

 **MITSUBISHI**

AM/FM STEREO RECEIVER

DA-R15

INSTRUCTION BOOK

Congratulations on your choice of the Mitsubishi AM/FM Stereo Receiver Model DA-R15. For best performance results, please read this instruction book carefully before use.

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

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

Serial #

PRECAUTIONS

1. GENERAL

CONNECT ONLY TO YOUR A.C. POWER SUPPLY

The A.C. power supply required by this unit is marked on the rear panel. Connection to any other power source may damage this unit and cause severe electrical shock.

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

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

HANDLE THE POWER CORD WITH CARE

Do not bend sharply or twist the power cord, nor allow it to become trapped under heavy furniture. If the insulation becomes damaged, the conductor breaks, or poor contacts occur, request service from your authorized service center. Continued use under these conditions may cause fire or electrical shock.

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

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

DO NOT TOUCH THE INSIDE OF THIS UNIT

There are high voltages inside this unit. Never remove the bottom cover or the wooden case. All inspection and repairs, including fuse replacement, should be carried out only by your authorized service center.

UNPLUG THE POWER CORD AT THE FIRST SIGN OF TROUBLE

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

2. LOCATION

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

This unit can be adversely affected by operation at unusually high or low temperatures. Place in a well ventilated area for proper heat dissipation. Avoid placement in direct sunlight, near air conditioners, in poorly ventilated areas or in areas of excess humidity or dust. Do not block the ventilation holes.

3. CONNECTIONS

BE SURE TO TURN THE POWER OFF WHILE MAKING CONNECTIONS TO OTHER COMPONENTS

This is to prevent damage to the speakers from the popping noise that would occur when plugging and unplugging connections to other components with the power on.

BE VERY CAREFUL TO MAKE THE CORRECT CONNECTIONS

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

BE VERY CAREFUL TO MAKE SECURE CONNECTIONS

Improperly connected plugs may become loose or disconnected, resulting in hum and other noise. If not corrected, deterioration of sound quality and damage to the speakers may result.

USE ONLY SHIELDED CORDS FOR THE LEADS

Use only shielded cords for interconnecting components. Do not use cords longer than 2 m (about 6"). Excessive cord lengths can degrade high frequency response and may pick up interference that will produce hum or noise.

IF YOU CONNECT TWO PAIRS OF SPEAKERS, BOTH PAIRS SHOULD BE OPERATED AT THE SAME TIME ONLY IF THEIR COMBINED IMPEDANCE IS 4 OHMS OR MORE

If the combined impedance is less than 4 ohms, the protection circuit may operate and mute the power-output stage. The combined impedance can be calculated as shown below.

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

A: Normal impedance of the A speakers.

B: Normal impedance of the B speakers.

So for 8-ohm speakers, the combined impedance would be $(8 \times 8)/(8 + 8)$ or 4 ohms, which is a satisfactory value. If in doubt, please consult your audio dealer for additional information.

4. OPERATION

ALWAYS TURN THE VOLUME (ATTENUATOR) CONTROL FULLY COUNTERCLOCKWISE BEFORE OPERATING ANY SWITCH, INCLUDING THE POWER ON/OFF SWITCH

This is to protect the speakers from the damage that can occur if the volume level is excessively high when switches are operated.

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

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

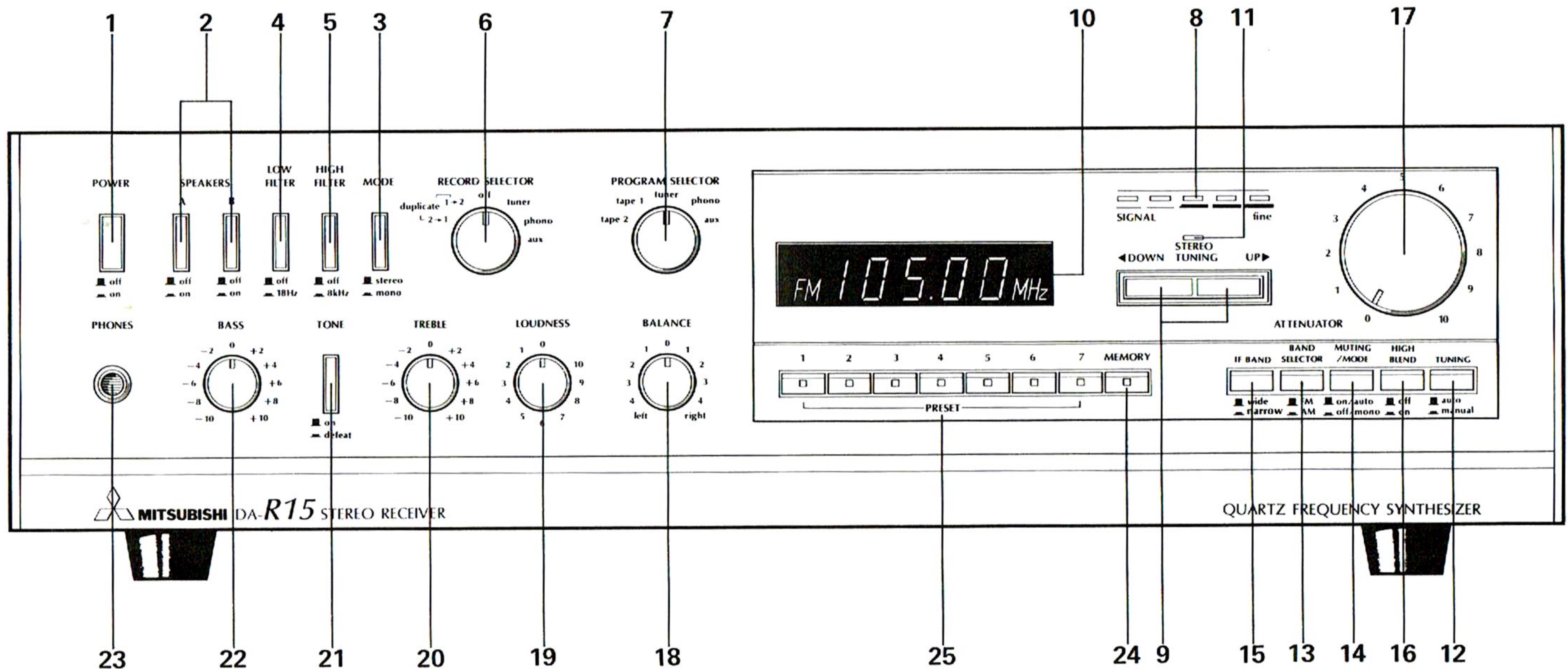
5. CARE

Wipe the cabinet with a soft cloth when it becomes dusty. If it should get really dirty, dampen a soft cloth in a weak solution of mild soap and water, wring it out dry and wipe off. When finished, dry completely with a soft, dry cloth. Volatile materials such as alcohol, thinner, benzene, insecticides, etc., may remove the paint or affect the luster: they should not be applied to the unit.

6. VENTILATION

Do not place a tape deck or other objects on the top or against the side of this receiver. This will cause the internal temperature to rise and may result in a failure.

FRONT PANEL TERMINOLOGY AND FUNCTIONS



1. POWER (Power Switch)

This switch is for turning this unit on and off. When in the ON position, the digital frequency display is illuminated.

2. SPEAKERS (Speaker Selection Switches)

These switches control speaker selection.

A B

For listening with headphones. The speakers are disconnected.



For listening to the speakers connected to terminals A.

For listening to the speakers connected to terminals B.

For listening to the speakers connected to terminals A and B.

3. MODE (Mode Switch)

This switch selects whether reproduction will be stereo or monaural.

- stereo**  The normal play position. Sounds from the left channel of the source are reproduced through the left speaker, and sounds from the right channel through the right speaker.
- mono**  Program material from both right and left channels is combined and reproduced through both speakers. Note that FM stereo broadcasts will be reproduced monaurally even though the FM STEREO indicator will remain illuminated.

4. LOW FILTER (Low Frequency Filter Switch)

This filter attenuates the frequencies below 18Hz by 12dB/octave. It is normally used only when reproducing discs, where it eliminates unwanted low frequency noise and helps to prevent acoustic feedback.

5. HIGH FILTER (High Frequency Filter Switch)

This filter attenuates the frequencies above 8kHz by 6dB/octave. It is normally used to eliminate high frequency noise such as tape hiss or the surface noise from phono discs.

6. RECORD SELECTOR (Selection Switch for Recording)

This switch selects which program can be recorded by the tape decks connected to the TAPE 1 and TAPE 2 terminals. It can also be used when duplicating from one tape deck to the other. Recording and duplicating are performed independently of the program selected for audition by the PROGRAM SELECTOR switch.

DUPLICATE 1 → 2 This position is used to duplicate from the tape deck connected to the PLAY 1 inputs to the tape deck connected to the REC 2 outputs.

DUPLICATE 2 → 1 This position is used to duplicate from the tape deck connected to the PLAY 2 inputs to the tape deck connected to the REC 1 outputs.

7. PROGRAM SELECTOR (Program Audition Selection Switch)

This switch selects the desired program source for audition. It operates independently of the source selected for recording, but can be used for monitoring.

