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OPERATING & SERVICE MANUAL

**AM/FM
STEREO
RECEIVER**

MODEL LR-9090

[No. 99-03675W]

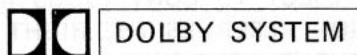
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Model LR-9090

[Stock. No. 99-03675W]

AM/FM STEREO RECEIVER



 AND "DOLBY" ARE TRADE MARKS OF DOLBY LABORATORIES

IMPORTANT

In compliance with certain state laws, Lafayette, the manufacturer of the equipment you have purchased, is required to provide suitable space in your instruction manual to enable you to record the Model and Serial numbers of the equipment and to provide you with a description of the location of such numbers on the equipment. When you have entered the required information in the spaces provided below, you should retain the manual so that you have a permanent record of these Model and Serial numbers.

UNIT DESCRIPTION: AM/FM Stereo Receiver

MODEL [or STOCK] NO. _____
[Located on rear or underside of unit]

SERIAL NO. _____
[Located on rear or underside of unit]

WARNING

To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

BECAUSE ITS PRODUCTS ARE SUBJECT TO CONTINUOUS IMPROVEMENT, THE LAFAYETTE RADIO ELECTRONICS CORPORATION RESERVES THE RIGHT TO MAKE DESIGN CHANGES OR MODIFICATIONS AT ANY TIME WITHOUT INCURRING ANY OBLIGATION TO INCORPORATE THEM IN PRODUCTS PREVIOUSLY SOLD.

A QUICK GUIDE TO OPERATING

FUNCTION	RECEIVER CONTROLS [BASE]									
	STATION TUNING	SELECTOR SWITCH	VOLUME CONTROL	BALANCE CONTROL	TREBLE CONTROL	MID CONTROL	BASS CONTROL	FILTER SWITCH		TONE SWITCH
								LOW	HIGH	
FM STEREO	Use tuning control and 88 – 108 MHz Scale.	FM	Set to "2" initially.	"5" [12 o'clock] position	"0" position	"0" position	"0" position	OFF	OFF	VARIABLE [released]
AM BROADCAST	Use tuning control and 550 – 1600 KHz Scale.	AM	Set to "2" initially.	"5" [12 o'clock] position	"0" position	"0" position	"0" position	OFF	OFF	VARIABLE [released]
STEREO PHONO	Not Used.	Phono 1 or Phono 2 [3]	Set to "2" initially.	"5" [12 o'clock] position	"0" position	"0" position	"0" position	OFF	OFF	VARIABLE [released]
STEREO TAPE PLAYBACK WITH ONE OR TWO TAPE RECORDERS	Tape Recorder "A"	Not used [4]	Set to "2" initially.	"5" [12 o'clock] position	"0" position	"0" position	"0" position	OFF	OFF	VARIABLE [released]
	Tape Recorder "B"	Not used [5]	Set to "2" initially.	"5" [12 o'clock] position	"0" position	"0" position	"0" position	OFF	OFF	VARIABLE [released]
STEREO TAPE PLAYER		AUX [6]	Set to "2" initially.	"5" [12 o'clock] position	"0" position	"0" position	"0" position	OFF	OFF	VARIABLE [released]

[1] If FM stereo broadcast is Dolby-encoded, switch DOLBY FM "on".

[2] Assuming stereo speakers in main listening area are connected to the "A" set of speaker terminals.

[3] Set Selector to position which selects desired record player; if a single record player is being used, it is usually connected to the Phono 1

[4] Assuming the output of the tape recorder is connected to the TAPE A-PLAY input jacks [SELECTOR is by-passed in the "A" position]

[5] Assuming the output of the tape recorder is connected to the TAPE B-PLAY input jacks [SELECTOR is by-passed in the "B" position]

[6] Assuming the output of the tape player is connected to the AUX input jacks.

OPERATING YOUR STEREO RECEIVER

RECEIVER CONTROLS [BASIC SETTINGS]

FILTER SWITCH		TONE SWITCH	BASS TURNOVER SWITCH	TREBLE TURNOVER SWITCH	MODE SWITCH	DOLBY FM SWITCH	MUTE SWITCH		LOUDNESS SWITCH	DUBBING SWITCH	MONITOR SWITCH	SPEAKER SWITCH
LOW	HIGH						FM	AUDIO				
OFF	OFF	VARIABLE [released]	250 Hz [depressed]	5 KHz [depressed]	STEREO [released]	OFF [1] [released]	OFF	OFF	OFF	SOURCE	SOURCE	"A" [2]
OFF	OFF	VARIABLE [released]	250 Hz [depressed]	5 KHz [depressed]	Not Used	Not Used	Not Used	OFF	OFF	SOURCE	SOURCE	"A" [2]
OFF	OFF	VARIABLE [released]	250 Hz [depressed]	5 KHz [depressed]	STEREO [released]	Not Used	Not Used	OFF	OFF	SOURCE	SOURCE	"A" [2]
OFF	OFF	VARIABLE [released]	250 Hz [depressed]	5 KHz [depressed]	STEREO [released]	Not Used	Not Used	OFF	OFF	SOURCE	"A" [4]	"A" [2]
OFF	OFF	VARIABLE [released]	250 Hz [depressed]	5 KHz [depressed]	STEREO [released]	Not Used	Not Used	OFF	OFF	SOURCE	"B" [5]	"A" [2]
OFF	OFF	VARIABLE [released]	250 Hz [depressed]	5 KHz [depressed]	STEREO [released]	Not Used	Not Used	OFF	OFF	SOURCE	SOURCE	"A" [2]

connected to the Phono 1 inputs.

passed in the "A" position of MONITOR switch].

passed in the "B" position of MONITOR switch].

A QUICK GUIDE TO OPERATING YOUR STEREO RECEIVER

FUNCTION	RECEIVER CONTROLS [BASIC SETTINGS]																			
	STATION TUNING	SELECTOR SWITCH	VOLUME CONTROL	BALANCE CONTROL	TREBLE CONTROL	MID CONTROL	BASS CONTROL	FILTER SWITCH		TONE SWITCH	BASS TURNOVER SWITCH	TREBLE TURNOVER SWITCH	MODE SWITCH	DOLBY FM SWITCH	MUTE SWITCH		LOUDNESS SWITCH	DUBBING SWITCH	MONITOR SWITCH	SPEAKER SWITCH
								LOW	HIGH						FM	AUDIO				
FM STEREO	Use tuning control and 88 – 108 MHz Scale.	FM	Set to "2" initially.	"5" [12 o'clock] position	"0" position	"0" position	"0" position	OFF	OFF	VARIABLE [released]	250 Hz [depressed]	5 KHz [depressed]	STEREO [released]	OFF [1] [released]	OFF	OFF	OFF	SOURCE	SOURCE	"A" [2]
AM BROADCAST	Use tuning control and 550 – 1600 KHz Scale.	AM	Set to "2" initially.	"5" [12 o'clock] position	"0" position	"0" position	"0" position	OFF	OFF	VARIABLE [released]	250 Hz [depressed]	5 KHz [depressed]	Not Used	Not Used	Not Used	OFF	OFF	SOURCE	SOURCE	"A" [2]
STEREO PHONO	Not Used.	Phono 1 or Phono 2 [3]	Set to "2" initially.	"5" [12 o'clock] position	"0" position	"0" position	"0" position	OFF	OFF	VARIABLE [released]	250 Hz [depressed]	5 KHz [depressed]	STEREO [released]	Not Used	Not Used	OFF	OFF	SOURCE	SOURCE	"A" [2]
STEREO TAPE PLAYBACK WITH ONE OR TWO TAPE RECORDERS	Tape Recorder "A"	Not used [4]	Set to "2" initially.	"5" [12 o'clock] position	"0" position	"0" position	"0" position	OFF	OFF	VARIABLE [released]	250 Hz [depressed]	5 KHz [depressed]	STEREO [released]	Not Used	Not Used	OFF	OFF	SOURCE	"A" [4]	"A" [2]
	Tape Recorder "B"	Not used [5]	Set to "2" initially.	"5" [12 o'clock] position	"0" position	"0" position	"0" position	OFF	OFF	VARIABLE [released]	250 Hz [depressed]	5 KHz [depressed]	STEREO [released]	Not Used	Not Used	OFF	OFF	SOURCE	"B" [5]	"A" [2]
STEREO TAPE PLAYER		AUX [6]	Set to "2" initially.	"5" [12 o'clock] position	"0" position	"0" position	"0" position	OFF	OFF	VARIABLE [released]	250 Hz [depressed]	5 KHz [depressed]	STEREO [released]	Not Used	Not Used	OFF	OFF	SOURCE	SOURCE	"A" [2]

[1] If FM stereo broadcast is Dolby-encoded, switch DOLBY FM "on".

[2] Assuming stereo speakers in main listening area are connected to the "A" set of speaker terminals.

[3] Set Selector to position which selects desired record player; if a single record player is being used, it is usually connected to the Phono 1 inputs.

[4] Assuming the output of the tape recorder is connected to the TAPE A-PLAY input jacks [SELECTOR is by-passed in the "A" position of MONITOR switch].

[5] Assuming the output of the tape recorder is connected to the TAPE B-PLAY input jacks [SELECTOR is by-passed in the "B" position of MONITOR switch].

[6] Assuming the output of the tape player is connected to the AUX input jacks.

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AM/FM SIGNAL TUNING METER

Used for tuning on AM — also shows relative signal strength on both AM and FM [tune for maximum on AM].

TONE SWITCH

All tone controls are functional in "Variable" position. "Flat" position provides flat tonal response regardless of existing tone control settings.

BASS TURNOVER SWITCH

Selects frequency below which bass control starts to affect tonal response [see text].

TREBLE TURNOVER SWITCH

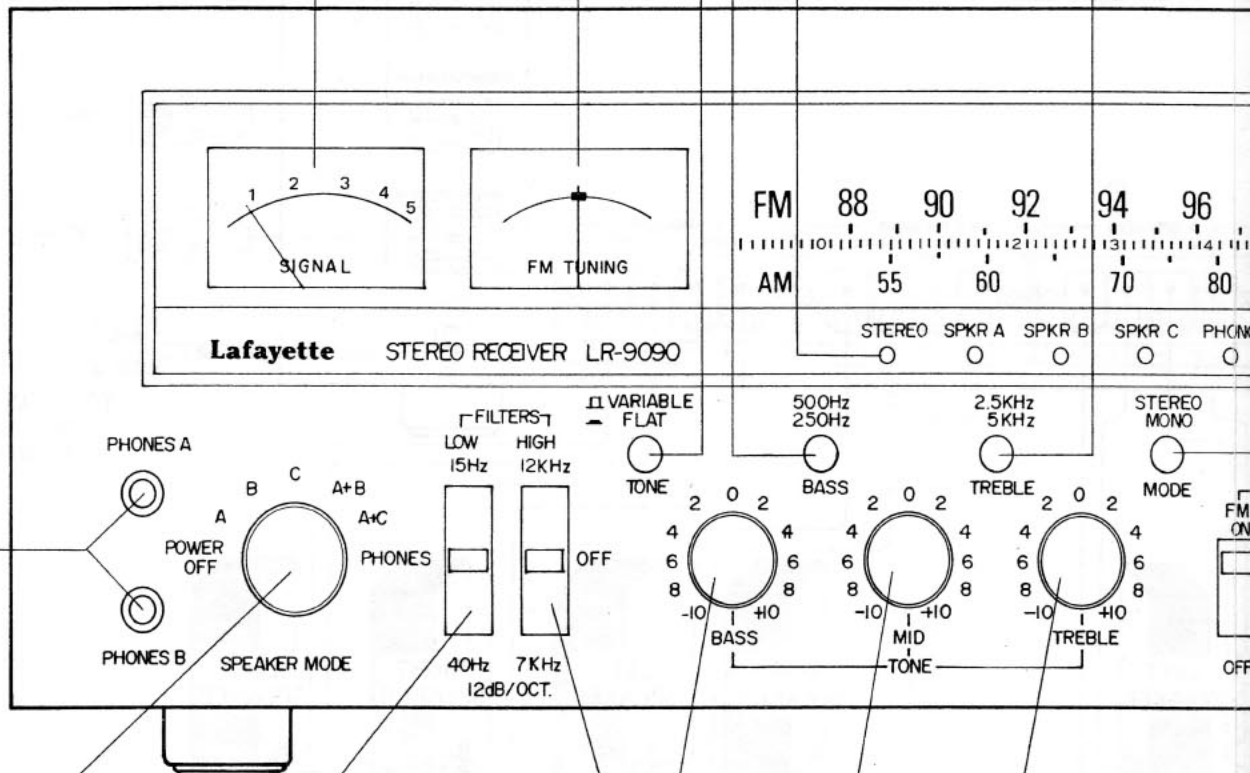
Selects frequency which treble control starts to affect tonal response [see text].

FM CENTER-TUNING METER

Permits precise FM tuning to center of station to assure optimum FM reproduction [tune for center reading].

AUTOMATIC FM STEREO INDICATOR

Lights up to indicate that the receiver has switched to stereo reception.



STEREO PHONES

Receptacles provided for use with two stereo headphones [4, 8 or 16 ohms impedance].

SPEAKER MODE SWITCH

Switches the receiver on and selects stereo speaker set "A" only, stereo speaker set "B" only, stereo speaker set "C" only, stereo speaker set "A" and "B", stereo speaker set "A" and "C", or PHONES only.

LOW FILTER

Used to reduce low frequency noise below 15 Hz or 40 Hz [center position off].

HIGH FILTER

Used to reduce high frequency noise above 7 KHz or 12 KHz [center position off].

BASS CONTROL

Provides adjustment of the bass [low tones] for both channels ["0" position for normal bass response].

MID-RANGE CONTROL

This control provides simultaneous adjustment of the mid-range [middle tones] for both channels ["0" position for normal mid-range response].

TREBLE CONTROL

Provides adjustment of the treble [high tones] for both channels ["0" position for normal treble response].

FM MUTE

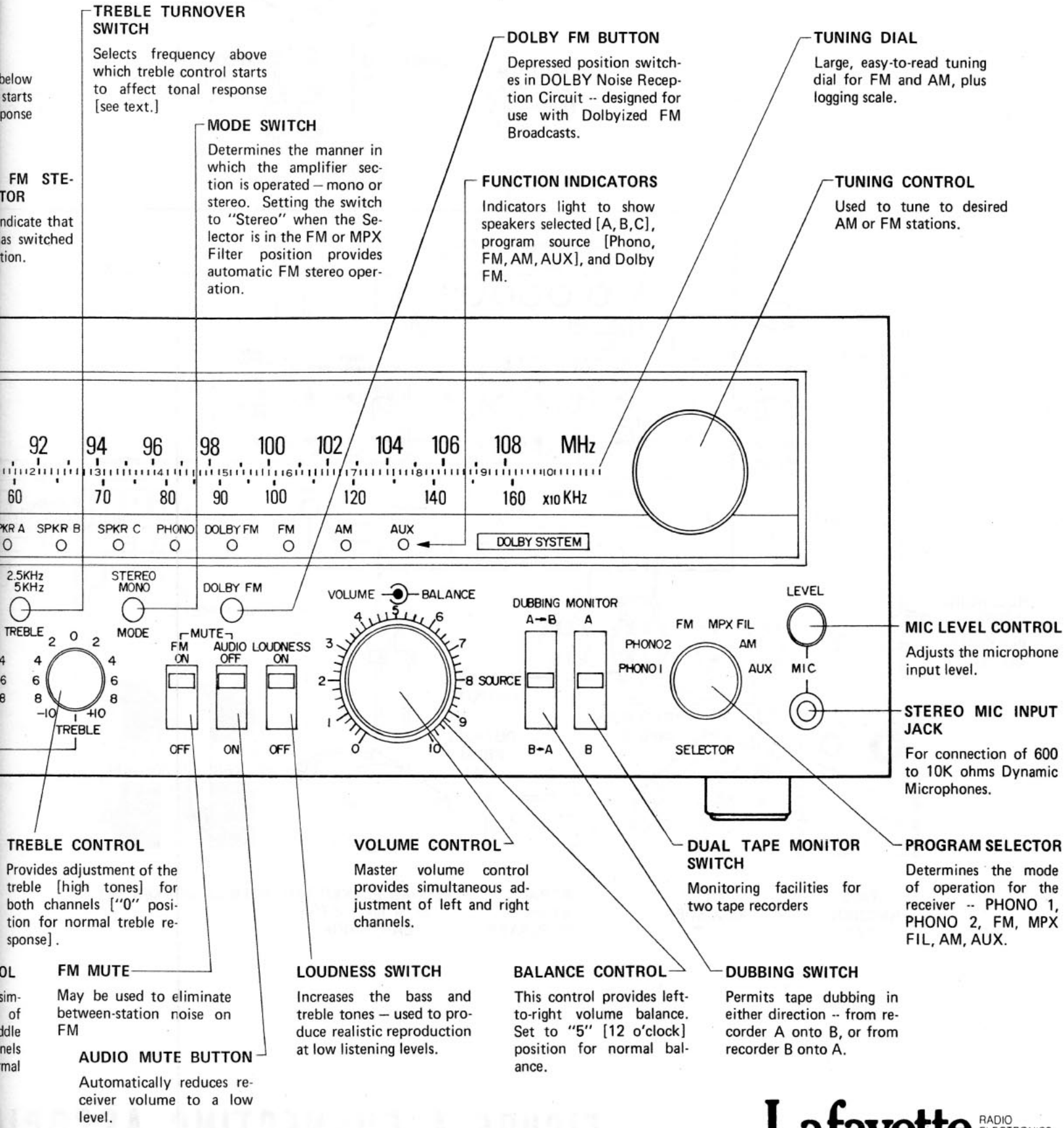
May be used to eliminate between-station noise on FM.

AUDIO MUTE

Automatically reduces receiver volume level.

