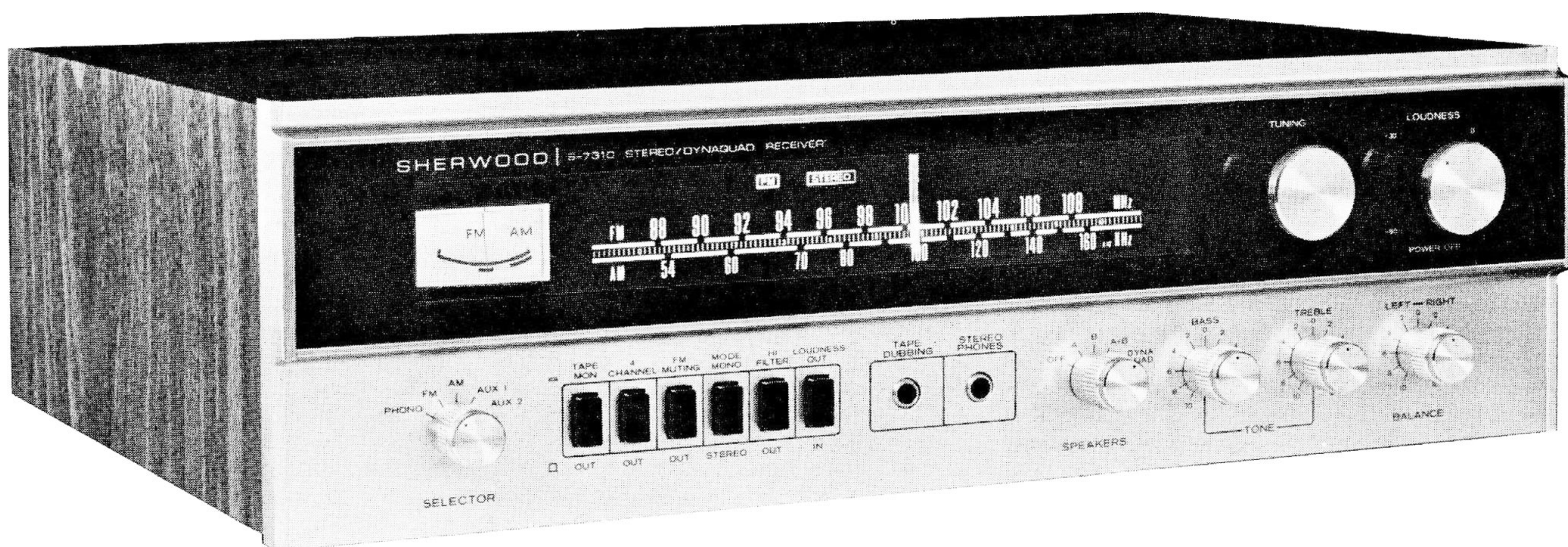


SHERWOOD

MODEL S-7310 AM/FM STEREO SOLID-STATE RECEIVER

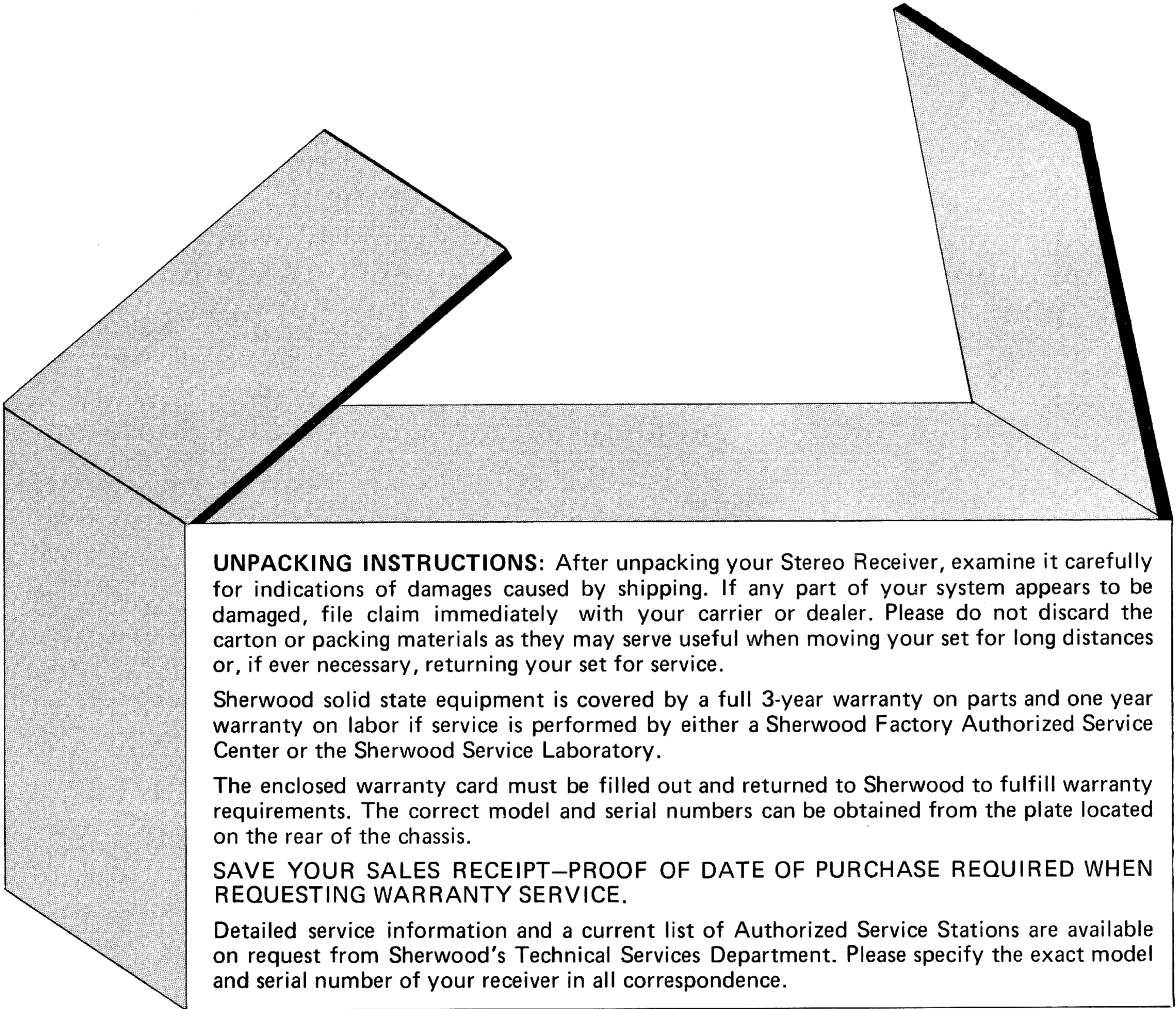
- PHASE LOCK LOOP MPX
- SOLID STATE CERAMIC IF FILTERS
- INTEGRATED CIRCUITS; FIELD EFFECT TRANSISTORS
- FM INTERCHANNEL "HUSH" MUTING CIRCUIT
- DIRECT COUPLED POWER AMPLIFIER
- BUILT IN DYNAQUAD MATRIXING CIRCUIT
- HI FILTER



INSTALLATION and

OPERATION MANUAL

We have reserved this space for the attachment of your sales receipt and customer portion of the warranty card so you may have a permanent record of the serial number, date of purchase, and dealer's name.



UNPACKING INSTRUCTIONS: After unpacking your Stereo Receiver, examine it carefully for indications of damages caused by shipping. If any part of your system appears to be damaged, file claim immediately with your carrier or dealer. Please do not discard the carton or packing materials as they may serve useful when moving your set for long distances or, if ever necessary, returning your set for service.

Sherwood solid state equipment is covered by a full 3-year warranty on parts and one year warranty on labor if service is performed by either a Sherwood Factory Authorized Service Center or the Sherwood Service Laboratory.

The enclosed warranty card must be filled out and returned to Sherwood to fulfill warranty requirements. The correct model and serial numbers can be obtained from the plate located on the rear of the chassis.

SAVE YOUR SALES RECEIPT—PROOF OF DATE OF PURCHASE REQUIRED WHEN REQUESTING WARRANTY SERVICE.

Detailed service information and a current list of Authorized Service Stations are available on request from Sherwood's Technical Services Department. Please specify the exact model and serial number of your receiver in all correspondence.

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

Congratulations!

