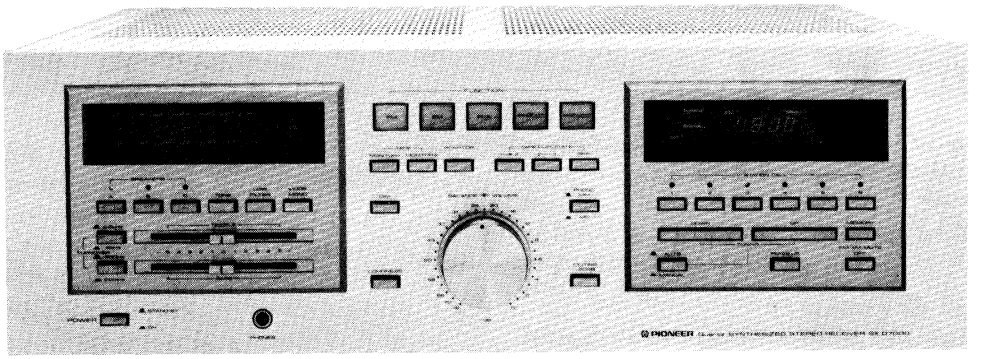
# Operating Instructions

Quartz Synthesized
## STEREO RECEIVER
# SX-D7000

**KU**



### IMPORTANT NOTICE

The serial number for this equipment is located on the rear panel. Please write this serial number on your enclosed warranty card and keep in a secure area.
This is for your security.

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

PIONEER®

# SAFETY INSTRUCTIONS

**READ INSTRUCTIONS** – All the safety and operating instructions should be read before the appliance is operated.

**RETAIN INSTRUCTIONS** – The operating instructions should be retained for future reference.

**HEED WARNING** – All warnings on the appliance and in the operating instructions should be adhered to.

**FOLLOW INSTRUCTIONS** – All operating and use instructions should be followed.

**WATER AND MOISTURE** – The appliance should not be used near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.

**LOCATION** – The appliance should be installed in a stable location.

**WALL OR CEILING MOUNTING** – The appliance should not be mounted to a wall or ceiling.

**VENTILATION** – The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.

**HEAT** – The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.

**POWER SOURCES** – The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

**POWER-CORD PROTECTION** – Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

**CLEANING** – The appliance should be cleaned only with a polishing cloth or a soft dry cloth. Never clean with furniture wax, benzine, insecticides or other volatile liquids since they may corrode the cabinet.

**POWER LINES** – An outdoor antenna should be located away from power lines.

**NONUSE PERIODS** – The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.

**OBJECT AND LIQUID ENTRY** – Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

**DAMAGE REQUIRING SERVICE** – The appliance should be serviced by Pioneer authorized service center or qualified service personnel when:

- The power-supply cord or the plug has been damaged; or
- Objects have fallen, or liquid has been spilled into the appliance; or
- The appliance has been exposed to rain; or
- The appliance does not appear to operate normally or exhibits a marked change in performance; or
- The appliance has been dropped, or the enclosure damaged.

**SERVICING** – The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be contacted nearest Pioneer authorized service center.

**OUTDOOR ANTENNA GROUNDING** – If an outside antenna is connected to the antenna terminal, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges. Section 810 of the National Electrical Code, ANSI/NEPA No. 70-1978, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Fig. A.

**EXAMPLE OF ANTENNA GROUNDING AS PER NATIONAL ELECTRICAL CODE INSTRUCTIONS**

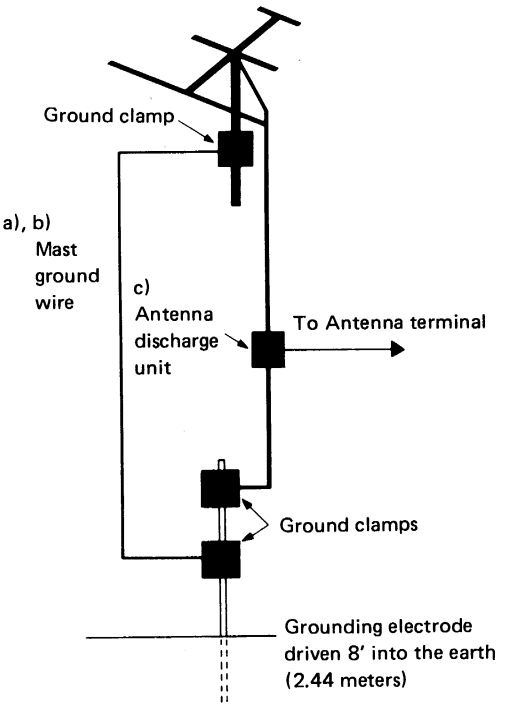



Fig. A

a) Use No. 10 AWG copper or No. 8 AWG aluminum or No. 17 AWG copper-clad steel or bronze wire, or larger as ground wires for both mast and lead-in.

b) Secure lead-in wire from antenna to antenna discharge unit and mast ground wire to house with stand-off insulators, spaced from 4 feet (1.22 meters) to 6 feet (1.83 meters) apart.

c) Mount antenna discharge unit as closely as possible to where lead-in enters house.

# CONTENTS



# FEATURES

## Quartz Synthesized Tuner Section

The quartz synthesized tuner employs two scanning methods, auto scan tuning and manual scan tuning, to pick up broadcasting stations and hold the frequency point securely. In the auto scan tuning mode, the frequency band is automatically scanned when the UP or DOWN tuning switch is lightly depressed, and the frequency of the broadcasting station is picked up. In the manual scan tuning mode for FM, the frequency changes in 100 kHz units every time the tuning switch is depressed once while in the AM band, the frequency varies in 1 kHz units. The tuned frequency is controlled using a reference frequency produced by a highly precise quartz crystal and so tuning is sure-fire without drift or fluctuations.

Another big feature is that the six STATION CALL switches can be used to preset up to six FM and six AM frequencies for later recall at the touch of the switch.

When the power switch is turned on again after having been turned off and when the function switch has been selected, the last station which was tuned in is held in the memory for instant recall.

## DC Power Amplifier with Non Switching Amplifier System

The DC power amplifier features a non-switching amplifier system which uses a high-speed bias servo circuit to control the bias current of the transistors in the power amplifier's output stage at a high speed and which, like a class A amplifier, employs transistors in the active region at all times. As with a class B amplifier, the end-stage transistors are prevented from being set to the cut-off mode and so there is no switching distortion. Furthermore, the bias current varies in line with the input signals and the power efficiency is as high as with a class B amplifier.

Along with the adoption of the non-switching amplifier system, the power amplifier with its first-stage differential current mirror load DC amplifier configuration pumps out

Continuous power output of 120 watts* per channel, min., at 8 ohms from 20 Hertz to 20,000 Hertz with no more than 0.005% total harmonic distortion.

* *Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers.*

## Preamplifier Guaranteeing High-fidelity Sound Reproduction

The tone amplifier which employs low-noise, low-distortion ICs assures a low distortion of 0.005% (from 20Hz to 20,000Hz, 4V output). The equalizer amplifier also employs low-noise transistors and also high-precision capacitors and resistors to deliver top-notch characteristics such as an RIAA deviation of ±0.2dB over 20 to 20,000Hz, a signal-to-noise ratio of 86dB (MM), 72dB (MC) and a maximum allowable input of 200mV (MM).

## Fluorescent Display Tubes for Power Meter and Frequency Indicator

Featured for the power meter is a fluorescent display tube using the latest digital technology, a logarithmic compression circuit and a peak hold circuit. This combination allows a power output level display from 0.001 watts up to 120 watts without range selection on a bar graph display.

In addition, there is a reception frequency display based on a fluorescent display tube. This indicates the frequency of the broadcasting station in five digits so that it is easy to tune in a station quickly. The tuning and signal indicators also use new indicators with fluorescent display tubes.

## Other Features

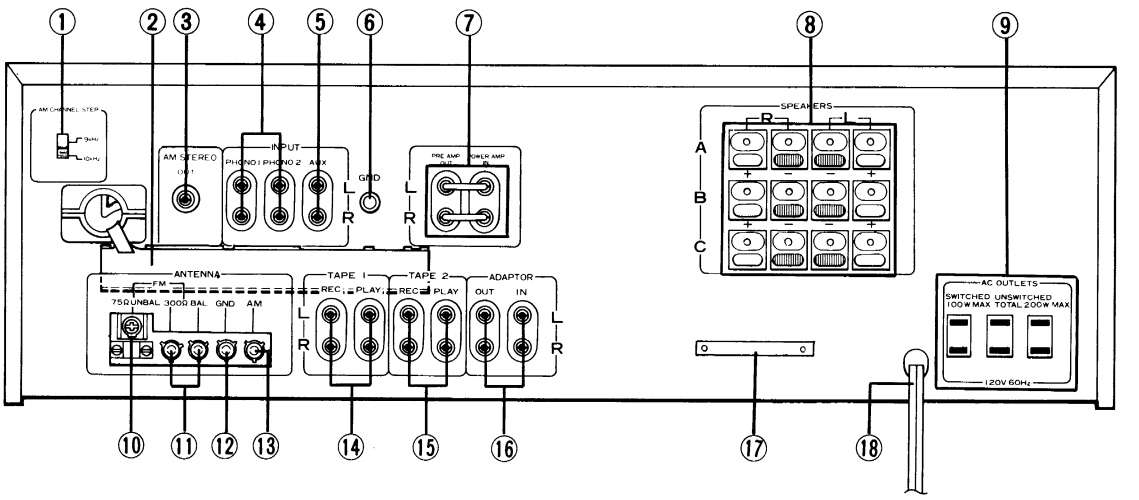
**TURNOVER switches:** These switches yield variations in the curves of the BASS and TREBLE controls when they are operated in conjunction with the other BASS and TREBLE controls. One is used for the bass and the other for the treble, thereby allowing plenty of variation in BASS and TREBLE control adjustment.

**PNONO MM/MC switch:** This switch is used to select between MC (moving coil) cartridges and MM (moving magnet) cartridges. There is no need to change over the turntable connections every time you want to use a different cartridge.

