

YAMAHA T-60

Natural Sound AM/FM Stereo Tuner

16 Station Random Access Preset Tuning

Multi-Status Station Memory

Selectable Auto Search or Manual Up/Down Tuning

Thank you for selecting the YAMAHA model T-60 AM/FM Stereo Tuner.

CENTER

OWNER'S MANUAL



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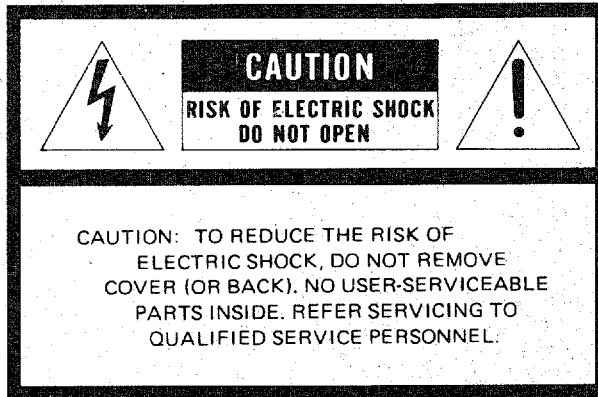
IMPORTANT!

Please make a note of the serial number of this unit in the space indicated below.

Model: **T-60**
Serial No.:

The serial number is inscribed on the rear of the unit. Keep this Owner's Manual in a safe place for future reference.

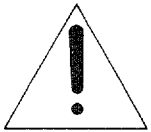
SAFETY INSTRUCTIONS



• Explanation of Graphical Symbols



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert you to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert you to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING

To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture.

1 Read Instructions – All the safety and operating instructions should be read before the appliance is operated.

2 Retain Instructions – The safety and operating instructions should be retained for future reference.

3 Heed Warnings – All warnings on the appliance and in the operating instructions should be adhered to.

4 Follow Instructions – All operating and other instructions should be followed.

5 Water and Moisture – The appliance should not be used near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.

6 Carts and Stands – The appliance should be used only with a cart or stand that is recommended by the manufacturer.

6A An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.



7 Wall or Ceiling Mounting – The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.

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

9 Heat – The appliance should be situated away from heat sources such as radiators, stoves, or other appliances that produce heat.

10 Power Sources – The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

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

12 Cleaning – The appliance should be cleaned only as recommended by the manufacturer.

13 Nonuse Periods – The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.

14 Object and Liquid Entry – Care should be taken so that objects do not fall into and liquids are not spilled into the inside of the appliance.

15 Damage Requiring Service – The appliance should be serviced by qualified service personnel when:

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

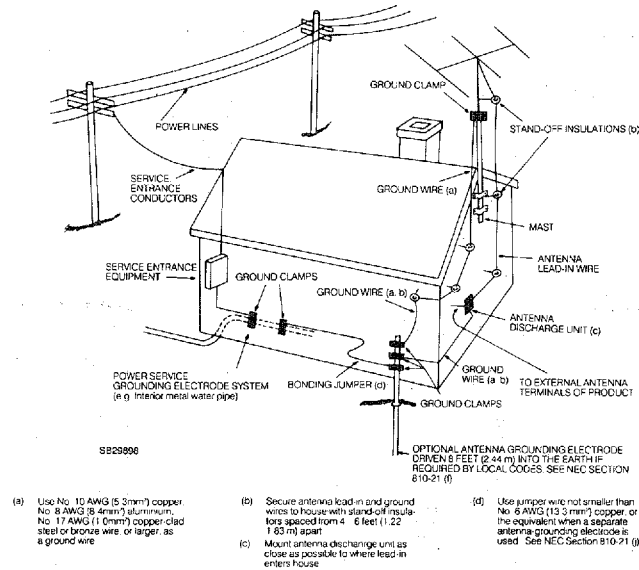
16 Servicing – The user should not attempt to service the appliance beyond those means described in the operating instructions. All other servicing should be referred to qualified service personnel.

17 Power Lines – An outdoor antenna should be located away from power lines.

18 Grounding or Polarization – The precautions should be taken so that the grounding or polarization is not defeated.

19 Outdoor Antenna Grounding – If an outside antenna is connected to this unit, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.

EXAMPLE OF ANTENNA GROUNDING ACCORDING TO NATIONAL ELECTRICAL CODE INSTRUCTIONS (CONTAINED IN ARTICLE 180 – "RADIO AND TELEVISION EQUIPMENT")



Note to CATV system installer:

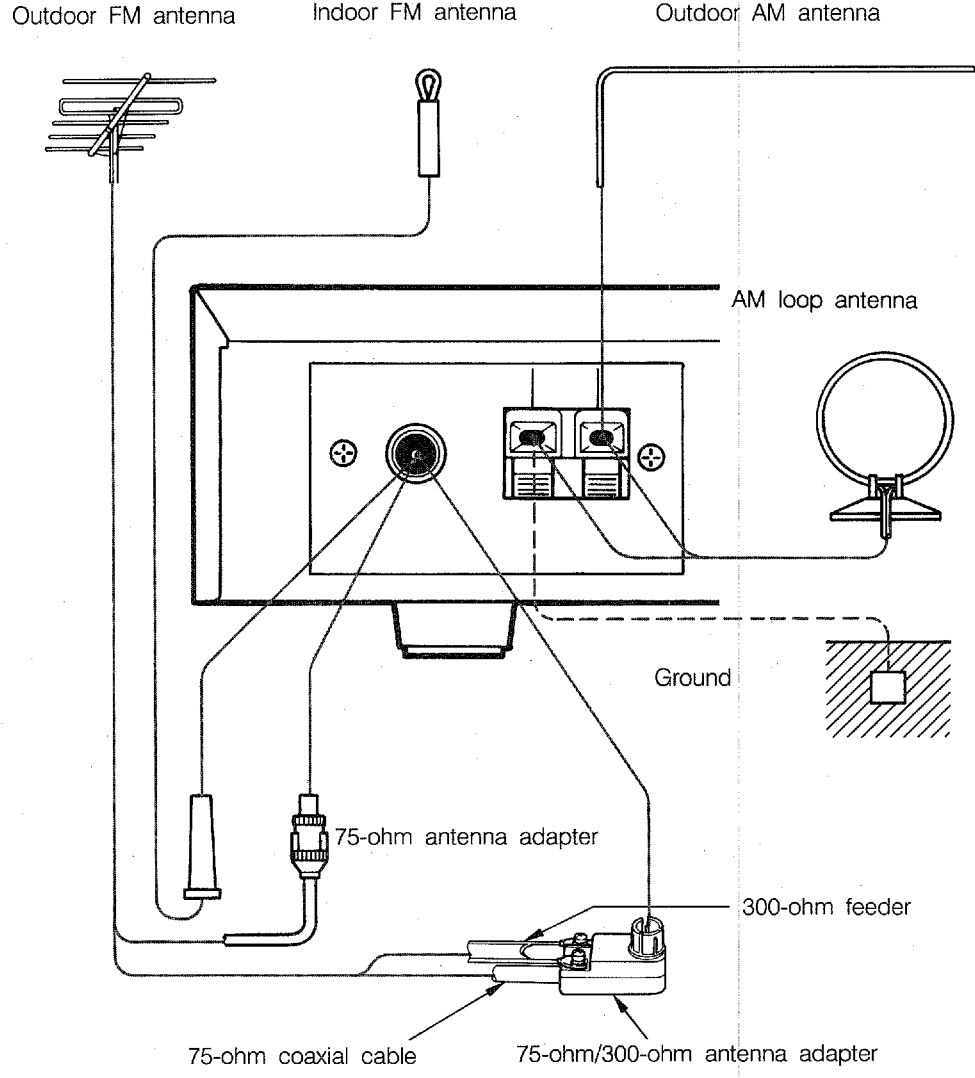
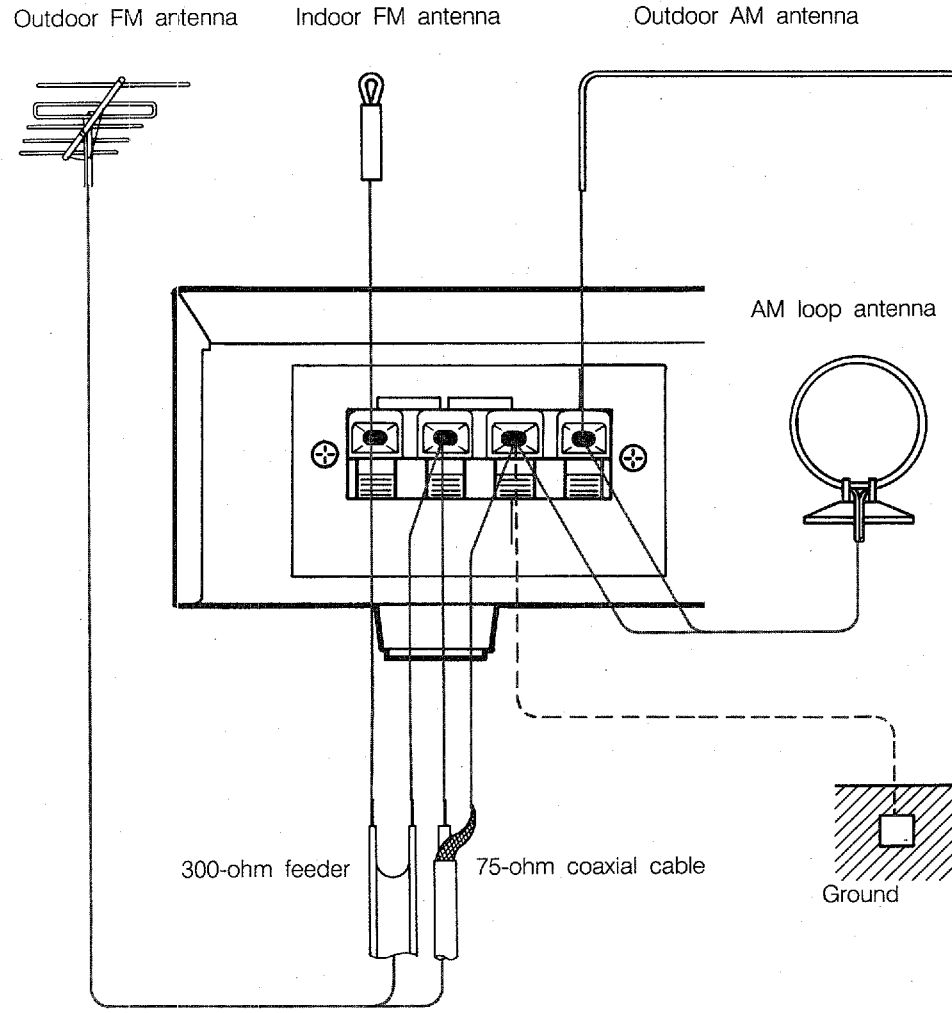
This reminder is provided to call the CATV system installer's attention to Article 820-22 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

