



LAFAYETTE

A Lafayette First!

LAFAYETTE®
COMPUTOR-MATIC™



Model LR-1500T

Stock No. 99-0190WX

175-Watt Solid State AM/FM Stereo Receiver

With
COMPUTOR-MATIC™
Overload Protection

Featuring
Four Integrated Circuits
Two Field Effect Transistors

Installation And Operating Manual



LAFAYETTE RADIO CORP.

Model LR-1500T 175-Watt Solid State AM/FM Stereo Receiver

FEATURING

New Revolutionary Integrated Circuits



Electronic Miracle
of the Space Age

Revolutionary new electronic devices that are the ultimate in miniaturization and reliability. Each no larger than a tiny transistor, yet housing a complete circuit with many transistors, diodes and resistors. Provides improved performance in far less space—assures reliability for years to come.

Advanced "COMPUTOR-MATIC" Over-Load Protection Circuit (Patent Pending).

A new fuseless computer-type overload protection circuit (Pat. Pend.) that automatically guards against damage to drivers and output transistors. Not only is this protective circuit hundreds of times faster than a fuse, but it is also self-restoring. When the cause of overload is removed, the circuit automatically restabilizes, allowing resumption of normal operation.

Silicon Field Effect Transistors

Two high-performance silicon Field Effect Transistors (FET's) in FM "front-end" assure high overload capability, superior cross-modulation index and image rejection.

SPECIFICATIONS

AMPLIFIER SECTION

POWER OUTPUT (IHF)..... 175 watts at 4 ohms (both channels)
 125 watts at 8 ohms (both channels)
POWER OUTPUT (RMS)..... 140 watts at 4 ohms (70 each channel)
 100 watts at 8 ohms (50 each channel)
TOTAL HARMONIC DISTORTION..... Under 1% at rated output, 0.15% at 1 watt.
FREQUENCY RESPONSE..... 20-20,000 Hz \pm 0.75 db
POWER BANDWIDTH..... 25-35,000 Hz
HUM AND NOISE..... High Level Inputs: -75 db
 Low Level Inputs: -57 db
INPUT SENSITIVITY..... Tape Head: 2.5 mV; Phono: 1.8 mV (H), 4.5 mV (M), 12 mV (L); Aux: 270 mV; Tape In: 500 mV.
TONE CONTROL RANGE..... Bass (50 Hz): 12 db boost or cut
 Treble (10 KHz): 12 db boost or cut

FM SECTION

TUNING RANGE..... 88-108 MHz
SENSITIVITY (IHF)..... 1.5 μ V
SELECTIVITY..... 40 db
CAPTURE RATIO..... 1.25 db
FM DISTORTION..... 0.3% (at 400 Hz)
STEREO SEPARATION..... 40 db (at 400 Hz)
AM SUPPRESSION..... 50 db
SIGNAL-TO-NOISE RATIO..... 68 db (100% mod)
SPURIOUS RESPONSE REJECTION..... 95 db
CROSS MODULATION INDEX 90 db
INTERMEDIATE FREQUENCY..... 10.7 MHz

ANTENNA..... Built-in, plus 300 ohm balanced input for external antenna.

AM SECTION

TUNING RANGE..... 535-1605 KHz
SENSITIVITY..... 15 μ V (ant terminal)
IMAGE REJECTION..... 50 db (at 1 MHz)
INTERMEDIATE FREQUENCY..... 455 KHz
ANTENNA..... Built-in, plus provision for external antenna.
SELECTIVITY..... \pm 20 KHz at 35 db
SIGNAL TO NOISE RATIO..... 45 db (400 Hz, 30% mod)

GENERAL

SOLID STATE DEVICES..... 4 Integrated Circuits, 2 Field Effect Transistors, 40 Transistors, 35 Diodes, 2 Thermistors.
FUNCTIONS..... FM Mono, Automatic FM Stereo, and AM reception. Inputs for stereo phono (magnetic), stereo tape heads, stereo Aux inputs, plus high level tape inputs.
OUTPUTS..... Stereo tape recorder outputs (front and rear); Main stereo speakers and Remote stereo speakers (4, 8 or 16 ohms); Stereo headphones.
CONTROLS..... Selector, Mode, Dual Bass, Dual Treble, Balance/Volume, Tuning, Speaker Mode, Mute, Loudness, L Filter, H Filter, Tape Monitor.
POWER REQUIREMENTS..... 105-120 volts, 50/60 Hz AC.
DIMENSIONS..... 16³/₄" W x 5" H (including legs) x 14¹/₄" D (including rear projections but excluding Knobs).
NET WEIGHT..... 30 lbs.

GENERAL

The Lafayette LR-1500T is one of the most advanced stereophonic high fidelity receivers ever made. It combines a sensitive AM tuner, a fully automatic FM stereo multiplex tuner, stereo control-preamplifier, and a powerful 175 watt stereo amplifier in one single, handsomely styled component. By simply adding loudspeakers, you can immediately enjoy individual AM and FM broadcasts, or the full-dimensional FM stereo broadcasts — all reproduced with a quality that is unsurpassed.

To ensure finest FM performance, the receiver employs two advanced space-age innovations — Integrated Circuits (IC's) and Field Effect Transistors (FET's). The use of IC's in home music equipment represents one of the most important technological advances in high fidelity history. An outgrowth of aerospace electronics, IC's represent the ultimate in miniaturization and reliability. No larger than a tiny resistor, each IC is actually a complete circuit in miniature containing 5 transistors and 2 resistors. Four of these devices are used in the IF section of the receiver, resulting in a total of 20 transistors where formerly only 4 were used.

The use of IC's in the IF, plus two silicon FET's in the FM "front end," results in dramatic improvements in FM reception. You will receive more stations than ever possible before — and with less noise and interference. Stations formerly too weak for good stereo reception will also be heard with greater clarity and with greater channel separation. And, because of the amazing reliability of IC's, you are assured of this superior performance for many years to come.

The advanced all-transistor design offers every advantage expected from solid-state circuitry — instant-on operation, low current consumption, cool operation, low distortion and noise, good transient response, and wide frequency response at full power. Stereo inputs have been provided for high-quality reproduction of programs from external sources such as record players, tape recorders, etc. Phono-graph inputs are provided for record players equipped with magnetic cartridges of varying output levels, these inputs offering proper loading and equalization for accurate reproduction. Also included are inputs for direct connection to the tape playback heads of a tape mechanism. These, too, offer correct equalization for proper reproduction. Tape recorder outputs at front and rear let you record all stereo or monophonic programs reproduced through the receiver. A dual set of outputs is provided for 4, 8 or 16 ohm loudspeakers — one set for main stereo

speakers, another set for remote stereo speakers. A special computer-type protective circuit in each channel offers automatic protection against damage to the drivers and output transistors caused by overloads. This circuit is completely effective and will act instantaneously to protect the transistors at all times.

A full range of front panel controls provides complete flexibility of operation and ensures the finest sound reproduction at all times regardless of variations in program sources or room acoustics.

In order that you may benefit from the many operating and performance features designed into this receiver, we recommend that you carefully read all the instructions contained in this manual. Also, we suggest that you keep the manual close at hand and in a safe place so that you can refer to it when necessary.

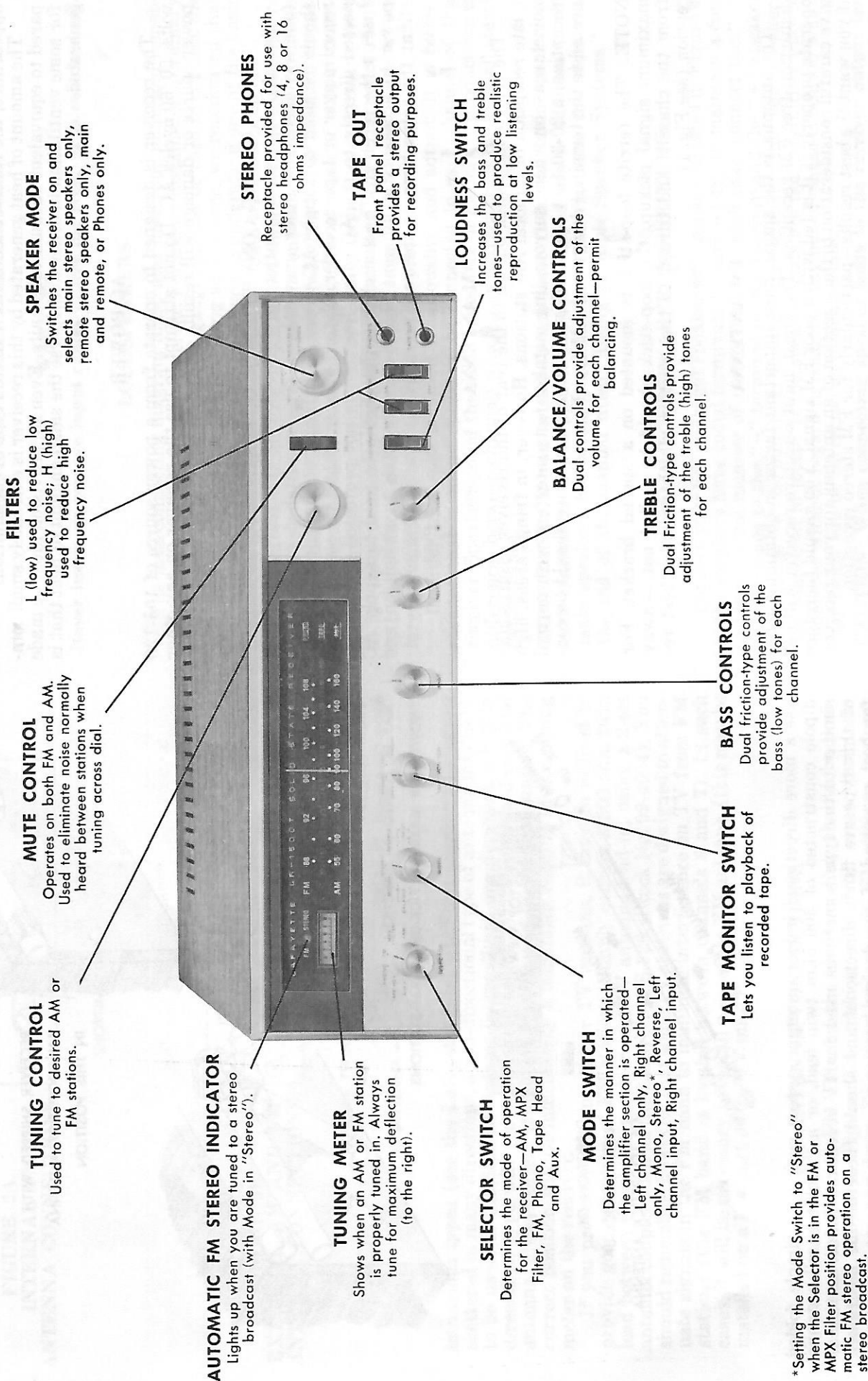
Special Features

AM/FM TUNER SECTION

- ✓ Sensitive FM "Front End" with silicon Field Effect Transistors and 4-gang tuning.
- ✓ Four Integrated Circuits in FM IF
- ✓ Fully automatic FM mono-stereo switching.
- ✓ Adjustable automatic interstation muting on FM and AM.
- ✓ Built-in FM and AM antenna systems.
- ✓ Precision tuning meter.

AUDIO AMPLIFIER SECTION

- ✓ Full range of stereo inputs for external sources.
- ✓ 3-position magnetic phono input sensitivity switch.
- ✓ Full complement of controls including Tape Monitor and Speaker Mode Switching.
- ✓ Rugged Silicon power output transistors mounted on oversized, finned heat sinks.
- ✓ New, "COMPUTOR-MATIC" overload protection circuit.
- ✓ Massive, regulated power supply.
- ✓ Center channel output.
- ✓ Provision for connection of remote speakers.
- ✓ Front and rear panel tape outputs.



TUNING CONTROL
Used to tune to desired AM or FM stations.

