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PURCHASER'S RECORD ►

Model purchased _____

Date of purchase _____

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Address _____ City _____ State _____

Serial Number _____

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1. Dolby Mode Chart

GENERAL DESCRIPTION

Your Marantz Model 4240 is a high-quality Stereo 2 + Quadradial 4 Receiver developed by Marantz, a name famous for quality in the audio component industry. The Model 4240 incorporates Marantz' exclusive Vari-Matrix circuit which simulates 4-channel sound from normal 2-channel stereo programs, and is capable of reproducing 4-channel sound from any matrix-encoded source. The 4240 will also reproduce any discrete 4-channel program as well as regular stereo and monaural programs. An optional plug-in decoder adapts the 4240 for any specific matrix system such as Columbia's SQ.

The FM tuner section employs an FET for the RF amp stage. The IF tuning circuit employs ceramic filters of wide bandwidth and high selectivity to provide high sensitivity and unparalleled interference-free operation. The 4240 incorporates a two-process, 2-channel DOLBY system to reduce noise, inherent in recording music from records, tape, FM broadcasts and TV.

The FM multiplex circuitry includes a Stereo-Monaural Automatic switching circuit, stereo indicator circuit and a buffer amplifier to obtain output power at low impedance. An SCA filter is incorporated, as well as low pass filters for the 19KHz and 30KHz bands. Moreover, the Model 4240 unit has a muting circuit that permits pleasant FM broadcast reception by completely eliminating inter-station interference which is usually generated at the time of selecting FM stations.

FOREWORD

To obtain optimum performance and enjoyment from the Model 4240, please study these instructions carefully. Follow the step-by-step instructions to obtain maximum performance.

This manual is divided into two parts. The first covers installation and operation in simple, non-technical language. The second describes the Model 4240 in more detail with technical specifications and functional explanations.

For quick identification of the controls and connections, references are printed in bold face type.

AFTER UNPACKING

It is advisable to save all original packing material to prevent damage should you wish to transport or ship the Receiver (refer to Figure 21 for packing instructions). Please inspect your Model 4240 carefully for any signs of damage in transit. It has undergone stringent quality control inspection and tests prior to packing, and left the factory in perfect operating condition. If the unit is damaged, notify the carrier without delay. Only the consignee may institute a claim with the carrier for damage during shipment. However, the Marantz Company will co-operate fully in such an event. Save the damaged carton as evidence for inspection by the carrier.

CONNECTING THE 4240

The 4240 can be used as a stereo or 4-channel Receiver. When using the 4240 as a stereo unit, the **POWER MODE** Switch on the rear panel should be placed in the **40Wx2** mode. The instructions contained in this manual are to be followed for both stereo or 4-channel operation; however, for stereo operation, the front channels alone will apply.

1. Using a balanced and shielded 300 Ohm cable, connect an FM antenna to the 4240 as shown in Figure 11.
2. Using No. 18, or heavier, lamp cord (zip cord), connect main speakers to the 4240 as follows:

LEFT FRONT SPEAKER	4240
- or GND or NEG or COMM or 0	to MAIN SPEAKERS FRONT L-
+ or HOT or POS or 1	to MAIN SPEAKERS FRONT L+

RIGHT FRONT SPEAKER	4240
- or GND or NEG or COMM or 0	to MAIN SPEAKERS FRONT R-
+ or HOT or POS or 1	to MAIN SPEAKERS FRONT R+

LEFT REAR SPEAKER	4240
- or GND or NEG or COMM or 0	to MAIN SPEAKERS REAR L-
+ or HOT or POS or 1	to MAIN SPEAKERS REAR L+

RIGHT REAR SPEAKER	4240
- or GND or NEG or COMM or 0	to MAIN SPEAKERS REAR R-
+ or HOT or POS or 1	to MAIN SPEAKERS REAR R+

CAUTION: When using the 4240 in the 40 W x 2 mode, do not use 4 Ohm speakers — use 8 Ohms or higher.

3. Using shielded audio cables with phono plugs, connect your record player to the 4240 as follows:

RECORD PLAYER

4240

LEFT OUTPUT
RIGHT OUTPUT

to PHONO L
to PHONO R

4. If a discrete 4-channel playback device, (Q-8 cartridge player, 4-channel reel-to-reel player, CD-4 discrete disc demodulator, etc.) is to be engaged in the system, make connections between the device and the 4240 using shielded audio cables with phono plugs.

DISCRETE 4-CHANNEL PLAYBACK DEVICE

4240

LEFT-FRONT or LF or
CHANNEL 1 or TRACK 1

to FRONT CD-4/AUX L

LEFT-REAR or LR or
CHANNEL 2 or TRACK 2

to REAR CD-4/AUX L

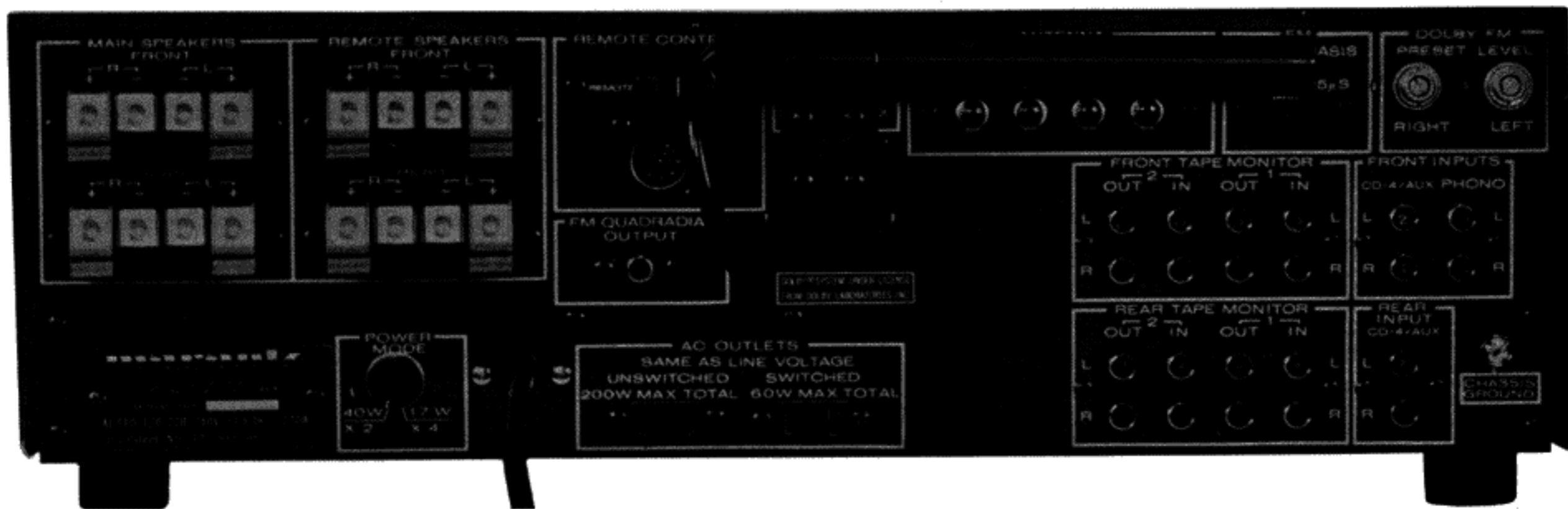
RIGHT-FRONT or RF or
CHANNEL 3 or TRACK 3

to FRONT CD-4/AUX R

RIGHT-REAR or RR or
CHANNEL 4 or TRACK 4

to REAR CD-4/AUX R

Figure 1. Rear Panel Connection Facilities and Adjustments

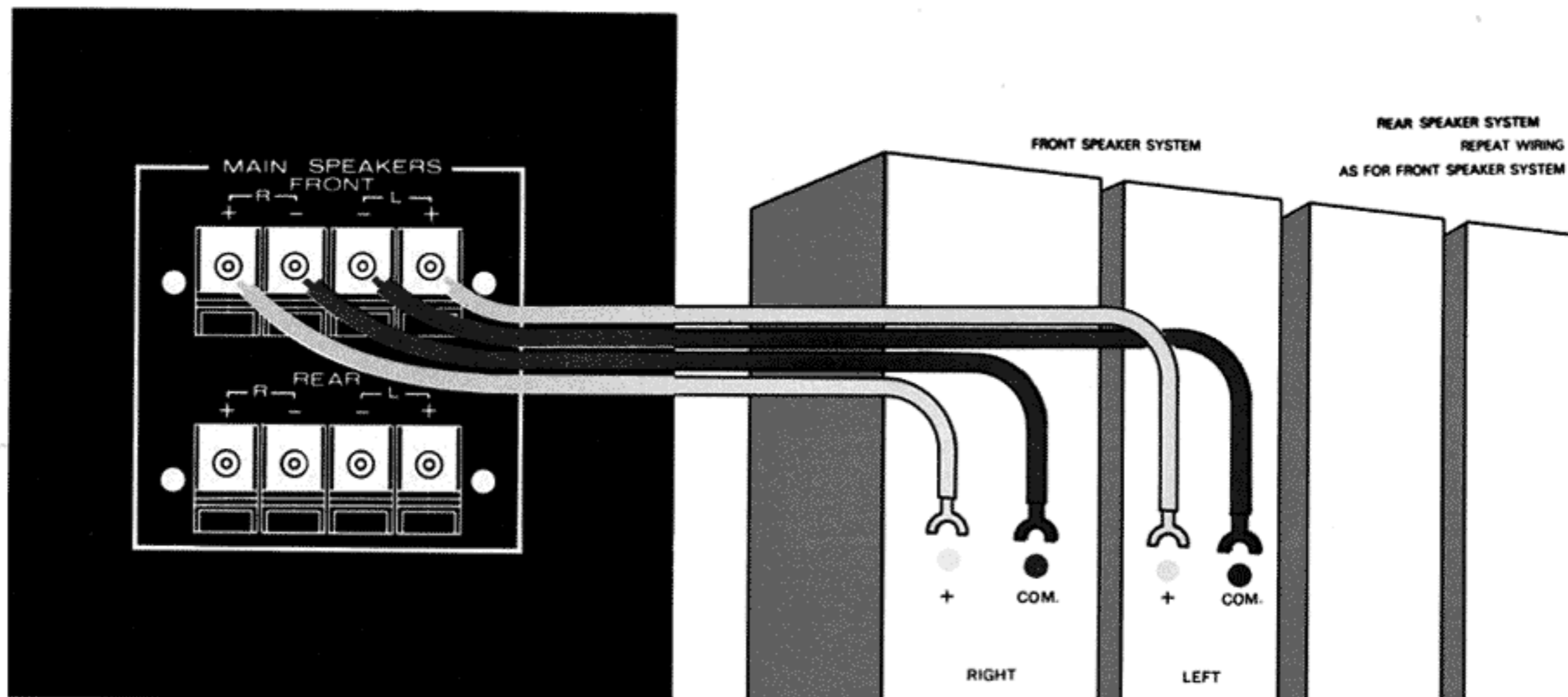


5. Using shielded audio cables with phono plugs, connect a discrete 4-channel tape recorder to the 4240 as follows:

DISCRETE 4-CHANNEL TAPE RECORDER	4240
LEFT-FRONT OUTPUT or LINE OUT	to FRONT TAPE MONI- TOR IN L
LEFT-REAR OUTPUT or LINE OUT	to REAR TAPE MONI- TOR IN L

RIGHT-FRONT OUTPUT or LINE OUT	to FRONT TAPE MONI- TOR IN R
RIGHT-REAR OUTPUT or LINE OUT	to REAR TAPE MONI- TOR IN R
LEFT-FRONT INPUT or LINE IN	to FRONT TAPE MONI- TOR OUT L

Figure 2. Loudspeaker System Connections



LEFT-REAR INPUT
or LINE IN

to REAR TAPE MONI-
TOR OUT L

RIGHT-FRONT INPUT
or LINE IN

to FRONT TAPE MONI-
TOR OUT R

RIGHT-REAR INPUT
or LINE IN

to REAR TAPE MONI-
TOR OUT R

6. Pull the AM ferrite-rod antenna out as shown in Figure 12.

7. Set the controls and switches as follows:

FRONT L-R BALANCE	Mid position
REAR L-R BALANCE	Mid position
FRONT-REAR BALANCE	Mid position
MODE	VARI-MATRIX
DIMENSION	Mid position
BASS and TREBLE Controls	Mid position
VOLUME	Minimum (fully counter-clockwise)
MAIN SPKR	ON (in)
REMOTE SPKR	OFF (out)
FM MUTING	ON (in)

MONITOR (TAPE-SOURCE)	SOURCE (out)
HI FILTER	OFF (out)
LOUDNESS	OFF (out)
DOLBY	OFF
400Hz TONE	OFF (out)
POWER	OFF (out)

8. Plug the 4240 into the AC wall outlet.

9. Turn the POWER switch ON.

10. Select the desired program source by setting the SELECTOR switch to appropriate position.

11. If phono is selected, put on a stereo record. If FM is selected, tune to a stereo broadcast.

12. Increase the VOLUME control to a comfortable listening level.

Your complete 4-channel or stereo system is now operative, and you may experiment with the various controls to discover their effects.

The remainder of this manual explains how to use your system most effectively.

SOURCE DEVICES

2-channel

A stereo record player may be connected to the **PHONO** jacks.

High level 2-channel playback devices (tuner, tape player, record player with equalized high level output, etc.) may be connected to the **FRONT TAPE MONITOR** and **CD-4/AUX INPUTS**.

4-channel

Discrete 4-channel playback devices (Q-8 cartridge player, 4-channel reel-to-reel player, CD-4 discrete disc demodulator, etc.) may be connected to the **CD-4/AUX, TAPE MONITOR 1** or **TAPE MONITOR 2** input jacks.

REMOTE SPEAKERS

The 4240 can accommodate both main and remote speaker systems. A second group of four speakers may be set up in another room.

Connect these four remote speakers to the **REMOTE SPEAKERS** terminals as you did the main speakers.

