



# FM/AM STEREO TUNER

## MODEL NO. ST-R22K

- OPERATING INSTRUCTIONS

# AIWA®



## FEATURES

- **Digital display for reception frequency of tuned station**

The frequency of the station you tune is accurately displayed in digits so that you can read the frequency at a glance.

The display employs a newly developed LSI (large-scale integrated circuit) and a crystal which generates 6.4 MHz signals to serve as the reference oscillator. This means that there is no discrepancy between the tuner's display and the actual frequency of the broadcast station.

- **Low-noise dual gate MOS FET front end**

The RF amplifier stage of the front end adopts a dual gate MOS FET (metal-oxide semiconductor field effect transistor) with remote cut-off characteristics which enable extremely sensitive reception with the absolute bare minimum of interference.

- **Stable PLL IC MPX demodulator with excellent separation**

The MPX demodulator with a PLL IC (phase-locked loop integrated circuit) yields a low distortion and a superior separation. A very stable performance is also ensured regardless of temperature and humidity fluctuations or aging.

- **IF discriminator with excellent group delay response at low distortion levels**

By using a ceramic filter with a flat group delay response and a quadrature discriminator with minimal distortion in the detector stage, a high signal-to-noise ratio, low distortion and high selectivity are achieved.

High-performance ICs are used for both the limiter and detector stages and these contribute to ensuring a high level of reliability and stability.

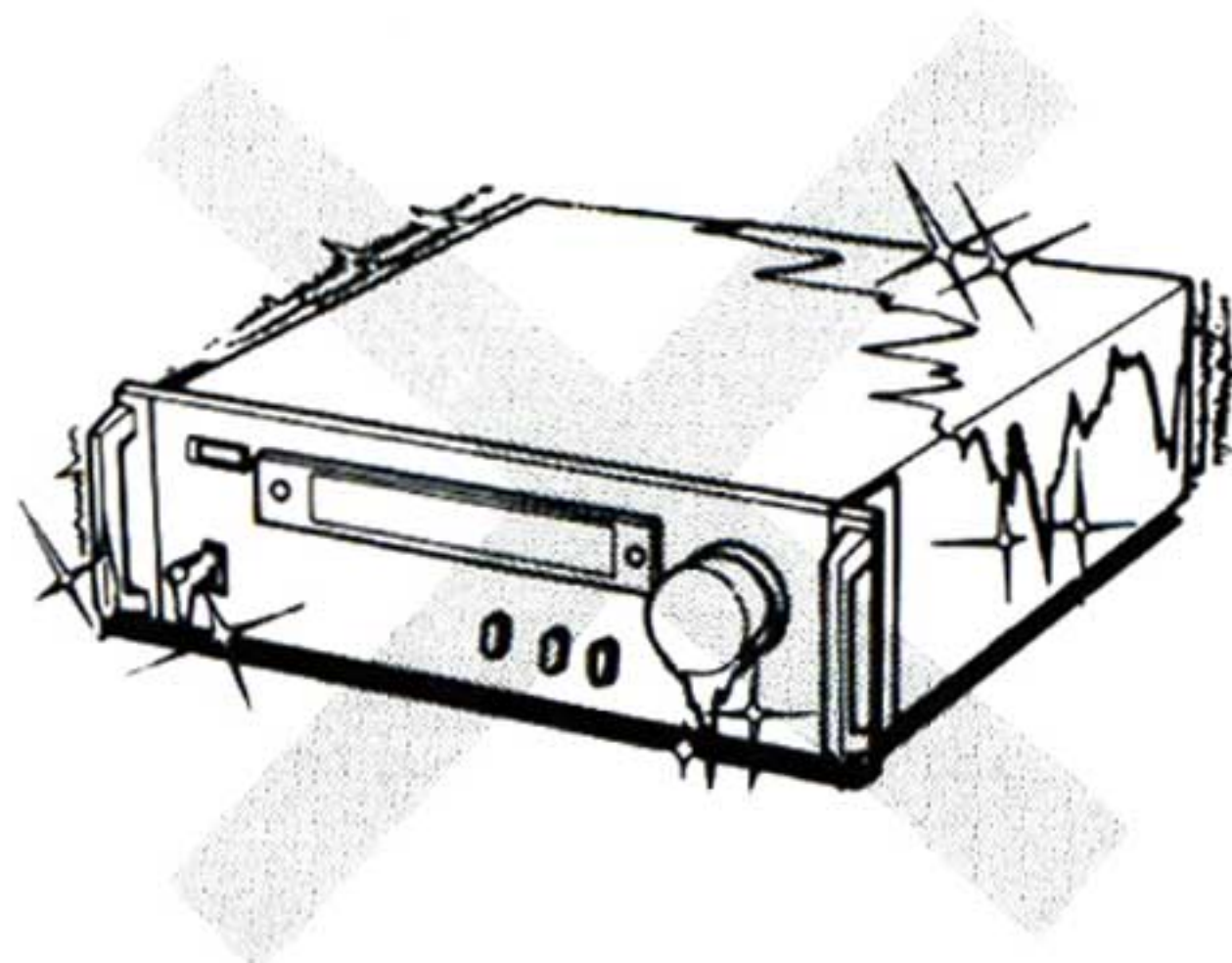
- **5-point LED bar graph signal meter display**
- **Hi-blend circuit for cutting out noise without sacrificing the stereo effect**
- **Muting circuit for effectively suppressing the interstation noise**
- **AFC (automatic frequency control) ON/OFF selector switch**

