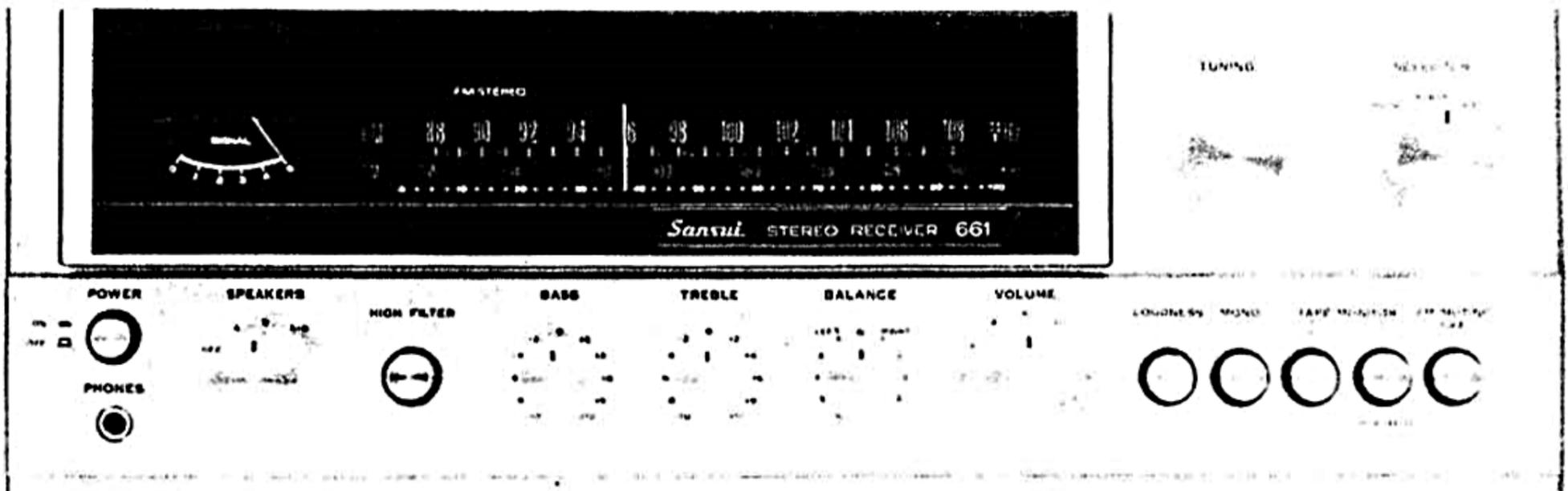


# OPERATING INSTRUCTIONS

## STEREO RECEIVER

# SANSUI 661



*Sansui*

SANSUI ELECTRIC CO., LTD.

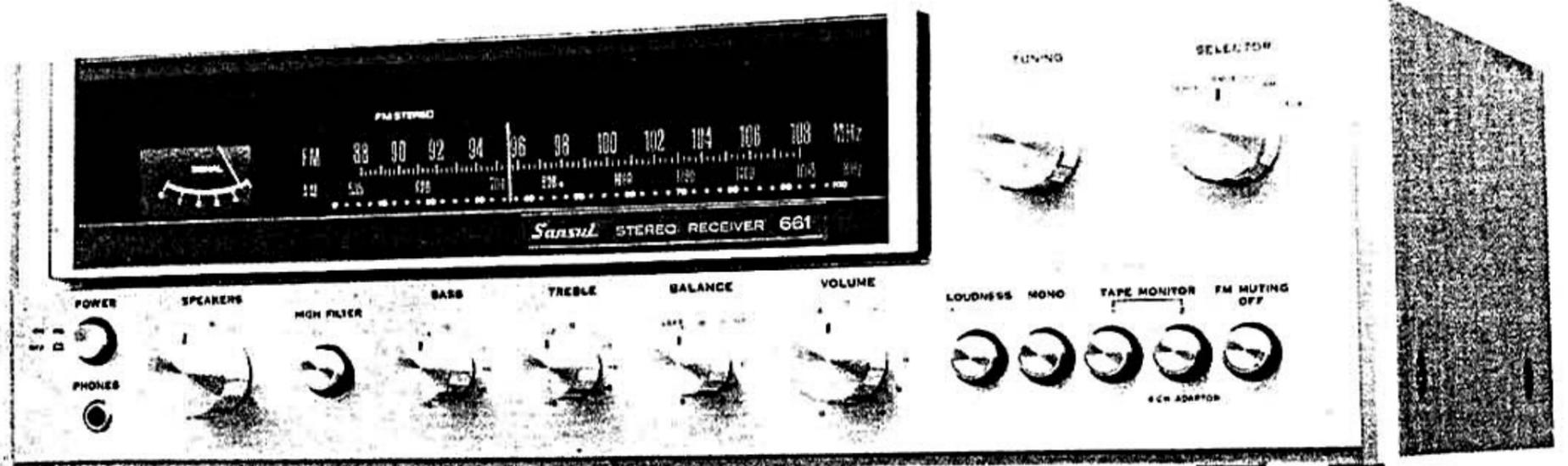
We are grateful for your choice of the Sansui 661 AM/FM stereo receiver. Before you begin to operate it, may we suggest that you read this booklet of operating instructions once carefully? You will then be able to connect and operate it correctly, and enjoy its superb performance for years.

## ●FUNCTIONAL FEATURES

- \*Circuits for handling two tape decks provided.  
Tape-to-tape recording (dubbing) can be easily facilitated.
- \*Terminals for connecting up to three pairs of speakers.  
In addition to having the usual arrangement of speakers in your listening room, another pair of speakers can be set-up in another room enabling you to enjoy your music almost anywhere you like.
- \*Terminals provided for two different types of FM antennas.  
Provisions are made for both 75-ohm and 300-ohm FM antenna terminals. Connection is extremely simple when setting up an outdoor antenna using either a 75-ohm unbalanced coaxial type lead-in cable or a 300-ohm balanced feeder type lead-in cable.
- \*Pushbutton HIGH FILTER switch provided.  
By operation of this switch unpleasant noises in the highs can be eliminated. Also, noises that occur when listening to FM stereo broadcasts can be attenuated by virtue of the FM MUTING OFF switch.
- \*Versatile control of tonal quality possible  
The BASS and TREBLE tonal quality can be adjusted independently of each other. Together with the LOUDNESS switch, they provide for optimum control of tonal quality to suit your taste or room acoustics.

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## IMPORTANT PRECAUTIONS

To keep the set in top condition all the time, observe these precautions:

1. Install the set where there is a good circulation of air.
2. Do not obstruct the ventilation opening of the cabinet.
3. Avoid an extremely hot or dusty place.
4. If the set is placed on a shelf, be sure that the shelf board is thick and strong.

