

GTE SYLVANIA

FACTORY PREPARED TECHNICAL SERVICE DATA

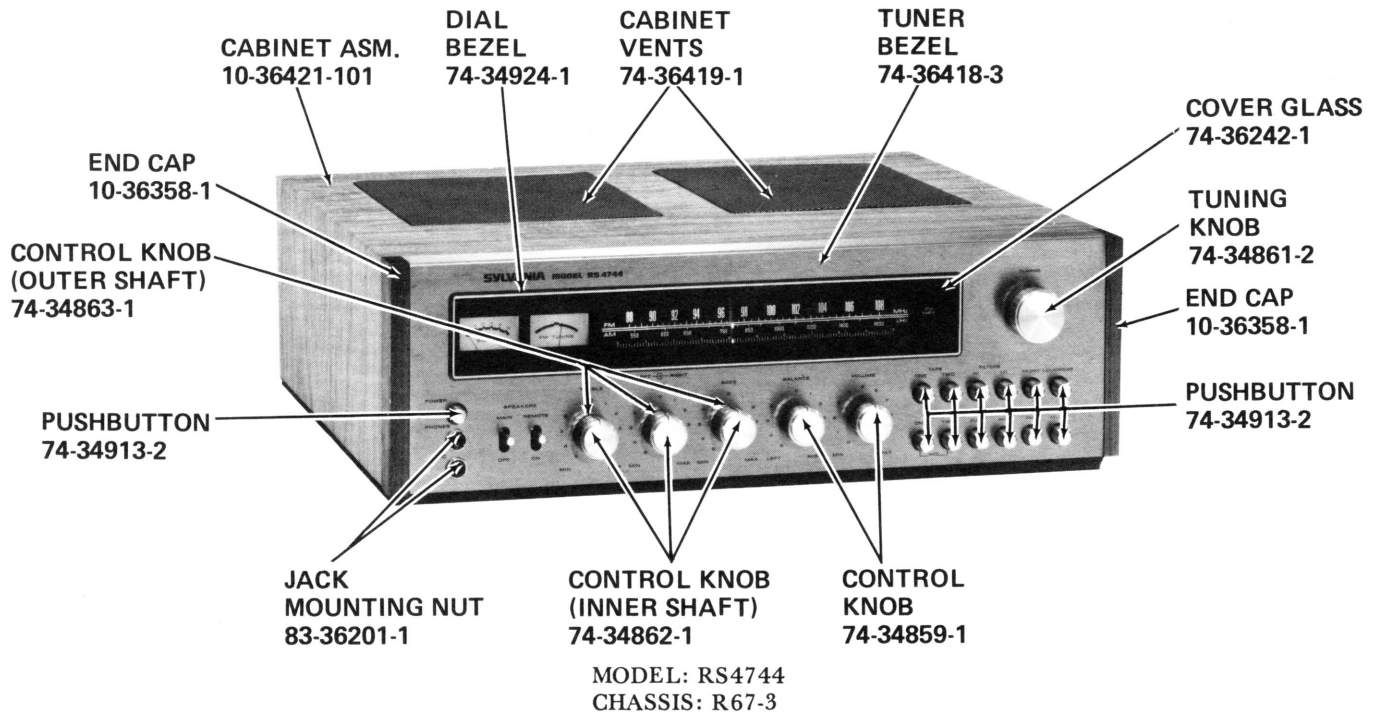
STEREO HI-FI
BULLETIN: R67-3

MODEL: RS4744

SERVICE PUBLICATIONS DEPARTMENT

Entertainment Products Group

700 Ellicott Street - Batavia, N.Y.



BULLETIN: R67-3

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PRODUCT SAFETY GUIDELINES FOR ALL PRODUCTS

CAUTION: Do NOT modify any circuit. Service work should be performed only after you are thoroughly familiar with all of the following safety checks. Risk of potential hazards and injury to the user increases if safety checks are not adhered to.

SAFETY CHECKS

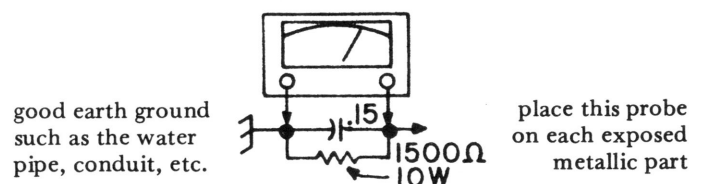
SUBJECT: Fire & Shock Hazard

1. Be sure that all components are positioned in such a way to avoid possibility of shorts to adjacent components. This is especially important on those chassis which are transported to and from the repair shop.
2. Always replace all protective devices such as insulators and barriers after working on a set.
3. Check for damaged insulation on wires including the AC cord.
4. Check across-the-line components for damage and replace if necessary.
5. After re-assembly of the set, always perform an AC leakage test on the exposed metallic parts of the cabinet such as the knobs, antenna terminals, etc. to be sure the set is safe to operate without danger of electrical shock. Do not use a line isolation transformer during this test. Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner:
Connect a 1500 ohm 10 watt resistor, paralleled by

.15MFD AC type capacitor, between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination 1500 ohm resistor, and .15MFD capacitor. Reverse the AC plug on the set and repeat AC voltage measurements again for each exposed metallic part. Voltage measured must not exceed .3 volt R.M.S. This corresponds to 0.2 milliamp AC.

Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.

AC VOLTMETER

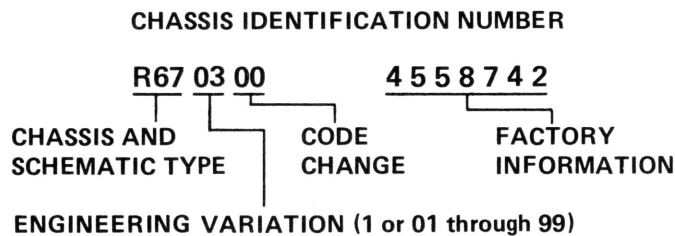


IMPORTANT: Always use genuine Sylvania replacement parts and tubes.

Price \$1.75

CHASSIS IDENTIFICATION

Chassis Identification consists of two blocks of numbers. In all correspondence relating to a specific model, both blocks of numbers, plus the cabinet model number should be given. To associate a chassis with its proper schematic, refer to the number breakdown described below:



R67 PERFORMANCE ANALYSIS

The R67-3 Amplifier is capable of delivering 60 Watts - per - channel (21.91V., R.M.S., measured across 8 ohm load resistors) at a frequency range of 20Hz to 20kHz.

Maintain 120VAC, 60Hz line for all tests.

Use a 60 Watt, 8 ohm non-inductive load across each channel output during amplifier performance tests, unless otherwise noted.

Amplifier IDLE CURRENT is set with the entire chassis at ROOM TEMPERATURE. Make this measurement within 30 seconds after turn-on if possible. Basically, the idle current should NOT be readjusted unless component changes have been made in the Bias Regulator, Driver or Output circuits.

Measure idle current with no input signal and no output load. Adjust R822 for approximately 9 to 11mV across pins LU and LV. Adjust R922 for approximately 9 to 11mV across pins RU and RV.

Since the idle current will drift upward as the amplifier warms up, R822 and R922 should be set ONCE - AND NOT RE-ADJUSTED.

The DC OFFSET voltage is measured across the speaker terminals, no signal input and no output loads. DC offset should read less than $\pm 150\text{mV}$ between main speaker "+" and "-" terminals on each amplifier channel.

HUM AND NOISE:

SWITCH POSITIONS

Loudness	OFF
High Filter	OFF
Low Filter	OFF

CONTROL SETTINGS:

Volume	MAXIMUM (CLOCKWISE)
Bass	MECHANICALLY CENTERED
Mid-Range	MECHANICALLY CENTERED
Treble	MECHANICALLY CENTERED
Balance	MECHANICALLY CENTERED

Load AUX. and TAPE inputs with 4.7K, 5% resistors.

Load PHONO and MIC. inputs with 330 ohm, 5% resistors. (Use standard stereo phone plug on MIC. inputs.)

Orient AC power plug for minimum hum; read hum level across 8 ohm load resistors. Ignore major meter fluctuations.

SELECT FUNCTION	MAXIMUM HUM LEVEL
AUX.	3mV.
MIC.	50mV.
PHONO	40mV.
TAPE	3mV.

SENSITIVITY:

Use same set-up as for hum and noise - remove loads from input to be tested.

Test signal source impedance shall be 600 ohms or less.

Drive both channels simultaneously with a 1kHz signal at levels charted to produce the rated (60 WATTS - PER - CHANNEL) output of 21.91V, R.M.S. across 8 ohm load resistor.

Select function as required.

POWER AMP.	AUX.	MIC.	PHONO	TAPE
1.4V. (TYP.)	250mV. (TYP.)	1.2mV. (TYP.)	2.2mV. (TYP.)	250mV. (TYP.)

TOTAL HARMONIC DISTORTION:

Switch and control settings are as outlined under HUM and NOISE section.

Test signal source impedance shall be 600 ohms or less. Inject test signals, at frequencies charted, at the AUX. inputs. Select the AUX. function.

Drive both channels simultaneously for an output of 60 Watts per channel (21.91V, R.M.S. - measured across 8 ohm load resistors). Measure distortion at this same point.

FREQUENCY	MAXIMUM DISTORTION
18Hz	.25%
1kHz	.15%
20kHz	.25%

PHONO INPUT OVERLOAD:

Measure distortion at TAPE RECORD JACKS.

Select PHONO function. Maintain output at 10 dB below 60 watts at amplifier output with volume control as input signal is increased.

A 1kHz input signal of 60mV. MINIMUM should be required to show less than .25% T.H.D. at TAPE RECORD JACKS.

CHANNEL UNBALANCE:

Drive both channels through the AUX. inputs with a 1kHz signal level adjusted for an output level of approximately 1 Watt (2.83V, R.M.S.) measured across 8 ohm output load resistors, with controls adjusted as follows:

PERFORMANCE ANALYSIS (CONTINUED)

VOLUME - At Tape.
TONE and BALANCE - Centered.

Select AUX. function. All other FUNCTION and MODE buttons to be in the out (OFF) position.

MAXIMUM channel output difference shall be 4 dB.

TONE CONTROL RANGE:

Drive both channels through the AUX. inputs with a 1kHz input signal level adjusted for an output level of approximately 1 Watt (2.83V, R.M.S.) measured across 8 ohm output load resistors - VOLUME CONTROL AT MAXIMUM.

Bass, Mid-range and Treble controls are to be in the center (FLAT) position for establishing reference output levels. Switch generator to charted frequencies at same output level to measure tone control range.

Select AUX. function. All other FUNCTION and MODE buttons to be in the out (OFF) position.

CONTROL	GENERATOR FREQUENCY	CUT (FULL C.C.W.)	BOOST (FULL C.W.)
BASS	100Hz	-13 dB	+13 dB
MID-RANGE	1kHz	-10 dB	+10 dB
TREBLE	10kHz	-12 dB	+11 dB
±3 dB TOLERANCE			

COMPENSATION:

Use the same set-up as for tone control range. Activating the mode button specified will change the amplifier output level as charted - with an input level adjusted for an output level of approximately 1 Watt. Check loudness compensation at Volume Control tap, Hi Filter and Lo Filter at Maximum Volume.

BUTTON	GENERATOR FREQUENCY	OUTPUT LEVEL CHANGE
HIGH FILTER	20kHz	23 dB Cut, ±3 dB
LOUDNESS	100Hz	6 dB Boost, ±2 dB
LOW FILTER	18Hz	22 dB Cut, ±3 dB

CHANNEL SEPARATION:

Volume control - At TAP.