MUTE CONTROL
Operates on both FM and AM. Used to eliminate noise normally heard between stations when tuning across dial.

FILTERS
L (low) used to reduce low frequency noise; H (high) used to reduce high frequency noise.

SPEAKER MODE
Switches the receiver on and selects main stereo speakers only, remote stereo speakers only, main and remote, or Phones only.

AUTOMATIC FM STEREO INDICATOR
Lights up when you are tuned to a stereo broadcast (with Mode in "Stereo").

TUNING METER
Shows when an AM or FM station is properly tuned in. Always tune for maximum deflection (to the right).

SELECTOR SWITCH
Determines the mode of operation for the receiver—AM, MPX Filter, FM, Phono, Tape Head and Aux.

MODE SWITCH
Determines the manner in which the amplifier section is operated—Left channel only, Right channel only, Mono, Stereo*, Reverse, Left channel input, Right channel input.

TAPING MONITOR SWITCH
Lets you listen to playback of recorded tape.

BASS CONTROLS
Dual friction-type controls provide adjustment of the bass (low tones) for each channel.

TREBLE CONTROLS
Dual Friction-type controls provide adjustment of the treble (high) tones for each channel.

BALANCE/VOLUME CONTROLS
Dual controls provide adjustment of the volume for each channel—permit balancing.

LOUDNESS SWITCH
Increases the bass and treble tones—used to produce realistic reproduction at low listening levels.

TAPE OUT
Front panel receptacle provides a stereo output for recording purposes.

STEREO PHONES
Receptacle provided for use with stereo headphones (4, 8 or 16 ohms impedance).

*Setting the Mode Switch to "Stereo" when the Selector is in the FM or MPX Filter position provides automatic FM stereo operation on a stereo broadcast.

OPERATING CONTROLS AND FEATURES

INSTALLATION

The receiver may be used in any convenient location such as an equipment cabinet shelf, table or bookcase. Modern and attractive in appearance, the receiver lends itself to this type of installation.

The amount of heat generated by this receiver is extremely small compared to equivalent vacuum-tube units. Even so, provision must be made for some ventilation in order to disperse the small amount of heat that is generated.

AC POWER

The receiver is designed to operate from a power source of 105-120 volts, 50/60 cycles AC. Do not attempt to use the receiver on any other power source or damage will result.

AC CONVENIENCE OUTLETS

Two AC convenience outlets are provided at the rear of the unit (one switched, the other unswitched). The unswitched outlet (red) should be used to supply AC power to external equipment such as a record player or tape recorder. Note, however, that this outlet is connected directly to the AC input line and is not protected by the AC fuse in the receiver. The switched outlet should be used to supply AC power to accessory equipment that you may wish to switch on and off at the same time as the receiver.

AM ANTENNA

The ferrite loop-stick built into the rear of the receiver assures adequate reception of all local AM stations. However, in fringe areas, high noise areas, or where surrounding metal objects interfere with normal reception, a 20-30 foot length of insulated antenna wire should be connected to the terminal designated AM (see Figure 2-B)

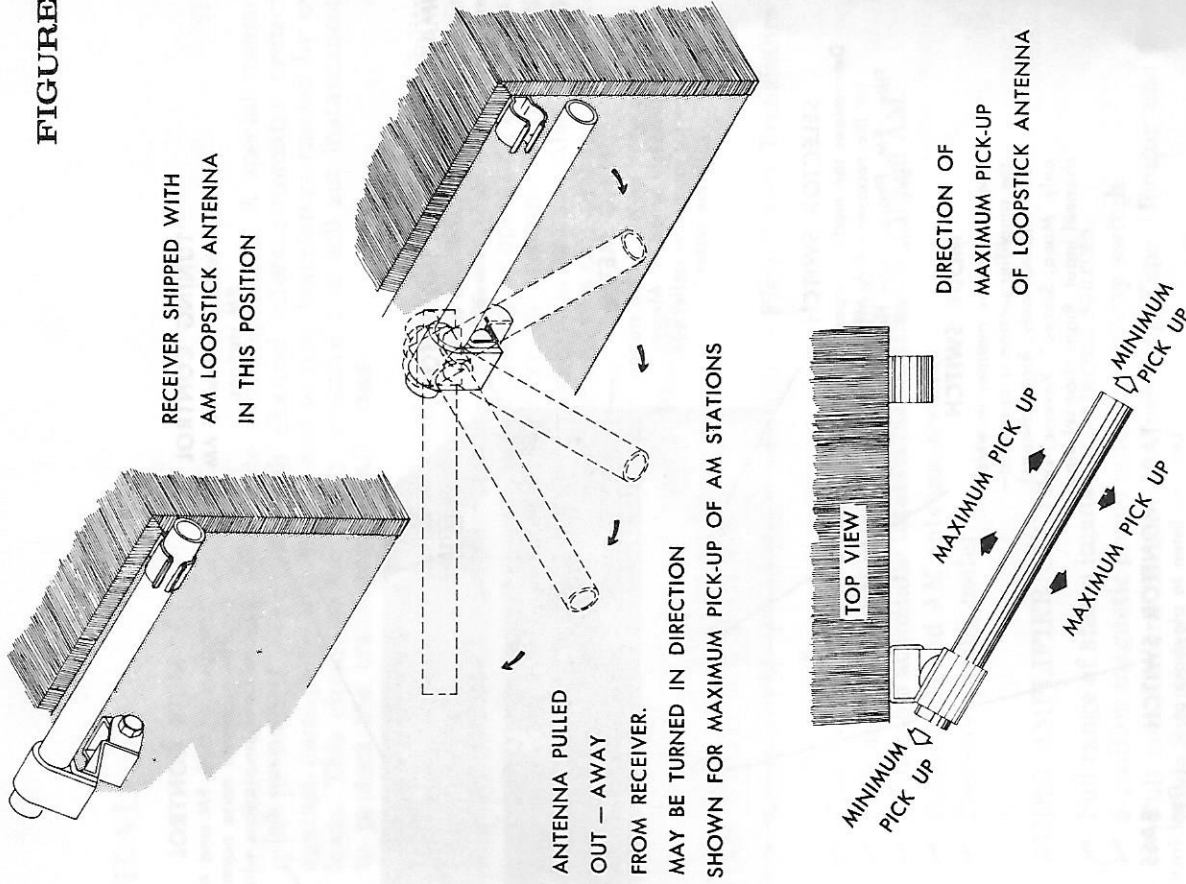
NOTE: The ferrite loop-stick is mounted on a special bracket. For maximum signal pickup, the loop-stick should be pulled out —away from the chassis, and turned to the position which provides best reception (see Fig. 1).

FM ANTENNA

The antenna is the single, most important factor in obtaining good, distortion-free FM reception. The finest, most sensitive receiver will not operate properly if it is fed with a poor FM signal. You should therefore give careful consideration to the selection of an antenna for your receiver if you want the best results—particularly for FM stereo reception.

In areas reasonably close to the station, the built-in FM antenna system will generally provide good results (see Fig. 2-A for internal FM connections). In certain cases, however, it may be necessary to

FIGURE 1.



use a more directional indoor antenna system such as a simple folded dipole constructed of 300 ohm twin lead, or a "rabbit ears" antenna similar to the type sometimes used for TV reception. Indoor antennas of this type are fairly directional and should therefore be positioned for best reception of the desired stations.

In areas further from the transmitter, the use of an outdoor antenna installed as high as possible is highly recommended. These are available

CONNECTING YOUR ASSOCIATED EQUIPMENT

WARNING

Never insert or remove input cables unless the receiver is switched off.

LOUDSPEAKERS

The interconnecting diagram illustrates how your main and remote speakers are connected to this receiver. For indoor installations, ordinary plastic-covered lamp cord (No. 18 gauge) should be used to connect the speakers to the receiver. Before doing so, however, we recommend that you read the following. It will enable you to understand one of the basic differences between a vacuum-tube unit and a transistorized one.

Transistorized amplifiers which do not employ output transformers in their design need only be equipped with one pair of speaker terminals (for each channel). Thus, all speakers, whether 4, 8 or 16 ohms impedance, are connected to these terminals. The absence of output transformers enables the amplifier in the receiver to produce maximum power at low distortion levels. In addition, it permits a wider frequency range to be reproduced at high power—particularly in the bass range where large amounts of power are required for proper reproduction.

In order to ensure balanced tonal quality and output, it is recommended that identical speakers be connected to each channel of this receiver. Speakers not of the same impedance or model will produce sound differences between channels which may detract from the over-all stereo performance.

IMPORTANT: If you intend to use more than one main speaker on each channel, or if you plan to use remote speakers in addition to the main speakers, we strongly recommend that you read the section at the end of the manual titled "Using Multiple Speaker Systems."

MAIN LOUDSPEAKER CONNECTIONS

Connect your left and right speaker systems as indicated in Figure 3. If the speakers have coded terminals (+ and -) try to maintain a consistency in the manner of connections—in each case, connect the "—" speaker leads to the "—" terminal on the receiver and the "+" speaker leads to the "+" terminals, as shown. This will ensure that your speakers are connected in phase. If the speaker leads are not coded, they may be connected without regard to polarity. Any out-of-phase condition which may result can be corrected as indicated later.

CAUTION: When connecting speaker leads to the receiver output terminals or to the speaker terminals, make sure that the strands of wire on each lead are securely held under each screw head. This will avoid the possibility of a loose strand accidentally touching an adjacent terminal

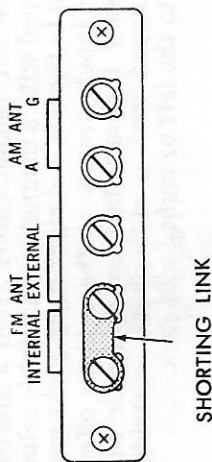


FIGURE 2A. INTERNAL FM ANTENNA CONNECTIONS

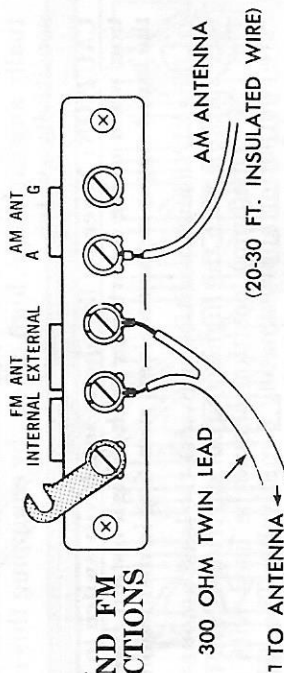


FIGURE 2B. EXTERNAL AM AND FM ANTENNA CONNECTIONS

in various types (see the Lafayette catalog). For reception of stations scattered in many directions, a non-directional type of antenna may have to be used. If the desired stations lie mostly in one direction, a highly directional type will provide better results. When using a directional antenna, always orient it for best reception of the desired station. The correct position will be indicated by a maximum reading of the tuning meter on the receiver.

If you presently use an outdoor TV antenna, it may be utilized to provide good reception of FM stations. Simply connect a 300 ohm twin lead between the stereo receiver and TV antenna lead-in, using a 2-set antenna coupler such as the Lafayette TS-326 (Stock No. 99-4004). You should remember, however, that some TV antennas are designed to attenuate signals in the FM band to minimize interference on TV from FM stations (the FM band is located between channels 6 and 7). In such cases, it will be necessary to install a separate FM antenna (this may be installed on a low part of the TV mast).

FM ANTENNA CONNECTIONS

To use the internal FM antenna the shorting link should be positioned as shown in Figure 2-A, making sure both screw terminals are tightly screwed down. To connect an external FM antenna, connect the 300 ohm twin lead to the "external" pair of terminals as shown in Figure 2-B. BE SURE TO REMOVE THE SHORTING LINK WHEN USING AN EXTERNAL ANTENNA.

and short-circuiting the speaker output. Also, if the speaker leads are secured anywhere by means of staples, make sure they do not pierce the actual wires and produce a short-circuit.

REMOTE SPEAKER CONNECTIONS

Remote speakers are connected in the same manner as the main speakers, except that they are connected to the "Remote" terminals.

