

ATT.

METER LAMP GREEN

**SERVICE MANUAL**

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SECTION 1 TECHNICAL DESCRIPTION

1-1. TECHNICAL SPECIFICATIONS

Technical specifications for the ST-5100 are given in Table 1.

TABLE 1. SPECIFICATIONS

Fm Tuner Section

Antenna	: 300 Ω balanced, 75 Ω unbalanced
Tuning range	: 87 to 108 MHz
Usable sensitivity	: 2.6 μ V IHF
S/N ratio	: 70 dB
Capture ratio	: 1.5 dB
Selectivity	: 80 dB IHF
Image rejection	: 75 dB
I-f rejection	: 90 dB
Spurious rejection	: 100 dB
A-m suppression	: 50 dB IHF
Harmonic distortion	: Mono: 0.2% at 400 Hz, 100% mod. Stereo: 0.5% at 400 Hz, 100% mod.
Fm stereo separation:	Greater than 40 dB at 400 Hz
19 kHz, 38 kHz suppression	: 60 dB

A-m Tuner Section

Antenna	: Built-in ferrite-bar antenna with external antenna provision
Tuning range	: 530 kHz to 1605 kHz
Intermediate frequency	: 455 kHz
Sensitivity	: 48 dB/m, built in antenna 20 μ V, external antenna
S/N ratio	: 50 dB
Image rejection	: 60 dB at 1000 kHz
I-f rejection	: 46 dB at 1000 kHz
Harmonic distortion	: 0.8 %

Audio Output

FIX	: 750 mV 10 k ohms
VARIABLE	: 0 to 2 V 1 k ohm

General

Power requirements	: 100, 117, 220, 240 V AC 50/60 Hz
Power consumption	: Approx 13 watts
Dimensions	: 422mm (width) $\times$ 148mm (height) $\times$ 340mm (depth) 16 ⁵ / ₈ " (width) $\times$ 5 ¹³ / ₁₆ " (height) $\times$ 13 ³ / ₈ " (depth)
Net weight	: 7.2 kg (15 lb 14 oz)
Shipping weight	: 11.3 kg (24 lb 12 oz)

Design and specifications are subject to change without notice.

1-2. DETAILED CIRCUIT ANALYSIS

The following describes the operation or functions of all stages and controls. The text sequence follows signal paths. Stages are listed by transistor reference designation at the left margin; major components are also listed in a similar manner.

Refer to the block diagram on page 7 and the schematic diagram on pages 33 to 34.

Stage/Control

Function

FM Front End

Balun B1	This transformer matches 300-ohm twin lead to the fm front-end's input stage and thereby couples the received signal to the front-end.
Passive rf circuit L101, L102, L103	A triple-tuned circuit is employed between the antenna and mixer transistor. This passive coupling circuit contains no active amplifiers, so it is perfectly linear and cannot produce distortion and overload components. Thus, the factors that contribute to spurious responses are eliminated ahead of the mixer.
Local oscillator Q102	Supplies heterodyning voltage to the mixer via L104. The circuit is a modified Hartley type with feedback applied to the emitter from the tap on L104.

Stage/Control

Function

Stage/Control

Function

AFC circuit
D101, D102

An automatic frequency control circuit is incorporated in the oscillator circuit to eliminate frequency drift and the difficulty of exact tuning. The principle of afc operation is as follows:
When the tuner is correctly tuned, the intermediate frequency is 10.7 MHz and no dc correction voltage is produced by the ratio detector as shown in the "S" curve response of Fig. 1-1.
So the voltage applied to diode D101 is determined solely by the positive fixed reverse bias voltage supplied by zener diode D102. Now, assume that the local oscillator frequency changes by $+\Delta f$. This means that the new intermediate frequency is 10.7 MHz $+\Delta f$. See Fig. 1-1.
As the result a positive dc component is fed back to the anode of D101, decreasing the reverse voltage to it, and making D101's barrier capacitance increase. This decreases the local oscillator's frequency, since the series circuit composed of C120

and D101 is connected in parallel with the tank circuit of the local oscillator. Conversely, if the local oscillator frequency decreases a negative dc voltage is fed back to D101 increasing the local oscillator frequency.

Mixer Q101

Rf signals and local oscillator voltages are heterodyned in the gate-source junction of mixer Q101 to produce 10.7 MHz i-f output signal.

IFT 101

Transformer IFT 101 and capacitors C106 and C107 form a 10.7 MHz "high-C" tuned circuit. This type of circuit has the advantage of reducing the higher order harmonics of 10.7 MHz which cause cross modulation or spurious interference.

I-f preamplifier
Q103

The i-f signal coupled to the base of if preamplifier Q103 by the secondary winding of IFT 101 is amplified to achieve a favorable signal-to-noise ratio before application to the filters in the i-f strip.

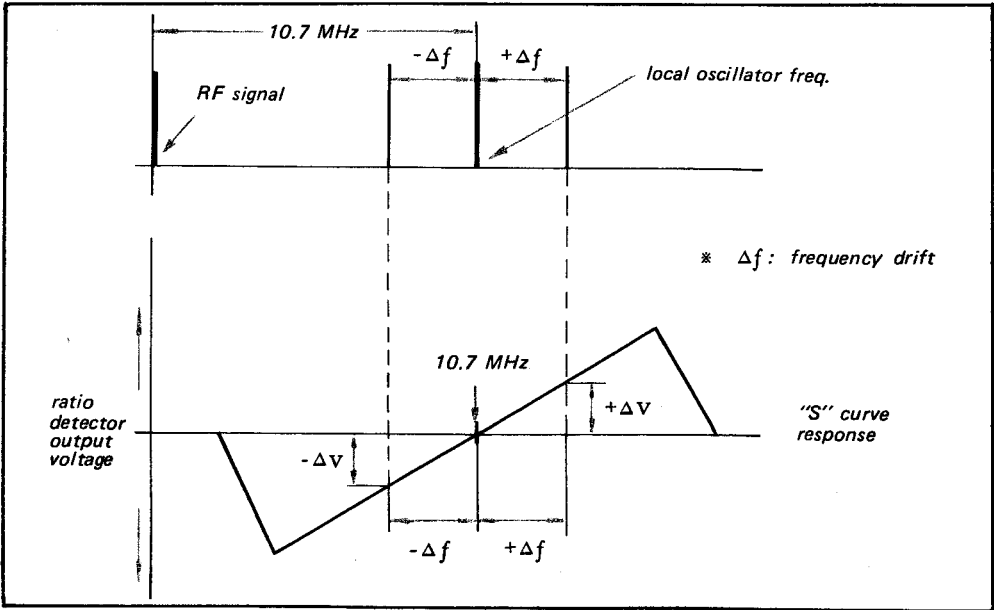
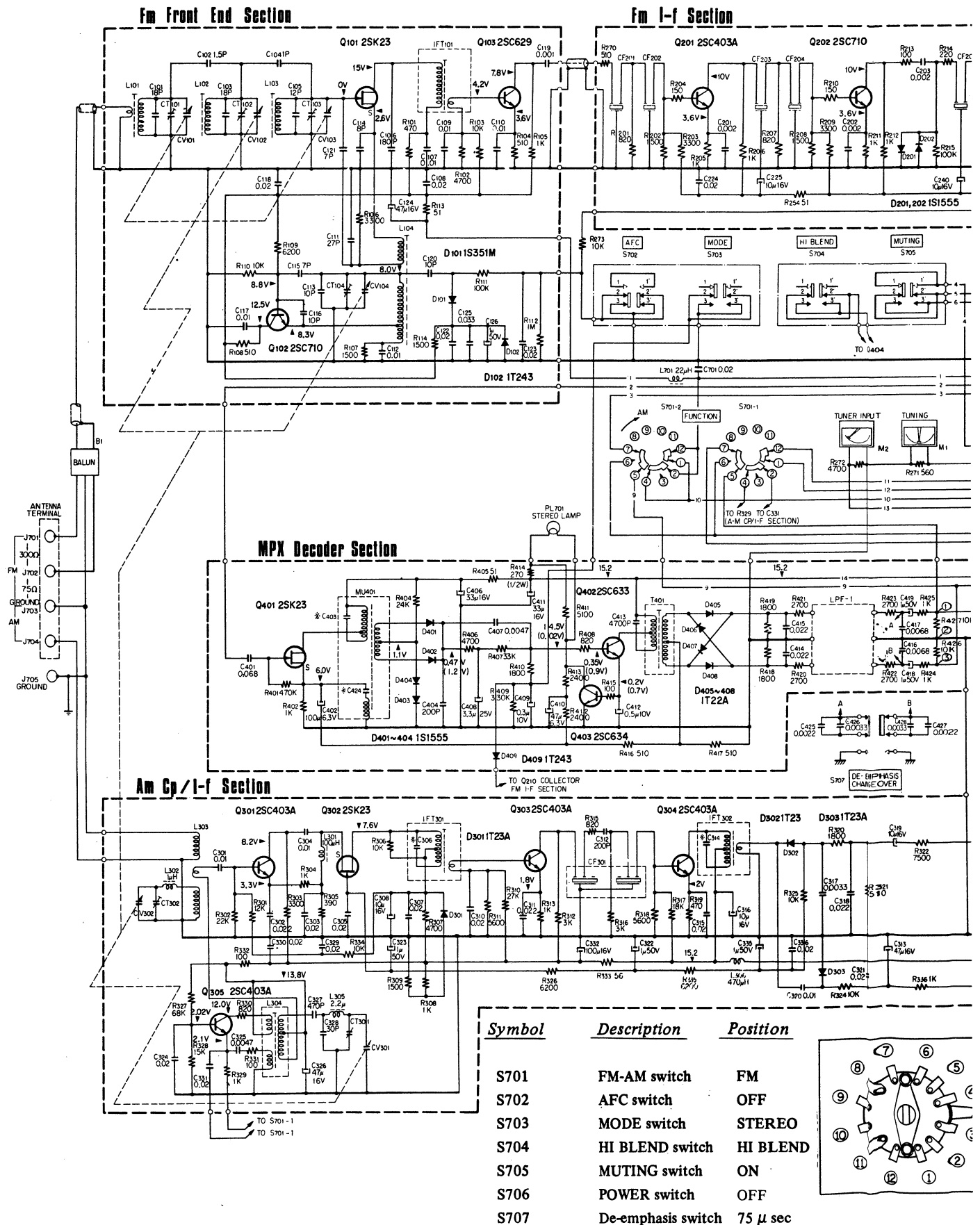
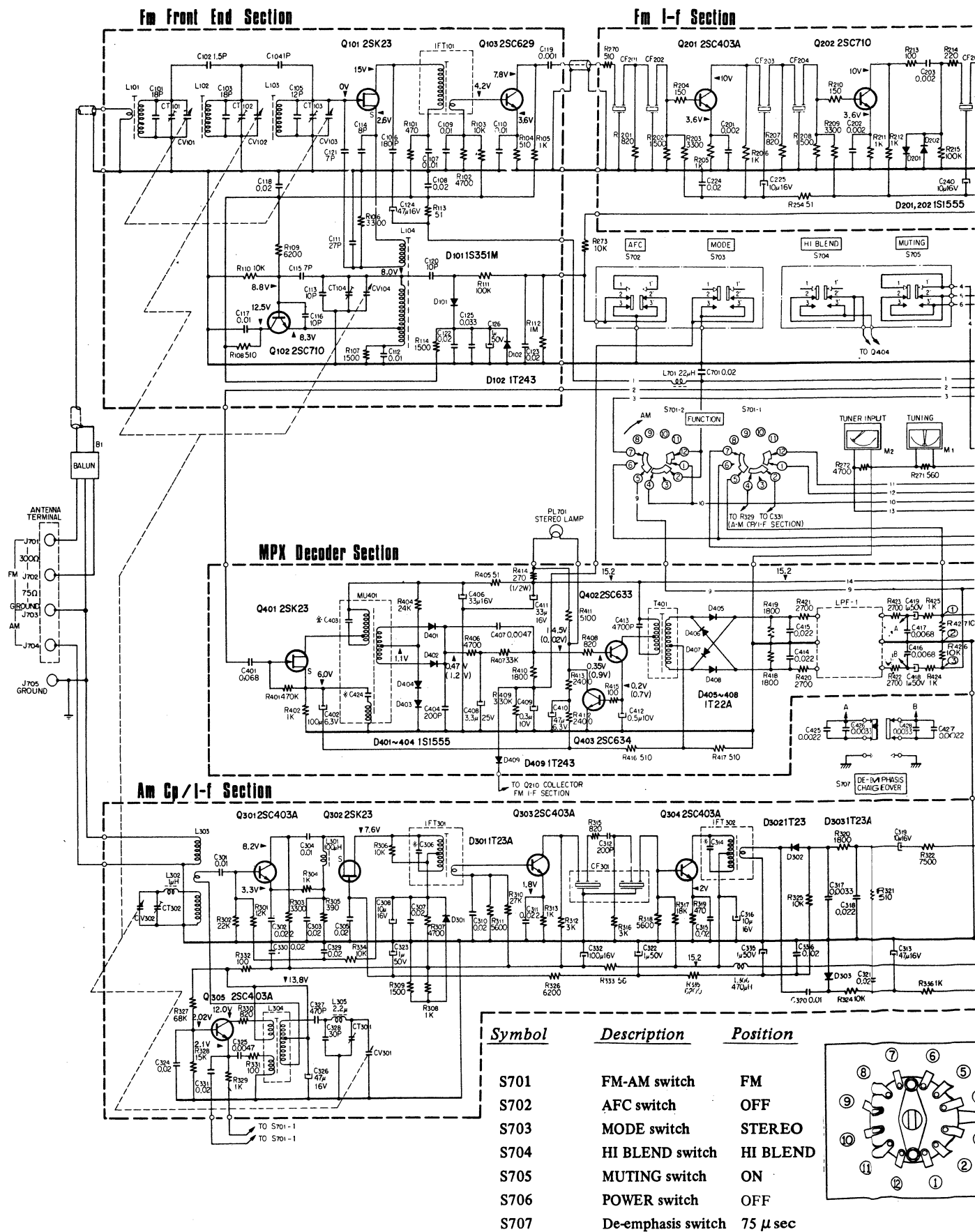


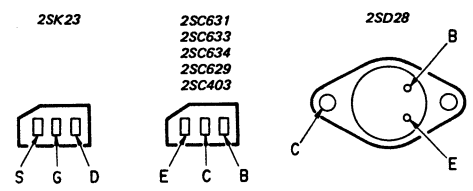
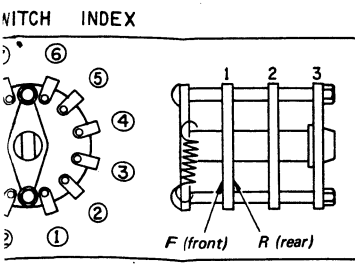
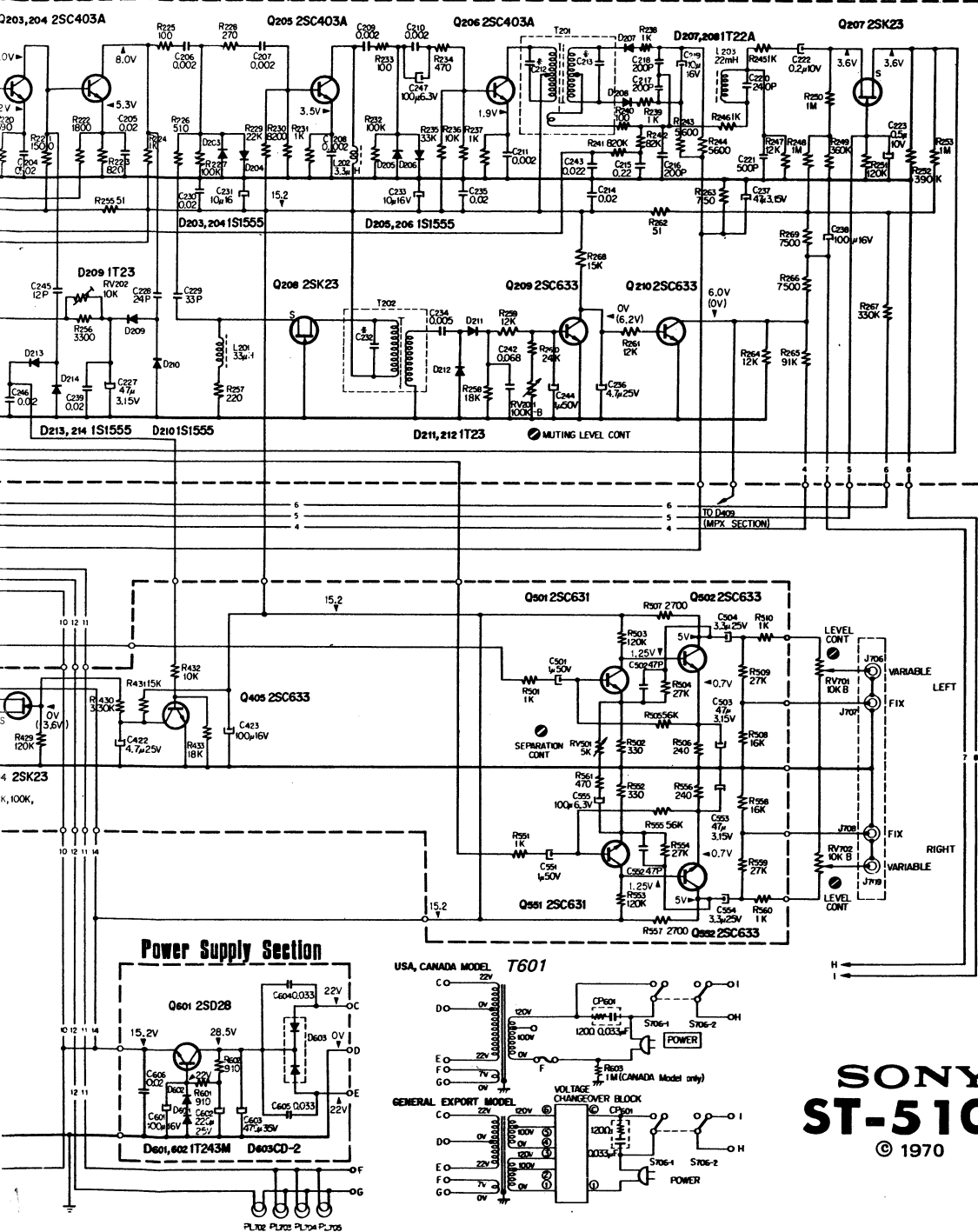
Fig. 1-1 Local oscillator's frequency drift and afc voltage relationship

SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM





SONY®
ST-5100
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Note:
All resistance values are in ohms. k=1000, M=1000 k
All capacitance values are in μF except as indicated with p, which means μF .
All voltages represent an average value and should hold within $\pm 20\%$.
All voltages are dc measured with a VOM which has an input impedance of 20 k ohms/volt. No signal in.
[] signal voltages are measured with ac VTVM and expressed in dBm referred to 0.775 volts, 1 kHz.

<u>Stage/Control</u>	<u>Function</u>	<u>Stage/Control</u>	<u>Function</u>
<i>Fm I-f Amplifier</i>			
I-f amplifiers Q201 to Q206 CF201 to CF206	These i-f stages are basically RC coupled amplifiers that provide an essentially flat frequency response. The selectivity of this section is determined by three pairs of ceramic filters (CF201 to CF206) in the interstage-coupling path. These filters operate in a "trapped-energy" mod. The filters provide extremely sharp skirt selectivity and flat response inside the passband. Thus, these filters determine overall tuner selectivity.		rf signals. Q209 and Q210 form a switching circuit which is driven by the voltage doubler. Q209 is normally cutoff, thus forcing Q210 into conduction. The collector of Q210 is connected to the gate of FET Q207 through MUTING switch S705. FET Q207 acts as an electronic switch which is inserted between the ratio detector and MPX decoder, and is controlled by the gate voltage applied. With the MUTING switch ON, fm signals of average strength keep Q209 saturated, thus cutting off Q210. This causes Q207 to conduct and maintain normal operation. Weak stations and interstation noise can not produce sufficient dc voltage at the base of Q209 to keep it conducting. As a result, Q209 is cutoff. This saturates Q210 and cuts off Q207, accordingly, the audio output is muted. With the MUTING switch OFF, Q207 is kept conducting regardless of the strength of the fm signal by a positive bias voltage on its gate. Rv201 adjusts the muting level.
Diode limiters D201 to D206	Limiting is accomplished by diode pairs, connected in parallel and poled in opposite directions. The diodes conduct when the signal across them exceeds the barrier potential of about 0.6 volts in the forward direction. Thus, the signal is limited in both directions to 1.2 volts peak-to-peak. The diodes provide symmetrical limiting.		
Q206	Signal at the base of Q206 has had all amplitude variations removed by the preceding limiters and only selected signals have been passed by the ceramic filters. Q206 provides power to driver the ratio detector.		
Muting circuit Q207 to Q210 D211, D212 S705 T202	The i-f signal is extracted from limiter diodes D203 and D204 to drive the muting circuit. The extracted i-f signal is amplified by Q208 enough to drive voltage doubler D211 and D212 through tuned transformer T202. T202 determines band width (about ± 150 kHz) necessary to control muting circuit without generate interstation or detuning noise. The output of the voltage doubler is a positive dc voltage proportional to carrier levels of weak	Stereo-mono automatic switching circuit D409, Q210	The collector of Q210 is also connected to the output terminal of the MPX decoder's frequency doubler through diode D409. This prevents noisy stereo reception by automatically switching the MPX decoder's operation into the monaural mode. This is because in fm stereo broadcasting, the S/N ratio of a demodulated stereo signal worsens much more rapidly than that of a mono signal when the input signal strength decreases. As Q210 is forced into conduction by weak stations, the frequency doubler's output is effectively

Stage/ControlFunction

grounded, stopping the operation of the stereo demodulator.

Thus, automatic switching of stereo to mono according to the input rf signal level is achieved.

TUNER INPUT
meter M2,
D209, D210

I-f signal from the collector of Q204 is coupled through C228 to a rectifier-doubler consisting of diodes D209 and D210. At this point in the circuit, the i-f signal is proportional to the r-f signal strength for all but very -strong input signals. Therefore, the filtered dc output voltage of the rectifier-doubler is proportional to the r-f signal strength, and is used to drive TUNER INPUT meter M2.

SCA trap
L203, C220

The composite signal containing monaural information from 0 to 15 kHz, the 19 kHz pilot carrier, and the fm stereo signal at 38 kHz is fed to Q207 through trap L203-C220. This trap removes the unwanted SCA signals to feed a clean composite signal to the base of Q401 (the 19 kHz amplifier) through Q207.

MPX Decoder

19 kHz
amplifier
Q401

This stage serves two functions. It extracts the 19 kHz pilot signal by means of a tuned circuit at its drain, and provides a low -impedance source of composite stereo signal (without pilot carrier) at its source. By using an FET, harmonics of the 19 kHz and 38 kHz components are reduced to a low level, thereby causing less carrier leak or beat interference.

Frequency doubler
D401, D402

Signals developed at the collector of Q401 are transformer coupled to a full wave rectifier consisting of D401 and D402. The output of this rectifier is not filtered,

Stage/ControlFunction

resulting in two positive pulses for each input cycle. Thus, the 19 kHz pilot-carrier frequency is effectively doubled by D401 and D402. However, the waveform is not sinusoidal at the base of Q402.

