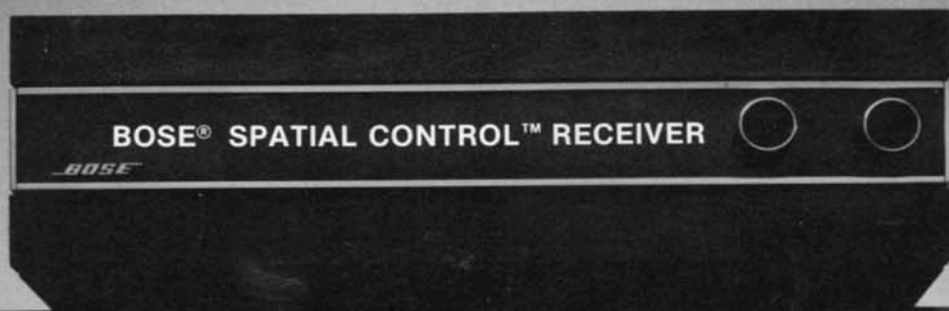




Service Manual

BOSE® SPATIAL CONTROL™ RECEIVER

BOSE

Service Manual

TABLE OF CONTENTS

1. SPECIFICATIONS	3
2. TECHNICAL DESCRIPTION	4, 5, 6
3. SIGNAL LEVEL DIAGRAM	7
4. ASSEMBLY LOCATION DIAGRAM	7
5. BLOCK DIAGRAM	8, 9
6. EXPLODED VIEWS	10, 11, 12
7. DISASSEMBLY PROCEDURES	13
A. Top Cover	13
B. Bottom Cover	13
C. Turn-On Relay	13
D. Speaker Relay	13
E. Power Amplifier	13
F. Front Panel	13
G. 901 Equalizer/CMOS/Spatial Board	14
H. Fuse Assembly	14
I. Volume Control Assembly	14
J. Volume Control Lamp Assembly	14
K. FM Zero Center Tuning And Signal Strength Meters	14
L. Preamplifier Assembly	14
M. Slide Control Assembly	14
N. Tuner Assembly	14
O. Phono Circuit and 9 Pin Jack Assembly	15
8. DIAL STRINGING PROCEDURE	15
9. TEST PROCEDURES	16 thru 20
0. FM/AM TUNER ALIGNMENT	21
A. AM Section	21
B. FM Section	22
C. MPX Section	22
1. POWER AMPLIFIER ADJUSTMENT PROCEDURES	23
A. Idling Current	23
B. Balance Adjustment	23
C. Gain Adjustment	23
2. PRINTED CIRCUIT BOARD ASSEMBLIES	24 thru 29
3. TROUBLE-SHOOTING GUIDE	30
4. MAIN CIRCUIT SCHEMATIC	31
5. WIRING DIAGRAM	32
6. VOLTAGE CONVERSION	33
7. PARTS LIST	34 thru 36

CAUTION: THE SPATIAL CONTROL RECEIVER CONTAINS NO USER-SERVICABLE PARTS. TO PREVENT WARRANTY INFRACTIONS, REFER SERVICING TO WARRANTY SERVICE STATIONS OR FACTORY SERVICE.

SPECIFICATIONS

General

The BOSE® Spatial Control™ Receiver incorporates three important features which open new dimensions of audible performance and ease of operation:

The BOSE Receiver, when used with BOSE 901 Series III or IV Loudspeakers, has the ability to control the spatial properties of sound. Spatial properties create the sense of room size and convey the apparent location of the performers; they also create the ambience that makes music sound life-like. This Receiver incorporates four power amplifiers, a 901 Series IV Equalizer, Spatial Control™ Circuitry, and CMOS switching Logic to control the spatial performance of the system.

The Source and Room Compensation Controls replace the standard tone controls normally found on receivers but offer much greater flexibility. These Controls help eliminate the tonal imbalances caused by room construction and furnishings, and by variations in program material.

A BOSE 901 Series IV equalizer, used with the BOSE 901 Series III or IV Loudspeaker System, is built into the Receiver. Once the rear panel programming switches are set, the equalizer is switched in and out of the signal path automatically, preventing accidental equalization of conventional loudspeakers and allowing operation of BOSE® 901 Series III or IV Loudspeakers and conventional speakers at the same time.

Amplifier: Non-bridged Mode (Test Procedure I)
Power Output: 50 Watts per channel minimum RMS continuous power, with both channels driven into 8 Ohms, THD < .09% non-bridged mode. Bridged Mode (Test Procedure II) 100 Watts per channel minimum RMS continuous power, with both channels driven into 8 Ohms, THD < .09% from 20 Hz to 20 kHz, power amps in bridged (non-spatial) mode.

IHF Power Bandwidth: 20 Hz to 20 kHz, both channels driven, THD < .09%

Intermodulation Distortion: .09% IHF (60 Hz/7 kHz mixed 4:1 at rated output)

Frequency Response: 20 Hz - 20 kHz +0.1 -0.5 dB
 Phono RIAA ±0.3 dB

Input Sensitivity/Impedance/Capacitance: Aux and Tape: 200 mV/50 K Ohms
 Phono: 2.0 mV/47 K /150 pF

Signal to Noise Ratio: Amplifier: 90 dB @ weighted, below rated output, inputs shorted
 97 dB A weighted, below rated output, min. volume.
 Phono: 83 dB @ weighted, below rated output, inputs shorted.

Channel Separation: Aux and Tape: 65 dB @ 1 kHz (to pre-out)
 Phono: 60 dB @ 1 kHz.

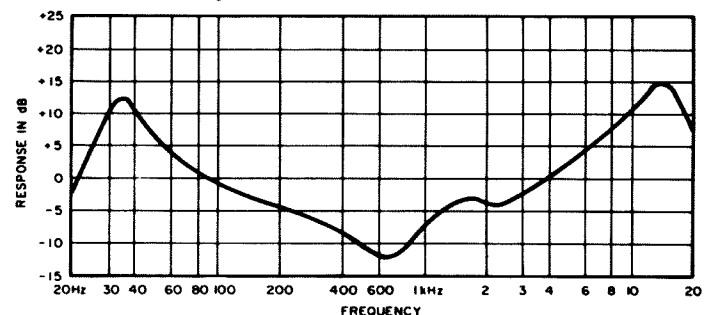
Phono Overload: 145 mV

Loudness Contour: +8 dB @ 100 Hz (± 2 dB)
 +3.5 dB @ 10 kHz (± 1 dB)

Output Impedance: Tape out: 3 K Ohms
 Preamp out: 1.6 K Ohms

Protection Circuitry: DC voltage detection to protect speakers
 Current limiting to protect against short circuits
 Thermal protection on heat sink and transformer case

901 Series IV Equalization



901 SERIES IV EQUALIZER

FM Tuner

IHF Usable Sensitivity: 1.9 µV/10.8 dBf (Mono);
 3.3 µV/15.6 dBf (Stereo)

50 dB Quieting Sensitivity: 3.5 µV/16.11 dBf (Mono);
 35 µV/36.11 dBf (Stereo)

Frequency Response: 30 Hz - 15 kHz, +0.2 -1.0 dB

Signal to Noise Ratio (65 dBf) 70 dB (Mono); 65 dB (Stereo)

THD at 65 dBf .10% (Mono); .25% (Stereo)

Capture Ratio 1.8 dB

Alternate Channel Sensitivity 70 dB

Spurious Response Rejection 100 dB

Image Rejection 80 dB

AM Rejection 53 dB

Stereo Separation, 1 kHz 45 dB

AM Tuner

20 dB Usable Sensitivity	250 μ V (ferrite loopstick)
Adjacent Channel Selectivity	40 dB
Total Distortion	.5% (400 Hz @ 50% Modulation)
Image Rejection	70 dB
IF Rejection	80 dB
Signal to Noise Ratio	45 dB

General

Power Requirements	120 volts AC 60 Hz
Power Consumption	1150 Watts at rated power
AC Outlets	2 switched, 2 unswitched 400 watts max. total
Dimensions	20-1/2" (52cm) x 6-5/8" (16.8cm) x 16-3/8" (41.6cm).
Weight	36-1/2 lbs. (16.6 Kg).

Source and Room Compensation Controls

Low Filter:	- 3 dB at 100 Hz. - 7 dB max. at 20 Hz.
-------------	--

Low Frequency Control, Narrow Position

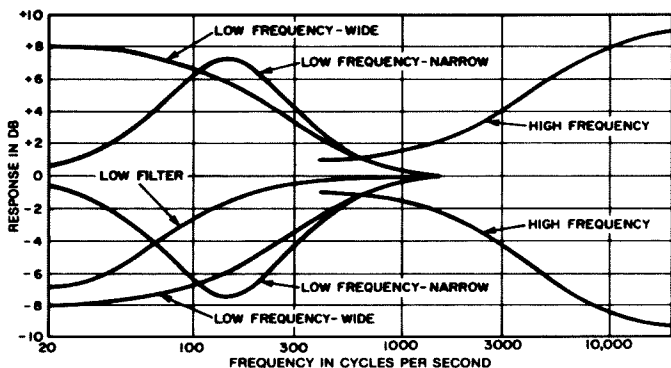
$\pm$ 8 dB at 140 Hz. (center frequency)
$\pm$ 1 dB at 20 Hz and 1 kHz.

Low Frequency Control, Wide Position

$\pm$ 3 dB at 350 Hz.
$\pm$ 8 dB at 50 Hz.

High Frequency Control

$\pm$ 8 dB at 15 kHz.
$\pm$ 3 dB at 2.2 kHz.



COMPENSATION CONTROLS AND LOW FILTER FREQUENCY RESPONSE

Voltage Sources

The Bose® Spatial Control™ Receiver is manufactured in two voltage configurations:

120V AC, 60 Hz (USA model)
240V AC, 50-60 Hz (Export model)

TECHNICAL DESCRIPTION

Spatial Control™ Receiver

The operation, design, and servicing of the BOSE® Spatial Control™ Receiver is different from that of any other receiver design. We encourage you to take the time to read this Technical Description before attempting to service the receiver, as this description will significantly aid your ability to repair this unit.

The FM tuner incorporates a quadrature detector in the tuning circuit and phase-lock loop in the multiplex stereo decoder for greater stability and tuning accuracy. A MOSFET front-end improves linearity of RF response and gives greater protection against front-end overload. The FM circuit also incorporates a separate IF Buffer amplifier that improves IF selectivity (the small printed circuit board (Board #1611979) mounted vertically and located near the power transformer.)

The AM circuitry has been designed to incorporate excellent sensitivity and frequency response. The circuit includes an 18 db/octave filter (the other small board (Board # 1611989) mounted vertically and located next to the FM IF Buffer amp) specifically designed to remove noise from the audio signal. A rear panel external AM loopstick antenna and terminal for connection of an external wire antenna are provided on the rear panel.

The Source and Room Compensation Controls (IC 207,208) represent a major advance in controlling the effects of room acoustics and deficiencies in program material. The High Frequency control reduces frequency imbalances and helps restore brilliance and clarity. Unlike conventional treble controls, it has a broad range and smooth gradual taper to correct tonal imbalances.

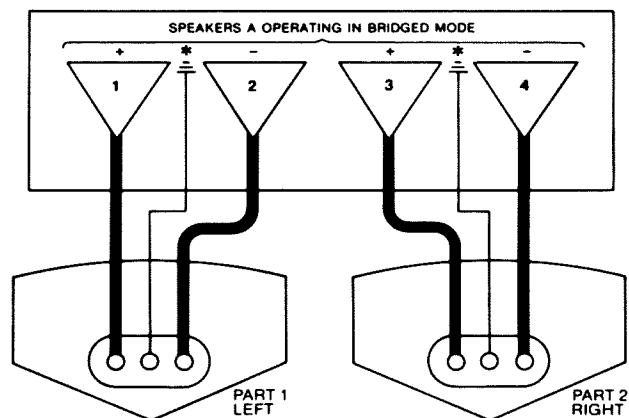
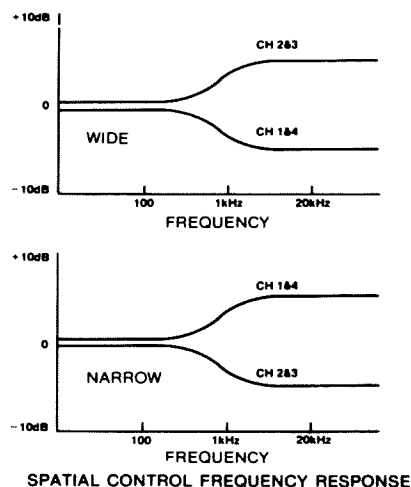
The Low Frequency control helps compensate for problems in the middle and deep bass regions. Its action is modified by the Low Frequency Range Switch. In the Narrow position, it acts on the midbass only without affecting the musical fundamentals. In the Wide position, the Low Frequency control affects a broader range of frequencies. (See page 3).

The specially designed Low Filter reduces turntable rumble with much less impairment of audible bass than is possible with standard filter designs.

In many cases the effect of the Low Filter and Wide/Narrow pushbutton settings provide a subtle change in performance as the frequencies affected are primarily below 100 Hz.

Note that all the COMPENSATION CONTROLS are active when the COMP. pushbutton is RELEASED, NOT DEPRESSED.

The Spatial Control™ receiver changes the spatial image by controlling the direction of the mid and high frequency sound energy coming from the speaker system. This is only possible when the receiver is used with the BOSE® 901 Series III or IV loudspeakers having three connection terminals. The receiver (using a special 3-wire speaker cable) powers the different rear panels of the 901 speaker using its 4 separate power amplifiers. By varying the frequency response characteristics of each of the amplifiers, the spatial control circuitry (IC 206,207) creates the sound image desired.



When the Spatial Control is off and Speakers A and B are engaged, the Spatial Control acts as a balance control between the A and B pairs of speakers. This permits separate volume adjustment on two pairs of speakers played simultaneously. The Spatial Control does not function when Speakers A only is depressed and when using conventional speakers.

Separate headphone amplifiers (Q 601-608) allow independent operation of headphones while playing any loudspeaker, equalized or unequalized.

The sophisticated output circuitry provides connection flexibility as well. Because the individual amplifier inputs and outputs are accessible through rear panel connections, the addition of features like time delay or bi-amplification is easily accomplished. IC inverters (IC 601,602 located on the 9 pin jack board) are used to provide in phase preamplifier outputs.

Front and rear panel switches interact to reconfigure the CMOS switching logic (IC 203,204 located on the Spatial/Equalizer board) to change the preamp gain by 6 dB (gain change at IC 201,202 located on the pre-amplifier board), 901 Series IV Equalization, and output operating mode (bridged or non-bridged) of the four amplifiers. Due to the various amplifier configurations used in different operating modes, the amplifier output and polarity of each speaker connection terminal changes. See Table 1.

Table 1 Amplifier Equalization

Front Panel Speaker Switches		"901-Other" Rear Panel Speaker Switches		Equalization of Receiver Amplifiers	
A	B	A	B	1 and 4	2 and 3
out	out	any setting			
in	out	other	other		
in	out	901	other	E	E
in	out	other	901		
in	out	901	901	E	E
out	in	other	other		
out	in	901	other		
out	in	other	901	E	E
out	in	901	901	E	E
in	in	other	other		
in	in	901	other	E	
in	in	other	901		E
in	in	901	901	E	E

E: Indicates equalized channels.

A built-in 901 Series IV Equalizer (Q205-210) can be programmed into the circuit when playing 901 Series III or IV Loudspeakers.* See front cover graph. The receiver, using the programmed switch settings, CMOS logic, Spatial control functioning as a balance control, and four power amplifiers can operate Bose® 901 Series III or IV Loudspeakers and conventional speakers at the same time. (Conventional loudspeakers should not be operated with the equalizer activated.) See Table 2 for equalizer operating modes. (See page 6).

The amplifier section of the receiver consists of four conservatively rated Direct Coupled power amplifiers with NPN and PNP transistors functioning in a True Complementary push-pull circuit. Individual pre-amplifier outputs and power amplifier inputs are provided on the rear panel, amplifiers 1 and 4 power Speakers A, amplifiers 2 and 3 power Speakers B, when operating in the non-bridged mode. Speaker Relays RI 601,602 delay turn-on, eliminate transients, and also reconfigure amplifier outputs for different operating modes. (See page 6).

Comprehensive protection circuitry guards against virtually any failure mode. Current limiting circuits, temperature sensors (US 601,602 located on the power transformer and output transistor heatsinks) and DC detection circuitry (operating with the ON/OFF circuitry) protect the receiver and speakers should a malfunction occur anywhere in the system. This protection circuitry is specifically designed not to impede the response of the amplifiers at instantaneous high-power levels.

*The 901 Series III loudspeaker is fully compatible with the 901 Series IV Equalizer.

The On/Off touch circuitry (vertically mounted board with solenoid near the power transformer) is controlled by a rear panel master on/off switch and by touching any two adjacent letters in the BOSE nameplate found on the front panel. This circuit is also part of the protection circuitry and will not allow the unit to operate under inappropriate operating conditions. (See Troubleshooting guide).

