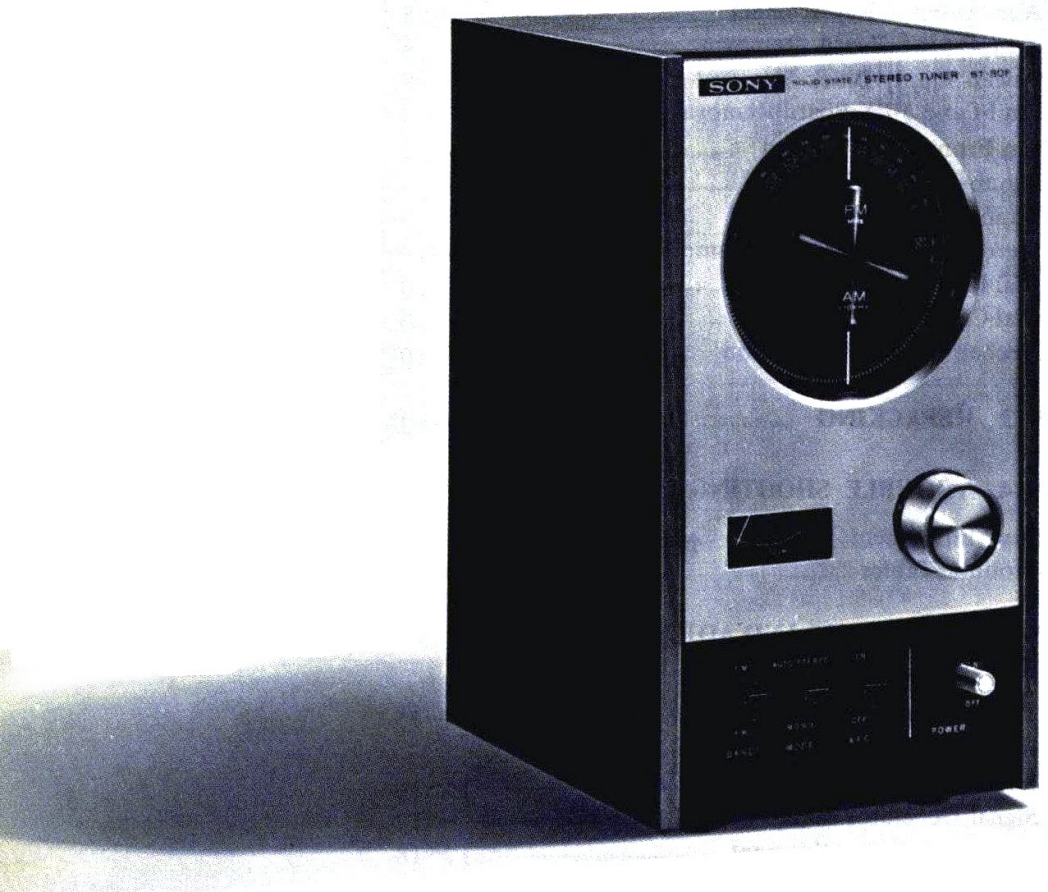
ST-80F

ISO

Set using ISO screws



SONY®

SERVICE MANUAL

TABLE OF CONTENTS

ST-80F

SECTION 1
TECHNICAL DESCRIPTION

1-1. TECHNICAL SPECIFICATIONS

Technical specifications for the ST-80F are given in Table 1.

TABLE 1

Fm Tuner Section

Antenna	:	300 ohms balanced
Tuning range	:	87 to 108 MHz
Sensitivity	:	2.4 μV S/N 30 dB 400 Hz 100% modulation
S/N ratio	:	65 dB
Capture ratio	:	2 dB
Selectivity	:	50 dB, IHF
Image rejection	:	50 dB
I-f rejection	:	90 dB
Spurious rejection	:	80 dB
A-m suppression	:	50 dB
Frequency response	:	30 to 15000 Hz
Harmonic distortion	:	Mono. 0.5%, IHF Stereo 0.8%, IHF
Fm stereo separation	:	Greater than 36 dB at 1 kHz
Stereo automatic switching level	:	10μV
19 kHz, 38 kHz suppression	:	50 dB

A-m Tuner Section

Antenna	:	Built-in ferrite-bar antenna with external antenna terminal
Tuning range	:	530 to 1605 kHz
Sensitivity	:	48 dB/m, built-in antenna 10 μV, external antenna
I-f rejection	:	36 dB at 1000 kHz
Harmonic distortion	:	0.8% at 5 mV input

Audio Output

High level	:	2.0 V (at 400 Hz 100% modulation)
Low level	:	700 mV

General

Power requirements	:	100, 117, 220, 240V AC 50/60 Hz
Power consumption	:	Approx. 13 watts
Dimensions	:	5.0"(width) x 9⅛"(height) x 7½"(depth) 128mm(width) x 231mm (height) x 187mm (depth)
Weight	:	5 lb 8 oz (2.6 kg)
Supplied accessories	:	Connection cord RK-74

1-2. CIRCUIT FEATURES

Fm Tuner Section

In the front-end section a field-effect transistor improves sensitivity, noise figure and overload capacity. A newly-developed fm local oscillator provides drift-free operation, but automatic frequency control is provided for easy tuning.

Four i-f stages, using four ceramic filters, ensure high selectivity, sharp skirt response, and essentially flat response within the selected channel's frequency range. This results in excellent adjacent-channel separation on fm broadcast.

A-m Tuner Section

Two ceramic filters in the a-m tuner provide good selectivity and adjacent-channel rejection. In addition, an FET is used in the mixer circuit to improve the tuner's performance for distortionless reception.

1-3. DETAILED CIRCUIT ANALYSIS

The following describes the 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 5 and the schematic diagram on page 25 to 26.

Stage/Control	Function
Fm Front End	
Balun B1	This transformer matches 300-ohm twin lead to the fm front-end's input stage.
RF amplifier Q101	The rf amplifier and tuned circuits provide high sensitivity, good image rejection, and good selectivity.

Stage/Control	Function
	Field-effect transistor Q101 is ideally suited for this job since it has low-noise characteristics and a wide dynamic range. The latter characteristic results in very low cross-modulation products. The secondary winding of L101 is tapped to match the low input impedance of the grounded-gate amplifier.
Local oscillator Q103	This oscillator supplies injection voltage to the mixer through capacitor C107. The circuit is a modified Hartley oscillator with feedback applied to the emitter from a tap on tank coil L103.
AFC circuit D101 C118, C221 R113, R230 R229	Automatic-frequency-control circuit is incorporated in the oscillator to provide easy reception of fm signals. Usually tuning is performed by ear, that is, turning the tuning knob and setting it to the position where the most clear sound is heard. That is a rather difficult job. By using afc, the difficulty of tuning and frequency drift in the local oscillator can be eliminated. The afc circuit works as follows: a dc component which is detected at the ratio detector when the tuner is not tuned correctly is filtered and fed back to the anode of D101 through the AFC switch. D101 has a characteristic of varying its barrier capacitance according to the bias voltage supplied across it. D101 acts as one of the components in the local-oscillator tank circuit. Thus the local-oscillator frequency is controlled by dc voltage which is supplied to the D101.
Mixer Q102	Rf signals and local oscillator voltage are heterodyned in the base-emitter junction of mixer Q102 to produce 10.7-MHz i-f output signal. Tuned transformer IFT101 develops the i-f output, provides a path to ground for the other heterodyne products, and provides low-impedance link coupling to the i-f amplifier section.

Stage/Control	Function
I-f amplifier section	
I-f amplifiers Q201 to Q204	The i-f amplifier stages consist of two pairs of direct-coupled amplifiers that provide essentially flat response. The selectivity of this section is determined by two pairs of filters (CF201 and CF202, CF203 and CF204) in the interstage-coupling path. Each of these filters is a two-section ceramic filter that operates in the "trapped-energy" mode. The filters provide extremely sharp skirt selectivity and flat response inside the pass band. These filters largely determine overall selectivity in the fm tuner.
Ratio detector D201, D202	IFT201 and diodes D201 and D202 form a balanced ratio detector that transforms the frequency-modulated signal into an audio signal. Output appears across C210.
Meter circuit	The i-f signal from the collector of Q203 is fed via C204 to the voltage doubler consisting of D203 and D204. The d-c output of this circuit is a negative voltage proportional to carrier level, and is fed to the meter through BAND switch S703-2.

Fig. 1-1 38 kHz pulse

Stage/Control	Function
MPX Decoder	
SCA trap L301 C301	The composite signal containing monaural information from 0 to 15 kHz, the 19-kHz pilot carrier and the FM stereo signal at 38 kHz ± 15 kHz is fed to traps L301 and C301. These traps remove the unwanted SCA signals to feed a clean composite signal to the base of Q301 (composite amplifier).
19 kHz amplifier Q301	This stage serves two functions. It extracts the 19-kHz pilot signal by means of a tuned circuit at its collector, and provides a low-impedance source of composite stereo signal (without the pilot carrier) at its emitter. Two series-resonant circuits in the emitter circuit eliminate the 19-kHz pilot signal and 67-kHz SCA signal in the composite stereo signal.
Frequency doubler D301, D302	Signals developed at the collector of Q301 are transformer-coupled to a full-wave rectifier consisting of D301 and D302. The output of this rectifier is not filtered, resulting in two positive pulses for each input cycle. Thus the 19-kHz pilot-carrier frequency is effectively doubled by D301 and D302. However, the waveform is not sinusoidal at the base of Q303.
38 kHz amplifier Q303	The 38-kHz pulses produced by D301 and D302 are amplified by Q303. The tank circuit at the collector of Q303 is tuned to 38 kHz to restore these pulses to the sinusoidal waveform. This signal is transformer-coupled to the bridge-type demodulator to supply sampling drive for the demodulator.
STEREO lamp circuit Q302	The STEREO indicator lights when the MODE switch is set to the AUTO STEREO position and an fm stereo signal is received. The emitter of Q303 is connected to the base of Q302, 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 Q303. This forces Q302 into conduction, lighting STEREO indicator lamp PL701.
Multiplex demodulator D303, D304, D305, D306	The demodulator circuit employs four diodes in a balanced bridge arrangement. This system has the advantage of cancelling residual rf components (38-kHz signal, some 19-kHz signal, and higher-order harmonics of these frequencies.)

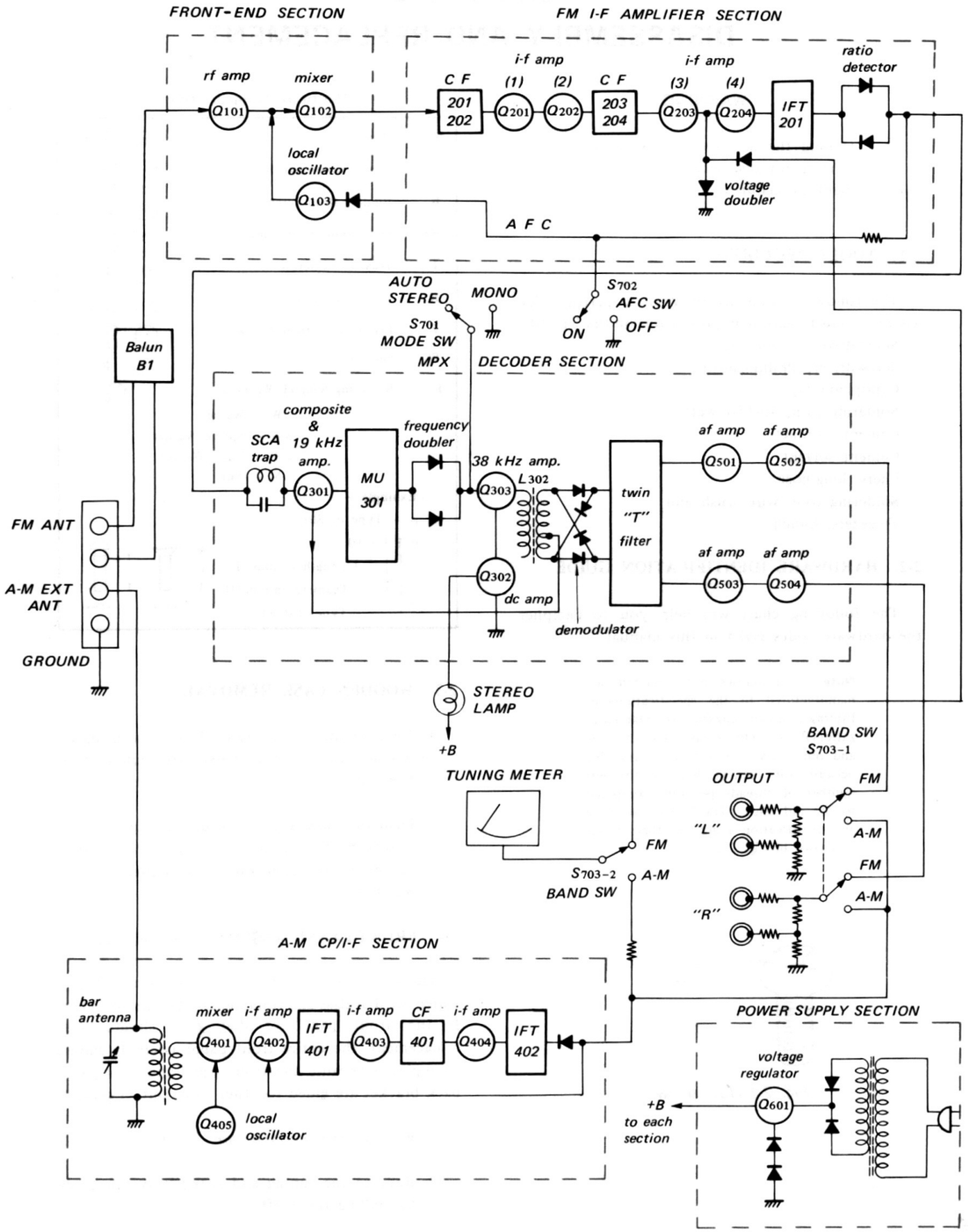
ST-8OF

Stage/Control	Function
	"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 D303 and D304 are forward biased by supply voltage through R317, the stereo indicator lamp, R313 and R332, so these diodes merely act as small resistances. Under this condition, the monaural signal is applied to both "L" and "R" audio amplifiers.
De-emphasis circuit C314, C315	These capacitors provide the roll-off at high audio frequencies necessary to compensate for pre-emphasis at the transmitter.
Twin-T filter C319, C320 C321, R321, R325, R326 (C318, C323, C324, R323, R324, R328)	This filter eliminates the 38-kHz carrier, thereby preventing carrier leak.
A-m tuner	
Local oscillator Q405	This stage supplies injection voltage to the mixer through L401. The circuit is a modified Hartley oscillator with feedback applied to the emitter of Q405 from the tap on the secondary winding of oscillator coil L403.
Mixer /amplifier Q401, Q402	Incoming rf signals and local-oscillator voltage are heterodyned in the base-emitter junction of Q401 to produce the 455-kHz output. Transistors Q401 and Q402 form a cascode mixer/amplifier that ensures stable processing of the signals. In addition, an ingenious agc circuit is incorporated in the cascode amplifier (via Q402) to provide gain control over a wide range of signal strength. IFT401 is a transformer tuned for 455 kHz. It develops the i-f signal, and provides a path to ground for the other heterodyne products.

