

harman kardon

# The Coda

— HIGH FIDELITY CONSOLE RADIO-PHONOGRAPH —

OPERATION AND SERVICE INSTRUCTIONS



The purpose of your new Coda is 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 Coda, 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 Coda so that you can make it perform to its maximum potential.

HARMAN - KARDON, INC.

520 MAIN STREET, WESTBURY, L. I., N. Y.

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 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.

## FUNCTIONS OF THE VARIOUS CONTROLS

### RECORD EQUALIZATION

On the front panel of the Coda 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 tuner-amplifier chassis at the rear of the Coda 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 tuner-amplifier chassis at 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 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.

### TAPE INPUT

Program material from a tape recorder or player may be connected into the Coda in two different ways. If the tape player has a built-in amplifier or pre-amplifier, it should be connected to the AUXILIARY INPUT receptacle on the tuner-amplifier chassis at the rear of the cabinet. If the tape player has no pre-amplifier, or if its amplifier is not of top quality, the tape head should be connected to the receptacle marked "TAPE INPUT". Setting the "FUNCTION" selector at the position marked with the appropriate speed will then provide the equalization recommended by the manufacturers of prerecorded tape.

### 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 (0-5) 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.

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

Separate "BASS AND TREBLE" controls are incorporated in the CODA to provide further adjustments  
(continued on page 6)

required for excellent high fidelity performance in your living room.

When the red dots on each control are set in the vertical (12 o'clock) position, an "average" overall response is provided.

### 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 CODA 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 decibels. Frequency response is reduced by 12 decibels 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 which will be most helpful in cases of heavy rumble.

### AM ANTENNA

The Harman-Kardon ferrite loopstick, built into the Coda 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 tuner-amplifier chassis.

### 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 Coda can receive.

### SPEAKER CONNECTIONS

A unique method of connecting one or two loudspeakers is incorporated in the Coda 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 Coda and use either one or both together, remove the Jumper wire between terminals "A" & "B" at the rear of the tuner-amplifier chassis 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 Coda's speakers slide the front panel Speaker Selector Switch to position "A". To select the remote speaker slide the switch to position "B". To operate both speaker systems 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