The **MAIN** and **REMOTE SPKR** switches on the front panel now permit activation of **MAIN** and/or **REMOTE** groups of loudspeakers.

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

SPEAKER PHASING

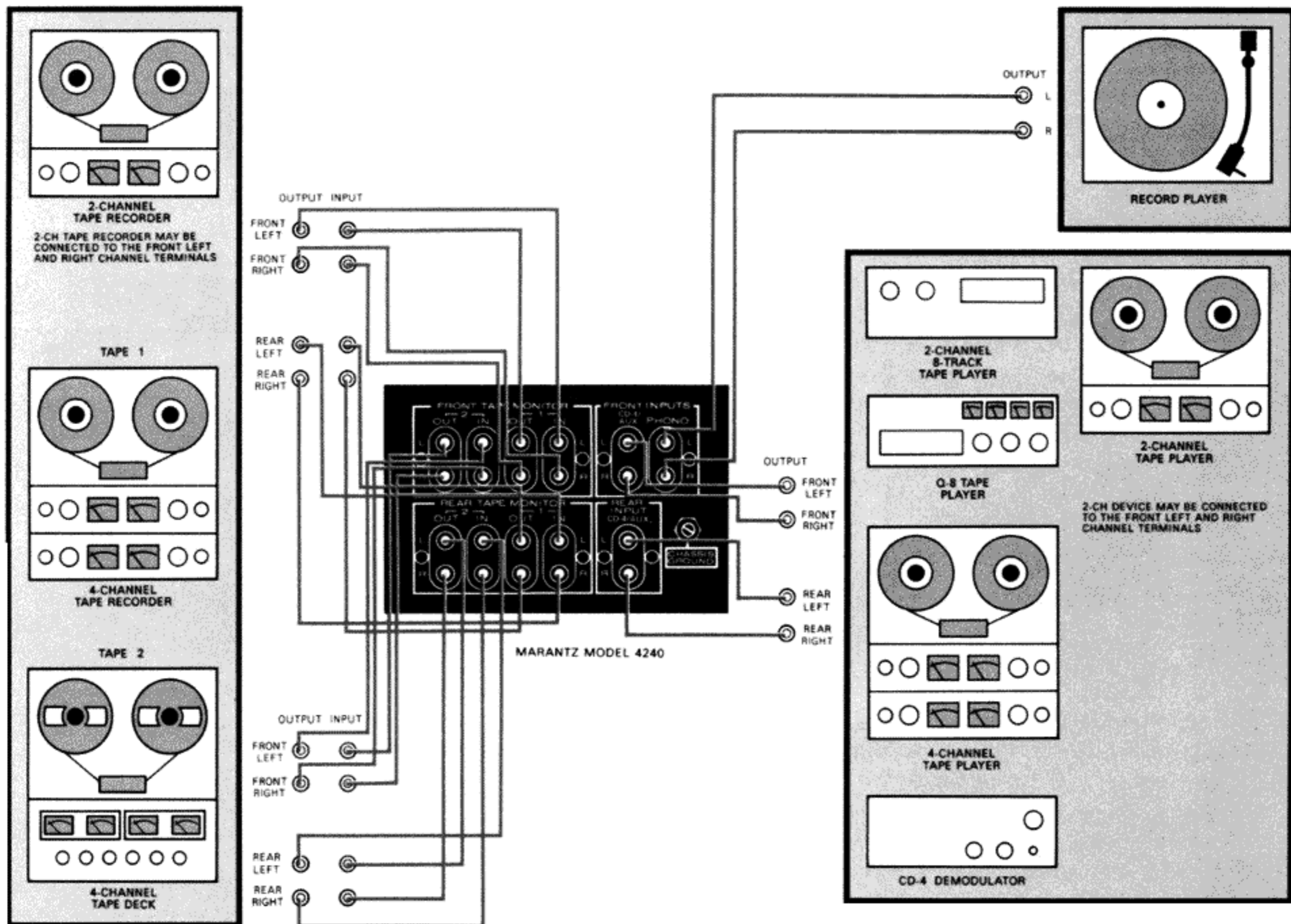
To assure the best 4-channel or Stereo separation and frequency response, the following tests will verify that all four speakers are correctly phased.

1. After the speakers are connected to the 4240, place all four speakers in the center of the room.
2. Set **MODE** switch at **MONO**. Play a record (or radio or tape) with strong bass tones, at a low volume level. Center the **FRONT L-R** and **REAR L-R BALANCE** controls. Set **FRONT-REAR BALANCE** control at extreme **FRONT** position.
3. Position the front (left and right) speakers about six inches apart, face-to-face. Listen, particularly to the apparent loudness of the bass tones.

4. Next, turn off all power, but do not disturb the volume, tone, or balance settings. Reverse connections on the right-front 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 front (left and right) speakers. If the bass tones now sound softer, then turn off all power and re-connect the right-front speaker as you first had it connected.

5. Now check phasing between the two left (front and rear) speakers. Set both **FRONT L-R** and **REAR L-R BALANCE** controls at extreme L position, and set **FRONT-REAR BALANCE** for equal loudness from the two speakers. Position the two speakers face-to-face, about six inches apart, and listen for bass as in (3).

Figure 3. Connection Diagram

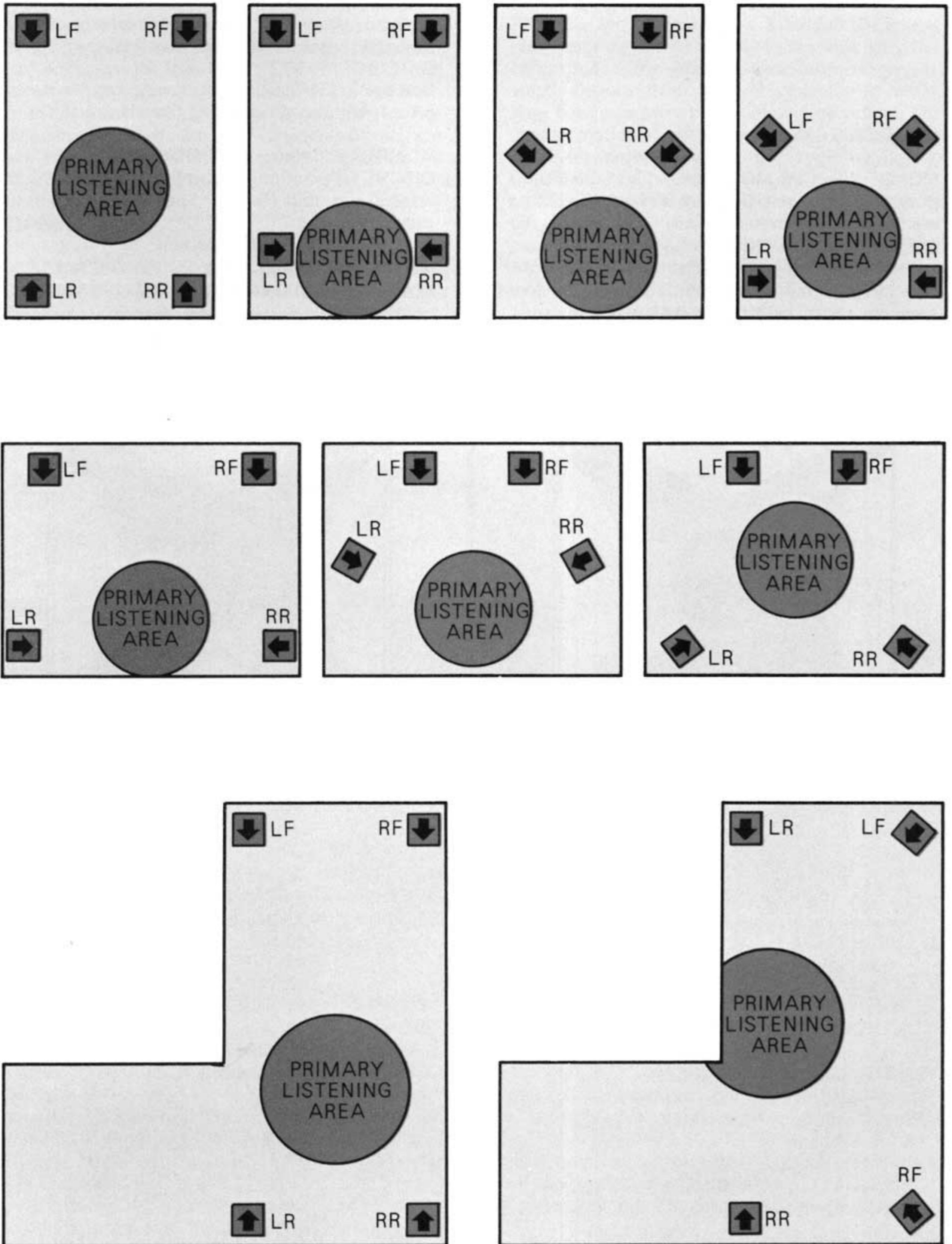


6. Turn off power. Experimentally reverse connections only on the left-rear speaker. Use the connection which gives the "best" bass, as in (4).
7. Last, check phasing between the two rear (left and right) speakers. Center both **FRONT** and **REAR BALANCE** controls. Set **FRONT-REAR BALANCE** control at extreme **REAR** position. Position the two rear speakers face-to-face as before. Listen for bass.
8. Turn off power. Experimentally reverse connections only on the right rear speaker. Listen again to determine the "best bass" method of connecting the right-rear speaker. All speakers will then be in phase, and you may use all controls normally.
9. Once having phased your four speakers, you need not repeat the procedure in the future if you now code the speaker connections and/or the speaker cables. Any method of coding is satisfactory, provided it enables you, in the future, to duplicate your now-correct hookup between speakers and amplifiers.

SPEAKER PLACEMENT

Experimentation will reveal the best speaker locations in your room. The placements are shown in Figure 4.

Figure 4. Speaker Placement



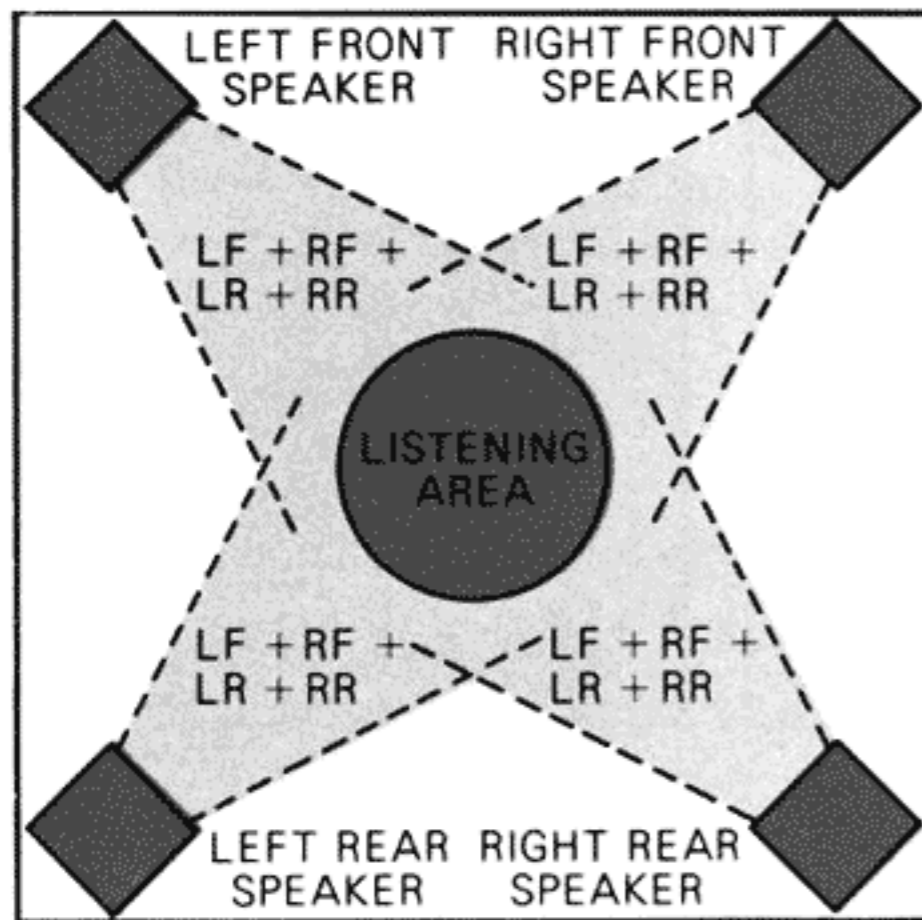
FRONT PANEL FEATURES

MODE SWITCH

MONO: When the **MODE** Switch is in the **MONO** position, all input signals are summed. Speakers are driven as shown in Figure 5.

Use the **MONO** position for a) Phasing speakers, b) Playing a monaural source such as TV audio, AM radio or monaural records through all four speakers and c) Setting up **BALANCE** controls.