FRONT PANEL

Lafayette LR-9090



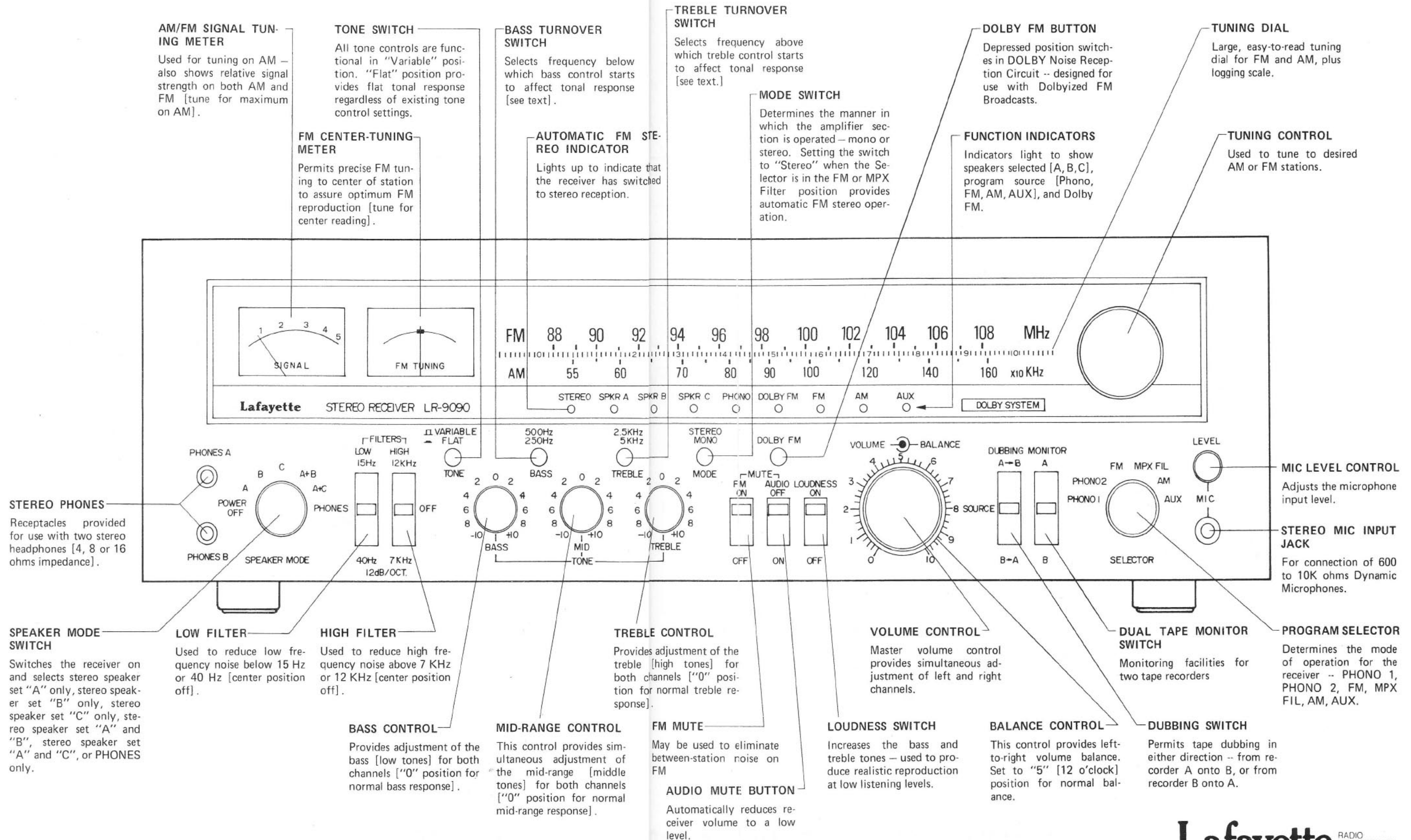
FRONT PANEL CONTROLS

Lafayette RADIO ELECTRONICS CORPORATION

111 Jericho Turnpike, Syosset, L.I., New York 11791

Printed in Japan

Lafayette LR-9090



FRONT PANEL CONTROLS

Lafayette RADIO ELECTRONICS CORPORATION

111 Jericho Turnpike, Syosset, L.I., New York 11791

Printed in Japan

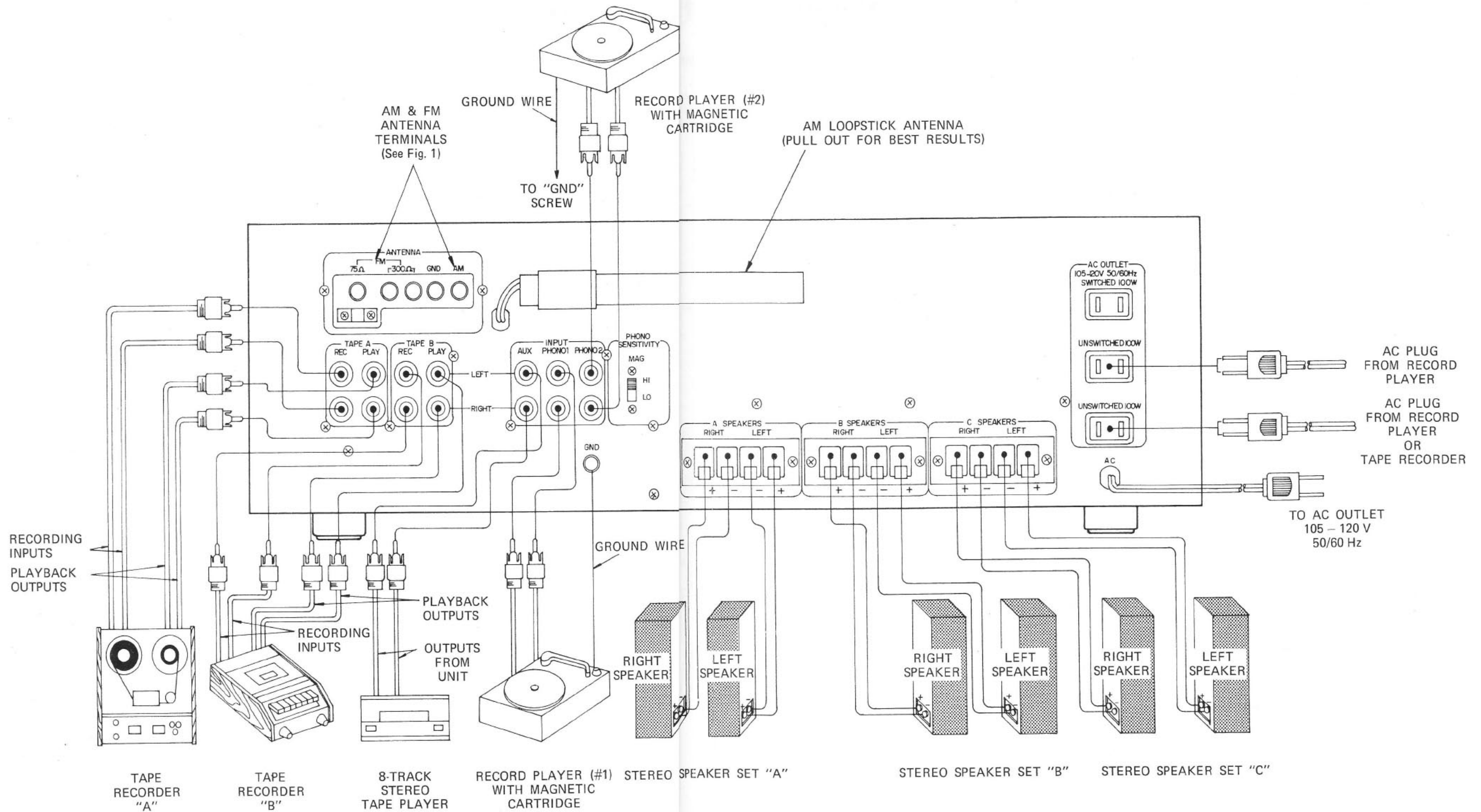


FIGURE 4 CONNECTING ASSOCIATED EQUIPMENT

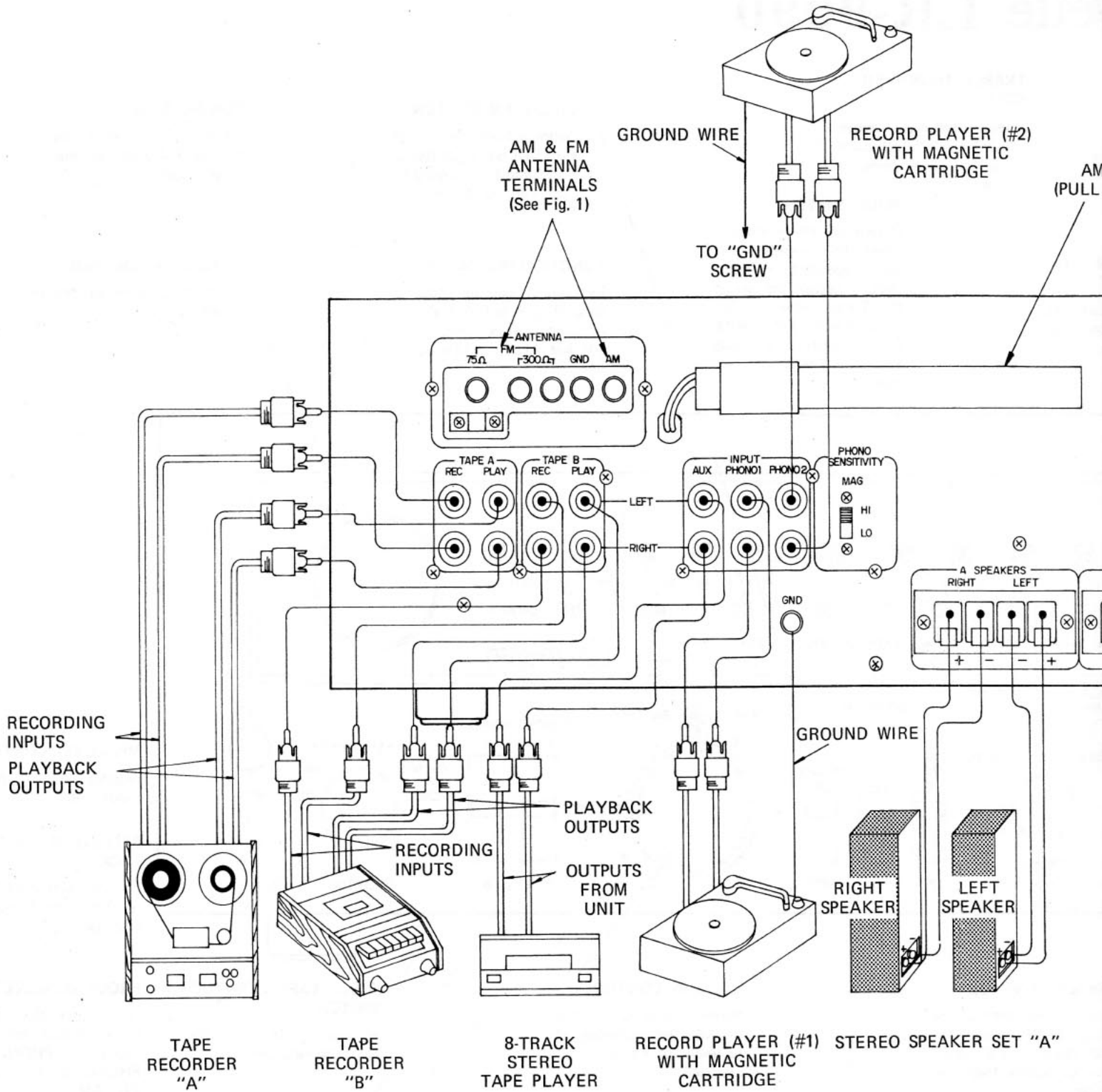
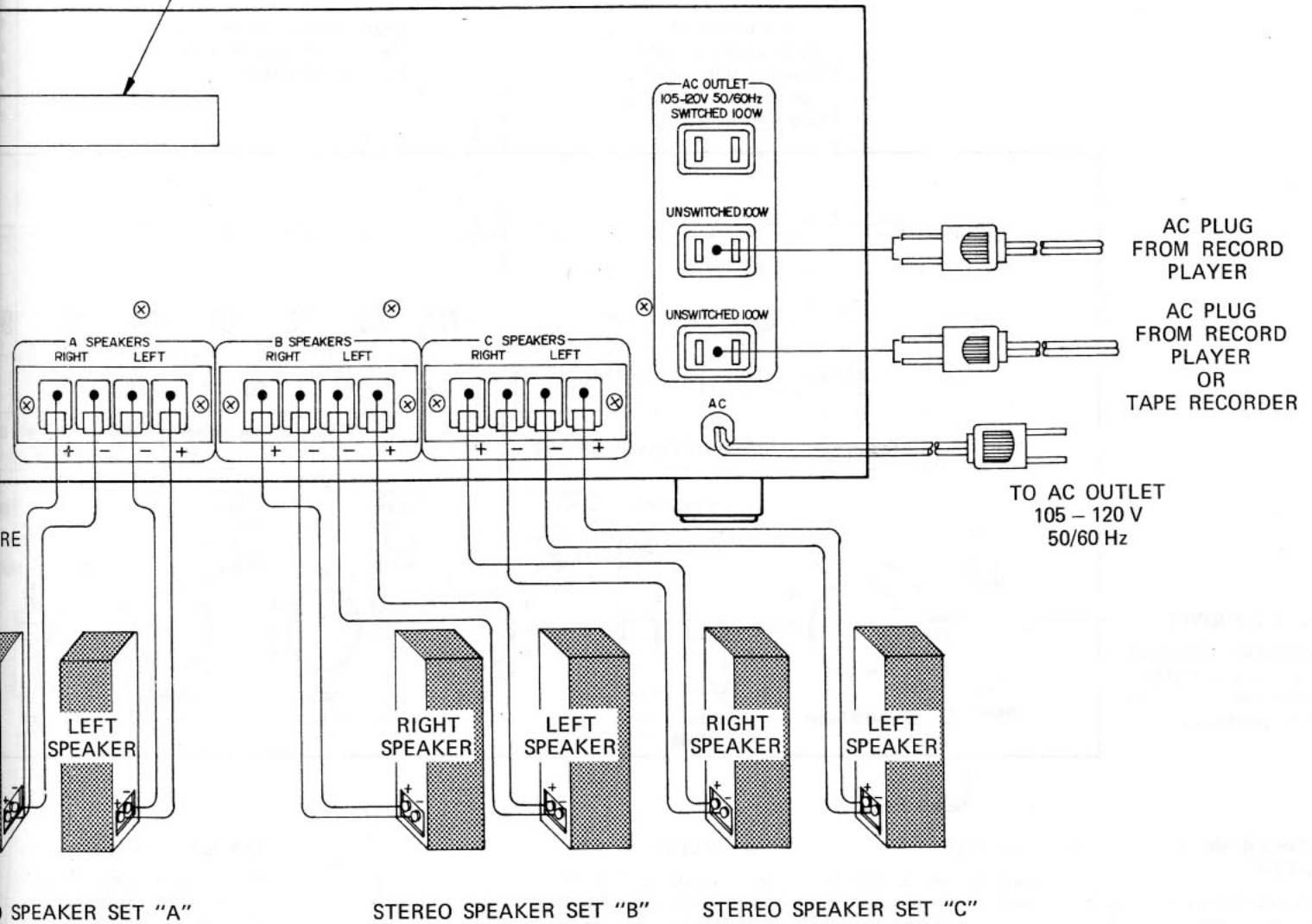


FIGURE 4 CONNECTING ASSOC

RD PLAYER (#2)
TH MAGNETIC
CARTRIDGE

AM LOOPSTICK ANTENNA
(PULL OUT FOR BEST RESULTS)



NG ASSOCIATED EQUIPMENT

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GENERAL DESCRIPTION

The Lafayette 9090 is a highly sophisticated solid-state stereophonic high fidelity receiver that combines an AM tuner, a highly sensitive FM stereo tuner, and a high quality integrated stereo amplifier in one single, handsomely styled unit.

The receiver not only offers all the advantages expected from solid-state circuitry such as instant operation, low current consumption, and cool operation, but also provides extremely low distortion and noise, plus wide frequency response at its full rated power to ensure the finest sound reproduction.

Stereo inputs have been provided for reproduction from a wide variety of external program sources that you may wish to use — record players, tape recorders, tape players, etc.

Some of the special features that have been incorporated in this receiver to ensure a high degree of performance and to provide complete flexibility of operation are as follows:

- * 75 ohm and 300 ohm antenna inputs for FM.
- * Sensitive dual-gate MOS FET in the FM RF section with 4-section variable capacitor.
- * Three 2-element ceramic filters used in the IF section for high selectivity.
- * PLL [Phase Lock Loop] IC used in the FM stereo decoder section for optimum stereo performance with minimum distortion.
- * A newly-developed IC functioning as an IF amplifier, a low-distortion Quadrature FM detector, a driver for the tuning meters, and as a sophisticated FM muting circuit which not only eliminates noise between stations on FM in the conventional manner, but also silences the receiver when not properly tuned to a station.
- * Dual Meters used — a conventional signal strength meter plus an FM center-tuning meter for precise tuning.
- * Built-in Dolby Noise reduction circuit for decoding Dolby FM broadcasts.
- * Two sets of magnetic phono inputs accommodating a range of cartridge output levels from 2.5 mV to 360 mV [for rated power output].
- * Stereo microphone input controlled only by a mic level control for convenient mixing with other program sources.
- * Two-position turnover frequency switches for Bass and Treble controls.
- * Direct-coupled OCL power amplifier stages.
- * Amplifier output stages protected by a dual system of relay and electronic overload protection circuitry.
- * Quick-connect output terminals for up to three sets of stereo speakers.
- * 2-position 12 dB/octave Low Frequency Filter switch [15 or 40 Hz].
- * 2-position 12 dB/octave High Frequency Filter switch [7 or 12 kHz].
- * Dual Tape Monitoring facilities plus special dubbing switch to permit recording from one tape recorder onto another in either direction.

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.

INSTALLATION

The unit may be used in any convenient location such as an equipment cabinet shelf, table or bookcase. The amount of heat generated by this unit is small compared to vacuum-tube equipment. Even so, provision must be made for some ventilation in order to disperse the small amount of heat that is generated. Do not place books or other objects on top of the unit so that the ventilation slots are obstructed. Do not place near radiators or other sources of heat.

AC POWER

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

CONVENIENCE OUTLETS

Three convenience outlets are provided at the rear of the receiver. The unswitched outlets should be used to supply AC power to equipment such as a record player and tape recorder. The switched outlet is controlled by the power on-off switch on the receiver and should be used for equipment you wish to operate simultaneously with the receiver [a transistorized indoor FM antenna or booster, for example. Note that neither of the unswitched outlets are protected by the AC fuse in the receiver.

GROUND CONNECTION

A ground screw at the receiver's rear [marked GND] provides for optional connection between the receiver and other Hi Fi components that may be used in a system [such as a record player]. In many cases, this connection aids in the reduction of hum.

ANTENNAS

AM ANTENNA

The ferrite loopstick built into the rear of the receiver assures adequate reception of all local AM stations. However, in the fringe areas, high noise areas, or where surrounding metal objects interfere with normal reception, a 20 — 30 foot length of insulated antenna wire can be connected to the terminal designated AM [See Figure 1-A].

NOTE: The ferrite loopstick is mounted on a swivel bracket. For maximum signal pickup, the loopstick should be swung out — away from the chassis — and adjusted for best reception.

FM ANTENNAS

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 transmitter, you may be able to use an 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. For the very best FM stereo reception, the use of an outdoor antenna is highly recommended. These are available 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 "SIGNAL" tuning meter on the receiver.

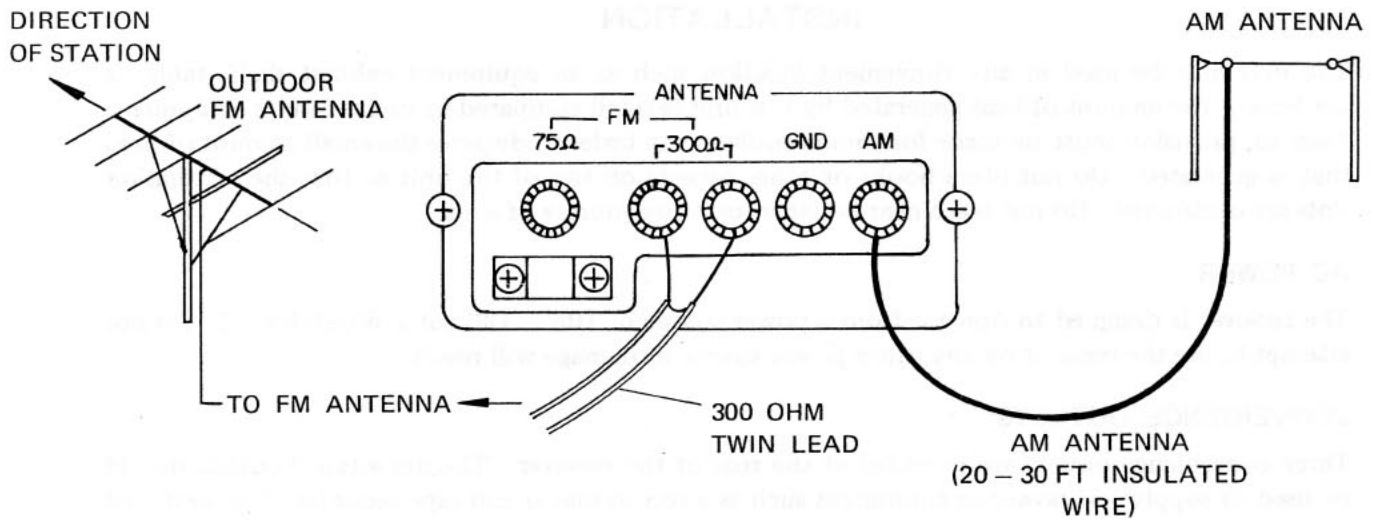
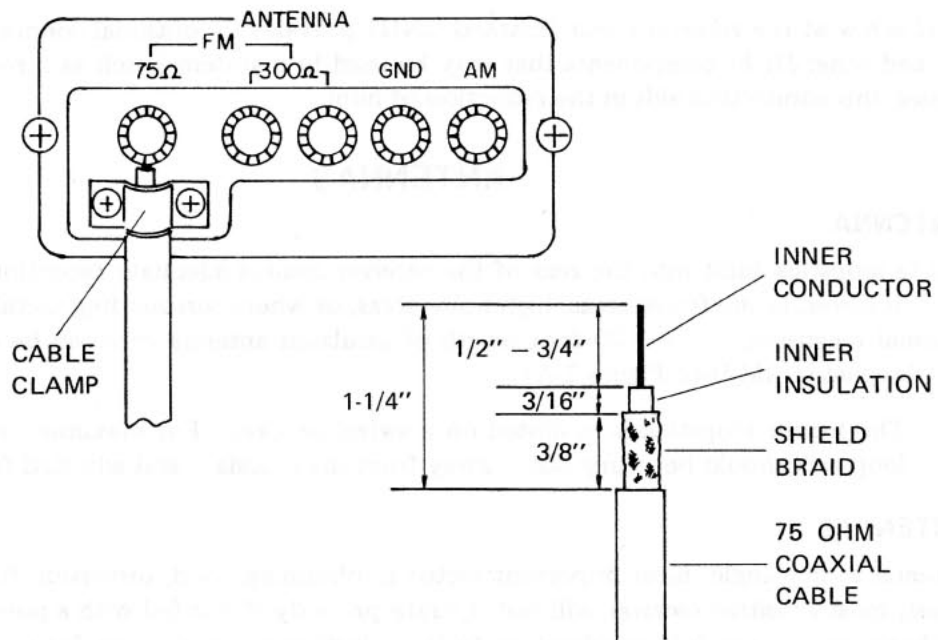


FIGURE 1-A AM EXTERNAL ANTENNA AND 300 OHM FM EXTERNAL ANTENNA CONNECTIONS



1. Remove approx 1-1/4" of outer insulation from cable.
2. Remove all but 3/8" of the shield braid.
3. Remove inner insulation, leaving 3/16" of the insulation exposed. The center conductor should be approx 1/2" long.

FIGURE 1-B 75 OHM FM ANTENNA CABLE CONNECTION

If you presently use an outdoor TV antenna, it can sometimes be used to provide good reception of FM stations. Simply make a connection between the stereo receiver and TV antenna lead-in, using a 2-set antenna coupler [See Lafayette catalog]. 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 lower part of the TV mast].

FM ANTENNA CONNECTIONS

300 Ohm Connection

When 300 ohms lead-in is used from the antenna, connection to the receiver should be made as shown in Figure 1-A [to the two terminals marked 300Ω].

75 Ohm Connection

In areas subject to electrical interference from vehicles, power lines, etc., the use of 75 ohm shielded cable as a lead-in to the receiver may result in a reduction of the interference. The use of 75 ohm shielded cable is also required in amplified distribution systems. The 75 ohm lead-in cable to the receiver is connected as shown in Figure 1-B. Prepare the end of the cable as shown, loosen the cable clamp [2 screws], then slip the shield braid section under the clamp. Wrap the center [inner] conductor around the 75Ω screw terminal and tighten the screw firmly. Now secure the cable clamp tightly against the shield braid section by means of the two clamp screws.

CAUTION: Make sure that no strands of shield braid come into contact with the 75Ω terminal since this will short out the antenna input signal.

Note that 75 ohm cable cannot be connected to the 300 ohm output of a booster amplifier, or a 300 ohm coupler or splitter. Nor can it be connected directly to a 300 ohm antenna, unless a 300—75 ohm matching transformer is used at the antenna. Antennas and booster amplifiers with 75 ohm outputs will present no problems, of course. If you intend to couple the 75 ohm cable to an existing 75 ohm feeder line, be sure to use a 75 ohm coupler [available from Lafayette].

CONNECTING YOUR ASSOCIATED EQUIPMENT

WARNING: DO NOT ATTACH OR REMOVE CONNECTING CABLES WITH RECEIVER SWITCHED ON.

LOUDSPEAKERS

GENERAL

This stereo receiver is equipped with three sets of speaker output terminals, set "A SPEAKERS", set "B SPEAKERS" and set "C SPEAKERS".

For conventional stereo operation in your main listening area, the left and right speakers [stereo speaker set "A" as shown in Figure 2] must be connected to the terminals marked "A SPEAKERS". If you wish to connect a second or third set of speakers in other locations, stereo speaker set "B" and stereo speaker set "C" must be connected to the applicable set of speaker terminals marked "B SPEAKERS" and "C SPEAKERS".

Selection of speakers is determined by the position of the "SPEAKER MODE" Switch.

NOTE: The larger the number of the wire, the smaller its size. For example, 18 gauge is smaller than 16 gauge wire.

SPEAKER SELECTED	MAXIMUM LENGTH OF WIRE FROM SOURCE	WIRE GAUGE	SPEAKER SELECTED	MAXIMUM LENGTH OF WIRE FROM SOURCE	WIRE GAUGE
4 OHM SPEAKER	11 Feet	24	8 OHM SPEAKER	23 Feet	24
	30 Feet	20		60 Feet	20
	47 Feet	18		95 Feet	18
	75 Feet	16		150 Feet	16
	120 Feet	14		240 Feet	14
6 OHM SPEAKER	16 Feet	24	16 OHM SPEAKER	47 Feet	24
	35 Feet	20		118 Feet	20
	75 Feet	18		190 Feet	18
	110 Feet	16		300 Feet	16
	180 Feet	14		475 Feet	14

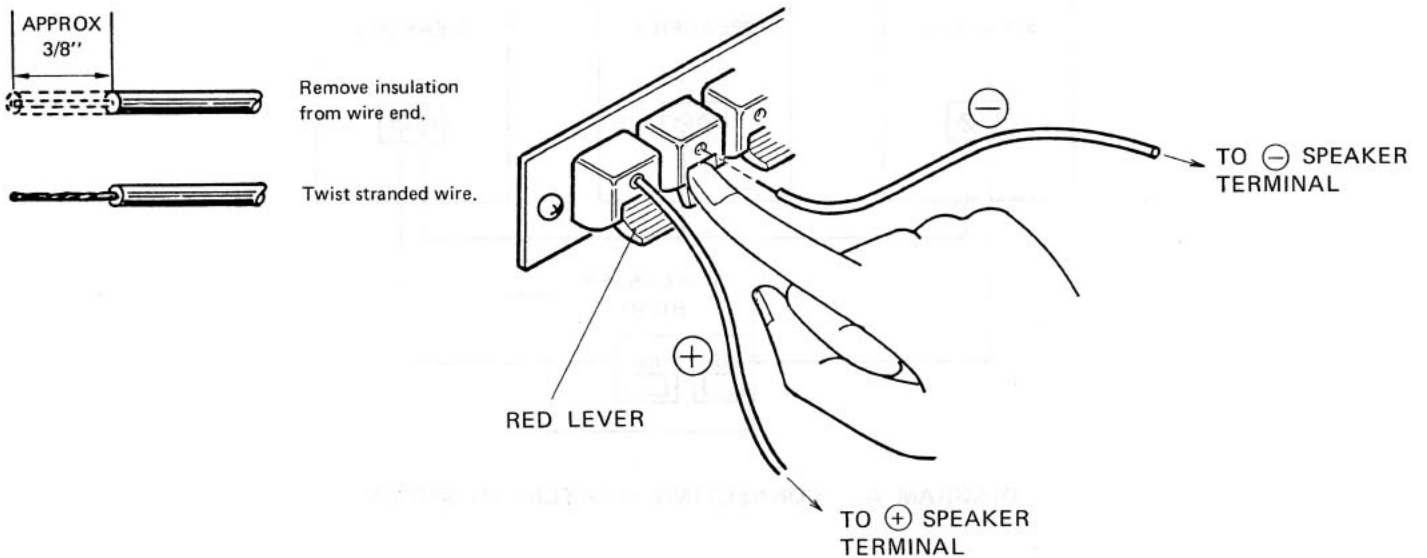


FIGURE 3. CONNECTING SPEAKER LEADS TO THE RECEIVER OUTPUT TERMINALS

IMPEDANCE OF SPEAKERS USED

On this receiver it is possible to select two sets of speakers simultaneously. Special care must therefore be taken to ensure that the combined impedance of all speakers selected does not fall below 4 ohms (particularly at moderate or high volume levels), or the protective circuit in the receiver will be activated and automatically cut off the output to the speakers. No problem exists when only one set of speakers (left and right channel) are connected, provided they are each rated at 4 ohms or higher.

The table which follows shows the minimum speaker impedances that may be used when selecting one or two sets of speakers. In no case does the combined impedance fall below 4 ohms in the combinations shown.

TABLE 1

SPEAKERS SELECTED	MINIMUM SPEAKER IMPEDANCES
One Set Of Speakers Only	4, 6, 8 OR 16 Ohms
Two Sets Of Speakers Simultaneously	a) Two 8 Ohm Sets b) Two 16 Ohm Sets c) One 6 Ohm Set and One 16 Ohm Set

If you are using more than one set of speakers, and their impedance rating is lower than the minimum outlined in Table 1 (two sets of 6 ohm speakers, for example), you must either make certain that only one set of speakers is selected at a time, or wire the speakers in series to one set of terminals, as shown in Diagram A (this diagram illustrates three speakers wired in series).

