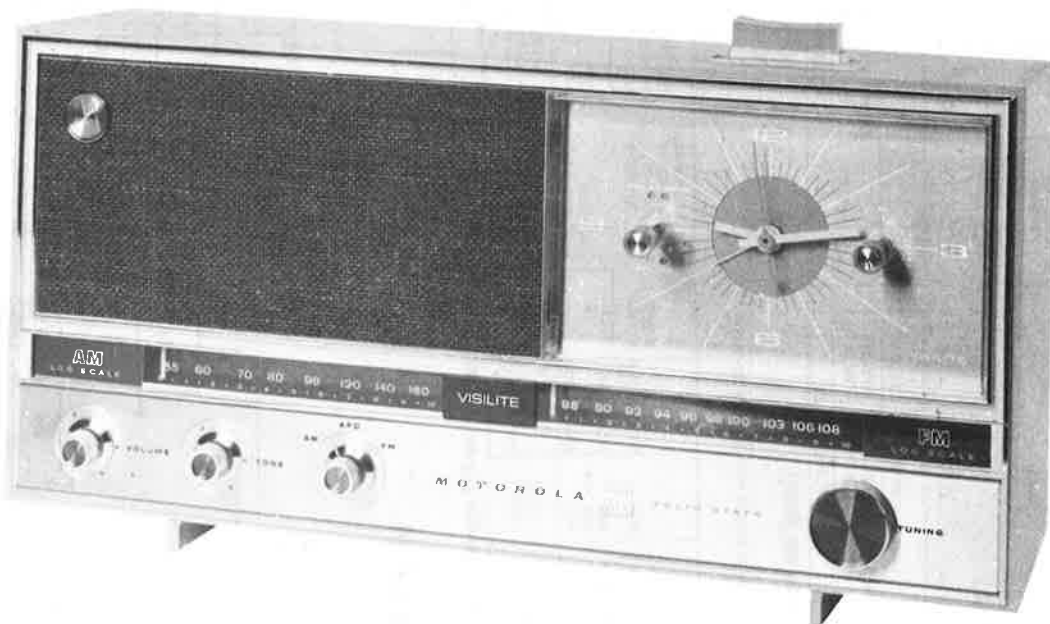


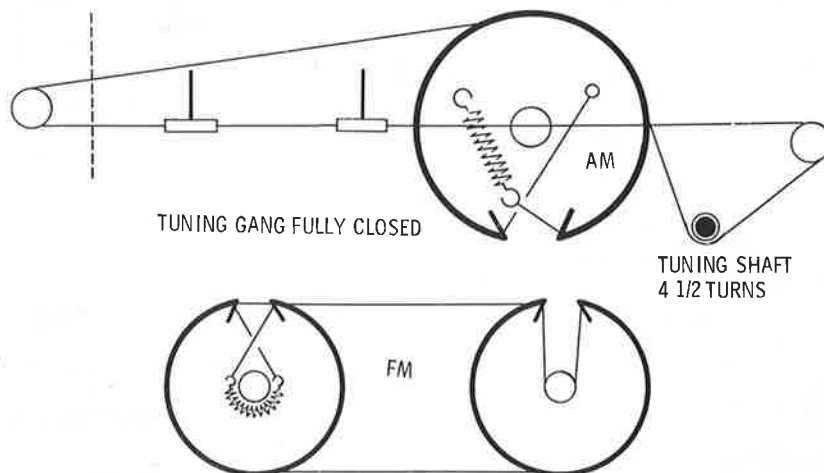
For Supplier Address See PHOTOFACT Index

MOTOROLA CHASSIS
HS-67232, HS-67232-1

Models TC18DE, DH, DN, TC19W, TT29DE, DH, DN, TT30DW, TT31DS

SAFETY PRECAUTIONS

Caution: One side of AC line connected to chassis. Use isolation transformer for servicing.
Make certain isolation networks are in place and exposed metal is safe to touch before returning set to customer.

DIAL CORD STRINGING**REMEMBER TO ASK— “What else needs fixing?”****HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana 46206

