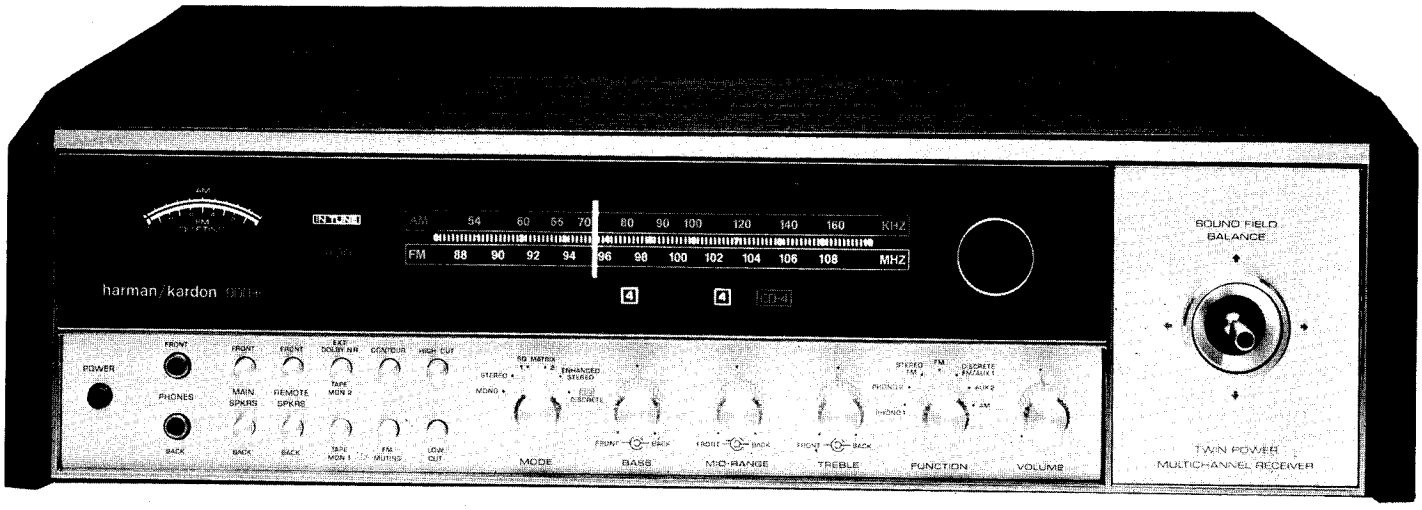
The Harman-Kardon Model 900+

AM/Stereo FM Multichannel Receiver

Technical Manual



harman/kardon

ALIGNMENT PROCEDURES

AM IF AMPLIFIER ALIGNMENT PROCEDURE

INSTRUMENT: AM Generator (With Scope)
OUTPUT OF GENERATOR: Connect to TC5 (On V.C. – AM OSC) Terminal, Frequency = 455 KHz.
Adjust IFT51 for Maximum
NOTE: Keep Signal from Generator as low as possible when adjusting.

AM ALIGNMENT PROCEDURE

INSTRUMENT: AM Signal Generator, AC VTVM & Oscilloscope
NOTE: Set Function Switch to "AM"
Set Mode Switch to "MONO"
Set Volume Control to "MINIMUM"
Input Signal must be kept as low as possible to avoid A.V.C. action

Steps	Signal Generator		Tuning Dial Setting	VTVM & Scope Connection	Adjustment	Adjust for
	Coupling	Frequency				
1	The Test Loop about 60 cm (2 ft.) away from AM Bar (Loop Stick) Antenna	515KHz	Frequency Minimum	L Channel Tape Out Terminal	L53 (AM OSC Coil)	Maximum Amplitude
2		1650KHz	Frequency Maximum		TC6 (AM OSC TRIMMER)	
*3						
4		600KHz (400Hz, 30% Modulation)	600KHz		L51 (BAR ANT TRIMMER) L52 (AM RF Coil)	
5		1400KHz (400Hz, 30% Modulation)	1400KHz		TC5 (BAR ANT TRIMMER) TC7 (AM RF TRIMMER)	
*6		100KHz (400Hz, 30% Mod.)	1000KHz		IFT51	
7		1000KHz (400Hz, 30% Modulation)	1000KHz		VR52	0.225V (RMS) Output
8		Generator Output 1000 Microvolts			VR53	Tuning Meter Full Scale
*3	Repeat Steps 1 and 2 until no further improvement is noticed.					
*6	Repeat Steps 4, 5 and 6 until no further improvement is noticed.					

FM FRONT END ALIGNMENT PROCEDURE

INSTRUMENT: FM Signal Generator, AC VTVM & Oscilloscope

NOTE: Set Function Switch to "FM"
Set Mode Switch to "MONO"
Set Volume Control to "MINIMUM"
Input Signal must be kept as low as possible to avoid limiting point

Steps	Generator Connection	Generator Frequency	Tuning Dial Setting	VTVM & Oscilloscope Connection	Adjustment & Function	Adjust for
1	Connect FM Signal Generator to FM Ant Terminal	87MHz (400Hz, 75KHz DEVIATION)	Frequency Minimum	L, or R Channel Tape Out Terminal	L4 (FM OSC Coil)	Maximum Amplitude & Undistorted Sine Wave on Scope
2		109MHz (400Hz, 75KHz DEVIATION)	Frequency Maximum		TC4 (FM OSC TRIMMER)	
*3						
4		90MHz (400Hz, 75KHz Deviation)	90MHz		L1 (FM Ant Coil) L2 (FM RF1 Coil) L3 (FM RF2 Coil)	
5		106MHz (400Hz, 75KHz Deviation)	106MHz		TC1 (FM Ant Trimmer) TC2 (FM RF1 Trimmer) TC3 (FM RF2 Trimmer)	
6	Repeat steps 4 and 5 until no further improvement is noticed.					
*3	Repeat steps 1 and 2 until no further improvement is noticed.					

FM IF AMPLIFIER ALIGNMENT PROCEDURE

INSTRUMENT: FM Signal Generator, FM Stereo Generator, AC VTVM, DC VTVM, Oscilloscope & Distortion Meter

NOTE: Set Function Switch to "FM"
Set Mode Switch to "MONO"
Set Volume Control to "MINIMUM"
The Front End Alignment must be completed.

GENERATOR CONNECTION: Connect FM Signal Generator to FM Ant Terminal

GENERATOR FREQUENCY: 98MHz (400Hz, 75KHz Deviation)

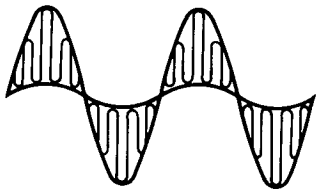
TUNING DIAL: 98MHz

AC VTVM, OSCILLOSCOPE & DISTORTION METER CONNECTION: L, or R Channel Tape Out Terminal

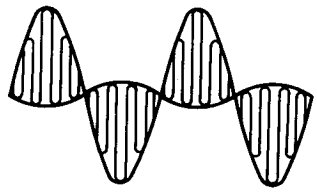
NOTE: All Readings indicated are at Generator

Step	Input Signal Level	DC VTVM Connection	Adjustment & Function	Adjust for
1	Must be kept as low as possible to avoid limiting point		Front End IFT & IF Amp IFT101 (Bottom Core) Disc. CAN.	Maximum Amplitude and Undistorted Sine Wave On Oscilloscope
2	At No Input Signal	Junction of R121, R122 IF Board	IF Amp IFT101 (Top Core) Disc. CAN.	OV DC
3	At No Input Signal	Junction of R128, R129 (Pin #8 IF Board)	VR101	OV DC
4	100μV		IF Amp IFT101 (Bottom Core) Disc. CAN.	Minimum Distortion on Harmonic Distortion Analyzer

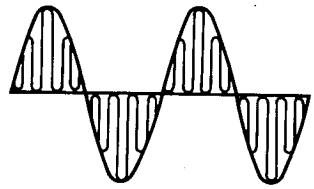
STEPS 5: OSCILLOSCOPE CONNECTION: FM QUAD Terminal
Input Level 1000μV
Adjust VR102 for flat base line composite MPX Signal



VR102 UNDER COMPENSATED



VR102 OVER COMPENSATED



VR102 CORRECT

FM METER ALIGNMENT PROCEDURE

INSTRUMENT: FM Signal Generator, FM Stereo Generator, AC VTVM, DC VTVM & Oscilloscope
NOTE: Set Function Switch to "FM STEREO"
Set Mode Switch to "STEREO"
Set Volume Control to "MINIMUM"
The FM Front End and FM IF Alignment must have been completed.
GENERATOR CONNECTION: Connect FM Signal Generator to FM Ant Terminal
GENERATOR FREQUENCY: 98MHz (400Hz, 75KHz Deviation)
TUNING DIAL SETTING: 98MHz
AC VTVM' OSCILLOSCOPE & DISTORTION METER CONNECTION: L, or R Channel Tape Out Terminal
FM Muting in OFF Position and Muting Threshold in CCW Position

Step	Input Signal Level	DC VTVM Connection	Adjustment & Function	Adjust for
1	At No Input Signal	Pin #16 on 16 Pin Terminal Meter Board	VR206	DC Minimum
2	40μV	#16 Pin Meter Board	VR205 VR201	DC Minimum In Tune Light Turn On
3	At No Input Signal		VR202	Meter Pointer To Maximum ("O" on FM Quieting Scale)
4	30μV (Stereo Signal)		VR203	Stereo Light Turn On

FM MPX STEREO ALIGNMENT PROCEDURE

INSTRUMENT: FM Signal Generator, FM Stereo Generator, AC VTVM, & Oscilloscope (High Impedance and Low Capacity Probe)

NOTE: Set Function Switch to "FM STEREO"
Set Mode Switch to "STEREO"
The FM Front End and FM IF Amp Alignment must be completed before attempting this FM MPX Stereo Alignment. Poor Front End and IF Alignment will result in Poor FM MPX Stereo Adjustment.

Steps	FM Stereo Generator		Output Indicator Connected to	Adjustment & Function	Adjust for
	Signal	Modulation			
1	Main Signal	100%	VTVM & Oscilloscope To Left Channel Tape Out Terminal	VR301	0.75V (RMS) Output
2	19KHz Pilot Signal Only	Less 5%	Probe Of Oscilloscope To Test Point	L301, L302 L303	Maximum Reading On Oscilloscope
3	Composite Signal To Left Channel Only	1000μV Signal	VTVM & Oscilloscope To Left Channel Tape Out Terminal	L301	Maximum Amplitude And Undistorted Sine Wave On Oscilloscope
4	Composite Signal To Right Chan Only	Pilot 10%			Minimum Reading Minimum Reading
5	19KHz Pilot Signal Only	5.5%		VR302	Stereo Light Turn On
6		Repeat Steps 3 – 4			

AUDIO DRIVER BIAS ADJUSTMENT

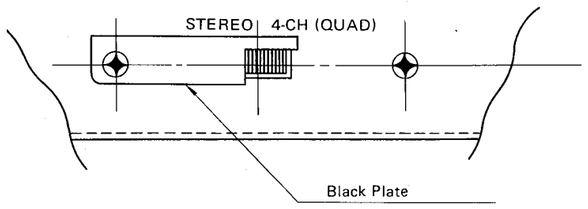
1. Set volume control to minimum position.
2. Connect 8 ohm load resistor to speaker terminals in parallel.
3. Connect 20 mV DC millivolt meter to LEFT FRONT (L_f) channel test point TP1 and TP2 (R765).
4. Adjust bias control VR751 until millivolt meter indicates 8 mV.
5. Repeat preceding steps for L_b, R_f, and R_b channel.

CHANGING THE STEREO 4CH SWITCH

This receiver operates at 32W per channel, four channels driven, in the "4CH" switch position and 90W per channel, two channels driven, in the "Stereo" switch position.

The switch is factory set in the 4CH position. To switch to the STEREO mode remove the black screw holding the black lock plate (left side of switch). Reset this screw and switch to the STEREO position. Replace the lock plate by removing the black screw to the right of the 4CH designation. Reverse the plate and reset so that the switch is now locked in the STEREO position. Replace screw.

When the receiver operates in the STEREO mode the signal will only appear on the LEFT FRONT and RIGHT FRONT speaker terminals. There is no signal on the LEFT & RIGHT BACK terminals.



CD-4 ALIGNMENT PROCEDURE

DEMODULATION CIRCUIT

The following adjustment sets the center frequency of the demodulation phase locked loop to 30kHz:

If a frequency counter is available:

1. Set the function switch to "Phono" position and put shorting plugs in the phono inputs and connect the counter to TP 1 and Ground.
2. Connect power and turn the unit on. Allow a 5 minute warm-up time.
3. Adjust VR 403 to obtain a free running frequency of 30.0kHz.
4. Repeat using TP 4 and VR 404.
5. Disconnect power and remove measuring equipment.

In the absence of a counter, an accurate source of 30kHz signal at a level of 1–2mV is required, or a CD-4 record may be used, according to the following procedure:

1. Connect a clip lead from the top of D 411 to Ground. (This disables the muting circuit).
2. Connect a 100μf capacitor from Pin 2 of IC 403 to Ground. If a polarized capacitor is used, the positive lead is to be connected to the IC. DO NOT SOLDER DIRECTLY TO THE IC.
3. Turn the "CD-4 Separation" controls fully counterclockwise.
4. Set the Function switch to "Phono" position, and the Mode switch to "Mono."
5. Connect the signal generator or a turntable with a CD-4 cartridge and record to the input.
6. Connect a speaker to the left front speaker terminals and turn on the speaker switches on the front panel, or connect a set of headphones to the front headphone jack.
7. Connect power and turn it on. Allow it to warm-up for 5 minutes.
8. Set the signal generator to 30kHz at 1–2mV. If a signal generator is not available, a Harman/Kardon test record or other CD-4 record may be used as a source of 30kHz signal. It is essential that an UNMODULATED signal be used. The test record is ideal in this regard, since long passages of unmodulated carrier are available for channel balancing. On a commercial disc, the grooves between selections may be used.
9. Adjust the volume so that a beat note can be heard.

   NOTE: A beat may not be heard if VR 403 is already adjusted for zero beat or if the beat is out of the audible range.

   If a beat is not heard when rocking VR 403 through its extremes, there is a problem with the unit.
10. Adjust VR 403 for zero beat.

    NOTE: Within a small range of this adjustment the beat will disappear. This is due to the phase locked loop locking to the input. Set VR 403 to the approximate center of this range.
11. Disconnect power and remove the 100μf capacitor and jumpers.
12. Repeat this procedure, substituting VR 404 for 403, IC 404 for 403.

NOTE: L401 and 402 are factory set and need not be adjusted. If they are misadjusted by mistake, they can be set approximately 1 turn above the top of the form.

FM MPX STEREO ALIGNMENT PROCEDURE

INSTRUMENT: FM Signal Generator, FM Stereo Generator, AC VTVM, & Oscilloscope (High Impedance and Low Capacity Probe)

NOTE: Set Function Switch to "FM STEREO"
Set Mode Switch to "STEREO"
The FM Front End and FM IF Amp Alignment must be completed before attempting this FM MPX Stereo Alignment. Poor Front End and IF Alignment will result in Poor FM MPX Stereo Adjustment.

Steps	FM Stereo Generator		Output Indicator Connected to	Adjustment & Function	Adjust for
	Signal	Modulation			
1	Main Signal	100%	VTVM & Oscilloscope To Left Channel Tape Out Terminal	VR301	0.75V (RMS) Output
2	19KHz Pilot Signal Only	Less 5%	Probe Of Oscilloscope To Test Point	L301, L302 L303	Maximum Reading On Oscilloscope
3	Composite Signal To Left Channel Only	1000μV Signal	VTVM & Oscilloscope To Left Channel Tape Out Terminal	L301	Maximum Amplitude And Undistorted Sine Wave On Oscilloscope
4	Composite Signal To Right Chan Only	Pilot 10%			Minimum Reading Minimum Reading
5	19KHz Pilot Signal Only	5.5%		VR302	Stereo Light Turn On
6		Repeat Steps 3 – 4			

AUDIO DRIVER BIAS ADJUSTMENT

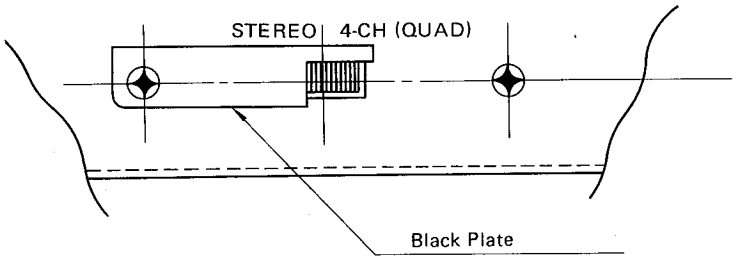
1. Set volume control to minimum position.
2. Connect 8 ohm load resistor to speaker terminals in parallel.
3. Connect 20 mV DC millivolt meter to LEFT FRONT (L_f) channel test point TP1 and TP2 (R765).
4. Adjust bias control VR751 until millivolt meter indicates 8 mV.
5. Repeat preceding steps for L_b, R_f, and R_b channel.

CHANGING THE STEREO 4CH SWITCH

This receiver operates at 32W per channel, four channels driven, in the "4CH" switch position and 90W per channel, two channels driven, in the "Stereo" switch position.

The switch is factory set in the 4CH position. To switch to the STEREO mode remove the black screw holding the black lock plate (left side of switch). Reset this screw and switch to the STEREO position. Replace the lock plate by removing the black screw to the right of the 4CH designation. Reverse the plate and reset so that the switch is now locked in the STEREO position. Replace screw.

When the receiver operates in the STEREO mode the signal will only appear on the LEFT FRONT and RIGHT FRONT speaker terminals. There is no signal on the LEFT & RIGHT BACK terminals.



