

HMP-70

AEP and UK Model



STEREO MUSIC SYSTEM

SPECIFICATIONS

FM TUNER SECTION

Frequency range: 87.5 to 108 MHz
Usable sensitivity: 7 dB (2.2 μ V) (S/N = 30 dB)
Signal-to-noise ratio: 65 dB
Capture ratio: 2 dB
Frequency response: 20 Hz to 15 kHz
Fm stereo separation: Better than 35 dB

A-M TUNER SECTION

Frequency range: MW 530 to 1,605 kHz
LW 150 to 350 kHz
Sensitivity: MW 48 dB/m (250 μ V/m),
built-in antenna
26 dB (20 μ V), external
antenna
LW 52 dB/m (400 μ V/m),
built-in antenna
45 dB (180 μ V), external
antenna
Signal-to-noise ratio: MW/LW 50 dB

AUDIO AMPLIFIER SECTION

Music power output: 70 watts total (THD 0.9%,
EIA = 5%) 8 Ω DIN
**Continuous RMS
power output:** 40 watts total (THD 0.9%,
8 Ω DIN
Harmonic distortion: Less than 0.9% at 1 kHz at
continuous RMS power output

Frequency response: PHONO: RIAA equalization
curve $\pm$ 2 dB
TAPE: 40 Hz to 20 kHz at
continuous RMS power output

RECORD PLAYER SECTION (TTS-360)

Speeds: 33 $\frac{1}{3}$, 45 rpm
Drive system: Belt-drive

SPEAKER SECTION (SS-5177)

System: 3-way
Impedance: 8 Ω

GENERAL

Power consumption: 130 watts
Power requirements: 220 V, 50 Hz (AEP Model)
240 V, 50 Hz (UK Model)
(110, 127, 220 and 240 V
adjustable)
Dimensions: 626 (w) x 191 (h) x 420 (d) mm
24 $\frac{5}{8}$ (w) x 7 $\frac{1}{2}$ (h) x 16 $\frac{1}{2}$ (d) inches
Net weight: 16.3 kg (35 lb 15 oz)

SONY[®]

SERVICE MANUAL

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SECTION 1 TECHNICAL DESCRIPTION

1-1. SPECIFICATIONS

Fm Tuner Section

Frequency range: 87.5 to 108 MHz

Antenna terminals: 75 ohms unbalanced
300 ohms balanced

Intermediate frequency: 10.7 MHz

Usable sensitivity: 7 dB (2.2 μ V) (S/N = 30 dB)

Signal-to-noise ratio: 65 dB

Capture ratio: 2 dB

Selectivity: 50 dB

Image rejection: 40 dB

I-f rejection: 90 dB

A-m suppression: 50 dB

Frequency response: 20 Hz to 15 kHz

Harmonic distortion: Mono: 0.5 % at 400 Hz
Stereo: 1.0 % at 400 Hz

Fm stereo separation: Better than 35 dB

19 kHz, 38 kHz suppression: 45 dB

A-m Tuner Section

Frequency range: MW 530 to 1,605 kHz
LW 150 to 350 kHz

Antenna: MW/LW Built-in ferrite-bar antenna and external antenna jack

Intermediate frequency: MW/LW 468 kHz

Sensitivity: MW 48 dB/m (250 μ V/m), built-in antenna
26 dB (20 μ V), external antenna
LW 52 dB/m (400 μ V/m), built-in antenna
45 dB (180 μ V), external antenna

Signal-to-noise ratio: MW/LW 50 dB

Harmonic distortion: MW/LW 0.8 % at 400 Hz

Image rejection: MW 40 dB at 1,000 kHz
LW 50 dB at 160 kHz

I-f rejection: MW 40 dB at 1,000 kHz
LW 40 dB at 240 kHz

Audio Amplifier Section

Music power output: 70 watts total (THD 0.9 %, 8 Ω)
(EIA = 5 %) DIN

Continuous RMS power output: 40 watts total (THD 0.9 %, 8 Ω)
DIN

Harmonic distortion: Less than 0.9 % at 1 kHz at continuous RMS power output

IM distortion: Less than 0.2 % at 1 kHz at continuous RMS power output
(250 Hz: 8 kHz = 4 : 1)

Frequency response: PHONO: RIAA equalization curve $\pm$ 2 dB
TAPE: 40 Hz to 20 kHz at continuous RMS power output

Input sensitivity and impedance: TAPE: 440 mV, 50 k ohms
REC/PB (input): 440 mV, 50 k ohms

Signal output and impedance: REC OUT: 250 mV, 10 k ohms
REC/PB (output): 30 mV, 80 k ohms

Signal-to-noise ratio: TAPE } 75 dB with
REC/PB (input) } 440 mV input

Tone controls: BASS: $\pm$ 10 dB at 100 Hz
TREBLE: $\pm$ 10 dB at 10 kHz

LOUDNESS control: +8 dB at 100 Hz
+4 dB at 10 kHz
(volume control attenuation: 30 dB)

Damping factor: Better than 60 (8 Ω) DIN

High filter: 6 dB/octave above 4.3 kHz

General

Circuit system:	Fm stereo, FM/MW/LW super-heterodyne tuner, SEPP OTL power amplifier
Power consumption:	130 watts
Power requirements:	220 V, 50 Hz (AEP Model) 240 V, 50 Hz (UK Model) (110, 127, 220 and 240 V adjustable)
Semiconductors:	1 FET, 3 ICs, 40 transistors and 21 diodes
Dimensions:	626 (w) x 191 (h) x 420 (d) mm 24 ⁵ / ₈ (w) x 7 ¹ / ₂ (h) x 16 ¹ / ₂ (d) inches
Net weight:	16.3 kg (35 lb 15 oz)
Shipping weight:	20 kg (44 lb 2 oz)

Motor:	4-pole hysteresis synchronous
Wow and Flutter:	±0.09 % weighted (DIN 45507)
S/N Ratio:	Greater than 63 dB weighted (DIN 45539)
Tonearm:	Universal type, statically balanced
Optimum stylus force:	2 g
Cartridge:	IM type, SONY VM-26G
Stylus:	SONY ND-132G (Conical 0.5 mil diamond)

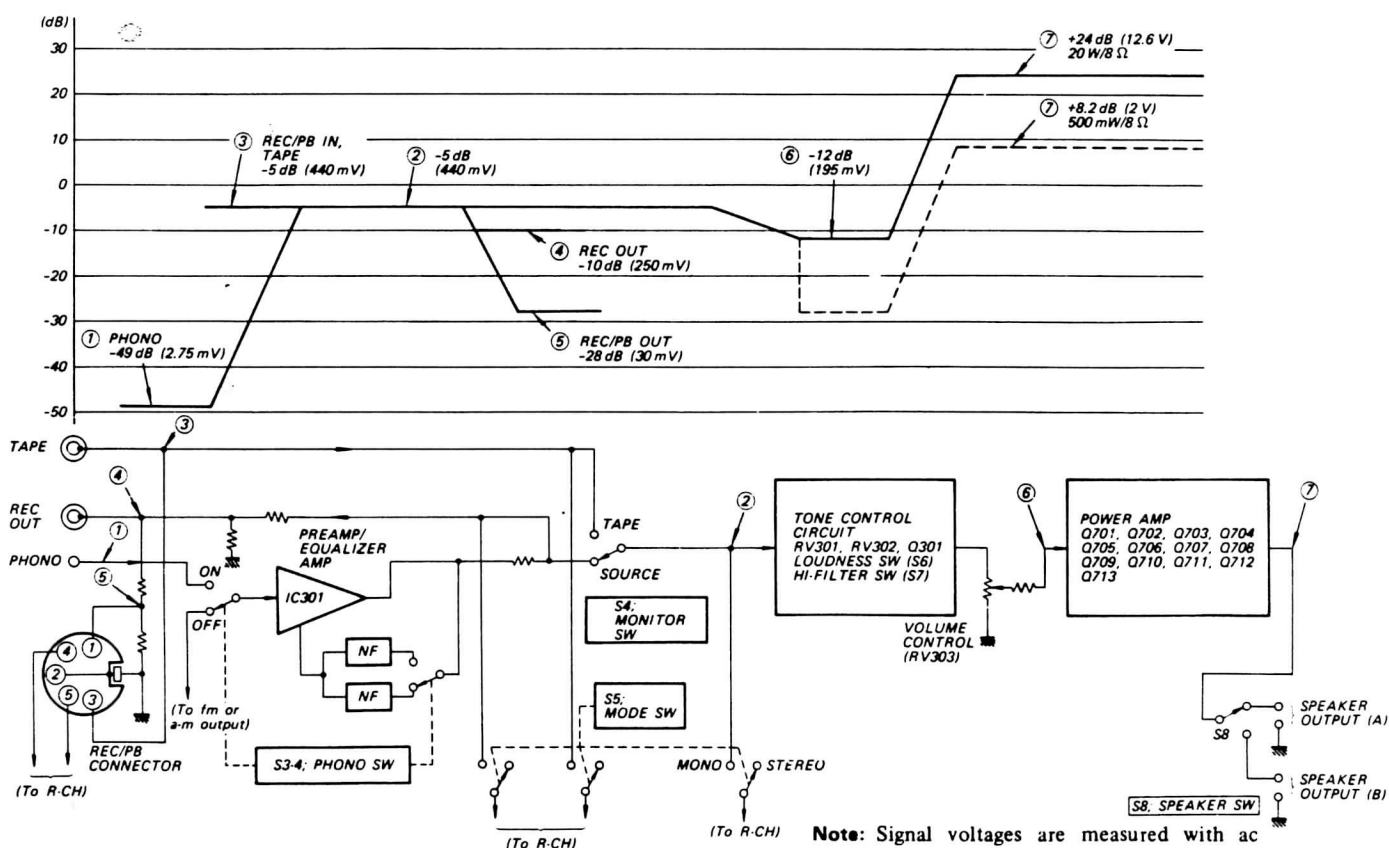
Speaker Section (SS-5177)

System:	3-way
Woofer:	22 cm (8 ³ / ₄ ") cone type
Mid-range:	9 cm (3 ¹ / ₂ ") cone type
Tweeter:	5 cm (2") cone type
Impedance:	8 Ω
Dimensions:	285 (w) x 495 (h) x 240 (d) mm 11 ¹ / ₄ (w) x 19 ¹ / ₂ (h) x 9 ³ / ₈ (d) inches
Net weight:	5.5 kg (12 lb 2 oz) (each)

Record Player Section (TTS-360)

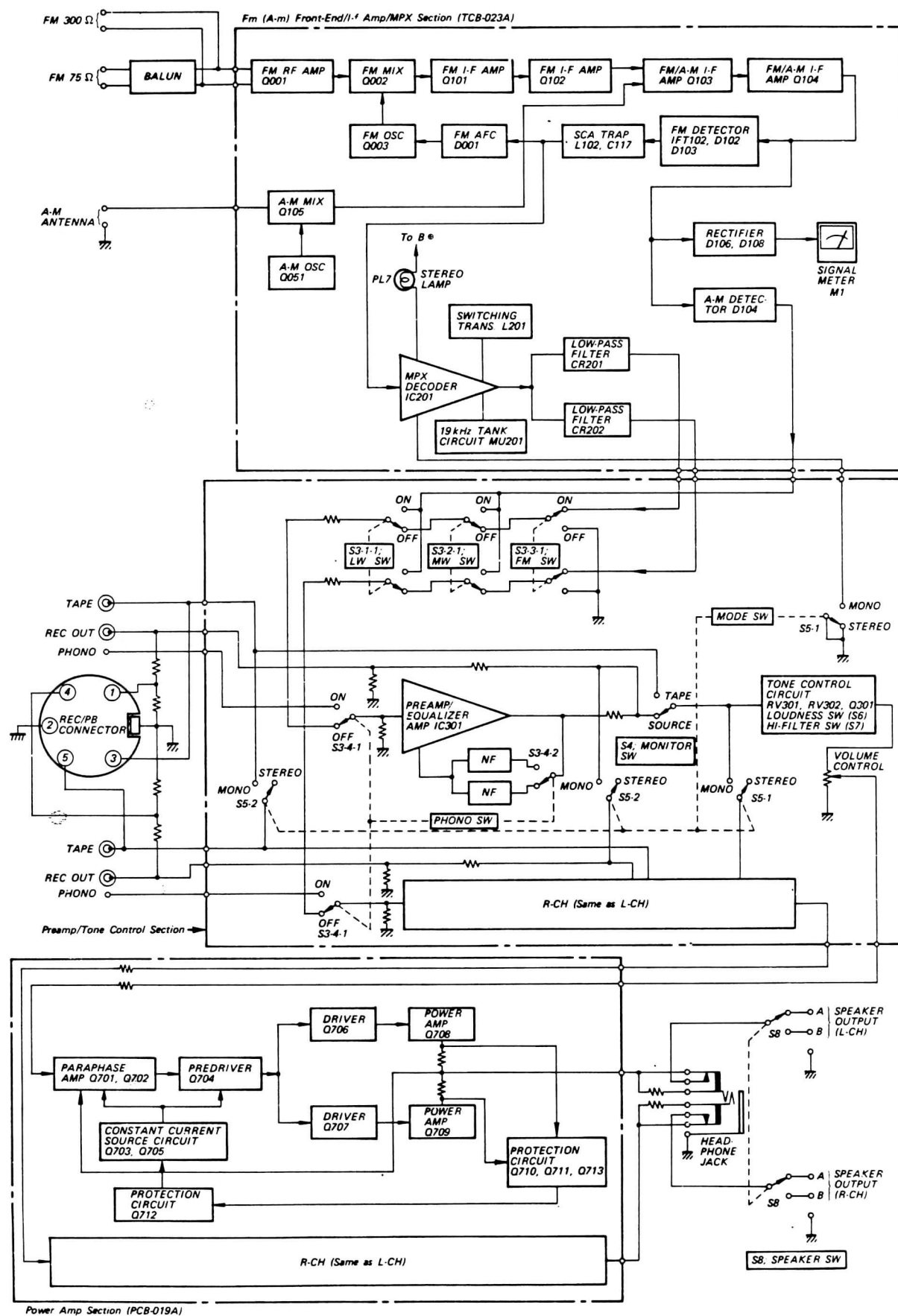
Platter:	30 cm (11 ³ / ₁₆ "), die-cast aluminum alloy 1 kg (2 lb 3 oz)
Speeds:	33 ¹ / ₃ , 45 rpm
Drive system:	Belt-drive

1-2. LEVEL DIAGRAM



Note: Signal voltages are measured with ac VTVM and expressed in dB referred to 0.775 V, 1 kHz.

1-3. BLOCK DIAGRAM



SECTION 2 DISASSEMBLY AND REPLACEMENT

Note: All screws are Phillips type unless otherwise indicated.

(-): slotted head

2-1. TOP COVER REMOVAL (See Fig. 2-1.)

1. Open the top cover.
2. Pull out the top cover in the arrow direction (A) and (B) in the order.

2-2. WOODEN CABINET REMOVAL (See Fig. 2-1.)

1. Remove the four screws (①).
2. Slide the wooden cabinet in the arrow direction (C).
3. Lift the wooden cabinet straight up, and disconnect the two 4-P connectors (② and ③). This frees the wooden cabinet along with the turntable base.

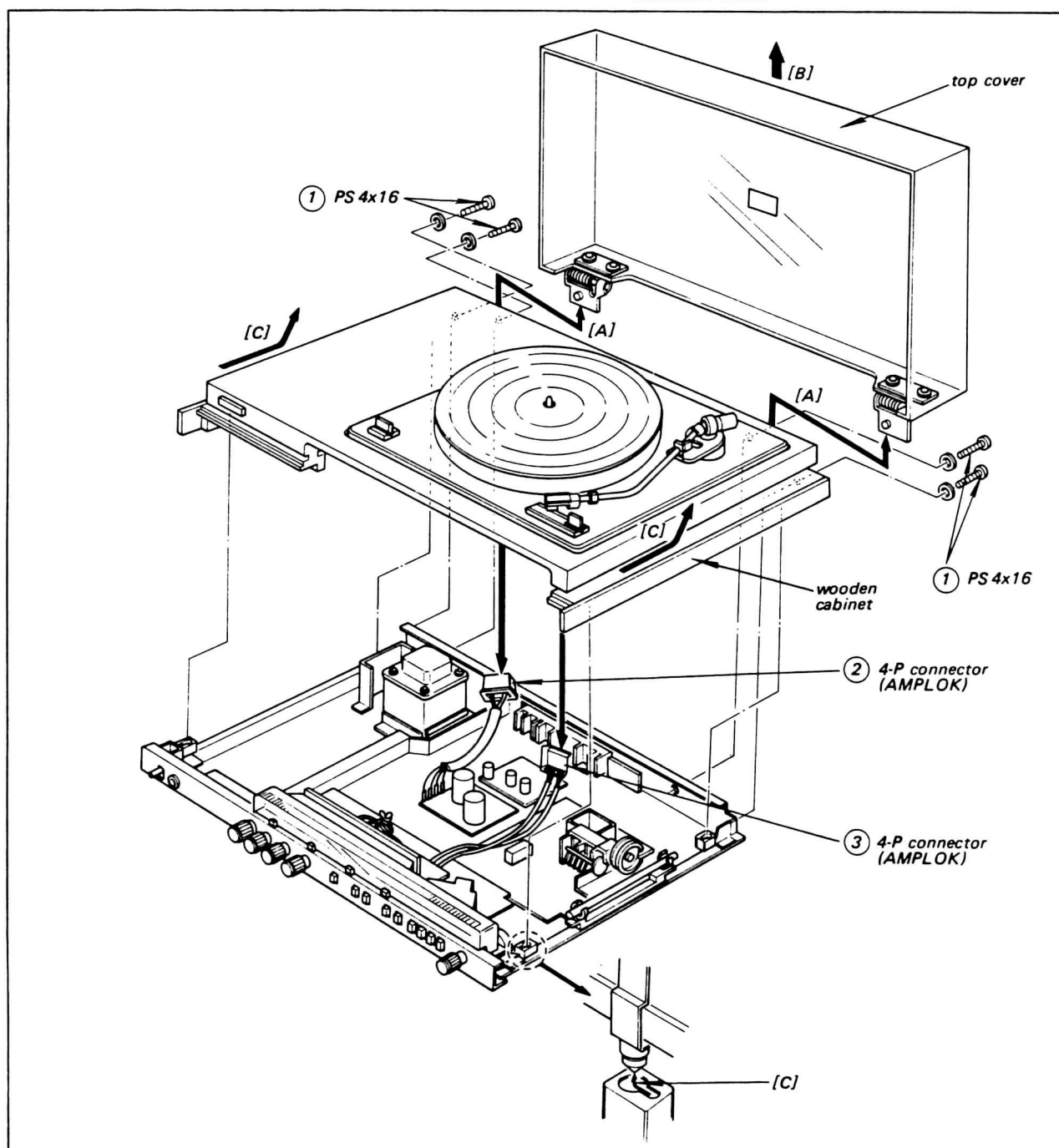


Fig. 2-1. Top cover and wooden cabinet removal

2-3. TURNTABLE BASE REMOVAL (See Fig. 2-2.)

1. Remove the three transit screws (④).
2. Remove the two mounting screws (⑤).
3. Carefully lift the turntable base, and disconnect the two 4-P connectors (⑥ and ⑦).
This frees the turntable base.

2-4. FRONT PANEL REMOVAL (See Fig. 2-3.)

1. Remove the wooden cabinet along with the

turntable base as described in procedure 2-2.

2. Pull off the VOLUME, BALANCE, TONE control and TUNING knobs (⑧ and ⑨).
3. Remove the front panel bracket (⑩) in the arrow direction (D) by removing the two self-tapping screws (⑪) at each side of the front subchassis.
4. Remove the front panel in the arrow direction (E).

Be careful not to lose the four preset tuning knobs (⑫), when removing the front panel.