Stage/Control	Function
	The low-impedance output winding of IFT401 provides link coupling to i-f amplifier Q403.
I-f amplifier Q403, ceramic filter CF401	This stage is basically an RC coupled amplifier. The selectivity of the stage is determined by a double ceramic filter (CF401) in the inter-stage coupling paths. The filter provides extremely sharp skirt selectivity inside the pass band.
I-f amplifier Q404	This circuit provides the power to drive diode detector D402.
AGC circuit R428, R430, R433, C426, C435, C433	The negative dc component of the output of detector diode D402 is fed back to the gate of FET Q402 to control its gain. The time constants of the RC networks in the agc path filter audio variations out of the agc voltage.
Tuning meter	The negative dc-component of the output of D402 is applied to the tuning meter through BAND switch S703-2. This meter is also used as an fm tuning indicator when the BAND switch is in the FM position.
Audio Stages	
Audio Preamplifier	Demodulated L and R signals are amplified by these stages to obtain the specified audio output levels. This stage's gain is about *46* dB at 1 kHz.
Separation control RV501	The network that connects the emitters of Q501 and Q502 provides a form of negative feedback between left and right

Stage/Control	Function
	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 J705, J706	The audio signal passed from the preamplifier is fed to the output terminal through R519 (10k) or R520 (10k). These resistors determine the output impedance.
	The specified output level at the HIGH LEVEL jack (J705) is about *10* dBm but the LOW LEVEL (J706) output is about 10 dB lower. **Note:** 0 dBm = 0.775V
Power Supply	
Rectifier circuit T1, D601	Line input is supplied to transformer T1 through POWER switch S704. The output from T1 is rectified by full-wave rectifier D601 to produce +26 volts dc.
Voltage regulator Q601, D602, D603	DC output from the rectifiers is filtered by C603 and applied to series regulator Q601. As the voltage at the base of Q601 is kept constant by means of zener diodes D602 and D603, 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.

BLOCK DIAGRAM



SECTION 2
DISASSEMBLY AND REPLACEMENT

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-80F.

Screwdriver, 4-inch blade
Screwdriver, Phillips-head
Cellophane tape
Soldering iron, 40-150 watts
Cement, contact
Cement solvent
Pliers, long-nose
Soldering tool, wire-brush-end
Tweezers, 6-inch

2-2. HARDWARE IDENTIFICATION GUIDE

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

Note: All screws in the ST-80F are manufactured to the specifications of 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.

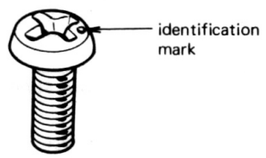
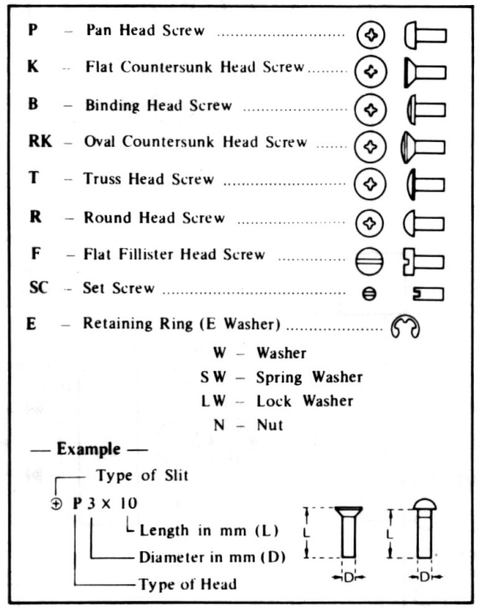


Fig. 2-1 ISO screw

— Hardware Nomenclature —



2-3. WOODEN CASE REMOVAL

1. Remove the four screws (+P4x16) securing the wooden case to the chassis with rubber foot. See Fig. 2-2.

2. Push the chassis out carefully and place it on a soft protective pad, otherwise the bottom of the front panel will be scratched. See Fig. 2-3.

2-4. FRONT-PANEL ASSEMBLY REMOVAL

The front panel assembly is a vertical member to which the dial glass and ornamental plate are attached. If the front panel or dial glass should need replacement, the entire front panel assembly should be replaced because the front panel and front-panel back bracket are glued together with contact cement.

1. Remove the wooden case. See Procedure 2-3.

2. Remove the tuning and POWER switch knobs by pulling them off.

3. Unsolder the lead wires from the TUNING meter.

4. Remove the four self-tapping screws (+R3x8) securing the front-panel assembly to the chassis.

2-5. SWITCH REPLACEMENT

1. Remove the wooden case and front panel assembly as described in Procedures 2-3 and 2-4.

2. All switches can be removed by loosening the two screws securing them to the chassis. See Fig. 2-4.

3. Remove the defective switch.

Note: To remove either MODE or BAND switch, the hook-up wire between them should be cut.

4. Solder the lead wires to the new switch and install it.

Fig. 2-2. Bottom screw removal

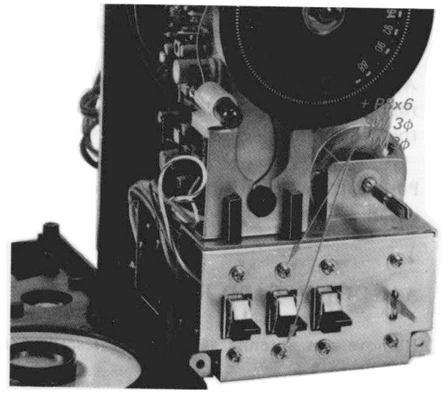


Fig. 2-4. Switch removal

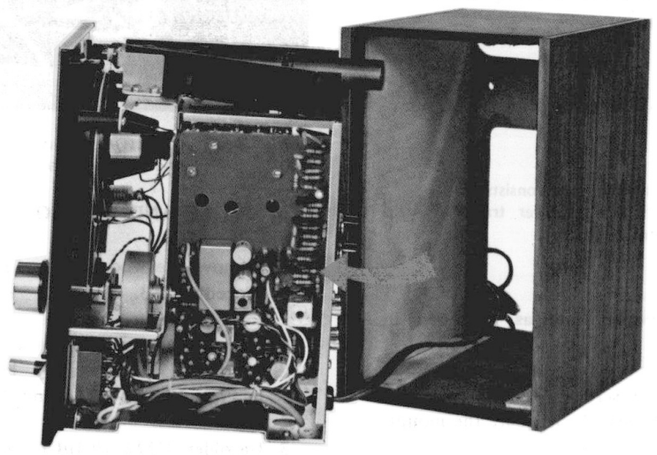


Fig. 2-3. Wooden case removal

2-6. A-M ANTENNA ASSEMBLY REMOVAL

1. Remove the wooden case. See Procedure 2-3.
2. Remove the three screws (+P3x6) securing the a-m antenna assembly to the top of chassis. See Fig. 2-5.

2-7. A-M ANTENNA REPLACEMENT

1. Remove the wooden case. See Procedure 2-3.
2. Remove the a-m c-p/i-f board by loosening the two screws securing it to the chassis.
3. Unsolder the lead wires from the printed circuit board and antenna terminal.
4. Apply a few drops of cement solvent to the rubber bushing and wait a few minutes for the cement to dissolve.
5. Push out the defective antenna core and then install a new one.

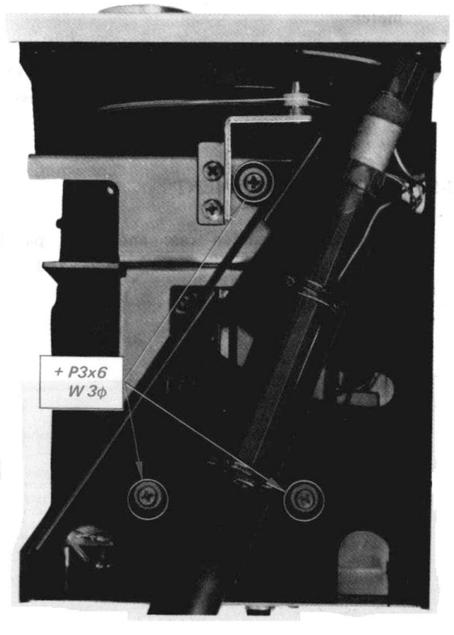


Fig. 2-5. A-m antenna ass'y removal

2-8. A-M C-P/I-F BOARD REMOVAL

1. Remove a-m antenna assembly as described in Procedure 2-6.
2. Unsolder the two lead wires which connect between the printed circuit board and the variable capacitor as shown in Fig. 2-6.
3. Remove the two screws securing the circuit board to the chassis.

2-9. POWER-SUPPLY BLOCK REMOVAL

Note: Power supply block consists of a printed circuit board, power transformer and mounting bracket.

1. Remove the wooden case as described in Procedure 2-3.
2. Remove the three screws (+P3x6) from the bottom of the chassis which secure the mounting bracket to the chassis.
3. Pull out the power-supply block.

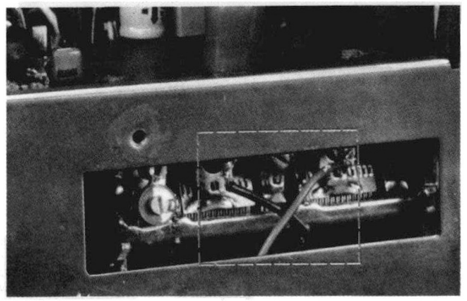


Fig. 2-6. Lead wires between tuning capacitor and a-m pc board.

2-10. FM I-F AND MPX BOARD REMOVAL

1. Remove the wooden case first as described in Procedure 2-3.
2. Remove the a-m antenna assembly, a-m c-p/i-f board and power-supply block as described in Procedures 2-6, 2-8 and 2-9.
3. Unsolder C222 (0.1μF), and R230 (47 k), which are soldered between the front end and printed circuit board as shown in Fig. 2-7.

4. Unsolder braided wires connecting between printed circuit board and chassis ground.
5. Remove the three hex nuts securing the printed circuit board to the variable capacitor's frame.

Note: Some of the fm i-f and MPX boards are fixed to the variable capacitor's frame by soldering.

6. Unsolder the coaxial cable and stereo-lamp lead wires. Now the circuit board can be tilted forward and down.

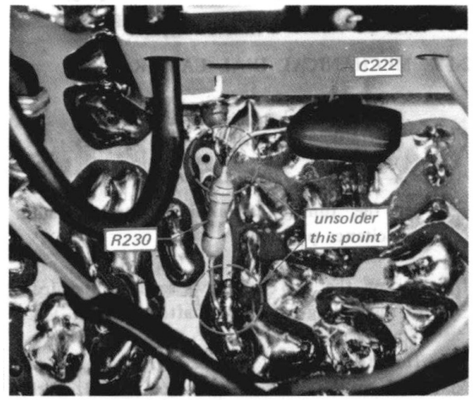


Fig. 2-7. C222 and R230 removal

2-11. FM FRONT-END REMOVAL

1. Remove the front panel assembly. See Procedure 2-4.
2. Remove the fm i-f and MPX board as described in Procedure 2-10.
3. Loosen the two set screws on the tuning capacitor drive drum.
4. Fix the dial cord to the tuning-capacitor drive drum and tuning shaft with cellophane tape.
5. Remove the drum while unhooking the dial cord from the pulley, then stick the drum to the chassis with cellophane tape as shown in Fig. 2-8.
6. Remove the three screws (+B3x6), see Fig. 2-8, securing the variable capacitor frame to the chassis, and then unsolder the power-supply lead wire. Now the front-end is free.

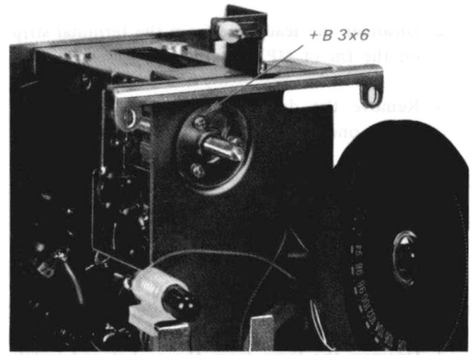


Fig. 2-8. Fm front-end removal

2-12. PHONO-JACK REPLACEMENT

1. Remove the wooden case as described in Procedure 2-3.
2. Remove the power transformer mounting bracket. See Procedure 2-9.
3. Remove the four screws and two nuts securing the phono jack to the chassis.
4. Unsolder the lead wires from the defective phono jack.
5. Solder the lead wires to a new one and install it.

2-13. TUNING-METER REPLACEMENT

1. Remove the wooden case and front panel assembly. See Procedures 2-3 and 2-4.
2. Gently pry out the meter with a screw driver.
3. Apply double-stick tape to the new meter and then install the replacement.