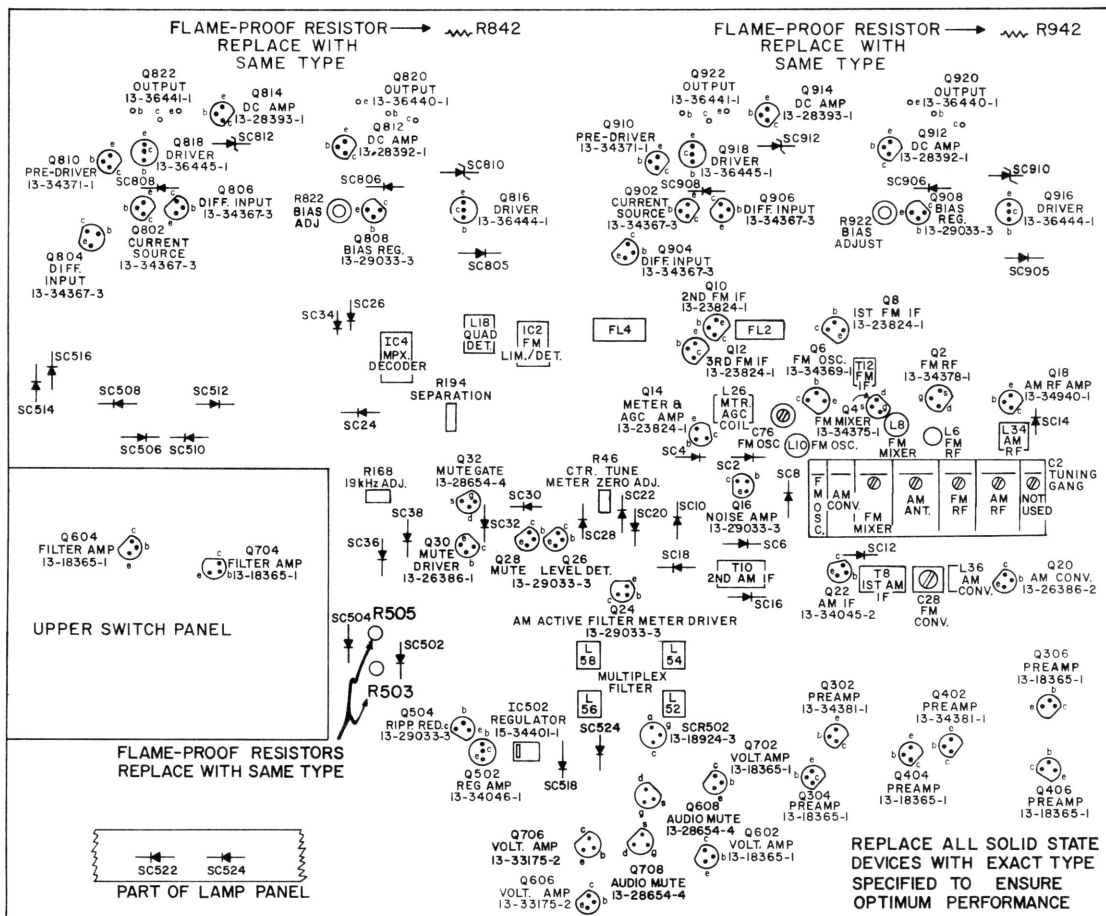
Tone and Balance controls - MECHANICAL CENTER.
Mode Switches - off (OUT) position.
Select AUX. function.

Drive ONE Aux. input at a time for an output of 60 Watts (21.91V, R.M.S. - measured across 8 ohm output load resistor). Terminate other AUX. input with 4.7K, 5% load resistor.

Measure UNDRIVEN output in reference to DRIVEN output.

FREQUENCY	CROSSTALK
100Hz	-45 dB, MAX.
1kHz	-45 dB, MAX.
10kHz	-35 dB, MAX.

TRANSISTOR LAYOUT DIAGRAM



— BOTTOM COVER REMOVAL —

Metal bottom cover is secured by six (6) bright screws and two (2) black screws. Be sure to replace longer black screws in proper place when replacing bottom cover.

Fiber bottom cover is secured by three (3) bright screws plus the lip of the metal cover.

— TOP COVER REMOVAL —

Cabinet top is secured to the chassis by three (3) screws at the top of the Jack Plate and six (6) screws along the outer edges of the cabinet bottom. Screws at Jack Plate need only be loosened slightly to allow them to slip out of the slots in the Jack Plate. Lift rear of cabinet slightly, then move to rear to disengage escutcheon. Then lift cabinet straight off of chassis.

— ESCUTCHEON REMOVAL —

Tuning, Volume and Balance knobs are secured to control shafts by slotted set screws. The OUTER Bass, Mid-range and Treble knobs are also secured by set screws. The INNER Bass, Mid-range and Treble knobs are of the slip-on type.

TO REMOVE ESCUTCHEON:

1. Remove top cover.
2. Remove rotary control knobs.
3. Remove nut from Volume and Treble control bushings.
4. Remove nuts from Headphone and Microphone jacks.
5. Remove one screw from each top inside corner of escutcheon.

— UPPER SWITCH PANEL REMOVAL —

1. Remove top cover.
2. Remove escutcheon.
3. Remove 22-pin edge connector from rear of switch panel.
4. Remove two (2) screws from ends of row of pushbuttons.
5. Remove screw at rear of panel support bracket securing bracket to chassis frame.

— UPPER SWITCH PANEL REMOVAL (CONT'D) —

6. Move switch panel to rear of chassis to clear pushbuttons.

— DIAL LAMP REPLACEMENT —

1. Remove cabinet top.
2. Remove single screw from center of lamp panel.
3. Move lamp panel slightly to side to release panel from plastic retaining clips.

Use number 259 lamp, Sylvania part number 30-26288-1 for replacement.

— METER LAMP REPLACEMENT —

1. Remove cabinet top.
2. Remove screw at center of small lamp panel.

Use number 259 lamp, Sylvania part number 30-26288-1 for replacement.

MULTIPLEX INDICATOR LAMP REPLACEMENT

1. Remove cabinet top.
2. Remove bulb from retaining grommet.

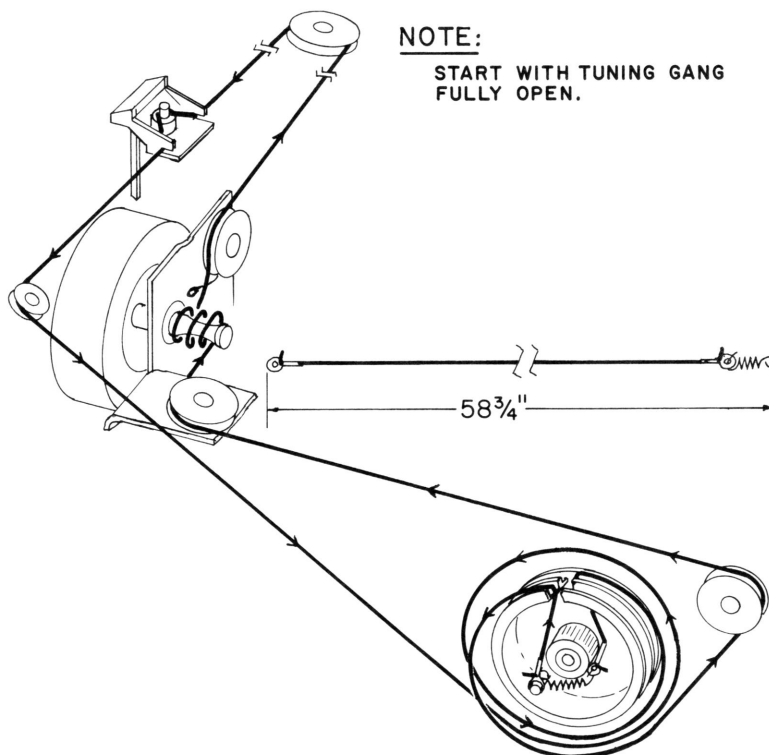
Use number 2820-8 lamp, Sylvania part number 30-36246-1 for replacement.

— DIAL POINTER LAMP REPLACEMENT —

1. Remove cabinet top.
2. Remove escutcheon.
3. Remove fiber cover heat staked to top of dial pointer carriage.

Use number 0406 lamp, Sylvania part number 30-34803-1 for replacement.

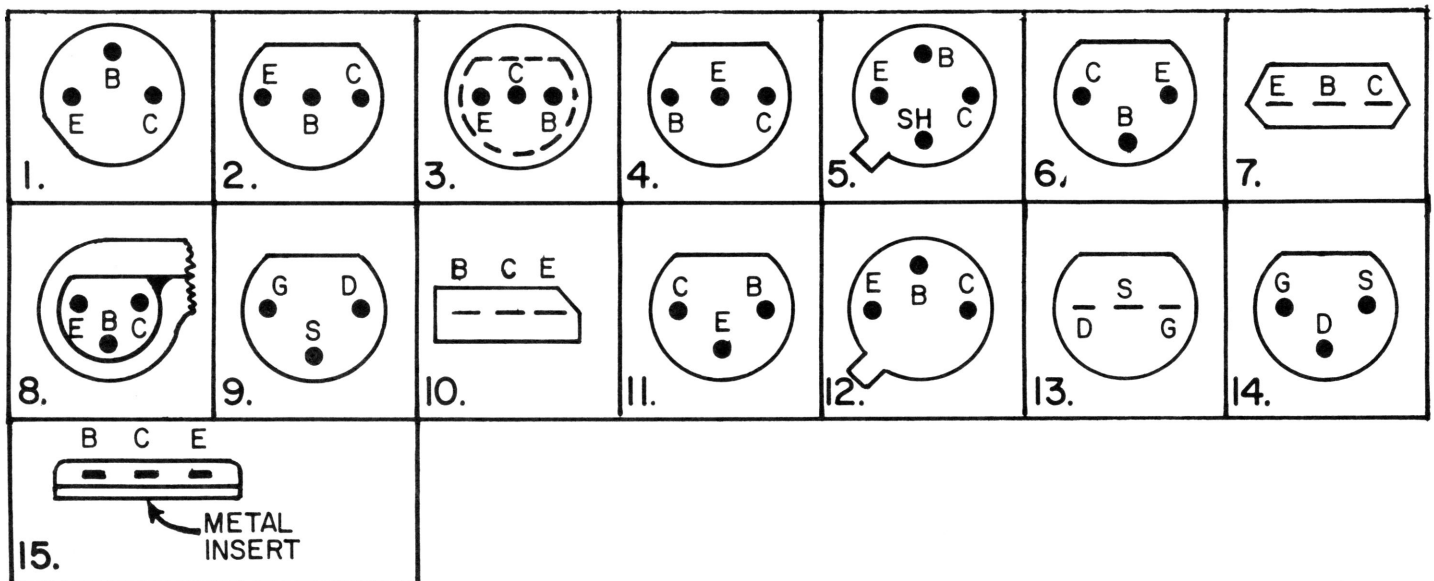
— DIAL STRINGING —



TRANSISTOR CROSS REFERENCE CHART

SYLVANIA PART NUMBER	ALL SILICON TYPE	APPLICATION	DC CURRENT GAIN	EMITTER - COLLECTOR (DRAIN - SOURCE) VOLTAGE (MAX.) @ 25 DEG. C. AMBIENT	EMITTER - BASE (GATE - SOURCE) VOLTAGE (MAX.) @ 25 DEG. C. AMBIENT	MAXIMUM POWER DISSIPATION @ 25 DEG. C. AMBIENT	IC (GATE CURRENT) MAXIMUM	BASING
13-18365-1	NPN	Q304, Q404 - Pre-Amplifier. Q306, Q406 - Pre-Amplifier. Q602, Q702 - Voltage Amplifier. Q604, Q704 - Filter Amplifier.	225-450	40V	4V	200mW	50mA	1, 2, 3
13-23824-1	NPN	Q8 - First FM IF. Q10 - Second FM IF. Q12 - Third FM IF. Q14 - Meter, AGC Amplifier.	27-275	35V	3V	180mW	N/A	2, 4, 5, 6
13-26386-1	PNP	Q30 - Mute Driver.	100-350	32V	.56V	200mW	100mA	2, 6
13-26386-2	PNP	Q20 - AM Converter.	100-350	15V	4V	200mW	100mA	2, 6
13-28392-1	NPN	Q812, Q912 - D.C. Amplifier.	90-270	45V	4V	500mW	500mA	2, 7, 8
13-28393-1	PNP	Q814, Q914 - D.C. Amplifier.	90-270	45V	4V	500mW	500mA	2, 8
13-28654-4	N-CHAN. FET	Q32 - Mute Gate. Q608, Q708 - Audio Mute.	N/A	30V	30V	200mW	30mA	9, 13
13-29033-3	NPN	Q16 - Noise Amplifier. Q24 - AM Active Filter, Meter Driver. Q26, Q28 - Mute Level Detector. Q504 - Ripple Reducer. Q808, Q908 - Bias Regulator.	200-400	45V	4V	200mW	N/A	2, 6
13-33175-2	NPN	Q606, Q706 - Voltage Amplifier - Darlington.	7K-70K	40V	10V	310mW	200mA	2, 6
13-34045-2	NPN	Q22 - AM IF Amplifier.	4-18	12V	3V	250mW	30mA	6
13-34046-1	NPN	Q502 - Regulator Amplifier.	10-150	40V	4V	2.1W	1.5A	10
13-34367-3	PNP	Q802, Q902 - Current Source. Q804 - Q806 - MATCHED Differential Input Pair Q904 - Q906 - MATCHED Differential Input Pair	See Below	50V	4V	300mW	100mA	2, 6, 11
13-34369-1	PNP	Q6 - FM Oscillator.	20	20V	.85V	N/A	N/A	4
13-34371-1	NPN	Q810, Q910 - Pre-Driver.	90-270	110V	4V	500mW	500mA	2, 12
13-34375-1	N-CHAN. FET	Q4 - FM Mixer.	N/A	N/A	25V	200mW	10mA	9, 13
13-34378-1	N-CHAN. FET	Q2 - FM RF Amplifier.	N/A	±20V	-10V	250mW	N/A	13, 14
13-34381-1	NPN	Q302, Q402 - Pre-Amplifier.	225-450	30V	4V	200mW	50mA	2, 6
13-34940-1	NPN	Q18 - AM RF Amplifier.	50-150	30V	4V	200mW	50mA	2, 6
13-36440-1	NPN	Q820, Q920 - Power Output.	25-100	100V	7V	150W	15A	15
13-36441-1	PNP	Q822, Q922 - Power Output.	25-100	100V	7V	150W	15A	15
13-36444-1	NPN	Q816, Q916 - Driver.	40-360	100V	7V	1.5W	1A	16
13-36445-1	PNP	Q818, Q918 - Driver.	40-360	100V	7V	1.5W	1A	16
13-34367-3	DC Current Gain	- Brown Dot 100-160 - Red Dot 150-210 - Orange Dot 200-260 - Yellow Dot 250-310 - Green Dot 300-360						

