ST-5055L

AEP and UK Model

FM STEREO/FM-AM TUNER

SPECIFICATIONS

FM TUNER SECTION

Antenna: 300 ohms balanced
75 ohms unbalanced

Tuning range: 87.5 to 108 MHz

Usable sensitivity: 2.2 μV IHF
1.7 μV (S/N = 30 dB)

S/N ratio: 68 dB

Frequency response: 30 Hz ~ 15 kHz $^{+1}_{-3}$ dB

Harmonic distortion: Mono: 0.4 % at 400 Hz
100 % Mod.
Stereo: 0.6 % at 400 Hz
100 % Mod.

Fm stereo separation: Greater than 35 dB at 400 Hz

A·M TUNER SECTION

(MW)
Antenna: Built-in ferrite bar antenna
with external antenna provision

Tuning range: 530 to 1,605 kHz

Sensitivity: 46 dB/m, built-in antenna
100 μV, external antenna

Harmonic distortion: 0.5 %

(LW)
Antenna: Built-in ferrite bar antenna
with external antenna provision

Tuning range: 150 kHz to 350 kHz

Sensitivity: 50 dB/m, built-in antenna
100 μV, external antenna

Harmonic distortion: 0.5 %

AUDIO SECTION

Audio output and impedance: FIXED: 750 mV (10 k)
VARIABLE: 0 to 1.5 V (*1.8 k)

* **Note:** at maximum output

GENERAL

Power requirements: 110, 127, 220, 240 V ac

Power consumption: Approx, 23 watts

Dimensions: 412 mm (width) x 120 mm (height) x 284 mm (depth)
16 1/4" (width) x 4 3/4" (height) x 11 1/4" (depth)

Net weight: 4.9 kg (10 lb 13 oz)

Shipping weight: 6.8 kg (15 lb)

SONY®
SERVICE MANUAL

1125

ST-5055L

TABLE OF CONTENTS

SERVICING NOTES

1. CAUTIONS ON HANDLING IC's

a. Excessive heat may destroy an IC. Never re-install a used IC.

b. Check the related components for defects before replacing the IC.

c. When installing new IC's, do not apply excessive heat. Solder quickly while holding a wet rag on the heat-sink tab as shown in Fig. A.

d. Do not short adjacent IC leads when performing electrical checks as this might damage the IC.

e. Always solder the IC heat sink to the printed circuit board to avoid damage.

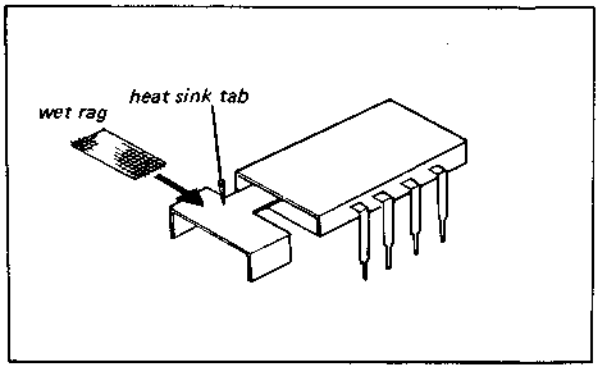


Fig. A. IC installation

2. NYLON RIVET REMOVAL

a. To remove the nylon rivet, push its end with a tweezers as shown in Fig. B.

b. To reinstall the rivet, insert the flared part into the opening first, then push its head as far as it will go.

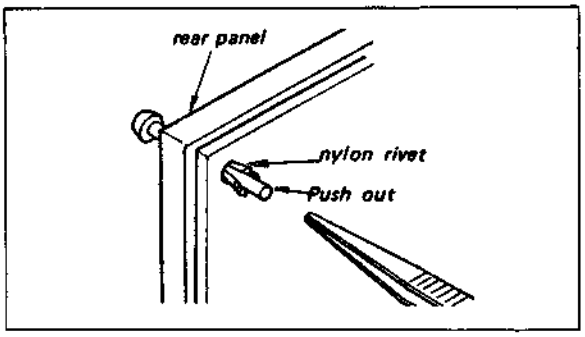


Fig. B. Nylon rivet removal

3. FM DISCRIMINATOR AND I-F STRIP ALIGNMENT

SONY developed new component for fm discriminator circuit which eliminates conventional discriminator transformer.
Fm demodulation is performed by combination of special ceramic filter and inductor shown in Fig. C. Therefore no adjustment is required in the field. But note the color mark on the top, since the ceramic filters or inductor in the fm i-f circuit are selected according to their specified center frequencies as described in Section 3.

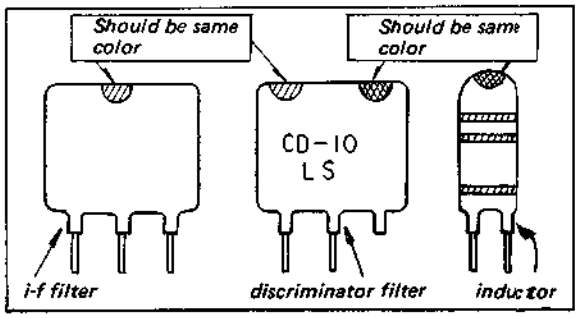


Fig. C Filter and discriminator components

4. MW/LW I-F STRIP ALIGNMENT

The i-f transformers of MW/LW band (CFT 401, L406) are adjusted at the factory, so very little adjustment is necessary in the field, even if replacing any of these i-f transformers.

5. ELECTRICAL CHECK

Remove the mask plate at the bottom for quick electrical checks shown in Fig. D.

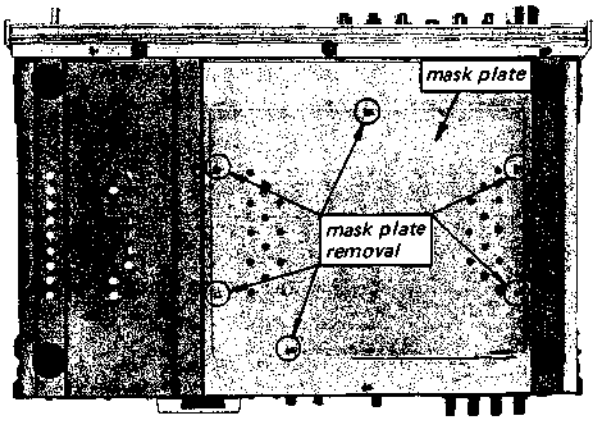


Fig. D Mask plate removal

SECTION 1
TECHNICAL DESCRIPTION

1-1. SPECIFICATIONS

Fm Tuner Section

Antenna:	300 ohms balanced 75 ohms unbalanced
Tuning range:	87.5 to 108 MHz
Intermediate frequency:	10.7 MHz
Usable sensitivity:	2.2 μV IHF 1.7 μV (S/N = 30 dB)
S/N ratio:	68 dB
Capture ratio:	1.0 dB
Selectivity:	70 dB IHF
Image rejection:	45 dB
I-f rejection:	95 dB
Spurious rejection:	75 dB
A-m suppression:	45 dB IHF
Frequency response:	30 Hz ~ 15 kHz $\pm \frac{1}{3}$ dB
Harmonic distortion:	Mono: 0.4 % at 400 Hz 100 % Mod. Stereo: 0.6 % at 400 Hz 100 % Mod.
Fm stereo separation:	Greater than 35 dB at 400 Hz
19 kHz, 38 kHz suppression:	40 dB

A-m Tuner Section

Intermediate frequency:	468 kHz
(MW)	
Antenna:	Built-in ferrite bar antenna with external antenna provision
Tuning range:	530 to 1,605 kHz
Sensitivity:	46 dB/m, built-in antenna 100 μV, external antenna
I-f rejection:	65 dB at 1,000 kHz
Harmonic distortion:	0.5 %
(LW)	
Antenna:	Built-in ferrite bar antenna with external antenna provision
Tuning range:	150 kHz to 350 kHz
Sensitivity:	50 dB/m, built-in antenna 100 μV, external antenna
I-f rejection:	55 dB at 250 kHz
Harmonic distortion:	0.5 %

Audio Section

Audio output and impedance:	FIXED: 750 mV (10 k) VARIABLE: 0 to 1.5 V (*1.8 k) *Note: at maximum output

General

Power requirements:	110, 127, 220, 240 V ac
Power consumption:	Approx, 23 watts
Dimensions:	412 mm (width) x 120 mm (height) x 284 mm (depth) $16\frac{1}{4}$" (width) x $4\frac{3}{4}$" (height) x $11\frac{1}{4}$" (depth)
Net weight:	4.9 kg (10 lb 13 oz)
Shipping weight:	6.8 kg (15 lb)

1-2. NEWLY ADOPTED CIRCUIT DESCRIPTION

1. Fm I-f IC Amp (IC201)

This amplifies only selected signals passed by ceramic filters and provides power to drive fm detector circuit. IC201 also functions as buffer amplifier for the muting circuit. Fig. 1-1 shows the IC block diagram.

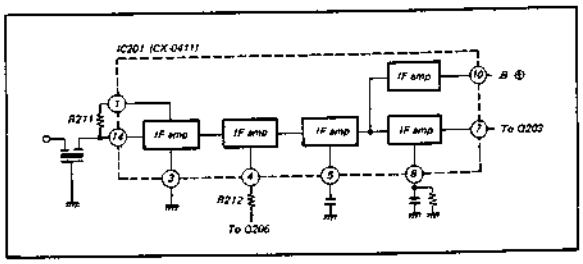


Fig. 1-1. IC diagram (IC201)

2. Fm Discriminator

Fig. 1-2 (a) shows the newly designed fm discriminator circuit which operates as follows:
To simplify the discussion, assume that

V1 . . . . . input signal (10.7 MHz, fm signal)
V2 . . . . . signal output at collector circuit of Q203.
V3 . . . . . signal output at emitter circuit of Q203.
V4 . . . . . signal output at the connection point of L202 and CF203.
V5 . . . . . signal output at D205 cathode.
V6 . . . . . signal output at D206 anode.

V7 . . . . . audio signal output; V7 = V5 – V6

Note: Dot represents phasor.

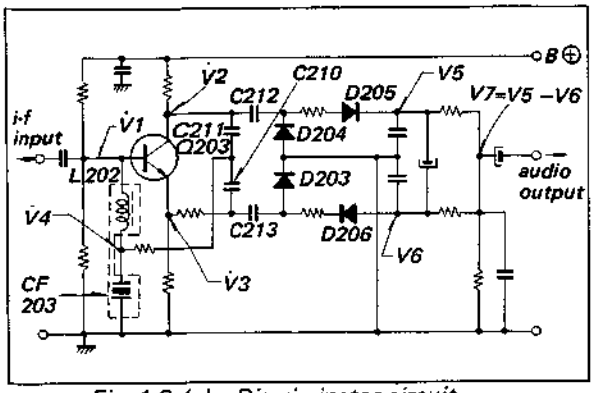


Fig. 1-2 (a). Discriminator circuit

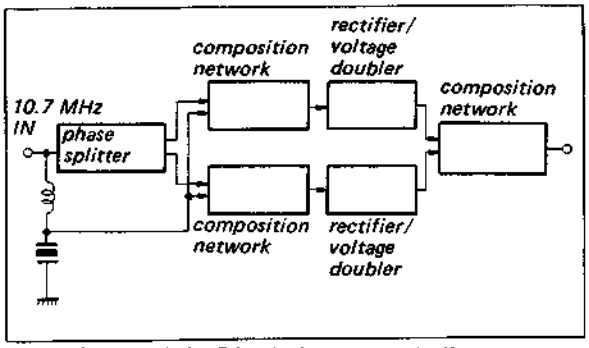


Fig. 1-2 (b). Discriminator block diagram

The relation between signal phasors are shown in Fig. 1-3. Referring to Fig. 1-3, input signal is splitted into V̇2 and V̇3 at Q203. V̇4 is added to V̇2 and V̇3 through C211 or C210, then rectified by voltage doublers and converted into V5 and V6 respectively. V5 and V6 changes corresponding to the phase shift of V̇4 due to frequency modulation. Thus an audio signal (V5-V6) is detected.

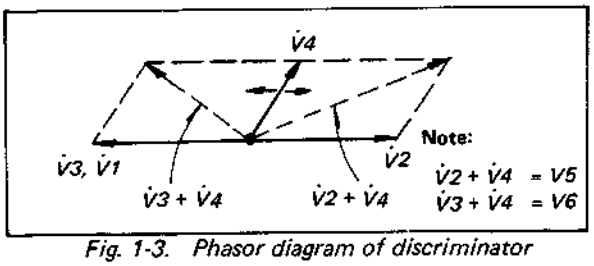


Fig. 1-3. Phasor diagram of discriminator

3. Muting/TUNER INPUT METER Circuit

Refer to Fig. 1-4.

