

 **MITSUBISHI**

**AM/FM STEREO TUNER-PREAMPLIFIER**

**DA-C20**

**INSTRUCTION BOOK**

Congratulations on your choice of the Mitsubishi AM/FM Stereo Tuner-Preamplifier Model DA-C20. For best performance results, please read this instruction book carefully before use.

**WARNING—TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.**

For future reference a space has been provided below for recording the serial number of your tuner - preamplifier.

Serial #

AB8201056

# PRECAUTIONS

## 1. GENERAL

**BE SURE TO USE YOUR A.C. POWER SOURCE**  
Your A.C. power is marked on the side panel of this unit. Connection to any other power source may cause damage to this unit and/or severe electrical shock.

### **DO NOT PLUG IN OR UNPLUG THE POWER CORD WITH WET HANDS**

There is a great danger of severe electrical shock if the power cord is plugged in or unplugged with wet hands. Do not attempt to unplug the cord from an A.C. outlet by pulling the cord. Firmly grasp the plug to remove it from the A.C. outlet.

### **DO NOT ALLOW WATER OR ANY FOREIGN MATTER TO GET INSIDE THIS UNIT**

Should water or a metallic object accidentally fall into this unit, immediately disconnect the power cord and consult your authorized service dealer.

### **HANDLE THE POWER CORD WITH CARE**

Do not bend sharply or twist the power cord. If the insulation becomes damaged, the conductor breaks, or poor contacts occur, request service from your authorized service dealer. Continued use under these conditions, may cause fire or electrical shock.

### **DO NOT TOUCH THE INSIDE OF THIS UNIT**

There are high voltages inside this unit. Never remove the top or bottom cover. All inspections and repair including fuse replacement, should be carried out by your authorized service dealer.

### **DISCONNECT THE POWER CORD AT THE FIRST SIGN OF TROUBLE**

At the first sign of unusual noise, odor, or malfunction, disconnect the power cord and consult your authorized service dealer. Continued use under these conditions, may increase damage or cause additional problems.

## 2. LOCATION

### **AVOID PLACEMENT IN DIRECT SUNLIGHT, NEAR AIR CONDITIONER ETC.**

This unit can become unstable if operated in extremely high or low temperatures. Place it in a well ventilated area for proper heat dissipation. Avoid placement in direct sunlight, near air conditioners, poorly ventilated areas or in areas of excess humidity or dust. Do not block the ventilation holes.

## 3. CONNECTIONS

### **BE SURE TO TURN OFF THE POWER BEFORE MAKING CONNECTIONS**

This is to prevent damage to the speakers from the popping noise which occurs when plugging and unplugging cords.

### **USE EXTREME CARE IN MAKING THE CORRECT CONNECTIONS**

If you reverse the R (right) and L (left) leads, you will reverse the stereo location of R and L channels.

### **MAKE CONNECTIONS SECURELY**

If any of the plugs should become loose or disconnected, a hum may develop. If this is not corrected, deterioration of sound quality and possible damage to the speakers may result.

### **USE ONLY SHIELDED CORD FOR THE LEADS**

Use only shielded cords for interconnecting components. Do not use cords longer than 2m (6'). Excessive lead lengths can deteriorate high frequency response and are subject to interference that can result in hum or noise.

### **WHEN NOT USING THE PHONO INPUTS, KEEP THE SHORTING PLUGS INSERTED IN THE INPUTS**

This is to prevent hum and noise and to prevent the popping noise which can occur when switching the program selector switch without a turntable connected.

### **WHEN USING THE COMPANION POWER AMPLIFIER (DA-A10DC, DA-A15DC) AND SWITCHING TWO PAIRS OF SPEAKERS FROM THIS UNIT, ENSURE THAT THE COMBINED IMPEDANCE (BOTH PAIRS OF SPEAKERS OPERATING) IS 4 OHMS OR ABOVE**

If the combined impedance is below 4 ohms, the load impedance detector circuit may operate and mute the power amplifier output.

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The combined impedance is determined with the following formula.

$$\text{COMBINED IMPEDANCE} = \frac{A \times B}{A + B} \text{ (OHMS)}$$

# FRONT PANEL TERMINOLOGY AND FUNCTIONS

eg.  $\frac{8 \times 8}{8 + 8} = 4$  (ohms)

A : Nominal impedance of speaker A

B : Nominal impedance of speaker B

Please consult your audio dealer for additional information.

## 4. OPERATIONS

**BEFORE PLACING THE POWER SWITCH IN THE ON OR OFF POSITION OR OPERATING SWITCHES, ALWAYS TURN THE PREAMPLIFIER'S VOLUME (ATTENUATOR) CONTROL ALL THE WAY DOWN**

This is to protect the speakers from the damage, that can occur if the volume level is set high and the power is turned on.

**THERE WILL BE NO SOUND FOR A FEW SECONDS AFTER YOU TURN ON THE POWER. THIS IS NOT A MALFUNCTION.**

This unit is equipped with a power supply muting circuit which prevents popping noise when the power switch is turned on or off.

## 5. CARE

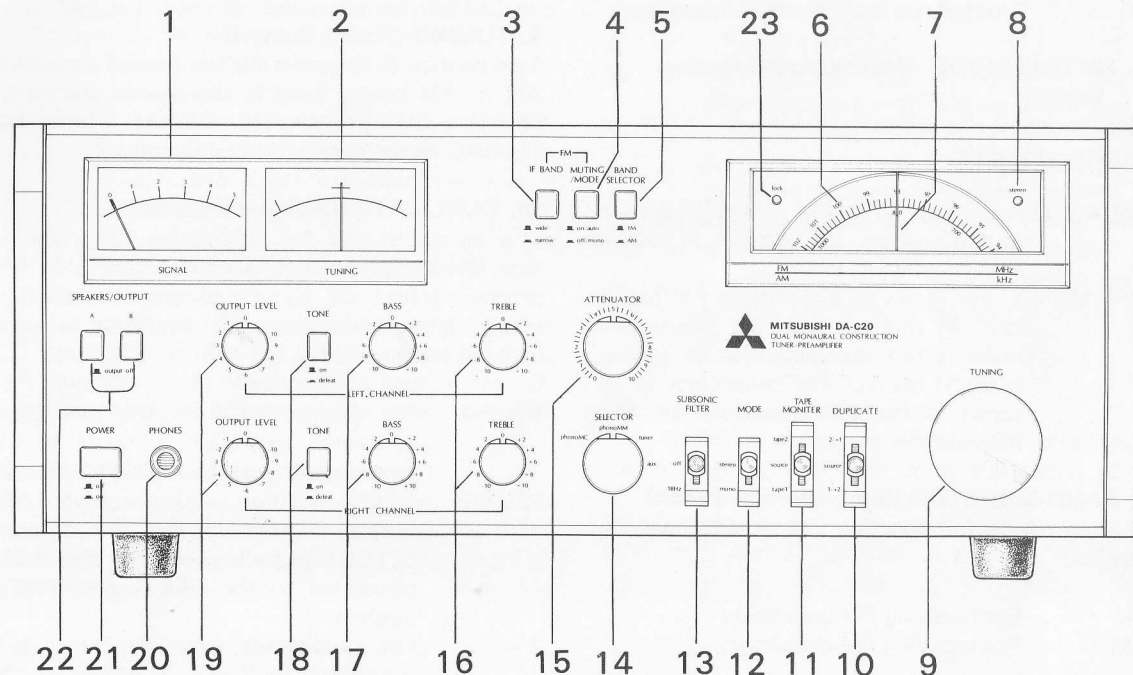
Wipe the cabinet with a soft cloth when it becomes dusty. If it should get really dirty, dampen a soft cloth in a weak solution of mild soap and water, wring it out dry and wipe off. When finished, dry completely with a soft dry cloth. Any volatile materials such as alcohol, thinner, benzine, insecticides, etc, may remove the paint or damage the luster and should not be used.