TRANSISTOR BASING DIAGRAMS



REPLACEMENT PARTS LIST

SCHMATIC SERVICE
CODING PART NO. DESCRIPTION

CAPACITORS (All in MFD, unless otherwise specified)

C2	42-34768-1	Main Tuning Gang
C3		330PF, Z5P
C4		330PF, Z5P
C6		330PF, Z5P
C8		330PF, Z5P
C10		10PF, NPO
C12		15PF, NPO
C14		18PF, N220
C16		.01, 100V
C18		3.3PF, NPO
C20		330PF, Z5P
C22		3.3PF, NPO
C24		.01, 100V
C26		.01, 100V
C28	42-34941-1	15PF Trimmer
C30		.01, 100V
C32		.01, 100V
C34		.01, 100V
C36		33PF, N150
C37		.01, 100V
C38		.02, 100V
C40		.02, 100V
C42		.01, 100V
C44		.01, 100V
C47		.02, 100V
C48		100PF, Z5P
C49		56PF, NPO
C50		.01, 100V
C52		330PF, Z5P
C54	41-32477-46	5/25V Electrolytic
C76	42-18146-1	Ceramic Trimmer
C78		.01, 100V
C80		.01, 100V
C82		10PF, NPO
C84		.01, 100V
C86		100PF
C88		.05, 50V
C90	41-32477-46	5/25V Electrolytic
C92	41-32477-85	1/50V
C94		.05, 50V
C96		.01, 100V
C98		.01, 100V
C100		100PF, Z5P
C102		.05, 50V
C104		330PF, Z5P
C108	41-32477-33	10/15V Electrolytic
C114		4700PF, Z5U
C116		.05, 50V
C118		.02, 100V
C120		.01, 100V
C122		15PF, NPO
C124		.01, 100V
C126	40-10285-50	390PF - Polystyrene
C128		22PF, NPO
C132	41-32477-33	10/15V Electrolytic
C134		.05, 50V
C136		33PF, N150
C138		.05, 50V
C140	41-32477-86	2/50V Electrolytic
C142		180PF, Z5P
C144		560PF, Z5P
C146		270PF, Z5P
C148		.047
C150	41-32477-9	100/6V Electrolytic
C162		.01, 100V
C164		.01, 100V
C168	40-10285-50	390PF - Polystyrene
C170	41-32477-86	2/50V Electrolytic
C172	41-34346-2	.22/25V Electrolytic
C174	41-39148-64	.47/50V Electrolytic
C176		.033
C178	41-39148-64	.47/50V Electrolytic
C180		2,200PF, 100V
C182		2,700PF, 100V

SCHMATIC SERVICE
CODING PART NO. DESCRIPTION

CAPACITORS (CONTINUED)

C184	41-32477-46	5/25V Electrolytic
C186	41-32477-46	5/25V Electrolytic
C188		.022 (Early Production)
C188		.018
C190		.022 (Early Production)
C190		.018
C192		.0047 (Early Production)
C192		.015
C194		.0082
C196		.0047 (Early Production)
C196		.012
C198		.0047 (Early Production)
C198		.015
C200		.0082
C202		.0047 (Early Production)
C202		.012
C204		.015
C206		.015
C208	41-32477-46	5/25V Electrolytic
C210	41-32477-38	250/15V Electrolytic
C212		.0027
C214		.0027
C220	41-32477-34	25/15V Electrolytic
C301	41-32477-34	25/15V Electrolytic
C302	41-32477-46	5/25V Electrolytic
C304		220PF, Z5P
C306		.039
C308		.15
C310	41-32477-37	100/15V Electrolytic
C312	41-32477-85	1/50V Electrolytic
C314	41-32477-85	1/50V Electrolytic
C316		220PF, Z5P
C318	41-32477-46	5/25V Electrolytic
C401	41-32477-34	25/15V Electrolytic
C402	41-32477-46	5/25V Electrolytic
C404		220PF, Z5P
C406		.039
C408		.15
C410	41-32477-37	100/15V Electrolytic
C412	41-32477-85	1/50V Electrolytic
C414	41-32477-85	1/50V Electrolytic
C416		220PF, Z5P
C418	41-32477-46	5/25V Electrolytic
C502	43-33245-5	.005, 150V
C504	43-98665-6	.005, 150V AC
C506	41-32477-95	500/50V Electrolytic
C508	41-32477-95	500/50V Electrolytic
C510	41-36437-1	5000/55V Electrolytic
C512	41-36437-1	5000/55V Electrolytic
C514		.01, 100V
C516	41-32477-93	100/50V Electrolytic
C518		.01, Z5U
C520		.01, Z5U
C522		.01, Z5U
C524		.01, Z5U
C526		.01, Z5U
C528		.01, Z5U
C530		.01, 100V
C532	41-32477-33	10/15V Electrolytic
C534	41-32477-33	10/15V Electrolytic
C536	41-32477-85	1/50V Electrolytic
C602		.047
C604	41-32477-85	1/50V Electrolytic
C605	41-32477-85	1/50V Electrolytic
C608	41-32477-86	2/50V Electrolytic
C610		.1
C612		.1
C614		1200PF, Z5P
C616		.1
C618		560PF, Z5P
C620	41-32477-47	10/25V Electrolytic
C622		.022
C624		.022
C626		.0047

REPLACEMENT PARTS LIST (CONTINUED)

SCHEMATIC CODING	SERVICE PART NO.	DESCRIPTION
CAPACITORS (CONTINUED)		
C628		.0039
C630		.0039
C632		.0039
C634		.1
C636	41-32477-46	5/25V Electrolytic
C637		820PF, Z5P
C702		.047
C704	41-32477-85	1/50V Electrolytic
C705	41-32477-85	1/50V Electrolytic
C708	41-32477-86	2/50V Electrolytic
C710		.1
C712		.1
C714		1200PF, Z5P
C716		.1
C718		560PF, Z5P
C720	41-32477-47	10/25V Electrolytic
C722		.022
C724		.022
C726		.0047
C728		.0039
C730		.0039
C732		.0039
C734		.1
C736	41-32477-46	5/25V Electrolytic
C737		820PF, Z5P
C801	41-32477-85	1/50V Electrolytic
C802	41-32477-37	100/15V Electrolytic
C804	41-32477-90	25/50V Electrolytic
C805		.01, Z5U
C806		220PF, Z5P
C807		5000PF, 100V
C808		33PF, N150
C809		5000PF, 100V
C810		220PF, Z5P
C812		100PF, Z5P
E814		100PF, Z5P
C816		.1
C822		33PF, N150 (Early Production)
C822		5.6PF, N150 (Later Production)
C901	41-32477-85	1/50V Electrolytic
C902	41-32477-37	100/15V Electrolytic
C904	41-32477-90	25/50V Electrolytic
C905		.01, Z5U
C906		220PF, Z5P
C907		5000PF, 100V
C908		33PF, N150
C909		5000PF, 100V
C910		220PF, Z5P
C912		100PF, Z5P
C914		100PF, Z5P
C916		.1
C922		33PF, N150 (Early Production)
C922		5.6PF, N150 (Later Production)

RESISTORS (All 1/4 Watt, Carbon, 5%, unless otherwise specified)

R2	560 ohm
R4	10K
R6	3.3K
R8	1K
R10	4.7K
R12	270 ohm
R14	22K
R16	10K
R18	10K
R20	22K
R22	330 ohm
R24	1K
R26	100 ohm
R28	5.6K
R30	270 ohm
R32	180 ohm
R34	820 ohm
R36	15K

SCHEMATIC CODING	SERVICE PART NO.	DESCRIPTION
RESISTORS (CONTINUED)		
R38		220 ohm
R40		390 ohm
R42		15K
R44		820 ohm
R46	37-14576-5	1K Variable - FM Meter Zero
R48		1K
R70		22K
R72		10K
R74		2.2K
R76		100 ohm
R78		56K, 10% - Early Production
R78		56K
R80		100K
R82		330K, 10% - Early Production
R82		330K
R84		10K
R86		120K
R88		100K
R90		91K
R92		130K
R94		47K - Early Production
R94		56K
R96		33K
R98		1K
R100		10K
R102		22K
R112		1K
R114		22K
R116		82K
R118		1.8K
R120		560 ohm
R122		10K
R124		22K
R126		120K
R128		4.7K
R130		33 ohm
R132		150K
R134		33K
R136		470 ohm
R138		3.3K
R140		10K
R142		150K
R144		100K
R146		100K
R148		10K
R150		18K
R152		4.7K
R162	35-36453-1	20K, 2%
R168	37-14576-14	2K Variable - 19kHz Adjust
R170		10 ohm, 10% - Early Production
R170		10 ohm
R172		1K
R174		10 ohm, 10% - Early Production
R174		10 ohm
R176		2K
R178		10 ohm
R180		3K
R182		20K
R184		2.2K
R186		12K
R188		10 ohm
R190		3.3K
R192		10K
R194	37-14576-3	15K Variable - Separation Adj.
R196		3.9K
R198		3.9K
R204		200 ohm, 5% - 1/2 Watt
R206		1K
R210		1.3K
R214		1.3K
R220		4.7K
R222		1.8K
R224		18K
R226		560 ohm

REPLACEMENT PARTS LIST (CONTINUED)

