



**marantz**®

**Model 2325  
Stereophonic  
Receiver**

MARANTZ CO., INC. 20525 NORDHOFF STREET, CHATSWORTH, CALIFORNIA 91311  
A WHOLLY-OWNED SUBSIDIARY OF SUPERSCOPE INC., CHATSWORTH, CALIFORNIA 91311

**AC Line Operation**

**WARNING : TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.**

## FOREWORD

To obtain maximum performance and enjoyment from the Model 2325 Stereo Receiver, please study these instructions carefully. Installing and operating the Model 2325 is not complicated, but the flexibility provided by its numerous operating features merits your becoming familiar with its controls and connections. Our recommended procedures will assure you of securing the superb performance for which the Model 2325 was designed.

For convenience, this manual is divided into two parts. The first part covers installation and operation in a simple, nontechnical manner. The second part provides a more detailed description of the features of the Model 2325.

For quick identification of the many controls, connection facilities, and adjustments on the Model 2325 Stereo Receiver, all references to them in this manual are printed in **BOLDFACE TYPE**.

## GENERAL DESCRIPTION

The Marantz Model 2325 is an all solid state receiver incorporating the innovative design and unparalleled technology that have made Marantz famous in the audio component industry.

The Model 2325 features a sensitive FM tuner, a highly selective AM tuner, a single process Dolby Noise Reduction system, a low distortion pre-amplifier and two direct coupled power amplifiers on a single chassis, while retaining a flexibility comparable to that achieved using separate components. The FM tuner utilizes an FET front end, ceramic IF filters, and an advanced integrated circuit for high selectivity and sensitivity. The Dolby system may be used to decode or encode any source material. The amplifier sections permit the connection of two stereo pairs of loudspeakers, a turntable or record changer, two tape recorders, stereo headphones, and an auxiliary source such as an additional tuner or a TV sound source. The 2325 also features a variable turnover tone control and front panel dubbing jacks.

## AFTER UNPACKING

It will be to your advantage to save all the packing materials, carton, fillers, cushioning, etc. They will prove valuable in preventing damage should it become necessary to transport or ship the Model 2325. Be careful that you do not inadvertently throw away or lose the parts packed with the unit.

Please inspect this unit carefully for any signs of damage incurred in transit. It has undergone very strict quality control inspections and tests prior to packing, and it left the factory unmarred and in perfect operating condition. If the unit was shipped directly to you and you discover damage, notify the transportation company without delay. Only you, the consignee, may institute a claim against the carrier for damage during shipment. However, the Marantz Company will cooperate fully with you in such an event. Save the carton as evidence of damage for their inspection. If you received the unit directly from a Marantz dealer, return it to him for adjustment.

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Figure 1. Rear Panel Connection Facilities and Adjustments

## PREPARATION FOR USE

### REAR PANEL CONNECTIONS

Figure 1 shows the location of input and output jacks on the rear panel. These jacks are for "permanent" connections. Front panel jacks and their use will be discussed later. All connections to the rear panel should be made with the power to the entire system turned off. The rear panel signal connections are arranged in stereo pairs. All signal connections to the Model 2325, with the exception of the FM antenna and loudspeakers, should be made with shielded audio cables. To avoid confusion, connect one cable at a time between the 2325 and the other components of your system. This is the safest way to avoid cross-connecting channels or confusing signal source outputs with inputs.

### PHONO INPUTS JACKS

The **PHONO** jacks are intended for use with magnetic phono cartridges and have a 47,000 ohm input impedance.

If a hum is heard when playing records, this is an indication that the record player or its connections are inadequately grounded. Connect a separate ground wire from the turntable or record changer frame to the **CHASSIS GROUND** binding post of the Model 2325. If this is ineffective, try reversing the polarity of the turntable's power plug.

If hum persists, consult the instruction booklets for the turntable and/or phono cartridge.

### TAPE MONITOR JACKS

The rear panel of the 2325 can accommodate two tape recorders.

The terms **IN** and **OUT** refer to the input and output of the Model 2325. Therefore, the **IN** jacks on the Model 2325 accept signals from the line outputs of each tape recorder; the **OUT** jacks feed signal to the tape recorders' line inputs.

### AUX INPUTS JACKS

The **AUX INPUTS** jacks are for miscellaneous high level signal sources such as additional tuners and/or receivers, tape players, phonographs that provide RIAA equalized high level output, TV sound outputs and other external components.

### FM ANTENNA

The best FM reception is obtained with a Log-Periodic type antenna mounted on a good quality rotor system. For fringe areas, Marantz recommends a Log-Periodic antenna with six or more elements designed expressly for FM reception. To minimize local noise and multipath picked up by the lead-in wires, use a balanced and shielded 300 ohm cable or a coaxial 75 ohm cable with a 300 to 75 ohm matching transformer at the antenna. Unshielded lead-in acts as an omnidirectional antenna, and can cancel the directional benefits of your antenna. Low-loss 300 ohm shielded cable consists of two inner conductors plus an outer shield and insulating jacket. This type of shielded cable effectively prevents the lead-in from contributing multipath distortion.

For rural areas, it is recommended that a local dealer be consulted about antenna installation and lightning arrestor protection. Master antenna systems are not recommended for use with your Model 2325; such systems are usually designed expressly for television reception and frequently suppress FM signals before distribution. In addition, master antenna systems often severely reduce the quality of the FM signal. Where outdoor antennas are prohibited or inconvenient, place the antenna in vacant attic space or use a simple 300 ohm TV "rabbit ear" antenna or the ribbon-type folded dipole antenna supplied with the Model 2325. Both are practical and will give satisfactory results in primary signal areas.

Your Model 2325 Receiver will accept either a 75 or 300 ohm antenna (see diagram, Figure 2). The 300 ohm antenna cable should be connected to the two terminals marked FM on the ANTENNA terminal. When using 75 ohm coaxial antenna cable, connect its shield to the G (GROUND) terminal, and its inner or center conductor to either of the FM terminals.

## AM ANTENNA

Your Receiver is equipped with an AM ferrite-rod antenna. **BEFORE USING THE MODEL 2325, SWING THE ANTENNA OUT AS SHOWN IN FIGURE 3.**

The ferrite-rod antenna will give you satisfactory results in primary signal areas. However, an outdoor antenna will provide better reception in weaker signal areas. Two single wires are required to make an AM outdoor antenna. First,

connect one end of a single wire to the **AM ANTENNA** terminal on the rear panel, and the other end to a very high horizontal antenna wire of 25 to 75 feet in length suspended between insulators in an outdoor location (the higher the better). Next, connect the other single wire between the "G" terminal of your Model 2325 and an authenticated earth ground (such as a metal water pipe).

## FM QUADRADIAL OUTPUT JACK

In anticipation of future four channel quadraphonic broadcasting, your Model 2325 is equipped with an **FM QUADRADIAL OUTPUT** jack. The signal available at this jack is the unequalized, buffered output of the FM discriminator. Its level, frequency response characteristics, and output impedance are ideal to drive a four channel adaptor. This jack can also be used as a simple "white noise" generator for checking the response characteristics of loudspeakers or amplifiers. For this application, place the Model 2325 in FM mode with the muting off, and tune between FM stations to receive interstation noise.

## PRE OUT AND MAIN IN JACKS

The **PRE OUT** jacks deliver the output of the Model 2325 preamplifier circuits to the rear panel.

The **MAIN IN** jacks are the input terminals of the power amplifier section of the Model 2325. The **PRE OUT** and **MAIN IN** jacks are bridged internally by special contacts within the jack assembly. When you wish to use such equipment

