

# General Electric TV



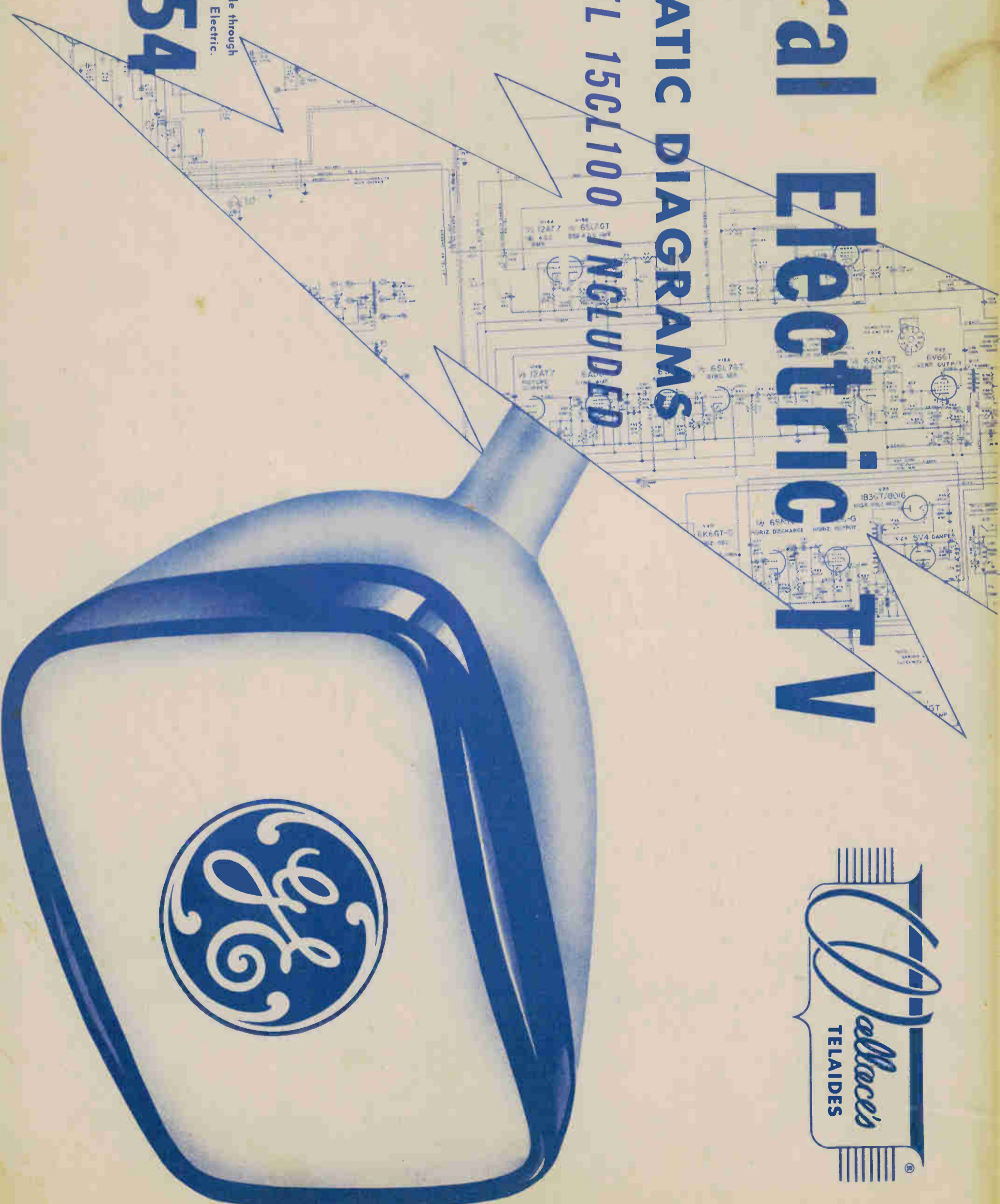
**SCHEMATIC DIAGRAMS**

**COLOR MODEL 15CL100 INCLUDED**

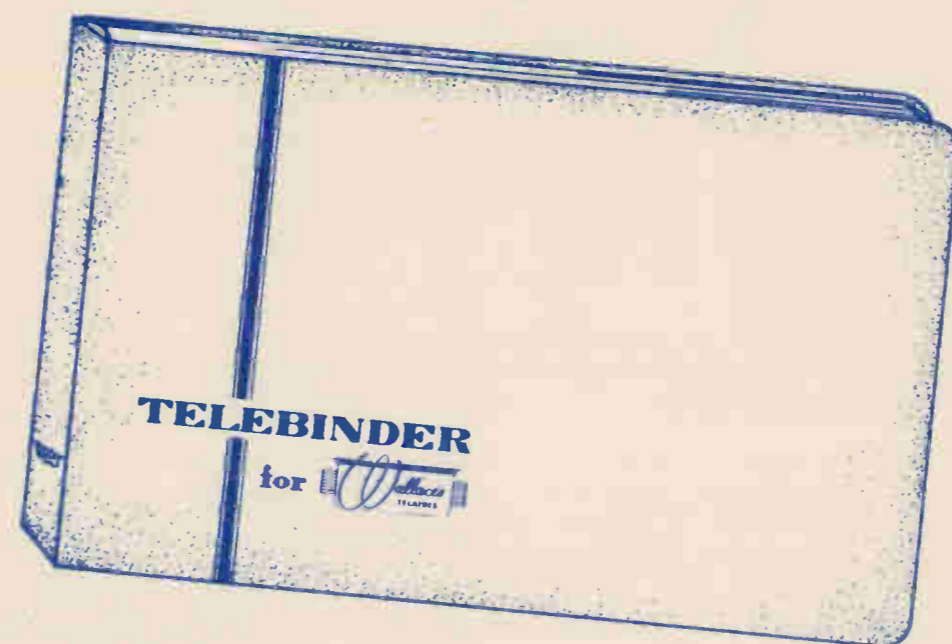
Publication of this book was made possible through  
the Courtesy and Co-operation of General Electric.

**1946-1954**

**\$3.00**



# Talk about CONVENIENCE!



## ANNOUNCING THE TELEBINDER

In response to your many requests, there is now available the new TELEBINDER, designed especially for use with Wallace's TELAIDES. Ruggedly constructed, the binder has metal rings which open or close instantly for the addition or removal of material. Pages lie flat when the TELEBINDER is opened. The TELAIDES you now own are punched to fit exactly the rings of this new binder.

THE TELEBINDER IS CONSTRUCTED SO AS TO HAVE A LONG AND USEFUL LIFE.

Cover material is extremely tough, flexible and attractively stamped.

No tugging at the rings, or jammed fingers -- separate levers at opposite ends of the binder spine instantly open or close the twenty-two steel rings.

Binder and cover are brass riveted.

### USE TELEBINDERS FOR:

Combining TELAIDES for several manufacturers into a single traveling service reference book!

Combining 1956 and other added information for a single manufacturer, with the initial TELAIDE covering early chassis, into one convenient unit!

Collating information in any other manner to fit your individual needs.

# now ready!

EMERSON  
MOTOROLA  
ADMIRAL  
ZENITH  
SYLVANIA  
PHILCO  
CROSLEY  
RAYTHEON  
WESTINGHOUSE  
GENERAL ELECTRIC  
R.C.A. VICTOR

EACH

**\$2.50**

Is your TELAIDE library  
up-to-date?

COMBINATION No. 1:  
Stromberg-Carlson, Kaye-Halbert, Starrett

COMBINATION No. 2:  
Arvin, Trav-ler, Philmore

COMBINATION No. 3: (1954 Models)  
Admiral, Motorola, Westinghouse  
Sylvania, Arvin, Trav-ler

COMBINATION No. 4: (1954 Models)  
Philco, Emerson, Zenith, Crosley  
Raytheon, Stromberg-Carlson

COMBINATION No. 5:  
Late 1954 and Early 1955 Models  
for all above manufacturers.

BENDIX (1946-1955)  
CAPEHART (1947-1955)  
SENTINEL (1947-1955)



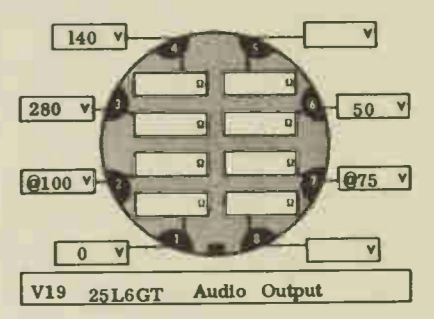
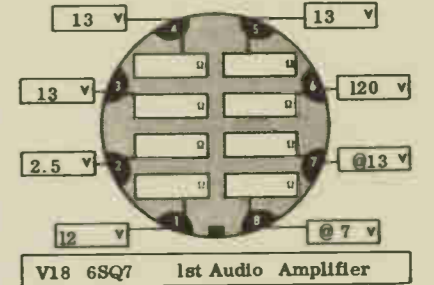
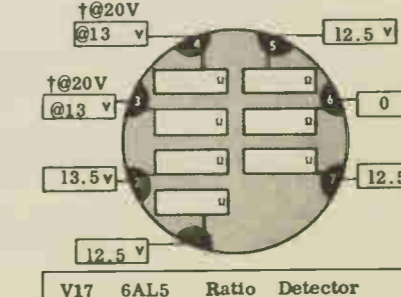
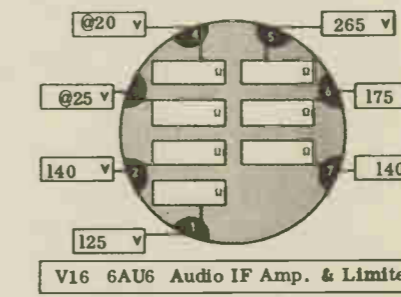
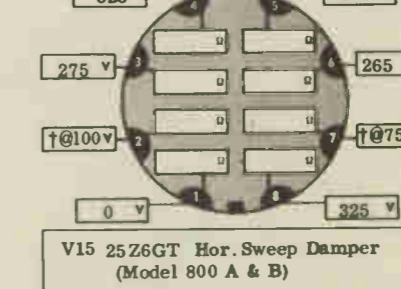
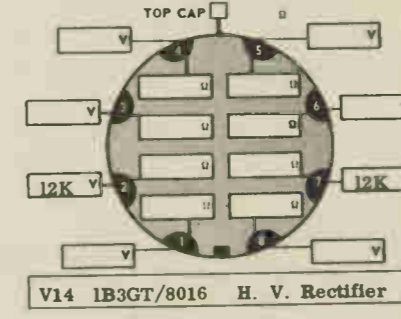
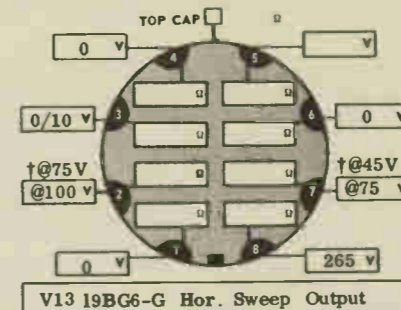
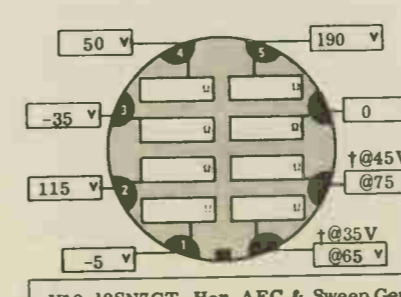
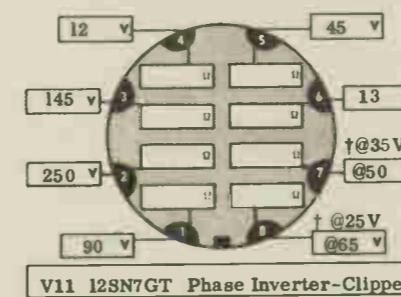
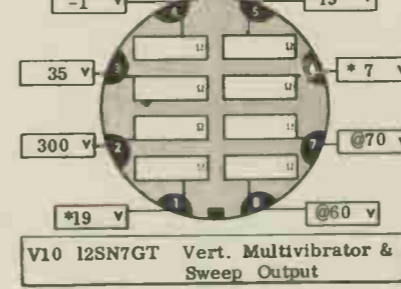
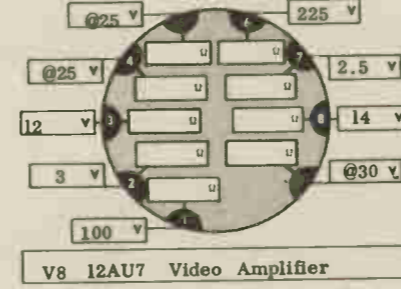
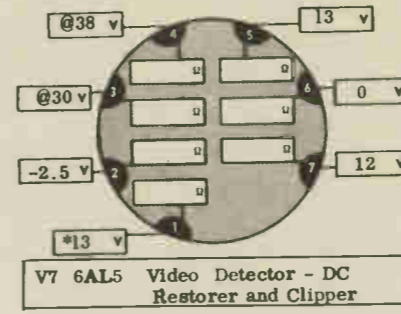
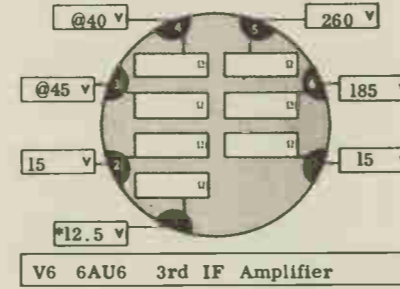
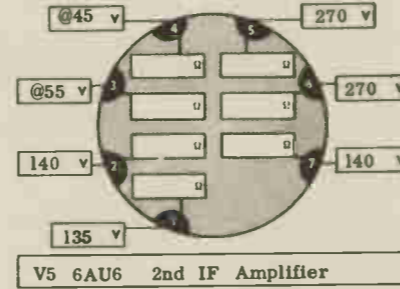
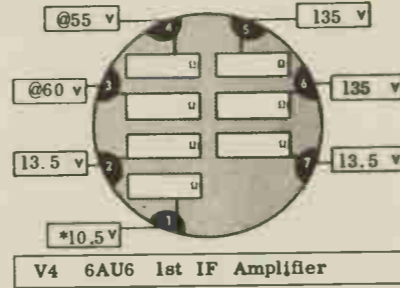
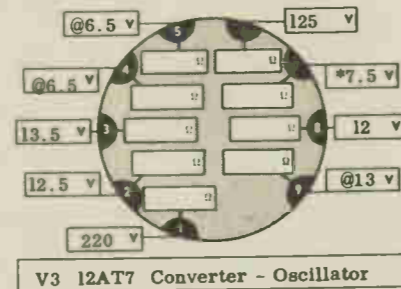
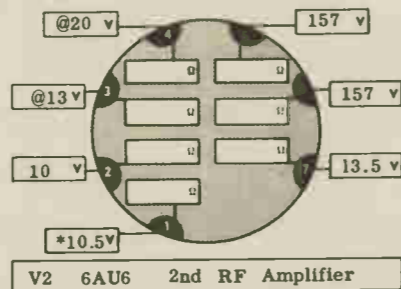
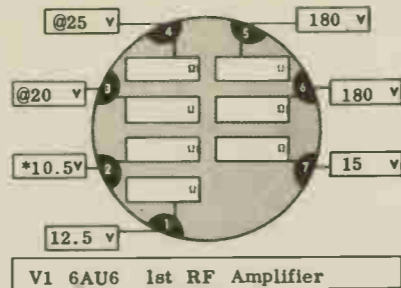
# MODEL INDEX

Models	Pages	Models	Pages	Models	Pages	Models	Pages	Models	Pages	Models	Pages
800A	2, 3	12C107	42-45	17C108	56, 57	20T2	68, 69	21C351	86, 87	<b>COLOR:</b>	
800B	2, 3	12C108	42-45	17C109	56, 57	21C103	82, 83	21T1	74, 75	15CL100	90-99
800C	4, 5	12C109	42-45	17C110	58, 59	21C104	82, 83	21T2	72, 73		
800D	4, 5	12K1	46, 47	17C111	58, 59	21C105	82, 83	21T3	74, 75		
801	6, 7	12T1	40, 41	17C112	56, 57	21C114	80, 81	21T4	70, 71		
802	8, 9	12T3	42-45	17C113	60, 61	21C115	80, 81	21T5	70, 71		
803	10, 11	12T4	42-45	17C114	56, 57	21C116	80, 81	21T6	74, 75		
805	12-15	12T7	44, 45	17C115	60, 61	21C117	80, 81	21T7	76, 77	<b>RADIOS:</b>	
806	12-15	14C101	48, 49	17C117	60, 61	21C119	80, 81	21T8	76, 77	818	101, 2, 3
807	12-15	14C102	48, 49	17C120	60, 61	21C120	80, 81	21T10	80, 81	820	101, 2, 3
809	12-15	14T2	48, 49	17C125	74, 75	21C121	80, 81	21T11	80, 81	840	101, 2, 3
810	16, 17	14T3	48, 49	17C127	80, 81	21C200	68, 69	21T12	80, 81	12K1	101, 2, 3
811	16, 17	16C103	52, 53	17T1	56, 57	21C201	74, 75	21T14	80, 81	16K1	101, 2, 3
814	18, 19	16C104	52, 53	17T2	56, 57	21C202	74, 75	21T15	80, 81		
815	20, 21	16C110	50, 51	17T3	56, 57	21C204	74, 75	21T17	88, 89		
817	22-25	16C111	50, 51	17T4	56, 57	21C206	74, 75	21T18	88, 89	<b>UHF:</b>	
818	26, 27	16C113	52, 53	17T5	56, 57	21C208	74, 75	21T19	80, 81	UHF-70	104
820	28, 29	16C115	50, 51	17T6	56, 57	21C210	74, 75	21T20	78, 79	UHF-80	104
821	22-25	16C116	52, 53	17T7	60, 61	21C214	74, 75	21T21	78, 79	UHF-90	104
830	30, 31	16K1	54, 55	17T10	72, 73	21C225	78, 79	21T22	82, 83	UHF-101	104
835	32, 33	16K2	54, 55	17T11	72, 73	21C226	78, 79	21T23	82, 83	UHF-103	104
840	34, 35	16T1	50, 51	17T12	72, 73	21C227	78, 79	21T24	82, 83	RUX-001	82
901	36, 37	16T2	50, 51	17T14	88, 89	21C228	78, 79	21T25	82, 83	RUX-003	105
910	36, 37	16T3	52, 53	17T15	80, 81	21C229	78, 79	21T26	84, 85	RUX-006	105
10C101	38, 39	16T4	52, 53	17T16	88, 89	21C230	78, 79	21T27	84, 85	RUX-007	105
10C102	38, 39	16T5	52, 53	17T17	80, 81	21C231	78, 79	21T30	86, 87		
10T1	38, 39	16T6	52, 53	17T20	82, 83	21C232	78, 79	21T31	86, 87		
10T4	38, 39	17C101	52, 53	19C101	62, 63	21C233	78, 79	24C101	66, 67		
10T5	38, 39	17C102	52, 53	20C105	68, 69	21C240	84, 85				
10T6	38, 39	17C103	56, 57	20C106	68, 69	21C241	84, 85				
12C101	40, 41	17C104	56, 57	20C107	74, 75	21C348	86, 87			<b>PRODUCTION</b>	
12C102	40, 41	17C105	56, 57	20C150	64, 65	21C349	86, 87			CHANGES	106-111
12C105	40, 41	17C107	56, 57	20C151	64, 65	21C350	86, 87				

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C268	40 mf, 300V	RCE-088
C277	10 mf, 150V	RCE-088
C278	150 mf, 15V	RCE-088
C297	100 mf, 50V	RCE-089
C354	50 mf, 100V	RCE-089
C358	10 mf, 350V	RCE-089
C346	1 mf, 50V	RCE-090
C371	150 mf, 150V	RCE-091
C372	150 mf, 150V	RCE-091
C373	150 mf, 150V	RCE-091
C374	150 mf, 150V	RCE-091
C299	30 mf, 450V	RCE-092
SPECIAL		
C325	47 mf, 800V., mica	RCN-021
C327	Hi voltage, 500 mmf., 20,000 V.	RCN-023
TRIMMERS		
C319	45-380 mmf., horiz. drive trimmer cap.	RCY-051
C213	1.25-1.95 mmf., 500V., trimmer capacitor.	RCY-053
CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume 500K	R347	RRC-099 *
Brightness 500K	R261A	RRC-097 *
Contrast 500K	R261B	RRC-097 *
Hor. Hold 100K	R321	RRC-103 **
Vert. Hold 100K	R298	RRC-098 *
Vert. Size 2 meg	R302	RRC-096
Vert. Lin. 2K, 2W	R300	RRC-099 *
Focus 100K	R353	RRC-104 **
On-off	S371	RRC-104 **
WIREWOUND & SPECIAL		
42.5K, temp. comp.	R328	RRN-007
Globar, 75 ohms	R373, 4	RRW-041
5 ohms, 1/2W (used with original thermal cutout)	R371	RRW-043
4.6 ohms, 5W (use w/RSR-002 only)	R371	RRW-048
COILS		
REF. NO.	DESCRIPTION	PART NO.
L201	Input	RLF-023
L202, 5	RF & Osc. choke 8.2 uh.	RLI-032
L204	RF choke	RLF-024
L248	IF	RLF-027
L255, 6	Vid. comp. ch. 165 mic	RLI-038
L257	Vid. comp. choke	RLI-068
L311	Hor. Size	RLD-011
L312	Hor. lin.	RLD-012
L316	Hor. flywheel	RLD-014
L341	1st audio IF	RLI-069
L342	Focus, clamp type	RLF-025
L343	Focus, swivel type	RLF-026
L372, 3	4, 5, 249	RLI-063
L376	RF choke-2.0 uh. Filter reactor-used w/ PM speaker	RTL-096
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Audio Output	T342	RTO-062 (spkr. mounted on chassis)
Hor. output (sweep)	T311	RTO-076 & RKT-010
Ratio detector	T341	RTD-008
Vertical sweep	T291	RTO-064
Yoke (used w/clamp type focus coil assy)		RLD-010
Yoke (used w/swivel type focus coil assy)		RLD-013
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
X371	Selenium rectifier-5pl. limited mounting space adjacent to spkr LS1	RER-007
LS1	Ion trap replaces earlier double magnet type Head end (800A)	RET-003
	Broadcast filter ass'y	RJX-028
	Speaker-4" electro-dynamic	RLX-027
B371	Thermal cut out-power line circuit breaker	ROP-019
S341	Focus switch	RSR-002
LS2	Speaker-4" PM	RSW-066 402C3
X371, 2	Selenium rectifier-6 pl. (see RER-007) Head-end (800B)	RER-004 RIX-027

REF. NO.	DESCRIPTION	PART NO.
X371	Selenium rectifier-5pl. limited mounting space adjacent to spkr LS1	RER-007
LS1	Ion trap replaces earlier double magnet type Head end (800A)	RET-003
	Broadcast filter ass'y	RJX-028
	Speaker-4" electro-dynamic	RLX-027
B371	Thermal cut out-power line circuit breaker	ROP-019
S341	Focus switch	RSR-002
LS2	Speaker-4" PM	RSW-066 402C3