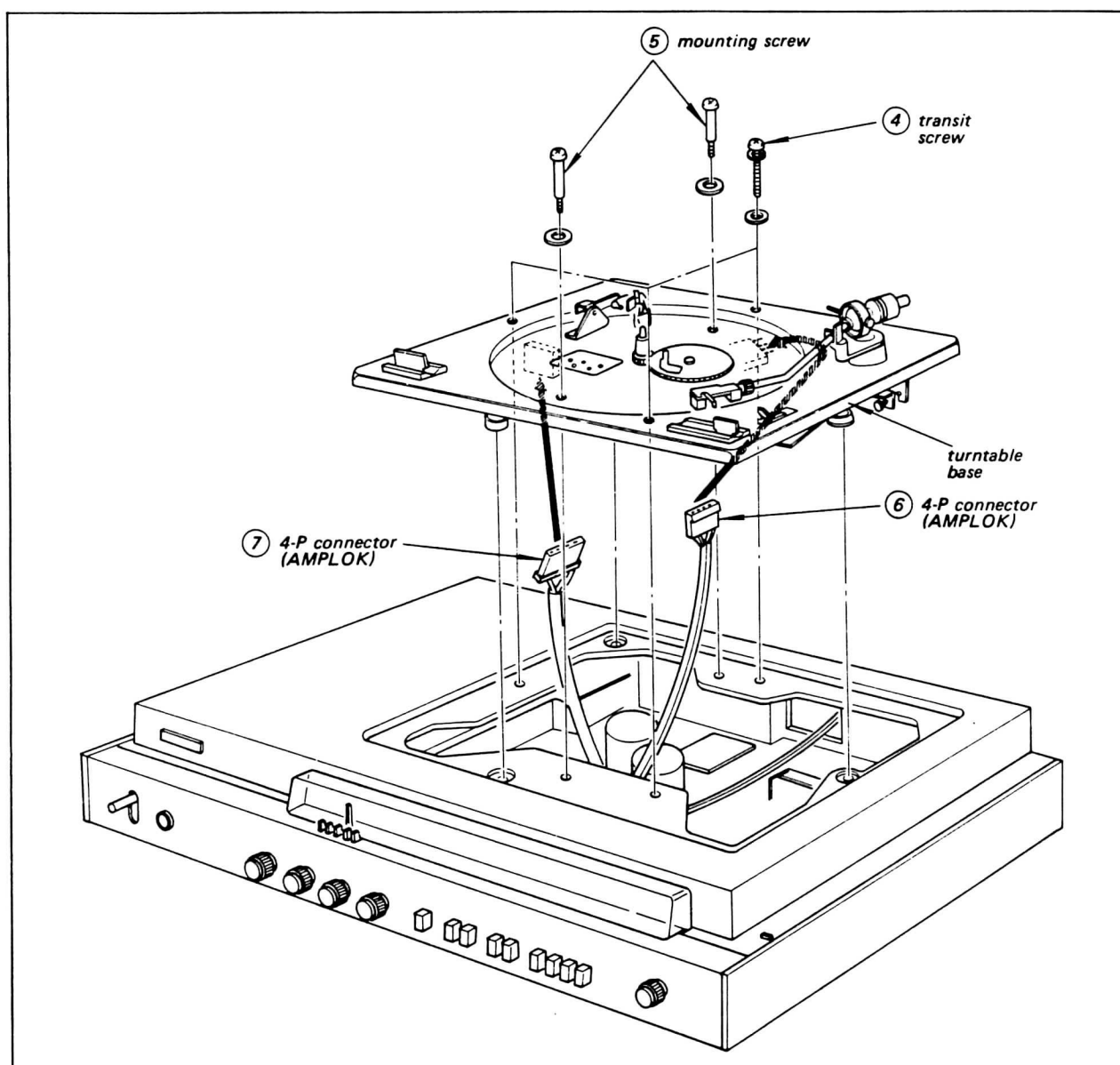


Fig. 2-2. Turntable base removal

2-5. COMPLETE CIRCUIT BOARD REMOVAL

Fm (A-m) Front-end/I-f Amp/MPX Board
(See Fig. 2-3.)

1. Remove the wooden cabinet along with the turntable base as described in procedure 2-2.
2. Remove the screw (13).
3. Remove the slide switch joint plate (A) (14) by removing the screw (15).
4. Remove the two self-tapping screws (16) and the nylon rivet (17).
5. Raise the tab (18) of the bar antenna holder (19) as shown in Fig. 2-3-1.
6. Slide the bar antenna holder (19) in the arrow direction (F) as shown in Fig. 2-3-1 and pull it out straight up.
7. Remove the tuning drum (20) by removing the screw (21), hook it to a screwdriver and plug the screwdriver into the hole of chassis as illustrated.
8. Remove the fm antenna lead wires.
9. Push down the five circuit board holders (22) in the arrow direction (G).
10. Plug the two legs of the bar antenna holder (19) into the holes on the circuit board as illustrated.
11. Take out the circuit board.

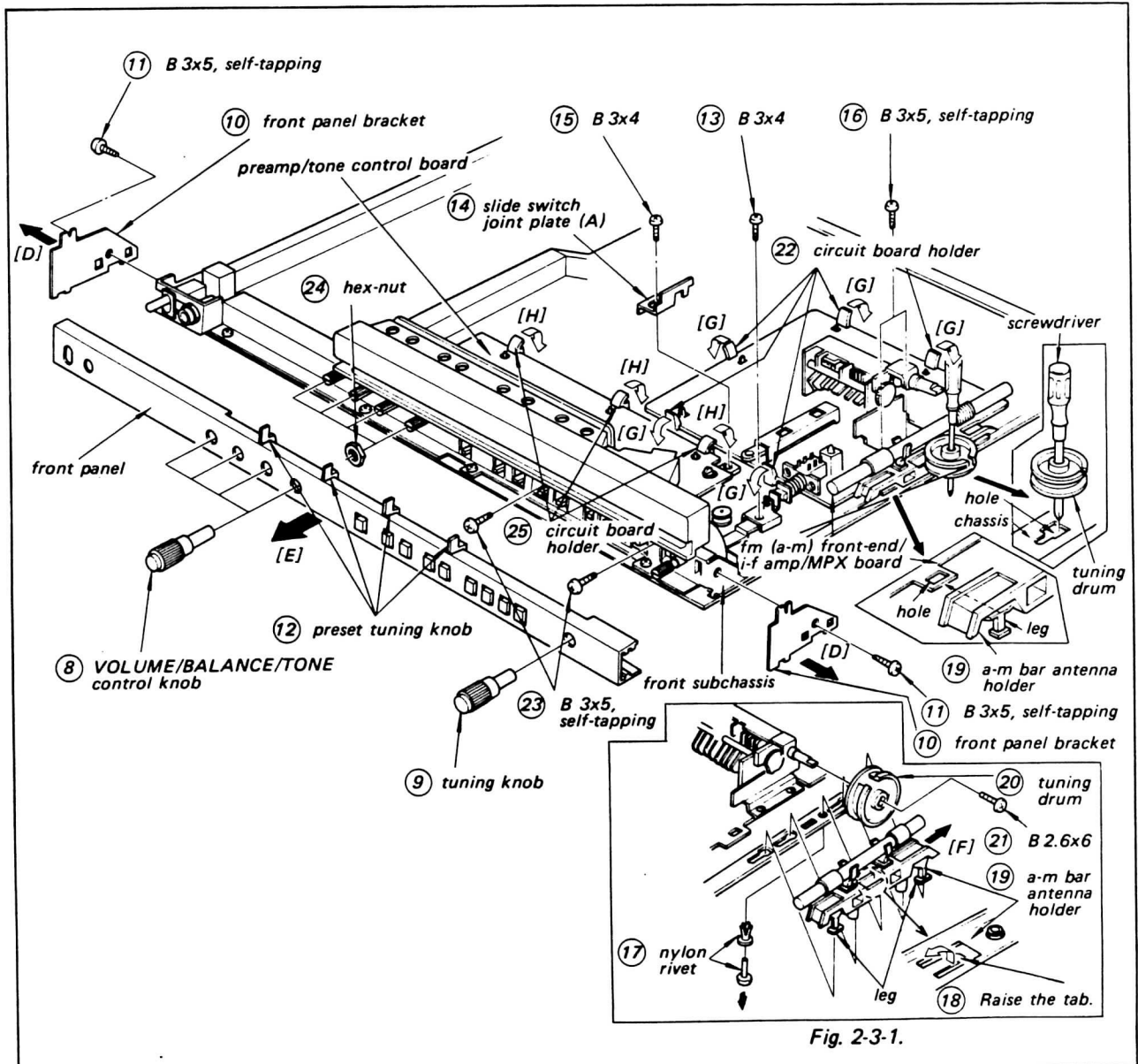


Fig. 2-3-1.

Fig. 2-3. Fm (a-m) front-end/i-f amp/MPX and preamp/tone control board removal

Preamp/Tone Control Board (See Fig. 2-3.)

1. Remove the front panel as described in procedure 2-4.
2. Remove the two self-tapping screws (23) and the four hex-nuts (24).
3. Remove the slide switch joint plate (A) (14) by removing the screw (15).
4. Push down the three circuit board holders (25) in the arrow direction (H).
5. Take out the circuit board.
6. Disconnect the 3-P connector and 5-P connector at the fm (a-m), front-end/i-f amp/MPX board. This frees the circuit board.

Power Amplifier Board (See Fig. 2-4.)

1. Remove the wooden cabinet along with the turntable base as described in procedure 2-2.
2. Push down the three circuit board holders as shown.
3. Take out the circuit board.

Power Supply Board (See Fig. 2-4.)

1. Remove the wooden cabinet along with the turntable base as described in procedure 2-2.
2. Push down the four circuit board holders as shown.
3. Take out the circuit board.

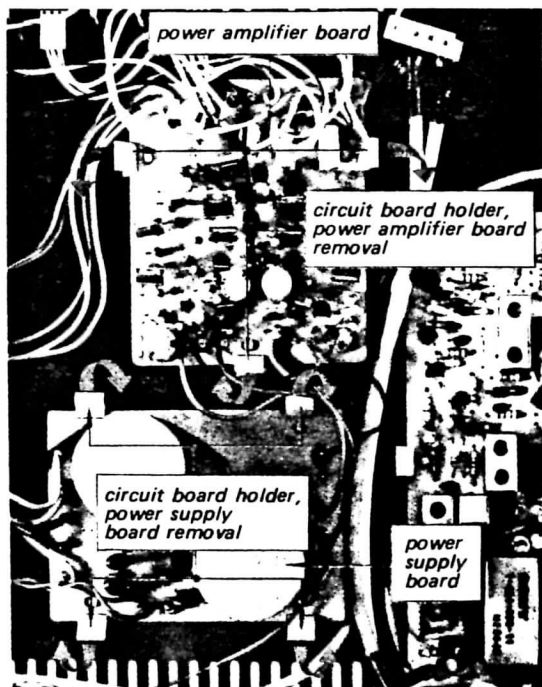


Fig. 2-4. Power amplifier and power supply board removal

2-6. POWER TRANSISTOR REPLACEMENT

1. Remove the wooden cabinet along with the turntable base as described in procedure 2-2.
2. Pull out the 3-P socket from the power transistor as shown in Fig. 2-5.
3. Remove the screw shown in Fig. 2-5.
4. Replace the transistor.
5. Connect the 3-P socket to the legs of a new transistor. Note that the slit upon 3-P socket should come to upper side.
6. Bend the legs of the transistor by 90° at 4 mm ($\frac{5}{32}$ ") from their base as shown in Fig. 2-6.
7. Apply a silicone grease on the mica insulator as shown in Fig. 2-5, when installing it.

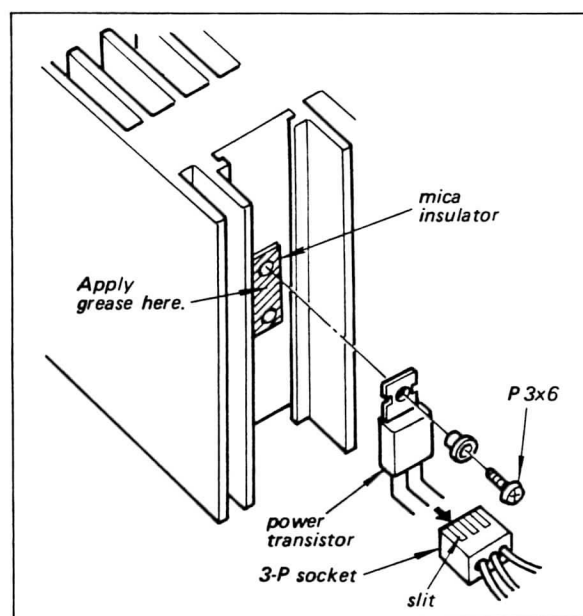


Fig. 2-5. Power transistor removal

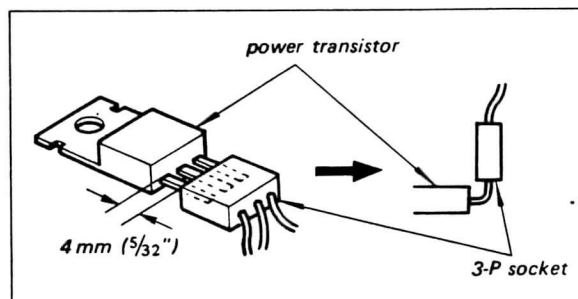


Fig. 2-6. Power transistor replacement

2-7. REPLACEMENT OF THE COMPONENTS SECURED TO THE REAR PANEL BY THE NYLON RIVETS

1. Remove the wooden cabinet along with the turntable base as described in procedure 2-2.
2. Remove the nylon rivets securing the defective component by pushing its end with a tweezers as shown in Fig. 2-7.
3. Remove the defective component and install a new one.
4. To reinstall the nylon rivet, insert the flared part into the head as far as it will go.

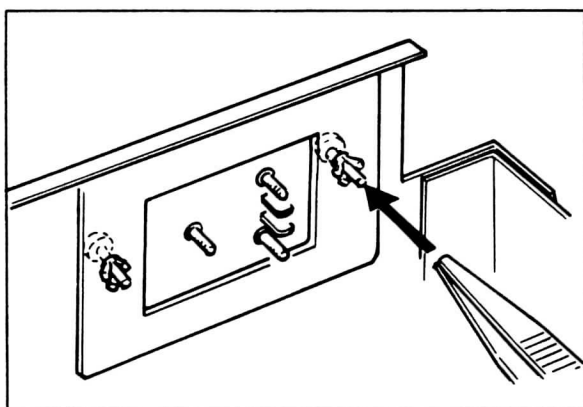


Fig. 2-7. Nylon rivet removal

2-8. DIAL LAMP REPLACEMENT

1. Remove the wooden cabinet along with the turntable base as described in procedure 2-2.
2. Straighten the tabs of the dial lamp shade to permit removal of 3-P dial lamp holder as shown in Fig. 2-8.
3. Pull out the dial lamp holder, and install a new one.

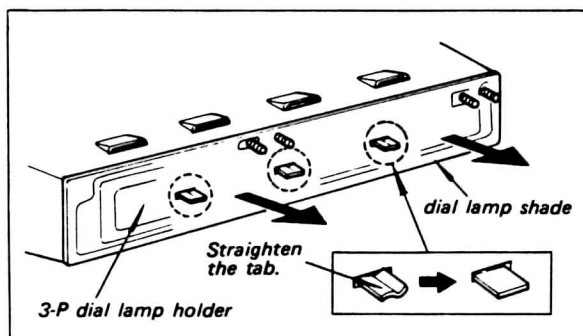


Fig. 2-8. Dial lamp replacement

2-9. DIAL CORD STRINGING

Preparation

1. Remove the wooden cabinet along with the turntable base as described in procedure 2-2.
2. Cut a 63-inch (1,600 mm) length of 1/64-inch (0.3 mm) diameter dial cord.
3. Tie the end of the cord to a spring as shown in Fig. 2-10.
4. Rotate the tuning capacitor fully clockwise (maximum capacitance position).

Note: Confirm that slit of tuning drum is positioned as shown in Fig. 2-10.

Procedure

1. Referring to Fig. 2-10, proceed stringing in numerical order.

Note: Refer to the Fig. 2-9 for wrapping the cord around the drum. At the finish point of stringing, tighten the cord so that the spring is under tension, and squeeze the eyelet.

2. After completing the dial cord stringing, make sure that the tuning system works properly.
3. Apply a drop of contact cement to the finish point.
4. Perform the mechanical dial calibration by following the procedure 2-10.

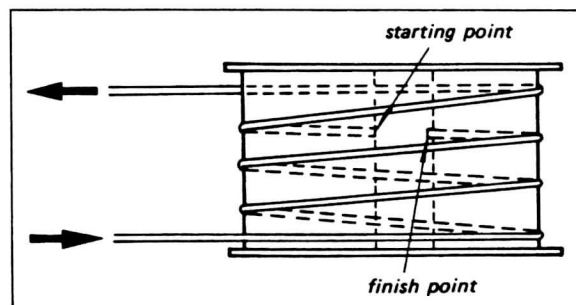


Fig. 2-9. Wrapping the dial cord

2-10. MECHANICAL DIAL CALIBRATION

1. Put the dial pointer on the cord as shown in Fig. 2-10, and move it to a position where the pointer coincides with 530 kHz mark on the dial scale with the tuning capacitor set to the maximum capacitance position.
2. Perform precise dial calibration by utilizing off-the-air local signals.

