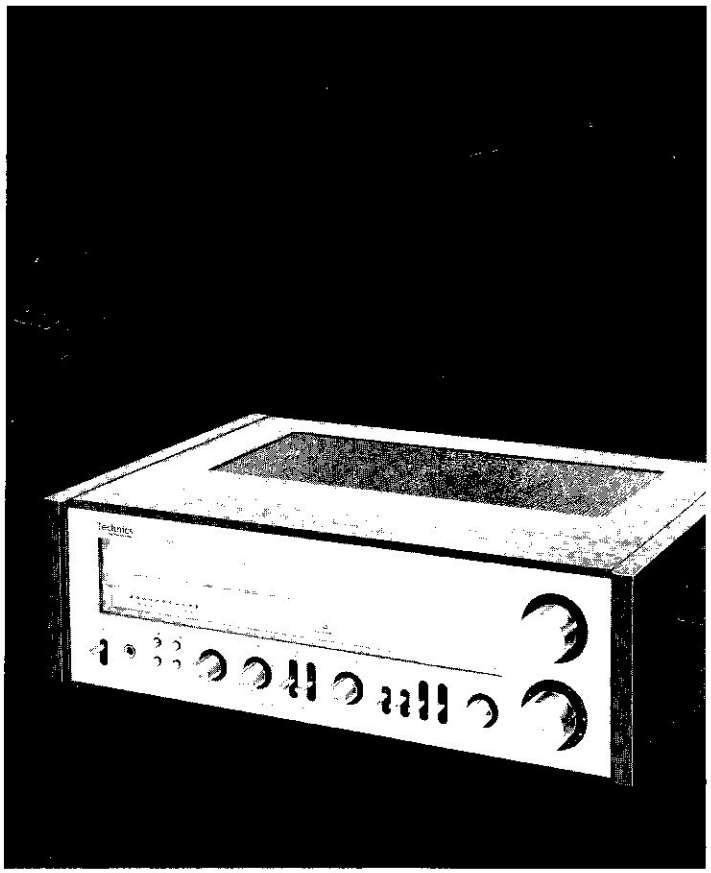
Technics
by Panasonic

FM/AM STEREO RECEIVER

SA-500

OPERATING INSTRUCTIONS



Simulated wood cabinet

Before operating this unit, please read these instructions completely.

Dear Stereo Fan

Your new "Technics by Panasonic" FM/AM stereo receiver was manufactured and assembled under exacting quality control standards.
The incorporation of the latest advances in design and the use of the most modern components assure outstanding performance with superb sensitivity and tonal quality.
A few minutes of your time, wisely spent reading carefully through this instruction booklet, will assure you of getting the maximum benefit of this fine component's potential.

CONTENTS

ACCESSORIES

FM feeder antenna 1
Speaker circuit protection fuses 2

PRODUCT SERVICE

WARNING CONCERNING REMOVAL OF COVERS
This unit should be serviced by qualified technicians only. No service information is provided for customers.
Should your "Technics by Panasonic" product ever require servicing, refer to the Directory of Authorized Service Centers or your franchised "Technics by Panasonic" dealer for detailed instructions.

LOCATION OF SERIAL NUMBER
You will find the serial number located at the back of the unit.

MAINTENANCE OF EXTERNAL SURFACES

To clean, use a soft, dry cloth. If the surfaces are extremely dirty, use a soft cloth soaked in a detergent (such as used for washing dishes; diluted to 1/5 or 1/6 strength), and then wring the cloth well. Wipe once again with a soft, dry cloth. Never use chemicals such as alcohol, paint thinner and benzine, nor a chemically-treated cloth, to clean this unit because the finish may be damaged or lose its luster.

The model number of this product may be found on the back of the unit; and the serial number on the label affixed to the back of the unit.
You should note the model and serial numbers of this unit in the space provided and retain this booklet as a permanent record of your purchase to aid in identification in the event of theft.

MODEL NUMBER__ _____ ____ SERIAL NUMBER_____ _____

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

FOR LONG AND SAFE USE OF THIS UNIT

1) USE AN ORDINARY HOUSEHOLD AC POWER SOURCE

1. **Use from an AC power source of high voltage,such as for air conditioners, is very dangerous.**
   Be extremely careful not to make a connection to the electrical outlet for a large air conditioner or central-heating unit which uses high voltage, because there is the possibility of fire.
2. **A DC power source cannot be used.**
   Be sure to check the power source carefully, especially on a ship or other place where DC is used.

2) CONNECTION AND DISCONNECTION OF THE POWER CORD PLUG

1. **Wet hands are dangerous.**
   A dangerous electric shock may result if the plug is touched by wet hands.
2. **Don't pull the power cord.**
   Always grasp the plug; never pull the cord itself.

3) AC OUTLETS ON REAR PANEL

1. **Any equipment connected here should have specified power consumption or less.**
   These outlets are exclusively for the connection of other audio equipment, such as a tape deck. Be sure the power consumption of each does not exceed wattage specified near the AC outlets.
2. **Never connect other electrical appliances such as an iron or toaster.**
   If appliances with a large power consumption are connected, an unexpected accident might occur as a result of overheating.

