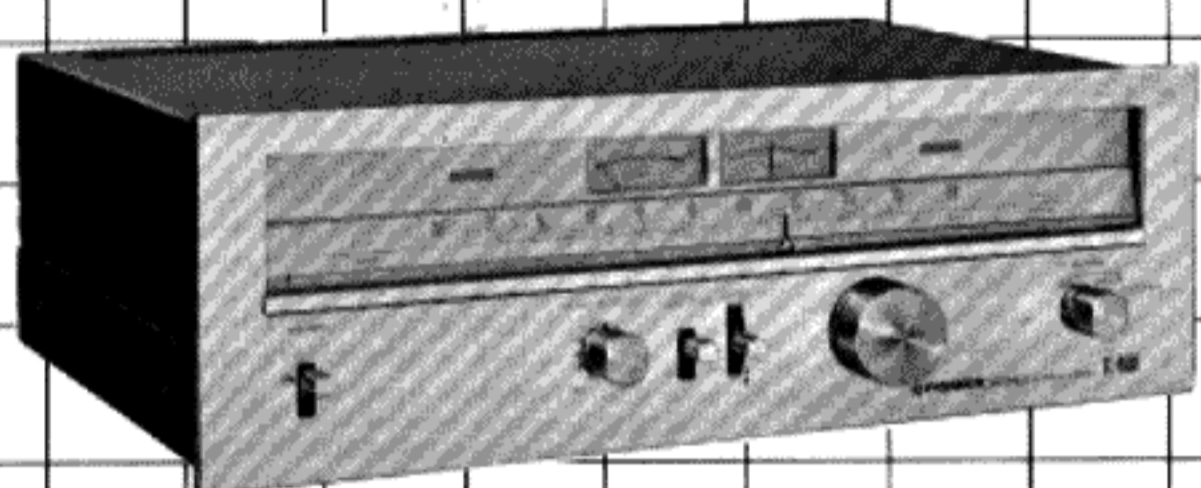


STEREO TUNER

# TX-9500

OPERATING INSTRUCTIONS

KCU



 **PIONEER**

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

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## FEATURES

### 5-gang Variable Capacitor Front End

The high frequency amplifier 2 stage front end employs a 5-gang variable capacitor and dual gate MOS FET. Imaging, IF, spurious and other types of interference rejection are greatly advanced. The local oscillator circuit is also provided with a buffer amplifier for always stable FM reception even in high field strength areas.

### Newly Developed Ultra Wideband Linear Phase Detector

A newly developed delay type ultra wideband linear phase detector is employed. Coupled with the flatness of the group time delay characteristic of the IF amplifier circuit, it results in excellent linearity and high fidelity FM reception.

### Wideband High Selectivity IF Amplifier

Seven integrated circuits and 4 stringently selected dual element ceramic filters are utilized in the IF amplifier. The circuitry expands bandwidth, controls phase characteristics and compensates for group delay. High selectivity and high AM suppression are also obtained from the strong limiter operation. Ideal stereo reproduction can thus be performed without interference from nearby stations.

### Recording Level can be Checked

The built-in fundamental signal oscillator (level corresponds to 50% FM modulation) allows the recording level to be checked. It can be employed regularly for distortionless recording of desired FM programs.

### Magnificent FM Reception

An IC phase locked loop (PLL) system is employed in the stereo demodulator. This is not affected by temperature fluctuations or aging and results in superb frequency response and high separation covering a wide bandwidth. High and low frequency noise is cut by filters, so excellent results can be obtained recording of FM programs.

### High Performance IC AM Tuner

Greatly improved imaging and IF rejection are provided by the tuned type high frequency amplifier circuit employing a 3-gang variable capacitor. The AM section is completely IC, with a precision ceramic filter for enhanced selectivity and frequency response. Balanced type mixer circuit and high performance AGC circuit assure stable reception with low spurious interference and distortion, even in strong field areas.

### Human Engineered Panel Layout

Tuning is easy, aided by the long 250mm tuning scale, large size meters, and positive-touch controls. The handsome front panel design of the new Pioneer stereo tuner attests to its position of leadership in the stereo component field.

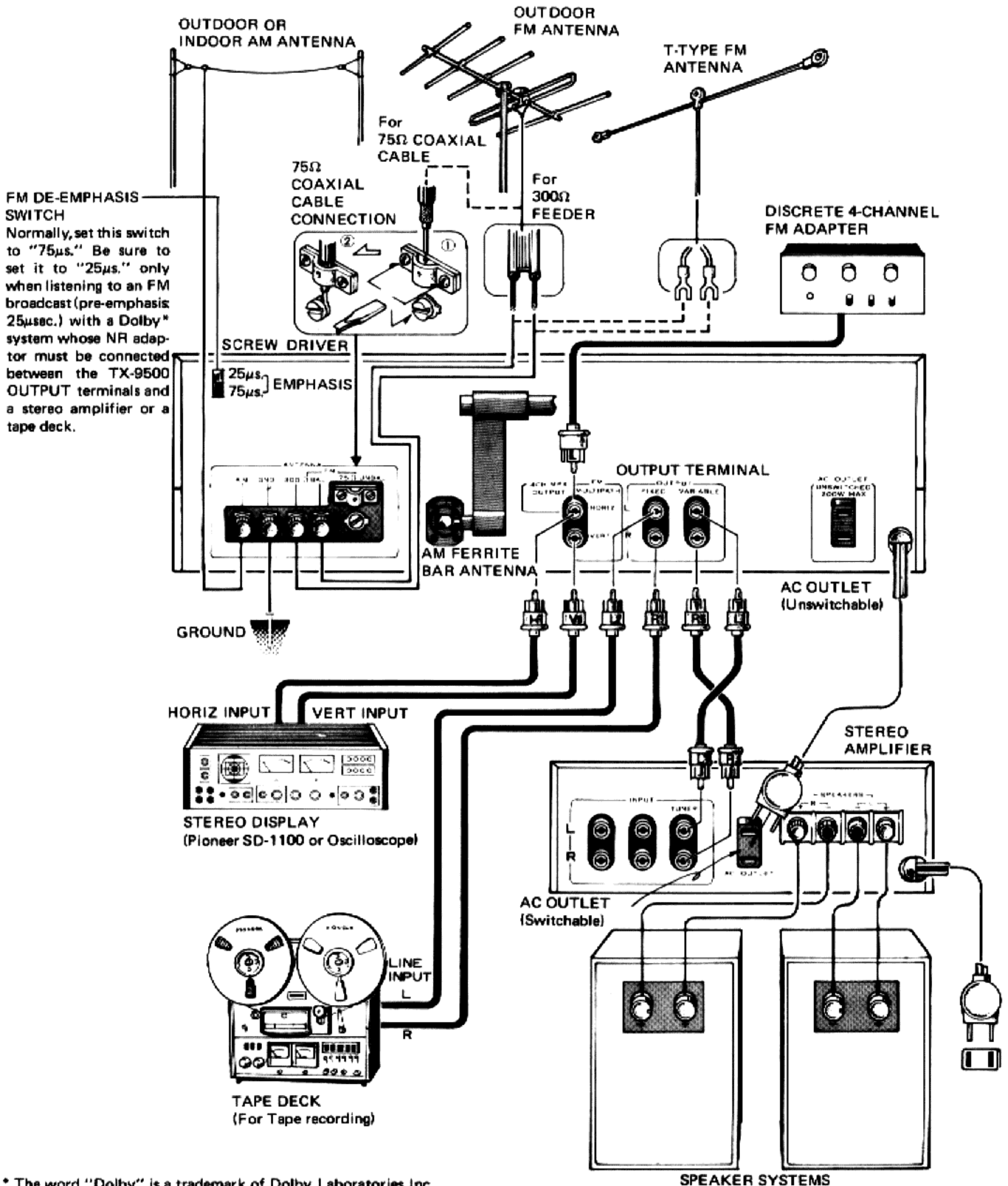
## INSTALLATION CAUTIONS

Avoid installing the TX-9500 in locations such as the following.

