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**marantz®**

**Model 4400  
Stereo 2 + Quadradial 4  
Receiver**

MARANTZ CO., INC. · P.O. BOX 99 · SUN VALLEY, CALIFORNIA · 91352  
A WHOLLY-OWNED SUBSIDIARY OF SUPERSCOPE INC., SUN VALLEY, CALIFORNIA 91352



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# GENERAL DESCRIPTION

Your Marantz Model 4400 is a high-quality Stereo 2+Quadradial 4 Receiver developed by Marantz, a name famous for quality in the audio component industry. The Model 4400 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 4400 will also reproduce any discrete 4-Channel program as well as regular stereo and monaural programs. An optional plug-in decoder adapts the 4400 for any specific matrix system, such as Columbia's SQ.

The FM tuner section employs an FET for the RF Amplifier and MIXER stage. The IF tuning circuit employs ceramic filters of wide bandwidth and high selectivity to provide unparalleled interference-free operation. The 4400 incorporates a full-process, 2-Channel DOLBY System to reduce noise, inherent in recording.

The FM multiplex circuitry includes a phase locked loop, Stereo-Monaural Automatic switching circuit, stereo indicator circuit and a buffer amplifier to obtain output at low impedance. Low pass filters for 19kHz and 38kHz rejection are incorporated. Moreover, the Model 4400 unit has a muting circuit that completely eliminates inter-station interference.

# FOREWORD

To obtain optimum performance and enjoyment from the Model 4400, 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 4400 in more technical detail.

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 22 for packing instructions). Please inspect your Model 4400 carefully for any signs of damage in transit. It has undergone stringent quality control inspections 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.



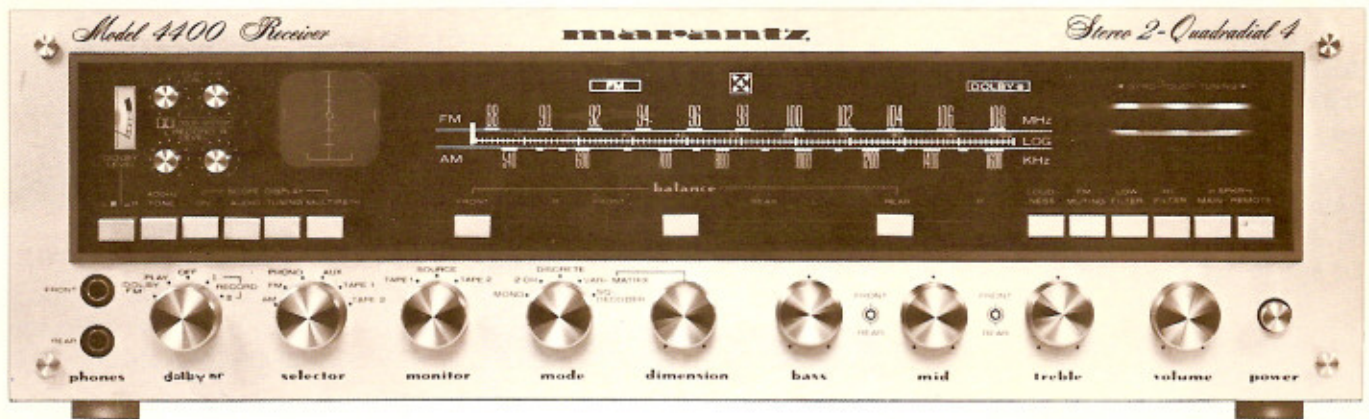


Figure 1. Front Panel Controls And Jacks

## CONNECTING THE 4400

The 4400 can be used as a stereo or 4-Channel Receiver. When using the 4400 as a stereo unit, the **POWER MODE** Switch on the rear panel should be placed in the **120Wx2** 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.

- Using a balanced and shielded 300 Ohm cable, connect an FM antenna to the 4400 as shown in Figure 9.
- Using No. 18, or heavier, lamp cord (zip cord), connect main speakers to the 4400 as follows:

<b>LEFT FRONT SPEAKER</b>	<b>4400</b>
- or GND or NEG or COMM or 0	to MAIN SPEAKERS FRONT L -
+ or HOT or POS or 1	to MAIN SPEAKERS FRONT L+
<b>RIGHT FRONT SPEAKERS</b>	<b>4400</b>
- or GND or NEG or COMM or 0	to MAIN SPEAKERS FRONT R-
+ or HOT or POS or 2	to MAIN SPEAKERS FRONT R+
<b>LEFT REAR SPEAKER</b>	<b>4400</b>
- or GND or NEG or COMM or 0	to MAIN SPEAKERS REAR L-
+ or HOT or POS or 1	to MAIN SPEAKERS REAR L+

<b>RIGHT REAR SPEAKER</b>	<b>4400</b>
- or GND or NEG or COMM or 0	to MAIN SPEAKERS REAR R-
+ or HOT or POS or 2	to MAIN SPEAKERS REAR R+

**NOTE:** When operating the unit in the 120W 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. Also, when using the 4400 in the 120W x 2 mode, do not use 4 Ohm speakers—use 8 Ohms or higher.

- Using shielded audio cables with phono plugs, connect your record player to the 4400 as follows:

<b>RECORD PLAYER</b>	<b>4400</b>
LEFT OUTPUT	to PHONO L
RIGHT OUTPUT	to PHONO R

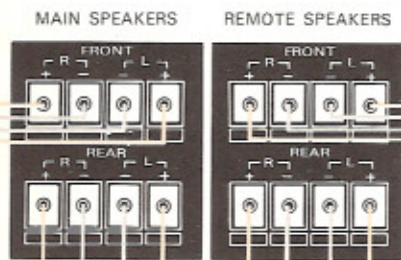
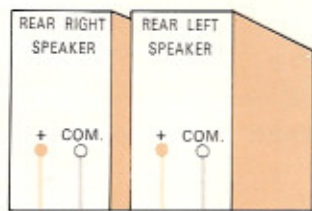
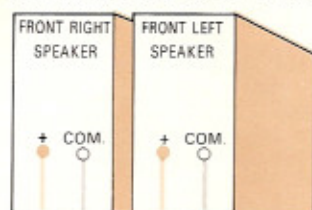
- If a discrete 4-Channel playback device (Q-8 cartridge player, 4-Channel reel-to-reel player, CD-4 discrete disc demodulator, etc.) is to be connected to the system, make connections between the device and the 4400 using shielded audio cables with phono plugs.

### DISCRETE 4-CHANNEL PLAYBACK DEVICE

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



CONNECTION DIAGRAM OF MAIN SPEAKERS SYSTEM



CONNECTION DIAGRAM OF REMOTE SPEAKERS SYSTEM

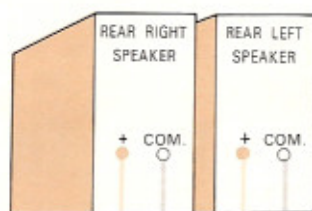
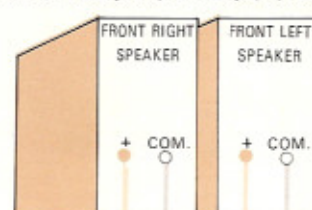


Figure 2. Louds Speaker System Connections

RIGHT-FRONT or RF or CHANNEL 3 or TRACK 3 to FRONT CD-4/AUX R

RIGHT-REAR RR or CHANNEL 4 or TRACK 4 to REAR CD-4/AUX R

5. Using shielded audio cables with phono plugs, connect a discrete 4-Channel tape recorder to the 4400 as follows:

DISCRETE 4-CHANNEL TAPE RECORDER 4400

LEFT-FRONT OUTPUT or LINE OUT to FRONT TAPE IN L

LEFT-REAR OUTPUT or LINE OUT to REAR TAPE IN L

RIGHT-FRONT OUTPUT or LINE OUT to FRONT TAPE IN R

RIGHT-REAR OUTPUT or LINE OUT to REAR TAPE IN R

LEFT-FRONT INPUT or LINE IN to FRONT TAPE OUT L

LEFT-REAR INPUT or LINE IN to REAR TAPE OUT L

RIGHT-FRONT INPUT or LINE IN to FRONT TAPE OUT R

RIGHT-REAR INPUT or LINE IN to REAR TAPE OUT R

6. Pull the AM ferrite-rod antenna out as shown in Figure 10.

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, MIDRANGE and TREBLE	Mid position
VOLUME	Minimum (fully counter-clockwise)

MAIN SPKR	ON (in)
REMOTE SPKR	OFF (out)
MUTING	ON (in)
MONITOR SWITCH	SOURCE
HI FILTER	OFF (out)
LOW FILTER	OFF (out)
LOUDNESS	OFF (out)
DOLBY NR	OFF
400Hz TONE	OFF (out)
POWER	OFF (out)
SCOPE DISPLAY	OFF (out)

8. Plug the 4400 into the AC wall outlet.  
9. Set the POWER Switch to the On (in) position.



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** or **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 4400 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 4400, 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 reconnect 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).
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 following placements are suggested: Figure 3.



