

# OPERATING INSTRUCTIONS

## 4-CHANNEL RECEIVER

# SANSUI QRX-7500



**Sansui**

SANSUI ELECTRIC CO., LTD.

We are grateful for your choice of the Sansui QRX-7500 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.





## 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 the SQ\* system to properly reproduce them in 4-channel stereo.
- ◆ The new Sansui-improved built-in CD-4 demodulator makes it possible to reproduce discrete 4-channel records, with increased inter-channel separation.

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

\*SQ is a trademark of Columbia Broadcasting System, Inc.

# 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 openings 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 openings 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.

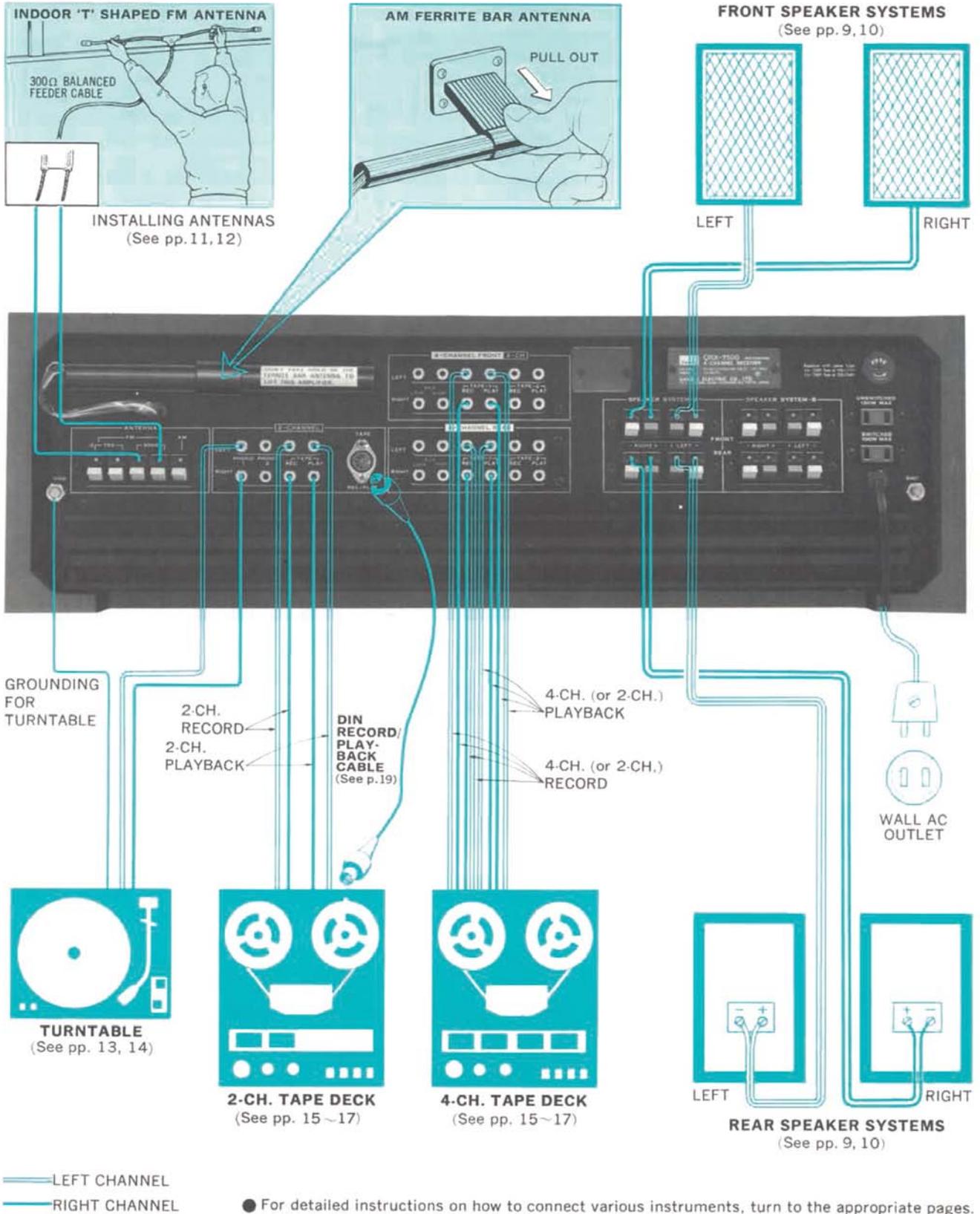
The 'SWITCHED' outlet has a 100-watt capacity. The 'UNSWITCHED' ones have a combined capacity of 150 watts. Do not connect any equipment whose power consumption exceeds the capacity of each outlet, as it is extremely dangerous.



