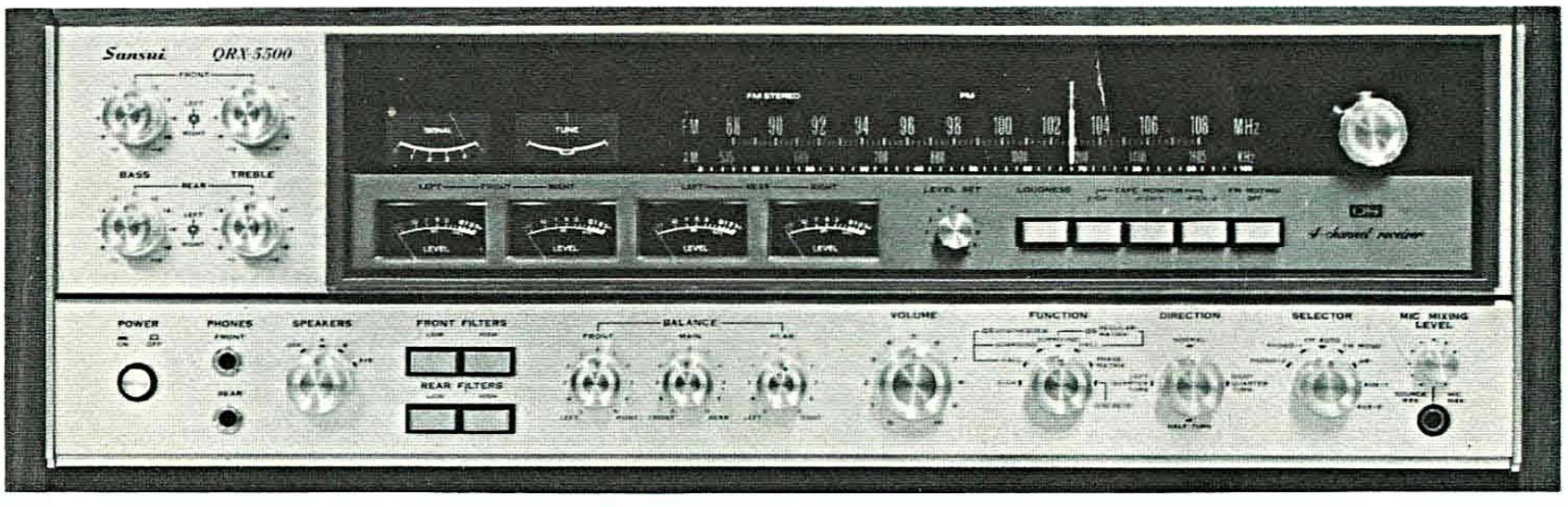
QS
REGULAR MATRIX

# OPERATING INSTRUCTIONS

## 4-CHANNEL RECEIVER

# SANSUI QRX-5500




Sansui

SANSUI ELECTRIC CO., LTD.

We are grateful for your choice of the Sansui QRX-5500 4-channel 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.

QS
REGULAR MATRIX


## FUNCTIONAL FEATURES

◇Incorporates a QS Synthesizer circuit to reorganize conventional 2-channel stereo signals and create a 4-channel sound field.

◇The built-in QS regular matrix system 4-channel decoder decodes 4-channel records and tapes encoded with the regular matrix system such as the QS system, and their broadcasts, to reproduce them as a perfect 4-channel sound field.

◇The built-in Phase Matrix circuit, featuring Sansui's own front-back logic, decodes records and tapes encoded with CBS SQ system to reproduce them in 4-channel stereo.

◇Offers two 4-channel AUX inputs, to which you can connect a discrete 4-channel record demodulator to reproduce discrete 4-channel records.

◇Connects an optional 4-Channel Remote Controller QBL-100 to permit you to adjust volume and 4-channel balance from a distance.

◇Offers two PHONO inputs, two 4-channel tape record/playback circuit, and one 2-channel tape record/playback circuit.

◇Provides a built-in mic-mixing unit, thus gives you a pleasure of duet with your favorite singer for recording.

◇Four-channel front input can be exactly in the same manner as 2-channel inputs, for either ordinary 2-channel reproduction or 4-channel reproduction through the built-in QS Synthesizer/Decoder circuit.

◇Offers facilities for independent adjustments of tonal quality in the front and rear channels.

# 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.

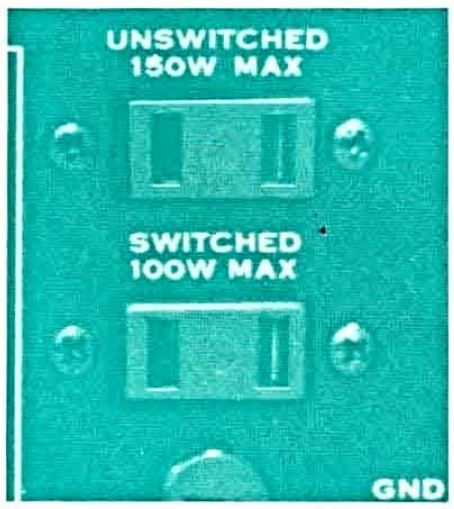
## HEAT RADIATED BY THE SET

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 breaks down. Always try to provide a good circulation of air around the set. But removing the enclosure or the bottom plate to allow good ventilation is not only dangerous but undesirable from the standpoint of electrical performance.

## AC OUTLETS

Of the three 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 two AC outlets, marked 'UNSWITCHED' are not related to the set's power switch.

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

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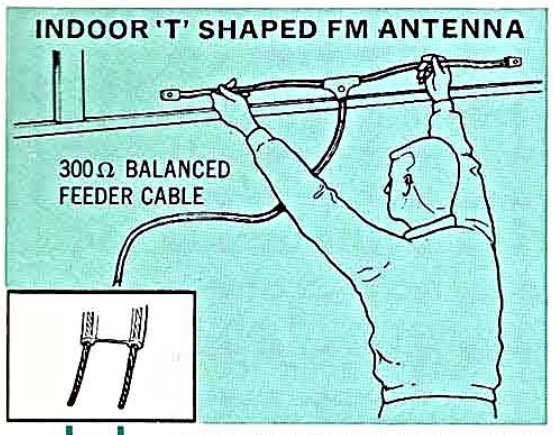


INSTALLING ANTENNAS
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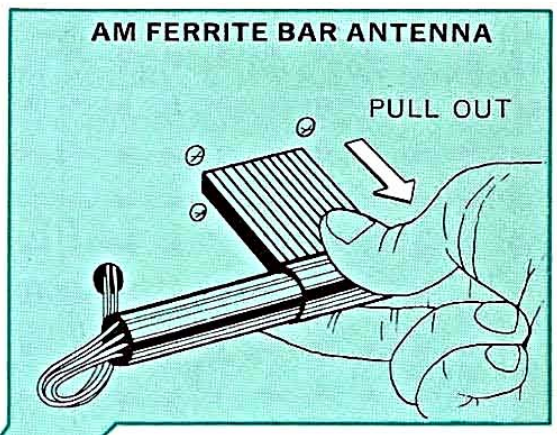
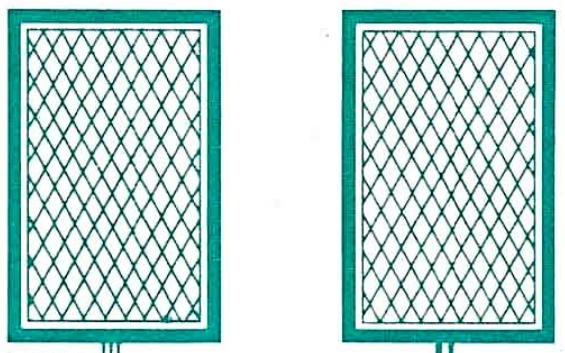
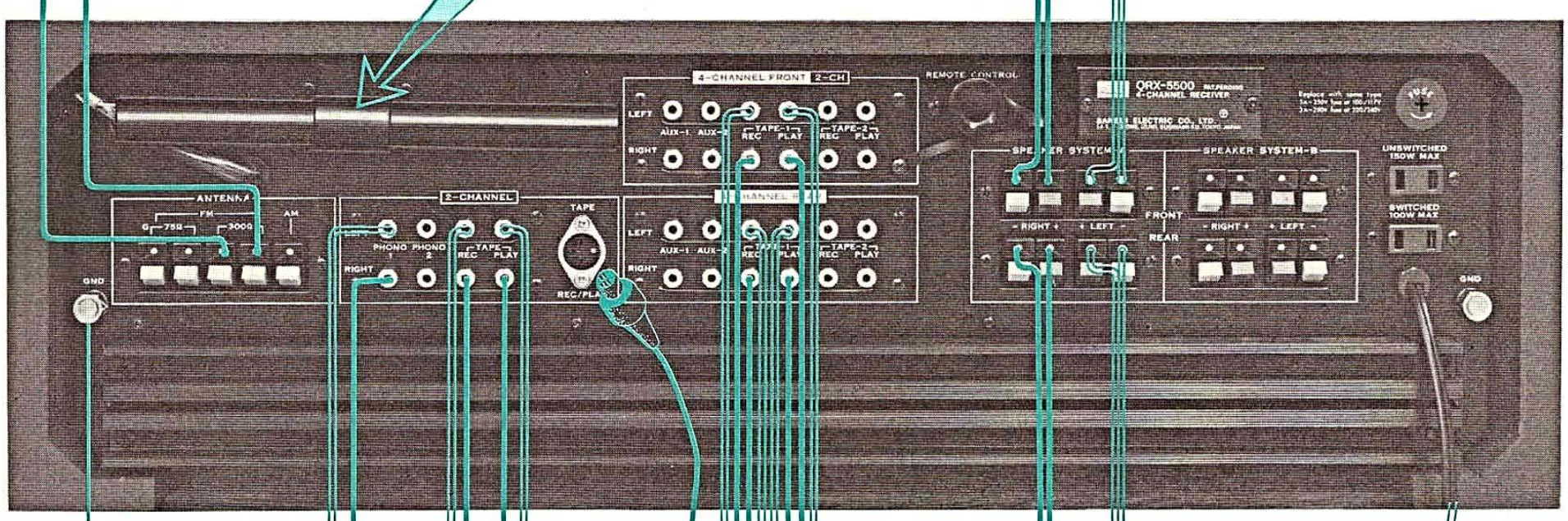



**FRONT SPEAKER SYSTEMS**
(See pp. 9, 10)




GROUNDING FOR TURNTABLE

2-CH. RECORD

2-CH. PLAYBACK

**DIN RECORD/ PLAY-BACK CABLE**
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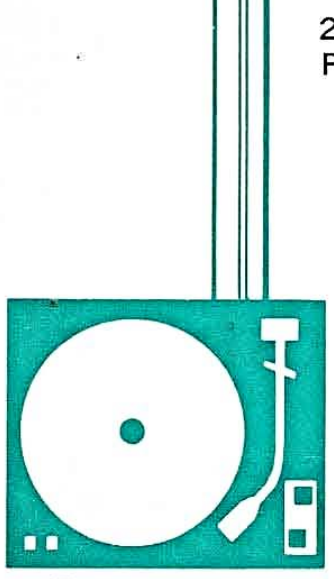
4-CH. (OR 2-CH.) PLAYBACK

4-CH. (OR 2-CH.) RECORD

WALL AC OUTLET



**TURNTABLE**
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**2-CH. TAPE DECK**
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**4-CH. TAPE DECK**
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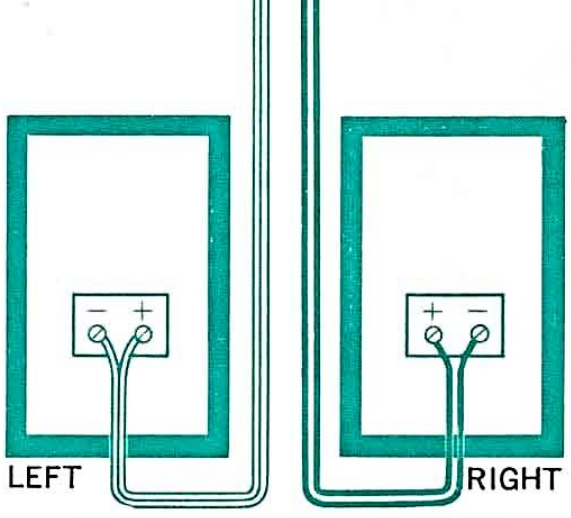



**REAR SPEAKER SYSTEMS**
(See pp. 9, 10)

LEFT CHANNEL

RIGHT CHANNEL

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

# BASIC OPERATING PROCEDURES

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

## 1. POWER

### ①POWER Switch

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

## 2. SELECTING SPEAKER SYSTEMS

### ②SPEAKERS Switch

Selects the speaker systems of the front and rear channels.