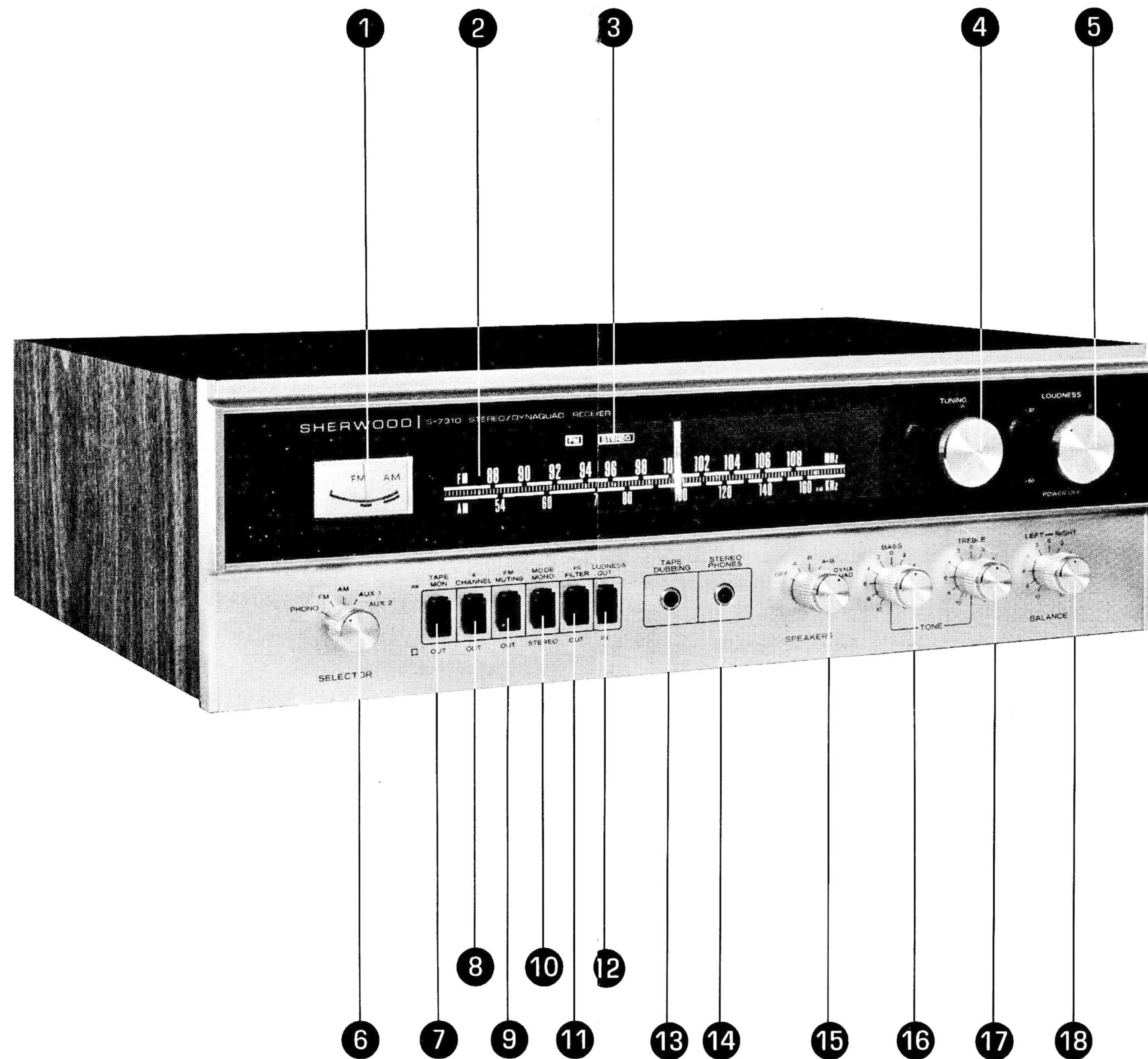
Your new Sherwood receiver provides you with the fullest enjoyment possible in the field of true high fidelity. Although the Sherwood receiver is simple to operate, it has many features designed to produce the utmost in listening pleasure in any location or room situation. To insure fullest enjoyment and maximum performance, please read this instruction booklet thoroughly before connecting the rest of your equipment.

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Switches and Controls

- 1 Zero Center Tuning Meter**
For precise tuning of FM Stations.
[AM: tune max. right hand deflection.]
- 2 Tuning Scales**
FM band in MHz; AM band in KHz.
- 3 Stereo Indicator**
Indicates FM stereo broadcasts.
- 4 Tuning**
Counterbalanced for easy tuning.
- 5 Loudness**
Master power ON/OFF and volume control for your speakers. Also automatically adds bass compensation at low levels when Loudness switch is used.
- 6 Selector Control**
Selects your listening source: Phono, FM, AM, AUX 1, or AUX 2.
- 7 Tape Monitor**
Permits monitoring during tape recording.
- 8 4-channel**
For connecting 4-channel decoder [also doubles as 2nd Tape Mon.]
- 9 Muting**
Removes FM interstation noise.
- 10 Mode**
Depress for Mono listening.
- 11 Hi Filter**
Cuts off scratch from records, or background "hiss" from noisy FM stations. [Attenuates at 12 db/octave.]



- 12 Loudness**
Defeats loudness control compensation.
 - 13 Tape Dubbing**
Permits recording to, or playing back from, a second tape recorder. Also, dubbing from one recorder to the other.
 - 14 Stereo Phones**
For private listening with headphones.
 - 15 Speakers [Dynaquad]**
Selects main speakers [A], remote speakers [B], both sets [A & B], or turns speakers off [for headphone listening]. Also activates Dynaquad 4-channel Matrix circuit.
 - 16 Bass**
Increases treble tones up to +10 db, decreases to -10 db at 100 Hz.
 - 17 Treble**
Increases treble tones up to +10 db, decreases to -10 db at 10 KHz.
 - 18 Balance**
Balances the relative volume levels of right and left speakers.
- Three-year Warranty**
Sherwood—first in the industry to provide a three-year warranty on transistor receivers, tuners, amplifiers. Warranty covers all parts plus one-year repair labor when returned to factory or authorized service station. [Transportation costs not included.]

installation

Sherwood receivers are usually placed so as to afford the greatest operating convenience: on a chairside table, desk, bookshelf, or in a conventional audio cabinet.

Once you have chosen the best location, you can proceed with connection of the speaker systems and turntable. Be sure to avoid the following locations, which can cause malfunctions:

- Places exposed to direct sunlight or close to heating units or other sources of heat,
- Places with poor ventilation,
- Excessively humid or dusty locations,
- Sloping locations, those subject to vibration, or otherwise unstable.

We recommend that your record changer or turntable be located within ten feet of the receiver's input panel. However, magnetic phono cartridges should be located at least eight inches away from the receiver's power transformer. The speakers may be placed as far as 50 feet from your Sherwood receiver.

NOTES

IMPORTANT: Allow at least two inches in back of your receiver for adequate ventilation and cabling convenience. Never place the unit near radiators or in front of heating vents. Excessive heat tends to shorten the life of the parts. (This is an important fact to remember in caring for all the elements of your high-fidelity system, including records and tape.)

PANEL MOUNTING: The Sherwood receiver is a self-contained, self-cabineted unit which is easily adapted for panel mounting in custom cabinetry. The enclosed full-size mounting template should be used for custom installation.

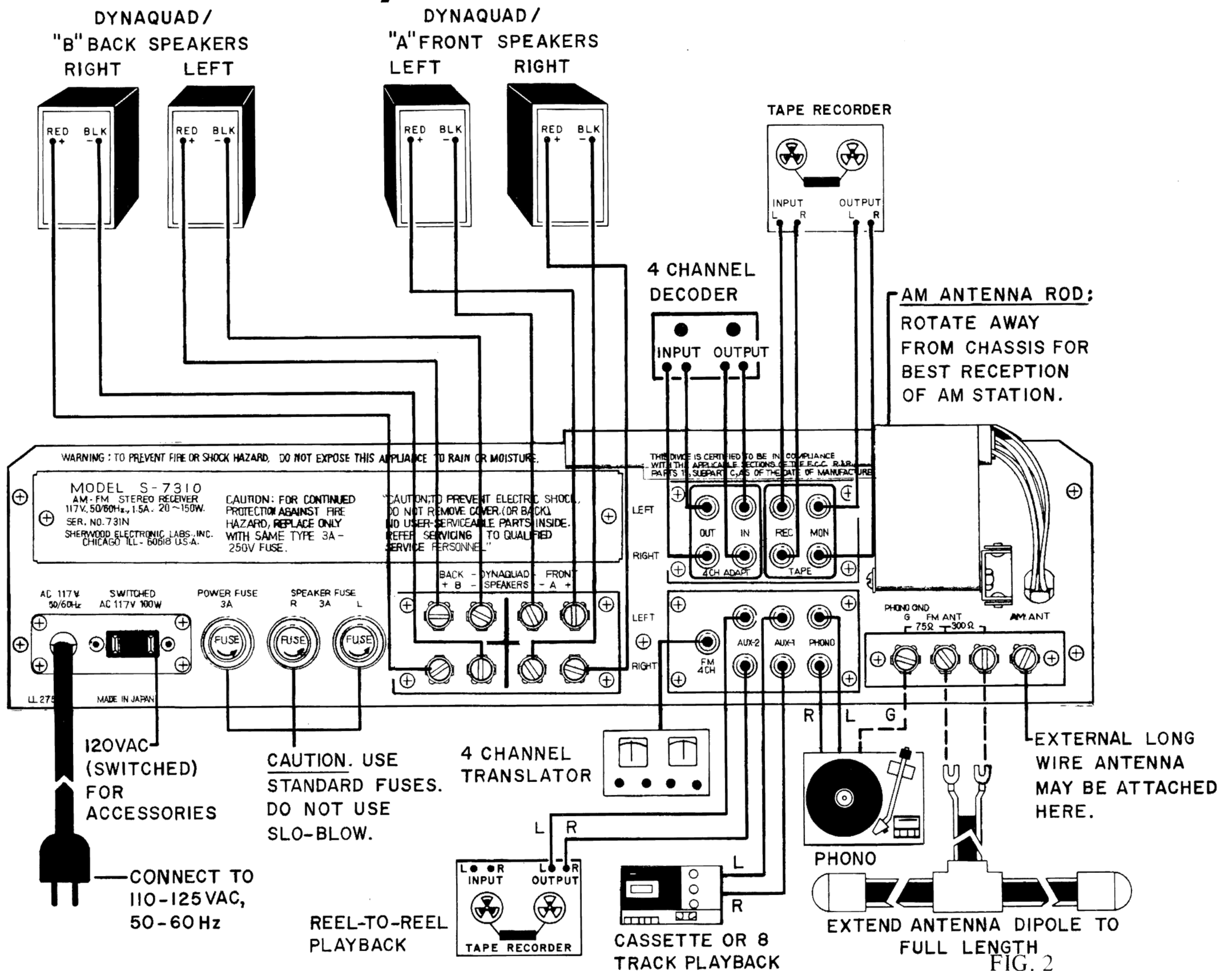
To mount the Sherwood receiver behind a panel, follow the detailed instructions on the enclosed mounting template.

VERTICAL MOUNTING: Although your Sherwood receiver has been designed to be mounted in a horizontal plane, it can be operated vertically (with the face plate up). In this vertical type installation, do not use the Sherwood wood enclosure. The receiver may be supported completely by its escutcheon in a custom installation; however this type support is not adequate to withstand shipping.

The Sherwood receiver is designed primarily for horizontal installation. Therefore, the components contributing the greatest amount of heat have been placed near the back of the chassis. This enables the heat to be dissipated without affecting the other components in the receiver. When mounting your receiver vertically, special precautions must be taken to insure adequate ventilation. Since warmer air rises, it is recommended that vents are provided in the mounting board (near the escutcheon) to allow the heated air to escape. Vents should also be provided below and in back of the receiver to allow cool air to enter. If it is impractical to incorporate vents in the mounting board, an alternate and more effective solution would be to install a small exhaust fan near the back of the chassis.

