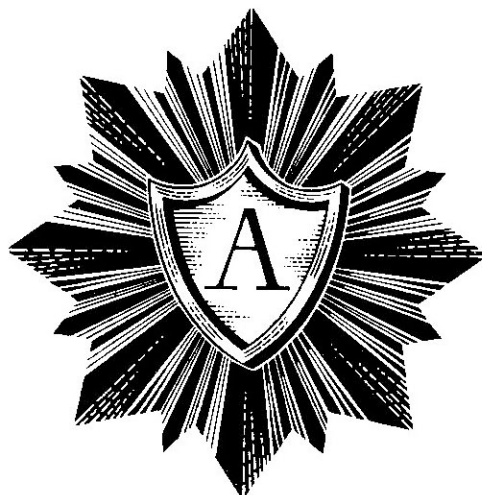


harman kardon

The Award Series



F 500

FM/MULTIPLEX TUNER

TECHNICAL SPECIFICATIONS

Circuit:	Front-end circuit tuned by two separate electrically and mechanically isolated tuning sections for maximum selectivity at lowest oscillator radiation. Also featured is the new Harman-Kardon cartridge which consists of a grounded grid triode RF stage, triode mixer and solid state AFC circuit and three wide band IF stages. A 6BN6 zero time constant gated beam limiter followed by a wide band Foster-Seeley discriminator. Special wide band audio output circuitry for extended frequency response with unmeasurable phase shift.
Sensitivity:	Standard: 0.85 mv. for 20 db of quieting. Usable Sensitivity: (IHFM) 3 microvolts.
Discriminator Peak To Peak Separation:	1 megacycle, ultra linear.
Image Rejection:	66 db.
Selectivity:	240 KC. 6 db down.
Frequency Response:	± 1 db 10-52,000 cycles per second.
Distortion:	Unmeasurable at 30% modulation. Less than 0.1% at 100% modulation.
Limiter:	Gated beam, constant output.
Antenna Input:	300 ohms, balanced.
Hum Level:	60 db below 100% modulation.
Radiation:	Well within FCC requirements.
Front Panel Controls:	On/Off Switch, FM/FM Multiplex Switch, Interchannel Muting Defeat Switch, AFC Defeat Switch and Counterweighted Flywheel Tuning Control.
Rear Panel Controls:	Interchannel Muting Threshold Control.
Rear Outputs:	(Total 4) 2 FM Outputs, 1 Multiplex Output, 1 A.C. convenience receptacle.
Output Level:	1 volt at 100% modulation.
Power Consumption:	45 watts.
Special Features:	Microbalance Tuning Meter for precise tuning. Function Selector Indicator Lights. Plug-in Multiplex Adapter provision on chassis.
Dimensions:	15 $\frac{1}{4}$ " wide x 5 $\frac{7}{16}$ " high x 12" deep. (Excludes knobs.)
Shipping Weight:	22 lbs.
Finish:	Brushed gold front panel.

INTRODUCTION

The new Harman-Kardon Award Series represents the culmination of extensive research and experimentation in high fidelity component design. These magnificent instruments will satisfy the aspirations of those who insist on nothing short of perfection itself. They also anticipate all of the new developments in high fidelity by including features never before found in high quality components. The keynote in the Award Series is unparalleled performance and no compromise has been made in the design of these superb units.

It is essential you read this instruction manual carefully before installing your F500 FM tuner. You have invested in a high quality electronic instrument and a few moments taken now to read this manual may save considerable time and effort later on. This booklet has been written in simple, non-technical language and by following the recommendations made in the manual you should be able to obtain optimum performance from your stereophonic system.

KEEP THIS INSTRUCTION MANUAL AVAILABLE AT ALL TIMES. IT CONTAINS INDISPENSIBLE TECHNICAL AND SERVICE INFORMATION.