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# REAR-PANEL CONNECTIONS



# 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

### ① POWER Switch

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

## 2. SELECTING SPEAKER SYSTEMS

### ② SPEAKERS 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

### ③ SELECTOR 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.

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

### ④ 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 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.

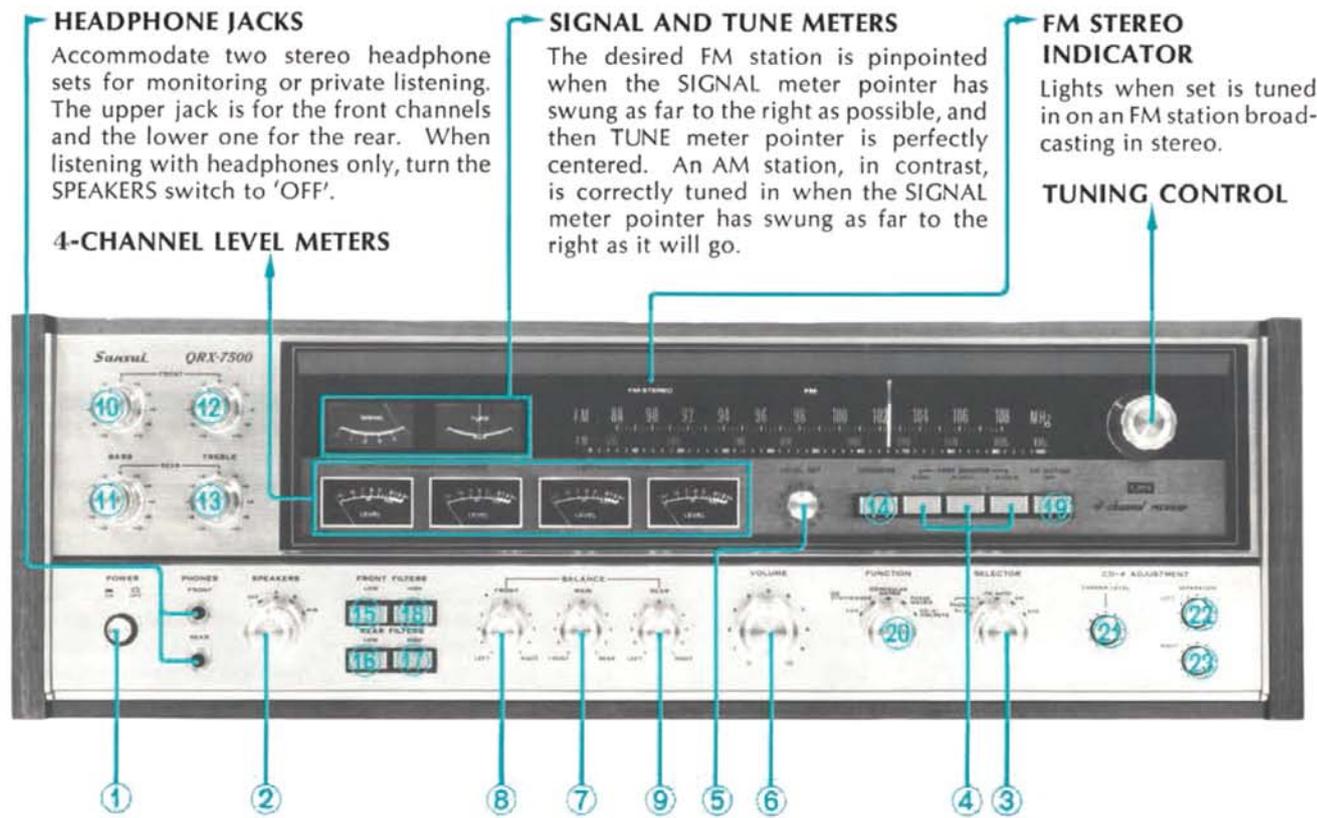
With the SELECTOR switch set at FM AUTO, turning the FUNCTION control to QS SYNTHESIZER or QS REGULAR MATRIX automatically adjusts the set's Synthesizer Decoder to receive better FM reception.

## 4. INPUT LEVEL ADJUSTMENT

### ⑤ LEVEL 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 any 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'.

