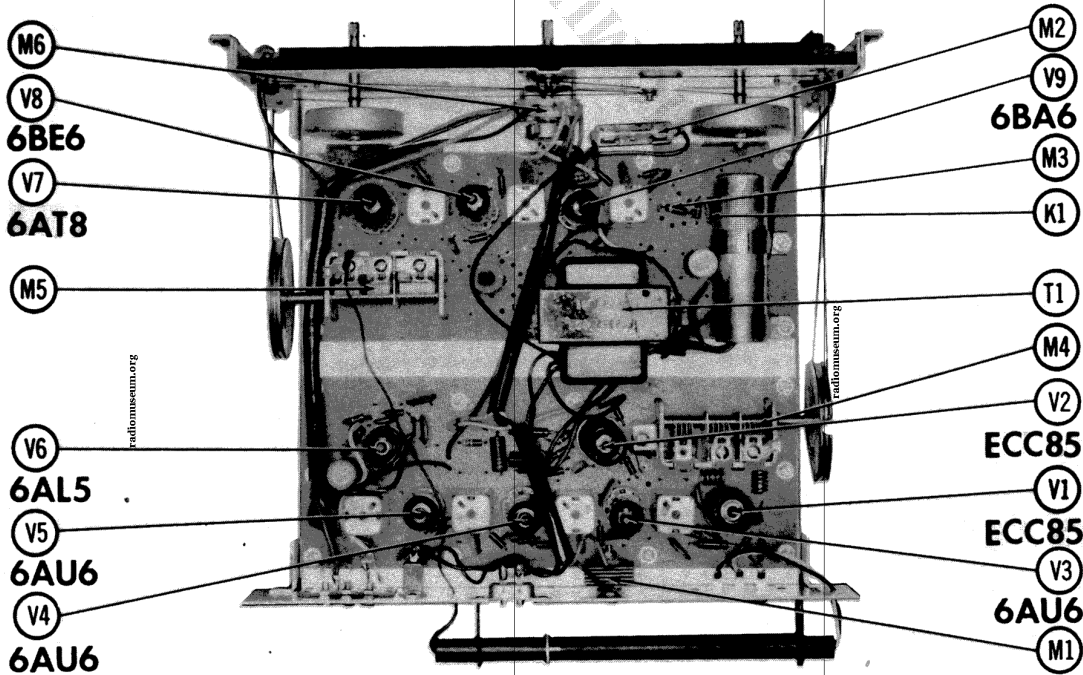


HARMAN-KARDON  
MODEL T-230

TRADE NAME	Harman-Kardon Model T-230 (The Sonnet)		
MANUFACTURER	Harman-Kardon, Inc., 520 Main Street, Westbury, L. I., N. Y.		
TYPE SET	AC Operated 9 Tube FM-AM Tuner		
POWER SUPPLY	105 - 125 Volts AC, 60 Cycles	RATING	37 Watts, .38 Amp. @117 Volts AC
TUNING RANGE - BROADCAST	530 - 1640KC	FREQ. MOD.	88 - 108MC

