

SERVICE MANUAL

FISHER

RS-2004A

Stereo Receiver
(EUROPE)



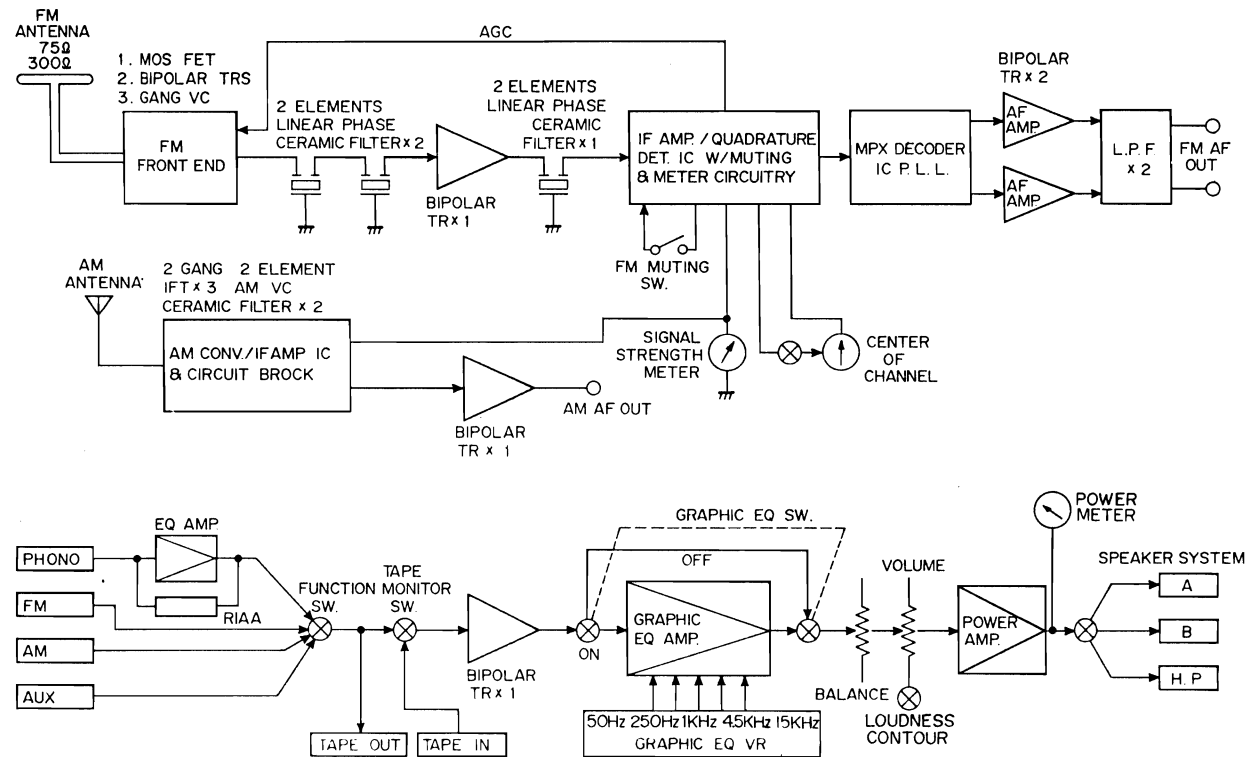
The first name in high fidelity

Nominal Specifications For Informations Only.

RECEIVER	RS-2004A
POWER AMPLIFIER SECTION	
Continuous RMS is sine wave power per channel within stated bandwidth at no more than stated distortion and with an 8 ohm load.	45 W
Power Bandwidth	20 Hz/20 kHz
Total Harmonic Distortion at Rated Power	0.09 %
I.M. Distortion	0.09 %
PREAMPLIFIER SECTION	
Input sensitivity and Impedance at rated output 8-ohms at 1 kHz	
Phono	2 mV/50k ohm
Auxiliary	150 mV/100k ohm
Tape Monitor	150 mV/100k ohm
Hum & Noise (below rated output)	
Phono	76 dB
Auxiliary	90 dB
Tape Monitor	90 dB
Frequency Response	
Phono (RIAA EQUALIZED ± 1 dB)	30 Hz - 15 kHz
Auxiliary input ± 1 dB	20 Hz - 20 kHz
Tone Control	
(GRAPHIC EQUALIZER)	
50 Hz	± 10 dB
250 Hz	± 10 dB
1 kHz	± 10 dB
4.5 kHz	± 10 dB
15 kHz	± 10 dB
FM TUNER SECTION	
Usable Sensitivity	
Mono	1.9 μ V/10.8 dBf
Stereo	4.6 μ V/18.5 dBf
50 dB Quieting Sensitivity	
Mono	2.8 μ V/14.2 dBf
Stereo	38 μ V/36.8 dBf
Signal-to-Noise Ratio	
Mono	70 dB
Stereo	66 dB
Capture Ratio	1.0 dB
Alt Channel Selectivity (± 400 kHz)	68 dB
Image Response Ratio	56 dB
Spurious Response Ratio	85 dB
AM Suppression Ratio	55 dB
Signal-to-Noise Ratio (Mono/Stereo)	70/66 dB
Total Harm. Distortion (Mono/Stereo) at 65 dBf	0.3/0.4 %
T.H.D. at 50 dB Quieting	
Mono	0.4 %
Stereo	0.5 %
Stereo Separation (1 kHz/10 kHz)	45/35 dB
Sub-Carrier Suppression (19/38 kHz)	65/70 dB
AM TUNER SECTION	
Usable Sensitivity	300 μ V/m
Selectivity (± 10 kHz)	40 dB
Signal-to-Noise Ratio	55 dB
Image Response Ratio	50 dB
IF Response Ratio	45 dB
GENERAL SECTION	
Power Requirements (50/60 Hz)	110/220 V AC ± 10 %
Power Consumption	210 W/260 VA
Dimensions W x D x H	(Inches) 5-7/8" x 19-1/4" x 14-7/8"
Weight	(lbs.) 28.5

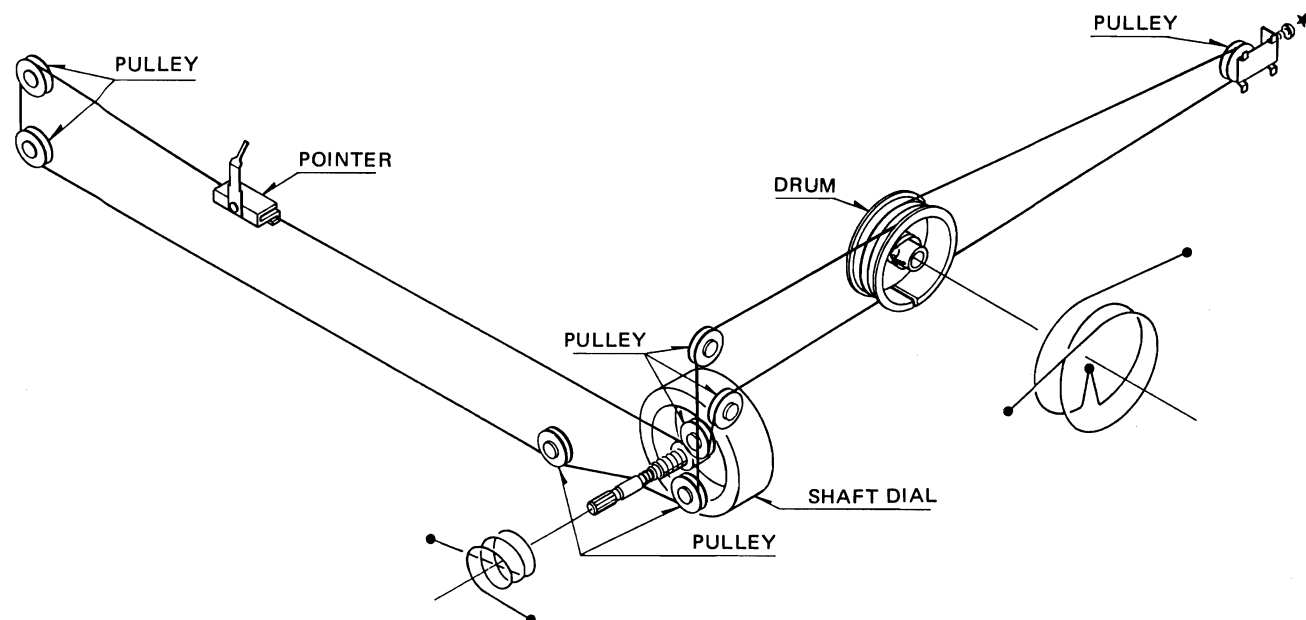
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FUNCTIONAL BLOCK DIAGRAM



