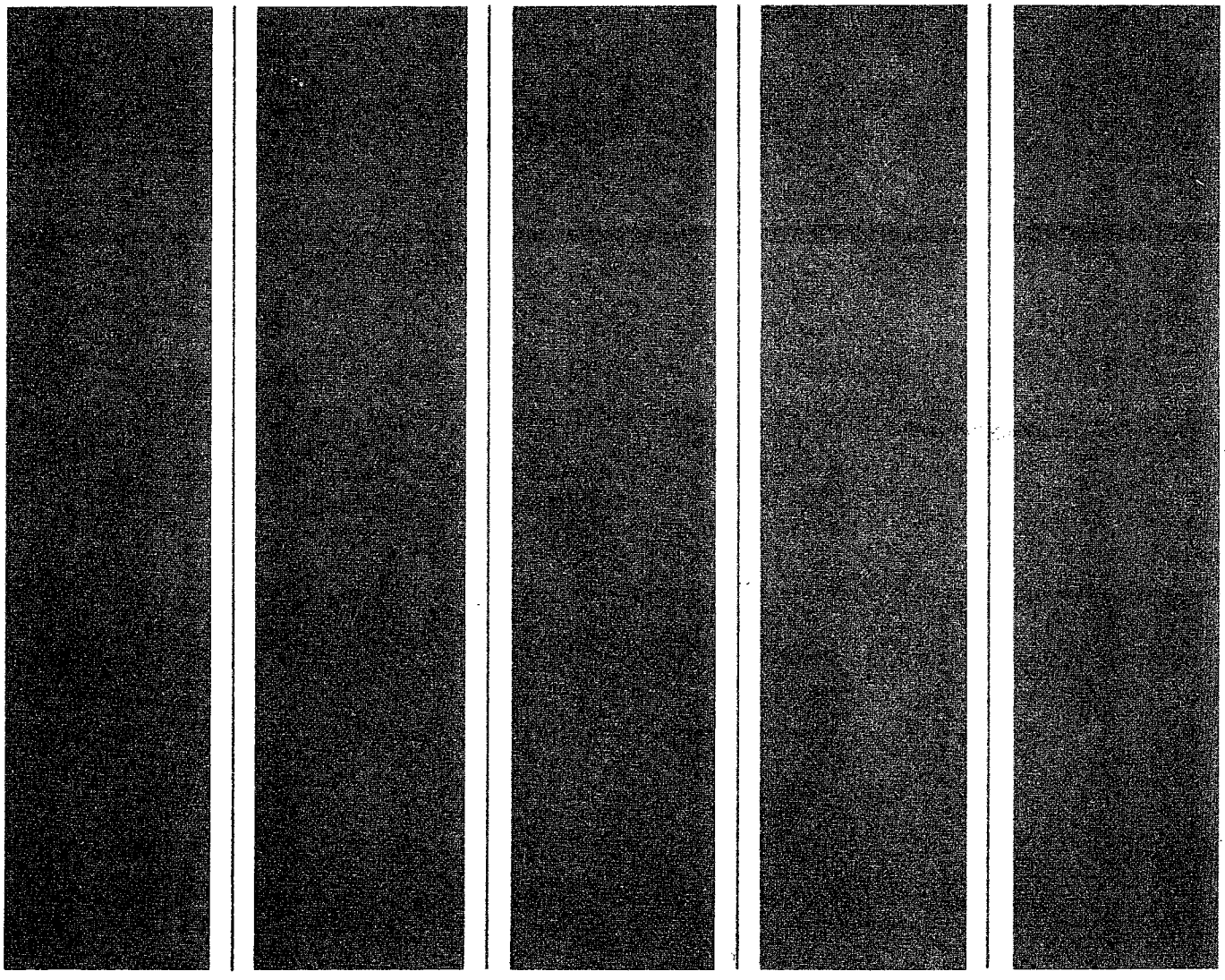
SERVICE MANUAL
stereo receiver

R376



SCOTT

The Name to listen to.

H. H. SCOTT, INC., 20 Commerce Way, Woburn, Mass. 01801, Tel. 617 933-8800

NOTICE

The following safety precautions must be followed to assure continued reliability and safety against fire and shock hazard:

1.) Replacement parts used during servicing of this appliance must have identical characteristics as those offered and recommended by H. H. Scott, Inc.

2.) A dielectric test is to be performed on each appliance following the re-assembly and before returning the unit to the customer.

3.) The dielectric test to be performed on H. H. Scott, Inc. electronic components serviced in the United States and Canada for use in these countries shall consist of not less than the following:*

   1.) A dielectric tester designed to supply not less than 1100 volts at 60 Hz and employing leakage current indicator/s, is to be used.

   2.) The tester is to be connected per the instructions enclosed with the instrument, or as follows:

      a) The tester is connected to the power line receptacle and the power switch is turned ON.

      b) Sufficient time is allowed for the tester supply to stabilize and then the output voltage is adjusted for 1080V.

      c) Leads of the tester, usually marked GND and HV, are connected between chassis GND and both blades of the male plug of the power cord.

      d) Switch tester to "test" and observe leakage indicator.

   LEAKAGE CURRENT MUST NOT EXCEED 0.5 mA.

* Dielectric tests made by service personnel in countries other than USA and Canada must use test equipment and procedures specified by the safety agency serving that country.

AUDIO SPECIFICATIONS

Output Power	75W	Minimum continuous RMS power output per channel, both channels driven into 8 ohms from 20 to 20,000 Hz with no more than 0.1% total harmonic distortion.

Maximum Total Harmonic Distortion	0.1%
Maximum Intermodulation Distortion From 0.5 Watt to Rated Output	0.07%

Input Sensitivity	
Phono	2.5; 6 mV
Mic	6.0 mV
Aux	150 mV
Tape	150 mV

Signal-to-noise Ratio (weighted, shorted input)	
Phono	75 dB
Mic	80 dB
Aux	85 dB
Tape	85 dB

Frequency Response at 1 Watt ±1 dB	
Phono	20 to 20,000 Hz
Aux	15 to 35,000 Hz

Phono Overload	120 mV
Mic Overload	200 mV

Input Impedance	
Phono	47,000 ohms
Mic	47,000 ohms
Aux	60,000 ohms
Tape	60,000 ohms

Separation @ 1 kHz	
Phono	60 dB
Aux	68 dB

Speaker Load Impedance	4, 8, or 16 ohms
Damping Factor	45 @ 8 ohms

CONTROLS

Bass Control Range	±12 dB at 100 Hz
Treble Control Range	±12 dB at 10 kHz
Midrange	±6 dB at 1 kHz
High Filter	10 dB at 10 kHz
Low Filter	10 dB at 50 Hz
Loudness Compensation	3 dB at 10 kHz; 7 dB at 100 Hz
Headphone Output Load Impedance	8 to 600 ohms

FM TUNER SECTION

Tuning Range	87.5 to 108 MHz
Usable Sensivity	
Mono	9.3 dBf; 1.6 µV
Stereo	28 dBf; 18 µV
Sensivity for 50 dB Signal to Noise Ratio	
Mono	15 dBf; 3.1 µV
Stereo	36 dBf; 34.5 µV
Signal to Noise Ratio (at 65 dBf)	
Mono	74 dB
Stereo	68 dB
Frequency Response ±1.5 dB	20 to 20 kHz
Distortion at 65 dBf; 1 kHz	
Mono	0.15%
Stereo	0.25%
Capture Ratio	1.0 dB
Alternate Channel Selectivity	80 dB
Image Rejection Ratio	85 dB
Stereo Separation - 10,000 Hz	34 dB
1,000 Hz	45 dB
100 Hz	40 dB
Spurious Response Ratio	100 dB
AM Suppression Ratio	60 dB
SCA Rejection Ratio	65 dB
Stereo Threshold (preset)	7 to 15 µV; 22.1 to 28.7 dBf
Muting Threshold	2 to 10 µV; 11.2 to 25.2 dBf

AM TUNER SECTION

Tuning Range	535 to 1,606 kHz
Usable Sensitivity	100 µV/M
Selectivity, Minimum	40 dB
Signal to Noise Ratio	50 dB
Total Harmonic Distortion	1.0%

GENERAL SPECIFICATIONS

Power Line Requirement	120 VAC, 60 Hz
Power Consumption (max.)	250 Watts
Dimensions	5 11/16 x 19 3/8 x 15 7/8 in
	14.4 x 49.0 x 40.0 cm
Weight	31 lbs; 14 kg
Shipping Weight	37 lbs; 17 kg

TOP COVER REMOVAL

CAUTION: Disconnect power cord before removing covers.

1.) Remove the two black screws attaching cover at each side.
2.) Push cover slightly backward while lifting at the back edge.

BOTTOM COVER REMOVAL

1.) Remove the twelve screws and lift cover. Do not remove rubber feet unless replacement is required.

FRONT PANEL REMOVAL

1.) Remove the four screws securing the panel at top and bottom.
2.) Remove all the knobs (BASS, MIDRANGE, TREBLE, VOLUME, BALANCE, TAPE COPY, TAPE MONITOR, FUNCTION, TUNING) except the push buttons. This frees the panel, pull from the front using care.