<u>SCHEMATIC</u> <u>CODING</u>	<u>SERVICE</u> <u>PART NO.</u>	<u>DESCRIPTION</u>	<u>SCHEMATIC</u> <u>CODING</u>	<u>SERVICE</u> <u>PART NO.</u>	<u>DESCRIPTION</u>
RESISTORS (CONTINUED)			RESISTORS (CONTINUED)		
R228		15K	R609		120K
R230		1.8K	R610		15K
R232		8.2K	R612		680 ohm
R234		180K	R614		330K, 10% - Early Production
R236		120K	R614		330K
R238		68K	R616		15K
R240		820K	R618		27K
R242		68K	R620		33K
R244		1K	R622		27K
R246		100K	R624		1.8 meg, 10% - 1/2 Watt
R248		150K	R626		5.6K
R304		1.5K	R628		10K
R308		220K	R630	37-36406-2	100K Dual Bass Control
R310		82 ohm, 1/2 Watt - Early Production	R632		10K
R310		82 ohm	R634		47K
R312		15 ohm	R636		8.2K
R314		22K	R638		4.7K
R316		1.8K	R640	37-36406-2	100K Dual Mid-Band Control
R318		68K	R642		4.7K
R320		4.7K	R644		2.2K
R322		220 ohm	R646	37-36406-1	100K Dual Treble Control
R324		470K	R648		2.2K
R326		47K	R650		3.3K
R328		820K	R652		2.7 meg, 10% - 1/2 Watt
R330		2.7K	R654		1 meg
R332		560 ohm	R656		10K
R334		470K - Early Production	R658		33K
R334		47K	R702		12K
R336		4.7K	R703		68K
R338		560 ohm	R704		10K
R340		3.9K	R708		120K
R404		1.5K	R709		120K
R408		220K	R710		15K
R410		82 ohm, 1/2 Watt - Early Production	R712		680 ohm
R410		82 ohm	R714		330K, 10% - Early Production
R412		15 ohm	R714		330K
R414		22K	R716		15K
R416		1.8K	R718		27K
R418		68K	R720		33K
R420		4.7K	R722		27K
R422		220 ohm	R724		1.8 meg, 10% - 1/2 Watt
R424		470K	R726		5.6K
R426		47K	R728		10K
R428		820K	R732		10K
R430		2.7K	R734		47K
R432		560 ohm	R736		8.2K
R434		470K - Early Production	R738		4.7K
R434		47K	R742		4.7K
R436		4.7K	R744		2.2K
R438		560 ohm	R748		2.2K
R440		3.9K	R750		3.3K
R502		3.3 meg, 10% - 1/2 Watt	R752		2.7 meg, 10% - 1/2 Watt
R503	36-34727-36	4.7 ohm, 2W - W/W, NON-FLAMMABLE	R754		1 meg
R504		120 ohm, 10% - 2 Watt	R756		10K
R505	36-34727-36	4.7 ohm, 2W - W/W, NON-FLAMMABLE	R758		33K
R506		68 ohm, 10% - 1/2 Watt	R802		100K
R508		3.9K, 10% - 1/2 Watt	R804		47K
R510		1 ohm, 10% - 1/2 Watt	R806		680 ohm
R512		3.9K	R808		680 ohm
R514		2.2K	R809		2.2K
R516		12K	R810		10K
R518	36-62454-37	33 ohm, 5 Watt	R811		2.2K
R522		1K	R812		2.2K
R524		1K	R814		3.3K - Early Production
R528		220K	R814		6.8K, 10% - 1/2 Watt
R530		1.8K	R816		3.3K
R532		47K	R816		680 ohm
R534		1K	R818		1.8K
R600	37-34909-3	100K Balance Control	R820		680 ohm - Early Production
R602		12K	R820		470 ohm
R603		68K	R822	37-33717-6	330 ohm Variable - Bias Adjust.
R604		10K	R824		39 ohm
R606	37-34289-8	100K Dual Volume Control	R826		39K
R608		120K	R828		2.2K

REPLACEMENT PARTS LIST (CONTINUED)

<u>SCHEMATIC CODING</u>	<u>SERVICE PART NO.</u>	<u>DESCRIPTION</u>
RESISTORS (CONTINUED)		
R830		1K
R832		1K
R834		2.2K
R836		39K
R838		100 ohm, 10% - 1/2 Watt
R840		100 ohm, 10% - 1/2 Watt
R842	36-34727-6	.22 ohm, 2W - NON-FLAMMABLE
R844	36-14764-20	.22 ohm - 2 Watt W/W
R846	36-14764-20	.22 ohm - 2 Watt W/W
R848		.22 ohm, 2W - NON-FLAMMABLE (Early Production)
R848	36-14764-20	.22 ohm - 2 Watt W/W
R850		10 ohm, 10% - 1 Watt
R852		560 ohm, 10% - 1 Watt
R854		27K
R856		27K
R902		100K
R904		47K
R906		680 ohm
R908		680 ohm
R909		2.2K
R910		10K
R911		2.2K
R912		2.2K
R914		3.3K - Early Production
R914		6.8K, 10% - 1/2 Watt
R916		3.3K - Early Production
R916		680 ohm
R918		1.8K
R920		680 ohm - Early Production
R920		470 ohm
R922	37-33717-6	330 ohm Variable - Bias Adjust.
R924		39 ohm
R926		39K
R928		2.2K
R930		1K
R932		1K
R934		2.2K
R936		39K
R938		100 ohm, 10% - 1/2 Watt
R940		100 ohm, 10% - 1/2 Watt
R942	36-34727-6	.22 ohm, 2W - NON-FLAMMABLE
R944	36-14764-20	.22 ohm - 2 Watt W/W
R946	36-14764-20	.22 ohm - 2 Watt W/W
R948		.22 ohm, 2W - NON-FLAMMABLE (Early Production)
R948	36-14764-20	.22 ohm - 2 Watt W/W
R950		10 ohm, 10% - 1 Watt
R952		560 ohm, 10% - 1 Watt
R954		27K
R956		27K

COILS AND TRANSFORMERS

L4	50-11378-5	3.3UH Filter
L6	50-34409-4	FM RF Coil
L8	50-34409-8	FM Mixer Coil
L10	50-34409-7	FM Oscillator Coil
L12	22-28072-2	Ferrite Bead
L16	50-34939-6	27UH Peaking Coil
L18	50-34411-1	Quadrature Detector Coil
L20	50-34939-6	27UH Peaking Coil
L22	50-34939-6	27UH Peaking Coil
L24	22-28072-2	Ferrite Bead
L26	50-34411-1	19kHz Coil
L28	50-18789-3	5.7MH Choke
L30	27-34851-1	AM Rod Antenna
	86-34774-1	Rod Antenna Holder
	86-34777-1	Rod-to-Bracket Adaptor
L32	22-28072-2	Ferrite Bead
L34	50-34938-1	AM RF Coil
L36	50-34936-1	AM Oscillator Coil
L38	22-28072-2	Ferrite Bead
L40	22-28072-2	Ferrite Bead

<u>SCHEMATIC CODING</u>	<u>SERVICE PART NO.</u>	<u>DESCRIPTION</u>
COILS & TRANSFORMERS (CONTINUED)		
L42	22-28072-2	Ferrite Bead
L50	22-28072-2	Ferrite Bead
L52	50-36552-2	Multiplex Filter
L54	50-36552-2	Multiplex Filter
L56	50-36552-3	Multiplex Filter
L58	50-36552-3	Multiplex Filter
L502	22-28072-2	Ferrite Bead
L602	50-15318-19	820UH Peaking Coil
L604	22-28072-2	Ferrite Bead
L702	50-15318-19	820UH Peaking Coil
L704	22-28072-2	Ferrite Bead
L802	50-36391-1	Audio Choke
L804	22-28072-2	Ferrite Bead
L806	22-28072-2	Ferrite Bead
L902	50-36391-1	Audio Choke
L904	22-28072-2	Ferrite Bead
L906	22-28072-2	Ferrite Bead
T2	50-89962-6	FM Balun
T8	50-34937-1	455kHz AM Transformer
T10	50-34937-1	455kHz AM Transformer
T12	50-34952-1	FM Mixer
T502	55-36551-1	Power Transformer

SOLID STATE DEVICES

FL2	26-34156-101	Ceramic Filter - BLACK DOT
	26-34156-102	Ceramic Filter - BLUE DOT
	26-34156-103	Ceramic Filter - RED DOT
	26-34156-104	Ceramic Filter - ORANGE DOT
	26-34156-105	Ceramic Filter - WHITE DOT
FL4	26-34156-101	Ceramic Filter - BLACK DOT
	26-34156-102	Ceramic Filter - BLUE DOT
	26-34156-103	Ceramic Filter - RED DOT
	26-34156-104	Ceramic Filter - ORANGE DOT
	26-34156-105	Ceramic Filter - WHITE DOT
IC2	15-34452-1	Integrated Ckt. - FM LIM./DET.
IC4	15-36446-1	Integrated Ckt. - PLL MPX. DET.
IC502	15-34401-1	Integrated Ckt. - REGULATOR
L2	22-28072-3	Ferrite Bead
L12	22-28072-3	Ferrite Bead
L24	22-28072-2	Ferrite Bead
L32	22-28072-2	Ferrite Bead
L38	22-28072-2	Ferrite Bead
L40	22-28072-2	Ferrite Bead
L42	22-28072-2	Ferrite Bead
L50	22-28072-2	Ferrite Bead
L502	22-28072-2	Ferrite Bead
L604	22-28072-2	Ferrite Bead
L704	22-28072-2	Ferrite Bead
L804	22-28072-2	Ferrite Bead
L806	22-28072-2	Ferrite Bead
L904	22-28072-2	Ferrite Bead
L906	22-28072-2	Ferrite Bead
Q2	13-34378-1	FET - FM RF Amplifier
Q4	13-34375-1	FET - FM Mixer
Q6	13-34369-1	FM Oscillator
Q8	13-23824-1	First FM IF
Q10	13-23824-1	Second FM IF
Q12	13-23824-1	Third FM IF
Q14	13-23824-1	Meter, AGC Amplifier
Q16	13-29033-3	Noise Amplifier
Q18	13-34940-1	AM RF Amplifier
Q20	13-26386-2	AM Converter
Q22	13-34045-2	AM IF Amplifier
Q24	13-29033-3	AM Active Filter, Meter Driver
Q26	13-29033-3	Mute Level Detector
Q28	13-29033-3	Mute Level Detector
Q30	13-26386-1	Mute Driver
Q32	13-28654-4	FET - Mute Gate
Q302	13-34381-1	Pre-Amplifier
Q304	13-18365-1	Pre-Amplifier
Q306	13-18365-1	Pre-Amplifier
Q402	13-34381-1	Pre-Amplifier
Q404	13-18365-1	Pre-Amplifier

REPLACEMENT PARTS LIST (CONTINUED)

<u>SCHEMATIC CODING</u>	<u>SERVICE PART NO.</u>	<u>DESCRIPTION</u>
SOLID STATE DEVICES (CONTINUED)		
Q406	13-18365-1	Pre-Amplifier
Q502	13-34046-1	Regulator Amplifier
Q504	13-29033-3	Ripple Reducer
Q602	13-18365-1	Voltage Amplifier
Q604	13-18365-1	Filter Amplifier
Q606	13-33175-2	Darlington - Voltage Amplifier
Q608	13-28654-4	FET - Audio Mute
Q702	13-18365-1	Voltage Amplifier
Q704	13-18365-1	Filter Amplifier
Q706	13-33175-2	Darlington - Voltage Amplifier
Q708	13-28654-4	FET - Audio Mute
Q802	13-34367-3	Current Source
Q804	13-34367-3	Differential Input - MATCHED
Q806	13-34367-3	Differential Input - MATCHED
Q808	13-29033-3	Bias Regulator
Q810	13-34371-1	Pre-Driver
Q812	13-28392-1	D.C. Amplifier
Q814	13-28393-1	D.C. Amplifier
Q816	13-36444-1	NPN Driver
Q818	13-36445-1	PNP Driver
Q820	13-36440-1	Output
Q822	13-36441-1	Output
Q902	13-34367-3	Current Source
Q904	13-34367-3	Differential Input - MATCHED
Q906	13-34367-3	Differential Input - MATCHED
Q908	13-29033-3	Bias Regulator
Q910	13-34371-1	Pre-Driver
Q912	13-28392-1	D.C. Amplifier
Q914	13-28393-1	D.C. Amplifier
Q916	13-36444-1	NPN Driver
Q918	13-36445-1	PNP Driver
Q920	13-36440-1	Output
Q922	13-36441-1	Output
SC2	1N295	Diode
SC4	1N295	Diode
SC6	13-17596-5	Diode - D6726
SC8	13-17596-5	Diode - D6726
SC10	13-17596-5	Diode - D6726
SC12	1N295	Diode
SC14	13-17596-5	Diode - D6726
SC16	13-17596-5	Diode - D6726
SC18	1N295	Diode
SC20	13-17596-5	Diode - D6726
SC22	13-17596-5	Diode - D6726
SC24	13-17596-5	Diode - D6726
SC26	13-17596-5	Diode - D6726
SC28	13-17596-5	Diode - D6726
SC30	13-33187-12	5V Zener
SC32	13-17596-5	Diode - D6726
SC34	13-17596-5	Diode - D6726
SC36	13-17596-5	Diode - D6726
SC38	13-17596-5	Diode - D6726
SC502	13-17174-2	Diode
SC504	13-17174-2	Diode
SC506	13-34368-1	Diode
SC508	13-34368-1	Diode
SC510	13-34368-1	Diode
SC512	13-34368-1	Diode
SC514	13-17596-5	Diode - D6726
SC516	13-17596-5	Diode - D6726
SC518	13-17596-5	Diode - D6726
SC520	13-17596-9	Diode
SC522	13-17596-9	Diode
SC524	13-17596-9	Diode
SC805	13-17596-10	Diode
SC806	13-17596-9	Diode
SC808	13-17596-9	Diode
SC810	13-33187-16	27V Zener
SC812	13-33187-16	27V Zener
SC905	13-17596-10	Diode
SC906	13-17596-9	Diode
SC908	13-17596-9	Diode
SC910	13-33187-16	27V Zener
SC912	13-33187-16	27V Zener