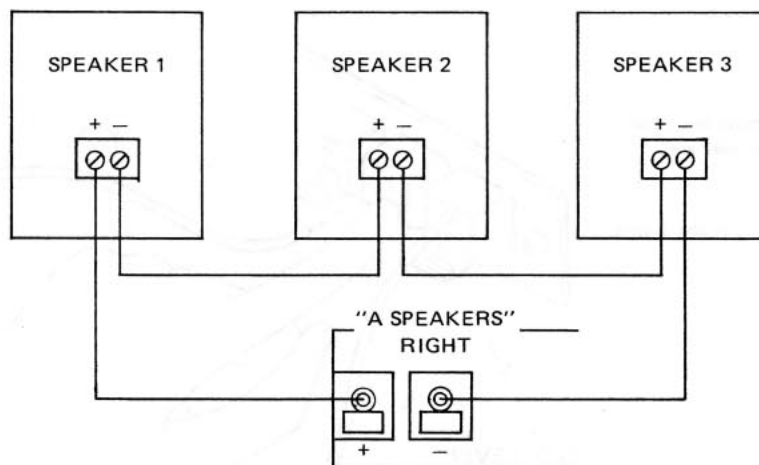


DIAGRAM A. CONNECTING SPEAKERS IN SERIES.

Connections to the right channel are illustrated — connect the left channel speakers using the same wiring method, but to the left channel output terminals on the receiver. Since all speakers are connected to the “A” speaker terminals, the SPEAKER MODE switch must be set to the “A” position. All speakers will be “on”, and no individual speaker selection will be possible unless an external speaker selector switch is used which will select each speaker individually.

STEREO HEADPHONES

Two sets of stereo phone jacks on the front panel are provided for private stereo headphone listening, when desired. The outputs of both Phone jacks [A and B] are identical.

If you wish to listen privately without any speakers being on, place the "SPEAKER MODE" switch to the "PHONES" position.

CONNECTING A STEREO RECORD PLAYER

This receiver is equipped with two sets of phono inputs [PHONO 1 and PHONO 2] for use with record players whose pick-up arm is equipped with a magnetic cartridge [most players are so equipped]. The two shielded audio cables from a record changer or turntable are normally terminated with RCA-type phono plugs. To ensure minimum "hum" and to avoid the possible pick-up of RF interference [plus possible loss in high frequency tones], the cables from the record player should be kept as short as possible [they should not exceed 10 feet in length]. Figure 4 shows the manner in which two record players are connected. If the record player has a ground wire, connect it to the GND terminal on the receiver. If this results in "hum", disconnect the ground wire.

If you are using only one record player, connect the left and right output cables from the record player to the left and right "PHONO 1" inputs. If you wish to use a second record player, connect its output cables to the "PHONO 2" inputs. Set the "MAG HI-LO" switch to the "HI" position initially [a procedure for determining the optimum position of this switch is provided in the section titled "Adjusting Phono Input Sensitivity On The Receiver".

To select either of the phono inputs, set the SELECTOR switch to the PHONO 1 or PHONO 2 position.

STEREO TAPE RECORDER CONNECTIONS

CONNECTING A SINGLE TAPE RECORDER

A single stereo tape recorder [cassette, 8-track or open reel] should be connected to the TAPE A jacks as shown in Figure 4, using shielded audio connecting cables. Note that the input of the recorder is connected to the TAPE A — REC output jacks on the receiver, and that the output of the recorder is connected to the TAPE A — PLAY input jacks on the receiver.

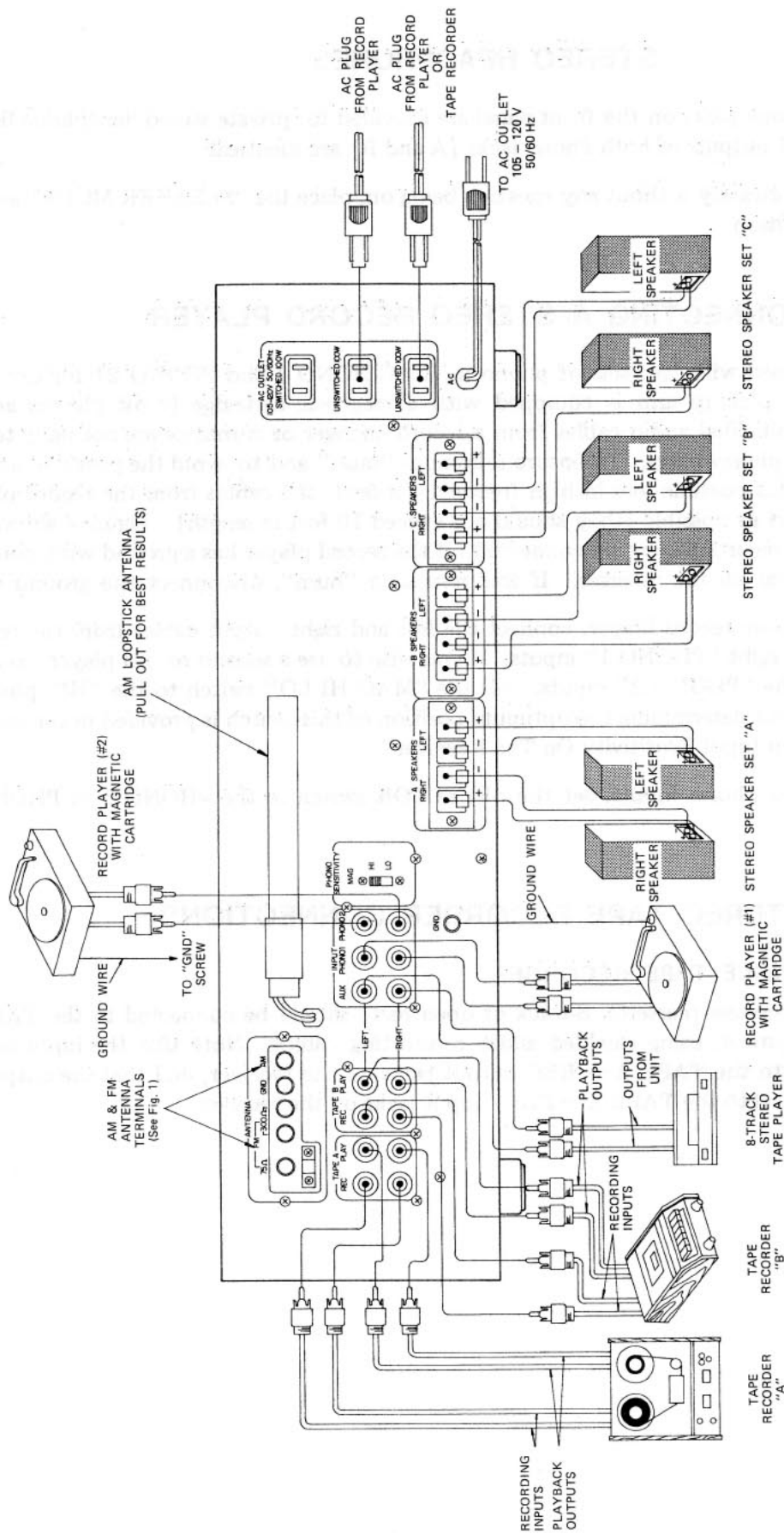


FIGURE 4 CONNECTING ASSOCIATED EQUIPMENT

CONNECTING TWO TAPE RECORDERS

The first stereo tape recorder [A] must be connected to the TAPE A — REC and PLAY jacks on the receiver [as shown in Fig. 4].

The second stereo tape recorder [B] is connected in the same manner, but to the TAPE B jacks on the receiver.

CONNECTING AN 8 TRACK STEREO TAPE PLAYER

Using shielded audio cables terminated with RCA-type phono plugs at each end, connect one end of each cable to the Outputs on the stereo tape player. Connect the other end of each cable to the AUX [Left and Right] input jacks on the receiver.

DESCRIPTION OF RECEIVER CONTROLS

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

NOTE: The BASS, MID, TREBLE and VOLUME controls all have a light “detent” action when rotated throughout their range. This serves two purposes. It will permit you to make a note of a specific setting for future reference [all controls have calibration markings], and will also reduce the possibility of accidental disturbance of the position of a control [even though the detent has a light action]. The BALANCE control has only one detent, this being at the center position [12 o'clock].

SELECTOR SWITCH

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

- PHONO 1 Selects the outputs of a stereo record player connected to the “PHONO 1” inputs on the receiver.
- PHONO 2 Selects the outputs of a stereo record player connected to the “PHONO 2” inputs on the receiver.
- FM Selects Automatic FM Stereo reception.
- MPX FIL 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 AM reception.
- AUX Selects a program source connected to the “AUX” input jacks.

MONITOR A — B SWITCH

When this switch is in the SOURCE [center] position, the program selected by the SELECTOR switch will be reproduced through the receiver and heard in the speakers. When this switch is in the “A” position, any stereo program source connected to the TAPE A — PLAY inputs will be reproduced through the receiver, regardless of the Selector switch selection. When this switch is in the

“B” position, any program source connected to the TAPE B — PLAY input jacks is reproduced through the receiver and will be heard through the speakers, regardless of the SELECTOR switch selection [see “Stereo Tape Recorder Operation”].

DUBBING SWITCH

The Dubbing switch is used only when you wish to duplicate a tape [two tape recorders must be connected]. For example, if you want to copy the program on a tape on recorder “A” onto a blank tape on recorder “B”, you would set the DUBBING switch to the A — B position, place the “A” recorder in the play mode and the “B” recorder in the record mode. To reverse this procedure [record the tape program on recorder “B” onto a blank tape on recorder “A”] you would set the DUBBING switch to the B — A position, place the “B” recorder in the play mode and the “A” recorder in the record mode [see “Stereo Tape Recorder Operation” in a subsequent section].

BALANCE CONTROL

This control, which is positioned behind the VOLUME control, provides left to right balance of the volume. Initially, this should be set to its normal center [5] position. Turn the control to the left of the center position to increase the volume of the left channel and turn it to the right to increase the volume of the right channel.

VOLUME CONTROL

This permits adjustment of the volume for both left and right channels simultaneously.

LOUDNESS SWITCH

The Loudness Switch, when ON, will compensate for an apparent loss of bass and high treble tones at low volume settings. Such compensation is necessary because a natural peculiarity of the ear causes it to have a reduced sensitivity to low and high tones when music is played at low volume. The Loudness circuit will emphasize these tones and thus restore full body and brilliance to the music. At high volume settings, this action is automatically reduced, and the receiver will assume a normal tonal response.

MODE SWITCH

This switch determines the manner in which program sources will be reproduced by the receiver.

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 FIL position.

TONE SWITCH

This switch, when set to the “FLAT” [depressed] position, will disable all tone controls and the

receiver will produce a normal [flat] tonal response regardless of the existing settings of the BASS, MID and TREBLE controls. In the VARIABLE position, all tone controls are functional.

BASS CONTROL

This control will allow you to increase or decrease the bass [low tones] in the sound output. When the indicator line on the control is in the center [0] position, the bass response of the receiver is normal. Clockwise rotation will increase the bass tones and counter-clockwise rotation will decrease them. See "Bass Turnover Switch" also.

TREBLE CONTROL

This control operates in the same way as the Bass control, except that it provides adjustment of the treble [high] tones. See "Treble Turnover Switch" also.

MID CONTROL

This control operates in the same general manner as the Bass and Treble controls, except that it provides adjustment of the midrange frequencies [middle tones]. For normal midrange response, set the control to the "0" position.

BASS TURNOVER SWITCH

This switch affects the action of the BASS control by changing the frequency below which the control will affect the tonal response. When the switch is in the 500 Hz position, Bass control adjustment will affect frequencies from 500 Hz down. When the switch is in the 250 Hz position, frequencies from 250 Hz down are affected. The 250 Hz position is recommended initially since this will move the Bass control action into the lower region of the audio spectrum where, generally, most change is desired. For further information on the action of this switch, see "Bass and Treble Turnover Switch Action" in a subsequent section of this manual.

TREBLE TURNOVER SWITCH

This switch affects the action of the TREBLE control by changing the frequency above which the control will affect tonal response. When the switch is in the 2.5 kHz position, Treble control adjustment will affect frequencies from 2.5 kHz up. When the switch is in the 5 kHz, frequencies from 5 kHz up are affected. The 5 kHz position is recommended initially since this will move the Treble control action into the upper region of the audio spectrum where, frequently, most change is desired. For further information on the action of this switch, see "Bass and Treble Turnover Switch Action" in a subsequent section of this manual.

LOW FILTER SWITCH

A sharp [12 dB/octave] filtering action can be introduced at either of two frequencies — 15 Hz or 40 Hz [the center position is off]. Generally, the use of the low filters is only required where low frequency rumble or vibration is encountered while using a record player. If your record player appears to be generating low frequency "rumble" through motor vibration, switch first to the 15 Hz position and then, if ineffective, switch to the 40 Hz position. The 40 Hz position will usually reduce any low frequency noise although it will have some effect on the program material. The 15 Hz position [which has little or no effect on program material] introduces filtering in the sub-sonic range and can be particularly useful when a record player is subjected to very low frequency vibrations [from the speakers or some other source]. However, if problems of this nature are not experienced, leave the switch in the off position.

HIGH FILTER SWITCH

A sharp [12 dB/octave] filtering action can be introduced at either of two frequencies — 7 kHz or 12 kHz [the center position is off]. High frequency filtering should only be used when high frequency noise in the program material is encountered. Such noises might be experienced when playing worn records which produce “scratching” noises, or with some tapes which might produce disturbing “hiss”. Excessive high frequency noise on FM can also be reduced by means of this filter switch. When attempting to reduce high frequency noise, always start with the 12 kHz position [this position has least affect on program material]. If this does not reduce the noise sufficiently, you should then go to the 7 kHz position. Since all high frequency filters have some effect on the high frequency response in the program material, they should not be used unless disturbing high frequency noises are present.

DOLBY FM SWITCH

When depressed, this button will switch in a DOLBY noise reduction circuit, which, when used with Dolby-encoded FM broadcasts, will provide reception that is remarkably free of noise.

Since all Dolby FM broadcasts employ 25 micro-second pre-emphasis [instead of the conventional 75 micro-second pre-emphasis], automatic switching to 25 micro-second de-emphasis also takes place when the DOLBY FM switch is activated.

The Dolby circuit should not be used with any conventional stereo FM broadcast to provide a reduction in any noise present. It must be remembered that the Dolby circuit is primarily designed for use with specially processed broadcasts.

NOTE: If you tune in a Dolby-encoded broadcast with the DOLBY FM button off and then depress the button, a slight reduction of high frequency response may appear to take place. This is due to the fact that with the Dolby circuit off, a Dolby-encoded program has a response with emphasis in the high frequencies; switching the Dolby circuit in will de-emphasize these high frequencies. Although this may create the illusion of a loss in the highs, the response is actually being returned to a normal condition.

SPEAKER MODE SWITCH

This switch turns the receiver on and allows you to select one of the five listening modes.

- POWER OFF In this position AC power is disconnected from the receiver and no sound will be heard. AC power is ON in all other positions.
- A This connects the sound output to the two speakers attached to the “A SPEAKERS” output terminals. This position is used when only two speakers are being used.
- B This connects the sound output only to the set of speakers attached to the “B SPEAKERS” output terminals.
- C This connects the sound output only to the set of speakers attached to the “C SPEAKERS” output terminals.
- A + B This connects the sound output simultaneously to speakers attached to the “A SPEAKERS” and “B SPEAKERS” output terminals. The “A” set of speakers are normally located in your principal listening area; the “B” set of speakers usually in a secondary area such as a den.

A + C This connects the sound output simultaneously to speakers attached to the "A SPEAKERS" and "C SPEAKERS" output terminals. The "A" set of speakers are normally located in your principal listening area; the "C" set of speakers usually in another remote location.

PHONES In this position, all speakers are silenced and the sound output is connected only to any headphones that are plugged into the "Phones" jacks on the front panel. Note, however, that the sound output is connected to the headphone jacks in all other positions of this switch. When listening through speakers, any headphones plugged into the jacks should therefore be removed to avoid possible overload of the phones.

"SIGNAL" METER [AM and FM]

This meter is used for all tuning on AM, and for initial tuning on FM [the FM "TUNING" meter is used for final, more precise tuning on FM]. Tune for a maximum reading on this meter on AM.

The meter also indicates the relative strength with which various stations are received on AM or FM. For example, a station producing a reading of 5 is being received with greater strength than a station producing a reading of 3.

FM "TUNING" METER

This is a special center-reading meter which is used for precise tuning to the center of an FM station to assure optimum FM reproduction. After the station is tuned in, finely adjust the tuning control for a center reading. Note that the pointer will swing toward the left or right of center if you are mistuned. If the meter pointer is over to the right, tune slightly toward the left on the main tuning dial; if the meter pointer is over to the left, tune slightly toward the right on the main tuning dial.

FM STEREO INDICATOR

When you tune in an FM stereo station, the STEREO Indicator will light up, indicating that FM reception is stereophonic. When you are tuned to a monophonic FM station, the STEREO Indicator will not light.

Any stereo station which produces an unsteady "flickering" stereo indication must be considered too weak or noisy for proper stereo reception [although it may be good enough for mono reception].

Note 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.

AUDIO-MUTE SWITCH

This switch, when set to the ON position, will automatically reduce the volume of the receiver to a low level regardless of the existing volume control setting. This feature will enable you to lower the volume temporarily, when you find it necessary to momentarily interrupt your listening [to answer a phone, etc.].

FM-MUTE SWITCH

One of the normal characteristics of FM is the loud "rushing" noise heard between stations. The receiver incorporates a special muting circuit which may be used to eliminate this noise between

stations on FM, so that when tuning over the dial each station will “break through” from a background of silence. In addition to eliminating inter-station noise, the muting circuit also causes the receiver to be silenced if you are not properly tuned to an FM station. This second function, which can be described as “detune muting”, is designed to guard against improper tuning on FM. For additional information, see “Operation of the FM Mute Circuit” in a subsequent section of this manual. To activate the circuit, set the FM-MUTE switch to the “ON” position.

TUNING CONTROL

This control is used to tune in AM or FM stations. Use the 88 to 108 MHz scale on the tuning dial for FM stations, and the 55 [550 kHz] to 160 [1600 kHz] scale for AM stations.

MIC LEVEL CONTROL

This control adjusts the microphone input level for both the left and right channels simultaneously providing you are using two microphones [see Stereo Mic Input Jack].

STEREO MIC INPUT JACK

This is a stereo input jack for left and right channel microphones. When using two microphones, you will need to connect them to a 3-conductor phone plug [through the use of an adapter cable]. A single microphone with a 2-conductor phone plug may also be plugged into this jack, which will connect it to the left input channel in the receiver [see section titled “Microphone Operation”].

Microphones used should have an impedance between 600 and 10 kohms [dynamic type] # for best results.

OPERATING PROCEDURES

Before attempting to operate the system, we urge you to check the following:

1. Make sure that at least one set of stereo speakers have been connected to the output terminals on the receiver.
2. Make sure the receiver SPEAKER MODE switch is in the “OFF” position, and that you have properly connected any other associated equipment you intend to use, such as record players or tape recorders. For FM reception, you must have an external antenna properly connected, as indicated previously. Then connect the AC power cord to an electrical outlet supplying 105 – 120 volts, 50/60 Hz AC.

Refer to the chart titled “Quick Guide To Operating Your Receiver” and set all operating controls and switches in the positions indicated for the particular type of operation desired.

When the SPEAKER MODE switch is rotated clockwise beyond the OFF position, the dial lights will come on, indicating that the unit is ready for operation. Select your program source [FM, Phono, etc.] and adjust the VOLUME control for desired volume from all speakers.

NOTE: When the receiver is first switched on, there is an approximate 6 second delay before sound is heard from the speakers. The delay is due to the activation of the built-in overload protection circuit which consists of a combination of electronic and relay circuitry. However, if no sound is heard from one or both speakers after 9 or 10 seconds, switch the power OFF and see section titled “Power Overload Safeguard System”.

TUNING IN FM STEREO

To select an FM stereo broadcast, proceed as follows:

1. Switch the receiver on and set the Program Selector switch to the "FM" position.
2. Adjust the VOLUME control for a suitable listening level.
3. Tune across the FM dial observing the FM STEREO indicator light on the receiver. When it illuminates, you know that you are tuned to a stereo broadcast.

INTERFERENCE ON FM

FM stereo broadcasts are more susceptible to noise pickup 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, or even by the FM station itself.
- [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 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 75 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 FIL position of the program selector. This filter has negligible effect on the high frequency response of the program, but is helpful in reducing high frequency noise on FM stereo.
2. If the noise is still present, set the HIGH FILTER switch to the 12 kHz position. If this does not reduce the noise sufficiently, use the 7 kHz position. Although the use of this filter will affect the higher frequencies on the program material [the 12 kHz position will have the least effect], any noise present will be significantly reduced.

OPERATION OF THE FM MUTE CIRCUIT

This receiver incorporates a sophisticated FM muting circuit with dual functions. One of its functions is to eliminate the "rushing" noise normally heard between FM stations. This form of FM muting is of the conventional type found in other receivers.

A second function of this FM muting circuit is that it will mute [silence] the receiver if you are not properly tuned to an FM station — even though the station may be an extremely strong one. This is graphically illustrated in Diagram B. Correct practice is to tune the FM station in so that the FM TUNING meter reads precisely at its mid-point. If the receiver is improperly tuned, causing the pointer to move outside the shaded area shown in Diagram B, muting will automatically occur and the receiver will be silenced. This action will take place even with the strongest signal. This unique form of "detune muting" is designed to guard against improper FM tuning.

NOTE: Rapid tuning across the dial will cause the receiver to remain in a state of almost continuous muting. When tuning across the dial [in search of an FM station offering music of your preference, for example], tune slowly to avoid this condition.

This dual muting system is activated by setting the FM MUTE switch "on", and defeated when the switch is off.

If receiver is detuned sufficiently to cause pointer to go outside the shaded area, muting will occur even though signal meter shows a high reading.

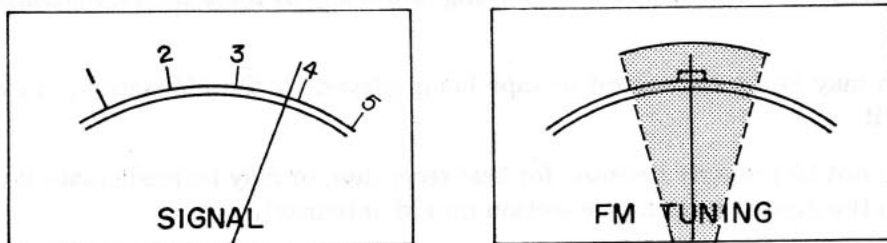


DIAGRAM B. "DETUNE MUTING" ACTION

ADJUSTING PHONO INPUT SENSITIVITY ON THE RECEIVER

Provision has been made to accommodate the output from virtually any magnetic cartridge, high or low, by equipping this receiver with a phono sensitivity switch. This switch is located on the rear panel of the receiver and is marked "MAG HI-LO".

CAUTION: Never set the phono sensitivity switch to the "HI" (High) position when using cartridges with a high output level. This may overload the input stages in the receiver, possibly resulting in distortion in the sound output.

The "LO" (Low) position provides the least amount of gain and is therefore suitable with the higher output cartridges. The "HI" position is designed to use with cartridges with low outputs.

The following procedure should 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.]. A record player should be connected to the PHONO 1 inputs, as instructed previously, and the Phono Sensitivity switch set initially to "LO".

NOTE: The Phono Sensitivity Switch setting will affect both sets of Phono inputs [Phono 1 and 2]. If two record players are to be used with the receiver, identical or very similar cartridges [in terms of output level] should be used for each record player.

2. Set all controls for "FM Stereo" operation [see chart headed "Quick Guide to Operating the Receiver"].
3. Tune in a strong FM station and set the VOLUME control to produce normal listening volume. Leave the volume control in this position.
4. Operate the record player, using a stereo record containing the same general type of music being broadcast on the selected FM station.
5. Alternately, switch between the "Phono 1" and "FM" positions on the Program SELECTOR switch. Compare the output level from the speakers in each position. If the sound output is lower in the "Phono" position, set the "MAG HI-LO" switch to the "HI" position and compare once more. 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 phono cartridge is changed.

NOTE: An exact matching of the volume of FM and Phono is not likely. Simply find the position which provides the closest match.

