

SECTION 1. SUMMARY

SERVICING PRECAUTIONS

1. Always disconnect the power source before:

- 1) Removing or reinstalling any component, circuit board, module or any other instrument assembly.
- 2) Disconnecting or reconnecting any instrument electrical plug or other electrical connection.
- 3) Connecting a test substitute in parallel with an electrolytic capacitor in the instrument.

CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Do not defeat any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.

3. Do not apply power to this instrument and or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.

4. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.

- 1) The service precautions are indicated or printed on the cabinet, chassis or components. When servicing, follow the printed or indicated service precautions and service materials.
- 2) The Components used in the unit have a specified conflammability and dielectric strength. When replacing any components, use components which have the same ratings. Components marked  in the circuit diagram are important for safety or for the characteristics of the unit. Always replace with the exact components.
- 3) An insulation tube or tape is sometimes used and some components are raised above the printed writing board for safety. The internal wiring is sometimes clamped to prevent contact with heating components. Install them as they were.
- 4) After servicing always check that the removed screws, components and wiring have been installed correctly and that the portion around the service part has not been damaged. Further check the insulation between the blades of attachment plug and accessible conductive parts.

CAUTION. GRAPHIC SYMBOLS



THE LIGHTNING FLASH WITH APOWHEAD SYMBOL. WITHIN AN EQUILATERAL TRIANGLE, IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF UNINSULATED "DANGEROUS VOLTAGE" THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK.



THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

ESD PRECAUTIONS

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive Devices (ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors and semiconductor chip components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

- 1) Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
- 2) After removing an electrical assembly equipped with ESD devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
- 3) Use only a grounded-tip soldering iron to solder or unsolder ESD devices.
- 4) Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESD devices.
- 5) Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESD devices.
- 6) Do not remove a replacement ESD device from its protective package until immediately before you are ready to install it. (Most replacement ESD devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
- 7) Immediately before removing the protective material from the leads of a replacement ESD device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

- 8) Minimize bodily motions when handling unpackaged replacement ESD devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ESD device).

SPECIFICATIONS

1. GENERAL

Power requirements	DC12V~15V
Ground system	Negative
Dimensions(W x H x D)	188 x 58 x 166mm
Weight	Net: 1.3kg

2. RADIO SECTION

	FM	AM(MW)	LW(Optional)
Frequency range	65.0~74.0MHz(Optional), 87.5~108MHz	522~1,620kHz (Optional:530~1,710kHz/ 520~1,620kHz)	144~281kHz
Intermediate frequency	10.7MHz	450kHz	450kHz
Usable sensitivity	10dB μ V	28dB μ V	35dB μ V
Signal to noise ratio	60dB	50dB	50dB

3. TAPE SECTION

Tape type	2 track 2 channel system
Tape speed	4.75cm/sec
Wow and flutter	0.2%(WRMS)
Signal to noise ratio	50dB

4. AUDIO SECTION

Maximum output power	50W x 4
Frequency response	40Hz to 14,000Hz
Speaker impedance	4 Ω x 4 or 8 Ω x 4
Signal to noise ratio	60dB

NOTE: The design and specifications are subject to change without notice in the source of product improvement.