## OPERATION PRECAUTIONS

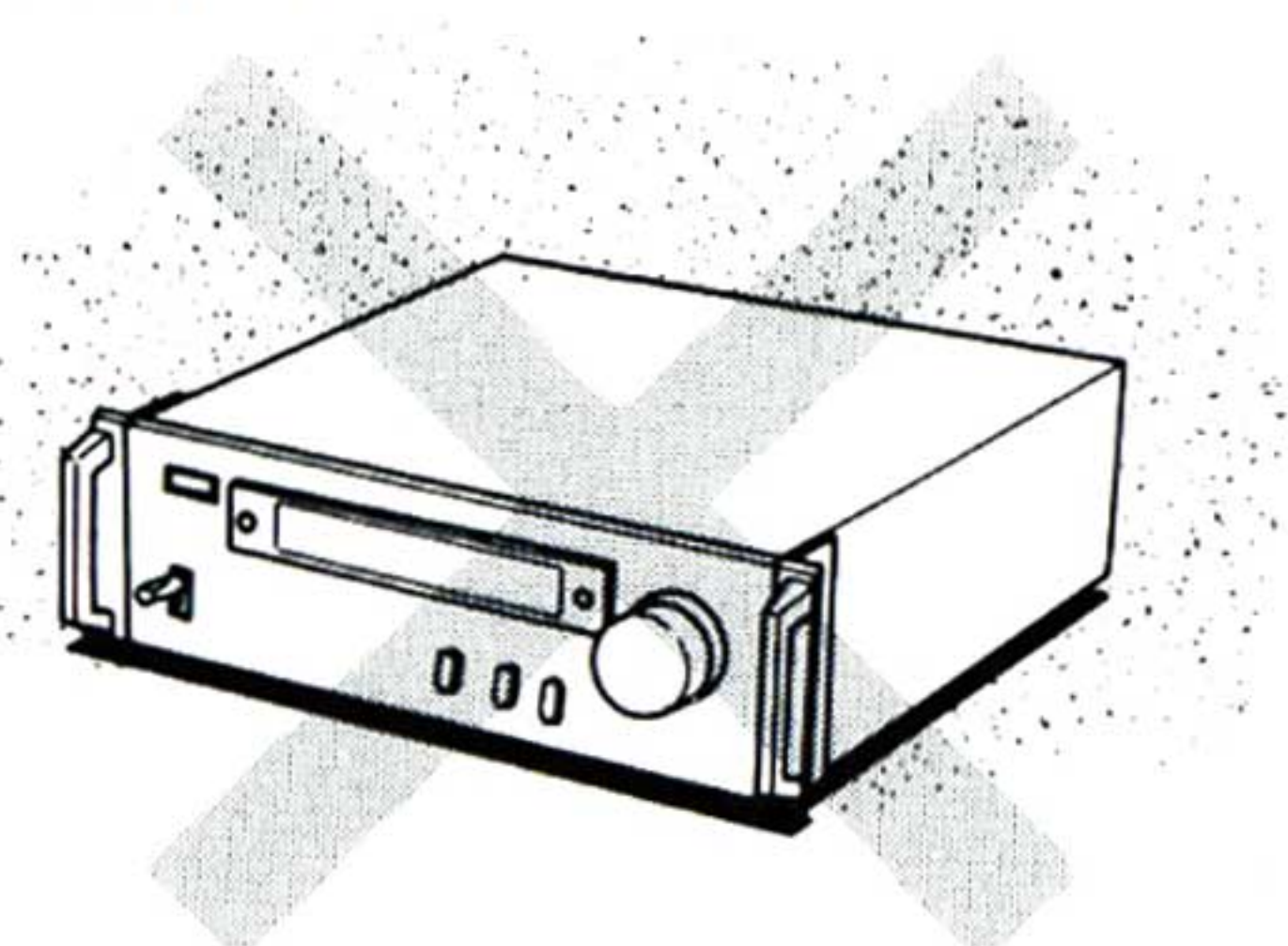
Following the instructions will allow the tuner to make the most of its performance and ensure many long years of use.