### 1. SIGNAL (Signal Strength Meter)

This meter shows the signal strength level of AM and FM broadcasts. For AM broadcasts, the best position for reception is obtained when the needle of this meter reaches its maximum deflection to the right. For FM broadcasts, the best position for reception is obtained when the needle of this meter reaches its maximum deflection to the right and the needle of the TUNING meter is centered.

### 2. TUNING (FM Center Channel Tuning Meter)

This meter shows the most distortion-free position for receiving the FM signal. When locating FM broadcasts, first tune in the station with the SIGNAL meter. Then use this meter for fine tuning adjustments. When no FM signal is being received, the needle of this meter is in the center. As a station is tuned in, the needle will move either to the right or the left and then back to the center when the signal is tuned to its best position. This meter does not function for AM stations.



### 3. IF BAND (Selectivity Switch)

This selectivity switch is for choosing the IF bandwidth and may be switched between the WIDE (with 45 dB selectivity) and the NARROW (with 75 dB selectivity) for reception.

**WIDE** For receiving an FM broadcast when there is no interference from nearby stations. In this position, the lowest distortion reception is obtained.

**NARROW** For receiving an FM broadcast in a crowded broadcast area to eliminate interference from nearby stations.

### 4. MUTING/MODE (Muting Mode Selection Switch)

This switch is for selecting the mode of FM reception you desire.

**ON/AUTO** For receiving a FM stereo broadcast. In this position, the interstation noise is eliminated while tuning.

**OFF/MONO** For receiving a monaural FM broadcast. In this position, the interstation noise is not eliminated while tuning, enabling weaker FM broadcasts to be tuned in. Stereo broadcasts are also received monaurally.

### 5. BAND SELECTOR (Band Selection Switch)

This switch is for selecting FM or AM band reception.

**FM** For receiving FM broadcasts

**AM** For receiving AM broadcasts

### 6. DIAL SCALE

This scale indicates FM or AM frequencies.

### 7. DIAL MARKER

This marker indicates receiving FM or AM frequency.

### 8. STEREO (Stereo Indicator)

This indicator lights up when a FM stereo broadcast is being received. If the MUTING/MODE switch is in the OFF/MONO position, this indicator will not light up even when a stereo station is tuned in.

### 9. TUNING (Tuning Control)

This control is for selecting the desired station on AM or FM bands. Tune in the desired station by observing the position of SIGNAL meter and TUNING meter while rotating this control.

### 10. DUPLICATE (Duplicate Switches)

This switch is used for duplicating from tape to tape. While duplicating, normal listening to the program source set by the program SELECTOR switch is possible since the duplicate function operates independently.

**1 → 2** For duplicating from the tape deck connected to PLAY 1 inputs to the tape deck connected to REC 2 outputs.

**SOURCE** In this position, you can record the program source set by the program SELECTOR switch with the tape decks connected to the REC 1 and REC 2 outputs.

**2 → 1** For duplicating from the tape deck connected to PLAY 2 inputs to the tape deck connected to REC 1 outputs.

### 11. TAPE MONITOR (Tape Monitor Switches)

This switch is used for monitoring either the program source being recorded or the playback from a tape deck. For more details, see page 13.

**TAPE 1** For playing or record monitoring of the tape deck connected to PLAY 1 inputs.

**SOURCE** For reproducing program sources set by the program SELECTOR switch.

**TAPE 2** For playing or record monitoring of the tape deck connected to PLAY 2 inputs.

### 12. MODE (Mode Switch)

This switch selects stereo or monaural.

**STEREO** The normal play position. Sounds on the left channel are reproduced through the left speaker, and sounds on the right channel are reproduced on the right speaker.

**MONO** Program material from both right and left channels is combined and reproduced through both speakers.

### 13. SUBSONIC FILTER (Subsonic Filter Switch)

This filter attenuates the frequencies below 18 Hz on the right and left channels at a 6 dB/oct rate. The subsonic filter is used to remove unwanted low frequency noise, and to prevent acoustic feedback.

**14. SELECTOR (Input Selection Switch)**

This switch selects the desired program source.

**PHONO MC** This position is used for playing a disc on the turntable equipped with a MC (moving coil) cartridge and connected to the PHONO MC inputs.

**PHONO MM** This position is used for playing a disc on the turntable equipped with a MM (moving magnet) cartridge and connected to the PHONO MM inputs.

**TUNER** For listening to programs on the AM/FM tuner.

**AUX** For playing a second tuner turntable with a high output ceramic cartridge, tape deck for playback use, television audio, or any suitable high output sources connected to the AUX inputs.

**15. ATTENUATOR (Volume Control)**

This control adjusts the sound volume from the speakers and the headphones. The volume is increased by rotating clockwise, and decreased by rotating counterclockwise.

**16. TREBLE (R & L) (Treble Controls)**

These controls vary the sound level of the high frequency range on the right and left channels. Moving clockwise from "0" increases treble, while moving counterclockwise from "0" attenuates treble. Each step of these controls precisely adjusts the treble at 2dB. Select the best positions to suit the characteristics of your speakers and listening room, or personal preference. At the "0" position, a flat frequency response is obtained.

**17. BASS (R & L) (Bass Controls)**

These controls vary the sound level of the low frequency range on the right and left channels. Moving clockwise from "0" increases bass while moving counterclockwise from "0" attenuates bass. Each step of these controls precisely adjusts the bass at 2dB. Select the best positions to suit the characteristics of your speakers and listening room, or personal preference. At the "0" position, a flat frequency response is obtained.

**18. TONE (R & L) (Tone Defeat Switches)**

This switch is used for cancelling the TREBLE and BASS controls on the right and left channels.

**ON** Both TREBLE and BASS controls can be adjusted.

**DEFEAT** In this position, TREBLE and BASS controls are removed from the signal path and a flat frequency response is obtained.

**19. OUTPUT LEVEL (R & L) (Output Level Controls)**

Moving these controls counterclockwise from their "0" position reduces the volume of the right and left channels. They are normally kept in the "0" position or may be adjusted to any level in between.