### HEAT RADIATED BY THE SET

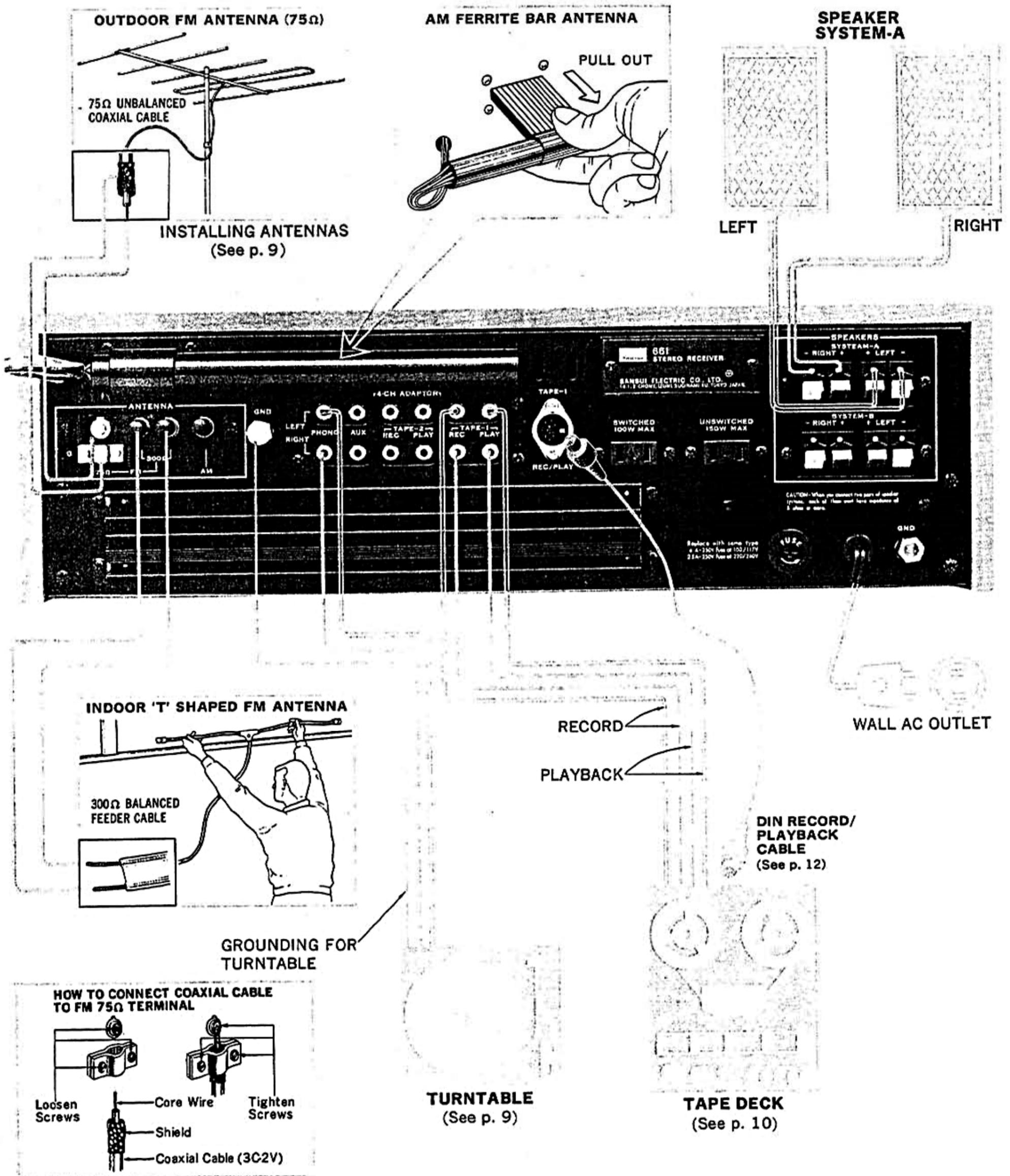
As transistors are sensitive to heat, the enclosure of this set is designed to provide a good dissipation of the heat radiated inside this set. Thus, if you place something on top of the ventilation opening of the enclosure, place the set inside a closed box and operate it for many hours, it is possible that the set will break down. Always try to provide sufficient circulation of air around the set. But removing the enclosure or the bottom plate to allow better ventilation is not only dangerous but undesirable from the standpoint of electrical performance.

### AC OUTLETS

Of the two AC outlets provided on the rear panel, the one marked 'SWITCHED' is controlled by the front-panel POWER switch. It is convenient to use it to power a program source component, such as your turntable. If you keep the power switch of such a component turned on, then that component will be turned on and off as you operate the POWER switch of this set. The other AC outlet, marked 'UNSWITCHED' is not related to the set's POWER switch.

The 'SWITCHED' outlet has a 100-watt capacity. The 'UNSWITCHED' one has a capacity of 150 watts. Do not connect any equipment whose power consumption exceeds the capacity of each of the outlets, as it is extremely dangerous.