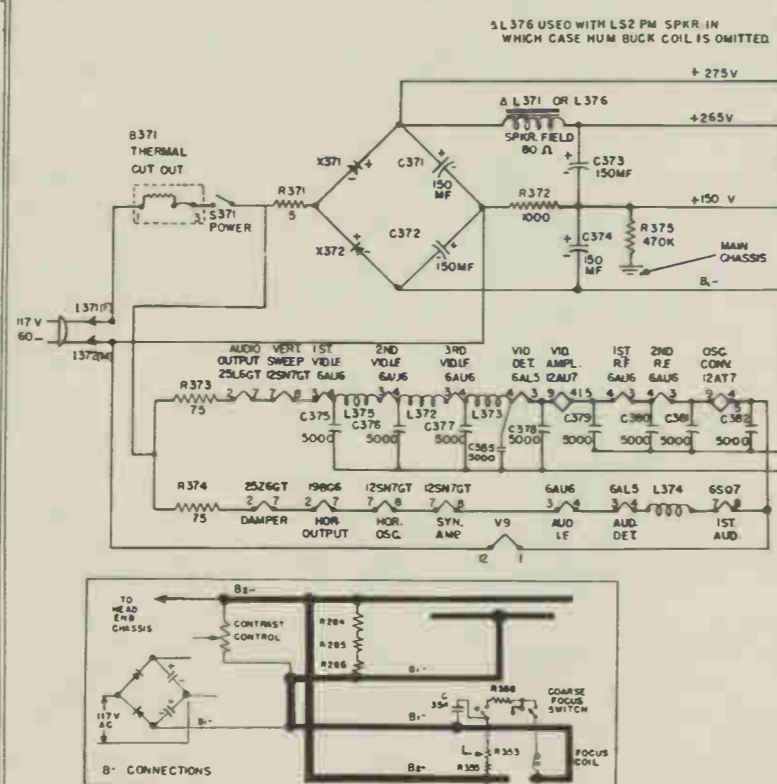
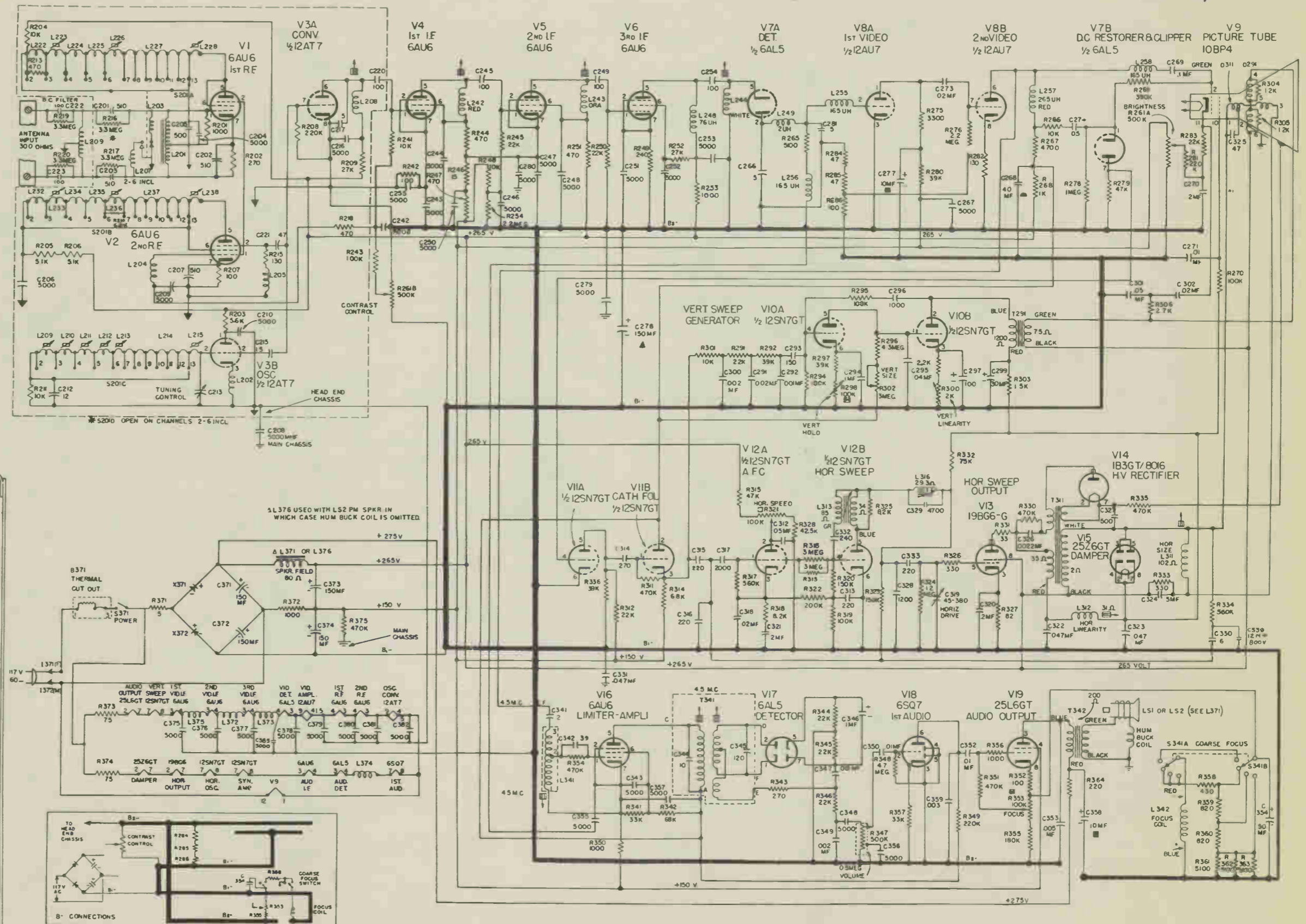
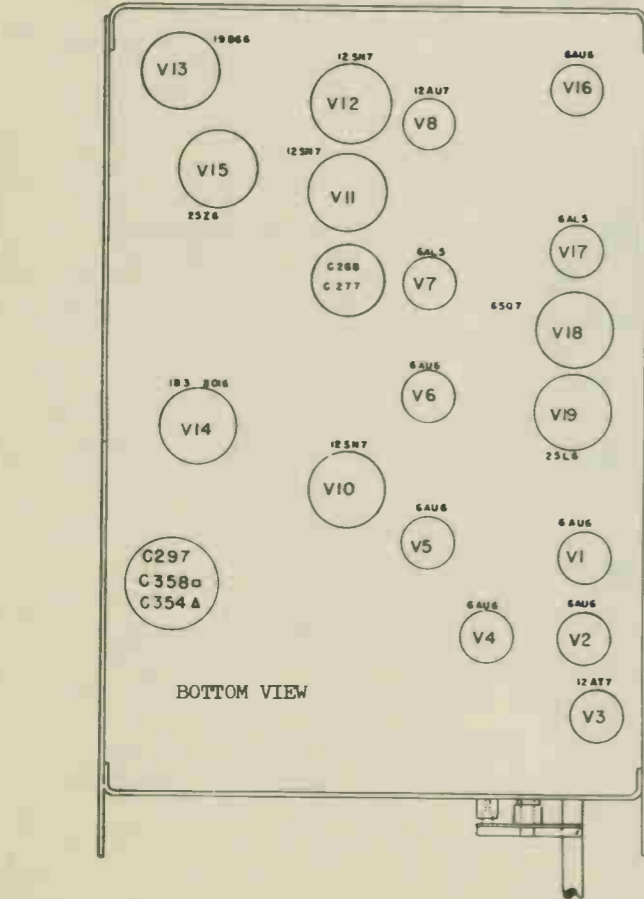
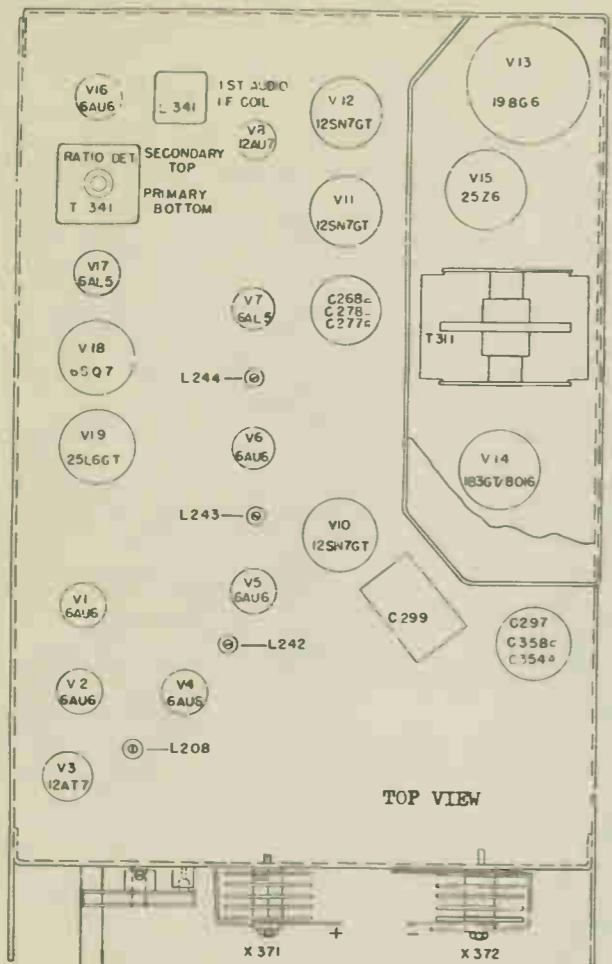
Important Note: It is important, with the change of units, that the proper series resistors R371 is used. With original cut-out, use RRW-043, 5 ohms, 4W., W.W. New units, RSR-002, require the series resistance R371, to be RRW-048, 4.6 ohms. Therefore, when original thermal cut-out units are being replaced by RSR-002, the original 5 ohm series resistor R371 must also be replaced by RRW-048...



### TEST CONDITIONS

- Volume - Min.
  - Focus - Normal
  - H. Hold - Normal
  - V. Hold - Normal
  - Brightness - Min.
  - Contrast - Max.
- Meters:  
 AC 1000 ohm/volt.  
 DC 20,000 ohm/volt.  
 Line volts - 117V.  
 All voltage DC unless otherwise noted.  
 \* Use scale 50V or higher.  
 † Voltages on Models 800A & B only.  
 \*\* Min. - Max. of Focus Control.  
 @ AC voltage reading.

# 800A, 800B



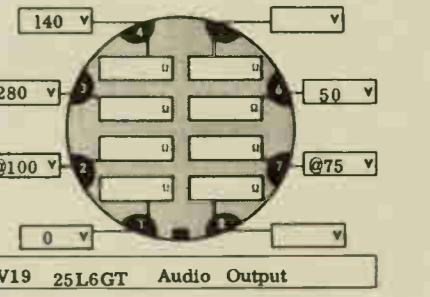
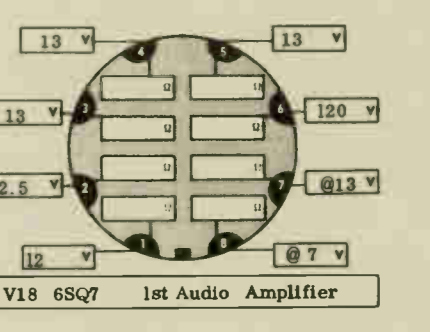
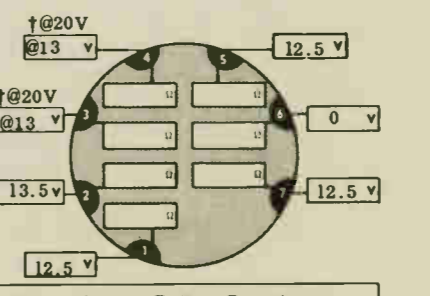
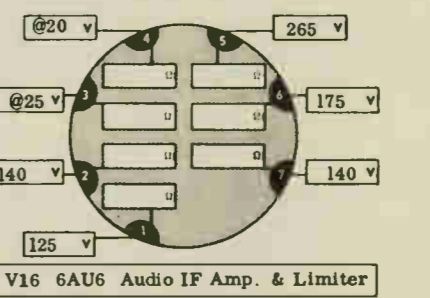
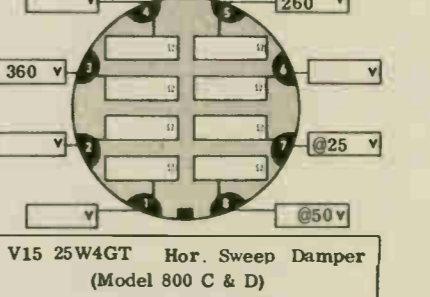
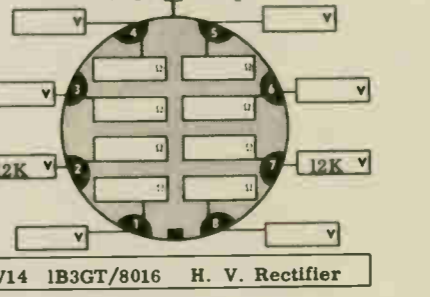
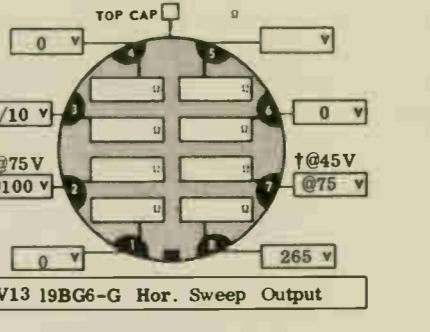
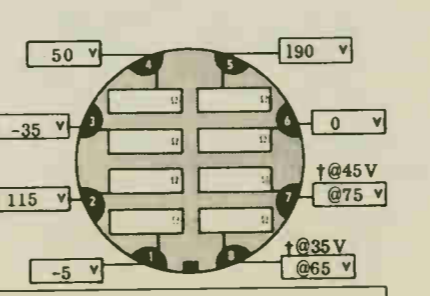
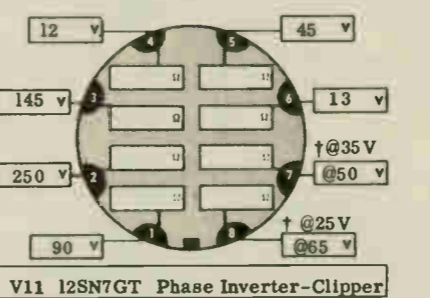
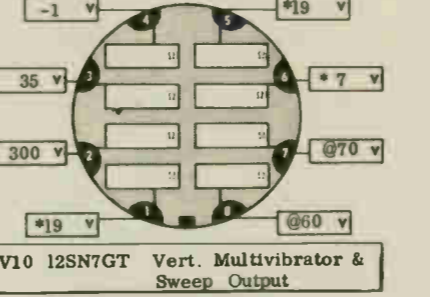
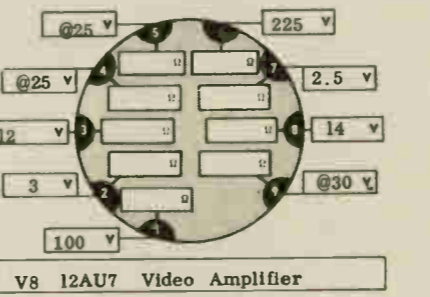
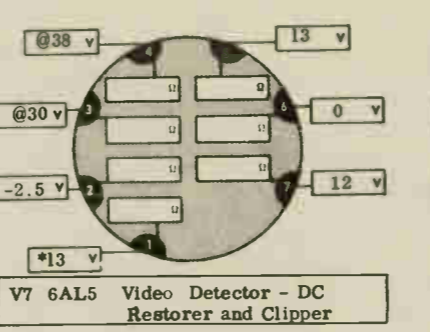
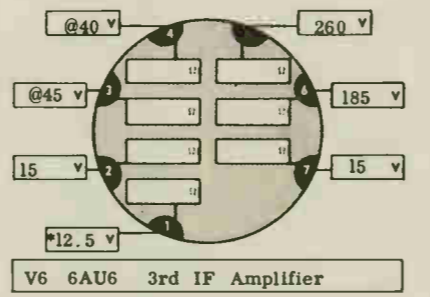
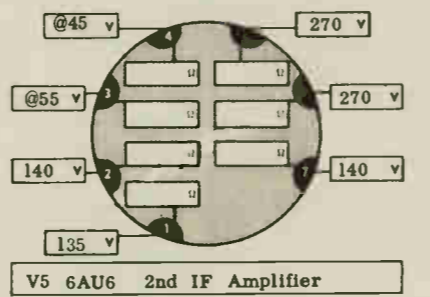
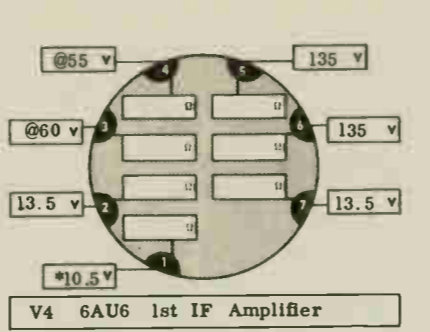
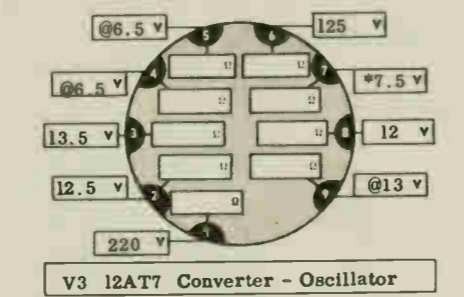
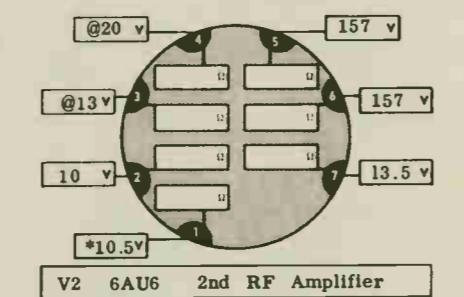
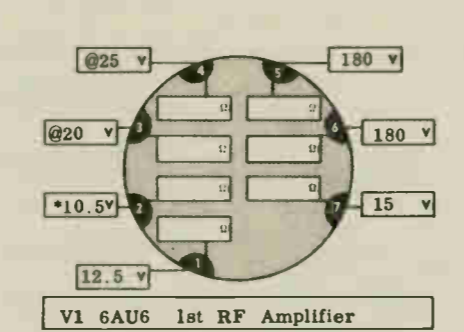
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C268	40 mf., 300V	RCE-088
277	10 mf., 150V	
278	150 mf., 15V.	
C297	100 mf., 50V.	RCE-089
354	50 mf., 100V.	
358	10 mf., 350V.	
C346	1 mf., 50V.	RCE-090
C371,2	3,4	
	150 mf., 150V	RCE-091
C299	30 mf., 450V	RCE-092
C383,4	60 mf., 350V	RCE-094
	Special	
C327	500mmf., 20K V HV Trimmers	RCN-023
C319	45-380mmf., hor. d.	RCY-051
C213	1.25-1.95mmf 500V	RCY-053

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume 500K	R347	RRC-099 *
Volume 500K	R347	RRC-104 **
Brightness 500K	R261A	RRC-097 *
Brightness 500K	R261A	RRC-102 **
Contrast 500K	R261B	RRC-097 *
Contrast 500K	R261B	RRC-102 **
Hor. Hold 100K	R321	RRC-098 *
Hor. Hold 100K	R321	RRC-103 **
Vert. Hold 100K	R298	RRC-098 *
Vert. Hold 100K	R298	RRC-103 **
Vert. Size 2 meg	R302	RRC-096
Vert. Lin. 2K, 2W	R300	RRC-095
Focus 100K	R353	RRC-099 *
On-off	S371	RRC-099 *
Focus 100K	R353	RRC-104 **
On-off	S371	RRC-104 **
Wirewound & Special		
42.5 temp. compensating	R328	RRN-007
Globar - 75 ohms	R373,4	RRW-041
5 ohms, 1/2 W (use with orig. thermal cut-out)	R371	RRW-043***
4.6 ohms, 5W (use with thermal cut-out RSR-002)	R371	RRW-048***

COILS		
REF. NO.	DESCRIPTION	PART NO.
L201	Input	RLF-023
L202,5	RF & Osc. ch. 8.2 uh.	RLI-032
L203,7	RF	RLI-083
L204	RF choke	RLF-024
L208:	242, 3, 4	
	Video IF plate	RLP-014
L209,	C222, C223, C219, R220	
	Broadcast filter	RLX-027
L248	Coil-IF	RLF-027
L255,6	P. Vid. comp. ch. 165 mic	RLI-038
L257,6	Vid. comp. Choke	RLI-068
L313,	R325	
	Blocking oscillator	RLI-086
L314,	315, 316 Hor. size lin. or flywheel	RLD-014
L341	1st audio IF	RLI-069
L342	Focus-clamp type	RLF-025
L343	Focus, swivel type	RLF-026
L372,3,4	5, 249. RF Ch., 2.0 uh.	RLI-063
L376	Flt. React., w/PM Spkr.	RLI-096

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Hor. output (sweep)	T321	RTO-076
Audio output	T342	RTO-062
Ratio detector	T341	RTD-008
Vertical sweep	T291	RTO-064
Audio output	T342	RTO-066
Yoke used w/clamp type focus ass'y		RLD-010
Yoke used w/swivel type focus ass'y		RLD-013

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
X371,2	Selenium rectifier - 6 pl.	RER-004 (See RER-007)
X371	Selenium rectifier - 5 pl. limited mounting space adjacent to electrodynamic spkr dictates the use of this rectifier ion trap-replaces earlier double magnet type	RER-007
		RET-003



### TEST CONDITIONS

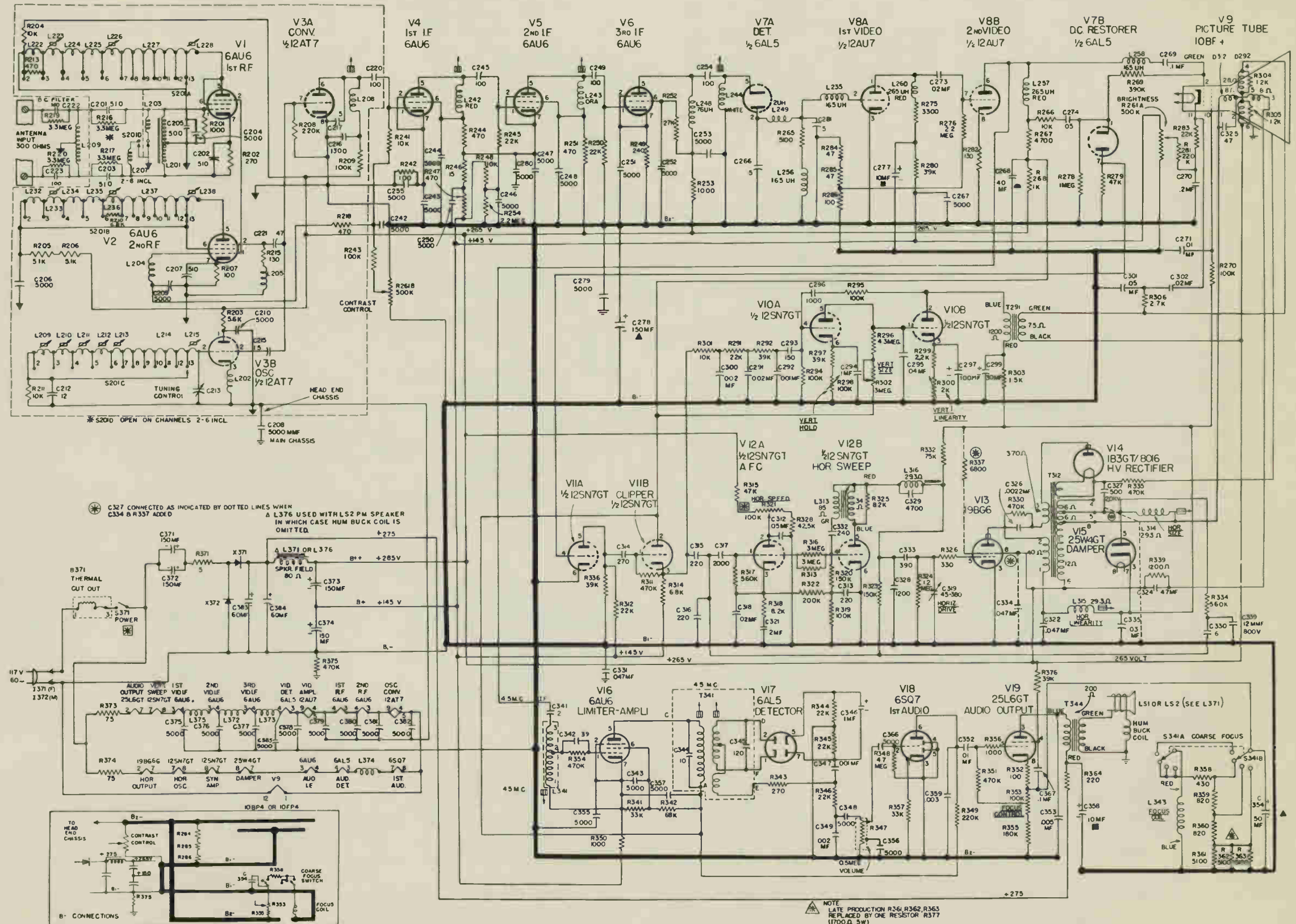
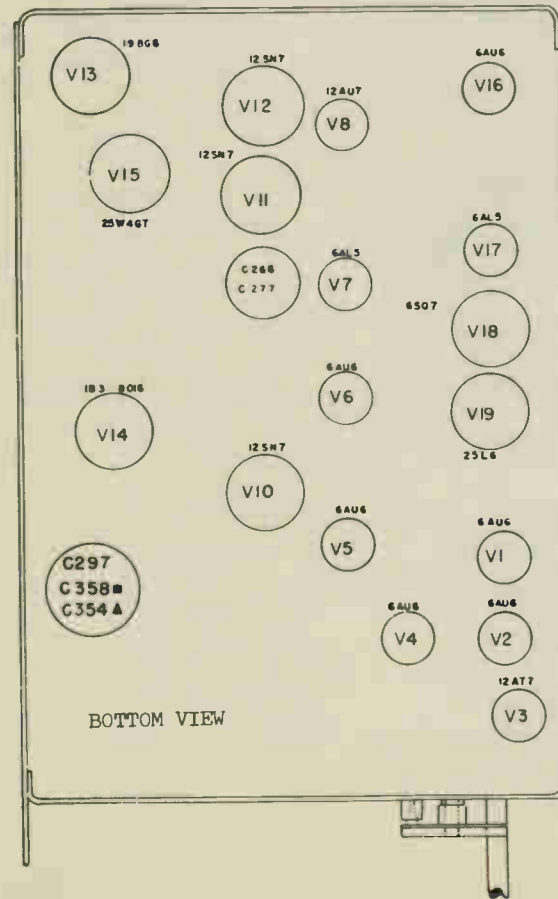
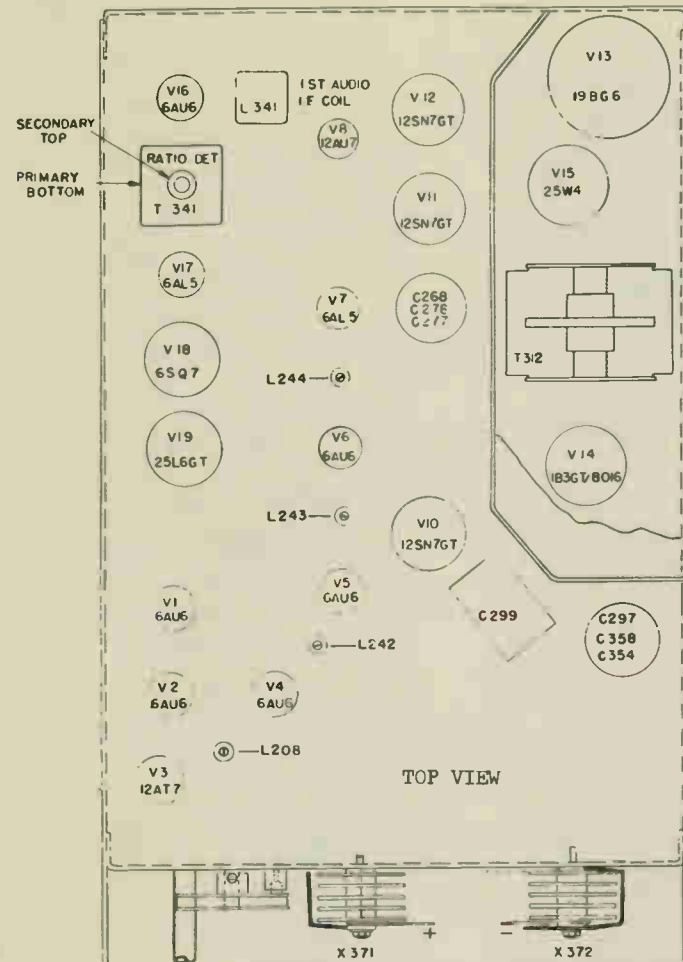
- Volume - Min.
- Focus - Normal
- H. Hold - Normal
- V. Hold - Normal
- Brightness - Min.
- Contrast - Max.

