harman kardon

The Sonata

Model FA-10

INTRODUCTION

It is essential you read this instruction book carefully before setting up your high fidelity system. You have invested in a fine instrument into which many excellent engineering developments have been incorporated, and each is important for the proper operation of your system. This booklet has been written in non-technical language and if you will take the time to read it first before doing anything else, you will find it simple to obtain optimum performance from your Harman-Kardon unit.

UNPACKING

After unpacking the Sonata, Model FA-10, inspect it carefully for signs of damage in transit. This unit was subjected to many inspections and tests prior to final packing and it, therefore, should be in perfect condition. If damage is visible, notify your dealer at once. If the unit was shipped to you, notify the transportation company immediately.

Check the contents of the carton carefully and inspect the folds of the packing material before discarding it.

The package should contain:

1 Sonata, Model FA-10 FM tuner-amplifier combination.
1 Instruction Booklet.
1 Warranty Card.
1 Mounting Template.

WARRANTY

It is strongly urged that the warranty card be completed and mailed without delay, to protect your rights under warranty. These cards are carefully filed for reference and should you require information on the use of this high fidelity unit or repair service, we will be able to immediately identify your set and respond quickly.

It is necessary to receive factory authorization before returning a set for warranty repair. We will suggest a warranty station in your area and give you the proper procedure and authorization for shipping.

We warrant each Sonata, Model FA-10 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 covered by manufacturer's 90 day 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 judgement to affect its stability or reliability nor which has been subject to misuse, neglect, 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.

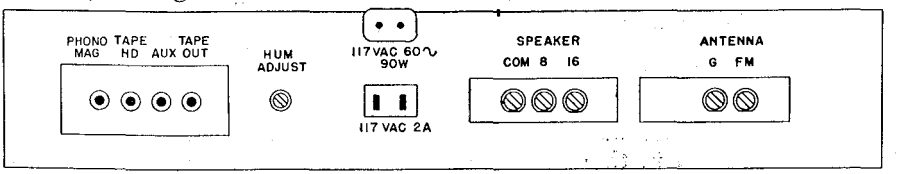
This warranty is expressly in lieu of all other warranties, express or implied, and of all other obligations or liabilities on our part, and we neither assume nor authorize any representative or other person to assume for us any other liability in connection with the sale of the Model FA-10, Sonata.

INSTALLATION PROCEDURE

Your FM-tuner-amplifier may be installed on an open shelf, table, bookcase or high fidelity equipment cabinet. For cabinet mounting, refer to the mounting template and instructions supplied with this book.

Ventilation:

The Sonata is well ventilated in itself, but sufficient space must be allowed around it to permit proper air flow. Permit the air to enter from one side or from the front, and allow it to dissipate through the rear. Do not place books or other objects on the cage or in the immediate vicinity of the amplifier. Reducing the air flow will result in sharply reduced component and tube life. For custom cabinet installation, the cage must be removed to assure maximum ventilation.



REAR PANEL CONNECTIONS FA 10

Power Requirements:

Plug the AC power cord into any outlet furnishing 117 volts, 60 cycle house current. The exact voltage is relatively unimportant and may vary between 105 and 125 volts. Be sure the power source is 60 cycles. The Sonata has a convenience AC power outlet on the rear of the chassis. Auxiliary high fidelity equipment may be plugged into this outlet and will be controlled by the on/off switch

Connecting Your Phonograph:

You may use a record changer or turntable and arm with the Sonata. To derive maximum performance, it is suggested a high quality pickup and rumble-free turntable be used. The magnetic cartridges available today are excellent and may be hooked directly into the "Phono-Mag" jack located on the rear of the chassis.

It is suggested to ground the phonograph chassis to the receiver chassis in order to reduce unwanted noise and hum. Attach a heavy wire to the metal framework of the changer and connect the other end to the "COM" terminal on the Speaker Terminal Strip.

A ceramic or crystal cartridge may be used with the Sonata. The cartridge is connected directly to the "Aux" jack on the rear panel and should never be connected to the "Phono-Mag" position on the rear terminal strip.

Connecting Your Tape Recorder:

Program material from a tape recorder may be connected to the Sonata in two ways. If the tape machine incorporates a preamplifier stage, it should be connected to the "Aux" jack on the rear panel of the unit. If the tape recorder has no preamplifier stage, the playback head may be connected directly to the "Tape HD" jack on the rear panel. Setting the Function Selector Switch in the position marked "Tape Head" will then activate the "Tape HD" jack and provide the proper playback equalization for prerecorded tape.