Table 2 Speaker Switching and Preamp Gain Table

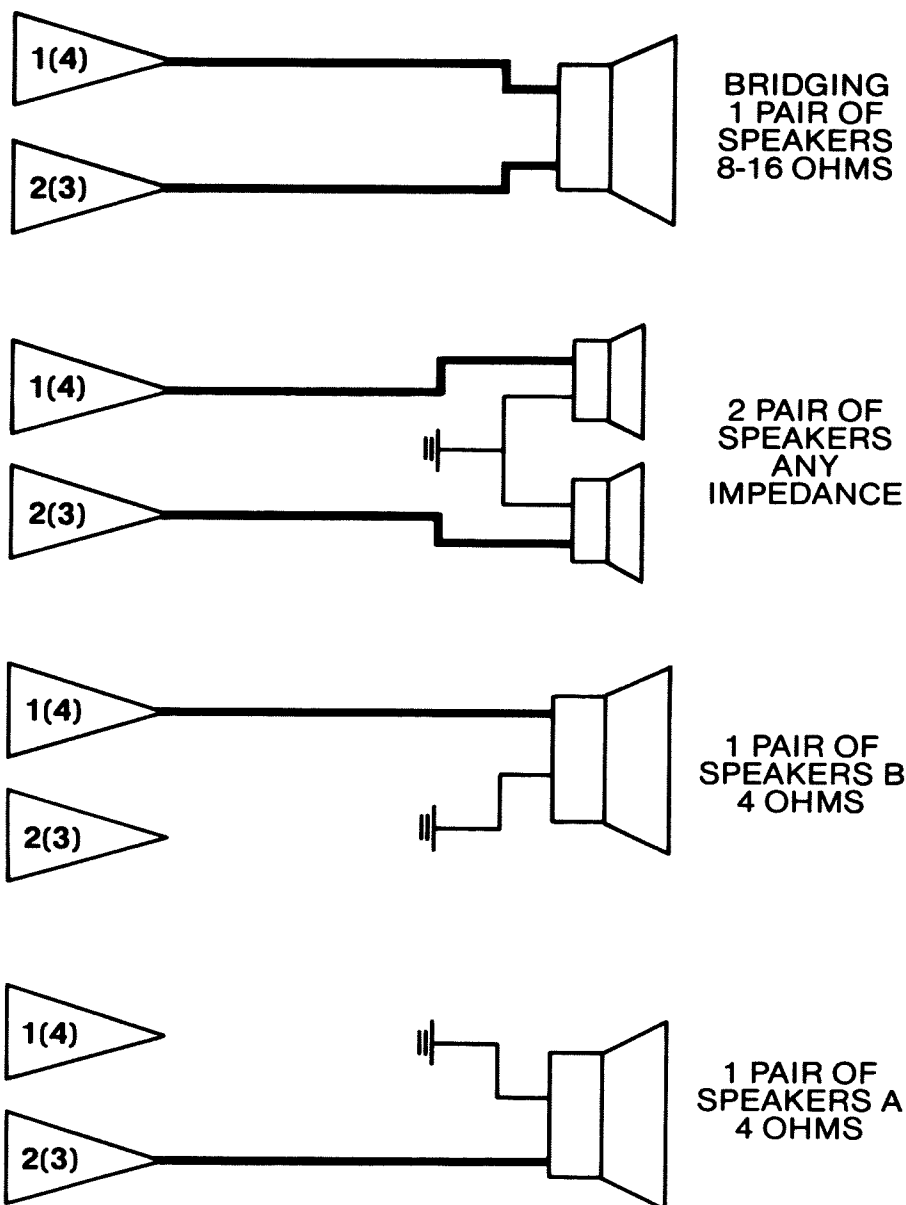
Front Panel Speaker Switches		Rear Panel Impedance Switches		Right A		Speaker Terminals Left A		Right B		Left B		Preamp Gain
A	B	Speakers A	Speakers B	+	-	+	-	+	-	+	-	
out	out	4 Ohms	4 Ohms	G	G	X	G	X	G	G	X	high
out	out	4 Ohms	8 Ohms	G	G	X	G	G	X	X	X	high
out	out	8 Ohms	4 Ohms	X	G	X	X	G	X	G	X	high
out	out	8 Ohms	8 Ohms	X	G	X	X	G	X	X	X	high
in	out	4 Ohms	4 Ohms	G	G	4	1	G	G	X	G	high
in	out	4 Ohms	8 Ohms	G	G	4	1	G	G	X	G	high
in	out	8 Ohms	4 Ohms	3	G	4	1	G	2	X	G	low
in	out	8 Ohms	8 Ohms	3	G	4	1	G	2	X	G	low
out	in	4 Ohms	4 Ohms	G	X	X	X	X	G	3	G	high
out	in	4 Ohms	8 Ohms	G	X	X	X	X	G	3	4	low
out	in	8 Ohms	4 Ohms	G	X	X	X	X	G	3	G	high
out	in	8 Ohms	8 Ohms	G	X	X	X	X	G	3	4	low
in	in	any set tings		G	X	4	1	X	G	3	G	high

X: Speaker terminal not connected internally.

G: Speaker terminal connected to ground.

1-4: Speaker terminal connected to output of amplifiers 1-4.

Preamp gain increased by a factor of X2 in high gain position.



SPEAKER SWITCHING (4 SITUATIONS)