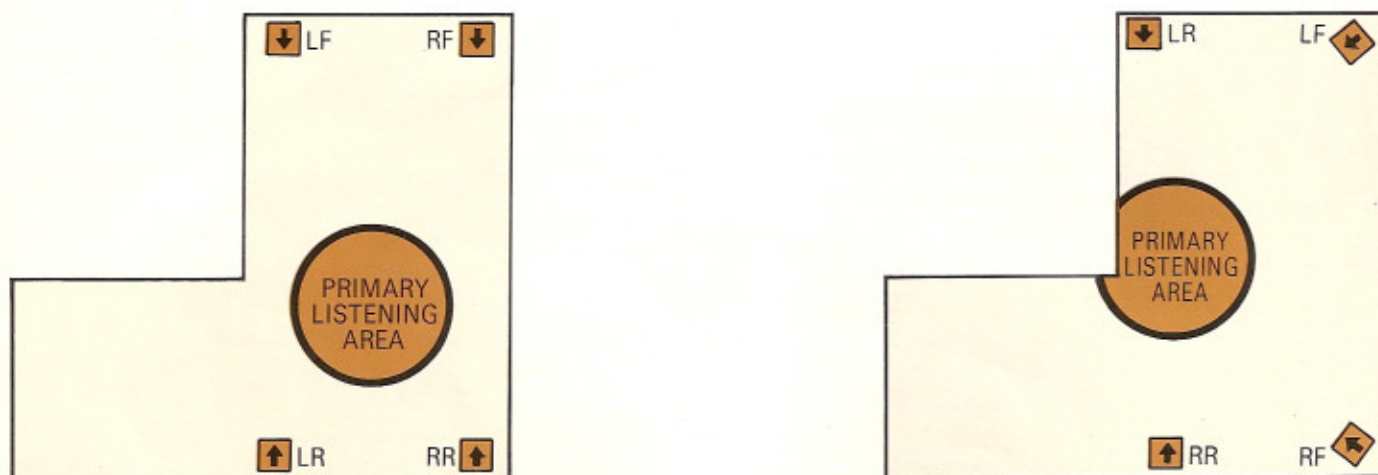
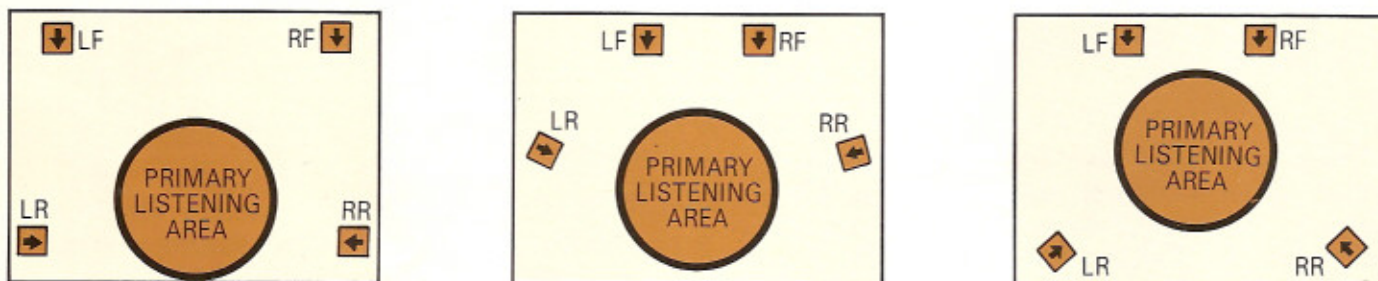
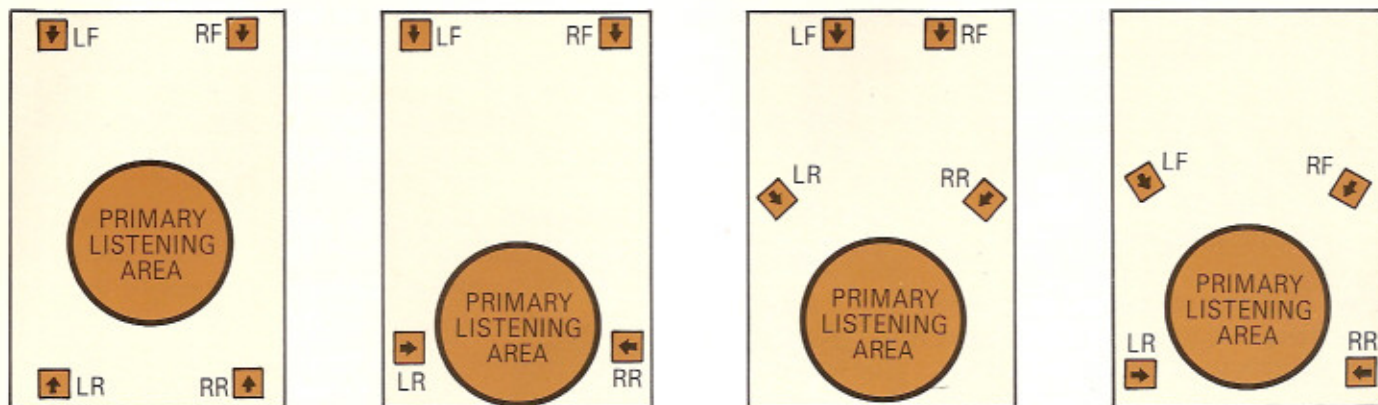


Figure 3. Speaker Placement

# FRONT PANEL FEATURES

## MODE SWITCH

### MONO

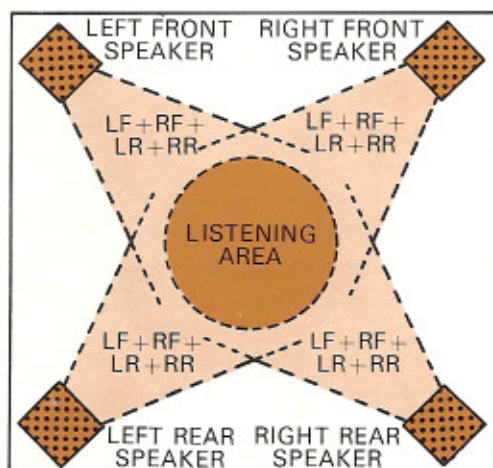
When the MODE Switch is in the **MONO** position, all input signals are summed. Speakers are driven as shown in Figure 4.

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.

### 2 CH

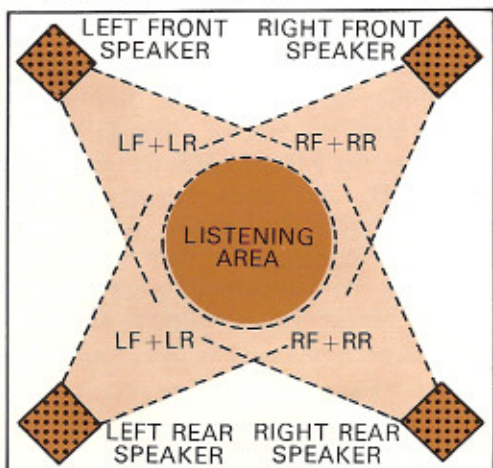
When the MODE Switch is in the **2 CH** position, left-front and left-rear inputs are summed. Right-front and right-rear inputs are summed. Speakers are driven as shown in Figure 5.

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



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

Figure 4. Mono Mode Sound Dispersion



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

Figure 5. 2-Channel Mode Sound Dispersion

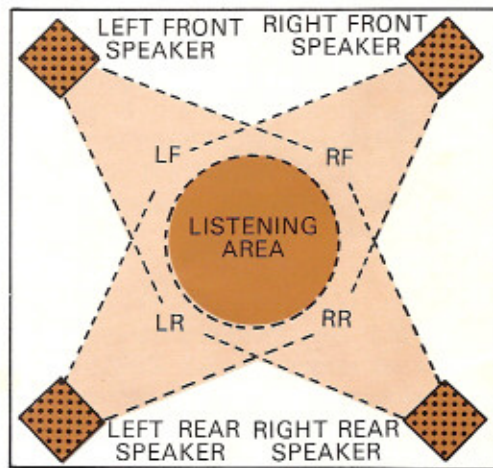
### DISCRETE

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 6.

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.

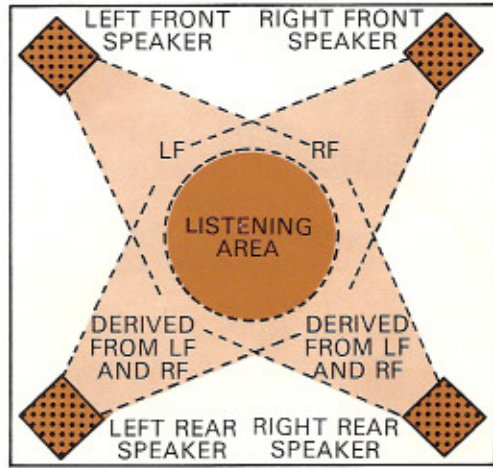
### VARI-MATRIX

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 7.