SECTION 2. ELECTRICAL ADJUSTMENTS

1. Test & Adjustment point (6410/6430/6510)

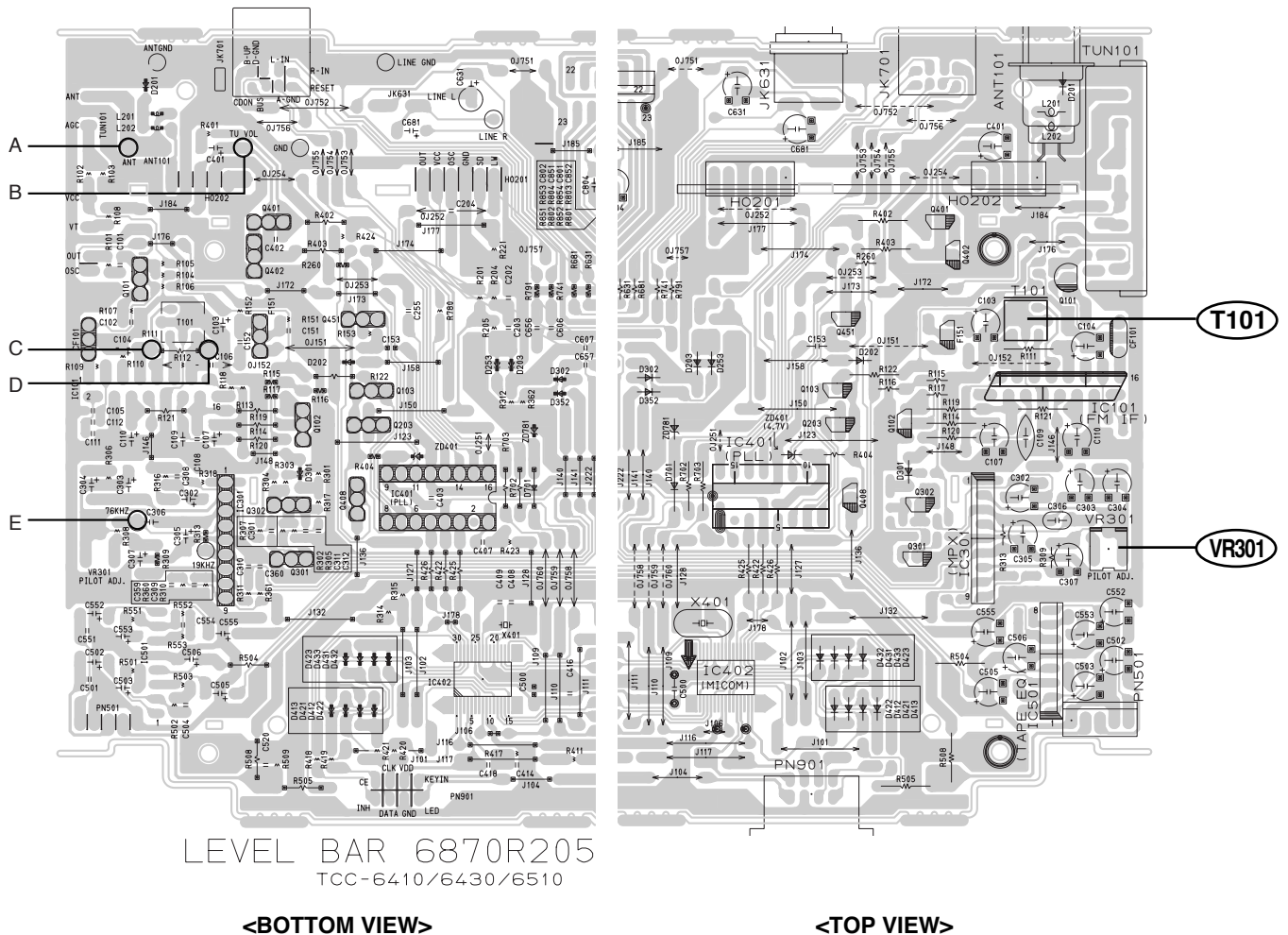


Figure 1. MAIN PCB Board

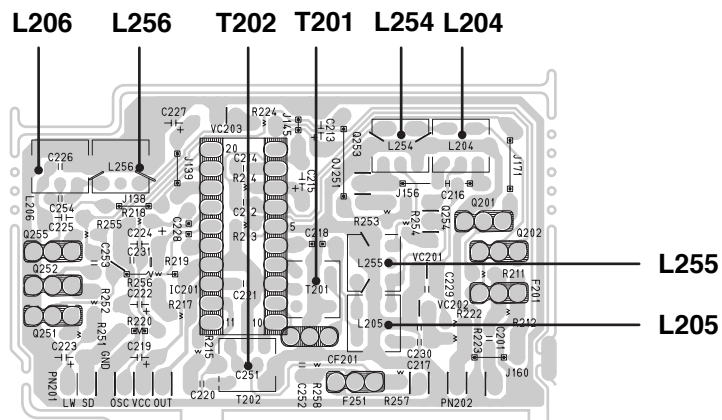


Figure 2. RF PCB Board

2. FM Adjustment

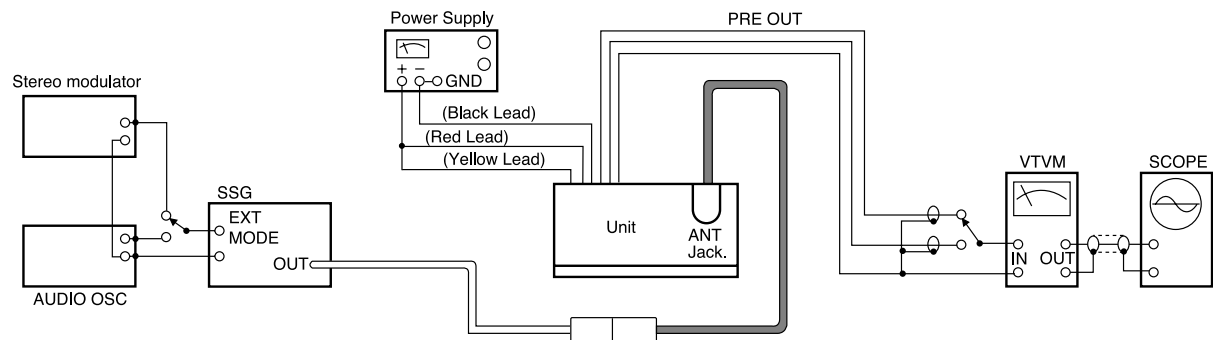


Figure 3.

- (1) The impedance of FM antenna terminal is 75Ω
Therefore, connect coaxial cable (3C-2V etc.) between FM SG and antenna terminal when wiring.

Type	Item	FM SSG Attenuator Indication	Available Power Ratio	Antenna Terminal Voltage
Open indication type		0dB	5.2dBf	6dB/μV
		60dB	65.2dBf	66dB/μV
Load or close indication type		0dB	11.2dBf	12dB/μV
		54dB	65.2dBf	66dB/μV

- (2) There are two kind in indication of FM SG output attenuator.
- 1) Attenuator with Marking of 75Ω open...open indication type.
 - 2) Attenuator with marking of 75Ω load or close...load or close indication type.
- (3) FM SG output level in this FM adjustment are described as open indication type. The left table shows relations among FM SG attenuator indication(dB), available power ratio(dBf) and antenna terminal voltage(dB/μV) in each indication type.

Notes:

1. BAND Switch FM
2. BALANCE Center
3. TREBLE/BASS Center
4. Connect as shown in figure 3.
5. Refer to figure 1~2 for Adjustment Points.

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUSTMENT	ADJUST FOR
		FROM	TO			
1	Discriminator	98MHz 60dB 22.5kHz Dev. 1kHz FM SSG	ANT Jack or Point A	Between Point C & Point D, DC Volt Meter.	T101	DC 0V±10mV
2	MPX Adjustment	98MHz 60dB 75kHz Dev.1kHz FM SSG	Same as above	Between Point E & GND, Frequency Counter	VR301	76kHz±50Hz