Meters:  
 AC 1000 ohm/volt.  
 DC 20,000 ohm/volt.  
 Line volts - 117V.  
 All voltage DC unless otherwise noted.  
 \* Use scale 50V or higher.  
 † Voltages on Models 800A & B only.  
 \*\* Min. - Max. of Focus Control.  
 @ AC voltage reading.

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
	Ring - large outside picture centering ring	RHM-059
	Ring - small inside picture centering ring	RHM-060
	Head end-complete	RJX-027 (800D)
LS2	Speaker - 4" PM	402C3
LS1, 371	Electrodynamic Speaker, 4"	ROP-019
B371	Thermal cut-out	RSR-002 ***
S341	Focus Switch	RSW-066

\*\*\* NOTE: It is important, with the change of units, that the proper series resistor R371 is used. With original cut-out, use RRW-043, 5 ohms, 4W., W.W. New units, RSR-002, require the series resistance, R371, to be RRW-048, 4.6 ohms. Therefore, when original thermal cut-out units are being replaced by RSR-002. The original 5 ohm series resistor R371 must also be replaced by RRW-048.

- 800C
- 800D



ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C64	90 mfd., 450V	RCE-017
C31A	40 mfd., 25V	RCE-018
C31B	40 mfd., 25V	RCE-018
C31C	40 mfd., 25V	RCE-018
C45A	30 mfd., 450V	RCE-019
C45B	30 mfd., 450V	RCE-019
C45C	15 mfd., 450V	RCE-019
C45D	30 mfd., 15V	RCE-019
22A	30 mfd., 450V	RCE-019
22B	30 mfd., 450V	RCE-019
22C	15 mfd., 450V	RCE-019
22D	30 mfd., 15V	RCE-019
C32A, B, C, D	30 mfd., 15 mfd., 15 mfd., 450V	RCE-020
C62,3	30 mfd., 300V	RCE-021
C69	50 mfd., 25V	RCE-048
TRIMMERS		
C67A, B	B'cast tun'g cond	RCT-013
C112	TV tuning cond.	RCY-015

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume 2 meg, 1/2 W	R69A	RRC-022
Brightness 500K, dual 1/2W	R84A	RRC-023
Contrast 500K, dual 1/2W	R84B	RRC-023
Hor. Hold 100K, dual, 2w.	R36	RRC-020
Hor. Size		
Vert. Hold 250K, 1/2W.	R62	RRC-021
Vert Size		
Vert Lin. 1000, 2W. w. w.	R58	RRC-024
Height 100K, dual, 2W	R61	RRC-020
Horiz. Lin. 250K, 1/2W	R49	RRC-021
Tone 500K, 1/2W.	R69B	RRC-022
Focus 5000, 4W. w. w.	R88	RRC-025
WIREWOUNDS		
300 ohms, 7.4W.	R50	RRW-011
3000 ohms, 7.4W	R69	RRW-012

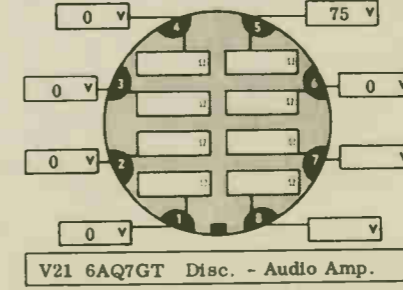
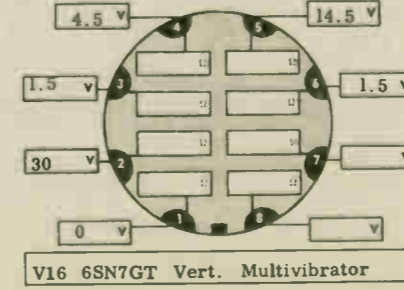
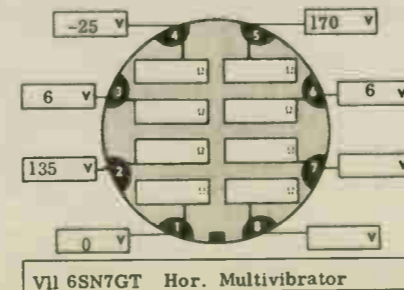
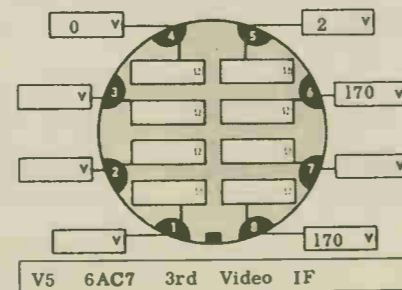
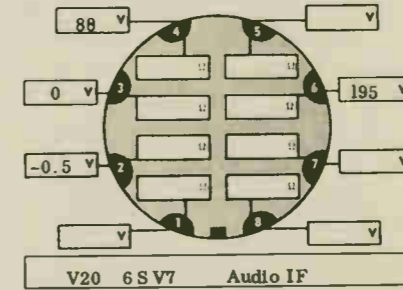
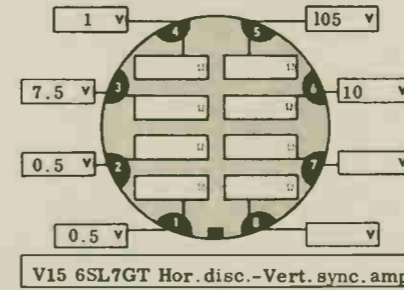
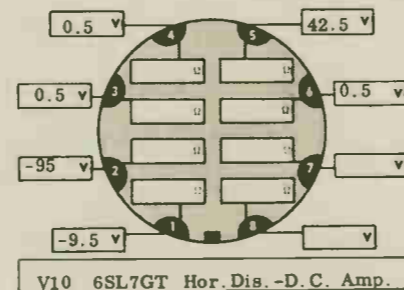
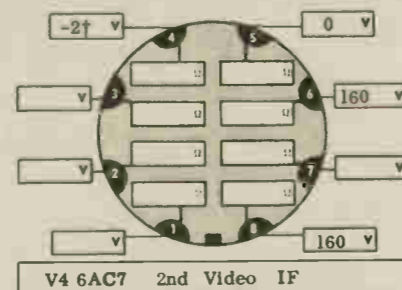
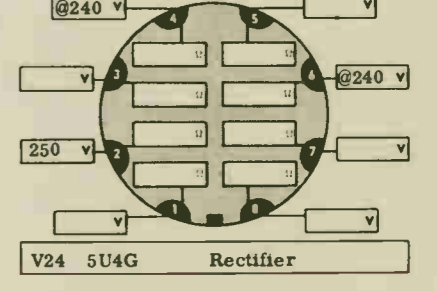
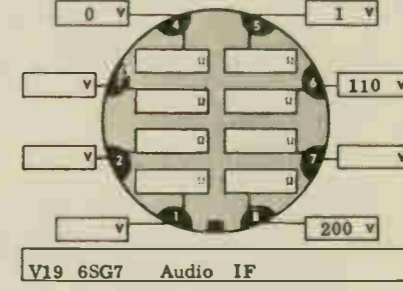
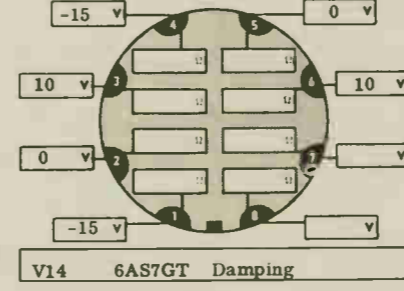
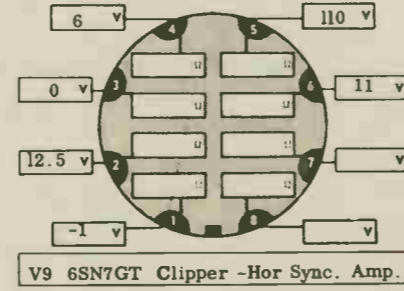
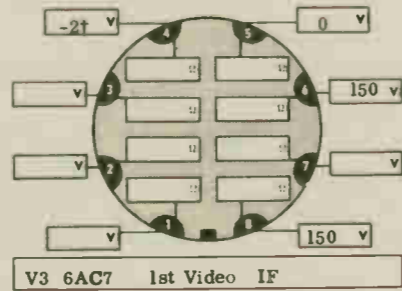
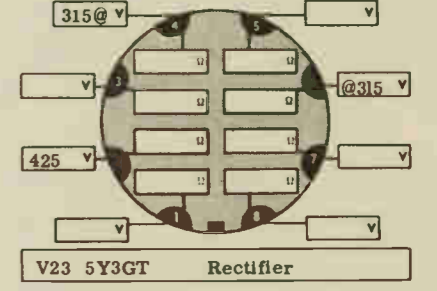
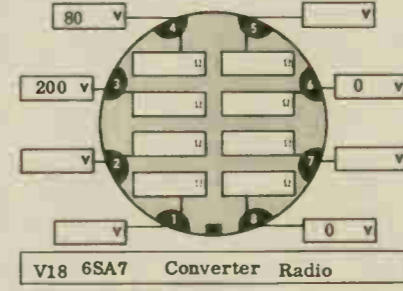
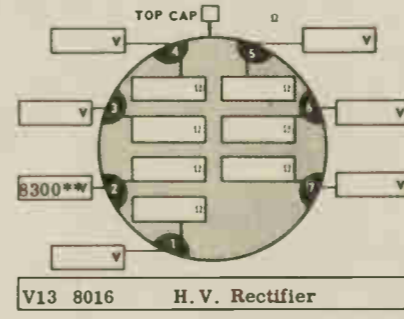
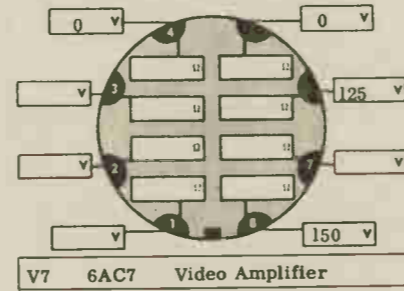
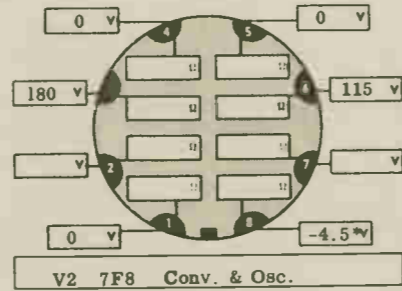
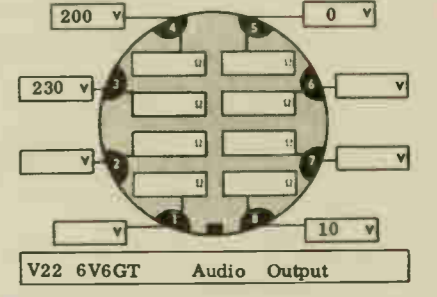
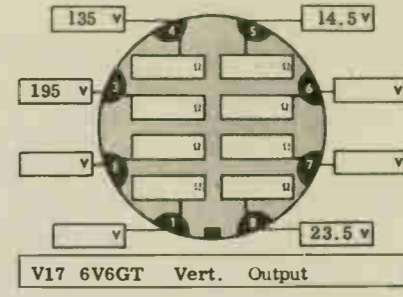
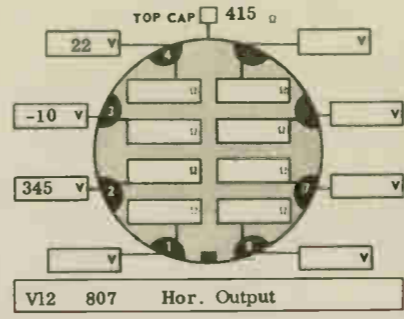
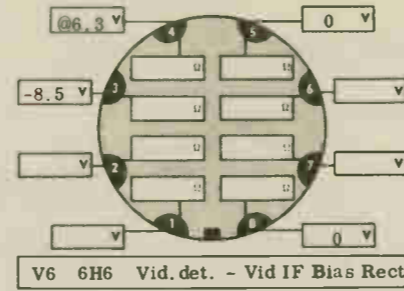
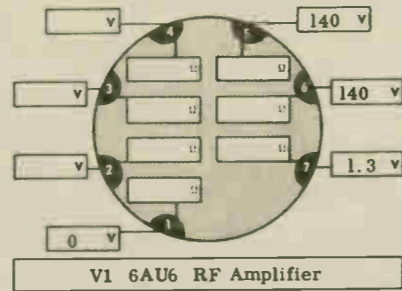
COILS		
REF. NO.	DESCRIPTION	PART NO.
L1	7 h., 75ma., filt. ch.	RLF-005
L2	7 h., 140ma., filt. ch.	RLF-006
L3, 98	90 uh., video choke	RLI-007
L4	55 uh., video choke	RLI-008
L5	Video detector choke	RLI-009
L7	Variable choke hor. size	RRC-034
L8	Focus	RLF-008
L10	Choke-broadcast	RLF-009
L18	Choke-RF amplifier "K"	RLI-003
L15, 19	Choke-RF amplifier "K"	RLI-006
L14	Osc. Cathode Choke	RLI-019
L21	Cathode Choke Ass'y	RLI-031

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Osc.		
Vert. Output (sweep)	T8	RTO-016
Hor. Output (sweep)	T9	RTO-076
Audio Output	T10	RTO-017
Yoke	L9	RLD-001
FM IF discriminator	T6	RTD-003
1st Video IF	T1	RTL-023
2nd Video IF	T2	RTL-024
3rd Video IF	T3	RTL-025
445 kc IF	T13	RTL-027
4th Video IF	T4	RTL-033
Composite 455 kc & 10-7 mc IF	T5	RTL-034
1st Video IF		RTL-053
AFC synchronizing	T7	RTM-001
Power, 50 cycles	T14	RTP-037
Power, 60 cycles	T14	RTP-040
B-C antenna	T11	RLA-007
B-C oscillator	T12	RLC-012

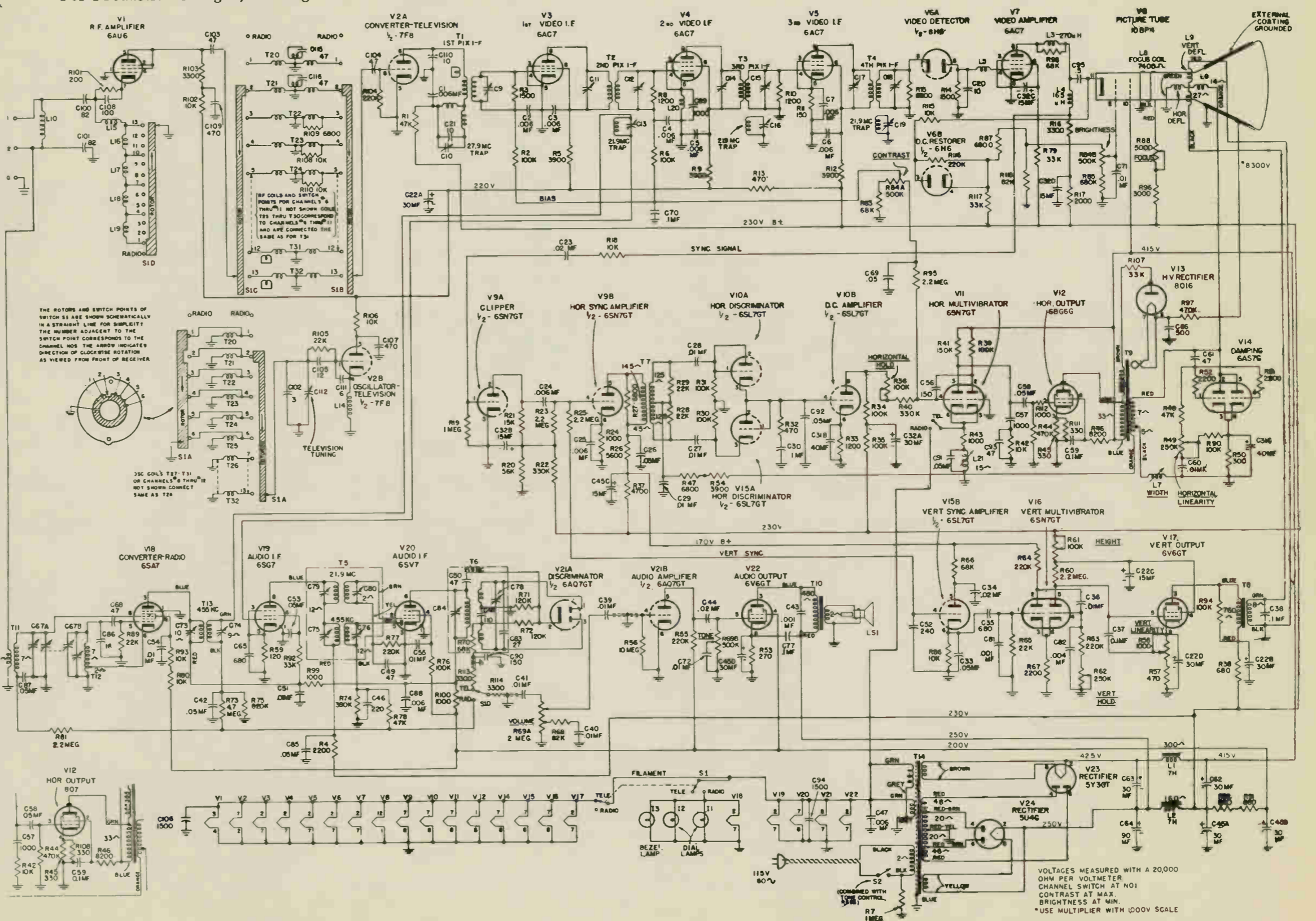
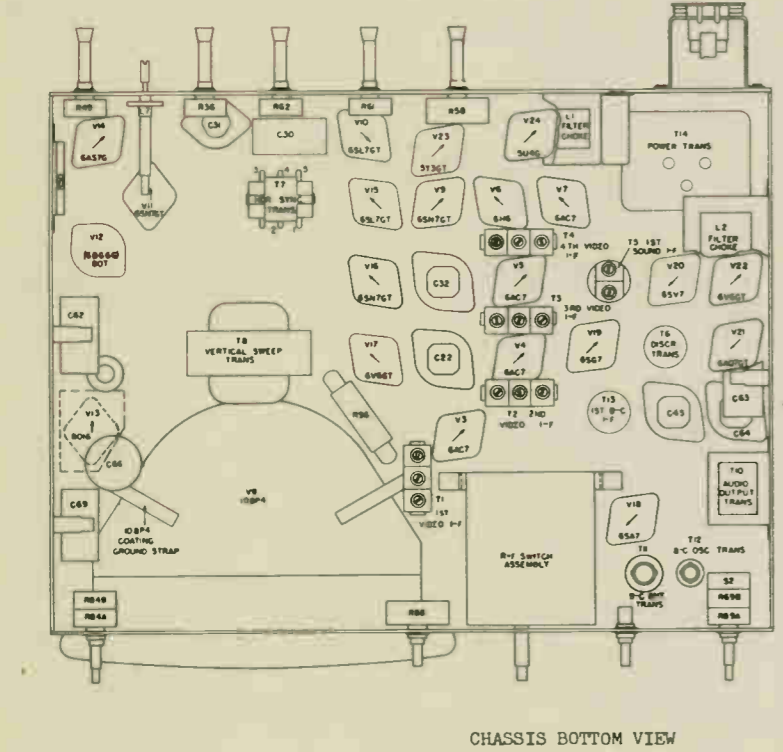
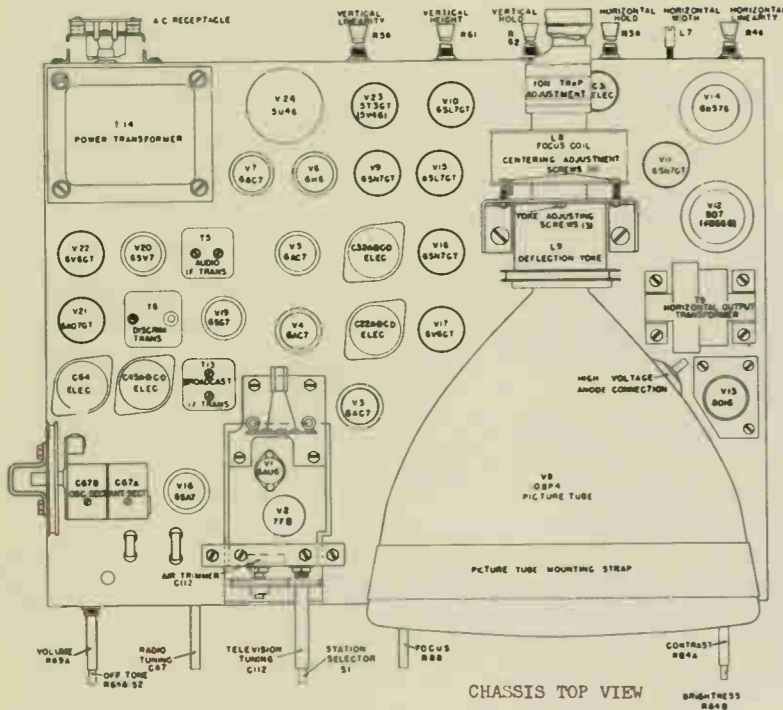
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
S1	Switch - RF Coil	RJX-014
LS1	***y, complete Loudspeaker - 12" PM Replacement Speaker Cone assembly	UOP -1206 UOX -005



\* Measured with VTVM  
 † Measured on 50V scale  
 \*\* Use multiplier with 1000V scale  
 @ AC Voltage  
 Use vacuum tube volt meter unless otherwise noted.  
 Unless noted all readings are DC taken by a 20,000 ohm/volt meter, selector switch at channel No. I, contrast at maximum and brilliance at minimum.



For Production Changes, see Page 106.



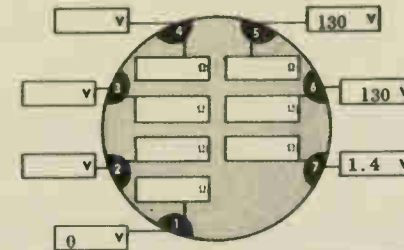
THE ROTORS AND SWITCH POINTS OF SWITCH S1 ARE SHOWN SCHEMATICALLY IN A STRAIGHT LINE FOR SIMPLICITY. THE NUMBER ADJACENT TO THE SWITCH POINT CORRESPONDS TO THE CHANNEL NOS. THE ARROW INDICATES DIRECTION OF CLOCKWISE ROTATION AS VIEWED FROM FRONT OF RECEIVER.



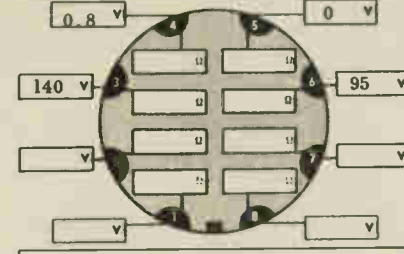
J3C COILS T27-T31 OR CHANNELS 8 THRU 12 NOT SHOWN. CONNECT SAME AS T26.