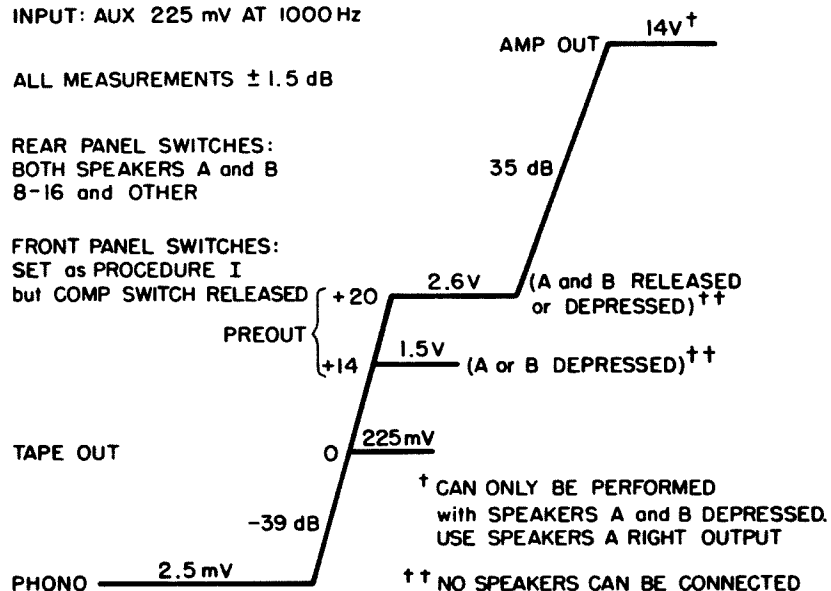
SIGNAL LEVEL DIAGRAM

INPUT: AUX 225 mV AT 1000 Hz

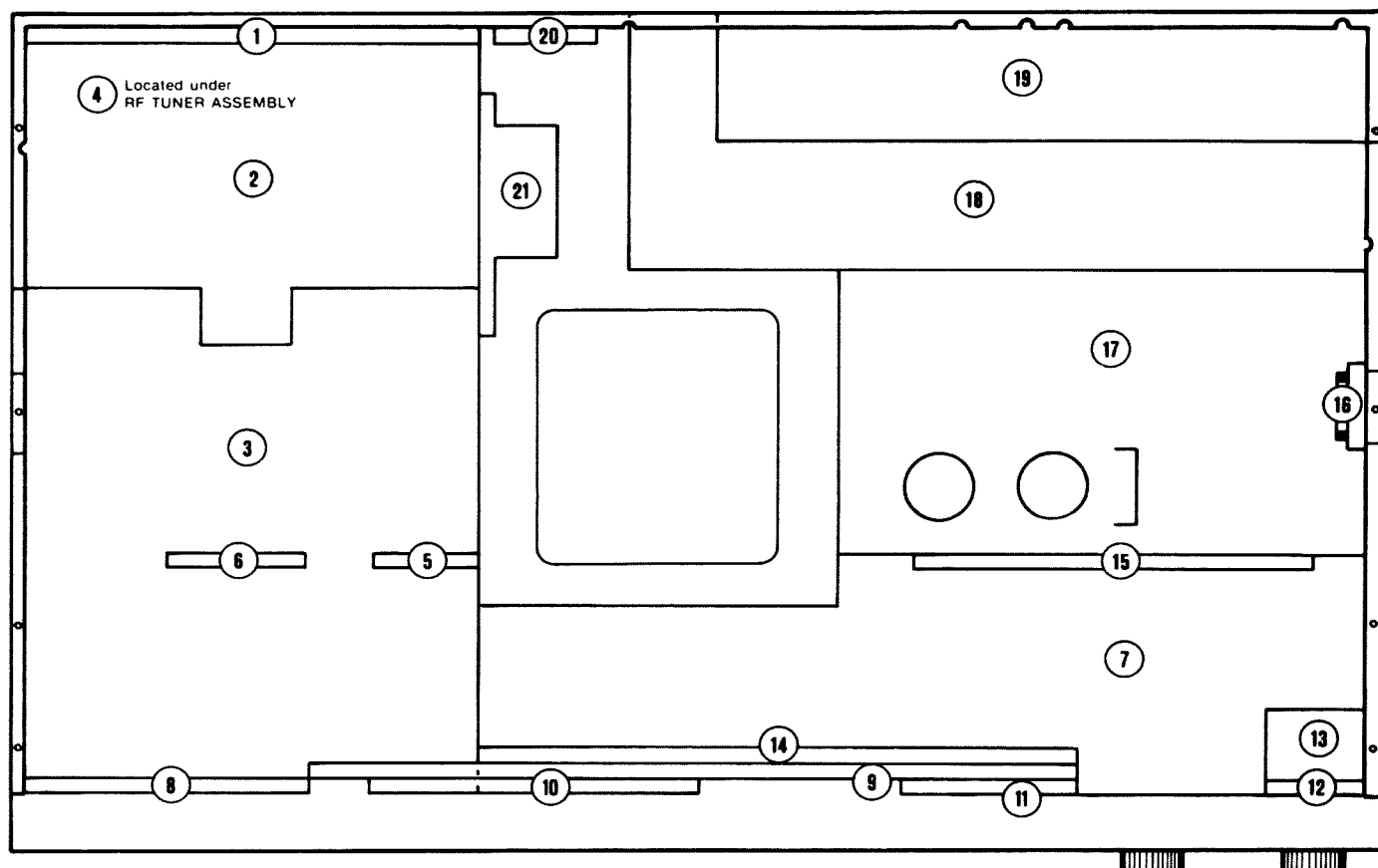
ALL MEASUREMENTS ± 1.5 dB

REAR PANEL SWITCHES:
BOTH SPEAKERS A and B
8-16 and OTHER

FRONT PANEL SWITCHES:
SET as PROCEDURE I
but COMP SWITCH RELEASED

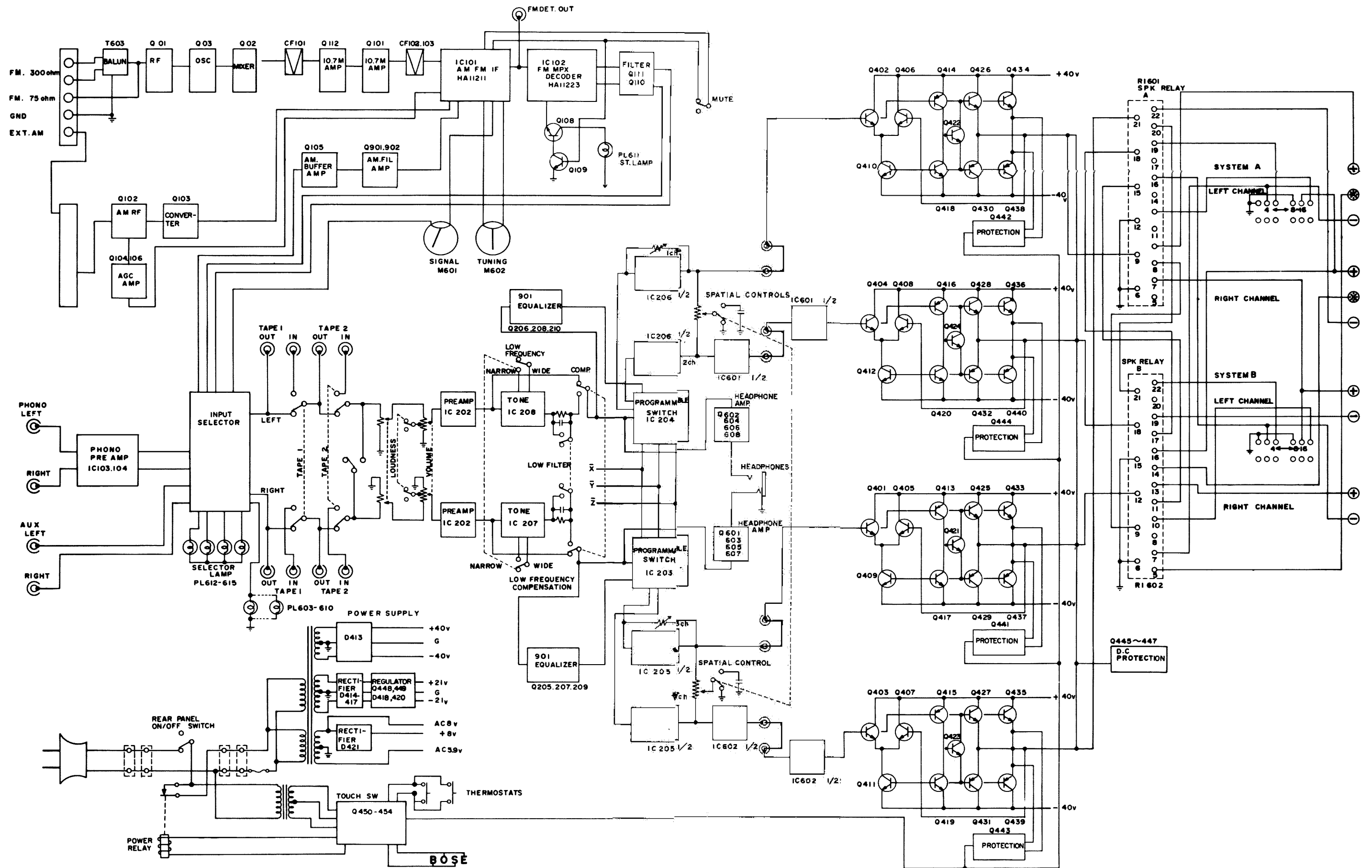


ASSEMBLY LOCATION DIAGRAM

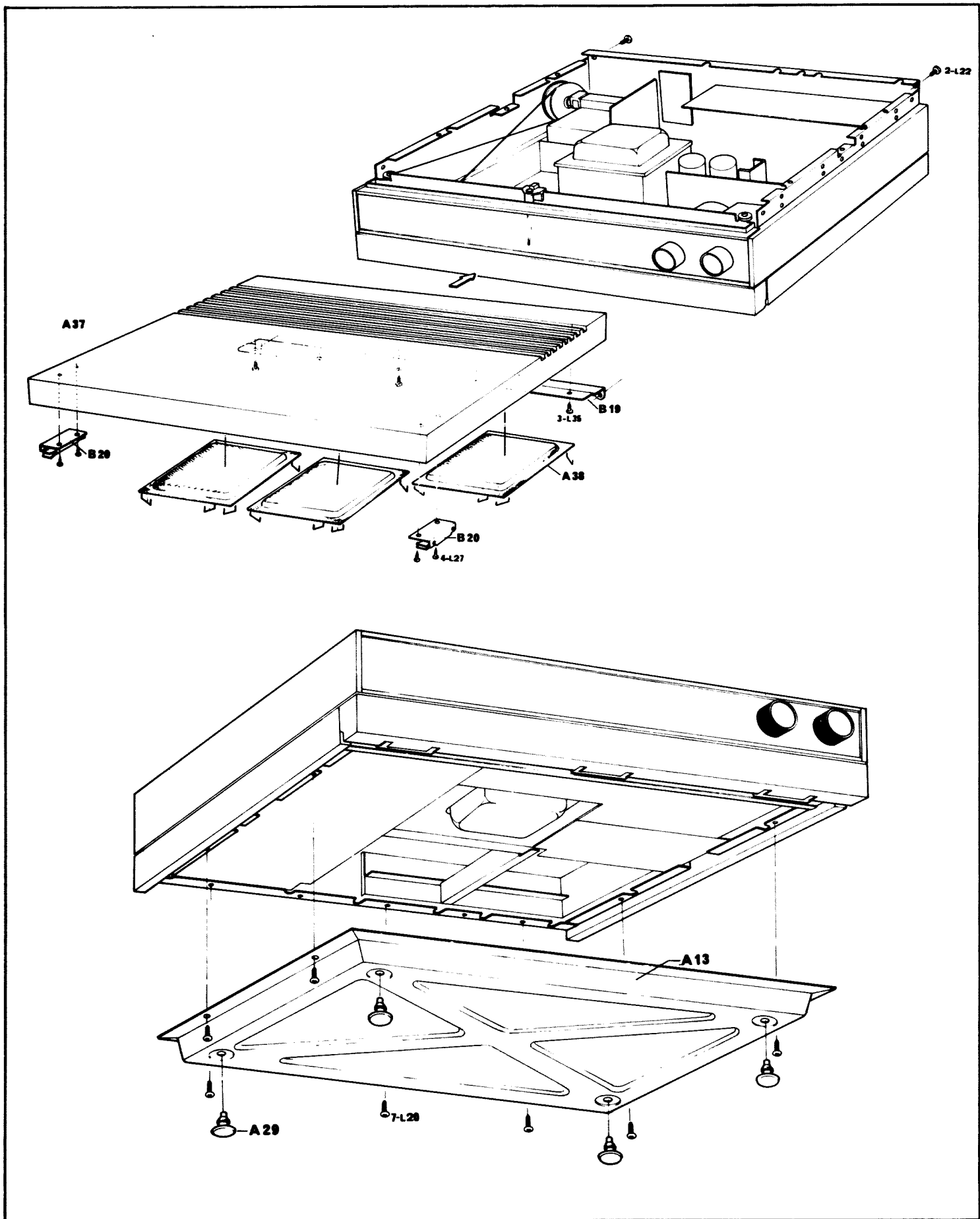


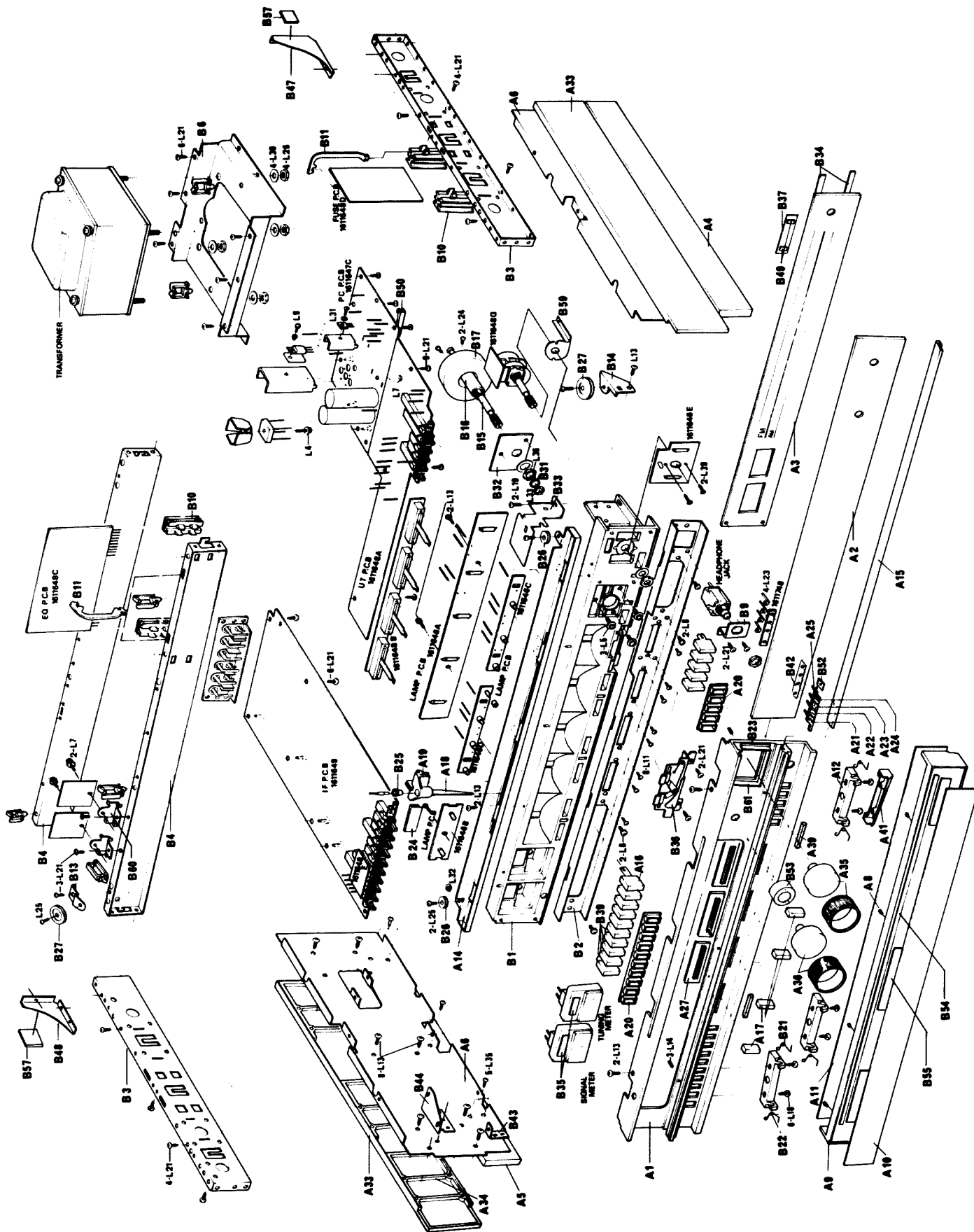
- | | | |
|-------------------------------------|--|---|
| 1 9 PIN JACK ASSEMBLY
1611800 | 8 METER LAMP ASSEMBLY
1611646B | 15 901 IV EQ./CMOS/SPATIAL ASSEMBLY
1611648C |
| 2 RF TUNER ASSEMBLY
1611963 | 9 TUNING DIAL LAMP ASSEMBLY
1161646A | 16 FUSE ASSEMBLY
1611648D |
| 3 IF/MPX ASSEMBLY
1611649 | 10 SELECTOR LAMP ASSEMBLY
1611646D | 17 POWER SUPPLY ASSEMBLY
1611647C |
| 4 PHONO PREAMP
(Part of IF/MPX) | 11 STEREO 901 EQ.. SPATIAL LAMP ASSEMBLY
1611646C | 18 POWER AMPLIFIER ASSEMBLY
1611647A |
| 5 FM/IF AMP ASSEMBLY
1611979 | 12 VOLUME LAMP ASSEMBLY
1611646E | 19 SPEAKER RELAY ASSEMBLY
1611645A |
| 6 AM FILTER ASSEMBLY
1611989 | 13 VOLUME CONTROL ASSEMBLY
1611648G | 20 AC OUTLET ASSEMBLY
1611645B |
| 7 PREAMPLIFIER ASSEMBLY
1611648A | 14 SLIDE CONTROL ASSEMBLY
1611648B | 21 TURN-ON RELAY ASSEMBLY
1611647B |

BLOCKDIAGRAM



EXPLODED VIEWS





DISASSEMBLY PROCEDURES

CAUTION: Because of the touch turn-on circuitry, this unit can be easily turned on by accident. All work should be accomplished with the AC power turned off at the test bench variac.

Top Cover

1. Remove the 2 phillips screws located at the top left and right of the rear panel.
2. Gently slide the top cover towards the front of the unit approximately 1 inch.
3. Lift the front of the top cover and remove. Place the cover and the screws in a secure area.

NOTE: When re-installing the top, position cover about 1 inch from the back of the unit. With the cover resting on the top of the unit, gently push the cover towards the rear of unit, assuring the two clips at the front of the cover lock into place, securing the front of the cover to the chassis.

Bottom Cover

1. Remove 7 screws (2 on each side and 3 on rear).
2. Slide bottom cover towards rear of unit and remove.

CAUTION: The front panel door can be easily damaged with the bottom cover removed. Protect the door assembly or extend the receiver over the front of the test bench to prevent undue pressure on door panel.

CAUTION: The side panels can be easily scratched. Use clean carpet or tape side panels.

Turn-on Relay

1. Remove 2 screws (top left and right of printed circuit board) securing the board to the receiver chassis.
2. Disconnect the 2 plug-in black wires connected on the 2 bottom terminals of the relay board, and move wires out of the way.
3. Open wiring harness clamp nearest relay board and remove all wiring going to relay board.
4. Cut appropriate tie-wraps.
5. Gently lift and rotate the board towards the front of the unit.

NOTE: When re-installing turn-on relay board, be certain to position board in bottom mounting slot for proper installation. Also, remember to reconnect the two black plug-in wires.

Speaker Relay

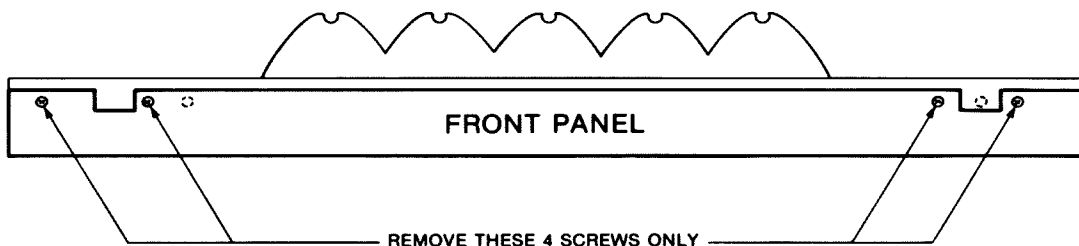
1. Remove 2 screws located between the Impedance and Speakers switches on the rear panel of the unit.
2. Cut appropriate tie-wraps and gently slide the board toward the front of the unit.
3. Remove the tie-wrap on the Speaker Relay cable closest to the wire harness clamp.
4. Rotate Speaker Relay board away from the power amplifier.

Power Amplifier

1. Remove the Speaker Relay board if adjustment of the power amplifiers or service to the circuitry is required.

Front Panel

1. Remove the tuning and volume knobs.
2. Disconnect the 2 black plug-in wires located at the two bottom terminals of the turn-on relay board, which are coming from the 'BOSE logo'.
3. Cut appropriate tie wrap holding the two black wires secure at the front of the receiver.
4. Pull the two black wires to the first wire harness clamp, leaving the wire slack nearest the front panel.
5. Stand receiver on its side and remove the three screws located on the bottom of the front panel assembly. (DO NOT REMOVE THE SCREWS HOLDING THE DOOR PANEL HINGES IN PLACE.)
6. Remove the 4 screws holding the top of the front panel assembly in place. See figure below.



7. Position the tuning dial pointer at the center of the dial scale. Remove the dial pointer from the dial glass and off the tracking rail. Rotate the pointer assembly back and rest it against the metal frame. This should be done carefully. Do not attempt to remove the dial pointer from the unit.
8. Open the lower panel door and gently pull 4 slider knobs off.
9. After removing the slider knobs, close door. DO NOT PULL ON DOOR WHEN REMOVING THE FRONT PANEL.
10. While gently removing the front panel, separate the side panels slightly allowing the front panel to be released. PUSH ON THE FRONT PANEL'S METAL FRAME FROM THE REAR, ROCKING THE PANEL GENTLY AS IT IS REMOVED.
11. Gently move the front panel assembly 1-3 inches away from the front of the unit.

CAUTION: Do not attempt to move the front panel more than 4 inches from the unit without removing the 'Bose logo' wiring. If removal is necessary, feed the wires out of the unit thru the front panel. **DO NOT UNSOLDER THE LOGO WIRING.**

CAUTION: When re-installing front panel to unit, gently slide the 'Bose logo' wiring back into the unit without pinching the wiring.

901 Equalizer/CMOS/Spatial Plug-In Board

1. Gently lift and rotate the hold-down clamp away from board.
2. Pull board out of unit by grasping each side of board and lifting **EVENLY**.

CAUTION: Carefully align connector pins when re-installing Equalizer/CMOS/Spatial Board.

Fuse Assembly

1. Gently lift and rotate hold-down clamp away from board.
2. Cut appropriate tie-wraps and remove necessary wires from the wire harness clamps.
3. Remove board from board guides and lift toward the transformer.

Volume Control Assembly

1. Remove front panel, 901 Equalizer/CMOS/Spatial Board, and Fuse Board.
2. Remove hexnut and washer holding volume control assembly in place.
3. Cut 2 tie-wraps to volume control and remove all wires from wire harness clamp nearest volume control.
4. Slide the assembly gently out of the front panel, dropping the rear of the board and pointing the shaft up toward the front of the unit.
5. Lift assembly out of unit, taking care not to damage the dial stringing.

Volume Lamp Assembly

1. Remove front panel and Fuse Board.
2. Remove black and red wires from the 3 wiring cable harnesses and cut appropriate tie-wraps, allowing maximum wire slack at the front of the unit.
3. Remove two screws holding the lamp assembly in place.
4. Slide the assembly forward and rotate over volume control shaft.

FM Tuning And Signal Strength Meters

1. Remove the front panel assembly.
2. Gently pry the AM/FM dial glass away from the lamp housing, lifting the dial from right to left.

NOTE: Dial and meters are held in place by double-sided tape. Pry the dial slowly to prevent cracking or discoloration.

Preamplifier Assembly

1. Remove top and bottom covers, front panel, 901 Equalizer/CMOS/Spatial Board, Fuse Board.
2. Cut all appropriate tie-wraps and free necessary wires from wire harnesses to permit the preamplifier board to be lowered approximately 1 inch.
3. Remove the 5 push-switch buttons from the switches located on the right side of unit: **DEPRESS ALL SWITCHES.**
4. This board is held in by a total of 6 screws. Remove the 2 screws holding the right-hand push button assembly to the chassis; these screws are located on the front of the unit. Remove the 4 screws located on the bottom of the receiver holding the preamplifier board in place.
5. **GENTLY** slide the board towards the rear of the unit and lower preamplifier board.

CAUTION: Preamplifier board can be lowered only about 1 inch from unit. This is a delicate procedure and must be accomplished carefully. Guide the wiring by hand if necessary.

When reinstalling preamplifier board, slide the board back in place taking care not to pinch the connecting wires.

Slide Control Assembly

1. Remove top and bottom covers, front panel, 901 equalizer/spatial board, fuse board, and lower preamplifier board approximately 1 inch.
2. Remove the 8 screws (2 located on each side of each slider).
3. **GENTLY** push the slider board back and drop the board slightly.

CAUTION: The slide control assembly is very thin and exerting too much pressure could result in damage to the board.

NOTE: When re-installing the slide control assembly, check that the spatial slide control is properly positioned between the brackets operating the spatial indicator pilot lamp assembly.

Tuner Assembly

1. Tune the Receiver to approximately 100mHz on the FM dial.
2. Adjust the pulley on the tuner shaft so the dial string tie point on the tuner pulley is straight up and down.
3. Put masking tape on the dial string at the tuner pulley and at the 2 closest pulleys holding the dial string in place.
4. Remove the 3 screws holding the tuner assembly in place.
5. Cut the appropriate tie-wraps and remove appropriate wiring from the wiring harness clamps and gently rotate tuner assembly up (lifting tuner shaft side up first and out of chassis), rotating toward the front of unit.

Phono Circuitry And 9 Pin Jack Assembly

1. Remove the Tuner Assembly.
2. Remove the 2 screws used to hold the RF shield (under the tuner) in place.
3. Remove the screw found in left rear of unit holding ground lugs in place.
4. Remove the 3 black screws holding the antenna terminal strip. Note the location of the antenna terminal ground lug. The hardware is NOT captive and should be removed from unit. **DO NOT REMOVE TERMINAL STRIP AT THIS TIME.**
5. Remove the 3 rear panel screws holding the 9 Pin Jack Panel in place. Do not remove the screw located nearest the unswitched outlet.
6. Gently slide the 9 Pin Jack Panel (along with the RF shield) approximately 1 inch toward the front of the unit and move the antenna terminal strip out of the way. **DO NOT UNSOLDER WIRING TO ANTENNA TERMINAL STRIP.**
7. Remove the RF shield, and move the 9 Pin Jack Assembly out of the way.

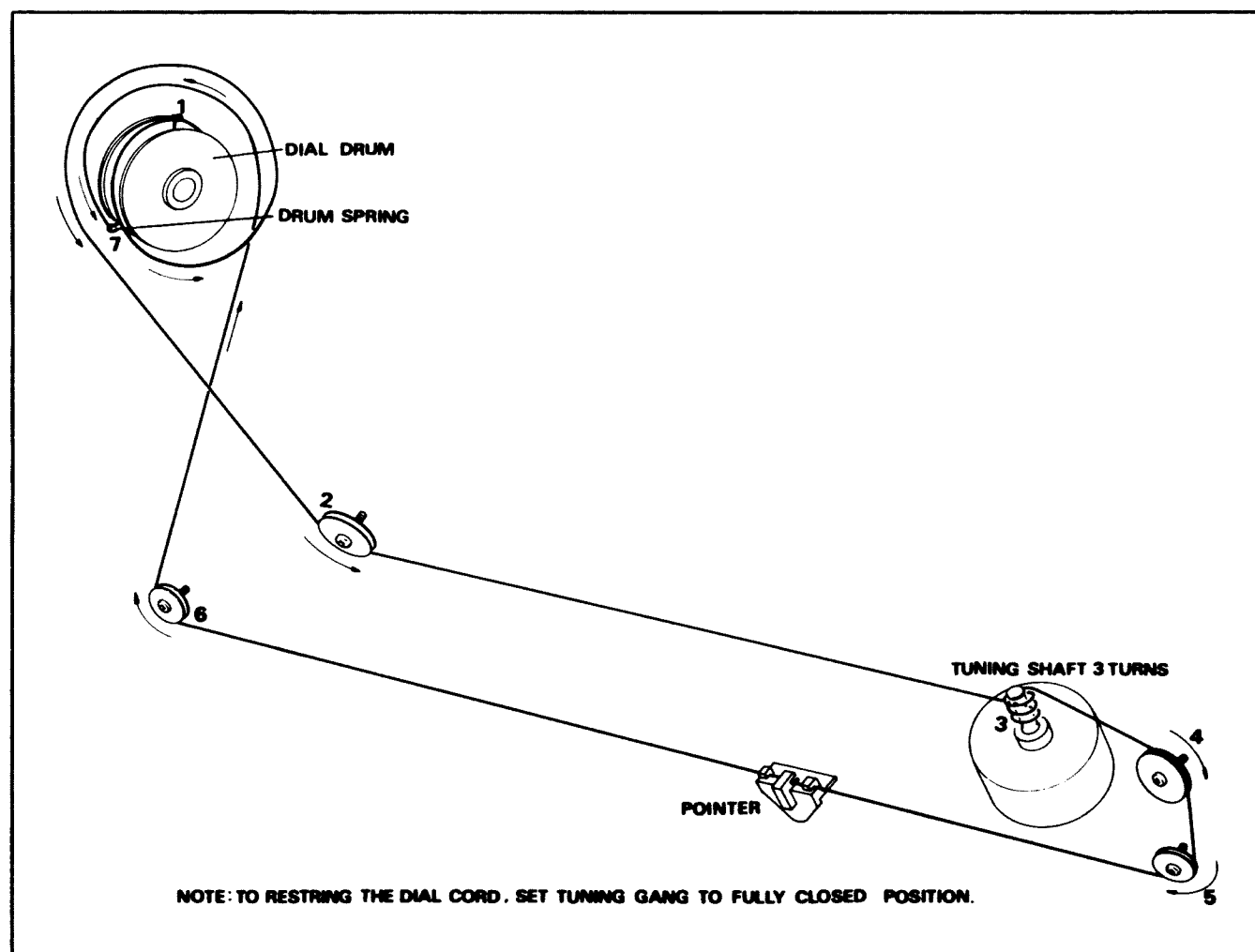
NOTE: When re-installing the RF shield, note the orientation of the locking flanges located on the chassis frame member and by the turn-on relay. Slide RF shield 1 inch towards the front of the unit and place 9 Pin Jack Assembly over the 3 metal fingers used to secure the jack assembly. Make certain not to pinch any wires between the metal fingers and jack assembly. **PUSH RF SHIELD WITHIN A HALF INCH OF CHASSIS AND WHILE HOLDING CHASSIS IN ALIGNMENT, PLACE ANTENNA TERMINAL STRIP IN THE CHASSIS, AND MOVE THE RF SHIELD AND JACK STRIP TO THE REAR OF UNIT.**

Re-install all rear panel screws. Re-install the RF shield screws. Re-install the chassis ground terminal and check that the antenna terminal strip ground connection is connected.

Install RF Tuner to RF shield assembly. Add appropriate tie-wraps keeping wiring away from the RF Tuner.

Gently remove the tape holding the tuning string in place.

DIAL STRINGING PROCEDURES



TEST PROCEDURES

CAUTION: Due to the complexity of this receiver, do not attempt to operate or test this unit without following the test procedures outlined below.

TEST EQUIPMENT REQUIRED

1. Dual-trace oscilloscope
2. Digital multi-meter
3. Audio signal generator
4. Distortion analyzer
5. AM & FM alignment generators
6. Variac with current and voltage meters
7. 4 & 8 ohm 100 watt load resistors.
8. Stereo headphones

NOTE: This test procedure has been designed to test the Spatial Control Receiver in 2 sections. Test Procedure I checks Amplifiers 2 and 4, FM, AM, Phono, Tape, and the Preamplifier circuitry. If testing of the Spatial circuitry, Speaker switching, CMOS logic circuitry, or Amplifiers 1 and 3 is required, proceed with Section II of the Test Procedure.

Test Procedure I Tests the Following:

A. Amplifiers 2 and 4:

1. D.C. offset in each amplifier
2. Bias
3. Output balance
4. Amplifier gain
5. Power output (Non-bridged mode) = 50W Per Channel @ 8 Ohms
6. Frequency response
7. Distortion
8. Source and Room Compensation Controls
9. Loudness control
10. Mode (Mono/Stereo)
11. Balance (Left/Right)
12. Spatial Control™ used as Speakers A/B balance
13. Auxillary inputs

B. External Sources

1. Phono
2. Tape 1 and 2 inputs and outputs, Dubbing from Tape 1 to 2 only
3. Auxillary

C. Internal sources

1. AM
2. FM
3. FM Stereo
4. FM Muting

D. Stereo Headphone Amplifiers

Test Procedure II Tests The Following:

Amplifiers 1 and 3 (non-bridged mode = 50 watts/channel at 8 ohms)
Speakers A bridged output
901 Series IV Equalizer
CMOS logic (901 Series IV Equalizer and 6 dB Gain Switching)
Spatial Control™ Frequency Response.
Speaker Relay Switching

RECEIVER SET-UP AND CONNECTIONS FOR TEST PROCEDURE I

CAUTION: All connections must be accomplished with the variac on zero volts

A. Back Panel Switch Settings

1. Speaker System "A"
 - A. Impedance Switch: 8-16 ohm position
 - B. Speakers Switch: Other position
2. Speaker System "B"
 - A. Impedance Switch: 8-16 ohm position
 - B. Speakers Switch: Other position
3. Power On/Off Switch: On
4. Pre-amp out/main amp in jumpers connected
5. Power cord to Variac (SET AT ZERO VOLTS)

B. Receiver Rear Panel Connections

NOTE: The Spatial Control™ Receiver utilizes inverters at various points in its amplifying circuitry. It is IMPORTANT to connect the unit as directed to prevent shut-downs or inversion of the output signal.