CD-4 ALIGNMENT PROCEDURE

DEMODULATION CIRCUIT

The following adjustment sets the center frequency of the demodulation phase locked loop to 30kHz:

If a frequency counter is available:

1. Set the function switch to "Phono" position and put shorting plugs in the phono inputs and connect the counter to TP 1 and Ground.
2. Connect power and turn the unit on. Allow a 5 minute warm-up time.
3. Adjust VR 403 to obtain a free running frequency of 30.0kHz.
4. Repeat using TP 4 and VR 404.
5. Disconnect power and remove measuring equipment.

In the absence of a counter, an accurate source of 30kHz signal at a level of 1—2mV is required, or a CD-4 record may be used, according to the following procedure:

1. Connect a clip lead from the top of D 411 to Ground. (This disables the muting circuit).
2. Connect a 100μf capacitor from Pin 2 of IC 403 to Ground. If a polarized capacitor is used, the positive lead is to be connected to the IC. DO NOT SOLDER DIRECTLY TO THE IC.
3. Turn the "CD-4 Separation" controls fully counterclockwise.
4. Set the Function switch to "Phono" position, and the Mode switch to "Mono."
5. Connect the signal generator or a turntable with a CD-4 cartridge and record to the input.
6. Connect a speaker to the left front speaker terminals and turn on the speaker switches on the front panel, or connect a set of headphones to the front headphone jack.
7. Connect power and turn it on. Allow it to warm-up for 5 minutes.
8. Set the signal generator to 30kHz at 1—2mV. If a signal generator is not available, a Harman/Kardon test record or other CD-4 record may be used as a source of 30kHz signal. It is essential that an UNMODULATED signal be used. The test record is ideal in this regard, since long passages of unmodulated carrier are available for channel balancing. On a commercial disc, the grooves between selections may be used.
9. Adjust the volume so that a beat note can be heard.

   NOTE: A beat may not be heard if VR 403 is already adjusted for zero beat or if the beat is out of the audible range.

   If a beat is not heard when rocking VR 403 through its extremes, there is a problem with the unit.

10. Adjust VR 403 for zero beat.

    NOTE: Within a small range of this adjustment the beat will disappear. This is due to the phase locked loop locking to the input. Set VR 403 to the approximate center of this range.

11. Disconnect power and remove the 100μf capacitor and jumpers.
12. Repeat this procedure, substituting VR 404 for 403, IC 404 for 403.

NOTE: L401 and 402 are factory set and need not be adjusted. If they are misadjusted by mistake, they can be set approximately 1 turn above the top of the form.

CD-4 ANRS ALIGNMENT PROCEDURE

This procedure must be performed if any components in the ANRS are replaced.

1. Connect a clip lead from TP2 to Pin 12 of socket MC 2 (+12 volts).
2. Connect an audio oscillator through an attenuator and a 10μf, 25 volt capacitor to TP3. The positive lead of the capacitor connects to the CD-4 board.
3. Connect a clip lead from the top of D 411 to Ground. (This disables the muting circuit.)
4. Place the function switch in the "Phono" position.
5. Connect power to the unit and turn it on. Allow it to warm-up at least 1 minute.
6. Set the ANRS controls, as follows: VR 405, 407 at center, VR 409 fully clockwise, VR 411 fully counterclockwise.
7. Set the frequency of the oscillator to 30Hz and the level to 140mV (−15dBm) and observe the output level at left front tape output. It should be 200mV (−12dBm) ±2dB.

   This level is a reference to which the following readings are compared:

Step No.	Set Frequency To	Set Level To	Adjust	To Obtain at Tape Output
8	4kHz	125mV (−1dB)	VR 405	−1 +2dB −1dB
9	4kHz	31mV (−13dB)	VR 409	−21 ±1dB
10	Repeat 8 & 9 until no further improvement is noticed.			
11	4kHz	55mV (−8dB)	Check	−11 ±1dB
12	4kHz	14mV (−20dB)	Check	−32 ±2dB
13	If 11 & 12 are not within limits, return to Step 8.			
14	630Hz	31mV (−13dB)	VR 411	−20 ±1dB
15	630Hz	140mV (0dB)	VR 407	0dB ±1dB
16	Repeat 14 & 15 until no further improvement is noticed.			
17	630Hz	63mV (−7dB)	Check	−10 ±1dB
18	630Hz	14mV (−20dB)	Check	−30 ±2dB
19	Repeat Steps 8 thru 17 until no further improvement is noticed.			
20	Disconnect power and oscillator			
21	Remove the added components and jumpers.			
22	Repeat, substituting VR 406 for 405, VR 408 for 407, VR 410 for 409, VR 412 for 411, Q418 for 417, TP6 for TP3, TP5 for TP2, "Right" for "Left."			

VOLTAGE SELECTION

The Export Model receiver is a multi voltage equipment that can operate on 100V, 117(120)V, 220V, or 240V power. Your unit comes preset at the proper voltage for use in your area; however, if you move to an area where the power supply voltage is different, the voltage setting can be manually changed.

Be sure that your unit is not connected to the power source before attempting to make this change.

To change the voltage setting, remove the bottom plate and locate VOLTAGE SELECTOR (see Fig : 1 and schematic). Pull up the voltage-selector plug (white arrow on top), reset the plug to selector base so that the head of the arrow lines up with the pointer line of the voltage you desire.

CONNECTING TO POWER SUPPLY

Before connecting, ensure that the voltage selector is set correctly for your supply, and a suitable plug fitted.

The unit is protected with a 5 amp fuse when power supply voltage is 100V or 117(120)V, and a 2.5 amp fuse when voltage is 200V or 240V. When changing the voltage setting, please change the fuse accordingly.

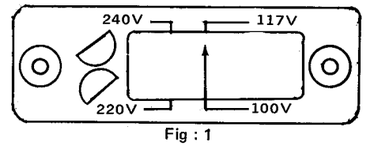
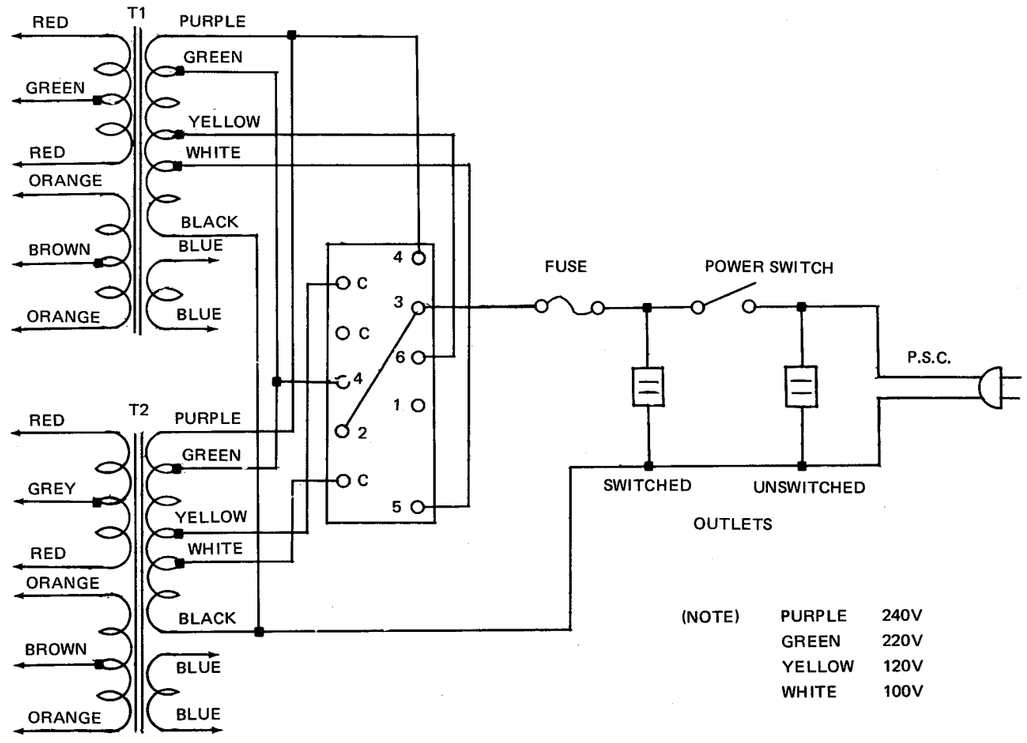


Fig : 1

POWER SUPPLY SCHEMATIC DIAGRAM



CD-4 ANRS ALIGNMENT PROCEDURE

This procedure must be performed if any components in the ANRS are replaced.

1. Connect a clip lead from TP2 to Pin 12 of socket MC 2 (+12 volts).
2. Connect an audio oscillator through an attenuator and a 10μf, 25 volt capacitor to TP3. The positive lead of the capacitor connects to the CD-4 board.
3. Connect a clip lead from the top of D 411 to Ground. (This disables the muting circuit.)
4. Place the function switch in the "Phono" position.
5. Connect power to the unit and turn it on. Allow it to warm-up at least 1 minute.
6. Set the ANRS controls, as follows: VR 405, 407 at center, VR 409 fully clockwise, VR 411 fully counterclockwise.
7. Set the frequency of the oscillator to 30Hz and the level to 140mV (−15dBm) and observe the output level at left front tape output. It should be 200mV (−12dBm) ±2dB.

   This level is a reference to which the following readings are compared:

Step No.	Set Frequency To	Set Level To	Adjust	To Obtain at Tape Output
8	4kHz	125mV (−1dB)	VR 405	−1 +2dB −1dB
9	4kHz	31mV (−13dB)	VR 409	−21 ±1dB
10	Repeat 8 & 9 until no further improvement is noticed.			
11	4kHz	55mV (−8dB)	Check	−11 ±1dB
12	4kHz	14mV (−20dB)	Check	−32 ±2dB
13	If 11 & 12 are not within limits, return to Step 8.			
14	630Hz	31mV (−13dB)	VR 411	−20 ±1dB
15	630Hz	140mV (0dB)	VR 407	0dB ±1dB
16	Repeat 14 & 15 until no further improvement is noticed.			
17	630Hz	63mV (−7dB)	Check	−10 ±1dB
18	630Hz	14mV (−20dB)	Check	−30 ±2dB
19	Repeat Steps 8 thru 17 until no further improvement is noticed.			
20	Disconnect power and oscillator			
21	Remove the added components and jumpers.			
22	Repeat, substituting VR 406 for 405, VR 408 for 407, VR 410 for 409, VR 412 for 411, Q418 for 417, TP6 for TP3, TP5 for TP2, "Right" for "Left."			

VOLTAGE SELECTION

The Export Model receiver is a multi voltage equipment that can operate on 100V, 117(120)V, 220V, or 240V power. Your unit comes preset at the proper voltage for use in your area; however, if you move to an area where the power supply voltage is different, the voltage setting can be manually changed.

Be sure that your unit is not connected to the power source before attempting to make this change.

To change the voltage setting, remove the bottom plate and locate VOLTAGE SELECTOR (see Fig : 1 and schematic). Pull up the voltage-selector plug (white arrow on top), reset the plug to selector base so that the head of the arrow lines up with the pointer line of the voltage you desire.

CONNECTING TO POWER SUPPLY

Before connecting, ensure that the voltage selector is set correctly for your supply, and a suitable plug fitted.

The unit is protected with a 5 amp fuse when power supply voltage is 100V or 117(120)V, and a 2.5 amp fuse when voltage is 200V or 240V. When changing the voltage setting, please change the fuse accordingly.

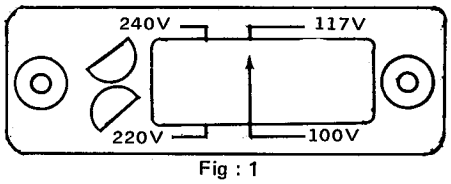
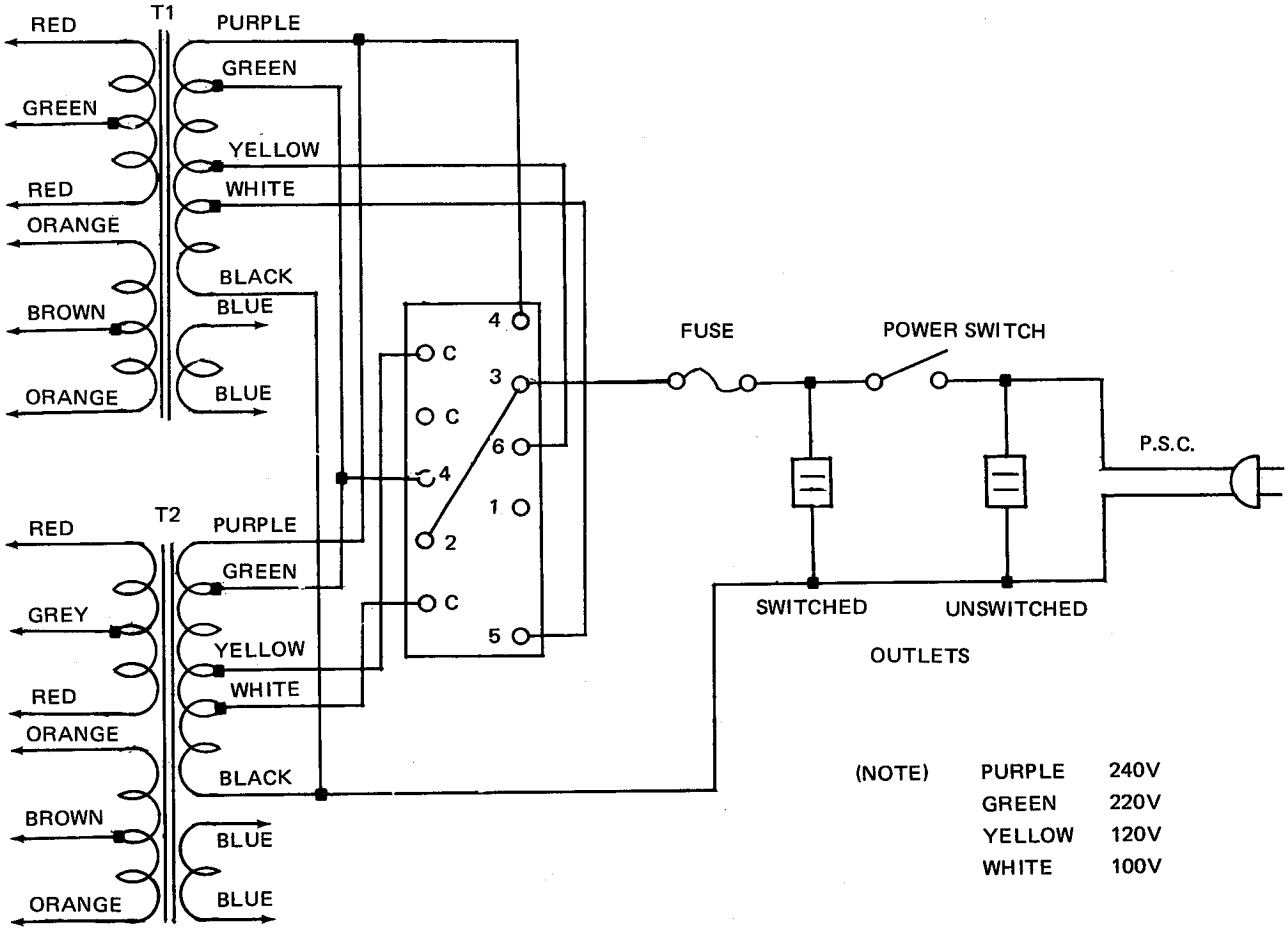
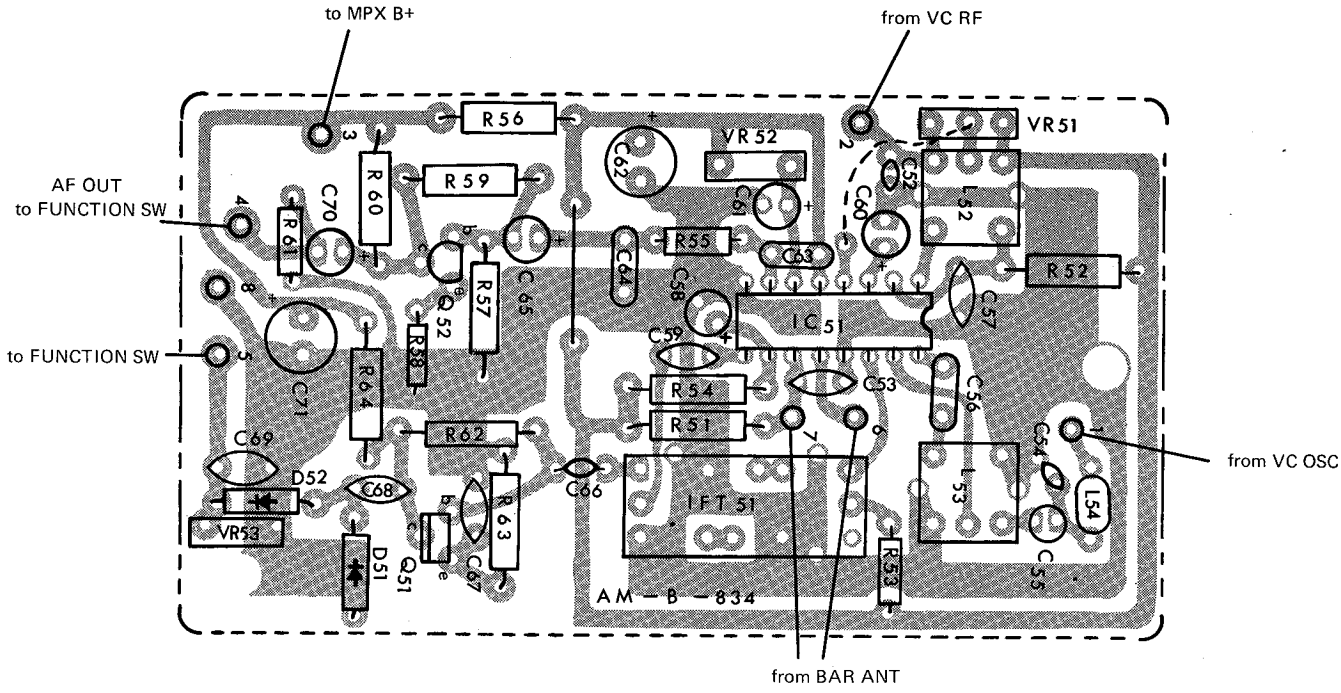


