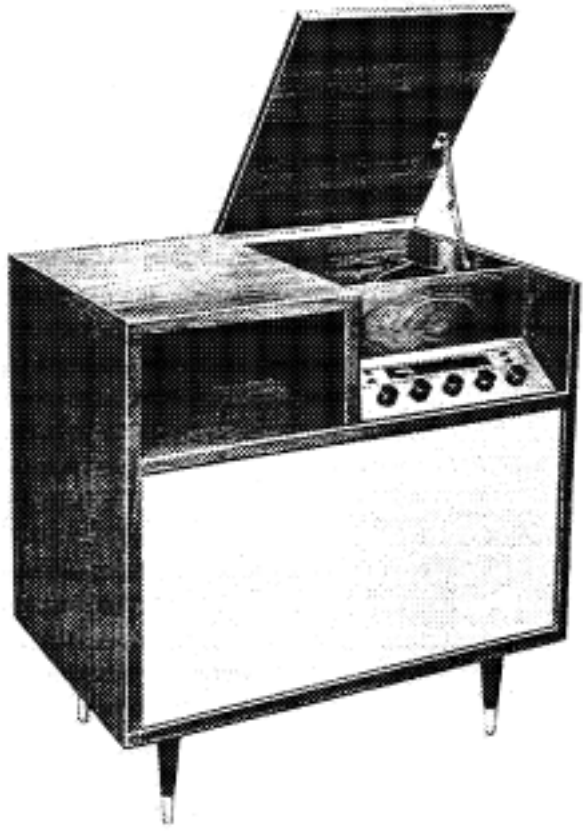
harman kardon

The Ballad

HIGH FIDELITY CONSOLE RADIO PHONOGRAPH

OPERATION AND SERVICE INSTRUCTIONS



It is the purpose of your new Ballad to recreate music and the spoken word in your home as the composer wished you to hear it. An understanding of the fine instrument you have purchased and the intelligent use of it will make it possible for you to achieve this purpose with almost no compromise. Keep in mind that a high fidelity performance created in your living room has a number of actual advantages over listening to the same program material in a concert hall or stadium. For one thing, today's records are produced under absolutely ideal conditions, and the recording which you place on your record changer clearly reflects this fact. When necessary, a passage has been redone and redone until perfection has been achieved. In addition, there are controls on your Ballad such as the Loudness Contour Control and the Tone Controls which make it possible for you to adjust your system so that proper compensation has been made for the acoustics of your room and for your own hearing characteristics. This is obviously not possible in an auditorium or concert hall.

We urge you to study the following material carefully. It has been written in lay language to familiarize you thoroughly with the Ballad so that you can make it perform to its maximum potential.

HARMAN-KARDON, INC. 520 MAIN STREET, WESTBURY, L. I., N. Y.

UNPACKING

Lay the carton on one end, open all flaps from the bottom and fold them back. Remove all the internal packing and set the carton upright. Gently lift the carton up and over the set.

Check the contents of the package carefully.

You should find:

1 - Ballad Radio-Phonograph
1 - Instruction booklet
1 - Warranty card
1 - Garrard Instruction Manual

In the record changer compartment will be found:

4 - Wood mounting legs
1 - 45 rpm Record Spindle

Screw the 4 legs tightly into the special mounting brackets located in each corner at the bottom of the cabinet. This installation may be simplified by setting the cabinet, in the upright position on some object such as a kitchen chair which will permit free access to these mounting brackets. After this is done, carefully place the Ballad on the floor.

Insert the 45 rpm spindle in its mounting well located at the left of the record changer compartment.

Unfasten the Record Changer Tone Arm from the Center Spindle. Underneath the front portion of the Tone Arm will be found a metal styli (needle) protective clip. Remove this by prying downward.

Remove the two transit screws. Their location is indicated on Page 6 of the Garrard Instruction Manual. The changer should then float freely on its shock mounting springs.

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The Ballad has been made to operate on 105 to 125 volts of 60 cycle ALTERNATING CURRENT ONLY. Before plugging the set into a wall socket it should be determined that the current meets these requirements. Serious damage to the machine may result if any other type of current is used.

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The Ballad should be placed on a level surface. Uneven placement may cause the Tone Arm to track the record incorrectly. The most natural sound reproduction may be obtained by placing the cabinet some distance from where the listeners will be seated with no frontal obstructions.

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OPERATING INSTRUCTIONS

The On-Off Switch is located on the Loudness Control. Rotating this control turns the set on.