**TAPE DUPLICATE switch:** This switch allows you to use two tape decks to edit or duplicate material recorded on one tape to another. Duplication from an open-reel deck to a cassette deck, for example, can be performed in a one-touch operation.

- AM STEREO OUTPUT jack for AM stereo broadcast
- FM 25μS Switch and Adaptor Switch
- Separable Preamplifier/Power amplifier
- FM/AM muting switch

# REAR PANEL FACILITIES




## ① AM CHANNEL STEP SWITCH

This switch is normally set to the 10 kHz position. Set it to the 9 kHz position when the channel allotment plan is changed and the intervals between the AM broadcasting stations change from 10 kHz units to 9 kHz units.

## ② AM BAR ANTENNA

This antenna is for AM broadcasts. When tuning in an AM station, first use the tuning operation and then move this bar antenna and set it where the optimum reception is obtained. At the same time observe the signal indicator.

For details, refer to "AM ANTENNA" on page 9.

## ③ AM STEREO OUTPUT JACK

This jack is for AM stereo broadcasts. When listening to the AM stereo broadcasts, connect the adaptor component to this jack. For further details, refer to the operating instructions of the AM stereo adaptor component.

## ④ PHONO 1, 2 JACKS

Connect the two turntables output cords to these jacks.

## ⑤ AUX JACKS

These are auxiliary input jacks. Connect a TV tuner or cartridge tape player to them.

## ⑥ GND TERMINAL

This is the ground terminal. Connect the ground wire of the turntable, etc. to this terminal.

## ⑦ PREAMPLIFIER/POWER AMPLIFIER CONNECTOR BARS

When the connector bars are disconnected from the jacks, you can separate the receiver's preamplifier and power amplifier. For normal use, however, they are connected. For further details on how to use these bars, refer to page 17.

*NOTE:*
*If these bars are not connected properly, you will not hear any sound from the speakers connected to the SPEAKERS terminals.*

## ⑧ SPEAKERS TERMINALS A, B, C

Connect the three speaker systems to these terminals.

## ⑨ AC OUTLETS

These are spare power outlets. Insert the power plug on the stereo components (turntable, tape deck, etc.) into these outlets.

**SWITCHED** The power supplied through this outlet is coupled to the operation of the receiver's power switch. The maximum power capacity which may be connected to this outlet is 100W.

**UNSWITCHED** The power is always supplied through these two outlets regardless of the position of the power switch. The maximum power capacity which may be connected to these two outlets is 200W.

## ⑩ FM 75-OHM ANTENNA TERMINAL

Connect a 75-ohm coaxial cable to this terminal when using it as the feeder from the FM antenna.

## ⑪ FM 300-OHM ANTENNA TERMINALS

Connect a 300-ohm twin-lead feeder to these terminals when using it as the feeder from the FM antenna. Use these terminals when connecting the accessory T-type FM antenna.

### ⑫ ANTENNA GND TERMINAL

This is the ground terminal. From aspects of reduced noise, connect a ground lead to this terminal.

### ⑬ AM ANTENNA TERMINAL

When using an external AM antenna, connect it to this terminal.

### ⑭ TAPE 1 JACKS

Connect the tape deck cords to these jacks.
Connect the REC (recording) jacks to the INPUT jacks on the tape deck, and the PLAY (playback) jacks to the OUTPUT jacks.

### ⑮ TAPE 2 JACKS

Connect your second tape deck cords to these jacks.

### ⑯ ADAPTOR JACKS

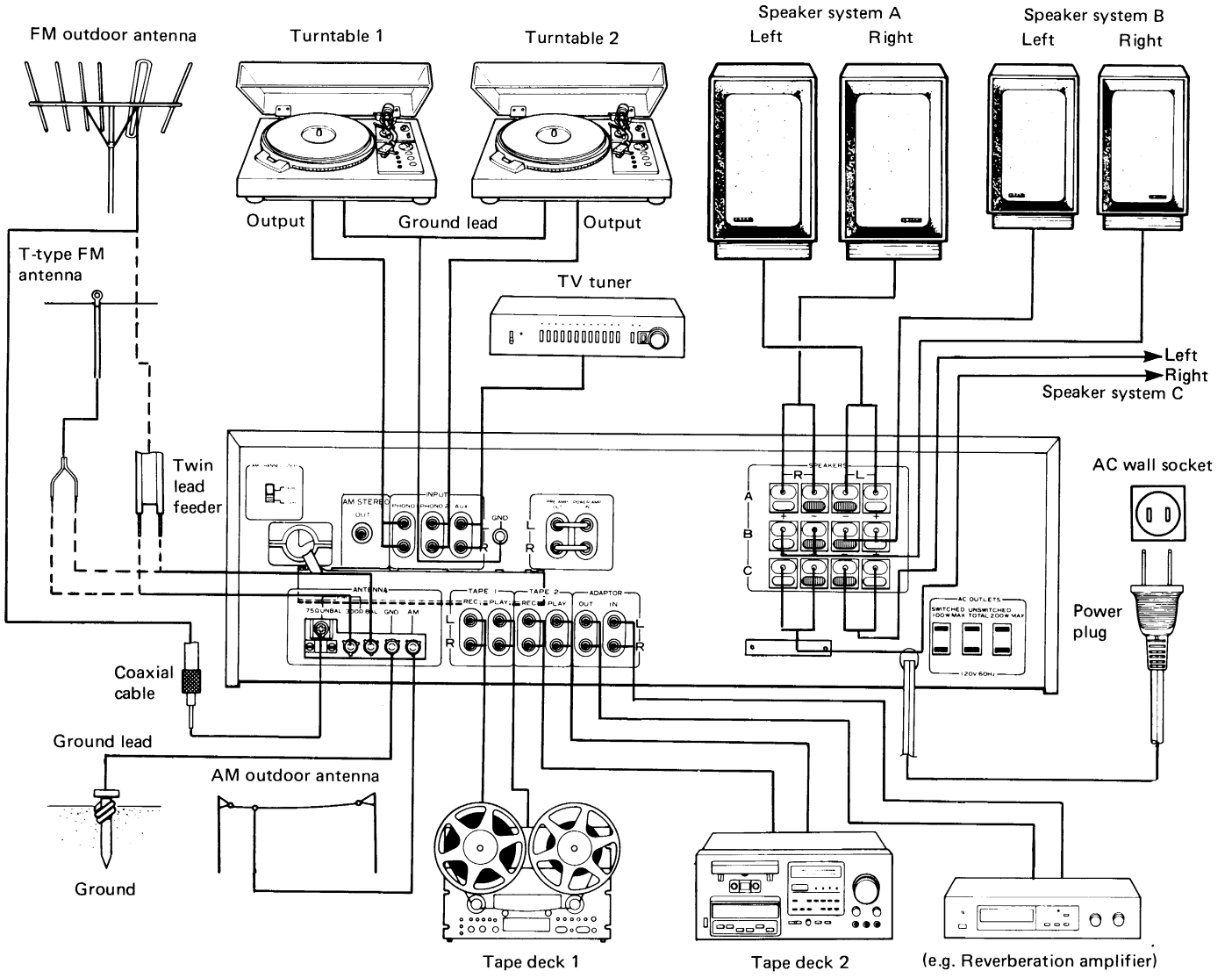
Connect the adaptor component or third tape deck to these jacks.

### ⑰ SERIAL NUMBER PLATE

### ⑱ POWER CORD

Plug this into an wall socket.

# CONNECTION DIAGRAM



# CONNECTIONS

## PRECAUTIONS

- Set the POWER switch to ON only when you have completed all the connections of the stereo system. Always set this switch to STAND-BY position if you want to change the connections.
- All the receiver's jacks are aligned for easy connection in two rows: the upper row for L (left channel) and the lower row for R (right channel). Always connect L to L and R to R with the audio component output and input jacks.
- Make sure that the connections are secure. Improper connections can generate noise or cause the sound to be cut off.
- The SPEAKERS switches may be used in combination so that sound can be heard through the A and B, A and C or B and C pairs of speakers. If the A, B and C switches are all depressed, no sound will be heard through the speakers.

## SPEAKER SYSTEM CONNECTIONS (Fig. 1)

The receiver is provided with three sets of SPEAKERS output terminals. Use the A set when connecting only one set of speakers. Viewed from the front, the R (right channel) SPEAKERS terminals are on the right and the L (left channel) SPEAKERS terminals are on the left. Connect the left channel speaker to the L terminals and the right channel speaker to the R terminals.

### Cautions when connecting the speakers

1. Do not plug the receiver's power cord into an wall socket before the speakers are fully connected to the SPEAKERS terminals.
2. The speaker output terminals have polarities: minus (black) and plus (red). The input jacks on the speakers also have plus and minus polarities. When connecting, make sure that these polarities are aligned: plus to plus and minus to minus. If the left and right speaker polarities are misaligned, the reproduced sound will not display a natural stereo effect.
3. Use speakers with a nominal impedance of 4 ohms or more.
   If you want to connect three sets of speaker system, make sure that the impedance of each system is 8 ohms or more. If the impedance is less than 8 ohms, the protection circuit will be actuated when the volume is turned up and you will not be able to enjoy proper stereo performance.
4. Never use the speakers with the speaker output terminals shorted (minus and plus jacks connected) since this may damage the power transistors in the receiver.
5. This receiver delivers a high output power and so make sure that you use speakers with a high allowable input.
6. The high output power of this receiver requires that the speaker lead wires have an ample current carrying capacity. Use wires with a high capacity and connect them securely. If you use low capacity wires and do not connect them properly, the reproduced sound will be adversely affected and heat generation or short circuits may be caused.