**20. PHONES (Headphone Output)**

For stereo listening with headphones, plug the headphones into this output. Listening by headphones is possible at all positions of the SPEAKERS/OUTPUT switches.


**21. POWER (Power Switch)**


This switch is for turning this unit on and off. When in the ON position, the faces (SIGNAL, TUNING, dial scale) are illuminated.


**22. SPEAKERS/OUTPUT (Speaker Selection Switches)**


When using the companion power amplifier (DA-A10DC, DA-A15DC), the speakers connected to the power amplifier may be controlled with these switches. The "speaker control cable" supplied with the power amplifier must be connected, to utilize these switches.

**A B**

 For listening with headphones. Preamp-lifier outputs are off and no sound will be produced from the speakers.

 For listening to the speakers connected to the A terminals on the power amplifier.

 For listening to the speakers connected to the B terminals on the power amplifier.

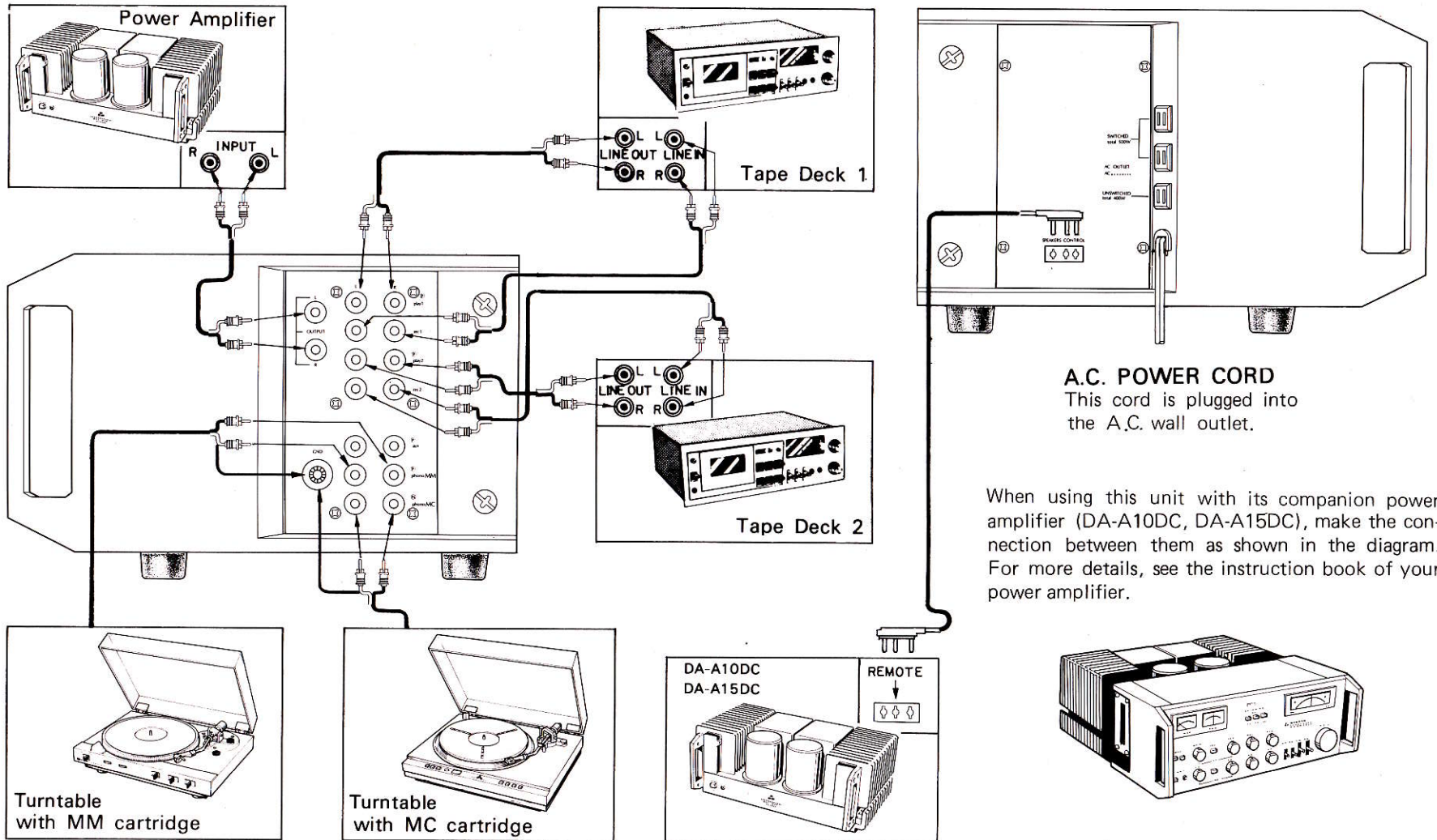
 For listening to the speakers connected to both A and B terminals on the power amplifier.