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

Figure 6. Discrete Mode Sound Dispersion



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

Figure 7. Vari-Matrix Mode Sound Dispersion



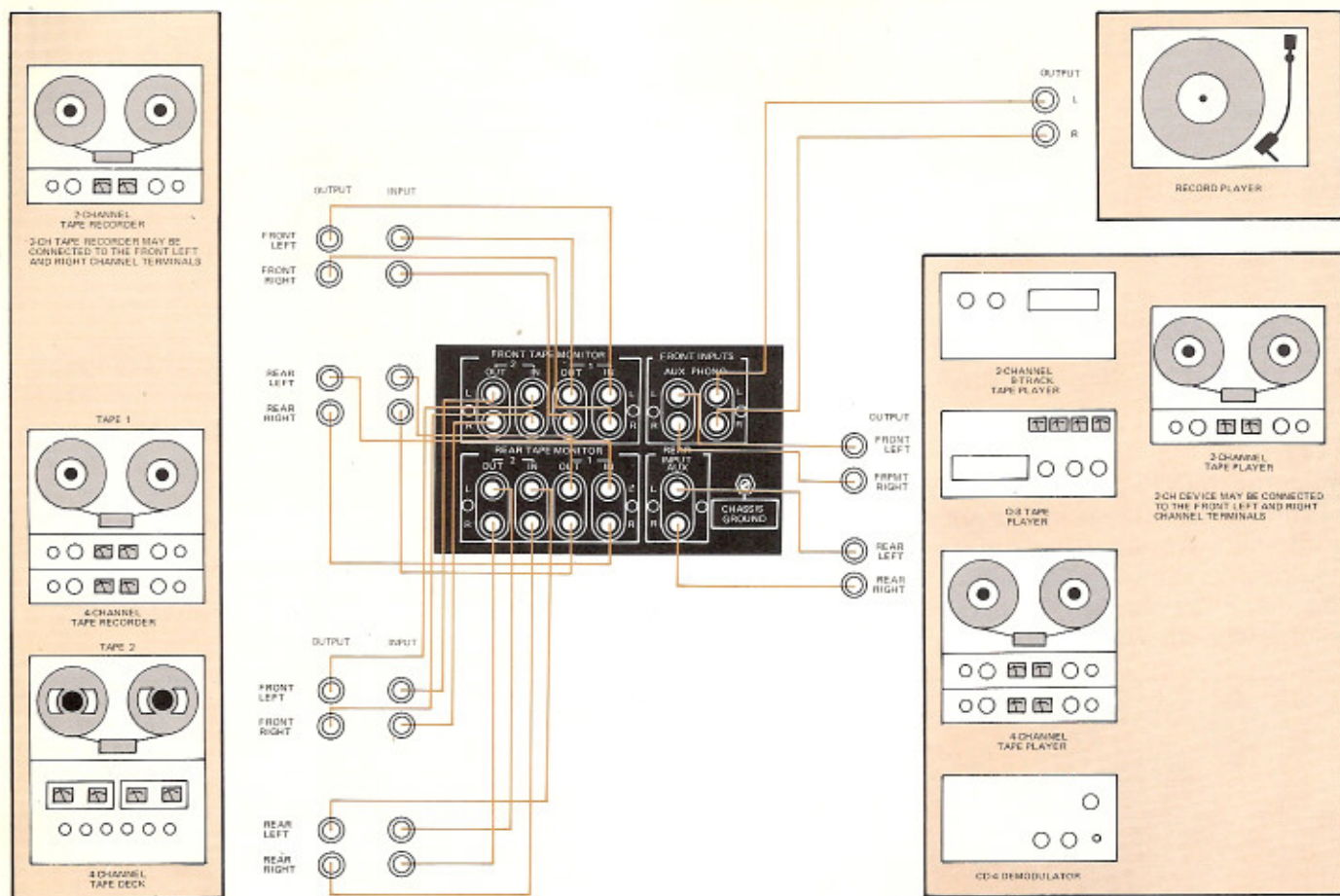


Figure 8. Connection Diagram

## 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.

## SQ DECODER

With the **MODE** Switch set to the **SQ DECODER** position, any rear input signals to the 4400 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.

## BALANCE CONTROLS

The Model 4400 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. The balancing technique described should be carried out in the **MONO MODE**. 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. To facilitate balance adjustments the Marantz Model RC-4 Remote Balance and Volume control (optional) is recommended.

## 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** or **TAPE 2**.



## BASS, MIDRANGE AND TREBLE CONTROLS

These controls are used to adjust the tonal balance of program material to suit your individual listening preference. The bass, midrange and treble responses are adjusted by dual-concentric, friction-coupled controls. With the **BASS, MID-RANGE** and **TREBLE** Controls set at the center position, frequency response of the amplifier becomes flat. The smaller (outer) knob adjusts the response of the rear audio channels, while the larger (inner) knob adjusts the front audio channels.

Turn the knobs clockwise to boost, or counter-clockwise to attenuate, their respective frequency ranges.

## MONITOR SWITCH

When the **MONITOR** Switch is placed in the "**TAPE 1**" or "**TAPE 2**" position, the signals connected to the tape input jacks will be played back.

To play a tape recorder connected to the **TAPE 1** jacks, or to monitor the tape on a three-head recorder during recording, place the **MONITOR** Switch to the "**TAPE 1**" position. To play a tape recorder connected to the **TAPE 2** jacks, or to monitor the tape on a three-head recorder during recording, place the **MONITOR** Switch to the "**TAPE 2**" position.

During recording, the **MODE** Switch should be in **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, set the **MODE** Switch to the **2 CH** position. Leave the **MONITOR** Switch in the **SOURCE** position while recording. This will feed the sum of the left-front and left-rear inputs to the left-front **TAPE OUT** jacks, and the sum of the right-front and right-rear inputs to the right-front **TAPE OUT** jacks.

To record any type of source on a monaural recorder, set the **MODE** Switch to the **MONO** position. Leave the **MONITOR** Switch in the **SOURCE** 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 per channel.

## POWER SWITCH

This pushswitch turns the Power on or off. When the **POWER** Switch is depressed, the dial will illuminate. 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.

## LOW FILTER SWITCH

With the pushswitch set "**IN**", the **LOW FILTER** suppresses low frequency noise, such as turntable rumble or "boomy, exaggerated" bass. The use of this filter will also reduce desired low frequency sounds, as well as unwanted noise. In the "**OUT**" position, the **LOW FILTER** is switched out of the circuits.

## HI FILTER SWITCH

With this pushswitch set "**IN**", the **HIGH FREQUENCY FILTER** suppresses high frequency noise, such as "scratches" 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**".



## GYRO-TOUCH TUNING KNOB

When rotated, the **GYRO-TOUCH TUNING KNOB** smoothly selects either **AM** or **FM** stations. Accurate tuning is accomplished by utilizing the 4400's oscilloscope. (See **FM/AM TUNING DISPLAY** sections).

## DOLBY LEVEL METER

The **DOLBY LEVEL METER** is a visual indicator used during the adjusting of the **PLAY CAL** and **RECORD LEVEL** controls when calibrating the recording and playback signals being applied to the Dolby processors.

## FM MUTING SWITCH

When tuning to **FM** broadcasts with the **MUTING** Switch in its **"IN"** position, the muting circuit will eliminate inter-station noise. To prevent muting of very weak stations, in addition to noise, the muting function may be turned off by releasing the **MUTING** pushswitch to the **"OUT"** position.

## VOLUME

This control regulates volume of all four channels simultaneously.

## DOLBY NR FUNCTION SWITCH

This switch activates the Dolby noise-reduction circuit.

**DOLBY FM:** This position is used for listening to Dolbyized **FM** broadcasts. The Dolby **FM** level has been pre-adjusted at the factory. However, should the Dolby **FM** level require re-calibration, the adjustment potentiometers are located on the rear panel (**PRE-SET** level—Dolby **FM**) and can be adjusted to the proper Dolby level by using the Dolby tone broadcasted by the **FM** station.

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

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

**RECORD I:** This position is used to make a Dolbyized recording from an in-coming "flat" (non-Dolbyized) signal: When the **MONITOR** Switch is set to the **SOURCE** position, the "FLAT" signal will be heard. When making a Dolby recording and utilizing a three-head tape recorder, full advantage of the 4400's 4-process Dolby System can be appreciated. When the 4400's **MONITOR** Switch is in the **"TAPE"** position, the signal heard will be "flat," i.e., it

will be the sound produced after the record and playback Dolby process has been completed.

**RECORD II:** This position is used to make 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. For further details on the use of the Dolby **NR** Switch, refer to the "Dolby Mode Chart" on page 15.

## 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 **OVU** level.

## PLAY CAL. (L) (R)

The knobs adjust the playback output level 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 400Hz sine wave signal output of 580 mV will be applied to the four **TAPE OUT** jacks.