3. AM(MW) Adjustment

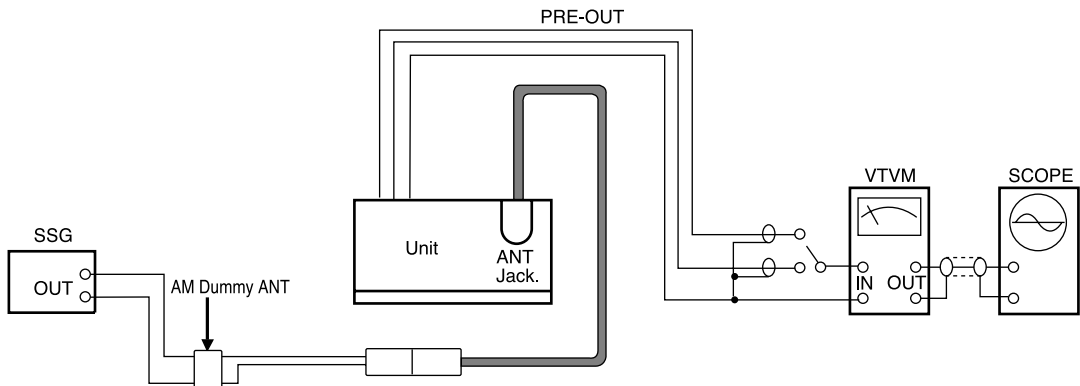


Figure 4.

Notes:

- 1. BAND Switch AM(MW)
- 2. Connect as shown in figure 4.
- 3. Refer to figure 1~2 for Adjustment Points.

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUSTMENT	ADJUST FOR
		FROM	TO			
1	520 or 522kHz	No Input		LCD Display (Reception Frequency)	TUNE +/- Button	520 or 522kHz
	Tuning Voltage Adjustment			Between Point B and GND, DC Volt Meter	L206	DC 1.2V ± 0.05V
2	IF Coil Adjustment	600kHz or 603kHz ANT input, 30dB, 400Hz (30% MOD) SSG.	ANT Jack or Point A	Output L or R ch, VTVM & Oscilloscope	T201 & T202	Max. Output
3	600kHz or 603kHz RF Adjustment	600kHz or 603kHz ANT input, 30dB, 400Hz (30% MOD) SG.	Same as above	LCD Display (Reception Frequency)	TUNE +/- Button	600 or 603kHz
				Output L or R ch, VTVM & Oscilloscope	L204 & L205	Max. Output

4. LW Adjustment(Optional)

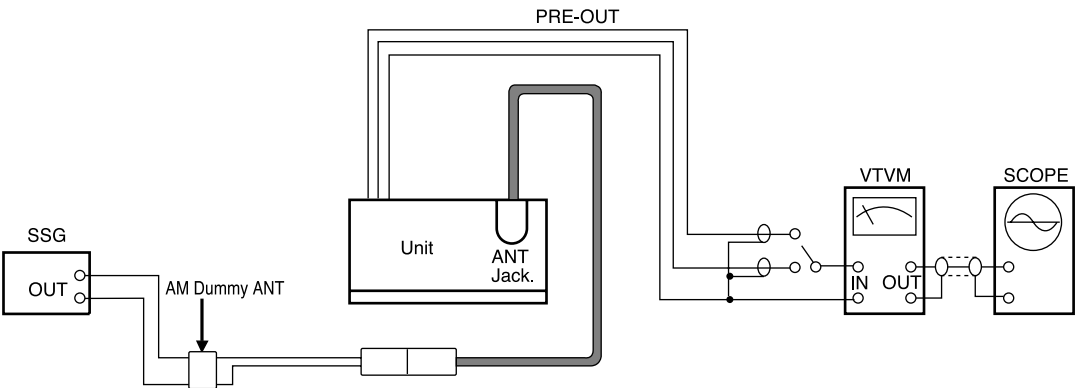


Figure 5.

Notes:

- 1. BAND Switch LW
- 2. Connect as shown in figure 5.
- 3. Refer to figure 1~2 for Adjustment Points.

