AM/FM STEREO RECEIVER

SX-780

OPERATING INSTRUCTIONS

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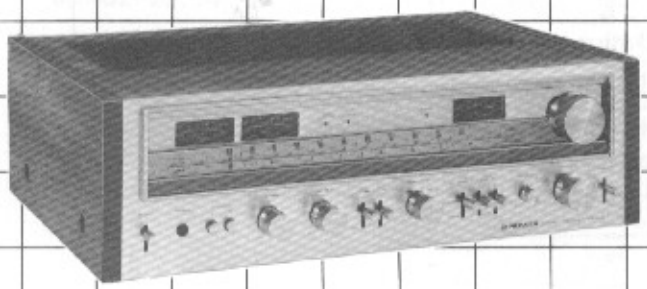


Walnut grained vinyl top and side panels are used in the construction of this cabinet.

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®

CONTENTS

FEATURES

High-Output, Low-Distortion High-Power Amplifier

The differential amplifier with its current mirror load employing PNP dual transistors in the first stage helps to yield a high gain even in the high-frequency range. The pre-driver stage features a constant current circuit as the load for upgraded gain. The power stage uses Darlington power ICs which provide stable characteristics and eliminate the effects of the transient response. The NFB circuit is configured as a DC amplifier without the use of capacitors for improved dynamic characteristics and a stable output. The SX-780 delivers a **Continuous Power Output of 45 watts*per channel, min., at 8 ohms from 20 Hertz to 20,000 Hertz with no more than 0.05% total harmonic distortion.**

This is more than enough power for satisfying music listening requirements.

High-Stability FM Tuner

The first stage of the front end is configured with a 3-gang variable capacitor and a 3-stage RF amplifier with a dual gate MOS FET for a high sensitivity of 1.8μV (IHF). The IF stage packs two ICs and three dual-element ceramic filters which feature superb phase characteristics. These produce a sufficient gain and excellent limiter characteristics as well as a low distortion of 0.07% (1kHz, mono) and a high signal-to-noise ratio of 80dB (mono). The MPX stage contains a 19kHz pilot signal auto canceller IC which extends the frequency response up to the high-frequency range and produces an extremely clear FM sound. There is also an FM muting circuit which cuts out all that irritating noise when detuning or when setting the FUNCTION switch.

High-Fidelity Equalizer Amplifier

The SX-780 has an IC-configured NFB-type equalizer amplifier which is characterized by its low noise and high gain. The maximum allowable input level is 200mV (at 1kHz) and only precision parts are used for the RIAA elements for an RIAA deviation of only ±0.2dB across a frequency range of 20Hz to 20kHz.

Tone Controls with Tone Defeat Function

When the CR-type bass and treble tone control knobs are set to the center position (OFF), the tone control networks are automatically disengaged and uniformly flat frequency response is yielded. There is also a low cut filter which cuts out the ultra-low-frequency noise at frequencies below 15Hz.

Built-in Protection Circuits

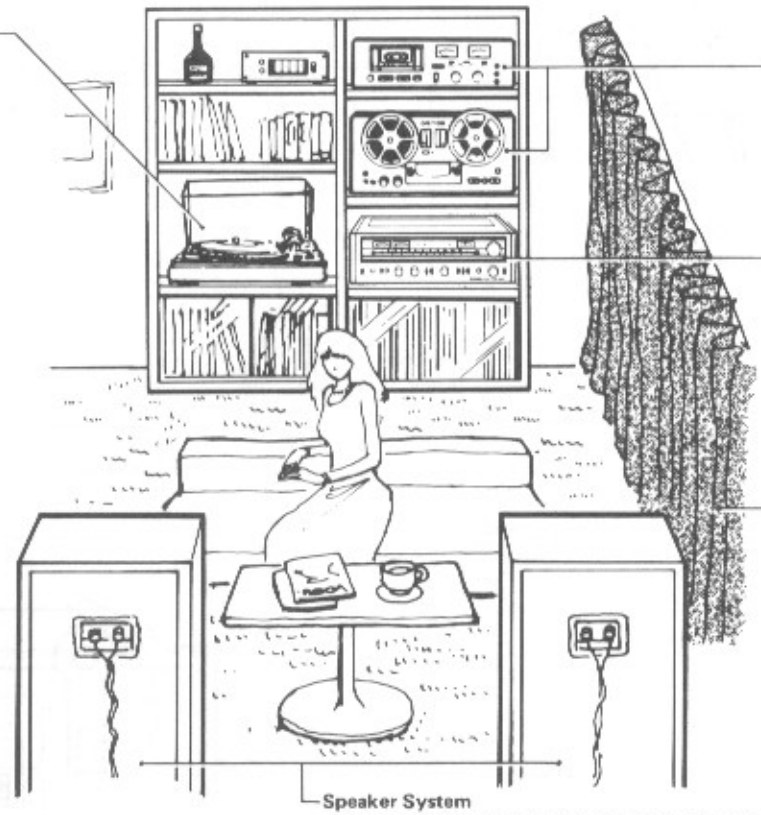
The IC-based protection circuit protects the power amplifier and the speakers from unforeseen accidents and mishaps. This circuit cuts out the unpleasant noise generated when the power switch is turned on and off.

Independent Power Meters

The independent left and right channel power meters enable the strength of the output signal to be read out directly, thanks to their logarithmic compression circuitry, from 0.01W up to 100W without any switches having to be thrown.

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

STEREO SYSTEM COMPOSITIONS



Turntable
- Protect from vibrations and close dust cover whenever possible.
- Store records vertically and protect from dust and dirt.

Furnishing materials can improve tone.

Listening position is slightly to the rear of the apex of an equilateral triangle formed with left and right speakers.

Carpet
Absorbs sound and vibration. (Placing on floor in front of speakers is also effective.)

Tape deck
- Be sure to install reel clamps when using vertically.
- Always keep heads clean.
- Do not neglect recorded tape for long periods.
- Avoid magnetic fields.

SX-780 (keep connecting cords as short as possible.)

Thick curtain shuts out direct sunlight.

Speaker System
Rear and side panels of left and right speakers should have the same surroundings. (Placing with rear panel against a wall improves bass.)
Install speakers so that vibrations are not transferred directly to the floor. (Employ stands or concrete blocks with bookshelf-type speakers.)