TO OPERATE RADIO

For radio reception, set the "FUNCTION SELECTOR" to AM, FM or FM-AFC. Stations may now be chosen by use of the "TUNING" control.

AUTOMATIC FREQUENCY CONTROL (AFC)

FM Broadcasting, by its very nature, eliminates almost all natural and man-made static. However, the characteristics of FM which make this possible also make for problems in tuning. The HARMAN-KARDON Ballad incorporates an effective Automatic Frequency Control (AFC) circuit that overcomes these problems and insures proper tuning even if the manual tuning is not accurately done. The following experiment will lead to an understanding of AFC, and the fuller enjoyment of the Ballad.

Tune across the FM scale with the function switch into the FM-AFC position. Note how the stations "pop" into place. Now tune to any station, preferably one with a musical program. Defeat the AFC by tuning the function switch to the FM position, and tune slowly through the station from left to right. Notice that there are three points where the station sounds clean, interspersed with points of distorted sound. The middle clean-sounding point is the proper tuning position for the best tone quality with minimum noise and interference. Detune the station so that the sound is distorted. Turn the function switch to FM-AFC, & notice how the sound clears up.

Actually, the tuning has been readjusted by the operation of the AFC circuit, which automatically retunes the electronic circuits to the center of the station channel.

The AFC circuit of the Harman-Kardon Ballad performs the further function of overcoming any tendency of the tuner to drift.

In order to take maximum advantage of the benefits of AFC, it is suggested that fine tuning be done with the function switch in the FM position. When the switch is then turned to the FM-AFC position the AFC will improve this careful tuning by a factor of 10 to 1. This procedure is especially recommended in those cases where a weak station is found close to a strong station. Under these conditions, the AFC may tend to reach for the strong station, and completely skip over the weak station. If the weak station is tuned with the AFC defeated, the AFC will lock it in, after it has been reinserted.

USE OF PHONOGRAPH

To operate the phonograph, set the "FUNCTION SELECTOR" to PHONO.

TO OPERATE RECORD CHANGER AUTOMATICALLY

Make sure that MANUAL/AUTO switch is in AUTO position.

Move Speed Change Knob to desired speed.

Set correct stylus for type of record to be played (16, 33, 45 or 78 rpm).

This is done by depressing red button on Tone Arm and rotating 180 degrees to desired setting (MG for 16, 33, and 45 rpm; STD for 78 rpm). The stylus to be used should be facing the operator. The Ballad employs a diamond stylus for microgroove (MG) records and a sapphire for 78's (STD).

Grasp Overarm at rear, (this is the arm that fits over the record to prevent it from shaking on the spindle) lift up and turn outward until it is directly above the Tone Arm.

Gently place records on Record Spindle and move Overarm inward.

Move right hand control knob to START. At the conclusion of the last record the Record Changer will shut off automatically.

TO OPERATE CHANGER MANUALLY

Move MANUAL/AUTO switch to MANUAL.

Move right hand control knob to START.

Turntable will revolve and Tone Arm will raise and return to rest. The arm may then be placed on any portion of the record. At the completion of the record, the arm will return to its rest position. Move right hand control knob to OFF position.

Detailed instructions may be found in your Garrard Instruction Manual, Pages 1 through 4.

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FUNCTIONS OF THE VARIOUS CONTROLS

RECORD EQUALIZATION

On the front panel of the Ballad will be found a switch marked: LP, RIAA and EUR. These are extremely important for High Fidelity record reproduction and are commonly known as Equalization Curves.

Contrary to general belief records are not recorded "flat"; that is to say all recordings must be "modified" by the engineers. The lower frequencies must be reduced in amplitude; the higher frequencies must be increased in amplitude. If this were not done it would be impossible to obtain an entire symphony on one 12" disc and the "cutting noise" would be excessive. By correctly setting the equalization controls you recreate the music as it was originally played in the studio. A table for these settings will be found below.

LP: Most American long playing records made before 1954 and some European LP's. Labels include: Columbia, London, Mercury, Oceanic, Remington, Tempo, Urania, Vanguard, Bach Guild, Vox, Westminster, RCA Victor (older), Atlantic, Decca, Polyphonic, Cetra-Soria, Esoteric, Haydn Society, MGM, Angel.

RIAA: Most American records made after 1954, all records cut to standards of Audio Engineering Society, NAB, new RCA Victor Ortho, and newly standardized RIAA. Labels include RCA Victor (newer), Extended Play 45, Blue Note Jazz, Canyon, Capitol, Good Time Jazz, Mercury, some London, Bartok, Caedman, Capitol-Cetra, Philharmonic, EMS.