HARMAN-KARDON  
MODEL T-230



**HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana**

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of KL022

the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

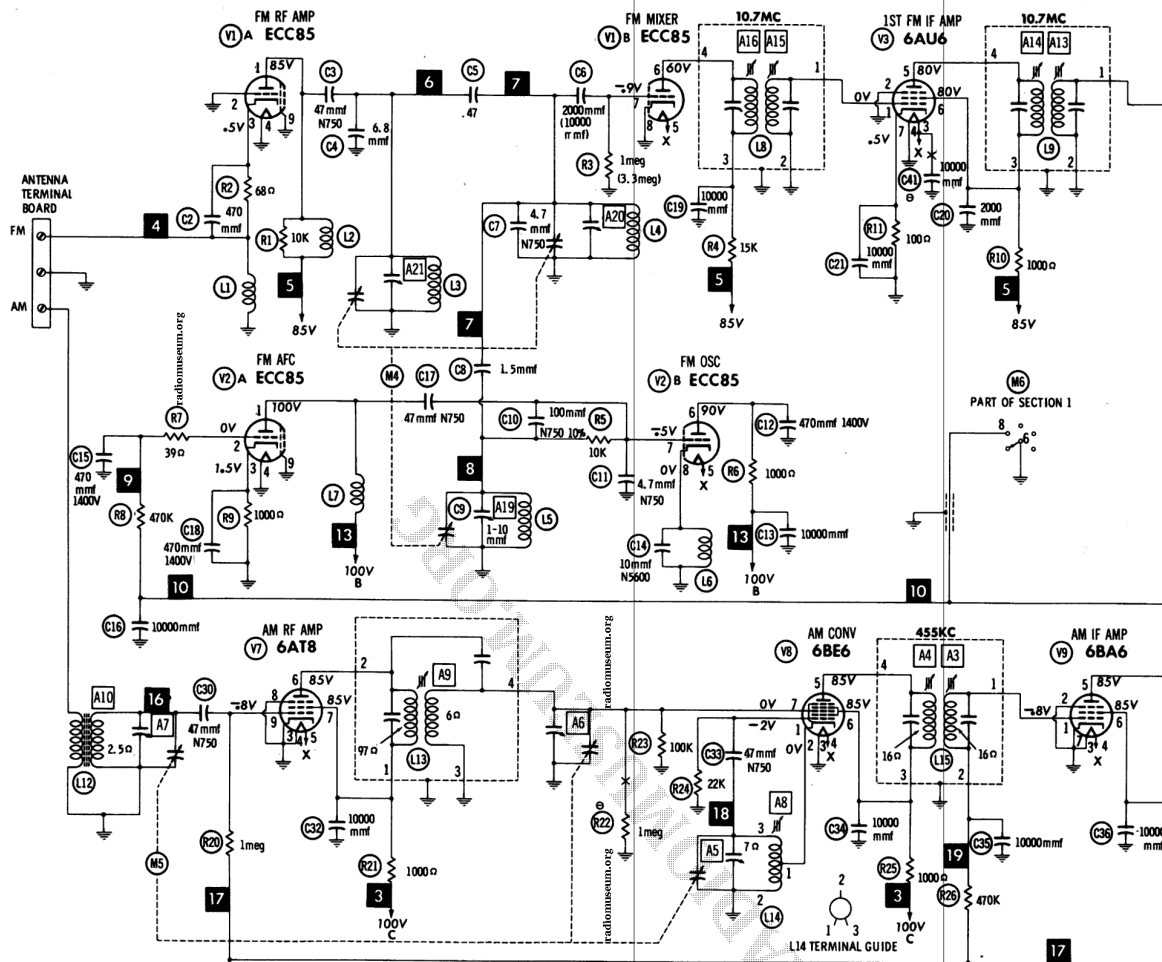


DATE 9 - 60

SET497

FOLDER 8

SET 497  
FOLDER 8



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

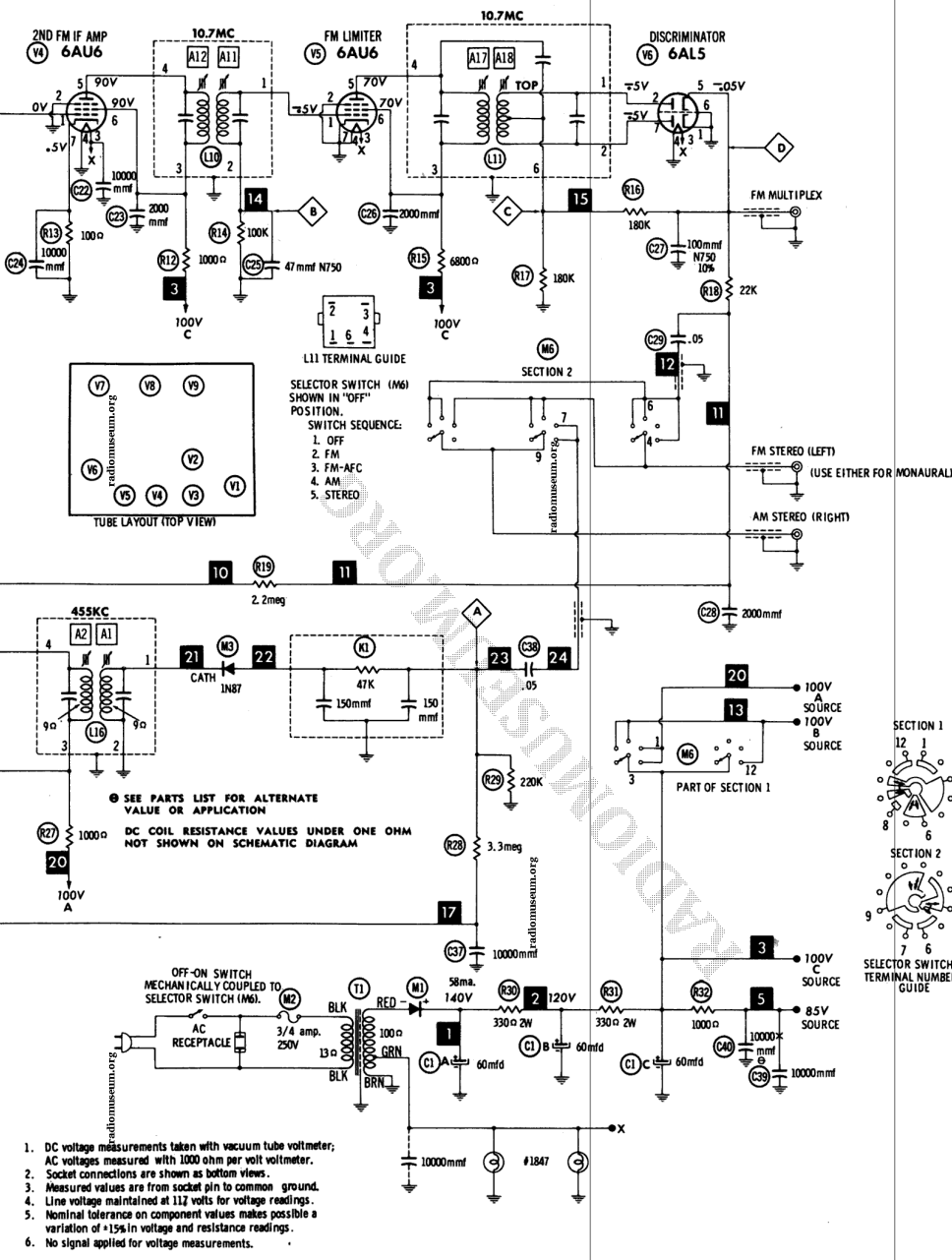
RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC85 6AQ8	11600Ω	0Ω	68Ω	0Ω	.1Ω	117K	1meg	0Ω	0Ω
V2	ECC85 6AQ8	1660Ω	0Ω	1000Ω	0Ω	.1Ω	11600Ω	10K	.1Ω	0Ω
V3	6AU6	.1Ω	0Ω	.1Ω	0Ω	12600Ω	12600Ω	100Ω		
V4	6AU6	.5Ω	0Ω	.1Ω	0Ω	11600Ω	11600Ω	100Ω		
V5	6AU8	100K	0Ω	.1Ω	0Ω	17400Ω	17400Ω	0Ω		
V6	6AL5	0Ω	180K	.1Ω	0Ω	360K	0Ω	180K		
V7	6AT8	NC	NC	0Ω	0Ω	.1Ω	11600Ω	11600Ω	0Ω	4.8meg
V8	6BE6	22K	.5Ω	0Ω	.1Ω	11600Ω	11600Ω	6Ω		
V9	6BA6	4meg	0Ω	0Ω	.1Ω	11600Ω	11600Ω	0Ω		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE INDICATED.  
 † MEASURED FROM OUTPUT OF M1  
 NC NO CONNECTION.

A PHOTOFAC STANDARD NOTATION SCHEMATIC  
 with CIRCUITRACE  
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HARMAN-KARDON  
MODEL T-230

HARMAN-KARDON  
MODEL T-230

FOLDER 8

# ALIGNMENT INSTRUCTIONS

## ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.

Suggested alignment tools: A1 thru A4, A9, A11 thru A18. . . . GENERAL CEMENT #5097, 8727  