<u>SCHEMATIC CODING</u>	<u>SERVICE PART NO.</u>	<u>DESCRIPTION</u>
SOLID STATE DEVICES (CONTINUED)		
SCR502	13-18924-3	Silicon Controlled Rectifier
	86-14608-1	Mica Insulator, TO-3 Transistor
	72-34063-1	Socket, IC - 14 Pin Stagger Base
	72-34063-2	Socket, IC - 16 Pin Stagger Base
	72-28852-2	Socket - Transistor, In-line 3 Pin
	72-27200-7	Socket - Transistor, Large 3 Pin
	72-27200-5	Socket - Transistor, Small 3 Pin
	72-14607-2	Socket - Transistor, TO 3 Case
MISCELLANEOUS PARTS		
CB502	29-33346-18	Circuit Breaker - 3.5 Amp
CB802	29-33346-17	Circuit Breaker - 2.8 Amp
CB902	29-33346-17	Circuit Breaker - 2.8 Amp
PL2	73-10302-39	AM Antenna Connector Kit
SK2	73-10302-37	AM Antenna Connector Kit (at Jack Plate)
SK502	73-34307-2	Aux. AC Outlet
SK504	37-34307-2	Aux. AC Outlet
SK506	73-34307-2	Switched Aux. AC Outlet
SK508	73-26338-13	Headphone Socket
SK510	73-26338-13	Microphone Socket
SK514	73-34786-2	Quad PHONO NO. 1, PHONO NO. 2 INPUT Sockets
SK518	73-34786-1	Dual AUX. INPUT Sockets
SK520	73-34786-2	Quad TAPE NO. 1 RECORD/PLAY Sockets
SK522	73-34786-2	Quad TAPE NO. 2 RECORD/PLAY Sockets
SK528	73-34786-1	Dual PREAMP OUT Sockets
SK530	73-34786-1	Dual POWER AMP IN Sockets
SK550	86-14395-5	P.C. Panel Edge Connector Kit
SW502	33-36719-1	Complete FUNCTION Switch Asm.
	33-35745-1	FM MUTE Switch Section only
	33-35745-4	AUX. Switch Section only
	33-35745-5	PHONO NO. 1 or PHONO NO. 2 Switch Section only
	33-35745-6	AM or FM Switch Section only
	33-35745-13	AUDIO MUTING Switch Section only
SW504	33-36403-1	Complete MODE Switch Assembly
	33-35745-1	ANY Single Switch Section
SW506	33-34917-2	AC POWER Switch
SW508	33-16011-7	MAGNETIC/CERAMIC Slide Switch
SW510	33-34953-2	MAIN/PQ4 Speaker Switch
	70-32627-2	Special Mounting Screw - SW510
SW512	33-34953-2	REMOTE Speaker Switch
	70-32627-2	Special Mounting Screw - SW512
SW514	33-16011-7	PQ4 SPEAKER Slide Switch
	73-33071-41	AC Power Cord
	27-34851-1	AM Rod Antenna
	86-34774-1	AM Rod Mounting Bracket
	86-34777-1	AM Rod Mounting Bushing
	73-34927-1	Antenna Terminal
	86-34386-3	Antenna Terminal Insulator
	74-36213-4	Chassis Base
	70-98939-3	Dial Cord Pulley, 3/8" Dia.
	70-98939-2	Dial Cord Pulley, 5/8" Dia.
	77-41699-4	Dial Cord Tension Spring
	86-34757-1	Dial Drive Pulley
	30-26288-1	Dial Lamp, No. 259
	73-36258-1	Dial Lamp Mounting Clip
	70-99257-4	Dial Mounting Clip
	74-36257-6	Dial Overlay
	74-36218-2	Dial Pointer - Lighted
	86-36227-1	Dial Pointer Carriage
	86-36273-1	Dial Pointer Filter
	30-34803-1	Dial Pointer Lamp - No. 0406
	03-36263-1	Dial Tuning Shaft & Flywheel Asm.
	76-36254-1	Dial Tuning Shaft Bearing
	70-14098-1	Dial Tuning Shaft Bearing - Nylon
	81-36214-1	Dial Tuning Shaft Sleeve Bushing
	74-36407-1	Jack Plate
	83-34776-1	Jack Plate Jumper (Preamp Out - Amp. In)

REPLACEMENT PARTS LIST (CONTINUED)

SERVICE PART NO. DESCRIPTION

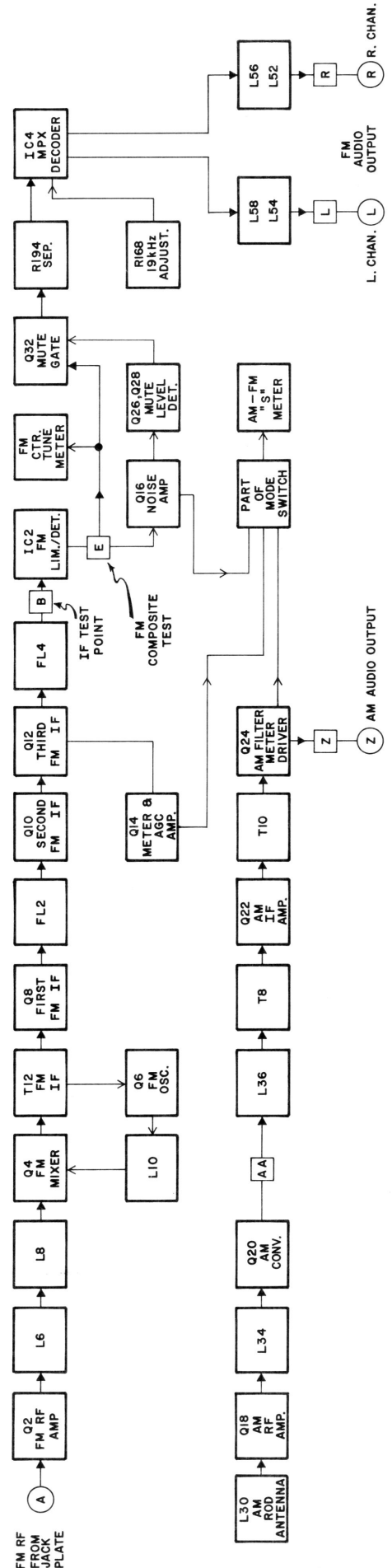
MISCELLANEOUS PARTS (CONTINUED)

- 73-34959-1 Jack Plate Panel (Speaker Connect - Quad.)
- 30-26288-1 Lamp - Dial & Meter, No. 259
- 70-26679-1 Lamp Terminal, No. 259 Bulb
- 30-34803-1 Lamp - Dial Pointer, No. 0406
- 30-36246-1 Lamp - Stereo Indicator, No. 2820-8
- 70-16003-8 Lamp Mtg. Grommet - No. 2820-8 Bulb
- 86-14608-1 Mica Insulator, TO-3 Transistor
- 72-34063-1 Socket, IC - 14 Pin Stagger Base
- 72-34063-2 Socket, IC - 16 Pin Stagger Base
- 72-28852-2 Socket - Transistor, In-line 3 Pin
- 72-27200-7 Socket - Transistor, Large 3 Pin
- 72-27200-5 Socket - Transistor, Small 3 Pin
- 72-14607-2 Socket - Transistor, TO-3 Case
- 25-34802-1 Tuning Meter - Center Tune (FM)
- 25-34802-2 Tuning Meter - Signal Strength
- 74-36311-1 Tuning Meter Filter
- 30-26288-1 Tuning Meter Lamp, No. 259
- 86-36232-1 Tuning Meter Lamp Holder
- 70-26679-1 Tuning Meter Mounting Clip

RS4744 CABINET PARTS LIST

DESCRIPTION	SERVICE PART NO.
FM Antenna	27-14926-2
BEZEL	
Control Knob - Balance, Volume	74-34859-1
Control Knob - Bass, Mid-Range, Treble (Inner Shaft)	74-34862-1
Control Knob - Bass, Mid-Range, Treble (Outer Shaft)	74-34863-1
Control Knob - Tuning	74-34861-2
Cover Glass	74-36242-1
Dial	74-34924-1
End Cap	10-36358-1
Headphone, Microphone Jack Mounting Nut	83-36201-1
Mounting Clip	77-36217-1
Mounting Nut - Volume & Treble Controls	70-32649-1
Pushbutton	74-34913-2
Pushbutton Guide - 1 Hole	74-34929-3
Pushbutton Guide - 6 Hole	74-34929-1
Spacer - Mounting	81-36348-1
Toggle Switch Cover	74-36233-1
Tuner	74-36418-3
CABINET	
Assembly	10-36421-101
Vent	74-36419-1

BLOCK DIAGRAM (TUNER)



R67 ALIGNMENT PROCEDURE

GENERAL

This receiver has been factory aligned with precision equipment. The circuits are quite stable, and not normally subject to frequency drift. Therefore, check all circuits for malfunctions before attempting realignment. Realign **ONLY** when absolutely necessary.

Maintain line voltage at 120V, 60Hz during alignment.

All RF shields must be in place during alignment.

60 Watt, 8 ohm, non-inductive loads are required for each channel output if speaker systems are disconnected during alignment.

AM:

1. PREFERRED FOR IF - Sweep generator capable of 455kHz signals.
2. AM signal generator capable of 400Hz, 30% modulated accurate signals from 455kHz to 1650kHz.
3. General purpose scope.
4. General purpose DC V.T.V.M.

FM:

1. PREFERRED FOR IF - Sweep generator capable of 88 - 108MHz wide band sweep, as well as narrow band sweep at 106MHz.
2. FM signal generator capable of accurate signals from 10.6MHz - 10.8MHz and 87 to 109MHz. (Modulated.)

ALWAYS KEEP INPUT SIGNALS AT THE LOWEST USEABLE LEVEL DURING ALIGNMENT - unless a specific signal level is indicated. Note the signal generator output attenuator setting at which increased input signal does not increase output signal. Keep the input signal level well below this point.

Set the tuning dial indicator at zero (0) on the logging scale with main tuning gang (C2) set at maximum capacity. Readjusting tuning dial indicator after AM or FM RF alignment will result in incorrect station calibration.

FM RF and IF sections must be properly aligned before beginning FM Multiplex alignment.

EQUIPMENT REQUIRED:

3. General purpose scope, detector probe.
4. General purpose V.T.V.M.
5. Distortion analyzer or 400Hz high pass filter.

MULTIPLEX FM:

1. Multiplex generator with the following capabilities:
 - a. Pilot - only signal.
 - b. Standard multiplex signal, modulated.
 - c. Single channel modulation.
2. Audio oscillator capable of 150mV., R.M.S. output (680 ohm load) at 19kHz through 28.194kHz.
3. Accurate frequency counter (19 - 29kHz).
4. General purpose V.T.V.M.
5. General purpose scope.

AM ALIGNMENT

STEP	TUNING INDICATOR SETTING	TEST EQUIPMENT HOOK-UP	GENERATOR FREQUENCY	ADJUSTMENT POINT	ADJUST FOR
Switch receiver on - Select AM function and check for +12V at pins V and W.					
1	PREFERRED. Tuning gang fully closed.	Radiate 455kHz sweep modulated signal into tuner. Scope to pin ZB.	Wide Sweep.	T8, T10	Symmetrical IF Passboard.
NOTE: The preferred IF alignment will yield a better AM distortion figure.					
1	OPTIONAL. Tuning gang fully closed.	Radiate 455kHz modulated signal into tuner. Scope to either L or R Tape Record Jack.	455kHz - 30% 400Hz modulation.	T8, T10	Maximum recovered audio.
2	1400kHz	Radiate signal into tuner. Scope to either L or R Tape Record Jack.	1400kHz - 30% 400Hz modulation.	C28, C2H, C2K	Maximum recovered audio.
3	600kHz		600kHz - 30% 400Hz modulation.	L36, L34, L30	Maximum recovered audio.
Reduce signal level and repeat steps 2 and 3 until maximum sensitivity and correct dial calibration are achieved.					
When correctly aligned, this receiver will tune through a signal from 535kHz to 1650kHz.					