The i-f signal is extracted from the output circuit of IC201 and fed to Q206 through C204. Q206 increases i-f signal level to drive the rectifier D207 through tuned circuit T201. T201 determines the bandwidth (about 150 kHz) necessary to control the muting circuit without generating interstation noise. The output of the rectifier is a positive dc voltage proportional to the carrier level of weak rf signals and delivered to both switching circuit and TUNER INPUT meter.

Note that RT201 calibrates the TUNER INPUT meter. Q207 and Q208 form a switching circuit and drive the IC301 MPX decoder muting circuit through MUTING switch S3. Detail of IC301 will be described later. With the MUTING switch ON, fm signals of average strength keep Q207 saturated, thus cutting off Q208. This has no effect on IC301 operation. Weak stations and interstation noises cannot produce sufficient dc boltage at the base of Q207 to keep it conducting. As a result Q208 conducts and operates the muting circuit in the IC301 (MPX decoder). Note that the muting circuit does not short the output but decreases output signal about 20 dB.

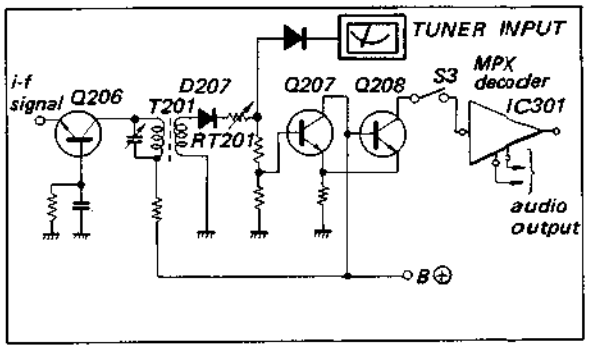


Fig. 1-4. Muting circuit

4. MPX Decoder Section

Refer to Fig. 1-5.

The composite stereo signal is applied to terminal 6 , which is the input of the pilot/composite separator. The composite signal is directed to the switching demodulator circuit, and also fed to the doubler/19 kHz tuned-amp circuit which generates 38 kHz pulses. 38 kHz pulses are waveshaped by the 38 kHz tuned amplifier and supplied to the switching circuit through a limiter for sampling drive operation. "L" and "R" components are developed at the switching circuit and supplied to terminal 11 and 12 respectively. The stereo demodulation principle is shown in Fig. 1-6. RT301 controls separation.

The stereo lamp lights when a stereo signal exists. The doubler output is fed to the stereo/mono changeover circuit. The circuit actuates the stereo lamp switch, lighting the STEREO lamp. This also controls the operation of the switching circuit. When a monaural signal is received, this circuit forces the switching circuit into conduction, enabling the monaural signal operation. Moreover, since the doubler output and muting circuit form an OR circuit, weak stereo signals also produce the monaural mode. Thus, the hiss and noise caused by weak stereo stations are eliminated by forcing the decoder operation into the mono mode.

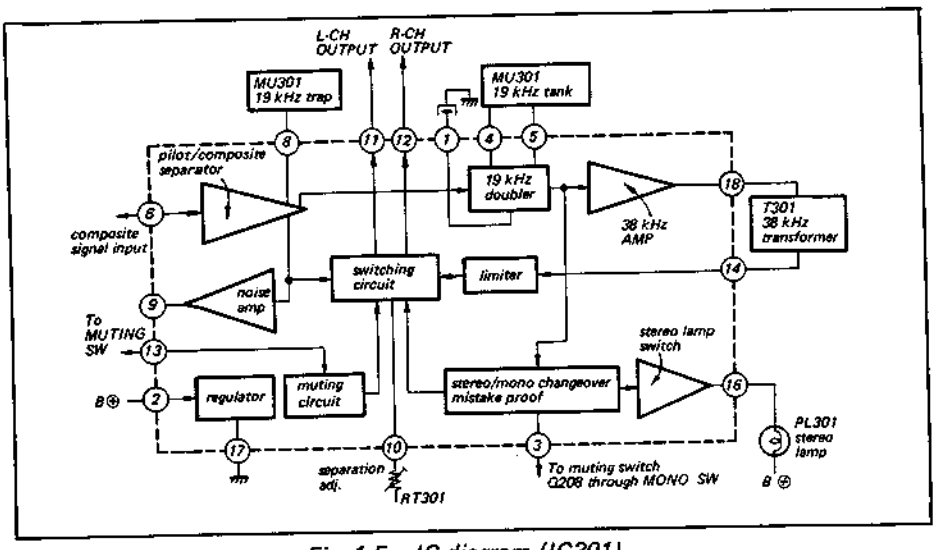


Fig. 1-5. IC diagram (IC301)

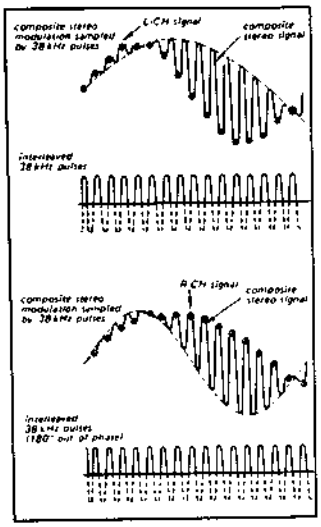


Fig. 1-6. Stereo demodulation operation

5. A-m Tuner Section

(a) A-m antenna switch circuit

Fig. 1-7 shows how the antenna circuit operates when changing a-m antenna switch S6 or function switch in a-m signal reception.

(b) AGC circuit

Referring to Fig. 1-8, there are three feedback loops ensuring proper agc operation. Reverse agc is applied to Q403, Q402 and Q401.

The a-m i-f signal is detected by D401 and a negative dc voltage roughly proportional (not exactly due to agc action) to the carrier levels of the input signal is fed back to Q403 base. This controls the bias current of Q403 thereby its emitter voltage.

Emitter voltage of Q403 is fed back to the base circuit of Q402 (mixer) through secondary winding of oscillator coil and rf coil.

Since Q402 and Q401 are in series, agc voltage controls the current flow in both transistor.

AGC operates as follows:

When strong signal is received, current flow in Q403, Q402 and Q401 decreases since base bias is decreased due to agc circuit.

Lower current flow reduces the gain of each transistor thereby maintain stable operation.

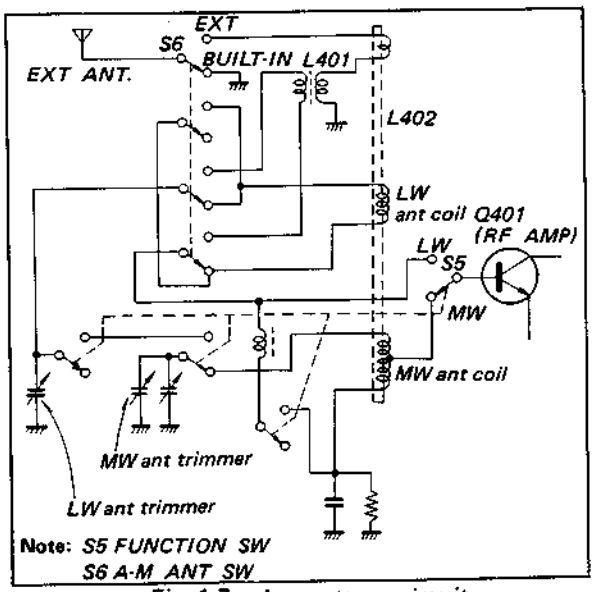


Fig. 1-7. A-m antenna circuit

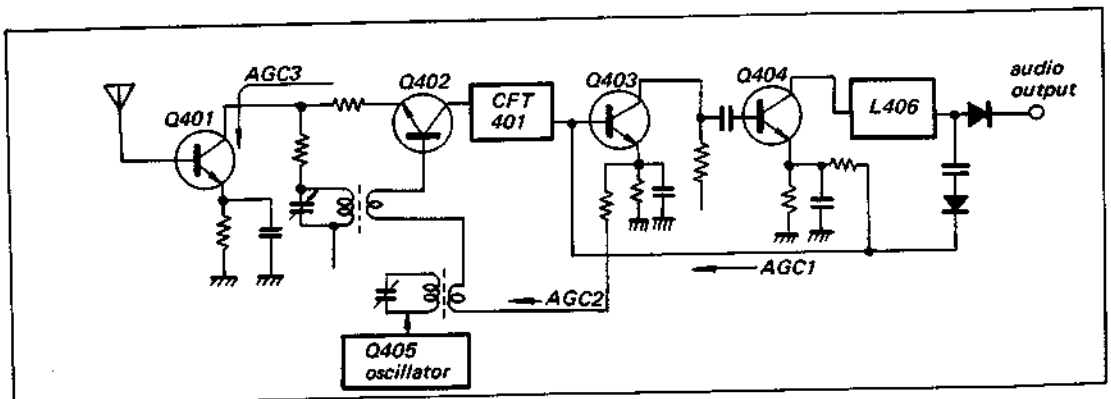
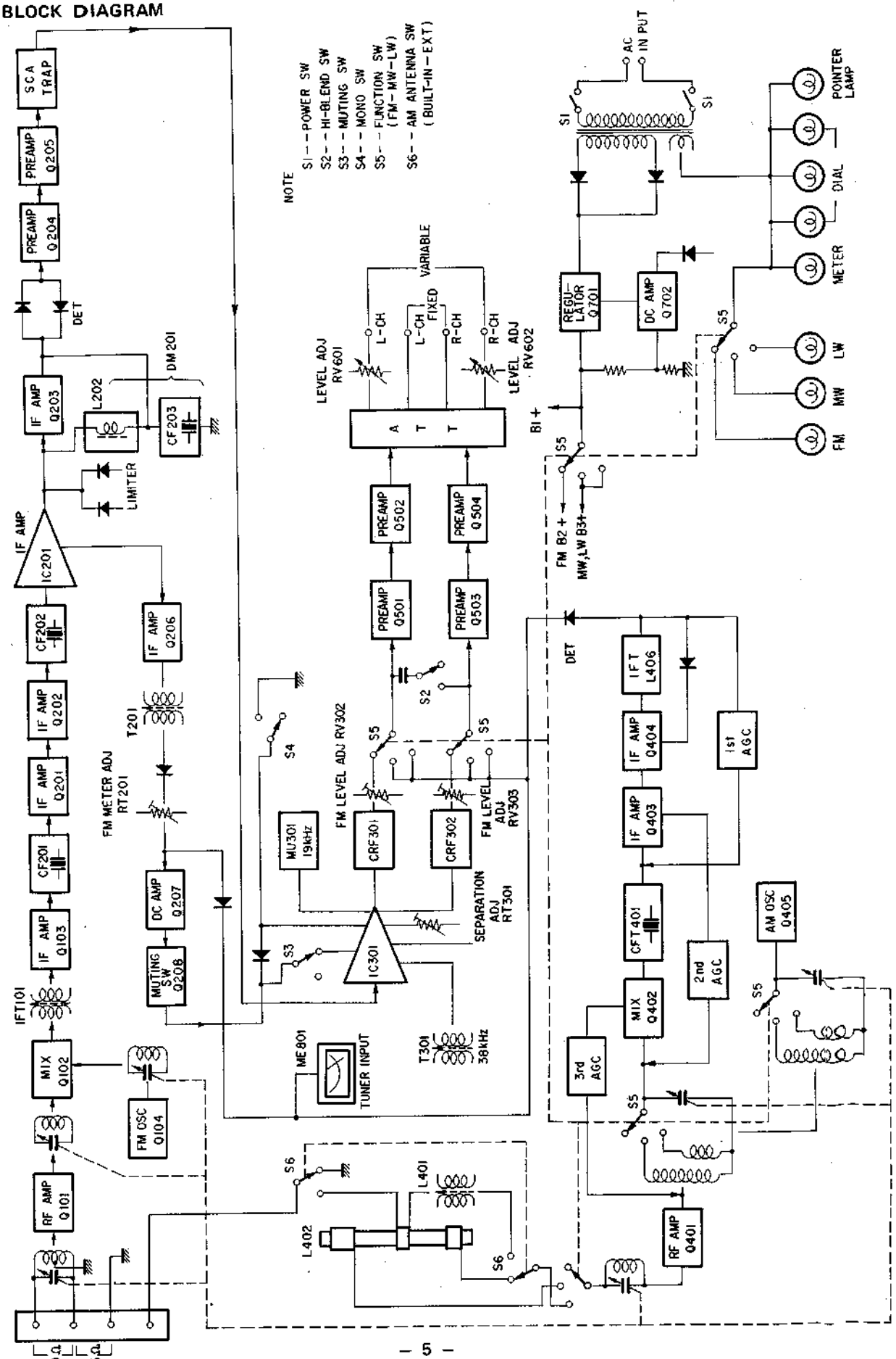


Fig. 1-8. A-m AGC circuit

1-3. BLOCK DIAGRAM



SECTION 2
DISASSEMBLY AND REPLACEMENT

Note: All screws in this service manual are Phillips type (cross recess type) unless otherwise indicated.

2-1. FRONT PANEL REMOVAL

1. Remove the two screws at both sides of the wooden case. This frees wooden case.
2. Remove the two screws from the bottom and one screw at both sides as shown in Fig. 2-1 and 2-2. This frees front panel.