 WALSCO #2515  
 A5, A6, A7, A19, A20, A21. . . . . GENERAL CEMENT #5004, 5008, 5009  
 WALSCO #2520  
 A8. . . . . GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440  
 WALSCO #2526, 2543, 2544, 2545

### AM ALIGNMENT—SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400v Mod.)	(AM) Tuning gang fully open.	DC probe to point $\diamond A$ . Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	High side thru .001mfd to AM antenna terminal. Low side to chassis.	1400KC	1400KC	"	A5, A6, A7	"
3.	"	600KC	600KC	"	A8, A9, A10	Adjust for maximum deflection Repeat Step 2.

### FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	High side thru .001mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe to point $\diamond B$ . Common to chassis.	A11, A12, A13, A14, A15, A16	Adjust for maximum deflection.
5.	"	"	"	DC probe thru 1meg to point $\diamond C$ . Common to chassis.	A17	"
6.	"	"	"	DC probe to point $\diamond D$ . Common to chassis.	A18	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

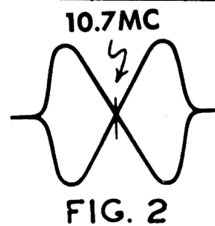
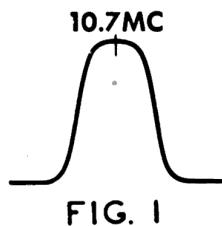
### FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE—SELECTOR IN FM POSITION