- tape 2** This position is used to playback or monitor the recording of a tape deck connected to the PLAY 2 inputs.
- tape 1** This position is used to playback or monitor the recording of a tape deck connected to the PLAY 1 inputs.
- tuner** This position is for listening to programs on the AM/FM tuner section.
- phono** This position is for listening to a turntable unit connected to the PHONO inputs.
- aux** This position is for listening to a second tuner, a turntable with a high output ceramic cartridge, an 8-track tape cartridge player, television audio, or any suitable high output sources connected to the AUX inputs.

8. SIGNAL INDICATOR

This indicator shows the signal strength level of the input at the antenna. Sufficient signal to noise ratio for stereo reception is obtained when four or more indicator lamps are illuminated. For monaural reception, when three or more indicator lamps are illuminated.

9. TUNING CONTROL

When the UP or DOWN button is pressed with the TUNING switch in the AUTO position, the reception frequency will change continuously until a broadcasting frequency is reached. If then pressed again, the reception frequency will continue to change until the next broadcasting frequency is reached. When the UP or DOWN button is pressed with the TUNING switch in the MANUAL position, however, the reception frequency will be increased or decreased by a 0.2MHz (FM) 10kHz (AM) step. Keeping the UP or DOWN button depressed, will cause the frequency to be changed continuously until the button is released.

10. DIGITAL FREQUENCY DISPLAY

The digits displayed here show the frequency to which the unit is tuned. If you know the frequency of a station you want to hear, just press the tuning control until that frequency is displayed.

11. STEREO (Stereo Indicator)

This indicator is illuminated when an FM stereo broadcast is being received in the stereo mode. If the MUTING/MODE switch is in the OFF/MONO position, this indicator will not light.

NOTE: The FM stereo program will not be heard in stereo unless the MODE switch is also in the STEREO position.

12. TUNING

- auto For automatic tuning operations.
- manual For manual tuning operations.

13. BAND SELECTOR (Band Selection Switch)

This switch is for selecting FM or AM band reception.

- FM For receiving FM broadcasts
- AM For receiving AM broadcasts

14. MUTING/MODE (Muting Mode Selection Switch)

This switch is for selecting the mode of FM reception required.

- on/auto For FM stereo broadcast reception. In this position both interstation noise and stations too weak for good stereo reception are muted while tuning.
- off/mono For receiving FM broadcasts (including stereo broadcasts) monaurally. Muting is off, and both the interstation noise and the weaker stations will be heard.

15. IF BAND (Selectivity Switch)

- wide For receiving an FM broadcast when there is no interference from nearby stations. In this position, the lowest distortion reception is obtained.
- narrow For receiving an FM broadcast when the dial is crowded with other stations. In this position interference from nearby stations is minimized.

16. HIGH BLEND (Switch to Reduce FM Hiss Noise)

- off Use this position for more powerful, local stations, where hiss noise is not obtrusive.
- on In this position, the hiss noise that accompanies FM stereo reception from weak or distant stations is greatly reduced, with some blending of the high frequencies in the two stereo channels.

17. ATTENUATOR (Volume Control)

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

18. BALANCE (Balance Control)

This control adjusts the balance between the two channels. There is a click-stop at the central (zero) position. Rotate clockwise to move the sound image to the right, and counterclockwise to move it to the left. Adjust the control to match any imbalance between the channels of the program sources, or to compensate for listening positions that are nearer one speaker than the other.



19. LOUDNESS (Loudness Compensation Control)

This control compensates for our ears' reduced sensitivity to high and low frequencies at low listening volumes. First, rotate this control fully clockwise (to the zero position). Then turn up the volume to the highest level at which you will normally be listening, and adjust the bass and treble tone controls suitably. To listen at lower levels use the LOUDNESS control, leaving the ATTENUATOR position unchanged. This will preserve the same tonal balance at all listening levels.

20. TREBLE (Treble Tone Control)

This control boosts or reduces the level of the response in the high frequency region. The zero position is off or flat: rotate it clockwise to increase the treble and counterclockwise to reduce the treble. The best setting will depend upon the characteristics of your speakers, your listening room, and your personal preferences.

21. TONE ON/DEFEAT (Tone Defeat Switch)

- on  In this position, both treble and bass tone controls are operative and may be adjusted.
- defeat  In this position the signal bypasses the treble and bass tone controls, and a completely flat frequency response is obtained.

22. BASS (Bass Tone Control)

This control boosts or reduces the level of the response in the low frequency region. The zero position is off or flat: rotate it clockwise to increase the bass and counterclockwise to reduce it. The best setting will depend upon the characteristics of your speakers, your listening room and your personal preferences.

23. PHONES (Headphone Output)

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

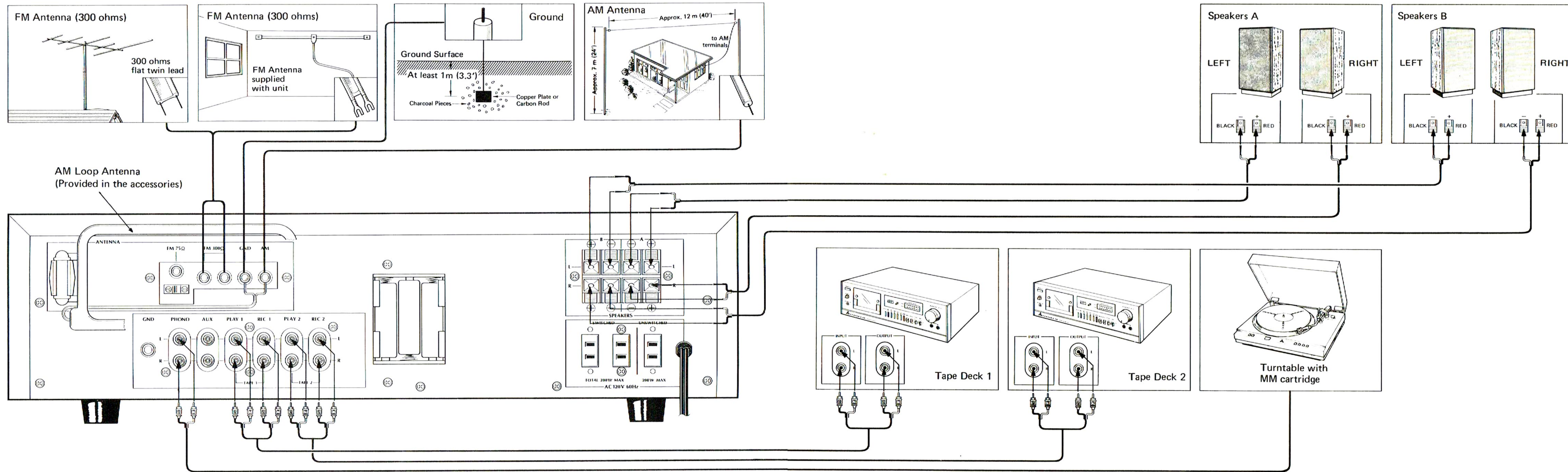
24. MEMORY

When this button is pressed, the MEMORY indicator illuminates for about 5 seconds. To preset a particular broadcasting station in the memory, first tune to the desired frequency by operating the TUNING buttons, press this MEMORY button, and then while the MEMORY indicator remains on, press a suitable PRESET button. In order to remember the frequencies of preset stations even when the unit is switched off, this receiver has dry-cell batteries (provided in the accessories envelope) for back up memory. Please replace the same types of dry-cell batteries about every 3 years.

25. PRESET

When any of these buttons is pressed, the frequency already preset in memory will be tuned automatically, and the corresponding indicator inside the button will be illuminated.

REAR PANEL CONNECTIONS



REAR PANEL TERMINOLOGY AND CONNECTIONS

GND (Ground Terminal)

Turntable units are generally provided with a ground wire. This should be connected to the GND terminal to reduce the risk of hum and noise.

PHONO (Phono Inputs)

The output leads from a turntable unit should be plugged in here.

AUX (Auxiliary Inputs)

These inputs may be used for any suitable high output source, including TV audio signal or 8-track tape cartridge players, etc.

PLAY 1, PLAY 2 (Tape Playback Inputs)

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

REC 1, REC 2 (Tape Recording Outputs)

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

AM LOOP ANTENNA

Connect the AM loop antenna provided in the accessories envelope. Attach the antenna leads to the GND and AM antenna terminals and rotate the loop antenna in its bracket for best reception.

ANTENNA (Antenna Terminals)

These terminals are used for connecting FM and AM antennas. For more details see page 11 and 12.

FM 75Ω (75-ohm Antenna Terminals with Holder)

For connecting 75-ohm coaxial cable.

FM 300Ω (FM 300-ohm Antenna Terminals)

For connecting 300-ohm flat twin lead.

GND (Ground Terminal)

For connecting a ground wire when using an outdoor AM antenna. A good ground connection can be obtained by burying a copper plate or rod and connecting the ground wire to it.

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

AM (AM External Antenna Terminals)

For connecting AM loop antenna. If you wish to listen to weak or very remote AM station, connect a 3–12 meter length of wire. (The recommended antenna is 7 m (24') high and 12 m (40') long).

SPEAKERS (Speaker Connection Terminals)

These terminals are spring loaded for quick and effective connection. First cut back the outer insulation of the speaker leads for about 12 mm (½") and twist each of the inner conductors. Depress a spring-loaded red or black grip and insert the twisted end of one of the speaker leads fully into the terminal hole. Release the grip, and the lead will be gripped firmly (pull gently on the lead to confirm this). Be careful to connect the (+) terminal on the speaker with the (+) terminal on the back panel of the unit.