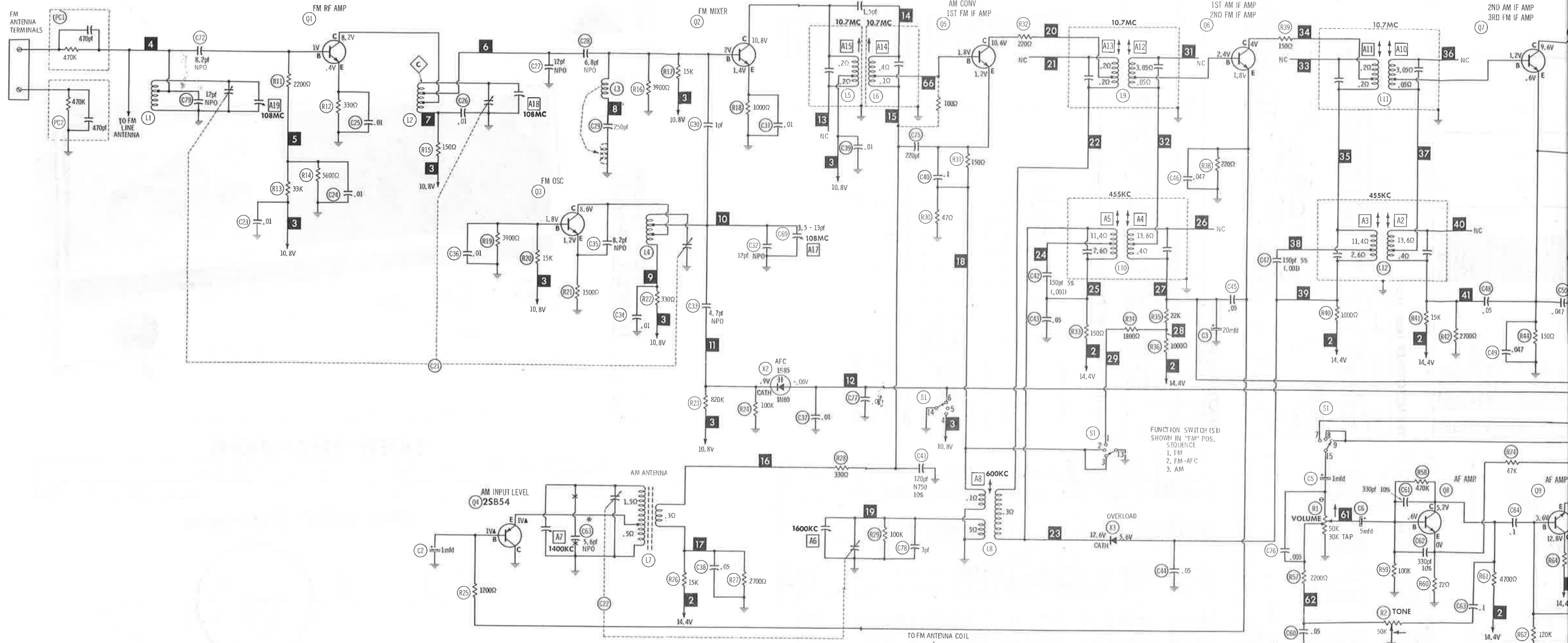
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. SK919

Reproduction or use, without express permission, of editorial or pictorial content, in any matter, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1968 Howard W. Sams & Co., Inc., Indianapolis, Indiana 46206. Printed in U. S. of America.

DATE 12-68

SET 1000 FOLDER 5

MOTOROLA CHASSIS
HS-67232, HS-67232-1



Measurements taken in FM position unless otherwise indicated.

▲ Measured in "AM" position.

⊕ Denotes ground.

* Not used in some versions.

⊙ See parts list.

1. Controls viewed from actuator end.

Arrow indicates clockwise rotation.

2. Resistors are 1/2 watt or less and rated 10% or 20% unless otherwise indicated.

3. Voltage and resistance readings taken with a VTVM.

4. Supply voltage maintained at rated value for voltage measurements.

5. All controls set for normal operation, no signal applied.

6. Measured values are from socket pin or terminal to common ground.

7. All terminals viewed from bottom unless otherwise indicated.

8. Numbers assigned to terminals may not be found on the unit.

9. Resistance measurements not given because of the wide variation in internal resistance of the transistor.

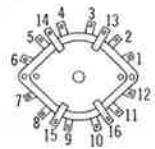
A PHOTOFAC STANDARD NOTATION SCHEMATIC

with CIRCUITRACE

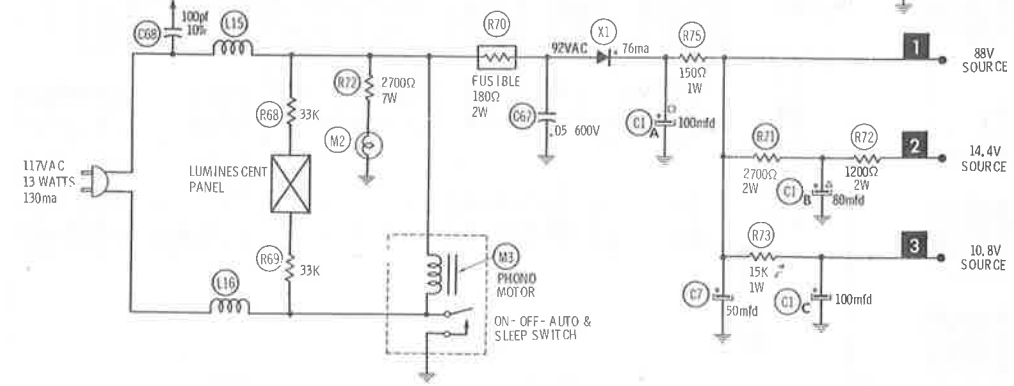
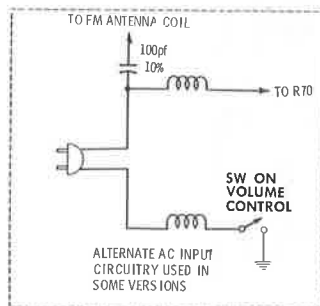
© Howard W. Sams & Co., Inc. 1968