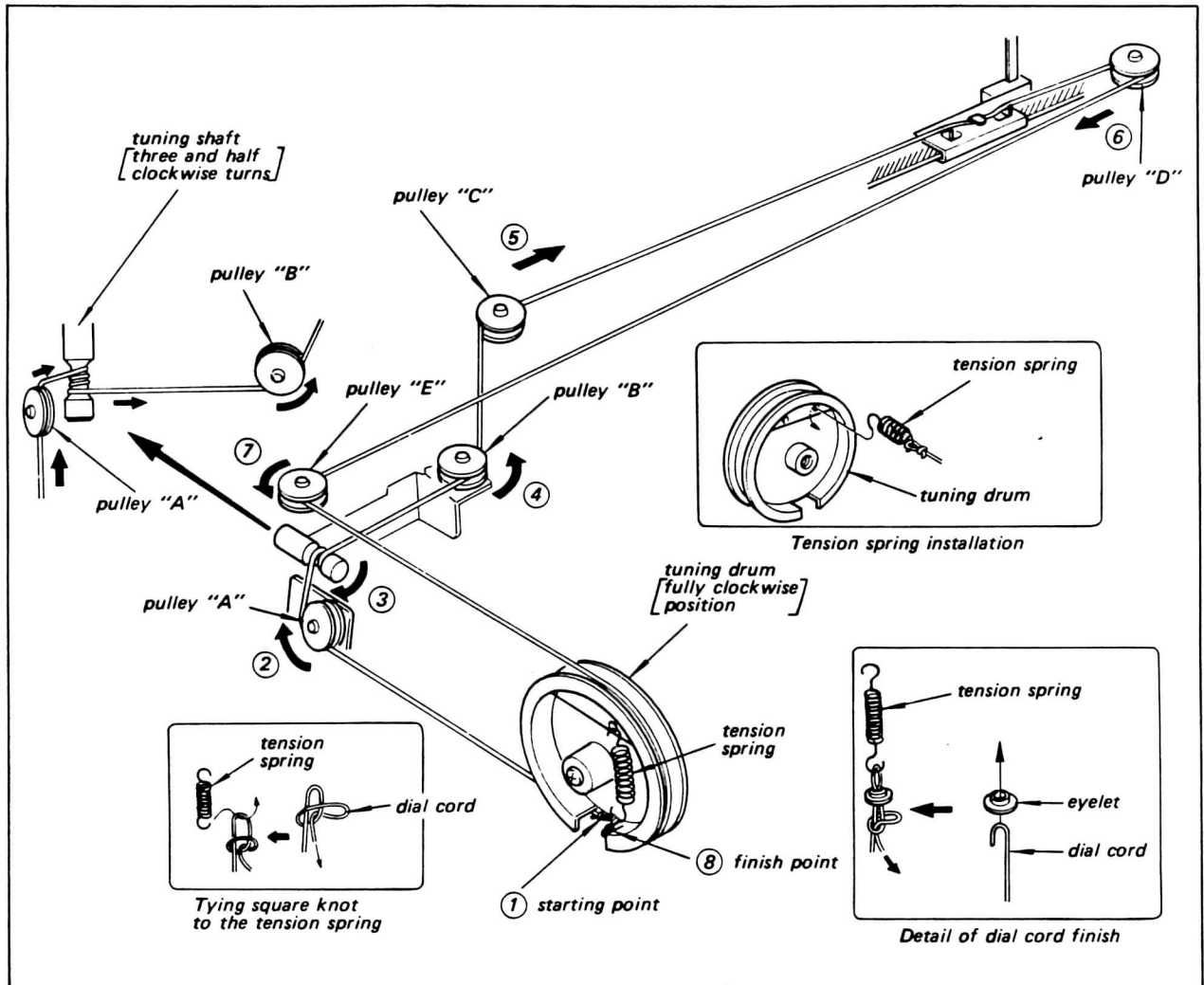


Fig. 2-10. Dial cord stringing

2-11. CHASSIS LAYOUT

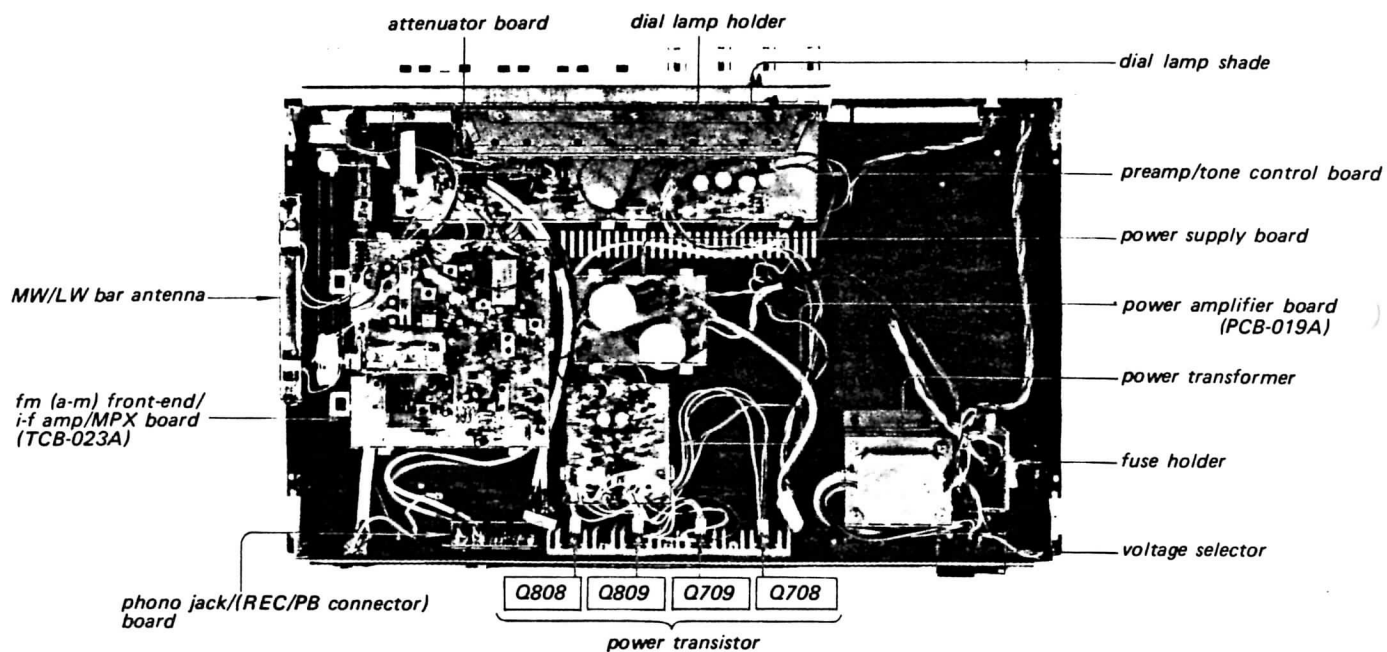


Fig. 2-10. Chassis layout

SECTION 3 ALIGNMENT AND ADJUSTMENT

3-1. FM I-F AND DISCRIMINATOR ALIGNMENT

CAUTION

The ceramic filters in the fm i-f circuit are selected according to their specified center frequencies and color coded as shown in Fig. 3-1 and listed in Table 3-1. Check the color code of the filters to identify the same center frequency when replacing any of these filters.

TABLE 3-1.
FM I-F CERAMIC FILTERS

<u>Part No.</u>	<u>Color</u>	<u>Specified Center Freq.</u>
1-527-220-11	red	10.70 MHz
1-527-220-21	blue	10.67 MHz
1-527-220-31	orange	10.73 MHz
1-527-220-41	black	10.64 MHz
1-527-220-51	white	10.76 MHz

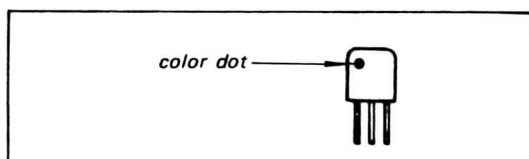


Fig. 3-1. Color dot on ceramic filters

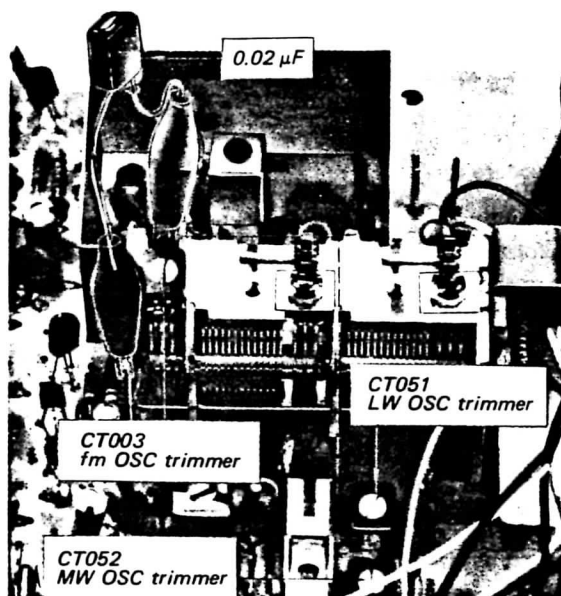


Fig. 3-2. Interruption of fm or a-m local oscillator operation

Note: Local oscillator should be killed when performing this alignment. To stop the local oscillator's operation, shunt the oscillator capacitor with a 0.02 μF capacitor as shown in Fig. 3-2.

Signal Generator Method

Test Equipment Required

1. Signal generator capable of generating a 10.7-MHz a-m/fm signal.
2. Oscilloscope
Vertical sensitivity . . . 100 mV/cm minimum
3. Alignment tools
4. Ac VTVM

Preparation

1. Connect the input cable of the oscilloscope with alligator clips to connection point of R154 and C116, and ground on the fm (a-m) front-end/i-f amp/MPX board and solder a 0.02 μF capacitor across these clips as shown in Fig. 3-3.
2. Connect the output cable of the signal generator across CT002 on the fm (a-m) front-end/i-f amp/MPX board through a 0.02 μF coupling capacitor as shown in Fig. 3-4.

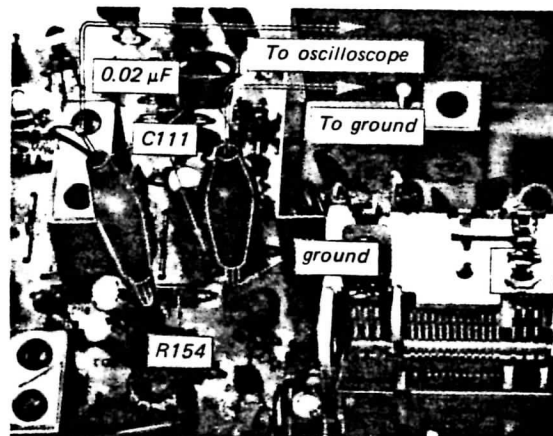


Fig. 3-3. Fm discriminator output connection

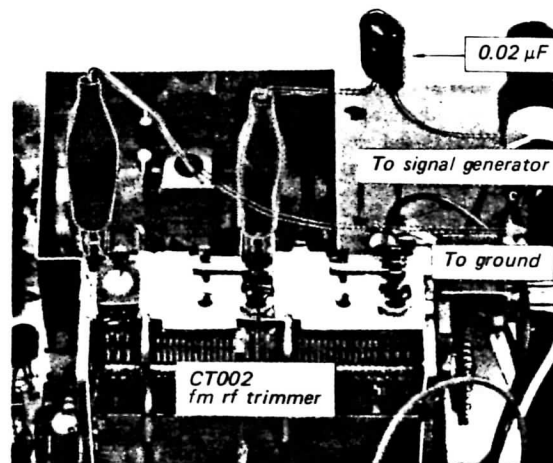


Fig. 3-4. 10.7 MHz signal injection

Procedure

1. With the equipment connected as shown in Fig. 3-5, set the signal-generator controls as follows:

Frequency	Specified center frequency of ceramic filter. See Table 3-1.
Modulation	Fm, 400 Hz, 100 % (75 kHz deviation)
Output level	1,000 μ V (60 dB)

2. Set the receiver controls as follows:

FUNCTION switch..... FM
VOLUME control..... Minimum

3. Adjust the signal generator frequency slightly to obtain a maximum output, and then change the signal generator's modulation to a-m, 400-Hz 30 %.
4. If the discriminator transformer IFT102 (See Fig. 3-13) is not aligned correctly, 400 Hz ripple will be observed as shown in Fig. 3-6.
5. Turn the secondary side core (green) of discriminator transformer IFT102 (See Fig. 3-13) with an alignment tool to obtain a minimum indication on the oscilloscope as shown in Fig. 3-6.

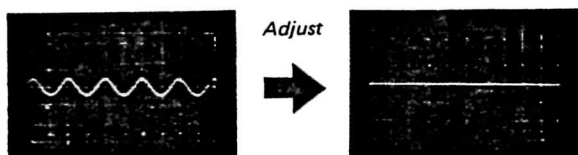


Fig. 3-6. Fm discriminator alignment output response

Note: Turn the core carefully and slowly because the output appearing on the oscilloscope jumps up and down when turning the core. This might cause difficulty in determining the point of minimum output.

Also, at both extreme positions of the secondary core, decreased output will be observed. The real null point should be obtained in the middle of the core thread length, and maximum output appears at each side of the true null

point.

6. Change the signal generator modulation to fm, 400 Hz 100 % (75 kHz deviation).
7. Turn the core of fm IFT001 and the primary side core (brown) of discriminator transformer IFT102 (See Fig. 3-13), to obtain the maximum output.

3-2. FM FREQUENCY COVERAGE AND TRACKING ALIGNMENT

Note: Before starting this alignment, be sure that the fm i-f and discriminator alignment has been performed, and that the dial is mechanically calibrated.

Signal Generator Method

Test Equipment Required

1. Fm signal generator
2. Ac VTVM
3. Alignment tools
4. Oscilloscope

Preparation

1. Connect the equipment as shown in Fig. 3-7.
2. Set the receiver controls as follows:
FUNCTION switch..... FM
VOLUME control..... Minimum
3. Short the connection point of R154 and C111 (AFC circuit) to ground as shown in Fig. 3-8.

Procedure

Follow the procedures given in Table 3-2 when performing this alignment with an fm signal generator.

Off-the-Air Signal Method

An accurate dial calibration and a frequency-coverage alignment can also be performed by utilizing off-the-air local fm signals.

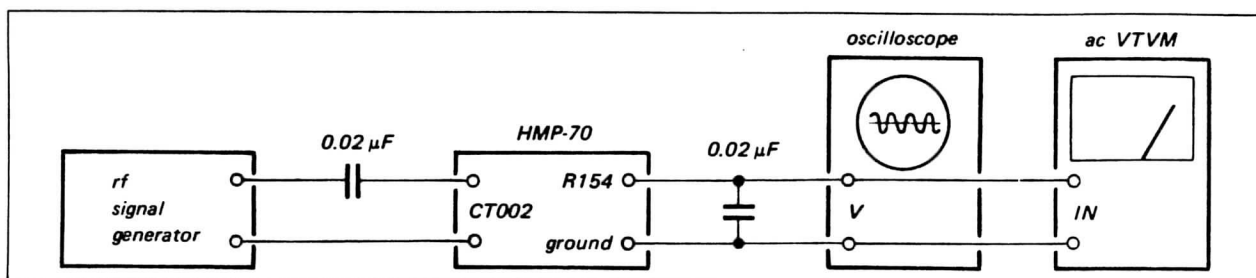


Fig. 3-5. Fm i-f and discriminator alignment setup by rf signal generator

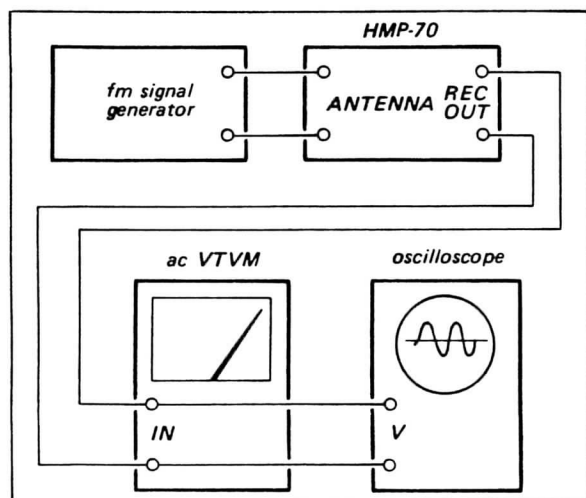


Fig. 3-7. Fm frequency coverage and tracking alignment setup

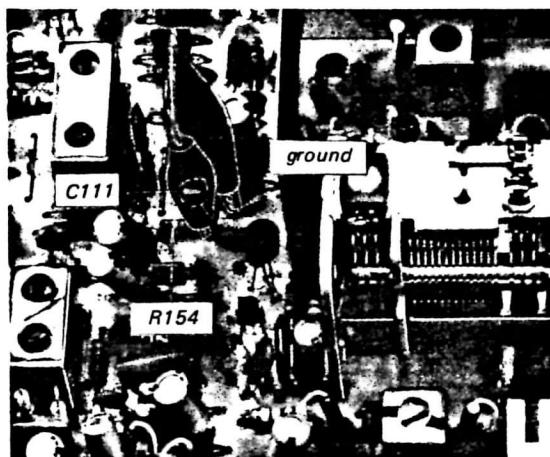


Fig. 3-8. Interruption of AFC circuit

TABLE 3-2. FM FREQUENCY COVERAGE AND TRACKING ALIGNMENT

FM FREQUENCY COVERAGE ALIGNMENT						
Step	SG Coupling	SG Frequency and Output Level	Dial Indication	Ac VTVM Connection	Adjust	Indication
1.	Direct coupling	87.2 MHz (* 87.5 MHz) 400 Hz 75 kHz deviation (100%) mod. Output level; as low as possible	lowest position	REC OUT	OSC coil L002 See Fig. 3-13.	Maximum VTVM reading
2.	Same as above	108.4 MHz (* 108.0 MHz) 400 Hz 75 kHz deviation (100%) mod. Output level; as low as possible	highest position	Same as above	OSC trimmer CT003 See Fig. 3-13.	Same as above
FM TRACKING ALIGNMENT						
1.	Direct coupling	87.2 MHz (* 87.5 MHz) 400 Hz 75 kHz deviation (100%) mod. Output level; as low as possible	lowest position	REC OUT	Antenna coil L001 RF coil L003 See Fig. 3-13.	Maximum VTVM reading
2.	Same as above	108.4 MHz (* 108.0 MHz) 400 Hz 75 kHz deviation (100%) mod. Output level; as low as possible	highest position	Same as above	Antenna trimmer CT001 RF trimmer CT002 See Fig. 3-13.	Same as above

Note: * West Germany Model only

3.3. FM STEREO SEPARATION ADJUSTMENT

Test Equipment Required

1. Fm stereo signal generator
2. Ac VTVM
3. Oscilloscope
4. Alignment tools

Preparation

1. Remove the turntable base as described in Procedure 2-3 on page 5.
2. Connect the equipment as shown in Fig. 3-9, then set the fm stereo signal generator controls as follows:
Carrier frequency 98 MHz
Output level 1,000 μ V (60 dB)
Mode Stereo
Audio (400 Hz) Mod .. 67.5 kHz (90 %)*
Pilot (19 kHz) Mod 7.5 kHz (10 %)

*Note: 75 kHz (100 %) if the metering indicates total modulation (audio+pilot).

Procedure

1. Precisely tune the set to the carrier frequency of stereo signal generator, then turn the top core of switching transformer L201 (See Fig. 3-13) to obtain maximum output at the left channel. Note that this adjustment has a close relationship with stereo distortion.
2. Record the output level of the left channel when the stereo signal generator input selector is set to the left channel.
3. Switch the stereo signal generator input selector to the right channel and read the residual signal level of the left channel.
4. The output-level to residual-level ratio represents the separation. Turn the top core of switching transformer (L201) (See Fig. 3-13) for minimum residual level. Check the right channel for separation. Readjust switching transformer for minimum difference between left and right-channel separation.

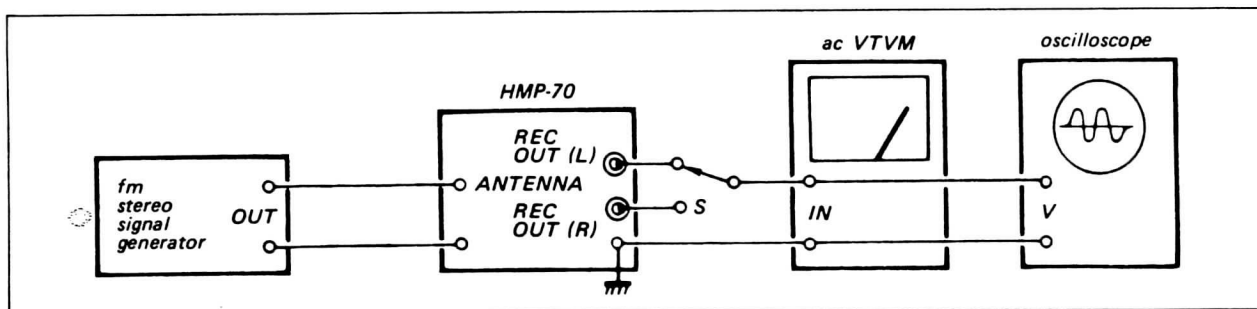


Fig. 3-9. Fm stereo separation adjustment setup

3-4. A-M I-F STRIP ALIGNMENT

Note: The a-m i-f transformers (CFU101 and IFT101) are shipped from the factory with all adjustments set for correct operation. Therefore no adjustment is required in the field service.

3-5. MW/LW FREQUENCY COVERAGE AND TRACKING ALIGNMENT

Note: Before performing the following procedure, be sure that the dial is mechanically calibrated.

Preparation

1. Set the FUNCTION switch to MW or LW.
2. Set the A-M ANTENNA selector switch to BUILT-IN.

Signal Generator Method

Test Equipment Required

1. A-m signal generator
2. Loop antenna
3. Ac VTVM
4. Oscilloscope and alignment tools

Procedure

With the equipment connected as shown in Fig. 3-10, follow the procedures given in Table 3-3 and Table 3-4 when performing this alignment with an a-m signal generator.

Off-the-Air Signal Method

An accurate dial calibration, and a frequency-coverage and tracking alignment can also be performed by utilizing off-the-air local a-m signals.