———— FM ALIGNMENT ————

STEP	TUNING INDICATOR SETTING	TEST EQUIPMENT HOOK-UP	GENERATOR FREQUENCY	ADJUSTMENT POINT	ADJUST FOR	
Switch receiver on. Select FM function and check for +12V at pins W and Y.						
1	PREFERRED. 106MHz.	Sweep generator to FM antenna terminals. Scope to pin B. Use detector probe.	88-108MHz sweep modulated signal.	C76, C2B, C2D	MAXIMUM response at 106MHz marker.	
2	90MHz.		Narrow sweep down.	T12	Symmetrical IF Passband.	
Repeat steps 1 and 2 until indicated dial frequencies are correct at 90MHz and 106MHz.						
1	ALTERNATE. 106MHz.	Signal generator to FM antenna terminals. Scope to pin B. Use detector probe.	106MHz, 100%, 400Hz modulation.	C76, T12, C2B, C2D.	MAXIMUM response.	
2	90MHz.		90MHz, 100%, 400Hz modulation.	L10, L8, L6		
Repeat steps 1 and 2 until indicated dial frequencies are correct at 90MHz and 106MHz.						
3	106MHz.	Signal generator to FM antenna terminals. Scope to L or R Tape Record Jack.	106MHz, 100%, modulation.	C76, C2B, C2D.	MAXIMUM recovered audio.	
4	90MHz.	Use low level signal so that noise is present on recovered audio - REDUCE signal as required.	90MHz, 100%, modulation.	L10, L8, L6		
Repeat steps 3 and 4 until maximum sensitivity with correct dial calibration are achieved. Continue to reduce signal level to achieve maximum sensitivity.						
5	98MHz.	Signal generator to FM antenna inputs. Scope to L or R Tape Record Jacks.	98MHz, 100%, 400Hz modulation. signal. Use 100uV signal.	L18	MAXIMUM recovered audio.	
6	98MHz	As above - use distortion analyzer or 400Hz high pass filter.		L18	MINIMUM distortion.	
7				R46 (Meter Zero)	Centered deflection.	
8				Increase signal level to 1000uV.	L26 - "S" meter coil.	MAXIMUM "S" meter reading.
9				Reduce signal level to 1.8uV.	T12	MINIMUM noise on peaks of recovered audio.
When correctly aligned, this receiver will tune through a signal from 87.5MHz to 108.5MHz.						

———— MULTIPLEX ALIGNMENT ————

STEP	TUNING INDICATOR SETTING	TEST EQUIPMENT HOOK-UP	GENERATOR FREQUENCY	ADJUSTMENT POINT	ADJUST FOR
Switch receiver on. Select FM and STEREO functions. Enable MUTE switch. Check for +12V at pins W and Y.					
1	Tune receiver to generator.	Multiplex generator to FM antenna terminals. Frequency counter to pin G.	Use 1uV input signal.	R168 (19kHz Adj.) *SEE NOTE.	Frequency reading of 19kHz, ± 10 Hz at pin G.
2		Multiplex generator to FM antenna terminals. Scope to R Tape Record Jack. Disconnect counter from pin G.	1000uV, L. only stereo signal.	R194 (separation).	MINIMUM signal on RIGHT channel.
3		Multiplex generator to FM antenna terminals. Scope to L Tape Record Jack. Audio generator to pin FL through 680 ohm load - COUNT generator frequency.	1uV input level. 19,607Hz at 150mV, R.M.S. (COUNTED).	L54	MINIMUM 19,607Hz at L Tape Jack.
4		Multiplex generator - as above. Scope to R Tape Record Jack. Audio generator to pin FR.	As above.	L52	MINIMUM 19,607Hz at R Tape Jack.
5			28,194Hz at 150mV R.M.S. (COUNTED).	L56	MINIMUM 28,194Hz at R Tape Jack.
6		Multiplex generator - as above. Scope to L Tape Record Jack. Audio generator to pin FL.	As above.	L58	MINIMUM 28,194Hz at L Tape Jack.

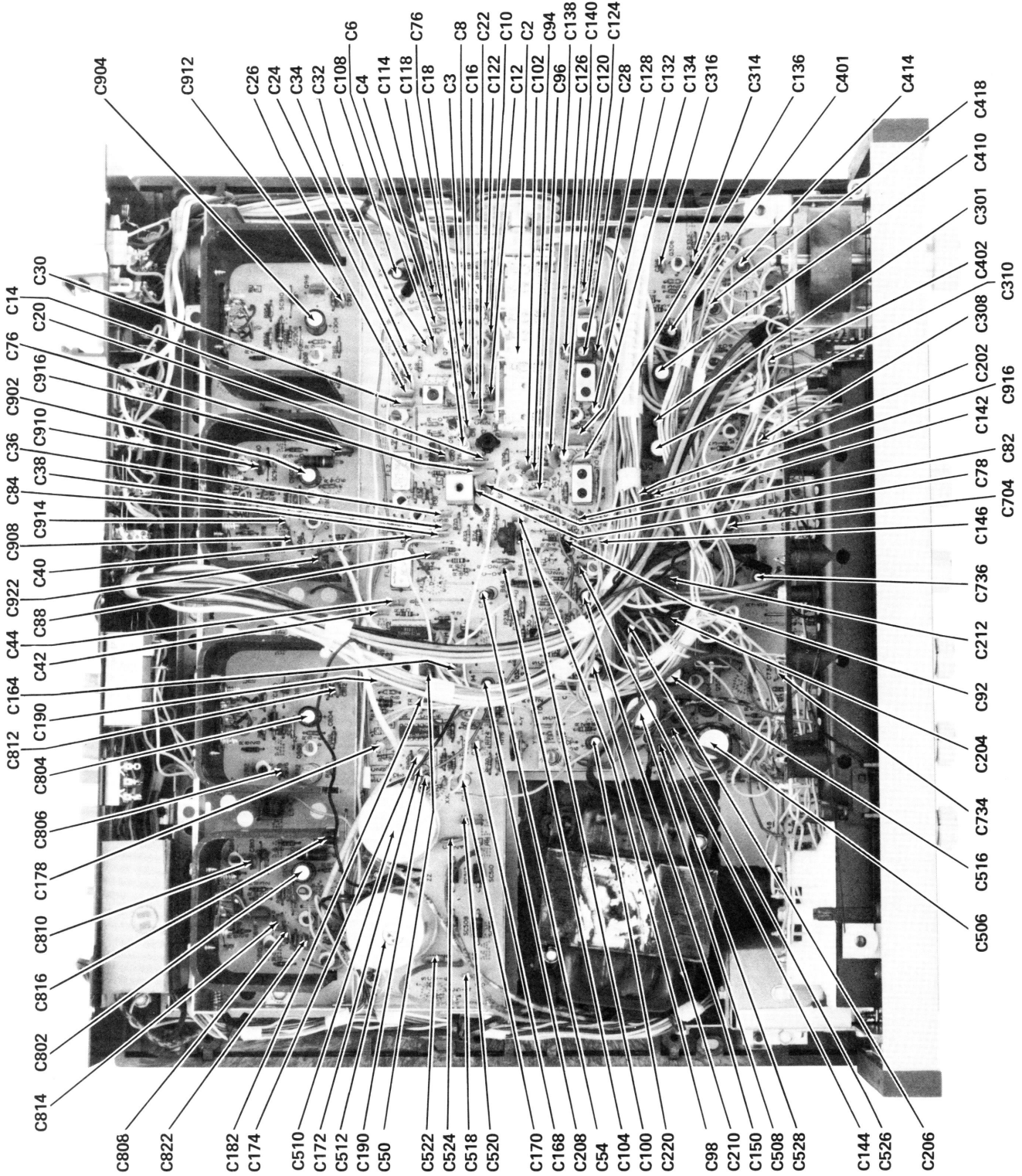
19kHz ADJUSTMENT TABLE

In the unlikely event that the proper 19kHz frequency cannot be achieved at Pin G, the following circuit changes may be made:

The frequency at Pin "G" should be counted with R170, R174 and R178 connected in the circuit and with R168 (19kHz Adj.) at minimum resistance (highest frequency).

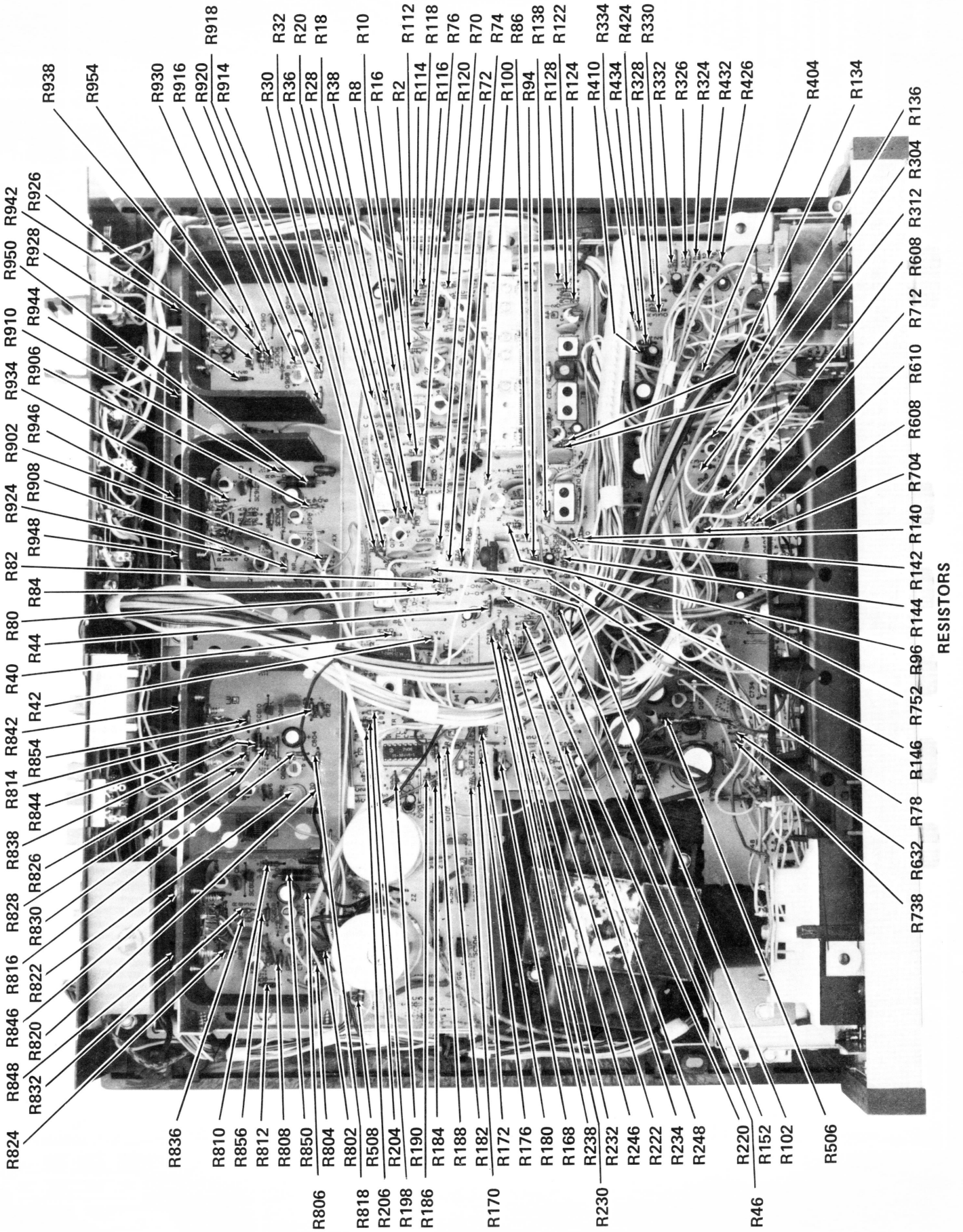
IF FREQUENCY IS EQUAL TO, OR GREATER THAN	BUT FREQUENCY IS EQUAL TO, OR LESS THAN	THEN REMOVE RESISTORS LISTED AND RESET R168.
20,224Hz 21,172Hz 22,121Hz 23,060Hz 24,008Hz 24,948Hz	21,171Hz 22,120Hz 23,059Hz 24,007Hz 24,947Hz 26, 181Hz	R 170 R 174 R 178 R 170, R 178 R 174, R 178 R 170, R 174, R 178

—— PARTS IDENTIFICATION (CONTINUED) ——
MAIN PANEL (CONTINUED)



