

marantz.[®]

**Model 2238 B
Stereophonic
Receiver**

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

FOREWORD

For optimum performance and enjoyment from your Model 2238B Stereo Receiver, please study these instructions carefully. Installation and operation are not complicated, but its flexibility and features deserve your becoming familiar with its controls and connections.

This manual is divided into two parts. The first covers installation and operation in simple, nontechnical language. The second describes the 2238B in more detail with functional explanations. For quick identification of the controls and connections, references to them are printed in **BOLDFACE TYPE**, exactly as they appear on the front and rear panels of your Receiver.

AC Line Operation

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

GENERAL DESCRIPTION

The Marantz Model 2238B 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 2238B features a sensitive stereo FM tuner, a highly selective AM tuner, and a low distortion preamplifier and amplifier on a single chassis. The FM tuner utilizes a dual gate MOS-FET front end, ceramic IF filters, and a phase locked loop multiplex decoder. The AM tuner features an advanced integrated circuit with ceramic and L-C filters for high selectivity and low interference. 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.

AFTER UNPACKING

It is advisable to retain all original packing material to prevent damage should you wish to transport or ship the Model 2238B (refer to page 14 for repacking and shipping instructions). Be careful that you do not inadvertently throw away or lose the parts packed with the unit.

Please inspect your Model 2238B carefully for any signs of shipping damage. Our very strict quality control and professional pride ensure that each Model 2238B left the factory in perfect condition. If the unit is damaged or fails to operate, immediately notify your dealer. If the unit was shipped to you directly, notify the transportation company without delay. Only you, the consignee, may institute a claim against the carrier for shipping damage. Save the carton and all packing material as evidence of damage for their inspection. Should assistance be required, the Marantz Company will cooperate fully in assisting your claim.

Please fill out and mail the Warranty Registration Card within ten days of purchase. The card will remain on file at the Marantz Company for the duration of the warranty period. We also strongly advise that you retain your sales receipt to provide proof of purchase in the event that warranty service is sought.

TABLE OF CONTENTS

PREPARATION FOR USE	1
Mechanical Installation	1
Marantz Walnut Veneer Cabinet	1
Custom Installation	1
CONNECTING THE MODEL 2238B	1
Phono Inputs	1
Tape Jacks	2
Aux Inputs	2
FM Antenna	2
Outdoor FM Antennas	2
AM Antenna	3
FM Quadradial Output Jack	3
Pre Out and Main In Jacks	3
Speaker Systems	4
Speaker Phasing	4
Connection to AC Outlet	5
Convenience Outlets	5
AC Protector Fuse	5
Installation of Dolby Plug-in FM Decoder	5
Signal Connection Checklist	5
SIMPLIFIED OPERATING PROCEDURES	6
MAIN CONTROLS AND SWITCHES	6
Power Switch	6
Selector Switch	6
Volume Control	6
Balance Control	6
Bass, Mid and Treble Controls	6
Tuning Meters	7
Gyro-Touch Tuning Knob	7
FM 25 μ S Switch—Dolby FM Reception	7
Speaker System Switches	7
Phones Jack	8
FM Muting Switch	8
Loudness Switch	8
Hi Filter Switch	8
Mono Switch	8
Tape 1 Monitor Switch	8
TAPE RECORDING AND DUBBING	9
Recording	9
Dubbing	9
Recording Dolbyized FM Programs	9
TECHNICAL DESCRIPTION	11
General	11
FM Front End	11
FM IF Amplifier	11
FM Stereo Demodulator	11
Muting Circuit	11
AM Tuner	11
Selector Switch	12
Tape 1 Monitor Switch	12
Phono EQ Amplifier	12
Mono Functions	12

Control Circuits	12
Balance Control	12
Volume Control	12
Tone Control Amplifier	12
Amplifier	12

MAINTENANCE	13
Cleaning	13
Fuse Replacement	13
In Case of Difficulty	13

SERVICE NOTES	14
Repairs	14
Repacking for Shipment	14

LIST OF ILLUSTRATIONS

1. Rear Panel Connection Facilities	1
2. FM Antenna Connection	2
3. AM Ferrite-rod Antenna	2
4. Loudspeaker System Connections	4
5. Front Panel Controls and Jack	6
6. Stereophone Plug	8
7. Functional Block Diagram	10
8. Packing Instructions	14

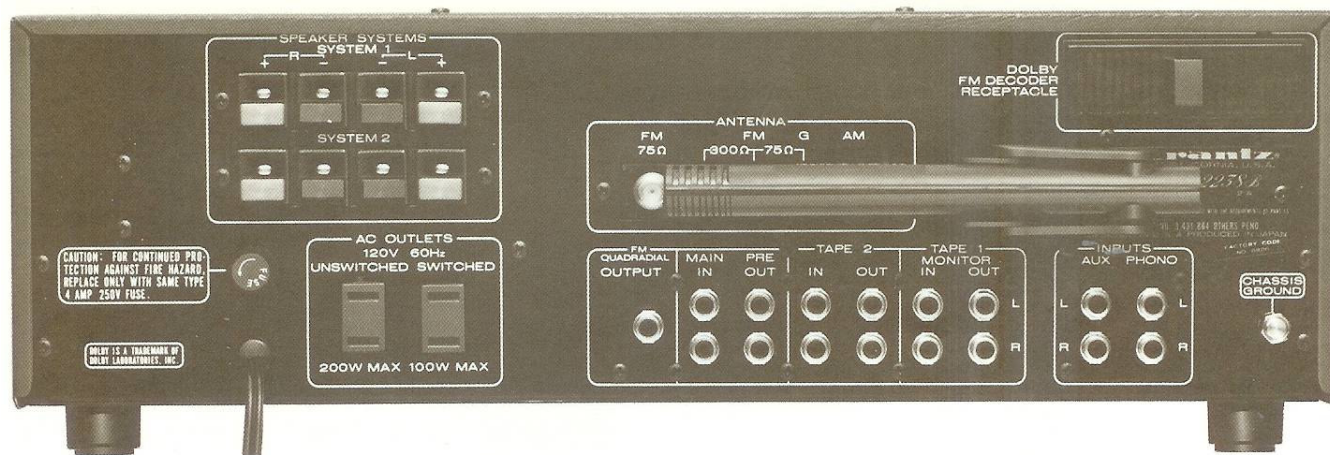


Figure 1 Rear Panel Connection Facilities

PREPARATION FOR USE

● MECHANICAL INSTALLATION

The Model 2238B Stereo Receiver can be installed in two basic ways: In a beautiful walnut veneer cabinet for placement on a table or shelf, or mounted in your own cabinetry or custom installation.