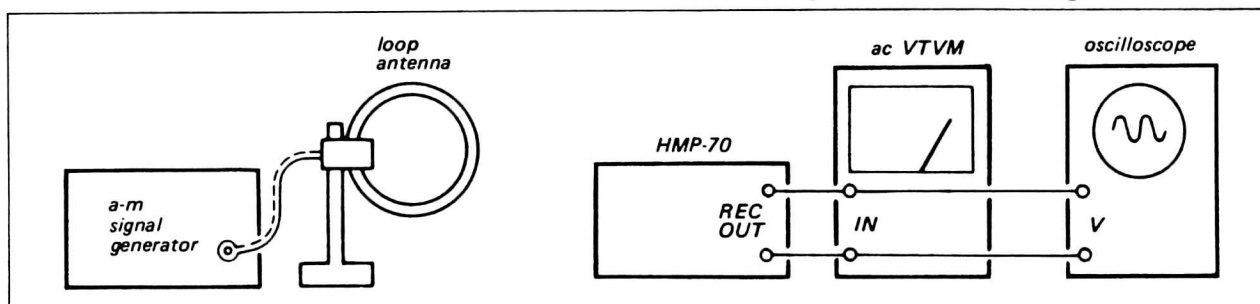


Fig. 3-10. MW/LW frequency coverage and tracking alignment setup

TABLE 3-3. MW FREQUENCY COVERAGE AND TRACKING ALIGNMENT

FREQUENCY COVERAGE ALIGNMENT						
Step	SG Coupling	SG Frequency and Output Level	Dial Indication	Ac VTVM Connection	Adjust	Indication
1	Loop antenna	520 kHz 400 Hz 30 % mod. Output level: as low as possible	lowest position	REC OUT	OSC coil L052 See Fig. 3-13.	Maximum VTVM reading
2	Same as above	1,680 kHz Same as above	highest position	Same as above	OSC trimmer CT052 See Fig. 3-13.	Same as above
TRACKING ALIGNMENT						
1	Loop antenna	600 kHz 400 Hz 30 % mod. Output level: as low as possible	Tune to the SG signal.	REC OUT	Position of antenna coil L055-M See Fig. 3-13.	Maximum VTVM reading
2	Same as above	1,400 kHz Same as above	Same as above	Same as above	Antenna trimmer CT053 See Fig. 3-13.	Same as above

TABLE 3-4. LW FREQUENCY COVERAGE AND TRACKING ALIGNMENT

FREQUENCY COVERAGE ALIGNMENT						
Step	SG Coupling	SG Frequency and Output Level	Dial Indication	Ac VTVM Connection	Adjust	Indication
1	Loop antenna	145 kHz 400 Hz 30 % mod. Output level: as low as possible	lowest position	REC OUT	OSC coil L051 See Fig. 3-13.	Maximum VTVM reading
2	Same as above	365 kHz Same as above	highest position	Same as above	OSC trimmer CT051 See Fig. 3-13.	Same as above
TRACKING ALIGNMENT						
1	Loop antenna	145 kHz 400 Hz 30 % mod. Output level: as low as possible	lowest position	REC OUT	Position of antenna coil L055-L See Fig. 3-13.	Maximum VTVM reading
2	Same as above	320 kHz Same as above	Tune to the SG signal.	Same as above	Antenna trimmer CT054 See Fig. 3-13.	Same as above

3-6. EXTERNAL ANTENNA COIL ALIGNMENT

Signal Generator Method

Test Equipment Required

1. A-m signal generator
2. LW dummy antenna (See Fig. 3-11.)
3. Ac VTVM or oscilloscope

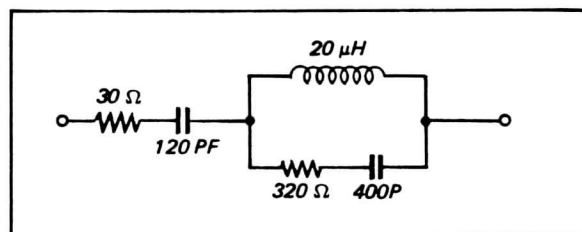


Fig. 3-11. LW dummy antenna

Preparation

1. Set the FUNCTION switch to LW.
2. Set the A-M ANTENNA selector switch to EXT.

Procedure

With the equipment connected as shown in Fig. 3-12, follow the procedure given in Table 3-5 when performing this alignment with an a-m signal generator.

Note: The off-the-air signal can be utilized instead of signal generator.

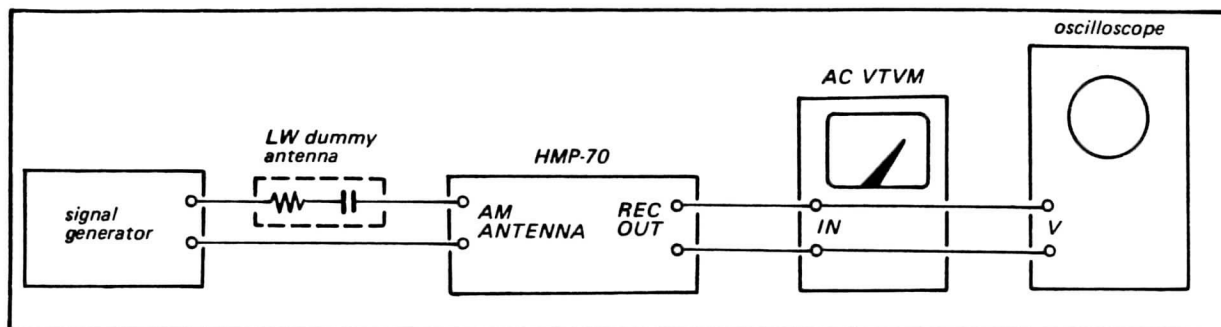


Fig. 3-12. External antenna coil alignment setup

TABLE 3-5. EXTERNAL ANTENNA COIL ALIGNMENT

SG Coupling	SG Frequency and Output Level	Dial Indication	Ac VTVM Connection	Adjust	Indication
Dummy antenna	250 kHz 400 Hz 30 % mod. Output level: as low as possible	Tune to the SG signal.	REC OUT	External antenna coil L053 See Fig. 3-13.	Maximum VTVM reading

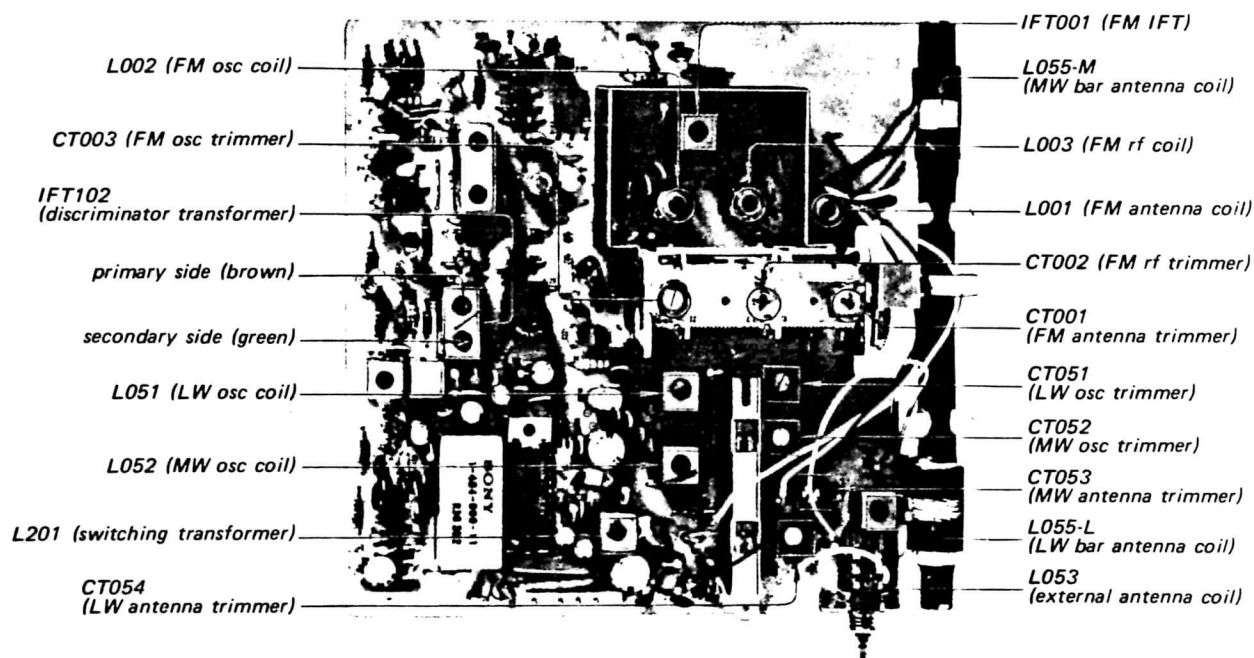


Fig. 3-13. Adjustment parts location

SECTION 4 REPACKING

The original shipping carton and packing materials are the ideal containers for shipping the unit. However to secure the maximum protection, the

receiver must be repacked in these materials precisely as before. The proper repacking procedures are shown in Fig. 4-1.

Note: UK Model Serial No. 600,001 and later
AEP Model Serial No. 500,001 and later

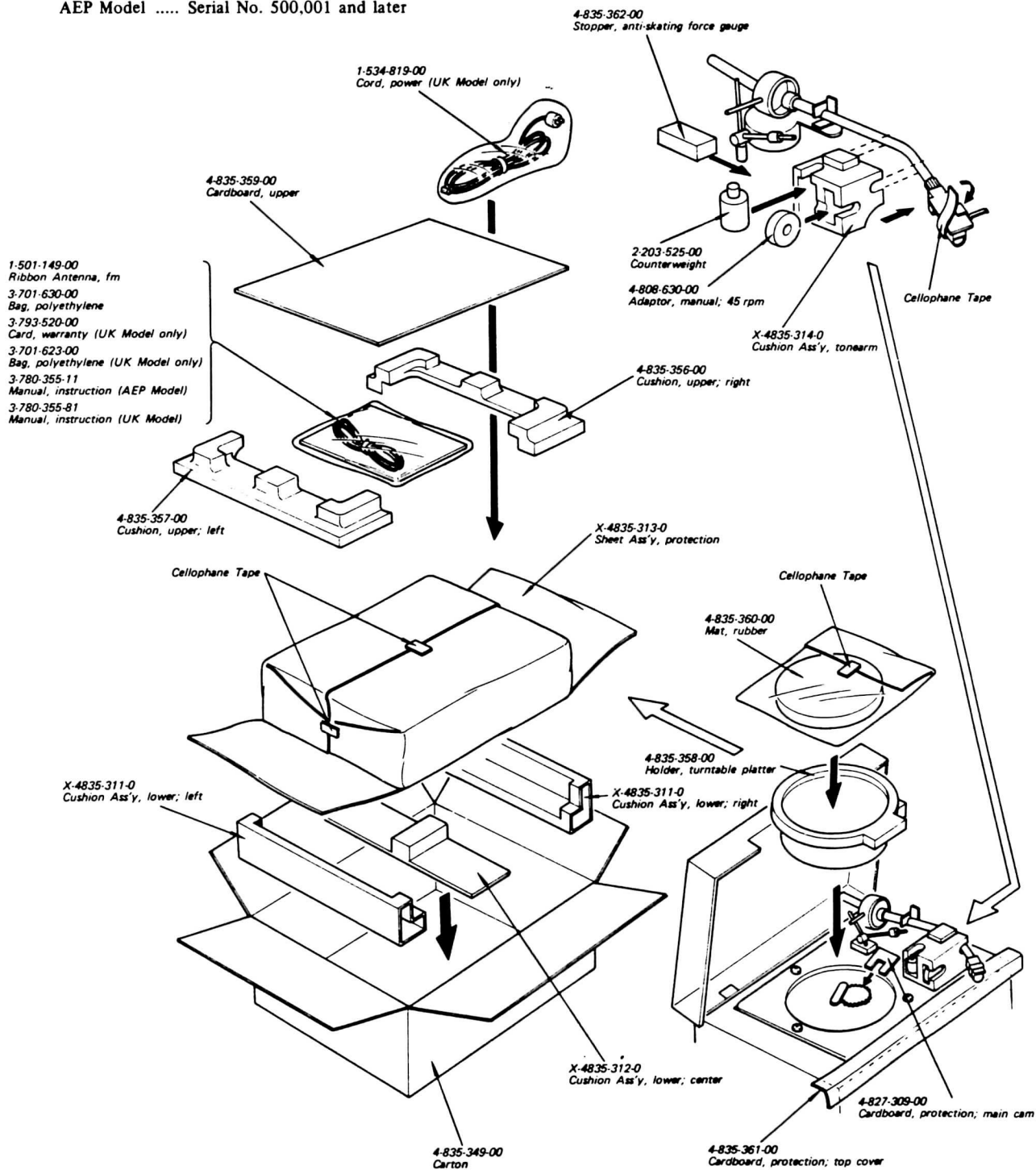
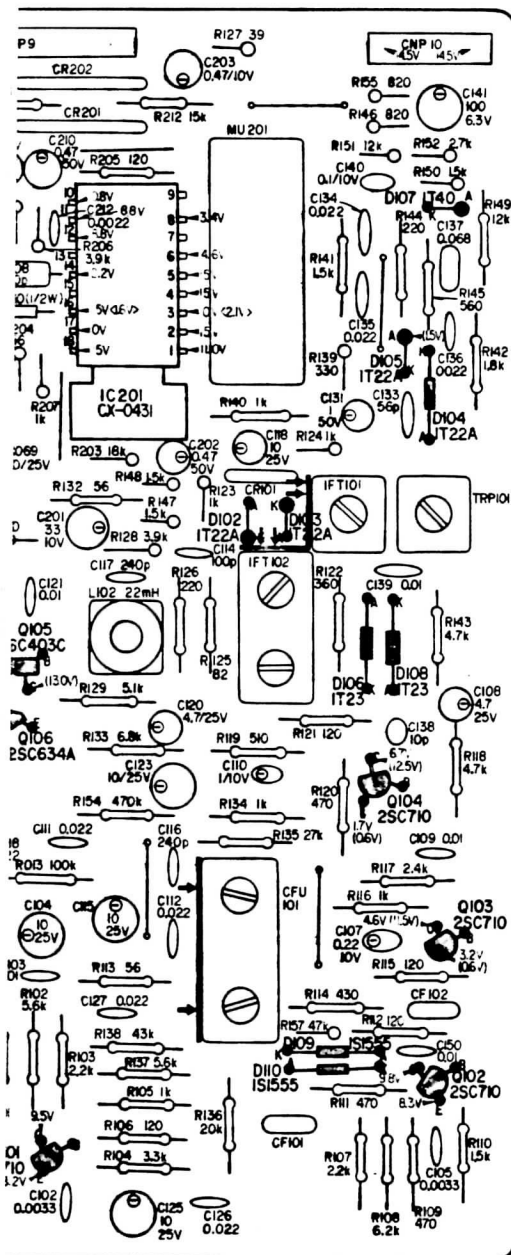
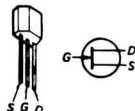


Fig. 4-1. Repacking

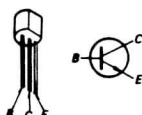


Q105	Q101	IC201	Q104	Q103
Q106			Q102	
D102 D103 D109 D105 D107				
D110 D106 D108 D104				
IFT102				

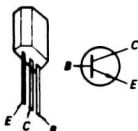
2SK23A



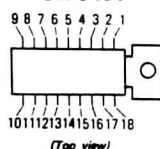
2SC710



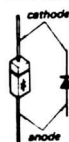
2SC403C
2SC634A



CX-0431



1S1555



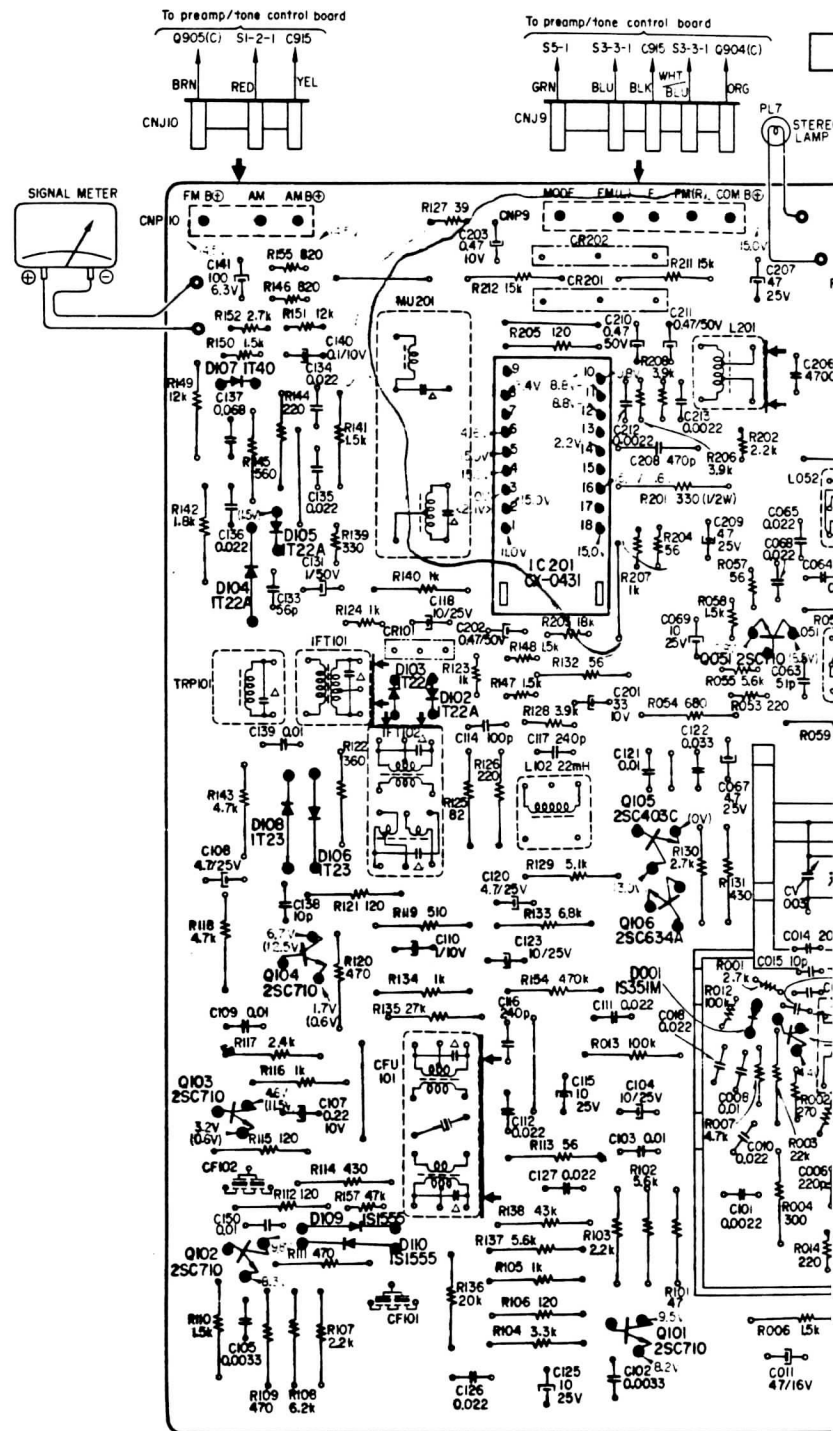
1S351M
1T22A
1T23



Note:  Shows the location of stenciled part number. Refer to this mark when replacing the part.
 () ; A-m operation
 < > ; STEREO operation