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUSTMENT	ADJUST FOR
		FROM	TO			
1	144kHz	No Input		LCD Display (Reception Frequency)	TUNE +/- Button	144kHz
	Tuning Voltage Adjustment			Between Point B and GND, DC Volt Meter	L256	DC 1.2V $\pm$ 0.05V
2	150kHz RF Adjustment	150kHz ANT input, 30dB, 400Hz (30% MOD) SSG.	ANT Jack or Point A	LCD Display (Reception Frequency)	TUNE +/- Button	150kHz
				Output L or R ch, VTVM & Oscilloscope	L254 & L255	Max. Output

5. Cassette Deck Adjustment

- (1) Before this adjustment, clean PLAYBACK head surface.
- (2) For this adjustment, use test tape MTT-114.
- (3) VOLUME Center
- (4) BALANCE Center
- (5) TREBLE/BASS Center
- (6) Connect as shown in figure 6.

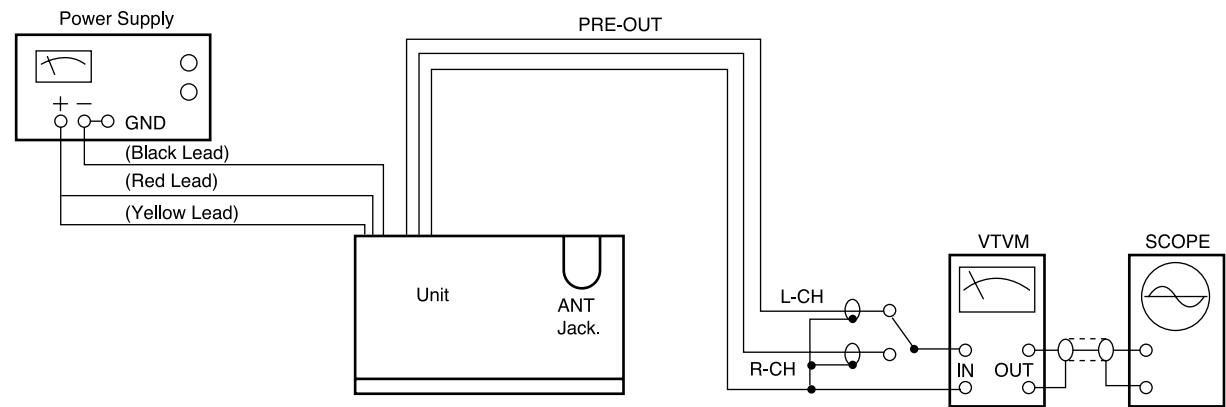


Figure 6.

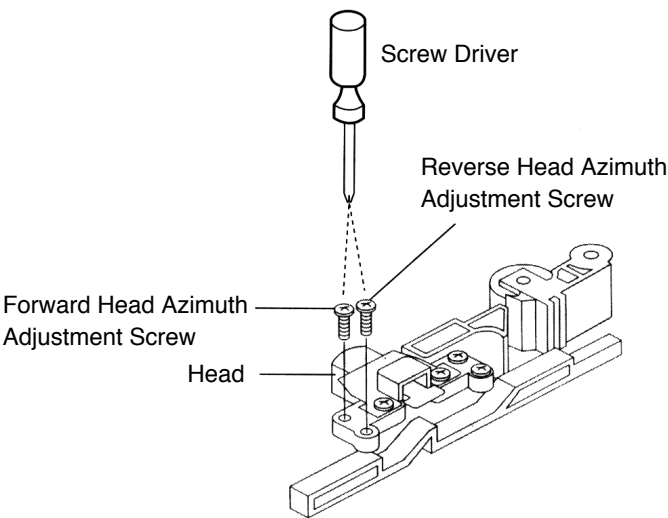


Figure 7.

SUBJECT	MEASURE OUTPUT	SETTING	ADJUSTMENT	ADJUST FOR	REMARKS
P.B Head Adjustment	L-CH, R-CH, VTVM and Scope See figure 6.	Playback(FWD & REV) the TEST TAPE MTT-114	Adjust the azimuth adjusting screw (in figure 7).	Max. Output both channels on FWD and REV PLAY	After this adjustment, lock the screw with paint.