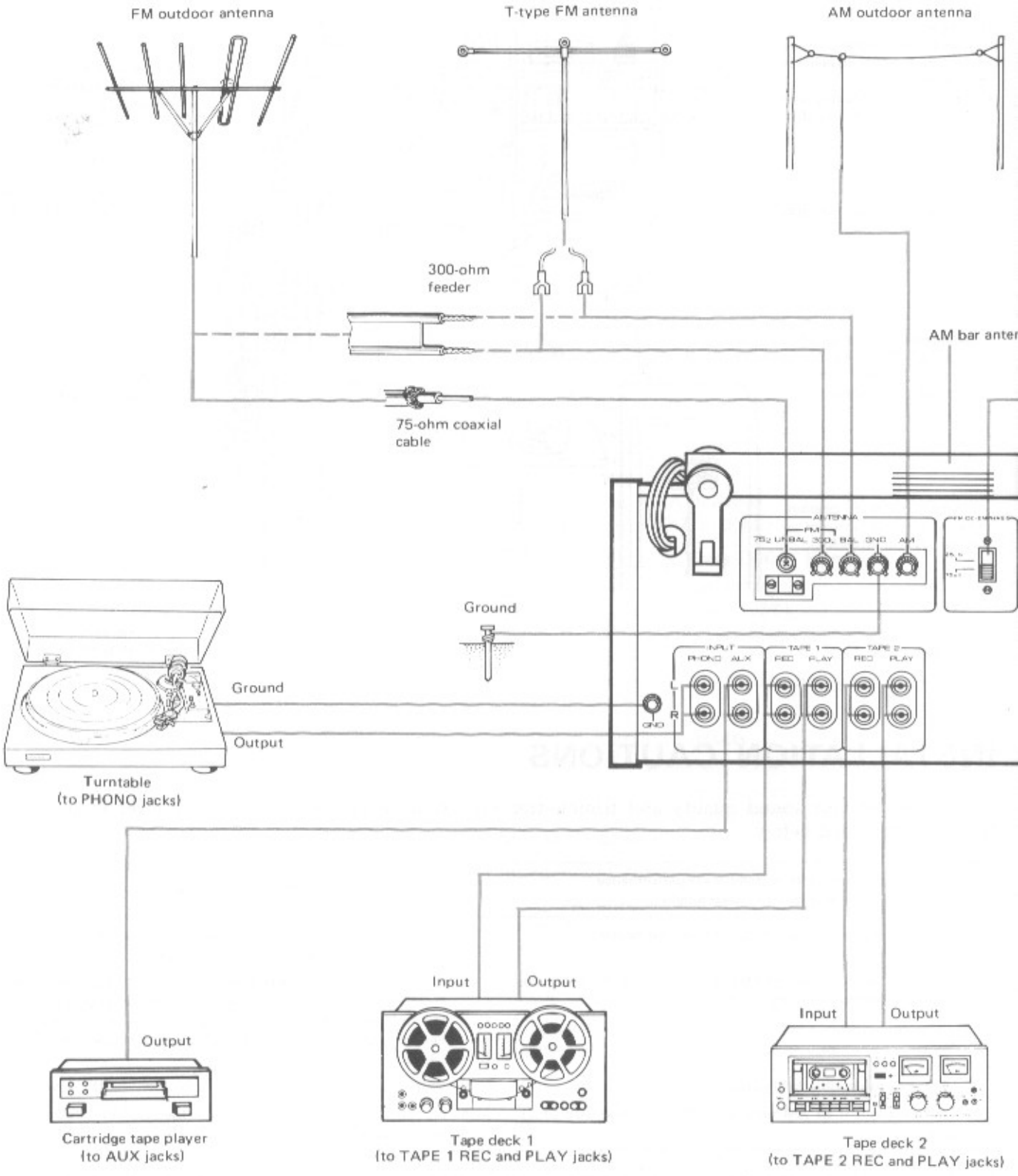
INSTALLATION CAUTIONS

To ensure the best sound quality and trouble-free operation, avoid setting up the receiver in any of the locations described below:

Locations liable to downgrade performance and result in breakdowns	Resulting trouble
1. Locations exposed to direct sunlight, or near heaters.	1. External heat causes the performance of the electronic parts to deteriorate, and operation becomes unstable.
2. Locations with poor ventilation, with high humidity or moisture contents, or dusty locations.	2. Cause of faulty contact in input-output terminals, and rust. High humidity and a high moisture content cause deterioration in insulation. There is also the danger of current leakage and heat generation in the circuit parts. Dust or grease in the rotating parts causes them to deteriorate.
3. Locations susceptible to vibration.	3. These locations affect the precision parts adversely.
4. Locations where an AM radio or TV set is being used simultaneously.	4. Mutual interference can occur from the oscillator circuits used in these products.

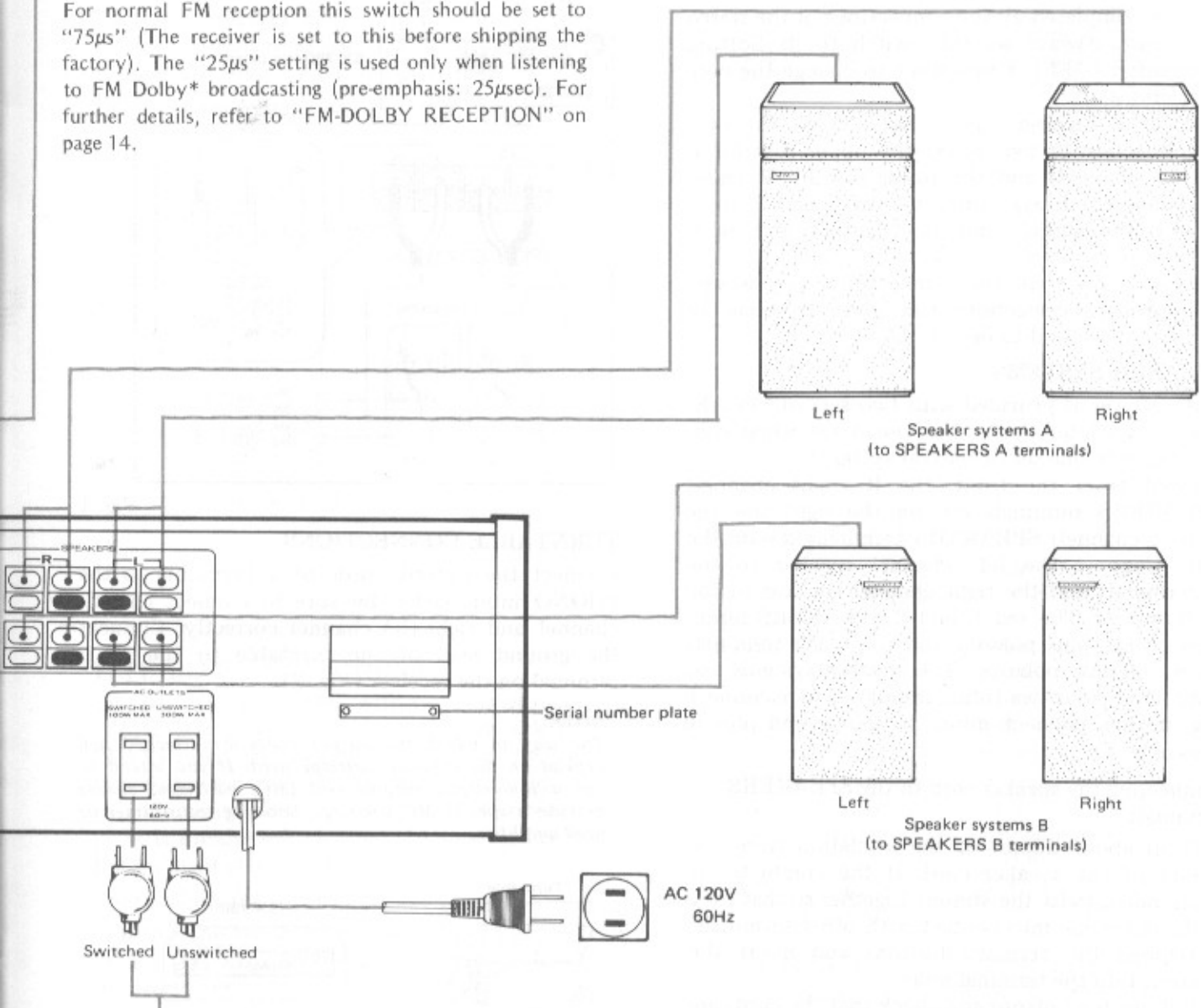
Don't put anything on the top of the receiver because a high-power receiver will produce a lot of heat. Also leave sufficient space around the receiver for adequate ventilation.