To Make A Recording:

A jack marked "Tape Out" is located on the rear of the chassis. This will provide program material to a tape recorder or other auxiliary equipment. Any program appearing at the speaker terminals also appears at the "Tape Out" jack, but unmodified by the volume and tone controls. This enables you to record a program with the proper recording equalization as determined by your tape recorder.

while simultaneously monitoring the program with the proper tone control and volume setting.

The Auxiliary Input:

There is an Auxiliary input located on the rear panel. Plug all high level equipment such as a T.V. tuner, tape recorder, ceramic and crystal cartridges into this receptacle. This position is controlled by the Function Selector Switch on the front panel.

Connecting Your Loudspeaker:

The loudspeaker manufacturer usually includes the impedance rating of the speaker either on the back of the voice coil or in accompanying literature. Connect one speaker wire to the "COM" terminal (this is ground) and the other wire to either 16 Ohms or 8 Ohms according to the recommended impedance. If the speaker is 4 Ohms it may be connected to the 8 Ohm terminal without seriously affecting overall performance.

Connecting Your FM Antenna:

Due to the extremely high FM sensitivity of the Sonata, a 48" piece of wire will be sufficient antenna for all but the most difficult locations. One end of this wire should be trimmed (remove about ½" of the insulation) and fastened to the "FM" terminal on the Antenna strip located on the rear of the chassis. The other end may be left free and extended as may be convenient. Horizontal positioning of the wire usually delivers maximum signal pickup. The wire may be tacked or stapled to the rear of the bookcase or equipment cabinet if preferred.

If, for some reason, an outside antenna is necessary, do not use your TV antenna. A folded dipole or Yagi cut for the FM band (88-108 mc) should be used. Attach one end of the 300 Ohm lead-in wire to the antenna and the other end to terminals "G" and "FM" on the Antenna Terminal Strip.

OPERATING INSTRUCTIONS

Your Sonata receiver incorporates the following operating controls located on the front panel. Each control has a specific useful function related to each of the other controls and a proper understanding of the operation of the various controls will doubtless prove useful in organizing and clarifying them for you.

Viewing your receiver from left to right, you will find the Contour Control, Loudness Control (on/off switch is incorporated into this control), Treble Control, & Bass Control. Directly above the tone controls you will note the Function Selector Switch and Tuning Control.

To operate, turn the Volume Control clockwise and set at approximately ⅓ volume. Turn the Function Selector Switch to "RIAA-Phono" and activate your turntable or changer. The Bass and Treble Controls should be set in the "flat" position with the white lines on the knobs pointing straight up.

Adjust the volume to a comfortable listening level and slowly adjust the Bass and Treble tone controls to correct for the loudspeaker characteristics and room acoustics. It is not wise to rotate the controls to their extremes for this will create false high frequency and low frequency response.

The Function Selector Switch has 4 positions. Its use is to select the desired type of program. The first position (reading from left to right) controls the "Tape HD" jack on the rear panel. To play back your tape deck through the Sonata when the program source is taken directly off the tape head, turn the Function Selector to "Tape HD" and the program will be played back with the proper equalization.

The magnetic cartridge on your changer or turntable is controlled by the Function Switch set to the "Phono-RIAA" position. This automatically equalizes for the majority of records manufactured today.

The third switching position activates the FM tuner and the fourth position enables you to use your tape recorder, ceramic or crystal cartridge when plugged into the "Aux" jack.

Loudness Control:

This adjusts the volume level of all program material. Its effect is selectively varied by the Contour Control.

Contour Control:

One of the limitations of human hearing is its tendency to lose sensitivity to very low pitched sounds as the sound level is reduced. To a very small degree, this also applies to very high pitched sounds. It is this characteristic (known as the Fletcher-Munson effect) which causes one to play music programs at high volume in order to experience the fullness of tone available from fine modern recordings. The Harman-Kardon Contour Control compensates for the Fletcher-Munson effect, eliminating high listening levels as a requisite for full enjoyment of reproduced music. Three positions of compensation are provided to allow the selection of the one most suited to your hearing.

Each position (0-2) causes the Loudness (volume) Control to perform with a different degree of compensation, the amount increasing with each clockwise setting. Position O is uncompensated. Position 1 provides somewhat less compensation than required to match the Fletcher-Munson curves and position 2 matches the curves. Since hearing characteristics differ from person to person (some require more and others less compensation) the great flexibility provided in this control can be appreciated.