STEREO TAPE RECORDER OPERATION

RECORDING/PLAYBACK USING ONE TAPE RECORDER

To record a stereo program on a tape recorder connected to the TAPE A-REC and TAPE A-PLAY jacks (as shown in Figure 4), select the desired program source (FM, Phono, Etc.). The TAPE A-REC output jacks will automatically produce a recording output during reproduction of a program through the receiver and will provide the tape recorder connected to these jacks with a recording signal. If you wish, you may monitor the program information that is being recorded (provided

the stereo tape recorder you are using has tape monitoring facilities, 3-head machine) by simply setting the MONITOR switch on the receiver to the "A" position.

IMPORTANT: Make sure that the DUBBING switch is set to the SOURCE position during record.

For playback from the tape recorder, set the MONITOR switch to the "A" position if you used the TAPE A-PLAY inputs on the receiver.

SIMULTANEOUS RECORDING (TWO RECORDERS CONNECTED)

To record a stereo program on two stereo tape recorders simultaneously, select the desired stereo program source (FM, Phono, Etc.). Be sure the DUBBING switch is in the SOURCE position. The TAPE A-REC and the TAPE B-REC output jacks will automatically produce a stereo recording output during reproduction of a program through the receiver. If you wish, you may monitor tape recorder "A" or "B" (providing the tape recorders have tape monitoring facilities, 3-head machine) by setting the MONITOR switch on the receiver to the "A" or "B" position.

DUBBING OR DUPLICATING (TWO RECORDERS CONNECTED)

To duplicate a tape presently on recorder "A" onto a tape on recorder "B", proceed as follows:

1. Make sure the inputs and outputs of tape recorders "A" and "B" are properly connected, as shown in Figure 4.
2. Set the DUBBING switch to the "A → B" position.
3. Playback the tape on tape recorder "A" and record it on tape recorder "B" (the output of recorder "A" is being fed to recorder "B").
4. The tape being recorded on tape recorder "B" may be monitored by setting the MONITOR Switch to the "B" position.

NOTE: If you wish to monitor the output of tape recorder "A", simply set the MONITOR switch to the "A" position.

To reverse the recording procedure (duplicating a tape on recorder "B" onto a tape on recorder "A"), simply set the DUBBING switch to "B → A". The tape being recorded on recorder "A" may be monitored by placing the MONITOR switch in the "A" position.

NOTE: If you wish to monitor the output of tape recorder "B", simply set the MONITOR Switch to the "B" position.

5. During either of the dubbing operations (A→B or B→A) just described, the MONITOR switch may be set to the SOURCE position to permit you to listen to any other selected program source (such as FM or Phono) without disturbing the dubbing operation.

RECORDING ON ONE TAPE RECORDER WHILE PLAYING TAPE ON ANOTHER

It is possible to record an FM broadcast or record on one tape deck while simultaneously playing a tape on a second tape deck. With this type of operation, you will obviously not be able to monitor the program being recorded on one tape recorder and also listen to the tape playing on the second recorder. However, you can periodically monitor the program being recorded to check for possible problems by means of the MONITOR switch (if the recorder has monitoring facilities).

RECORDING ON TAPE RECORDER "B" WHILE PLAYING BACK TAPE ON TAPE RECORDER "A"

1. Select the program you wish to record by means of the SELECTOR switch (FM, Phono, Etc.). Initially, set the MONITOR switch to the SOURCE position (DUBBING must always be in the SOURCE position).
2. Place Recorder "B" in the record mode and adjust recording level in the normal manner.
3. When recording on machine "B" commences, set the MONITOR switch to the "A" position and place recorder "A" in the playback mode. You will now hear the tape being played on tape recorder "A" while simultaneously recording the selected program source on recorder "B".

RECORDING ON TAPE RECORDER "A" WHILE PLAYING BACK TAPE ON TAPE RECORDER "B"

1. Select the program you wish to record by means of the SELECTOR switch (FM, Phono, Etc.). Initially, set the MONITOR switch to the SOURCE position (DUBBING must always be in the source position).
2. Place Recorder "A" in the record mode and adjust recording level in the normal manner.
3. When recording on machine "A" commences, set the MONITOR switch to the "B" position and place recorder "B" in the playback mode. You will now hear the tape being played on the recorder "B" while simultaneously recording the selected program on recorder "A".

PLAYBACK (TWO RECORDERS CONNECTED)

For playback from either tape recorder, simply set the "MONITOR" switch to "A" for playback from tape recorder "A", or to "B" for playback from tape recorder "B".

8-TRACK TAPE PLAYER OPERATION

For playback from an 8-track stereo tape player, set the SELECTOR switch to the "AUX" position in order to select the "AUX" inputs on the receiver (assuming the tape player has been connected to the "AUX" inputs).

MICROPHONE OPERATION

This receiver has a Stereo "MIC" input jack for connection of left and right channel microphones which can be used for mixing with any other program source. This allows you to sing-a-long with music from a program source or to make announcements, etc. However, the output of the microphone(s) cannot be recorded.

When using two microphones, you will need to connect them to the single 3-conductor phone jack on the receiver. An adaptor cable with two 2-conductor phone jacks at one end and a 3-conductor phone plug at the other end is available from Lafayette (Stock No. 24-90217).

A single microphone with a 2-conductor phone plug may also be plugged into the "MIC" jack, which will connect it to the left input channel in the receiver.

Microphones used should have an impedance between 600 and 10 kohms (dynamic type) for best results.

To adjust the microphone input level for one or two microphones connected to the "MIC" input jack, simply rotate the "MIC-LEVEL" control to the right (clockwise) to increase the microphone level and to the left (counter-clockwise) to decrease the microphone level.

NOTE: If the microphone is being used in the same area as the speakers, feedback (evidenced by a "howling" noise) may occur as the "MIC-LEVEL" control is increased. If this should happen, reduce the setting of the "MIC-LEVEL" control or set the "SPEAKER MODE" switch to one of the remote speaker settings so that the microphone and the speakers are not in the same area.

SPEAKER PHASING

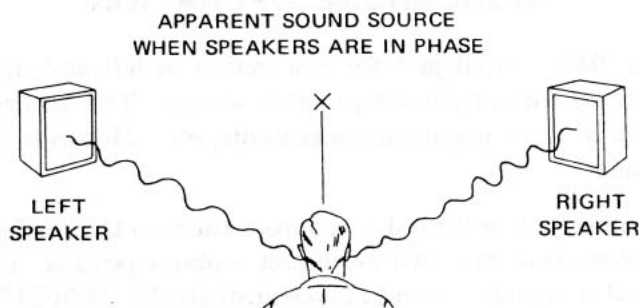
In order for any system to be effective, it is important that all speakers be operated in the proper phase (speakers are in phase if all speaker cones move in the same direction when an identical signal is applied to them).

If all speakers used were equipped with coded terminals and if you made all connections correctly when wiring them to the unit (as indicated in the section dealing with speaker connections), you can assume that all speakers are in proper phase. However, if you have any doubts, you can use the following detailed procedure for checking the phase of all speakers in the system.

PRELIMINARY SET-UP

Operate the receiver in the normal manner for Phono or Tuner, with the "A" SPEAKER button in the depressed position (if phasing the "A" set of speakers). Play any monophonic FM program (if using FM), preferably one with a voice content.

The listening tests that follow are based on the fact that when two speakers produce the same "in phase" sound, the sound will appear to come from between the speakers. If the sound is out-of-phase, the sound will not appear to come from any definite location and will be dispersed over an area across both speakers. When carrying out a listening test on any two speakers, they should be separated by a distance of approximately 6 – 10 feet and turned in at an angle to face the listener who should stand about 6 – 10 feet in front of them, as shown in the diagram.



For these listening tests, the help of another person may be required (to adjust the controls on the equipment, reverse wires at each speaker, etc.).

1. Position yourself midway between the left and right speakers as shown in the diagram.
2. Set the POWER button "on" (depressed). Adjust the VOLUME Control to a slightly higher than normal listening level. Also, set the "BALANCE" Control in the 12 o'clock position. Listen carefully, and try to determine the area from which the sound appears to be coming. If the speakers are "in phase", the sound will seem to come from between the speakers.
3. Have someone reverse the connections at the rear of the right speaker. Listen carefully to the sound output again as the wires are switched. Repeat this procedure a few times.

CAUTION: Use extreme care when reversing wires to the speaker terminals — make sure the wires are not inadvertently shorted together.

When you have the correct or "in phase" connections, you will notice that the sound seems to come from an area somewhere between the speakers. If the speakers are not "in phase", however, the sound will not seem to come from any clearly defined area and will appear to be dispersed. When you have determined that the speakers are "in phase", permanently connect the right speaker wires in the positions that produced it.

BASS AND TREBLE TURNOVER SWITCH ACTION

Figure 5 shows how the Bass and Treble Turnover Switches will affect the action of the Bass and Treble controls when the controls are set at maximum or minimum.

BASS TURNOVER SWITCH

In the 500 Hz position, frequencies from about 500 Hz begin to be affected by the Bass control, with maximum rated boost or cut taking place at 100 Hz. In the 250 Hz position, frequencies from about 250 Hz begin to be affected, with maximum rated boost or cut taking place at 50 Hz. When the Bass control is in the flat [0] position, the turnover switch has no effect, of course. Since the 250 Hz position shifts the action of the Bass control into the lower region of the audio spectrum [where most change is generally desired], we recommend you use this position initially. However, some experimentation with the 500 Hz position should be undertaken to determine the position which provides the most desirable Bass control action with your complete system.

TREBLE TURNOVER SWITCH

In the 2.5 kHz position, frequencies from about 2.5 kHz begin to be affected by the Treble control, with maximum rated boost or cut taking place at 10 kHz. In the 5 kHz position, frequencies from about 5 kHz begin to be affected, with maximum rated boost or cut taking place at 20 kHz. When the Treble control is in the flat [0] position, the turnover switch has no effect, of course. Since the 5 kHz position shifts the action of the Treble control into the higher region of the audio spectrum [where most change is generally desired], we recommend you use this position initially. However, some experimentation with the 2.5 kHz position should be undertaken to determine the optimum position for your needs [as in the case of the Bass Turnover switch].

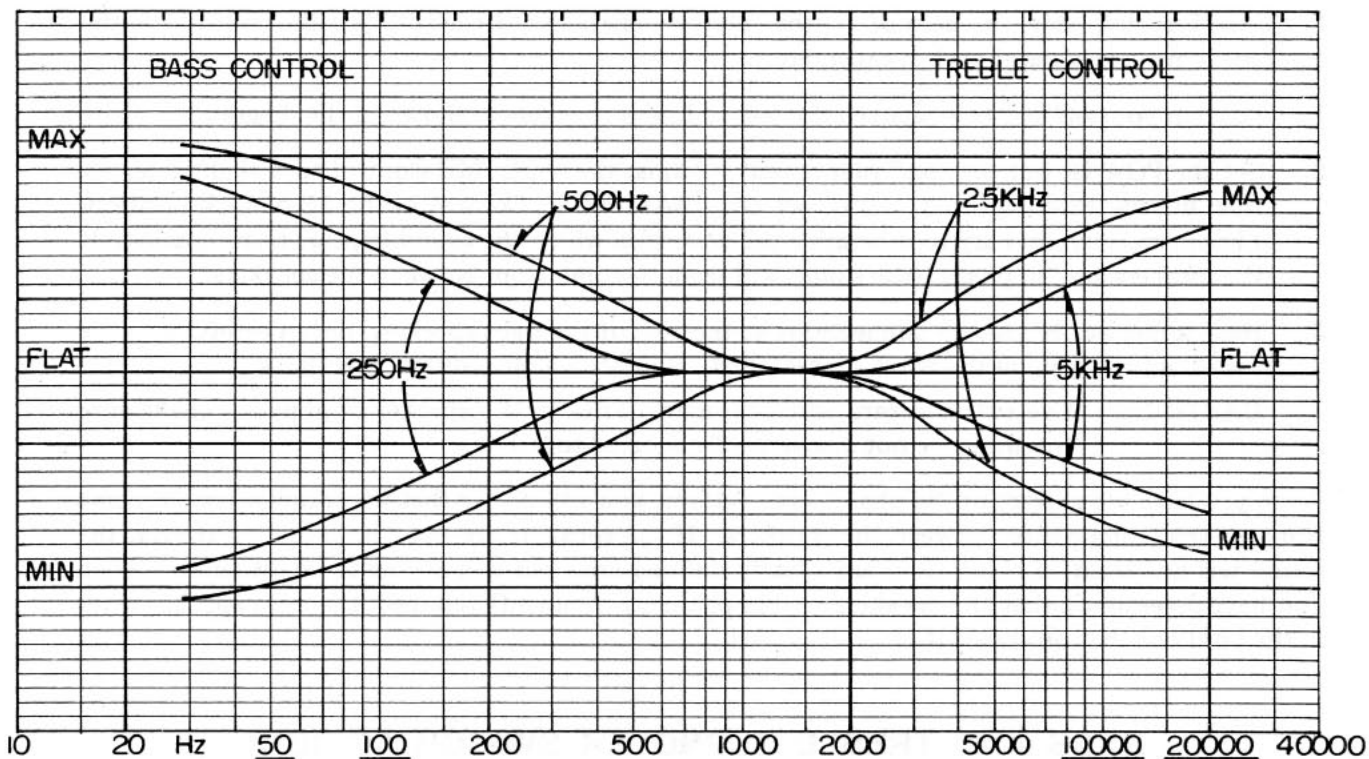


FIGURE 5. BASS AND TREBLE TURNOVER SWITCH ACTION

POWER OVERLOAD SAFEGUARD SYSTEM

This receiver is protected by a unique built-in safeguard system which consists of a combination of electronic and relay circuitry. This protects both transistors and speakers from damage by automatically disengaging the speakers the instant a dangerous power overload condition occurs.

When the receiver is first switched on, there is an approximate 6 second delay before sound is heard from the speakers [you will hear a "clicking" noise from the relays as the circuit is activated]. This is to prevent initial surge currents from possibly damaging the output transistors or speakers, and also to avoid any unpleasant "popping" noises from being heard. If no sound is heard from one or both speakers after a period of 9 – 10 seconds, set the "SPEAKER MODE" Switch to the "OFF" position and check all speakers connections and wiring for a possible short-circuit.

Another indication of a dangerous power overload condition would be the sudden interruption of sound from one or both speakers during normal operation, or intermittent sound output accompanied by a continuous relay switching sound [clicking]. Both of these symptoms may indicate a malfunction within the unit, but a check of the speaker connections or wiring should be made to make sure that a short or partial short has not suddenly occurred [for example, a wire connection may have become loose and shorted to an adjacent wire].

The overload protection circuit is self-resetting. Once the cause of the power overload is located and the problem rectified, normal operation will resume.

MAINTENANCE

WARNING: Do not attempt to remove the cover — there are no user serviceable parts inside this receiver. Refer servicing only to qualified personnel. [See “Returning The Unit For Service”].

TROUBLE-SHOOTING GUIDE

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 Hz AC]. Check the dial and meter lamps on the receiver. If they are not lit, switch the unit off — the AC fuse within the unit may have blown and a fault in the receiver must be suspected. **DO NOT ATTEMPT TO REPLACE THE INTERNAL AC FUSE YOURSELF.** This must be performed by a qualified technician.
2. If the receiver appears to be operating on FM or AM [tuning meter is indicating reception of signals], but there is no sound output on one or both speakers, check the speaker connections at the speaker[s] and on the receiver for the channel affected [refer to section titled “Power Overload Safeguard System”]. Also remember that with the FM MUTE circuit on, you must be tuned accurately on FM or the receiver will be silenced [see “FM MUTING OPERATION”].
3. Check for possible error in control or switch settings. Check that the AUDIO MUTE switch is off. Make sure the “MONO — STEREO” switch and Program “SELECTOR” switches are correctly set to provide the type of operation you want. Check the “SPEAKER MODE” switch setting for proper selection of speakers.
4. If you are not selecting the “TAPE-PLAY” jacks on the receiver, make sure that the MONITOR switch is in the “SOURCE” position.
5. If the trouble was experienced during your initial operation of the system, check that all plugs are firmly inserted. Make sure speakers are properly connected and that they are not at fault.
6. If you are having trouble on FM [little or no meter reading as you tune across the dial], check antenna connections. Check to make sure your program source is not at fault if you are using a record player or tape recorder.
7. Check any connecting audio cables themselves for an intermittent “Open” or “Shorted” condition.

IMPORTANT: When checking interconnecting cables, make sure the Volume Control is at minimum or receiver is switched off.

RETURNING THE UNIT FOR SERVICE

In the event that repair is necessary (either in or out of warranty), we recommend that you return the unit to the store from which it was purchased. In most cases, this will be your fastest and most efficient method of obtaining service.

If you wish to ship the unit to our main service center, 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 6 inches of crumpled newspaper or other packing material packed tightly around the unit to avoid any chance of damage in shipment. Be sure to use strong cord or tape around carton. If this unit is being returned under warranty, it must be accompanied by a copy of the original sales ticket or shipping document to establish date of purchase. Also, include with the unit a letter explaining what difficulties you have encountered (remember to add extra First Class 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.
150 Engineers Road
Hauppauge, L.I., N.Y. 11787

LR-9090

TECHNICAL SPECIFICATIONS

AMPLIFIER SECTION

POWER OUTPUT [Both Channels Driven]

90 Watts per channel, minimum RMS, at 8 ohms from 20 Hz to 20 kHz, with no more than 0.1 % Total Harmonic Distortion.

HUM AND NOISE	Aux:	- 80 dB
	Tape Play "A" and "B":	- 80 dB
	Mag Phono:	- 60 dB [Hi]
		- 65 dB [Lo]
INPUT SENSITIVITY [for rated output]	Aux:	150 mV
	Tape Play "A" and "B":	150 mV
	Mag Phono:	5 mV [Lo]
		2.5 mV [Hi]
	Mic:	6 mV [10 k]
MAXIMUM INPUT VOLTAGE	Aux:	10 V
	Tape Play "A" and "B":	10 V
	Mag Phono:	360 mV [Lo]
		180 mV [Hi]
	Mic:	420 mV [Mic Level at Max.]
BASS CONTROL RANGE	250 Hz Turnover:	± 12 dB at 50 Hz
	500 Hz Turnover:	± 12 dB at 100 Hz
TREBLE CONTROL RANGE	2.5 kHz Turnover:	± 10 dB at 10 kHz
	5 kHz Turnover:	± 10 dB at 20 kHz
MID CONTROL RANGE		± 6 dB at 1 kHz
LOW FREQUENCY FILTER [12 dB/octave] ...		15 Hz [- 3 dB], 7 Hz [-12 dB]
		40 Hz [- 3 dB], 20 Hz [- 12 dB]
HIGH FREQUENCY [12 dB/octave]		7 kHz [- 3 dB], 14 kHz [- 12 dB]
		12 kHz [- 3 dB], 24 kHz [- 12 dB]
LOUDNESS	50 Hz:	+ 12 dB
	10 kHz:	+ 3.5 dB
AUDIO MUTE		- 20 dB
TAPE OUTPUT LEVEL		0.15 V output at rated input sensitivity.

FM SECTION

TUNING RANGE	88 - 108 MHz
IHF SENSITIVITY [Mono]	1.8 μ V**
USEABLE SENSITIVITY	10.3 dBf [Mono], 21 dBf [Stereo]**
50 dB QUIETING SENSITIVITY	16.5 dBf [Mono], 39.3 dBf [Stereo]**
SELECTIVITY [Alternate channel]	80 dB**
CAPTURE RATIO	1.25 dB*
FM DISTORTION [at 1 kHz]	0.2 % [Mono], 0.4 % [Stereo]*
STEREO SEPARATION	40 dB at 1 kHz, 32 dB at 100 and 10,000 Hz*

FREQUENCY RESPONSE	30 – 15,000 Hz, + 0.5, – 1.5 dB*
IF REJECTION	90 dB*
SIGNAL/NOISE RATIO	72 dB [Mono], 67 dB [Stereo] *
SPURIOUS REJECTION [F + IF/2]	90 dB**
IMAGE REJECTION	80 dB**
SUB-CARRIER PRODUCT REJECTION	60 dB*
FM-MUTE THRESHOLD	14 dBf**
DOLBY FM	De-emphasis: 25 μ S
TAPE OUTPUT LEVEL [FM]	0.77 V*
ANTENNA	75 ohms unbalanced and 300 ohm balanced input for external antenna.

* At 98 MHz, 65 dBf signal input, 100 % Mod.

** At 98 MHz.

AM SECTION

TUNING RANGE	535 – 1605 kHz
SENSITIVITY [IHF]	20 μ V [ant terminal] **
IMAGE REJECTION	60 dB at 600 kHz
SELECTIVITY [Alternate channel]	45 dB**
SIGNAL/NOISE RATIO	45 dB*
TAPE OUTPUT LEVEL	0.3 Volts*
ANTENNA	Built-in adjustable ferrite bar, plus provision for external antenna.

* At 1 MHz, 1 mV input signal 30 % Mod.

** At 1 MHz.

GENERAL

SOLID STATE DEVICES	8 ICs, 2 MOS-FETs, 4 Dual-Transistors, 43 Transistors and 41 Diodes.
AC POWER REQUIREMENT	105 – 120 volts, 50/60 Hz AC.
POWER CONSUMPTION	220 Watts
DIMENSIONS	20-7/8" W x 6-3/8" H [including legs] x 15-1/2" D [including rear protrusions and knobs]. 530 mm W x 162 mm H x 394 mm D
NET WEIGHT	38 lbs./17 kgs.

Lafayette

LR-9090

SERVICE ADJUSTMENT PROCEDURES

These procedures have been carefully prepared to aid you in servicing the LAFAYETTE LR-9090 AM/FM Stereo Receiver. It contains receiver adjustment procedures, replacement of Dial Lamps and Dial Cord Stringing.

Before servicing this receiver, read the LR-9090 Owner's Manual, as it will help you to understand the correct operation of the receiver's controls and their functions. The Owner's Manual also contains Interior Parts Location Drawing, PC Board Drawings and complete Schematic Diagram including voltages. Parts Listing for this receiver is available on Microfische Film from the Lafayette Parts Department, Hauppauge NY.

CAUTION: Only a qualified technician having enough knowledge and experience in repair of solid state equipment should attempt to service this receiver, or damage to the unit may result.

Please follow the procedures outlined - do not attempt short-cuts.

- * Always remove the AC power cord plug from the outlet when soldering or making repairs to the unit. Wait until the power supply filters have dissipated their charge.
- * Do not use an ohmmeter to test transistors. In some instances the voltage across the test probes of an ohmmeter may exceed the base to emitter breakdown voltage. Therefore, do not use an ohmmeter for testing transistors unless you are certain of the transistor's capability.
- * Do not replace a defective output transistor, until you have determined the cause of its failure.
- * When installing a power transistor, make sure that the bottom of its mounting flange, surface of the heat sink and the insulator between them are free of dust and dirt particles. Failure to observe this precaution will prevent proper heat transfer and may even puncture the insulator, causing a short circuit to ground. Also, for proper heat transfer, both sides of the insulator should be coated with silicone grease.
- * To prevent damage to the printed circuit boards and components, use the correct soldering iron; small diameter tip for single connection, large chisel tip for large areas and special de-soldering tip for multiple connection component removal.
- * All voltage measurements should be made with the AC line adjusted to 117V. VTVM DC measurements are made to chassis ground, with no signal input unless specified otherwise. Measurements may vary plus or minus 20%.

SERVICING NOTES

1. From a servicing stand point, the voltage drop across the emitter resistor is very important in determining circuit operation. A higher than normal emitter voltage would generally indicate excessive current flow which can be caused by a shorted transistor or bias defect. A lower than normal emitter voltage would generally indicate an open transistor or bias defect.
2. Check the emitter voltage in each stage and compare them with the voltages given in the circuit diagram. If the voltages obtained are 20% higher or lower than the voltages given on the circuit diagram, troubleshoot and find the defective component(s).
3. When servicing the receiver, you may quickly determine the circuit operating conditions by using the method of signal tracing and checking the waveform signal at any given stage on an oscilloscope display.

IMPORTANT: Do not attempt to adjust any FM MPX coils if you have not a proper MPX stereo generator. These coils generally cannot be adjusted without an MPX stereo generator.

MAIN AMPLIFIER IDLE CURRENT ADJUSTMENT

NOTE: The following adjustments are located on PC Board PS-MA025COX:

1. Set the receiver VOLUME Control to the "0" position for minimum volume, with no input signal.
2. Connect an Ammeter in series with the collector of transistor "Q1" on the top side of the main amplifier PC Board. The DC Ammeter should indicate 50 mA. If not, adjust RV1, 100 ohm "Bias" adjust for 50 mA current indication on Ammeter.
3. Repeat Step 2 for the other channel.