EUR: Most European long playing, some American LP's and most 78 RPM discs.

AUXILIARY INPUT

An input is provided for auxiliary high level equipment such as a tape recorder or television tuner. This input is located on the rear of the Ballad cabinet. Connections to this input should be made by means of a shielded, coaxial cable.

To operate, set the "FUNCTION SELECTOR" to Aux.

TAPE OUTPUT

A receptacle marked "Tape Out" is located on the rear of the cabinet. This is used to provide output to a tape recorder or other auxiliary equipment. Any program material appearing at the speaker terminals also appears at the "Tape Out" receptacle, but unmodified by the volume or tone controls. This makes it possible to record programs with the proper recording equalization (as determined by your tape recorder) while simultaneously listening to the program with the proper tone control, contour and loudness settings.

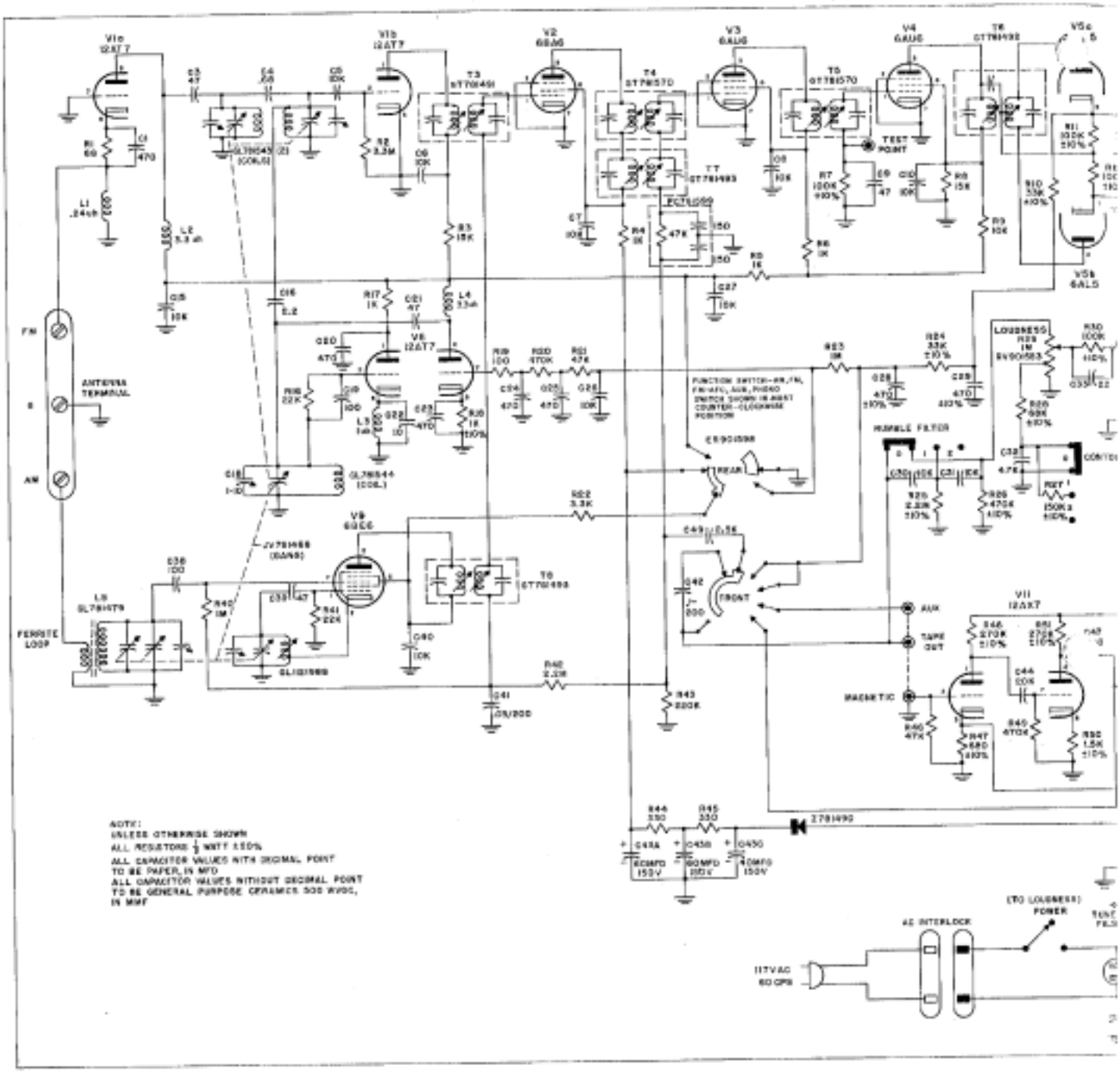
LOUDNESS CONTROL

The "LOUDNESS CONTROL" is used to adjust the volume of any program. Its effect is selectively varied by the