- In direct sunlight, near radiators or other heat sources.
- Above a large heat producing power amplifier, or near an amplifier power transformer.
- Humid or dusty surroundings.
- Unlevel or unstable supports, or where subject to vibration.

Mutual interference can be caused if located too close to an AM radio or TV set, allow for adequate spacing.

# CONNECTION DIAGRAM



\* The word "Dolby" is a trademark of Dolby Laboratories Inc.



# CONNECTIONS

## CONNECTION TO STEREO AMPLIFIER

Employ the accessory cords to connect the OUTPUT (VARIABLE) jacks of the TX-9500 with the tuner input jacks of the stereo amplifier, as shown in Fig. 1.

## TAPE DECK CONNECTION

Programs can be recorded by connecting the TX-9500 directly to a tape deck.

As shown in Fig. 2, connect the OUTPUT (FIXED) jacks of the TX-9500 with the recording input (LINE INPUT) terminals of the tape deck.

### Connection Notes

- Observe the L & R jacks of the TX-9500 and stereo amplifier (or tape deck), and be sure to connect L to L, and R to R.
- Insert connecting plugs firmly. Loose connections can cause absence of sound or noise.

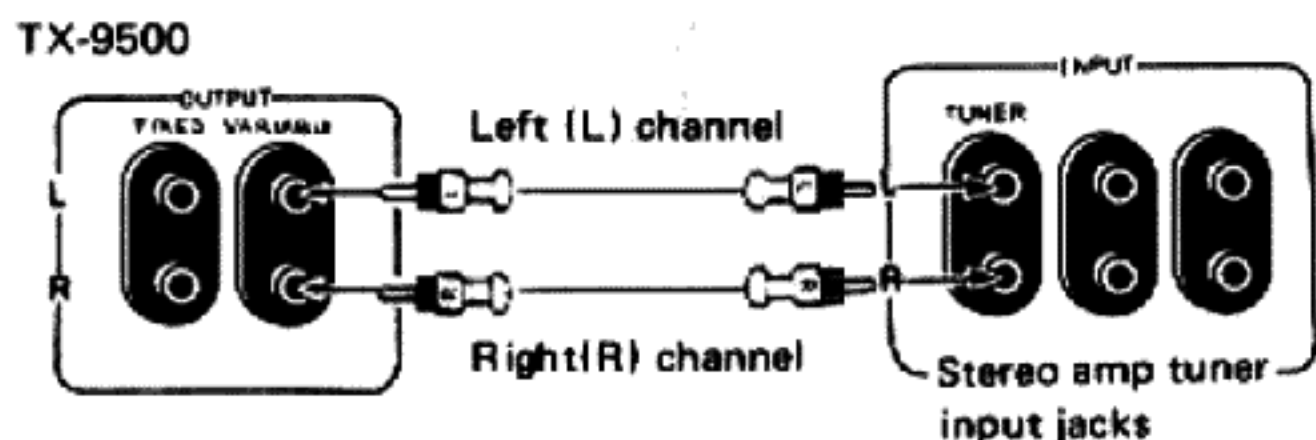


Fig. 1

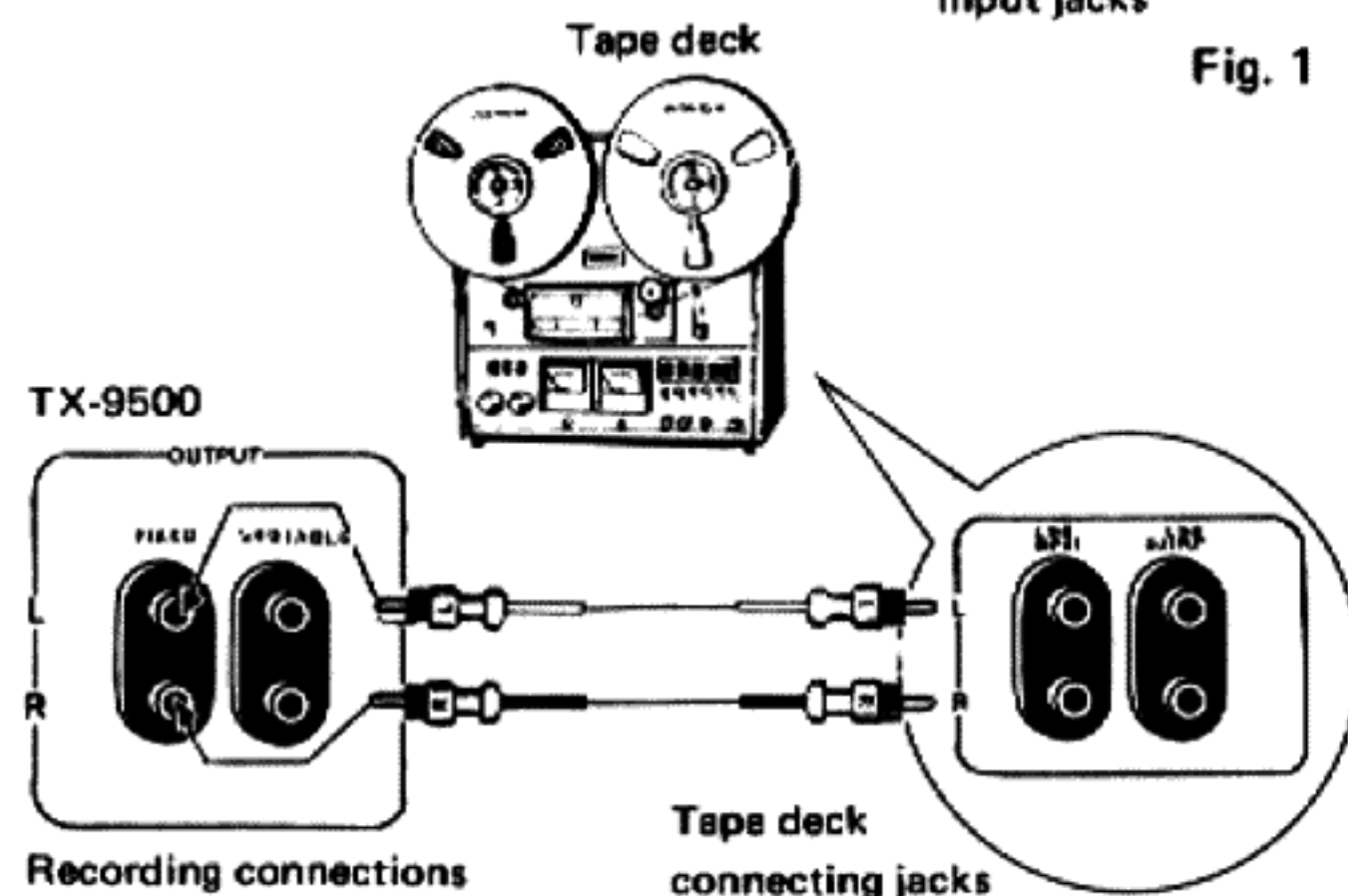


Fig. 2

**NOTE:**  
The level at the OUTPUT (FIXED) jacks cannot be adjusted.

# ANTENNA & GROUND CONNECTIONS

## FM BROADCAST ANTENNA

FM broadcast signals are sharply affected by intervening mountains, buildings, and inside metal framed structures. The signals are both weakened and reflections can cause multipath reflection, resulting in deteriorated reception. Care is thus needed in selecting an appropriate FM antenna to match surrounding conditions and field strength. See P. 8 description on reducing multipath interference.