Fig : 1

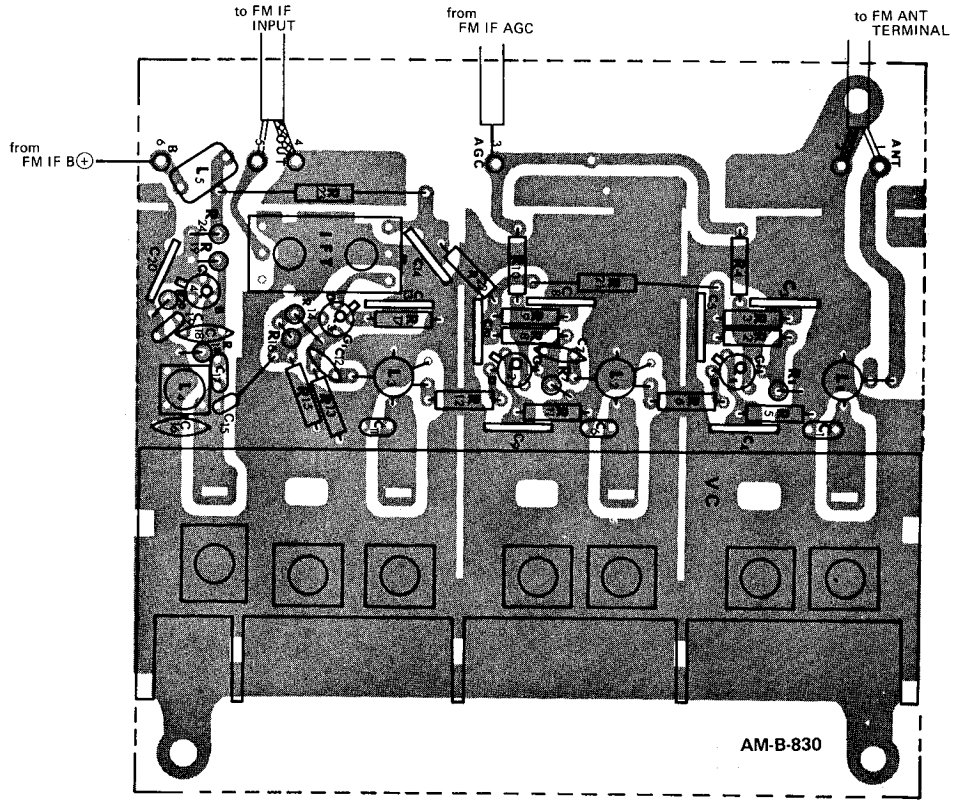
POWER SUPPLY SCHEMATIC DIAGRAM



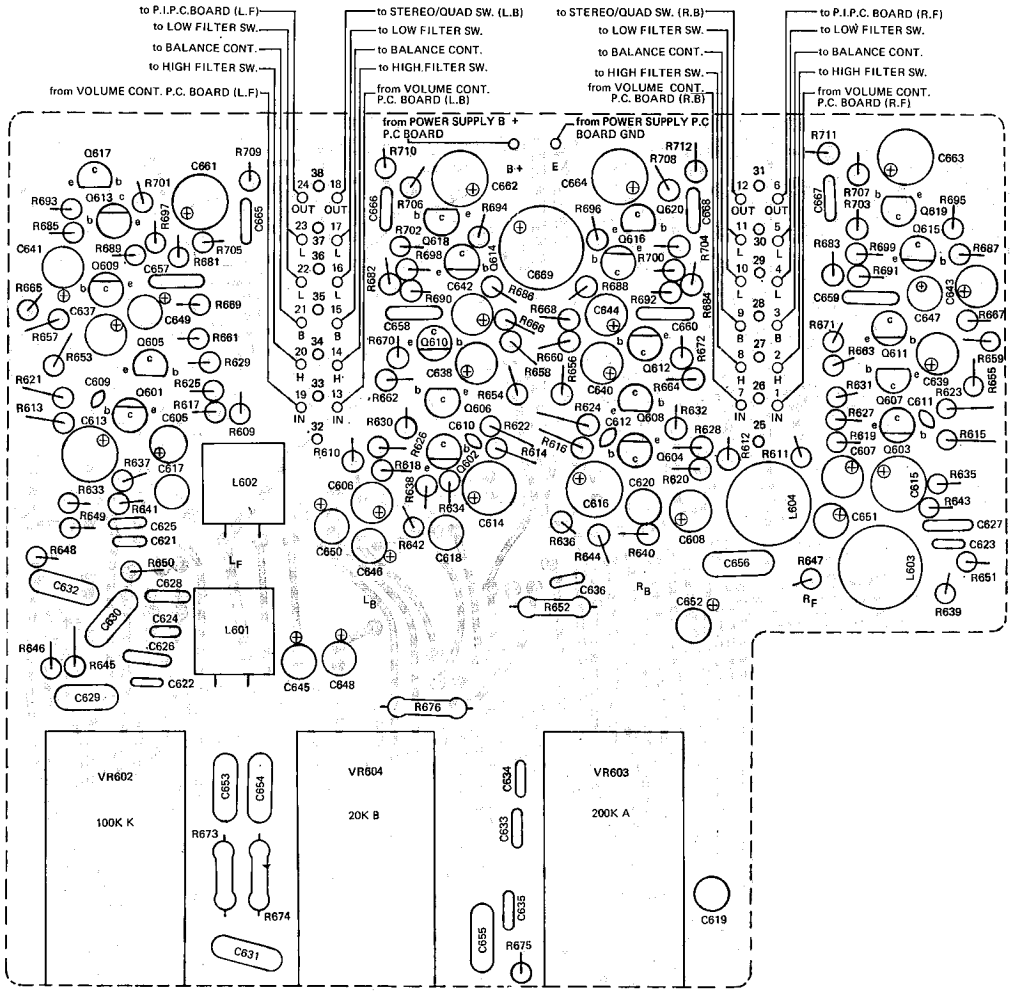
AM TUNER BOARD



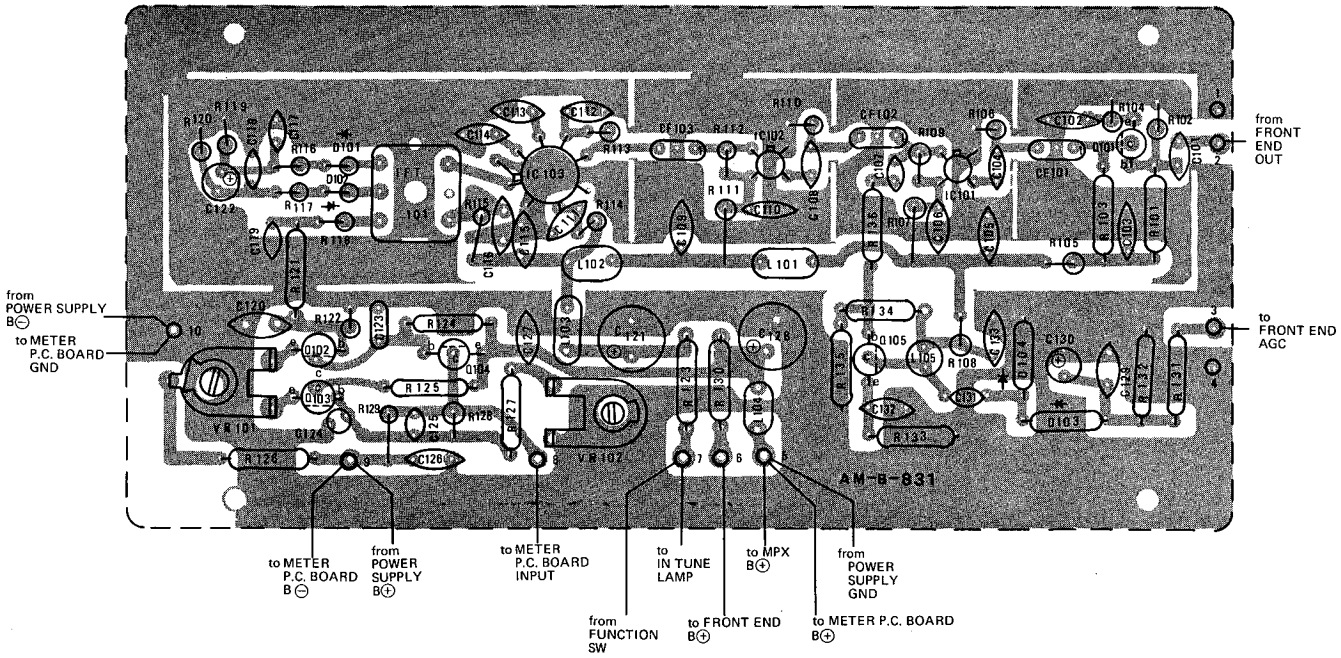
FM FRONT END BOARD



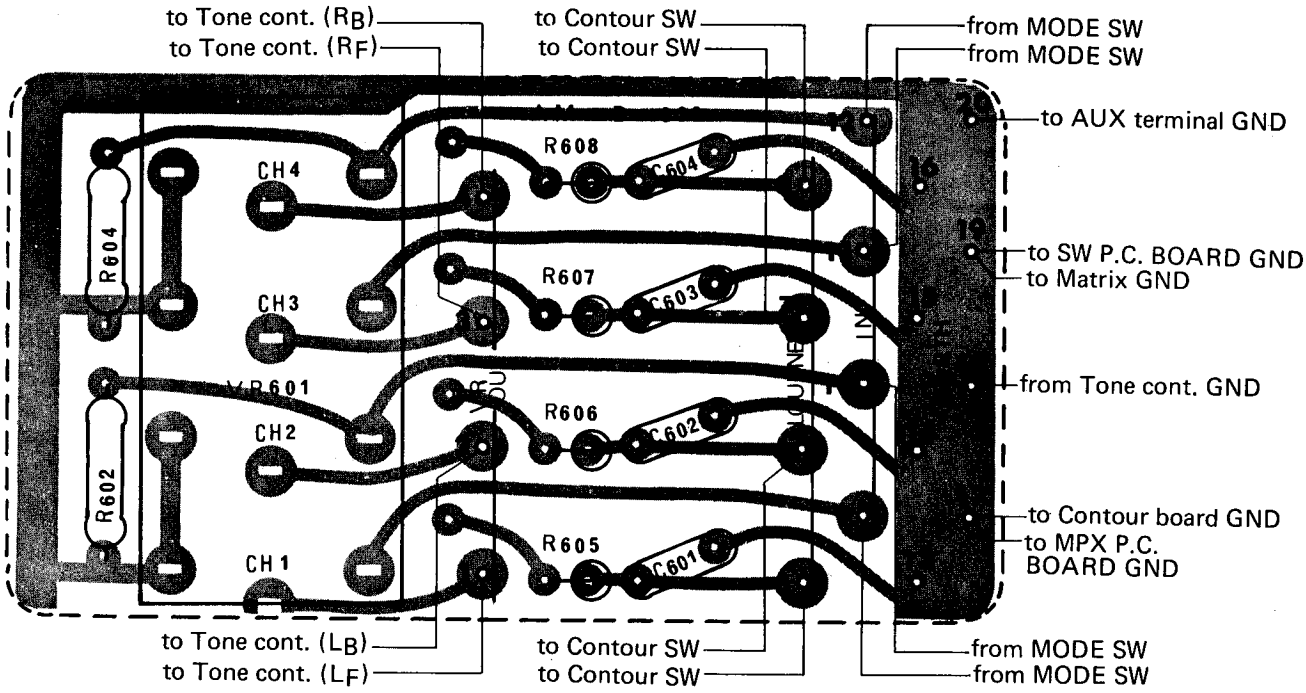
TONE CONTROL BOARD



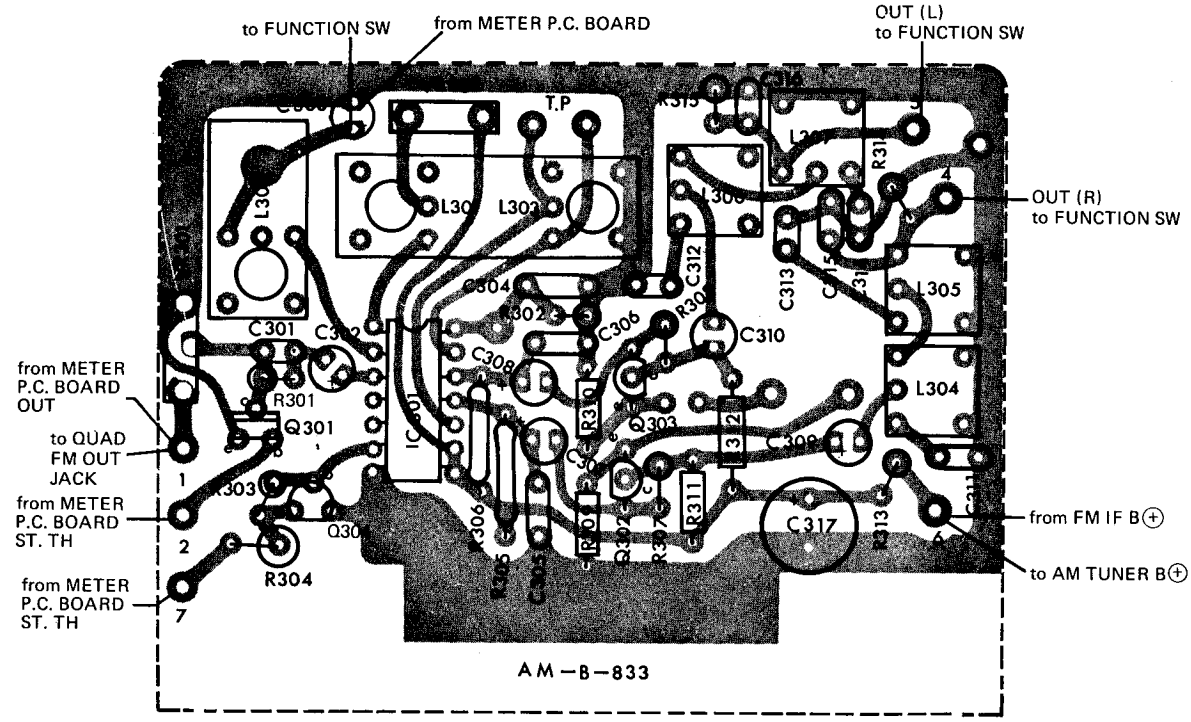
FM IF BOARD



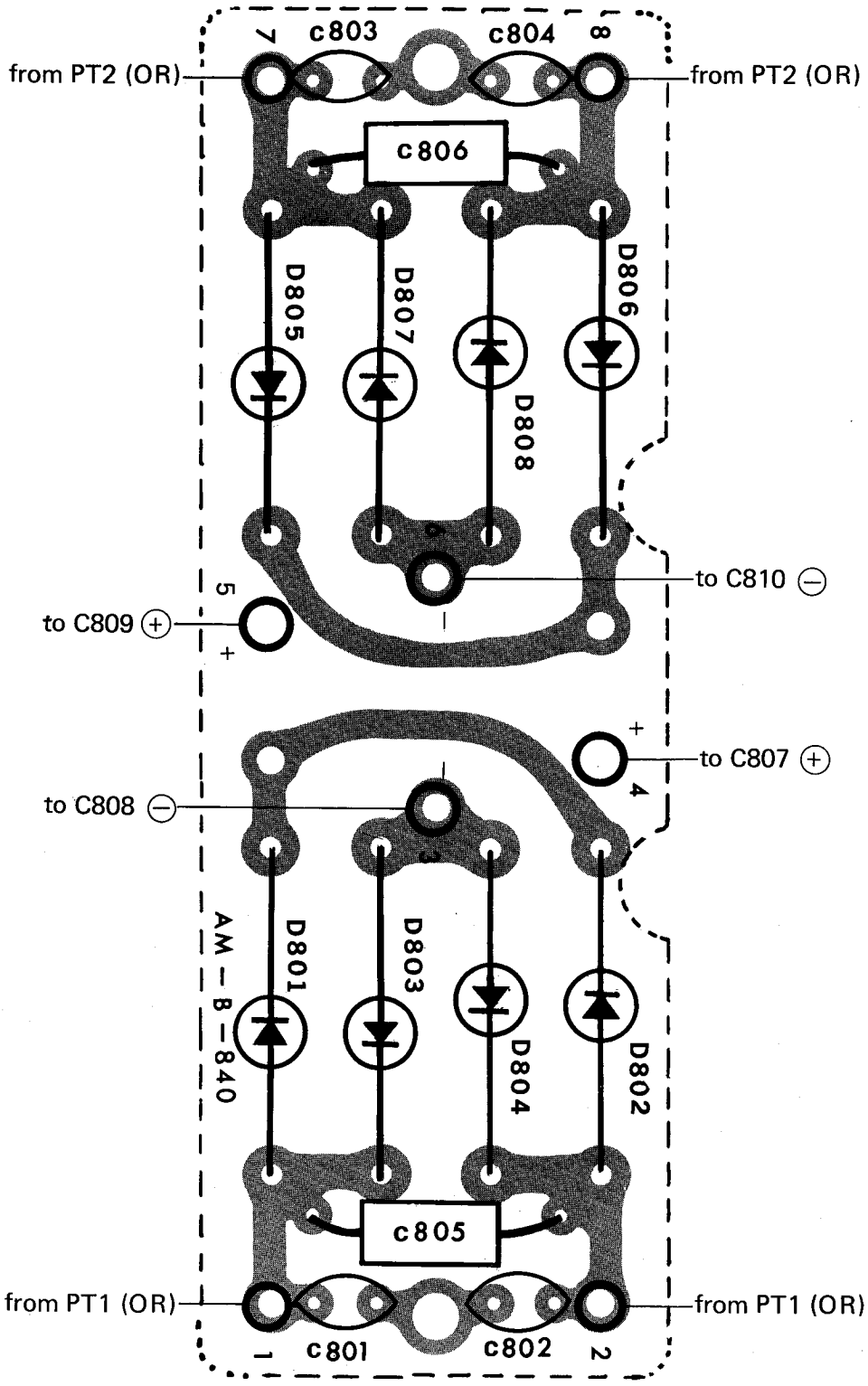
VOLUME CONTROL BOARD



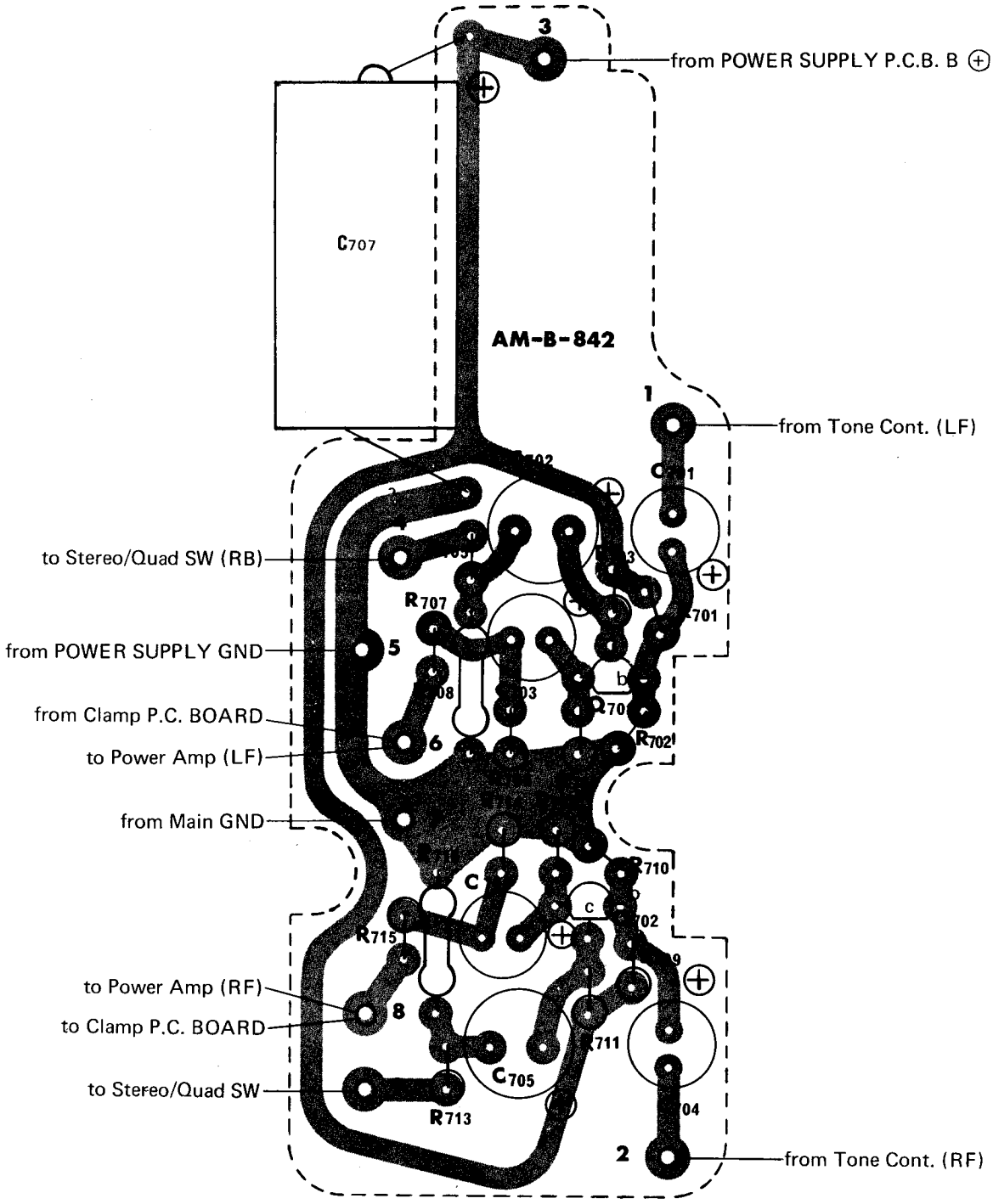
MPX BOARD



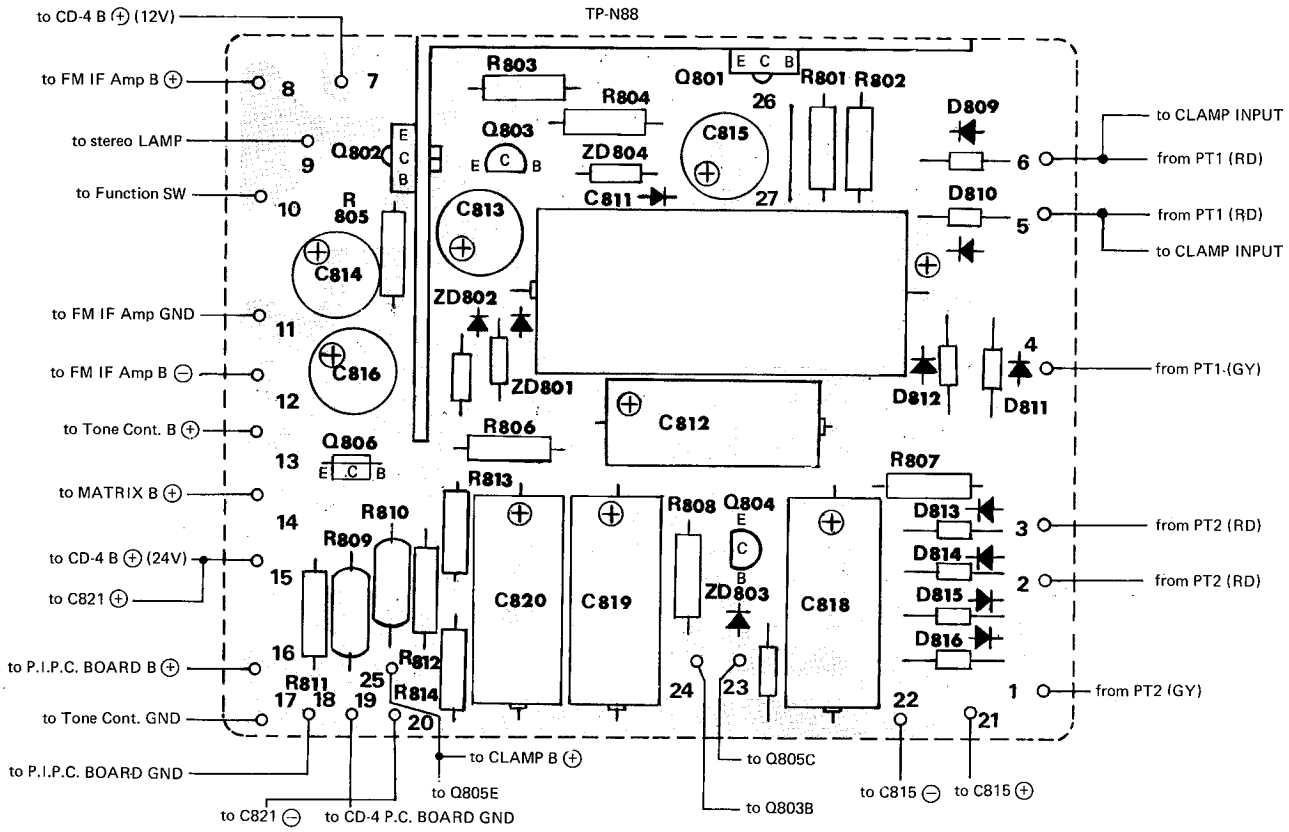
RECTIFIER BOARD



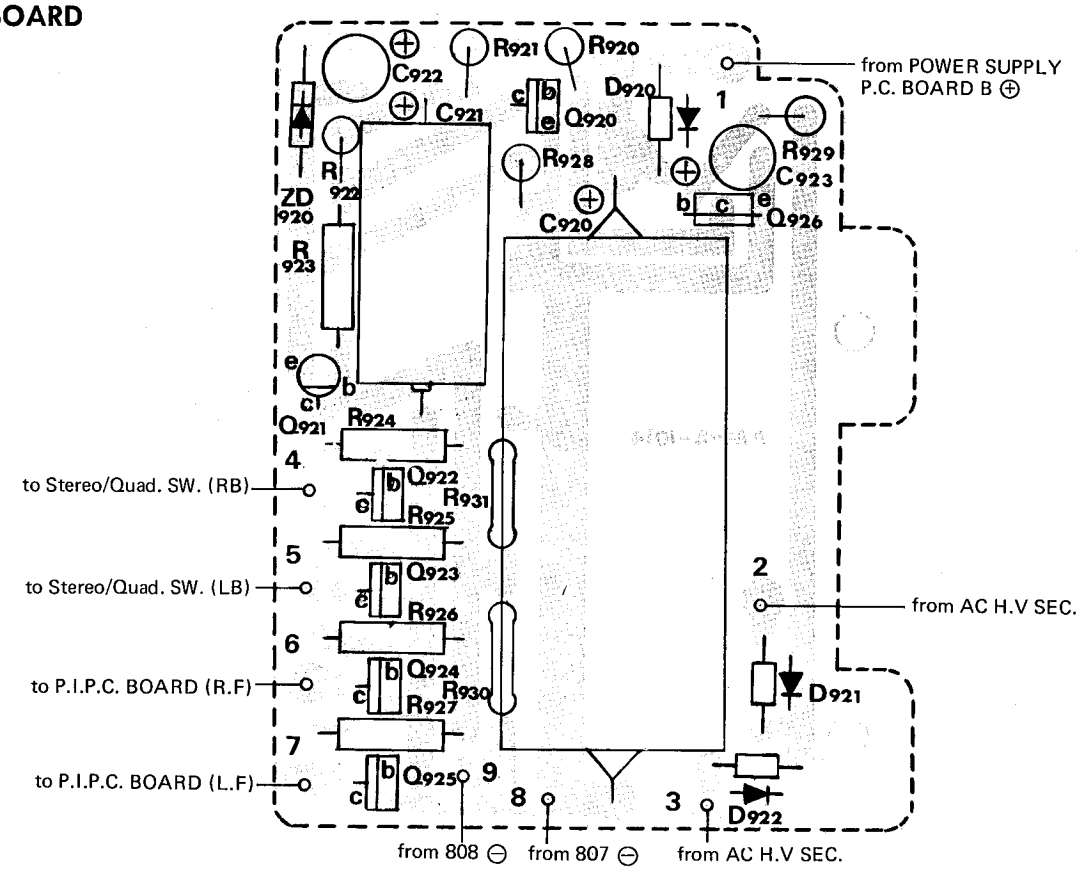
PHASE INVERTER BOARD



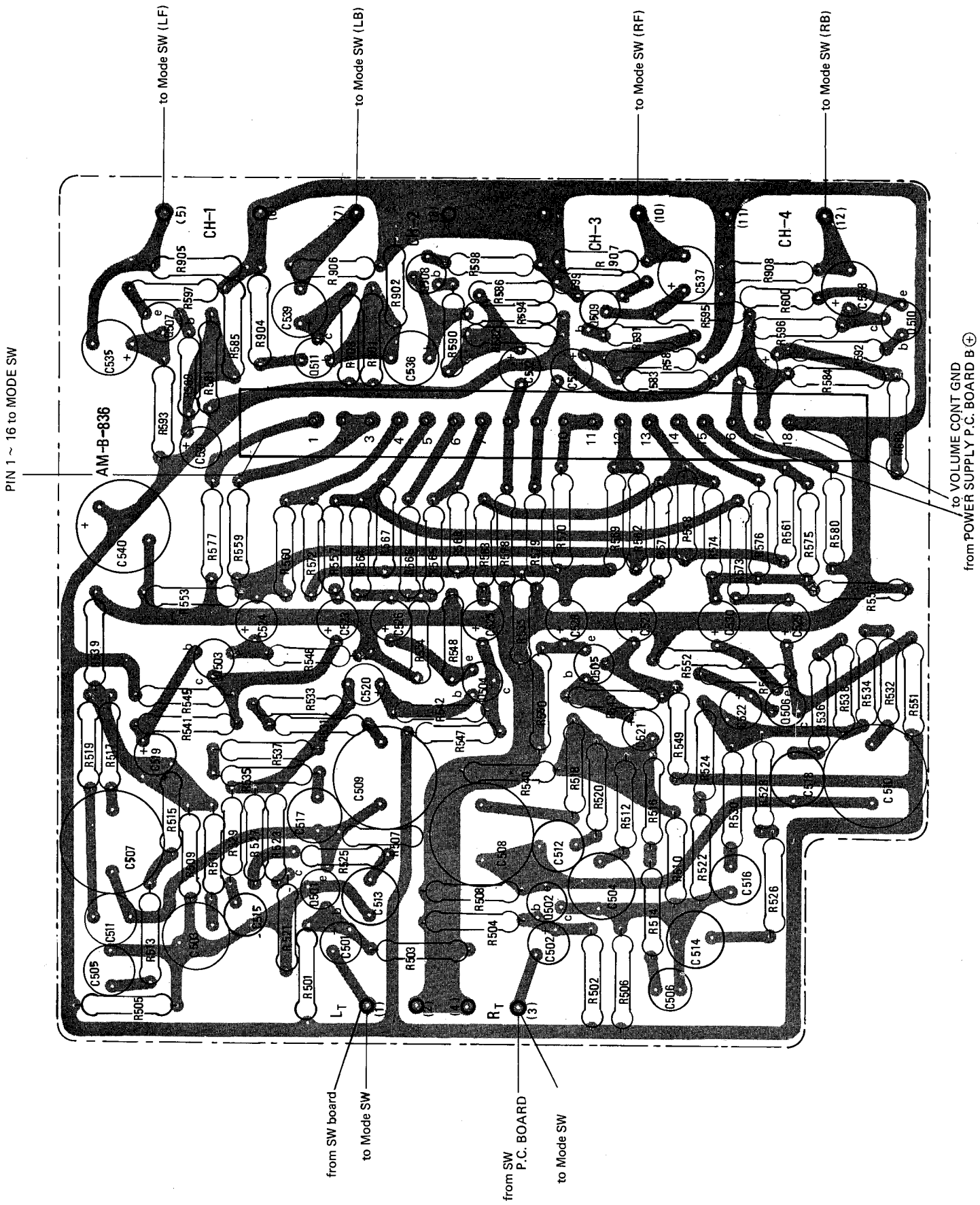