Connect complementary components as illustrated in following sections. The next page illustrates, briefly, how to connect your system. Each area is covered in depth later in this manual.

system hookup



interconnections

(See Fig. 2 above)

1. Connect speaker wire (plastic covered 18 ga. lamp cord) between your stereo speakers and the speaker terminals labeled FRONT SPEAKER "RIGHT" and FRONT SPEAKER LEFT." Please note: speakers should only be connected as indicated. Be sure speaker outputs are not shorted before turning on the receiver. (See detailed instructions for the connection of REMOTE speakers or REAR speakers of the DYNAQUAD 4-channel matrixing circuit.)
2. Connect complementary components as illustrated in Figure 2.
3. Plug the Sherwood receiver line cord into a wall outlet supplying 115-125V, 50/60 Hz current.

speaker connections

STEREO SPEAKER OUTPUTS: Examine your speaker system nameplate to determine its rated impedance. Your receiver is designed to work with speaker systems rated from 4 to 16 ohms.

FOR CONVENTIONAL STEREO: Each speaker system has two leads which are to be connected to your new Sherwood receiver. Connect each speaker to the corresponding speaker terminals on the rear panel of your receiver labeled "Front A Speakers" "Left" and "Right."

A second set of stereo speaker terminals are available on the rear panel. The additional set ("Back B Speakers" "Right" and "Left") may be used to power a remote set of speakers anywhere in the home.

Plastic-covered 18 ga. lamp cord serves as excellent speaker connecting lead and may be extended as far as 50 feet with little power loss. For shorter distances, TV antenna lead can be used since it is especially convenient for installations where it is desirable to conceal speaker leads under a rug.

STEREO SPEAKER PHASING: Correct phasing is required to obtain maximum bass response and preserve a unity in sound when solo vocalists perform. To identify correct phasing, either play a mono music selection or switch your receiver into the mono mode. Increase bass response slightly (to approximately 2 o'clock) and reduce treble slightly (to approximately 10 o'clock). Now, turn the balance control from left-speaker only to right-speaker only. If the speaker systems are in phase, the balanced (centered) bass response will exceed either left-only or right-only response. If the speaker systems are out-of-phase, the balanced bass response will be less than either left-only or right-only response.

If it is determined with this test that the speakers are out of phase, reverse (interchange) the connections to one speaker only. Repeat the test to verify that speakers are now correctly phased.

FOR 4-CHANNEL SOUND: Connect the left front, right front, left back, and right back speakers to the corresponding "Dynaquad" speaker outputs on the rear of the S-7310 receiver.

The "remote speakers" or the "back speakers" of the Dynaquad 4-channel matrixing circuit should be phased in the same manner as the "main speakers" or "front speakers" of the Dynaquad 4-channel matrixing circuit. This is done by placing the speaker selection switch to the "B" position. The MODE switch must remain in the "MONO" position.

Your Sherwood S-7310 control receiver incorporates the Dynaquad 4-channel matrixing circuit. This integrated matrixing circuit allows conventional 2 channel stereo sources to be converted to exciting 4-channel sound.

Conventional 2 channel stereo programs often include certain "hidden" ambient signals which are not reproduced during conventional stereo playback. These hidden signals are primarily non-phased. The Dynaquad 4-channel matrixing circuit uncovers these non-phased signals and directs them to the left rear and right rear speakers of the 4-channel system. The most dramatic programs containing ambient information are those of which have been recorded "live" and also where multiple microphones were used to actually record this non-phased ambient information. Your Sherwood S-7310 will reproduce these two additional channels containing ambient signals without using any additional amplifying equipment. Just add two additional speakers and enjoy thrilling 4-channel sound.

Although the Dynaquad 4-channel matrixing system is easy to use, it is important that the system be properly adjusted to achieve the optimum in realism. Please read the following pages carefully to insure fullest enjoyment of 4-channel listening.

DYNAQUAD SYSTEM FRONT "A" SPEAKER SYSTEM

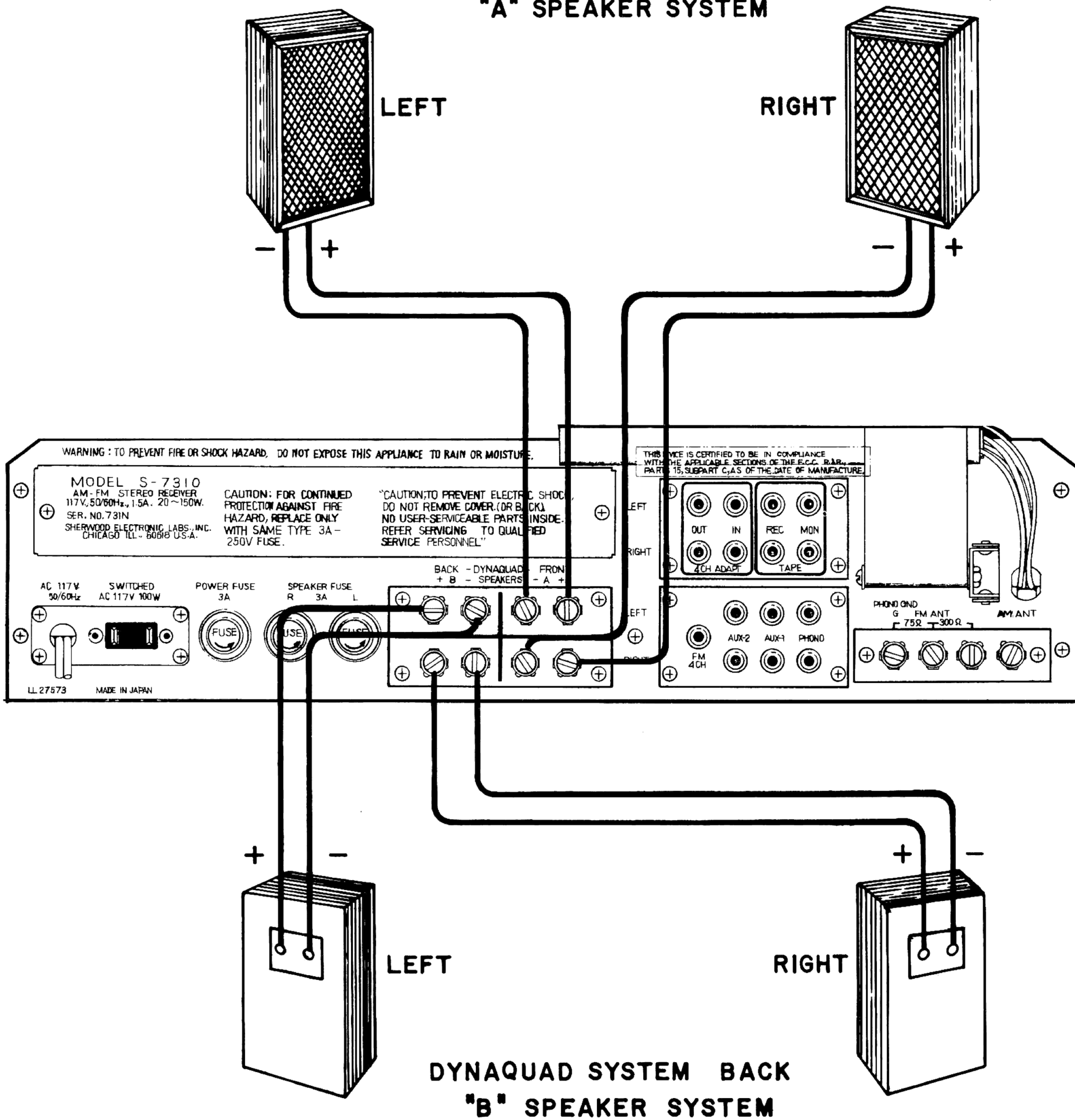


FIG. 3

dynaquad 4-channel matrixing circuit

SELECTION OF SPEAKERS: In any 2 channel system, speaker selection is of the utmost importance. Speakers should be selected to fit your listening, size and price needs. In a 4-channel system, it is also important that the rear speakers be complimentary to the front channel speakers in terms of impedance, efficiency, and same sonic characteristics. It is a misconception that low-cost speakers are ideal for the rear channels of a 4-channel system. At times, the ambient information fed to the rear speakers may be of very low or of very high frequencies. Speakers not capable of producing these low or high frequencies will diminish the 4-channel effect. Therefore, good speaker systems should be considered for rear-channel use.

SPEAKER PLACEMENT: While personal taste and room furnishings, as well as the floor plan of the listening room, are decisive factors in determining speaker placement, these general suggestions may help get the best results for your Dynaquad 4-channel listening.

The present positions of the left and right (front) speakers need not be changed in most instances (see Fig. 4). They are normally placed along the wall opposite the listening area, spaced equally to the right and left, and usually separated by nearly the same distance as the listener is from each speaker. It is assumed that the listener will be centrally located near the back wall of the room. The relative position of the listener and the four speakers must accommodate any left-to-right balance considerations, as the amplifier's balance control serves another purpose in the Dynaquad matrixing circuit.

The back speakers should likewise be placed at equal distances to each side of the listener, and usually to the rear and relatively far apart. All speakers should normally face the listener. In most cases the back speakers will be against the back wall, and somewhat closer to the listener than are the front speakers. (See Fig. 5)

Some users may like the effect of aiming the back speakers so that the sound bounces off an adjacent wall surface. (See Fig. 6) This arrangement may

heighten ambience effects, but it rolls off the high frequencies, and thus lessens directionality.

Though referred to as a "4 corner" placement, the speakers should not necessarily be put in the corners, but they generally will form a rectangle. (See Fig. 5) Those who favor a lot of bass will likely prefer corner locations. Some listeners, too, will prefer to mount the back speakers above ear level for the sense of spaciousness this provides.