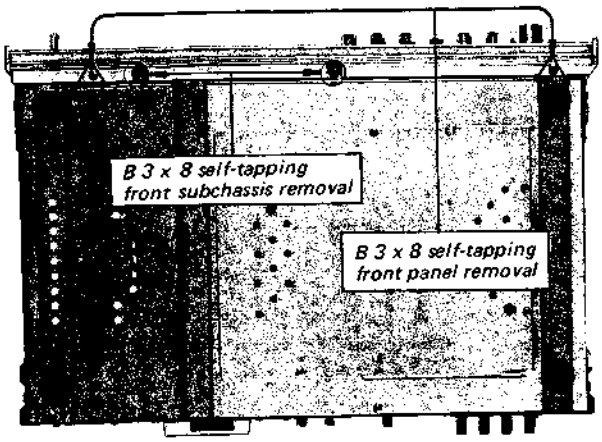


Fig. 2-1 Bottom view

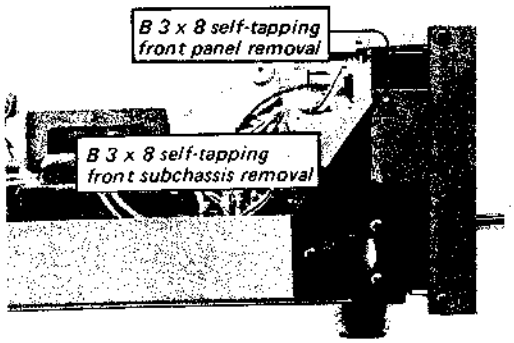


Fig. 2-2. Side view

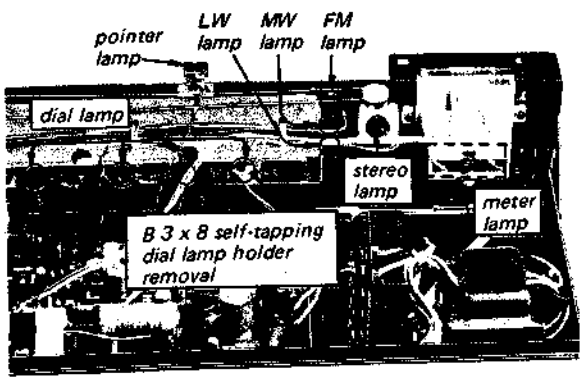


Fig. 2-3. Dial lamp replacement

2-2. LAMP REPLACEMENT

Dial Lamp

1. Remove the screw securing the dial lamp holder to its shade shown in Fig. 2-3.
   This frees the holder.

Meter Lamp

1. Straighten the flat spring, then pull it up as shown in Fig. 2-4. This frees the meter lamp holder.

2-3. DIAL CORD RESTRINGING

Preparation

1. Cut a 1250 mm(51-inch)length of 0.3 mm (1/64-inch) diameter dial cord.
2. Tie the end of the cord to a spring as shown in Fig. 2-5.
3. Rotate the tuning capacitor drum fully clockwise (minimum capacitance position).

Procedure

1. Referring to Fig. 2-5, proceed the stringing in numerical order as shown.

   Note: Refer to the Fig. 2-6, 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 crod stringing, make sure that the tuning system works properly.
3. Apply a drop of contact cement to the finish point.

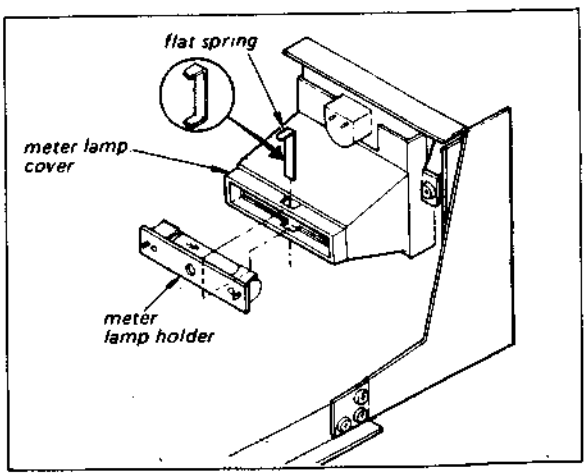


Fig. 2-4. Meter lamp replacement

4. Put the dial pointer on the cord as shown in Fig. 2-7, and tune the set to the local fm station. Move the dial pointer to the position where the dial indication coincides with the local station carrier frequency.

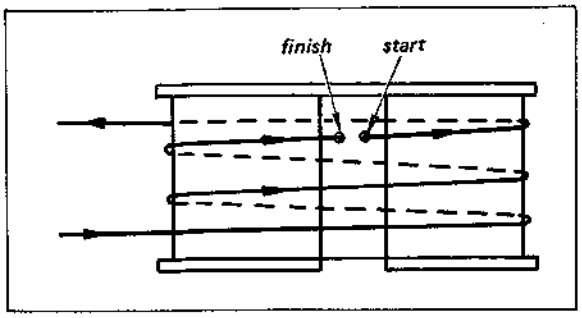


Fig 2-6. Wrapping the dial cord

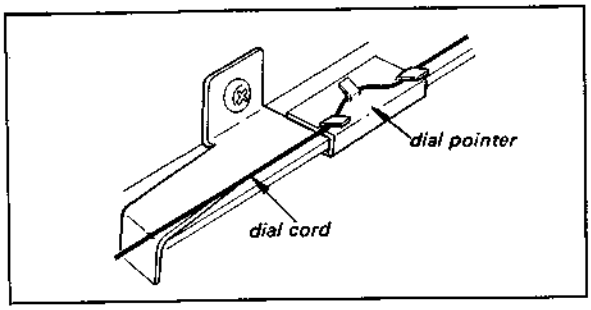


Fig. 2-7. Dial pointer installation

2-4. FRONT SUBCHASSIS REMOVAL

Preparation

1. Fix the dial cord to the drum by using a cellophane tape.
2. Remove the capacitor drum.
3. Remove the front panel as described in Procedure 2-1.

Procedure

1. Remove the two screws from front bottom of the chassis shown in Fig. 2-1.
2. Remove the three screws at both sides of the chassis as shown in Fig. 2-2.
3. Remove the two screws shown in Fig. 2-8. This frees the front subchassis with dial cord.

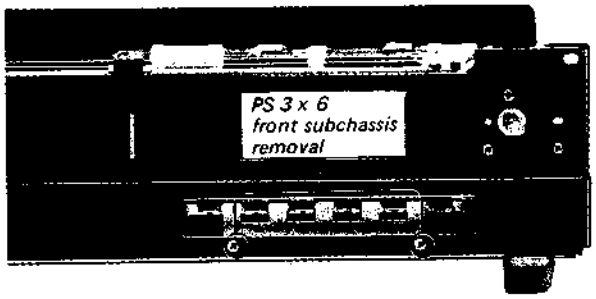


Fig. 2-8. Front subchassis removal

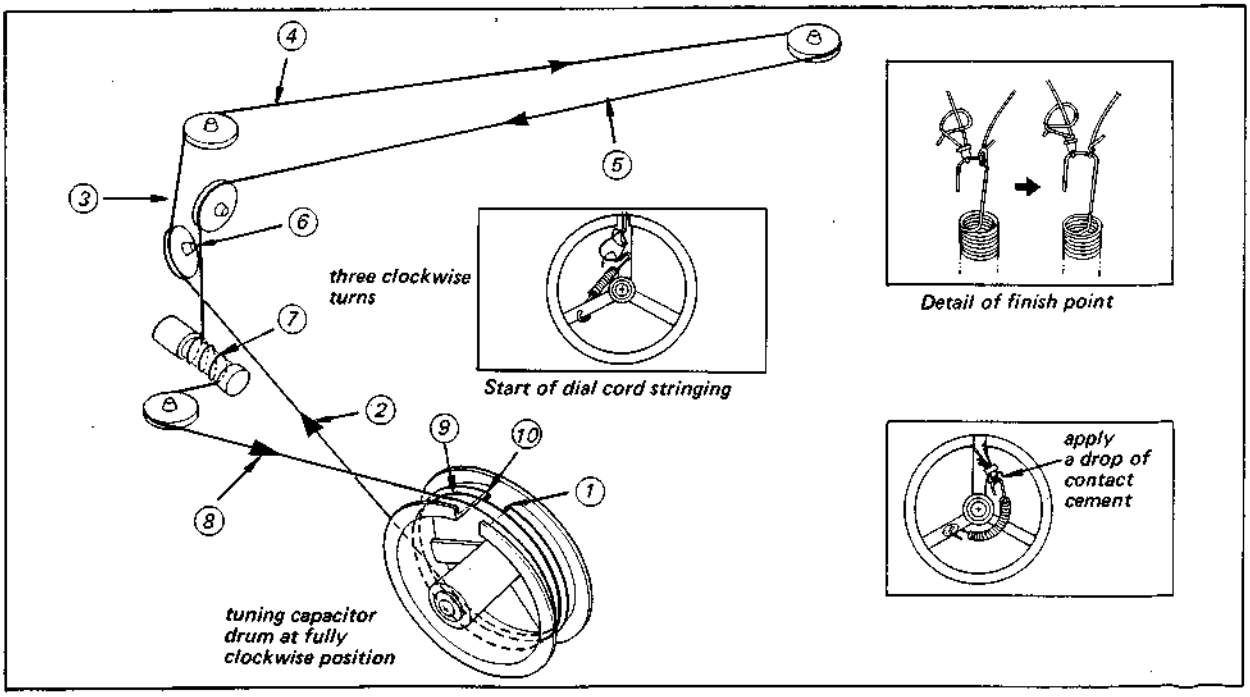


Fig. 2-5. Dial cord stringing

2-5. PRINTED CIRCUIT BOARD REMOVAL

1. Remove the front subchassis as described in Procedure 2-4.
2. Remove the four screws shown in Fig. 2-9. This frees the printed circuit board.

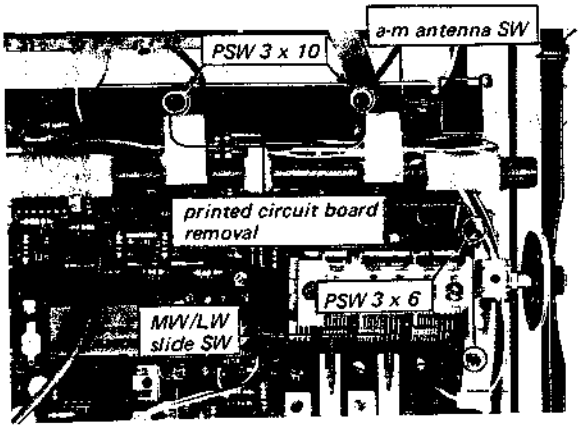


Fig. 2-9. Printed circuit board removal

2-6. SWITCH REPLACEMENT

MW/LW Slide Switch and A-m Antenna Switch (See Fig. 2-9)

1. Remove the mask plate at the bottom by taking out screws.
2. Unhook the connection spring from the slide switch if necessary.
3. With a soldering iron having a solder sucking tip, clean the solder from each lug of the defective switch and printed circuit board.

Pushbutton Switch (6-key)

1. Remove the printed circuit board as described in Procedure 2-5.
2. Remove the switch bracket by taking out the three screws shown in Fig. 2-10.
3. Remove the two screws from the bottom as shown in Fig. 2-10.
4. With a soldering iron having a solder sucking tip, clean the solder from each lug of the switches.

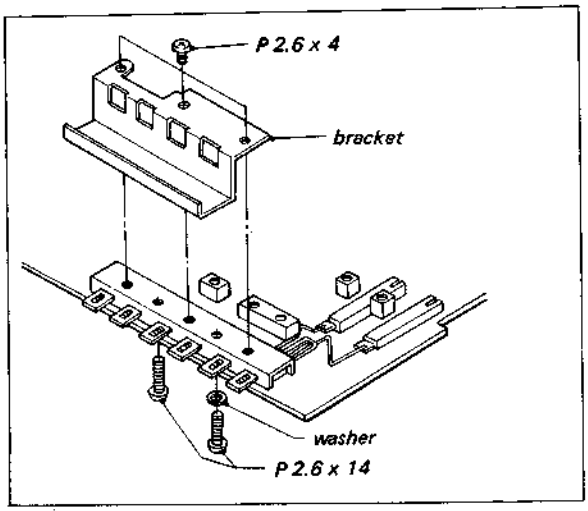


Fig. 2-10. 6-key pushbutton switch replacement

SECTION 3
ALIGNMENT AND ADJUSTMENT

CAUTION

The fm i-f and discriminator ceramic filters and inductors are selected according to their specified center frequencies and color coded as shown in Fig. 3-1 and in table 3-1, 3-2. Check the color code of the filters and inductor to identify the same center frequency when replacing any of these filters or inductors. Note that seven pairs of ceramic filter and inductor are available.

※ **Note:** All signal generator output levels specified in this section are for terminated outputs.