POWER SUPPLY BOARD



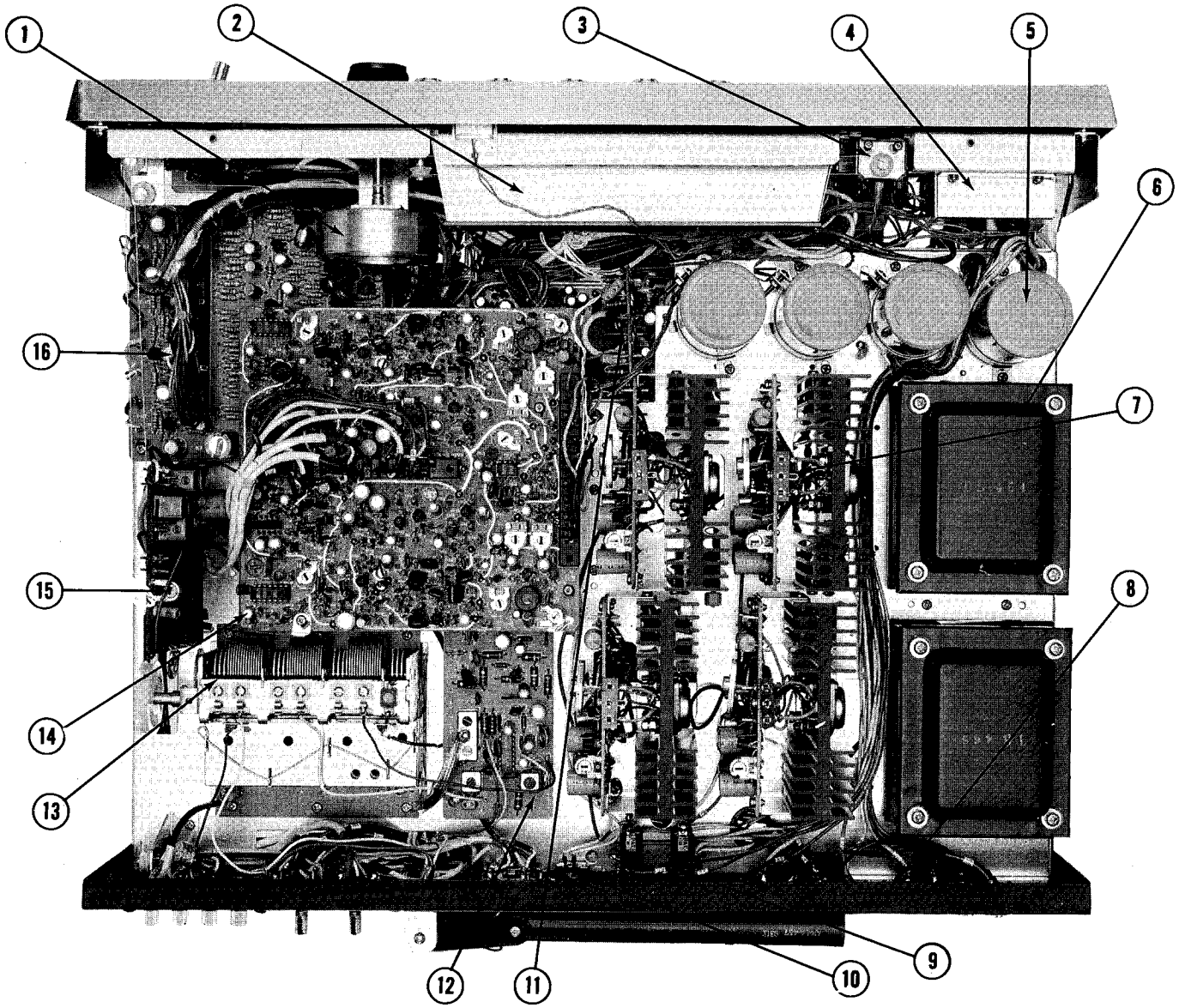
CLAMP BOARD



S.Q. MATRIX BOARD

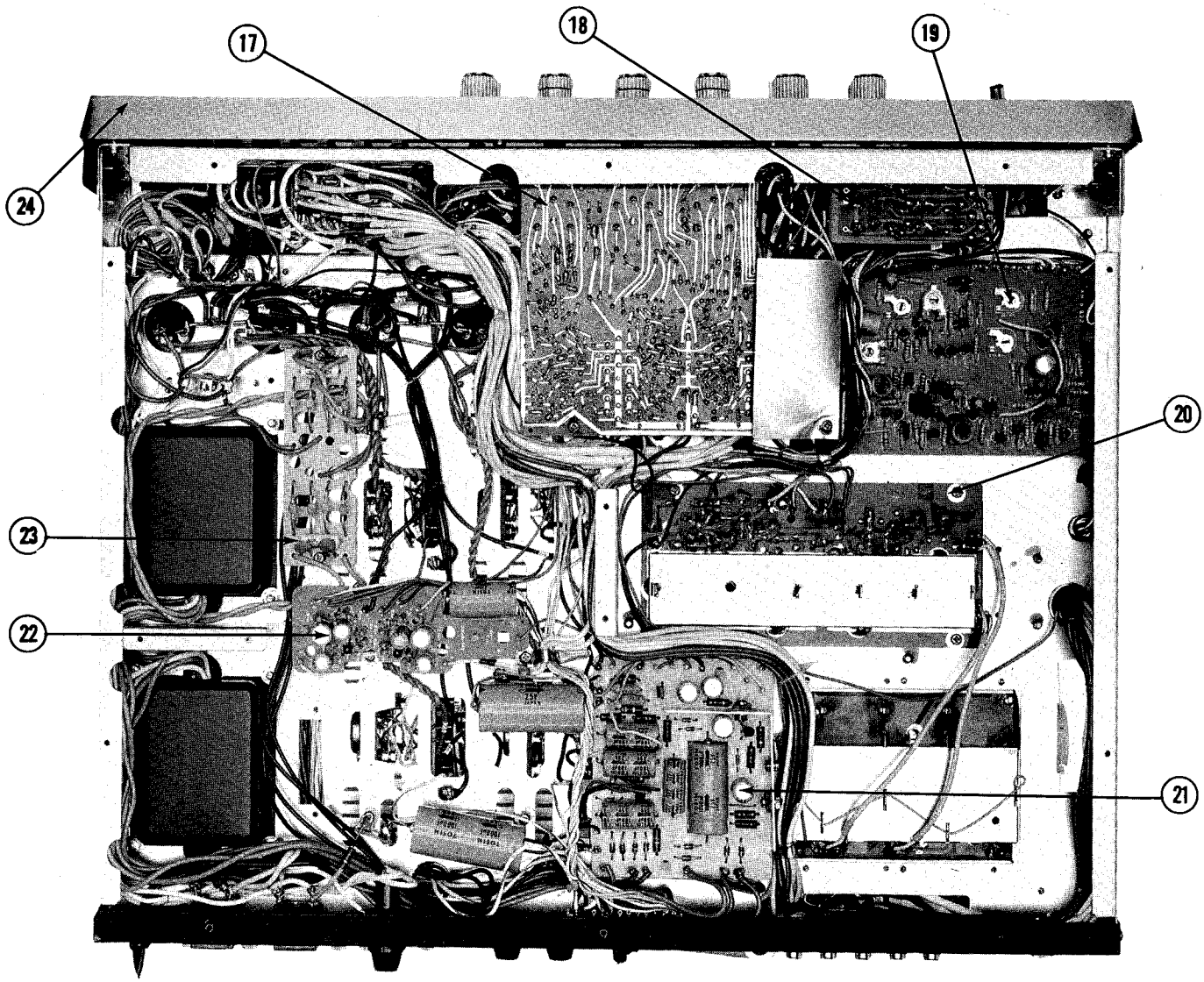


TOP VIEW



(1) FLYWHEEL
(2) DIAL LAMP HOUSING
(3) IN TUNE, & STEREO INDICATOR LAMPS
(4) FM QUIETING METER
(5) 6800μF 50V CAPACITORS (4)
(6) POWER TRANSFORMERS (2)
(7) POWER AMPLIFIERS (4) AM-B-836
(8) SPEAKERS TERMINAL BOARD
(9) SPEAKER FUSES
(10) MUTE ADJUSTMENT VR204
(11) CLAMP P.C.B. AM-B-1014
(12) AM TUNER P.C.B. AM-B-834
(13) VARIABLE CONDENSER
(14) CD-4 P.C.B. AM-B-1013
(15) MPX P.C.B. AM-B-833
(16) SQ MATRIX P.C.B. AM-B-836