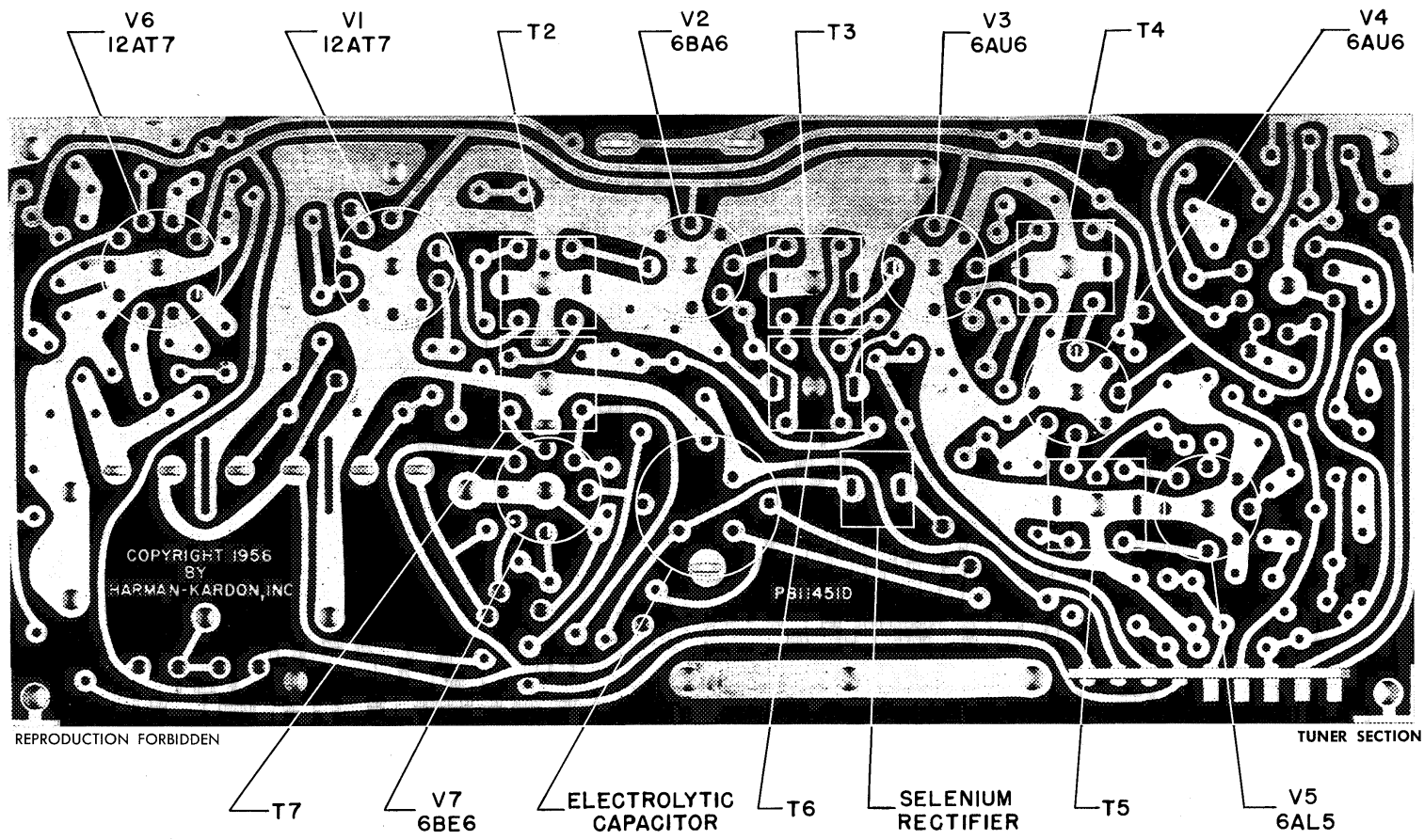
In general, every control on a well designed, honestly considered high fidelity instrument has a specific useful function, related to each of the other controls. Although this cannot be a full treatise on the subject, an explanatory note on the relationship of the various front panel controls will doubtless 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 (radio, 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 Coda, 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.

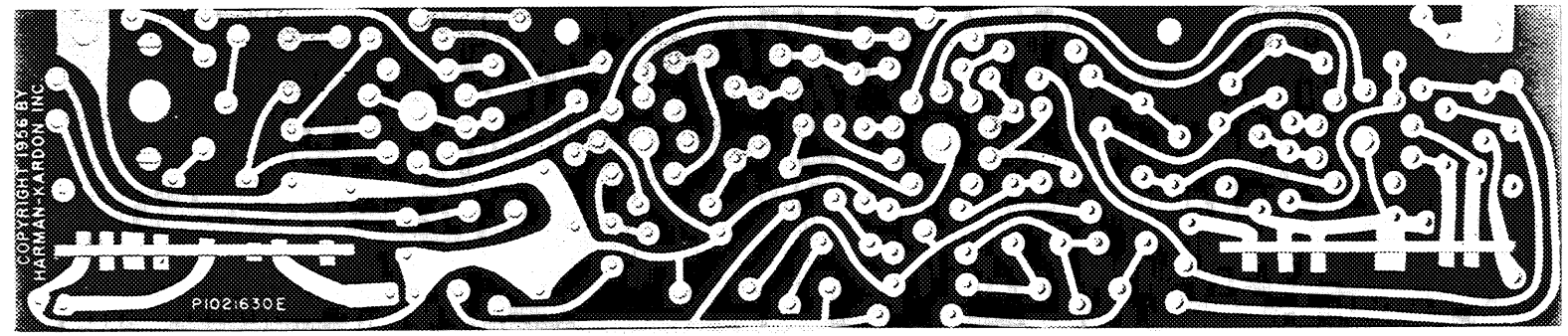


These photographs show the printed circuit boards used in the Harman-Kardon Coda and indicate to some degree the complexity of design and painstaking care required in the planning of such a unit.

FM frequencies, by their very nature, require careful placement of parts and leads. In conventional point to point wiring, misplacement of a wire, even a slight amount from its correct position will adversely affect operation.

The amplifier has been designed to use printed circuits in those areas where each component and each connecting lead must be carefully positioned in order to afford best possible operation.