### FM Outdoor Antenna

Normally, install antenna as follows.

- Connect antenna feeder wire to the 300Ω antenna terminals of the TX-9500 as shown in Fig. 3.
- While listening to broadcasts, as described on P. 7, install the antenna and determine best location for optimum reception. Secure antenna firmly.

### Connection with Coaxial Cable

In urban locations where traffic is heavy, industrial zones, or when nearby high voltage power lines are present, an ordinary FM antenna may not be adequate to prevent noise.

The problem can often be solved by using a special FM antenna and 75Ω coaxial cable to connect it to the TX-9500. Connect the cable to the 75Ω antenna terminal as shown in Fig. 4.

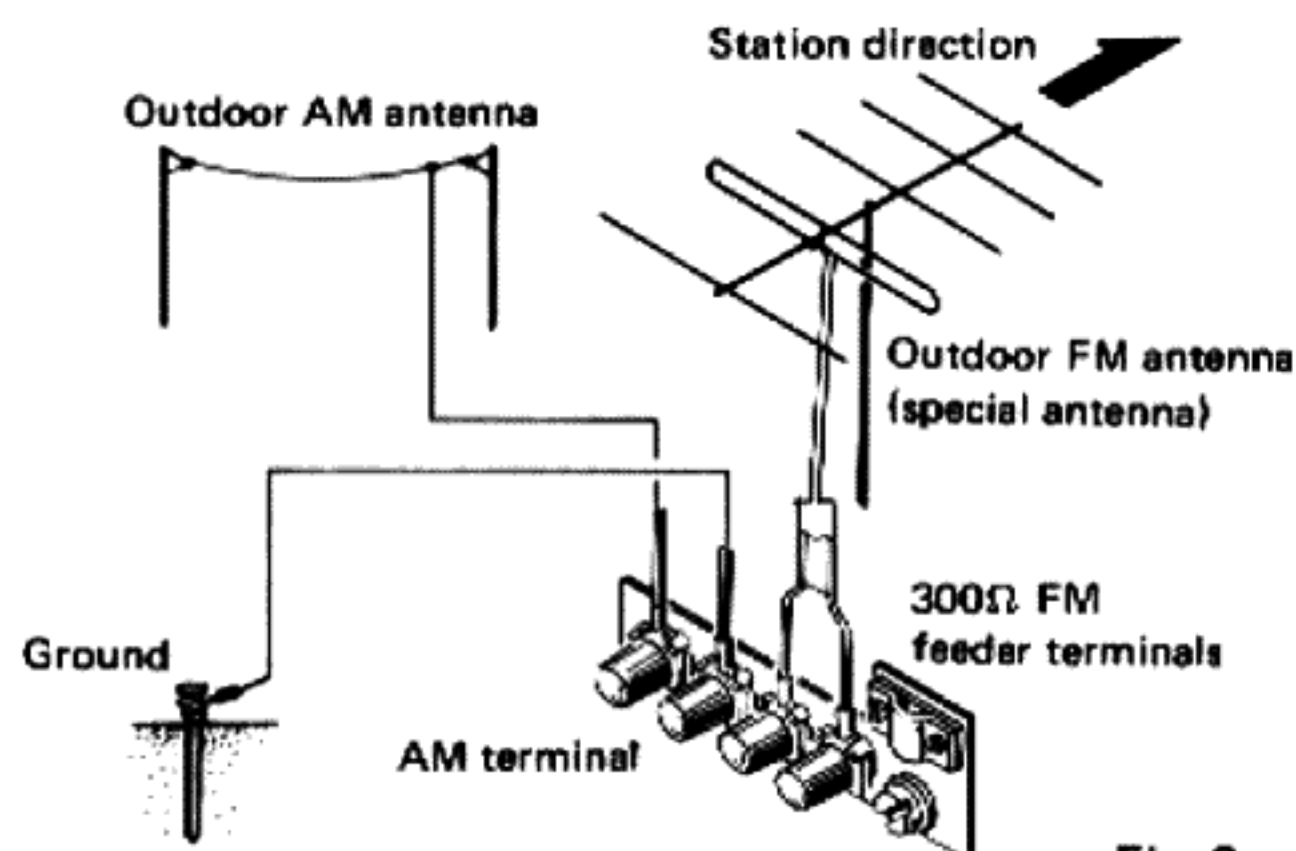
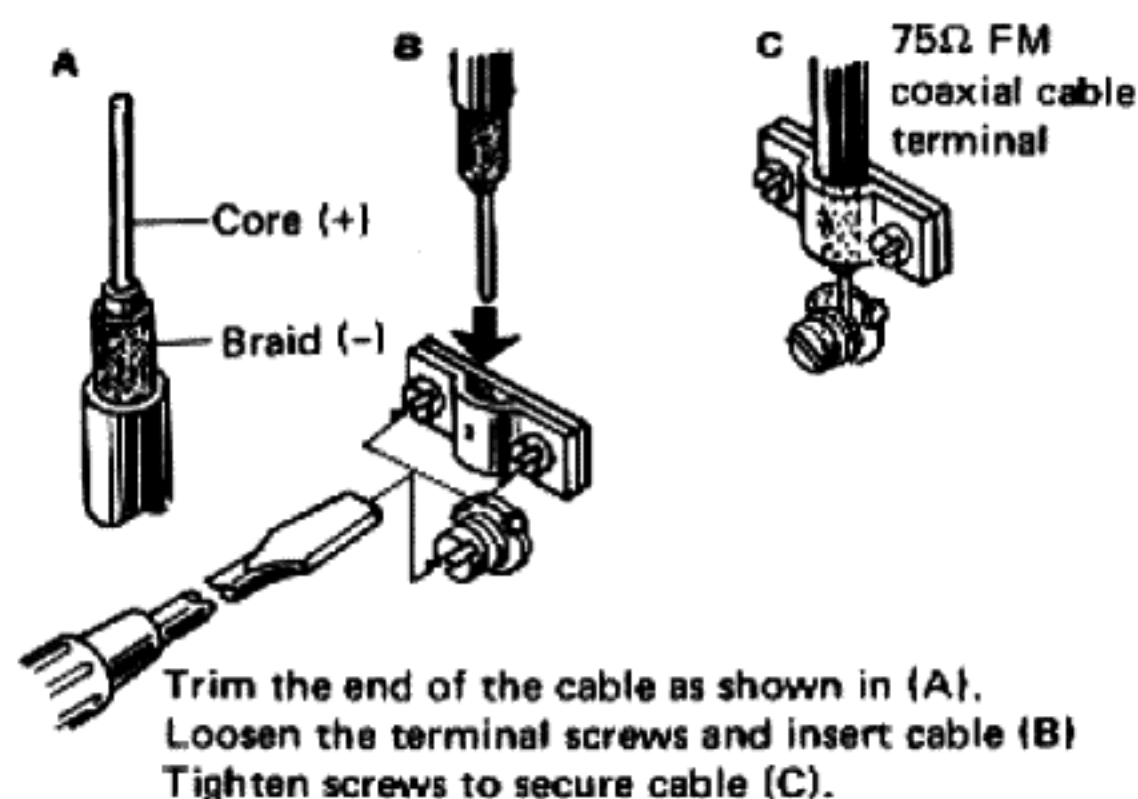


Fig. 3



Trim the end of the cable as shown in (A).  
Loosen the terminal screws and insert cable (B).  
Tighten screws to secure cable (C).