CONNECTION DIAGRAM



FM DE-EMPHASIS switch

For normal FM reception this switch should be set to "75μs" (The receiver is set to this before shipping the factory). The "25μs" setting is used only when listening to FM Dolby* broadcasting (pre-emphasis: 25μsec). For further details, refer to "FM-DOLBY RECEPTION" on page 14.



Convenience Outlets

SWITCHED 100W MAX: A frequently used component (turntable, tape deck, etc.) can be plugged into this outlet. By leaving the power switch of that component in the ON position, the power supply to the component will be coupled with the receiver switch operation.

UNSWITCHED 300W MAX: A less frequently used component, which does not require coupled power, can be plugged into this outlet.

Connection Notes

- Do not bundle input and output cords with power and speaker cords. Also avoid using longer cords than necessary.
  These practices can result in noise, impaired sound quality, and possible operating difficulties.
- To prevent faulty connections, read "CONNECTIONS" on pages 6 and 7 before attaching connecting cords.

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

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 its bottom position (OFF) 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.

SPEAKER SYSTEMS

The receiver is provided with two sets of SPEAKERS output terminals. Use the A set when connecting only one set of speaker systems.
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. The red L and R SPEAKERS terminals have a plus polarity and the black terminals have a minus polarity. The speaker systems also have two polarities (plus, minus). When connecting, always connect minus to minus and plus to plus (Fig. 1).

Connecting the speaker cord to the SPEAKERS terminals

1. Strip about 10mm of the insulation from the end of the speaker cord. If the conductor is stranded, twist the strands together so that they do not come into contact with other terminals.
2. Depress the terminal buttons and insert the cords into the terminal holes.
3. Release the buttons and check that the cords are secure.

NOTES:

1. *The high output power of this receiver requires that the speaker cords have an ample current-carrying capacity. Use cords with a high capacity and connect them securely. If you use low-capacity cords and do not connect them properly, the reproduced sound will be adversely affected and heat generation or short-circuits may be caused.*
2. *This receiver delivers a high output power and so make sure that you use speakers with a high allowable input.*
3. *If you want to use two sets of speaker systems, 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.*

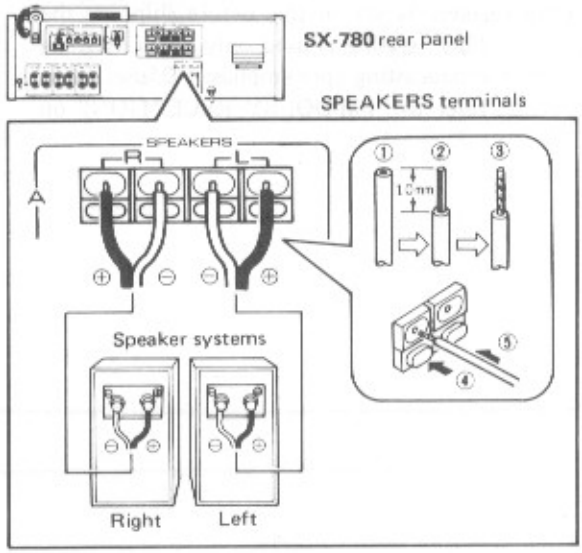


Fig. 1

TURNTABLE CONNECTIONS

Connect the output cords of a turntable to the PHONO 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 (Fig. 2).

NOTE:
The way in which the output cords are attached will depend on the type of cartridge used. If you intend to use a low-output moving coil (MC) cartridge, always provide a special MC cartridge boosting transformer or head amplifier.

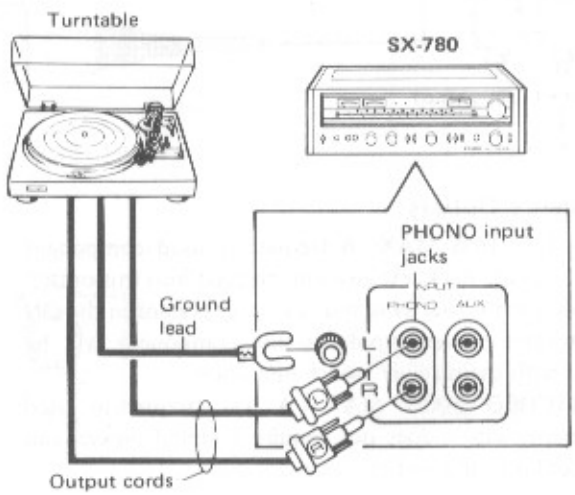


Fig. 2

USING THE AUX JACKS

You can connect an 8-track cartridge tape player, TV tuner, second tuner, or tape-deck playback output to these jacks. Be sure to connect both left channel (L) and right channel (R) correctly (Fig. 3).

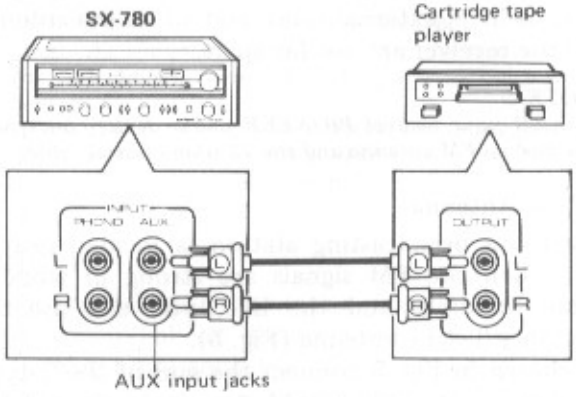


Fig. 3

TAPE DECK CONNECTIONS

The receiver is provided with two sets of recording (TAPE REC) output jacks and 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) (Fig. 4).

Connections for recording

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

Connections for playback

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

NOTE:
Connect your second tape deck to TAPE 2 REC and PLAY jacks.