Figure 5. Mono Mode Sound Dispersion



INPUT SIGNAL DESIGNATIONS:
LF=LEFT FRONT, RF=RIGHT FRONT
LR=LEFT REAR, RR=RIGHT REAR

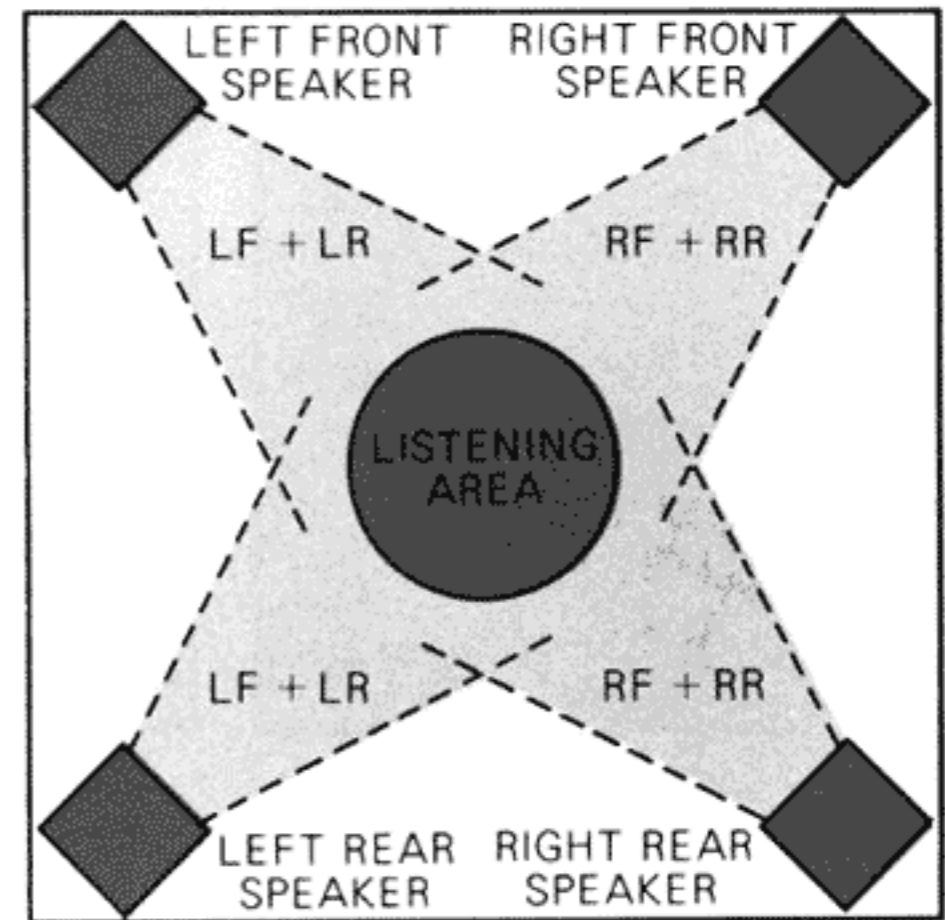
2 CH: When the **MODE** Switch is in the **2 CH** position, left-front and left-rear inputs are summed. Right-front and right-rear inputs are summed. Speakers are driven as shown in Figure 6.

Use the **2 CH** position for playing regular stereo records without synthesizing rear channels.

DISCRETE: When the **MODE** Switch is in the **DISCRETE** position, each input signal goes to its respective output channel. Speakers are driven as shown in Figure 7.

Use the **DISCRETE** position for a) playing discrete 4-channel sources such as Q-8 cartridges or CD-4 records, and b) playing 2-channel stereo programs through front speakers only.

Figure 6. 2-Channel Mode Sound Dispersion



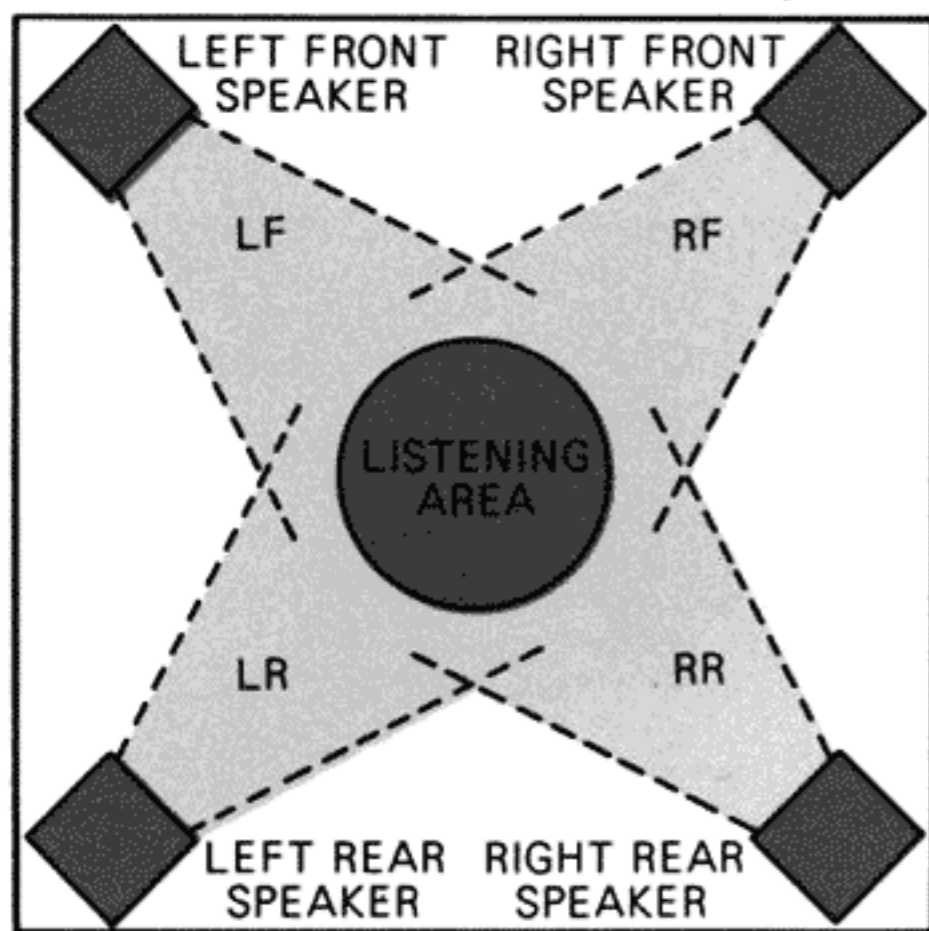
INPUT SIGNAL DESIGNATIONS:
LF=LEFT FRONT, RF=RIGHT FRONT
LR=LEFT REAR, RR=RIGHT REAR

VARI-MATRIX: When the **MODE** Switch is in the **VARI-MATRIX** position, rear input signals are internally disconnected. Left-front and right-front inputs feed left-front and right-front speakers, as in the **DISCRETE MODE**. Rear channel signals are "synthesized" or derived from the left-front and right-front input signals. The characteristics of the rear channel signals are varied by the **DIMENSION** control. Speakers are driven as shown in Figure 8.

DIMENSION

The **DIMENSION** control is operative only when the **MODE** Switch is set to the **VARI-MATRIX** position. This control optimizes the 4-channel **VARI-MATRIX** effect.

Figure 7. Discrete Mode Sound Dispersion



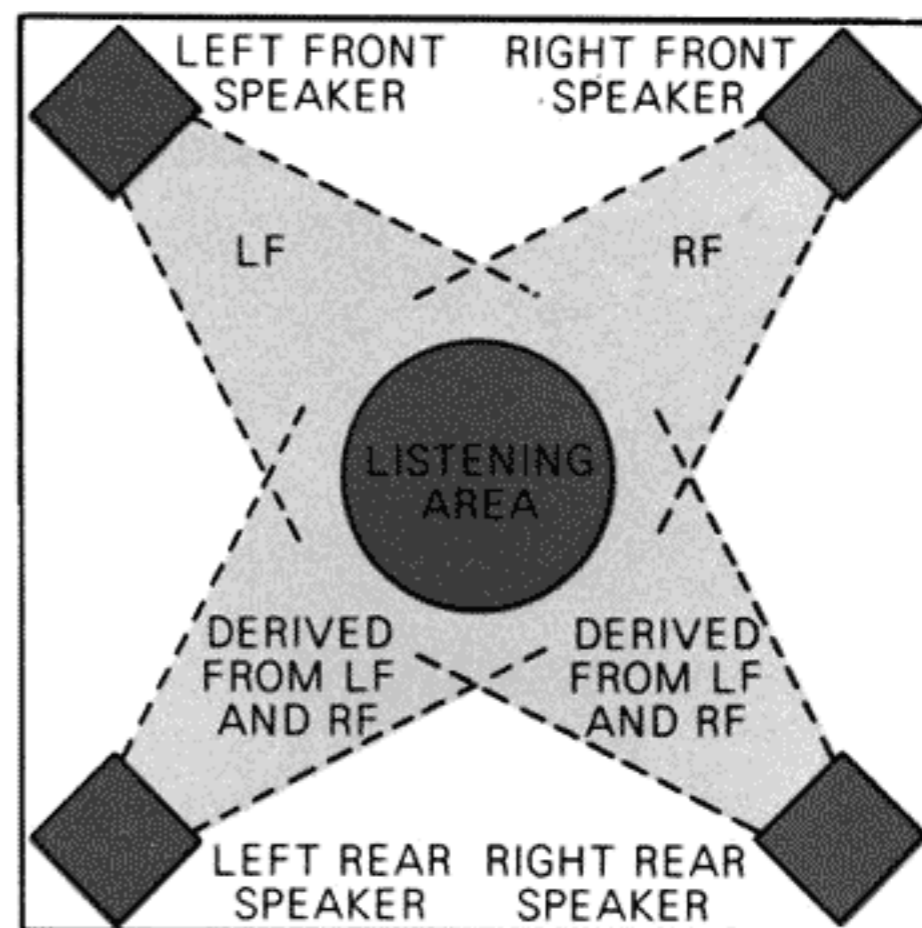
INPUT SIGNAL DESIGNATIONS:
LF=LEFT FRONT, RF=RIGHT FRONT
LR=LEFT REAR, RR=RIGHT REAR

SQ DECODER

With the **MODE** Switch on **SQ DECODER**, any rear input signals to the 4240 are internally disconnected. The rear channel outputs are, instead, derived from front channel signals which have been processed by the plug-in decoder. The characteristics of these derived rear channel outputs are determined by the type of plug-in decoder.

Use **SQ DECODER** position only with an optional plug-in decoder installed. Without this optional decoder, there will be no output when the **MODE** Switch is set to the **SQ DECODER** position.

Figure 8. Vari-Matrix Mode Sound Dispersion



INPUT SIGNAL DESIGNATIONS:
LF=LEFT FRONT, RF=RIGHT FRONT
LR=LEFT REAR, RR=RIGHT REAR

BALANCE CONTROLS

The Model 4240 has three **BALANCE** Controls: **FRONT L-R**, **REAR L-R** and **FRONT-REAR**. The **FRONT L-R** slide knob adjusts the balance between the front channels. The **REAR L-R** slide knob adjusts the balance between the rear channels. The **FRONT-REAR** slide knob adjusts the balance between the rear and front pairs of channels. To balance the front channels, first set the **FRONT-REAR** control all the way to the **FRONT**, to silence the rear speakers while you adjust the **FRONT L-R BALANCE** control. To balance the rear channels, move the **FRONT-REAR** control all the way to **REAR**, and then adjust **REAR L-R BALANCE**. Now you are ready to adjust the **FRONT-REAR** control for the most pleasing overall balance.

SELECTOR SWITCH

The **SELECTOR** Switch selects the program source for listening or recording. The switch can select any of six sources: **AM**, **FM**, **PHONO**, **CD-4/AUX**, **TAPE 1** and **TAPE 2**.

BASS AND TREBLE CONTROLS

These controls are used to adjust the tonal balance of program material to suit your individual listening preference. The bass and treble responses are adjusted by dual concentric, friction-coupled controls. With both **BASS** and **TREBLE** controls set at the center position, frequency response of the amplifier becomes flat.

The smaller (outer) knob adjusts the response of the front audio channels, while the larger (inner) knob adjusts the rear audio channels.

Figure 9. Front Panel Controls and Jacks



Turn the Tone Control knobs clockwise to boost or counterclockwise to attenuate their respective frequency range.

MONITOR SWITCH FOR TAPE 1/TAPE 2

This switch assigns the **TAPE/SOURCE MONITOR** switch to either **TAPE 1** or **TAPE 2**.

MONITOR SWITCH FOR TAPE/SOURCE

When the **MONITOR (TAPE/SOURCE)** Switch is placed in "**TAPE**" (in) position, the signals connected to the tape input jacks (as selected by the **MONITOR TAPE 1, 2** Switch) will be played back.

To play the tape recorder connected to the **TAPE MONITOR 1** or **TAPE MONITOR 2** jacks, or to monitor the tape on a three-head recorder during recording, place the **MONITOR (TAPE/SOURCE)** pushswitch in the "**TAPE**" (in) position.

During recording, the **MODE** Switch should be in the **DISCRETE**, **VARI-MATRIX** or **SQ DECODER** positions. This applies the source signal, unchanged, directly to the tape outputs.

To record a discrete 4-channel source on a 2-channel recorder, put the **MODE** Switch in the **2 CH** position. Leave the **TAPE/SOURCE** button in the **SOURCE** (out) position while recording.

This will feed the sum of the left-front and left-rear inputs to the left-front **TAPE MONITOR OUT** jack, and the sum of the right-front and right-rear inputs to the right-front **TAPE MONITOR OUT** jack.

To record any type of source on a monaural recorder, put the **MODE** Switch in the **MONO** position. Leave the **TAPE/SOURCE** button in the **SOURCE** (out) position while recording.

MAIN AND REMOTE SPKR SWITCHES

These switches select the loudspeaker terminals to which audio power is fed. The **MAIN** and **REMOTE** groups of loudspeakers may be operated separately or simultaneously. With both speaker switches in the "out" position, all loudspeakers are disconnected. The signal at the **FRONT** and **REAR HEADPHONE** jacks is not affected by the **MAIN** and **REMOTE SPKR** Switches.

NOTE: When using both **MAIN** and **REMOTE** speakers simultaneously, the combined impedance of all the speakers should not be less than 4 Ohms.

POWER SWITCH

This pushswitch turns the Power on or off. When the **POWER** Switch is "in", the dial lamp illuminates. Be sure to turn the **POWER** pushswitch off before plugging or unplugging the power cord.

FRONT AND REAR PHONES JACKS

These jacks accept a standard 3-conductor phone plug employed with standard stereo or 4-channel headphones. When using 2-channel headphones, insert the plug into the **FRONT PHONES** jack. When using 4-channel headphones, insert the front plug into the **FRONT PHONES** jack and the rear plug into the **REAR PHONES** jack. Either high- or low-impedance headphones may be used.