In operation, the proper choice of contour is easily made, by switching through the several contour positions and selecting the one which sounds best to you.

Bass and Treble Controls:

Separate tone controls are provided in order to realize the full range of tone adjustment required for maximum high fidelity listening. The controls may either boost or cut the Bass and Treble tones of the program source. The controls should be set in accordance with your own hearing preference, speaker characteristics and room acoustics.

Tuning Control:

This selects the desired FM station when the Function Selector Switch is in the "FM" position.

ADJUSTMENTS

The hum adjustment screw is located on the rear of the unit to the left of the AC auxiliary receptacle. Set the Function Selector Switch on "RIAA-Phono", tone controls to "flat" (white lines on knobs pointing straight up) and Volume Control to approximately ½ volume. Now turn the hum adjust screw for minimum hum in your loudspeaker system.

In some installations where a record player, tape recorder or other auxiliary AC operated equipment is used, hum may be encountered due to voltage differences between the various units. This may be eliminated by reversing one or all of the AC power plugs. Simply reverse one at a time until improvement is experienced.

The Balance Potentiometer is accessible through a hole on the bottom plate or through the top of the set with the cage removed between the contour switch and power transformer.

This control should be adjusted only by a competent service technician. Procedure for adjustment is as follows. Remove the phase inverter tube 12AX7/ECC-83, physically located behind the on/off switch and volume control. Observe wave form on a scope and adjust the balance potentiometer for minimum vertical deflection. If using an audio VTVM which would connect across speaker terminals and proper load resistor (16 ohms) tune for minimum reading on the meter.

MAINTENANCE AND REPAIR

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

SERVICE NOTES

Servicing printed wiring is a relatively simple matter and is no more complicated than servicing conventionally wired circuits. No special tools or skills are required and if you follow the outlined procedure, a repair can be easily made.

Avoid damage to the copper foil. Remove components carefully. If the copper is damaged, the broken spot may be jumped with a small piece of wire or bridged with molten solder.

Avoid damage to the printed board. Do not press the board, especially when changing tubes. The board is sturdy in construction, but may break if proper care is not taken when servicing.

Avoid excessive solder deposits. In some areas on the board, wiring is closely spaced. Be careful not to bridge two leads with excessive solder. This may cause a short or intermittent trouble.

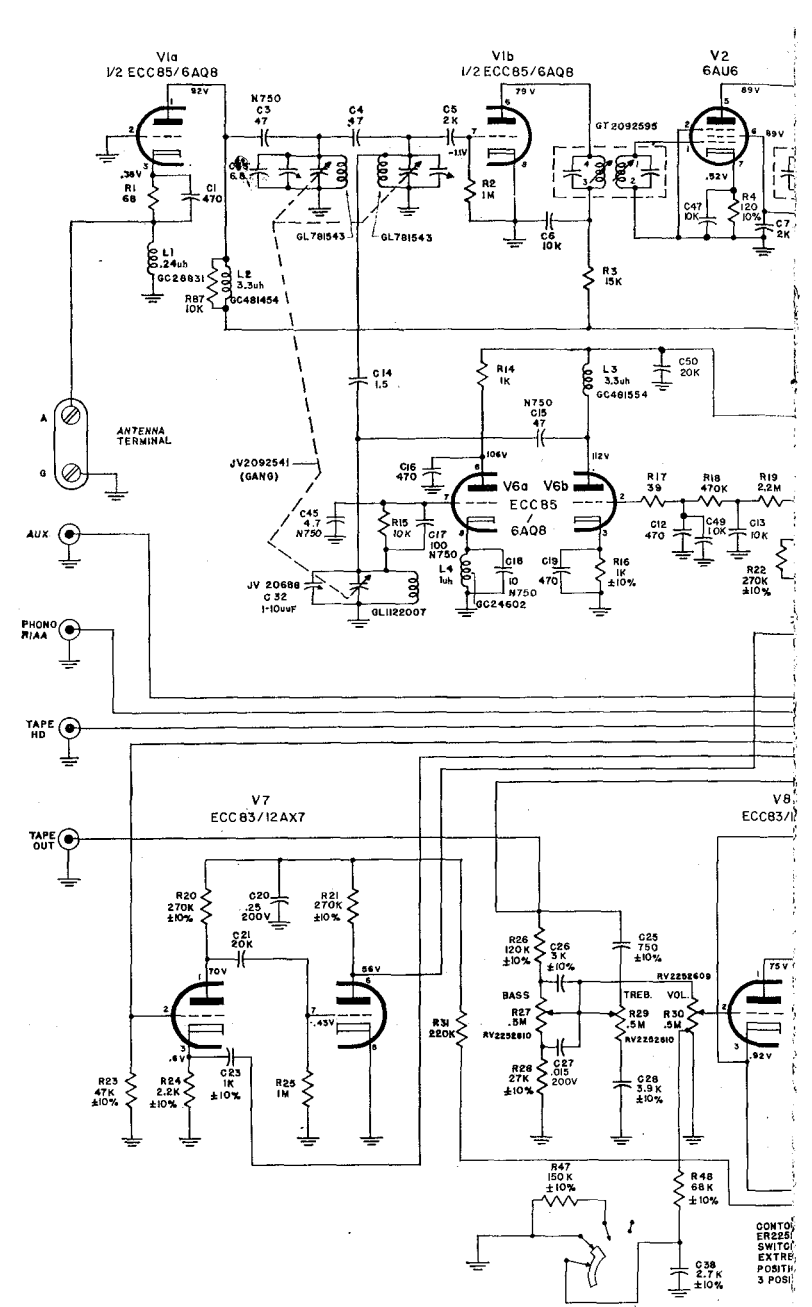
Avoid overheating. Use an iron 35 watts or less and do not hold the iron to the connection for a longer period of time than necessary.