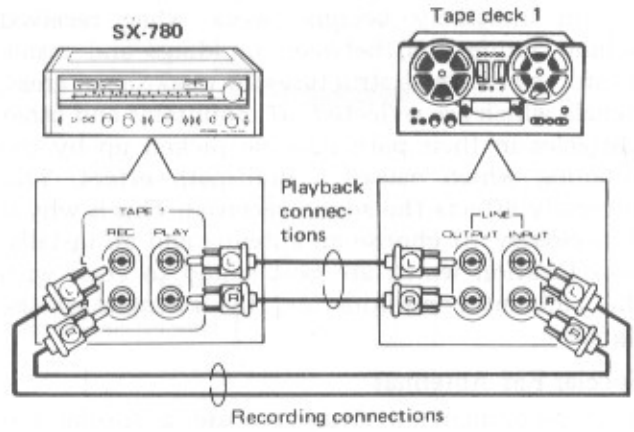


Fig. 4

AC OUTLETS AND POWER PLUGS

Plug the power plug of your audio components into the SWITCHED and UNSWITCHED convenience outlets.

SWITCHED . . . . . The power supplied through this outlet is coupled to the operation of the receiver's POWER switch; so when the POWER switch is turned to ON, power is supplied through this outlet and when it is turned to OFF, power is cut off. For instance, if you connect a turntable to the outlet and keep its power switch at ON, you can turn it on and off by turning the receiver's POWER switch on and off. The maximum power capacity which may be connected to the SWITCHED outlet is 100W.

UNSWITCHED . . . . . Power is supplied through this outlet regardless of the position of the POWER switch. The maximum power capacity which may be connected to this outlet is 300W.

NOTES:

- *Never connect an iron or a toaster to these outlets.*
- *Do not get the power outlets and the power plugs wet or touch them with wet hands, since you may get an electric shock.*

ANTENNA AND GROUND CONNECTIONS

FM ANTENNA CONNECTIONS

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 an installation location which are best suited to cope with the ambient conditions and the strength of the signals.

Special FM Antennas

It is recommended that you use a special FM antenna in order to obtain input signals which will allow your receiver to display its capabilities to the full.

- When installing your antenna, refer to the instructions in "FM RECEPTION" on page 12 and determine in which direction the antenna should point for the best reception, all the while listening to a broadcast to check the reception. Mount the antenna securely.
- In accordance with the application of the antenna, use a 75-ohm coaxial cable or a 300-ohm feeder to connect the antenna to the receiver.

75-ohm coaxial cable: As shown in Fig. 5, connect the cable to the 75Ω UNBAL terminal of the receiver. This cable is used in locations near roads with a great deal of traffic, and near overhead high-tension power lines which generate a lot of noise. It is also used when the antenna and the receiver are far apart.

300-ohm feeder: As shown in Fig. 5, connect the feeder to the 300Ω BAL terminals. Use it when there is little external noise and when the antenna and the receiver are not far apart.

NOTE:
Consult your nearest PIONEER audio dealer concerning the special FM antenna and the 75-ohm coaxial cable.

T-type Antenna

When the broadcasting station is located nearby and when the FM signals are strong in wooden frame buildings and the like, you can use the accessory T-type antenna (Fig. 5).
As shown in Fig. 5 connect the end of the T-type antenna to the 300Ω BAL terminals. Spread the two arms of the antenna horizontally and while listening to an FM broadcast, rotate the antenna through 180 degrees and position it for the best reception. Tape the antenna to a wall or ceiling.

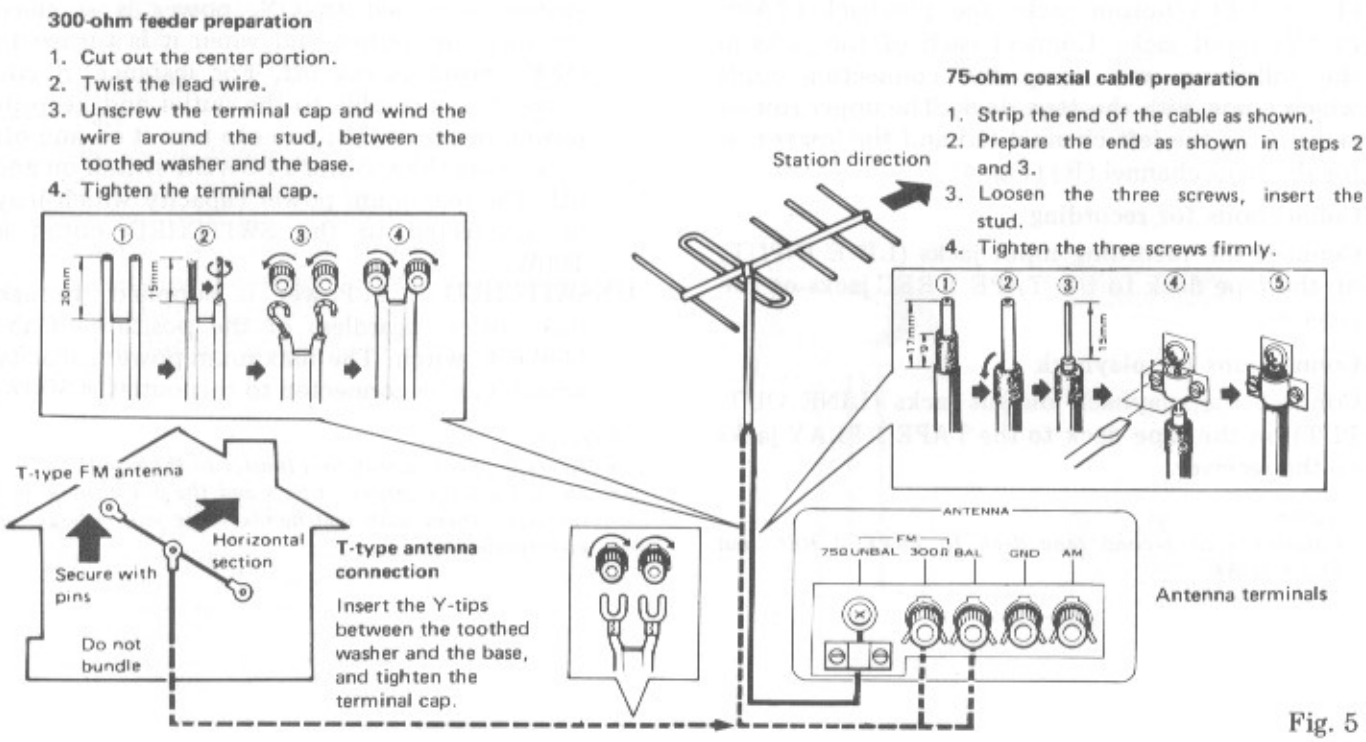


Fig. 5

AM ANTENNA CONNECTION

Move the AM bar antenna on the rear panel of the receiver and find the best reception position (Fig. 6), all the while following the instructions outlined on page 12 under "AM RECEPTION".