DIAL CORD STRINGING

★ Adjustment screw of dial cord tension.



NOTE: Check to see that the dial cord is correctly strung by turning the dial.

REQUIRED TEST EQUIPMENT

The following test equipments are required to completely test and align the Receiver:

- Line Voltage Isolation Transformer
- AC DC Multimeter
- Accurately Calibrated AC Voltmeter
- Oscilloscope (Flat to 100 kHz Minimum)
- Low-Distortion Audio Sine-Wave Generator
- Harmonic Distortion Analyzer
- Two (2) Load Resistors, 8-ohms, 250 Watts (Minimum Rating)
- Low-Distortion AM-FM Signal Generator
- 10.7 MHz Sweep Generator
- Multiplex Generator
- 455 kHz Sweep Generator

CAUTION: Limit the following tests to no more than ten minutes each. Use 8-ohm resistors with a minimum power rating of 250 watts when connecting a load across the SPEAKERS terminals.

HARMONIC DISTORTION TEST

CONTROL SETTINGS:

POWER switch to OFF
 GRAPHIC EQUALIZER switch to OFF
 TAPE MONITOR to SOURCE
 LOUDNESS CONTOUR switch to OFF
 VOLUME control to MINIMUM position
 BALANCE control fully to LEFT position
 FUNCTION switch to AUX
 LEFT CHANNEL DRIVEN

ONE CHANNEL DRIVEN:

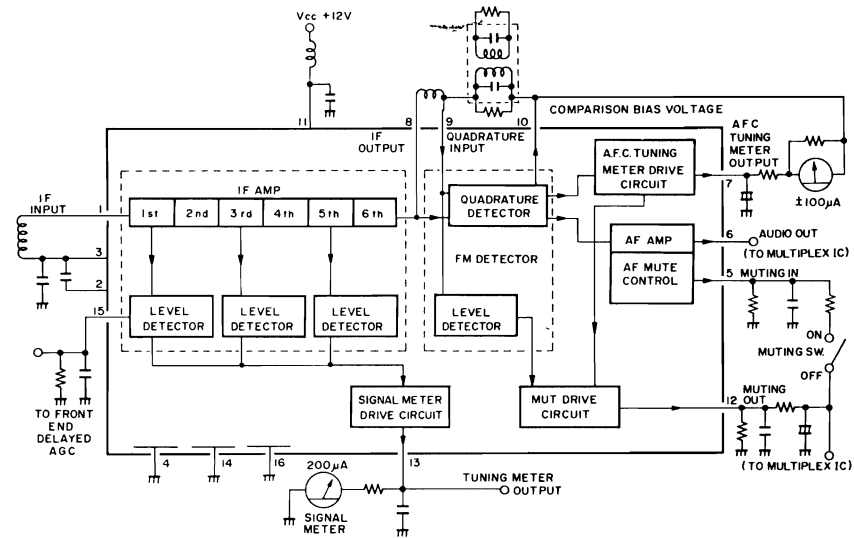
- 1) Connect a low distortion audio generator to LEFT AUX IN jack. Set generator frequency to 1 kHz and output to minimum.
- 2) Connect an 8-ohm load resistor between SPEAKERS MAIN LEFT and COM terminals. Connect a Harmonic Distortion analyzer and an AC VTVM in parallel across the 8-ohm load.
- 3) Connect the AC power cord and set SPEAKERS switch to MAIN. Turn VOLUME control to MAX.
- 4) Increase generator output for 45W RMS (18.9V across the 8-ohm load). Harmonic Distortion Analyzer should measure 0.1% distortion or less.
- 5) Repeat steps 1 through 4 for RIGHT CHANNEL.

BOTH CHANNELS DRIVEN

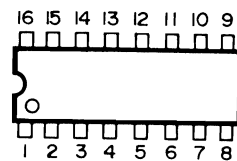
Connect 8-ohm load resistors across LEFT and RIGHT MAIN SPEAKERS terminals. Check for distortion of 0.1% or less at 45 watts sine-wave power (18.9 volts RMS across the 8 -ohm loads) on each channel with both channels driven simultaneously.

CAUTION: This precision high-fidelity instrument should be serviced only by qualified Personnel, trained in the repair of transistor equipment and printed circuitry.