# REAR-PANEL CONNECTIONS

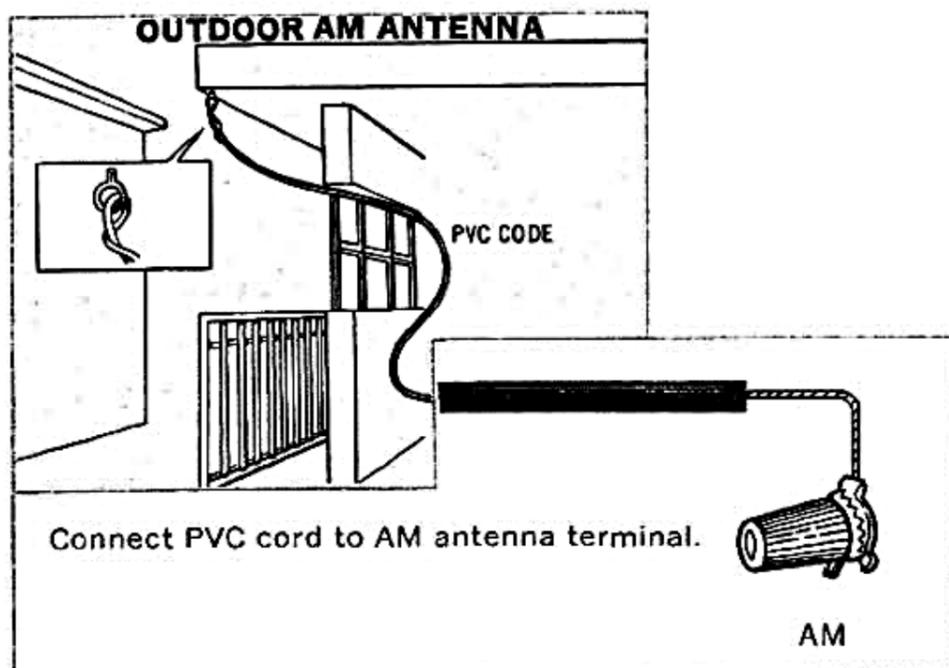
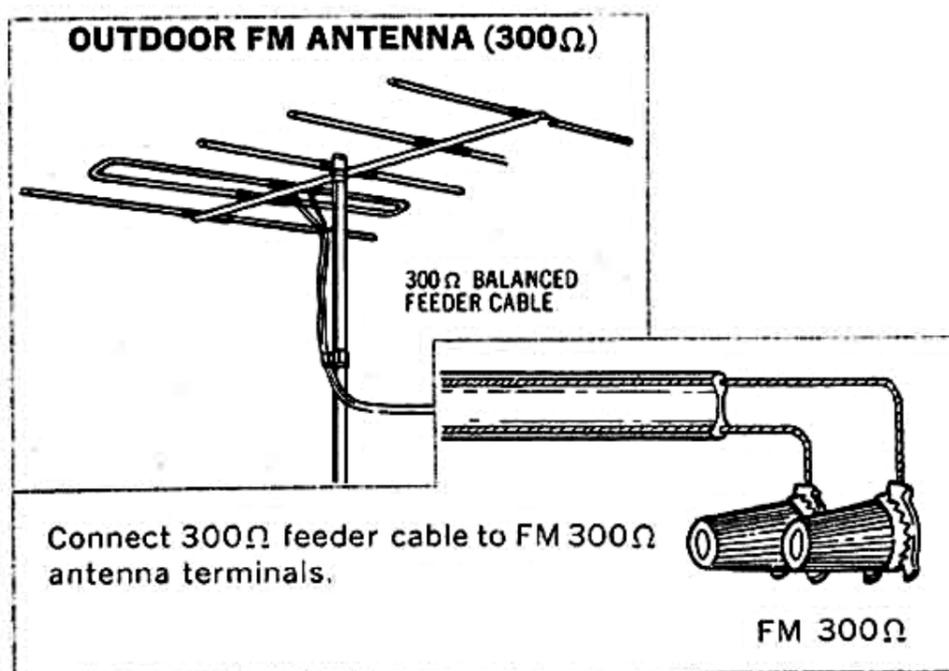
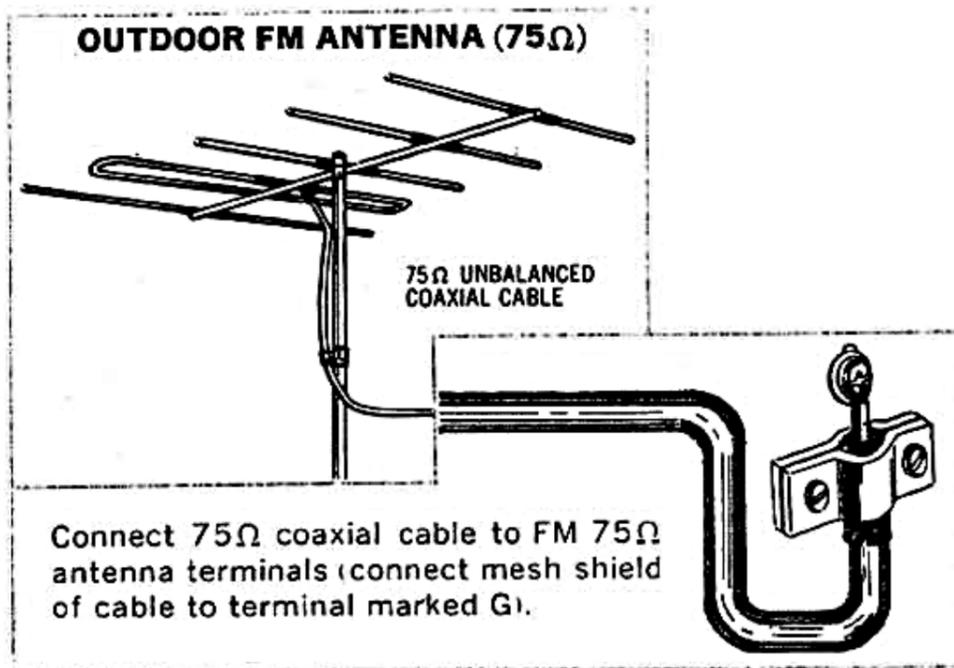


--- LEFT CHANNEL  
 - - - RIGHT CHANNEL

● For detailed instructions on how to connect various instruments, turn to other pages.

# HINTS FOR BETTER RECEPTION

It is always recommended to install outdoor antennas so that you may receive noise-free FM and AM broadcasts with optimum tonal quality. You will find an outdoor antenna—especially one for FM—particularly effective if you are remote from broadcasting or surrounded by high mountains, buildings or other obstacles.



## FM ANTENNAS

Outdoor FM antennas are commercially available with three, five or seven 'elements'. The more elements an antenna has, the farther distance it is generally intended to cover. You may connect an antenna to your set either by means of coaxial cable (75-ohm unbalanced) or feeder cable (300-ohm balanced). The former is more expensive but more effectively keeps off external noise—especially the ignition noise of nearby automobiles—and transmit the signals more efficiently.

It is advised that you decide on the type of antenna and cable to use after consultation with your Sansui dealer. Depending on the type of antenna, you may require an impedance matching transformer between the antenna and the connecting cable, and this too should be found out from the dealer.

**How to connect:** Connect the antenna to your set as illustrated in the diagram.

If you are using coaxial cable, connect it to the FM 75Ω terminals; if you are using feeder cable, connect it to the FM 300Ω terminals.

### ⟨Note for Installing⟩

- ◆ To avoid ignition noise produced by automobiles and motor-cycles, install the antenna as far away from the street as possible.
- ◆ As an antenna is directional, adjust its height and direction while actually receiving your favorite FM station.
- ◆ Be careful so that the antenna or the lead-in cable does not touch the electrical power line around your house.
- ◆ It is always advisable to keep the lead-in cable as short as possible.

## AM ANTENNA

Connect the PVC cord (supplied) to the AM antenna terminal, then stretch it to outside of your house.

## GROUNDING

If you connect a grounding lead to the grounding terminal marked GND on the rear panel, the noise contained in radio broadcasts may decrease. It may also keep external noises from creeping into the set.

The grounding lead may either be standard PVC cord or enameled wire. Attach a small copper plate or carbon rod to its end, and bury it deep underground. Or if there is a special grounding wire or terminal in your room, or if your water piping is of iron, the grounding lead may be connected to them. But never connect it to your gas piping as it is dangerous.

# BASIC OPERATING PROCEDURES

## 1. POWER

### Ⓚ POWER Switch

Push the POWER switch once to turn the set on, once more to turn it off.

## 2. SELECTING SPEAKER SYSTEMS

### Ⓚ SPEAKERS Switch

Select the speaker systems and/or headphones connected to the set.

**OFF:** To cut off the sound from the speaker systems when listening with headphones.

**A:** To drive the speaker systems connected to the rear-panel SPEAKERS SYSTEM-A terminals.

**B:** To drive the ones connected to the SYSTEM-B terminals.

**A+B:** To drive both A and B pairs of speaker systems.

## 3. SELECTING PROGRAM SOURCE

### Ⓚ SELECTOR Switch

Set to the program source you wish to hear.

**PHONO:** For playing disc records.

**FM AUTO:** For receiving FM stereo or mono broadcasts. When an FM stereo broadcast is received, the legend FM STEREO appears in the dial window.

**AM:** For receiving AM broadcasts.

**AUX:** To reproduce whatever program source is connected to the rear-panel AUX inputs.

### Ⓚ TAPE MONITOR Switches

Use them to reproduce a recorded tape or to monitor a recording that you are making. Push the one that governs the record/playback circuit connecting the tape deck in use at the moment. At all other times, push it once more to restore it to the normal position.

### Ⓚ MODE (MONO-STEREO) Switch

Use to listen to mono records or tapes reproduced using a monophonic turntable or tape deck. The monophonic equipment may be connected to either right or left input on the rear panel. You can hear sound from both speakers. For stereo operation, push it once more to restore it to the original position.

## 4. ADJUSTMENT OF VOLUME

### Ⓚ VOLUME Control

The overall volume is controlled by the VOLUME control. The more this control is turned clockwise the louder the volume of the sound becomes.