CONTOUR CONTROL

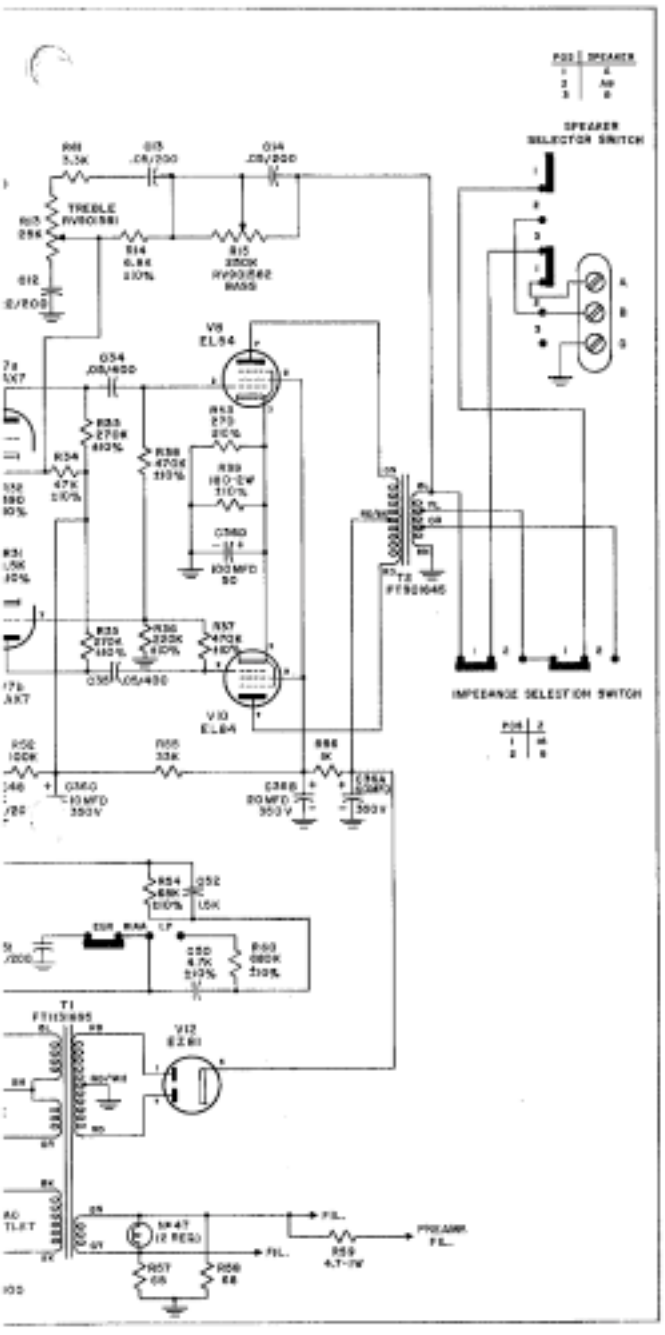
One of the limitations of human hearing is its tendency to lose sensitivity to the very low and very high pitched sounds, as the sound level is reduced. Thus in order to obtain faithful sound reproduction at low levels it is obvious that both the low and high frequencies must be increased, in varying degrees depending upon the volume desired. Your "CONTOUR CONTROL" produces this desired effect. Each position (0-2) causes the LOUDNESS (Volume Control) to a different degree of compensation, the amount increasing with each clockwise setting. Position 0 is uncompensated. Since hearing characteristics vary from person to person, the great flexibility provided in these controls can be appreciated. Therefore, select the position which sounds best to you at any desired volume.

