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Model 2240 Stereophonic Receiver

Handbook of Instructions

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Model 2240
Stereophonic
Receiver

MARANTZ CO., INC. · P.O. BOX 99 · SUN VALLEY, CALIFORNIA · 91352
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FOREWORD

To obtain maximum performance and enjoyment from the Model 2240 Stereo Console, please study these instructions carefully. Installing and operating the Model 2240 is not complicated, but the flexibility provided by its numerous operating features merits your becoming familiar with its controls and connections. Our recommended procedures will assure you of securing the superb performance for which the Model 2240 was designed.

For convenience, this manual is divided into two parts. The first part covers installation and operation in a simple, nontechnical manner. The second part provides a more detailed description of the features of the Model 2240. Detailed technical specifications and functional explanations are included in this part.

For quick identification of the many controls, connection facilities, and adjustments on the Model 2240 Stereo Console, all references to them in this manual are printed in **BOLDFACE TYPE**.

GENERAL DESCRIPTION

The Marantz Model 2240 is an all solid state receiver incorporating the innovative design and unparalleled technology that have made Marantz famous in the audio component industry.

The Model 2240 features a sensitive FM tuner, a highly selective AM tuner, a low distortion preamplifier and two direct coupled amplifiers on a single chassis, while retaining a flexibility comparable to that achieved using separate components. The FM tuner utilizes an FET front end, ceramic IF filters, and a phase locked loop multiplex decoder. The AM tuner features an advanced integrated circuit and ceramic IF filters for high selectivity and sensitivity. The amplifier sections permit the connection of two stereo pairs of loudspeakers, a turntable or record changer, two tape recorders, stereo headphones, and an auxiliary source such as an additional tuner or a TV sound source. The 2240 also features front panel dubbing jacks.

AFTER UNPACKING

It will be to your advantage to save all the packing materials, carton, fillers, cushioning, etc. They will prove valuable in preventing damage should it become necessary to transport or ship the Model 2240. Be careful that you do not inadvertently throw away or lose the parts packed with the unit.

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

Please fill out and mail the Warranty Registration card as soon as possible. The Marantz 3-year Golden Warranty will not go into effect until receipt of the registration, which was packed in the carton with your Model 2240.

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Figure 1. Rear Panel Connection Facilities and Adjustments

PREPARATION FOR USE

REAR PANEL CONNECTIONS

Figure 1 shows the location of input and output jacks on the rear panel. These jacks are for "permanent" connections. Front panel jacks and their use will be discussed later. All connections to the rear panel should be made with the power to the entire system turned off. The rear panel signal connections are arranged in stereo pairs. All signal connections to the Model 2240, with the exception of the FM antenna and loudspeakers, should be made with shielded audio cables. To avoid confusion, connect one cable at a time between the 2240 and the other components of your system. This is the safest way to avoid cross-connecting channels or confusing signal source outputs with inputs.

PHONO INPUTS

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

If a hum is heard when playing records, this is an indication that the record player or its connections are inadequately grounded. Connect a separate ground wire from the turntable or record changer frame to the **CHASSIS GROUND** binding post of the Model 2240. If this is ineffective, try reversing the polarity of the turntable's power plug.

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

TAPE JACKS

The rear panel of the 2240 can accommodate two tape recorders.

The terms IN and OUT refer to the input and output of the Model 2240. Therefore, the **IN** jacks on the Model 2240 accept signals from the line outputs of each tape recorder; the **OUT** jacks feed signal to the tape recorders' line inputs.

AUX INPUTS

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

FM ANTENNA

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

For rural areas, it is recommended that a local dealer be consulted about antenna installation and

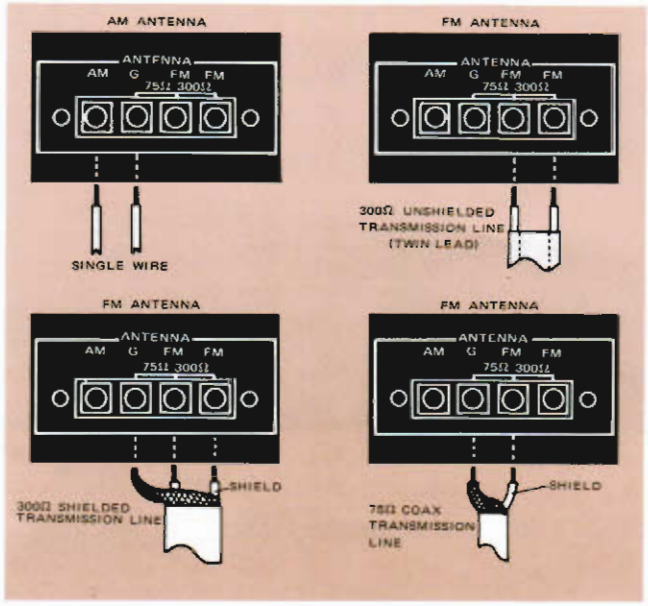

Figure 2. AM/FM Antenna Connection

lightning arrestor protection. Master antenna systems are not recommended for use with your Model 2240; such systems are usually designed expressly for television reception and frequently suppress **FM** signals before distribution. In addition, master antenna systems often severely reduce the quality of the **FM** signal. When outdoor antennas are prohibited or inconvenient, place the antenna in vacant attic space or use a simple 300 ohm TV "rabbit ear" antenna or the ribbon-type folded dipole antenna supplied with the Model 2240. Both are practical and will give satisfactory results in primary signal areas.

