLOCK WISE)

TUNER-IF BOARD (COMPONENT TOP VIEW)



AF AMPLIFIER BOARD (COMPONENT TOP VIEW)



SEMICONDUCTORS

ITEM	PART NO./TYPE
D1	53A001-4
D2	53A001-4
D101	53A006-1
D102	53A006-1
D103	53A001-2
D104	53A001-2
D106	53A006-1
D107	53A001-6
D108	53A006-1
D109	53A001-2
D110	53A001-2
D111	53A001-2
D112	53A001-2
D113	53A001-2
D114	53A001-2
D115	53A001-9
D116	53A001-4
D117	53A006-1
TR101	2SK37H
TR102	2SC921K
TR103	2SC921K
TR104	2SC838H
TR105	2SC838F
TR106	2SC838H
TR107	2SC838F
TR108	2SC945R
TR109	2SC945R
TR110	2SB178M
TR201	2SA641K
TR202	2SA641K
TR203	2SA733Q
TR204	2SA733Q
TR205	2SC923E
TR206	2SC923E
TR207	2SA733Q
TR208	2SA733Q
TR209	2SA733Q
TR210	2SA733Q
TR211	2SC945Q
TR212	2SC945Q
TR213	2SC1096M
TR214	2SC1096M
TR215	2SC1096M
TR216	2SC1096M
VD1	22A001-16
VD2	22A001-16
VD3	22A001-17
VD4	22A001-17
ZD1	53A001-10

ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C7	27X035-2222	2200 uF 35 V
C8	27X109-5235	470 uF 16 V
C145	27X109-3015	3.3 uF 16 V
C149	2X109-3015	3.3 uF 16 V
C155	2X109-3015	3.3 uF 16 V
C156	27X109-1225	100 uF 16 V
C161	27X109-3015	3.3 uF 16 V
C163	27X109-3015	3.3 uF 16 V
C170	27X109-5115	47 uF 16 V
C207	27X109-5050	4.7 uF 25 V
C208	27X109-5050	4.7 uF 25 V
C211	25A001-5	3.3 uF 16 V
C212	25A001-5	3.3 uF 16 V
C213	27X109-3115	33 uF 16 V
C214	27X109-3115	33 uF 16 V
C221	27X109-5115	47 uF 16 V
C222	27X109-5115	47 uF 16 V
C225	27X109-5225	470 uF 25 V
C226	27X109-5225	470 uF 25 V
C230	27X109-1225	100 uF 25 V
C231	27X109-1225	100 uF 25 V
C232	27X109-2225	220 uF 25 V
TC101	26A001-3	Trimmer
TC102	26A001-3	Trimmer
TC103	26A001-3	Trimmer
TC104 TC105 VC1 VC2 VC3 VC4 VC5	26A001-2	Tuning Gang

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R245	23A001-3	.5 ohm 1/2W WW
R246	23A001-3	.5 ohm 1/2W WW
R247	23A001-3	.5 ohm 1/2W WW
R248	23A001-3	.5 ohm 1/2W WW
VR1 & VR2	22A001-18	50 K Dual Bass
VR3 & VR4	22A001-18	50 K Dual Treble
VR5 & VR6	22A001-25	100 K Dual Balance
VR7 & VR8	22A001-26	100 K Dual Volume

COILS/TRANSFORMERS

ITEM	PART NO.
L101	36A001-30
L102	36A001-31
L103	36A001-32
L104	36A001-33
L105	36A001-32
L106	36A001-29
L107	36A002-3
L108	36A002-4
L109	36A002-5
T1	30A001-4
T101	36A002-6
T102	36A002-7
T103	36A002-7
T104	36A002-8
T105	36A002-9
T106	36A002-10
T107	36A002-11
T108	36A002-12
T109	36A002-13
T110	36A002-14
T111	36A002-15
T112	36A002-16

MISCELLANEOUS

ITEM	NAME	PART NO.
S1	Switch, Power On/Off	16A001-23
S2	Switch, Mode	16A001-24

Pages 67-74 Courtesy of MATSUSHITA ELECT. CORP. OF AMERICA

ALIGNMENT INSTRUCTIONS

1. AM-IF & RF ALIGNMENT

STEP	SIGNAL GENERATOR		RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
	CONNECTION	FREQUENCY				
1	Fashion loop of several turns of wire and radiate signal into loop of receiver	455kHz (400Hz Mod.)	Point of non-interference (on/about 600kHz)	Output meter across EXT Speaker Jack (L)	T201, 202 (1st IFT) T206 (2nd IFT) T209 (3rd IFT)	Adjust for maximum output.
2		550kHz (400Hz Mod.)	550kHz		L201 (ANT Coil) L202 (OSC Coil)	Adjust for maximum output by sliding coil (L201) along ferrite core.
3		1500kHz (400Hz Mod.)	1500kHz		C205 (ANT Trimmer) C210 (OSC Trimmer)	Adjust for maximum output. Repeat steps (2) and (3).

- Cement antenna bobbin with wax after completing alignment.

2. FM-IF & DETECTOR ALIGNMENT WITH OSCILLOSCOPE

STEP	SWEEP GENERATOR		RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
	CONNECTION	FREQUENCY				
1	High side through 0.001 mfd. to point TP_1 Terminal Common to chassis.	10.7MHz (400kHz SWEEP)	Point of non-interference. (on/about 89MHz)	Connect vert. amp. of scope, through Diode to point TP_{203}. Common to chassis.	T101, T102 (1st IFT) T203, T204 (2nd IFT) T205 (3rd IFT) T207 (4th IFT) T208 (Disc. IFT)	Turn T208 (Primary & Secondary) upwards and adjust T101, T102, T203, T204, T205 & T247 for maximum amplitude and symmetrical curve. (Refer to fig. 6)
2					T206 (Disc. IFT)	Adjust T208 so that 10.7MHz marker is at the center (Refer to fig. 7.)

- Turn the core of T208 (FM Disc. IFT) fully counterclockwise before alignment.

3. FM-RF ALIGNMENT

STEP	SWEEP GENERATOR		RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
	CONNECTION	FREQUENCY				
1	Connect to EXT. FM antenna terminal through FM dummy antenna. Common to chassis	90MHz (400Hz Mod.)	90MHz	Output meter across EXT Speaker Jack (L)	L103 (OSC Coil) L101 (ANT Coil) L102 (Det. Coil)	Adjust for maximum audio output.
2		106MHz (400MHz Mod.)			C116 (OSC Trimmer) C103 (ANT Trimmer) C110 (Det. Trimmer)	Adjust for maximum audio output. Repeat steps (1) and (2)

- As three output readings will be present, adjustments must be made at center frequency

4. FM STEREO ALIGNMENT

■ 19 kHz AMP. ALIGNMENT

ALIGNMENT	EQUIPMENT CONNECTION		ADJUSTMENT	REMARKS
	SIGNAL GENERATOR	OSCILLOSCOPE		
19 kHz Amp.	Connect to EXT. FM antenna terminal thru. FM dummy antenna.	Connect vert. Amp. of scope to point TP_{301} Common to chassis.	T_{301} (19 kHz Coil) T_{302} (38 kHz Coil)	Adjust T_{301} and T_{302} for maximum oscilloscope pattern of 19 kHz

■ SEPARATION ALIGNMENT

ALIGNMENT CIRCUIT	ALIGNMENT	REMARKS
SEPARATION	R_{303} (Separation Control) T_{302} (38 kHz Coil)	Adjust R_{303} and T_{302} for the best of separation indication on VTVM.

■ STEREO EYE ON LEVEL CHECK AND ALIGNMENT

EQUIPMENT CONNECTION			ADJUST	REMARKS
SIGNAL GENERATOR	VTVM	OSCILLOSCOPE		
Connect to EXT FM antenna terminal through dummy antenna	Connect across speaker jack (Left side) (Imp. 8Ω)	Connect to terminals of VTVM.	R_{304} (Stereo Eye on level Adjust)	Stereo eye should light up when about 22 dB applied from signal generator. If not, adjust R_{304} to light up

ALIGNMENT POINTS

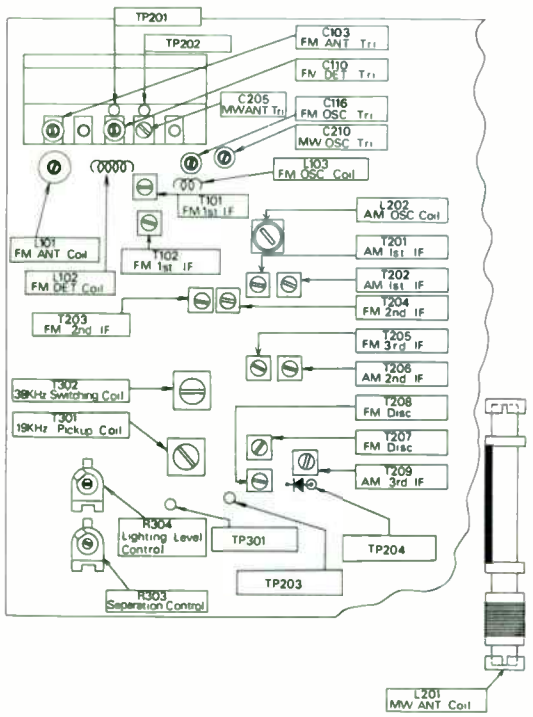


Fig. 5

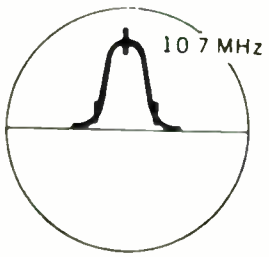


Fig. 6

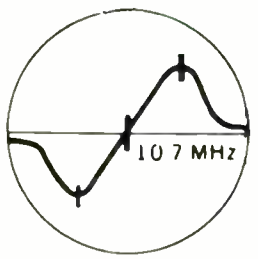


Fig. 7

SEMICONDUCTORS

ITEM	PART NO./TYPE
D101	1S351
D102	0A90
D201	0A90
D202	1S1211
D203	0A90
D204	20A90
D205	20A90
D301	0A90
D601	MA26-2
D602	MA26-2
D701	SVDS1RB10
D702	RVD10DC1
D703	RVD10DC1R
D704	SVD02Z8.2A
IC301	AN211A
TR101	2SK37L
TR102	2SC920R
TR103	2SC920Q
TR201	2SC920Q
TR202	2SC920Q
TR203	2SC920Q
TR204	2SC920R
TR301	2SB178WXST
TR401	2SA666IQRS
TR402	2SA666IQRS
TR403	2SA666QRS
TR404	2SA666QRS
TR501	2SA666QRS
TR502	2SA666QRS
TR503	2SA666QRS
TR504	2SA666QRS
TR601	2SA720QRS
TR602	2SA720QRS
TR603	2SA699SFPQR
TR604	2SA699SFPQR
TR605	2SC1226SFPQR
TR606	2SC1226SFPQR
TR701	2SA683QRS

ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE	
C101	ECEA16V10	10 uF	16 V
C102			
C109			
C115	ECV5XR27B13S	Tuning Gang	
C205			
C206			
C211			
C128	ECEA50V1	1 uF	50 V
C129	ECEA10V220	220 uF	10 V
C215	ECEA10V470	470 uF	10 V
C217	ECEA25V3R3	3.3 uF	25 V
C224	ECEA25V4R7	4.7 uF	25 V
C226	ECEA10V220	220 uF	50 V
C301	ECAG25ER47	.47 uF	25 V
C305	ECEA25V4R7	4.7 uF	25 V
C306	ECEA16V33	33 uF	16 V
C307	ECEA10V47	47 uF	10 V
C308	ECEA10V470	470 uF	10 V
C309	ECEA10V220	220 uF	50 V
C310	ECEA16V10	10 uF	16 V
C313	ECEA16V10	10 uF	16 V
C317	ECEA25V4R7	4.7 uF	25 V
C401	ECEA25V4R7	4.7 uF	25 V
C402	ECEA25V4R7	4.7 uF	25 V
C407	ECEA16V10	10 uF	16 V
C408	ECEA16V10	10 uF	16 V
C501	ECEA50V1	1 uF	50 V
C502	ECEA50V1	1 uF	50 V
C503	ECEA50V1	1 uF	50 V
C504	ECEA50V1	1 uF	50 V
C507	ECEA50V1	1 uF	50 V
C508	ECEA50V1	1 uF	50 V
C509	ECEA10V220	220 uF	50 V
C601	ECEA25V3R3	3.3 uF	25 V
C602	ECEA25V3R3	3.3 uF	25 V
C605	ECEA10V220	220 uF	50 V
C606	ECEA10V220	220 uF	50 V
C613	ECEA16V470	470 uF	16 V
C614	ECEA16V470	470 uF	16 V
C615	ECEA25V10	10 uF	25 V
C702	ECET25R2200S	2200 uF	25 V
C703	ECEA16V1000	1000 uF	16 V
C704	ECEA10V1000	1000 uF	10 V

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R303	EVLS3AA00B14	10 K Separation
R304	EVLS3AA00B53	5000 ohms Lighting Level
R511	EVFK1AU40B54	50 K Tone
R512	EVFK1AU40B54	50 K Tone
R513	EVCB2AU40G24	20 K Balance
R514 & R515	EVFNQ5U40A54	500 K Dual Volume
R613	ERX1ANJ1R0	1 ohm 5% 1W
R614	ERX1ANJ1R0	1 ohm 5% 1W
R615	ERX1ANJ1R0	1 ohm 5% 1W
R616	ERX1ANJ1R0	1 ohm 5% 1W
Th1	ERTD2FCL101L	Thermistor
Th2	ERTD2FCL101L	Thermistor

COILS/TRANSFORMERS

ITEM	PART NO.	ITEM	PART NO.
L101	RLA4P7	T201	RLI2B123-M
L102	RLD4Y54	T202	RLI2B157-M
L103	RLO4Y53	T203	RLI4B351
L104	RLQY15G-5	T204	RLI4B351
L201	SLF2D11	T205	RLI4B251
L202	RLO2B43-T	T206	RLI2B257-M
L203	RLQY121-1	T207	RLI4B551
L204	RLQY75S-5	T208	RLI4B552
L301	RLM1X1-Y	T209	RLI2B451-M
L701	RLQX101-1Q	T301	RLM1C16
T101	RLI4B152	T302	RLM1C17
T102	RLI4B152	T801	SLT5L91

MISCELLANEOUS

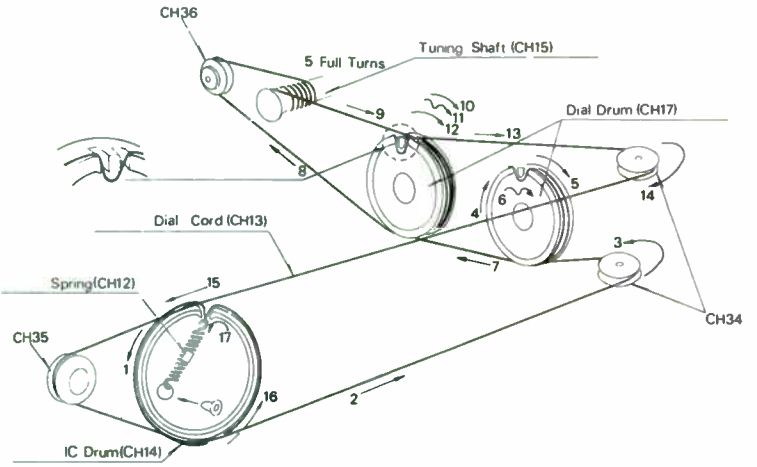
ITEM	NAME	PART NO.
CR201	Component Combination	EXAF253Z152
CR202	Component Combination	EXA5DL04C
CR301	Component Combination	EXA6FC04
CR302	Component Combination	EXA6FC04
S1	Switch, Band Select	SSRK1
S2	Switch, Function	SSRK2
S3	Switch, Quadriplex	SSH31S
S5	Switch, Repeat	SSHK1
S6	Switch, Channel Change	SSHK2
S7	Switch, Channel Change	SSHK2
	Belt, Tape Drive	RMQ195A-A
	Head, Play	RMQ280A-A
	Motor, Tape Drive	RJQ8A
	Assembly, Record Changer	SP-880C
	Cartridge, Record Changer	EPC-34STFA
	Stylus, Record Changer	EPS-18ST
	Assembly, Speakers	SB-1022

CABINET PARTS

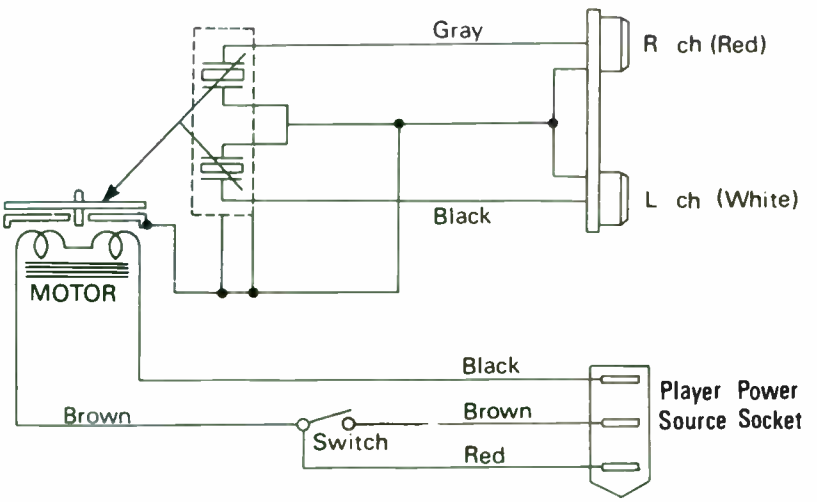
NAME	PART NO.
Bottom, Cabinet	SKMK801
Top, Cabinet	SKM1210
Panel, Control	SYE323
Knob, Tuning	SBN467
Knob, Volume/Selector	SBNU69
Cover, Dust	SYE297

DIAL CORD STRINGING GUIDE

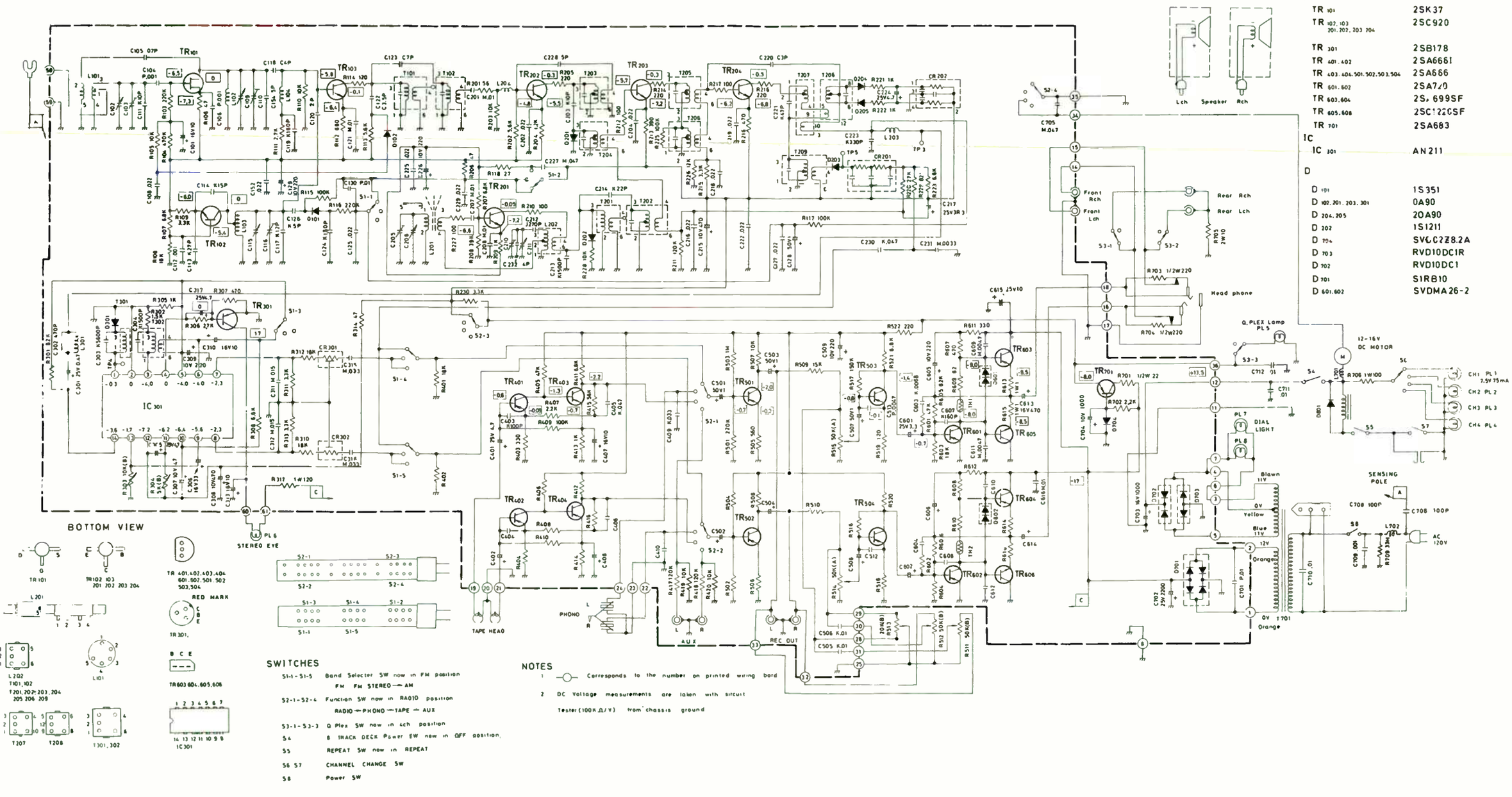
NOTES: 1. Dial Cord length is 75".
2. Tuning capacity should be positioned at minimum capacity (shut) and dial pointer is positioned at start point.
3. Arrow marks (1-17) indicate correct order and direction of stringing dial cord.
4. Cement the dial cord ends.