UNPACKING

After unpacking the F500, inspect it carefully for signs of transit damage. The tuner was subjected to numerous rigid quality control inspections and therefore should be in perfect operating condition. If damage is visible, notify your dealer at once. If the tuner was shipped to you, notify the transportation company. Harman-Kardon will cooperate with you in such instances, but please note that only you can recover from the carrier for damages incurred during shipment.

Check the folds of the carton and packing material before discarding. Your package should contain the following items:

- 1 Award Series, Model F500 FM Tuner.
- 1 Instruction Manual.
- 1 Warranty Card.
- 1 Mounting Template.
- 1 48 Inch Wire Antenna

WARRANTY POLICY

We urge you to fill in your warranty card and mail it to the factory without delay to protect your rights under warranty. The Harman-Kardon warranty is not valid unless we have your card on file.

WARRANTY

We warrant each F500 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 1 year from date of delivery to the original purchaser, and agree to replace or repair any part or parts, with the exception of tubes which are under the manufacturer's 90 days warranty, returned to us within said 1 year, 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 instructions furnished by us.

This warranty is expressly in lieu of all other warranties, express or implied, and of all other obligations or liability 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 this instrument.

SERVICE POLICY

Harman-Kardon has established a special consumer division to answer all questions pertinent to the installation and operation of your unit. Please feel free to write us at any time and we will endeavor to offer prompt and complete advice.

If your problem cannot be resolved through our combined efforts then we may wish to refer you to one of our authorized warranty stations. The unit must be then shipped via Railway Express, Prepaid to the station designated, accompanied by a brief note describing the exact nature of the difficulty. Under no circumstances should the set be shipped directly to the factory without prior authorization.

INSTALLATION PROCEDURE

Ventilation:

The F500 tuner is well ventilated in itself, but sufficient space must be allowed around it to permit proper air flow. Install the tuner in a manner to allow for unrestricted circulation. When mounting into a cabinet allow at least 3 inches above the tubes. Do not place books or other objects on the cage or in the immediate vicinity of the instrument. Reducing the air flow will result in sharply reduced component and tube life. Caution: When custom installing the tuner do not place it directly over the amplifier. The heat generated by the amplifier may cause deterioration of tuner components.

Power Requirements:

Plug the AC cord into any outlet furnishing 117 volts, 50 or 60 cycle, AC current. The voltage may vary between 105 and 125 volts. An AC convenience receptacle is located on the top of the chassis and is controlled by the on/off switch.

Audio Output:

Three AUDIO OUTPUT receptacles are located on the top rear of the F500 chassis. They are used to connect the tuner to the amplifier for either monophonic FM reception or for stereophonic FM multiplex, when using an external multiplex adapter. The de-emphasis characteristic of the F500 includes the capacitance of the patch cord supplied with the tuner. If it is necessary to use a longer run of cable, use the following chart to determine cable type.

LENGTH OF CABLE	CABLE TYPE
3 ft.	Use Patch Cord Supplied
Above 3 ft. and up to 15 ft.	RG 59/U
Above 15 ft. and up to 30 ft.	RG 71/U

Connecting for Monophonic FM:

To operate the F500 as a conventional monophonic FM tuner connect a shielded lead between either FM1 or FM2 output receptacle and the Tuner or Aux input receptacle of your amplifier.

Connecting for Stereophonic FM Multiplex:

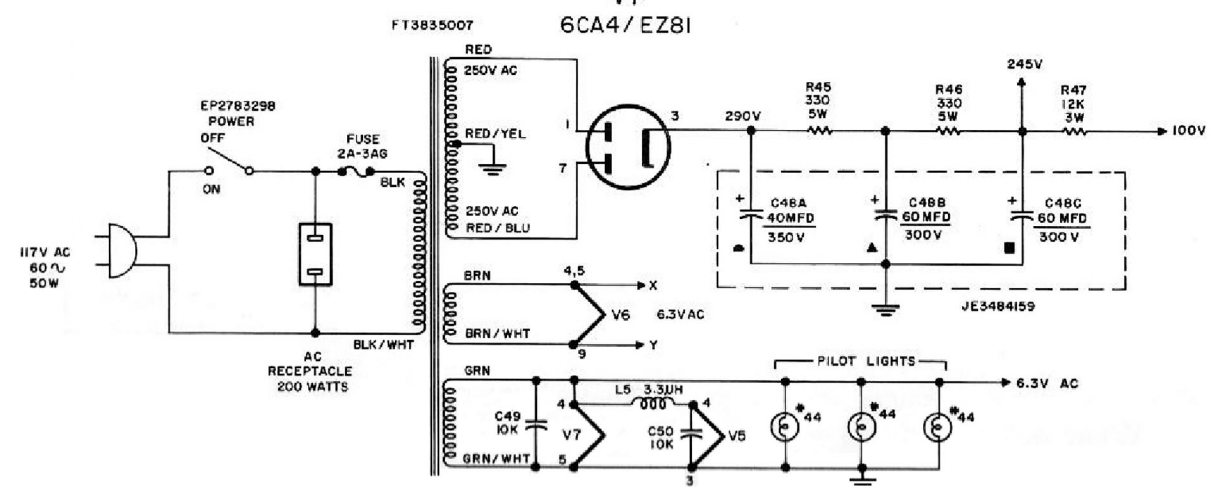
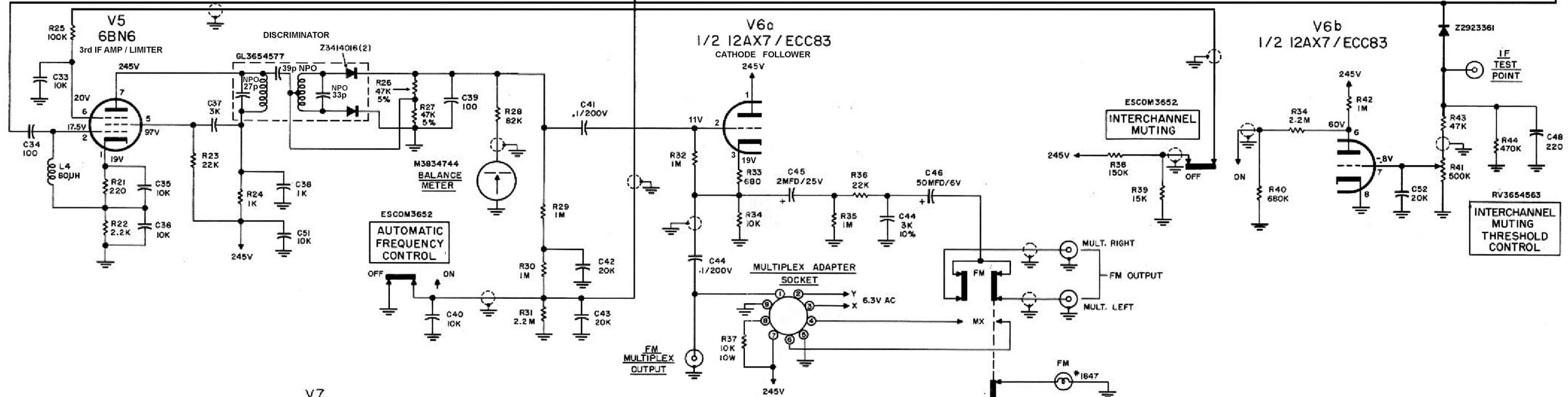
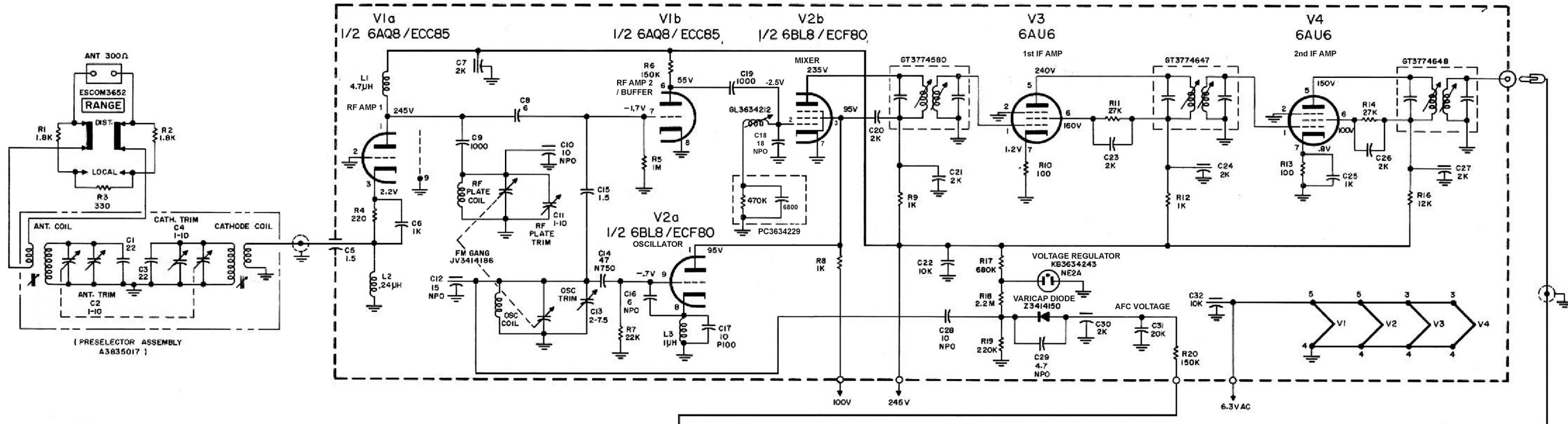
To operate the F500 as a multiplex receiver (with the multiplex adapter installed) connect a shielded lead between FM1 and the Left Tuner input on your amplifier. Connect an additional shielded lead between the FM2 output receptacle and the Right Tuner input of your amplifier. This will permit either FM or FM multiplex operation if the multiplex adapter is used. Additional instructions will be supplied with the Harman-Kardon plug-in multiplex adapter.