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

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

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

**A+B:** To drive both SYSTEM-A and SYSTEM-B pairs.

## 3. SELECTING PROGRAM SOURCES

### ③SELECTOR Switch

Adjust to the program source (except tape) you wish to hear.

**PHONO-1, 2:** For playing 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. In this position, the set's QS Synthesizer Decoder is automatically adjusted for better FM reception.

**FM MONO:** If an FM stereo broadcast is disturbingly noisy for some reason, reset the switch to this position and hear it in mono. Noise decreases considerably.

**AM:** For receiving AM broadcasts.

**AUX-1, 2:** To reproduce whatever program source is connected to the rear-panel 4-CHANNEL AUX inputs. Whenever reproducing a 4-channel discrete source, be sure to set the FUNCTION control to DISCRETE.

### ④TAPE 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 particular tape deck in use at the moment. At all other times, push it once more to restore it to the normal position.

**2-CH:** To play back on the 2-channel tape deck connected to the 2-CHANNEL TAPE inputs and outputs.

**4-CH-1, -2:** To play back on the 4-channel tape deck connected to the 4-CHANNEL TAPE-1 or -2 inputs and outputs.

◇Set the SELECTOR switch to a position other than FM AUTO whenever you push the 2-CH (or 4-CH) TAPE MONITOR switch to reproduce a 2-channel recorded tape and Synthesize the reproduced sound into 4-channel, or if the tape contains encoded 4-channel recording, to decode it back to 4-channel. In both cases, be sure to adjust the FUNCTION control also.

With the SELECTOR switch set at FM AUTO, turning the FUNCTION control to QS SYNTHESIZER or QS REGULAR MATRIX automatically adjusts the set's Synthesizer Decoder to receive better FM reception.

### ⑤MIC MIXING LEVEL Control

When using a microphone, turn this control clockwise. This set assures you to mix your voice signal with the program source being selected by the SELECTOR switch. Turning this control clockwise emphasizes as much the voice signal level from the microphone suppressing the level of another program source according to the extent of turning it clockwise. Overall sound volume is adjusted with the VOLUME control. When only the microphone signal is allowed, turn this control fully clockwise up to the MIC MAX position.

◇Meanwhile, the microphone is not used, turn this control fully counterclockwise up to the SOURCE MAX position.

## 4. INPUT LEVEL ADJUSTMENT

### ⑥LEVEL SET Control

It is necessary to adjust the level of input signals if you wish to take maximum advantage of this set when you are making 4-channel reproducing. To adjust, reproduce a 4-channel program source on the set, and adjust the LEVEL SET control so that none of the four LEVEL meters swing beyond the red numeral "2" during the loudest passages of the music. The meter pointers will deflect less and less as you turn the control counterclockwise.

To reproduce a 4-channel stereo source, see 2-CHANNEL VS. 4-CHANNEL on page 8. Before you make the adjustment, be sure that the FUNCTION control is set to a position other than 2-CH.

**HEADPHONE JACKS**

Accommodate two stereo headphone sets for monitoring or private listening. The upper jack is for the front channels and the lower one for the rear. When listening with headphones only, turn the SPEAKERS switch to 'OFF'.

**4-CHANNEL LEVEL METERS**

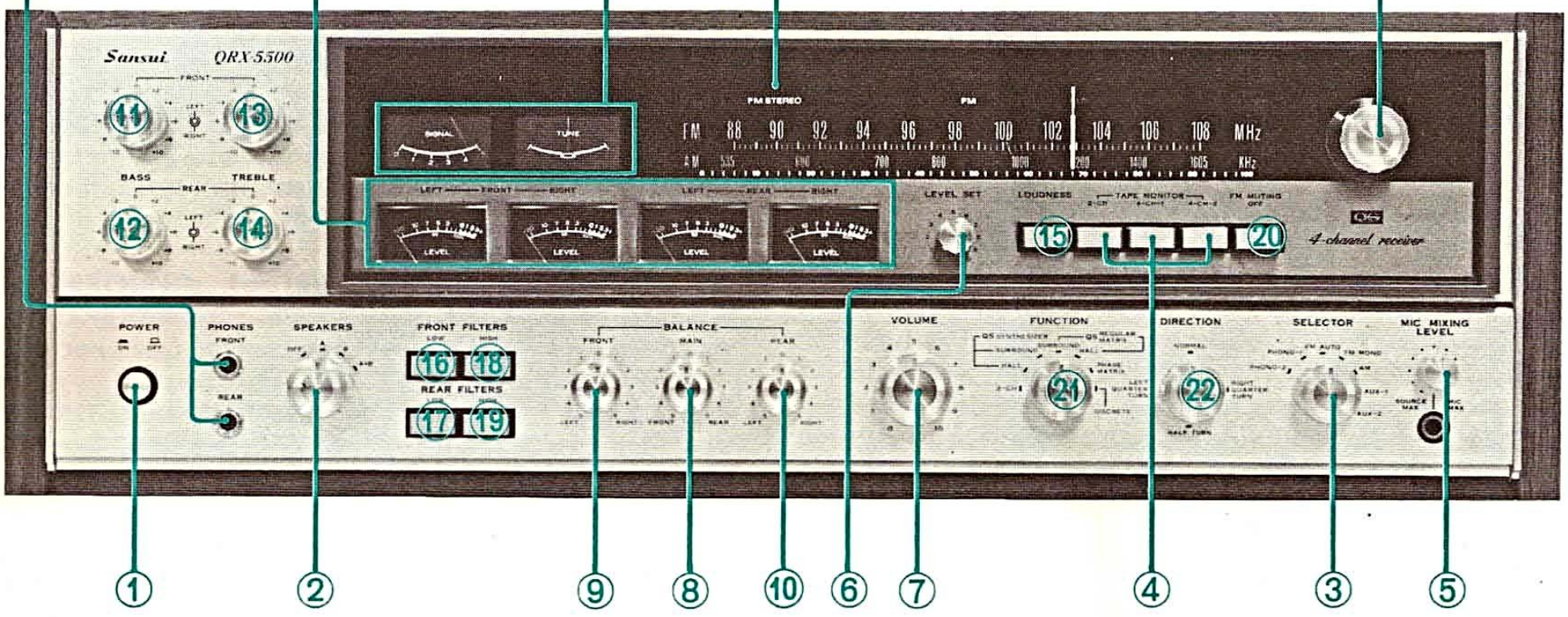
**SIGNAL AND TUNE METERS**

The desired FM station is pinpointed when the SIGNAL meter pointer has swung as far to the right as possible, and then TUNE meter pointer is perfectly centered. An AM station, in contrast, is correctly tuned in when the SIGNAL meter pointer has swung as far to the right as it will go.

**FM STEREO INDICATOR**

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

**TUNING CONTROL**




# 5. VOLUME & BALANCE

(Adjust the volume and the inter-channel balance only after you have adjusted the input signal level as instructed above. Otherwise, sound may fail to come out even if you turn the volume control up, or the sound may be distorted due to excessively high-level signals.)

## ⑦VOLUME Control

Use to adjust the overall sound volume. Turn it clockwise to raise it.

## ⑧MAIN BALANCE Control

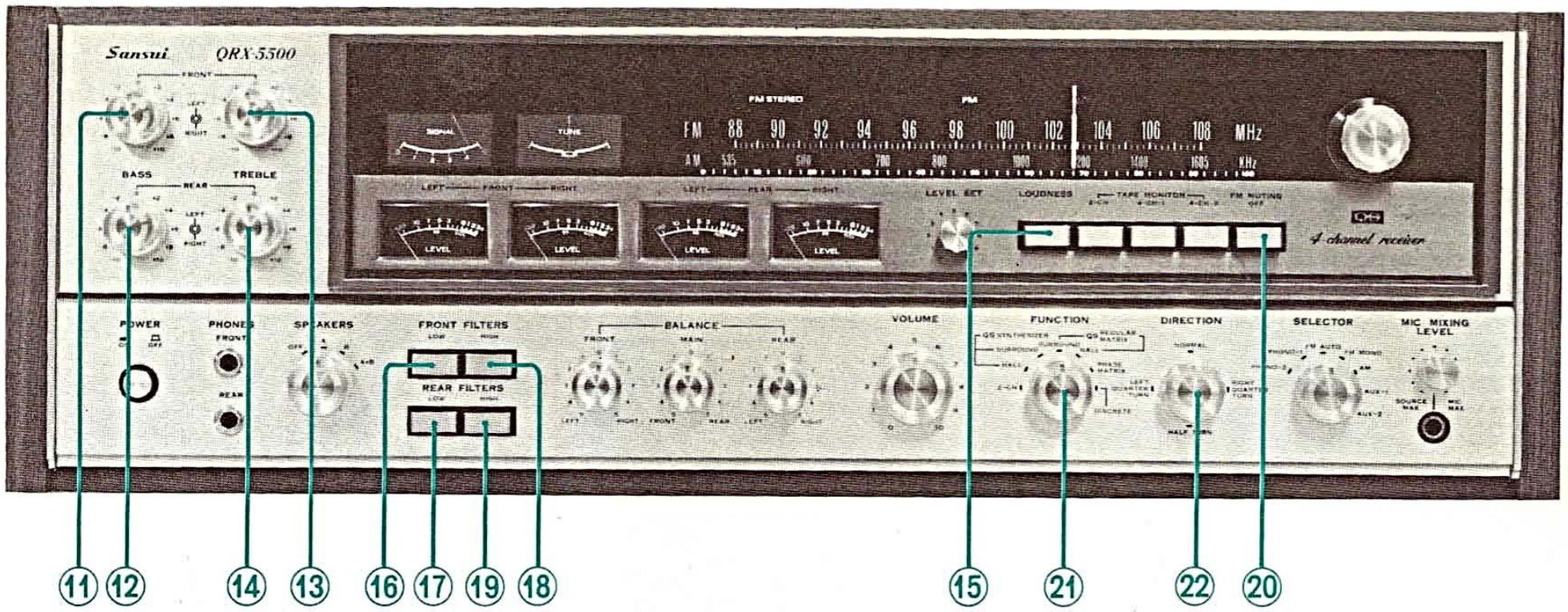
## ⑨FRONT/⑩REAR BALANCE Controls

The standard practice in listening to 4-channel stereo sound is for you to sit at the center of the approximate square formed by your four speakers placed in the so-called 2-2 arrangement. This way you will be seated roughly at identical distances to each speaker. Accordingly, the two balance controls are both usually set to their center positions. If necessary, however, they should be adjusted to suit the particular arrangement of your speakers, your listening position, the nature of the program sources being placed, or your personal preference.