SCHEMATIC DIAGRAM MODEL SP-880C



SCHEMATIC DIAGRAM MODEL SE-2090



TR

TR 101	2SK37
TR 102, 103 201, 202, 203 204	2SC920
TR 301	2SB178
TR 401, 402	2SA666I
TR 403, 404, 501, 502, 503, 504	2SA686
TR 601, 602	2SA720
TR 603, 604	2SA699SF
TR 605, 606	2SC1226SF
TR 701	2SA683

IC

IC 301	AN211

D

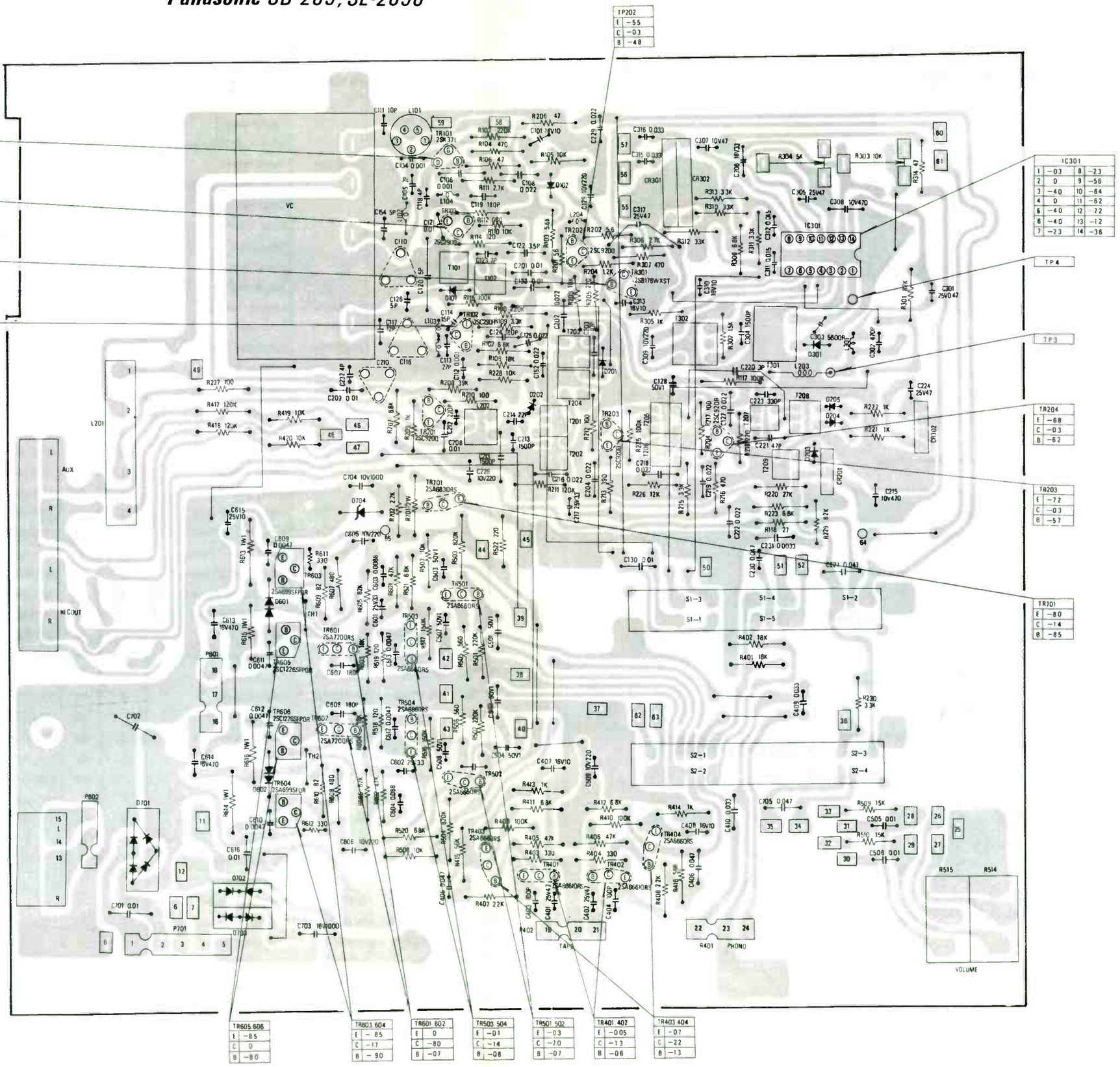
D 101	1S351
D 102, 201, 203, 301	0A90
D 204, 205	20A90
D 202	1S1211
D 704	SVC228.2A
D 703	RVD10DC1R
D 702	RVD10DC1
D 701	S1RB10
D 601, 602	SVDMA26-2

SWITCHES

S1-1 - S1-5	Band Selector SW now in FM position FM FM STEREO — AM
S2-1 - S2-4	Function SW now in RADIO position RADIO — PHONO — TAPE — AUX
S3-1 - S3-3	Q Plex SW now in 4ch position
S4	8 TRACK DECK Power SW now in OFF position.
S5	REPEAT SW now in REPEAT
S6 S7	CHANNEL CHANGE SW
S8	Power SW

NOTES

1. Corresponds to the number on printed wiring bord
2. DC Voltage measurements are taken with sircuit Tester (100K Ω/V) from chassis ground



Pages 75-86 Courtesy of PIONEER ELECTRONICS OF AMERICA

5. ALIGNMENT

5-1. FM IF ALIGNMENT

(a) Connect a capacitor 0.01μF between TP_1 and ground before the alignmnet.
(b) Connect a resistor 220k Ω in series with the vertical input terminals of the oscilloscope (Fig. 2).
(c) Remove the capacitor (4.7μF) from the terminal ㉘ before the alignment (Fig. 2).
(d) Turn the selector switch to FM MONO.
(e) Turn the tuning knob to the right and set dial at high end of scale.
(f) Connect the output leads of sweep generator to the FM antenna terminals. (Fig. 2).
(g) Connect the vertical input of oscilloscope to the FM meter output terminal ⑱, when connecting to the FM meter terminal, disconnect the meter lead, then terminate 4.7k Ω between the terminal ⑱ and ground.
(h) Set the output level of sweep generator to 60 dB.
(i) Adjust the FM IFT cores (T_4, T_5, T_6) as shown in Fig. 2.
(j) Set the output level of sweep generator to 100 dB, then keep the top of the pattern flat and check the tuning center frequency does not move when feed the high level input (100 dB) to FM antenna terminal, if it is moved, repeat the steps (h) to (i).
(k) Disconnect the vertical input of oscilloscope from the FM meter output terminal, then connect the vertical input leads of oscilloscope to TP_1 (Fig. 4).
(l) Adjust the S-curve pattern for adjusting the cores of the FM IFT T_7. (Linearity is improved by primary core: symmetry by the secondary core) (Fig. 4).
(m) Disconnect the capacitor 0.001μF from the TP_1 after the alignments has been completed.
(n) Connect the capacitor (4.7μF) to the terminal ㉘ after the alignment has been completed.

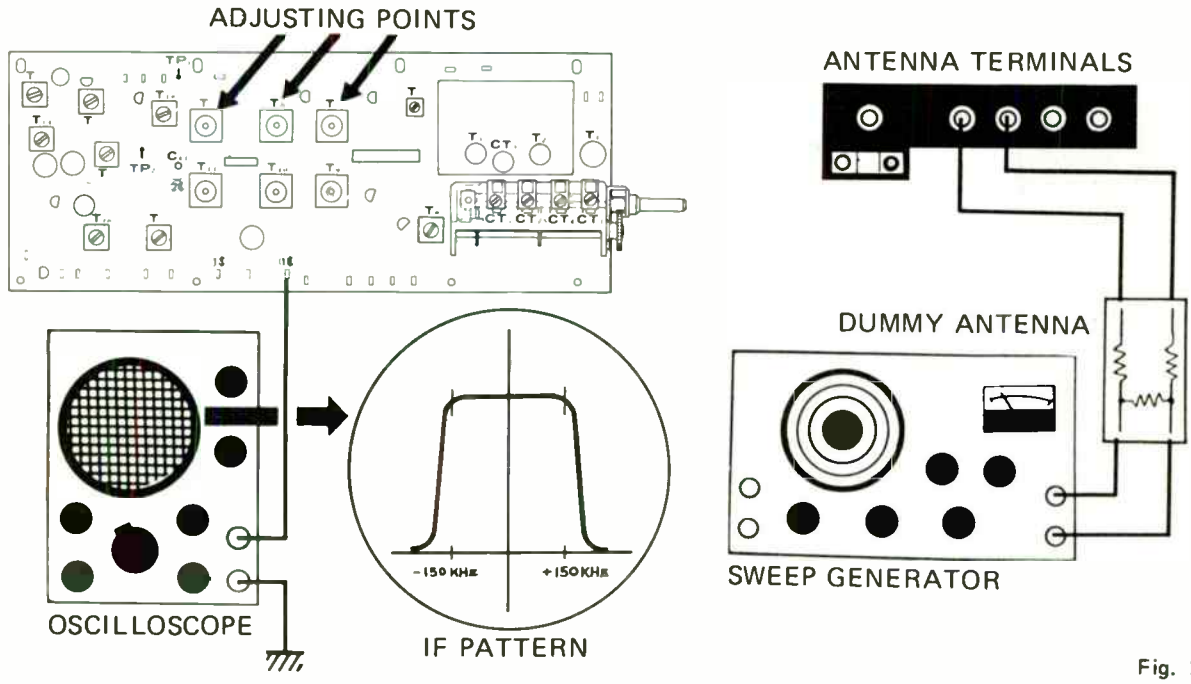


Fig. 2

Note: When it is difficult to get synchronism of oscilloscope, make connection between the oscilloscope and sweep generator for easy synchronism refering to the operating instructions.

5-2. AM IF ALIGNMENT

(a) Turn the selector switch to AM.
(b) Connect the output leads of the sweep generator to AM antenna terminals.
(c) Connect the input leads of the oscilloscope to the AM detector output terminal ⑬.
(d) Set the output level of the sweep generator to 40 dB.
(e) Adjust the AM IFT cores (T_9, T_{10}, T_{11}) as shown in Fig. 3.
Make the pattern symmetrical with respect to the center, coinciding with the peak of the pattern to the oscilloscope pattern.

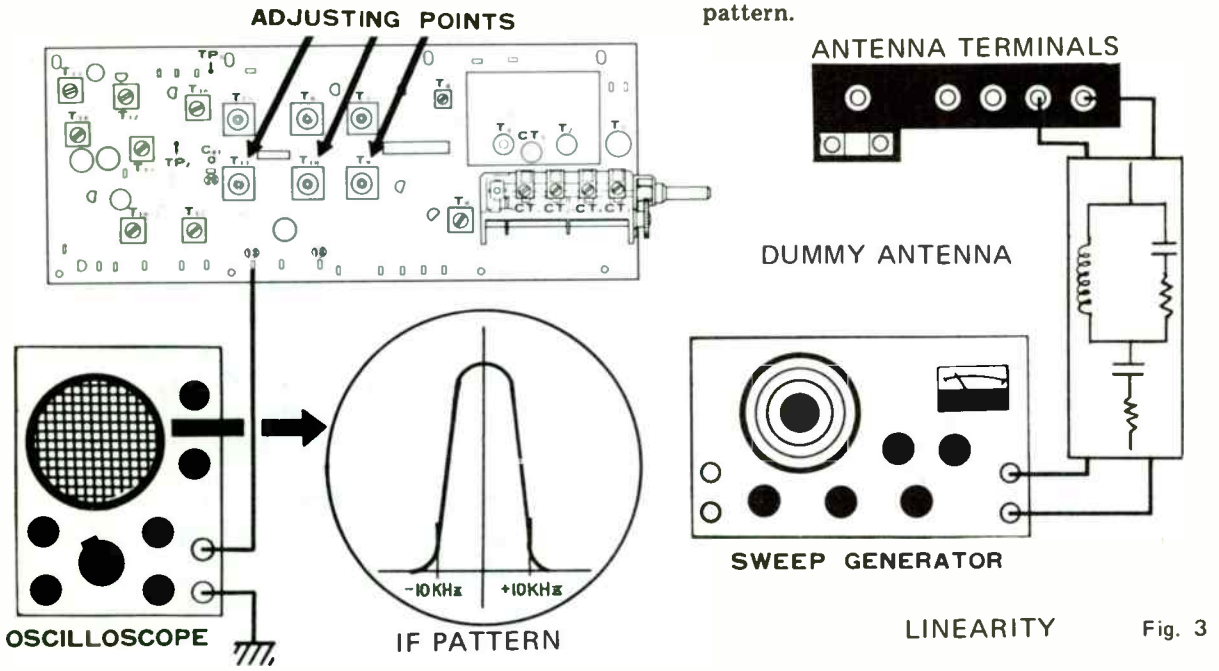
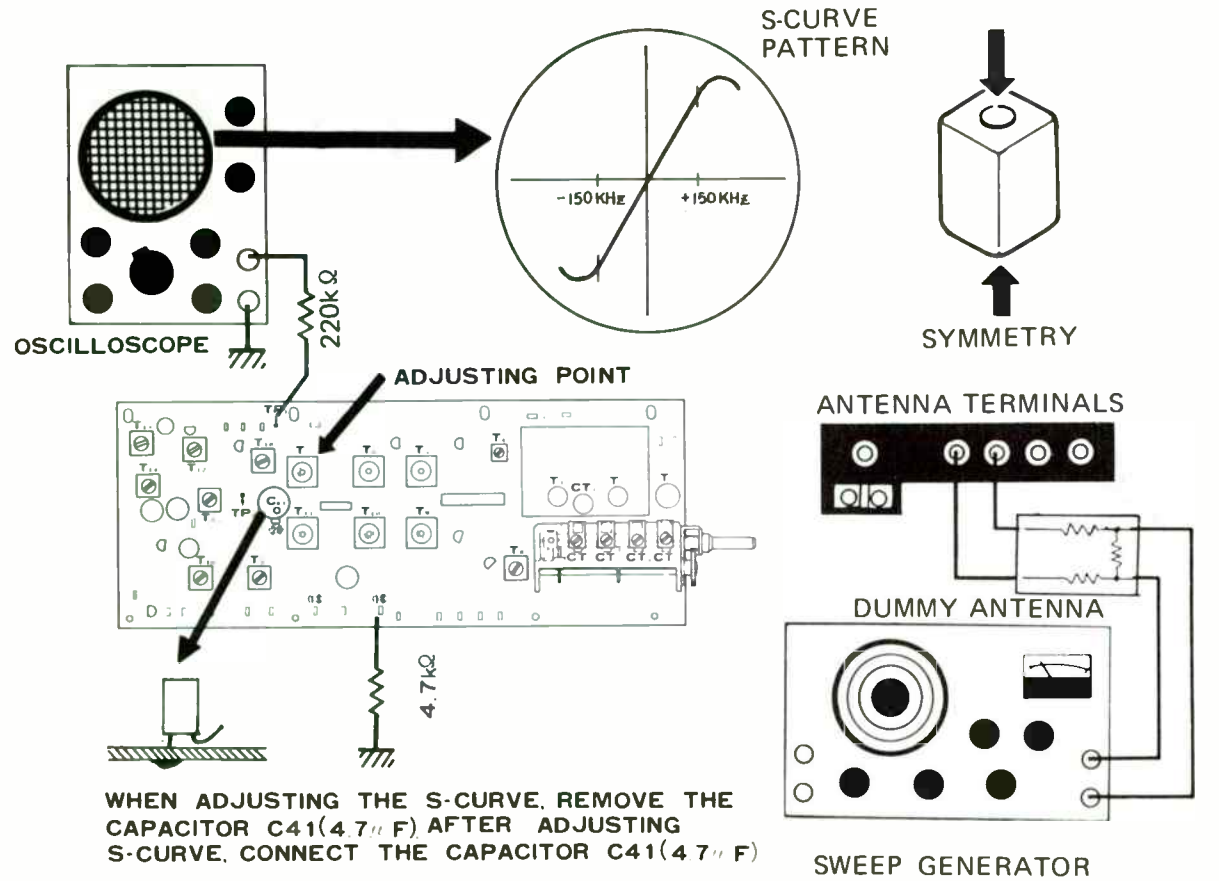


Fig. 3



WHEN ADJUSTING THE S-CURVE, REMOVE THE CAPACITOR C41(4.7μF) AFTER ADJUSTING S-CURVE, CONNECT THE CAPACITOR C41(4.7μF)

Fig. 4

5-3. FM TRACKING ALIGNMENT

(a) Turn the selector switch to FM.
(b) Connect the output leads of sweep generator to the FM antenna terminals.
(c) Connect the vertical input leads of oscilloscope to the TAPE REC terminal ⑬.
(d) Set the output level of sweep generator to modulation 400 Hz, 100% and level 15 dB, the frequency set to 90 MHz under the test equipment's dial set at 90 MHz.
(e) Connect the V.T.V.M. and oscilloscope to the TAPE REC terminals.
(f) Observing the output level on the V.T.V.M. and adjust the following cores to get maximum reading on the meter.
T_3 . . . . . Oscillator circuit
T_1 . . . . . Antenna coil circuit
T_2 . . . . . RF circuit
(g) Set the frequency of the FM signal generator and dial pointer of equipment to 106 MHz.
(h) Follow the steps below to adjust the adjusting points:
Trimmer capacitor CT_3: Oscillator circuit
Trimmer capacitor CT_1: Antenna circuit
Trimmer capacitor CT_2: RF circuit
(i) Repeat the steps (f) to (h) several times.
(j) After the alignment, lock the trimmer capacitor with paint.

5-4. CHECKING MUTING FUNCTION

(a) Connect the output leads of FM signal generator to the FM antenna terminals.
(b) Connect the vertical input leads of oscilloscope to the TAPE REC terminals.
(c) Set the output level of FM signal generator to 16 dB and turn the muting switch on, then check the muting function on the scope. The muting function is designed to the function at about 16 dB input.

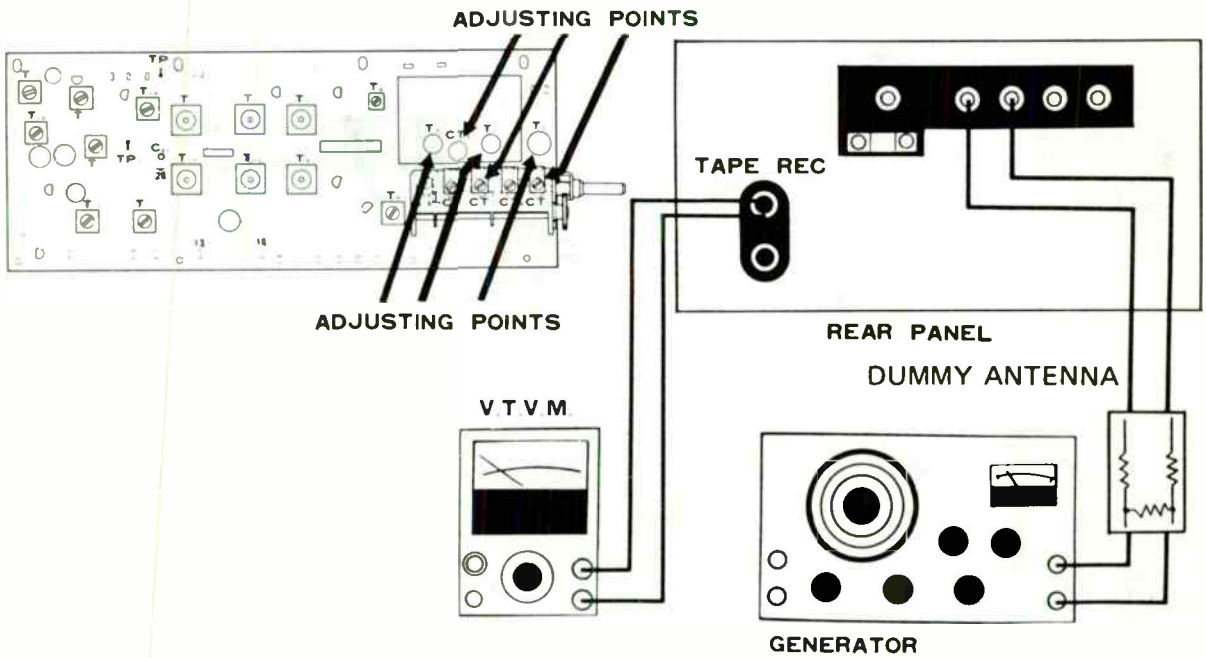


Fig. 5

5-5. AM TRACKING ALIGNMENT

(a) Turn the selector switch to AM.
(b) Connect the AM signal generator to the AM antenna terminals (Fig. 6).
(c) Set the condition of the AM signal generator to the modulation 400 Hz, 30% and output level 30 dB, then frequency is 600 kHz under the test equipment's dial set at 600 kHz.
(d) Connect the V.T.V.M. and oscilloscope to the TAPE REC terminals.
(e) Observing the output level on the V.T.V.M. and adjust the following core to get maximum reading on the meter.
T_8 . . . . . Oscillator circuit
Ferrite loopstick antenna: Antenna circuit
(f) Set the condition of the AM signal generator and turning knob to 1400 kHz.
(g) Observing the output level on the V.T.V.M. and adjust the following core to get maximum reading on the meter.
CT_5 . . . . . Oscillator circuit
CT_4 . . . . . Antenna circuit
(h) Repeat the alignments (e) to (g) several times.
(i) After the alignments, lock the trimmer capacitor with paint.
(j) As this result, the signal meter should indicate maximum.

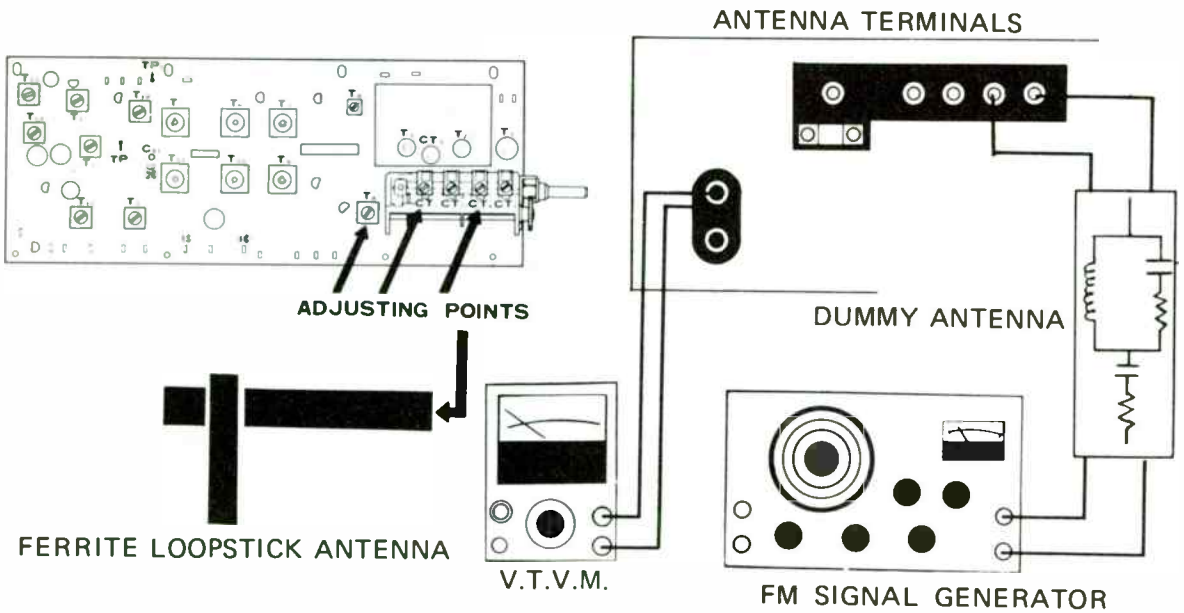


Fig. 6

5-6. MPX DECODER ALIGNMENT

(a) Modulate the FM signal generator output by FM stereo MPX modulator.
(b) Turn the selector switch to FM AUTO.
(c) Connect the FM signal generator to the FM antenna terminals.
(d) Set the condition of the FM stereo MPX modulator to modulation: main 1 kHz (L + R) 60%, pilot 8 ~ 10%.
(e) Set the output level of the FM signal generator to 60 dB.
(f) Turn the tuning knob to maximum reading on the signal meter.
(g) Set the modulation of the FM stereo MPX modulator to pilot only.
(h) Connect the oscilloscope to TP_2.
(i) Adjust the transformers (T_{13}, T_{14}, T_{15}) until the output level of the 19 kHz becomes maximum on the scope.
(j) Set the condition of the FM stereo MPX modulator to the pilot with L or R signal.
(k) Connect the dual-trace oscilloscope and V.T.V.M. to the TAPE REC terminals.
(l) Adjust the semi-fixed potentiometer on the AF printed circuit board until the output level of the L or R signal becomes maximum on the scope.

5-7. CHECKING SCA FILTER

(a) Connect the FM signal generator to the FM antenna terminals.
(b) Turn the selector switch to FM AUTO.
(c) Modulate the FM signal generator connected to the audio generator, check the frequency responsce for the deep dips at around 67 kHz and 72 kHz in the frequency response.

5-8. CHECKING STEREO INDICATOR

(a) Connect the FM signal generator to the FM antenna terminals.
(b) Turn the selector switch to FM AUTO.
(c) Modulate the FM signal generator connected to the FM stereo MPX modulater, and set the FM stereo MPX modulator pilot on, and check the stereo indicator lamp for lights, set the FM stereo MPX modulator to pilot off, and check the stereo indicator lamp for goes out.

