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Model 2235B Stereophonic Receiver

Handbook of Instructions

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Model 2235B Stereophonic Receiver

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A WHOLLY-OWNED SUBSIDIARY OF SUPERSCOPE INC., CHATSWORTH, CALIFORNIA 91311

FOREWORD

To obtain maximum performance and enjoyment from the Model 2235B Stereo Receiver, please study these instructions carefully. Installing and operating the Model 2235B 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 2235B was designed.

For convenience, this manual is divided into three parts. The first part covers installation. The second part outlines a simplified operating procedure in a simple, nontechnical manner. The third part provides a more detailed description of the features of the Model 2235B. 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 2235B Stereo Receiver, all references to them in this manual are printed in **BOLDFACE** type.

AC Line Operation

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

AFTER UNPACKING

It is advisable to retain all original packing material to prevent damage should you wish to transport or ship the Model 2235B (refer to page 19 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 Stereo Receiver carefully for any signs of shipping damage. Our very strict quality control and professional pride ensure that each Model 2235B 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.

GENERAL DESCRIPTION

The Marantz Model 2235B 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 2235B 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 2235B also features front panel **DUBBING** jacks.

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MECHANICAL INSTALLATION

The Model 2235B 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 CABINET

An attractive walnut veneer cabinet, Model WC-22U, 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-22U.

CUSTOM INSTALLATION

When planning a custom installation, allow adequate spacing between the Model 2235B, cabinet surfaces, and other components for adequate ventilation.

To install the Model 2235B 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 2235B 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 2235B, adequate bracing across the rear of the cabinet must be located to provide contact with the rear of the unit.

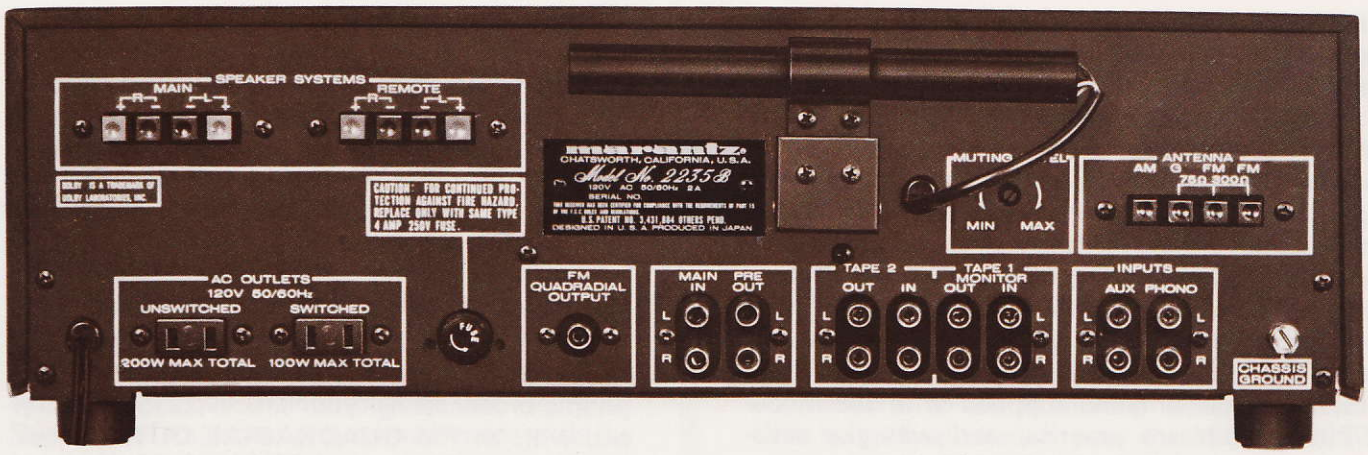


Figure 1. Rear Panel Connection Facilities and Adjustments

CONNECTING THE MODEL 2235B

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 2235B, 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 2235B 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 truntable or record changer frame to the **CHASSIS GROUND** binding post of the Model 2235B. 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 2235B can accommodate two tape recorders.

The terms **IN** and **OUT** refer to the input and output of the Model 2235B. Therefore, the **IN** jacks on the Model 2235B 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 lightning arrestor protection. Master antenna systems are not recommended for use with your Model 2235B; 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 2235B. Both are practical and will give satisfactory results in primary signal areas.

Your Model 2235B 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 2235B, SWING THE ANTENNA OUT AS SHOWN IN FIGURE 3.

The ferrite-rod antenna will give you satisfactory results in primary signal areas. However, an outdoor antenna will provide better reception in weaker signal areas. Two single wires are required to make an AM outdoor antenna. First, connect one end of a single wire to the **AM ANTENNA** terminal on the rear panel, and the other end to a very high horizontal antenna wire of 25 to 75 feet in length suspended between insulators in an outdoor location (the higher the better). Next, connect the other single wire between the **"G"** terminal of your Model 2235B 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 2235B 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 2235B 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 2235B preamplifier circuits to the rear panel. The **MAIN IN** jacks are the input terminals of the power amplifier section of the Model 2235B. 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 2235B with appropriate lengths of shielded audio cables. When the