If you only connect one pair of speakers, it is suggested that you connect them to the 'A' terminals.

SWITCHED/UNSWITCHED (Power-Supply Outlets)

Up to three other components can be plugged into the back panel of the unit, rather than having to be plugged into separate A.C. outlets. Two of them can be switched on by the POWER switch on the unit: use the SWITCHED outlets. The combined power consumption of these two units must not exceed 200W. Cassette tape decks, etc., are suitable. One component can be plugged into the UNSWITCHED outlet: a turntable unit is suitable. The power consumption from the unswitched outlet must not exceed 200W. Total power consumption when all three outlets are used must not exceed 400W.

INFORMATION ON ANTENNA

1. FM ANTENNA

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

CHOOSE THE PROPER ANTENNA FOR YOUR AREA

• AREAS WHERE THE STATIONS ARE CLOSE AND THE SIGNALS ARE STRONG

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

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

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

• AREAS WITH A LOT OF INTERFERENCE OR NOISE

If you live in the city where there is a lot of automobile traffic, near industrial plants, or near high voltage lines, you may encounter noise even if you install an outdoor FM an-

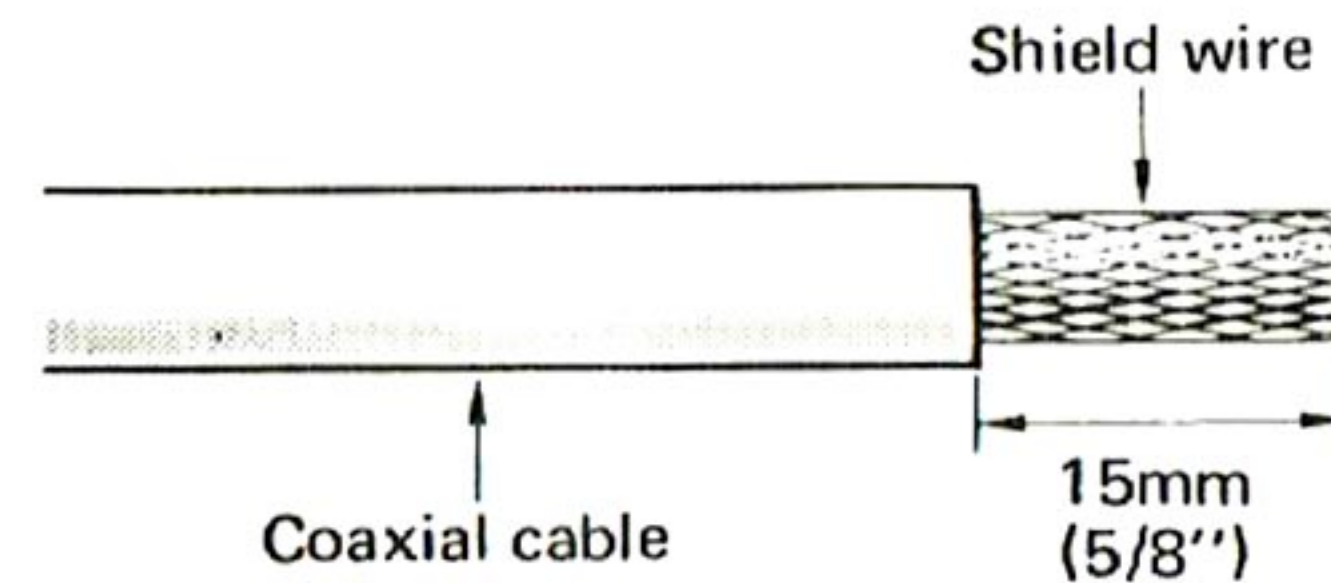
tenna. In such areas, it is necessary to connect the antenna to the tuner with 75 ohms coaxial cable. When using 75 ohms coaxial cable, connect it to the FM 75Ω terminal.

HOW TO ATTACH COAXIAL CABLE

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

TO 75 OHMS TERMINALS WITH HOLDER

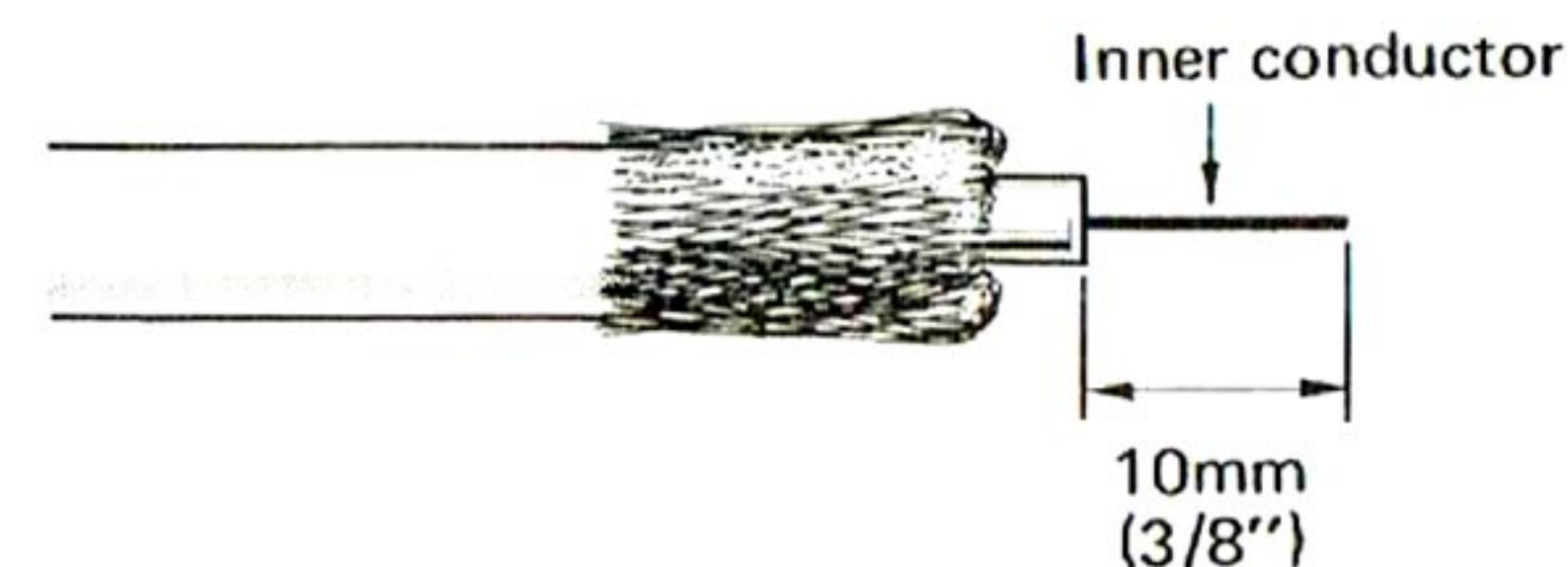
- 1 Cut back the outer insulation of the cable to a distance of 15 mm (5/8").



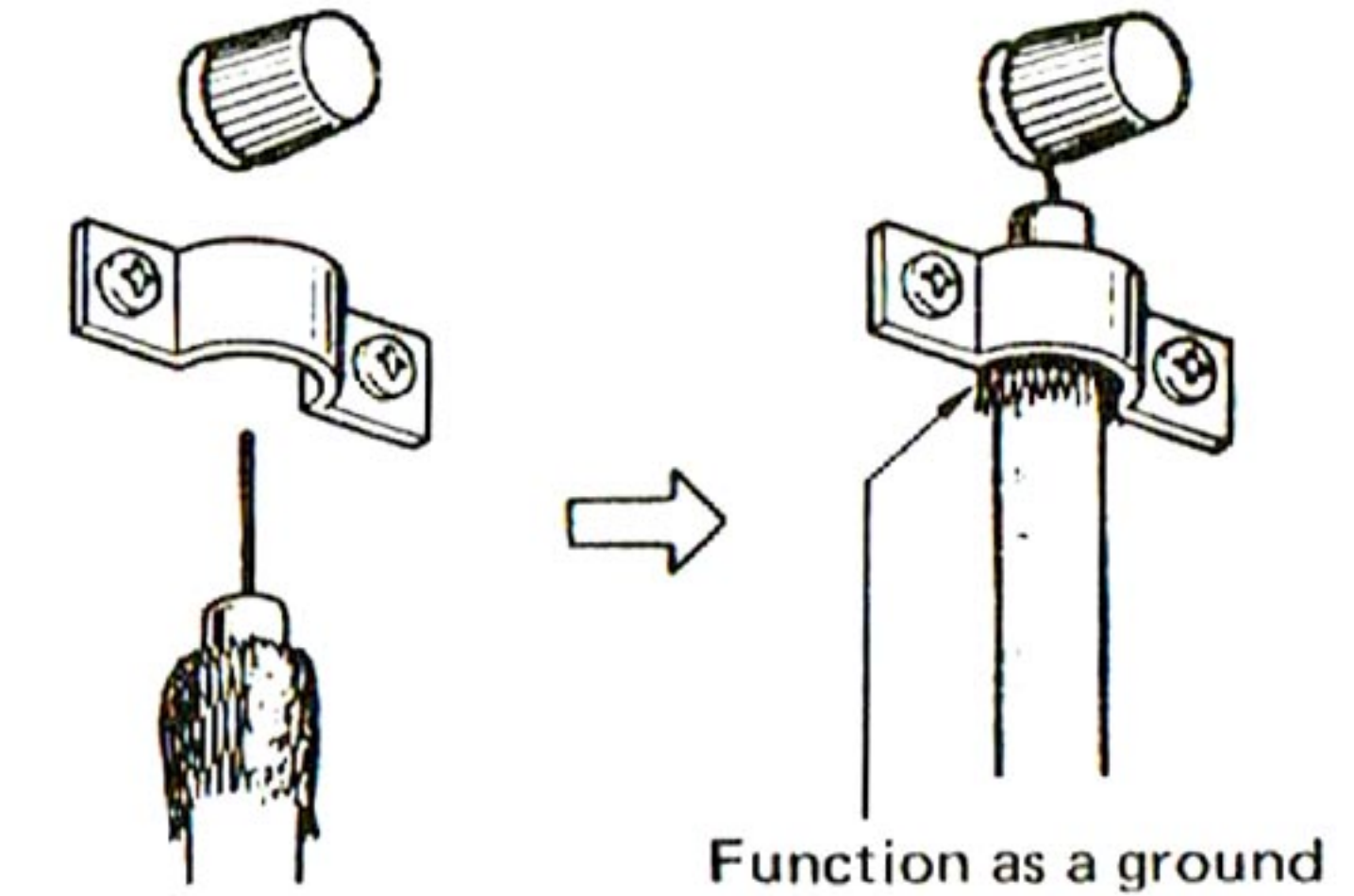
- 2 Peel the braided shield wire back over the outer insulation of the cable.



