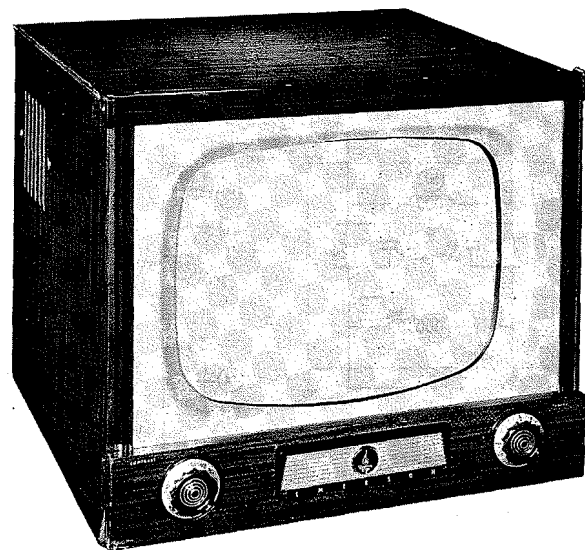




EMERSON Ch. 120233-D, -F, 120234-D,
120235-D, 120236-D, 120237-D, 120238-D,
-F, -H, 120241-D, -F, 120249-D, -F)



CHASSIS

120233-D, 120233-F, 120234-D, 120235-D, 120236-D,
120237-D, 120238-D, 120238-F, 120238-H, 120241-D,
120241-F, 120249-D, 120249-F

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.
2. Remove 7 wood screws. Remove rear cover.
3. Loosen 2 wood screws. Remove antenna bracket.
4. Disconnect speaker leads.
5. Remove 4 chassis bolts. Remove chassis.
6. Remove 2 speaker nuts. Remove speaker.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet above and slightly to the left of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 6 wood screws holding plastic strip at the top edge of safety glass. Remove plastic strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

SPECIAL ADJUSTMENTS

- A. Picture stabilizer Control Adjustment

In normal signal areas the picture stabilizer control (R7) should be set at its maximum clockwise position. In noisy fringe areas rotate R7 counter clockwise for best sync stability.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator can be made from the rear panel of the set. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (B1) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the sound discriminator secondary (L18) located on top of chassis.

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

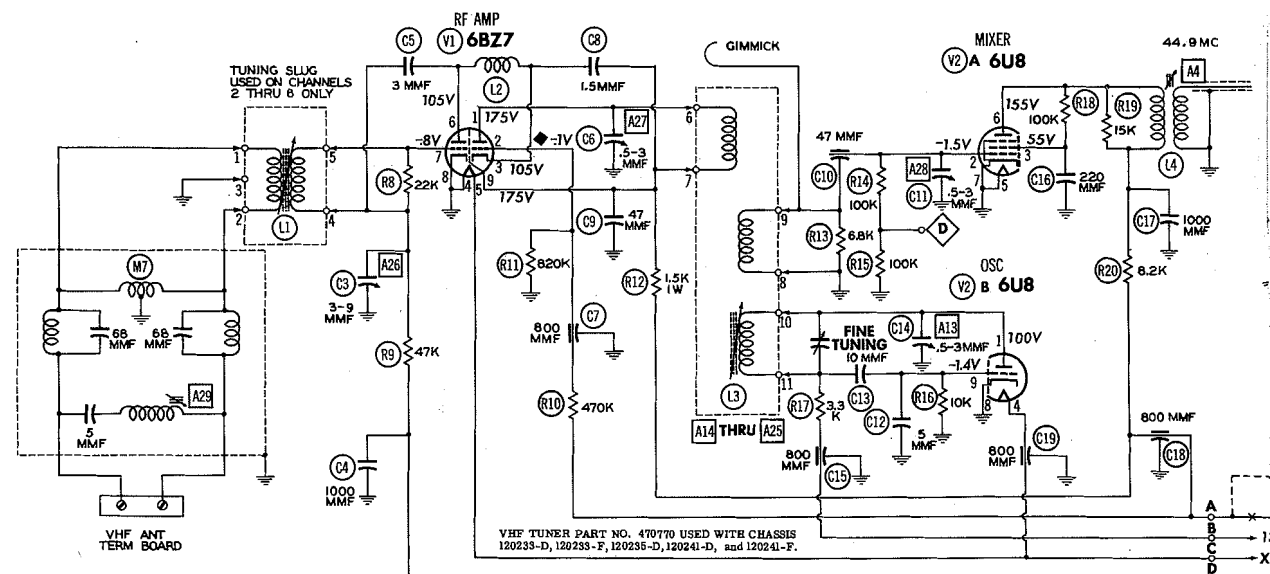
Centering is accomplished mechanically by adjusting a magnetic ring around the neck of the picture tube located flush against the yoke. Loosen the thumb screw and rotate the ring around the tube until the picture is properly centered.

EMERSON Ch. 120233-D, -F, 120234-D,
120235-D, 120236-D, 120237-D, 120238-D,
-F, -H, 120241-D, -F, 120249-D, -F)

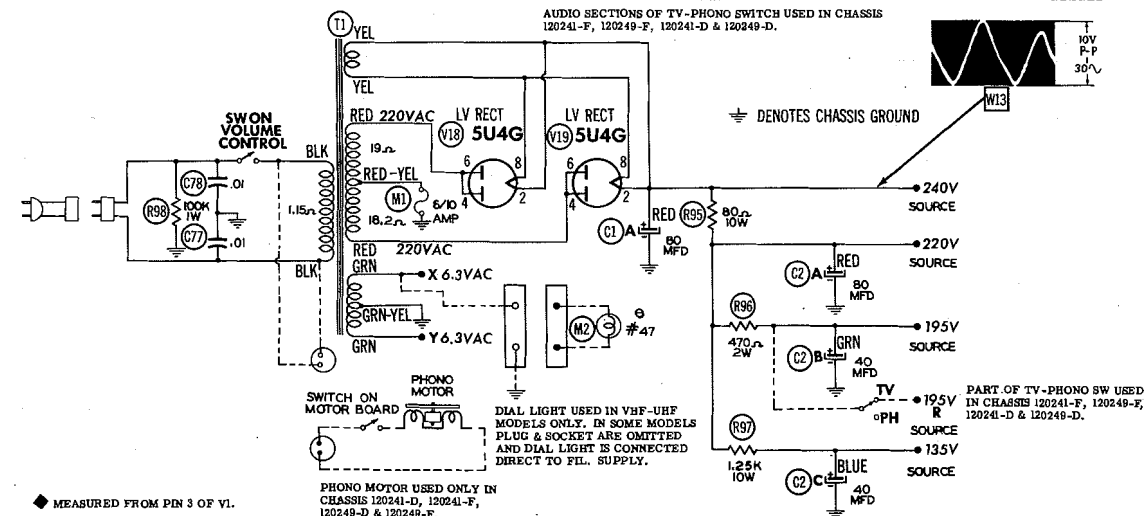
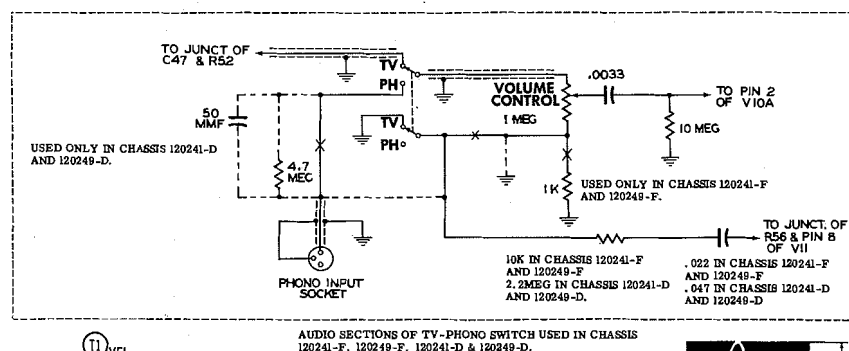
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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ALTERNATE TUNER SCHEMATICS LOCATED ON PAGES 11, 12, 17, 18.



◆ MEASURED FROM PIN 3 OF V1.
⊙ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)

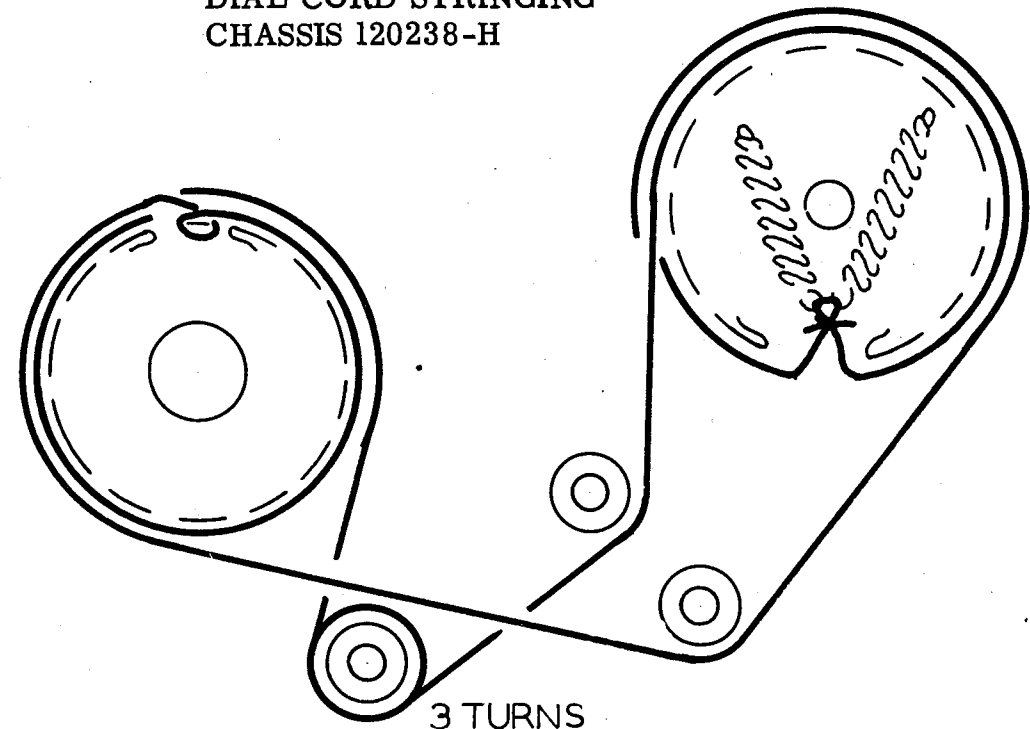
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 40 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