Your Model 2240 Receiver will accept either a 75 or 300 ohm antenna (see diagram, Figure 2). The 300 ohm antenna cable should be connected to the two terminals marked **FM** on the **ANTENNA** terminal. When using 75 ohm coaxial antenna cable, connect its shield to the G(GROUND) terminal, and its inner or center conductor to either of the **FM** terminals.

AM ANTENNA

Your Tuner is equipped with an **AM** ferrite-rod antenna. BEFORE USING THE MODEL 2240, SWING THE ANTENNA OUT AS SHOWN IN FIGURE 3.

The ferrite-rod antenna will give you satisfactory results in primary signal areas. However, an outdoor antenna will provide better reception in weaker signal areas. Two single wires are required to make an **AM** outdoor antenna. First, connect one end of a single wire to the **AN ANTENNA** terminal on the rear panel, and the other end to a very high horizontal antenna wire of 25 to 75 feet in length suspended between insulators in an outdoor location (the higher the better). Next, connect the other single wire between the "**G**" terminal of your Model 2240 and an authenticated earth ground (such as a metal water pipe).

FM QUADRADIAL OUTPUT JACK

In anticipation of future four channel quadraphonic broadcasting, your Model 2240 is equipped with an **FM QUADRADIAL OUTPUT** jack. The signal available at this jack is the unequalized, buffered output of the **FM** discriminator. Its level, frequency response characteristics, and output impedance are ideal to drive a four channel adaptor. This jack can also be used as a simple "white noise" generator for checking the response characteristics of loudspeakers or amplifiers. For this application, place the Model 2240 in **FM** mode with the muting off, and tune between **FM** stations to receive interstation noise.

PRE OUT AND MAIN IN JACKS

The **PRE OUT** jacks deliver the output of the Model 2240 preamplifier circuits to the rear panel. The **MAIN IN** jacks are the input terminals of the power amplifier section of the Model 2240.

The **PRE OUT** and **MAIN IN** jacks are bridged internally by special contacts within the jack assembly. When you wish to use such equipment as a graphic equalizer, compressor/limiter, or expander, you may connect these instruments to your Model 2240 with appropriate lengths of