RECEIVER	TEST PANEL
1. Right speaker "A" Positive (+)	Rt. Ch. Ground (negative)
2. Right speaker "A" Negative (–)	Rt. Ch. Positive (8 ohm)
3. Left speaker "B" Positive (+)	Lt. Ch. Ground (negative)
4. Left speaker "B" Negative (–)	Lt. Ch. Positive (8 ohm)
5. Audio signal generator (output set at zero volts) to both Auxillary inputs.	

NOTE: The Spatial Control™ Receiver has 4 separate amplifiers for speaker outputs. PROCEDURE I tests two of the amplifiers and associated circuitry. PROCEDURE II tests the remaining two amplifiers and their associated circuitry. Test Procedure II also provides instructions for testing the power amplifiers in the bridged output mode, 901 IV Equalization, and Spatial Control™ Operation.

C. Front Panel Switch Positions

1. Auxillary:..... IN
2. Tape 1:..... OUT
3. Tape 2:..... OUT
4. Mode: OUT
5. Comp: IN
6. Low filter: OUT
7. Low frequency range: NARROW
8. Bass slider:..... CENTER
9. High frequency slider:..... CENTER
10. Balance: CENTER
11. Spatial Slider:..... CENTER
12. Spatial: OUT
13. FM Muting:..... IN
14. Loudness: OUT
15. Volume Control OFF (FULLY COUNTER-CLOCKWISE)
16. Speaker "A" & "B" Switches IN*

***CAUTION: Both speaker switches must be "IN" at all times unless otherwise instructed.**

D. Turn-on Procedure:

1. Set Variac on high current setting and run up to 120 volts.
2. Lightly touch **any two** letters of the 'BOSE logo' (Name plate located on the front panel). The unit will produce a turn-on transient of approximately 4 amps and then idle at approximately .4 amperes.¹

It is now possible to test the Spatial Control™ Receiver in all functions listed under Test Procedure I listed above.

PROCEDURE I TESTS ONLY A PORTION OF THE POWER AMPLIFIER CIRCUITRY; CONTINUE WITH PROCEDURE II IF FURTHER TEST INFORMATION IS REQUIRED CONCERNING SPATIAL OPERATION, CMOS LOGIC, SPEAKER SWITCHING, OR OPERATION OF THE FOUR POWER AMPLIFIERS.

¹ Immediately upon touch and release of the 'BOSE logo', the click of the turn-on relay should be heard. Then, in approximately 1-2 seconds, the two clicks of the speaker output relays activating will be heard.

If the unit fails to stay on (turns on then shuts down), check to see if all connections were completed as instructed.

If your test bench has common ground resistor loads, it may be necessary to disconnect either one of the speaker wires connected to your test panel ground terminals. If unit still fails to stay on, refer to the trouble-shooting guide.

RECEIVER SET-UP AND CONNECTIONS FOR TEST PROCEDURE II

CAUTION: All connections must be accomplished with the variac on zero volts

NOTE: The Spatial Control™ Receiver has 4 separate amplifiers for speaker outputs. PROCEDURE I tests amplifiers 2 and 4 and their associated circuitry. PROCEDURE II tests amplifiers 1 and 3 and their associated circuitry.

A. Back Panel Switch Settings

Set all back panel switches as in Procedure I.

B. Receiver Back Panel Connections

NOTE: The receiver utilizes inverters at various points in the amplifying circuitry. It is IMPORTANT to connect unit as instructed to prevent shut-downs or inversion of the output signals.

RECEIVER

TEST PANEL

- | | |
|--|---------------------------|
| 1. Right speaker "B" Positive (+) | Rt. Ch. Positive (8 ohm) |
| 2. Right speaker "B" Negative (–) | Rt. Ch. Ground (negative) |
| 3. Left speaker "A" Positive (+) | Lt. Ch. Positive (8 ohm) |
| 4. Left speaker "A" Negative (–) | Lt. Ch. Ground (negative) |
| 5. Audio signal generator (output set at zero volts) to both auxillary inputs. | |

C. Front Panel Switch Positions

Set all front panel switches as in Procedure I.

D. Turn-on Procedure:

Complete turn-on procedure as indicated in Procedure I.

It is now possible to test the Spatial Control™ Receiver amplifiers 1 and 3 in all functions shown under Test Procedure IA., IB., and IC. listed above.

E. Speaker Switching

1. Connect the receiver back panel connections as described in Test Procedure II.
2. Set rear panel Speakers A and B switches to "8-16" and "Other."
3. Use a 1000 Hz signal and monitor the amplifier outputs at approximately 2 volts output; release and depress the Speakers A front panel pushbutton. Only the left channel of the signal should be affected.
4. Leaving the Speakers A push button depressed, release and depress the Speakers B front panel pushbutton. Only the right channel of the signal should be affected.
5. Reconfigure the receiver back panel connections as shown in Test procedure I and repeat the procedure for the other two amplifier channels. Use a 1000 Hz signal and monitor the amplifier outputs at approximately 2 volts; release and depress the Speakers A front panel pushbutton. Only the right channel of the signal should be affected.
6. Leaving the Speakers A push button depressed, release and depress the Speakers B front panel pushbutton. Only the left channel of the signal should be affected.
7. Once relay activation is confirmed, both speaker switches should be depressed.

F. CMOS Logic test (901 Equalizer Switching and 6 dB Gain Switching)

1. 901 Series IV Equalizer Testing
 - a. Disconnect all connections from the Speaker outputs to the Test Panel.
 - b. Set both Speakers A and B rear panel switches to "Other" and "8-16 ohms."
 - c. Depress both front panel Spkr Switches.
 - d. Using a 700 Hz signal, monitor the preamplifier outputs for all channels and move the rear panel Speakers A Switch to '901'. The BOSE® 901 Series IV active equalizer should be connected in the preamp output signal for amplifiers 1 and 4 only. (This will results in a 7 dB $\pm$ 2 dB drop in signal level for those two channels.)
 - e. Move the Speakers B Switch to the '901' position. The BOSE® 901 Series IV active equalizer should now be connected in the preamp output signal for amplifiers 2 and 3 only. (This will results in a 7 dB $\pm$ 2 dB drop in signal level for those two channels.)
 - f. The complete 901 Series IV equalizer contour is displayed on the front cover of this manual. Test points for the equalizer are:
0 dB = 250 Hz at 250 mv at preamplifier output.
At 14kHz +21 dB $\pm$ 2 dB.
At 10kHz +16 dB $\pm$ 2 dB.
At 700 Hz –7 dB $\pm$ 2 dB.
At 40 Hz +16 dB $\pm$ 2 dB.
2. 6 dB Gain Switching
 - a. Disconnect all connections from the Speaker outputs to the Test Panel.
 - b. Set both Speakers A and B rear panel switches to "Other" and "8-16 ohms."
 - c. Depress both front panel Spkr Switches.
 - d. While monitoring all preamplifier channels, first release the front panel Speakers A switch, then the Speakers B switch and depress it again. A 6 dB $\pm$ 2 dB decrease in level should be detected as the switches are individually released. No reduction in level will be noted when both Speaker switches are depressed.*

*Individual channel levels may vary somewhat from each other as the gain controls in the preamplifier adjust the overall channel gain as seen at the speaker output. Reference the 6 dB measurement to the individual channel's level.

G. Spatial Control™ Circuitry

NOTE: Due to the Characteristics of the Spatial Circuitry, it can only be tested with the 901 IV Equalizer activated and with certain combinations of switch settings.

1. Set the Back Panel Speakers A switches to 8-16 ohms and '901'.

DISCONNECT ALL SPEAKER OUTPUT WIRES OR WIRES GROUNDING THE RECEIVER!!

2. Use the same switch settings listed in procedure I EXCEPT release Speakers B pushbutton, and depress the Spatial pushbutton.
3. Use the same turn-on procedure listed in procedure I.
4. Test Speakers A LEFT CHANNEL Spatial response in the following manner:

ALL FREQUENCY RESPONSE MEASUREMENTS FOR THIS SECTION ARE ± 2 dB.

- a. Connect the test equipment as follows:
Speakers A left channel (+) to Test Equipment Positive
Speakers A left channel (*) to Test Equipment Negative
 - b. Insert a 600 mV sine wave at 1000 Hz, adjust the receiver output to 1 volt.
With the Spatial Control™ CENTERED, reference THE OUTPUT to "0" dB AT EACH STEP. The following variations in frequency response can be seen as the control is moved from the CENTERED POSITION:
Wide setting of (+) terminal: - 12 dB.
Narrow setting of (+) terminal: + 3 dB.
 - c. Insert a 10kHz sine wave and move the Spatial Control™ from wide to narrow.
With the Spatial control CENTERED, reference THE OUTPUT to "0" dB AT EACH STEP. The following variations in frequency response can be seen as the control is moved from CENTERED POSITION:
Wide setting of (+) terminal: - 28 dB.
Narrow setting of (+) terminal: + 3 dB.
 - d. Insert a 100 Hz sine wave and move the control from Wide to Narrow.
With the Spatial control CENTERED, reference THE OUTPUT to "0" dB AT EACH STEP. Variations in frequency response should be ± 2 dB as the control is moved from CENTERED POSITION:
 - e. Repeat the test again for the Speakers A terminal connections listed below:
A. Speakers A left channel (-) to Test Equipment Positive
B. Speakers A left channel (*) to Test Equipment Negative
 - f. Insert a 600 mV sine wave at 1000 Hz, adjust the receiver output to 1 volt.
 - g. With the Spatial control CENTERED, reference THE OUTPUT to "0" dB AT EACH STEP. The following variations in frequency response can be seen as the control is moved from CENTERED POSITION:
Wide setting of (-) terminal: + 3 dB.
Narrow setting of (-) terminal: - 12 dB.
 - h. Insert a 10kHz sine wave and move the Spatial control from Wide to Narrow.
With the Spatial control CENTERED, reference THE OUTPUT to "0" dB AT EACH STEP. The following variations in frequency response can be seen as the control is moved from CENTERED POSITION:
Wide setting of (-) terminal: + 3 dB.
Narrow setting of (-) terminal: - 33 dB.
 - i. Insert a 100 Hz sine wave and move the control from Wide to Narrow.
With the Spatial control CENTERED, reference THE OUTPUT to "0" dB AT EACH STEP. Variations in frequency response should be ± 2 dB as the control is moved from CENTERED POSITION:
5. Test Speakers A RIGHT CHANNEL Spatial response in the following manner:

ALL FREQUENCY RESPONSE MEASUREMENTS FOR THIS SECTION ARE ± 2 dB.

- a. Connect the test equipment as follows:
Speakers A right channel (+) to Test Equipment Positive
Speakers A right channel (*) to Test Equipment Negative
- b. Insert a 600 mV sine wave at 1000 Hz, adjust the receiver output to 1 volt.
With the Spatial control CENTERED, reference THE OUTPUT to "0" dB AT EACH STEP. The following variations in frequency response can be seen as the control is moved from the CENTERED POSITION:
Wide setting of (+) terminal: + 3 dB.
Narrow setting of (+) terminal: - 12 dB.
- c. Insert a 10kHz sine wave and move the spatial control from wide to narrow.
With the Spatial control CENTERED, reference THE OUTPUT to "0" dB AT EACH STEP. The following variations in frequency response can be seen as the control is moved from CENTERED POSITION:
Wide setting of (+) terminal: + 3 dB.
Narrow setting of (+) terminal: - 28 dB.
- d. Insert a 100 Hz sine wave and move the control from Wide to Narrow.
With the Spatial control CENTERED, reference THE OUTPUT to "0" dB AT EACH STEP. Variations in frequency response should be ± 2 dB as the control is moved from CENTERED POSITION:
- e. Repeat the test again for the Speakers A terminal connections listed below:
A. Speakers A right channel (-) to Test Equipment Positive
B. Speakers A right channel (*) to Test Equipment Negative
- f. Insert a 600 mV sine wave at 1000 Hz, adjust the receiver output to 1 volt.

- g. With the Spatial control CENTERED, reference THE OUTPUT to "0" dB AT EACH STEP. The following variations in frequency response can be seen as the control is moved from CENTERED POSITION:
Wide setting of (–) terminal: – 12 dB.
Narrow setting of (–) terminal: + 3 dB.
- h. Insert a 10kHz sine wave and move the Spatial control from Wide to Narrow.
With the Spatial control CENTERED, reference THE OUTPUT to "0" dB AT EACH STEP. The following variations in frequency response can be seen as the control is moved from CENTERED POSITION:
Wide setting of (–) terminal: – 33 dB.
Narrow setting of (–) terminal: + 3 dB.
- i. Insert a 100 Hz sine wave and move the control from Wide to Narrow.
With the Spatial control CENTERED, reference THE OUTPUT to "0" dB AT EACH STEP. Variations in frequency response should be ± 2 dB as the control is moved from CENTERED POSITION:

Speakers A Bridged mode

- 1. Set the Back Panel Speakers A switches to 8-16 ohms and 'Other'
- 2. If using a dual trace scope, connect as follows:
 - a. Speakers A right channel (+) to Scope channel A
 - b. Speakers A right channel (–) to Scope channel B
 - c. Speakers A right channel (*) to Scope ground

DISCONNECT ANY OTHER SPEAKER OUTPUT WIRES OR WIRES GROUNDING THE RECEIVER!!

- 3. Use the same switch settings listed in procedure I but RELEASE SPEAKERS B PUSHBUTTON.
- 4. Use the same turn-on procedure listed in procedure I.
- 5. Test Speakers A bridged power output response in the following manner:
 - a. Use a 1000 Hz signal connected to the Auxillary input.
 - b. Output power and measurements can be determined using floating ground equipment connected across the (+) and (–) terminals.
 - c. The left channel can be checked in the same manner.

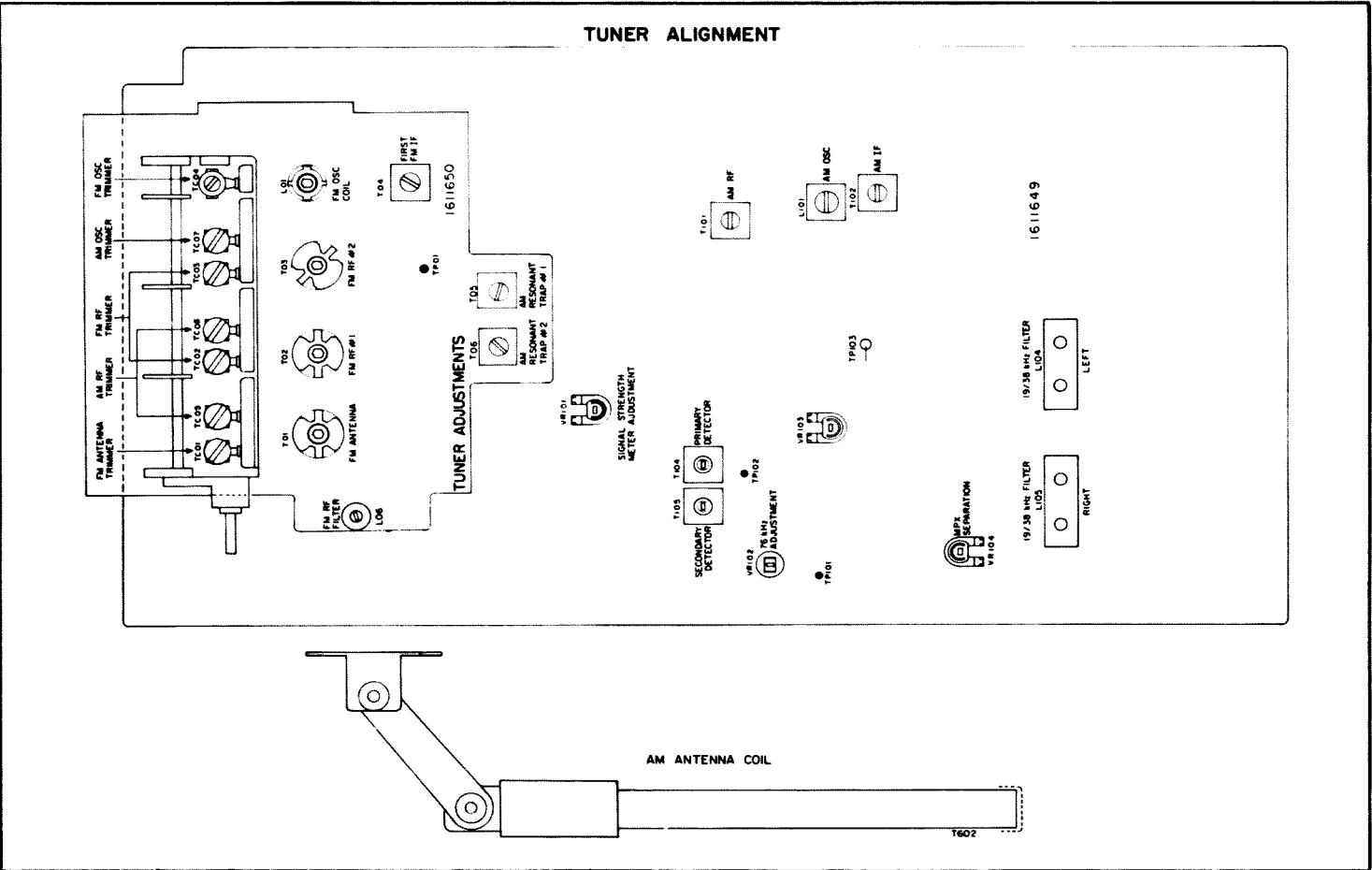
FM/AM TUNER ALIGNMENT

IMPORTANT

- 1. For AM Alignment, modulate the carrier with 400Hz.
- 2. Connect the VTVM across and 8 ohm load when measuring output from the audio amplifier.
When necessary, reduce the generator output so that meter reading does not exceed 2V.
- 3. After alignment has been completed, all coil slugs and trimmers that have been moved during alignment should be rewaxed to lock them in place.
- 4. Use only nonmetallic alignment tools to insure proper alignment.