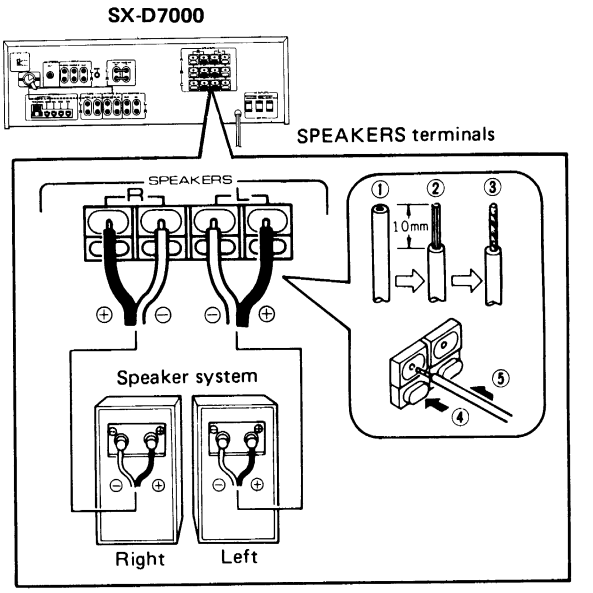



Fig. 1

**Processing and connecting the speaker cords**

1. *Cut off the covering of the speaker cords as shown in Fig. 1.*
2. *If the strands at the tip of the cord are pointing in all directions, twist them with your thumb and forefinger. Otherwise some of the strands may come into contact with other terminals and cords, and cause a short.*
3. *Push the minus (black) button of the speaker terminals with your finger and insert the minus speaker lead into the hole above the button.*
   *The lead is locked into position when the button is released. Check that the lead is connected firmly.*
4. *In the same way, connect the plus speaker lead to the plus terminal (red).*
5. *Check that the core wires of the speaker leads are not projecting from the terminals. If they should come into contact, this will give rise to a short circuit.*

## TURNTABLE CONNECTIONS (Fig. 2)

Connect the output cords of a turntable to the PHONO 1 input jacks. Be sure to connect left (L) channel and right (R) channel correctly. Connect the ground lead of the turntable to the GND terminal on the receiver.

This stereo receiver contains a built-in amplifier for MC cartridges. This means that you can use moving coil (MC), and moving magent (MM) cartridges on your turntable.

*NOTES:*

1. *Connect your second turntable to the PHONO 2 input jacks.*
2. *If your turntable is fitted with two tonearms, the output cords for each the tonearms should be connected to the PHONO 1 and PHONO 2 input jacks.*

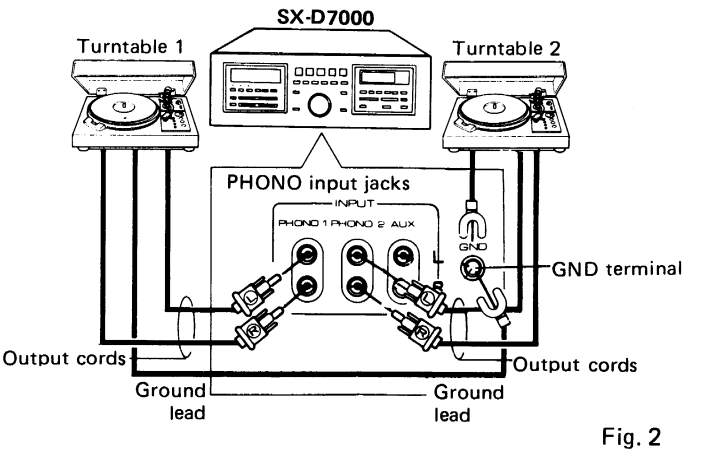



Fig. 2

## AUX JACK CONNECTIONS (Fig. 3)

These jacks can be connected to the OUTPUT (PLAY) jacks on a TV tuner, cartridge tape player or tape deck. Use connecting cords with pin plugs to connect the OUTPUT jacks on the component with the AUX jacks. Connect the left channel and right channel properly.

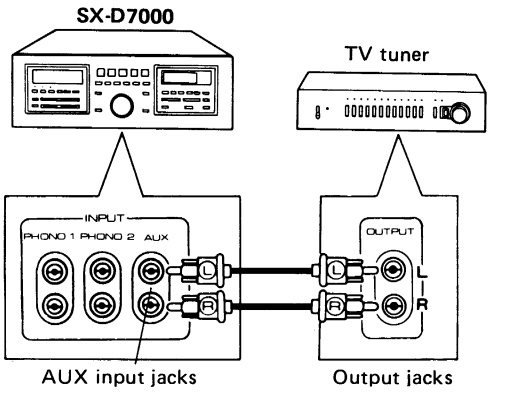



Fig. 3

## TAPE DECK CONNECTIONS (Fig. 4)

The receiver is provided with two sets of recording (TAPE REC) output jacks and two sets of playback (TAPE PLAY) input jacks. Connect each of the jacks in the following way using the connecting cords which come with the tape deck. The upper row of jacks is for the left channel (L) and the lower row for the right channel (R).

### Connections for recording

Connect the recording input jacks (INPUT REC) on the tape deck to the TAPE 1 REC jacks on the receiver.

### Connections for playback

Connect the playback output jacks (OUTPUT PLAY) on the tape deck to the TAPE 1 PLAY jacks on the receiver.

*NOTE:*
*Connect your second tape deck to the TAPE 2 jacks (REC, PLAY).*

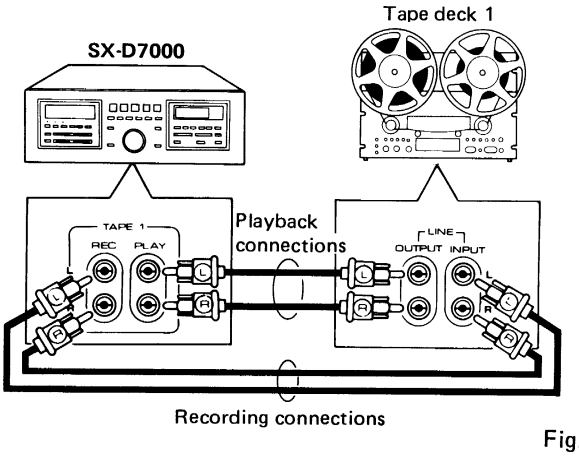



Fig. 4

## ADAPTOR JACK CONNECTIONS (Fig. 5)

A third tape deck or other adaptor component (which is connected to the tape terminals on the receiver) can be connected to these terminals.

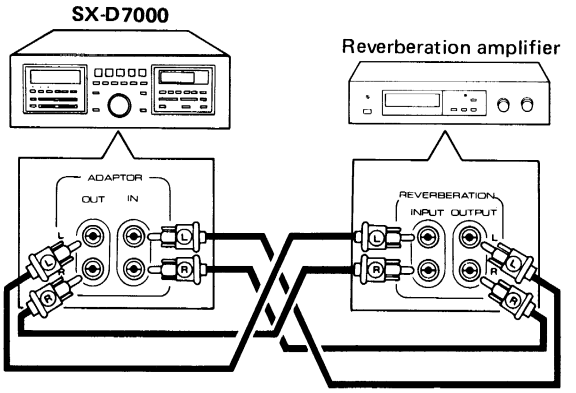



Fig. 5

# ANTENNA AND GROUND CONNECTIONS

## FM ANTENNAS

There are two methods you can use when connecting the FM antenna to the antenna input terminals: you can use a 300-ohm twin-lead feeder or a 75-ohm coaxial cable. Pioneer recommends the 75-ohm coaxial cable (RG59U, etc.) if you want your receiver to display its capabilities to the full. The coaxial cable is more effective than the twin-lead feeder in safeguarding against external interference noise from impairing the sound quality. In other words, twin-lead feeders are liable to pick up external noise, and this is why they are not recommended.

## CONNECTIONS USING A 75-OHM COAXIAL CABLE

Refer to Fig. 6 and follow the procedure. Prepare the tip of the coaxial cable and connect it to the antenna input terminals (75Ω-UNBAL).

## CONNECTIONS USING A 300-OHM TWIN-LEAD FEEDER

In cases where it is only possible to use a twin-lead feeder with a community receiving system antenna, refer to Fig. 6 and follow the procedure. Prepare the ends of the twin-lead feeder and attach them to the 300Ω-BAL antenna input terminals. Then make the twin-lead feeder as short as possible but do not bundle the wires or run them loose on the floor.

## ACCESSORY T-TYPE ANTENNA

This antenna is designed to allow you to receive FM programs in areas where strong signals are beamed by broadcasting stations until you install your FM antenna. As shown in Fig. 6, attach the antenna to the 300Ω-BAL antenna input terminals and then tune into an FM station, following the instructions listed under "OPERATION" on page 13. Extend both ends of the antenna horizontally, locate the optimum receiving location by moving the antenna to the left or right, or up or down, and then secure it to the ceiling or wall.