DIAL CORD RESTRINGING INSTRUCTIONS

1.) Rotate the tuning capacitor shaft fully counterclockwise (minimum capacitance position). The slit of the pulley should be positioned as shown in diagram.
2.) Tie an end of the cord to the stud on the pulley as shown.
3.) Wrap the dial cord one turn around the pulley and string the dial cord following the direction of the arrows.
4.) Pass the other end of the dial cord through the slit of the pulley. Tie the end of the cord to the tension spring so that the end of the loop is positioned between A and B as shown, when dial cord is under tension with spring installed. Crimp spring around drum "hook" B.
5.) After completing the dial cord stringing, make sure that the tuning system works properly. Apply a drop of suitable cement to the ends of the cord and to the spring at point "B".

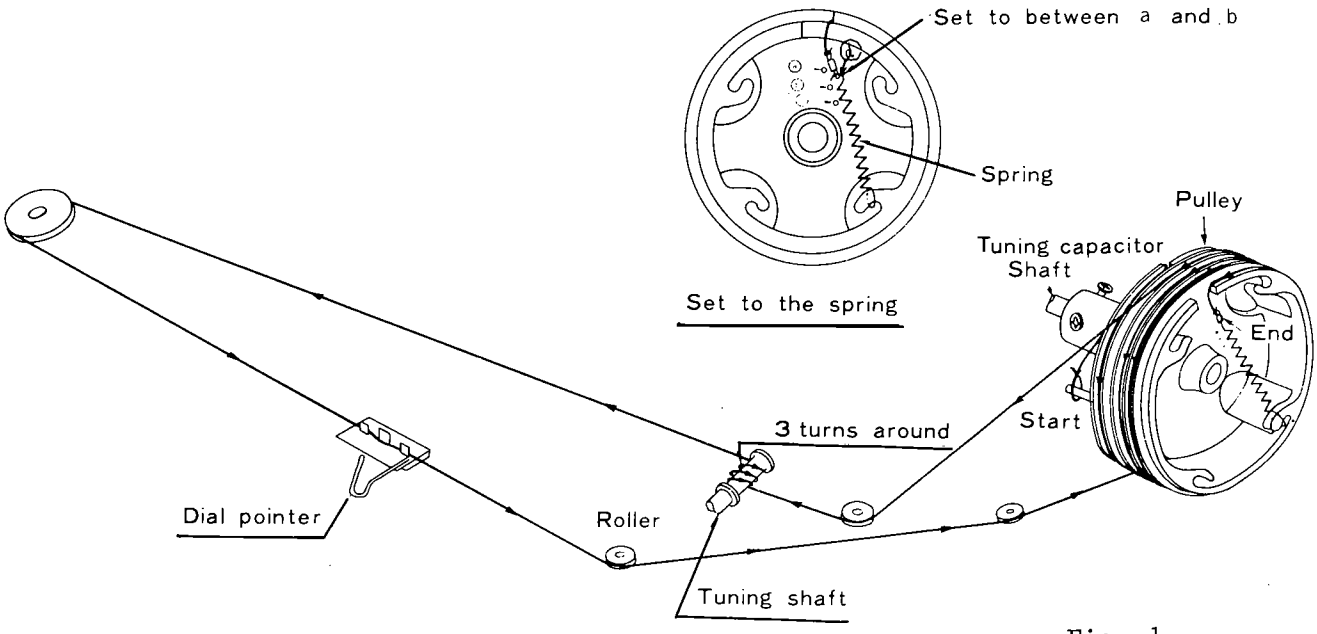


Fig. 1

MECHANICAL DIAL CALIBRATION

With the dial pointer on the cord, tune the receiver to a known frequency. Slide the pointer to read the dial frequency of the known station. Crimp the clips of the pointer around the dial cord and apply suitable cement. Again check for satisfactory dial travel.

METER REPLACEMENT

Remove top and bottom covers.
Remove front panel.
Remove the five screws securing the dial lamp housing.
Remove the one screw attaching the meter clip.
Apply pressure at front of meter to break the adhesive used to mount the meter.
Replacement meters must be mounted using the reverse order and using new double-stick tape.

TONE CONTROL PRINTED CIRCUIT BOARD REMOVAL

Remove top and bottom covers.
Remove front panel.
Remove seven screws.
Remove five nuts from the rotary controls.
Remove plastic ties as required to move the PCB to the rear and out of the chassis.
RE-INSTALL in the reverse order. Make sure wire leads are dressed so that they are not "pinched", and that channel separation is not degraded.

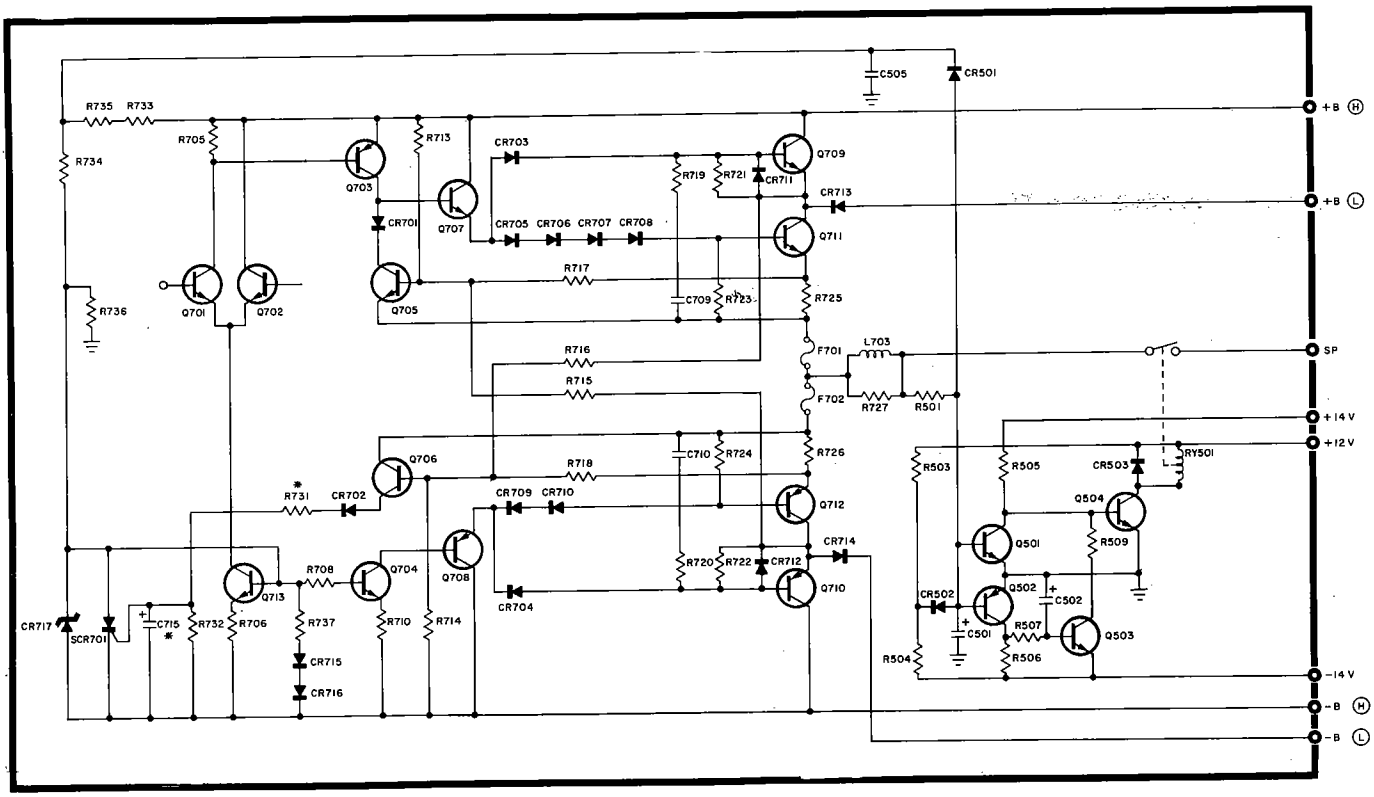


Fig. 2

NOTE:

Early production changes were made in the protection circuit to prevent the circuit from acting when driving low efficiency loud speakers. Change: *R731 from 33K to 15K
*C715 from 0.1 to 4.7 μF

CIRCUIT DESCRIPTION OF THE POWER AMPLIFIER

A basic circuit is shown in Fig. 2.

Q707 and Q708 are driver transistors and Q709, 710, 711 & 712 are the output transistors. When the input signal levels are low, the smaller power transistors, Q711 and Q712, operate to drive the speaker from the supply voltage at B (L). When the input signal level exceeds a predetermined level, Q709 and Q710 will start to conduct in addition to Q711 and Q712. With the higher input signal, the emitter voltage of Q711 and Q712 exceed +B (L) and -B (L). The output current is then drawn from +B (H) and -B (H).

Diodes, CR705 - 708 and CR709 & 710, are installed to eliminate distortion caused by current limiting. The actual number of diodes will vary depending on Vce (sat) of Q711 and Q712.

Diodes CR703 and CR704 are installed to prevent Q707 and Q708 from being destroyed by excessive Vbe.

Diodes CR711 and CR712 are used to prevent excessive Vbe from destroying Q709 and Q710.

Resistors, R719 and R720, and capacitors C710 and C709, are installed for minimum distortion at high frequencies.

