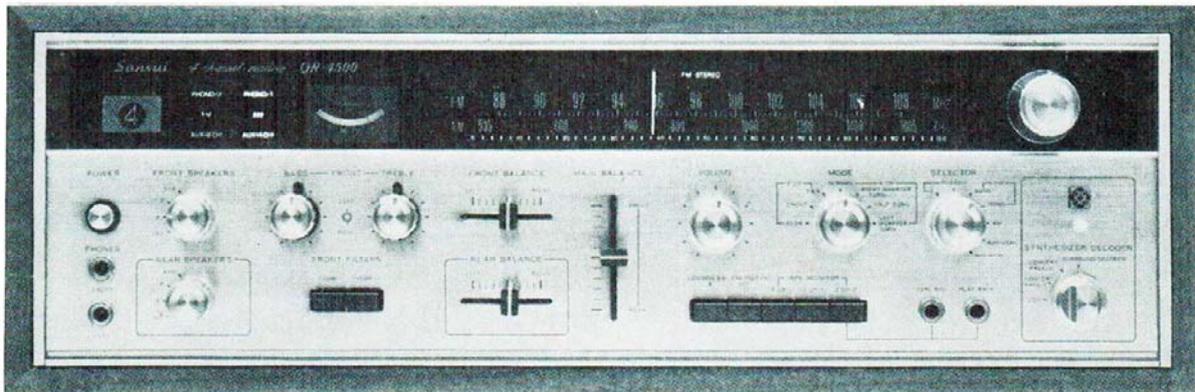




OPERATING INSTRUCTIONS

4-CHANNEL RECEIVER

SANSUI QR-4500



Sansui

SANSUI ELECTRIC COMPANY LIMITED

Congratulations on joining the thousands of proud, satisfied owners of quality stereo components from Sansui. The QR-4500 is a 240 watt 4-channel receiver endowed with practically all the features necessary for enjoying every type of music in the new, enthralling 4-channel form. Incorporating Sansui's exclusive 4-Channel Synthesizer Decoder, it lets you convert today's 2-channel stereo records, tapes and FM multiplex broadcasts into four channels. It also lets you reproduce discrete 4-channel program sources. Then it lets you transform 4-channel sources encoded into two channels back to four channels. In addition, it reproduces 2-channel sources in 2-channel stereo if you so desire.

The QR-4500 connects up to two pairs of speaker systems for the front channels, and another two pairs for the rear channels, enabling you to hear the reproduction in two rooms. In addition, it is provided with a Synthesizer/Decoder Function Control and a Mode Switch to let you hear each selection with the most effective sound effect. In short, we have made it one of the most complete, most versatile 4-channel receivers available today.

Now it is up to you to read the instructions contained in this booklet, so that you may take full advantage of its rich performance potential.

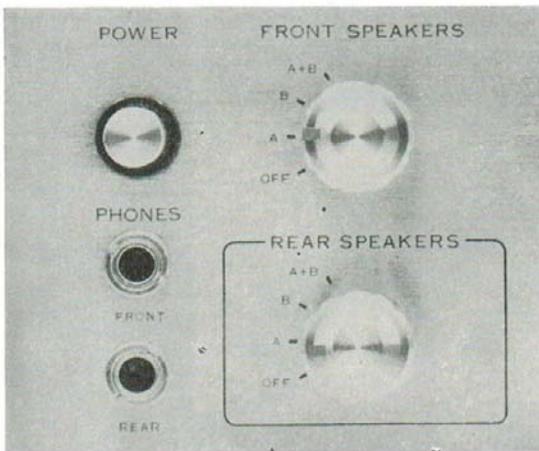
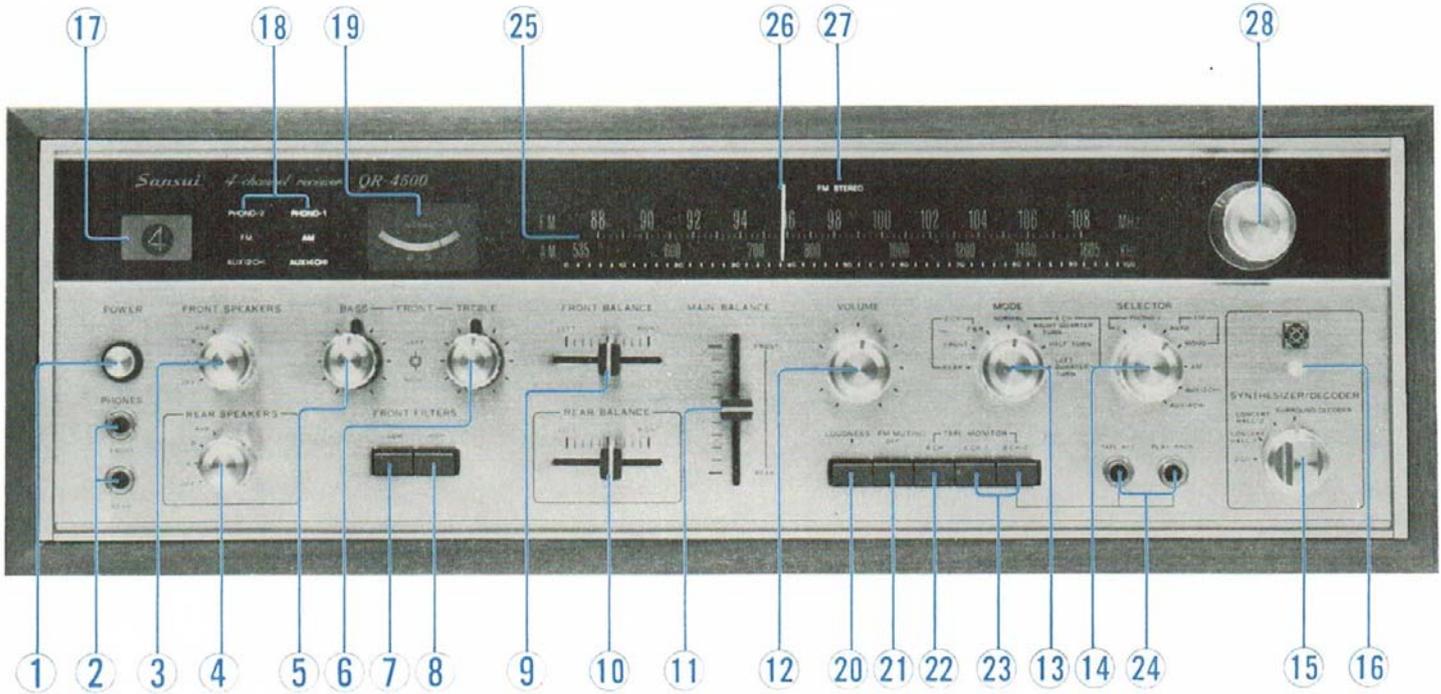
Again, welcome to the world of 4-channel stereo, and our sincere gratitude for your choice. You will not be disappointed.

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SWITCHES AND CONTROLS



① Power Switch

Turns on and off the power supply for the entire receiver. Push it once to turn on, once more to turn off. It also controls the AC outlet marked SWITCHED on the rear panel.

② 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, turn both the Front and Rear Speakers Switches to 'OFF.' The headphone used should be dynamic types.

③ Front Speakers Switch

The QR-4500 connects up to two pairs of speaker systems for reproducing the front channel sounds, with this switch allowing either or both pairs to be selected.

OFF: To cut off the sound from the front left and right speaker systems when listening with headphones.

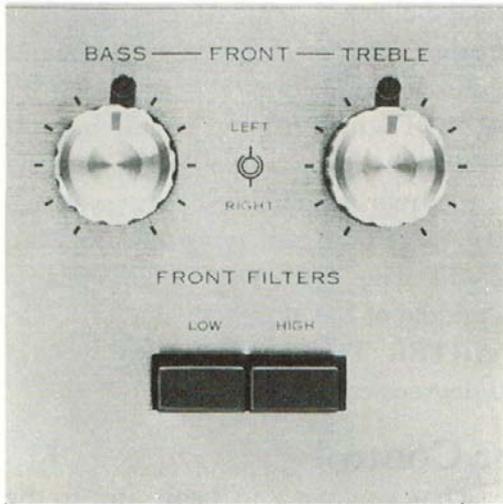
A: To drive the front channel speaker systems connected to the FRONT SYSTEM-A terminals on the receiver's rear panel.

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

A+B: To drive both the A and B pairs.

④ Rear Speakers Switch

The QR-4500 also connects up to two pairs of speaker systems for the rear channels, with this switch enabling you to choose either or both pairs according to your needs. Use the switch in a manner similar to the Front Speakers Switch.



⑤ Front Bass Control

Use to strengthen or weaken the receiver's lowend response according to your personal preference, the frequency response of the speaker systems in use or the acoustics of your room. Turn it clockwise to emphasize the lows in the front channel sounds, counterclockwise to de-emphasize. The inner knob (controlling the front left channel) and the outer knob (controlling the front right channel) are friction-coupled and permit separate or simultaneous adjustment of the two front channels.

⑥ Front Treble Control

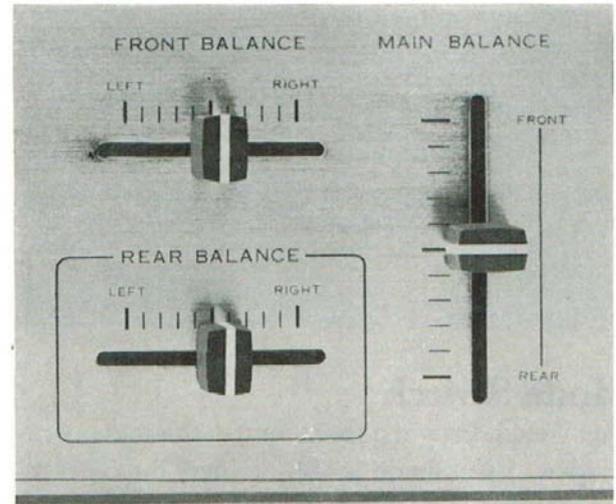
Use in the same manner as the above control to adjust the strength of the highs in the front channel sounds.

⑦ Low Filter Switch

Push to eliminate low-frequency noise such as the rumbling of the turntable motor from the front channel sounds. If no such noise is present, be sure to keep the switch off.