Tools and materials required. Low wattage iron, small wire brush, 60% tin – 40% lead low temperature solder-rosin core, thin bladed knife and a small pick or soldering aid.

SPECIFICATIONS

For those who are technically minded, we have listed a brief summation of the excellent performance characteristics of the Sonata. All specifications are based on actual measurement using the most accurate test equipment available.

AUDIO	
Circuits	2-EL84's Pentode Connected
Output Level	10 Watts at less than 1% Harmonic Dist. 2% IM 60/7000 cps. 4:1 Ratio
Peak Power Output	16 Watts
Frequency Response	±0.5 db 15-30,000 cps. at 2 Watts ±1.0 db 45-20,000 cps. at 10 Watts
Tone Control Range	±12 db at 50 cps. ±12 db at 10 KC
RF	
Circuits	Armstrong Circuit with Limiter and Wide Band Discriminator, Automatic Frequency Control, Low Noise Front End consisting of Tuned Triode Grounded Grid Amplifier and Triode Mixer.
Sensitivity:	
(for 30 db of quieting)	7 microvolts
(for 20 db of quieting)	4 microvolts
Selectivity:	200 KC Bandwidth: 6 db down.
Discriminator Peak to Peak Separation:	600 KC
Frequency Range	88-108 MC
Drift	±5 KC Max.
Image Rejection	40 db
IF Rejection	70 db
Antenna Input	300 ohms
Distortion	Less than 1% harmonic and IM standard 75 micro-second deemphasis
Hum Level	60 db below 100% modulation
Radiation	Within FCC requirements



RESISTANCE CHART

TUBE	1	2	3	4	5	6	7	
V1 ECC 85	∞	0	68	0	0	∞	3M	
V2 6AU6	0	0	0	0	∞	∞	120	
V3 6AU6	0	0	0	0	∞	∞	120	
V4 6AU6	100K	0	0	0	∞	∞	0	
V5 6AL5	0	200K	0	0	400K	0	200K	
V6 ECC85	∞	3.5 M	1K	0	0	∞	20K	
V7 ECC83	∞	50K	2500	240	240	∞	1M	
V8 ECC 83	300K	27	1500	240	240	∞	10 M	15
V9 EL 84	450K	450K	160	240	240	∞	∞	0
V10 EL 84	450K	450K	160	240	240	∞	∞	0
V11 EZ 81	58	∞	∞	240	240	∞	50	0

NOTES:

UNLESS OTHERWISE SPECIFIED,
ALL RESISTORS 1/2 WATT ±20% AND IN OHMS.
ALL CAPACITOR VALUES WITH DECIMAL POINT TO BE PAPER IN MFD ±20%.
ALL CAPACITOR VALUES WITHOUT DECIMAL POINT TO BE GENERAL PURPOSE CERAMICS 500 WV DC IN MMF.