CAUTION: If your "main" speakers are of 4 ohms impedance, do not connect remote speakers or damage may result. If main speakers are either 8 or 16 ohms, you may use either 8 or 16 ohm remote speakers safely, but not 4 ohm types. If you have not already done so, we urge you to read the section at the end of this manual entitled "USING MULTIPLE SPEAKER SYSTEMS."

THIRD CHANNEL OPERATION

The phono jack at the rear of the unit marked "CENTER CH OUT" may be connected (by means of shielded audio cable) to the high level input of a separate monophonic amplifier. A speaker attached to this amplifier will serve as the center or third channel speaker.

NOTE: The output at the Center Channel Out jack is a combination of left and right channel signals and is therefore monophonic. Not only is this output controlled by the Volume/Balance control on the receiver, but in addition it is always present at the jack, regardless of the Speaker Mode switch setting. Additional information on center channel operation is provided on a succeeding page under "SPEAKER PLACEMENT."

STEREO HEADPHONES

The receiver is also designed for stereophonic headphone listening. Simply plug the headphones into the front panel receptacle marked "Stereo Phones" (the Speaker switch may be in any position). If you wish to listen privately without the main speakers being on, set the speaker Mode switch to the "phones" position.

RECORD PLAYER CONNECTIONS

The shielded cables from a record changer or turntable are normally terminated with RCA-type phono plugs. The phonograph input jacks on your receiver are designed to accept this type of plug. To avoid loss in the high frequency tones, the cables from the record player should not exceed 10 feet in length.

A screw at the rear of the receiver has been provided that will permit grounding of the unit to a cold waterpipe, etc. If you are using a record player that is equipped with a ground wire, connect it to this ground screw.

RECORD PLAYERS WITH MAGNETIC CARTRIDGES

The two output cables from a stereo record changer or turntable equipped with a magnetic or variable reluctance cartridge should be connected to the left and right input jacks marked "PHONO".

The input circuits at these jacks offer standard RIAA equalization necessary for outputs from magnetic cartridges. If the record player is equipped with a monophonic cartridge, connect the single output cable to the left or right input jack.

PHONO SENSITIVITY SWITCH

Output levels of magnetic cartridges vary from one manufacturer to another—some being as low as 2 millivolts, others as high as 12 millivolts or more. Provision has been made to accommodate the output from virtually any cartridge, high or low, by equipping this receiver with a phono sensitivity switch.

CAUTION: Never set the phono sensitivity switch to the "H" (high) position when using a cartridge with a high output level. This will overload the input stages in the receiver, resulting in distortion in the sound output.

The "L" (low) position provides the least amount of gain and is therefore suitable with the higher output cartridges (12 millivolts or higher). The "M" (medium) position should be used with cartridges having a rated output of approximately 6 millivolts. The "H" (high) position is designed for use with cartridges with an output of between 2 and 4 millivolts. Information regarding the output level of any cartridge is generally to be found in the literature supplied by the manufacturer of the cartridge.

PHONO INPUT SENSITIVITY CHART

Minimum Input	Position For Rated Output
12 millivolts	L
5 millivolts	M
2 millivolts	H

Even if the output level of the cartridge in your record player is known, however, it is recommended that the following procedure be used to obtain a proper setting for the phono sensitivity switch.

1. Set up complete installation of the receiver (including speakers, FM antenna, AC power, etc.). The record player should be connected to the PHONO inputs, as instructed previously, and the Phono Sensitivity switch set initially to "L" (low).
2. Set all controls for "FM Stereo or Mono" operation (see chart headed "Quick Guide to Operating Your Receiver").

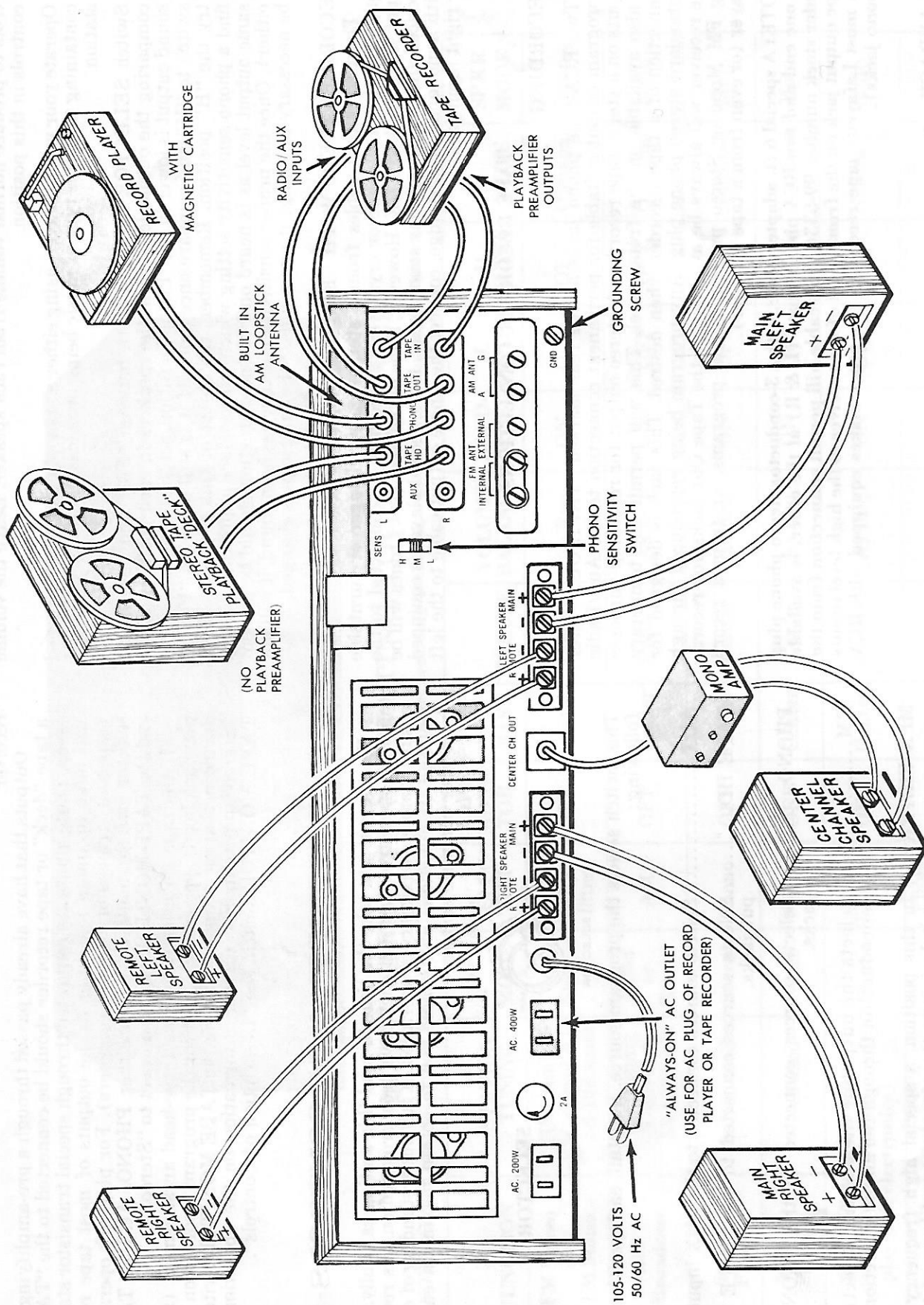


FIGURE 3.
CONNECTIONS TO ASSOCIATED EQUIPMENT

3. Tune in a strong FM station and set the BALANCE-VOLUME controls to produce normal volume from each speaker. Leave the volume controls in this position.
4. Operate your record player, using either a monophonic or stereo record containing the same type of music being broadcast on the selected FM station.
5. Switch SELECTOR back and forth between "FM" and "PHONO", comparing the output level from the speakers in each position. If the sound output is lower in the "Phono" position, set the phono sensitivity switch to "M" and compare once more. If it is still lower on "Phono" try the "H" position. Remember, the object of this procedure is to find a phono sensitivity setting which will produce approximately the same output level as is heard on FM (no distortion should be present either). Once the proper sensitivity position has been found, it will not be necessary to change it again unless the cartridge is changed.

RECORD PLAYERS WITH CERAMIC CARTRIDGES

The two output cables from a stereo record changer or turntable equipped with a ceramic or crystal cartridge may be connected to the input jacks marked AUX. However, some of the bass (low) tones will be reduced and the output may sound weak. If the record player is equipped with a monophonic cartridge, connect the single output cable to the left or right input jack.

TAPE RECORDER CONNECTIONS

RECORDING

Two RCA-type phono jacks at the rear marked "TAPE OUT" offer a program output suitable for permanent connection to the Aux/Radio inputs on a stereo tape recorder. A stereo output for recording purposes is also available on the front panel. This will permit the temporary connection of a tape recorder when desired. This jack is designed for a standard stereo phone plug. Any program being reproduced through the receiver will always be available at the Tape Out jacks for recording FM Mono or Stereo programs, AM programs, or from a record player (or even from a tape recorder).

NOTE: A special 6 ft. adapter cable, with a 3-conductor stereo phone plug at one end and two RCA phono plugs (L & R) at the other, is available under stock number 99-6336. This cable will permit connection from the tape output jack on the front panel of the receiver to the high level inputs on most Lafayette tape recorders (or other makes equipped with RCA phono jacks).

PLAYBACK

The two jacks marked "TAPE HD" (Tape Head) are special inputs designed for connections from the "tape head" outputs of a tape playback deck with no playback preamplifiers. The "Tape Hd" inputs provide the standard NAB equalization necessary for outputs from tape heads, and

allow the tape to be played back using the pre-amplifying system in the receiver.

Outputs that have already passed through a pre-amplifying stage in a tape "deck" or tape recorder should be connected to the "TAPE IN" jacks. These inputs are connected through special transistor stages, and will offer optimum matching to the outputs of most tape recorders (especially transistorized tape recorders). For playback operation the selector switch should be left in either PHONO, AUX or TAPE HD and the TAPE MONITOR switch now set to "Stereo."

If the tape recorder employs a three-head arrangement (separate playback head), you can also monitor the program recorded on the tape during actual recording by placing the TAPE MONITOR switch in the "Stereo" position. For further information on the operation of the TAPE MONITOR switch, see "Description of Controls".

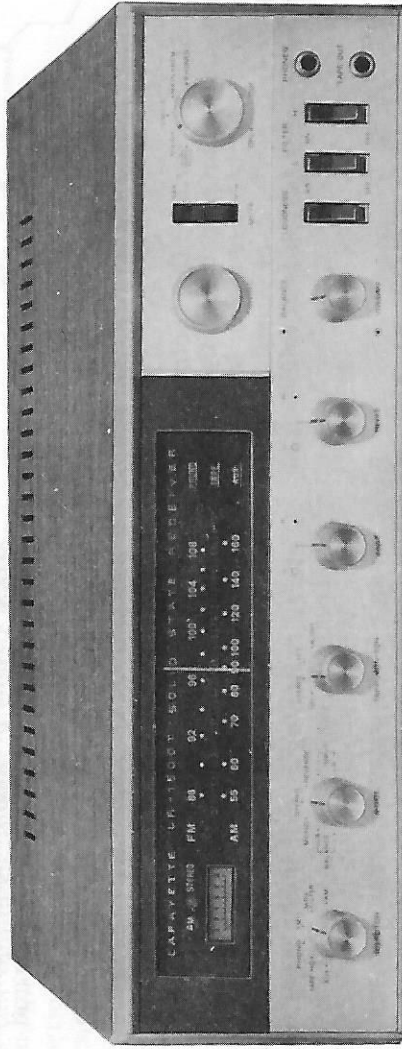
DESCRIPTION OF CONTROLS

We suggest you take the time to read this section carefully. A large number of controls and switches have been provided on this receiver to ensure complete flexibility of operation. A full understanding of each control and its functions will enable you to obtain maximum enjoyment from your complete system.