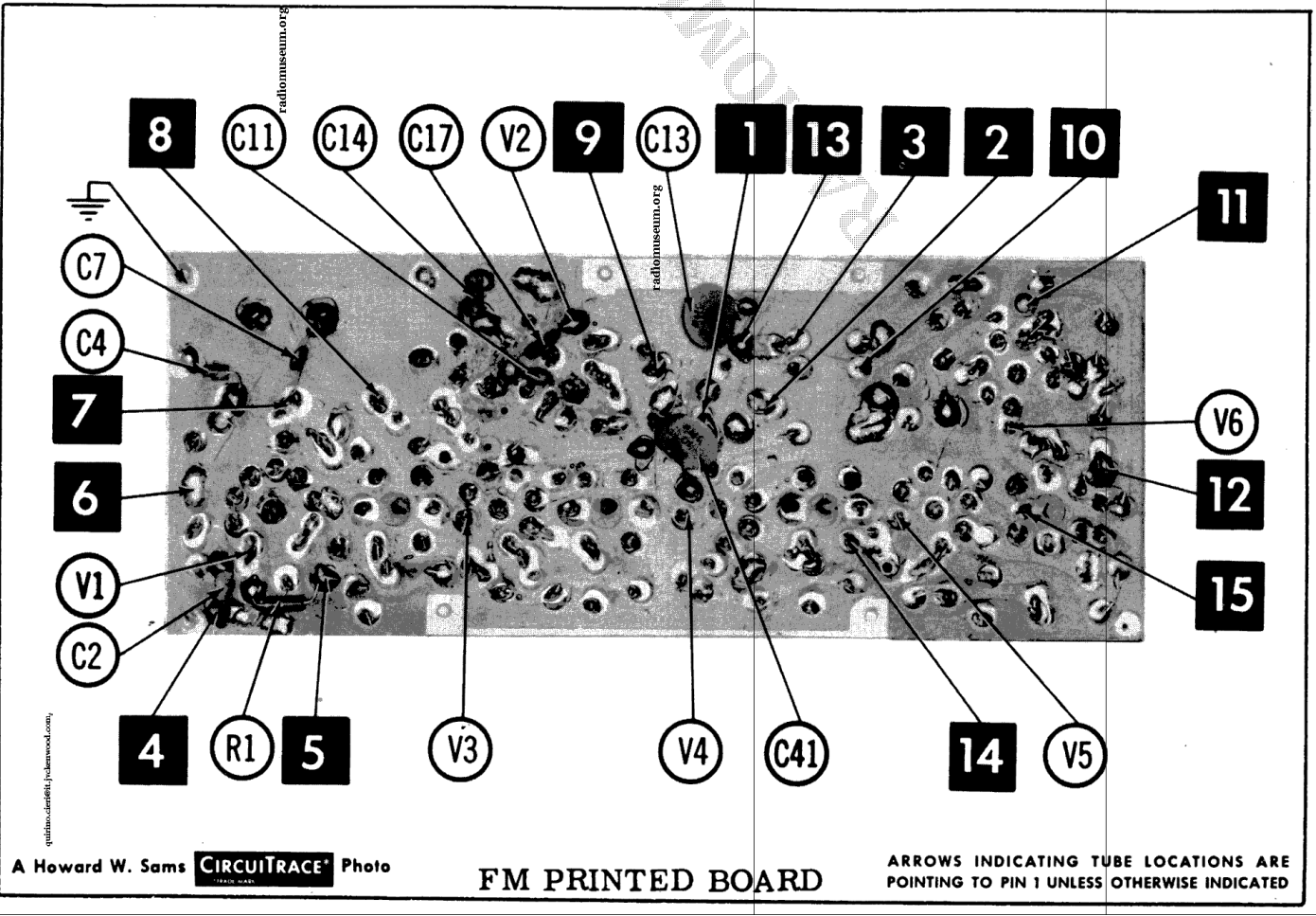
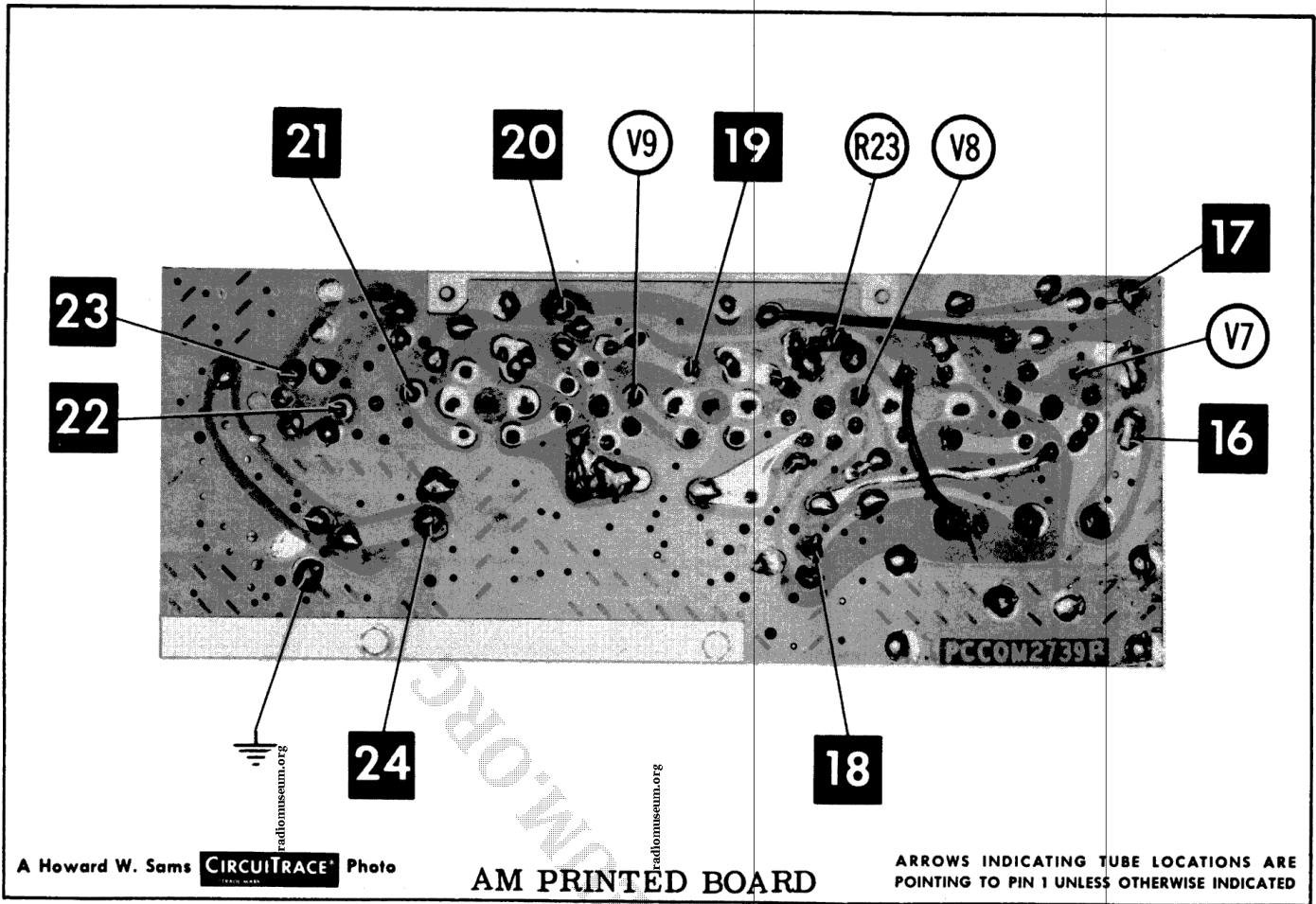
Use frequency modulated signal with 60v modulation and 450KC sweep. Use 120v sawtooth voltage in scope for horizontal deflection.