The optimum balance among the four channels is most quickly obtained by adjusting the front left-right balance, then the rear left-right balance, and finally, the overall front-rear balance.

Needless to say, the left-right balance can be separately adjusted for the two front and the two rear speaker systems utilizing the respective balance control. Turning each control counterclockwise from the center raises the sound volume from the left speaker system, and turning it clockwise increases the sound volume from the right speaker system. On the other hand, the front-rear balance is adjusted with the MAIN BALANCE control. Turning it counterclockwise from the center increases the sound volume from the front speaker systems, while turning it clockwise increases that from the rear speaker systems.

# CONTROLLING SOUND TO YOUR TASTE




## TONAL QUALITY

### ⑪FRONT BASS/⑫REAR BASS Tone Control

### ⑬FRONT TREBLE/⑭REAR TREBLE Tone Control

The strength of low-frequency sound, such as is produced by a bass, is adjusted separately for the front two and the rear two speaker systems, utilizing the BASS tone controls. On each control, the outer knob part controls the left channel, and the inner ring part the right channel, hold the other channel still with the fingers of one hand.

The strength of high-frequency sound, such as is produced by cymbals, is similarly adjusted with the TREBLE tone controls.

### ⑮LOUDNESS 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.

## ELIMINATING NOISE

### ⑯FRONT LOW FILTER Switch

### ⑰REAR LOW FILTER Switch

### ⑱FRONT HIGH FILTER Switch

### ⑲REAR HIGH FILTER Switch

Use the LOW FILTER switches to eliminate low-frequency noise. Pushing the FRONT LOW FILTER switch, reduces disturbing low-frequency noise from the front channels such as may be produced by a turntable motor. Pushing the REAR LOW FILTER one, reduces disturbing low-frequency noise from the rear channels. The upper switches are for the front channels, and the lower ones for the rear.

If high-frequency noise disturbes you, push the FRONT and/or REAR HIGH FILTER switches. Surface and other kinds of high-frequency noise will be reduced.

◇If no low- or high-frequency noise disturbes you be sure to keep both switches off.

### ⑳FM 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.

# 2-CHANNEL VS. 4-CHANNEL

## ㉑FUNCTION Control

Use to select the sound reproduction mode most appropriate for your 2-channel or 4-channel program source.

**2-CH:** To hear 2-channel stereo program sources in stereo, utilizing your two front speakers only. Use this position also to hear AM and FM mono broadcasts, mono records and tapes. The built-in QS Synthesizer converts 2-channel signals to 4-channel, but does not work with mono signals.

**QS SYNTHESIZER:** To convert (synthesize) conventional 2-channel stereo program sources to 4-channel stereo sound. The built-in QS Synthesizer operates to transform your room into a concert hall, theater and so forth.

**HALL:** Use this mode for program sources in which the musical instruments and the singers are gathered in the front. The QS Synthesizer will acoustically reconstruct the orchestra or band in front of you.

**SURROUND:** For program sources which sound effective when the musical instruments are all arranged around you, making you feel as if you were participating in the performance as a conductor or player:

**QS REGULAR MATRIX:** To decode and reproduce 4-channel program sources (records, tapes and their broadcasts) encoded into a 2-channel form with the QS regular matrix system. The QS vario-matrix circuit will be put to full use and accomplish impressive 4-channel sound reproduction.

**SURROUND:** The QS regular matrix system is the most effective in this mode because of its square matrix configuration. Each musical instrument will be positioned exactly as in the original performance.

**HALL:** This mode is most appropriate for reproducing 'recoded-live' concerts and so forth. The concert hall effect, with the stage in front of you and the hall ambience around and behind you, will be emphasized.

**PHASE MATRIX:** To decode and reproduce 4-channel program sources (records, tapes and their FM broadcasts) encoded with the CBS SQ matrix system. Sansui's unique front-back logic circuit will reproduce them with excellent front-rear separation.

**DISCRETE:** Set to this position whenever you wish to reproduce discrete 4-channel sound from program sources connected to 4-CHANNEL AUX or TAPE inputs on the rear panel. In such a case, it is also necessary to adjust the SELECTOR switch or the 4-CH TAPE MONITOR switch to select the desired program source.

## ㉒DIRECTION Switch

Lets you turn the 4-channel sound around by 90 degrees at a time.

**NORMAL:** For normal 4-channel sound.

**RIGHT QUARTER TURN:** To turn the sound around by 90 degrees clockwise. Use this position to obtain a normal 4-channel stereo effect when hearing vocal or other types of program source where sound is loud only on the left-hand side.

**HALF TURN:** To turn the sound around by a full 180 degrees. This position will make you feel as if you were right in the middle of the stage.

**LEFT QUARTER TURN:** To turn the sound around by 90 degrees counterclockwise.

## OPERATING PROCEDURE

**1.** Operate the SELECTOR switch or an appropriate tape monitor switch, depending on the program source (record, radio broadcast or tape) you wish to hear.

**2.** Operate the FUNCTION control to obtain the desired 4-channel function mode—QS SYNTHESIZER, QS REGULAR MATRIX, PHASE MATRIX or DISCRETE. If you only wish to hear 2-channel stereo sound from your two front speakers, set the control to 2-CH. If you wish to record 4-channel sound converted from 2-channel sources by the set's QS SYNTHESIZER, refer to TAPE RECORDING on page 16 and COPYING A RECORDED TAPE on page 17.

**3.** Adjust the input signal level, volume and balance, and start listening.

## OPERATION OF FUNCTION CONTROL

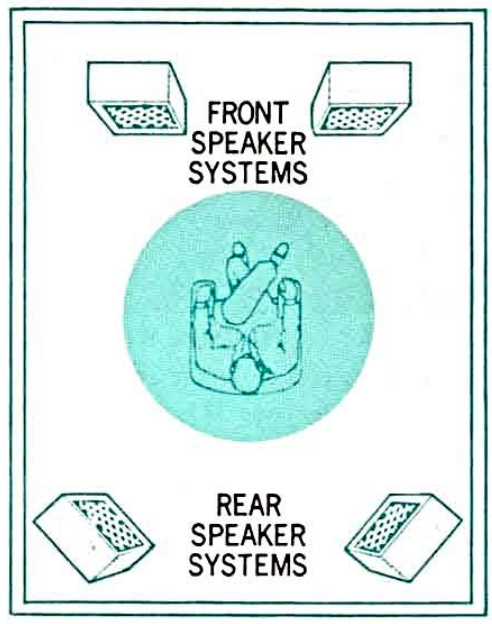
| Type of Program | Production Mode | Set FUNCTION Control to |
|---|---|---|
| Mono | Mono | 2-CH |
| 2-channel stereo | 2-channel | 2-CH |
| | 4-channel (2-channel to 4-channel conversion) | QS SYNTHESIZER |
| QS-encoded 4-channel | 4-channel | QS REGULAR MATRIX |
| CBS SQ-encoded 4-channel | 4-channel | PHASE MATRIX |
| Discrete 4-channel (tape, record) | 4-channel | DISCRETE (To play discrete 4-channel records, special cartridge and demodulator are needed.) |

# PLACEMENT OF SPEAKER SYSTEMS

The placement of your four speaker systems is a very important consideration to enjoy 4-channel sound at its very best. Three basic placement systems will be described below. Experiment with them and find one that best suits the type of music or the layout of your room.

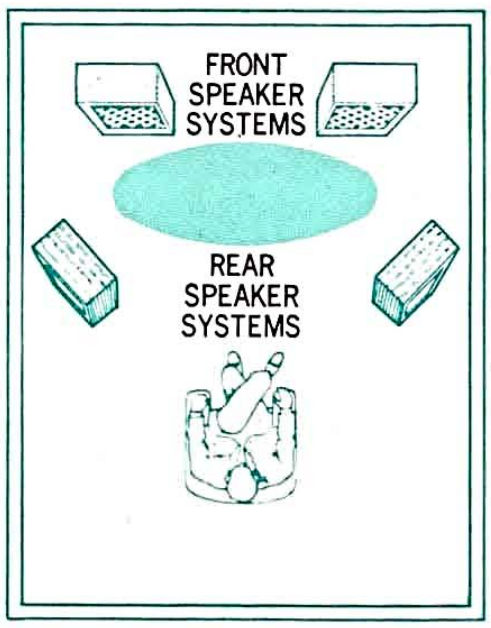
## 2-2 System

This is the standard 4-corner placement system, and is effective for hearing quiet background music, popular music, rock music and others. It is recommended for reproducing QS-encoded 4-channel records or discrete 4-channel tapes.



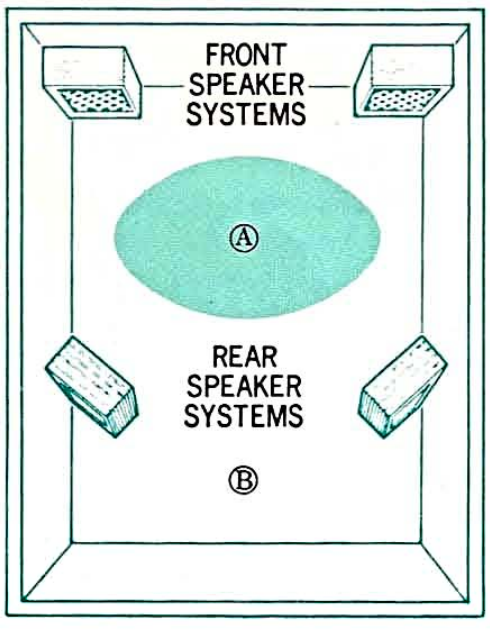

## Front 2-2 System

This system moves the rear two speakers to your front, and is good for objective appreciation of music.