Connecting the FM Antenna:

Due to the exceptionally high sensitivity of the F500, the 48 inch wire antenna supplied with the tuner is sufficient for all but the most difficult locations. The antenna input is designed to accept either the wire antenna or a balanced 300 Ω antenna, indoor or outdoor type.

When using the wire antenna supplied, the link between the ground terminal and the center terminal should be connected, and the wire antenna is to be connected to the third terminal marked "connect link to use wire antenna".

harman-kardon F500 FM TUNER



NOTES:
 UNLESS OTHERWISE SPECIFIED -
 1- ALL RESISTANCE VALUES IN OHMS ± 10%.
 2- ALL RESISTORS 1/2 WATT.
 3- ALL CAPACITORS WITH DECIMAL VALUES IN MFD.
 4- ALL CAPACITORS WITHOUT DECIMAL VALUES IN MMF.
 5- ALL VOLTAGES ARE DC & MAY VARY ± 20%

ITEM	TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
V1	ECC85	*660	0	220	—	—	*150K	1M	—	—
V2	ECF80	*14K	470K	*14K	—	—	*1660	0	0.1Ω	22K
V3	6AU6	0.5Ω	0	—	—	—	*1660	*29K	100	—
V4	6AU6	0.5Ω	0	—	—	—	*12.6K	*39.6K	100	—
V5	6BN6	2.4K	2.2K	—	—	—	*22.6K	115K	*1.6K	—
V6	12AX7	*660	1M	10.6K	—	—	1M	—	0	—
V7	6AC4	120	—	—	—	—	—	—	120	—

VOLTAGE & RESISTANCE READINGS
 AFC OFF, MODE SWITCH IN FM POSITION, RANGE SWITCH IN DISTANT POSITION, INTERCHANNEL MUTING OFF, TUNING IN FULL CCW POSITION.
 * RESISTANCE READINGS MARKED WITH ASTERISK ARE MEASURED TO PIN 3 6CA4 / EZ81.

