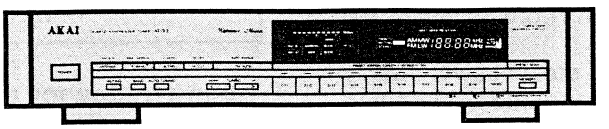
AKAI

QUARTZ SYNTHESIZER TUNER

AT-93/L



Operator's Manual 5

* This operator's manual applies equally to models AT-93 and AT-93L except where otherwise noted.

Reference Master

This is the Akai 1 Quartz Synthesizer Tuner

Use the Akai tuner in combination with the other components in the Akai Pro-series and you will have an excellent hi-fi system.

Features

- Stable accurate reception microcomputer controlled quartz synthesizer tuner
- 20 station random preset system (See page 6)
- Sensitive large AM loop antenna (See page 8)
- Computer controlled FM antenna selector and 2 separate terminals for dual FM antenna connection (See page 8)
- FM mute system (See page 5)
- FM IF band select system (Wide/Narrow, see page 7)
- FM auto mode system (See page 5)
- 6-way tuning system including timer controlled tuning (See page 6)
- Wide scale LED (Light Emitting Diode) signal strength indicator
- Dual gate MOS (Metal Oxide Semi-conductor) FET (Field Effect Transistor) incorporated Front end
- Microcomputer controlled antenna switching system with PIN diodes
- Improved PLL (Phase Locked Loop) quartz synthesizer tuning system
- Akai original open loop multiplex circuit with DC servo circuit for accurate reproduction of FM stereo signals
- Large capacity and high stable power supply system with fast recovery diodes, low noise zenner diode and high quality parts
- Separate power supply system for digital and audio sections
- Large FL (Fluorescent) display
- Large pedestals

Table of contents

Lithium battery

This product uses a lithium battery for memory back-up. The lithium battery should only be replaced by qualified service personnel.
Improper handling may cause risk of explosion.

WARNING

To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

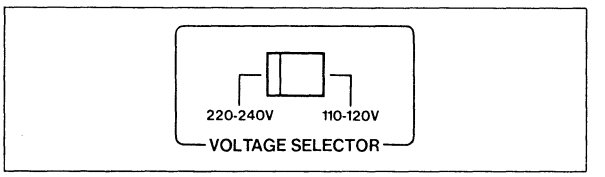
Power requirements

Power requirements for electrical equipment differ from area to area. Please ensure that your machine meets the power requirements in your area.
If in doubt, consult a qualified electrician.
120 V, 60 Hz for USA and Canada
220 V, 50 Hz for Europe except UK
240 V, 50 Hz for UK and Australia
110-120 V/220-240 V, 50/60 Hz convertible for other countries.

Voltage conversion

Models for Canada, USA, Europe, UK and Australia are not equipped with this facility. Each machine is preset at the factory according to its destination, but some machines can be set to 110 V—120 V or 220 V—240 V as required.
If your machine's voltage can be converted:

Before connecting the power cord, if the proper voltage for your area is not shown, turn the VOLTAGE SELECTOR located on the rear panel of the machine with a screwdriver so that the correct voltage is indicated.



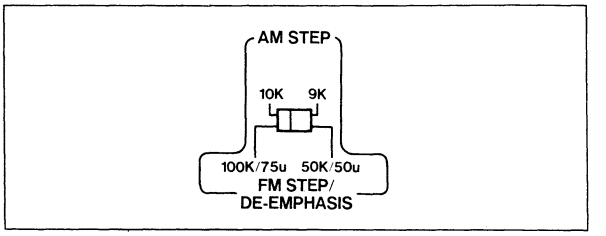
Tuning frequency step/FM De-emphasis conversion (Voltage convertible models only)

Set the tuning frequency step for your area after changing the operating voltage.
Set the AM FM STEP/FM DE-EMPHASIS selector on the rear panel of the tuner as follows:

For North and South America
Set the selector to the 10 kHz/75 μs position

For Other countries
Set the selector to the 9 kHz/50 μs position

After changing the position of this selector
Press the RESET button after turning on the power.



What you should know to protect yourself

Watch out! You might get an electric shock.

- Never touch the plug with wet hands.
- Always pull out by the plug and never the cord.
- Only let a qualified professional repair or reassemble the Akai tuner. An unauthorized person might touch the internal parts and receive a serious electric shock.
- Never allow a child to put anything, especially metal, into the Akai tuner.

Let's protect the Akai tuner too.

- Use only a household AC power source. Never use a DC power source.
- Make sure that the power consumption of each component does not exceed the wattage specified on the rear panel.
- If water is spilled on the Akai tuner, disconnect it and call your dealer.
- Make sure that the Akai tuner is well ventilated and away from direct sunlight. Be careful not to block the side ventilator of the Akai tuner.
- To avoid damage to the internal circuits and the external surface, keep away from heat (stoves, etc.)
- Avoid using spray type insecticide near the Akai tuner. It can damage the finish and might ignite suddenly.
- To avoid damaging the finish, never use denaturated alcohol, paint thinner or other similar chemicals to clean the Akai tuner.
- Place the Akai tuner on a flat and solid surface.
- **If you don't plan to use the Akai tuner for a long period of time, disconnect the power cord.**

To enjoy the Akai tuner for a long time, please read this operator's manual thoroughly.