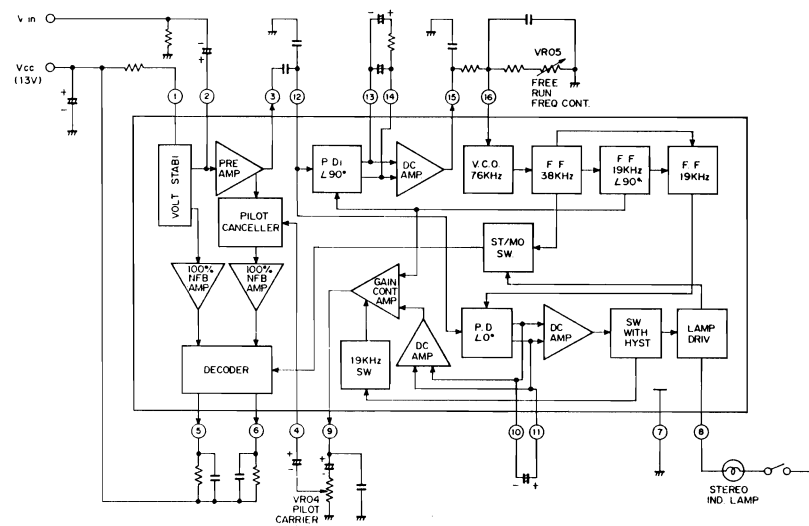
FM IF IC LA1230 SIGNAL FLOW



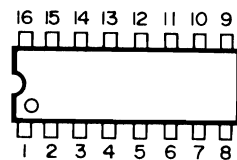
IC TOP VIEW



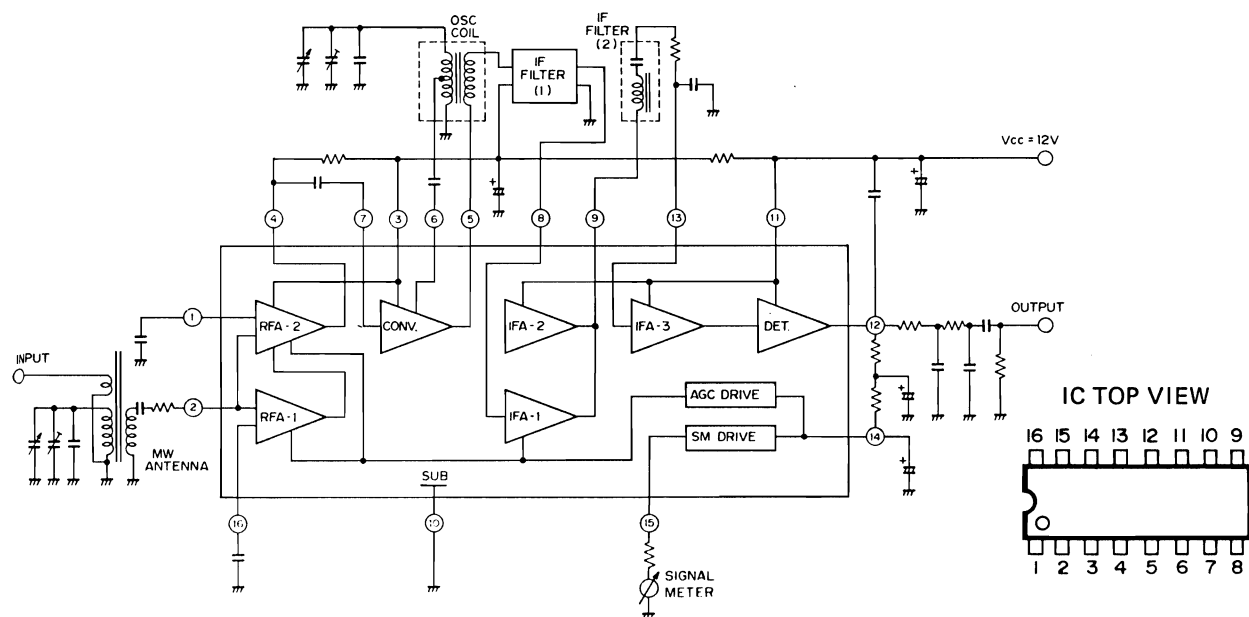
FM MPX IC HA11223 SIGNAL FLOW



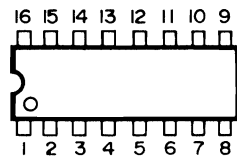
IC TOP VIEW



AM RF IF IC LA1240 SIGNAL FLOW



IC TOP VIEW



FM TUNER ALIGNMENT

FM ALIGNMENT – FUNCTION switch to FM, MUTING switch to OFF, VOLUME control to minimum.

Maintain generator output as low as possible for suitable indications.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
NOTE: The FM IF circuit utilizes a non-turnable ceramic filter which establishes the IF bandpass. To insure symmetrical tuning and selectivity, the IF must be aligned precisely to the center of the filter bandpass, rather than to 10.7 MHz as in conventional LC circuits.				
1. IF ALIGNMENT	Connect 10.7 MHz Sweep Generator to VC2 and, ground lead to chassis. Markers are not required. Set generator output to -12dB (250mV).	Position of non-interference	Scope vertical input to TP6, and connect ground lead to chassis. Set vertical sensitivity to 0.5V/cm.	Adjust L05 (top slug) for maximum gain and best symmetry. See Figure 1 for FM IF ALIGNMENT.
2. PRELIMINARY DETECTOR ALIGNMENT	Generator connections are the same as above. Adjust for S-curve display. Set generator output to -20dB. (100mV)	Position of non-interference	Scope vertical input to TP19.	Adjust IFT01 (bottom slug) for maximum gain and best linearity. Adjust IFT01 (top slug) for minimum gain and best linearity. See Figure 2 for FM DETECTOR ALIGNMENT. NOTE: Harmonic Distortion test must be performed as part of detector alignment. Remove jumper from pin 23 and ground.
NOTE: Connect 120-ohm composition resistors in series with each lead from the RF generator to match the 50-ohm output to the 300-ohm input impedance. Generator output voltage is reduced to one-half at antenna terminals. Signal voltages specified in this table are generator output levels, <i>not antenna voltages</i> .				
3. FRONT END ALIGNMENT		Tuning knob fully counterclockwise		Center dial pointer on "0" and cement
4. FRONT END ALIGNMENT (90 MHz)	Connect FM generator to FM ANT terminals through 120-ohm resistors. Set to 90 MHz. Adjust output for approximately 3 on Field Strength meter.	Center of 90 MHz calibration mark on dial	Front panel Field Strength meter (M1) and Center of Channel meter (M2)	Adjust L04, L03, L02, and L01 for maximum deflection on Field Strength meter and zero deflection of M2. Reduce generator output to keep Field Strength meter indication at approximately 3. NOTE: It is almost unnecessary to adjust L01 - 04 in Front End as perfectly adjusted.
5. FRONT END ALIGNMENT (106 MHz)	Set to 106 MHz.	Center of 106 MHz calibration mark on dial	Same as above	Adjust TC3, TC2, and TC1 for maximum deflection on Field Strength meter (M1) and zero deflection of M2. Reduce generator output to keep Field Strength meter indication at approximately 3. Repeat steps 4 and 5 for optimum alignment.
6. FINAL DETECTOR ALIGNMENT (MINIMUM THD)	Set generator to receiver frequency. Modulate with 400 Hz ±75 kHz deviation. Connect generator to FM ANT terminals.	Tune receiver to position of non-interference.	Scope vertical input to LEFT TAPE output jack.	Reduce generator output for noise to be visible on sine wave. Readjust generator frequency to center noise on positive and negative half cycles. See Figure 3 for SYMMETRICAL TUNING. Adjust VR01 (200k) for CENTER 0 (ZERO). NOTE: Do not change generator or receiver tuning; proceed to Item 7.

FM TUNER ALIGNMENT

— continued —

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
7.	Same as above. Increase generator output to 2mV.	Same as above.	AC Voltmeter and Harmonic Distortion Analyzer to LEFT TAPE OUT jack	Adjust IFT01 (bottom slug) for center of channel indication on M2. Adjust top slug for minimum THD (0.3% typically).
8. PLL IC F.R.F. (76 kHz)	Same as above.	Same as above	Connect frequency counter to TP13. NOTE: Connect Buffer Amp of a high input impedance (over 500 k-ohm) to TP13 and then, to the frequency counter through 220 k-ohm.	Adjust VR05 (5k) in Multiplex circuit to obtain 76 kHz±200 Hz on counter.
9. PILOT CANCEL ADJUSTMENT	Set generator to receiver frequency. Modulate with 19 kHz ±7.5 kHz deviation (Pilot Signal). Connect generator to FM ANT terminals.	Tune receiver to Position of non-interference.	Scope vertical input to LEFT TAPE output jack.	Adjust VR04 (100k) until deviation of levels (VTVM output) on R and L channels become minimum.
10. FM STEREO SIGNAL SEPARATION CONTROL	Connect FM stereo SG to FM ANT terminals. 19 kHz signal ON. Main channel, sub channel signal ON. Apply 1000 Hz signal from L Ch.		Scope and AC-VTVM to RIGHT TAPE output jack.	Adjust VR06 (10k) for minimum output.
	Same as above for RIGHT channel.		Scope and AC-VTVM to LEFT TAPE output jack.	

AM TUNER ALIGNMENT

AM ALIGNMENT – GRAPHIC EQUALIZER switch to OFF, SPEAKERS switch to PHONES position, FUNCTION switch to AM position, and VOLUME to MIN.