⑧ High Filter Switch

Use in the same manner as the above switch to eliminate, from the front channel sounds, such high-frequency noise as the scratch noise produced by a worn record, tape hiss or the whistle noise contained in radio broadcasts. Be sure to keep it off if no such noise exists.



⑨ Front Balance Control

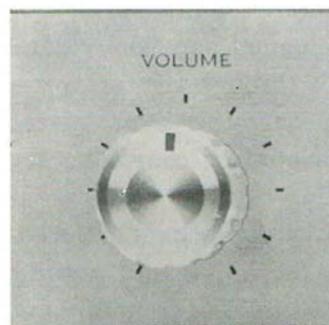
Use to balance the front left and right channels. Slide it to the left to increase the sound volume in the front left channel, to the right to increase that in the front right channel.

⑩ Rear Balance Control

Use in the same manner as the Front Balance Control to balance the rear left and right channels.

⑪ Main Balance Control

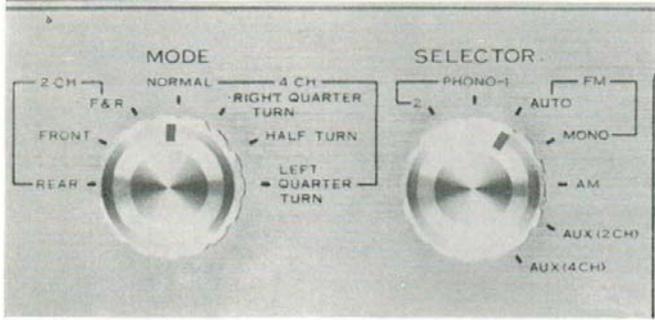
Use to balance the front and rear channels. Slide it up to increase the sound volume in the front channels, down to increase that in the rear channels.



⑫ Volume Control

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

SWITCHES AND CONTROLS



⑬ Mode Switch

Lets you switch between the 2- and 4-channel operating modes. Each mode is sub-divided into several modes to let you hear the music in the best condition possible. Functions when reproducing discrete 4-channel program sources as well, whether they are connected to the AUX (4 CHANNEL) or 4 CHANNEL TAPE MON inputs on the rear panel.

2CH: With this switch set to any of the three 2-channel positions, if you have the Synthesizer/Decoder Function Control set to the '2CH' position, you'll hear the unaffected 2-channel program source that you fed to the receiver. However, if you have the control set to other positions, or if you are reproducing a pre-recorded 4-channel tape, only the front left and right channel sounds will be heard.

REAR: The front left and right channel sounds will be heard from the rear left and right speaker systems only.

FRONT: The same sounds will be heard from the front left and right speaker systems only.

F & R: The same sounds will be heard from all our speaker systems simultaneously.

4 CH: Set the control to one of the following four positions when hearing music in 4-channel stereo. If the music is originally 2-channel and you're converting it into four channels through the receiver's 4-Channel Synthesizer Decoder, the Synthesizer/Decoder Function Control should of course be set to a position other than '2CH.'

NORMAL: Normal position for 4-channel stereo.

RIGHT QUARTER TURN: To turn around sound by 90 degrees clockwise. The front left and right channel sounds will now be heard from the front and rear right speaker systems, and the rear left and right channel sounds from the front and rear left speaker systems. Use this position to

obtain a normal 4-channel stereo effect when hearing vocal or other types of program where sound is loud only on one side.

HALF TURN: To turn around sound by 180 degrees, so that the front channel sounds will be heard from the rear channel speaker systems. Used to hear vocal or other types of program, this position will make the listener feel like he is right in the middle of the stage.

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

⑭ Selector Control

Depending on what you wish to hear, turn to the appropriate position.

PHONO 2: Selects a turntable (auto changer, phonograph, gramophone or record player) connected to the PHONO 2 inputs on the receiver's rear panel.

PHONO 1: Selects the one connected to the PHONO 1 inputs.

FM AUTO: To hear FM broadcasts, whether stereo or mono. When the broadcast signal changes from mono to stereo, the receiver automatically switches itself to stereo reception.

FM MONO: When the receiver is set to FM AUTO and receiving an FM stereo signal, reset it to this position if the reception should be filled with noise and intolerably unpleasant. The broadcast will now be received in mono but the noise will be substantially reduced.

AM: For receiving AM broadcasts.

AUX (2CH): To hear whatever 2-channel program source is connected to the AUX (2 CHANNEL) inputs on the receiver's rear panel.

AUX (4CH): To hear whatever 4-channel program source is connected to the AUX (4 CHANNEL) inputs on the receiver's rear panel.

Note: Whatever program source is connected to the AUX (4 CHANNEL) inputs bypasses the receiver's 4-Channel Synthesizer Decoder section.



⑮ Synthesizer/Decoder Function Control

Operate this switch to obtain the sound effect most appropriate for the particular type of music you are about to hear.

Such sound effect will be further enhanced by employing a proper speaker position (see page 8) and setting the Mode Switch to an appropriate position.

2CH: Two-channel input signals will bypass the built-in 4-Channel Synthesizer Decoder and be reproduced as the front left and right channel sounds.

CONCERT HALL 1: For orchestras, big band jazz, etc. Suitable for most purposes. The 'Front 2-2 System' of speaker positioning produces the best results.

CONCERT HALL 2: For solo performances, vocals, and other small band selections. Again, the 'Front 2-2 System' of speaker positioning produces the best results.

SURROUND/DECODER: Suitable for programs which sound most effective with the musical instruments scattered throughout the room, such as popular music, mood music, Moog sound, rock 'n' roll, rhythm and blues, etc. Set to this position also when hearing 4-channel program sources encoded into a 2-channel form (record, tape, etc.) by a 4-channel encoder. Produces distinct sound images of the musical instruments and singers in the room, giving you a 4-channel stereo effect equal to or, in most cases, even better than that obtainable from a discrete 4-channel stereo system. For this sound effect, the '2-2 System' of speaker positioning is more effective.

⑯ 4-Channel Indicator

This orange indicator glows to indicate the receiver is operating in a 4-channel mode when the Synthesizer/Decoder Function Control is set to a position other than '2CH' and the Mode Switch to a 4-channel position.



⑰ Digital Indicator

Indicates whether the receiver is operating in the 2- or 4-channel mode. Figure '2' appears when the Mode Switch is set to a 2-channel position, and figure '4' when it is set to a 4-channel position.

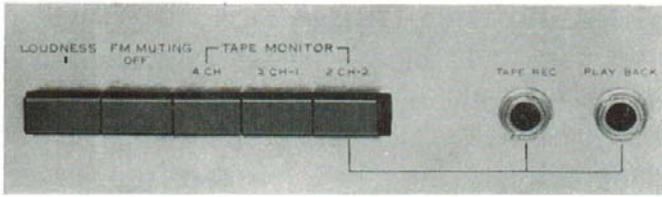
⑱ Selector Indicators

When the receiver is turned on, one of these indicators brightly illuminates to show what program source is selected on the Selector Control.

⑲ Signal Meter

Illuminates when FM AUTO, FM MONO or AM is selected on the receiver's Selector Control, and shows the strength of the antenna input signal. The desired station is pinpointed when the pointer of this meter has swung as far to the right as possible.

SWITCHES AND CONTROLS



⑳ Loudness Switch

The human ear is such that an apparent 'dropout' of the lows and highs occurs when you're listening at a low volume level. Pushing this switch compensates for this apparent loss and appropriately accents the lows and highs, in both the front and rear channel sounds simultaneously. You'll thus be able to hear the music in a more natural state.

㉑ FM Muting Release Switch

This switch, if not depressed, eliminates the interstation noise commonly heard when tuning on the FM band. It should be pushed to release the muting function when you are tuning in on a weak FM station.

㉒ 4-Channel Tape Monitor Switch

Push this switch to monitor a tape being recorded by the 4-channel tape deck connected to the 4-channel tape monitor inputs on the receiver's rear panel, or to reproduce a tape so recorded. The monitoring is possible only if the 4-channel tape deck is equipped with separate heads for recording and playback.

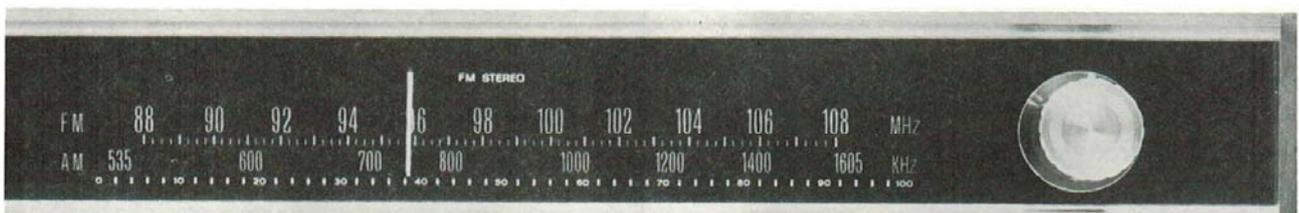
At all other times, push the switch once more to restore it to the original position.

㉓ 2-Channel Tape Monitor Switches

These switches control 2-channel tape monitor circuits 1 and 2. Detailed instructions on the operation of such tape decks are given on page 13.

㉔ Tape Deck Jacks

A part of tape monitor circuit 2, these jacks are for connecting a 2-channel tape deck with phone plugs. The left jack is for recording, and the right one for playback. When a tape deck is connected here, the pin jack terminals for tape monitor circuit 2 on the receiver's rear panel is automatically disabled.



㉕ Dial Scales

Illuminate when either AM, FM AUTO or FM MONO is selected on the Selector Control. The upper scale is for FM, the lower one for AM.

㉖ Dial Pointer

Illuminates in the same manner as the dial scales.

㉗ FM Stereo Indicator

Illuminates when the receiver is tuned in on an FM station broadcasting in stereo.

㉘ Tuning Knob

Tune in the receiver on the desired station by turning this knob, watching the Signal Meter.

TO ENJOY 4-CHANNEL STEREO AT ITS BEST

The 4-channel stereo system far excels the conventional 2-channel system in its capability to faithfully reproduce the sound field normally present at any live performance. Your QR-4500 incorporates a QS synthesizing/decoding matrix to re-organize ordinary 2-channel stereo signals to four channels and establish distinct sound images of the musical instruments and singers, as well as Sansui's exclusive phase modulator circuit to lend the reproduced sound the liveliness or presence of the original sound field.