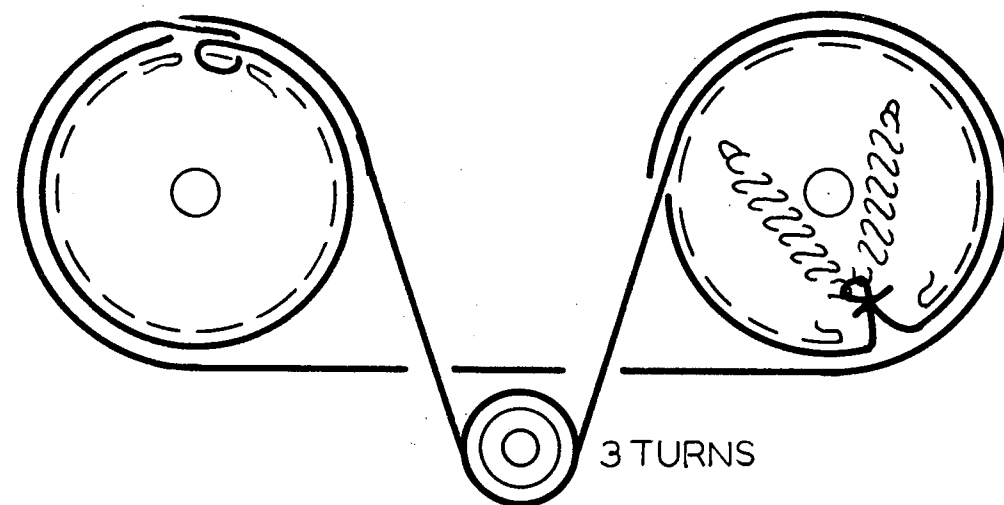
A PHOTOFAC STANDARD NOTATION
© Howard W. Sams & Co., Inc. 1

DIAL CORD STRINGING CHASSIS 120238-H

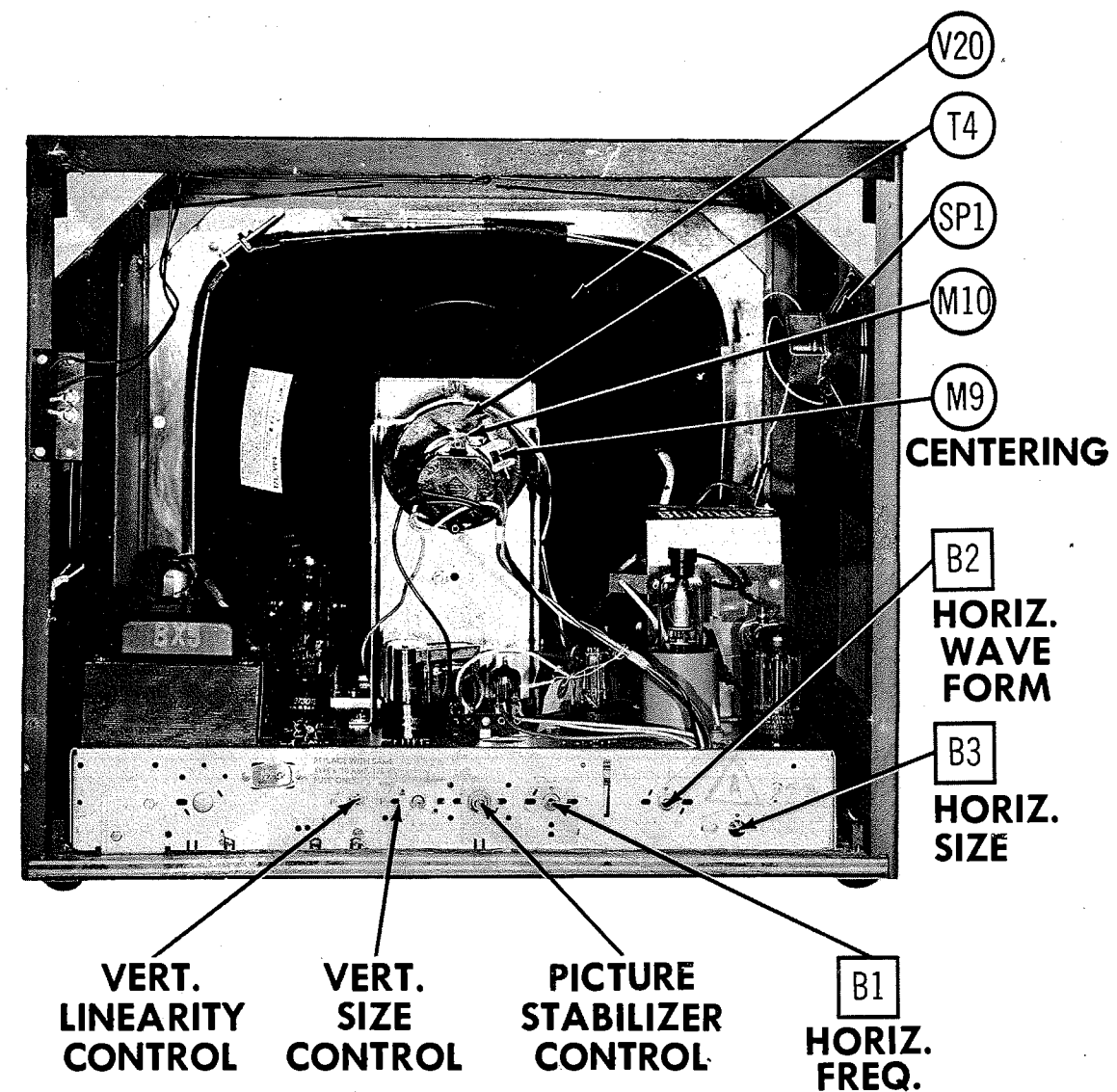


TUNING GANG FULLY COUNTER CLOCKWISE

DIAL CORD STRINGING CHASSIS 120238-F, 120249-D



UHF DIAL CORD DRIVE



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

- Turn the set on and tune in a TV station, preferably a test pattern. Set the picture stabilizer control (R7) fully clockwise. Alignment of the horizontal oscillator can be done without removing chassis.
- Turn the horizontal hold control maximum clockwise position.
- Connect short across L20. Leads are brought to terminal strip on top of chassis (near the rear center) for shorting out L20.
- Adjust the horizontal frequency slug (B1) to the center of the range over which the picture synchronizes horizontally.
- Remove short from L20.
- Connect the vertical input lead of an oscilloscope to point (E) Low side to chassis.
- Adjust the horizontal waveform slug (B2) until the broad and narrow peaks are of equal amplitude as shown in Fig. 7.
- Remove scope from point (E) and chassis. The picture should be in sync and remain in synchronization over the entire range of the horizontal hold control.

Adjust the horizontal size slug (B3) for a picture slightly wider than necessary to fill the picture mask horizontally.