## SCOPE DISPLAY SWITCHES:

### ON/OFF SWITCH

When this pushswitch is depressed (**ON**), the scope is energized. It requires approximately 30 seconds warm-up time.

### AUDIO SWITCH

Audio signals are displayed on the scope when the **AUDIO** pushswitch is depressed (**ON**), acting in conjunction with the **SELECTOR**, **MONITOR** or **MODE** Switches. (See **AUDIO DISPLAY**, figures 18 and 19.)

### TUNING SWITCH

When the **TUNING** pushswitch is depressed (**ON**), a visual trace will appear on the scope, thereby enabling proper tuning for either **FM** or **AM** as selected on the 4400's **SELECTOR** Switch. (See **TUNING DISPLAY**, figures 14 and 15).

### MULTIPATH SWITCH

When this pushswitch is depressed (**ON**), the trace on the scope will indicate **FM** broadcast modulation and multipath distortion characteristics. (See **FM MULTIPATH INDICATION**, figure 17).



# REAR PANEL FEATURES

## PHONO JACKS

These two jacks are intended for use with a magnetic cartridge 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 to the **CHASSIS GROUND** binding post of the 4400.

## CD-4/AUX JACKS

These jacks are for connection of any 4-Channel high level 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 IN AND TAPE OUT JACKS

These jacks are for the connection of 2-Channel or 4-Channel tape recorders. (Refer to "SOURCE DEVICES", page 4.)

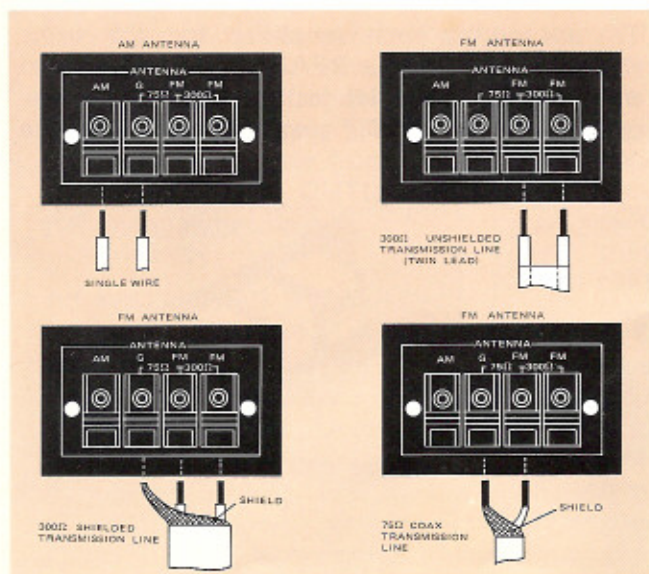


Figure 9. FM/AM Antenna Connection

## 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 4400. 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 antenna 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 4400. Both are practical and will give satisfactory results in primary signal areas.

Your Model 4400 will accept either a 75 Ohm or 300 Ohm antenna. (See Figure 9). 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.

## AM ANTENNA TERMINAL

An external AM antenna can be connected to this terminal. The 4400 is equipped with a ferrite-rod antenna for AM reception and it will give satisfac-

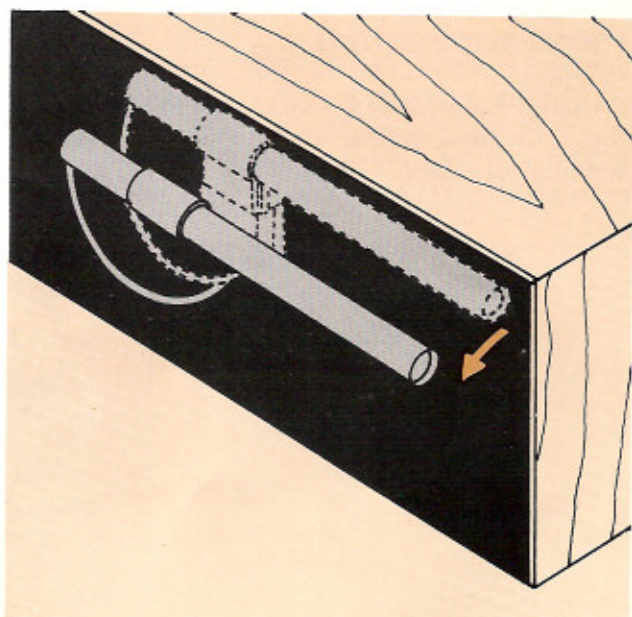


Figure 10. AM Ferrite-Rod Antenna



tory 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 long wire to the **ANTENNA** terminal on the rear panel. Place the other end at a very high position outdoors. Next, connect the other wire between the "G" terminal and an earth ground (such as a metal waterpipe). (Refer to Figure 9).

### FM QUADRADIAL OUTPUT JACK

In anticipation of discrete 4-Channel stereo broadcasts, your Model 4400 is equipped with an **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.

### FM DE-EMPHASIS SWITCH

Selects  $75\mu\text{S}$  or  $25\mu\text{S}$  **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 inter-station muting circuit. Turning this control counter-clockwise will lower the threshold to permit reception of weak signals.

### POWER MODE SWITCH

Switches from 120W x 2 operation to 50W x 4. In the 2-Channel mode, only the front speaker terminals are used.

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

### PRE-OUT, MAIN IN JACKS

For normal operation, these jacks are interconnected with the supplied jumpers. When connecting an external unit (equalizer, reverberation unit, etc.), remove the jumpers and connect the **PRE-OUT** jacks to the external unit's inputs. In turn, connect the external unit's outputs to the **MAIN IN** jacks.

It is possible to create a higher powered 4-Channel system by adding an external amplifier. If the external amplifier has less than 120 watts x 2, it should be used to drive the rear speakers. If the external amplifier has more than 120 watts x 2, it should be used to drive the front speakers. In each case, the rear panel **POWER MODE** Switch should be set to the 120 watts x 2 position.

### CONNECTING AN EXTERNAL AMPLIFIER FOR REAR CHANNELS

To use an external amplifier for the rear channels, connect the **REAR PRE-OUT** jacks to the inputs of the external amplifier. In turn, connect the rear speakers to the output terminals on the external amplifier. The 4400 will then supply the power for the front speakers and the external amplifier will supply the power for the rear speakers.

### CONNECTING AN EXTERNAL AMPLIFIER FOR FRONT CHANNELS

To use an external amplifier for the front channels, connect the **REAR PRE-OUT** jacks to the **FRONT MAIN IN** jacks. Connect the rear speakers to the **FRONT** speaker terminals on the

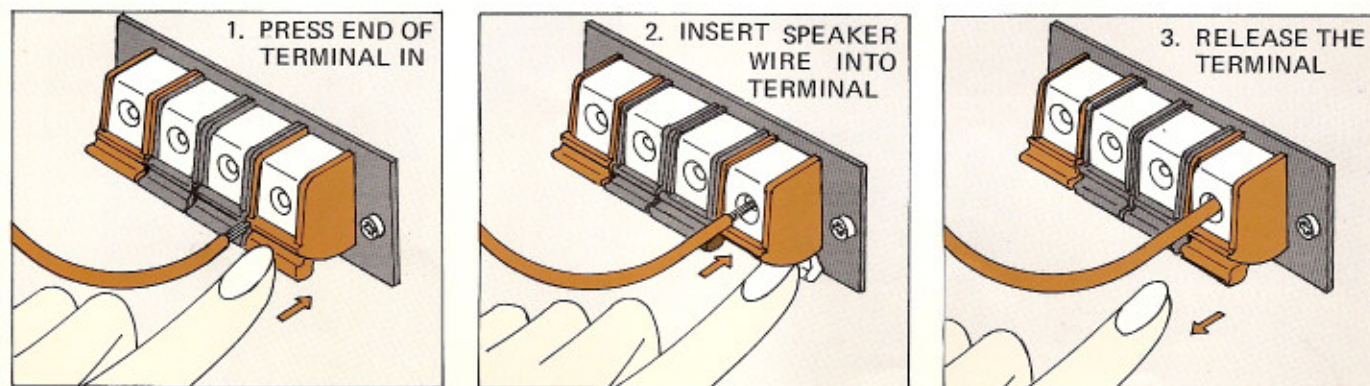


Figure 11. Quick-Connect Speaker Terminal



4400. Then, connect the **FRONT PRE-OUT** jacks to the inputs of the external amplifier. In turn, connect the front speakers to the output terminals on the external amplifier. The 4400 will then supply the power for the rear speakers and the external amplifier will supply the power for the speakers.

### 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 4400" AND "REMOTE SPEAKERS")

Terminals work as shown in Figure 11.

- 1) Press terminal in
- 2) Insert speaker wire
- 3) Release 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 4400 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 100 watts and 200 watts, respectively.

### AC PROTECTOR FUSE

This feature automatically disconnects AC power in the event of a power surge or circuit failure. 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 been broken. If so, replace the fuse with one having the same specifications.