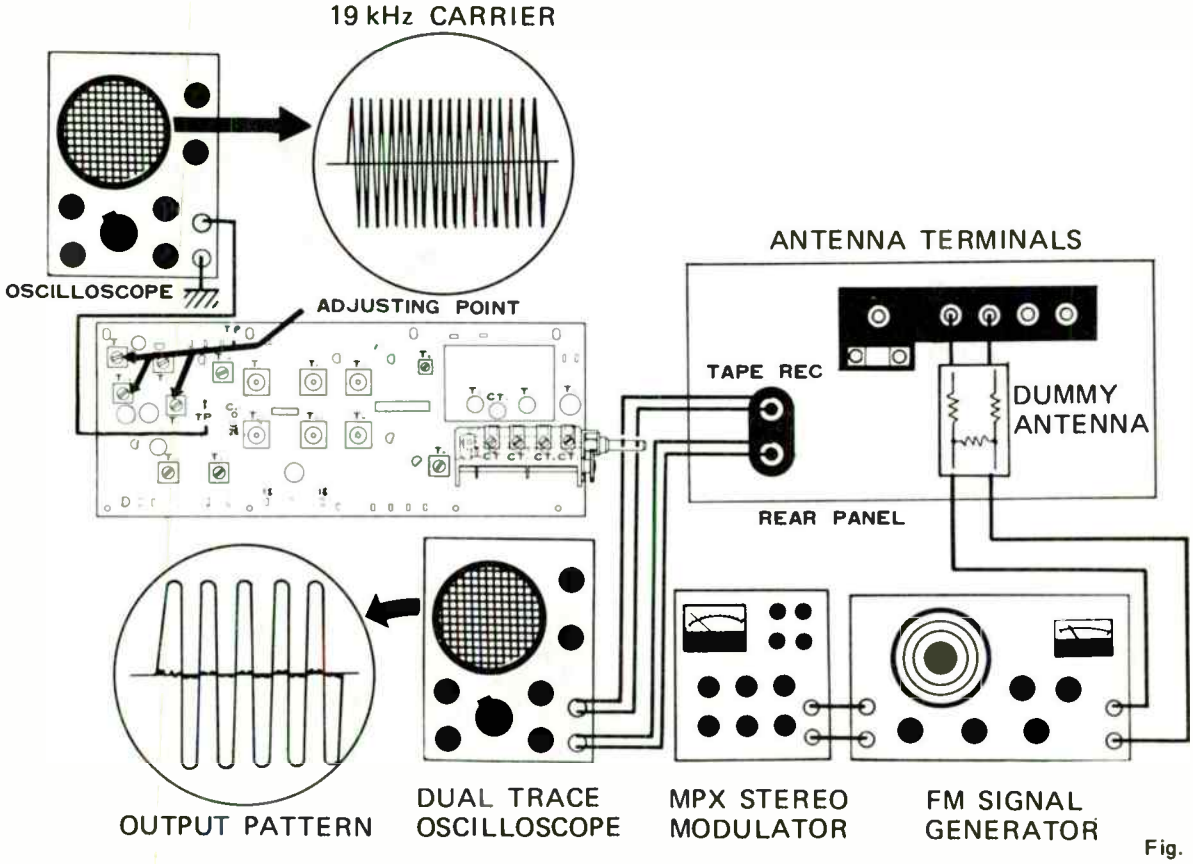
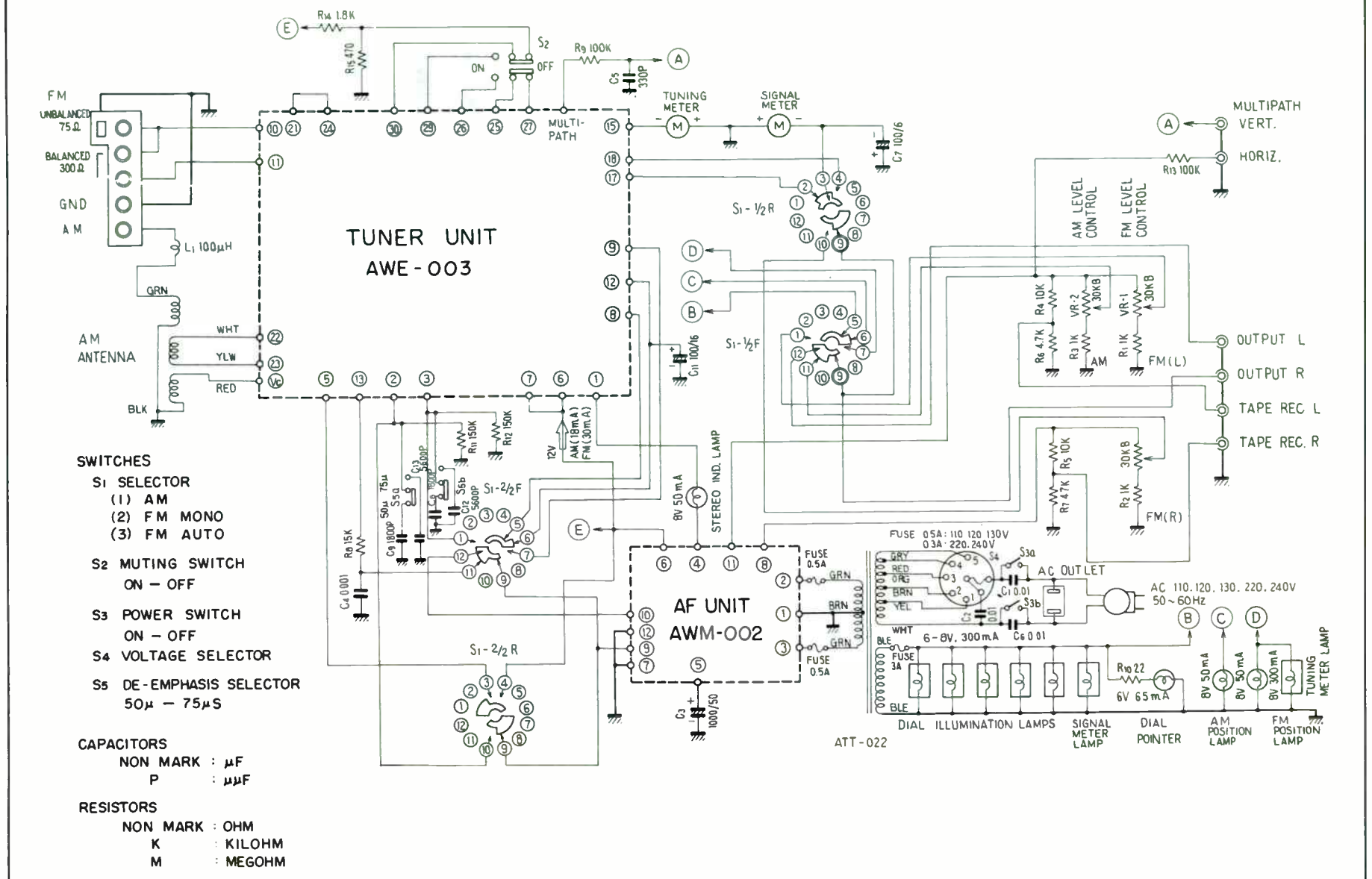


Fig. 7

SCHEMATIC DIAGRAMS

TX-600



SWITCHES

S1 SELECTOR
(1) AM
(2) FM MONO
(3) FM AUTO

S2 MUTING SWITCH
ON — OFF

S3 POWER SWITCH
ON — OFF

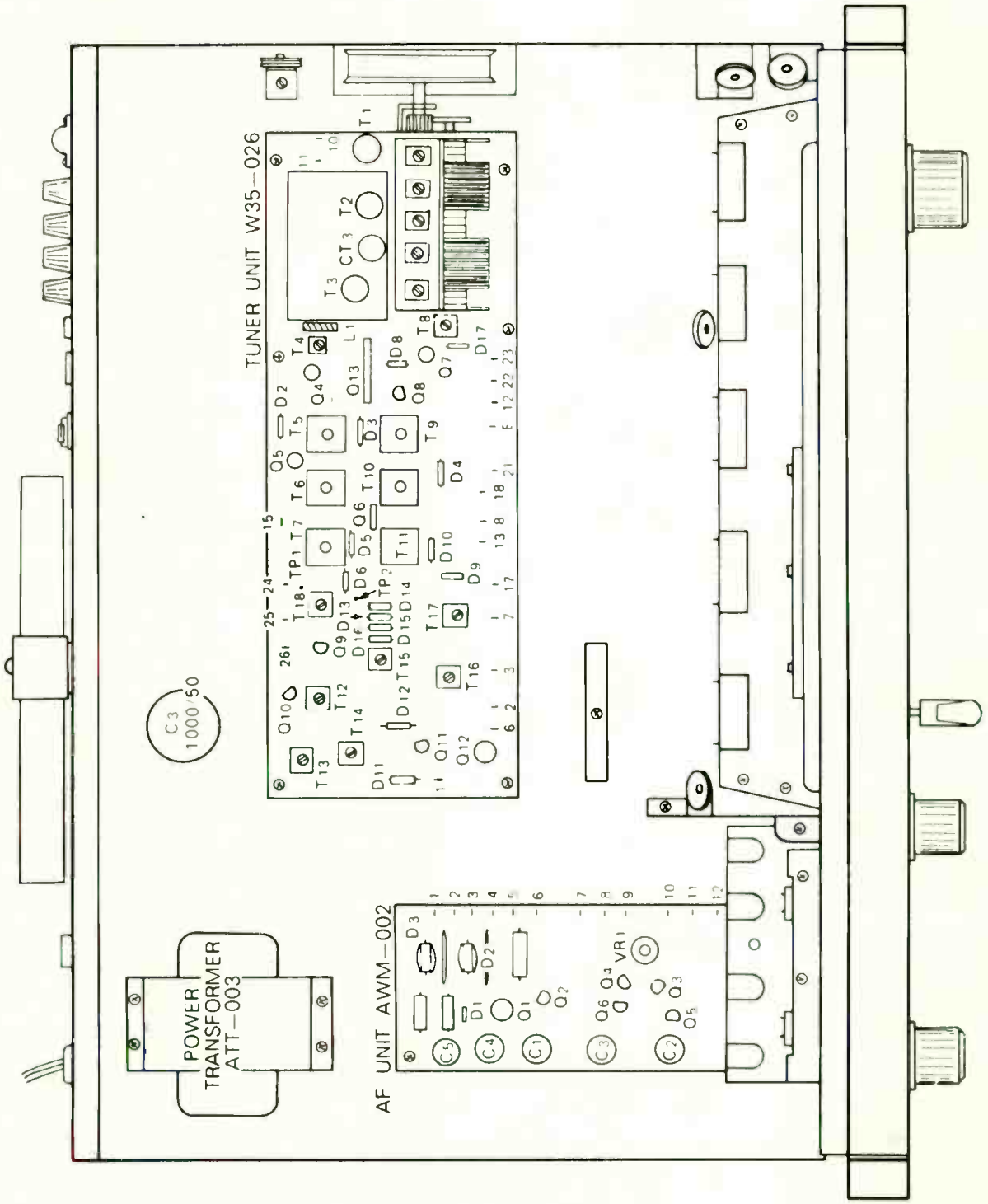
S4 VOLTAGE SELECTOR

S5 DE-EMPHASIS SELECTOR
50μ — 75μS

CAPACITORS
NON MARK : μF
P : μμF

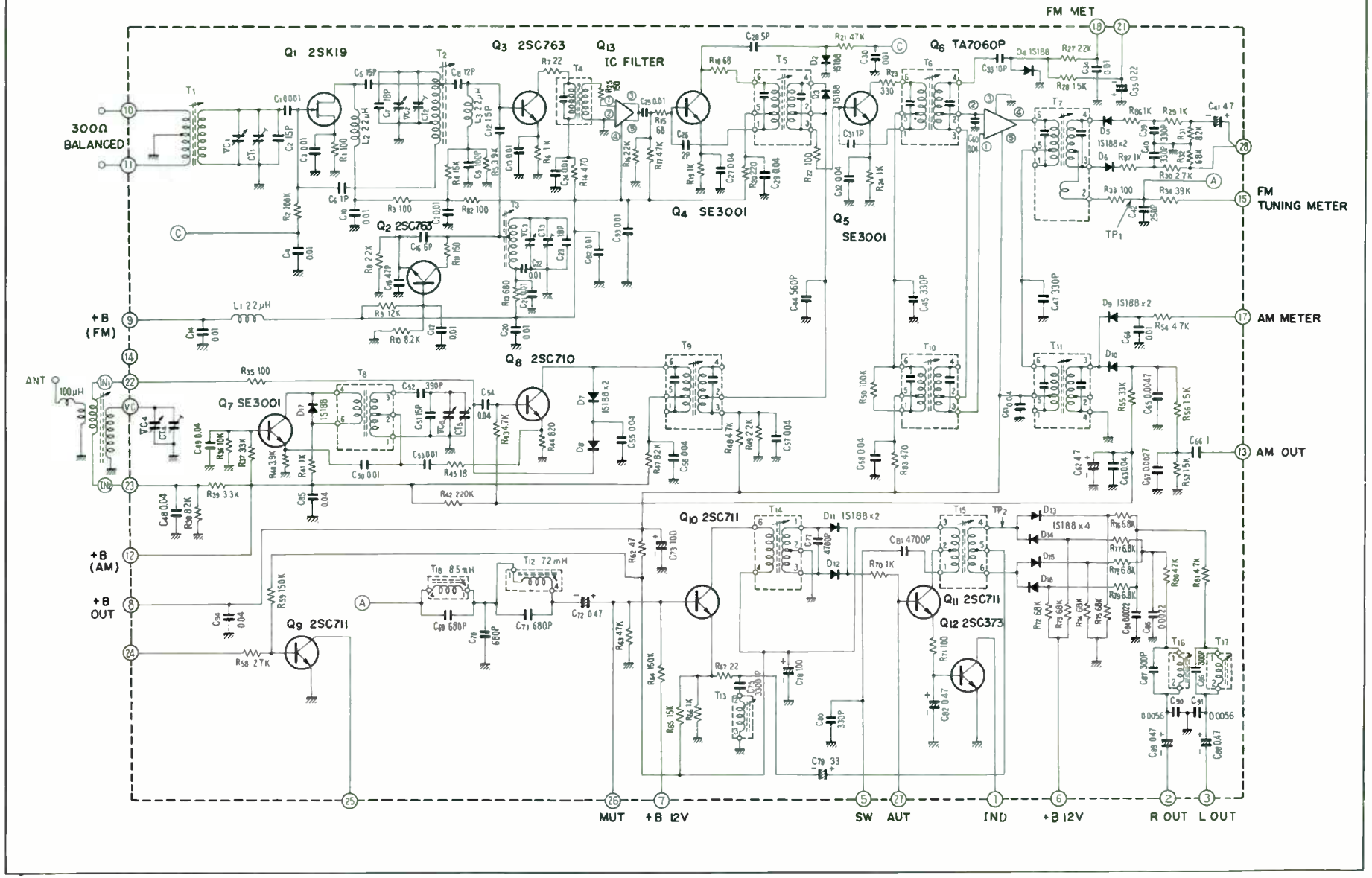
RESISTORS
NON MARK : OHM
K : KILOHM
M : MEGOHM

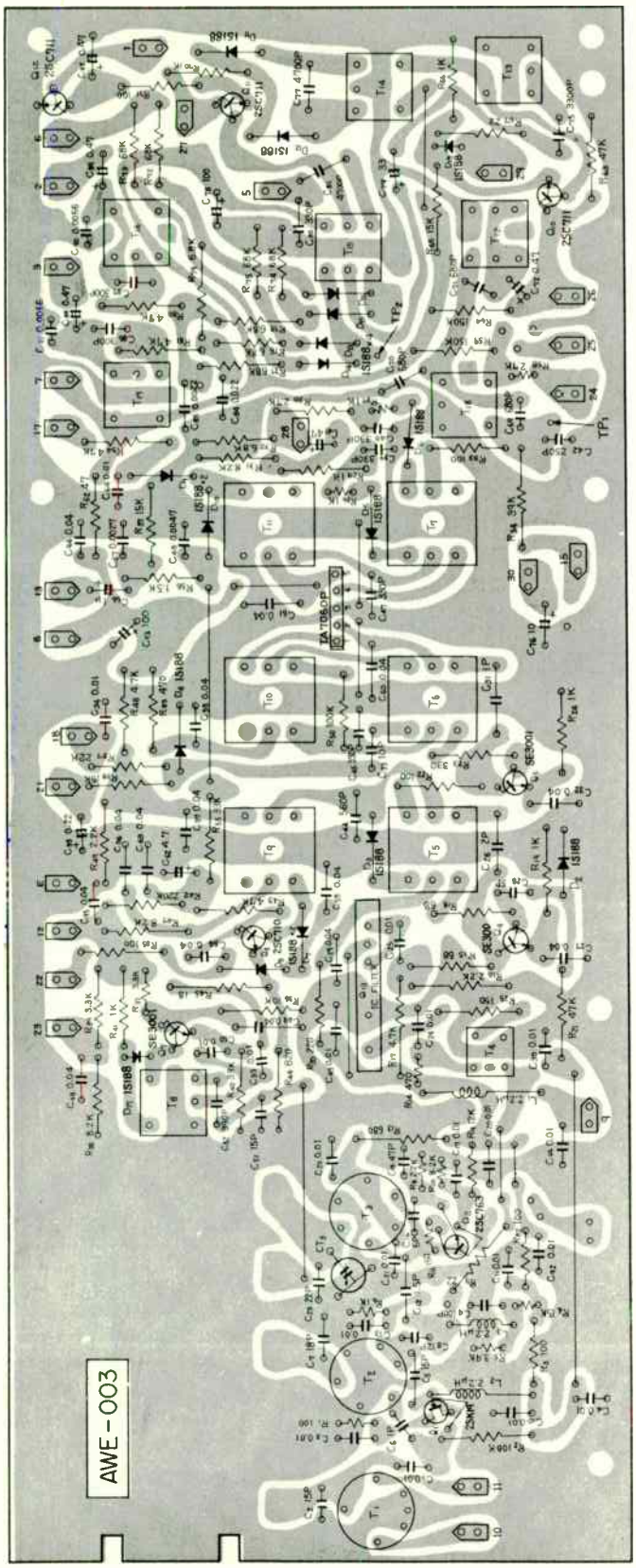
CHASSIS LAYOUT



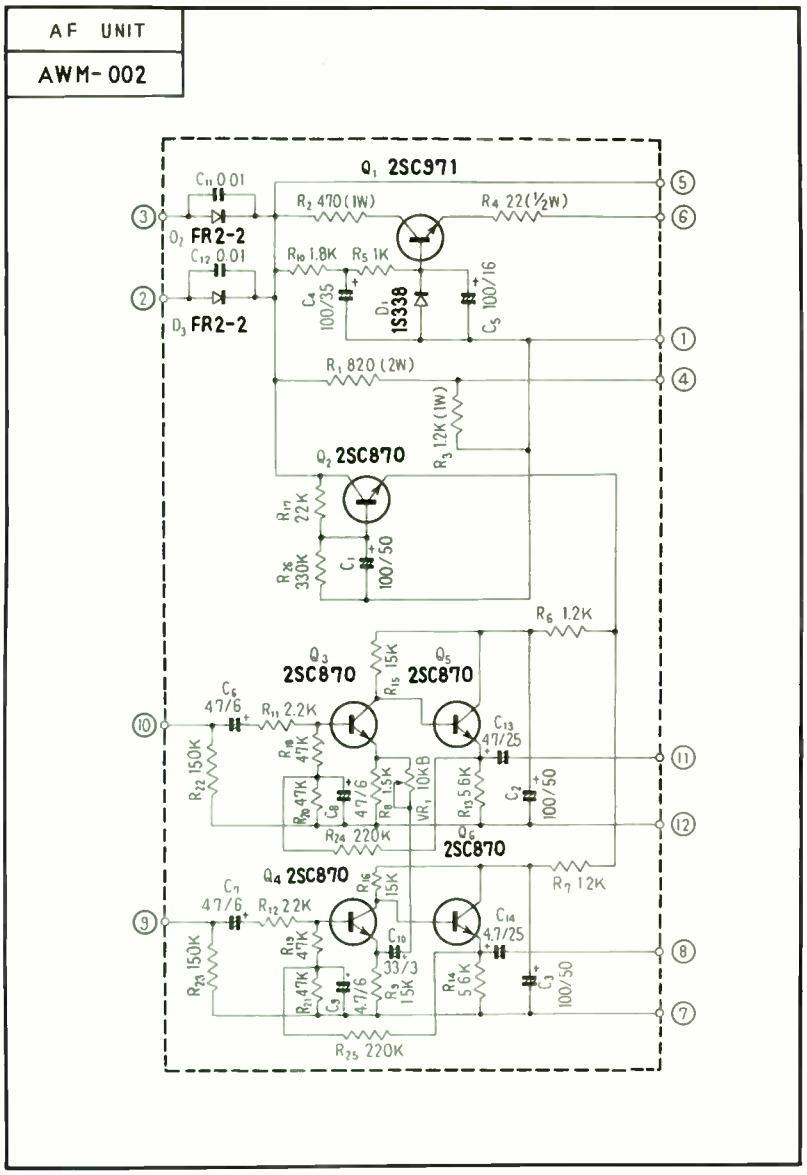
TUNER UNIT (AWE-003)

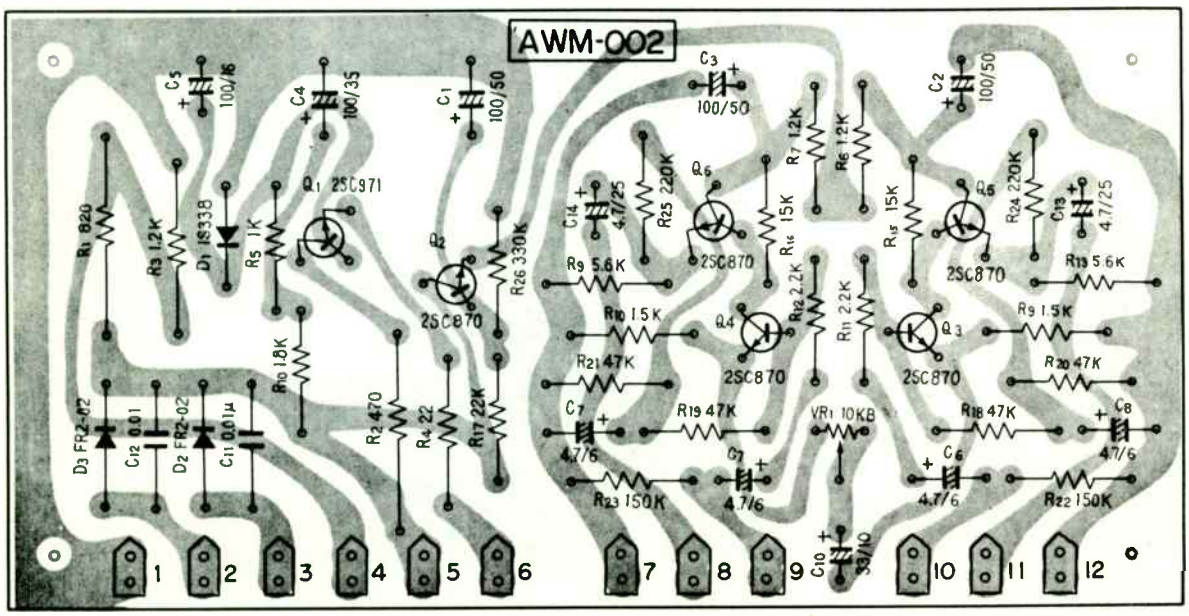
TUNER UNIT
AWE - 003





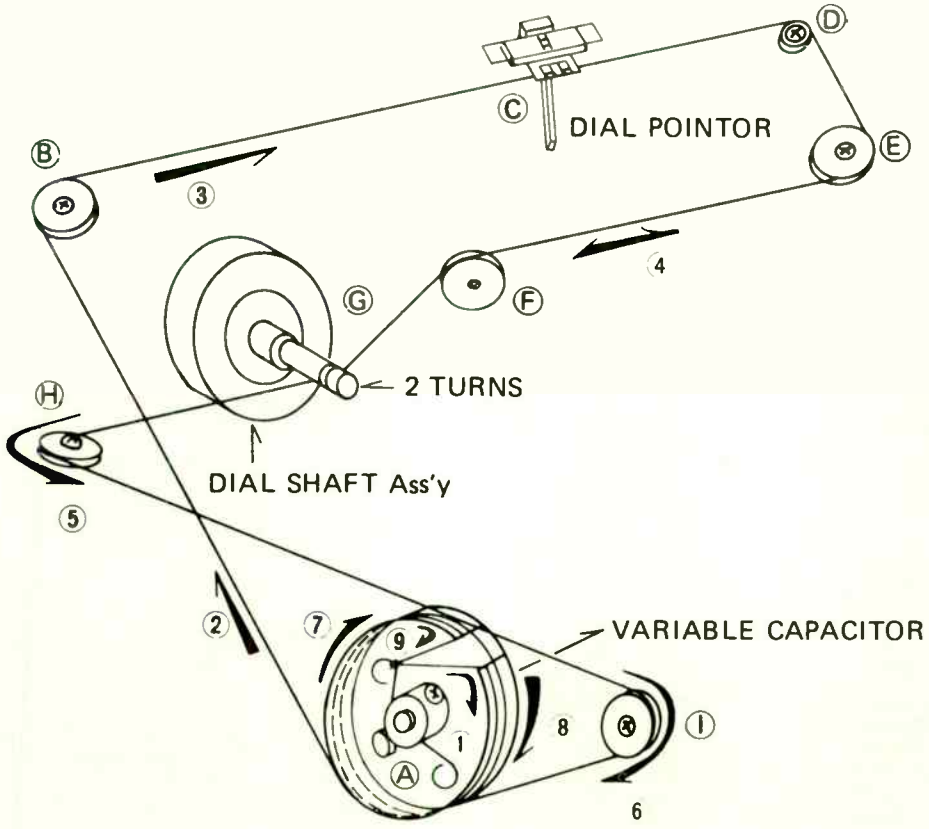
AF UNIT (AWM-002)





4. DIAL CORD STRINGING

1. Set the AM/FM tuning capacitor at the minimum.
2. Tie the string to the spring of the pulley Ⓐ Wind the string one and a half turns around the pulley Ⓐ before extending the string in the direction ②.
3. Turn the string in the direction ③ at the pulley Ⓑ and hook it onto the arm C of the dial pointer. Extend the string in the direction ④ after turning it at the pulleys Ⓓ and Ⓔ.
4. Hook the string on the pulley Ⓕ. Wind the string two turns around the dial shaft Ⓖ and bring it up to the pulley Ⓗ.
5. Turn the string in the direction ⑤ at the pulley Ⓗ, and bring the string up to the pulley Ⓘ.
6. Turn the string in the direction ⑥ at the pulley Ⓘ and wind it one and a half turns around the pulley Ⓐ in the direction ⑦ and ⑧. Tie the string to the spring as shown by ⑨.
7. After the string has been arranged by the above steps, apply a little amount of lacquer or paint on the arm Ⓒ and on the point ⑨ where the string has been tied to the spring.