Bear in mind the following suggestions:

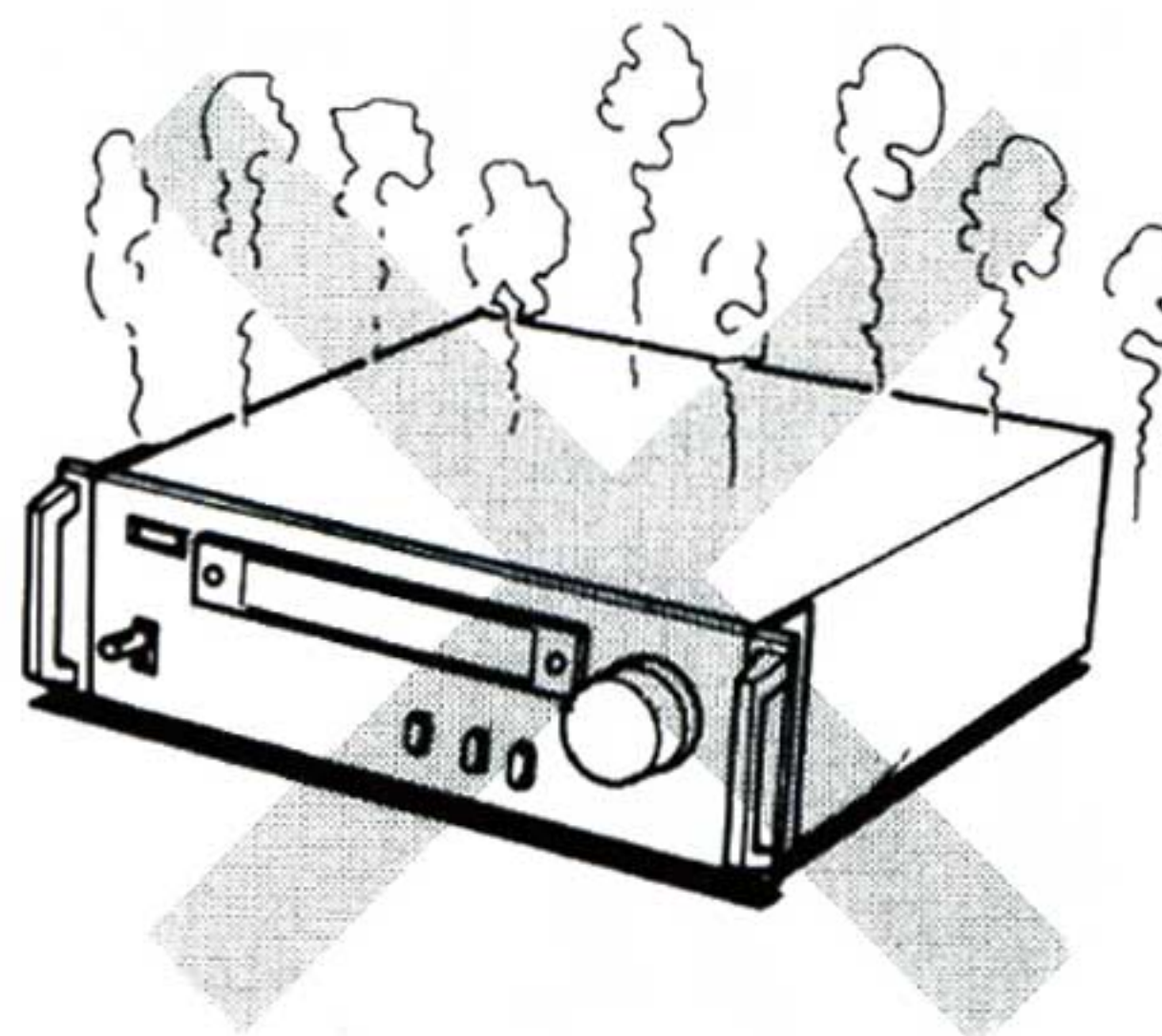
1. Use or storage in extremely cold locations may impair its performance.