## 5. LEFT & RIGHT BALANCE ADJUSTMENTS

### Ⓚ BALANCE Control

### Ⓚ MODE (MONO-STEREO) Switch

The volume of the left and right speakers can be adjusted by the BALANCE control. As the control is turned counterclockwise from the center position the sound from the left speaker becomes louder than that from the right speaker. When turned clockwise from the center, the sound from the right speaker increases in volume as compared with that of the left.

Stereo balance adjustments are made by depressing the MODE switch and then adjusting the BALANCE control so that the sound you are listening to can be heard from the exact center position between both speakers.

Reset the switch to its original (stereo) position by depressing it once again. If, in this case you can sense some difference in the volume between the left and right speakers, recheck the program source side (stylus pressure balance, etc.).

# CONTROLLING SOUND TO YOUR TASTE

## SIGNAL METER

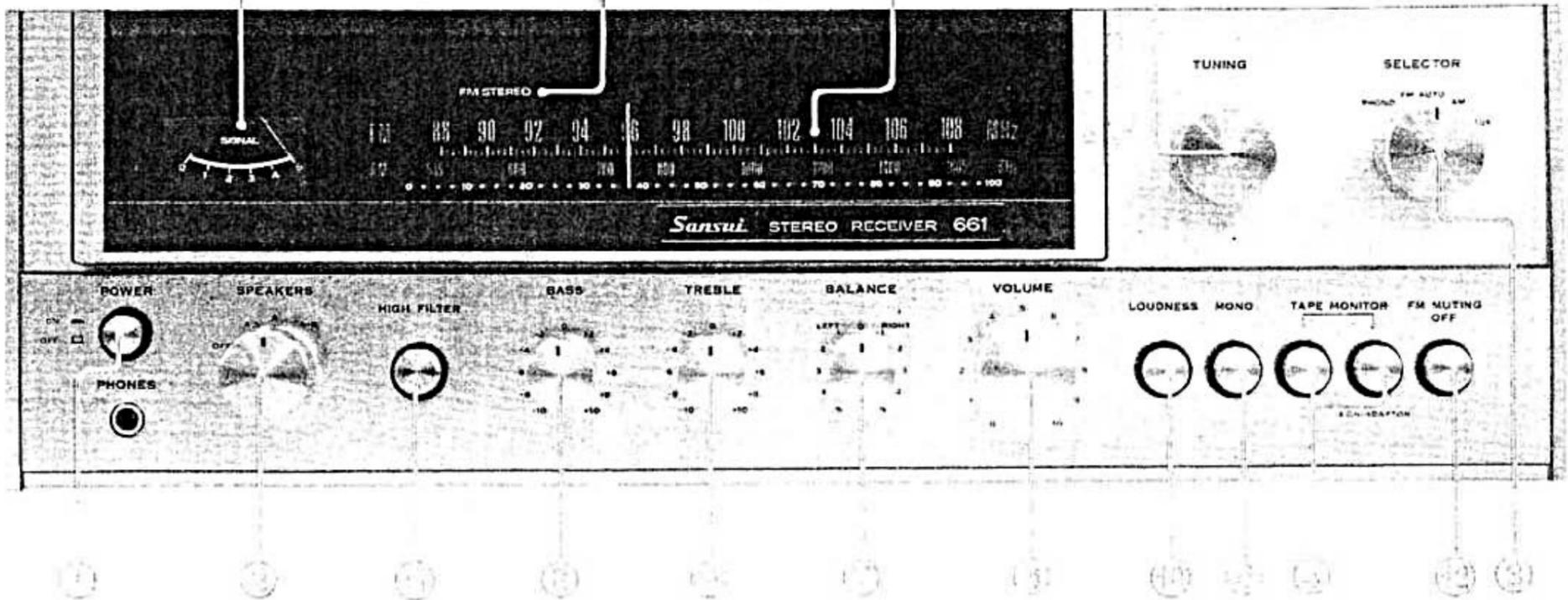
(Tune in desired FM or AM station while watching this meter. Adjust Tuning Control for maximum deflection of the pointer.)

## FM STEREO INDICATOR

(Lights when set is tuned in on FM station broadcasting in stereo.)

## DIAL SCALE

## TUNING CONTROL



● When you operate the various switches, it is suggested that you reduce the volume first by turning the VOLUME control counterclockwise.

## TONAL QUALITY

### ① BASS Control

The strength of low-frequency sound, such as is produced by a bass, is adjusted with the BASS control. Turning it clockwise from the center emphasizes the lows, and turning it counterclockwise de-emphasizes them.

Likewise, the strength of high-frequency sound, such as generated by cymbals, is adjusted with the TREBLE control. Operation is the same as for the BASS control.

To emphasize the middle-frequency sound, such as human voice, turn both the BASS and TREBLE controls counterclockwise for reduced bass and treble strengths. If you feel the sound volume is low after this adjustment, raise the overall volume with the VOLUME control.

### ② LOUDNESS SWITCH

Pushing this switch when listening at a low volume level accents the lows and highs properly to render the reproduced sound more realistic. This compensates for the fact that the human ear becomes insensitive to the lows and highs as the sound volume is reduced.

### ③ HIGH FILTER Switch

Use the HIGH FILTER switch to eliminate high-frequency noise. If high-frequency noise disturbs you, push the HIGH FILTER switch. Surface noise from a worn record, fluorescent lamp noise and other kinds of high-frequency noise will be reduced.

◆ If no high-frequency noise disturbs you, be sure to keep the switch off.

### ④ FM MUTING OFF Switch

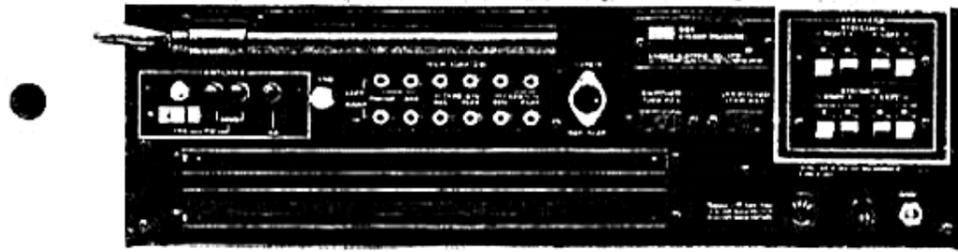
When turning on the FM band, noise is usually heard between stations that is peculiar to FM broadcasting. However, as an FM muting circuit is built into this set, no such noise will be normally heard as you tune in an FM station, **unless** you push the FM MUTING OFF switch.

When the built-in FM muting circuit is at work, it is possible that weak or distant FM stations are muted along with the noise, making it impossible to tune them in. If this happens, release the muting circuit by pushing the FM MUTING OFF switch first and then tune.

# CONNECTION OF SPEAKER SYSTEMS

## SPEAKERS

OFF A B A+B



## CONNECTION AND SELECTION OF SPEAKER SYSTEMS

If you are connecting only pair of speaker systems to the set, they may have any impedance from 4 to 16 ohms. Connect them to the SYSTEM A or B terminals on the rear panel, making sure not to confuse the left and right cables, plus and minus leads on the set and speaker ends.

But if you wish to connect two pairs of speaker systems and drive them simultaneously by turning the SPEAKERS switch to A+B, each speaker system should have an impedance of 8 to 16 ohms. Using a system with a lower impedance could result in a breakdown of the set. Doing so will reduce the composite speaker impedance in each channel to less than 4 ohms.