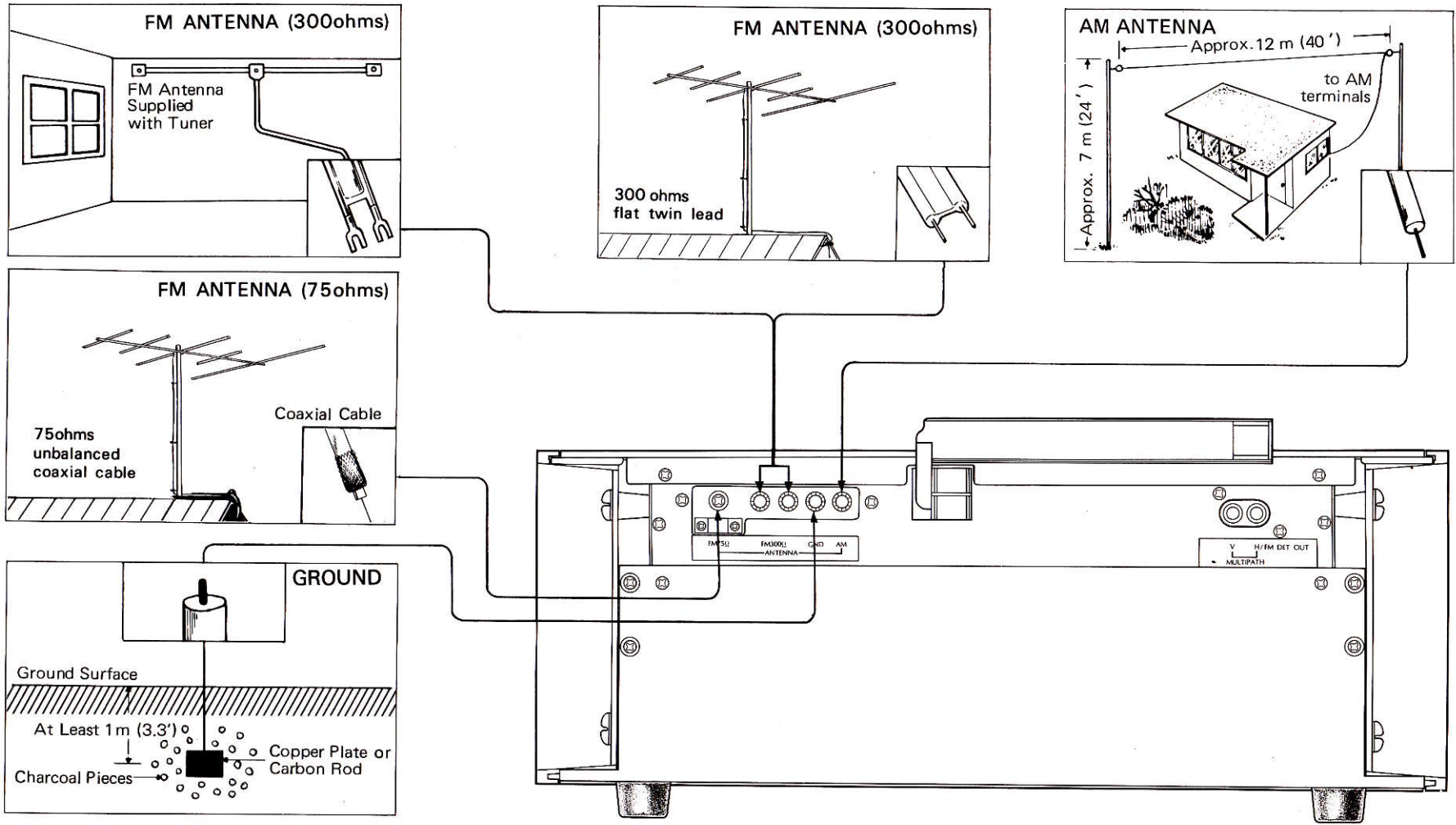
**23. LOCK (Lock Indicator)**

This indicator lights up when a FM broadcast is being received and tune in to the center of the TUNING meter. This indicator does not work for AM reception.

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# SIDE AND REAR PANELS TERMINOLOGY AND CONNECTIONS





**PHONO MC (Phono Inputs for MC Cartridge)**

The input impedance of phono MC is 10 ohms. The output leads from the turntable equipped with a MC cartridge are connected here.

**PHONO MM (Phono Inputs for MM Cartridge)**

The input impedance of phono MM is 50k ohms. The output leads from the turntable equipped with a MM cartridge are connected here.

**AUX (Auxiliary Inputs)**

These inputs may be used for a television audio or any suitable high output sources.

**PLAY 1, PLAY 2 (Tape Playback Inputs)**

These inputs are for tape playback. Connect the tape deck outputs here.

**REC 1, REC 2 (Recording Tape Outputs)**

These outputs are for use when recording on tape. Connect the tape deck inputs here.

**GND (Ground Terminal)**

Sometimes, hum or other noise may develop when a turntable is connected to this unit. In such a case, connect the ground wire of a turntable to this terminal.

**OUTPUT (Preamplifier Outputs)**

The preamplifier outputs are connected to the inputs of the power amplifier.

**AM BAR ANTENNA**

This is the antenna for receiving AM broadcasts. This antenna is directional. It should be put in the position which brings the best reception.

**ANTENNA (Antenna Terminals)**

These terminals are used for connecting an FM antenna. For more details, page 9 and 10.

**FM 75Ω (75 ohms Antenna Terminals with Holder)**

For connecting 75 ohms coaxial cable.

**FM 300Ω (FM 300 ohms Antenna Terminals)**

For connecting 300 ohms flat twin lead.

**GND (Ground Terminal)**

For connecting ground wire when using an outdoor AM receiving antenna. A good earth ground can be obtained by burying a copper plate or rod and connecting all ground wires to it. **Caution**—Never connect the ground wires to water or gas pipes.

**AM (AM External Antenna Terminal)**

For connecting an external AM antenna. When using this unit in an area of poor AM reception, connect an outdoor AM receiving antenna to this terminal.

**MULTIPATH (Multipath Detector Outputs)**

These outputs are for detecting multipath disturbance. For more details, see "FM MULTIPATH ADJUSTMENT" section on page 11.

**FM DET OUT (FM Detector Outputs)**

These outputs are for connection to an FM 4 channel decoder when receiving FM 4 channel broadcasts.

**SWITCHED (A.C. Outlets)**

A.C. power is available from these outlets when the POWER switch is on. These may be used for power amplifier, etc. The total output power must not exceed 500W.

**UNSWITCHED (A.C. Outlets)**

A.C. power is available from these outlets whether the POWER switch is on or off. These may be used for turntable, etc. The total output power must not exceed 400W.

**SPEAKERS CONTROL (Speaker Control Output Terminal)**

When using a companion power amplifier (DA-A10 DC, DA-A15DC), this terminal is connected to the "remote" terminal on the power amplifier by means of the "speaker control cable" supplied with the power amplifier. This allows control of the speakers from the front panel of this unit.

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# INFORMATION ON ANTENNA

## 1. FM ANTENNA

For excellent reproduction of FM broadcasts, a proper FM antenna is a necessity.

### CHOOSE THE PROPER ANTENNA FOR YOUR AREA

- **AREAS WHERE THE STATIONS ARE CLOSE AND THE SIGNALS ARE STRONG**

The use of an outdoor FM antenna is recommended but the T shaped antenna provided with this unit can also be used. When using the T shaped antenna, connect it to the FM 300Ω terminals. While listening to an FM station, attach the antenna to the ceiling or wall. The strength of the signal will change with the direction of the horizontal part of the antenna. (The top of the "T"). Orient it in the direction that brings the strongest and best reception.

- **AREAS WHERE SIGNALS ARE WEAK BECAUSE OF LONG DISTANCE FROM FM STATIONS OR WHERE BUILDING CONSTRUCTION BLOCKS THE SIGNALS**

Use an outdoor FM antenna of from 3 to 8 elements located in the highest possible place. Usually 300 ohms flat twin lead is used between the antenna and the tuner. It should be connected to the FM300Ω terminals.

- **AREAS WITH INTERFERENCE OR NOISE**

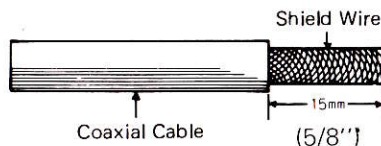
If you live in the city where there is a lot of automobile traffic, near industrial plants, or near high voltage lines, you may encounter noise even if you install an outdoor FM antenna. In such areas it is necessary to

connect the antenna to the tuner with 75 ohms coaxial cable. When using 75 ohms coaxial cable, connect it to the FM75Ω terminals.

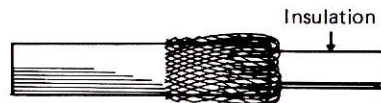
### HOW TO ATTACH COAXIAL CABLE

Use a coaxial cable cutter or some other suitable instrument such as a wire cutter, etc.