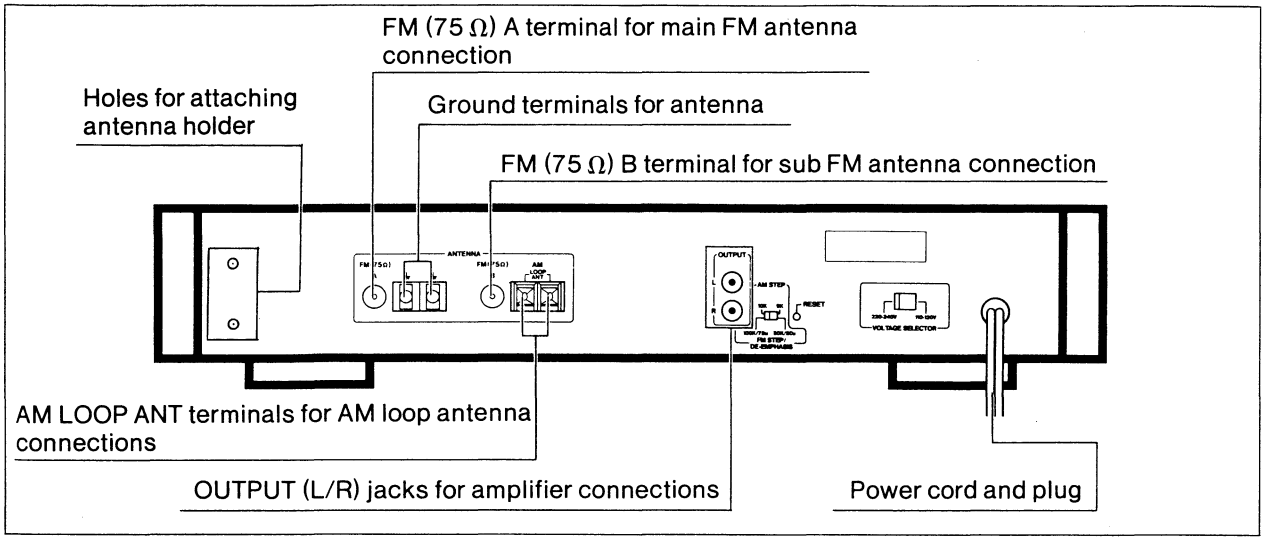
CAUTION

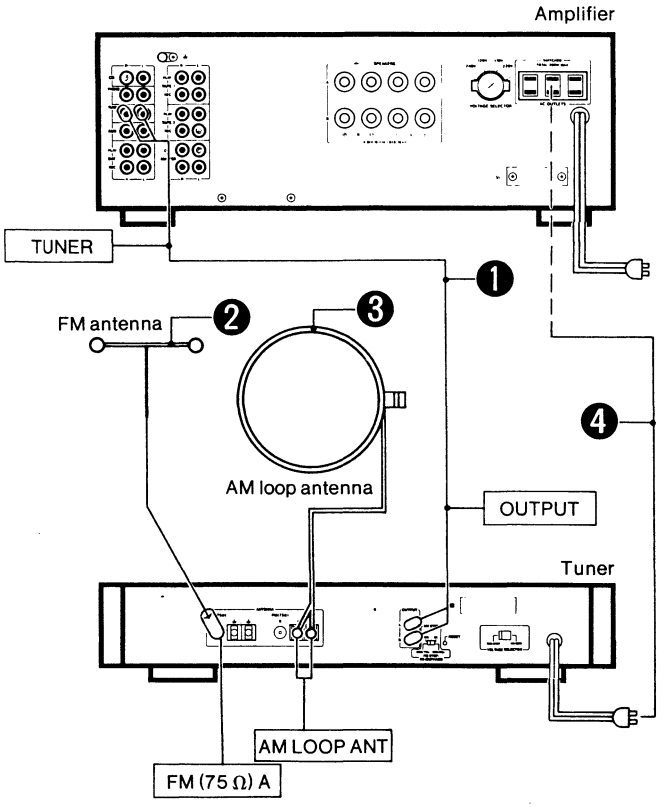
To prevent electric shock, do not use this polarized AC power plug with an extension cord receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

Making the right connections

3

- Turn off all the components before connecting.
- Connect the power cord last.
- Make sure that you connect the white PIN-plugs to the left (white) jacks and the red PIN-plugs to the right (red) jacks.
- Connect everything securely. Loose connections can cause distortion.
- To prevent damage to the cords, connect and disconnect by holding the plug, not the cord.





1 **OUTPUT jacks connection**
Connect the Akai tuner's OUTPUT jacks and the amplifier's TUNER jacks with the provided connection cord. (left and right)

2 **T-shape FM antenna connection**
Connect the provided T-shape FM antenna (using the FM antenna plug) to the tuner's FM (75 Ω) A terminal on the rear panel, then attach the antenna to a wall.