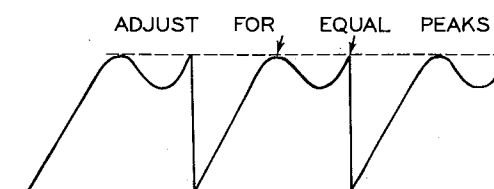
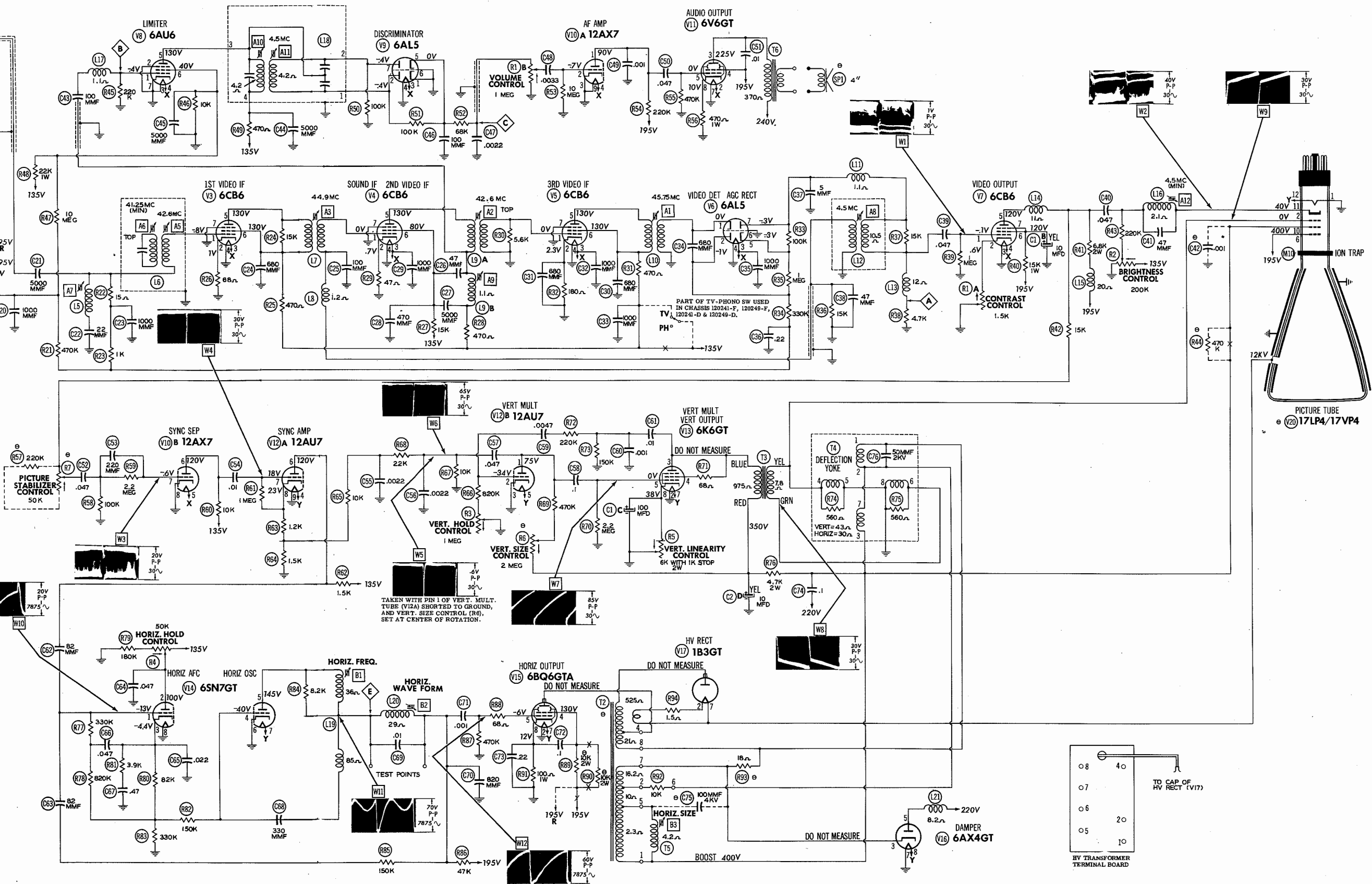
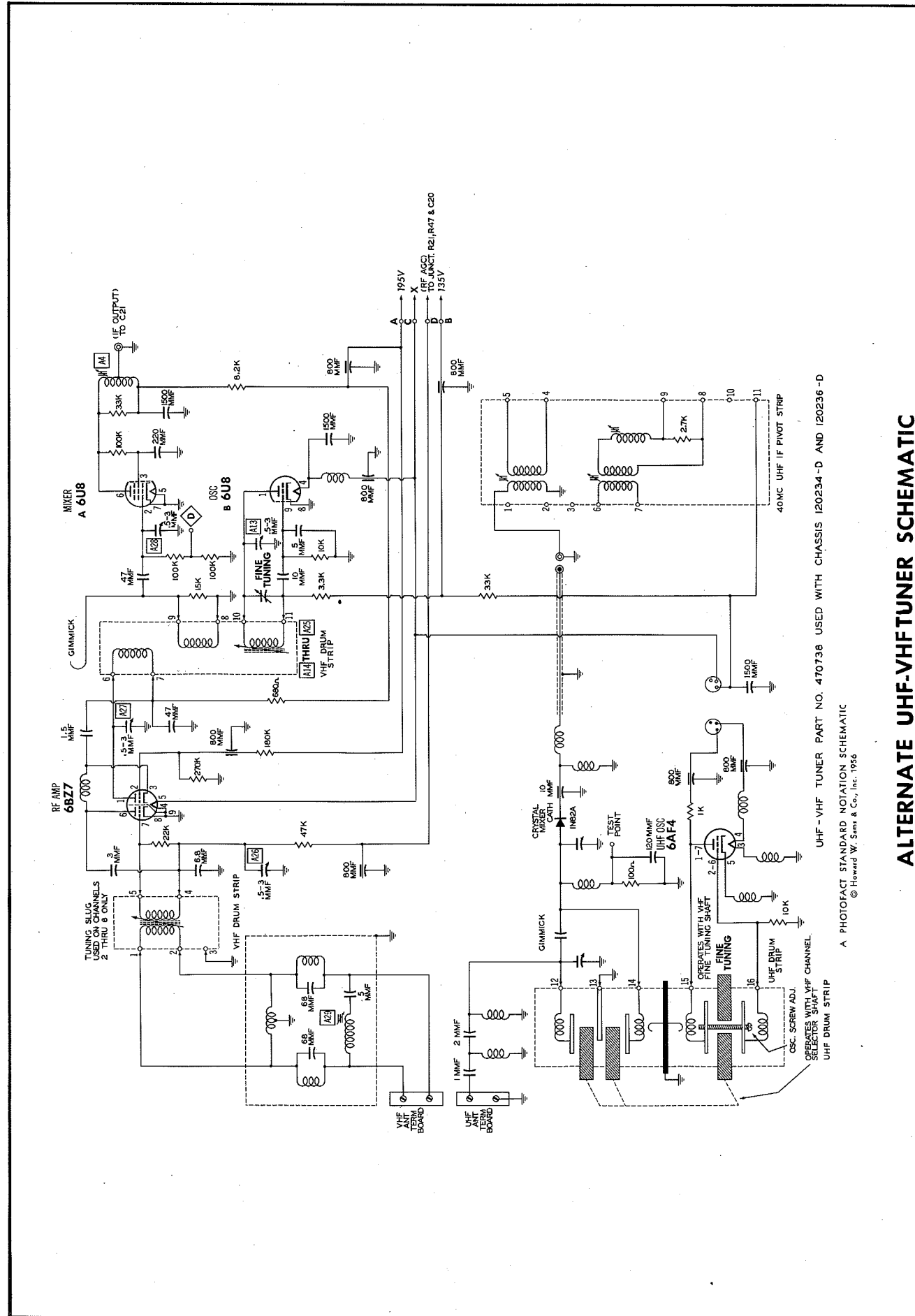
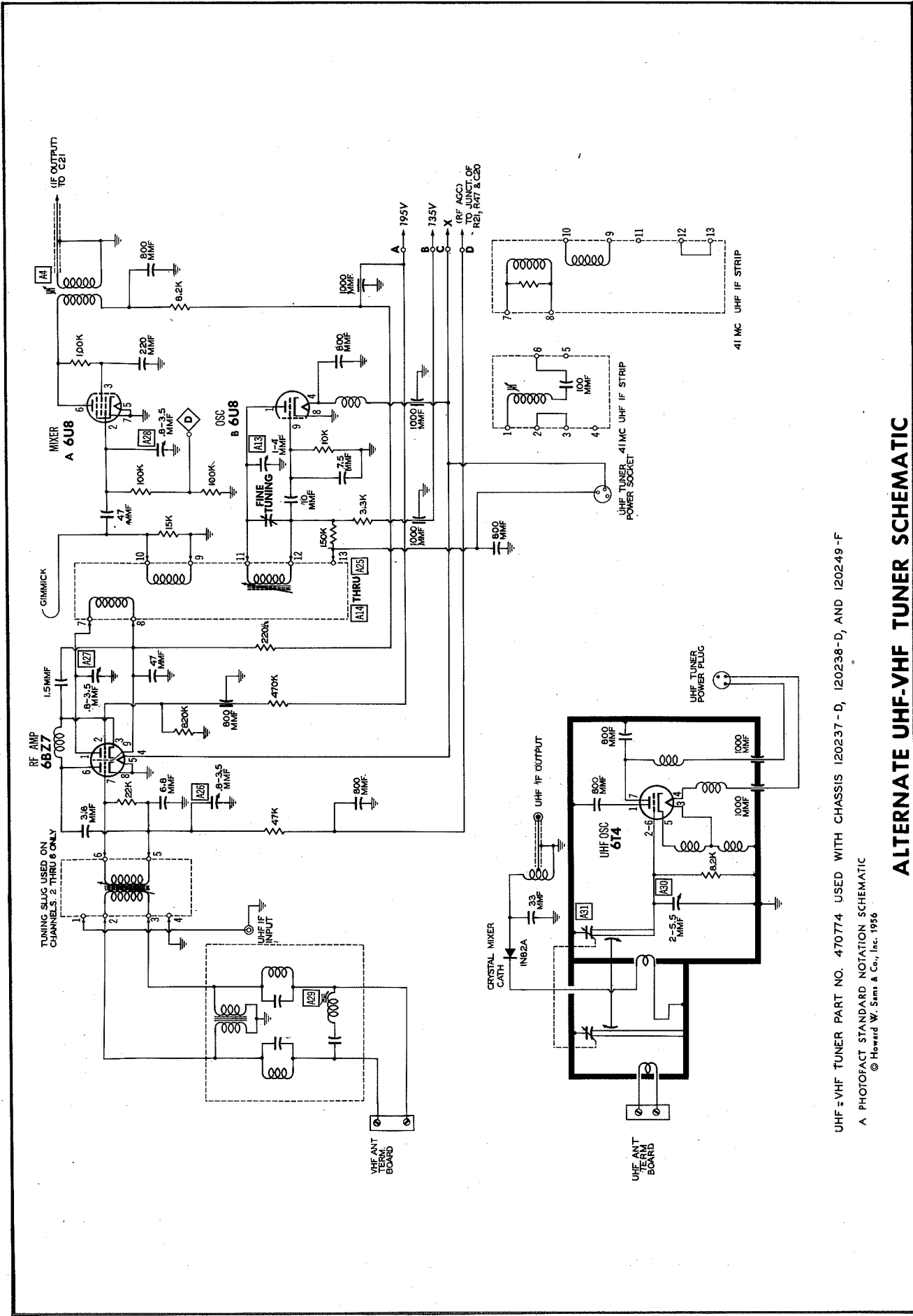


FIG. 7

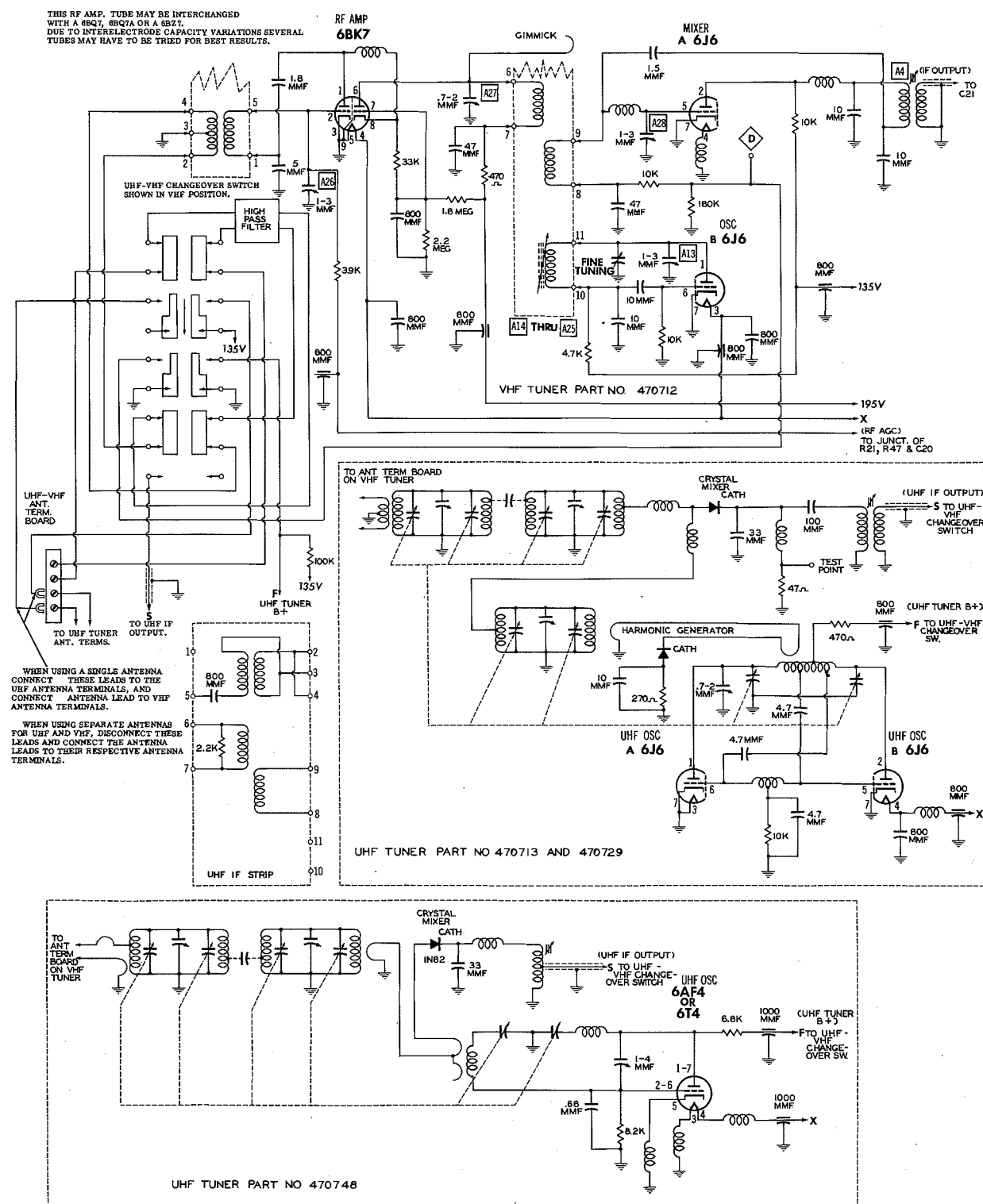


EMERSON (Ch. 120233-D, -F, 120234-D, 120235-D, 120236-D, 120237-D, 120238-D, -F, -H, 120241-D, -F, 120249-D, -F)