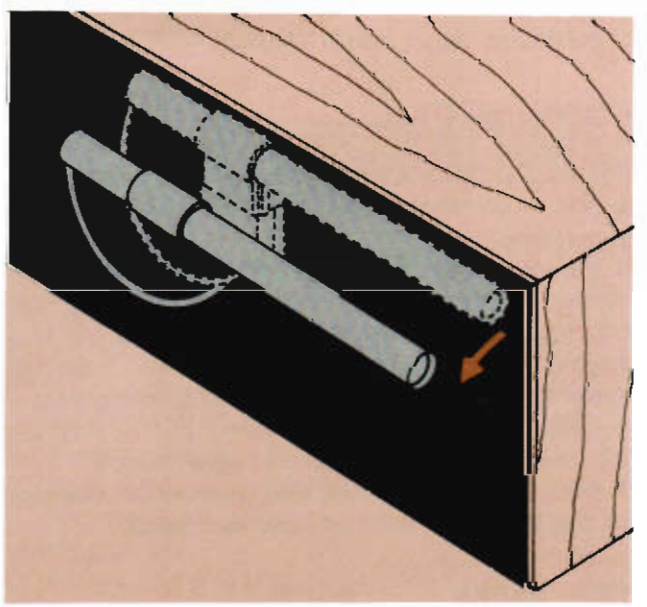

Figure 3. AM Ferrite-rod Antenna

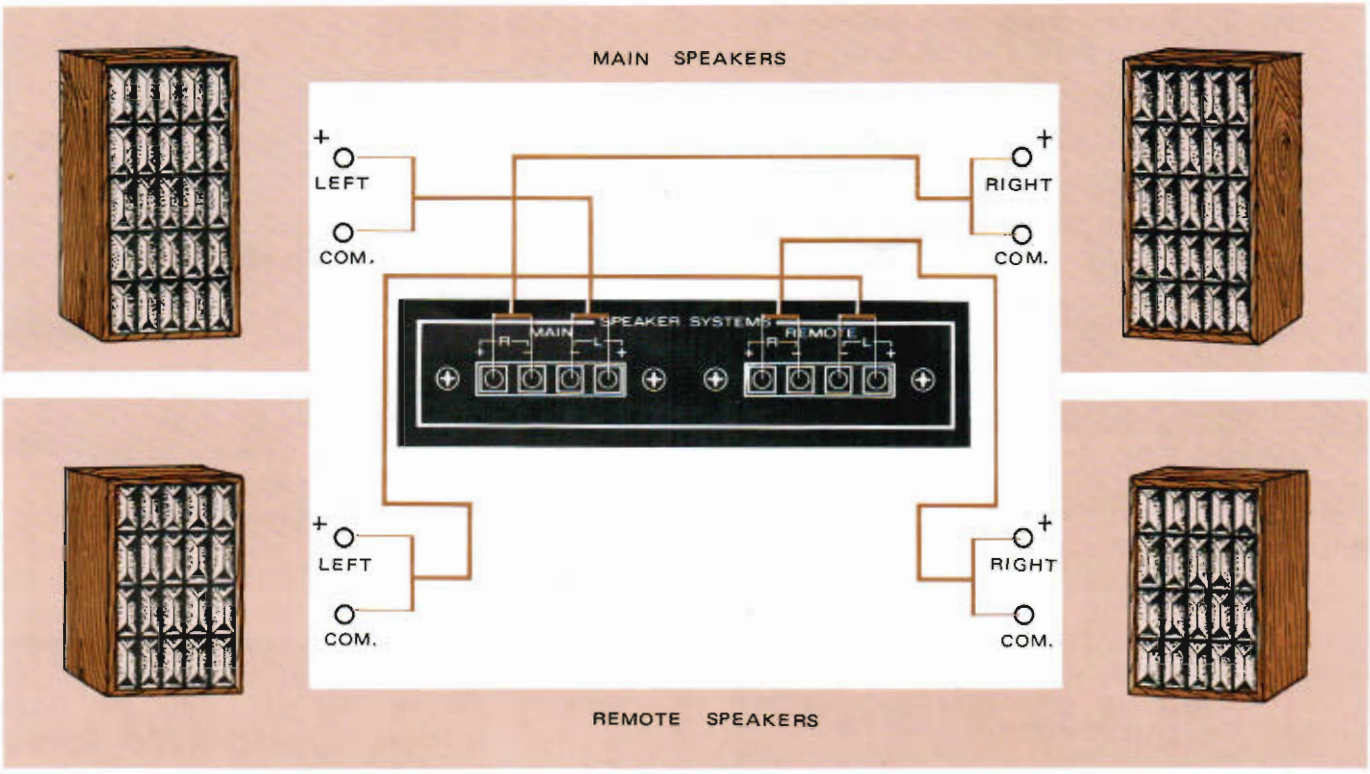

Figure 4. Speaker System Connections

shielded audio cables. When the external equipment is connected, the insertion of its RCA phono plugs in to the MAIN IN jacks automatically breaks the internal connections to prevent the external equipment from being bypassed.

SPEAKER SYSTEMS

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

SPEAKER PHASING

To assure the best stereo separation and frequency response, the speakers must be properly phased. The positive terminal on each speaker should be connected to its respective (+) terminal on the Model 2240, and the negative or "common" terminal should be connected to its respective (–) terminal. To verify that a pair of speakers are correctly phased, perform the following test:

1. Complete the necessary signal connections so that program material may be played through the speakers.
2. Place the speakers in the center of the room.
3. Depress the MONO pushswitch and play a record (or radio or tape) with strong bass tones at a low volume level. Center the BALANCE control.
4. Position the speakers about six inches apart, face-to-face. Listen, particularly to the apparent loudness of the bass tones.
5. Next, turn off all power, but do not disturb the VOLUME or BALANCE settings. Reverse the connections on the right speaker only. Turn on the power and listen again. If the bass tones now seem louder than in (3), you have corrected the phasing between the speakers. If the bass notes now sound softer, turn off the power and re-connect the speakers as they had been originally.
6. If an additional pair of speakers is used along with the main speaker system, check phasing between the remote speakers and the main speakers. Use the BALANCE control to play only two speakers at once, and invert the wiring on the remote speakers as necessary. Do not change the connections on the main speaker system.
7. Once having phased all speakers, you need not repeat this procedure in the future if you now

mark the speaker connections and/or cables. Any method of coding is satisfactory, provided it enables you, in the future, to duplicate your now-correct hookup between speakers and amplifier.

Use caution when connecting your Model 2240 to a loudspeaker with built-in power supply such as an electrostatic loudspeaker. The "common" connection terminal of such a speaker may be capacitively coupled to ground through its own power supply. To protect the Model 2240 from distortion and possible overload, make sure the (—) terminals of the Model 2240 are connected to the "common" terminals of such a loudspeaker system.

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

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

CONNECTION TO AC OUTLET

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

CAUTION: DO NOT PLUG YOUR MODEL 2240 INTO A DC OUTLET, AS SERIOUS DAMAGE WILL OCCUR.

CONVENIENCE OUTLETS

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

AC PROTECTOR FUSE

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

SIMPLIFIED OPERATING PROCEDURES

When operating the Model 2240 Stereo Receiver for the first time, follow these simple directions. Later, full advantage can be taken of its versatility with the remaining controls and pushswitches.

Step 1. Connect the FM antenna to the appropriate terminals on the rear panel.

Step 2. Connect the speakers to the **MAIN** speaker terminals.

Step 3. Place all pushswitches in the "out" position.

Step 4. Turn the **VOLUME** control all the way to the left (counterclockwise) and set the balance control in center position.

Step 5. Rotate **TREBLE, MID** and **BASS** controls to the 12 o'clock position (each pair of pointers to dot).

Step 6. Depress the **MAIN** speaker pushswitch.

Step 7. Apply system power by depressing the **POWER** switch.

Step 8. Select the desired program source by setting the **SELECTOR** switch to the appropriate position. If **FM** or **AM** is selected, rotate the Gyro-Touch TUNING knob until the desired station is tuned. Adjust the **VOLUME** control to a comfortable listening level.

Figure 5. Front Panel Controls and Jacks

MAIN CONTROLS AND SWITCHES

POWER SWITCH

The **POWER** switch, when depressed, supplies AC power to the Model 2240 and to the **SWITCHED** outlet on its rear panel.

SELECTOR SWITCH

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

VOLUME CONTROL

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

BALANCE CONTROL

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

BASS, MID AND TREBLE CONTROLS

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

TUNING METER

The Model 2240 is equipped with two meters, a **SIGNAL STRENGTH** meter and an **FM TUNING** meter.

1. The **SIGNAL STRENGTH** meter indicates the relative signal strength of any **AM** or **FM** broadcast.
2. The **FM TUNING** meter operates only when **FM** is selected and indicates correct station tuning when centered.

GYRO-TOUCH TUNING CONTROL

AM

Switch the **SELECTOR** to AM and tune to the desired station. Then rotate the **GYRO-TOUCH TUNING** knob slightly back and forth until the maximum reading is obtained on the **SIGNAL STRENGTH** meter.