NOTE:

- *The AM bar antenna on the receiver's rear panel displays directivity, so some stations may be poorly received. In such cases, change the installation of the receiver.*
- *If you still cannot obtain good reception even by moving the AM bar antenna, erect an indoor AM antenna with a vinyl-insulated wire (about 5—6 meters long). As shown in Fig. 7, connect the lead wire to the AM antenna terminal, and tape it to the wall or ceiling.*
- *If you live in an area where the reception is poor even if you erect an indoor AM antenna, use a tree to erect an outdoor AM antenna with a vinyl-insulated wire (Fig. 7).*

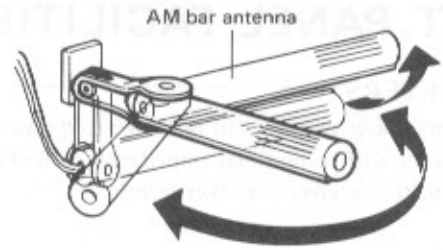


Fig. 6

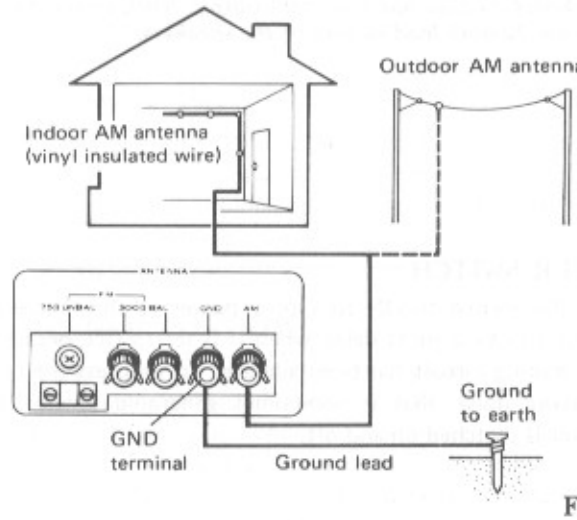


Fig. 7

GROUND

As shown in Fig. 7, connect a ground lead to the ground terminal on the receiver for maximum safety and noise reduction, never make this connection near gas pipes and other potentially dangerous locations.

FM ANTENNA LOCATION

It is important to choose the installation locations for your antenna with care for the stable reception of the signals from FM broadcasting stations and for superior sound reproduction.
Bear in mind the following points and determine the optimum location (height and direction).

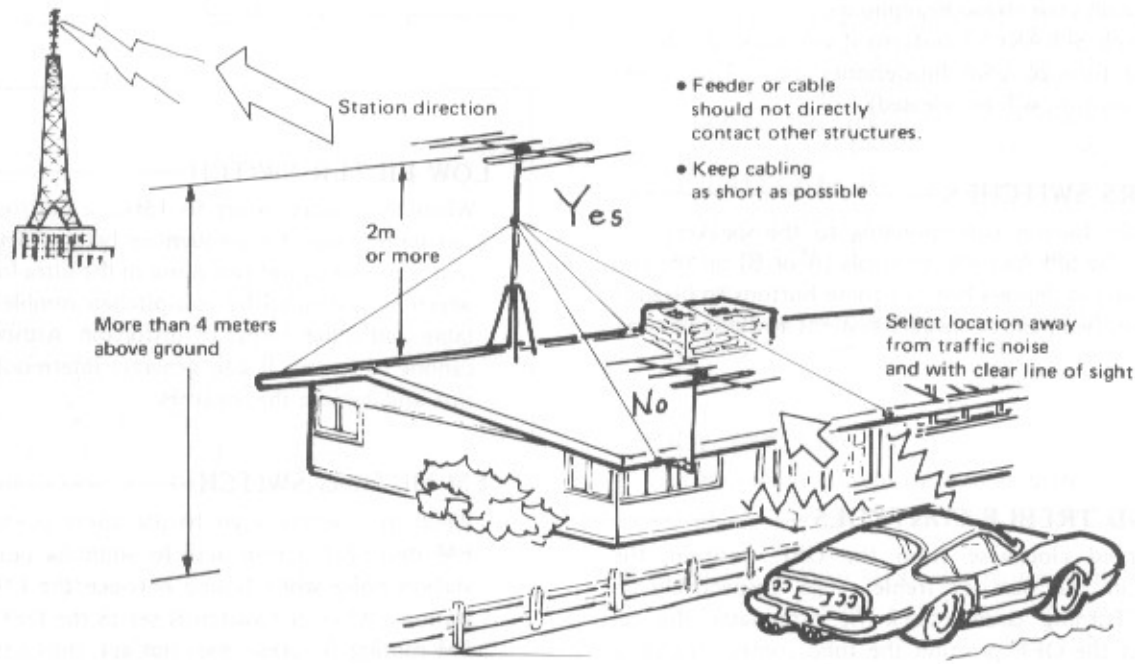


Fig. 8

FRONT PANEL FACILITIES

POWER METERS

These meters allow you to read out the rated power level when speakers with a nominal impedance of 8 ohms are connected to the receiver's speaker terminals.

NOTE:
These values are related to the impedance of the speakers and they vary according to the frequency. In order to find out the exact output level, connect an 8-ohm dummy load instead of the speakers.

TAPE MONITOR INDICATOR

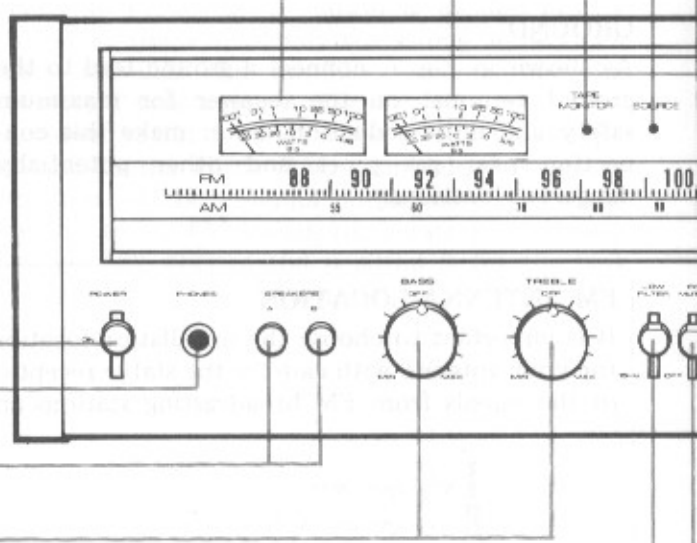
With either of the TAPE MONITOR switches set to ON, the TAPE MONITOR indicator lights up. This lamp indicates the receiver is monitoring or playing back the tape on the tape deck connected to the TAPE jacks.