4-CHANNEL SPEAKER PHASING (See Fig. 3 and refer to Page 8 for correct phasing of four-channel speakers):

After the speaker placement, speaker wiring, phasing and balance has been completed, you are now ready to enjoy four-channel sound. To do so:

- 1) Turn the **SPEAKER SELECTOR** switch to the **DYNAQUAD** position.
- 2) Position the **MODE** switch to "STEREO."
- 3) Adjust the **LOUDNESS**, **BASS**, **TREBLE**, and **BALANCE** controls to suit your personal listening taste.
- 4) Sit back and enjoy thrilling 4-channel sound.

Once you begin listening to your 4-channel system, you may feel that either the rear channels or the front channels are too loud with respect to the entire system. To compensate for this problem, a monaural 8 ohm 10 watt speaker volume control may be added to each speaker to decrease the volume of any speaker. This control is available from most electronic stores and should carefully be connected directly to the speaker whose relative volume needs lowering. (Please refer to the instructions included with the volume control).

Fig. 4: Normal Stereo Placement

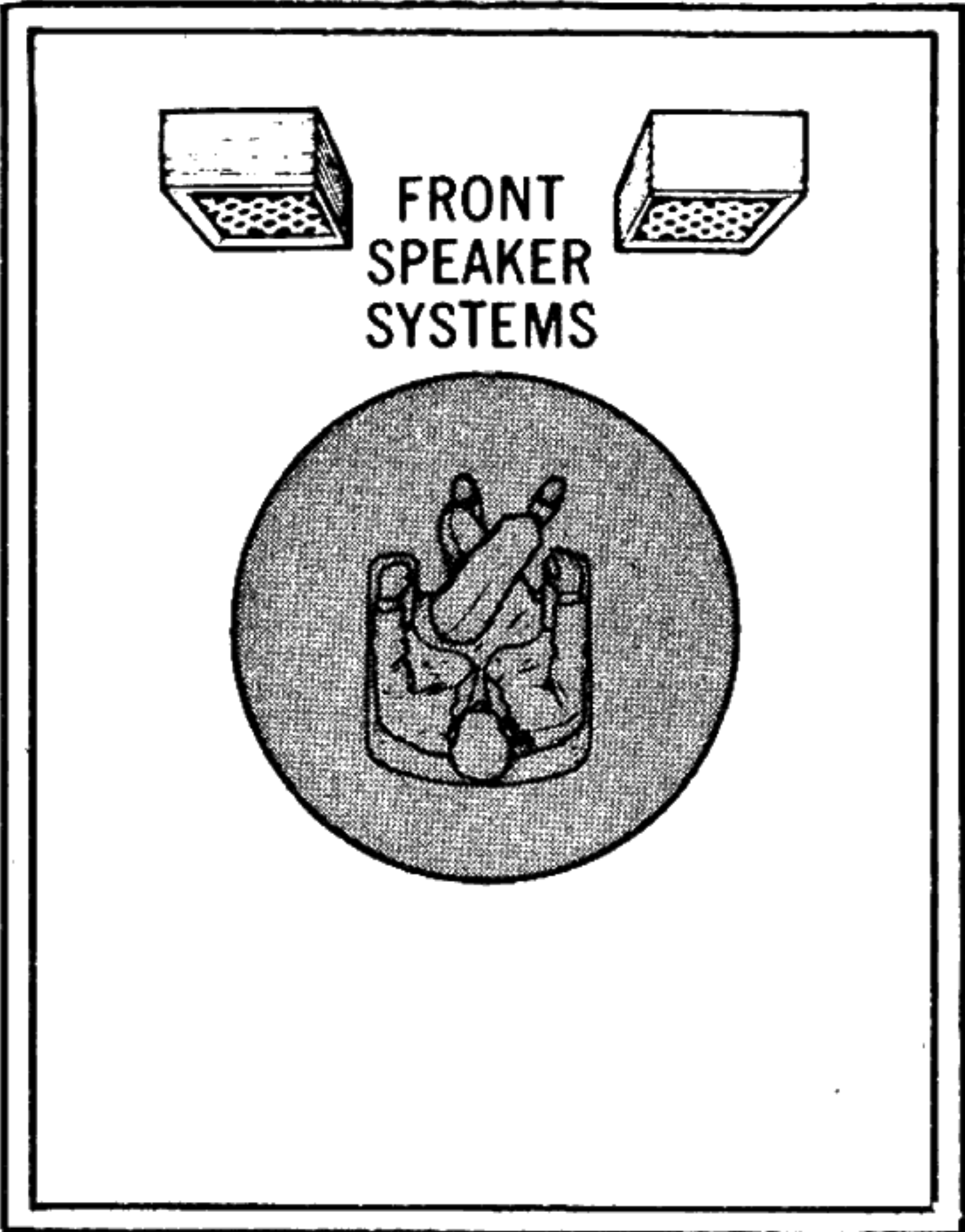


Fig. 5: Four Channel Placement

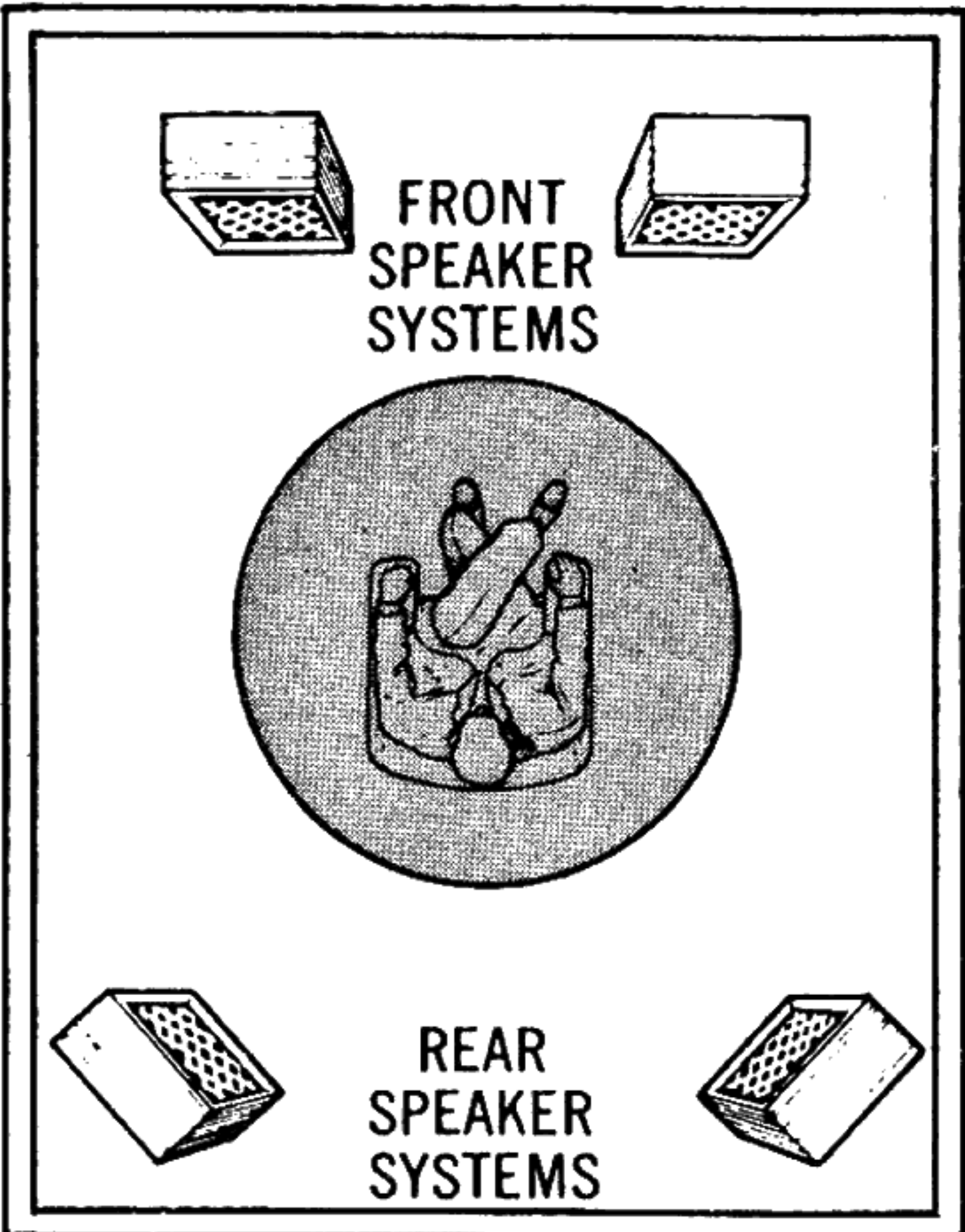
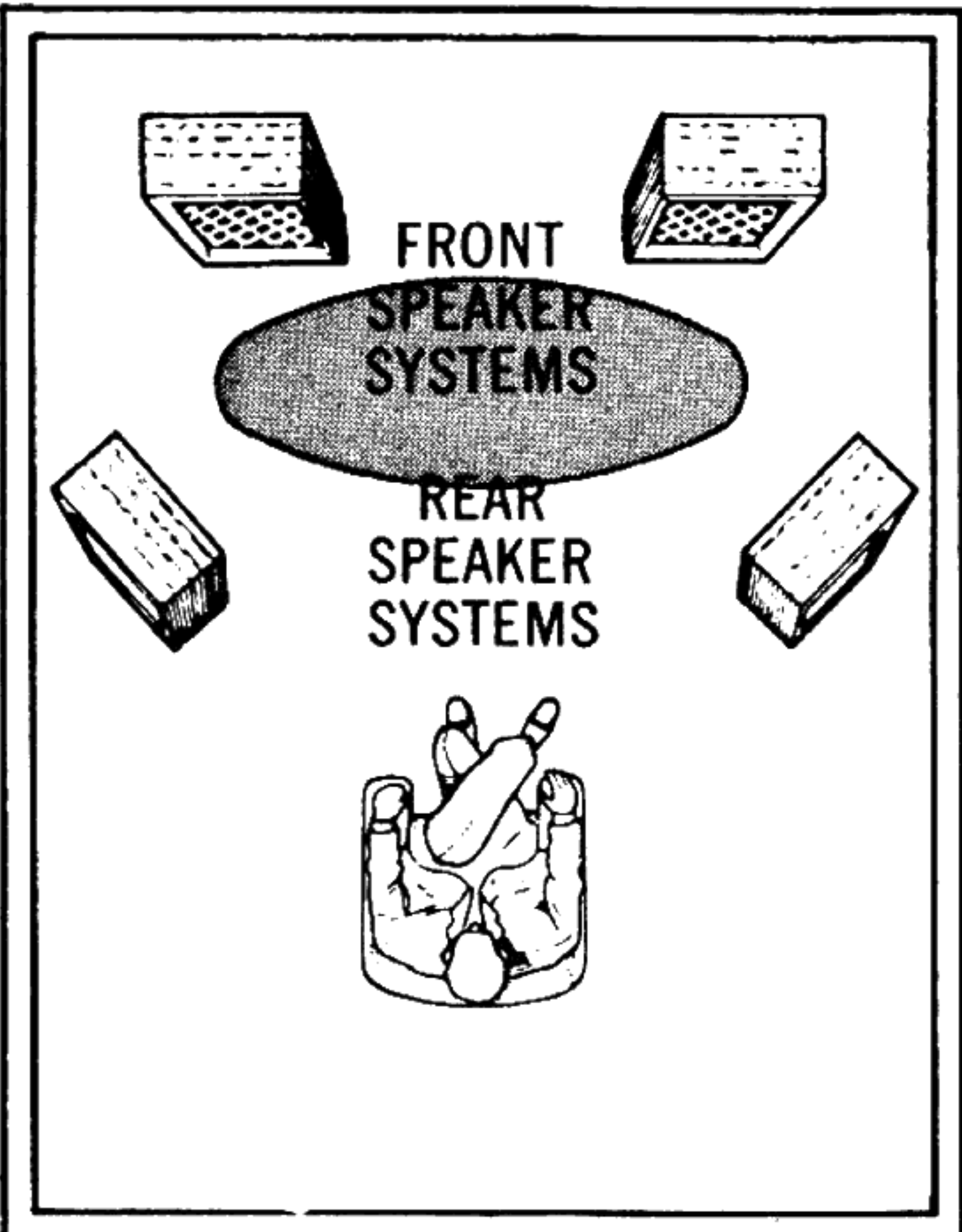