2-14. STEREO AND TUNING-METER LAMP REPLACEMENT

Before performing either of the following procedure, remove the wooden case.

Stereo Lamp

1. Simply pull out the lamp from the rubber grommet.

2. Unsolder the lead wire from the terminal strip on the fm i-f MPX board.

3. Remove the defective lamp and then install a new one.

Meter Lamp

1. Straighten the tab of the lamp-socket bracket to permit removal of the lamp.

2. Slide the lamp socket off.

3. Unscrew the lamp from the socket and install a new lamp.

2-15. DIAL-LAMP REPLACEMENT

1. Remove the wooden case and front-panel assembly as described in Procedures 2-3 and 2-4.

2. Slide the lamp socket forward to permit removal of lamp as shown in Fig. 2-9.

3. Unscrew the lamp from the socket and install a new lamp, and then push the socket back to its original place.

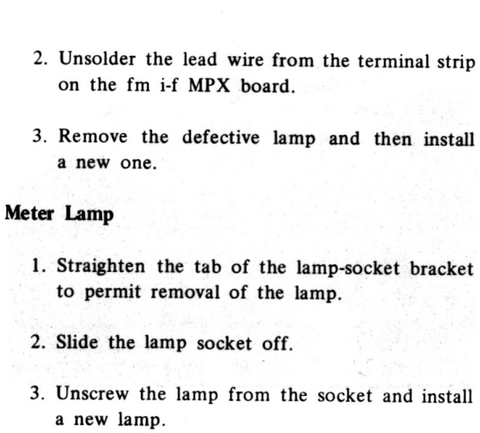


Fig. 2-9. Dial lamp removal

2-16. DIAL-CORD STRINGING

1. Remove the wooden case and front panel assembly as described in Procedures 2-3 and 2-4.

2. Set the variable capacitor to its minimum capacitance position.

3. Cut a 1000 mm (40 inch) of dial cord. Tie one end to a coil spring and then follow the diagram as shown in Fig. 2-11.

4. At the finish point, tighten the cord, then squeeze the eyelet so that the spring is under tension.
Make a knot in the cord end to keep it from slipping out of the eyelet.

5. After completing the dial-cord stringing, make sure the tuning system works properly.

2-17. MECHANICAL DIAL CALIBRATION

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

1. Set the tuning capacitor to its maximum capacitance position.

2. Loosen the two set screws securing the drum to the tuning capacitor shaft.

3. Turn the drum to the position where the dot mark on the dial scale (close to 88 MHz mark) coincides with the dial-cursor line. See Fig. 2-10.

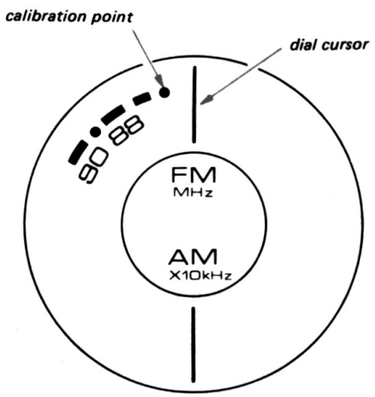


Fig. 2-10. Detail of finish point

ST-80F

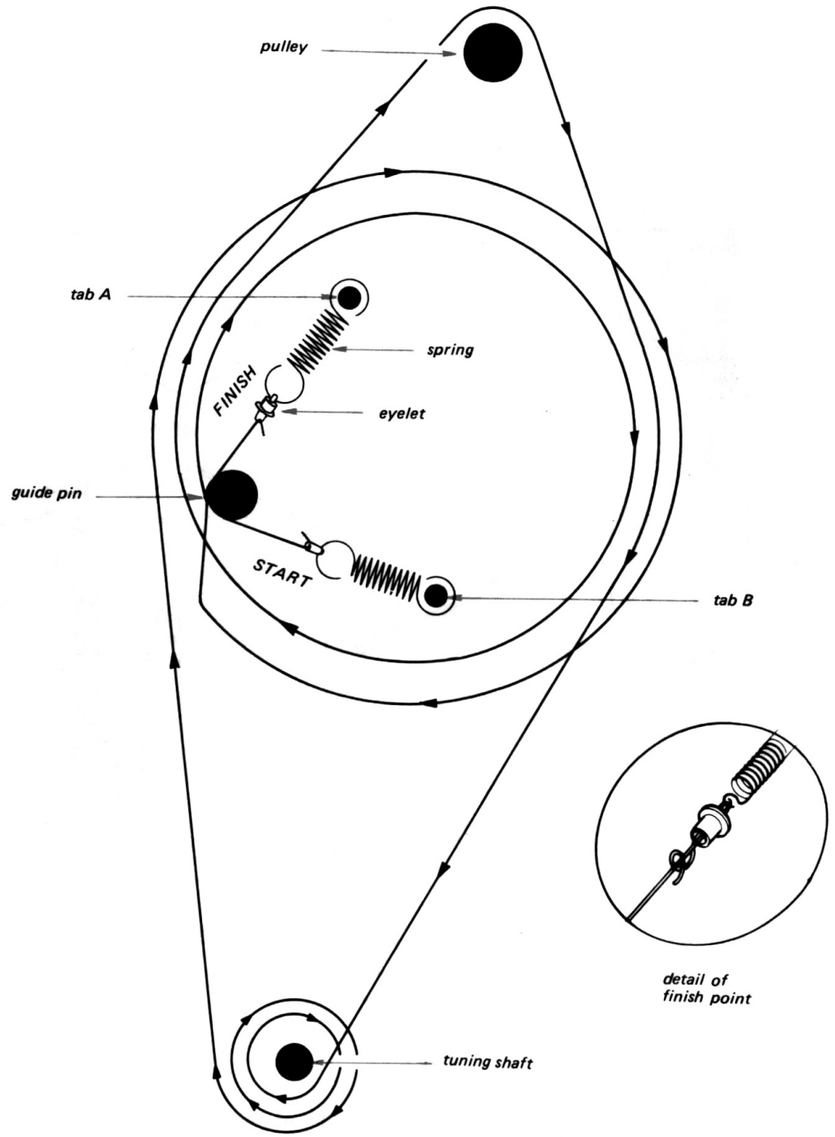
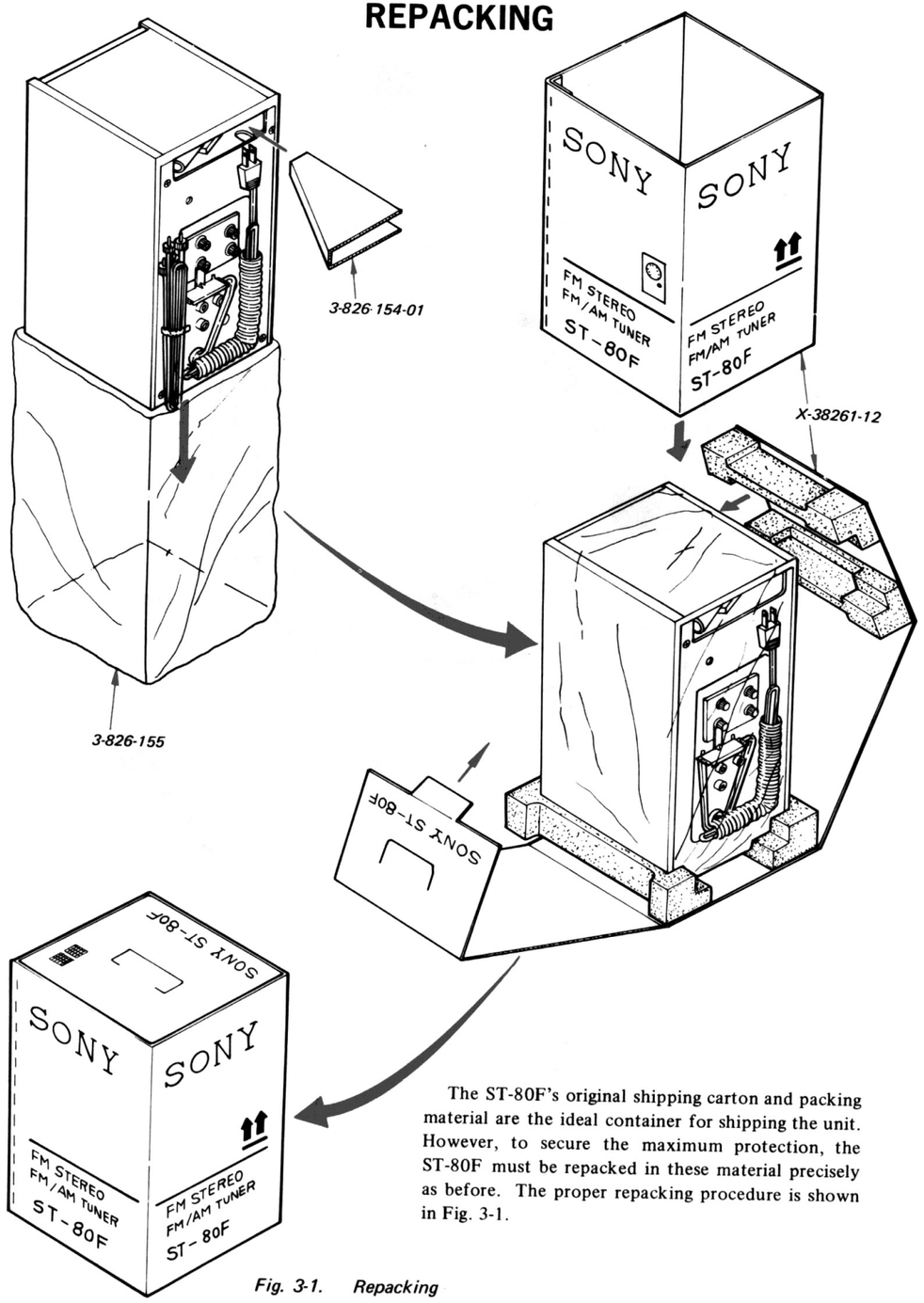


Fig. 2-11 Dial-cord stringing

SECTION 3
REPACKING



The ST-80F's original shipping carton and packing material are the ideal container for shipping the unit. However, to secure the maximum protection, the ST-80F must be repacked in these material precisely as before. The proper repacking procedure is shown in Fig. 3-1.

Fig. 3-1. Repacking

SECTION 4
TROUBLE SHOOTING

4-1. TEST EQUIPMENT REQUIRED

1. Fm and a-m signal generator
2. Dc VTVM or VOM
3. Audio oscillator
4. Audio Level meter, or ac VTVM
5. Stereo signal generator (MPX signal generator) If a signal generator or MPX signal generator is not available, off-the-air stereo signals will suffice.

4-2. TROUBLE TABLES

Power Supply

Symptom	Cause	Correction
Pilot lamp fails to light and no output (FM/AM).	No ac line input. Defective power transformer. S704 defective.	Trace ac input circuit. Replace power transformer. Check and replace S704.
Dial lamp becomes dim and no output.	One or both diode rectifiers shorted. C603 shorted.	Replace D601. Check and replace C603.
Dial lamp lights but no output.	C601 or C603 shorted. Q601 open.	Check and replace. Check and replace.
Excessive hum in output.	C603 open.	Check and replace.

Preamplifier

Symptom	Cause	Correction
Output is noisy or distorted.	C502 leaky.	Check and replace.

MPX Section (FM-stereo reception only)

Note: Confirm that tuning meter indicates relatively strong signal.

Symptom	Cause	Correction
Poor separation and low output level, STEREO lamp lights.	D303 or D304 shorted or open. D305 or D306 shorted. C303 shorted.	Check and replace. Check and replace. Check and replace.
Poor separation and low output, hum noise is present.	D305 or D306 open.	Check and replace.
Poor separation and STEREO lamp fails to light.	C313 shorted.	Check and replace.
Only monaural signals are received and STEREO lamp fails to light.	C310 leaky or shorted.	Check and replace.
No output, and STEREO lamp fails to light.	C308 or C307 shorted. Front-end or i-f section is defective. C303 open.	Check and replace. Check and repair. Check and replace.

Fm I-f Strip

Symptom	Cause	Correction
No output or low sensitivity, tuning meter indicates input signal.	D201 or D202 shorted or open. Defective IFT201.	Check and replace. Check and replace.
No output, tuning meter indicates no or weak input signal.	CF201, 202, 203 or 204 defective. C206 shorted.	Check and replace. Check and replace.

FM Front-End

Symptom	Cause	Correction
No output, tuning meter indicates no input signal.	Defective IFT101. Local oscillator dead.	Check and replace. Check Q103 and replace if necessary.

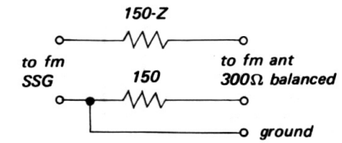
A-m/ Cp/I-f Section

Symptom	Cause	Correction
Low sensitivity and noisy output.	Either C426, 433 or 428 shorted.	Check and replace as required.
Self oscillation at strong stations.	C407 open.	Check and replace.
Low sensitivity.	CF401 or IFT401 defective. Antenna-coil lead wire broken.	Check and replace.
No output, tuning meter indicates no signal input.	Local oscillator dead. CF401 or IFT401 defective.	Check L403 and Q405, and replace as necessary. Check and replace as necessary.

SECTION 5
ALIGNMENT AND ADJUSTMENT PROCEDURES

5-1. TEST EQUIPMENT REQUIRED

1. Fm a-m standard signal generator.
   If such a generator is unavailable, off- the- air signals at each end of the band will suffice.
2. Dummy antenna. (for fm alignment)
   See Fig. 5-1.
3. MPX stereo signal generator.
4. A-m standard loop antenna.
5. Audio signal generator.
6. Oscilloscope.
7. Fm 10.7-MHz sweep generator.
8. A-m 455-kHz sweep generator.
9. Alignment tools.



Z: output impedance of S.S.G.

Fig. 5-1. Dummy antenna

5-2. FM DISCRIMINATOR ALIGNMENT

Note: There are two methods of aligning the fm discriminator. Two of them are described herein. You can use either of them.