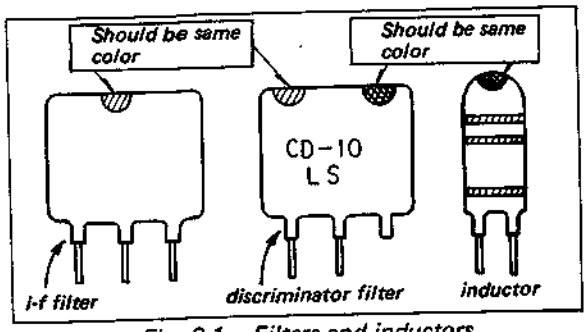


Fig. 3-1. Filters and inductors

TABLE 3-1. INDUCTORS

Color	Part No.	Inductance (μH) ± 5 %
yellow	1-527-201-15	2.7
red	1-527-201-25	2.9
orange	1-527-201-35	3.1
no mark	1-527-201-45	3.3
blue	1-527-201-55	3.5
violet	1-527-201-65	3.7
black	1-527-201-75	3.9

3-1. FM I-F ALIGNMENT

Note: This should be performed only after replacing the I-F transformer in the front-end.

Test Equipment Required

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

Procedure

1. With the equipment connected as shown in Fig. 3-2, set the signal-generator controls as follows:

   Carrier Frequency . . . . . 98 MHz
   Modulation . . . . . Fm, 400 Hz, 30 % (22.5 kHz)
   * Output level . . . . . as low as possible (less than 30 μV)

2. Set the tuner controls as follows:

   FUNCTION switch . . . . FM
   MODE switch . . . . . STEREO

3. Precisely tune to the signal generator carrier frequency for maximum deflection on the TUNER INPUT meter. Carefully turn IFT101 for maximum deflection on the TUNER INPUT meter.

TABLE 3-2. CERAMIC FILTERS

Color	Specified Center Freq. (MHz)	I-f Ceramic Filter Part No.	Discriminator Ceramic Filter Part No.
red	10.70	1-527-507-12	1-527-201-11
black	10.66	1-527-507-22	1-527-201-21
white	10.74	1-527-507-32	1-527-201-31
green	10.62	1-527-507-42	1-527-201-41
yellow	10.78	1-527-507-52	1-527-201-51

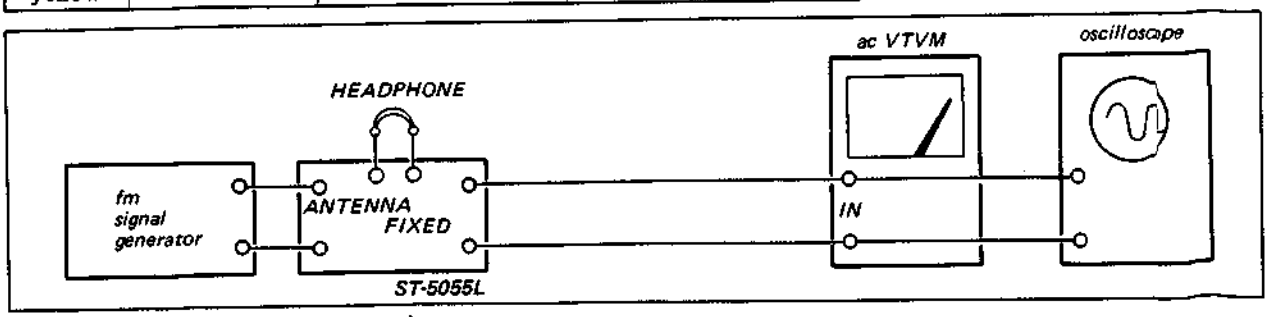


Fig. 3-2. Fm i-f, muting, and front-end alignment test setup

3-2. FM FREQUENCY COVERAGE AND TRACKING ALIGNMENT

Note: Before starting this alignment, ensure that the fm i-f alignment have already been performed.

Test Equipment Required

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

Preparation

1. Connect the equipment as shown in Fig. 3-2.
2. Set the tuner controls as follows:

FUNCTION switch . . . . FM

Signal Generator Alignment

Follow the procedures given in Table 3-3 when performing this alignment with an fm signal generator. Be sure that the dial is mechanically calibrated.

Off-the-Air Signal Alignment

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

3-3. MUTING ADJUSTMENT

Readjustment is necessary after replacing Q206 or if the muting point is not symmetrical when detuning higher or lower than the reference carrier frequency. Two methods of muting adjustment are avaiable, signal generator adjustment and adjustment by using an off-the-air signal. You can use either of them.

Signal Generator Adjustment

Test Equipment Required

1. Fm signal generator
2. Ac VTVM or oscilloscope
3. Alignment tools

Procedure

1. With the equipment connected as shown in Fig. 3-2, set the signal generator and tuner controls as follows:

Carrier frequency . . . . . 98 MHz
Modulation . . . . . Fm, 400 Hz, 30 %
* Output level . . . . . 1000 μV (60 dB) terminated
FUNCTION switch . . . . FM
MUTING switch . . . . . ON

TABLE 3-3. FM FREQUENCY COVERAGE AND TRACKING ALIGNMENT

	FREQUENCY COVERAGE ALIGNMENT (SG Coupling . . . . Direct SG Output Level . . .400 Hz, 100 % mod; as low as possible)				
Step	SG Frequency	Dial Indication	Ac VTVM Connection	Adjust	Indication
1.	87.5 MHz	lowest position	FIXED	OSC coil L103 See Fig. 3-4.	Maximum VTVM reading
2.	108.4 MHz (108.0 MHz)	highest position		OSC trimmer CT103 See Fig. 3-4.	
	TRACKING ALIGNMENT				
1.	87.5 MHz	lowest position	FIXED	Antenna coil L101 RF coil L102 See Fig. 3-4.	Maximum VTVM reading
2.	108.4 MHz (108.0 MHz)	highest position		Antenna trimmer CT101 RF trimmer CT102 See Fig. 3-4.	

Note: ( ) West Germany only.

2. Tune to the signal generator frequency, then adjust T201 (See Fig. 3-4) for proper muting operation.

Off-the-Air Signal Adjustment

Accurate muting adjustment can also be performed by utilizing an off-the-air local fm signal instead of the fm signal generator. Note that a weak signal is best for this purpose.

3-4. TUNER INPUT METER CALIBRATION

Test Equipment Required

Same as MUTING ADJUSTMENT

1. With the equipment connected as shown in Fig. 3-2, set the signal generator output as follows:

Carrier frequency	98 MHz
Modulation	Fm, 400 Hz, 100 %
Output level	1,000 μV (60 dB)

2. Tune to the signal generator frequency,then adjust RT201 (See Fig. 3-4) for 4.8 reading on the meter as shown in Fig. 3-3.

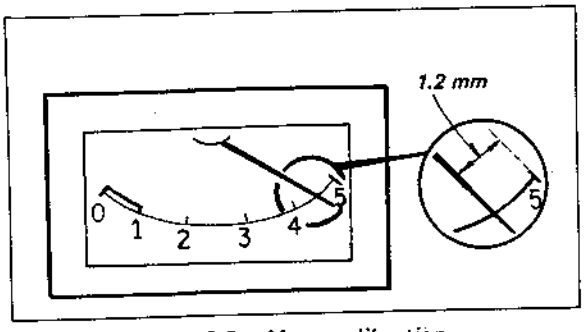


Fig. 3-3. Meter calibration

3-5. FM STEREO SEPARATION ADJUSTMENT

Test Equipment Required

1. Fm stereo signal generator
2. Ac VTVM
3. Oscilloscope
4. MPX generator
5. Audio oscillator
6. Alignment tools

Preparation

Before starting the stereo-separation adjustment, check and adjust the phase between the 19-kHz pilot signal and the sub-channel signal in the MPX stereo generator as follows:

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

MAIN CHANNEL	OFF
SUB CHANNEL	ON
PILOT (19 kHz)	OFF
AUDIO OSCILLATOR OUTPUT	400 Hz, 250 mV

2. Adjust the oscilloscope controls to obtain a visible indication. Be sure the scope horizontal display switch is set for external input.
3. Turn the pilot-signal (19 kHz) phase control to obtain an in-phase and stable lissajous pattern as shown in Fig. 3-6.

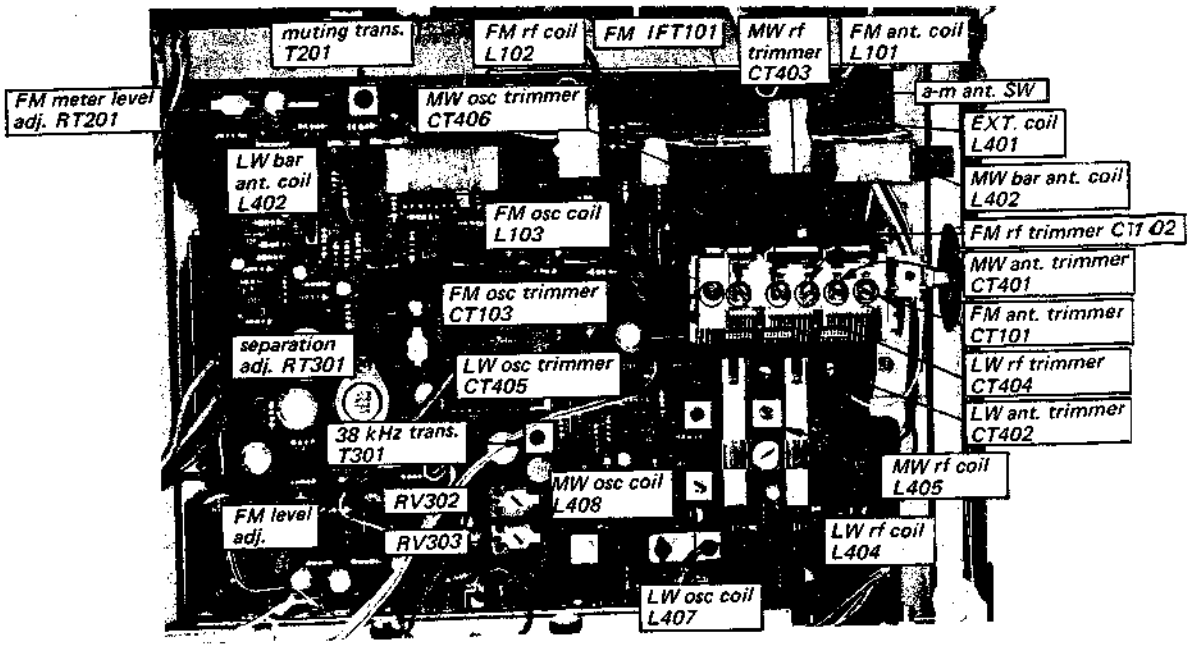


Fig. 3-4. Adjustment parts location

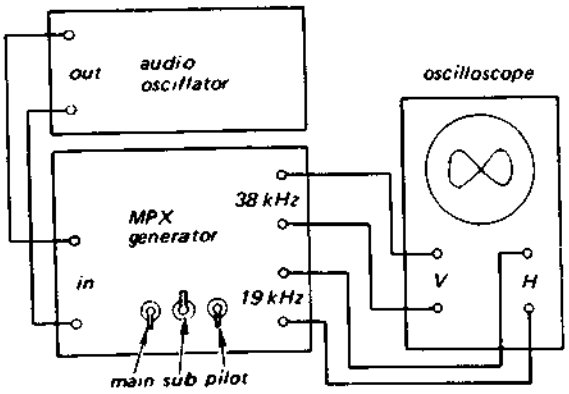


Fig. 3-5. MPX generator preadjustment

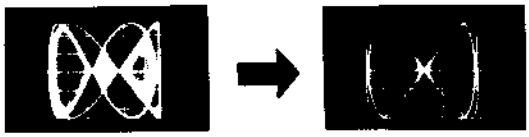


Fig. 3-6. Lissajous pattern

Procedure

1. Connect the equipment as shown in Fig. 3-7. Set the fm signal-generator control as follows:

   Carrier frequency . . . . . 98 MHz
   Output level . . . . . 1,000 μV (60 dB)
   Modulation:
   Main channel (400 Hz) . . 33.75 kHz (45 %)
   Sub channel (38 kHz) . . 33.75 kHz (45 %)
   Pilot (19 kHz) . . . . . 7.5 kHz (10 %)

   The previously mentioned modulation levels can be set as follows:

   (a) With the equipment connected as shown in Fig. 3-7, set the MPX stereo generator controls as follows.

   MAIN CHANNEL . . . . OFF
   SUB CHANNEL . . . . . OFF
   PILOT (19 kHz) . . . . . ON

   (b) Adjust the 19 kHz signal level to obtain a 7.5 kHz deviation on the fm signal generator modulation indicator.
   (c) Reset the MPX stereo-generator control as follows:

   MAIN CHANNEL . . . . ON
   SUB CHANNEL . . . . . OFF
   PILOT (19 kHz) . . . . . OFF
   INPUT SELECTOR . . . L-CH

   (d) Adjust the audio-oscillator output (400 Hz) to obtain a 33.75 kHz deviation on the fm signal generator modulation indicator.
   (e) Set all controls to ON.