This switch selects the program source. In detail, each position does the following:

- AUX.....Selects sources connected to the AUX input jacks.
- TAPE HD.....Selects sources connected to the "TAPE HD" input jacks.
- PHONO.....Selects sources connected to the PHONO input jacks.
- FM.....Selects the output of the FM tuner section for reproduction through the amplifier section.
- MPX FILTER.....In this position, a special high frequency filter is switched into the circuit to reduce any high frequency noise that may occur during FM stereo reception (see section titled "Interference on FM").
- AM.....Selects the output of the AM tuner section for reproduction through the amplifier section.

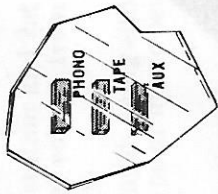


QUICK GUIDE TO OPERATING YOUR RECEIVER

NOTE: Certain controls, such as Bass, Treble, L and H Filter, may be re-set according to the needs of the installation or your personal preferences.

FUNCTION	STATION TUNING	MODE	SELEC-TOR	TAPE MONI-TOR	BASS	TREBLE	VOLUME BALANCE	LOUD-NESS	L FILTER	H FILTER	MUTE	SPKR MODE
FM Stereo or FM Mono	Use tuning control & 88-108 scale	Stereo†	FM or MPX filter	OFF	Center	Center	As Req	ON	OFF	OFF	Optional	Main
AM Broadcast	Use tuning control & 55-160 scale	Mono or Stereo	AM	OFF	Center	Center	As Req	ON	OFF	OFF	Optional	Main
Stereo Phono	Not used	Stereo	Phono	OFF	Center	Center	As Req	ON	OFF	OFF	Not used	Main
Mono Phono	Not used	Mono	Phono	OFF	Center	Center	As Req	ON	OFF	OFF	Not used	Main
Stereo Playback from tape deck (with no playback electronics)		Stereo	Tape Hd	OFF	Center	Center	As Req	ON	OFF	OFF	Not used	Main
Stereo Playback from tape recorder (with playback pre-amp outputs)		Stereo	Phono Aux or Tape Hd	Stereo	Center	Center	As Req	ON	OFF	OFF	Not used	Main

†In the "Stereo" position of the Mode switch, the receiver will automatically switch to stereo operation when tuned to an FM stereo broadcast, and return to mono on a monophonic broadcast.



FUNCTION INDICATOR LIGHTS

The Selector also provides switching for the AM/FM tuning meter and the three colored function indicator lights. In the AM, MPX FILTER, and FM positions of the Selector switch, the tuning meter is activated and lights up. In the remaining three positions, the tuning meter is switched off and the three colored lights provide an indication of the selector switch setting for Phono, Tape Head, or Auxiliary. This feature offers visible indication of the Selector switch setting from any listening position.



MODE

This switch determines the manner in which program sources (previously selected by the SELECTOR switch) will go through the amplifier section of the receiver.

BALANCE L... This mixes a left and right channel input for reproduction through the left channel and left speaker only.

BALANCE R... This mixes a right and left channel input for reproduction through the right channel and right speaker only. Switching between this position and "Balance L" allows you to listen to each channel individually to compare them for equal volume level (see section on Speaker Phasing and Balancing).

MONO... A program source connected to left and right channel input jacks is mixed and reproduced through both channels and speakers. Also, a single program source connected to either the left or right input jack is automatically reproduced through both channels and is heard from both speakers.

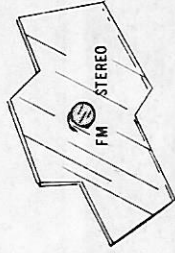
NOTE: During FM operation, switching to "Mono" will disable the automatic stereo switching circuit of the receiver and provide only monophonic FM reception.

STEREO... This provides stereophonic reproduction of any stereo program source. This position will also provide automatic FM stereo operation when the SELECTOR switch is in the FM or MPX FILTER position.

REVERSE... During stereo reproduction, you may wish to reverse the sound outputs from the left and right speakers. Placing the switch in the reverse position will cause the instruments formerly heard from the left speaker to be heard from the right speaker, and vice versa.

INPUT L... A program source connected to a left channel input jack is reproduced through both channels and is heard from both speakers.

INPUT R... A program source connected to a right channel input jack is reproduced through both channels and is heard from both speakers.



FM STEREO INDICATOR LIGHT

The FM stereo light works in conjunction with the automatic FM stereo switching circuit in the receiver. On a stereo broadcast the light will come on, indicating that the receiver has switched to FM stereo operation. When the light is out, it is an indication that the receiver is not tuned to an FM stereo broadcast and has returned to FM mono operation. Note, however, that placing the MODE switch in the "Mono" position will disable the automatic FM stereo switching circuit and extinguish the light, even on a stereo broadcast.

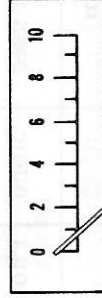
Any stereo station which produces an unsteady "flickering" light must be considered too weak or noisy for proper stereo reception (although it may be good enough for mono reception). Tune only to those stations that produce a steady, uninterrupted light if you want best stereo reproduction.



TUNING

TUNING

Tuning for either AM or FM is carried out with the same control. An electronic tuning meter on the receiver permits accurate tuning of all stations. Simply tune for highest meter reading. This is particularly important on FM—poor tuning will result in noise and distortion. On FM stereo, poor tuning will also result in a loss of channel separation.



TUNING METER

An illuminated meter, arbitrarily calibrated from 1 to 10, permits accurate tuning of FM or AM stations (see "TUNING"). The meter also provides an indication of the relative strength with which the unit is receiving various stations. One station may produce a reading of 6, another a reading of 10. This indicates that the signal arriving at the receiver input from one station is weaker than the other, even though both may have originated at transmitting stations having equal power.

Factors causing one station to be received with less strength than another are numerous — particularly on F.M. These include: the distance of the station from your antenna, the terrain over which the signal must pass (intervening structures such as tall buildings, towers, etc. will affect reception), and the direction in which your F.M. antenna is “beamed”. Your antenna (unless omni-directional) must be oriented correctly for maximum “pick-up”. Maximum signal pickup will be readily seen on the tuning meter. The meter can also be used to judge the efficiency of one antenna as compared to another, the better antenna producing a higher meter reading.

• BALANCE

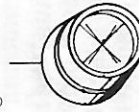


● VOLUME

VOLUME/BALANCE CONTROLS

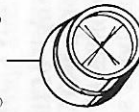
These are concentric controls which permit individual adjustment of the volume for each channel. Generally, they should be set so that the indicator lines on the knobs are in the same position and turned together by grasping both knobs. However, if the speaker outputs are not equal in volume, adjustment of the small outer control should be made to equalize outputs. The rear knob (nearest the front panel) controls the left channel, and the small outer knob controls the right channel.

L ○ R ●



TREBLE

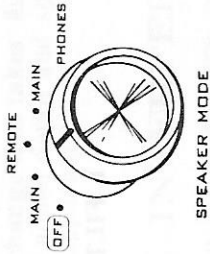
L ○ R ●



BASS

BASS AND TREBLE CONTROLS

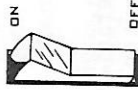
These are dual concentric friction-type controls which permit the bass (low) or treble (high) tones of both channels to be adjusted simultaneously. However, the concentric controls may be operated individually by holding one knob firmly and rotating the other. When the indicator lines on these knobs are set to the center or 12 o'clock position, response is normal (flat frequency response) and the amplifier section reproduces all input frequencies equally. Clockwise rotation (from center) increases the bass or treble tones, and counter-clockwise rotation decreases them. In each case, the small outer knob controls the right channel and the panel knob behind it controls the left channel.



SPEAKER MODE

This switch turns the unit on and also allows you to connect the sound output either to the main speakers in your principal listening area (Main), to remote speakers located in a secondary area (Remote), to both sets of speakers (Main + Remote), or to headphones only (Phones).

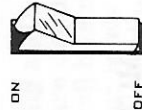
LOUDNESS



LOUDNESS

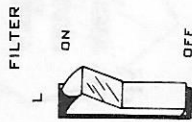
At low listening levels the human ear does not respond equally to all frequencies. When played at very low volume, a musical program will appear to exhibit a fairly great loss of the bass tones and a slight loss of the treble tones. In order to compensate for this deficiency in the human ear, it becomes necessary to provide added volume at the low (bass) and high (treble) frequencies. This is accomplished by the **LOUDNESS** switch. At low volume, it provides the required amount of bass and treble boost to enable the listener to hear the full range of frequencies with greater realism. The loudness circuit works in conjunction with the Volume/Balance controls so that at high volume control settings, the boosting action is automatically reduced, and the receiver output assumes a normal response.

FILTER H



H FILTER

This switch, when “on”, will remove any of the high frequency noises (hiss and scratch) sometimes encountered in older records, or on weak F.M. stereo stations. Unless such noises are disturbing, however, this switch should be left in the “off” position to permit the full reproduction of the high frequencies.



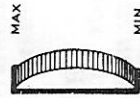
L FILTER

This switch, when "on", removes any annoying low frequency rumble that may originate in your record player and can be heard from the speakers. Normally, however, this switch should be placed in the "off" position to permit the full reproduction of the low frequencies.



TAPE MONITOR

In the OFF position of this switch, the program chosen by the Selector switch will be reproduced through the receiver and heard from the speakers. Setting the switch to the other positions selects the program source connected to the TAPE IN jacks (the high level output of a tape recorder, for example) and reproduces it through the receiver—regardless of the Selector switch setting. This feature is also useful when employed with a tape recorder that is equipped with a separate playback/monitor head. During recording, the output of the playback/monitor head is connected (after suitable preamplification in the receiver) to the "TAPE IN" jacks on the receiver. Placing the TAPE MONITOR in the "Off" position allows the program source (a phonograph record, for example) to be heard through the amplifier as you record. Placing the switch in any of the other positions now allows the program you have recorded on the tape itself to be heard. In this way, you can monitor the actual recording on the tape and make any adjustments if necessary. In the "Stereo" position, you are able to monitor both channels of a stereo tape recording: in "Left" you can monitor the left channel only, and in "Right," the right channel only.



MUTE

One of the normal characteristics of FM tuners is the loud "rushing" noise heard between stations. With AM tuners, a similar condition also exists—frequently much more severe due to the pick-up of various forms

of electrical interference, static, etc. The receiver incorporates a special muting circuit to completely eliminate noise between stations on FM and AM, so that when tuning over the dial each station will "break through" from a background of complete silence.

The degree of muting may be varied from minimum to maximum by means of the MUTE control on the receiver. In the minimum position, no muting action is applied and the FM and AM tuners will function in a normal manner. In the maximum position, full muting is applied and only strong stations can break through the silence.

It should be noted that the muting action may not always operate simultaneously on both channels. Occasionally, you may notice a slight delay on one channel (a fraction of a second only) as the stations come in or go out. This is a normal condition and is usually noticeable only when using headphones.

Proper adjustment of the Mute control on FM (or AM) is as follows:

1. Set the receiver for FM Mono Operation (or AM), and rotate the MUTE control to minimum.
2. Tune to a spot on the dial where there are no stations. A loud "rushing" noise should be heard.
3. *Slowly* rotate the MUTE control toward maximum, listening to the background noise. At a certain point, the noise will begin to fade out. *Slight* further rotation will produce complete silence. Do not rotate the control too far or some of the weaker stations will also be silenced.
4. Check the action of the muting circuit by tuning across the dial. The receiver should be completely silent between stations. If some noise occasionally breaks through, or if you wish to eliminate very weak stations, increase the setting of the MUTE control slightly.

IMPORTANT NOTE

"Fading" of the incoming signal may sometimes cause the muting circuit to temporarily silence the receiver. This will occur only when the signal becomes so reduced as to fall beneath the level at which the MUTE control has been set. With slow fading, the receiver will suddenly become silent as the signal level falls beyond a certain level, to come on again only when the signal level begins to increase and overcomes the muting action. This type of fading is usually encountered with distant stations. The solution, then, is either to tune to a local station, or to reduce the MUTE control to minimum. With rapid fading (as frequently occurs on FM when aircraft pass overhead), the muting circuit may cause the receiver to be silenced in an intermittent manner until the rapid changes in signal level cease. This type of fading, which can occur even when you are tuned to a normally strong, steady station, is usually of short duration and you need only wait until it passes. If it is occurring at frequent intervals however, you can either tune to another station (which may not have this condition) or you can set the MUTE control to minimum to prevent the intermittent silencing of the receiver.