LOUDNESS

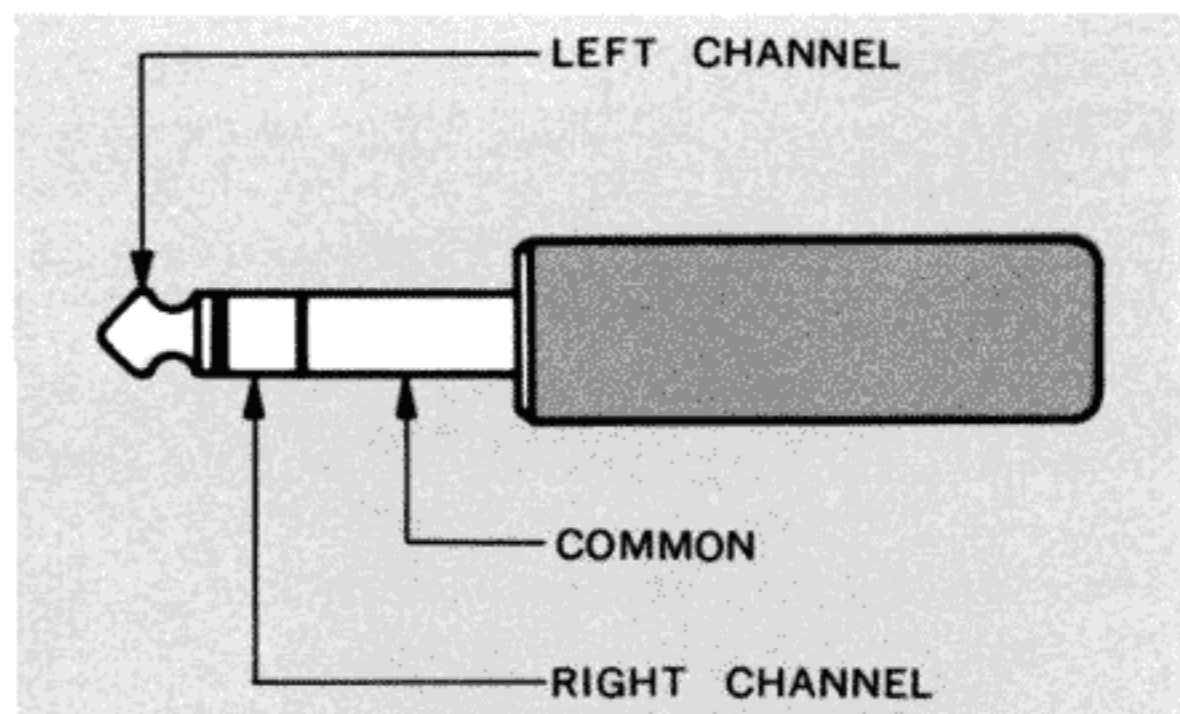
When listening at low levels, set this switch "in". The **LOUDNESS** Switch boosts bass and treble

tones to compensate for the human ear's lack of response to those frequencies at low volume levels.

HI FILTER SWITCH

With this pushswitch set "in", the High Frequency Filter suppresses high frequency noise, such as "scratch" from worn phonograph records and tape "hiss". The filter will also slightly reduce high frequencies in the program material. When the program does not have high frequency noise, the **HI FILTER** pushswitch should be "out".

Figure 10. Stereophone Plug



TUNING METER

The Model 4240 is equipped with two meters, a **SIGNAL-STRENGTH** Meter and an **FM TUNING** Meter. The **SIGNAL-STRENGTH** Meter indicates the signal-strength of any AM or FM broadcast.

The **FM TUNING** Meter operates on FM only and indicates correct station tuning. The **SIGNAL-STRENGTH** Meter acts as a Dolby calibration meter when the **DOLBY** Switch is in any position other than "OFF".

TUNING

AM: For optimum AM reception, tune to the desired station. Then, rock the **TUNING** knob slightly back and forth until the maximum reading is obtained on the **SIGNAL-STRENGTH** Meter. The **FM TUNING** Meter is not used for AM.

FM: Set the **SELECTOR** Switch to "FM" and tune to the desired station. Then, slowly rock the **TUNING** knob back and forth until the **FM TUNING** Meter points to the center scale position.

FM MUTING SWITCH

When tuning to FM broadcasts with the **FM MUTING** Switch in its "in" position, the muting circuit will eliminate interstation noise. To prevent muting of very weak stations along with the noise, the muting function may be turned off by releasing the **FM MUTING** pushswitch to the "out" position.

VOLUME

This control regulates volume of all four channels simultaneously.

DOLBY SWITCH

This switch sets the Dolby noise-reduction circuit for record or playback and also switches the Meter Mode from AM or FM **SIGNAL-STRENGTH** to **DOLBY CAL LEVEL**, or vice-versa. With the **DOLBY** Switch placed in "OFF" position, the Meter will be used as a **SIGNAL-STRENGTH** Meter; in all other positions as a **DOLBY CAL LEVEL METER**.

DOLBY FM: This position is used for listening

to Dolbyized FM broadcasts. The Dolby FM level has been pre-adjusted at the factory.

PLAY: This position is used to play back a Dolbyized source (except FM).

OFF: With this position, the Dolby circuit is by-passed and the input signals are directly applied to both **TAPE MONITOR OUT** jacks and amplifiers.

RECORD I: For making a Dolbyized recording from an in-coming "flat" (non-Dolbyized) signal. When the **MONITOR** Switch is in the **SOURCE** (out) position, the "flat" signal will be heard. When the **MONITOR** Switch is in the **TAPE** (in) position, the Dolbyized signal from the tape will be heard.

RECORD II: For making a "flat" (non-Dolbyized) recording from an in-coming Dolbyized signal. Regardless of the position of the **MONITOR** Switch, a "flat" signal will be heard. Refer to the "Dolby Mode Chart" on page 30.

RECORD LEVEL (L) (R)

These knobs control the record level of the signals

to be recorded through the Dolby unit. Adjust the knobs so that the Level Meter pointers of the tape recorder do not exceed the 0VU level.

PLAY CAL. (L) (R)

These knobs adjust the playback outputs from a tape deck to the proper Dolby level.

400Hz TONE SWITCH

This is used for calibration of the record input level of the tape deck. When the switch is depressed, the built-in oscillator operates and a sine wave signal output of 580mV will be applied to the four **TAPE MONITOR OUT** jacks.

REAR PANEL FEATURES

PHONO JACKS

These two jacks are intended for use with magnetic cartridges requiring a standard 47,000 Ohm resistive load. If a hum is heard when playing a record, try reversing the polarity of the turntable power plug. If this is ineffective, connect a separate ground wire from the turntable or record changer frame to the **CHASSIS GROUND** binding post of the 4240.

CD-4/AUX JACKS

These jacks are for connection of any 4-channel high level equipment source. Manufacturers may use different terminology for the four channels, and care should be exercised to avoid confusing the signal channel terminations. The following are examples of 4-channel nomenclature equivalents:

LEFT FRONT	-LF-LF-	CHANNEL-1	TRACK 1
LEFT REAR	-LR-LB-	CHANNEL-2	TRACK 2
RIGHT FRONT	-RF-RF-	CHANNEL-3	TRACK 3
RIGHT REAR	-RR-RB-	CHANNEL-4	TRACK 4

TAPE MONITOR IN AND TAPE MONITOR OUT JACKS

These jacks are for the connection of a 2-channel or 4-channel tape recorder.
(Refer to "SOURCE DEVICES", page 7.)

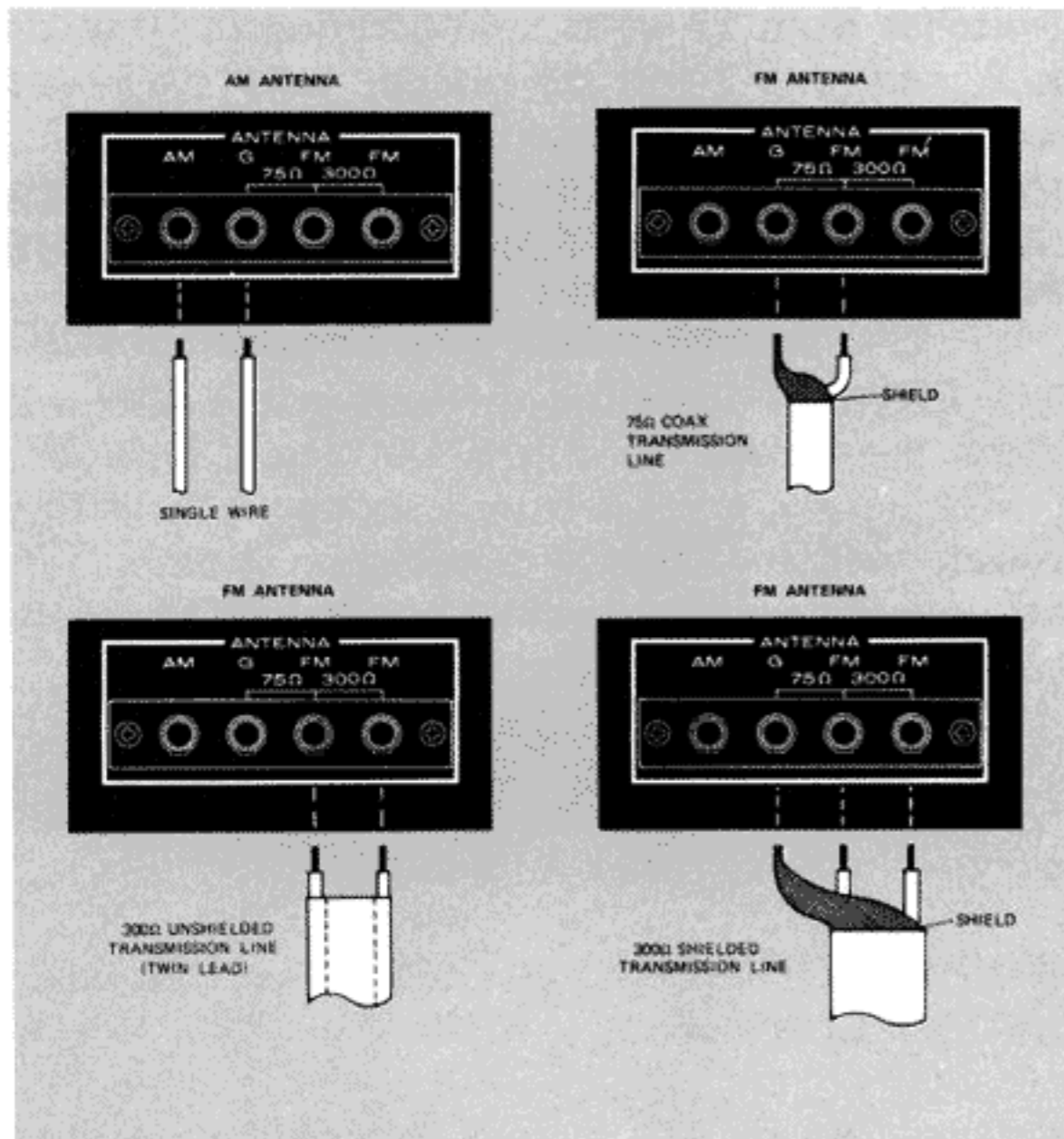
FM ANTENNA TERMINALS

Connect the FM antenna to these terminals. For best FM reception, Marantz recommends a Log-Periodic antenna mounted on a good quality rotor system. For rural areas, it is recommended that a local dealer be consulted about antenna installation and lightning arrestor protection. A master antenna system is not recommended for use with your Model 4240; such systems are usually designed expressly for television reception and frequently suppress FM signals before distribution. In addition, master antenna systems often severely limit quality FM reception. Where outdoor antennas are prohibited or inconvenient,

use a simple form of 300 Ohm TV "rabbit ear" antenna or the simple ribbon-type folded dipole antenna supplied with the 4240. Both are practical and will give satisfactory results in primary signal areas.

Your Model 4240 will accept either a 75 Ohm or 300 Ohm antenna. (See diagram Figure 11.) 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**" terminal, and its inner or center conductor to either of the **FM** terminals.