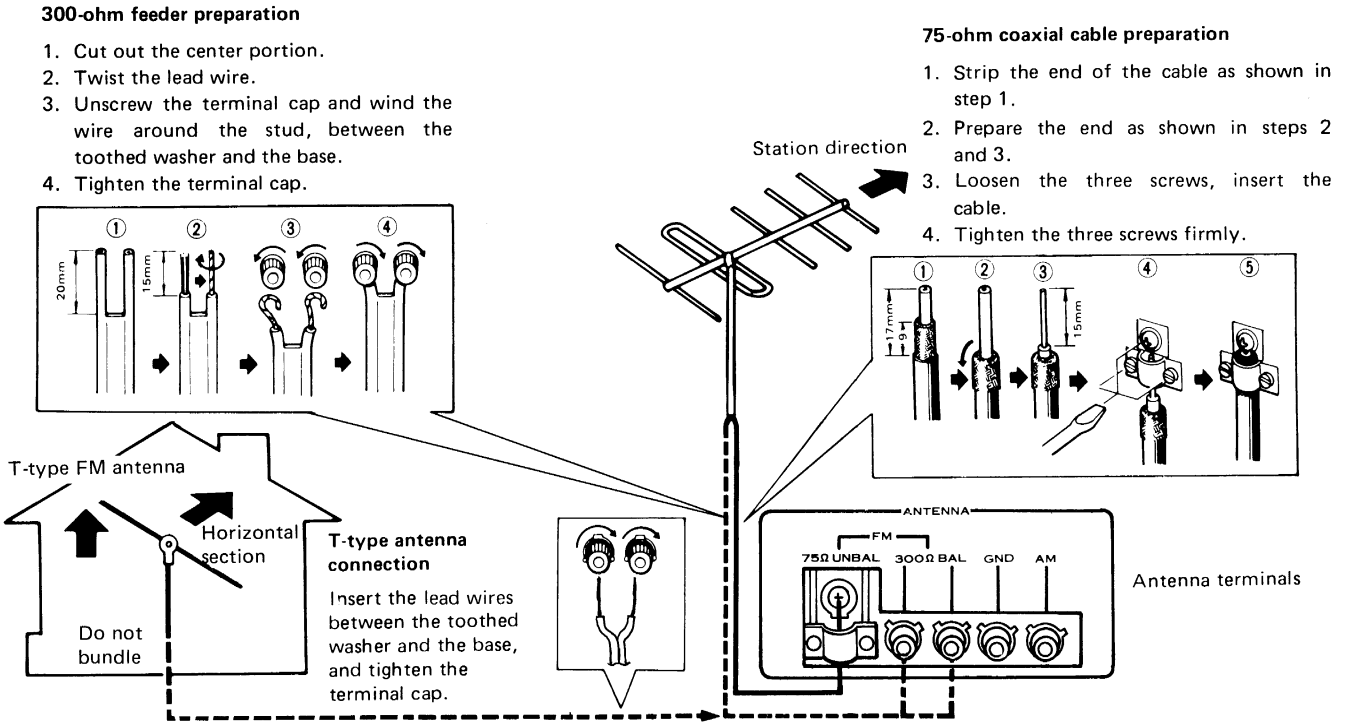



Fig. 6

## AM ANTENNAS

While listening to AM stations (see OPERATION on page 13), move the rear panel ferrite bar antenna and position it for best reception.

- Select the desired AM station, and move the bar antenna around in every direction and then set it at the position where the best reception is obtained (Fig. 7).
- In cases when the bar antenna is insufficient for adequate reception, an indoor AM antenna can be made from a length (5 to 6 meters) of vinyl insulated wire as shown in Fig. 8, connect one end of the wire to the AM antenna terminal and suspend the free end from an wall or ceiling at as high a location as possible.
- If reception is still difficult with an indoor antenna, use vinyl insulated wire to erect an outdoor AM antenna between two supports as shown in Fig. 8.

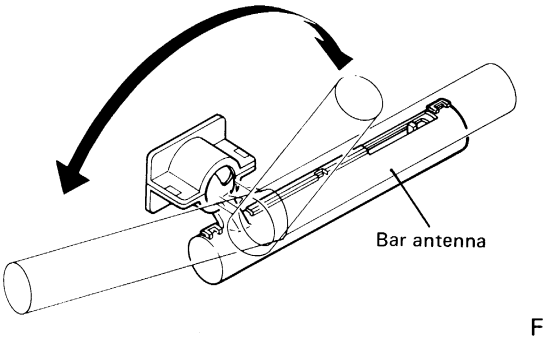



Fig. 7

## GROUNDING

From the viewpoint of both safety and reduced noise, Pioneer recommends that you employ a ground as shown in Fig. 8. Connect the ground lead to the GND terminal of the receiver. Never connect it to a gas pipe or other dangerous location.

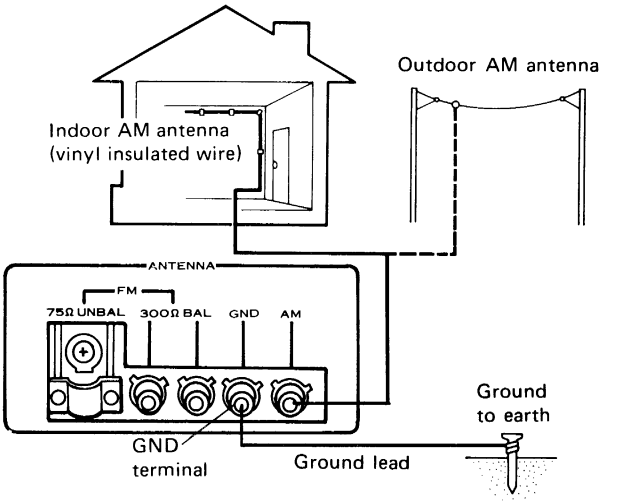



Fig. 8

## FM ANTENNA LOCATION

The signals transmitted by an FM broadcasting station inevitably become weak when received behind mountains, between buildings and inside reinforced concrete structures. In weak-signal areas, signals which are reflected off mountains and other obstacles in their path may be picked up by the antenna, which causes a multipath effect. This adversely affects the sound received. This is why it is necessary to choose an antenna and installation location which are best suited to cope with the ambient conditions and the strength of the signals.

Bear in mind the following points and determine the optimum location (height and direction).

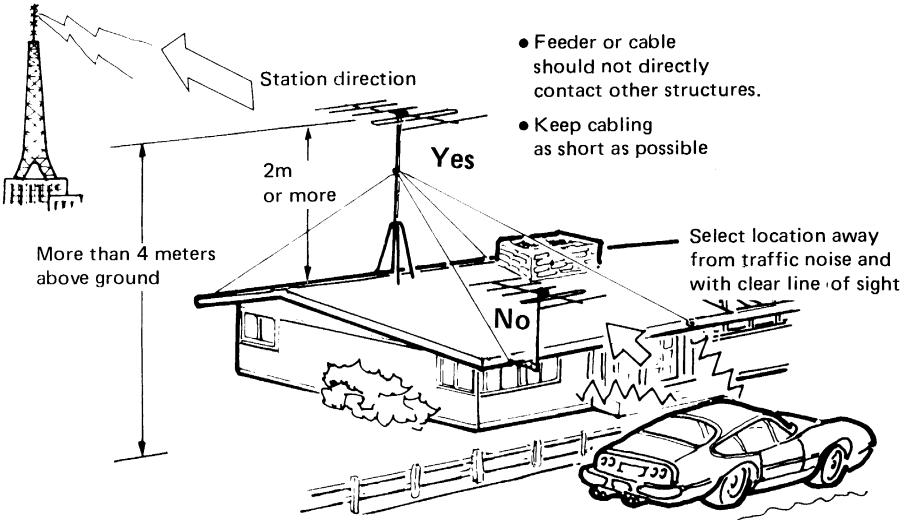



Fig. 9

# FRONT PANEL FACILITIES

## ① POWER SWITCH

Power is supplied to the receiver when this switch is depressed. When the switch is released (STAND-BY position) too, the power source for the unit's memory circuit is activated.

When you do not intend to use the receiver for a long period of time, disconnect the power cord from the power outlet.

The memory contents will be retained for a minimum period of three days when the power cord has been disconnected.

## ② BASS CONTROL

Use this control to adjust the bass of the sound. When the control is moved to the right (+ direction) after the TONE switch has been depressed, the bass is emphasized, and when it is moved to the left (– direction), the bass is attenuated. By selecting the bass TURNOVER switch, two types of tone adjustment curves can be obtained. For details, refer to "EFFECTIVE OPERATION" on page 16.

When the TONE switch is depressed, the indicator on the control lights.

## ③ BASS TURNOVER SWITCH

Use this switch to change over the frequency in which the sound adjustment with the bass control is starting to take effect. Select 200Hz or 400Hz in accordance with the characteristics of your listening room and of your speakers, and with your general preference.

## ④ TREBLE TURNOVER SWITCH

Use this switch to change over the frequency in which the sound adjustment with the treble control is starting to take effect. Select 2.5kHz or 5kHz in accordance with the characteristics of your listening room and of you speakers, and with your general preference.

## ⑤ TREBLE CONTROL

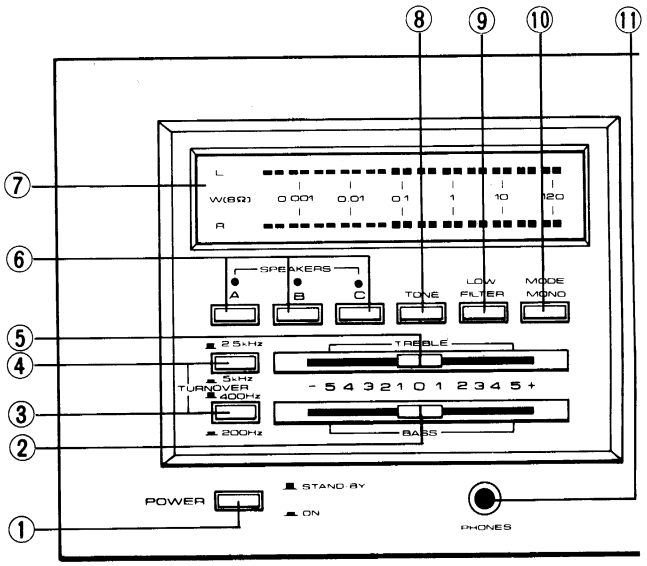
Use this control to adjust the treble of the sound. When the control is moved to the right (+ direction) after the TONE switch has been depressed, the treble is emphasized, and when it is moved to the left (– direction), the treble is attenuated. By selecting the treble TURNOVER switch, two types of tone adjustment curves can be obtained. For details, refer to "EFFECTIVE OPERATION" on page 16.

When the TONE switch is depressed, the indicator on the control lights.

## ⑥ SPEAKERS SWITCH

Depress the switch corresponding to the speakers connected to the SPEAKERS terminals (A, B, C) on the rear panel.

You can depress two of these switches to listen to sound from two pairs of speaker systems at the same time.




## ⑦ POWER METER

This meter allows you to read out the rated power level on the fluorescent display tube when speakers with a nominal impedance of 8 ohms are connected to the SPEAKERS terminals.

## ⑧ TONE SWITCH

Used to switch the tone control circuit on and off. Depress it when adjusting the tone with the BASS and TREBLE controls. Once the switch is released, the tone control circuit is deenergized and a flat frequency response is obtained.