2. Use or storage in a dusty or sandy place will cause deterioration of performance.



3. Avoid placing the tuner near a stove or similar appliance or in a location where the temperature is high.



- **Handling the AC cord**

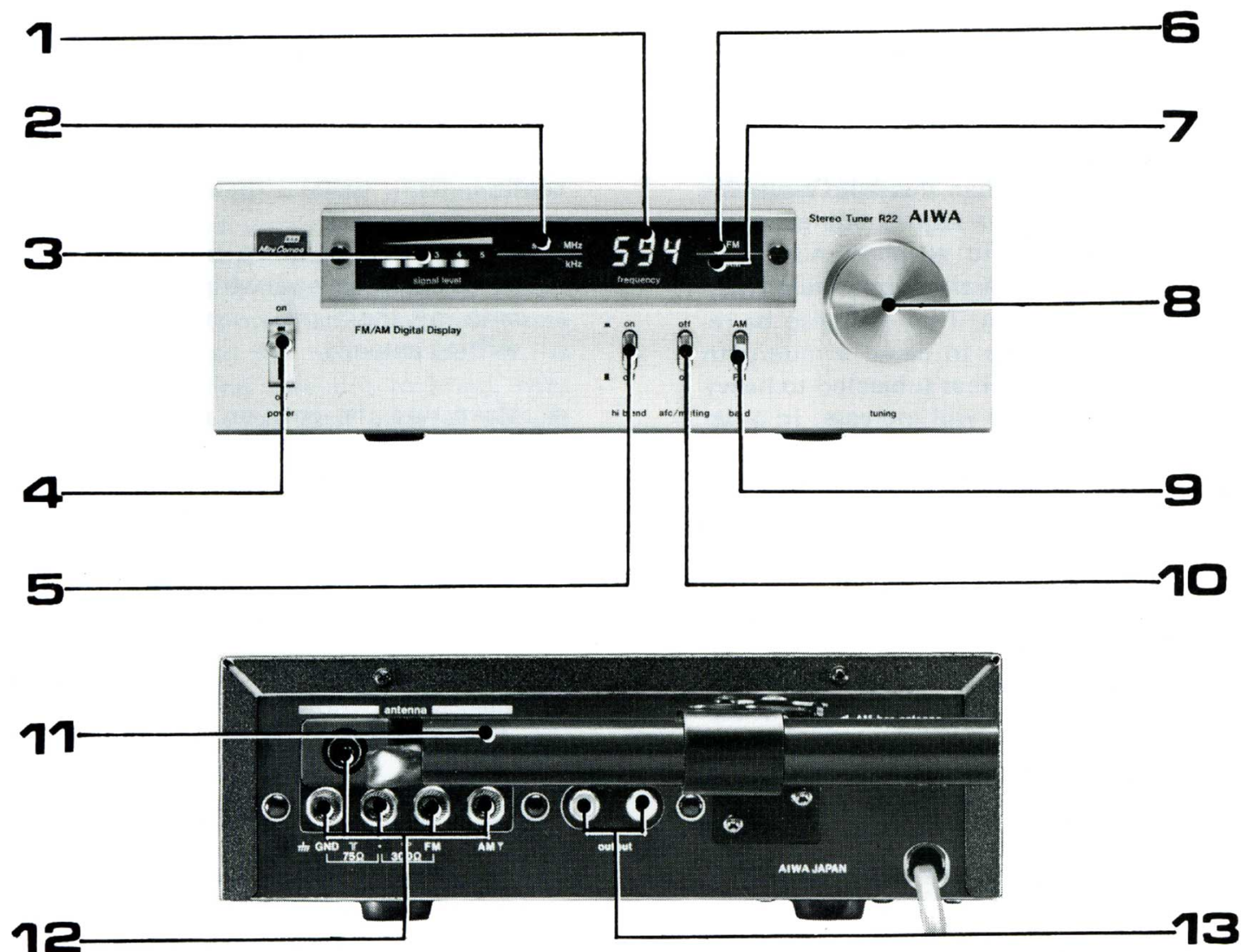
When connecting and disconnecting the AC cord, take hold of the plug section and not the cord. Pulling the cord may cause damage to the cord and create hazards.

- **Preventing electric shocks and fire hazards**

If the AC cord is broken or damaged, or if the wires are exposed, contact your dealer or an AIWA service station and have it replaced or repaired.



## NAMES OF PARTS AND THEIR FUNCTIONS



### ① Digital Frequency Indicator

This indicates the frequency of the broadcast station in three or four digits.

### ② Stereo Indicator

This comes on when an FM stereo broadcast is being received.

### ③ Signal Level Indicator

This comes on in accordance with the strength of the signals which are received.

### ④ "Power" Switch

### ⑤ "Hi-blend" Switch

When this switch is set to "on" during a stereo broadcast where the signals are weak and contain considerable high-frequency noise, the noise can be effectively suppressed.

### ⑥ FM Indicator

This comes on when the "band" switch is set to the FM position.

### ⑦ AM Indicator

This comes on when the "band" switch is set to the AM position.

### ⑧ Tuning Knob

This is used to select the broadcast stations on the dial.

### ⑨ "Band" Switch

This is used to select the FM and AM bands.

### ⑩ "AFC/muting" Switch

The muting switch which suppresses inter-station noise is coupled with the AFC ON/OFF selector switch.

### ⑪ AM Bar Antenna

This is the AM antenna.

### ⑫ Antenna Terminals

These are used for connecting an external antenna.

### ⑬ "Output" Jacks

These jacks are used for connections to the input jacks (tuner) of the preamplifier.



# ANTENNAS

## FM Antennas

The tuner and the antenna play important roles in determining the quality of the sound broadcast from an FM station. Other factors affecting the quality are noise and the multipath effect which may be caused when the radio waves are reflected off mountains or high buildings.