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



- 4 Insert the end of the coaxial cable into the holder of the FM 75Ω terminals and fasten the inner conductor down. Then tighten the holder, over the braided portion of the cable.



HOW TO POSITION THE FM ANTENNA

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

Positioning of FM Antenna



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

ATTENUATION

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

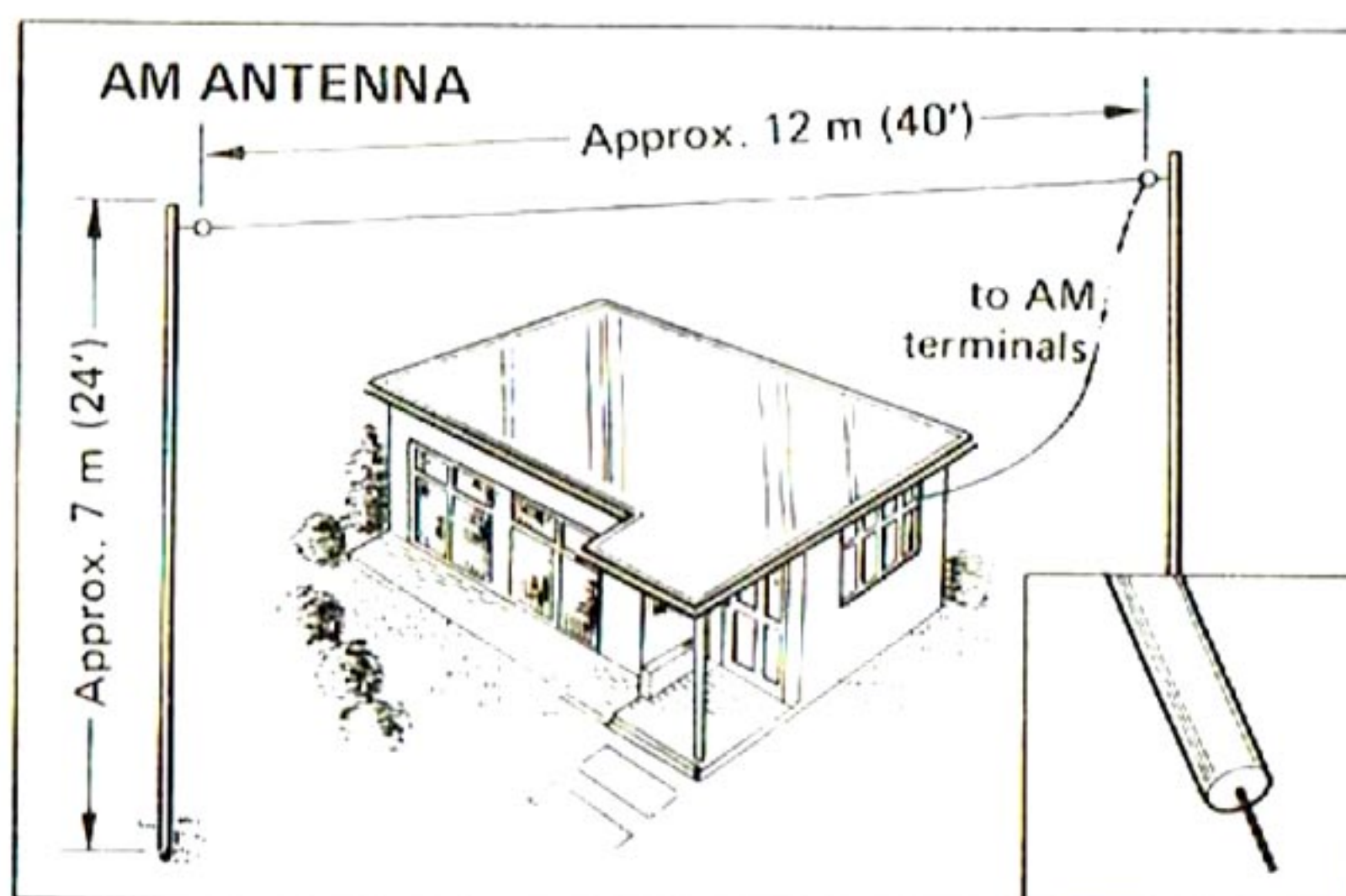
2. AM ANTENNA

AM LOOP ANTENNA

The AM loop antenna provided in the accessories envelope is highly sensitive and no outdoor antenna should normally be necessary. Rotate the loop antenna in its bracket for best reception. This loop antenna may be detached from its bracket and placed at a distance from the set for best reception. Be careful not to place the A.C. power cord or other wires too close, since this may cause interference.

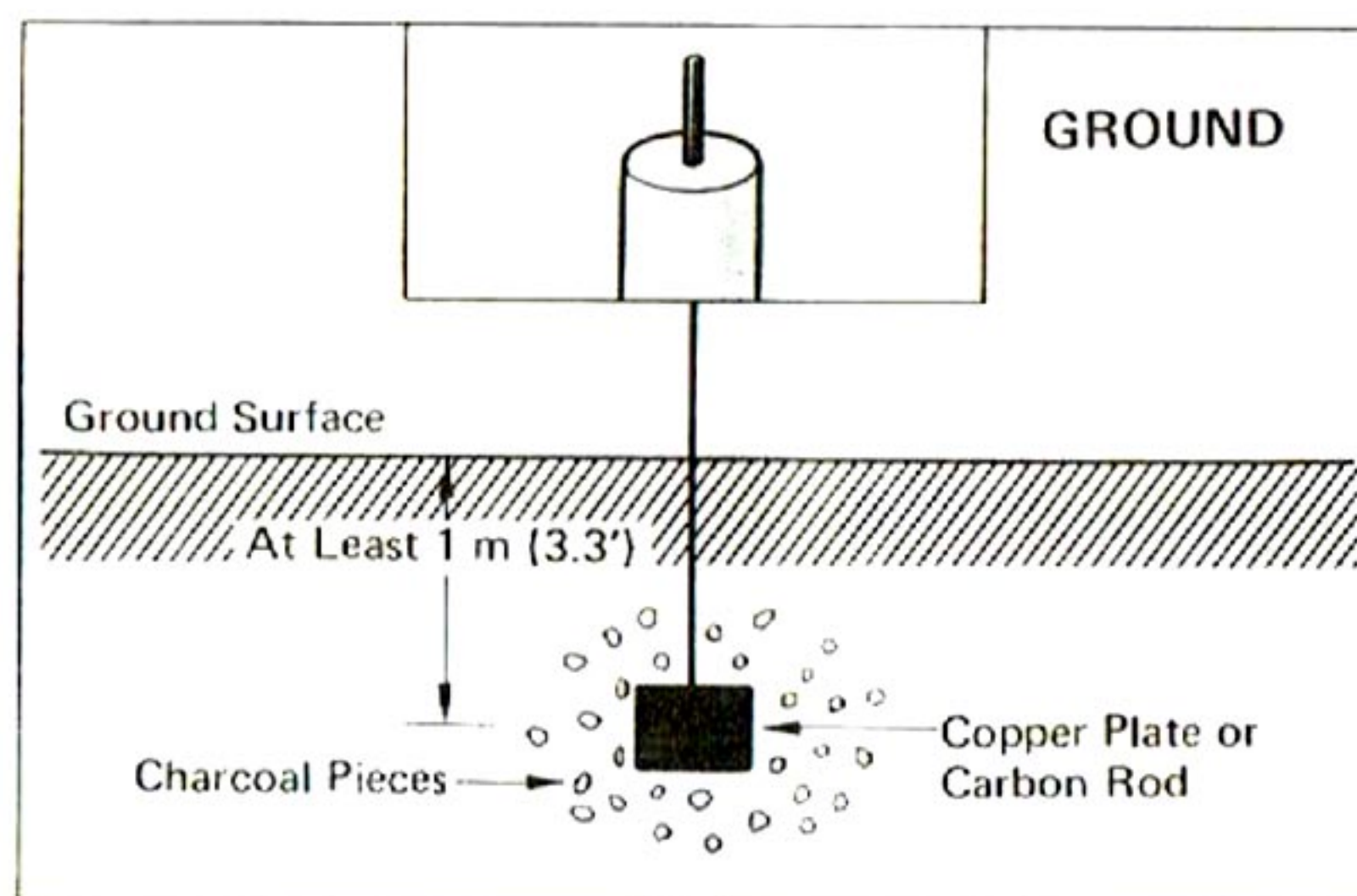
EXTERNAL ANTENNA

If you wish to listen to weak or very remote AM stations, connect an external antenna. The recommended antenna is 7 m (24') high and 12 m (40') long).