**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.

**4-CHANNEL LEVEL METERS**

**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.)

**⑥ VOLUME Control**

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

**⑦ MAIN BALANCE Control**

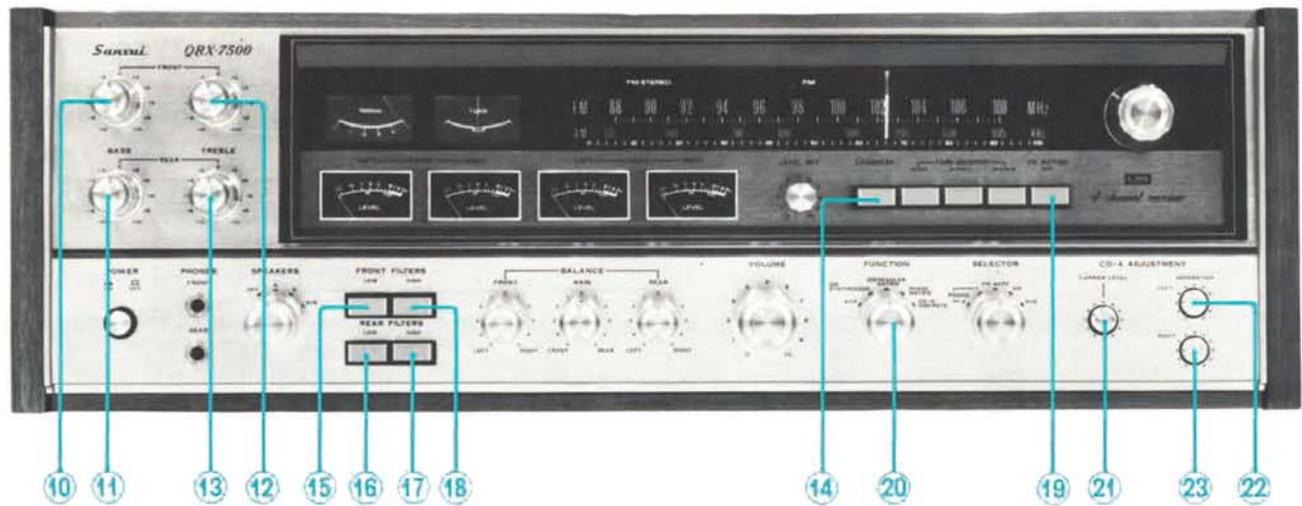
**⑧ FRONT / ⑨ REAR BALANCE Controls**

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

### ⑩FRONT BASS / ⑪REAR BASS Tone Control

### ⑫FRONT TREBLE / ⑬REAR 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.

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

### ⑭LOUDNESS 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

### ⑮FRONT LOW FILTER Switch

### ⑯REAR LOW FILTER Switch

### ⑰FRONT HIGH FILTER Switch

### ⑱REAR 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 disturbs 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 disturbs you be sure to keep both switches off.

### ⑲FM 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

## 20 FUNCTION 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.

**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.

**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.

**CD-4/DISCRETE:** When wishing to hear discrete 4-channel tapes or CD-4 (Quadradisc) records, it is necessary to operate the 4-CH TAPE MONITOR switch or the SELECTOR switch in addition to setting the FUNCTION control to the CD-4/DISCRETE position. When reproducing discrete 4-channel CD-4 (Quadradisc) records switch the SELECTOR switch to either the PHONO-1 or PHONO-2 position.

## 21 CD-4 CARRIER LEVEL control

## 22 CD-4 SEPARATION LEFT control

## 23 CD-4 SEPARATION RIGHT control

This control, used when playing discrete 4-channel CD-4 (Quadradisc) records, lets you carry out adjustments to facilitate matching between the built-in CD-4 demodulator and your turntable. For adjustment procedures, refer to ADJUSTMENTS FOR PLAYING CD-4 RECORDS on page 14 of this manual.

## 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 CD-4/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	2-CH
2-channel stereo	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	CD-4/DISCRETE (To play CD-4 discrete 4-channel records, it is necessary to use a turntable provided with a cartridge and appropriate output cables capable of reproducing such records).

# PLACEMENT OF SPEAKER SYSTEMS

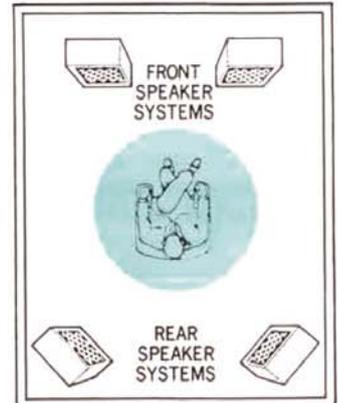
The placement of your four speaker systems is a very important consideration to enjoy 4-channel sound at its very best. Three basic placement systems will be described below. Experiment with them and find one that best suits the type of music or the layout of your room.

## 2-2 System

This is the standard speaker placement for 4-channel listening. In this system the four speakers are placed two in the front and two at the back roughly equidistant from your listening position.

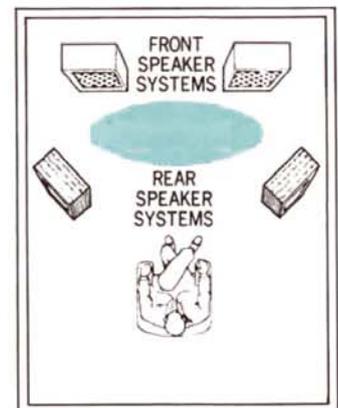
The sounds reproduced from the front and rear speakers will let you feel the magnificent scale of a performance by an orchestra or the vitality of the music felt by the audience at some in-jazz spot.

It is generally accepted that the 2-2 system is the optimum speaker placement when reproducing 4-channel program sources (either discrete or matrix encoded records and tapes).



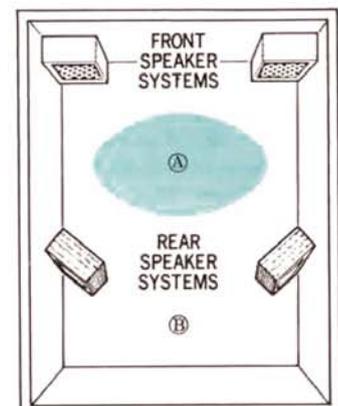
## Front 2-2 System

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

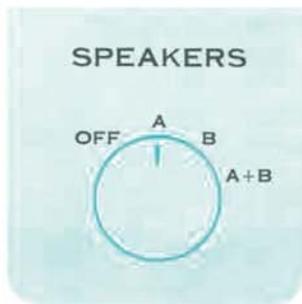


## 2-2/ Front 2-2 Compatible System

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.