38 kHz amplifier
Q402

The 38 kHz pulses produced by D401 and D402 are amplified by Q402. The tank circuit at the collector of Q402 is tuned to 38 kHz to restore these pulses to a sinusoidal waveform. This signal is transformer coupled to the bridge-type demodulator to supply sampling drive for the demodulator.

STEREO lamp
circuit
Q403

The STEREO indicator lights only when the MODE switch is set to STEREO and an fm stereo signal is received by means of stereo-mono switching circuit. The emitter of Q402 is connected to the base of Q403 which is normally cut off.

The circuit operates as follows: When a composite stereo signal is applied to the multiplex decoder, the 38 kHz pulses produced at the output of the frequency doubler yield a higher average current flow through Q402. This forces Q403 into conduction, lighting STEREO indicator lamp PL701.

Multiplex
demodulator
D405, D406
D407, D408

The demodulator circuit employs four diodes in a balanced-bridge arrangement. This system has the advantage of cancelling residual rf components (38 kHz signal, and higher-order harmonics of these frequencies.)

"L" and "R" components are developed at each side of the bridge as the result of demodulation, when the receiver is operated in the stereo mode. In the monaural mode, diodes D405

Stage/ControlFunction

and D408 are forward biased by supply voltage through R414, the stereo indicator lamp, R413, R412 and R416, so these diodes merely act as small resistances. Under this condition, the monaural signal is applied to both "L" and "R" audio amplifiers.

LPF-1

Filters out the unwanted higher-order harmonics of 19 kHz and 38 kHz leakage to obtain clear audio.

De-emphasis capacitors

C416, C417, C425, C426, C427, C428

These capacitors provide the roll-off at high audio frequencies necessary to compensate for pre-emphasis at the transmitter. S707 should be set to the proper time constant.

De-emphasis switch S707

Specified de-emphasis time constant is 75 micro-seconds in the USA and CANADA, and 50 micro-seconds in Europe.

Automatic high-blend circuit

D213, D214
Q404, Q405

This circuit is employed to automatically remove from the multiplex decoder output the hiss or noise caused by weak stereo signals. This noise reduction is achieved in the multiplex decoder with only a slight reduction in high-frequency response by mixing the oppositely-phased noise components of the left and right channels.

With the HIGH BLEND switch set to AUTO, FET Q404 acts as a noise mixer and operates as follows. The i-f signal from the collector of Q203 is rectified by a voltage doubler consisting of diodes D213 and D214. Its dc output is supplied to transistor Q405 which controls the gate voltage of Q404. As a result, fm input signal strength determines Q404's operating condition (the amount of mixing), because the

Stage/ControlFunction

fm i-f signal at Q203 is exactly proportional to the input signal strength.

Under no signal or weak signal conditions, Q405 is cut off without being forward biased. This produces a positive bias voltage at the gate of Q404, enabling the mixing of noise from each channel. The mixing level and noise frequency are determined by capacitors C420 and C421, and the impedance between the source and drain of Q404. When the stereo signal is strong enough to provide relatively noise-free listening, Q405 conducts and cuts off Q404. This stops the noise blending operation. When the HIGH BLEND switch is set to the HIGH BLEND, Q404's drain and source are shorted together, thereby providing maximum blending regardless of signal conditions.

A-m Tuner

Local oscillator Q305

This stage supplies injection voltage to the mixer via L303. In this oscillator circuit the feedback is applied to the emitter of Q305 from a low-impedance winding on oscillator coil L304.

Mixer Q301

Incoming rf signals and local-oscillator voltage are heterodyned in the base-emitter junction of Q301 to produce the 455-kHz output.

IFT 301 is a transformer tuned for 455 kHz. It develops the i-f signal, and provides a path to ground through bypass capacitor C307 for the other heterodyne products. The low-impedance output winding of IFT 301 provides link coupling to i-f amplifier Q303.

<u>Stage/Control</u>	<u>Function</u>
I-f amplifier Q303 Ceramic- filter CF301	This stage is basically an RC-coupled amplifier. The selectivity of the stage is determined by a double ceramic filter (CF301) in the interstage-coupling path. This filter provides extremely sharp skirt selectivity inside the pass-band.
I-f amplifier Q304	This circuit provides the power to drive diode detector D302.
Detector D302	The i-f signal from the secondary of IFT302 is rectified by diode D302. The i-f components of the output signal are filtered by C317, C318, and R320. The output appearing across R321 is therefore clean audio.
Agc circuit Q302	The negative dc component at the anode of diode D302 is filtered by C335, C336, C322, C323, R326, and R335, and fed back to the gate of Q302 to control its gain. The time constants of the agc filter components remove audio variations from the agc voltage.
TUNER INPUT meter M2, D303	I-f signal from the secondary winding of IFT302 is coupled through capacitor C320 to diode rectifier D303. The i-f output at the detector varies according to signal strength (it is not directly proportional due to AGC action), so the rectified and filtered i-f signal is used to drive the TUNER INPUT meter to indicate relative signal strength and facilitate a-m tuning.

Audio Stages

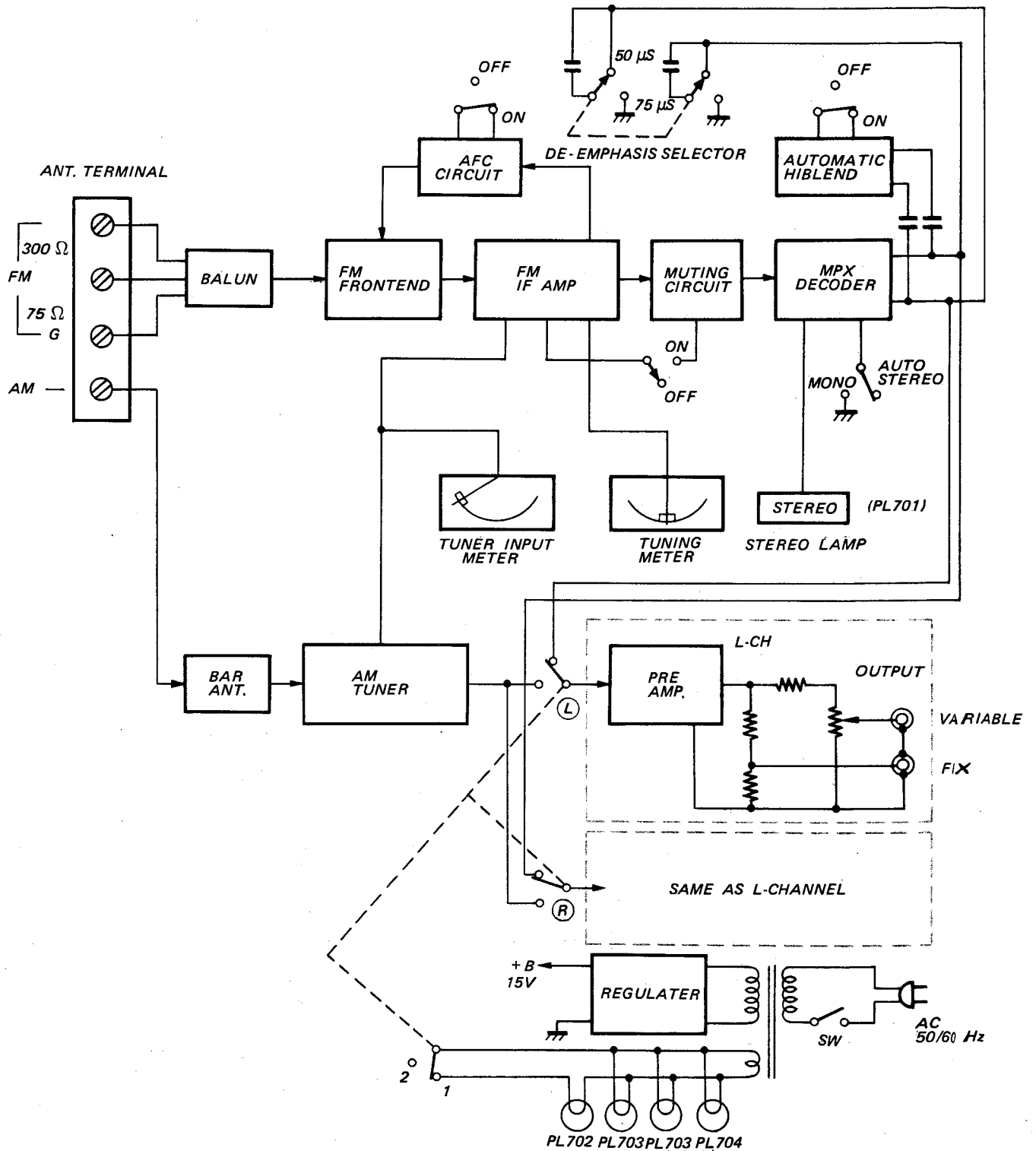
Audio preamplifier Q501, Q502 (Q551, Q552)	Demodulated L and R signals are amplified by these stages to obtain the specified audio output levels.
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<u>Stage/Control</u>	<u>Function</u>
Separation control Rv501	The network that connects the emitters of Q501 and Q551 provides a form of negative feedback between left and right channels. Any residual L signal in the R channel (which is about 180° out of phase) is cancelled out by the "L" signal from the L channel. The same is true of residual R signal in the L channel. Rv501 is therefore set for maximum channel separation.
Output terminals J706, J707, (J708, J709)	The audio signal from the pre-amplifier is fed through Rv701 (10 k) to the VARIABLE output jack, and through R509 (27 k) to the FIX output jack. These resistors determine the output signal level. The specified output level at the FIX jack is 750mV, while that at the VARIABLE jack can be changed from 0 to 2 V.

Power Supply

Rectifier circuit T601, D603	Line input is supplied to transformer T601 through POWER switch S705. The output from T601 is rectified by full-wave rectifier D603 to produce +28 volts dc.
Voltage regulator Q601, D601, D602	Dc output from the rectifiers is filtered by C603 and applied to series regulator Q601. Since the voltage at the base of Q601 is kept constant by means of zener diodes D601 and D602, the emitter voltage remains constant regardless of load or line-voltage variations. Moreover, since the base of Q601 is supplied with well filtered dc (due to C601 and C602), the ripple at the emitter of Q601 is negligible and the output impedance is very low.

1-3. BLOCK DIAGRAM



SECTION 2

DISASSEMBLY AND REPLACEMENT PROCEDURES

WARNING

Unplug the ac power cord before starting any disassembly or replacement procedures.

2-1. TOOLS REQUIRED

The following tools are required to perform disassembly and replacement procedures on the ST-5100.

Screwdriver, Phillips-head
Screwdriver, 1/8" blade (3mm)
Pliers, long-nose
Diagonal cutters
Nutdriver, 3mm (1/8")
Tweezers
Soldering iron, 40-150 watts
Cement solvent
Tape, electrical
Cement, contact
Solder, rosin core
Tape, double-coated

2-2. HARDWARE IDENTIFICATION GUIDE

The following chart will help you to decipher the hardware codes given in this service manual.

Note: All screws in the ST-5100 are manufactured to the specifications of the International Organization for Standardization (ISO). This means that the new and old screws are not interchangeable because ISO screws have a different number of threads per mm compared to the old ones.

The ISO screws have an identification mark on their heads as shown in Fig. 2-1.

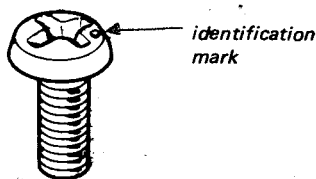
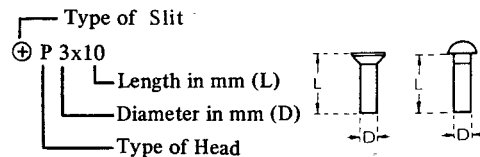


Fig. 2-1. ISO screw

Hardware Nomenclature

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)	
	W - Washer	
	SW - Spring Washer	
	LW - Lock Washer	
	N - Nut	

- Example -



2-3. TOP COVER AND BOTTOM PLATE REMOVAL

1. Remove the two machine screws at each side of the tuner, and lift off the top cover.
2. Remove the six screws (+PS 3 X 6) at the bottom of the tuner and pull the bottom plate in the direction indicated by the arrow in Fig. 2-2.

2-4. FRONT PANEL REMOVAL

1. Remove the top cover as described in Procedure 2-3.
2. Remove the POWER switch and FM-AM switch levers by unscrewing them counterclockwise.
3. Remove the three screws (+PS 4 X 6) behind the top edge of the front subchassis assembly. See Fig. 2-3.

4. Turn the tuner over and remove the two screws (+PS 3 X 6) at the front bottom edge of the chassis as shown in Fig. 2-4.
This frees the front panel.

2-5. REAR PANEL REMOVAL

1. Remove the top cover as described in Procedure 2-3.
2. Remove the two screws (+PS 3 X 6) at each side of the rear panel and one screw (+B 3 X 4) as shown in Fig. 2-5.
This frees the rear panel.

2-6. SWITCH REPLACEMENT

Preparation: Remove the front panel as described in Procedure 2-4.

POWER and FM-AM Switches

1. Unsolder the leads and encapsulated components from the switch lugs, then solder them to a new switch.
2. Remove the two screws (+PS 3 X 6) securing the switch to the front subchassis. See Fig. 2-6.
3. Install the new switch.

MUTING, HI BLEND, AFC and MODE Switches

1. Pull off the switch button.
2. Remove the two screws (+PS 3 X 6) securing the switch mounting circuit board to the subchassis as shown in Fig. 2-6.
3. Remove the defective switch and then install the replacement switch.

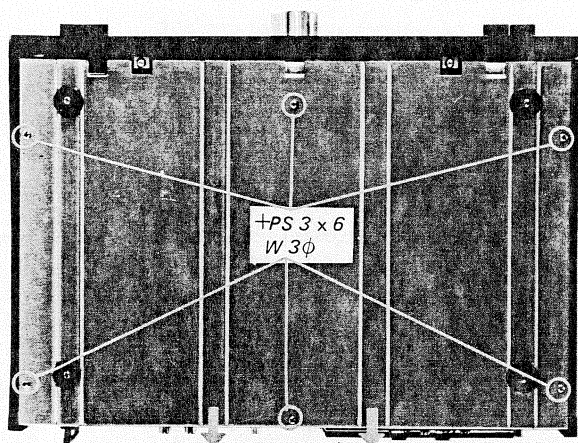


Fig. 2-2 Bottom plate removal

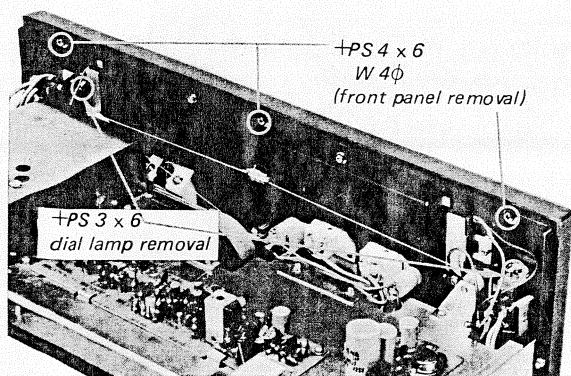


Fig. 2-3 Front panel removal (1)

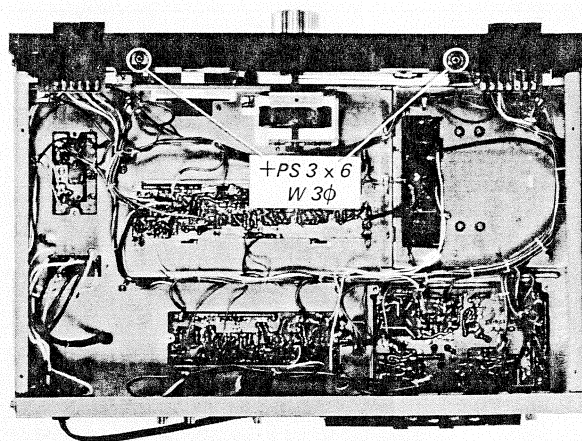


Fig. 2-4 Front panel removal (2)

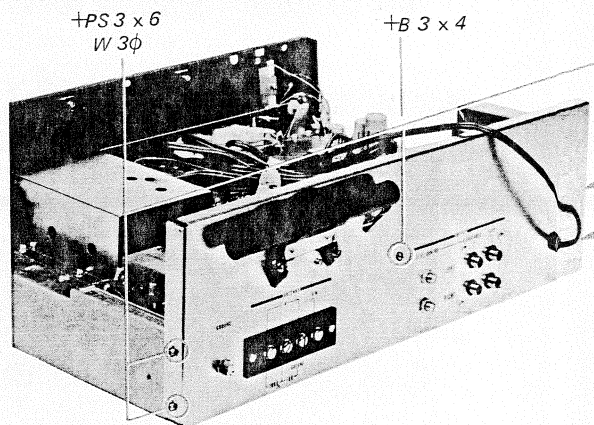


Fig. 2-5 Rear panel removal

2-7. PILOT LAMP REPLACEMENT

Preparation:

Remove the front panel as described in Procedure 2-4.

Dial Lamp

1. Remove the screw (+PS 3 X 6) securing the dial lamp socket to the front subchassis. See Fig. 2-7.
2. Pull the defective lamp from the socket with tweezers or long-nose pliers.
3. Install a new lamp.

Meter Lamp

1. Straighten the tab of the meter-lamp holder to permit the removal of the meter-lamp socket; then pull out the meter-lamp socket.
2. Unscrew the lamp from the socket and install a new one.

STEREO Lampe

1. Pull the lamp from its holder with tweezers.
2. Cut the lamp leads in the middle and solder the lead wires to a new lamp as shown in Fig. 2-8.
3. Wrap the soldered connections with electrical tape.
4. Install the new lamp in its holder.

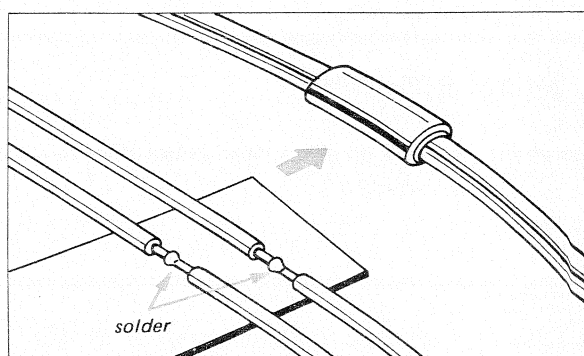


Fig. 2-8 Stereo lamp replacement

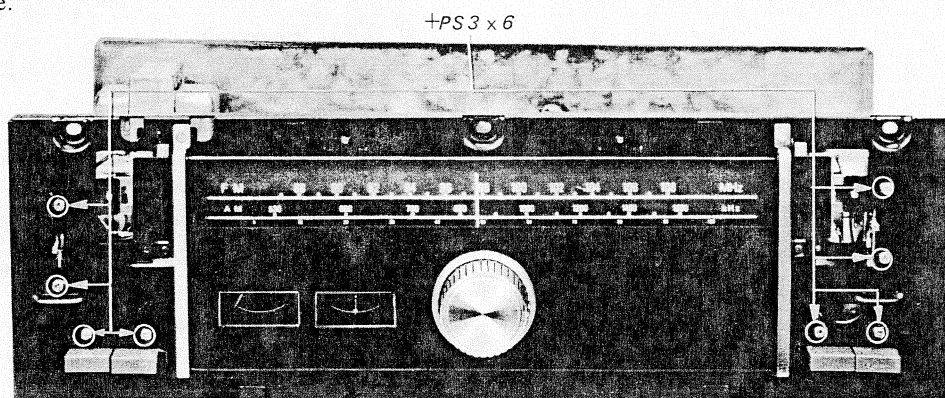


Fig. 2-6 Switch replacement

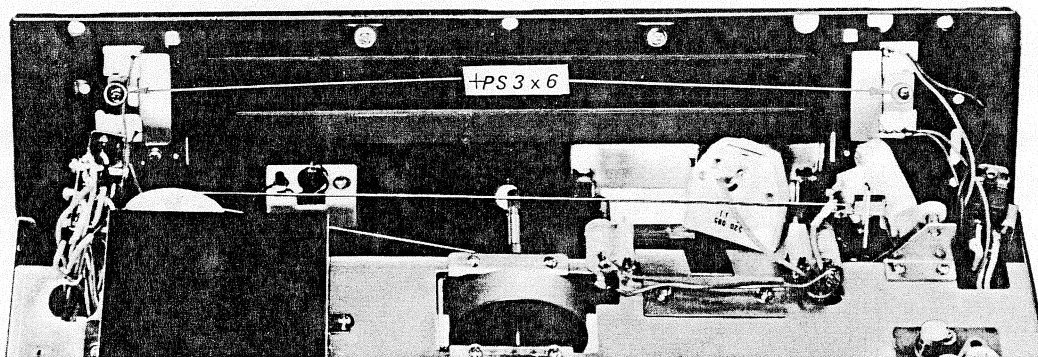


Fig. 2-7 Dial lamp removal

2-8. FRONT SUBCHASSIS

The front subchassis is a vertical member to which the dial glass, tuning meter, pilot lamps, and switches are attached.

1. Remove the front panel. POWER switch, FM-AM switch, and dial-lamp sockets as described in Procedures 2-4, 2-6 and 2-7.
2. Remove the two screws (+PS 3 X 6) at each side of the subchassis as shown in Fig. 2-9.
3. Unhook the dial pointer from the subchassis. Now the front subchassis can be tilted forward and down. See Fig. 2-10.

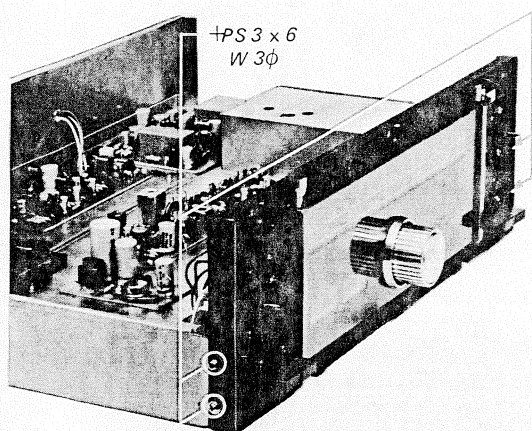


Fig. 2-9 Front subchassis removal (1)

2-9. METER REPLACEMENT

1. Remove the front subchassis as described in Procedure 2-8.
2. Unsolder the leads from the defective meter.
3. Gently pry out the meter with a screw driver.
4. Apply double-coated tape to the new meter, and then install the replacement meter.

2-10. DIAL SCALE REPLACEMENT

1. Remove the front subchassis as described in Procedure 2-8.
2. Remove the four screws (+PS 3 X 6) behind the front subchassis. See Fig. 2-11.