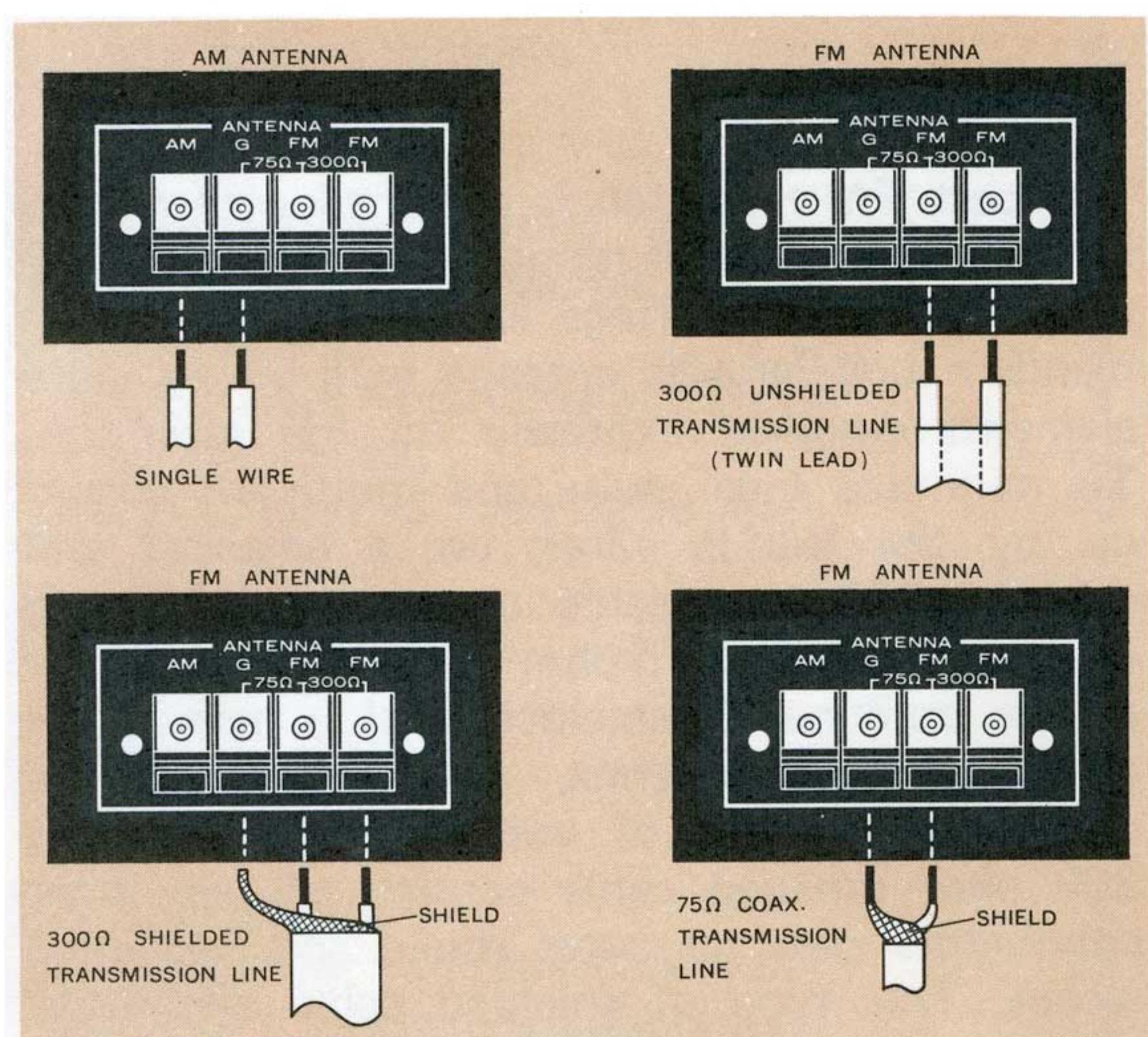


Figure 2. AM/FM Antenna Connection

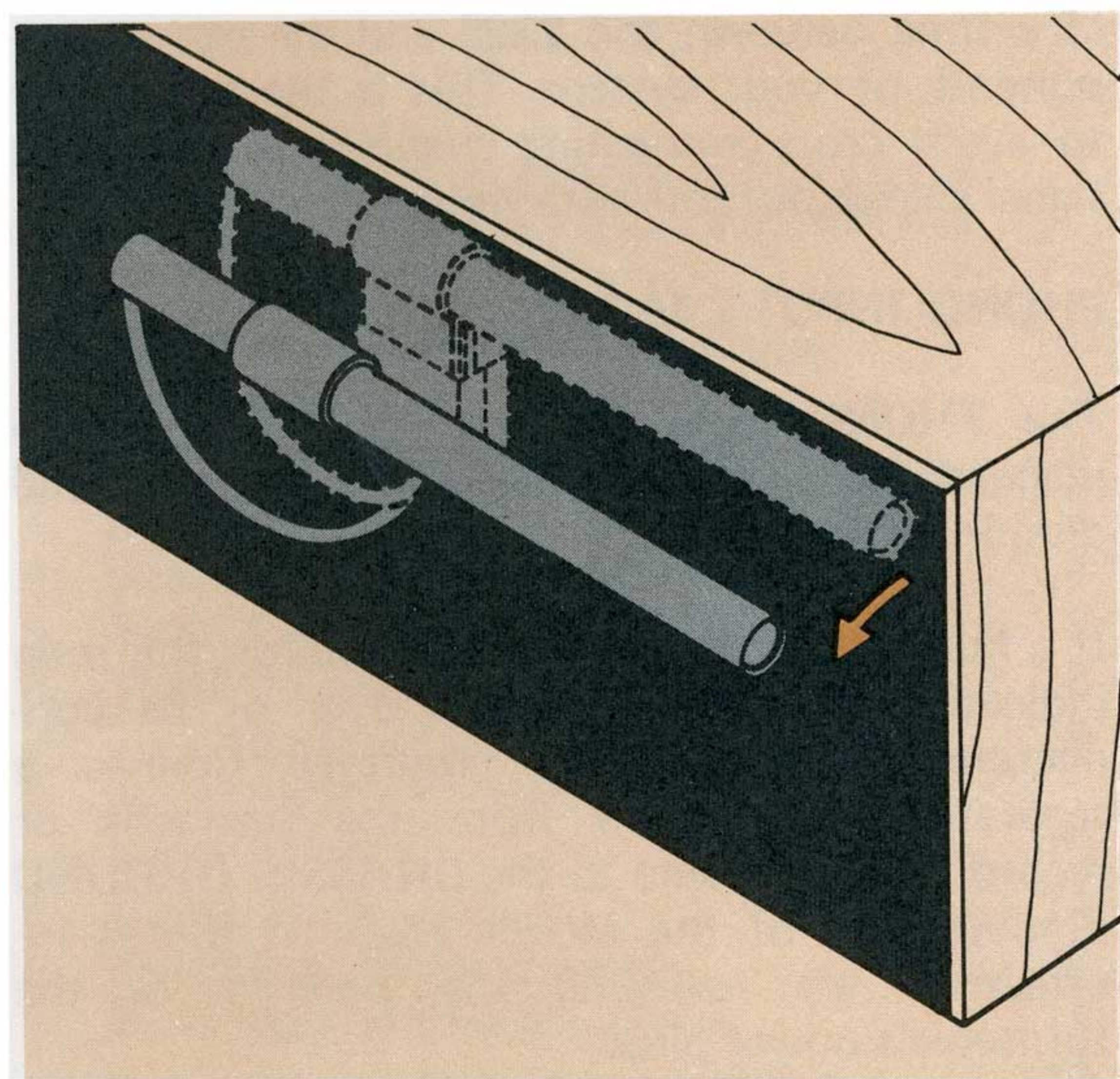


Figure 3. AM Ferrite-rod Antenna

as a graphic equalizer, compressor/limiter, or expander, you may connect these instruments to your Model 2325 with appropriate length of shielded audio cables. When the external equipment is connected, the insertion of its RCA phono plugs in to the **PRE OUT** and **MAIN IN** jacks automatically breaks the internal connections to prevent the external equipment from being bypassed.

## SPEAKER SYSTEMS

The **SPEAKER SYSTEMS** terminals on the rear panel can accommodate two stereo pairs of loudspeakers. Connect the main pair to the **MAIN** terminals. The **REMOTE** terminals are for a second stereo pair of loudspeakers (see Figure 4). Selection of loudspeaker systems is made with the **MAIN-SPKR-REMOTE** pushswitches on the front panel.

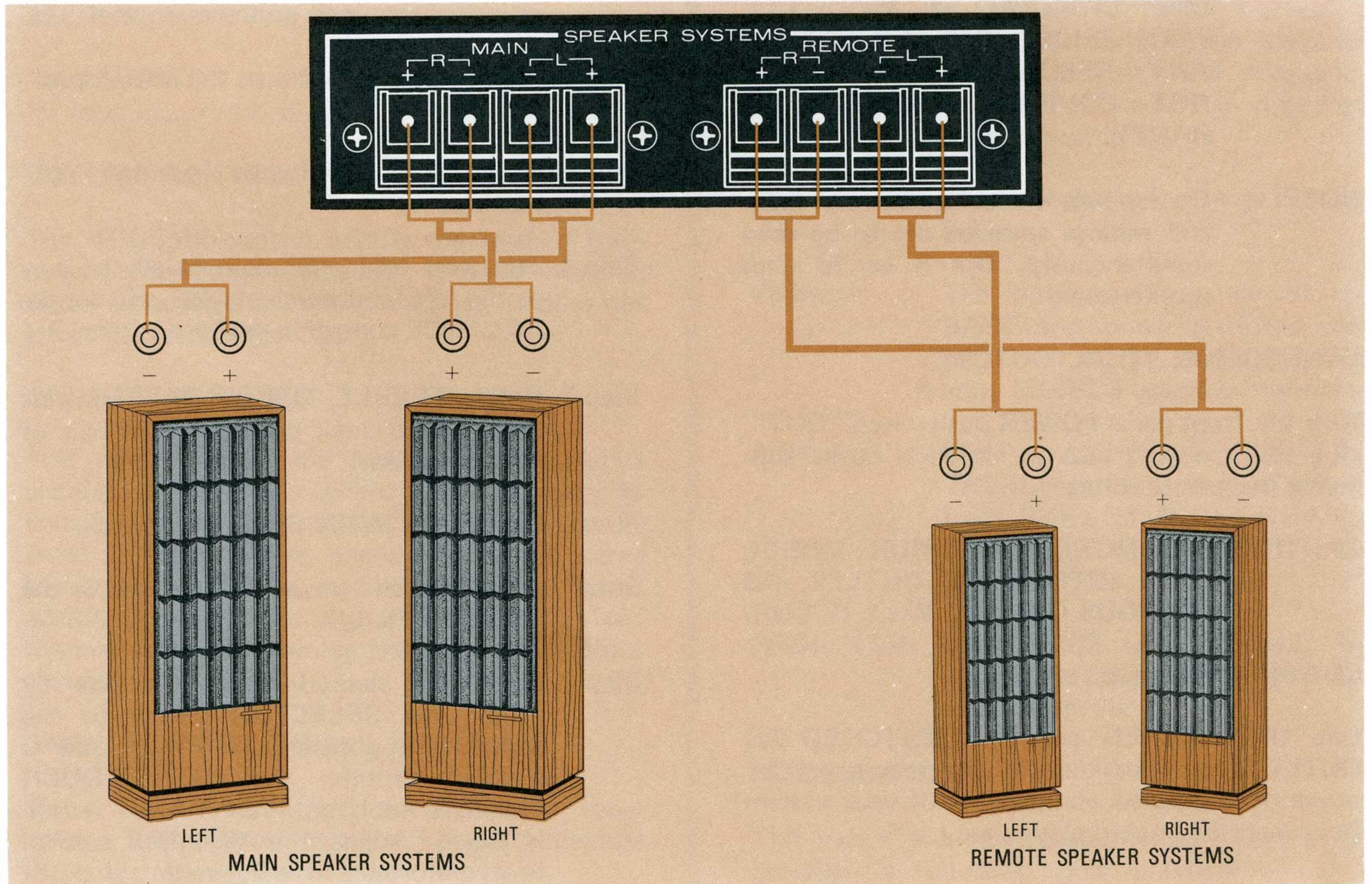
## SPEAKER PHASING

To assure the best stereo separation and frequency response, the speakers must be properly phased. The positive terminal on each speaker should be connected to its respective (+) terminal on the Model 2325, and the negative or "common"

terminal should be connected to its respective (-) terminal. To verify that a pair of speakers are correctly phased, perform the following test:

1. Complete the necessary signal connections so that program material may be played through the speakers.
2. Place the speakers in the center of the room.
3. Set the **MODE** switch to **MONO L+R** and play a record (or radio or tape) with strong bass tones at a low volume level. Center the **BALANCE** control.
4. Position the speakers about six inches apart, face-to-face. Listen, particularly to the apparent loudness of the bass tones.
5. Next, turn off all power, but do not disturb the **VOLUME** or **BALANCE** settings. Reverse the connections on the right speaker only. Turn on the power and listen again. If the bass tones now seem louder than in (3), you have corrected the phasing between the speakers. If the bass notes now sound softer, turn off the power and re-connect the speakers as they had been originally.

Figure 4. Speaker System Connections





6. If an additional pair of speakers is used along with the main speaker system, check phasing between the remote speakers and the main speakers. Use the **BALANCE** control to play only two speakers at once, and invert the wiring on the remote speakers as necessary. Do not change the connections on the main speaker system.
7. Once having phased all speakers, you need not repeat this procedure in the future if you now mark the speaker connections and/or cables. Any method of coding is satisfactory, provided it enables you, in the future, to duplicate your now-correct hookup between speakers and amplifier.

Use caution when connecting your Model 2325 to a loudspeaker with built-in power supply such as an electrostatic loudspeaker. The "common" connection terminal of such a speaker may be capacitively coupled to ground through its own power supply. To protect the Model 2325 from distortion and possible overload, make sure the (–) terminals of the Model 2325 are connected to the "common" terminals of such a loudspeaker system.