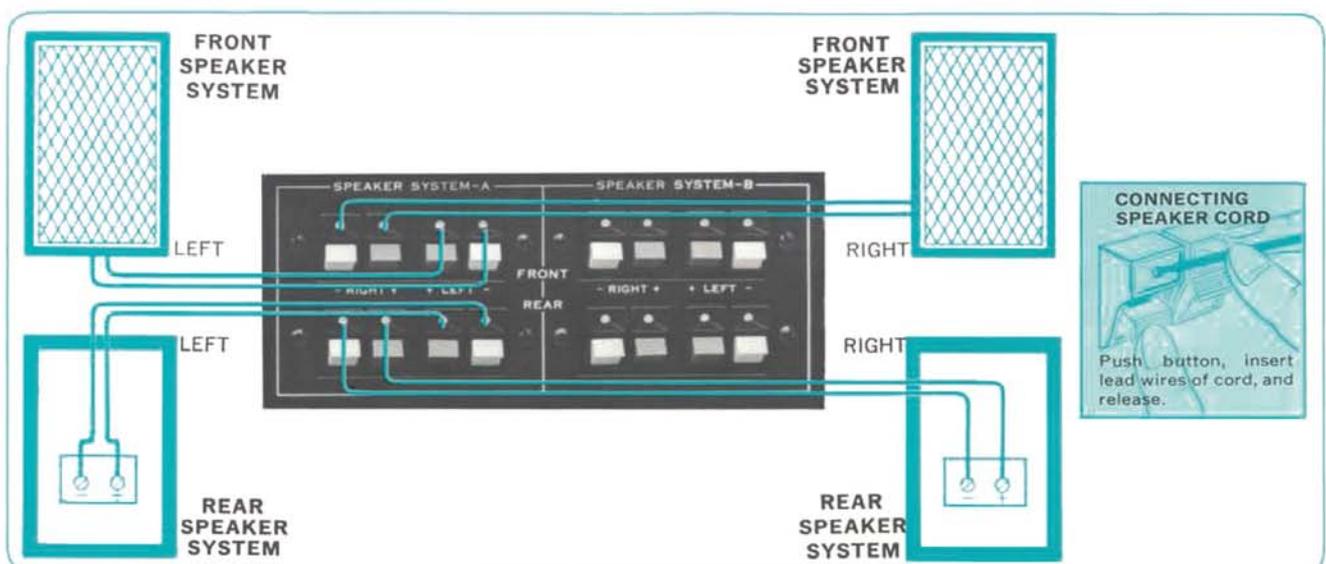
**Connection of two pairs of speaker systems:** When you want to enjoy the same sound produced simultaneously from two sets of speaker systems by setting the SPEAKERS switch to the A+B position, use the speaker system with an impedance of 8 ohms or more. If a speaker system with a lower impedance is 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. 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 ANTENNAS

**AM ANTENNA:** Once the set is in place, simply slide out the ferrite bar antenna built into the rear panel.

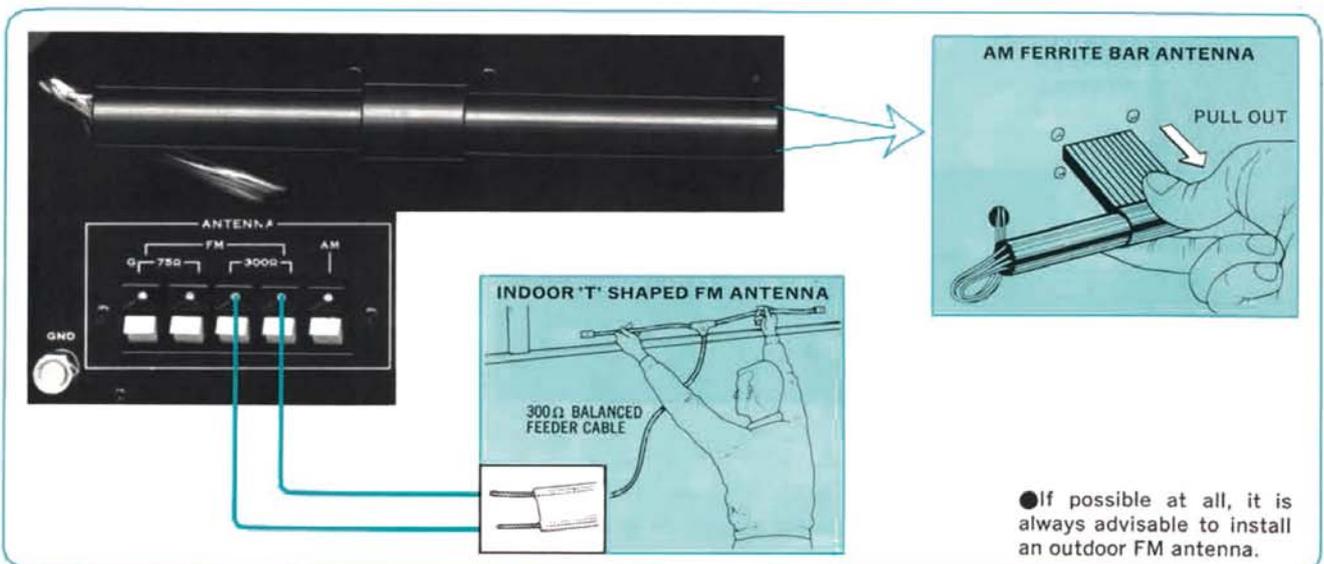
Since AC power supply cords and speaker cables are often the causes of noise, be sure that they are not allowed to come close to the antenna.