Fig. 6: Four Channel Placement



radio reception

The quality of reception that can be expected from the S-7210 is largely dependent on the correct positioning and use of antennas. The following procedures are recommended for noise-free reception.

FM ANTENNA: Included with the accessories is an FM twin-lead folded dipole antenna. Attach the two exposed ends to the two terminals marked “300Ω” on the rear panel (see Fig. 7). The antenna may be concealed by taping it to the back of the shelf on which the tuner is placed; however, best reception is normally obtained when the antenna is as high as possible above floor and when the dipole “arms” are extended to their full length, perpendicular to the direction of the FM station location.

If you are located a considerable distance from the FM station transmitters, an outdoor FM antenna may be required to reduce background noise, fading, or interference. FM antennas are available from your high-fidelity or TV parts distributor.

Direct interconnection with a TV antenna is also permissible. If interference from the interconnection is suspected, a connection with less coupling may be made by taping about 5 inches of the FM receiver 300-ohm twin-lead adjacent to the TV 300-ohm lead-in without actually making a direct connection.

If a 75 ohm antenna is used, connect the coaxial lead as follows: the shield (ground) wire should be connected to “G” and the center wire to the “75Ω” screw terminals. (See Fig. 7).

NOTE: FM sensitivity cannot be raised by simply lengthening the antenna. Adjust the antenna’s height and direction while actually listening to a broadcast for the best reception.

BUILT-IN AM FERRITE BAR ANTENNA: This sensitive antenna, located on the rear panel of the receiver, is usually adequate for strong AM reception. To use, pull it down and away from the back of the receiver until it comes to a stop halfway between the top and the bottom of the receiver. Then move it from up to down until best reception is obtained.

OUTDOOR AM ANTENNA: In ferroconcrete buildings or in areas remote from the broadcasting station, the built-in ferrite bar antenna may be inadequate for strong AM reception. An outdoor antenna then becomes necessary. This can be accomplished by connecting PVC wire to the antenna terminal marked AM on the back panel. Run this wire to an antenna that has been installed outdoors and away from the building. At the same time, the unit should be grounded. Position the outdoor antenna where reception is strongest while actually receiving a broadcast. And, for reasons of safety, be sure to attach a lightning arrester to the outdoor antenna.

RADIO RECEPTION – FM PROGRAMS:

1. Set the FUNCTION Selector to the FM position.
2. Select the desired FM station on the FM band of the tuning dial with the TUNING knob. The station is properly pinpointed when the needle in the TUNING meter is centered. For all stereo broadcasts being received, the STEREO Indicator will light up in red.
3. When a stereo broadcast is being received, use the BALANCE knob to control the balance of sound for both left and right channels. Use all other controls and switches according to taste and listening conditions.

FM MULTIPLEX DISTORTION: An effect which can either severely distort the reproduced sound of FM reception or remove the stereo separation expected, is known as multipath interference. This problem is caused by the simultaneous reception of more than one FM signal and is due to the reflection of the desired signal from high-rise buildings or other structures in urban areas or hilly terrain in mountainous country. Unfortunately, no FM tuner can correct for this difficulty. However, improving the signal receiving conditions by relocating the antenna can often alleviate the problem.

AM PROGRAMS:

1. Set the FUNCTION Selector to the AM position.
2. Select the desired station the the AM band of the tuning dial with the TUNING knob. The station is properly tuned when the needle in the SIGNAL meter moves as far to the right as possible.
3. Use all other controls and switches as required. During AM reception, the right and left speakers produce the same sounds whether in Stereo, Mono, or Dynaquad Mode.

“4 CHANNEL FM OUTPUT”: The Sherwood S-7210 receiver is equipped with a Four-channel FM output jack on the rear panel. This output will be used in conjunction with any adapter (when approved by the FCC) to produce 4 discreet channels from an FM source. In the event that the Federal Communications Commission approves a method of transmitting four discreet channels Sherwood will introduce at that time, a 4-channel demodulating adapter for use with this jack.

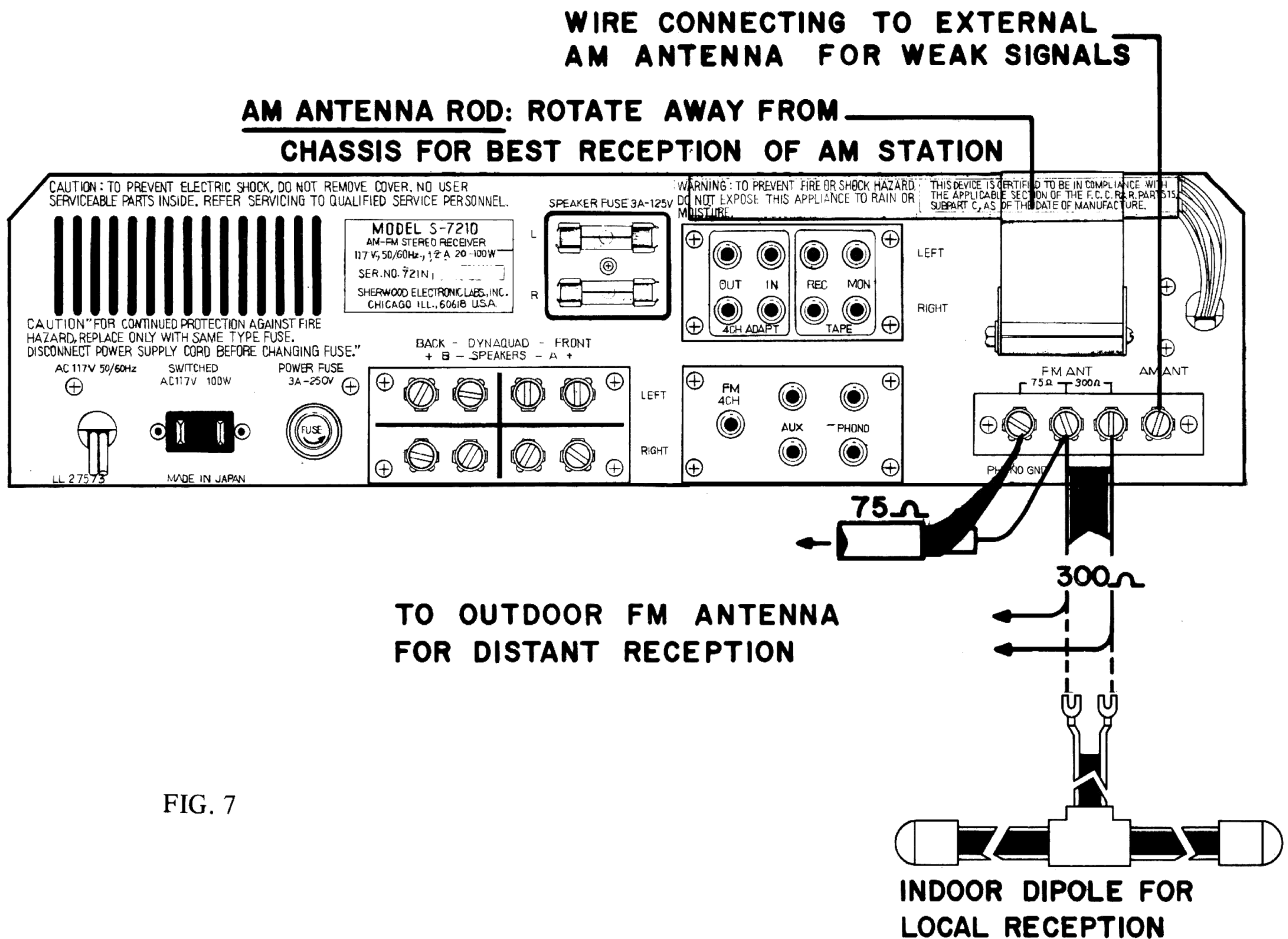


FIG. 7

record playing

RECORD PLAYER CONNECTIONS

PHONO INPUTS: The shielded cables from your phono arm should be provided with shielded “phono-type” plugs which can be connected to the “Left” and “Right” input jacks labeled “PHONO”. To avoid loss in hi-frequency response, it is recommended that these cables not exceed 10 ft. in length. Either a three-wire or four-wire cartridge will operate correctly, but must be provided with two phono plugs.