Figure 2. AM/FM Antenna Connection

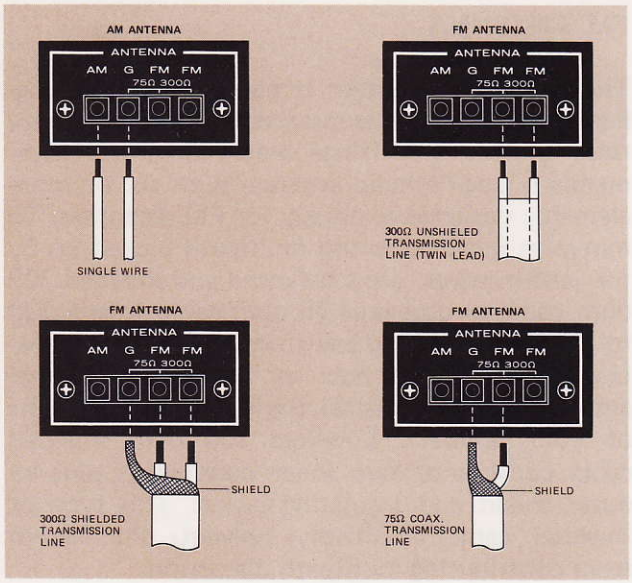
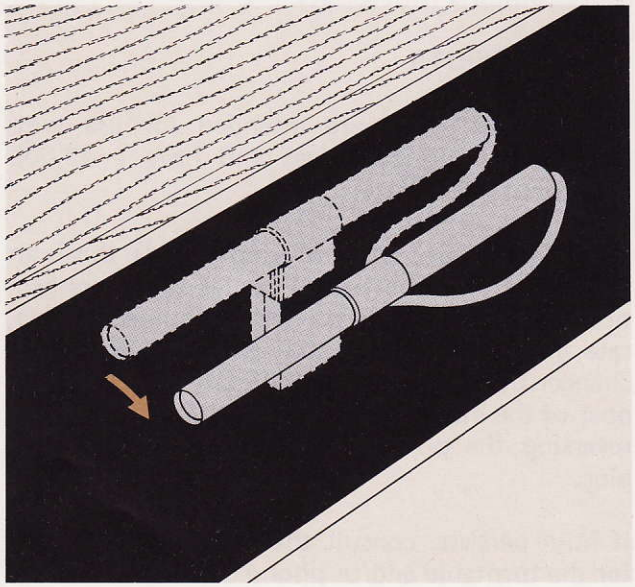


Figure 3. AM Ferrite-rod Antenna



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.

To connect the speakers to the Model 2235B, use ordinary #18 gauge stranded two-conductor lamp cord. If the desired cord length for either channel exceeds 30 feet, use #16 gauge wire or heavier.

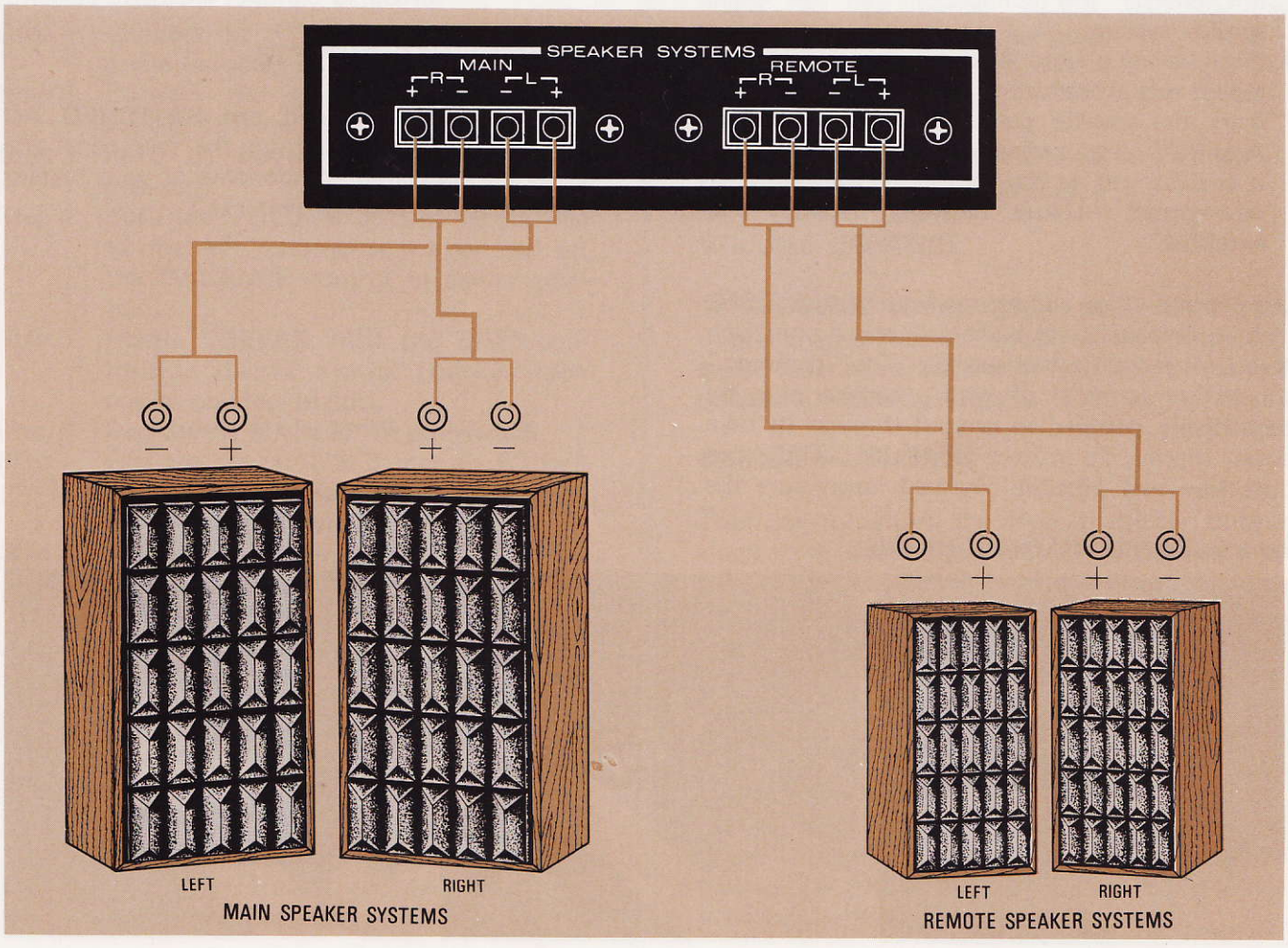
Strip about 1/2-inch of insulation from either end of both loudspeaker cords. Twist the strands of each conductor to prevent fraying. Examine the wires for polarity markings One of each pair will probably be marked in any one of several ways. Check for a molded ridge on the insulation, a tracer thread, or one or more tinned strands.