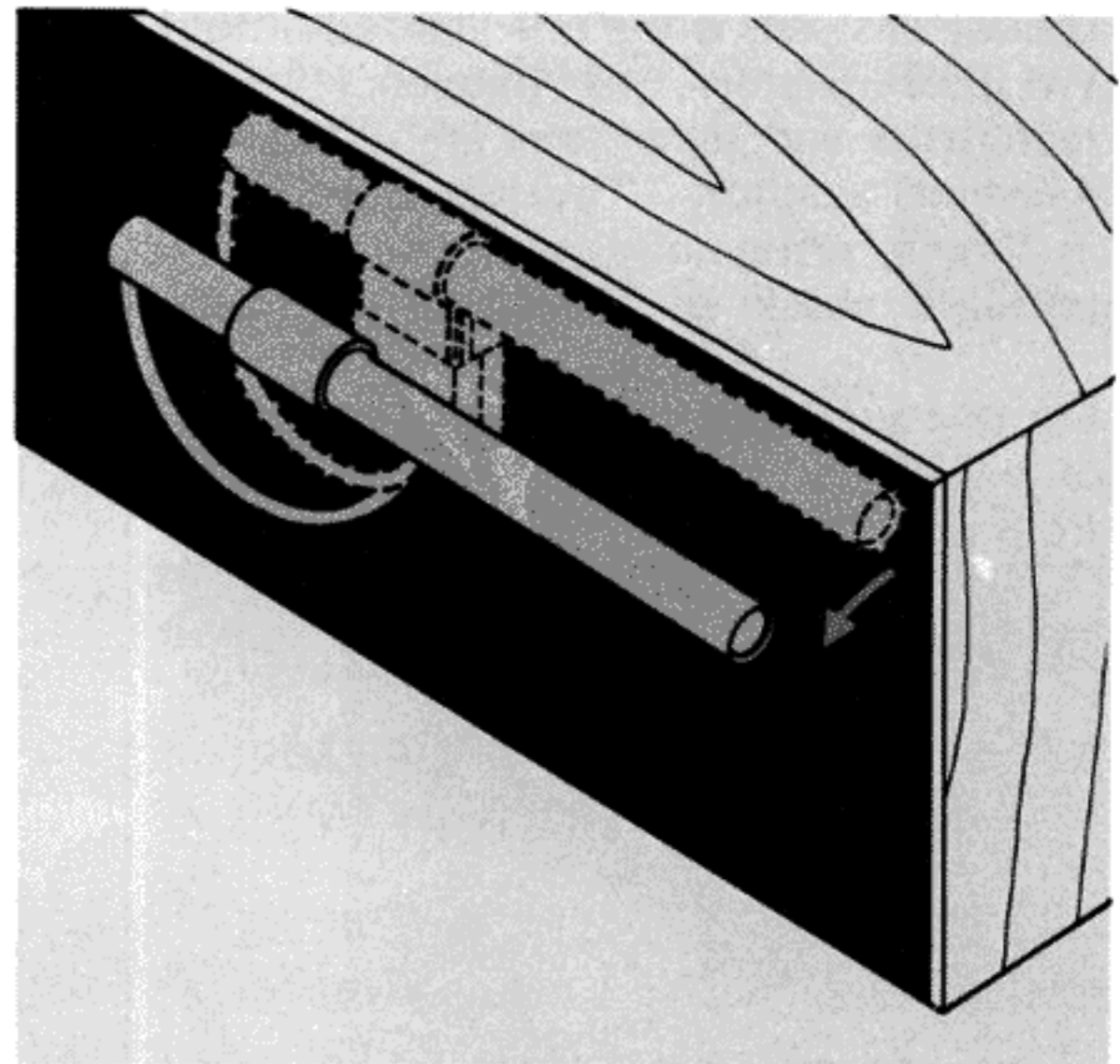
Figure 11. FM/AM Antenna Connections



AM ANTENNA TERMINAL

An external AM antenna can be connected to this terminal. The 4240 is equipped with a ferrite-rod antenna for AM reception and it will give satisfactory results in primary signal areas. However, an outdoor antenna will provide better reception. Two single wires are required to make an AM outdoor antenna. First, connect one end of a single

Figure 12. AM Ferrite-rod Antenna



wire to the **AM ANTENNA** terminal on the rear panel, and the other end at a very high position outdoors. Next, connect the other single wire between the "G" terminal and an earth ground (such as a water pipe).

(Refer to Figure 11, page 20.)

FM QUADRADIAL OUTPUT JACK

In anticipation of discrete 4-channel stereo broadcasts, your Model 4240 is equipped with the **FM QUADRADIAL OUTPUT** jack. The signal available at this jack is the unequalized output of the FM discriminator. Its frequency response characteristics and signal level are ideal to drive any 4-channel adaptor. This jack can also be used as a simple white-noise generator for frequency response check of loudspeakers or amplifiers.

For this application, release **FM MUTING** Switch of the Model 4240 in FM mode and tune off from any FM signal.

FM DE-EMPHASIS SWITCH

Selects **50 μ S** or **25 μ S** **FM DE-EMPHASIS** for accurate reception of Dolbyized FM signals.

DOLBY FM PRESET LEVEL CONTROLS

These factory-adjusted controls govern FM output level to the DOLBY circuit. These controls are for the use of a qualified technician only.

MUTING LEVEL CONTROL

Adjusts the threshold of the interstation muting circuit. Turning this control counter-clockwise will lower the threshold to permit reception of weak signals.

POWER MODE SWITCH

Switches from 17 watts x 4 operation to 40 watts x 2. In the 2-channel mode, only the front speaker terminals are used.

BE CERTAIN THAT THE UNIT'S POWER SWITCH IS OFF BEFORE OPERATING THE POWER MODE SWITCH.

NOTE: When operating the unit in the **40W x 2** mode, all speaker terminals are "above ground". Consequently, the use of any switching or testing system which employs a common ground will activate the limiting circuits and should therefore be avoided.

CHASSIS GROUND BINDING POST

Permits connection of the ground wire from a turntable or other component to reduce hum.

MAIN AND REMOTE SPEAKERS

Sixteen quick-connect terminals are provided — eight for main speakers and eight for remote speakers. (Refer to "CONNECTING THE 4240" page 3 . "REMOTE SPEAKERS", page 7.)

Terminals work as shown in Figure 13 .

- 1) Press the terminal down
- 2) Insert the speaker wire into the hold
- 3) Release pressure on the terminal

CONNECTION TO AC OUTLET

With the front panel **POWER** pushswitch "OUT",

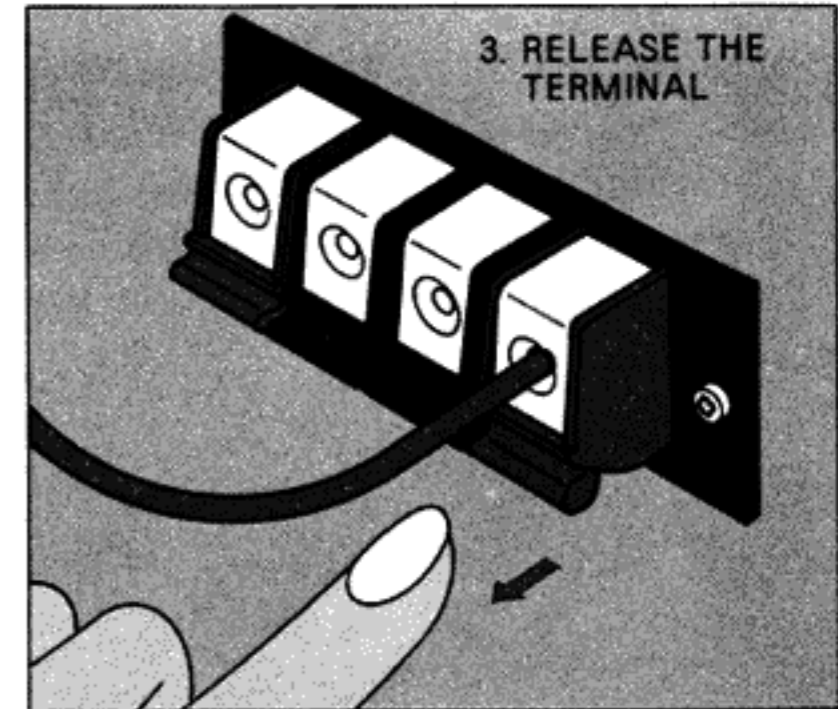
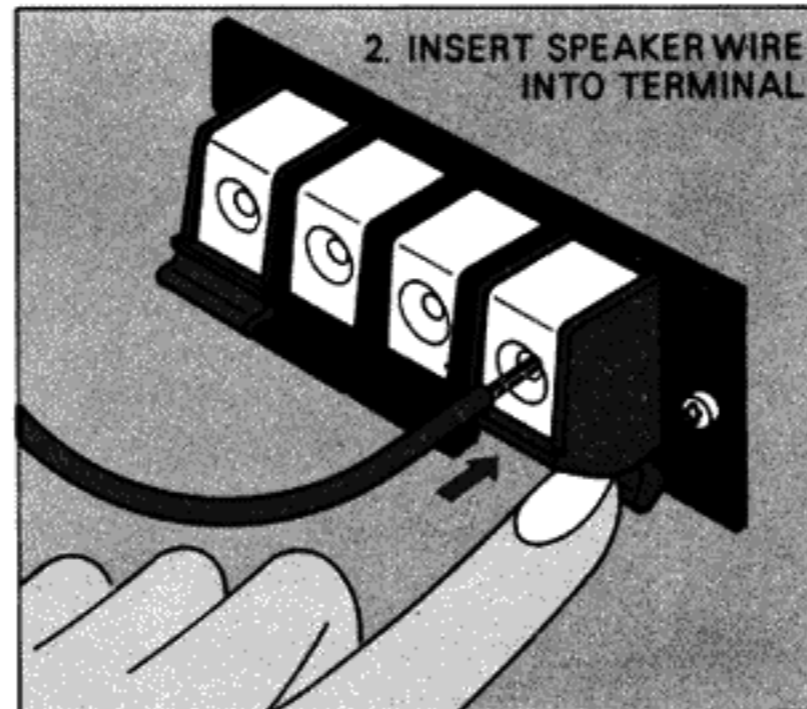
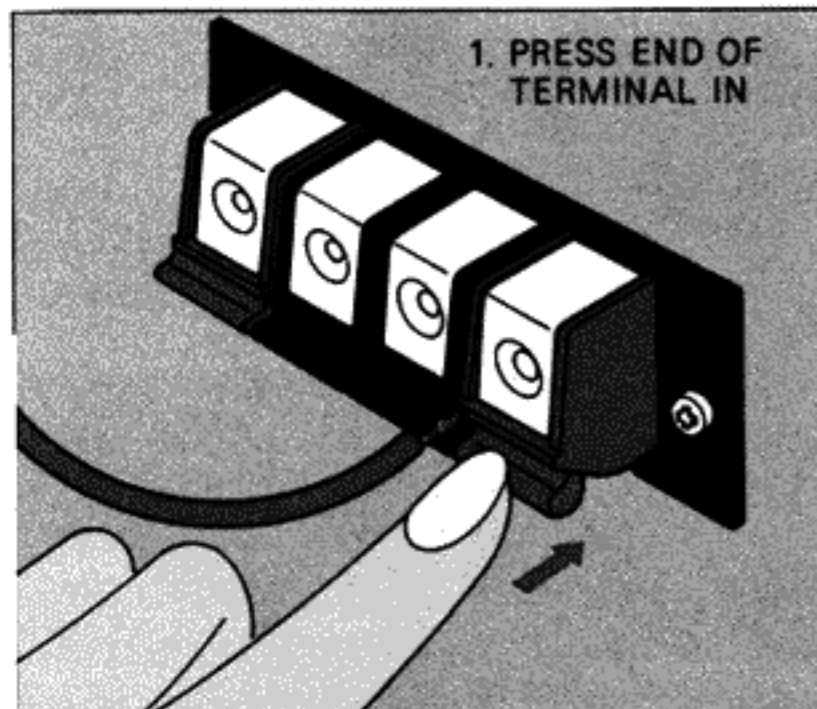
plug the line cord into an electrical outlet supplying the proper voltage.

CAUTION: DO NOT PLUG YOUR MODEL 4240 INTO A DC OUTLET, AS SERIOUS DAMAGE WILL OCCUR.

AC CONVENIENCE OUTLETS

Two AC outlets, one switched and one unswitched, are provided on the rear panel to supply power to associated components of the system (tape recorder, record player, etc.). The maximum power available from the **SWITCHED** and **UNSWITCHED AC OUTLETS** is 60 Watts and 200 Watts, respectively.

Figure 13. Quick-Connect Speaker Terminal



REMOTE CONTROL

The **REMOTE CONTROL** connector and switch are intended for use only with the optional Model RC-4 Remote Control. The **REMOTE CONTROL** Switch assigns control of loudness, balance and volume to the optional RC-4 Remote Control. **WHEN THE RC-4 IS NOT USED, THE REMOTE CONTROL SWITCH MUST BE IN THE LOCAL POSITION.**

EXTERNAL DECODER CONNECTION

A pocket on the bottom of the chassis will accommodate Marantz 4-channel decoders, such as the Model SQA-1. For use, follow the instructions supplied with the optional decoder.

TAPE RECORDING

Instructions for connecting a recorder and playing back a tape are given in "SOURCE DEVICES", page 7.

To record, select the desired program source, using the **SELECTOR** Switch. Put the recorder connected to the **TAPE MONITOR OUT** jacks "1 or 2" in the record mode.

For additional information, refer to **MODE**

SWITCH on page 11, and **MONITOR SWITCH** on page 14.

POWER CONNECTIONS

The Model 4240 is equipped with a universal power transformer to permit operation at any standard AC line voltage and at frequencies of 50/60 Hz. For operation at line voltages other than indicated on the rear panel nameplate, have a qualified technician perform the simple wiring changes necessary.

BASIC DOLBY PROCESS

The Dolby system increases the level of low-level, 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 has already been subjected to the first phase of the noise reduction process before it is transmitted. When these signals pass through the Dolby playback circuitry, the mid- and high-frequency noise, which is an inherent side-effect of FM transmission, is greatly reduced.

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.

The Model 4240 is capable of processing Dolby signals from sources other than a tape recorder (AUX, PHONO, FM, ETC.).

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.
6. Switch off the **400 Hz TONE**.

However, a Dolby recording made on your recorder using the calibrated tape you have just made may not necessarily be compatible with the Dolby circuits in a different recorder or systems.

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

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

PROCEDURE FOR PLAYBACK CALIBRATION

1. Turn on the Model 4240 and your recorder.
2. Set the **DOLBY** function switch on the Model 4240 to the **PLAY** position.
3. If your recorder allows you to monitor the tape while recording, set its **SOURCE/TAPE** Switch to "TAPE".
4. Load the Dolby standard alignment tape or the calibration tape you have made.

5. Play the Dolby Level 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 "OVU". Then proceed to step 9.
8. If neither 6 nor 7 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 4240 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 the settings of your recorder's output level controls or the Model 4240's **PLAY CAL** controls.

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 these 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 4240'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.

For Recorders with Three Heads

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

2. Put the 4240's **DOLBY** Switch in the "**PLAY**" position.
3. Put both the 4240's and the recorder's monitor switches to the "Tape" position.
4. Put the **400Hz TONE** Switch in the "ON" (in) position.
5. Put the recorder in the record mode.
6. Adjust the recorder's record level controls so the tone will deflect the 4240's **SIGNAL-STRENGTH** Meter to the "**DOLBY LEVEL**" mark.
7. Switch off the **400 Hz TONE** .