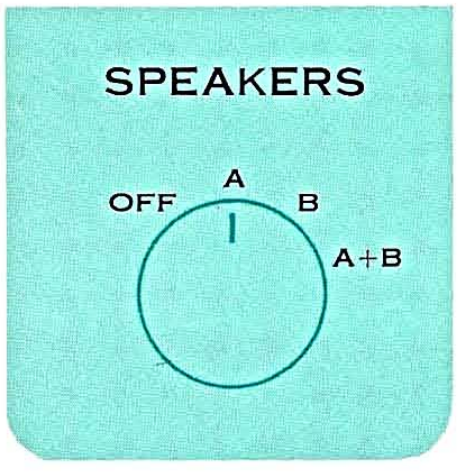


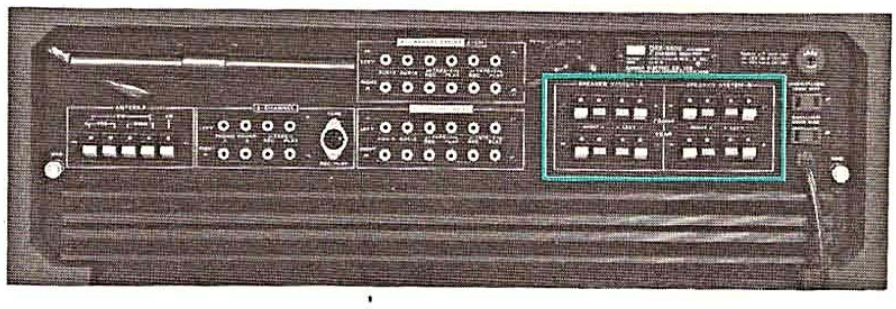

## 2-2/ Front 2-2 Compatible System

If your room is deep, you can place the rear speaker systems as illustrated and enjoy either system. To create the 2-2 system, situate yourself near point (**A**); to enjoy the front 2-2 system, sit near point (**B**).



# CONNECTION OF SPEAKER SYSTEMS



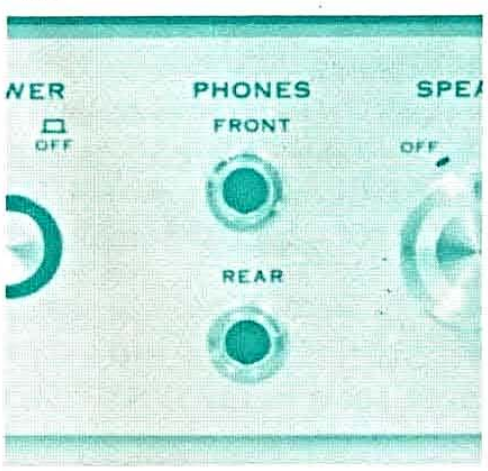
## CONNECTION AND SELECTION OF SPEAKER SYSTEMS

**Connection of a pair of speaker systems (total of four speaker systems):** this set provides as many output terminals as the number of channels for connecting speaker systems with available impedances of 4 to 16 ohms. Connect a pair of speaker systems to the appropriate terminals in the SPEAKER SYSTEM-A or -B group.

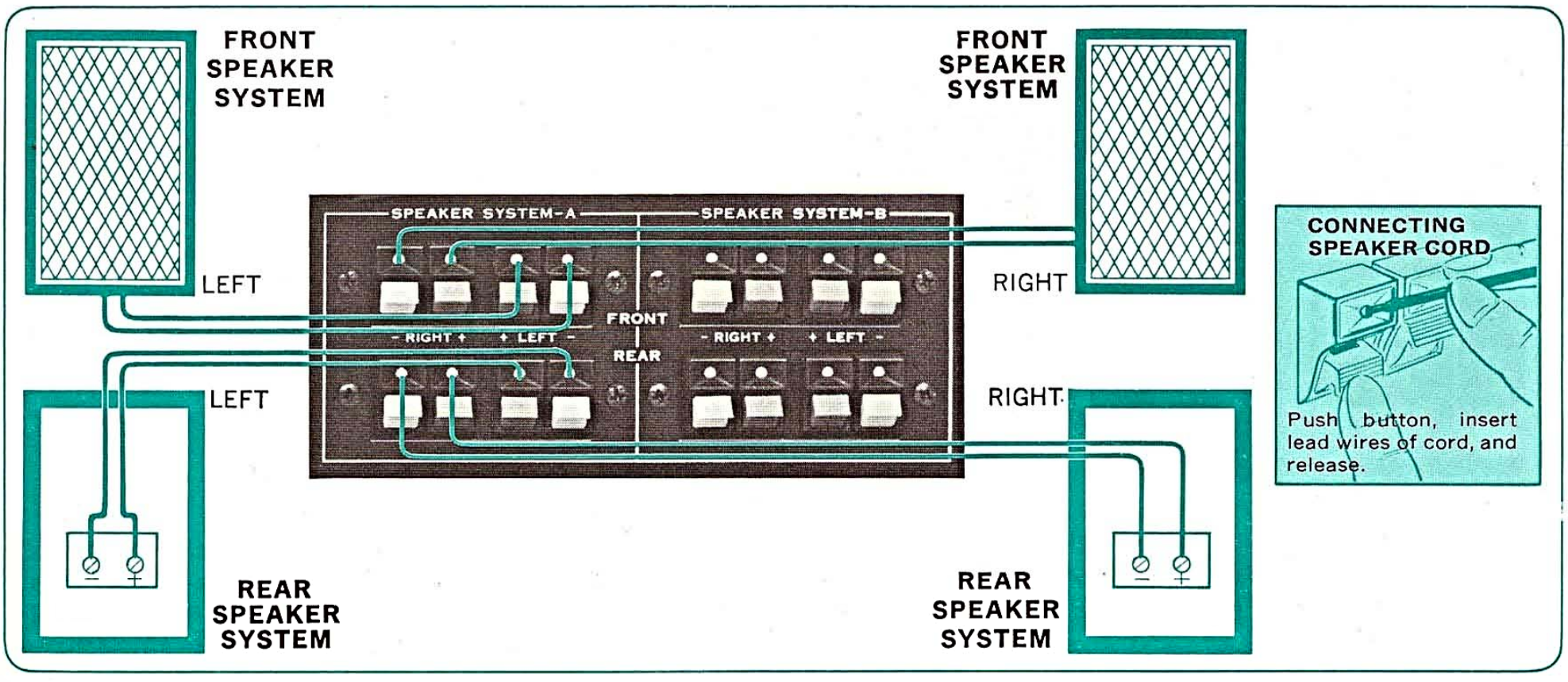
**Connection of two pairs of speaker systems:** When you want to enjoy the same sound produced simultaneously from two sets of speaker systems by setting the SPEAKERS switch to the A+B position, use the speaker system with an impedance of 8 ohms or more. If a speaker system with a lower impedance is ever connected, it could eventually cause the set to break down. This is because connecting two speaker systems in parallel, one or both of which has a impedance lower than 8 ohms, is equivalent to connecting a speaker system having an impedance lower than 4 ohms to.

## CONNECTING HEADPHONES

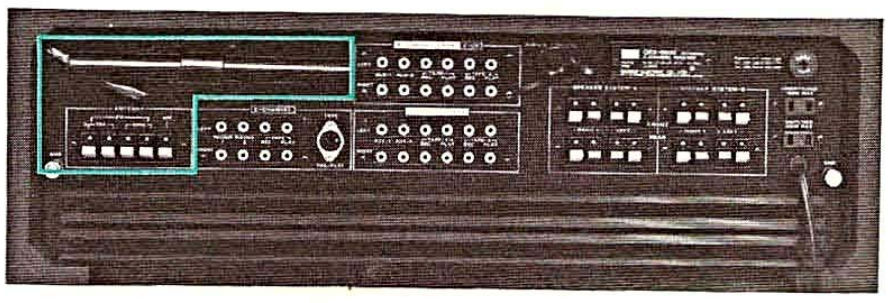
Headphones are connected to the PHONES jacks on the front panel. To hear the front-channel sound, plug a pair of headphones into the FRONT jack. To hear rear-channel sound, plug one into the REAR jack. But be sure to turn the SPEAKERS switch to OFF first unless someone is listening to the sound from speaker systems in another room.




## CONNECTIONS



# RECEIVING RADIO BROADCASTS

**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 black dial window.
**2.** Tune in the desired station by adjusting the Tuning Control. If you wish to tune in a distant station, it may be wise to push the FM MUTING OFF switch first.
**3.** If an FM stereo broadcast is received but disturbingly noisy, turn the SELECTOR switch over to FM MONO and hear it in mono.
**4.** Adjust the FUNCTION control to hear the broadcast in 2-channel or 4-channel stereo. In other words:

If you are receiving an AM or FM mono broadcast (with the FM STEREO indicator remaining unlit), set the control to 2-CH.

To hear a regular FM stereo broadcast in 2-channel stereo, set it to 2-CH. To convert such a stereo broadcast to 4-channel, set it to QS SYNTHESIZER.

To receive a 4-channel FM broadcast of the Regular Matrix System, set the control to QS REGULAR MATRIX. To receive a similar broadcast of the SQ system, set it to PHASE MATRIX. Turning the SELECTOR switch to FM AUTO adjusts the QS Synthesizer and QS Regular Matrix circuits in the set and prepares them for FM stereo reception.

## INSTALLING ANTENNA

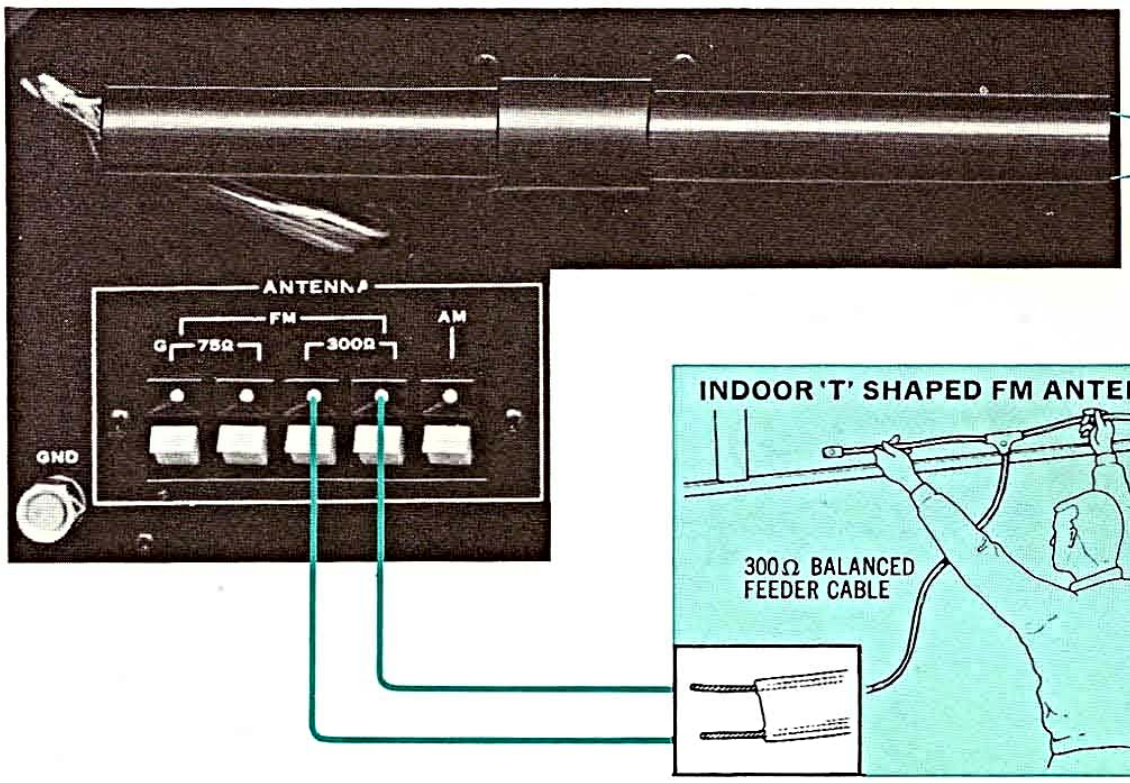
AM ANTENNA

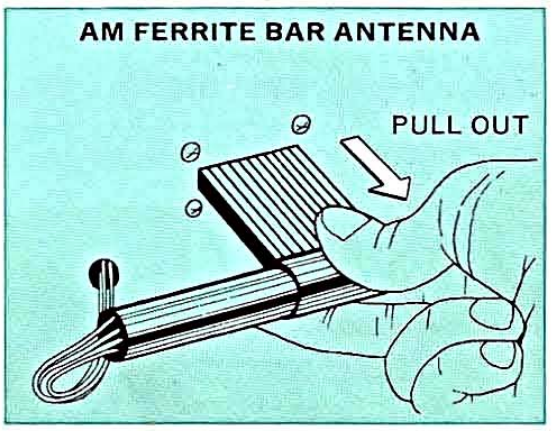
Simply slide out the ferrite bar antenna built into the rear panel of the set.