FM

Switch the **SELECTOR** to **FM** and tune to the desired station. Then rotate the **GYRO-TOUCH TUNING** knob slightly back and forth until the maximum reading is obtained on the **SIGNAL STRENGTH** meter and a center scale reading is obtained on the **FM TUNING** meter.

DOLBY FM-25μS SWITCH

To listen to a Dolbyized FM broadcast, connect a Dolby noise reduction adaptor between either **TAPE 1** or **TAPE 2 OUT** and **IN** jacks on the rear panel of the Model 2240. Depress the **Dolby FM-25μS** pushswitch, and place the tape

MONITOR switches in the corresponding position. With the **FM** Dolby switch in, the audio output signals are preset internally to standard Dolby level, and the de-emphasis time constant applied to the signals is also switched from 75μ sec to 25 μ sec automatically.

MONO SWITCH

When a marginal stereo signal is received, random noise and phase modulation may cause the tuner's multiplex circuitry to trigger the **STEREO** mode intermittently. In this case, it is sometimes desirable to cancel the multiplex operation entirely in favor of obtaining a more listenable signal. The **MONO** switch performs this function and converts all output signals to the **MONOPHONIC** mode.
While playing a single channel source such as TV or AM, depress the **MONO** pushswitch to hear the source through both speakers. When playing a monophonic phonograph record, use this pushswitch to suppress rumble, record surface noise, and pinch effect distortion.

FM MUTING SWITCH AND MUTING LEVEL CONTROL

In the absence of an **FM** carrier, all **FM** receivers produce noise. This noise is apparent between stations while tuning.
The **FM MUTING** pushswitch activates circuitry featured in the Model 2240 which mutes the audio outputs when tuned "off-station".
The **MUTING LEVEL** control on the rear panel determines the threshold level for the muting circuitry. Maximum muting effect is achieved by setting the **FM MUTING LEVEL** to MAX. To prevent muting very weak stations along with the noise, the muting function may be turned off by releasing the **FM MUTING** pushswitch.

MONITOR SWITCHES

These pushswitches control the tape monitoring functions of the Model 2240. When the **SOURCE/TAPE** switch is in **SOURCE** position, the amplifier inputs are determined by the **SELECTOR** switch. When the **SOURCE/TAPE** switch is in the **TAPE** position, the amplifier derives its inputs from one of the two pairs of **TAPE IN** jacks on the rear panel. The **MONITOR 1, 2** switch determines which of these two pairs becomes the input, or in other words which tape recorder is monitored.

LOUDNESS SWITCH

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

LOW FILTER SWITCH

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

HI FILTER SWITCH

This switch can be used to reduce high frequency noise such as that associated with the playing of poorly recorded tapes or worn disc recordings. When the **AM** tuner is being used, this switch will help to suppress considerably the high pitched "whistle" caused by adjacent **AM** channel interference. This filter will also, along with high frequency noise, slightly attenuate high frequency program material, and should therefore be used judiciously.