● MARANTZ WALNUT VENEER CABINET

An optional walnut veneer cabinet, Model WC-122, may be obtained from your Marantz dealer. The case provides for proper ventilation, and can be placed on furniture, or on a bookshelf. Complete instructions for installation are provided with the WC-122.

● CUSTOM INSTALLATION

When planning a custom installation, allow adequate spacing between the Model 2238B, cabinet surfaces, and other components for adequate ventilation.

To install the Model 2238B Stereo Receiver in a custom cabinet, cut an opening 16-7/8 inches wide by 5-1/8 inches high. Since the front panel of the Model 2238B is larger than the cutout, it will neatly hide the edges of the cut. Remove the plastic feet from the bottom of the unit and slide it through the opening. To support the weight of the Model 2238B, adequate bracing across the rear of the cabinet must be located to provide contact with the rear of the unit.

CONNECTING THE MODEL 2238B

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 2238B, 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 2238B and the other components of your system. This is the safest way to avoid cross-connecting channels or confusing signal sources with destinations.

● 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 incorrectly grounded. Connect a separate ground wire from the turntable or record changer frame to the **CHASSIS GROUND** binding post of the Model 2238B. 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.

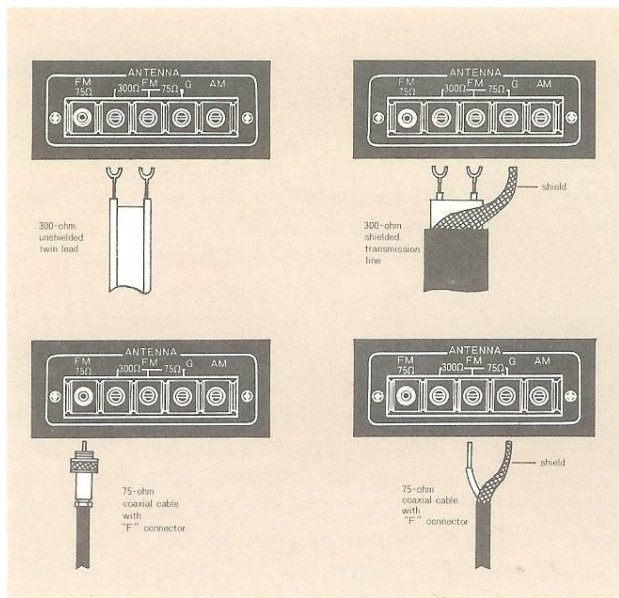


Figure 2 FM Antenna Connection

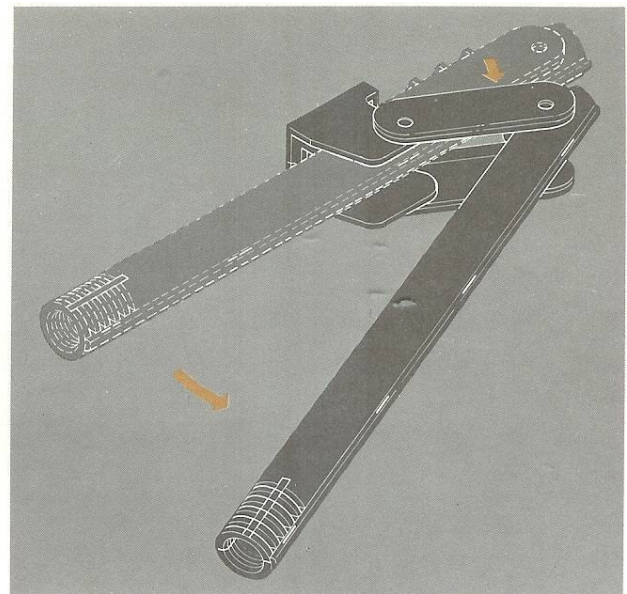


Figure 3 AM Ferrite-rod Antenna

● TAPE JACKS

TAPE 1 MONITOR IN — The pair of **TAPE 1 MONITOR IN** jacks serve two purposes:

1. By depressing the **TAPE 1 MONITOR** push-switch, signals can be played from a tape recorder set for playback mode of operation. This permits playing the tape source stereophonically or monophonically as indicated by the position of the **MONO** pushswitch.
2. While your tape recorder is recording, you can monitor the resulting tape quality by depressing the **TAPE 1 MONITOR** pushswitch. This requires that your recorder be equipped with separate record and playback heads and separate record and playback electronics.

TAPE 2 IN — The signals from your tape recorder connected to the **TAPE 2 IN** jacks can be played back when the **SELECTOR** switch is placed in the **TAPE 2** position and the **TAPE 1 MONITOR** switch is released. In addition, these jacks allow tape copying from **TAPE 2** to **TAPE 1**. The resulting recording can be monitored by depressing the **TAPE 1 MONITOR** pushswitch.

TAPE MONITOR 1 & TAPE 2 OUT — Connecting these jacks to the line inputs of a tape recorder permits recording from the program source indicated by the **SELECTOR** switch. The signals available at this pair of jacks are not affected by the **BALANCE**, **VOLUME**, **TREBLE**, **MID**, **BASS**, **HI FILTER**, **LOUDNESS**, and **MONO** pushswitches on the front panel.

● 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

Included in the accessory kit is a ribbon-type “folded dipole” FM antenna. This type of antenna is simple and practical and will give adequate results in primary signal areas. To use it, unfold it into a “T” shape and connect its leads to the terminals marked **300 Ω** on the back of the receiver (See Figure 2). The antenna is designed to operate in a horizontal position. Temporarily (for the purpose of getting started) attach it to a nearby wall.

As shown in Figure 2, the Model 2238B is also capable of accommodating other types of cable, including 75-ohm coaxial cable (with or without “F”-type connector), and 300-ohm shielded transmission line. These types of cable are for use with outdoor antennas, which will be discussed next.