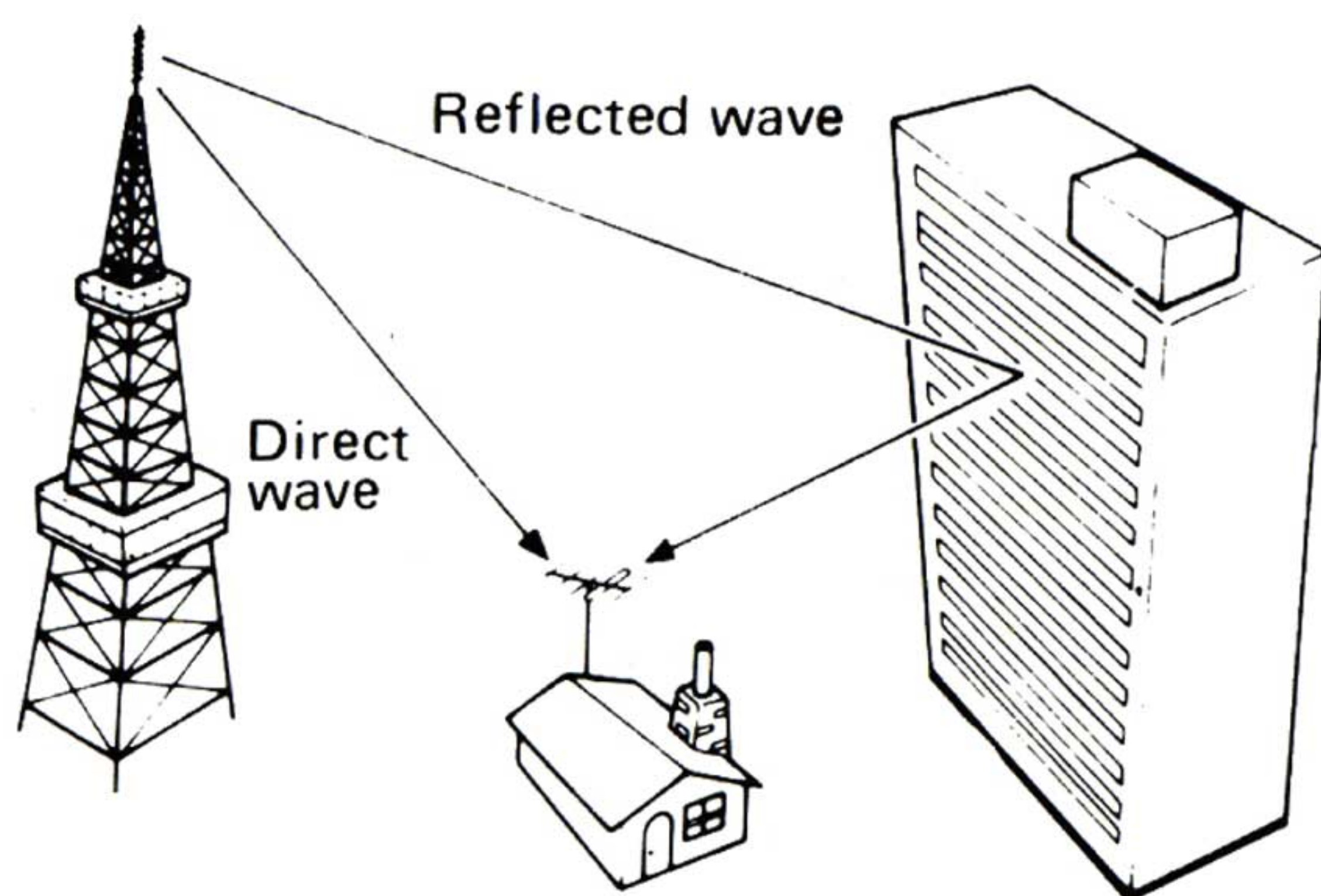
FM radio waves tend to advance in straight lines, and they will therefore be weak when blocked by high building. They will also be re-reflected by the buildings to cause a multipath effect. Furthermore, in areas subjected to heavy automobile traffic, noise will increase. In order to allow the tuner to perform to the best of its ability, it is important to choose an antenna suitable for the area of reception.

### Multipath effect

The multipath effect is caused when radio waves are reflected by buildings or mountains and they are picked up by the antenna together with radio waves received directly from the transmitting station.

With a television set, this phenomenon is known as ghosting and the pictures appear to be superimposed onto the screen. With FM broadcasts, this phenomenon increases distortion and impairs the sound quality.

This multipath effect is particularly a problem in big cities where there are many high buildings. To counter this effect, it is necessary to select an antenna with sharp directionality, and install it in a direction where there is minimal interference.