MAIN-SPKR-REMOTE SWITCHES

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

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

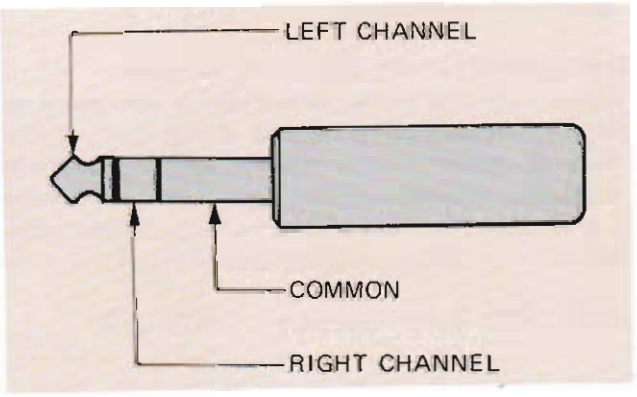

Figure 6. Three Conductor Phone Plug

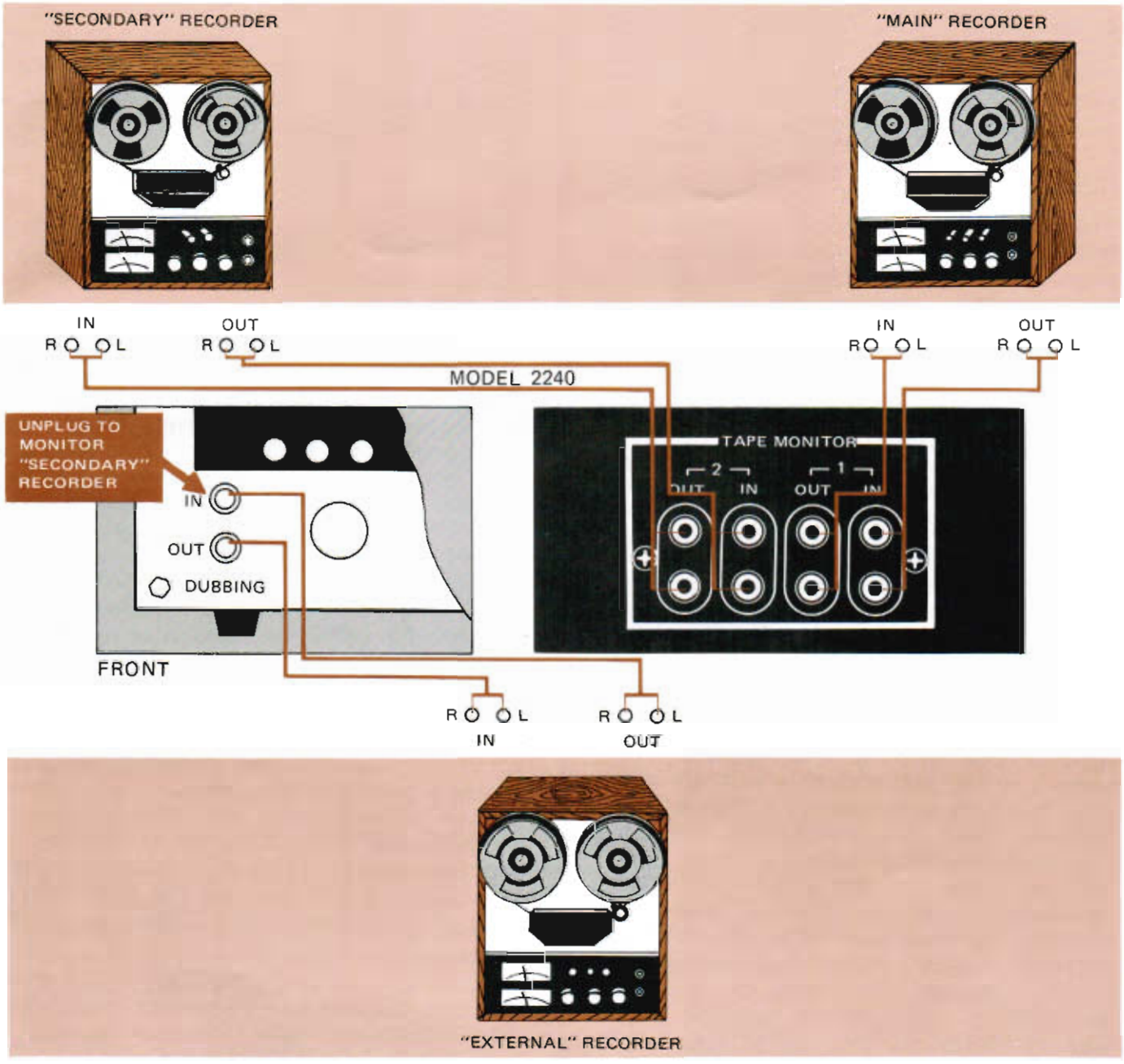

Figure 7. Tape Recorder Connections

PHONES JACK

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

SOME SUGGESTIONS ON USING TAPE RECODERS WITH YOUR MODEL2240

The Model 2240 has three sets of inputs and outputs for tape recorders: **TAPE 1 IN** and **OUT**, **TAPE 2 IN** and **OUT**,, and **DUBBING IN** and **OUT**. To simplify this discussion, the tape recorder connected to the **TAPE 1** jacks will be referred to

as the "MAIN" recorder; the tape recorder connected to TAPE 2 will be referred to as the "SECONDARY" recorder; the recorder connected to the DUBBING facilities on the front panel will be referred to as the "EXTERNAL" recorder.

DUBBING JACKS

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

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

MAKING TAPE RECORDINGS AND DUBS

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

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

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

TAPE MONITORING

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

"MAIN" recorder — Depress the SOURCE/TAPE MONITOR switch; release the 1, 2 MONITOR switch to the 1 positon.

"SECONDARY" recorder — Depress both MONITOR switches.

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

MAKING MODIFIED TAPE RECORDINGS

The PRE OUT jacks on the rear panel of the 2240 may be used to feed input signals to a tape recorder so that filters, balance, and tone controls can be used to modify the signal prior to recording. Modified tape copies can likewise be made. First, select the tape to be used as a source on the SELECTOR switch. Next, connect the input of the other tape recorder to the PFE OUT jacks. By connecting the