To assure the best stereo separation and frequency response, the speakers must be properly phased. Normally, the positive terminal on each speaker should be connected to its respective (+) terminal on the Model 2235B, and the negative or "common" terminal should be connected to its respective (—) terminal. Use the polarity markings on the wires to aid in making identical connections to each speaker. If your speakers use screw terminals, it is advisable to attach crimp-on "spade lug" terminal connectors to the wires at the end that will be connected to the speakers. At the amplifier end, connect the wires as shown in Figure 5.

SPEAKER PHASING

If the loudspeaker cords have no polarity markings, or if you are otherwise doubtful that your speakers are correctly phased, perform the following test after you have completed your installation and your system is operating.

Figure 4. Speaker System Connections



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 reconnect the speakers as they had been originally.
6. If an additional pair of speakers is connected, and if they are intended to be used in the same room as the main speaker, 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 2235B 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 2235B from distortion and possible overload, make sure the (–) terminals of the Model 2235B 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

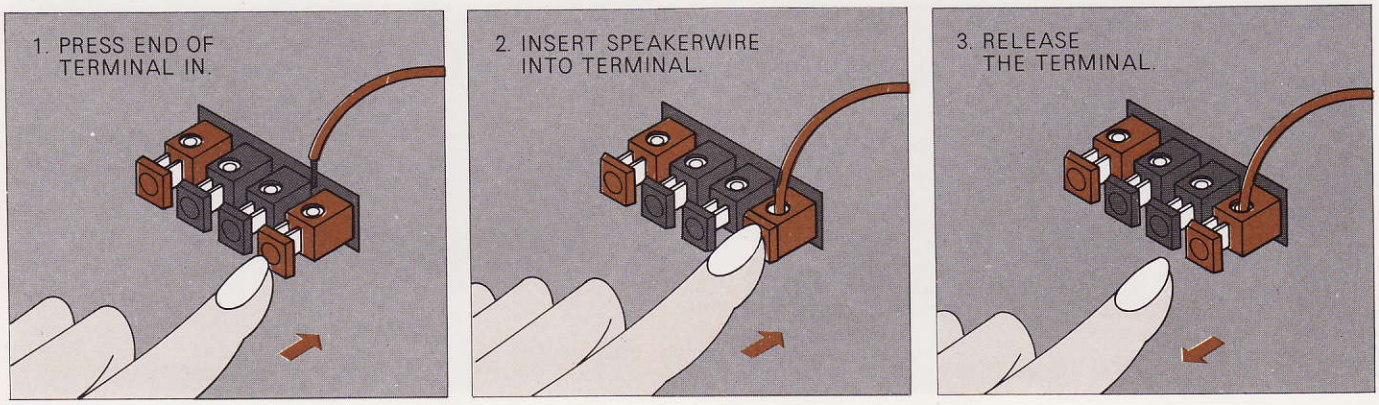
With the front panel **POWER** pushswitch "out", plug the line cord into an electrical outlet supplying the proper voltage.

CAUTION: **Do not exceed the maximum total power ratings of the AC outlets. The POWER switch and other circuitry in the 2235B may suffer damage if forced to conduct excessive current.**