5-2. MOUNTING DIAGRAM – Fm (A-m) Front-End/I-f Amp/MPX Board (TCB-023A) –

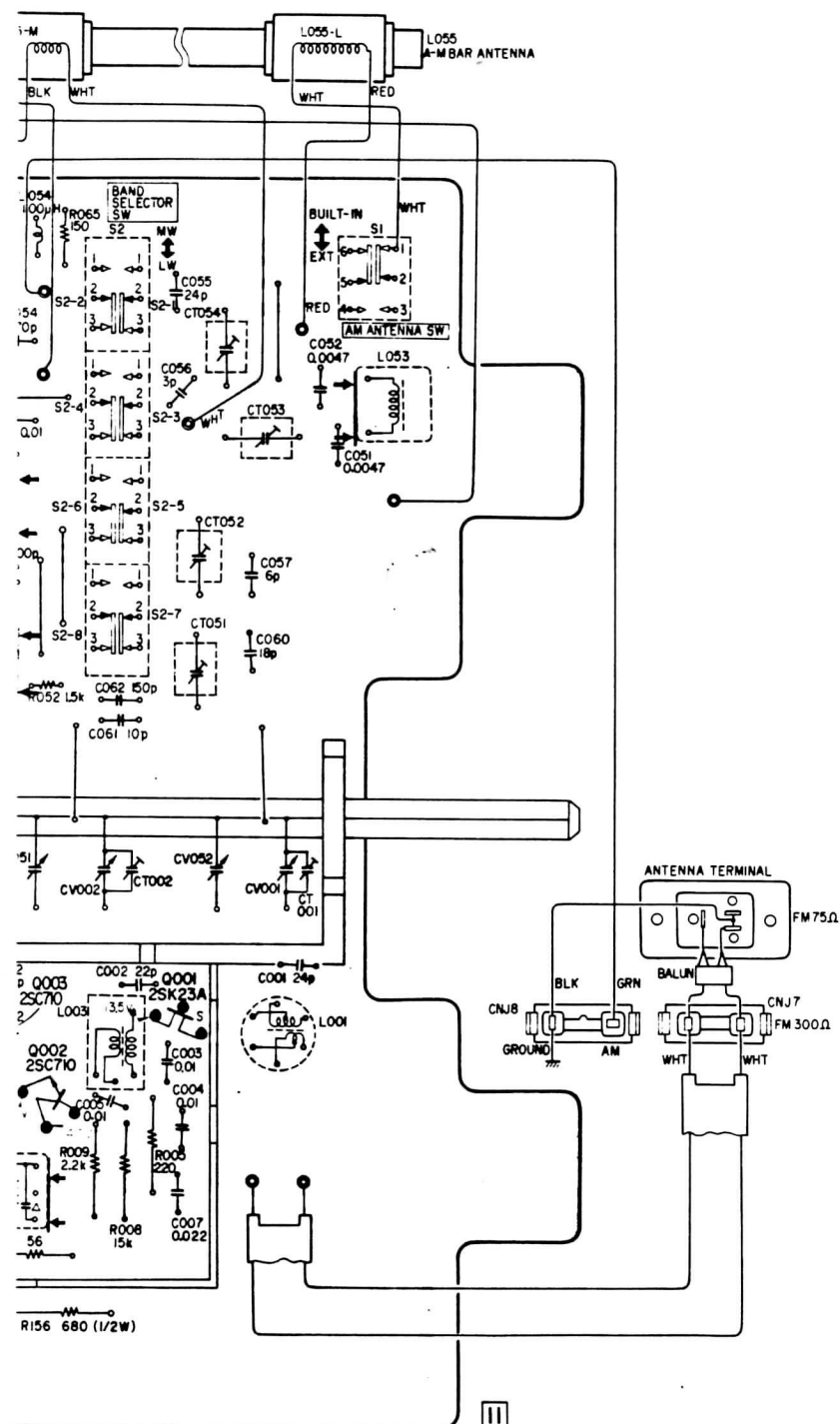
– Conductor Side –



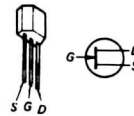
Semiconductor and Adjustment Parts Location

Q and IC	Q103 Q102	Q104	IC201	Q101	Q105 Q106	Q051	Q003
D	D107 D104	D105 D108	D109 D106	D103 D110			D001
ADJ	IFT102						

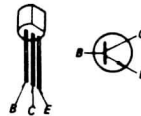
HMP-70



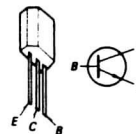
2SK23A



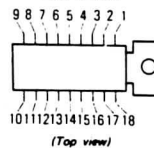
2SC710



2SC403C
2SC634A



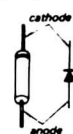
CX-0431



1S1555

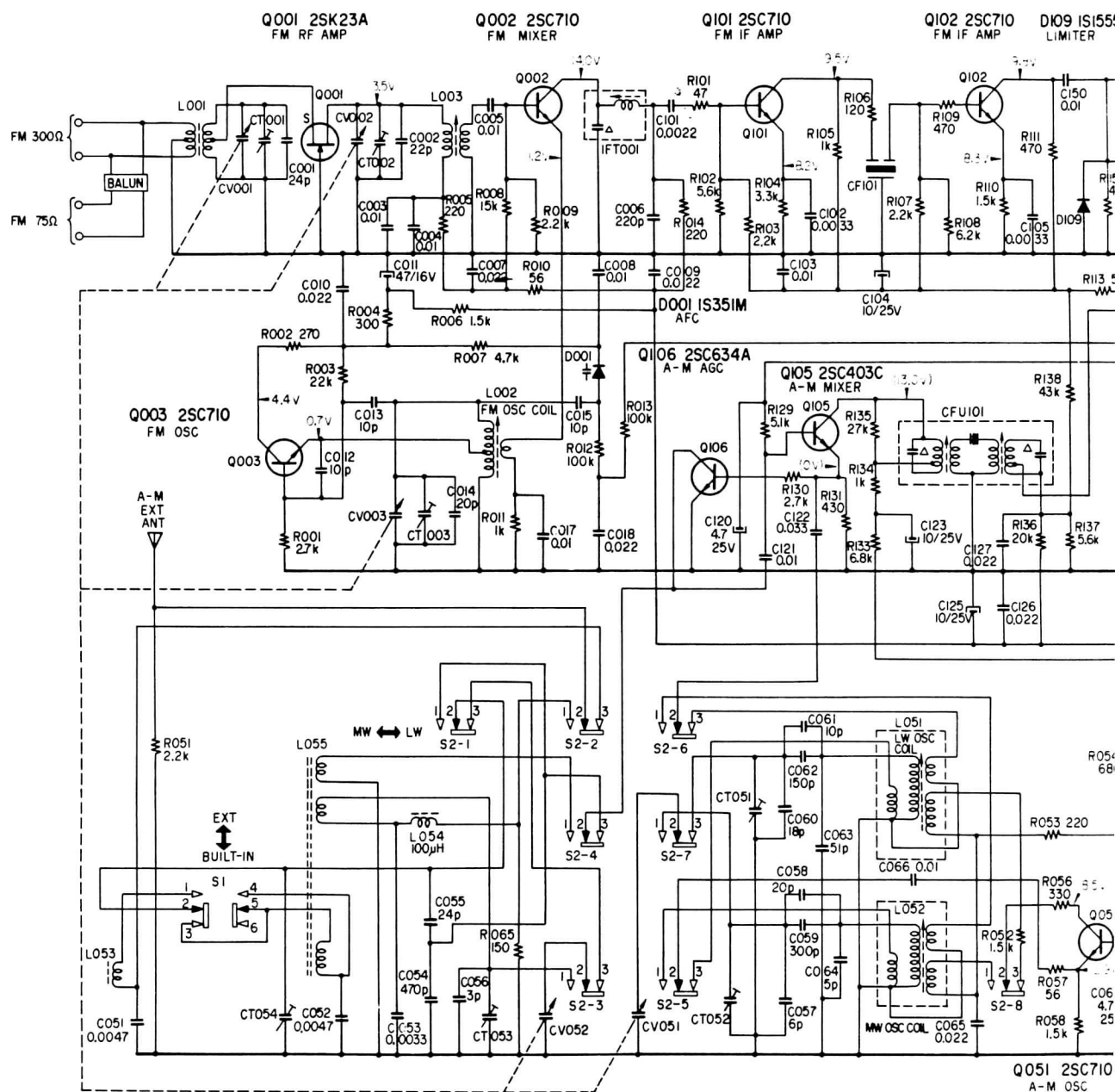


1S351M
1T22A
1T23



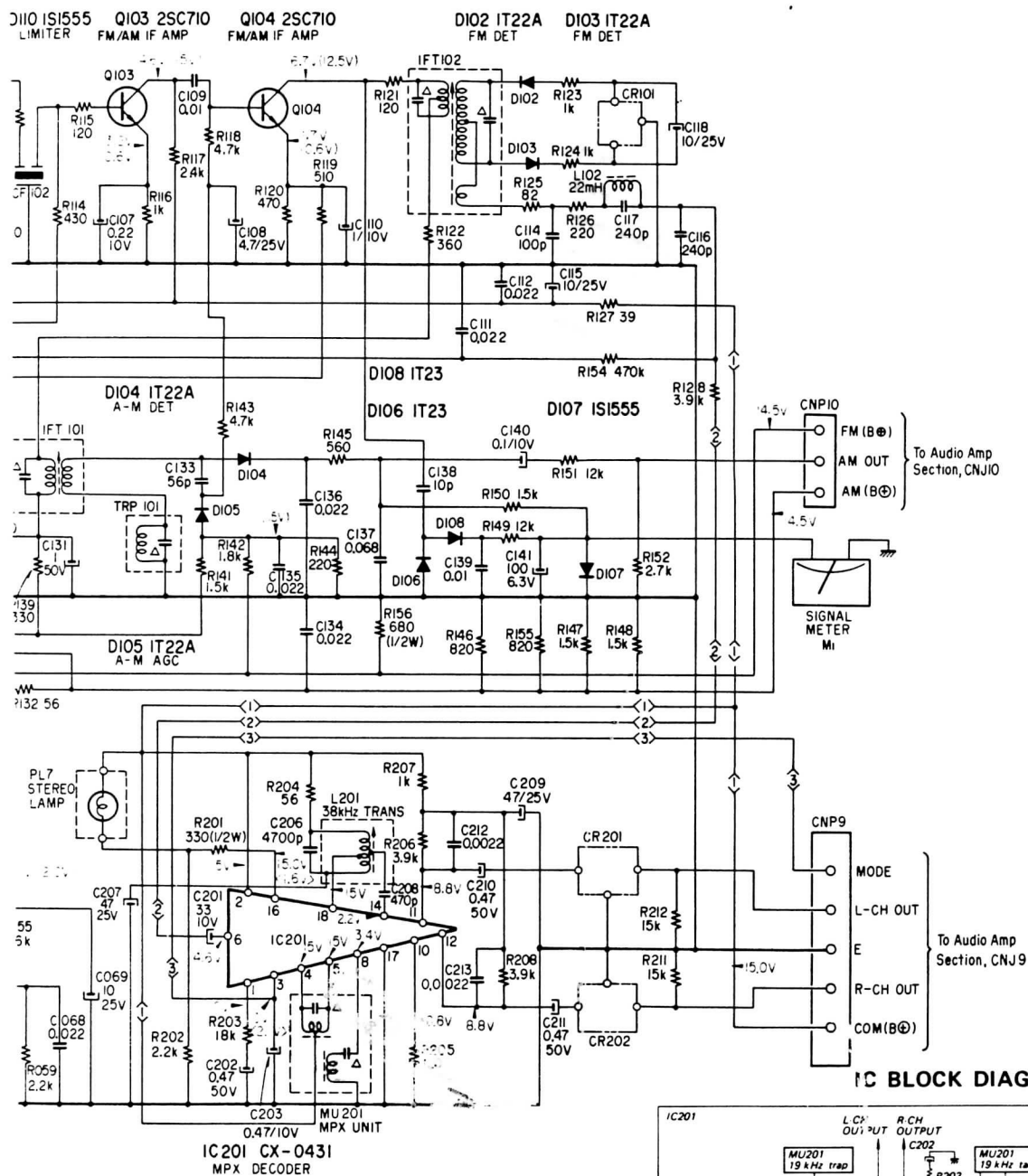
Note: Shows the location of stencilled part number. Refer to this mark when replacing the part.
Capacitors marked Δ are built in transformers.
() : A-m operation
< > : STEREO operation

5-3. SCHEMATIC DIAGRAM – Fm (A-m) Front-End/I-f Amp/MPX Section –

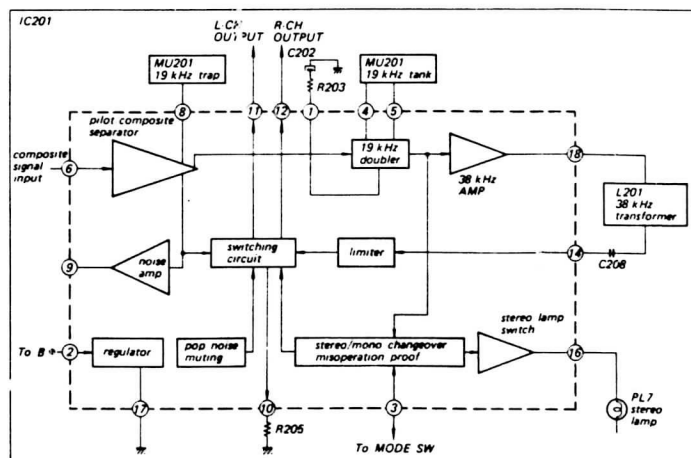


Ref. No.	Description	Position
S1	A-M ANTENNA SW (BUILT-IN - EXT)	BUILT-IN
S2	A-M BAND SW (LW-MW)	LW

HMP-70

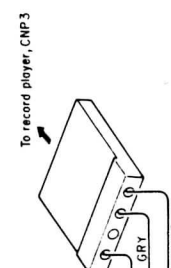
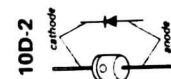
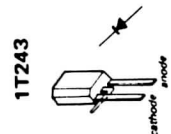
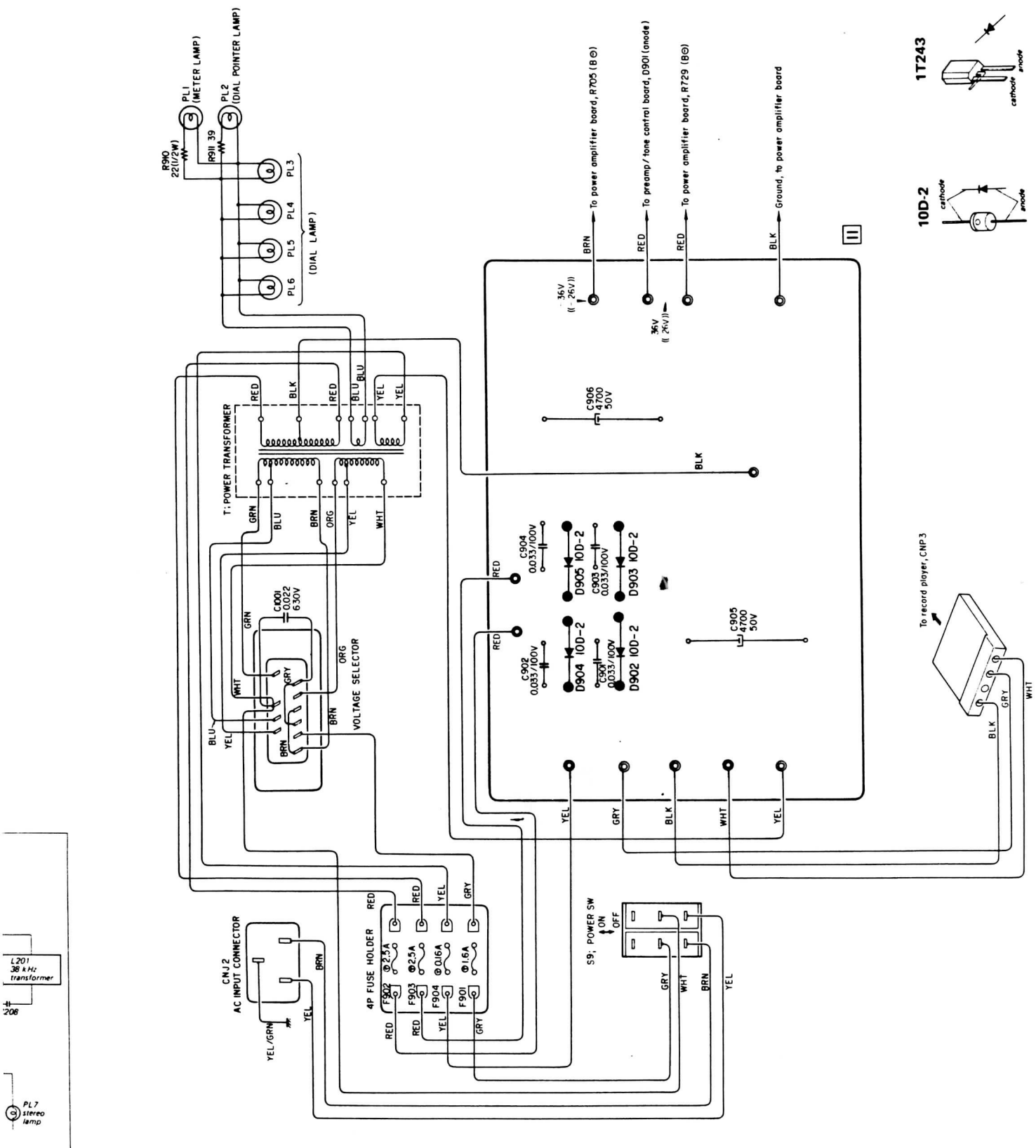


Note: All resistance values are in ohms. k = 1,000, M = 1,000 k.
 All capacitance values are in μF except as indicated with p, which means μF .
 All voltages are dc measured with a VOM which has an input impedance of 20 k ohms/volt. No signal in.
 Voltage variations may be noted because of normal production tolerances.
 Capacitors marked Δ are built in transformers.
 () ; A-m operation
 < > ; STEREO operation