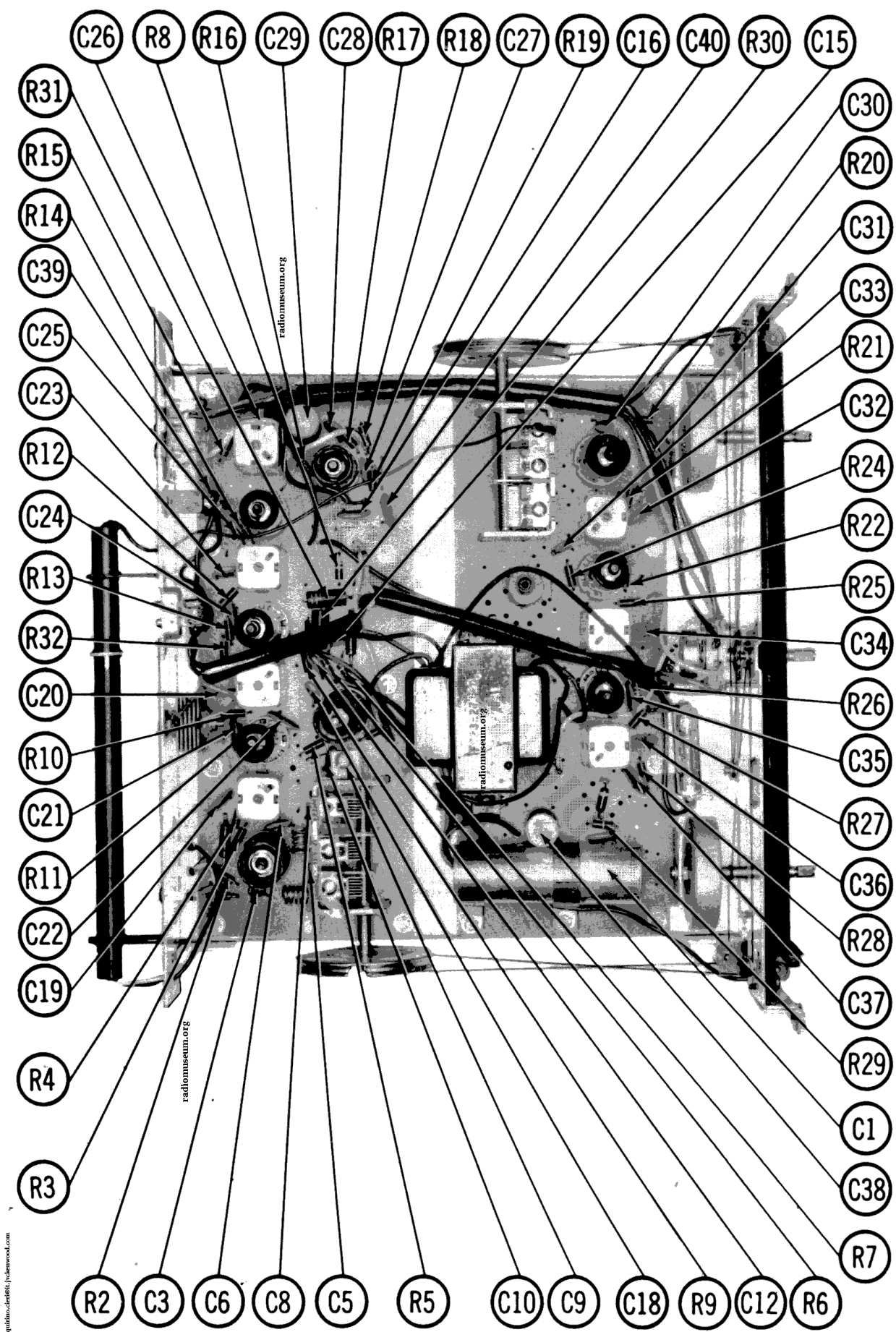
	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	High side thru .001mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp to point $\diamond B$ . Low side to chassis.	A11, A12, A13, A14, A15, A16	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
5.	"	"	"	Vert. amp thru 27K to point $\diamond C$ . Low side to chassis.	A17	"
6.	"	"	"	Vert. amp to point $\diamond D$ . Low side to chassis.	A18	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A17 for maximum amplitude and straightness of crossover lines.