**CAUTION: NEVER DIRECTLY CONNECT THE LOUDSPEAKER TERMINALS OF ONE CHANNEL IN PARALLEL WITH THOSE OF ANY OTHER. ANY RESULTING DAMAGE IS NOT COVERED UNDER WARRANTY.**

**NOTE:** Do not use 4 ohm speakers if main and remote speakers are to be used simultaneously. Use 8 or 16 ohm speakers only.

### CONNECTION TO AC OUTLET

With the front panel **POWER** pushswitch "OUT", plug the line cord into an electrical outlet supplying the proper voltage.

**CAUTION: DO NOT PLUG YOUR MODEL 2325 INTO A DC OUTLET, AS SERIOUS DAMAGE WILL OCCUR.**

### CONVENIENCE OUTLETS

One **UNSWITCHED** and one **SWITCHED AC OUTLETS** are provided on the rear panel for powering associated components of your system (tape recorder, record player, etc.).

### AC PROTECTOR FUSE

This feature automatically disconnects AC power in the event of a power source or circuit overload. If the **POWER** pushswitch is activated and the front panel fails to illuminate and no sound is heard through the speakers, unscrew the fuse holder on the rear panel and visually inspect the fuse to see if the internal conducting filament has opened. If so, replace the fuse with one having the same specifications.

## SIMPLIFIED OPERATING PROCEDURE

When operating the Model 2325 Stereo Receiver for the first time, follow these simple directions. Later, full advantage can be taken of its versatility with the remaining controls and pushswitches.

- Step 1. Connect the FM antenna to the appropriate terminals on the rear panel.
- Step 2. Connect the speakers to the **MAIN** speaker terminals.
- Step 3. Place all pushswitches in the "out" position.
- Step 4. Turn the **VOLUME** control all the way to the left (counterclockwise) and set the **BALANCE** control in center position.
- Step 5. Rotate **TREBLE**, **MID** and **BASS** controls to the 12 o'clock position (each pair of pointers to dot).
- Step 6. Depress the **MAIN SPKR** pushswitch.
- Step 7. Apply system power by depressing the **POWER** switch.
- Step 8. Select the desired program source by setting the **SELECTOR** switch to the appropriate position. If **FM** or **AM** is selected, rotate the **GYRO-TOUCH TUNING** knob until the desired station is tuned. Adjust the **VOLUME** control to a comfortable listening level.



Figure 5. Front Panel Controls and Jacks

## MAIN CONTROLS AND SWITCHES

### POWER SWITCH

The **POWER** switch, when depressed, supplies AC power to the Model 2325 and to the **SWITCHED** outlet on its rear panel.

### SELECTOR SWITCH

The **SELECTOR** switch selects the program source for listening or recording.

### VOLUME CONTROL

The **VOLUME** control adjusts the level of both output channels simultaneously while maintaining stereo balance at all normal settings. It does not effect the recording outputs.

### BALANCE CONTROL

This control alters the level of either output channel in situations where it is necessary to correct unbalanced programs sometimes encountered in older stereo recordings or in stereo broadcasts. As it is moved from its center position, it decreases the level in one output channel while maintaining the level in the other channel.

### BASS, MID AND TREBLE CONTROLS

These controls are used to adjust the tonal balance of program material to suit individual listening preference.

### TONE MODE SWITCH

The **TONE MODE** switch determines the operating characteristics of the **BASS**, **MID** and **TREBLE** controls, and allows additional flexibility in compensating for room, speaker, and program characteristics. The switch affects the tone controls as follows:

**OUT:** The tone controls are switched out of circuit, and frequency response is made flat regardless of their positions.

**IN:** The tone controls operate normally.

**250Hz:** The turnover frequency of the **BASS** tone control is shifted from 500Hz to 250Hz, while the **MID** and **TREBLE** operate normally.

**4KHz:** The turnover frequency of the **TREBLE** tone control is shifted from 2KHz to 4KHz, while the the **BASS** and **MID** operate normally.

**250Hz, 4KHz:** Both **BASS** and **TREBLE** are affected as above, while **MID** operates normally.

### MODE SWITCH

This switch is a five position rotary switch that provides the following signal functions:

**LEFT:** The LEFT channel signal is routed to drive both right and left audio channel speakers.

**RIGHT:** The RIGHT channel signal is routed to drive both right and left audio channel speakers.

**STEREO:** The LEFT channel signal is routed to drive the left audio channel speaker, and the RIGHT channel is routed to drive the right audio channel speaker.

**REVERSE:** The LEFT and RIGHT channel signals are reversely routed to drive the RIGHT and LEFT audio channel speakers, respectively.

**MONO L+R:** The LEFT and RIGHT channel signals are mixed and routed to drive both right and left audio channel speakers.

When playing a single channel source such as TV or AM radio, set the switch to either **LEFT** or **RIGHT** position or to **MONO L+R** so that the single channel source can be heard through both speakers.

## TUNING METERS

The Model 2325 is equipped with two meters, a **SIGNAL STRENGTH** meter and an **FM TUNING** meter.

1. The **SIGNAL STRENGTH** meter indicates the relative signal strength of any AM or FM broadcast. It also functions as a **DOLBY LEVEL** meter when the Dolby System is activated.
2. The **FM TUNING** meter operates only when FM is selected and indicates correct station tuning when centered.

## GYRO-TOUCH TUNING KNOB

**AM:** Switch the **SELECTOR** to **AM** and tune to the desired station. Place the **DOLBY NR** switch in "OFF". Then rotate the **GYRO-TOUCH TUNING** knob slightly back and forth until the maximum reading is obtained on the **SIGNAL STRENGTH** meter.

**FM:** Switch the **SELECTOR** to **FM** and tune to the desired station. Place the **DOLBY NR** switch in "OFF". Then rotate the **GYRO-TOUCH TUNING** knob slightly back and forth until the maximum reading is obtained on the **SIGNAL**

**STRENGTH** meter and a center scale reading is obtained on the **FM TUNING** meter.

## MULTIPATH BUTTON

When using a rotatable FM antenna, FM reception may be further optimized by pointing the antenna in the proper direction for minimum multipath.

First, tune to the desired station as above. Then, hold in the **MULTIPATH** button while rotating the FM antenna. Stop the antenna at the position for which a minimum deflection is indicated on the **MULTIPATH** meter. Then, release the **MULTIPATH** button to restore the meter to its normal **SIGNAL STRENGTH** function.

## HI BLEND SWITCH

The **HI BLEND** function is useful for reducing noise on weak stereo FM signals with excessive noise and/or interference. When activated, the **HI BLEND** slightly reduces separation at high audio frequencies. This offers moderate separation along with considerable suppression of out-of-phase noise and distortion components. Unlike most noise filters, the **HI BLEND** does not sacrifice full frequency response.

## LOW FILTER SWITCH

The **LOW FILTER** switch activates a low frequency filter that can be used to reduce turntable rumble and low frequency noise. The filter will also, however, slightly attenuate low frequency program material, and should therefore be used judiciously.

## HI FILTER SWITCH

This switch can be used to reduce high frequency noise such as that associated with the playing of poorly recorded tapes or worn disc recordings.

When the AM tuner is being used, this switch will help to suppress considerably the high pitched "whistle" caused by adjacent AM channel interference. This filter will also, along with high frequency noise, slightly attenuate high frequency program material, and should therefore be used judiciously.

## LOUDNESS SWITCH

The **LOUDNESS** switch compensates for human hearing characteristics by boosting the bass and treble response at low volume levels to achieve a more pleasing tonal balance.

## FM MUTING SWITCH AND MUTING LEVEL CONTROL

In the absence of an FM carrier, all FM receivers produce noise. This noise is apparent between stations while tuning.

The **FM MUTING** pushswitch activates circuitry features in the Model 2325 which mutes the audio outputs when tuned "off-station".

The **MUTING LEVEL** control on the rear panel determines the threshold level for the muting circuitry. Maximum muting effect is achieved by setting the **FM MUTING LEVEL** to **MAX**. To prevent muting very weak stations along with the noise, the muting function may be turned off by releasing the **FM MUTING** pushswitch.

## MAIN-SPKR-REMOTE SWITCHES

These switches select the loudspeaker terminals to which audio power is fed. Either the **MAIN** or the **REMOTE** stereo pair of loudspeakers may be operated individually, or simultaneously if both switches are depressed. When the two **MAIN-SPKR-REMOTE** switches are in the normal "out" position, all loudspeaker terminals are internally disconnected from the power amplifier section. The signal at the headphones jack is not affected by the **MAIN-SPKR-REMOTE** switches.

The "out" position allows "private listening" when stereo headphones are used.

**NOTE:** Volume level should be reduced to minimum when switching speakers.

## MONITOR SWITCHES

These pushswitches control the tape monitoring functions of the Model 2325. When the **SOURCE/TAPE** switch is in **SOURCE** position, the amplifier inputs are determined by the **SELECTOR** switch.