## CONNECTING HEADPHONES

Headphones are connected to the PHONES jacks on the front panel. But be sure to turn the SPEAKERS switch to OFF first unless someone is listening to the sound from speaker systems in another room.

## IF SPEAKER SYSTEMS ARE OUT OF PHASE

If you were careless when connecting the speaker systems and the plus and minus polarities are not in the same order for the left speaker system and the right speaker system, they would be reverse-phased. This will cause a 'drop-out' of sound at the extreme ends and the middle of the line between the two speaker systems, creating a sense of discontinuation and damaging the sense of stereo perspective. Also, the bass sound would lose much of its powerfulness and become rather unnatural.

While wrong connection of plus and minus polarities is most commonly seen at the speaker terminals, it could also happen in the phono cartridge or at the time of connecting various program source components.

Once that condition is corrected and the polarities are in order, you can detect it by reproducing a mono source (such as AM broadcast). Sound will seem to come from a point halfway between the two speakers.

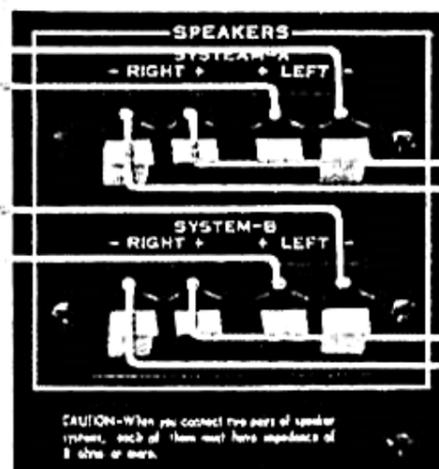
## CONNECTIONS

SPEAKER SYSTEM-A

LEFT

SPEAKER SYSTEM-B

LEFT



SPEAKER SYSTEM-A

RIGHT

SPEAKER SYSTEM-B

RIGHT

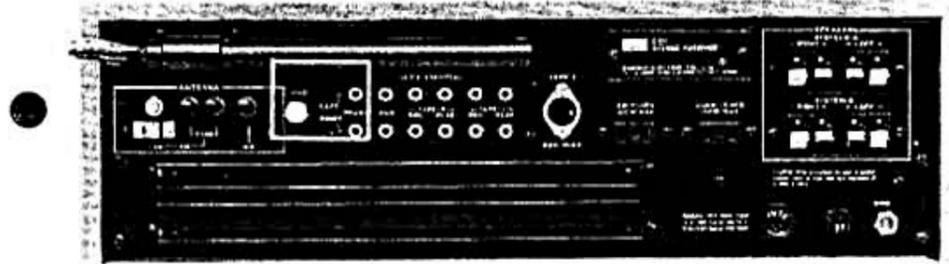
CONNECTING SPEAKER CORD

Push button, insert lead wires of cord, and release.

# PLAYING RECORDS

## SELECTOR

PHONO



1. Set the SELECTOR switch to PHONO.
2. Operate your turntable to play the record.
3. Use the various other controls and switches to suit your personal preference.

## HOW TO USE AUX INPUTS

The term AUX is an abbreviation of the word 'auxiliary.' If your turntable is equipped with a crystal or ceramic cartridge, connect it to these inputs.

The AUX inputs have the same electrical function as the TAPE PLAY inputs, and so may be used, if necessary, to connect a tape deck or tape player. Use them if the TAPE PLAY inputs of the set are already occupied for some other purpose. Tape playback—but not recording—will become possible.

Of course, a tuner or an amplifier-equipped adaptor may also be connected there. Since the AUX inputs have an input sensitivity of 100mV, almost any audio instrument having an output voltage of 100mV or so can be connected. To see if any particular instrument can be connected to the AUX inputs or not, consult its operating instructions (especially, its specifications) or check with our dealer.

## CONNECTIONS

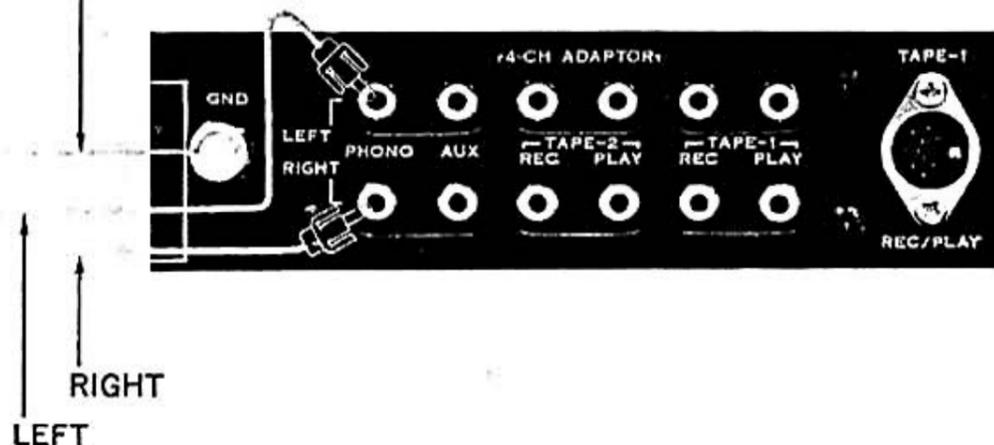


**TURNTABLE**  
(with Magnetic Cartridge)

● If your turntable has crystal or ceramic cartridge, connect it to AUX inputs instead of PHONO inputs.

### GROUNDING WIRE

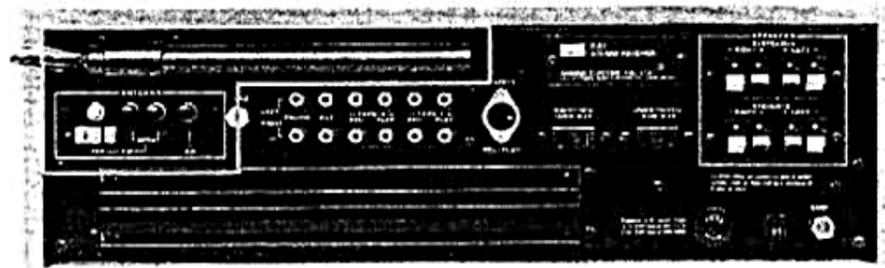
Be sure to connect grounding terminal (or lead) of turntable or other instrument to GND terminal of set. Hum noise may be suppressed.



# RECEIVING RADIO BROADCASTS

## SELECTOR

FM AUTO  
AM



1. Set the SELECTOR switch to FM AUTO or AM (to FM AUTO to receive an FM broadcast, to AM to receive an AM broadcast). If the received broadcast is stereophonic, the legend FM STEREO will appear in the dial window.
2. Tune in the desired station by adjusting the Tuning Control. It is correctly pinpointed when the Signal Meter pointer has deflected as far to the right as possible.
3. Use the various other controls and switches to suit your personal preference.