BOTTOM VIEW



(17) TONE CONTROL P.C.B. AM-B-1002

(18) VOLUME CONTROL P.C.B. AM-B-838

(19) QUIETING METER P.C.B. AM-B-832

(20) FM - IF P.C.B. AM-B-831

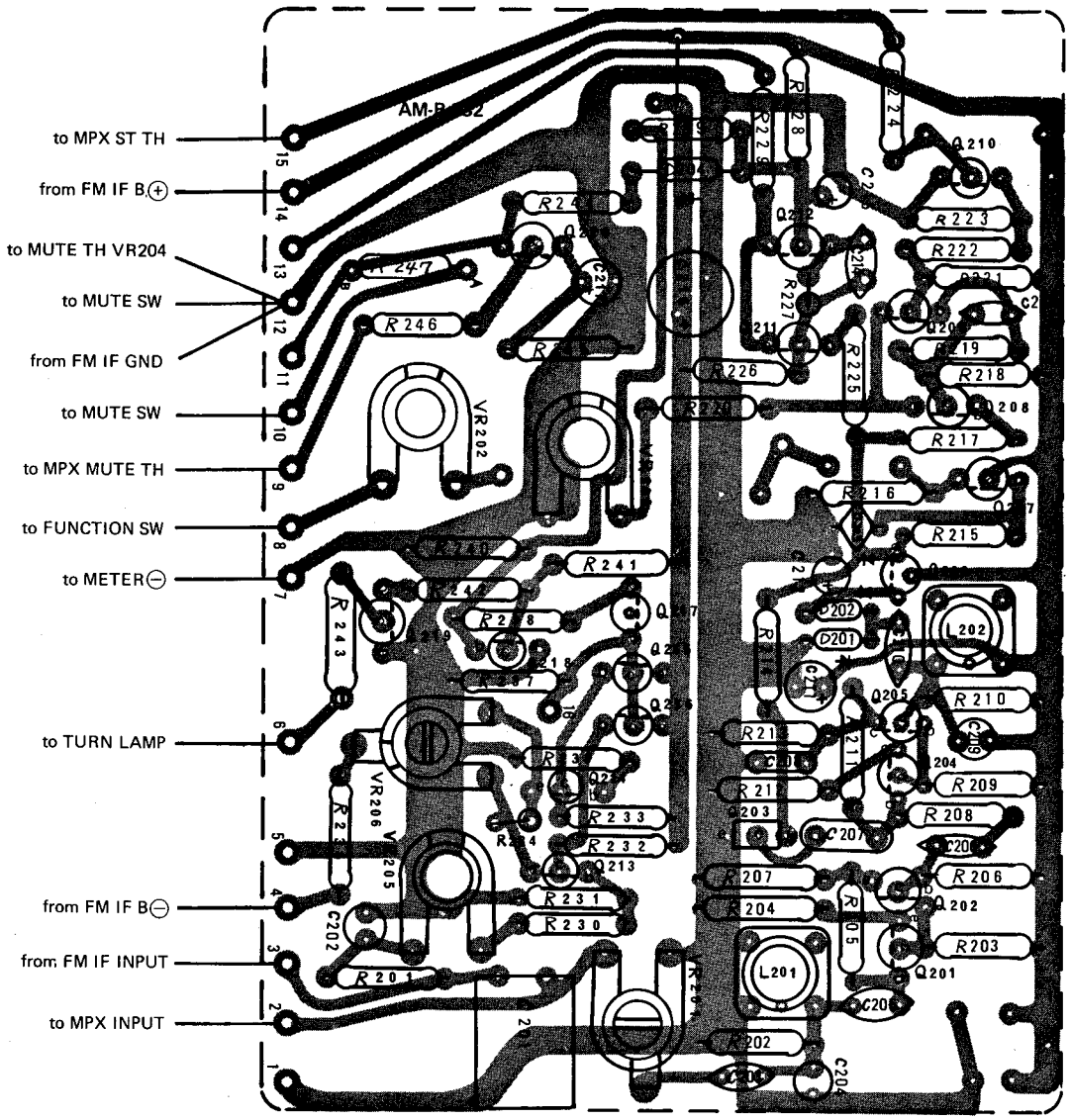
(21) POWER SUPPLY P.C.B. AM-B-1015

(22) PHASE INVERTER P.C.B. AM-B-842

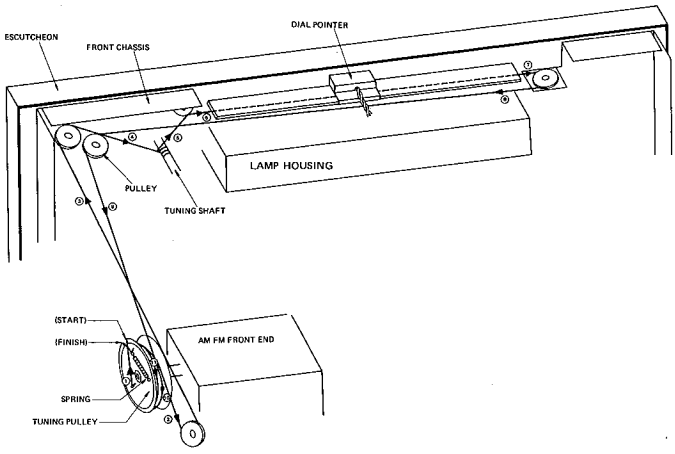
(23) RECTIFIER P.C.B. AM-B-840

(24) FRONT PANEL

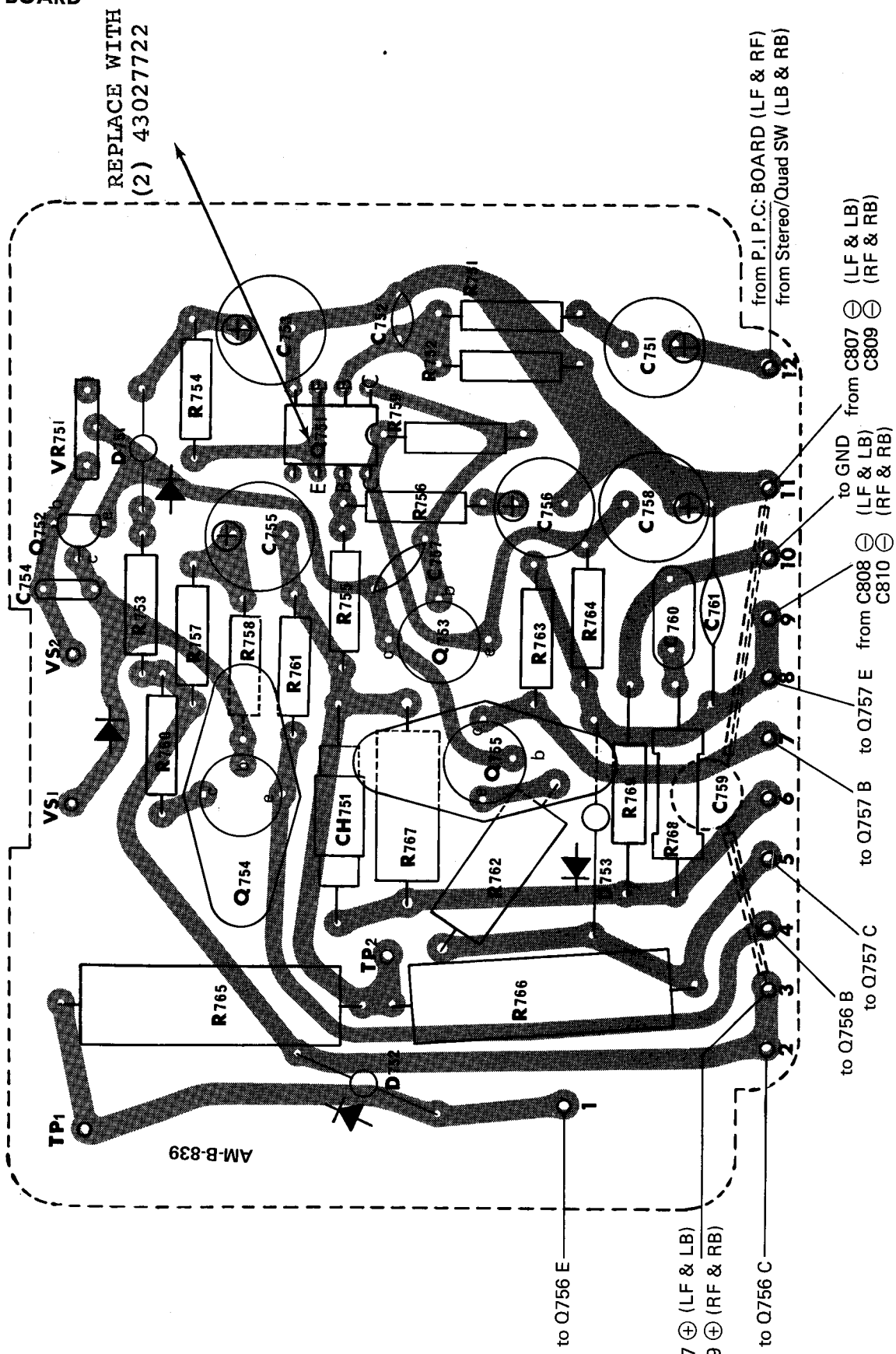
QUIETING METER BOARD



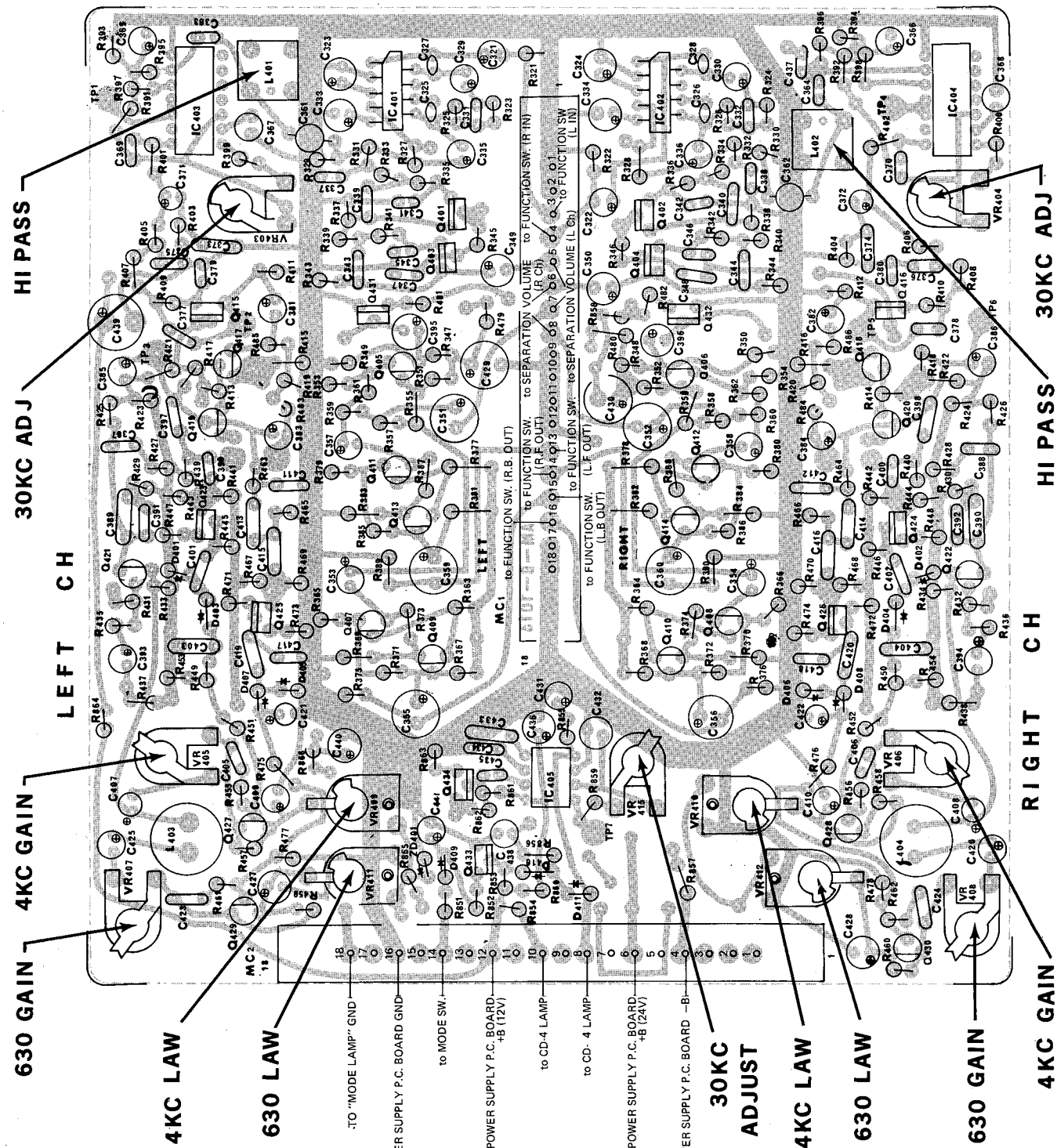
STRINGING DIAGRAM



POWER AMP BOARD



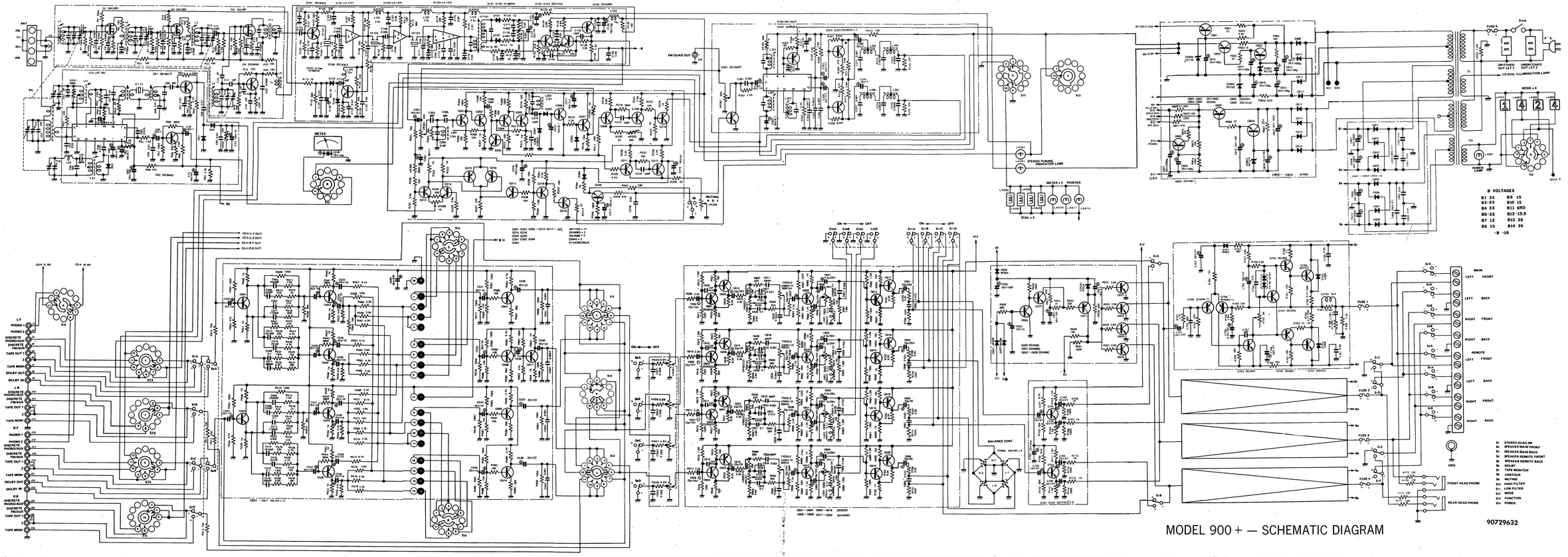
EQUALIZER CD-4 BOARD



REPLACEMENT PARTS LIST

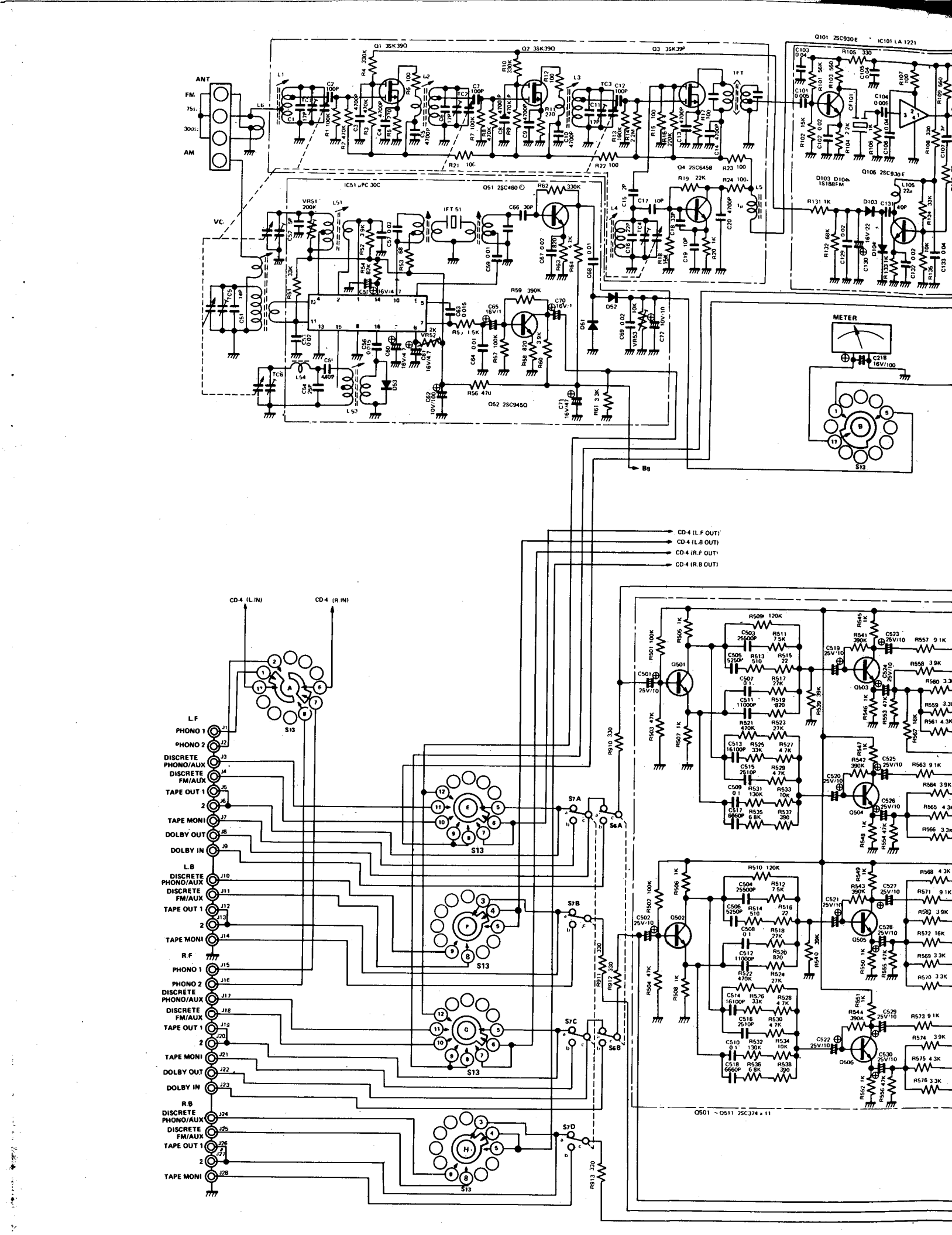
REF. NO.	H-K PART NO.	DESCRIPTION
FM FRONT END AM-B-830		
L1	12029043	Antenna Coil (75 ohm)
L2,3	12029044	Tuning Coil (2½ Turns)
L4	12029045	Oscillator Coil (1¾ Turns)
L5		Choke Coil, 1μH
L6	12029046	Choke Coil, 2.2μH
IFT	11029041	Transformer, I.F. 10.7MHz
Q1,2,3	43029381	Transistor, FET 2SK39Q,P,M
Q4	43029380	Transistor, NPN 2SC645B-M
AM TUNER AM-B-834		
L51	12029047	Coil, BAR Antenna
L52	12029048	Coil, Tuning
L53	12029049	Coil, Oscillator
L54	12029046	Coil, Choke 2.2μH
IFT51	11029040	Transformer, IF
IC51	43129354	I.C.,PC30C
VR51	23528996	Pot., 200K Type "B"
VR52	23528997	Pot., 2K Type "B"
VR53	23528998	Pot., 10K Type "B" (VR-470)
Q51	43025972	Transistor, NPN 2SC460
Q52	43025972	Transistor, NPN 2SC945Q
D51,52,53	41029009	Diode, IN34A
FM-IF AM-B-831		
L101,102,103	12029046	Coil, Choke 27μL
L104	12029050	Coil, Choke 15μH
L105	12029051	Coil, Choke 22μH
IFT101	11029042	Transformer, I.F. (13mm/10.7kHz
IC101-103	43128741	I.C.,LA1221
VR101	23528999	Pot., 1K Type "B"
VR102	23529001	Pot., 20K Type "B"
Q101,105	43025972	Transistor, NPN 2SC930E
Q102,103	43025972	Transistor, NPN 2SC715G
Q104	43027722	Transistor, PNP 2SA608G
D101-104	41628750	Diode, 1S188FM
QUIETING METER BOARD AM-B-832		
L201,202	12029052	Coil, (10mm/3μH)
VR201	23529002	Pot., 10K Type "B"
VR202,206	23528998	Pot., 10K Type "B"
VR203	23529003	Pot., 200 ohm Type "B"
Q201,202, 204-214	43025972	Transistor, NPN 2SC715G
Q215,216	43027722	Transistor, PNP 2SA608G