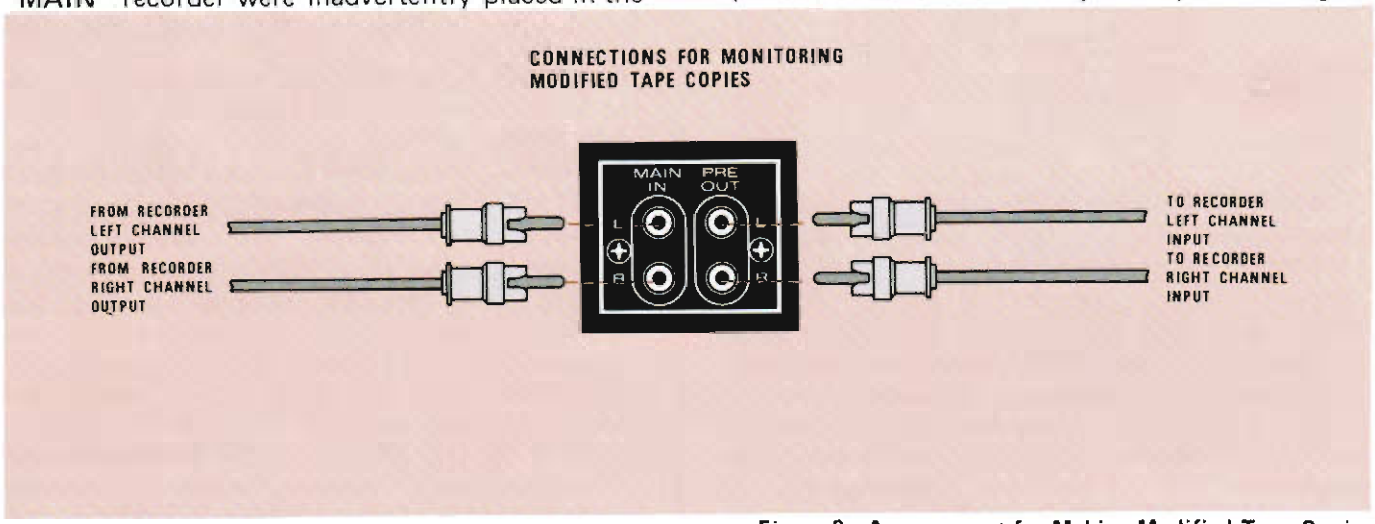

Figure 8. Arrangement for Making Modified Tape Copies

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

RECORDING DOLBYIZED FM PROGRAMS

Dolbyized FM broadcasts contain Dolbyized audio information to which a special pre-emphasis is applied for the purpose of improving the noise reduction process. To make a Dolbyized tape recording of such a broadcast, depress the **DOLBY FM-25μS** switch to properly de-emphasize the signal, but bypass the noise reduction adaptor to record the dolbyized audio directly onto the tape.
The inputs to the tape recorder in this application must be properly calibrated beforehand according to the procedure detailed in the Dolby unit's instruction booklet. To achieve proper calibration, it is necessary that the record level control on the Dolby unit be adjusted to the proper Dolby level by use of the reference tone transmitted by the FM station.
For monitoring purpose, connect the Dolby unit between the line outputs of the tape recorder and the **TAPE IN** jacks on the 2240.
When using a tape recorder containing a built-in FM Dolby de-emphasis circuit, a better signal-to-noise ratio can be achieved by using only the **DOLBY FM-25μS** circuit in the Model 2240 instead of the facilities in the tape recorder. Do not use both de-emphasis circuits simultaneously.

CONVERTING YOUR STEREO SYSTEM TO 4-CHANNEL

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

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

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

TECHNICAL DESCRIPTION

GENERAL

Figure 9 is a block diagram of the Model 2240 Receiver showing the main functional elements and input and output signal routing. The **AM** and **FM** sections have separate IF amplifiers. For clarity, only the left audio channel is shown; the right audio channel is identical. The **MONO** switch is common to both channels. All audio controls are ganged or concentrically clutched to their counterparts in the right channel. The left channel half of the front panel **DUBBING IN** and **DUBBING**

OUT jacks is shown interconnected in this diagram. The right channel of each jack is wired to the same circuit point in the right channel.

FM TUNER SECTION

FRONT END

FM antenna signals are applied through a balun transformer to the antenna coil which drives a field effect transistor RF amplifier. A four section tuning capacitor tunes antenna, interstage and oscillator circuits which provide exceptional selectivity and spurious signal rejection. The signals from the amplifier are fed through the double-tuned RF tank circuit to the FET mixer stage, which is also fed by the signal from the local oscillator. Careful attention to the thermal and electrical characteristics of the oscillator has minimized drift, thus obviating the necessity for AFC. The 10.7 MHz converted signal is then fed to the IF amplifier.

IF AMPLIFIER

The IF amplifier consists of eight ceramic filters and eight stages of IF amplifiers including four limiter stages. The characteristics of these ceramic filters are such that the 200 kHz passband is phase linear thus eliminating a major source of high frequency distortion and loss of stereo separation. The sharp cut-off slopes improve selectivity, permitting reception of closely spaced channels. The Model 2240 utilizes four symmetrical diode limiter stages consisting of high performance Gold Bond diodes which result in a very small dynamic aperture. Thus, undesirable Amplitude Modulation is removed from the IF signal within the limiter and good capture ratio is also assured. The amplified and symmetrically limited FM signals are fed to the super-linear discriminator circuit. The detected audio signals are then distributed to the QUADRADIAL jack, MPX Decoder circuit, Noise Amplifier, and Muting Circuit.

LIMITERS

The Model 2240 utilizes four stages of symmetrical diode limiter circuits consisting of two high performance Gold Bond Hot Carrier type diodes per stage, which result in a very small dynamic aperture. Thus undesirable amplitude modulation (AM signals, AM noise, AM distortion) is removed from the IF signal within the limiter and good capture ratio is also assured. The amplified and symmetrically limited FM signals are fed to the super-linear discriminator circuit. The detected audio signals are then distributed to the QUADRADIAL jack, MPX decoder circuit, Noise Amplifier, and Muting Circuit.

STEREO DEMODULATOR

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

Each left and right channel signal is then applied to the 19 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 an audio amplifier consisting of NPN-PNP direct-coupled transistor feedback pairs and amplified to the required signal of about 755 mV RMS. Finally, each amplkified signal is fed to the SELECTOR switch.

The phase locked loop IC in the multiplex stereo demodulator circuit is equipped with a separate automatic Stereo/Monaural switching circuit. The circuit examines the input signal intensity and actuates the stereo demodulator and stereo indicator lamp automatically when the input signal is of sufficient strength to provide high quality stereo reception. When the input signal intensity is insufficient for this purpose, the stereo signal is automatically changed to a monaural signal to ensure quality reception and a high signal-to-noise ratio.

MUTING CIRCUIT

In the absence of an FM carrier, all FM receivers produce interstation noise. The muting circuit eliminates this noise, providing noise-free tuning from station to station.

A muting circuit consisting of a two transistor noise amplifier and a three transistor (including one FET) switching circuit, has been incorporated in the Model 2240. The muting circuit perfectly mutes out all the interstation noise and Also completely mutes out the side slope spuriour response of the unit. The circuit has been designed to minimize annoying switching noise as the tuning band is scanned.