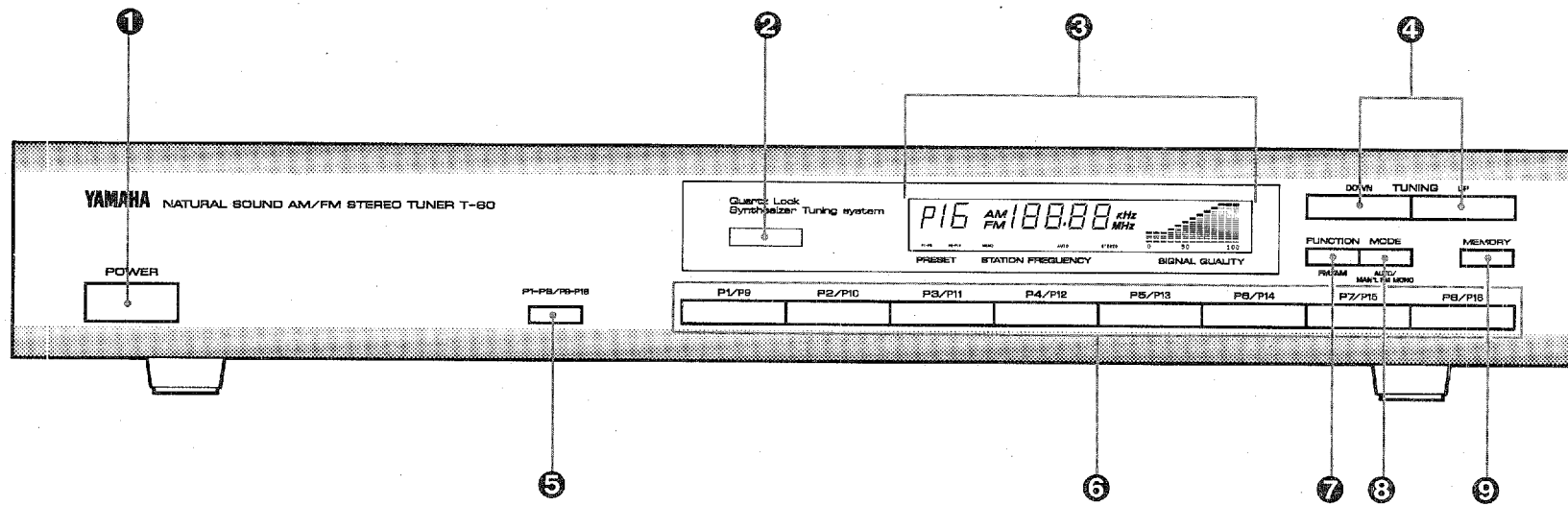
CAUTION : READ THIS BEFORE OPERATING YOUR UNIT

1. This unit is a sophisticated AM/FM stereo tuner. To ensure proper operation for the best possible performance, please read this manual carefully.
2. Choose the installation location of this unit carefully. Avoid placing it in direct sunlight or close to a source of heat. Also avoid locations subject to vibration and excessive dust, heat, cold or moisture. Keep it away from such sources of hum as transformers or motors.
3. Do not open the cabinet as this might result in damage to the set, or electrical shock. If a foreign object should get into the set, contact your dealer.
4. To prevent lightning damage, pull out the power cord and remove the antenna cable during an electrical storm.
5. When removing the power plug from the wall outlet, always pull directly on the plug; never pull the cord itself.
6. Do not use force when using the switches.
7. When moving the set be sure to first pull out the power plug and remove cords connected to other equipment.
8. Do not attempt to clean this unit with chemical solvent as this might damage the finish. Use a clean, dry cloth.
9. Be sure to read the "Troubleshooting" section for advice on common operating errors before concluding that this unit is faulty.
10. Keep this manual in a safe place for future reference.

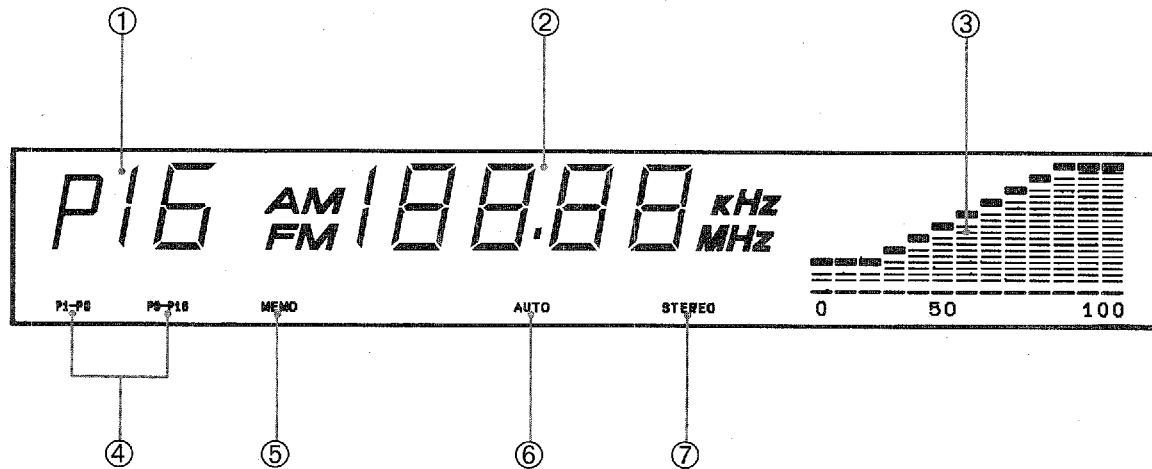
1 U.S.A., CANADA, U.K. AND GENERAL MODELS