The end effect of such treatments is so exciting and enthralling that many audio experts the world over have termed it purely revolutionary. It is particularly outstanding when you feed to the receiver 4-channel programs encoded into a 2-channel form by a 4-channel encoder.

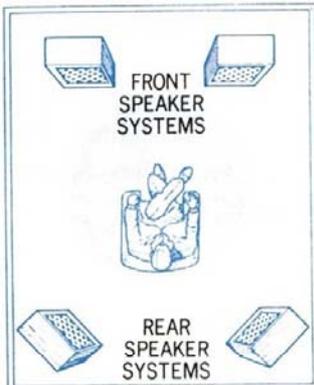
So that you may enjoy 4-channel stereo music at its best, it is important that you know all about the switches and controls of the receiver to put them to full use. But a few other useful hints are certain to help you hear the music more effectively, and will be outlined below.

Speaker System Positions

The positions of the four speaker systems in a 4-channel stereo system is an essential consideration if you are to enjoy 4-channel stereo sound at its best. It is essential that you place them appropriately to suit the type of program source you wish to hear. Two basic positions will be discussed below, but you are free to adapt them to the particular conditions—both acoustic and physical—of your room for optimum 4-channel stereo effects.

1) 2-2 System

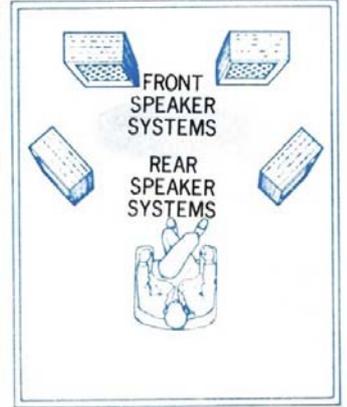
This is the 4-corner position widely accepted as the 'standard' for 4-channel stereo. While it is particularly good for hearing program sources encoded by a 4-channel encoder, it is also effective for these types of program source: mood music, popular music, contemporary music, Moog sound, rhythm and blues, musicals, and



live recordings.

2) Front 2-2 System

This system moves the rear speaker systems up front as shown below and creates a sound field—the equivalent of a concert hall stage—in front of you. It is suitable for those types of program source which more or less require an objective attitude of the audience, such as: symphonies, operas, chamber music, modern jazz and big band jazz.



3) Others

Variations of the above two systems are possible, and you are absolutely free to devise one to suit the particular conditions of your room.

If the Program Source is Monophonic

The QS synthesizing/decoding matrix incorporated in the QR-4500, by principle, is unable to produce a 4-channel stereo effect from a monophonic program source. When you listen to such monophonic program sources as AM broadcasts, FM mono broadcasts and mono records, it is usually advisable to set the Synthesizer/Decoder Function Control to '2CH' and hear them in mono, bypassing the matrix. Some mono sources, however, acquire depth when processed through that matrix, so it may be worth your while to experiment for yourself.

CONNECTING SPEAKER SYSTEMS / PLAYING RECORDS

Connecting Speaker Systems

The QR-4500 connects up to two pairs of speaker systems for the front channels, and another two pairs for the rear. Any pair may be driven independently or a combination of two pairs may be driven, as selected by the Front and Rear Speakers Switches. Connect them to the receiver as instructed in the diagram on the right, taking care not to confuse the front and rear, left and right channels, and the plus and minus polarities. Sufficient care should be taken not to short-circuit the plus and minus leads. As the connecting terminals all adopt Sansui's unique one-touch design, connections can be made simply by pushing the button, inserting the lead wires of the speaker cord, then releasing the button.

About the Speaker Impedance

Each speaker system connected to your QR-4500 must possess an impedance of from 4 to 16 ohms. Should you wish to drive two pairs of speaker systems simultaneously, they should all have an impedance of 8 ohms or more.

About the Speaker Polarities

Whether or not the four speaker systems in a 4-channel stereo system are in phase with one another is an important factor to the maximum enjoyment of 4-channel stereo sound. The phase relationship must be correct not only between the front left and right speaker systems, and the rear left and right speaker systems, but also between the front channels and rear channels.

When connecting each speaker system to the receiver, be certain to keep the plus and minus polarities in the right order at both ends.

Front & Rear Speakers Switches

If you have two pairs of speaker systems available for use as the rear channel speaker systems, you could place one pair to form the '2-2 System' and the other pair to form the 'Front 2-2 System' of speaker positioning. Then you could operate the Rear Speakers Switch to select either system to suit the particular type of music to be reproduced. Or, you could install four speaker systems in two rooms and enjoy 4-channel stereo music in either room independently or both rooms simultaneously by the use of the Front and Rear Speaker Switches.

Choice of the Turntable

The turntable connected to the QR-4500 should be equipped with a magnetic cartridge with an output voltage of from 2 to 10mV. The cartridge should be inspected beforehand as to whether the left and right channels are perfectly in phase or the left and right channel output voltages are proportionate, or the 4-channel stereo effect could be seriously impaired. Attention should be also paid to whether the stylus is worn out, whether dust is stuck on it or whether the stylus pressure is appropriate or not.

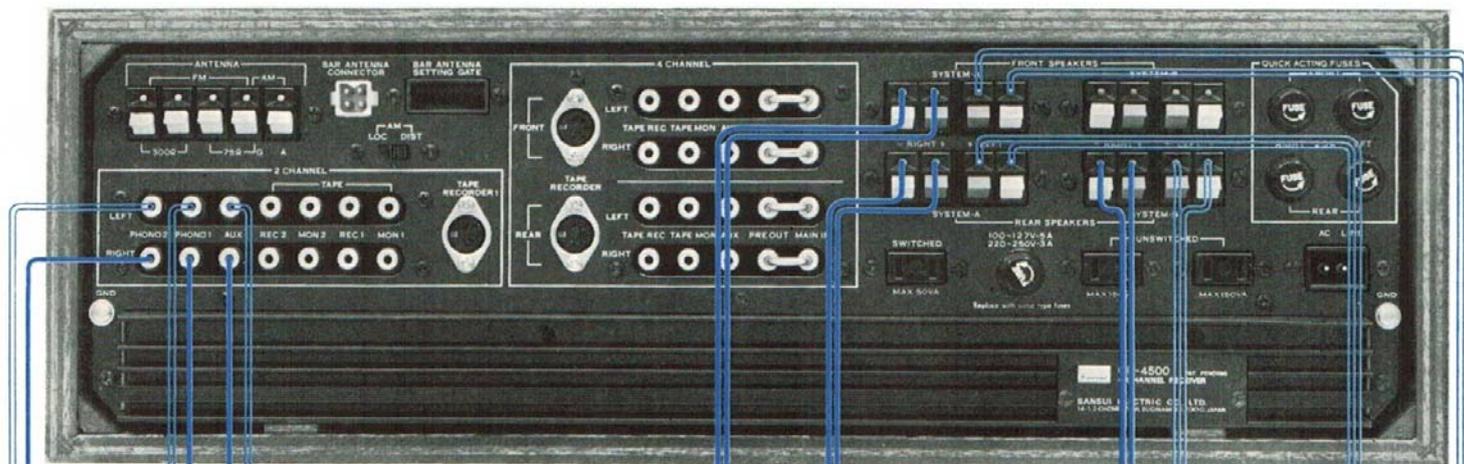
Connecting Turntables

As the QR-4500 is equipped with two phono input circuits, it is possible to employ two turntables or two tonearms. Connections should be made with shielded cables, taking care not to confuse the left and right channels.

Playing Records

1. Set the receiver's Selector Control to 'PHONO 1' or 'PHONO 2' depending on which input circuit you are using.
2. Turn on the turntable, and adjust it for the right speed.
3. Start playing the record.
4. Set the receiver's Mode Switch to an appropriate position, depending on the type of music being reproduced.
5. Adjust the receiver for optimum sound volume as well as for optimum balance between the front and rear, left and right channels.
6. Operate the receiver's Synthesizer/Decoder Function Control to obtain the desired sound effect.
7. Use the tone controls and other switches and controls according to your personal preference or the room acoustics.

Note: Insert the power cord plug of the turntable into the AC outlet marked SWITCHED on the receiver's rear panel. The power supply for the turntable will then be controlled by the front-panel Power Switch.

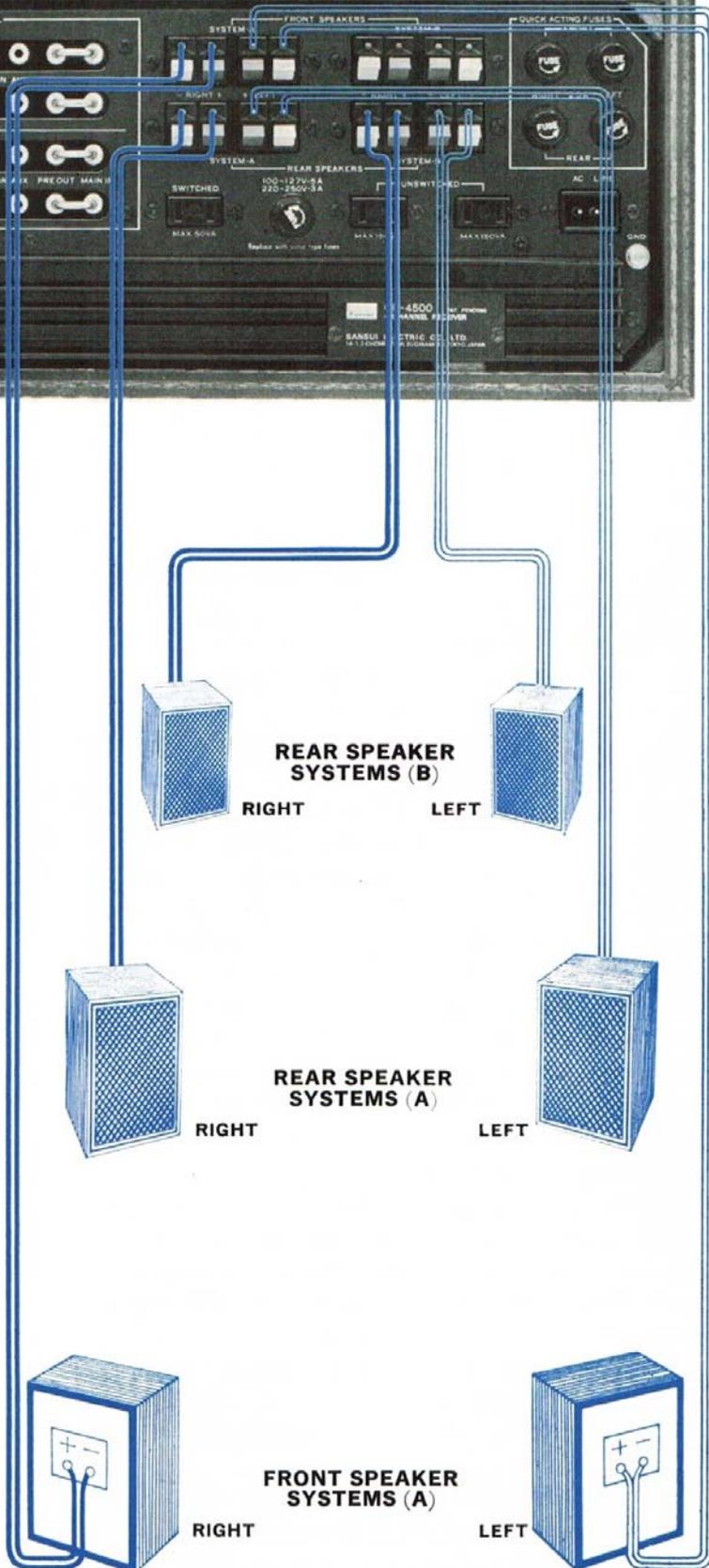
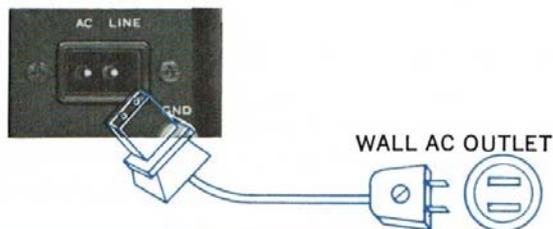


