

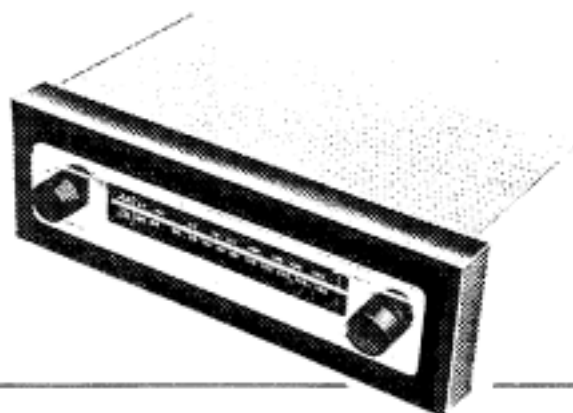
**harman kardon**

MODEL A-310

*The Theme*

HIGH FIDELITY AM-FM TUNER

OPERATION AND SERVICE INSTRUCTIONS



**UNPACKING**

After unpacking the Theme, inspect it carefully for any signs of damage in transit. Your unit was subjected to many inspections and tests, and then carefully packed. If any damage is visible, notify the transportation company at once.

Check the contents of the package carefully.

You should find:

- 1 Tuner, Model A-310
- 1 Instruction Booklet
- 1 Antenna wire, hanked
- 1 Shielded Output Cable
- 1 Warranty Card

It is strongly urged that the warranty card be completed and mailed without delay, to protect your rights under the warranty. If you should require repair service or information on the use of the Theme, we will be able to identify your unit immediately, and respond quickly.

**CONNECTIONS**

**AM ANTENNA**

The Harman-Kardon ceramic loopstick, built into the Theme, 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 it 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 chassis.

**FM ANTENNA**

Due to the extremely high FM sensitivity of the Theme, the 48 inch wire furnished will be sufficient antenna for all but the most difficult locations. One end of the wire should be connected to the FM terminal of the ANTENNA terminal strip, the other end being left free and extended as may be convenient. In remote locations, a standard roof-top dipole and suitable twin lead in wire may be used, connected between the FM and G terminals.

**POWER**

Plug the power cord into any outlet furnishing 117 volts, 60 cycles house current. The exact voltage is relatively unimportant, and may vary between 105 and 125. Be sure, however, that you have 60 cycle AC power. For many installations, such as with the Trend, Model C300 Amplifier, it will be more convenient, from an operational point of view, to plug the power cord of the Theme into the convenience outlets provided on the amplifier chassis. The tuner will then be turned on or off by the amplifier power switch.

## OUTPUT

Two receptacles, marked "Output" will be found at the rear of the chassis. For your convenience in connecting to the amplifier, a 36" shielded cable will be found in the Theme package. Plug one end of this cable into either one of the two output receptacles, and the other end into the appropriate amplifier input receptacle.

Since the output circuit of the Theme includes a cathode-follower, this cable may be extended to any reasonable length without deterioration of tone quality.

The second output receptacle may be similarly connected to a tape recorder, to provide program material unaffected by the tone and volume controls of the amplifier.

## VENTILATION

All electrical equipment generates heat which must be allowed to escape. Although the Theme is well ventilated in itself, sufficient space should be allowed around it to permit free air flow. If it is placed in a bookcase, it should be located well toward the front, to provide as much clearance as possible at the rear.

Do not put books or other objects on top of the Theme. Covering the perforated tube grill will reduce the ventilation and result in sharply reduced component and tube life.

## OPERATION

### CONTROLS

The Harman-Kardon Theme has only two operating controls. The Function Switch (at the left) serves to turn the power off in its extreme counterclockwise position. In any other position the power is turned on. This switch also selects among AM reception, FM reception with AFC and FM without AFC. The Tuning Knob (at the right) is used to tune to the desired station.

### TUNING METER

The Theme tuning meter operates both on the AM and FM bands in a similar manner. When the receiver is tuned completely off any station, the meter will point to the left end of the indicator scale. As you tune through a station the meter will swing to the right a maximum and to the left again, returning to the initial position as you tune away from the station. Proper tuning exists when the meter points to a maximum. Note that the pointer will show a small excursion on a weak signal and a correspondingly larger excursion on a stronger signal. The meter thus can be used as a relative field strength indicator helping you to evaluate reception from different stations and to optimize your antenna system for best reception.

## 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 Theme 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 Theme.