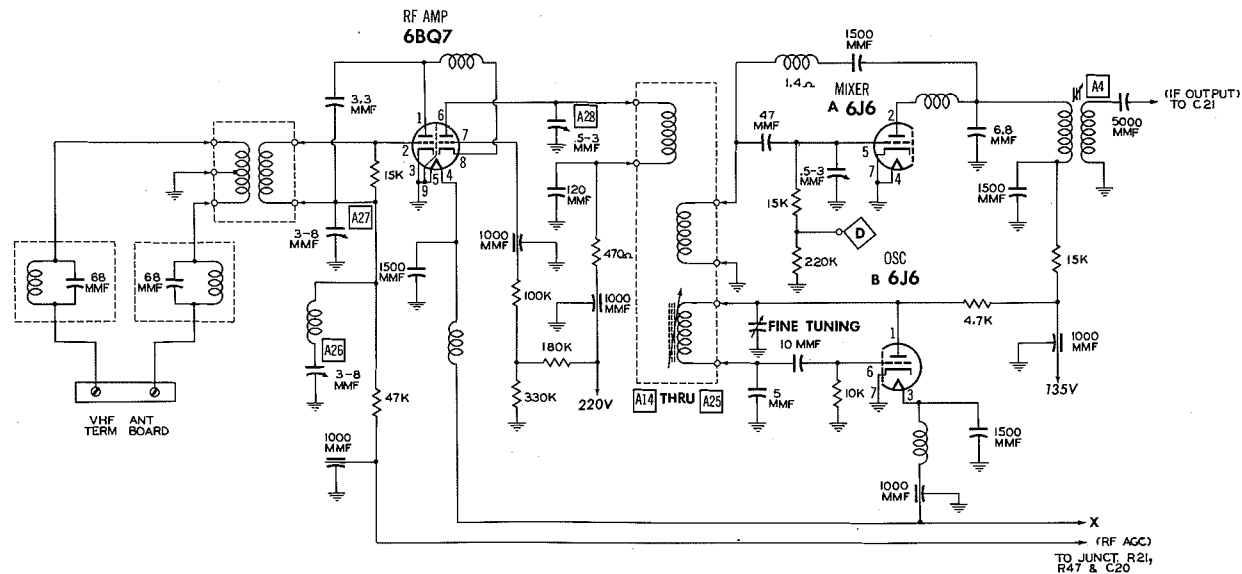
EMERSON Ch. 120233-D, -F, 120234-D, 120235-D, 120236-D, 120237-D, 120238-D, -F, -H, 120241-D, -F, 120249-D, -F)



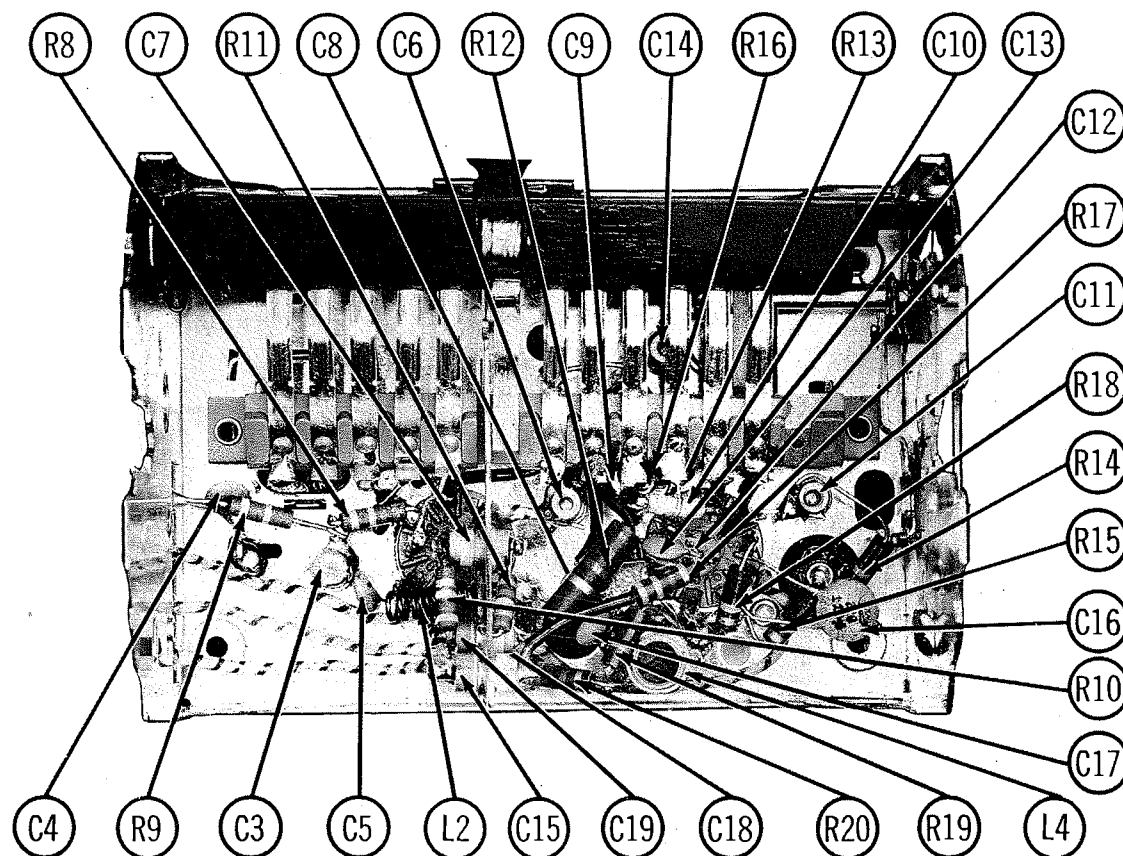
EMERSON (Ch. 120233-D, -F, 120234-D, 120235-D, 120236-D,
120237-D, 120238-D, -F, -H, 120241-D, -F, 120249-D, -F)
C1LW6HCS RENN1FH4-FHN 31VNE3L1V



ALTERNATE UHF-VHF TUNER SCHEMATIC



ALTERNATE VHF TUNER SCHEMATIC



RF TUNER-BOTTOM VIEW

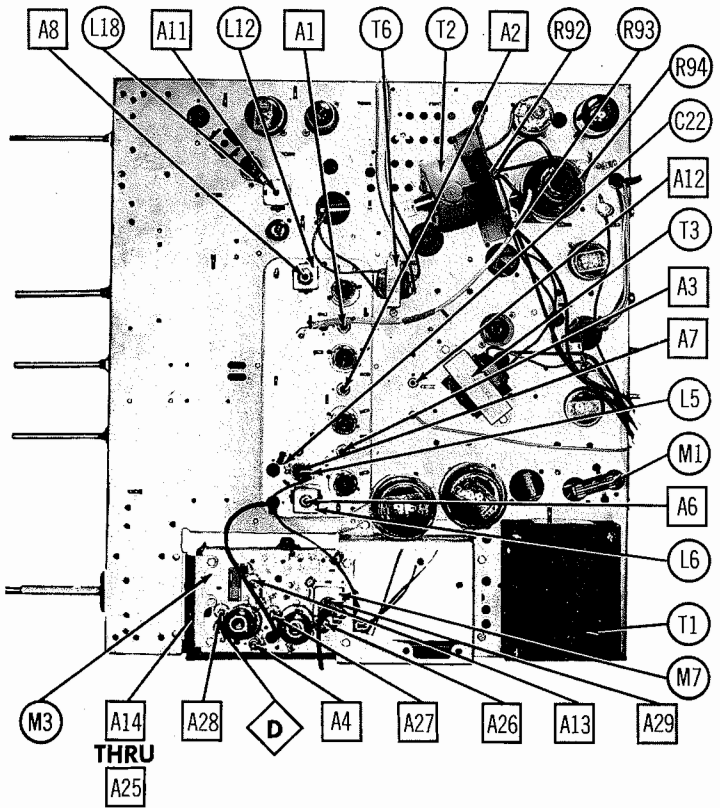
EMERSON (Ch. 120233-D, -F, 120234-D, 120235-D, 120236-D, 120237-D, 120238-D, -F, -H, 120241-D, -F, 120249-D, -F)

PARTS LIST AND DESCRIPTIONS (Continued)
FUSES

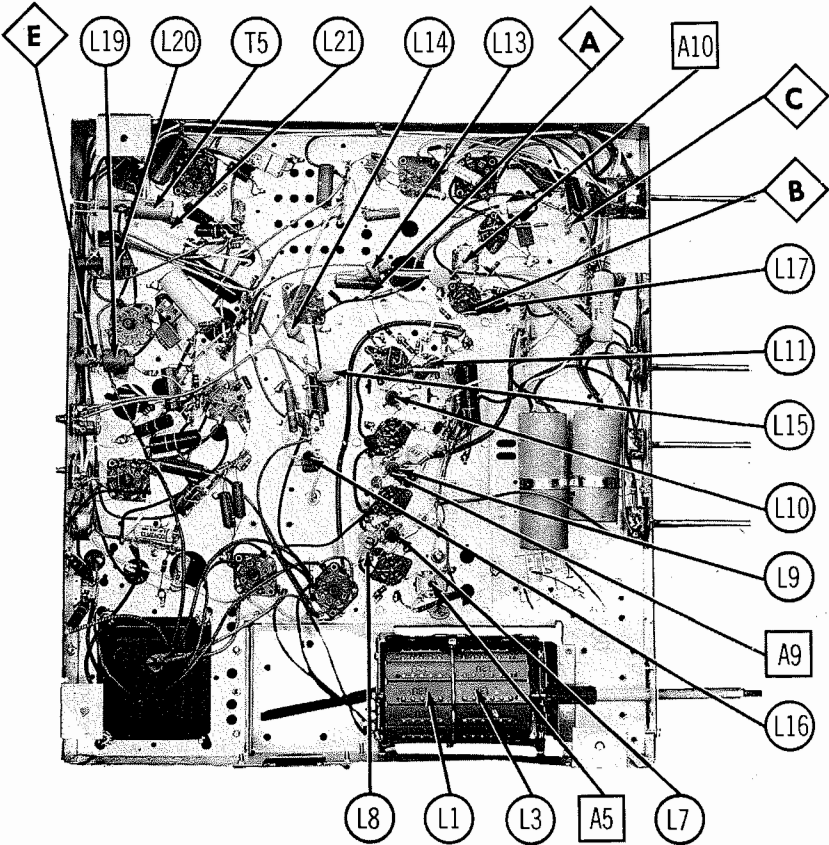
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			EMERSON PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	6/10A 125V	808005		313.600 (3AG S/B 6/10A)	357001	MDL 6/10	4405