SOURCE INDICATOR

With either of the TAPE MONITOR switches set to OFF, the SOURCE indicator lights up. This lamp indicates the receiver is playing the program source; AM broadcast, FM broadcast, record on the turntable, or another component connected to the AUX jacks.

POWER SWITCH

Set this switch to ON to supply power to the receiver. There will be a short delay when it is set to ON, because the muting circuit has been actuated to suppress the unpleasant noise that is sometimes generated when the power is switched on and off.



PHONES JACK

Plug the headphones into this jack when you want to listen through your stereo headphones.
Release both SPEAKERS buttons if you want to listen to the sound through your headphones only (This means that both buttons will be released).

SPEAKERS SWITCHES

Depress the button corresponding to the speakers connected to the SPEAKERS terminals (A or B) on the rear panel. You can depress both of these buttons to listen to sound from two pairs of speaker systems at the same time.

LOW FILTER SWITCH

When this switch is set to 15Hz, a 6dB/oct attenuation can be provided for frequencies below 15Hz. This means that you can cancel out noise in the ultra-low frequencies which is generated by low-pitched rumble from a turntable and other forms of distortion. Although this noise cannot be heard, it can generate intermodulation distortion and damage the speakers.

BASS AND TREBLE CONTROLS

When turned clockwise from the OFF position, the response in the bass or treble range, respectively, is boosted. Turning counterclockwise attenuates the response. At the OFF position the tone control circuit is bypassed and frequency response is flat.

FM MUTING SWITCH

When this switch is set to the upper position (On), the FM muting function acts to suppress unpleasant interstation noise while tuning between the FM broadcasting stations. When the switch is set to the OFF position, the FM muting function does not act, thus enabling suitable reception of weak radio stations.

DIAL POINTER

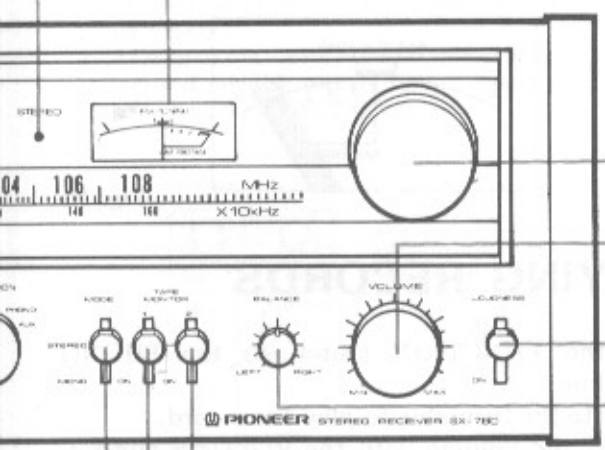
This pointer indicates the broadcasting stations.

STEREO INDICATOR

This indicator lights up when the receiver is tuned in to receive a stereo broadcast.

AM/FM TUNING METER

When tuning in to FM stations, position the meter pointer in the center of FM area for optimum reception. In the case of AM stations, tune for maximum meter deflection toward the right of the scale.



TUNING KNOB

Use this knob to tune in to broadcasting stations.
Select the station and tune for optimum reception by observing the dial scale and the AM/FM tuning meter.

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 to MIN.

LOUDNESS SWITCH

Set this switch to ON when listening at a low volume.
The frequency response of the human ear varies according to the listening volume, and setting this switch to the ON position compensates for hearing response by emphasizing the bass and treble.

BALANCE CONTROL

Use this control to balance the volume of the left and right channels. First, however, set the MODE switch to MONO. 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. After adjusting, return the MODE switch to STEREO.

TAPE MONITOR SWITCH (1, 2)

Set switch 1 to ON with a tape deck which is connected to the TAPE 1 jacks (REC and PLAY) when you want to monitor the playback or recording of a tape. The tape on a deck which is connected to the TAPE 2 jacks (REC and PLAY) can be similarly monitored by setting switch 2 to ON. For details, refer to "TAPE DECK OPERATIONS" on page 13.

NOTE:
Set the switches to the upper (OFF) position when listening to records or broadcasts.

FUNCTION SWITCH

Use this switch to select the program source. For a second after the switch is selected, no sound will be heard. This is due to the operation of the muting circuit, which can suppress the unpleasant switching noise generated when the FUNCTION switch is selected.

AM: When listening to AM broadcasting.
FM: When listening to FM broadcasting.
The STEREO indicator lights up when the receiver is tuned in to an FM stereo broadcast.
PHONO: When playing a record on the turntable connected to the PHONO jacks.
AUX: When listening to an audio component connected to the AUX jacks.

MODE SWITCH

Use this switch for selecting mono or stereo performances.

STEREO: Set to this position for normal stereo operation.
MONO: When set to this position, the left and right channel signals will be mixed and reproduced monophonically from both speaker systems.

BEFORE OPERATION

Prior to switching the power on, set the various controls as follows:

1. Depress the SPEAKERS button that corresponds to the speaker system which is connected to the SPEAKERS terminals on the rear panel.
2. Set the VOLUME control to the MIN position.
3. Set the BALANCE control to the center position.
4. Set the TAPE MONITOR switch 1 and 2 to the upper position (off).
5. Set the LOW FILTER switch to the upper position (off).
6. Set the FM MUTING switch to the upper position (on).
7. Set the MODE switch to the STEREO position.
8. Set the BASS and TREBLE controls to the OFF position.
9. Set the LOUDNESS switch to the upper position (off).

FM RECEPTION

1. Set the FUNCTION switch to the FM position.
2. Slightly turn the VOLUME control clockwise to obtain the sound.
3. Select the broadcasting station with the tuning knob. Adjust so that the tuning meter pointer is centered, as indicated in Fig. 9.
   Set the FM MUTING switch to OFF if the signals from the station are weak.
   If the program is being broadcast in stereo, the STEREO indicator will come on.
4. Adjust the volume with the VOLUME control.
5. Set the BASS and TREBLE controls for the preferred bass and treble levels.

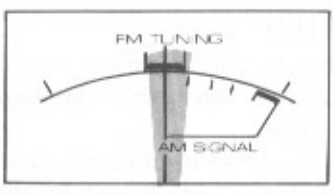


Fig. 9

AM RECEPTION

1. Set the FUNCTION switch to the AM position.
2. Slightly turn the VOLUME control clockwise to obtain the sound.
3. Turn the tuning knob to select a station. The best reception is obtained when the tuning meter pointer deflects to the extreme right, as indicated in Fig. 10.
4. Adjust the volume with the VOLUME control.
5. Set the BASS and TREBLE controls for the preferred bass and treble levels.

NOTE:
If, when listening to either an FM or AM broadcast, your listening pleasure is seriously affected by poor sensitivity or strong interference, refer to the section "ANTENNA AND GROUND CONNECTIONS" on page 8, and make any necessary changes.