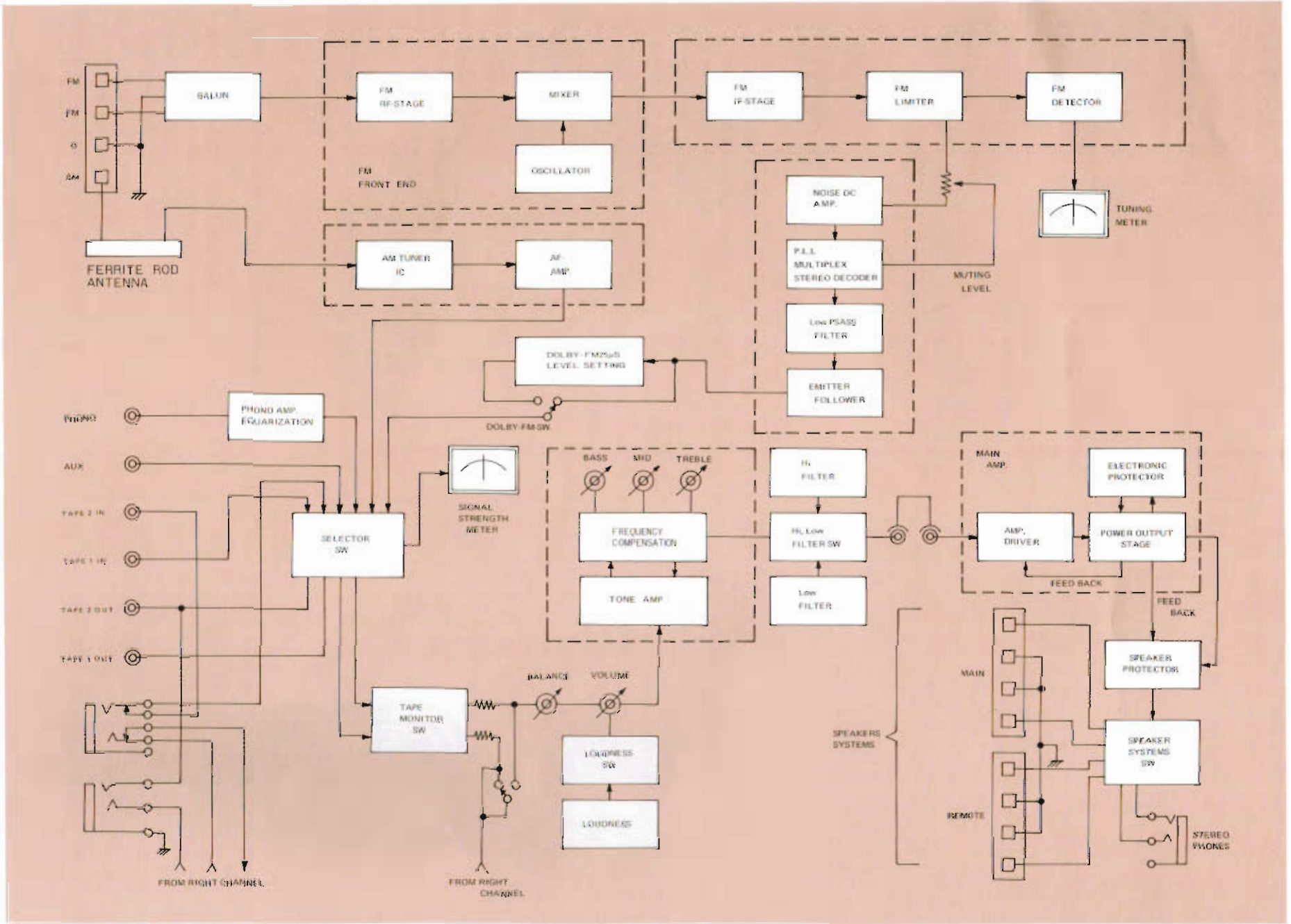

Figure 9. Functional Block Diagram

AM TUNER SECTION

The AM tuner section of the Model 2240 is composed of one IC (incorporating an RF amplifier, local oscillator, mixer, IF amplifier and detector) and three transistors. One of them is a signal strength indication amplifier, while the other two are used for amplifying detected audio signals. A three section variable capacitor is used to insert two tuned circuits into the RF stage for high selectivity and improved spurious signal rejection performance. The ceramic filters utilized in the AM IF amplifier are designed for higher selectivity and wider bandwidth for interference-free high quality AM reception. Following the AM IF amplifier, the AM detector recovers the audio modulation and presents this signal to the mode selection switch. The AM tuner and IF amplifier are subjected to the action of an effective automatic gain control circuit which maintains a constant signal level for all stations in the AM band.

AMPLIFIER SECTION

SELECTOR SWITCH

The Model 2240 has the capability to operate from a variety of program sources, e.g., **AM** or **FM** broadcasts, turntable (**PHONO**), tape recorders (**TAPE**) or any other source capable of providing 100 millivolts output level (**AUX**). The selector switch connects the desired source to the audio amplifying chain.

PHONO AMPLIFIER

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

MONO FUNCTIONS

When the **MONO** pushswitch is in the "in" position, the two channels are connected together through mixing resistors. In addition, the left and right channel tape input signals are connected together through the same resistor network. This facility allows all inputs to be converted to the monophonic mode.

CONTROL CIRCUITS

The control circuits portion of the Model 2240 consists of **BALANCE, VOLUME, BASS, MID TREBLE, HI FILTER** and **LOW FILTER** controls. All controls affect the left and right channels simultaneously. The **BASS, MID** AND **TREBLE** controls have clutched sections which allow individual adjustment of tonal balance for each channel. With the controls set for flat response and volume control at maximum, the over all voltage gain from any high level input to the loudspeaker terminals is approximately 40 dB.