Fig. 4

### T-type Antenna

When stations are nearby, and in wooden frame buildings, etc. where FM signals are strong, the accessory T-type antenna can be employed.

- As shown in Fig. 5, connect the T-type antenna to the 300Ω antenna terminals. Spread the 2 arms of the antenna horizontally and while listening to an FM station, position them for best reception. The antenna can then be taped to a wall or ceiling.

**NOTE:**

Consult audio dealer for detailed information on FM antennas and coaxial cable installations.

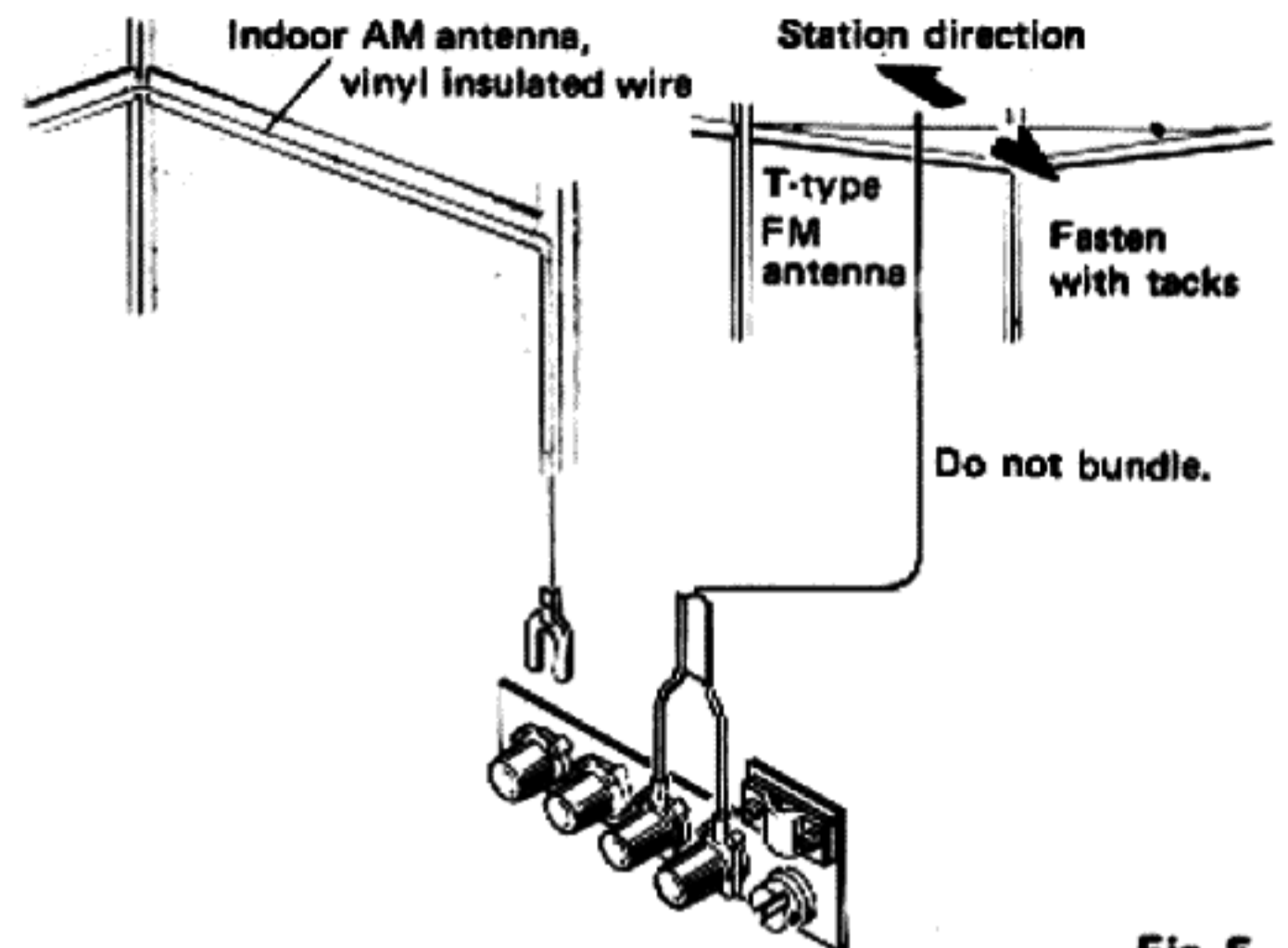


Fig. 5

### AM BROADCAST ANTENNA

Normally, position the ferrite bar antenna (Fig. 6) for best reception while listening to an AM station.

### AM Indoor Antenna

If reception is difficult with the bar antenna, an indoor AM antenna can be erected with vinyl insulated wire as shown in Fig. 5.

### AM Outdoor Antenna

For optimum AM reception, an outdoor AM antenna using vinyl insulated wire can be erected as shown in Fig. 3.