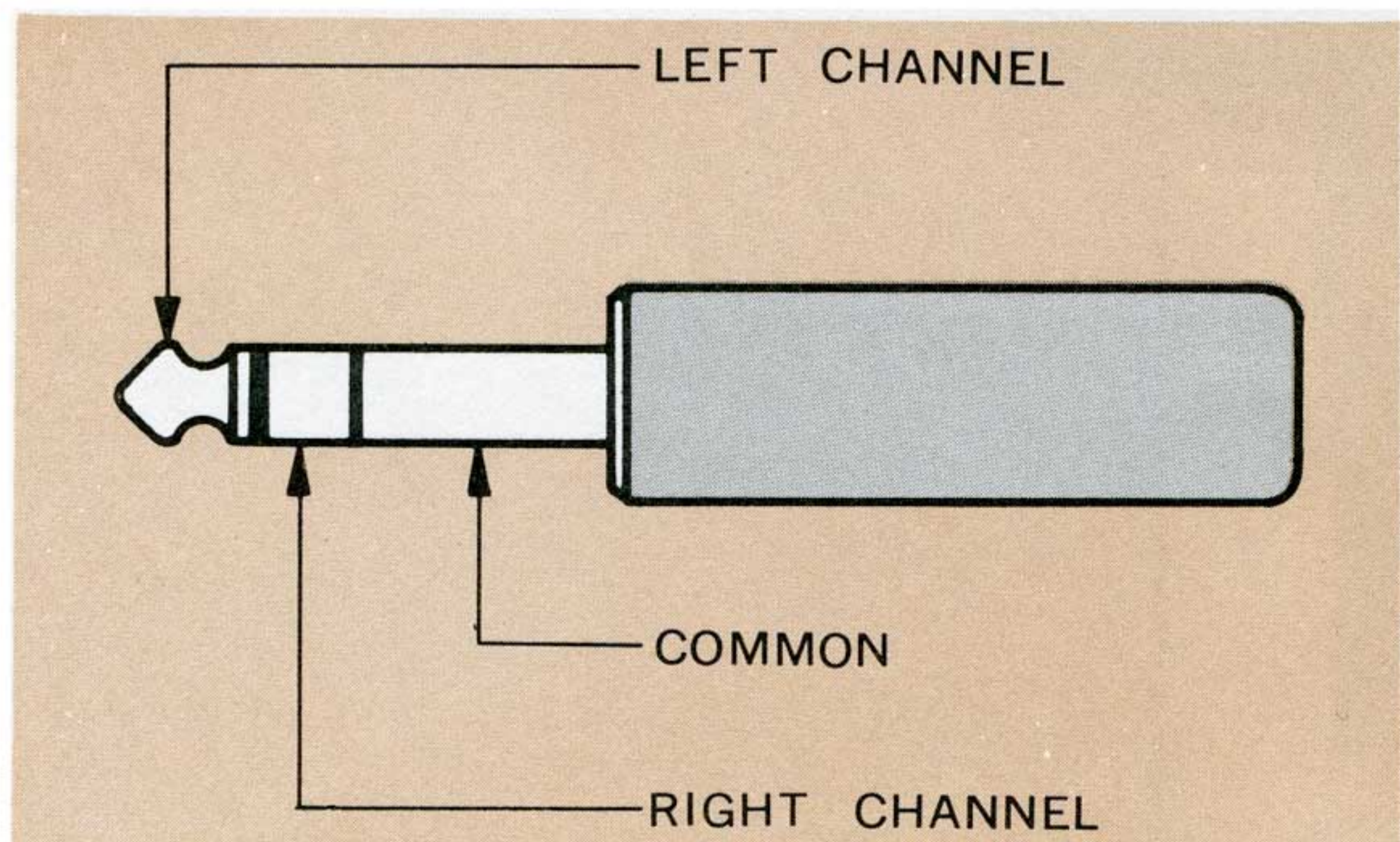


Figure 6. Three Conductor Phone Plug

When the **SOURCE/TAPE** switch is in **TAPE** position, the amplifier derives its inputs from one of the two pairs of **TAPE MONITOR IN** jacks on the rear panel. The **MONITOR 1, 2** switch determines which of these two pairs becomes the input, or in other words which tape recorder is monitored.

## DOLBY SYSTEM SWITCHES

See "DOLBY SYSTEM" section, page 11.

## PHONES JACK

This jack accepts headphones utilizing a standard three conductor phone plug (see Figure 6). It is internally connected to the power amplifier section through isolation resistors to provide adequate sound level with popular low impedance headphones as well as with high impedance units. Two or more sets of headphones may be used with the aid of "Y" connectors. However, output level will drop as additional headphones are added. The headphone jack output is not affected by the **MAIN-SPKR-REMOTE** switches.

# SOME SUGGESTIONS ON USING TAPE RECORDERS WITH YOUR MODEL 2325

The Model 2325 has three sets of inputs and outputs for tape recorders: **TAPE MONITOR 1 IN and OUT**, **TAPE MONITOR 2 IN and OUT**, and **DUBBING IN and OUT**. To simplify this discussion, the tape recorder connected to the **TAPE MONITOR 1** jacks will be referred to as the "MAIN" recorder; the tape recorder connected to **TAPE MONITOR 2** will be referred to as the "SECONDARY" recorder; the recorder connected to the **DUBBING** facilities on the front panel will be referred to as the "EXTERNAL" recorder.

## DUBBING JACKS

The **DUBBING IN** jack is the front panel equivalent of the rear panel **TAPE MONITOR 2** input jacks and automatically disconnects the **TAPE MONITOR 2** input jacks when a standard, three conductor, stereo phone plug is inserted. The line outputs of a tape playback source may be connected to this jack.

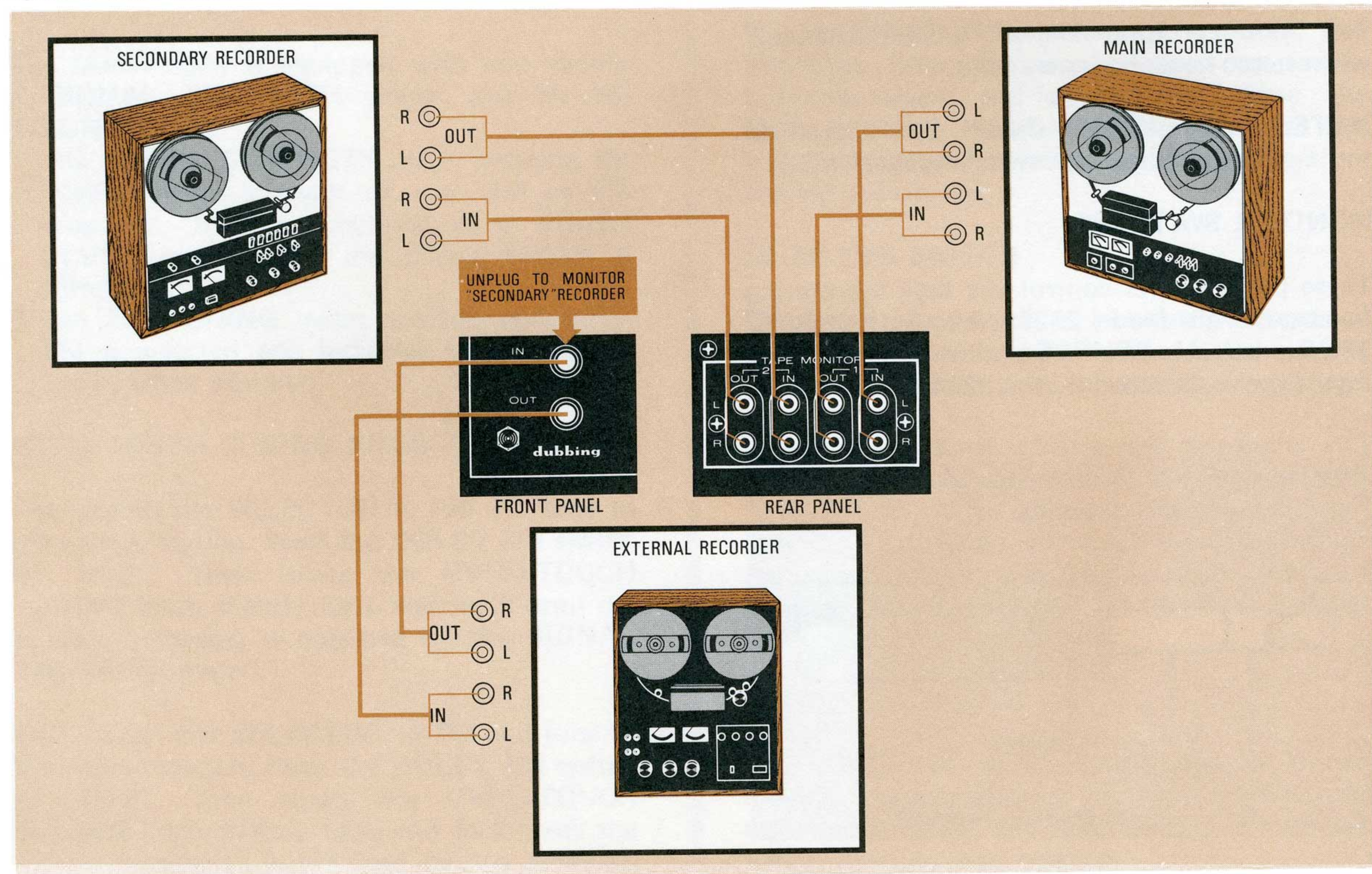
The **DUBBING OUT** jack is the front panel equivalent to the rear panel **TAPE MONITOR 2** output jacks and is permanently connected in parallel with the **TAPE MONITOR 2** output jacks. Therefore, any source material available at the rear panel output jacks, except that from the **TAPE MONITOR 2** inputs (when **DUBBING IN** is connected), is simultaneously available at the **DUBBING OUT** jack. The line inputs of a tape recorder may be connected to this jack, using a standard, three conductor stereo phone plug (see Figure 6).

## MAKING TAPE RECORDINGS AND DUBS

The **SELECTOR** switch determines the source input for tape recording. When the **SELECTOR** switch is in **AM**, **FM**, **PHONO** or **AUX**, the source input can be recorded on to the "MAIN", "SECONDARY", and "EXTERNAL" tape recorders individually or simultaneously.

To make a dub (tape copy) from the "MAIN" recorder onto the "SECONDARY" and/or "EXTERNAL" recorders, place the **SELECTOR** switch in **TAPE 1**. The "MAIN" tape recorder then becomes the source input. When this is the case, the **TAPE MONITOR 1 OUT** jacks are muted to prevent feedback oscillations that would

Figure 7. Tape Recorder Connections



occur if the "MAIN" recorder were inadvertently placed in the record mode.

To make a dub from the "SECONDARY" or "EXTERNAL" recorder on to the "MAIN" recorder, place the **SELECTOR** switch in **TAPE 2**. The "SECONDARY" recorder then becomes the source input. If the "EXTERNAL" tape recorder is plugged into the **DUBBING IN** jack, then it pre-empts the "SECONDARY" recorder and becomes the source input instead. The **TAPE MONITOR 2 OUT** and **DUBBING OUT** jacks are muted to prevent feedback oscillations. Therefore, dubs to the "MAIN" recorder may only be made from one of these two recorders at a time.

## TAPE MONITORING

Notice that the **MONITOR** switches operate independently of the **SELECTOR** switch. Thus, any tape recorder can be monitored regardless of the position of the **SELECTOR** switch. Monitoring of any of the tape recorders may be accomplished as follows:

"MAIN" recorder - Depress the **SOURCE/TAPE MONITOR** switch; release the **1, 2 MONITOR** switch to the **1** position.

"SECONDARY" recorder - Depress both **MONITOR** switches.