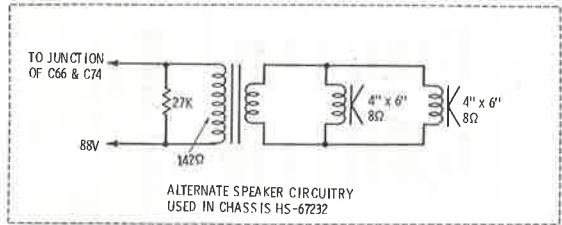


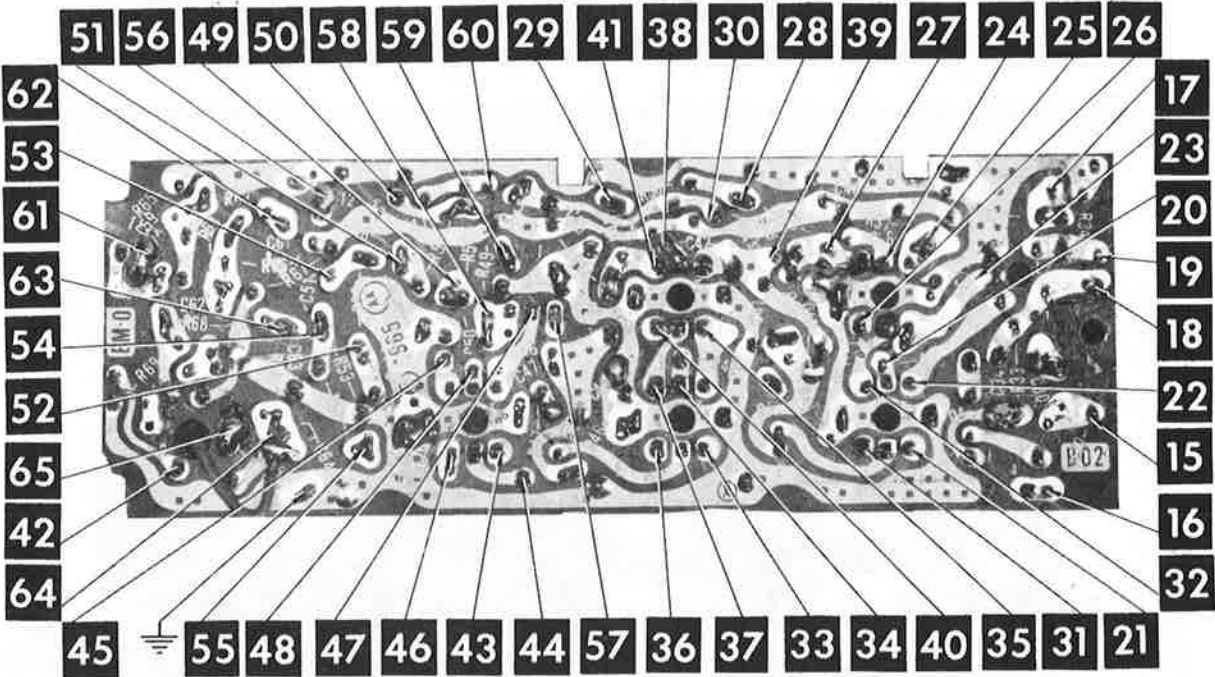
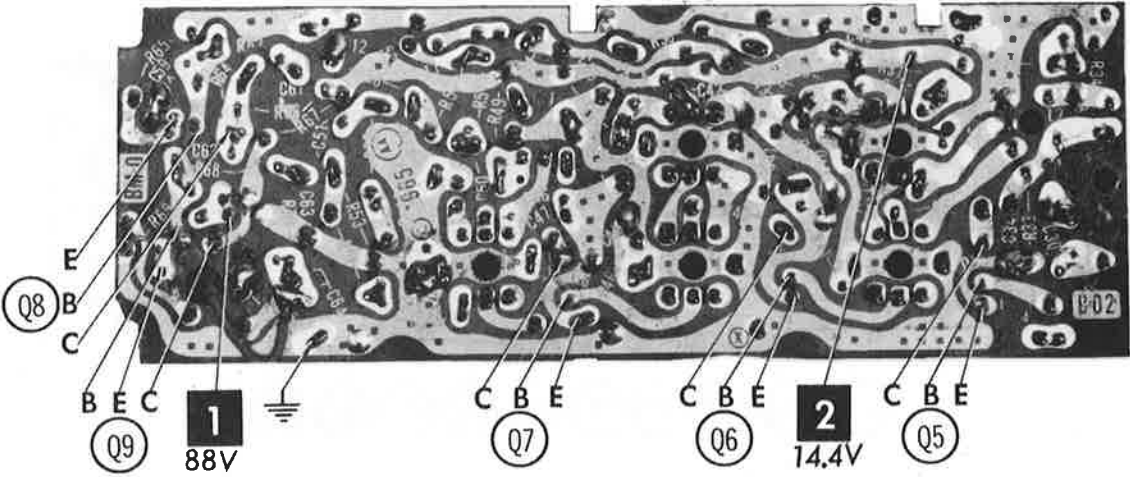