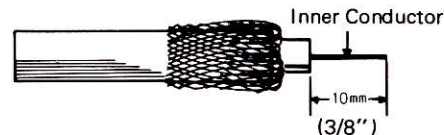
- 1 Cut back the outer insulation of the cable to a distance of 15mm (5/8")



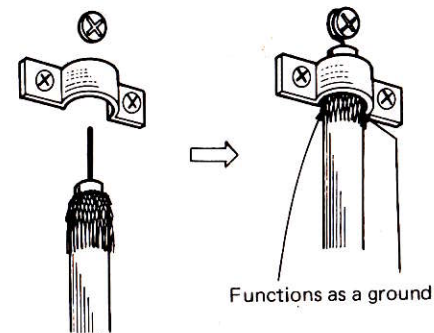
- 2 Peel the braided shield wire back over the outer insulation of the cable.



- 3 Cut the insulation from the inner conductor to a distance of 10mm (3/8").



- 4 Insert the end of the coaxial cable into the holder of the FM75Ω terminals and fasten the inner conductor down. Then tighten the holder, over the braided portion of the cable.

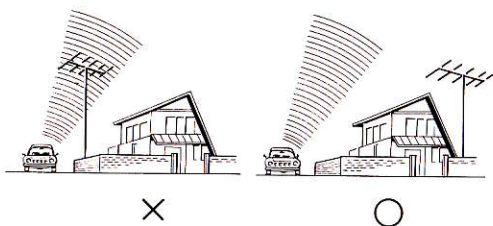


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### HOW TO POSITION THE FM ANTENNA

- Locate the antenna where the broadcasting station's signals can be received directly without obstruction, such as buildings, etc. In places where the radio signal cannot be received directly, as in between tall buildings, find the optimum location for the antenna by rotating to the position of least noise and distortion while listening to the signal.
- To avoid automobile ignition noise, place the antenna as far from roads as possible.

Positioning of FM Antenna



- As a rule, the higher the antenna, the better the reception, but in certain places medium height is best.
- FM antennas have a characteristic called "directivity" which means that they receive signals best from a certain direction. Be sure to orient the antenna so that it is pointing toward the transmitting antenna of the broadcasting station.
- Position your FM antenna in the direction which will minimize multipath interference.

For more details, see "FM MULTIPATH ADJUSTMENT" section on page 11.

### ATTENUATION

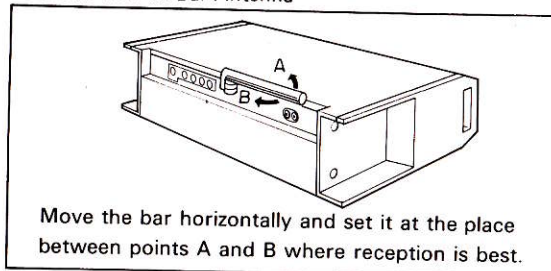
If you experience audible distortion, or if you are unable to get adequate station separation during FM reception, this indicates that signals may be too strong. By using an attenuator, this problem can be overcome. Please consult your authorized audio dealer for additional information.

## 2. AM ANTENNA

### FERRITE BAR ANTENNA

The built in ferrite bar AM antenna is highly sensitive and an outdoor antenna should not be necessary. Bend it out away from the rear panel and orient it to the position where reception is best. Be careful not to place the A.C. power cord or other wires too close to the antenna since this may cause unwanted noise.

How to use AM Bar Antenna



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### EXTERNAL ANTENNA

In areas where stations are especially weak, connect an external antenna (the standard is 7m [24'] high and 12m [40'] long) to the AM terminal.

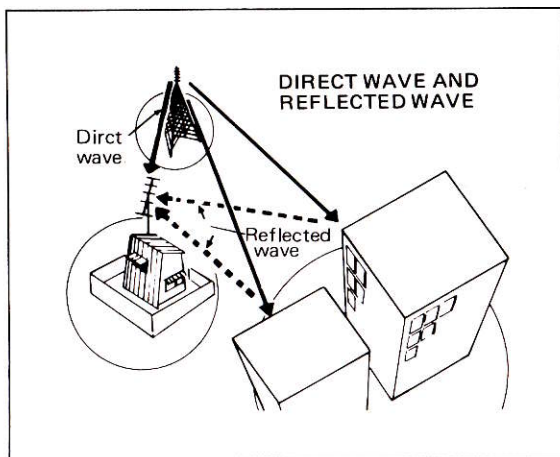
## 3. GROUND

You can receive broadcasts without a ground wire, however, we recommend the use of a good ground for the elimination of noise and for safer operation.

**CAUTION:** Never connect the ground wire to a gas or water pipe.

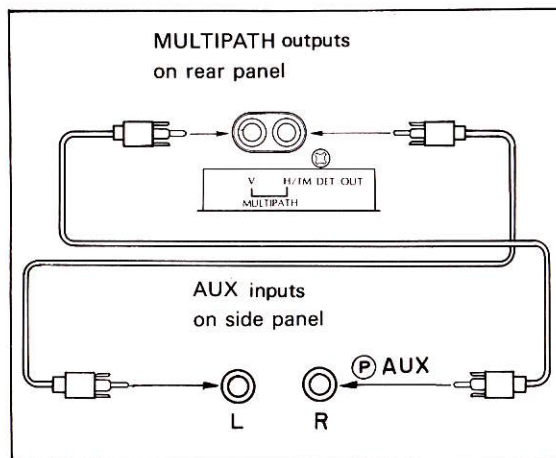
# FM MULTIPATH ADJUSTMENT

FM radio signals behave somewhat like light waves, and when there are buildings or other objects near the receiver antenna, the signals are reflected as shown in the diagram. When these reflected signals enter the antenna at the same time as the direct signals, the two interfere with each other and produce distortion in the receiver. This is termed "multipath distortion". The result of multipath is distortion in the sound and poor stereo separation. To prevent such multipath interference, use the most directional antenna you can obtain (one with the most elements) and point it either directly at the station's broadcasting antenna or in a direction where no multipath effects are noticed. To determine the direction of least multipath interference, this unit is equipped with a set of special outputs. Adjust your antenna position by the following method.



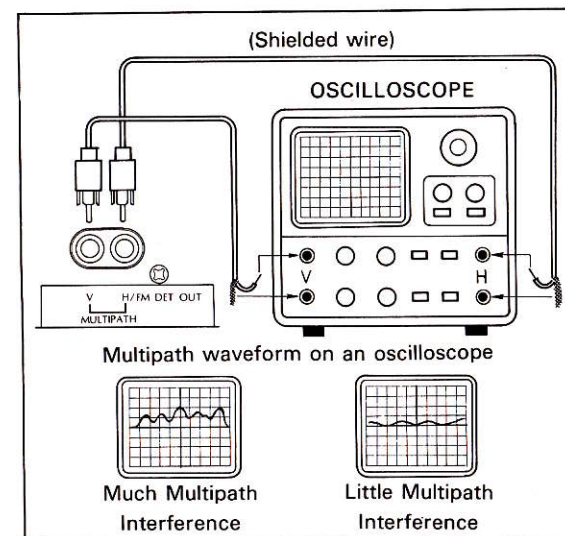
## 1. ADJUSTMENT WITHOUT AN OSCILLOSCOPE

- 1 Make the connections shown in the diagram and turn the SELECTOR switch to the AUX position.
- 2 Tune in a stereo broadcast. The sound coming from the L channel speaker will be free of distortion, while significant distortion is heard from the R channel speaker.
- 3 Adjust the OUTPUT LEVEL controls so that sound is heard only from R channel speaker.
- 4 Rotate the antenna until the volume of the R channel speaker is lowest. At this point, multipath distortion will be minimized and the antenna should be permanently fixed in this position.