VOLTAGES MEASURED WITH A 20,000 OHM PER VOLT METER CHANNEL SWITCH AT NO1 CONTRAST AT MAX BRIGHTNESS AT MIN. \*USE MULTIPLIER WITH 100V SCALE

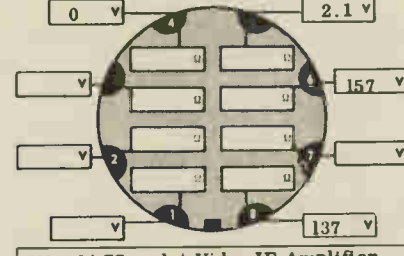
ELECTROLYTIC CONDENSERS			
REF. NO.	DESCRIPTION	PART NO.	
C27A	30 mfd., 300V	RCE-043	
C27C	30 mfd., 300V	RCE-043	
C40A	30 mfd., 300V	RCE-044	
C40B	15 mfd., 300V	RCE-044	
C40C	15 mfd., 300V	RCE-044	
C40D	15 mfd., 300V	RCE-044	
C45A	15 mfd., 300V	RCE-043	
C45C	30 mfd., 50V	RCE-043	
C50B	40 mfd., 25V	RCE-018	
C50C	40 mfd., 25V	RCE-018	
C106	90 mfd., 450V	RCE-017	
C107	30 mfd., 300V	RCE-045	
C108	30 mfd., 300V	RCE-045	
C122A	15 mfd., 350V	RCE-002	
C122B	15 mfd., 350V	RCE-002	
TRIMMERS			
C8, 100	1 to 8 mmf., trim.	RCY-029	
C101	TV tuning capacitor	RCY-015	
SPECIAL			
C118	500 mmf., lectro-film, HV	RCN-023	
CONTROLS			
DESCRIPTION	REF. NO.	PART NO.	
Volume 2 meg	R135	RRC-045	
Brightness 500K	R108B	RRC-051	
Contrast 500K	R108A	RRC-051	
Hor. Hold 100K	R86	RRC-041	
Vert. Hold 250K	R115	RRC-042	
Vert. Lin. 1K, 2W	R58	RRC-043	
Tone-500K	R107	RRC-040	
Power switch-500K	S2	RRC-040	
Vertical height-100K	R49	RRC-041	
Hor. linearity 250K	R46	RRC-042	
Focus 5K, 4W	R20	RRC-057	
WIREWOUND & SPECIAL			
300 ohms	R123	RRW-011	
3000 ohms	R119	RRW-012	
COILS			
REF. NO.	DESCRIPTION	PART NO.	
L1	Antenna choke	RLF-009	
L2, 25	26, 27 Filament Choke	RLI-034	
L29	Osc. coil ass'y (17.4mc)	RLI-030	
L4, 8,	30		
L7	RF choke	RLI-006	
L10	RF Cathode choke	RLI-003	
L11	Video coupling	RLI-009	
L12	FM osc. padder	RLM-010	
L13	Hor. & Vert. defl. ass'y	RLD-001	
L14, R	Focus	RLF-008	
L15	270 oh., ch. & 68K ohm.	RLI-039	
L16	165 oh. choke	RLI-038	
L17	B-C antenna	RLA-013	
L18	B-C oscillator	RLC-023	
L20	B-C padder coil	RLM-007	
L21	Oscillator cathode	RLI-019	
L22	7 henry, 140 ma., filt.	RLF-006	
L24	7 henry, 75 ma., filt.	RLF-005	
L28	IF cathode choke	RLI-033	
L31	Broadcast dummy loop	RLL-023	
L32	IF wave trap ass'y	RLL-029	
L33	Variable ch. (Hor. size)	RRC-034	
L34	Hor. multivibrator ch.	RLI-031	
L36	Broadcast ant. choke	RLI-008	
C56, 98,	21.9 mc trap	RLW-002	
127, L132			
C56, 98,	Trim. strip-B-C RF & osc. & 27.9 mc trap	RLM-011	
	trimmer & coil ass'y		
	Hor. width con. (incl. secondary for AFC feedback voltage) use w/RTO-076	RLD-017	
TRANSFORMERS			
DESCRIPTION	REF. NO.	PART NO.	
Vert. Osc.	T20	RTO-016	
Vert. Output	T25	RTO-076 & RKT-006	
Hor. Output H.V. & Sweep	T27	RTO-027	
Audio Output	T27	RTO-027	
Power 117V, 60 cycles.	T26	RTP-030	
FM discriminator	T24	RLD-005	
1st FM & BC IF	T22	RTL-037	
2nd FM & BC IF	T23	RTL-038	
1st video IF	T15	RTL-046	
TRANSFORMERS (CONCLUDED)			
DESCRIPTION	REF. NO.	PART NO.	
2nd Video IF	T16	RTL-047	
4th Video IF	T18	RTL-049	
3rd Video IF	T17	RTL-055	
Hor. AFC	T19	RTM-001	
MISCELLANEOUS			
REF. NO.	DESCRIPTION	PART NO.	
S1	Switch-RF coil & switch ass'y wired & aligned (incl. tubes)	RJX-021	
	Pickup-Variable reluctance pickup.	RPX-040	
	Switch-Coarse focus control switch (not on early production receivers).	RSW-038	
LS1	Speaker, 12" PM	UOP-1247	



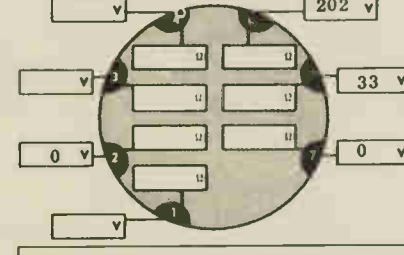
V1 6AU6 RF Amplifier



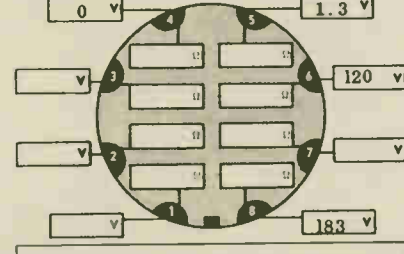
V2 7F8 Converter Oscillator



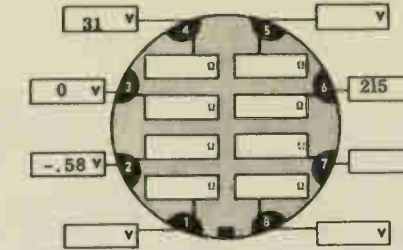
V3 6AC7 1st Video IF Amplifier



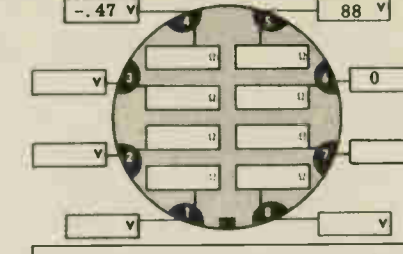
V4 6BE6 2nd Converter



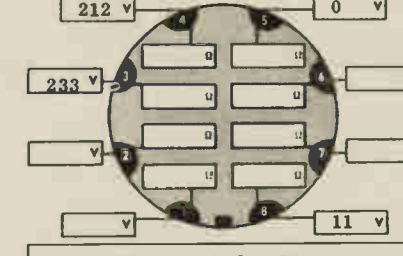
V5 6SG7 1st Audio IF Amplifier



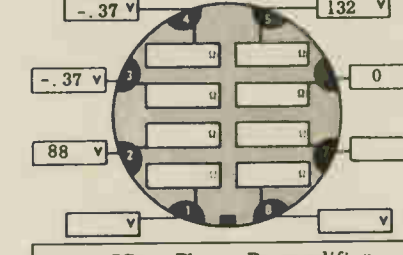
V6 6SV7 2nd Audio IF Amplifier



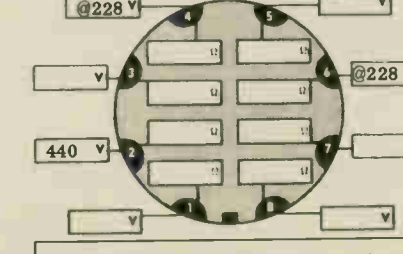
V7 6AQ7GT Audio Disc. -Amplifier



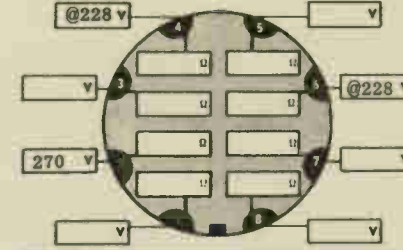
V8 6V6GT Audio Output



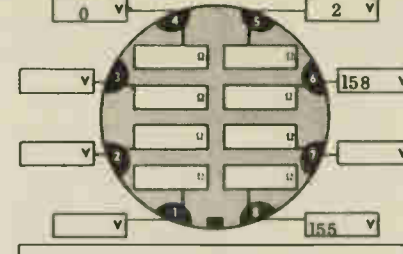
V9 6SG7 Phono Preamplifier



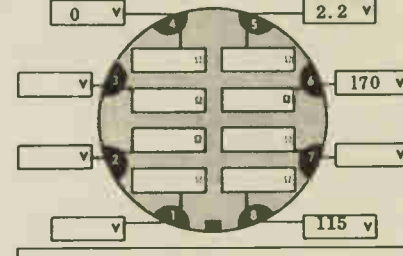
V10 5Y3GT Low Voltage Rectifier



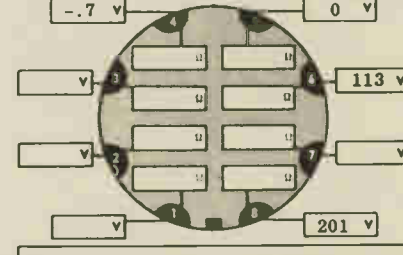
V11 5U4G Low Voltage Rectifier



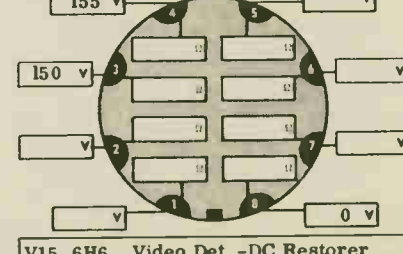
V12 6AC7 2nd Video IF Amplifier



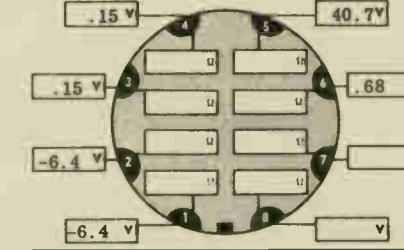
V13 6AC7 3rd Video IF Amplifier



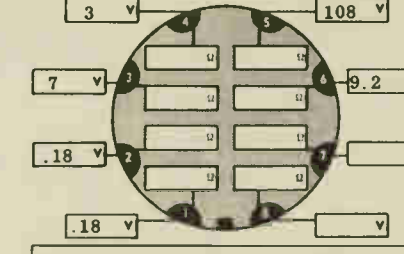
V14 6AC7 Video Amplifier



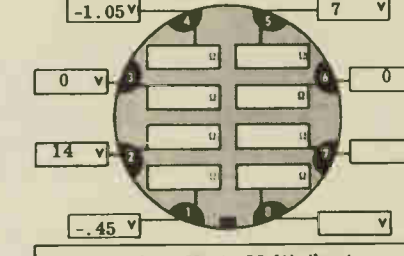
V15 6H6 Video Det. -DC Restorer



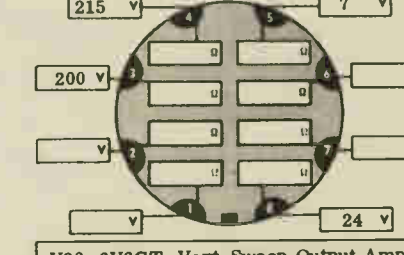
V17 6SL7GT H. Disc. - DC Amp.



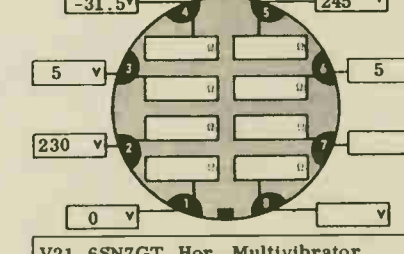
V18 6SL7GT H. Disc. -Vert. Sync. Amp.



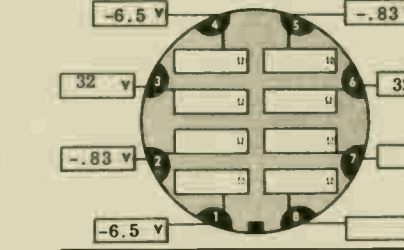
V19 6SN7GT Vert. Multivibrator



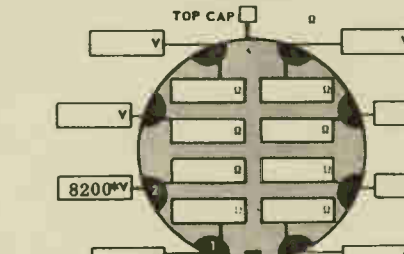
V20 6V6GT Vert. Sweep Output Amp.



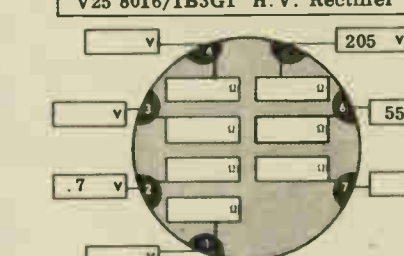
V21 6SN7GT Hor. Multivibrator



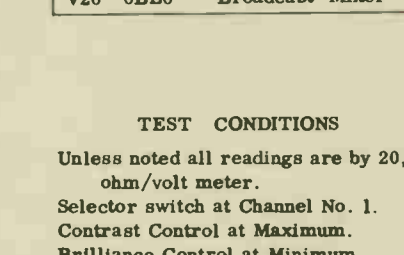
V23 6AS7G Hor. Damping



V25 8016/1B3GT H. V. Rectifier

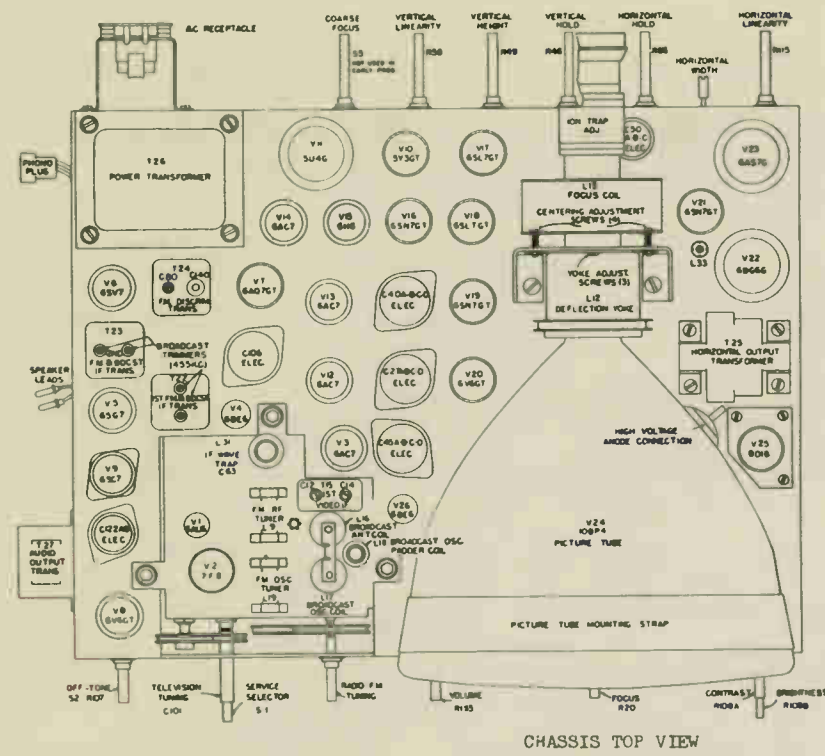


V26 6BE6 Broadcast Mixer

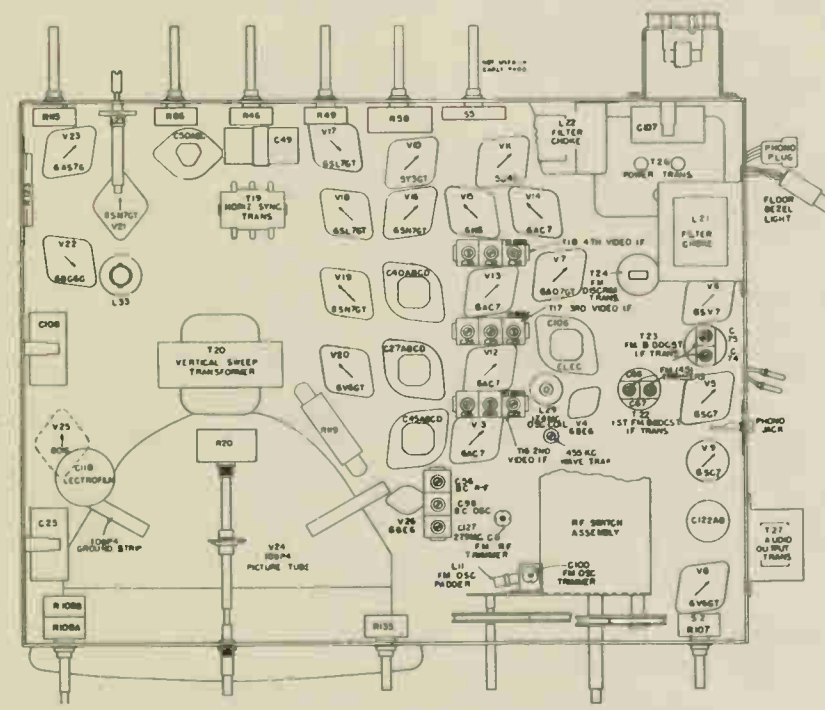


V22 6BG6G Hor. Sweep Output Amp.

**TEST CONDITIONS**  
 Unless noted all readings are by 20,000 ohm/volt meter.  
 Selector switch at Channel No. 1.  
 Contrast Control at Maximum.  
 Brilliance Control at Minimum.  
 All readings DC unless otherwise noted.  
 \* Use multiplier with 20,000 ohm voltmeter.  
 @ AC voltage reading.



CHASSIS TOP VIEW

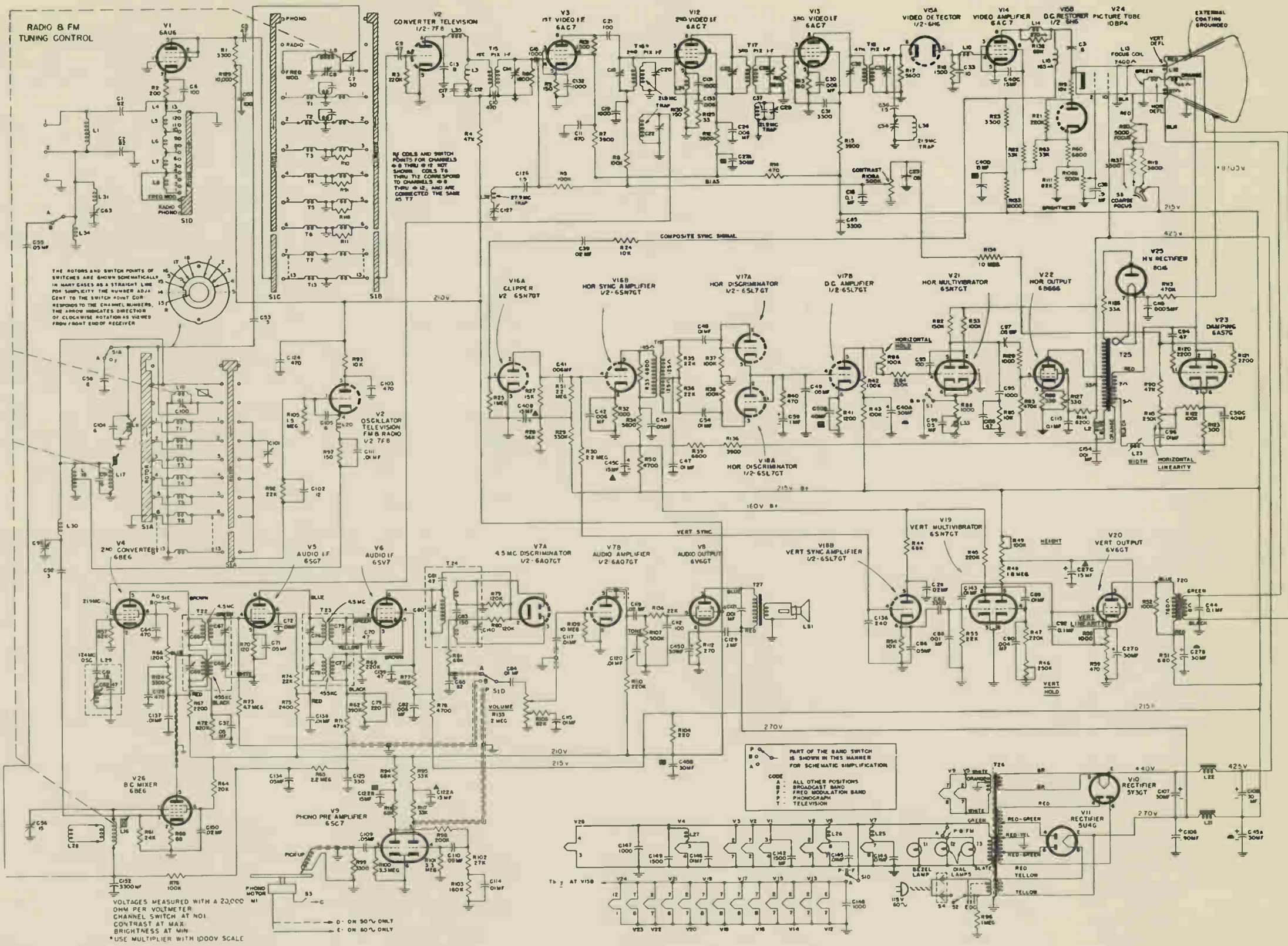


CHASSIS BOTTOM VIEW

PRODUCTION CHANGES MODEL 802

- 1. VIDEO COUPLING CAPACITOR, C3-The original value of this capacitor was 0.5 mfd. This was reduced to a 0.1 mfd. capacitor to improve immunity to aircraft and elevated rail-way flutter. Change made at approximately Serial No. 8500.
- 2. COARSE FOCUS SWITCH-This switch was incorporated at Serial No. 9000 approximately. This permitted the Focus control on the front panel to always operate at or near its mid-position.

- 3. 21.9 MC WAVE TRAP-The 21.9 mc wavetrap in the diode video IF transformer, T18, was changed from an absorption type to a series tuned trap. This was done to improve the sound carrier rejection. This change was made at approximately Serial No. 9000.



VOLTAGES MEASURED WITH A 20,000 OHM PER VOLT METER CHANNEL SWITCH AT NO1 CONTRAST AT MAX BRIGHTNESS AT MIN \*USE MULTIPLIER WITH 1000V SCALE

PART OF THE BAND SWITCH IS SHOWN IN THIS BARRETT FOR SCHEMATIC SIMPLIFICATION

CODE  
 A - ALL OTHER POSITIONS  
 B - BROADCAST BAND  
 F - FREQ MODULATION BAND  
 P - PHONOGRAPH  
 T - TELEVISION

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C106	90 mfd, 450 V	RCE-017
C27A, C45A, C40A,	B, C, D and B, C, D: 30-30-15/300 V, 30/50V	RCE-043
C107, C50A, E	B, C, D: 30-30-15-15/300V 30/300V 40-40/25V	RCE-044 RCE-045 RCE-054
C101	TRIMMERS: TV tuning capacitor	RCY-015
C8, 100	1 to 8 mmf trimmer	RCY-029
C118	SPECIAL: 500 mmf lectrofilm, high voltage	RCN-023

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume dual, 2 meg.	R107A	RRC-079
Brightness 500K, dual	R108B	RRC-080
Contrast 500K, dual	R108A	RRC-080
Hor. Hold 100K	R86	RRC-041
Hor. Size		
Vert. Hold 250K	R115	RRC-042
Vert. Size		
Vert. Lin. 1000, 2w.	R58	RRC-043
Vert. Height, 100K	R49	RRC-041
Hor. Lin., 250K, dual	R46	RRC-042
Tone, 50K	R107B	RRC-079
5000 ohm, 4w, w.w.	R20	RRC-081
WIREWOUND		
300 ohms	R123	RRW-011

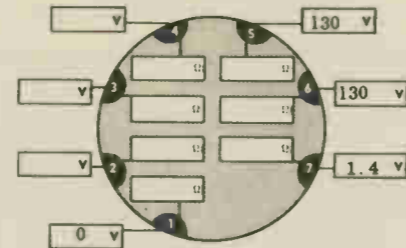
COILS		
REF. NO.	DESCRIPTION	PART NO.
L1	Antenna	RLF-009
L2, 25,	26, 27 Filament	RLI-034 RLI-006
L4, 8, 30	RF	RLI-003
L7	RF cathode	RLI-009
L10	Video coupling	RLM-010
L11	FM Osc. padder	RLD-001
L12	Hor. & Vert. defl. ass'y	RLF-008
L13	Focus	
L14	Choke, 270 uh & 86K resistor	RLI-039 RLI-038
L15	Choke, 165 uh.	
L16	B-C antenna	RLA-013
L17	B-C oscillator	RLC-023
L18	B-C padder	RLM-007
L20	Osc. cathode	RLI-019
L21	Theny, 140 ma., filt.	RLF-006
L22	7 henry, 75 ma., filt.	RLF-005
L23	Variable (hor. size)	RRC-034
L29	Osc., 17.4 mc.	RLI-030
L28	Loop, broadcast dummy	RLI-023
L31	IF wavetrap assembly	RLI-029
L33	Hor. multivibrator	RLI-031
L34	Antenna broadcast	RLI-008
L36	21.9 mc trap	RLW-002
C56, 98	127 Trimmer strip B-C RF Osc. & 27.9 trap trimmer ass'y	RLM-011

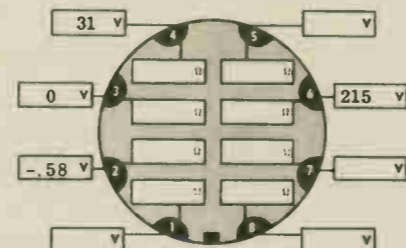
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
FM discriminator	T24	RTD-005
1st FM & BC IF		
2nd FM & BC IF		
1st Video IF		
2nd Video IF		
3rd Video IF		
4th Video IF		
Hor. AFC		
Vertical	T20	RTO-016
Audio	T27	RTO-035
Hor. & high voltage	T25	RTO-076 & RKT-007
Power-117V, 60 cycles.	T26	RTP-030

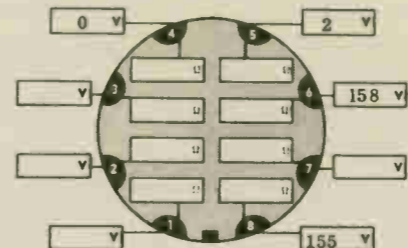
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
S5	Coarse focus switch	RSW-037
S1	RF head end unit aligned with tubes.	RJX-022
S2	ON - OFF switch Speaker, oval	RRC-079 ROP-013



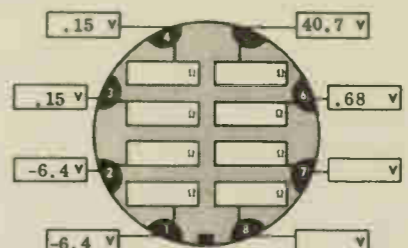
V1 6AU6 RF Amplifier



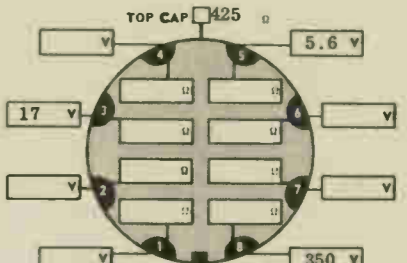
V6 6SV7 2nd Video IF Amplifier



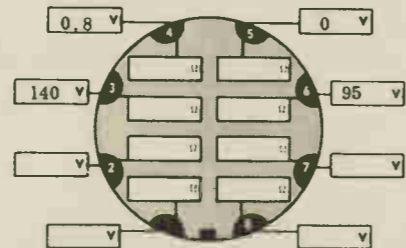
V12 6AC7 2nd Video IF Amplifier



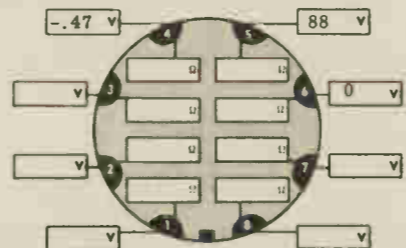
V17 6SL7GT Hor. Disc. -DC Amp.