Q203,220	43025972	Transistor, NPN 2SC458B
D201,202, 203,204	41622859	Diode Silicon IN4154
MPX AM-B-833		
IC301	43126551	IC, LM-1307
L301,303	12029057	Coil,Tuning MPX38KHz
L302	12029058	Coil, Tuning Filter 19KHz
L305-307	12029054	Coil, Tuning MPX 38KHz

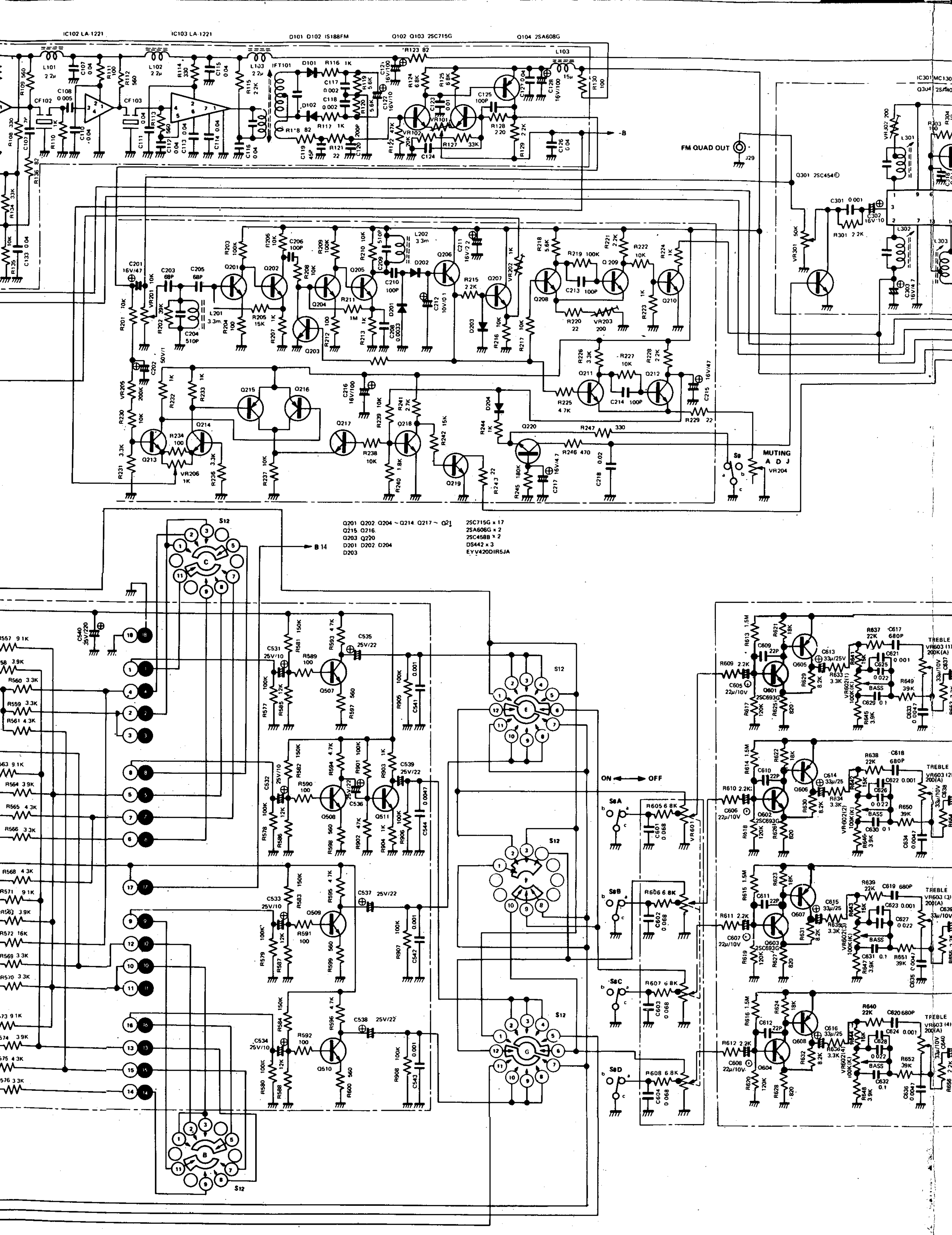
REF. NO.	H-K PART NO.	DESCRIPTION
MPX AM-B-833 (continued)		
L304,306	12029053	Coil, Tuning Filter 19KHz
VR301	23529004	Pot., 50K Type "B"
VR302	23529373	Pot., 500 Type "B"
Q301	43025972	Transistor, NPN 2SC454CM
Q302,303	43025972	Transistor, NPN 2SC945Q
Q304	43027722	Transistor, PNP 2SA509Y
SQ MARTIX AM-B-836		
Q501-511	43025972	Transistor, NPN 2SC374BL
VOLUME, TONE CONTROL BOARD AM-B-838		
VR60L	23028992	Pot., 100K—Volume (Type "B")
VR602	23028993	Pot., 100K—Bass (Type "K")
VR603	23028994	Pot., 200K—Treble (Type "A")
VR604	23028995	Pot., 20K—Mid-Range (Type"B")
VR605	00229000	Pot., 50K Balance (Type "W")
L601-604	12029055	Coil Choke 200mH
Q601-604, 609-616	43025972	Transistor, NPN 2SC693G
Q605-608, 617-620	43025972	Transistor, NPN 2SC763 (WL4,5)
PHASE INVERTER AM-B-842		
Q701-702	43025972	Transistor, NPN 2SC715G
POWER AMPLIFIER BOARD AM-B-839		
VR751	23529003	Pot., 5K Type "B"
Q758,759	43027722	Transistor, PNP 2SA640
Q753	43026284	Transistor, NPN 2SC959L
Q754	43026284	Transistor, NPN 2SC960L
Q755	43026285	Transistor, PNP 2SA607L
Q756,757	43024216	Transistor, NPN 2SD322K
D751	41028522	Diode, W06A
D752,753	41029377	Diode, V06B
HV46	38129008	Varistor, HV-46 (Red)
CH751	12029056	Coil, Choke 30μH
RECTIFIER BOARD AM-B-840		
D801-808	41029014	Diode, U05B 3A200
POWER SUPPLY AM-B-1015		
D809-816	41029015	Diode, Silicon, W06B 2A100
ZD801,802	42029017	Diode,Zener WZ162 16.2V 500mW 5%
ZD803	42029018	Diode, Zener WZ310 31.0V 500MW 5%
D804	41028606	Diode, Silicon HZ12H 12.5V 400MW 10%
Q801,802	43027213	Transistor NPN 2SC1368C,M
Q803,804	43025972	Transistor NPN 2SC945R,Q,or S
Q805	43027213	Transistor NPN 2SD234Y
Q806	43025972	Transistor NPN 2SC1213C,D
T1,T2	10129385	Transformer, Multivoltage, Export
T1,T2	10129366	Transformer, Power-Am-TS-465