AUSTRALIA AND EUROPE MODEL



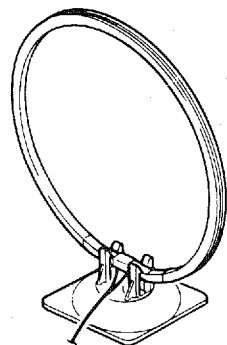


③ Display window

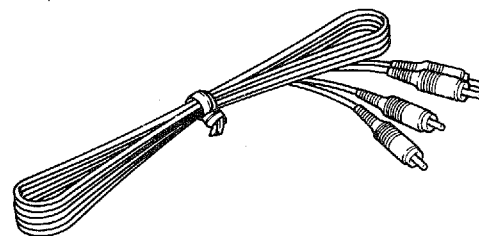


SUPPLIED ACCESSORIES

- AM Loop Antenna

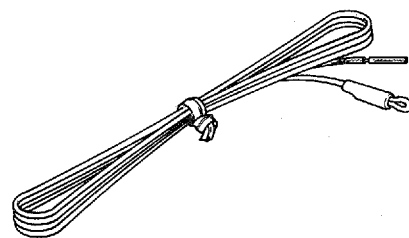


- Connection cords

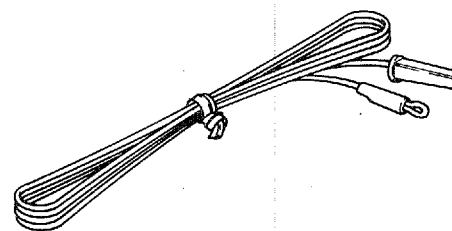


- Indoor FM Antenna

(U.S.A., Canada, U.K. and General models)

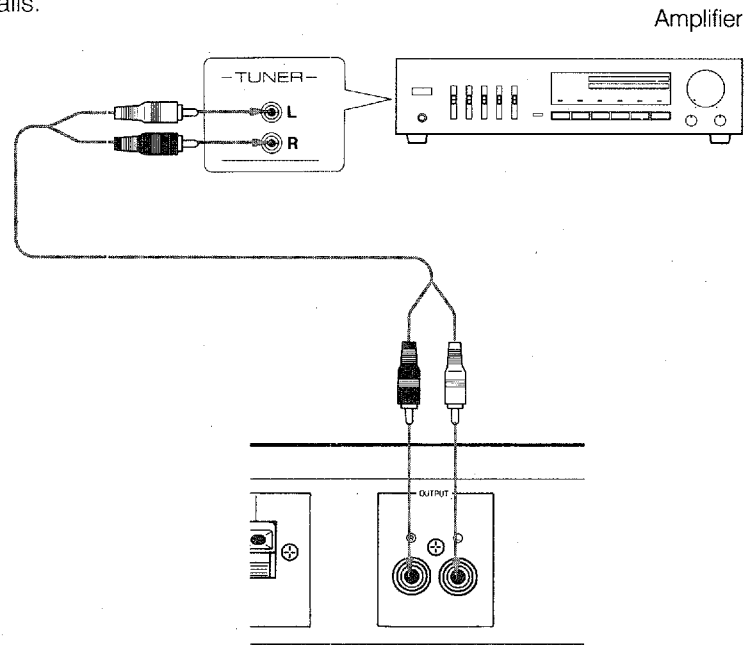


(Australia and Europe models)



CONNECTIONS TO THE AMPLIFIER

- Before making any connections, switch OFF the power to this unit and the amplifier or other component.
- Be sure that the connections from the left ("L") OUTPUT terminal and from the right ("R") terminal are to the correct corresponding (left and right) input terminals of the amplifier or other component.
- Connections should be made to the correct input terminals of the amplifier or other component by using the provided connection cords. Refer to that component's operation manual besides this manual for details.



GND terminal

For maximum safety and minimum interference, connect the GND terminal to a good earth ground if practicable. A good earth ground is a metal stake driven into moist earth.

ANTENNA CONNECTIONS

(See Fig. 1.)

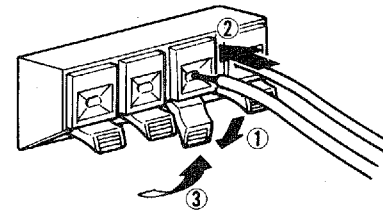
Both AM and FM indoor antennas are included with this unit. In general, these antennas will probably provide sufficient sensitivity. Furthermore, a properly installed outdoor antenna will give clearer reception than an indoor one. If you experience poor reception quality, an outdoor antenna may result in improvement.

AM ANTENNAS

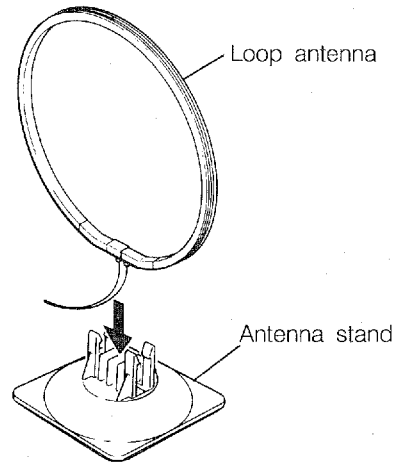
Included indoor AM loop antenna

The included AM loop antenna is designed for indoor use only. Connect the AM antenna lead wires to the AM ANT terminals.