2. Precisely tune the set to the signal generator carrier frequency, then turn the top core of switching transformer T301 (See Fig, 3-4), to obtain maximum output at left channel. Note that this adjustment has a close relationship with stereo distortion.

3. Set the MODE switch to MONO, then adjust RV302 and RV303 (See Fig. 3-4) for same but as large as possible output at both left and right channel.

4. Reset the MODE switch to STEREO.

5. Record the output level of the left channel when the MPX generator input selector is set to the left channel.

6. Switch the MPX generator input selector to the right channel and read the residual signal level in the left channel.

7. The output-level to residual-level ratio represents the separation. Adjust separation adj. control RT301 (See Fig. 3-4) for minimum residual level. Check the right channel for separation. Usually, about an 8 to 9 dB difference in channel separation exists. Readjust RT301 for minimum difference between left-and right-channel separation. While doing this, remember that the output level also changes according to the setting of RT301.

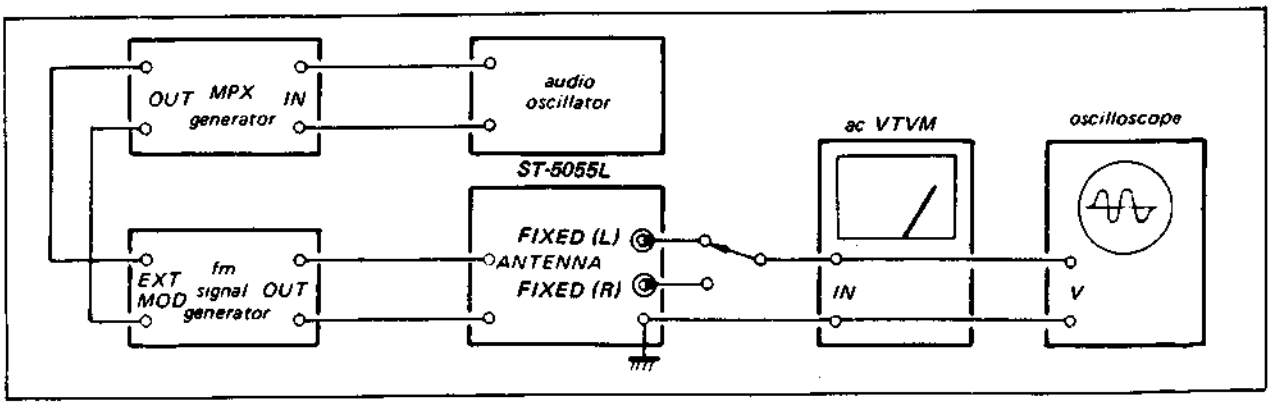


Fig. 3-7. Fm stereo separation adjustment test setup

3-6. MW/LW FREQUENCY COVERAGE AND TRACKING ALIGNMENT

Preparation

Set the FUNCTION switch to MW or LW and the a-m antenna switch to BUILT-IN.

Signal Generator Method

Test Equipment Required

1. A-m signal generator
2. Loop antenna
3. Ac VTVM

Procedure

With the equipment connected as shown in Fig. 3-8, follow the procedures given in Table 3-4 and Table 3-5 when performing this alignment with an a-m signal generator.

Off-the-Air Signal Method

Accurate dial calibration, and a frequency-coverage and tracking alignment can also be performed by utilizing off-the-air local a-m signals. However, before performing this alignment, be sure that the dial is mechanically calibrated.

3-7. EXT. ANTENNA COIL ADJUSTMENT

Preparation

Set the FUNCTION switch to LW and the a-m antenna switch to EXT.

Signal Generator Method

Test Equipment Required

1. A-m signal generator
2. LW dummy antenna. See Fig. 3-9.
3. Ac VTVM or oscilloscope.

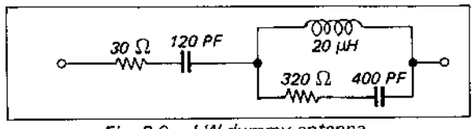


Fig. 3-9. LW dummy antenna

Procedure

1. With the equipment connected as shown in Fig. 3-10, set the signal generator as follows:

   Carrier frequency . . . . . 250 kHz
   Modulation . . . . . a-m, 400 Hz, 30 %
   Output level . . . . . 300 μV (50 dB)

2. Tune the set to the signal generator frequency, then adjust L401 (See Fig. 3-4) for maximum output.

   Note: You can use off-the-air signal instead of signal generator.

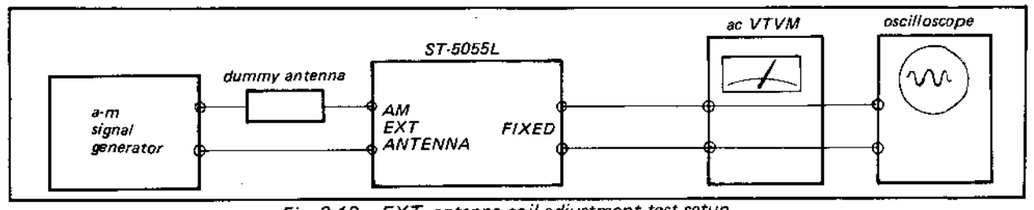


Fig. 3-10. EXT. antenna coil adjustment test setup

TABLE 3-5. LW FREQUENCY COVERAGE AND TRACKING ALIGNMENT

FREQUENCY COVERAGE ALIGNMENT	(SG Coupling . . . . Loop antenna SG Output Level 400 Hz, 30 %; as low as possible)				
Step	**SG Frequency**	**Dial Indication**	**Ac VTVM Connection**	**Adjust**	**Indication**
1.	150 kHz	150 kHz	FIXED	OSC coil L407 See Fig. 3-12.	Maximum VTVM reading
2.	350 kHz	350 kHz		OSC trimmer CT405 See Fig. 3-12.	
TRACKING ALIGNMENT					
1.	150 kHz	150 kHz	FIXED	Position of antenna coil L402 RF coil L404 See Fig. 3-12.	Maximum VTVM reading
2.	350 kHz	350 kHz		Antenna trimmer CT402 RF trimmer CT404 See Fig. 3-12.	

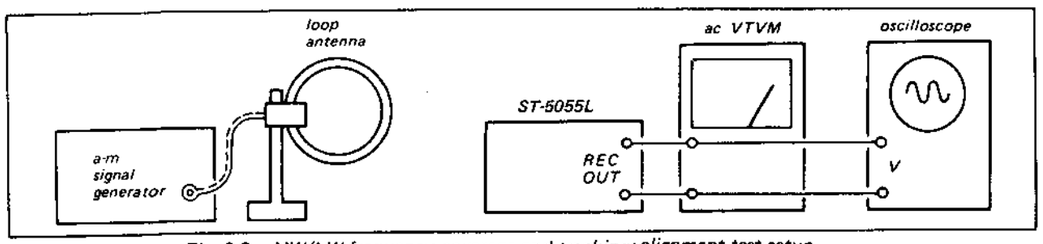


Fig. 3-8. MW/LW frequency coverage and tracking alignment test setup

TABLE 3-4. MW FREQUENCY COVERAGE AND TRACKING ALIGNMENT

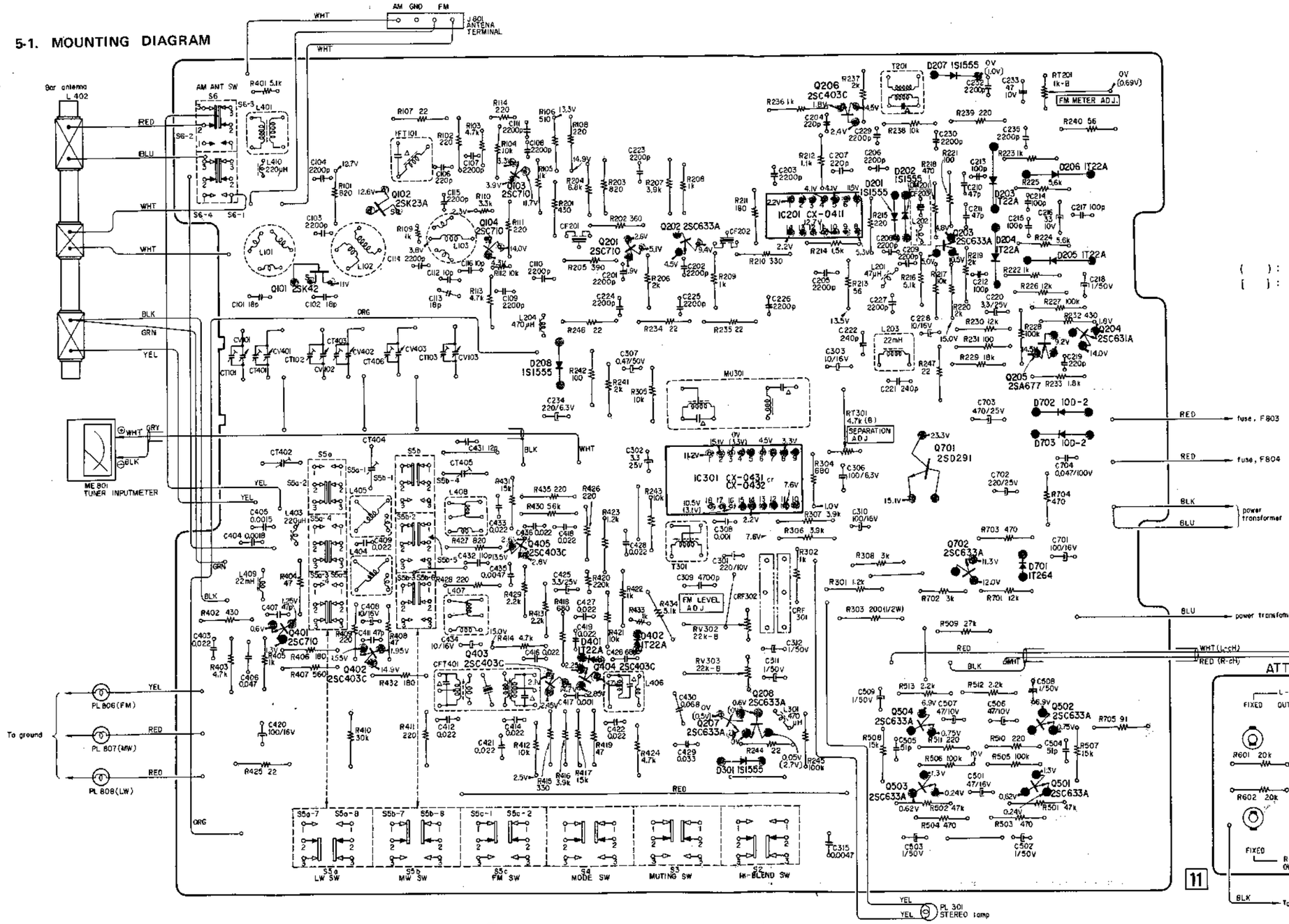
FREQUENCY COVERAGE ALIGNMENT	(SG Coupling . . . . Loop antenna SG Output Level . . 400 Hz, 30 % Mod, as low as possible)				
Step	**SG Frequency**	**Dial Indication**	**Ac VTVM Connection**	**Adjust**	**Indication**
1.	550 kHz	550 kHz	FIXED	OSC coil L408 See Fig. 3-4.	Maximum VTVM reading
2.	1,600 kHz	1,600 kHz		OSC trimmer CT406 See Fig. 3-4	
TRACKING ALIGNMENT					
1.	600 kHz	tune to the SG signal	FIXED	Position of antenna coil L402 RF coil L405 See Fig. 3-4.	Maximum VTVM reading
2.	1,400 kHz			Antenna trimmer CT401 RF trimmer CT403 See Fig. 3-4.	

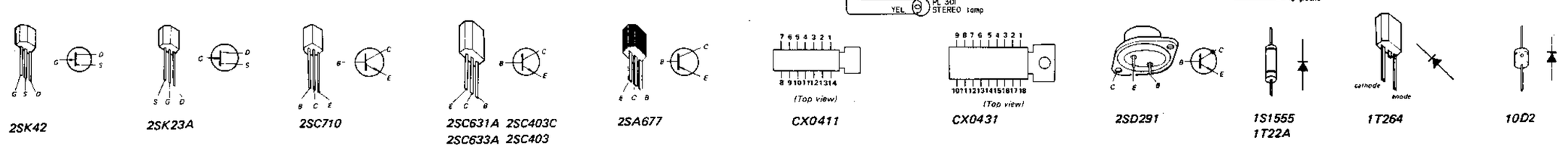
SECTION 4
REPACKING

The ST-5055L original shipping carton and packing materials are the ideal containers for shipping the unit. However to secure the maximum protection, the ST-5055L must be repacked in these materials precisely as before. The proper repacking procedures are shown on page 26.