4) NEVER ATTEMPT TO REPAIR OR RECONSTRUCT THIS UNIT

A serious electric shock might occur if this unit is repaired, disassembled or reconstructed by unauthorized persons, or if the internal parts are accidently touched.

5) FOR FAMILIES WITH CHILDREN

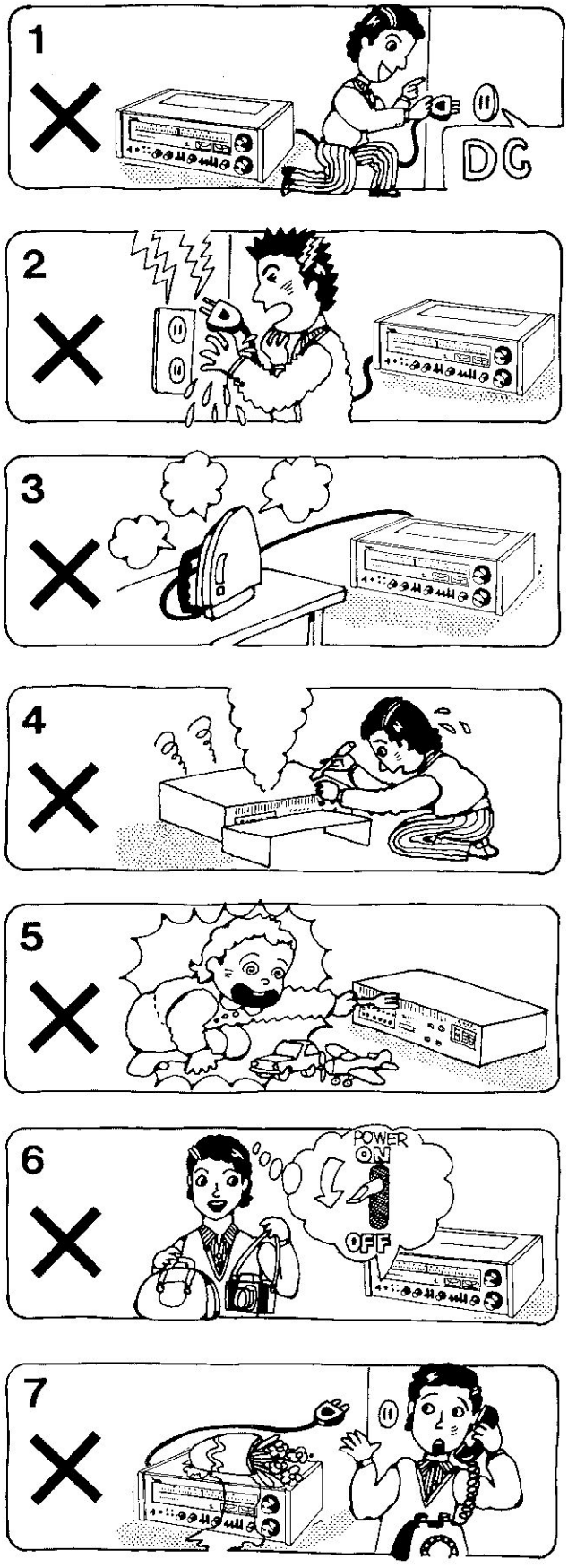
Never permit children to put anything, especially metal, inside this unit. A serious electric shock or malfunction could occur if articles such as coins, needles, screwdrivers, etc. are inserted through the ventilation holes, etc. of this unit.

6) TURN OFF AFTER USE

If the unit is left for a long time with the power on, this will not only shorten its useful operation life, but may also cause other unexpected trouble.

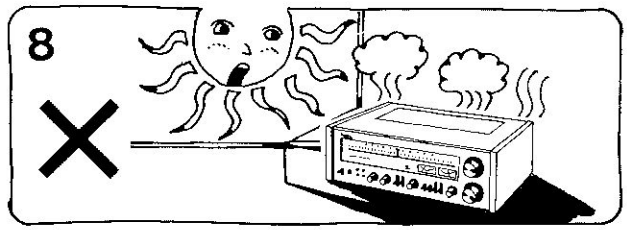
7) IF WATER IS SPILLED ON THE UNIT

Be extremely careful if water is spilled on the unit, because a fire or serious electric shock might occur. Immediately disconnect the power cord plug, and consult with your dealer.



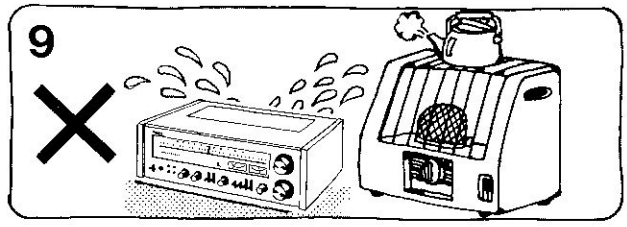
8) PLACE THE UNIT WHERE IT WILL BE WELL VENTILATED, AND AWAY FROM DIRECT SUNLIGHT

Place this unit at least 10 cm (4") away from wall surfaces, etc., and away from direct sunlight. Be careful that curtains and similar materials do not obstruct the ventilation holes.