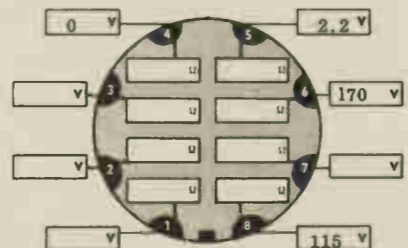
V22 6BG6G Hor. Sweep Output Amp.



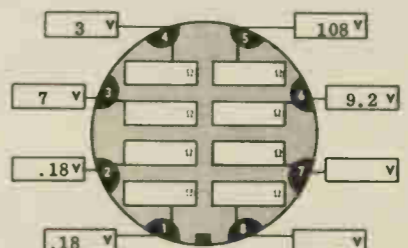
V2 7F8 Converter - Oscillator



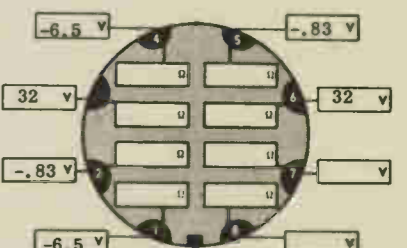
V7 6AQ7GT Audio Disc. - Amplifier



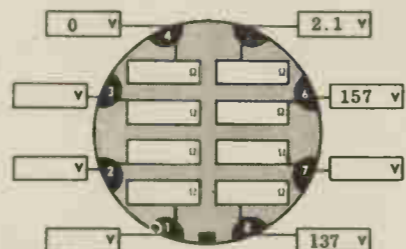
V13 6AC7 3rd Video IF Amplifier



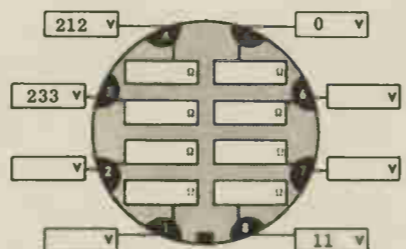
V18 6SL7GT H. Disc. -Vert. Sync. Amp.



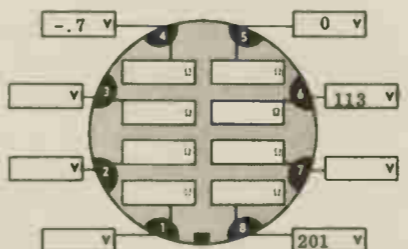
V23 6AS6G Hor. Damping



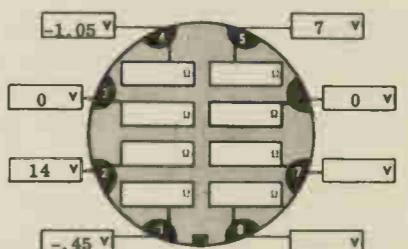
V3 6AC7 1st Video IF Amplifier



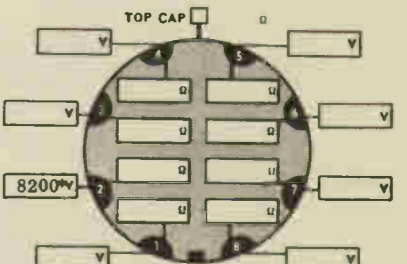
V8 6V6GT Audio Output



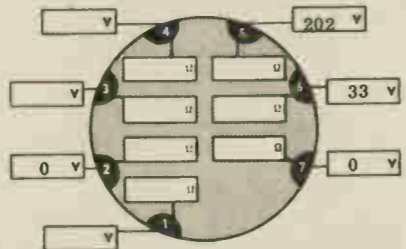
V14 6AC7 Video Amplifier



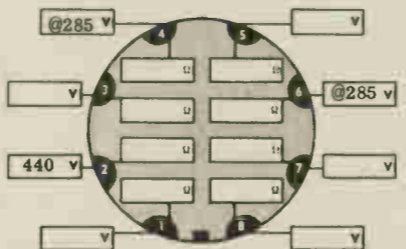
V19 6SN7GT Vert. Multivibrator



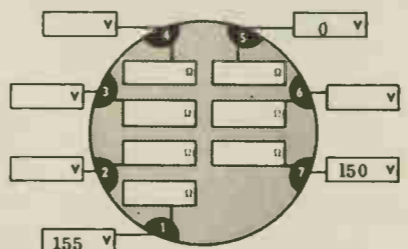
V25 8016 High Voltage Rectifier



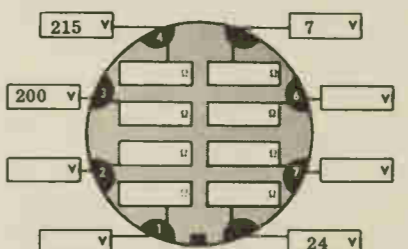
V4 6BE6 2nd Converter



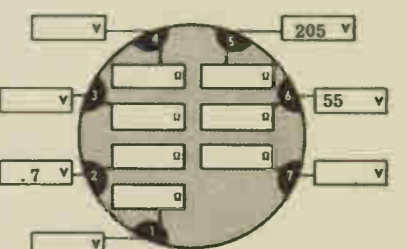
V10 5Y3GT Low Voltage Rectifier



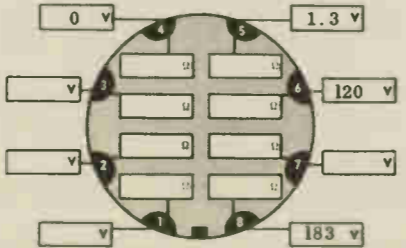
V15 6AL5 Vid. Det. -DC Restorer



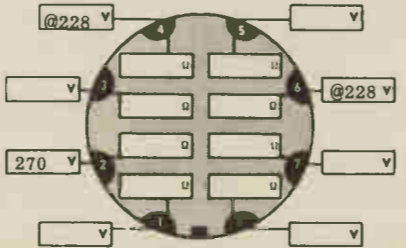
V20 6V6GT Vert. Sweep Output Amp.



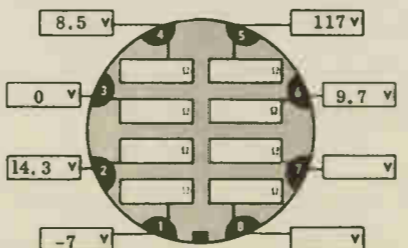
V26 6BE6 Broadcast Mixer



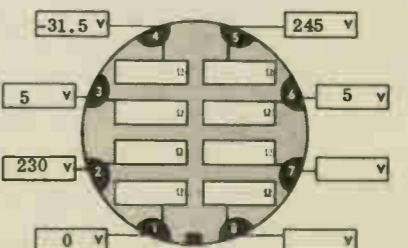
V5 6SG7 1st Video IF Amplifier



V11 5U4G Low Voltage Rectifier

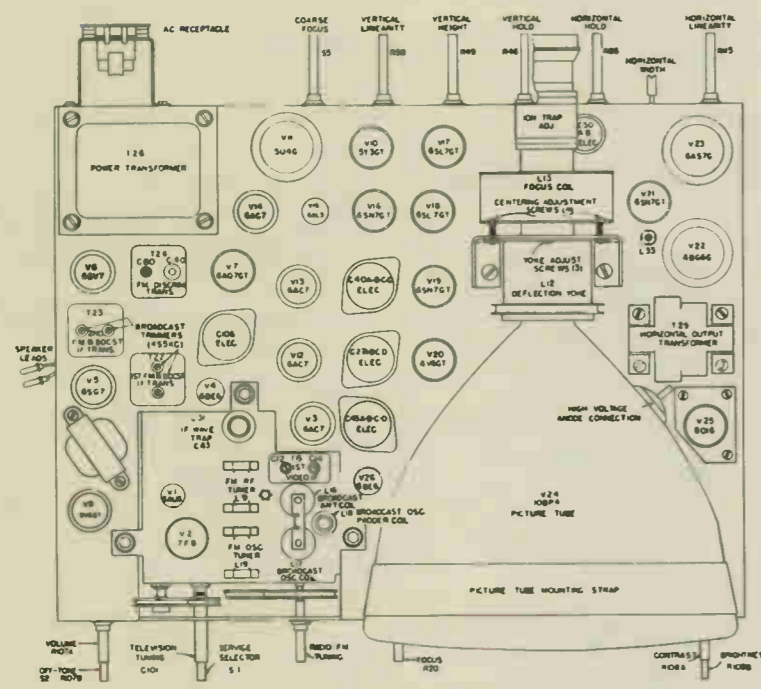


V16 6SN7GT Clipper - Hor. Sync. Amp.

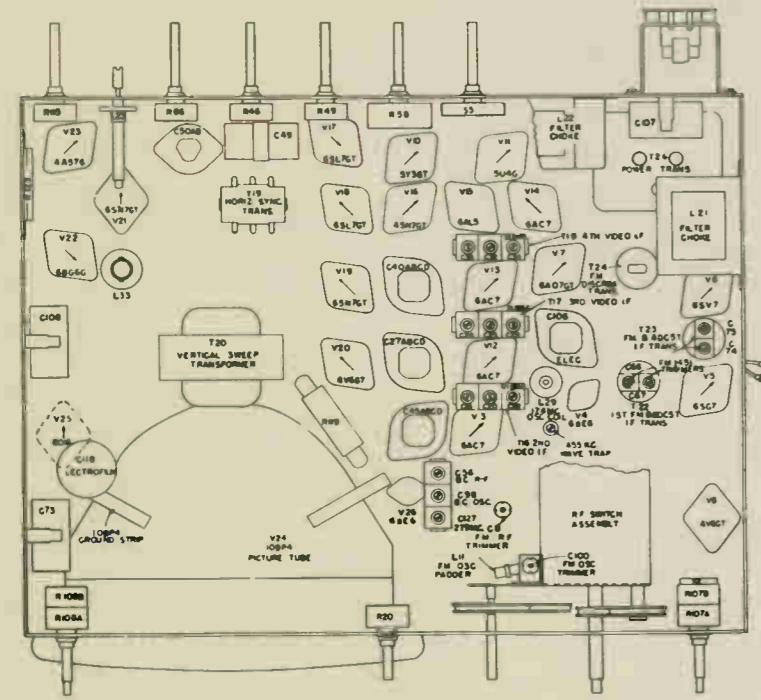


V21 6SN7GT Hor. Multivibrator

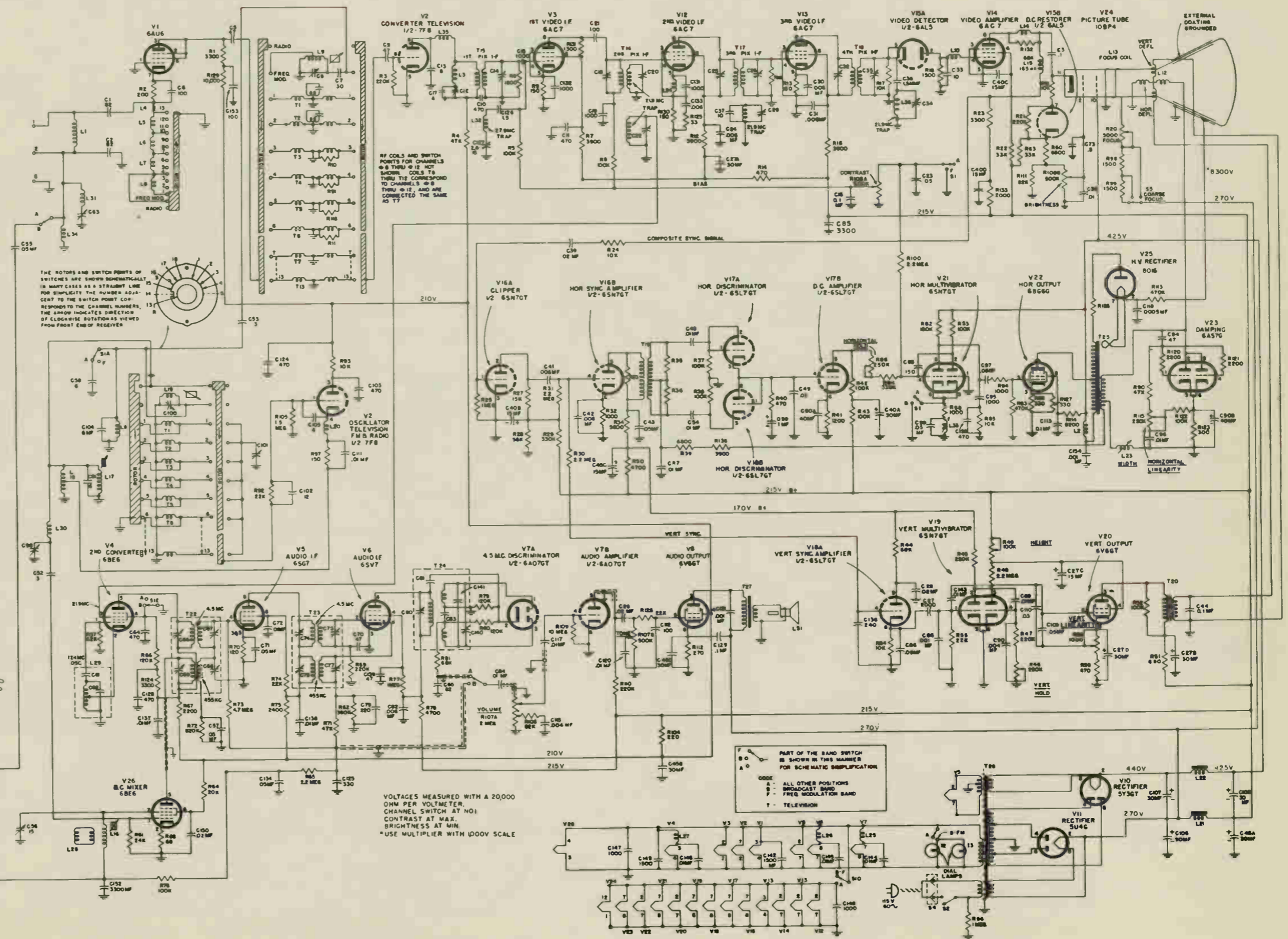
\* Use multiplier with 20,000 ohm/volt meter  
@ AC Voltage  
Use vacuum tube volt meter unless otherwise noted.  
Unless noted all readings are DC taken by a 20,000 ohm/volt meter, selector switch at channel No. I, contrast at maximum and brilliance at minimum.



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW



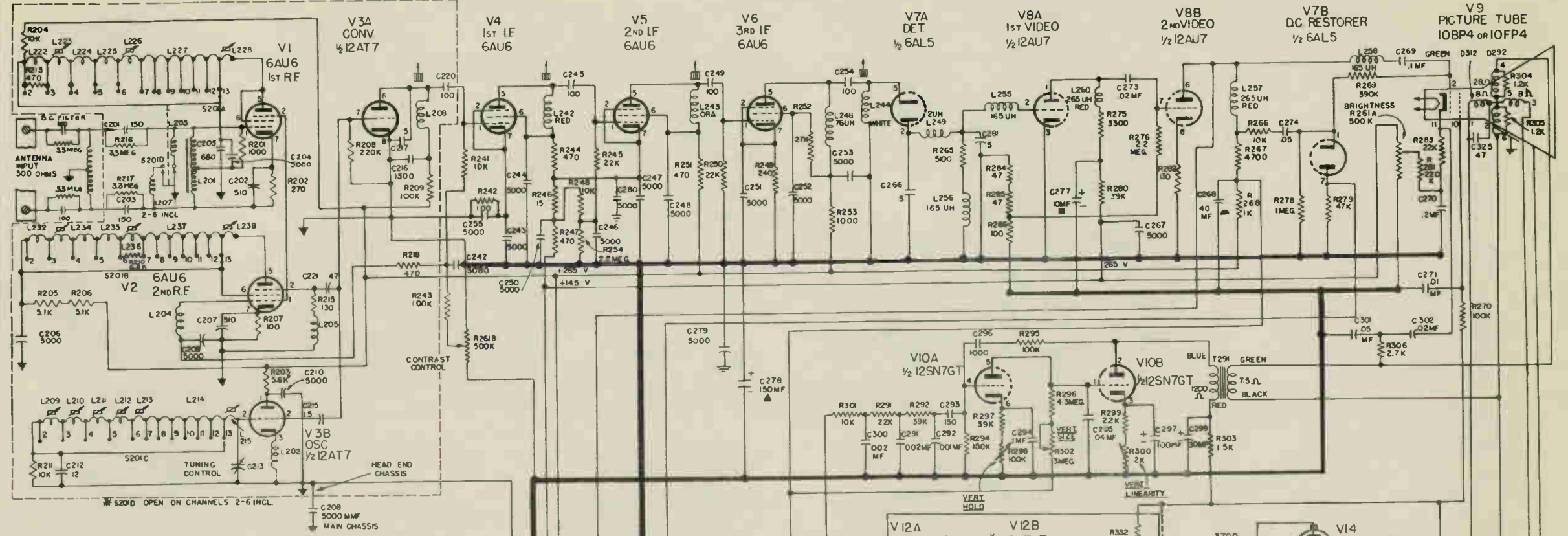
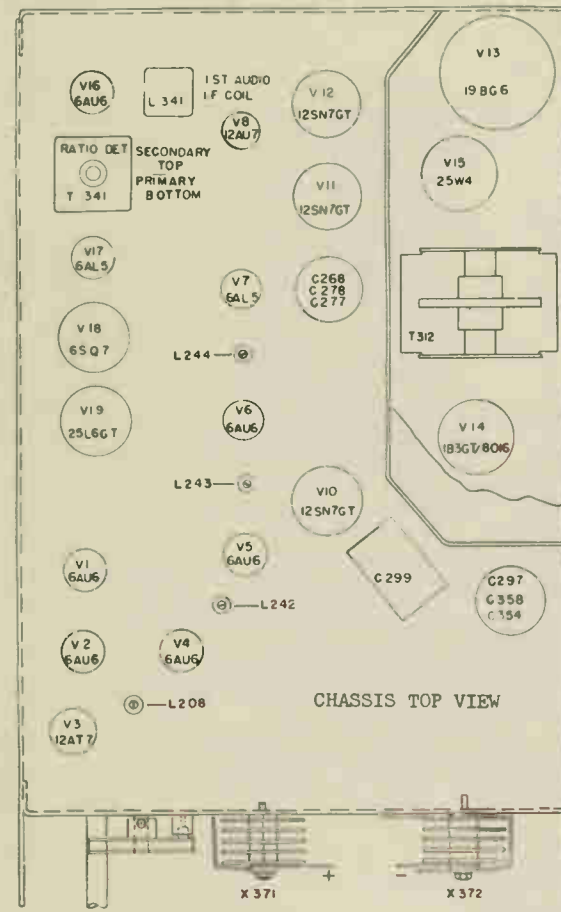
VOLTAGES MEASURED WITH A 2000 OHM PER VOLTMETER, CHANNEL SWITCH AT NO.1, CONTRAST AT MAX, BRIGHTNESS AT MIN \*USE MULTIPLIER WITH 100V SCALE

PART OF THE BAND SWITCH IS SHOWN IN THIS MANNER FOR SCHEMATIC SIMPLIFICATION

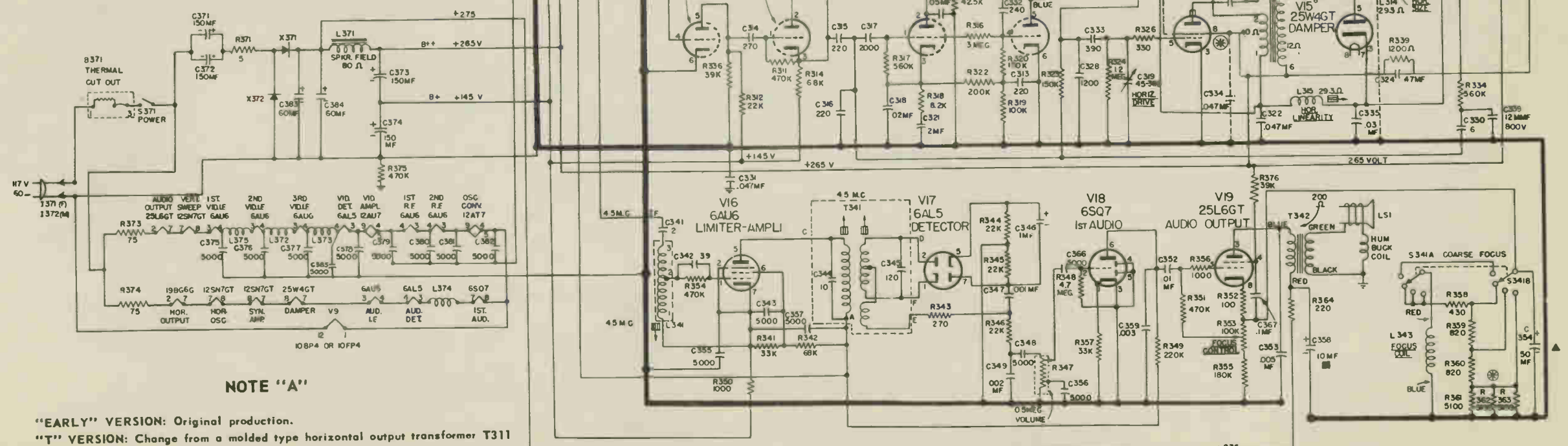
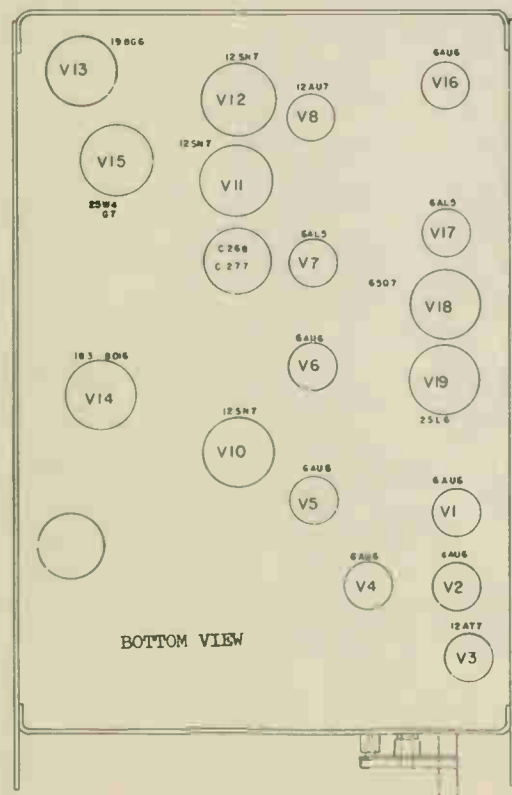
CODE  
 B O - ALL OTHER POSITIONS  
 B - BROADCAST BAND  
 F - FREQ MODULATION BAND  
 T - TELEVISION



For Production Changes, see Pages 106 and 107.



\* C327 CONNECTED AS INDICATED BY DOTTED LINES FOR 80PT, 80GS AND C334 & R337 ADDED INSTEAD OF CORN. OF PIN 8 OF V13 TO B++



NOTE "A"

- "EARLY" VERSION: Original production.
- "T" VERSION: Change from a molded type horizontal output transformer T311 to ceramic iron core type T312.
- "S" VERSION: In addition to "T" change a larger picture opening in cabinet.