A. AM SECTION

CIRCUIT ALIGNMENT	EQUIPMENT CONNECTION	STEP	GEN. FREQ.	DIAL SETTING	ADJUSTMENTS
IF	AM IF Sweep Generator	1	455 KHz	Tuning gang	T102 (AM IFT)
	MARKER Generator to TP104		(400Hz Mod.)	Fully closed	Adjust for maximum output.
	OSCILLOSCOPE across point TP103	2			Repeat until no further improvement can be made.
	OSCILLOSCOPE to Base of Q102	3			Adjust T05, T06 for minimum 455 KHz.
BAND	AM Signal Generator with loop antenna.	4	600 KHz	600KHz	L101 (AM OSC. Coil)
	Output Meter (VTVM)	5	1400KHz	1400KHz	TC07 (AM OSC. Trimmer)
		6	(400Hz Mod.)		Adjust for maximum output.
TRACKING	AM Signal Generator with loop antenna.	7	600KHz	Tune to signal	T602, T101 (AM ant. Coil)
	Output Meter (VTVM)	8	1400KHz	Tune to signal	TC05,06 (AM ANT. Trimmer)
		9		Tune to signal	Adjust for maximum output.
					Repeat steps 6 and 7.



B. FM SECTION

CIRCUIT ALIGNMENT	EQUIPMENT CONNECTION	STEP	GEN. FREQ.	DIAL SETTING	ADJUSTMENTS
Quadrature Detector	FM SIGNAL GENERATOR to antenna terminals through 300 dummy antenna. Oscilloscope, Dist. meter and Output Meter (VTVM) to TAPE OUT. (See Fig. A-4)	1	98MHz	Tune to signal	FM SIGNAL GENERATOR output; no output Tuning meter needle adjust to center by T104 output: 65dbf 100% mod. T105 adjust for minimum distortion.
		2	98MHz	Tune to signal	T04 Adjust for maximum symmetrical response.
IF	IF SWEEP GENERATOR MARKER GENERATOR to TP01	3	90MHz	Tune to signal	T02,T03 (RF Coil) T01 (ANT Coil) Adjust for maximum output.
RF AMPLIFIER	to antenna terminals through 300 ohm antenna matching network Output Meter (VTVM) to TAPE OUT. (See Fig. A-4)	(Mod.)			
		4	106MHz	Tune to signal	TC02,03 (RF Trimer), TC01 (ANT), L06 (RF) Adjust for maximum output
		5	(Mod.)		Repeat steps 8 and 9 to obtain suitable sensitivity at 90MHz and 106MHz.
LOCAL OSCILLATOR	FM SIGNAL GENERATOR to antenna terminals through 300 ohm antenna matching network Output Meter (VTVM) to TAPE OUT. (See Fig. A-4)	6	88 MHz	88MHz	L01 (OSC. Coil)
		7	108MHz	108MHz	TC04 (OSC. Trimmer) Adjust for maximum output.
		8			Repeat steps 5 and 6 several times.
	OSCILLOSCOPE Across Point TP102	9			Repeat step 1.

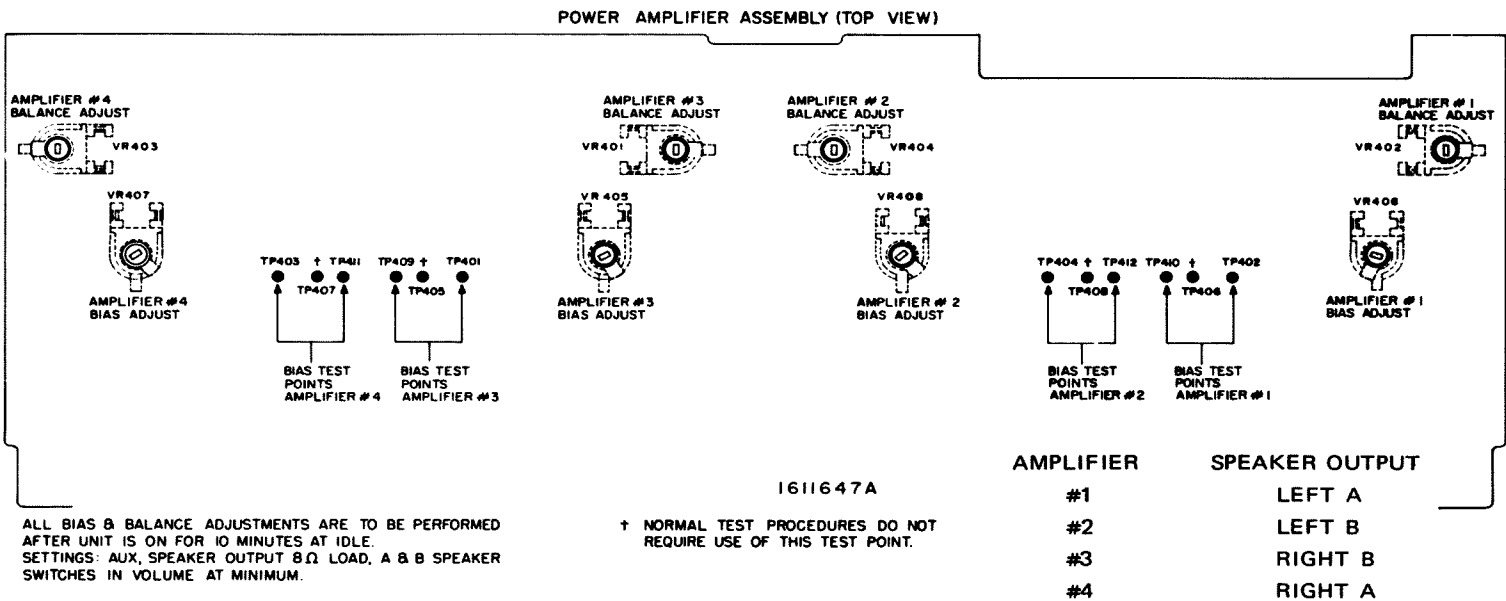
C. MPX SECTION

CIRCUIT ALIGNMENT	EQUIPMENT CONNECTION	STEP	GEN. FREQ.	DIAL SETTING	ADJUSTMENTS
19/38KHz	FM STEREO SIG. GEN. connect to EXT. MOD. of FM SIGNAL GENERATOR. FM SIG. GEN. to antenna terminals through 300 ohm antenna matching network Frequency Counter to TP101	1	98mHz (Mod.)	98mHz	(1) FM SIGNAL GENERATOR Output: 65 dbf unmod. Counter reading adjust to 76KHz $\pm$ 100Hz by VR102
					(2) Add composite signal to FM SIGNAL GENERATOR. Adjust VR104 for max. separation.
Pilot Suppressor	FM STEREO SIG. GEN. connect to ext. MOD. of FM SIGNAL GEN. FM SIGNAL GEN. to antenna terminals through 300 ohm dummy antenna	2	98mHz	98mhz	(1) FM SIGNAL GENERATOR Output: 65 dbf, pilot; 9% (2) Adjust for minimum 38kHz level in L and R channels.

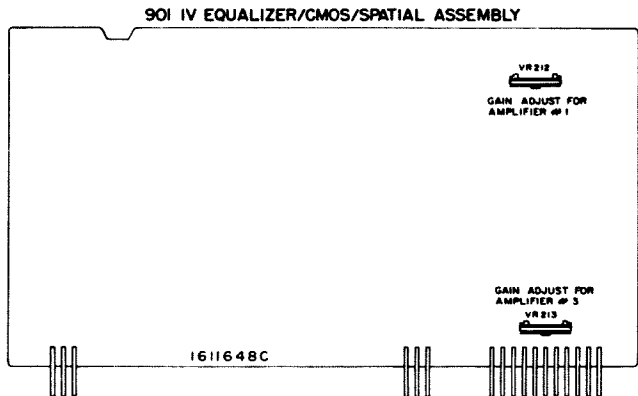
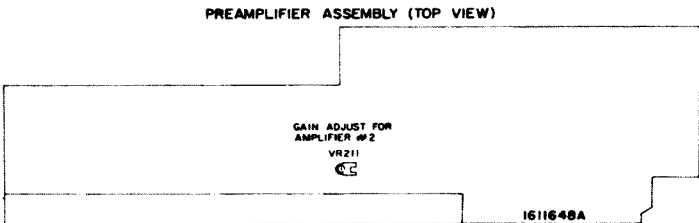
POWER AMPLIFIER ADJUSTMENT PROCEDURES

PROCEDURE: A pre-heating of units for about 10 minutes should be done prior to adjusting a idling current and a center point voltage as follows:

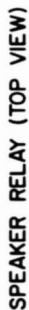
CIRCUIT-ALIGNMENT	TEST EQUIPMENT CONNECTION	SETTING	ADJUSTMENT
A. Idling current	Connect DC voltmeter with TP402 & 410, TP404 & 412, 401 & 409, 403 & 411. 8 ohm loaded (output terminals)	Turn the volume control to minimum position. Function switch set at AUX position.	VR401,402,403,404 are to be aligned to provide 15mV at test point which is equivalent to 15mV idling current.
B. Balance	Connect a DC volt meter with TP401,402,403,404. 8 ohm loaded (output terminals)	Same as above	Adjust VR 405,406,407,408 for minimum output (0 volts ± 5mV) at test point.



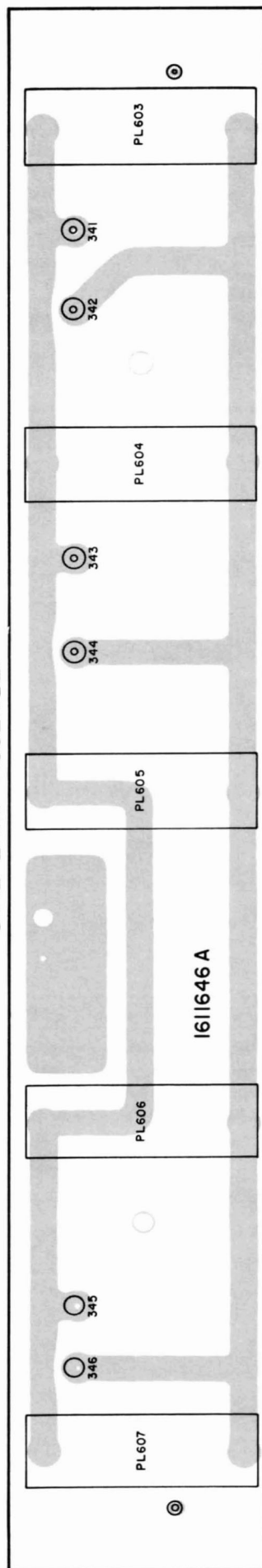
CIRCUIT-ALIGNMENT	TEST EQUIPMENT CONNECTION	SETTING	ADJUSTMENT
C. Gain	Connect a DC volt meter at TP401,402,403,404. 8 ohm loaded (output terminals) and audio generator (AUX input)	Turn the volume control to max. position. Function switch is to be set at AUX position. Speakers are A and B.	VR211,212,213 are to be adjusted to provide same gain as No. 4 amplifier.



24

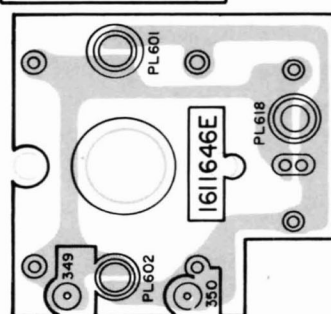


AC OUTLET



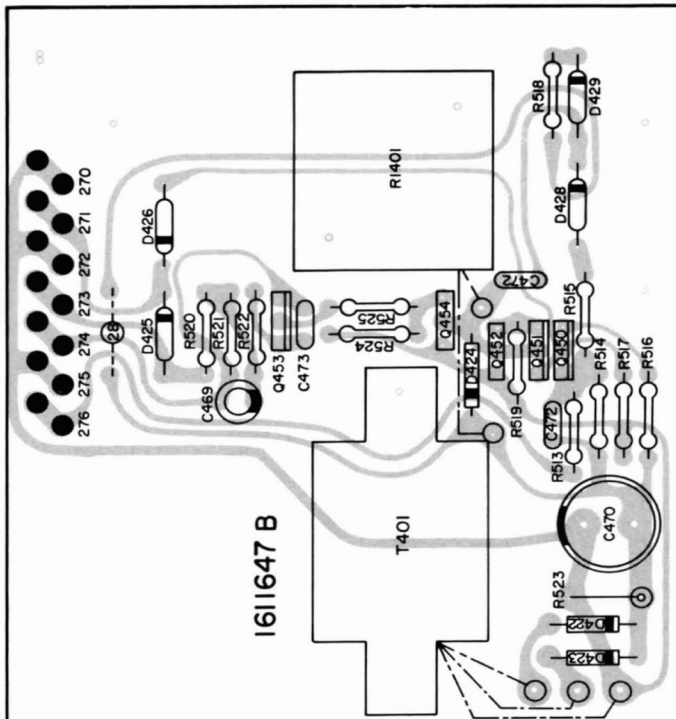
STEREO, 90I EQ./CMOS/SPATIAL LAMP ASSEMBLY