PROTECTION CIRCUIT

To prevent any turn-on "thump", and to provide protection for output transistors and speakers, the model No. R376 uses an active muting and protection circuit.

The muting circuit turns the relay off and opens the speaker circuit for approximately 4 seconds when the power switch is turned on.

Ref: Fig. 2. When power is switched ON, C502 is charged via R506 and R507 from the -14V supply. A minus voltage is immediately applied to the emitter of Q503, turning Q503 ON. The minus voltage on Q504 turns that device OFF and the relay is opened. When C502 completes charging, Q503 turns OFF and Q504 turns ON. Current then flows through the relay coil turning the speaker circuit on.

TRANSISTOR PROTECTION

This circuit protects the output transistors from damage by limiting excessive collector current if, Ic + Vce should exceed specified rating. For example, excessive collector current in Q709 and Q711 is sensed across R725. Vce is divided by R713, R717 and R715 and is added between B and E of Q705. When the base-emitter voltage exceeds 0.6V, Q705 turns on to control the current flowing through Q709 and Q711.

For protection of Q710 and Q712, excessive collector current is sensed across R726. Vce is divided by R714, R718 and R716 and is added between B and E of Q706. When this voltage exceeds 0.6V, Q706 turns on, the current causes SCR701 to conduct. As a result, Q704 and Q713 are cut off and the entire amplifier is shut down. When this happens, Q504 is also cut off and the protection relay opens.

SPEAKER PROTECTION

The protection circuit of this amplifier is also designed to protect the speakers from excessive DC voltage, should some defect occur in the output circuit. If a DC voltage appears at the speaker, (either + or -) it will be sensed by Q501 or Q502, through R/C network R501/C501.

If a positive voltage appears at the speaker, Q501 will turn ON, turning Q504 OFF and the relay will open the speaker circuit.

If a negative voltage is sensed at the speaker terminals, both Q502 and Q503 will conduct, opening the relay in collector circuit of Q504.

The protection will also operate if a very low frequency, high level signal is applied to the audio inputs. However, normal operation will be restored automatically, shortly after the condition is corrected.

TEST AND ALIGNMENT PROCEDURES

RECOMMENDED EQUIPMENT

1. AC vacuum tube voltmeter
2. DC millivolt meter or DMM
3. Oscilloscope
4. Volt-Ohm meter
5. Harmonic Distortion meter
6. AM Signal Generator
7. FM Signal Generator
8. Multiplex Generator
9. Audio Oscillator
10. Standard AM dummy antenna (200 $\mu\mu$F ceramic or mica capacitor)
11. Standard FM dummy antenna for 300 ohm balanced input (see circuit, Figure FM-1)
12. Suitable alignment tools, cables, etc.
13. Two 8 ohm resistive loads, compensated for L & C (min. 100W)
14. Variable power line transformer
15. Suitable line voltage and current monitoring meters
16. Frequency counter

As an alternate to separate meters and generators, there are available, excellent combined components which are highly recommended as a substitute for audio and RF testing equipment listed above.

All tests are to be made with 120V AC line. Unless otherwise specified, supply input to both channels and read both outputs.

To simplify troubleshooting of tone and power circuits, input is connected to the Aux input with controls set as follows: (use mode switch as required)

Front Panel

Input Selector	Aux
Tone Controls	Flat (12 O'clock)
Loudness	Minimum (full CCW)
Balance	12 O'clock
Speakers	A + B

Note: When troubleshooting defective power circuits, it is sometimes useful to switch a small line voltage lamp in series with equipment under test before applying power. The lamp will limit the current drawn, thus preventing further damage to circuit components. The variable power line transformer is also useful to determine if additional short circuits exist, if used with a power line ampere and Volt meter.

Note: When power line voltages other than 120V AC are used for testing, be sure voltage selector in the unit is set to the appropriate position and that equivalent test equipment is used.

Where a standard FM antenna matching network is not available for the particular signal generator in use, a suitable network can be assembled on a small phenolic, or plastic board, using the circuit below.

The completed assembly should use short leads for connection to the receiver antenna terminals. Some generator cables may permit the circuit block to be attached directly to the cable terminals.

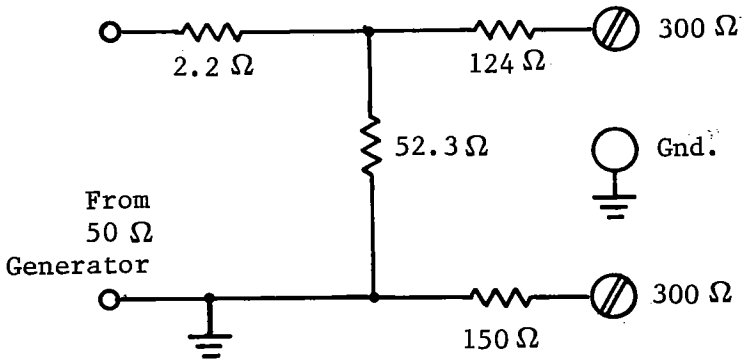


Fig. 3

Note: All resistors are 1/2 Watt, carbon composition, selected on a DVM, or Wheatstone bridge.

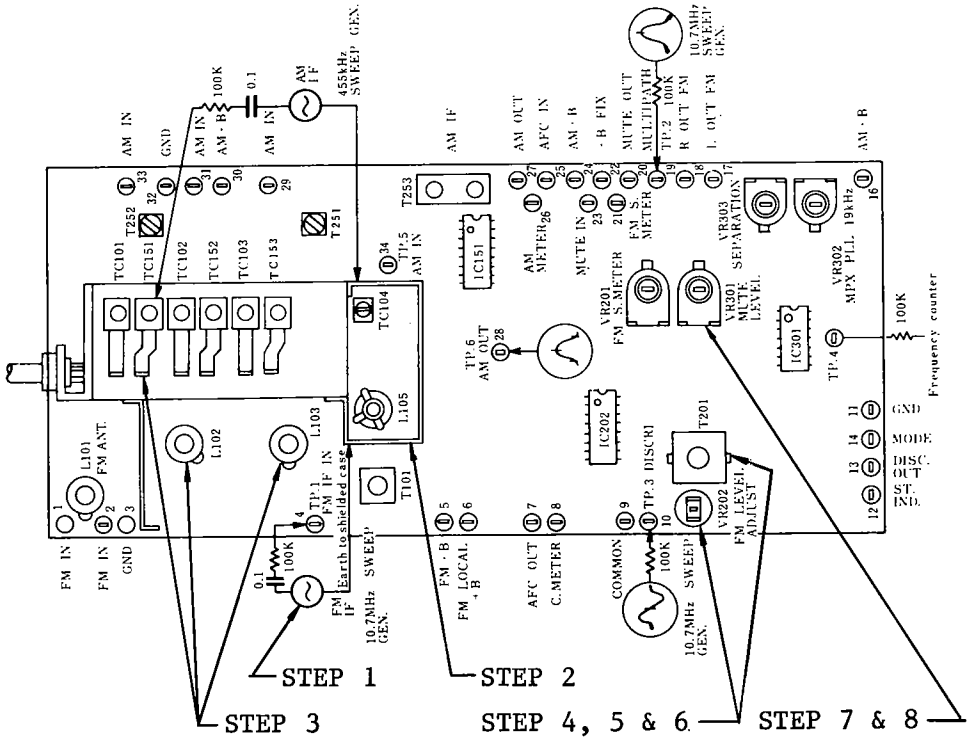


Fig. 4

FM TUNER ALIGNMENT

Test Conditions
Set controls as follows:

FUNCTION . . . . . FM
VOLUME . . . . . Minimum
POWER . . . . . On

FM TUNER ALIGNMENT

Steps		Item	Measuring Instrument	Input Terminal	Output Terminal	Frequency	Adjust	Wave Form
1	(1)	IF Amplifier	10.7 MHz ±150 kHz Sweep Generator	TP 1	TP 2		T101	Note (1)
	(2)	"S" curve		TP 1	TP 3		T201	Note (2)
2	(1)	RF Alignment	2.1 FM signal generator 90 MHz 400 Hz 100% modulated, 65 dBf at output. AC voltmeter.	Antenna terminal	REC OUT (L)	90 MHz (turn the dial pointer to 90 MHz)	L105.	Output Max.
	(2)		2.2 FM signal generator 106 MHz 400 Hz 100% modulated, 65 dBf at output. AC voltmeter.			106 MHz (turn the dial pointer to 106 MHz)	TC104	
	(3)							Repeat (1) & (2)
3	(1)	RF Tracking	3.1 FM signal generator 90 MHz 400 Hz 100% modulated, 10 dBf at output. AC voltmeter.	Antenna terminal	REC OUT (L)	90 MHz	L101,L102 L103	Output Max.
	(2)		3.2 FM signal generator 106 MHz 400 Hz 100% modulated, 10 dBf at output. AC voltmeter.			106 MHz	TC101, TC102, TC103	
	(3)							Repeat (1) & (2)

Steps		Item	Measuring Instrument	Input Terminal	Output Terminal	Frequency	Adjust	Wave Form
4		Detector	FM signal generator 98 MHz 400 Hz 100% modulated, 10 dBf at output. AC voltmeter	Antenna terminal	REC OUT (L)	98 MHz	T201 (lower)	Reduce the input signal level of FM signal gen. & set pointer of tuning meter to center mark.
5		Distortion	FM signal generator 98 MHz 400 Hz 100% modulated, 65 dBf at output. Distortion meter.	Antenna terminal	REC OUT (L)	98 MHz	T201 (upper)	Adjust T201 for min. distortion (repeat step 4 & 5 until lowest distortion is achieved).
6		Output	FM signal generator 98 MHz 400 Hz 30% modulated, 65 dBf at output. AC voltmeter	Antenna terminal	REC OUT (L)	98 MHz	VR202	150 mV ±1 dB
7		FM Muting	FM signal generator 98 MHz 400 Hz 100% modulated, 20 dBf at output. AC voltmeter	Antenna terminal	REC OUT (L)	98 MHz	VR301	Adjust VR301 so that the output signal can occur when the input signal is 28 dBf ±3 dBf.
8		Signal Meter	FM signal generator 98 MHz 400 Hz 100% modulated, 65 dBf at output. AC voltmeter	Antenna terminal	Signal Meter	98 MHz	VR201	Adjust VR201 so that deviation of pointer in signal meter will be 4 - 5.