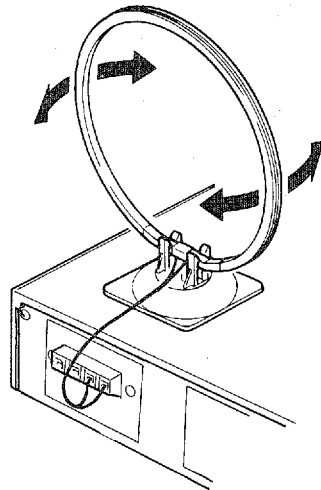
- ① Depress the tabs of the AM ANT terminals.
- ② Connect the AM loop antenna lead wires to the AM ANT terminals.
- ③ Release the tabs. Lightly pull on the lead wires to confirm a good connection.



- ④ Attach the loop antenna to the antenna stand.



- ⑤ Tune to an AM station and then position the loop antenna for best reception. Orient the AM loop antenna so that the best reception is obtained. Try other stations, and find the position that gives the best overall reception.



Optional outdoor AM antenna

In steel buildings or at a great distance from the transmitter, it may be necessary to install an outside long wire antenna. The end of the wire should be stripped of insulation and connected to the AM ANT terminal. At this time, also leave the loop antenna connected.

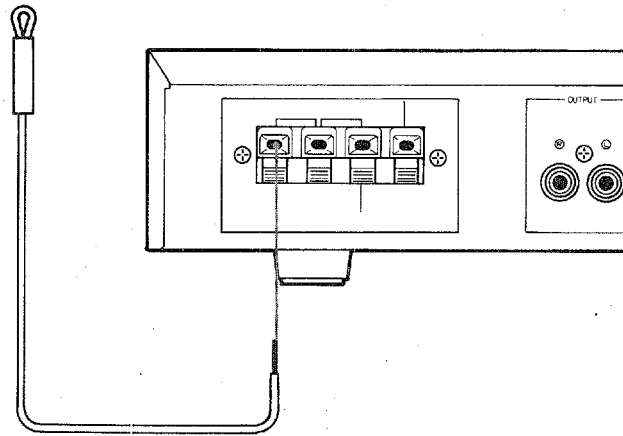
■ FM ANTENNAS

This tuner approaches the theoretical limit for FM sensitivity. However, the performance of this system is determined to a very large extent upon the signal conditions where the antenna is placed. This is because FM broadcast signals travel in straight paths, and, therefore, they can be blocked by natural or man-made obstructions such as mountains, hills, or buildings, and moreover, at a great distance from the transmitter, the curvature of the earth also presents an obstacle to good reception. If you live in an urban area, the included indoor antenna may be adequate, but if reception is weak, an outdoor antenna may improve reception.

Included indoor FM antenna

(U.S.A., Canada, U.K. and General models)

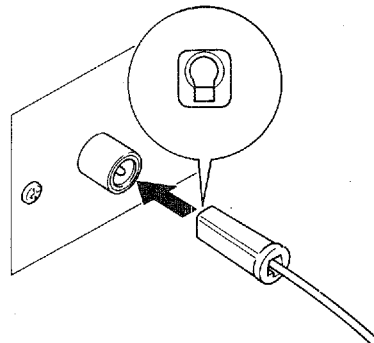
Connect the included indoor antenna to either of the 300 Ω BAL. FM ANT terminals. Move the antenna for best reception.



(Australia and Europe models)

Connect the included indoor antenna to the 75 Ω UNBAL FM ANT terminal.

* Insert so that the grooved part of the connector hole is facing downward when the connection is made.



Optional outdoor FM antenna

Consult with your dealer or service personnel about the best method of selecting and erecting an outdoor FM antenna.

The choice of the feeder cable is also important. Flat ribbon-shaped twin-lead cable performs well electrically, and is cheaper and somewhat easier to handle when routing it through windows and around rooms. Coaxial cable is more expensive, does a much better job of minimizing interference, is less prone to the effects of weather and close-by metal objects, and is nearly as good a signal conductor as feeder cable, particularly for foam-type coaxial cables. Coaxial cable is somewhat more difficult to install at the point where the cable enters the building. If coaxial cable is selected, make sure the antenna is designed to be used with that type of cable.

Note

An FM outdoor antenna can be connected to the tuner by using either a 75 Ω coaxial cable or a 300 Ω feeder cable. For proper connection, carefully read the instruction manual for the FM outdoor antenna.

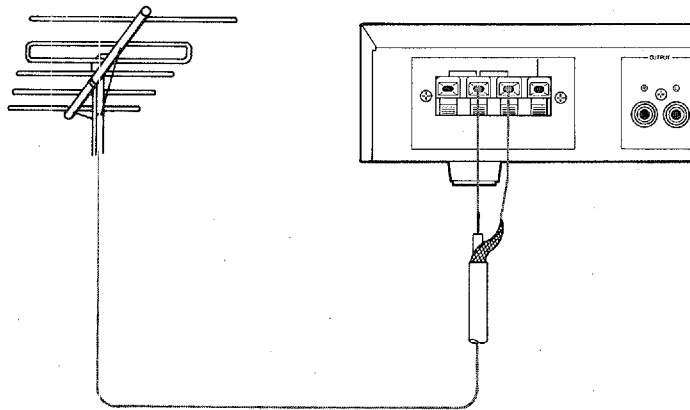
Notes for FM antenna installation

- To minimize automobile ignition noise, locate the antenna as far from heavy traffic as possible.
- Keep the feeder cable or coaxial cable as short as possible. Do not bundle or roll up excess cable.
- The antenna should be at least two meters (6.6 feet) from reinforced concrete walls or metal structures.