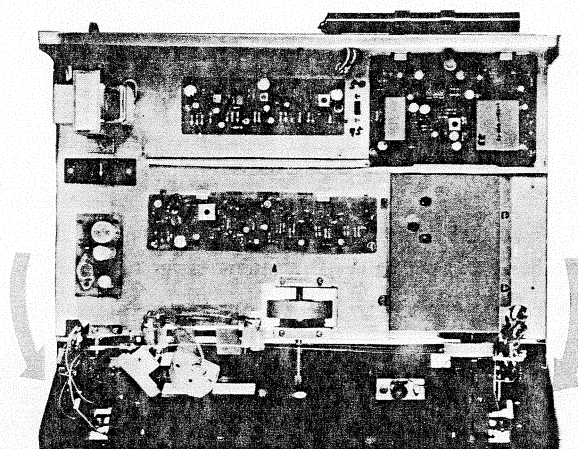


Fig. 2-10 Front subchassis removal (2)

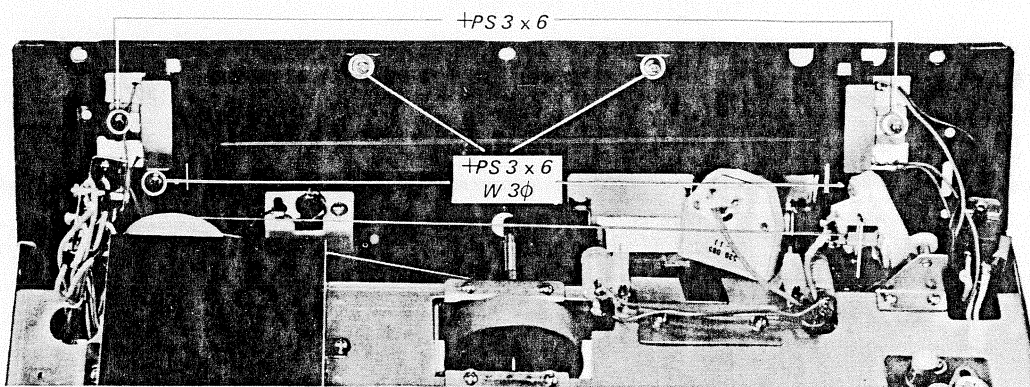


Fig. 2-11 Dial scale removal (1)

3. Now the dial scale can be removed with the back plate as shown in Fig. 2-12.
4. Remove the two screws (+P 2.6 X 4) securing the dial-scale holder to the back plate. See Fig. 2-12.
5. Remove the defective scale and then install a new one.

2-11. FRONT GLASS REPLACEMENT

1. Remove the front panel as described in Procedure 2-4.
2. Pull off the tuning knob, then remove the ornamental ring by loosening the two screws (+P 2.6 X 4). See Fig. 2-13.
3. Remove the two screws (+K 2.6 X 4) securing the front-glass holder to the subchassis. See Fig. 2-13.
4. Remove the front glass and then install the new one.

2-12. DIAL CORD STRINGING

Two dial cords are employed in the dial drive mechanism. One drives the tuning capacitor, and the other drives the dial pointer.

Tuning-Capacitor Drive-Cord Stringing

Preparation:

1. Remove the front subchassis as described in Procedure 2-8.
2. Remove the washer from the tuning capacitor shaft by loosening the screw (+P 2.6 X 4) as shown in Fig. 2-14.

Procedure

1. Rotate the tuning-capacitor drive drum fully clockwise.

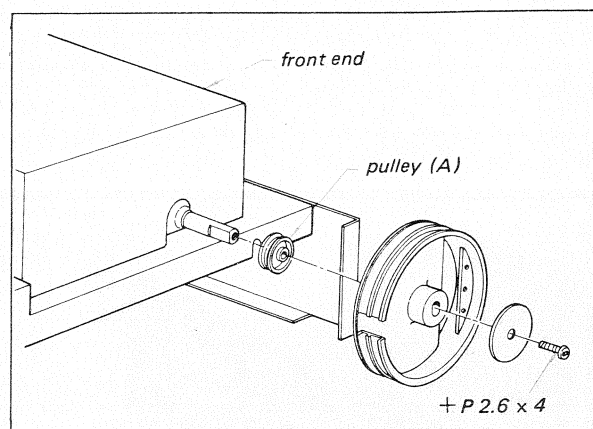


Fig. 2-14 Tuning-capacitor drive drum installation

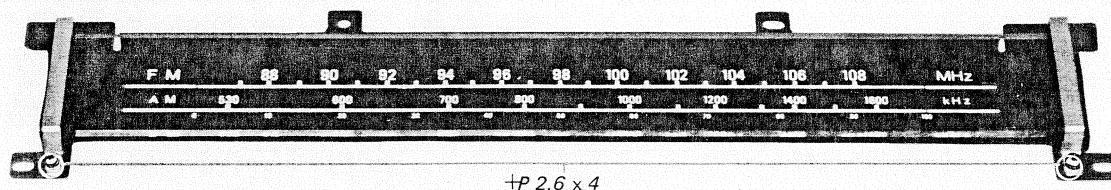


Fig. 2-12 Dial scale removal (2)

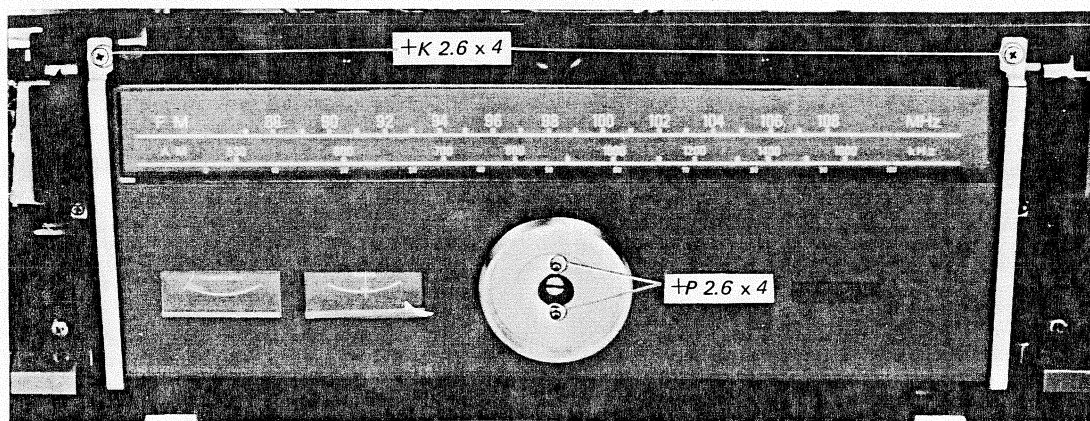


Fig. 2-13 Front glass replacement

2. Tie one end of the replacement dial cord (0.5 mm or 1/32" diameter) to a coil spring, and then hook the spring to one hole of the drive drum as shown in Fig. 2-15.
3. Follow the stringing diagram as shown in Fig. 2-16. Note that the dial cord should run through the inner groove of the drive drum.
4. At the finish, tighten the cord, then squeeze the eyelet so that the spring is under tension. See Fig. 2-17. Make a knot in the cord end to keep it from slipping out of the eyelet.

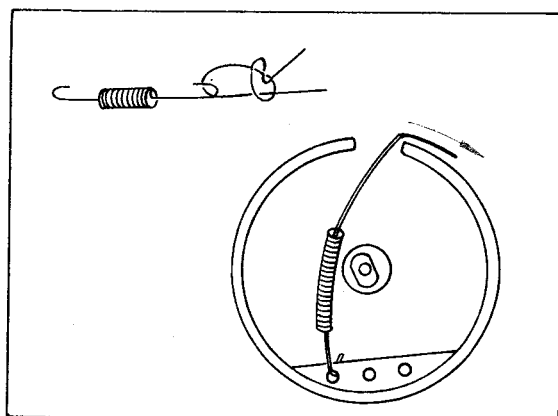


Fig. 2-15 Starting point detail

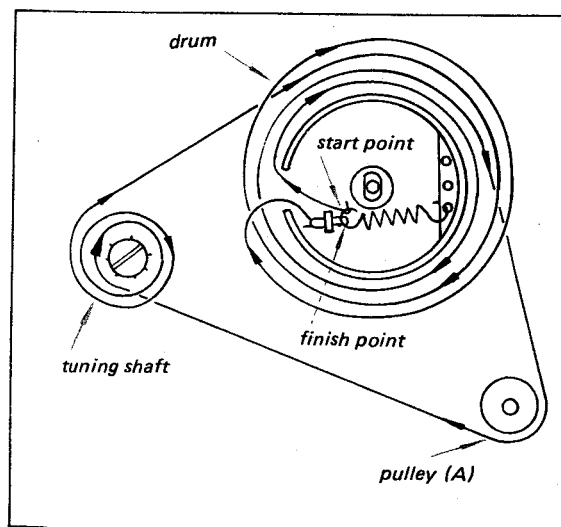


Fig. 2-16 Tuning-capacitor drive cord stringing

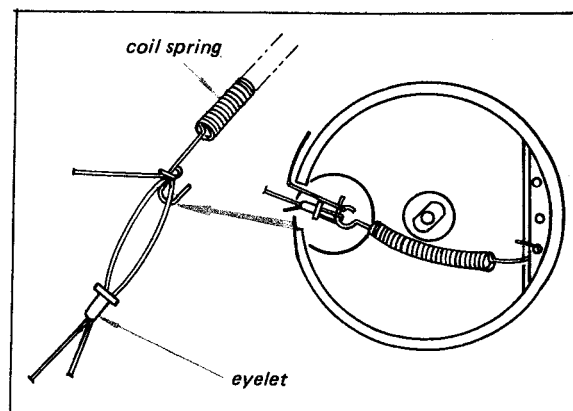


Fig. 2-17 Finish point detail

Dial-Pointer Driver-Cord Stringing

Preparation

1. Remove the front subchassis as described in Procedure 2-8.
2. Remove the washer from the tuning capacitor shaft by loosening the screw (+P 2.6 X 4) as shown in Fig. 2-14.

Procedure

1. Rotate the tuning-capacitor drive drum fully clockwise.
2. Tie one end of the replacement dial cord (0.5 mm or 1/32" diameter) to a coil spring, and then hook the spring to one hole of the drive drum as shown in Fig. 2-19.
3. Follow the stringing diagram as shown in Fig. 2-19.
Note that the cord should run through the outer groove of the drive drum.
4. At the finish, tighten the cord, then squeeze the eyelet so that the spring is under tension. See Fig. 2-17. Make a knot in the cord end to keep it from slipping out of the eyelet.
5. Put the dial pointer on the cord as shown in Fig. 2-18.
6. After completing the dial-cord stringing, make sure the tuning system works properly.

7. Reassemble the front subchassis, and then follow the mechanical dial calibration.

2-13. MECHANICAL DIAL CALIBRATION

Note: This is required after replacing the dial scale, dial drum, or tuning capacitor.

1. Put the dial pointer on the cord as shown in Fig. 2-18 and move it to a position indicating "0" reading on the dial scale when the tuning capacitor is set to maximum capacitance.

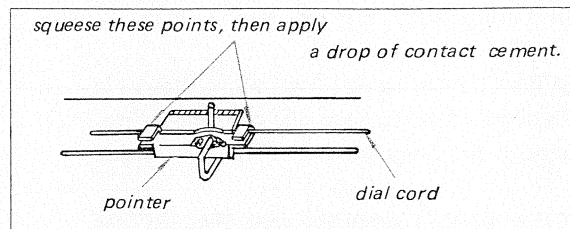
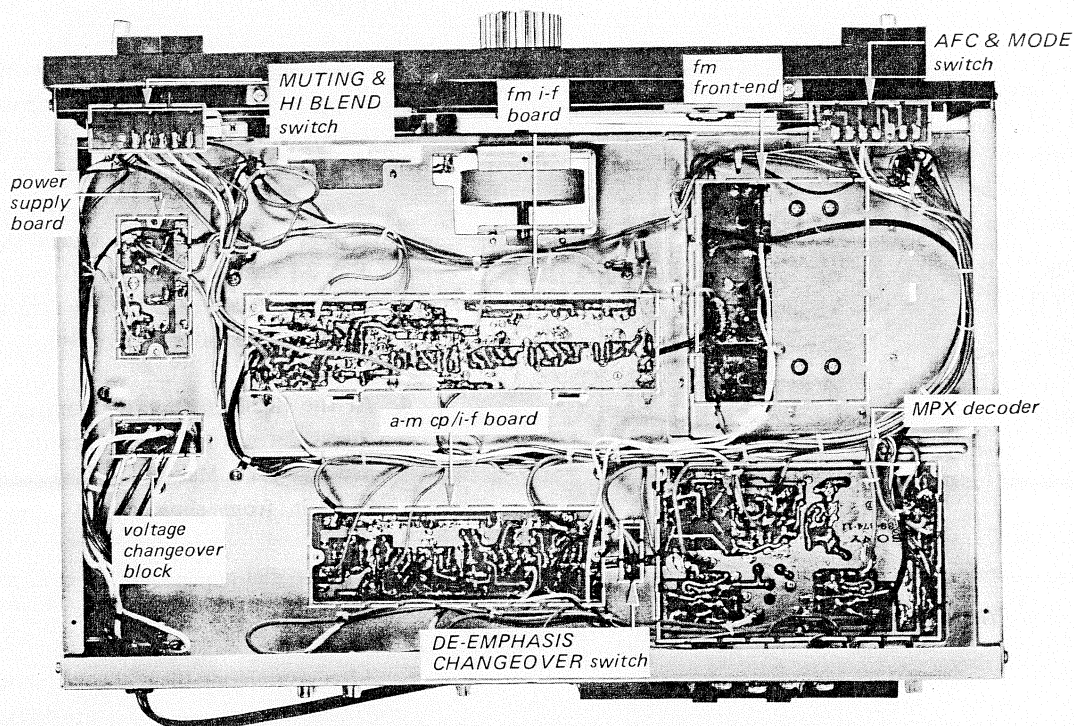


Fig. 2-18 Pointer installation



Fig. 2-19 Dial pointer driver cord stringing

2-14. CHASSIS LAYOUT



SECTION 3

ALIGNMENT AND ADJUSTMENT PROCEDURES

3-1. FM I-F STRIP 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		
Part No.	Color	Specified Center Freq.
1-403-562-11	red	10.70 MHz
1-403-562-21	black	10.66 MHz
1-403-562-31	white	10.74 MHz
1-403-562-41	green	10.62 MHz
1-403-562-51	yellow	10.78 MHz

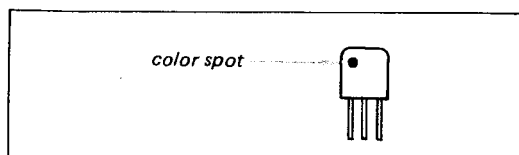


Fig. 3-1 Fm i-f ceramic filter

Test Equipment Required

1. Standard fm signal generator
2. Ac VTVM
3. Alignment tools

Note: Fm i-f strip alignment should be performed only after replacing IFT101 in the front end.

Preparation

1. Remove the top cover as described in Procedure 2-3.
2. Connect the input cable of the ac VTVM to the FIX terminal (J707).
3. Connect the signal-generator's output to the fm antenna terminal.

Procedure

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

Carrier frequency 98 MHz
 Modulation Fm, 400 Hz, 100%
 Output level 30 μ V (30 dB)

2. Set the receiver's controls as follows:

FUNCTION switch FM
 MODE switch MONO
 AFC switch OFF

3. Turn the core of transformer IFT101 (See Fig. 3-5) with the alignment tool to obtain maximum output.

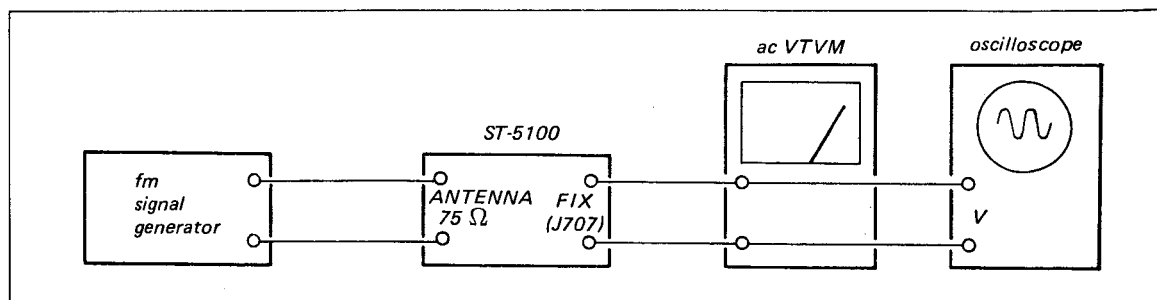


Fig. 3-2 I-f, muting and front-end alignment setup

3-2. FM DISCRIMINATOR ALIGNMENT

Note: There are two or three methods of discriminator alignment, but only the simplified method using the tuner's TUNING meter is described here.

Test Equipment Required

1. Oscilloscope
2. Alignment tools

Preparation

1. Remove the top cover as described in Procedure 2-3.
2. Connect the input cable of the oscilloscope to J707 (FIX jack).

Procedure

1. With the equipment connected as shown in Fig. 3-3, set the tuner's control as follows:

FM-AM switch FM
MODE switch MONO
AFC switch OFF

No signal should be received.

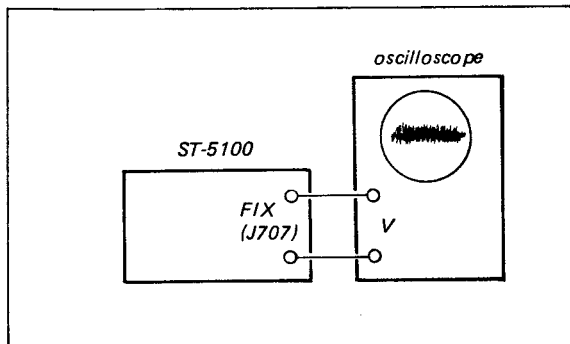


Fig. 3-3 Discriminator alignment test setup

2. Adjust the controls of the oscilloscope to provide a visible indication of noise. Always watch the oscilloscope to confirm that the tuner is not receiving any off-the-air signal.
3. Turn the top core (secondary side) of discriminator transformer T201 (see Fig. 3-4) with a hex-head alignment tool to obtain a null-point reading on the tuning meter.

If the discriminator transformer (T201) is not aligned correctly, some deviation on the tuning meter will be observed.

Note: Turn the core carefully and slowly. At both extreme positions of the top core, a null point will be observed. The real null point should be obtained in the middle of the core thread length.

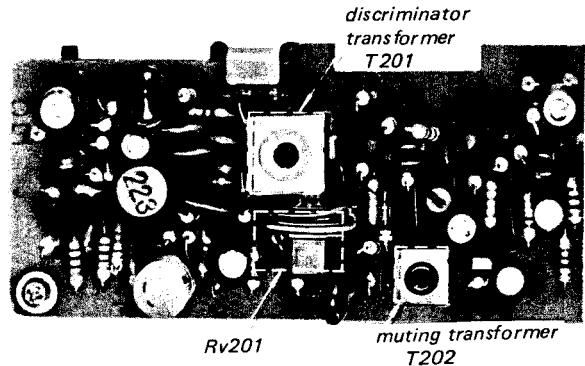


Fig. 3-4 Parts location

3-3. MUTING ADJUSTMENT

Note: Two methods of muting alignment are available, signal generator alignment and alignment by using an off-the-air signal. You can use either of them.

Signal Generator Alignment

Test Equipment Required

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

Preparation

1. Remove the top cover as described in Procedure 2-3.
2. Turn the knob of Rv201 (see Fig. 3-4) fully clockwise on the fm i-f and discriminator board.

Procedure

1. With the equipment connected as shown in Fig. 3-2, set the tuner's controls as follows:

FM-AM switch FM
 MODE switch MONO
 AFC switch OFF
 MUTING switch ON

- Follow the procedure given in Table 3-2. Note that the muting circuit should begin to operate at the symmetrical deflection point on the TUNING meter when detuning the tuner to higher or lower than the reference carrier frequency.

Off-the-Air Signal Alignment

Accurate muting circuit adjustment can also be performed by utilizing off-the-air local fm signals instead of the fm S. S. G.

Note that a weak signal is best for this purpose.

3-4. FM FRONT-END ALIGNMENT (Frequency coverage)

Never attempt alignment of the front-end section except for the frequency-coverage and dial-calibration adjustments. The front-end section of the tuner has been carefully adjusted at the factory, so very little adjustment is necessary in the field.

Alignment need not be performed when the front-end FET is replaced since changes in FET parameters have little effect upon tuning. If an rf-stage adjustment is required, ask your nearest SONY Service Station to send your unit to the Factory Service Center for a complete front-end alignment. Exercise caution when returning the faulty unit so that it is not damaged in transit. The warranty will not cover damage incurrent in transit to the Factory Service Center.

Note: Before starting this alignment, the discriminator transformer alignment should be performed.

Signal Generator Alignment

Test Equipment Required

- Standard fm signal generator
- Ac VTVM or oscilloscope
- Alignment tools

Preparation

- Remove the top cover as described in Procedure 2-3.
- Connect the equipment as shown in Fig. 3-2.
- Set the tuner's controls as follows:

FM-AM switch FM
 MODE switch MONO
 AFC switch OFF

Procedure

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

TABLE 3-2. MUTING ADJUSTMENT

Coupling Between Front End and S.S.G.	SSG Frequency and Output Level	Tuner Dial Indication	Scope Connection	Adjust	Remarks
Direct	98 MHz 400 Hz. 30% Mod 30 μ V (30 dB)	98 MHz	J707	T202	Turn the core of T202 (See Fig. 3-4) to obtain proper muting operation.

TABLE 3-3. FM FREQUENCY COVERAGE ADJUSTMENT

Step	Coupling Between Front End and S.S.G.	SSG Frequency and Output Level	Tuner dial	Scope Connection	Adjust	Indication
1.	Direct to 75 Ω input terminal	87 MHz 400 Hz 100 % Mod. 30 μ V (30 dB)	87 MHz	FIX (J707)	OSC coil (L104) See Fig. 3-5	Maximum
2.	Same as above	108 MHz 400 Hz 100 % Mod. 30 μ V (30 dB)	108 MHz	Same as above	OSC trimmer (CT104) See Fig. 3-5	Same as above

Off-the-Air Alignment

Accurate dial calibration and a frequency-coverage test can also be performed by utilizing off-the-air local fm signals. However, before performing the following procedure, be sure that the dial scale is correctly positioned, as described in Procedure 2-13.

Procedure

1. Tune the receiver to the lowest-frequency station.
2. Check the dial scale for a calibration accuracy of ± 200 kHz from the carrier frequency of the station. If the dial-accuracy deviation exceeds this limit, turn local-oscillator coil L104 slightly as shown in Fig. 3-5 until optimum dial calibration is obtained.

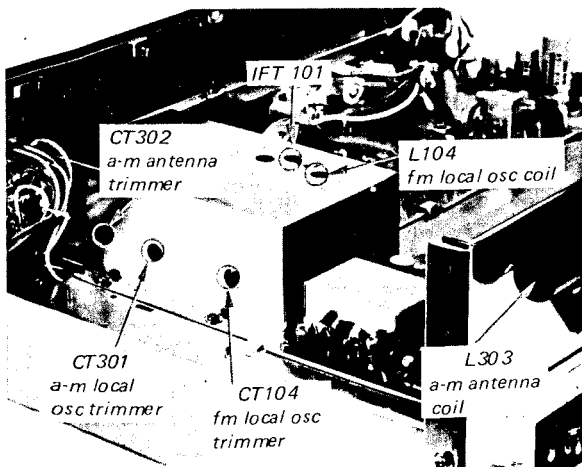


Fig. 3-5 Parts location

3. Tune the receiver to the highest-frequency station in your locality. If the dial-calibration error is excessive, adjust local-oscillator trimmer CT104 to obtain maximum calibration accuracy. See Fig. 3-5.