NOTE LATE PRODUCTION R361, R362, R363 REPLACED BY ONE RESISTOR R377 (1700D 5W)

# 805, 806, 807, 809 (U and W)

## ELECTROLYTIC CONDENSERS

REF. NO.	DESCRIPTION	PART NO.
C268	40 mf., 300V	RCE-088
C277	10 mf., 150V	RCE-088
C278	150 mf., 15V	RCE-088
C299	30 mf., 450V	RCE-092
C346	1 mf., 50V	RCE-090
C354	10 mf., 350V	RCE-089
C358	50 mf., 100V	RCE-089
C297	100 mf., 50V	RCE-089
C371,2	3, 4 150 mf., 150V TRIMMER	RCE-091
C213	1.25-1.95 mmf., 500V, trim. cap. SPECIAL	RCY-053
R328	42.5K temp. comp.	RRN-007
R373,4	75 ohms, globar	RRW-041
R371	5 ohms, 4W, w. w.	RRW-043

## CONTROLS

DESCRIPTION	REF. NO.	PART NO.
Volume	R353	RRC-099*
Volume	R366	RRC-104**
Brightness	R231	RRC-109*
Brightness	R226	RRC-102**
Contrast	R227	RRC-109*
Contrast	R263	RRC-102**
Hor. Hold	R321	RRC-098*
Hor. Hold	R329	RRC-103**
Vert. Hold	R298	RRC-098*
Vert. Hold	R307	RRC-103**
Vert. Lin.	R300	RRC-095
Hor. Lin.	R402	RRC-108
Height	R302	RRC-096
Focus	R347	RRC-099*
Focus	R365	RRC-104**
On-off switch	5372	RRC-104**

## COILS

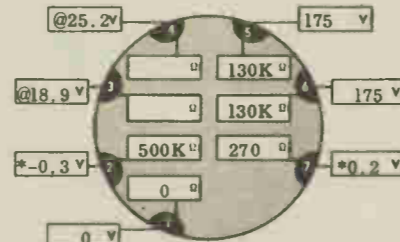
REF. NO.	DESCRIPTION	PART NO.
L201	Input coil	RLF-023
L202,5	RF & Osc. ch. 8.2 uh.	RLI-032
L203,7	RF coil	RLI-083
L204	RF Choke	RLF-024
L206,	259, 372, 373, 374, 375, 249 Heater choke 2.0 uh.	RLI-063
L208,	242, 243, 244 Video IF plate plug core	RLP-014
L248	IF Choke	RLF-027
L255,6	8 Video comp. ch. 165 uh.	RLI-038
L257	Video comp. choke	RLI-068
L313	Blocking oscillator	RLI-086
L314,5	Hor. size or Hor. lin.	RLD-014
L316	Hor. oscillator	RLC-091
L341	1st audio IF	RLI-069
L343	Focus	RLF-026
L376	Filter reactor	RTL-096

## TRANSFORMERS

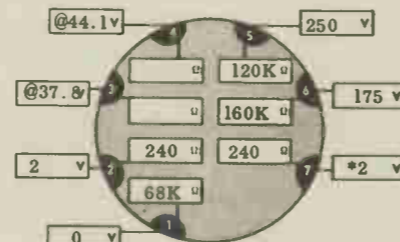
DESCRIPTION	REF. NO.	PART NO.
Hor. Output	T312	RTO-071
Audio Output	T344	RTO-066
Audio Output	T342	RTO-062
Yoke		RLD-013
Broadcast filter		RLX-027
Ratio detector	T341	RTD-008
Vertical sweep	T291	RTO-064

## MISCELLANEOUS

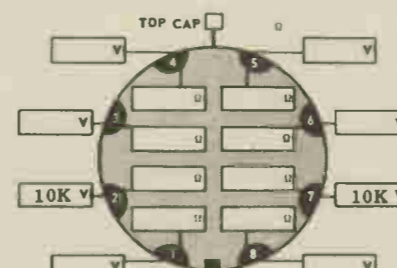
REF. NO.	DESCRIPTION	PART NO.
X371,2	Selenium Rectifier	RER-004
	Ion Trap-10BP4 pic. tub.	RET-002
	Lg. Outside center'g ring	RHM-059
	Sm. Inside center'g ring	RHM-060
	RF Head End, Complete	RJX-027 (Mod. 809)
	RF Head End, Complete	RJX-028 (805, 6, 7)
LS2	Speaker, 10" (Model 809)	ROP-018
LS5	Speaker, 4" PM	UOP-487
B371	Thermal Cutout	RSR-001
S341	Focus Switch	RSW-066



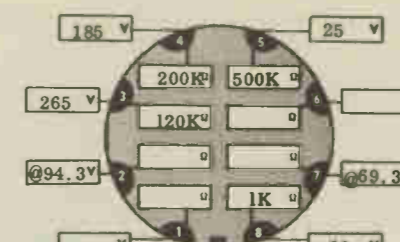
V1 6AU6 RF Amplifier



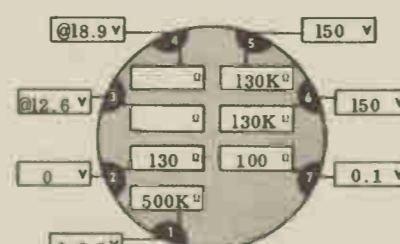
V6 6AU6 3rd IF Amplifier



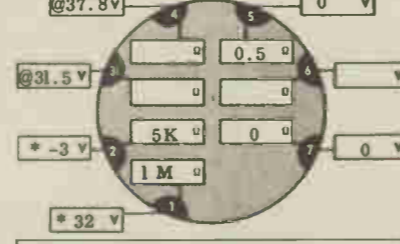
V14 1B3GT/8016 H. V. Rectifier



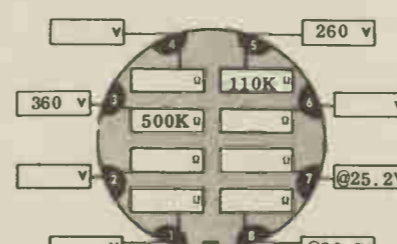
V19 25L6GT Audio Output



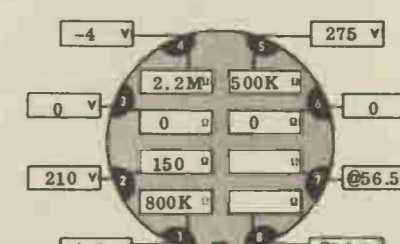
V2 6AG5 RF Amp. (W Version)



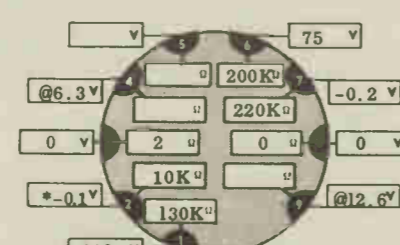
V7 6AL5 Video Detector, DC Restorer and Clipper



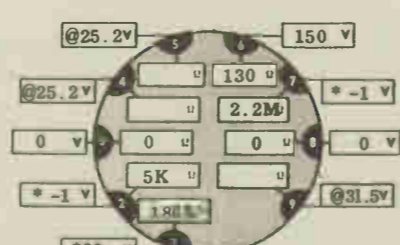
V15 25W4 Damper



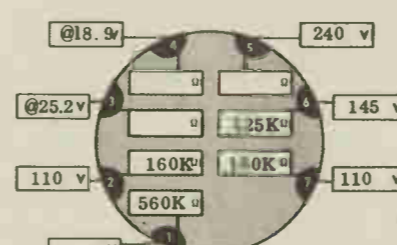
V20 6SL7GT Sync Inv. & Clipper



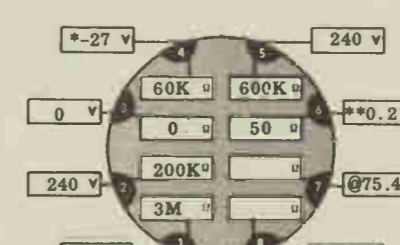
V3 12AT7 Converter-Oscillator



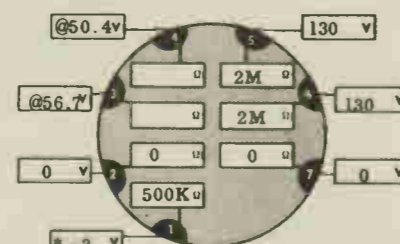
V8 12AU7 Video Amplifier



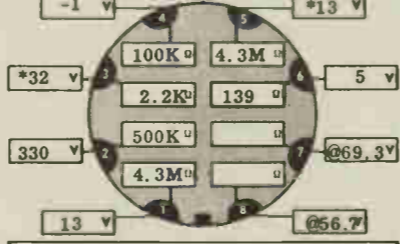
V16 6AU6 Audio IF Limiter & Amp.



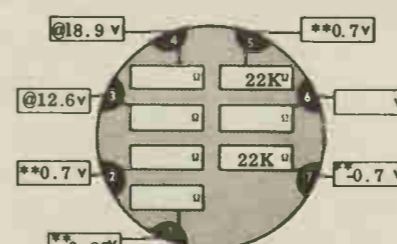
V21 12SN7GT Hor. Control & Osc.



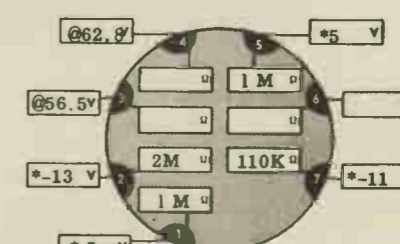
V4 6AU6 1st IF Amplifier



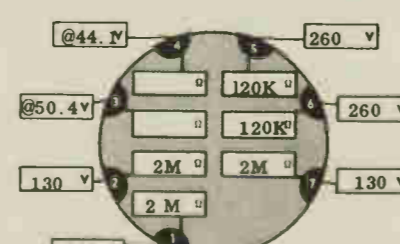
V10 12SN7GT Vert. Multivibrator & Sweep Output



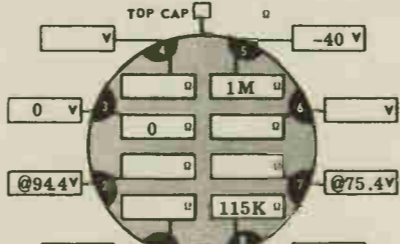
V17 6AL5 Ratio Detector



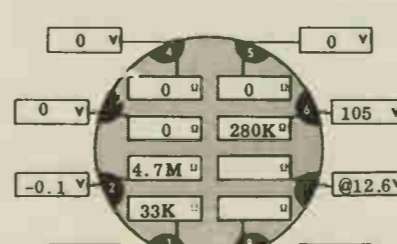
V22 6AL5 AFC Discriminator



V5 6AU6 2nd IF Amplifier



V13 19BG6-G Hor. Sweep Output



V18 6SQ7 1st Audio Amplifier

## TEST CONDITIONS

### Voltage Measured:

- \* Measured on 50V Scale.
- † Focus control max. - Focus switch max. clockwise.
- \*\* Measured on 2.5V Scale.

### Volume control off.

- Focus control - normal
- Contrast - max.
- Brightness - min.
- H-Speed - normal
- V-Speed - normal

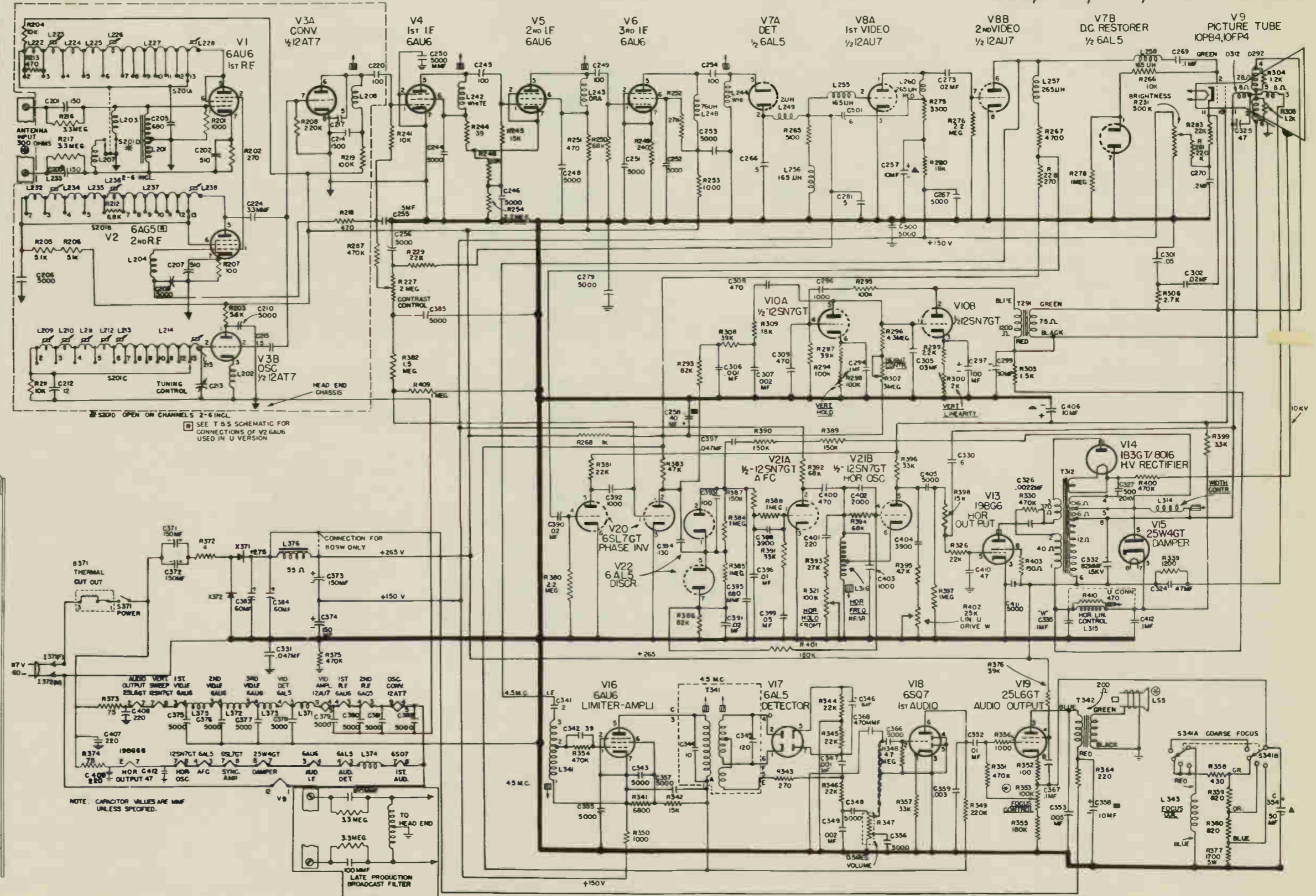
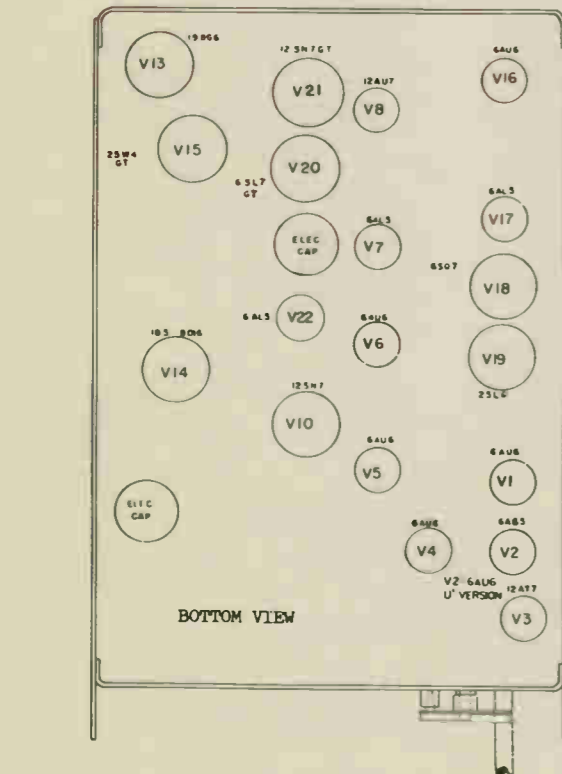
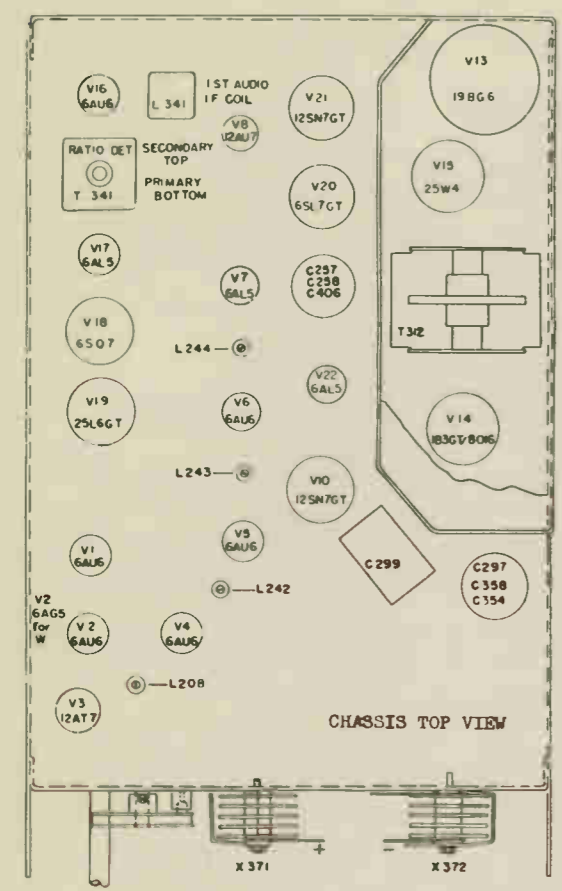
### Resistance Measured:

- Power cord - off
- Volume control - min.
- Focus control - max.
- H-Speed control - max.
- V-Speed control - max.
- Contrast control - max.
- Brightness control - min.
- Vert. Lin. control - max.
- Vert. Size control - max.
- Focus sw. control - max.
- Hor. Lin. control - max.



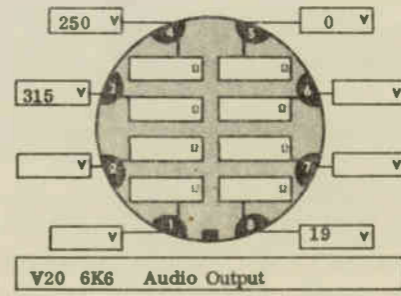
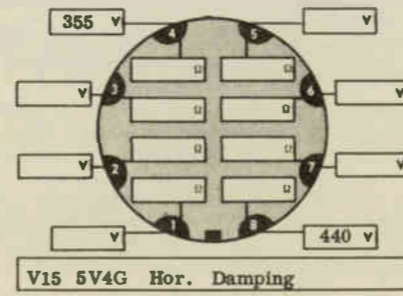
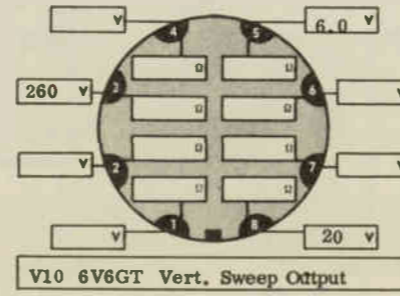
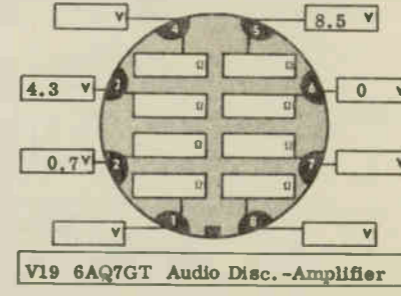
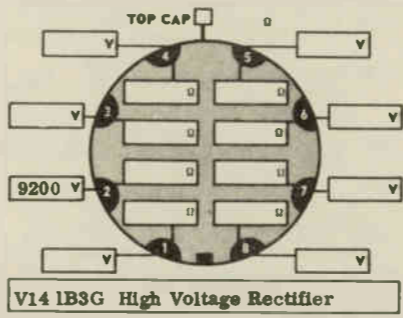
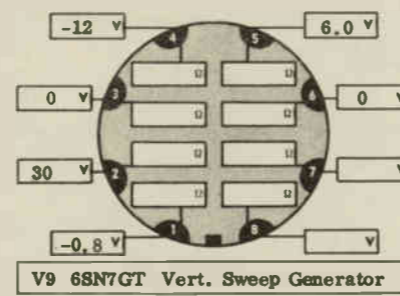
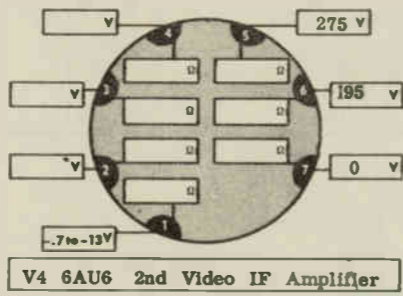
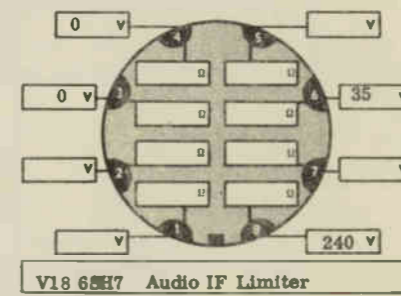
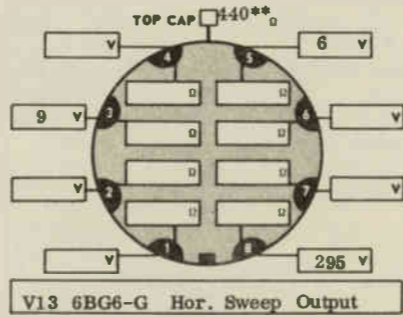
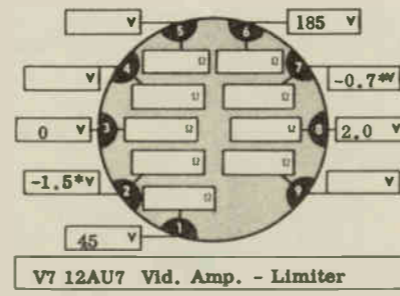
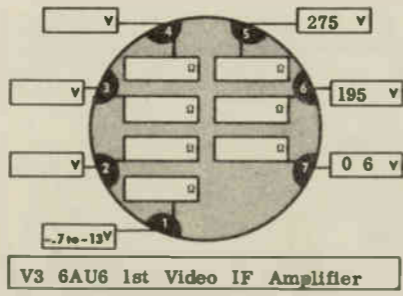
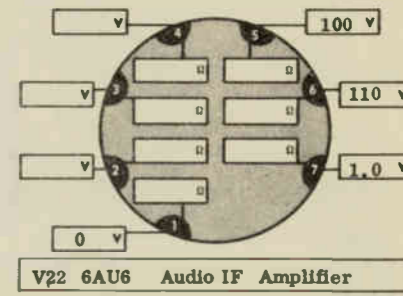
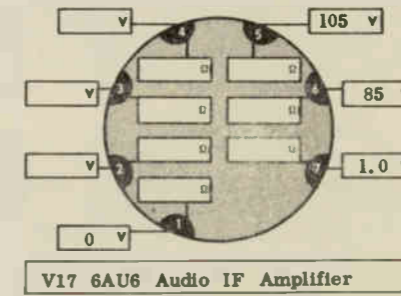
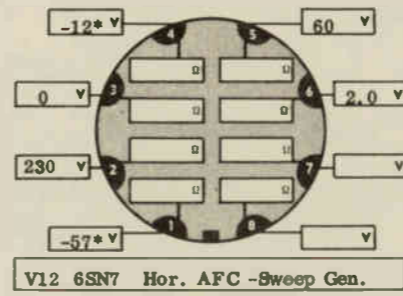
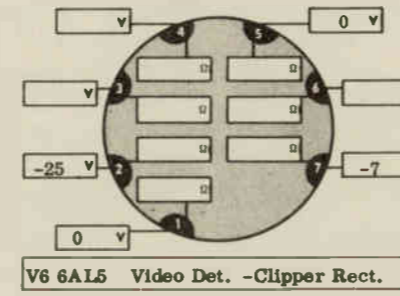
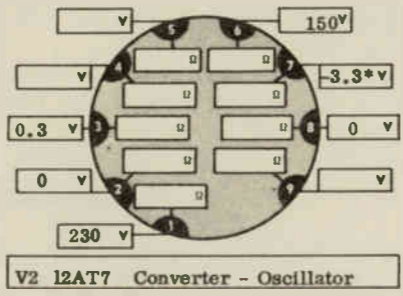
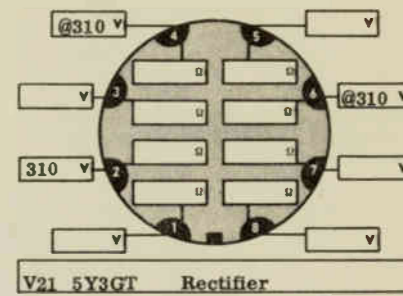
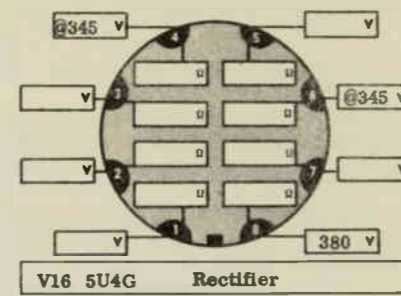
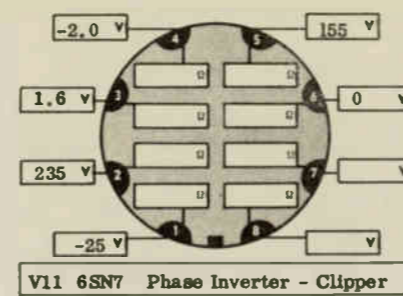
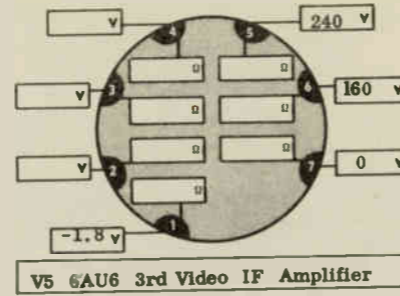
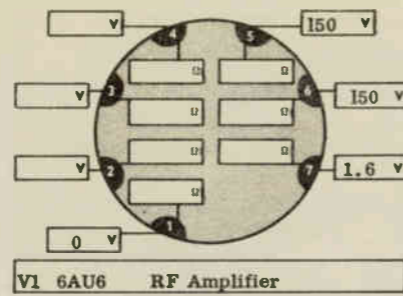
# 805, 806, 807, 809 (U and W)

For Production Changes, see Pages 106 and 107.



ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C33	15 mfd., 450V	RCE-070
C50	30 mfd., 450V	RCE-070
C42	30 mfd., 450V	RCE-070
C35	30 mfd., 50V	RCE-070
C59	15 mfd., 450V	RCE-071
C60	30 mfd., 450V	RCE-071
C61	10 mfd., 450V	RCE-071
C63	30 mfd., 450V	RCE-071
C102	2000 mfd.	RCE-083
C59	60, 61, 63	
C46	Capacitor	RCE-084
C46	Capacitor	RCE-093
C93	25 mfd., 25V	UCE-065
SPECIAL		
C53	500 mmf., 20K	RCN-011
C28	.047 mfd., 600V	RCN-014
C103	.0022 mfd., 1K V	RCN-019
C57	4 mmf., 800V	RCN-020
C56	47 mmf., 800V	RCN-021
TRIMMER		
C49, 81	25-150 mmf.,	RCY-045
C80	1.25 mmf., variable tuning condenser	RCY-046
C12, 17	1.5-15 mmf.	RCY-047
C5, 6	0.4-2.4 mmf.	RCY-048
CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume, 2 Meg; On-Off sw.	R86, 82	RRC-091
Brightness 7500, (dual)	R95	RRC-089
Contrast 500K, (dual)	R73	RRC-089
Hor. Hold 50K, (dual)	R46	RRC-090
Hor. Size		
Vert. Hold 50K, (dual)	R29	RRC-090
Vert. Size 100K	R31	RRC-087
Vert. Lin. 1000, 2W.	R33	RRC-086
Focus 1000, 4W., w.w.	R72	RRC-088
On-Off switch	S2	RRC-091
WIREWOUND		
560 ohms, 7W., w.w.	R70	RRW-028
.65 ohm, 4W., w.w.	R97	RRW-029 (810)
1.0 ohm, 1/2W., w.w.	R105	RRW-034
CONLS		
REF. NO.	DESCRIPTION	PART NO.
L1, 3	RF input, V2 cathode	RLI-006
L2	RF V2 cathode	RLI-003
L4	V2A oscillator cathode	RLI-019
L5	TV audio 1st IF	RTL-085
L6, 14	Video carrier set trap	RLI-005
L15	TV audio take-off trap	RLI-061
L16, 17	22, 23	
L18	Video, 165 hy.	RLI-038
L18	Horiz. size control	RLD-004
L19	Horiz. lin. control	RLD-005
L20	7 henry, HV sy. filter	RLI-059
L21	TV audio 2d IF	RTL-085
L24	7 henry, LV sply filter	RLI-060
L25	Focus	RLF-013
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Power Model 811	T18	RTP-300
Audio Output	T20	RTO-052
Yoke		RLD-006
Audio discriminator	T19	RTD-007
1st video IF	T11	RTL-081
2nd video IF	T12	RTL-082
3rd video IF	T13	RTL-083
4th video IF	T14	RTL-089
1st audio IF	T21	RTL-090
Hor. blocking osc.	T16	RTM-003
Vert. sweep output	T15	RTO-053
Hor. sweep	T17	RTO-076 & RKT-008
Power, 60 cy. (810)	T18	RTP-062
Antenna input	T1	RLA-031
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
SR1	Centering assembly Includes magnet ring & split fiber tube. Selenium rectifier. Ion Trap- model 811 Contacts- speaker model 811.	RAX-024 RER-003 RET-002 RJC-002

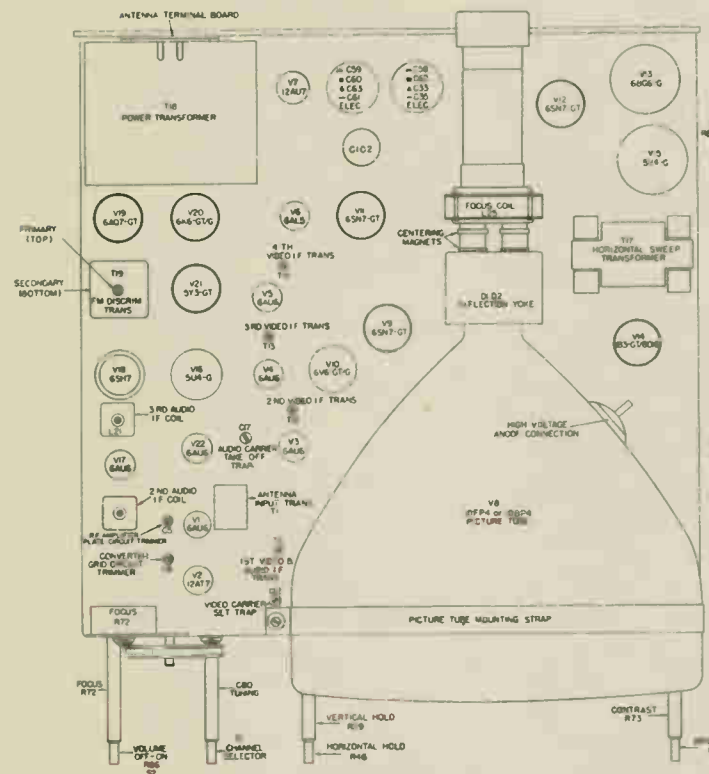
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
LS1	Head End Unit- incl. tubes, completely aligned. Speaker-ten inch, used on early production model 811. Board- Antenna term. Loudspeaker- 5 1/4 in. PM, model 810. Speaker-eight-inch PM, used on late production model 811.	RJX-023 ROP-018 UJB-004 UOP-577 UOP-867



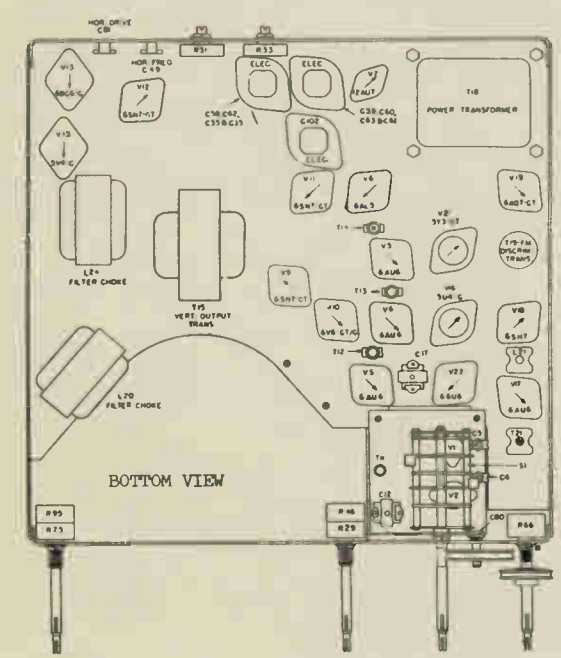
\* VTVM through 0.5 megohm resistor  
 \*\* Measured at start of primary winding  
 † Grid voltage at V3 & V4 indicates range of Contrast Control

@ AC Voltage  
 Unless noted all readings are DC, taken by a 20,000 ohm/volt meter, selector switch at Channel No. 4, normal sync'd picture, normal brilliance and contrast, line voltage - 117 Volts.

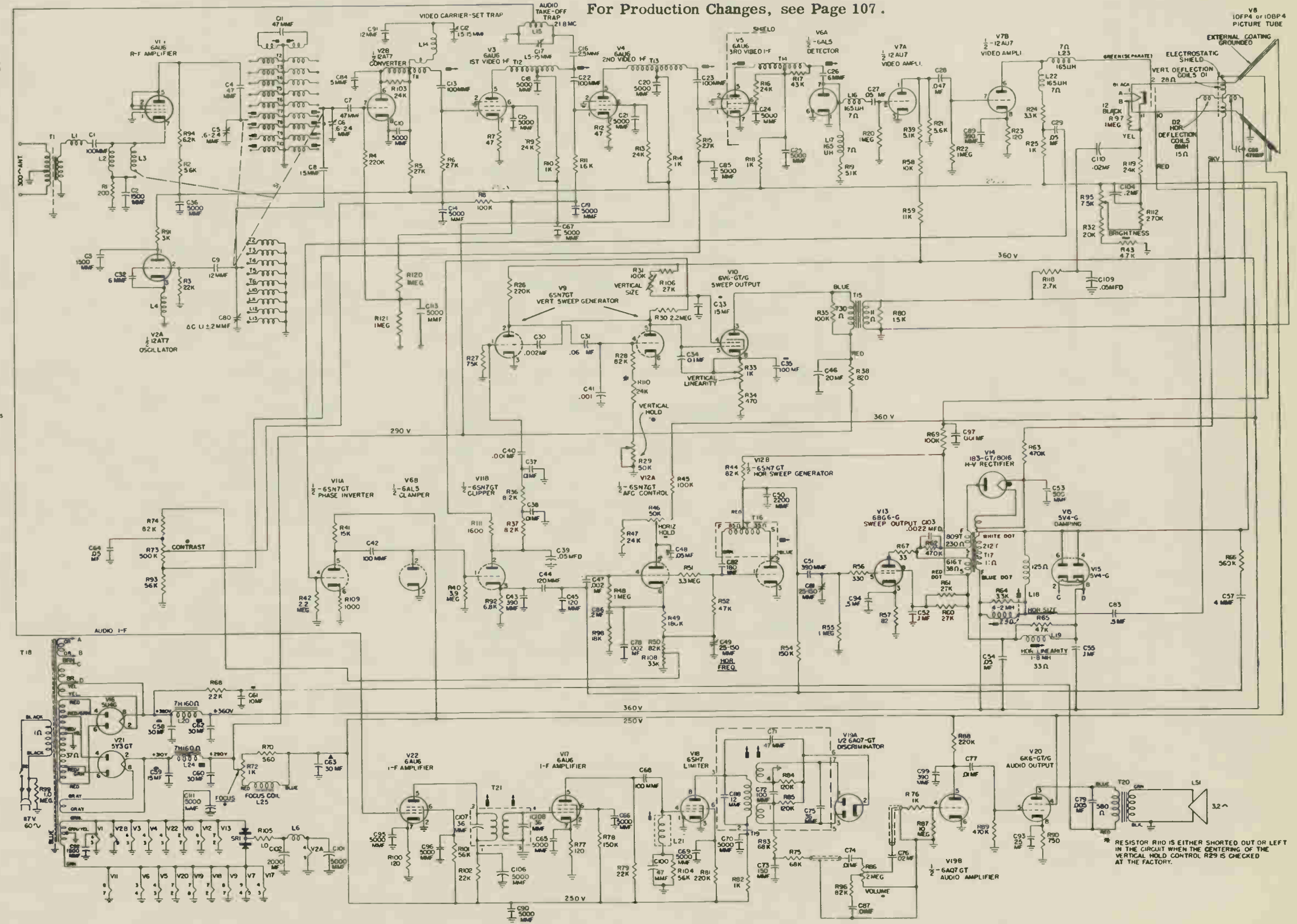
For Production Changes, see Page 107.



CHASSIS TOP VIEW

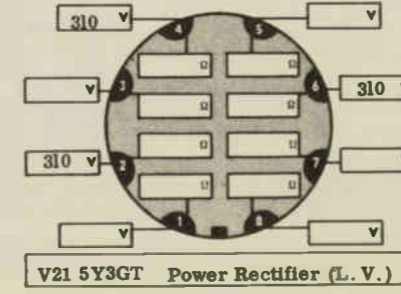
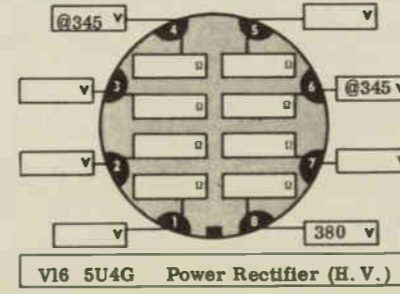
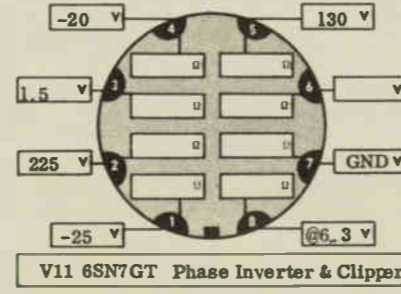
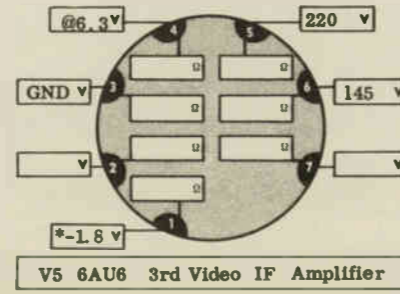
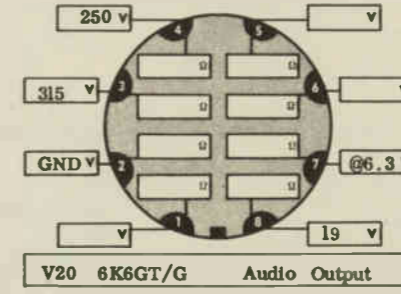
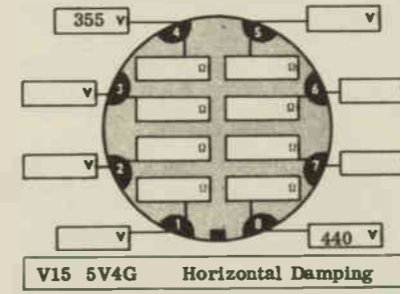
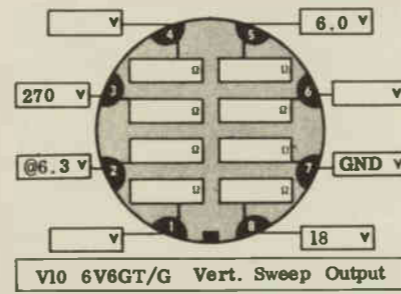
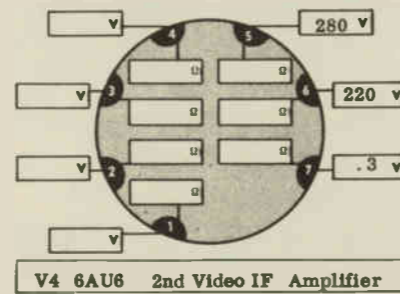
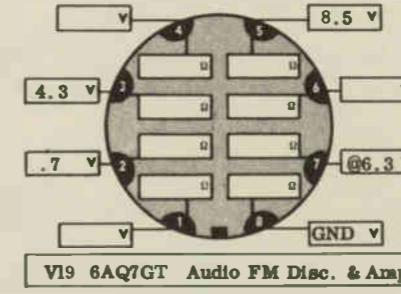
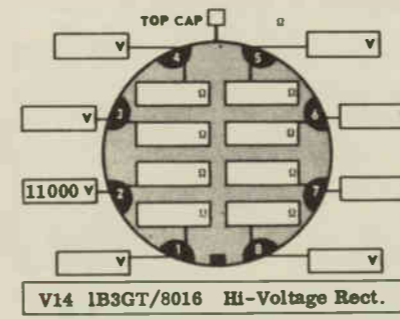
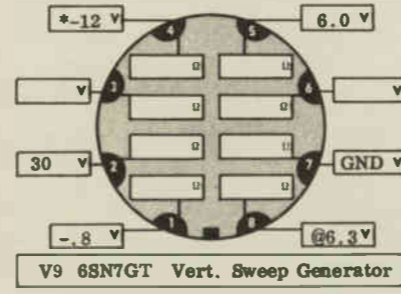
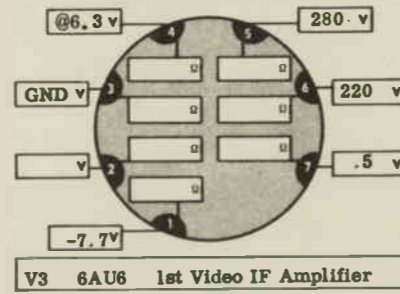
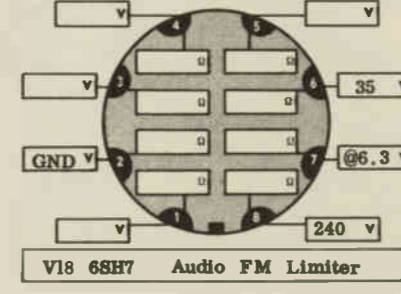
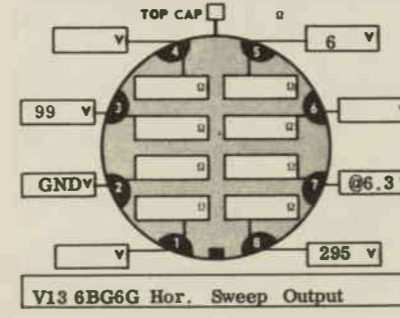
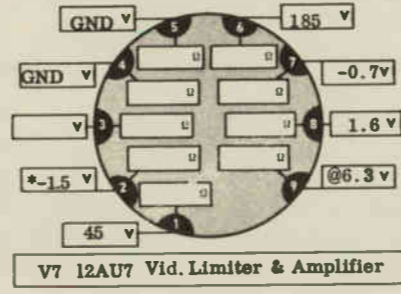
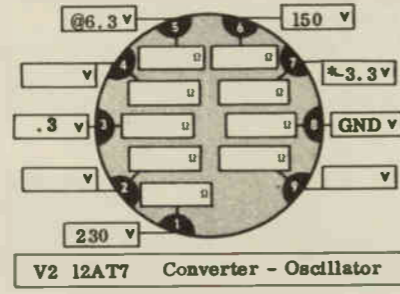
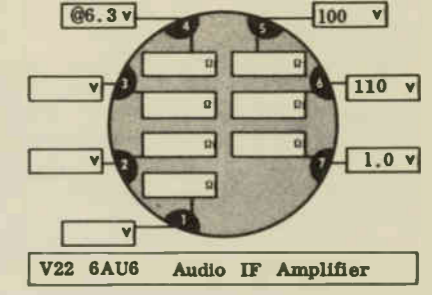
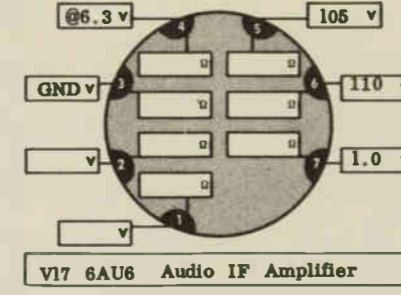
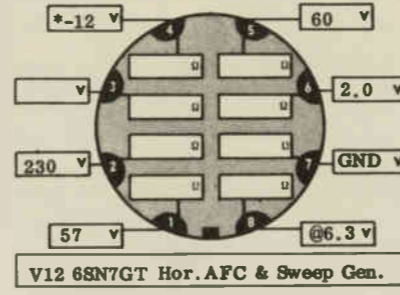
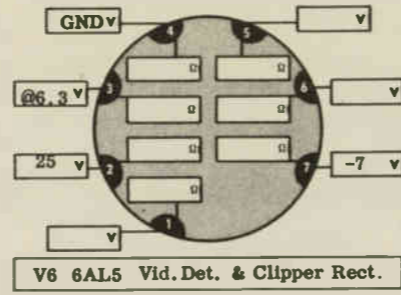
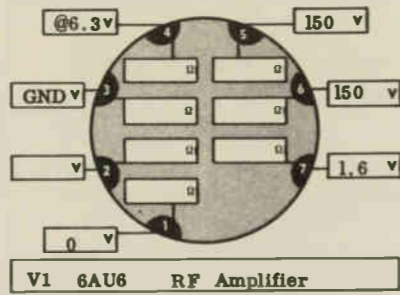


BOTTOM VIEW



\* RESISTOR R10 IS EITHER SHORTED OUT OR LEFT IN THE CIRCUIT WHEN THE CENTERING OF THE VERTICAL HOLD CONTROL R29 IS CHECKED AT THE FACTORY.

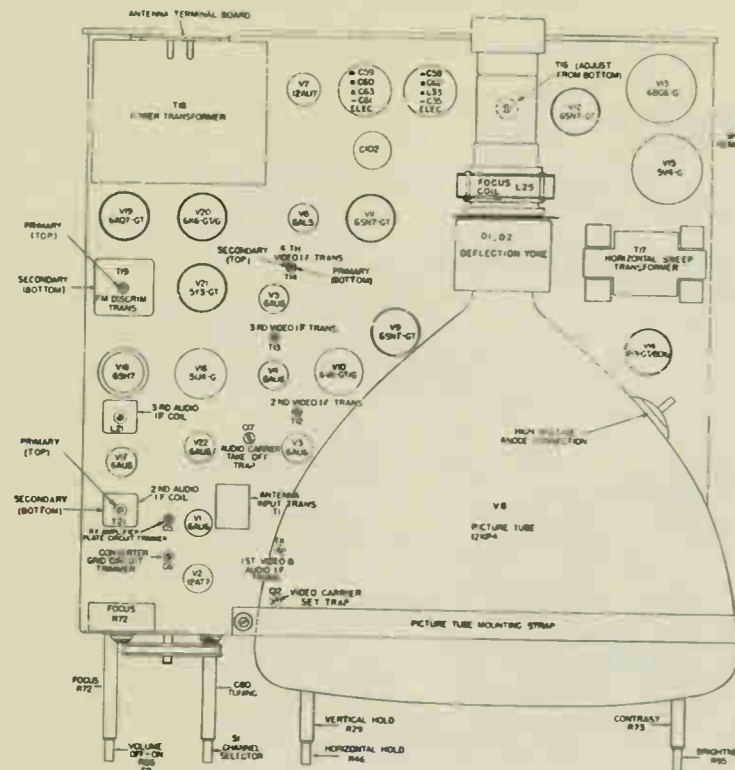
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C33	15 mfd., 450V	RCE-076
C35	30 mfd., 50V	RCE-076
C58	30 mfd., 450V	RCE-076
C62	30 mfd., 450V	RCE-076
C59	15 mfd., 450V	RCE-077
C60	30 mfd., 450V	RCE-077
C61	10 mfd., 450V	RCE-077
C63	10 mfd., 450V	RCE-077
C102	2000 mfd	RCE-083
C93	25 mfd, 25V	RCE-086
TRIMMERS		
C49	25-150 mmf, mica	RCY-045
C80	1.25 mmf, variable tuning condenser.	RCY-046
C12	1.5-15 mmf, mica trimmer.	RCY-047
C5,6	0.6-2.5 mmf,	RCY-048
C81	45-380 mmf,	RCY-051
SPECIAL		
C28	.047 mfd, 600V	RCN-014
C103	.0022 mfd, 1000V	RCN-019
C57	4 mmf, 800V, mica	RCN-020
C56	47 mmf, 800V mica.	RCN-021
C53	500 mmf, 20K V	RCN-023
CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume 2 meg	R86	RRC-091
Brightness (dual)	R95	RRC-089
Contrast (dual)	R73	RRC-089
Hor. Hold 50K, (dual)	R46	RRC-090
Vert. Hold 50K, (dual)	R29	RRC-090
Vert. Size 250K	R31	RRC-084
Vert. Lin. 1000, 2W., w.w.	R33	RRC-086
Focus w.w.	R72	RRW-033
On-Off switch	S2	RRC-091
WIREWOUND		
1.0 ohm, 1/2W.,	R105	RRW-034
900 ohms, 7W.,	R107	RRW-035
COILS		
REF. NO.	DESCRIPTION	PART NO.
L1,3	RF input, V2 cathode	RLI-006
L2	RF choke V2 cathode	RLI-003
L4	V2A oscillator cathode	RLI-019
L6,14	Vid.trap & filament choke	RLI-005
L16,17	Video choke, 165 uh.	RLI-038
L22,23		
L15	Audio take-off trap	RLI-061
L18	Hor. size cont.	RLD-004
L19	Hor. linearity	RLD-005
L20	7 henry, HV, supply filt. ch.	RLI-059
L21	TV audio 2nd IF	RTL-085
L24	7 henry, LV, supply filt. ch.	RLI-060
L25	Focus-PM magnet	RLF-017
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T15	RTO-053
Antenna Input	T1	RLA-031
Power 60 cycles	T18	RTP-066
Audio Output	T20	RTO-052
Yoke	D1,2	RLD-007
Audio discr.	T19	RTD-007
1st video IF	T11	RTL-081
2nd video IF	T12	RTL-082
3rd video IF	T13	RTL-083
4th video IF	T14	RTL-089
1st audio IF	T21	RTL-090
Horiz. blk. osc.	T16	RTM-003
Horiz. & high voltage.	T17	RTO-076 & RKT-009
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
RS1	Centering ring support assembly.	RAX-025
	Selenium rectifier	RER-003
	Cunifee centering ring.	RHM-057
	RF Head End Complete	RJX-023
	Speaker	ROP-015



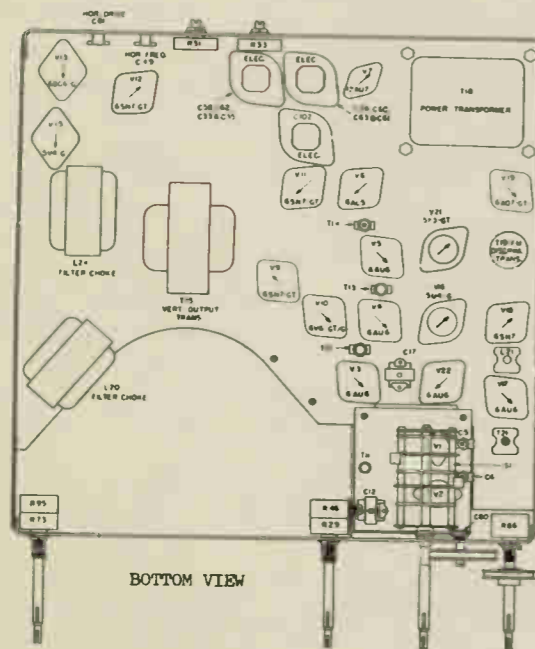
TEST CONDITIONS

DC Measurements taken on a 20,000 ohm per volt meter. Selector switch set at Channel No. 4. Normal Synced Picture, Normal Brilliance and Contrast. Line voltage - 117V. Values listed may have a tolerance of +20%.

\* Measured with a VTVM through 1/2 meg ohm resistor.  
@ AC voltage reading.  
All voltages DC unless otherwise noted.



CHASSIS TOP VIEW

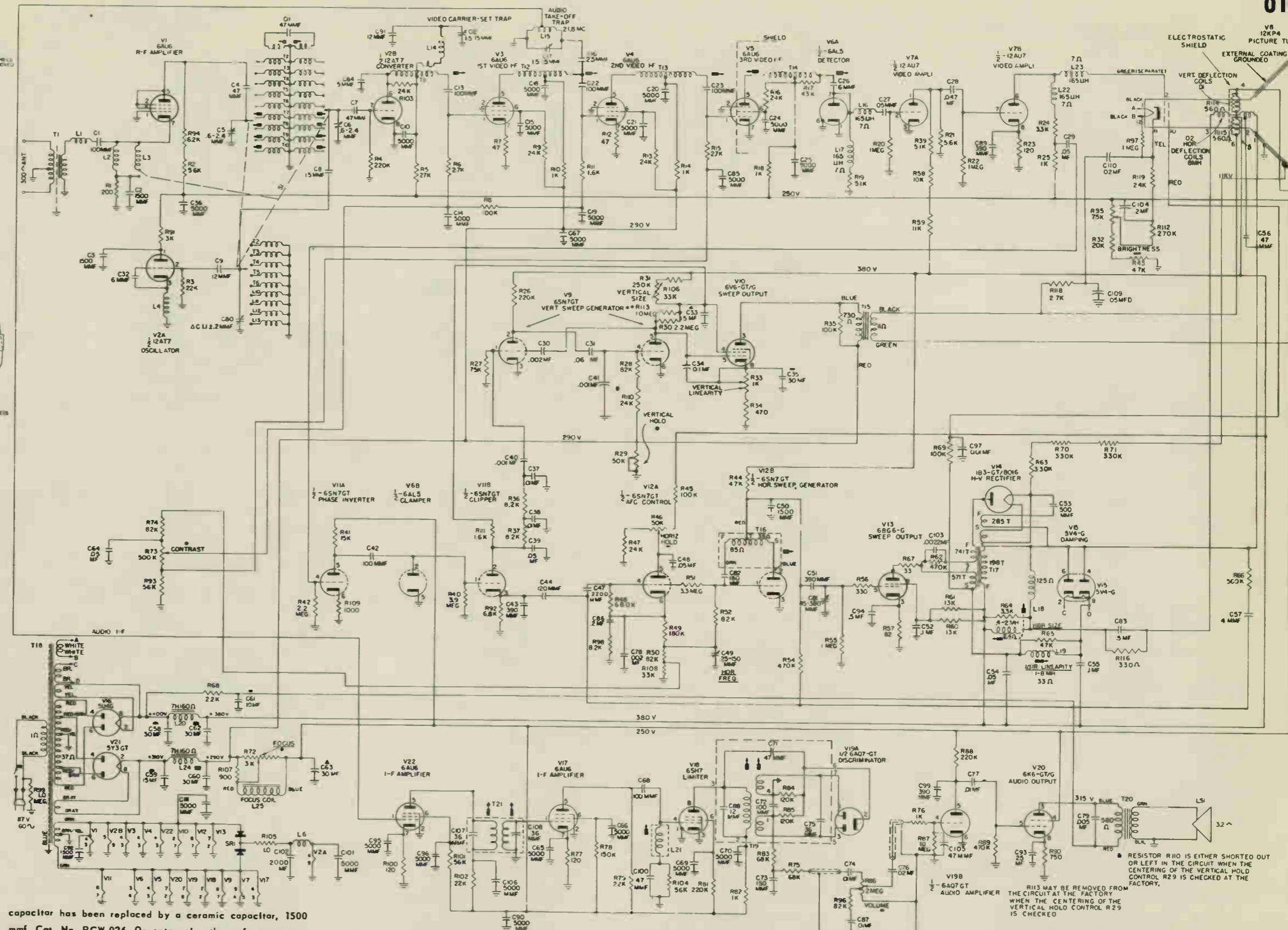


BOTTOM VIEW

**PRODUCTION CHANGES MODEL 814**

In later production Model 814, the audio if coil L5 has been changed to an audio IF transformer, T21, to give added selectivity in the audio channel to reject vertical pulses and video signal which cause hum and noise in the audio.