Sweep Generator Method

Preparation

1. Remove the wooden case as described in Procedure 2-3.
2. Remove the a-m c-p/i-f board and power supply section to permit a 0.02-μF capacitor soldering across connection point of R224 (100 ohm) and R229 (47 k), and ground on conductor side of fm i-f and MPX board as shown in Fig. 5-2.
3. Solder the 0.02μF capacitor.
4. Connect the sweep-generator's output across CV103 (variable capacitor), through 0.02μ and 50- or 75-ohm pad. See Fig. 5-3.

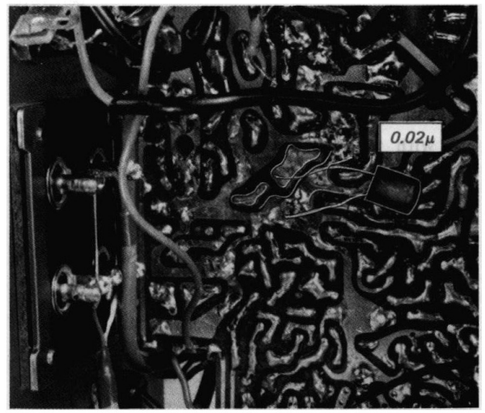


Fig. 5-2. 0.02-μF capacitor soldering points

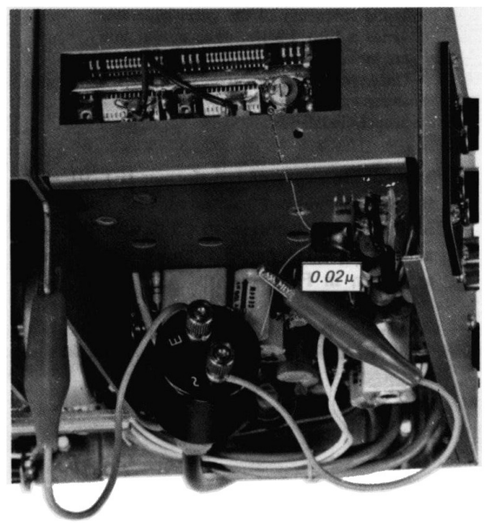


Fig. 5-3. Sweep generator output connection point

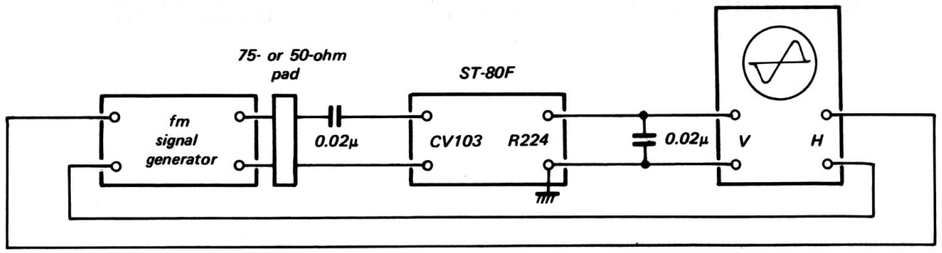


Fig. 5-4. Fm discriminator alignment by sweep generator test setup

Procedures

1. With the equipment connected as shown in Fig. 5-4, set the sweep-generator's controls as follows:
   Center frequency ..... 10.7 MHz
   Sweep width ..... 800kHz or more
   Output level 30mV

2. Set the tuner's BAND switch to FM.

3. Adjust the oscilloscope controls to provide a visible indication.

   Note: Two or three outputs will be observed on the oscilloscope as the center frequency of the sweep generator varies ±1 to 2 MHz. The output you are looking for has the largest amplitude. Once you get this curve, decrease the sweep-generator output to obtain a proper indication.

4. Turn the top core of transformer IFT201 with the hexagonal-head alignment tool (as shown in Fig. 5-5) to obtain an "S" curve response and to equalize negative and positive peaks as shown in Fig. 5-6.

   Note: Do not turn the bottom core of IFT201.

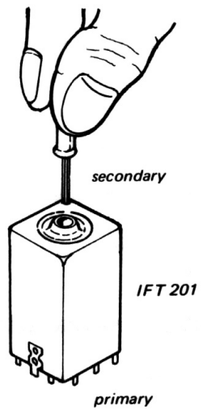


Fig. 5-5 Fm discriminator adjustment

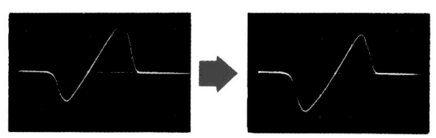


Fig. 5-6. "S" response curve

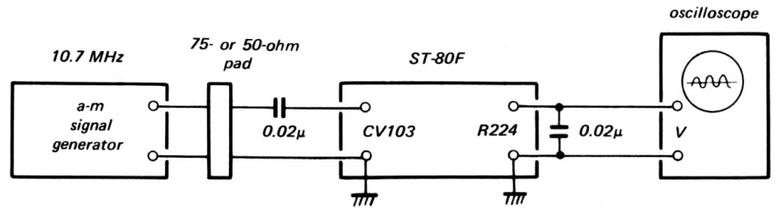


Fig. 5-7. Fm discriminator alignment by signal generator test setup

Signal Generator Method

Test Equipment Required

1. Standard signal generator which can generate a 10.7-MHz a-m signal.

2. Oscilloscope
   Vertical sensitivity ..... 100mV/cm minimum

3. Alignment tools

Preparation

Same as described in sweep generator method.

Procedure

1. With the equipment connected as shown in Fig. 5-7, set the signal-generator's controls as follows:
   Frequency ..... 10.7 MHz
   Modulation ..... A-m, 400Hz, 80%
   Output level ..... 10,000 μV (80 dB)

2. Set the tuner's BAND switch to FM.

3. Adjust the oscilloscope controls for maximum sensitivity.

4. If the discriminator transformer IFT201 is not aligned correctly, a 400-Hz ripple will be observed as shown in Fig. 5-8.

5. Turn the top core of transformer IFT201 with a hexagonal-head alignment tool to obtain a minimum indication on the oscilloscope as shown in Fig. 5-8.

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

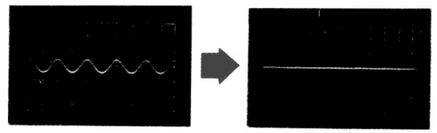


Fig. 5-8. Fm discriminator alignment by signal generator

5-3. 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 field. Alignment need not be performed when the front-end FET has been 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 incurred in transit to the Factory Service Center.

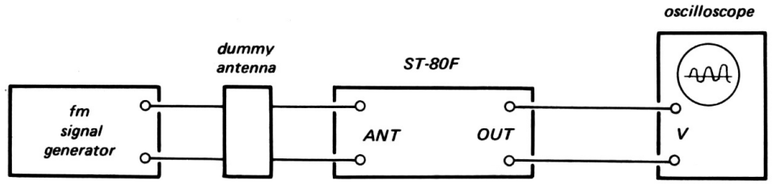


Fig. 5-9. Fm front-end alignment test setup

TABLE 1. FM FREQUENCY COVERAGE ADJUSTMENT

Coupling Between Front End and S.S.G.	SSG Frequency and Output Level	Tuning Capacitor	Scope Connection	Adjust	Indication
Dummy Antenna See Fig. 5-1	86 MHz 400 Hz 30 % Mod. 10 μV (20 dB)	Maximum - capacitance position	OUTPUT J705	OSC coil L103 See Fig. 5-10	Maximum
Same as above	109.5 MHz 400 Hz 30 % Mod. 10 μV (20 dB)	Minimum - capacitance position	Same as above	OSC trimmer CT103 See Fig. 5-10	Same as above

Preparation

1. Remove the wooden case as described in Procedure 2-3.
2. Connect the equipment as shown in Fig. 5-9.
3. Set the receiver's controls as follows:

BAND selector ..... FM
MODE switch ..... MONO
AFC switch ..... OFF

Generator Alignment

Follow the procedures given in Table 1 when performing this alignment with an fm signal generator.

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 in Procedure 2-17.

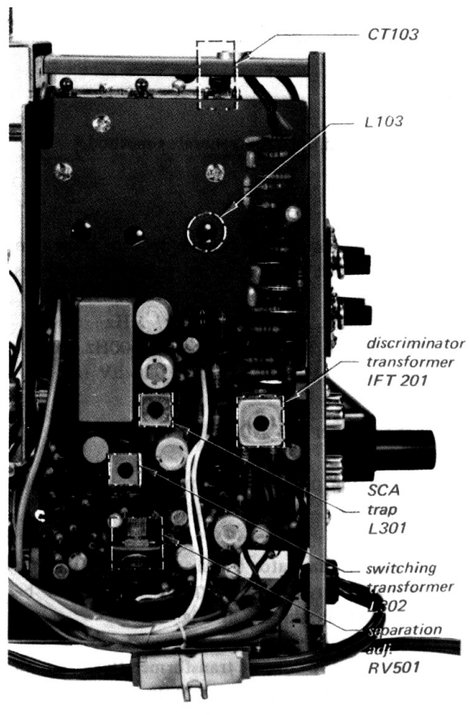


Fig. 5-10. Parts location

Procedure

1. Tune the receiver to the lowest-frequency station.
2. Check the dial scale for a calibration accuracy of ±500 kHz from the carrier frequency of the station. If the dial-accuracy deviation exceeds this limit, turn the local-oscillator coil L103 as shown in Fig. 5-10 slightly until optimum dial calibration is obtained.
3. Tune the receiver to the highest-frequency station in your locality. If the dial-calibration error is excessive, adjust local-oscillator trimmer CT103 to obtain maximum calibration accuracy.

5-4. FM STEREO SEPARATION ADJUSTMENT

Preparation

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

(1) With the equipment connected as shown in Fig. 5-11 set the MPX and audio signal-generator's control as follows:

MAIN CHANNEL ..... OFF
SUB CHANNEL ..... ON
PILOT (19 kHz) ..... OFF
AUDIO OSCILLATOR'S 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. 5-12.

Procedure

1. Connect the equipment as shown in Fig. 5-13.

Set the fm signal-generator's control as follows:
Carrier frequency ..... 98 MHz
Output level 1000μV (60dB)

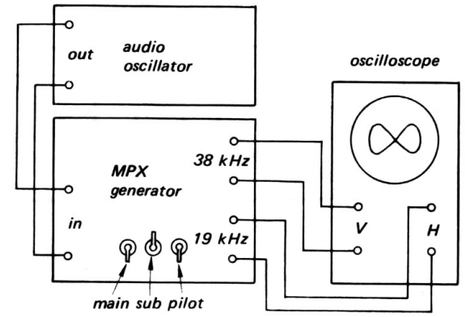


Fig. 5-11. MPX generator preadjustment test setup

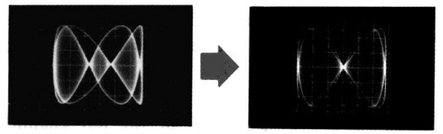


Fig. 5-12. Lissajous pattern

Modulation:
Main channel (400Hz) ..... 33.75 kHz (45%)
Sub channel (38kHz)..... 33.75 kHz (45%)
Pilot (19kHz) ..... 7.5 kHz (10%)

The above mentioned modulation levels can be set by following the subsequent procedure.

(a) With the equipment connected as shown in Fig. 5-13, 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 modualtion indicator.

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

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

(d) Adjust the audio-oscillator ouput (400 Hz) to obtain a 33.75-kHz deviation on the FM SSG modualtion indicator.

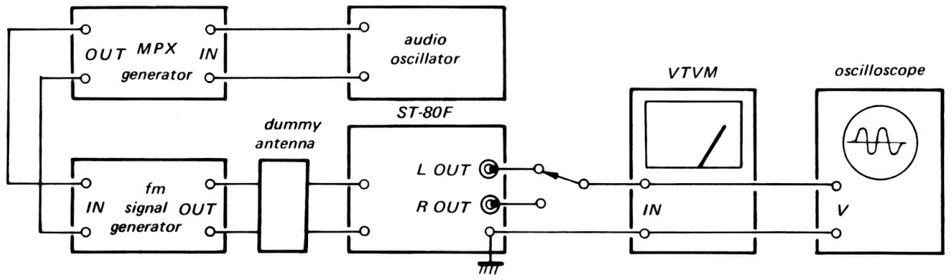


Fig. 5-13. Fm stereo separation adjustment test setup

(e) Set all controls to the ON position.

2. Turn the top core of switching transformer L302, to obtain maximum output at left channel. See Fig. 5-10. 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 adj. control RV501 (see Fig. 5-10) 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.

5-5. A-M I-F STRIP ALIGNMENT

Preparation

Remove the wooden case as described in Procedure 2-3. Then set the receiver's BAND selector to AM.

Sweep Generator Method

1. Connect the sweep-generator's output across CV402 (variable capacitor) through a 50- or 75-ohm pad, as shown in Fig. 5-14.

2. With the equipment connected as shown in Fig. 5-15, adjust the oscilloscope controls and generator output to provide a visible indication.

3. Turn the top core of IFT 401 to obtain a maximum and symmetrical response as shown in Fig. 5-17.

Rf Signal Generator Method

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

Modulation ..... INTERNAL
Frequency..... 455 kHz
OUTPUT level..... 1000 μV

2. Connect the rf signal-generator's output across CV402 (variable capacitor) through 50- or 75-ohm pad, as shown in Fig. 5-14.