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M2	Dial Light	807000	#47-Chassis 120234-D, 120236-D, 120237-D, 120238-D, 120249-F, 120238-F, 120249-D, 120238-H
M3	Tuner	470770	VHF-Chassis 120233-D, 120233-F, 120235-D, 120241-D, 120241-F; Alternate Part Nos. 470696 & 470772
M4	Tuner	470712	VHF-Chassis 120238-F, 120249-D, 120238-H
	Tuner	470738	UHF-VHF-Chassis 120234-D, 120236-D
M5	Tuner	470774	UHF-VHF-Chassis 120237-D, 120238-D, 120249-F
	Tuner	470713	UHF-Chassis 120238-F, 120249-D
M6	Trap	470748	UHF-Chassis 120238-H
	Trap	720173	VHF Ant. Input Filter-Chassis 120238-F, 120249-D
M7	Trap	720176	VHF Ant. Input Filter-Chassis 120238-H
	Trap		VHF Ant. Input Filter-Chassis 120233-D, 120233-F, 120235-D, 120241-D, 120241-F, 120234-D, 120236-D, 120237-D, 120238-D, 120249-F
M8	Switch	960703	UHF-VHF-Chassis 120238-F, 120249-D, 120238-H
M9	Centering Device	708149	Alternate Part No. 708134
M10	Ion Trap	708129	
	Cabinet	140571	Model 1002H
Cabinet		140571E	Model 1004H
	Cabinet	140571D	Model 1006H
Cabinet		140571B	Model 1008H
	Cabinet	140582B	Model 1009J
Cabinet		140582C	Model 1011J
	Cabinet	140589	Models 1012H, 1012J
Cabinet		140589A	Model 1014J
	Cabinet	140573	Model 1018H
Cabinet		140573A	Model 1020H
	Cabinet	140600	Model 1036H
Cabinet		140624	Model 1040H
	Cabinet	140605	Models 1041F, 1041H
Cabinet		140624A	Model 1042H
	Cabinet	140605A	Model 1043H
Cabinet		140618	Model 1044D
	Cabinet	140622	Models 1045D, 1045F, 1045H
Cabinet		140618A	Model 1046D
	Cabinet	140622A	Models 1047D, 1047F
Cabinet		140619	Models 1048D, 1049F, 1049D
	Cabinet	140628	Models 1050D, 1051D
Cabinet		140620	Model 1054D
	Cabinet	140623	Models 1055D, 1055F, 1055H
Cabinet		140620A	Model 1056D
	Cabinet	140623A	Model 1057D
Cabinet		140614	Models 1066D, 1067D, 1067F
	Cabinet	140614A	Models 1068D, 1069D
Cabinet		140615	Models 1070D, 1071D, 1071F
	Cabinet	140615A	Models 1072D, 1073D
Cabinet		140621	Model 1074D
	Cabinet	140625	Models 1075D, 1075F, 1075H
Cabinet		140630	Models 1084D, 1085D, 1085F, 1085H
	Cabinet	140630A	Models 1086D, 1087D, 1087F
Cabinet		140630B	Models 1088D, 1089D, 1089F
	Cabinet	140630C	Models 1090D, 1091D, 1091F
Cabinet		140630D	Models 1092D, 1093D, 1093F
	Cabinet	140637	Models 1098D, 1099D
Cabinet		140608	Models 1100D, 1101D
	Mask	565273	Dial - Models 1041F, 1045F, 1047F, 1051D, 1055F, 1075F, 1085F, 1075H
Mask		460527A	Picture tube - Models 1002H, 1004H, 1006H, 1008H, 1009J, 1011J, 1018H, 1020H, 1048D, 1049F
	Mask	460476A	Picture tube - Model 1012H
Mask		460638A	Picture tube - Models 1012J, 1014J
	Mask	460524A	Picture tube - Model 1036H
Mask		460624A	Picture tube - Models 1049D, 1040H, 1041F, 1041H, 1042H, 1043F, 1044D, 1045D, 1045F, 1045H, 1046D, 1047D, 1047F, 1050D, 1051D, 1054D, 1055D, 1055F, 1055H, 1056D, 1057D, 1059D
	Mask	460601	Picture tube - Models 1066D, 1067D, 1067F, 1068D, 1069D
Mask		460604	Picture tube - Model 1070D, 1071D, 1071F, 1072D, 1073D
	Mask	460605	Picture tube - Models 1074D, 1075D, 1075F, 1075H
Mask & Frame Assy		460620	Picture tube - Models 1084D, 1085D, 1085F, 1085H, 1086D, 1087D, 1087F, 1088D, 1089D, 1089F, 1090D, 1091D, 1091F, 1092D, 1093D, 1093F
	Mask & Frame Assy	460620B	Picture tube - Models 1100D, 1101D
Safety Glass		520205	Models 1002H, 1004H, 1006H, 1008H
	Safety Glass	520197	Models 1009J, 1011J
Safety Glass		520202	Models 1012H, 1012J, 1014J
	Safety Glass	520206	Models 1018H, 1020H, 1036H, 1048D, 1049F
Safety Glass		520213	Models 1049D, 1040H, 1041F, 1041H, 1042H, 1043D, 1044D, 1045D, 1045F, 1045H, 1046D, 1047D, 1047F, 1050D, 1051D, 1054D, 1055D, 1055F, 1055H, 1056D, 1057D, 1059D
	Safety Glass	520207	Models 1066D, 1067D, 1067F, 1068D, 1069D
Safety Glass		520209	Models 1070D, 1071D, 1071F, 1072D, 1073D
	Safety Glass	520215	Models 1074D, 1075D, 1075F, 1075H
Safety Glass		520218	Models 1084D, 1085D, 1085F, 1085H, 1086D, 1087D, 1087F, 1088D, 1089D, 1089F, 1090D, 1091D, 1091F, 1092D, 1093D, 1093F, 1100D, 1101D
	Safety Glass		



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION
SET 304 FOLDER 7

EMERSON (Ch. 120233-D, -F, 120234-D, 120235-D, 120236-D, 120237-D, 120238-D, -F, -H, 120241-D, -F, 120249-D, -F)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETM A BASE TYPE	NOTES
		EMERSON PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Mixer-Osc.	6U8	6U8	9AE	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	Sound IF Amp.	6CB6	6CB6	7CM	
V6	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Det.-	6AL5	6AL5	6BT	
V8	AGC Rectifier	6CB6	6CB6	7CM	
V9	Video Output	6AU6	6AU6	7BK	
V10	Limiter	6AL5	6AL5	6BT	
V11	Discriminator	12AX7	12AX7	9A	
V12	AF Amplifier- Sync Separator	6V6GT	6V6GT	7S	
V13	Audio Output	12AU7	12AU7	9A	
V14	Sync Amplifier- Vert. Mult.	6K8GT	6K8GT	7S	
V15	Vert. Mult.- Vert. Output	6SN7GT	6SN7GT	8BD	
V16	Horiz. AFC- Horiz. Osc.	6BQ6GTA	6BQ6GTA	6AM	
V17	Horiz. Output	6AX4GT	6AX4GT	4CG	
V18	Damper	1B3GT	1B3GT	3C	
V19	HV Rectifier	5U4G	5U4G	5T	
V20	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETM A BASE TYPE	NOTES
	EMERSON PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V20	17LP4/ 17VP4	17LP4/ 17VP4	17LP4/17VP4	17LP4/ 17VP4	17LP4/17VP4	12L	① Aluminized ② Silver screen
	21YP4A① 21YP4	17LP4A① 21YP4	21YP4A①	21YP4A② 21YP4	21YP4A① 21YP4	12L	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	EMERSON PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	80	300	925280	FP388.3	TM-3040	T-620	
B	10	250					
C	100	50					
C2A	80	300	925242	FP375.5		Q-012	
B	40	250		TC72		MT-4510	
C	40	250					
D	10	450					

FIXED CAPACITORS

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

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	EMERSON PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C3	3-9		961033	829-10	801-001	DC-521	
C4	1000			DD-102	801-001	DC-521	
C5	3		960887	NP0A-3R3	TCZ-3R3	CT565A	
C6	5-3		960634	829-3	3115-01-0R5	CT565A	
C7	800		960436				
C8	1.5			TCZ-1R5	NP0A-1R5	UC-5515	
C9	47		960897	DD-470	831-470	UC-5447	
C10	47		960834	MFT-50			
C11	5-3			829-3	3115-01-0R5	CT565A	
C12	5						
C13	10						
C14	5-3		960834	829-3	3115-01-0R5	CT565A	
C15	800		960436				
C16	220			DD-221	811-221	UC-5322	
C17	1000			DD-102	801-001	DC-521	
C18	800		960436				
C19	800		960436				
C20	1000		928077	DD-102	801-001	DC-521	
C21	5000		928109	DD-502	811-005	DC-525	
C22	39		928082	TCN-39	NT50K-390	DC-521	
C23	1000		928077	DD-102	801-001	UC-5368	
C24	680		928076	DD-681	811-681	UC-5368	
C25	100		928085	TCN-100	NT50L-101	UC-5368	
C26	47		928000-1	D6-470	GPIK-470	UC-5447	
C27	5000		928109	DD-502	811-005	DC-525	
C28	470		928081	DD-471	831-471	UC-5347	
C29	1000		928077	DD-102	801-001	DC-521	
C30	680		928076	DD-681	811-681	UC-5368	
C31	800		928076	DD-801	811-801	UC-5368	
C32	1000		928077	DD-102	801-001	DC-521	
C33	1000		928077	DD-102	801-001	DC-521	
C34	680		928076	DD-681	811-681	UC-5368	
C35	1000		928077	DD-102	801-001	DC-521	
C36	.22	200	922325				
C37	5		928017	D6-050	GPIK-050	DC-521	
C38	47		928000-1	TCN-47	NT50K-470	DC-521	
C39	.047	400	922554	DF-503		PT4147	
C40	.047	400	922554	DF-503		PT4147	
C41	47			TCZ-47	NP0-338-470	PT4147	
C42	.001	800	922713	DD-102	801-001	DC-521	
C43	100		928096	DD-101	811-101	UC-531	
C44	5000		928109	DD-502	811-005	DC-525	
C45	5000		928109	DD-502	811-005	DC-525	
C46	100	500	91182	D6-101	GPIK-101	MC235	
C47	.0022	400	922523	D6-222	GP2-333-222	PT6222	
C48	.0033	400	922533	D6-332	GP2-333-332	PT6233	
C49	.001	400	922513	D6-102	GP2L-102	PT621	
C50	.047	400	922554	DF-503		PT4147	
C51	.01	800	922714	D6-103	GP2-333-103	PT61	
C52	.047	400	922554	DF-503		PT4147	
C53	220	500	91184	D6-221	GP2K-221	UC-5322	
C54	.01	400	922514	D6-103	GP2-333-103	PT41	
C55	.0022	400	922523	D6-222	GP2-333-222	PT6222	
C56	.0022	400	922523	D6-222	GP2-333-222	PT6222	
C57	.047	400	922454				
C58	.1	400	922515	DF-104		PT401	

PARTS LIST AND DESCRIPTIONS
CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	EMERSON PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C59	.0047	400	922453	D6-102	GP2L-102	MCB465	
C60	.001	600	922713	D6-103	GP2-333-103	PT621	
C61	.01	800	922714	D6-103	GP2-333-103	PT61	
C62	.02	500	91180	D6-820	801-820		
C63	.02	500	91180	D6-820	801-820		
C64	.047	400	922554	DF-503		PT4147	
C65	.022	400	922524	DF-203	817-02	PT4122	
C66	.047	400	922554	DF-503		PT4147	
C67	.47	200	922355			PT4047	
C68	330	500	91187	D6-331	811-331		
C69	.01	600	922614				
C70	820	500	91172				
C71	.001	400	922413	D6-102	GP2L-102	PT621	
C72	.1	400	922515	DF-104		PT401	
C73	.22	200	922325			PT4022	
C74	.1	800	922715	DF-104		PT601	
C75	100	4000	928114	DD60-101			
C76	50	2000	928097	DD30-500			
C77	.01	400	922201	DD-103	GP2-333-103	PT61	
C78	.01	400	922201	DD-103	GP2-333-103	PT61	

Note 1. Not used in chassis coded Δ .