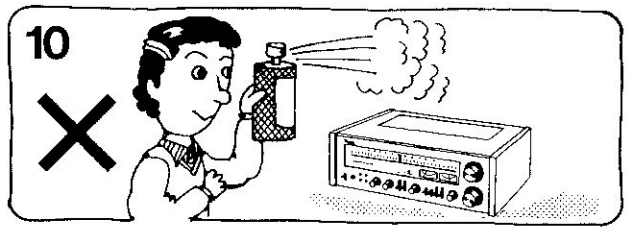
9) KEEP THE UNIT AWAY FROM STOVES, ETC.

Heat can damage the external surfaces as well as internal circuits and components.



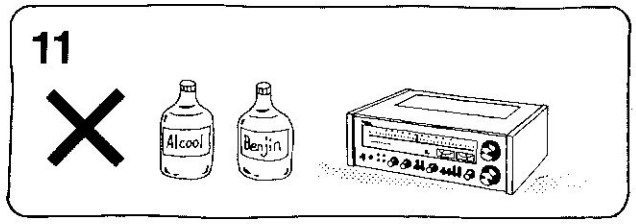
10) AVOID SPRAY-TYPE INSECTICIDES

Insecticides might cause cracks or "cloudiness" in the cabinet and plastic parts of this unit. The gas used in such sprays might, moreover, be ignited suddenly.



11) NEVER USE ALCOHOL OR PAINT THINNER

These and similar chemicals should never be used, because they may damage the finish.



IF TROUBLE OCCURS

If, during operation, the sound is interrupted or indication lamps no longer illuminate, or if abnormal odor or smoke is detected, immediately disconnect the power cord plug, and contact your dealer or an Authorized Service Center.

ABOUT THE CIRCUITRY-PROTECTION FUSES

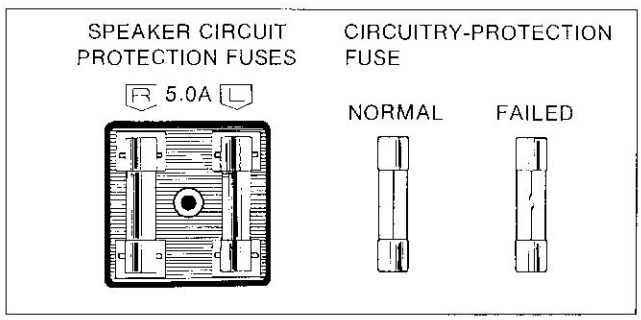
Circuitry damage may result if—with the power on and the volume control ⑨ set to any position except "0"—the plus (⊕) and minus (⊖) speaker terminals are accidently "shorted" or if speaker impedance is not correct. These fuses are to prevent such circuitry damage.

If no sound is heard from one or both speakers although the dial is illuminated and there are no mistakes with connections or operation, a fuse may have failed.

Replace the fuse in the following way.

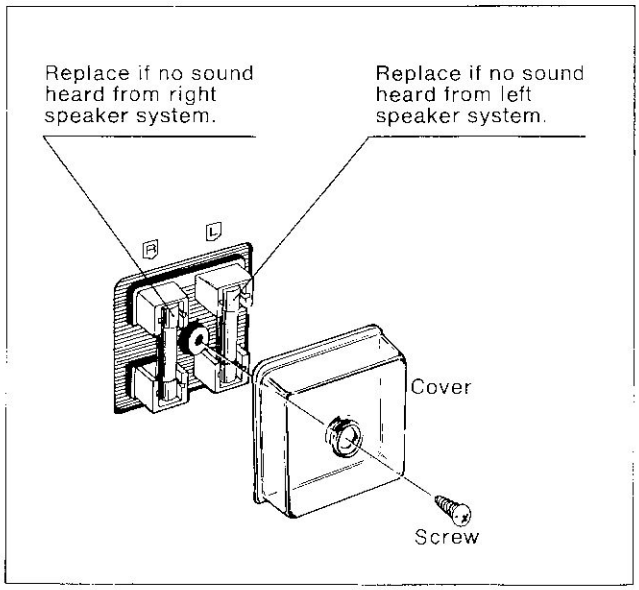
Note concerning speaker impedance:

1) When two pairs of speaker systems ("MAIN" and "REMOTE") are used, use speaker systems with an impedance of 8Ω or more each.
2) When "MAIN" or "REMOTE" speaker systems are used separately, use speaker systems with an impedance of 4Ω or more.