OPERATING INSTRUCTIONS

Before attempting to operate the receiver, make sure you have properly connected your loudspeakers and any other associated equipment you intend to use, such as a record player or tape recorder. For FM reception, you must have an antenna connected, as indicated previously.

Initially, set all controls as indicated in the chart headed "Quick Guide To Operating Your Receiver".

NOTE: A slight "pop" from each speaker when the receiver is first switched on is normal and should not cause concern.

AUTOMATIC FM STEREO SYSTEM

The automatic FM stereo circuit on your receiver offers a simple and fast means of locating FM stations which are broadcasting a stereo program. Operation is simple—you just tune over the FM band with the MODE switch in the "Stereo" position. Monophonic stations will produce no light from the stereo indicator and you will hear them monophonically. A station broadcasting a stereo program will cause the stereo circuit to switch in *automatically* and light the indicator to signify that the receiver is operating stereophonically.

On occasion, the FM stereo indicator will light on a station which sounds as if it is broadcasting a monophonic program. This condition is usually encountered during an announcement or newscast, and can be explained as follows: During stereo broadcasts, the complex FM wave transmitted from the station includes a component known as the "Pilot" signal. This signal (which is never heard) is used to synchronize the receiver to the transmitter. The switching circuit in the receiver is also actuated by this Pilot signal. Announcements or newscasts during a stereo program may actually be transmitted monophonically on both channels from the station, so that the sound heard from your left speaker will be identical to that heard from your right speaker (some stations transmit announcements on one channel only). During such periods, however, the station frequently retains the Pilot signal in the transmitted wave since it is inaudible anyway. In such a case, your receiver will produce an indication of stereo, even though the announcement or newscast is heard as a monophonic broadcast.

It should also be remembered that the musical program being transmitted from the station may have varying degrees of channel separation, depending on the musical selection which, most frequently, is reproduced from records. Since few record companies use the same stereo recording techniques, the amount of channel separation available will vary from one record to another. However, there is more to stereophonic sound than the mere division of musical instruments between the left and right channels. There is a subtle depth and spaciousness to the music, with the sounds of various instruments distributed over a broad area. This particular characteristic will become more apparent if you make the following listening test. Set all controls for normal FM stereo operation, but place the MODE switch in the "Mono" position. Tune in a known stereo station and adjust tonal controls for desired reproduction. The sound you will

hear from both speakers is monophonic. Now switch MODE to "Stereo" and note the change that takes place. By switching between "Mono" and "Stereo", the added depth and spaciousness of stereophonic sound will soon become apparent.

INTERFERENCE ON FM

FM stereo broadcasts are more susceptible to noise pick-up than regular FM monophonic broadcasts. Provision has therefore been made in the receiver to permit reduction of these noises by means of special high frequency filters.

However, before attempting to use any of these filters, remember the following:

- a) Noise or distortion may be on the record or tape being played by the FM station.
- b) Your antenna may not be properly oriented for best reception, or may be inadequate for good signal pick-up from the desired station (see the section on FM antennas).
- c) Nearby electrical signs, automobiles, etc., may sometimes cause annoying interference. These electrical disturbances are usually picked up by the antenna lead-in (if you are using a roof antenna), and can sometimes be reduced by using 300 ohm shielded cable.

REDUCING NOISE ON FM STEREO

1. If the noise is present when the MODE switch is in "Stereo" but disappears when set to "Mono", you should try the filter provided in the "MPX Filter" position of the SELECTOR. This filter has negligible effect on the main program, but is helpful in reducing high frequency noise.
2. If the noise is still present, set the H FILTER on. Although this filter will reduce the higher frequencies on the program material, any noise present will be significantly reduced.

SPEAKER PHASING AND BALANCING

Correct phasing and balancing is important in a stereophonic system. If the speakers are out of phase, they will work in opposition to each other and there will be a noticeable loss in the low frequencies (bass). If the speaker output levels are not equal, there will be an unnatural distribution of the musical program, resulting in a loss of the stereo effect. Correct balance and phase may be achieved using the method described below. It is based on the fact that if two speakers send out identical sound and you are equi-distant from them, your ears will place the apparent source of sound halfway between the two speakers, as indicated in the diagram (Fig. 4).

SPEAKER PHASING

1. Set the SELECTOR switch to "FM" and MODE switch to "MONO". Tune in any FM broadcast (preferably one with a voice content).

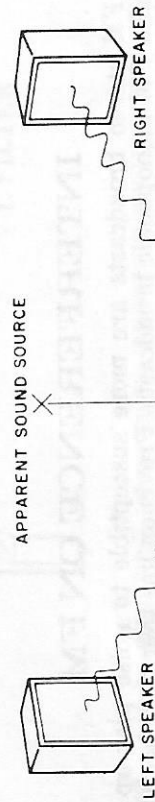


FIGURE 4.

2. For this test, the speakers should be placed about 6 to 8 feet apart and facing inward slightly as shown in the diagram. You will also require the help of another person to operate the receiver controls while you position yourself mid-way between the speakers as shown.
3. Adjust VOLUME/BALANCE controls to slightly higher than normal listening level. Make sure that each control is set so that the output from each speaker is approximately the same.
4. Have someone reverse the connections at the rear of one speaker. Listen carefully to the sound output as the wires are switched back and forth.

CAUTION: Use care when reversing wires to the speaker terminals. If the wires are inadvertently shorted together, the receiver's protective circuit will operate and momentarily cut off the sound output.

The correct, or "in-phase" connection will produce the greatest amount of bass and you will also notice that the sound seems to come from an area somewhere between the speakers. Adjustment of one of the VOLUME/BALANCE controls may be necessary to center the apparent sound source so that it seems to be located mid-way between the speakers. If the speakers are not in phase, however, the sound will not seem to come from any clearly defined area (unless there is a large difference in output between speakers), and you may have to reverse the speaker wires again.

Remember, when the speakers are in phase during the test, the sound will seem to come from *between* the speakers. During normal stereo operation this condition will no longer exist of course, and reproduction will be properly distributed in accordance with the manner in which the original stereo recording was made.

BALANCING THE SYSTEM

The concentric VOLUME/BALANCE controls on your receiver will allow you to correct for any difference in volume between channels. Initially, set the small outer control to minimum, and the rear (panel) control for normal room volume. You can use any program source for this procedure—FM, AM, phono or tape, mono or stereo.

Now increase the small outer control very slowly, while rapidly switching MODE between BAL R and BAL L. Leave the small outer control in the position which produces equal volume from both speakers.

Occasionally you may notice that one channel is weaker than the other during stereo operation. This may be due to out-of-balance records or stereo broadcasts. Simply adjust the small outer VOLUME/BALANCE control to correct as necessary.

SPEAKER PLACEMENT

To realize optimum performance from your stereo system, it is important that the left and right channel speakers be placed at definite locations within the listening area. If the speakers are too closely spaced, the stereo effect will be severely limited. Except in a very small room, eight feet is considered minimum spacing between speakers for good stereo separation. In a two-channel system, good stereo listening begins a distance in front of the speakers equal to their separation, and continues for twice this distance. For example, if the speakers are placed 8 feet apart, the best listening area extends from 8 to 16 feet in front of the speakers.

A large spread between speakers is permissible if the listening area is moved back proportionately. Close listening to widely separated speakers creates a "hole in the center" which gives the impression of two distinctly separate sound sources rather than the desired sound dispersion. If speakers are substantially separated, it is generally best to "angle" the side speakers toward the center of the listening area.

CENTER OR THIRD CHANNEL OPERATION

If you plan to operate your system with three channels, and have connected an amplifier and third speaker as indicated previously, proceed as follows. The volume control on the amplifier should be set to provide slightly less volume from the center speaker as compared to the left and right speakers. The center speaker should be located midway between the two side speakers and in line with them.

NOTE: The output at the Center Channel Out jack is a combination of left and right channel signals and is therefore monophonic. Not only is this output controlled by the Volume/Balance control on the receiver, but in addition it is always present at the jack, regardless of the Speaker Mode switch setting.

In operation, the center speaker reproduces the signal existing in both side speakers. The sound that originated from the center of the recording stage will actually radiate from all three speakers but will appear to be confined to the center channel. With two speakers not too widely separated this effect is preserved without the center speaker; but the third speaker will permit a much wider separation of speakers and spread of sound source without an undesirable "hole in the middle" effect.

AUTOMATIC OVERLOAD PROTECTION CIRCUIT

This receiver is equipped with "COMPUTOR-MATIC"—a newly-developed overload protection circuit (patent pending) that eliminates any possibility of damage to drivers and output transistors caused by momentary or sustained overloads. A special 2-transistor circuit is used in each channel that continuously monitors the output transistor stages. Any abnormal condition is immediately sensed and the protective circuit will act instantly to cut off operation of the amplifier before damage can result. Not only is this computer-type protective circuit hundreds of times faster than a fuse, but it is also self-restoring. When the cause of overload is no longer present, the circuit automatically begins to restabilize and normal operation is generally resumed within 1 or 2 seconds.

WHY SPECIAL OVERLOAD PROTECTION IS NECESSARY

It is well known that the output transistors in a solid state amplifier can be overloaded and damaged if a short-circuit is placed across the speaker output. Most units do therefore include a fuse or circuit that offers suitable protection against this type of overload. However, the superior transient response and the wider power bandwidth of today's solid state amplifiers have created another problem. An input signal of very short duration (caused by lightning or switching, for example) is faithfully reproduced through the various amplifier stages in a receiver and appears at the output as a momentary signal of dangerously high power. This frequently results in output transistor overload and subsequent damage. The greater the fidelity of the amplifier, the more serious this problem becomes. It is for this reason that a new and more complex type of circuit has been devised and included in your receiver.

HOW TO RECOGNIZE THE OPERATION OF THE PROTECTIVE CIRCUIT IN YOUR RECEIVER

If an overload occurs (even momentarily) the protective circuit will operate instantly and the receiver will be silenced. If the overload has occurred only on one channel, only that channel will be silenced. So

long as the overload exists, the receiver will remain silent on one or both channels. As soon as the cause of overload is removed, the circuits will begin to restabilize and, after 1 or 2 seconds, the receiver will resume normal operation.

On rare occasions, the receiver may not recover from a severe overload and remain silent even when the cause has been removed. If this occurs, simply set the volume control fully counter-clockwise to minimum for 2 or 3 seconds, then return it to its normal position. This action will speed the restabilization of the circuits.

CAUSES OF OVERLOAD

Overloads can be brought about by a number of causes, either momentary or permanent.

Momentary overloads can result from severe noise pulses such as those caused by lightning and static, switching noises, or from momentary shorting of speaker lines. Under these conditions, the receiver will usually resume normal operation within 1 or 2 seconds. Permanent overloads will result if speaker lines are permanently shorted or if a sustained signal of abnormally high level is applied to the input of the amplifier section (such as excessive hum, for example). Permanent causes of overload must be located and rectified before the receiver can resume normal operation.

NOTE: Momentary overload can also occur when tuning very rapidly across the receiver dial with the volume control in a high volume position. The sudden pulses of sound produced as the receiver tunes across the stations appear as large power pulses at the output, sufficiently high in some cases to cause a momentary overload. Tuning should therefore be carried out at a slower rate or with volume at a relatively low level (normal listening).

MULTIPLE SPEAKER SYSTEMS

The connection of several speaker systems on each channel must be carried out with great care in order to avoid the possible destruction of the output transistors in solid-state equipment. Basically, you must ensure that the final impedance presented by all speakers (both main and remote) on each channel does not fall below 4 ohms. Speakers connected to both "Main" and "Remote" terminals must be taken into consideration because in the "Main + REM" position of the SPEAKER MODE switch, any speakers attached to these terminals are connected in parallel, causing a considerable reduction in total speaker impedance — possibly to a dangerously low figure (below 4 ohms). We therefore urge you to read the following section if you intend to connect remote speakers or if you plan to use more than one speaker (per channel) on the "main" speaker outputs.