Note 2. Used only with horizontal output transformer part #738086.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA				INSTALLATION NOTES
	RESIST- ANCE	WATTS	EMERSON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	
RIA	1500Ω	1/2	390201	F1-7	RTV-296	QJ-313*	Contrast (Panel)
B	1Meg	1/2		R2-52			Volume (Rear) Attach to RIA.
C	Switch			KB-1			Attach to RIB.
R2A	200KΩ	1/2	390297	AB-46	A47-200K-S	Q11-129	Brightness
B	Shaft		Not Req.	AK-4	RS-3	Not Req.	Attach to R2A.
R3A	1Meg	1/2	390299	AB-69	A47-1Meg-S	Q11-137	Vertical Hold
B	Shaft		Not Req.	AK-4	RS-3	Not Req.	Attach to R3A
R4A	50KΩ	1/2	390296	AB-31	A47-50K-S	Q11-123	Horizontal Hold
B	Shaft		Not Req.	AK-4	RS-3	Not Req.	Attach to R4A.
R5	6000Ω	2	390227		39-5000	WK-5000	Vertical Linearity-Stop at 1000Ω
R6A	2Meg	1/2	390228	BX-75	A47-2Meg-S	Q11-139	Vertical Size-See Note 1
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Attach to R6A.
R6A	2Meg	1/2	390196	BX-75	A47-2Meg-S	Q11-139	Vertical Size-See Note 1
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Attach to R6A.
R6A	2Meg	1/2	390288	BX-75	A47-2Meg-S	Q11-139	Vertical Size-See Note 1
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Attach to R6A.
R7A	50KΩ	1/2	390225	AB-31	A47-50K-S	Q11-123	Picture Stabilizer-See Note 2
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Attach to R7A.

Note 1. Used in some versions.

Note 2. Controls 390289, 390132, 390219, used in some versions.

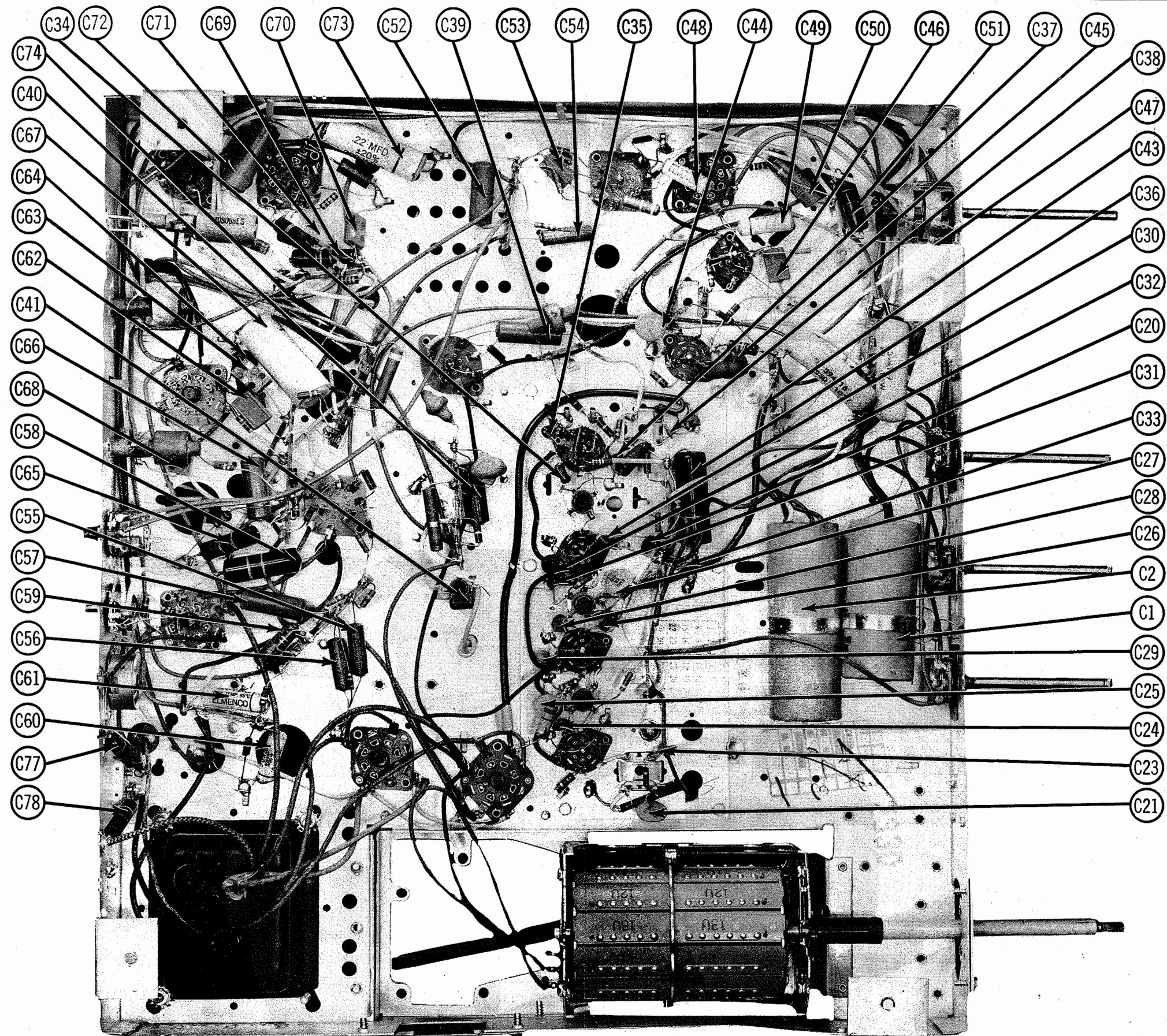
* CONCENTRIK EQUIVALENT: K-2 KIT, BASE ELEMENTS AND SHAFTS: B17-110, P1-224 (Panel)
B13-137, R1-308 (Rear)
76-1 Switch

* Universal Replacement (Mallory Exact Duplicate Part No. UE2055)

† Connect a 1000Ω resistor in series with control terminal.

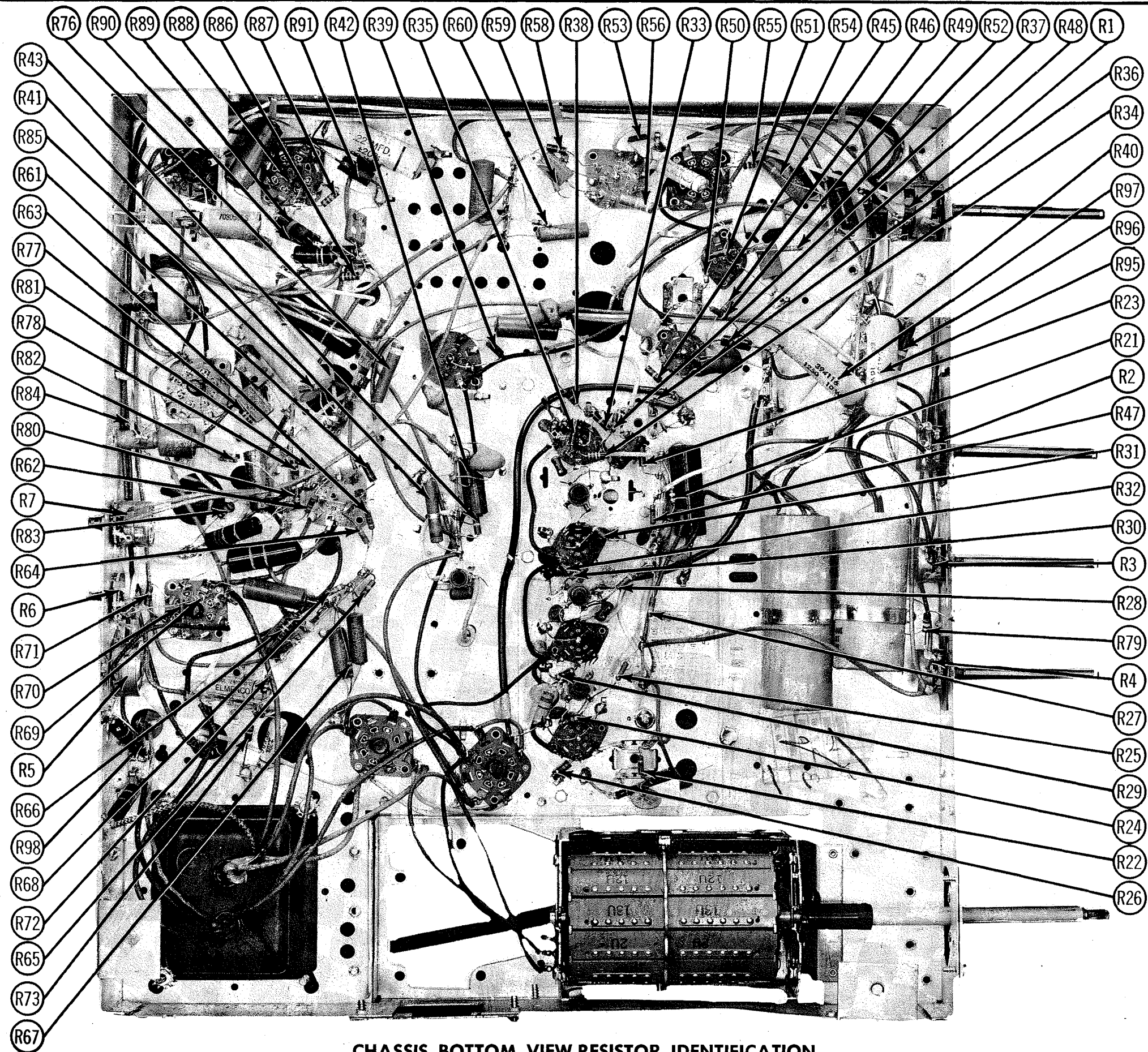
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	EMERSON PART No.	IRC PART No.	
R6	22KΩ	1/2			
R9	47KΩ	1/2		BTS-47K	
R10	470KΩ	1/2		BTS-470K	
R11	820KΩ	1/2		BTS-820K	
R12	1500Ω	1		BTA-1500	
R13	6800Ω	1			
R14	100KΩ	1			
R15	100KΩ	1			
R16	10KΩ	1			
R17	3300Ω	1		BTS-3300	
R18	100KΩ	1			
R19	15KΩ	1			
R20	8200Ω	1			
R21	470KΩ	1	341132	BTS-470K	
R22	15Ω	1	340052	BTS-15Ω	
R23	1000Ω	1	350492	BTS-1000	
R24	15KΩ	1	340772		
R25	470Ω	1	350412	BTS-470	
R26	68Ω	1	340212	BTS-68	
R27	15KΩ	1	340772		
R28	470Ω	1	350412	BTS-470	
R29	47Ω	1	340172	BTS-47	
R30	5600Ω	1	340672		
R31	470Ω	1	350412	BTS-470	
R32	180Ω	1	340312	BTS-180	
R33	100KΩ	1	350972	BTS-100K	
R34	330KΩ	1	340092	BTS-330K	
R35	1Meg	1	351212	BTS-1Meg	
R36	150KΩ	1	340772	BTS-150K	
R37	15KΩ	1	340772	BTS-15K	
R38	4700Ω	1	340652	BTS-4700	
R39	1Meg	1	351212	BTS-1Meg	
R40	15KΩ	1	370772	BTA-15K	
R41	8800Ω	2	780682	BTB-8800	
R42	15KΩ	1	350772	BTS-15K	
R43	220KΩ	1	351052	BTS-220K	
R44	470KΩ	1	351132	BTS-470K	
R45	220KΩ	1	351052	BTS-220K	
R46	10KΩ	1	340732	BTS-10K	
R47	10Meg	1	351452	BTS-10Meg	