SEMICONDUCTORS

ITEM	PART NO./TYPE
(TUNER; AWE-003)	
D2	1S188FM-1
D3	1S188FM-1
D4	1S188FM-1
D5	1S188FM-1
D6	1S188FM-1
D7	1S188FM-1
D8	1S188FM-1
D9	1S188FM-1
D10	1S188FM-1
D11	1S188FM-1
D12	1S188FM-1
D13	1S188FM-1
D14	1S188FM-1
D15	1S188FM-1
D16	1S188FM-1
D17	1S188FM-1
Q1	2SK19-Y
Q2	2SC763-D or C
Q3	2SC763-D or C
Q4	SE3001
Q5	SE3001
Q6	TA7060P-W
Q7	SE3001
Q8	2SC710-D or DR
Q9	2SC711-F
Q10	2SC711-E or F
Q11	2SC711-E or F
Q12	2SC373
Q13	W53-046-0
(AF; AWM-002)	
D1	1S338Q
D2	FR2-02
D3	FR2-02
Q1	2SC971
Q2	2SC870
Q3	2SC870
Q4	2SC870
Q5	2SC870
Q6	2SC870

ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE	
(CHASSIS)			
C7	CEMX100MF6V	100 uF	6 V
(TUNER; AWE-003)			
C41	CEMX4R7MF25V	4.7 uF	25 V
C62	CEMD4R7MF25V	4.7 uF	25 V
C66	CEMD1MF50V	1 uF	50 V
C72	CEMXR47MF50V	.47 uF	50 V
C73	CEMD100MF16V	100 uF	16 V
C78	CEMX100MF16V	100 uF	16 V
C79	CEMX33MF16V	33 uF	16 V
C82	CEMXR47MF50V	.47 uF	50 V
C88	CEMXR47MF50	.47 uF	50 V
C89	CEMXR47MF50	.47 uF	50 V
(AF; AWM-002)			
C1	CEMX100MF50V	100 uF	50 V
C2	CEMX100MF50V	100 uF	50 V
C3	CEMX100MF50V	100 uF	50 V
C4	CEMX100MF50V	100 uF	50 V
C5	CEMX100MF16V	100 uF	16 V
C6	CEMX4R7MF6V	4.7 uF	6 V
C7	CEMX4R7MF6V	4.7 uF	6 V
C9	CEMX4R7MF6V	4.7 uF	6 V
C9	CEMX4R7MF6V	4.7 uF	6 V
C10	CEMX33MF3V	33 uF	3 V
C13	CEMX4R7MF25V	4.7 uF	25 V
C14	CEMX4R7MF25V	4.7 uF	25 V

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
(CHASSIS)		
VR1	ACV-101-0	30 K Dual FM Level
VR2	C92-062-0	30 K AM Level

COILS/TRANSFORMERS

ITEM	PART NO.
(CHASSIS)	
Power (F Versions)	ATT-022-0
Power (K Versions)	ATT-021-0
(TUNER; AWE-003)	
L1	T24-028-0
L2	T24-028-0
L3	T24-028-0
T1	ATC-002-0
T2	T21-022-A
T3	ATC-001-0
T4	ATE-001-A
T5	T73-035-A
T6	T73-036-0
T7	T74-003-A
T8	ATB-001-A
T9	T71-028-0
T10	T71-026-0
T11	T72-022-0
T12	T75-027-0
T13	T75-023-B
T14	T75-024-B
T15	T75-025-B
T16	T75-028-0
T17	T75-028-0
T18	T75-029-0

MISCELLANEOUS

ITEM	NAME	PART NO.
S1	Switch, Input Select	S13-026-A
S2	Switch, Muting	ASK-006-0
S3	Switch, Power (K Versions)	ASA-008-0
	Switch, Power (F Versions)	S11-016-A
S4	Switch, Line Voltage (F Versions)	S11-018-0
	Meter, Signal	A91-017-B
	Meter, Tuning	A91-016-B

CABINET PARTS

NAME	PART NO.
Case, Wooden	M52-139-A
Assembly, Front Panel	ANB-068-0
Glass, Dial	AAC-012-0
Knob, Tuning	A12-235-0
Knob, Power/Selector	A12-232-0

Pages 87-98 Courtesy of RCA SALES CORP.

ALIGNMENT PROCEDURES

INSTRUMENTS REQUIRED

Signal Sources

1. RF Signal/Sweep Generator (RCA WR-50B or equivalent)
2. TV/FM Sweep Generator (RCA WR-69A or equivalent)
3. Marker Generator (RCA WR-99A or equivalent)

Output Indicators

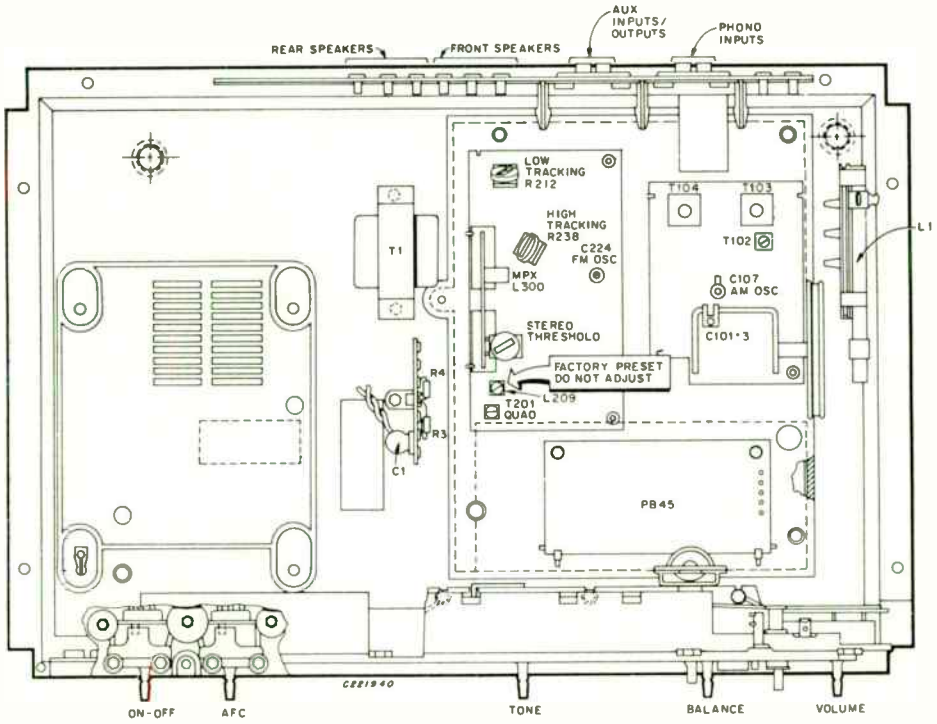
1. Electronic Voltmeter (RCA WV-98C or equivalent)
2. Oscilloscope (RCA WO-91C or equivalent)

GENERAL ALIGNMENT CONDITIONS

1. Signal input must be kept as low as possible to avoid overload and clipping. (Use highest possible sensitivity of output indicator.)
2. Marker insertion must not distort the oscilloscope trace.
3. Standard modulation is 400 Hz at 30% amplitude.
4. A non-metallic alignment tool should be used for all adjustments.

AM

Step	Connect Signal Source to—	Connect Output Indicator to—	Set Signal to—	Set Radio Dial to—	Adust	Adjust for—	Step
1	Set Radio Function Switch for "AM"						1
2	RF Generator to Point "A" on PB37	E.V.M.— Across Tape Output Jacks	455 kHz (modulated)	Gang Fully Open	T104 Top & Bottom (2nd AM IF)	Maximum	2
3					T103 Top & Bottom (1st AM IF)		3
4	RF Generator— A standard radiating loop or short piece of wire placed near the AM antenna		1620 kHz (modulated)		C107 (Oscillator Trim)		4
5			1400 kHz (modulated)	1400 kHz	C101-3T (Ant. Trim)		5
6			600 kHz (modulated)	600 kHz (rock gang)	T102 (Osc. Coil)		6
7	Repeat steps 4 through 7 as necessary to obtain Maximum sensitivity on stations						7



RC 1250 Chassis Layout (Alignment Points)

FM

Step	Connect Signal Source to—	Connect Output Indicator to—	Set Signal to—	Set Radio Dial to—	Adjust	Adjust for—	Step
1	Set Function Switch for "FM", Short Base of Q202 to Gnd.						1
2		Voltmeter from Arm of R200 to Gnd.		108.5 MHz	R238	9V	2
3				87.5 MHz	R212	4V	3
4	Repeat steps 2-3						4
5	Sweep Gen. to Ant. Terminals with marker Generator loosely coupled to Ant.	Scope to Base of Q203 Thru Probe Shown Figure 1.	98-108 MHz Range with 108.5 MHz marker.	108.5 MHz	Expand or Compress L204	Maximum Amplitude at 108.5 MHz	5
6					L206		6
7					L202		7
8					L203		8
9			88-98 MHz Range with 87.5 MHz marker.	87.5 MHz	R212	Center Response Curve on 87.5 MHz	9
10		Voltmeter from Arm of R200 to Gnd.		108.5 MHz	R238	9V	10
11	Repeat steps 9 & 10 until no further adjustment is required						11
12	Tune down the dial observing response curve amplitude thru out the Band. If any appreciable deviation in amplitude is observed repeat steps 5 thru 10.						12
13	Remove short from Base of Q202						13
14	Sweep Gen. to Ant. Terminals	Scope thru direct probe to Pin 15 of IC 201	98-108 MHz Range	Quiet Area on dial Near 108 MHz	C224 (OSC Trim)	A definite Peak in Amplitude	14
15			88-98 MHz Range	Quiet Area on Dial Near 88 MHz	Expand or Compress L207, L208		15
16	Repeat steps 14-15 until no further correction can be made						16
17	Sweep Gen. to Ant. Terminals	Scope thru direct probe to Pin 11 of J202 (Mplx Socket)	88-98 MHz Range Narrow Sweep Width	Tune to Center of "S" Curve	T201 (Quad. Coil)	Minimum Horizontal Movement of "S" Curve as AFC is switched on/off	17

MULTIPLEX ALIGNMENT

1. Tune the receiver to a station known to be broadcasting a stereo signal.
2. Turn the core of the multiplex coil, L300, to the bottom.
3. Unlock the oscillator by momentarily switching the function switch to the "AM" position. The stereo indicator light should now be off. It may be necessary to disconnect the antenna from the chassis in strong signal areas.
4. Very carefully turn the core of L300 counterclockwise until the stereo indicator lights. Note the mechanical position of the core slot.
5. Resume turning the core in a counterclockwise direction while alternately switching the function switch to "AM" & "FM" positions. Note the mechanical position of the core slot when the stereo indicator fails to light as the receiver is returned to the "FM" position.
6. Adjust the core slot to center between the two positions determined in steps 4 & 5. See figure 2.

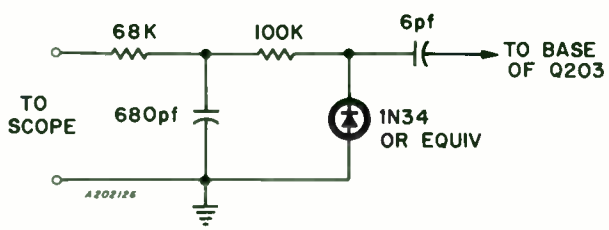


Fig. 1
Detector Probe

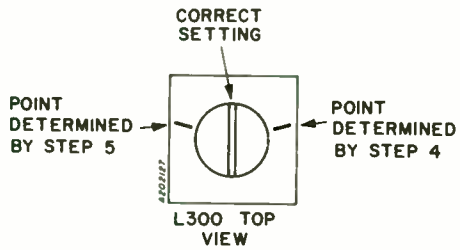
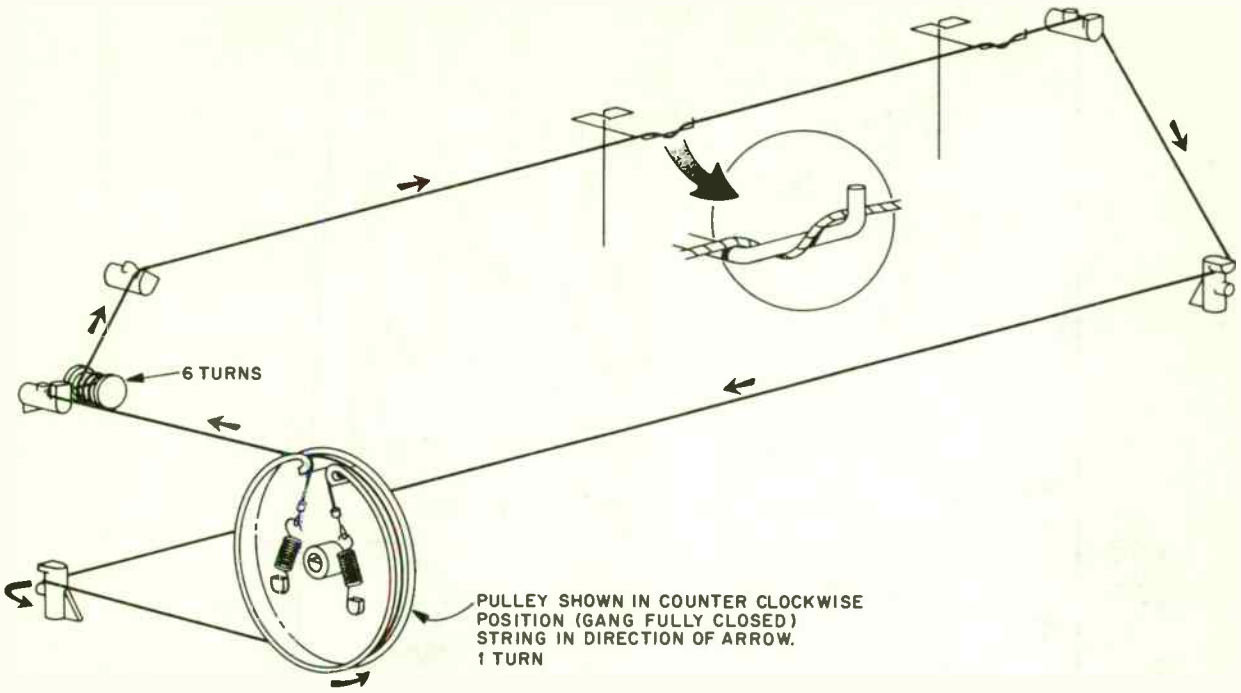
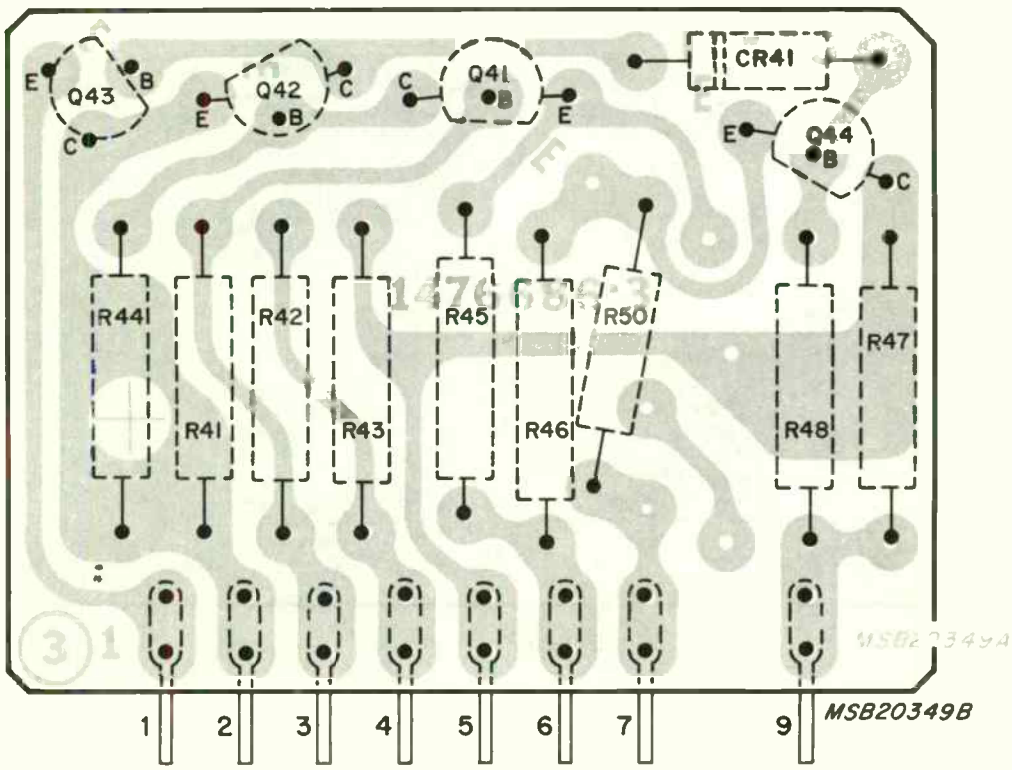


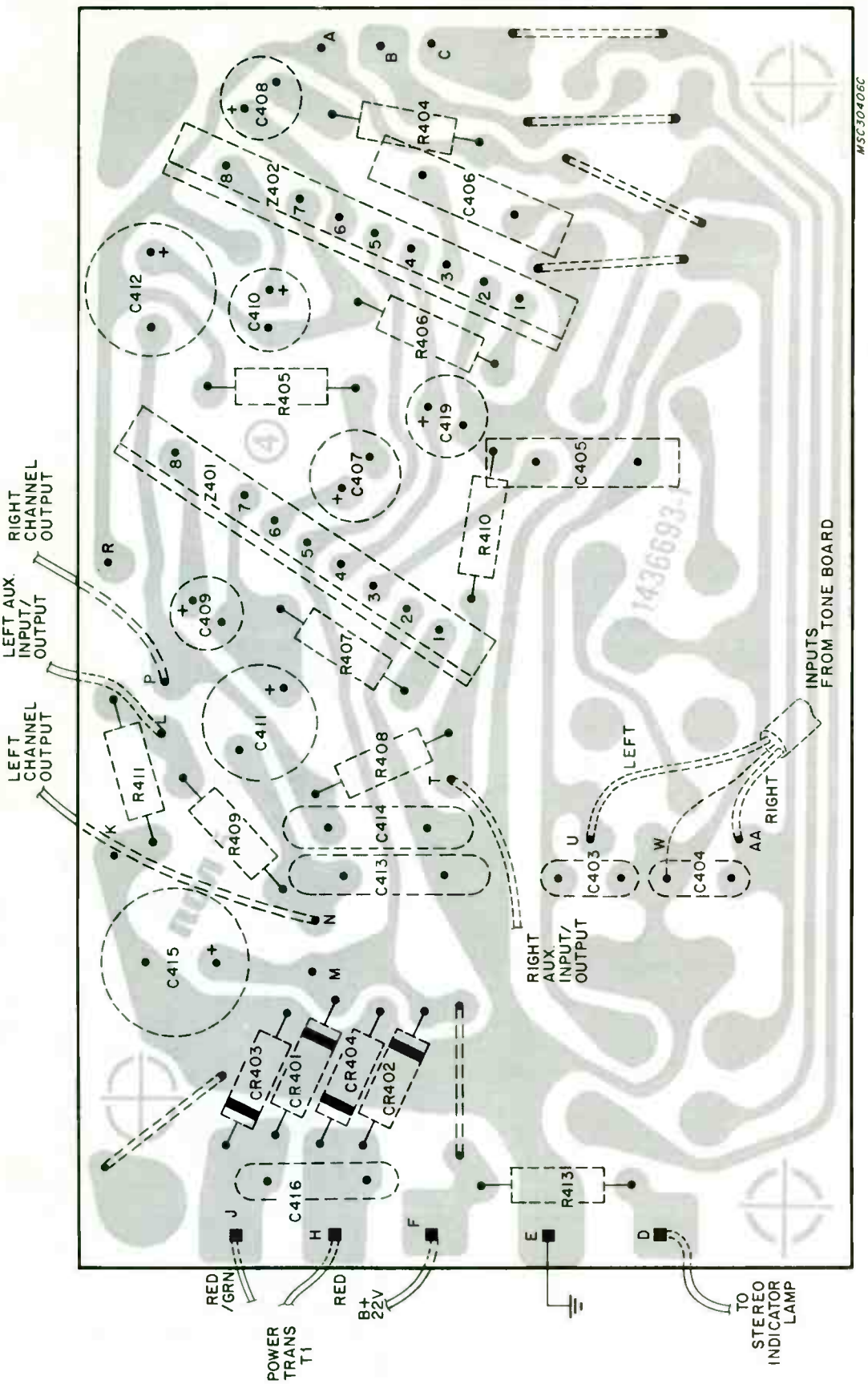
Fig. 2
Multiplex Align.