3-5. FM STEREO SEPARATION ADJUSTMENT

Test Equipment Required

1. MPX stereo signal generator
2. Audio oscillator
3. Oscilloscope and VTVM
4. Alignment tool

Preparation

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

- (1) With the equipment connected as shown in Fig. 3-6, set the MPX and audio signal-generator's 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's 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. 3-7.

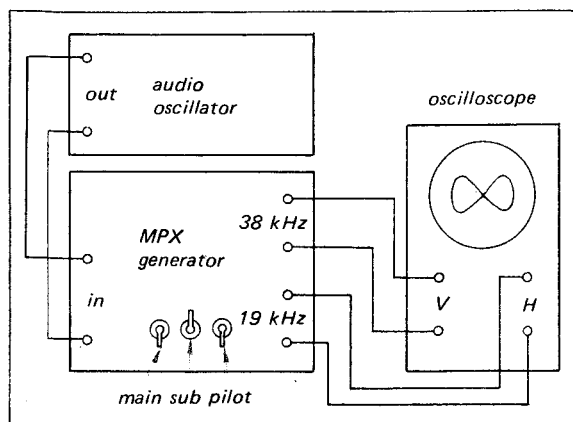


Fig. 3-6 MPX generator preadjustment setup

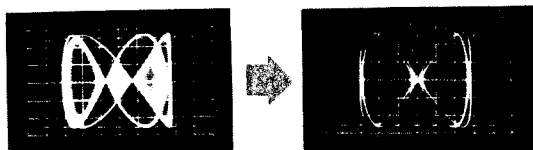


Fig. 3-7 Lissajous pattern

Procedure

1. Connect the equipment as shown in Fig. 3-8. Set the fm signal-generator's controls as follows:

Carrier frequency 98 MHz
Output level 30 μ V (30 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 above-mentioned modulation levels can be set as follows:

- (a) With the equipment connected as shown in Fig. 3-8, set the MPX stereo generator controls as follows:

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

- (b) Adjust the 19-kHz signal level to obtain a 7.5-kHz deviation on the FM SSG modulation indicator.

- (c) Reset the MPX stereo-generator's controls as follows:

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

- (d) Adjust the audio-generator output (400 Hz) to obtain a 33.75-kHz deviation on the FM SSG modulation indicator.

- (e) Set all controls to ON.

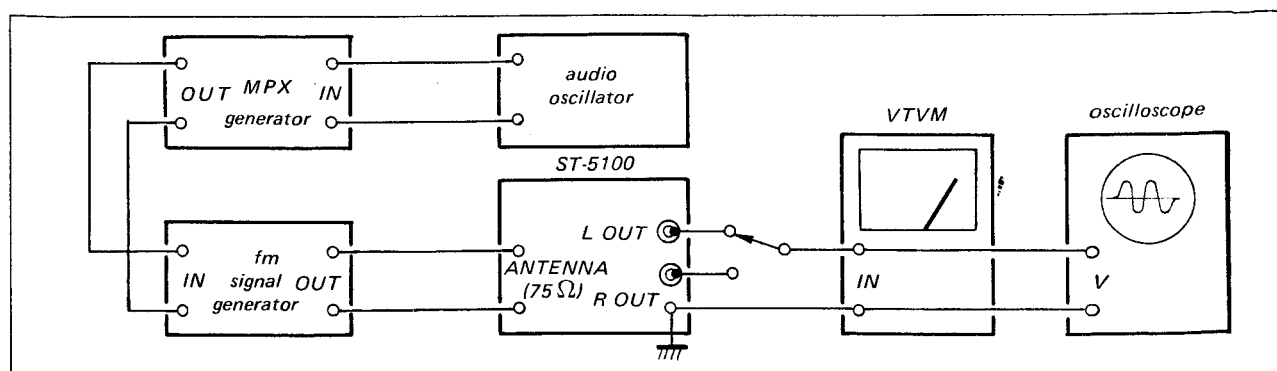


Fig. 3-8 Fm stereo separation adjustment test setup

2. Precisely tune the set to the SSG's carrier frequency, then turn the top core of switching transformer T104, to obtain maximum output at the left channel. See Fig. 3-9. Note that this adjustment has a close relationship with stereo distortion.
3. Record the output level of the left channel when the MPX generator input selector is set to the left channel.
4. Switch the input selector to the right channel and read the residual signal level in the left channel.
5. The output-level to residual-level ratio represents the separation. Adjust separation control Rv501 (see Fig. 3-9) for minimum residual level. Check the right channel for separation. Usually, about an 8 to 9 dB difference in channel separation exists. Readjust Rv501 for minimum difference between left and right-channel separation. While doing this, remember that the output level also changes according to the setting of Rv501.

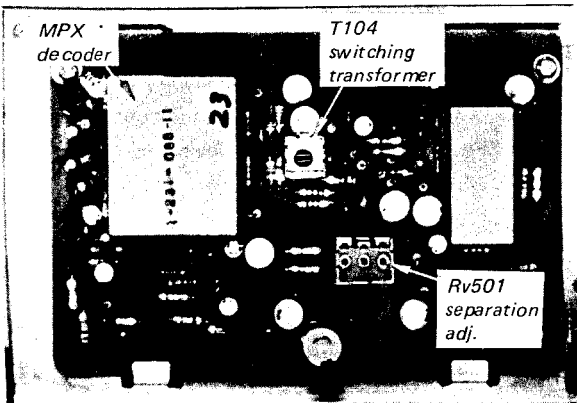


Fig. 3-9 Parts location

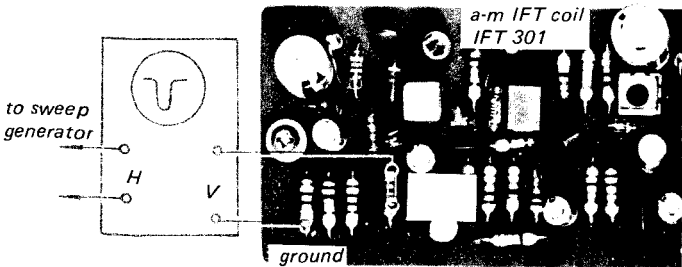


Fig. 3-11 A-m detector output connection

3-6. A-M I-F STRIP ALIGNMENT

Preparation

Remove the top cover and front-end shield cover. Then, set the receiver's FM-AM switch to AM.

Sweep Generator Alignment

Test Equipment Required

1. 455-kHz sweep generator
2. Oscilloscope
3. Alignment tool

Procedure

1. Connect the sweep generator's output across (variable capacitor) Cv301 as shown in Fig. 3-10.

Set the sweep generator's control as follows:

Center frequency 455 kHz

Sweep width 25 kHz

Output as low as possible

2. Connect the input cable of the oscilloscope to R321 and ground on the a-m tuner circuit board with alligator clips as shown in Fig. 3-11.

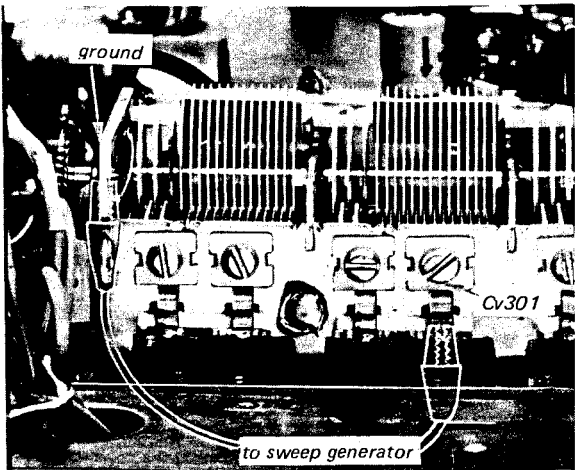


Fig. 3-10 445 kHz sweep signal injection

3. With the equipment connected as shown in Fig. 3-13, adjust the oscilloscope controls and generator output to provide a visible indication.
4. Turn the top core of (IFT301) (see Fig. 3-11) to obtain a maximum and symmetrical response as shown in Fig. 3-12.

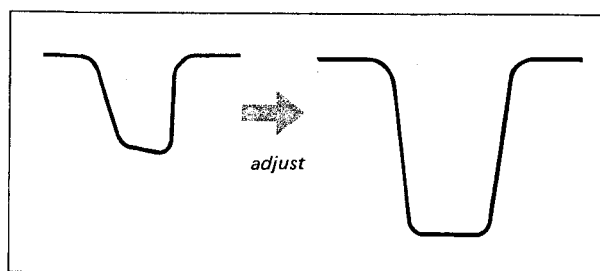


Fig. 3-12 A-m i-f response

Rf Signal Generator Method

Test Equipment Required

1. 455-kHz signal generator
2. Ac VTVM and oscilloscope
3. Alignment tool

Procedure

1. Set the rf signal generator's controls as follows:

Modulation Internal
 Frequency 455 kHz
 OUTPUT level 1000 μ V (60 dB)

2. Connect the rf signal-generator's output across variable capacitor, Cv301 as shown in Fig. 3-10.
3. With the scope VTVM aconnected as shown in Fig. 3-14, turn the top core of IFT301 (see Fig. 3-11) to obtain maximum output.

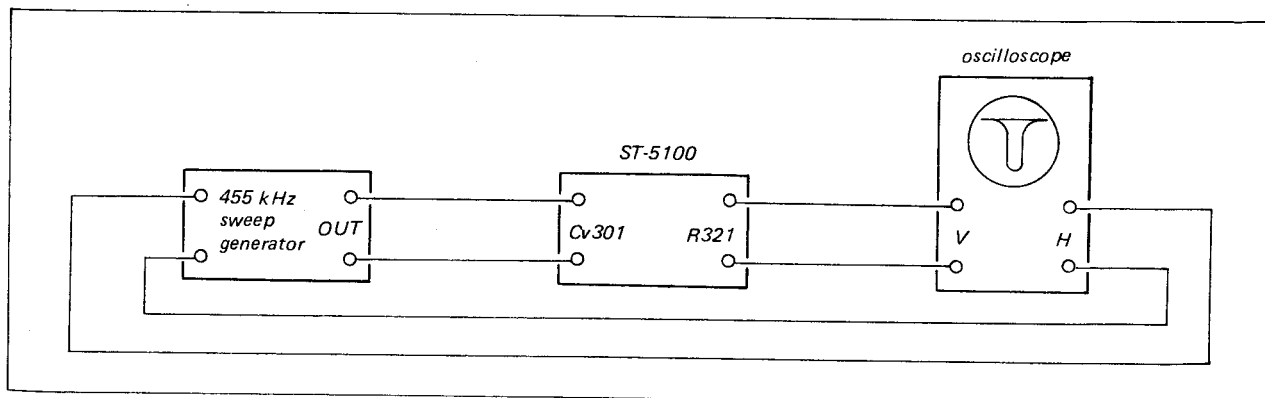


Fig. 3-13 A-m i-f strip alignment by sweep generator

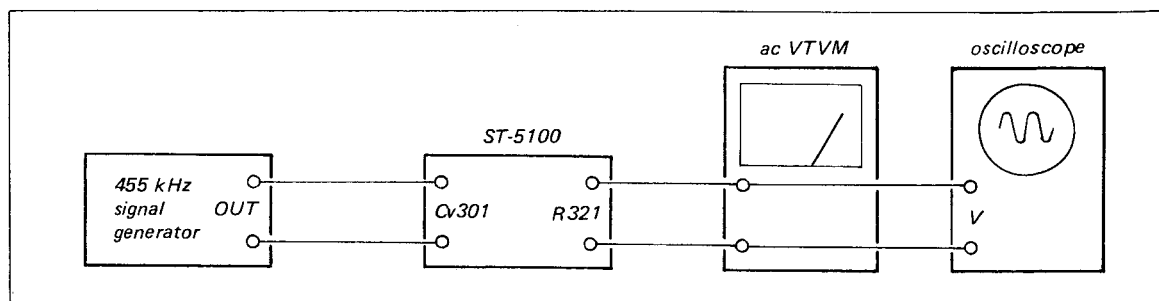


Fig. 3-14 A-m i-f strip alignment by rf generator

3-7. A-M FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

Preparation

Remove the top cover as described in Procedure 2-3. Then, set the tuner's FM-AM switch to AM.

Signal Generator Method

Test Equipment Required

1. A-m signal generator
2. Loop antenna

3. Ac VTVM and oscilloscope

4. Alignment tool

Procedure

With the equipment connected as shown in Fig. 3-15, follow the procedures given in Table 3-4 and 3-5 when performing this alignment with an a-m signal generator.

TABLE 3-4. A-M FREQUENCY COVERAGE ADJUSTMENT

SSG Coupling	SSG Frequency and Output Level	Tuning Capacitor	Scope Connection	Adjust	Indication
Loop antenna	520 kHz 400 Hz 30 % Mod. 3000 μ V (70 dB)	Maximum capacitance position	FIX jack (J707)	OSC coil L304 See Fig. 3-16	Maximum
Loop antenna	1,680 kHz Same as above	Minimum-capacitance position	Same as above	OSC trimmer CT301 See Fig. 3-5	Same as above

TABLE 3-5. A-M TRACKING ADJUSTMENT

SSG Coupling	SSG Frequency and Output Level	Tuning Capacitor	Scope Connection	Adjust	Indication
Loop antenna	620 kHz 400 Hz 30% Mod. Output Level as low as possible	Tune to 620 kHz	FIX (J707)	Position of antenna coil L303 See Fig. 3-5	Maximum
Loop antenna	1,400 kHz same as above	Tune to 1,400 kHz	Same as above	Antenna trimmer CT302 See Fig. 3-5	Same as above

Off-the-Air Signal Method

Accurate dial calibration, and a frequency-coverage and tracking test can also be performed by utilizing off-the-air local a-m signals. However, before performing the following procedure, be sure that the dial scale is correctly positioned, as in Procedure 2-13. Note that a weak signal is best for this purpose.

Frequency Coverage Adjustment

1. Tune the receiver to the lowest-frequency station in your locality.

If the dial calibration error exceeds ± 15 kHz from the station carrier frequency, turn local oscillator coil L304 (shown in Fig. 3-16) slightly until optimum dial calibration is obtained.

2. Tune the receiver to the highest-frequency station in your locality. If the dial calibration error exceeds ± 30 kHz from the station carrier frequency, adjust local-oscillator trimmer-capacitor CT301 (see Fig. 3-5) to obtain maximum calibration accuracy.

Tracking Adjustment

1. Tune the set to the station whose carrier frequency is closest to 620 kHz and adjust the position of antenna coil L303 as shown in Fig. 3-5 to obtain maximum output.
2. Tune the set to the station whose carrier frequency is closest to 1400 kHz and adjust antenna trimmer CT302 to obtain maximum output. See Fig. 3-5.
3. Repeat the above steps two or three times.

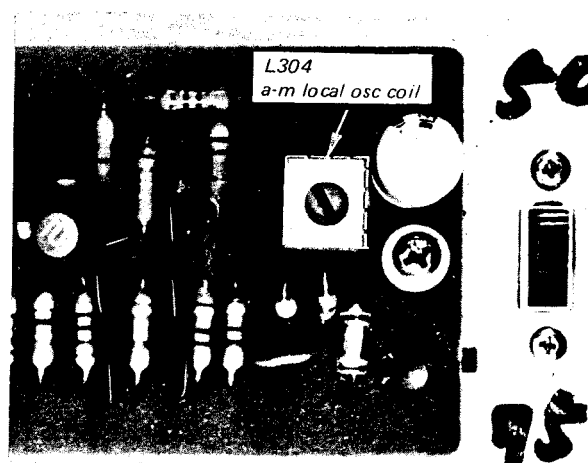


Fig. 3-16 Parts location

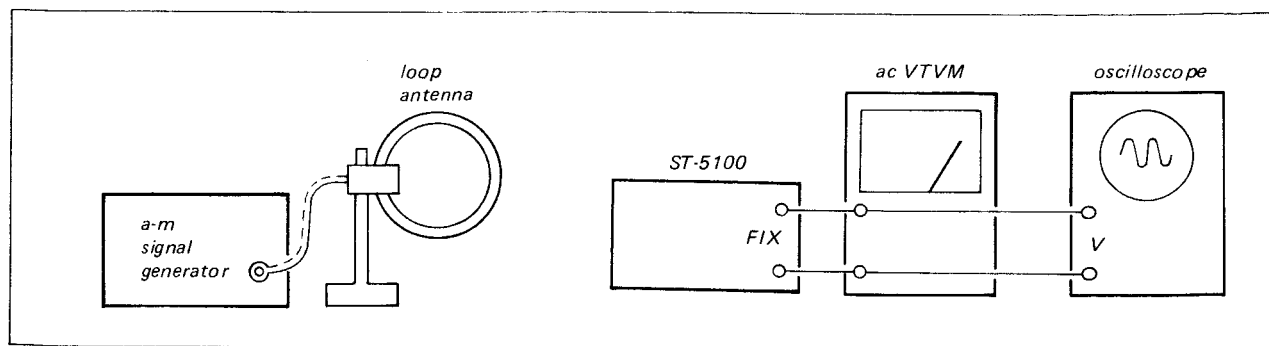


Fig. 3-15 A-m frequency coverage and tracking adjustment test setup

SECTION 4 REPACKING

The ST-5100's original shipping carton and packing material is the ideal container for shipping the unit. However, to secure the maximum protection the

ST-5100 must be repacked in this material precisely as before. The proper repacking procedure is shown in Fig. 4-1.

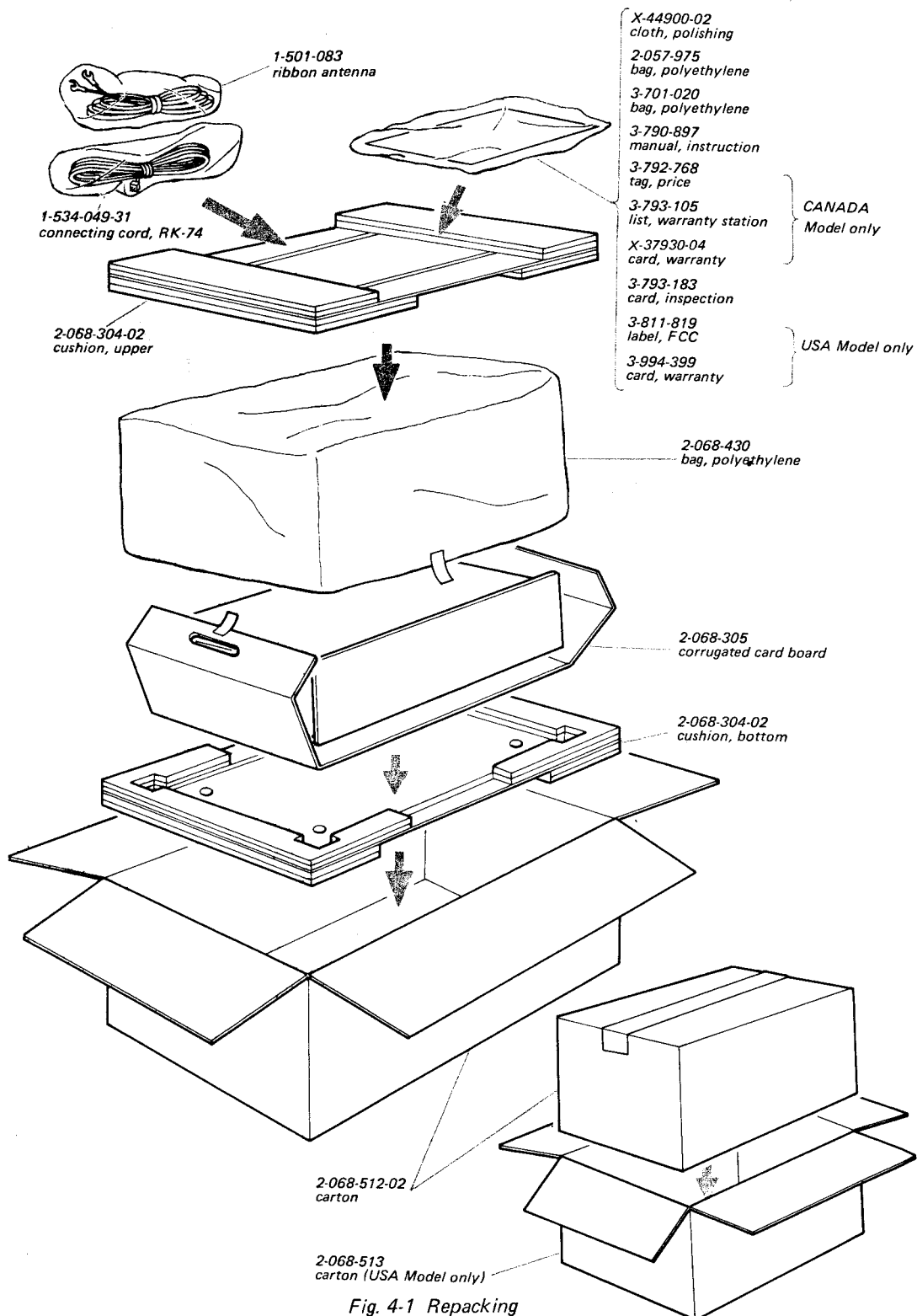
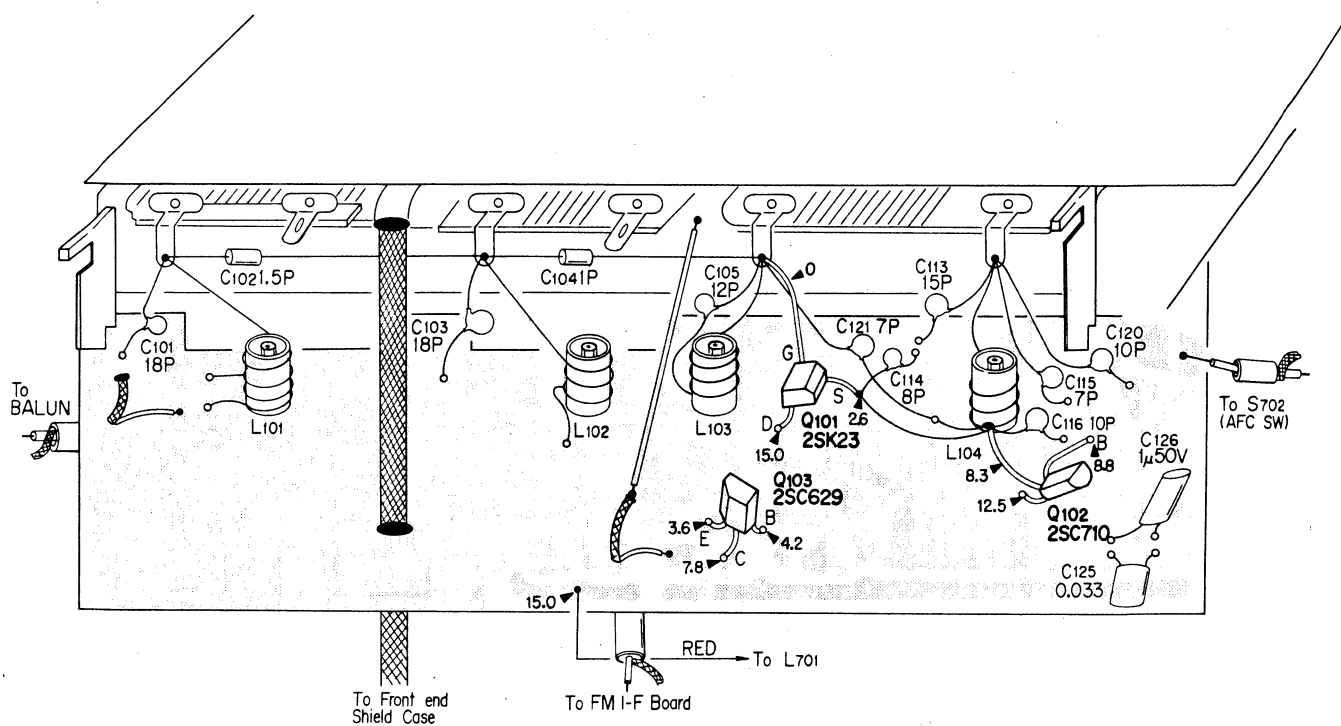