CONNECT THE OUTPUTS OF AN AUXILIARY COMPONENT



Power Cord

The power cord for the QR-4500 is included in the accessory kit with the other accessories provided with the receiver. Insert the connector end of it into 'AC LINE' socket on the receiver's rear panel.



RADIO RECEPTION

Connecting Antennas

The wonderful 4-channel stereo effect would be seriously impaired if considerable noise is mixed with the radio broadcast received by the QR-4500. As the quality of the reception is largely dependent upon the antennas, be sure to connect them correctly and enjoy noise-free broadcasts.

FM Antenna

T-Shaped Feeder Antenna

If you live in the proximity of broadcast stations where radio waves are able to travel unobstructed, quality reception can be usually achieved by setting up the T-shaped feeder cable antenna supplied with the receiver as illustrated next page, connecting it to the receiver's FM 300 Ω terminals. Set up the receiver for FM reception and stretch the antenna to a full T shape, change its height and direction until the best reception is obtained.

External FM Antenna

In areas remote from broadcast stations or blocked by such obstacles as mountains and large buildings, the above-mentioned feeder antenna alone may fail to give you quality reception of FM stations. The problem, however, can be usually overcome by installing an external FM antenna. While many different types of antenna are commercially available, we recommend to use one with at least 5 or 7 elements. The antenna is normally connected to the same FM 300 Ω terminals by means of feeder cable, but such cable should be kept as short as possible lest it should pick up noise. Change the height, direction and position of the antenna until you are certain you're receiving the broadcast with the best sensitivity.

If you should need long feeder cable to connect the antenna or where the automobile traffic is heavy, it is advisable to employ 75 Ω coaxial cable. In this case, however, it is necessary to connect a matching transformer between the antenna and the coaxial cable to match their impedances.

The cable should be connected to the FM 75 Ω terminals. (If the antenna itself has an impedance of 75 Ω , no matching transformer is needed.)

AM Antenna

In most areas, clear AM reception is obtained simply by attaching the highly sensitive ferrite bar antenna

supplied with the receiver.

The antenna is kept in the accessory kit together with the other accessories. Take it out and install it, following the directions given below and referring to the diagram.

1. Insert the connector of the antenna into the 'BAR ANTENNA CONNECTOR' on the rear panel.
2. Then insert the bar antenna holder into the 'BAR ANTENNA SETTING GATE'.
3. With the antenna so installed, pull it out forward until the best reception is obtained.

Note: Should you ever need to pack the receiver up, be sure to remove the antenna. This can be achieved by unplugging the connector first, then pull out the antenna strongly.

Should the bar antenna fail to give you clear reception, however, connect a piece of polyvinyl wire supplied to the AM-A terminal on the receiver's rear panel and stretch it outside a window or on the roof of your home. Still better results would be obtained if you ground the receiver.

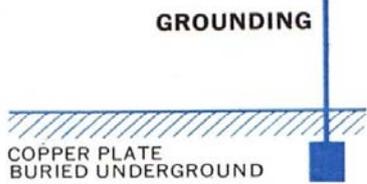
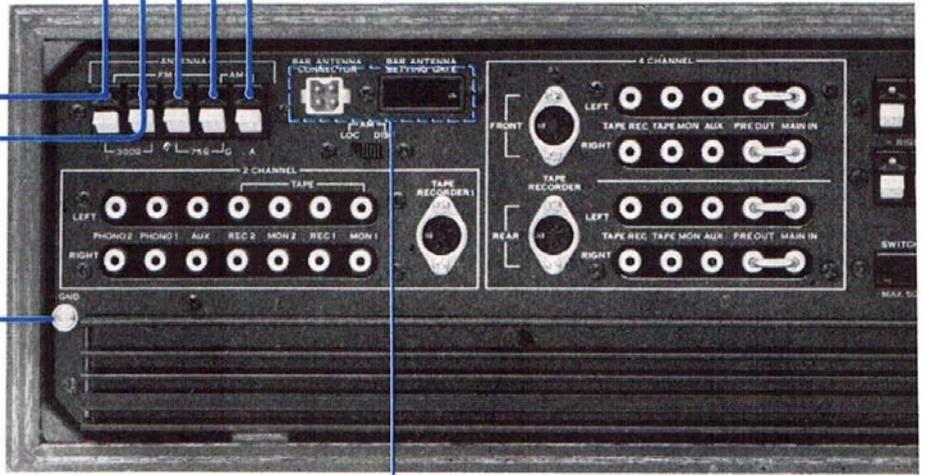
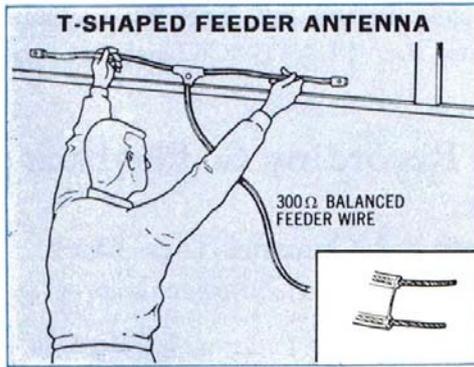
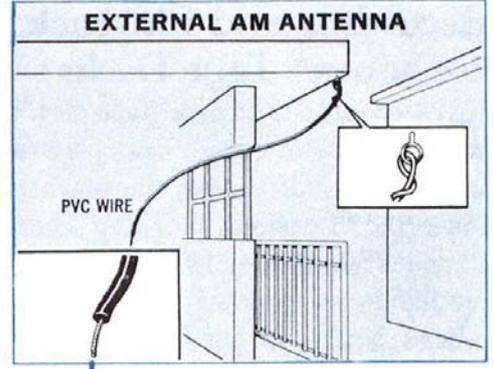
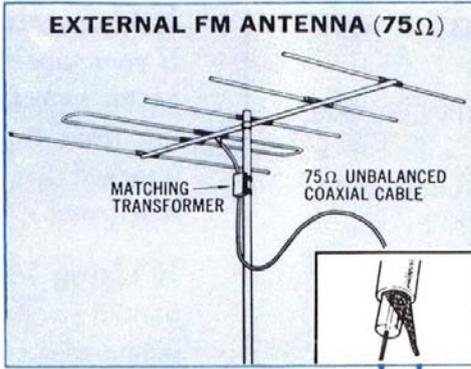
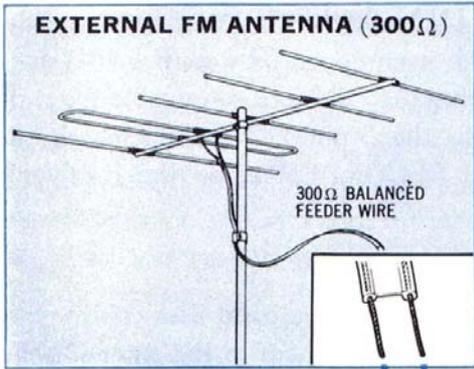
Radio Reception

FM Broadcasts

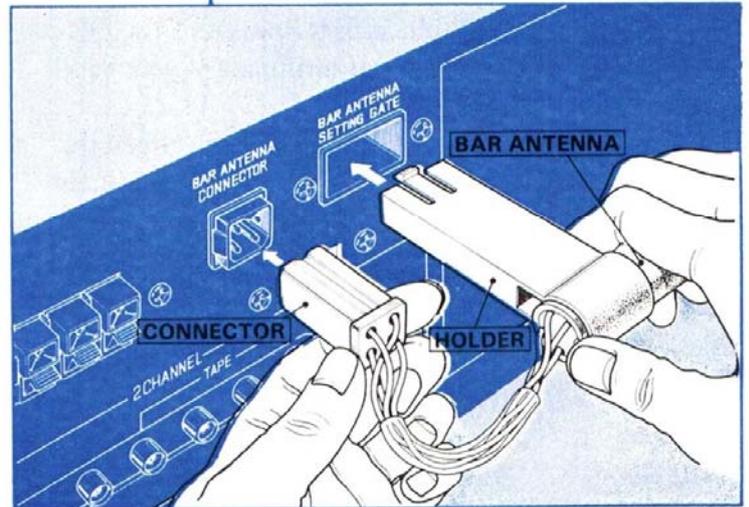
1. Set the Selector Control to 'FM AUTO.'
2. Select the desired FM station by turning the Tuning Knob. It is correctly pinpointed when the Signal Meter pointer has swung as far to the right as possible. If the station received is broadcasting in stereo, the Stereo Indicator will illuminate.
3. If unbearably disturbing noise interferes with the reception, reset the Selector Control to 'FM MONO,' and the station will be received monophonically and the noise will be drastically cut down.
4. Operate the various other controls and switches to obtain the best 4-channel stereo effect.