Dial Cord Arrangement

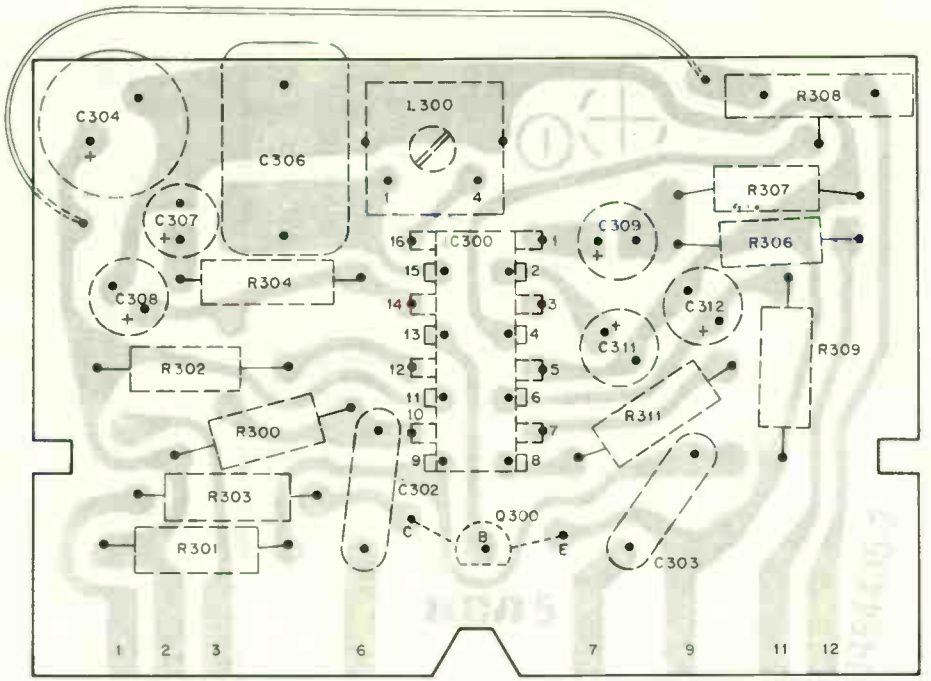


PB43D—Component Location (Z401/402)



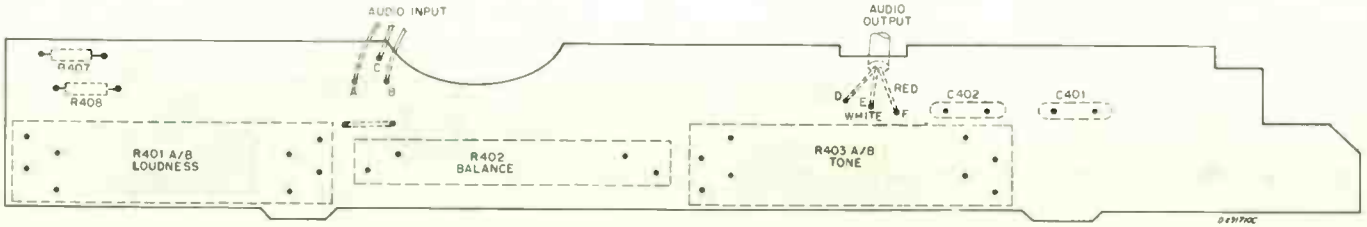
PB45F—Component Location (Wiring View)

MULTIPLEX



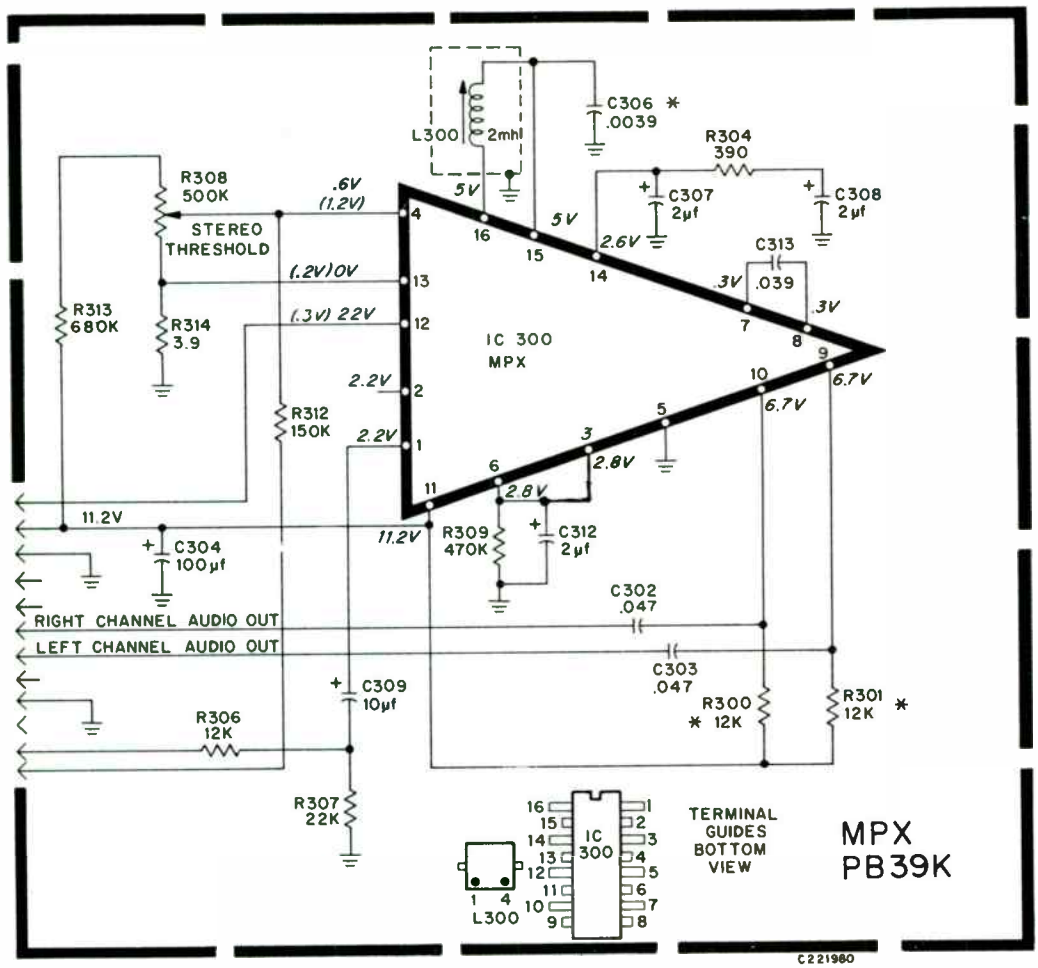
PB39DX—Component Location (Wiring View)

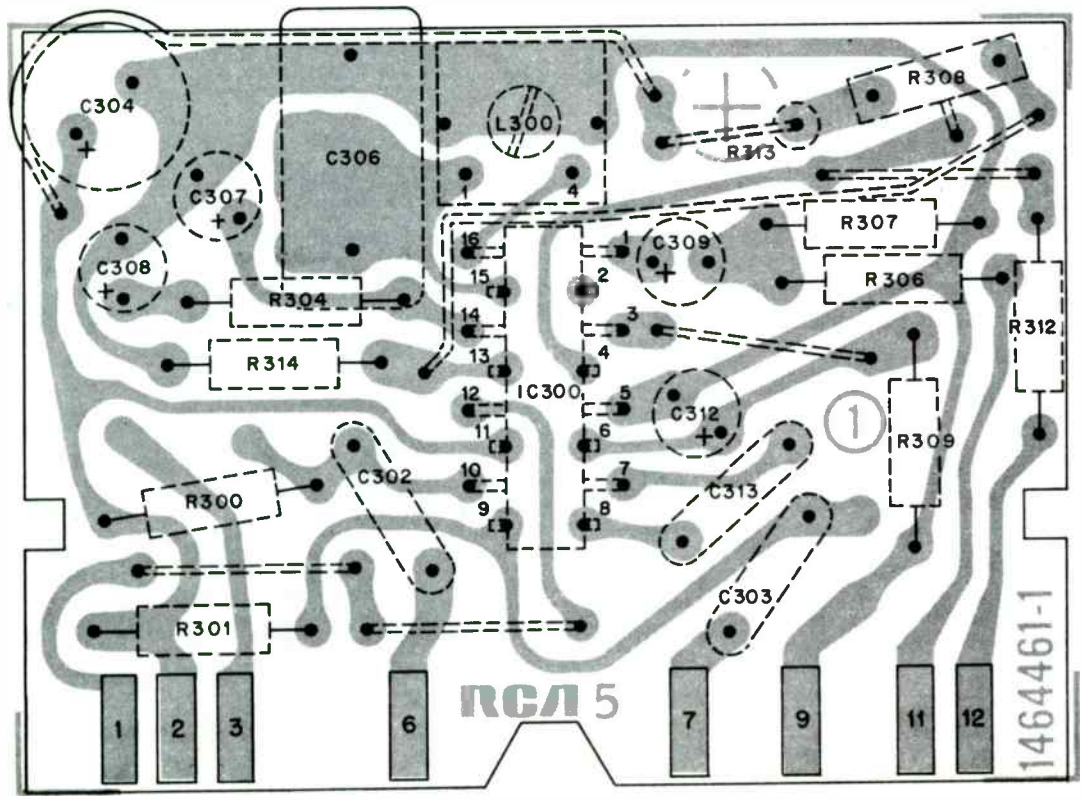
TONE

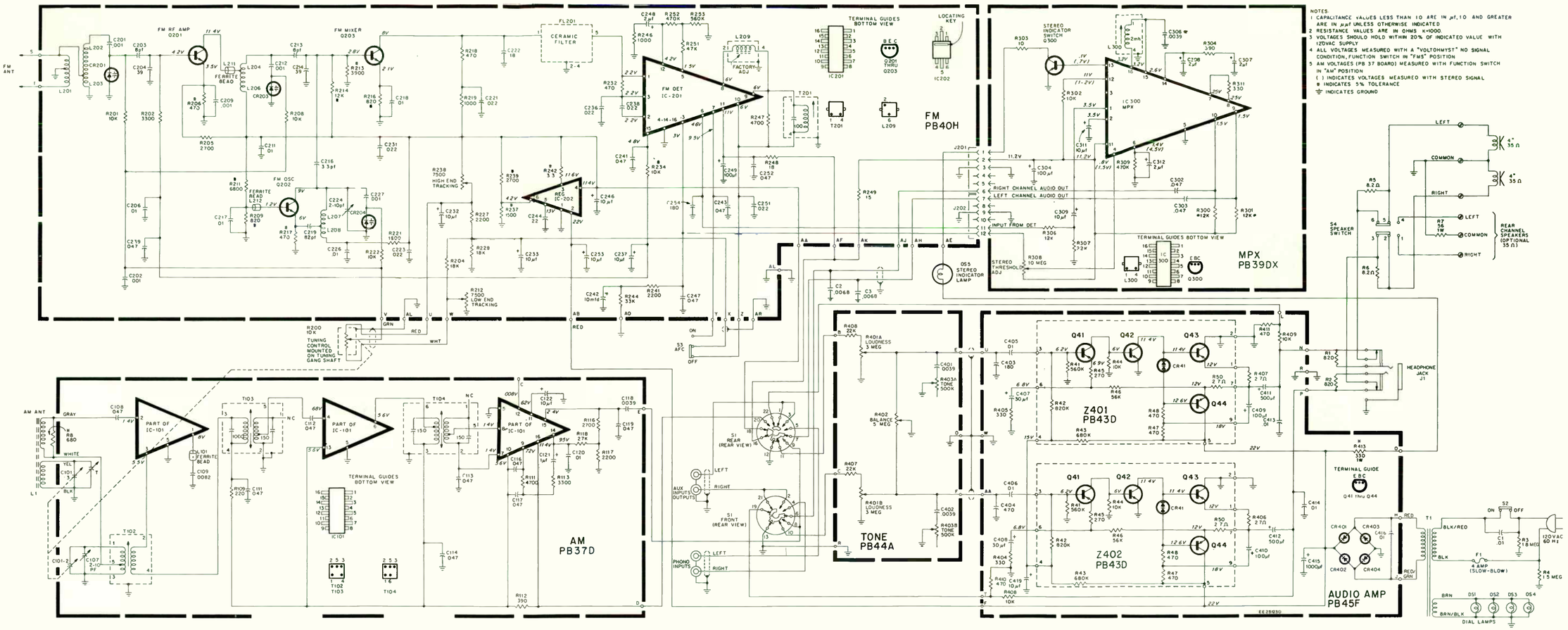


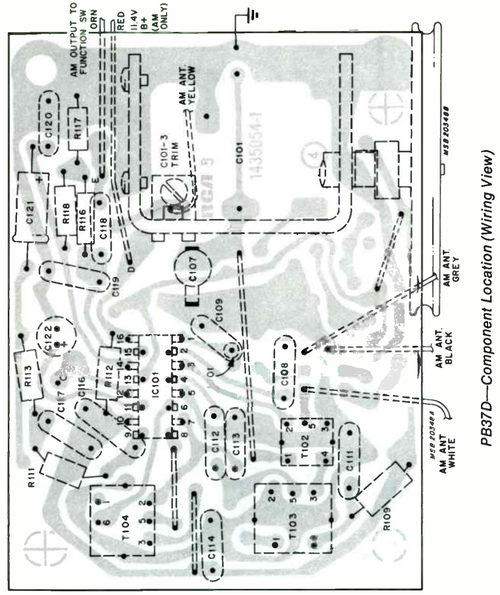
PB44A—Component Location (Wiring View)

NOTE: Some versions of Model VYC210 may contain alternate multiplex circuit board shown below:



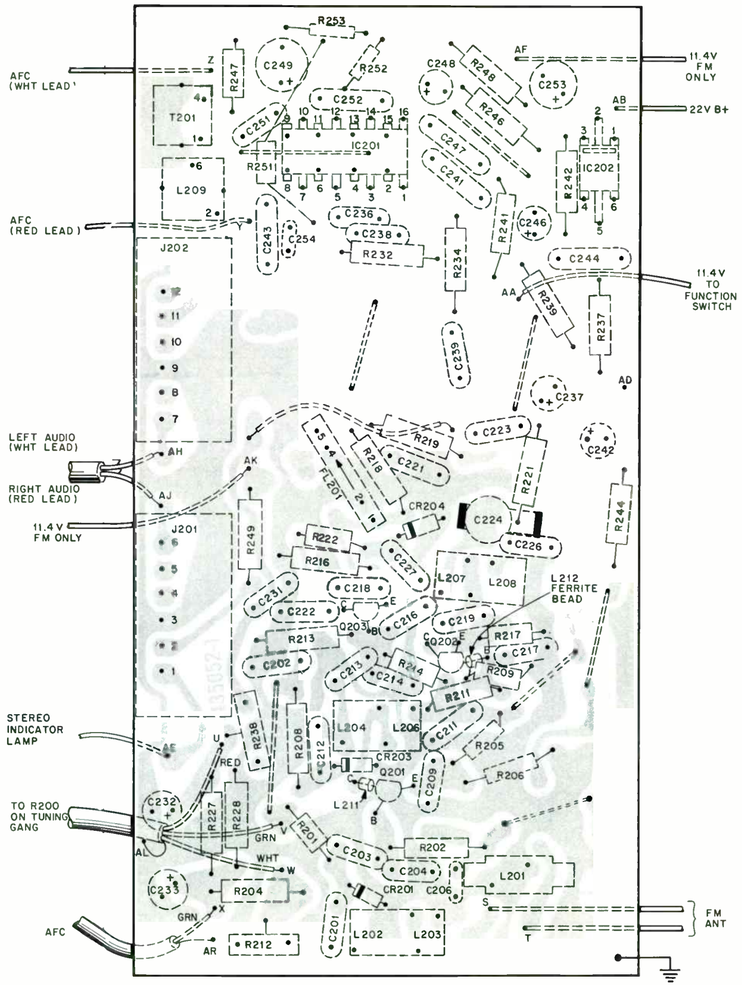






PB37D—Component Location (Wiring View)

FM



PB40H—Component Location (Wiring View)

SEMICONDUCTORS

ITEM	PART NO.
CR41	137613
CR201	136164
CR203	136164
CR204	136164
CR401	125105
CR402	125105
CR403	125105
CR404	125105
IC101	136145
IC201	136146
IC202	134340
IC300	136147
Q41	131242
Q42	137614
Q43	136423
Q44	136424
Q201	136168
Q202	136240
Q203	136240
Q300	136239

ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C101	137631	Tuning Gang
C107	116501	2-10 pF Trimmer
C121	136158	1 uF 50 V
C122	132543	10 uF 15 V
C224	130129	2-10 pF Trimmer
C232	132543	10 uF 15 V
C233	132543	10 uF 15 V
C237	132543	10 uF 15 V
C242	132543	10 uF 15 V
C246	132543	10 uF 15 V
C248	120083	2 uF 50 V
C249	115803	100 uF 15V
C253	418689	10 uF 50 V
C304	115803	100 uF 15 V
C307	120083	2 uF 50 V
C308	120083	2 uF 50 V
C309	132543	10 uF 15 V
C311	132543	10 uF 15 V
C312	120083	2 uF 50 V
C407	122012	30 uF 10 V
C408	122012	30 uF 10 V
C409	115617	100 uF 6 V
C410	115617	100 uF 6 V
C411	111789	500 uF 15 V
C412	111789	500 uF 15 V
C415	115593	1000 uF 25 V
C419	118832	10 uF 25 V

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R5	120595	8.2 ohms 10% 1/4W
R6	120595	8.2 ohms 10% 1/4W
R212	137269	7500 ohms FM Tracking, Low End
R238	137269	7500 ohms FM Tracking, High End
R308	137615	10 meg Stereo Threshold
R401	138100	3 meg Dual Loudness
R402	138098	5 meg Balance
R403	138099	500 K Dual Tone

COILS/TRANSFORMERS

ITEM	PART NO.
L1	138083
L101	119971
L201	130291
L209	137267
L211	116761
L212	119971
L300	136169
T1	138084
T102	136173
T103	136172
T104	136171
T201	136170

MISCELLANEOUS

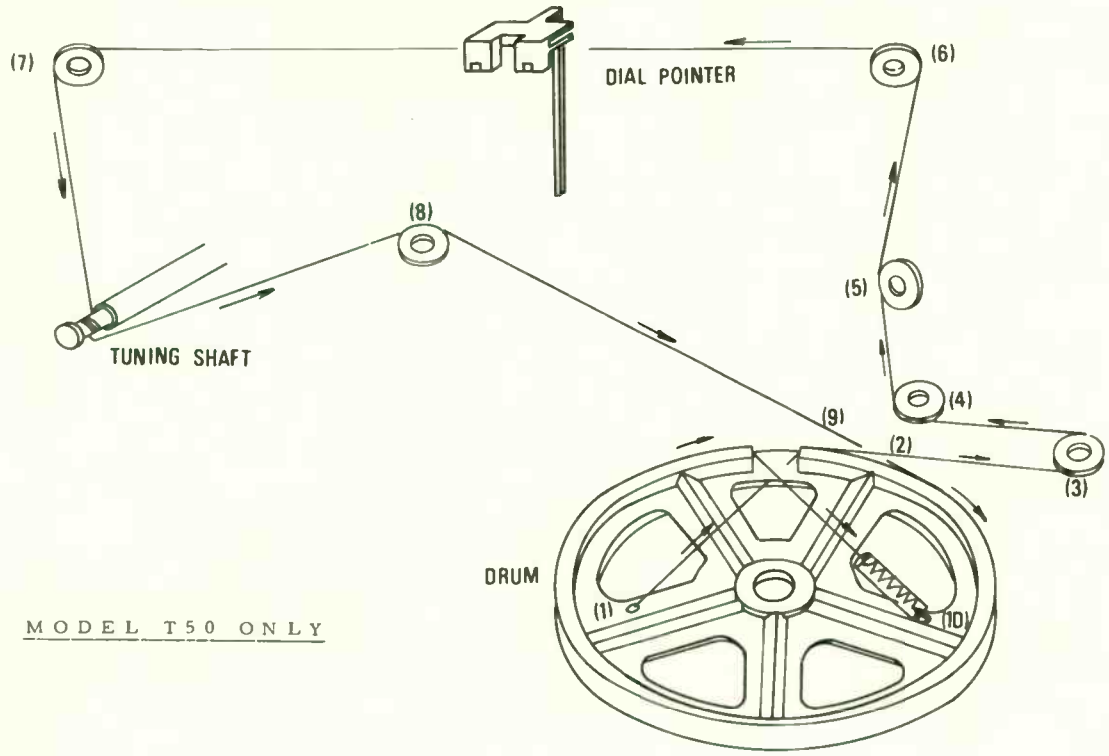
ITEM	NAME	PART NO.
F1	Fuse, 0.4 Amp Slo-Blo	130791
FL201	Filter, Ceramic	171190
S1	Switch, Function	138095
S2	Switch, Power	138088
S3	Switch, AFC	138087
S4	Switch, Speaker	171610
	Speaker, 4", 35 ohms	136872

CABINET PARTS

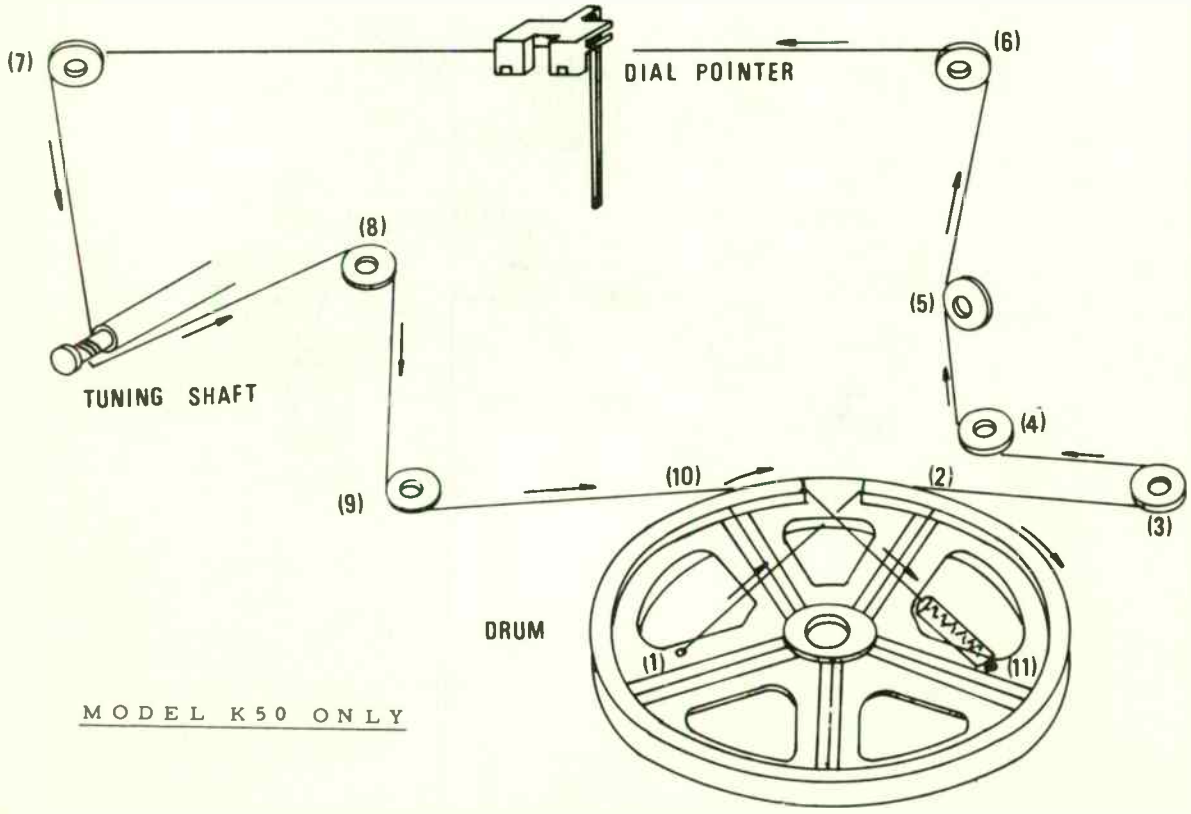
NAME	PART NO.
Case, Record Changer	134962
Case, Tuner	138003
Cloth, Grille	129887
Cover, Dust	134963
Escutcheon	138004
Knob, Function	138005
Knob, Power/AFC/Controls	138007
Knob, Tuning	138006