This design form results, we feel, in providing the best possible characteristics and reflects the highest state of the art in the construction of fine audio equipment.

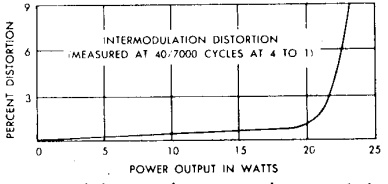
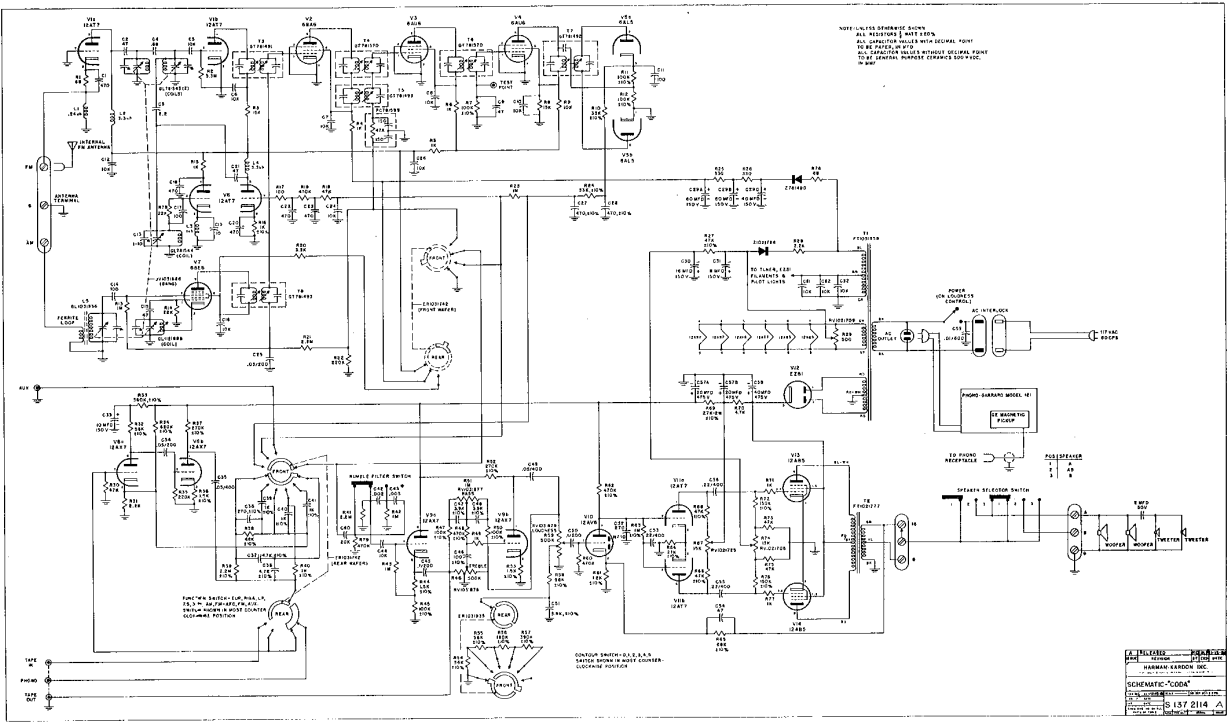


REPRODUCTION FORBIDDEN

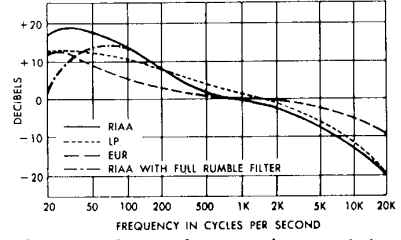
TUNER SECTION

REPRODUCTION FORBIDDEN  
HARMAN-KARDON, INC.