AM Broadcasts

1. Set the Selector Control to 'AM.'
 2. Choose the desired station by turning the Tuning Knob until the Signal Meter pointer swings as far to the right as it will go near the frequency of that station.
 3. Use the various other controls and switches to suit your personal preference or the room acoustics.
- Note:** When receiving FM mono or AM broadcasts, it is better to leave the Synthesizer/Decoder Function Control at '2CH' and let the signals bypass the receiver's built-in 4-Channel Synthesizer Decoder (see page 6).



INSTALLING AM FERRITE BAR ANTENNA



2-CHANNEL TAPE DECKS

Recording and Playback on 2-Channel Tape Decks

If you couple a 2-channel tape deck to the QR-4500, you'll be able to record and playback a 2-channel stereo tape. Of course, the playback sound can be converted, if desired, into four channels by the 4-Channel Synthesizer Decoder and reproduced out of the four speaker systems. If the tape deck is of a 3-head type (with separate record and play heads), you'll be able to monitor the sound as it is recorded. In addition, if you connect two tape decks to the QR-4500, you'll be able to record into both of them simultaneously or copy a recorded tape from one to the other.

Connecting 2-Channel Tape Decks

The QR-4500 is provided with two 2-channel tape monitor circuits; one has pin jack terminals and a DIN connector socket, while the other has pin jack terminals and phone type jacks. If you are connecting only one tape deck, you are absolutely free to use any terminals that are most convenient. But if you are connecting two tape decks, be sure to connect one of them to either terminals of the first tape monitor circuit, and the other to either terminals of the second tape monitor circuit. If a tape deck is connected to the phone type jacks of the second tape monitor circuit, the pin jack terminals are automatically cut off and cease to function.

If Using Pin Jacks

If you are using the pin jack terminals to connect your tape deck, proceed as follows:

1. Connect a pair of shielded cables between the 'TAPE REC 1 (or 2)' pin jack terminals of the QR-4500 and the recording input terminals of your tape deck.
2. Connect another pair of such cables between the receiver's 'TAPE MON 1 (or 2)' pin jack terminals and the tape deck's playback (or monitor) output terminals. Be sure to keep the left and right channel cables in the correct order at both ends.

If Using the DIN Socket

If your tape deck is equipped only with a DIN connector socket, plug the DIN connector cable extending from it into the 5-pin DIN connector socket (marked TAPE RECORDER 1) on the receiver's rear panel.

If Using Phone Jacks

Should your tape deck be equipped with cables with phone type plugs, connect them to the phone jacks on the receiver's front panel. The tape deck's recording input plug should be inserted into the 'TAPE REC' jack on the left, and its playback output plug into the 'PLAYBACK' jack on the right.

2-Channel Recording & Playback Procedures

To Record into a 2-Channel Tape Deck

1. Set the receiver's Selector Control to the program source you want to record.
2. Start the tape deck in the recording mode.
3. To monitor the sound being recorded, push the '2CH-1' or '2CH-2' tape monitor switch on the receiver's front panel, depending on which of the two 2-channel tape monitor circuits is accommodating the tape deck at the moment.

To Reproduce the Recorded Tape

1. If you have connected the tape deck to the first 2-channel tape monitor circuit, push the '2CH-1' tape monitor switch on the receiver's front panel. If you've connected it to the second circuit, push the '2CH-2' tape monitor switch.
2. Start the tape deck in the playback mode.
3. Use the various controls and switches on the receiver to obtain the best 4-channel stereo effect.

Recording into Two 2-Channel Tape Decks Simultaneously

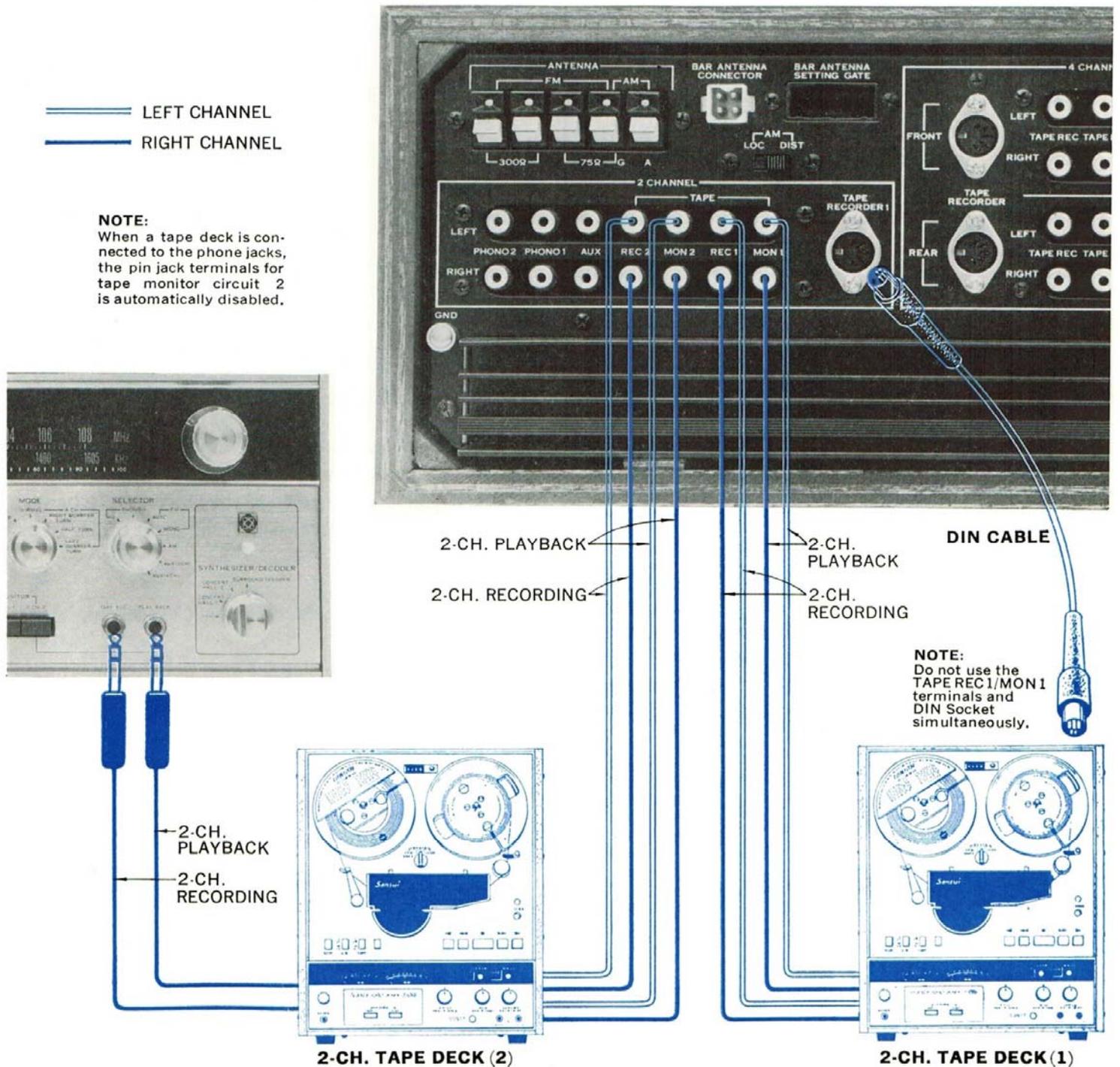
1. Set the receiver's Selector Control to the program source you want to record.
2. Start both tape decks in the recording mode.

Recording from One Tape Deck to the Other

1. Push the '2CH-1' tape monitor switch of the receiver.
2. Start the tape deck connected to the second tape monitor circuit, in the recording mode.
3. Now start the other tape deck (connected to the first tape monitor circuit) in the playback mode.

Note:

1. If the tape deck referred to in step 2. is of a 3-head type, the tape being copied can be monitored simply by pushing the '2CH-2' tape monitor switch of the receiver.
2. The copying (dubbing) of a recorded tape, as described above, is only possible from a tape deck connected to the first tape monitor circuit to the one connected to the second tape monitor circuit.



4-CHANNEL TAPE DEC

Recording and Playback on a 4-Channel Tape Deck

If you connect a 4-channel tape deck to the QR-4500, you'll be able to record and reproduce a 4-channel stereo tape. You may either record the 4-channel stereo sound converted from 2-channel program sources by the receiver's built-in 4-Channel Synthesizer Decoder, or if you connect two 4-channel tape decks, you'll even be able to record from a discrete 4-channel stereo tape. Of course, if the tape deck is of a 3-head type, it is possible to monitor the sound being recorded.

Connecting a 4-Channel Tape Deck

You may either connect a 4-channel tape deck to the receiver's 4-channel tape monitor pin jacks or DIN connector sockets. If using the former:

1. Connect the tape deck's recording input terminals with the receiver's 4-channel TAPE REC pin jacks, using shielded cables with pin plugs, and,
2. Connect the tape deck's playback output terminals with the receiver's 4-channel TAPE MON pin jacks, using similar cables. In both cases, be sure that the front and rear, left and right channel cables are kept in the correct order at both ends.

Note: On many tape decks, each of the four channels is designated as follows:

- Front left.....Channel 1 or Track 1
- Front rightChannel 3 or Track 3
- Rear leftChannel 2 or Track 2
- Rear rightChannel 4 or Track 4

A 4-channel tape deck can also be connected to the receiver's DIN connector sockets. The QR-4500 is provided with two such sockets on the rear panel... the upper one for the front channels and the lower one for the rear channels. To connect, you only need plug the DIN connector cables of the tape deck into the appropriate sockets firmly, taking care not to confuse the front and rear channels.

4-Channel Recording Procedures

To record the 4-channel sound converted from 2-channel program sources by the receiver's built-in 4-Channel Synthesizer Decoder, follow the simple steps described below.