## 2. ADJUSTMENT WITH AN OSCILLOSCOPE

Connect an oscilloscope to the MULTIPATH outputs as shown in the diagram. Use an oscilloscope with a vertical deflection sensitivity of more than 10mV/cm and a horizontal deflection sensitivity of more than 50mV/cm. Tune in an FM station and adjust the oscilloscope so that the wave pattern is easy to see. Adjust your antenna so that the multipath interference is minimized as shown in the right hand square in the diagram.



# OPERATIONS

## BEFORE OPERATING

Check the following items before placing the POWER switch in the ON position.

- All other components are properly connected.
- The SPEAKERS/OUTPUT switches should be in the on (A, B or both) position. (When using a companion power amplifier).
- The TAPE MONITOR and DUPLICATE switches are in the SOURCE position.
- \* The BASS and TREBLE controls are in the "O" position.
- The OUTPUT LEVEL controls are in the "O" position.
- The ATTENUATOR control should be turned fully counterclockwise.

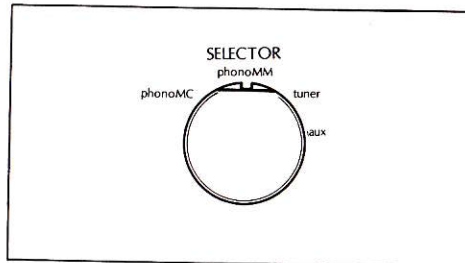
Then place the POWER switch in the ON Position.

**NOTE:** If the ATTENUATOR control is in any other position, the speakers may be damaged when the POWER switch is moved to the ON position.

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## 1. PLAYING DISCS

- 1 When playing a disc on a turntable connected to PHONO MM (or PHONO MC) inputs, rotate the SELECTOR switch to PHONO MM (or PHONO MC).



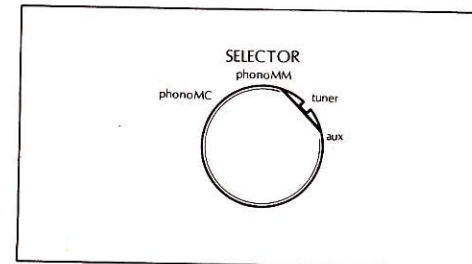
- 2 Operate the turntable.
- 3 Select the desired volume with the ATTENUATOR control.

**NOTE:** When using a high output power amplifier, it is possible to damage the speakers with excessive volume levels. Be extremely careful not to apply too much input to the speakers when using speakers with a maximum input rating less than the amplifier's rated power output.

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## 2. LISTENING TO BROADCASTS

- 1 Rotate the SELECTOR switch to the TUNER position.



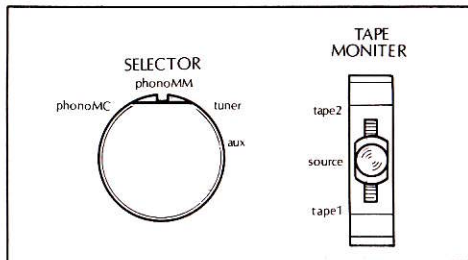
- 2 For FM reception, place the BAND SELECTOR switch in the FM position and MUTING/MODE switch in the ON/AUTO position. For AM reception, place the BAND SELECTOR switch in the AM position.
- 3 Tune in the desired station by observing the SIGNAL and TUNING meters while rotating TUNING control.
- 4 Select the desired volume with the ATTENUATOR control.

**NOTE:** If you experience excessive noise when listening to a weak FM station, turn the MUTING/MODE switch to the OFF/MONO position. The broadcast will not be in stereo but the noise will decrease. This measure should only be necessary to reduce noise when listening to a very weak stereo broadcast.

### 3. TAPE DECK RECORDING AND PLAYBACK

#### ● RECORDING

- 1 Rotate the SELECTOR switch to the program source you wish to record.

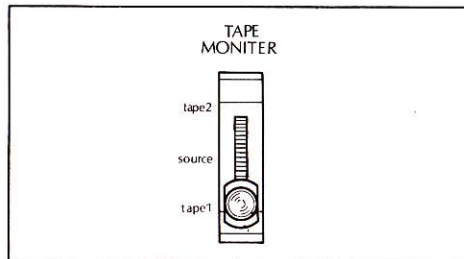


- 2 Operate the tape deck in recording mode.
- 3 Play the source to be recorded.
- 4 By placing the TAPE MONITOR switch in the SOURCE position, you can simultaneously record while listening to the original program source through the speakers. If your tape deck is of the three head variety (having independent erase, playback and record heads), you can monitor the recording being made by placing the TAPE MONITOR switch in the TAPE 1 (or TAPE 2) position.
- 5 Adjust the recording level with the "input" controls on the tape deck.

**NOTE:** The ATTENUATOR, TREBLE and BASS and other front panel controls and switches have no effect on the recording.

#### ● PLAYBACK

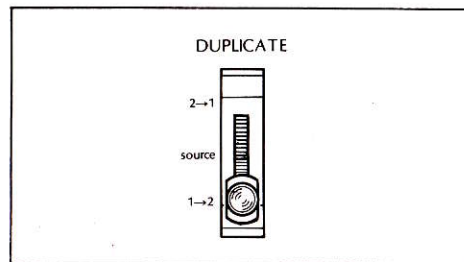
- 1 Place the TAPE MONITOR switch in the TAPE 1 (or TAPE 2) position according to the tape deck you wish to commence playback.



- 2 Operate the tape deck in playback mode.
- 3 Select the desired volume with the ATTENUATOR control.

#### ● DUPLICATING

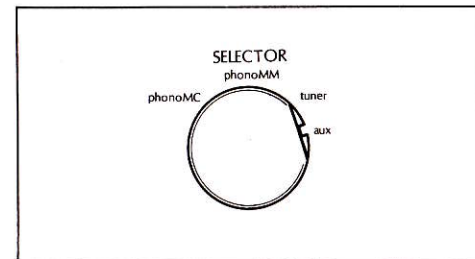
- 1 Place the DUPLICATE switch in the 1 → 2 (or 2 → 1) position.



- 2 Operate one tape deck, in playback mode, connected to PLAY 1 (or PLAY 2) inputs and another tape deck, in recording mode, connected to REC 2 (or REC 1) outputs.