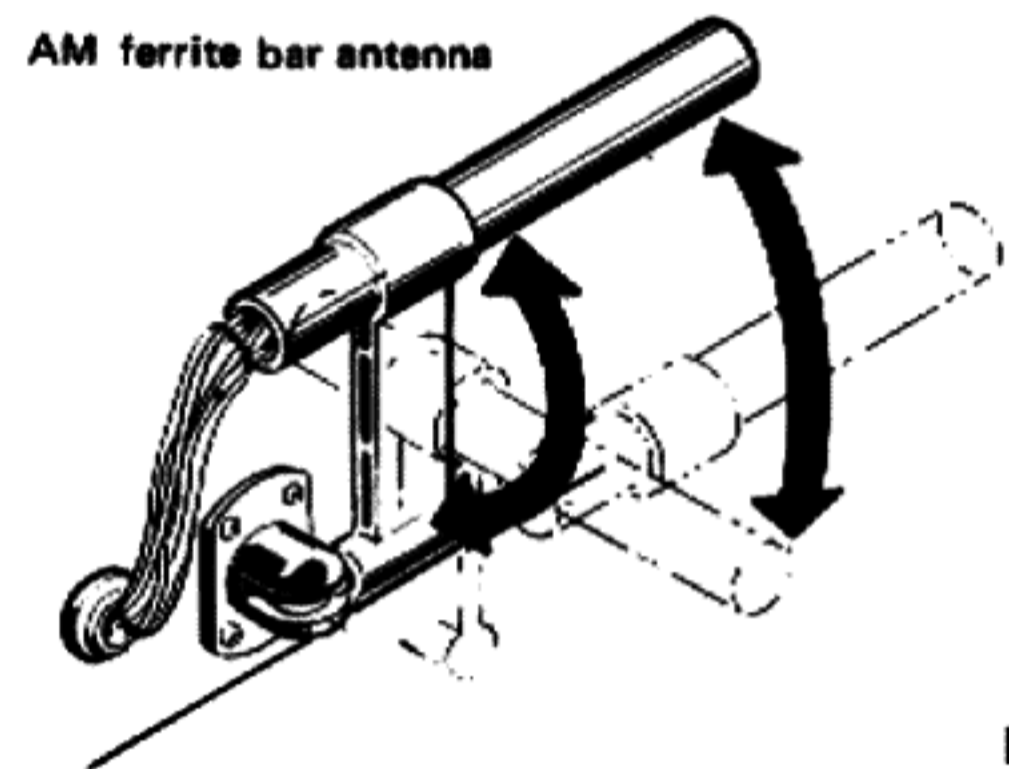
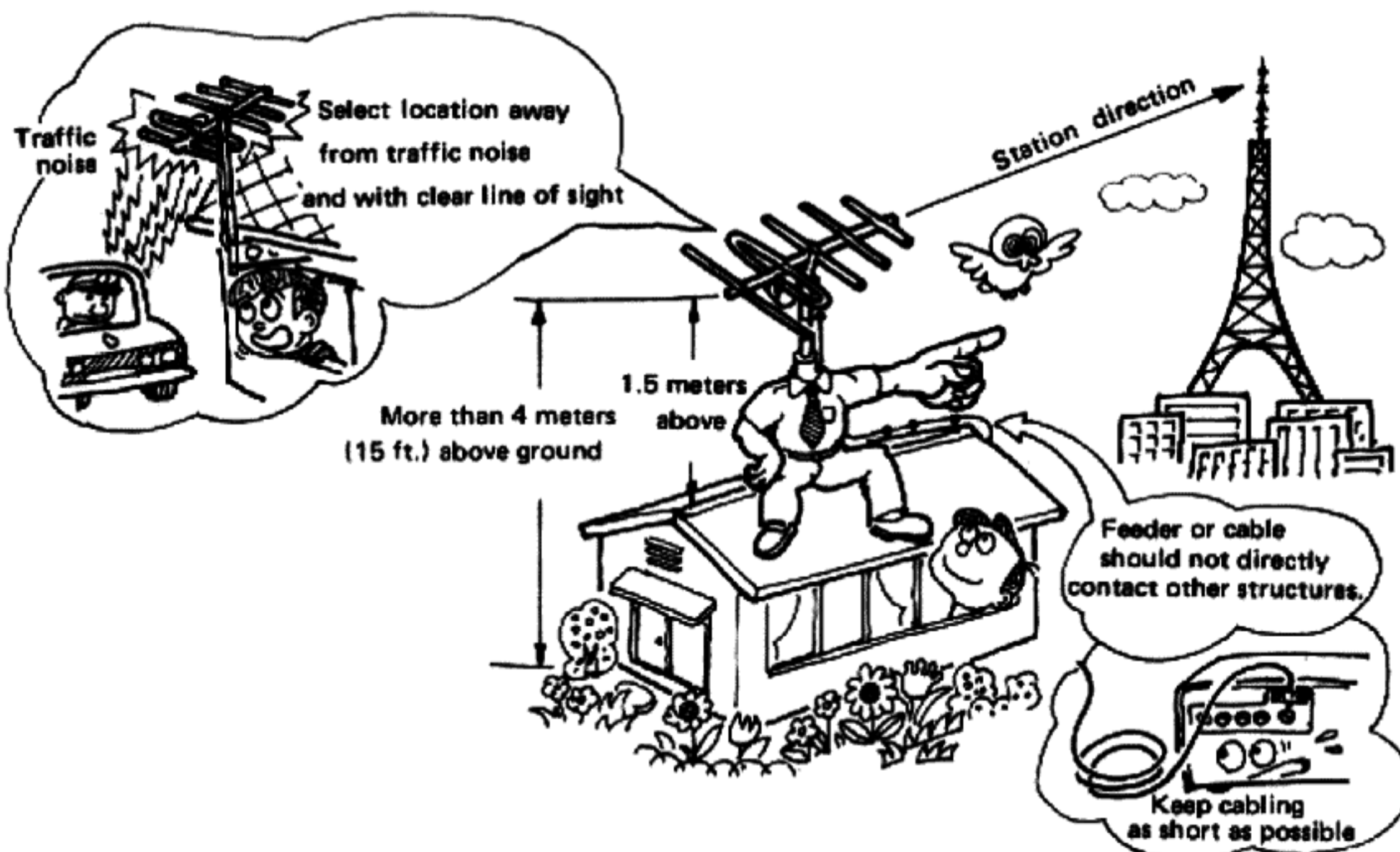


Fig. 6

### GROUNDING

For maximum safety and noise reduction, connect the GND terminal to an earth ground (Fig. 3).

### FM ANTENNA INSTALLATION NOTES



# FRONT PANEL FACILITIES

## SIGNAL METER

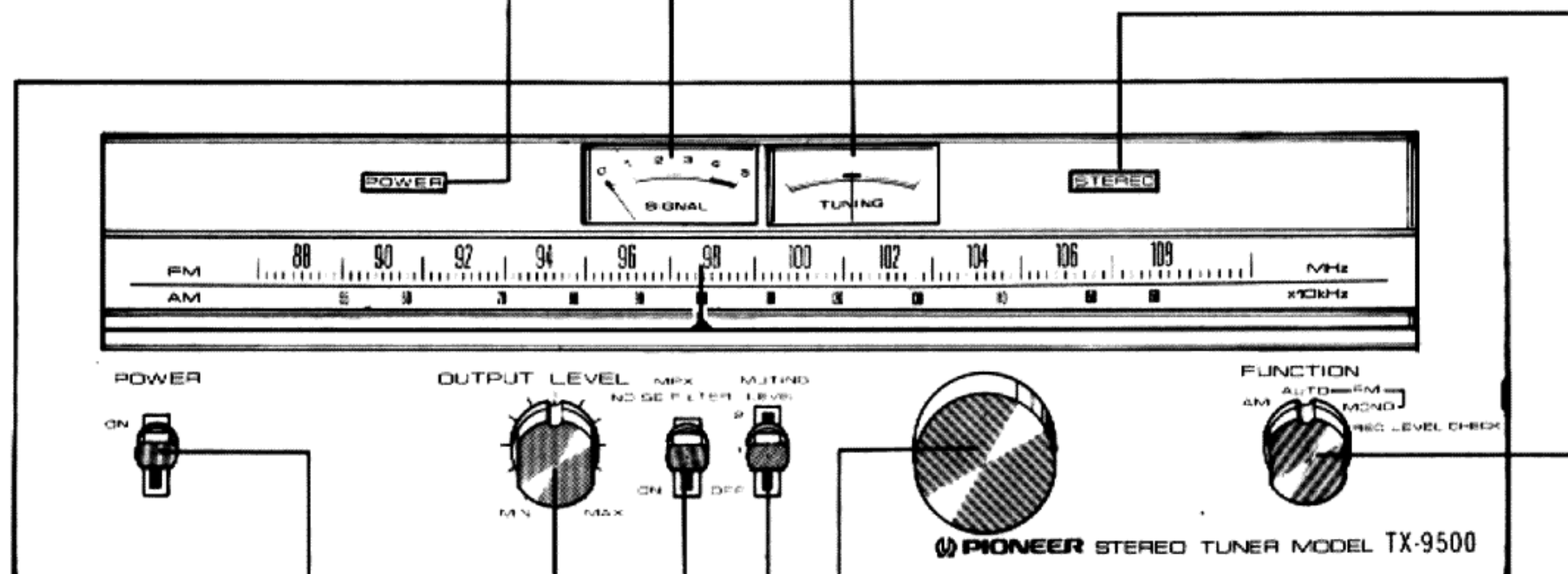
Tune for maximum deflection toward the right when selecting AM or FM station.