The phono input connection feeds the phono preamplifier and has been designed primarily for use with a magnetic or variable-reluctance (constant-velocity type) cartridge. The cartridge load is located directly across the phono input jack and is 47,000 ohms. This value correctly loads most pickups (such as the Shure, Pickering, Empire, Grado, and ADC) for flat high-frequency response.

Should a cartridge be used where the manufacturer recommends a lower-valued load for flat response, install a resistor across the pickup terminals which, in parallel with 47,000 ohms, will result in the recommended load impedance.

Lowest phono hum is obtained when the phono cartridge element is insulated from the metal parts of the turntable (or changer) chassis and tone arm. Interconnect these metal parts with a wire which is then connected to the terminal marked “PHONO GND” on the Sherwood receiver chassis. Note that this wire is separate from the shielded phono cable connected to the receiver. To reduce hum further, “ground” the “PHONO GND” terminal with a wire to the nearest water pipe or metal conduit which goes directly to true ground.

The following procedures are recommended for use with a player or turntable utilizing a magnetic cartridge with an output voltage between 2mV and 10mV:

1. Connect the left channel output of a stereo turntable to the LEFT channel (upper) PHONO input jack on the rear panel of the amplifier.
2. Connect the right channel output of the turntable to the RIGHT channel (lower) PHONO input jack.

3. If a monophonic player or turntable is used, it may be connected to either RIGHT or LEFT channel PHONO input jack.
4. Insert the power-cord plug of the player into the AC outlet labeled SWITCHED on the rear of the receiver. The power supply for the player will then be controlled by the POWER switch on the front panel of the receiver.

NOTE: Although it is not recommended from a standpoint of tone quality, if a player with a ceramic cartridge must be used, connect the output of the player to an input jack labeled AUX on the rear of the speaker.

RECORD PLAYER OPERATIONS:

1. Set the FUNCTION Selector to the PHONO position on the front panel of the receiver.
2. If a monaural player is used, push the MONO switch on.
3. Turn the player’s power on, and select the correct speed for the record(s) to be played.
4. Place the needle on the record. When monophonic records are played on a stereo player, follow the same procedures as for stereophonic records for better results.
5. Adjust the BALANCE control to obtain equal sound from both right and left channels.
6. Use all other controls and switches according to taste and listening conditions.

HUMMING AND HOWLING: Care must be taken never to place a record player on or too near a speaker enclosure. Otherwise the vibration of the speaker enclosure is transmitted to the player and causes howling. It is best to keep these components completely separated, but if this is impossible, to place a thick cushion between them.

Humming is a phenomenon caused by incomplete or incorrect player-receiver connections. If this occurs, check to make sure that all connections are complete and that the thickness of the connecting wire is sufficient.

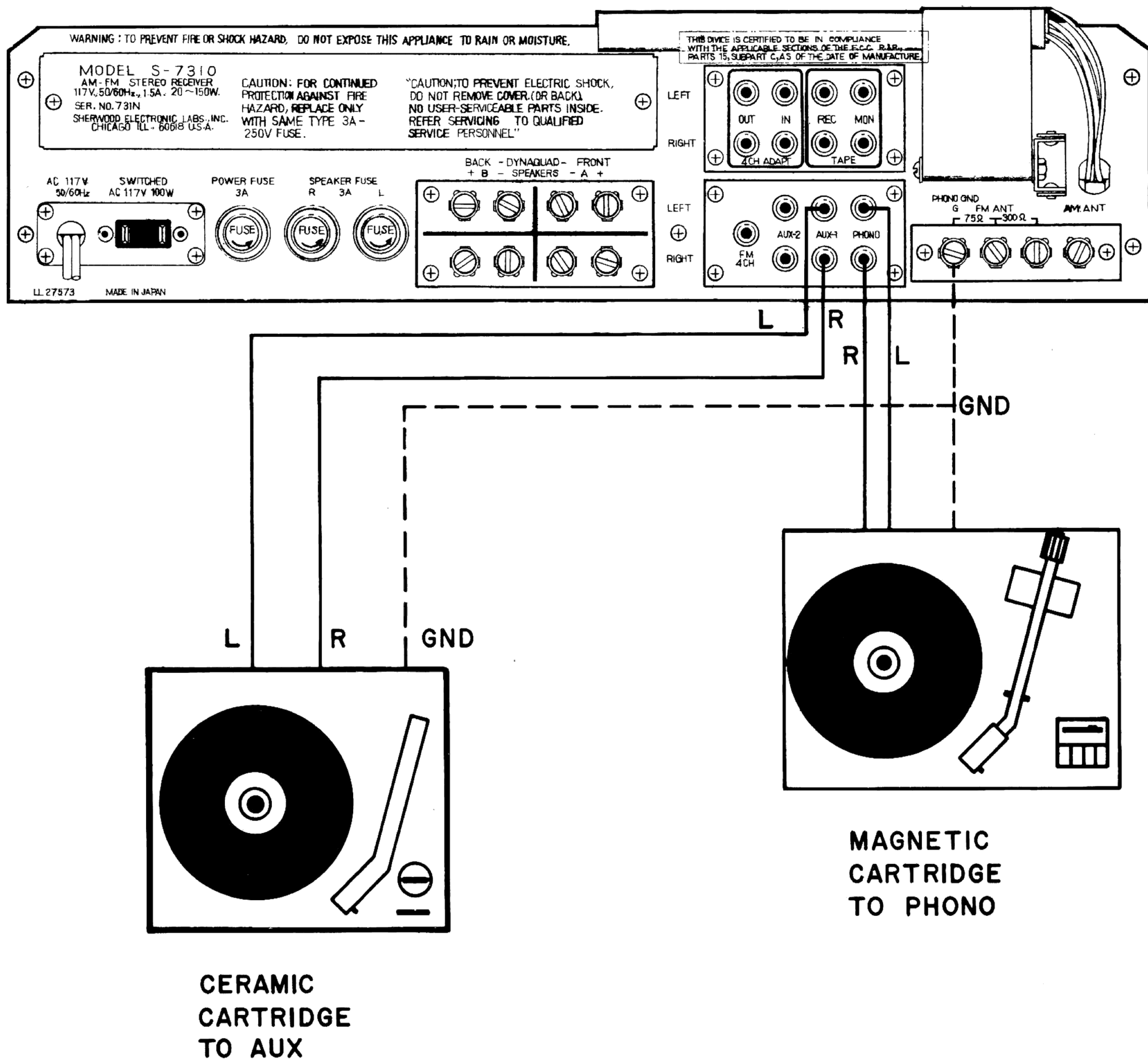


FIG. 8

tape playback and recording

TAPE RECORDING—STEREO: To record from the Sherwood receiver, connect shielded phono cables between the two receiver output jacks marked “REC” and the “line” or “high-level” inputs of your stereo tape recorder. Up to 50 feet of cable may be used. Select a program source by rotating the SELECTOR switch to the desired position. At this time the recording output signal from the receiver will not be affected by any of the remaining front panel controls and must be controlled by your recorder.

TAPE RECORDING—MONAURAL: To make a monaural recording of a stereo program, a “Y” cable (such as Switchcraft part No. 330F3P1) must be used. The “Y” end should be plugged into the two “REC” jacks and the single end plugged into the high level input of the monaural recorder.

TAPE PLAYBACK AND MONITORING

TAPE MONITOR JACKS: To play back from a tape recorder containing its own playback preamplifiers, use shielded phono cables to connect the outputs of your tape recorder to the “MON” jacks on the rear panel of your Sherwood receiver. If you have a monophonic recorder with a single output jack, it may be connected to either of the two “MON” inputs. To direct the incoming MONO signal through both channels of your receiver, depress the “TAPE MONTR” switch and rotate the MODE switch to the “MONO” position or to the corresponding channel (“LEFT” or “RIGHT”) of the rear panel “MON” jacks in use.

4-CHANNEL INPUTS: To connect a 4-channel adapter to your receiver, use shielded phono cables between the “4 CH OUT” jacks and the input jacks on the adapter. Connect the Front Left and Right outputs from your adapter to the “4-CH IN” jacks on the rear of the receiver. The “Rear Left and Right” outputs from your adapter must be connected to another stereo amplifier. Then depress the “4-CH” switch on front of the receiver, adjust volume and balance controls for optimum 4-channel listening.

Used as a second tape monitor, you may record from “TAPE MONTR” to “4-CH,” simply by depressing the “TAPE MONTR” switch; the playback signal may then be recorded by the other tape recorder.

FRONT PANEL TAPE JACK: The front panel tape jack duplicates the input capabilities of the rear panel “MON” jacks when the “TAPE MONTR” switch is depressed to “IN.” (Fig. 9).

TAPE DUBBING: Because your Sherwood receiver is equipped with multiple recording output jacks (see “TAPE RECORDING—STEREO,” “FOUR CHANNEL INPUTS/OUTPUTS” and “FRONT PANEL TAPE JACK”) you may actually record from a front panel connected tape deck simultaneously to two rear panel connected tape decks.

Dubbing can be done as follows:

TO PLAY THE FRONT PANEL CONNECTED TAPE DECK AND RECORD INTO ANY OR ALL REAR CONNECTED TAPE DECKS:

- a) Turn the receiver off.
- b) Release the “TAPE MONTR” and “4-CH” switch to the “NORM” position (out).
- c) Set the controls on the front playback deck to its playback mode.
- d) Set the controls on the rear tape deck(s) to its record mode.

When using the front panel tape dubbing feature of your receiver, it is recommended that the receiver remain in the “OFF” position. This will insure that no residual amplifier noise will be added to the program being taped.

TO PLAY A REAR CONNECTED TAPE DECK AND RECORD INTO THE FRONT CONNECTED TAPE DECK:

- a) Turn the receiver off.
- b) Depress the “TAPE MONTR” or “4-CH” switch (depending on which deck you wish to record from) to the “on” position (in).
- c) Set the controls on the rear tape deck to its playback mode.
- d) Set the controls on the front tape deck to its record mode.
- e) Turn receiver on, to monitor program through your speakers while dubbing.