### 4. PLAYING FROM OTHER SOURCES

- 1 Rotate the SELECTOR switch to the AUX position.



- 2 Operate the unit (television audio, or other sources).
- 3 Select the desired volume with the ATTENUATOR control.

### 5. LISTENING WITH HEADPHONES

- 1 Plug the headphones into the PHONES output.
- 2 Select the desired volume with the ATTENUATOR control.

**NOTE:** Use only low impedance headphones, e.g. 8–16 ohms. If high impedance headphones are used, sound volume may be decreased.

# BEFORE TAKING YOUR TUNER-PREAMPLIFIER IN FOR SERVICING....

First check to ensure that all other components are properly connected to this unit and are operating normally. Then check the following items.

SYMPTOM	CAUSE	REMEDY
<ul style="list-style-type: none"> <li>◊ Power does not come on when the POWER switch is turned on.</li> <li>◊ No sound</li> </ul>	<ul style="list-style-type: none"> <li>◊ Power cord not completely plugged in.</li> <li>◊ Fuse has blown.</li> </ul>	<ul style="list-style-type: none"> <li>◊ Plug in completely.</li> <li>◊ Consult your authorized service dealer.</li> </ul>
<ul style="list-style-type: none"> <li>◊ Noise</li> </ul>	<ul style="list-style-type: none"> <li>◊ SELECTOR, TAPE MONITOR or SPEAKERS/OUTPUT switches are in the wrong position.</li> <li>◊ Nominal speaker impedance is less than 4 ohms and protection circuit on the power amplifier is operating.</li> <li>◊ Speaker leads or plug not completely plugged in.</li> <li>◊ Speaker (+) and (-) leads are touching.</li> <li>◊ Left and right channels are out of balance.</li> </ul>	<ul style="list-style-type: none"> <li>◊ Place switches in the proper position.</li> <li>◊ Use speakers with nominal impedance of 4 ohms or above.</li> <li>◊ Plug in completely.</li> <li>◊ Separate the leads.</li> <li>◊ Adjust OUTPUT LEVEL controls.</li> </ul>
<ul style="list-style-type: none"> <li>a) Hum</li> <li>b) Scratching noise</li> <li>c) Continuous hissing in between stations. (FM)</li> <li>d) More noise on stereo than monaural. (FM)</li> <li>e) Hissing noise</li> <li>f) High frequency whistling sound (louder at night) (AM)</li> <li>g) Interference caused by amateur radio signals.</li> <li>h) Difficulty in listening to the station because it is weak and covered by noise.</li> </ul>	<ul style="list-style-type: none"> <li>◊ Turntable ground wire not attached.</li> <li>◊ Turntable output cord too close to power cord.</li> <li>◊ Plugs not completely plugged in.</li> <li>◊ Antenna not connected properly or not set in the proper direction.</li> <li>◊ Noise from electrical appliances (fluorescent lights, TV, motors, etc.)</li> <li>◊ Unfavorable listening location or problem at the radio station.</li> <li>◊ Auto ignition noise</li> <li>◊ Normal noise on the FM band</li> <li>◊ This is due to the fact that it requires more signal strength to secure better stereo broadcast than monaural.</li> <li>◊ Noise from electrical appliance (fluorescent lights, TV, motors, etc.)</li> <li>◊ Noise from TV or a beat sound caused by interference of other radio stations.</li> <li>◊ Interference noise by high or low harmonics from amateur radio stations.</li> <li>◊ Weak signal</li> </ul>	<ul style="list-style-type: none"> <li>◊ Connect ground wire to the GND terminal.</li> <li>◊ Separate the cords.</li> <li>◊ Plug in completely.</li> <li>◊ Connect the antenna properly or set in the proper direction.</li> <li>◊ Remove as far as possible from the noise source or eliminate the appliances.</li> <li>◊ Difficult to correct.               <ol style="list-style-type: none"> <li>1. Change antenna direction.</li> <li>2. Move outdoor antenna as far as possible from the road.</li> <li>3. Substitute coaxial cable for 300 ohms flat twin lead. (FM)</li> <li>4. Difficult to correct without eliminating source of noise.</li> </ol> </li> <li>◊ Turn the MUTING/MODE switch to ON/AUTO, and this noise should not be heard.</li> <li>◊ 1. Turn the MUTING/MODE switch to the OFF/MONO position.               <ol style="list-style-type: none"> <li>2. Install outdoor FM antenna.</li> </ol> </li> <li>◊ 1. Install outdoor antenna and attach a good ground.               <ol style="list-style-type: none"> <li>2. Difficult to correct without eliminating the source of noise.</li> </ol> </li> <li>◊ 1. Turn off TV.               <ol style="list-style-type: none"> <li>2. Difficult to completely do away with because it's a problem with the AM from of broadcasting.</li> </ol> </li> <li>◊ Discuss with the amateur radio operators concerned.</li> <li>◊ (FM) Install outdoor FM antenna.               <ol style="list-style-type: none"> <li>(AM) 1. Change the orientation of the bar antenna.</li> <li>2. Put up an external AM antenna.</li> </ol> </li> </ul>
<ul style="list-style-type: none"> <li>◊ Howling</li> </ul>	<ul style="list-style-type: none"> <li>◊ Caused by feedback. This occurs because speaker vibrations are being transmitted to the turntable.</li> </ul>	<ul style="list-style-type: none"> <li>◊ Place the speakers and the turntable as far apart as possible. It is also helpful to put an insulator under the turntable.</li> </ul>
<ul style="list-style-type: none"> <li>◊ Poor sound quality</li> <li>◊ No stereo effect and poor bass</li> <li>◊ No sound for 3-5 seconds after power is switched on.</li> <li>◊ Stereo indicator not lighting on stereo broadcasts.</li> <li>◊ Volume level difference between tuner and records.</li> </ul>	<ul style="list-style-type: none"> <li>◊ Too much power applied to speakers.</li> <li>◊ Not properly tuned in.</li> <li>◊ Radio signals too strong.</li> <li>◊ Radio signals too weak.</li> <li>◊ Plugs (+) and (-) connections are reversed.</li> <li>◊ Muting circuit is operating to eliminate the popping noise when power is turned on.</li> <li>◊ Weak signals.</li> <li>◊ MUTING/MODE switch is in the OFF/MONO position.</li> <li>◊ Receiver signal strength and record level are different,</li> </ul>	<ul style="list-style-type: none"> <li>◊ Adjust the ATTENUATOR control.</li> <li>◊ Tune in properly.</li> <li>◊ Install an attenuator between the antenna and the antenna terminals.</li> <li>◊ Install outdoor antenna</li> <li>◊ Correct the plugs connections.</li> <li>◊ This is not a malfunction.</li> <li>◊ Install outdoor FM antenna.</li> <li>◊ Place the MUTING/MODE switch in the ON/AUTO position.</li> <li>◊ It is not always possible to remedy this completely.</li> </ul>