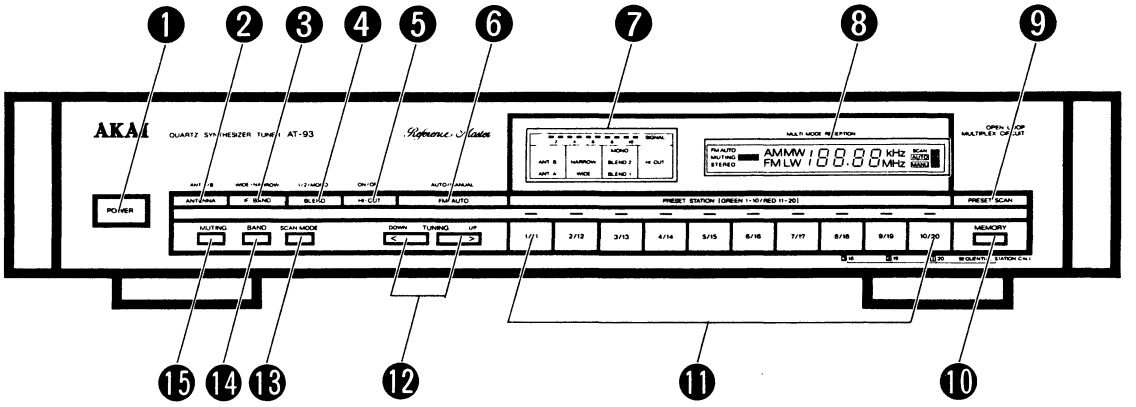
3 **AM Loop antenna connection**
Open both the AM LOOP ANT terminal tabs and insert one wire into each hole.
Close the tabs to complete the connection.
Attach the AM loop antenna to the provided holder or hang it where best reception can be obtained. Refer to page 8 "How to attach the AM loop antenna".

4 **After you have connected everything:**
Connect the power cord to the AC OUTLET of the Akai amplifier or an audio timer, or directly to a household AC outlet.

Note
The provided FM antenna is a simple type. If you want to receive FM broadcasts more clearly, we recommend a higher grade FM antenna (multi element antenna, etc.) for FM reception. See page 9.

IMPORTANT
The illustrated power plugs and cords are intended for general reference. The power plug and cord used in your country may differ from the illustration. (Example: U.K., Australia,, U.S.A., Europe etc.)

Controls



1 POWER button
To turn the power on and off.

2 ANTENNA Select button
To select the main or sub FM antenna.

3 IF BAND Select button
To select the wide or narrow FM IF (Intermediate Frequency) band.

4 BLEND select button
To select the blend mode during FM stereo reception.

5 HI-CUT button
To turn the high cut filter on or off during reception.

6 FM AUTO button
To set the tuner to the automatic FM reception mode.

7 LED (Light Emitting Diode) Indicators
Tells you which mode the tuner is in.

8 FL (Fluorescent) Display
Shows tuning information.

9 PRESET SCAN button
To set the tuner to the automatic preset station scan mode.

10 MEMORY button
To memorize preset stations. Press the button once to memorize preset station numbers 1 to 10. Press the button twice to memorize preset station numbers 11 to 20.

11 PRESET STATION Buttons and Indicators (1/11 to 10/20)
To memorize preset stations and tune in memorized stations.

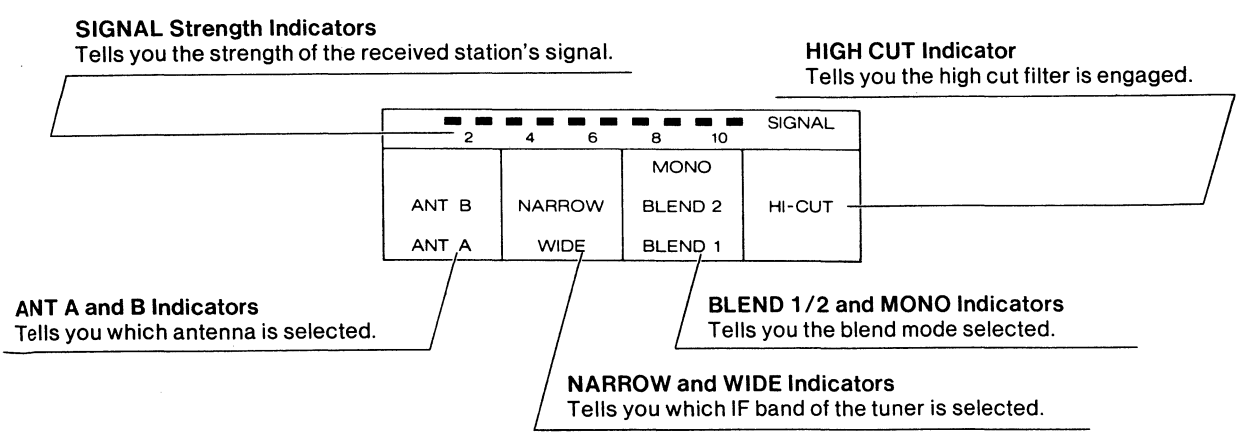
12 TUNING buttons (UP >/DOWN <)
To tune in a station manually.