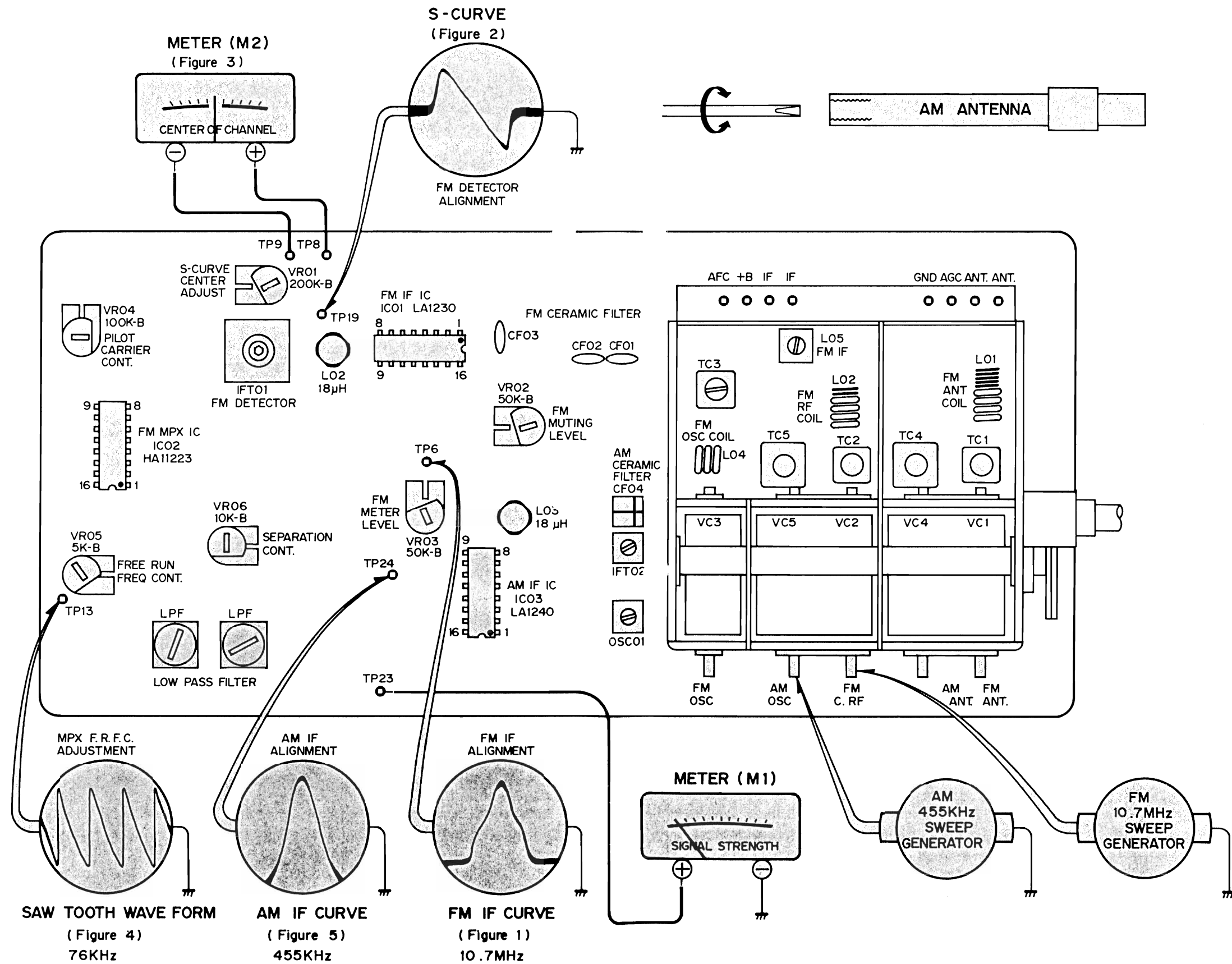
Maintain generator output as low as possible for suitable indications.

ITEM	GENERATOR	AM DIAL SETTING	INDICATOR	PROCEDURE
1. IF ALIGNMENT	Connect 455 kHz sweep generator to VC5 and ground lead to chassis. Use 0.1 μF capacitor in series with generator lead.	Position of non-interference near 1400 kHz.	Scope vertical input to TP24, and ground lead to chassis. Set vertical sensitivity to 0.2 V/cm.	Connect jumper to Pin 3 and chassis ground. Adjust IFT02. (top slug) for maximum gain and best symmetry. Keep signal low enough for noise on response as shown in Figure 5. Dis-connect jumper after completion of AM IF Alignment.
2. FRONT END ALIGNMENT (600 kHz)	AM generator to EXT AM ANT and GND terminals. Set to 600 kHz. Modulate with 400 Hz (30% modulation).	Center of 600 kHz calibration mark on dial	Front panel Field Strength meter (M1)	Adjust OSC01 and AM ANT (L01) for maximum Field Strength meter indication. Reduce generator output to keep meter reading below 3.
3. FRONT END ALIGNMENT (1400 kHz)	Set to 1400 kHz.	Center of 1400 kHz calibration mark on dial.	Front panel Field Strength meter (M1)	Adjust VC04 and VC05 for maximum deflection. Keep meter reading below 3. Repeat steps 2 and 3 until optimum alignment is reached.