AM TUNER ADJUSTMENT

NOTE: The following adjustments are located on PC Board PS-TU019COX unless otherwise specified:

AM IF Adjustment

1. Set the receiver SELECTOR switch to AM.
2. Connect the output of an AM Generator to the "AM" antenna terminal (on rear panel) and chassis ground.

3. Set the AM Generator frequency to 455 KHz.
4. Connect an Oscilloscope directly to the Left or Right "TAPE-REC" output jack on the rear panel of the receiver.
5. Adjust "CF4" for maximum and symmetrical oscilloscope display.

AM Front-End Adjustment

1. Connect test equipment to the receiver as shown in Figure 1, "AM Front-End Adjustment Test Set-Up".

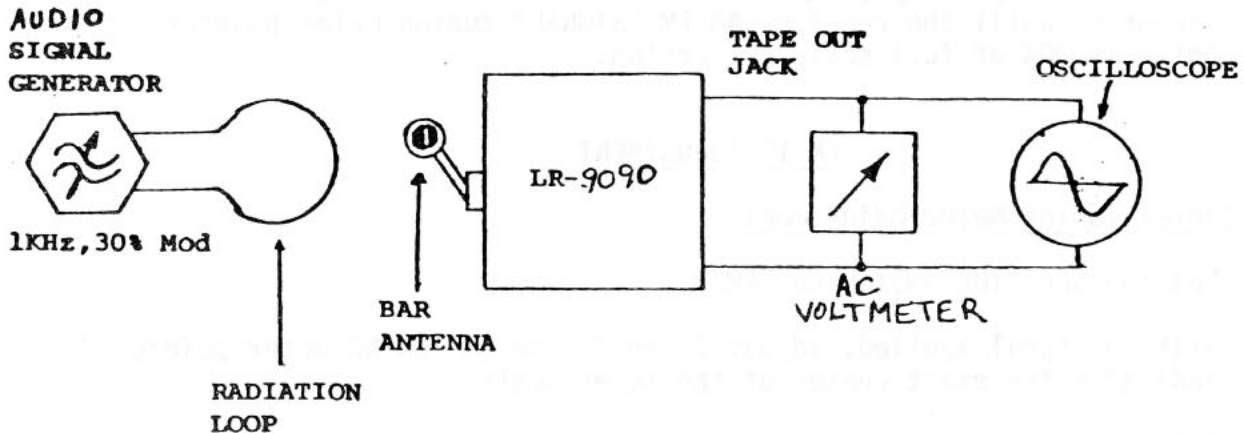


FIGURE 1. AM FRONT-END ADJUSTMENT TEST SET-UP

2. Place the AM Bar Antenna in the correct position by pulling it outward.
3. Set the AM Generator Output to 600 KHz for 30% modulation at 1 KHz with the receiver tuning dial pointer set to 600 KHz.
4. Increase the AM Signal Generator Output until a sine wave appears on the oscilloscope display. Then, adjust "T4" (dial frequency adjustment) for maximum audio output. Also, adjust "T3" and AM Bar Antenna coil position while adjusting screw core (on end of Bar Antenna) for maximum audio output (tracking adjustment).

NOTE: When adjusting the cores of trimming capacitors, the audio output level will rapidly increase and the AC Voltmeter pointer will go off scale. In this case always decrease the signal generator output for proper audio output. Do not change the AC Voltmeter range to match the increased audio output. Keep the AM Signal Generator output as low as possible to avoid AGC action during AM tuner adjustment.

5. Set the AM Generator frequency to 1400 KHz and place the receiver tuning dial pointer in the 1400 KHz position.

NOTE: The following adjustments in step 6 are located on top of the metal cage of the Tuner Unit.

- Adjust "AM2" (CT7 tuning capacitor) dial frequency adjustment and "AM1" (CT5) and "AM3" (CT6) tracking adjustment for maximum audio output.
- Repeat the above steps (at 600 KHz and 1400 KHz) until no further improvement is obtained.

AM Signal Meter Adjustment

- Connect test equipment to the receiver as shown in Figure 1.
- Increase the AM signal Generator Output until the meter reading saturates completely (full scale deflection), then, adjust "RV2" (1K ohms) until the receiver AM/FM "SIGNAL" tuning meter pointer deflects 90% of full scale deflection.

FM IF ADJUSTMENT

FM Center-Tuning Meter Adjustment

- Set the SELECTOR switch to "FM".
- With no signal applied, adjust T1 until the FM TUNING meter pointer indicates the exact center of the meter scale.

FM IF Adjustment

- Connect the output of a Sweep Generator to test point TP4 on Tuner Unit. Make connection to metal tab on underside of PC Board PS-TU019COX. To locate correct tab, look on topside of unit. Notice, on bottom of metal cage of the Tuner Unit there are numbers one through ten, number 4 is TP4. Then turn unit over and locate the number 4 metal tab protruding from the bottom of PC Board and connect the Generator to this point and PC Board Ground.
- Make-up a Detector Probe as shown in Figure 2, and connect it to the junction of C110 and D2 on PC Board PS-TU019COX and PC Board Ground.

NOTE: The hot lead of the probe should be made as short as possible and the ground lead should be connected to the closest ground point of the junction of C110 and D2.

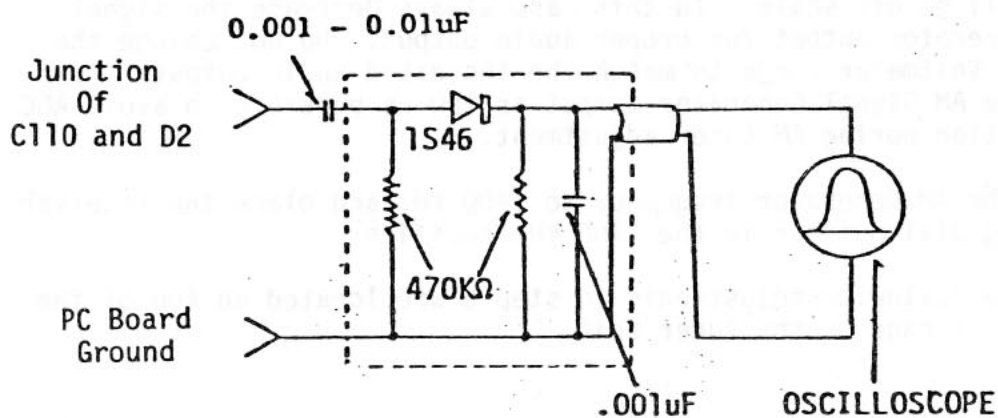


Figure 2. LR-9090 Detector Probe Circuit.

3. Set the Program SELECTOR switch to "FM".
4. Short the local oscillator by shorting the oscillator variable capacitor CV4 on Tuner Unit using a 0.001 uF ceramic capacitor.
5. Increase the sweep generator to provide about half of the saturation level as indicated on the oscilloscope.
6. Adjust the "IF" adjustment on top of Tuner Unit for highest, widest and round top response as shown in Figure 3.

NOTE: Since ceramic filters are used in the IF circuit, ignore 10.7 MHz center marker in the above adjustment. Also, when replacing a ceramic filter, always use the one having the same color dot (same center frequency).

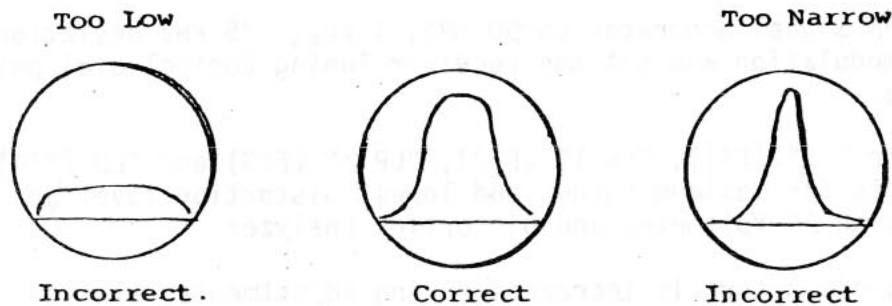


Figure 3. Correct IF Oscilloscope Waveshape.

FM FRONT-END ADJUSTMENT

NOTE: The following adjustments are located on top of the metal cage of Tuner Unit.

1. Set the Program SELECTOR switch to FM and the FM MUTE switch in the OFF position.
2. Connect test equipment to the receiver as shown in Figure 4.

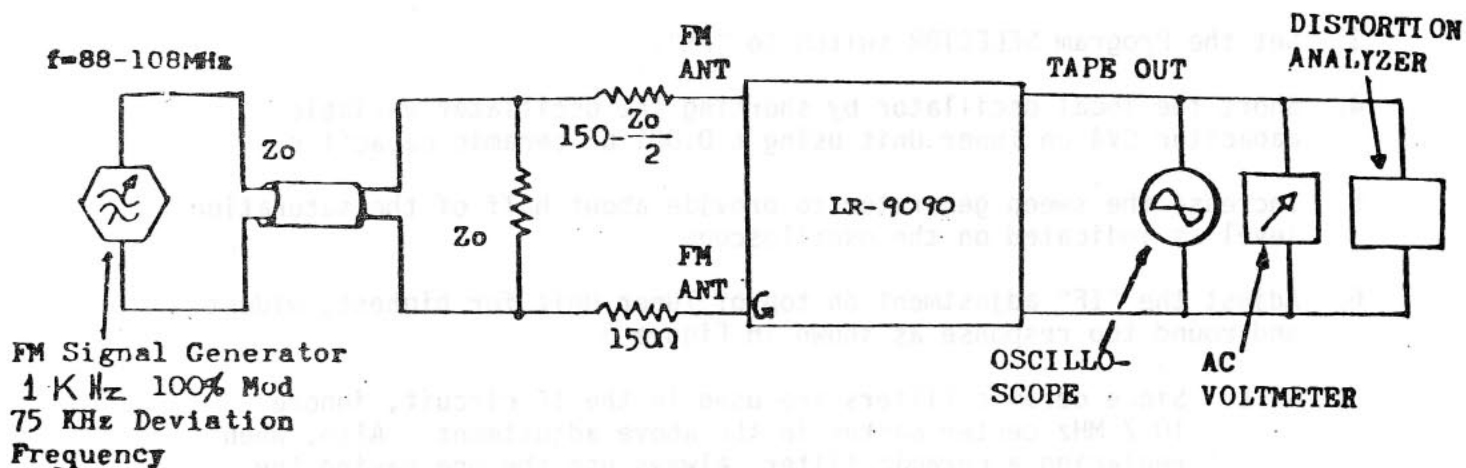


Figure 4. FM Front-End Test Set-Up.

3. Set the FM Signal Generator to 90 MHz, 1 KHz, 75 KHz deviation at 100% modulation and set the receiver Tuning Control dial pointer to 90 MHz.
4. Adjust the "LA" (FT1), "LR 1" (FT2), "LR 2" (FT3) and "LO" (FT4) adjustments for maximum output and lowest distortion level as indicated on AC Voltmeter and Distortion Analyzer,

NOTE: When audio output is increased during adjustments, always decrease the FM Signal Generator Output to such a level at which the sine wave on the oscilloscope includes visible noise pulses to avoid inaccurate adjustments due to limiting action,

5. Set the FM Signal Generator to 106 MHz and the receiver Tuning Dial Pointer to 106 MHz.
6. Adjust RF trimmers "TCA" (CT1), "TC1" (CT2), "TCR2" (CT3) and "TCO" (CT4), for maximum audio output and lowest distortion.
7. Repeat steps 3 through 6 until no further improvement is obtained.

IF DISTORTION ADJUSTMENT

NOTE: The following adjustments are located on PC Board PS-TU019COX:

1. Connect test equipment to the receiver as shown in Figure 4.
2. With no signal, make sure the FM TUNING Meter Pointer indicates the exact center of scale. If not, adjust T1 until the meter pointer indicates the exact center of the scale.

3. Set the signal generator frequency to 98 MHz. Then, using the receiver Tuning Control, tune the receiver to 98 MHz so that the FM TUNING meter pointer indicates the exact center of the scale.
4. Next, increase the signal generator output to 0.5 to 1 MV.
5. Set the Audio Distortion Analyzer to the distortion position and adjust the core of T2 for minimum distortion.

NOTE: Adjusting T2 may affect the FM TUNING meter adjustment slightly. Therefore, repeat steps 2 through 5 until no further improvement is obtained.

AM/FM SIGNAL METER ADJUSTMENT

1. Set the signal generator to 98 MHz 90dB output and tune the receiver to the same frequency using the TUNING meter.
2. Make sure the SIGNAL meter pointer deflects approximately 80-90% of full scale. If not, adjust RV2 on PC Board PS-TU019COX.

FM MPX STEREO CIRCUIT ADJUSTMENT

NOTE: The following adjustments are located on PC Board PS-TU019COX.

Connect test equipment to the receiver as shown in Figure 4.

76 KHz Adjustment

1. Set the FM MPX Signal Generator to 98 MHz and set the receiver Tuning Control dial pointer to 98 MHz for maximum indication on Receiver Signal Meter.
2. Place the MODE switch in the STEREO position.
3. Adjust the Signal Generator Output to provide a 60 dBf (approx. 1mv) antenna input with a modulated 1 KHz audio signal (do not include a 19 KHz pilot signal).
4. Connect a Frequency Counter to test point $\textcircled{\text{TP}}$ (as indicated on top side of PC Board) and chassis ground.

NOTE: The length of the ground lead should be as short as possible. Select the closest chassis ground point to $\textcircled{\text{TP}}$ to avoid the stray capacitance effect of this cable.

5. Read the frequency on the Frequency Counter - it should indicate 76 KHz \pm 300 Hz. If the frequency is not 76 KHz \pm 300 Hz, adjust RV4 to obtain the correct frequency.

Separation Adjustment

1. Modulate the FM MPX Signal Generator with a stereo composite signal (modulation frequency = 1 KHz, 9% pilot signal, 67.5 KHz deviation).

2. Set the Signal Generator frequency to 98 MHz and rotate the receiver tuning control to the same frequency until the FM TUNING meter pointer indicates the exact center of the channel. Then, increase the generator output to approximately 65 dBf (1mV).
3. Place the MODE switch in the STEREO position.
4. Modulate the MPX Signal Generator with a Left channel stereo composite signal.
5. Observe the output signal of the Right channel "TAPE-REC" output jack. There should be very little leakage from the Left channel. Then adjust RV3 for minimum leakage voltage (little or no crosstalk) from the Left channel.
6. Modulate the MPX Signal Generator with a Right Channel stereo composite signal.
7. Observe the output signal of the Left channel "TAPE-REC" output jack. The leakage voltage for the Left channel should be the same as that of the Right channel. If not, readjust RV4 for equal and minimum leakage at both Tape Record Output Jacks. The normal leakage voltage (separation) is approximately 40 to 50 dB.

REPLACEMENT OF DIAL LAMPS

1. Remove the top cover of the receiver by unscrewing the 4 Phillip's Head mounting screws and washers (2 on each side of cover).
2. Unscrew the 4 Phillips Head mounting screws (2 on each side) holding the Dial Light Assembly to the Escutcheon Assembly as shown in Figure 7.
3. Then lift Dial Light Assembly and remove the defective bulb. To remove bulb, twist bulb and pull from socket.

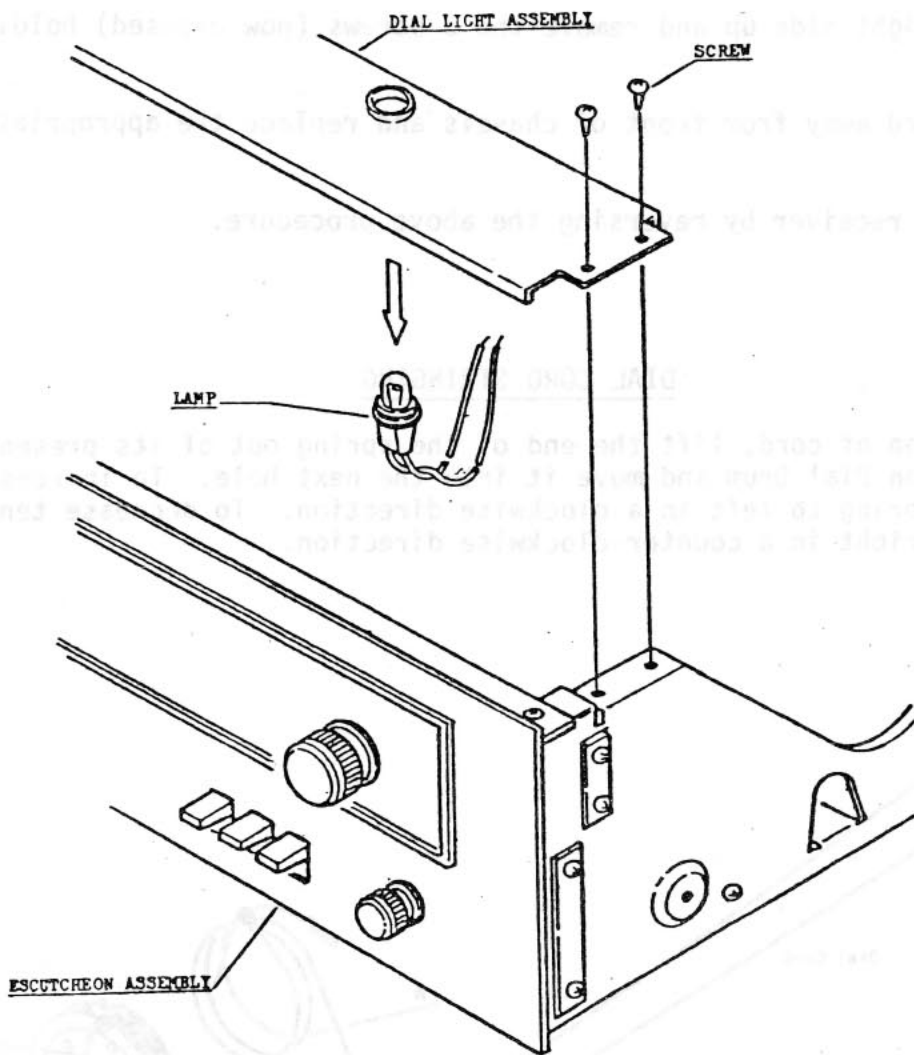


Figure 5. Replacement of Dial Lamps.

REPLACEMENT OF THE STEREO INDICATOR OR ANY FUNCTION INDICATOR (SPKR A, SPKR B, SPKR C, PHONO, DOLBY FM, AM AND AUX).

All of the Indicators listed above are located on PC Board PS-LD004COX, and replacement of any Indicator requires removal of this PC Board as follows:

1. Remove the top cover of the receiver by unscrewing the 4 Phillips Head mounting screws and washers (2 on each side of cover).
2. Unscrew the 4 Phillips Head mounting screws (2 on each side) holding the Dial Light Assembly to the Escutcheon Assembly (as shown in Figure 5). Then, lift Dial Lamp Assembly toward the rear of the receiver.
3. Remove all knobs and levers from the front panel by pulling them outward. The Tuning Control Knob has a setscrew-remove setscrew, then, pull knob outward.
4. Remove the 2 Phillips Head screws on top of front panel. Then, turn unit upside down and remove the 3 Phillips Head screws on bottom side of front panel. Then, remove front panel.

5. Turn unit right side up and remove the 3 screws (now exposed) holding PC Board.
6. Lift PC Board away from front of chassis and replace the appropriate indicator.
7. Re-assemble receiver by reversing the above procedure.

DIAL CORD STRINGING

To adjust tension of cord, lift the end of the spring out of its present hole (see Figure 6) on Dial Drum and move it into the next hole. To increase tension, move spring to left in a clockwise direction. To decrease tension, move spring to right in a counter-clockwise direction.

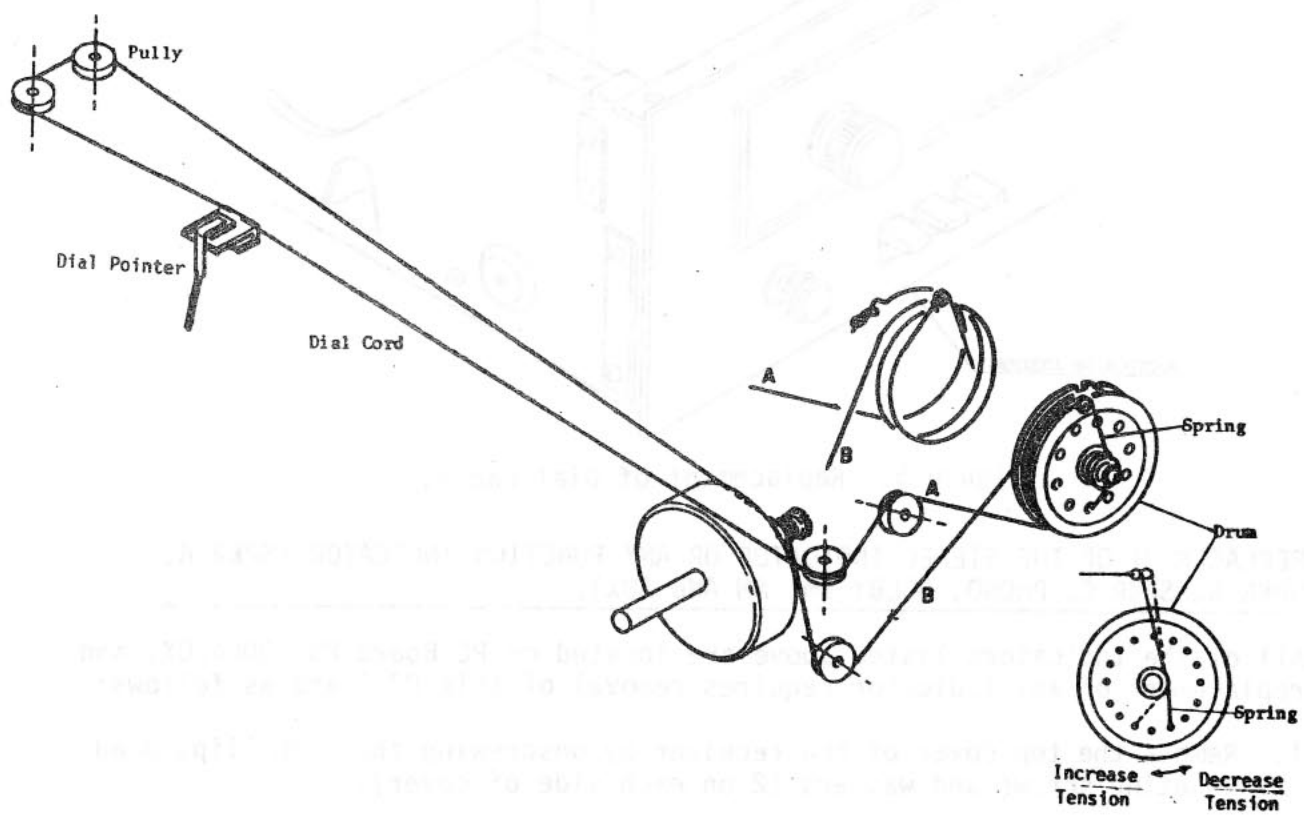


FIGURE 6



TC-28

LAFAYETTE RADIO ELECTRONICS CORPORATION INTRA COMPANY CORRESPONDENCE

TO: ALL STORE MANAGERS, BRANCH AND
ASSOCIATE STORE SERVICE

FROM:
STORE NO.
OR DEPT.: Technical Information
Services
SUBJECT: LR-1515/A, LR-2020/A,
LR-3030/A & LR-5555/A
DATE: March 6, 1979

DIAL LAMP REPLACEMENT

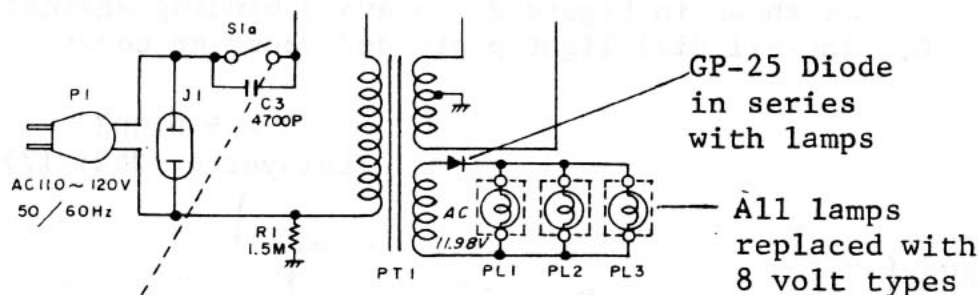
It should be noted that some of these receivers use 12 volt dial lamps, while others use 8 volt types.