13 SCAN MODE Select button
To select the manual or automatic tuning mode.

14 BAND Select Button
To select the band.

15 MUTING button
To cut inter-station noise during tuning.

LED Indicators



Listening to the radio

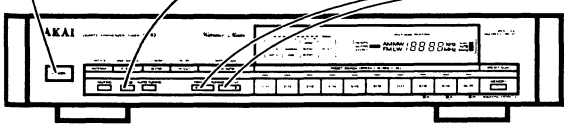
5 Basic tuning

Before proceeding, set your amplifier's input selector to the TUNER position.

❶ Depress the POWER button to turn on the power.

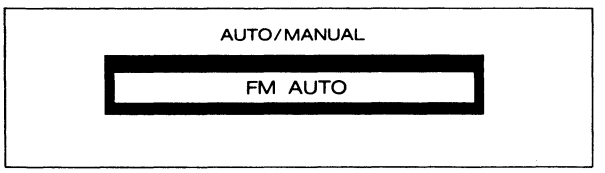
❷ Select the band with the BAND button.

❸ Tune in a station with the TUNING UP > or DOWN < button.



On FM station tuning (after setting the BAND to FM)

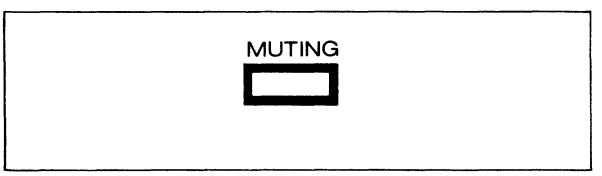
To set the tuner to the automatic FM reception mode



Normally set the tuner to the FM AUTO mode with the FM AUTO button. The FM AUTO indicator will light on the FL display.

When set to the FM AUTO mode, the tuner automatically selects STEREO or MONO according to the station which is tuned in. The STEREO indicator lights up when a stereo station is tuned in. When a monaural signal is tuned in, the MONO indicator above the BLEND indicators will light up.
The ANTENNA select button, IF BAND select button, BLEND select button and the HI-CUT buttons are set automatically by the microcomputer. Pressing any of these buttons will cancel the FM AUTO mode.

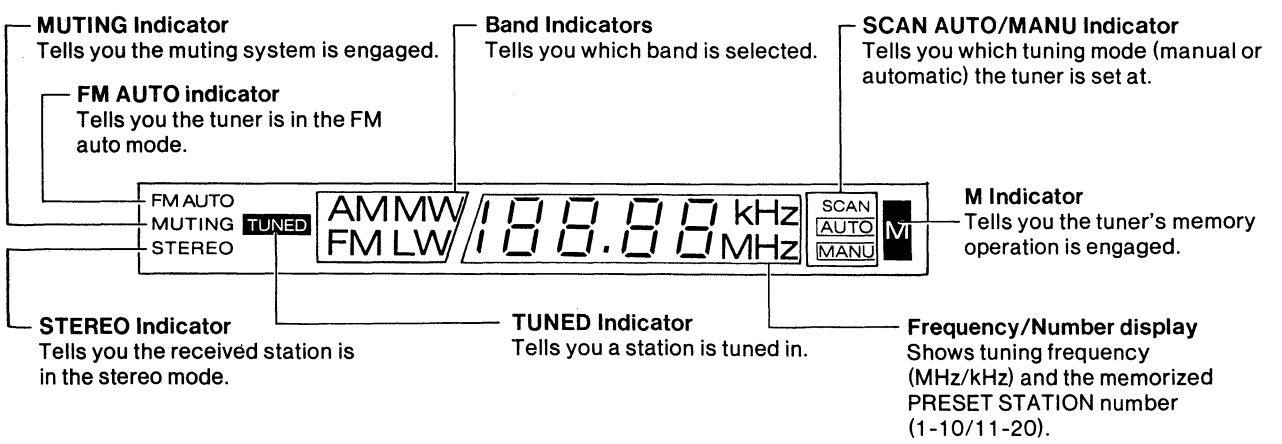
Eliminating inter-station noise during tuning



Press the MUTING button. The MUTING indicator will light up and inter-station noise will be eliminated during tuning.

* If you want to tune in a weaker station, press the MUTING button once again. The MUTING indicator will go off and inter-station noise will be heard during station tuning.

The FL (Fluorescent) display



6-way Tuning system

This quartz synthesizer tuner incorporates a 6-way tuning system.

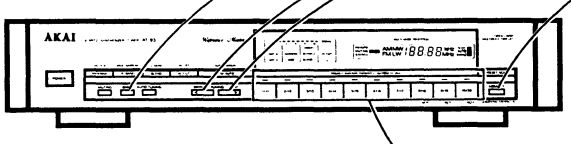
Before tuning in a station

Set the amplifier's input select button to the TUNER position.

* Before tuning in a station manually or automatically, remember to select the band with the BAND select button.
* When using a preset station button for tuning, make sure that you have already memorized a station.