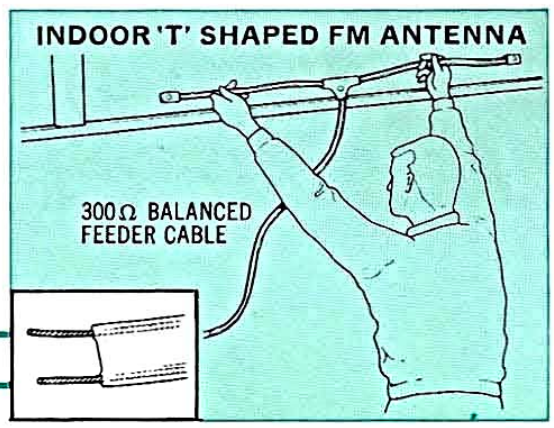
FM ANTENNA

Connect the T-shaped feeder cable antenna (supplied) to the FM 300Ω terminals on the rear panel. Stretch it to a full T shape while actually receiving your favorite FM station, and adjust its direction and position until the best reception is obtained.

# CONNECTIONS



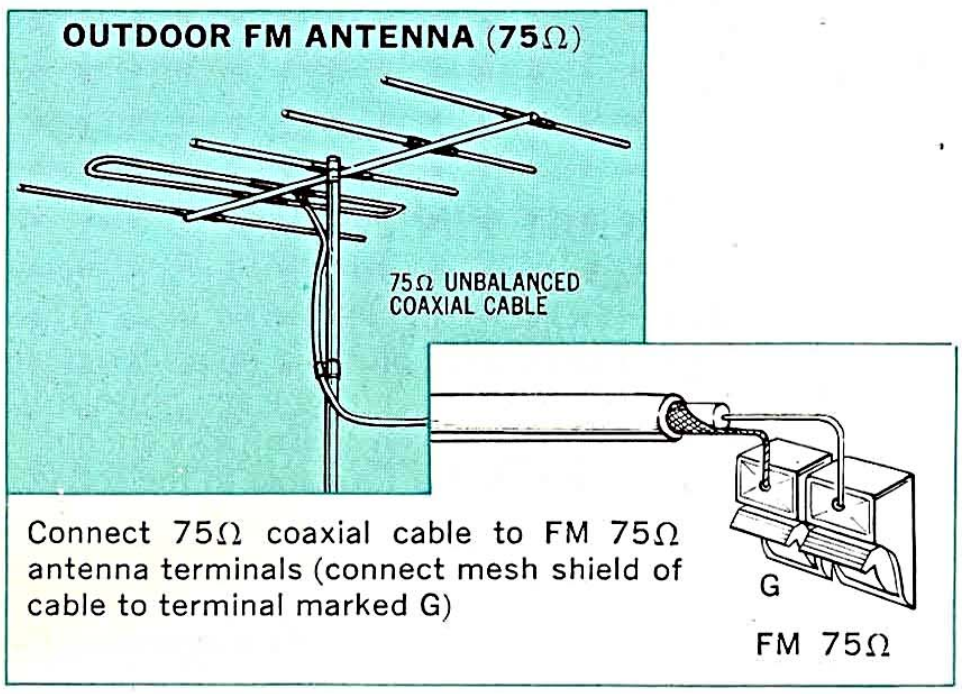



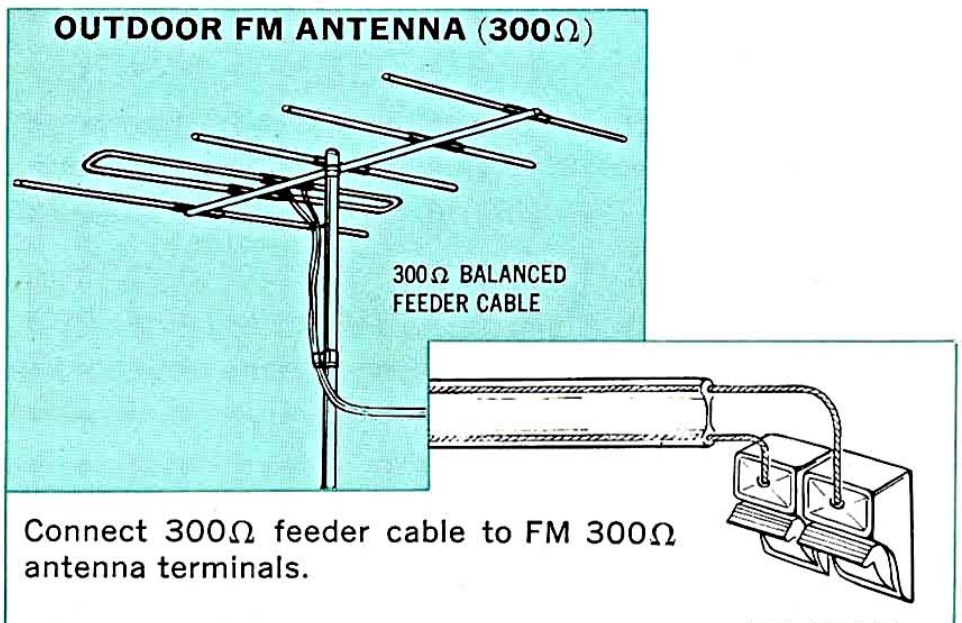

●If possible at all, it is always advisable to install an outdoor FM antenna.

# HINTS FOR BETTER RECEPTION

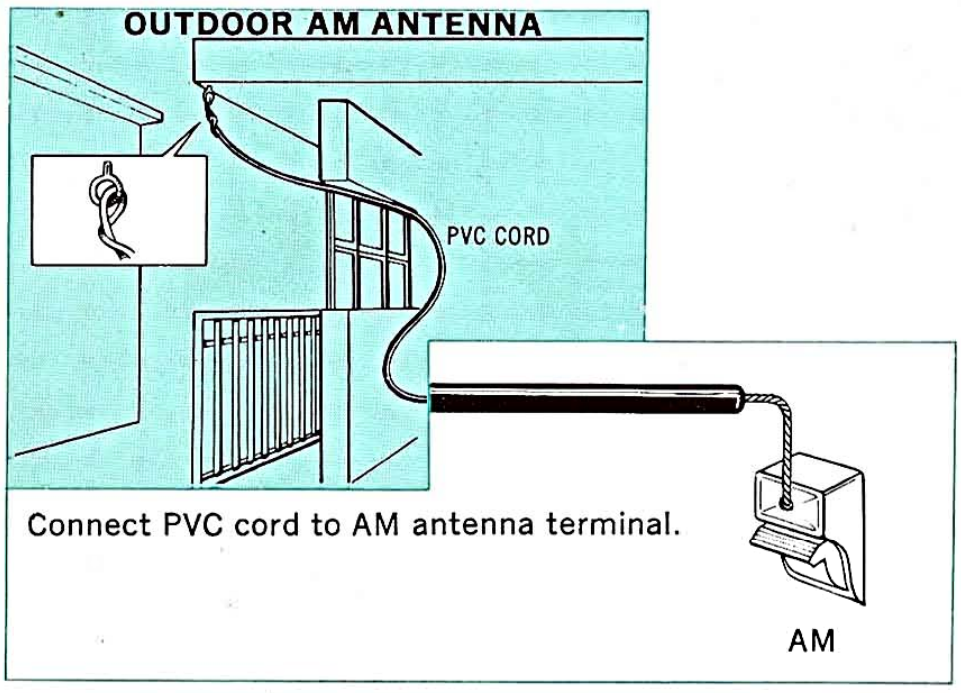
It is always recommended to install outdoor antennas so that you may receive noise-free FM and AM broadcasts with optimum tonal quality. You will find an outdoor antenna—especially one for FM—particularly effective if you are remote from broadcasting transmitters or surrounded by high mountains, buildings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




Connect 75Ω coaxial cable to FM 75Ω antenna terminals (connect mesh shield of cable to terminal marked G)




Connect 300Ω feeder cable to FM 300Ω antenna terminals.




Connect PVC cord to AM antenna terminal.

## FM ANTENNAS

Outdoor FM antennas are commercially available with three, five or seven 'elements'. The more elements an antenna has, the greater 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 out 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

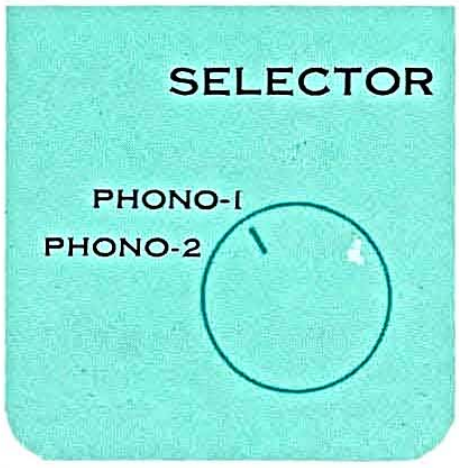
When you cannot obtain the desired results by using the AM ferrite bar antenna only, connect a PVC cord to the AM antenna terminal, extending it outdoors if possible.

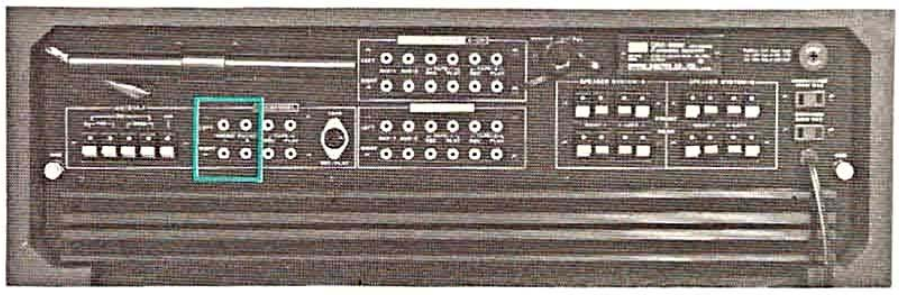
## GROUNDING

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. NEVER connect it to your gas piping.

# PLAYING RECORDS



1. Set the SELECTOR switch to PHONO 1- or -2.
2. Operate your turntable to play the record.
3. Adjust the FUNCTION control to hear the record in either 2-channel or 4-channel stereo. In other words:

* If you want to hear in 2-channel stereo using only the front speaker systems, set the control to 2-CH. Use the same position for any monophonic record also.

If you want to convert your stereo record to 4-channel, set the control to QS SYNTHESIZER.