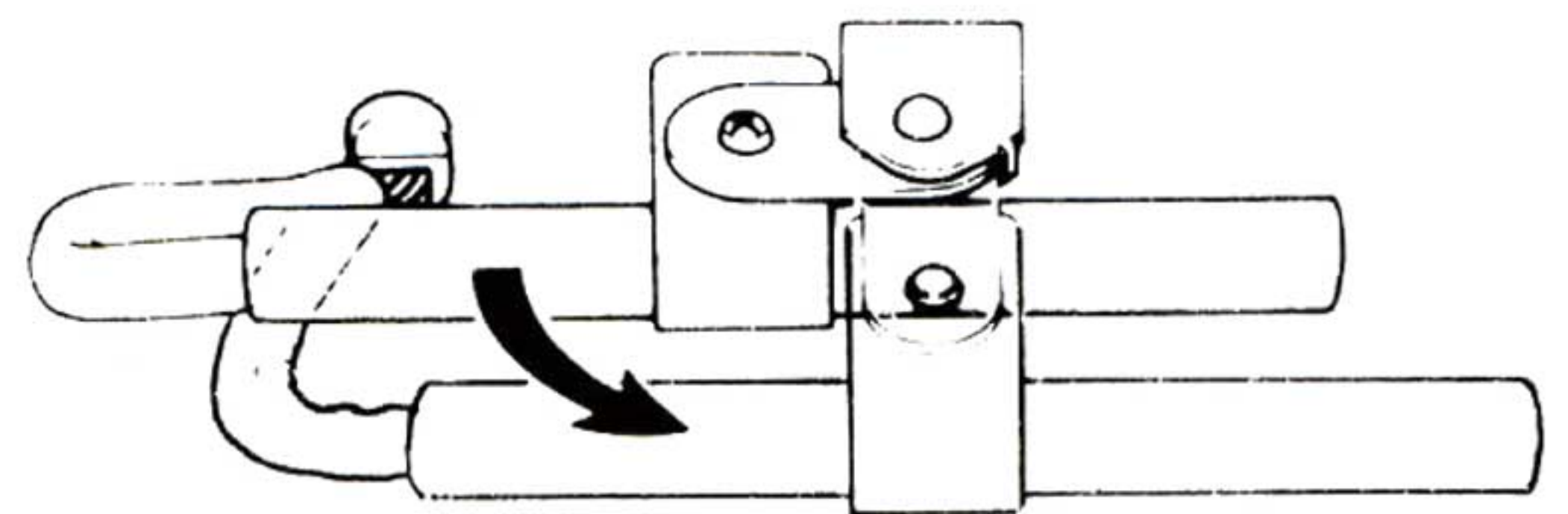
### Antenna installation location

A number of conditions must be met when installing the antenna. Vary its position and direction; bear in mind the items below and find the position displaying the optimum reception.

- Find a position which is not overshadowed by a building and which is in the direct path of the signals sent from the transmitting antenna.
- Make sure the position is as distant as possible from a road in order to avoid the ignition noise of automobiles.
- Install the antenna as far away as possible from any other antennas (for instance, the TV antenna).
- Avoid installing the antenna on a galvanized sheet iron roof. If this is unavoidable, make sure the antenna is at least 2 meters above.

### AM antennas

Pull the rear panel bar antenna out straight and set so that it is horizontal with the tuner. In this position, the sensitivity will be improved and noise reduced.





## CONNECTIONS

### Antenna terminals

There are two types of antenna cords: the 300 ohm twin-lead feeder and the 75 ohm coaxial cable. Either may be used with this tuner.

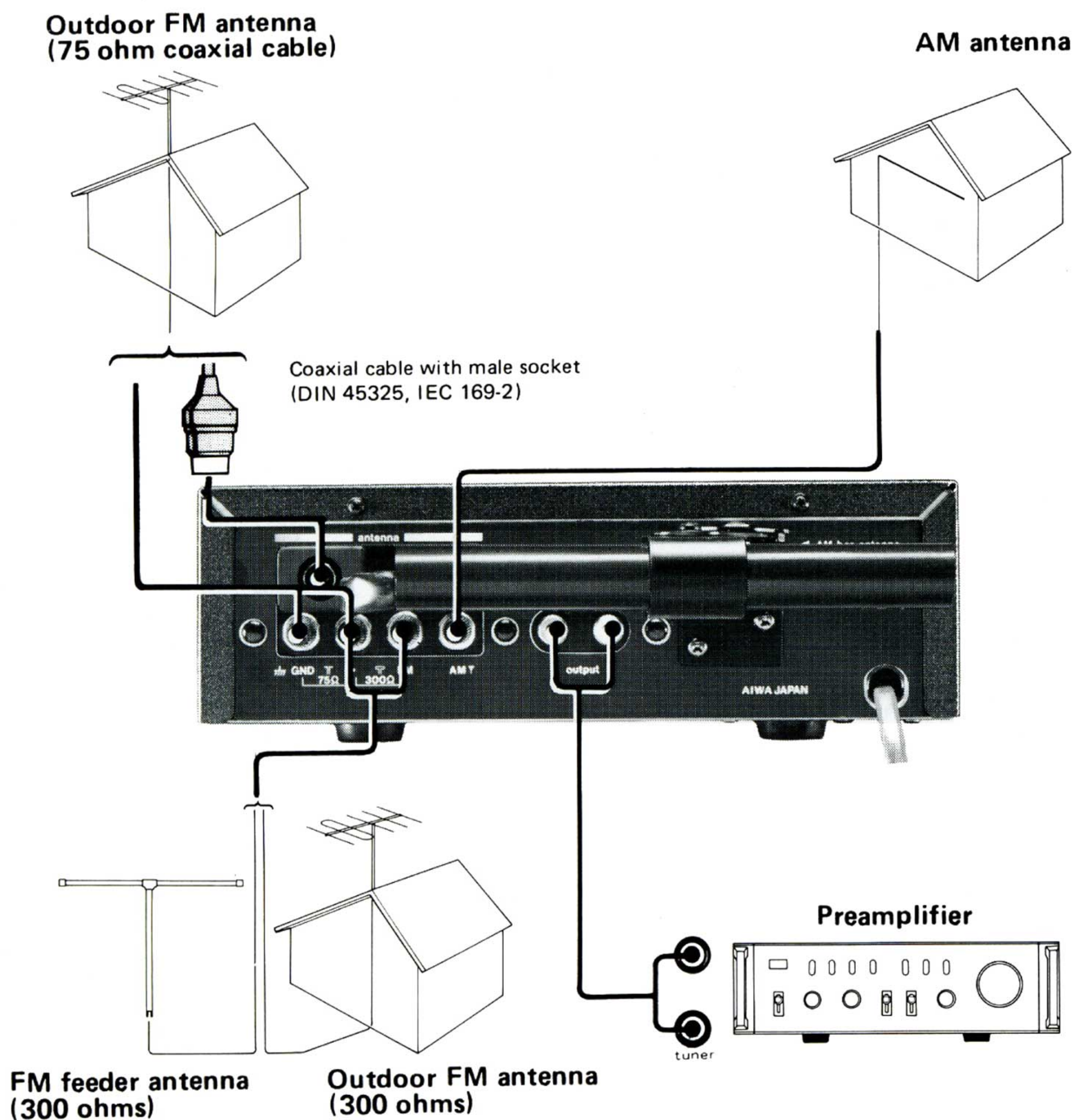
This tuner comes with a feeder antenna but it is recommended that you install an FM antenna outdoors so that the tuner displays its performance to the full. When installing a feeder antenna, connect it to the 300 ohm antenna terminals and spread the two ends out in the shape of a T, taking care not to bring them into contact with any metal such as curtain rails. Arrange them to find the optimum sensitivity.