12 volt dial lamps are no longer available as spare parts, but 8 volt lamps can be used in receivers using 12 volt types if a diode is wired in series with the lamp circuit (see Fig. 1)

8 volt lamps are available from the Lafayette Parts Department under Part No. 5836-20.

IMPORTANT: It is not possible to change only one lamp---all dial lamps must be replaced when using 8 volt lamps in place of 12 volt types.

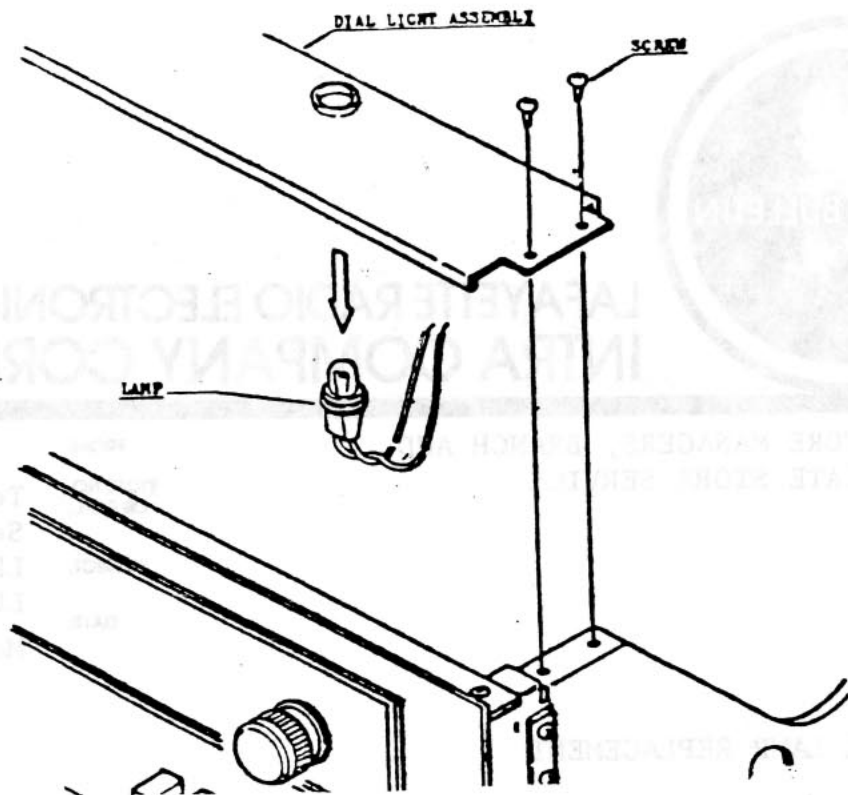
Figure 1



REPLACEMENT PROCEDURE

1. Remove receiver top cover.
2. Remove four screws (two each side) holding the dial light plate, as shown in Figure 2. Remove all lamp assemblies and disconnect wires from the terminals (on the dial light plate) to which they are connected.

Figure 2



3. Remove one of the two main lamp feed wires (usually green) connect to one of the terminals (see Fig. 3). Connect the GP-25 diode (Lafayette #2526-17) in series with this wire. Be sure to solder connections securely and tape junction of wire and diode to avoid the possibility of shorts.

NOTE: The polarity of the diode is not important.

4. Install new 8 volt lamps into the dial plate and connect all leads to the feed terminals in the same manner as those previously removed.
5. Push all lamp leads down neatly out of the way so that they do not touch the dial cord when the dial light plate is replaced. Also, make sure all lamp assemblies are positioned as shown in Figure 2 to avoid binding against the dial cord.
6. Install dial light plate and receiver cover.

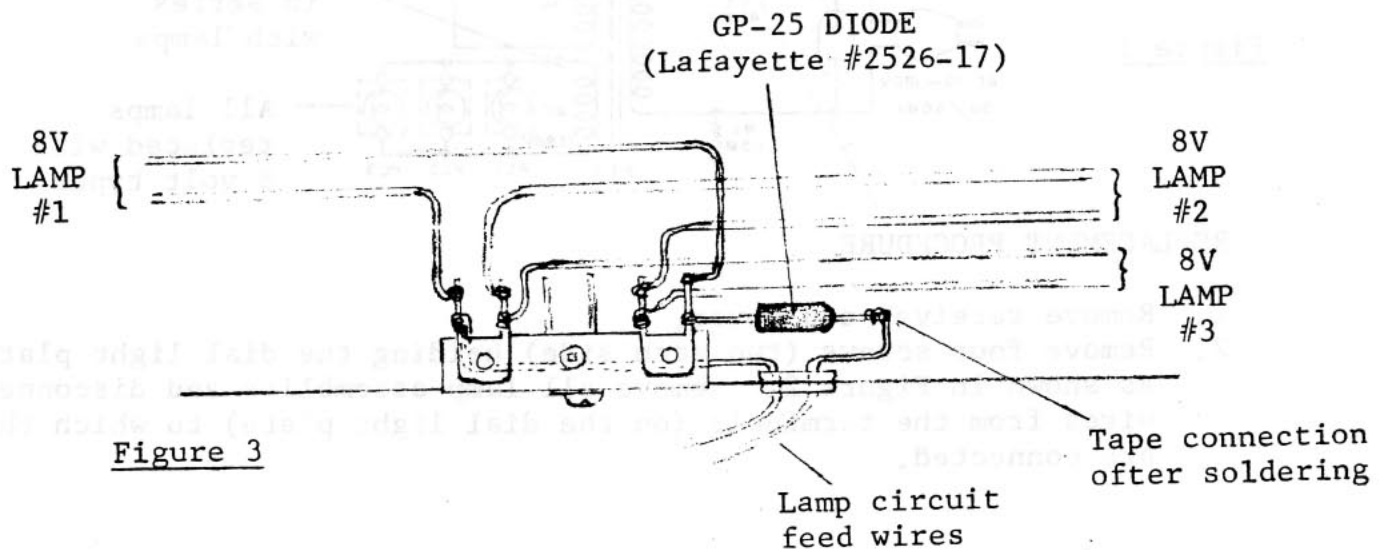
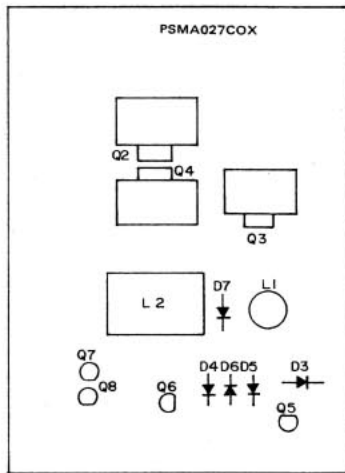
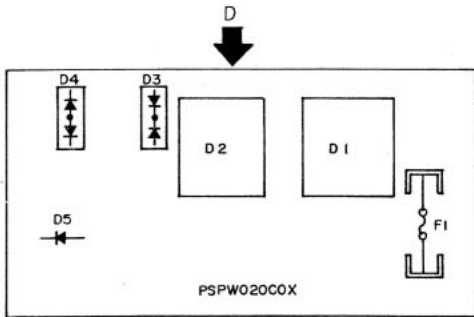


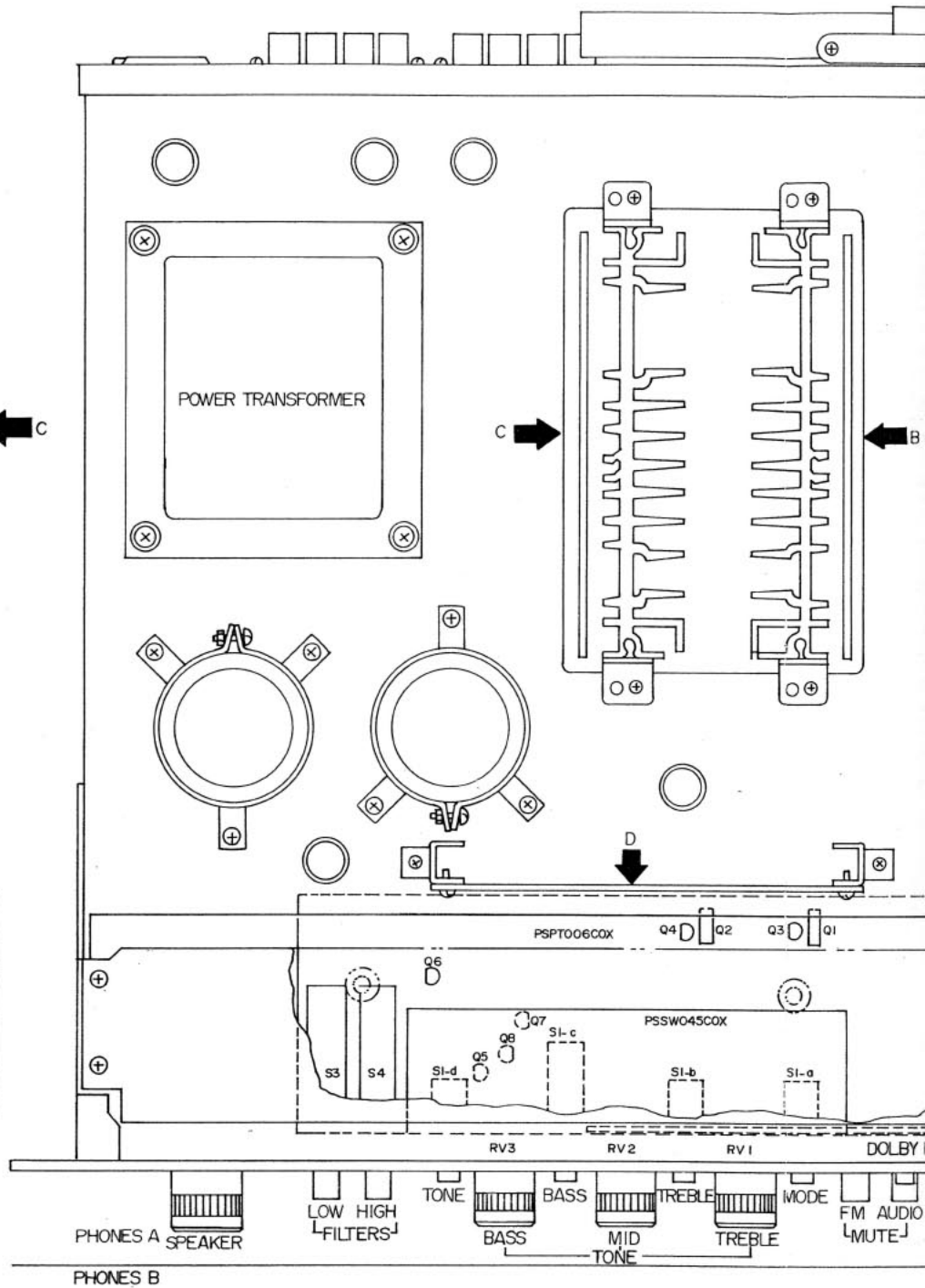
Figure 3



C ←



↓ D

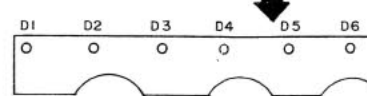


C →

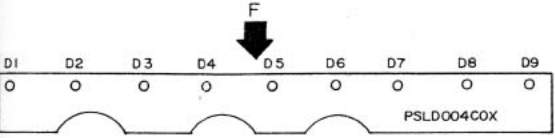
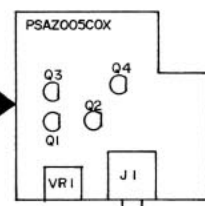
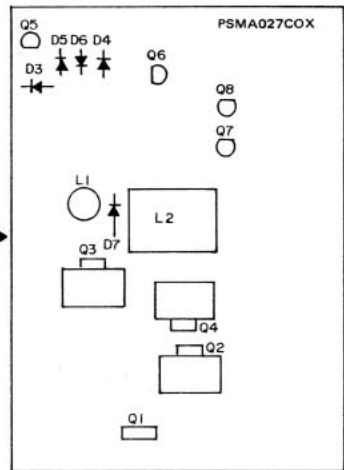
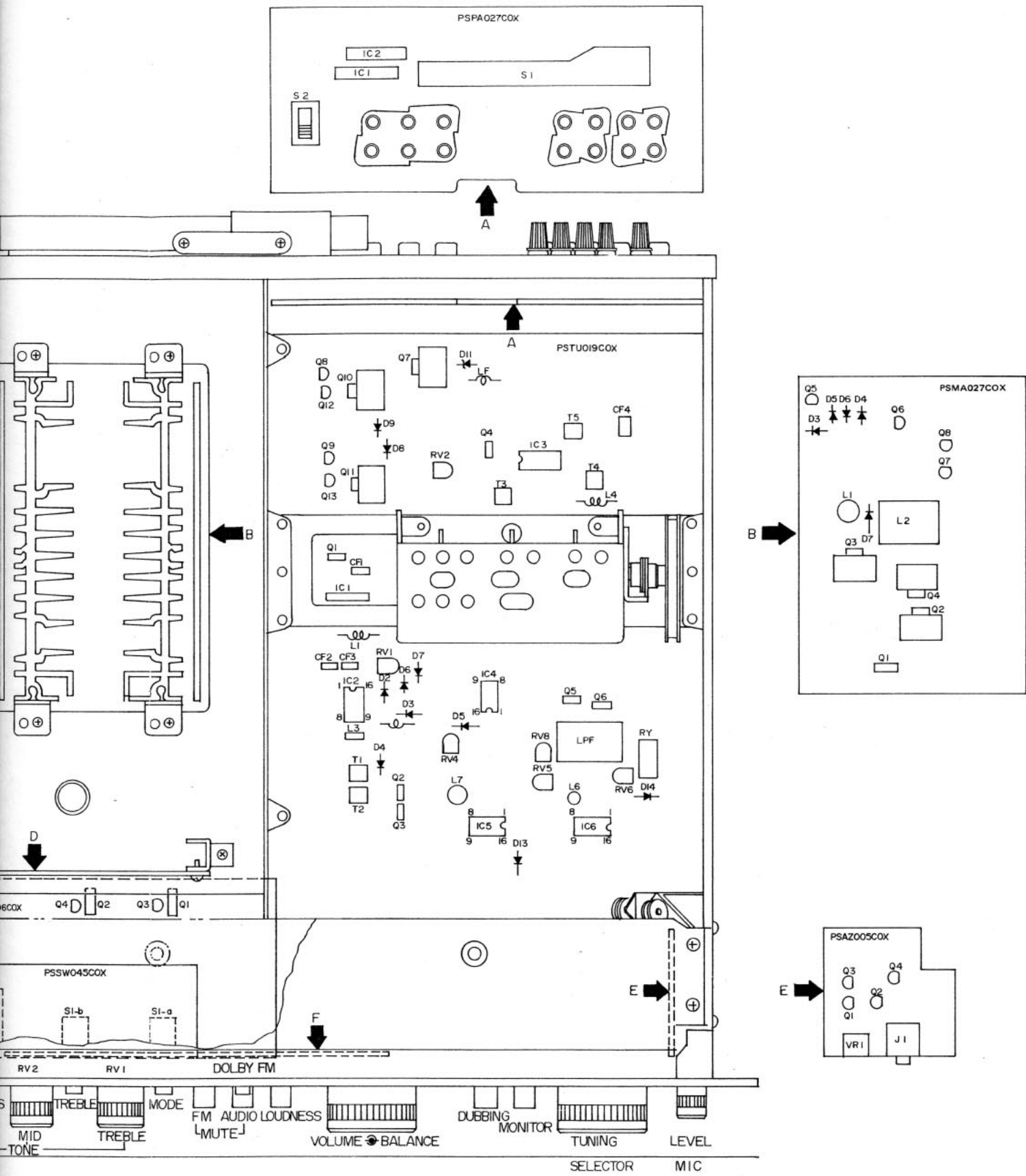
← B

↓ D

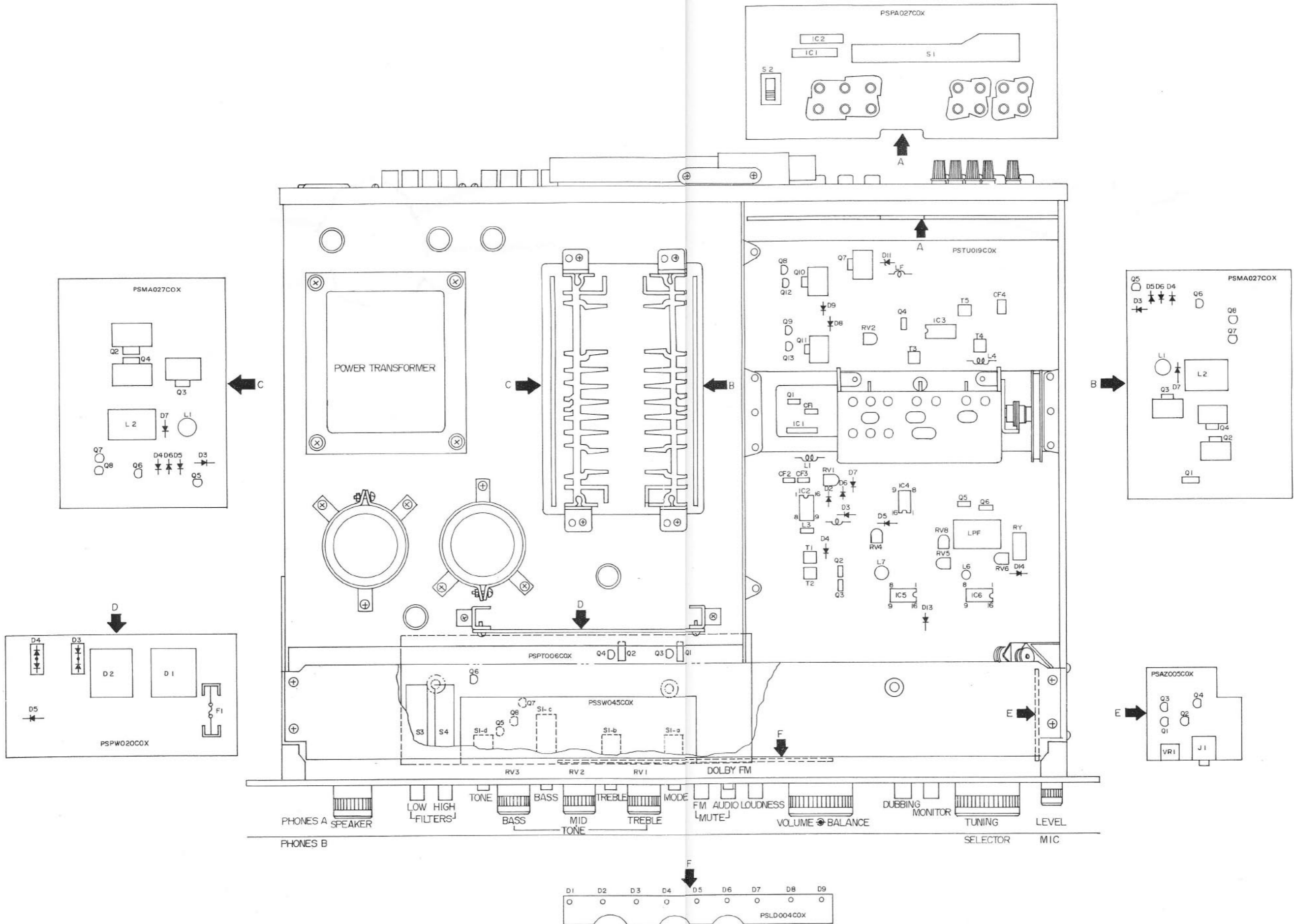
↓ F



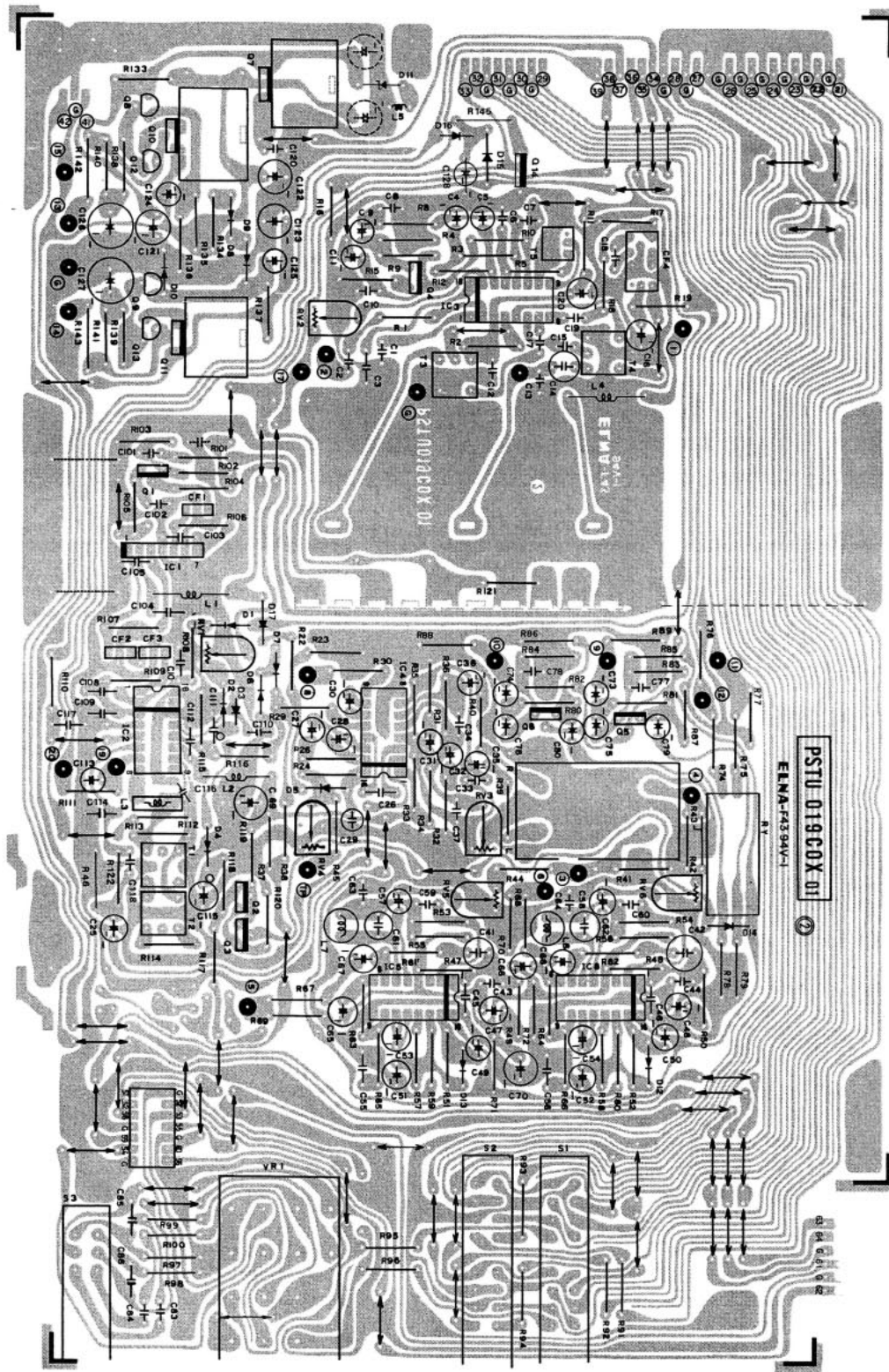
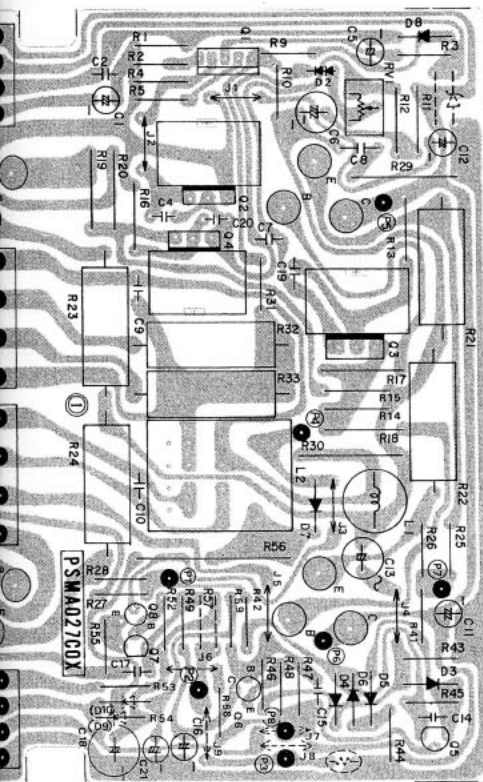
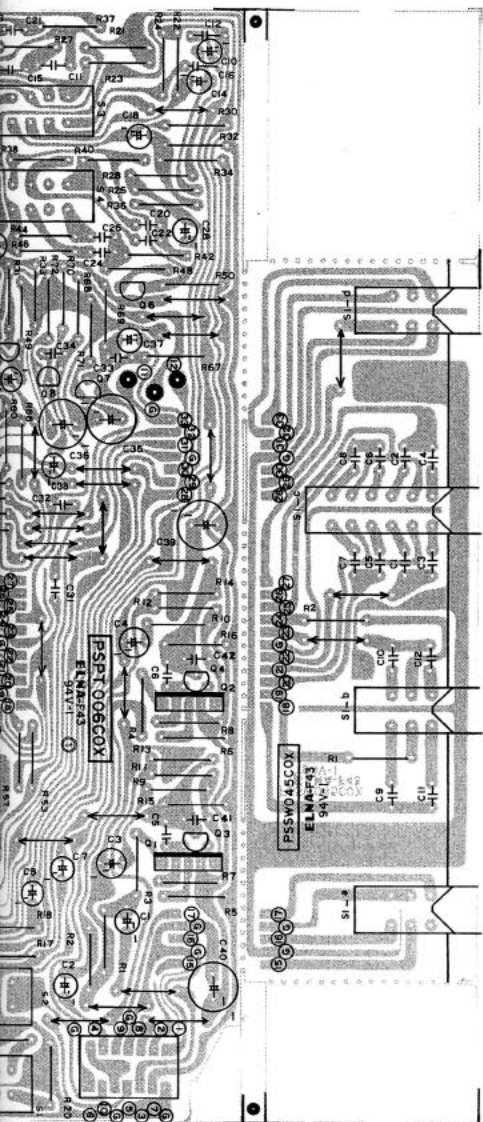
INTERIOR PARTS