Note that the function selector switch has four positions. The position marked "FM-AFC" should be selected whenever you wish to tune with the assistance of AFC. Should you wish to disable the AFC circuit fully, however, select the position marked "FM." In this position the AFC circuitry is eliminated.

Tune across the FM scale with the function switch in the FM-AFC position. Note how the stations "pop" into place and how the tuning meter pointer simultaneously indicates near-optimum tuning of each station by a rapid deflection to a maximum position. Now tune to any station, preferably one with a musical program. Defeat the AFC by turning 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. This should correspond with the maximum deflection of the tuning meter. Detune the station so that the tuning meter returns to near its minimum position and the sound is distorted. Turn the function switch to FM-AFC, and notice how the sound clears up and the meter shows near optimum tuning again.

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 Theme 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.

## MAINTENANCE AND REPAIR

In some installations, hum may be encountered due to a voltage difference between the amplifier, tuner and record changer chassis. This may be eliminated

by reversing one or all of the AC power plugs. Simply reverse one at a time until improvement is experienced.

Due to the conservative design and high quality components of the Theme, no routine maintenance other than yearly tube-testing is required. Should trouble develop, however, only the most qualified serviceman should be employed, as special equipment and training is required to properly service high fidelity equipment.

This instruction booklet contains diagrams and other information needed by your repairman. It should be kept available for his use.

### LIST OF REPLACEABLE PARTS

Description	Harman-Kardon Part Number	List Price
Power Transformer	FT481054	7.50
FM IF Transformer	GT24605	1.50
FM Discriminator	GT24608	2.10
AM IF Transformer	GT24610	1.30
K Tran Coil Clip	Z24614	.05
AM Osc. Coil	GL24610	1.30
Gang Condenser	JV24600	9.00
AM Antenna Loopstick	GL28827	3.50
Electrolytic Cap. 20, 20/250	JE28910	2.20
RF Trimmer 1-10 MMF	JV20688	.30
Function Switch	ER481199	2.50
Dial Glass	P481092	1.25
Dial Glass Clip	Z24774	.05
Pointer	Z24773	.30
Display Panel	P28761	4.75
Escutcheon	C28760	6.75
Cage	C28803	7.50
Knob	P20778	.15
Instruction Sheet		.75
Tuning Meter	Z481200	9.00

### SPECIFICATIONS

#### RF SECTION

**Circuits:** FM: Armstrong Circuit with Dual Limiters (Double Tuned) and Foster-Soley Discriminator, Automatic Frequency Control. Low noise, all triode front end with grounded grid RF amplifier and triode mixer. AM: Superheterodyne with tuned RF stage, and ferrite loop antenna. Two IF stages, 10 KC whistle filter. AVC operative over three stages.

**Sensitivity:** FM: 1.8 microvolts for 20 db quieting; 1.2 microvolts for 20 db quieting. AM: Terminal Sensitivity: 3 microvolts. Loop Sensitivity: 15 microvolts/meter.

**Selectivity:** FM: 200 KC bandwidth: 6 db down. AM: 10 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:**  $\pm$  2% KC with AFC on;  $\pm$  20 KC with AFC off.

**Image Rejection:** FM: 50 db. AM: 50 db.

**IF Rejection:** FM: 70 db. AM: 50 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:  $\pm$  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:** 65 db below 100% modulation.

#### AUDIO SECTION

**Circuits:** Cathode Follower Output

**Output Level:** FM: 2 1/2 volts for 100% modulation; 1 volt for 30% modulation. AM: 1 volt (average).

**Output Impedance:** Low Impedance Cathode Follower

#### OVERALL SPECIFICATIONS

**Controls:** (Total 2) Function (OFF-AM-FM with AFC-FM without AFC) and Tuning

**Tube Complement:** (Total: 12) 1-6AN4, 1-12AT7, 1-6AB4, 1-6BE6, 3-6BA6, 1-6AL5, 2-6AU6, 1-12AU7, 1-6X4.

**Dimensions:** 12 1/2" wide x 4" high x 8 1/2" deep (including ferrite loopstick—not including knobs).

**Power Consumption:** 50 watts

**Shipping Weight:** 14 lbs.

**Finish:** Chassis, escutcheon and cage: brushed copper—Display panel for escutcheon and knobs: matte black—Edge lighted dial glass: yellow and white.

**Hardware and Accessory Material Furnished:** Mounting screws, template, FM antenna wire, instruction booklet, shielded output cable.