## TUNING METER

When selecting FM stations, tune for maximum rightward deflection of the SIGNAL meter and center indication of this meter.

## PILOT LAMP

Lights to indicate AC power ON.



## POWER SWITCH

Switch for turning AC power ON and OFF.

## OUTPUT LEVEL CONTROL

Adjusts the output level at the OUTPUT (VARIABLE) jacks. Clockwise rotation increases the level. See additional description on P. 9.

## TUNING KNOB

Knob for selecting stations. Tune for optimum reception while observing the SIGNAL meter for AM stations, and both SIGNAL and TUNING meters for FM stations.

## MUTING LEVEL SWITCH

Eliminates bothersome inter-station noise when tuning FM stations.

- 2: For receiving only strong stations
- 1: When desired station is suppressed by setting 2. Set to this position normally.
- OFF: For very weak reception areas.

See additional explanation on P. 8.

## MPX NOISE FILTER SWITCH

Comparatively high frequency noise incurred when receiving weak FM stereo signals can be cut by setting this switch to ON. In this case, however, there will be some loss of stereo separation.



## BROADCAST RECEPTION

### FM STEREO INDICATOR

With the FUNCTION switch set to FM AUTO, the STEREO inscription lights while an FM stereo station is being received.

### FUNCTION SWITCH

Selects type of reception.

- AM: For receiving AM stations
- FM AUTO: For FM stereo reception. Automatically receives monophonically during FM monophonic broadcasts. The STEREO indicator lights while FM stereo is being received.
- FM MONO: For monophonic FM reception
- REC LEVEL CHECK: Signal (level corresponding to 50% FM modulation) is produced at approximately 1.3 second intervals for setting the recording level of a tape deck connected directly or through a stereo amplifier.

### FM RECEPTION

1. Set FUNCTION switch to FM AUTO.
2. Set MUTING LEVEL switch to 1. However, if desired station is weak, set it to OFF.
3. Rotate TUNING knob to select station. Tune for maximum deflection of the SIGNAL meter toward the right, and center indication of the TUNING meter. See Fig. 7.

The STEREO indicator lights during FM stereo reception, and does not light during monophonic reception.

- When the stereo amplifier is connected to the OUTPUT (VARIABLE) jacks of the TX-9500, the volume can be adjusted by the OUTPUT LEVEL control.

#### NOTES:

1. With very weak signals, noise may be objectionable when the FUNCTION switch is positioned at FM AUTO. In this case set the switch to FM MONO.
2. If comparatively high frequency noise becomes objectionable during stereo reception positioned at FM AUTO, set the MPX NOISE FILTER switch to ON for easier listening.

### AM RECEPTION

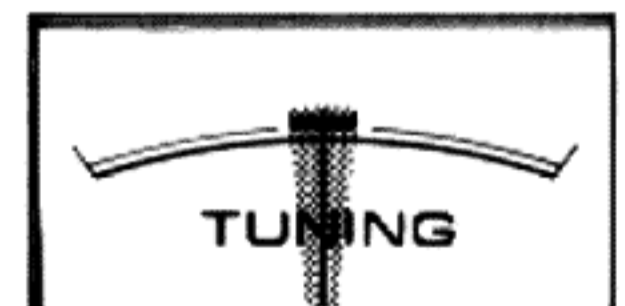
1. Set FUNCTION switch to AM.
  2. Rotate TUNING knob to select station. Observe the SIGNAL meter and tune for maximum deflection toward the right.
- When the stereo amplifier is connected to the OUTPUT (VARIABLE) jacks of the TX-9500, the volume can be adjusted by the OUTPUT LEVEL control.

#### NOTE:

If poor sensitivity or noise occurs during FM or AM reception, inspect the antenna connections by referring to P. 4.



SIGNAL Meter



TUNING Meter  
(Does not deflect during AM reception)

Fig. 7

# EFFECTIVE OPERATION

## MUTING LEVEL SWITCH

As FM stations are being selected, an annoying inter-station noise can be heard when the TUNING knob is turned. The muting circuit eliminates this type of noise and provides easy station selection. With the TX-9500 switching of the muting circuit, operation according to the signal strength is possible.

- Set the switch to 2 when the received signal is exceptionally strong.
- When the received station is not unusually strong, set the switch to 1.
- Set the switch to OFF in extremely weak field strength areas. Although noise will increase, distant, weak stations can then be received.

## REC LEVEL CHECK

On recording of an FM broadcast, the input level to the tape deck changes according to the change in the modulation ratio of the FM broadcast, and the S/N can deteriorate or distortion can occur. Because of this it is necessary to set to the most suitable recording level.

As on recording of an FM broadcast with a tape deck connected to the TX-9500 the standard signal (corresponding to 50% FM modulation) is generated at the same level at left and right output terminals, setting to the most suitable recording level should be done as follows.

1. Connect tape deck.
2. Set the FUNCTION switch to REC LEVEL CHECK. A about 440Hz signal at approximately 1.3 second intervals will then be present at the OUTPUT (FIXED & VARIABLE) jacks.
3. Adjust the tape deck recording level controls for the following ranges.  
Open reel deck: 0 ~ +2dB  
Cassette deck: about -2dB
4. Set the FUNCTION switch to FM AUTO (or MONO) and proceed with recording.

## OUTPUT JACKS & OUTPUT LEVEL CONTROL

The output level at the TX-9500 OUTPUT (VARIABLE) jacks is adjustable (70mV to 2V) by the OUTPUT LEVEL control on the front panel, while the level at the OUTPUT (FIXED) jacks cannot be adjusted.

### Employing VARIABLE Jacks

- This control can be used to match the AM or FM volume with the output levels of other components (turntable, tape deck, etc.) connected to the stereo amplifier.

## 4CH MPX OUTPUT JACKS

Amongst the 4 channel reproduction methods is the discrete 4 channel FM broadcast.

A discrete 4 channel FM adapter can be connected for reproducing this format if it is being broadcast in your area. For detailed information, refer to the adapter operating instructions.



### FM MULTIPATH REFLECTION

This phenomenon is mainly caused as shown in Fig. 8, when the direct signals from an FM station are reflected by objects such as mountains and buildings. Both direct and reflected signals then enter the receiving antenna from different directions. The slight timing difference due to the differing paths results in mutual interference between the signals. Phase distortion, and deteriorated S/N and channel separation affect the received sound.

Minimizing these effects calls for a sharply directional antenna, plus careful selection of the installation site and orientation.