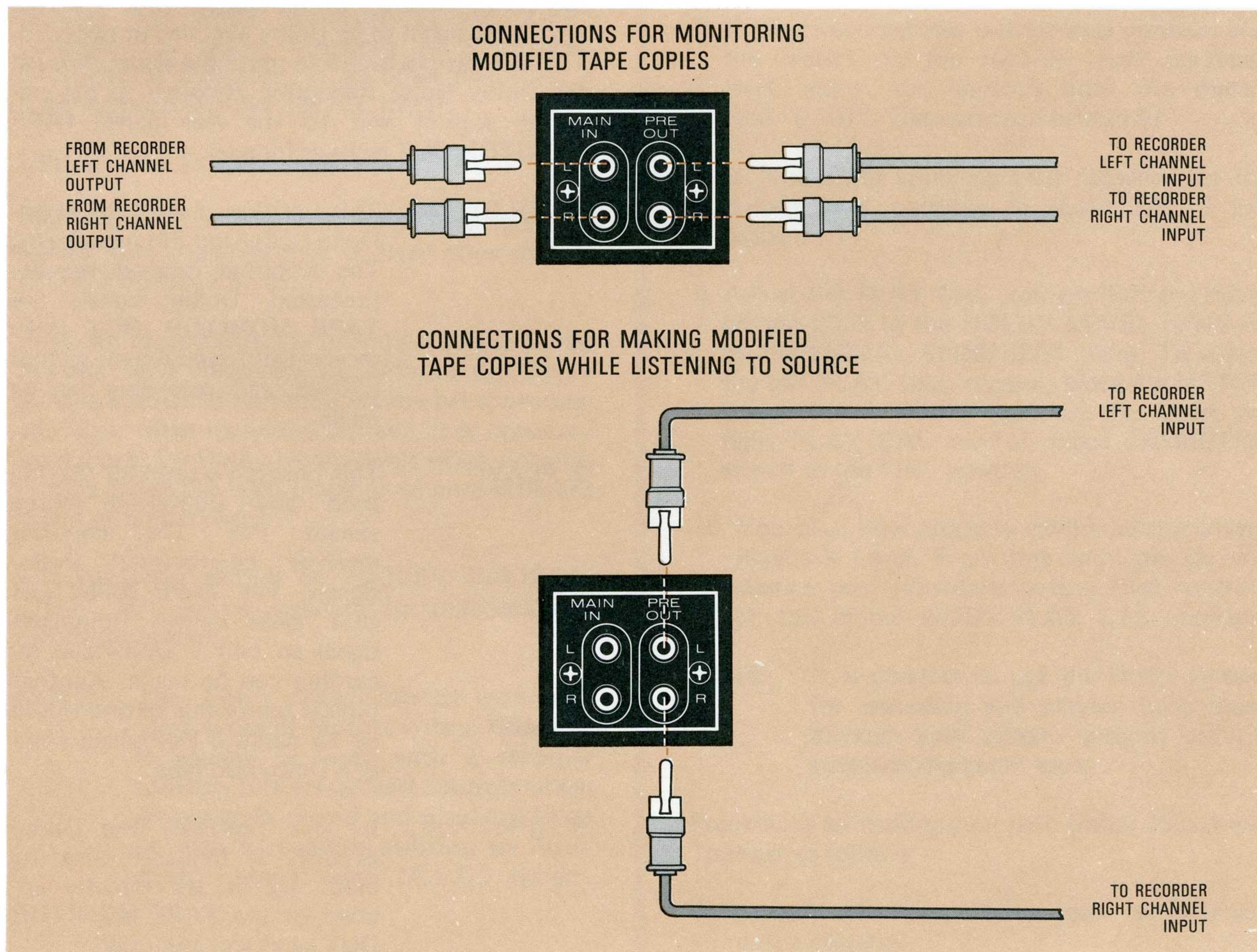
"EXTERNAL" recorder - With the "EXTERNAL" recorder connected to the **DUBBING IN** jack, depress both **MONITOR** switches.

## MAKING MODIFIED TAPE RECORDINGS

The **PRE OUT** jacks on the rear panel of the 2325 may be used to feed input signals to a tape recorder so that filters, balance, and tone controls can be used to modify the signal prior to recording.

Modified tape copies can likewise be made. First, select the tape to be used as a source on the **SELECTOR** switch. Next, connect the input of the other tape recorder to the **PRE OUT** jacks by one of the two methods illustrated in Figure 8. The input signal can be monitored through the speakers. By connecting the output of the second

Figure 8. Arrangement for Making Modified Tape Copies



tape recorder directly to the **MAIN IN** jacks, the newly recorded tape can be monitored. However, please note that when this method is employed, the volume level of the speakers is determined only by the output level of the tape recorder. Adjustment of volume is possible only if the recorder has output level controls.

## **DOLBY SYSTEM**

### **BASIC DOLBY PROCESS**

The Dolby system increases the level of low volume mid- and high-frequency signals during recording and reduces the level of these signals by an identical amount during playback. As a result, the playback signal is identical to the original source signal, but the level of background noise generated by the tape recorder is greatly reduced. A Dolbyized FM broadcast is subjected to the first phase of the noise reduction process before being transmitted. When these signals pass through the Dolby playback circuitry, the mid- and high-frequency noise is greatly reduced.

The Marantz 2325 contains a "single process" Dolby Noise Reduction System. This means that the Dolby circuitry can be used to either Dolbyize or de-Dolbyize the incoming signal, but cannot perform both functions at the same time.

### **DOLBY NR SWITCH**

The **DOLBY NR** switch is the main control for the Dolby circuitry in the Model 2325. It allows any input signal to be Dolby encoded or decoded. The five settings available route the signal through the Dolby Noise Reduction circuitry to the amplifier section and to the rear panel **TAPE MONITOR OUT** jacks as follows:

- 1. DOLBY FM:** This position is used for listening to Dolbyized FM broadcasts. The amplifier receives the de-processed Dolby signal; the **TAPE MONITOR OUT** jacks receive Dolbyized signals so that a Dolbyized recording can be made.
- 2. PLAY:** This position is used for playing back any Dolbyized source except FM. The amplifier receives de-processed Dolby signals. The **TAPE MONITOR OUT** jacks deliver Dolbyized signal so that a Dolbyized recording can be made. Another typical use of this setting would be to make a Dolbyized copy of a Dolbyized tape.
- 3. OFF:** In this position, the Dolby circuitry is bypassed, and the input signals are directly applied to the **TAPE MONITOR OUT** jacks and amplifier.

4. **RECORD I:** This position is used for making a Dolbyized recording of an incoming "flat" (non-Dolbyized) signal. The amplifier receives the "flat" signal; the **TAPE MONITOR OUT** jacks receive Dolbyized signals.

If the tape is monitored by use of the **MONITOR** switch, the Dolbyized signal from the tape (with its characteristic brightness) can be heard.

5. **RECORD II:** This position is used for making a "flat" (non-Dolbyized) recording from an incoming Dolbyized signal. Both the amplifier and the **TAPE MONITOR OUT** jacks receive "flat" signals.

Refer to the Dolby Mode chart on page 14.

The **DOLBY NR** switch also selects the mode of the **SIGNAL STRENGTH** meter. When the **DOLBY NR** switch is placed in the "OFF" position, the meter functions as a **SIGNAL STRENGTH** indicator; in all other positions, it functions as a **DOLBY LEVEL** meter.

### USING THE DOLBY SYSTEM

The Model 2325 is capable of processing Dolby signals from a tape recorder or from other sources (AUX, PHONO, FM, etc.).

In order to optimize the operation of the Dolby System, it is necessary to calibrate the Dolby playback levels to suit each source being processed. Also, when recording on tape, it is necessary to calibrate the Dolby record levels when a change in tape speed has been made or when a different brand of tape is used.

The following section on "DOLBY CALIBRATION" will outline methods for playback and record calibration.

**NOTE:** The Dolby system can be used with most types of tape recorders. However, it cannot be used with a recorder utilizing one set of level controls which govern both record and playback levels or with a recorder utilizing an Automatic Level Control (A.L.C.) system.

## DOLBY CALIBRATION

The purpose of the following adjustments is to achieve the proper Dolby levels by calibrating the recording and playback signals being applied to the Dolby processors.

### PROCEDURE FOR PLAYBACK CALIBRATION

1. Turn on the Model 2325 and your recorder.
2. Set the **DOLBY NR** switch on the Model 2325 to the **PLAY** position.
3. If your recorder has a **SOURCE/TAPE (MONITOR)** switch, set it to "TAPE".
4. Load a Dolby standard alignment tape.
5. Play the tape.
6. If your recorder does not have output level controls, proceed to step 9.
7. If your recorder has output level controls and the meters on the recorder read playback level, adjust the controls until the meters read "0 VU". Then proceed to step 9.
8. If 7 does not apply to your recorder, set the output level controls to about 2/3 of full output.
9. Adjust the **PLAY CAL** controls (left and right) on the 2325 to the **DOLBY LEVEL** reference on the **SIGNAL STRENGTH** meter. To adjust the left **PLAY CAL** control, place the **METER** switch to the "OUT" position. To adjust the right **PLAY CAL** control, place the **METER** switch to the "IN" position.
10. You have now properly calibrated the Dolby Playback Level. From this point on, do not change your recorder's output level controls or the Model 2325's **PLAY CAL** controls.

**NOTE:** It is possible to use the Dolby system for recording and playing back tapes through your system without using a standard alignment tape.

Procedures for making your own Dolby Alignment Tape are as follows:

1. Thread a blank tape onto your recorder (or insert a cassette).



2. Set the **400Hz TONE** switch to the "ON" (in) position.
3. Set your recorder's monitor switch to the source position.
4. Set your recorder's record levels to 0 VU.
5. Commence recording. Record about 45 seconds of the tone. This tape you have just made is used to calibrate the Marantz Dolby circuit with the recorder.

However, a Dolby recording made on your recorder using the calibrated tape you have just made may not necessarily be compatible with the Dolby level on pre-recorded tapes or on a different recorder or system.

Therefore, for universal compatibility, Marantz offers a Dolby standard alignment tape which is available from your local Marantz dealer.

Since the calibration is extremely stable and should not have to be repeated (except to periodically check it), we suggest that you mark the settings of your recorder's output level controls with a felt-tipped pen. Doing so will enable you to easily reset the controls if they are inadvertently moved.

#### PROCEDURE FOR RECORD CALIBRATION

Before proceeding with the record calibration, be certain that the playback adjustments have been performed. **DO NOT CHANGE THE POSITIONS OF THE RECORDER'S PLAYBACK LEVEL CONTROLS (if any) OR THE 2325'S PLAY CAL CONTROLS.**

When calibrating a recorder that is connected to the **TAPE MONITOR 1 IN** and **OUT** jacks, be sure the **SELECTOR** switch is NOT in the **TAPE 1** position. When calibrating a recorder that is connected to the **TAPE MONITOR 2 IN** and **OUT** jacks, be sure the **SELECTOR** switch is NOT in the **TAPE 2** position.

The following are procedures for calibrating Dolby record level:

##### For Recorders with Three Heads

1. Thread a blank tape onto your recorder.
2. Put the 2325's **DOLBY NR** switch in the **PLAY** position.
3. Put both the 2325's and the recorder's **MONITOR** switches in the **TAPE** position.

4. Put the **400Hz TONE** switch in the "ON" (in) position.
5. Commence recording.
6. Adjust the recorder's record level controls so the tone will deflect the 2325's **SIGNAL STRENGTH** meter to the **DOLBY LEVEL** mark.
7. Switch off the tone.