### 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.

### FOCUS AND BRIGHTNESS CONTROLS

The rear panel **FOCUS** control adjusts the focus of the oscilloscope. The rear panel **BRIGHT** control adjusts the intensity of the oscilloscope's trace. For adjustment, see **FOCUS, BRIGHTNESS AND CENTERING** section, page 19).

### SCOPE CENTERING CONTROLS

These rear panel controls are utilized for the proper centering of the oscilloscope's trace (dot). For procedure, see **FOCUS, BRIGHTNESS AND CENTERING** section, page 19).

### TAPE RECORDING

Instructions for connecting a recorder and playing back a tape are given in "SOURCE DEVICES," page 4).

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 6, and **MONITOR** Switch on page 8.



## 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 transmission.

When Dolbyized FM signals pass through the Dolby playback circuitry, the mid- and high-frequency noise present in the transmission is greatly reduced.

## DOLBY CALIBRATION

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

The Model 4400 is capable of processing Dolby signals from sources other than a tape recorder (AUX, PHONO, FM, etc.)

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.
- 6) Turn off the **400Hz TONE**.

This tape you have just made can be 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 be compatible with a Dolby recording made with different recorders or systems.

Therefore, for universal compatibility, Marantz offers a Dolby 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."



Figure 12. Dolby Reference Level on Dolby Meter

### PROCEDURE FOR PLAYBACK CALIBRATION

1. Turn on the Model 4400 and your recorder.
2. Set the **DOLBY NR** function switch on the Model 4400 to the **PLAY** position.
3. If your recorder has a "**Source/Tape**" (Monitor) Switch, set it to "**Tape**".
4. Load the Dolby standard alignment tape, or the calibration tape you have made.
5. Play the tape.
6. If your recorder does not have output level controls, proceed to step 9.
7. When your recorder has output level controls and the meters on the recorder read playback level, adjust the controls until the meter reads "0 VU". Then proceed to step 9.
8. If Step 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 4400 to the **DOLBY LEVEL** reference on the **DOLBY LEVEL METER**. (See Figure 12.) To adjust the left **PLAY CAL** control, place the **DOLBY** Meter



Switch to the "OUT" position. To adjust the right **PLAY CAL** control, place the **DOLBY** 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 4400'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 setting 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 4400'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. Load a blank tape onto your recorder.
2. Set the 4400's **DOLBY NR** Switch to the "PLAY" position.
3. Put both the 4400's and the recorder's Monitor switches to their "tape" positions.
4. Set the **400Hz TONE** Switch to the "ON" (in) position.
5. Commence recording.
6. Adjust the recorder's record level controls so the tone deflects the 4400's **DOLBY LEVEL METER** to the "DOLBY LEVEL" mark.
7. Switch off the **400Hz TONE**.

#### FOR RECORDERS WITH TWO HEADS (including most cassette machines)

1. Load a blank tape onto your recorder
2. Set the 4400's **DOLBY NR** Switch to the "OFF" position.
3. Set the **400Hz TONE** Switch to 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. Switch off the **400Hz TONE**.
8. Set the 4400 **DOLBY NR** Switch to the "PLAY" position.

9. Put the recorder in the play mode and play back the tape.
10. Note the level reading on the 4400's **DOLBY LEVEL METER**. To check the left channel level, set the **DOLBY LEVEL METER** Switch to the "OUT" position. To check the right channel level, set the **DOLBY LEVEL METER** Switch to the "IN" position. The object is to adjust the recorder's record level controls so the playback level achieved indicates "DOLBY LEVEL" on the 4400 **DOLBY LEVEL METER**.
11. If the Meter indicates "DOLBY LEVEL", calibration of the recorder is completed. **DO NOT** change the position of the record or playback controls on your recorder.
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.

#### FOR ALL RECORDERS

After the "DOLBY LEVEL" has been achieved on the **DOLBY LEVEL METER**, **DO NOT** change the recorder's input or output level controls or the 4400's **PLAY CAL** controls.

Utilizing the recorder's VU Meters, proper Dolby recording levels are adjustable by using the **RECORD LEVEL** controls on the Model 4400's front panel.

**CHANGING THE RECORDER'S RECORD OR PLAYBACK LEVEL CONTROLS OR THE 4400's PLAY CAL CONTROLS WILL RESULT IN INACCURATE DOLBY SYSTEM OPERATION.**

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 4400's PLAY CAL controls.

### USE OF THE DOLBY SYSTEM ON FM BROADCASTS

Your Model 4400 is equipped to receive Dolbyized FM Broadcasts. If a local station is broadcasting a Dolbyized FM signal, full advantage of the increase in signal-to-noise ratio may be obtained by setting the DOLBY NR Switch to the "DOLBY FM" position. The rear panel DOLBY FM level controls are factory-adjusted. Do not change the position of these controls. If your local station is not broadcasting a Dolbyized FM signal, leave the DOLBY SWITCH IN THE "OFF" position.

### FM DE-EMPHASIS SWITCH

This rear panel switch operates only when the front panel DOLBY NR Switch is in the "DOLBY FM" position. It alters the frequency response of the FM signal. Normally, this switch should be left in the 75  $\mu$ S position. However, if the station

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

### EXPLANATION OF 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, together with DE-EMPHASIS Switch position, is shown under the appropriate mode of operation.

### OSCILLOSCOPE FUNCTIONS AND ANALYSIS

The Cathode Ray Tube, also referred to as an oscilloscope, is the only vacuum tube in the Model 4400. It provides a visual display permitting accurate tuning, accurate antenna alignment for minimal multipath distortion, and an evaluation of stereo programs as to stereo separation and modulation.

To extend the life of the Cathode Ray Tube, set the ON/OFF front panel OSCILLOSCOPE DIS-

Input / Operating Mode	De-Emphasis switch position	Dolby NR Switch Position			Notes:
		Listening	Record		
			Without Dolby	With Dolby	
F.M. (Normal)	75 $\mu$ s	"Off"	"Off"	"Record I"	—
F.M. with Dolby 75 $\mu$ s Pre-emphasis	75 $\mu$ 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 $\mu$ s Pre-emphasis	25 $\mu$ s	"Dolby FM"	"Record II"	"Dolby FM"	
Non Dolbyized sources (Phono, Tape, Aux inputs, A.M.)	—	"Off" or "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" or "Record II"	"Record II"	"Play"	

For initial calibration utilizing the Dolby standard alignment tape, see detailed instructions on Pages 13 through 15 of this manual.



**PLAY** pushswitch to the OFF (out) position when the **OSCILLOSCOPE** is not in use. This will prevent the phosphor from becoming desensitized in the center portion of the display area. **SUCH DAMAGE TO THE CATHODE RAY TUBE IS NOT COVERED BY THE MARANTZ WARRANTY.**

### CENTERING THE OSCILLOSCOPE DISPLAY

When the **POWER** Switch is set to "ON", the receiver will come on immediately, however, the oscilloscope requires about 30 seconds warmup time.

Set the **VERTICAL** and **HORIZONTAL** rear panel controls to their mid (straight up) position. Depress the **OSCILLOSCOPE ON** and **AUDIO** buttons. Set the **MONITOR** Switch to the **TAPE 1** position (even if you have not connected a recorder) and turn your recorder off.

After the oscilloscope has warmed up, the **OSCILLOSCOPE "trace"**, or small "dot", will appear somewhere on the face of the display area. Under high ambient light conditions and/or low power line conditions, the dot may appear to be extremely dim. If necessary, shade the **OSCILLOSCOPE** so that the dot can be seen during this adjustment. Adjust the **VERTICAL** and **HORIZONTAL** controls to move the dot back and forth and up and down, as required, to place the dot within the reticle circle on the face of the display area. See Figure 13.

### FM TUNING DISPLAY

With the **TUNING DISPLAY** pushswitch depressed to the "ON" position and the **SELECTOR** Switch set to the **FM** position, a short vertical trace will appear in the lower center of the oscilloscope. As you tune past each station, this bright trace follows an approximate rectangular path, as indicated in Figure 14.