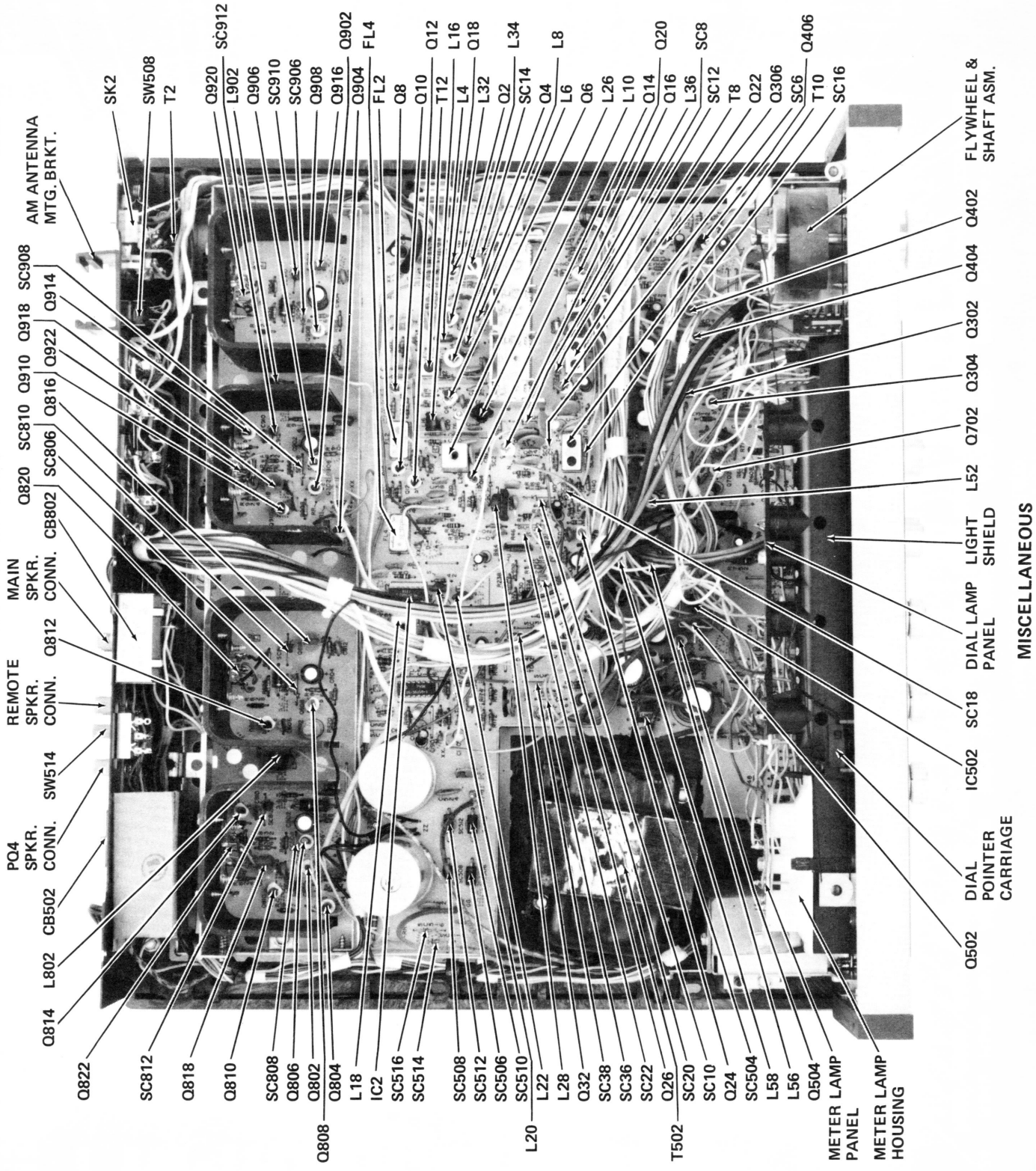
CAPACITORS

—— PARTS IDENTIFICATION (CONTINUED) ——
MAIN PANEL (CONTINUED)

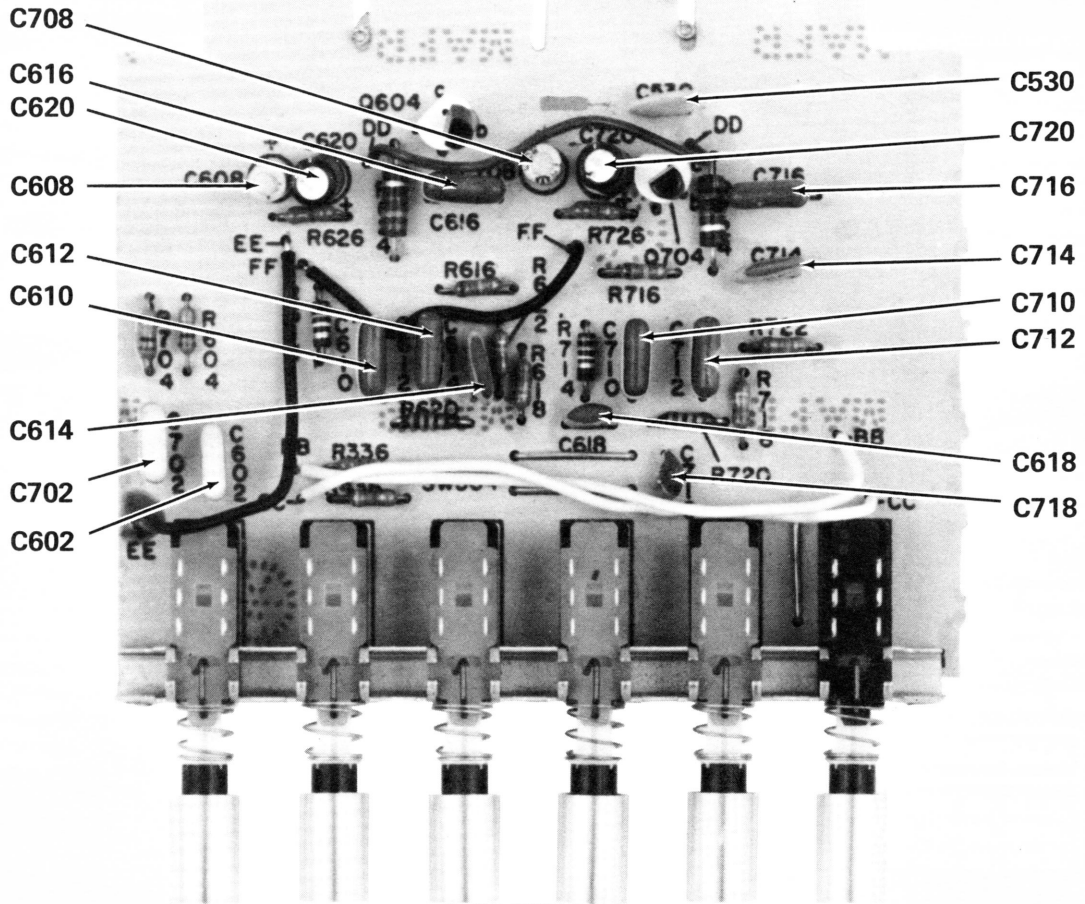


RESISTORS

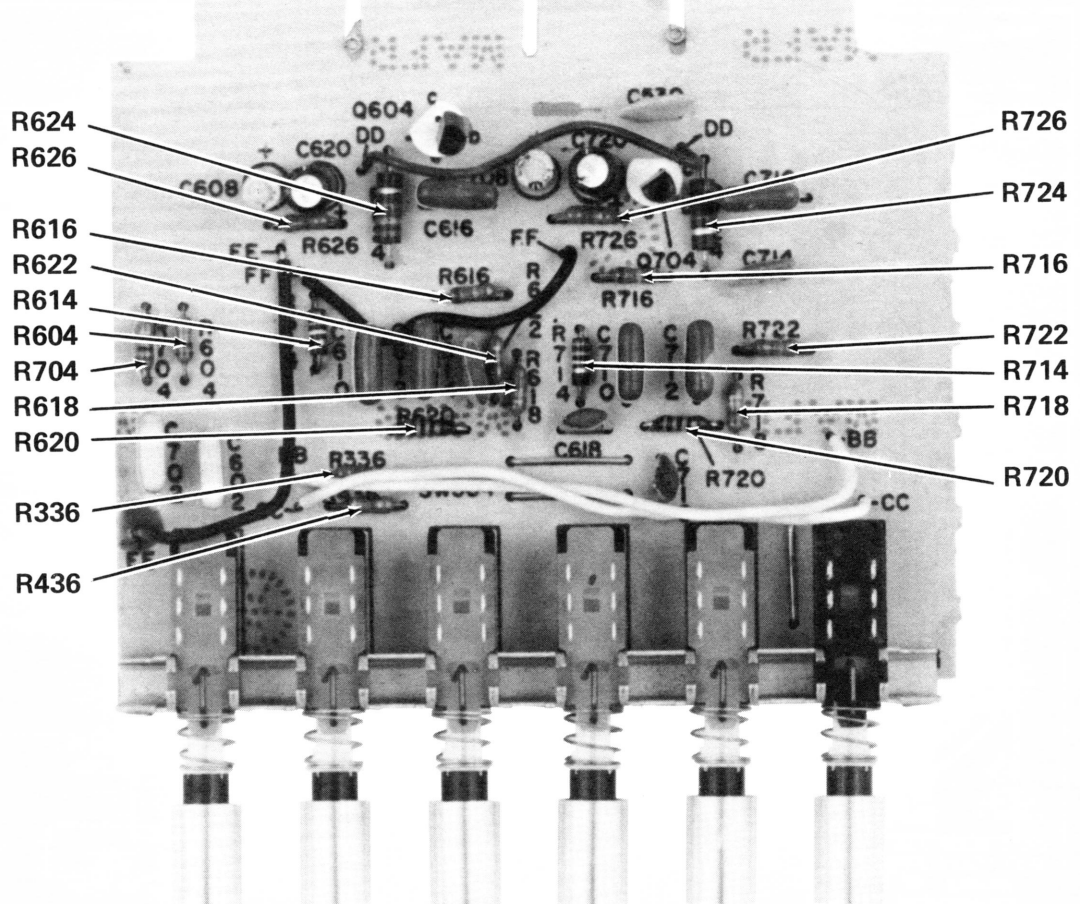
—— PARTS IDENTIFICATION (CONTINUED) ——
MAIN PANEL (CONTINUED)



———— PARTS IDENTIFICATION (CONTINUED) ————
SWITCH PANEL (CONTINUED)