3. GROUND

You can receive broadcasts without a ground wire. However, we recommend the use of a good ground wire for the reduction of noisy interference and for safer operation.



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

OPERATIONS

BEFORE SWITCHING ON

Check the following items before pushing the POWER switch to the ON position.

- All components are properly connected.
- The SPEAKERS switches (A, B or A i B) for the speakers you have connected are in the ON position.
- The ATTENUATOR control is turned fully counterclockwise (to minimum volume, the zero position).
- All other controls are turned to the "top or 12 o'clock" position.

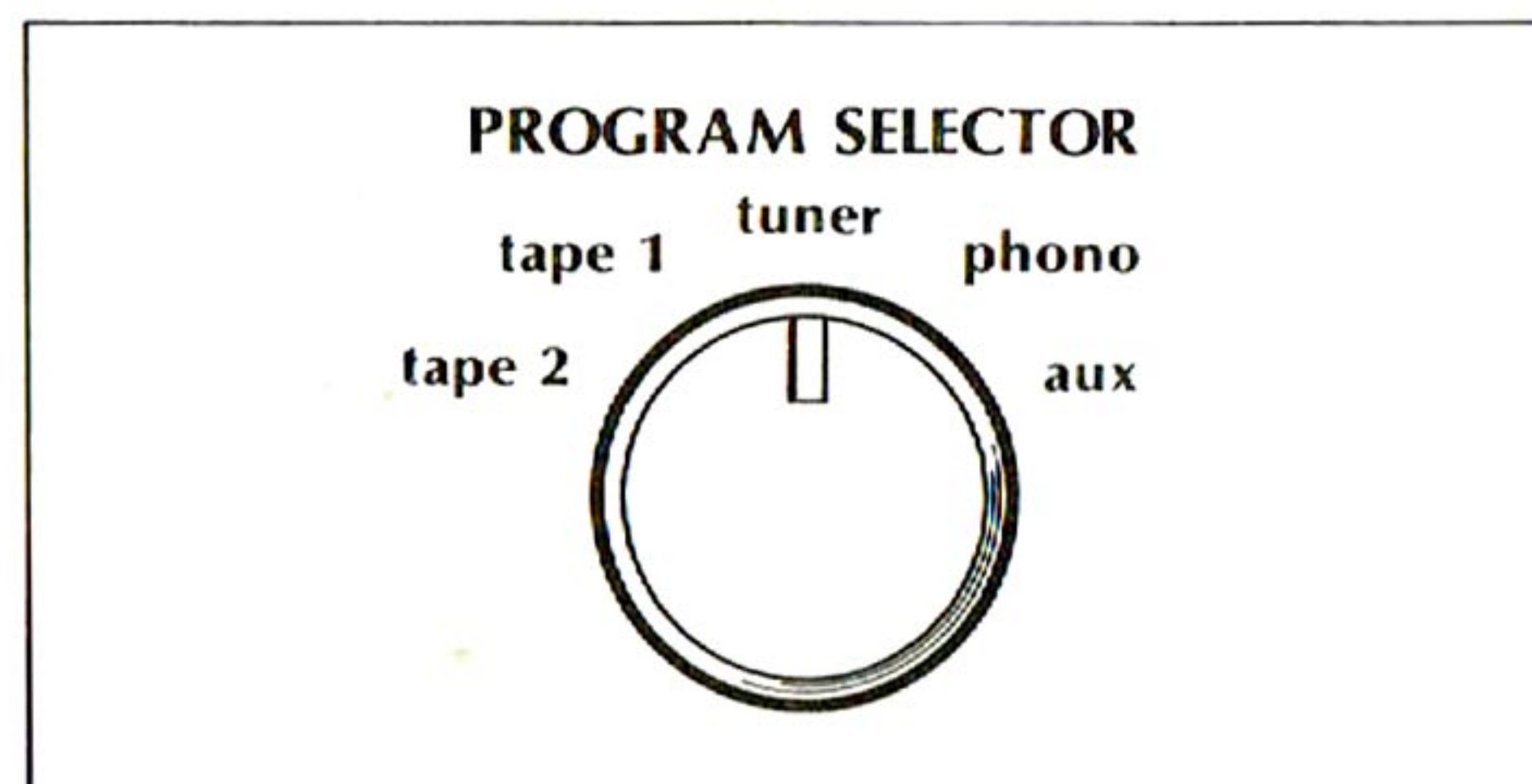
Only now should you depress the POWER switch to the ON position.

NOTE 1 Failure to turn the ATTENUATOR fully down can severely damage the speakers when the POWER switch is pushed to the ON position.

NOTE 2 If your speakers have a maximum input rating less than the rated power output of this unit, they can be severely damaged by listening at excessively high levels. Turn the volume down immediately you detect any sense of strain or distortion in the sound from the speakers, and avoid using such high levels again. This applies to all program sources.

1. LISTENING TO BROADCASTS

- 1 The PROGRAM SELECTOR should be in the TUNER position.



- 2 For FM reception, the BAND SELECTOR should be in the FM position, the MUTING/MODE switch in the ON/AUTO (■) position, the IF BAND switch in the WIDE (■) position, and the HIGH BLEND switch in the OFF (■) position, until other settings prove desirable. For AM reception, the BAND SELECTOR should be in the AM position.
- 3 Tune in the desired station by manual tuning, auto tuning, or preset tuning.

Manual Tuning

Set the TUNING selector to the manual (■) position. Press either the UP or DOWN TUNING button until the frequency of the desired station appears in the frequency display.

The frequency display is changed in 0.2MHz steps in the FM band and in 10kHz steps in the AM band each time the UP or DOWN TUNING button is pressed. The frequency display will change constantly while either TUNING button is depressed. When the frequency of the desired station is approached, release the button and then press in single pushbutton operations.

Auto Tuning

Set TUNING selector to auto (■) position. If the frequency of the desired station is higher than the frequency shown in the frequency display, press the UP TUNING button. If the desired frequency is lower than the display frequency, press the DOWN TUNING button. By pressing the button only once, the display frequency will change continuously until a broadcast frequency is reached. To tune to the next station, simply press the button again.

Preset Tuning

Tune to the frequency of the desired broadcasting station by either auto or manual tuning method. Press the MEMORY button. The corresponding MEMORY indicator will illuminate. The MEMORY indicator lamp will remain on for only a short time (about 5 seconds).

During this period, press any one of the PRESET buttons. That completes the presetting operation for that station.