### AM antenna

If reception is poor with the built-in bar antenna, connect an AM antenna to the AM antenna terminals.

### "Output" jacks

Connect the "output" jacks on this tuner to the "tuner" jacks of the preamplifier using the stereo pin cords.





## AFC-MUTING SWITCH

### What is muting?

When the muting switch is set to ON when a station is being tuned, the irritating hiss between stations known as interstation noise is muted, or suppressed.

### What is AFC?

The AFC (automatic frequency control) circuit automatically adjusts the changes in the reception frequency caused by variations in the temperature, for instance, and it serves to provide optimum reception.

### Using the AFC/Muting switch

Normally, the AFC/muting switch is kept at "on".

However, if the signals are weak during reception or if a station with strong signals is adjacent to the station you want to tune and is making reception difficult, set the switch to "off".

When this switch is at "off", remember that interstation noise will be heard during detuning, so turn the volume control down.

## SIGNAL LEVEL INDICATOR

The LEDs will come on in accordance with the signal strength when a radio program is being tuned: the more LEDs come on, the better the reception.

## DIGITAL TUNING

The frequency of the station whose signals are being received is indicated accurately by the digital display. This allows you to tune in accurately to the frequency of the broadcasting station. With AM reception, the band is wide; thus the same high standard of tuning accuracy is provided even when the final digit varies  $\pm 1$  or  $\pm 2$  from the broadcasting station's frequency.

## HI-BLEND CIRCUIT

When receiving an FM stereo program from a station whose signals are weak, the noise in the high-frequency range is often irritating. The hi-blend circuit serves to effectively suppress this noise.

The circuit mixes the signals of the midrange and high range, where the noise is most pronounced, it cancels out the noise components and upgrades the signal-to-noise ratio. This, however, reduces the high-range separation somewhat.

The circuit makes it possible to listen to stereo programs from stations transmitting signals with a poor signal-to-noise ratio by suppressing the noise without sacrificing the stereo effect. This circuit will not work with AM broadcasts.