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

EMERSON (Ch. 120233-D, -F, 120234-D, 120235-D, 120236-D,
120237-D, 120238-D, -F, -H, 120241-D, -F, 120249-D, -F)



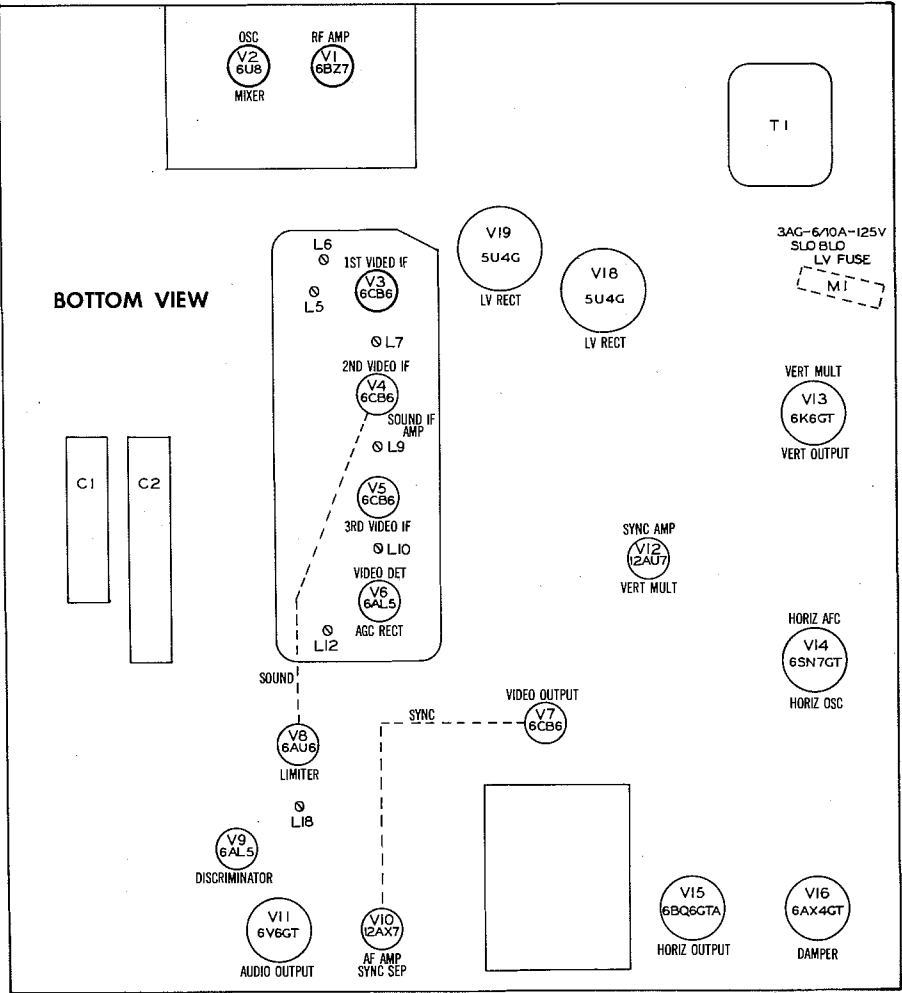
CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

EMERSON (Ch. 120233-D, -F, 120234-D, 120235-D, 120236-D,
120237-D, 120238-D, -F, -H, 120241-D, -F, 120249-D, -F)

RESISTANCE MEASUREMENTS

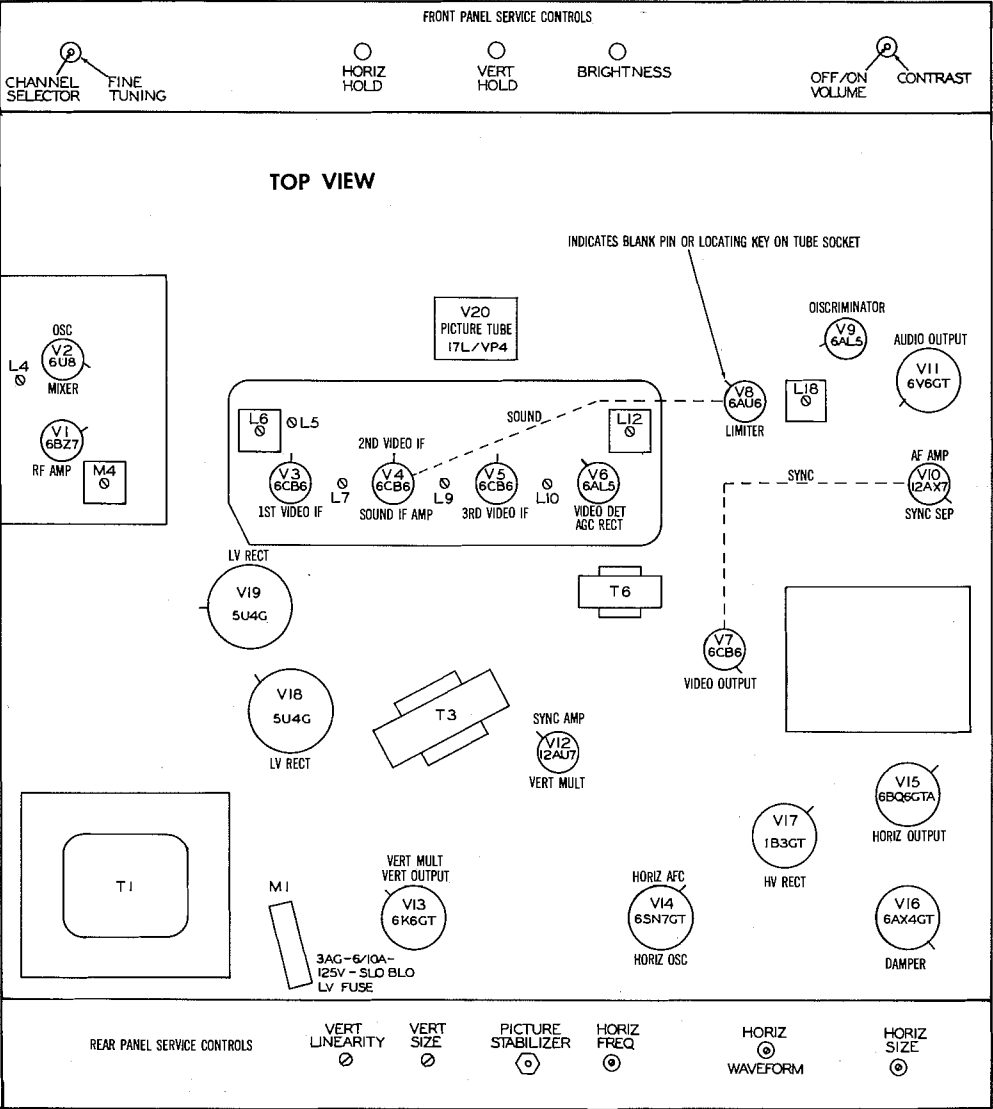
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	↑2KΩ	300KΩ	INF	0Ω	.1Ω	INF	1.6Meg	0Ω	↑2KΩ
V 2	6U8	↑5KΩ	200KΩ	↑100KΩ	.1Ω	0Ω	↑8.7KΩ	0Ω	0Ω	10KΩ
V 3	6CB6	1.3Meg	68Ω	.1Ω	0Ω	↑2KΩ	↑2KΩ	0Ω		
V 4	6CB6	2.2Ω	47Ω	.1Ω	0Ω	↑2KΩ	↑17KΩ	0Ω		
V 5	6CB6	0Ω	180Ω	.1Ω	0Ω	↑2KΩ	↑2KΩ	0Ω		
V 6	6AL5	.1Ω	1Meg	.1Ω	0Ω	100KΩ	0Ω	4.7KΩ		
V 7	6CB6	1Meg	37Ω	0Ω	.1Ω	↑7.3KΩ	↑15KΩ	↑15KΩ		
V 8	6AU6	220KΩ	0Ω	0Ω	.1Ω	↑2KΩ	↑22KΩ	0Ω		
V 9	6AL5	0Ω	100KΩ	.1Ω	0Ω	170KΩ	0Ω	100KΩ		
V 10	12AX7	↑220KΩ	10Meg	0Ω	.1Ω	.1Ω	↑11KΩ	2.3Meg	0Ω	0Ω
V 11	6V8GT	NC	.1Ω	↑370Ω	↑550Ω	470KΩ	TP	0Ω	470Ω	
V 12	12AU7	↑1.4Meg	1.3Meg	0Ω	.1Ω	.1Ω	↑3.3KΩ	1Meg	2.7KΩ	0Ω
V 13	6K6GT	NC	0Ω	↑5.7KΩ	↑5.7KΩ	2.2Meg	TP	.1Ω	3.2KΩ	
V 14	6SN7GT	1.5Meg	↑40KΩ	400KΩ	480KΩ	↑47KΩ	0Ω	.1Ω	0Ω	
V 15	6BQ6GTA	NC	0Ω	TP	↑5.2KΩ	470KΩ	NC	.1Ω	100Ω	TOP CAP ↑39Ω
V 16	6AX4GT	NC	NC	1Meg	NC	↑90Ω	NC	0Ω	.1Ω	
V 17	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ↑86Ω
V 18	5U4G	NC	25KΩ	NC	19Ω	NC	19Ω	NC	25KΩ	
V 19	5U4G	TP	25KΩ	TP	18Ω	TP	18Ω	NC	25KΩ	
V 20	17LP4/ 17VP4	0Ω	13Ω	PIN 6 ↑550Ω	PIN 10 ↑20Ω	PIN 11 ↑330KΩ	PIN 12 .1Ω			

↑MEASURED FROM PIN 2 OF V18.
↑MEASURED FROM PIN 3 OF V16.
NC-NO CONNECTION.
TP-TIE POINT.