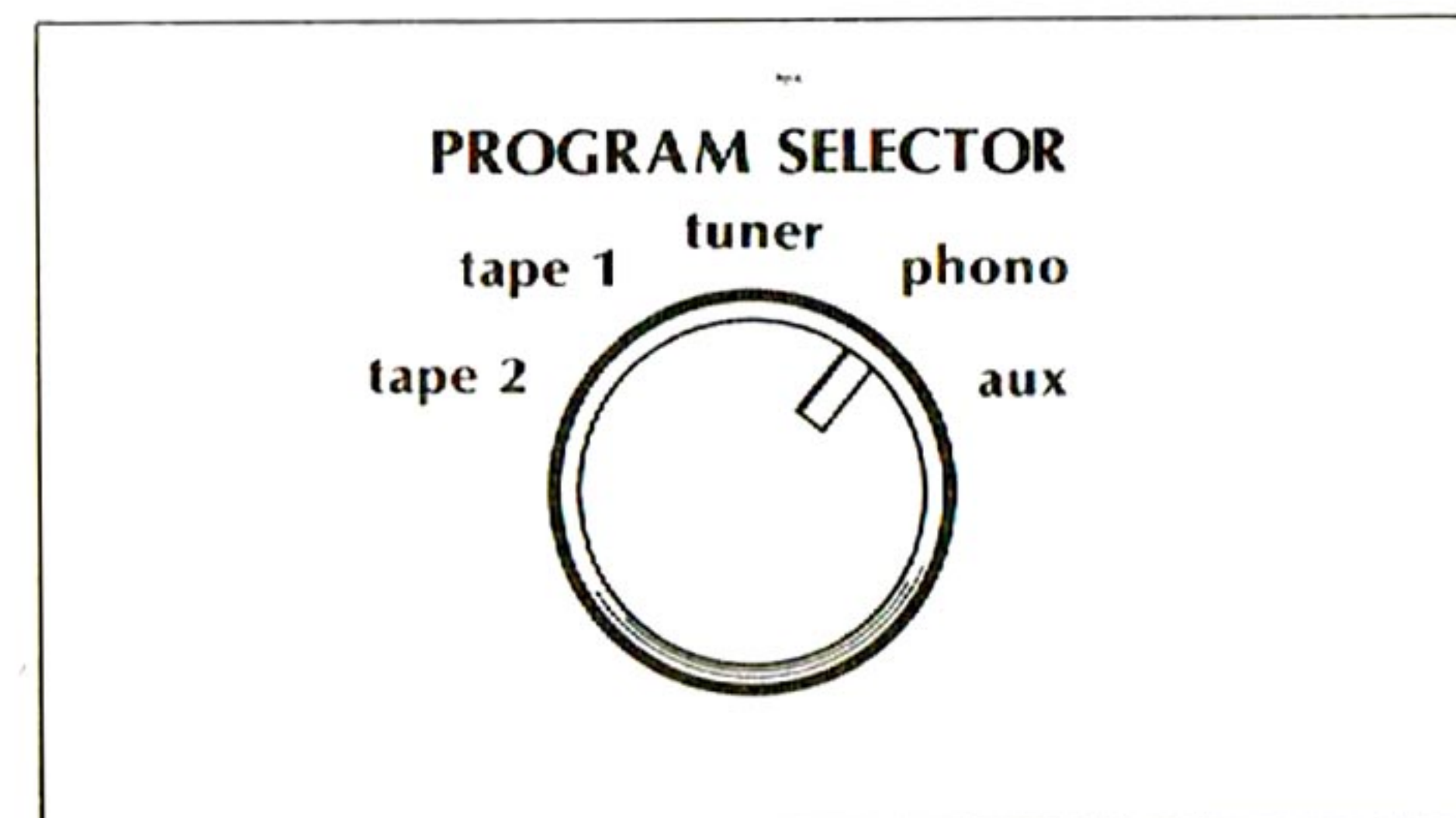
The remaining channels may be used for presetting other stations. Up to 7 AM and 7 FM stations can be preset. (each numbered button selects one of two stations – one FM and one AM – depending on which band has been selected).

After completing the presetting operation, any of the preset stations may be tuned automatically by a single push of the appropriate PRESET button. The selected preset station will be indicated by the illumination of the corresponding PRESET channel indicator lamp located in the center of the pressed button.

- 4 Now set the desired volume with the ATTENUATOR.
- 5 Reduction in volume below this level should be made with the LOUDNESS control.

2. PLAYING DISCS

- 1 Rotate the SELECTOR switch to the PHONO position.

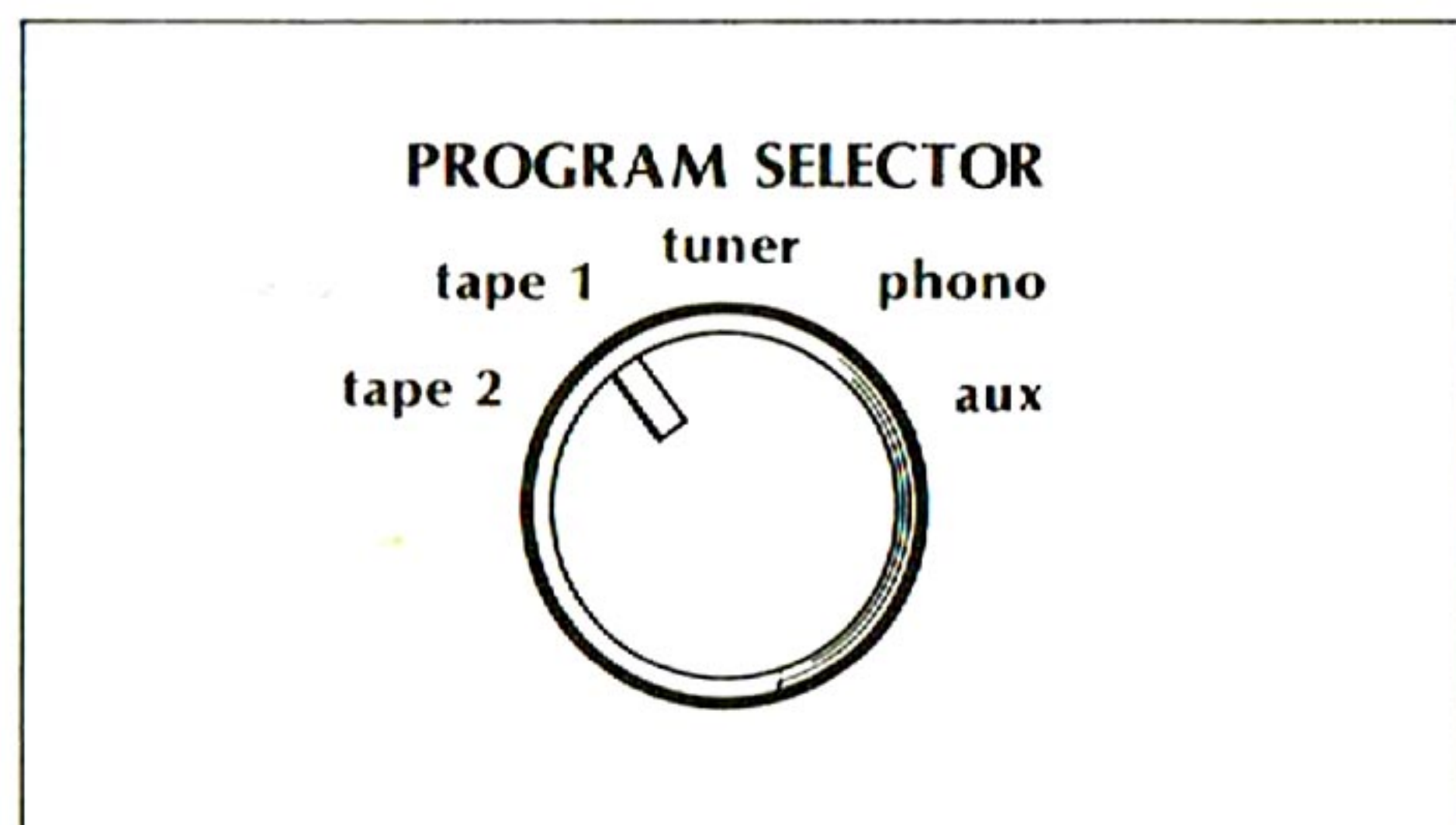


- 2 Operate the turntable unit.
- 3 Now set the desired volume with the ATTENUATOR.
- 4 Reductions in volume below this level should be made with the LOUDNESS control.

3. TAPE-DECK RECORDING AND PLAYBACK

● PLAYBACK

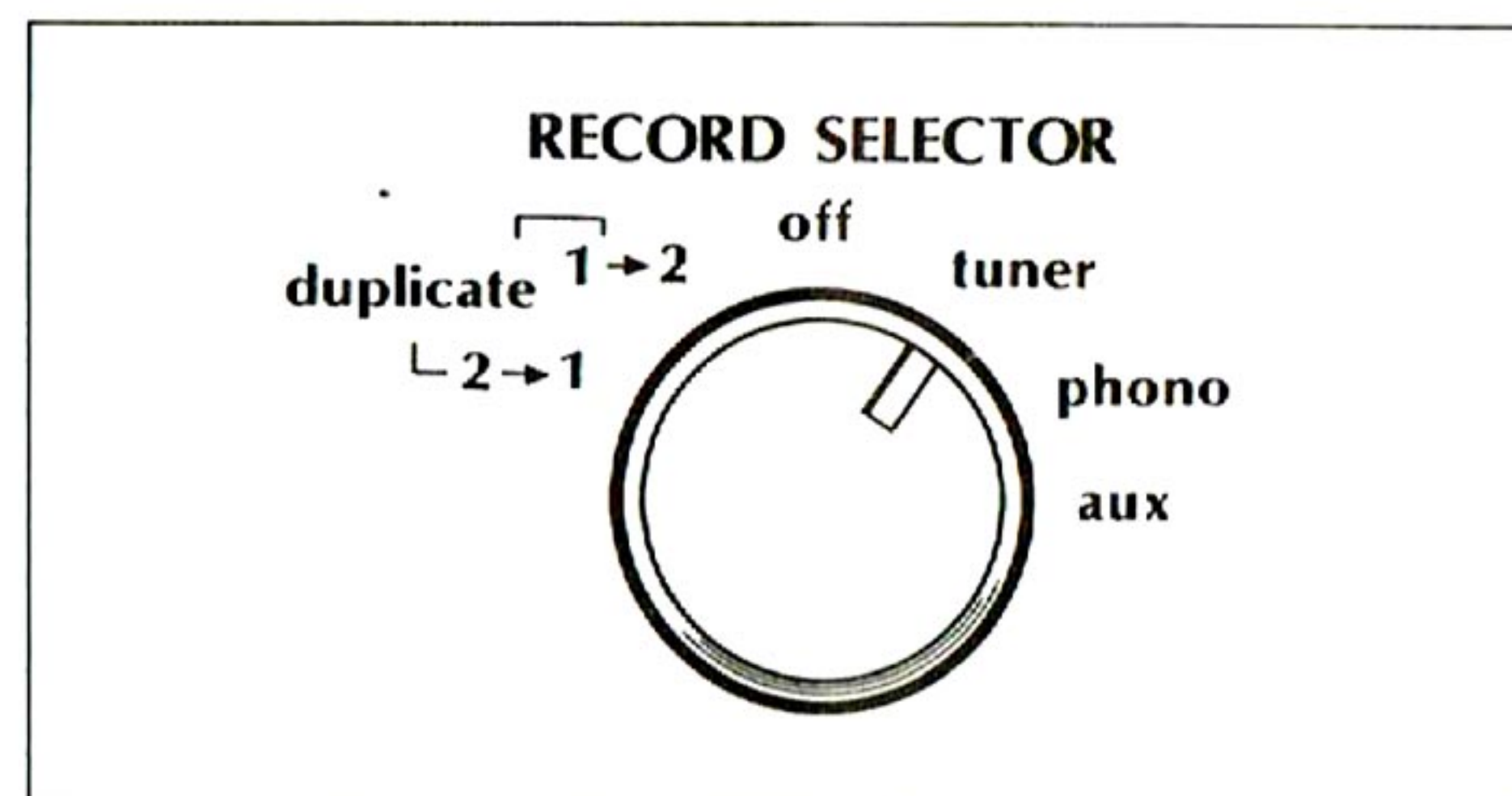
- 1 Rotate the PROGRAM SELECTOR switch to the TAPE 1 (or TAPE 2) position.