3. With the equipment connected as shown in Fig. 5-16, turn the top core of IFT 401 to obtain the maximum output.

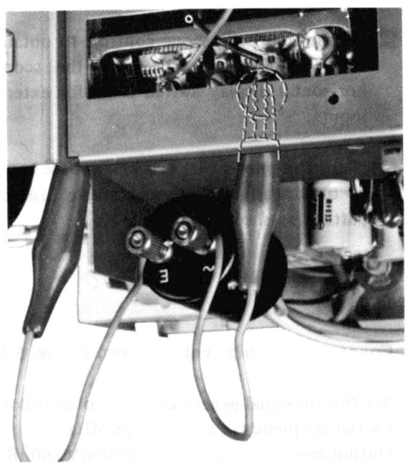


Fig. 5-14. 455-kHz sweep-generator connection point

ST-80F

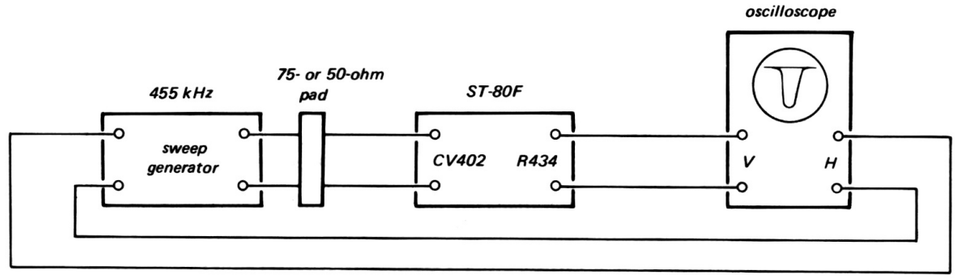


Fig. 5-15. A-m i-f alignment by sweep generator test setup

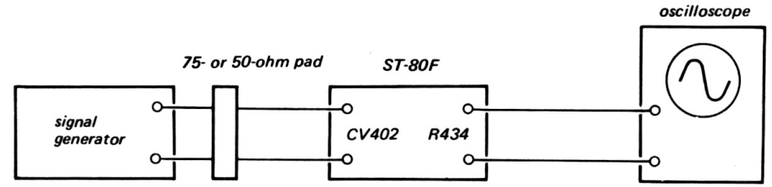


Fig. 5-16. A-m i-f alignment by rf signal generator test setup

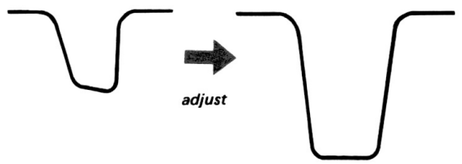


Fig. 5-17. A-m i-f response

5-6. A-M FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

Preparation

Remove the wooden case as described in Procedure 2-3. Then, set the tuner's BAND selector to AM.

Signal Generator Method

With the equipment connected as shown in Fig. 5-18, follow the procedures given in Tables 2 and 3 when performing this alignment with an a-m signal generator.

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 the Procedure 2-17.

Frequency Coverage Adjustment

1. Tune the receiver to the lowest-frequency station.

2. Check the dial scale for a calibration accuracy of ±40 kHz from the carrier frequency of the lowest and ±20 kHz at the highest station. If the dial-accuracy deviation exceeds this limit, turn the local oscillator-coil L403 as shown in Fig. 5-19, slightly until optimum dial calibration is obtained.

3. Tune the receiver to the highest-frequency station in your locality. If the dial-calibration error is excessive, adjust local-oscillator trimmer-capacitor CT402 (see Fig. 5-19.) 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 L401 as shown in Fig. 5-20 to obtain maximum output.

2. Tune the set to the station whose carrier frequency is closest to 1400 kHz and adjust the antenna trimmer CT 401 to obtain a maximum output. See Fig. 5-19.

3. Repeat the above steps two or three times.

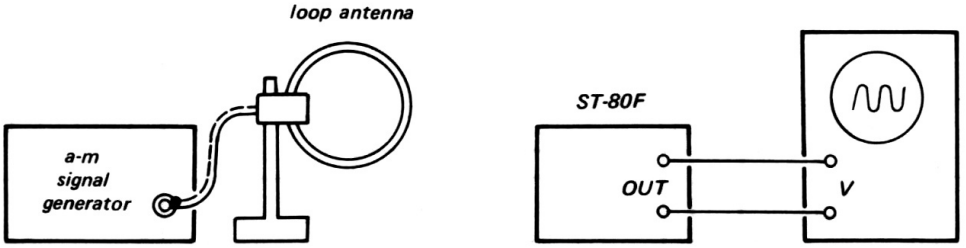


Fig. 5-18. A-m frequency coverage and tracking adjustment test setup

TABLE 2. 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 μV (70 dB)	Maximum-capacitance position	OUTPUT J705	OSC coil L403 Fig. 5-19	Maximum
Loop antenna	1,680 kHz same as above	Minimum-capacitance position	Same as above	OSC trimmer CT402 See Fig. 5-19	Same as above

TABLE 3. 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	OUTPUT J705	Position of antenna coil L 401 See Fig. 5-20	Maximum
Loop antenna	1,400 kHz Same as above	Tune to 1,400 kHz	Same as above	Antenna trimmer CT401 See Fig. 5-19	Same as above

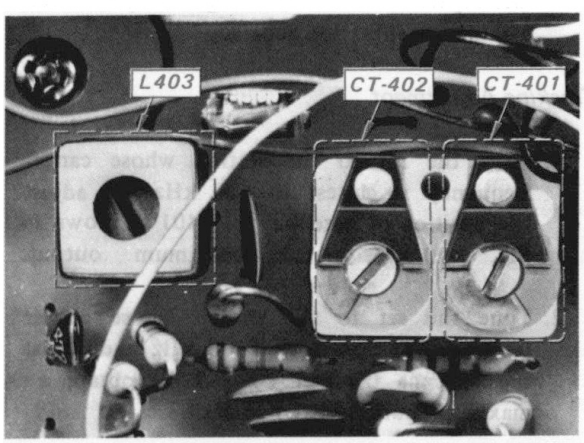


Fig. 5-19. Parts location

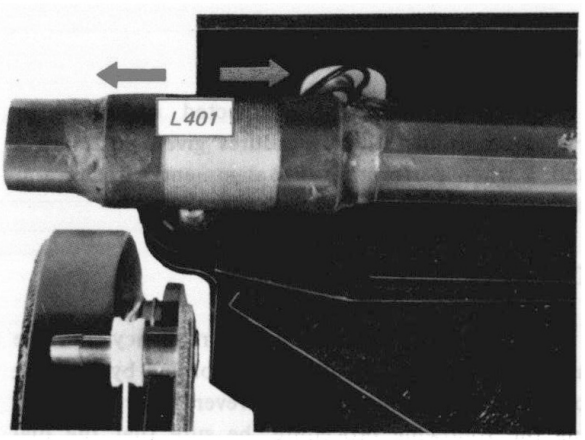


Fig. 5-20. Antenna coil

SECTION 6
LINE-VOLTAGE CHANGEOVER

WARNING

Make sure the ST-80F line cord is disconnected from the ac outlet before performing the following procedures.

The ST-80F can be adapted to operate at several different power-line voltages. The line-voltage change procedure for this model can be performed as follows:

Procedure

1. Take the chassis out of the wooden cabinet as described in Procedure 2-3.
2. Remove the power-supply block as described in Procedure 2-9.
3. Change the wiring to match the line voltage as shown in Fig. 6-1 and Table 4.

TABLE 4. VOLTAGE CONNECTIONS

Line Voltage	100 V	120 V	220 V	240V
Pattern Number/Wire to be soldered				
1	WHT & BRN	WHT & BRN	WHT	WHT
2	YEL & BLU	GRN & ORG	BLU	GRN
3	GRN & ORG	BLU & YEL	BRN & ORG	BRN & ORG
4			GRN	BLU
5			YEL	YEL

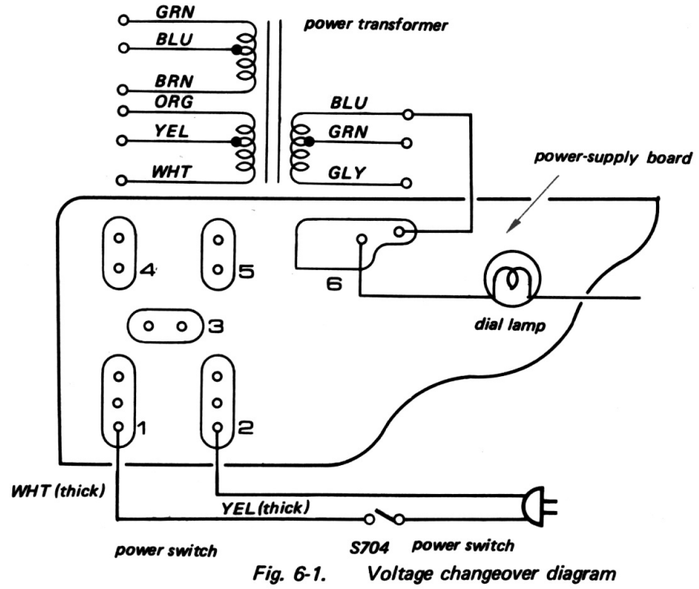
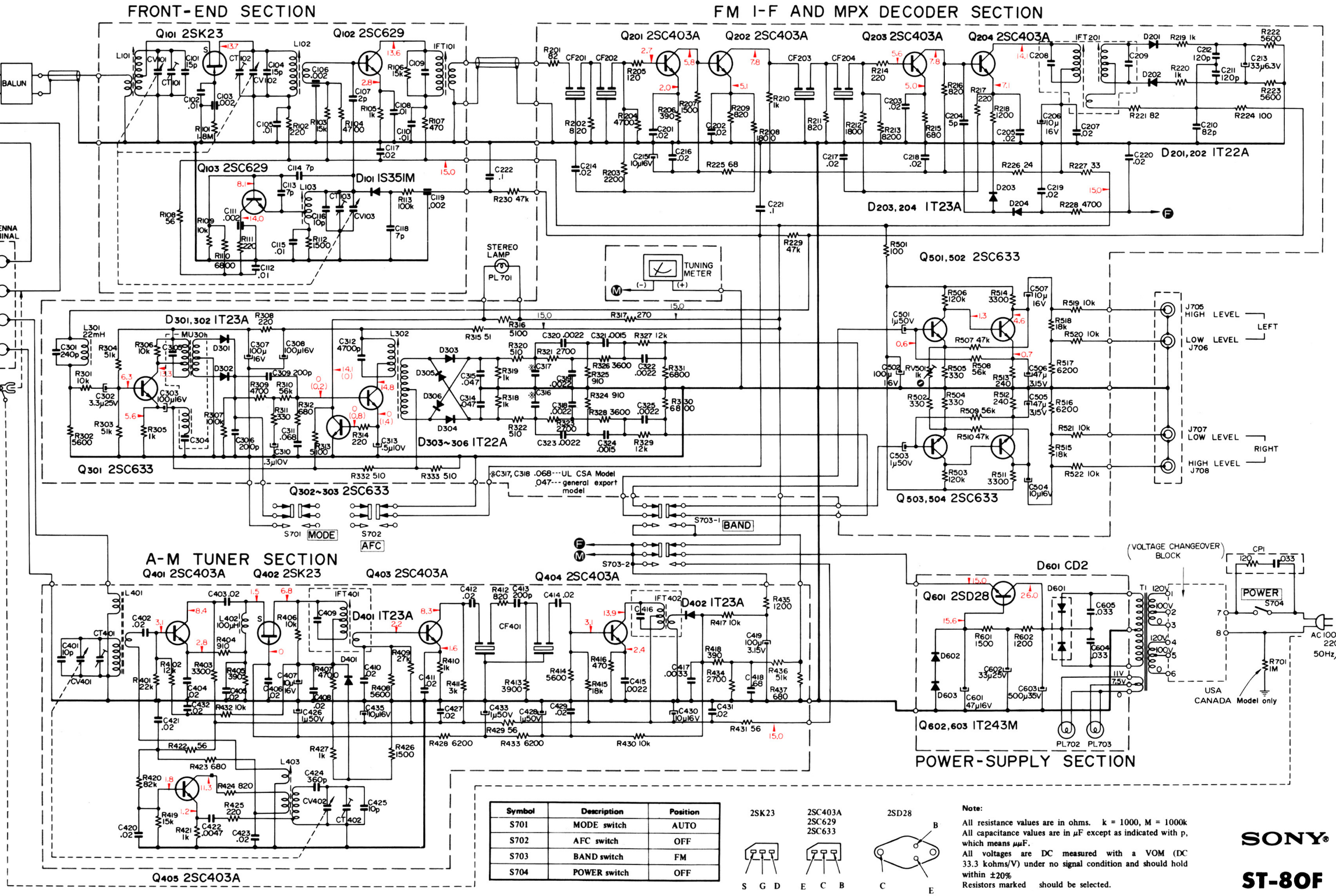


Fig. 6-1. Voltage changeover diagram

MEMO

SCHEMATIC DIAGRAM



Symbol	Description	Position
S701	MODE switch	AUTO
S702	AFC switch	OFF
S703	BAND switch	FM
S704	POWER switch	OFF

2SK23 (S G D)

2SC403A 2SC629 2SC633 (E C B)

2SD28 (B C E)

Note:

All resistance values are in ohms. k = 1000, M = 1000k
All capacitance values are in μF except as indicated with p, which means μμF.
All voltages are DC measured with a VOM (DC 33.3 kohms/V) under no signal condition and should hold within ±20%
Resistors marked should be selected.