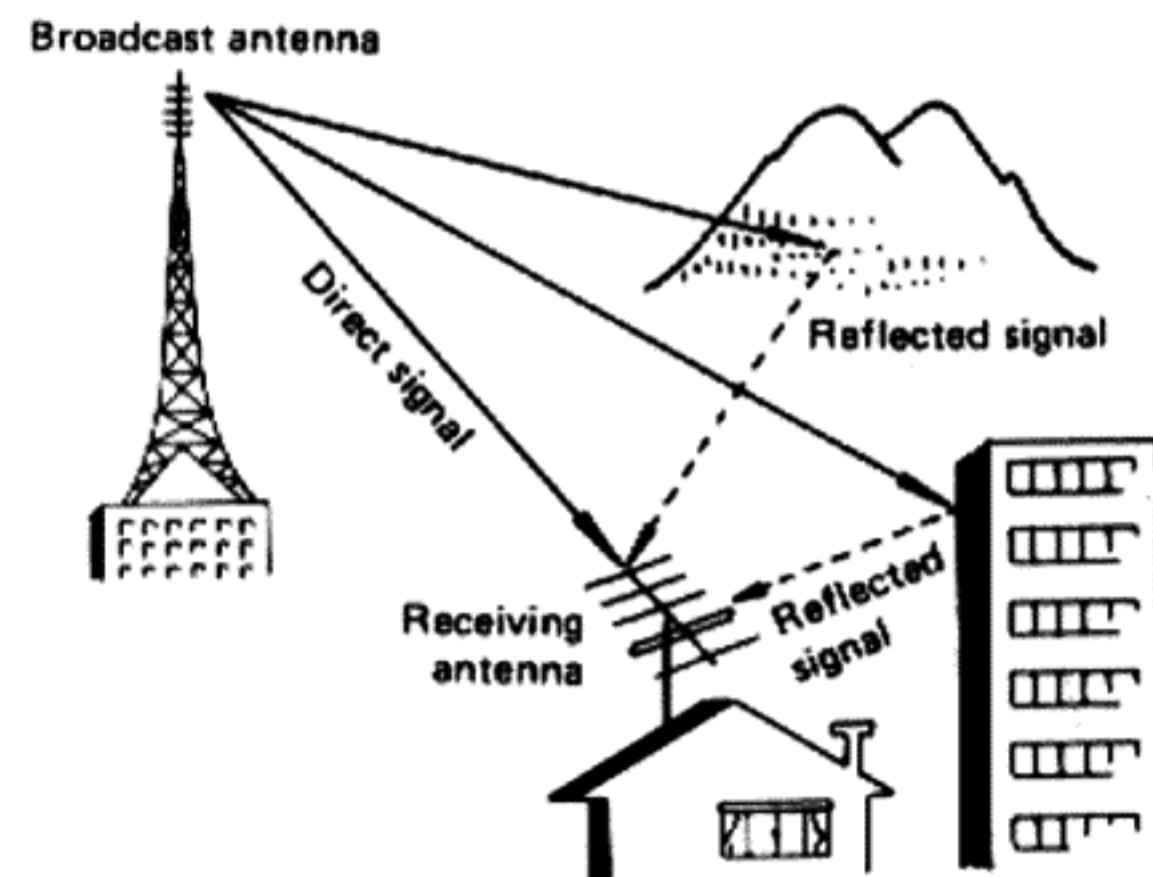
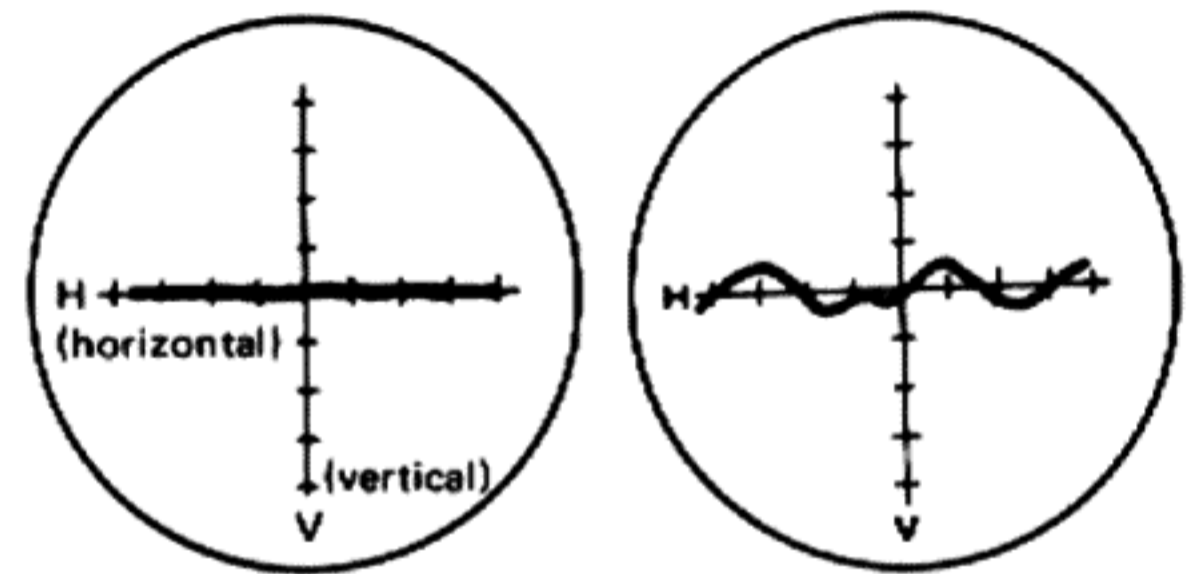


Fig. 8

### Employing MULTIPATH Jacks

1. With good quality shielded cable, connect the VERT (lower) and HORIZ (upper) FM MULTIPATH jacks with the respective vertical and horizontal inputs of an oscilloscope (or Pioneer SD-1100 Stereo Display).
2. Tune in an FM station (conversation program) with the TX-9500 and adjust the oscilloscope to obtain a waveform on the CRT.
3. Adjust the antenna direction to minimize the vertical component of the waveform as shown in Fig. 9.



Low multipath reflection appears as an essentially straight horizontal line as shown at left, while a high multipath reflection percentage introduces a vertical component such as seen at right.

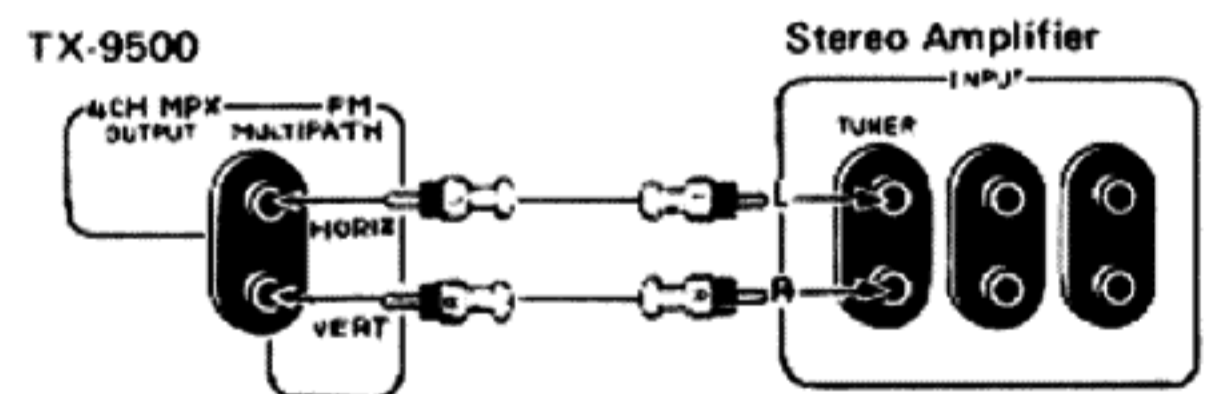
Fig. 9

**NOTE:**

If the waveform is difficult to observe when employing an oscilloscope due to insufficient horizontal axis gain, instead of the MULTIPATH HORIZ jack, connect the L channel OUTPUT jack to the horizontal terminal of the oscilloscope and perform the above adjustment.