**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. Then secure the antenna (avoid contact with metal fasteners).

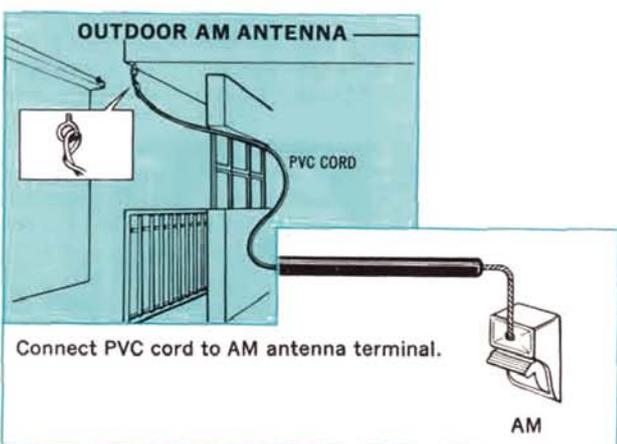
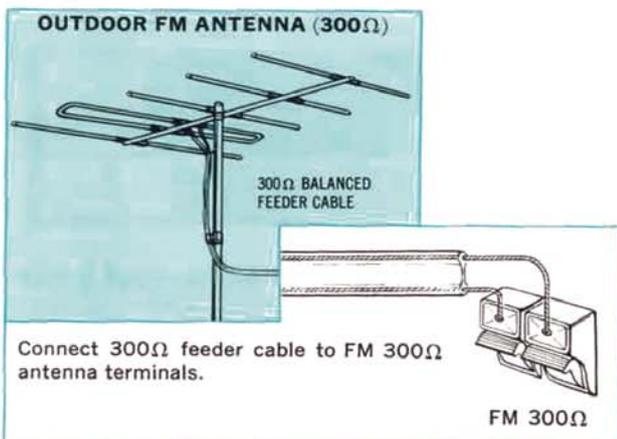
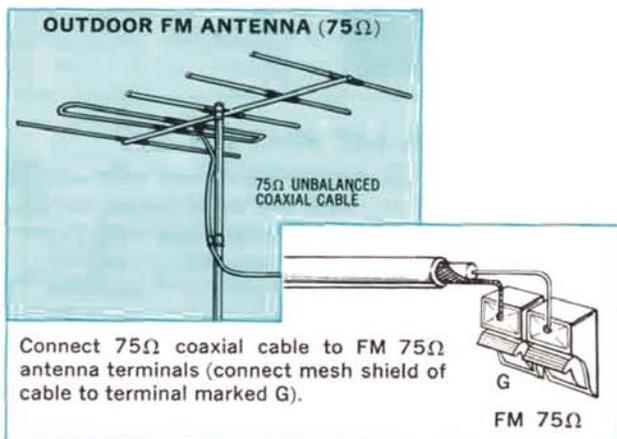
## CONNECTIONS



● 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 in good 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 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

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.

# 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.

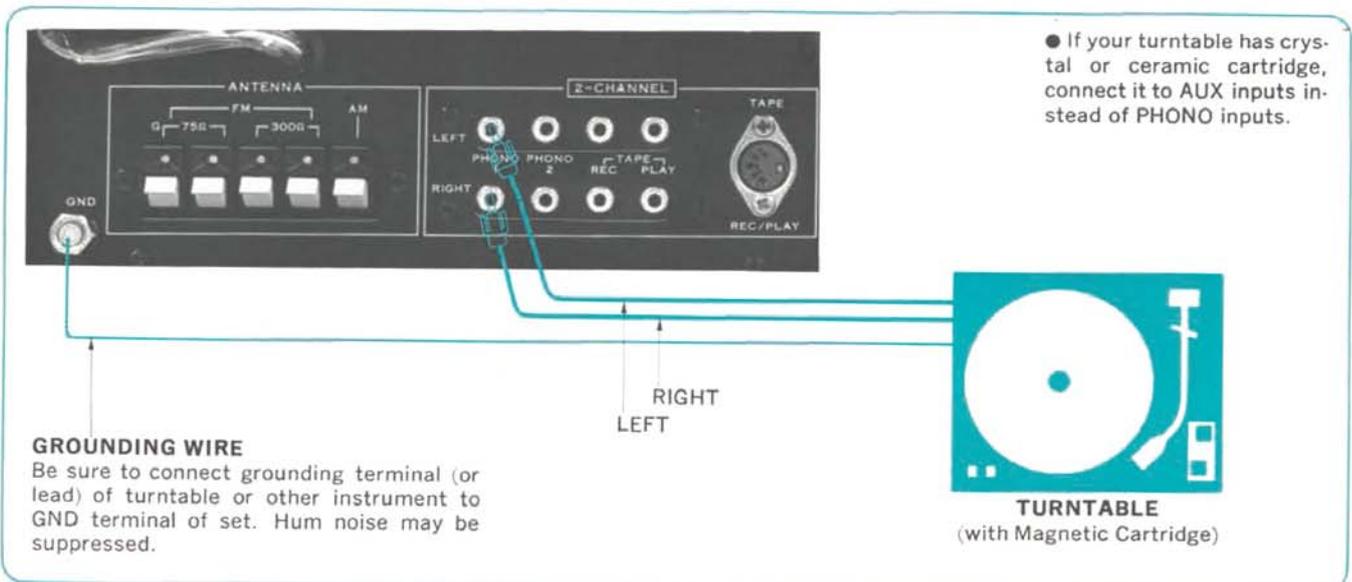
When desiring to hear a CD-4 record in discrete 4-channel, set the FUNCTION control to the CD-4/DISCRETE position. Also, when any change has been made to the turntable, such as replacement of the cartridge (or stylus) and/or output signal cables, the built-in CD-4 demodulator will require some adjustments which should be carried out in accordance with ADJUSTMENTS FOR PLAYING CD-4 RECORDS on page 14 of this operating manual.