● OUTDOOR FM ANTENNAS

As stated before, the supplied folded dipole antenna will give satisfactory results in primary signal areas. It should be obvious, however, that if you are located in a fringe area where signals are weak, then an outdoor antenna will be necessary. Even if you live in a strong signal location, an outdoor directional antenna may be needed to eliminate “multipath” reflections.

Multipath reflections are responsible for much of the distortion and sibilance associated with poor FM reception. They occur when radio waves from the transmitter bounce off of nearby

mountains and tall buildings. The reflected waves follow different, more roundabout paths to your tuner and arrive slightly delayed and out of phase with the direct signal (hence, the term "multipath"). This causes distortion in the same manner that "ghost" images are generated on television.

The way to minimize multipath is to use a "beam type" antenna that can be aimed toward to the FM transmitter and away from the multipath reflections. The best types of antennas to use are either a "Yagi" or "Log-Periodic" configuration with six or more elements designed expressly for FM reception.

If you want to receive stations from more than one general direction, then you will need a good quality antenna rotor system. This will enable you to point the antenna in the direction giving the least multipath interference, by means of a control box located near the tuner.

Another important factor is the type of lead-in wire to use. Unshielded lead-in wires, such as 300-ohm twin lead, can act as an omnidirectional antenna, and can cancel the directional benefits of your antenna. Therefore, we recommend using a balanced, shielded 300-ohm cable or a coaxial 75-ohm cable with a 300-to-75-ohm matching transformer at the antenna. These types of shielded cable effectively prevent the lead-in from contributing to multipath distortion.

Shielded antenna cable will be available at the same store where you buy your antenna. If you decide to use 75-ohm coaxial cable, we recommend buying cable with "F"-type connectors attached. These will fit both the matching transformer and the terminal on the Model 2238B (See Figure 2).

It is considered good practice to connect the antenna mast to an earth ground, both for reasons of safety and noise reduction. If 300 ohm shielded cable is used, connect the shield to ground (G) at the tuner end only.

For rural areas, it is recommended to consult a local dealer about installation and lightning ar-restor protection.

We don't recommend using master antenna systems, such as those found in apartment buildings. Such systems are usually designed expressly for television reception and frequently suppress or reduce the quality of the FM signals before distribution.

Where outdoor antennas are prohibited or inconvenient, the simplest form of "rabbit-ear" TV antenna is the most practical and will give satisfactory results. This type is preferred over the folded dipole because it can be more readily rotated for the best reception.

● AM ANTENNA

Your Receiver is equipped with an AM ferrite-rod antenna. BEFORE USING THE MODEL 2238B, SWING THE ANTENNA OUT AS SHOWN IN FIGURE 3.

The ferrite-rod antenna will give you satisfactory results in primary signal areas. However, an outdoor antenna will provide better reception in weaker signal areas. Two single wires are required to make an AM outdoor antenna. First, connect one end of a single wire to the **AM ANTENNA** terminal on the rear panel, and the other end to a very high horizontal antenna wire of 25 to 75 feet in length suspended between insulators in an outdoor location (the higher the better). Next, connect the second single wire between the **G** terminal of your Model 2238B and an authenticated earth ground (such as a metal water pipe).

● FM QUADRADIAL OUTPUT JACK

In anticipation of future four channel quadrasonic broadcasting, your Model 2238B 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, connect the **FM QUADRADIAL OUTPUT** jack to the **TAPE 1 MONITOR IN** jack, press the **TAPE 1 MONITOR** switch, place the Model 2238B 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 2238B preamplifier circuits to the rear panel. The **MAIN IN** jacks are the input terminals of the power amplifier section of the Model 2238B. 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 2238B with appropriate lengths of shielded audio cables. When the external equipment is connected, the insertion of its RCA phono plugs into the **MAIN IN** jacks automatically breaks the internal connections to prevent the external equipment from being bypassed.