THE EFFECT OF MULTIPLE SPEAKERS ON IMPEDANCE

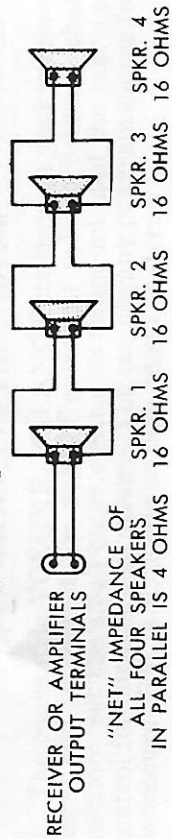
Most of the high fidelity speakers systems manufactured today are rated at either 8 or 16 ohms impedance, although there are several good ones rated at 4 ohms. When used singly, that is, one speaker on each channel, no special precautions need be taken. Each speaker, whether 4, 8 or 16 ohms impedance, is simply connected to the "Main" output terminals on each channel of the receiver. However, if you wish to add Remote speakers or connect more than one speaker to each "Main" channel, special precautions must be taken.

First, it must be understood that the recommended method of wiring multiple speakers in a high fidelity system is the parallel type of connection. This is illustrated in the following diagram. Series type connections may produce undesirable reactions in each speaker and should not therefore be used.

Unfortunately, the final or "net" impedance that results when speakers are connected in parallel is considerably lower than any one of the individual speaker impedances. And, as each additional speaker is added, the net impedance is further reduced. When each speaker in the group has the same impedance, it is relatively simple to calculate the net impedance of all the speakers combined. Divide the impedance of any speaker by the total number of speakers you intend to use (on each channel). For example, four 16 ohm speakers in parallel would be:

$$16 \text{ (ohms)} \div 4 \text{ (number of speakers)} = 4 \text{ ohms}$$

Thus, the actual impedance presented to the receiver is 4 ohms.



This method may be used to calculate the net impedance of any number of speakers in parallel, provided all speakers are of identical impedance. However, when the speakers have differing impedances, a more complex formula must be used.

To avoid the need for time-consuming calculations, we have provided a chart which shows many combinations of speakers that may safely be connected to your receiver. Note that the number and impedance of speakers that may be used applies to each channel. For example, in combination "D" two 8-ohm speakers may be attached to the "Main" terminals on each channel, resulting in a total of four 8-ohm speakers for both channels. With this arrangement, however, no speakers may be connected to the "Remote" terminals. In combination F, the chart shows that a total of four 16-ohm speakers may be used on each channel — two 16-ohm speakers connected to the "Main" terminals on each

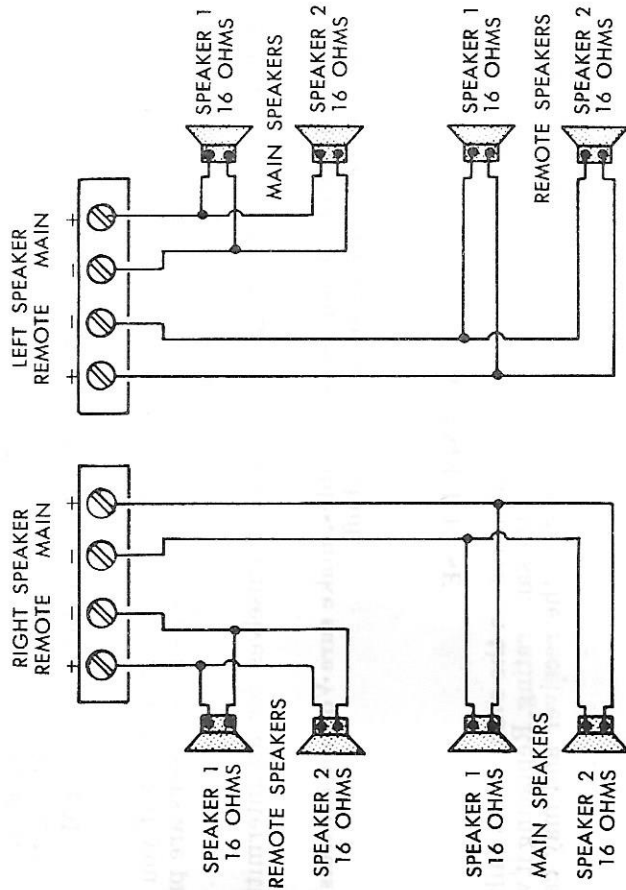
PERMISSIBLE SPEAKER COMBINATIONS

The chart below shows the various combinations of speakers that may be connected to each channel of the receiver

Single Speaker Systems	"MAIN" TERMINALS (Each Channel)		"REMOTE" TERMINALS (Each Channel)	
	A	B	C	D
Multiple Speaker Systems	1st Speaker: 4 ohms	1st Speaker: 8 ohms	1st Speaker: 16 ohms	None
	1st Speaker: 8 ohms	1st Speaker: 8 ohms	1st Speaker: 8 or 16 ohms	1st Speaker: 8 or 16 ohms
	1st Speaker: 16 ohms	1st Speaker: 16 ohms	1st Speaker: 8 or 16 ohms	1st Speaker: 8 or 16 ohms
	1st Speaker: 8 ohms	2nd Speaker: 8 ohms	None	None
	1st Speaker: 8 ohms	2nd Speaker: 16 ohms	1st Speaker: 16 ohms	1st Speaker: 16 ohms
	1st Speaker: 16 ohms	2nd Speaker: 16 ohms	1st Speaker: 16 ohms	1st Speaker: 16 ohms
	1st Speaker: 16 ohms	2nd Speaker: 16 ohms	1st Speaker: 8 ohms	1st Speaker: 8 ohms
	1st Speaker: 16 ohms	2nd Speaker: 16 ohms	2nd Speaker: 8 ohms	2nd Speaker: 8 ohms
	1st Speaker: 16 ohms	2nd Speaker: 16 ohms	1st Speaker: 8 ohms	2nd Speaker: 16 ohms
	1st Speaker: 16 ohms	2nd Speaker: 16 ohms	2nd Speaker: 16 ohms	1st Speaker: 16 ohms
	1st Speaker: 16 ohms	2nd Speaker: 16 ohms	1st Speaker: 16 ohms	2nd Speaker: 16 ohms
	1st Speaker: 16 ohms	2nd Speaker: 16 ohms	1st Speaker: 16 ohms	2nd Speaker: 16 ohms
1st Speaker: 8 ohms	2nd Speaker: 16 ohms	3rd Speaker: 16 ohms	None	
1st Speaker: 16 ohms	2nd Speaker: 16 ohms	3rd Speaker: 16 ohms	None	
1st Speaker: 16 ohms	2nd Speaker: 16 ohms	4th Speaker: 16 ohms	None	

NOTE: Total of all speakers on any one channel (both "MAIN" and "REMOTE") never results in an impedance below 4 ohms.

This type of arrangement, when correctly carried out, will permit the use of an even wider range of speaker combinations. Unfortunately, each resistor added in series will introduce a substantial loss in power. In the example just given, half of the output power available would go to the 4-ohm speaker and half would be developed across the 4-ohm resistor. In effect, this means that twice as much power would be required for a given sound output. When two 4-ohm speakers are paralleled and a series resistor is included in each line to avoid reducing the net impedance below 4 ohms (as shown in the following diagram), the available output power is developed across four elements in the system — two speakers and two resistors. If each speaker requires 5 watts of power to produce adequate sound output, the amplifier or receiver would have to provide 20 watts — 5 watts across each speaker and 5 watts across each resistor. The examples given are relatively simple ones and were chosen to more clearly illustrate some of the problems that may be encountered when series resistors are added. Therefore, before attempting to connect any speaker arrangement using series resistors, we strongly recommend that you consult a local high fidelity technician who will be able to determine the value of the resistors to be used, plus the necessary power rating required.

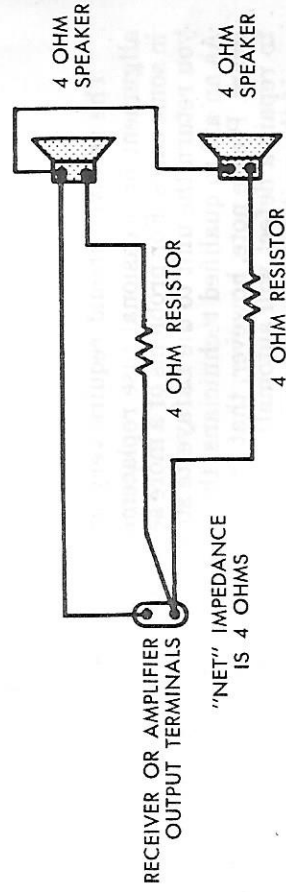


WIRING OF SPEAKERS LISTED IN COMBINATION "F" OF CHART

channel and two 16-ohm speakers to the "Remote" terminals on each channel. An illustration of the wiring of speakers listed in combination F has been provided as an example.

USING SERIES RESISTORS TO INCREASE NET IMPEDANCE

The use of a large wattage resistor in series with one lead to a speaker will effectively increase its impedance by the value of resistor chosen. For example, if a 4-ohm resistor were connected in series with a 4-ohm speaker, the total impedance of the speaker system would become 8 ohms ($4 + 4$).



SIMPLE TROUBLE-SHOOTING

If any trouble is encountered with your high-fidelity system, we recommend that you do the following:

1. Make sure the receiver is plugged into the correct power source (105-120 volts 50/60 cycles AC). Check the dial and meter lamps on the receiver. If they are not lit, switch the unit off and check the main AC fuse at the rear of the unit. If the fuse has blown, obtain a replacement fuse of the same rating and insert it into the receiver. If the fuse blows again, a fault in the receiver must be suspected. **DO NOT ATTEMPT TO USE A FUSE OF A HIGHER RATING THAN THAT SPECIFIED.**
2. If the receiver appears to be operating (tuning meter is indicating reception of signals) but there is no sound output on one or both channels, check for a possible overload which has caused the protective circuit to operate (see section titled "Overload Protection Circuit").
3. Check for possible error in control or switch settings (see "Quick Guide To Operating Your Receiver"). Make sure the **MODE** and **SELECTOR** switches are correctly set to provide the type of operation you want. Be sure the **TAPE MONITOR** switch is in the **OFF** position (if you are not monitoring tape).

4. If the trouble was experienced during your initial operation of the system, check all interconnections for accuracy, and check that all plugs are firmly inserted. If trouble is experienced on FM, check antenna system and connections.
5. Check to make sure your program source is not at fault if you are using a record player or tape recorder. Make sure speakers are properly connected and that they are not at fault.
6. Check any connecting audio cables themselves for an intermittent "open" or "shorted" condition.

IMPORTANT: When checking cables, make sure Volume controls are at minimum or receiver is switched off.

AC INPUT FUSE

The value of the AC fuse is 2 amperes. In the event of its failure, this fuse should be replaced with one of the same rating. Replacing it with a fuse of a higher rating will not protect the receiver and may cause severe damage.