NOTES:

1. Short-circuit the OSC stage by grounding the live side of the variable capacitor in that stage.
   Adjust the core of T101 so that the gain will be maximum.
   Reduce the level of the input signal of signal generator so that the waveform will be as shown in Fig. 5.
2. Short-circuit the OSC stage as described in note 1.
   Adjust the primary core (lower) of T201 so that the output is like the S curve shown in Fig. 6 with A and B symmetrical with respect to C.
   Adjust the secondary core (upper) so that the straight line of the S curve can be achieved.
   At the time of adjustment in notes 1 and 2, center of the marker will sometimes not correspond to that of the waveform because of the ceramic filters used.

FM MPX ALIGNMENT

Test Conditions
Set controls as follows:

FUNCTION . . . . . FM Mute
MODE . . . . . Stereo
VOLUME . . . . . Minimum
POWER . . . . . On

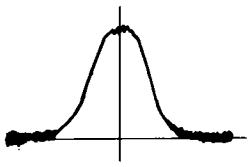


Fig. 5

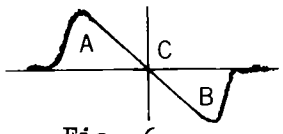


Fig. 6

Steps		Item	Measuring Instrument	Input Terminal	Output Terminal	Frequency	Adjust	Wave Form
1		19 kHz Free Running Frequency	FM signal generator 98 MHz non-modulated 65 dBf at output. AC voltmeter, Frequency counter.	Antenna terminal	TP 4	98 MHz	VR302	Adjust VR302 so that counter will indicate 19 kHz ±30 Hz
2	(1)	Separation	1. FM signal generator 98 MHz, 65 dBf at output. 2. Stereo signal generator Main signal 92% modulated. Pilot signal 8% modulated. AC voltmeter.	Antenna terminal	REC OUT (L)	98 MHz	VR303	Switch stereo generator to Rch only, adjust VR303 so that output of Lch is minimum.
	(2)							Optimize VR303 so that separation of Lch signal is equal to that of the Rch.

AM TUNER ALIGNMENT

Test Condition
Set controls as follows:

FUNCTION . . . . . AM
VOLUME . . . . . Minimum
POWER . . . . . On

Steps		Item	Measuring Instrument	Input Terminal	Output Terminal	Frequency	Adjust	Wave Form
1		IF Amplifier	Sweep generator 455 kHz	TC151	TP 6		T253	Gain Max. Note (1)
2	(1)	Covering	AM signal generator 600 kHz 400 Hz 30% modulated, 50 dBf at output. AC voltmeter.	Ferrite antenna	REC OUT	600 kHz	T252	Gain Max. Note (2)
	(2)		AM signal generator 1400 kHz 400 Hz 30% modulated, 50 dBf at output. AC voltmeter.			1400 kHz	TC152	
	(3)							Repeat (1) & (2)
3	(1)	Tracking	AM signal generator 600 kHz 400 Hz 30% modulated, 50 dBf at output. AC voltmeter.	Ferrite antenna	REC OUT	600 kHz	Ferrite antenna T251	Gain Max. Note (2)
	(2)		AM signal generator 1400 kHz 400 Hz 30% modulated, 50 dBf at output. AC voltmeter.			1400 kHz	TC151 TC153	
	(3)							Repeat (1) & (2)

NOTES:

1. In item 1, set the capacitance of the variable capacitor to minimum and adjust red and blue cores of T253 so that the waveform is as shown in Fig. 7 . Since T253 contains a 455 kHz ceramic filter, sometimes the center of the marker will not correspond to that of the waveform.
   In this case, neglect the marker. After adjusting as above, increase the output level of the sweep generator and adjust T253 again so that the top of the waveform A (indicated in Fig. 8) will be flat and wide.
2. As the unit is aligned, the input level should be reduced to maintain an audio output less than maximum.

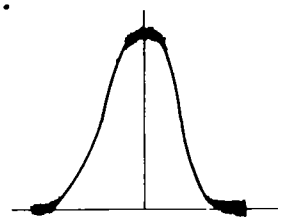


Fig. 7

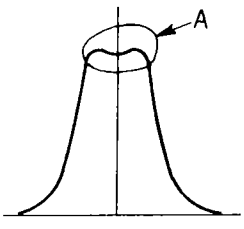


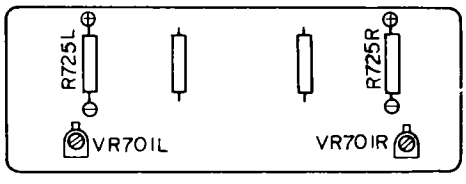
Fig. 8

AUDIO CIRCUIT ALIGNMENT

Test Condition
Set controls as follows:

FUNCTION . . . . . Free
VOLUME . . . . . Minimum
POWER . . . . . On

Perform this adjustment approximately 10 minutes after the power switch is ON.

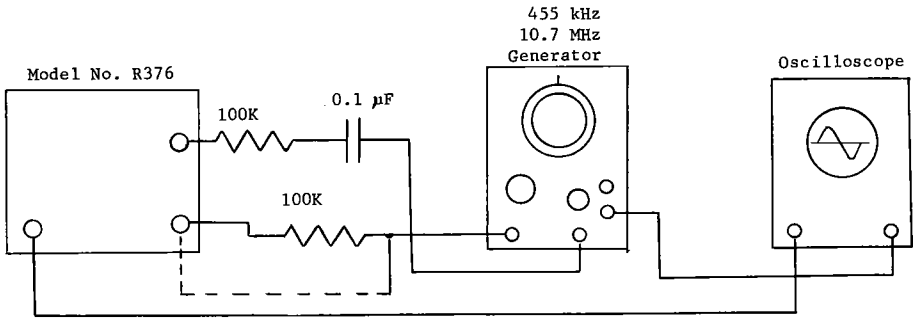


MAIN PRINTED WIRING BOARD

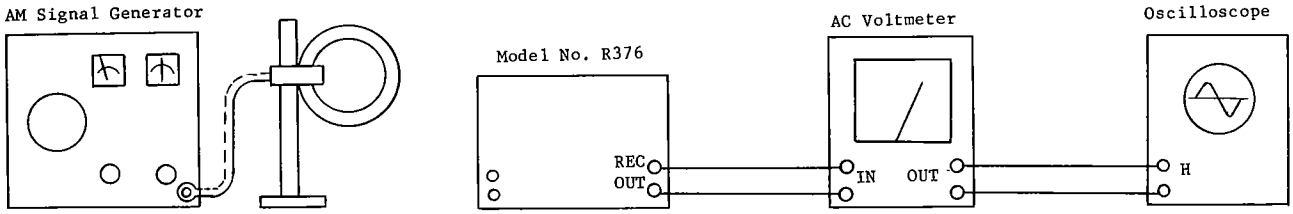
Fig. 9

Item	Measuring Instrument	Point Measured	Adjust	Value Adjusted
Bias Current	DC Millivoltmeter	R725 L, R	VR701 L, R	.013V ±30% (60 ±20 mA)

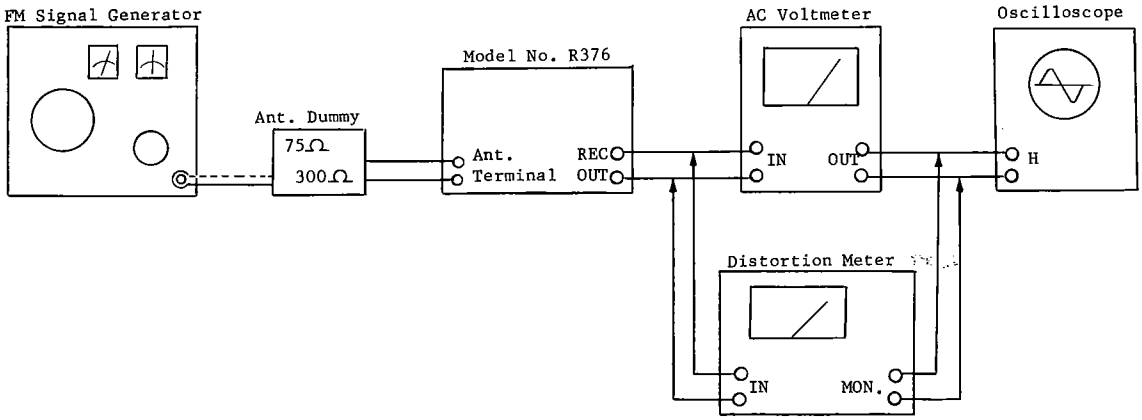
EQUIPMENT SETUPS



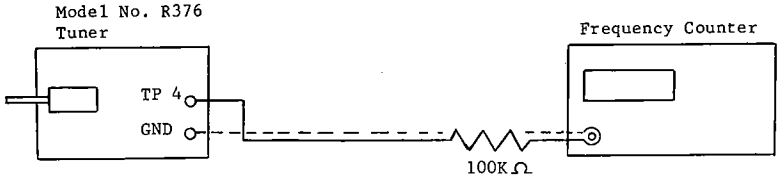
FM IF, Detector and AM IF alignment. (AM and FM Step 1)