Fig. 4-1 Repacking

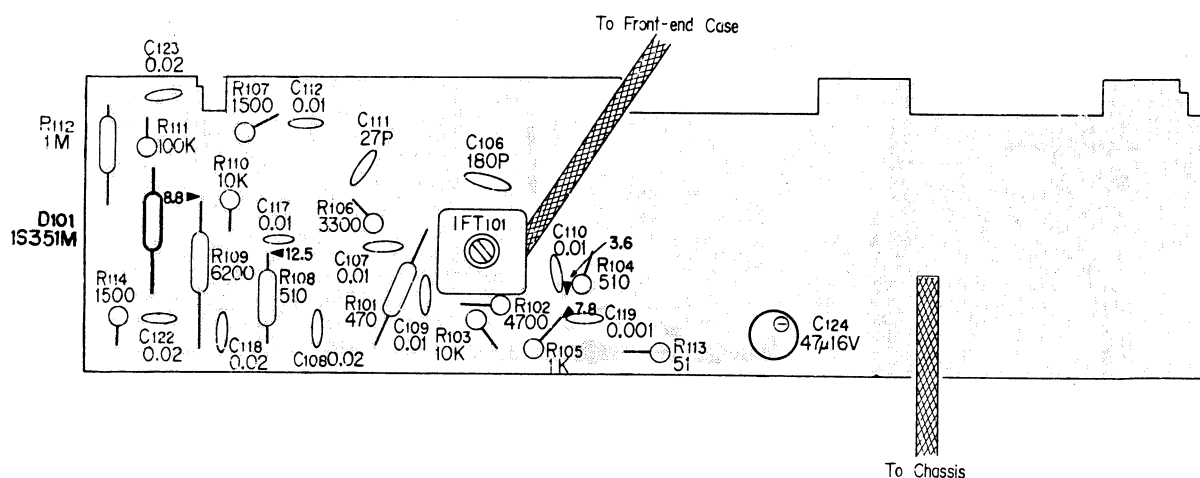
SECTION 5 DIAGRAMS

5-1. MOUNTING DIAGRAM—Fm Front-end Board

Conductor Side—

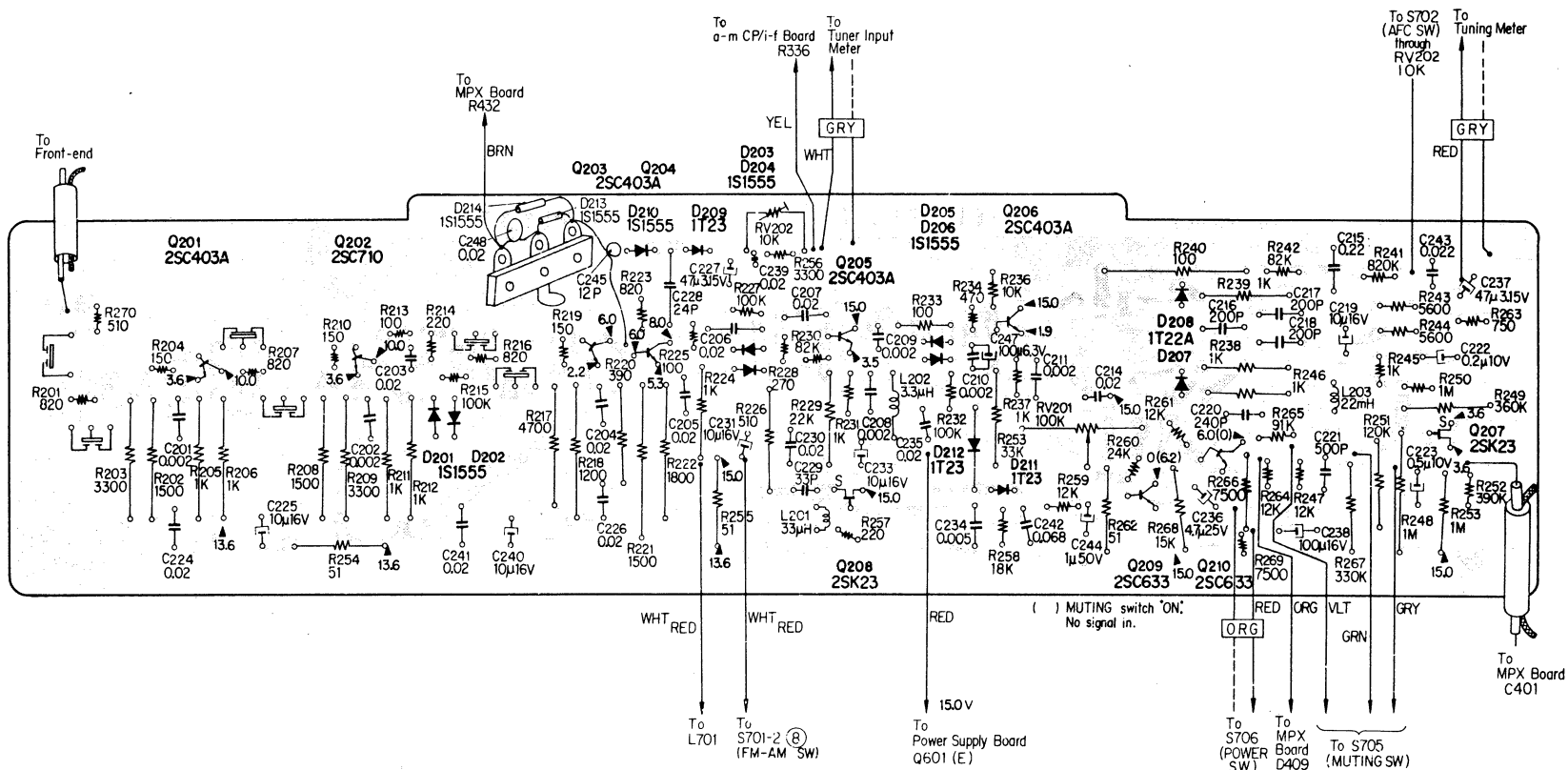


Component Side—

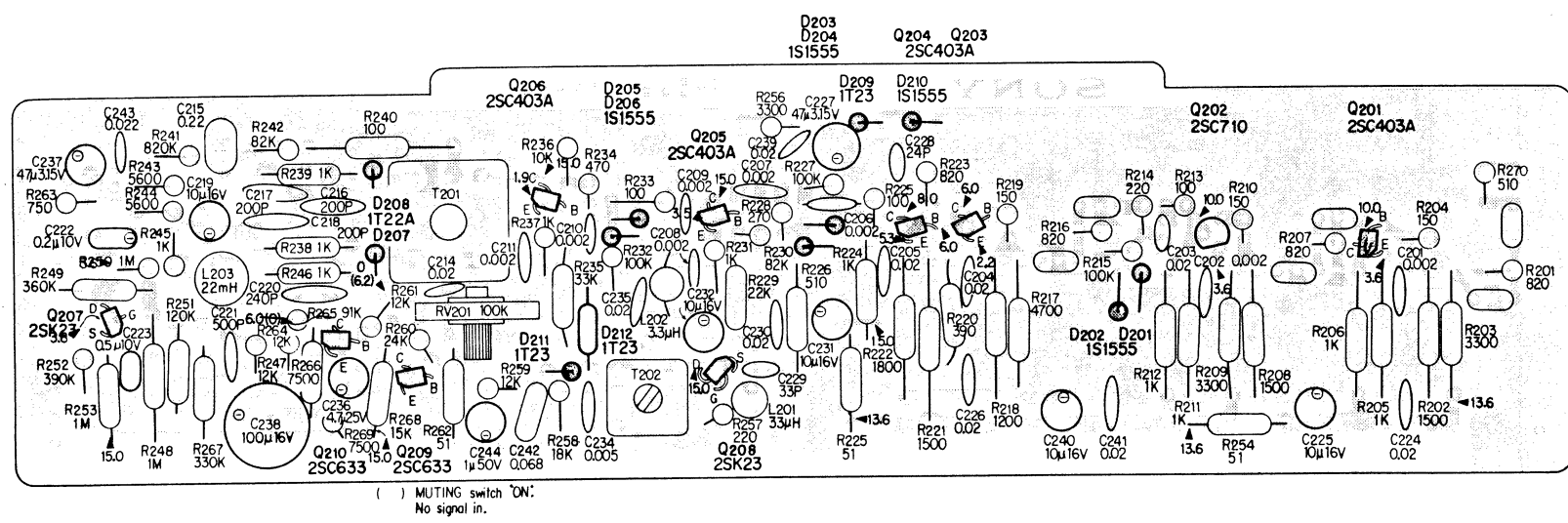


5-2. MOUNTING DIAGRAM-Fm I-f Board

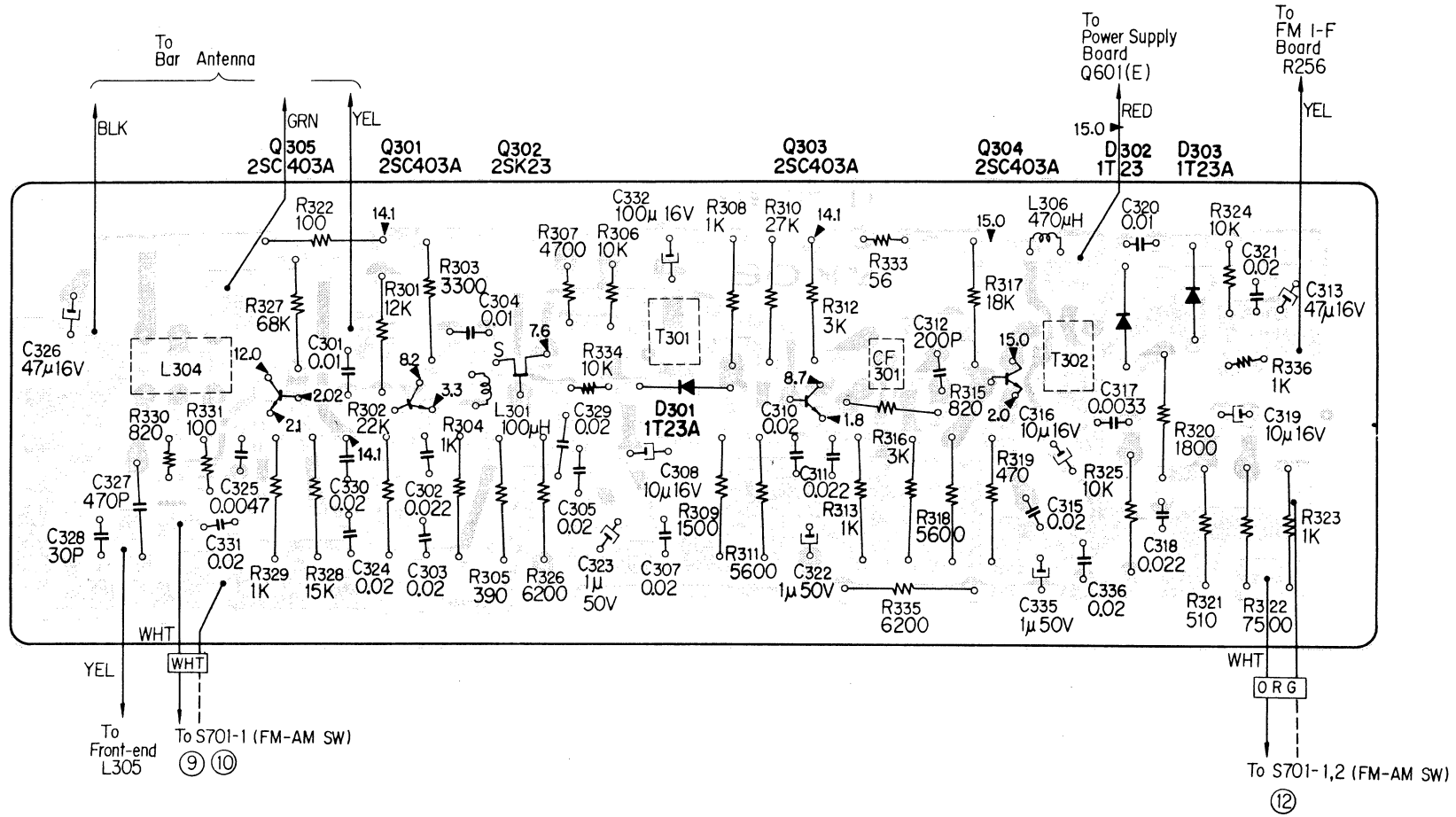
Conductor Side

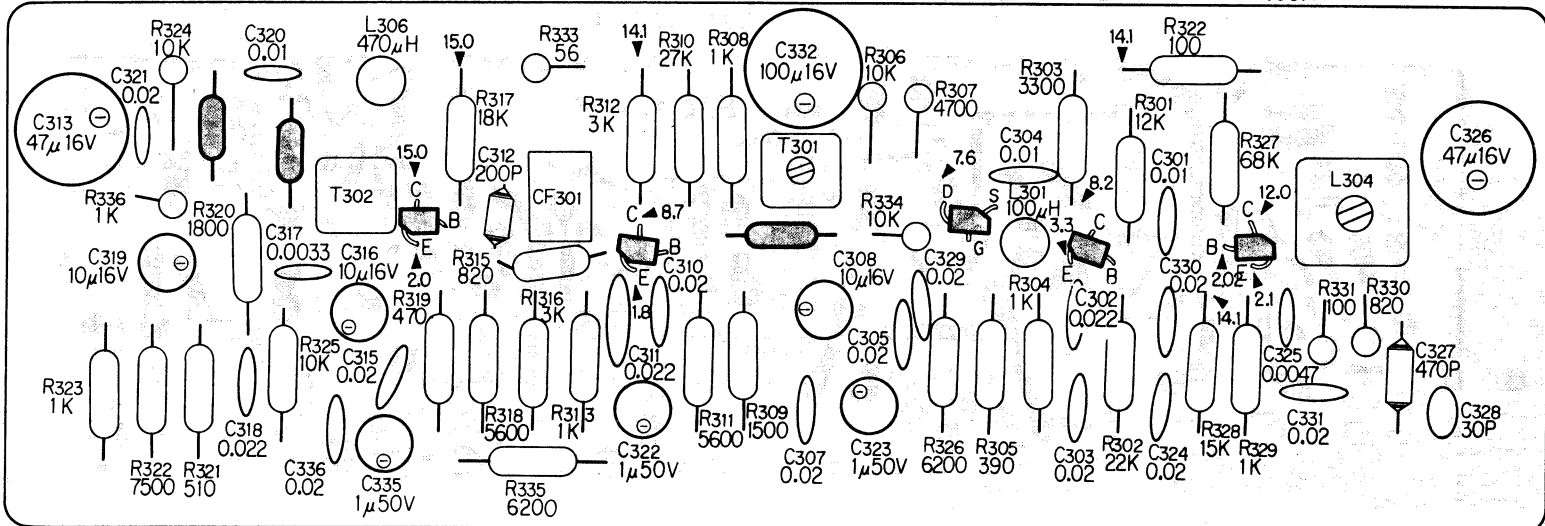


5-2. MOUNTING DIAGRAM-Fm I-f Board
-Component Side-



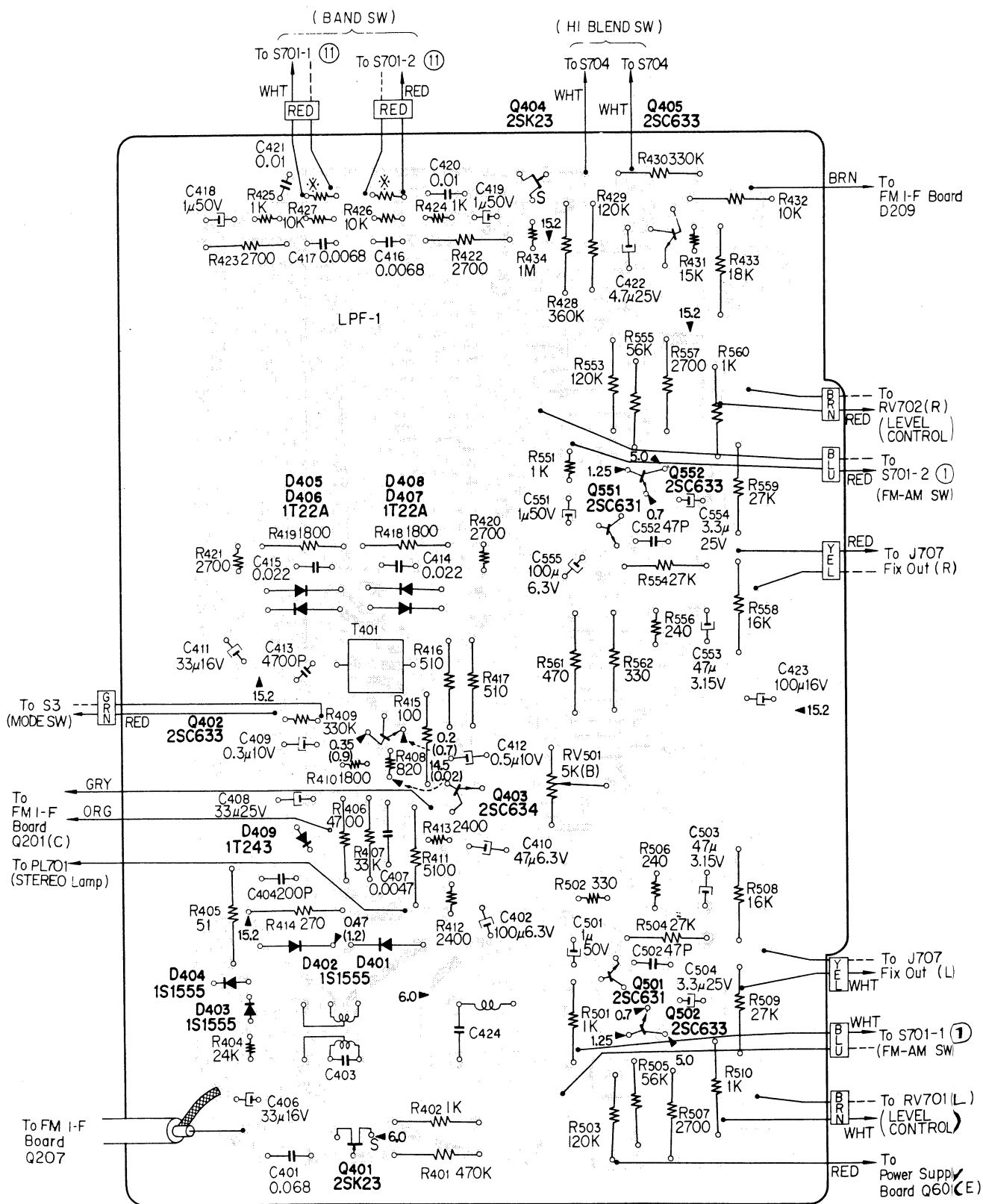
5-3. MOUNTING DIAGRAM—A-m Cp/I-f Board
—Conductor Side—