When using a balanced 300Ω antenna, remove the link and connect the antenna on terminals marked "remove link to use 300Ω antenna".

In more remote locations, an outside Yagi, folded dipole or omni-directional antenna is recommended. For the greatest gain, a 4 to 11 element Yagi designed for the FM band is suggested. A Yagi, however, is very directional and it may be desirable to use an antenna rotor if a full 360° coverage is required. For reception in the suburbs, an outside folded dipole or omni-directional dipole is recommended.

Grounding:

It is not generally recommended to ground the F500 to your companion amplifier as this may result in a ground loop which will introduce hum into your system.

OPERATING INSTRUCTIONS

The F500 incorporates the following operating controls: Automatic Frequency On/Off Switch, Mode Selector, Range Selector, Interchannel Muting Switch, Illuminated Push-Button On/Off Switch, Balance Tuning Meter and Tuning Control. On the extreme right side of the escutcheon there is provision for a Multiplex Dimension Control when the Harman-Kardon multiplex adapter is connected.

Illuminated Push-Button On/Off Switch:

This control turns the tuner on and off. It also controls the AC convenience outlet located at the rear of the tuner.

Automatic Frequency Control Switch:

FM broadcasting, by its very nature, eliminates almost all natural and man-made static. However, the characteristics of FM which make this possible also causes specific problems in tuning. The F500 incorporates a special electronic circuit known as AFC (automatic frequency control) that overcomes these problems and insures proper tuning even if the manual tuning is not accurately done. Therefore AFC always keeps the station in the center of the channel and eliminates distortion caused by inaccurate tuning.

It should be made quite clear that AFC is not a means to eliminate tuner drift. A fine wide band tuner will not drift even upon warm-up whether AFC is in the circuit or not.

The following experiment will lead to an understanding of AFC and how it performs its job.

Throw the AFC switch located on the front panel to "ON". Now tune across the FM band and note how the stations "pop" into place. Now tune to any station, preferably one with a musical program. Defeat the AFC circuit by throwing the AFC switch to "OFF", and tune slowly through the station from left to right. Notice there are three distinct points where the station sounds clear, interspersed with points of distorted sound. The middle, clear-sounding point is the proper tuning position for the best tone quality with minimum noise, distortion and interference. Detune the station slightly so that the sound is distorted. Now throw the AFC switch "ON" and notice how the station retunes itself and the sound clears up. The AFC circuit has readjusted the electronic circuits to the center of the station channel.

In order to take full advantage of the benefits of AFC, it is suggested that fine tuning be done with the AFC switch "OFF". When the station is aurally tuned in, throw the AFC switch "ON" and the AFC circuit will retune your careful tuning by a tuning factor of 10:1. This procedure is especially recommended when a weak station is being tuned on a channel adjacent to a stronger one. This will prevent the AFC from reaching for the more powerful signal thereby skipping over the weaker one. Whenever a weak station is being tuned, the AFC should be defeated.

Mode Selector Switch:

This switch selects between ordinary FM and FM Multiplex operation. For conventional FM listening allow the switch to remain in the "FM" position. For FM Multiplex stereo listening (when the Harman-Kardon multiplex adapter is plugged-in) throw the switch to "MX". The two indicator lamps behind the dial glass operate in conjunction with this switch as a visual aid.

Interchannel Muting Switch:

The purpose of the muting circuit is to reduce audible noise when tuning from station to station. Since very weak signals may be muted at the same time, the front panel INTERCHANNEL MUTING switch may be used to defeat the muting circuit on weak signals.

To eliminate interstation noise, throw the INTERCHANNEL MUTING switch "ON". To defeat the circuit, throw the switch "OFF".

Balance Meter:

The F500 FM tuner incorporates a D'Arsonval movement tuning meter for precise tuning. The BALANCE METER is used to tune to the exact center of the station channel and proper tuning is achieved when you are on a station and the BALANCE METER reads "O".