For Recorders with Two Heads

1. Thread a blank tape onto your recorder (or insert a cassette).
2. Put the 4240's **DOLBY** Switch in the "**OFF**" position.
3. Put the **400Hz TONE** Switch in the "ON" (in) position.

4. Put the recorder in the record mode.
5. Adjust the recorder's record level controls to deflect the recorder's meters to 0VU.
6. Record the tone for approximately 30 seconds.
7. Stop the recorder and rewind it to the beginning of the tone recording.
Switch off the **400 Hz TONE** .
8. Put the 4240's **DOLBY** Switch in the "**PLAY**" position.
9. Put the recorder in the play mode.
10. Note the level reading on the 4240'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 4240's **SIGNAL-STRENGTH** Meter.

11. If the Meter indicates **"DOLBY LEVEL"**, calibration is completed, do not change the position of the record or playback controls.
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 0VU 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 0VU on the recorder's VU Meters.

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 4240's **PLAY CAL** controls.

Utilizing the recorder's VU Meters, proper Dolby recording levels are adjustable by using the **RECORD LEVEL** controls on the front panel of the 4240. This only applies when making a Dolby recording.

CHANGING THE RECORDER'S RECORD OR PLAYBACK LEVELS OR THE 4240'S PLAY

CAL CONTROLS WILL DESTROY THE DOLBY CALIBRATION.

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.

IMPORTANT:

It will be necessary to re-calibrate the Dolby levels when a change in tape speed has been made or when a different brand or type of tape is used.

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 4240's **PLAY CAL** controls.

USE OF THE DOLBY SYSTEM ON FM BROADCASTS

Your Model 4240 is equipped to receive Dolbyized FM broadcasts.

To receive FM broadcasts which are not using the Dolby Noise-Reduction System, leave the **DOLBY** 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** Switch in the "**DOLBY FM**" position. The rear panel **DOLBY FM PRESET LEVEL** controls are factory-adjusted. Do not change the position of these controls.

FM DE-EMPHASIS SWITCH

This rear panel switch operates only when the front panel **DOLBY** Switch is in the "**DOLBY FM**" position. It alters the frequency response of the FM signal. Normally, this switch should be left in the **50 μ S** position. However, if the

Table 1. Dolby Mode Chart

Input / Operating Mode	De-Emphasis switch position	Dolby Switch Position			Notes:
		Listening	Record		
			Without Dolby	With Dolby	
F.M. (Normal)	50 μ s	"Off"	"Off"	"Record I"	—
F.M. with Dolby 50 μ s Pre-emphasis	50 μ s	"Dolby FM"	"Record II"	"Dolby FM"	If there is a doubt regarding the pre-emphasis used on the transmission, the F.M. station should be contacted, where possible, to ensure correct position for de-emphasis switch.
F.M. with Dolby 25 μ s Pre-emphasis	25 μ s	"Dolby FM"	"Record II"	"Dolby FM"	
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"	

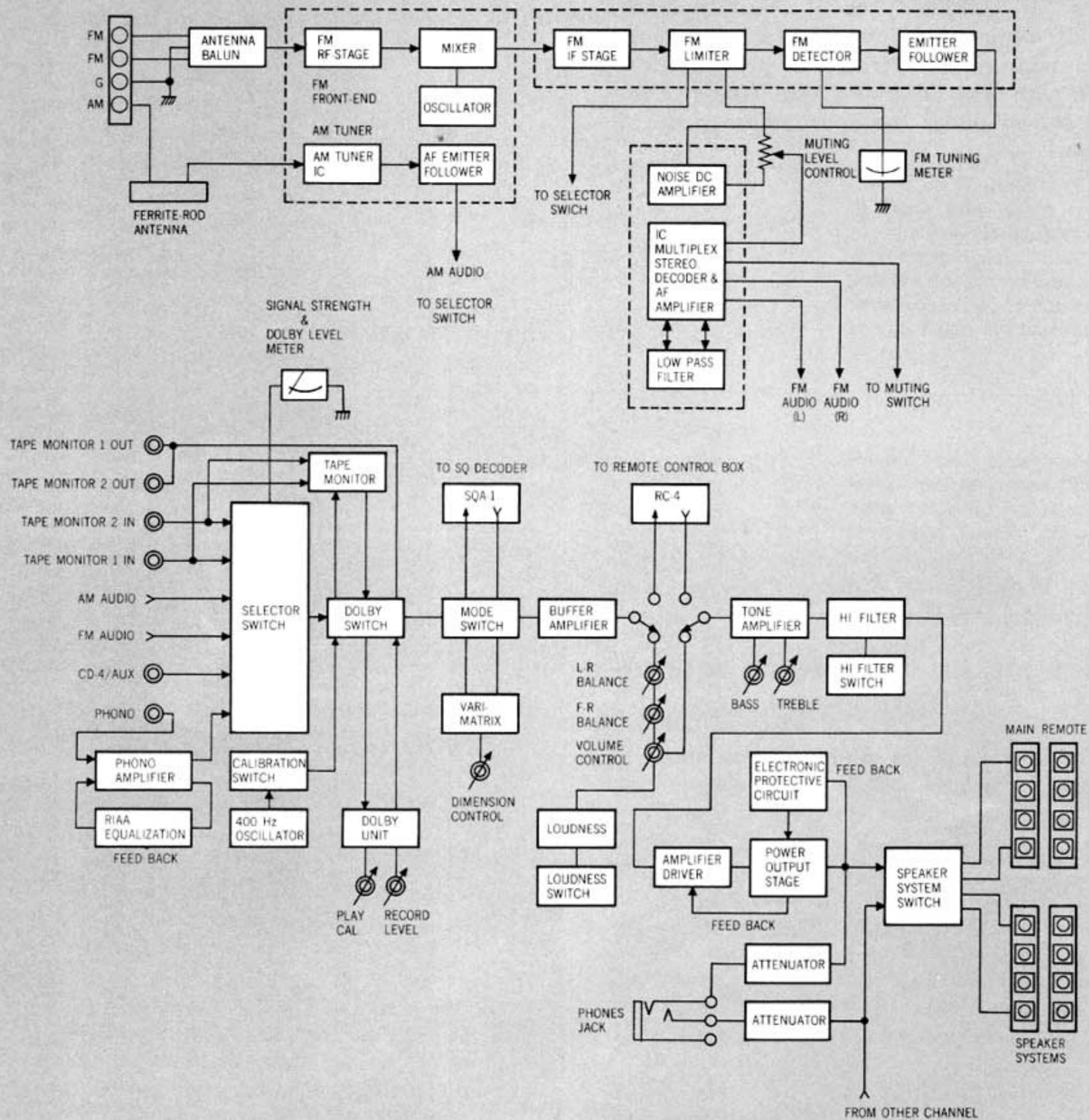
For initial calibration, utilizing the Dolby standard alignment tape, see detailed instructions on Pages 24 thru 30 of this manual.

station is broadcasting the Dolbyized signal using a $25\mu\text{S}$ pre-emphasis, put this switch in the " $25\mu\text{S}$ " position to obtain flat FM frequency response. If in doubt, call the station.

EXPLANATION OF THE DOLBY MODE CHART

This chart indicates the correct **DOLBY** Switch positions for various types of input material. The input format is indicated in the left column and the appropriate **DOLBY** Switch position, together with **FM DE-EMPHASIS** Switch position, is shown under the appropriate mode of operation.

Figure 14. Simplified Block Diagram



TECHNICAL DESCRIPTION

GENERAL

Figure 14 is a block diagram of the model 4240 Stereo 2 + Quadradius 4 Receiver showing main functional elements and input and output signal routing. For simplicity, only a single audio channel is shown; other channels are identical. **PHONO INPUT** jacks are provided for the front pair of channels.

FUNCTIONAL DESCRIPTION

FRONT END

FM antenna signals are applied through a balun transformer to the antenna coil which drives a field-effect transistor RF amplifier. The signals from the RF amplifier are fed through the double-tuned RF tank circuit to the Mixer stage, which is also fed by the signal generated by a local oscillator. This mixer converts the carrier frequency to the 10.7 MHz intermediate frequency.

FRONT END

FM antenna signals are applied through a balun transformer to the antenna coil which drives a field-effect transistor RF amplifier. The signals from the RF amplifier are fed through the double-tuned RF tank circuit to the Mixer stage, which is also fed by the signal generated by a local oscillator. This mixer converts the carrier frequency to the 10.7 MHz intermediate frequency. Careful attention to its thermal and electrical characteristics has minimized drift, thus obviating the necessity for AFC. The 10.7 MHz converted signal is then fed to a phase-linear ceramic IF filter, followed by the limiter. It is then, in turn, processed through an FM discriminator. The output of the FM discriminator is fed to a buffer amplifier which then drives the demodulator.

IF STAGES

The IF section consists of six transistors and three pieces of dual elements ceramic filters. The characteristics of this filter are ideal in that the 200KHz passband is phase-linear, with sharp cutoff slopes. Its exceptional phase linearity assures the elimination of a major source of high-

frequency distortion and a loss of stereo separation. The sharp cut-off slopes provide improved selectivity, permitting reception of closely spaced channels.

LIMITER

The Model 4240 utilizes symmetrical diode limiter circuits consisting of high-performance Gold Bond Hot Carrier type diodes and IF limiter amplifier with a very small dynamic symmetrical aperture, eliminating the need for AGC circuit which introduces low frequency distortion. Undesirable amplitude Modulation (AM signals, AM noise, AM distortion) are removed from the IF signal within the limiter.

FM STEREO DEMODULATOR

The composite signal from the buffer amplifier is fed into the multiplex stereo discriminator, which is composed of fully integrated circuits, with the exception of the circuit containing the inductor and capacitor.

This integrated circuit is equipped with a lamp display circuit for stereo operation and a buffer amplifier to obtain the low impedance output.

To insure stability, reliability and high degree of separation, this stereo discriminator employs an air-tight coil integral with the inductor and capacitor.

The multiplex stereo discriminator circuit is equipped with a separate automatic Stereo/Monaural switching circuit. The circuit checks the input signal intensity, actuates the stereo discriminator and stereo indicator lamp automatically only 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 insure reception with a high quality signal-to-noise ratio.

MUTING CIRCUIT

In the absence of an FM carrier, all FM receivers produce inherent noise. The muting circuit eliminates this noise, providing you with 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 4240. The muting circuit perfectly mutes out all the interstation noise and also com-

pletely mutes out the side slope spurious response of the unit. The circuit has been designed to minimize annoying "pop" noise for velvet smooth tune in and tune out.

AM TUNER

The AM tuner portion of the Model 4240 has been provided with a tuned RF amplifier incorporating a three-section variable capacitor for improved spurious response ratio.

The ceramic filter utilized in the AM IF amplifier comes with higher selectivity and wider bandwidth for interference-free hi-fi AM reception.

Following the AM IF amplifier, the AM detector recovers the audio modulation and provides 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 constant the level of all stations in the AM band.

An advanced AM tuner integrated circuits has been utilized for the AM tuner portion of the Model 4240.

PHONO AMPLIFIERS

These amplifiers permit phono signals of up to 100 millivolts to be handled without overloading. The RIAA equalization network provides precise equalization and sets the phono preamplifier voltage gain to 37dB (at 1,000Hz).

Figure 17 shows the RIAA reproducing characteristics together with the recording characteristic. The net result after playback is a flat frequency response.

SELECTOR SWITCH

The **SELECTOR** Switch selects the program source for listening or recording. The Model 4240 has four sets of input jacks: **PHONO**, **CD-4/AUX**, **TAPE MONITOR 1** and **TAPE MONITOR 2**. Any discrete 4-channel program source can be connected to the **CD-4/AUX** jacks. The input sensitivity for each set of input jacks is 2.2 millivolts at **PHONO**, and 150 millivolts at **CD-4/AUX**, **TAPE MONITOR 1** and **TAPE MONITOR 2**. The **SELECTOR** Switch outputs are fed through the **DOLBY** Switch and **TAPE MONITOR OUT** jacks to the **MODE** Switch.

MONITOR (TAPE/SOURCE) SWITCH

When the **MONITOR (TAPE/SOURCE)** push-switch is in the "out" position, the selector switch outputs are fed through the **DOLBY** Switch to the **MODE** Switch. When the **MONITOR (TAPE/SOURCE)** Switch is depressed, the input signals from the **TAPE MONITOR (1 or 2)** jacks are fed to the **DOLBY** Switch.

MONITOR (TAPE 1 or 2) SWITCH

This switch selects between the **TAPE MONITOR 1** or **2** jacks on the rear panel. Depressing the switch selects input signal connected to the **TAPE MONITOR 2 IN** jacks and releasing the switch (out position) **TAPE MONITOR 1 IN** jacks.

TONE CONTROL

After volume level control, each channel program source is fed into the tone control network. The network uses two-stage direct-coupled NPN and PNP configuration at the input stage for the high-impedance termination of the volume control output and low driving impedance to the R-C feed back type tone control network. Each

signal adjusted for bass and treble in the tone control network is amplified in two-stage direct-coupled NPN and PNP configuration and is delivered through a **HI FILTER** Switch to the main amplifier section. The driving impedance to the high filter section is satisfactorily reduced by NFB.

Figure 18 shows the frequency response curves for maximum boost and cut for each control.

POWER AMPLIFIER

Four power amplifiers are incorporated for driving left-front, left-rear, right-front and right-rear speakers. Each of these amplifiers includes pre-amplifier, driver, electronic protective, and output circuits. These amplifiers consist of four totally direct-coupled and differential amplifiers to provide superior dynamic characteristics, the frequency response and satisfactory D.C. stability. The output stage employs eight high current, high voltage, triple-diffused silicon output transistors having superior linearity and sufficient collector dispersion margin arranged in a quasi-complimentary Darlington format.

Figure 19 shows the distortion factor-to-output characteristics of the Model 4240.

Figure 20 is the frequency response.