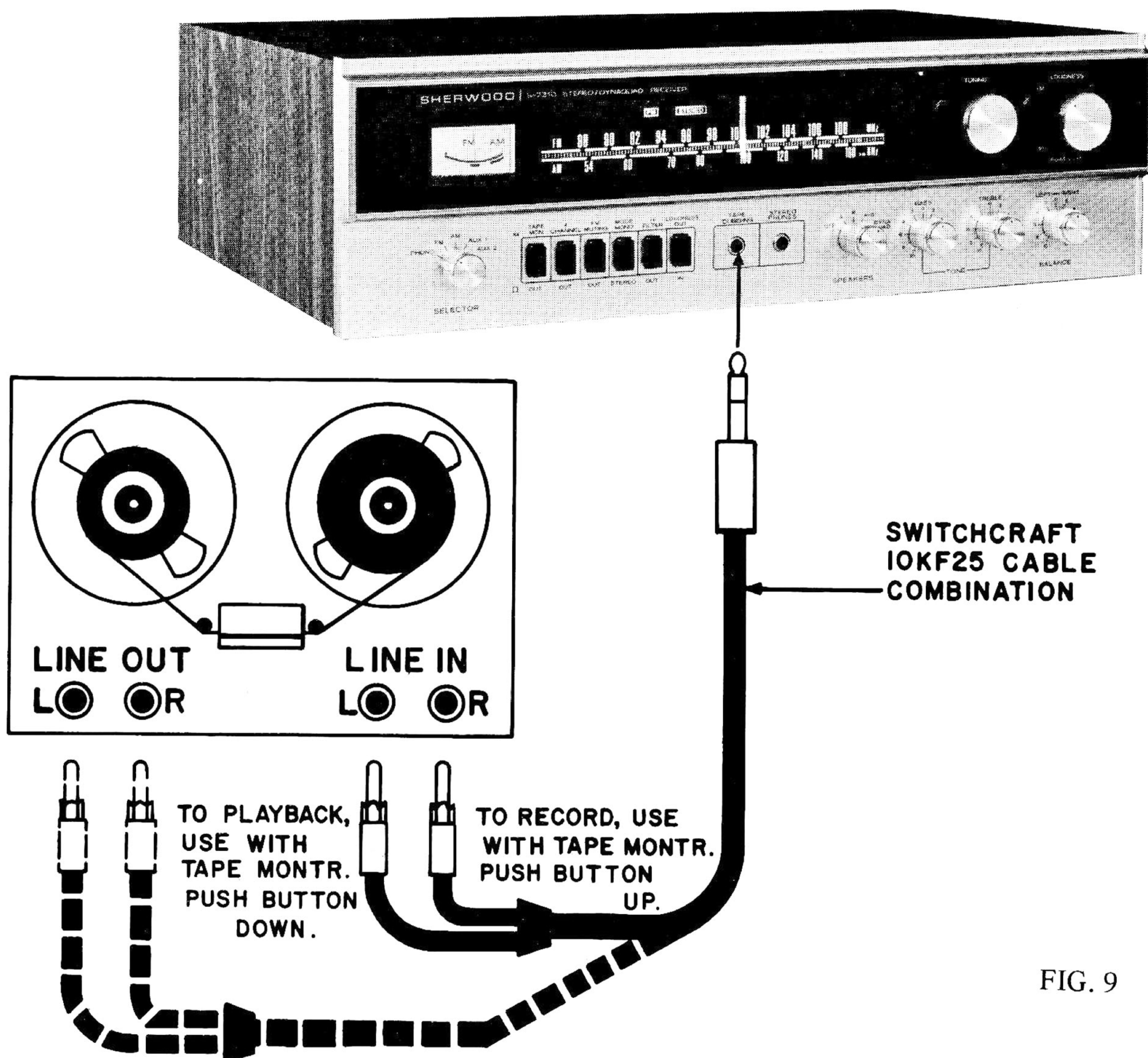


FIG. 9

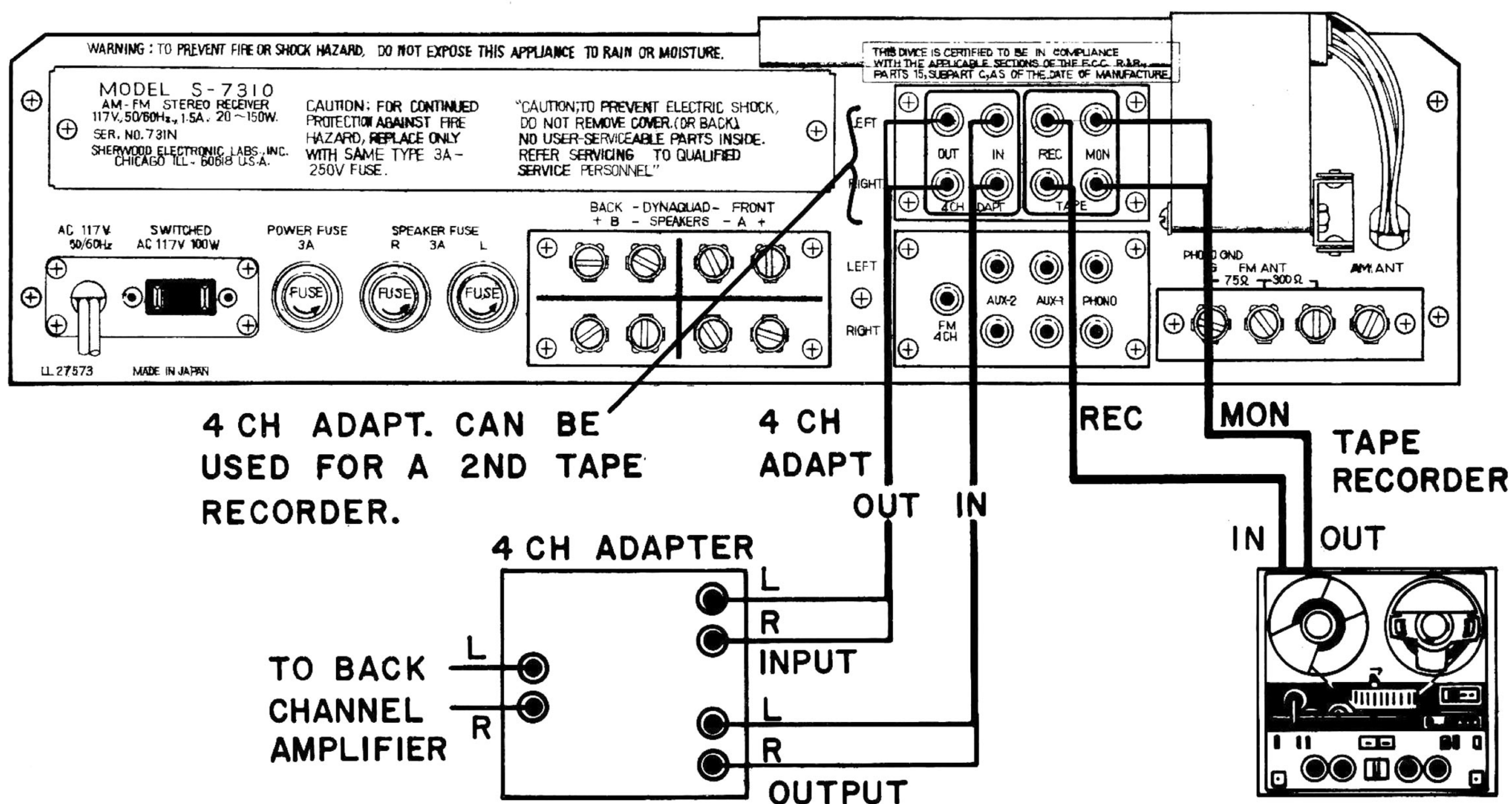


FIG. 10

additional controls and features

AUXILIARY PROGRAM SOURCES: With the Selector switch in the "AUX" position, the corresponding high-level input from a tuner, TV, etc., will feed through the receiver.

Proper adjustment of the gain control on each high-level source is made with one of the higher-volume orchestral programs serving as source material. With the Loudness Control set to "O", adjust the gain control on the source to match the receiver's phono and FM output level. Thereafter, use only the Loudness Control to vary the sound level; the source gain control should remain at its preset position.

LOUDNESS CONTROL: A Loudness Control combines the function of a standard volume control with a tone compensating network which boosts the lowest bass frequencies when the Loudness Control is set for low-volume listening levels. To function properly (in accordance with the Fletcher-Munson hearing curves) the loudness compensation should not affect your listening response at above-average listening levels. Therefore, your Sherwood receiver should, when possible, be operated with the Loudness Control set near "zero" for above-average listening levels, or near -20 dB for normal listening. There will be very little loudness compensation at this setting. However, when the Loudness Control is turned down for low listening levels, the bass frequencies are automatically boosted to compensate for reduced response of the ear at low volume levels.

BASS AND TREBLE CONTROLS: Independent increase or decrease of bass or treble response is accomplished with the tone controls. The markings are calibration guides to the boost or attenuation at 50 and 10,000 Hertz with intermediate response. These controls have unusually smooth action because of their freedom from "shelving" in their intermediate positions. This results in a less-obvious yet more-pleasing change in tone.

4-CHANNEL INPUTS: For instructions on the use of the 4-channel inputs, see tape playback and recording on page 16.

FM INTERCHANNEL HUSH: A feature of your Sherwood receiver is an electronic muting circuit which automatically removes or reduces the noise (rushing sound) normally heard between the channels of highly sensitive FM receivers. Depress the "FM HUSH" switch to eliminate this interchannel noise while tuning.

AUTOMATIC FM STEREO/MONO SWITCHING: Your new Sherwood receiver incorporates a unique noise-threshold-gated automatic FM stereo/mono switching circuit. In the normal FM mode of the receiver, this circuit will automatically switch the FM stereo multiplex circuitry from mono to stereo, if and when the station you are tuned to transmits a stereo program.