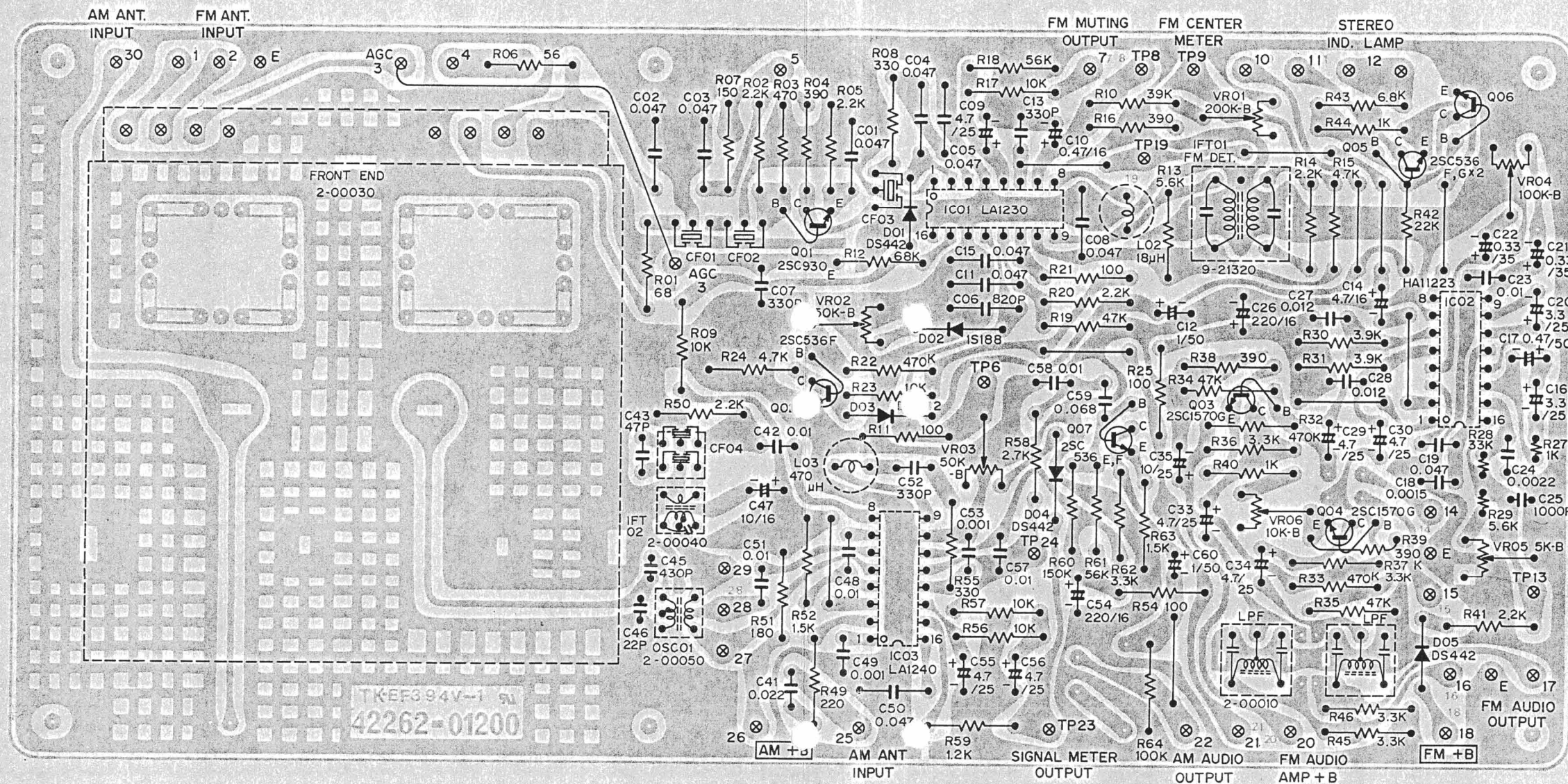
AM-FM TUNER BOARD LAYOUT

WITH OSCILLOSCOPE TIME BASE SETTINGS

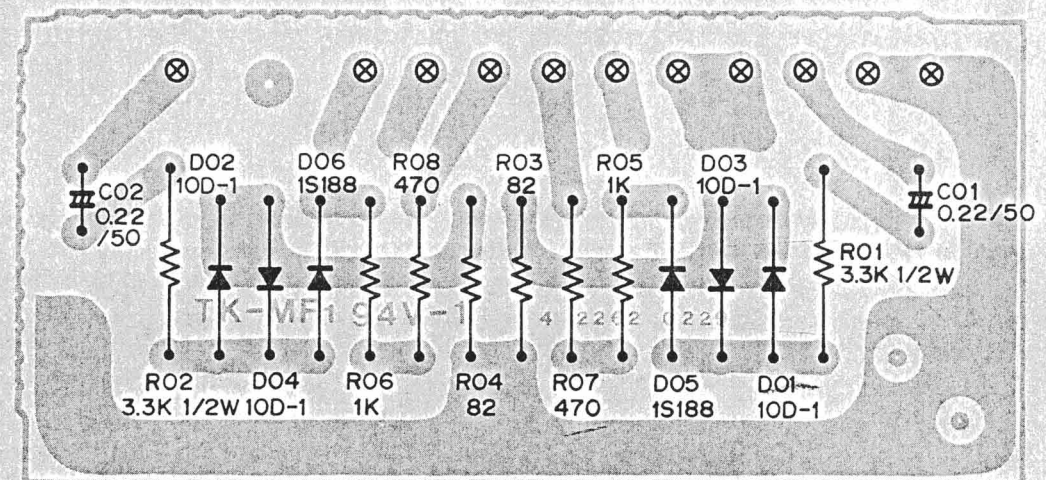
(TOP VIEW)



AM-FM RF/IF MPX P.C.BOARD (BOTTOM VIEW)



POWER METER P.C.BOARD (BOTTOM VIEW)



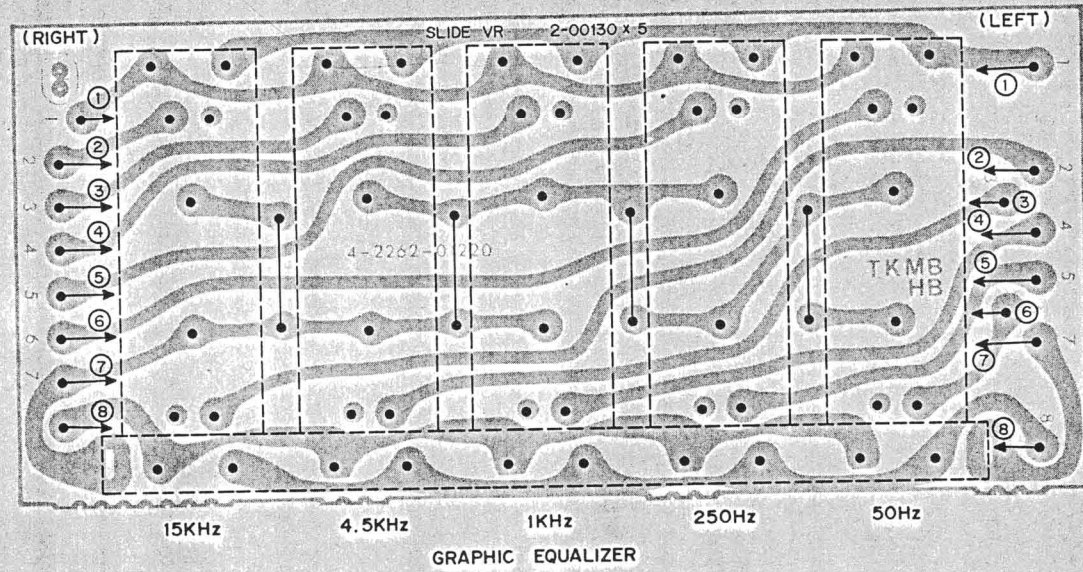
TRANSISTOR DC VOLTAGES

SYMBOL No.	DEVICE	B	C	E	SYMBOL No.	DEVICE	B	C	E
Q01	2SC930	2.4V	13.4V	1.8V	Q05	2SC536	0.06V	15V	0.06V
Q02	2SC536	0.6V	0.7V	0V	Q06	2SC536	0.6V	0.06V	0V
Q03,04	2SC1570	1.6V	11.9V	1.0V	Q07	2SC536	3.4V	7.7V	2.7V

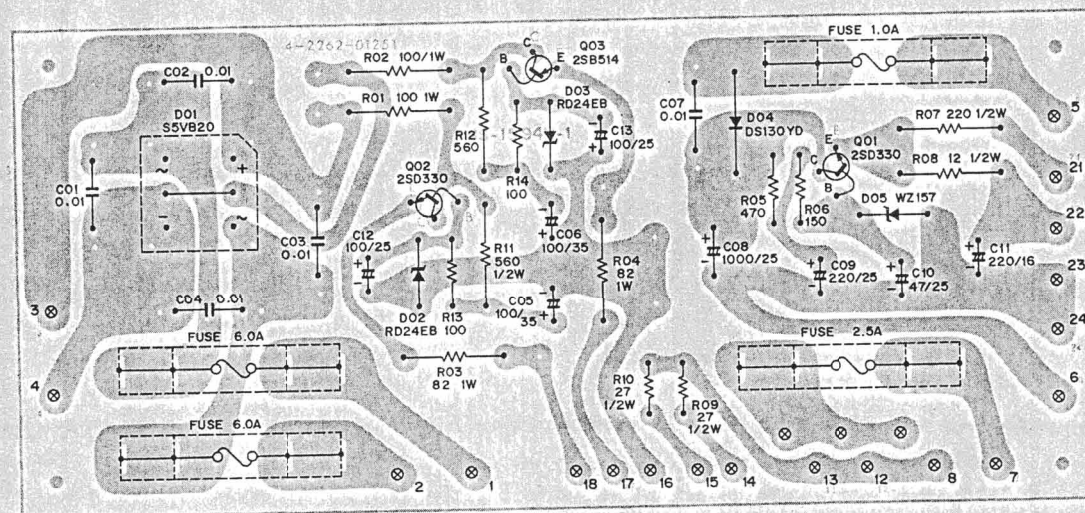
IC PIN NUMBERS VOLTAGES

SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC01	LA1230	2.7V	2.7V	2.7V	0V	2.3V	5.6V	5.6V	5.6V	5.6V	5.6V	12.8V	4.5V	0.1V	0V	5.0V	0V
IC02	HA11223	11.6V	3.5V	4.8V	0.7V	8.9V	8.8V	0V	0.06V	5.6V	2.8V	2.8V	2.8V	2.8V	2.8V	4.5V	3.0V
IC03	LA1240	4.6V	1.6V	13.5V	11.5V	13.5V	3.3V	1.2V	2.6V	11.4V	0V	13.8V	2.0V	0.6V	2.0V	0.1V	1.1V