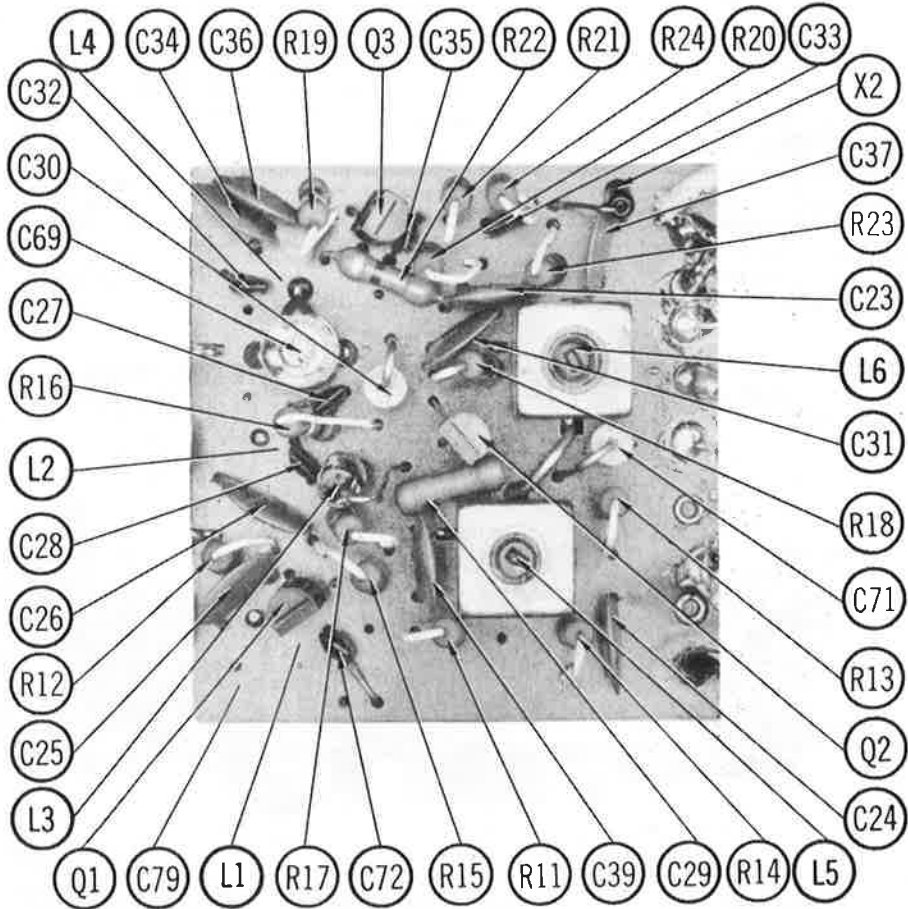
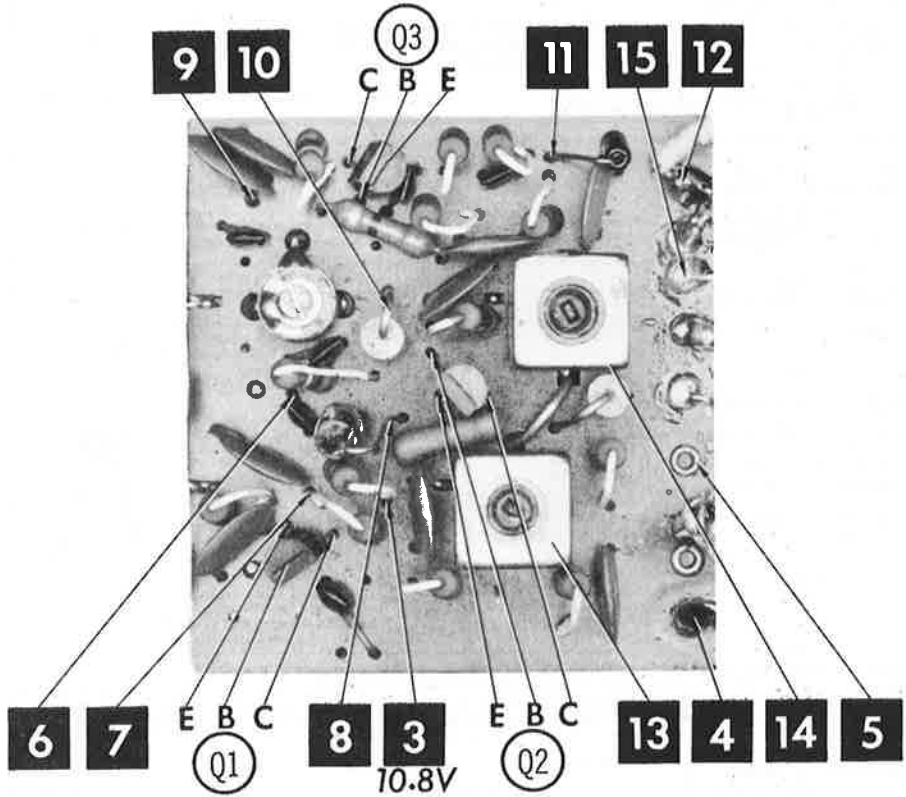
TRANSISTOR TERMINAL GUIDES