FUSE REPLACEMENT

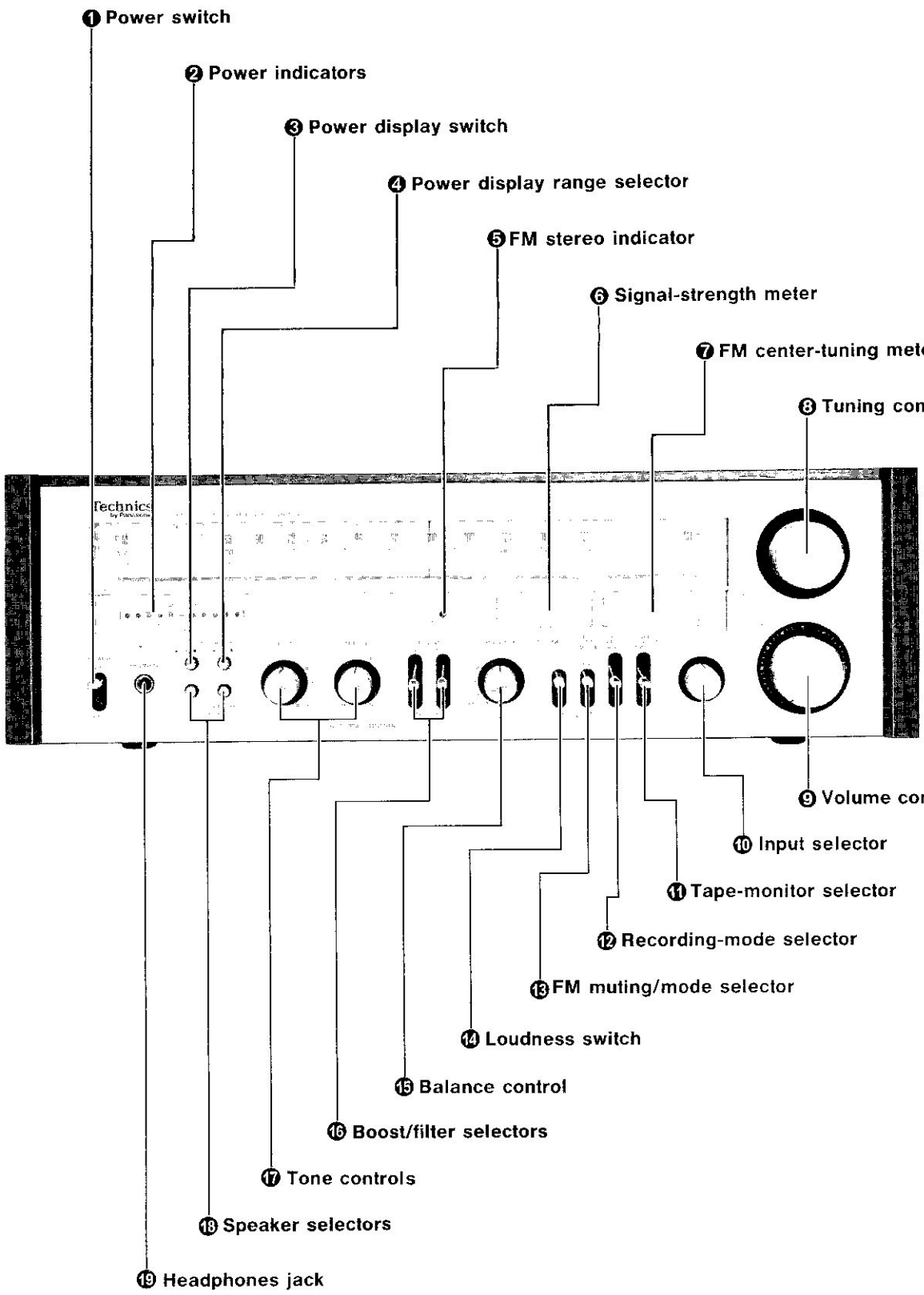
1) Loosen the screw and remove the cover.



2) After fuse replacement, close the cover.

Note:
Replacement fuses are included with the operation instructions.

FRONT PANEL CONTROLS AND THEIR FUNCTIONS



❶ Power switch (POWER)

Note:

Speakers may be damaged if connection cords to a record player, tape deck, etc. are connected or disconnected with power switch on.

❷ Power indicators (POWER LEVEL)

These are indicators which electronically show the peak output level of this unit with an extremely fast response time.

These indicators can be used to watch continuous signal changes, such as in music signals.

If the impedance of the speaker systems is 8Ω, the indicators show the actual standard value; if the impedance is 16Ω, the actual value is one-half of that shown; and, if the impedance is 4Ω, the actual value is twice the indicated value.

If main and remote speaker systems are used at the same time, inpendance will change according to the following equation:

$$\text{Total impedance} = \frac{1}{\frac{1}{R} + \frac{1}{R}}$$

Where: R = impedance of speakers used

❸ Power display switch (POWER DISPLAY)

This switch is used to turn the power indicators ② on and off.

❹ Power display range selector (POWER DISPLAY RANGE)

This selector is used to select the sensitivity of the power indicators ②.

When the output is small, set this selector to the "X0.1" position. The indicated value will then be one-tenth of the actual value.

❺ FM stereo indicator (FM STEREO)

This indicator automatically illuminates when an FM stereo broadcast is being received.

❻ Signal-strength meter (SIGNAL)

This meter shows the strength of the antenna input level. The point of best reception for both FM and AM is where the indication is farthest to the right.

❼ FM center-tuning meter (FM TUNING)

This meter indicates the optimum tuning point for best reception, with least distortion, of FM broadcasts.

After tuning by referring to the signal-strength meter ⑥, adjust the tuned position so that the indication needle of this meter is at the center position.

Note that this meter will also indicate the center position when the broadcast is completely detuned.

❽ Tuning control (TUNING)

Tune to the desired broadcast while referring to the signal-strength meter ⑥ and the FM center-tuning meter ⑦.

❾ Volume control (VOLUME)

This control is used to adjust the volume level.

❿ Input selector (SELECTOR)

AM:

Set to this position for reception of AM broadcasts.

FM:

Set to this position for reception of FM broadcasts.

PHONO:

Set to this position to listen to phono discs.