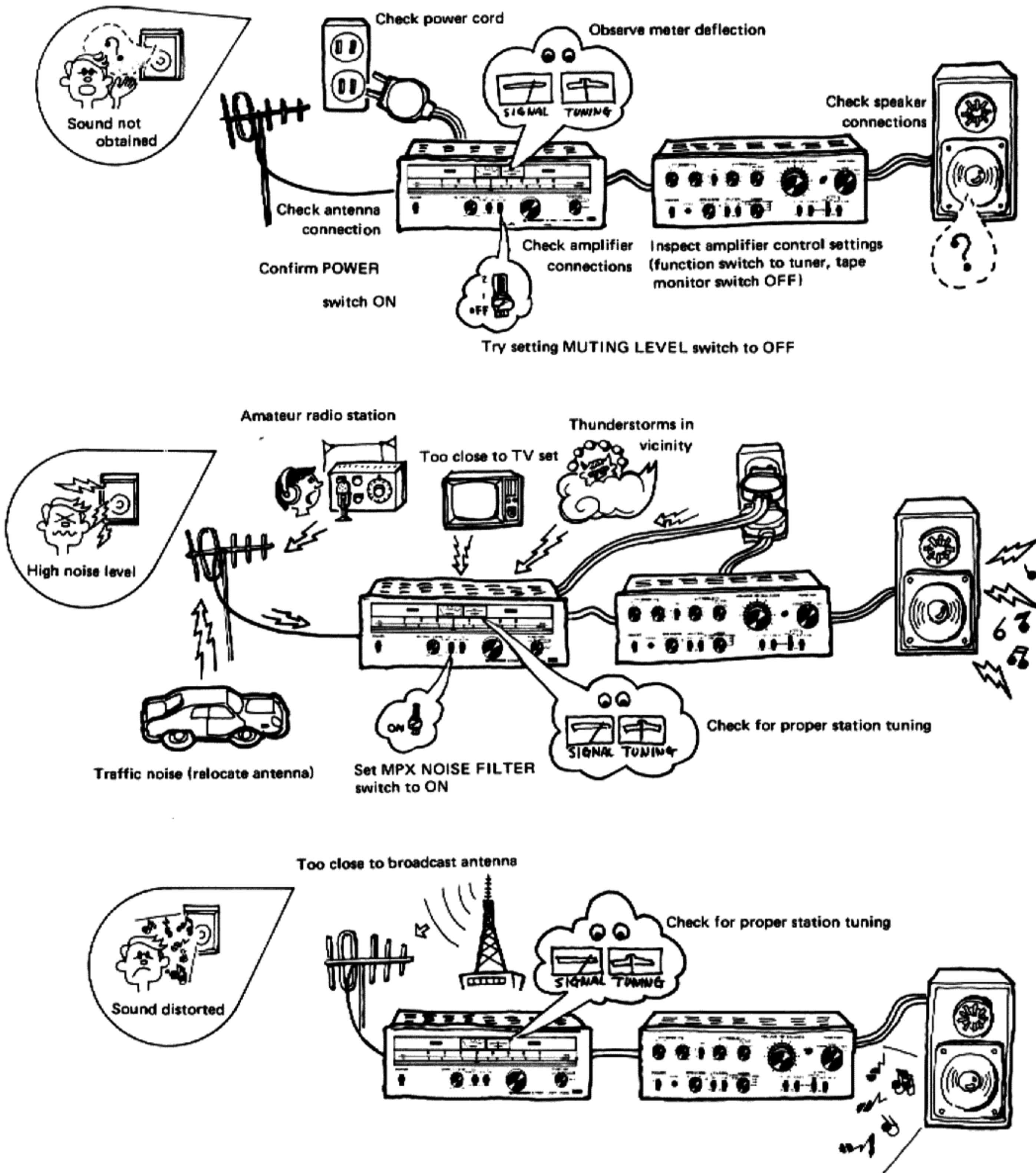
**In Event an Oscilloscope is Unavailable, Adjustment Can Also be Performed by The Following Method.**

1. Connect the FM MULTIPATH HORIZ jack to the Left channel side of either the TUNER or AUX jacks of the stereo amplifier, and the VERT jack to the Right channel side.
2. Tune in an FM station on the TX-9500 and listen via speakers or headphones. The FM broadcast will be audible from the Left channel, while the multipath sound can be heard from the Right channel.
3. Employ the BALANCE control of the stereo amplifier to reduce Left channel sound to the point where only the Right channel becomes audible. Then adjust the antenna direction for minimized multipath sound from the Right channel.
4. After determining the antenna direction by the above steps, disconnect the HORIZ and VERT jacks, and reconnect equipment for normal operation.



# CONDITIONS FREQUENTLY MISTAKEN FOR MALFUNCTION

In the event of trouble, first inspect the points indicated below. If this fails to correct the problem, contact a Pioneer Authorized Service Center. For further information, contact Pioneer Electronic Corp.



# SPECIFICATIONS

## Semiconductor

FET(s)	3
IC(s)	11
Transistors	34
Diodes	23

## FM Section

**Circuitry** 3 MOS FETs, 2-stage RF Amplifier 5-gang Variable Capacitor, 8-stage Limiter, PLL MPX Circuit.

<b>Sensitivity</b>	
IHF	1.5 $\mu$ V
50dB Quieting	2.5 $\mu$ V(mono), 35 $\mu$ V(stereo)
Signal-to-Noise Ratio	80dB(mono), 75dB(stereo)
<b>Total Harmonic Distortion</b>	
100Hz	0.15% (mono), 0.2% (stereo)
1kHz	0.15% (mono), 0.2% (stereo)
10kHz	0.15% (mono), 0.5% (stereo)
<b>Capture Ratio</b>	1.0dB
<b>Selectivity</b> $\pm$ 400kHz	85dB
$\pm$ 300kHz	55dB
<b>Frequency Response</b>	50Hz ~ 10kHz $\begin{matrix} +0.2 \\ -0.5 \end{matrix}$ dB
	20Hz ~ 15kHz $\begin{matrix} +0.2 \\ -1.5 \end{matrix}$ dB

## Separation

1kHz	40dB
50Hz ~ 10kHz	35dB
<b>Image Rejection</b>	110dB
<b>IF Rejection</b>	110dB
<b>Spurious Rejection</b>	110dB
<b>AM Suppression</b>	55dB
<b>Sub Carrier Suppression</b>	65dB
<b>Muting Threshold</b>	5 $\mu$ V/22 $\mu$ V
<b>Stereo Threshold</b>	5 $\mu$ V
<b>De-emphasis</b>	25 $\mu$ s/75 $\mu$ s switchable

## AM Section

**Circuitry** 1-stage RF Amplifier, 3-gang Variable Capacitor.

<b>Sensitivity</b>	
(IHF, Ferrite antenna)	300 $\mu$ V/m
(IHF, Ext. antenna)	15 $\mu$ V
<b>Selectivity</b>	40dB
<b>Signal-to-Noise Ratio</b>	50dB
<b>Image Rejection</b>	65dB
<b>IF Rejection</b>	85dB

## Audio Section

<b>Output Level/Impedance</b>	
FIXED	650mV/5k $\Omega$
VARIABLE	70mV ~ 2V/3.5k $\Omega$
4CH MPX	400mV/2.5k $\Omega$

## Miscellaneous

<b>Power Requirements</b>	AC 120V 60Hz
<b>Power Consumption</b>	23W
<b>Dimensions</b>	420(W) x 150(H) x 365(D)mm
	16-9/16 x 5-7/8 x 14-3/8 in.
<b>Weight: Without Package</b>	9.1kg (20 lb 1 oz)
<b>With Package</b>	10.6kg (23 lb 5 oz)

## Furnished Parts

FM T-type Antenna	1
Connection Cord with Pin Plugs	1
Hexagonal wrench	1
Operating Instructions	1

### NOTE:

Specifications and the design subject to possible modification without notice due to improvements.