Method	Operation
Manual tuning	Set the SCAN MODE to MANUAL with the SCAN MODE button, then repeatedly press the TUNING UP > or DOWN < button until a station is tuned in. * To quickly change the frequency, depress the TUNING button continuously. For fine tuning press the button repeatedly.
Automatic tuning	Set the SCAN MODE to AUTO with the SCAN MODE button , then press the TUNING UP < or DOWN > button once.
Preset station tuning	Press the preset station button once or twice depending on which preset station you want to listen to.
Automatic preset scan tuning	Press the PRESET SCAN button once. Automatic preset station scanning is engaged. To stop at a preset station, press the PRESET SCAN button again or press the PRESET STATION button that holds the station you want to listen to.
Manual preset station tuning	Repeatedly press the PRESET SCAN button.
Sequential station call tuning with an optional audio timer	Make sure you have tuned in and memorized a station at the PRESET STATION number 20 before turning off the power. For operation details see page 7.

How to memorize a preset station



1. Select the band with the BAND button.
2. Tune in a station you want to memorize with the TUNING UP < or DOWN > button.
3. Press the MEMORY button as follows;
   Press the button once.....
   To memorize channels 1 to 10. The M indicator and 1-10 display will appear on the FL display.
   Press the button twice .....
   To memorize channels 11 to 20. The M indicator and 11-20 display will appear on the FL display.
   Press the button three times.....
   To cancel the memory operation. The normal tuning display will appear.
4. **Within 5 seconds**
   Press the PRESET STATION button where you want to memorize the station.
   When pressing a PRESET STATION button, it's indicator will light up.

After completing a preset station memorization, to memorize more stations, repeat the above steps 1 through 4.

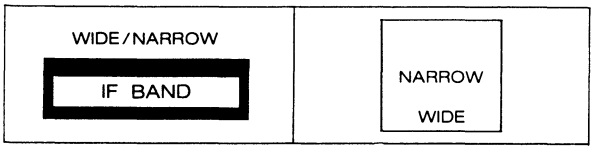
Notes

- As well as memorizing the band and frequency of a preset station, the tuner's memory system also memorizes the ANTENNA, IF BAND, HI-CUT and FM AUTO button's modes during preset station memorization.
- If a PRESET STATION button is not pressed within 5 seconds after the MEMORY button is pressed, the memory operation will be cancelled automatically.
- If you are using timer controlled preset station tuning (Sequential station call function), make sure you have memorized the desired stations at the PRESET STATION numbers 20, 19 and 18 (See page 7).

Operation details

7 Station interference during FM reception

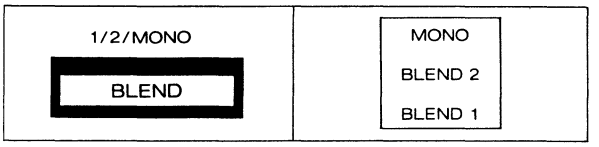
If interference from another nearby FM station is bothering the FM station you have tuned in, use the IF BAND select button to reduce the interference.



Press the IF BAND select button until the NARROW indicator lights up.
With the IF BAND set to it's narrow setting, interference caused by another FM station will be reduced. Normally set the IF BAND to WIDE for good FM stereo station reception. The WIDE indicator will light up.

FM reception enhancement

Use the BLEND select button to enhance reception during different reception conditions.



Press the BLEND select button as follows;

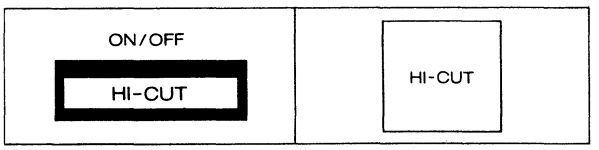
Normal stereo reception:
Repeatedly press the BLEND button until all the indicators are off.

Noisy stereo reception:
Repeatedly press the BLEND button until the **BLEND 1** or **2** indicator lights up. High frequency separation and noise will be decreased.

Weak and noisy stereo reception:
Repeatedly depress the BLEND button until the **MONO** indicator lights up. The FM mode will be set at monaural.

Eliminating high frequency noise (hiss) during reception

Use the HI-CUT button to eliminate high frequency signals including noise.



Press the HI-CUT button. The HI-CUT indicator will light up.

Note
When the tuner is set at the FM AUTO mode with the FM AUTO button (FM AUTO will be on the FL display), using the BLEND or HI-CUT buttons to enhance reception is not necessary. The tuner will adjust itself automatically to the best FM tuning conditions. If these buttons are pressed while the tuner is set at the FM AUTO mode, the FM AUTO mode will be cancelled automatically.

How to use the Sequential station call function

This tuner has a sequential station call function for automatic preset station selection. 3 different stations can be memorized and then recalled when the tuner's power is turned on with the optional Akai audio timer. This function can be used effectively during absentee recording.

1 Turn on the power of all the components connected to the optional Akai audio timer.
2 Memorize the stations that you want to record at PRESET STATION numbers 20, 19 and 18.
3 Prepare for sequential station call by pressing the 10/20 button of the PRESET STATION button twice to tune in the memorized station number 20.
4 Turn off the power with the timer mode button of the audio timer. Power of all components will be turned off and then turned on again at the time that the Akai audio timer has been programmed for. (For operation details, please refer to the audio timer's operator's manual.)