RETURNING FOR SERVICE

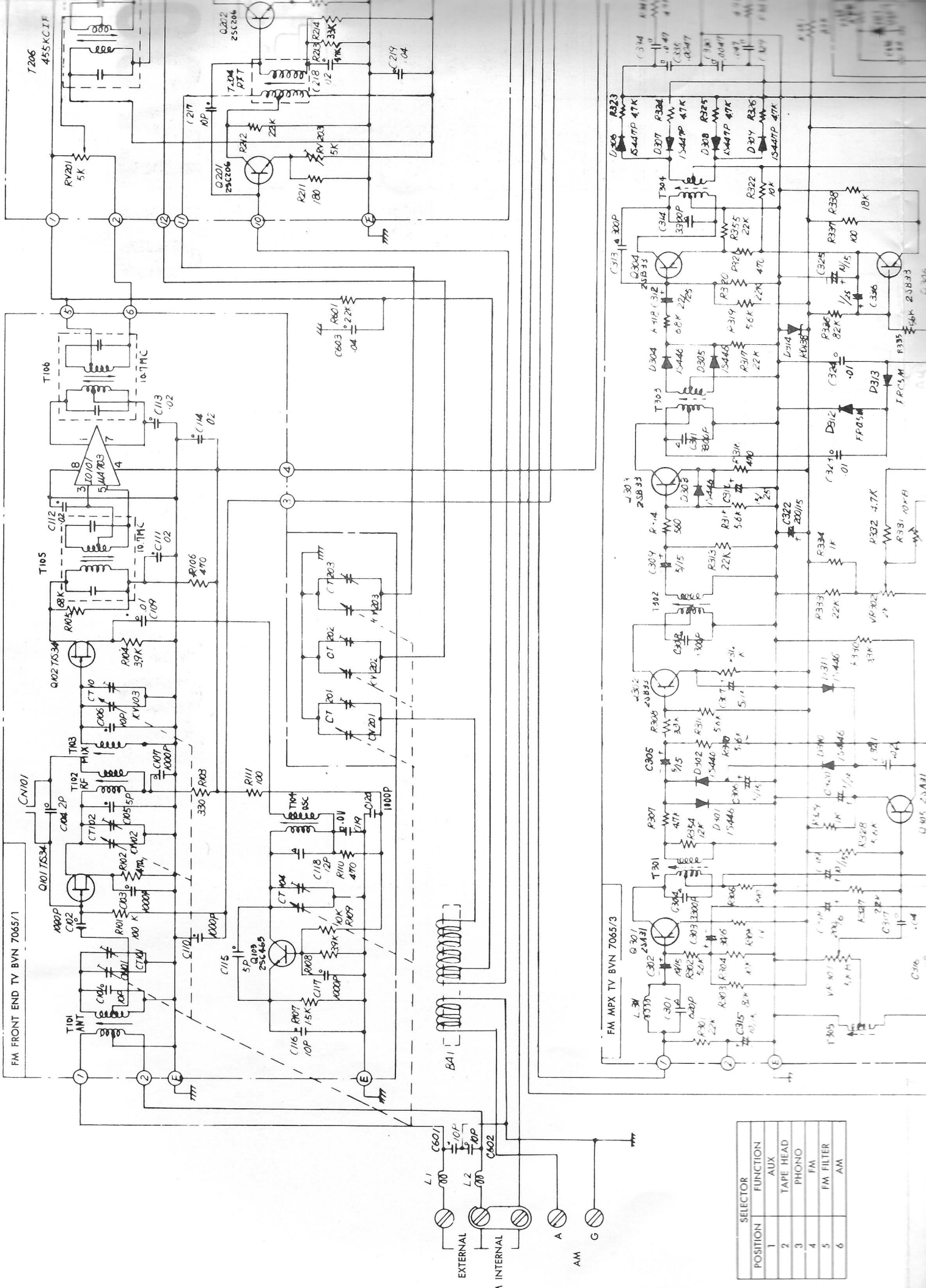
The receiver should require very little service except for periodical alignment or occasional fuse replacement which may become necessary in some cases. For problems of a more serious nature, we recommend that you return the unit to the Lafayette store from which it was purchased. As an aid to qualified technicians, this manual contains a schematic diagram. Please note, however, that any damage incurred while attempting to repair a defect will automatically void the guarantee if still in force. If the unit is to be shipped to our main office for service, please read the instructions which follow.

SHIPPING INSTRUCTIONS

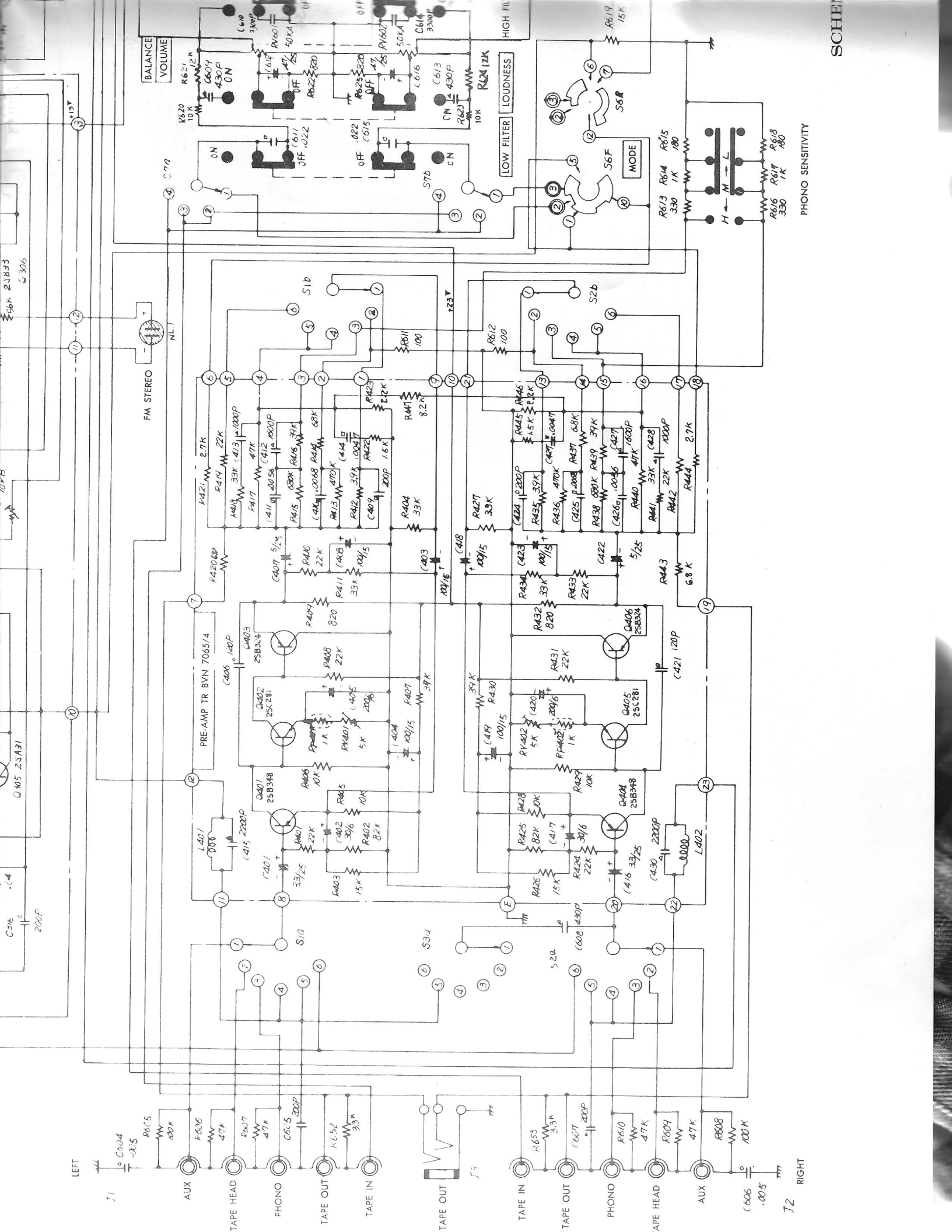
Pack the unit very carefully to avoid damage in transit, preferably in its original carton. If the original carton is not available, use a sturdy carton with at least 3 inches of shredded paper or excelsior around the unit. In the latter case, wrap the unit in paper first to avoid particles of

packing material getting into it. Include with the unit a letter explaining exactly what difficulties you have encountered (remember to add an extra 5¢ postage and indicate on the outside of the carton that First Class Mail is enclosed). Ship by prepaid express if possible and mark **ELECTRONIC EQUIPMENT—FRAGILE**. Clearly address the carton as follows:

**SERVICE DIVISION
LAFAYETTE RADIO ELECTRONICS CORP.
111 JERICHO TURNPIKE
SYOSSET, L.I., N.Y. 11791**



POSITION	SELECTOR FUNCTION
1	AUX
2	TAPE HEAD
3	PHONO
4	FM
5	FM FILTER
6	AM



SCHIE

PHONO SENSITIVITY

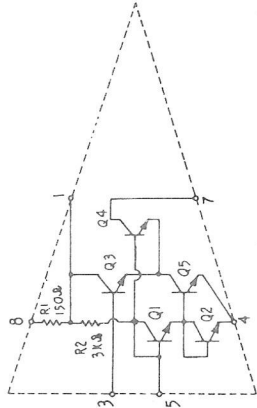
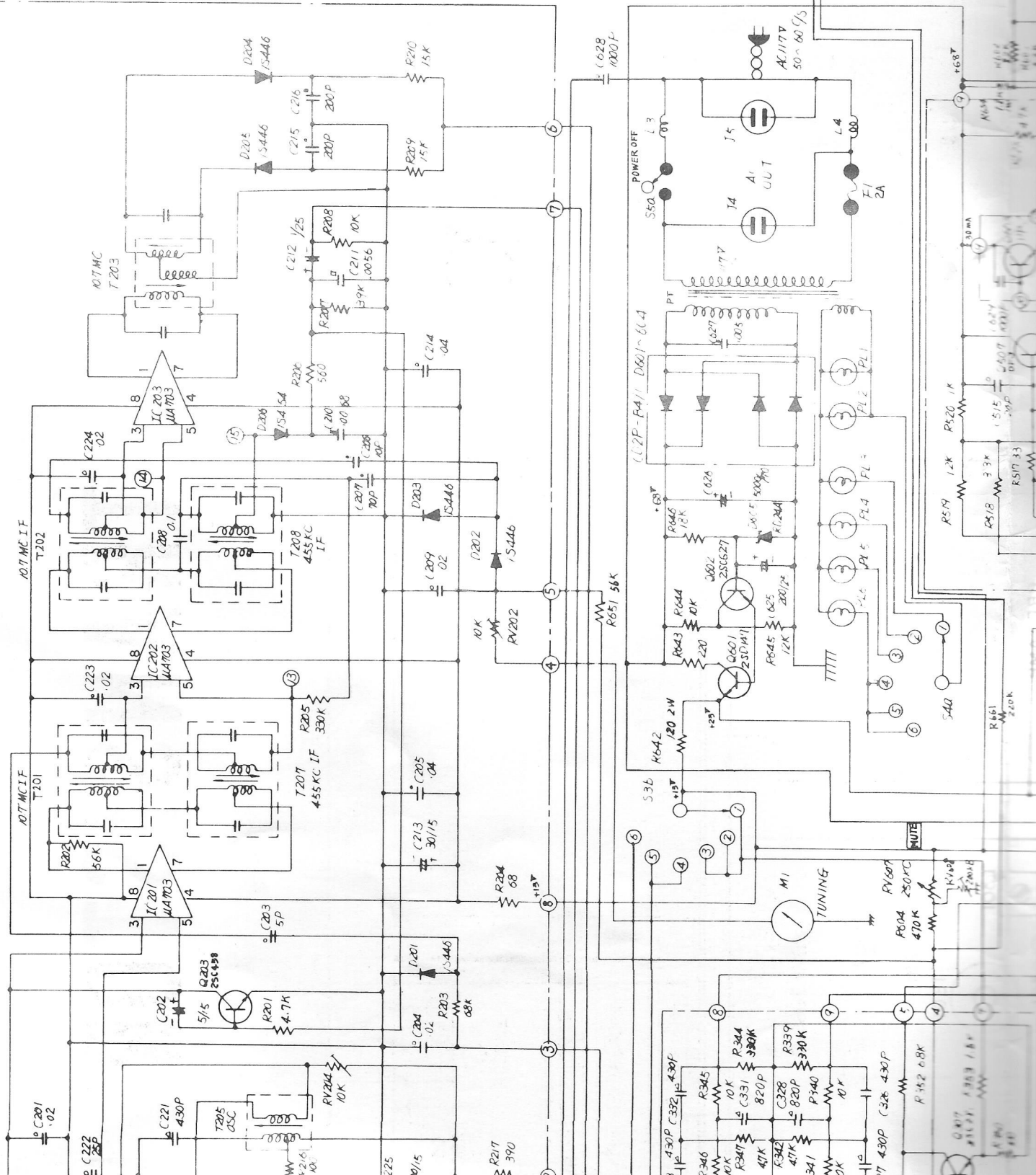
RIGHT