AUX:

Set to this position to use equipment connected to the auxiliary input terminals ("AUX") on the rear panel of this unit.

⓫ Tape-monitor selector (TAPE MONITOR)

TAPE 1:

Set to this position to playback or monitor the sound from tape deck 1.

SOURCE:

Set to this position to listen to phono discs or radio broadcasts and to record from tape deck 1 and/or 2.

TAPE 2:

Set to this position to playback or monitor the sound from tape deck 2.

Notes:

* Tape deck 1 is the tape deck connected to the tape deck 1 terminals ("TAPE 1") on the rear panel of this unit.
* Refer to page 8 for detailed information concerning tape monitoring.

⓬ Recording-mode selector (REC MODE)

TAPE 1▶2:

Set to this position for recording from tape deck 1 to tape deck 2.

SOURCE:

Set to this position for recording phono disc sound or radio broadcasts to tape deck 1 and/or tape deck 2.

TAPE 2▶1:

Set to this position for recording from tape deck 2 to tape deck 1.

Note:

Tape deck 1 is the tape deck connected to the tape deck 1 terminals ("TAPE 1") on the rear panel of this unit.

⓭ FM muting/mode selector (FM MUTING/MODE)

ON/FM AUTO:

Set to this position for ordinary use. FM stereo and monaural broadcasts can be received, and between-station noise is eliminated.

OFF/FM MONO:

All broadcasts will be received monaurally.

Use at this position if there is excessive noise in stereo broadcasts or if signals are weak because of reception far from the broadcasting station or in a mountainous region, when the broadcast cannot be heard at the "ON/FM AUTO" position.

To avoid between-station noise, reduce the setting of the volume control before tuning.

⓮ Loudness switch (LOUDNESS)

It is usually difficult for human ears to clearly hear low-range sound when the volume level is low.

When listening at a low volume level, therefore, this switch can be set to the "ON" position to compensate for this, making sound more dynamic and powerful.

⓯ Balance control (BALANCE)

While listening to an AM broadcast or a monaural FM broadcast, balance the sound so that it seems to be heard from the center, between the speakers.

⑯ Boost/filter selectors (BOOST · FILTERS)

These selectors can be used to select the characteristics of change of the low-sound range and high-sound range adjusted by using the tone controls⑰.

BOOST:

When the "LOW" switch is set to the "BOOST" position, low-range sound is emphasized ("boosted") in the 100 Hz range. When the "HIGH" switch is set to the "BOOST" position, high-range sound is emphasized in the 10 kHz range. The amount of actual emphasis will differ depending upon the settings of the bass and treble tone controls⑰, but the maximum level of the emphasized range will be the same as when the tone controls⑰ are set to their maximum position (+5).

When listening to music with a strong beat, such as rock, set both switches ("LOW" and "HIGH") to this position.

OFF:

When the switches are set to this position, the boost and filter functions are turned off.

FILTER:

When the "LOW" switch is set to the "FILTER" position, low-range sound of 100 Hz and lower is cut.

When the "HIGH" switch is set to the "FILTER" position, high-range sound of 7 kHz and higher is cut.

Set the "LOW" switch to this position to eliminate low-range noises such as motor rumble, and set the "HIGH" switch to this position to eliminate high-range noises such as tape "hiss" noise, etc.

⑰ Tone controls (BASS/TREBLE)

The bass control is for adjustment of low-range sound, and the treble control for high-range sound.

⑱ Speaker selectors (SPEAKERS)

For selection of speaker systems connected to "MAIN" or "REMOTE" terminals on rear panel. Push button inward (■—■) to select the desired speaker system.

⑲ Headphones jack (PHONES)

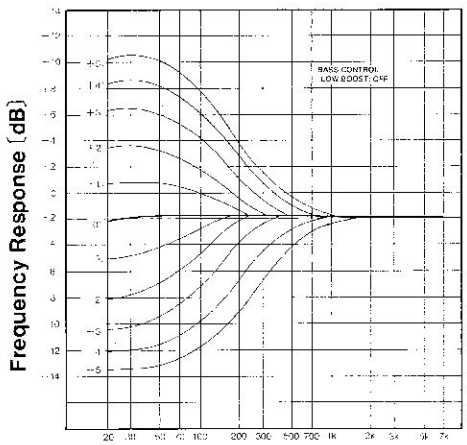
Use headphones with an impedance of 4～16Ω.

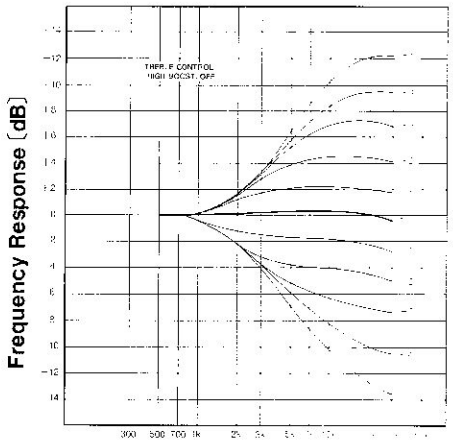
ACOUSTIC CONTROLS

This unit has two separate tone controls⑰ (for bass, and treble), plus boost/filter selectors⑯ which can be for immediate emphasis of the sound.