TUBE PLACEMENT CHART

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

- POWER SUPPLY FAILURE**
No raster, no sound - V18, V19, Fuse (M1)
- LOSS OF PICTURE OR SOUND**
No pic, no sound, has raster - V2, V3, V4
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V5, V6, V7, V20
Has pic, no sound - V4, V8, V9, V10, V11
- SYNC FAILURE**
No vert. sync - V12, V13
No horiz. sync - V12, V14
No vert. or horiz. sync - V10, V12
- SWEEP FAILURE**
No raster, has sound - V14, V15, V16, V17, V20
No vertical deflection - V12, V13
Poor vert. linearity or foldover - V12, V13
Poor horiz. linearity or foldover - V14, V15, V16
Narrow picture - V14, V15, V16, V17, V18, V19
Vert. off freq. - V12, V13
Horiz. off freq. - V12, V14

EMERSON Ch. 120233-D, -F, 120234-D,
120235-D, 120236-D, 120237-D, 120238-D,
-F, -H, 120241-D, -F, 120249-D, -F)

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Picture tube may be removed from chassis for easier slug adjustments. The high voltage lead should be securely taped and kept away from chassis.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1. Direct	High side to an ungrounded tube shield floating over converter tube. Low side to chassis.	Not used	45.75MC (Unmod)	10 or 12	Use VTVM. DC probe to point \odot . Common to chassis.	A1	Attenuate generator output for not more than -2 volts at VTVM. Adjust for maximum deflection.
2. "	"	"	42.6MC	"	"	A2, A5	"
3. "	"	"	44.9MC	"	"	A3, A4	"
4. "	"	"	41.25MC	"	"	A6	Increase generator output for desirable reading and adjust A6 for MINIMUM deflection.
5. "	"	"	47.25MC (400% Mod)	"	Vert. Amp. thru 10K Ω to point \odot . Low side to chassis.	A7	Adjust for MINIMUM 400% indication on scope. Use high scope gain and increase generator output.
6. "	"	44MC (10MC Swp)	41.25MC 45.75MC 47.25MC	"	"	"	Use only enough sweep generator output to produce usable curves similar to Fig. 1. If necessary slightly retouch A1 thru A5 to obtain desired response. If video marker (45.75MC) is too high readjust A1. If too low, readjust A3. Increase sweep generator and scope output to observe 41.25MC and 45.75MC trap markers. If necessary, retouch A6 for 41.25MC and A7 for 47.25MC trap markers.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7. .01MFD	High side to pin 7 (plate) of 6AL5 (V6). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point \odot thru 10K Ω . Common to chassis.	A8, A9	Adjust for maximum deflection.
8. "	"	"	"	DC probe to point \odot thru 10K Ω . Common to chassis.	A10, A11	Detune A11 for maximum negative deflection. Adjust A10 for maximum deflection. Readjust A11 for zero reading on VTVM. A positive and negative reading will be obtained on either side of the correct setting. Remove short from pin 1 of V3.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7. .01MFD	High side to pin 7 (plate) of 6AL5 (V6). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. thru 10K Ω to point \odot . Low side to chassis.	A8, A9	Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
8. "	"	"	"	"	Vert. Amp. thru 10K Ω to point \odot . Low side to chassis.	A10, A11	Adjust A10 for maximum amplitude and straightness of crossover lines as in Fig. 3. Adjust A11 so that 4.5MC occurs at center of crossover lines. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines. Remove short from pin 1 of V3.

4.5MC TRAP ALIGNMENT

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9. .01MFD	High side to pin 1 (grid) of 6CB6 (V7). Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru detector (Fig. 4) to pin 11 of picture tube. Common to chassis.	A12	Adjust for MINIMUM deflection. Remove short from pin 1 of V3.

ALTERNATE 4.5MC TRAP ALIGNMENT

Replace V1 in its socket. Tune in a TV station and adjust the fine tuning control for maximum 4.5MC beat interference in the picture. Then adjust A12 for MINIMUM 4.5MC beat interference in the picture.

ALIGNMENT INSTRUCTIONS

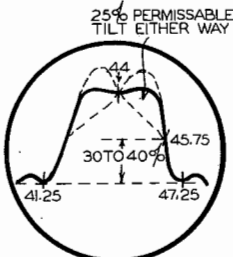


FIG. 1

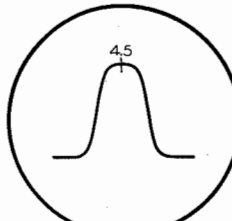


FIG. 2

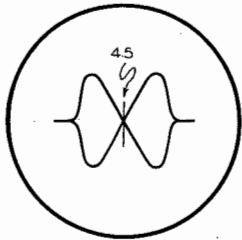


FIG. 3

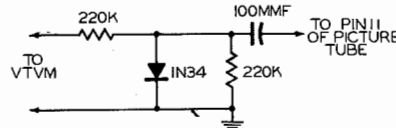


FIG. 4

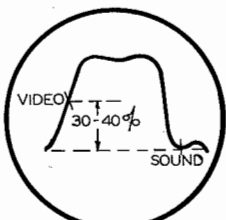


FIG. 5

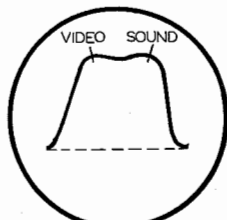


FIG. 6

VHF OSCILLATOR ALIGNMENT

Complete Oscillator Alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels, it may be necessary to correct them in one step using A13. Note: A13 adjustment not in tuner Part No. 470696. It should be noted that A13 is an all channel adjustment for the oscillator section and should not be used to correct any one channel. If A13 will not bring in all channels well within the range of the fine tuning control, it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel oscillator adjustment screws are reached through a hole just above and slightly to the left of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each VHF channel. Replace shield over converter tube. Connect bias as under "Video IF Alignment".

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 Ω . Set the fine tuning control to the mid-position of its range.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10. Two 120 Ω Carbon Resistors	Across antenna terminals with 120 Ω in each lead.	207MC (10MC Swp) 213MC (10MC Swp) 201MC (10MC Swp) 199.25MC (10MC Swp) 195MC (10MC Swp) 189MC (10MC Swp) 183MC (10MC Swp) 177MC (10MC Swp) 85MC (10MC Swp) 79MC (10MC Swp) 69MC (10MC Swp) 63MC (10MC Swp) 57MC (10MC Swp)	205.25MC 209.75MC 215.75MC 203.75MC 193.25MC 187.25MC 181.25MC 175.25MC 83.25MC 77.25MC 71.75MC 61.25MC 55.25MC 59.75MC	12 13 11 10 9 8 7 6 5 4 3 2	Vert. Amp. thru 10K Ω to point \odot . Low side to chassis.	A14 A15 A16 A17 A18 A19 A20 A21 A22 A23 A24 A25	Advance gain so that the sound notch is visible on response curve. Adjust to place sound marker in trap notch. Video marker should fall at 30 to 40% of maximum on opposite slope of response curve as in Fig. 5.

VHF RF AND MIXER ALIGNMENT

Connect bias as under "Video IF Alignment". Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 Ω .

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11. Two 120 Ω Carbon Resistors	Across antenna terminals with 120 Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75 MC	12	Vert. Amp. thru 10K Ω to point \odot . Low side to chassis.	A26, A27, A28	Adjust marker generator to provide readable marker. Be sure it does not distort the response curve. Adjust for response similar to Fig. 6.
12. "	"	213MC (10MC Swp) 201MC (10MC Swp) 199.25MC (10MC Swp) 195MC (10MC Swp) 189MC (10MC Swp) 183MC (10MC Swp) 177MC (10MC Swp) 85MC (10MC Swp) 79MC (10MC Swp) 69MC (10MC Swp) 63MC (10MC Swp) 57MC (10MC Swp)	211.25MC 215.75MC 203.75MC 193.25MC 187.25MC 181.25MC 175.25MC 83.25MC 77.25MC 71.75MC 61.25MC 55.25MC 59.75MC	13 11 10 9 8 7 6 5 4 3 2	"	"	Check for response similar to Fig. 6 on all channels. If markers fall below 70% on any channel, make compromise adjustments of A26, A27 and A28 with channel switch set to that channel. Then recheck all other channels to see that they have not been seriously affected.

IF WAVE TRAP ADJUSTMENT

The IF wave trap should be tuned to minimize interference caused by signals which fall within the video IF band-pass (40-48MC). Tune in a station on which the interference is noted and adjust A29 for minimum interference in the picture.

UHF OSCILLATOR ALIGNMENT FOR UHF TUNER USED WITH VHF TUNER 470772

Connect bias as under "VHF Oscillator Alignment". Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 Ω .

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13. Two 120 Ω Carbon Resistors	Across UHF antenna terminals with 120 Ω in each lead.	453MC (12MC Swp)	451.25MC (Video)	Tuning plates fully meshed (fully clockwise)	Vert. Amp. thru 10K Ω to point \odot . Low side to chassis.	A30	If separate UHF marker generator is used, couple it loosely to sweep generator terminals. Adjust to place video (451.25MC) marker at the 50% point on response curve.
14. "	"	869MC (12MC Swp)	867.25MC (Video)	80	"	A31	Remove shield from side of UHF tuner. Adjust A31 to place video marker (867.25MC) at 50% on response curve. Use low marker generator output. Replace tuner shield.

UHF RF ALIGNMENT FOR UHF TUNER USED WITH VHF TUNER 470772

The RF portion has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

UHF TUNER ALIGNMENT FOR UHF TUNERS 470748, 470713 AND UHF-VHF TUNER 470712 COMBINATION

In the event the UHF oscillator tube is replaced, it is recommended that several tubes be tried and the one which works best should be used. Alignment of these tuners is not recommended in the field.

EMERSON (Ch. 120233-D, -F, 120234-D, 120235-D, 120236-D, 120237-D, 120238-D, -F, -H, 120241-D, -F, 120249-D, -F)