## INSTALLING ANTENNAS

**AM ANTENNA:** Simply slide out the ferrite bar antenna built into the rear panel of the set.

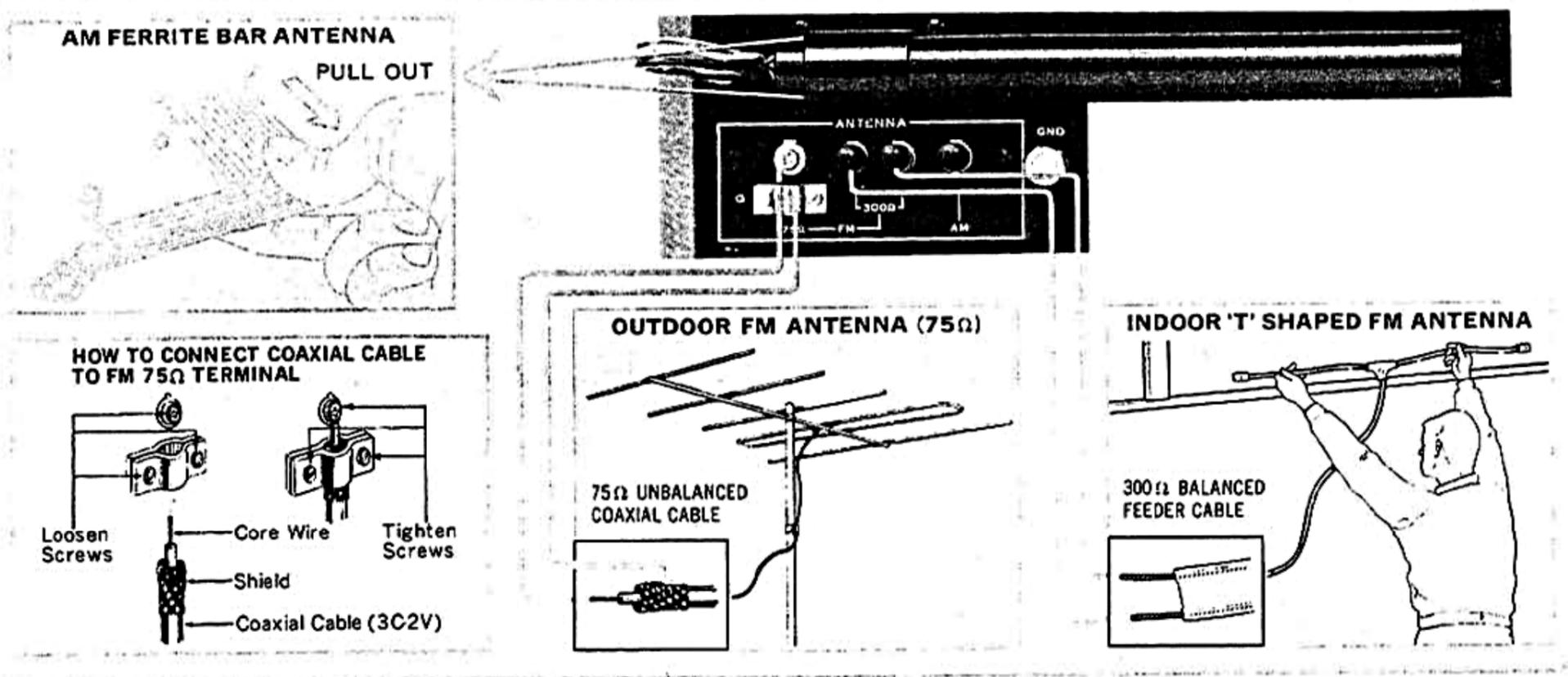
Since AC power supply cord and speaker cables are often the causes of noise, be sure that they are not allowed to come close to the antenna.

**FM ANTENNA:** When ever possible, a special outdoor FM antenna should be installed for stable, noise-free reception of your favorite FM stations.

If the antenna input signals are very weak, then really good Hi-Fi reception cannot be expected, even with sets of the highest performance efficiency. To get the very best performance out of your set it is necessary to use an FM antenna similar to those used for television pick up. Install the outdoor FM antenna referring to "HINTS FOR BETTER RECEPTION."

When using the "T" shaped feeder FM antenna, supplied with this set, as a temporary measure, connect it to the FM 300Ω ANTENNA terminals on the rear panel of the set. Spread the antenna out in the shape of a "T". Then while listening to your favorite FM station change the direction and location until the position where optimum, noise-free reception is found and secure the antenna.

## CONNECTIONS



# TAPE RECORDING & PLAYBACK

## TAPE MONITOR

1 2



**Playback Procedure:** 1. Push either the TAPE MONITOR-1 or -2 switch, depending on which tape playback circuit is connecting the tape deck in use.

2. Operate the tape deck.

3. Use the various other controls and switches to suit your personal preference.

**Recording Procedure:** 1. Prepare the program source you wish to record and keep it ready to go. The SELECTOR switch must be adjusted.

2. Operate the tape deck and start recording. Adjust the record levels with controls provided on the tape deck.

3. To monitor the sound being recorded, follow the same procedure as for playback after making certain that the tape deck itself is adjusted to permit monitoring. If the tape deck only has a combined record/playback head, keep the TAPE MONITOR switch off (protruding) and hear the sound before it is recorded.

● When monitoring the sound during simultaneous recording using two tape decks, depress only the TAPE-2 circuit pushbutton switch.

If you monitor the tape deck connected to the TAPE-1 terminals, the monitored sound will be recorded onto the tape deck connected to the TAPE-2 terminals causing deterioration in the tonal quality of the sound.

## TAPE-TO-TAPE RECORDING

This set is provided with two record/playback circuits. Connect the tape deck you are going to use for playback to TAPE-1 terminals and the one for recording to TAPE-2 terminals. Depress the TAPE MONITOR-1 switch on the front panel of the set when you are going to record from one tape to the other.

Tape monitoring can be facilitated during actual recording by depressing the TAPE MONITOR-2 switch. If the TAPE MONITOR-2 switch is in the OFF position (protruding) the sounds you are going to record can be heard before actual recording.

● Tape-to-tape recordings cannot be made from the tape deck connected to the TAPE-2 terminal to the one connected to the TAPE-1 terminals.

● When simultaneous recording by pre-recorded tape sounds using two tape decks, a third tape deck for playback is connected to the AUX terminals (playback only).

## CONNECTIONS

● If using pin plug cables, connect input terminals of tape deck to TAPE REC jacks of set, and its output terminals to PLAY jacks of same circuit.



● Do not connect tape deck(s) to TAPE-1 pin jacks and DIN socket simultaneously.