## ⑨ LOW FILTER SWITCH

Depress this switch in the event that turntable rumble, recording cutting noise or other low frequency noise becomes objectionable. Attenuation in the frequency band below 18Hz is 6dB/octave.

## ⑩ MODE SELECTOR

When this switch is depressed, the sound is reproduced in mono. Release it for stereo reproduction.

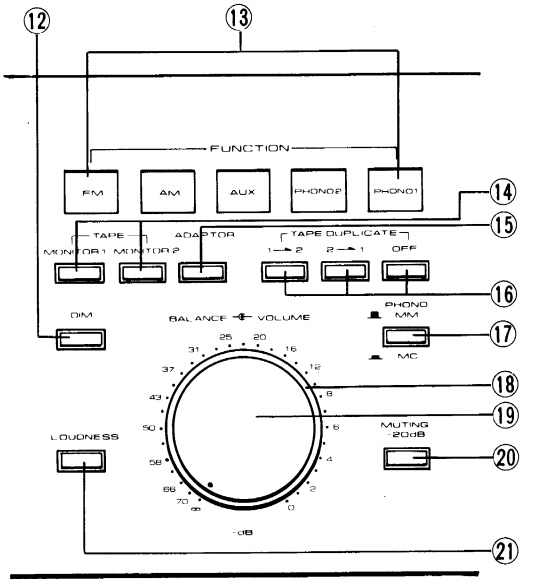
## ⑪ PHONES JACK

Plug the headphones into this jack when you want to listen through your stereo headphones.

Release both SPEAKERS switches if you want to listen to the sound through your headphones only.

## ⑫ DIMMER SWITCH

When this switch is depressed, the frequency display and power meter have their brightness reduced.




## ⑬ FUNCTION SELECTOR

Depress the FUNCTION switch which corresponds to the program source.

**FM:** Depress this switch for FM broadcasts.

**AM:** Depress this switch for AM broadcasts.

**AUX:** Depress this switch when listening to an audio component connected to the AUX jacks.

**PHONO 2:** Depress this switch when playing a record on the turntable connected to the PHONO 2 jacks.

**PHONO 1:** Depress this switch when playing a record on the turntable connected to the PHONO 1 jacks.

*NOTE:*
*Only one function switch should be depressed at a time.*

## ⑭ TAPE MONITOR SWITCHES

Depress the MONITOR 1 switch with a tape deck which is connected to the TAPE 1 jacks (REC and PLAY) when you want to monitor the recording or playback of a tape. The tape on a deck which is connected to the TAPE 2 jacks (REC and PLAY) can be similarly monitored by depressing the MONITOR 2 switch.

For further details, refer to "TAPE DECK OPERATIONS" on page 15.

## ⑮ ADAPTOR SWITCH

Depress this switch when reproducing sound from an optional component which is connected to the ADAPTOR jacks. Always release this switch if you are not using a component with these terminals.

## ⑯ TAPE DUPLICATE SWITCHES

These are used when dubbing or editing tapes using two tape decks connected to the TAPE 1 and TAPE 2 rear panel terminals.

1→2: Depress when dubbing from the tape deck connected to the TAPE 1 terminals to the tape deck connected to the TAPE 2 terminals.

2→1: Depress when dubbing from the tape deck connected to the TAPE 2 terminals to the tape deck connected to the TAPE 1 terminals.

OFF: Depress when you are not dubbing tapes.

*NOTE:*
*Make absolutely sure that the OFF switch is depressed if you do not intend to make use of the dubbing function. Otherwise you may not be able to record ordinary program sources.*

## ⑰ PHONO CARTRIDGE SELECTOR

Depress the cartridge selector switch that corresponds to the type of cartridge used on the turntable. When the PHONO switch is released, it is lighted green, and when the switch is depressed, it goes orange.

## ⑱ BALANCE CONTROL

Use this control to balance the volume of the left and right channels. If the sound appears to be louder on the right, it means that the volume of the right channel is higher. Turn the balance control to the left and adjust. Conversely, if the sound appears to be louder on the left, it means that the volume of the left channel is higher. Therefore, turn the balance control to the right and adjust.

## ⑲ VOLUME CONTROL

Use this control to adjust the output level to the speakers and headphones. Turn it clockwise to increase the output level. No sound will be heard if you set it to ∞. The scale is graduated in –dB which indicate the attenuation when the maximum output level is 0dB.

## ⑳ MUTING SWITCH

Depress this switch to attenuate the audio output indicated by the VOLUME control by –20dB. There is no need to adjust the VOLUME control if you use this switch when turning down the audio output temporarily and when changing over records or tapes.

## ㉑ LOUDNESS SWITCH

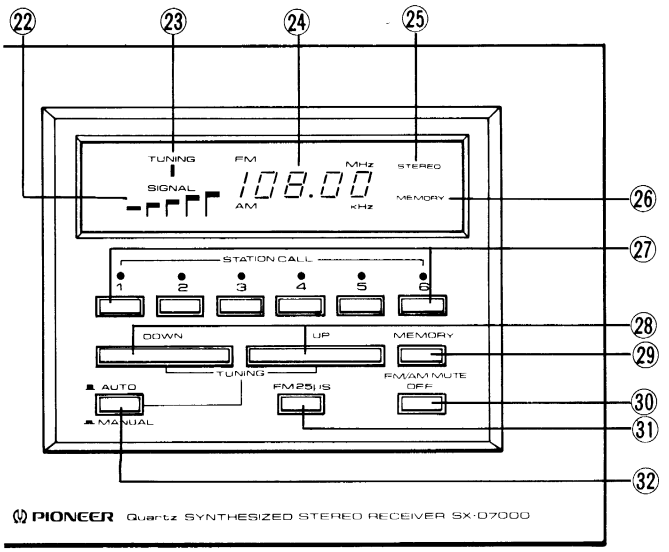
When listening to a performance with the volume control turned down, depress this switch and the bass and treble will be accentuated.

When the volume is low, the human ear finds it harder to hear the bass and treble than when the volume is high. The loudness switch is thus designed to compensate for this deficiency.

(Continued next page)

# FRONT PANEL FACILITIES (Continued)

## TUNER SECTION




### ㉒ SIGNAL INDICATOR

This indicator lights in sequence from left through right during the tuning of an AM or FM broadcast in accordance with the strength of the signals being received. The optimum tuning point is where the maximum number of indicators light.

### ㉓ TUNING INDICATOR

This lights when the frequency has been tuned in properly.

### ㉔ FREQUENCY DISPLAY

This indicates the frequency which is tuned.
With FM reception, the letters "FM" appear on the left of the display and "MHz" on the right. With AM reception, "AM" appears on the left and "kHz" on the right. These change when the FUNCTION selector position is changed.

### ㉕ FM STEREO INDICATOR

The letter "STEREO" lights up when receiving an FM stereo program.

### ㉖ MEMORY INDICATOR

The letter "MEMORY" lights up when the MEMORY switch is depressed. Operate the STATION CALL switches while this indicator is on. Frequencies can not be stored when it goes off.

### ㉗ STATION CALL SWITCHES

These are depressed to call out preset broadcasting stations and to preset the stations.
To call out a station, first set the desired frequency band using the FUNCTION selector and then depress the desired switch.

### ㉘ TUNING UP, DOWN SWITCHES

Depress the DOWN switch to tune in a station broadcasting on a frequency lower than that indicated on the frequency display, and depress the UP switch to tune in a station broadcasting on a frequency which is higher than that indicated.

### ㉙ MEMORY SWITCH

This is depressed when presetting a broadcasting station into one of the STATION CALL switches. For presetting, depress the MEMORY switch and then depress the STATION CALL switch which will be used for presetting the station while the MEMORY indicator remains lighted (about 5 seconds).

### ㉚ FM/AM MUTE OFF SWITCH

Normally stations are tuned in with this switch at the released position, and the unpleasant interstation noise is muted. However, when tuning in a distant station or one with weak signals and the input level is low, set the switch to the depressed position.

### ㉛ FM 25μS SWITCH

Depress this switch when listening to a Dolby* FM broadcast; otherwise keep this switch at the released position.

For further details, refer to page 16.

### ㉜ TUNING MODE SWITCH

Set this switch to AUTO for auto scan tuning.
Set this switch to MANUAL for manual tuning. When the tuning switches are depressed, the frequencies will change in 100 kHz steps for FM reception and 1 kHz steps for AM reception.

* The word "Dolby" is a trademark of Dolby Laboratories Licensing Corporation.

# OPERATION

## PRIOR TO SWITCHING POWER ON

Before switching the power on, set the various controls as follows.

1. Depress the SPEAKERS switch that corresponds to the speaker systems which are connected to the SPEAKERS terminals on the rear panel.
2. Release the TONE, LOW FILTER and MODE switches.
3. Set the volume control to ∞.
4. Release the TAPE MONITOR 1, 2 and ADAPTOR switches.
5. Depress the TAPE DUPLICATE OFF switch.
6. Release the LOUDNESS and MUTING switches.
7. Release the FM 25μS and FM/AM MUTE OFF switches.

## LISTENING TO THE BROADCAST

Three different tuning methods are possible with this receiver.

### AUTO TUNING

1. Depress the POWER switch.
2. Depress the FM or AM FUNCTION switch, depending on the program you want to listen to.
3. Release the TUNING mode switch (AUTO).
4. Depress the DOWN or UP TUNING switch lightly. When the strength of the signals received exceeds a certain level, the tuning operation will stop and the frequency received will be indicated on the frequency display.
5. To tune in to another station, depress the DOWN or UP TUNING switch.
6. Adjust the volume with the VOLUME control.
7. Depress the TONE switch in line with your preference and adjust the tone with the BASS and TREBLE controls.