To listen to a 4-channel record produced with the Regular Matrix System, set the control to QS REGULAR MATRIX.

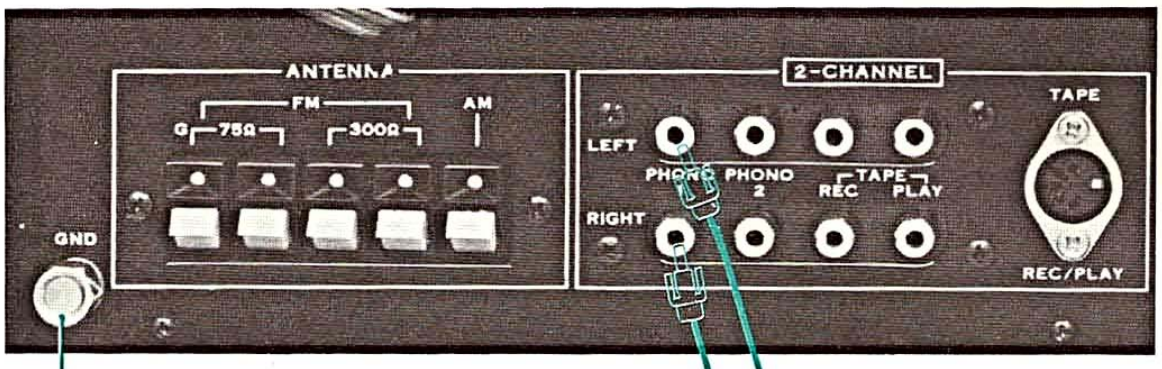
To hear a 4-channel record produced with the SQ system, set it to PHASE MATRIX.

If you have a discrete 4-channel disc demodulator coupled to the 4-CHANNEL AUX inputs, and want to hear a discrete 4-channel record, set the control to DISCRETE. The SELECTOR switch must be turned to 4-CH AUX at the same time.

## SHORT-CIRCUIT PIN PLUGS

When you unpack the set, you'll find special pin plugs inserted into the PHONO-1 and PHONO-2 jacks. Their function is to short-circuit the plus and minus terminals of each input circuit and thus prevent any noise from being generated by them when these jacks are not in use. Therefore, to connect a turntable to the set, you must remove these plugs first. You may keep them elsewhere for later use, or insert them into the AUX or TAPE PLAY jacks. But do NOT insert them into the output jacks (such as TAPE REC), or the sound from the receiver will be cut off.

# CONNECTIONS



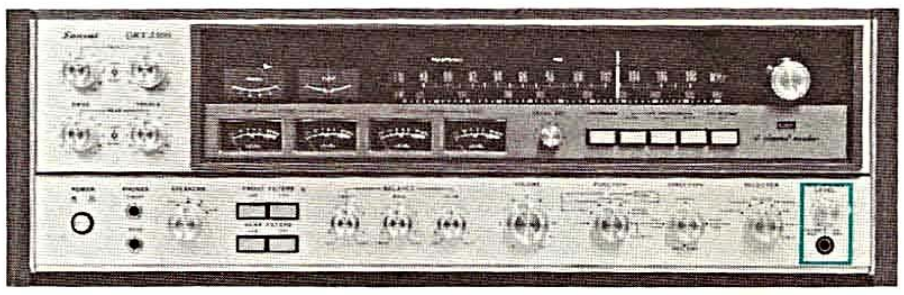

● If your turntable has crystal or ceramic cartridge, connect it to AUX inputs instead of PHONO inputs.

RIGHT
LEFT

**TURNTABLE**
(with Magnetic Cartridge)

**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.

# USING A MICROPHONE

**1.** Turn the MIC MIXING LEVEL control fully clockwise.

Monaural sound can be heard simultaneously from four (or two) speaker systems by using a microphone. When using a microphone, enjoy 2-channel stereo sound by setting the FUNCTION control to 2-CH.

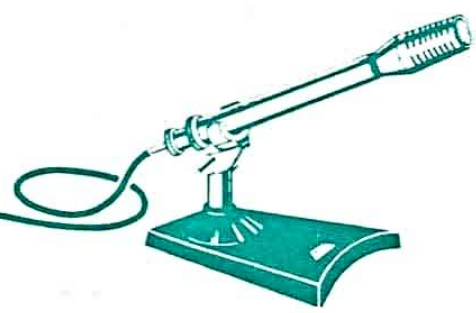
**2.** For mixing the microphone signal with another program source (records or broadcasts), gradually turn the MIC MIXING LEVEL control in order to set the balance between two signal levels. For mixing the tapes with microphone, connect the playback output from your tape deck to the 4-CHANNEL AUX terminals of the rear panel and turn the SELECTOR switch.

**3.** Adjust the overall sound volume using the VOLUME control. When microphone is used, the speaker system sometimes howls (usually called as howling). This phenomenon is caused by such an unvisable loop than the sound from the microphone and electrical signal from the microphone is amplified again. The howling is likely to be generated in particular when the sound volume is raised in an acoustically reflective room. If the howling occurs, turn the facing of the microphone to the speaker system of put the distance between the microphone and the speaker system.

## ABOUT A MICROPHONE

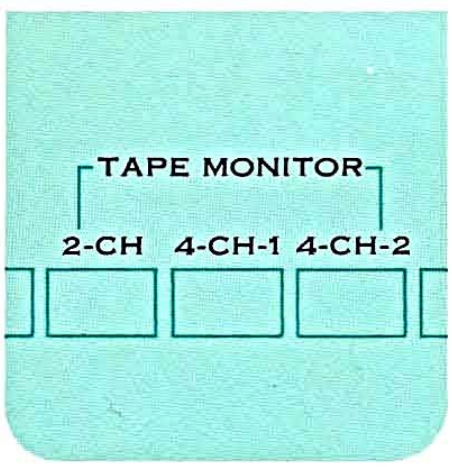
It is recommended to use a high-impedance (10kΩ—50kΩ) microphone, although a low-impedance one (600Ω) will be more effective if you wish to use it several meters away from the set. If using a low-impedance one with a small output (such as a dynamic type low-impedance microphone), you'll need a matching transformer between the microphone cord and the set's microphone jack.

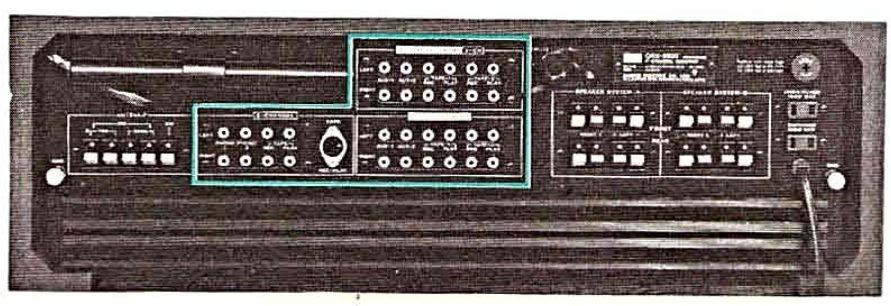
# CONNECTIONS

**MICROPHONE**
(HIGH IMPEDANCE TYPE)

# TAPE PLAYBACK



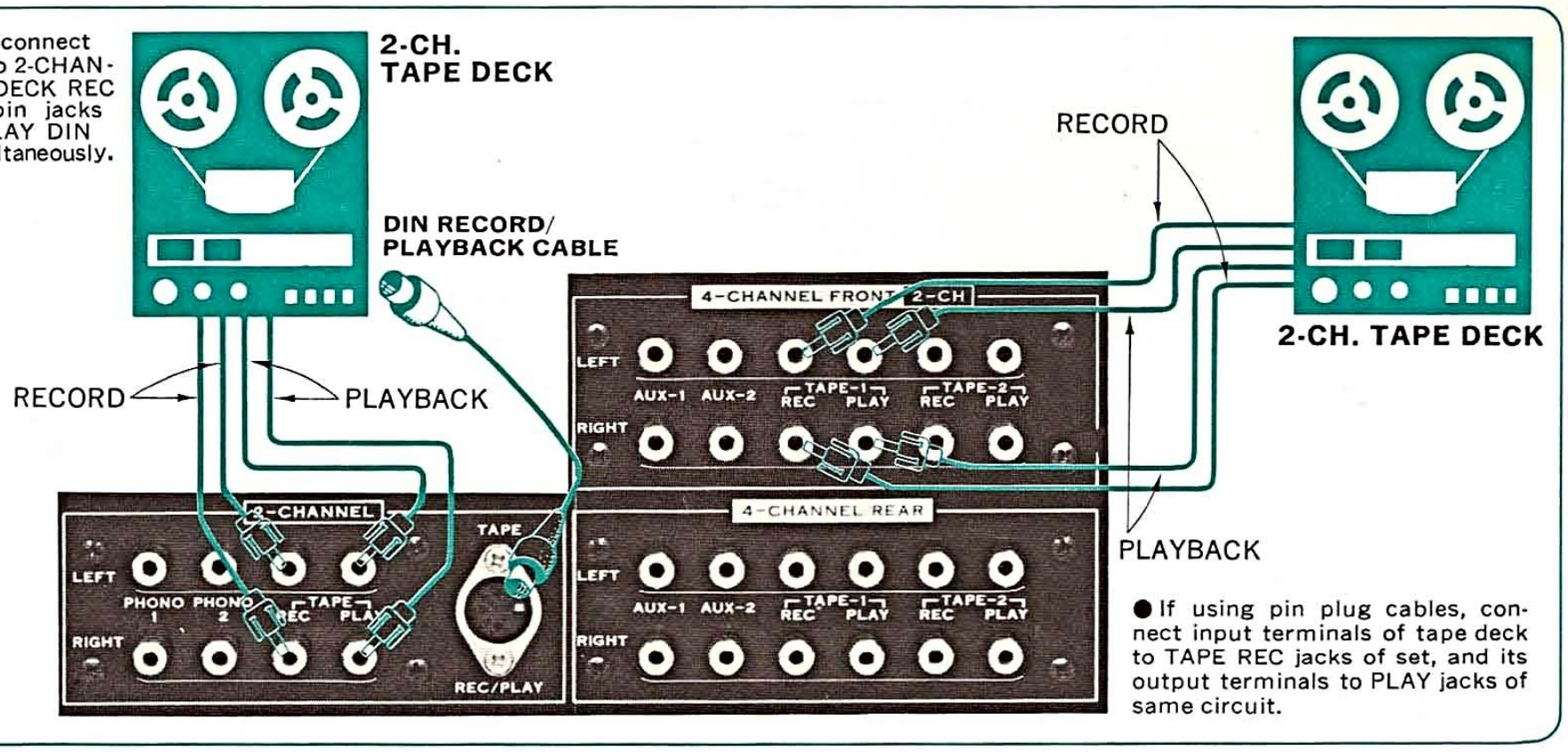
**1.** Push either the 2-CH, 4-CH-1 or 4-CH-2 TAPE MONITOR switch, depending on which tape playback circuit is connecting the tape deck in use.
**2.** Operate your tape deck to start playback.
**3.** Adjust the FUNCTION control to suit the type of program source you are reproducing. If the tape is already recorded in discrete 4-channel, be sure to set the FUNCTION control to DISCRETE.
**4.** Adjust the input signal level, sound volume and balance.