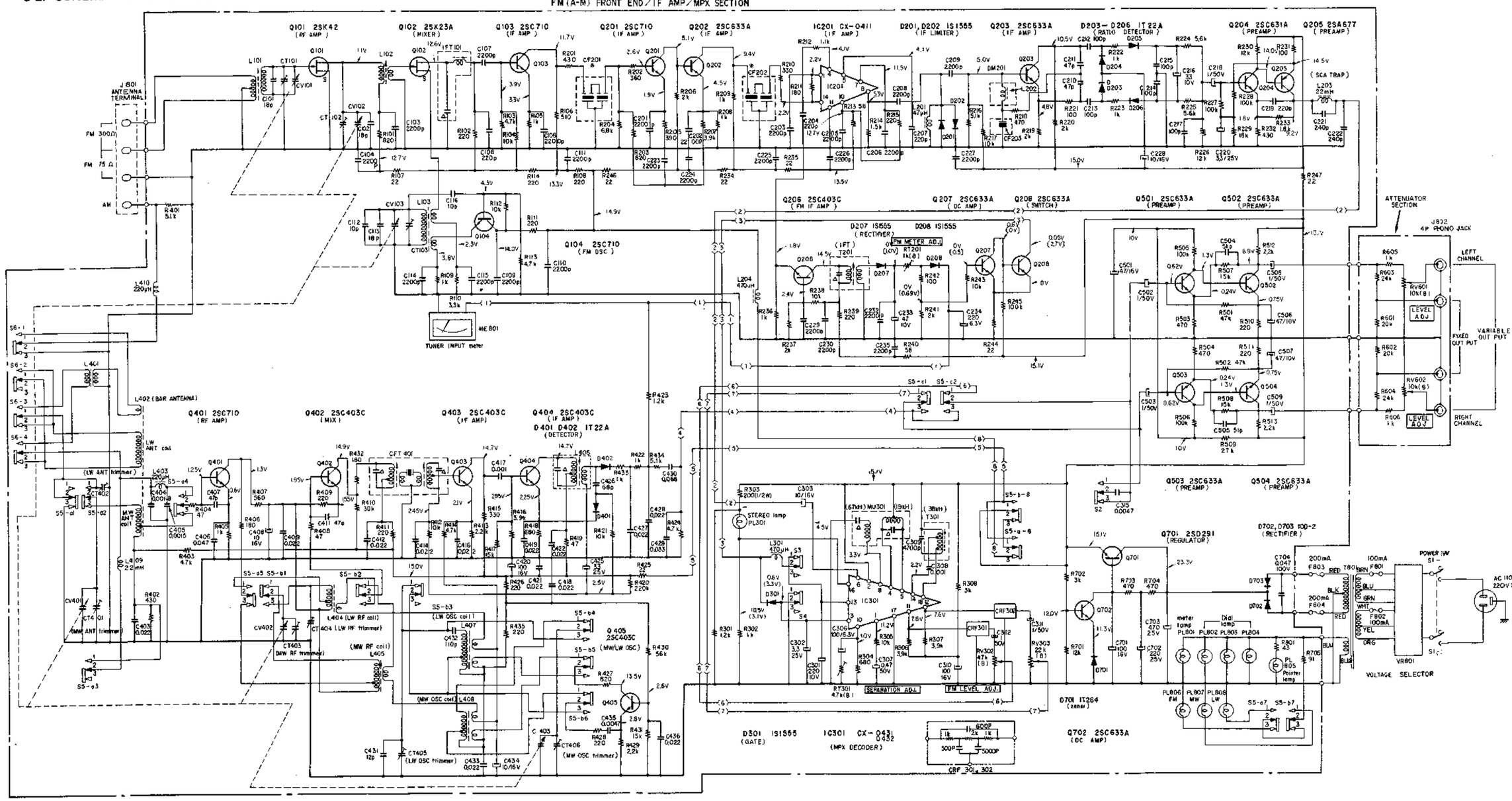
SECTION 5
DIAGRAMS

5-1. MOUNTING DIAGRAM





5-2. SCHEMATIC DIAGRAM



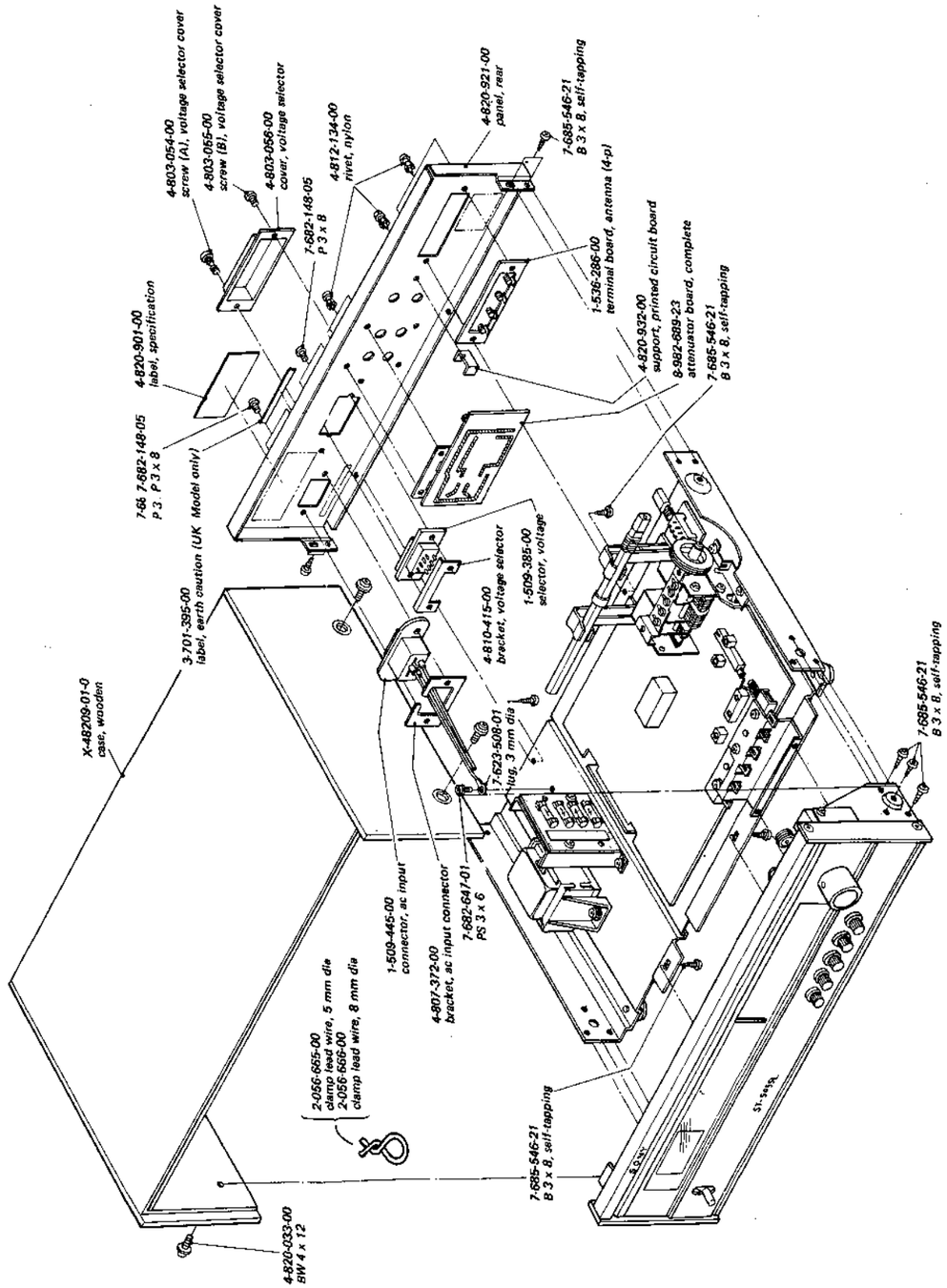
Ref. No	*Description*	*Position*
S1	POWER SW	OFF
S2	HI-BLEND	OFF
S3	MUTING	ON
S4	MODE SW (STEREO-MONO)	STEREO
S5	FUNCTION SW (FM-MW-LW)	FM
S6	A-M ANTENNA SW	BUILT-IN

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 μμF.
All voltages are dc measured with a VOM having 20 k ohms/volt input impedance. No signal in.
Voltage variations may be noted due to normal production tolerances.

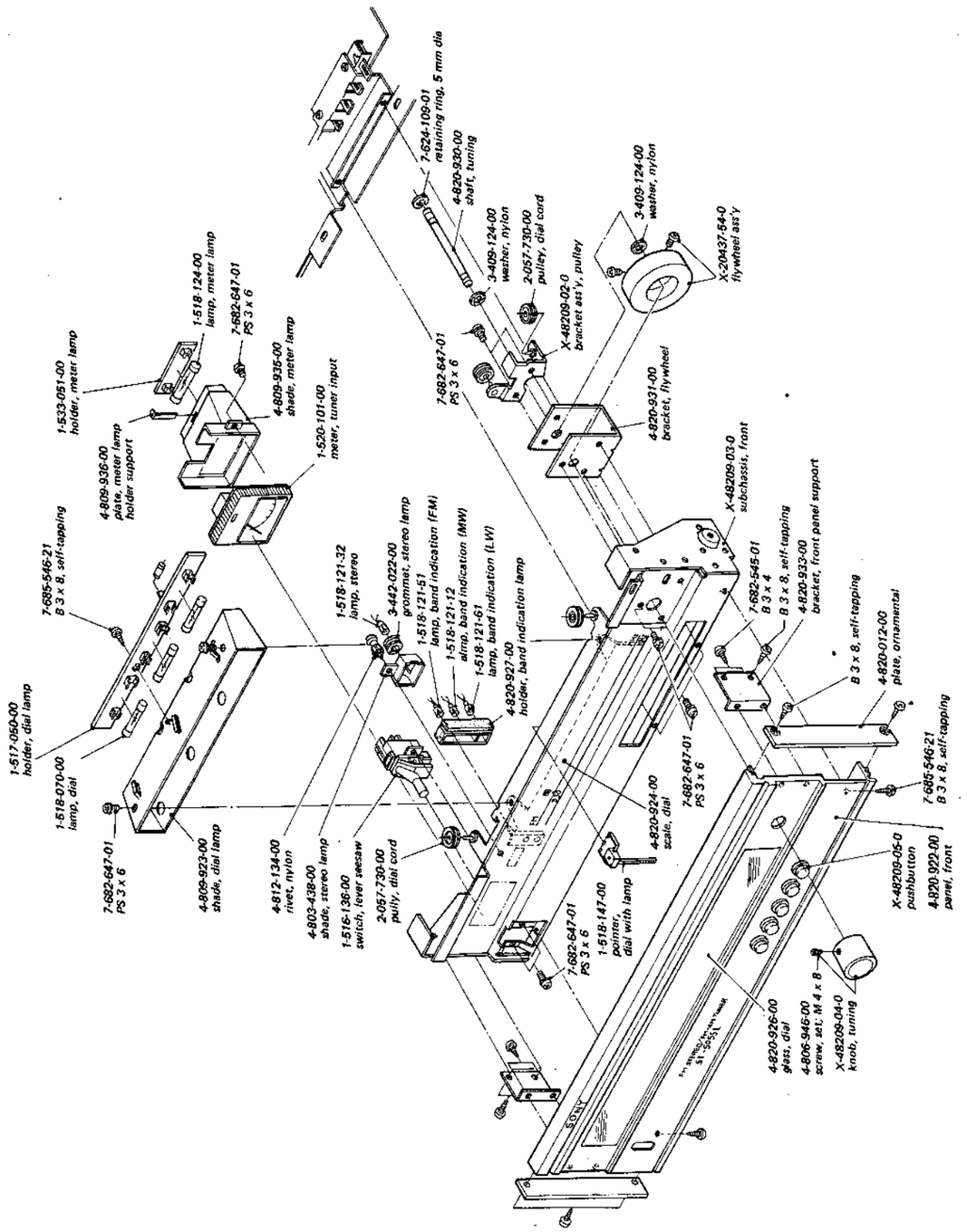
( ): Stereo operation
[ ]: Muting "ON"