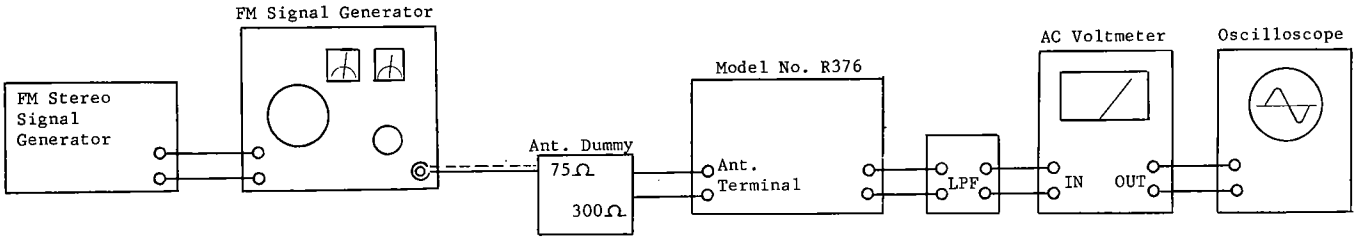
AM alignment, covering and tracking alignment. (Step 2 and 3)



FM alignment, covering, tracking and other alignment. (Step 2 to 8)



FM MPX 19 kHz adjustment (Step 1)



FM MPX alignment (Step 2)

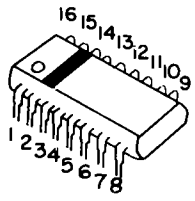
H. H. SCOTT PART NO.	DESCRIPTION	
011-1003-017	Capacitor, Variable, Tuning	
011-1004-036	Capacitor, Electrolytic, Can	6800 μF 80V
011-1004-037	Capacitor, Electrolytic, Can	5600 μF 40V
012-1020-006	Diode, Germanium	1N 34A
012-1021-006	Diode, Silicon	1SS 62
012-1021-007	Diode, Silicon	1S 2076
012-1021-008	Diode, Silicon	WO 6C
012-1022-003	Diode, Stabistor	MV 1Y
012-1023-015	Diode, Zener	HZ 15
012-1023-016	Diode, Zener	HZ 16
012-1024-016	Diode, Rectifier	UO 6C
012-1024-017	Diode, Rectifier	MV 5W
012-1025-007	Rectifier, Bridge	S5VB20
013-1031-040	Fuse, Normal-Blo	5A 250V
013-1031-048	Fuse, Slo-Blo	6.25A 125V
013-1031-049	Fuse, Normal-Blo, Pigtail	3A 250V
015-1060-019	Jack, Input, 4 Pin	
015-1060-020	Jack, Input, 8 Pin	
015-1061-016	Jack, Phone	
015-1061-017	Jack, Mic	
015-1065-015	Jack, Din	
017-1095-041	Meter, Signal	
017-1095-042	Meter, Center Tune	
018-1100-191	Knob, Lever	
018-1100-192	Knob, Rear (volume, balance)	
018-1100-193	Knob, Front (volume, balance)	
018-1100-194	Knob, Single	
018-1100-195	Knob, Push	
018-1100-196	Knob, Tuning	
018-1102-176	Panel	
018-1105-122	Dial	
020-1110-066	Transistor, PNP	2SA 872 BE
020-1110-067	Transistor, NPN	2SC 1775 E
020-1110-068	Transistor, NPN	2SC 458 L
020-1110-069	Transistor, NPN	2SC 1213 C
020-1110-070	Transistor, NPN	2SC 1344 E
020-1110-071	Transistor, NPN	2SC 1344 F
020-1110-072	Transistor, PNP	2SA 836 E
020-1110-073	Transistor, PNP	2SA 844 E
020-1111-061	Transistor, PNP	2SB 568 C
020-1111-062	Transistor, NPN	2SD 478 C
020-1111-063	Transistor, NPN	2SD 608 R
020-1111-064	Transistor, PNP	2SB 616 R
020-1111-065	Transistor, NPN	2SD 586 R
020-1111-066	Transistor, PNP	2SB 628 R
020-1111-067	Transistor, NPN	2SC 1514
020-1111-068	Transistor, PNP	2SB 611 AB
020-1111-069	Transistor, NPN	2SD 581 AB
020-1111-070	Transistor, PNP	2SB 568 AB

PARTS LIST

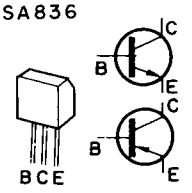
H. H. SCOTT PART NO.	DESCRIPTION	
020-1112-018	Transistor, RF, MOS FET	3SK 45 BBK
020-1112-019	Transistor, RF, J FET	2SK 55 AD
020-1112-020	Transistor, RF	2SC 461 B
020-1112-021	Transistor, RF	2SC 535 B
020-1114-033	Integrated Circuit	HA 1137
020-1114-034	Integrated Circuit	HA 1138
020-1114-035	Integrated Circuit	HA 1452 W
020-1114-036	Integrated Circuit	HA 1156 WZ
020-1114-037	Integrated Circuit	HA 1211
020-1115-001	Thyristor	CW 01 B
021-1125-162	Potentiometer (tone)	200K
021-1125-163	Potentiometer (volume)	200K
023-1135-042	Switch, Slide	
023-1136-026	Switch, Lever, Tape/Mon	
023-1136-027	Switch, Lever, Tape/Copy	
023-1137-092	Switch, Rotary, Selector	
023-1137-093	Switch, Rotary, Power/Speakers	
023-1138-064	Switch, Push, Mode/Loud	
023-1138-065	Switch, Push, Mute	
023-1138-066	Switch, Push, Filter	
023-1139-007	Relay, Reed	
023-1139-008	Relay, Power	
024-1140-090	Transformer, Power	
024-1143-009	Transformer, Balun	
027-1157-046	Cabinet	
030-1187-041	Terminal, Antenna, 4 Screw	
030-1187-042	Terminal, Speaker, 4 Pin	
030-1189-036	Lamp,	8V 30 mA
030-1192-016	Fuse Holder	
030-1194-006	Receptacle, Voltage Change	
030-1194-007	Receptacle, AC Input	
030-1194-009	Receptacle, AC Outlet	
031-1198-028	Dial Pointer	
031-1200-009	Foot	
031-1201-015	Jewel	
031-1203-024	Pulley, Front End Drum	
031-1208-031	Bushing, Function Light	
031-1208-032	Bushing, Stereo Light	
035-1276-017	Antenna, AM	
100-1333-042	Assy., Preamp Board	
100-1334-035	Assy., Tone Control Board	
100-1335-026	Assy., Power Amp Board	
100-1340-045	Assy., Regulator Board	
100-1343-015	Assy., AM/RF Board	
100-1346-007	Assy., Filter Board	
100-1351-009	Assy., Tuner Board	
100-1352-038	Assy., De-Emphasis Switch Board	
110-1404-012	Assy., Flywheel	

SEMICONDUCTOR OUTLINES

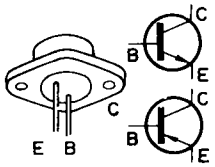
HA1137
HA1138



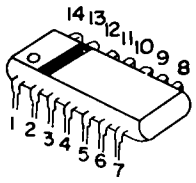
2SC458
2SC1345
2SC1344
2SC535
2SA836
2SA844
2SC1213
2SC461



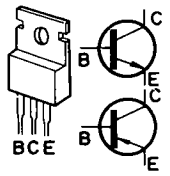
2SD581A
2SB611A



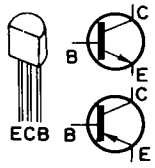
HA1452W
HA1156WZ



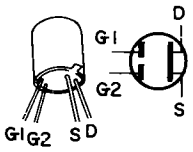
2SB568A
2SD478



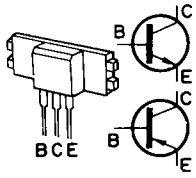
2SC458
2SA872B
2SC1775



3SK45



2SB616
2SD586



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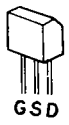
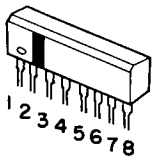
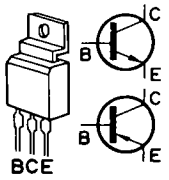