TONE VOLUME P.C.BOARD (BOTTOM VIEW)

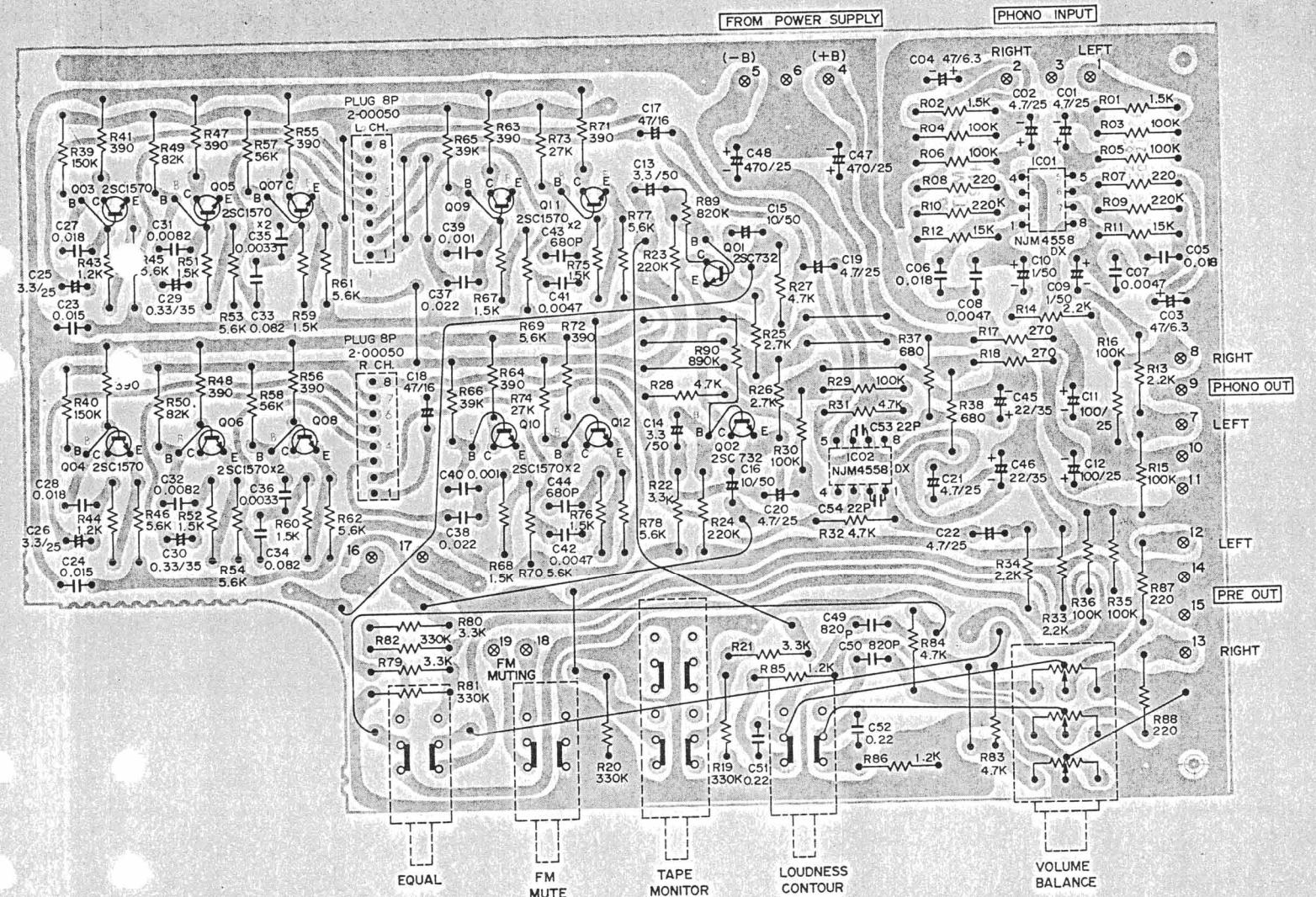


POWER SUPPLY P.C.BOARD (BOTTOM VIEW)



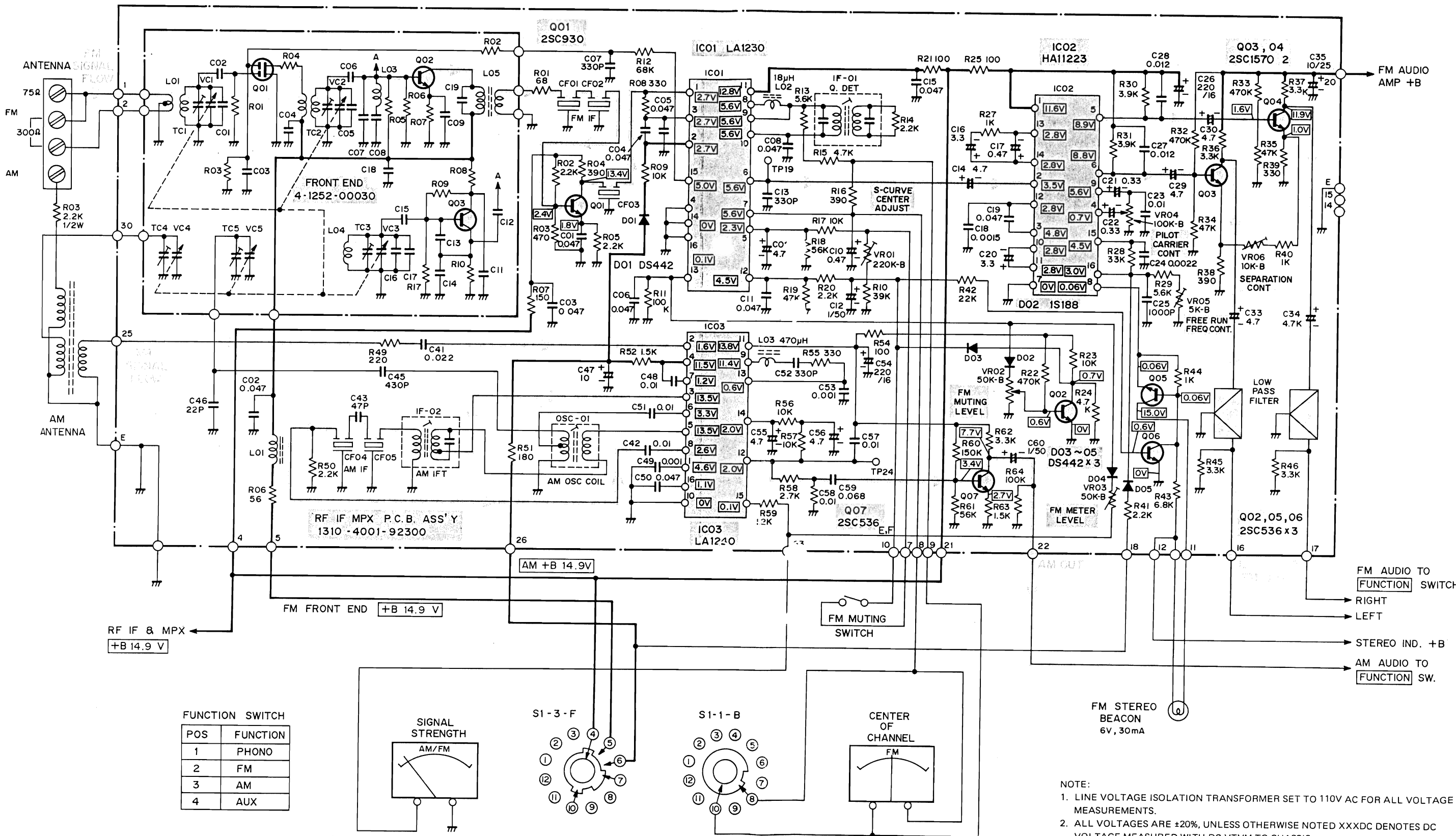
SYMBOL No.	DEVICE	B	C	E	SYMBOL No.	DEVICE	B	C	E
Q01	2SD330	16.1V	21.5V	15.5V	Q03	2SB514	-24.7V	-33.5V	-24.1V
Q02	2SD330	24.6V	33.0V	24.0V					