CONVENIENCE OUTLETS

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

Figure 5. Operation of Speaker Terminals



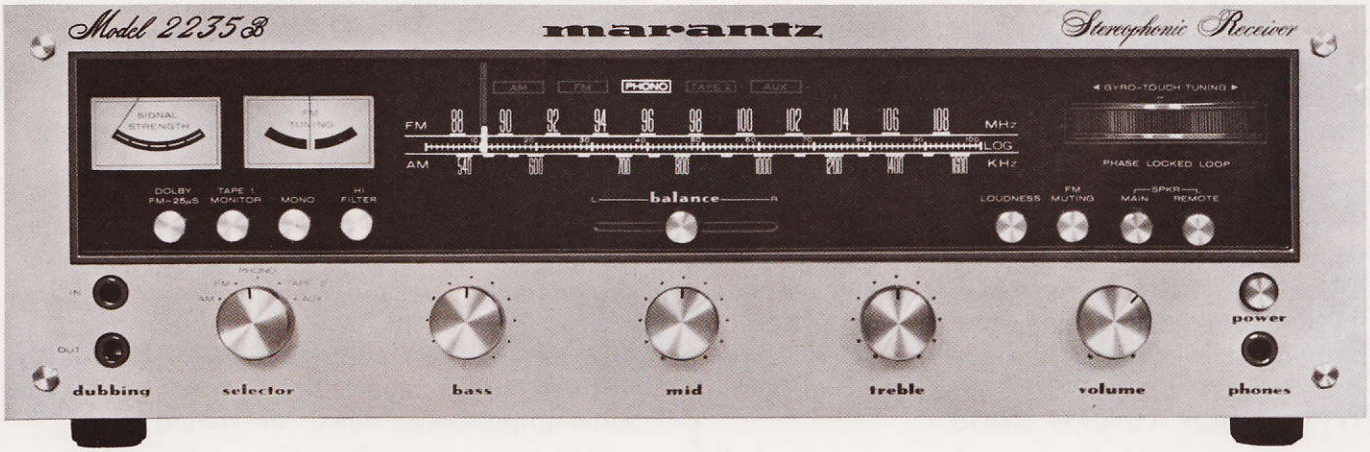


Figure 6. Front Panel Controls and Jacks

SIMPLIFIED OPERATING PROCEDURES

When operating the Model 2235B 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 terminal.
Step 3. Place all pushswitches in the "out" position.
Step 4. Turn the **VOLUME** control all the way to the left (counterclockwise) and set the **BALANCE** control in center position.
Step 5. Rotate **TREBLE, MID** and **BASS** controls to the 12 o'clock position (each pair of pointers to dot).
Step 6. Depress the **MAIN SPKR** pushswitch.
Step 7. Plug the Model 2235B into an AC wall outlet. 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.
Step 9. Adjust the **VOLUME** control to a comfortable listening level.

The following section will explain the remainder of the front panel controls. The controls will be discussed in order of usage with the most commonly used controls discussed first.

MAIN CONTROLS AND SWITCHES

POWER SWITCH

The **POWER** switch, when depressed, supplies AC power to the Model 2235B 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 METERS

The Model 2235B 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 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.

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 SWITCH

To listen to a Dolbyized FM broadcast, connect a Dolby noise reduction adaptor between the **TAPE 1 MONITOR OUT** and **IN** jacks on the rear panel of the Model 2235B. Depress the **DOLBY FM** pushswitch, and depress the **TAPE 1 MONITOR** switch.

With the **DOLBY FM** 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 75 μsec to 25 μsec 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 2235B 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.

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.

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 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.

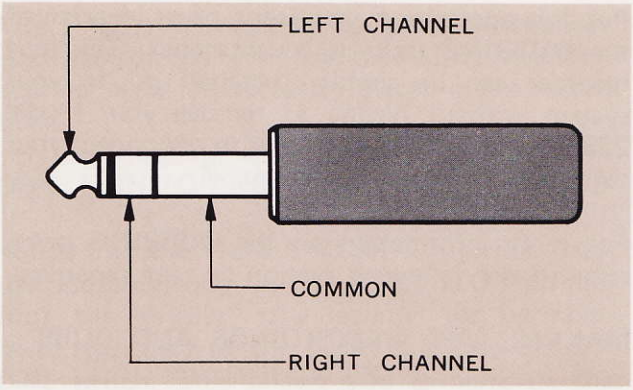


Figure 7. Three Conductor Phone Plug

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 operate 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 **PHONES** jack is not affected by the **MAIN-SPKR-REMOTE** switches.

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 7). 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.

USING TAPE RECORDERS WITH YOUR MODEL 2235B

The Model 2235B has three sets of inputs and outputs for tape recorders: **TAPE 1 MONITOR 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 MONITOR** 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** jacks are provided to connect an external tape recorder to the front panel of the Model 2235B.

Typically, the **DUBBING** jacks are used when the tape recorder is to be a "temporary" part of your system. For example, a friend may bring his cassette recorder to your home to record some tapes using your Marantz console.

For this application, the front panel location of the **DUBBING** jacks is advantageous. The tape recorder can be simply "patched in" to your system without having to remove your Model 2235B from its installation or to disconnect your own tape deck from the rear panel.