##### For Recorders with Two Heads

1. Thread a blank tape onto your recorder (or insert a cassette).
2. Put the 2325's **DOLBY NR** switch in the "OFF" position.
3. Put the **400Hz TONE** switch in the "ON" (in) position.
4. Commence recording.
5. Adjust the recorder's record level controls to deflect the recorder's meters to 0 VU.
6. Record the tone for approximately 30 seconds.
7. Stop the recorder and rewind it to the beginning of the tone recording.
8. Put the 2325's **DOLBY NR** switch in the **PLAY** position.
9. Put the recorder in the play mode and play back the tape.
10. Note the level reading on the 2325's **SIGNAL STRENGTH** meter. To check the left channel level, put the **METER** switch in the **OUT** position. To check the right channel level, put the **METER** switch in the **IN** position. The object is to adjust the recorder's record level controls so the playback level achieved indicates **DOLBY LEVEL** on the 2325's **SIGNAL STRENGTH** meter.
11. If the meter indicates **DOLBY LEVEL**, calibration is completed.
12. A) If the meter indication is above the **DOLBY LEVEL**, repeat steps 2-11, but decrease the record level in step 5 to slightly below 0 VU on the recorder's VU meters.  
B) If the meter indication is below the

**DOLBY LEVEL**, repeat steps 2-11 but increase the record level in step 5 to slightly above 0 VU on the recorder's VU meters.

- C) Repeat as necessary until the exact Dolby level is achieved on each channel.

**For all Recorders**

After the **DOLBY LEVEL** has been achieved on the **SIGNAL STRENGTH** meter, DO NOT change the recorder's input or output level controls or the 2325's **PLAY CAL** controls.

CHANGING THE RECORDER'S RECORD OR PLAYBACK LEVELS OR THE 2325's **PLAY CAL** CONTROLS WILL NECESSITATE REPEATING THE DOLBY CALIBRATION PROCEDURE.

Mark the calibration positions on the recorder's record and playback level controls to avoid the necessity of re-calibrating after making a non-Dolby recording.

To adjust the recording level during Dolbyized recording, use the **RECORD LEVEL** controls on the 2325 rather than the tape recorder's record level control. The recorder's VU meters will indicate the recording level.

When the Dolby process is not desired on a recording, record in the normal manner - adjusting the record levels with the recorder's record level controls. DO NOT change the 2325's **PLAY CAL** controls.

**USING THE DOLBY SYSTEM ON FM BROADCASTS**

Your Model 2325 is equipped to received Dolbyized FM broadcasts.

Most FM broadcasts do not currently use the Dolby Noise Reduction system. To receive these broadcasts, leave the **DOLBY NR** switch in the **OFF** position. However, if a local station is broadcasting a Dolbyized FM signal, full advantage of the increase in signal-to-noise ratio may be obtained by putting the **DOLBY NR** switch in the **DOLBY FM** position.

The Dolby FM level has been pre-adjusted at the factory and should not normally need to be re-adjusted. However, should the Dolby FM level require recalibration, adjustment potentiometers are located on the rear panel (**DOLBY FM PRESET LEVEL**) and can be adjusted to the proper Dolby level by using the Dolby reference tone transmitted by the FM station at the beginning of the broadcast.

**Figure 9. Dolby Mode Chart**

Input / Operating Mode	Dolby NR Switch Position			Notes:
	To Listen	To Record		
		Without Dolby	With Dolby	
F.M. (Normal)	"Off"	"Off"	"Record I"	Normal FM de-emphasis applied
F.M. with Dolby	"Dolby FM"	"Record II"	"Dolby FM"	25 μsec FM de-emphasis applied
Non Dolbyized sources (Phono, Tape, Aux inputs, A.M.)	"Off" "Record I"	"Off"	"Record I"	Pre-recorded tape manufacturers indicate when the material has been recorded in a Dolbyized format. Home recorded tapes should also be clearly marked as to format, to ensure correct play back mode.
Dolbyized sources (derived from "Tape" or "Aux" inputs etc.)	"Play" "Record II"	"Record II"	"Play"	

For initial calibration, utilizing the Dolby standard alignment tape, see detailed instructions on Pages 12 through 15 of this manual.

## DOLBY MODE CHART

This chart indicates the correct **DOLBY NR** switch positions for various types of input material. The input format is indicated in the left column and the appropriate **DOLBY NR** switch position is shown under the appropriate mode of operation.

## CONVERTING YOUR STEREO SYSTEM TO 4-CHANNEL

In the future, you may decide to expand your stereo component system into a four channel sound system. Marantz simplifies this conversion by offering the Model 4000 Quadradiad Adaptor, which has been specifically designed and engineered to add the dimension of four channel sound to your stereo components. The Marantz Model 4000 incorporates all the technology required to convert your present Marantz components into a four channel sound system.

Features of the Marantz Model 4000 Quadradiad Adaptor:

- Accepts an external CD-4 disc demodulator
- SQ pocket for plugging in Marantz' SQA-1 and SQA-2 decoders and all future matrix decoders
- Complete provisions for accepting any four channel tape recorder
- Low and hi filters for rear channels
- Master volume control with switchable loudness compensation for all four channels
- Four channel fingertip balance controls
- Complete provisions for switching both MAIN and REMOTE four channel speaker systems
- Headphone jack for the rear channels
- Base and treble controls for the rear channels
- Accepts Marantz' Model RC-4 remote control unit.

The Model 4000 also incorporates Marantz' exclusive VARI-MATRIX feature to synthesize four channel sound from any stereo source. Along with the Model 4000, all that is required is a basic amplifier and a pair of speakers. Further information can be obtained from your local Marantz dealer.

## TECHNICAL DESCRIPTION

### GENERAL

Figure 10 is a block diagram of the Model 2325 Receiver showing the main functional elements and input and output signal routing. Each AM and FM front end has its own IF stages. For clarity, only the left audio channel is shown; the right audio channel is identical. All audio controls are ganged or concentrically clutched to their counterparts in the right channel. The left channel half of the front panel **DUBBING IN** and **DUBBING OUT** jacks are shown interconnected in this diagram. The right channel of each jack is wired to the same circuit point in the right channel.

### FM TUNER SECTION

**FRONT END** - FM antenna signals are applied through a balun transformer to the antenna coil which drives a field-effect transistor RF amplifier. The amplified signals from the RF amplifier are fed through the triple-tuned Butterworth type RF filter circuit to the FET Mixer stage, which also receives the signal generated by the local oscillator. A five section tuning capacitor tunes antenna, interstage and oscillator circuits which provide exceptional selectivity and spurious signal rejection. The mixer converts the carrier frequency to the 10.7MHz intermediate frequency. Careful attention to the local oscillator's thermal and electrical characteristics has minimized drift, thus obviating the necessity for AFC. The 10.7 MHz converted signal is then fed to the IF amplifier.

**IF AMPLIFIER** - The IF amplifier consists of eight ceramic filters and eight stages of IF amplifiers including four limiter stages. The characteristics of these ceramic filters are such that the 200KHz passband is phase linear, thus eliminating a major source of high frequency distortion and loss of stereo separation. The sharp cut-off slopes improve selectivity, permitting reception of closely spaced channels. The Model 2325 utilizes four symmetrical diode limiter stages consisting of high performance Gold Bond diodes which result in a very small dynamic aperture. Thus, undesirable Amplitude Modulation is removed from the IF signal within the limiter and good capture ratio is also assured. The amplified and symmetrically limited FM signals are fed to the super-linear discriminator circuit.

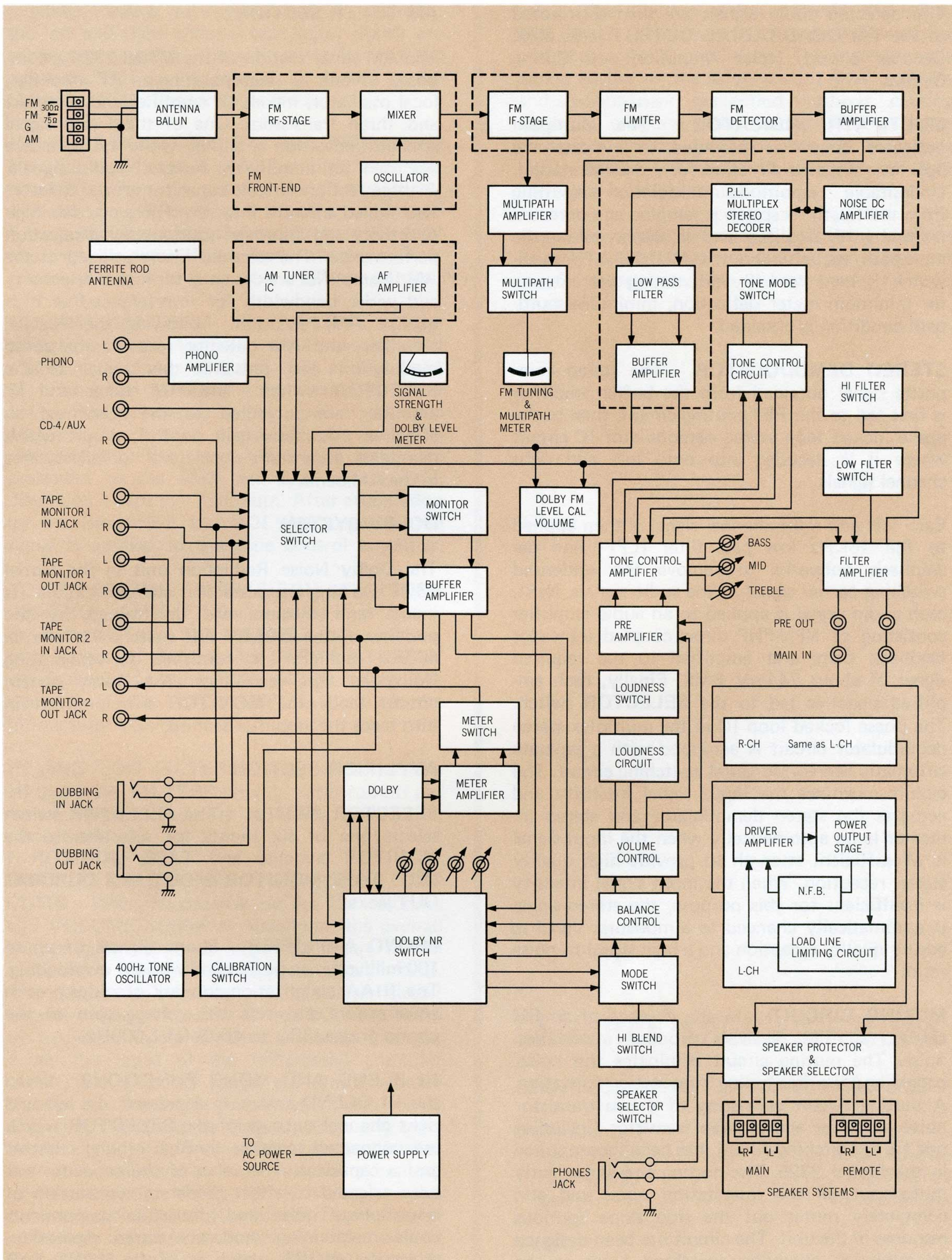


Figure 10. Functional Block Diagram

The detected audio signals are then distributed to the **FM QUADRADIAL OUTPUT** jack, MPX Decoder circuit, Noise Amplifier, and Muting Circuit.