EQ PRE AMP P.C.BOARD (BOTTOM VIEW)



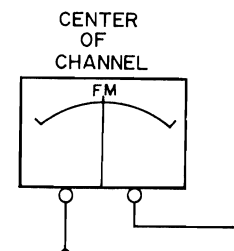
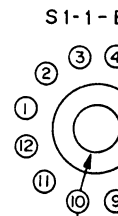
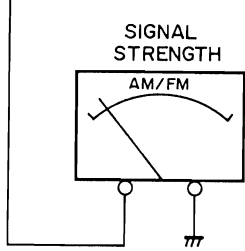
SYMBOL No.	DEVICE	B	C	E	SYMBOL No.	DEVICE	B	C	E
Q01,02	2SC1570	-0.8V	20.6V	-1.4V	Q07,08	2SC1570	-0.4V	19.3V	-1.0V
Q03,04	2SC1570	-0.2V	19.3V	-0.8V	Q09,10	2SC1570	-0.3V	19.3V	-0.9V
Q05,06	2SC1570	-0.2V	19.3V	-0.8V	Q11,12	2SC1570	-0.5V	19.3V	-1.2V

SCHEMATIC DIAGRAM



FUNCTION SWITCH

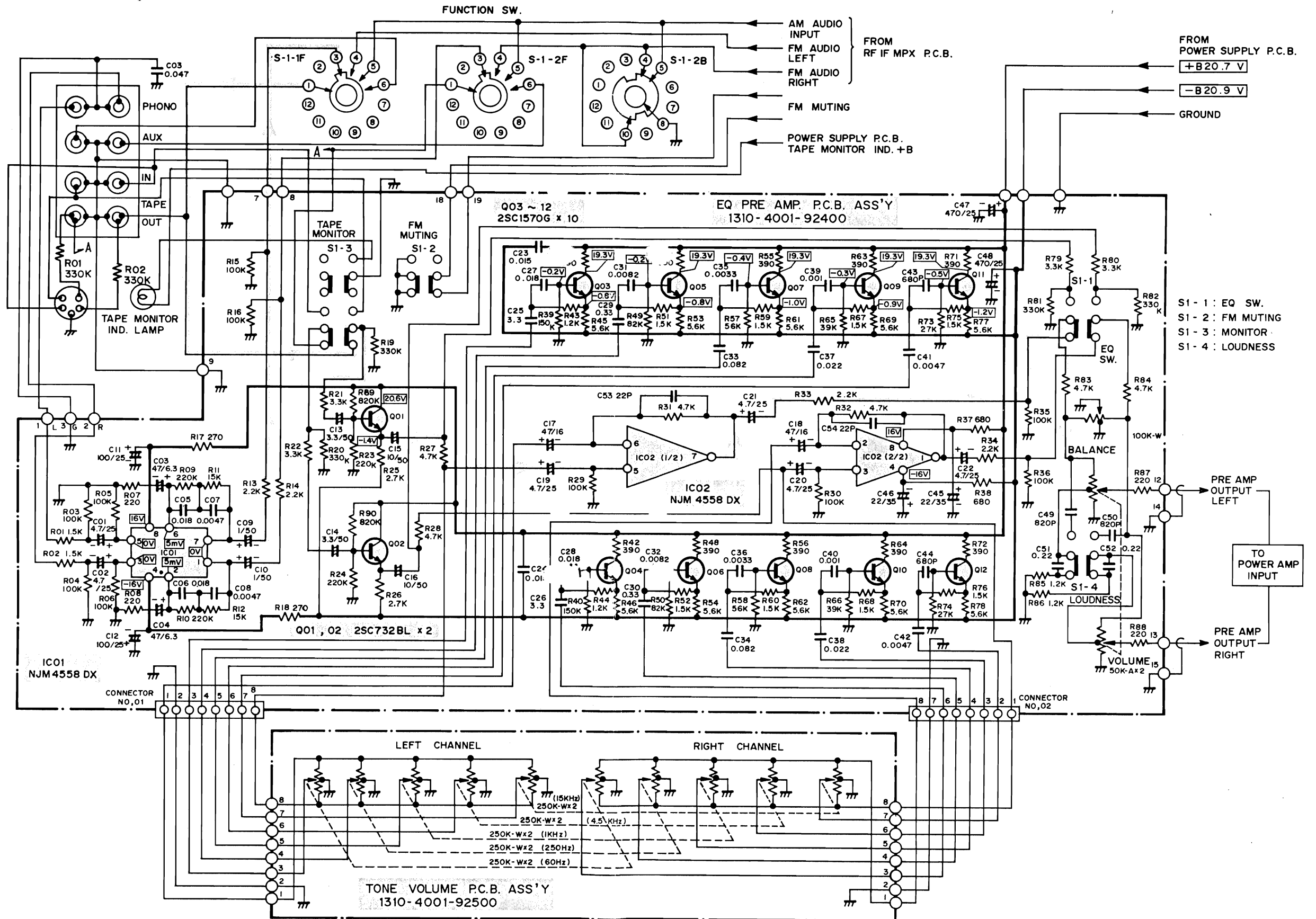
POS	FUNCTION
1	PHONO
2	FM
3	AM
4	AUX



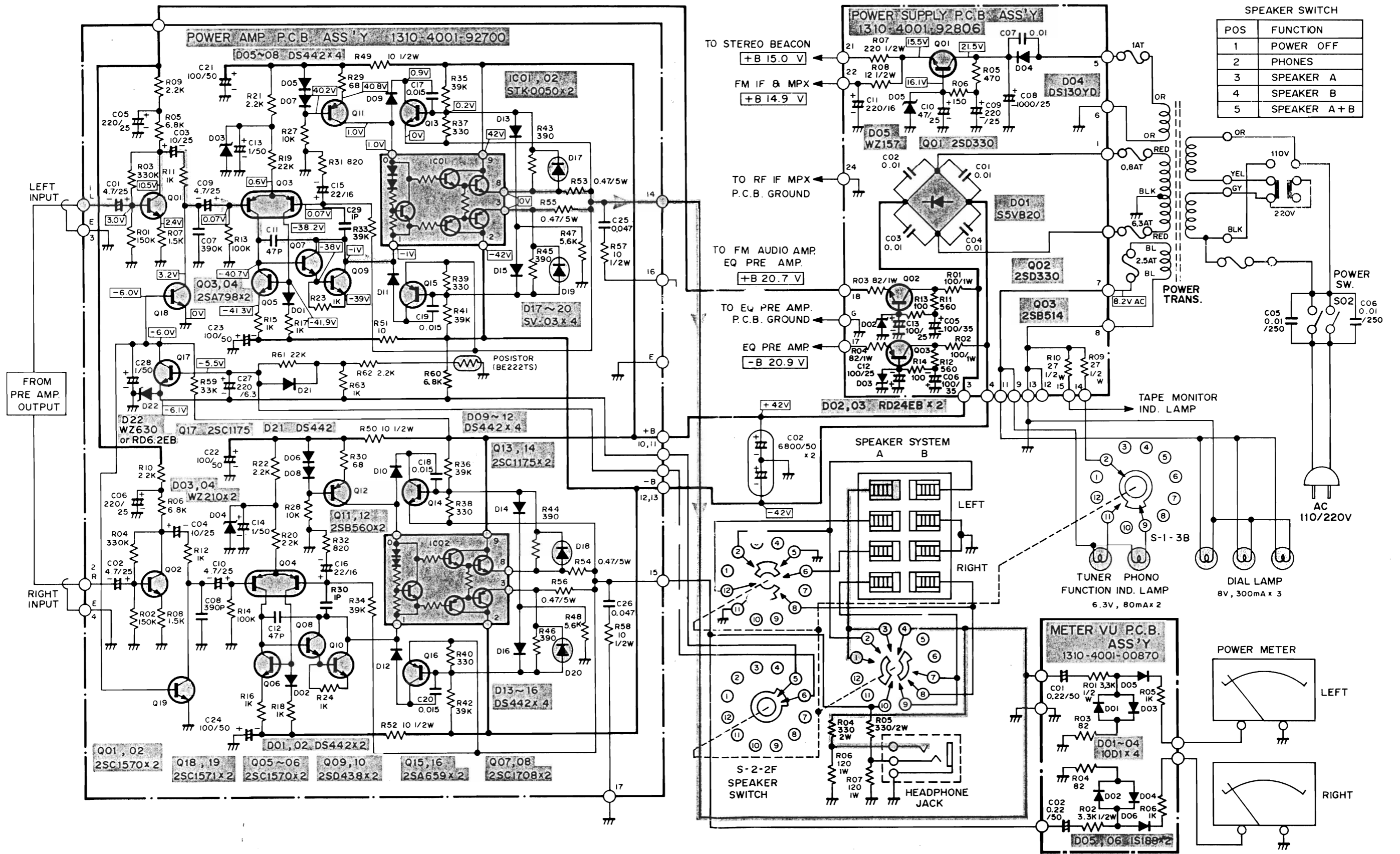
FM STEREO BEACON
6V, 30mA

- NOTE:
1. LINE VOLTAGE ISOLATION TRANSFORMER SET TO 110V AC FOR ALL VOLTAGE MEASUREMENTS.
 2. ALL VOLTAGES ARE ±20%, UNLESS OTHERWISE NOTED XXXDC DENOTES DC VOLTAGE MEASURED WITH DC VTVM TO CHASSIS.
 3. ALL CAPACITOR VALUES ARE MICROFARAD UNLESS OTHERWISE NOTED.
 4. ALL RESISTOR VALUES ARE OHMS, ±5%, 1/4W WATT UNLESS OTHERWISE NOTED.

SCHEMATIC DIAGRAM (Continued)



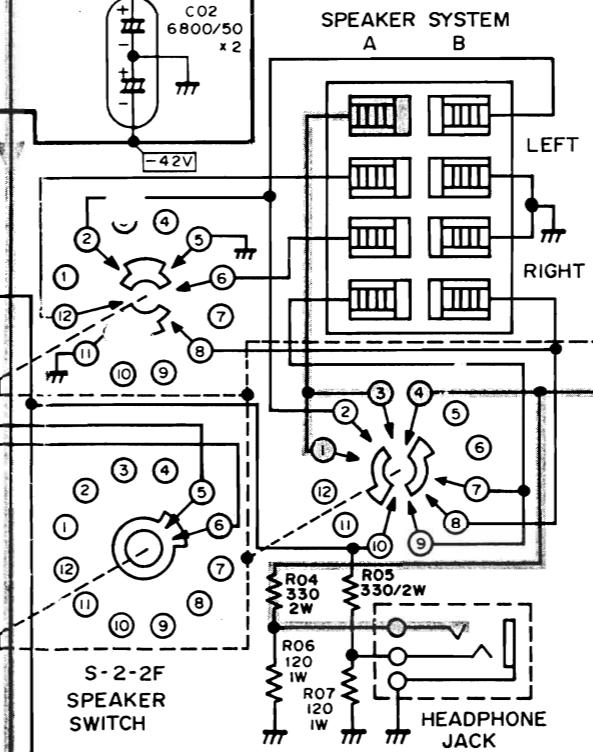
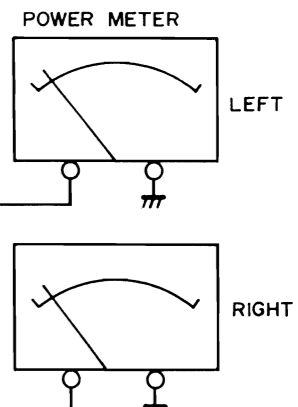
SCHEMATIC DIAGRAM (Continued)



SPEAKER SWITCH