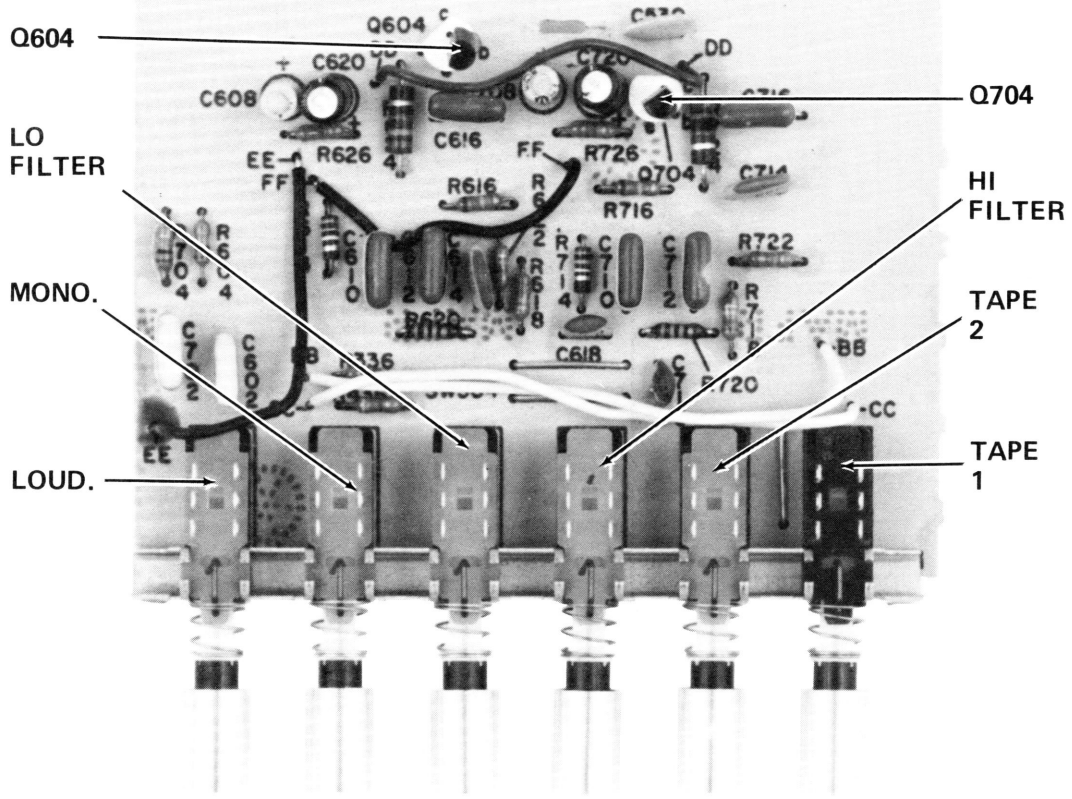


CAPACITORS

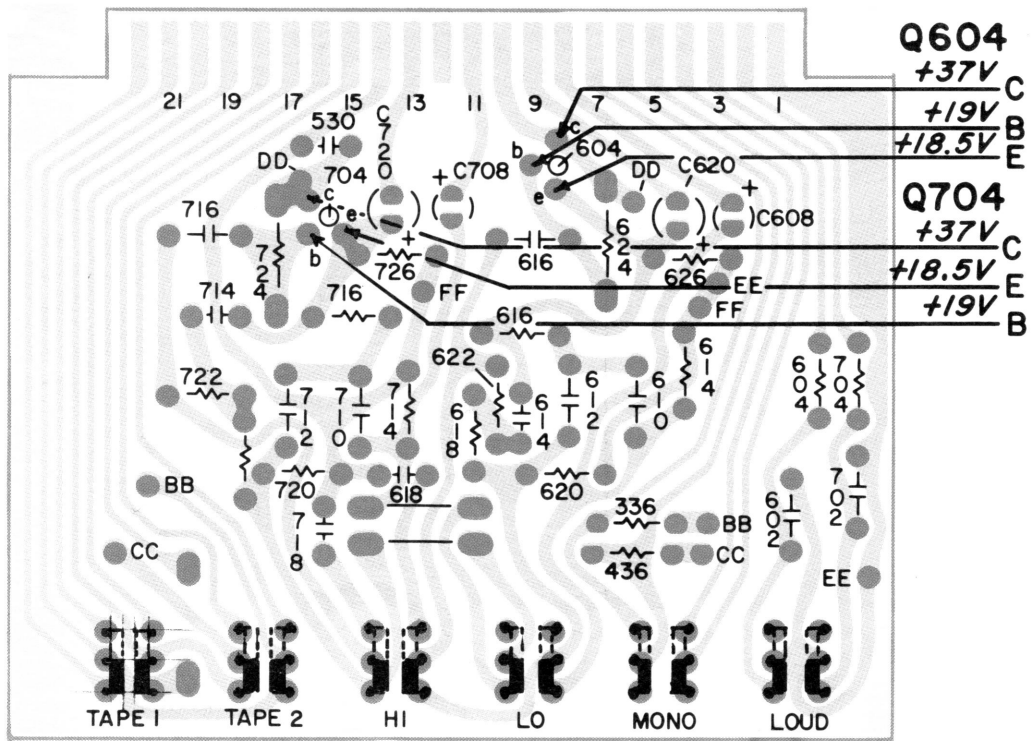


RESISTORS

———— PARTS IDENTIFICATION (CONTINUED) ————
 SWITCH PANEL (CONTINUED)

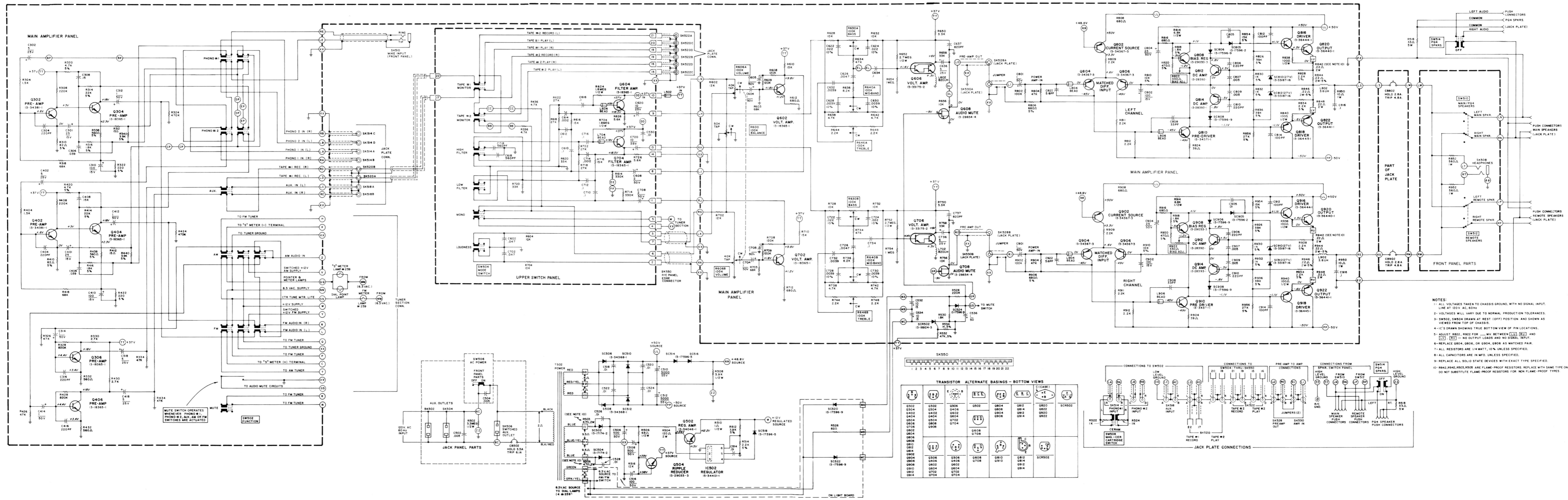


MISCELLANEOUS



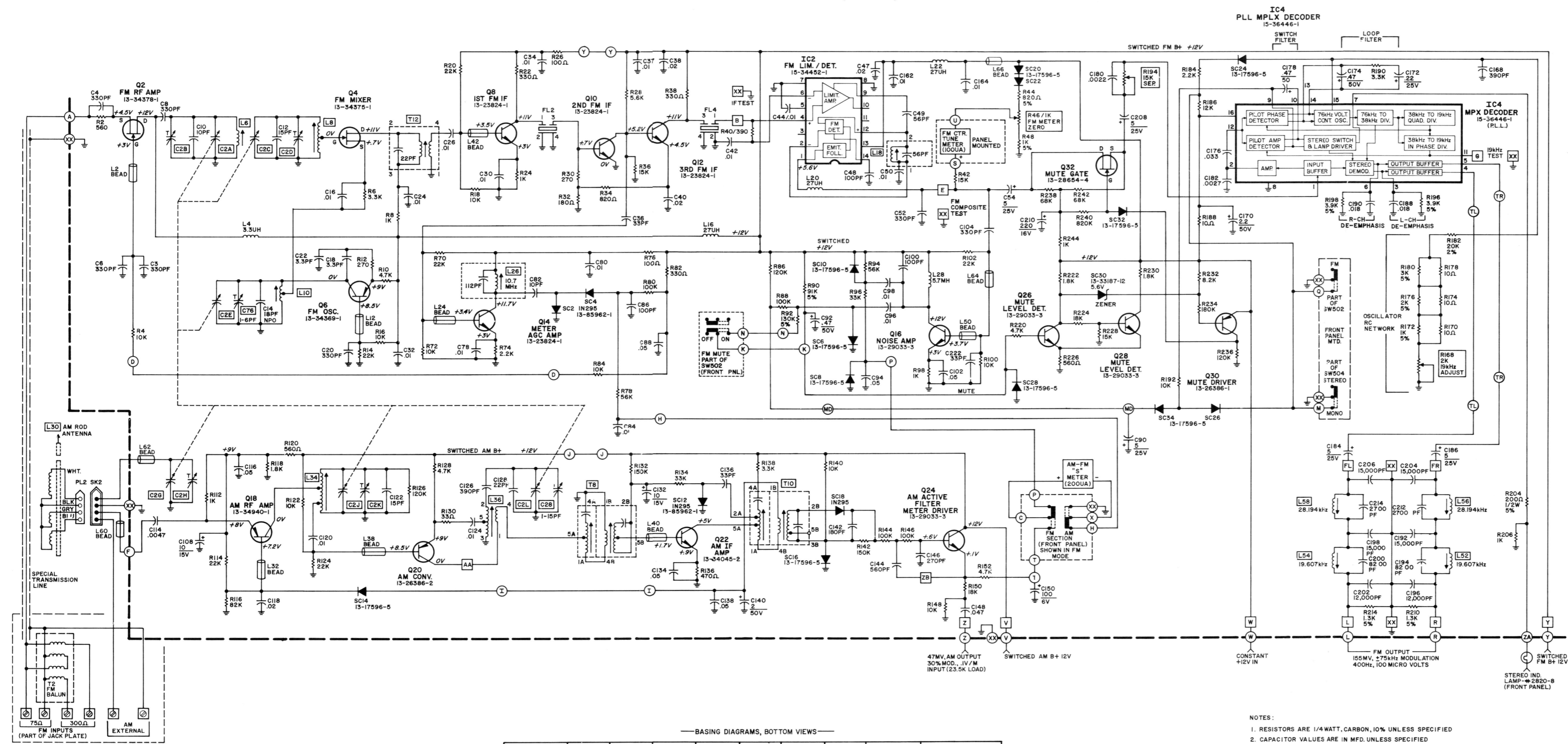
BOTTOM FOIL

SCHEMATIC DIAGRAM (AMP)

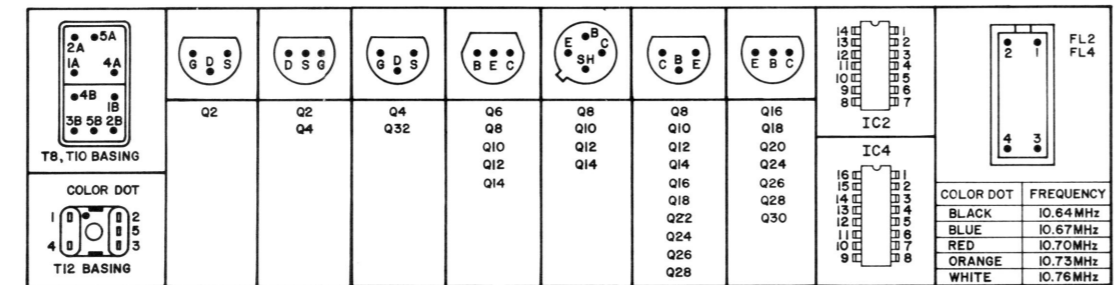


- NOTES:
- 1- ALL VOLTAGES TAKEN TO CHASSIS GROUND, WITH NO SIGNAL INPUT. LINE AT 120V AC, 60Hz.
 - 2- VOLTAGES WILL VARY DUE TO NORMAL PRODUCTION TOLERANCES.
 - 3- SW502, SW504 DRAWN AT REST (OFF) POSITION AND SHOWN AS VIEWED FROM TOP OF CHASSIS.
 - 4- IC'S DRAWN SHOWING TRUE BOTTOM VIEW OF PIN LOCATIONS.
 - 5- ADJUST R822, R822 FOR \approx MV BETWEEN [] AND []
 - 6- REPLACE Q804, Q806, OR Q904, Q906 AS MATCHED PAIR.
 - 7- ALL RESISTORS ARE 1/4 WATT, 10% UNLESS SPECIFIED.
 - 8- ALL CAPACITORS ARE IN MFD. UNLESS SPECIFIED.
 - 9- REPLACE ALL SOLID STATE DEVICES WITH EXACT TYPE SPECIFIED.
 - 10- R842, R940, R803, R903 ARE FLAME-PROOF RESISTORS. REPLACE WITH SAME TYPE ONLY. DO NOT SUBSTITUTE FLAME-PROOF RESISTORS FOR NON FLAME-PROOF TYPES.

SCHEMATIC DIAGRAM (TUNER)



BASING DIAGRAMS, BOTTOM VIEWS



- NOTES:
- RESISTORS ARE 1/4 WATT, CARBON, 10% UNLESS SPECIFIED
 - CAPACITOR VALUES ARE IN MFD. UNLESS SPECIFIED
 - MEASURE VOLTAGE TO CHASSIS GROUND WITH RECEIVER TUNED OFF-STATION. SELECT AM OR FM FUNCTION AS REQUIRED. MAINTAIN LINE AT 120 VAC
 - ROUND CONNECTIONS (K) ARE WIRE HOLES ONLY
 - SQUARE PINS (X) ARE TEST POINTS AND/OR WIRE WRAP CONNECTIONS
 - REPLACE SOLID STATE DEVICES WITH EXACT TYPE SPECIFIED FOR OPTIMUM PERFORMANCE

BLOCK DIAGRAM (AMP)