**Functional Features:** (a) Counterweighted Tuning Control; (b) AFC defeat available on function switch. (c) Illuminated Tuning Meter; (d) Cathode follower output to drive tape recorder.

**Special Notes:** (a) Can be stacked with C-300 amplifier in total height of 8", with C-100 amplifier in total height of 7 1/2"; (b) Face up mounting of these permissible without special precaution.

#### OPTIONAL ACCESSORIES

- (a) Brass finished escutcheon available on special order.  
 (b) Brass finished cage available on special order.  
 (c) Vertically calibrated dial glass available on special order.

### WARRANTY

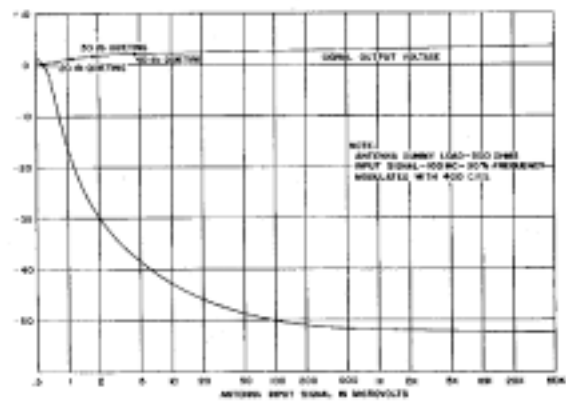
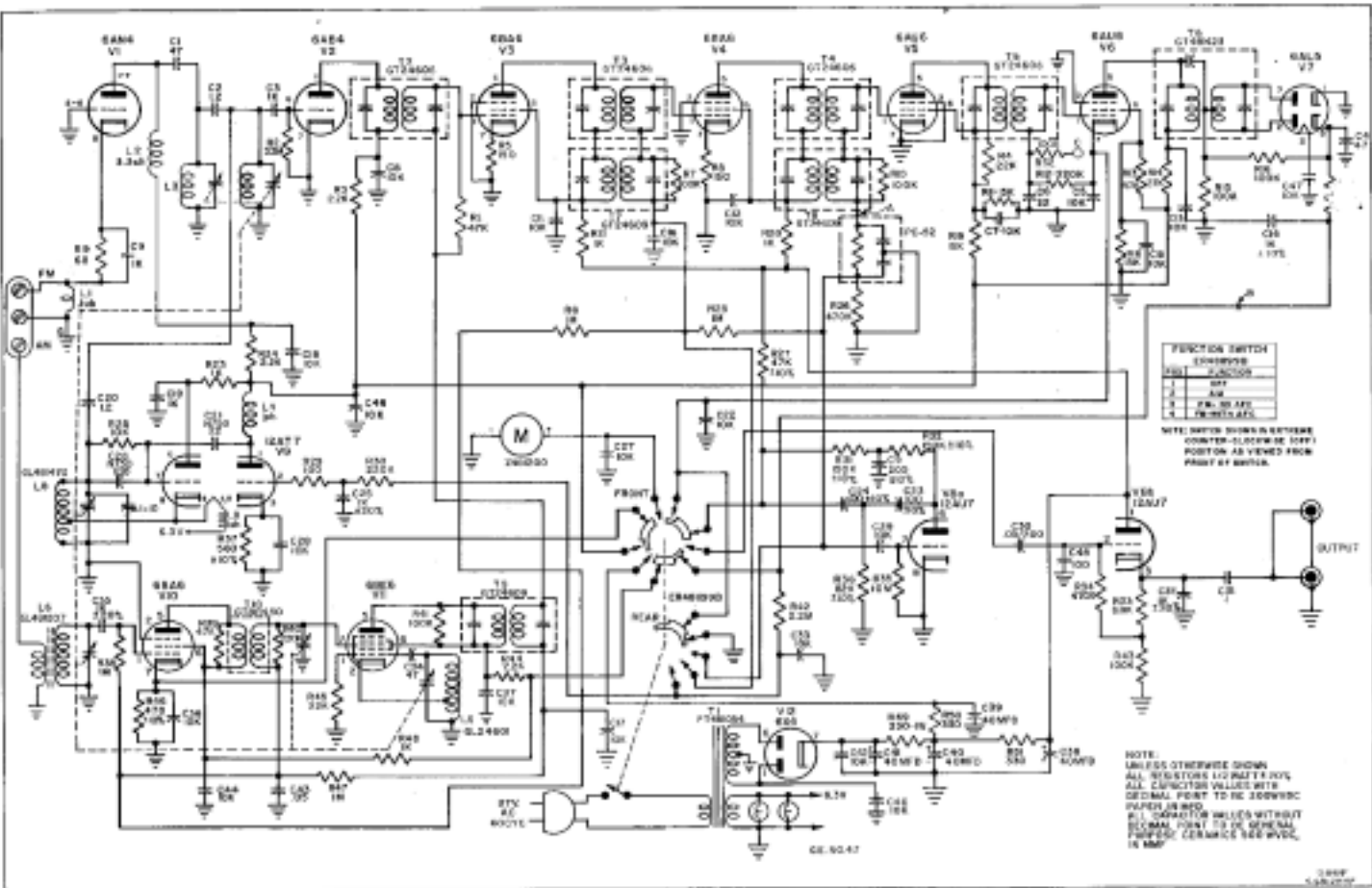
We warrant each Theme, Model A-310 to be free from defects in material and workmanship under normal use and service, and in accordance with the conditions herein below set forth, for a period of 90 days from date of delivery to the original purchaser, and agree to replace or repair any part or parts 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.