## SHORT-CIRCUIT PIN PLUGS

This set is shipped from the factory with a pair of short-circuit pin plugs inserted in the PHONO-2 jacks. These plugs are designed to reduce noise likely to occur when the phono jacks are not in use.

When connecting only one turntable to one of the two sets of PHONO jacks of the set, be sure to remove the short-circuit pin plugs from the PHONO jacks and by no means insert them into other unused output jacks (TAPE REC jacks, etc.) on the set otherwise sound may not emanate from your speakers. The plugs should be stored in a safe place for use when the need arises.

## CONNECTIONS



# ADJUSTMENT FOR PLAYING CD-4 RECORDS

Prior to listening to a CD-4 record, it is necessary to adjust the built-in CD-4 demodulator of this set using the CD-4 ADJUSTMENT RECORD supplied as an accessory.

Since these adjustments are imperative for matching your turntable with the CD-4 demodulator built into the set, they should be carried out only after completion of turntable adjustments (tonearm balance, stylus pressure, etc.).

▷Once the adjustments are completed, further adjustments are unnecessary provided that the turntable conditions such as cartridge, stylus, output signal cables, etc. are not changed.

## Precautions On Playing a CD-4 Record or CD-4 ADJUSTMENT RECORD

1. Use a turntable capable of reproducing CD-4 records.
2. Be sure to remove any dust or other foreign matter that may have adhered to the stylus.
3. Clean any dust, etc. from the surface of the record you are going to play with a suitable record cleaner. For optimum reproduction of CD-4 records avoid using spray type cleaners and anti-static agents.
4. Set the stylus pressure exactly as designated by the cartridge manufacturer and if the stylus tip is worn, replace it with a new one immediately.



## Some Facts about CD-4 Reproduction

Signals covering a frequency range from 30Hz to 45kHz are cut into both sides of the groove of a CD-4 record. This range far exceeds the frequency range of conventional stereo and mono records which is usually from 30Hz to 15kHz. It is therefore imperative that a turntable capable of reproducing frequencies as high as 45kHz be used to play CD-4 records. A conventional turntable when playing a CD-4 record will of course reproduce sounds from each of the four speakers, but they will reproduce an unbearable degree of noise together with very poor interchannel separation among the four speakers.

In order to obtain optimum results from discrete 4-channel records processed by the CD-4 system, your turntable must fulfil the following conditions, if not the parts in question should be replaced.

1. The cartridge (and stylus) should be capable of responding to frequencies up to the region of 45kHz.
2. The output signal cable of your turntable should be of the shielded, lowcapacitance type (about 35 pico Farads/meter).

Special styli (and stylus-equipped cartridges) and low-capacitance output cables capable of reproducing CD-4 records can be purchased today from most audio

stores. If you are not sure whether your turntable meets the above conditions, consult the store from which you purchased it or contact the manufacturer.

## CD-4 Demodulator Adjustments

Prior to adjustments, set the SELECTOR control to either the PHONO-1 or PHONO-2 position and the FUNCTION control to the CD-4/DISCRETE position. Next, set the VOLUME control to the volume level of your choice.

Turn the CD-4 demodulator adjustment controls (CARRIER LEVEL, CD-4 SEPARATION LEFT and SEPARATION RIGHT) using a coin that fits into the slot on the head of the control shafts.

## 30kHz Carrier Level Adjustments

1. Play band 2 (30kHz Carrier Level Adjustment Tone) of the CD-4 ADJUSTMENT RECORD.
2. Turn the CARRIER LEVEL control slowly clockwise until the reproduced sounds are crystal clear and free of distortion.

## CD-4 Channel Separation Adjustments

1. Turn the MAIN BALANCE control fully counterclockwise so that the sounds will be heard only from the back speakers.
2. Turn the REAR BALANCE control fully counterclockwise.
3. Play band 3 (CD-4 Adjustment Tone) of the CD-4 ADJUSTMENT RECORD.
4. Turn the CD-4 SEPARATION LEFT control so that the sounds emanating from the left back speaker are minimum.
5. Turn the REAR BALANCE control fully clockwise, then turn the CD-4 SEPARATION RIGHT control so that the sounds from the right back speaker are minimum.

## Channel Balance Adjustments

1. Play band 4 (Channel Balance Adjustment Tone) of the CD-4 ADJUSTMENT RECORD.
2. Adjust the MAIN, FRONT and REAR BALANCE controls so that the sounds emanating from the four speakers are of equal volume (Refer to page 6, 5. VOLUME & BALANCE, of this operating manual.)

## Channel Identification

1. Play band 5 of the CD-4 ADJUSTMENT RECORD and confirm that the chimes are heard in the sequence of left front, left back, right back and right front. The level at which you hear the chimes from each speaker will not necessarily be equal. Listen for correct location of the chimes rather than their volume levels.
2. If there is a mistake in channel connections it should be corrected at once.
3. Carry out CD-4 Channel Separation Adjustments and Channel Balance Adjustments once again.