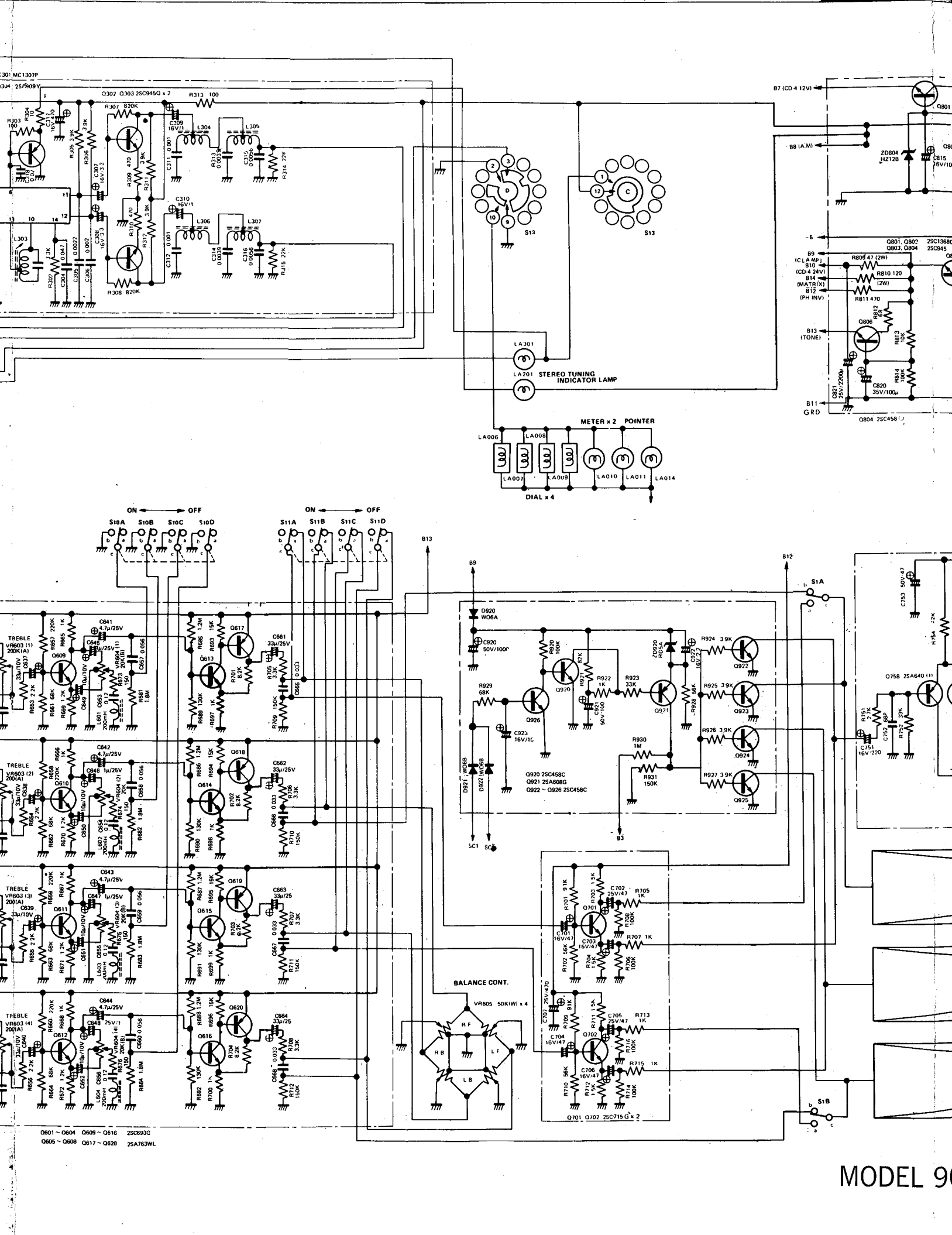


MODEL 900 + — SCHEMATIC DIAGRAM

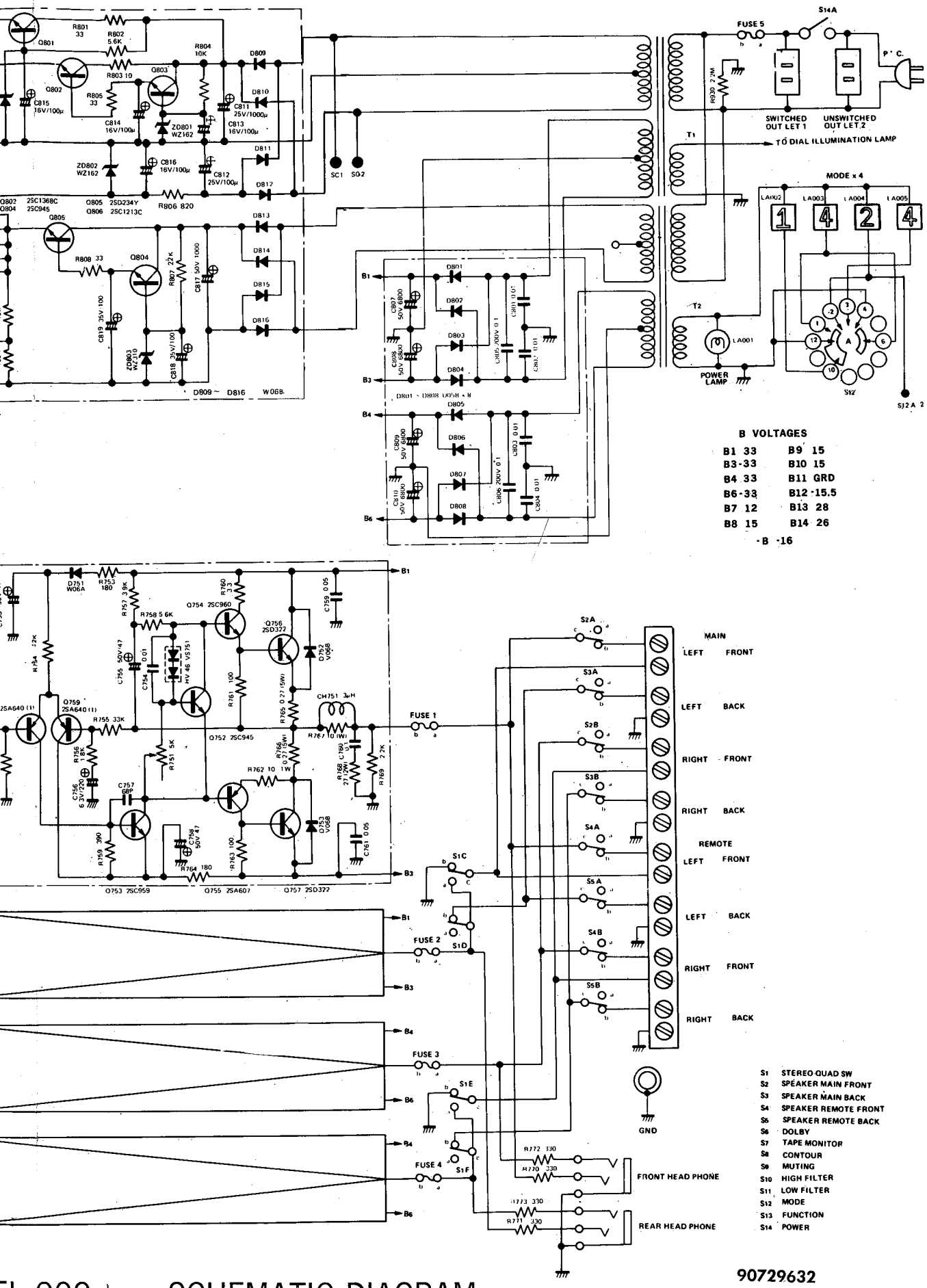
90729632


ANT
FM
75Ω
300Ω
AM
Q1 3SK39Q
Q2 3SK39Q
Q3 3SK39P
Q101 2SC930E
IC101 LA 1221
Q105 2SC930E
D103 D104 1S188FM
IC51 μPC 30C
Q51 2SC460
Q4 2SC6458
Q52 2SC945Q
VC
METER
CD-4 (L.F OUT)
CD-4 (L.B OUT)
CD-4 (R.F OUT)
CD-4 (R.B OUT)
CD-4 (L.IN)
CD-4 (R.IN)
L.F
PHONO 1
PHONO 2
DISCRETE PHONO/AUX
DISCRETE FM/AUX
TAPE OUT 1
2
TAPE MONI
DOLBY OUT
DOLBY IN
L.B
R.F
R.B
S13
S7A
S7B
S7C
S7D
S6A
S6B
Q501 ~ Q511 2SC374 x 11
Q501
Q502
Q503
Q504
Q505
Q506


IC102 LA-1221
IC103 LA-1221
D101 D102 IS188FM
Q102 Q103 2SC715G
Q104 2SA608G
IC301 MC130
FM QUAD OUT
J29
Q301 2SC454©
-B
MUTING
A D J
VR204
Q201 Q202 Q204 ~ Q214 Q217 ~ Q21
Q215 Q216
Q203 Q220
D201 D202 D204
D203
2SC715G x 17
2SA608G x 2
2SC458B x 2
DS442 x 3
EYV420DIR5JA
B 14
S12
ON ← → OFF
S8A
S8B
S8C
S8D
TREBLE
BASS


Q302 Q303 2SC945Q x 2
R313 100
R307 820K
R308 820K
L304
L305
L306
L307
C309 16V/1
C310 16V/1
S13
S13
LA301
LA201 STEREO TUNING INDICATOR LAMP
METER x 2 POINTER
LA006
LA008
LA007
LA009
LA010
LA011
LA014
DIAL x 4
Q801, Q802 2SC1368
Q803, Q804 2SC945
R809 47 (2W)
R810 120 (2W)
R811 470
R812 68
R813 10K
R814 100K
Q806
C820 35V/100μ
C821 25V/2200μ
B7 (CD-4 12V)
B8 (AM)
B9 (CLAMP)
B10 (CD-4 24V)
B11 GRD
B12 (PH INV)
B13 (TONE)
Z0804 HZ12B
C815 16V/10
Q804 2SC458
ON OFF
S10A S10B S10C S10D
S11A S11B S11C S11D
TREBLE VR603 (1) 200K(A)
TREBLE VR603 (2) 200(A)
TREBLE VR603 (3) 200(A)
TREBLE VR603 (4) 200(A)
C641 4.7μ/25V
C642 4.7μ/25V
C643 4.7μ/25V
C644 4.7μ/25V
C645 1μ/25V
C646 1μ/25V
C647 1μ/25V
C648 1μ/25V
C661 33μ/25V
C662 33μ/25V
C663 33μ/25
C664 33μ/25
Q617
Q618
Q619
Q620
Q613
Q614
Q615
Q616
Q609
Q610
Q611
Q612
D920 WO6A
C920 50V/100
R920 100K
R921 82K
R922 1K
R923 33K
R924 3.9K
R925 3.9K
R926 3.9K
R927 3.9K
R928 56K
R929 68K
R930 1M
R931 150K
Q920
Q921
Q922
Q923
Q924
Q925
Q926
C922 16V/22
C923 16V/10
C924 50V/100
D921 WO6B
D922 WO6B
D923 RD5A
Q920 2SC458C
Q921 2SA608G
Q922 ~ Q926 2SC458C
S1A
S1B
B3
SC1
SC2
BALANCE CONT.
VR605 50K(W) x 4
RF
RB
LF
LB
Q701 Q702 2SC715 G x 2
Q601 ~ Q604 Q609 ~ Q616 2SC693G
Q605 ~ Q608 Q617 ~ Q620 2SA763WL
Q758 2SA640 (1)