SECTION 6
EXPLODED VIEWS

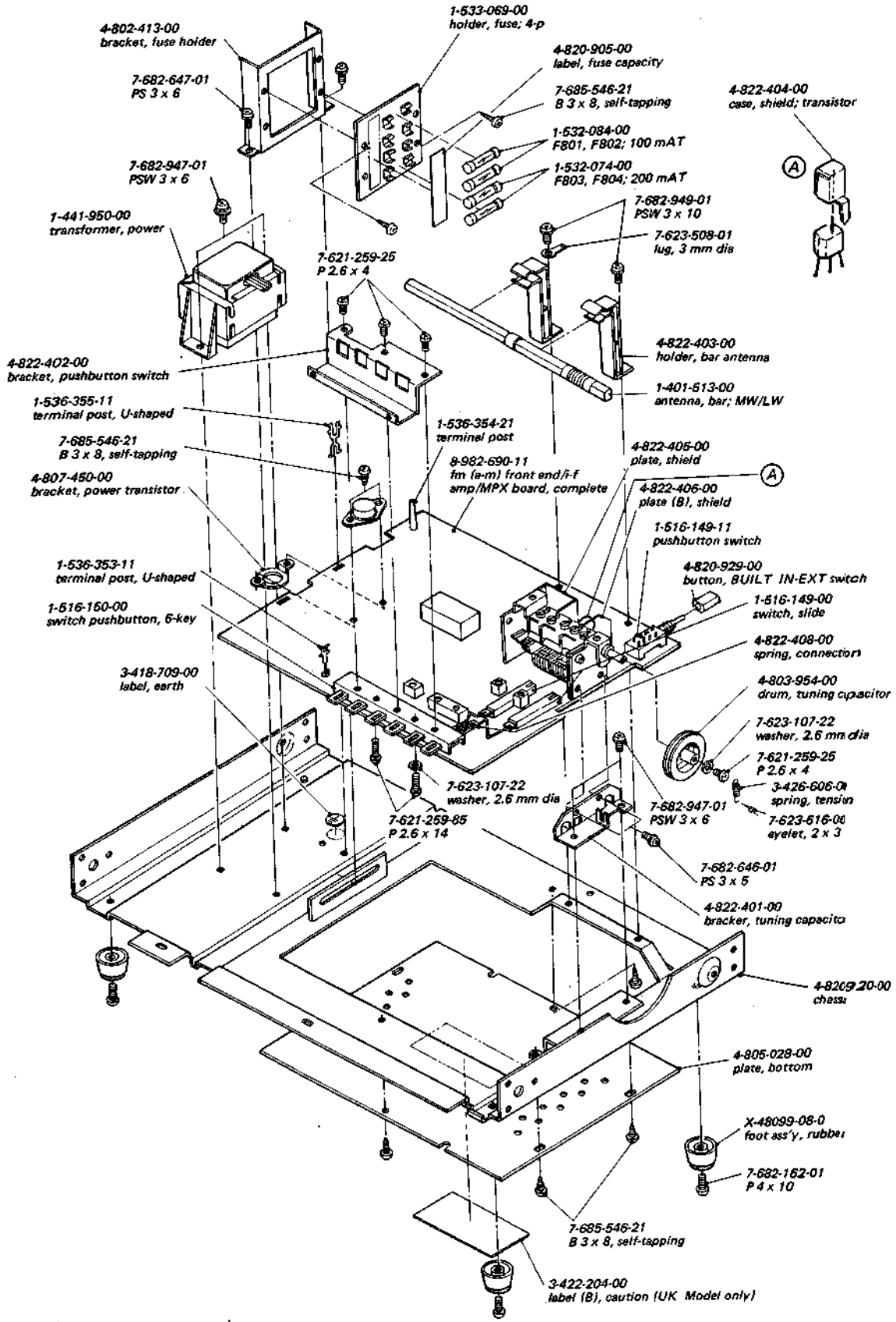
(1)



(2)



(3)


4-802-413-00
bracket, fuse holder
1-533-069-00
holder, fuse; 4-p
4-820-905-00
label, fuse capacity
7-682-647-01
PS 3 x 6
7-685-546-21
B 3 x 8, self-tapping
4-822-404-00
case, shield; transistor
1-532-084-00
F801, F802; 100 mAT
1-532-074-00
F803, F804; 200 mAT
7-682-947-01
PSW 3 x 6
7-682-949-01
PSW 3 x 10
1-441-950-00
transformer, power
7-623-508-01
lug, 3 mm dia
7-621-259-25
P 2.6 x 4
4-822-403-00
holder, bar antenna
4-822-402-00
bracket, pushbutton switch
1-401-613-00
antenna, bar; MW/LW
1-536-355-11
terminal post, U-shaped
1-536-354-21
terminal post
7-685-546-21
B 3 x 8, self-tapping
4-822-405-00
plate, shield
4-807-450-00
bracket, power transistor
8-982-690-11
fm (a-m) front end/i-f
amp/MPX board, complete
4-822-406-00
plate (B), shield
1-516-149-11
pushbutton switch
1-536-353-11
terminal post, U-shaped
4-820-929-00
button, BUILT IN-EXT switch
1-516-150-00
switch pushbutton, 6-key
1-516-149-00
switch, slide
4-822-408-00
spring, connection
3-418-709-00
label, earth
4-803-954-00
drum, tuning capacitor
7-623-107-22
washer, 2.6 mm dia
7-621-259-25
P 2.6 x 4
3-426-606-01
spring, tension
7-623-107-22
washer, 2.6 mm dia
7-682-947-01
PSW 3 x 6
7-623-616-00
eyelet, 2 x 3
7-621-259-85
P 2.6 x 14
7-682-646-01
PS 3 x 5
4-822-401-00
bracket, tuning capacitor
4-8269-20-00
chassis
4-805-028-00
plate, bottom
X-48099-08-0
foot ass'y, rubber
7-682-162-01
P 4 x 10
7-685-546-21
B 3 x 8, self-tapping
3-422-204-00
label (B), caution (UK Model only)

SECTION 7
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
	MOUNTED CIRCUIT BOARDS	
	8-982-690-11	fm (a-m) front-end/I-f amp/MPX board, complete (TCB016W2A)
	8-982-689-23	attenuator board, complete
	SEMICONDUCTORS	
D201		diode 1S1555
D202		diode 1S1555
D203		diode 1T22A
D204		diode 1T22A
D205		diode 1T22A
D206		diode 1T22A
D207		diode 1S1555
D208		diode 1S1555
D301		diode 1S1555
D401		diode 1T22A
D402		diode 1T22A
D701		diode 1T264
D702		diode 10D-2
D703		diode 10D-2
Q101		FET 2SK42
Q102		FET 2SK23A
Q103		transistor 2SC710
Q104		transistor 2SC710
Q201		transistor 2SC710
Q202		transistor 2SC633A
Q203		transistor 2SC633A
Q204		transistor 2SC631A
Q205		transistor 2SA677
Q206		transistor 2SC403C
Q207		transistor 2SC633A
Q208		transistor 2SC633A
Q401		transistor 2SC710
Q402		transistor 2SC403
Q403		transistor 2SC403
Q404		transistor 2SC403
Q405		transistor 2SC403
Q501		transistor 2SC633A
Q502		transistor 2SC633A
Q503		transistor 2SC633A
Q504		transistor 2SC633A
Q701		transistor 2SD291
Q702		transistor 2SC633A

Ref. No.	Part No.	Description
IC201		IC CX-0411
IC301		IC CX 0431 or 0432
	TRANSFORMERS, COILS & INDUCTORS	
CFT401	1-403-830-00	CFT, 468 kHz; triple tuned
IFT101	1-403-821-00	IFT, 10.7 MHz
L101	1-401-514-00	coil, fm antenna
L102	1-425-746-00	coil, fm rf
L103	1-405-554-00	coil, fm osc
L201	1-407-165-00	inductor, micro 47 μH
L203	1-407-418-00	coil, SCA 22 mH
L204	1-407-177-00	inductor, micro 470 μH
L301	1-407-177-00	inductor, micro 470 μH
L401	1-401-515-00	coil, 220 μH
L402	1-401-513-00	bar antenna, MW/LW
L403	1-407-173-00	inductor, micro 220 μH
L404	1-425-753-00	coil, LW rf
L405	1-425-752-00	coil, MW rf
L406	1-403-149-00	IFT, 455 kHz
L407	1-405-553-00	coil, LW osc
L408	1-405-552-00	coil MW osc
L409	1-407-210-00	inductor, micro 22 mH
L410	1-407-173-00	inductor micro 220 μH
MU301	1-464-009-00	MPX unit
T201	1-403-295-00	IFT, fm 10.7 MHz
T301	1-425-729-00	transformer, switching 38 kHz
T801	1-441-950-00	transformer, power
L202	→ See TABLE 3-1 on page 9.	
	CAPACITORS	

All capacitance values are in μF except as indicated with p, which means μμF.

C101	1-101-927-11	18 p	± 5 %	50 V	ceramic
C102	1-101-927-11	18 p	± 5 %	50 V	ceramic
C103	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C104	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C105		----------			
C106	1-102-256-11	220 p	± 10 %	50 V	ceramic
C107	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C108	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C109	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C110	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C111	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C112	1-102 858-11	10 p	± 0.5 pF	50 V	ceramic
C113	1-101-972-11	18 p	± 5 %	50 V	ceramic
C114	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C115	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C116	1-101-978-11	10 p	± 0.5 pF	50 V	ceramic
C201	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic

Ref. No.	Part No.	Description			
C202	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C203	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C204	1-102-256-11	220 p	±10 %	50 V	ceramic
C205	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C206	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C207	1-102-256-11	220 p	±10 %	50 V	ceramic
C208	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C209	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C210	1-101-880-11	47 p	±5 %	50 V	ceramic
C211	1-101-880-11	47 p	±5 %	50 V	ceramic
C212	1-102-258-11	100 p	±10 %	50 V	ceramic
C213	1-102-258-11	100 p	±10 %	50 V	ceramic
C214	1-102-258-11	100 p	±10 %	50 V	ceramic
C215	1-102-258-11	100 p	±10 %	50 V	ceramic
C216	1-121-402-11	33		10 V	electrolytic
C217	1-102-258-11	100 p	±10 %	50 V	ceramic
C218	1-121-912-11	1		50 V	electrolytic
C219	1-102-256-11	220 p	±10 %	50 V	ceramic
C220	1-121-392-11	3.3		25 V	electrolytic
C221	1-102-979-11	240 p	±5 %	50 V	ceramic
C222	1-102-979-11	240 p	±5 %	50 V	ceramic
C223	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C224	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C225	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C226	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C227	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C228	1-121-651-11	10		16 V	electrolytic
C229	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C230	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C231		----------			
C232	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C233	1-121-352-11	47		10 V	electrolytic
C234	1-121-419-11	220		6.3 V	electrolytic
C235	1-102-257-11	2200 p	$^{+80}_{-20}$ %	50 V	ceramic
C301	1-121-420-11	220		10 V	electrolytic
C302	1-121-392-11	3.3		25 V	electrolytic
C303	1-121-916-11	10		16 V	electrolytic
C304		----------			
C305		----------			
C306	1-121-413-11	100		6.3 V	electrolytic
C307	1-121-726-11	0.047		50 V	electrolytic
C308	1-105-661-12	0.001	±10 %	50 V	mylar
C309	1-103-575-11	4700 p	±5 %	50 V	styrol
C310	1-121-415-11	100		16 V	electrolytic
C311	1-121-912-11	1		50 V	electrolytic
C312	1-121-912-11	1		50 V	electrolytic
C313		----------			
C314		----------			
C315	1-105-669-12	0.0047	±10 %	50 V	mylar
C403	1-105-677-12	0.022	±10 %	50 V	mylar
C404	1-105-664-12	0.0018	±10 %	50 V	mylar

Ref. No.	Part No.	Description			
C405	1-105-663-12	0.0015	±10 %	50 V	mylar
C406	1-105-681-12	0.047	±10 %	50 V	mylar
C407	1-101-880-11	47 p	±5 %	50 V	ceramic
C408	1-121-651-11	10		16 V	electrolytic
C409	1-105-677-12	0.022	±10 %	50 V	mylar
C410		----------			
C411	1-101-880-11	47 p	±5 %	50 V	ceramic
C412	1-105-677-12	0.022	±10 %	50 V	mylar
C413		----------			
C414	1-105-677-12	0.022	±10 %	50 V	mylar
C415		----------			
C416	1-105-677-12	0.022	±10 %	50 V	mylar
C417	1-105-661-12	0.001	±10 %	50 V	mylar
C418	1-105-677-12	0.022	±10 %	50 V	mylar
C419	1-105-677-12	0.022	±10 %	50 V	mylar
C420	1-121-415-11	100		16 V	electrolytic
C421	1-105-677-12	0.022	±10 %	50 V	mylar
C422	1-105-677-12	0.022	±10 %	50 V	mylar
C423		----------			
C424		----------			
C425	1-121-392-11	3.3		25 V	electrolytic
C426	1-101-888-11	68 p	±5 %	50 V	ceramic
C427	1-105-677-12	0.022	±10 %	50 V	mylar
C428	1-105-677-12	0.022	±10 %	50 V	mylar
C429	1-105-679-12	0.033	±10 %	50 V	mylar
C430	1-105-683-12	0.068	±10 %	50 V	mylar
C431	1-102-949-11	12 p	±0.5 pF	50 V	ceramic
C432	1-102-916-11	110 p	±5 %	50 V	ceramic
C433	1-105-677-12	0.022	±10 %	50 V	mylar
C434	1-121-651-11	10		16 V	electrolytic
C435	1-105-669-12	0.0047	±10 %	50 V	mylar
C436	1-105-677-12	0.022	±10 %	50 V	mylar
C501	1-121-409-11	47		16 V	electrolytic
C502	1-121-912-11	1		50 V	electrolytic
C503	1-121-912-11	1		50 V	electrolytic
C504	1-101-882-11	51 p	±5 %	50 V	ceramic
C505	1-101-882-11	51 p	±5 %	50 V	ceramic
C506	1-121-352-11	47		10 V	electrolytic
C507	1-121-352-11	47		10 V	electrolytic
C508	1-121-391-11	1		50 V	electrolytic
C509	1-121-391-11	1		50 V	electrolytic
C701	1-121-415-11	100		16 V	electrolytic
C702	1-121-422-11	220		25 V	electrolytic
C703	1-121-733-11	470		25 V	electrolytic
C704	1-105-881-12	0.047	±20 %	100 V	mylar

CT101, 102, 103 CT401, 403, 406	1-151-254-11	capacitor, tuning
CT402, 404 405	1-141-147-11	capacitor, trimmer

Ref. No.	Part No.	Description
CV101, 102, 103 CV401, 402, 403	1-151-254-11	capacitor, tuning

RESISTORS

All resistors are in Ω, ± 5 %, ¼ W and carbon type unless otherwise indicated.