BALANCE CONTROL

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

VOLUME CONTROL

The **VOLUME** control attenuates both channels simultaneously and maintains tracking to within 3 dB at any point of attenuation to −50 dB from maximum. Since the control is situated at the input of the tone amplifier, there is no possibility of overloading the amplifier stages under maximum rated output conditions. Thus, distortion is kept to a minimum. After attenuation by the **BALANCE** and **VOLUME** controls, the signal is applied to the **TONE CONTROL AMPLIFIER.**

OUTPUT STAGE AND PROTECTIVE CIRCUITS

The differential amplifier and pre-driver circuit amplify the signal from the HI and **LOW FILTERS** to sufficient levels to drive the output stages. From the input of the differential amplifier circuit, the amplifier stages are direct coupled through to the loudspeakers (and headphones) providing instantaneous recovery from any overdriven condition. The output stage consists of a pair of push-pull, complementary symmetry transistors (**PNP, NPN**), having massive current and dissipation capabilities. The electronic protective circuit senses excessive output current and voltage conditions and limits the signal to the driver transistors to a safe, predetermined value. This limiting action protects the driver and output transistors from excessive overdrive and short circuit conditions. This instantaneous acting safety circuit gives constant and unobtrusive protection without causing annoying program interruptions. Thermal compensation circuits are also provided to ensure highly stable operation under severe temperature and signal handling conditions.

GENERAL SPECIFICATIONS

Power Requirements 120V 50/60Hz
Power Consuiremption :
At rated output, both channels operating 170W
Idling Power (Volume control at zero) 30W
Dimensions:
Panel Width ..... 17-3/8 inches
Panel Height ..... 5-3/8 inches
Depth ..... 14-3/8 inches
Weight:
Unit alone ..... 30.8 lbs
Packed for shipment ..... 38.1 lbs

SERVICE NOTES

Because the Model 2240 Stereo Receiver is completely solid state, replacement of parts should never be required. If the pilot lamp burns out, have your serviceman replace it.

FUSE REPLACEMENT

The Model 2240 is protected by a 5-amp fuse. In the event the fuse blows out, replace it ONLY with a fuse of the same type and rating. Replacement with fuse of higher rating will not protect the instrument and will void the warranty.

CLEANING

Your Model 2240 Stereo Receiver has a very durable finish. The front panel and knobs are gold anodized for lasting beauty. You can clean the panel and knobs with a liquid solution of mild detergent and water applied with a soft cloth or cotton-tipped swab. Never use scouring powder or any abrasive cleaner.

REPAIRS

Only the most competent and qualified service technicians should be allowed to service the Model 2240 Stereo Receiver. The Marantz Company and its factory trained warranty station personnel have the knowledge and special equipment needed for repair and calibration of this precision instrument. In the event of difficulty, write directly to the Marantz Technical Service Department, P.O. Box 99, Sun Valley, California 91352, for the name and address of the Marantz warranty or authorized service station nearest your home or business. Please include the model and serial number of your unit and a description of what you feel is abnormal about its operation.

REPACKING FOR SHIPMENT

Should it become necessary to repack your Model 2240 for shipment to the factory, to an authorized service station, or elsewhere, please observe the following precautions:

a. Do not ship your unit to the factory without an Authorized Return Label, which the Marantz Company will supply if the description of difficulties appears to warrant factory service.
b. Do not ship the unit installed in its accessory walnut cabinet; remove the unit from the cabinet before packing.
c. Pack the unit carefully, using the original material as shown in Figure 11.
PLEASE NOTE that if you have discarded, lost, or damaged the packing material, new packing material may be obtained by writing to the Marantz Technical Services Department. The carton, its fillers, and packing instructions will be returned to you at a nominal charge.
d. Ship via a reputable carrier (do not use Parcel Post) and obtain a shipping receipt from the carrier.
e. Insure the unit for its full value.
f. Be sure to include your return address on the shipping label.

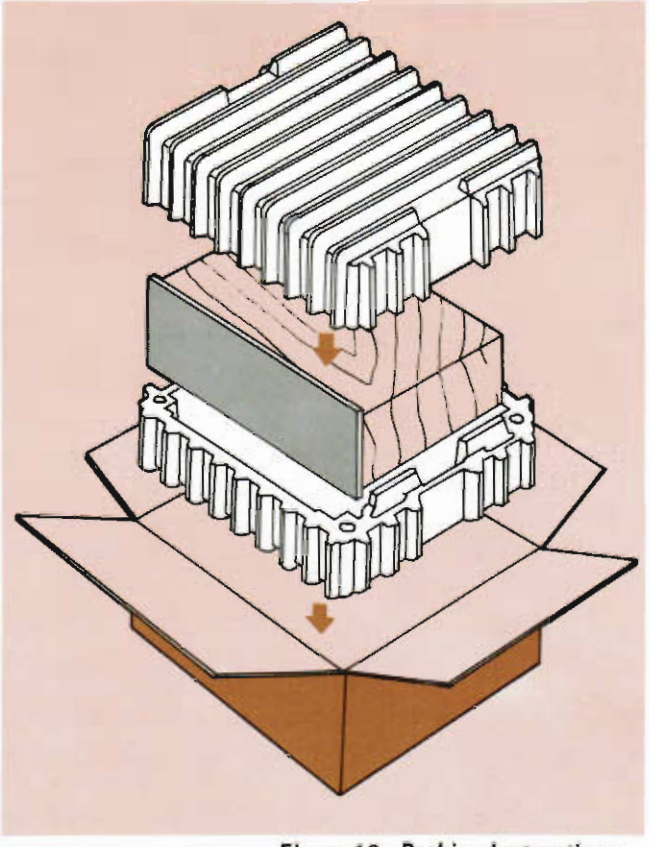

Figure 10. Packing Instructions

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.
TheSound 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 theSound of Marantz
is the sound of music at its very best.

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