Notes
- In order for the sequential function to work properly, 3 stations must be memorized at PRESET STATION numbers 20, 19 and 18.
- During absentee recording, sequential recall of preset stations begins with the station memorized at PRESET STATION number 20 and then continues with the stations at PRESET STATION numbers 19 and 18.
- If you are only planning to record one station during absentee recording it is not necessary to use the sequential station call function. Memorize the station you want to record at one of the PRESET STATION numbers between 1 and 17 and use the last station memory function to recall the station.
- When the power is turned on after the third time, the tuner will automatically tune in PRESET STATION number 18.

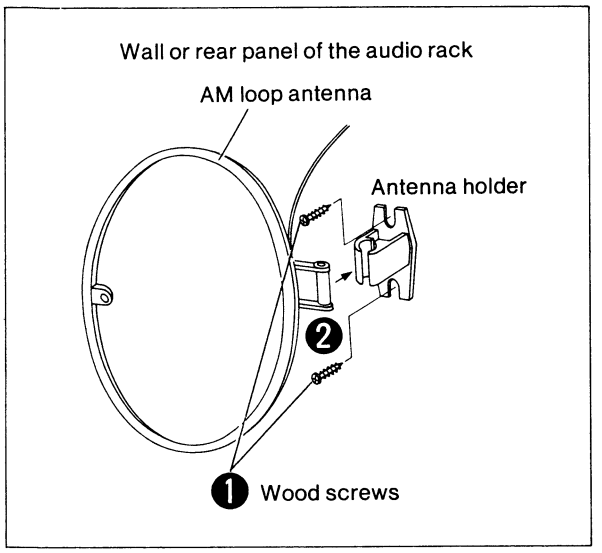
Last station memory

This tuner has built-in last station memory. When the tuner's power is turned off, the tuning frequency, band , and tuning mode of the station at the last preset station button you have pressed will be memorized in the memory system of the microcomputer. When the power is turned on again (manually or with an audio timer), the tuner is automatically set to that station. This function is useful if you have a favorite station that you often listen to, as it saves having to tune that station in repeatedly. This function can also be used to recall a station during absentee recording.

How to attach the AM loop antenna

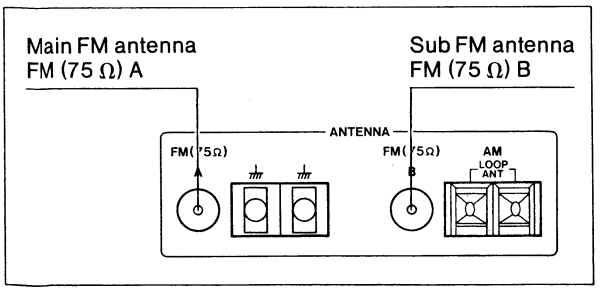
After finding the best position for reception by changing the direction of the AM loop antenna and adjusting it's height:

1 Attach the provided antenna holder firmly to a wall, to the rear panel of the audio rack or to the rear panel of the tuner with the two provided wood screws.
2 Attach the AM loop antenna to the antenna holder.



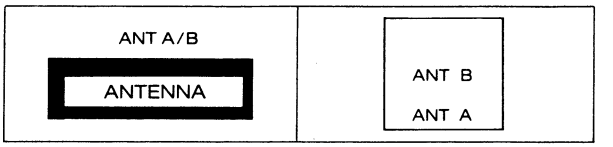
How to use the A/B FM antenna terminals

Use the A terminal for the main FM antenna connection. For best reception Akai recommends the use of a higher grade FM outdoor antenna for the main antenna. Adjust it's direction so that as many stations as possible can be received.
Use the B terminal for the sub FM antenna connection. Use the sub FM antenna to catch stations that the main antenna can't pick up by setting it in a different position.



A/B antenna selection

Use the ANTENNA select button to switch between the A or B antenna terminals when you are using 2 FM antennas.

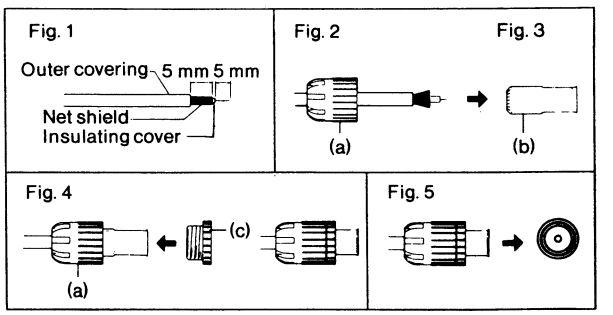


Press the ANTENNA select button. The ANT A or B indicator will light up.

How to use the FM antenna plug

Connect the FM antenna to the A (75 Ω) terminal using the provided FM antenna plug.