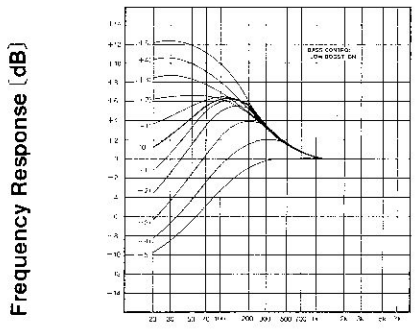
This unit is designed with "flat" characteristics, so that it is usually possible to obtain the desired tone quality level. If, however, it is necessary to further emphasize or attenuate tone quality because of personal preference or listening room construction, to use the tone controls⑰ and boost/filter selectors⑯.

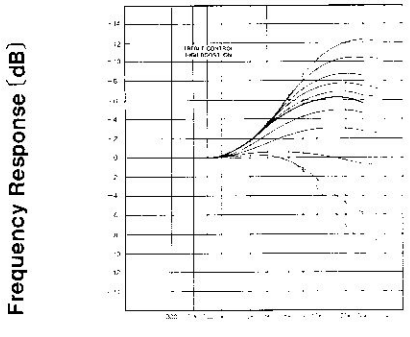
(1) Characteristics of change: tone controls ⑰





(2) Characteristics of change: tone controls ⑰ and boost/filter selectors ⑯ combined





CONNECTION NOTES

For additional information, refer to the separate instruction sheet.

CONNECTION OF AN FM ANTENNA

For best reception of FM broadcasts, select an FM antenna with the best characteristics for the area in which the unit is to be used.

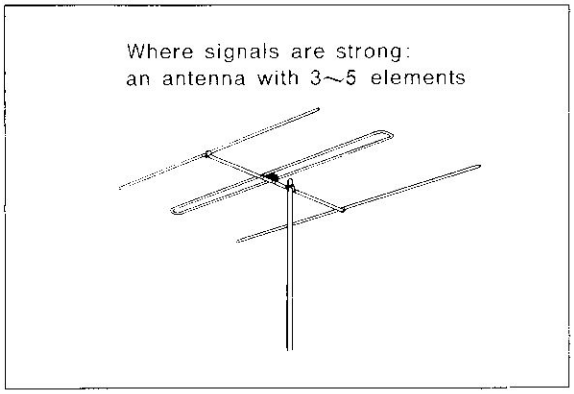
■ Included antenna

The included antenna is easy to install and is suggested for use until a permanent antenna is installed especially for FM. An antenna especially for FM should be installed in order to obtain the best reception characteristics of which this unit is capable.

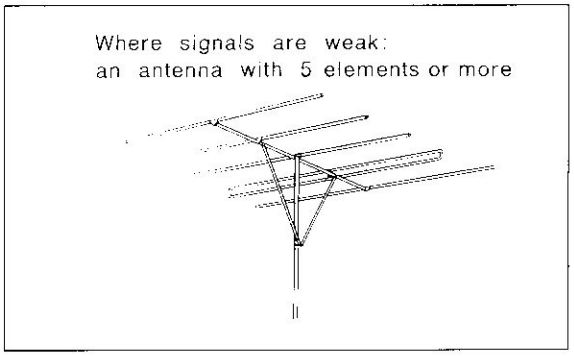
■ Antenna exclusively for FM reception

1) Selection

1. In areas where very strong broadcast signals are received (where the transmitting antenna can be seen), use an outside antenna with 3~5 elements.



2. In areas where weak broadcast signals are received (in mountainous regions or between tall buildings), use an outside antenna with 5 elements or more.



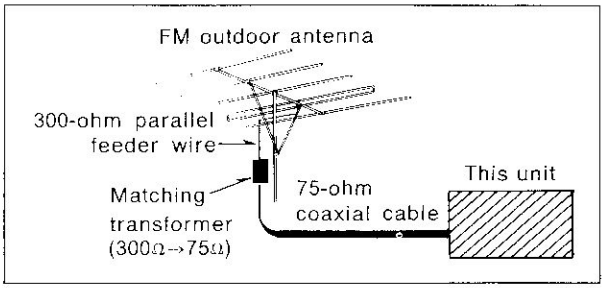
Consult with your dealer for detailed advice concerning the number of elements the antenna should have.

2) Connection wire from the antenna

Two types of wire are most commonly used for connection from the antenna: 300Ω parallel feeder wire and 75Ω coaxial cable (type RG-59/U or equivalent). For best resistance to external interference noise, the use of 75Ω coaxial cable is suggested.

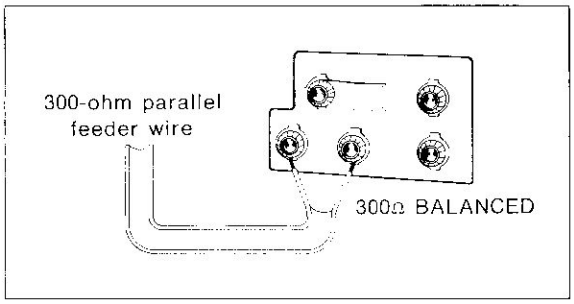
3) Impedance matching

If it is impossible to make a direct connection with 75Ω coaxial cable from the antenna, a matching transformer should be installed, as close to the antenna itself as possible.