**MULTIPATH INDICATOR** - The Multipath Indicator circuit is provided to indicate the optimum antenna direction for a desired station. Undesirable amplitude modulation resulting from multipath reception is sampled and detected from the IF amplifier and is displayed on the multipath meter when the **MULTIPATH** push-switch is held "in". By orientating the antenna for minimum meter deflection, minimum multipath condition is obtained.

**STEREO DEMODULATOR** - The stereo composite signal obtained from the buffer amplifier is first fed to the FET muting circuit, then to the phase locked loop stereo demodulator IC circuit where it is decoded into both left and right channel signals.

Each left and right channel signal is then applied to the 16KHz low pass filter (LPF) and de-emphasis networks to remove the undesired switching carrier signal in the audio signals. Next, each audio signal is applied to an audio amplifier consisting of NPN-PNP direct-coupled transistor feedback pairs and amplified to the required signal of about 744mV RMS. Finally, each amplified signal is fed to the **SELECTOR** switch. The phase locked loop IC in the multiplex stereo demodulator circuit is equipped with a separate automatic Stereo/Monaural switching circuit. The circuit examines the input signal intensity and actuates the stereo demodulator and stereo indicator lamp automatically when the input signal is of sufficient strength to provide high quality stereo reception. When the input signal intensity is insufficient for this purpose, the stereo signal is automatically changed to a monaural signal to ensure quality reception and a high signal-to-noise ratio.

**MUTING CIRCUIT** - In the absence of an FM carrier, all FM receivers produce interstation noise. The muting circuit eliminates this noise, providing noise-free tuning from station to station. A muting circuit consisting of a two transistor noise amplifier and a three transistor (including one FET) switching circuit, has been incorporated in the Model 2325. The muting circuit perfectly mutes out all the interstation noise and also completely mutes out the side slope spurious response of the unit. The circuit has been designed to minimize annoying switching noise as the tuning band is scanned.

## AM TUNER SECTION

The AM tuner section of the Model 2325 is composed of one IC (incorporating an RF amplifier, local oscillator, mixer, IF amplifier and detector) and three transistors. One of them is a signal strength indication amplifier, while the other two are used for amplifying detected audio signals. A three section variable capacitor is used to insert two tuned circuits into the RF stage for high selectivity and improved spurious signal rejection performance. The ceramic filters utilized in the AM IF amplifier are designed for higher selectivity and wider bandwidth for interference-free high quality AM reception. Following the AM IF amplifier, the AM detector recovers the audio modulation and presents this signal to the **SELECTOR** switch. The AM tuner and IF amplifier are subjected to the action of an effective automatic gain control circuit which maintains a constant signal level for all stations in the AM band.

## DOLBY SYSTEM

The Dolby Noise Reduction unit in the Model 2325 is a single process two channel circuit. Its inputs and outputs are determined by the position of the **DOLBY NR** switch. An internal 400Hz oscillator is furnished for calibrating Dolbyized tape recordings. The Dolby system output feeds the **MONITOR** switch which in turn feeds the amplifier section.

## AMPLIFIER SECTION

**SELECTOR SWITCH** - The **SELECTOR** switch selects one of six inputs for selection to the **MONITOR** switches and **TAPE MONITOR 1 OUT**, **TAPE MONITOR 2 OUT**, and **DUBBING OUT** jacks.

**PHONO AMPLIFIER** - Phono signals of up to 100 millivolts can be handled without overloading. The RIAA equalization network provides precise equalization and sets the voltage gain of the phono preamplifier to 40dB (at 1,000Hz).

**HI BLEND AND MONO FUNCTIONS** - When the **HI BLEND** switch is depressed, the left and right channel outputs of the **SELECTOR** switch are connected together through mixing resistors and a capacitor. The value of the capacitor has been selected to effect moderate suppression of out-of-phase noise and distortion components while maintaining moderate stereo separation. When the **MODE** switch is in the **MONO L+R** position, the two channels are connected directly

together through mixing resistors. In addition, the left and right channel tape input signals are connected together through a similar resistor network. This facility allows all inputs to be converted to the monophonic mode.

**BALANCE CONTROL** - The **BALANCE** control is a wide range control which permits attenuation of each channel to cutoff. The change of attenuation in each channel as the control is moved from center has been designed to maintain total apparent loudness from both channels. This feature makes it a true stereo balance control.

**VOLUME CONTROL** - The **VOLUME** control attenuates both channels simultaneously and maintains tracking to within 3dB at any point of attenuation to 50dB from maximum. Since the control is situated at the input of the tone amplifier, there is no possibility of overloading the tone amplifier stages when large signals are presented to the AUX and tape inputs. This, distortion is kept to a minimum. After attenuation by the **BALANCE** and **VOLUME** controls, the signal is applied to the tone control amplifier.

**TONE CONTROL AMPLIFIER** - The **TONE CONTROL AMPLIFIER**'s circuitry uses a continuously variable R-C feedback-type configuration. Turnover frequencies for **BASS** and **TREBLE** are determined by the **TONE MODE** switch. The signal from the **TONE AMPLIFIER** feeds the hi/low filter circuit.

**HI AND LOW FILTERS** - When depressed the **HI** and **LOW FILTERS** provide 12dB roll off per octave, with -3dB points at 9KHz and 50Hz, respectively.

**OUTPUT STAGE AND PROTECTIVE CIRCUITS** - With the controls set for flat response and **VOLUME** control at maximum, the over-all voltage gain from any high-level input to the loudspeaker terminals is approximately 45dB. The differential amplifier and pre-driver circuit amplify the signal from the **HI** and **LOW FILTERS** to sufficient levels to drive the output stages. From the input of the differential amplifier circuit, the amplifier stages are direct coupled through to the loudspeakers (and headphones) providing instantaneous recovery from any over-driven condition. The output stage consists of four push-pull, parallel complementary symmetry power transistors (PNP, NPN), having massive current and dissipation capabilities. The electronic protection circuit senses excessive output current and voltage conditions and limits the signal to the driver transistors to a safe, pre-determined

value. This limiting action protects the driver and output transistors from excessive overdrive and short circuit conditions. The instantaneous acting nature of the safety circuit gives constant and unobtrusive protection without causing annoying program interruptions. Thermal compensation circuits are also provided to ensure highly stable operation under severe temperature and signal handling conditions.

A speaker protection relay protects the speakers in the event of transistor failure, and eliminates low frequency transients when the unit is turned on or off.

## GENERAL SPECIFICATIONS

Power Requirements . . . . . 120V AC, 50/60Hz

Dimensions:

Panel Width . . . . . 19-5/16 inches  
Panel Height . . . . . 5-3/4 inches  
Depth . . . . . 15-3/16 inches

Weight:

Unit Alone . . . . . 49.5 lbs.  
Packed for Shipment . . . . . 57.2 lbs.