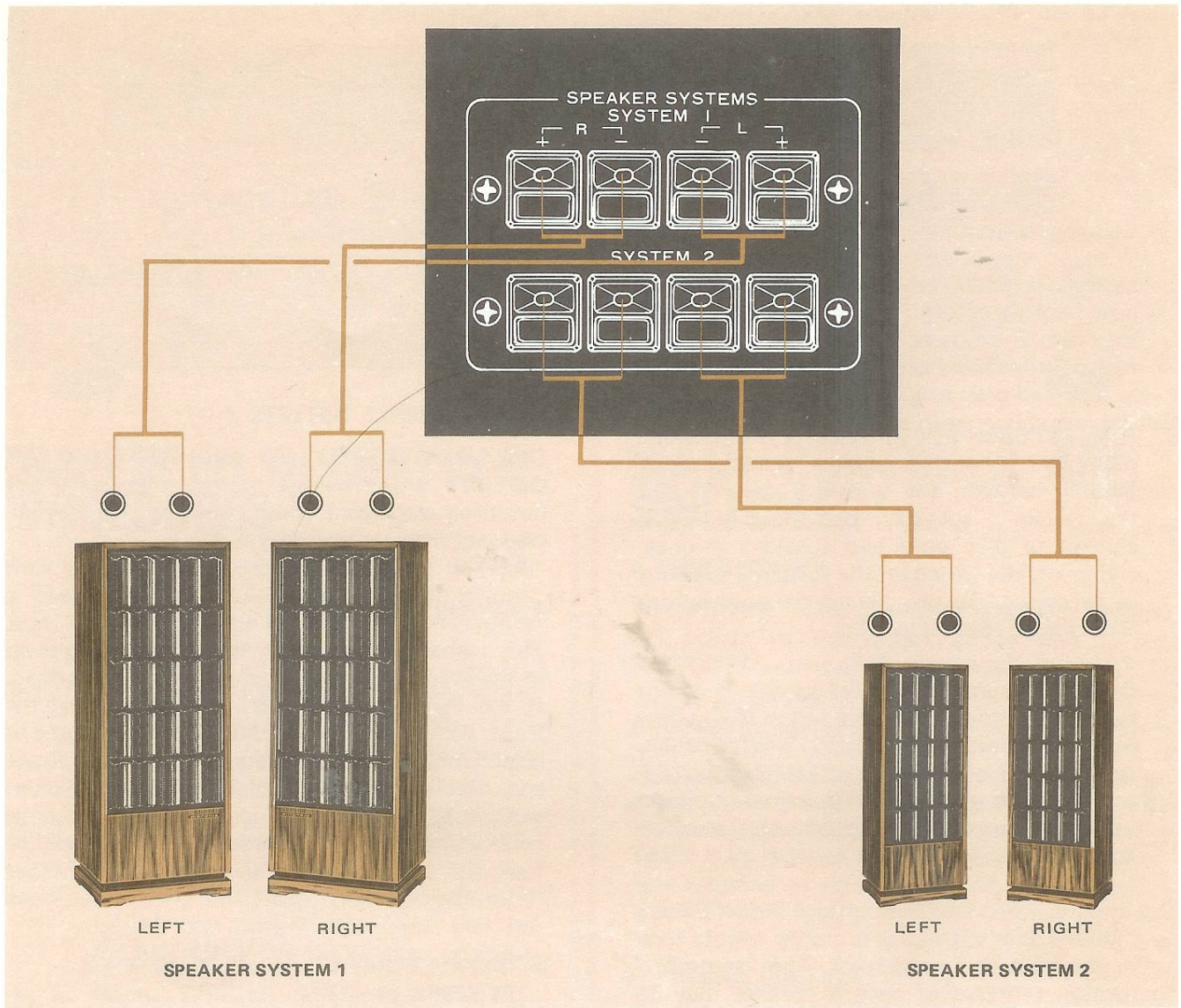


Figure 4 Loudspeaker System Connections

● SPEAKER SYSTEMS

The **SPEAKER SYSTEMS** terminals on the rear panel can accommodate two stereo pairs of loudspeakers. Connect the main pair to the **SYSTEM 1** terminal. The **SYSTEM 2** terminals are for a second stereo pair of loudspeakers (see Figure 4). Selection of loudspeaker systems is made with the **SPEAKER SYSTEM** pushswitches on the front panel.

To connect the speakers to the 2238B, use ordinary #18 gauge two conductor lamp cord. For distances longer than 30 feet, use #16 gauge wire or heavier.

● 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 2238B, 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 (4), you have corrected the phasing between the speakers. If the bass notes now sound softer, turn off the power and reconnect the speakers as they had been originally.
6. If an additional pair of speakers is used along with the system 1 speaker system, check phasing between the system 2 speakers and the system 1 speakers. Use the **BALANCE** control to play only two speakers at once, and invert the wiring on the system 2 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 2238B 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 2238B from distortion and possible overload, make sure the (-) terminals of the Model 2238B 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 SYSTEM 1 and SYSTEM 2 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 2238B 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, turn off the power and 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. See "Fuse Replacement", page 13.

● INSTALLATION OF DOLBY PLUG-IN FM DECODER

The pocket on the rear panel will accommodate Marantz Model DLB-1 Plug-in FM Dolby Decoder. For use, follow the instructions supplied with the optional decoder. For more information, see "Dolby FM Reception", page 7.

● SIGNAL CONNECTIONS CHECKLIST

Before proceeding with operation, double check to make sure the following preparations have been made.

1. **SPEAKERS** connected to **SPEAKER SYSTEM** terminals. Speaker wires are not shorted together.
2. **ANTENNA** connected properly.
3. **AM FERRITE-ROD ANTENNA** extended.
4. **AC LINE CORD** plugged in.
5. **PHONO, TAPE, and AUX** plugs are pushed full into jacks.



Figure 5 Front Panel Controls and Jacks

SIMPLIFIED OPERATING PROCEDURES

When operating the Model 2238B 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 **SYSTEM 1** 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 **SYSTEM 1** speaker push-switch.
- 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.

MAIN CONTROLS AND SWITCHES

● POWER SWITCH

The **POWER** switch, when depressed, supplies AC power to the Model 2238B and to the **SWITCHED** outlet on its rear panel.

● SELECTOR SWITCH

The **SELECTOR** switch selects the program source for listening or recording. If a tape recorder's playback output has been connected to the **TAPE 2 IN** jacks on the rear panel, you can select tape listening by rotating the **SELECTOR** switch to the **TAPE 2** position.

● 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.

tones, the **MID** control adjusts the middle frequency tones, and the **TREBLE** control adjusts the high frequency tones.

These controls may be adjusted to compensate for unbalanced room acoustics or any other tonal difference between the left and right channels of the stereo program. The tone controls have no effect on the signals present at the **TAPE 1** or **TAPE 2** output jacks.

● TUNING METERS

The Model 2238B is equipped with two meters, a **SIGNAL STRENGTH** meter and a **TUNING** meter.

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

● GYRO-TOUCH TUNING KNOB

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. The **FM TUNING** meter is not used for AM.

FM: Switch the **SELECTOR** to **FM** and tune to the desired station. Then slowly rotate the **GYRO-TOUCH TUNING** knob slightly back and forth until maximum reading is obtained on the **SIGNAL STRENGTH** meter and the **FM TUNING** meter points to the center scale position. The multiplex section of the Model 2238B is equipped with electronically triggered circuits which automatically switch to the proper mode of operation for stereo and monophonic FM broadcasts. In addition, the **STEREO** indicator light automatically indicates a stereo broadcast.

● FM 25 μ S SWITCH—DOLBY FM RECEPTION

The Dolby System is an electronic method of reducing the amount of background noise ("tape hiss") inherent in tape recording. The same noise reduction technology is being applied by a growing number of FM radio stations to improve the signal-to-noise ratio of their broadcast signals.

In the case of tape recording, mid- and high-frequency audio signals are increased in level during soft volume passages in the recording and decreased 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.

In the case of Dolby FM broadcasting, the FM broadcast is subjected to the first phase of the Dolby process before being transmitted. When these signals are received by the tuner and passed through a Dolby playback processor, the amount of FM hiss is reduced in the same way as with a tape recorder.

To further improve the noise reduction process, the FM station broadcasting in Dolby applies a special "pre-emphasis" to the frequency response of the music. When receiving these broadcasts, it is necessary to apply the proper "de-emphasis" to return the frequency response to normal.

The **FM 25 μ S** switch on the Model 2238B serves two functions. First, it supplies the proper de-emphasis mentioned above. Second, it internally presets the audio output signal to the standard Dolby level (580 mV) and applies this signal to the **OUTPUT** jacks and the **EXTERNAL ADAPTOR** socket on the rear panel.