MX Dimension Control:

Provision has been made on the front panel to accept the multiplex adapter dimension control when the adapter is installed. Complete instructions for installing the adapter and control will be provided with your Harman-Kardon multiplex adapter.

Dial Scale:

The F-500 Dial Scale is marked with two scales, a frequency scale (88-108 MC), and a logging scale (0-100). Since most FM stations operate on frequencies which are not whole numbers (such as 96 MC as compared to 96.3) ideally each megacycle division on the frequency scale should be divided into 10 parts to enable the user to pinpoint the location of the station. This would require a dial scale which would be longer than the front panel.

The logging scale which is divided into 100 equal parts provides a means of finding your favorite station, once you have noted its position on the logging scale. For example, in New York City, WQXR operates on 96.3MC. After locating this station through the use of the frequency scale (between 96 and 98 MC), you find that the pointer falls on 46 on the logging scale. Make a note of this setting and when you next want to tune to WQXR, all that is necessary is to set the pointer to 46 on the logging scale.

Interchannel Threshold Adjustment:

This control is located on the top rear of the chassis and should be adjusted as follows: Tune in the weakest station in your area with the front panel Interchannel Muting switch in the "OFF" position. Tune off the station and throw the Inter-

channel Muting Switch "ON". Using a small screwdriver, rotate the "Threshold Adjustment" clockwise. Then rotate counter-clockwise until only a faint hiss is heard. Tune in again to the weak signal. If it still can be heard, and noise present off station is negligible, the adjustment can be considered satisfactory. NOTE: Maximum sensitivity is obtained with the Interchannel Muting Switch in the "OFF" position.

Range Switch:

The full sensitivity of the F500 is utilized when the RANGE switch is in the "DISTANT" position. However, on extremely strong signals, the switch should be in the "LOCAL" position to prevent overloading of the input stage.

ADDITIONAL INFORMATION

Fuse:

The F500 is protected by a 2 Amp-3AG fuse. In the event the fuse blows out, replace with only the same type used. Replacing with a fuse of a higher rating will not protect the tuner and will automatically void the warranty.

Hum:

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.

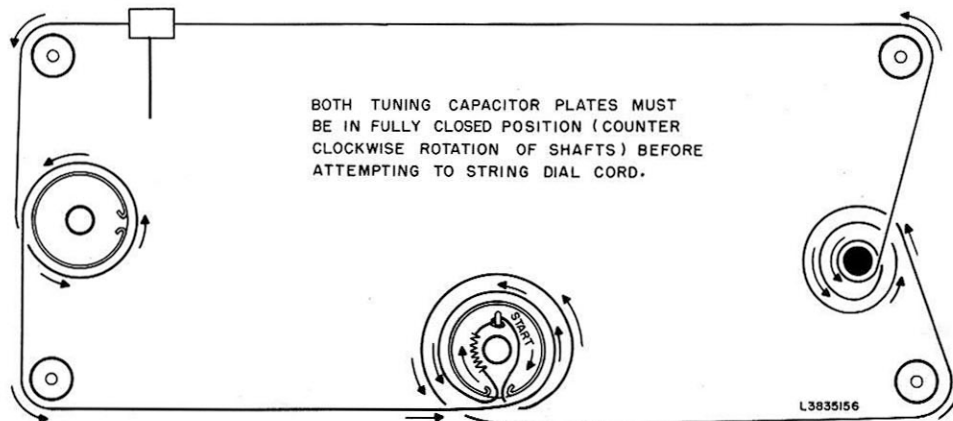
Routine Maintenance:

Due to the conservative design of the F500, no routine maintenance other than yearly tube checking is required.

Repair:

Only the most qualified service technician should be employed, as special equipment and training is required to properly service a high fidelity instrument. This manual contains information of great value to the repairman, and should be kept available.

Factory Warranty Stations are maintained in most major cities. For the address of the nearest one, or for any other information relating to your Harman-Kardon products, write to the attention of the Customer Service Department, Harman-Kardon, Inc., Plainview, L. I., N. Y. Be sure to include the model and serial number of the set in question. A short description of your complete installation is often of help in answering your questions.