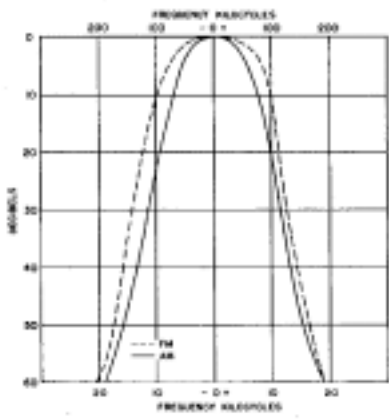
This warranty is expressly in lieu of all other warranties, express or implied, and of all other obligations or liabilities on our part, and we neither assume nor authorize any representative or other person to assume for us any other liability in connection with the sale of the Model A-310 Theme.

#### A-310 ALIGNMENT PROCEDURE

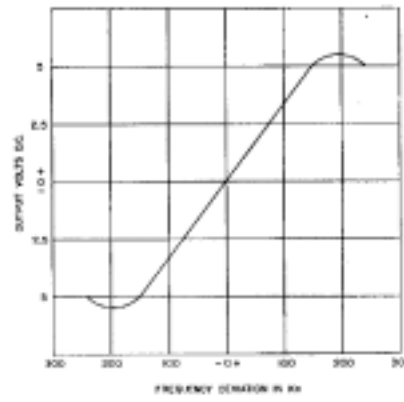
Func. Switch Setting	Signal Generator Freq.	Mod.	Signal Input Point	Output Indicator	Connect Indicator To:	Dial Setting	Adjust	Output Indication	Panel Switch Setting	Signal Generator Freq.	Mod.	Signal Input Point	Output Indicator	Connect Indicator To:	Dial Setting	Adjust	Output Indication
AM	400KC	30% AM	6000 Pts 7	AC-VTVM or scope	Output Terminal	-	IAM IF Transformers (T1, T2)	Max. Output	FM	10.7MC	300KC FM 50 Cycles	6A8M Pts 6	AC-VTVM or scope	"A" on schematic thru 100K	-	4 FM IF Transformers (T1, T2, T3, T4)	Max. gain and symmetry
AM	1500KC	30% AM	AM Ant. Terminals	AC-VTVM or scope	Output Terminal	1500KC	OSC. RF and Antenna Triaxials	Max. Output	FM	10.7MC	300KC FM 50 Cycles	6A8M Pts 6	AC-VTVM or scope	"B" on schematic	-	Limiter Transformer (L1)	Max. gain
									FM	10.7MC	300KC FM 50 Cycles	6A8M Pts 6	AC-VTVM or scope	"B"	-	Shorted-tape Transformer	8 Pattern of Max. gain and symm.
AM	800KC	30% AM	AM Ant. Terminals	AC-VTVM or scope	Output Terminal	800KC	OSC coil	Max. Output	FM	100MC	300KC FM 50 Cycles	FM Ant. Terminals	AC-VTVM or scope	"A"	100MC	OSC. RF and Ant. Trimmer	Max. Output
									FM	80MC	300KC FM 50 Cycles	FM Ant. Terminals	AC-VTVM or scope	"A"	80MC	OSC. RF and Ant. Trimmer	Max. Output



FM detector output voltage characteristics



FM & AM selectivity characteristics



FM discriminator characteristics