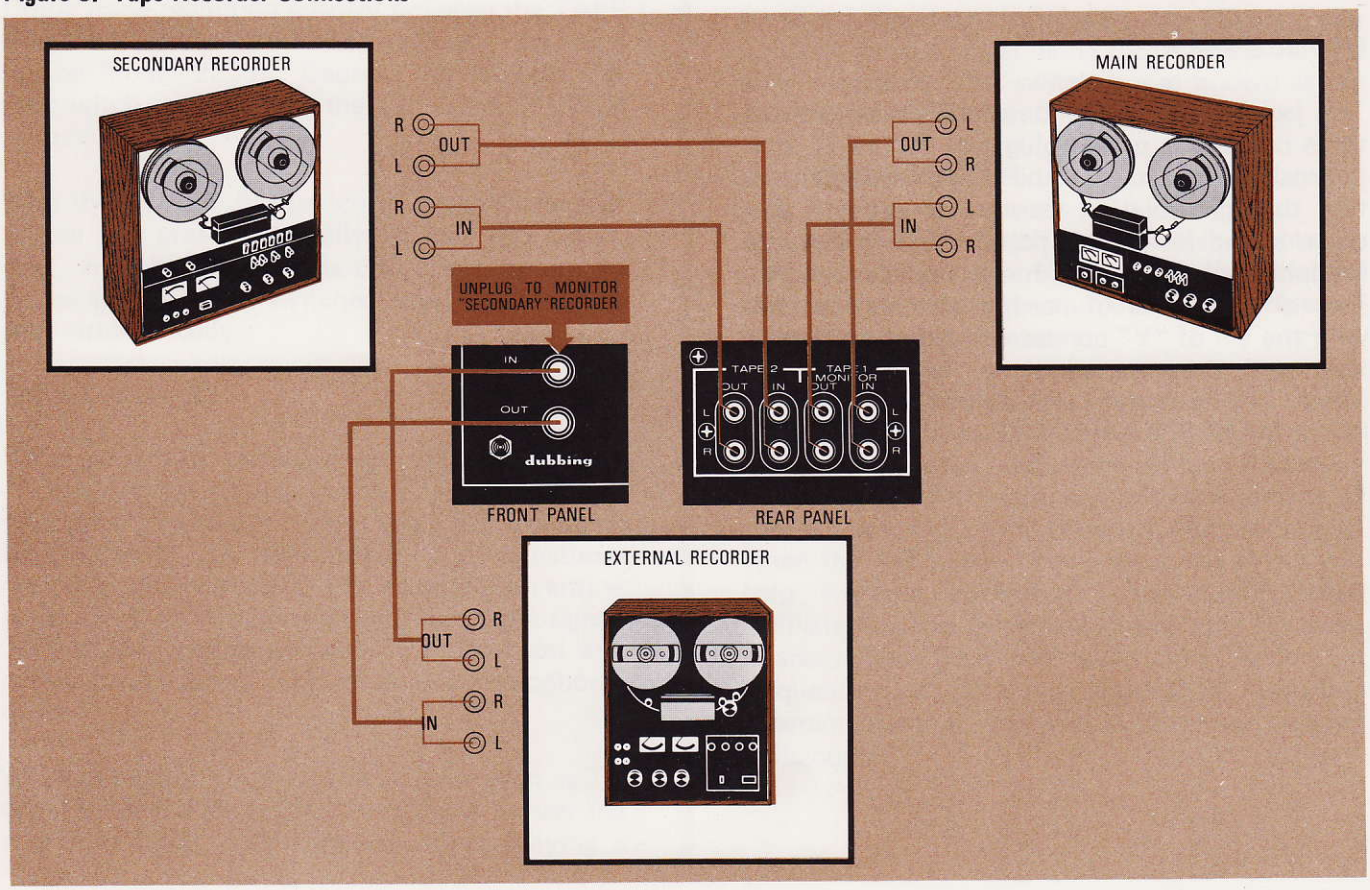
For more information on the **DUBBING** jacks, refer to the following section on tape recorders.

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 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" recorder is plugged into the **DUBBING IN** jack, then it pre-empts the "SECONDARY" recorder and becomes the source input instead. Therefore, dubs to the "MAIN" recorder can only be made from one of these two recorders at a time. The **TAPE**

Figure 8. Tape Recorder Connections



2 OUT jacks are muted to prevent feedback oscillations in the event that the "SECONDARY" recorder were inadvertently placed in the record mode.

TAPE MONITORING

Notice that the **TAPE 1 MONITOR** switch operates independently of the **SELECTOR** switch. Thus, the "MAIN" tape recorder can be monitored regardless of the position of the **SELECTOR** switch. This allows you to compare the output of the tape recorder to the input source. To listen to tape 1, depress the **TAPE 1 MONITOR** switch. To listen to the source, as determined by the **SELECTOR** switch, release the **TAPE MONITOR 1** switch.

MAKING MODIFIED TAPE RECORDINGS

The **PRE OUT** jacks on the rear panel of the 2235B 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 source on the **SELECTOR** switch. Next, connect the input of the tape recorder to the **PRE OUT** jacks by the method illustrated in Figure 9. By connecting the output of the 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.