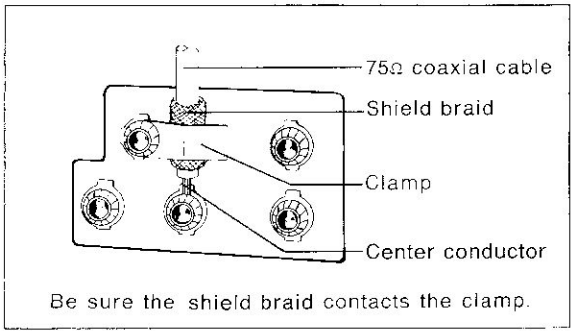


4) Connection

1. If 300Ω parallel feeder wire is used.



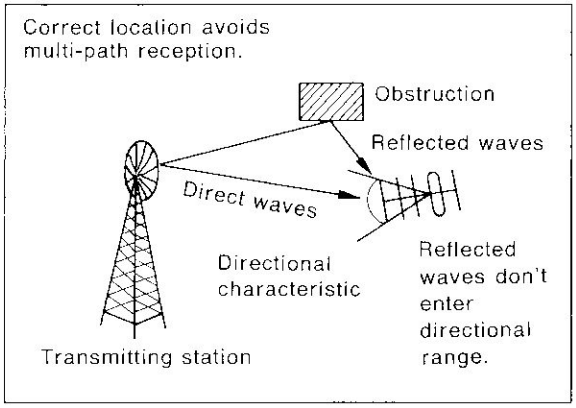
2. If 75Ω coaxial cable is used.



5) Location of antenna

Install the antenna:

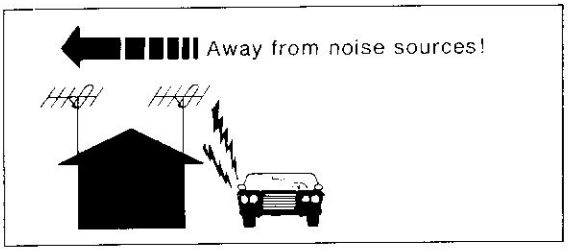
1. Where it will receive FM broadcast signals directly; not in the "shadow" of a building.



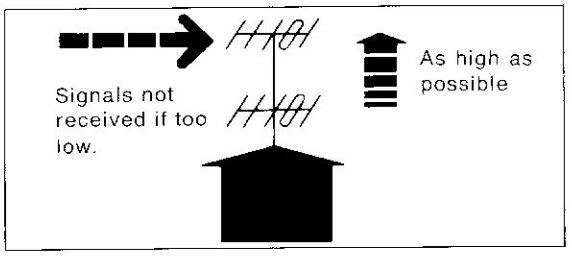
Note:

Multi-path reception is the distortion which results from the reception of two types of signals: those reflected from nearby buildings, mountains, etc., and those received directly from the broadcasting station.

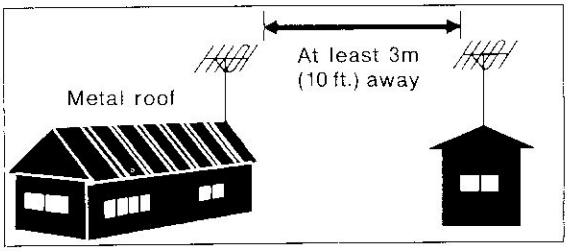
2. Away from busy roads, and away from neon signs.



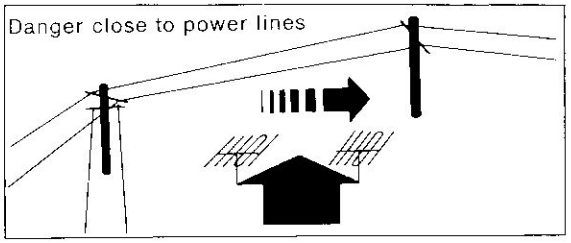
3. At least 4m (13 ft.) above the ground (except in mountainous regions, etc.).



4. At least 3m (10 ft.) away from a metal roof or other antennas.

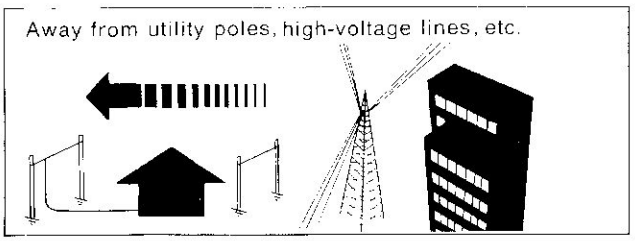


5. To avoid danger, away from electric power lines.



CONNECTION OF AN AM ANTENNA

If an outside AM antenna is installed (in mountainous regions or between reinforced-concrete buildings), install it in a location away from utility poles, high-voltage power lines, high buildings and busy roads.



TAPE RECORDING AND TAPE-TO-TAPE RECORDING

TAPE RECORDING

When the recording-mode selector ⑫ is set to the "SOURCE" position, the signal source selected by the input selector ⑩ is emitted from the tape deck 1 or 2 recording output terminals ("REC OUT").

1) Set the recording-mode selector ⑫ to the "SOURCE" position.
2) Set the input selector ⑩ to the position corresponding to the program source to be recorded.
3) Adjust the recording level of the tape deck, and begin the recording.