The FM stereo subchannel transmitted by an FM station broadcasting a stereo program is more susceptible to noise than is the main channel. A program may therefore have more background noise in stereo than in mono. A special noise-threshold circuit included in the receiver will automatically switch your receiver to stereo only if the background noise level is less than that which is considered acceptable for stereo. Should the noise increase, the receiver will automatically be switched to the mono mode. This feature is especially useful during the recording of stereo programs off-the-air, for it can save a valuable recording from being interrupted by noisy interference.

AUTOMATIC STEREO DEFEAT: Because of the additional noise introduced by the FM stereo subchannel, FM stereo listening might prove impractical on some very remote stations. It will then be desirable to completely bypass the MX stereo detector circuitry. This is accomplished by depressing the MONO switch to its Mono position.

HI FILTER: Worn, frequently-used records have a high hissing or scratching sound which consists, primarily, of very high frequencies. Depressing the "Hi Filter" switch, switches in a 12dB/octave, 5Hz filter. This filter eliminates most of these undesirable high frequencies without the disturbance to the entire treble response that would be incurred by turning down the Treble control. The "Hi Filter" operates in all positions, and is completely independent of the phono-equalizer and tone controls, modifying both channels' response simultaneously.

conditions frequently mistaken for malfunction

NOISE: There are a variety of noises relating to the operation of a hi-fi unit. These are generally divided into two types; (1) the unit is faulty (a transistor or part has deteriorated) and (2) an external source is adding to the unit.

When a hi-fi unit produces an unpleasant noise, it is often assumed that the unit is faulty, but statistical records indicate that the majority of noises produced

in hi-fi acoustic units result from external sources of noise: Due to the inherent high sensitivity and the high fidelity in reproduction, the unit amplifies and reproduces extraneous noises, however small, into definite output noise. If your receiver produces a noise, check the following table and trace out the source of the noise for the appropriate corrective action.

WHEN LISTENING TO BROADCASTS

SYMPTOM	SUSPECTED SOURCE OF NOISE	DIAGNOSIS AND REMEDY
Continuous or intermittent noise like jjjjjj or zzzzzz.	● Static (lightning) ● Fluorescent lamp, motor, thermostat, or lamp dimmer may be in use in the house or in the vicinity of the house.	In many cases, it is very difficult to remove the source of noise. In order to make the radio input larger than the noise level, set up a good outdoor antenna and make a complete grounding.
When a station is tuned in, hum is mixed in the program.	● Poor fluorescent lamp, motor, or electric heater may be in use in house or near the house.	Reversing the line plug may occasionally alleviate this noise problem. Usually it is very difficult to eliminate the noise.
Hissing sound noise in AM (medium wave) reception.	● The frequency of an adjacent station is interfering with that of the station being tuned in (10kHz beat interference). ● TV set is on in the same house with the receiver.	Impossible to remove such interference. If the case of such noise is in the TV set, increase the distance between the TV set and receiver.
Static noise (in particular, when automobiles run close to the house).	● White noise generated from automobile engines. ● High Frequency sewing machine or welding machine being used near your house.	In an area surrounded by hills or high buildings, the FM input signals are very weak. Thus the noise limiter in the circuit loses its function. Set up an FM outdoor antenna having many director elements.
Reception of FM stereo program contains more noise than FM mono program.	● Note that the service area covered by an FM stereo broadcast is about 50% of that of a regular mono broadcast.	Increasing FM input signal may alleviate this problem. Use an exclusive FM outdoor antenna instead of the indoor T-type antenna.

WHEN PLAYING RECORDS

SYMPTOM	SUSPECTED SOURCE OF NOISE	DIAGNOSIS AND REMEDY
Hum or buzz. When switched to radio reception, the noise disappears.	● Poor connection of shielded wire. (a) ● Jack connection is loose. (b) ● Line cord of fluorescent lamp is near the shielded wire. (c) ● Poor grounding (d) ● Ham transmitting station or TV transmitting station is near your house. (e)	Correct the conditions stated in (a), (b), (c) or (d). In case of (e), report it to an official activity
Output tone quality is poor and mixed with noise. Treble is not clear.	● Stylus wears out.(a) ● Record wears out. (b) ● Dust adheres to stylus. (c) ● Stylus is improperly mounted. (d) ● Stylus pressure is not proper. (e) ● The TREBLE level is too high.	Check (a) through (e) and correct the condition. Lower the TREBLE level.

WATCH FOR THE FOLLOWING CONDITIONS; THESE ARE ALSO APT TO BE MISTAKEN FOR MALFUNCTIONS.

SYMPTOM	SUSPECTED SOURCE OF NOISE	DIAGNOSIS AND REMEDY
Power is not turned on although the power switch is set to ON.	● Fuse blows. (a) ● Line plug is loose. (b)	Check (a) and (b) and correct the condition.
In playing a record, increasing the volume causes howling.	● Distance between the turntable and the speakers is too short. ● The place on which the turntable or speakers are set is unstable.	Change the distance or rearrange the installation increase of the unit and speakers. (Installing the turntable on a firm, solid stand may alleviate this problem.) Do not enhance the BASS sound level excessively.

SHERWOOD S-7310 SPECIFICATIONS

amplifier:

POWER OUTPUT-RMS, both channels driven:
50 watts x 2 @ 4 ohms, 1 KHz
43 watts x 2 @ 8 ohms, 1 KHz
40 watts x 2 @ 8 ohms, 40-20,000 Hz
38 watts x 2 @ 8 ohms, 20-20,000 Hz
HARMONIC DISTORTION: 0.5% @ 8 ohms rated output, 0.1% @ 10 watts.
INTERMODULATION DISTORTION: 0.5% @ 8 ohms rated output, 0.15% @ 10 watts
SPEAKER OUTPUT IMPEDANCE: 4, 8 or 16 ohms.
STEREO RECORDING OUTPUT: 200 mv.
POWER BANDWIDTH: 7-50 KHz. 0.5% Dist.
FREQUENCY RESPONSE: Aux. 20-20 KHz. ± 0.5 db. Phono: RIAA Std. ± 1.5 db.
DAMPING FACTOR: 30:1 @ 8 ohms
BASS CONTROL: ± 12 db @ 50 Hz.
TREBLE CONTROL: ± 12 db @ 10 KHz.
INPUT SENSITIVITY (for rated output)
Phono, 2.0 mv.
INPUT CAPABILITY for 1% dist.
Phono, 90 mv.
Auxiliary, greater than 10 V.
HUM AND NOISE: Phono -65 db.
Aux. -80 db.
Vol. Control Min. -85 db
CROSSTALK: -40 db @ 20-20 KHz.

tuner (FM):

FM SENSITIVITY (IHF): $1.8\mu\text{V}$ (-30 db noise & dist.)
SIGNAL-TO-NOISE RATIO: -70 db.
CAPTURE RATIO: 1.2 db.
SUPPRESSION OF AM: -60 db.
TUNING RANGE: 87.5 to 108.5 MHz.
DISTORTION: Mono, 0.25% @ 100% Mod.
Stereo, 0.5% @ 100% Mod.
SPURIOUS RESPONSE REJECTION: -95 db.
IMAGE REJECTION: -90 db.
AUTOMATIC STEREO THRESHOLD: $5\mu\text{V}$.
IF REJECTION: -90 db.
ALTERNATE-CHANNEL SELECTIVITY: 65 db.
STEREO SEPARATION: 40 db @ 1 KHz.
FREQUENCY RESPONSE: 20-15 KHz
1.0 db. (STEREO)
ANTENNA: 300-ohm balanced

Tuner (AM):

SENSITIVITY (IHF): $10\mu\text{V}$. (30% Mod. for 10 db S/N).
SELECTIVITY: ± 10 KHz, 20 db.
FREQUENCY RESPONSE: 3 KHz (-6 db).
TUNING RANGE: 530 to 1625 KHz
IMAGE REJECTION: -42 db @ 1 MHz
IF REJECTION: -40 db @ 1 MHz
ANTENNA: Ferrite Rod (rotatable). High Imp. input.

general:

POWER REQUIREMENTS: 115-125V, 50/60 Hz.
(Export Models, 230V) 2A, 20-220 watts fused.
AC OUTLETS: 100 W. switched.
FUSES: Power Fuse 3 A, 3 AG, Speaker Fuses 3 A, 3 AG. Do not use Slo-Blo Fuses.
DIMENSIONS (Overall): $17\frac{1}{2}$ " W x $5\frac{1}{4}$ " H x $13\frac{1}{4}$ "
SHIPPING WEIGHT: 35.5 lbs.

WARRANTY

Your Sherwood solid state high fidelity equipment and Sherwood Speaker Systems are covered by a full three-year warranty against defects in material and workmanship. Sherwood Labs. maintains a complete factory service laboratory as well as Authorized Service Stations in larger cities where equipment of its manufacturer will be repaired at nominal rates if out of warranty or at no cost (except delivery charges) within the first year after purchase. During the second and third years of the warranty, defective parts will be replaced at no cost; however, Authorized Service Stations may charge the customer for the cost of labor associated with repair service.

If your Sherwood component is not operating satisfactorily immediately after purchase, contact your Sherwood dealer, who will inspect the equipment and refer you to the most conveniently located Sherwood Service Station. A current list of Authorized Service Stations is available on request from Sherwood Labs.

Before returning any equipment to Sherwood Labs. for repairs, please write to the Service Department, Sherwood Electronic Laboratories, Inc., 4300 N. California Ave., Chicago, Illinois 60618, giving full details of any operating difficulties. When writing to Sherwood Labs, about maintenance problems, always specify the model and serial number of the units in question so that prompt, accurate service can be provided. For best handling, high-fidelity equipment should always be shipped in its original carton by express (prepaid) rather than parcel post.

This warranty is effective from the date of sale to the original purchaser. It is void if the equipment has been altered or repaired by unauthorized personnel, if the serial number has been defaced or removed, or if the warranty card has not been returned to Sherwood Labs. within ten days after the date of purchase.

This warranty shall not cover damage to exterior paint and trim resulting from mishandling or careless use of the equipment. Sherwood reserves the right to change, improve or modify its product without obligation to install same on units previously manufactured.

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