## IMPORTANT

If you have a stereo tape deck connected to the 2-CHANNEL TAPE (or 4-CHANNEL FRONT TAPE) jacks and wish to convert a stereo recorded tape to 4-channel in playback, be sure to set the SELECTOR Switch to a position other than FM AUTO. But if the tape contains music recorded off FM, the Switch should be turned to FM AUTO. The reason for this caution is because turning the SELECTOR Switch to FM AUTO automatically adjusts the QS Synthesizer and QS regular matrix circuits to prepare them for optimum FM stereo reception.

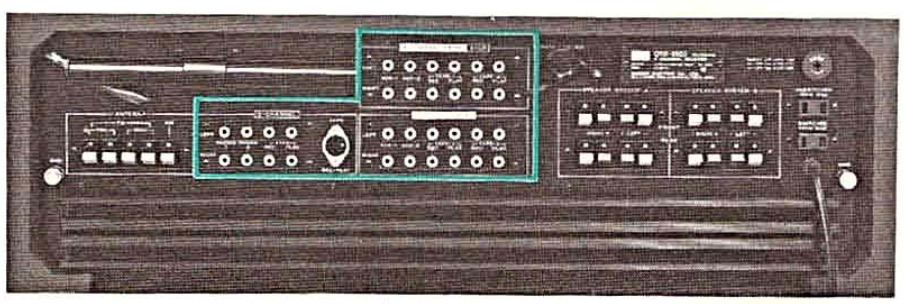
# CONNECTING 2-CHANNEL TAPE DECKS

● DO NOT connect tape deck to 2-CHANNEL TAPE DECK REC and PLAY pin jacks and REC/PLAY DIN socket simultaneously.




● 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.

# TAPE RECORDING

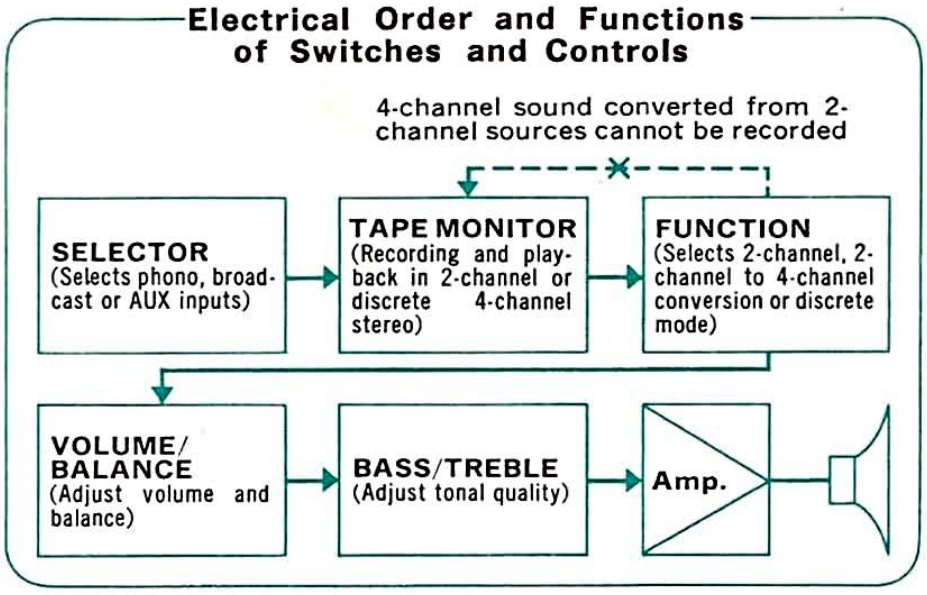



**1.** Prepare the program source you wish to record and keep it ready to go. The SELECTOR switch must be adjusted.
**2.** Operate the tape deck and start recording. Adjust the record levels with controls provided on the tape deck. The FUNCTION control, the volume and tone controls on the set do not affect the sound to be recorded. If you wish to convert 2-channel sound to 4-channel, it should be done at the time of playback.
**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 switches off (protruding) and hear the sound before it is recorded.

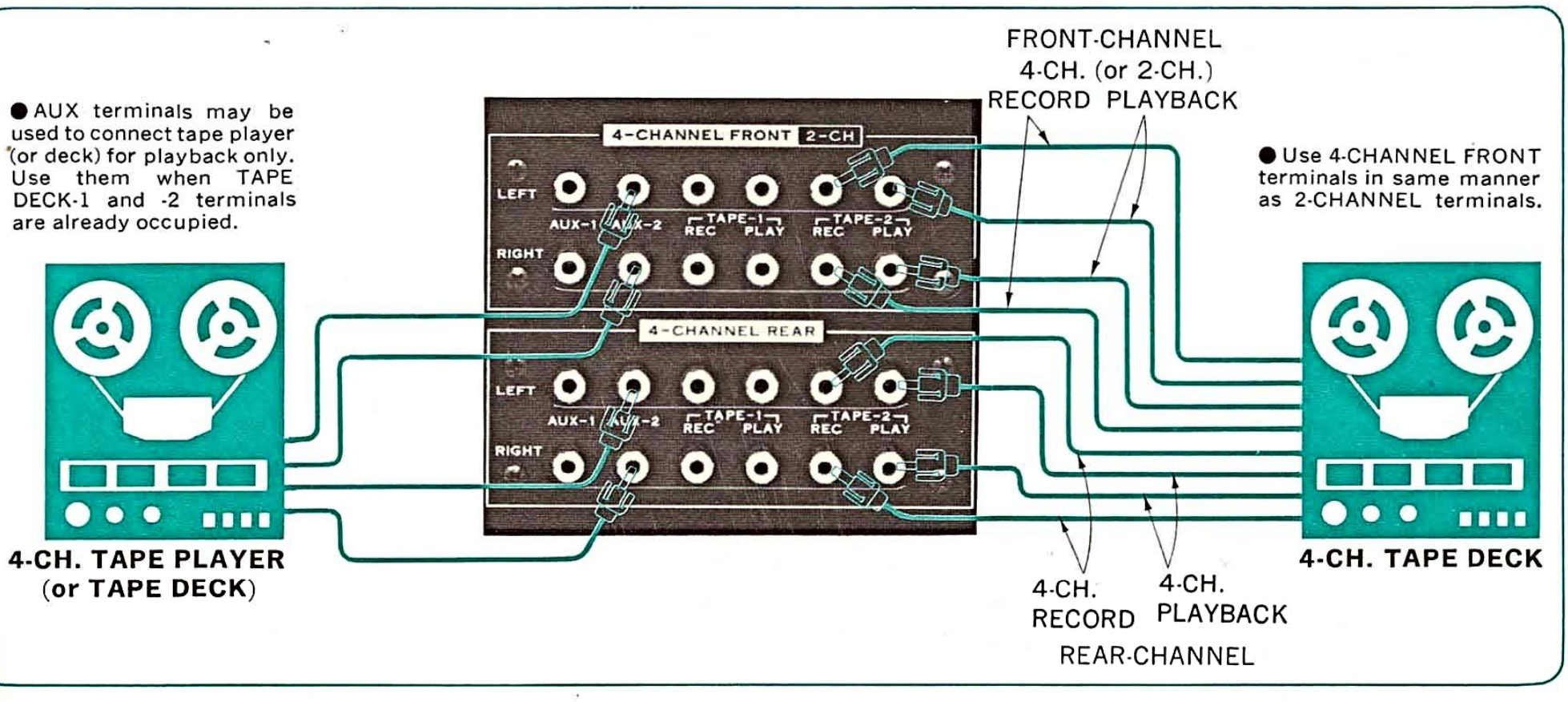
## NOTE

The FUNCTION control has nothing to do with the sound signal to be recorded on the recording tape. Therefore the 4-channel stereo sound from 2-channel sources cannot be recorded. If you wish to convert 2-channel sound to 4-channel, it should be done at the time of playback.

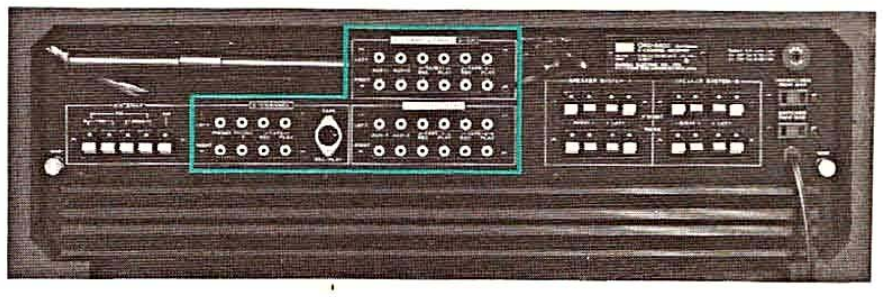
**Electrical Order and Functions of Switches and Controls**




## CONNECTING 4-CHANNEL TAPE DECKS



# COPYING A RECORDED TAPE

**1.** Connect the tape deck that you wish to use for playback, to either the 2-CHANNEL TAPE or 4-CHANNEL TAPE-1 jacks; then connect the one that you wish to use for recording to either of the two unused sets of tape record/playback jacks.
**2.** Push the TAPE MONITOR switch that represents the tape record/playback jack connecting the tape deck you are going to use for playback.
**3.** Operate the two tape decks and start copying the recorded tape from one tape deck onto the other.
**4.** If you wish to monitor the copying process, push the TAPE MONITOR switch that represents the tape record/playback jacks connecting the tape deck are using to record.
if that switch is kept off (protruding), you'll hear the sound recorded on the original tape before it is copied onto another tape.

## TAPE CIRCUITS

**1.** The three tape record/playback circuits in this set are located in this set in the order of 2-CH, 4-CH-1 and 4-CH-2. Copying of a recorded tape is therefore possible from the 2-CH to the 4-CH-1 circuit, from the 2-CH to the 4-CH-2 circuit, or from the 4-CH-1 to the 4-CH-2 circuit. However, a 2-channel recorded tape cannot be converted to 4-channel during this copying process and copied onto a 4-channel tape deck.
**2.** If you are using either the 4-CH-1 or 4-CH-2 circuit to connect a 2-channel tape deck, be sure to use the FRONT jacks.

# QUICK CHECK LIST OF SIMPLE MISTAKES

● Some of the troubles which seem to result from a malfunction of the set—including the complete absence of sound from your speaker systems—are caused by wrong operation and the negligence of simple maintenance, and can bequickly corrected by making a simple invesigation and providing simple cures. If, after making all the preparations and operating the set as required, no sound is heard from your speaker systems, go over the following check list once to make sure you haven't made any simple mistake.

## CONNECTIONS

**1.** Have you connected the power cord to a wall AC outlet?
**2.** Are the connecting cables for the turntable and tape deck not loose?
**3.** Are the speaker cables not loose from the set's or the speaker systems?
**4.** Are the left-right and plus-minus connections of speaker systems; the input cables wrong?

## OPERATING PROCEDURE

**1.** Have you turned on the POWER switch?
**2.** Is the SPEAKERS switch set the correct position?
**3.** Are the TAPE MONITOR switches not push to ON position; though you don't want to reproduce a tape?
**4.** Is the SELECTOR switch set to the correct position?