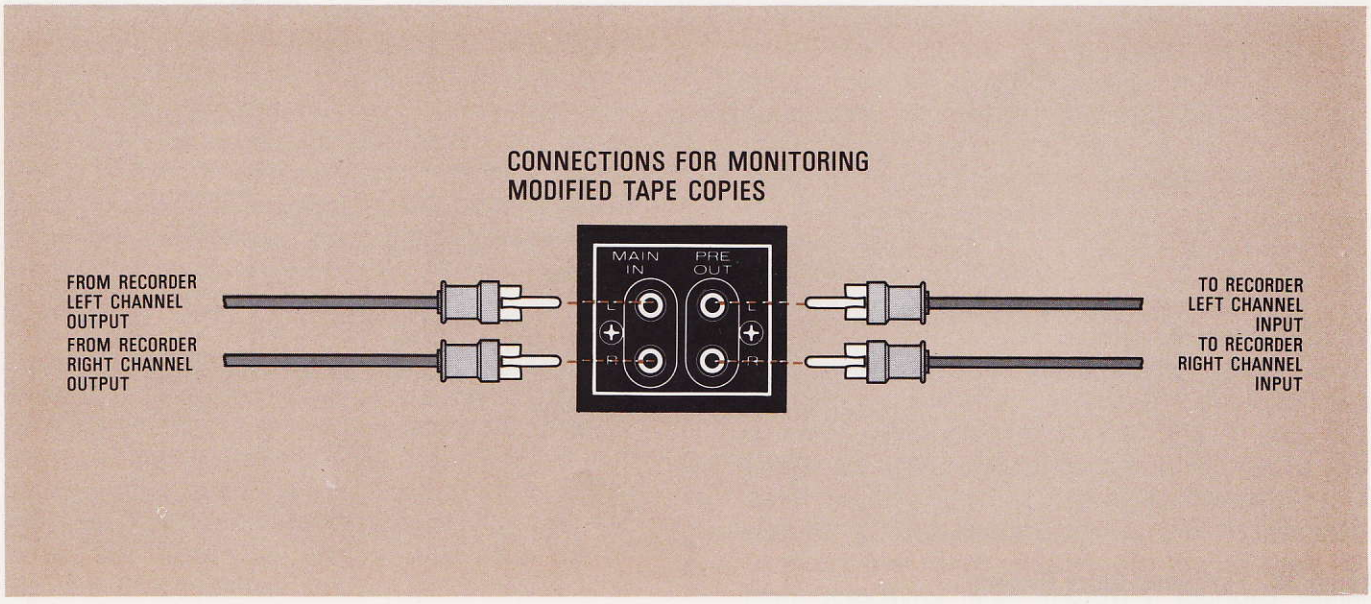
RECORDING DOLBYIZED FM BROADCASTS

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** 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 purposes, connect the Dolby unit between the line outputs of the tape recorder and the **TAPE 1 MONITOR IN** jacks on the 2235B. 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 circuit in the Model 2235B instead of the facilities in the tape recorder. Do not use both de-emphasis circuits simultaneously.