Pages 99-110 Courtesy of TELEDYNE PACKARD-BELL ELECTRONICS

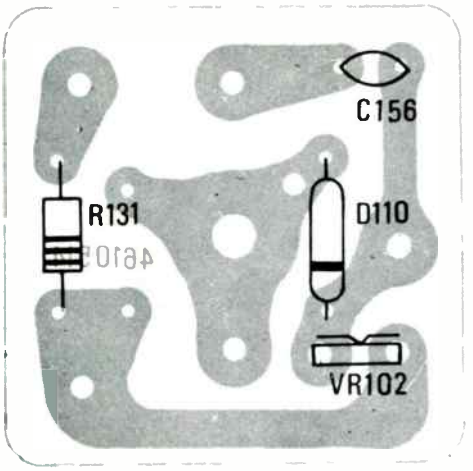
DIAL CORD RESTRINGING DIAGRAM

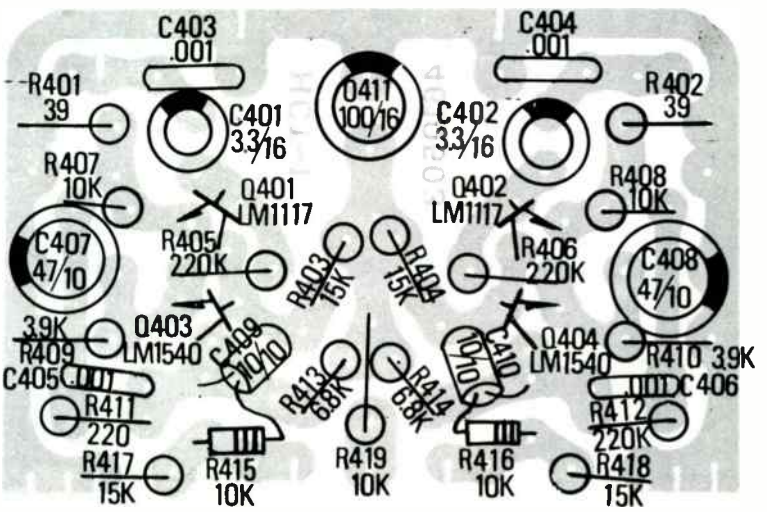


MODEL T50 ONLY

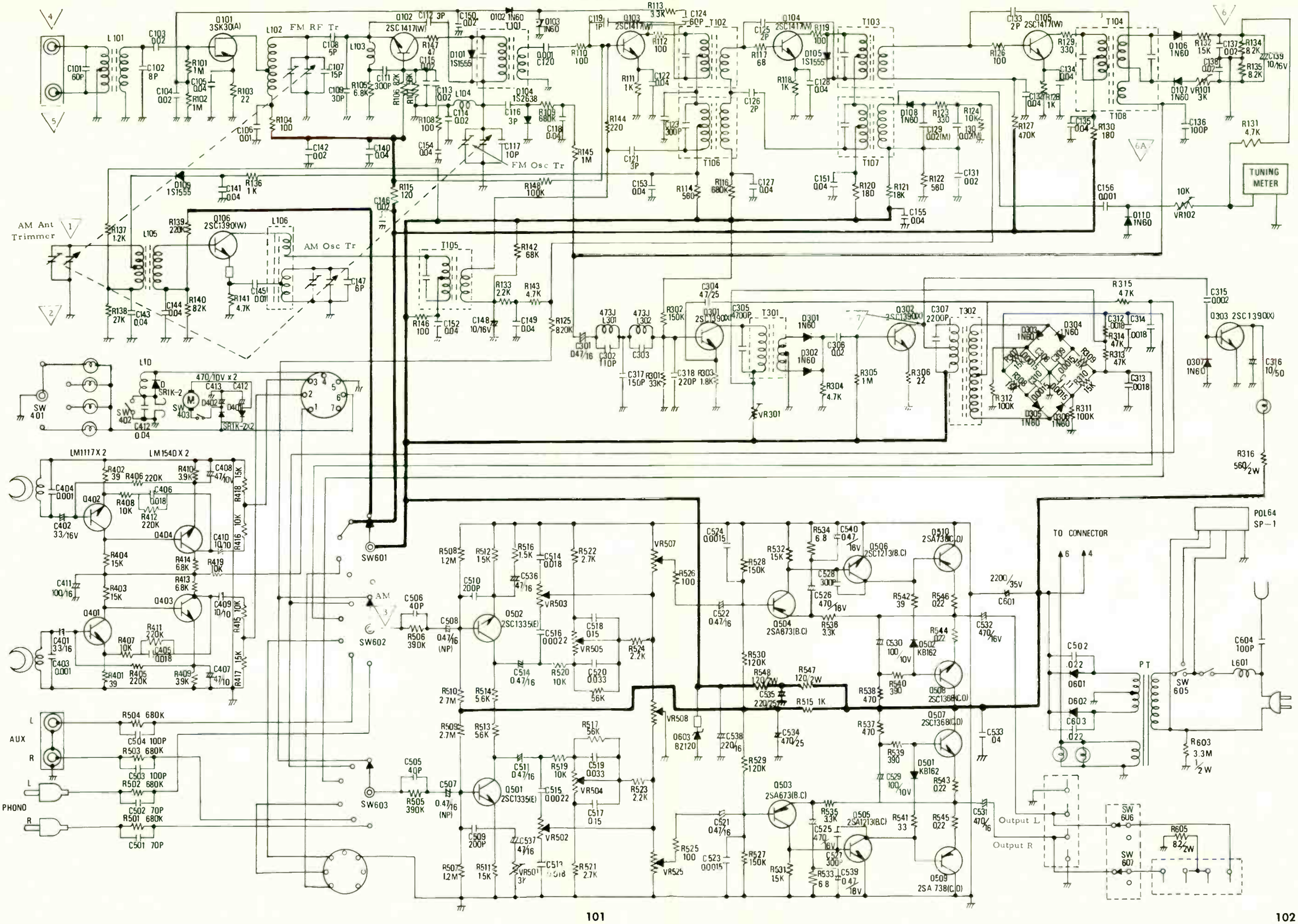


MODEL K50 ONLY





MODEL K50



ALIGNMENT INSTRUCTIONS

CAUTION: Use isolation transformer or observe polarity when connecting test equipment.
Maintain line voltage at 120VAC. Allow a 15-minute warm-up period.
Use only enough generator output to obtain a suitable indication.

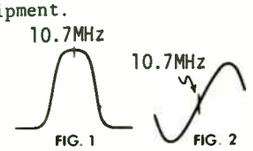


FIG. 1 FIG. 2

AM ALIGNMENT—SELECTOR IN AM POSITION

Connect generator across loop fashioned of several turns of wire. Set volume at maximum.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
455kHz 400-hertz Modulation	Tuning gang fully open	Output meter across voice coil	T107, T106, T105	Adjust for maximum. Repeat until no further improvement is noted.
600kHz	Tune to signal	"	L106	Adjust for maximum.
1640kHz	"	"	AM Osc.Trimmer	Adjust for maximum.
1400kHz	"	"	AM RF Trimmer	Adjust for maximum. Repeat AM alignment until no further improvement is noted.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001mfd to Jct. L102 & C108, low side to ground.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
10.7MHz Unmodulated	Point of non-interference	DC probe of VTVM to Cathode D106 common to ground.	T104(Pri),T103 T102, T101	Adjust for maximum.
"	"	DC probe of VTVM to point A6, common to ground.	T104 (Sec)	Adjust for zero reading. A positive or negative reading will be obtained on either side of correct setting.

ALIGNMENT INSTRUCTIONS (Continued)

FM IF ALIGNMENT USING FM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001mfd to point Jct. L102 & C108, low side to ground.
Use only enough marker signal for indication. Use 60-hertz frequency modulated signal with 450kHz sweep. Use 60-hertz sawtooth voltage in scope for horizontal deflection.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
10.7MHz 450kHz Sweep	Point of non-interference	Vert input of scope to Cathode D106, low side to ground.	T104(Pri),T103 T102,T101	Disconnect stabilizing capacitor C 139. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C 139.
"	"	Vert input of scope to point A6 low side to ground.	T104 (Sec.)	Adjust T104(Sec.) to place marker at center of S curve similar to Fig. 2. Readjust T104(Pri) for maximum amplitude and straightness of line.

FM RF ALIGNMENT—SELECTOR IN FM POSITION

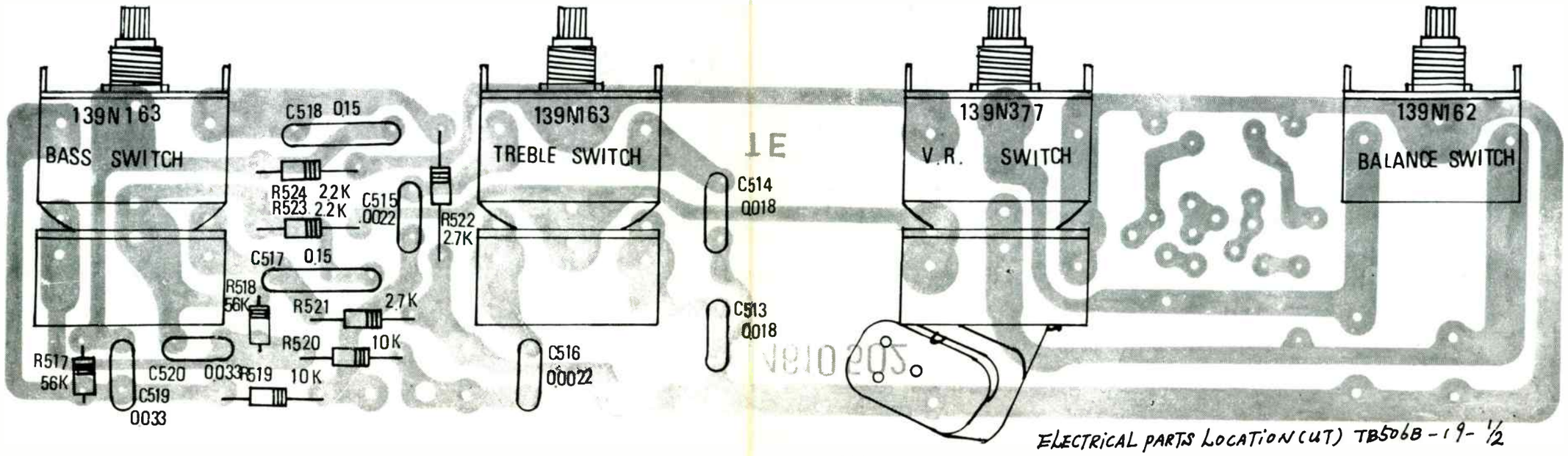
Connect generator across antenna terminals with 120-ohm carbon resistor in series with each lead.
Adjustment of coils by bending should not be attempted unless the coil is deformed or replaced.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
88MHz Unmodulated	Low freq end	DC probe of VTVM to Cathode D106 common to ground.	L104, L102, L101	Adjust for maximum.
Unmodulated	Tune to signal	"	FM Osc.Trimmer Sec.RF Trimmer	Adjust for maximum. Repeat FM RF steps until no further improvement is noted.

FM STEREO MULTIPLEX ALIGNMENT USING FM STEREO SIGNAL GENERATOR (± .0001% ACCURACY)

High side of generator thru 47K to point A6, low side to ground.

GENERATOR FREQUENCY	INDICATOR	ADJUST	REMARKS
19kHz	Vert input of scope thru 47K to Anode D301, low side to ground.	T301	Adjust for maximum.
19kHz	Vert input of scope thru 47K to Cathode D304 low side to ground.	T302	Adjust for maximum 38kHz response.



ELECTRICAL PARTS LOCATION (UT) TB506B-19-½

HEAD AZIMUTH AND HEIGHT ADJUSTMENT USING RCA TEST CARTRIDGE

Before starting this adjustment, the head and all tools to be used for alignment must be demagnetized.

The following equipment is required:

- VTVM
- Load resistor, 10 kΩ
- AC power source, 120 V, 60 Hz
- RCA test tape cartridge #321
- Small screwdriver

1. Connect the VTVM and load resistor across the left channel output of the stereo tape player
2. Depress channel selector button to obtain track two on the channel indicator.
3. Adjust the height screw to obtain a minimum reading on the VTVM.

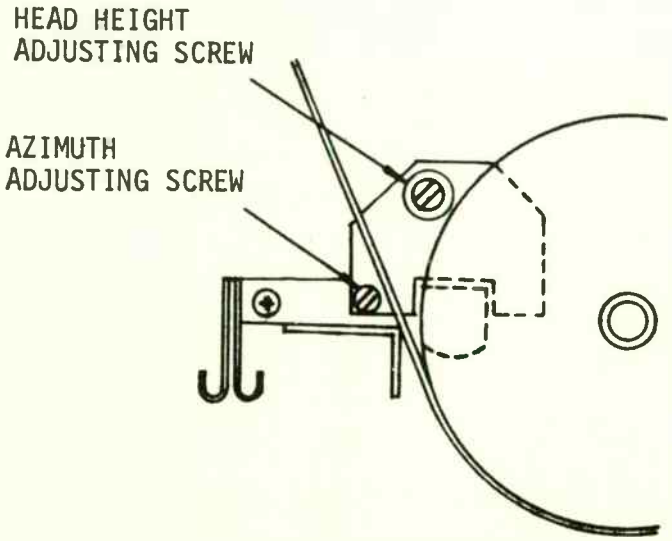
NOTE: A 1000 Hz signal is recorded on each side above and below track 2 (left channel) of the RCA test cartridge #321.

4. Transfer the VTVM and load resistor to the right channel output.
5. Turn the azimuth adjusting screw to obtain maximum meter deflection.

NOTE: Track 6 (right channel) has an 8000 Hz signal slightly wider than standard, which is used for azimuth adjustment.

6. Repeat these adjustments (3 and 5) alternately, since height may change with azimuth adjustment.

7. After adjustments are complete, lock the height and azimuth adjusting screws with silicone cement.



SEMICONDUCTORS

ITEM	PART NO./TYPE
D101	1S1555
D102	1N60
D103	1N60
D104	1S2139B (1S2638)
D105	1S1555
D106	1N60P
D107	1N60P
D108	1N60
D109	1S1555
D110	1N60
D301	1N60P
D302	1N60P
D303	1N60P
D304	1N60P
D305	1N60P
D306	1N60P
D307	1N60
D308	1N60
D401	10D-1 (SRIK-2)
D402	10D-1 (SRIK-2)
D403	10D-1 (SRIK-2)
D501	KB-162
D502	KB-162
D601	10D-1 (SRIK-2)
D602	10D-1 (SRIK-2)
D603	BZ-120
Q101	3SK30 (A)
Q102	2SC1417 (W)
Q103	2SC1417 (W)
Q104	2SC1417 (W)
Q105	2SC1417 (W)
Q106	2SC1390 (W)
Q301	2SC1390 (X)
Q302	2SC1390 (X)
Q303	2SC1390 (X)
Q401	LM1117 (B)
Q402	LM1117 (B)
Q403	LM1540 (B)
Q404	LM1540 (B)
Q501	2SC1335 (E)
Q502	2SC1335 (E)
Q503	2SA673 (B) or (C)
Q504	2SA673 (B) or (C)
Q505	2SC1213 (B) or (C)
Q506	2SC1213 (B) or (C)
Q507	2SC1368 (C) or (D)
Q508	2SC1368 (C) or (D)
Q509	2SA738 (C) or (D)
Q510	2SA738 (C) or (D)

ELECTROLYTIC/VARIABLE CAPS

ITEM	VALUE
C139	10 uF 16 V
C148	10 uF 16 V
C301	.47 uF 16 V
C316	10 uF 50 V
C407	47 uF 10 V
C408	47 uF 10 V
C409	10 uF 10 V
C410	10 uF 10 V
C412	470 uF 10 V
C413	470 uF 10 V
C507	.47 uF 16 VNP
C508	.47 uF 16 VNP
C511	.47 uF 16 V
C514	.47 uF 16 V
C521	.47 uF 16 V
C522	.47 uF 16 V
C525	470 uF 16 V
C526	470 uF 16 V
C529	100 uF 10 V
C530	100 uF 10 V
C531	470 uF 16 V
C532	470 uF 16 V
C536	47 uF 16 V
C537	47 uF 16 V
C538	220 uF 16 V
C539	.47 uF 16 V
C540	.47 uF 16 V
C601	2200 uF 35 V
FUN4290112	Tuning Gang

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION	
VR101	FUN1390175	3000 ohms	Detector Balance
VR102	FUN1380171	10 K	Tuning Meter
VR301	FUN1390175	3000 ohms	Separation
VR501	FUN1390175	3000 ohms	Channel Balance
VR502	FUN139N163	Treble	
VR503	FUN139N163	Treble	
VR504	FUN139N163	Bass	
VR505	FUN139N163	Bass	
VR506	FUN139377	Volume	
VR507	FUN139377	Volume	
	FUN139N162	Balance	

COILS/TRANSFORMERS

ITEM	PART NO.
L101	FUN111M505
L102	FUN412M502
L103	FUN111M077
L104	FUN111M106
L105	FUN4110503
L106	FUN113M203
L301	FUN1170015
L302	FUN1170015
L601	FUN1170020
T101	FUN11LM105
T102	FUN11LM105
T103	FUN11LM105
T104	FUN11DM060
T105	FUN11AM004
T106	FUN11BM004
T107	FUN11CM004
T108	FUN11EM060
T301	FUN11PN001
T302	FUN11QN001
Power	FUN418M507U (FUN118M173NEW)

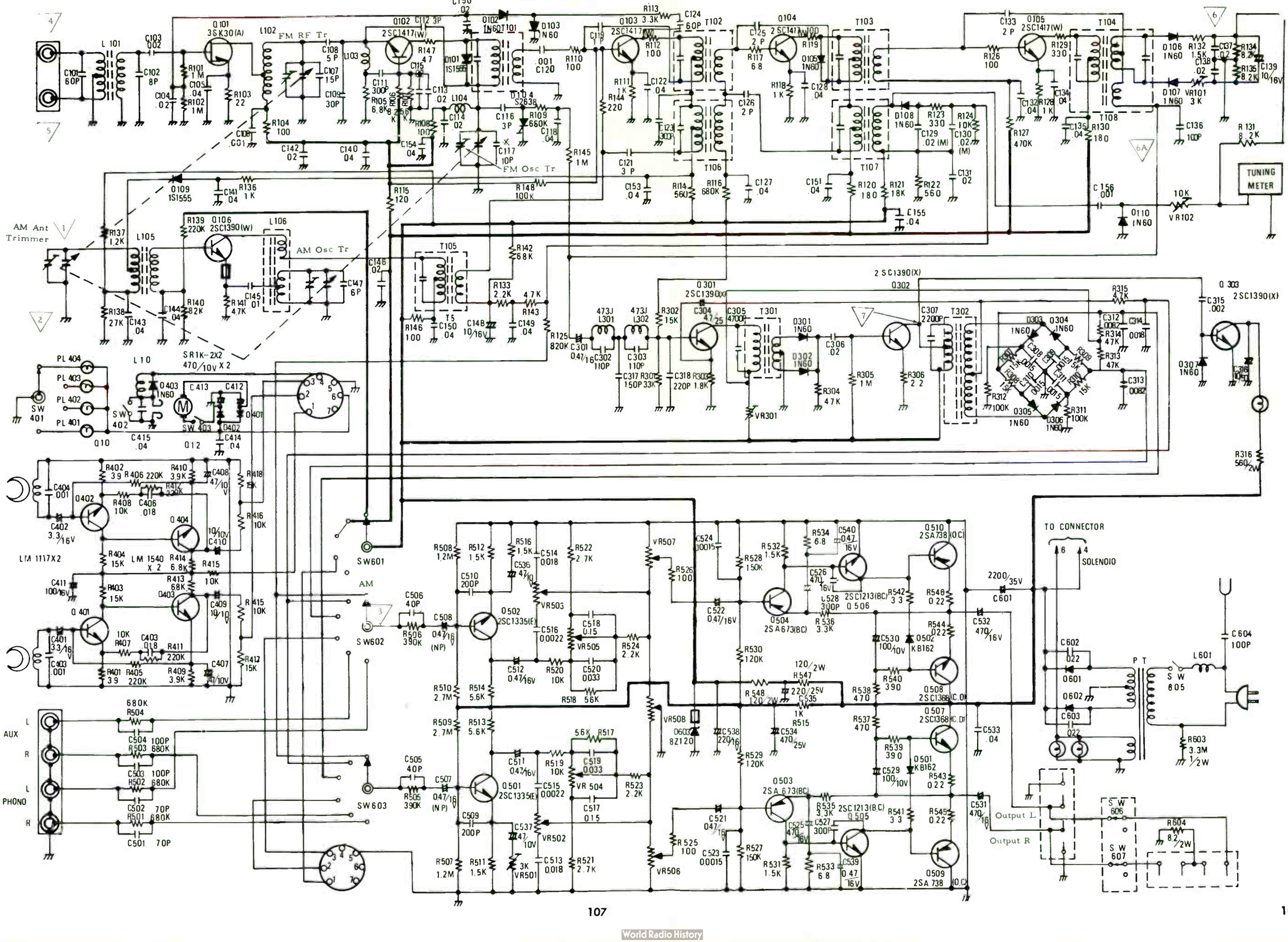
MISCELLANEOUS

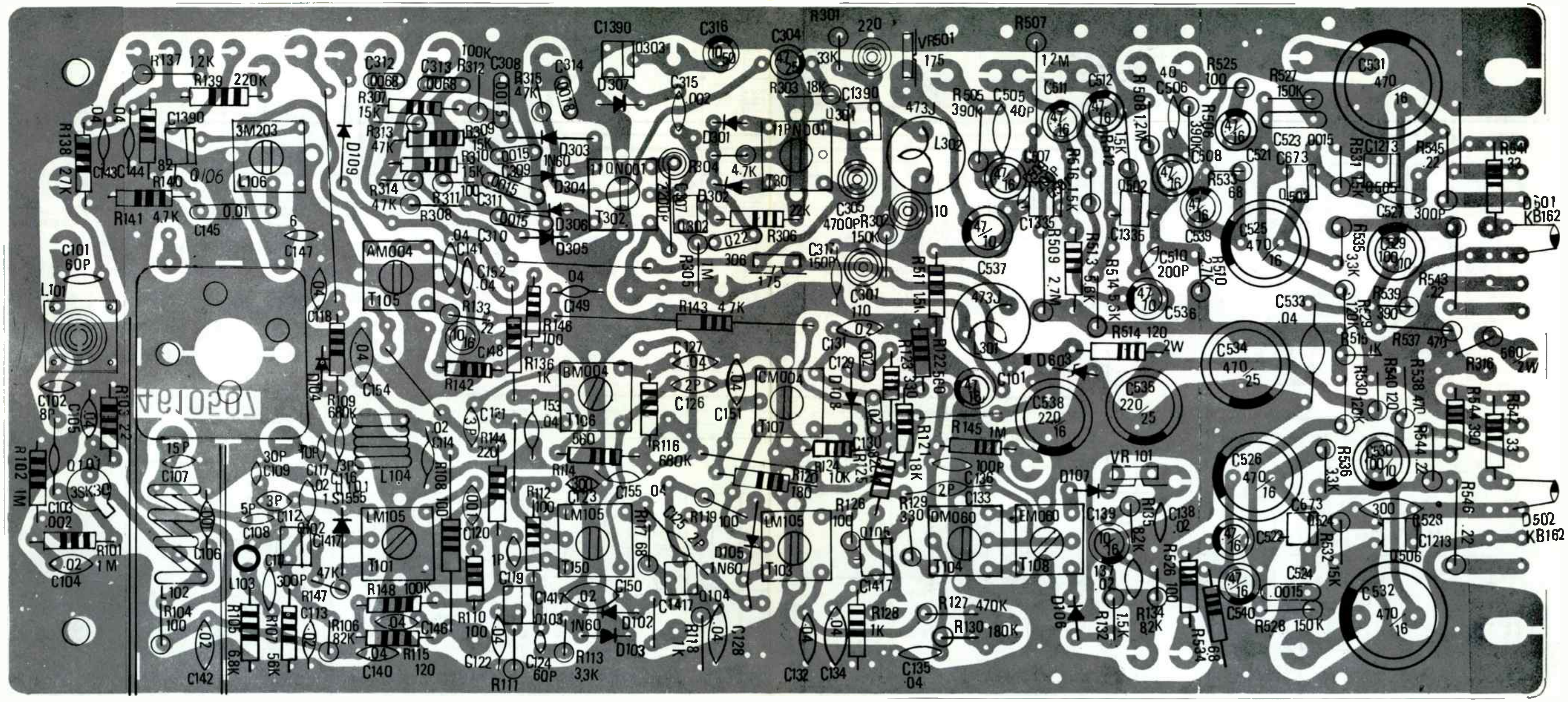
ITEM	NAME	PART NO.
SW601, SW602, SW603	Switch, Function	FUN1620178
	Meter, Tuning	FUN4831503
	Switch, Micro	FUN1623021
	Switch, Push	FUN1622079

CABINET PARTS

NAME	PART NO.
(COMMON)	
Panel, Front	FUN21FE019
Knob, Tuning	FUN21N4100
Knob, 4-Channel	FUN21N4117
Button, Channel Select	FUN21NE032
(MODEL K50)	
Assembly, Cabinet	FUN27CE001
Lid, Rear	FUN24CE014
(MODEL T50)	
Assembly, Cabinet	FUN27CE008
Lid, Rear	FUN24CE008

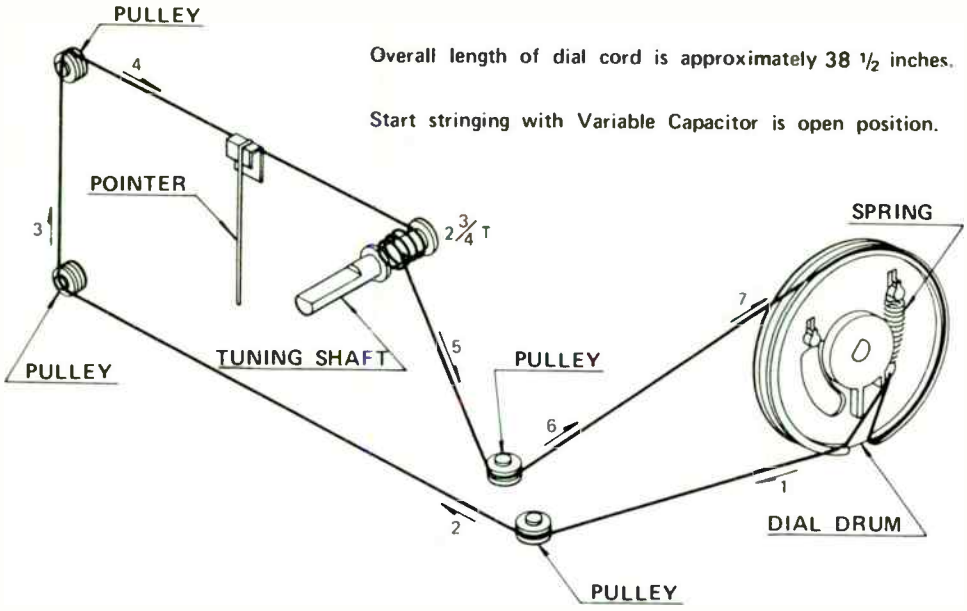
MODEL T50





Pages 111-118 Courtesy of MONTGOMERY WARD & CO.