POS	FUNCTION
1	POWER OFF
2	PHONES
3	SPEAKER A
4	SPEAKER B
5	SPEAKER A + B

METER VU P.C.B. ASS'Y
1310-4001-00870



TAPE MONITOR IND. LAMP

TUNER PHONO FUNCTION IND. LAMP
6.3V, 80mA x 2


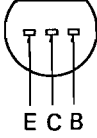

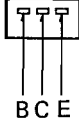

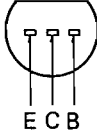
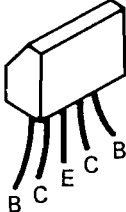
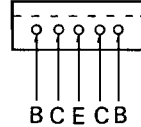
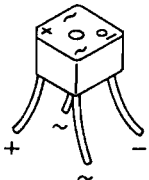

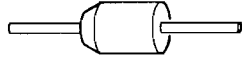
DIAL LAMP
8V, 300mA x 3

POWER TRANS.

POWER SW.

AC 110/220V

TRANSISTOR LEAD IDENTIFICATION

FRONT VIEW	BOTTOM VIEW	TRANSISTOR	FRONT VIEW	BOTTOM VIEW	TRANSISTOR
		<ul style="list-style-type: none"> • 2SC536 • 2SC930 • 2SC1175 • 2SC1570 • 2SC1571 • 2SA659 • 2SC732 			<ul style="list-style-type: none"> • 2SD330
		<ul style="list-style-type: none"> • 2SB560 • 2SD438 			<ul style="list-style-type: none"> • 2SA798
	<p>S5VB20</p>		<ul style="list-style-type: none"> • RD-24FB • WZ157 		<ul style="list-style-type: none"> • DS130YD

IC EQUIVALENT CIRCUIT & BLOCK DIAGRAM

EQ AMP IC NJM4558D EQUIVALENT CIRCUIT