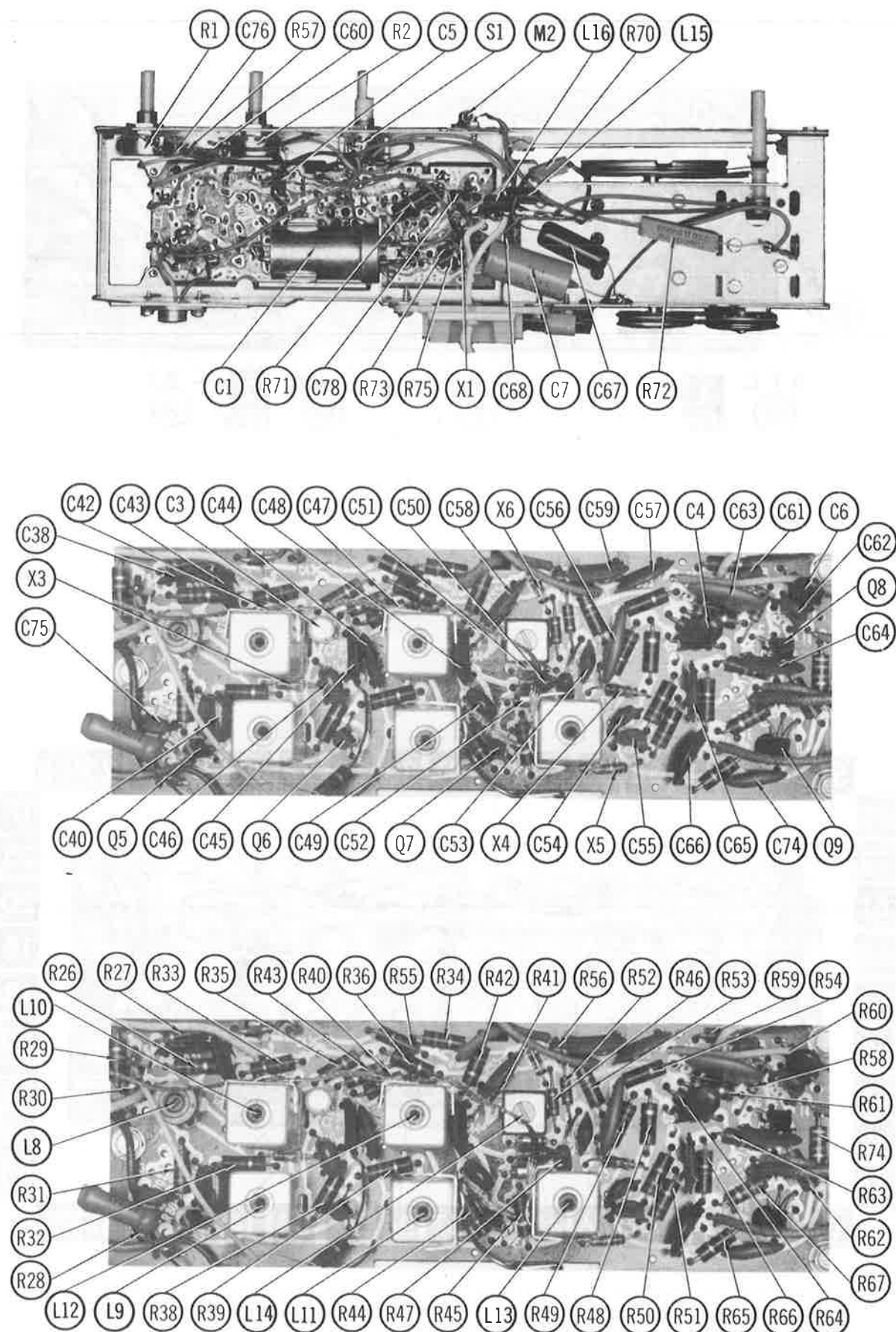


S1 TERMINAL GUIDE
REAR VIEW



S1 TERMINAL GUIDE
REAR VIEW





ALIGNMENT INSTRUCTIONS

Maintain line voltage at 117 volts. Use only enough generator output to obtain a suitable indication. Allow a 15 minute warmup for receiver and equipment.

CAUTION: Use isolation transformer, if available. If not, observe polarity when connecting test equipment.

Suggested Alignment Tools:


A1, A6, A7, A17, A18, A19.....	GENERAL CEMENT #8868, 8987, 9089....	WALSCO #2531-X, 2541, 2587
A2 thru A5, A9 thru A13, A16.....	GENERAL CEMENT #9296, 9397, 9300....	WALSCO #2510, 2546, 2547
A8, A14, A15.....	GENERAL CEMENT #9440.....	WALSCO #2501



AM ALIGNMENT - SELECTOR IN AM POSITION

Fashion loop of several turns of wire and connect generator across loop. Set volume control at maximum.

	GENERATOR FREQUENCY	DIAL SETTING	INDICATOR	ADJUST	REMARKS
1.	455KC (400v Mod.)	Tuning gang fully open.	Output meter across voice coil.	A1, A2, A3, A4, A5	Adjust for maximum. Repeat until no further improvement can be made.
2.	1600KC	∞	∞	A6	Adjust for maximum.
3.	1400KC	Tune to signal.	∞	A7	∞
4.	600KC	∞	∞	A8	Rock tuning gang and adjust for maximum, Repeat steps 2 thru 4 until no further improve- ment can be made.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR - SELECTOR IN FM POSITION

High side of generator thru .001mfd to point , low side to ground.

	GENERATOR FREQUENCY	DIAL SETTING	INDICATOR	ADJUST	REMARKS
5.	10.7 MC (Unmod.)	Point of non-interference.	DC probe of VTVM to point  , common to ground.	A9, A10, A11, A12, A13, A14, A15	Adjust for maximum.
6.	"	"	DC probe to point  , common to ground.	A16	Adjust for zero reading. A positive or negative reading will be obtained on either side of the correct setting.