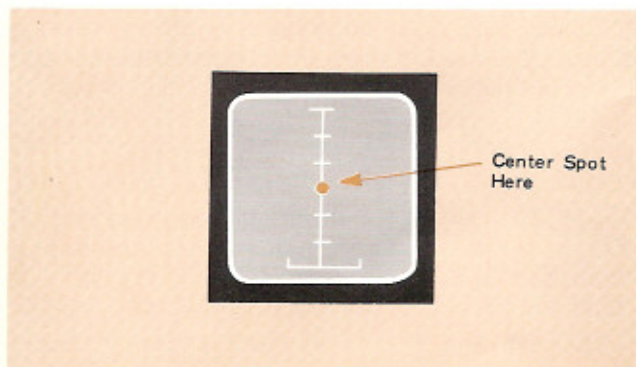


Figure 13. Center The Dot Within The Reticle

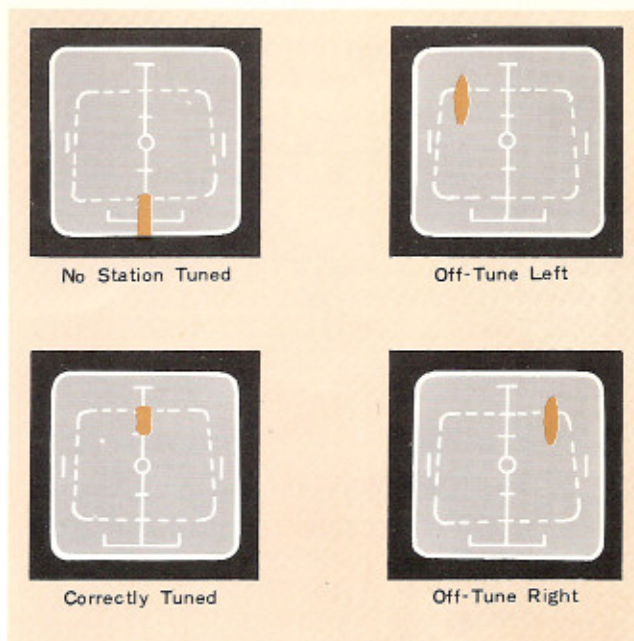


Figure 14. FM Tuning Display

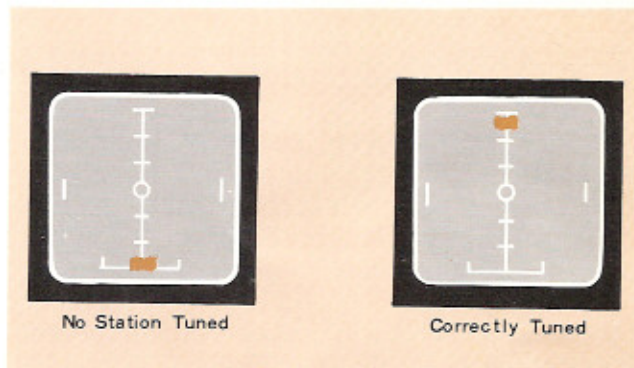


Figure 15. AM Tuning Display

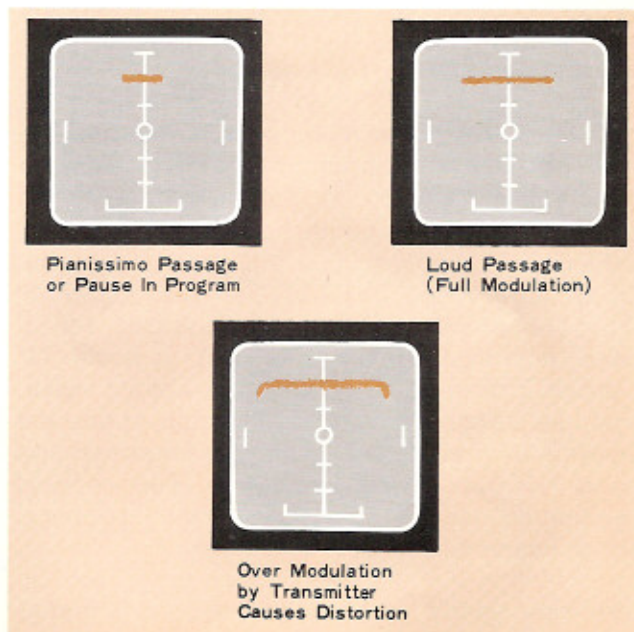


Figure 16. FM Broadcast Modulation Characteristics



For correct tuning, the trace should be centered on the upper portion of the oscilloscope as illustrated in Figure 14. Weak, distant stations can be tuned in even when below the muting threshold. Reorientation of the antenna will often increase the signal strength sufficiently to improve reception.

Signal strength is indicated by the relative displacement of the trace on the vertical axis. A trace near the top of the vertical axis indicates greater signal strength than a lower trace.

### AM TUNING DISPLAY

With the **TUNING DISPLAY** pushswitch depressed to the "ON" position and the **SELECTOR** Switch set to the AM position, a short horizontal trace will appear in the lower part of the oscilloscope. As you tune past each AM station, this trace will move up and down. For correct tuning, the trace should indicate the maximum vertical deflection. (See Figure 15).

### FM MULTIPATH INDICATION

With the **MULTIPATH DISPLAY** pushswitch depressed to the "ON" position and the **SELECTOR** Switch set to the FM position, the trace on the oscilloscope will indicate FM broadcast modulation and multipath distortion characteristics.

FM Modulation characteristics (without multipath distortion) are shown in Figure 17A. If an FM station flagrantly over-modulates (grossly exceeds the 75kHz deviation limits), an excessively long horizontal trace will result, with ends bending downwards, outlining the top of the IF pass band characteristics of the Tuner section.

The trace on the oscilloscope will also indicate when the antenna is oriented in the best possible direction. A snake-like, or distorted, trace (rather than the relatively smooth horizontal line shown in Figure 17A) indicates that the antenna is pointed in an unfavorable direction for good reception from the station. It shows the multipath reflections (identical to the ones that generate TV "ghosts") received along with the wanted signal. For best reception from each station, rotate the antenna to the direction giving the smoothest and most horizontal trace indication. This antenna orientation may not be the same for the strongest signal (maximum vertical deflection).

The long, gentle trace of illustration B is preferable to those of illustrations C through G and should yield good reception. In turn, trace G

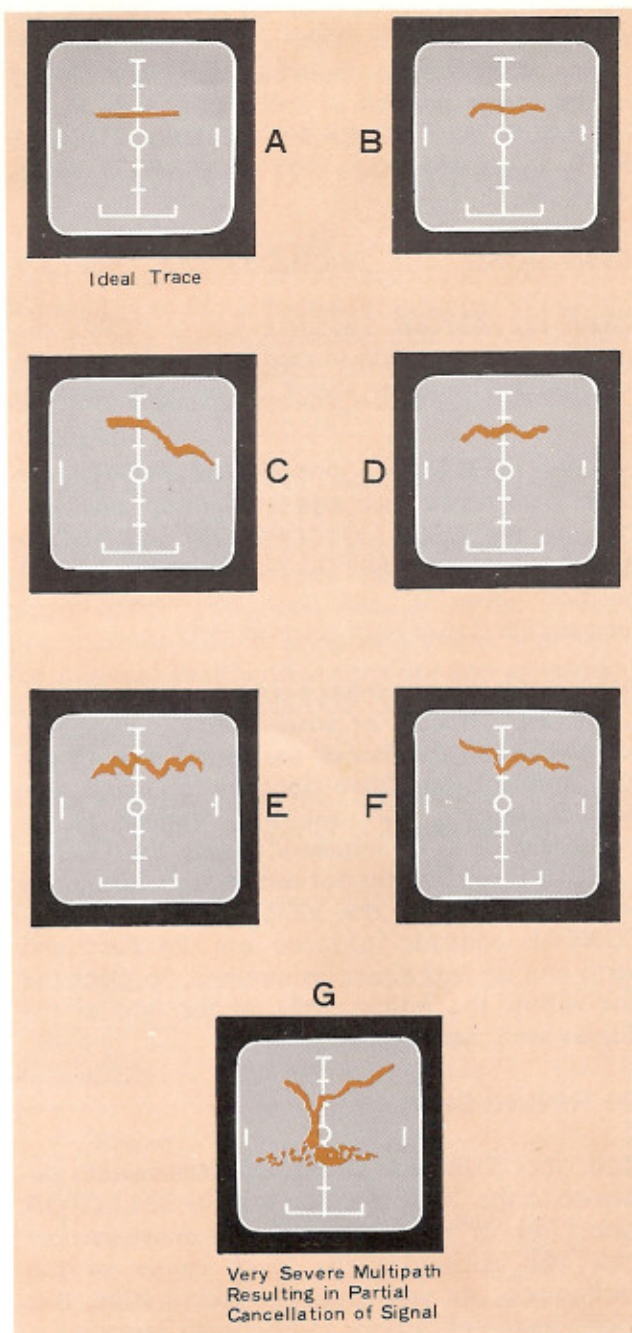


Figure 17. Adjusting Antenna Direction

indicates very poor antenna orientation, causing signal cancellation and unacceptable noise and distorted reception.

### AUDIO DISPLAY SWITCH

Visual analysis of the program being received on FM is performed with the **AUDIO** pushswitch depressed to the "ON" position and the **SELECTOR** Switch set to the FM position. The **OSCILLOSCOPE** will display the left and right audio channels. This permits checking of the channel separation and phasing of the program material.



Typical trace patterns of the audio display are shown in Figure 18. The display of left and right audio channels is an X-Y plot, or Lissajou figure. With the illustrations shown in Figure 18, one can visually analyze the program material.