### MANUAL TUNING

1. Depress the POWER switch.
2. Slightly turn the VOLUME control in the clockwise direction to obtain the sound.
3. Depress the FM or AM FUNCTION switch, depending on the program you want to listen to.
4. Depress the TUNING mode switch (MANUAL).
5. Depress the DOWN or UP TUNING switch lightly.
   Every time the TUNING switch is depressed, the frequency will change in 100kHz steps for FM and 1kHz steps for AM.
   If the switch is kept depressed, the frequency is continuously scanned. Release the switch at the frequency of the desired station and this will stop the tuning operation.
6. Adjust the volume with the VOLUME control.
7. Depress the TONE switch in line with your preference and adjust the tone with the BASS and TREBLE controls.

### PRESET TUNING

1. Depress the POWER switch.
2. Depress the FM or AM FUNCTION switch, depending on the program you want to listen to.
3. Depress the STATION CALL switch corresponding to the station required.
   **For the presetting procedure, refer to the section on presetting given on page 14.**
4. Adjust the volume with the VOLUME control.
5. Depress the TONE switch in line with your preference and adjust the tone with the BASS and TREBLE controls.

### Last station recall function

When the PHONO or AUX function switch is depressed while an FM or AM broadcast is being received and the FM or AM switch is then depressed again, the station which was received before the function switch was selected is tuned in. The last station to be received is also recalled when the power is switched off while that station was being received and then switched on again.

*NOTE:*
*If you set the function switch to AM when receiving an FM station with preset tuning and then you depress the FM switch again, the FM station of the depressed button is tuned in but the station indicator goes off.*
*This is the same in reverse cases (when switching from the AM to the FM function switch).*

## PLAYING RECORDS

1. Depress the POWER switch.
2. If your turntable is connected to the PHONO 1 jacks, depress the PHONO 1 FUNCTION switch. If it is connected to the PHONO 2 jacks, depress the PHONO 2 switch.
3. Select the PHONO cartridge selector in line with the type of cartridge which is being used for record play.
4. Operate the turntable to play the records.
5. Adjust the volume with the VOLUME control.
6. Depress the TONE switch in line with your preference and adjust the tone with the BASS and TREBLE controls.

## PLAYING A STEREO COMPONENT CONNECTED TO THE AUX JACKS

1. Depress the POWER switch.
2. Depress the AUX FUNCTION switch.
3. Operate the audio component which you have connected to the AUX jacks.
4. Adjust the volume with the VOLUME control.
5. Depress the TONE switch in line with your preference and adjust the tone with the BASS and TREBLE controls.

**Protection Circuit**

After the power switch is set to ON, there is short delay of about 7 ~ 8 seconds before sound is obtained. This is due to the muting funtion of the procection circuit which eliminates unpleasant noise when the power supply is sctivated.

# HOW TO PRESET THE STATION

The six STATION CALL switches can be used to accomodate six FM stations and six AM stations to make a total of 12 stations. Preset as outlined below.

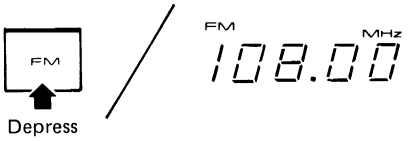
## PRESETTING

For the presetting procedure, proceed as outlined below.
Before presetting, set up the receiver for reception of a broadcast.

- Depress the POWER switch.
- Rotate the VOLUME control slightly to the right.
- Release the TAPE MONITOR and ADAPTOR switches.
- Release the FM/AM MUTE OFF switch.
- Release the TUNING mode switch.

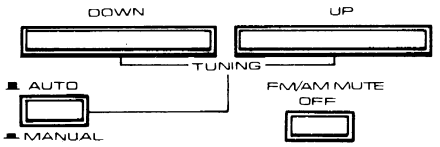
The example gives the procedure for presetting an FM station broadcasting on the 106.5MHz frequency into STATION CALL switch 1.

### 1 Depress the FM switch.

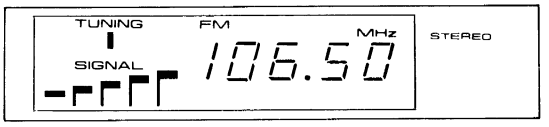



The letters "FM" and "MHz" are appeared on the frequency display.

### 2 Depress the DOWN or UP TUNING switch lightly



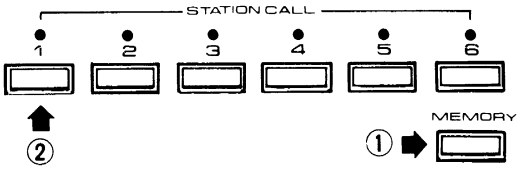

If the frequency of the broadcasting station to be tuned in is lower than the frequency on the display, depress the DOWN switch lightly. If it is higher, depress the UP switch.
If the frequency display has stopped before the desired station, depress the TUNING switch again.




*NOTE:*
*If the station whose program you want to hear is not picked up as you depress the TUNING switches with the tuning mode switch at the AUTO position (because the input level of the signal is too low), depress the tuning mode switch (MANUAL) and the FM/AM MUTE OFF switch and try tuning in manually.*

Once the frequency of the desired station is displayed on the frequency display, check the sound rotating the VOLUME control.

### 3 Depress the MEMORY switch and then depress the STATION CALL switch 1.

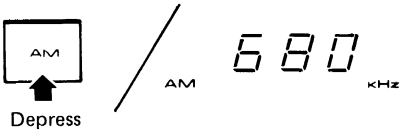



*NOTE:*
*The MEMORY indicator will remain lighted for 3 or 4 seconds. If the MEMORY indicator has gone off before the indicator above the STATION CALL switch has lighted, depress the MEMORY switch again and then depress the STATION CALL switch 1.*

Taking the above procedure, it is possible to preset 6 FM stations in STATION CALL switches 1 through 6.
Now change the position of the FUNCTION switch to AM and try presetting an AM station.

The example gives the procedure for presetting a station broadcasting on a frequency of 1,000kHz into STATION CALL switch 1.

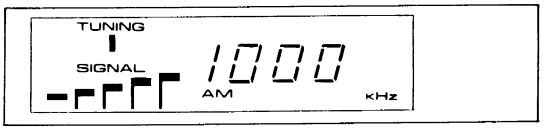
### 4 Depress the AM switch




The letters "AM" and "kHz" are appeared on the frequency display.

### 5 Depress the TUNING switches

The tuning operation is the same as that described for FM reception.




*NOTE:*
*If the station whose program you want to hear is not picked up as you depress the TUNING switches with the tuning mode switch at the AUTO position (because the input level of the signal is too low), depress the tuning mode switch (MANUAL) and the FM/AM MUTE OFF switch and try tuning in manually.*

### 6 Depress the MEMORY switch and then the STATION CALL switch 1.

In accordance with the above operation, the 106.5MHz FM station and the 1,000kHz AM station are both preset into the STATION CALL switch 1.

*NOTE:*
*Each STATION CALL switch can accommodate two stations: one FM station and one AM station.*



*NOTE: If the power cord is disconnected for three days or longer, the station stored in the STATION CALL switch will be erased.*

# TAPE DECK OPERATIONS

## PLAYBACK (Fig. 10)

1. Depress the TAPE MONITOR 1 switch if the tape deck connected to the TAPE 1 jacks. Depress the TAPE MONITOR 2 switch if it is connected to the TAPE 2 jacks.
2. Operate the tape deck controls for playback.
3. Adjust the volume with the VOLUME control.
4. Depress the TONE switch in line with your preference and adjust the tone with the BASS and TREBLE controls.

*NOTE:*

1. *Always release the TAPE MONITOR 1 and 2 switches, when you are not playing back a tape.*
2. *If you depress the ADAPTOR switch together, you will hear the playback sound of the tape deck through the adaptor connected to the ADAPTOR jacks.*

## RECORDING (Fig. 11)

1. Select the FUNCTION switch that corresponds to the program source which you intend to record.
2. Depress the TAPE DUPLICATE OFF switch.
3. Play the program source (record, FM broadcast, etc.).
4. Set the recording level on the tape deck.
5. Start the recording by following the tape deck's recording procedure.

*NOTE:*

1. *When recording, release the MODE SELECTOR.*
2. *The receiver's VOLUME, BASS and TREBLE controls have no affect on the recorded sound when a recording is being made.*

### Tape monitoring

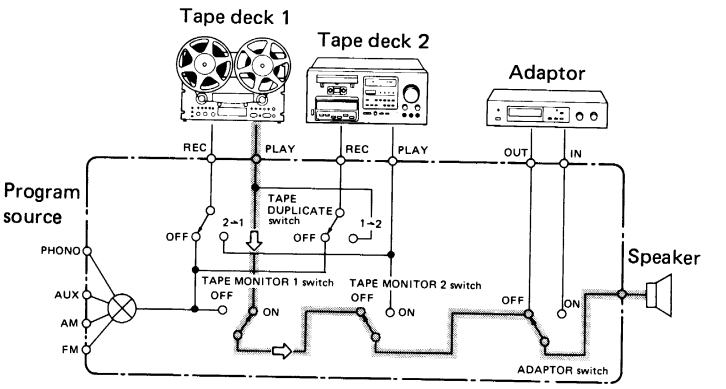
If a recording is being made on a 3-head tape deck, the recorded sound can be monitored through the speaker systems if the TAPE MONITOR 1 or 2 switch is depressed, depending on which TAPE jacks the tape deck is connected to. In this case, both recording and playback connections must be made.

*NOTE:*

*If you have a 2-head open-reel deck or cassette deck, you will not be able to monitor the recorded sound even if you depress the TAPE MONITOR 1 or 2 switch. However, you will be able to hear the sound at the playback end (program source).*

### Duplicating and editing recorded tapes

1. As shown in Fig. 12, connect the tape decks to the receiver's TAPE 1 and TAPE 2 jacks.
2. If you are duplicating from TAPE 1 (playback mode) to TAPE 2 (recording mode), depress the TAPE DUPLICATE 1 → 2 switch. Conversely, if duplicating in the opposite direction (from TAPE 2 to TAPE 1), depress the TAPE DUPLICATE 2 → 1 switch.
3. Depress the TAPE MONITOR 1 or 2 switch, depending on which tape deck the recording is being made when you want to monitor the recorded sound.