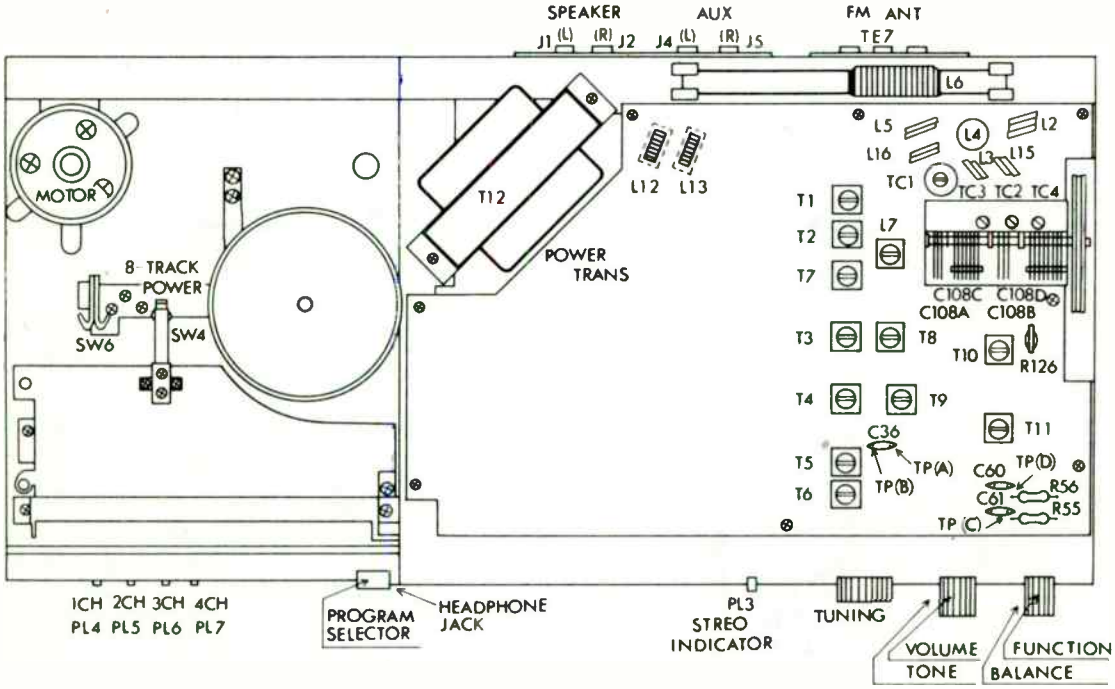
DIAL CORD STRINGING



Overall length of dial cord is approximately 38 1/2 inches.

Start stringing with Variable Capacitor is open position.

CHASSIS ALIGNMENT LAYOUT



AM AND FM ALIGNMENT

EQUIPMENT REQUIRED

1) AM signal generator covering frequency ranges of 455 KHz, and 500 to 1,700 KHz modulated with 400 or 1,000 Hz.
2) FM signal generator capable of producing 10.7 MHz.
3) FM signal generator covering frequency range of 85 to 110 MHz.
4) V.T.V.M. with DC and AC probes.

PRELIMINARIES

1) In all tests outputs of both channels must be terminated with 8 ohm loads. (Use speakers or resistive loads.)
2) Set volume control to maximum.
3) Keep output of signal generator no higher than necessary to obtain an output reading.

AM SECTION

Step	Connect S.G. to	S.G. Output	Dial Setting	Connect V.T.V.M. to	Point Adjusted	Adjust for
SELECTOR AT "AM" POSITION						
1	Short wire or coil of few turns placed to Radiate signal into ferrite bar-antenna	455 KHz (AM Mod.)	Quiet Point Near 1,600 KHz	AC probe Across Output loads	T7	Maximum on V.T.V.M.
2					T8	
3					T9	
REPEAT (1) THROUGH (3) FOR BEST SENSITIVITY						
4	Same as above	520 KHz (AM Mod.)	Gang Closed	AC probe Across Output loads	L7	Maximum on V.T.V.M. Slide Coil On Ferrite Rod for Maximum on V.T.V.M.
5		1,650 KHz (AM Mod.)	Gang Open		TC3	
6		600 KHz (AM Mod.)	Tune to Signal		L6	
7		1,400 KHz (AM Mod.)	Tune to Signal		TC4	
REPEAT (4) THROUGH (7) FOR BEST SENSITIVITY						

FM SECTION

SELECTOR AT "FM" POSITION						
1	Loop to L4	10.7 MHz Modulated (FM Mod.)	Quiet Point	AC probe of V.T.V.M. Across output load	T1	Maximum on V.T.V.M.
2					T2	
3					T3	
4					T4	
5					T5	
6	Same as above	10.7 MHz Unmodulated		DC probe of V.T.V.M. connect to TP(A), TP(B)	T6	Null on V.T.V.M.
7	High side to FM Ant. Terminal through Capacitor of 0.01 MF Low side to chassis ground	86.5 MHz (FM Mod.)	Gang Closed	AC probe of V.T.V.M. Across output load	L5, L16	Maximum on V.T.V.M.
8		109.5 MHz (FM Mod.)	Gang Closed		TC1	
9		90 MHz (FM Mod.)	Tune to Signal		L3, L15	
10		106 MHz (FM Mod.)	Tune to Signal		TC2	
REPEAT (7) THROUGH (10) FOR BEST SENSITIVITY						

MULTIPLEX ALIGNMENT

EQUIPMENT REQUIRED

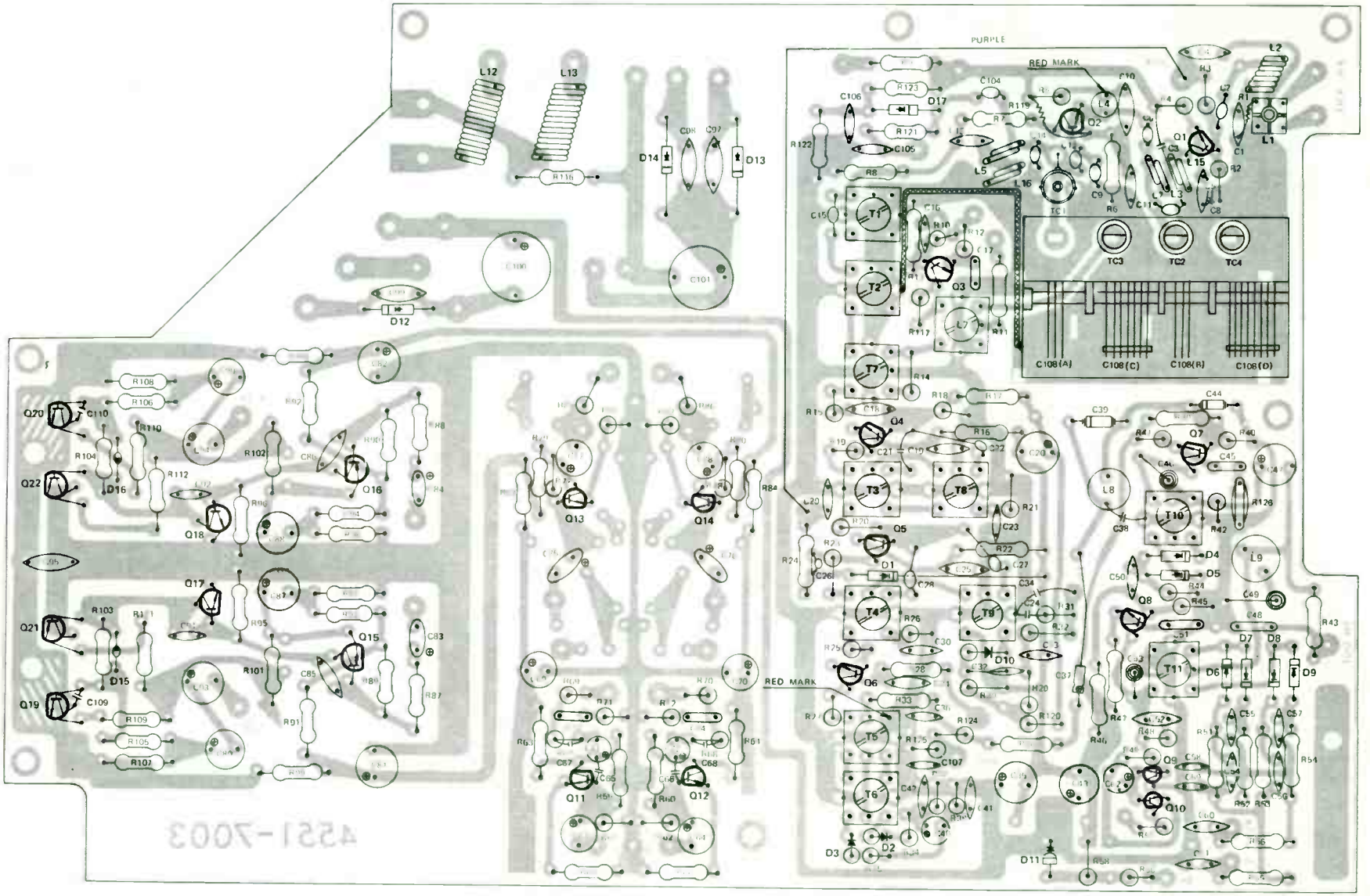
1) FM-Stereo Simulator.
2) Oscilloscope or V.T.V.M.

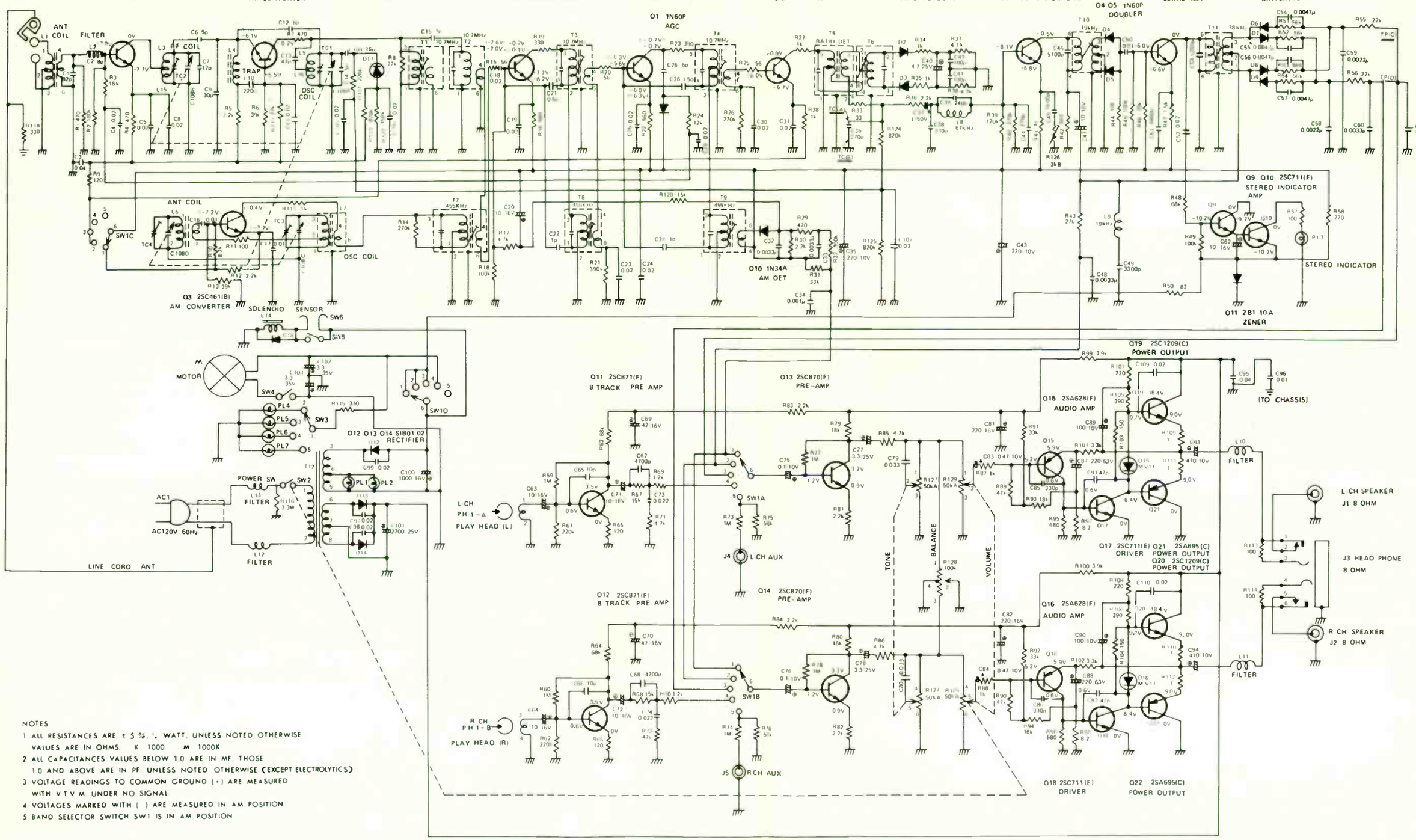
PRELIMINARIES

1) Connect FM-Stereo Simulator to FM antenna terminals.
2) Tune radio to a 100 MHz Signal from the FM-Stereo Simulator.
3) Connect low side of oscilloscope or V.T.V.M. to chassis ground adjacent to point where high side is connected.
4) Set RF deviation to approximately 75 KHz.
5) Keep 100 MHz input signal above limiting level.
6) Set 19 KHz subcarrier level to 10 %.

Step	Stereo Simulator Setting		Output Indicator	Point Adjusted	Adjust For
	Modulation Freq.	Function			
1	19 KHz	Stereo left	Stereo Indicator Lamp (PL3)	T10 T11	Adjust to have stereo indicator lit.
2	1 KHz	Stereo left	Oscilloscope or VTVM to TP(C)	T10 R126	Minimum dip between two peaks
3	1 KHz	Stereo left	Oscilloscope or VTVM to TP(C)	T11	Minimum dip between two peaks but balanced reading between step 3 and step 4.
4	1 KHz	Stereo right	Oscilloscope or VTVM to TP(D)	T11	
5	Repeat step 3 and 4, to obtain same level at Left and Right channels.				

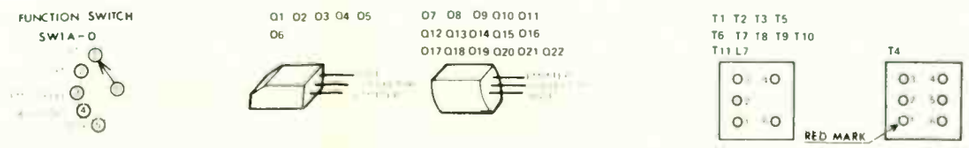
TOP VIEW OF PC BOARD





NOTES

1 ALL RESISTANCES ARE ± 5 %, ¼ WATT, UNLESS NOTED OTHERWISE VALUES ARE IN OHMS. K 1000 M 1000K
2 ALL CAPACITANCES VALUES BELOW 1.0 ARE IN MF, THOSE 1.0 AND ABOVE ARE IN PF UNLESS NOTED OTHERWISE (EXCEPT ELECTROLYTICS)
3 VOLTAGE READINGS TO COMMON GROUND (⏚) ARE MEASURED WITH V T V M UNDER NO SIGNAL
4 VOLTAGES MARKED WITH ( ) ARE MEASURED IN AM POSITION
5 BAND SELECTOR SWITCH SW1 IS IN AM POSITION



8-TRACK TAPE PLAYER
SERVICE INFORMATION AND ADJUSTMENT

TAPE HEAD ADJUSTMENT

Head Adjustments are normally required in cases of cross-talk, loss of, or noisy high frequency response or if the Head has been replaced. A suitable test tape should be used for the Azimuth and Height Adjustments. Use standard equipment item 21617 or equivalent. Connect 8 ohm loads (either speakers or dummy resistors) across the output of each channel and set treble control to maximum position. Use an AC VTVM and a Phillips Head Screwdriver for the Head Adjustments.

AZIMUTH (See Figure 1 and 2)

With the test tape, proceed as follows:

1. Insert the test tape cartridge into tape slot and position Head to program 2 and advance to Sequence B.
2. Set Balance Control for maximum output from Right Channel.
3. Connect VTVM across the Right Channel output (track 6 information-8 KHz will be presented).
4. Adjust Volume Control for approximately 0.5 Volts on VTVM.
5. Alternately adjust Azimuth Adjusting Screws (42, 26 and 43) for maximum output, as follows:
   A. Adjust tape head with screw (42) in Fig.1 so that tape head is perpendicular to chassis.
   B. Adjust a screw height to 7 mm (¼") with screw (26) in Fig.2. Adjust screw (43) to have tape head at 90° to chassis.

Misadjustment of these screws will cause poor High Frequency Response.

HEIGHT (See Figure 3)

6. Set Balance Control for maximum output from Left Channel.
7. Connect VTVM across the Left Channel output (track 2 information-approximately 125 Hz will be presented.)
8. Adjust Volume Control for approximately 0.5 Volts on VTVM.
9. Adjust Head Height Adjusting Screw (41) for a NULL.

Misadjustment of this screw will cause cross-talk and/or poor separation.

10. Repeat steps 5 and 9 to optimize these adjustments, then fasten adjusting screws in place with glyptal or other non-hardening cement.

Fig. 1

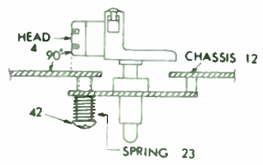


Fig. 2

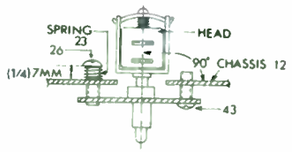
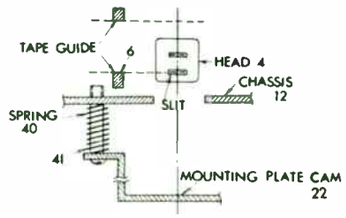


Fig. 3



SEMICONDUCTORS

ITEM	PART NO.	TYPE
D1	1N60	1N60
D2 &	J24820	1N60P
D3		
D4 &	J24820	1N60P
D5		
D6 &	J24820	1N60P
D7		
D8 &	J24820	1N60P
D9		
D10	1N34A	1N34A
D11	24MW1065	ZB1-10A
D12	J24871	S1B01-02
D13	J24871	S1B01-02
D14	J24871	S1B01-02
D15	24MW1113	MV11
D16	24MW1113	MV11
C17	J241184	1S85 (WT)
D18	24MW1071	
Q1	J24812	2SC535 (B)
Q2	J24852	2SC461 (B)
Q3	J24852	2SC461 (B)
Q4	J24863	2SC535 (C)
Q5	J24563	2SC460 (B)
Q6	J24812	2SC535 (B)
Q7	24MW1059	2SC711 (E)
Q8	24MW1059	2SC711 (E)
Q9	J24817	2SC711 (F)
Q10	J24817	2SC711 (F)
Q11	24MW1060	2SC871 (F)
Q12	24MW1060	2SC871 (F)
Q13	24MW807	2SC870 (F)
Q14	24MW807	2SC870 (F)
Q15	24MW1061	2SA628 (F)
Q16	24MW1061	2SA628 (F)
Q17	24MW1059	2SC711 (E)
Q18	24MW1059	2SC711 (E)
Q19 &	24MW1062	2SC1209 (C)
Q21		2SA695 (C)
Q20 &	24MW1062	2SC1209 (C)
Q22		2SA695 (C)

ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C20	32MW881	10 uF 16 V
C35	32MW882	220 uF 10 V
C37	32MW883	1 uF 50 V
C40	J32655	4.7 uF 25 V
C47	32MW881	10 uF 16 V
C62	32MW881	10 uF 16 V
C63	32MW881	10 uF 16 V
C64	32MW881	10 uF 16 V
C69	32MW887	47 uF 16 V
C70	32MW887	47 uF 16 V
C71	32MW881	10 uF 16 V
C72	32MW881	10 uF 16 V
C75	J32705	.1 uF 10 V
C76	J32705	.1 uF 10 V
C77	32MW889	3.3 uF 25 V
C78	32MW889	3.3 uF 25 V
C81	32MW1002	220 uF 16 V
C82	32MW1002	220 uF 16 V
C83	32MW1000	.47 uF 10 V
C84	32MW1000	.47 uF 10 V
C87	32MW890	220 uF 6.3 V
C88	32MW890	220 uF 6.3 V
C89	J32898	100 uF 10 V
C90	J32898	100 uF 10 V
C93	32MW885	470 uF 10 V
C94	32MW885	470 uF 10 V
C94	32MW885	470 uF 10 V
C100	32MW893	1000 uF 16 V
C101	32MW992	2200 uF 25 V
C102	32MW1003	3.3 uF 35 V
C103	32MW1003	3.3 uF 35 V

C108 TC2 TC3 TC4	35MW417	Tuning Gang
TC1	35MW390	Trimmer

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R109	CB51R0	1 ohm 1/2W
R110	CB51R0	1 ohm 1/2W
R111	CB51R0	1 ohm 1/2W
R112	CB51R0	1 ohm 1/2W
R126	25MW366	3000 ohms Separation
R127	J25600	50 K Dual Tone
R128	J25601	100 K Balance
R129/SW2	J25602	50 K Dual Volume/Switch

COILS/TRANSFORMERS

ITEM	PART NO.
L1	61MW958
L2	61MW1029
L3	61MW960
L4	J61726
L5	61MW962
L6	61MW963
L7	61MW512
L8	J61790
L9	J61790
L10	61MW1031
L11	61MW1031
L12	61MW733
L13	61MW733
L14	39MW563
L15	61MW960
L16	61MW962
T1	62MW673
T2	62MW674
T3	62MW675
T4	62MW675
T5	62MW676
T6	62MW677
T7	62MW546
T8	62MW518
T9	62MW678
T10	62MW679
T11	62MW679
T12	J11406

MISCELLANEOUS

ITEM	NAME	PART NO.
PH1	Head, Tape	39MW557
M	Assembly, Motor	39MW556
SP1	Speaker, 8 ohms	J10157
SW1	Switch, Function	12MW360
SW3	Switch, Channel Indicator	39MW570
SW4	Switch, 8-Track Power	12MW366
SW5	Switch, 8-Track Program	12MW363
SW6	Switch, Sensing	12MW365
	Belt, Tape Drive	39MW555
	Solenoid, Track Change	39MW563

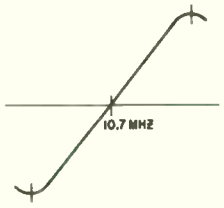
CABINET PARTS

NAME	PART NO.
Assembly, Main Cabinet	J98751
Assembly, Front Panel	J70594
Knob, Tuning	J50881
Knob, Function	J50882
Knob, Fone/Balance/Volume	J50883
Button, Program Selector	J50880
Cabinet, Speaker	J70591
Cover, Speaker Cabinet	J70592

Pages 119-125 Courtesy of ZENITH SALES COMPANY

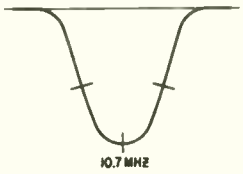
RF AND IF ALIGNMENT

Alignment of these chassis will, in most cases, be unnecessary unless an IF transformer or RF coil is replaced; or if the adjustments have been tampered with. Because of the wide FM band pass requirements, it is desirable to use an FM signal generator and an oscilloscope for FM alignment. Generator output must be held to the minimum required for scope or VTVM indication.