The **EXTERNAL ADAPTOR** socket is designed to accept the optional Marantz Model DLB-1 Dolby FM decoder, which is available at your Marantz dealer. When the adaptor is plugged in and the **FM 25 μ S** switch is depressed, the DLB-1 is automatically placed in circuit to de-process the Dolby-encoded FM broadcast. Additionally, the **DLB-1** indicator on the front panel will illuminate.

If your audio system already contains a Marantz Dolby-equipped cassette deck (such as Model 5420, 5220, 5120 or 5020), or an outboard Dolby unit, then the external adaptor is not necessary. Instead, you may use the Dolby System in one of these other components.

For use with our cassette decks, refer to the instructions included with them. Depress the **FM 25 μ S** switch on the Model 2238B to supply the proper de-emphasis and output level.

For use with an outboard Dolby unit, connect the playback portion of the Dolby unit to the output of the tuner, either by way of the tape monitor circuitry or by re-connecting the cables on the various units. The Dolby unit should be calibrated to the proper level by using the Dolby reference tone transmitted by the FM station at the beginning of the broadcast.

● SPEAKER SYSTEM SWITCHES

These switches select the loudspeaker terminals to which audio power is fed. Either the **SYSTEM 1** or the **SYSTEM 2** stereo pair of loudspeakers may be operated individually, or simultaneously if both switches are depressed. When the two **SPEAKER SYSTEM** switches are in the normal "out" position, all loudspeaker terminals are internally disconnected from the power amplifier

section. The signal at the **PHONES** jack is not affected by the **SPEAKER SYSTEM** switches. The "out" position allows "private listening" when stereo headphones are used.

NOTE

Volume level should be reduced to minimum when switching speakers.

● 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 **SPEAKER SYSTEM** switches.

● FM MUTING SWITCH

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

● 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.

● 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.

● 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, 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.

● TAPE 1 MONITOR SWITCH

When this pushswitch is "out", the program being recorded and heard is determined by the setting of the **SELECTOR SWITCH**. With the **TAPE 1 MONITOR** pushswitch "in", the amplifier input connections are switched to the output of the tape recorder without affecting the signal presented to the tape recorder's input, thus allowing you to listen to the signal being recorded before and after recording. This switch is also known as the **TAPE-SOURCE** switch.

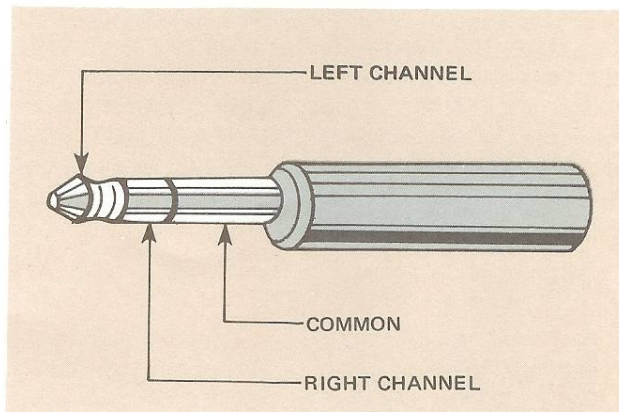


Figure 6 Stereophonic Plug

TAPE RECORDING AND DUBBING

● RECORDING

The program source selected by the **SELECTOR** switch may be recorded onto either tape recorder. When the **SELECTOR** switch is set to **TAPE 2**, however, the **TAPE 2 OUT** jacks are muted to prevent feedback oscillations that would occur if tape recorder 2 were inadvertently placed in the record mode.

● DUBBING

A tape played on tape recorder 2 may be copied on to tape recorder 1. Set the **SELECTOR** switch to **TAPE 2**. To monitor tape recorder 1 as it is being recorded, depress the **TAPE 1 MONITOR** switch. To monitor the source (which is, in this case, tape recorder 2), release **TAPE 1 MONITOR** switch. Either tape or source can be monitored without disturbing the actual recording process.

● 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 **FM-25 μ S** switch to properly de-emphasize the signal, but bypass the noise reduction adaptor to record the Dolbyized audio directly onto the tape. This can be done by switching the Noise Reduction switch to "OFF" if the Dolby adaptor is so equipped, or by connecting the **TAPE OUT** jacks of the 2238B directly to the **LINE IN** jacks of the tape deck.

NOTE

If the optional Marantz DLB-1 Dolby FM decoder has been fitted to the rear panel receptacle of your Model 2238B, this decoder must be removed in order to obtain Dolby-encoded signals at the **TAPE OUT** jacks.

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 purposes, connect the Dolby unit between the line outputs of the tape recorder and the **TAPE IN** jacks on the 2238B.

When using a tape recorder containing a built-in FM-25 μ S de-emphasis circuit, a better signal-to-noise ratio can be achieved by using only the FM-25 μ S circuit in the Model 2238B instead of the facilities in the tape recorder. Do not use both de-emphasis circuits simultaneously.