*Note:*
*Set these switches to the released (OFF) position when you listen to records or a broadcasting.*

Fig. 10

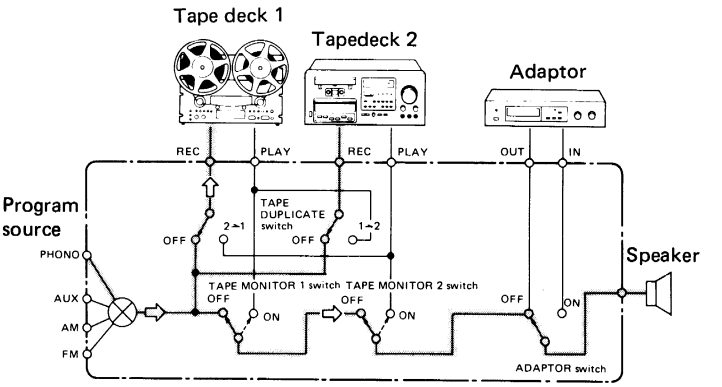
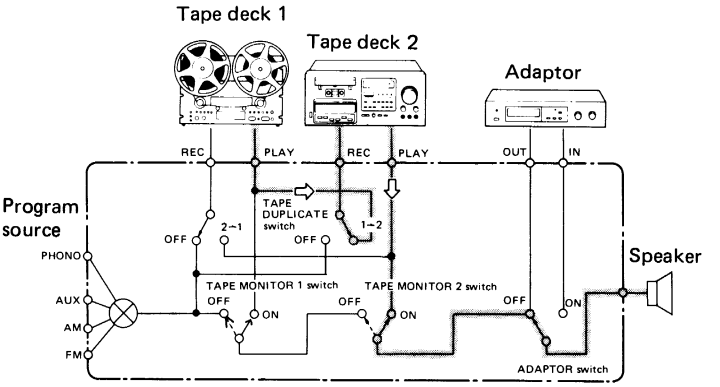



Fig. 11




*NOTE:*
*Do not set both tape decks to the recording mode at the same time.*

Fig. 12

# EFFECTIVE OPERATION

## RECEPTION OF FM DOLBY BROADCASTS

If you live in an area where you can receive FM Dolby broadcasts, you can listen it if you connect an optional Dolby NR adaptor to the ADAPTOR jacks.

1. Connect the Dolby NR adaptor to the ADAPTOR jacks (OUT, IN), as shown in Fig. 13.
2. Depress the FM 25μS switch.
3. Depress the ADAPTOR switch.
4. Operate the Dolby NR adaptor.
5. Depress the FUNCTION FM switch and tune in the Dolby broadcast with the tuning operation. For reception, refer to "OPERATION" on page 13, since the procedure is the same.

*NOTES:*

- *For detailed instructions on connections and the handling of the Dolby adaptor, refer to its operating instructions.*
- *When you are not listening to an FM Dolby broadcast, release the FM 25μS switch and the ADAPTOR switch to their released positions.*

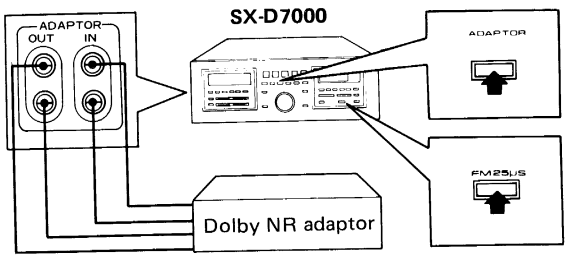



Fig. 13

## WHEN USING ADAPTOR COMPONENTS

The ADAPTOR jacks are available in addition to the normal tape REC and PLAY jacks to enable other sophisticated adaptor units (graphic equalizer, reverberation amplifier, etc.) to be connected without disturbing the full tape monitoring and duplicating facility. When using an adaptor, the program source can be taken from the FUNCTION selector or the tape deck output jacks. Fig. 14 illustrates a reverberation amplifier connected to the ADAPTOR jacks.

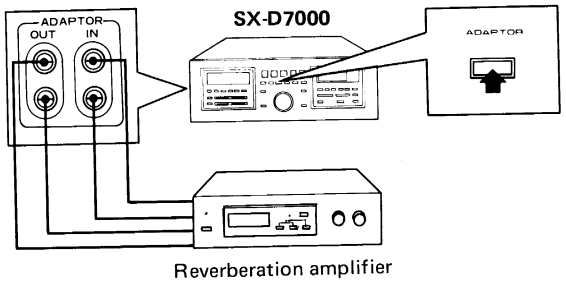



Fig. 14

## TURNOVER SWITCHES

As shown in Fig. 15, the receiver adopts a tone control system that combines the BASS and TREBLE controls with two turnover switches which are used to select the frequency. Select the frequency with the turnover switches and then enhance or attenuate the sound in the lower (or higher) frequencies with the bass (or treble) controls.

For instance, if the bass turnover switch is set to 400Hz (see Fig. 15), the bass covers a wide frequency spectrum and can be enhanced (or reduced) with large gain per step of the bass control. For this reason, the reproduced sound sometimes seems unnatural depending on the program source, but this can be remedied by depress the switch to 200Hz.

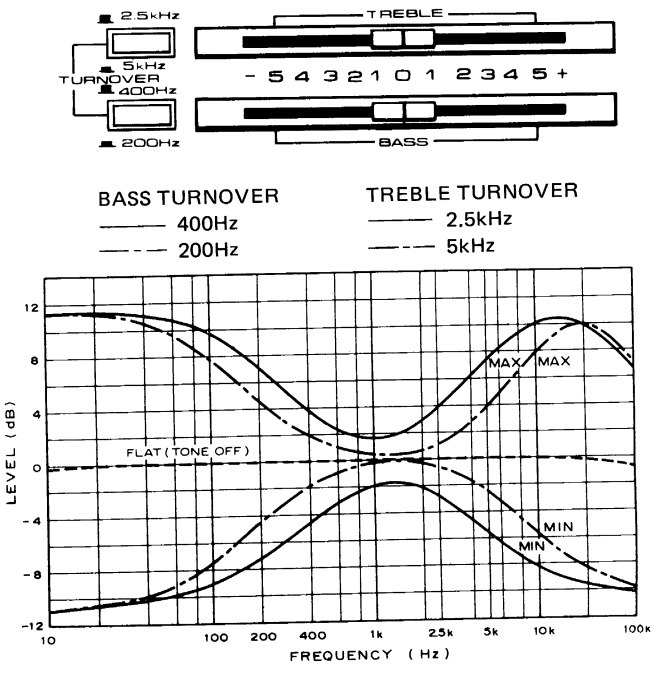



Fig. 15

# USING THE PREAMP OUT AND POWER AMP IN JACKS

If the connector bars between the PREAMP OUT and POWER AMP IN jacks are removed (see Fig. 16), it is possible to use the preamplifier section and the power amplifier section independently. However, for normal use always keep these connector bars in place because once you remove them, no sound will be heard through the speakers. Always set the power switch to STAND-BY when removing or replacing these connector bars.

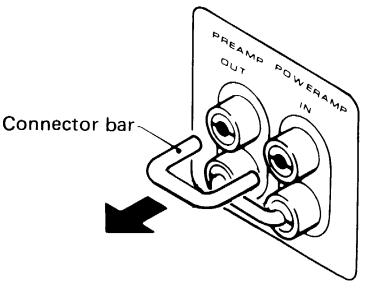



Fig. 16

## INDEPENDENT PREAMPLIFIER SECTION

As shown in Fig.17 you can connect a high output power stereo power amplifier or a homebuilt power amplifier to the PREAMP OUT jacks and compare the sound with the power amplifier section of the stereo receiver.

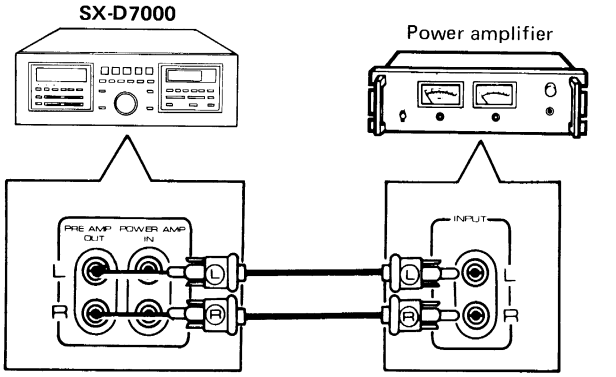



Fig. 17

## INDEPENDENT POWER AMPLIFIER SECTION

As shown in Fig. 18, you can connect a stereo preamplifier which you may have to the POWER AMP IN jacks and compose your own stereo system.

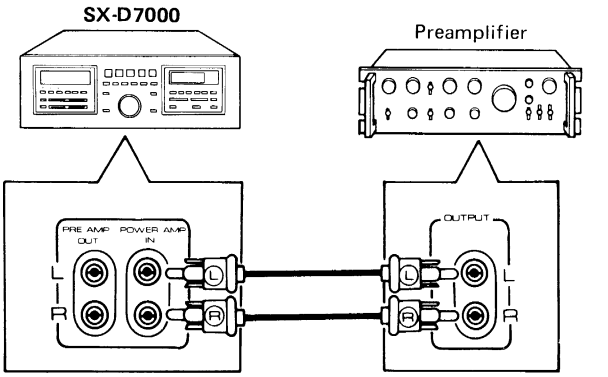



Fig. 18

## COMPOSING A MULTI-AMPLIFIER SYSTEM

As shown in Fig. 19, you can compose your own multi-amplifier system if you connect an optional stereo power amplifier and crossover network. A multi-amplifier system splits up the audible frequency range into different frequency bands. Each of these bands is then amplified by the amplifiers and so this has the advantage of reducing intermodulation distortion.