### FM RF ALIGNMENT—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	Across FM Antenna terminals.	106MC (Unmod.)	(FM) 106MC	DC probe to point $\diamond B$ . Common to chassis.	A19, A20, A21	Adjust for maximum deflection.
8.	"	90MC	90MC	"	L5, L4, L3	Adjust for maximum deflection by expanding or compressing coil turns.







CHASSIS TOP VIEW-CAPACITOR AND RESISTOR IDENTIFICATION

HARMAN-KARDON  
MODEL T-230

FOLDER 8

## PARTS LIST AND DESCRIPTIONS

quirino.cieri@it.jyckenwood.com

### TUBES

CBS			GENERAL ELECTRIC			RAYTHEON			SYLVANIA		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE	ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	FM RF Amp. -FM Mixer	ECC85/ 6AQ8	V6	Discriminator	6AL5						
V2	FM Osc. -FM AFC	ECC85/ 6AQ8	V7	AM RF Amplifier	6AT8						
V3	1st FM IF Amplifier	6AU6	V8	AM Converter	6BE6						
V4	2nd FM IF Amplifier	6AU6	V9	AM IF Amplifier	6BA6						
V5	FM Limiter	6AU6									

### ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA					NOTES
	CAP.	VOLT.	Harman-Kardon PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	
C1A	60	200	JE2352713	PR3-020	BBRT0235	WT458		TVAS-3470 *
B	60	200						
C	60	200						

\* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

### FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA						
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	470	(10000) †	BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47	
C3	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CNO-447	10TCU-Q47	
C4	6.8		NPO-SI 6.8	TCZ-6.8	C10V68C	CCTO-6R8	CNO-568	10TCC-V68	
C5	.47		NPO-SI .5	TCZ-R47					
C6	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20	
C7	4.7 N750		1.5	DTN-5	DTN-5	C10V5U	CCTN-050	CN7-547	10TCU-V50
C8	1.5			NPO-SI 1.5	TCZ-1R5	C10V15C		CNO-515	10TCC-V15
C9	1-10		100 N750 10%	829-10	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C10	100 N750 10%			N750-DI 100	DTN-100	C10V5U	CCTN-4R7	CN7-547	10TCU-V50
C11	4.7 N750		10000	HVD-15-470	DD30-471	HVB20T47	3CCD-471	2DY-347	30GA-T47
C12	470 1400V			PPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C13	10000		470 1400V	HVD-15-470	DD30-471	HVB20T47	3CCD-471	2DY-347	30GA-T47
C14	10 N5600			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C15	470 1400V		10000	N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C16	10000			HVD-15-470	DD30-471	HVB20T47	3CCD-471	B-110	5HK-S10
C17	47 N750		10000	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C18	470 1400V			BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C19	10000		10000	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C20	2000			BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C21	10000		10000	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C22	10000			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C23	2000		10000	BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C24	10000			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C25	47 N750		100 N750 10%	N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C26	2000			BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C27	100 N750 10%	.05 200V	N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10	
C28	2000		BPD-002	DD-102	BYA10D2	CCD-202	B-220	5HK-D20	
C29	.05 200V	47 N750	P2151N-047	DD-503	BC2S47J	4DP-3-503	ACE-615	2SE-S47	
C30	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-47	CN7-447	10TCU-Q47	
C31	.05 400V	10000	P488N-05	DD-503	CUB455	4DP-3-503	GEM-415	4TM-S5	
C32	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C33	47 N750	10000	N750-DI 47	DTN-47	C10Q47U	CCTN-47	CN7-447	10TCU-Q47	
C34	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C35	10000	.05 200V	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C36	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C37	10000	10000	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C38	.05 200V		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C39	10000	Note 1	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C40	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C41	10000	Note 1	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	

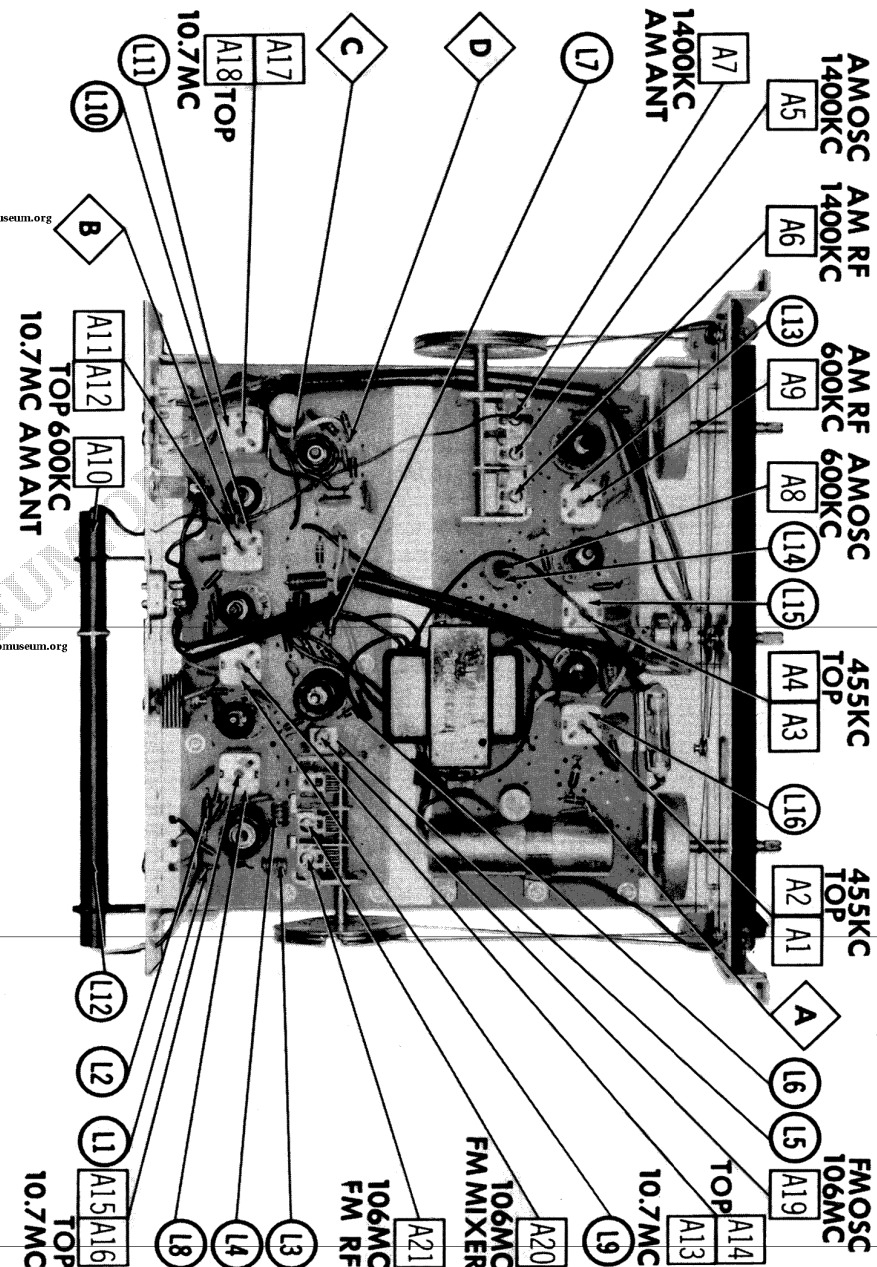
Note 1. Not used in some versions.