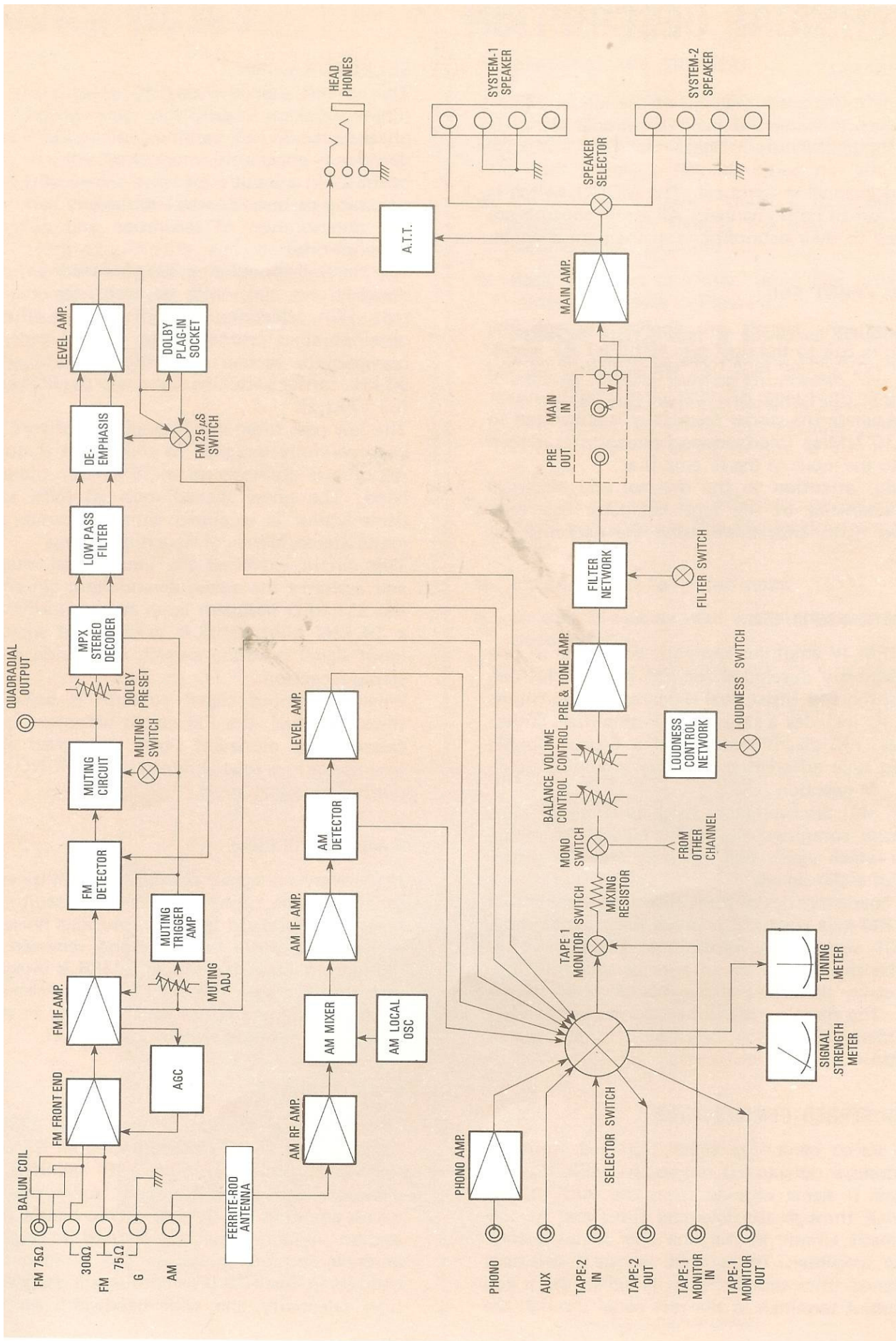


Figure 7 Functional Block Diagram

TECHNICAL DESCRIPTION

● GENERAL

Figure 7 is a block diagram of the Model 2238B Receiver showing the main functional elements and input and output signal routing. 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 to their counterparts in the right channel.

● FM FRONT END

FM antenna signals are applied through the antenna coil to the dual gate MOSFET RF amplifier. The signals from the RF amplifier are fed through the tuned RF tank circuit to the mixer stage where the carrier frequency is converted to the 10.7 MHz intermediate frequency. It is then fed to the input of the IF amplifier.

Careful attention to the thermal and electrical characteristics of the local oscillator has minimized drift, thus eliminating the necessity for AFC.

● FM IF AMPLIFIER

The FM IF amplifier system is composed of one IC expressly developed for FM IF use, plus one transistor and three dual-element ceramic filters. The IC includes a complete IF amplifier, limiter stages, FM discriminator, and a 6-stage double ended type differential amplifier providing excellent AM rejection.

The FM discriminator is a quadrature type detector composed of a double balanced demodulator which yields high linearity and low distortion of audio signals.

The characteristics of these filters are ideal in that the 200 kHz passband is phase linear, with sharp cutoff slopes. Its exceptional phase linearity assures the elimination of a major source of high frequency distortion and a loss of stereo separation. The sharp cutoff slopes provide outstanding selectivity, permitting reception of closely spaced stations.

● FM STEREO DEMODULATOR

The stereo composite signal obtained from the quadrature detector is fed to the MPX IC. The L and R signal outputs from the MPX IC are applied through the low-pass filter and the de-emphasis circuit to the one (per channel) transistor amplifier. The output (about 1,100 mV) obtained from this amplifier is fed to the L and R output terminals at the rear panel through the

SELECTOR switch.

This stereo demodulating IC employs a PLL (Phase Locked Loop) technique, whereby the phase of the 38 kHz switching carrier signal in the decoder is constantly interlocked with the phase of the 19 kHz input pilot signal. Phase shift of the switching carrier (38 kHz) is thereby eliminated and deterioration of separation and distortion does not occur.

The stereo demodulating 38 kHz carrier switching signal is very clean with no even harmonic content. SCA rejection of approximately 80 dB is obtained since resonant beats are not generated between the second harmonic (76 kHz) of the 38 kHz carrier switching signal and the SCA signal (67 ± 7 kHz).

The low pass filter and de-emphasis network have been carefully designed so that a flat frequency response is obtained up to 15 kHz on the audio band. The phase locked loop IC MPX stereo demodulator is equipped with a separate automatic Stereo/Monaural switching circuit.

This circuit examines the input signal intensity and activates the stereo demodulator circuit and the STEREO indicator lamp automatically when a 19 kHz pilot signal is present and when the input signal is strong enough to provide quality stereo reception.

When the input signal strength is below the threshold level, the FM stereo broadcast is processed as a monaural signal. Improved signal-to-noise ratio is thus obtained in the MONO mode during low signal levels.

● MUTING CIRCUIT

If there are no signals present, any FM tuner will generate some noise. The muting circuit eliminates this noise. In addition, spurious noise that is generated while tuning is also removed. The muting circuit in the Model 2238B is integrated into the IF stage. The circuit is also designed to minimize popping noises which tend to be generated when muting is switched in and out.

● AM TUNER

The AM tuner section of the Model 2238B is composed of an IC (incorporating an RF amplifier, local oscillator, mixer, IF amplifier, and detector) and a one transistor audio amplifier, which amplifies the detected audio signals. A two section variable capacitor is used to tune the antenna and mixer stages. The ceramic filters utilized in the AM IF amplifier are designed for high selectivity and wide bandwidth for inter-

ference-free high quality AM reception. Following the AM IF amplifier, the AM detector recovers the audio modulation and presents this signal to the audio amplifying stage and the mode selector switch. The AM tuner and IF amplifier are subjected to the action of an effective automatic gain control circuit which maintains a constant volume level for all stations in the AM band.