Figure 9. Arrangement for Making Modified Tape Copies



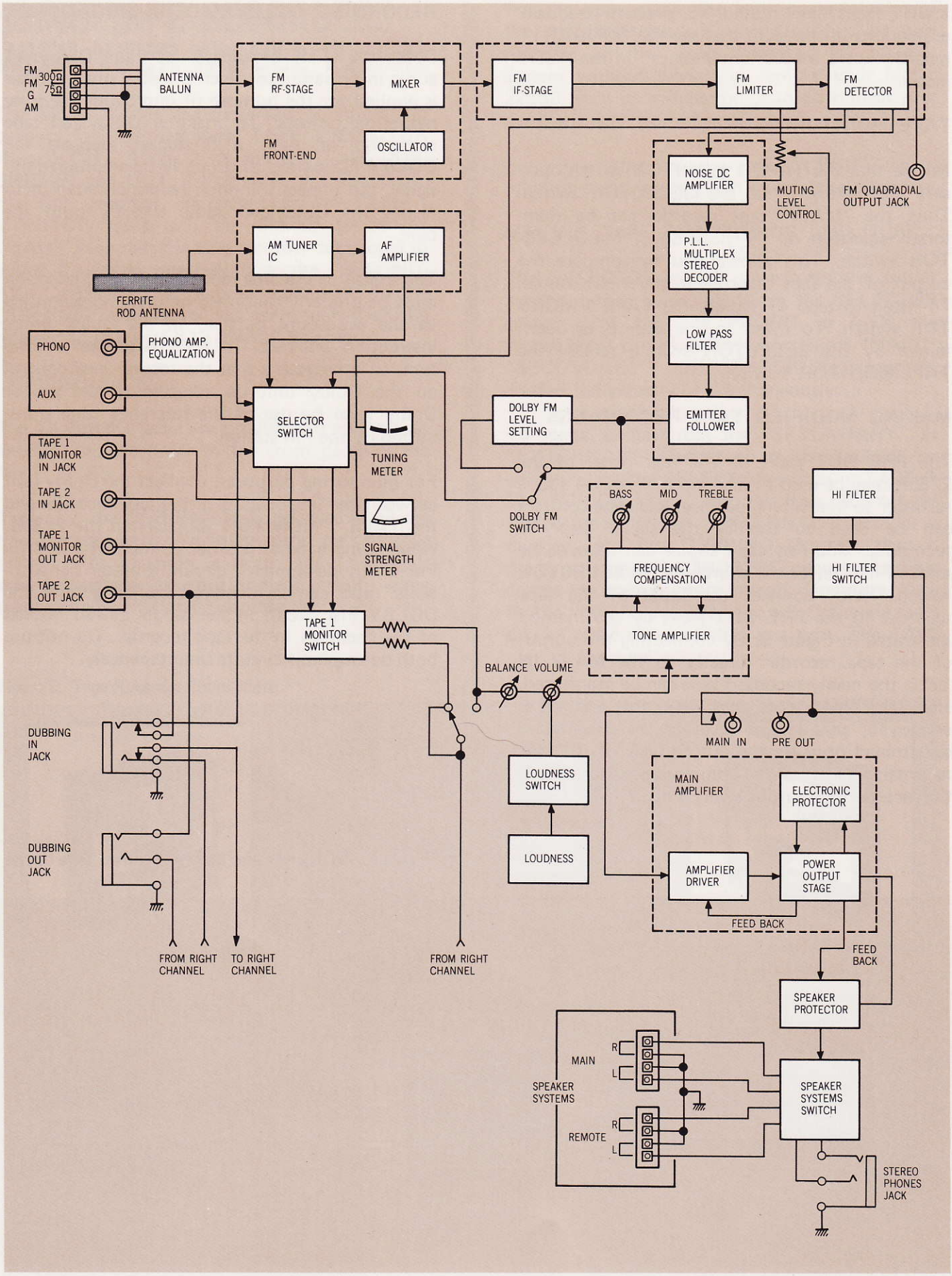


Figure 10. Functional Block Diagram

TECHNICAL DESCRIPTION

GENERAL

Figure 10 is a block diagram of the Model 2235B Receiver showing the main functional elements and input and output signal routing. Each AM and FM front end has its own IF stages. For clarity, only the left audio channel is shown; the right audio channel is identical. The **MONO** switch is common to both channels. All audio controls are ganged to their counterparts in the right channel. The left channel half of the front panel **DUBBING IN** and **DUBBING OUT** jacks are shown interconnected in this diagram. The right channel of each jack is wired to the same circuit point in the right channel.

FM TUNER SECTION

FRONT END – FM antenna signals are applied through a balun transformer to the antenna coil which drives a field effect transistor RF amplifier. 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 STAGES – The IF section consists of six transistors and three stages of dual element ceramic filters. The characteristics of these filters are ideal in that the 200 kHz 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.

The Model 2235B 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) are removed from the IF signal with the limiter.

STEREO DEMODULATOR

The stereo composite signal obtained from the buffer amplifier is fed to the FET muting circuit, the **FM QUADRADIAL OUTPUT** jack and 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 amplified signal is fed to the **SELECTOR** switch.

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

MUTING CIRCUIT

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

A muting circuit consisting of a two transistor noise amplifier and a three transistor (including one FET) switching circuit, has been incorporated in the Model 2235B. The muting circuit perfectly mutes out all the interstation noise and also completely mutes out the side slope spurious response of the unit. The circuit has been designed to minimize annoying switching noise as the tuning band is scanned.

AM TUNER SECTION

The AM tuner section of the Model 2235B 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 high selectivity and wide 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.

PREAMPLIFIER SECTION

TAPE SIGNALS – With the exception of tape input, all high-level inputs are fed directly to the **SELECTOR** switch. Tape input is routed through the front panel **DUBBING IN** jack to a section of the **TAPE 1 MONITOR** switch. The **DUBBING IN** jack is a three-conductor stereo jack which has two built-in switches, one for each channel. Normally, these switches are closed, allowing the tape input signals from the **TAPE 2 IN** jack on the rear panel to be fed to the **SELECTOR** switch. When a plug is inserted in the **DUBBING IN** jack, the switches are opened, disconnecting the **TAPE 2 IN** jacks and allowing the signal from the **DUBBING IN** jack to reach the **TAPE 1 MONITOR** switch. Thus only one tape recorder at a time can feed playback signals into the Model 2235B.

TAPE MONITOR SWITCH

When the **TAPE 1 MONITOR** pushswitch is in the "out" position, the amplifier circuit receives its signal directly from the source **SELECTOR** switch. When the **TAPE 1 MONITOR** is depressed, the amplifier receives its signal from the output of the tape recorder connected to the **TAPE 1 MONITOR IN** jacks.

CONTROL CIRCUITS

The control circuits portion of the Model 2235B consists of the **BALANCE, VOLUME, BASS, MID, TREBLE**, and **HI FILTER** controls. All controls affect the left and right channels simultaneously.

With the controls set for flat response and **VOLUME** control at maximum, the overall voltage gain from and 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 cutoff. The change of attenuation in each channel as the control is turned 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 amplifier.

TONE AMPLIFIER

The TONE AMPLIFIER's circuitry uses a continuously variable R-C feedback-type configuration. The signal from the TONE AMPLIFIER feeds a 6 dB per octave hi filter circuit when the **HI FILTER** pushswitch is depressed.

OUTPUT STAGE AND PROTECTIVE CIRCUITS

The differential amplifier and pre-driver circuit amplify the signal from the **HI FILTER** 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 high 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 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.

SPECIFICATIONS

AMPLIFER SECTION

RATED POWER OUTPUT . . . . . 35 WATTS PER CHANNEL, CONTINUOUS AVERAGE POWER, BOTH CHANNELS DRIVEN.

POWER BAND . . . . . 20 Hz to 20 kHz

TOTAL HARMONIC DISTORTION 0.25%

LOAD IMPEDANCE . . . . . 8 Ω

Intermodulation Distortion at rated power 0.25%

Damping Factor 55

Frequency Response . . . . . 20 Hz to 20 kHz±0.25 dB

PREAMPLIFIER SECTION

Phono:

Dynamic Range . . . . . 96 dB

Note: Dynamic Range is the ratio in dB of the phono input overload to equivalent input noise.