Ref. No.	Part No.	Description
R101	1-244-671-11	820
R102	1-244-657-11	220
R103	1-242-689-11	4.7 k
R104	1-244-697-11	10 k
R105	1-244-673-11	1 k
R106	1-244-666-11	510
R107	1-244-633-11	22
R108	1-244-657-11	220
R109	1-242-673-11	1 k
R110	1-242-685-11	3.3 k
R111	1-244-657-11	220
R112	1-242-697-11	10 k
R113	1-244-689-11	4.7 k
R114	1-242-657-11	220
R201	1-244-664-11	430
R202	1-244-662-11	360
R203	1-244-671-11	820
R204	1-244-693-11	6.8 k
R205	1-244-663-11	390
R206	1-244-680-11	2 k
R207	1-244-687-11	3.9 k
R208	1-244-673-11	1 k
R209	1-244-673-11	1 k
R210	1-244-661-11	330
R211	1-244-655-11	180
R212	1-244-674-11	1.1 k
R213	1-244-643-11	56
R214	1-244-677-11	1.5 k
R215	1-244-657-11	220
R216	1-244-690-11	5.1 k
R217	1-244-697-11	10 k
R218	1-244-665-11	470
R219	1-244-680-11	2 k
R220	1-244-680-11	2 k
R221	1-244-649-11	100
R222	1-244-673-11	1 k
R223	1-244-673-11	1 k
R224	1-244-691-11	5.6 k
R225	1-244-691-11	5.6 k
R226	1-244-699-11	12 k
R227	1-244-721-11	100 k
R228	1-244-721-11	100 k
R229	1-244-703-11	18 k
R230	1-244-699-11	12 k
R231	1-244-649-11	100
R232	1-244-664-11	430
R233	1-244-679-11	1.8 k
R234	1-244-633-11	22
R235	1-244-633-11	22
R236	1-244-673-11	1 k
R237	1-244-680-11	2 k
R238	1-244-697-11	10 k
R239	1-244-657-11	220
R240	1-244-643-11	56
R241	1-244-680-11	2 k
R242	1-244-649-11	100
R243	1-244-697-11	10 k
R244	1-244-633-11	22
R245	1-244-721-11	100 k
R246	1-244-633-11	22
R247	1-244-633-11	22
R301	1-244-675-11	1.2 k
R302	1-244-673-11	1 k
R303	1-202-556-11	200 ½ W composition
R304	1-244-669-11	680
R305	1-244-697-11	10 k
R306	1-244-687-11	3.9 k
R307	1-244-687-11	3.9 k
R308	1-244-684-11	3 k
R401	1-242-690-11	5.1 k
R402	1-244-664-11	430
R403	1-244-689-11	4.7 k
R404	1-244-641-11	47
R405	1-244-673-11	1 k
R406	1-244-655-11	180
R407	1-244-667-11	560
R408	1-244-641-11	47
R409	1-244-657-11	220
R410	1-244-708-11	30 k
R411	1-244-657-11	220
R412	1-244-697-11	10 k
R413	1-244-681-11	2.2 k
R414	1-244-689-11	4.7 k
R415	1-244-661-11	330
R416	1-244-687-11	3.9 k
R417	1-244-701-11	15 k
R418	1-244-669-11	680
R419	1-244-641-11	47
R420	1-242-729-11	220 k
R421	1-244-697-11	10 k
R422	1-244-673-11	1 k
R423	1-244-675-11	1.2 k
R424	1-244-689-11	4.7 k

Ref. No.	Part No.	Description
R425	1-244-633-11	22
R426	1-244-657-11	220
R427	1-244-671-11	820
R428	1-244-657-11	220
R429	1-244-681-11	2.2 k
R430	1-244-715-11	56 k
R431	1-244-701-11	15 k
R432	1-244-655-11	180
R433	1-242-673-11	1 k
R434	1-244-690-11	5.1 k
R435	1-244-657-11	220
R501	1-244-713-11	47 k
R502	1-244-713-11	47 k
R503	1-244-665-11	470
R504	1-244-665-11	470
R505	1-244-721-11	100 k
R506	1-244-721-11	100 k
R507	1-244-701-11	15 k
R508	1-244-701-11	15 k
R509	1-244-707-11	27 k
R510	1-244-657-11	220
R511	1-244-657-11	220
R512	1-244-681-11	2.2 k
R513	1-244-681-11	2.2 k
R601	1-244-704-11	20 k
R602	1-244-704-11	20 k
R603	1-244-706-11	24 k
R604	1-244-706-11	24 k
R605	1-244-673-11	1 k
R606	1-244-673-11	1 k
R701	1-244-699-11	12 k
R702	1-244-684-11	3 k
R703	1-244-665-11	470
R704	1-244-665-11	470
R705	1-244-648-11	91
R801	1-244-640-11	43
RT201	1-222-761-11	1 k (B), adjustable (fm meter adj)
RT301	1-222-763-11	4.7 k (B), adjustable (separation adj)
RV302	1-222-764-11	22 k (B), adjustable (fm level adj)
RV303	1-222-764-11	22 k (B), adjustable (fm level adj)
RV601	1-222-693-11	10 k (B), variable (LEVEL adj)
RV602	1-222-693-11	10 k (B), variable (LEVEL adj)

SWITCHES

S1	1-516-136-00	switch, lever/seesaw (POWER)
S2, S3, S4, S5	1-516-150-00	switch, pushbutton; 6-key (HI-BLEND) (MUTING) (MODE) (FM)
S5a, S5b	1-516-148-00	switch, slide (LW) (MW)
S6	1-516-149-00	switch, pushbutton (A-M ANTENNA)

FILTERS

CF201, CF202	1-527-507-12	fm i-f, ceramic 10.70 MHz (red)
	1-527-507-22	fm i-f, ceramic 10.66 MHz (black)
	1-527-507-32	fm i-f, ceramic 10.74 MHz (white)
	1-527-507-42	fm i-f, ceramic 10.62 MHz (green)
	1-527-507-52	fm i-f, ceramic 10.78 MHz (yellow)
CF203	1-527-201-11	filter, ceramic 10.70 MHz (red)
	1-527-201-21	filter, ceramic 10.66 MHz (black)
	1-527-201-31	filter, ceramic 10.74 MHz (white)
	1-527-201-41	filter, ceramic 10.62 MHz (green)
	1-527-201-51	filter, ceramic 10.78 MHz (yellow)

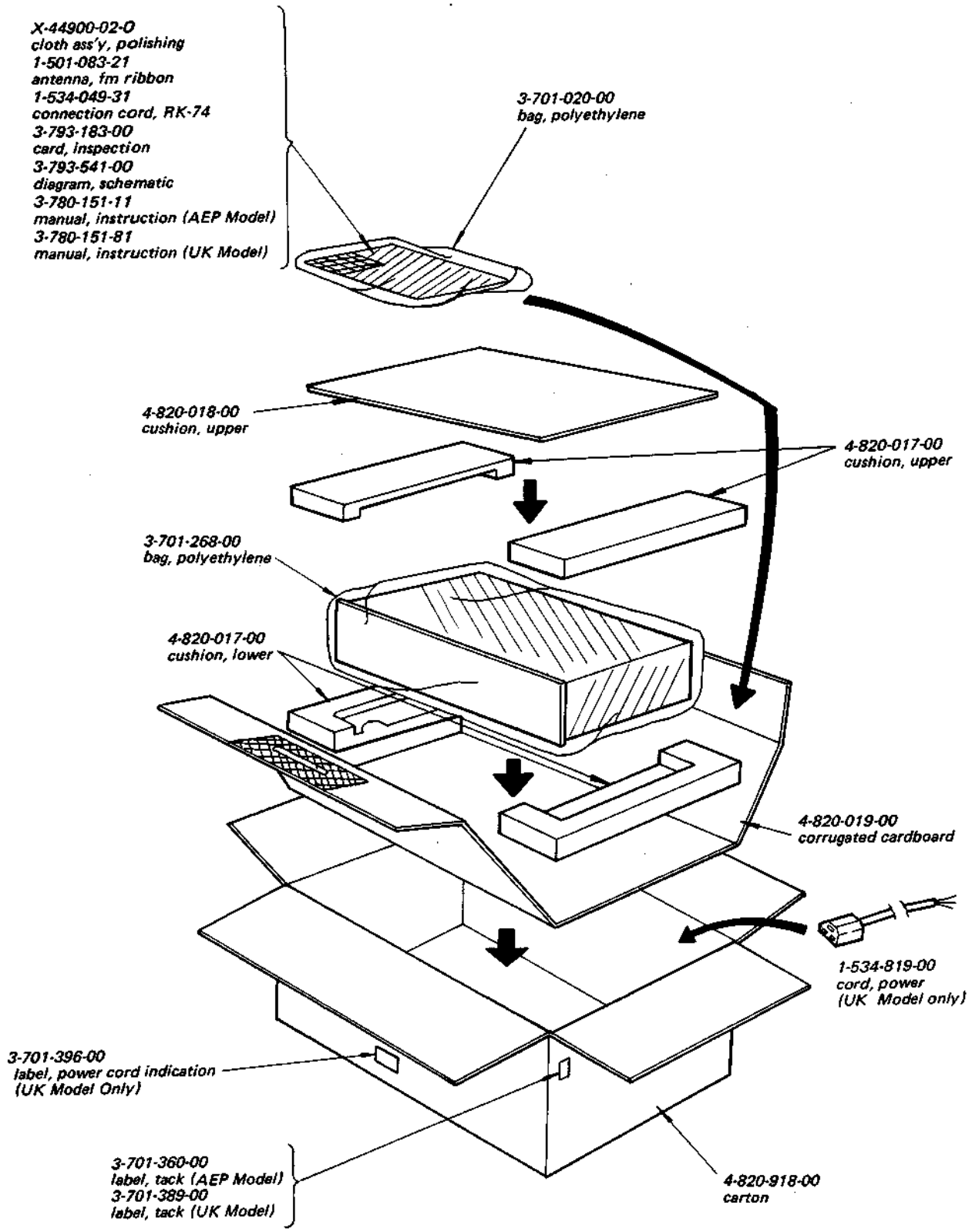
(See Table 3-2 on page 9.)

MISCELLANEOUS

CRF301, CRF302	1-231-224-00	encapsulated component (L.P.F)
F801, F802	1-532-084-00	fuse, 100 mAT
F803, F804	1-532-074-00	fuse, 200 mAT
J801	1-536-286-00	terminal board, antenna (4-p)
J802	1-536-352-00	jack phono; 4-p
ME801	1-520-101-00	meter, TUNER INPUT
PL301	1-518-121-32	lamp, stereo 4.5 V/40 mA
PL801	1-518-124-00	lamp, meter 8 V/0.25 A
PL802	1-518-070-00	lamp, dial 8 V/0.3 A
PL803	1-518-070-00	lamp, dial 8 V/0.3 A
PL804	1-518-070-00	lamp, dial 8 V/0.3 A
PL805	1-518-147-00	lamp, pointer 5 V/0.06A
PL806	1-518-121-51	lamp, FM 4.5 V/40 mA
PL807	1-518-121-12	lamp, MW 4.5 V/40 mA
PL808	1-518-121-61	lamp, LW 4.5 V/40 mA
VS801	1-509-385-00	selector, voltage
	1-509-445-00	connector, ac input
	1-533-051-00	holder, meter lamp
	1-533-069-00	holder, fuse; 4-p
	1-534-819-00	cord, power (UK Model only)
	1-536-353-00	terminal post, U-shaped (single)
	1-536-354-00	terminal post
	1-536-355-00	terminal post, U-shaped (double)
	1-517-050-00	holder, dial lamp

REPACKING

Note: AEP Model . . . Serial No. 900,001 and later
UK Model. . . . Serial No. 400,001 and later



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