DRIVER STAGE

This stage incorporates a pair of push-pull, complementary-symmetry transistors (PNP, NPN). The electronic protective circuit comprised of two transistors and four diodes for each channel, senses the peak output current and limits the current to the driver transistors at a safe, predetermined value. This limiting current protects the driver and output transistors under over-drive and short circuit conditions and effectively prevents the driver and output transistor from exceeding safe operating conditions.

Figure 15. FM Characteristics

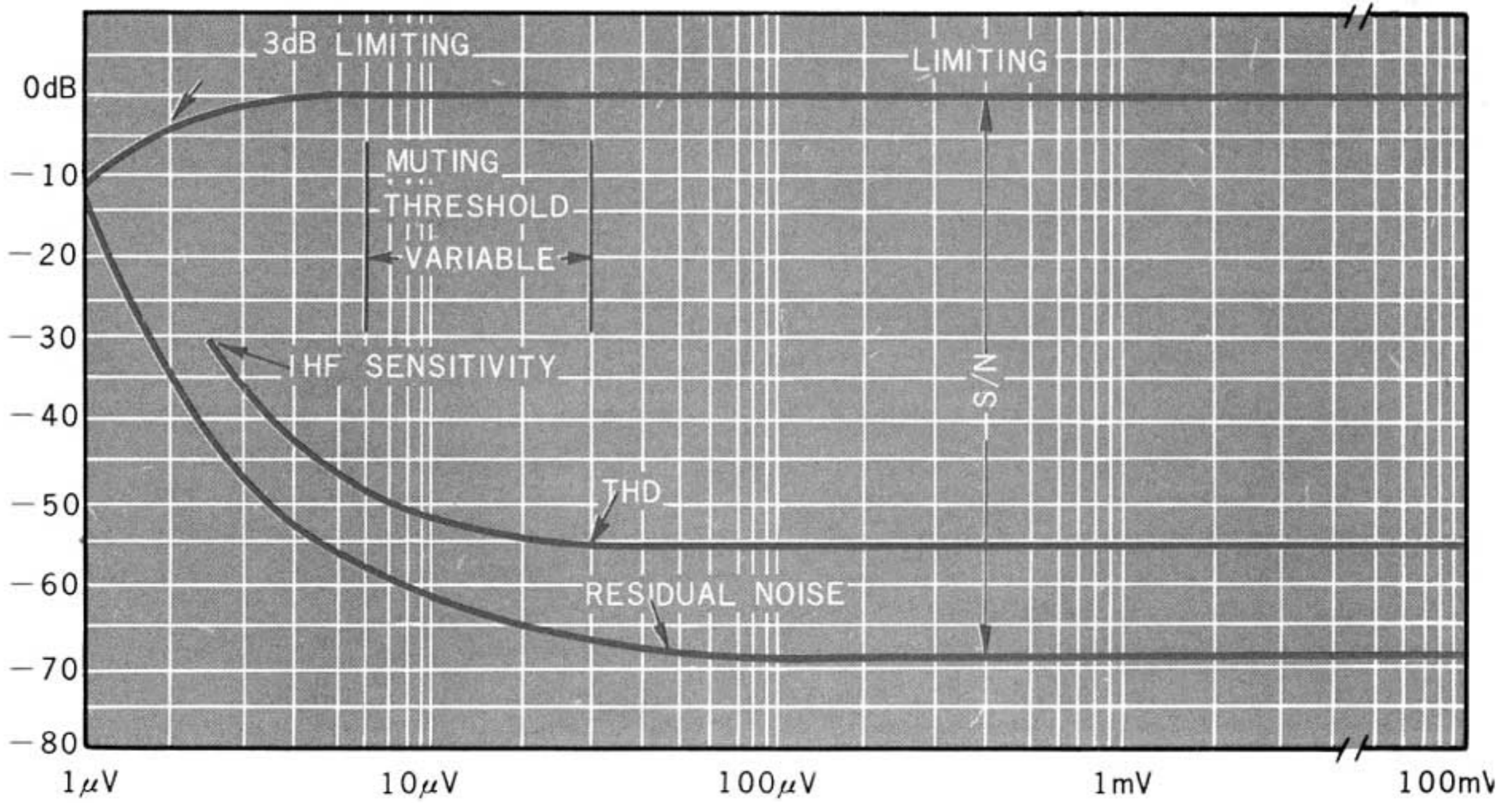


Figure 16. Stereo Separation

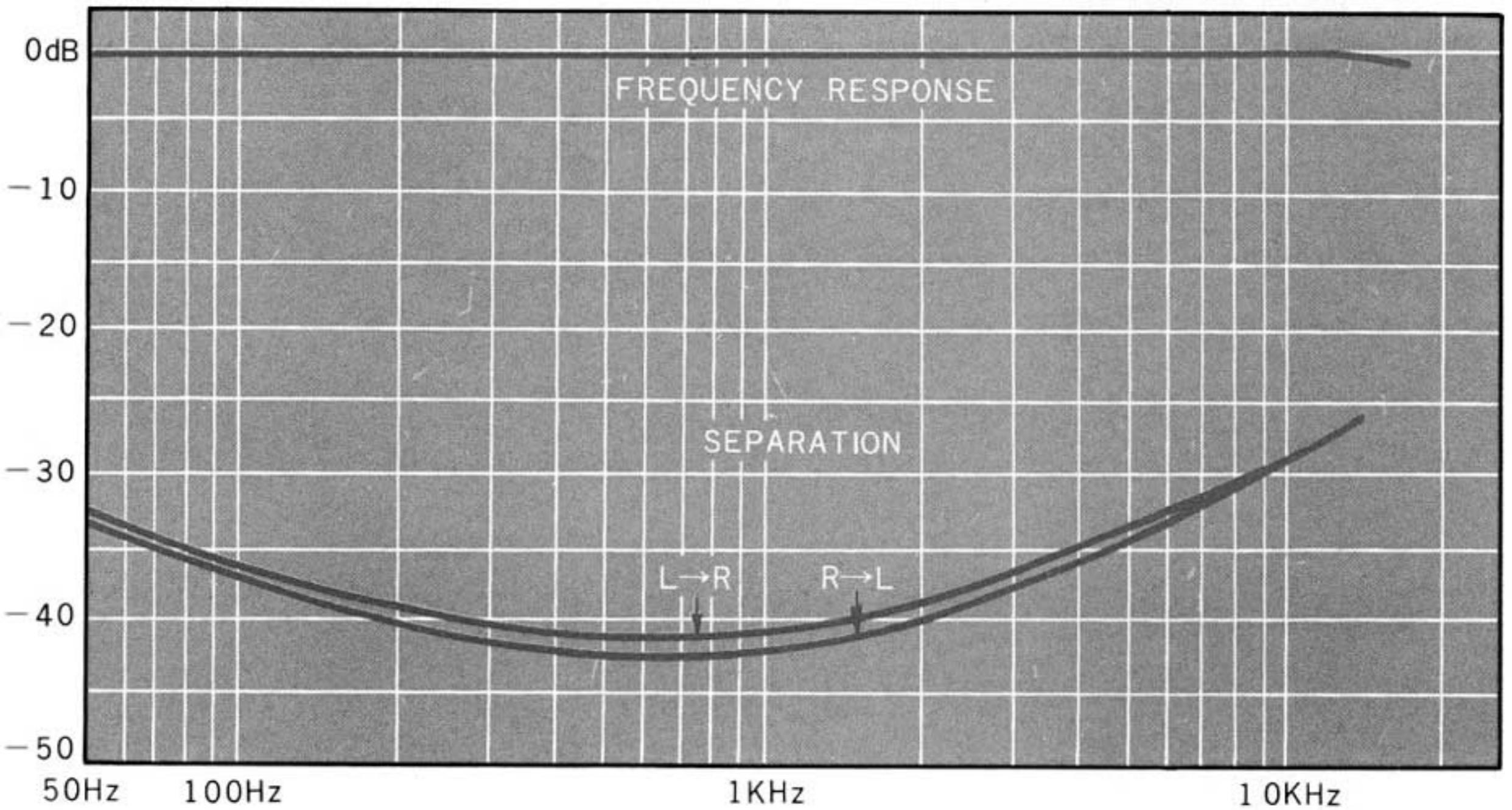


Figure 17. Phono Equalization Characteristics

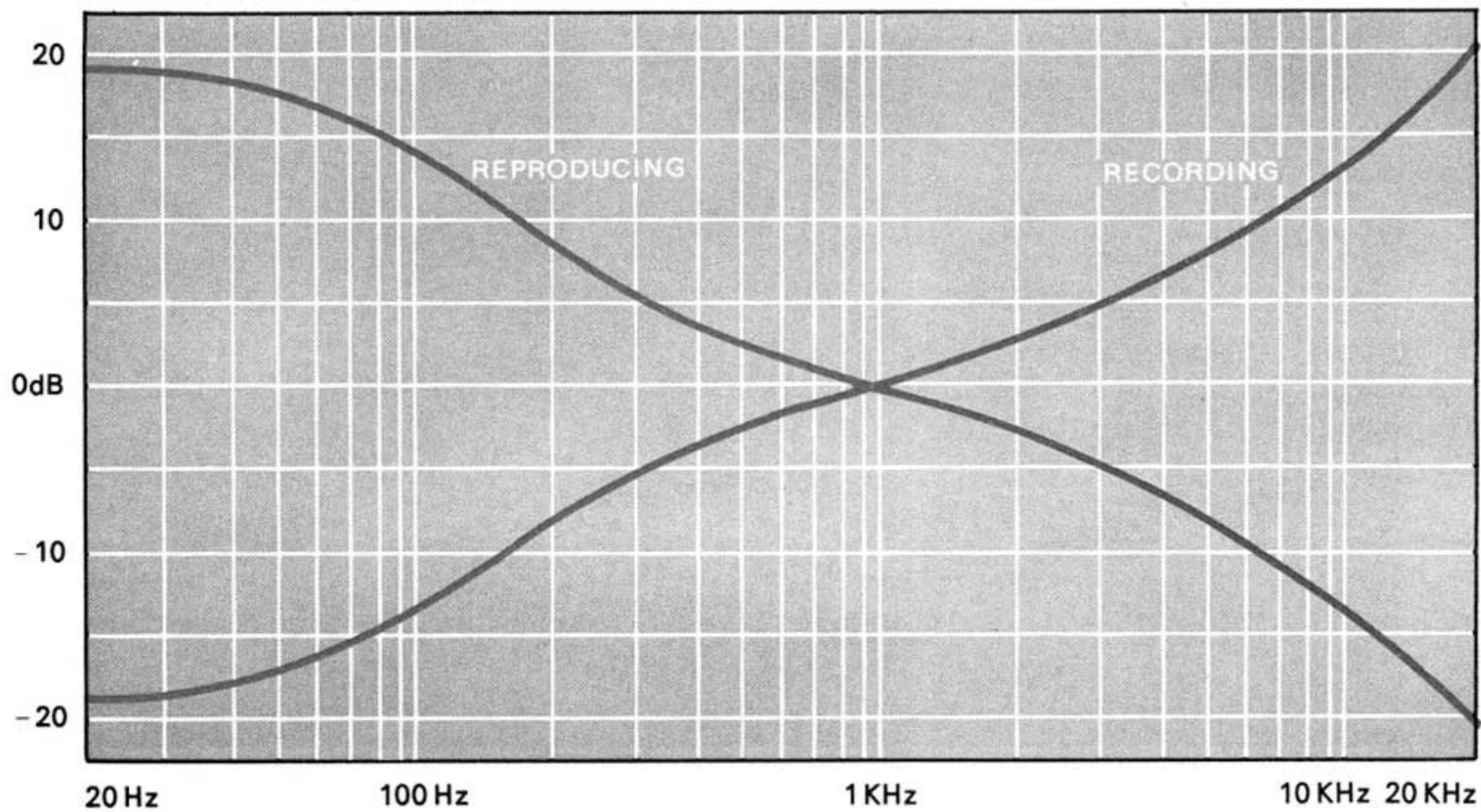


Figure 18. Tone Control Characteristics

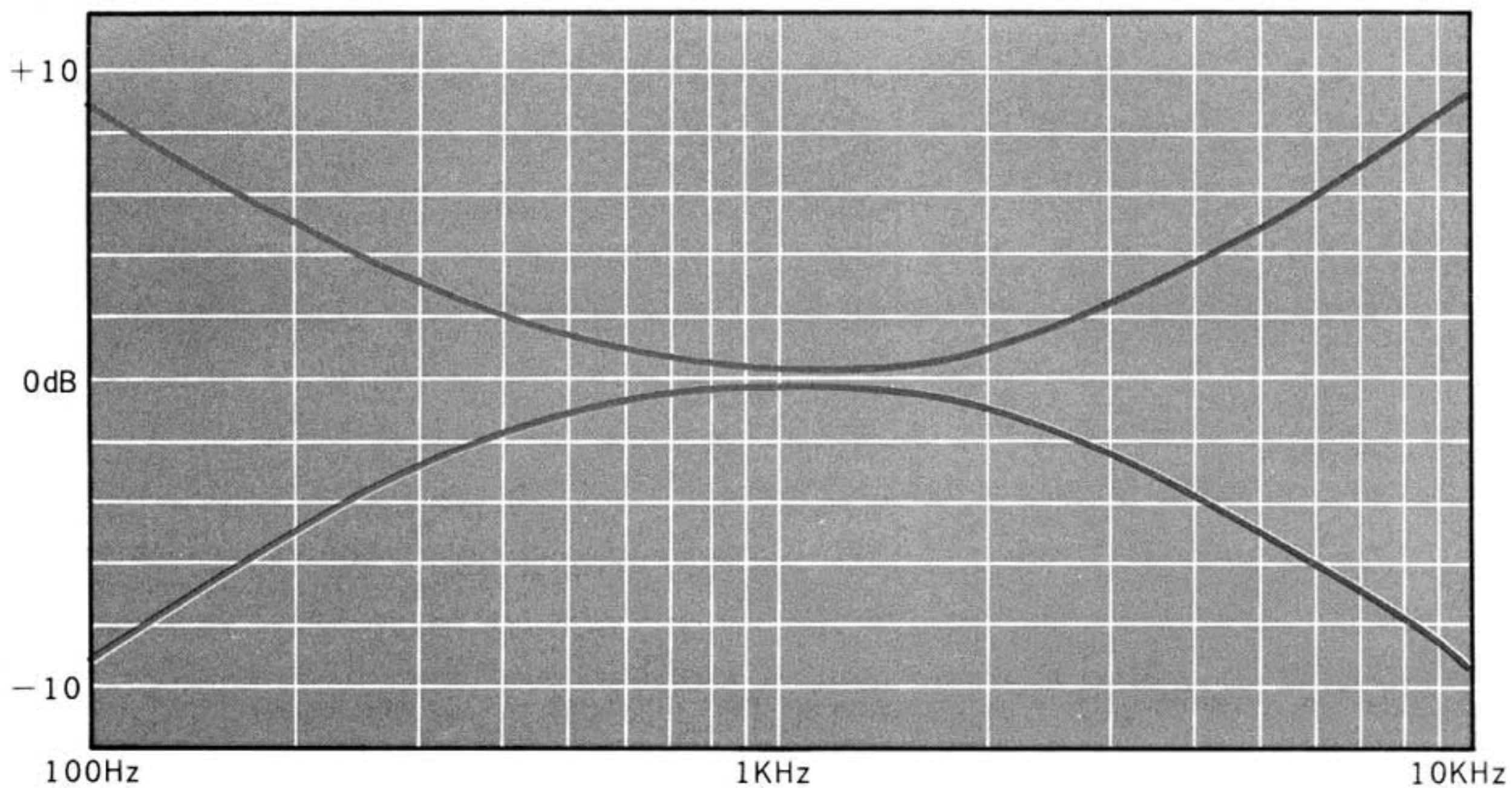


Figure 19. Harmonic Distortion

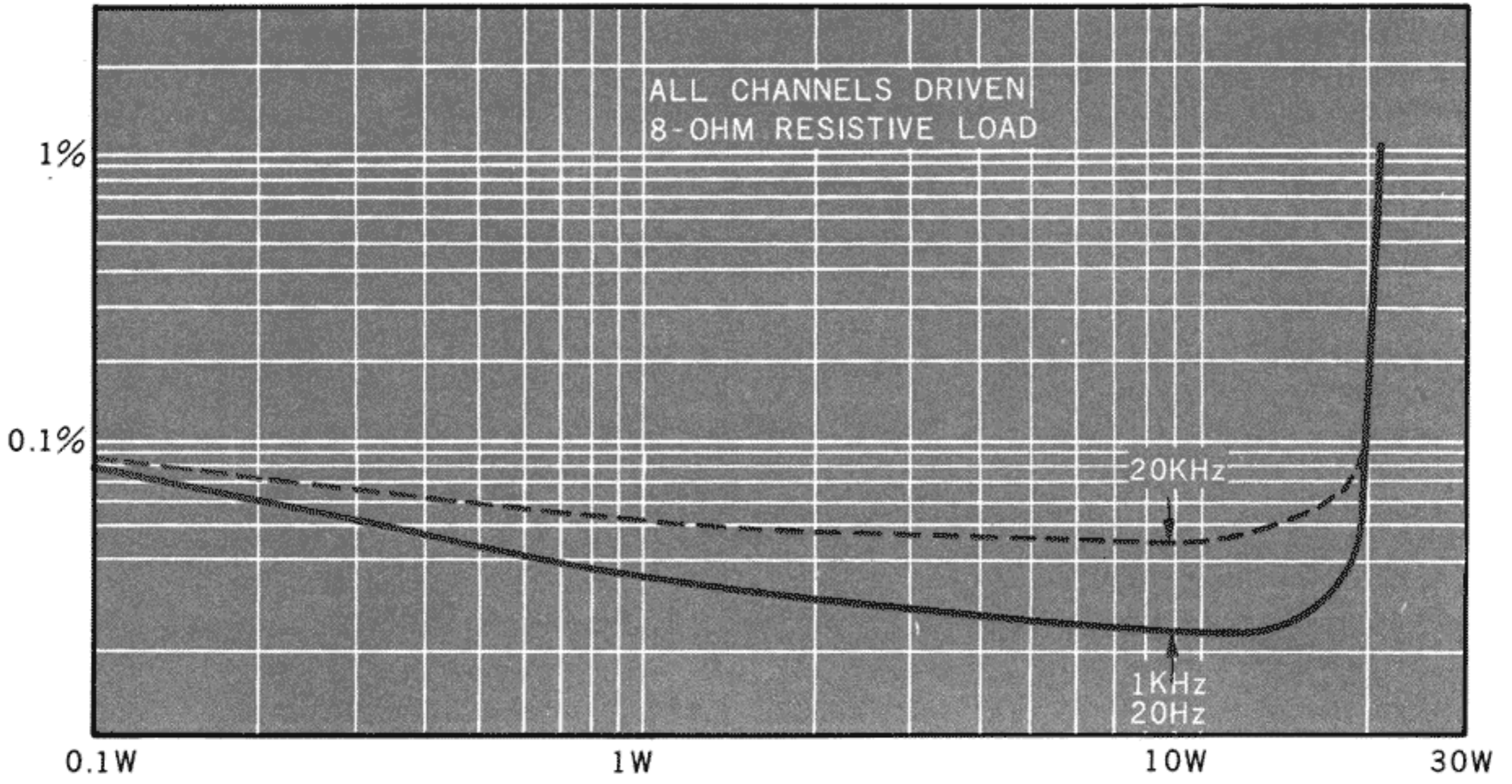
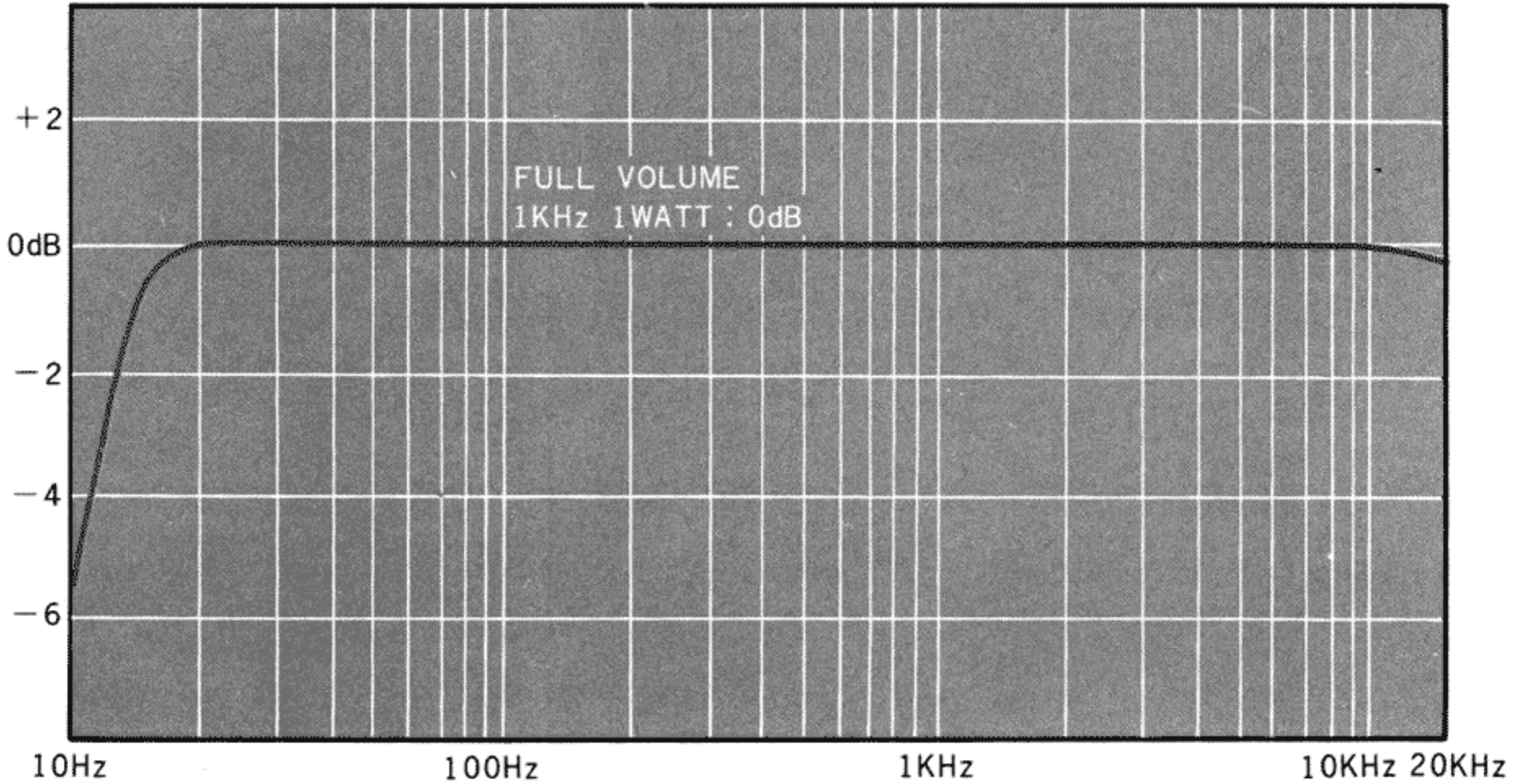


Figure 20. Frequency Response



TECHNICAL SPECIFICATIONS

FM SECTION

Tuning Frequency Range	88 — 108MHz
IHF M Usable Sensitivity	2.2 μ V at 30dB, 50 μ V at 70dB
IHF Selectivity	60dB
Capture Ratio	1.5dB
Image Rejection Ratio at 106MHz	more than 60dB
Total Harmonic Distortion (Mono)	0.3%
Total Harmonic Distortion (Stereo)	0.4%
Frequency Response (ref. 50 μ sec. de-emphasis)	\pm 1dB, from 30Hz to 15KHz
Stereo Separation at 1KHz	40dB, 30dB at 15KHz
Quadrantal Output (400Hz 75KHz dev.)	300mV, 15Kohms

AM SECTION

Tuning Frequency Range	540 to 1605KHz
Usable Sensitivity	20 μ V or less
Selectivity	1000KHz, 30dB
Image Rejection Ratio at 1400KHz	better than 60dB
Bandwidth (at -6dB)	7KHz

AUDIO SECTION

Input Sensitivity and Impedance — Phono	2.2mV, 47Kohms
— High level	150mV

Phono Frequency Response	30 to 15KHz, ± 1 dB (RIAA)
Intermodulation Distortion below rated power output (SMPTE)	Less than 0.5%, Nominal 0.3%
Damping Factor	2 channel: 20 at 20Hz 4 channel: 40 at 20Hz
Total Noise-from magnetic phono input to power amp output	93dB at Phono, less than $1.7\mu V$ equivalent input noise
Rated Continuous (RMS) Output all channels operating simultaneously at 40Hz to 20KHz for nominal harmonic distortion	80W at 8ohms (40W x 2) 68W at 8ohms (17W x 4)

GENERAL

Power Requirements	110, 120, 220, 240V A.C., 50/60Hz
Power Consumption— at maximum power output	270Watts
— idling (no signal)	40Watts
Dimensions — Panel Width	440mm (17-21/64)"
— Panel Height	137mm (5-25/64)"
— Depth	365mm (14-3/8)"
— Width (Packed for Shipment)	565mm (22-1/4)"
— Height (Packed for Shipment)	267mm (10-1/2)"
— Depth (Packed for Shipment)	495mm (19-1/2)"
Weight — Unit alone	15.5Kg (34.1 lbs)
— Packed for Shipment	19.5Kg (43.1 lbs)