1 Prepare a 75 ohm coaxial cable (3C-2V or 5C-2V; not provided) by stripping off approx. 10 mm of the outer insulation. Be careful not to cut through the copper wire 'net' beneath it. Fold back the copper wire and then strip off about 5 mm of the inner wire's insulating cover. Fig. 1
2 Rotate the FM antenna plug and take it apart. Pass the prepared 75 ohm coaxial cable through part (a) as shown in Fig. 2, and then return the copper wire to it's folded back position.
3 Insert the inner wire of the coaxial cable through the center hole of part (b) and stop when the folded back copper wire surrounds the bottom of part (b). (If there is a multiple core center strand, first twist it together to form a single strand.) Fig. 3
4 Fit parts (a) and (c) together in the order shown in Fig. 4 and screw together as shown in Fig. 5.



Antennas

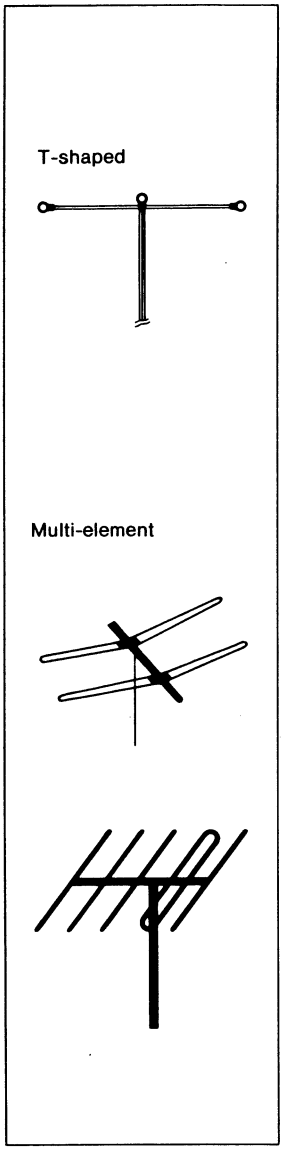
9 FM antennas

FM broadcasts give you excellent sound quality, but in order to enjoy this quality, you must catch the radio waves properly. Therefore, we recommend that you select an antenna appropriate for your area.

T-shaped FM antenna

The standard accessory T-shaped FM antenna is a simple one. Extend the ends and move it around to find the best location, or attach it to a wall, for example.

* Unless the radio waves are strong enough, the antenna can't deliver the full body of the music, or let the Akai Tuner show its full capability.



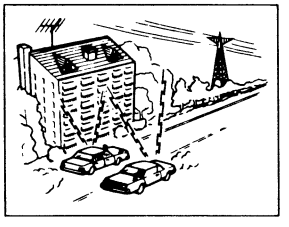
Multi-element FM outdoor antenna

Chose the number of elements according to how far you are from the radio station. The greater the number of elements, the more signals your antenna will receive and this in turn will improve directivity and lessen multipath distortion.

Where to install the antenna

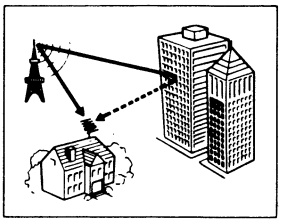
Keep the following in mind when you install the antenna.

- Make sure that the antenna is not in the shadow of a building and is away from car traffic and high voltage wires.
- Tune in a station and move the antenna around until you obtain the best reception.



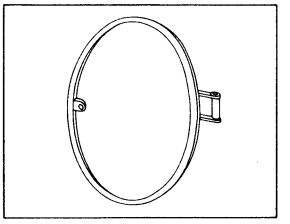
Multipath distortion

Multipath distortion occurs when radio waves reaching the antenna directly and indirectly (reflected off buildings, mountains, etc.) from the FM station interfere with each other. This can result in noise and inadequate channel separation.



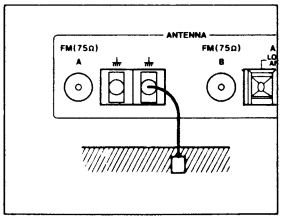
AM loop antennas

This Akai tuner is equipped with an AM loop antenna. Attach this antenna to a wall or to the rear panel of the audio rack. If good reception cannot be obtained, attach a wire antenna of more then 5 m to the LOOP ANT terminal along with the AM loop antenna.



Grounding

You can tune in stations without grounding, but by grounding you can effectively reduce noise such as humming. Also, when you use an outdoor antenna, it helps to prevent an electric shock. Connect one end of the ground wire to one of the ground terminals (⏚) and the other end to a deeply buried underground bar (must be made of lead). Do not connect to a gas line, etc. If you live in an apartment that is equipped with a community antenna terminal, grounding is not necessary.

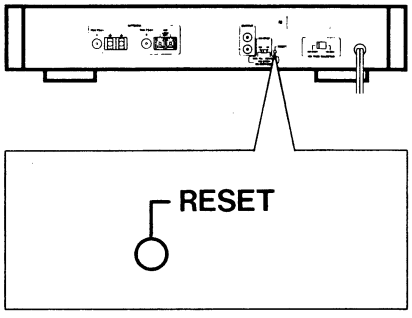


On the RESET button

When the tuner does not fuction properly due to interference caused by static electricity, etc., press the RESET button located on the rear panel with the blunt end of a pen or pencil, for example. (The tuner must be on.)
Afterwards, the tuner will be set to the following initial modes:

• Antenna	A
• IF BAND	NARROW
• HI-CUT	On
• MUTING	On
• FM mode	FM AUTO
• SCAN MODE	MANU
• Tuning band	FM
• Tuning frequency	87.5 MHz
• Memorized preset stations	All cancelled

After the RESET button has been pressed, it will be necessary to memorize all broadcast stations once again.