ALIGNMENT PROCEDURE

Control Settings: Automatic Frequency Control off. Interchannel Muting Switch off. Range Switch in "Distant" position.

STEP	ALIGN.	GENERATOR SETTING		FEED SIGNAL	OUTPUT IND.	DIAL SETTING	ADJUST	ADJUST FOR	NOTES
		FREQ.	MODULATION						
1	IF	10.7 MC	None	See Note, last column	VTVM at IF Test Point	90 MC	1st, 2nd, 3rd, 4th IF Tran.	Maximum	Remove ECC85 (V2) tube shield. Couple signal by loop around tube.
2	Oscillator	90 MC	None	Antenna Terminals	Same	90 MC	Osc. Coil	Maximum	
3	Oscillator	106 MC	None	Same	Same	106 MC	Osc. Trimmer	Maximum	
4	Repeat steps 2 and 3.								
5	RF Amplifier	90 MC (See Note)	None	Same	Same	90 MC	Antenna Coil, RF Cathode Coil, RF Plate Coil	Maximum	Alternatively, an FM station, near specified frequency may be used as a signal source for steps 5 & 6.
6	RF Amplifier	106 MC	None	Same	Same	106 MC	Antenna Trimmer, RF Cathode Trimmer, RF Plate Trimmer	Maximum	
7	Repeat steps 5 and 6.								
8	Discriminator Transformer Primary (See Note)		Remove Generator Tune Off Station		Balance Meter	Off Station	Disc Primary (Bottom)	Maximum Positive Indication	Rotate top slug of discriminator transformer fully counter-clockwise before adjusting discriminator primary
9	Discriminator Transformer Secondary				Balance Meter	Off Station	Disc Secondary (Top)	Zero on Balance Meter	

MODEL F500 PARTS REPLACEMENT LIST

PART NO.	DESCRIPTION	PRICE
STCOM4566	Antenna Term Strip	.20
HC24625	AC Convenience Outlet	.20
STCOM4253	Phono Socket (3 Jack)	.30
P3824652	Bottom Plate	3.75
P3834748	Chassis Front Panel	9.15
ESCOM3652	Slide Switch (Grey)	1.00
ES3835100	Slide Switch (Grey)	1.00
HCOM3750	Fuse Holder	.85
ZCOM2856	Fuse 2 Amps (3 AG)	.10
JE3484159	Capacitor, 40/350 60-60/300	3.30
FT3835007	Power Transformer	11.75
M3834744	Meter (Balance)	8.25
P3834660	Dial Plate	1.95
KBCOM3429	Pilot Light #44 (2)	.25
KB1142117	Pilot Light #1847 (3)	.25
P3834761	Dial Glass	1.10
ER3654563	Control (Squelch)	.75
2783298	Power Switch	.75
	EZ81	2.00
	12AX7	3.00
	6BN6	3.50
3414016	IN541	pr. 1.80
GL3654577	Discriminator	5.00
RS3654592	330 Ohms 5W 10%	.30
RSCOM3692	12K 3W	.50
JE3283790	Electrolytic 2 μ fd 25V	.85
JE3584255	Electrolytic 50 mfd 6V	.40
Z2923361	Diode 1N87A	1.00
RWCOM5116	10,000 10W 10%	.50
GC3654594	Choke 80 μ h	.50
GC2503070	Choke 3.3 μ h	.50
PC3825094	Jewel On-Off Power	.15
P3824999	Jewel Pilot Light	.15
B3835023	Escutcheon	6.40
P3835004	Knob	1.00

NOTE: To speed handling of your order be sure to include both the model and serial numbers which appear at the back of the chassis, in addition to the quantity, part number and part description of the items ordered. Orders from independent dealers, independent servicemen, and retail customers will be shipped on a C.O.D. basis except for orders \$1.00 or less, for which remittance should be enclosed. Prices subject to change without notice. Harman-Kardon reserves the right to substitute equivalent parts for those originally installed in this chassis.