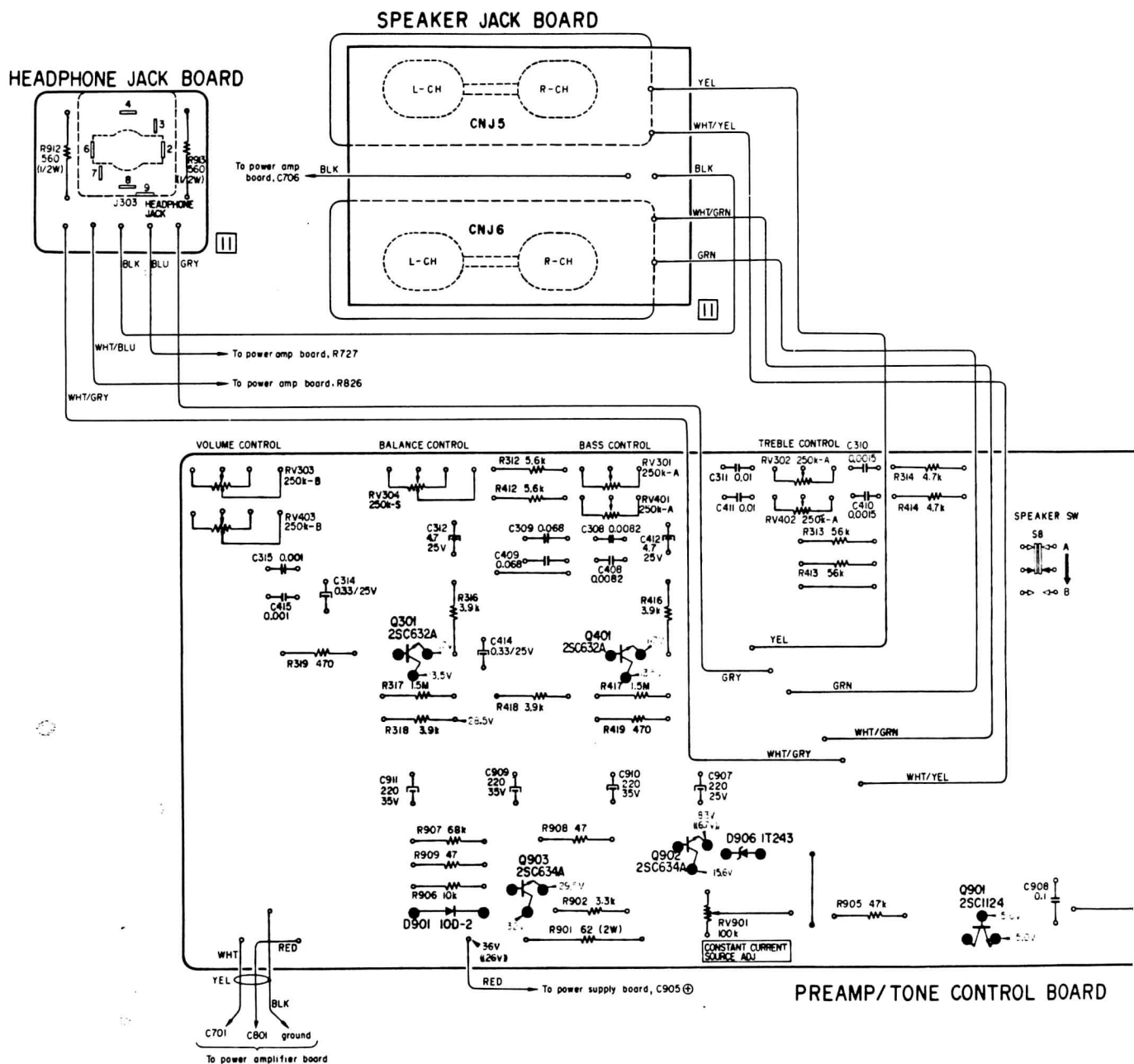
Detailed IC (CX-0431) diagram

5-4. MOUNTING DIAGRAM – Power Supply Board – – Conductor Side –



5-5. MOUNTING DIAGRAM – Preamp/Tone Control Board –

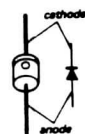
– Conductor Side –



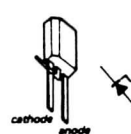
Semiconductor and adjustment Parts Location

Q301	Q903	Q401	Q902	D906	Q901
D901				RV901	

10D-2



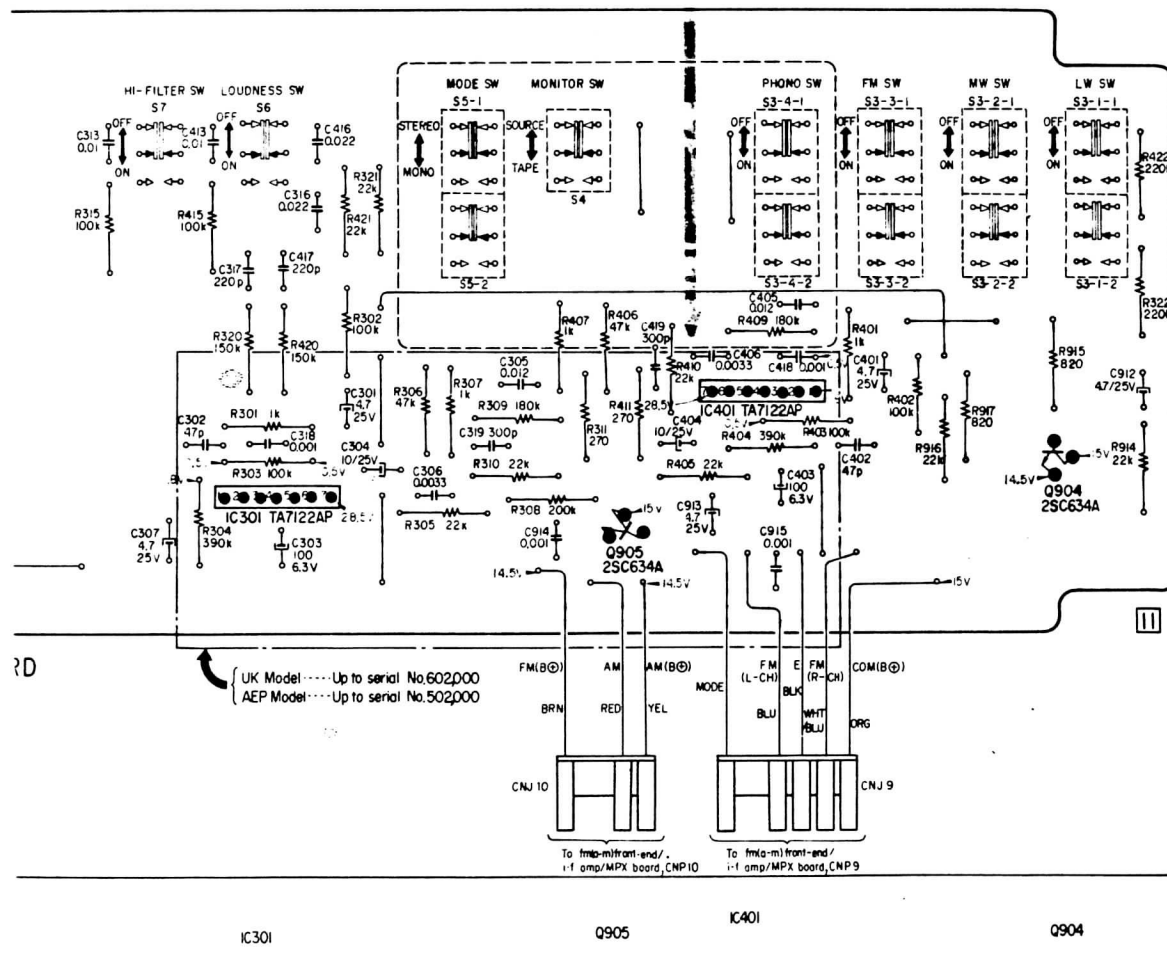
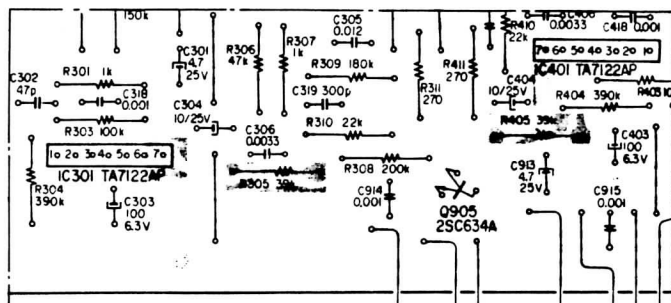
1T243



2S

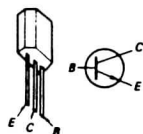


UK Model ---Serial No.602,001 and later
AEP Model---Serial No.502,001 and later



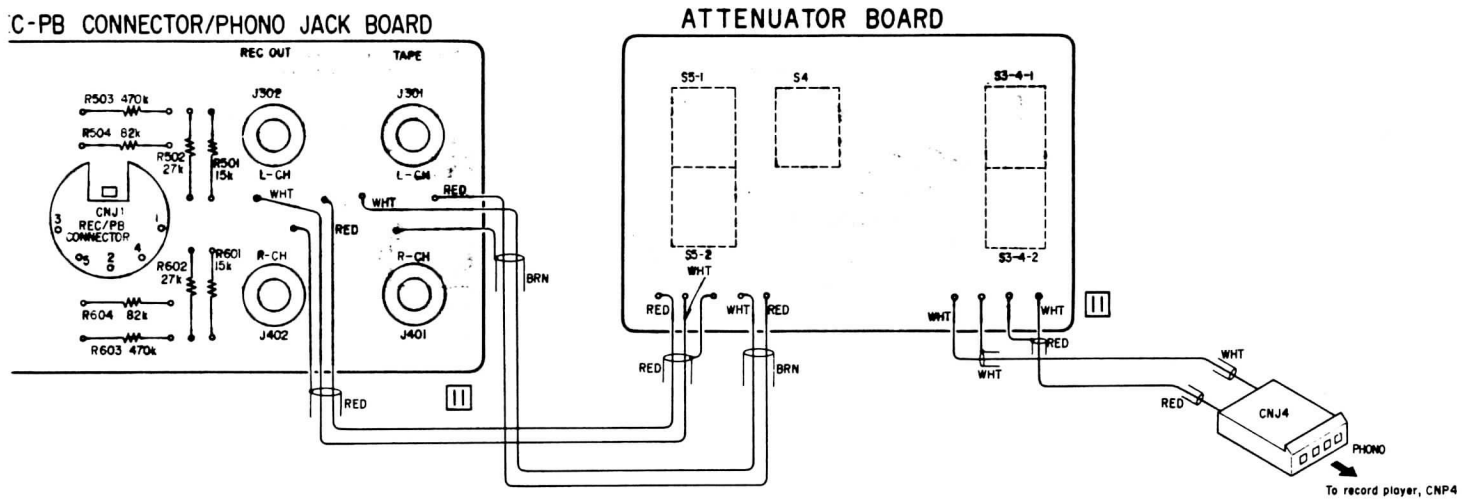
Q904

2SC632A

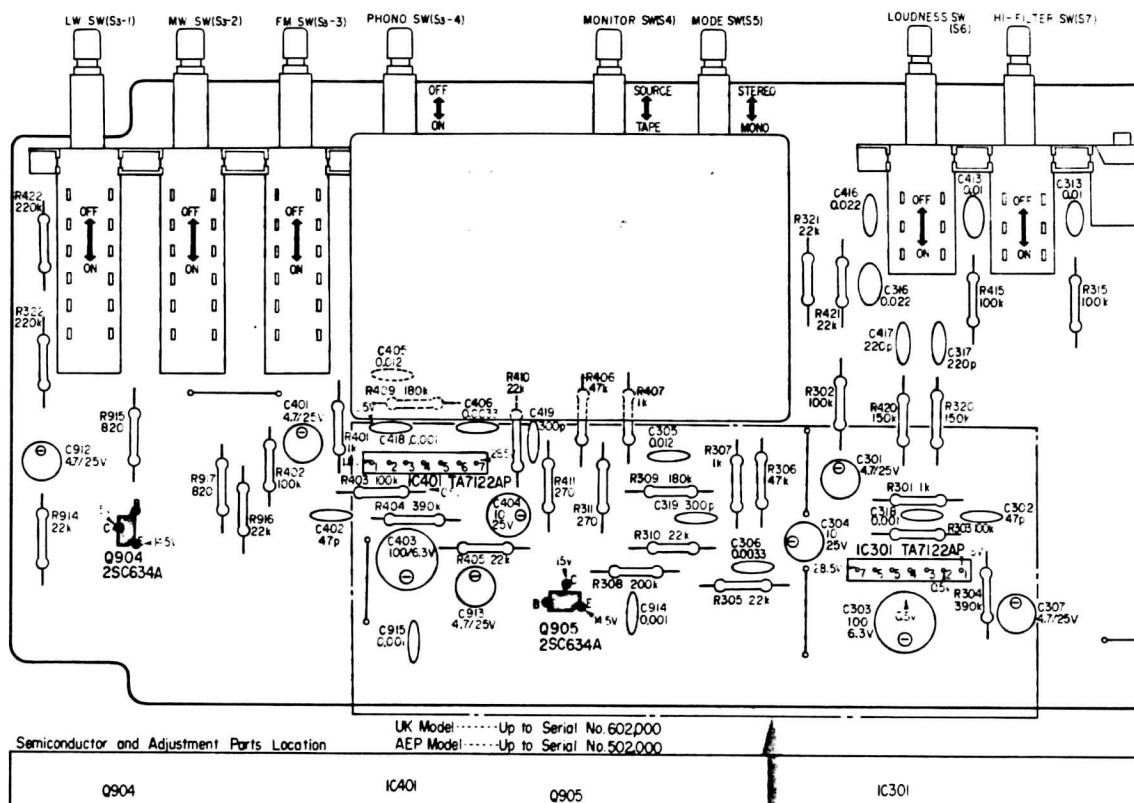


Note: (); Measured with rated output

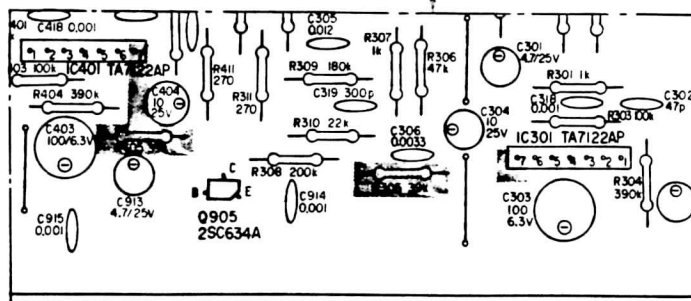
5-6. MOUNTING DIAGRAM — REC-PB Connector/Phono Jack Board and Attenuator Board — — Conductor Side —

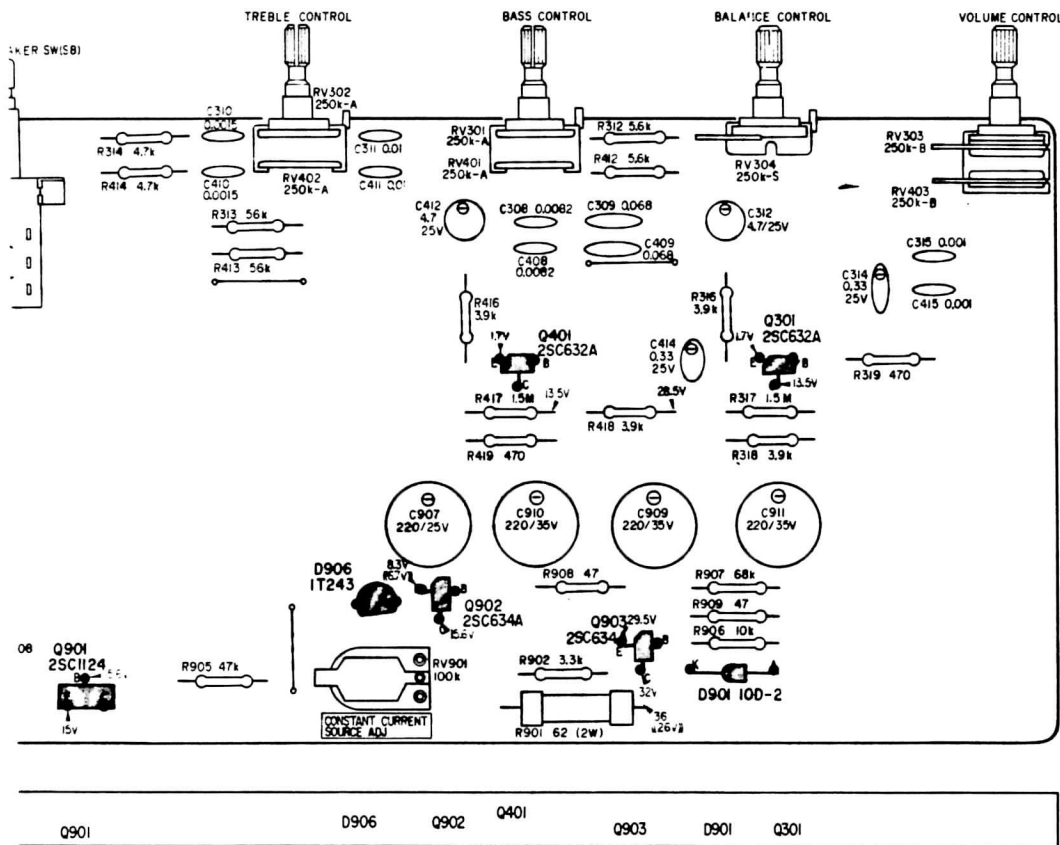


5-7. MOUNTING DIAGRAM – Preamp/Tone Control Board –
 – Component Side –



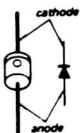
UK Model --- Serial No.602,001 and later
 AEP Model --- Serial No.502,001 and later