Analysis of all other audio signals originating from within your system can be performed in the same manner by setting the **AUDIO DISPLAY** Switch to the depressed "ON" position and selecting an audio source. The **SELECTOR**, **MONITOR** and **MODE** Switches will enable you to select between various stereo, monaural and 4-Channel sources. The oscilloscope will display the signal of the selected source. When a 4-Channel source is being displayed on the oscilloscope, each of the four channels of information will appear in their respective quadrants. (See Figure 19)



Figure 18. 2-Channel Audio Display

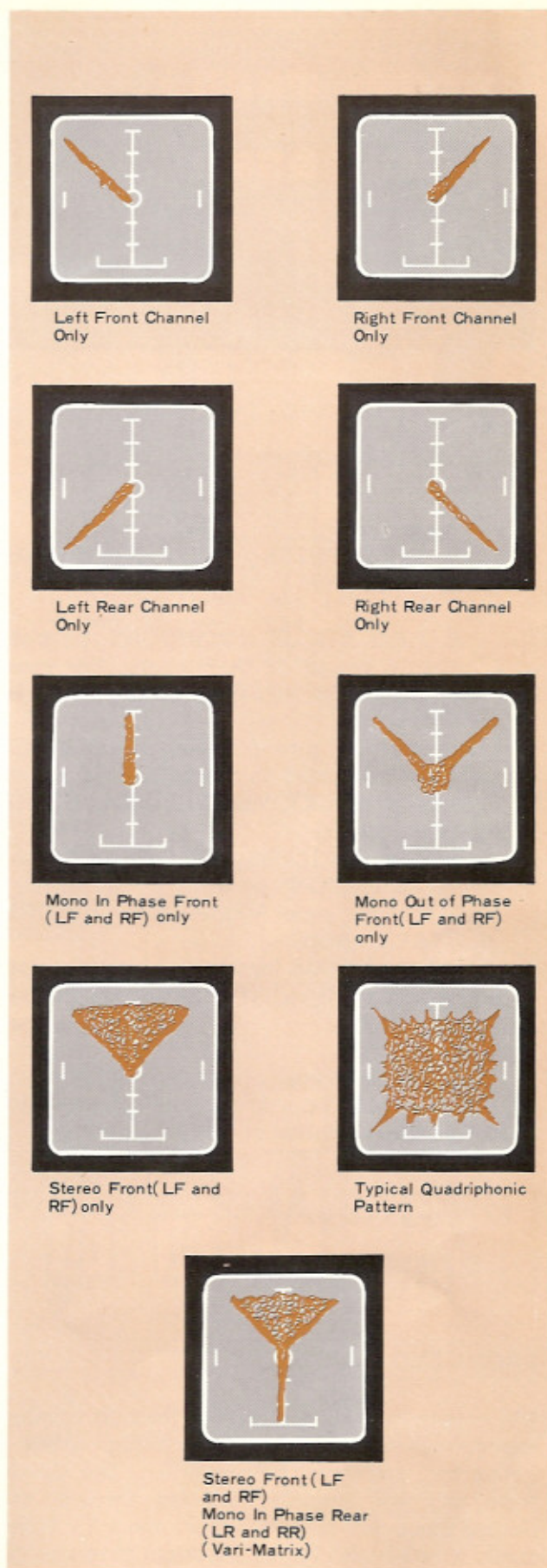


Figure 19. 4-Channel Audio Display



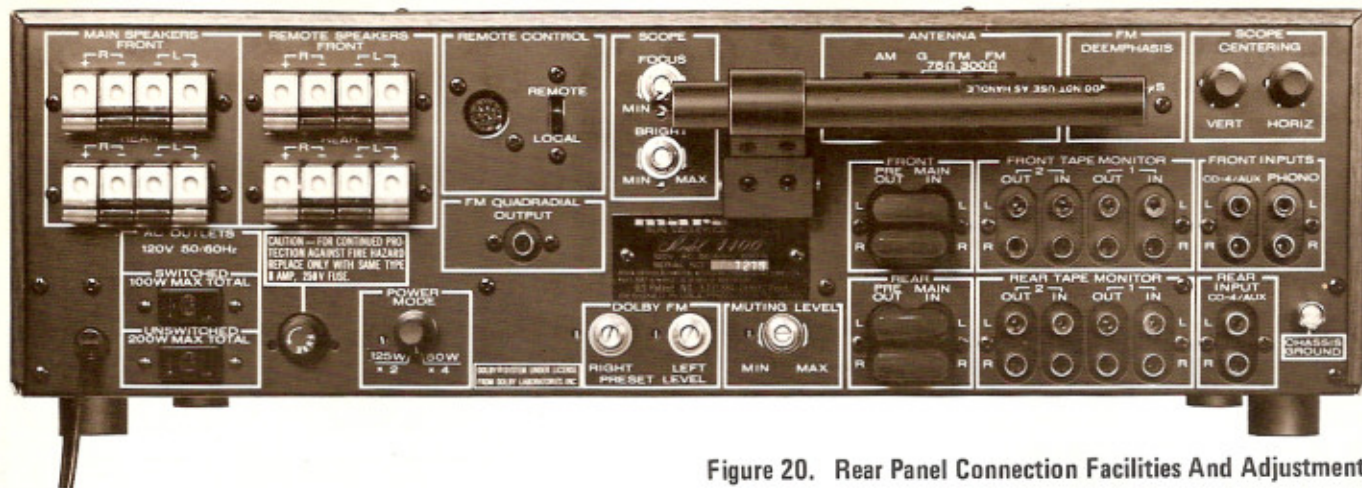


Figure 20. Rear Panel Connection Facilities And Adjustments

## FOCUS, BRIGHTNESS AND CENTERING ADJUSTMENTS

The rear panel **FOCUS** and **BRIGHT** controls were properly pre-set at the factory. For your convenience, proper adjusting procedure is as follows:

1. Disconnect (or turn off) any source device you have connected to the 4400's rear panel.
2. Depress the "EXT." OSCILLOSCOPE DISPLAY pushswitch.
3. Depress the OSCILLOSCOPE DISPLAY pushswitch to the "ON" position. Center the dot with the rear panel **VERTICAL** and **HORIZONTAL** controls.
4. Adjust the **FOCUS** for a sharply defined dot, and adjust the **BRIGHTNESS** so that the dot is barely visible.

Automatic beam intensifier circuitry will brighten the display when trace deflecting signals are applied to the horizontal or vertical amplifiers.

## 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 FET Mixer stage, which is also fed by the signal generated by a local oscillator. Careful attention to its thermal and electrical characteristics has minimized drift,

thus eliminating the necessity for AFC. The 10.7MHz converted signal is then fed to a phase-linear ceramic IF filter, followed by the limiter. 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 four stages of dual element ceramic filters. The characteristics of these filters are ideal in that the 200kHz passband is phase-linear, with sharp cutoff slopes. This exceptional phase linearity assures the elimination of a major source of high-frequency distortion and a loss of stereo separation. The sharp cutoff slopes provide improved selectivity, permitting reception of closely spaced channels.

### LIMITER

The Model 4400 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 an AGC circuit which introduces low frequency distortion. Undesirable amplitude modulation (AM signals, AM noise, AM distortion) is removed from the IF signals by the limiters.

### FM STEREO DEMODULATOR

The stereo composite signal obtained from the buffer amplifier is first applied to the FET muting circuit; then to the phase locked loop stereo demodulator IC circuit and decoded into both left and right channel signals. Each left and right