# TAPE PLAYBACK

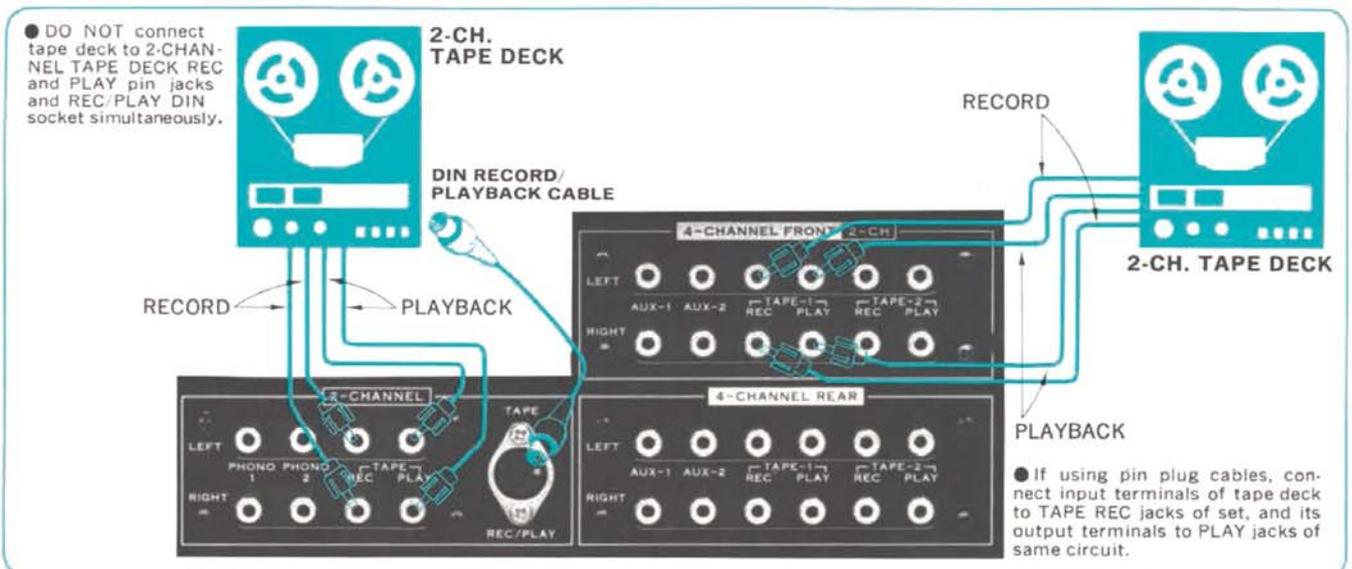


1. Push either the 2-CH, 4-CH-1 or 4-CH-2 TAPE MONITOR switch, depending on which tape playback circuit is connecting the tape deck in use.
2. Operate your tape deck to start playback.
3. Adjust the FUNCTION control to suit the type of program source you are reproducing. If the tape is already recorded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



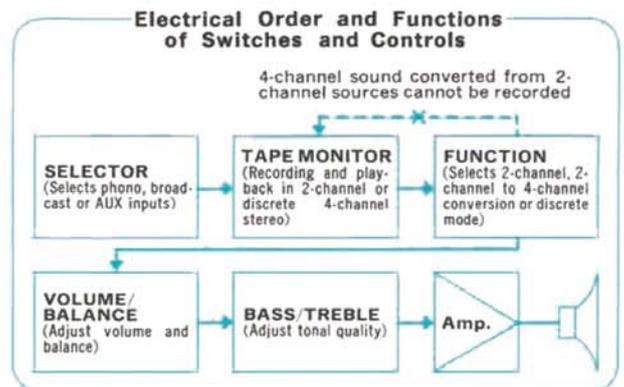
# TAPE RECORDING



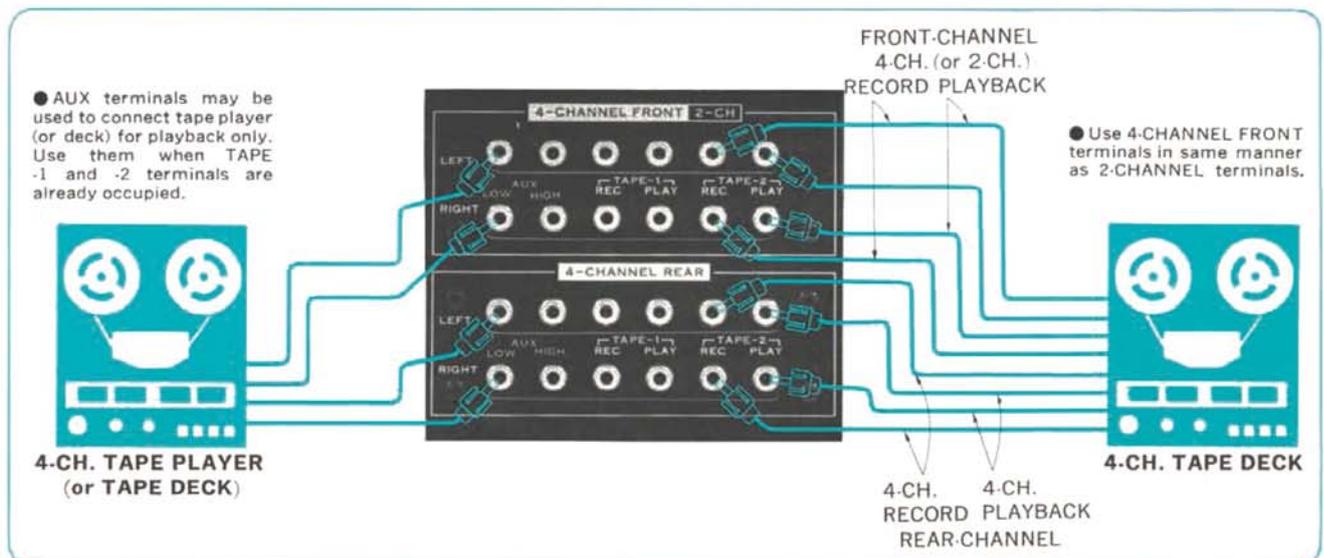
1. Prepare the program source you wish to record and keep it ready to go. The SELECTOR switch must be adjusted.
2. Operate the tape deck and start recording. Adjust the record levels with controls provided on the tape deck. The FUNCTION control, the volume and tone controls on the set do not affect the 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.