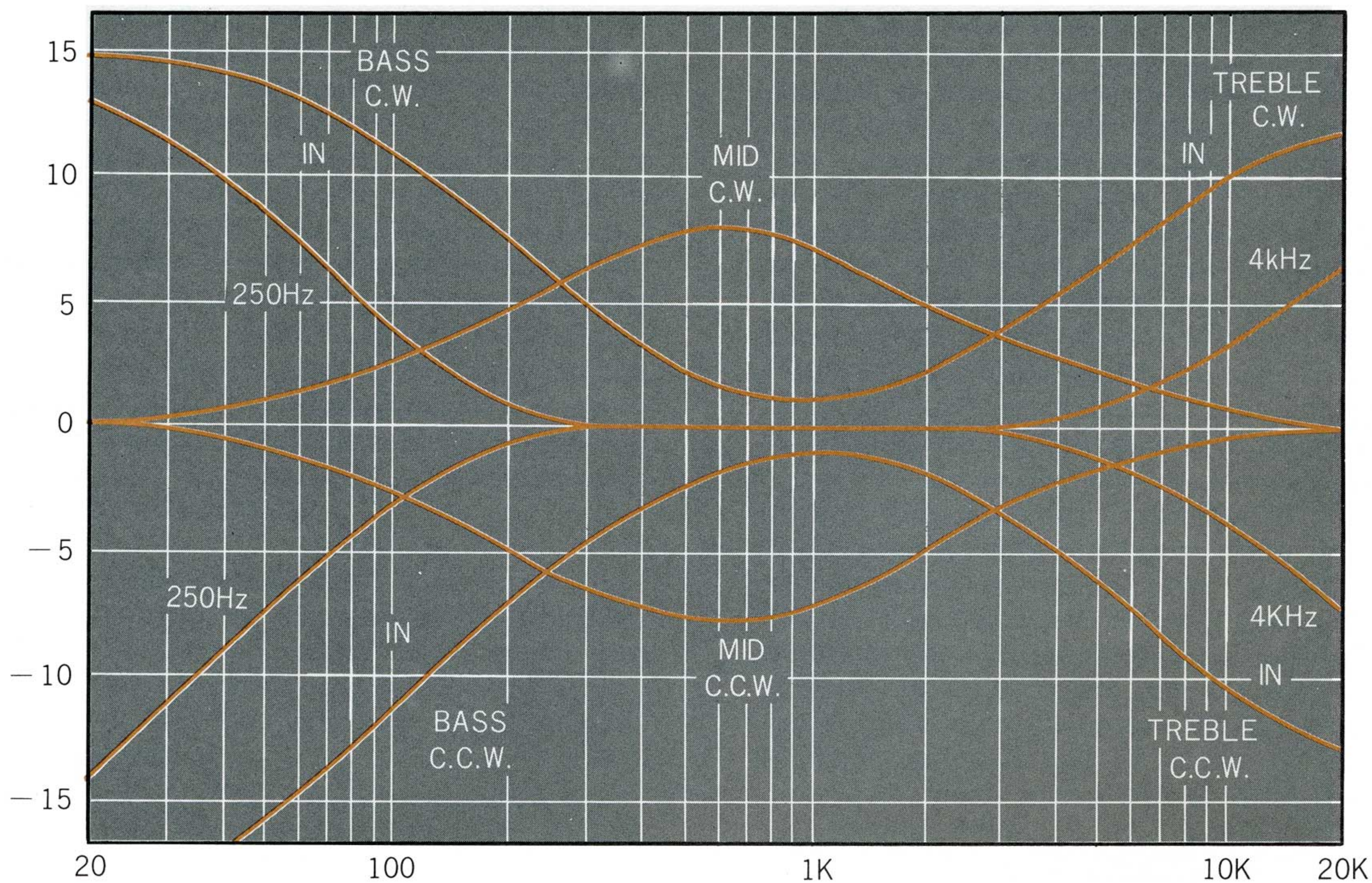


Figure 11. Tone Control Characteristics

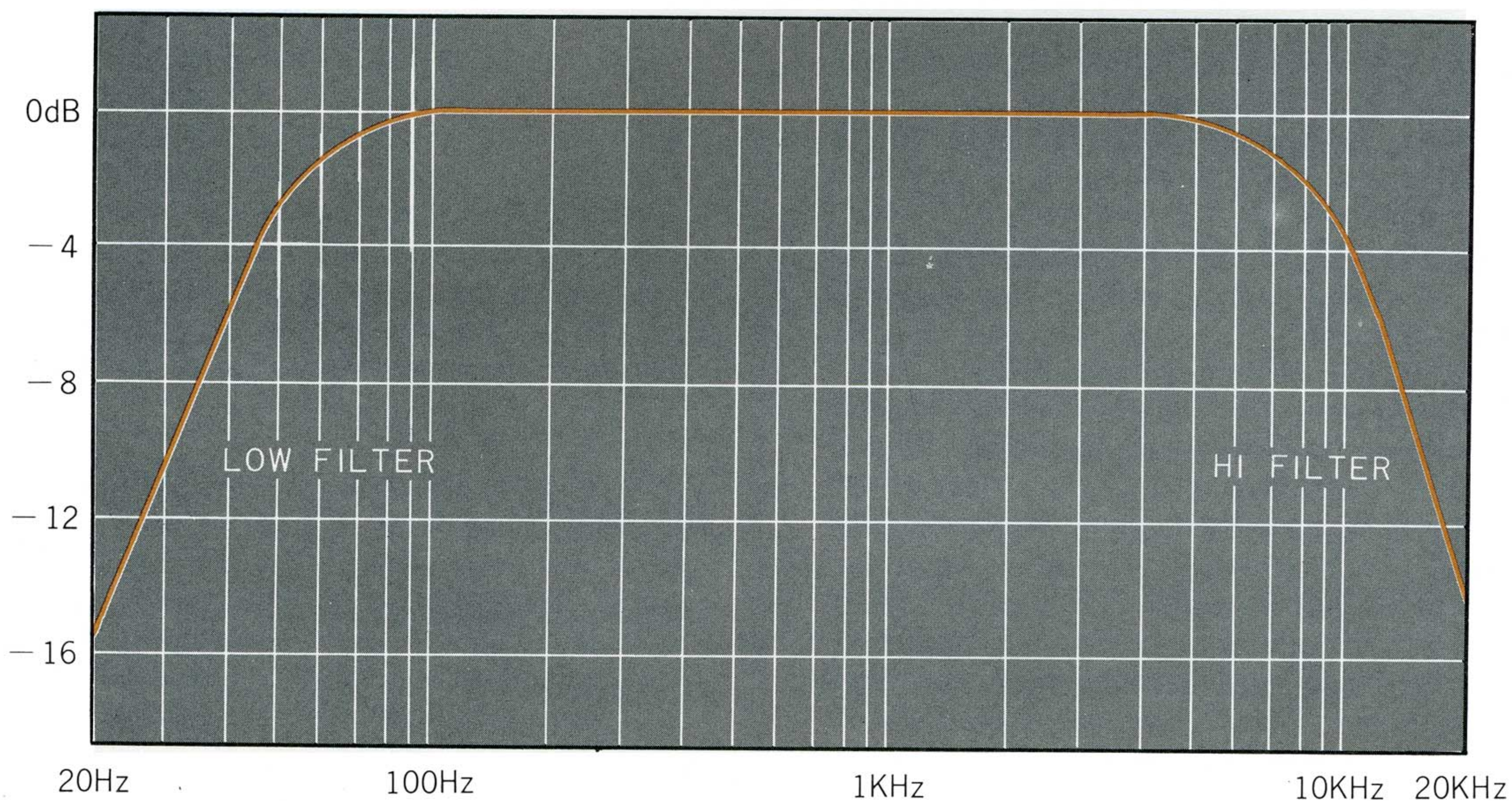


Figure 12. Low and Hi Filter Characteristics

# SERVICE NOTES

Because the Model 2325 Stereo Receiver is completely solid state, replacement of parts should never be required. If the pilot lamp burns out, have your serviceman replace it.

## FUSE REPLACEMENT

The Model 2325 is protected by an 8-amp fuse. In the event the fuse blows out, replace it **ONLY** with a fuse of the same type and rating. Replacement with fuse of higher rating will not protect the instrument and will void the warranty.

## CLEANING

Your Model 2325 Stereo Receiver has a very durable finish. The front panel and knobs are gold anodized for lasting beauty. You can clean the panel and knobs with a liquid solution of mild detergent and water applied with a soft cloth or cotton-tipped swab. Never use scouring powder or any abrasive cleaner.

## REPAIRS

Only the most competent and qualified service technicians should be allowed to service the Model 2325 Stereo Receiver. The Marantz Company and its factory trained warranty station personnel have the knowledge and special equipment needed for repair and calibration of this precision instrument.

In the event of difficulty, write directly to the **Marantz Technical Service Department, P.O. Box 99, Sun Valley, California 91352**, for the name and address of the Marantz warranty or authorized service station nearest your home or business. Please include the model and serial number of your unit and a description of what you feel is abnormal about its operation.

## REPACKING FOR SHIPMENT

Should it become necessary to repack your Model 2325 for shipment to the factory, to an authorized service station, or elsewhere, please observe the following precautions:

a. Do not ship your unit to the factory without an Authorized Return Label, which the Marantz Company will supply if the description of difficulties appears to warrant factory service.

b. Do not ship the unit installed in its accessory walnut cabinet; remove the unit from the cabinet before packing.

c. Pack the unit carefully, using the original material as shown in Figure 11.

**PLEASE NOTE** that if you have discarded, lost, or damaged the packing material, new packing material may be obtained by writing to the Marantz Technical Services Department. The carton, its fillers, and packing instructions will be returned to you at a nominal charge.

d. Ship via a reputable carrier (**do not use Parcel Post**) and obtain a shipping receipt from the carrier.

e. Insure the unit for its full value.

f. Be sure to include your return address on the shipping label.

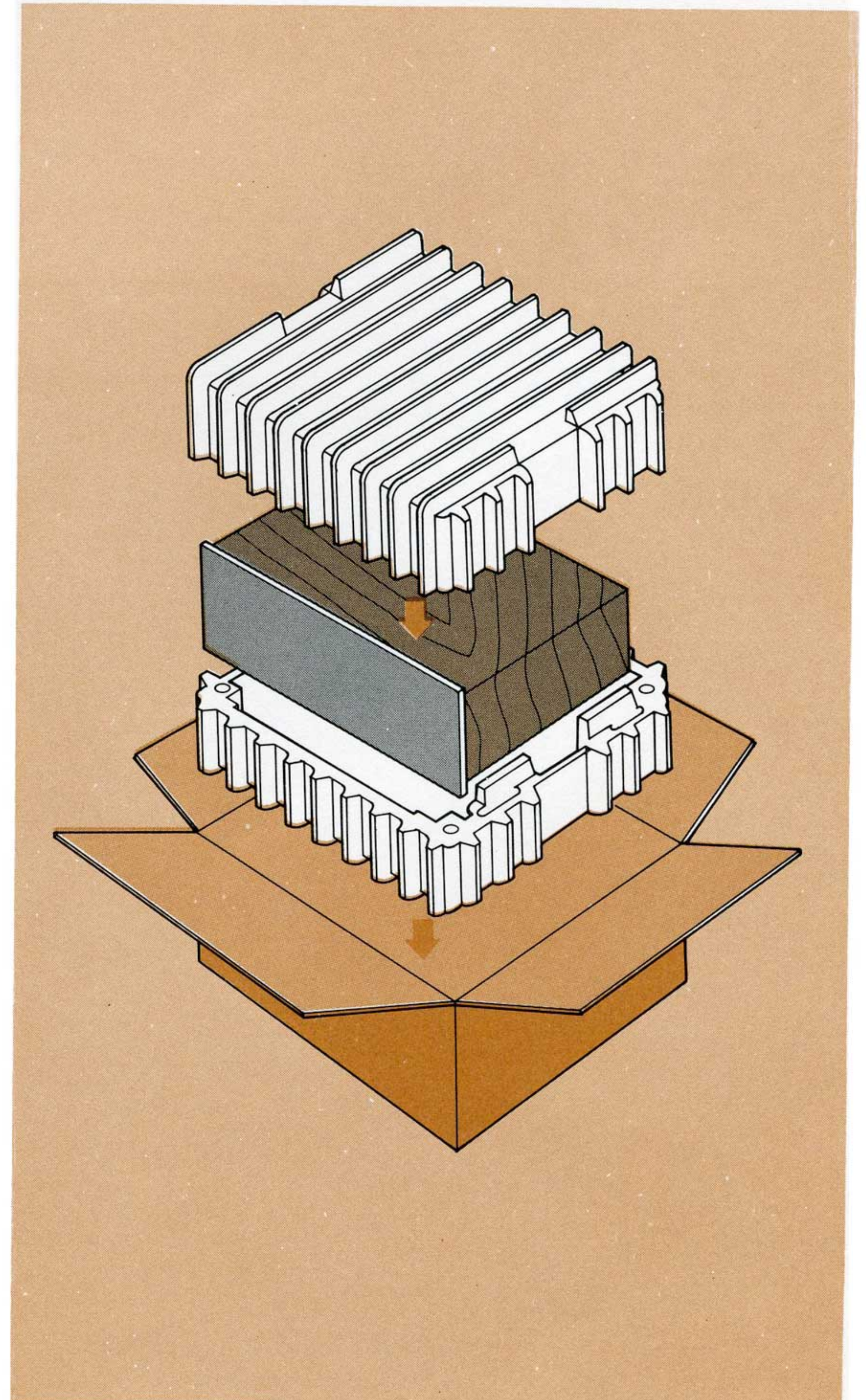


Figure 13. Packing Instructions



The Sound of Marantz  
is the compelling warmth of a Stradivarius.  
It is a dancing flute, a haughty bassoon  
and the plaintive call of a lone French horn.  
The Sound of Marantz is the sound of beauty,  
and Marantz equipment is designed to bring  
you the subtle joy of its delight.  
Wonderful adventures in sound await you  
when you discover that the Sound of Marantz  
is the sound of music at its very best.

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Noise reduction circuit under license from Dolby Laboratories, Inc.

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