Problem? Let's check

Only noise is heard during AM (MW and LW) or FM reception

The antenna is not properly connected.
For good reception, always connect an antenna appropriate for your area.

The frequency will not change when a PRESET STATION button is pressed

There is nothing memorized at that PRESET STATION button.
Memorize a station.

The station is not received clearly

The antenna is incorrectly oriented or insufficient for good reception.
For good reception, the antenna must be oriented properly and be capable of catching as many signals as possible.

Sequential station call tuning will not function properly

The sequential station call function is not engaged.
Set the 10/20 PRESET STATION button to 20 before turning off the power.
Make sure you have memorized stations at PRESET STATION buttons 20, 19, and 18.

The preset station changes automatically when the power is turned on

The SEQUENTIAL STATION CALL function is engaged.
Press one of the PRESET STATION buttons between 1 and 17 before turning off the power.

Tuner does not function properly

The microcomputer is malfunctioning.
Press the RESET button on the rear panel of the tuner.

Should a problem persist, write down the model and serial numbers and all pertinent data regarding warranty coverage as well as a clear description of the exisiting trouble. Then contact your nearest authorized Akai Service Station.

Specifications

11

FM section

Tuning frequency
range ..... 87.5 MHz to 108.0 MHz
Usable sensitivity ..... 1.0 μV (11.2 dBf)
Quieting sensitivity (S/N = 50 dB)
Mono ..... 2.0 μV (17.2 dBf)
Stereo ..... 22 μV (38.2 dBf)
Capture ratio (Wide) ... 1.3 dB
Selectivity (±400 kHz)
For West Germany
Wide ..... 60 dB
Narrow ..... 80 dB
For other countries
Wide ..... 60 dB
Narrow ..... 90 dB
Image rejection ratio .. 90 dB
IF rejection ratio ..... 100 dB
Spurious rejection
ratio ..... 100 dB
AM suppression ratio . 65 dB
Sub carrier
suppression ratio ... 70 dB
S/N
For West Germany
Mono ..... 85 dB (at 60 dBμ)
Stereo ..... 76 dB (at 60 dBμ)
80 dB (at 80 dBμ)
For other countries
Mono (IHF-A) ..... 90 dB (at 60 dBμ)
Stereo (IHF-BPF) ... 80 dB (at 60 dBμ)
86 dB (at 80 dBμ)
Distortion (T.H.D., at 1 kHz)
For West Germany
Wide ..... 0.04% (Stereo)
Narrow ..... 0.05% (Mono)/
0.15% (Stereo)
For other countries
Wide ..... 0.02% (Mono)/
0.07% (Stereo)
Narrow ..... 0.08% (Mono)/
0.3% (Stereo)
Stereo separation ..... 62 dB (Wide)/
(at 1 kHz) 55 dB (Narrow)
Frequency response .. 0±0.5 dB (30 Hz to 15 kHz)

AM section (MW for AT-93L)

Tuning frequency range
For USA and
Canada ..... 530 kHz to 1,610 kHz
For other countries .. 531 kHz to 1,602 kHz
Sensitivity
(Loop antenna) ..... 300 μV/m
Selectivity
USA and Canada .... 50 dB (±10 kHz)
Other countries ..... 40 dB (±9 kHz)
Image rejection ratio .. 40 dB
IF rejection ratio ..... 60 dB
S/N ..... 45 dB
Distortion (T.H.D.)
For West Germany .. 0.8%
For other countries .. 0.6%

LW section (AT-93L only)

Tuning frequency
range ..... 144 kHz to 351 kHz
Sensitivity ..... 300 μV/m
Selectivity ..... 55 dB (±9 kHz)
Image rejection ratio .. 45 dB
IF rejection ratio ..... 37 dB
S/N ..... 40 dB
Distortion (T.H.D.) 0.6%

Output level
FM
For West Germany .. 770 mV
(at 100% modulation)
For other countries .. 770 mV
(at 100% modulation)
AM ..... 250 mV
(MW for AT-93L) (at 30% modulation)
Hi-cut filter ..... −6 dB/10 kHz
Blend (Separation at 1 kHz)
Blend 1 ..... 20 dB
Blend 2 ..... 10 dB

Power requirements ... 120 V, 60 Hz for USA and Canada
220 V, 50 Hz for Europe except UK
240 V, 50 Hz for UK and Australia
110—120 V/220—240 V, 50/60Hz convertible for other countries
Dimensions ..... 461 (W) ×87 (H) ×344 (D) mm
(18.1 ×3.4 ×13.5 inches)
Weight ..... 6.3 kg (13.9 lbs)

Standard accessories

Connection cord ..... ×1
FM di-pole antenna ... ×1
FM antenna plug ..... ×1
AM loop antenna ..... ×1
Loop antenna holder .. ×1
Wood screws ..... ×2

* For improvement purposes, specifications and design are subject to change without notice.