PLAYBACK  
RECORD

PLAYBACK  
RECORD

DIN RECORD/  
PLAYBACK  
CABLE



TAPE DECK



TAPE DECK

# CONDITIONS MISTAKEN FOR BREAKDOWNS

PROGRAM SOURCE	SYMPTOM	PROBABLE CAUSE	WHAT TO DO
Tuner.	* Noise during AM reception.	* Interference by adjacent stations (called beat interference). * TV set is being used simultaneously.	* Peculiar to AM waves, and unavoidable to some extent. * Move TV set away from tuner and amplifier.
	* Noise heard at certain hours, in certain areas or over part of dial during AM reception.	* Interference by nearby electrical appliances.	* Attach noise limiter to appliance producing noise. * In some cases, can be eliminated by reversing power cord plug-AC outlet connections.
	* Pop noise during FM reception.	* Ignition noise from nearby automobile, motorcycle, etc.  Note: In many cases, high-frequency noise during radio reception cannot be entirely eliminated. Try turning on set's HIGH FILTER switch on turning TREBLE control counterclockwise.	* Adjust antenna location and height for maximum sensitivity. * Keep antenna away from streets.
Turntable.	* Hum noise.	* Unshielded cables used to connect turntable. * Minus (ground) wire of connecting cable is not connected completely. * Turntable motor or tonearm is not grounded.	* Use regular shielded cables. * Examine connecting cables, especially their plugs. * Connect grounding lead of turntable to set's GND terminal.
	* Loud oscillating noise.	* Turntable is placed on top of or too close to speaker systems.	* Place thick cushion between turntable and speaker systems. * Change location of turntable and speaker systems.
	* Sound is shaky.	* Dust on record or pickup stylus. * Worn pickup stylus. * Improper stylus pressure.	* Clean record and pickup stylus. * Replace pickup stylus. * Adjust stylus pressure.
Tape Deck.	* Hiss noise.	* Magnetic heads are magnetized.	* Demagnetize heads. * Turn on HIGH FILTER switch. * Connect noise reduction adaptor.
	* Sound is not clear.	* Dust on magnetic heads. * Tape is not pressed tight to heads.	* Clean heads. * Align tape transport mechanism.
General.	* When left and right channel sound volumes are balanced with Set's BALANCE control, it does not come to center position.	* Left and right channel signal strengths vary with program source. * Left and right speaker systems have different efficiencies.	* Never mind. Optimum stereo effect is obtained by adjusting BALANCE control so that sound comes from midway point between two speaker systems.
	* Musical instruments and singer not located clearly.	* Left-right, plus-minus connections of speaker systems input cables are wrong.	* Examine connections.

# SIMPLE MAINTENANCE HINTS

## BEFORE SENDING THE SET OUT FOR SERVICING

Some of the symptoms and conditions which seem to indicate a breakdown of the set are caused by wrong operation or by external components. These can be spotted with a simple examination and restored to normal. If you suspect a breakdown, please confirm the connections and your operating procedure once more.

### Here are some useful hints:

First, if you hear absolutely no sound from the set, inspect your turntable, tape deck and other program source components, then examine this set and your speakers in that order, paying attention to both their connections and operation. Be sure to reduce the volume beforehand.

Second, if the sound fails to come out only when you play records, reproduce a recorded tape or receive broadcasts, then chances are that only the particular program source component may be wrongly connected.

If loud hum noise of constant loudness is heard, it may be suppressed by connecting the grounding lead or terminal of your turntable or tape deck to the set's GND terminal, using PVC cord. Or, more simply, reversing the connection between the set's power cord plus and the wall AC outlet may stop it.

## CHECK LIST OF OPERATION

1. Is the power switch turned on?
2. Are tape monitor switches not pushed although you do not wish to reproduce a recorded tape?
3. Is the SELECTOR switch turned to the correct position?
4. Is the volume control turned to an appropriate level?

## CHECK LIST OF CONNECTIONS

1. Is the power cord inserted into a wall AC outlet?
2. Are the connection cords for your turntable and tape deck loose or touching some other object? Are you using shielded cords?
3. Are the speaker connection cords loose from set or your speakers?

## ABOUT THE VOLTAGE ADJUSTMENT

Your set is adjusted to operate at the correct power supply voltage of your area prior to shipment from our factory.

If you move after purchasing it or send it as a gift to a friend living in an area where the voltage is different, it may be necessary to adjust its Voltage Selector.

To adjust it, remove the two screws securing the name plate on the rear panel, then set the arrow mark on the Voltage Selector Plug to the correct voltage indication (100, 117, 220 or 240 volts). It may be necessary to replace the power fuse as well whenever the voltage has changed. For operation at 100 to 117 volts, use a 5-ampere fuse. For operation at 220 to 240 volts, use a 3-ampere one.

## ABOUT THE QUICK-ACTING FUSES

When a Dial Indicator is glowing if no sound comes out of one or more of the four speaker systems, examine their connections and operation once. If nothing is wrong with them, it is possible that the quick-acting fuse or fuses protecting the power transistor have blown.

If this should happen, disconnect the power cord from the wall AC outlet immediately and check the eight quick-acting fuses inside the rear panel. To reach them, remove the enclosure from the set. If you find any of them blown, discover and eliminate the cause of the blowout, and replace with new 4-ampere quick-acting fuses supplied. Probable causes of the blowout include excessively large input signals and a short-circuit at the speaker terminals.

## SHOULD THE POWER FUSE BLOW

If no Dial Indicator should glow and the set simply remains dead even after you have turned on its POWER switch, it is possible that its power fuse has blown.

If this happens, disconnect the power cord from the wall AC outlet at once and examine the power fuse on the rear panel. If you find it blown, replace it with a new glass-tubed fuse of the rated capacity (4-ampere for 100 to 117 volts, 2.5-ampere for 220 to 240 volts).

Never use a fuse of a different capacity or a piece of wire, even as a stop-gap measure, or serious danger could result.

## ABOUT THE FM DE-EMPHASIS SWITCH

Use this switch inside the set only if you move to an area where the FM de-emphasis characteristic is different. It is adjusted to the correct de-emphasis characteristic of your area in our factory prior to shipment, so there is normally no need to touch it. The correct de-emphasis is 50  $\mu$ sec. for Japan and Europe, and 75  $\mu$ sec. for the U.S.A. and southeast Asia.

After you have made the above examination and made the required corrections, if the set fails to operate normally, there may be something wrong with the set itself. In such a case, please contact the dealer from whom you purchased it or your nearest SANSUI AUTHORIZED SERVICE STATION.

# SIMPLE MAINTENANCE HINTS

## 4-CHANNEL STEREO SYSTEM

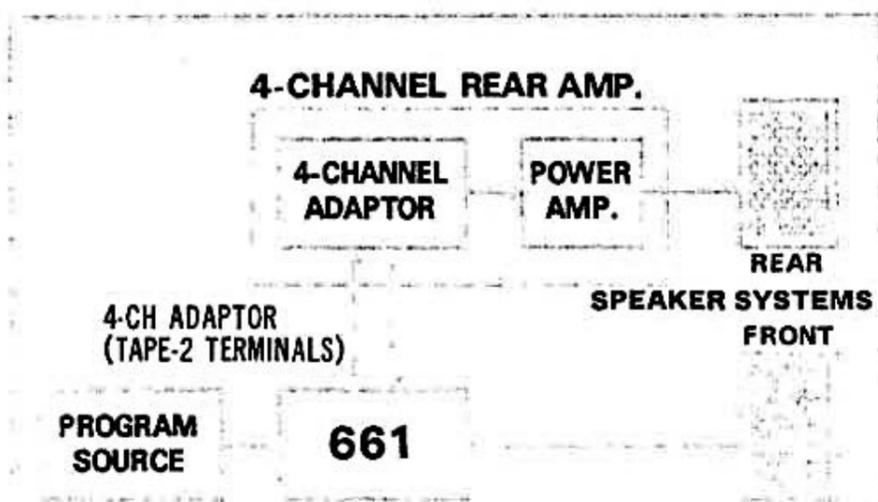
The sound we hear daily is a mixture of the sound that reaches our ears straight from the sound source—be it a musical instrument, a jet, a man's mouth or what have you—and the 'indirect sounds' that arrive at your ears only after they are reflected off various surfaces, such as the walls, ceiling and so forth.