5-4. MOUNTING DIAGRAM—MPX Decoder Board

---Conductor Side---

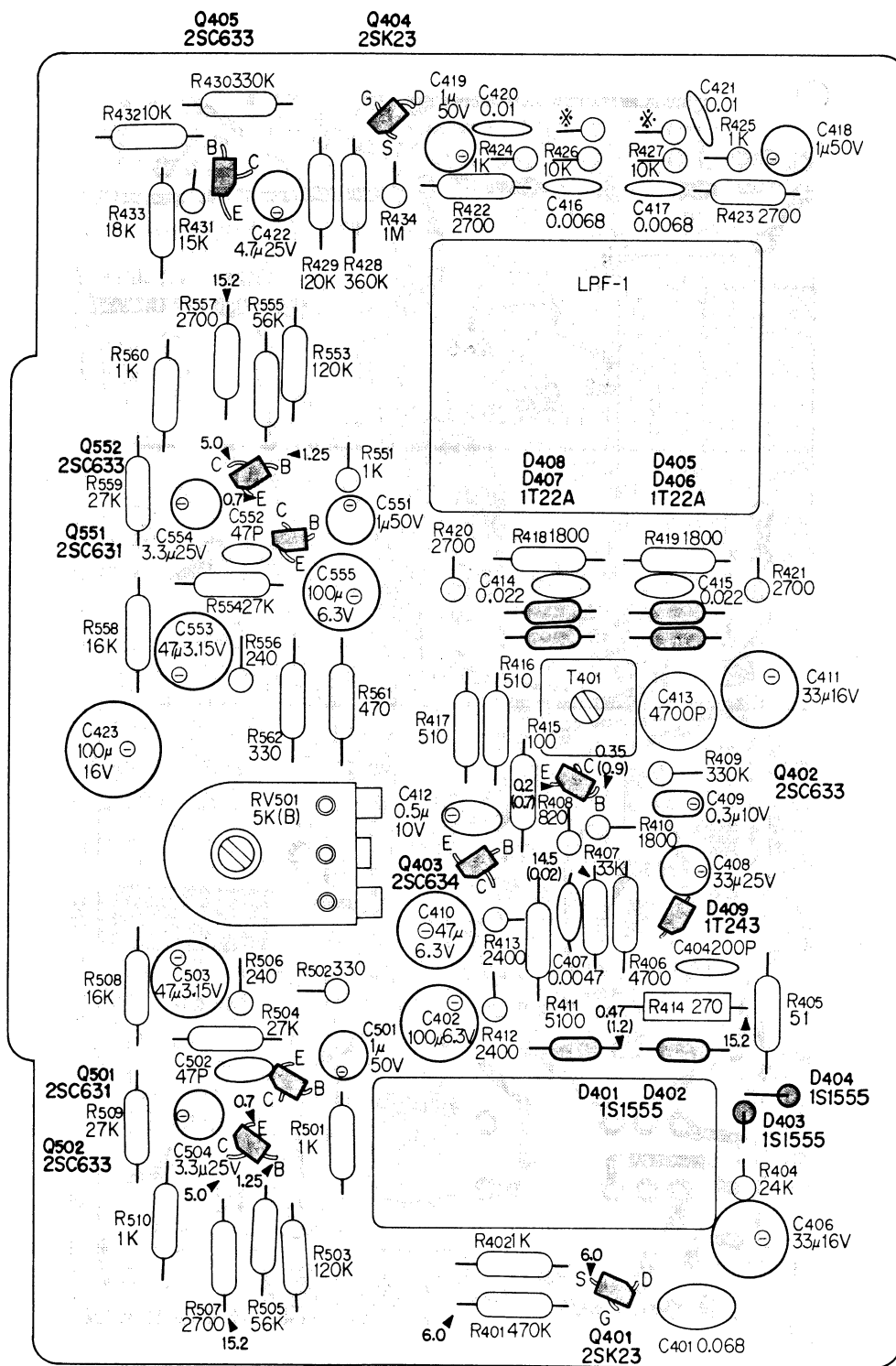


() STEREO OPERATION

✱ Resistors should be selected

5-4. MOUNTING DIAGRAM—MPX Decoder Board

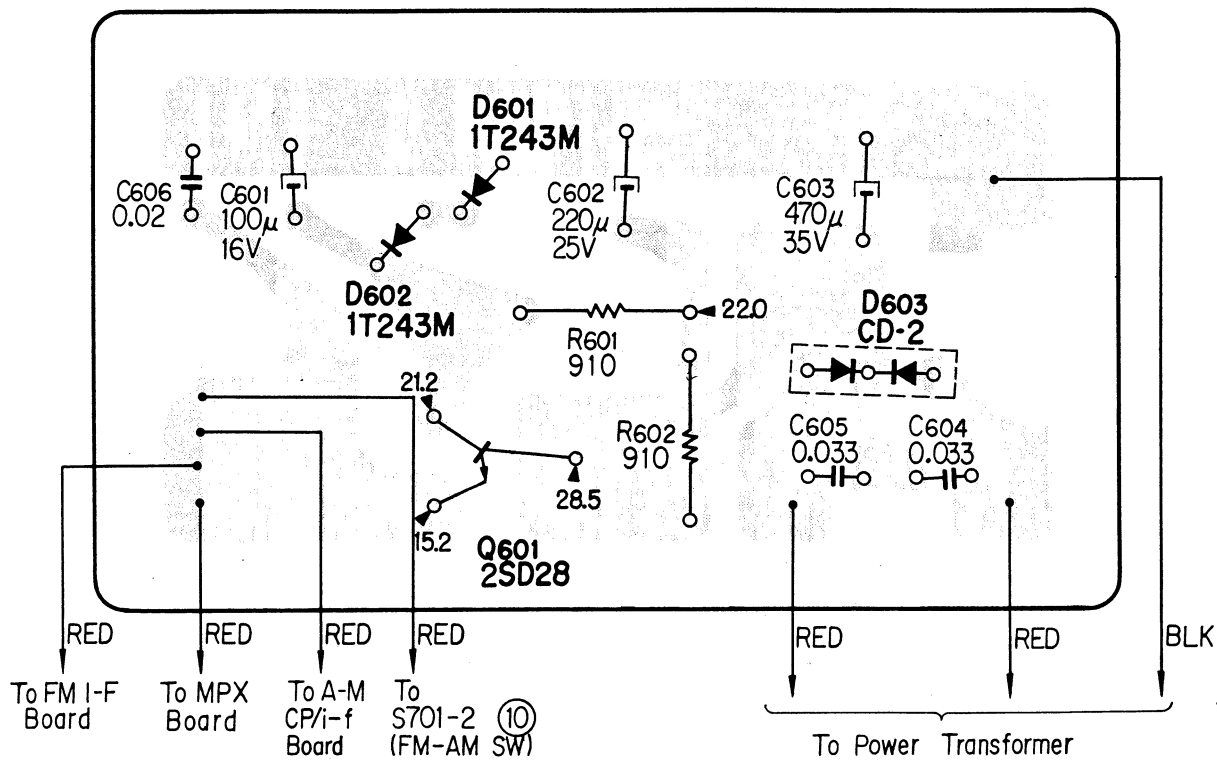
--Component Side--



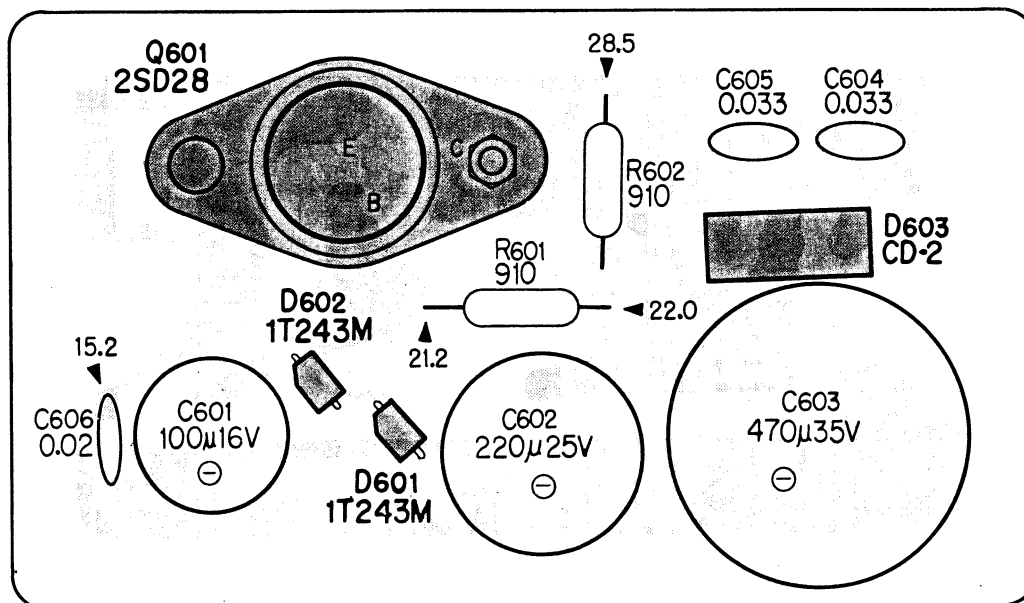
(*) STEREO OPERATION

5-5. MOUNTING DIAGRAM—Power Supply Board

—Conductor Side—

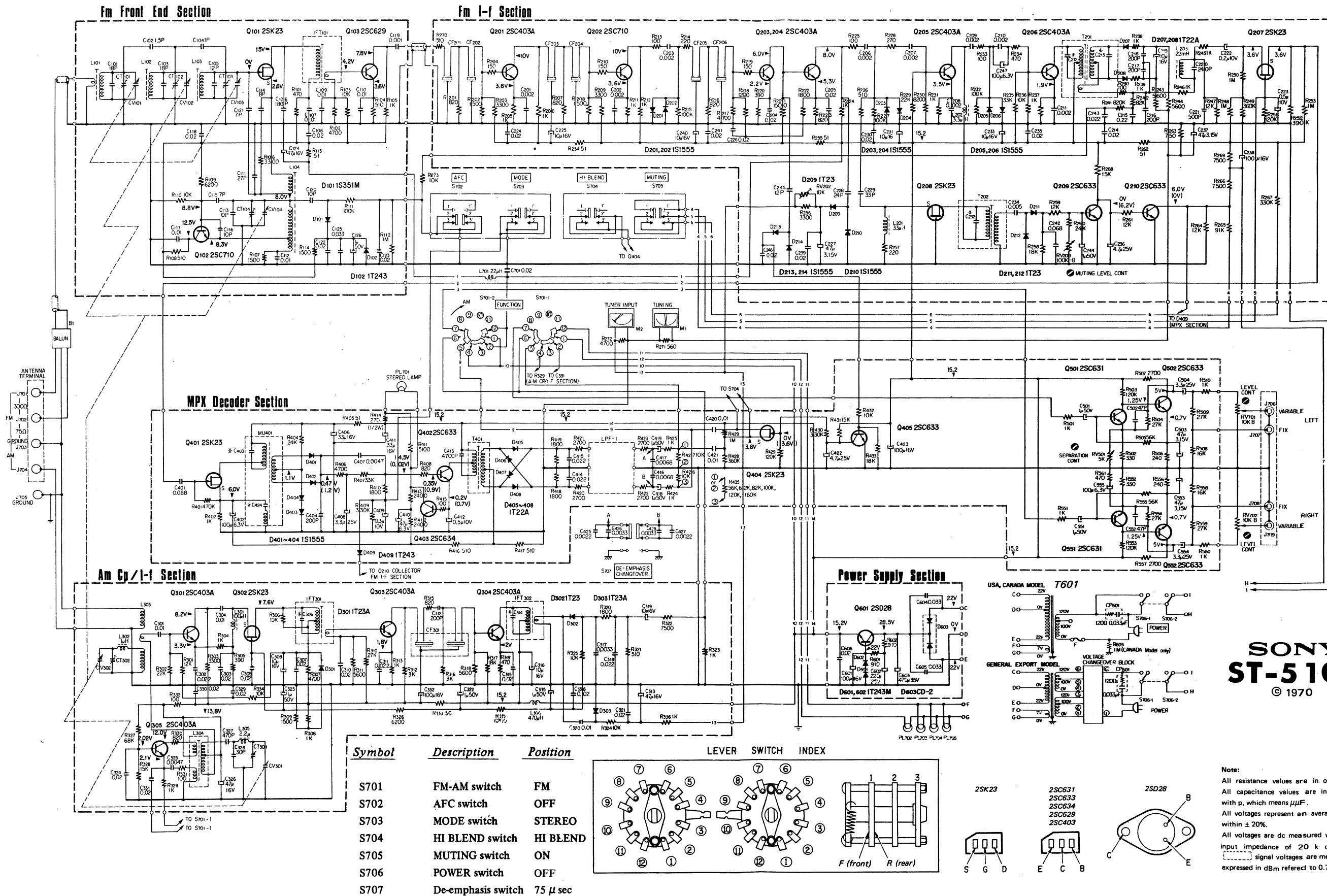


—Component Side—



ST-5100 ST-5100

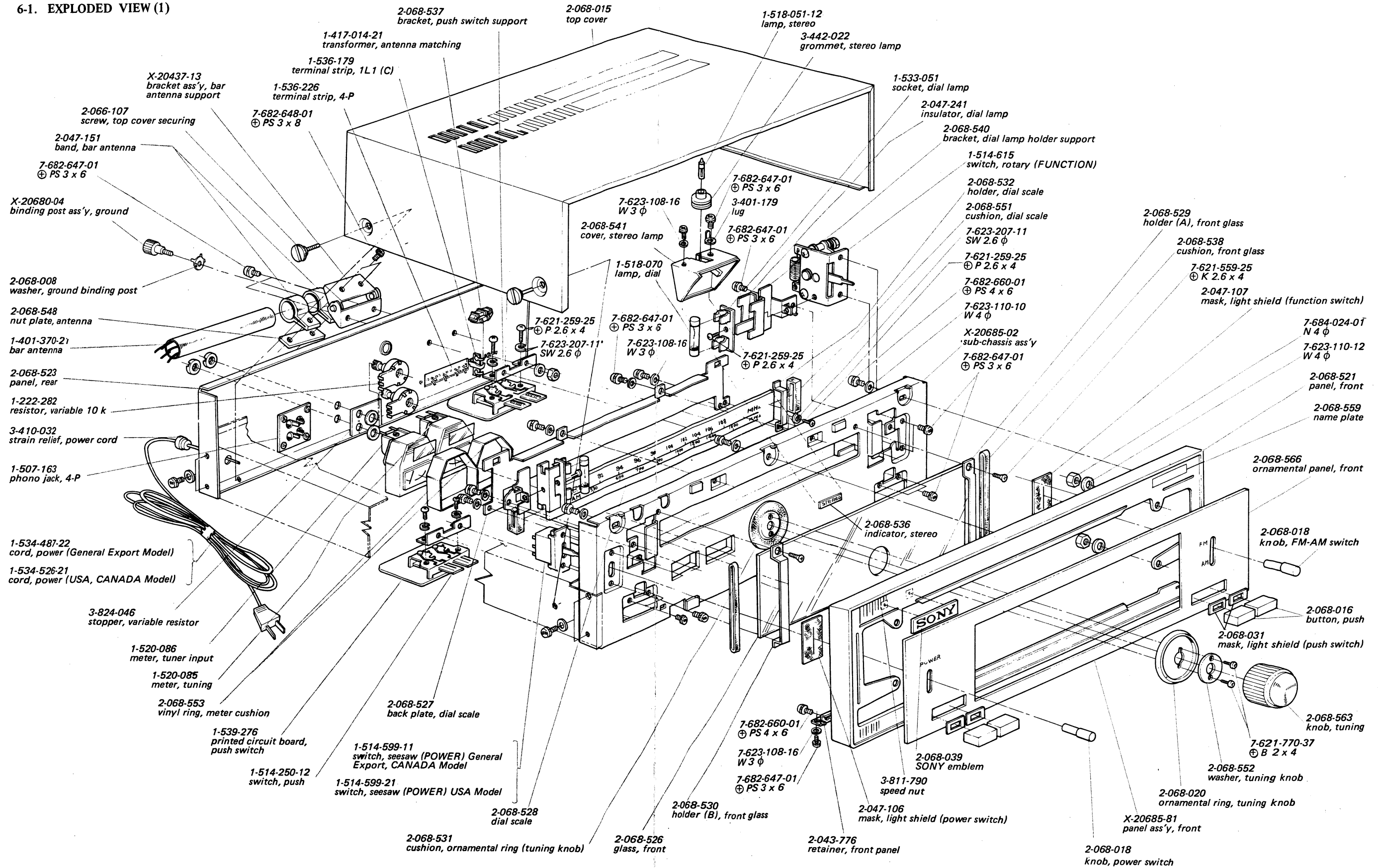
5-6. SCHEMATIC DIAGRAM



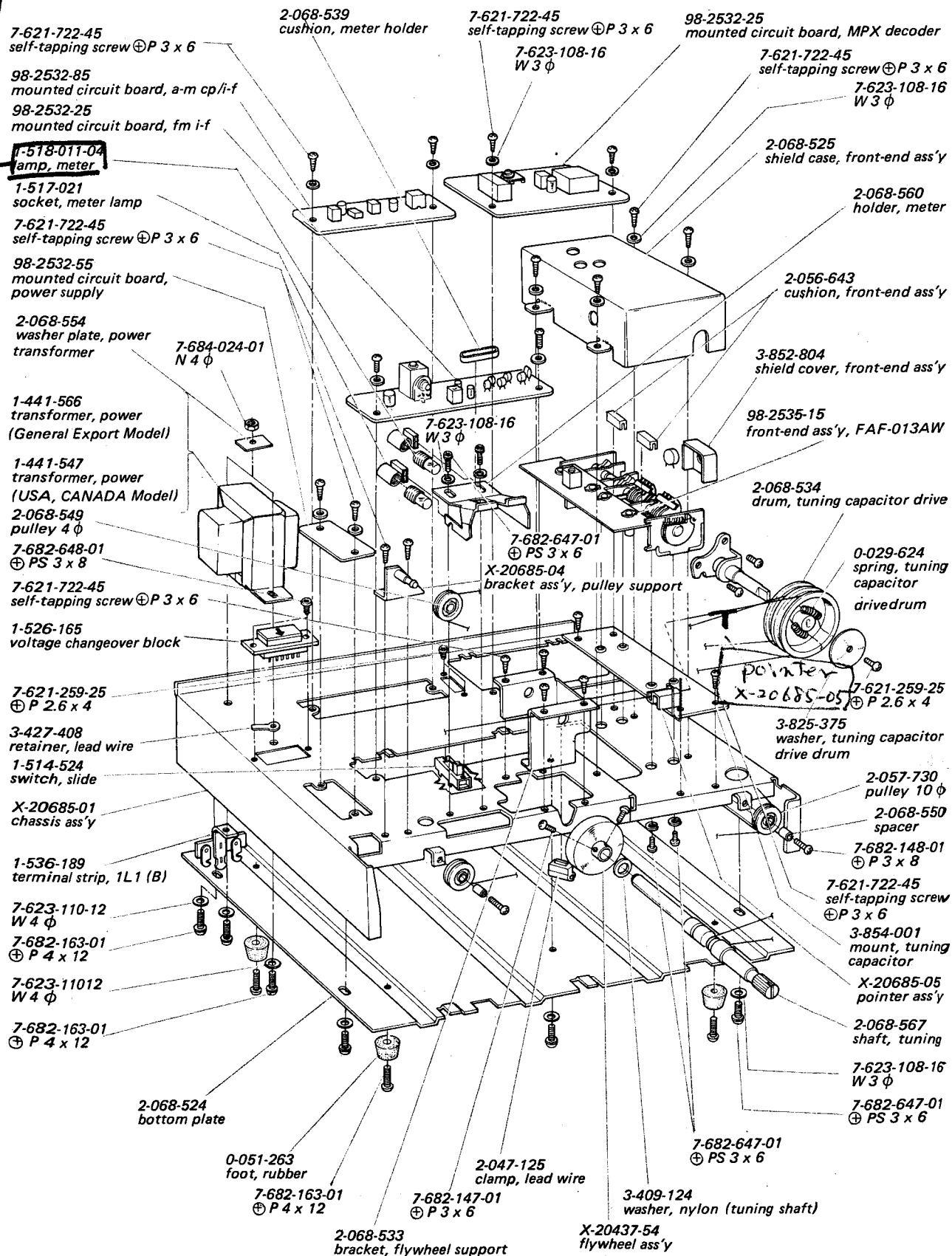
Pointer X-20685-05-

SECTION 6 EXPLODED VIEW

6-1. EXPLODED VIEW (1)



6-2. EXPLODED VIEW (2)



SECTION 7 ELECTRICAL PARTS LIST

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
Mounted Circuit Boards			Q103		transistor, 2SC629
	98-2532-25	F-M I-F circuit board	Q201		transistor, 2SC403A
	98-2532-75	MPX decoder circuit board	Q202		" 2SC710
	98-2532-85	A-M CP/I-F circuit board	Q203		" 2SC403A
	98-2532-55	power supply circuit board	Q204		" "
	98-2535-15	front-end ass'y, FAF-013AW	Q205		" "
Diodes			Q206		" "
			Q207		FET, 2SK23
			Q208		" "
D101	diode,	1S351M	Q209		transistor, 2SC633
D102	"	1T243	Q210		" "
D201	diode,	1S1555	Q301		transistor, 2SC403A
D202	"	"	Q302		FET, 2SK23
D203	"	"	Q303		transistor, 2SC403A
D204	"	"	Q304		" "
D205	"	"	Q305		" "
D206	"	"			
D207	"	1T22A	Q401		FET, 2SK23
D208	"	"	Q402		transistor, 2SC633
D209	"	1T23	Q403		" 2SC634
D210	"	"	Q404		FET, 2SK23
D211	"	"	Q405		transistor, 2SC633
D212	"	"			
			Q501(Q551)		transistor, 2SC631
D301	diode,	1T23A	Q502(Q552)		" 2SC633
D302	"	1T23			
D303	"	1T23A	Q601		transistor, 2SD28
D401	diode,	1S1555	Transformers, Coils and Inductors		
D402	"	"	B1	1-417-014-21	transformer, antenna matching
D403	"	"			
D404	"	"	IFT101	1-403-295	IFT, fm
D405	"	1T22A			
D406	"	"	IFT301	1-403-152	IFT, a-m
D407	"	"	IFT302	1-403-128	" "
D408	"	"			
D409	"	1T243	L101	1-401-351	coil, fm antenna
			L102	1-425-446	coil, fm rf
D601	diode,	1T243	L103	1-425-446	" "
D602	"	"	L104	1-405-377	coil, fm osc
D603	"	CD-2			
Transistors			L201	1-407-163	inductor, micro 33μH
			L202	1-407-184	inductor, micro 3.3μH
Q101	FET,	2SK 23	L203	1-407-408	inductor, micro 22mH
Q102	transistor,	2SC710			

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
L301	1-407-169	inductor, micro 100 μ H	C124	1-121-353	47 $\pm 100\%$ 16V electrolytic
L302	1-407-178	inductor, micro 1.0 μ H	C125	1-105-679-12	0.033 $\pm 10\%$ 50V mylar
L303	1-401-370-21	bar antenna, a-m	C126	1-121-343	1 $\pm 150\%$ " electrolytic
L304	1-405-359	coil, a-m osc			
L305	1-407-182	inductor, micro 2.2 μ H	C201	1-101-919	0.002 $\pm 80\%$ 25V ceramic
L306	1-407-177	inductor, micro 470 μ H	C202	1-101-919	" " " "
			C203	1-101-919	" " " "
L701	1-407-026	inductor, micro 22 μ H	C204	1-101-073	0.02 " " "
			C205	1-101-073	" " " "
MU401	1-425-548	MPX unit	C206	1-101-919	0.002 " " "
			C207	1-101-919	" " " "
T201	1-403-291	transformer, discriminator 10.7MHz	C208	1-101-919	" " " "
T202	1-403-299	IFT, f-m 10.7MHz	C209	1-101-919	" " " "
			C210	1-101-919	" " " "
T401	1-425-260-12	transformer, switching 38kHz	C211	1-101-919	" " " "
			C212		
			C213		
			Included in T201		
T601	1-441-547	transformer, power (USA, CANADA Model)	C214	1-101-073	0.02 $\pm 80\%$ 25V ceramic
	1-441-566	transformer, power (General Export Model)	C215	1-105-689-12	0.22 $\pm 10\%$ 50V mylar
			C216	1-101-030	200p $\pm 5\%$ " ceramic
			C217	1-101-030	" " " "
			C218	1-101-030	" " " "
			C219	1-121-347	10 $\pm 100\%$ 16V electrolytic
			C220	1-107-140	240p $\pm 10\%$ 50V silvered mica
			C221	1-101-424	500p $\pm 20\%$ 250V ceramic
			C222	1-127-020	0.2 " 10V electrolytic (aluminum)
			C223	1-127-021	0.3 " " "
			C224	1-101-073	0.02 $\pm 80\%$ 25V ceramic
			C225	1-121-347	10 $\pm 100\%$ 16V electrolytic
			C226	1-101-073	0.02 $\pm 80\%$ 25V ceramic
			C227	1-121-287	47 $\pm 100\%$ 3.15V electrolytic
			C228	1-101-867	24p $\pm 5\%$ 25V ceramic
			C229	1-101-872	33p " " "
			C230	1-101-073	0.02 $\pm 80\%$ " "
			C231	1-121-347	10 $\pm 100\%$ 16V electrolytic
			C232		
			Included in T202		
			C233	1-121-347	10 $\pm 100\%$ 16V electrolytic
			C234	1-101-904	0.005 $\pm 80\%$ 50V ceramic
			C235	1-101-073	0.02 " 25V "
			C236	1-121-281	4.7 $\pm 100\%$ " electrolytic
			C237	1-121-287	47 " 3.15V "
			C238	1-121-356	100 " 16V "
			C239	1-101-073	0.02 $\pm 80\%$ 25V ceramic
			C240	1-121-347	10 $\pm 100\%$ 16V electrolytic
			C241	1-101-073	0.02 $\pm 80\%$ 25V ceramic
			C242	1-105-683-12	0.068 $\pm 10\%$ 50V mylar
			C243	1-105-837-12	0.022 " " "

Capacitors

All capacitance values are in μ F, except as indicated with, p which means μ F.