SELECTOR LAMP ASSEMBLY



VOLUME LAMP ASSEMBLY

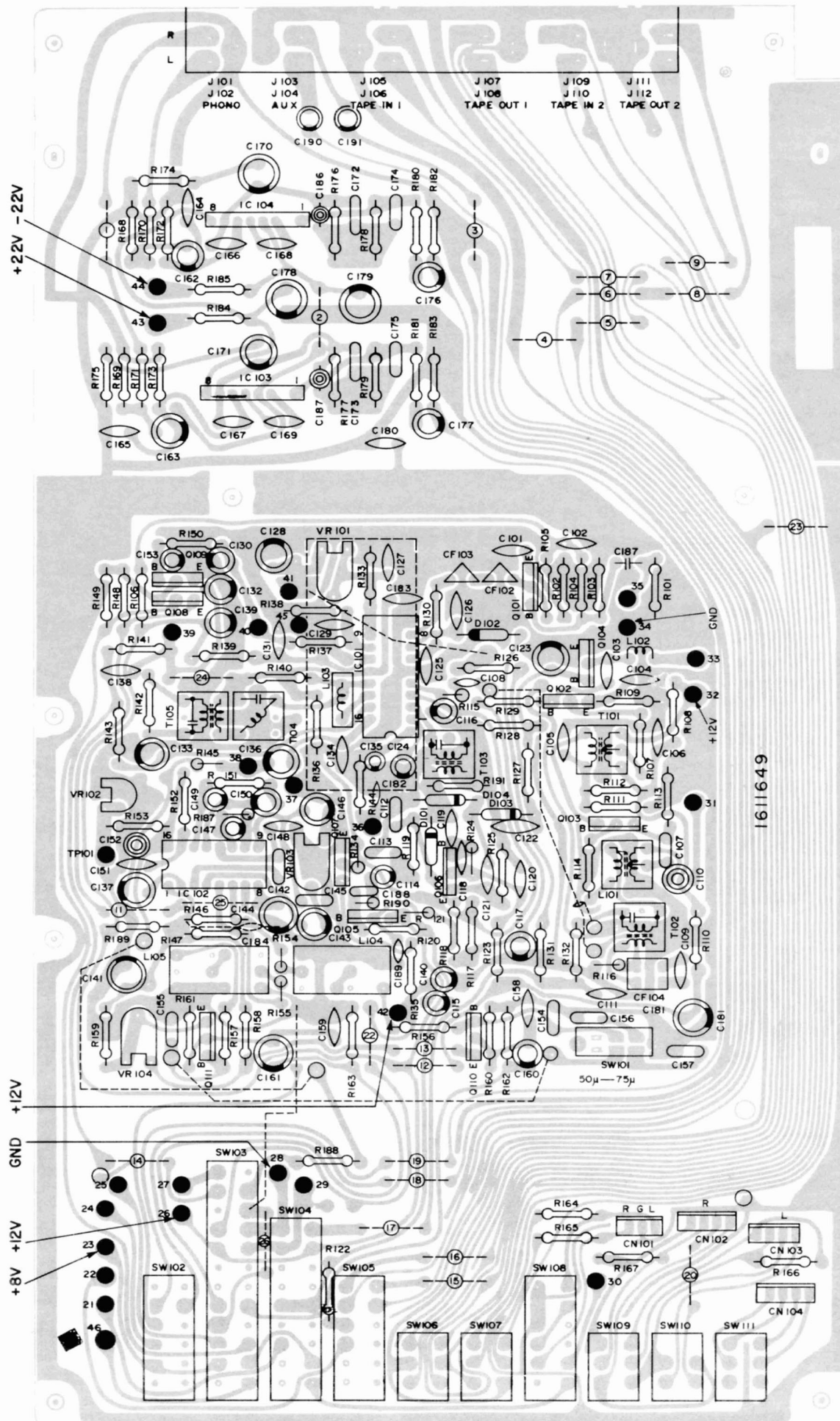
TURN-ON RELAY ASSEMBLY



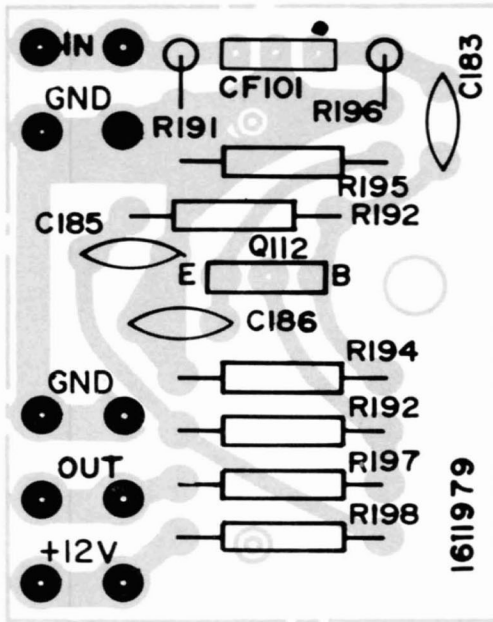
POWER AMPLIFIER ASSEMBLY



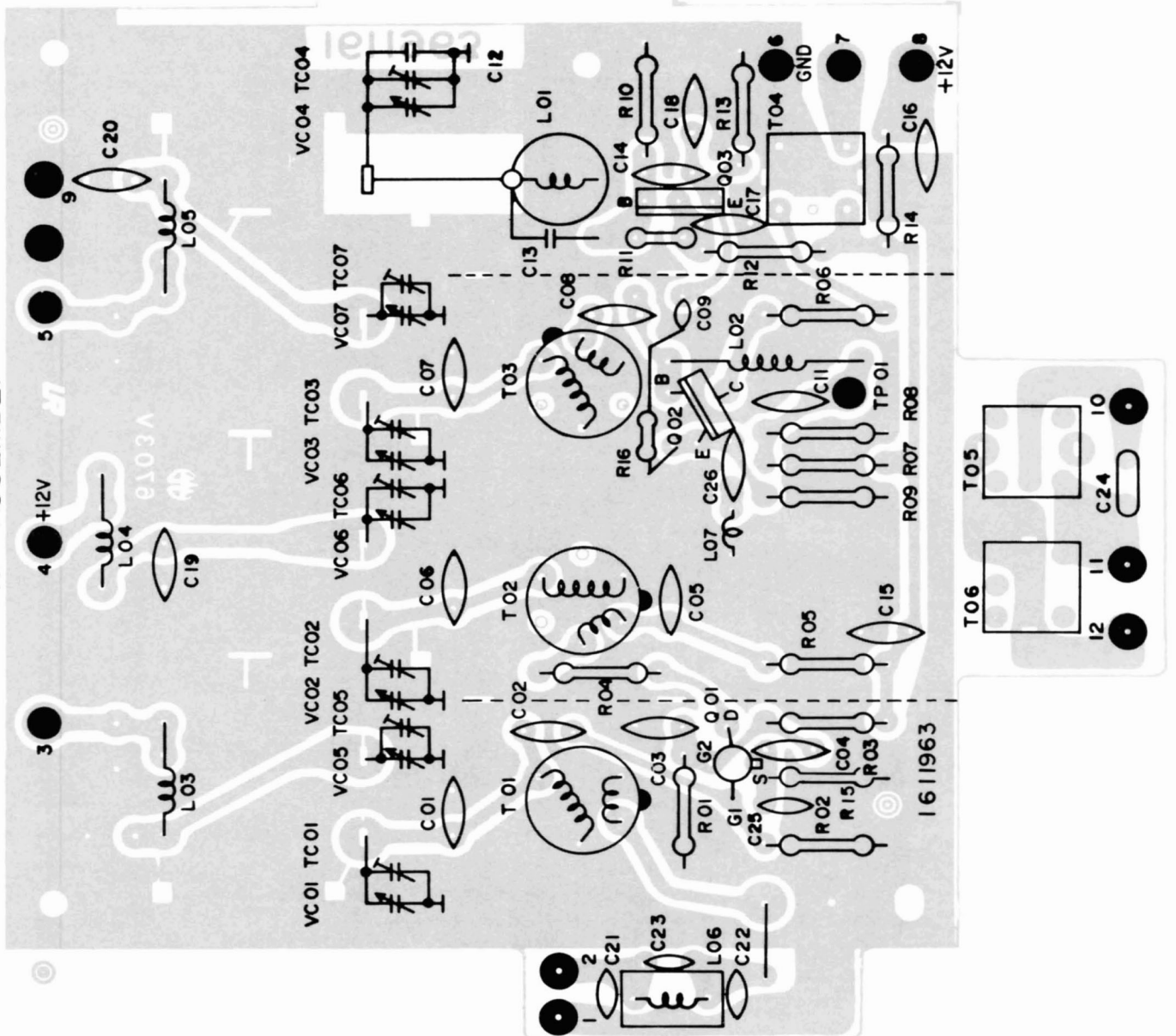
IF/MPX P.C.B. PARTS LOCATION (TOP VIEW)



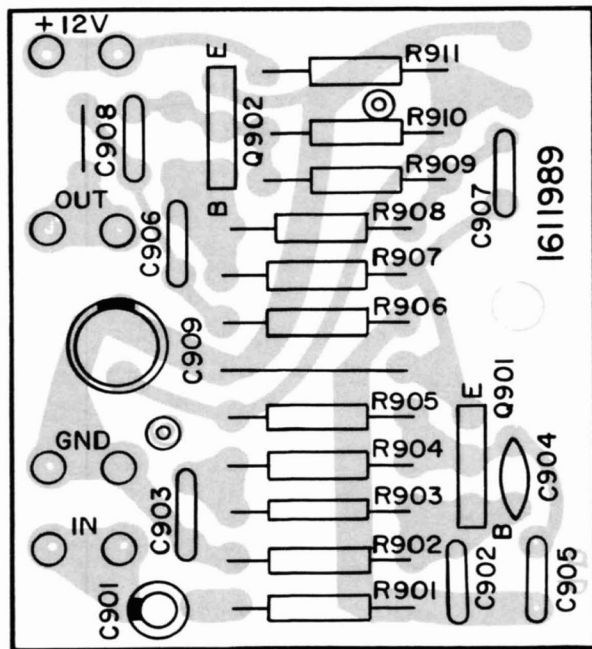
FM IF AMP ASSEMBLY



RF ASSEMBLY

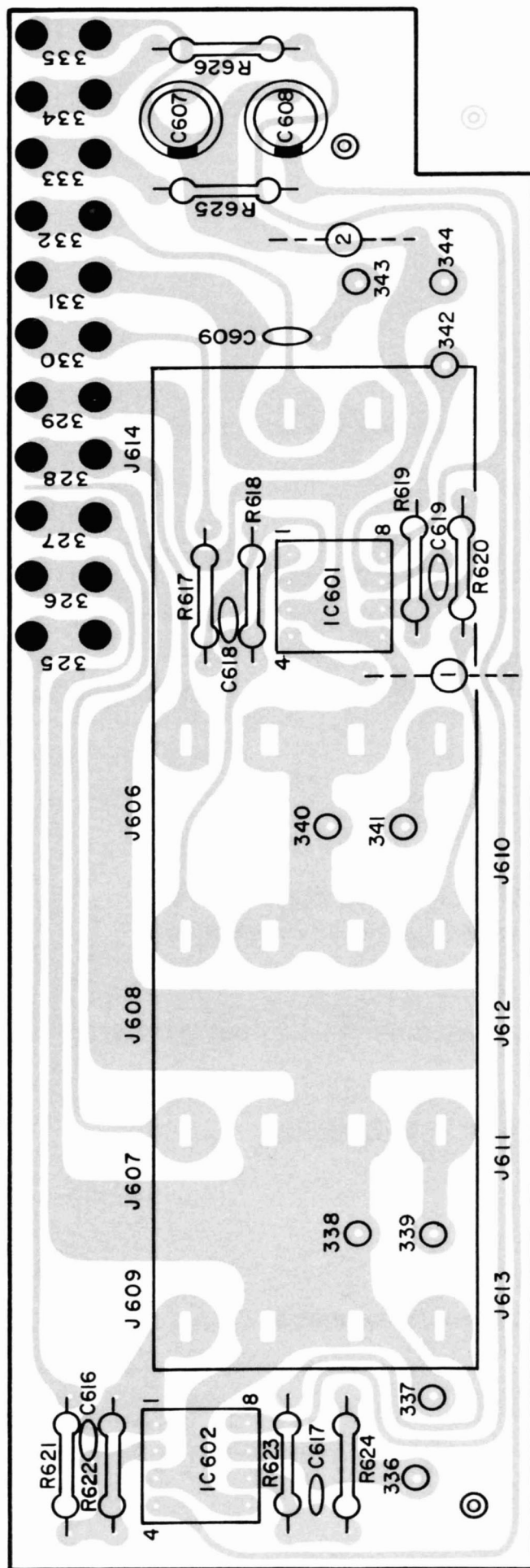


AM FILTER P.C.B. PARTS LOCATION (TOP VIEW)



9 PIN JACK ASSEMBLY (TOP VIEW)

1611800



TROUBLE-SHOOTING GUIDE

PROBLEM

RECEIVER FAILS TO TURN ON OR TURNS ON AND OFF.

POSSIBLE CAUSE AND SOLUTION

Rear Panel Switch must be set to "ON".
Front Panel Touch Switch must be activated.
Speaker wires shorted with high level program source.
Speaker impedance less than 8 ohms with rear panel switch set to 8-16 ohms.
Speaker impedance less than 4 ohms with rear panel switch set to 4 ohms.
Defective component in power amplifier circuitry.
DC offset.
High internal temperatures.
Amplifier connected to common ground at test bench.
Defective power or turn-on transformer.
Open fuse F601.
Defective power supply circuit.

NOTE: If unit fails to stay on it can be manually turned on by:

1. Remove top cover.
2. With Variac set at ZERO VOLTS, manually depress the solenoid (located on the turn-on relay pcb) in. This releases the latch, and the micro switch is then also released.
3. Slowly bring up variac, checking for high current draw.
4. Check for offset, or power supply problems.
5. If unit does not try to turn on, repeat steps 2 thru 4 assuring latch is released.

THE RECEIVER TURNS OFF AT HIGH VOLUMES.

IF OPERATING 8 OHM SPEAKERS:

Impedance at each speaker terminal must be 8 ohms or higher (operating in the bridged mode with the rear panel switches set to "8-16 ohms".)

IF OPERATING 4 OHM SPEAKERS:

Impedance at each speaker terminal must be 4 ohms or higher (with rear panel switches set to "4 ohms".)

SPATIAL CONTROL WON'T TURN ON.

Switches must be set to the following:

Spkrs A set to 8-16 ohms.
Spkrs A set to 901.
ONLY Speakers A (front panel pushbutton) depressed.
Spatial Pushbutton depressed.

ONLY HALF THE SPEAKER (901 III OR IV) PLAYS.

Speaker is wired for spatial performance but Receiver rear panel Speakers A switch is set to "4 ohms." (Disconnect "*" terminal wiring whenever rear panel switch is set to 4 ohms.)

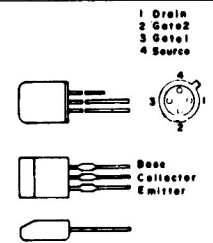
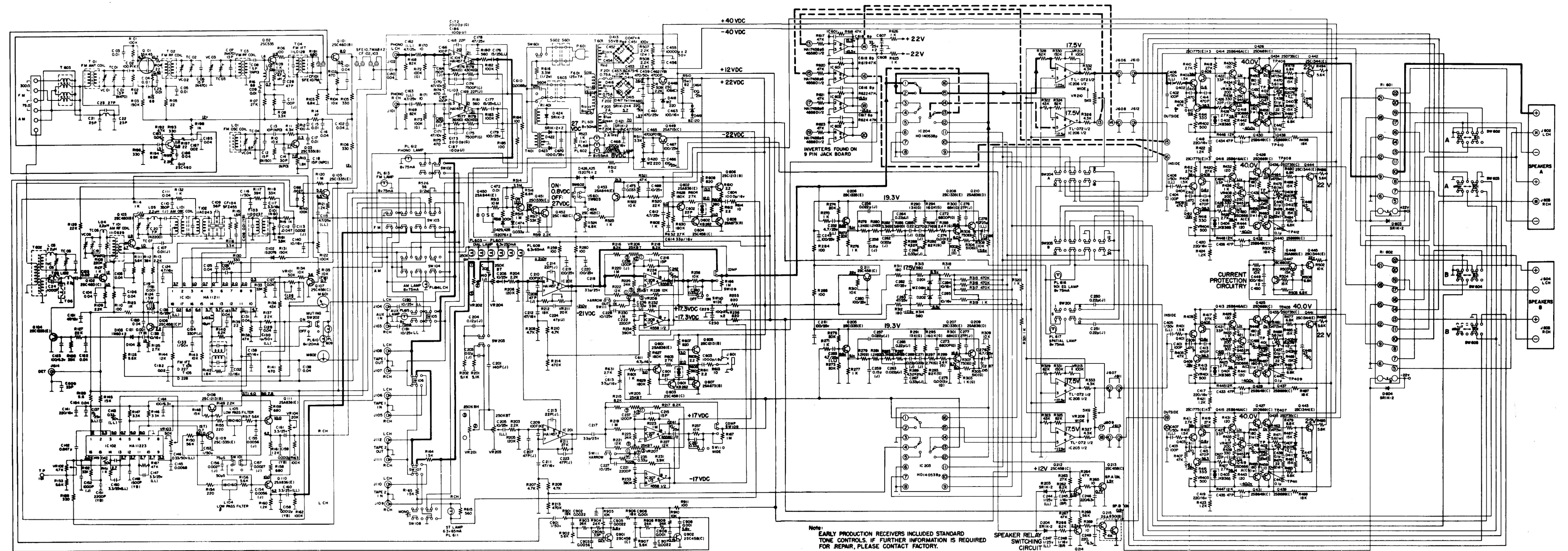
LIGHTS, BUT NO SOUND

TAPE 1 or 2 depressed.
Pre-out/Main-In connections non-functional.
Spkrs A or B not depressed.
One pair of speakers connected to Speakers A, Spkrs A and B pushbutton depressed, and Spatial Control set to "Wide".
Check fuses F201, F202.
Check operation of Speaker relays.

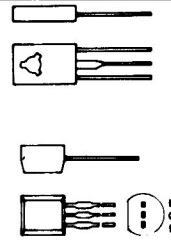
SOUND, BUT NO LIGHTS:

Check fuses F203, F204.

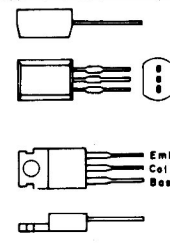
MAIN CIRCUIT SCHEMATIC



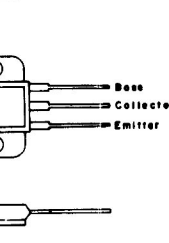
Q01,
Q02, Q03, Q04, Q05, Q06, Q07, Q08, Q09, Q10, Q11, Q12
Q205, Q206, Q207, Q208, Q209, Q210
Q211, Q212, Q213, Q214, Q215, Q216
Q433, Q434, Q435, Q436, Q437, Q438, Q439, Q440
Q601, Q602, Q603, Q604, Q605, Q606
Q607, Q608, Q609, Q610



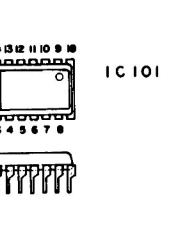
Q425, Q426, Q427, Q428, Q429
Q430, Q431, Q432, Q433, Q434, Q435, Q436
Q401, Q402, Q403, Q404, Q405
Q406, Q407, Q408, Q409, Q410
Q411, Q412, Q413, Q414, Q415, Q416
Q417, Q418, Q419, Q420
Q448



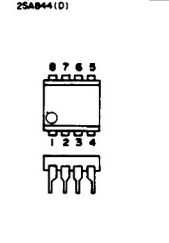
Q413, Q414, Q415, Q416
Q417, Q418, Q419, Q420
Q433, Q434, Q435, Q436
Q437, Q438, Q439, Q440