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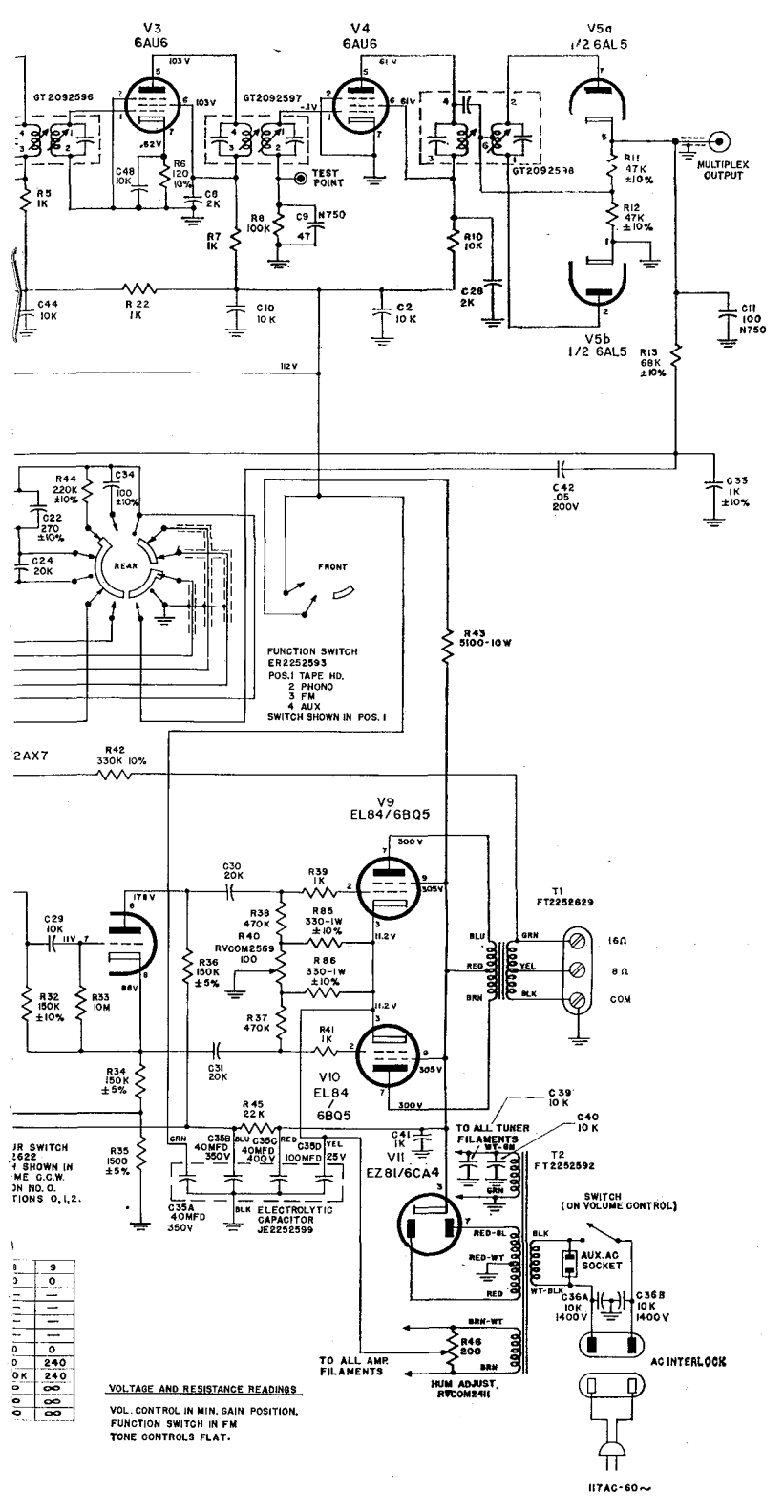
S484