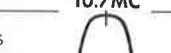


FIG. 1






FIG. 1

FM IF ALIGNMENT USING FM SIGNAL GENERATOR - SELECTOR IN FM POSITION

High side of generator thru .001mfd to point \odot , low side to ground. Use **only enough marker signal for indication**. Use 60v frequency modulated signal with 450KC sweep. Use 60v sawtooth voltage in scope for horizontal deflection.

	GENERATOR FREQUENCY	DIAL SETTING	INDICATOR	ADJUST	REMARKS
5.	10.7MC (450KC Swp.)	Point of non-interference	Vert. amp. of scope to point  , low side to ground.	A9, A10, A11, A12, A13, A14, A15	Disconnect stabilizing capacitor C4 . Adjust for maximum gain and symmetry of response similar to Fig. 1 with marker as shown. Reconnect C 4 .
6.	10.7MC	Point of non-interference	Vert. amp. to point  , low side to ground.	A16	Adjust A16 (secondary) to place marker at center of "S" curve similar to Fig. 2. Adjust A9 (primary) for maximum amplitude and straightness of line.

FM RF ALIGNMENT - SELECTOR IN FM POSITION

Connect generator across antenna terminals with 120Ω carbon resistors in series with each lead.

	GENERATOR FREQUENCY	DIAL SETTING	INDICATOR	ADJUST	REMARKS
7.	108MC	Set at high end.	DC probe of VTVM to point A, common to ground.	A17, A18, A19	Adjust for maximum.


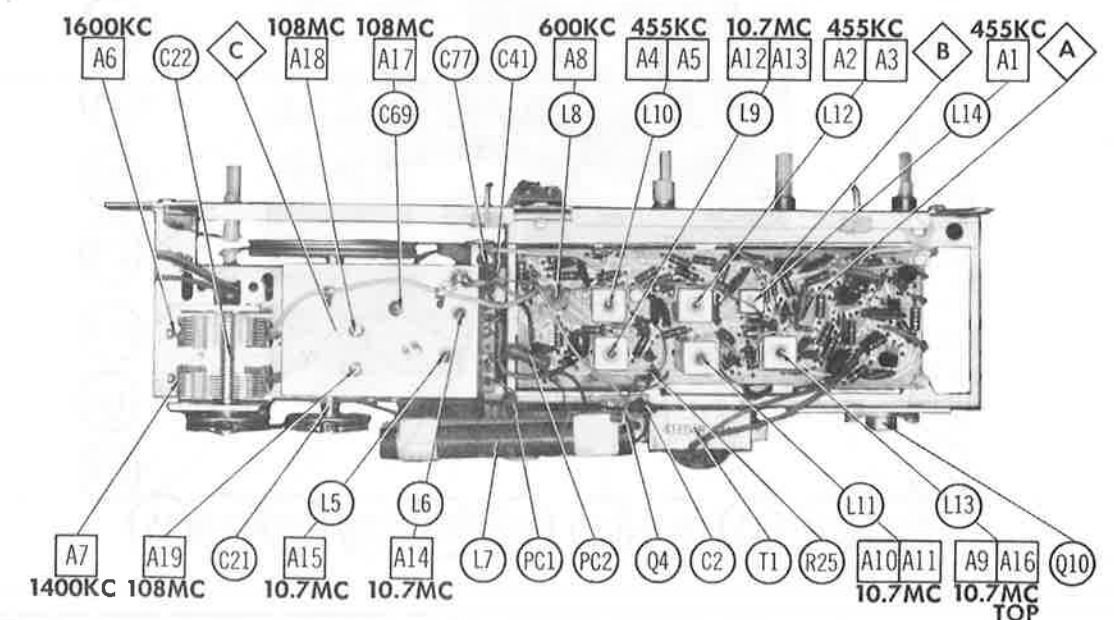


FIG. 2

FIG. 2



PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in 12 Colors
Power Cord	6524 (Stranded) Available in 12 Colors
	171106 (Plastic) or 171126 (Rubber) - 6 Ft.
	171108 (Plastic) or 171128 (Rubber) - 9 Ft.

TRANSISTORS

ITEM No.	TYPE No.	FUNCTION	REPLACEMENT DATA				
			MFGR. PART No.	DELCO PART No.	GENERAL ELECTRIC PART No.	MOTOROLA PART No.	SYLVANIA PART No.
Q1		FM RF Amp.	48S134066	DS-81	GE-17	TR-22	HEP50
Q2		FM Mixer	48S134837	DS-81	GE-17	TR-22	HEP50
Q3		FM Osc.	48S134826	DS-81	GE-17	TR-22	HEP50
Q4		AM Input Level	48S134407	DS-25	GE-1	TR-11	HEP54
Q5		AM Comp. -	48S134945	DS-74	GE-20	TR-21	HEP54
Q6		1st FM IF Amp.					
		1st AM-2nd FM IF Amp.	48S134945	DS-74	GE-20	TR-21	HEP54
Q7		2nd AM - 3rd FM IF Amp.	48S134857	DS-74	GE-20	TR-21	HEP54
Q8		AF Amp.	48S134732	DS-66	GE-10	TR-21	HEP54
Q9		AF Amp.	48S134987	DS-66	GE-10	TR-21	HEP54
Q10		Output	48S134739		GE-12	TR-23	HEP240