C101	1-101-862	18p $\pm 5\%$ 50V ceramic
C102	1-101-938	1.5p $\pm 10\%$ 500V "
C103	1-101-862	18p $\pm 5\%$ 50V "
C104	1-101-937	1p $\pm 10\%$ 500V "
C105	1-101-961	12p $\pm 5\%$ 50V "
C106	1-102-985	180p " " "
C107	1-101-072	0.01 $\pm 80\%$ 25V "
C108	1-101-073	0.02 " " "
C109	1-101-072	0.01 " " "
C110	1-101-072	" " " "
C111	1-101-869	27p $\pm 5\%$ 50V "
C112	1-102-077	0.01 $\pm 20\%$ " "
C113	1-101-873	15p $\pm 5\%$ " "
C114	1-101-958	8p $\pm 0.5p$ " "
C115	1-102-875	7p $\pm 5\%$ " "
C116	1-101-978	10p " " "
C117	1-101-072	0.01 $\pm 80\%$ 25V "
C118	1-101-073	0.02 " " "
C119	1-101-918	0.001 " " "
C120	1-101-986	10p $\pm 5\%$ 50V "
C121	1-101-957	7p $\pm 0.5p$ " "
C122	1-101-073	0.02 $\pm 80\%$ 25V "
C123	1-101-073	" " " "

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
C244	1-121-391	1	$\pm^{150}_{10}\%$ 50V electrolytic	C408	1-121-344	3.3	$\pm^{150}_{10}\%$ 25V electrolytic
C245	1-101-961	12p	$\pm 5\%$ " ceramic	C409	1-127-021	0.3	$\pm 20\%$ 10V electrolytic (aluminum)
C246	1-101-073	0.02	$\pm^{80}_{20}\%$ 25V "	C410	1-121-322	47	$\pm^{100}_{10}\%$ 6.3V electrolytic
C247	1-121-491	100	" " electrolytic	C411	1-121-286	33	$\pm^{100}_{10}\%$ 16V "
C301	1-101-072	0.01	$\pm^{80}_{20}\%$ 25V ceramic	C412	1-127-022	0.5	$\pm 20\%$ 10V electrolytic (aluminum)
C302	1-105-837-12	0.022	" " mylar	C413	1-105-575	4700p	$\pm 5\%$ 50V styrol
C303	1-101-073	0.02	$\pm^{80}_{20}\%$ 25V ceramic	C414	1-105-677-12	0.022	$\pm 10\%$ 50V mylar
C304	1-101-072	0.01	" " "	C415	1-105-677-12	"	" " "
C305	1-101-073	0.02	" " "	C416	1-105-671-12	0.0068	" " "
C306	Included in IFT301			C417	1-105-671-12	"	" " "
C307	1-101-073	0.02	$\pm^{80}_{20}\%$ 25V ceramic	C418	1-121-343	1	$\pm^{150}_{10}\%$ " electrolytic
C308	1-121-347	10	$\pm^{100}_{10}\%$ 16V electrolytic	C419	1-121-343	"	" " "
C310	1-101-073	0.02	$\pm^{80}_{20}\%$ 25V ceramic	C420	1-105-673-12	0.01	$\pm 10\%$ 50V mylar
C311	1-101-073	"	" " "	C421	1-105-673-12	"	" " "
C312	1-103-608	200p	$\pm 5\%$ 50V styrol	C422	1-121-281	4.7	$\pm^{100}_{10}\%$ 25V electrolytic
C313	1-121-353	47	$\pm^{100}_{10}\%$ 16V electrolytic	C423	1-121-356	100	" 16V "
C314	Included in IFT 302			C424	Included in MU 401		
C315	1-101-073	0.02	$\pm^{80}_{20}\%$ 25V ceramic	C425	1-105-665-12	0.0022	$\pm 10\%$ 50V mylar
C316	1-121-347	10	$\pm^{100}_{10}\%$ 16V electrolytic	C426	1-105-667-12	0.0033	" " "
C317	1-105-827-12	0.0033	$\pm 20\%$ 50V mylar	C427	1-105-665-12	0.0022	" " "
C318	1-105-837-12	0.022	" " "	C428	1-105-667-12	0.0033	" " "
C319	1-121-347	10	$\pm^{100}_{10}\%$ 16V electrolytic	C501(C551)	1-121-343	1	$\pm^{150}_{10}\%$ 50V electrolytic
C320	1-101-072	0.01	$\pm^{80}_{20}\%$ 25V ceramic	C502(C552)	1-101-881	47p	$\pm 10\%$ " ceramic
C321	1-101-073	0.02	" " "	C503(C553)	1-121-287	47	$\pm^{100}_{10}\%$ 3.15V electrolytic
C322	1-121-391	1	$\pm^{150}_{10}\%$ 50V electrolytic	C504(C554)	1-121-344	3.3	$\pm^{150}_{10}\%$ 50V "
C323	1-121-391	"	" " "	C555	1-121-291	100	$\pm^{100}_{10}\%$ 6.3V "
C324	1-101-073	0.02	$\pm^{80}_{20}\%$ 25V ceramic	C601	1-121-415	100	$\pm^{100}_{10}\%$ 16V electrolytic
C325	1-105-829-12	0.0047	$\pm 20\%$ 50V mylar	C602	1-121-297	220	" 25V "
C326	1-121-353	47	$\pm^{100}_{10}\%$ 16V electrolytic	C603	1-121-361	470	" 35V "
C327	1-103-617	470p	$\pm 5\%$ 50V styrol	C604	1-105-679-12	0.033	$\pm 10\%$ 50V mylar
C328	1-101-871	30p	" " ceramic	C605	1-105-679-12	"	" " "
C329	1-101-073	0.02	$\pm^{80}_{20}\%$ 25V ceramic	C606	1-101-073	0.02	$\pm^{80}_{20}\%$ 25V ceramic
C330	1-101-073	"	" " "	C701	1-101-073	0.02	$\pm^{80}_{20}\%$ 25V ceramic
C331	1-101-073	"	" " "	CV101	1-551-191-13S capacitor, tuning		
C332	1-121-356	100	$\pm^{100}_{10}\%$ 3.15V electrolytic	CV102			
C335	1-121-391	1	$\pm^{150}_{10}\%$ 50V electrolytic	CV103			
C336	1-101-073	0.02	$\pm^{80}_{20}\%$ 25V ceramic	CV104			
C401	1-105-683-12	0.068	$\pm 10\%$ 50V mylar	CV301			
C402	1-121-291	100	$\pm^{100}_{10}\%$ 6.3V electrolytic	CV302			
C403	Included in MU401						
C404	1-103-608	200p	$\pm 5\%$ 50V styrol				
C406	1-121-286	33	$\pm^{100}_{10}\%$ 16V electrolytic				
C407	1-105-669-12	0.0047	$\pm 10\%$ 50V mylar				

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
Resistors			R230	1-244-695	8.2K
All resistance values are in ohms, $\pm 5\%$ 1/4watts, carbon type unless otherwise indicated.			R231	1-244-673	1K
R101	1-244-665	470	R232	1-244-721	100K
R102	1-244-689	4.7 K	R233	1-244-649	100
R103	1-244-697	10K	R234	1-244-665	470
R104	1-244-666	510	R235	1-244-709	33K
R105	1-244-673	1K	R236	1-244-697	10K
R106	1-244-685	3.3K	R237	1-244-673	1K
R107	1-244-675	1.5 K	R238	1-244-673	1K
R108	1-244-666	510	R239	1-244-673	1K
R109	1-244-692	6.2K	R240	1-244-649	100
R110	1-244-697	10K	R241	1-244-743	820K
R111	1-244-721	100K	R242	1-244-719	82K
R112	1-244-745	1M	R243	1-244-691	5.6K
R113	1-244-642	51	R244	1-244-691	5.6K
R114	1-244-675	1.5K	R245	1-244-673	1K
R201	1-244-671	820	R246	1-244-673	1K
R202	1-244-677	1.5K	R247	1-244-699	12K
R203	1-244-685	3.3K	R248	1-244-745	1M
R204	1-244-653	150	R249	1-244-734	360K
R205	1-244-673	1K	R250	1-244-745	1M
R206	1-244-673	1K	R251	1-244-723	120K
R207	1-244-671	820	R252	1-244-735	390K
R208	1-244-677	1.5 K	R253	1-244-745	1M
R209	1-244-685	3.3 K	R254	1-244-642	51
R210	1-244-653	150	R255	1-244-642	51
R211	1-244-673	1 K	R256	1-244-685	3.3K
R212	1-244-673	1K	R257	1-244-657	220
R213	1-244-649	100	R258	1-244-703	18K
R214	1-244-657	220	R259	1-244-699	12K
R215	1-244-721	100K	R260	1-244-706	24K
R216	1-244-671	820	R261	1-244-699	12K
R217	1-244-689	4.7K	R262	1-244-642	51
R218	1-244-675	1.2K	R263	1-244-670	750
R219	1-244-653	150	R264	1-244-699	12K
R220	1-244-663	390	R265	1-244-720	91K
R221	1-244-677	1.5K	R266	1-244-694	7.5K
R222	1-244-679	1.8K	R267	1-244-733	330K
R223	1-244-671	820	R268	1-244-701	15K
R224	1-244-673	1K	R269	1-244-694	7.5K
R225	1-244-649	100	R270	1-244-666	510
R226	1-244-666	510	R271	1-244-667	560
R227	1-244-721	100K	R272	1-244-689	4.7K
R228	1-244-659	270	R273	1-244-697	10K
R229	1-244-705	22K	R301	1-244-699	12K
			R302	1-244-705	22K
			R303	1-244-685	3.3K
			R304	1-244-673	1K

Switches

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
S705	1-514-250	switch, seesaw (MUTING)	CF301	1-403-153-14	filter, ceramic 455 kHz
S706	{ 1-514-599-11	" " (POWER)	LPF 1	1-231-088	filter, low-pass
	{ 1-514-599-21	" " (POWER) (USA Model)			
S707	1-514-524	switch, slide (DE-EMPHASIS CHANGEOVER)	Miscellaneous		

Filters

CF201	1-403-562	filter, ceramic	10.7 MHz
CF202	1-403-562	" "	"
CF203	1-403-562	" "	"
CF204	1-403-562	" "	"
CF205	1-403-562	" "	"
CF206	1-403-562	" "	"

FM I-F CERAMIC FILTERS

<u>Part. No.</u>	<u>Color</u>	<u>Specified Center Freq.</u>
1-403-562-11	red	10.70 MHz
1-403-562-21	black	10.66 MHz
1-403-562-31	white	10.74 MHz
1-403-562-41	green	10.62 MHz
1-403-562-51	yellow	10.78 MHz

M1	1-520-085	meter, tuning
M2	1-520-086	meter, tuner input
	1-231-057	encapsulated component, 120Ω + 0.033μF
	1-507-163	phono jack 4-p
	1-517-021	socket, meter lamp
	1-518-051-04	lamp, meter 8V 0.15A
	1-518-051-12	lamp, stereo 4.5V 40mA
	1-518-070	lamp, dial 8V 0.3A
	1-533-051	holder, dial lamp
	1-534-487-22	cord, power (General Export Model)
	1-534-526-21	cord, power (USA, CANADA Model)
	1-536-179	terminal strip, 1L1 (C)
	1-536-189	terminal strip, 1L1 (B)
	1-536-226	terminal strip, 4-p
	1-539-276	printed circuit board, 3-key switch

→ 9-919-305-00
lamp Green

ST-5100

SONY CORPORATION

SONY®

Complete Spare Parts List

Model **ST-5100**

"IMPORTANT"

When ordering parts, please do not fail to furnish us the followings:

1. Part Number
2. Model Name
3. Description as mentioned in this parts list

This is due to our employment of EDPS (Electronic Data Processing System) in all the departments concerned, for procurement, inventory control, packing, warehousing, etc. Your orders are processed mainly with the PART NUMBERS referred by you. Wrong part number, therefore, will cause wrong parts supply. To assure prompt shipment of correct parts, your cooperation will be appreciated.

NOTE:

Prices are subject to change without notice.

COMPLETE SPARE PARTS LIST FOR ST-5100

MARCH, 1970

<u>Part No.</u>	<u>Description</u>	<u>Unit Price</u>
<u>I. MECHANICAL PARTS</u>		
X-20437-13	Bracket Ass'y, bar antenna support -----	\$0.06
X-20437-54	Flywheel Ass'y -----	0.26
X-20680-04	Binding Post Ass'y, ground -----	0.06
X-20685-01	Chassis Ass'y -----	1.44
X-20685-02	Sub-chassis Ass'y -----	1.51
X-20685-04	Bracket Ass'y, pulley support -----	0.06
X-20685-05	Pointer Ass'y -----	0.16
X-20685-81	Panel Ass'y, front -----	4.72
0-029-624	Spring, tuning-capacitor drive-drum -----	0.01
0-051-263	Foot, rubber -----	0.03
2-029-953	Label, power requirement indicating (for GENERAL EXPORT Model only) -----	0.01
2-043-776	Retainer, front panel -----	0.03
2-047-106	Mask, light shield (power switch) -----	0.01
2-047-107	Mask, light shield (fm-am switch) -----	0.01
2-047-125	Clamp, lead wire -----	0.02
2-047-151	Band, bar antenna -----	0.01
2-047-241	Insulator, dial lamp -----	0.02
2-056-643	Cushion, front-end ass'y -----	0.02
2-057-730	Pulley 10 ϕ -----	0.01
2-066-107	Screw, top-cover securing -----	0.07
2-068-008	Washer, ground binding post ass'y -----	0.01
2-068-016	Button, push -----	0.01
2-068-018	Knob, fm-am selector and power switch -----	0.07
2-068-020	Ornamental Ring, tuning knob -----	0.18
2-068-031	Mask, light shield (push switch) -----	0.01
2-068-039	SONY Emblem -----	0.09
2-068-521	Panel, front -----	2.17
2-068-523	Panel, rear -----	1.04
2-068-524	Plate, bottom -----	0.99
2-068-525	Shield Case, front-end ass'y -----	0.42
2-068-526	Glass, front -----	0.53
2-068-527	Back Plate, dial scale -----	0.30
2-068-528	Dial Scale -----	0.37
2-068-529	Holder (A), front glass -----	0.05
2-068-530	Holder (B), front glass -----	0.05

<u>Part No.</u>	<u>Description</u>	<u>Unit Price</u>
2-068-531	Cushion, ornamental ring (tuning knob) -----	\$0.01
2-068-532	Holder, dial scale -----	0.02
2-068-533	Bracket, flywheel support -----	0.13
2-068-534	Drive-drum, tuning-capacitor -----	0.06
2-068-536	Illuminator, stereo -----	0.12
2-068-537	Bracket, push switch support -----	0.04
2-068-538	Cushion, front glass -----	0.02
2-068-539	Cushion, meter holder -----	0.01
2-068-540	Bracket, dial-lamp holder support -----	0.05
2-068-541	Cover, stereo lamp -----	0.03
2-068-548	Nut-plate, antenna -----	0.02
2-068-549	Pulley 4 x 10 -----	0.02
2-068-550	Spacer -----	0.01
2-068-551	Cushion, dial scale -----	0.02
2-068-552	Washer, tuning knob -----	0.01
2-068-553	Vinyl Ring, meter cushion -----	0.02
2-068-554	Washer-plate, power transformer -----	0.01
2-068-559	Name Plate -----	0.02
2-068-560	Holder, meter -----	0.06
2-068-563	Knob, tuning -----	0.12
2-068-566	Ornamental Panel, front -----	1.87
2-068-567	Shaft, tuning -----	0.12
3-401-179	Lug -----	0.01
3-409-124	Washer, nylon (tuning shaft) -----	0.01
3-410-032	Strain Relief, power cord -----	0.02
3-427-408	Retainer, lead wire -----	0.01
3-442-022	Grommet, stereo lamp -----	0.02
3-701-026	Tack Label -----	0.01
3-701-030	Label, serial number -----	0.01
3-701-402-01	Rivet -----	0.01
3-811-790	Speednut -----	0.01
3-824-046	Stopper, variable resistor -----	0.03
3-825-375	Washer, tuning-capacitor drive-drum -----	0.01
3-852-803	Shield Plate, front-end ass'y -----	0.03
3-852-804	Shield Cover, front-end ass'y -----	0.03
3-854-001	Mount, tuning-capacitor -----	0.05
<u>Hardwares</u>		
7-621-259-25	Screw, machine (+) P 2.6 x 4 -----	0.14/100
7-621-559-25	Screw, machine (+) K 2.6 x 4 -----	0.13/100
7-621-722-45	Screw, self-tapping (+) P 3 x 6 -----	0.25/100

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<u>Part No.</u>	<u>Description</u>	<u>Unit Price</u>
7-621-770-37	Screw, machine (+) B 2 x 4 -----	\$0.17/100
7-623-108-16	Washer, 3 ϕ -----	0.38/100
7-623-110-12	Washer, 4 ϕ -----	0.20/100
7-623-207-11	Washer, spring 2.6 ϕ -----	0.05/100
7-623-408-01	Washer, lock (external) 3 ϕ -----	0.19/100
7-623-507-01	Lug 2.6 ϕ -----	0.12/100
7-623-616-00	Eyelet 2 x 3 -----	0.06/100
7-682-148-01	Screw, machine (+) P 3 x 8 -----	0.12/100
7-682-163-01	Screw, machine (+) P 4 x 12 -----	0.16/100
7-682-545-03	Screw, machine (+) B 3 x 4 -----	0.14/100
7-682-646-01	Screw, machine (+) PS 3 x 5 -----	0.24/100
7-682-647-01	Screw, machine (+) PS 3 x 6 -----	0.24/100
7-682-648-01	Screw, machine (+) PS 3 x 8 -----	0.24/100
7-682-660-01	Screw, machine (+) PS 4 x 6 -----	0.31/100
7-682-663-01	Screw, machine (+) PS 4 x 12 -----	0.30/100
7-684-023-01	Nut 3 ϕ -----	0.27/100
7-684-024-01	Nut 4 ϕ -----	0.47/100

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Ref. No.	Part No.	Description	Unit Price
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II. ELECTRICAL PARTS

Mounted Circuit Boards

98-2532-25	F-M I-F Circuit Board -----	\$7.90
98-2532-75	MPX Decoder Circuit Board -----	7.91
98-2532-85	A-M CP/I-F Circuit Board -----	3.88
98-2532-55	Power Supply Circuit Board -----	1.62
98-2535-15	Front-end Ass'y, FAF-013AW -----	6.81

Semiconductors

D101	Diode,	1S351M -----	0.12
D102	Diode,	1T243 -----	0.13
D201	Diode,	1S1555 -----	0.07
D202	Diode,	1S1555 -----	0.07
D203	Diode,	1S1555 -----	0.07
D204	Diode,	1S1555 -----	0.07
D205	Diode,	1S1555 -----	0.07
D206	Diode,	1S1555 -----	0.07
D207	Diode,	1T22A -----	0.05
D208	Diode,	1T22A -----	0.05
D209	Diode,	1T23 -----	0.05
D210	Diode,	1T23 -----	0.05
D211	Diode,	1T23 -----	0.05
D212	Diode,	1T23 -----	0.05
D301	Diode,	1T23A -----	0.05
D302	Diode,	1T23 -----	0.05
D303	Diode,	1T23A -----	0.05
D401	Diode,	1S1555 -----	0.07
D402	Diode,	1S1555 -----	0.07
D403	Diode,	1S1555 -----	0.07
D404	Diode,	1S1555 -----	0.07
D405	Diode,	1T22A -----	0.05
D406	Diode,	1T22A -----	0.05
D407	Diode,	1T22A -----	0.05
D408	Diode,	1T22A -----	0.05
D409	Diode,	1T243 -----	0.13

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Ref. No.	Part No.	Description	Unit Price
D601		Diode, 1T243 -----	\$0.13
D602		Diode, 1T243 -----	0.13
D603		Diode, CD-2 -----	0.18
Q101		FET, 2SK23 -----	0.42
Q102		Transistor, 2SC710 -----	0.12
Q103		Transistor, 2SC629 -----	0.25
Q201		Transistor, 2SC403A -----	0.14
Q202		Transistor, 2SC710 -----	0.12
Q203		Transistor, 2SC403A -----	0.14
Q204		Transistor, 2SC403A -----	0.14
Q205		Transistor, 2SC403A -----	0.14
Q206		Transistor, 2SC403A -----	0.14
Q207		FET, 2SK23 -----	0.42
Q208		FET, 2SK23 -----	0.42
Q209		Transistor, 2SC633 -----	0.14
Q210		Transistor, 2SC633 -----	0.14
Q301		Transistor, 2SC403A -----	0.14
Q302		FET, 2SK23 -----	0.42
Q303		Transistor, 2SC403A -----	0.14
Q304		Transistor, 2SC403A -----	0.14
Q305		Transistor, 2SC403A -----	0.14
Q401		FET, 2SK23 -----	0.42
Q402		Transistor, 2SC633 -----	0.14
Q403		Transistor, 2SC634 -----	0.14
Q404		FET, 2SK23 -----	0.42
Q405		Transistor, 2SC633 -----	0.14
Q501(Q551)		Transistor, 2SC631 -----	0.17
Q502(Q552)		Transistor, 2SC633 -----	0.14
Q601		Transistor, 2SD28 -----	0.42

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(HT-4)

Ref. No.	Part No.	Description	Unit Price
<u>Transformers, Coils and Inductors</u>			
B1	1-417-014-21	Transformer, antenna matching -----	\$0.06
IFT101	1-403-295	IFT, fm -----	0.12
IFT301	1-403-152	IFT, a-m -----	0.11
IFT302	1-403-128	IFT, a-m -----	0.09
L101	1-401-351	Coil, fm antenna -----	0.69
L102	1-425-446	Coil, fm rf -----	0.10
L103	1-425-446	Coil, fm rf -----	0.10
L104	1-405-377	Coil, fm osc. -----	0.12
L201	1-407-163	Inductor, micro 33 μ H -----	0.03
L202	1-407-184	Inductor, micro 3.3 μ H -----	0.05
L203	1-407-408	Inductor, micro 22 mH -----	0.35
L301	1-407-169	Inductor, micro 100 μ H -----	0.03
L302	1-407-178	Inductor, micro 1.0 μ H -----	0.04
L303	1-401-370-21	Bar Antenna, a-m -----	0.61
L304	1-405-359	Coil, a-m osc. -----	0.11
L305	1-407-182	Inductor, micro 2.2 μ H -----	0.05
L306	1-407-177	Inductor, micro 470 μ H -----	0.03
L701	1-407-026	Inductor, micro 22 μ H -----	0.03
MU401	1-425-548	MPX Unit -----	0.69
T201	1-403-291	Transformer, discriminator 10.7 MHz -----	0.28
T202	1-403-299	IFT, f-m 10.7 MHz -----	0.13
T401	1-425-260-12	Transformer, switching 38 kHz -----	0.33
T601	1-441-547	Transformer, power (USA, CANADA Models) -----	1.89
	1-441-566	Transformer, power (GÉNÉRAL EXPORT Model) ---	2.27

Capacitors

All capacitance values are in μ F, except as indicated with P, which means μ pF.