# SPECIFICATIONS

## 1-(1) FM TUNER SECTION (IHF)

<b>Usable sensitivity</b>	
<b>MONO</b>	11.2dBf (2.0 $\mu$ V)
<b>STEREO</b>	22.7dBf (7.5 $\mu$ V)
<b>50dB quieting sensitivity</b>	
<b>MONO</b>	19.2dBf (5.0 $\mu$ V)
<b>STEREO</b>	39.2dBf (50 $\mu$ V)
<b>Signal to noise ratio</b>	
<b>MONO</b>	80dB
<b>STEREO</b>	75dB
<b>Frequency response</b>	$\pm$ 1dB from 30Hz to 15kHz
<b>Total harmonic distortion</b> <b>(at 1kHz, 65dBf)</b>	
<b>MONO</b>	0.05% (WIDE) 0.2% (NARROW)
<b>STEREO</b>	0.08% (WIDE) 0.5% (NARROW)
<b>Capture ratio</b>	0.8dB (WIDE) 1.5dB (NARROW)
<b>Alternate channel selectivity</b>	45dB (WIDE) 75dB (NARROW)
<b>Spurious response ratio</b>	90dB
<b>Image response ratio</b>	80dB
<b>IF response ratio</b>	80dB
<b>AM suppression ratio</b>	55dB (WIDE) 50dB (NARROW)
<b>Stereo separation</b>	
<b>WIDE</b>	45dB at 1kHz, 35dB at 10kHz
<b>NARROW</b>	40dB at 1kHz, 30dB at 10kHz
<b>Subcarrier product ratio</b>	70dB
<b>SCA rejection ratio</b>	70dB
<b>Tuning range</b>	88MHz to 108MHz

## 1-(2) FM TUNER SECTION (DIN)

<b>Sensitivity</b> <b>(at 40kHz deviation)</b>	
<b>MONO (S/N 26dB)</b>	1.2 $\mu$ V
<b>STEREO (S/N 46dB)</b>	32 $\mu$ V
<b>Image frequency rejection</b> <b>(at 98MHz)</b>	78dB
<b>IF rejection</b> <b>(at 98MHz)</b>	85dB
<b>Spurious rejection</b> <b>(at 98MHz)</b>	90dB
<b>AM suppression</b>	60dB (WIDE) 55dB (NARROW) 40dB (WIDE) 70dB (NARROW)
<b>Selectivity</b> <b>(at 40kHz deviation,</b> <b><math>\pm</math>300kHz)</b>	
<b>Signal to noise ratio</b> <b>(at 40kHz deviation)</b>	
<b>MONO</b>	75dB
<b>STEREO</b>	72dB
<b>Total harmonic distortion</b> <b>(at 1kHz, 40kHz deviation)</b>	
<b>MONO</b>	0.06% (WIDE) 0.15% (NARROW)
<b>STEREO</b>	0.08% (WIDE) 0.3% (NARROW)
<b>Stereo separation</b> <b>(at 1kHz, 40kHz deviation)</b>	45dB (WIDE) 35dB (NARROW)
<b>Frequency response</b>	$\pm$ 1dB from 30 Hz to 15kHz

## 2-(1) AM TUNER SECTION (IHF)

<b>Usable sensitivity</b> <b>(bar antenna)</b>	45dB
<b>Selectivity</b>	30dB
<b>Total harmonic distortion</b>	0.8%
<b>Image response ratio</b>	40dB
<b>IF response ratio</b>	70dB
<b>Hum and noise</b>	50dB
<b>Tuning range</b>	525kHz to 1605kHz

## 2-(2) AM TUNER SECTION (DIN)

<b>Selectivity</b> (bar antenna, at 30% modulation, S/N 26dB)	300 $\mu$ V/m
<b>Signal to noise ratio</b> (at 5mV/m, 30% modulation)	50dB
<b>Selectivity (at <math>\pm</math>9kHz)</b>	30dB
<b>Image frequency rejection</b> (at 1MHz)	40dB
<b>IF rejection (at 1MHz)</b>	70dB
<b>Total harmonic distortion</b> (at 30% modulation)	0.8%

## 3 PREAMPLIFIER SECTION

<b>Input sensitivity/impedance</b>	
PHONO MC	0.1mV/10 ohms
PHONO MM	2.3mV/50k ohms/100pF
AUX, PLAY 1, PLAY 2	150mV/50k ohms
<b>Output level/impedance</b>	
<b>OUTPUT</b>	1V (rated output)/600 ohms
<b>REC 1, REC 2</b>	18V (maximum output)
<b>PHONES (8 ohms)</b>	150mV/600 ohms
	600mV (at output 1V)/15 ohms
	650mV (maximum output) (headphone impedance from 8 ohms to 16 ohms)
<b>Equivalent input noise level</b> (IHF, A network)	
PHONO MC	-157dB(V) (47 ohms terminated)
PHONO MM	-136dB(V) (closed circuit)
AUX, PLAY 1, PLAY 2	-126dB(V) (closed circuit)
<b>Signal to noise ratio</b> (IHF, A network, at rated output)	

## MELCO SALES, INC.

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<b>PHONO MC</b>	77dB (47 ohms terminated)
<b>PHONO MM</b>	84dB (closed circuit)
<b>AUX, PLAY 1, PLAY 2</b>	110dB (closed circuit)
<b>Signal to noise ratio (DIN)</b>	
PHONO MC	72dB (47 ohms terminated)
PHONO MM	73dB (2.2k ohms terminated)
AUX, PLAY 1, PLAY 2	106dB (closed circuit)
	92dB (47k ohms/250pF terminated)
<b>Total harmonic distortion</b> (at rated output attenuator -20dB from 20Hz to 20kHz)	
PHONO MC	0.005%
PHONO MM	0.003%
AUX, PLAY 1, PLAY 2	0.003%
<b>Channel separation</b>	
PHONO MC,	
PHONO MM	
PLAY 1, PLAY 2	
	Crosstalk is less than noise level at 1kHz, 80dB at 20kHz
	Crosstalk is less than noise level at 1kHz, 100dB at 20kHz
<b>Frequency response</b>	
PHONO MC,	
PHONO MM	
PLAY 1, PLAY 2	
	$\pm$ 0.2dB from 20Hz to 20kHz (RIAA STD)
	$\pm$ 8dB from 10Hz to 100kHz
<b>Tone control</b>	
<b>BASS</b>	$\pm$ 10dB at 100kHz
<b>TREBLE</b>	$\pm$ 10dB at 10kHz
<b>Subsonic filter</b>	18Hz (-6dB/oct)
<b>Phono overload level</b> (at 1kHz with 0.1% THD)	
PHONO MC	12mV
PHONO MM	290mV
<b>Power consumption</b>	30W
<b>Dimensions</b> (W x H x D)	425 x 170 x 292mm (16-3/4 x 6-3/4 x 11-1/2")
<b>Weight</b>	7.5kg (16-1/2 lbs)
<b>Supplied with: T shaped antenna</b>	

Design and specifications are subject to change without notice for improvements.

IB-1075-2 Printed in Japan