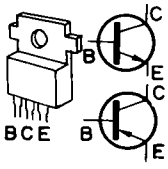
HA1211



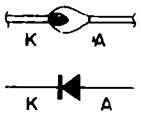
2SC1514



2SB628
2SD608

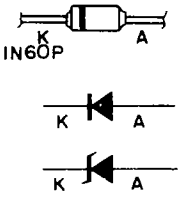


MV-5W

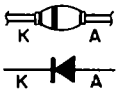


CW01B

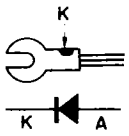
W06C
IS2076
HZ-15
IS2267
IS S62
HZ-16
IN34A



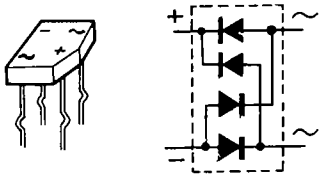
U06C



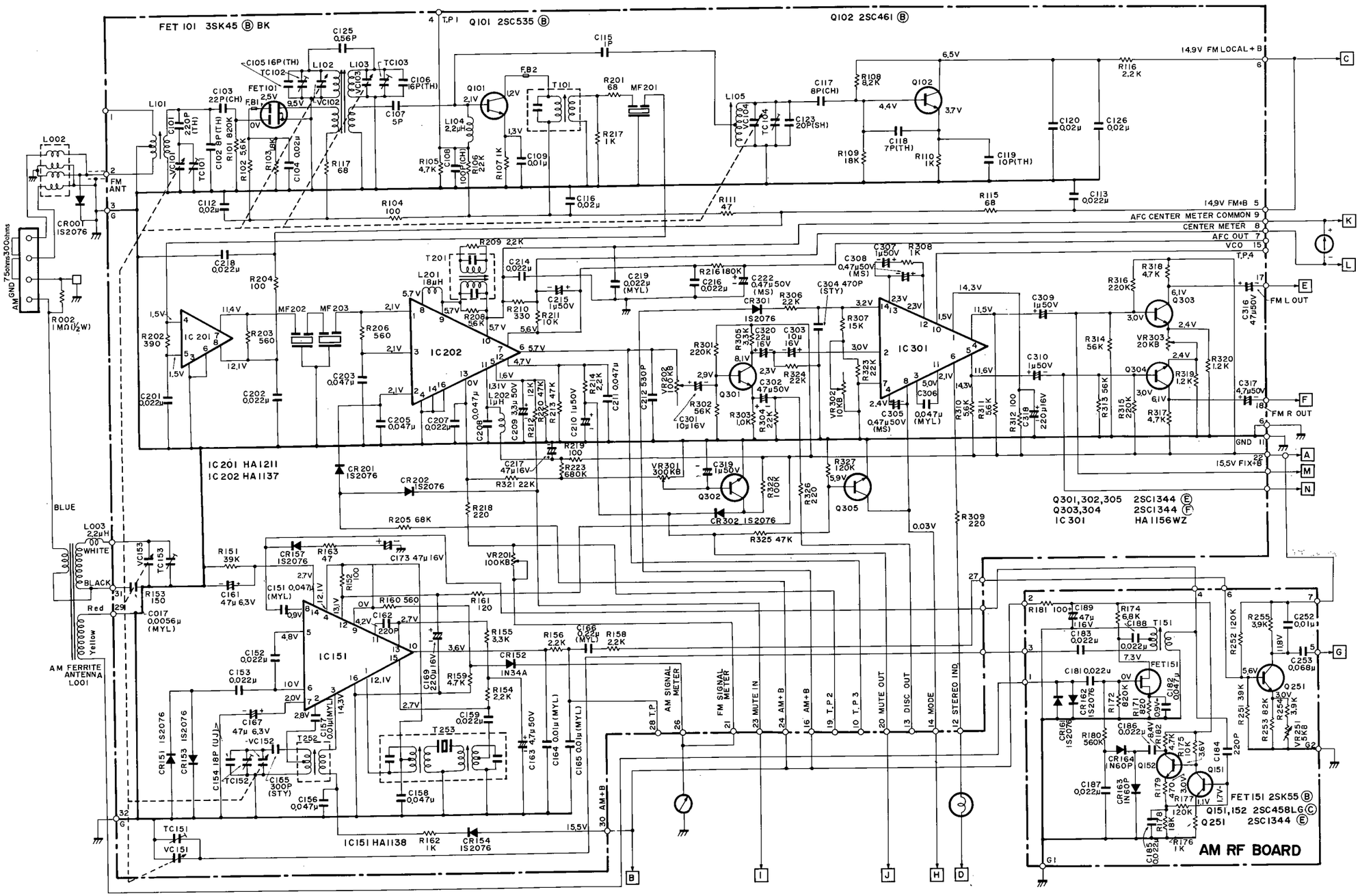
MV-1Y



S5VB20



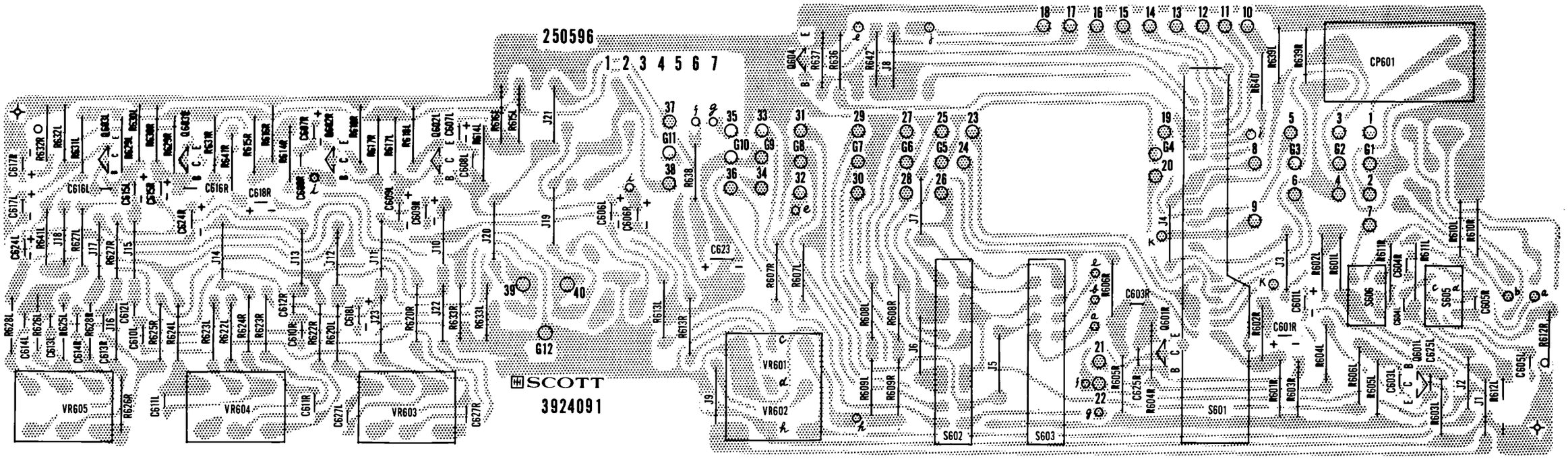
SCHEMATIC DIAGRAM
TUNER SECTION



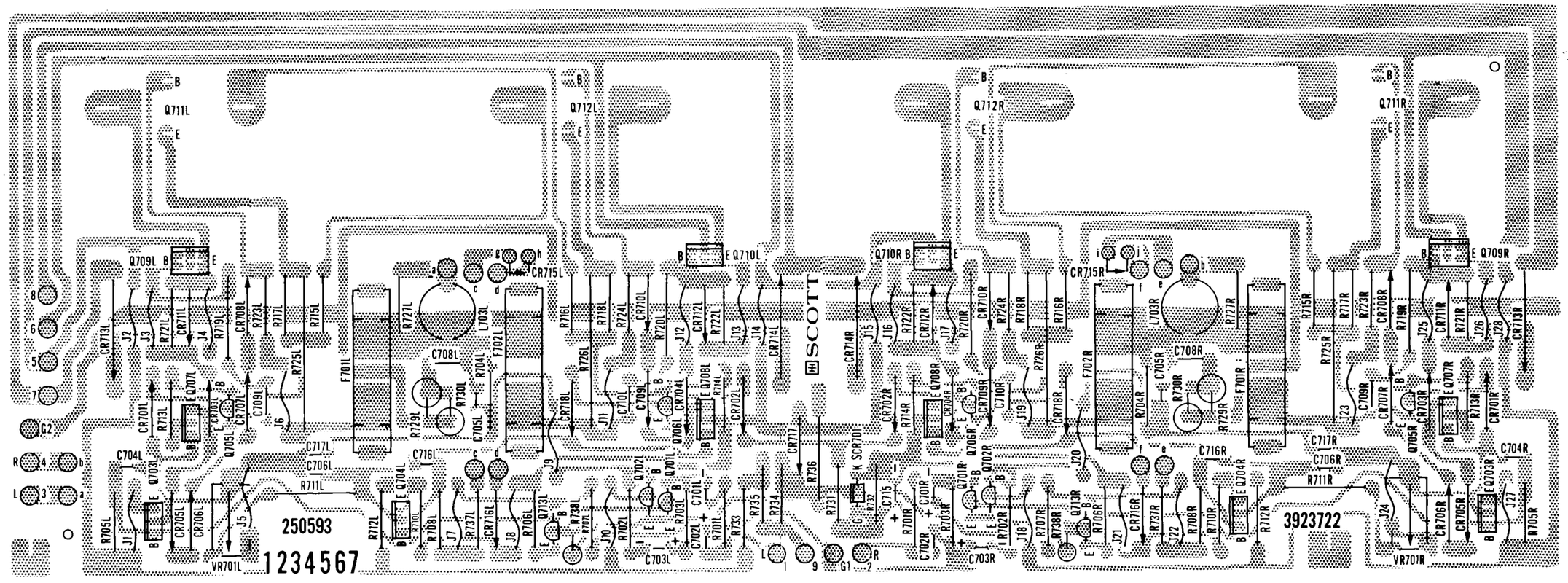
POTENTIOMETERS:

FM Output Level Adjust	VR202
OSC Adjust	VR302
Muting Threshold	VR301
Tuning Meter Adjust	VR201
Separation	VR303

TONE CONTROL BOARD
Assy No. 100-1334-035



MAIN BOARD/POWER AMP. BOARD
Assy No. 100-1335-026



SCHEMATIC DIAGRAM
AMPLIFIER SECTION

Unit manufactured in plant
No. 4, identified by serial
No. suffix "CN"

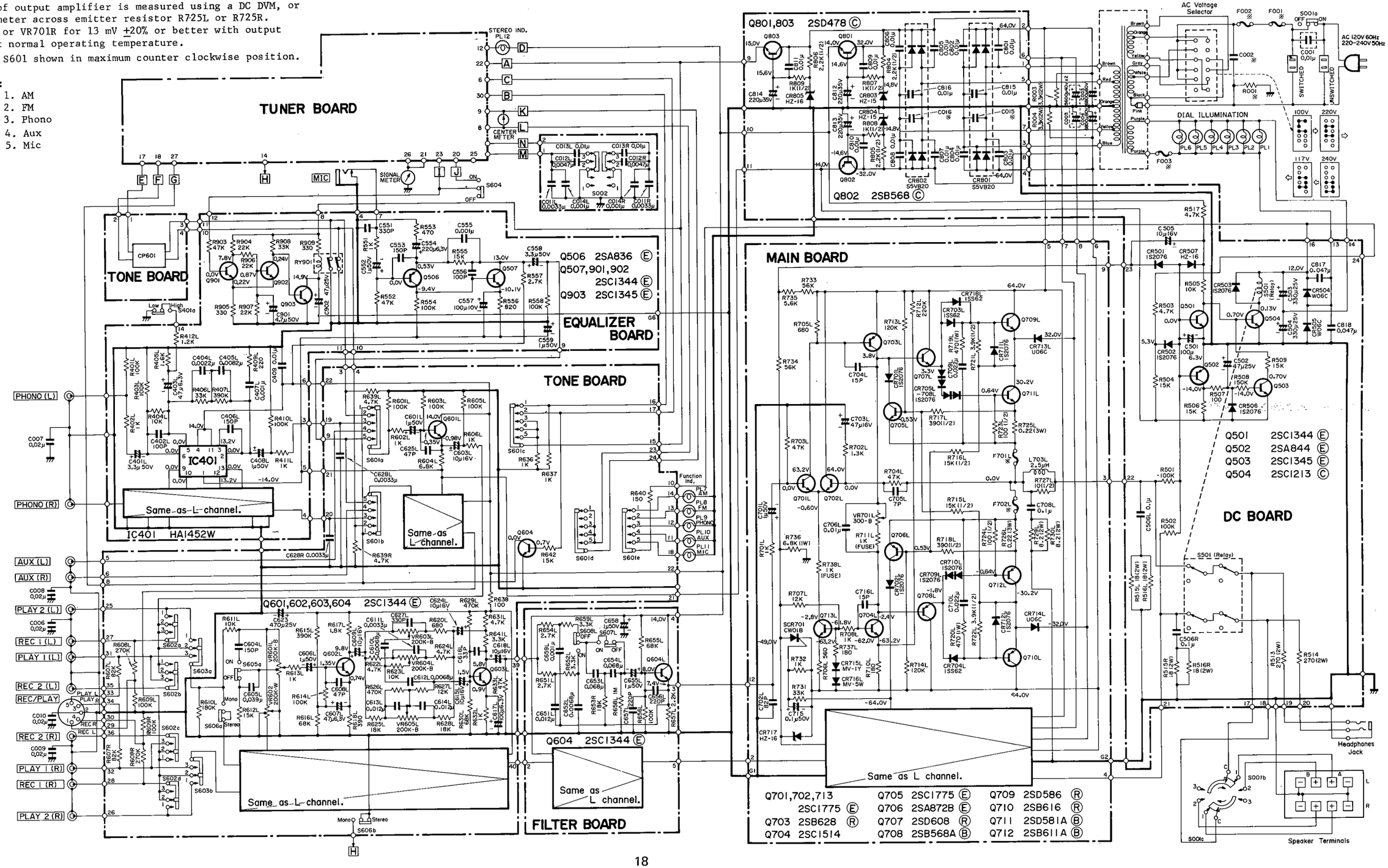
NOTES:

1. Unless otherwise specified, all resistors are in ohms ±10%, 1/4 watt. Capacitors in microfarad.
2. Unless otherwise specified, all DC voltages are ±10%, using DVM, with power line at 120V.
   FM tuner voltages measured with 300 ohm antenna, tuner tuned off station, input selector switch in "FM" position.
3. DC Offset Voltage

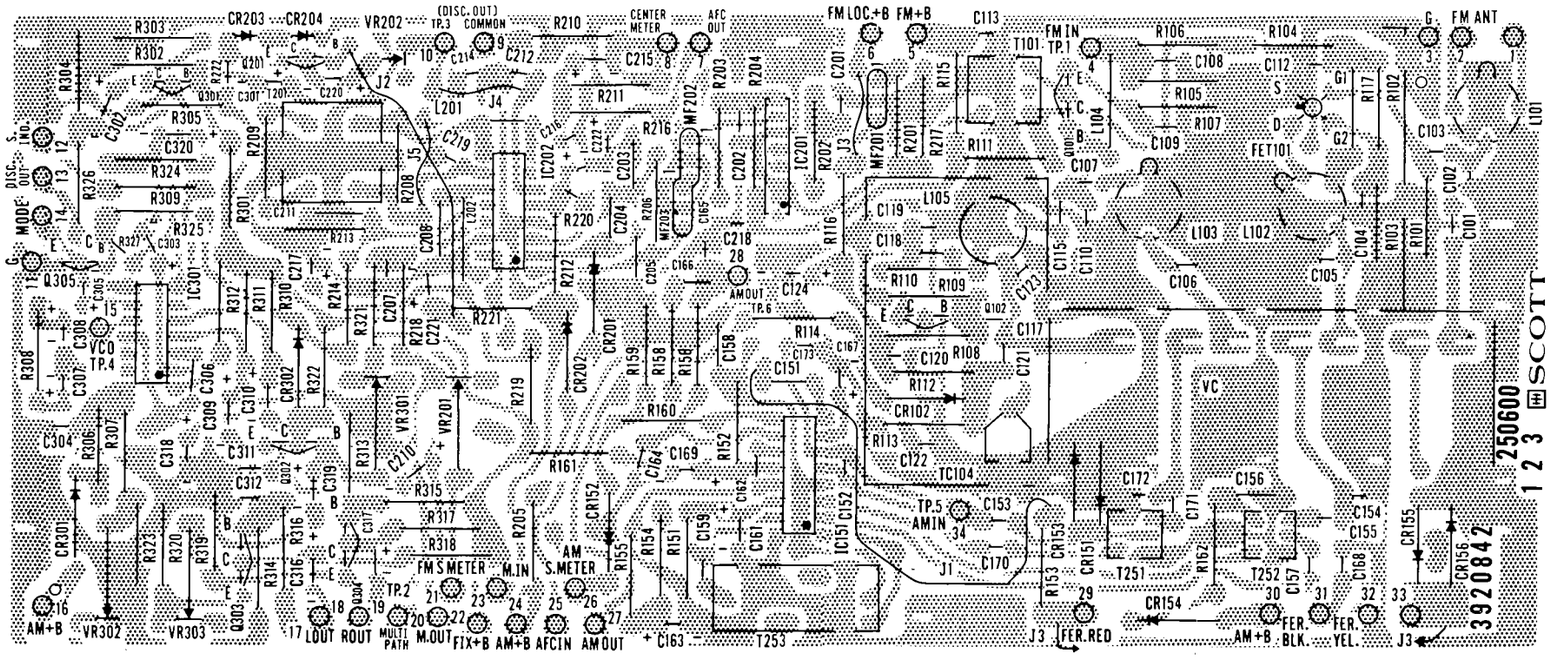
   With no audio signal applied, read 0 volts ±25 mV at speaker A output terminal.
4. Bias Current

   Bias current of output amplifier is measured using a DC DVM, or DC millivolt meter across emitter resistor R725L or R725R. Adjust VR701L or VR701R for 13 mV ±20% or better with output transistors at normal operating temperature.
5. Rotary switch S601 shown in maximum counter clockwise position. (pos. 1)
   Positions are:
   1. AM
   2. FM
   3. Phono
   4. Aux
   5. Mic