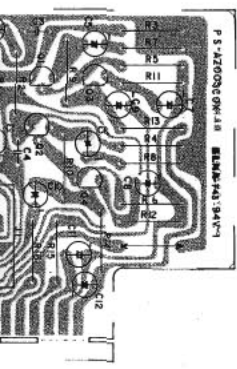
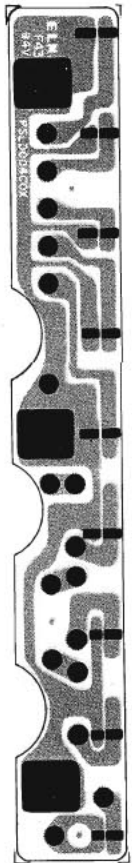
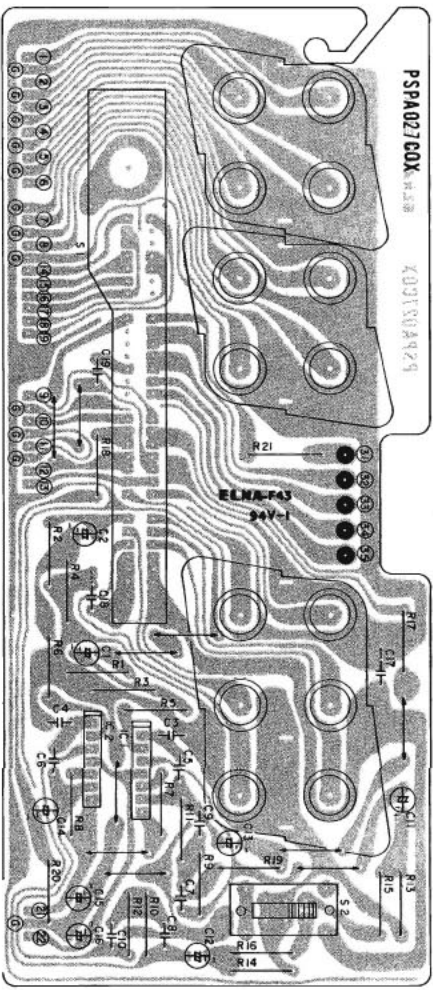
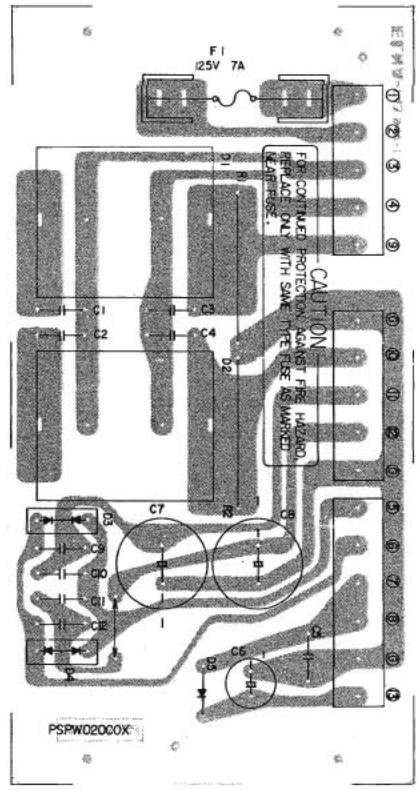
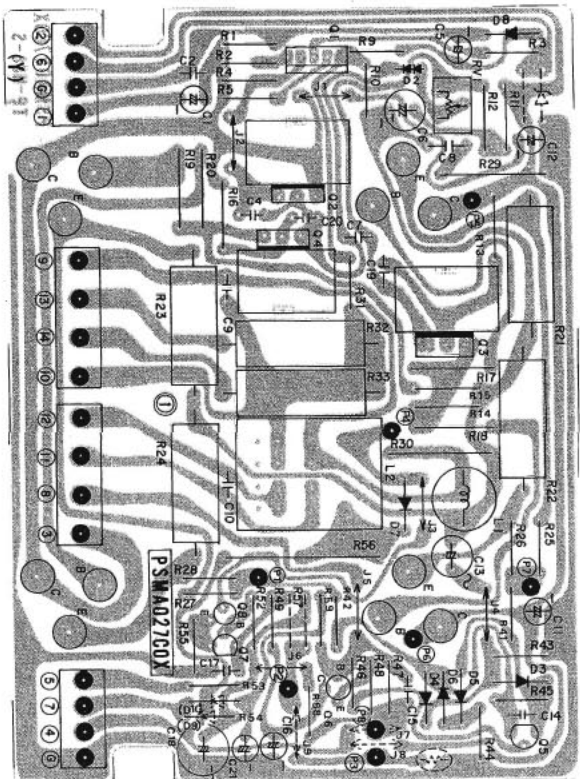
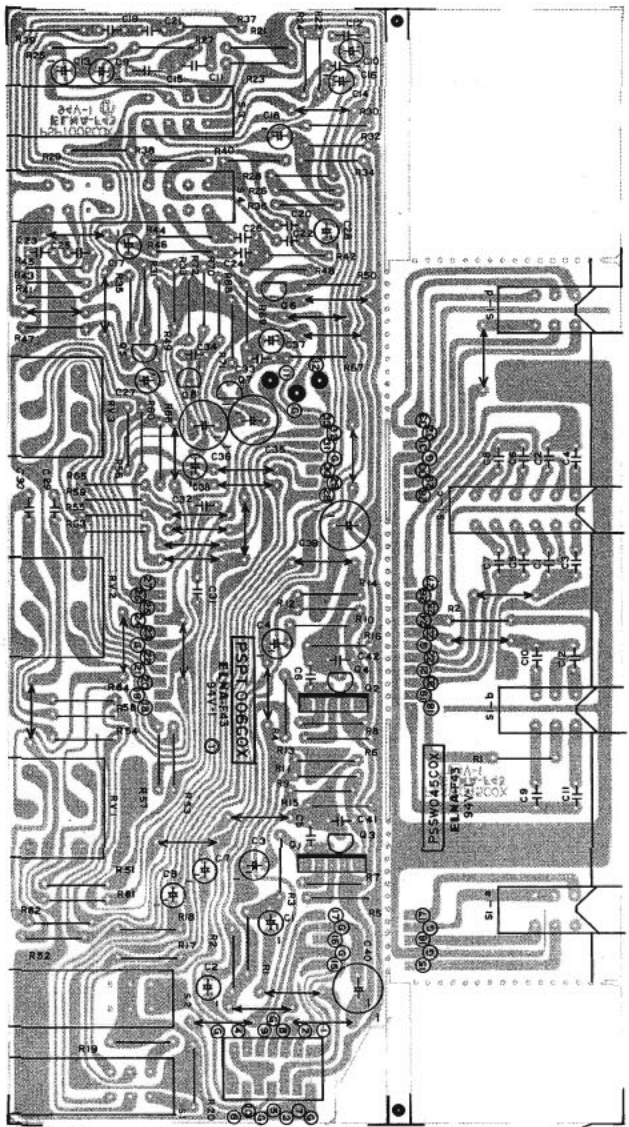


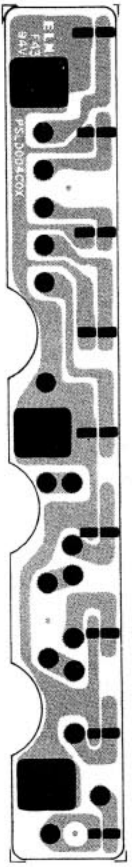
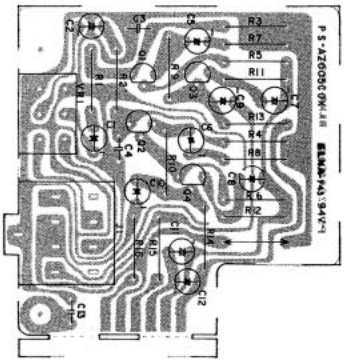
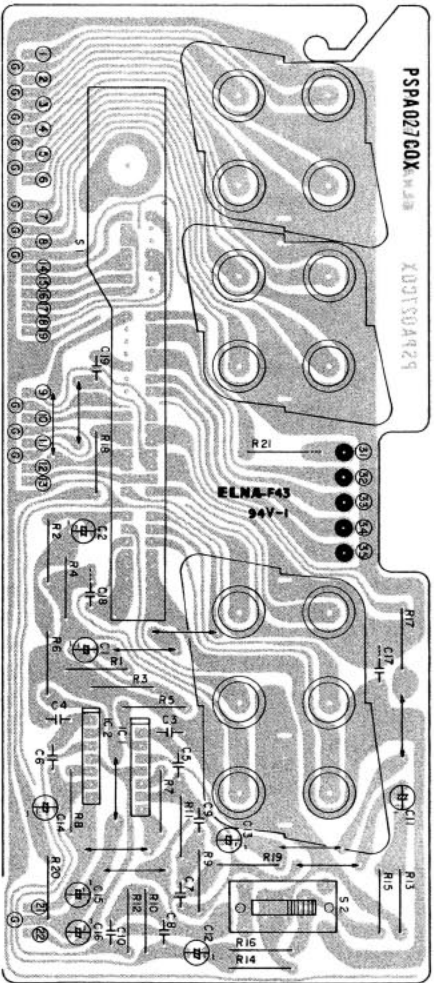
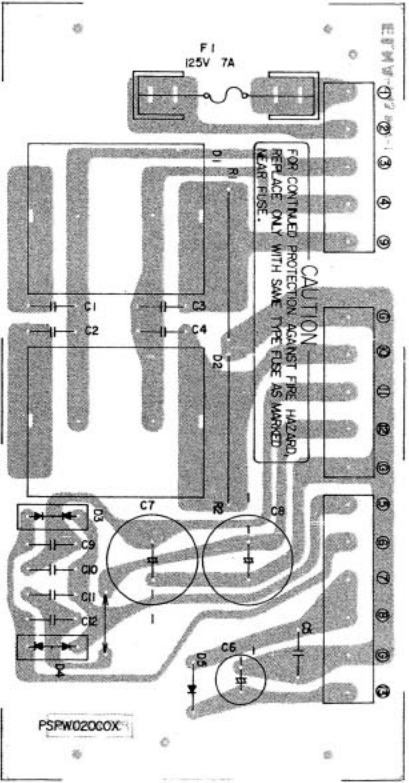
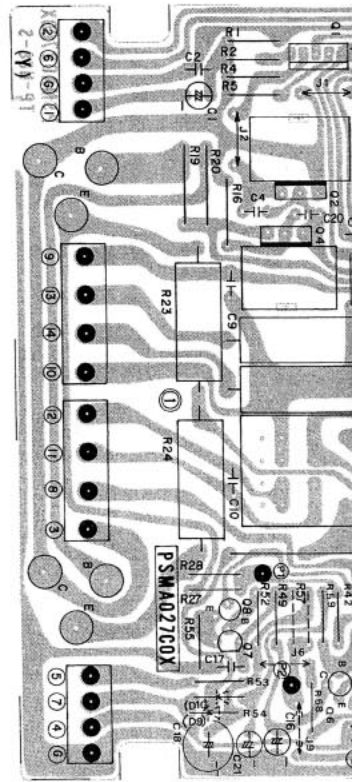
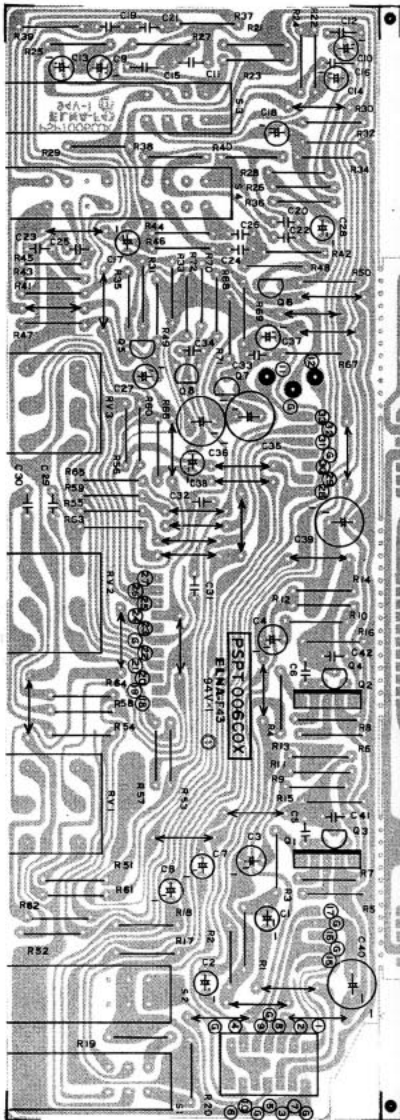
R PARTS LOCATION



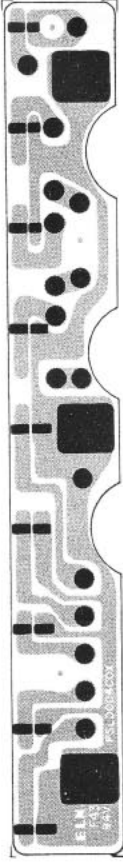
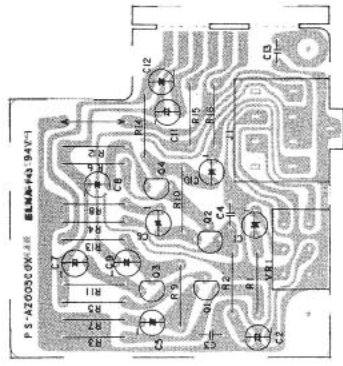
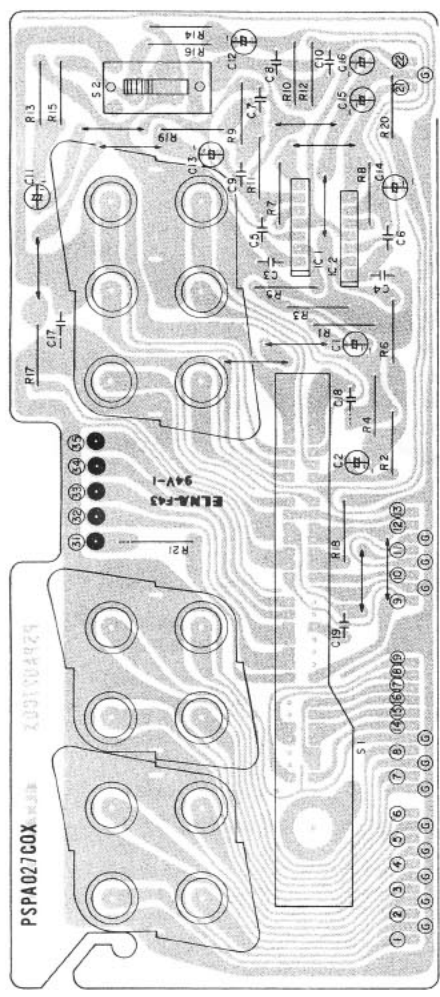
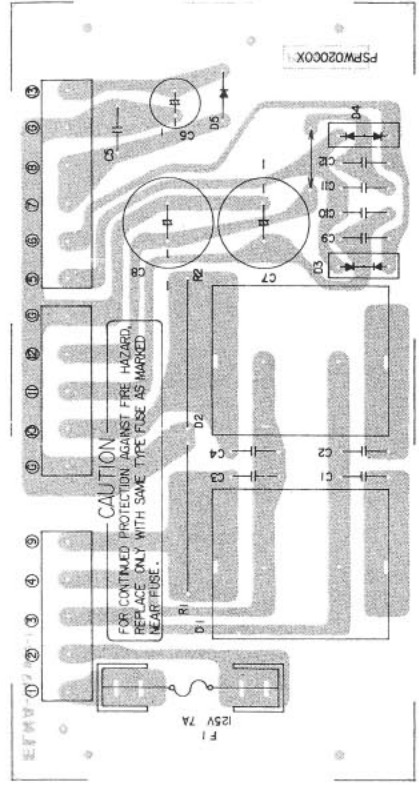
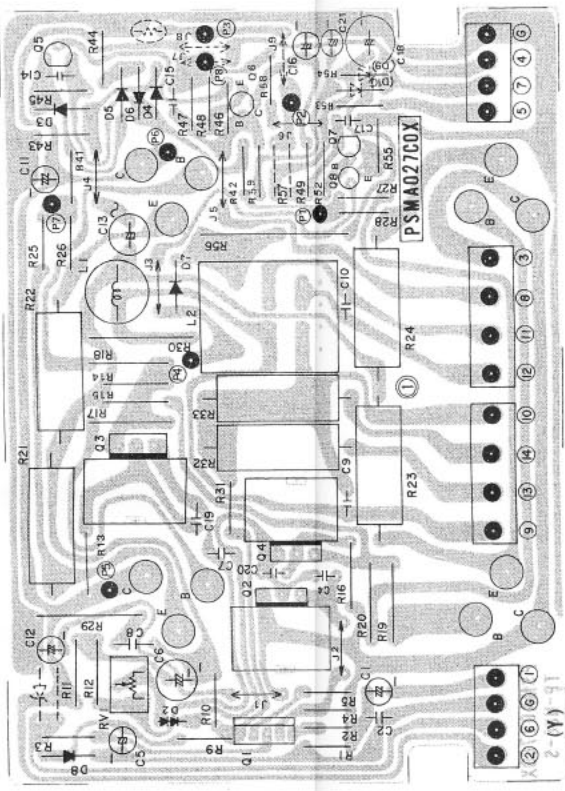
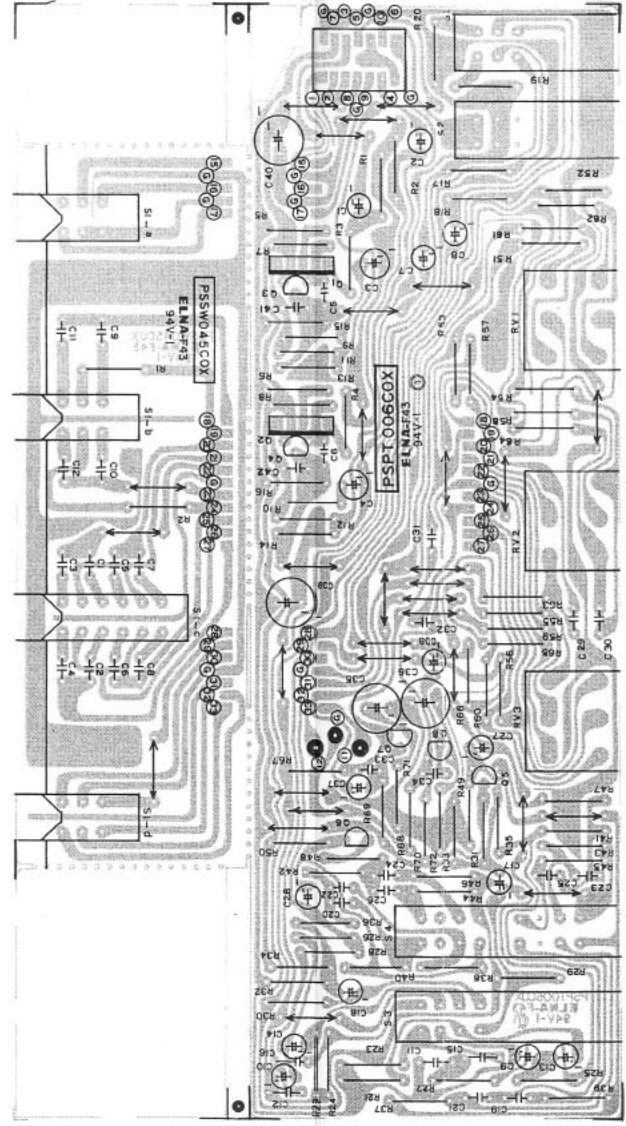
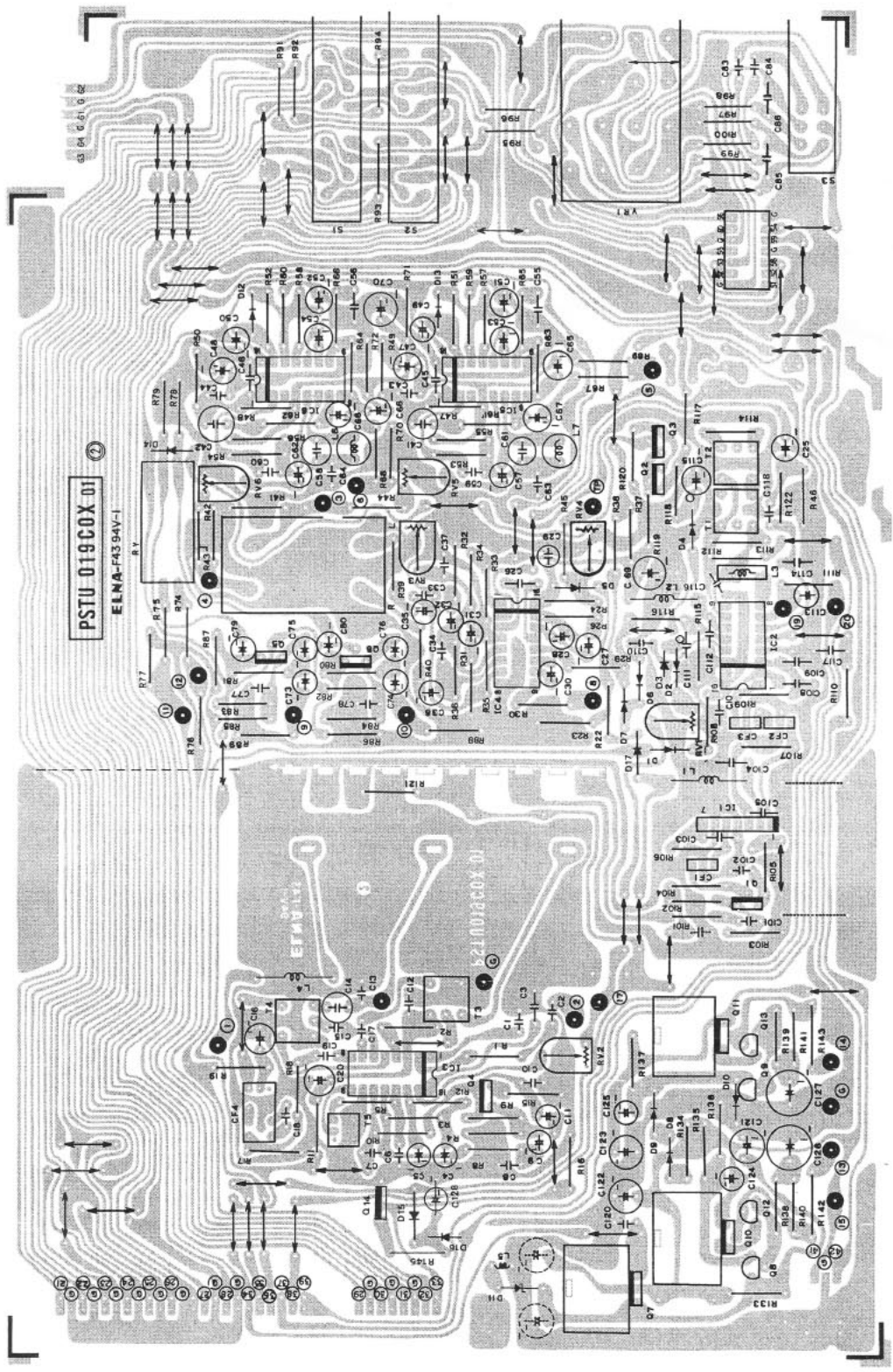
INTERIOR PARTS LOCATION