J2

LEFT

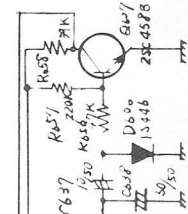
J1

FM IF/AM REC TV BVN 7065/2

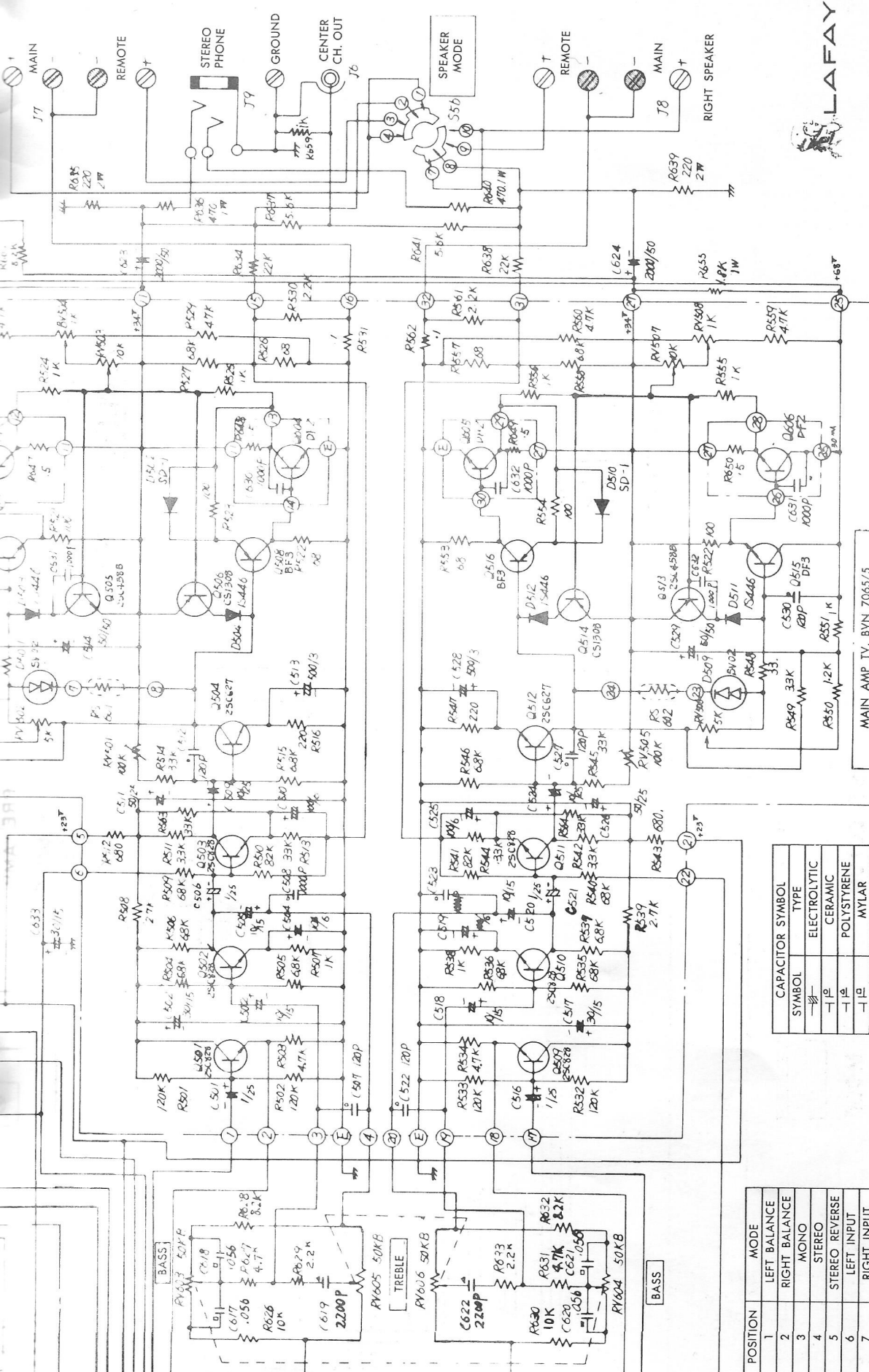


IC (INTEGRATED CIRCUIT)
LAFAYETTE TYPE NO. IC-F-1/μA703

POSITION	SPEAKER MODE
1	POWER OFF
2	MAIN
3	REMOTE
4	MAIN & REMOTE
5	PHONE



LEFT SPEAKER



POSITION	MODE
1	LEFT BALANCE
2	RIGHT BALANCE
3	MONO
4	STEREO
5	STEREO REVERSE
6	LEFT INPUT
7	RIGHT INPUT

CAPACITOR SYMBOL	TYPE
	ELECTROLYTIC
	CERAMIC
	POLYSTYRENE
	MYLAR

LAFAYETTE

Model LR-1500T

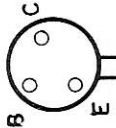
175 Watt

Solid-State AM/FM Stereo Receiver

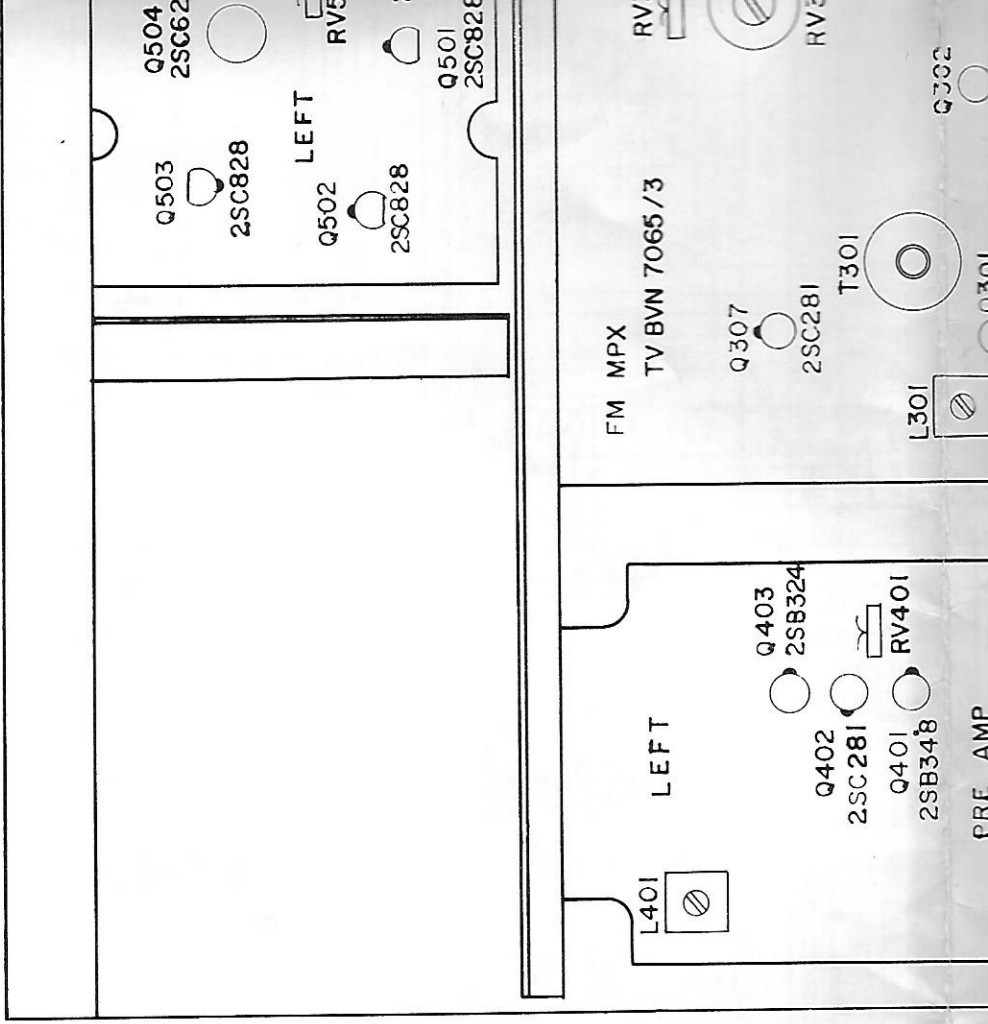
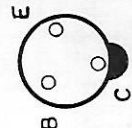


SCHEMATIC DIAGRAM

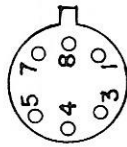
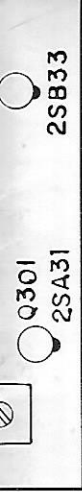
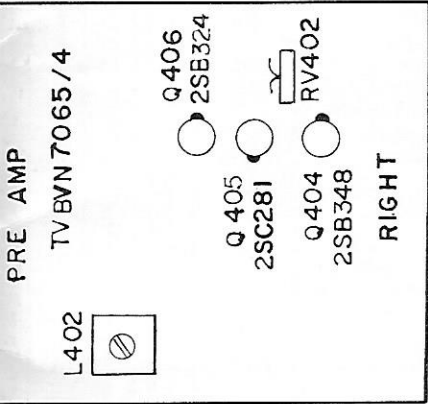
TRANSISTOR L



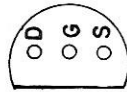
TAB



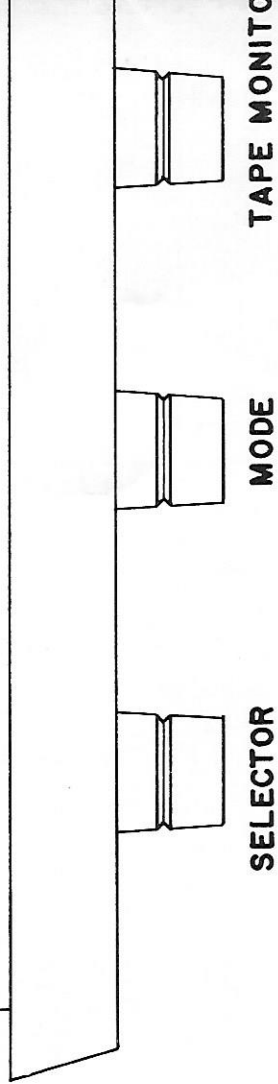
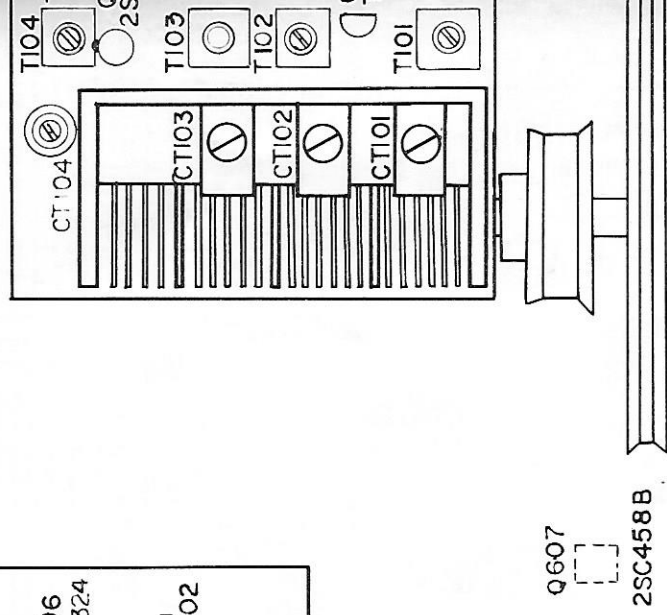
COLLECTOR MARK



IC BASE (BOTTOM VIEW)



FET. T1S34



OCATION 24 LR-1500T