● **75-ohm coaxial cable connection**

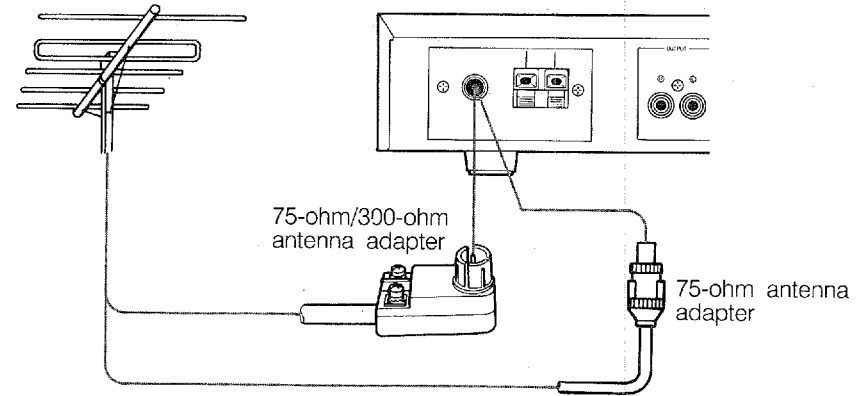
(U.S.A., Canada, U.K. and General models)

After stripping the end of your coaxial cable, insert the wires into the 75 Ω UNBAL FM ANT terminals on the rear panel.

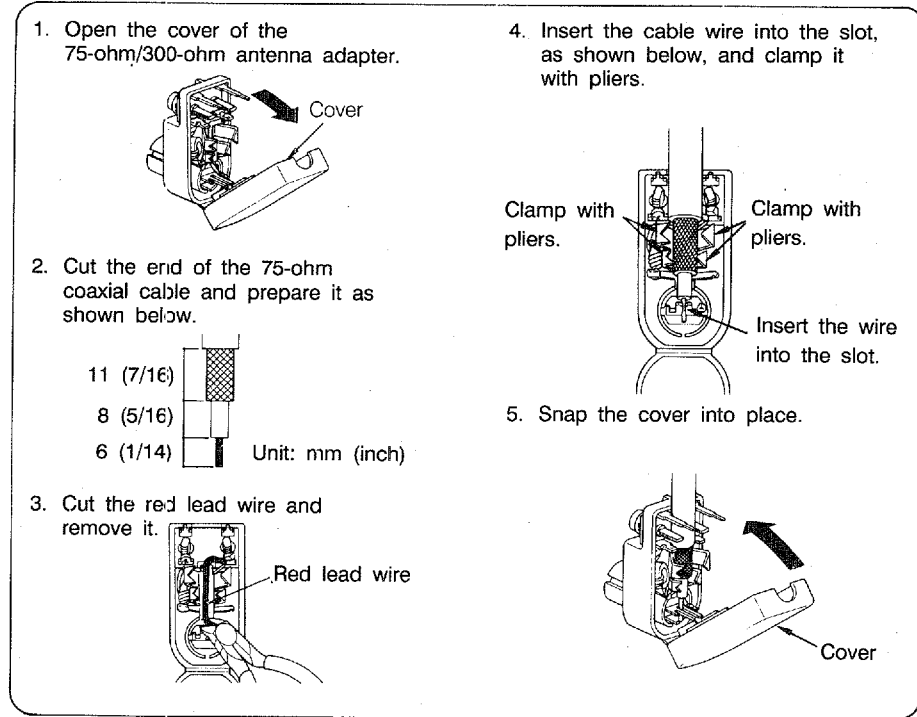


(Australia and Europe models)

1. Connect the coaxial cable to a separately purchased 75-ohm antenna adapter or 75-ohm/300-ohm antenna adapter.
2. Insert the adapter into the 75Ω UNBAL FM ANT terminal.



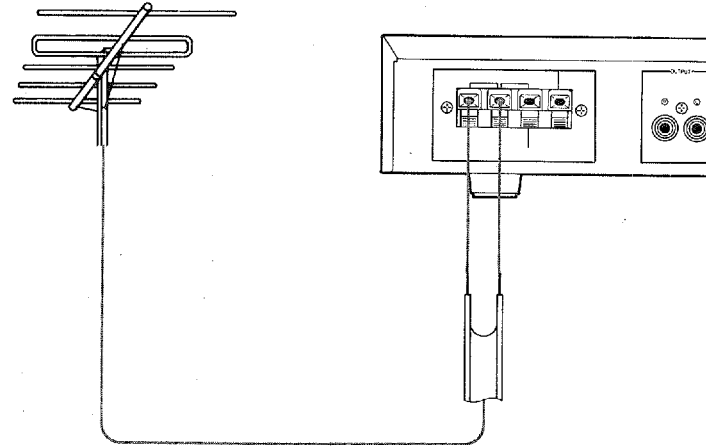
* When using a 75-ohm/300-ohm antenna adapter (separate purchase), follow the instructions shown below.



● **300-ohm feeder cable connection**

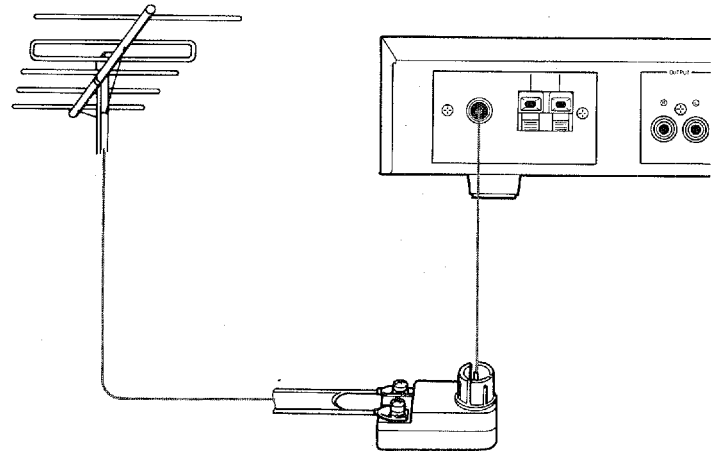
(U.S.A., Canada, U.K. and General models)

Insert the 300-ohm feeder into the 300 Ω BAL FM ANT terminals on the rear panel.