1. Set the receiver's Selector Control to the program source you wish to record. However, if the program source is a 2-channel stereo tape, operate both the 2-channel tape deck and the receiver to reproduce the tape, in accordance with the instructions on '2-Channel Recording & Playback Procedures' on page 13.
2. Turn the receiver's Synthesizer/Decoder Function Control to a position that gives you the sound effect best suited to the type of music you are about to record.
3. Adjust the receiver's Volume Control so as to feed signals of appropriate strength into the tape deck.
4. Start the 4-channel tape deck in the recording mode.

NOTE: Push the '4CH' tape monitor switch on the receiver's front panel if you want to monitor the recording as you make it.

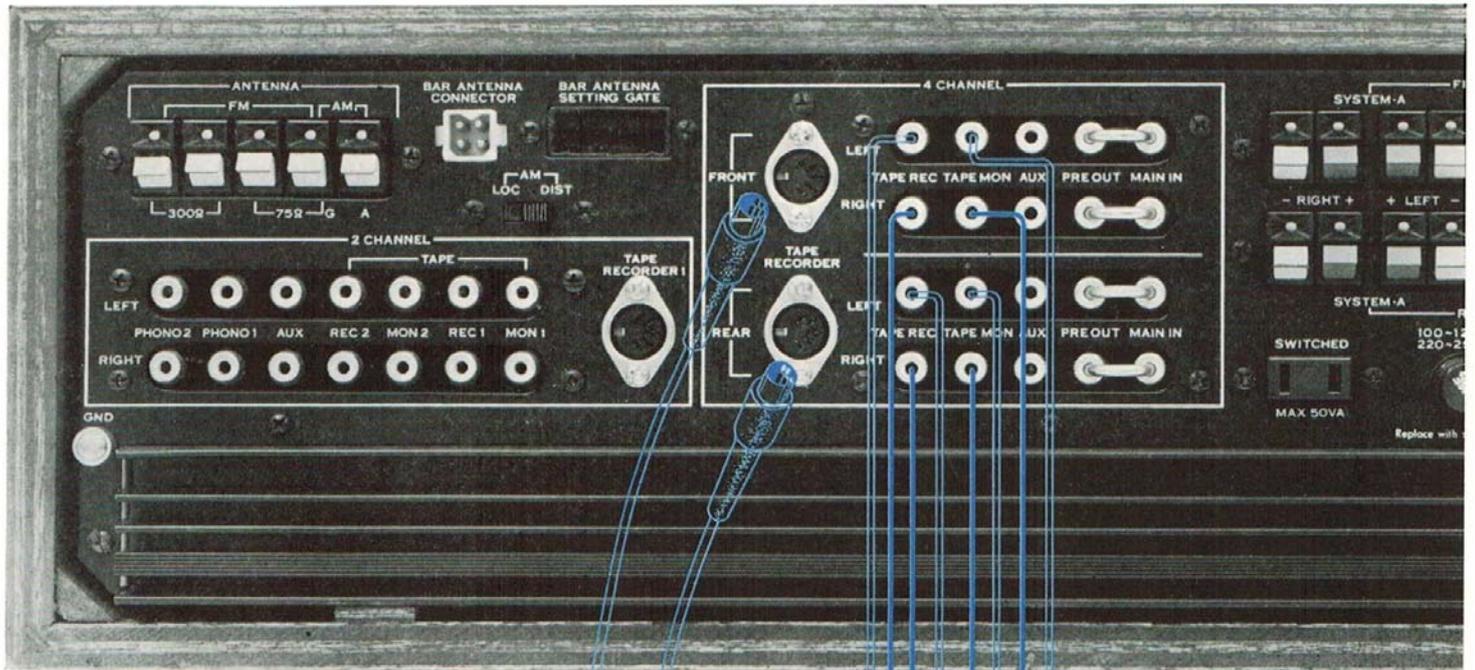
If you want to copy a 4-channel stereo tape, you need another 4-channel tape deck. This second tape deck should be connected to the receiver's 4-channel AUX input terminals, using shielded cables with pin plugs.

Then:

1. Set the receiver's Selector Control to 'AUX (4CH).'
2. Start the first 4-channel tape deck (connected to the 4-channel tape monitor terminals) in the recording mode.
3. Start the other 4-channel tape deck (connected to the 4-channel AUX input terminals) in the playback mode to reproduce the 4-channel stereo tape.

4-Channel Playback Procedure

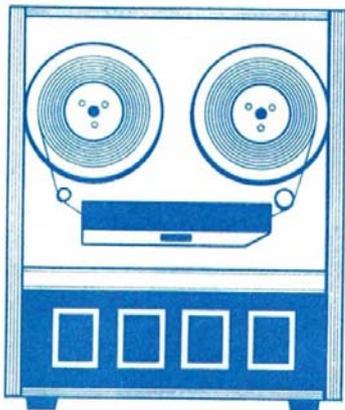
1. Push the '4CH' tape monitor switch on the receiver's front panel.
2. Start the 4-channel tape deck in the playback mode.
3. Use the various controls and switches on the receiver to obtain the best 4-channel stereo effect.



DIN CABLE

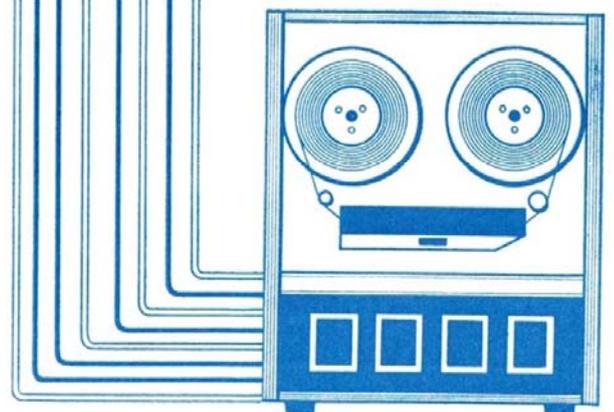
FRONT
REAR

NOTE:
Do not use the TAPE REC/MON terminals and DIN Connector Sockets simultaneously.



4-CH. TAPE DECK
(With DIN Connector Sockets)

4-CH. PLAYBACK
FRONT
REAR
4-CH. RECORDING
FRONT
REAR

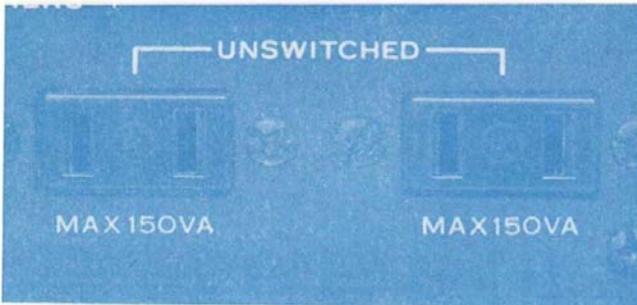
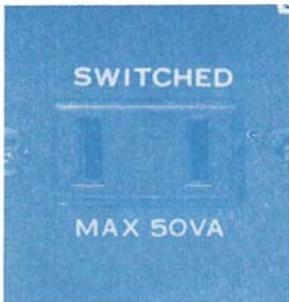


4-CH. TAPE DECK

MAINTENANCE

Rear-panel AC Outlets

Of the three AC outlets provided on the rear panel, the one marked 'SWITCHED' is controlled by the front-panel Power Switch. The other two, marked 'UNSWITCHED,' are always 'live' and independent of the Power Switch. The three outlets together have limited power capacities, and it is extremely dangerous to connect equipment with bigger power requirements. Before connecting any equipment, make certain its power requirement does not exceed the power capacity limit.



AM Local/Distant Antenna Switch

Should you happen to live near a broadcasting station, the AM radio wave may be excessively strong, distorting the sound. In such a case, change this switch to 'LOC,' and the distortion will normally disappear, giving you a pleasant reception. Leave the switch at 'DIST' at all other times.

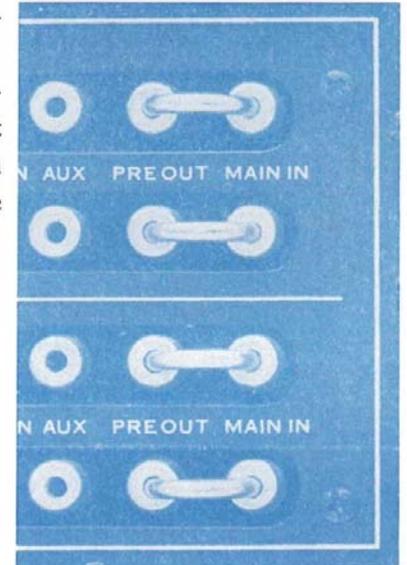


PM Connectors

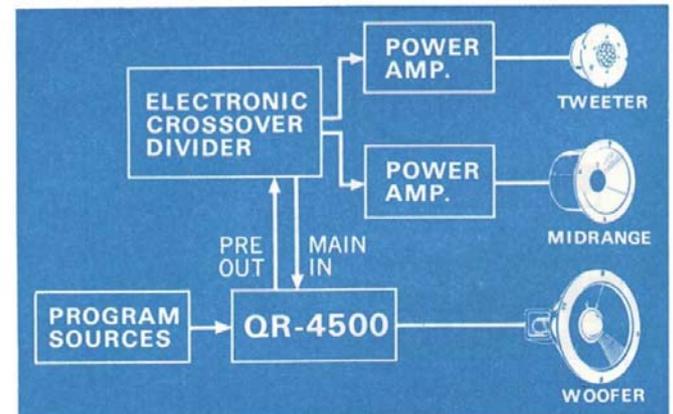
These are the U-shaped jumper connectors connecting the 'PRE OUT' (preamplifier output) terminals and the 'MAIN IN' (power amplifier input) terminals on the receiver's rear panel, and can be very easily pulled out. With these connectors unplugged, the four preamplifiers and four power amplifiers of the QR-4500 are separated and may be independently used. For example, other preamplifiers may be connected to the 'MAIN IN' terminals, or other power amplifiers to the 'PRE OUT' terminals. This would make it possible to upgrade your 4-channel stereo system further by adopting the 'electronic crossover system,' among other things.

Note:

1. Be sure to leave the PM connectors firmly plugged in unless you wish to connect other preamplifiers or power amplifiers.
2. Cut off the Power Switch without failure before you plug in or out the PM connectors.



ELECTRONIC CROSSOVER SYSTEM



About the Place of Installation

The wooden cabinet of the QR-4500 is designed so that any heat radiated inside will effectively escape through it. Proper care should therefore be taken of the dissipation of such heat if you wish to place something on top of the receiver or place it inside a closed box, etc. Above all, avoid placing it where it may be exposed to the direct sunlight.