Equivalent Input Noise . . . . . 1.5 μV

Input Overload . . . . . 100 mV

Sensitivities (for rated power output)

Phono . . . . . 1.8 mV

Tape . . . . . 180 mV

Main In . . . . . 1.5 V

Frequency Response (phono) . . . . . 30 Hz to 15 kHz±1.0 dB

Input Impedances

Phono . . . . . 47 kΩ

Aux or Tape . . . . . 100 kΩ

Main In . . . . . 30 kΩ

Tape Output Level . . . . . 775 mV

Ref.: 7.75 mV at phono input

Signal to Noise Ratio

Aux Input . . . . . 80 dB

Phono Input . . . . . 65 dB

Tone Controls

Bass: 50 Hz . . . . . ±10 dB

Mid: 700 Hz . . . . . ±6 dB

Treble: 15 kHz . . . . . ±10 dB

FM TUNER SECTION

Selectivity (alternate carrier) . . . . . 65 dB

Quieting Slope

RF Input for 30 dB Quieting . . . . . 1.9 μV

Quieting at 5 μV RF Input . . . . . 52 dB

Quieting at 10 μV RF Input . . . . . 58 dB

Quieting at 50 μV RF Input . . . . . 68 dB

Total Harmonic Distortion

Mono: 0.3%

Stereo: 0.5%

Capture Ratio . . . . . 1.5 dB

Stereo Separation at 1 kHz . . . . . 40 dB

Spurious Rejection . . . . . 95 dB

Image Rejection . . . . . 70 dB

IF Rejection . . . . . 90 dB

AM Suppression . . . . . 50 dB

AM TUNER SECTION

Sensitivity	20 μV

GENERAL

Power Requirements	120 V AC, 50/60 Hz
Power Consumption at rated output, both channels operating	180 W
Idling Power (Volume Control at zero)	30 W
Dimensions:	
Panel Width	17-3/8"
Panel Height	5-3/8"
Depth	14"
Weight:	
Unit alone	26.4 lbs.
Packed for shipment	36.4 lbs.

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 2235B is protected by a 0.5Amp 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.

IN CASE OF DIFFICULTY

If the receiver operates normally, but the dial lamp does not light, then the lamp(s) probably requires replacement. If the receiver does not operate, make sure the power cord is connected. If the power cord is all right and your unit is equipped with an external AC line protector fuse, check the fuse and replace it if necessary. If the dial lamp is properly illuminated but one channel is inoperative, check the loudspeaker cord of the inoperative channel for a short circuit, broken wire, loose connection or other fault. If the loudspeaker connections appear satisfactory, check for a broken, open, shorted, corroded, or disconnected shielded cable between the receiver and the input equipment. Check for improper setting of the **BALANCE** control. Look for any other visible fault. If no fault is noted, turn off the audio system, then transpose (left for right) the shielded source input cables at the receiver. If the opposite channel becomes inoperative when turned back on, then either the shielded cable or the input equipment is at fault. If the same channel remains inoperative, turn off power and similarly transpose the loudspeaker cords. If when the system is turned on there still is no sound from the same speaker system, then either the loudspeaker system or the loudspeaker cord is at fault. If the opposite speaker system fails to operate, then the receiver is inoperative. Refer the problem to your nearest Authorized Marantz Service Facility.

REPAIRS

Only the most competent and qualified service technicians should be allowed to service the Model 2235B. 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, refer to the list of Authorized Marantz Service Stations packed with the Model 2235B or write directly to the location listed below for the name and address of the Marantz Authorized Service Station nearest your home or business. Please include the model and serial number of your unit together with a full description of what you feel is abnormal in its behaviour.

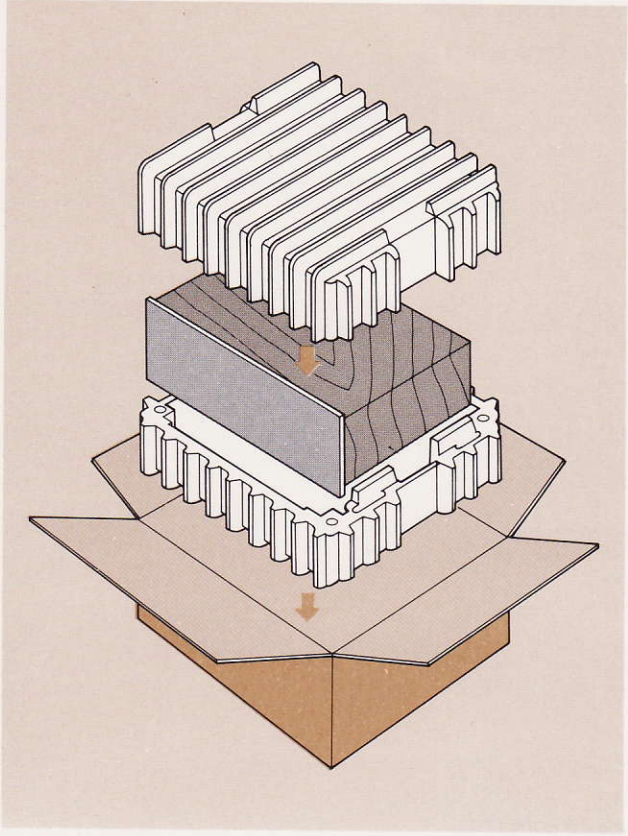
Marantz Company, Inc.
National Service Dept.
P.O. Box 577
Chatsworth, CA 91311
U.S.A.

REPACKING FOR SHIPMENT

Should it become necessary to repack your Model 2235 B 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 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 Service 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 11. 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
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