(Australia and Europe models)

Connect the 300-ohm feeder cable to the terminals of a 75-ohm/300-ohm antenna adapter (separate purchase), and then insert into the 75Ω UNBAL FM ANT terminal.



FRONT PANEL COMPONENTS AND THEIR FUNCTIONS

(See Fig. 2.)

① POWER switch

Press this switch to switch the power ON. Press it again to switch the power OFF.

② Remote control sensor

This sensor receives the signal from a remote-control transmitter provided with a YAMAHA amplifier.

③ Display window

① Preset station indicator

This indicator illuminates to indicate the pressed preset station button.

② Station frequency display

Displays the band and frequency of the received station.

③ Signal-quality indicators

This meter indicates the level of the received frequency.

If multipath interference is detected, the signal-quality level indication decreases.

④ P1-P8/P9-P16 indicators

These indicators show the range of the preset station buttons.

⑤ MEMO indicator

When the MEMORY button is pressed, this indicator flashes for about 5 seconds. During this period, the displayed frequency can be programmed to the memory by using one of the preset buttons.

⑥ AUTO indicator

This indicator shows that the AUTO TUNING mode has been selected by using the MODE AUTO/MAN'L FM MONO button.

⑦ STEREO indicator

This indicator illuminates when an FM stereo broadcast with sufficient signal strength is received.

④ TUNING DOWN and UP buttons

Press the DOWN button to locate a signal of lower frequency. Press the UP button to locate a signal of higher frequency. These buttons function in either manual (MAN'L) or automatic (AUTO) tuning mode.

⑤ P1-8/P9-16 button

Press this button to change the range of the preset station buttons. When this button is pressed, the selected range indicator (P1-P8 or P9-P16) flashes for about 5 seconds, and then illuminates.

⑥ Preset station buttons

The preset station buttons are used to enter as many as 16 station frequencies, including reception modes, into the memory.

⑦ FUNCTION FM/AM button

Press this button to select the reception band: FM or AM. The station frequency display will change according to this button's setting.

⑧ MODE AUTO/MAN'L FM MONO button

For either AM or FM tuning, press this button to select between AUTO and MAN'L tuning modes.

The AUTO indicator in the display window lights up if automatic tuning mode is selected and does not when manual tuning mode is selected. During automatic tuning, the tuner automatically searches for the next receivable signal.

During MAN'L tuning, the tuner searches only as long as a TUNING button is pressed. When receiving FM stations in this mode, the reception is monaural.

⑨ MEMORY button

When this button is pressed, the MEMO indicator flashes for about 5 seconds. During this period, press the desired preset station button to enter the displayed frequency into the memory.

OPERATION

There are three ways to tune to a broadcast station, and you should select the best method according to the signal strength or your own preference.

AUTOMATIC TUNING: This tuning method can be used to find and receive a station of sufficient signal strength.

MANUAL TUNING: This tuning method can be used to tune to a weak station.

PRESET TUNING: This tuning method can be used to tune to a preset station by single-touch tuning.

AUTOMATIC TUNING

If station signals are strong and there is no interference, quick automatic-search tuning is possible.

1. Select the reception band by using the FM/AM button.
2. Press the MODE AUTO/MAN'L FM MONO button so that the AUTO indicator illuminates.
3. Use the TUNING DOWN and UP buttons to tune to a station. To tune to a higher frequency, press the UP button. To tune to a lower frequency, press the DOWN button.
Tuning will start automatically, and will stop at a broadcast station frequency of sufficient signal strength.
4. If the station where tuning stops is not the one you want, press the DOWN or UP button again.

MANUAL TUNING

Automatic tuning may be impossible if the station signal is weak. If so, use manual tuning.

1. Select the reception band by using the FM/AM button.
2. Press the MODE AUTO/MAN'L FM MONO button so that the AUTO indicator switches OFF.

3. Use the TUNING DOWN and UP buttons to tune to a station.
To tune to a higher frequency, press and hold the UP button.
To tune to a lower frequency, press and hold the DOWN button.
Release it just before reaching the desired frequency, and then press it many times until the desired frequency is tuned.

NOTE: If a weak FM stereo signal is received, switching to MAN'L FM MONO mode may improve the reception (by combining left and right signals into one stronger signal).

PRESET TUNING

The preset station buttons can be used to select, with a single touch, any desired station which has been preset.

1. Tune to the desired station by using automatic or manual tuning.
2. Select the range of the preset station buttons by using the P1-8/P9-16 button.
3. Press the MEMORY button and then, while the MEMO indicator is flashing, press the desired preset station button.
4. Follow the same procedures for the other preset station buttons.
5. To recall a preset station, first select the range of the preset station button by using the P1-8/P9-16 button, and then press the desired preset station button.
 - A new setting can be programmed in place of the former one.
 - For presets, the setting of the automatic (stereo) or manual (mono) tuning mode is stored along with the station frequency.
 - This unit automatically remembers the most recently tuned station when the power is switched OFF. When the power is switched ON again, the same station will be received.

Memory back-up

The memory back-up circuit prevents the programmed data from being lost even if the power is switched OFF (for timer use or due to temporary power failure). If, however, the unit is not used for a long time, the memory may be erased. If so, it can be re-programmed by simply following the PRESET TUNING steps.