Hum and Howling

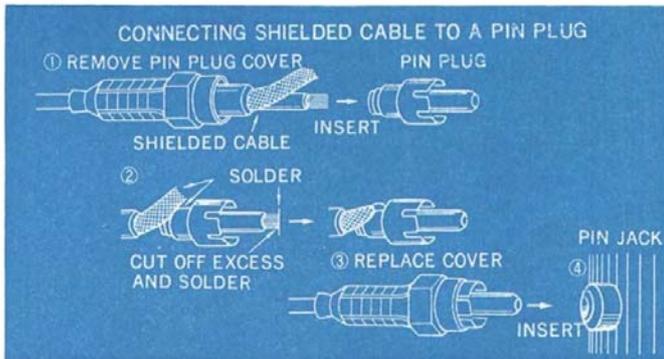
Care must be taken never to place a turntable on or too close to a speaker system, or the vibration of the speaker system is transmitted and causes howling. It is best to keep these components completely separated, but if this is impossible, place a thick cushion between them.

Humming is a phenomenon often caused by incomplete or incorrect turntable-receiver connections. If this should occur, check to see if all connections are completely made and if the connecting wires are sufficiently thick.

When Connecting a Turntable, etc.

To connect a turntable, tape deck and so forth, it is strongly recommended to use thick, shielded cables with a minimum of distributed capacity and to keep them as short as possible.

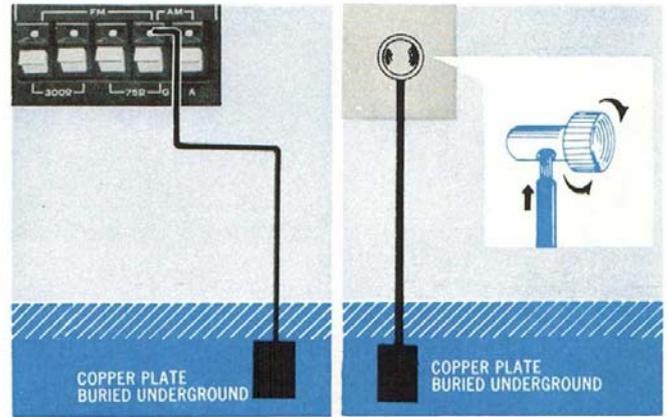
To solder the pin plugs supplied as accessories onto such shielded cords, refer to the illustration below.



Grounding

Any noise picked up by the connecting cables can be effectively grounded by connecting a piece of PVC (polyvinyl chloride) or enameled wire to the 'GND' terminal on the QR-4500's rear panel, attaching a small copper plate or carbon rod to the other end and burying it deep underground. The grounding leads of other equipment in your 4-channel stereo system may be connected to the same terminal to ground the entire system at once.

If you have connected an external AM antenna to the receiver, it is advisable to ground it at the same time.



Should the Power Fuse Blow

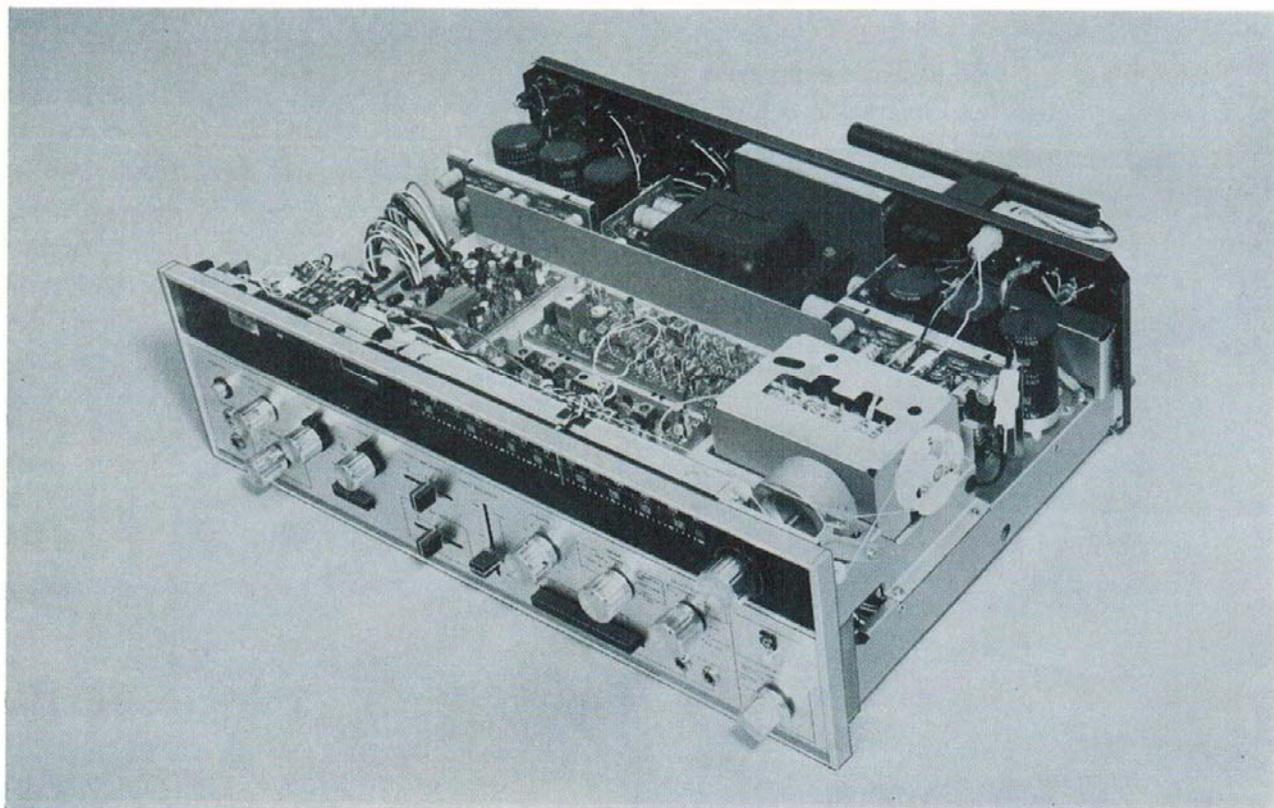
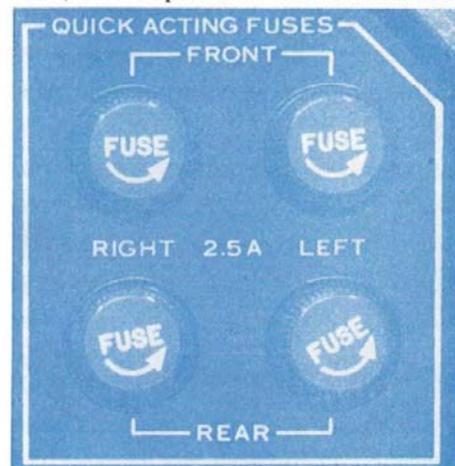
If no Selector Indicator should glow and the receiver simply remains dead even after you have turned on its Power Switch, it is possible that its power fuse has blown. If this happens, disconnect the power cord from the wall AC outlet at once and examine the power fuse on the receiver's rear panel. If you find it blown, replace it with a new glass-tubed fuse of the rated capacity (5-ampere for 100 to 127 volts, 3-ampere for 220 to 250 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 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 transistors have blown.

If this should happen, disconnect the power cord from the wall AC outlet immediately and check the four quick-acting fuses on the rear panel. If you find any of them blown, discover and eliminate the cause of the blowout, and replace it with a new 2.5-ampere quick-acting fuse supplied. Probable causes of the blowout include excessively large input signals and a short-circuit at the speaker terminals.



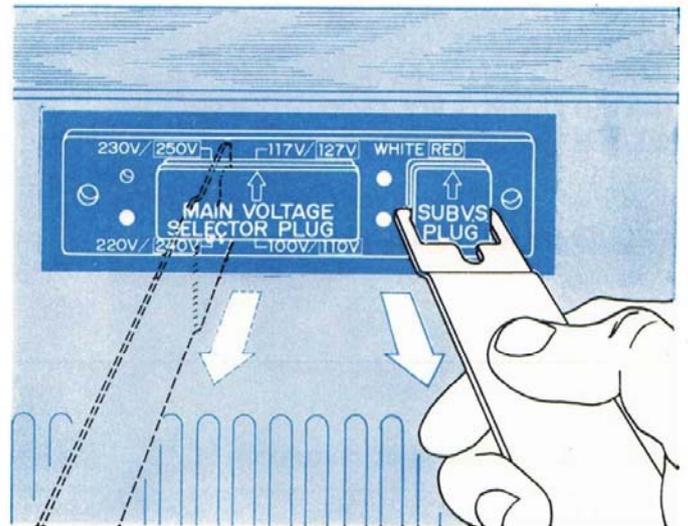
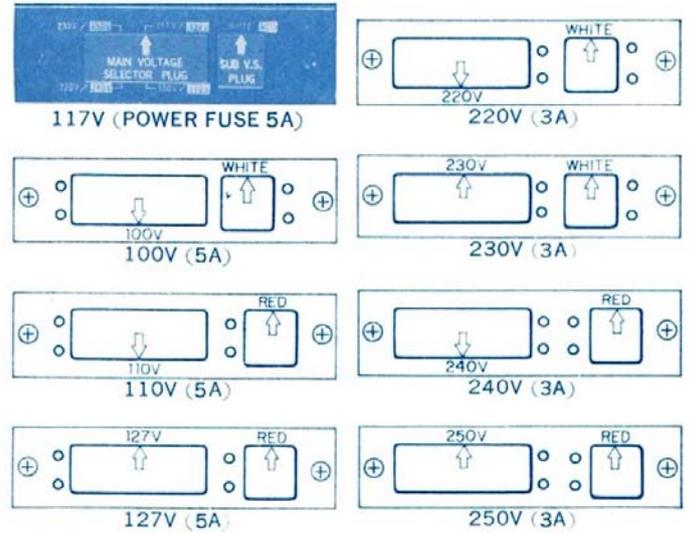
Voltage Adjustment

So that you may operate your QR-4500 in any part of the world, it is equipped with Voltage Selector plugs. As it is set to the correct power supply voltage of your area in our factory prior to shipment, so there is no need to touch it. However, should you move after purchasing the receiver and find the power supply voltage is different, simply reset the plugs as follows:

1. The Voltage Selector Plugs are located at the bottom of the receiver, protected by a metal cover. Remove this cover first by loosening the two screws securing it to the bottom.
2. The metal cover is shaped so as to facilitate extracting the plugs. Pull out the plugs, as illustrated at right.
3. Set the arrow mark on the Main Voltage Selector Plug to the required voltage: 100, 110, 117, 127, 220, 230, 240 or 250 volts.
4. If the required voltage is indicated in red, set the arrow mark on the adjacent Sub Voltage Selector Plug to "RED." If it is indicated in white, however, set that arrow to "WHITE."
5. It may be necessary to change the power fuse itself when the power supply voltage has changed. For 100-127 volt operation, a 5-ampere fuse is required. For 220-250 volt operation, however, it should be changed to a 3-ampere one.
6. Where the power supply voltage considerably fluctuates, the Voltage Selector plugs may be reset to avoid unpleasant side-effects of such fluctuation. Reset them to the voltage immediately higher than the peak of the fluctuation.