## 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 be quickly corrected by making a simple investigation 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 deck, 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.

## 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 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 (6-ampere for 100 to 117 volts, 3.5-ampere for 220 to 240 volts).

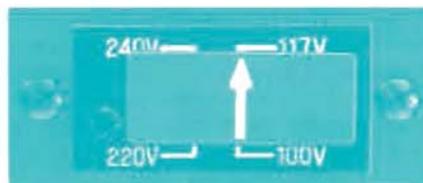
Never use a fuse of a different capacity or a piece of wire, even as a stop-gap measure, or serious danger could result.

## 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.



## 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.



## LIST OF ACCESSORIES

1. FM ANTENNA.....	1
2. QUICK-ACTING FUSES (3.5A).....	4
3. OPERATING INSTRUCTIONS.....	1
4. OPERATING INSTRUCTIONS SHEET.....	1

# SPECIFICATIONS

## AUDIO SECTION

### POWER OUTPUT (at rated distortion)

MUSIC POWER (IHF).....260W (4 $\Omega$  1,000Hz)  
180W (8 $\Omega$  1,000Hz)

### CONTINUOUS POWER

Each Channel Driven ..52W  $\times$  4 (4 $\Omega$  1,000Hz)  
35W  $\times$  4 (8 $\Omega$  1,000Hz)  
4-Channels Driven..28+28+28+28W (8 $\Omega$  1,000Hz)  
25+25+25+25W  
(8 $\Omega$  20 to 20,000Hz)  
2-Channel Operation (2-channel driven)  
32+32W (8 $\Omega$  1,000Hz)

### TOTAL HARMONIC DISTORTION

(at rated power output)

OVERALL (from 4-CHANNEL AUX)  
less than 0.3%

### INTERMODULATION DISTORTION (at rated power output 70Hz:7,000Hz=4:1 SMPTE method)

OVERALL (from 4-CHANNEL AUX)  
less than 0.3%

### POWER BANDWIDTH (IHF) ..10 to 30,000Hz

### LOAD IMPEDANCE .....4 to 16 $\Omega$

### DAMPING FACTOR .....40 (8 $\Omega$ )

### INPUT SENSITIVITY AND IMPEDANCE (1,000Hz, for rated power output)

2-CHANNEL PHONO-1, 2 ..2.5mV 50k $\Omega$   
(Max. input capability; 150mV at 0.5% distortion)

### 2-CHANNEL TAPE

PLAY Pin Jacks .....100mV 50k $\Omega$   
REC/PLAY DIN Socket ..100mV 50k $\Omega$   
4-CHANNEL AUX-LOW ..100mV 50k $\Omega$   
AUX-HIGH ..200mV 100k $\Omega$

### 4-CHANNEL TAPE-1, 2

PLAY Pin Jacks .....100mV 50k $\Omega$

### 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  $\pm$ 1.0 dB  
 $\pm$ 1.5 dB

### EQUALIZATION (RIAA curve) 30 to 15,000Hz $\pm$ 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.

## CD-4 DEMODULATOR

Input Sensitivity.....2.5mV (1 to 10mV adjustable)

Input Impedance .....50k $\Omega$

Frequency Response (STD test signal)

Main-Channel.....30 to 15,000Hz  $\pm$ 0.5 dB

Sub-Channel .....30 to 10,000Hz  $\pm$ 1.0dB

## TUNER SECTION

### <FM>

TUNING RANGE.....88 to 108MHz

SENSITIVITY (IHF) .....1.9 $\mu$ V

(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  $\pm$ 1.0 dB

ANTENNA IMPEDANCE ....300 $\Omega$  balanced,  
75 $\Omega$  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 $\frac{3}{8}$ " )W

203mm (8" )H

370mm (14 $\frac{9}{16}$ " )D

WEIGHT .....21.8kg (48.0 lbs.) Net

25.0kg (55.0 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). * TV set is being used simultaneously.	* Peculiar to AM waves, and unavoidable to some extent. * 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. * 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 or 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 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.	* Tape heads are magnetized.	* Demagnetize heads. * Turn on HIGH FILTER switch. * Connect noise reduction adaptor.
	* Sound is not clear.	* Dust on tape heads. * Tape is not pressed tightly against 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.



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