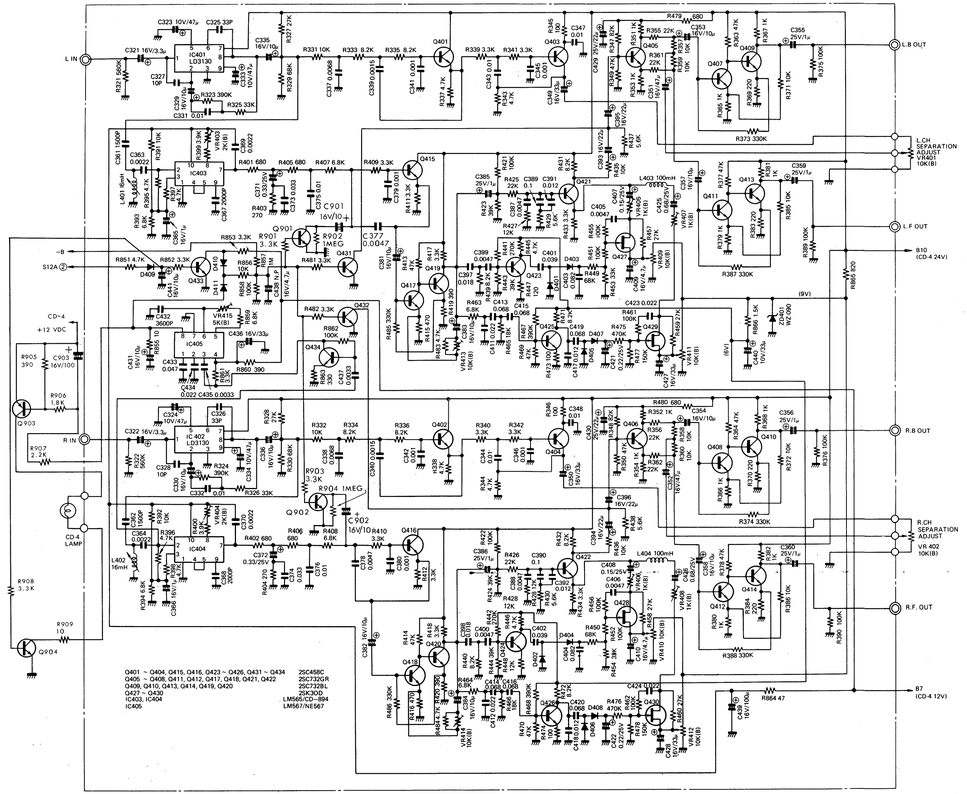
MODEL 9



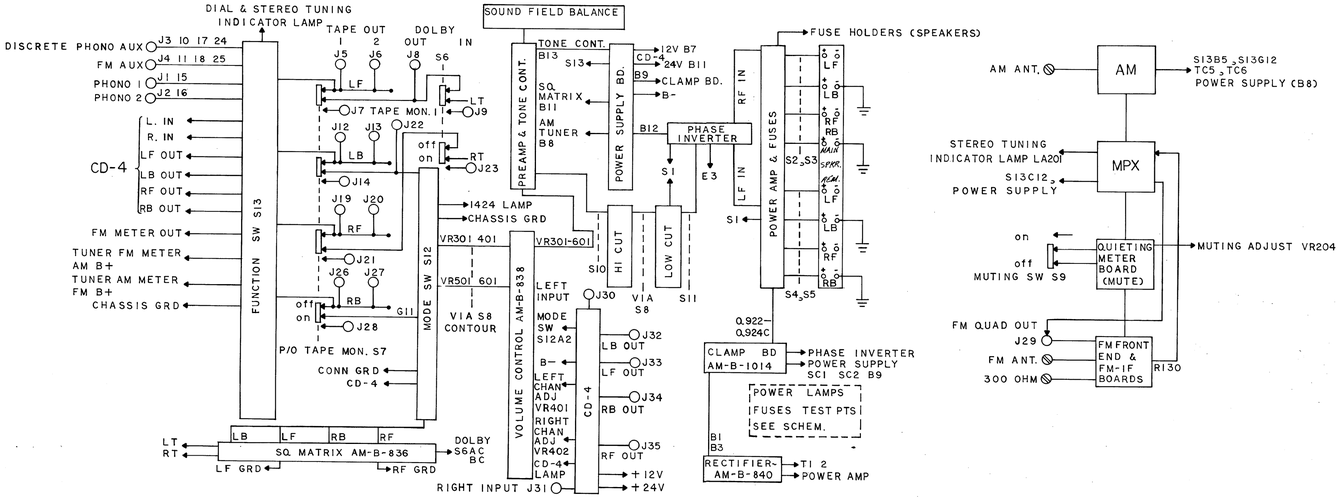
90729632

EL 900 + — SCHEMATIC DIAGRAM

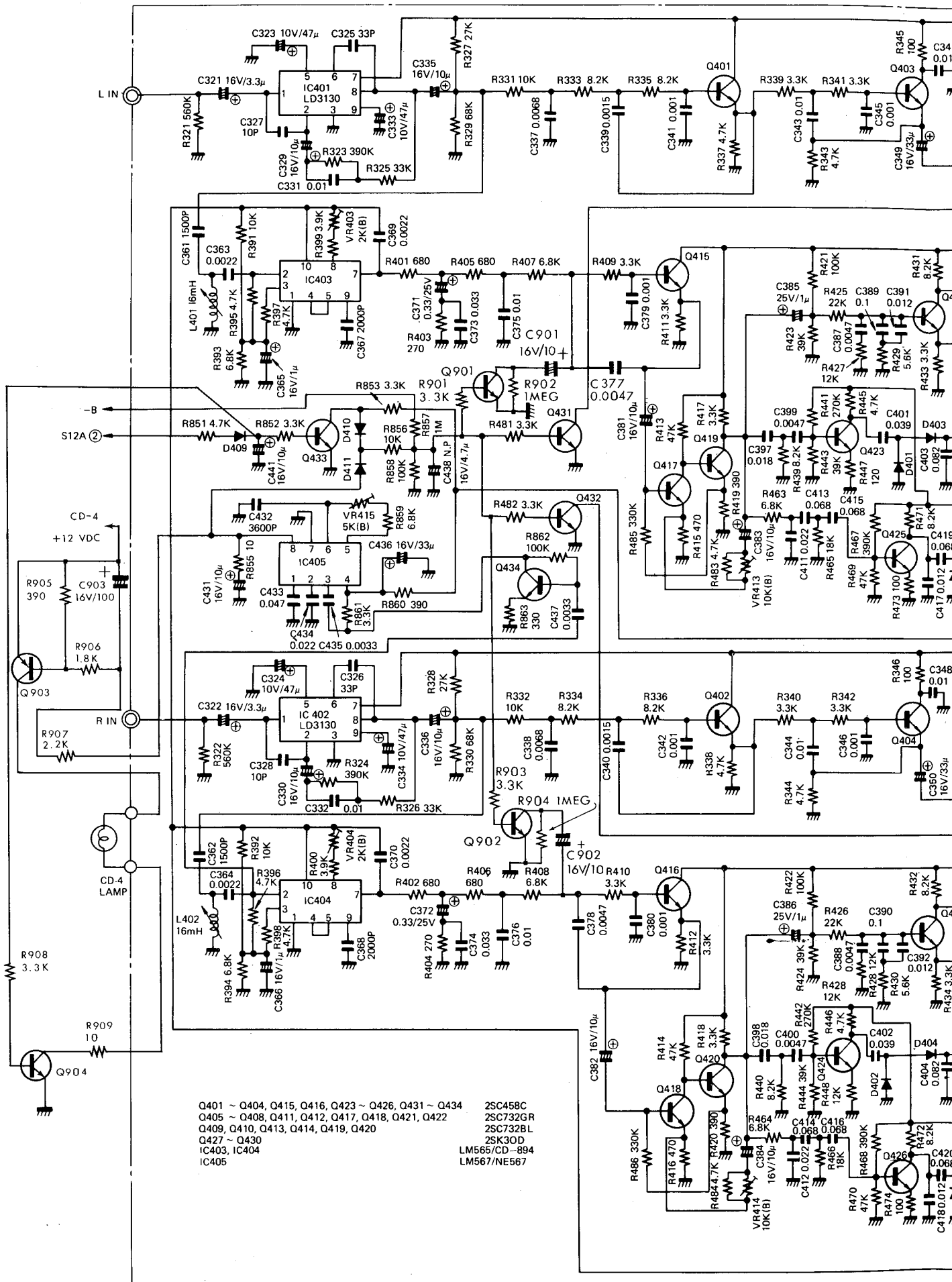
MODEL 900 + — CD-4 SCHEMATIC

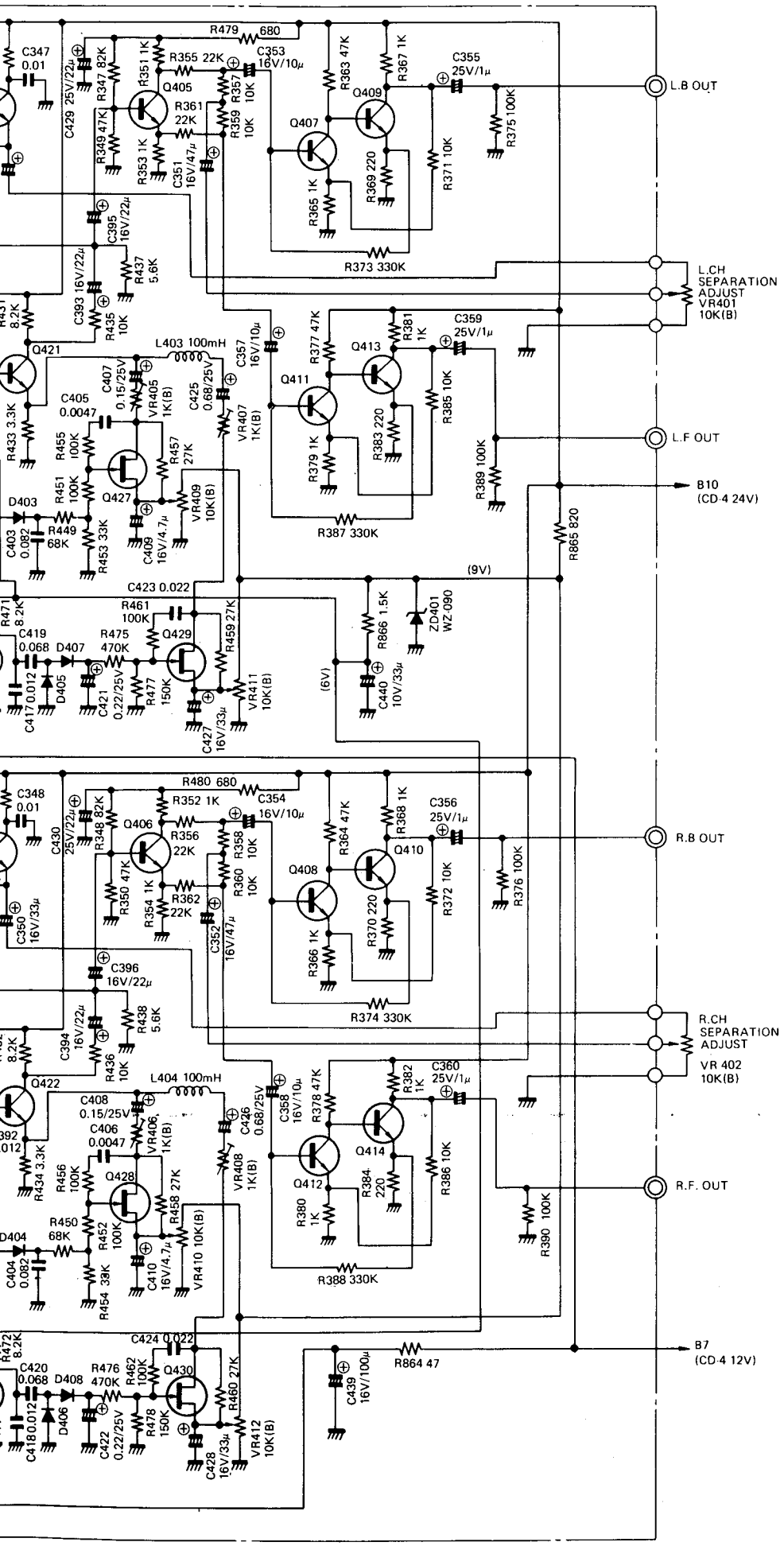


MODEL 900 + — BLOCK DIAGRAM



MODEL 900+ — CD-4 SCHEMATIC





MODEL 900 +

DISCRETE PHONO A

FM A

PHONO

PHONO

CD-4

FM ME

TUNER F

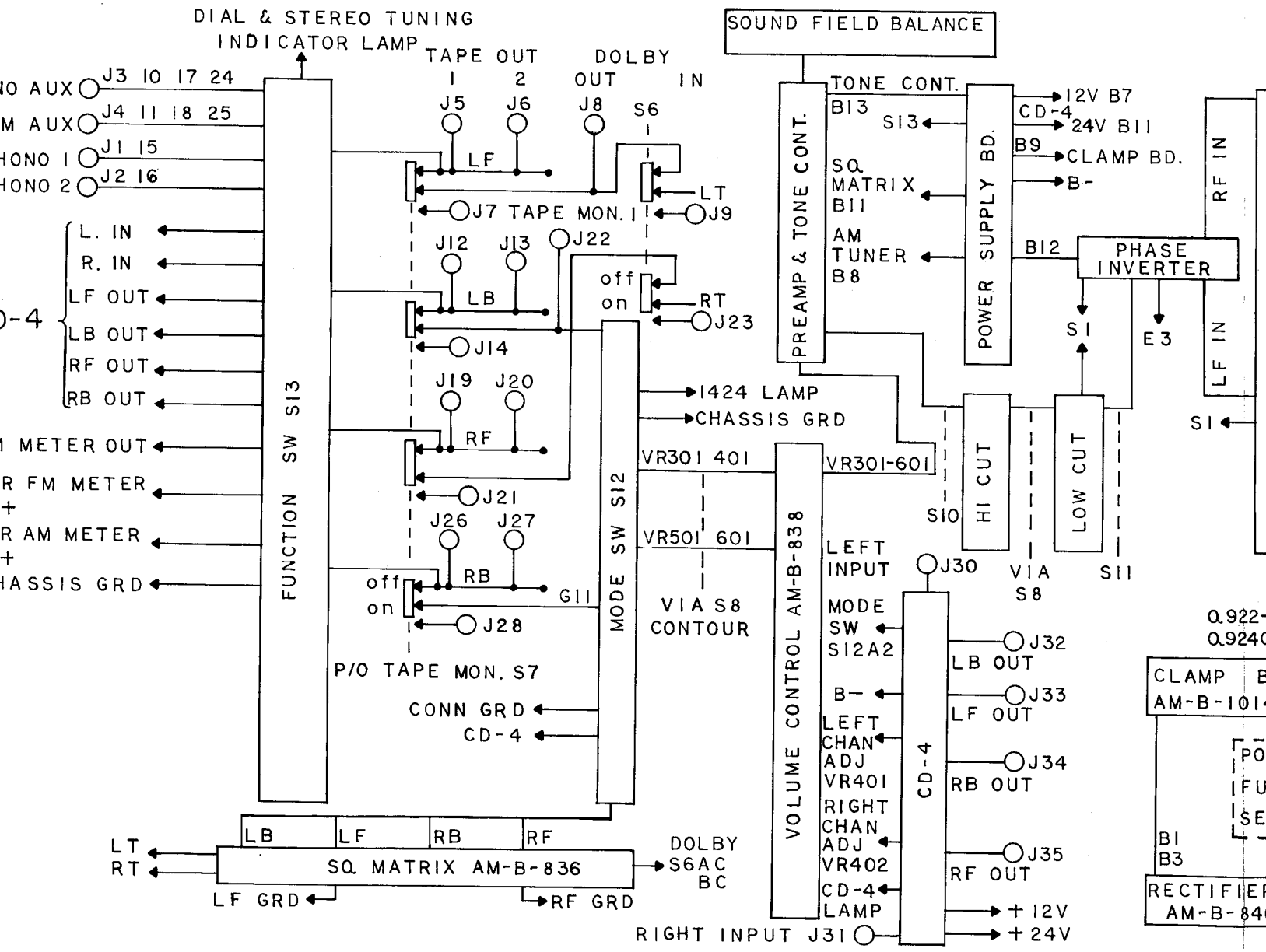
AM B+

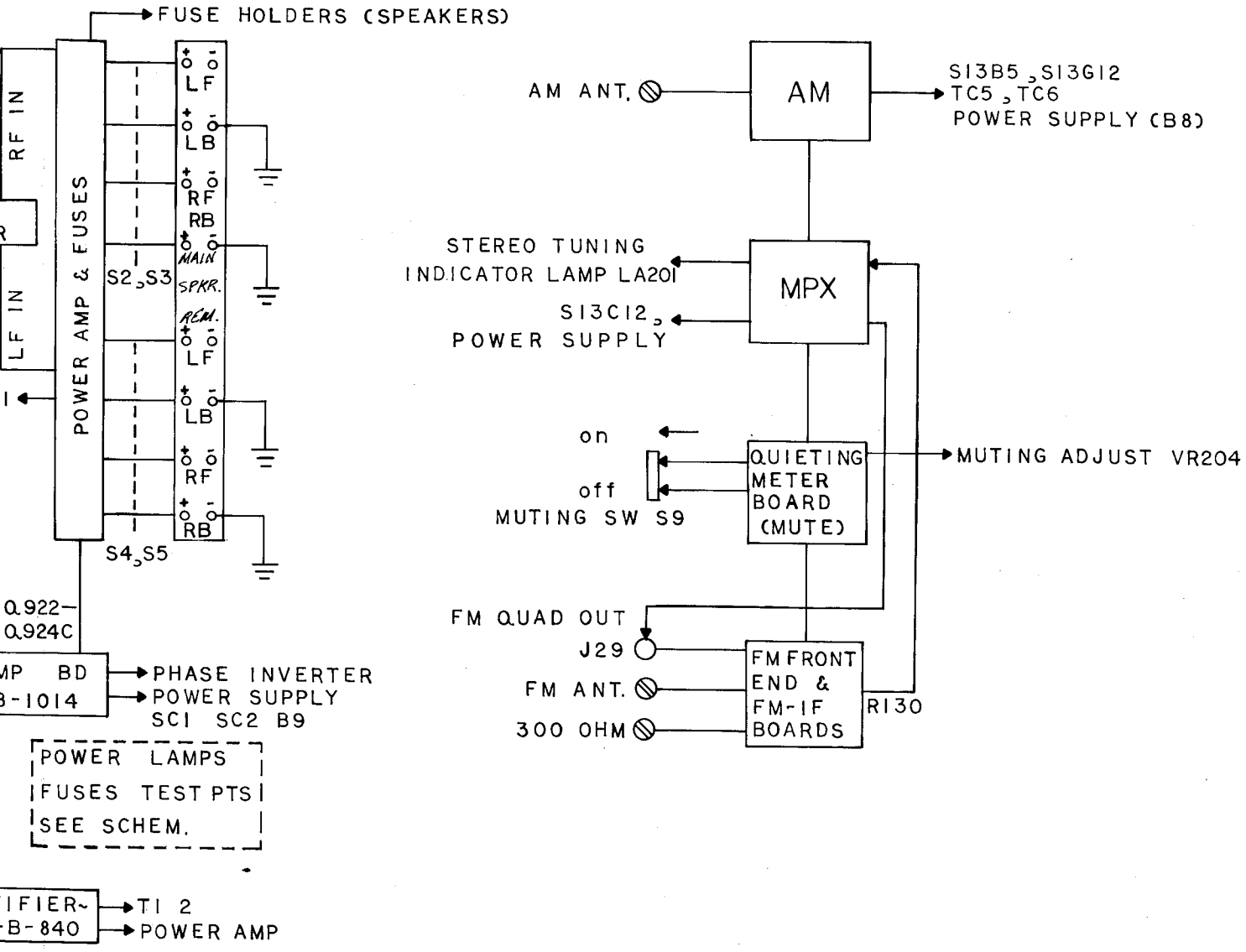
TUNER AM

FM B+

CHAS

0 + — BLOCK DIAGRAM




FUSE HOLDERS (SPEAKERS)
RF IN
LF IN
POWER AMP & FUSES
LF
LB
RF
RB
MAIN SPKR.
REM.
S2, S3
S4, S5
Q922–
Q924C
MP BD
B-1014
PHASE INVERTER
POWER SUPPLY
SC1 SC2 B9
POWER LAMPS
FUSES TEST PTS
SEE SCHEM.
IFIER~
-B-840
TI 2
POWER AMP
AM ANT.
AM
S13B5, S13G12
TC5, TC6
POWER SUPPLY (B8)
STEREO TUNING
INDICATOR LAMP LA201
S13C12,
POWER SUPPLY
MPX
on
off
MUTING SW S9
QUIETING
METER
BOARD
(MUTE)
MUTING ADJUST VR204
FM QUAD OUT
J29
FM ANT.
300 OHM
FM FRONT
END &
FM-IF
BOARDS
R130

REF. NO.	H-K PART NO.	DESCRIPTION
CLAMP BOARD AM-B-1014		
D920	41028522	Diode, W06A
ZD920	42029013	Diode, Zener 5V RD5A
D921,922	41029015	Diode, Silicon, W06B 2A100
Q920,922-926	43025972	Transistor, NPN 2SC458C
Q921	43027722	Transistor, PNP 2SA608G
900+ CD-4 BOARD AM-B-1013		
L401,402	12029375	Coil, 16mH 10m/n
L403,404	12029376	Coil, 100mH 12ϕ
ZD401	41629374	Diode, Zener, WZ090 9.0V 500mW 5%
VR403,404	23528997	Pot, 2K Type "B"
VR405,406 407,408	23528999	Pot, 1K Type "B"
VR409,410, 411,412, 413,414	23529002	Pot, 10K Type "B"
VR415	23529370	Pot, 5K Type "B"
IC401,402	43128767	I.C., LD3130
IC403,404	43128917	I.C., LM565/CD-894
IC405	43128918	I.C., LM567/NE567
Q401-404, 415,416, 423-426, 431-434	43025972	Transistor, NPN 2SC458C
Q405-408, 411,412, 417,418, 421,422, 409,410, 413,414, 419,420	43025972	Transistor, NPN 2SC732G,R,L
Q427-430	43028068	Transistor, FET 2SK30D
MISCELLANEOUS		
H7201-001	63029298	Escutcheon
H7303-004	61629355	Tinted Plexiglas Plate
H7201-036	63029531	Joystick Rim
H7303-003	63029356	Front Plate
H7201-063A	60129357	Packing
H7201-004	6028904	Cover, Top (Optional)

REF. NO.	H-K PART NO.	DESCRIPTION
MISCELLANEOUS (continued)		
H7201-018/ 046A	00228709	Dial Shaft, Assy
H7201-046A	60429059	Tuning Flywheel
H7303-002	61629358	Dial Plate
H7201-016A	60728984	Dial Pointer
H7201-029	61629359	Bar Antenna Holder
H7303-011	63629360	Wooden Frame
H7303-012	63629361	Support, Wooden
H7303-014	60129362	Bottom Plate
H7303-007	63229363	Knob, Tuning
H7201-023	63229536	Knob, Volume/Mode/Function Bass/Treble/Midrange
H7201-024	63229535	Knob, Outside
H7201-025	63229534	Knob,Bass/Treble/Midrange-inside
H7201-026	63229599	Knob, Pushbutton-Gold
H7201-027	63228979	Knob,Power Switch-Red
H7303-299	90129364	Box,Carton
	65429533	Jack,Headphone
Fuse 1	45028865	Fuse, 5 amp 3AG
Fuse 1	65428716	Fuse Holder SN-1301
LA001, LA002- LA005	46529367	Lamp, Mode/Power 10v/55mA
LA301	46528980	Lamp 15v/70mA
Dial	46528903	Lamp, Dial 10V 300mA
LA010,11	46528981	Lamp 10v/150mA
S14	25029065	Switch, Pushbutton
S2,4,6,8,10	25029006	Switch, Pushbutton – Top Bank
S3,5,7,9,11	25029007	Switch, Pushbutton – Bottom Bank
S12	24029542	Switch Rotary – Mode
S13	24029441	Switch, Rotary – Function
S1	24529532	Switch, Slide – Stereo/Quad
TM1-TM20	65428990	4 Pin (Screw) Terminal Ant/Speaker
J1,2,15,16 J8,9,22,23	65428988	4 Pin (RCA Type) Terminal
J3-7,J10-14 J17-21,J24-28	65428989	10 Pin (RCA Type) Terminal
J29	65428987	1 Pin RCA Type Terminal
	62028695	Feet, Mounting
	53028720	Cord, Power

NOTE: To speed handling of your order be sure to include both the model and serial numbers which appear at the back of the chassis, in addition to the quantity, part number and part description of the items ordered. Orders from independent dealers, independent servicemen, and retail customers will be shipped on a cash in advance basis. Harman-Kardon reserves the right to substitute equivalent parts for those originally installed in this chassis. All parts should be ordered from Harman-Kardon, 55 Ames Court, Plainview, L.I., N.Y. 11803, Att: Parts Department.

harman/kardon 55 AMES COURT, PLAINVIEW, N.Y. 11803

90729303
PRINTED IN U.S.A.