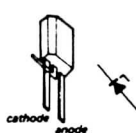


Note: (()); Measured with rated output

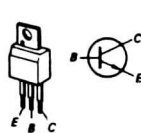
10D-2



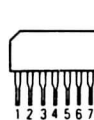
1T243



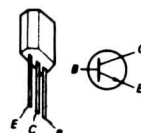
2SC1124



TA-7122AP

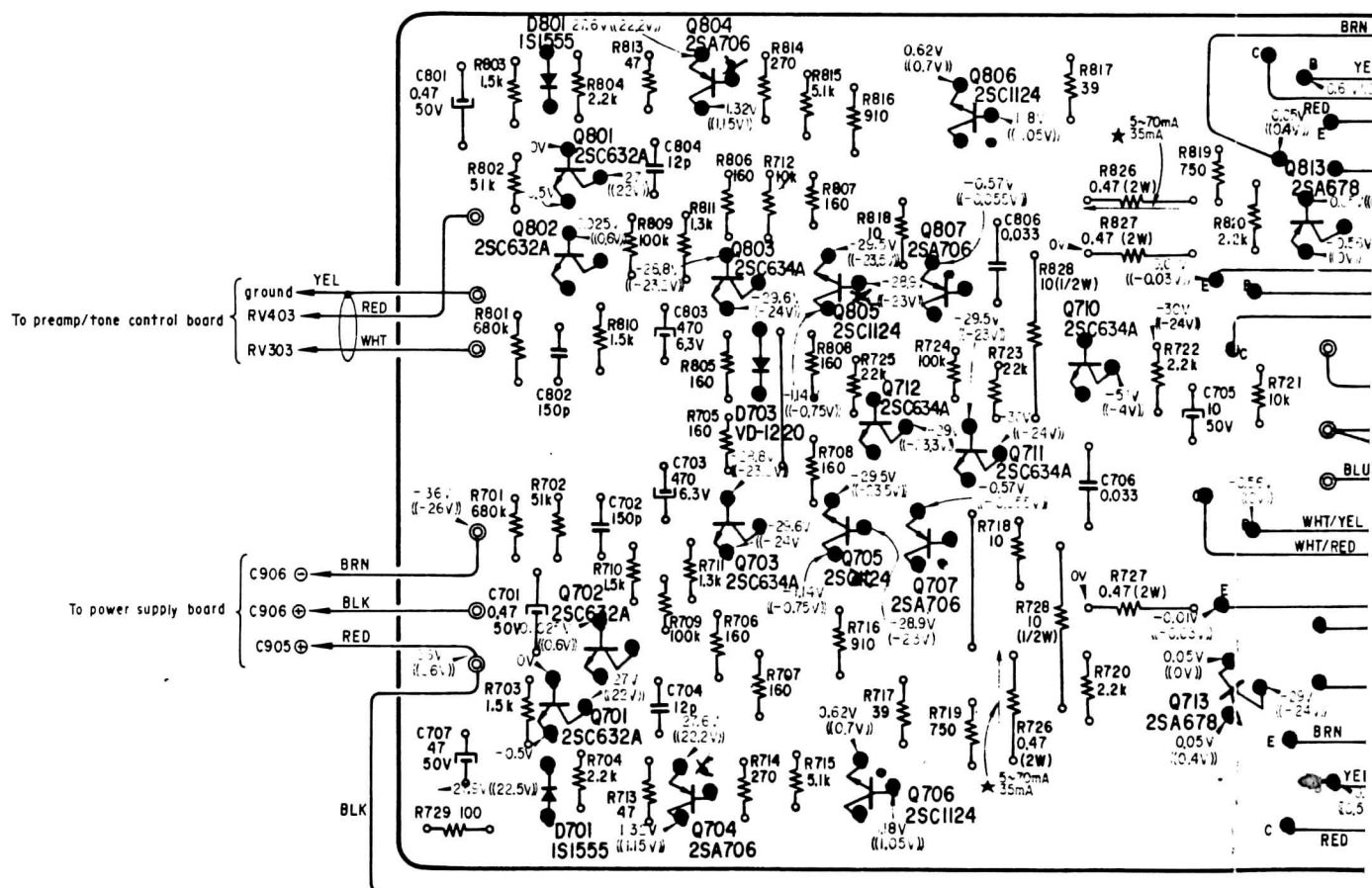


2SC634A
2SC632A



5-8. MOUNTING DIAGRAM – Power Amplifier Board (PCB-019A) –

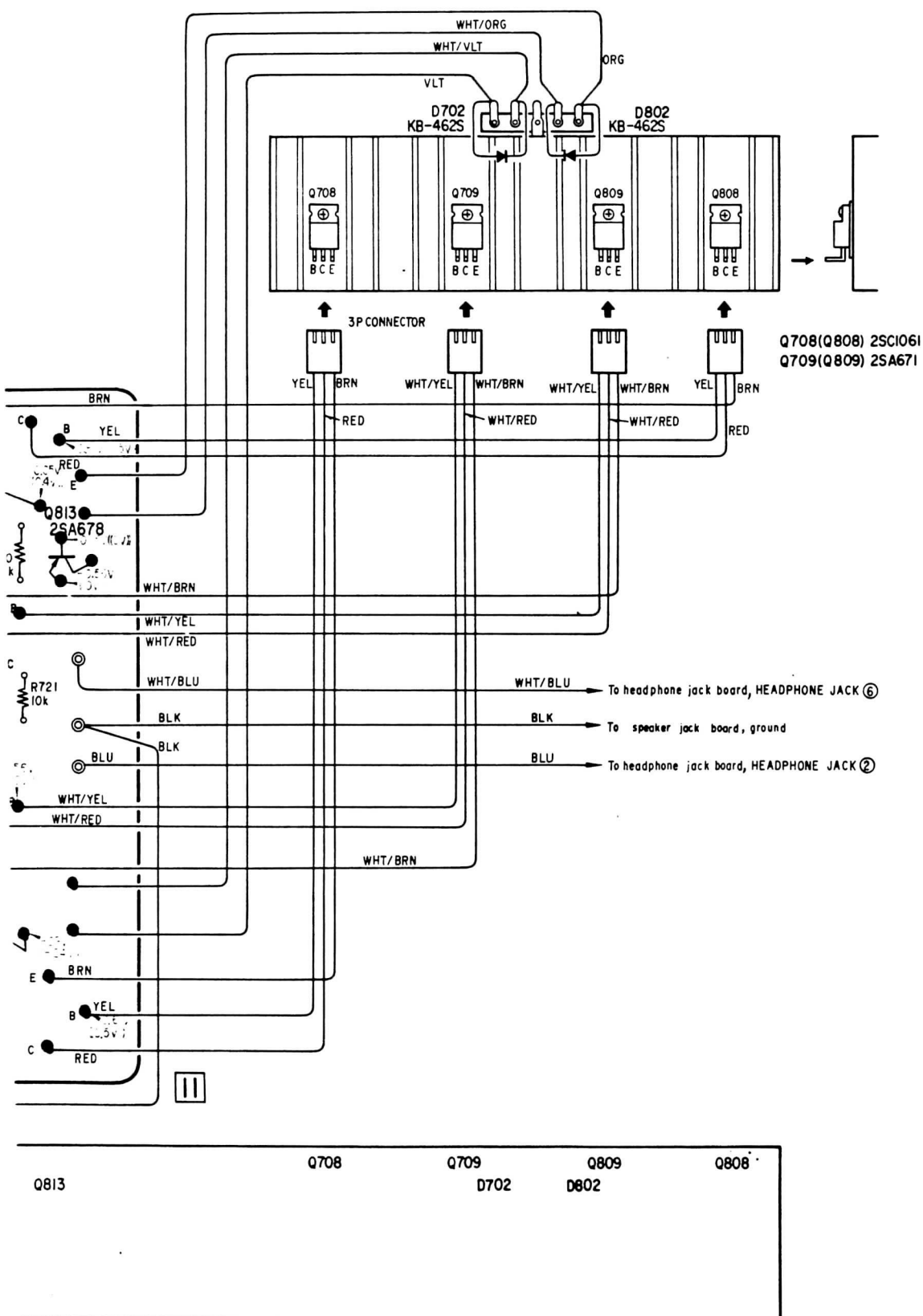
– Conductor Side –



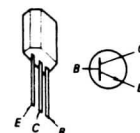
Semiconductor Location

D801	Q804	Q806			
Q801	Q803	Q805	Q807	Q710	Q813
Q802	D703	Q712	Q711		
		Q705	Q707		
Q702	Q703				
Q701					Q713
D701	Q704	Q706			

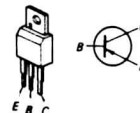
HMP-70



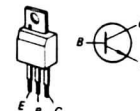
2SC632A
2SC634A



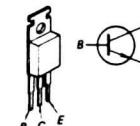
2SA706



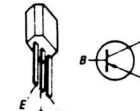
2SC1124



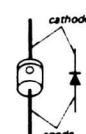
2SC1061



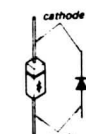
2SA678



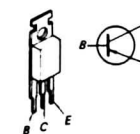
10D-2



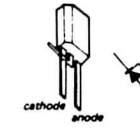
1S1555



2SA671



1T243

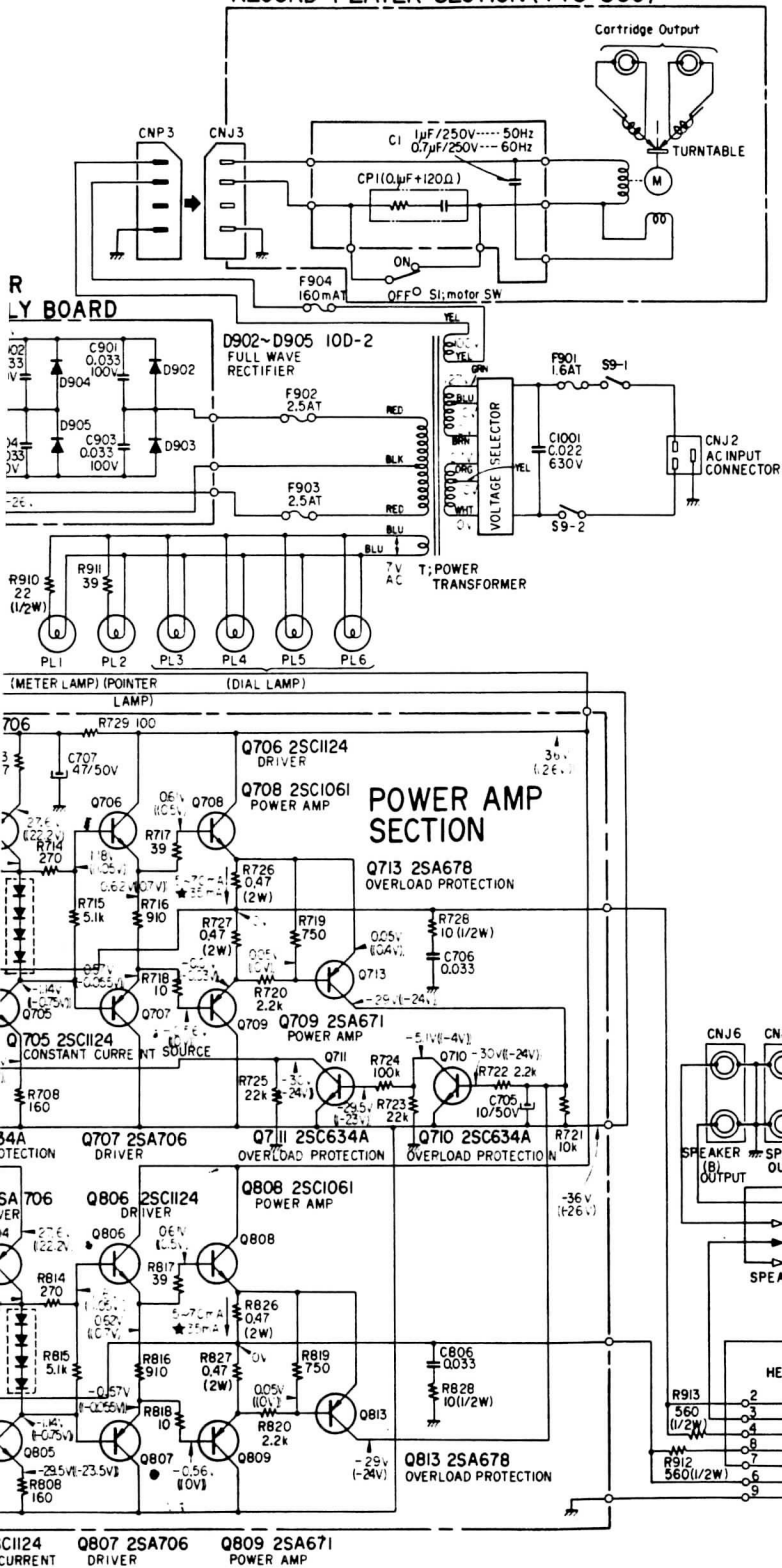


KB-462S
VD-1220

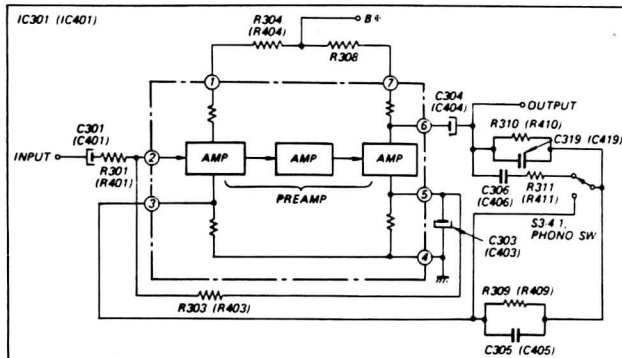


Note: () ; Measured with rated output
* ; Average current

RECORD PLAYER SECTION (TTS-360)



IC BLOCK DIAGRAM



<u>Ref. No.</u>	<u>Description</u>	<u>Position</u>
S3-1~4	FUNCTION SW (PHONO-FM-MW-LW)	FM
S4	MONITOR SW (SOURCE-TAPE)	SOURCE
S5-1~2	MODE SW (STEREO-MONO)	STEREO
S6	HI-FILTER SW (ON-OFF)	OFF
S7	LOUDNESS SW (ON-OFF)	OFF
S8	SPEAKER SW (A-B)	A
S9-1~2	POWER SW (ON-OFF)	OFF

Note:

All resistance values are in ohms. $k = 1,000$, $M = 1,000k$.
All capacitance values are in μF except as indicated with p , which means μF .
All voltages are dc measured with a VOM which has an input impedance of 20 k ohms/volt. No signal in.
Voltage variations may be noted because of normal production tolerances.

(()) ; Measured with rated output

★ ; Average current

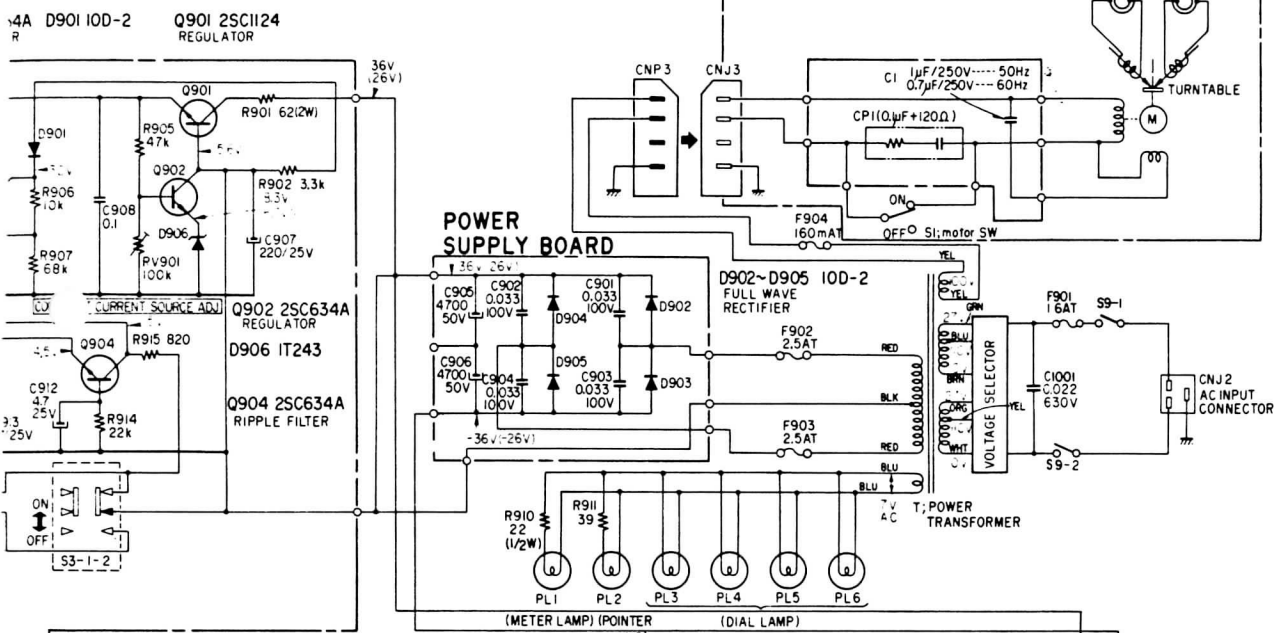
- Shorted between A and B for the sets with the following serial numbers.

	AEP Model	UK Model
Serial No.	Up to 502,000	Up to 602,000

▲ The values of R305 and R405 are as follows: 

Destination Value	AEP	UK
22 kΩ	Up to Serial No. 502,000	Up to Serial No. 602,000
39 kΩ	Serial No. 502,001 and later	Serial No. 602,001 and later

RECORD PLAYER SECTION (TTS-360)



IC301 (IC401)

C301 (C401)
INPUT

Ref. No.

S3-1~4

S4

S5-1~2

S6

S7

S8

S9-1~2

Note:

All resistors

All capacitors

which meet

All voltage

impedance

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v

v

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HMP-70

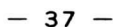
are Phillips type (cross recess type)
otherwise indicated.
ted head
del Serial No. 600,001 and later
del Serial No. 500,001 and later

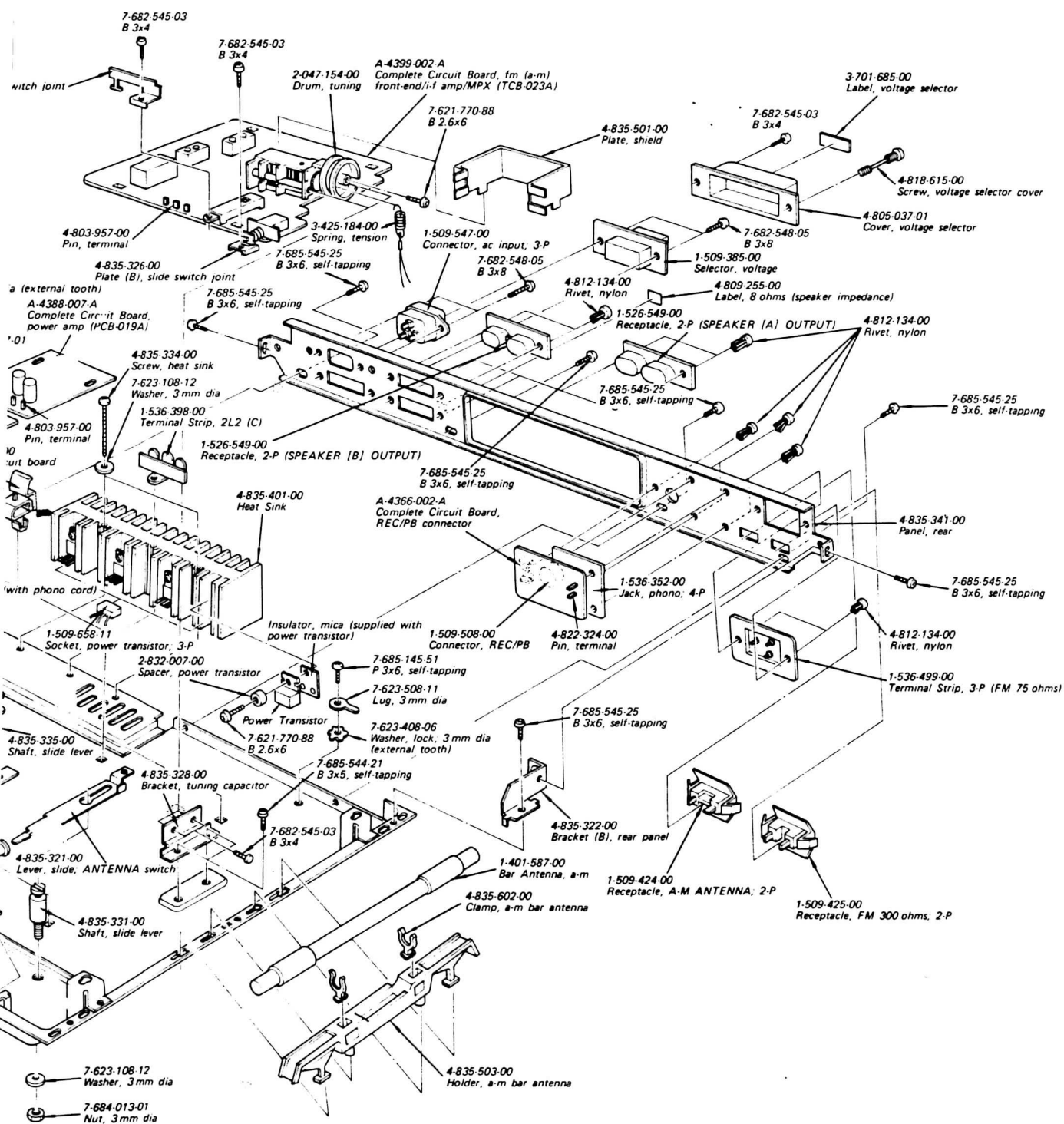




P	- Pan Head Screw		
PS	- Pan Head Screw with Spring Washer		
K	- Flat Countersunk Head Screw		
B	- Binding Head Screw		
RK	- Oval Countersunk Head Screw		
T	- Truss Head Screw		
R	- Round Head Screw		
F	- Flat Fillister Head Screw		
SC	- Set Screw		
E	- Retaining Ring (E Washer)		

Type of Slot
 P 3 x 10
 Length in mm (L)
 Diameter in mm (D)
 Type of Head





SECTION 7 ELECTRICAL PARTS LIST

Ref. No. Part No. Description

Note: UK Model Serial No. 600,001 and later
AEP Model Serial No. 500,001 and later

COMPLETE CIRCUIT BOARDS

A-4399-002-A Fm (A-m) Front-end/I-f Amp/MPX
(TCB-023A)
A-4366-002-A REC/PB Connector
A-4375-007-A Preamp/Tone Control
A-4385-005-A Speaker Jack
A-4388-007-A Power Amplifier (PCB-019A)
A-4394-007-A Power Supply

SEMICONDUCTORS

Q001	FET	2SK23A
Q002	Transistor	2SC710
Q003	Transistor	2SC710
Q051	Transistor	2SC710
Q101	Transistor	2SC710
Q102	Transistor	2SC710
Q103	Transistor	2SC710
Q104	Transistor	2SC710
Q105	Transistor	2SC403C
Q106	Transistor	2SC634A
Q301(Q401)	Transistor	2SC632A
Q701(Q801)	Transistor	2SC632A
Q702(Q802)	Transistor	2SC632A
Q703(Q803)	Transistor	2SC634A
Q704(Q804)	Transistor	2SA706
Q705(Q805)	Transistor	2SC1124
Q706(Q806)	Transistor	2SC1124
Q707(Q807)	Transistor	2SA706
Q708(Q808)	Transistor	2SC1061
Q709(Q809)	Transistor	2SA671
Q710	Transistor	2SC634A
Q711	Transistor	2SC634A
Q712	Transistor	2SC634A
Q713(Q813)	Transistor	2SA678
Q901	Transistor	2SC1124
Q902	Transistor	2SC634A
Q903	Transistor	2SC634A
Q904	Transistor	2SC634A
Q905	Transistor	2SC634A
IC201	IC	CX-0431