## HINTS FOR QUICK CHECKING

**1.** If absolutely no sound is heard from the speaker systems, check the program source components tape deok turntable, etc.), set and speaker systems in that order and see if they are connected and operated correctly. The most common causes are, believe it or not, the power cord unplugged from the wall AC outlet and the connecting cables unplugged from the jacks.
**2.** If the set receives a broadcast normally, it is not faulty. Check other components and their connections.
**3.** If hum noise is of a constant level, it may be stopped simply by connecting the grounding lead of the program source component(s) to the set's GND terminal.

# SIMPLE MAINTENANCE HINTS

## HOW TO USE THE AUX TERMINALS

The term AUX is an abbreviation for auxiliary. If your turntable has a crystal or ceramic cartridge, it should be connected to the AUX FRONT terminals.

The AUX terminals have the same electrical function as TAPE PLAY terminals. So you can connect a tape deck or player to them, if your TAPE PLAY terminals are already occupied. Playback function will be obtained.

A tuer or an amplifier-equipped adaptor (such as a discrete 4-channel discs demodulator) may also be connected to the AUX terminals. The AUX terminals have an input sensitivity of 100 milivolts. So most audio components having an output voltage of 100 milivolts or so can be connected. If you are not certain whether you can connect a particular component to the AUX terminals, look up its operating manual or specifications.

The FRONT portion of the 4-CHANNEL AUX terminals can be used just like 2-channel AUX terminals. Two-channel program sources reproduced on a 2-channel or 4-channel tape deck connected to those terminals can be converted to 4-channel with the set's built-in QS Synthesizer.

## 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 an RCA type plug soldered to each end. They are used to connect a turntable, tape deck or 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 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.

## ABOUT THE SPEAKER PROTECTION CIRCUIT

This set offers double protection for the important power transistors and your speakers. One, an electronic relay-equipped protection circuit; two, special quick-acting fuses that instantly blow should an abnormal condition occur inside the set or at the speaker terminals. Together, they protect the power transistors and your speakers from such accidents as a careless short-circuit of the speaker terminals, a mis-connection of the speaker cords.

The relay-equipped protection circuit also serves to cancel the unpleasant popping noise that is generated when the power switch is turned on. It also works the same way when a stereo headphone set is inserted to the set's front-panel jack. To allow stable operation of the electronics involved, the set itself is designed so that sound will be heard after a few seconds pause after the POWER switch is turned on.

## IF SPEAKER SYSTEMS ARE OUT OF PHASE

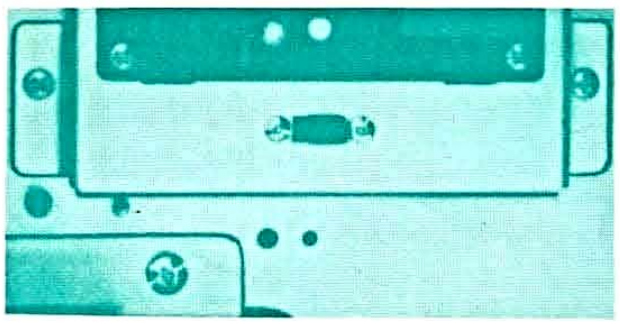
If you were careless when connecting the speaker systems and the plus and minus polarities are not in the same order for the left speaker system and the right speaker system, they would be reverse-phased. This will cause a 'drop-out' of sound at the exteme ends and the middle of the line between the 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 polaries are in order, you can detect it by reproducing a mono source (such as an AM broadcast). Sound will seem to come from a point halfway between the two speakers.

## 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.



## HOWLING AND HUM

Take care never to place a turntable on or too near a speaker system, or the vibration produced by the speaker system is transmitted and causes an oscillating phenomenon called howling. it is best to keep these components completely separated, but if this is impossible, place a thick cushion between them. Humming, in contrast, is a phenomenon caused by incomplete or incorrect turntable-amplifier connections. Should this occur, check to see if all connections are completely made and if the connecting cables are sufficiently thick. Hum noise may sometimes be eliminated by connecting the grounding lead of the turntable to the GND terminal on the rear panel.

## ABOUT THE QUICK-ACTING FUSES

When a Selector 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 four quick-acting fuses inside the set. To reach them, remove the wood case from the set. If you find any of them blown, discover and eliminate the cause of the blowout, and replace it with a 3.5-ampere quick-acting fuse 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 Function Indicator sould 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 (6-ampere for 100 to 117 volts, 3.5-ampere for 220 to 240 volts).

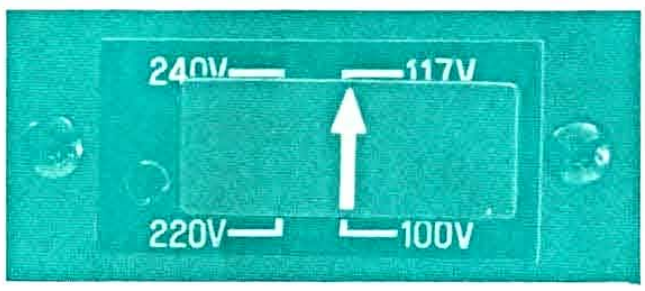
Never use a fuse of a different capacity or a piece of wire, even as a stop-gap measure, or serious danger could result.

## ABOUT THE 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 6-ampere fuse. For operation at 220 to 240 volts, use a 3.5-ampere one.




## LIST OF ACCESSORIES

| | |
|---|---|
| FM ANTENNA | 1 |
| QUICK-ACTING FUSES (3.5A) | 4 |
| OPERATING INSTRUCTIONS | 1 |
| OPERATING INSTRUCTIONS SHEET | 1 |

Operating Instructians **Stock No. 9207610**

# SPECIFICATIONS

**AUDIO SECTION**

CONTINUOUS RMS POWER OUTPUT
.....25 Watts per channel × 4
(both channels driven)
LOAD IMPEDANCE .....8Ω
POWER BAND .....20 to 20,000Hz
TOTAL HARMONIC DISTORTION
.....less than 0.5% (from AUX)
Music power (IHF).....220W (4Ω 1,000Hz)
160W (8Ω 1,000Hz)
Continuous rms power output ..25×4W (8Ω 1,000Hz)
INTERMODULATION DISTORTION (at rated power output 70Hz : 7,000Hz = 4 : 1 SMPTE method)
OVERALL (from 4-CHANNEL AUX)
less than 0.3%
DAMPING FACTOR .....40 (8Ω)
INPUT SENSITIVITY AND IMPEDANCE (1,000Hz, for rated power output)
2-CHANNEL PHONO-1, 2 ..2.5mV 50kΩ
(Max. input capability; 250mV at 0.5% distortion)
2-CHANNEL TAPE
PLAY Pin Jacks .....100mV 50kΩ
REC/PLAY DIN Socket ..100mV 50kΩ
4-CHANNEL AUX .....100mV 50kΩ
4-CHANNEL TAPE-1, 2
PLAY Pin Jacks .....100mV 50kΩ
MIC (monophonic) .....2.5mV 10kΩ
RECORDING OUTPUT
2-CHANNEL TAPE
REC Pin Jacks .....100mV
REC/PLAY DIN Socket ..30mV
4-CHANNEL TAPE-1, 2
REC Pin Jacks .....100mV
FREQUENCY RESPONSE (at 1 Watt output)
OVERALL (from 4-CHANNEL AUX)
30 to 30,000Hz $^{+1.0}_{-1.5}$ dB
EQUALIZATION (RIAA curve) 30 to 15,000Hz ±1.0dB
CROSSTALK (FUNCTION control : 2-CH, 1,000Hz)
better than 50dB
HUM AND NOISE (IHF)
2-CHANNEL PHONO ....better than 70dB
4-CHANNEL AUX .....better than 80dB
SWITCHES AND CONTROLS
BASS .....+12dB, −12dB at 50Hz
TREBLE .....+12dB, −12dB at 15,000Hz
LOUDNESS .....+8dB at 50Hz,
+3dB at 10,000Hz
LOW FILTER .....−10dB at 50Hz (6dB/oct.)
HIGH FILTER .....−10dB at 10,000Hz
(6dB/oct.)
SYNTHESIZER/DECODER ....QS regular matrix system with QS vario-matrix circuit.

**TUNER SECTION**

<FM>
TUNING RANGE.....88 to 108MHz
SENSITIVITY (IHF) .....1.9μV
(Max. input capability: 120dB)
SIGNAL TO NOISE RATIO (mono)
better than 65dB
CAPTURE RATIO (IHF) .....less than 2.0dB
IMAGE REJECTION .....better than 75dB
IF REJECTION .....better than 90dB
SPURIOUS RESPONSE REJECTION
better than 80dB
SELECTIVITY .....better than 60dB
TOTAL HARMONIC DISTORTION
Mono .....less than 0.3%
Stereo .....less than 0.5%
STEREO SEPARATION .....better than 37dB
FREQUENCY RESPONSE ....30 to 15,000Hz $^{+1.0}_{-3.0}$ dB
ANTENNA IMPEDANCE ....300Ω balanced,
75Ω unbalanced

<AM>
TUNING RANGE .....535 to 1,605kHz
SENSITIVITY (bar antenna) ..50dB/m
IMAGE REJECTION .....better than 80dB
IF REJECTION .....better than 80dB
SELECTIVITY .....25dB

**OTHERS**

POWER REQUIREMENTS
Voltage.....100, 117, 220, 240V 50/60Hz
Consumption .....140W (rated), 400VA (max.)
DIMENSIONS .....594mm (23 3/8")W
203mm (8")H
370mm (14 9/16")D
WEIGHT .....21.6kg (47.5 lbs.) Net
24.8kg (54.6 lbs) Packed

* Design and specifications subject to change without notice for improvements.

# CONDITIONS MISTAKEN FOR BREAKDOWNS

| PROGRAM SOURCE | SYMPTOM | PROBABLE CAUSE | WHAT TO DO |
|---|---|---|---|
| Tuner. | * Noise during AM reception. | * Interference by adjacent stations (called beat interference).<br>* TV set is being used simultaneously. | * Peculiar to AM waves, and unavoidable to some extent.<br>* Move TV set away from the set. |
| | * 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.<br>* 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. | * Adjust antenna location and height for maximum sensitivity.<br>* Keep antenna away from streets. |
| | Note: In many cases, high-frequency noise during radio reception cannot be entirely eliminated. Try turning on set's HIGH FILTER switch or turning TREBLE control counterclockwise. | | |
| Turntable. | * Hum noise. | * Unshielded cables used to connect turntable.<br>* Minus (ground) wire of connecting cable is not connected completely.<br>* Turntable motor or tonearm is not grounded. | * Use regular shielded cables.<br>* Examine connecting cables, especially their plugs.<br>* Connect grounding lead of turntable to set 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.<br>* Change location of turntable and speaker systems. |
| | * Sound is shaky. | * Dust on record or pickup stylus.<br>* Worn pickup stylus.<br>* Improper stylus pressure. | * Clean record and pickup stylus.<br>* Replace pickup stylus.<br>* Adjust stylus pressure. |
| Tape Deck. | * Hiss noise. | * Tape heads are magnetized. | * Demagnetize heads.<br>* Turn on HIGH FILTER switch.<br>* Connect noise reduction adaptor. |
| | * Sound is not clear. | * Dust on tape heads.<br>* Tape is not pressed tightly against heads. | * Clean heads.<br>* 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.<br>* 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. |

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