Q433, Q434, Q435, Q436
Q437, Q438, Q439, Q440



Q433, Q434, Q435, Q436
Q437, Q438, Q439, Q440



Q433, Q434, Q435, Q436
Q437, Q438, Q439, Q440

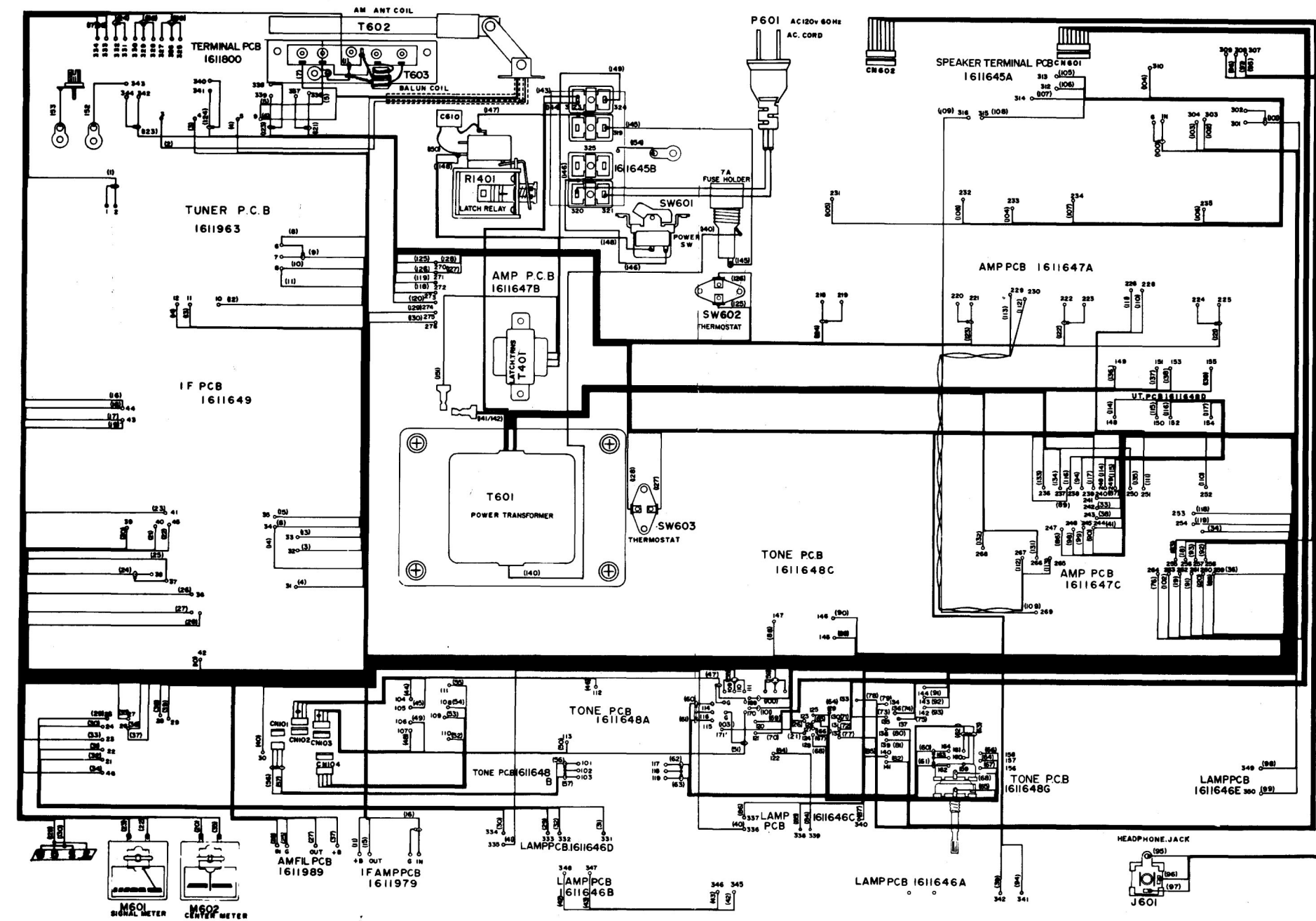


Q433, Q434, Q435, Q436
Q437, Q438, Q439, Q440

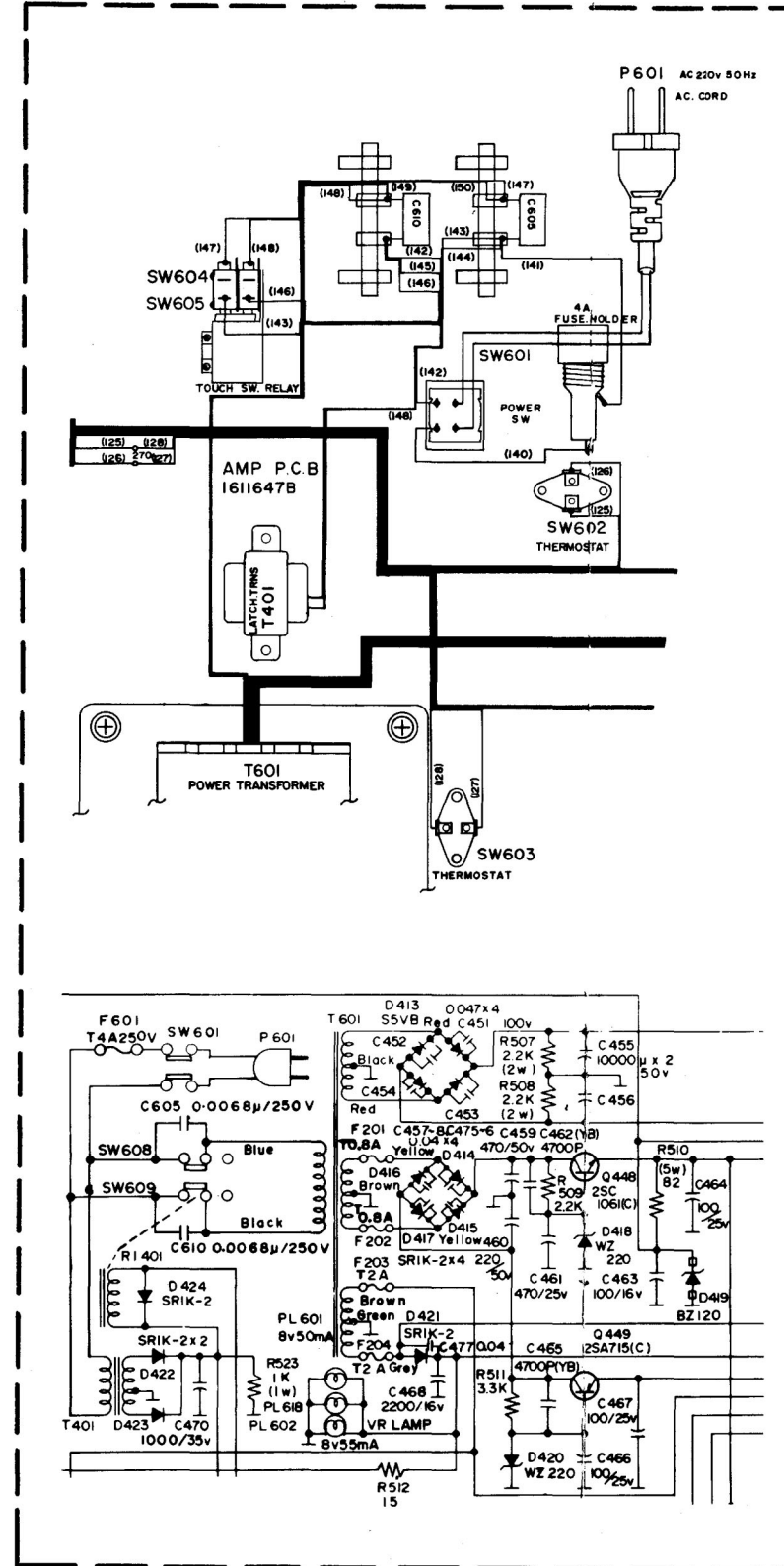


Q433, Q434, Q435, Q436
Q437, Q438, Q439, Q440

WIRING DIAGRAM



220V (EUROPEAN VERSION)



WIRING CONNECTION CHART

Wire NBR	Color	PCB NBR	Connection	Locations	
			From	To	
1	Black	1,2	TU PCB 1611963	AM FM ANT Terminal Board	
2	Yellow	3	TU PCB 1611963	T602 AM ANT Coil	
3	Blue	4	32	TU PCB 1611963	IF PCB 1611649
4	Sky Blue	5	31	TU PCB 1611963	IF PCB 1611649
5	Pink	9		TU PCB 1611963	AM FM ANT Terminal Board
6	Black	9		TU PCB 1611963	T602 AM ANT Coil
7	Blue			T602 AM ANT Coil	AM FM ANT Terminal Board
8	Gray	6	34	TU PCB 1611963	IF PCB 1611649
9	Red	6,7		TU PCB 1611963	IF AMP PCB 1611979
10	White	8	42	TU PCB 1611963	IF PCB 1611649
11	Green	8		TU PCB 1611963	IF AMP PCB 1611979
12	Red	10		TU PCB 1611963	T602 AM ANT Coil
13	White	11	33	TU PCB 1611963	IF PCB 1611649
14	Black	12	34	TU PCB 1611963	IF PCB 1611649
15	Red	35		IF PCB 1611649	IF AMP PCB 1611979
16	White	44	333	IF PCB 1611649	9 Pin Jack PCB 161800
17	Red	43	334	IF PCB 1611649	9 Pin Jack PCB 161800
18	White	44	256	IF PCB 1611649	PS PCB 1611647C
19	Red	43	262	IF PCB 1611649	PS PCB 1611647C
20	Sky Blue	39		IF PCB 1611649	M602 Center Meter
21	Gray	40	124	IF PCB 1611649	Preamp PCB 1611648A
22	Green	45		IF PCB 1611649	M601 Signal Meter
23	Yellow	41		IF PCB 1611649	M601 Signal Meter
24	White	38,37	332,331	IF PCB 1611649	9 Pin Jack PCB 161800
25	Black	37		IF PCB 1611649	AM FIL PCB 1611989
26	Violet	36	133	IF PCB 1611649	Preamp PCB 1611648A
27	White			IF PCB 1611649	AM FIL PCB 1611989
28	Sky Blue			IF PCB 1611649	AM FIL PCB 1611989
29	Gray	25	333	IF PCB 1611649	Lamp PCB 1611646D
30	White	24	334	IF PCB 1611649	Lamp PCB 1611646D
31	Yellow	22	331	IF PCB 1611649	Lamp PCB 1611646D
32	Red	21	332	IF PCB 1611649	Lamp PCB 1611646D
33	Pink	23	242	IF PCB 1611649	PS PCB 1611647C
34	Black	46		IF PCB 1611649	PS PCB 1611647C
35	Black	27		IF PCB 1611649	M602 Center Meter
36	Orange	26	259	IF PCB 1611649	PS PCB 1611647C
37	Red	26		IF PCB 1611649	AM FIL PCB 1611989
38	Blue	28	243	IF PCB 1611649	PS PCB 1611647C
39	Yellow	29	342	IF PCB 1611649	Lamp PCB
40	Brown	30	336	IF PCB 1611649	Lamp PCB 1611646C
41	Black	335	244	Lamp PCB 1611646D	PS PCB 1611647C
42	Yellow	348	345	Lamp PCB 1611646A	Lamp PCB 1611646B
43	White	347	346	Lamp PCB 1611646A	Lamp PCB 1611646B
44	White	104	CN102	UT PCB 1611648A	IF PCB 1611649
45	Orange	105	CN102	UT PCB 1611648A	IF PCB 1611649
46	Sky Blue	112	CN102	UT PCB 1611648A	IF PCB 1611649
47	Brown	169,G	CN102	UT PCB 1611648A	IF PCB 1611649
48	Violet	107	CN103	UT PCB 1611648A	IF PCB 1611649
49	Red	106	CN103	UT PCB 1611648A	IF PCB 1611649
50	Yellow Green	113	CN103	UT PCB 1611648A	IF PCB 1611649
51	Gray	170,G	CN103	UT PCB 1611648A	IF PCB 1611649
52	Yellow	110	CN104	UT PCB 1611648A	IF PCB 1611649
53	Blue	109	CN104	UT PCB 1611648A	IF PCB 1611649
54	Pink	108	CN104	UT PCB 1611648A	IF PCB 1611649
55	Green	111	CN104	UT PCB 1611648A	IF PCB 1611649
56	Gray	101	CN101	UT PCB 1611648B	IF PCB 1611649
57	Gray	103	CN101	UT PCB 1611648B	IF PCB 1611649
58	Black	109,110 111	330,329 328	UT PCB 1611648B	9 Pin Jack 1611800
59	Red		327,326 325	UT PCB 1611648B	9 Pin Jack 1611800
60	Gray	114	164	UT PCB 1611648A	Preamp PCB 1611648G
61	Gray	115	162	UT PCB 1611648A	Preamp PCB 1611648G
62	Gray	117	161	UT PCB 1611648B	Preamp PCB 1611648G
63	Gray	119	159	UT PCB 1611648B	Preamp PCB 1611648G
64	Orange	129	157	UT PCB 1611648A	Preamp PCB 1611648G
65	Pink	125		UT PCB 1611648A	Preamp PCB 1611648G
66	Green	126	158	UT PCB 1611648A	Preamp PCB 1611648G
67	Blue	127	156	UT PCB 1611648A	Preamp PCB 1611648G
68	Sky Blue	128		UT PCB 1611648A	Preamp PCB 1611648G
69	Black	120	CN601	UT PCB 1611648A	Speaker Relay PCB 1611645A
70	Blue	121		UT PCB 1611648A	Speaker Relay PCB 1611645A
71	Brown	130	CN601	UT PCB 1611648A	Speaker Relay PCB 1611645A
72	Gray	131	CN601	UT PCB 1611648A	Speaker Relay PCB 1611645A
73	Yellow	135	CN601	UT PCB 1611648A	Speaker Relay PCB 1611645A
74	White	136	CN601	UT PCB 1611648A	Speaker Relay PCB 1611645A
75	Red	137	CN601	UT PCB 1611648A	Speaker Relay PCB 1611645A
76	White	264	CN601	PS PCB 1611647C	Speaker Relay PCB 1611645A
77	Orange	132	CN602	UT PCB 1611648A	Speaker Relay PCB 1611645A
78	Orange Green	133	CN602	UT PCB 1611648A	Speaker Relay PCB 1611645A
79	Pink	134	CN602	UT PCB 1611648A	Speaker Relay PCB 1611645A
80	Green	138	CN602	UT PCB 1611648A	Speaker Relay PCB 1611645A
81	Violet	139	CN602	UT PCB 1611648A	Speaker Relay PCB 1611645A

Wire NBR	Color	PCB NBR	Connection Locations		
			From	To	
82	Light Green	141	CN602	UT PCB 1611648A	Speaker Relay PCB 1611645A
83	Sky Blue	255	CN602	PS PCB 1611647C	Speaker Relay PCB 1611645A
84	Brown	122	339	UT PCB 1611648A	Lamp PCB 1611646C
85	Green	140	338	UT PCB 1611648A	Lamp PCB 1611646C
86	Violet	337	247	Lamp PCB 1611646C	PS PCB 1611647C
87	Orange	340	241	Lamp PCB 1611646C	PS PCB 1611647C
88	Yellow	147	259	UT PCB 1611648A	PS PCB 1611647C
89	Violet	145	238	UT PCB 1611648A	PS PCB 1611647C
90	Black	146	244	UT PCB 1611648A	PS PCB 1611647C
91	Red	144	261	UT PCB 1611648A	PS PCB 1611647C
92	Black	143	258	UT PCB 1611648A	PS PCB 1611647C
93	White	142	257	UT PCB 1611648A	PS PCB 1611647C
94	Black	341	239	Lamp PCB 1611646A	PS PCB 1611647C
95	Black	J601	307	Headphone Jack	Speaker Relay PCB 1611645A
96	Red	J601	307	Headphone Jack	Speaker Relay PCB 1611645A
97	White	J601	308	Headphone Jack	Speaker Relay PCB 1611645A
98	Red	349	246	Lamp PCB 1611646E	PS PCB 1611647C
99	Black	350	245	Lamp PCB 1611646E	PS PCB 1611646C
100	Red	169		UT PCB 1611648A	Speaker Relay PCB 1611645A
101	White	170	310,302	UT PCB 1611648A	Speaker Relay PCB 1611645A
102	White	303	263	Relay PCB 1611645A	PS PCB 1611647C
103	Black	304	171	Relay PCB 1611645A	Preamp PCB 1611648A
104	Black	310	233	Relay PCB 1611645A	AF PCB 1611647A
105	Orange	313	231	Relay PCB 1611645A	AF PCB 1611647A
106	White	312	235	Relay PCB 1611645A	AF PCB 1611647A
107	Blue	314	234	Relay PCB 1611645A	AF PCB 1611647A
108	Yellow	315	232	Relay PCB 1611645A	AF PCB 1611647A
109	Black	316	269	Relay PCB 1611645A	PS PCB 1611647C
110	White	228	252	AF PCB 1611647A	PS PCB 1611647C
111	Red	226	251	AF PCB 1611647A	PS PCB 1611647C
112	Red	230	267	AF PCB 1611647A	PS PCB 1611647C
113	White	229	265	AF PCB 1611647A	PS PCB 1611647C
114	Orange	148	248	Fuse PCB 1611648D	PS PCB 1611647C
115	Yellow	150	249	Fuse PCB 1611648D	PS PCB 1611647C
116	Blue	152	238	Fuse PCB 1611648D	PS PCB 1611647C
117	Gray	154	240	Fuse PCB 1611648D	PS PCB 1611647C
118	Orange	253	273	PS PCB 1611647C	Turn-on Relay 1611647B
119	Brown	254	272	PS PCB 1611647C	Turn-on Relay 1611647B
120	White	260	274	PS PCB 1611647C	Turn-on Relay 1611647B
121	Brown	224,225	336,337	AF PCB 1611647A	9 Pin Jack PCB 1611800
122	Gray	222,223	338,339	AF PCB 1611647A	9 Pin Jack PCB 1611800
123	Brown	220,221	342,344	AF PCB 1611647A	9 Pin Jack PCB 1611800
124	Gray	218,219	340,341	AF PCB 1611647A	9 Pin Jack PCB 1611800
125	Sky Blue	270	SW602	Latch PCB 1611647B	Bimetal
126	Orange Green	271	SW602	Latch PCB 1611647B	Bimetal
127	Orange Green	271	SW603	Latch PCB 1611647B	Bimetal
128	Sky Blue	270	SW603	Latch PCB 1611647B	Bimetal
129	Black	275		Latch PCB 1611647B	BOSE Badge
130	Black	276		Latch PCB 1611647B	BOSE Badge
131	Black	266	T601	PS PCB 1611647C	Transformer
132	Red	268	T602	PS PCB 1611647C	Transformer
133	Red	236	T602	PS PCB 1611647C	Transformer
134	Yellow Green	237	T602	PS PCB 1611647C	Transformer
135	Brown	250	T602	PS PCB 1611647C	Transformer
136	Yellow	149	T602	Fuse PCB 1611648D	Transformer
137	Yellow	151	T601	Fuse PCB 1611648D	Transformer
138	Blue	153	T601	Fuse PCB 1611648D	Transformer
139	Gray	155	T601	Fuse PCB 1611648D	Transformer
140	Brown	156	T601	Transformer T601	Fuse Holder
141	Black			Transformer T601	But Splice
142	Yellow			Transformer T601	But Splice
143	Gray		323	Transformer T601	1611645B
144	Orange		323	Transformer,T601	1611645B
145	Brown	319		Fuse Holder	1611645B
146	Green	SW601	318	SW601	1611645B
147	Red		317	Micro Switch	1611645B
148	Orange		SW601	Micro Switch	SW601
149	Brown	324	T401	1611645B	Transformer
150	Red		T401	Micro Switch	Transformer
151	Orange		T401	Transformer	But Splice
152	Gray	343		Jack PCB 1611800	Lug Plate
153	Gray			Ground Terminal	Lug Plate
154	Black	325		1611645B	Lug Plate

VOLTAGE CONVERSION INSTRUCTIONS

CAUTION: All voltage conversions must be performed with the AC power cord disconnected from any power source.

Conversion instructions are arranged in three steps; main power transformer conversion, turn-on relay conversion, and FM de-emphasis change.

MAIN POWER TRANSFORMER

1. Disconnect yellow and black transformer leads that are tied together.
2. Disconnect orange wire at switched AC outlet and connect to yellow wire. Insulate the connection.
3. Disconnect brown wire at AC fuse and insulate. (This wire is not used for 240 volt operation.) Connect Black wire to center of AC fuse.
4. Replace the AC line fuse with a 250V 4 Amp fast acting fuse.
5. Relabel rear chassis for 240V operation.

TURN-ON TRANSFORMER

1. Disconnect Red wire going to the micro-switch and insulate wire.
2. Locate unused Orange primary wire. Connect to micro-switch.