- 2 Operate the tape deck in the playback mode.
- 3 Now set the desired volume with the ATTENUATOR.
- 4 If the tape deck is fitted with an output level control, adjust this so that your ATTENUATOR setting gives you approximately the same volume as it would when listening to the TUNER section.

● RECORDING

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



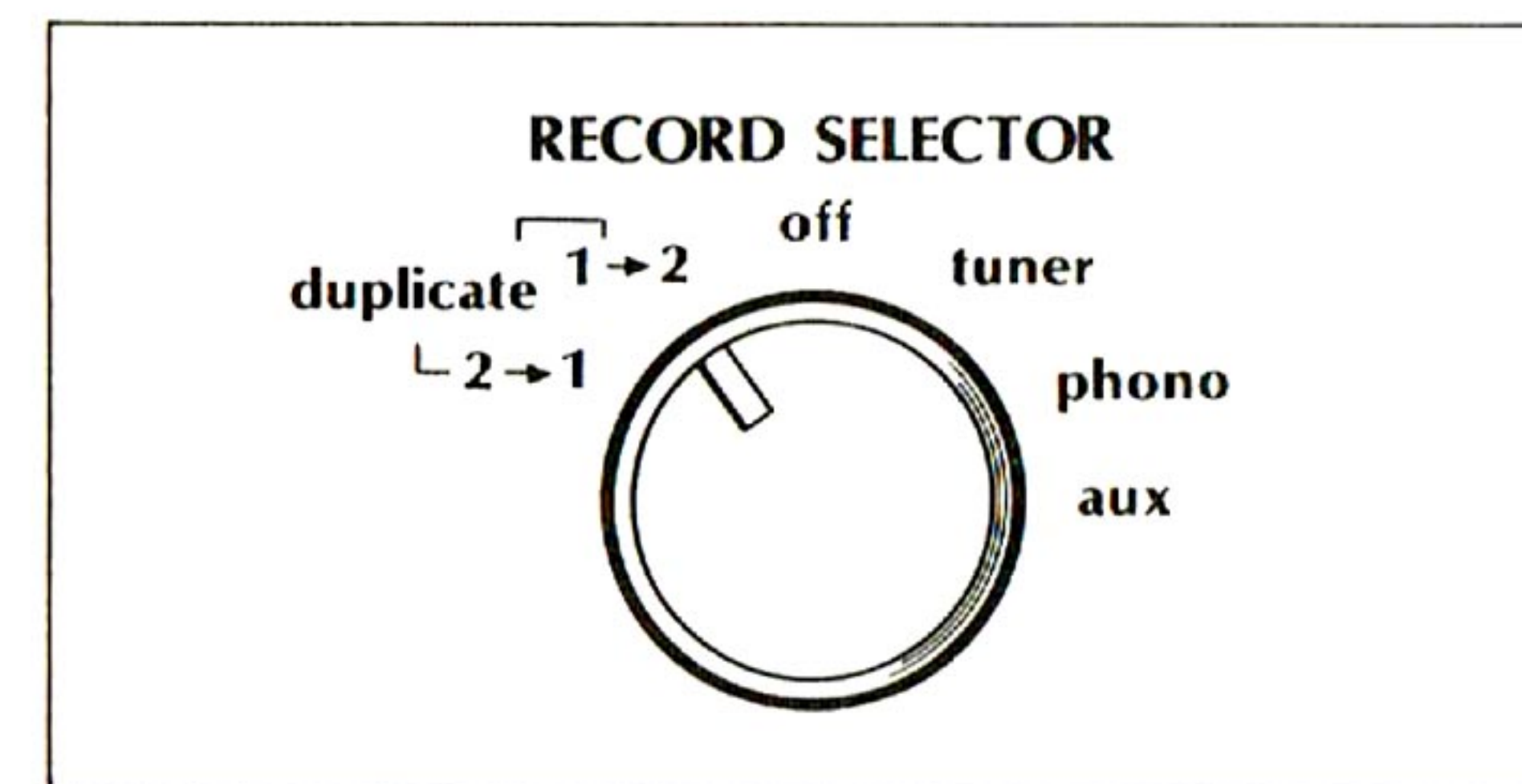
- 2 Operate the tape deck in the recording mode.
- 3 Play the source to be recorded.
- 4 If you rotate the PROGRAM SELECTOR switch to the same program source, you will be able to hear the program you are recording. You can, of course, listen to any other program source while the recording is in progress.
- 5 If your tape deck is of the three-head kind (with separate record, playback and erase heads), you will be able to monitor the recording while it is being made. Rotate the PROGRAM SELECTOR to TAPE 1 (or TAPE 2— whichever you are using).
- 6 Adjust the recording level with the input level controls on the tape deck.

NOTE: The ATTENUATOR tone controls, filters, etc., have no effect on the recording.

● DUPLICATING

Duplicating is simply playing back a tape in one tape deck and recording it on another.

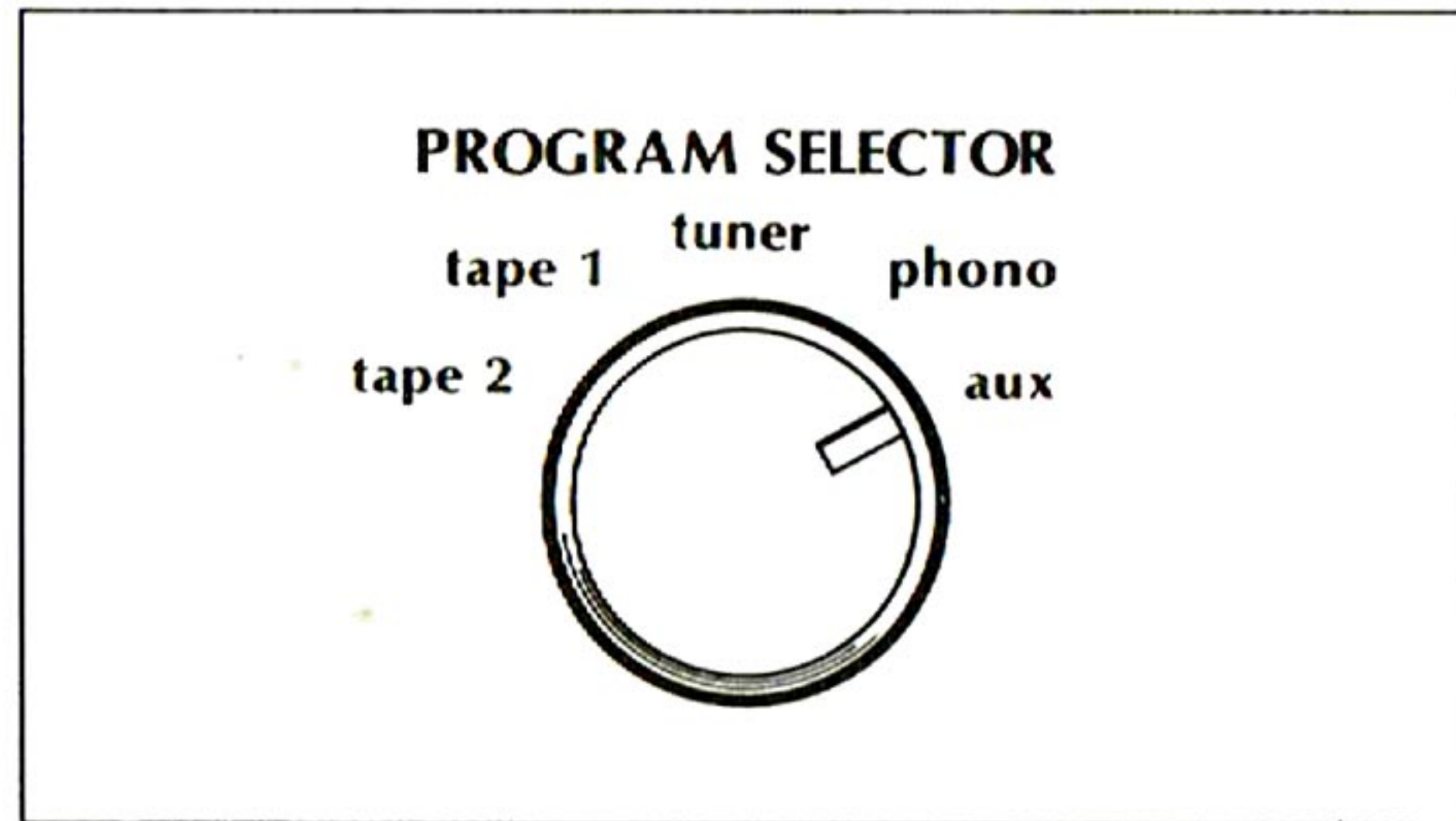
- 1 Rotate the SELECTOR switch to DUPLICATE 1 → 2 (or 2 → 1).