AMPLIFIER SECTION



Intermodulation distortion characteristics



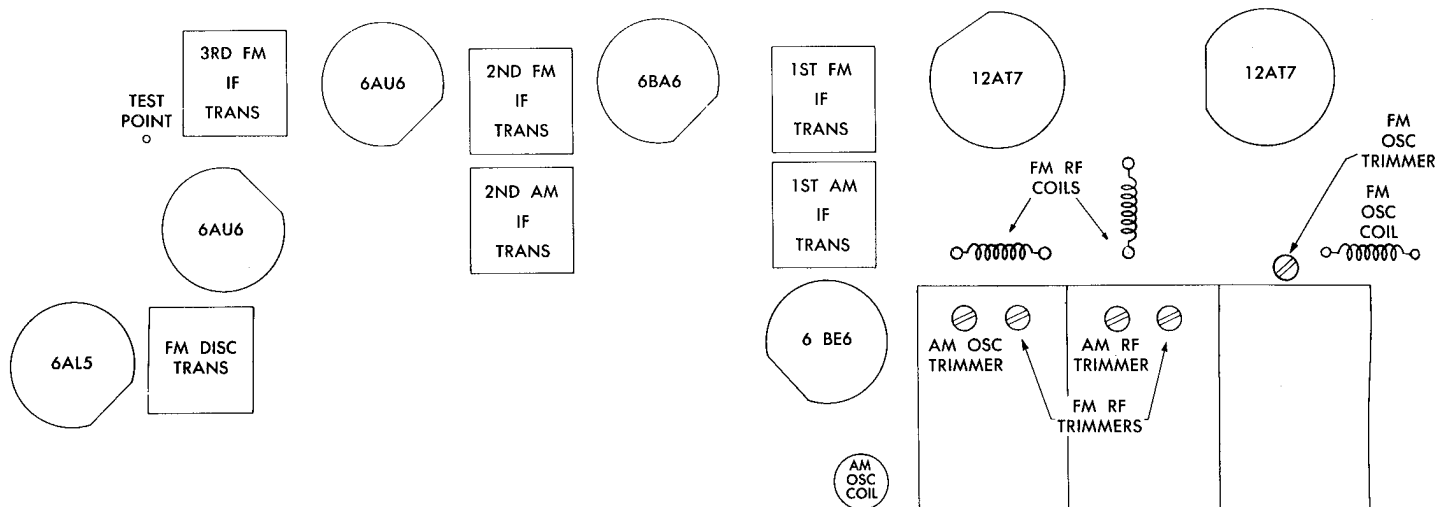
Phonograph equalization characteristics

FUNCTION SWITCH SETTING	SIGNAL GENERATOR		SIGNAL INPUT POINT	OUTPUT INDICATOR	CONNECT INDICATOR TO:	DIAL SETTING	ADJUST	OUTPUT INDICATION
	FREQ.	MOD.						
AM	455 KC	30% AM	AM RF	AC-VTVM OR SCOPE	TUNER OUTPUT	1600 KC	2 AM IF TRANS.	MAXIMUM OUTPUT
AM	1400 KC	30% AM	AM ANT. TERM.	AC-VTVM OR SCOPE	TUNER OUTPUT	1400 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	1400 KC				REPEAT STEP 2			

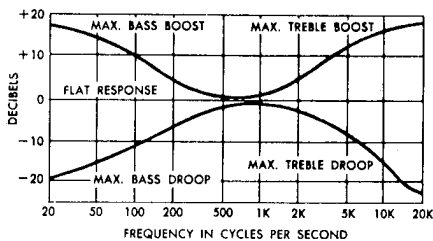
AM ALIGNMENT PROCEDURE

FUNCTION SWITCH SETTING	SIGNAL GENERATOR		SIGNAL INPUT POINT	OUTPUT INDICATOR	CONNECT INDICATOR TO:	DIAL SETTING	ADJUST	OUTPUT INDICATION
	FREQ.	MOD.						
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



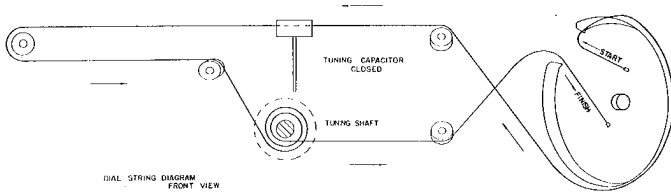
TRIMMER & TUBE LOCATION CODA  
TOP VIEW (FRONT)