* These specifications and exterior designs may be changed for improvement without advance notice.

INSTALLATION OF WALNUT CABINET

The optional walnut cabinet may be installed in the following manner.

If you have an optional plug-in decoder, un-plug it from the chassis. If you do not have an optional plug-in decoder, remove the cover plate from the bottom of the chassis by removing the four screws. Place the rear end of the Marantz unit into the front end of the walnut cabinet and slide it into place.

Using the four screws supplied with the walnut cabinet, pass each screw through each of the supplied rubber feet and screw them into the holes provided.

If you have an optional plug-in decoder, install it at this time by plugging it into the Marantz unit, passing it through the walnut cabinet's cutout.

If you do not have an optional plug-in decoder, replace the metal plate in the same manner and tighten with screws.

SERVICE NOTES

REPAIRS

Only the most competent and qualified service technicians should be allowed to service the Marantz Model 4240 Stereo 2 + Quadradial 4 Receiver. The Marantz Company and its warranty station personnel have the knowledge and special equipment needed for the repair and calibration of this precision instrument.

In the event of difficulty, write directly to the factory (to the attention of the **technical service department**) for the name and address of the nearest Marantz warranty or authorized service station. Please include the model and serial number of the unit together with a description of the problem.

If it should ever be necessary to ship the unit to the factory or authorized service station and your receiver is mounted in its accessory walnut cabinet, **ALWAYS REMOVE THE CABINET BEFORE PACKING. DO NOT SHIP THE ACCESSORY WALNUT CABINET.** Pack the unit carefully, using the original packing material. If the packing material has been discarded, lost,

or damaged, write to the factory (to the attention of the **technical service department**) for new packing material. Carton, fillers, and packing instructions will be shipped to you at a nominal charge.

No receiver should be returned to the factory without an Authorized Return Label which the Marantz Company will supply if the description of difficulties appears to warrant factory service. Please Pack the Receiver as Illustrated.

CAUTION

Please **DO NOT** ship your receiver mounted in its accessory walnut cabinet.

Insure the receiver for full value:

Make sure that your correct return address is on the shipping label.

Ship via a reputable carrier (**DO NOT USE PARCEL POST**). Be sure to obtain receipt from the carrier.

Figure 21. Packing Instructions