TAPE-TO-TAPE RECORDING

If two tape decks are connected, recordings can be made from one deck to the other.

■ **To record from tape deck 1 to 2, or from 2 to 1:**

1) Set the recording-mode selector ⑫ to the "TAPE 1▶ 2" position.
2) Prepare tape deck 1 (or tape deck 2) for playback, and tape deck 2 (or tape deck 1) for recording, and begin the tape-to-tape recording.
   To record from tape deck 2 to tape deck 1, set the recording-mode selector ⑫ to the "TAPE 2▶1" position.

■ **To listen to phono discs or a radio broadcast while recording from tape to tape:**

By setting the tape-monitor selector ⑪ to the "SOURCE" position, it is possible to listen to phono discs or a radio broadcast while recording from tape to tape.

TAPE MONITORING

If the tape deck to be used is the three-head type, tape monitoring is a method to listen to, and thus confirm, the material being recorded.

When the tape-monitor selector ⑪ is set to the "SOURCE" position, the incoming sound can be heard immediately prior to recording. When it is set to the "TAPE 1" or "TAPE 2" position, the sound can be heard immediately after it is recorded.

Use the tape-monitor selector ⑪, therefore, to confirm that the source sound is being recorded correctly, by switching back and forth between the "SOURCE" position and the "TAPE 1" or "TAPE 2" position.

Note:

Tape deck 1 is the tape deck connected to the tape deck 1 terminals ("TAPE 1") on the rear panel of this unit.

TECHNICAL SPECIFICATIONS

POWER AMPLIFIER SECTION

Rated minimum sine wave RMS power output
20 Hz~20 kHz
both channels driven
0.04% total harmonic distortion
55 W per channel (8 ohms)
60 W per channel (4 ohms)

1 kHz continuous power output	
both channels driven	
0.04% total harmonic distortion	
	58W per channel (8 ohms)
	70W per channel (4 ohms)
Total harmonic distortion	
rated power	0.04% (20 Hz~20 kHz, 8 ohms, 4 ohms)
half power	0.025% (20 Hz~20 kHz, 8 ohms)
	0.008% (1 kHz, 8 ohms)
Intermodulation distortion	0.04%
Residual hum and noise	0.6mV
Damping factor	32 (8 ohms)
	16 (4 ohms)
Load impedance	
MAIN or REMOTE	4~16 ohms
MAIN + REMOTE	8~16 ohms

PREAMPLIFIER SECTION

Input sensitivity and impedance	
PHONO	2.5 mV, 47 kilohms
AUX	150 mV, 33 kilohms
PLAYBACK TAPE 1	150 mV, 33 kilohms
TAPE 2	150 mV, 33 kilohms
Phono max. Input voltage	150 mV (1 kHz RMS)
S/N (IHF, A)	
PHONO	78 dB
AUX	95 dB
Frequency response	
PHONO	RIAA standard curve ±0.2 dB
AUX	20 Hz~20 kHz ±0.5 dB
	10 Hz~40 kHz −1 dB
Tone controls	
BASS	50 Hz, +10 dB~ −10 dB
TREBLE	10 kHz, +10 dB~ −10 dB
Low filter	100 Hz, −6 dB/oct.
High filter	7 kHz, −6 dB/oct.
Loudness control (−30 dB)	50 Hz, +9 dB
Output voltage	
REC OUT TAPE 1	150 mV
TAPE 2	150 mV
Acoustic controls (Tone controls: "0" position)	
LOW BOOST	100 Hz, +6 dB
HIGH BOOST	10 kHz, +6 dB

FM TUNER SECTION

Frequency range	88~108 MHz
Sensitivity	10.8 dBf (1.9 μV IHF '58)
50 dB quieting sensitivity	
MONO	13.7 dBf (2.7 μV IHF '58)
STEREO	37.2 dBf (39.7 μV IHF '58)
Total harmonic distortion	
100 Hz	0.15% (MONO), 0.35% (STEREO)
1 kHz	0.15% (MONO), 0.3% (STEREO)
6 kHz	0.3% (MONO), 0.4% (STEREO)
S/N	75 dB (MONO), 70 dB (STEREO)
Frequency response	20 Hz~15 kHz, $^{+1\ dB}_{-2\ dB}$
Alternate channel selectivity	70 dB
Capture ratio	1.2 dB
Image rejection at 98 MHz	70 dB
IF rejection at 98 MHz	90 dB
Spurious response rejection at 98 MHz	80 dB
AM suppression	55 dB
Stereo separation	45 dB (1 kHz), 35 dB (10 kHz)
Leak carrier	−40 dB (19 kHz), −50 dB (38 kHz)
Antenna terminals	300Ω, 75Ω

AM TUNER SECTION

Frequency range	525~1605 kHz
Sensitivity	30μV, 300μV/m
Selectivity	35 dB
Image rejection at 1000 kHz	50 dB
IF rejection at 1000 kHz	45 dB

GENERAL

Power consumption	380VA, 320W
Power supply	AC 120V, 60 Hz
Dimensions (W × H × D)	486 × 157 × 329 mm
	$19\frac{1}{8}$" × $6\frac{3}{16}$" × $12\frac{15}{16}$"
Weight	11.4 kg, 25.1 lb.

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