● SELECTOR SWITCH

The Model 2238B has the capability to operate from a variety of program sources, such as AM or FM broadcasts, turntable (PHONO), tape player, or any other source capable of providing 180 mV output level (AUX). The SELECTOR switch connects the inputs of the TONE control amplifier to the desired source.

● TAPE 1 MONITOR SWITCH

The TAPE 1 MONITOR switch selects between the source and TAPE 1 MONITOR IN jacks. When the TAPE 1 MONITOR switch is in its normal "out" position, the preamplifier receives its input from the SELECTOR switch. When the TAPE 1 MONITOR switch is depressed, the preamplifier receives its input from the TAPE 1 MONITOR IN jacks.

● PHONO EQ AMPLIFIER

Phono signals of up to 100 mV can be handled without overloading. The equalization network provides precise equalization to the RIAA standard and sets the voltage gain of the phono preamplifier to 40 dB (at 1 kHz).

● 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 2238B consists of the BALANCE, VOLUME, BASS, MID, TREBLE, LOUDNESS and HI FILTER controls. All controls affect the left and right channels simultaneously. However, 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 maxi-

mum, the overall voltage gain from any high-level input to the loudspeaker terminals is approximately 40 dB.

● BALANCE CONTROL

The change of alternation in each channel as the control is moved from center has been designed to decrease the level in one output channel while maintaining the level in the other channel.

● VOLUME CONTROL

The VOLUME control attenuates both channels simultaneously. 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.

● TONE CONTROL AMPLIFIER

The TONE CONTROL AMPLIFIER's circuitry uses a continuously variable negative feedback type configuration for lowest distortion. The signal from the TONE CONTROL AMPLIFIER feeds the HI filter circuit when the HI FILTER is activated.

● AMPLIFIER

The amplifier section of the Model 2238B is a direct coupled, full complementary circuit. It utilizes current limiting and thermal compensation circuits to provide safe, highly stable operating conditions. The silicon output devices used in the power amplifier section provide a large collector dissipation margin.

MAINTENANCE

● CLEANING

The satin gold anodized finish of the knobs and heavy aluminum front panel will last indefinitely with proper care and cleaning. **NEVER** use scouring pads, steel wool, scouring powders, or harsh chemical agents, such as lye solution. These will mar the finish. Clean with a soft, lint-free cloth or cotton swab slightly dampened with a mild solution of detergent and water.

● FUSE REPLACEMENT

The Model 2238B is protected by a 4 amp 250 V fuse. In the event the fuse blows out, replace it **ONLY** with a fuse of the same type and rating. Replacement with a fuse of higher rating will not protect the instrument and will void the warranty.

Before replacing the fuse, turn the power off. If the replacement fuse blows out within a short time after power is turned back on, refer the problem to an authorized service facility.

● IN CASE OF DIFFICULTY

Should you experience difficulties when operating your system for the first time, and you have followed the procedure outlined in the "Simplified Operating Procedures", use of the following data will help you correct or isolate the problem. If these hints fail to remedy the situation, refer the problem to your nearest authorized service facility.

Receiver does not operate, and dial lamps do not illuminate.

1. Make sure power cord is properly connected.
2. Check AC line fuse; replace if necessary (the unit should be OFF when replacing fuse).

Receiver does not operate, but dial lamp is on.

1. Check settings of controls such as SELECTOR, TAPE MONITOR, SPEAKERS switches VOLUME, etc.
2. Turn off POWER and check connection of cables from turntables, tape decks, speakers, and other equipment. Make sure speaker wires are not shorted together.

Receiver operates in one channel only.

1. Check setting of BALANCE control.
2. Turn off system power and transpose (left for right) the speaker cables at the SPEAKER

SYSTEMS terminals. If opposite channel becomes inoperative when turned back on, either the cable or speaker is at fault.

No FM reception.

1. Release FM MUTING switch.
2. Connect FM antenna.

FM reception sounds scratchy or raspy.

1. Make sure FM antenna is connected properly.
2. Try re-orienting FM antenna.
3. Determine if you are in a poor reception area. If so, refer to "OUTDOOR FM ANTENNAS" section.

AM reception poor.

1. Swing out AM Ferrite-rod antenna on rear panel.
2. Re-orient the AM ferrite-rod antenna.
3. Determine if other components in your system, appliances, or fluorescent lights are causing interference.
4. Try an outdoor AM antenna. See "OUTDOOR AM ANTENNA" section.

Loud hum in phono.

1. Check to see that phono plugs and jacks are clean and properly connected.
2. Try connecting turntable ground wire (usually colored green) to **CHASSIS GROUND** post on rear panel of receiver.
3. If ground wire is already connected, try disconnecting it.
4. Make sure phono cartridge is wired properly and making good contact with terminals in tone arm.

SERVICE NOTES

● REPAIRS

Only the most competent and qualified service technicians should be allowed to service the Model 2238B. 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, call the toll free telephone number listed on the back of the Warranty to obtain the name and address of the Marantz Authorized Service Station nearest your home or business. In many cases, the dealer where you purchased your Marantz unit will be equipped to provide service.

● REPACKING FOR SHIPMENT

Should it become necessary to repack your Model 2238B for shipment to the factory, to an authorized service station, or elsewhere, please observe the following precautions:

- a. Do not ship the unit installed in its accessory walnut cabinet; remove the unit from the cabinet before packing.
- b. Pack the unit carefully, using the original material as shown in Figure 8.

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.

- c. Ship via a reputable carrier (do not use Parcel Post) and obtain a shipping receipt from the carrier.
- d. Insure the unit for its full value.
- e. Be sure to include your return address on the shipping label.