- 2 Operate one tape deck, connected to the PLAY 1 (or PLAY 2) inputs, in the playback mode, and the other connected to the REC 2 (or REC 1) outputs, in the recording mode.
- 3 Other instructions are exactly the same as for recording and playback (as detailed).

4. PLAYING FROM OTHER SOURCES

- 1 Rotate the PROGRAM SELECTOR switch to the AUX position.



- 2 Operate the unit (8-track tape cartridge player, etc.).
- 3 Now set the desired volume with the ATTENUATOR or LOUDNESS control.

5. LISTENING WITH HEADPHONES

- 1 Plug the headphones into the PHONE output.
- 2 Now set the desired volume with the ATTENUATOR or LOUDNESS control.
- 3 The speakers will not be automatically muted: if you do not want to use them, switch them off with the SPEAKERS (A, B) switches.
- 4 Low impedance (8 ~ 16 ohms) headphones are best. Higher impedance headphones may require rather higher settings of the ATTENUATOR control. Be sure to turn the volume down again before switching back to your speakers.

BEFORE TAKING YOUR RECEIVER IN FOR SERVICING . . .

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

SYMPTOM	CAUSE	REMEDY
Power does not come on although the POWER switch is in the ON position.	Power cord not properly plugged in.	Plug in firmly.
	Fuse has blown.	Consult your authorized service center.
No sound	Plugs and/or speaker connections are defective.	Check and replace or repair.
	PROGRAM SELECTOR or SPEAKERS switches in wrong positions.	Place in correct positions.
	Protection circuit in operation.	Ensure that speaker impedance is above 4 ohm and speaker leads (+/-) not touching.
Poor bass response and stereo effect.	Speaker (+/-) connections reversed.	Ensure that the (+) terminal of the speaker is connected to the (+) connector of the receiver and that the (-) speaker terminal is connected to the (-) connector of the receiver for both speakers.
Left and right channels out of balance.	Speaker or input connections faulty.	Check and replace or repair.
	BALANCE control needs adjustment.	Adjust.
Loud humming noise when listening to PHONO discs.	Loose PHONO connections or faulty ground connection.	Check and correct.
Loud howling noise when you turn up the volume listening to PHONO discs.	Due to acoustic feedback from the speakers to the turntable pickup.	Increase the distance between the speakers and the turntable unit. Insulating feet or pads under the turntable can help.
The bass and treble tone controls have no effect.	The TONE switch is at the DEFEAT position.	Select the ON position.
Bass and treble frequencies are exaggerated.	The LOUDNESS control position is too far counterclockwise.	Return to zero, reset ATTENUATOR control and then reset the LOUDNESS control.
Your tape deck doesn't record the program you are listening to.	The RECORD SELECTOR is not at the position for the required program.	Turn to the proper position.
Poor sound quality at high volumes.	Overloaded speakers.	Turn down the ATTENUATOR control.

SYMPTOM	CAUSE	REMEDY
AM broadcasts accompanied by hum.	Poor reception area.	Difficult to cure: try moving the unit to a different position.
	Interference from domestic or other electrical equipment.	Move the unit as far as possible away from the offending equipment, or fit interference suppressors.
Intermittent or continuous cracking on AM.	Electrical storms, atmospheric electricity, other interference.	A good external antenna and ground connection can improve reception.
High-frequency whistles (particularly at night) on AM.	Signals from other stations or from nearby TV set.	The 8kHz HIGH filter can reduce this noise Move away from TV set.
Amateur (CB) radio conversation can be heard.	This is interference from i.properly operated equipment.	Try to identify the operators and urge elimination of the interference.
The STEREO indicator does not light for stereo FM programs.	The signal is too weak for stereo reception.	Install an outdoor FM antenna, or if you have one, increase the number of elements.
	The MUTING/MODE switch is in the OFF/MONO position.	Switch back to ON/AUTO.
Loud bissing between FM stations.	This is normally suppressed by the MUTING/MODE switch.	Switch to the ON/AUTO position.
Unacceptable amount of hiss on FM stereo stations.	Stereo broadcasts are more liable to this form of interference.	Use an outdoor antenna, or a more sensitive one, or orient it towards the desired station. Alternatively switch the HIGH BLEND switch to the ON position.
Local FM stations are distorted.	Signal too strong.	Turn the antenna away from the station, or fit an attenuator.

SPECIFICATIONS

Note: All measurements are for 8 ohms output unless otherwise stated.

AMPLIFIER SECTION

45 watts per channel, min. RMS, at 8 ohms from 20Hz to 20kHz with no more than 0.015% total harmonic distortion.

60 watts per channel, min. RMS, at 4 ohms from 20Hz to 20kHz with no more than 0.05% total harmonic distortion.

50watts per channel, min. RMS, into 8 ohms at 1kHz with 0.015% total harmonic distortion.
65watts per channel, min. RMS, into 4 ohms at 1kHz with 0.015% total harmonic distortion.

Input sensitivity/impedance		
PHONO		2.5mV/50k ohms, 100PF
AUX, PLAY		150mV/50k ohms
Maximum input level		
PHONO		140mV
Output level/impedance		
REC OUT 1, 2		150mV/220 ohms
Frequency response		
PHONO		±0.3dB, 20Hz – 20kHz, RIAA
AUX, PLAY		±0.2dB, 20Hz – 20kHz
Total harmonic distortion (20Hz – 20kHz)		
PHONO		0.01%
AUX, PLAY		0.01%
Signal to noise ratio		
PHONO	(10mV)	94dB
PHONO	(new IHF)	78dB
AUX, PLAY	(150mV)	106dB
AUX, PLAY	(new IHF)	87dB
Residual noise (IHF A-weighted)		0.1mV
Tone control		
BASS	boost/cut	±10dB at 100Hz
TREBLE	boost/cut	±10dB at 10kHz
Loudness control (attenuation)		Level-related equalization –20dB
Filter characteristics		
Low filter		18Hz, 12dB/oct
High filter		8kHz, 12dB/oct

FM SECTION

Tuning range	87.9 ~ 107.9MHz
50dB quieting sensitivity	
MONO	3.0μV (15dBf)
STEREO (Hi-Blend ON)	25μV (33.2dBf)

Usable sensitivity	1.8μV (10.3dBf)	
Image response ratio	55dB	
IF response ratio	90dB	
Spurious response ratio	80dB	
AM suppression ratio	50dB	
Capture ratio	1.5dB	
Alternate channel selectivity		
WIDE	55dB	
NARROW	75dB	
Signal to noise ratio		
MONO (65dBf)	82dB	
STEREO (65dBf)	74dB	
	(85dBf) 84dB	
	(85dBf) 78dB	
Total harmonic distortion		
MONO	0.08%	
WIDE	0.15%	
NARROW	0.1%	
STEREO	0.2%	
WIDE	0.2%	
NARROW	0.2%	
Subcarrier product ratio		
	60dB	
Stereo separation		
WIDE	100Hz	42dB
	1kHz	46dB
	10kHz	43dB
NARROW	100Hz	36dB
	1kHz	40dB
	10kHz	40dB
Hi-BLEND ON	100Hz	37dB
	1kHz	20dB
Frequency response		
50Hz to 15kHz		±0.5dB
30Hz to 16kHz		+0.5 – 1.0dB

AM SECTION

Tuning range	530 ~ 1620kHz
Usable sensitivity	300μV/m
Selectivity	40dB
Signal to noise ratio	52dB
Image response ratio	40dB
IF response ratio	50dB
Total harmonic distortion	0.5%

GENERAL

Power consumption	160W
Dimensions (W x H x D)	
	470 x 135 x 436 mm
	(18-1/2 x 5-3/8 x 17-1/5")
Weight	11.2 kg (25 lbs)

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



MITSUBISHI ELECTRIC SALES AMERICA, INC.

3030 East Victoria Street, Compton, California 90221, U.S.A.
Tel.: (213) 537-7132, Telex : 0673278
Toll Free : (800) 421-1132 (Outside of California)

MELCO SALES CANADA, INC.

900 C Dension St., Markham, Ontario L3R 3K5 CANADA
Tel.: (416)495-7728 Telex : 06966536

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