POWER RECTIFIERS & SIGNAL DIODES

ITEM No.	MFGR. PART OR TYPE No.	REPLACEMENT RECTIFIERS & DIODES				NOTES
		GENERAL ELECTRIC PART No.	SYLVANIA PART No.	RCA PART No.	SARKES TAZKIAN PART No.	
X1	48S10062 A05	GE-504A	8D4 or 5 A4B	SK-3031 or SK-3017A	40C or F-4	① Variable Capacitor Diode
X2	48P60022A98 ① (1885)			ECG 109		② Matched Pair
X3	48S134816	1N60	1N60	ECG 110 ②		
X4	48D63590A01	1N60	1N60	ECG 110 ②		
X5	48D63590A01	1N60	1N60	ECG 109		
X6	48K134587 (DHD800)	1N60	1N60	ECG 109		

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA				
		MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNEILL DUBILIER PART No.	GENERAL ELECTRIC PART No.
C1A	100M 50V	23C60396B01	AFH3-13-72 & PRS1470		CC0124A	
B	80 450V					
C	1 100 15V					
C2	1 10V	23C63827A08	BCD12001		NLW1-50	MTL-1
C3	20 3V	23C60496A16	BCD3020	EP6-25	NLW25-3	MTL-13
C4	5 6V	23C63827A07	BCD6005	EP6-5	NLW5-15	MTL-3
C5	1 10V	23C63827A08	BCD12001		NLW1-50	MTL-1
C6	5 6V	23C63827A07	BCD6005	EP6-5	NLW5-15	MTL-3
C7	50 150V	23C62914A09	PRS1460		BR50-150	QTI-17

CAPACITORS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA				
			AEROVOX PART No.	CENTRALAB PART No.	CORNEILL DUBILIER PART No.	ELMENC0 PART No.	MALLORY PART No.
C21		#19P60077A88			HOY101ZV103P	CCD-103	TA110
C22		#19C61372A03			HOY101ZV103P	CCD-103	TA110
C23	-01		TFP-01	CK-103	HOY101ZV103P	CCD-103	TA110
C24	-01		TFP-01	CK-103	HOY101ZV103P	CCD-103	TA110
C25	-01		TFP-01	CK-103	HOY101ZV103P	CCD-103	TA110
C26	-01		TFP-01	CK-103	HOY101ZV103P	CCD-103	TA110
C27	12 NPO 50V		NPO-DI 6.8	TCZ-12	CZ601CG120J	CCTO-120	CNO412
C28	6.8 NPO 50V		NPO-DI 6.8	TCZ-12	CZ601CG120J	CCTO-120	CNO412
C29	250			DD-251	CZ601CH68RD	CCD-251	CNO568
C30	1		NPO-DI 1.0	TCZ-1	HOY101ZV103P	CCD-103	CNO510
C31	-01		TFP-01	CK-103	HOY101ZV103P	CCD-103	TA110
C32	12 NPO 50V		NPO-DI 4.7	TCZ-12	CZ601CG120J	CCTO-120	CNO412
C33	4.7 NPO 50V		TFP-01	DD-47	HOY101ZV103P	CCD-103	CNO547
C34	-01		TFP-01	CK-103	HOY101ZV103P	CCD-103	TA110
C35	8.2 NPO 50V		NPO-DI 8.2	TCZ-1	HOY101ZV103P	CCD-103	TA110
C36	-01		TFP-01	CK-103	HOY101ZV103P	CCD-103	TA110
C37	-01		TFP-01	CK-103	HOY101ZV103P	CCD-103	TA110
C38	-01		TFP-01	CK-103	HOY101ZV103P	CCD-103	TA110
C39	-05		TFP-01	CK-103	HOY101ZV103P	CCD-103	TA110
C40	1 100V		DBE2P1	TCN-120	DMF1P1	CCD-103	TA110
C41	120 N750 100V 10%			CPR-150J	CD15F151J500	CCD-103	TA110
C42	150 25V 5%			CK-503	DM-15-151J	CCD-103	TA110
C43	-05		TFP-05	CK-503	HOY101ZV503Z	CCD-503	TA150
C44	-05		TFP-05	CK-503	HOY101ZV503Z	CCD-503	TA150
C45	-05		TFP-05	CK-503	HOY101ZV503Z	CCD-503	TA150
C46	.047		V1612547	DD-503	DMF1547	CCD-503	PVC1147
C47	150 25V 5%		TFP-05	CK-503	CD15F151J500	CCD-503	TA150
C48	.047		TFP-05	CK-503	DMF1547	CCD-503	TA150
C49	.047 100V		V1612547	DD-503	DMF1547	CCD-503	TA150
C50	.047 100V		V1612547	DD-503	DMF1547	CCD-503	TA150
C51	390 33V 5%		TFP-05	CPR-390J	CD15F151J500	CCD-503	TA150
C52	.001 33V 5%		TFP-05	CK-503	DMF1547	CCD-503	TA150
C53	330 100V 10%		TFP-05	CK-503	DMF1547	CCD-503	TA150
C54	330 100V 10%		TFP-05	CK-503	DMF1547	CCD-503	TA150
C55	330 100V 10%		TFP-05	CK-503	DMF1547	CCD-503	TA150
C56	330 100V 10%		TFP-05	CK-503	DMF1547	CCD-503	TA150
C57	.1 25V		TFP-01	CK-104	HOY101ZV104Z	CCD-331	GP333
C58	.02 100V		TFP-02	CK-104	HOY101ZV104Z	CCD-331	GP333
C59	.02 100V		TFP-02	CK-104	HOY101ZV104Z	CCD-331	GP333
C60	.02 100V		TFP-02	CK-104	HOY101ZV104Z	CCD-331	GP333
C61	330 100V 10%		TFP-05	CK-503	DMF1547	CCD-503	TA150
C62	330 100V 10%		TFP-05	CK-503	DMF1547	CCD-503	TA150
C63	330 100V 10%		TFP-05	CK-503	DMF1547	CCD-503	TA150
C64	330 100V 10%		TFP-05	CK-503	DMF1547	CCD-503	TA150
C65	.1 25V		TFP-01	CK-104	HOY101ZV104Z	CCD-331	GP333
C66	.05 600V		DBE6S5	DD-503	DMF6S5	CCD-331	GP333
C67	100 100V 10%		TFP-01	CK-104	HOY101ZV104Z	CCD-331	GP333
C68	100 100V 10%		TFP-01	CK-104	HOY101ZV104Z	CCD-331	GP333
C69	100 100V 10%		TFP-01	CK-104	HOY101ZV104Z	CCD-331	GP333
C70	1.5		NPO-DI 1.5	DTZ-1R5	HOY101ZV103P	CCD-103	CNO515
C71	8.2 NPO 50V		NPO-DI 8.2	DTZ-1R5	HOY101ZV103P	CCD-103	CNO515
C72	.01 100V		TFP-01	CK-103	HOY101ZV103P	CCD-103	TA110
C73	220 500V		TFP-01	CK-221	JBZ601YP221K	CCD-221	GP322
C74	.005 500V		TFP-02	CK-208	JBZ601YP502K	CCD-208	JF250
C75	.02 100V		TFP-02	CK-208	JBZ601YP502K	CCD-208	JF250
C76	3 100V		NPO-DI 3.0	DTZ-3R3	HOY101ZV103P	CCD-3R3	CNO533
C77	12 NPO			CCD-120	CZ601CG120J	CCD-120	CNO412