Four-channel recordings are made using two microphones in the front of the concert hall and two in the rear (to simplify the explanation). The 'indirect sounds' with their complicated waveforms are mainly picked up by the two microphones in the rear, and reproduced out of the two rear speakers in a 4-channel stereo set-up for greatly enhanced 'ambience' effects. The sound effect is almost as if the original live performance were re-played right in your own room. This new approach can now be yours simply by adding certain equipment—mainly, a Sansui 4-channel rear amplifier with its unique QS regular matrix system, and a second pair of speaker systems.—to your 2-channel stereo system.

**Connecting a 4-channel Adaptor:** Connection of such a rear amplifier or 4-channel adaptor is easy. Just connect the TAPE-2 (4-CH ADAPTOR) REC terminals of your set with the input terminals of such rear amplifier or 4-channel adaptor, then connect its TAPE-2 (4-CH ADAPTOR) PLAY terminals with the output terminals of such unit.



**Operation:** To operate the rear amplifier or 4-channel adaptor so connected, push the TAPE MONITOR-2 (4-CH ADAPTOR) switch on the set's front panel, and otherwise follow its manufacturer's instructions.



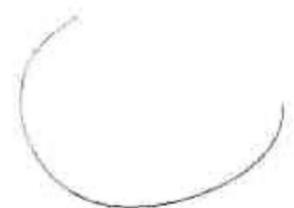
## CONNECTION CORDS

Be sure to connect your turntable, tape deck and speakers firmly. Be careful that the connection plugs are not loose from the jacks or the leads of the connection cords are not touching other parts. If the connections are imperfect, noise may be generated and, eventually, the set may break down. It is advisable to follow the instructions given by the manufacturer of the equipment you are connecting.

**CONNECTION CORDS WITH RCA TYPE PLUGS:** These are shielded cords with a RCA type plug soldered to each end. They are used to connect a turntable, tape deck and other program source components. Try to keep the cords as short as possible. If you use long cords, the high-frequency signals tend to be attenuated. Their maximum length should be two meters (8 feet). If such cords are already supplied with your tape deck or turntable, it is advisable to use them.

**DIN RECORD/PLAYBACK CORD:** This is a combined 2-channel stereo record/playback cord, standardized in Germany. This set has a special 5-pin socket marked TAPE REC/PLAY on the rear panel to accept such a cord. It can be used only if your tape deck has an identical socket.

**PVC CORDS:** These are used to connect your speakers, and are basically the same type of vinyl-covered cords as the power cords for your TV set or radio. Peel the vinyl covering off each end of the cord, carefully intertwine the lead wires, then connect it to your speaker and the set. To prevent mis-connection, it is advisable to paint color to each cord. Color-coded cords are available at some appliance stores.



# SPECIFICATIONS

## AUDIO SECTION

POWER OUTPUT (at rated distortion)	
MUSIC POWER (IHF)	....110W (4 $\Omega$ 1,000Hz) 75W (8 $\Omega$ 1,000Hz)
CONTINUOUS POWER	
Each Channel Driven	..40/40W (4 $\Omega$ 1,000Hz) 32/32W (8 $\Omega$ 1,000Hz)
Both Channels Driven	..27 +27W (8 $\Omega$ 1,000Hz) 20+20W (8 $\Omega$ 20 to 20,000Hz)
TOTAL HARMONIC DISTORTION	(at rated power output)
OVERALL (from AUX)	....less than 0.5%
INTERMODULATION DISTORTION	(at rated power output, 70Hz:7,000Hz=4:1 SMPTE method)
OVERALL (from AUX)	....less than 0.5%
POWER BANDWIDTH (IHF)	..15 to 40,000Hz
FREQUENCY RESPONSE (at 1 Watt power output)	
OVERALL (from AUX)	....15 to 30,000Hz $\pm$ 1.0dB $\pm$ 2.0dB
EQUALIZATION (at TAPE REC output)	.....RIAA Curve (30 to 15,000Hz $\pm$ 1.0dB)
LOAD IMPEDANCE	.....4 to 16 $\Omega$
DAMPING FACTOR	.....60 (8 $\Omega$ )
CHANNEL SEPARATION (1,000Hz, at rated power output)	
PHONO	.....better than 45dB
AUX	.....better than 45dB
HUM AND NOISE (IHF)	
PHONO	.....better than 70dB
AUX	.....better than 80dB
INPUT SENSITIVITY AND IMPEDANCE	(1,000Hz, for rated power output)
PHONO	.....2.5mV 50k $\Omega$ (Max. input capability: 150mV at rated distortion)
AUX	.....100mV 50k $\Omega$
TAPE-1	
PLAY Pin Jacks	.....100mV 50k $\Omega$
REC/PLAY DIN Socket	..100mV 50k $\Omega$
TAPE-2 (4-CH ADAPTOR)	
PLAY Pin Jacks	.....100mV 50k $\Omega$
RECORDING OUTPUT	
TAPE-1	
REC Pin Jacks	.....100mV
REC/PLAY DIN Socket	..30mV
TAPE-2 (4-CH ADAPTOR)	
REC Pin Jacks	.....100mV
SWITCHES AND CONTROLS	
BASS	.....+10dB, -10dB at 50Hz
TREBLE	.....+10dB, -10dB at 10,000Hz
LOUDNESS	.....+10dB at 50Hz, +8dB at 10,000Hz
HIGH FILTER	.....-10dB at 10,000Hz (6dB/oct.)

## TUNER SECTION

<FM>	
TUNING RANGE	.....88 to 108MHz
SENSITIVITY (IHF)	.....2.2 $\mu$ V
TOTAL HARMONIC DISTORTION	
MONO	.....0.5%
STEREO	.....0.7%
SIGNAL TO NOISE RATIO	..better than 60dB
SELECTIVITY	.....better than 50dB
CAPTURE RATIO	.....2.5dB
IMAGE REJECTION	.....better than 55dB at 98MHz
IF REJECTION	.....better than 60dB at 98MHz
SUPERIOUS RESPONSE REJECTION	.....better than 60dB at 98MHz
SPURIOUS RADIATION	....less than 34dB
STEREO SEPARATION	.....better than 35dB at 400Hz
FREQUENCY RESPONSE	....30 to 12,000Hz $\pm$ 1.0dB $\pm$ 3.0dB
ANTENNA INPUT IMPEDANCE	.....300 $\Omega$ balanced, 75 $\Omega$ unbalanced
<AM>	
TUNING RANGE	.....535 to 1,605kHz
SENSITIVITY (Bar Antenna)	..50dB/m at 1,000Hz
SELECTIVITY	.....better than 28dB at 1MHz
IMAGE FREQUENCY REJECTION	.....better than 80dB/m at 1MHz
IF REJECTION	.....better than 80dB/m at 1MHz

## OTHERS

POWER REQUIREMENTS	
VOLTAGE	.....100, 117, 220, 240V 50/60Hz
CONSUMPTION	.....70W (rated), 210VA (max.)
DIMENSIONS	.....444mm (17-1/2") W 135mm (5-3/8") H 300mm (11-3/8") D
WEIGHT	.....10 kg (22.0 lbs.) net 12.4 kg (27.3 lbs.) packed

\* Design and specification subject to change without notice for improvements.

## LIST OF ACCESSORIES

1. FM ANTENNA	1
2. AM ANTENNA	1
3. POLISHING CLOTH	1
4. QUICK-ACTING FUSES (4A)	2
5. OPERATING INSTRUCTIONS	1
6. OPERATING INSTRUCTIONS SHEET	1