† Alternate Value.

\* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FOLDER 8

## CHASSIS—TOP VIEW



HARMAN-KARDON  
MODEL T-230

## PARTS LIST AND DESCRIPTIONS (Continued)

### RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS	ITEM No.	RATING	REMARKS
R1	10K	(3.3meg) *	R12	1000Ω	radiomuseum.org Note 1
R2	68Ω		R13	100Ω	
R3	1meg		R14	100K *	
R4	15K		R15	6800Ω	
R5	10K		R16	180K	
R6	1000Ω		R17	180K	
R7	39Ω		R18	22K	
R8	470K		R19	2.2meg	
R9	1000Ω		R20	1meg	
R10	1000Ω		R21	1000Ω	
R11	100Ω		R22	1meg	

\* Alternate Value.  
Note 1. Not used in some versions.

### COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Harman-Kardon PART No.	REPLACEMENT DATA
K1	AM Det. RF Filter	150mmf, 150mmf, 47K	PC781599	Aerovox PA-98 Centralab PC-51 Cornell-Dubilier 111TM2 Sprague D-2

### COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES <small>radiomuseum.org</small>	
		Harman-Kardon PART No.	Gromer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.		
L1	FM Ant. Coil		19-2003	19-2003	BC-584	4584	.24uh 3.3uh  1uh 3.3uh		
L2	RF Coil		19-1003	19-1003		4608			
L3	FM RF Coil		GT2092595	19-1000	19-1000	BC-561		4602	
L4	FM Mixer Coil			19-1003	19-1003	BC-564		4608	
L5	FM Osc. Coil			16-3490	16-3490	1463-PC		1463-PC	
L6	Cathode Choke			16-3490	16-3490	1463-PC		1463-PC	
L7	RF Choke			14-7002	14-7002	BC-418		705-A	
L8	1st FM IF Trans.			16-6780	16-6780	BC-356		13-PC1	RF-4
L9	2nd FM IF Trans.			16-6780	16-6780	BC-357		13-PC2	RF-4
L10	3rd FM IF Trans.								
L11	Discriminator								
L12	Loopstick								
L13	AM RF Trans.								
L14	AM Osc. Coil								
L15	1st AM IF Trans.								
L16	2nd AM IF Trans.								

### TRANSFORMER (POWER)

ITEM No.	RATING		REPLACEMENT DATA						
	PRI.	SEC. I	Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
	T1	117V @ .38A	120V @ .055A Tap 6.3V @ 3.1A	FT2352712					

### RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	Harman-Kardon PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.058A	Z1122134 *	T075 *	I234AH *	75 *	SR200 *	* Selenium Type * Silicon Type

### FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Harman-Kardon PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	3/4A 250V			312.750 (3AG 3/4A 250V)	357001	AGC 3/4	4405

### CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		Harman-Kardon PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M3	1N87	GC2923361	1N60	1N60	1N60	AM Det. (Pigtail)

### MISCELLANEOUS

ITEM No.	PART NAME	Harman-Kardon PART No.	NOTES
M4	Tuning Cap.	JV2092541	FM, 3 Gang AM, 3 Gang Function
M5	Tuning Cap.	JV2352725	
M6	Switch	ER2353488	

### CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART No.	DESCRIPTION
Knob Dial Glass	PCOM3468 P2353518	Tuning Function

### WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors  
8524 (Stranded) Available in Ten Colors  
Power Cord (Interlock Type) ..... Use BELDEN No. 8874

### DIAL CORD STRINGING