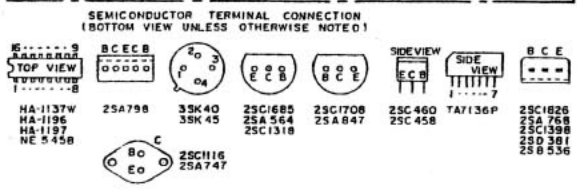
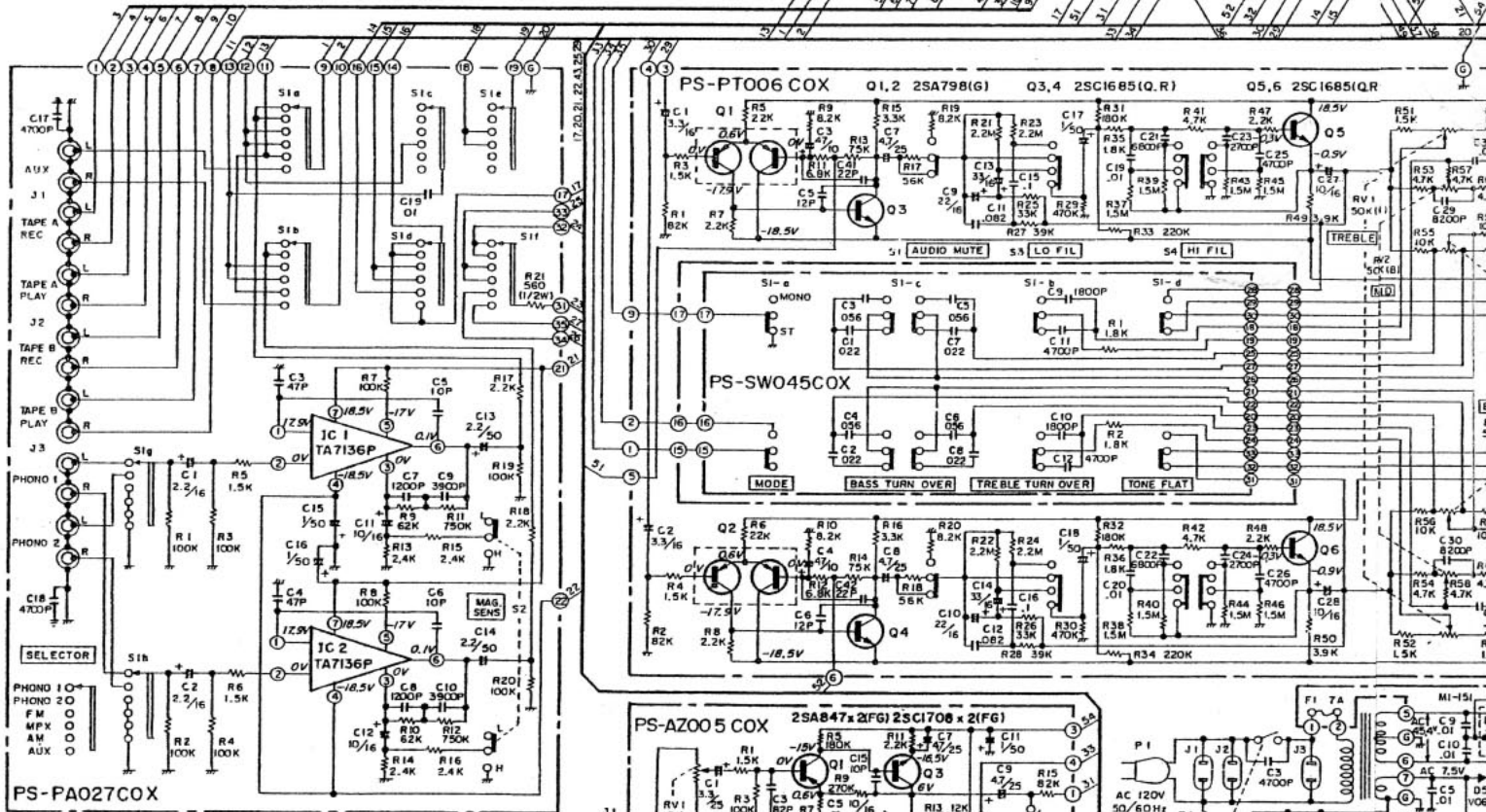
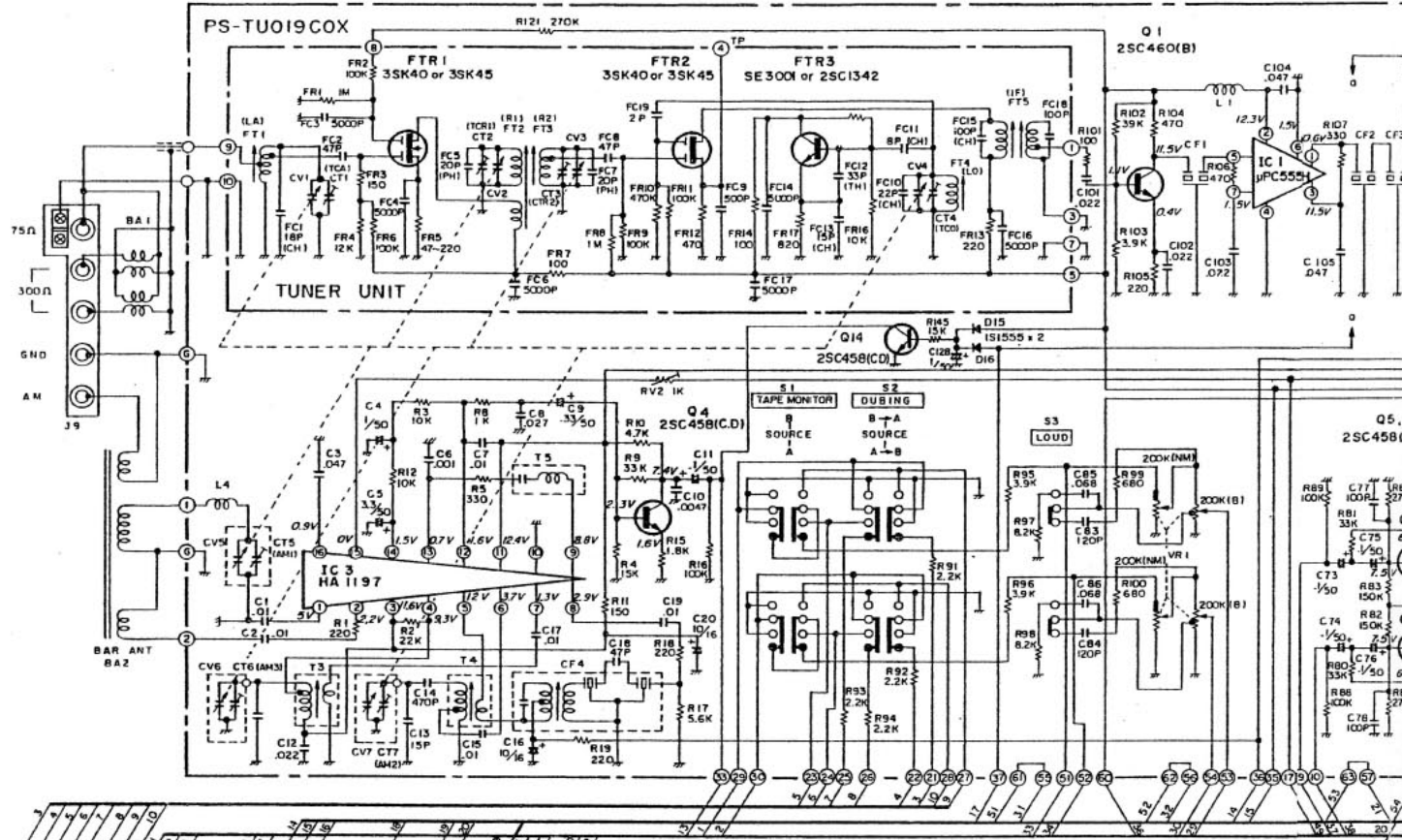




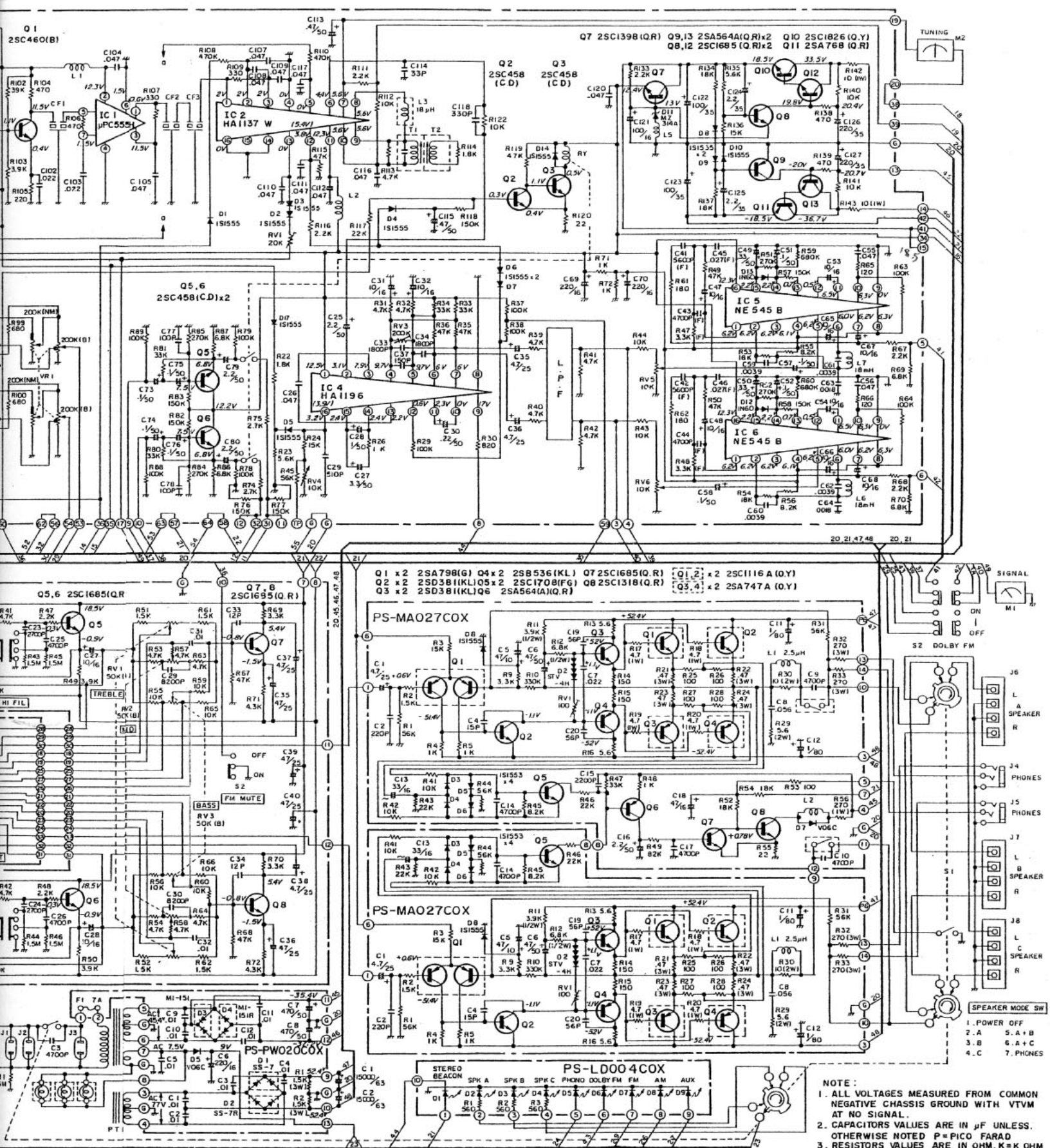
PC BOARDS



PC BOARDS

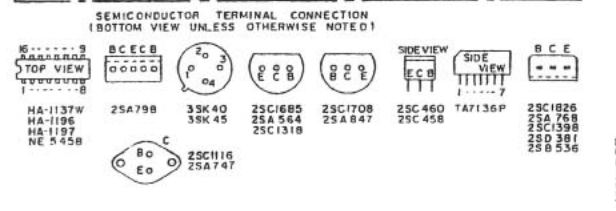
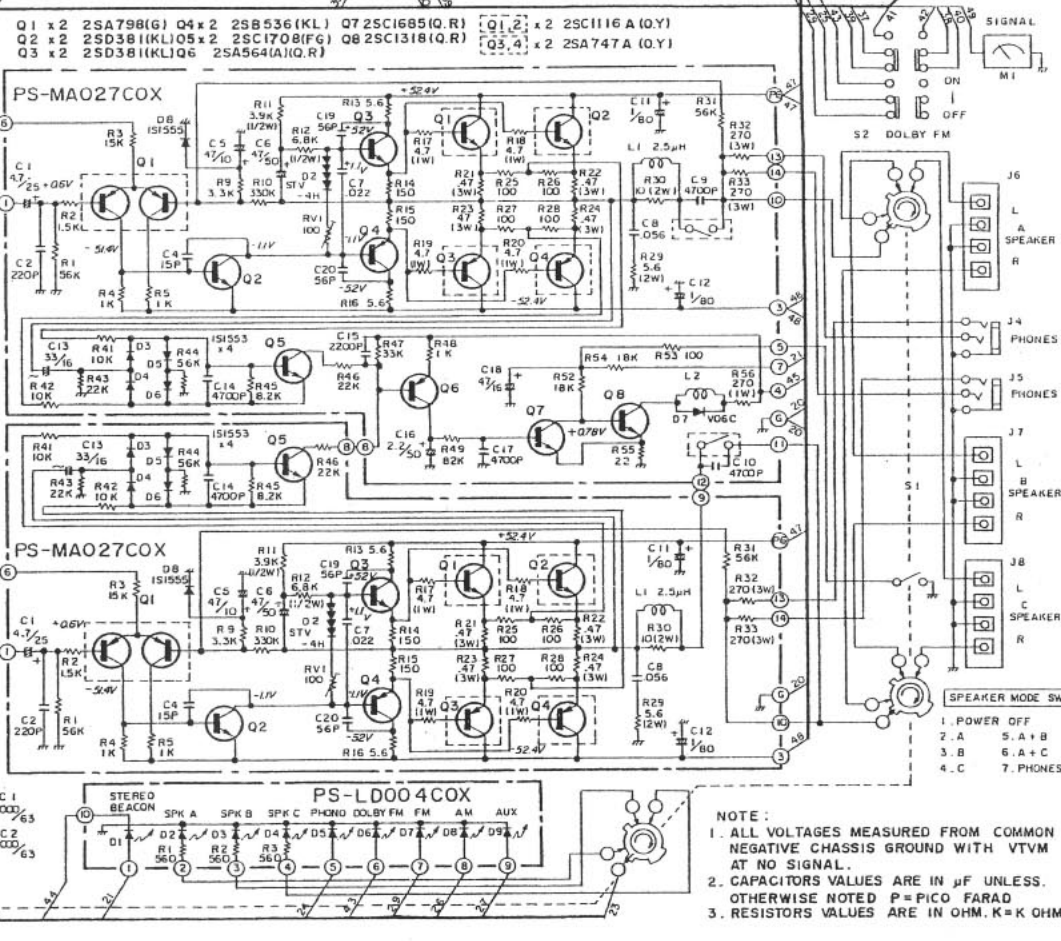
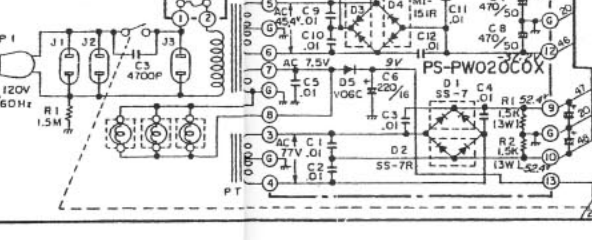
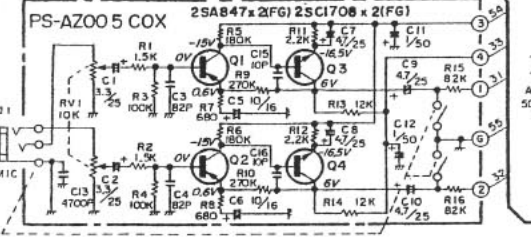
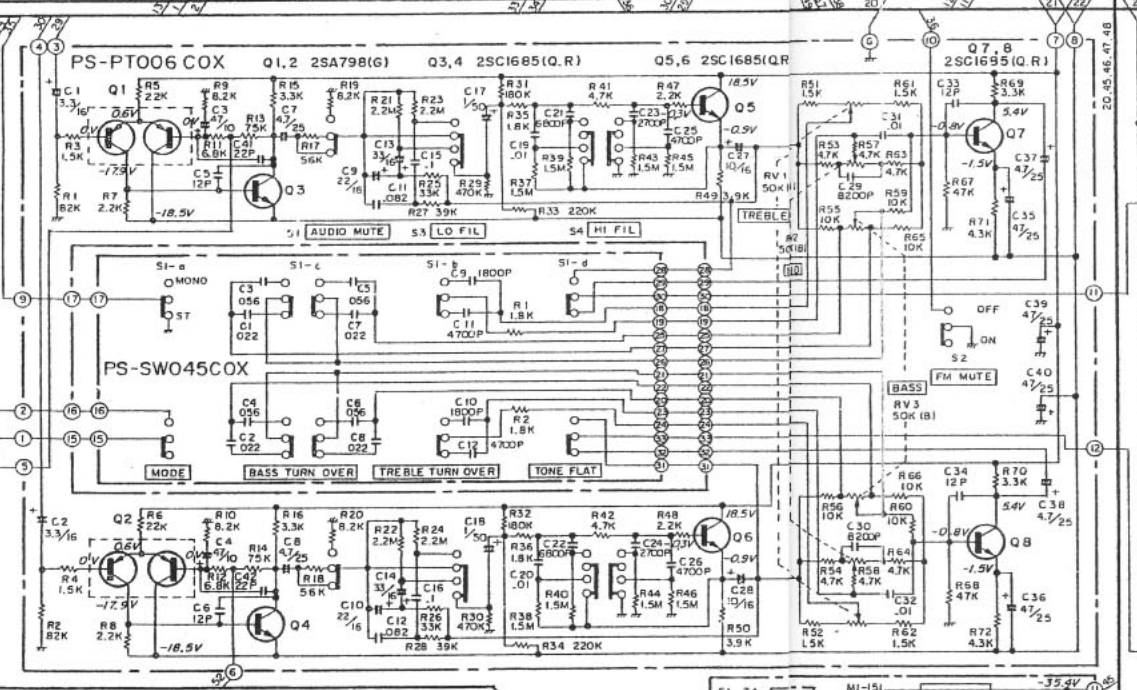
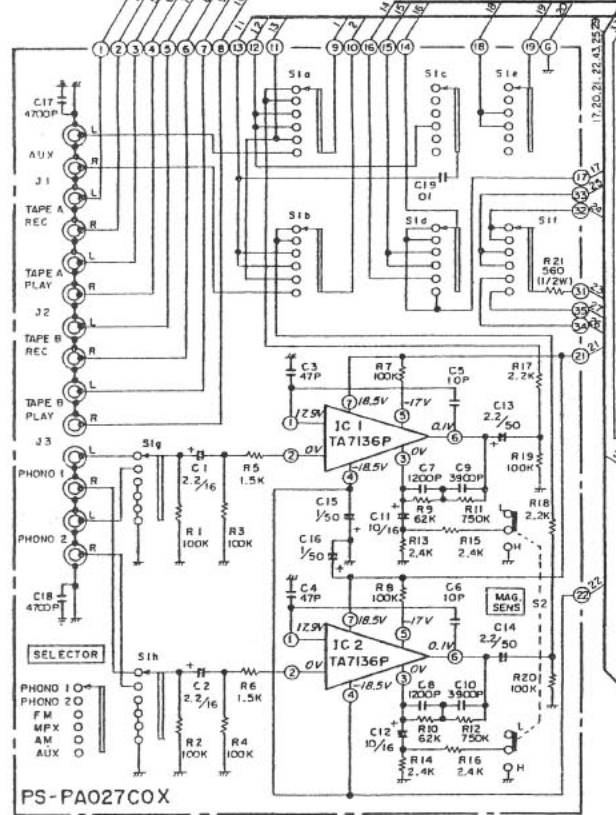
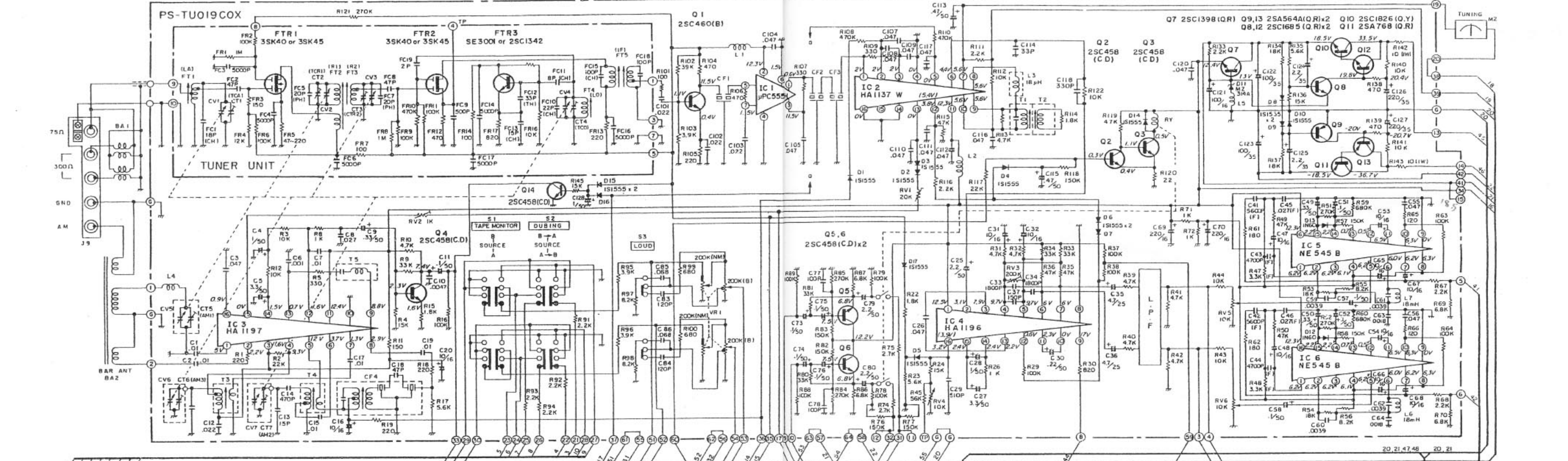


E. EMITTER
C. COLLECTOR
B. BASE
1. DRAIN
G. GATE
4. SOURCE



090 SCHEMATIC DIAGRAM

- NOTE:
1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE CHASSIS GROUND WITH VTVM AT NO SIGNAL.
 2. CAPACITORS VALUES ARE IN µF UNLESS OTHERWISE NOTED P=PICO FARAD
 3. RESISTORS VALUES ARE IN OHM. K=K OHM



NOTE:
 1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE CHASSIS GROUND WITH VTVM AT NO SIGNAL.
 2. CAPACITORS VALUES ARE IN μ F UNLESS OTHERWISE NOTED P = PICO FARAD
 3. RESISTORS VALUES ARE IN OHM, K = K OHM

MODEL LR-9090 SCHEMATIC DIAGRAM

PARTS LIST:

SEE SETTON RS 660 SM

LR 4090 = SETTON RS 660

LR 5555 = SETTON RS 440