V3
6AU6
V4
6AU6
V5a
1/2 6AL5
V5b
1/2 6AL5
GT2092596
GT2092597
GT2092538
TEST POINT
MULTIPLEX OUTPUT
R5 1K
C48 10K
R6 120 10%
C6 2K
R7 1K
R8 100K
C9 N750 47
R10 10K
C26 2K
R11 47K ±10%
R12 47K ±10%
R13 68K ±10%
C44 10K
R 22 1K
C10 10 K
C2 10 K
C11 100 N750
112V
C42 .05 200V
C33 1K ±10%
R44 220K ±10%
C34 100 ±10%
C22 270 ±10%
C24 20K
REAR
FRONT
FUNCTION SWITCH ER2252593
POS.1 TAPE HD.
2 PHONO
3 FM
4 AUX
SWITCH SHOWN IN POS. 1
R43 5100-10W
2AX7
R42 330K 10%
V9
EL84/6BQ5
C30 20K
R39 1K
R38 470K
R85 330-1W ±10%
R40 RVCOM2569 100
R86 330-1W ±10%
R36 150K ±5%
R37 470K
R41 1K
C31 20K
C29 10K
R32 150K ±10%
R33 10M
R34 150K ±5%
R35 1500 ±5%
R45 22K
V10
EL84
6BQ5
T1
FT2252629
16Ω
8Ω
COM
BLU
GRN
RED
YEL
BRN
BLK
C39 10 K
C40 10 K
TO ALL TUNER FILAMENTS
WT-GR
C41 1K
V11
EZ81/6CA4
T2
FT2252592
SWITCH (ON VOLUME CONTROL)
RED-BL
BLK
RED-WT
AUX. AC SOCKET
WT-BLK
RED
C36A 10K 1400V
C36B 10K 1400V
BRN-WT
R46 200
BRN
AC INTERLOCK
TO ALL AMP FILAMENTS
HUM ADJUST. RVCOM2411
C35A 40MFD 350V
C35B 40MFD 400V
C35C 100MFD 25V
BLK
ELECTROLYTIC CAPACITOR JE2252599
117AC-60~
VOLTAGE AND RESISTANCE READINGS
VOL. CONTROL IN MIN. GAIN POSITION.
FUNCTION SWITCH IN FM
TONE CONTROLS FLAT.

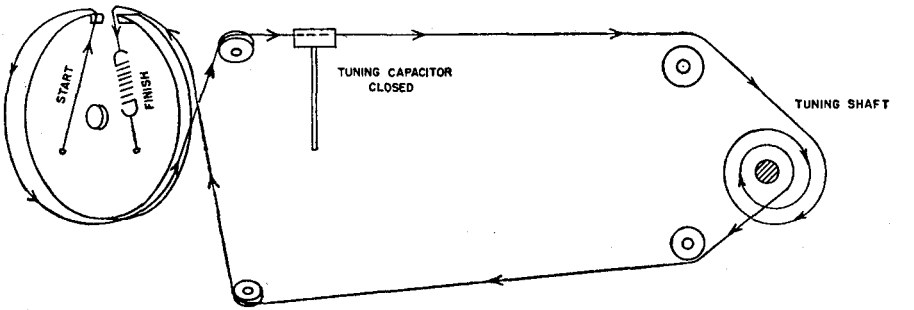
ALIGNMENT PROCEDURE

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	300 KC FM 60 CPS	FM MIXER GANG	AC-VTVM OR SCOPE	TEST POINT		3 FM IF TRANS.	MAX GAIN & SYMMETRY
FM	10.7 MC	300 KC FM 60 CPS	FM MIXER GANG	AC-VTVM OR SCOPE	TUNER OUTPUT		DISCR. TRANS	S PATTERN OF MAX GAIN & SYMM.
FM	106 MC	300 KC 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	300 KC FM 60 CPS	FM ANT. TERMINAL	AC-VTVM OR SCOPE	TEST POINT	90 MC	OSC. RF. MIXER COILS	MAXIMUM OUPTPUT

LIST OF REPLACEABLE PARTS

Model FA10

H-K Part No.	Description	List Price
RV2252610	Control, Bass	$ 1.00
RV2252610	Control, Treble	1.00
RV2252609	Control, Loudness	1.40
ER 2252622	Switch, Contour	1.75
ER2252593	Switch, Function	1.80
FT2252592	Transformer, Power	14.00
FT2252629	Transformer, Output	7.00
P2252617	Dial Glass	.80
P1712390	Pointer	.15
JV2092541	Cond. Variable	4.50
STCOM2529	Pulley, Variable	.15
GT2092595	Transformer 1st IF	1.55
GT2092596	Transformer 2nd IF	1.55
GT2092597	Transformer 3rd IF	1.55
GT2092598	Transformer Disc	2.00
JE2252599	Capacitor, Elect.	3.75
P2252603	Escutcheon	3.00
P2252601	Cage	7.00
P22783	Knob w/white line	.15
P22783	Knob, tuning	.15
L2252635	Instruction Book	.50
L2252636	Mounting Template	.25



STRINGING DIAGRAM FOR MODEL FA 10
(FRONT VIEW)