C101	1-101-862	18 P $\pm 5\%$ 50 V, ceramic -----	0.02
C102	1-101-938	1.5 P $\pm 10\%$ 500 V, ceramic -----	0.03
C103	1-101-862	18 P $\pm 5\%$ 50 V, ceramic -----	0.02
C104	1-101-937	1 P $\pm 10\%$ 500 V, ceramic -----	0.03
C105	1-101-961	12 P $\pm 5\%$ 50 V, ceramic -----	0.02
C106	1-102-985	180 P $\pm 5\%$ 50 V, ceramic -----	0.04
C107	1-101-072	0.01 +80 -20 % 25 V, ceramic -----	0.02
C108	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C109	1-101-072	0.01 +80 -20 % 25 V, ceramic -----	0.02
C110	1-101-072	0.01 +80 -20 % 25 V, ceramic -----	0.02

Ref. No.	Part No.	Description	Unit Price
C111	1-101-869	27 P $\pm 5\%$ 50 V, ceramic -----	\$0.02
C112	1-102-077	0.01 $\pm 20\%$ 50 V, ceramic -----	0.04
C113	1-101-873	15 P $\pm 5\%$ 50 V, ceramic -----	0.02
C114	1-101-958	8 P ± 0.5 P 50 V, ceramic -----	0.01
C115	1-102-875	7 P $\pm 5\%$ 50 V, ceramic -----	0.03
C116	1-101-978	10 P $\pm 5\%$ 50 V, ceramic -----	0.02
C117	1-101-072	0.01 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C118	1-101-073	0.02 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C119	1-101-918	0.001 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C120	1-101-986	10 P $\pm 5\%$ 50 V, ceramic -----	0.03
C121	1-101-957	7 P ± 0.5 P 50 V, ceramic -----	0.02
C122	1-101-073	0.02 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C123	1-101-073	0.02 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C124	1-121-353	47 $\pm 100 -10\%$ 16 V, electrolytic -----	0.05
C125	1-105-679-12	0.033 $\pm 10\%$ 50 V, mylar -----	0.03
C126	1-121-343	1 $\pm 150 -10\%$ 50 V, electrolytic -----	0.04
C201	1-101-919	0.002 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C202	1-101-919	0.002 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C203	1-101-919	0.002 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C204	1-101-073	0.02 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C205	1-101-073	0.02 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C206	1-101-919	0.002 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C207	1-101-919	0.002 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C208	1-101-919	0.002 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C209	1-101-919	0.002 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C210	1-101-919	0.002 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C211	1-101-919	0.002 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C212		Included in T201	
C213			
C214	1-101-073	0.02 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C215	1-105-689-12	0.22 $\pm 10\%$ 50 V, mylar -----	0.09
C216	1-101-030	200 P $\pm 5\%$ 50 V, ceramic -----	0.02
C217	1-101-030	200 P $\pm 5\%$ 50 V, ceramic -----	0.02
C218	1-101-030	200 P $\pm 5\%$ 50 V, ceramic -----	0.02
C219	1-121-347	10 $\pm 100 -10\%$ 16 V, electrolytic -----	0.04
C220	1-107-140	240 P $\pm 10\%$ 50 V, silvered mica -----	0.02
C221	1-101-424	500 P $\pm 20\%$ 250 V, ceramic -----	0.02
C222	1-127-020	0.2 $\pm 20\%$ 10 V, electrolytic (aluminum) ---	0.06
C223	1-127-021	0.3 $\pm 20\%$ 10 V, electrolytic (aluminum) ---	0.06
C224	1-101-073	0.02 $\pm 80 -20\%$ 25 V, ceramic -----	0.02
C225	1-121-347	10 $\pm 100 -10\%$ 16 V, electrolytic -----	0.04
C226	1-101-073	0.02 $\pm 80 -20\%$ 25 V, ceramic -----	0.02

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Ref. No.	Part No.	Description	Unit Price
C227	1-121-287	47 +100 -10 % 3.15 V, electrolytic -----	\$0.04
C228	1-101-867	24 P +5 % 25 V, ceramic -----	0.02
C229	1-101-872	33 P +5 % 25 V, ceramic -----	0.02
C230	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C231	1-121-347	10 +100 -10 % 16 V, electrolytic -----	0.04
C232		Included in T202	
C233	1-121-347	10 +100 -10 % 16 V, electrolytic -----	0.04
C234	1-101-904	0.005 +80 -20 % 50 V, ceramic -----	0.02
C235	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C236	1-121-281	4.7 +100 -10 % 25 V, electrolytic -----	0.04
C237	1-121-287	47 +100 -10 % 3.15 V, electrolytic -----	0.04
C238	1-121-356	100 +100 -10 % 16 V, electrolytic -----	0.04
C239	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C240	1-121-347	10 +100 -10 % 16 V, electrolytic -----	0.04
C241	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C242	1-105-683-12	0.068 +10 % 50 V, mylar -----	0.04
C243	1-105-837-12	0.022 +10 % 50 V, mylar -----	0.02
C244	1-121-391	1 +150 -10 % 50 V, electrolytic -----	0.03
C245	1-101-961	12 P +5 % 50 V, ceramic -----	0.02
C246	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C247	1-121-491	100 +80 -20 % 25 V, electrolytic -----	0.04
C301	1-101-072	0.01 +80 -20 % 25 V, ceramic -----	0.02
C302	1-105-837-12	0.022 +10 % 50 V, mylar -----	0.02
C303	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C304	1-101-072	0.01 +80 -20 % 25 V, ceramic -----	0.02
C305	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C306		Included in IFT301	
C307	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C308	1-121-347	10 +100 -10 % 16 V, electrolytic -----	0.04
C310	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C311	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C312	1-103-608	200 P +5 % 50 V, styrol -----	0.03
C313	1-121-353	47 +100 -10 % 16 V, electrolytic -----	0.05
C314		Included in IFT302	
C315	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C316	1-121-347	10 +100 -10 % 16 V, electrolytic -----	0.04
C317	1-105-827-12	0.0033 +20 % 50 V, mylar -----	0.02
C318	1-105-837-12	0.022 +20 % 50 V, mylar -----	0.02
C319	1-121-347	10 +100 -10 % 16 V, electrolytic -----	0.04
C320	1-101-072	0.01 +80 -20 % 25 V, ceramic -----	0.02
C321	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C322	1-121-391	1 +150 -10 % 50 V, electrolytic -----	0.03

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<u>Ref.</u> <u>No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Unit</u> <u>Price</u>
C323	1-121-391	1 +150 -10 % 50 V, electrolytic -----	\$0.03
C324	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C325	1-105-829-12	0.0047 +20 % 50 V, mylar -----	0.02
C326	1-121-353	47 +100 -10 % 16 V, electrolytic -----	0.05
C327	1-103-617	470 P +5 % 50 V, styrol -----	0.03
C328	1-101-871	30 P +5 % 50 V, ceramic -----	0.02
C329	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C330	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C331	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C332	1-121-356	100 +100 -10 % 3.15 V, electrolytic -----	0.04
C335	1-121-391	1 +150 -10 % 50 V, electrolytic -----	0.03
C336	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C401	1-105-683-12	0.068 +10 % 50 V, mylar -----	0.04
C402	1-121-291	100 +100 -10 % 6.3 V, electrolytic -----	0.04
C403		Included in MU401	
C404	1-103-608	200 P +5 % 50 V, styrol -----	0.03
C406	1-121-286	33 +100 -10 % 16 V, electrolytic -----	0.10
C407	1-105-669-12	0.0047 +10 % 50 V, mylar -----	0.02
C408	1-121-344	3.3 +150 -10 % 25 V, electrolytic -----	0.04
C409	1-127-021	0.3 +20 % 10 V, electrolytic (aluminum) ---	0.06
C410	1-121-322	47 +100 -10 % 6.3 V, electrolytic -----	0.04
C411	1-121-286	33 +100 -10 % 16 V, electrolytic -----	0.10
C412	1-127-022	0.5 +20 % 10 V, electrolytic (aluminum) ---	0.06
C413	1-105-575	4700 P +5 % 50 V, styrol -----	0.13
C414	1-105-677-12	0.022 +10 % 50 V, mylar -----	0.02
C415	1-105-677-12	0.022 +10 % 50 V, mylar -----	0.02
C416	1-105-671-12	0.0068 +10 % 50 V, mylar -----	0.02
C417	1-105-671-12	0.0068 +10 % 50 V, mylar -----	0.02
C418	1-121-343	1 +150 -10 % 50 V, electrolytic -----	0.04
C419	1-121-343	1 +150 -10 % 50 V, electrolytic -----	0.04
C420	1-105-673-12	0.01 +10 % 50 V, mylar -----	0.02
C421	1-105-673-12	0.01 +10 % 50 V, mylar -----	0.02
C422	1-121-281	4.7 +100 -10 % 25 V, electrolytic -----	0.04
C423	1-121-356	100 +100 -10 % 16 V, electrolytic -----	0.04
C424		Included in MU401	
C425	1-105-665-12	0.0022 +10 % 50 V, mylar -----	0.02
C426	1-105-667-12	0.0033 +10 % 50 V, mylar -----	0.02
C427	1-105-665-12	0.0022 +10 % 50 V, mylar -----	0.02
C428	1-105-667-12	0.0033 +10 % 50 V, mylar -----	0.02

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Ref. No.	Part No.	Description	Unit Price
C501(C551)	1-121-343	1 +150 -10 % 50 V, electrolytic -----	\$0.04
C502(C552)	1-101-881	47 P +10 % 50 V, ceramic -----	0.02
C503(C553)	1-121-287	47 +100 -10 % 3.15 V, electrolytic -----	0.04
C504(C554)	1-121-344	3.3 +150 -10 % 50 V, electrolytic -----	0.04
C555	1-121-291	100 +100 -10 % 6.3 V, electrolytic -----	0.04
C601	1-121-415	100 +100 -10 % 16 V, electrolytic -----	0.06
C602	1-121-297	220 +100 -10 % 25 V, electrolytic -----	0.09
C603	1-121-361	470 +100 -10 % 35 V, electrolytic -----	0.18
C604	1-105-679-12	0.033, +10 % 50 V, mylar -----	0.03
C605	1-105-679-12	0.033 +10 % 50 V, mylar -----	0.03
C606	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
C701	1-101-073	0.02 +80 -20 % 25 V, ceramic -----	0.02
CV101 CV102 CV103 CV104 CV301 CV302	1-151-191-13S	Capacitor, tuning -----	0.83

Resistors

All resistance values are in Ω , $\pm 5\%$ 1/4 Watts,
carbon type unless otherwise indicated.

R101	1-244-665	470 -----	0.02
R102	1-244-689	4.7 k -----	0.02
R103	1-244-697	10 k -----	0.02
R104	1-244-666	510 -----	0.02
R105	1-244-673	1 k -----	0.02
R106	1-244-685	3.3 k -----	0.02
R107	1-244-675	1.5 k -----	0.02
R108	1-244-666	510 -----	0.02
R109	1-244-692	6.2 k -----	0.02
R110	1-244-697	10 k -----	0.02
R111	1-244-721	100 k -----	0.02
R112	1-244-745	1 M -----	0.02
R113	1-244-642	51 -----	0.02
R114	1-244-675	1.5 k -----	0.02

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<u>Ref.</u> <u>No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Unit</u> <u>Price</u>
R201	1-244-671	820 -----	\$0.02
R202	1-244-677	1.5 k -----	0.02
R203	1-244-685	3.3 k -----	0.02
R204	1-244-653	150 -----	0.02
R205	1-244-673	1 k -----	0.02
R206	1-244-673	1 k -----	0.02
R207	1-244-671	820 -----	0.02
R208	1-244-677	1.5 k -----	0.02
R209	1-244-685	3.3 k -----	0.02
R210	1-244-653	150 -----	0.02
R211	1-244-673	1 k -----	0.02
R212	1-244-673	1 k -----	0.02
R213	1-244-649	100 -----	0.02
R214	1-244-657	220 -----	0.02
R215	1-244-721	100 k -----	0.02
R216	1-244-671	820 -----	0.02
R217	1-244-689	4.7 k -----	0.02
R218	1-244-675	1.2 k -----	0.02
R219	1-244-653	150 -----	0.02
R220	1-244-663	390 -----	0.02
R221	1-244-677	1.5 k -----	0.02
R222	1-244-679	1.8 k -----	0.02
R223	1-244-671	820 -----	0.02
R224	1-244-673	1 k -----	0.02
R225	1-244-649	100 -----	0.02
R226	1-244-666	510 -----	0.02
R227	1-244-721	100 k -----	0.02
R228	1-244-659	270 -----	0.02
R229	1-244-705	22 k -----	0.02
R230	1-244-695	8.2 k -----	0.02
R231	1-244-673	1 k -----	0.02
R232	1-244-721	100 k -----	0.02
R233	1-244-649	100 -----	0.02
R234	1-244-665	470 -----	0.02
R235	1-244-709	33 k -----	0.02
R236	1-244-697	10 k -----	0.02
R237	1-244-673	1 k -----	0.02
R238	1-244-673	1 k -----	0.02
R239	1-244-673	1 k -----	0.02
R240	1-244-649	100 -----	0.02
R241	1-244-743	820 k -----	0.02
R242	1-244-719	82 k -----	0.02
R243	1-244-691	5.6 k -----	0.02

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<u>Ref.</u> <u>No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Unit</u> <u>Price</u>
R244	1-244-691	5.6 k -----	\$0.02
R245	1-244-673	1 k -----	0.02
R246	1-244-673	1 k -----	0.02
R247	1-244-699	12 k -----	0.02
R248	1-244-745	1 M -----	0.02
R249	1-244-734	360 k -----	0.02
R250	1-244-745	1 M -----	0.02
R251	1-244-723	120 k -----	0.02
R252	1-244-735	390 k -----	0.02
R253	1-244-745	1 M -----	0.02
R254	1-244-642	51 -----	0.02
R255	1-244-642	51 -----	0.02
R256	1-244-685	3.3 k -----	0.02
R257	1-244-657	220 -----	0.02
R258	1-244-703	18 k -----	0.02
R259	1-244-699	12 k -----	0.02
R260	1-244-706	24 k -----	0.02
R261	1-244-699	12 k -----	0.02
R262	1-244-642	51 -----	0.02
R263	1-244-670	750 -----	0.02
R264	1-244-699	12 k -----	0.02
R265	1-244-720	91 k -----	0.02
R266	1-244-694	7.5 k -----	0.02
R267	1-244-733	330 k -----	0.02
R268	1-244-701	15 k -----	0.02
R269	1-244-694	7.5 k -----	0.02
R270	1-244-666	510 -----	0.02
R271	1-244-667	560 -----	0.02
R272	1-244-689	4.7 k -----	0.02
R273	1-244-697	10 k -----	0.02
R301	1-244-699	12 k -----	0.02
R302	1-244-705	22 k -----	0.02
R303	1-244-685	3.3 k -----	0.02
R304	1-244-673	1 k -----	0.02
R305	1-244-663	390 -----	0.02
R306	1-244-697	10 k -----	0.02
R307	1-244-689	4.7 k -----	0.02
R308	1-244-673	1 k -----	0.02
R309	1-244-677	1.5 k -----	0.02
R310	1-244-707	27 k -----	0.02
R311	1-244-691	5.6 k -----	0.02
R312	1-244-684	3 k -----	0.02

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<u>Ref.</u> <u>No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Unit</u> <u>Price</u>
R313	1-244-673	1 k -----	\$0.02
R315	1-244-671	820 -----	0.02
R316	1-244-684	3 k -----	0.02
R317	1-244-703	18 k -----	0.02
R318	1-244-691	5.6 k -----	0.02
R319	1-244-665	470 -----	0.02
R320	1-244-679	1.8 k -----	0.02
R321	1-244-666	510 -----	0.02
R322	1-244-694	7.5 k -----	0.02
R323	1-244-673	1 k -----	0.02
R324	1-244-697	10 k -----	0.02
R325	1-244-697	10 k -----	0.02
R326	1-244-692	6.2 k -----	0.02
R327	1-244-717	68 k -----	0.02
R328	1-244-701	15 k -----	0.02
R329	1-244-673	1 k -----	0.02
R330	1-244-671	820 -----	0.02
R331	1-244-649	100 -----	0.02
R332	1-244-649	100 -----	0.02
R333	1-244-643	56 -----	0.02
R334	1-244-697	10 k -----	0.02
R335	1-244-692	6.2 k -----	0.02
R336	1-244-673	1 k -----	0.02
R401	1-244-737	470 k -----	0.02
R402	1-244-673	1 k -----	0.02
R404	1-244-706	24 k -----	0.02
R405	1-244-642	51 -----	0.02
R406	1-244-689	4.7 k -----	0.02
R407	1-244-709	33 k -----	0.02
R408	1-244-671	820 -----	0.02
R409	1-244-733	330 k -----	0.02
R410	1-244-679	1.8 k -----	0.02
R411	1-244-690	5.1 k -----	0.02
R412	1-244-682	2.4 k -----	0.02
R413	1-244-682	2.4 k -----	0.02
R414	1-202-559	270 1/2 W composition -----	0.02
R415	1-244-649	100 -----	0.02
R416	1-244-666	510 -----	0.02
R417	1-244-666	510 -----	0.02
R418	1-244-679	1.8 k -----	0.02
R419	1-244-679	1.8 k -----	0.02
R420	1-244-683	2.7 k -----	0.02

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Ref. No.	Part No.	Description	Unit Price
R421	1-244-683	2.7 k -----	\$0.02
R422	1-244-683	2.7 k -----	0.02
R423	1-244-683	2.7 k -----	0.02
R424	1-244-673	1 k -----	0.02
R425	1-244-673	1 k -----	0.02
R426	1-244-697	10 k -----	0.02
R427	1-244-697	10 k -----	0.02
R428	1-244-734	360 k -----	0.02
R429	1-244-723	120 k -----	0.02
R430	1-244-733	330 k -----	0.02
R431	1-244-701	15 k -----	0.02
R432	1-244-697	10 k -----	0.02
R433	1-244-703	18 k -----	0.02
R434	1-244-745	1 M -----	0.02
R435		56 k, 62 k, 82 k, 100 k, 120 k, 160 k -----	0.02
R501(R551)	1-244-673	1 k -----	0.02
R502(R552)	1-244-661	330 -----	0.02
R503(R553)	1-244-723	120 k -----	0.02
R504(R554)	1-244-707	27 k -----	0.02
R505(R555)	1-244-715	56 k -----	0.02
R506(R556)	1-244-658	240 -----	0.02
R507(R557)	1-244-683	2.7 k -----	0.02
R508(R558)	1-244-702	16 k -----	0.02
R509(R559)	1-244-707	27 k -----	0.02
R510(R560)	1-244-673	1 k -----	0.02
R561	1-244-665	470 -----	0.02
R601	1-244-672	910 -----	0.02
R602	1-244-672	910 -----	0.02
R701	1-202-645	1 M 1/2 W composition -----	0.02
RV201	1-221-966	10 k (B), semi-fixed -----	0.10
RV202	1-221-636	10 k (B), semi-fixed -----	0.05
RV501	1-222-811	5 k (B), semi-fixed -----	0.24
RV701	1-222-282	10 k (B), variable -----	0.14
RV702	1-222-282	10 k (B), variable -----	0.14

<u>Ref.</u> <u>No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Unit</u> <u>Price</u>
<u>Switches</u>			
S701	1-514-615	Switch, rotary (FM-AM) -----	\$0.83
S702	1-514-250	Switch, push (AFC) -----	0.46
S703	1-514-250	Switch, push (MODE) -----	0.46
S704	1-514-250	Switch, push (HI BLEND) -----	0.46
S705	1-514-250	Switch, push (MUTING) -----	0.46
S706	1-514-599-11)	Switch, seesaw (POWER) -----	0.47
	1-514-599-21)	Switch, seesaw (POWER) (for USA Model) -----	0.52
S707	1-514-524	Switch, slide (DE-EMPHASIS CHANGEOVER) -----	0.12
<u>Filters</u>			
CF201	1-403-562-92	Filter, ceramic 10.7 MHz -----	0.17
CF202	1-403-562-92	Filter, ceramic 10.7 MHz -----	0.17
CF203	1-403-562-92	Filter, ceramic 10.7 MHz -----	0.17
CF204	1-403-562-92	Filter, ceramic 10.7 MHz -----	0.17
CF205	1-403-562-92	Filter, ceramic 10.7 MHz -----	0.17
CF206	1-403-562-92	Filter, ceramic 10.7 MHz -----	0.17
CF301	1-403-153-14	Filter, ceramic 455 kHz -----	0.19
LPF1	1-231-088	Filter, low-pass -----	1.27
<u>Miscellaneous</u>			
M1	1-520-085	Meter, tuning -----	0.99
M2	1-520-086	Meter, tuner input -----	0.99
	1-231-057	Encapsulated Component, 120 Ω +0.033 μ F -----	0.12
	1-507-163	Phono Jack 4-P -----	0.17
	1-517-021	Socket, meter lamp -----	0.05
	1-518-011-04	Lamp, meter 8 V / 0.15 A -----	0.04
	1-518-051-12	Lamp, stereo 4.5 V / 40 mA -----	0.08
	1-518-070	Lamp, dial 8 V / 0.3 A -----	0.12
	1-533-051	Holder, dial lamp -----	0.04
	1-534-487-22	Cord, power (for GENERAL EXPORT Model) -----	0.32
	1-534-526-21	Cord, power (for USA, CANADA Models) -----	0.33
	1-536-179	Terminal Strip, 1L1 (C) -----	0.02
	1-536-189	Terminal Strip, 1L1 (B) -----	0.03
	1-536-226	Terminal Strip, 4-P -----	0.22
	1-539-276	Printed Circuit Board, 3-Key Switch -----	0.06

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<u>Part No.</u>	<u>Description</u>	<u>Unit Price</u>
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III. ACCESSORIES & PACKING MATERIALS

Packing Materials

X-20685-07-3	Carton Ass'y (for CANADA, GENERAL EXPORT Models) ---	\$2.14
(2-068-304)	Cushion -----	0.66
(2-068-305)	Corrugated Cardboard -----	0.61
(2-068-512)	Carton -----	0.85
X-20685-08	Carton Ass'y (for USA Model) -----	3.31
(2-068-304)	Cushion -----	0.66
(2-068-305)	Corrugated Cardboard -----	0.61
(2-068-512)	Carton -----	0.85
(2-068-513)	Carton, outer -----	1.18
2-068-430	Bag, polyethylene -----	0.12

Accessories

X-37930-04	Card Ass'y, warranty -----	0.15
X-44900-02	Cloth, polishing -----	0.02
1-501-083	Feeder Antenna -----	0.39
1-534-049-31	Connecting Cord, RK-74 -----	0.48
2-057-975	Bag, polyethylene -----	0.01
3-701-020	Bag, polyethylene -----	0.01
3-790-897-12	Manual, instruction (for CANADA, GENERAL EXPORT Models) -----	0.35
3-790-897-31	Manual, instruction (for USA Model) -----	0.35
3-792-768-41	Tag, price (for CANADA Model only) -----	0.03
3-793-105	List, warranty station (for CANADA Model only) -----	0.03
3-793-107	Card, warranty (for CANADA Model only) -----	0.04
3-793-183	Card, inspection -----	0.01
3-811-819-03	Label, FCC (for USA Model only) -----	0.02