FM DE-EMPHASIS

1. Locate FM de-emphasis switch SW 101 near FM MPX circuitry.
2. Move switch from 70 to 50 microsecond de-emphasis.

PARTS LIST

SEMICONDUCTORS

Symbol	Description	Part Number	Symbol	Description	Part Number
TRANSISTORS					
Q01	FET 3SK45(B)	112136	C164,165	150p(J) Ceramic	113311
Q02	2SC535(B)	109880	C168,169,213,214,425-428,601,602	22p(J) Ceramic	113310
Q03	2SC461(B)	109881	C172,173	2000P(G) Polypropylen	112251
Q101,103,112	2SC460(B)	112241	C174,175	7500P(G) Polypropylen	112250
Q102	2SC460(C)	112138	C178,282,283	47u/25V Electrolytic	113312
Q104,105,109,205-208,451	2SC1335(E)	112117	C179,219,220,229,230,243,280,281,464,466,467	100uF/25V Electrolytic	113314
Q106,107,211,212	2SC458(C)	112242	C186,187	100P(J) Polystyrene	112249
Q108	2SC1213(B)	112244	C190,191	10u/25V Electrolytic	113313
Q110,111	2SA836(E)	112243	C201,202	140P(J) Polystyrene	112200
Q209,210	2SA836(D)	119887	C203,204	0.12u(J) Mylar	112196
Q213	2SC1335(F)	113405	C205,206,227,228,241,242	10uF/16V (LL)	112271
Q214,215	2SA844(D)	112213	C207,208,223,224,433,436	47p(J) Ceramic	113359
Q401-412	2SC1775(E)	112123	C215,216	15pF(J) Ceramic	113373
Q413-416	2SB646A(C)	112210	C217,218	33uF/25V (LL)	112273
Q417-420	2SD666A(C)	112209	C221,222,902,905,907	0.0022u(J) Mylar	112275
Q421-424	2SA945(P)	112215	C235,236,260,261,266,267	0.33u(J) Mylar	112199
Q425-428	2SD699(C)	112207	C244,247	1uF/25V(LL) Electrolytic	113374
Q429-432	2SB649(C)	112208	C245,248	1uF/16V BP Capacitor	112270
Q433-436	2SD735(C)	112121	C246,249	220uF/6.3V Electrolytic	109979
Q437-440	2SB699(C)	112122	C250,251,264,265,268-271	0.22u(J) Mylar	112198
Q441-445	2SC1344(E)	112211	C252,253,278,279	1uF/25V (LL)	112272
Q446	2SA893(E)	112142	C256,257,262,263	0.022u(J) Mylar	109972
Q447	2SC1890(E)	112212	C258,259	0.15u(J) Mylar	112197
Q448	2SC1061(C)	109893	C272,273	6800P(G) Polypropylen	112202
Q449	2SA715(C)	112143	C274,275	1200P(G) Polypropylen	112201
Q450,453	2SA844(E)	112213	C405-408,901	1uF 50V (LL)	112218
Q452,454	2SC1162(C)	112214	C409-416	470p(K) Ceramic	113356
Q601,602	2SA836(E)	112168	C417,420	220uF/16V Electrolytic	109954
Q603,604,901,902	2SC458(C)	109885	C421-424,609,904	33pF(J) Ceramic	113357
Q605,606	2SC1213(B)	112169	C429-432,445-448	4.7uF/50V Electrolytic	113358
Q607,608	2SA673(B)	112170	C437-444	0.1uF Ceramic	113360
I.C.'s			C449,450,463	100uF/16V Electrolytic	109966
IC101	HA11211	112114	C451-454	0.047uF/100V(M) Mylar	112222
IC102	HA11223W	112115	C459	470uF/50V Electrolytic	113361
IC103,104,201,202	HA1457	112116	C461	470uF/25V Electrolytic	113362
IC203,204	HA14053PB	112119	C462,465	4700pF Ceramic	113363
IC205,206	TL072CP	112110	C468	2200uF/16V Electrolytic	113425
IC207,208	IC4558D	110369-2	C469	10uF/25V Electrolytic	109959
IC601,602	IC4558D	110369-2	C470	1000uF/35V Electrolytic	113364
DIODES			C472	0.01uF/50V(K) Mylar	109957
D101,103,104	1N60	112139	C473,474	0.033uF/50V(K) Mylar	112221
D102,405-412,425,426,428,429	1S2076	109894	C603,604	470uF/16V Electrolytic	113407
D201,202	W2081(Zener)	112120	C607,608	33uF/25V Electrolytic	113408
D203,204,414-417,421-424,603,604	SR1K-2	112113	C616,619	8pF(50v J) Ceramic	113413
D401-404	KB365(Varistor)	112217	C909	33uF/16V Electrolytic	113412
D413	S5VB(200V)	112216	CHOKES, COILS, FILTERS, TRIMMERS		
D418,420	W2220(Zener)	112124	CF101	Ceramic Filter (SFE 10.7 ML)	112239
D419	B2120(Zener)	109897	CF102,103	Ceramic Filter (SFE 10.7MA8)	113294
D601,602	KB262 (Varistor)	112434	CF104	Ceramic Filter (SFE 455B)	112240
CAPACITORS			L01	FM Osc Coil	112130
Tolerance Table (C) = 2% (J) = 5% (K) = 10% (LL) = Low Leakage			L02	Choke Coil 2.2 uH	112184
VCL-7	Variable Capacitor	112134	L03-05,102	Choke Coil 2.2 uF	112185
C01,07	13pF(N470) Ceramic	109933	L06	Choke Coil 0.05 uH	112183
C02,118,166,167,209,210,401-404	100pF(K) Ceramic	109965	L101	AM Osc Coil	109907
C03-05,10,15,17,108	0.01uF(J) Ceramic	113270	L103	Choke Coil 18uH	112238
C06	15pF(N470) Ceramic	113271	L104,105	19/38 KHz Coil (MPX Coil)	112137
C08,19	5pF(NPO) Ceramic	113272	L401-404	Choke Coil	112141
C09	3pF(NPO) Ceramic	113273	T01	Fm Ant Coil	112128
C11	100pF(J) Ceramic	113274	T02,03	FM RF Coil	112129
C12	15pF(N220) Ceramic	113275	T04	FM IFT	112133
C13	10pF(NPO) Ceramic	113276	T05	IFT TM60542	112131
C14	30pF(NPO) Ceramic	113277	T06	IFT TM60543	112132
C16,101,102,104-106,111,120,122,125-127,129,131,138,180,183-186,189,457,458,475-477	0.04uF Ceramic	109940	T101	AM RF Coil 44M654	112193
C18	15pF(NPO) Ceramic	109938	T102	AM IFT 46Y006	112194
C20	7pF(N2200) Ceramic	113278	T103	AM IFT 46Y006	112195
C21,22	25pF(J) Ceramic	113279	T104	FM IFT	109902
C23,276,277	27pF(J) Ceramic	113280	T105	FM IFT	109901
C24,906,908	1000P(J) Mylar	112186	T601	AM Ant Coil	112163
C103,182,187	0.02uF Ceramic	109955	T603	Balun Coil 111B528	109860
C107	0.01uF(J) Mylar	109974	TC04	Trimmer Cap 6pF	112135
C109	56p(J) Ceramic	113295	RESISTORS		
C110	350P(J) Polystyrene	109956	Semi-Fixed		
C112	0.0047uF(J) Mylar	112254	VR101,103	50K	112246
C113,237,238	0.0012u(J) Mylar	112274	VR102	4.7K	112245
C115,162,163,611-614	4.7N/25V(LL) Electrolytic	113296	VR104,211	20K	112247
C116,130,133,153	1u/50V Electrolytic	109942	VR212,213	100K	112269
C117	3.3u/16V Electrolytic	113927	VR401-404	500 Ohm	112219
C119,121	0.001uF(K) Ceramic	109929	VR405-408	200 Ohm	112220
C123,144	100uF/6.3V Electrolytic	113299	Potentiometers		
C124	4.7u/16V Electrolytic	113301	VR201,202	250KBH x2 Slide	112266
C128,170,171	47u/10V Electrolytic	113302	VR203,204	250KBH Volume	112265
C132,135,140,284,285	10uF/16V Electrolytic	113303	VR205-208	25KB Slide	112268
C134	330p(J) Ceramic	113304	VR209,210	5KG Slide	112267
C136,137,176,177	15u/25(LL) Electrolytic	113305	Fixed		
C139,181,211,212	47u/16V Electrolytic	109962	Tolerance Table: (C) = 2% (J) = 5% (K) = 10% (M) = 20% Unless otherwise stated, all resistors are 1/4 watt.		
C142	0.047uF(J) Mylar	112255	R01,122,162,163,182,183,190,518	100K(J) Carbon	113281
C143,146	0.33uF/50V(LL) Electrolytic	113307	R02,120,166,167,219,220,223,224,229,230,515	1M(J) Carbon	113282
C145	0.0068uF(J) Mylar	112253	R03,131,330,331	150K(J) Carbon	113283
C147,150,160,161	3.3uF/25V(LL) Electrolytic	113308	R04,05,139,197	22 Ohm (J) Carbon	113284
C148	.0015uF(K) Ceramic	109953	R06,12,110,911	100 Ohm (J) Carbon	113285
C149	.47u/50V(LL) Electrolytic	113575	R07,211,263,417-420,603,604	27K(J) Carbon	113286
C151	.0022u(K) Ceramic	109952	R08,116,146,147,511	3.3k(J) Carbon	113239
C152	1000P(J) Polystyrene	112248			
C154,155,903	0.0056uF(J) Mylar	109968			
C156,157,188	0.0027uF(J) Mylar	112252			
C158,159	.0012u(K) Ceramic	113309			

Symbol	Description	Part Number	Symbol	Description	Part Number
R09,107,114,119,123,132,151,198 270,271,276,277,318-321 433-436,601,602,625,626	1k(J) Carbon	113238	J602-605 J606-614	Speaker Terminal Pin Jack Plate 9P Pin Jack 12P Terminal 3P Terminal 11P	112175 112453 112189 112375 112376 112260 112261
R10,104,134,135,143,257,258, 308-310,502,504,522,901,905	10K(J) Carbon	113288	CN101 CN102 CN103 CN104 CN601 CN602 CN201,202 CN203 CN101	Post Header Assy 3P Post Header Assy 4P Post Header Assy 5P Post Header Assy 6P Post Header Assy 8P Post Header Assy 7P Connector Top Entry 3P Connector Top Entry 11P Post Header Assy 3P Ferrite Bead Core 117B029 Ferrite Bead Core 117B025	112368 112367 112262 112263 112260 112192 109918
R11,103,194,477-484,505,506,516, 524	6.8K(J) Carbon	113289		Transistor Preassure Transistor Heat Sink Transistor Heat Sink Diode Heat Sink Lamp Holder Color Cap A4210 W-50	112379 112380 112381 112382 112165 112369
R13,109,113,137,149,195,203,204, 509,519	2.2K(J) Carbon	113240			
R14 R101,158,159 R102,141 R105,106,130,188,193,196,437-440 R108 R111,126,153,156,157,493-496, 902,907	47 Ohm(1W J) Oxidized 680 Ohm (J) Carbon 470 Ohm (J) Carbon 330 Ohm (J) Carbon 220K(J) Carbon 5.6K(J) Carbon	112187 113316 113317 113290 113318 113319			
R112,117,128 R115,164,165,401-404 R118,133,152,517 R121,160,161,421-424 R124 R125,409-412,425-428,631,632 R127,129,520,906 R136,322,323 R138,187,192,264,267,405-408, 521,617-624	39K(J) Carbon 1.5K(J) Carbon 33K(J) Carbon 1.2K(J) Carbon 1.5M(J) Carbon 2.7K(J) Carbon 22K(J) Carbon 43K(J) Carbon 47K(J) Carbon	113320 113321 113322 113323 113324 113340 113341 113342 113343			
R140 R142 R144,221,222,227,228,445-448 R145,148,485-492,503,504 R150,268 R154,155 R168,169,324,325 R170,171,265,269,457-460,613,614 R172,173 R174,175 R176,177 R178,179 R180,181,199,313,314,615,616 R184,185 R189 R191,231,232 R201,202 R205,206 R207-210 R212,497-500,901 R213,214,315-317 R215-218,262,266 R225,226,903,904,908,909 R233,234 R255,256,607,608 R259,260 R272-275 R278-281 R282,283 R284,285 R286,287 R288,289 R290,291 R292,293 R294,295 R296,297 R298,299 R300,301 R302,303 R304,305 R306,307 R311,312 R326,327,332,333 R328,329 R413-416 R429-432,441-444 R449-456 R461-468 R469,470-472 R473-476 R501 R507,508 R512 R513 R514 R523 R526 R605,606 R609,612 R627-630	6.2K(J) Carbon 1.8K(J) Carbon 12K(J) Carbon 15K(J) Carbon 56K(J) Carbon 220 Ohm Carbon 82K(J) Carbon 10 Ohm(J) Carbon 100K(G) Oxidized 470 Ohm(J) Oxidized 36K(G) Oxidized 430K(G) Oxidized 560 Ohm (J) Carbon 100 Ohm(J) Fuse 5.6 Ohm (J) Carbon 3.9K (J) Carbon 5.1K(J) Carbon 120K(J) Carbon 4.7K(J) Carbon 18K(J) Carbon 470K(J) Carbon 8.2K(J) Carbon 24K(J) Carbon 390K(J) Carbon 820 Ohm(J) Carbon 100 Ohm(J) Fuse 20K(J) Carbon 1.2K(G) Carbon 3.3K(G) Carbon 100 Ohm (G) Carbon 3.6K(G) Carbon 4.32K 1% Oxidized 13K(G) Carbon 82K(G) Carbon 160K(G) Carbon 2.7K(G) Carbon 2.4K(G) Carbon 68K(G) Carbon 1K(G) Carbon 510 Ohm(G) Carbon 750 Ohm(G) Carbon 180 Ohm(J) Fuse 4.3K(J) Carbon 62K(J) Carbon 180 Ohm(J) Carbon 120 Ohm(J) Carbon 180 Ohm (1WK) Oxidized .47 Ohm(5WK) Wire Wound 5.6 Ohm (1WK) Oxidized 22 Ohm (2WK) Oxidized 82 Ohm (5WJ) Wire Wound 2.2K (2WK) Oxidized 15 Ohm(J) Carbon 10M 1/2W(J) Solid 3.3M(J) Carbon 1K (1WK) Oxidized 56 Ohm 1/2W(J) Carbon 390 Ohm(J) Carbon 2.2 Ohm (J) Carbon 180K(J) Carbon	113344 113345 113346 113347 113348 113349 113350 113351 112256 112259 112257 112258 113352 112140 113353 113354 113375 113376 113377 113367 113378 113379 113380 113382 113383 112140 113384 113386 113385 113387 113388 112203 113389 113390 113391 113392 113393 113394 113395 113396 113397 112205 113398 113399 113365 113366 110887 112323 112224 112226 113368 112227 113369 113370 113371 112223 113372 113409 113410 113411	A-1 A-2 A-3 A-4 A-5 A-6 A-7 A-7 A-8 A-9 A-10 A-11 A-12 A-13 A-14 A-15 A-16 A-17 A-18 A-19 A-20 A-21 A-22 A-23 A-24 A-25 A-26 A-27 A-28 A-29 A-30 A-31 A-32 A-33 A-34 A-35 A-36 A-37 A-38 A-39 A-40 A-41	Front Dial Window Dial Scale Plate Side Panel Board (L) Side Panel Board (R) Side Metal Holder Terminal Chassis 23S4276 Terminal Chassis 23S4353 Door Assembly Door Cushion Door Door Panel Board Door Rear Panel Door Hinge Bottom Cover Pointer Track Window Clamp Push Knob Slide Knob Dial Pointer Pointer Carriage Knob Guide Badge (B) Badge (O) Badge (S) Badge (E) Badge Base Antenna Cramp Slide Lever Guide Pin Plug Foot Ground Terminal Gnd Terminal Base Gnd Lug Side Trim Side Trim Base Vol Knob Assy Tuning Knob Assy Top Cover Top Cover Metal Door Cushion Antenna Cap Hinge Cover	113129 112144 113130 113131 113132 113133 113134 113136 112433 112145 112146 112147 112148 112149 113135 113136 113137 112228 112229 112230 112231 112231 112150 112232 112233 112151 112234 112235 113138 112236 112237 109822 113139 113140 112152 113141 112276 112277 112153 113212 112278 112279 112280
	MISCELLANEOUS			COSMETICS	
	METERS				
M601 M602	Tuning Meter Center Meter	112172 112173			
	LAMPS				
PL601,602,618 PL603-607 PL608 PL609,610 PL611 PL612-617	Volume Lamp 8V/50mA Dial Lamp 6.3V/250mA Dial Lamp 6.3V/65mA Meter Lamp 6V/120mA Stereo Lamp 6.3V/65mA Selector Lamp 8V/75mA	112112 109856 109857 112127 112126 112111			
	SWITCHES				
SW101 SW102-111 SW201-205 SW602-605 (SW)601 (SW)602 R1601,602 J101-112 J601	Slide Switch Push Switch Push Switch Slide Switch Bi-Metallic Thermostat Bi-Metallic Thermostat Relay 12P RCA Jack (PCB TYPE) Headphone Jack	112191 112190 112264 112176 112378 113426 112174 113291 109870			
				MECHANICAL ASSEMBLY	
			B-1 B-2 B-3 B-4 B-5 B-6 B-7 B-8 B-9 B-10 B-11 B-12 B-13 B-14 B-15 B-16 B-17 B-18 B-19 B-20 B-21 B-22 B-24 B-25 B-26 B-27 B-28 B-29 B-30 B-31 B-32 B-33 B-36	Chassis Front Control Chassis Chassis Joint (S) Chassis Joint TV PCB Holder Transformer Holder Power Relay Holder Drum Headphone Holder PCB Holder (B) PCB Holder (B) Drum Spring Pulley Holder (A) Pulley Holder (C) Tuning Shaft Tuning Shaft Sleeve Flywheel Heat Sink Cover Bracket Cover Holder (B) Door Spring (L) Door Spring (R) Pointer Slide Tape Lamp Holder Pulley Pulley Rubber Cushion Chassis Holder Cord Stopper Shaft Washer Sleeve Holder Volume Shield Plate Arm Plate Assy Arm Guide Plate Arm (L) Arm (R) Slide Plate Mask Plate Center Guide Shaft Mask Plate Shaft Slide Plate Shaft Arm Plate Shaft Mask Plate Spring E Ring O2 Rund + Screw M3X6	113142 113143 113144 113145 113146 113147 113148 113149 113150 113151 112281 113096 113152 113153 113155 113154 113156 113157 113158 113159 113160 113161 113162 113164 109841 112090 113165 113166 113167 113167 109842 112907 113168 113171 113172 113174 113175 113176 113177 113178 113179 113180 113181 113182 113183 113184

Symbol	Description	Part Number	Symbol	Description	Part Number
B-37	Protector	113185	S601-604	AC Outlet	109866
B-38	Amp PCB Holder	113186	SW601	Switch, See-Saw	112158
B-39	Switch Cushion	112917		Fuse Holder	112159
B-40	Stud	113187		Fuse Holder	112179
B-41	Spacer	113188	F601	Fuse 250V/7A	112160
B-43	Slide Metal	113190	F201,202	Fuse 250V/0.75A	112180
B-44	Slide Metal (B)	113191	F203,204	Fuse 250V/2A	112181
B-45	Cushion	113192	C610	Noise Suppression Cap	112164
B-46	Fibre	113193		AM FM Ant Terminal Plate	112162
B-47	Terminal Holder (L)	113194			
B-48	Terminal Holder (R)	113195			
B-50	PCB Holder	113197	220 Volt Export Model		
B-51	Spacer	113198			
B-53	Cushion	113200	T601	Power Transformer	113430
B-57	Cushion	113204	T401	Latch Transformer	113434
B-58	Spacer	113205	RI401	Latch Relay	113435
B-59	Volume Shield Plate	113206	P601	AC Power Cord	
B-60	Nut Holder	113207	SW601	Switch, See-Saw	113431
B-61	Volume Reflection Plate	113208		Fuse Holder	113432
110 And 220 Volt Component Variations			F601	Fuse 250V/4A	113433
				Fuse Holder	113248
110 Volt Domestic Model			F201,202	Fuse 250V/0.8A	113436
			F203,204	Fuse 250V/2A	112181
T601	Power Transformer	112156		Lug Terminal 2L2P	113306
T401	Latch Transformer	112166		Cord Bushing	113337
RI401	Latch Relay	112167		Fuse Label (T200mA)	113338
P601	AC Power Cord	112157	C610	Fuse Label E (250V T2A)	113339
				Noise Suppression Cap	112263

LIST OF COMPLETE PCB ASSEMBLIES

BOSE®

100 The Mountain Road, Framingham, Massachusetts 01701 • Cables: BOSE • Telephone 617-879-7330