Ref. No. Part No. Description

IC301(IC401)	IC	TA-7122AP
D001	Diode	1S351M
D102	Diode	1T22A
D103	Diode	1T22A
D104	Diode	1T22A
D105	Diode	1T22A
D106	Diode	1T22A
D107	Diode	1S1555
D108	Diode	1T23
D109	Diode	1S1555
D110	Diode	1S1555

D701(D801)	Diode	1S1555
D702(D802)	Diode	KB-462S
D703	Diode	VD1220

D901	Diode	10D-2
D902	Diode	10D-2
D903	Diode	10D-2
D904	Diode	10D-2
D905	Diode	10D-2
D906	Diode	1T243

TRANSFORMERS, COILS AND INDUCTORS

CFU101	1-403-830-51	I-f Transformer/Ceramic Filter,
IFT001	1-403-821-00	Transformer, i-f; 10.7 MHz
IFT101	1-403-820-00	Transformer, i-f; 468 kHz
IFT102	1-403-822-00	Transformer, discriminator
L001	1-425-814-00	Coil, fm antenna
L002	1-405-628-00	Coil, fm osc
L003	1-425-815-00	Coil, fm rf
L051	1-405-555-00	Coil, lw osc
L052	1-405-556-00	Coil, mw osc
L053	1-401-586-00	Coil, external antenna
L054	1-407-169-00	Inductor, micro; 100 μ H
	1-407-705-00	Inductor, micro; 100 μ H (should be selected)
L055	1-401-587-00	Bar Antenna, a-m
L102	1-407-418-00	Inductor, micro; 22 mH
L201	1-425-729-00	Transformer, switching; 38 kHz
MU201	1-464-009-00	Unit, MPX
T	1-442-276-00	Transformer, power
TRP101	1-409-274-00	Coil, trap
	1-417-014-21	Balun

Ref. No. Part No. Description

CAPACITORS

Capacitors listed here are 50 V, ceramic type unless otherwise specified and in μF except as indicated with p (p means $\mu\mu$). (elect = electrolytic)

C001	1-102-960-11	24P	
C002	1-102-959-11	22P	
C003	1-101-118-11	0.01	
C004	1-101-118-11	0.01	
C005	1-101-923-11	0.01	25 V
C006	1-102-978-11	220P	
C007	1-101-924-11	0.022	25 V
C008	1-101-118-11	0.01	
C009	1-101-924-11	0.022	25 V
C010	1-101-924-11	0.022	25 V
C011	1-121-409-11	47	16 V elect
C012	1-101-978-11	10P	
C013	1-101-978-11	10P	
C014	1-101-972-11	20P	
C015	1-102-858-11	10P	
C016		-----	
C017	1-101-923-11	0.01	25 V
C018	1-101-924-11	0.022	25 V
C051	1-105-669-12	0.0047	50 V mylar
C052	1-105-669-12	0.0047	50 V mylar
C053	1-105-667-12	0.0033	50 V mylar
C054	1-102-824-11	470P	
C055	1-102-960-11	24P	
C056	1-102-936-11	3P	
C057	1-102-808-11	6P	
C058	1-102-958-11	20P	
C059	1-102-981-11	300P	
C060	1-102-953-11	18P	
C061	1-102-947-11	10P	
C062	1-101-361-11	150P	
C063	1-101-882-11	51P	
C064	1-102-942-11	5P	
C065	1-101-924-11	0.022	25 V
C066	1-105-673-12	0.01	50 V mylar
C067	1-121-395-11	4.7	25 V elect
C068	1-101-924-11	0.022	25 V
C069	1-121-398-11	10	25 V elect
C101	1-101-919-11	0.0022	25 V
C102	1-105-667-12	0.0033	50 V mylar

Ref. No. Part No. Description

C103	1-101-923-11	0.01	25 V
C104	1-121-398-11	10	25 V elect
C105	1-105-667-12	0.0033	50 V mylar
C106		-----	
C107	1-127-020-11	0.22	10 V solid aluminum
C108	1-121-395-11	4.7	25 V elect
C109	1-101-923-11	0.01	25 V
C110	1-127-023-11	1	10 V solid aluminum
C111	1-101-924-11	0.022	25 V
C112	1-101-924-11	0.022	25 V
C113		-----	
C114	1-102-973-11	100P	
C115	1-121-398-11	10	25 V elect
C116	1-102-979-11	240P	
C117	1-107-140-11	240P	50 V silvered mica
C118	1-121-398-11	10	25 V elect
C119		-----	
C120	1-121-395-11	4.7	25 V elect
C121	1-101-923-11	0.01	25 V
C122	1-105-679-12	0.033	50 V mylar
C123	1-121-398-11	10	25 V elect
C124		-----	
C125	1-121-398-11	10	25 V elect
C126	1-101-924-11	0.022	25 V
C127	1-101-924-11	0.022	25 V
C128		-----	
C129		-----	
C130		-----	
C131	1-121-391-11	1	50 V elect
C132		-----	
C133	1-101-884-11	56P	
C134	1-101-924-11	0.022	25 V
C135	1-101-924-11	0.022	25 V
C136	1-105-677-12	0.022	50 V mylar
C137	1-105-683-12	0.068	50 V mylar
C138	1-102-947-11	10P	
C139	1-101-923-11	0.01	25 V
C140	1-127-019-11	0.1	10 V solid aluminum
C141	1-121-413-11	100	6.3 V elect
C150	1-101-923-11	0.01	25 V
C201	1-121-402-11	33	10 V elect
C202	1-121-726-11	0.47	50 V elect
C203	1-127-022-11	0.47	10 V solid aluminum
C204		-----	

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		
C205		-----		
C206	1-103-575-11	4700P	50 V	styrol
C207	1-121-410-11	47	25 V	elect
C208	1-103-717-11	470P	50 V	styrol
C209	1-121-410-11	47	25 V	elect
C210	1-121-726-11	0.47	50 V	elect
C211	1-121-726-11	0.47	50 V	elect
C212	1-105-665-12	0.0022	50 V	mylar
C213	1-105-665-12	0.0022	50 V	mylar
C301(C401)	1-121-395-11	4.7	25 V	elect
C302(C402)	1-101-881-11	47P		
C303(C403)	1-121-413-11	100	6.3 V	elect
C304(C404)	1-121-398-11	10	25 V	elect
C305(C405)	1-105-514-12	0.012	50 V	mylar
C306(C406)	1-105-507-12	0.0033	50 V	mylar
C307	1-121-395-11	4.7	25 V	elect
C308(C408)	1-105-672-12	0.0082	50 V	mylar
C309(C409)	1-105-683-12	0.068	50 V	mylar
C310(C410)	1-105-663-12	0.0015	50 V	mylar
C311(C411)	1-105-673-12	0.01	50 V	mylar
C312(C412)	1-121-395-11	4.7	25 V	elect
C313(C413)	1-105-673-12	0.01	50 V	mylar
C314(C414)	1-127-082-11	0.33	25 V	solid aluminum
C315(C415)	1-105-661-12	0.001	50 V	mylar
C316(C416)	1-105-677-12	0.022	50 V	mylar
C317(C417)	1-102-983-11	220P		
C318(C418)	1-105-661-12	0.001	50 V	mylar
C319(C419)	1-102-981-11	300P	50 V	
C701(C801)	1-121-726-11	0.47	50 V	elect
C702(C802)	1-101-124-11	150P		
C703(C803)	1-121-424-11	470	6.3 V	elect
C704(C804)	1-102-955-11	12P		
C705	1-121-738-11	10	50 V	elect
C706(C806)	1-105-679-12	0.033	50 V	mylar
C707	1-121-411-11	47	50 V	elect
C901	1-105-719-12	0.033	100 V	mylar
C902	1-105-719-12	0.033	100 V	mylar
C903	1-105-719-12	0.033	100 V	mylar
C904	1-105-719-12	0.033	100 V	mylar
C905	1-123-119-11	4700	50 V	elect
C906	1-123-119-11	4700	50 V	elect
C907	1-121-936-11	220	25 V	elect
C908	1-105-685-12	0.1	50 V	mylar

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		
C909	1-123-063-11	220	35 V	elect
C910	1-123-063-11	220	35 V	elect
C911	1-123-063-11	220	35 V	elect
C912	1-121-395-11	4.7	25 V	elect
C913	1-121-395-11	4.7	25 V	elect
C914	1-105-661-12	0.001	50 V	mylar
C915	1-105-661-12	0.001	50 V	mylar
C1001	1-129-735-11	0.02	630 V	polypropylene
CT001	1-141-097-21	trimmer, fm antenna		
CT002	1-141-097-21	trimmer, fm rf		
CT003	1-141-097-21	trimmer, fm osc		
CT051	1-141-097-21	trimmer, lw osc		
CT052	1-141-097-21	trimmer, mw osc		
CT053	1-141-097-21	trimmer, mw antenna		
CT054	1-141-097-21	trimmer, lw antenna		
CV001	1-151-281-11	tuning		
CV002				
CV003				
CV051				
CV052				

RESISTORS

All resistors are in Ω , $\pm 5\%$, $\frac{1}{4}W$ and composition type unless otherwise specified.

R001	1-202-393-11	2.7 k
R002	1-202-369-11	270
R003	1-202-415-11	22 k
R004	1-202-370-11	300
R005	1-202-367-11	220
R006	1-202-387-11	1.5 k
R007	1-202-399-11	4.7 k
R008	1-202-411-11	15 k
R009	1-202-391-11	2.2 k
R010	1-202-343-11	56
R011	1-202-383-11	1 k
R012	1-202-431-11	100 k
R013	1-202-431-11	100 k
R014	1-202-367-11	220
R051	1-202-391-11	2.2 k
R052	1-202-387-11	1.5 k
R053	1-202-367-11	220
R054	1-202-379-11	680
R055	1-202-401-11	5.6 k

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R056	1-202-371-11	330
R057	1-202-343-11	56
R058	1-202-387-11	1.5 k
R059	1-202-391-11	2.2 k
R065	1-202-363-11	150
R101	1-202-341-11	47
R102	1-202-401-11	5.6 k
R103	1-202-391-11	2.2 k
R104	1-202-395-11	3.3 k
R105	1-202-383-11	1 k
R106	1-202-361-11	120
R107	1-202-391-11	2.2 k
R108	1-202-402-11	6.2 k
R109	1-202-375-11	470
R110	1-202-387-11	1.5 k
R111	1-202-375-11	470
R112	1-202-361-11	120
R113	1-202-343-11	56
R114	1-202-374-11	430
R115	1-202-361-11	120
R116	1-202-383-11	1 k
R117	1-202-392-11	2.4 k
R118	1-202-399-11	4.7 k
R119	1-202-376-11	510
R120	1-202-375-11	470
R121	1-202-361-11	120
R122	1-202-372-11	360
R123	1-202-383-11	1 k
R124	1-202-383-11	1 k
R125	1-202-357-11	82
R126	1-202-367-11	220
R127	1-202-339-11	39
R128	1-202-397-11	3.9 k
R129	1-202-400-11	5.1 k
R130	1-202-393-11	2.7 k
R131	1-202-374-11	430
R132	1-202-343-11	56
R133	1-202-403-11	6.8 k
R134	1-202-383-11	1 k
R135	1-202-417-11	27 k
R136	1-202-414-11	20 k
R137	1-202-401-11	5.6 k
R138	1-202-422-11	43 k
R139	1-202-371-11	330

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R140	1-202-383-11	1 k
R141	1-202-387-11	1.5 k
R142	1-202-389-11	1.8 k
R143	1-202-399-11	4.7 k
R144	1-202-367-11	220
R145	1-202-377-11	560
R146	1-202-381-11	820
R147	1-202-387-11	1.5 k
R148	1-202-387-11	1.5 k
R149	1-202-409-11	12 k
R150	1-202-387-11	1.5 k
R151	1-202-409-11	12 k
R152	1-202-393-11	2.7 k
R153		-----
R154	1-202-447-11	470 k
R155	1-202-381-11	820
R156	1-202-569-11	680 ½W
R157	1-202-423-11	47 k
R201	1-202-561-11	330 ½W
R202	1-202-391-11	2.2 k
R203	1-202-413-11	18 k
R204	1-202-343-11	56
R205	1-202-361-11	120
R206	1-202-397-11	3.9 k
R207	1-202-383-11	1 k
R208	1-202-397-11	3.9 k
R209		-----
R210		-----
R211	1-202-411-11	15 k
R212	1-202-411-11	15 k
R301(R401)	1-244-673-11	1 k carbon
R302(R402)	1-244-721-11	100 k carbon
R303(R403)	1-244-721-11	100 k carbon
R304(R404)	1-244-735-11	390 k carbon
	1-244-705-11	22 k carbon
	UK Model..... Up to Serial No. 602,000	
R305	AEP Model..... Up to Serial No. 502,000	
(R405)	1-244-711-11	39 k carbon
	UK Model Serial No. 602,001 and later	
	AEP Model Serial No. 502,001 and later	
R306(R406)	1-244-713-11	47 k carbon
R307(R407)	1-244-673-11	1 k carbon
R308	1-244-728-11	200 k carbon
R309(R409)	1-244-727-11	180 k carbon

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
R310(R410)	1-244-705-11	22k	carbon
R311(R411)	1-244-659-11	270	carbon
R312(R412)	1-244-691-11	5.6k	carbon
R313(R413)	1-244-715-11	56k	carbon
R314(R414)	1-244-689-11	4.7k	carbon
R315(R415)	1-244-721-11	100k	carbon
R316(R416)	1-244-687-11	3.9k	carbon
R317(R417)	1-244-749-11	1.5M	carbon
R318(R418)	1-244-687-11	3.9k	carbon
R319(R419)	1-244-665-11	470	carbon
R320(R420)	1-244-725-11	150k	carbon
R321(R421)	1-244-705-11	22k	carbon
R322(R422)	1-244-729-11	220k	carbon
R501(R601)	1-244-701-11	15k	carbon
R502(R602)	1-244-707-11	27k	carbon
R503(R603)	1-244-737-11	470k	carbon
R504(R604)	1-244-719-11	82k	carbon
R701(R801)	1-242-741-11	680k	carbon
R702(R802)	1-242-714-11	51k	carbon
R703(R803)	1-242-677-11	1.5k	carbon
R704(R804)	1-242-681-11	2.2k	carbon
R705(R805)	1-242-654-11	160	carbon
R706(R806)	1-242-654-11	160	carbon
R707(R807)	1-242-654-11	160	carbon
R708(R808)	1-242-654-11	160	carbon
R709(R809)	1-242-721-11	100k	carbon
R710(R810)	1-242-677-11	1.5k	carbon
R711(R811)	1-242-676-11	1.3k	carbon
R712	1-242-697-11	10k	carbon
R713(R813)	1-242-641-11	47	carbon
R714(R814)	1-242-659-11	270	carbon
R715(R815)	1-242-690-11	5.1k	carbon
R716(R816)	1-242-672-11	910	carbon
R717(R817)	1-242-639-11	39	carbon
R718(R818)	1-242-625-11	10	carbon
R719(R819)	1-242-670-11	750	carbon
R720(R820)	1-242-681-11	2.2k	carbon
R721	1-242-697-11	10k	carbon
R722	1-242-681-11	2.2k	carbon
R723	1-242-705-11	22k	carbon
R724	1-242-721-11	100k	carbon
R725	1-242-705-11	22k	carbon
R726(R826)	1-217-153-11	0.47	2W metal-oxide
R727(R827)	1-217-153-11	0.47	2W metal-oxide

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
R728(R828)	1-202-525-11	10	½W
R729	1-242-649-11	100	carbon
R901	1-206-482-11	62	2W metal-oxide
R902	1-244-685-11	3.3k	carbon
R903		-----	
R904		-----	
R905	1-244-713-11	47k	carbon
R906	1-244-697-11	10k	carbon
R907	1-244-717-11	68k	carbon
R908	1-244-641-11	47	carbon
R909	1-244-641-11	47	carbon
R910	1-202-533-11	22	½W
R911	1-202-339-11	39	
R912	1-202-567-11	560	½W
R913	1-202-567-11	560	½W
R914	1-244-705-11	22k	carbon
R915	1-244-671-11	820	carbon
R916	1-244-705-11	22k	carbon
R917	1-244-671-11	820	carbon
RV301(RV401)	1-224-127-21	250k (A), variable	(TREBLE)
RV302(RV402)	1-224-127-21	250k (A), variable	(BASS)
RV303(RV403)	1-224-440-00	250k (B), variable	(VOLUME)
RV304	1-224-430-21	250k (S), variable	(BALANCE)
RV901	1-222-766-11	100k, adjustable	

SWITCHES

S1	1-516-205-00	Pushbutton, 1-key; (A-M ANTENNA)
S2	1-516-490-00	Slide (BAND SELECTOR)
S3,4,5	1-516-489-00	Pushbutton, 6-key (FUNCTION, MONITOR, MODE)
S6,7,8	1-516-488-00	Pushbutton, 3-key (LOUDNESS, SPEAKER, HI-FILTER)
S9	1-516-260-00	Lever (POWER)

FILTERS

CF101,102	1-527-220-11	Fm I-f, ceramic; 10.70 MHz (red)
	1-527-220-21	Fm I-f, ceramic; 10.67 MHz (blue)
	1-527-220-31	Fm I-f, ceramic; 10.73 MHz (orange)
	1-527-220-41	Fm I-f, ceramic; 10.64 MHz (black)
	1-527-220-51	Fm I-f, ceramic; 10.76 MHz (white)

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
MISCELLANEOUS					
CNJ1	1-509-508-00	Connector, REC/PB	F901	1-532-259-00	Fuse, 1.6AT
CNJ2	1-509-547-00	Connector, ac input; 3-P	F902 F903	1-532-286-00	Fuse, 2.5AT
CNJ3	1-508-655-41	Connector, 4-P; male (AMPLOK)	F904	1-532-275-00	Fuse, 160 mA
CNJ4	1-509-594-00	Connector, 4-P; female (AMPLOK)	M1	1-520-142-00	Meter, SIGNAL
CNJ5,6	1-526-549-00	Connector, SPEAKER OUTPUT; 2-P	PL1	1-518-176-00	Lamp, signal meter
CNJ7	1-509-425-00	Receptacle, FM 300 ohms; 2-P	PL2	1-518-218-00	Pointer, dial (with lamp)
CNJ8	1-509-424-00	Receptacle, A-M ANTENNA; 2-P	PL3	1-518-070-00	Lamp, dial
CNJ9	1-534-903-71	Connector, 5-P; female	PL4		
CNJ10	1-534-907-31	Connector, 3-P; female	PL5		
CNP101	1-508-491-12	Connector, 3-P; male	PL6		
CNP102	1-508-529-00	Connector, 5-P; male	PL7	1-518-169-91	Lamp, STEREO; 4.5 V/40 mA
CR101	1-231-175-00	Encapsulated Component		1-509-385-00	Selector, voltage
CR201	1-231-224-00	Encapsulated Component		1-509-658-00	Socket, transistor
CR202	1-231-224-00	Encapsulated Component		1-517-064-00	Holder, dial lamp
J301(J401)	1-536-352-00	Jack, phono; 4-P		1-533-069-00	Holder, fuse; 4-P
J302(J402)				1-536-398-00	Terminal Strip, 2L2 (C)
J303	1-507-440-00	Jack, HEADPHONE		1-536-459-00	Terminal Strip (ANTENNA)
				1-536-499-00	Terminal Strip, 3-P (FM 75 ohms)
				1-583-070-00	Printed Circuit Board, attenuator

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