Accessories

1. FM antenna	1
2. AM antenna	1
3. Power cord	1
4. Pin plugs.....	4
5. Polishing cloth.....	1
6. Quick-acting fuses (2.5A).....	2
7. Butterfly bolts	2
8. Washers	2
9. Operating Instructions Manual	1
10. Operating Instructions Sheet	1
11. Service Manual	1



About Servicing

If anything should ever go wrong with your QR-4500, or if you have any question about it, please contact the Sansui dealer from whom you purchased it or your nearest Authorized Sansui Service Station.

SPECIFICATIONS / CHARACTERISTICS

POWER AMPLIFIERS SECTION

POWER OUTPUT

MUSIC POWER (IHF): 240W at 4 ohms load
160W at 8 ohms load

CONTINUOUS POWER: 38W × 4 at 4 ohms load
27W × 4 at 8 ohms load

TOTAL HARMONIC DISTORTION: less than 0.5% at rated output

INTERMODULATION DISTORTION: less than 0.5% at rated output
(60Hz: 7,000Hz=4:1 SMPTE method)

POWER BANDWIDTH (IHF): 20 to 30,000Hz

FREQUENCY RESPONSE: (at normal listening level)
20 to 30,000Hz ±1dB

CHANNEL SEPARATION: (at rated output, 1,000Hz)
better than 50dB

HUM AND NOISE (IHF): less than -70dB

INPUT SENSITIVITY: (for rated output, 1,000Hz)
0.9V

INPUT IMPEDANCE: 100k ohms

LOAD IMPEDANCE: 4 to 16 ohms

DAMPING FACTOR: 30 at 8 ohms load

PREAMPLIFIERS SECTION

OUTPUT VOLTAGE

MAXIMUM OUTPUT VOLTAGE: 3V
RATED OUTPUT VOLTAGE: 0.95V

TOTAL HARMONIC DISTORTION: less than 0.1% at rated output
voltage

FREQUENCY RESPONSE (AUX): 20 to 30,000Hz ±1dB

CHANNEL SEPARATION (at rated output, 1,000Hz)
PHONO: better than 50dB at closed circuit

AUX: better than 50dB at 10k ohms load

HUM AND NOISE (IHF)
PHONO: less than -60dB

AUX: less than -70dB

INPUT SENSITIVITY (at rated output, 1,000Hz)

PHONO-1: 2mV (50k ohms)

PHONO-2: 2mV (50k ohms)

AUX (2CH): 160mV (50k ohms)

AUX (4CH): 360mV (50k ohms)

TAPE MON (pin) (2CH): 160mV (50k ohms)

TAPE MON (pin) (4CH): 360mV (50k ohms)

TAPE RECORDER (DIN) (2CH): 160mV (50k ohms)

TAPE RECORDER (DIN) (4CH): 360mV (50k ohms)

RECORDING OUTPUT (at rated input, 1,000Hz)

TAPE REC (pin) (2CH): 160mV

TAPE REC (pin) (4CH): 360mV

TAPE RECORDER (DIN) (2CH): 30mV

TAPE RECORDER (DIN) (4CH): 60mV

EQUALIZER PHONO: RIAA NF type

TONE CONTROLS Front channel

BASS: ±15dB at 50Hz

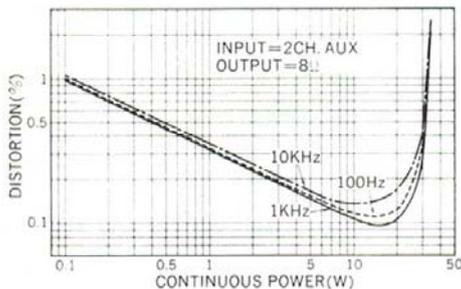
TREBLE: ±15dB at 20,000Hz

LOUDNESS CONTROL: +5dB at 50Hz
+3dB at 10,000Hz
(Volume control at -30dB)

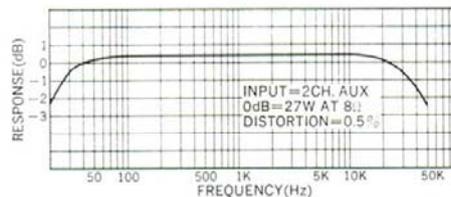
LOW FILTER (Front): -10dB at 50Hz

HIGH FILTER (Front): -10dB at 10,000Hz

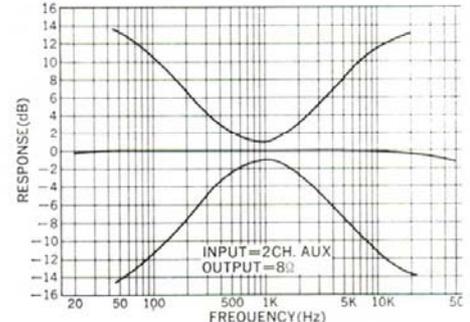
POWER OUTPUT HARMONIC DISTORTION



POWER BANDWIDTH



TONE CONTROL



SYNTHESIZER DECODER SECTION

FREQUENCY RESPONSE:

FRONT CHANNEL: 20 to 20,000Hz ± 1 dB
 REAR CHANNEL: 20 to 20,000Hz +1, -2dB
 REAR CHANNEL PHASE MODULATION RANGE:
 Max. 180 degrees at 10,000Hz

REAR CHANNEL PHASE SHIFT

LEFT: -90 degrees at 250Hz
 RIGHT: +90 degrees at 450Hz

TUNER SECTION

<FM>

TUNING RANGE: 88 to 108MHz
 SENSITIVITY (20dB quieting): 1.6 μ V
 (IHF): 2.0 μ V
 TOTAL HARMONIC DISTORTION:
 less than 0.8%
 SIGNAL TO NOISE RATIO: better than 65dB
 SELECTIVITY: better than 70dB
 CAPTURE RATIO (IHF): 2.0dB
 IMAGE FREQUENCY REJECTION:
 better than 80dB at 98MHz
 IF REJECTION: better than 70dB at 98MHz
 SPURIOUS RESPONSE REJECTION:
 better than 70dB at 98MHz
 FM STEREO SEPARATION: better than 35dB
 SPURIOUS RADIATION: less than 34dB
 ANTENNA INPUT IMPEDANCE:
 300 ohms balanced,
 75 ohms unbalanced
 FREQUENCY RESPONSE: 50Hz to 15,000Hz ± 1 dB

<AM>

TUNING RANGE: 535 to 1,605kHz
 SENSITIVITY: 200 μ V/m at 1,000kHz
 (bar antenna)
 (IHF): 15 μ V at Distant position
 IMAGE FREQUENCY REJECTION:
 better than 90dB at 1,000kHz
 IF REJECTION: better than 90dB at 1,000kHz
 SELECTIVITY: better than 30dB at 1,000kHz

GENERAL

SEMICONDUCTORS: Transistors: 85 FET; 2 IC; 5
 Diodes: 32 Zenner Diodes: 3
 Modules: 5

POWER REQUIREMENTS

POWER VOLTAGE: 100, 110, 117, 127, 220, 230,
 240, 250V 50/60Hz

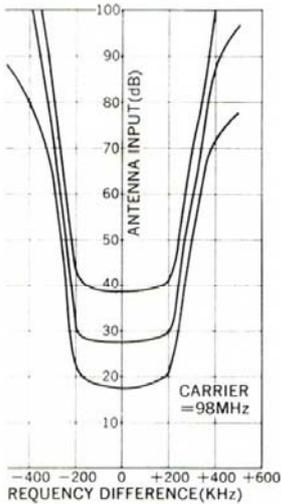
POWER CONSUMPTION: 310W (max. signal)

DIMENSIONS: 172mm(6¹¹/₁₆" H, 528mm(20¹³/₁₆" W,
 318mm(12⁵/₈" D

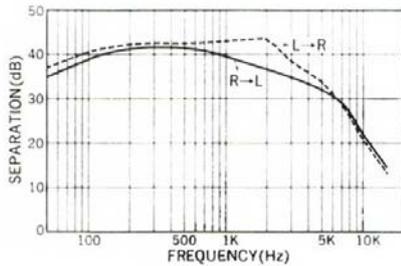
WEIGHT: 18.6kg (41 lbs.)

* Manufacturer reserves right to change design and/or specifications without notice for purpose of improvement.

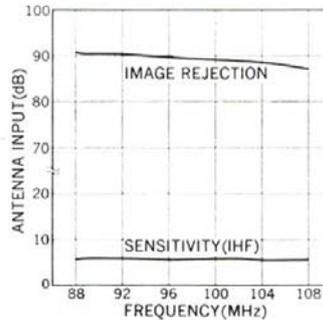
FM SELECTIVITY



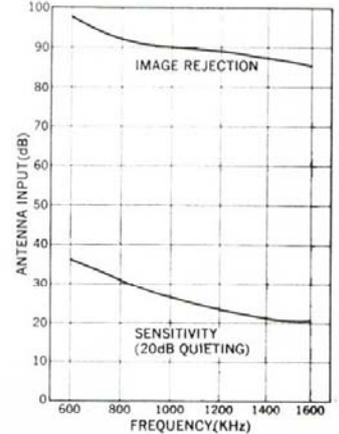
FM STEREO SEPARATION



FM SENSITIVITY & IMAGE REJECTION



AM SENSITIVITY & IMAGE REJECTION





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