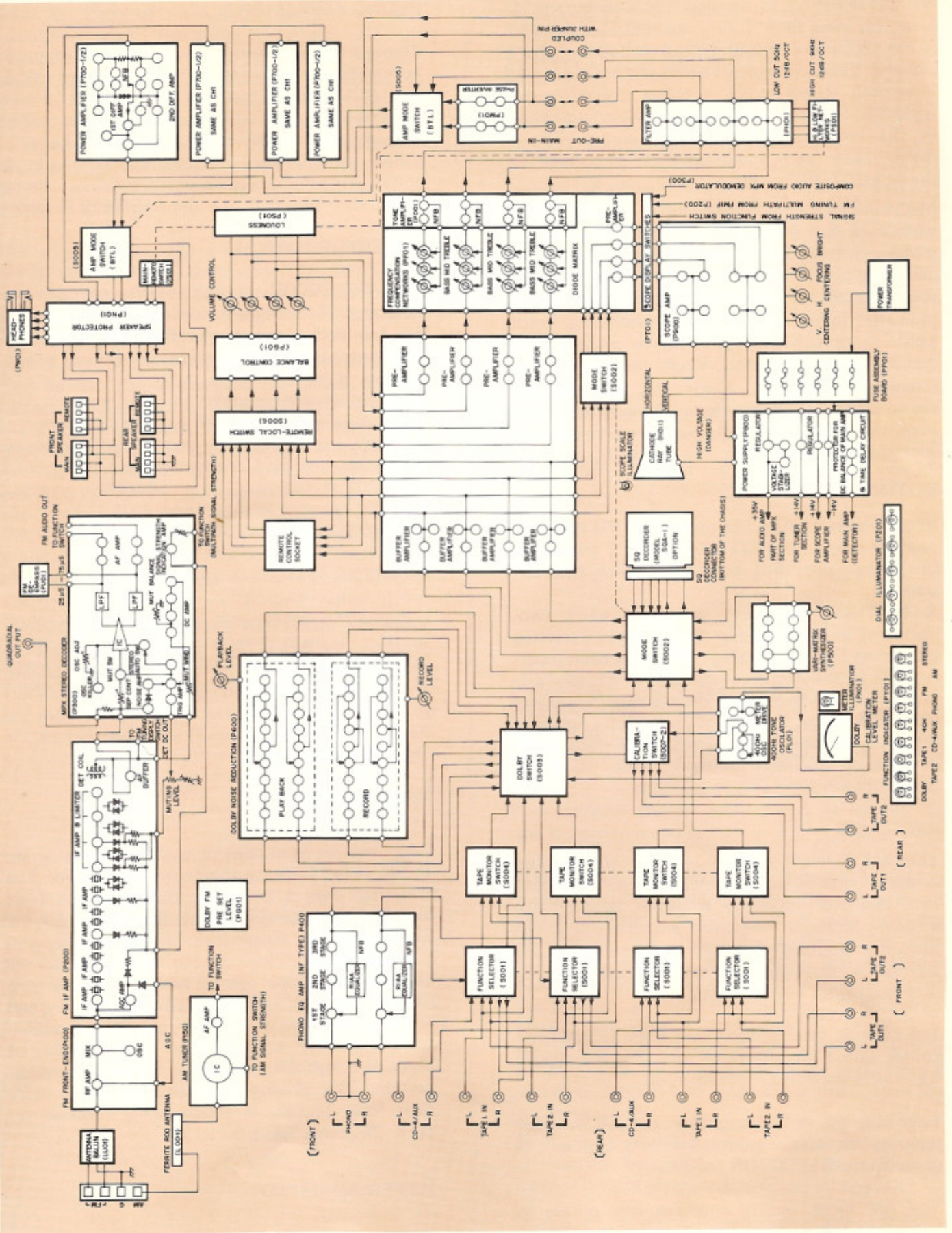


Figure 21. Functional Block Diagram



channel signal is then applied to the 19kHz and 38 kHz 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 the audio amplifier consisting of NPN-PNP direct-coupled transistors and amplifier to the required signal level of about 775mV RMS. Finally, each amplified signal is applied to the **SELECTOR Switch**.

The multiplex stereo demodulator circuit consists of a phase locked loop IC and is equipped with a separate automatic Stereo/Monaural switching circuit. The circuit checks 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 insure high quality reception with good signal-to-noise ratio.

### MUTING CIRCUIT

In the absence of an FM carrier, all FM receivers produce noise. The **MUTING CIRCUIT** eliminates this noise, providing noise-free tuning between stations.

A **MUTING CIRCUIT**, consisting of a two-transistor noise amplifier and a three-transistor (including FET) switching circuit, has been incorporated in the Model 4400. The **MUTING CIRCUIT** perfectly mutes all inter-station noise and also completely mutes the side slope spurious response of the unit. The circuit has been designed to minimize annoying "pop" noise for velvet smooth tuning characteristics.

### AM TUNER

The **AM TUNER** portion of the 4400 is composed of one IC circuit (including RF amplifier, local oscillator, mixer, IF amplifier, detector and a signal strength indication amplifier) and one transistor amplifier to amplify the detected audio signals. A three-section variable capacitor improves spurious response ratio.

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

Following the AM IF amplifier, the AM detector recovers the audio modulation and applies this signal to the **SELECTOR Switch**.

The AM tuner and IF amplifier incorporate an automatic gain control circuit, which maintains a constant level of all stations in the AM band.

## 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 pre-amplifier voltage gain to 36dB (at 1,000Hz). Figure 23 shows the RIAA reproducing characteristics together with the recording characteristics. 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 4400 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 2.0 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 NR Switch** and **TAPE OUT** jacks to the **MODE Switch**.

### MONITOR (TAPE 1 or 2) SWITCH

When the **MONITOR Switch** is in the **SOURCE** position, the **SELECTOR Switch** outputs are fed through the **DOLBY NR Switch** to the **MODE Switch**. When the **MONITOR Switch** is in **TAPE 1** or **TAPE 2** positions, the input signals from the **TAPE MONITOR (1 or 2)** jacks are fed to the **DOLBY NR Switch**.

### TONE CONTROL

After volume level control, each channel program source is fed into the tone control amplifier. The amplifier uses a 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 feedback tone control network. In the tone control network, each signal adjusted for bass and treble is amplified in the two-stage, direct-coupled NPN and PNP configuration and is delivered through a high filter switch to the main amplifier section. The driving impedance to the balance high filter section is satisfactorily reduced by NFB (Negative Feed Back).

### POWER AMPLIFIER

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 protection and output circuits. These amplifiers consist of four totally direct-coupled, differential amplifiers to provide superior dynamic characteristics and frequency response. Silicon output transistors having a large collector dissipation margin, are arranged in a full-complementary Darlington format.

#### DRIVER STAGE

This stage incorporates a pair of push-pull, complementary-symmetry transistors (PNP-NPN).

The electronic protective circuit, comprised of three transistors and four diodes for each channel, senses the peak output current and limits the current to the driver transistors to a safe maximum value.

This limiting circuit protects the driver and output transistors under over-drive and short circuit conditions and effectively prevents the driver and output transistors from exceeding safe operating conditions.

The **OSCILLOSCOPE DISPLAY CIRCUIT** of the Model 4400 consists of two deflection amplifiers, one vertical and the other horizontal, and a very sensitive Cathode Ray Tube. Each signal to be displayed is selected by the appropriate **OSCILLOSCOPE DISPLAY** pushswitch on the front panel. 4-Channel signals are matrix into the **OSCILLOSCOPE DISPLAY** circuits.

## GENERAL REQUIREMENTS

Power Requirements . . . . .	120V AC 50 to 60Hz
Power Consumption	
—at rated power output, all channels . . . . .	690W
—idling (no signal) . . . . .	65W
Dimensions — Panel Width . . . . .	19-19/64 inches
— Panel Height . . . . .	5-3/4 inches
— Depth . . . . .	15-3/16 inches
Weight — Unit alone . . . . .	52.8 lbs
— Packed for shipment . . . . .	63.8 lbs

*Record play*

*20 1/4*

## 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. Remove the four rubber feet from the bottom of the Model 4400. 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.



## 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 a receipt from the carrier.

## SERVICE NOTES

Only the most competent and qualified service technicians should be allowed to service the Marantz 4400 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 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 returned 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 in Figure 22.

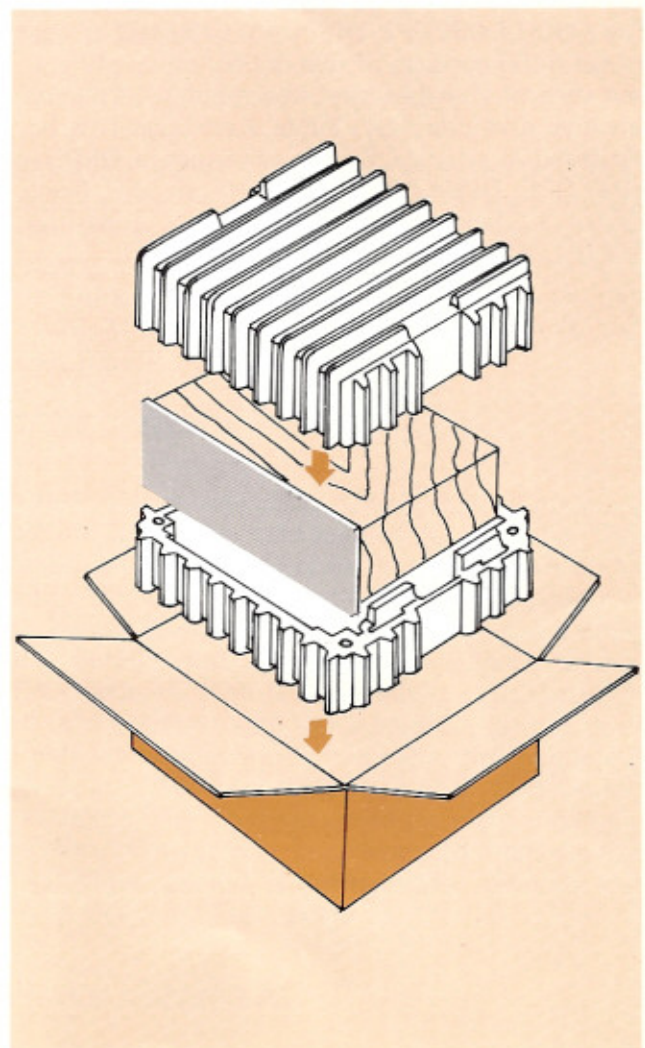


Figure 22. Packing Instructions







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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**DOLBY** ® is a trademark of Dolby Laboratories, Inc.  
**DOLBY** ® system under licence from Dolby Laboratories Inc.









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