Motorola Part Number

CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESIST-ANCE	REPLACEMENT DATA			
			MFGR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CT5-IRC PART No.
R1	Volume	50K	18C63847A08			
	Volume/Switch	50K	18C63847A01			
	Tone	50K	18C63847A07			

* "SNAPTROL" ① Do not use 20K Tap. ② Alternate Part, used in Models using Chassis HS-67232.

RESISTORS (Power and Special)

ITEM No.	RATING	IRC PART No.	REPLACEMENT DATA		ITEM No.	RATING	IRC PART No.	WORKMAN PART No.	MFGR. PART No.
			WORKMAN PART No.	MFGR. PART No.					
R72	27003 7W		10W-SQ-2.75	17S647134					

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA		MILLER PART No.	WORKMAN PART No.
		PART No.	MFGR. PART No.		
L1	FM Antenna	24P60077A78			
L2	FM RF	24P60077A78			
L3	FM RF Trap	24P60077A80			
L4	FM Osc.	24P60077A79			
L5	FM Input IF	24P60077A82			
L6	FM Interstage IF	24P60077A82			
L7	Loopstick	24B61746A05			
L8	AM Osc.	24C60108B01			
L9	FM Interstage IF	24C60263B01			
L10	FM Input IF	24C60263B01			
L11	FM Interstage IF	24C60263B01			
L12	FM Interstage IF	24C60263B01			
L13	Ratio Det.	24C60263B01			
L14	AM Output IF	24C63476A02			
L15	Line Choke	24C61620A05			
L16	Line Choke	24C61620A05			

① Clip Pins 1 & 4 at base.

TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE	MEGR. PART No.	REPLACEMENT DATA			NOTES
			STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	22003 32		A-3876	S-1X		Part of Speaker

SPEAKER

ITEM No.	TYPE	MFGR. PART No.	REPLACEMENT DATA		NOTES
			JENSEN PART No.	QUAM PART No.	
SP1	4" x 6" FM	32	50D60154B01 ①	P4X6X3	
	4" x 6" FM	80	50D60154B04 ②		
	4" x 6" FM	62	50D60154B03 ③		

MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
M1	Panel Lamp	65B83435A03	
M2	Dial Lamp	65SL86113	
M3	Motor	59P63023A14	Clock
PC1	Antenna Isolation	51K754068	CENTRALAB Replacement #RC-471
PC2	Antenna Isolation	40C63472A01	Selector
SI	Switch		

CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

SEE KEY SHEET	MODELS	KEY NO.		PART NO.
		1	2	
		1	2	16P60077A42
		3	3	16P60077A47
		4	4	16P60077A44
		5	5	16P60077A46
		6	6	16P60077A49
		7	7	61C60134B01
		8	8	36C60472B01
		9	9	36C60472B06
		10	10	36C60088B26
		11	11	52B60276B03
		12	12	15D60181B01
		13	13	16P60077A50
		14	14	16P60077A50
		15	15	36C60088B27
		16	16	36D60204B04
		17	17	16P60077A38
		18	18	16P60077A39
		19	19	16P60077A39
		20	20	16P60077A39
		21	21	16P60077A39
		22	22	16P60077A39
		23	23	16P60077A40
		24	24	16P60077A41
		25	25	16P60077A41
		26	26	16P60077A41
		27	27	16P60077A41
		28	28	16P60077A41