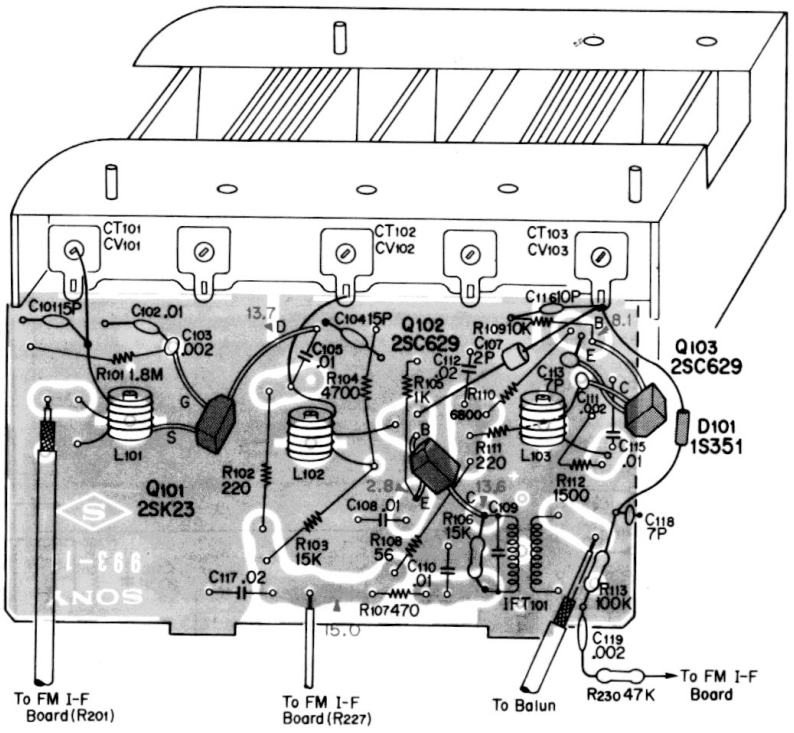
SONY

ST-80F

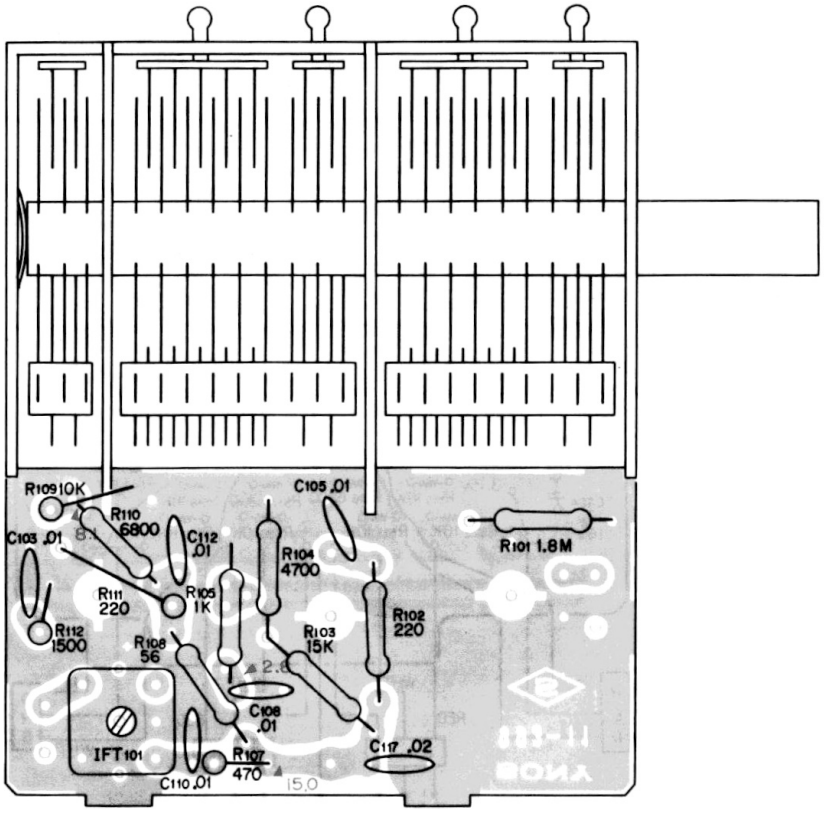
MOUNTING DIAGRAM

Fm Front-End Section

— Conductor side —



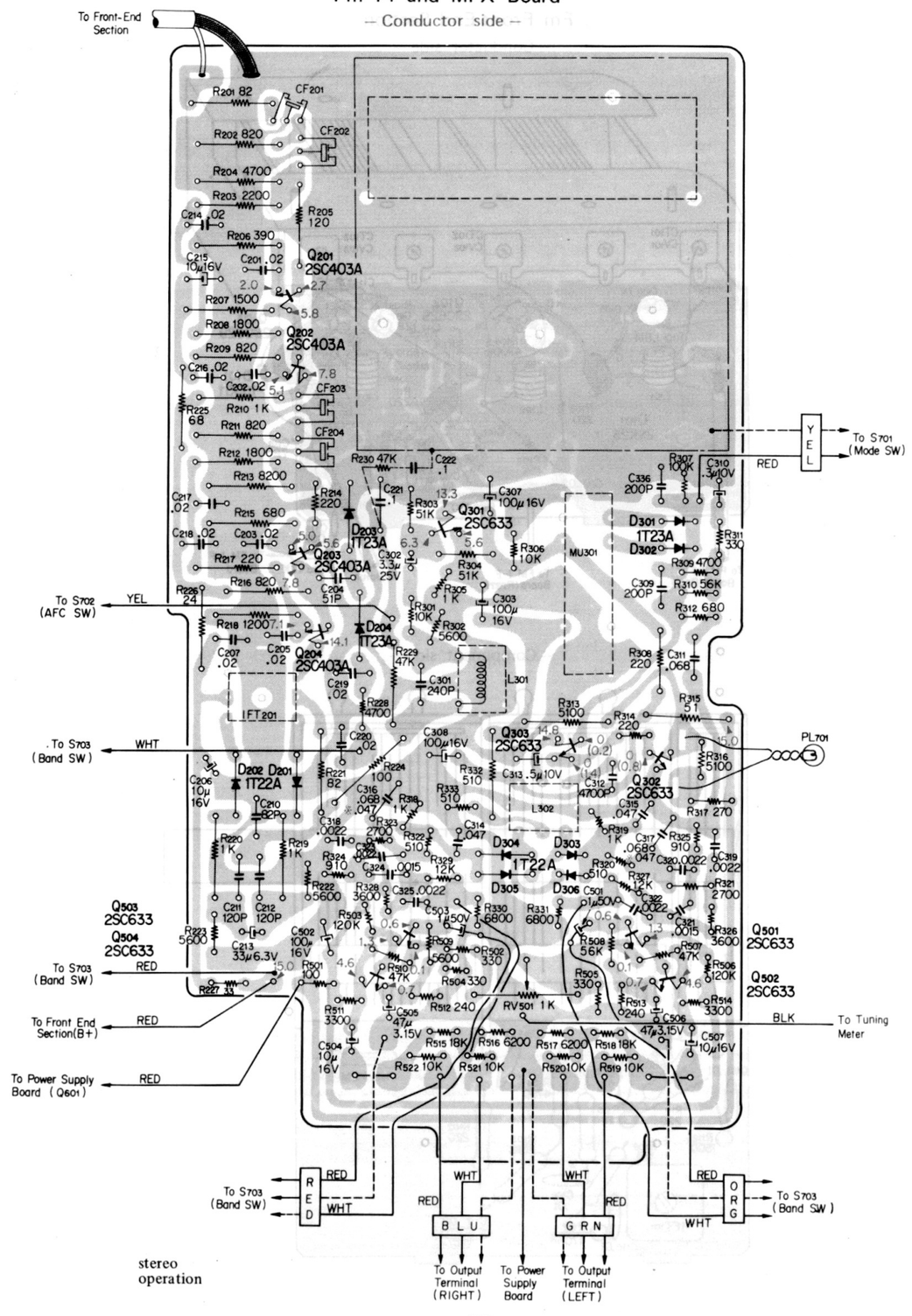
— Component side —



MOUNTING DIAGRAM

Fm I-f and MPX Board

— Conductor side —

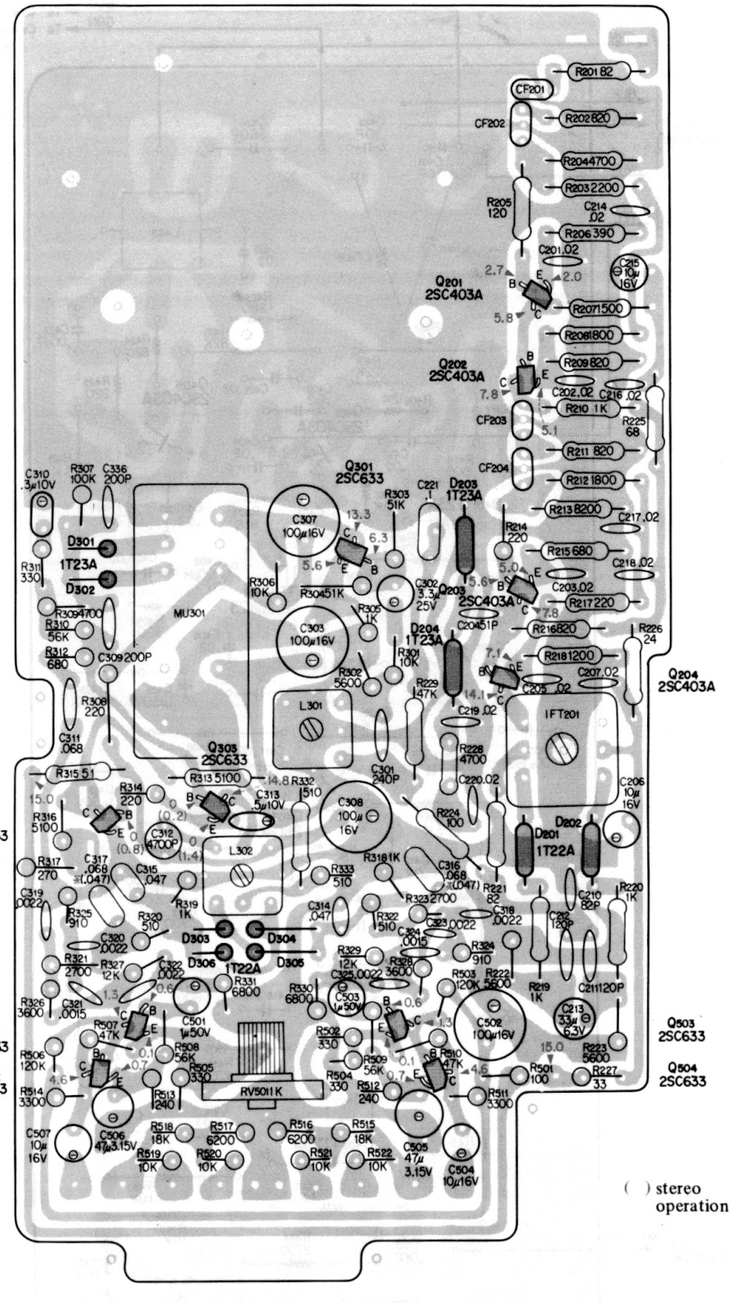


stereo operation

MOUNTING DIAGRAM

Fm I-f and MPX Board

— Component side —

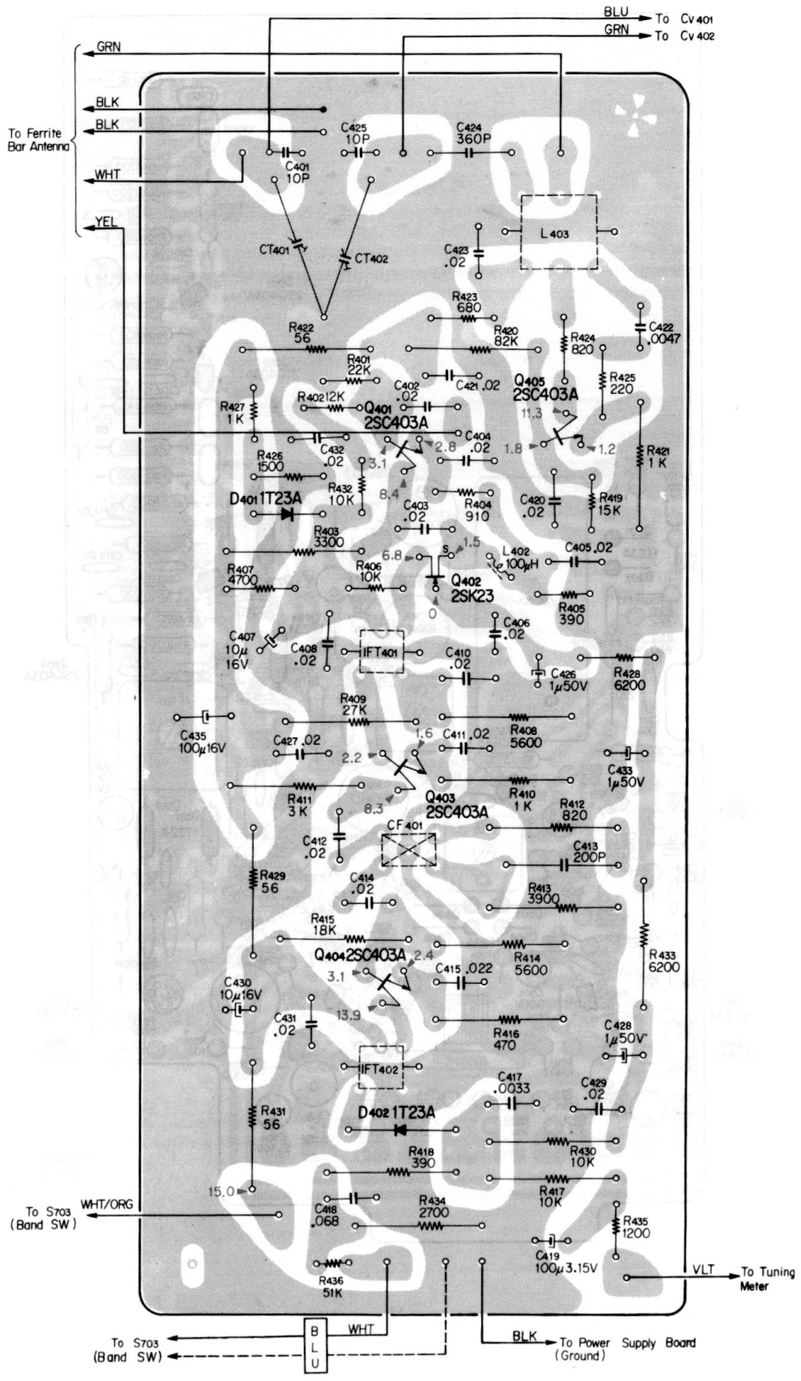


( ) stereo operation

MOUNTING DIAGRAM

A-m CP/I-f Board

– Conductor side –

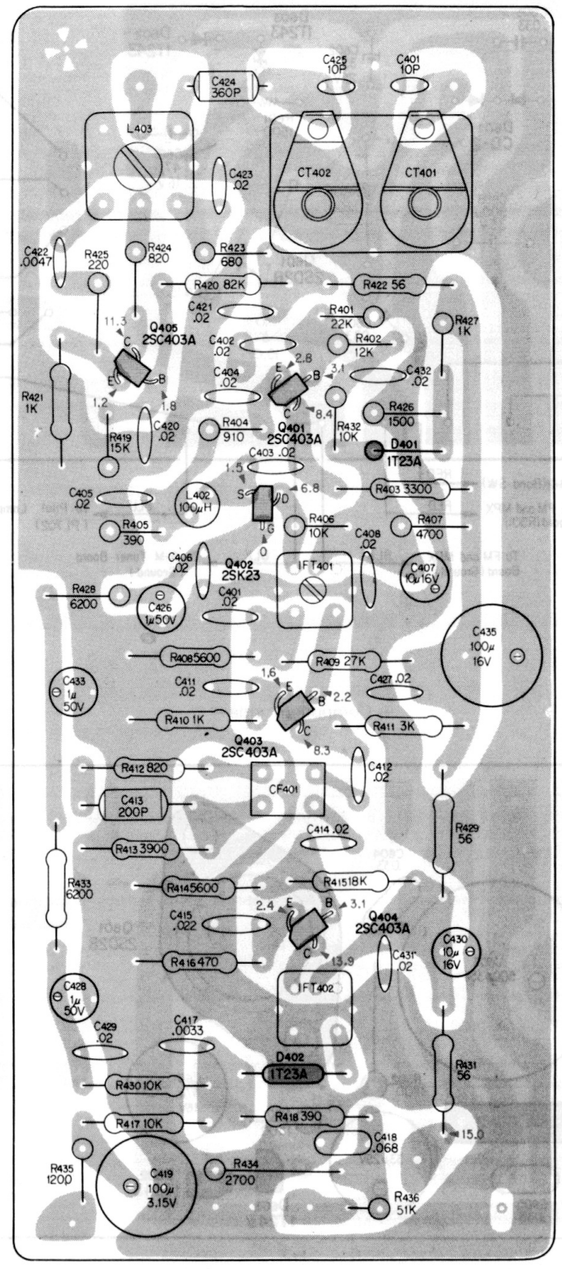


ST-80F

MOUNTING DIAGRAM

A-m CP/I-f Board

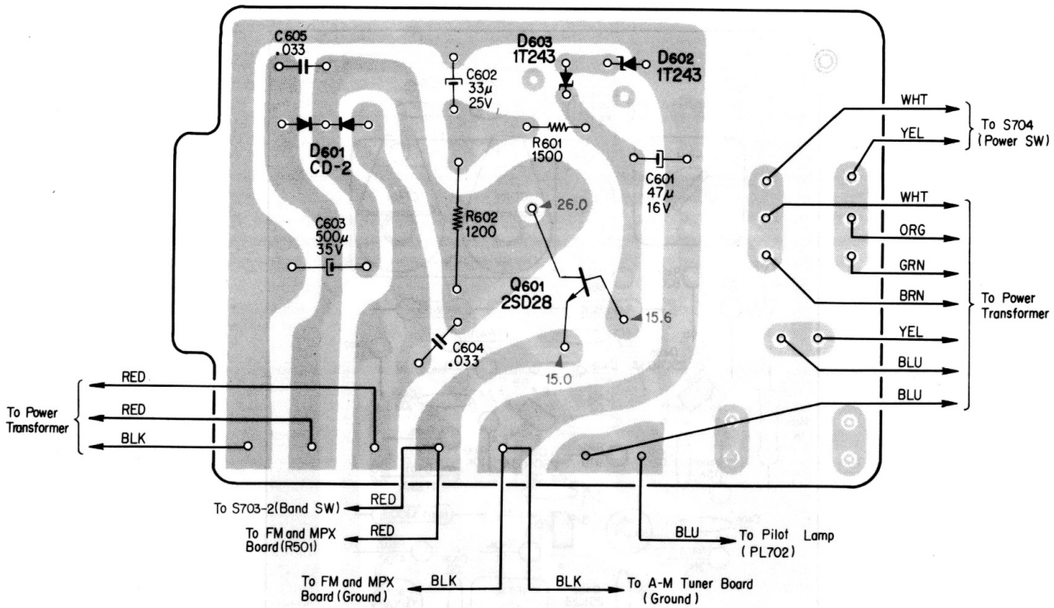
– Component side –



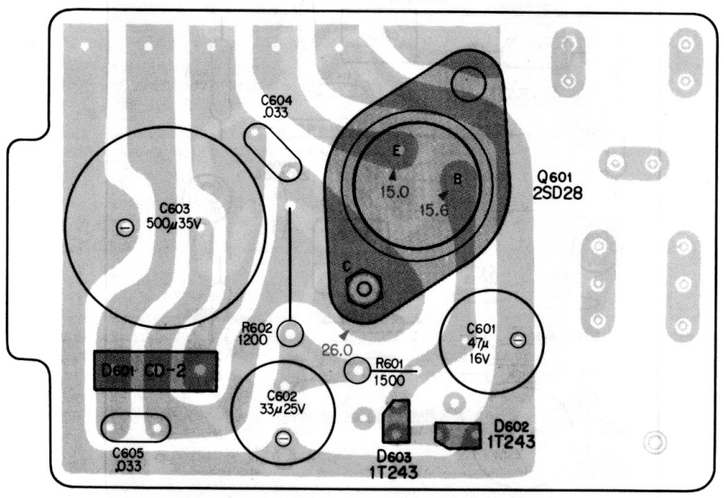
MOUNTING DIAGRAM

Power-Supply Board

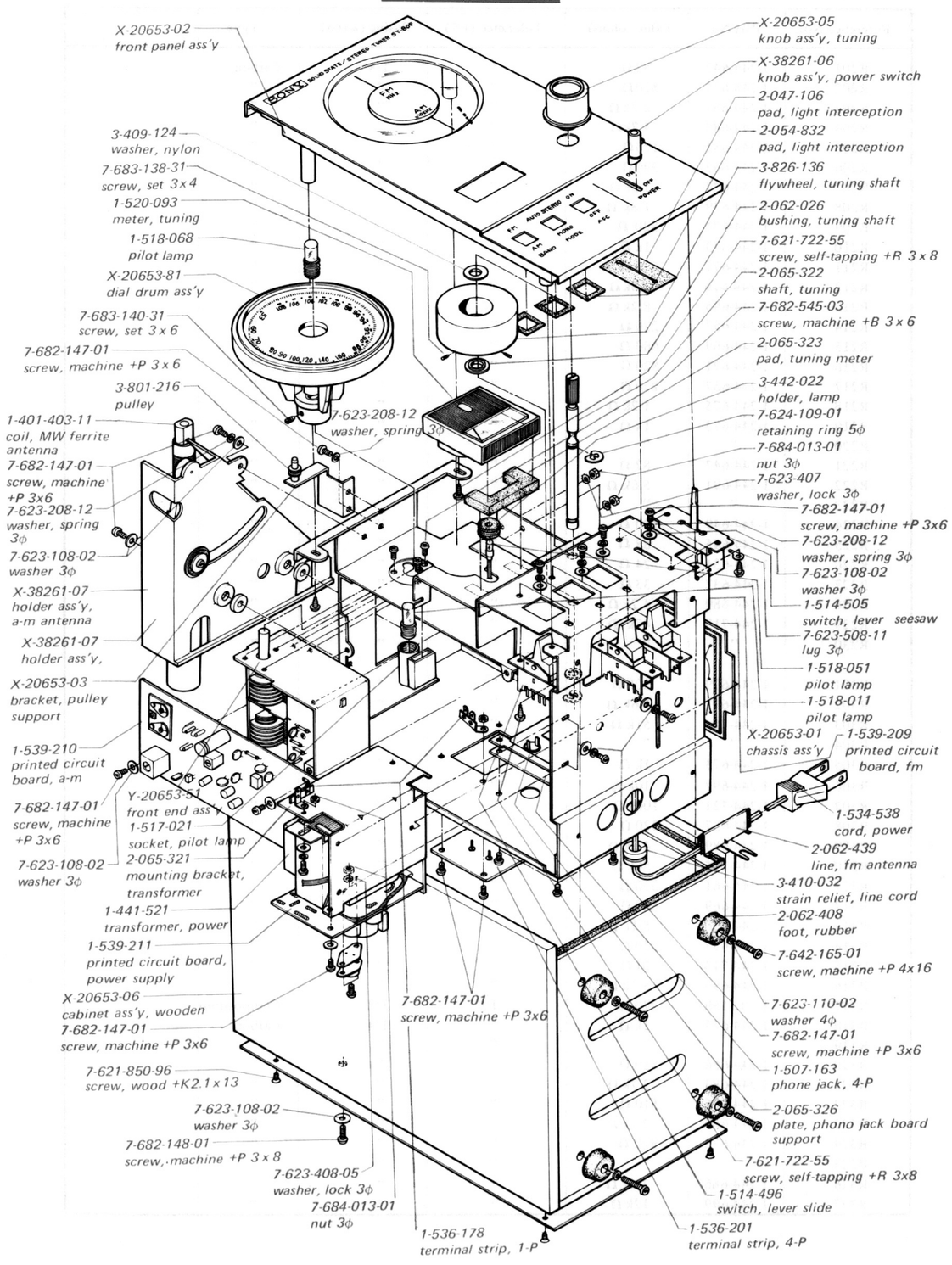
— Conductor side —



— Component side —



EXPLODED VIEW



ELECTRICAL PARTS LIST

(1) RESISTORS

Reference No.	Part No.	Value (ohms)	Tolerance (±%)	Rating (watts)	Type	
R201	1-244-647	82 Ω	5	1/4	Carbon	
R202	1-244-671	820 Ω	"	"	"	
R203	1-244-681	2.2k Ω	"	"	"	
R204	1-244-689	4.7k Ω	"	"	"	
R205	1-244-651	120 Ω	"	"	"	
R206	1-244-663	390 Ω	"	"	"	
R207	1-244-677	1.5k Ω	"	"	"	
R208	1-244-679	1.8k Ω	"	"	"	
R209	1-244-671	820 Ω	"	"	"	
R210	1-244-673	1k Ω	"	"	"	