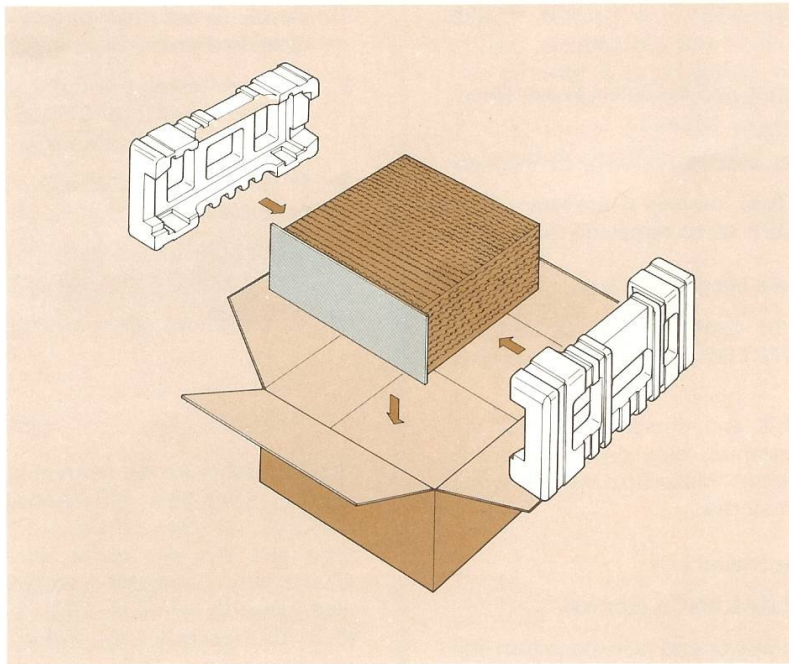


Figure 8 Packing Instructions

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.

MODEL 2238B TECHNICAL SPECIFICATIONS

AMPLIFIER SECTION:

RATED POWER OUTPUT, MINIMUM CONTINUOUS AVERAGE POWER PER CHANNEL, BOTH CHANNELS DRIVEN.....	38W
POWER BAND.....	20Hz to 20kHz
TOTAL HARMONIC DISTORTION.....	0.08%
LOAD IMPEDANCE.....	8 OHMS
RATED POWER OUTPUT, MINIMUM CONTINUOUS AVERAGE POWER PER CHANNEL, BOTH CHANNELS DRIVEN.....	48W
POWER BAND.....	20Hz to 20kHz
TOTAL HARMONIC DISTORTION.....	0.1%
LOAD IMPEDANCE.....	4 OHMS

I.M. Distortion

(I.H.F. method, 60 Hz and 7 kHz mixed 4:1 at rated power output)	
at 8 ohm load impedance	0.08%
at 4 ohm load impedance	0.1%
Damping Factor (at 20 Hz)	45
Sensitivity (at MAIN IN)	1.5 V
Impedance (at MAIN IN)	33 kohms
Frequency Response for Power Amp Only (at 1 Watt output, 20 Hz to 20 kHz)	±0.25 dB

PREAMPLIFIER SECTION:

Phono

Input Overload at 1 kHz	100 mV
Equivalent Input Noise	1.5 μ V
Dynamic Range (Dynamic Range is the ratio of input overload to equivalent input noise)	96 dB
Input Sensitivity	1.8 mV
Input Impedance	47 kohms
Input Capacitance	100 PF
Frequency Response, RIAA 20 Hz to 20 kHz	±1.0 dB
Signal-to-Noise Ratio (at rated output and 7.75 mV input)	76 dB
High Level (Aux and Tape)	
Input Sensitivity	180 mV
Input Impedance	20 kohms
Frequency Response (includes power amp)	10 Hz to 60 kHz ± 1.25 dB
Signal-to-Noise Ratio (ref. to rated output and 775 mV input)	90 dB
Output Levels	
Tape Out (ref. 7.75 mV at Phono inputs)	775 mV
Pre-Out (ref. 180 mV at Aux inputs)	1.5 V
(ref. 500 mV at Aux inputs, main amp disconnected)	4.2 V
Output Impedance	
Tape Out	600 ohms
Pre-Out	900 ohms

FM TUNER SECTION:

Sensitivity	
IHF Usable	10.8 dBf (1.9 μ V)
IHF 50 dB Quieting (Mono)	16.1 dBf (3.2 μ V)
(Stereo)	37.3 dBf (40 μ V)

Quieting Slope (Mono)	
RF Input for 30 dB Quieting	9.3 dBf (1.6 μ V)
Quieting at:	
20 dBf (5.5 μ V)	55 dB
25 dBf (10 μ V)	60 dB
40 dBf (55 μ V)	70 dB
65 dBf (1000 μ V)	75 dB
Quieting Slope (Stereo)	
Quieting at:	
30 dBf (17 μ V)	42 dB
40 dBf (55 μ V)	53 dB
50 dBf (173 μ V)	58 dB
65 dBf (1000 μ V)	65 dB
Distortion (Mono) at 65 dBf (1000 μV)	
100 Hz	0.25%
1000 Hz	0.15%
6000 Hz	0.35%
Distortion (Stereo) at 65 dBf (1000 μV)	
100 Hz	0.35%
1000 Hz	0.3 %
6000 Hz	0.55%
Distortion (Mono and Stereo)	
at 50 dB Quieting, 1000 Hz	0.6%
Hum and Noise	
at 65 dBf (1000 μ V)	
Mono	73 dB
Frequency Response	
30 Hz to 15 kHz	
Mono	+0.2 dB, -1.5 dB
Stereo	\pm 1.5 dB
Capture Ratio at 65 dBf (1000 μ V)	1.0 dB
Alternate Channel Selectivity	70 dB
Spurious Response Rejection	90 dB
Image Response Rejection	60 dB
I.F. Rejection (Balanced)	90 dB
A.M. Suppression	50 dB
Stereo Separation	
100 Hz	40 dB
1000 Hz	45 dB
10 kHz	40 dB
Subcarrier Rejection	60 dB

AM TUNER SECTION:

IHF Usable Sensitivity	15 μ V
Distortion (THD), 30% Modulation	0.5%
Signal-to-Noise Ratio	50 dB
Alternate Channel Selectivity	46 dB
Image Rejection	45 dB
Spurious Response Rejection	60 dB
I.F. Rejection	40 dB

GENERAL:

Power Requirements	120 VAC, 60 Hz
Power Consumption at rated output, both channels operating	170 W
Idling Power (Volume Control at zero)	27 W
Dimensions:	
Panel Width	440 mm (17-5/16 inches)
Panel Height	137 mm (5-3/8 inches)
Depth	362 mm (14-1/2 inches)
Weight:	
Unit alone	12.5 kg (27.5 lbs)
Packed for Shipment	15.0 kg (33.0 lbs)