TROUBLESHOOTING

When your unit fails to function properly, before assuming it is faulty, check it according to the following troubleshooting list. It details the corrective action you can take yourself without having to call a service engineer. If you have any doubts or questions, get in touch with your nearest YAMAHA dealer.

SYMPTOM	CAUSE	REMEDY	
FM	Crackling sounds from time to time (especially in weak signal areas).	● Ignition noise from passing vehicles.	● The FM antenna should be put up as high as possible, away from the road, and a coaxial cable used.
		● Noise from thermostats or other electrical equipment.	● Attach a noise suppressor to the equipment causing the noise.
	FM stereo reception is noisy.	● Because of the characteristics of FM stereo broadcasts, this is limited to cases where the transmitter is far away or the antenna input is poor.	● Check the antenna connections. ● Try using a multiple element FM antenna. ● Set the MODE AUTO/MAN'L FM MONO button to MAN'L mode.
	The FM STEREO indicator flickers and reception is noisy.	● Insufficient antenna input.	● Use an antenna appropriate for the reception condition in your area.
		● Not tuned correctly.	● Tune again.
	There is distortion and clear reception cannot be obtained even with a good FM antenna.	● There is multi-path interference.	● Adjust antenna placement to eliminate multi-path interference.
	No stereo effect even with a stereo broadcast.	● The MODE AUTO/MAN'L FM MONO button is set to MAN'L.	● Set the button properly.
A desired station cannot be tuned in with Automatic tuning.	● The station is too weak.	● Use Manual tuning mode. ● Use a high quality directional FM antenna.	
Previously preset stations can no longer be tuned in.	● The tuner has been unplugged for a long period.	● Repeat the presetting procedure.	
AM	Insufficient sensitivity.	● Weak signal or loose antenna connections.	● Tighten the AM loop antenna connections and rotate it for best reception.
	A desired station cannot be tuned in with Automatic tuning.		● Use Manual tuning mode.
	There are continuous crackling and hissing noises.	● These noises result from lightning, fluorescent lamps, motors, thermostats and other electrical equipment.	● Use an outdoor antenna and a ground wire. This will help some what but it is difficult to eliminate all noise.
	There are buzzing and whining noises (especially in the evening).	● Another station is interfering with the received station.	● This is impossible to remedy.
● A television set is being used nearby.		● Move the television away.	

SPECIFICATIONS

FM SECTION

Tuning Range

[U.S.A., Canada and General models] 87.5 to 107.9 MHz

[U.K., Australia, Europe and General models] 87.5 to 108 MHz

50 dB Quieting Sensitivity (IHF) [Except Europe model]

75 ohms Mono 1.6 μ V (15.3 dBf)

75 ohms Stereo 21 μ V (37.7 dBf)

Usable Sensitivity

[Except Europe model]

75 ohms, 1 kHz, 100% mod. (30 dB S/N Quieting)
..... 0.8 μ V (9.3 dBf)

[Europe model] (DIN)

75 ohms Mono (S/N 26 dB) 0.9 μ V

75 ohms Stereo (S/N 46 dB) 24 μ V

Image Response Ratio

[Except Europe model] 40 dB

[Europe model] 75 dB

IF Response Ratio

[Except Europe model] 90 dB

[Europe model] 75 dB

Spurious Response Ratio

..... 70 dB

AM Suppression Ratio

..... 55 dB

Capture Ratio

..... 1.5 dB

Alternate Channel Selectivity

[Except Europe model] 85 dB

Selectivity (two signals, 40 kHz Dev., \pm 300 kHz)

[Europe model] 70 dB

Signal-to-Noise Ratio

[Except Europe model] (IHF)

Mono 82 dB

Stereo 76 dB

[Europe model] (DIN-Weighted)

Mono (40 kHz Dev.) 75 dB

Stereo (40 kHz Dev.) 70 dB

Harmonic Distortion (1 kHz)

[Except Europe model]

Mono/Stereo 0.1%/0.2%

[Europe model (40 kHz Dev.)]

Mono/Stereo 0.1%/0.2%

Stereo Separation 1 kHz 40 dB

Frequency response

[Except Europe model]

30 Hz to 15 kHz 0 \pm 0.5 dB

[Europe model]

30 Hz to 13 kHz 0 \pm 0.5 dB

20 Hz to 15 kHz 0 \pm 1.5 dB

AM SECTION

Tuning Range

[U.S.A., Canada and General models] 530 to 1,710 kHz

[U.K., Australia and Europe models] 531 to 1,611 kHz

Usable Sensitivity 100 μ V/m

Selectivity 32 dB

Signal-to-Noise Ratio 50 dB

Image Response Ratio 40 dB

Spurious Response Ratio 50 dB

Harmonic Distortion; 400Hz 0.3%

AUDIO SECTION

Output Level/Impedance

FM (100 % mod. 1 kHz)

[Except Europe model] 500 mV/2.2 k-ohms

[Europe model] 400 mV/2.2 k-ohms

AM (30% mod. 400 Hz) 150 mV/2.2 k-ohms

GENERAL

Power Supply

U.S.A. and Canada models 120V, 60 Hz

Europe model 220V, 50 Hz

U.K. and Australia models 240V, 50 Hz

General model 110-120/220-240V, 50/60 Hz

Power Consumption 7W

Dimensions (W x H x D) 435 x 70 x 237 mm

(17-1/8" x 2-3/4" x 9-5/16")

Weight 2.1 kg (4 lbs. 10 oz.)

Specifications subject to change without notice.

YAMAHA

YAMAHA ELECTRONICS CORPORATION, USA 6722 ORANGETHORPE AVE., BUENA PARK, CALIF. 90620, U.S.A.
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