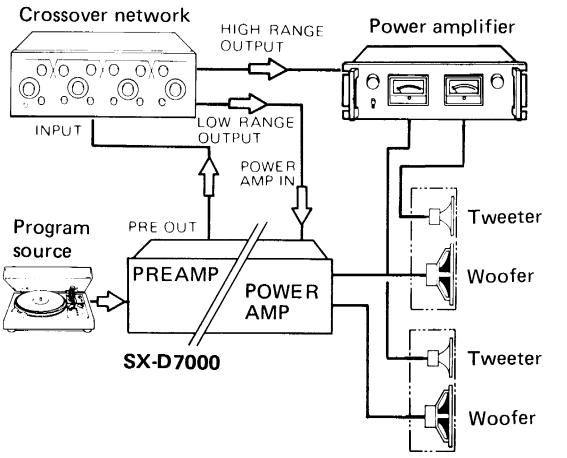



Fig. 19

# SPECIFICATIONS

### Power Amplifier Section

Continuous power output of 120watts* per channel, min., at 8ohms from 20Hertz to 20,000 Hertz with no more than 0.005% total harmonic distortion.

Total Harmonic Distortion (20 Hertz to 20,000 Hertz, 8 ohms)
- continuous rated power output ..... No more than 0.005%
- 60 watts per channel power output ..... No more than 0.004%

Intermodulation Distortion (50 Hertz : 7,000 Hertz = 4:1)
- continuous rated power output ..... No more than 0.005%
- 60 watts per channel power output ..... No more than 0.004%

Frequency Response .... 3 Hertz to 450,000 Hertz $^{+0}_{-3}$dB

Input Sensitivity/Impedance (POWER AMP IN) ..... 1V/50 kilohms

Output
- Speaker ..... A,B,C, A+B, B+C, A+C

Damping Factor (20 Hertz to 20,000 Hertz, 8 ohms) ..... 60

Hum and Noise (IHF, short-circuited, A network) ..... 115dB

### Preamplifier Section

Input (Sensitivity/Impedance)
- PHONO 1, 2 MM ..... 2.5mV/50 kilohms
- PHONO 1, 2 MC ..... 0.25mV/100 ohms
- AUX, TAPE PLAY 1, 2, ADAPTOR IN ..... 150mV/50 kilohms

Phono Overload Level (T.H.D. 0.005%, 1,000 Hertz)
- PHONO 1, 2 MM ..... 200mV

Output (Level/Impedance)
- TAPE REC 1, 2, ADAPTOR OUT ..... 150mV
- PREAMP OUT ($R_L$ : 50 kilohms) ..... 1V/1 kilohms (Volume : max)

Total Harmonic Distortion (20 Hertz to 20,000 Hertz)
- PHONO MM 1, 2 → REC OUT ..... No more than 0.005% (4V output)
- AUX, TAPE PLAY 1, 2, ADAPTOR IN ..... No more than 0.005% (4V output)

Frequency Response
- PHONO 1, 2 MM (RIAA Equalization) ..... 20Hz to 20,000 Hertz±0.2dB
- AUX, TAPE PLAY 1, 2, ADAPTOR IN ..... 5Hz to 100,000 Hertz $^{+0}_{-3}$dB

Tone Control
- BASS ..... ±8dB/±10dB (100Hz)
  - Turnover Frequency: 200Hz/400Hz
- TREBLE ..... ±10dB/±8dB (10kHz)
  - Turnover Frequency: 2.5kHz/5kHz

Low Filter ..... 18Hz (6dB/oct.)

Loudness Contour (Volume control set at –40dB position) ..... +6dB (100Hz), +3dB (10,000Hz)

Hum and Noise (IHF, short-circuited, A network)
- PHONO MM/MC ..... 86dB/72dB
- AUX, TAPE PLAY 1, 2, ADAPTOR IN ..... 100dB

Attenuator ..... –20dB

### FM Tuner Section

Usable Sensitivity (IHF) ..... 10.2dBf (1.8μV)

50dB Quieting Sensitivity
- MONO ..... 15.7dBf (3.2μV)
- STEREO ..... 34.2dBf (28.2μV)

Signal-to Noise Ratio (at 85 dBf)
- MONO ..... 82dB
- STEREO ..... 78dB

Distortion (at 65dBf)

| | | |
|---|---|---|
| MONO | 100Hz | 0.1% |
| | 1kHz | 0.07% |
| | 6 kHz | 0.1% |
| STEREO | 100Hz | 0.2% |
| | 1kHz | 0.1% |
| | 6kHz | 0.2% |

Capture Ratio ..... 1.0dB

Alternate Channel Selectivity
- 400kHz ..... 80dB

Stereo Separation
- 1kHz ..... 50dB
- 30Hz to 15kHz ..... 35dB

Frequency Response ..... 30Hz to 15kHz±0.5dB

Spurious Response Ratio ..... 80dB

Image Response Ratio ..... 80dB

IF Response Ratio ..... 90dB

AM Suppression Ratio ..... 60dB

Subcarrier Product Ratio ..... 65dB

SCA Rejection Ratio ..... 65dB

Muting Threshold ..... 35.7dBf (32μV)

Antenna Input ..... 300 ohms balanced, 75 ohms unbalanced

## AM Tuner Section

Sensitivity (IHF, Ferrite antenna) . . . . . 300μV/m
(IHF, Ext. antenna) . . . . . 15μV
Selectivity . . . . . 30dB
Signal-to-Noise Ratio . . . . . 45dB
Image Response Ratio . . . . . 30dB
IF Response Ratio . . . . . 60dB
Antenna . . . . . Ferrite loopstick antenna

## Miscellaneous

Power Requirements . . . . . AC 120V, 60Hz
Power Consumption . . . . . 400W (UL)
Dimensions . . . . . 519(W) x 180(H) x 460(D) mm
20-7/16(W) x 7-1/16(H) x 18-1/8(D) in
Weight (without package) . . . . . 19.2 kg (42 lb 5 oz)

## Furnished Parts

Operating instructions . . . . . 1
FM T-type antenna . . . . . 1

**Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers.*

*NOTE:*

*Specifications and the design subject to possible modifications without notice due to improvements.*

# TROUBLESHOOTING

If your stereo appears to malfunction, first check such things as the controls (POWER switch, FUNCTION switch, TAPE MONITOR switch 1 or 2, ADAPTOR switch, etc.) and connecting cords (components connected correctly).
Noise: There are a variety of noises relating to the operation of a hi-fi unit. There are generally divided into two types: (1) the unit is faulty (a transistor or part has deteriorated), and (2) an external source is interfering with the unit.
When a hi-fi unit produces an unpleasant noise, it is often assumed that the unit is faulty; however, statistical records indicate that the majority of noise produced in hi-fi acoustic units results from external sources of noise: Due to the inherent high-sensitivity and the high-fidelity reproduction, the unit amplifies and reproduces extraneous noise, however small, into audible output noise. If your receiver produces a noise, check according to the following table and trace the source of noise for the appropriate corrective action.

| | Symptom | Diagnosis checkpoints | Remedy |
|---|---|---|---|
| When listening to broadcasts | Cannot receive FM stations. | • Power switch is at STAND-BY.<br>• FUNCTION selector is at AM.<br>• Signal indicators do not light up properly.<br>• In the case of a far away broadcasting station or weak signals, all signals below the internal muting level are cut out. | • Depress to ON (fluorescent lamp will then come on).<br>• Depress the FM switch.<br>• In order to increase the antenna input of the radio signals, erect an FM outdoor antenna if you have been listening with the indoor T-type antenna.<br>• Depress the FM/AM MUTE OFF switch. |
| | Cannot receive AM stations. | • Signal indicators do not work properly indicating that signal strength at AM antenna is insufficient.<br>• FUNCTION selector is set to FM. | • Adjust the bar antenna.<br>• Install an outdoor antenna.<br>• Depress the AM switch. |
| | No sound is heard through the speakers. | • All the SPEAKERS switches (A, B, C) have been set to the depressed position.<br>• The TAPE MONITOR 1 or 2 or the ADAPTOR switch is depressed. | • Depress the A and B, A and C or B and C switches.<br>• Release the switch to the OFF position. |
| | No auto stop (figures on frequency display do not stop). | • Input signals are not strong enough.<br>• The AM CHANNEL STEP switch on the rear panel is set to the 9 kHz position with AM reception. | • If the T-type antenna is being used, change over to an FM outdoor antenna.<br>• Change the direction of antenna.<br>• Set it to the 10 kHz position. |
| | No FM stereo with stereo reception. | • MODE switch is depressed. | • Release the MODE switch. |
| | Preset function does not work. | • After MEMORY indicator goes off, STATION CALL switches are depressed. | • Depress the STATION CALL switch immediately after depressing the MEMORY switch again. |
| | Cannot receive programmed station even when the STATION CALL switch is depressed. | • Power cord has been disconnected for a long time (more than 3 days) and so contents of memory have been erased. | • Perform memory operation again. |
| | Cannot scan frequencies even when the tuning switches are depressed. | • Tuning mode switch is set to MANUAL. In this state, the frequencies can be scanned if the tuning switches are continuously depressed. | • Release the tuning mode switch to AUTO. |
| When playing records | Hum or buzz. | • Poor connection shielded wire. (a)<br>• Jack connection is loose. (b)<br>• Power lead of fluorescent lamp passes near the shielded wire. (c)<br>• Poor grounding. (d)<br>• Ham transmitting station or TV transmitting station is near your house. (e) | Correct the conditions stated in (a), (b), (c), or (d). In case of (e), report it to an official authority. |
| | Output tone quality is poor and mixed with noise. Treble is not clear. | • Stylus is worn. (a)<br>• Record is worn. (b)<br>• Dust adhering to stylus. (c)<br>• Stylus is improperly mounted. (d)<br>• Stylus pressure (tracking force) is not correct. (e)<br>• The treble level is too high. | Check (a) through (e) and correct the condition.<br>• Slide the treble control to 0. |
| | When playing a record, increasing the volume causes howl. | • Distance between the turntable and the speakers is too short.<br>• The turntable or speakers supports are unstable. | • Increase the distance or rearrange the installation of the unit and speakers. (Installing the turntable on a firm, solid stand may alleviate this problem.)<br>• Do not turn up the bass excessively. |

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