Tone control and frequency response characteristics

LIST OF REPLACEABLE PARTS

DESCRIPTION	HARMAN-KARDON PART NO.	PRICE
Output Transformer	FT1021707	\$19.60
Power Transformer	FT1031858	14.75
Antenna Loopstick	GL781479	2.30
Loopstick Tuning Ring	P481329	.15
Pointer	P1031864	.30
Dial Glass Assembly	P1031863	.80
Capacitor 40/475 V.	JE1071739	2.60
Capacitor 20, 20/475 V.	JE1071740	2.95
Function Switch	ER1031742	4.50
Contour Switch	ER1021632	2.55
Variable Condenser	JV1031886	8.25
Selenium Rectifier	Z781490	1.65
FM IF Transformer	GT781491	1.60
FM IF Transformer	GT781570	1.45
FM Disc. Transformer	GT781492	2.00
AM IF Transformer	GT781493	1.50
Oscillator Trimmer	JV20688	.30
Escutcheon	B1031867	7.50
Bass Control	RV1031877	.85
Treble Control	RV1031878	.85
Loudness Control	RV1031879	1.35
Knob	P22783	.15
Knob	P20778	.15
Instruction Sheet	L1031875	.75
12" Bass Speaker (each)	SP1352047A	29.50
3-1/2" Tweeter Speaker (each)	SP1352048	12.50



DIAL CORD DRIVE

# SPECIFICATIONS

## RF SECTION

Circuits: FM: Armstrong circuit with Limiter & Foster-Seeley Discriminator, Automatic Frequency Control - Low Noise Front End consisting of 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; External antenna sensitivity 20 microvolts.

Selectivity: FM: IF Bandwidth: 200 KC at 6 db down. Discriminator - 375 KC, peak to peak.

AM - 8 KC bandwidth at 6 db down.

Frequency Range: FM: 88-108 MC

AM: 530-1650 KC

FM Drift:  $\pm 5$  KC max.

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

Antenna Input: FM: 300 ohms

AM: Built-in low noise ferrite loop-stick 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:  $\pm 1/2$  db 20 to 20,000 c.p.s. including standard 75 microsecond 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: Output circuit employs 2 #12AB5 in new high efficiency, low heat generating circuit.

Power Output: 20 watt at 2% IM (40 & 7,000 cycles)

Peak Power: 30 watts

Frequency Response:  $\pm 1$  db, 20-20,000 c.p.s. at 20 watts  $\pm 1/2$  db, 20-40,000 at 10 watts.

Damping Factor: 20

Output Impedance: 8 and 16 ohms

Hum: Min. volume hum: 80 db below 20 watts.

Aux, and tuner hum: 70 db below 20 watts.

Phono hum (in RIAA position): 60 db below 20 watts.

Tone Control Range:  $\pm 16$  db at 50 and 10,000 c.p.s.

Input Levels: Aux. 0.3 volts, Phono: 6 millivolts

Rumble Filter: 3 Positions: Off, 6 db per octave cut below 50 cycles, 6 db per octave cut below 100 cycles.

Dynamic Loudness Contour: 6 Positions:

Position 1: Uncompensated

Position 2: Approximately 10 db less than Fletcher-Munson

Position 3: Approximately 5 db less than Fletcher-Munson

Position 4: Fletcher-Munson compensation

Position 5: Approximately 5 db more than Fletcher-Munson

Position 6: Approximately 10 db more than Fletcher-Munson

## OVERALL SPECIFICATIONS

Controls: (Total 8) Tuning, Loudness, Bass, Treble, Function (EUR, RIAA, LP, Tape 7.5, Tape 3.75, AM, FM-AFC, FM, AUX), Contour Speaker Selector, Rumble Filter.

Tube Complement: (Total: 14) 3-12AT7, 1-6BE6, 1-6BA6, 2-6AU6, 1-6AL5, 2-12AX7, 1-12AV6, 2-12AB5, 1-EZ81, plus 2 selenium rectifiers.

Functional Features: (a) Counterweighted Tuning Control

(b) Tape Output Receptacle furnished on chassis rear prior to tone controls.

(c) Rumble Filter

### WARRANTY:

We warrant each Coda 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, affaced, 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 Coda. It is strongly urged that the warranty card be completed and mailed without delay, to protect your rights under warranty.

## 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.