R211	1-244-671	820 Ω	"	"	"	
R212	1-244-679	1.8k Ω	"	"	"	
R213	1-244-695	8.2k Ω	"	"	"	
R214	1-244-657	220 Ω	"	"	"	
R215	1-244-669	680 Ω	"	"	"	
R216	1-244-671	820 Ω	"	"	"	
R217	1-244-657	220 Ω	"	"	"	
R218	1-244-675	1.2k Ω	"	"	"	
R219	1-244-673	1k Ω	"	"	"	
R220	"	"	"	"	"	
R221	1-244-647	82 Ω	"	"	"	
R222	1-244-691	5.6k Ω	"	"	"	
R223	"	"	"	"	"	
R224	1-244-649	100 Ω	"	"	"	
R225	1-244-645	68 Ω	"	"	"	
R226	1-244-634	24 Ω	"	"	"	
R227	1-244-637	33 Ω	"	"	"	
R228	1-244-689	4.7k Ω	"	"	"	
R229	1-244-713	47k Ω	"	"	"	
R230	"	"	"	"	"	
R301	1-244-699	10k Ω	"	"	"	
R302	1-244-691	5.6k Ω	"	"	"	
R303	1-244-714	51k Ω	"	"	"	
R304	"	"	"	"	"	
R305	1-244-673	1k Ω	"	"	"	
R306	1-244-697	10k Ω	"	"	"	
R307	1-244-721	100k Ω	"	"	"	
R308	1-244-657	220 Ω	"	"	"	
R309	1-244-689	4.7k Ω	"	"	"	
R310	1-244-715	56k Ω	"	"	"	
R311	1-244-661	330 Ω	"	"	"	
R312	1-244-669	680 Ω	"	"	"	
R313	1-244-690	5.1k Ω	"	"	"	
R314	1-244-657	220 Ω	"	"	"	
R315	1-244-714	51 Ω	"	"	"	
R316	1-244-690	5.1k Ω	"	"	"	
R317	1-202-559	270 Ω	10	1/2	Composition	
R318	1-244-673	1k Ω	5	1/4	Carbon	
R319	"	"	"	"	"	
R320	1-244-666	510 Ω	"	"	"	
R321	1-244-683	2.7k Ω	"	"	"	
R322	1-244-666	510 Ω	"	"	"	
R323	1-244-683	2.7k Ω	"	"	"	
R324	1-244-672	910 Ω	"	"	"	
R325	"	"	"	"	"	
R326	1-244-686	3.6k Ω	"	"	"	
R327	1-244-699	12k Ω	"	"	"	