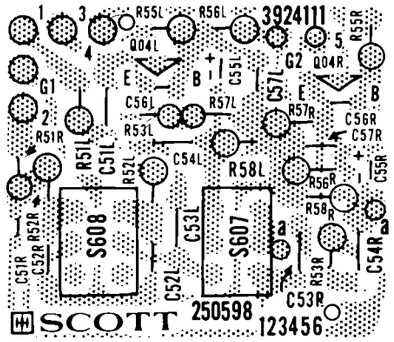
POTENTIOMETERS:		SWITCHES:			
Bias Adjust . . .	VR701	Power	S001	Loudness	S605
Balance	VR602	Input Selector .	S601	Mode	S606
Loudness	VR601	Tape Copy	S602	Mute	S604
Treble	VR603	Tape Monitor . .	S603	Speaker	S500
Midrange	VR604	Filter, Low . . .	S607	Preamp Level . .	S401
Bass	VR605	Filter, High . .	S608	De-emphasis . . .	S002



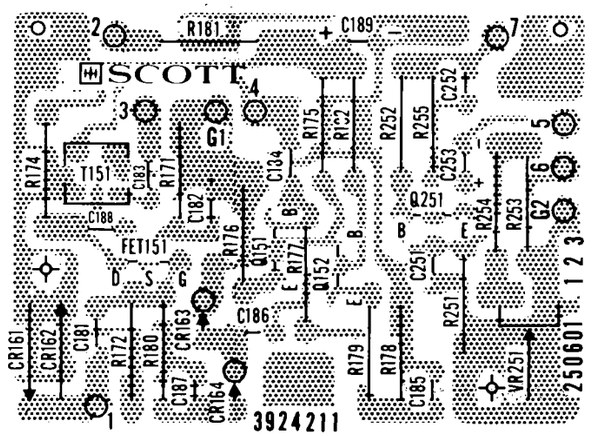
FM TUNER BOARD
Assy No. 100-1351-009



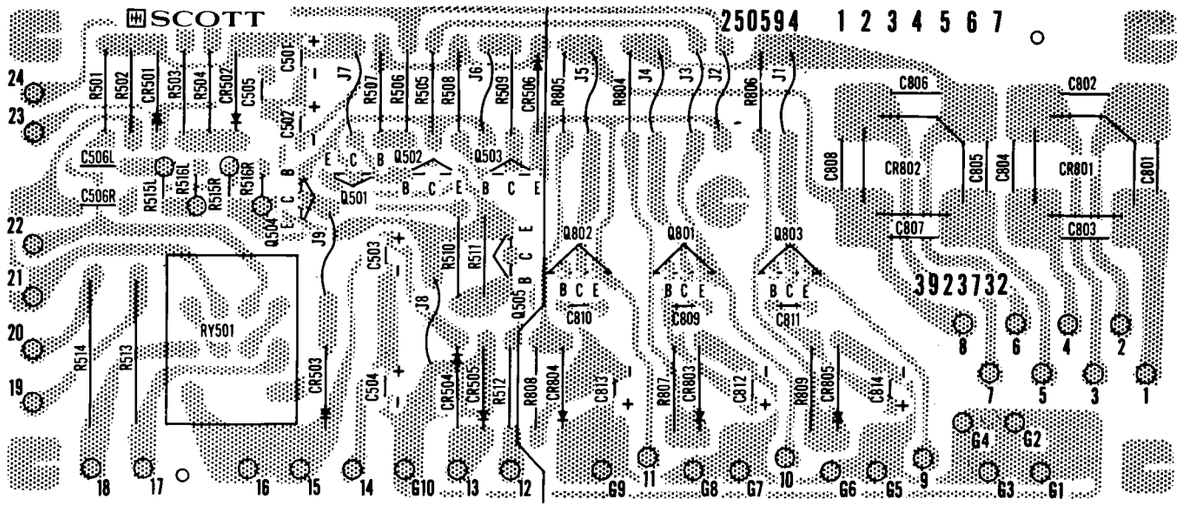
FILTER BOARD
Assy No. 100-1346-007



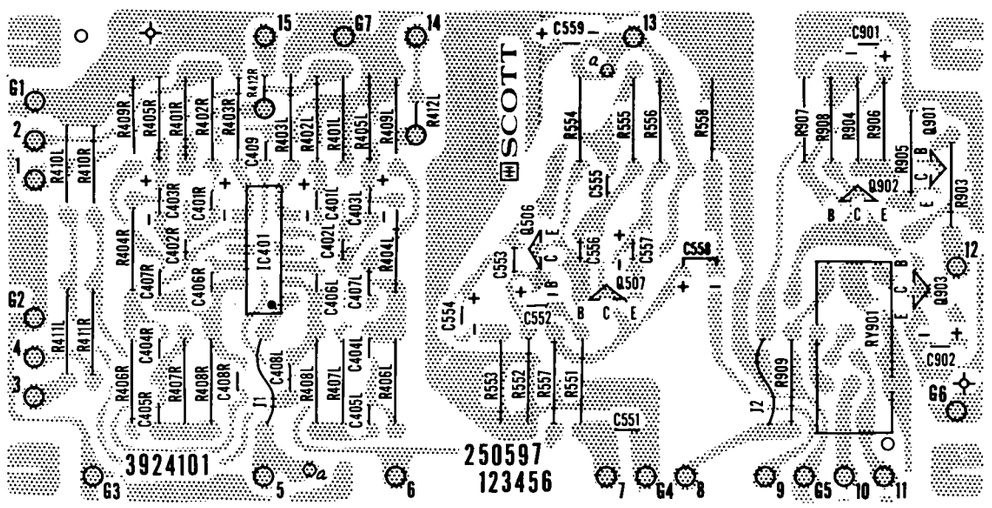
AM/RF BOARD
Assy No. 100-1343-015



DC REGULATOR BOARD
Assy No. 100-1340-045



EQUALIZER (PREAMP) BOARD
Assy No. 100-1333-042



USEFUL INFORMATION

dBf to Microvolt

Table - - - 300 ohms

CONVERSION OF MICROVOLT TO DBF @ 300 ohms

MICROVOLTS	DBF	MICROVOLTS	DBF
1	5.228	5	19.20
1.1	6.056	5.5	20.03
1.2	6.812	6	20.79
1.3	7.507	6.5	21.48
1.4	8.151	7	22.13
1.5	8.750	7.5	22.73
1.6	9.311	8	23.29
1.7	9.837	8.5	23.81
1.8	10.33	9	24.31
1.9	10.80	9.5	24.78
2	11.24	10	25.22
2.1	11.67	10.5	25.65
2.2	12.07	11	26.05
2.3	12.46	11.5	26.44
2.4	12.83	12	26.81
2.5	13.18	12.5	27.16
2.6	13.52	13	27.50
2.7	13.85	13.5	27.83
2.8	14.17	14	28.15
2.9	14.47	14.5	28.45
3	14.77	15	28.75
3.1	15.05	15.5	29.03
3.2	15.33	16	29.31
3.3	15.59	16.5	29.57
3.4	15.85	17	29.83
3.5	16.11	17.5	30.08
3.6	16.35	18	30.33
3.7	16.59	18.5	30.57
3.8	16.82	19	30.80
3.9	17.05	19.5	31.02
4	17.26	20	31.24
4.1	17.48	20.5	31.46
4.2	17.69	21	31.67
4.3	17.89	21.5	31.87
4.4	18.09	22	32.07
4.5	18.29	22.5	32.27
4.6	18.48	23	32.46
4.7	18.67	23.5	32.65
4.8	18.85	24	32.83
4.9	19.03	24.5	33.01
5	19.20	25	33.18

25	33.18
26	33.52
27	33.85
28	34.17
29	34.47
30	34.77
31	35.05
32	35.33
33	35.59
34	35.85
35	36.11
36	36.35
37	36.59
38	36.82
39	37.05
40	37.26
41	37.48
42	37.69
43	37.89
44	38.09
45	38.29
46	38.48
47	38.67
48	38.85
49	39.03
50	39.20
51	39.38
52	39.54
53	39.71
54	39.87
55	40.03
56	40.19
57	40.34
58	40.49
59	40.64
60	40.79
61	40.93
62	41.07
63	41.21
64	41.35
65	41.48
66	41.61
67	41.75
68	41.87
69	42.00
70	42.13
71	42.25
72	42.37
73	42.49
74	42.61
75	42.73
75	42.73
76	42.84
77	42.95
78	43.07
79	43.18
80	43.29
81	43.39
82	43.50
83	43.61
84	43.71
85	43.81
86	43.91
87	44.01
88	44.11
89	44.21
90	44.31
91	44.40
92	44.50
93	44.59
94	44.69
95	44.78
96	44.87
97	44.96
98	45.05
99	45.14
100	45.22
101	45.31
102	45.40
103	45.48
104	45.56
105	45.65
106	45.73
107	45.81
108	45.89
109	45.97
110	46.05
111	46.13
112	46.21
113	46.29
114	46.36
115	46.44
116	46.51
117	46.59
118	46.66
119	46.73
120	46.81
121	46.88
122	46.95
123	47.02
124	47.09
125	47.16