(continued on page 6)



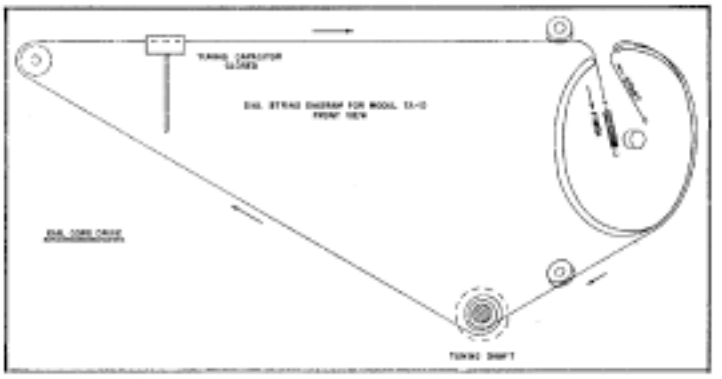
FUNCTION SWITCH SETTING	SIGNAL GENERATOR FREQ.	SIGNAL GENERATOR MOD.	SIGNAL INPUT POINT	OUTPUT INDICATOR	CONNECT INDICATOR TO:	DIAL SETTING	ADJUST	OUTPUT INDICATION
AM	455 KC	30% AM	AM RF GANG	AC-VTVM OR SCOPE	TUNER OUTPUT	1600 KC	2 AM IF TRANS.	MAXIMUM OUTPUT
AM	1500 KC	30% AM	AM ANT. TERM.	AC-VTVM OR SCOPE	TUNER OUTPUT	1500 KC	OSC & ANT TRIMMERS	MAXIMUM OUTPUT
AM	600 KC	30% AM	AM ANT. TERM.	AC-VTVM OR SCOPE	TUNER OUTPUT	600 KC	OSC COIL & LOOPSTICK	MAXIMUM OUTPUT
AM	1500 KC		REPEAT STEP 2					

AM ALIGNMENT PROCEDURE



LIST OF REPLACEABLE PARTS

DESCRIPTION	HARMAN-KARDON PART NO.	LIST PRICE
Antenna Loopstick	GL781479	2.30
Tuning Ring, Loopstick	P481329	.15
Switch, Function	ER901598	1.30
Transformer, Power	FT901572	11.45
Transformer, Output	FT901645	5.40
Dial Glass	P901575	.60
Pointer	Z24773	.20
Condenser, Variable	JV781468	6.30
Capacitor, Elect. 40-60-60/150V.	JE781436	2.50
Transformer, FM, IF	GT781491	1.60
Transformer, FM, Disc.	GT781492	2.00
Transformer, AM, IF	GT781493	1.50
Transformer, FM, IF	GT781570	1.45
Tone Control	RV901581	.60
Tone Control	RV901582	.60
Volume Control	RV901583	.90
Capacitor, Elect. 40-20-10/350, 100/150	JE621281	2.40
Front Panel Assembly	C901629	6.80
Instruction Sheet	L901593	.75
Mounting Template	L901594	.15
12" Bass Speaker	SP1352047A	29.50
3-1/2" Tweeter Speaker (each)	SP1352048	12.50



FUNCTION SWITCH SETTING	SIGNAL GENERATOR FREQ.	SIGNAL GENERATOR MOD.	SIGNAL INPUT POINT	OUTPUT INDICATOR	CONNECT INDICATOR TO:	DIAL SETTING	ADJUST	OUTPUT INDICATION
FM	10.7 MC	300KC FM 60 CPS	FM MIXER GANG	AC-VTVM OR SCOPE	TEST POINT	——	3 FM IF TRANS.	MAX GAIN & SYMMETRY
FM	10.7 MC	300KC FM 60 CPS	FM MIXER GANG	AC-VTVM OR SCOPE	TUNER OUTPUT	——	DISCR. TRANS.	S PATTERN OF MAX GAIN & SYMM.
FM	106 MC	300KC FM 60 CPS	FM ANT. TERMINAL	AC-VTVM OR SCOPE	TEST POINT	106 MC	106 MC OSC RF, MIXER TRIMMERS	MAXIMUM OUTPUT
FM	90 MC	300KC FM 60 CPS	FM ANT. TERMINAL	AC-VTVM OR SCOPE	TEST POINT	90 MC	OSC, RF, MIXER COILS	MAXIMUM OUTPUT

FM ALIGNMENT PROCEDURE

This is an exclusive feature of HARMAN-KARDON console high fidelity.

Separate "BASS AND TREBLE" controls are incorporated in the BALLAD to provide further adjustments required for excellent high fidelity performance in your living room.

The red dot next to each control is the suggested position to be used for "average" overall response.