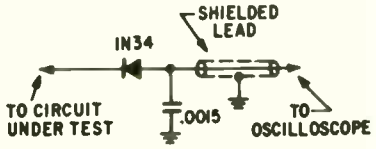
Scope Pattern - A

Adjust for maximum amplitude while maintaining linearity and symmetry. 10.7 MHZ marker must be on the curve at base line.



Scope Pattern - B

10.6 and 10.8 MHZ markers must be symmetrically positioned with 10.7 MHZ at center of curve. This point must be adjusted for maximum.



Detector Probe -

If your oscilloscope is not equipped with a detector probe, one can easily be constructed. For best results the probe should be shielded.

AM – RF AND IF ALIGNMENT PROCEDURE

STEP	CONNECT VTVM OR SCOPE	CONNECT GENERATOR	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL TO	ADJUST	PURPOSE
NOTE: FOR AM ALIGNMENT USE A SIGNAL OF 400Hz AT 30% MODULATION								
1	Across Voice Coil	One Turn Loosely Coupled To Wavemagnet	NONE	455kHz	AM	600kHz	T151, T206, T207, T208	Align I.F. for maximum output.
2				1600kHz	AM	1600kHz	C1I	Set Oscillator to dial scale.
3				550kHz	AM	550kHz	L102	
4				Repeat steps 2 and 3				
5				1400kHz	AM	1400kHz	C1G	Align Antenna Stage
6				600kHz	AM	600kHz	L101 if necessary	
7				Repeat steps 5 and 6				

FM – RF AND IF ALIGNMENT PROCEDURE – USING SWEEP GENERATOR AND SCOPE

STEP	CONNECT SCOPE TO	CONNECT GENERATOR	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL TO	ADJUST	PURPOSE
NOTE: FOR FM IF ALIGNMENT USE A SIGNAL OF 400 Hz AT 250 kHz DEVIATION. DO NOT ALIGN IN AFC POSITION.								
1	Test Point at P308 after Ratio Detector	Test Point "A" Junction of L5, C10, and R4	47 Ohm in shunt with generator output, then from hot lead, a 27 Ohm in series with a .04 capacitor.	10.7MHz	FM	Gang Closed	T204, T205	Adjust Primary and Secondary of ratio detector for maximum amplitude and symmetry, as shown in Scope Pattern "A".
2	Test Point at Pin 7 of IC202			10.7MHz	FM	Gang Closed	T201, T202, T203	Adjust I.F. transformer for maximum output and symmetry. This pattern is not necessarily the same overall Scope Pattern "B".
3				Repeat steps 1 and 2				Align I.F. transformers for maximum output and symmetry as indicated in Scope Pattern "B".
4		FM Antenna Terminal "F" (Disconnect FM Antenna)	300 Ohms	108MHz	FM	108MHz	C20	Set Oscillator to Dial Scale.
5				88MHz	FM	88MHz	L6	
6				Repeat steps 4 and 5				
7				106MHz	FM	106MHz	C1D	Align RF for maximum.
8				90MHz	FM	90MHz	L4 if necessary	
9				Repeat steps 7 and 8				
10				106MHz	FM	106MHz	C1B	Align Antenna for maximum.
11				90MHz	FM	90MHz	L3 if necessary	
12				Repeat steps 10 and 11				

FM ALIGNMENT WITH AM GENERATOR AND VTVM

Alignment of FM receivers should be performed with an oscilloscope and a FM sweep generator. If this equipment is not available, the following procedure may be used in an emergency.

When the secondary of the Ratio Detector is aligned, use sufficient signal input to get a good positive and negative indicating VTVM is recommended for this adjustment, but is not absolutely necessary. (Reversing the leads of a non-zero center meter, or observing closely when the meter starts to go negative will give the same results).

While aligning the IF and the Ratio Detector primary the generator must be held to the minimum required for a meter indication.

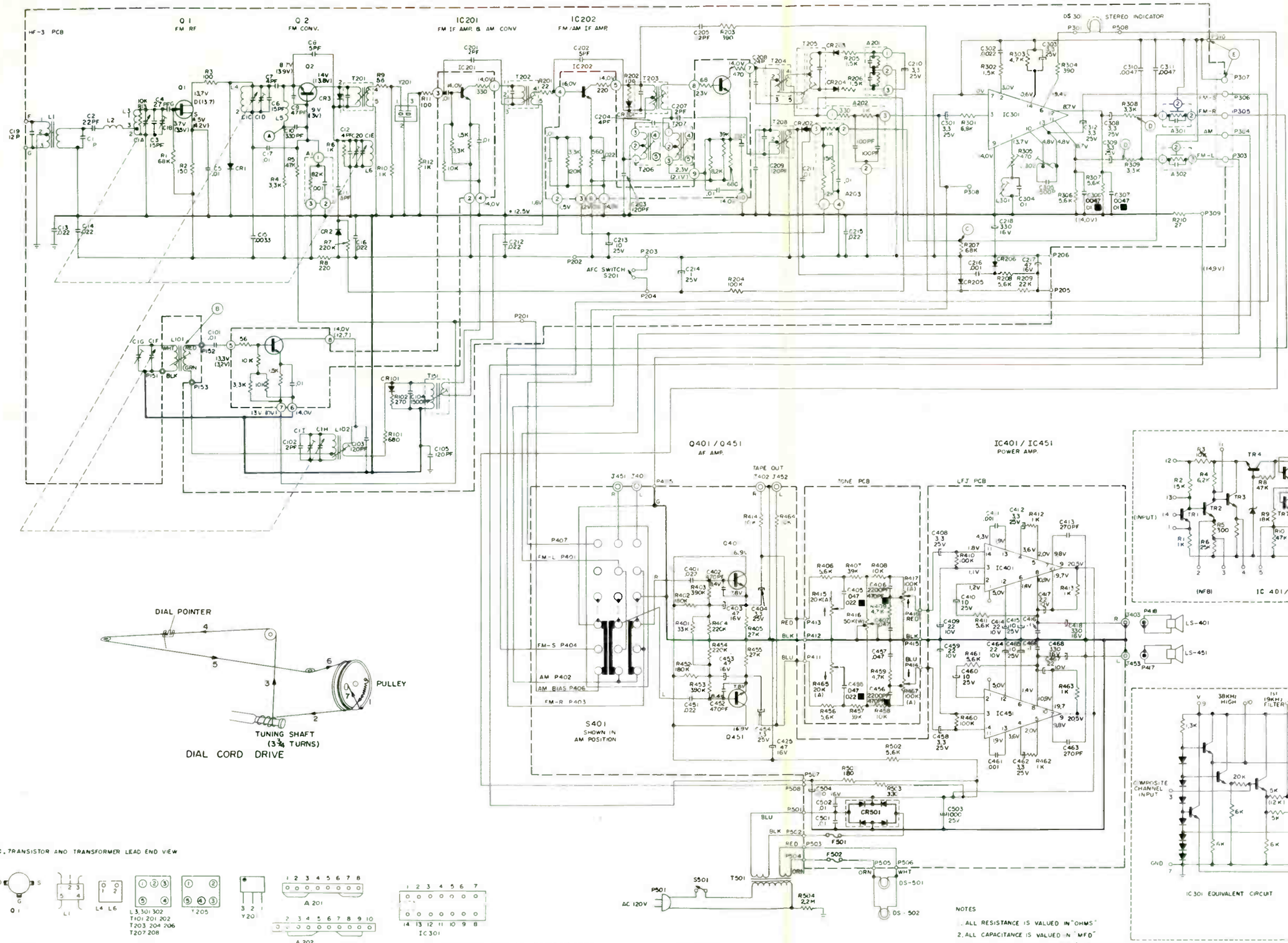
FM – RF AND IF ALIGNMENT PROCEDURE – USING AM GENERATOR AND VTVM

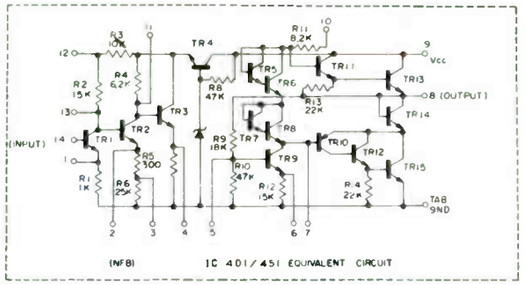
STEP	CONNECT VTVM TO	CONNECT GENERATOR	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL TO	ADJUST	PURPOSE
NOTE: – NOTE FOR FM IF ALIGNMENT USE AN UNMODULATED SIGNAL. DO NOT ALIGN IN AFC POSITION.								
1	Test Point at P308 after Ratio Detector	Test Point "A" Junction of L5, C10, and R4	47 Ohm in shunt with generator output, then from hot lead, a 27 Ohm in series with a .04 capacitor.	10.7MHz	FM	Gang closed	T205	Adjust Secondary of Ratio Detector for zero center reading.
2	Test Point + end of C210			107.MHz	FM	Gang closed	T204	Adjust Primary of Ratio Detector for maximum.
3	Test Point at P308 after Ratio Detector			10.7MHz	FM	Gang closed	T205	Adjust Secondary of Ratio Detector for zero center reading.
4	Test Point + end of C210	FM Antenna Terminal (Disconnect FM Antenna)	300 Ohm	10.7MHz	FM	Gang closed	T151, T201, T202, T203	Align I.F. for maximum.
5				Repeat steps 1 thru 4.				
6				108MHz	FM	108MHz	C20	Set Oscillator to Dial Scale.
7				88MHz	FM	88MHz	L6	
8				Repeat steps 6 and 7.				
9				106MHz	FM	106MHz	C10	Align RF for maximum.
10				90MHz	FM	90MHz	L4 if necessary	
11				Repeat steps 9 and 10.				
12				106MHz	FM	106MHz	C18	Align Antenna for maximum.
13				90MHz	FM	90MHz	L3 if necessary	
14				Repeat steps 12 and 13.				

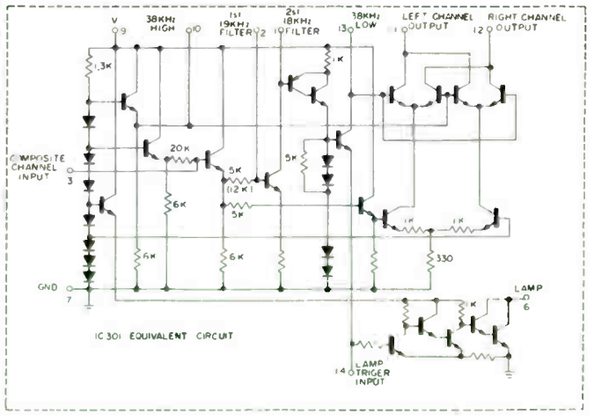
FM – MULTIPLEX ALIGNMENT PROCEDURE

Before Aligning Multiplex be certain that RF, IF and Ratio Detector are correctly Aligned and that Operation is Normal and on Monaural FM Signals.

STEP	CONNECT SCOPE AND/ OR VTVM	CONNECT GENERATOR	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL TO	ADJUST	PURPOSE
NOTE: – PLACE BANDSWITCH IN FM STEREO POSITION. USE RF FREQUENCY NEAR CENTER SCALE.								
1	Test Point at Pin 1 of IC301	Test Point at FM Antenna (Disconnect FM Antenna)	300 Ohm	98MHz 10% Pilot	FM	98MHz	L301	Adjust 19kHz Amp for maximum.
							NOTE: – Stereo Indicator Lamp may be on or off during the above step.	
2				98MHz 5% Pilot			R305	Adjust mute control to point where stereo lamp lights up.
							NOTE: – Stereo Indicator Lamp must remain on during the following steps.	
3	"L" Tape Output			98MHz 10% Pilot L+R, L – R, (Mod. L Only)			L302	Adjust for maximum L Channel reading.
4	"R" Tape Output						L302 if necessary	Adjust for minimum R Channel reading.
5				REPEAT STEPS 3 and 4 for MINIMUM CHANGE.				To provide max. separation.

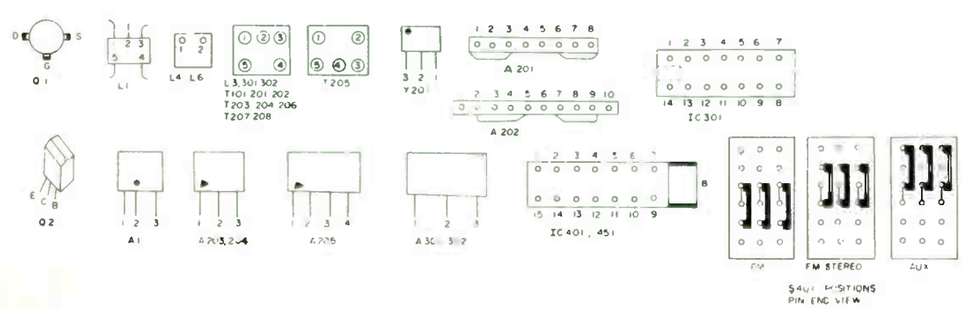






DIAL CORD DRIVE

IC, TRANSISTOR AND TRANSFORMER LEAD END VIEW



S401 POSITIONS
PIN END VIEW

TEST POINT

- (A) FM-IF CONTROL = 10.7 MHz INPUT
- (B) AM-IF CONTROL = 455 KHz INPUT
- (C) AM-IF CONTROL = AM DETECT OUT
- (D) FM-IF CONTROL = FM OUT
- (E) NEGATIVE POINT

NOTES

1. ALL RESISTANCE IS VALUED IN "OHMS"
2. ALL CAPACITANCE IS VALUED IN "MFD"
3. FUNCTION SWITCH IS SHOWN IN "AM" POSITION
4. IFT

03 40	04 30
02	20
01 60	06 10

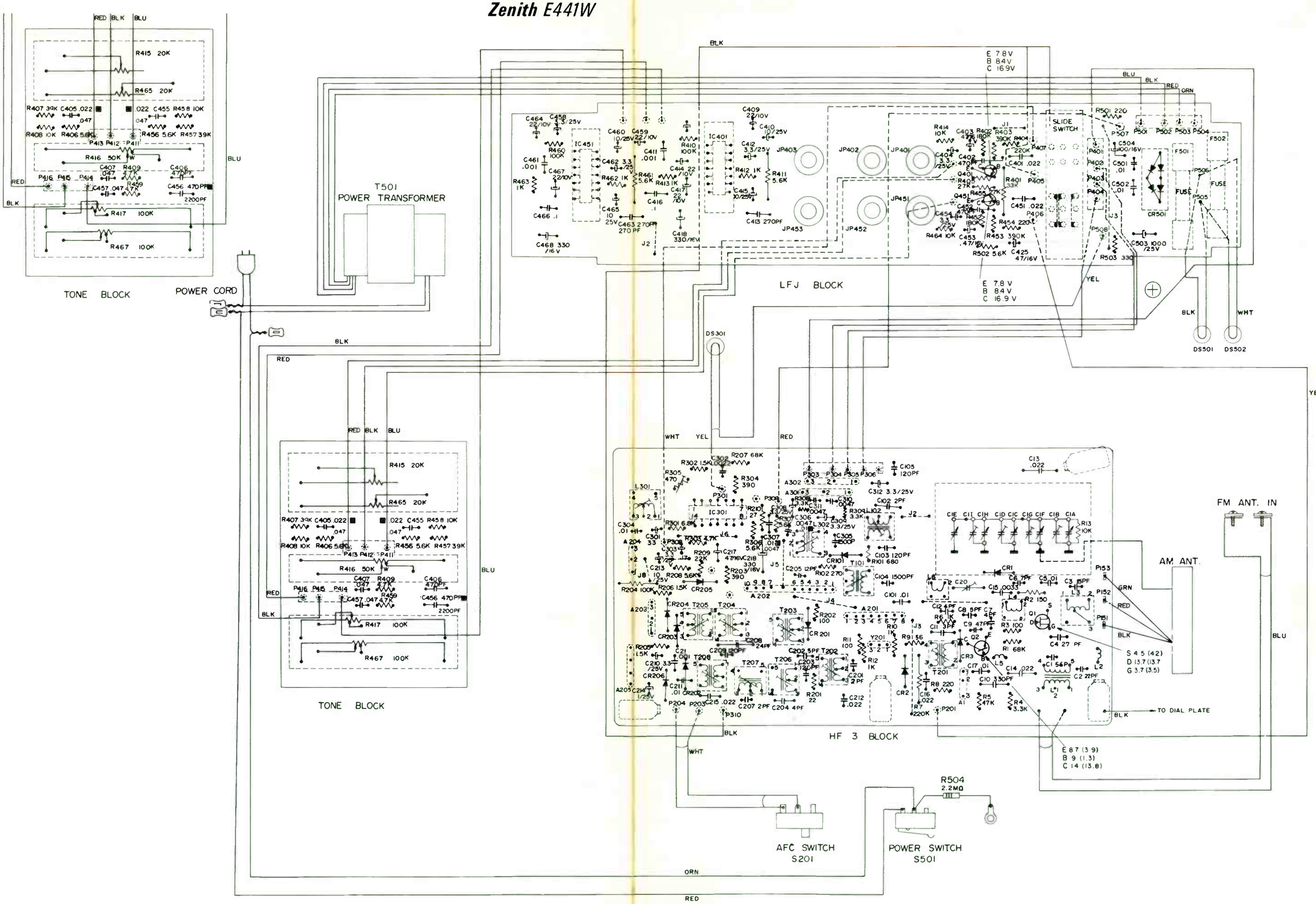
5. NUMBERS SHOWN INDICATE VOLTAGES WITH FUNCTION SWITCH IN "FM" POSITION.
6. NUMBERS SHOWN IN ( ) INDICATE VOLTAGES WITH FUNCTION SWITCH IN "AM"
7. VOLTAGES ARE MEASURED USING VTVM AT 120V LINE, LOUDNESS CONTROL MINIMUM AND NO SIGNAL.
8. PARTS MARKED WITH ■ ARE EARLY PRODUCTION

IMPORTANT SAFETY NOTICE

WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE ZENITH RADIO CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT. SPECIAL COMPONENTS ARE USED TO PREVENT SHOCK AND FIRE HAZARD. THESE CRITICAL COMPONENTS ARE SHADED FOR EASY IDENTIFICATION.

THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

Zenith E441W



SEMICONDUCTORS

ITEM	PART NO.	TYPE
CR1	903-72B	HV-80
CR2	903-28B	1S85
CR3	903-27B	1N60
CR4	903-119B	HZ9
CR101	903-72B	HV80
CR201	903-72B	HV80
CR202	903-18B	1N34A
CR203	903-29B	1N60P
CR204	903-29B	1N60P
CR205	903-27B	1N60
CR206	903-27B	1N60
#CR501	977-23B	1S2371
IC301	905-38B	SN76110
IC401	905-39B	UPC20C1
IC451	905-39B	UPC20C1
Q1	921-231B	2SK37
Q2	921-84B	2SC535C
Q401	921-200B	2SC458(LG) D
Q451	921-200B	2SC458(LG) D

ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C1A/I	822-1154B	Tuning Gang
C20	822-793B	Trimmer
C102	822-476B	2 pF Trimmer
C105	822-1151B	120 pF Trimmer
C203	822-1151B	120 pF Trimmer
C209	822-1151B	120 pF Trimmer
C210	822-796B	3.3 uF 25 V
C213	822-723B	10 uF 25 V
C214	822-485B	1 uF 25 V
C217	822-139B	47 uF 16 V
C218	822-250B	330 uF 25 V
C301	822-796B	3.3 uF 25 V
C303	822-796B	3.3 uF 25 V
C308	822-796B	3.3 uF 25 V
C309	822-796B	3.3 uF 25 V
C312	822-796B	3.3 uF 25 V
C403	822-788B	.47 uF 16 V
C404	822-796	3.3 uF 25 V
C408	822-796B	3.3 uF 25 V
C409	822-1152B	22 uF 10 V
C410	822-723B	10 uF 25 V
C412	822-796B	3.3 uF 25 V
C414	822-1152B	22 uF 10 V
C415	822-723B	10 uF 25 V
C417	822-1152B	22 uF 10 V
C418	822-250B	330 uF 16 V
C425	822-139B	47 uF 16 V
C453	822-796B	.47 uF 25 V
C454	822-796B	3.3 uF 25 V
C458	822-796B	3.3 uF 25 V
C459	822-1152B	22 uF 10 V
C460	822-723B	10 uF 25 V
C462	822-796B	3.3 uF 25 V
C464	822-1152B	22 uF 10 V
C465	822-723B	10 uF 25 V
C467	822-1152B	22 uF 10 V
C468	822-250B	330 uF 25 V
C503	822-1056B	1000 uF 25 V
C504	822-133B	100 uF 6V

For SAFETY, replace only with equivalent parts.

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R305	863-782B	470 ohms
R415 & R465	863-783B	20 K Dual Tone
R416	863-784B	50 K Balance
R417 & R467	863-785B	100 K Dual Volume
#R504	863-569B	2.2 meg 20% 1/2W

COILS/TRANSFORMERS

ITEM	PART NO.
L1	895-284B
L2	820-83B
L3	820-212B
L4	820-78B
L5	820-296B
L6	820-297B
L101	820-310B (820-298B)
L102	820-214B
L301	820-216B
L302	820-299B
T101	895-286B
T201	895-96B
T202	895-96B
T203	895-96B
T204	895-411B
T205	895-412B
T206	895-413B
T207	895-103B
T208	895-104B
T501	895-414B

MISCELLANEOUS

ITEM	NAME	PART NO.
A1	Component Combination	905-32B
A201	Component Combination	905-36B
A202	Component Combination	905-37B
A203	Component Combination	905-33B
A204	Component Combination	905-34B
A205	Component Combination	905-35B
A301	Component Combination	863-591B
A302	Component Combination	863-591B
#F501	Fuse, 1 A	936-17B
#F502	Fuse, 1 A	936-17B
S201	Switch, AFC	885-149B
S401	Switch, Function	885-150B
#S501	Switch, Power	885-160B
Y201	Filter, Ceramic	905-18B
	#Cord, Power	811-53B
	Speaker, 16 cm	849-86B

CABINET PARTS

NAME	PART NO.
Cabinet, Top	814-267B
Cabinet, Bottom	814-245B
Panel, Front	855-34B
Knob, Slide Control	846-393B
Knob, Tuning	846-394B
Knob, AFC	846-422B

INDEX

This index lists all Compact, Component, and Modular Hi-Fi Equipment in "PHOTOFACT MODULAR HI-FI SERIES" and "SAMS MODULAR HI-FI COMPONENTS" volumes.

$4.25
$5.10 IN CANADA
MHF-48
006582

HOWARD W. SAMS & CO., INC.
4300 WEST 62nd ST. · INDIANAPOLIS, INDIANA 46268