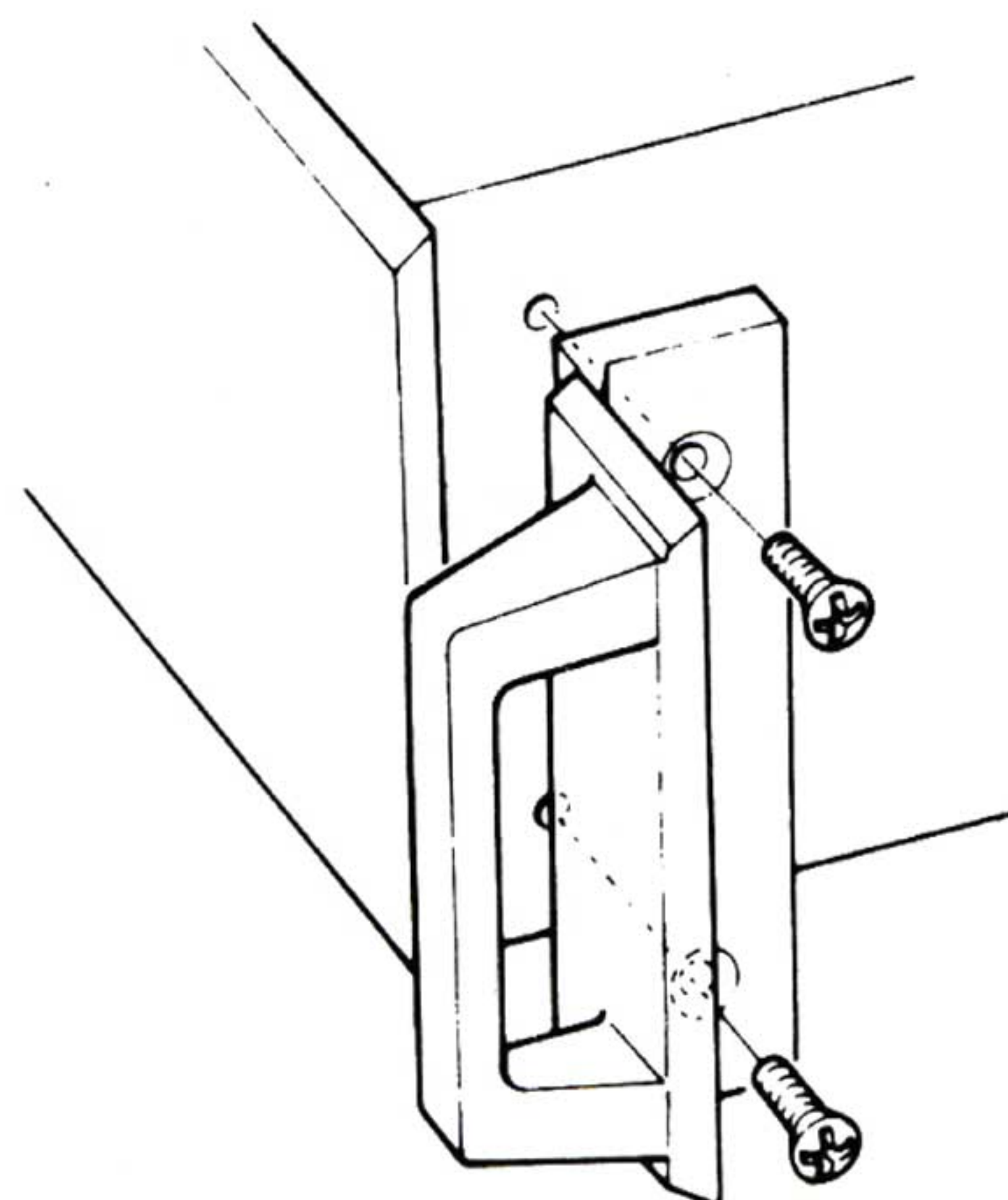
## CLEANING THE TUNER

When the cabinet has become dirty or stained, dip a piece of gauze or soft cloth into a diluted solution of neutral cleanser and wipe clean. Never use thinners or benzine since they will damage the surface of the cabinet.

## MOUNTING THE HANDLES (OPTION, AH-22Y)

Handles (option) can be mounted on this tuner. Attach at the sides of the model as shown in the figure.

\* Handles are provided with model K1





SPECIFICATIONS

Frequency range	AM: 525 kHz to 1,605 kHz FM: 87.5 MHz to 108 MHz
<FM section>	
Usable sensitivity (IHF)	1.9 $\mu$ V (MONO)
S/N 50 dB sensitivity	43 $\mu$ V (STEREO)
Signal-to-noise ratio (100% 1 mV)	70 dB (STEREO)
Total harmonic distortion (1 kHz)	0.1% (MONO) 0.25% (STEREO)
Capture ratio	1.5 dB
Alternate channel selectivity	70 dB
Stereo separation	45 dB at 1 kHz
Frequency response	$\pm$ 0.5 dB from 50 Hz to 10 kHz $\begin{smallmatrix} +0.5 \\ -1.5 \end{smallmatrix}$ dB from 30 Hz to 15 kHz
Image interference	55 dB
AM suppression ratio	55 dB
Subcarrier suppression ratio	60 dB
Muting operation level	10 $\mu$ V
Output level	150 mV
Output impedance	2.35 k $\Omega$
Harmonic spurious	80 dB
<AM section>	
AM sensitivity	20 $\mu$ V (IHF)
Bar antenna	250 $\mu$ V/m
Distortion	0.9%
Signal-to-noise ratio	50 dB (30%, 1 mV input)
Image ratio	45 dB
Selectivity (9 KHz)	30 dB
Semiconductors used	4 ICs, 24 transistors, 2 FETs, 21 diodes, 8 LEDs 4-LED digit numerical display
Power requirements	240 V 50/60 Hz
Power consumption	8 W

Dimensions	210 (W) x 71 (H) x 223.5 (D) mm
Weight	2.0 kg
Accessories	Stereo pin cords FM feeder antenna Handles (K1 model only)

- Specifications and design are subject to change without notice since the policy of this company is one of continuous improvement.



## **IMPORTANT**

The wires in this mains lead are coloured  
in accordance with the following code:

Blue:	Neutral
Brown:	Live

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows.

The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.

The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

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# **AIWACO.,LTD.**

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