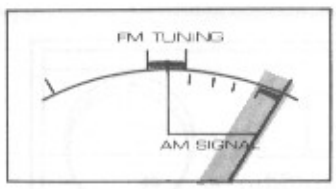


Fig. 10

PLAYING RECORDS

1. Set the FUNCTION switch to the PHONO position.
2. Operate the turntable to play the record.
3. Adjust the volume with the VOLUME control.
4. Set the BASS and TREBLE controls for the preferred bass and treble levels.

Precautions when playing records

- Lower the stylus gently onto the surface of the record. It is a good idea to turn the volume down when lowering the stylus onto the record.
- Do not cause the turntable to vibrate while a record is being played, since this will cause the stylus to jump and scratch the record. Do not turn off the power if the stylus is still tracing grooves on the record.

USING THE AUX JACKS

1. Set the FUNCTION switch to the AUX position.
2. Operate the audio component which you have connected to the AUX jacks.
3. Adjust the volume with the VOLUME control.
4. Set the BASS and TREBLE controls for the preferred bass and treble levels.

TAPE DECK OPERATIONS

PLAYBACK

Proceed as follows when playing back pre-recorded music tapes available on the market, and tapes on which you have recorded programs:

1. As shown in Fig. 11, set the TAPE MONITOR switch 1 to ON if the tape deck is connected to the TAPE 1 jacks. Set the TAPE MONITOR switch 2 to ON 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. Set the BASS and TREBLE controls for the preferred base and treble levels.

NOTES:

1. *Always return both of the TAPE MONITOR switches to the upper position (OFF) when you are not playing back a tape*
2. *As long as the TAPE MONITOR switch 1 or 2 is at ON, you will be able to play back a tape regardless of the setting of the FUNCTION switch.*

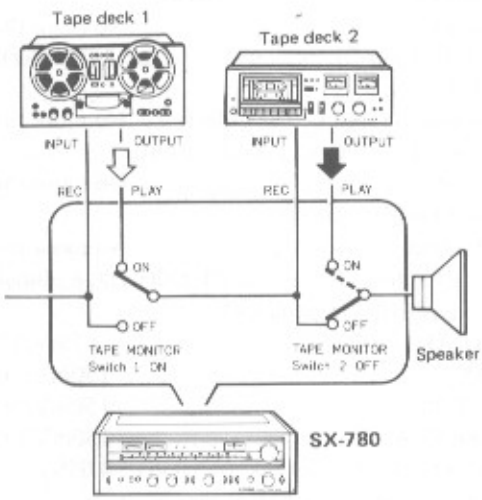


Fig. 11

RECORDING

1. Set the FUNCTION switch to the program source to be recorded.
2. Play the selected program source.
3. Set recording level by means of the controls on the tape deck. During recording, the VOLUME, BASS, and TREBLE controls of the receiver have no effect on the recording level.
4. Operate the tape deck controls and start recording.

NOTE:
When recording, keep the MODE switch at STEREO.

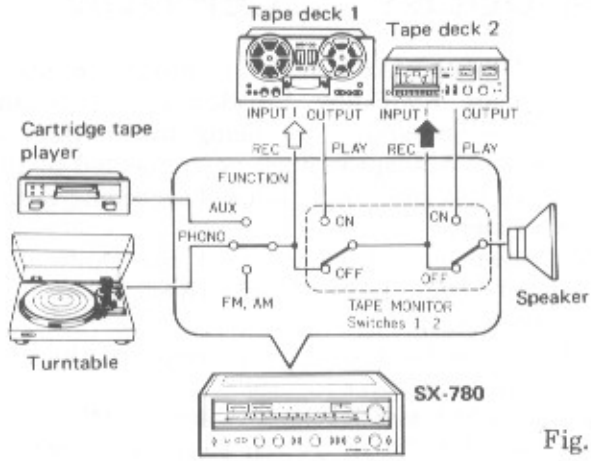


Fig. 12

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 switch 1 or 2 is set to ON. 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 set the TAPE MONITOR switch to ON. 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. 13, connect the tape deck for the receiver's TAPE 1 and TAPE 2 jacks.
2. Playback the recorded tape on tape deck 1 and set the TAPE MONITOR switch 1 to ON.
3. Operate the controls on tape deck 2 and start recording.
4. Set the TAPE MONITOR switch 2 to ON when you want to monitor the recorded sound.

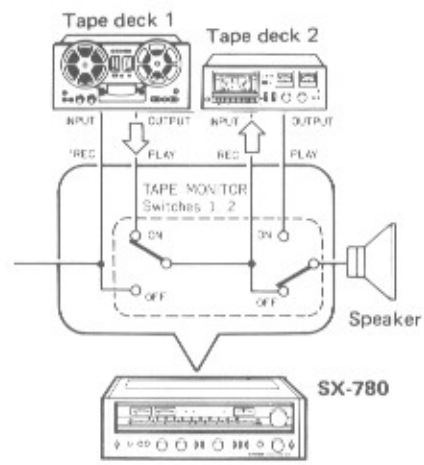


Fig. 13

FM-DOLBY RECEPTION

The FM DE-EMPHASIS switch is provided to allow reception of FM-Dolby broadcasts in locations where these programs are being transmitted. A separately sold adaptor must be connected to the receiver in this case, then proceed according to the following steps:

1. As shown in Fig. 14, connect the Dolby NR adaptor to the TAPE 2 jacks (REC, PLAY) on the receiver.
2. Set the FM DE-EMPHASIS switch on the rear panel of the receiver to "25μs".
3. Set the TAPE MONITOR 2 switch to ON.
4. Set the FUNCTION switch to the FM position and use the TUNING knob to tune in to FM-Dolby broadcasting. Tuning is performed in the same manner as described in "FM RECEPTION."
5. Operate the Dolby NR adaptor and set for reception. Adjust volume and tone with the controls on the receiver.

NOTES:

- *For detailed instructions on connections and the handling of the Dolby NR adaptor, refer to its operating instructions.*
- *When you are not listening to an FM Dolby broadcast, be sure to set the FM DE-EMPHASIS switch to "75μs".*

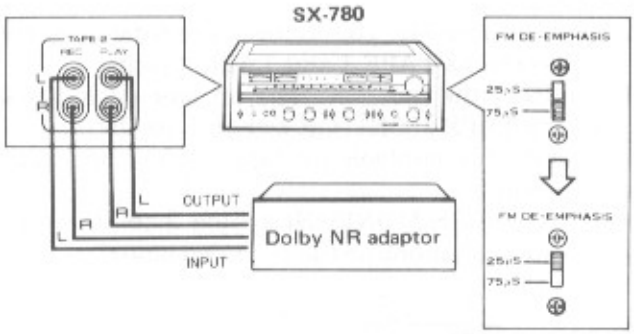


Fig. 14

SPECIFICATIONS

Semiconductors

FETs 5
ICs 11
Transistors 26
Diodes 22

Amplifier Section

Continuous Power Output of 45 watts* per channel, min., at 8 ohms from 20 Hertz to 20,000 Hertz with no more than 0.05% total harmonic distortion, or 45 watts per channel at 4 ohms from 20 Hertz to 20,000 Hertz with no more than 0.08% total harmonic distortion.