RUMBLE FILTER

Many records, particularly your older favorites may produce an objectionable low frequency signal that is often strong enough to be picked up by the phono cartridge and introduced into the playback system. Known as "rumble" this undesirable signal can be eliminated in the Ballad by the use of the Rumble Filter which is controlled by a three position slide switch located on the front panel. In position 0 the rumble filter is not connected and frequency response is essentially flat to 20 cycles. When the switch is placed in position 1 the response is slowly rolled off and at 20 cycles is reduced by 6 db. Frequency response is reduced by 12 db at 20 cycles when the switch is placed in position 2. Position 1 will be most useful where a minimum amount of rumble appears in the system while position 2 gives additional low frequency attenuation which will be most helpful in cases of heavy rumble.

AM ANTENNA

The Harman-Kardon ferrite loopstick, built into the Ballad, comprises all the antenna required for the finest in noise-free local AM reception. In locations more removed from metropolitan areas, an outdoor antenna may be required. This should consist of a single wire, as long as is reasonably practical, located away from large metal objects, power lines or electrical machinery. Connect one end to the AM terminal of the ANTENNA terminal strip on the rear of the cabinet.

FM ANTENNA

The internal FM antenna provided will usually be adequate for reception of all local and moderately distant FM stations. In those situations requiring an external FM antenna, connections should be made between "G" and "FM". A single dipole will be useful when stations to be received are located in opposite directions from each other. A non-directional dipole should be used if the stations are located in dispersed directions. A folded dipole antenna with reflector will provide maximum efficiency and may increase the number of distant FM stations your Ballad can receive.

SPEAKER CONNECTIONS

A unique method of connecting one or two loudspeakers is incorporated in the Ballad in order that you derive maximum enjoyment from this superlative instrument with any of today's fine speaker systems.

If you wish to play a remote speaker with the Ballad and use either one or both together, remove the jumper wire between terminals A & B at the rear of the cabinet marked "SPEAKER". Connect external speaker wires to terminals "G" and "B". For best operation this speaker should have an impedance of 8 ohms, although a slight mismatch will not affect the overall response. To select the Ballad's speakers slide the front panel "Speaker Selector Switch" to position "A". To select the remote speaker slide the switch to position "B". To feed both speakers at the same time slide the switch to the position marked "AB". Due to the fact that the Speaker Selector Switch changes the transformer connections as well as the speaker connections in any position either or both speakers will be fed at the correct matching impedance and optimum results will be obtained.

GENERAL INSTRUCTIONS

In general, every control on a well designed, honestly considered high fidelity instrument has a specific useful function, related to each of the other controls. Although this cannot be a full treatise on the subject, an explanatory note on the relationship of the various front panel controls will doubtless prove useful in organizing and clarifying them for the user.

Beginning with the function selector, choose the type of program material you plan to listen to (tuner, phono, etc.). Choose the correct record equalization setting for the particular record you are to play. With Loudness Contour Selector in the uncompensated position, turn the loudness (volume) control to as high a level as you can briefly allow. (This to permit you to make the remaining adjustments while you are listening at your own maximum efficiency.) Now adjust the Bass and Treble Tone Controls to correct for the electro-mechanical characteristics of the loudspeaker you are using and for the acoustic characteristics of the room in which you are listening.

Modify each until settings are chosen which in your total system create the proper sense of aural balance and evenness. Now reduce the loudness (volume) control setting to a level somewhat lower than normal listening level in your room. You will note that the full bodied-lifelike quality you experienced at high listening level has disappeared. With all other controls unchanged, select the best contour setting for you. Do this by switching quickly through the several positions until you find the one which most nearly duplicates the full bodied sound you enjoyed at high level. Now turn the loudness control up to the level at which you wish to listen - (perhaps the maximum level you can permit in your home) - and listen. You'll find that there is automatic compensation of contour wherever you set the loudness control thereafter. In fact, under normal circumstances, you should not find it necessary to readjust the tone controls or the contour selector once having chosen the correct settings for you, your room and your system.

MAINTENANCE AND REPAIR

Due to the conservative design and high quality components of the Ballad, no routine maintenance other than yearly tube-checking is required. Should trouble develop, however, only the most qualified service man should be employed, as special equipment and training is required to properly align a high fidelity FM receiver.

WARRANTY

We warrant each Ballad to be free from defects in material and workmanship under normal use and service, and in accordance with the conditions herein below set forth, for a period of 90 days from date of delivery to the original purchaser, and agree to replace or repair any part or parts returned to us within said 90 days, with transportation prepaid, and which our examination shall disclose to our satisfaction to have been thus defective. This warranty does not include free labor, nor is it applicable to any instrument which shall have been repaired or altered in any way so as in our judgment to affect its stability or reliability nor which has been subject to neglect, misuse, abuse, negligence or accident nor which has had the serial number altered, effaced, or removed. Neither shall this warranty apply to any instrument which has been connected otherwise than in accordance with the instructions furnished by us.