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Reference No.	Part No.	Value (ohms)	Tolerance (±%)	Rating (watts)	Type	
R328	1-244-686	3.6k Ω	5	¼	Carbon	
R329	1-244-699	12k Ω	"	"	"	
R330	1-244-693	6.8k Ω	"	"	"	
R331	"	"	"	"	"	
R332	1-244-666	510 Ω	"	"	"	
R333	"	"	"	"	"	
R401	1-244-705	22k Ω	"	"	"	
R402	1-244-699	12k Ω	"	"	"	
R403	1-244-685	3.3k Ω	"	"	"	
R404	1-244-672	910 Ω	"	"	"	
R405	1-244-663	390 Ω	"	"	"	
R406	1-244-697	10k Ω	"	"	"	
R407	1-244-689	4.7k Ω	"	"	"	
R408	1-244-691	5.6k Ω	"	"	"	
R409	1-244-707	27k Ω	"	"	"	
R410	1-244-673	1k Ω	"	"	"	
R411	1-244-684	3k Ω	"	"	"	
R412	1-244-671	820 Ω	"	"	"	
R413	1-244-687	3.9k Ω	"	"	"	
R414	1-244-691	5.6k Ω	"	"	"	
R415	1-244-703	18k Ω	"	"	"	
R416	1-244-665	470 Ω	"	"	"	
R417	1-244-697	10k Ω	"	"	"	
R418	1-244-663	390 Ω	"	"	"	
R419	1-244-701	15k Ω	"	"	"	
R420	1-244-719	82k Ω	"	"	"	
R421	1-244-673	1k Ω	"	"	"	
R422	1-244-643	56 Ω	"	"	"	
R423	1-244-669	680 Ω	"	"	"	
R424	1-244-671	820 Ω	"	"	"	
R425	1-244-657	220 Ω	"	"	"	
R426	1-244-677	1.5k Ω	"	"	"	
R427	1-244-673	1k Ω	"	"	"	
R428	1-244-692	6.2k Ω	"	"	"	
R429	1-244-643	56 Ω	"	"	"	
R430	1-244-697	10k Ω	"	"	"	
R431	1-244-643	56 Ω	"	"	"	
R432	1-244-697	10k Ω	"	"	"	
R433	1-244-692	6.2k Ω	"	"	"	
R434	1-244-683	2.7k Ω	"	"	"	
R435	1-244-675	1.2k Ω	"	"	"	
R501	1-244-649	100 Ω	"	"	"	
R502	1-244-661	330 Ω	"	"	"	
R503	1-244-723	120k Ω	"	"	"	
R504	1-244-661	330 Ω	"	"	"	
R505	"	"	"	"	"	
R506	1-244-723	120k Ω	"	"	"	
R507	1-244-707	27k Ω	"	"	"	
R508	1-244-715	56k Ω	"	"	"	
R509	"	"	"	"	"	
R510	1-244-707	27k Ω	"	"	"	
R511	1-244-685	3.3k Ω	"	"	"	
R512	1-244-658	240 Ω	"	"	"	
R513	"	"	"	"	"	
R514	1-244-685	3.3k Ω	"	"	"	
R515	1-244-703	18k Ω	"	"	"	

Reference No.	Part No.	Value (ohms)	Tolerance (±%)	Rating (watts)	Type	
R516	1-244-692	6.2k Ω	5	¼	Carbon	
R517	"	"	"	"	"	
R518	1-244-703	18k Ω	"	"	"	
R519	1-244-697	10k Ω	"	"	"	
R520	1-244-697	10k Ω	"	"	"	
R521	"	"	"	"	"	
R522	"	"	"	"	"	
R601	1-244-677	1.5k Ω	"	"	"	
R602	1-244-675	1.2k Ω	"	"	"	
*R701	1-202-645	1M Ω	10	1/2	Composition	

* USA CANADA Model only

(2) CAPACITOR

Reference No.	Part No.	Value (μF)	Tolerance (±%)	Rating (volts)	Type	
C201	1-101-073	0.02μF	+80 −20	25	Ceramic	
C202	"	"	"	"	"	
C203	"	"	"	"	"	
C204	1-101-882	51pF	5	50	"	
C205	1-101-073	0.02μF	+80 −20	25	"	
C206	1-121-347	10μF	+100 −10	16	Electrolytic	
C207	1-101-073	0.02μF	+80 −20	25	Ceramic	
C210	1-101-893	82pF	10	50	"	
C211	1-101-340	120pF	"	"	"	
C212	"	"	"	"	"	
C213	1-121-284	33μF	+100 −10	6.3	Electrolytic	
C214	1-101-073	0.02μF	+80 −20	25	Ceramic	
C215	1-121-347	10μF	+100 −10	16	Electrolytic	
C216	1-101-073	0.02μF	+80 −20	25	Ceramic	
C217	"	"	"	"	"	
C218	"	"	"	"	"	
C219	"	"	"	"	"	
C220	"	"	"	"	"	
C221	1-105-685	0.1μF	10	50	Mylar	
C222	"	"	"	"	"	
C301	1-107-140	240μF	±10	"	Silvered mica	
C302	1-121-344	3.3μF	+150 −10	25	Electrolytic	
C303	1-121-356	100μF	+100 −10	16	"	
C306	1-101-017	200PF	10	50	Ceramic	
C307	1-121-356	100μF	+100 −10	16	Electrolytic	
C308	1-121-356	100μF	+100 −10	16	Electrolytic	

Reference No.	Part No.	Value (μF)	Tolerance (±%)	Rating (volts)	Type	
C309	1-101-017	200PF	10	50	Ceramic	
C310	1-127-021	0.3μF	20	10	Electrolytic (aluminium)	
C311	1-105-683	0.068μF	10	50	Mylar	
C312	1-103-575	4700PF	5	"	Styrol	
C313	1-127-022	0.5μF	20	10	Electrolytic (aluminium)	
C314	1-105-681	0.047μF	10	50	Mylar	
C315	"	"	"	"	"	
C316	1-105-683	0.068μF	"	"	"	
C317	"	"	"	"	"	
C318	1-105-665	2200P	"	"	"	
C319	"	"	"	"	"	
C320	"	"	"	"	"	
C321	1-105-663	1500P	"	"	"	
C322	1-105-665	2200P	"	"	"	
C323	"	"	"	"	"	
C324	1-105-663	1500P	"	"	"	
C325	1-105-665	2200P	"	"	"	
C401	1-101-959	10pF	5	50	Ceramic	
C402	1-101-073	0.02μF	+80 −20	25	"	
C403	"	"	"	"	"	
C404	"	"	"	"	"	
C405	"	"	"	"	"	
C406	"	"	"	"	"	
C407	1-121-347	10μF	+100 −10	16	Electrolytic	
C408	1-101-073	0.02μF	+80 −20	25	Ceramic	
C410	"	"	"	"	"	
C411	"	"	"	"	"	
C412	"	"	"	"	"	
C413	1-103-608	200pF	5	50	Styrol	
C414	1-101-073	0.02 μ F	±80 −20	25	Ceramic	
C415	1-105-677	0.022μF	10	50	Mylar	
C417	1-105-667	3300P	"	"	"	
C418	1-105-677	0.022μF	"	"	"	
C419	1-121-290	100μF	+100 −10	3.15	Electrolytic	
C420	1-101-073	0.02μF	+80 −20	25	Ceramic	
C421	"	"	"	"	"	
C422	1-105-669	4700P	10	50	Mylar	
C423	1-101-073	0.02μF	+80 −20	25	Ceramic	
C424	1-103-614	360PF	5	50	Styrol	
C425	1-101-959	10PF	"	"	Ceramic	
C426	1-121-726	1μF	+150 −10	"	Electrolytic	
C427	1-101-073	0.02μF	+80 −20	25	Ceramic	
C428	1-121-726	1μF	+150 −10	50	Electrolytic	
C429	1-101-073	0.02 μ F	+80 −20	25	Ceramic	
C430	1-121-347	10μF	+100 −10	16	Electrolytic	
C431	1-101-073	0.02μF	+80 −20	25	Ceramic	

Reference No.	Part No.	Value (F)	Tolerance (±%)	Rating (volts)	Type	
C432	1-101-073	0.02μF	+80 −20	25	Ceramic	
C433	1-121-343	1μF	±10	50	Electrolytic	
C434	1-121-726	0.47μF	"	"	"	
C435	1-121-356	100μF	±10	16	"	
C501	1-121-343	1μF	±10	50	"	
C502	1-121-356	100μF	±10	16	"	
C503	1-121-343	1μF	±10	50	"	
C504	1-121-347	10μF	±10	16	"	
C505	1-121-287	47μF	"	3.15	"	
C506	"	"	"	"	"	
C507	1-121-347	10μF	"	16	"	
C601	1-121-353	47μF	±10	"	"	
C602	1-121-286	33μF	"	25	"	
R603	1-121-353	500μ	±10	35	Electrolytic	
R604	1-105-679	0.033μ	10	50	Mylar	
R605	"	"	"	"	"	
CT401 402	1-141-127	Capacitor, trimmer				

(3) SEMICONDUCTOR

Reference No.	Part No.	Description		Reference No.	Part No.	Description	
Q201		Transistor, 2SC403A-4		D201		Diode, 1T22A	
Q202		" "		D202		" "	
Q203		" "		D203		" 1T23A	
Q204		" "		D204		" "	
Q301		" 2SC633-6 or 2SC634-6		D301		" "	
				D302		" "	
Q302		" "		D303		" 1T22A	
Q303		" "		D304		" "	
Q401		" 2SC403A-2		D305		" "	
Q402		FET, 2SK23		D306		" "	
Q403		Transistor, 2SC403A-3		D401		" 1T23A	
Q404		" 2SC403A-4		D402		" "	
Q405		" 2SC403A-3		D601		" CD2	
Q501		" 2SC633 or 2SC634		D602		" 1T243M	
				D603		" "	
Q502		" "					
Q503		" "					
Q504		" "					
Q601		" 2SD28					

(4) TRANSFORMER, COIL AND INDUCTOR

Reference No.	Part No.	Description		Reference No.	Part No.	Description	
T1	1-441-521	Transformer, power		L302	1-425-260	Transformer, switching	
1FT201	1-403-291	Transformer, discriminator		MU301	1-425-535	Coil unit, MPX	
1FT401	1-403-152	Transformer, intermediate (455KHz)		L401	1-401-403	Coil, a-m ferrite antenna	
				L402	1-407-169	Microinductor, 100pH	
1FT402	1-403-128	"		L403	1-405-374	Coil, a-m oscillator	
L301	1-409-181	Coil, SCA channel trap					

(5) FILTER

Reference No.	Part No.	Description		Reference No.	Part No.	Description	
CF201	1-403-297	Filter, ceramic 10.7MHZ		CF204	1-403-297	Filter, ceramic 10.7MHZ	
CF201	"	" "		CF401	1-403-153	" 455KHz	
CF203	"	" "					

(6) SWITCH

Reference No.	Part No.	Description		Reference No.	Part No.	Description	
S701	1-514-496	Switch, lever slide		S704	1-514-505-22S	Switch, lever seesaw (USA. CANADA Model only)	
S702	"	"					
S703	"	"					

(7) MOUNTED CIRCUIT BOARD

Reference No.	Part No.	Description		Reference No.	Part No.	Description	
	X-20653-21	FM tuner circuit board			X-20653-23	Power supply circuit board	
	X-20653-22	A-M tuner circuit board			Y-20653-51	Front-end and ass'y	

(8) MISCELLANEOUS

Reference No.	Part No.	Description		Reference No.	Part No.	Description	
	1-231-057	Encapsulated component (120Ω + 0.033μF)			1-534-487-21	Cord, power (General Export Model only)	
	1-507-163	Phono jack, 4-P			1-534-538-21	Cord, power (USA. CANADA Model only)	
	1-517-021	Socket, pilot lamp			1-536-178	Terminal strip, 1-P	
	1-518-017	Pilot lamp, 8V 0.15A ±10%			1-536-201	" 4-P	
	1-518-051-22	Pilot lamp, 4.5V 0.04A ±10%			1-536-248	"	
	1-518-068	Pilot lamp, 12V 0.3A ± 10%					
	1-520-093	Meter, tuning					

(9) FRONT-END PARTS LIST

(a) Resistors

Ref. No.	Part No.	Value (ohms)	Tolerance (±%)	Rating (watts)	Type	
R101	1-244-751	1.8M	5	¼	carbon	
R102	1-244-657	220	"	"	"	
R103	1-244-701	15k	"	"	"	
R104	1-244-689	4.7k	"	"	"	
R105	1-244-673	1k	"	"	"	
R106	1-244-701	15k	"	"	"	
R107	1-244-665	470	"	"	"	
R108	1-244-643	56	"	"	"	
R109	1-244-697	10k	"	"	"	
R110	1-244-693	6.8k	"	"	"	
R111	1-244-657	220	"	"	"	
R112	1-244-677	1.5k	"	"	"	
R113	1-244-721	100k	"	"	"	

(b) Capacitors

Ref. No.	Part No.	Value (F)	Tolerance (±%)	Rating (volts)	Type	
C101	1-101-861	15p	5	50	ceramic	
C102	1-101-072	0.01μ	+80 -20	25	"	
C103	1-101-799	2000p	+100 -5	"	"	
C104	1-101-861	15p	5	50	"	
C105	1-102-077	0.01μ	20	25	"	
C106	1-101-073	0.02μ	+80 -20	"	"	
C107	1-101-939	2p	10	50	"	
C108	1-101-072	0.01μ	+80 -20	25	"	
C109		supplied with IFT101				
C110	1-101-072	0.01μ	+80 -20	25	"	
C111	1-101-799	2000p	+100 -5	"	"	
C112	1-101-072	0.01μ	+80 -20	25	"	
C113	1-102-875	7p ±0.5		50	"	
C114	1-102-875	"	"	"	"	
C115	1-102-072	0.01μ	+80 -20	25	"	
C116	1-101-999	10p±0.5			"	
C117	1-101-073	0.02μ	+80 -20	25	"	
C118	1-102-875	7p ±0.5		50	"	
C119	1-101-073	0.02μ	+80 -20	25	"	
CT103	1-141-087	Capacitor, trimmer				
CV101, CV102, CV103, CV301, CV302	1-151-190	Capacitor, tuning fm/a-m				

(c) Semiconductors

Ref. No.	Part No.	Description		Ref. No.	Part No.	Description	
Q101		FET, 2SK23		Q103		Transistor, 2SC629	
Q102		Transistor, 2SC629		D101		Diode, 1S351M	

(d) Transformers, Coils and Inductors

Ref. No.	Part No.	Description		Ref. No.	Part No.	Description	
L101	1-401-369	Coil, antenna		L103	1-405-376	Coil, OSC	
L102	1-425-517	" , rf		IFT101	1-403-295	IFT, fm	

(e) Front-end Ass'y

Ref. No.	Part No.	Description		Ref. No.	Part No.	Description	
FAF-012BW1	Y-20653-51	Front-End Ass'y					