Total Harmonic Distortion (20 Hertz to 20,000 Hertz, from AUX)
- continuous rated power output . . .No more than 0.05%
- 23 watts per channel power output,
  - 8 ohms . . . . . .No more than 0.03%
- 1 watt per channel power output,
  - 8 ohms . . . . . .No more than 0.03%

Intermodulation Distortion (50 Hertz : 7,000 Hertz = 4 : 1, from AUX)
- continuous rated power output . . .No more than 0.05%
- 23 watts per channel power output,
  - 8 ohms . . . . . .No more than 0.03%
- 1 watt per channel power output,
  - 8 ohms . . . . . .No more than 0.03%

Damping Factor (20Hertz to 20,000Hertz, 8 ohms) 30

Input (Sensitivity/Impedance)
- PHONO. . . . . 2.5mV/50 kilohms
- AUX. . . . . 150mV/50 kilohms
- TAPE PLAY 1 . . . . . 150mV/50 kilohms
- TAPE PLAY 2 . . . . . 150mV/50 kilohms

PHONO Overload Level (1kHz, T.H.D.: 0.05%) . . 200mV

Output (Level/Impedance)
- TAPE REC 1 . . . . . 150mV
- TAPE REC 2 . . . . . 150mV
- SPEAKERS . . . . . .A, B, A+B
- HEADPHONES . . . . . Low impedance

Frequency Response
- PHONO (RIAA Equalization)
  . . . . . .20Hz to 20,000Hz ±0.2dB
- AUX, TAPE PLAY . . . . . 5Hz to 80,000Hz $^{+0}_{-1}$ dB

Tone Control
- BASS . . . . . +8dB, −7dB (100Hz)
- TREBLE . . . . . +7dB, −6dB (10kHz)

Filter Low 15Hz (6dB/oct.)

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

Hum and Noise (IHF, short-circuited, A network, rated power)
- PHONO 76dB
- AUX, TAPE PLAY 95dB

FM Section

Usable Sensitivity
- MONO 10.3dBf (1.8μV)

50dB Quieting Sensitivity
- MONO 16.2dBf (3.6μV)
- STEREO 37.0dBf (39μV)

Signal-to-Noise Ratio at 65dBf
- MONO 80dB
- STEREO 72dB

Distortion at 65dBf

100Hz	MONO	0.07%
	STEREO	0.15%
1kHz	MONO	0.07%
	STEREO	0.15%
6kHz	MONO	0.12%
	STEREO	0.25%

Frequency Response . . . . . 30Hz to 15,000Hz $^{+0.2}_{-0.8}$ dB
Capture Ratio 1.0dB
Selectivity 75dB
Spurious Response Ratio 65dB
Image Response Ratio 65dB
IF Response Ratio 90dB
AM Suppression Ratio 50dB
Muting Threshold 19.2dBf (5μV)
Stereo Separation . . . . 45dB (1kHz), 35dB (30Hz~15kHz)
Subcarrier Production Ratio 55dB
SCA Rejection Ratio 65dB
Antenna Input . . . . . 300 ohms balanced
75 ohms unbalanced

AM Section

Sensitivity (IHF, ferrite antenna) 300μV/m
(IHF, ext. antenna) 15μV
Selectivity 26dB
Signal-to-Noise Ratio 50dB
Image Response Ratio 40dB
IF Response Ratio 40dB
Antenna . . . . . Built-in ferrite loopstic antenna

Miscellaneous

Power Requirements 120V, 60Hz
Power Consumption . . . . . 150W (UL), 280VA (CSA)
Dimensions . . . . . 480(W) x 140(H) x 320(D)mm
18-7/8(W) x 5-1/2(H) x 12-5/8(D)in
Weight Without package 11.2kg (24lb 11oz)
With package 12.8kg (28lb 3oz)

Furnished Parts

FM T-type antenna 1
Operating instructions 1

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

NOTE:
Specifications and design subject to possible modification without notice due to improvements.

CONDITIONS FREQUENTLY MISTAKEN FOR MALFUNCTION

If your stereo appears to malfunction, first check such things as the controls (POWER switch, FUNCTION switch, TAPE MONITOR 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, satistical 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 noises, 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	Suspected source of noise	Diagonosis and remedy
When listening to broadcasts	Continuous or intermittent buzzing noise.	• Static (lighting) • A fluorescent lamp, motor, or thermostat may be in use in the house or in the vicinity.	In many cases, it is very difficult to remove the source of noise. In order to make the radio input larger than the noise level, set up a good outdoor antenna and make a complete grounding.
	When a station is tuned in hum is mixed in the program.	• A poor fluorescent lamp, motor, or electric heater may be in use in the house or nearby.	Reversing the power plug may occasionally alleviate this noise problem. Usually it is very difficult to eliminate the noise.
	Hissing noise in AM (medium wave) reception.	• The frequency of an adjacent station is interfering with that of the station being tuned in to (10kHz beat interference). • TV set is on in the same house with the receiver.	Impossible to remove such interference. If the cause of such noise is the TV set, increase the distance between the TV set and receiver.
	Static noise (in particular, when automobiles run close to the house).	• White noise generated from automobile engines. • High-frequency sewing machine or welding machine being used near your house.	In an area surrounded by hills or high buildings, the FM input signals are very weak. Thus the noise limiter in the circuit losses its function. Set up an FM outdoor antenna having many director elements.
	Reception of FM stereo program contains more noise than FM mono program.	• Note that the service area covered by an FM stereo broadcast is about 50% of that of a regular mono broadcast.	Increasing the FM input signal may alleviate this problem. Use an exclusive FM outdoor antenna instead of the indoor T-type antenna.
When playing records	Hum or buzz. When switched to radio reception, the noise disappears.	• Poor connection of shielded wire. (a) • Jack connection is loose. (b) • Power lead of fluorescent lamp passes near the shielded wire. (c) • Poor grounding. (d) • Ham transmitting station or TV transmiting 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) • Record is worn. (b) • Dust adhering to stylus. (c) • Stylus is improperly mounted. (d) • Stylus pressure (tracking force) is not correct. (e) • The TREBLE level is too high.	Check (a) through (e) and correct the condition.
	In playing a record, increasing the volume causes howling.	• Distance between the turntable and the speakers is too short. • 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.) Do not enhance the BASS sound level excessively.

Protection Circuit

After the POWER switch is set to ON, there is delay of about 5 seconds before sound is obtained. This is due to the muting function of the protection circuit which eliminates unpleasant noise when the power supply is activated.

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
U.S. PIONEER ELECTRONICS CORPORATION 85 Oxford Drive, Moonachie, New Jersey 07074, U.S.A.
PIONEER ELECTRONIC (EUROPE) N.V. Luithagen-Haven 9, 2030 Antwerp, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia

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