This warranty is expressly in lieu of all other warranties, express or implied, and of all other obligations or liabilities on our part, and we neither assume nor authorize any representative or other person to assume for us any other liability in connection with the sale of the Ballad.

It is strongly urged that the warranty card furnished be completed and mailed without delay to protect your rights under warranty.

SPECIFICATIONS

RF SECTION

Circuits: FM: Armstrong circuit with Limiter & Foster-Seeley Discriminator, Automatic Frequency Control - Low Noise Front End consisting of Tuned Triode Grounded Grid Amplifier and Triode Mixer.
AM: Superheterodyne with A. V. C. and Ferrite Antenna.

Sensitivity: FM: 5 microvolts for 30 db quieting; 3 microvolts for 20 db quieting.
AM: Loop sensitivity 80 microvolts/meter; Terminal sensitivity 20 microvolts.

Selectivity: FM: 200 KC bandwidth: 6 db down.
AM: 8 KC bandwidth: 6 db down.

FM Discriminator peak to peak separation 375 KC.

Frequency Range: FM: 88-108 MC.
AM: 530-1650 KC.

FM Drift: ±5 KC max.

Image Rejection: FM: 40 db. AM: 30 db.

IF Rejection: FM: 70 db. AM: 30 db.

Antenna Input: FM: 300 ohms.
AM: Built-in low noise ferrite loopstick plus high impedance terminal for external antenna.

Distortion: Less than 1% harmonic on FM, Less than 1% harmonic for up to 80% mod. on AM.

Frequency Response: FM: ±1/2 db 20 to 20,000 c.p.s. including standard 75 micro-second deemphasis.
AM: 3 db 20 to 5,000 c.p.s.

Hum Level: 60 db below 100% modulation.

Radiation: Within FCC Requirements.

AUDIO SECTION

Circuits: 2-EL84 Pentode Connected

Output Level: 12 watts at 3% IM, Peak Power: 18 watts.

Output Impedance: 8 ohms.

Frequency Response: ±1 db 20-20,000 c.p.s. at 5 watts; ±1 db 30-10,000 c.p.s. at 12 watts.

Damping Factor: 6.

Hum: Min. Volume Hum: 80 db below 12 watts.
Aux and Tuner Hum: 60 db below 12 watts.
Phono Hum: 50 db below 12 watts.

Tone Control Range: 12 db boost at 50 cycles.
12 db boost, 15 db cut at 10,000 cycles.

Rumble Filter: 2 positions, 6 db per octave cut below 40 cycles, 6 db per octave cut below 160 cycles.

Input Levels: Aux: 0.7 volts; Phono: 8 millivolts.

Dynamic Loudness Contour: 3 Positions:
Position 0: Uncompensated
Position 1: Approximately 8 db less than Fletcher-Munson
Position 2: Fletcher-Munson Compensation

Equalization Control: 3 positions - LP, RIAA, EUR

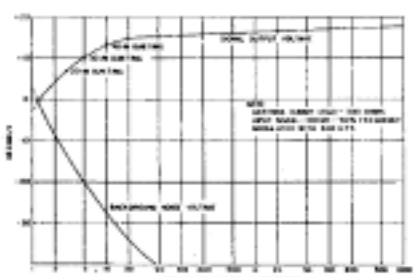
Speaker Selector Switch: 3 positions - A, B, or AB

OVERALL SPECIFICATIONS

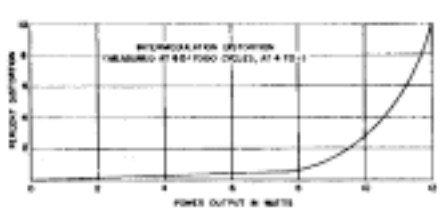
Controls: (Total 9) Function (AM, FM, FM-AFC, AUX, Phono) Loudness, Treble, Bass, Tuning, Rumble Filter, Contour, Equalization, Speaker Selector.

Tube Complement: (Total 12) 2-12AX7, 2-EL84, 1-EZ81, 2-12AT7, 1-6BA6, 2-6AU6, 1-6BE6, 1-6AL5.

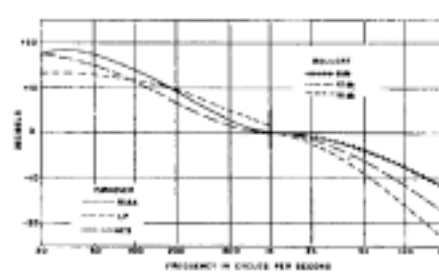
Power Consumption: 120 watts.



FM detector output voltage characteristics



Intermodulation distortion characteristics



Phonograph equalization characteristics.

SERVICE NOTES

Servicing printed circuits is a simple matter and is no more complicated than servicing conventionally wired circuits.

Printed circuit receivers, can be more easily repaired, if certain precautions are observed. Standard components are used throughout and can be removed and replaced by any serviceman. No special tools or skills are necessary. However, some parts which have special mounting and connection lugs should be replaced with exact duplicate parts.

AVOID DAMAGE TO COPPER FOIL

Be careful when removing components from the board. However, if the copper foil wiring is damaged a piece of wire can be used to replace the damaged foil. Small breaks can be "jumped" with molten solder. Larger breaks can be repaired with ordinary hook up wire. It is unnecessary to replace the entire board because of foil breakage.

AVOID DAMAGE TO PRINTED CIRCUIT BOARD

Do not apply excessive pressure to the printed circuit board or components. This is especially important to note when changing tubes. Although the board is sturdy in construction and mounting, it may crack or break if proper care is not taken when servicing. In case the board is to be removed from the chassis, remove the mounting screws around the edges and unsolder the few leads that connect between the board and the chassis. If this is done, a vise with protected jaws should be used to hold the board while servicing and care should be taken not to exert excessive pressure against the board.

AVOID EXCESSIVE DEPOSITS OF SOLDER

In some areas on the printed circuit board, the wiring is very closely spaced. When resoldering a new component avoid excessive deposits of solder. Excessive solder may cause a short or an intermittent trouble to occur later which may be difficult to locate.

AVOID OVERHEATING

When using the soldering iron (35 watts or less), do not overheat the component terminals or the copper foil. Excessive heat (applying soldering iron longer than necessary, using a higher wattage soldering iron than recommended, or using a solder gun) may cause the bond between the board and foil to break. This will necessitate replacement or repair of the foil connection.

TOOLS AND MATERIALS REQUIRED

(1) Low wattage soldering iron with a small point or wedge (rating should not exceed 35 watts).
(2) Small wire brush.
(3) 60% tin, 40% lead, low temperature rosin core solder.
(4) Thin bladed knife.
(5) Small wire pick, or soldering aid.

REPLACING COMPONENTS

SOLDERING REPLACEMENT COMPONENT TO OLD LEADS

Cut the leads where they enter the defective component. Clean off the ends of the leads, leaving as much of the leads as possible. Make a small loop in each lead of the replacement component and slide the loops over the remaining leads of the old component. Caution should be taken not to overheat the connection since the copper foil may peel or the original component lead may fall out of the board. This is possible due to heat transfer through the leads. The lead length of the replacement part should be kept reasonably short to provide some mechanical rigidity.

UNSOLDERING AND RESOLDERING COMPONENTS

To test a component or if the component is mounted in such a manner that the above method can not be used (such as vertically mounted capacitors, etc.) the component can be replaced by unsoldering it. This procedure should be used whenever it is necessary to unsolder any connections to replace defective components.

(a) Heat the connection on the wiring side of the board with a small soldering iron. When the solder melts, brush away the solder. Do not overheat the connection. In the process of removing the solder, caution must be taken to prevent excessive heating. Therefore, do not leave the iron on the connection while brushing away the solder. Melt the solder, remove the iron and quickly brush away the solder. It may require more than one heating and brushing process to completely remove the solder.

(b) Insert a knife blade between the wiring foil and the "bent-over" component lead and bend the lead perpendicular to the board. (It may be necessary to apply the soldering iron to the connection while performing this step as it is sometimes difficult to completely break the connection by brushing.) Do not overheat the connection.

(c) While applying the soldering iron to the connections, "wiggle" the component until it is removed.

(d) Remove any small particles of solder using a clean cloth dipped in solvent.

(e) A thin film of solder may remain over the hole through the board after removing the component. Pierce the film with the lead from the new component after heating the solder film with the soldering iron.

(f) Insert the leads of the new component through the holes provided. Cut to desired length and bend over the ends against the copper foil. Resolder the connection with 60/40 low temperature solder.