In late production Model 814, C3, a 5000 mmf. wafer-type



capacitor has been replaced by a ceramic capacitor, 1500 mmf. Cat. No. RCW-026. On sets using the wafer-type capacitor C3, it was found that this capacitor started vibrating and was a source of howl. Since C3 is comparatively difficult to replace, it is suggested that a rubber block (Cat. No. RMM-081) be wedged between the edge of C3 and the chassis of the head-end unit. To facilitate mounting of this

rubber piece, it should be cut into a V shape so that the edge of the capacitor C3 is held in the channel in the edge of the rubber block.

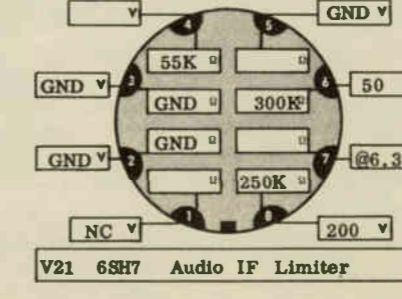
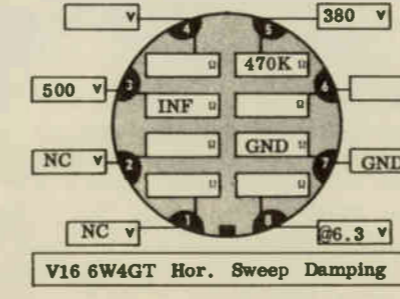
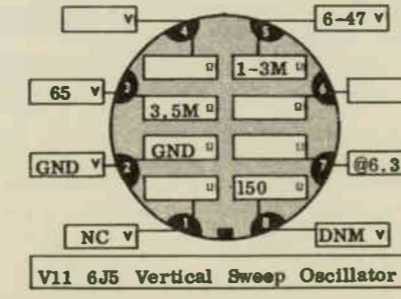
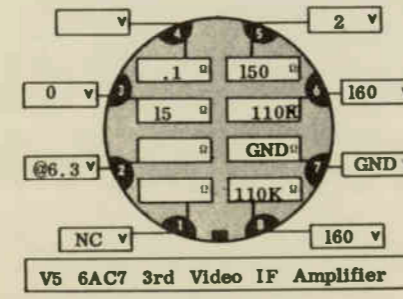
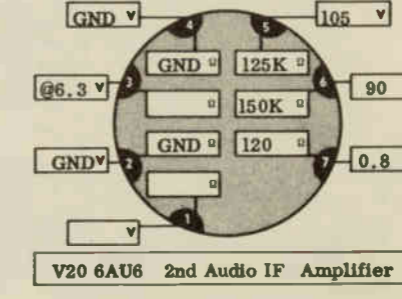
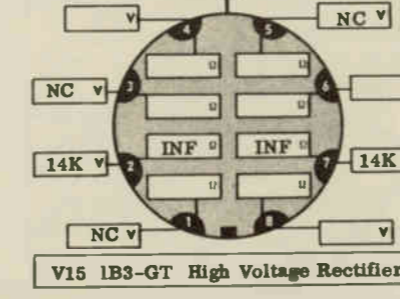
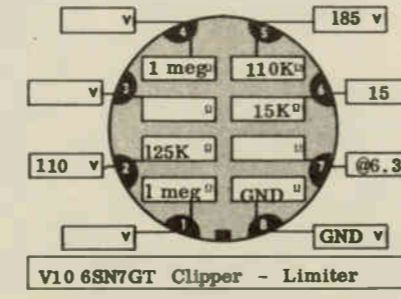
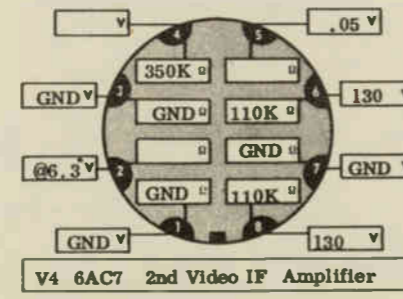
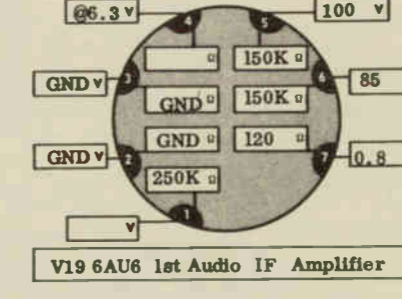
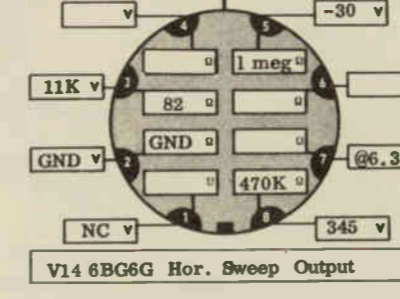
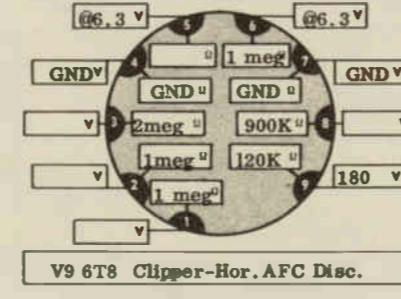
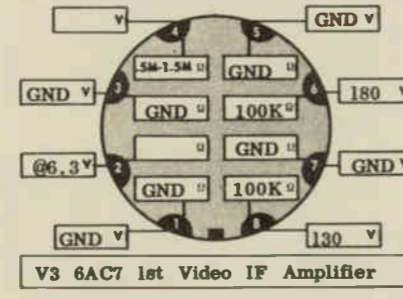
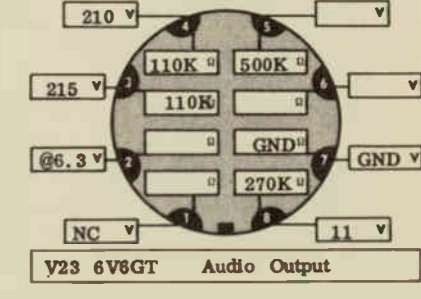
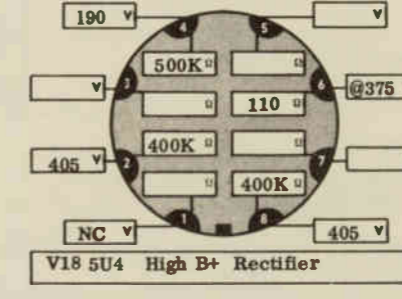
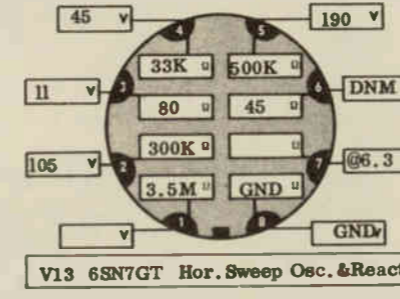
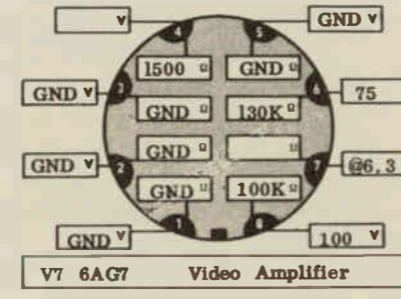
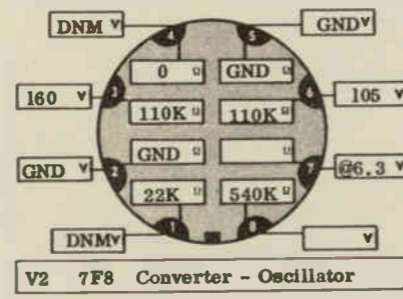
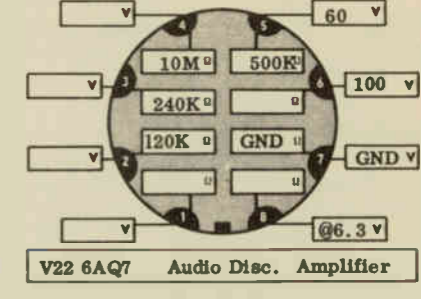
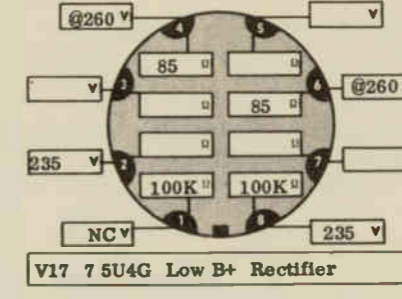
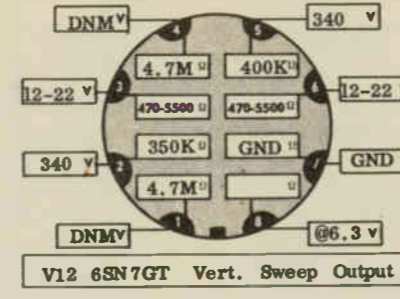
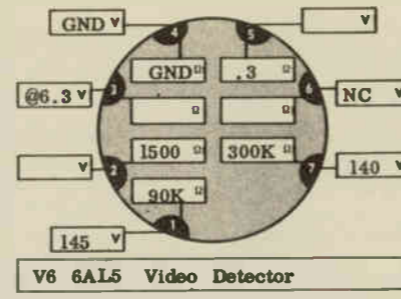
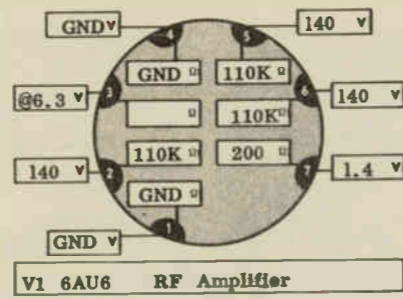
Another source of howl was found to be the tube V2 (12AT7) being or becoming microphonic. Where this is the case, a

lead cap (Cat. No. RHX-014) should be mounted on the 12AT7 tube.

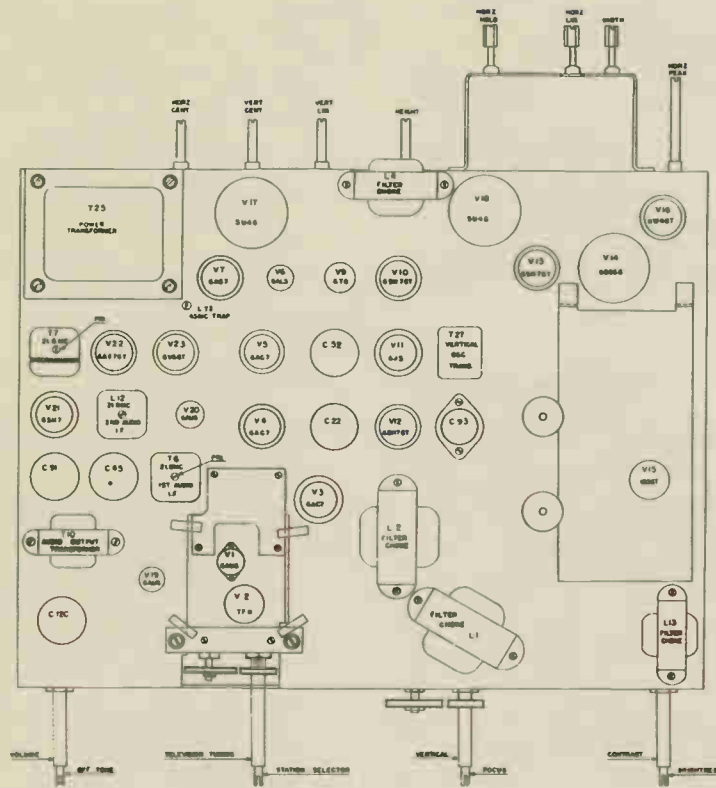
A third source of howl was found to be the textolite rotor and/or the metal guide ring on textolite rotor of the oscillator wiper of the channel switch becoming loose and vibrating. The guide ring should be cemented to the textolite

rotor and the textolite rotor should be cemented to the shaft with "Dekadhes Cement". Extreme caution should be observed when applying this cement. The cement should only be applied to the guide ring, the textolite rotor, and the shaft. The cement should not touch the fingers of the electrical contact ring which extend through the textolite rotor.

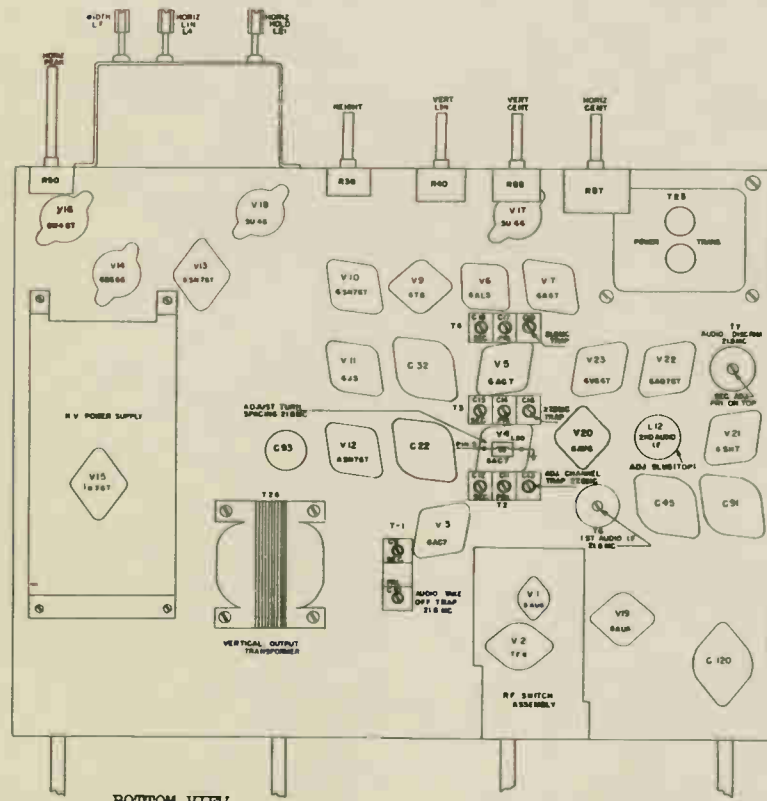
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C97,8	30 mf., 300V	RCE-009
C91	90 mf., 450V	RCE-017
C45A	30 mf., 450V	RCE-019
C45B	30 mf., 450V	RCE-019
C45C	15 mf., 450V	RCE-019
C45D	30 mf., 450V	RCE-019
C32A	30 mf., 450V	RCE-020
C32C	15 mf., 450V	RCE-020
C32D	15 mf., 450V	RCE-020
C60	50 mf., 25V	RCE-048
C35,6	60 mf., 300V	RCE-054
C95,6	60 mf., 300V	RCE-054
C120	4K mf., 10V	RCE-096
C22A	30 mf., 450V	RCE-103
C22B	200 mf., 50V	RCE-103
C93	200 mf., 50V	RCE-104
C115	1000 mf, 6V	RCE-106
C114	500 mf, 15V	RCE-107
C92	100 mf, 25V	RCE-108
TRIMMER		
C112	For television tuning.	RCY-057
CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume	dual, 2 meg	R69A RRC-079
Brightness	R84B	RRC-117
Contrast	R84A	RRC-117
Vert. Hold	R35	RRC-114
Vert. Lin.	R40	RRC-118
Tone	500K, dual	R69B RRC-079
Height	R36	RRC-115
Horiz. Peaking	R50	RRC-116
Focus	R74	RRC-119
Horizontal Centering	R87	RRC-120
Vertical Centering	R88	RRC-121
WIREWOUND		
55 ohms, 7 watts.	R73	RRW-046
COILS		
REF. NO.	DESCRIPTION	PART NO.
L1	Filter ch., Thy., 140 ma.	RLF-018
L2	Filter ch., Thy., 140 ma.	RLF-019
L3,10,19	RF coupling	RLI-006
L4,7	Width & Hor. lin.	RLD-014
L5	Video detector	RLI-009
L6	Osc. cathode	RLI-032
L8	Focus	RLF-029
L11	Filter (focus)	RLF-032
L13	Filter choke, pl. supply	RLF-031
L14	Video amp.	RLI-039
L15	Video amp.	RLI-038
L18	RF coupling	RLI-003
L20	Cathode, IF	RLI-033
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Osc.	T26	RTO-074
Vert. Output	T9	RTO-068
Hor. Output	T25	RTP-303
Power	T10	RTO-073
Audio Output	T4	RLA-033
Antenna input	T6	RLI-089
Audio IF	T21	RLI-091
Osc. & RF channel 11		
FM disc.	T7	RTD-009
1st video IF	T1	RTL-101
2nd & 3rd video	T2,3	RTL-102
4th video IF	T4	RTL-104
Vertical blocking	T27	RTM-007
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
SR1	Oval loudspeaker 4"x6"	ROP-015
	Selenium Rectifier	RER-005



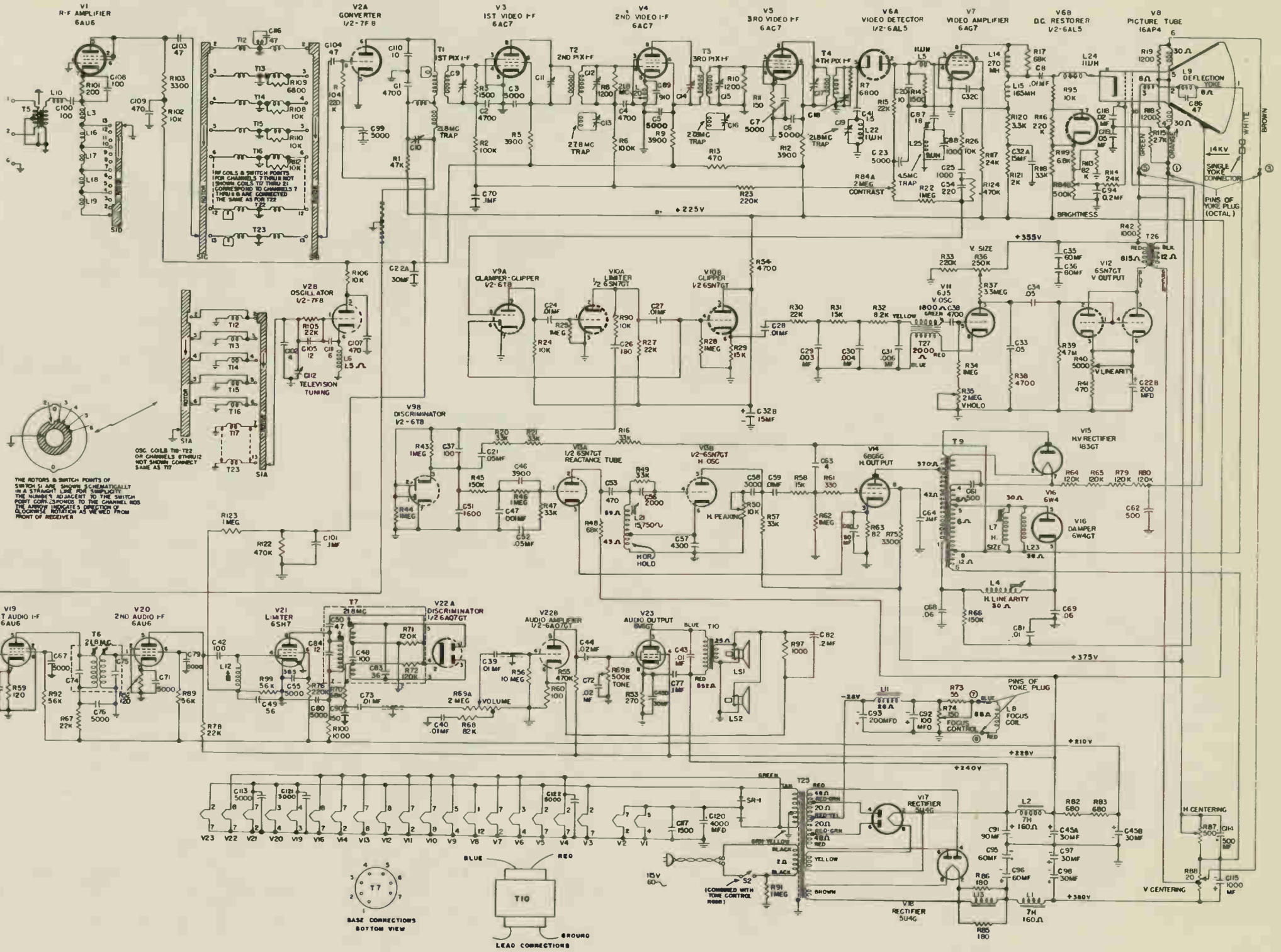
**TEST CONDITIONS**  
Readings taken by voltmeter 20,000 ohms per volt.  
@ - AC Voltage Reading.  
DNM - Do Not Measure.



TOP VIEW



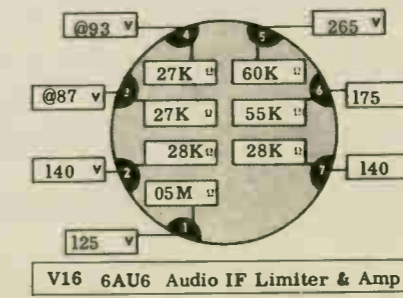
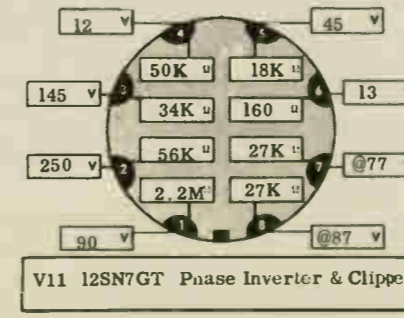
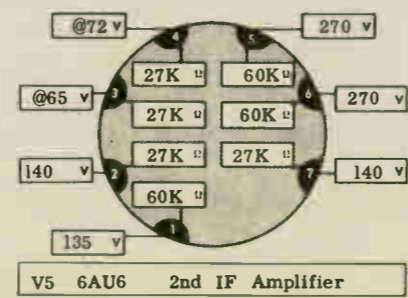
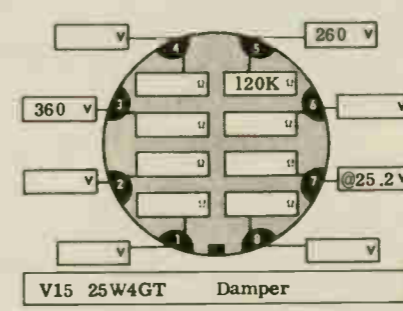
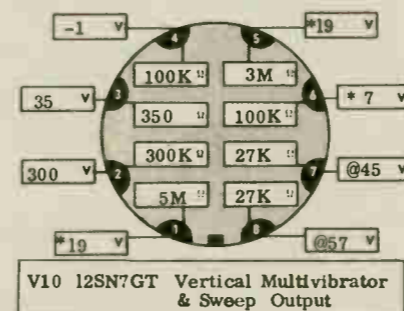
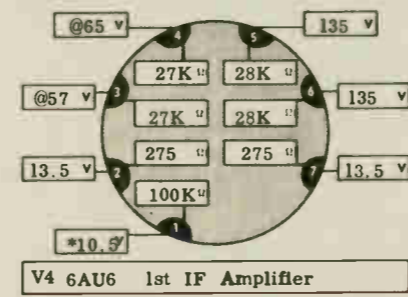
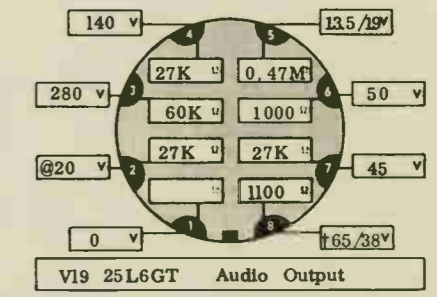
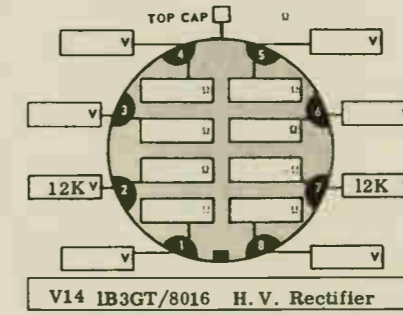
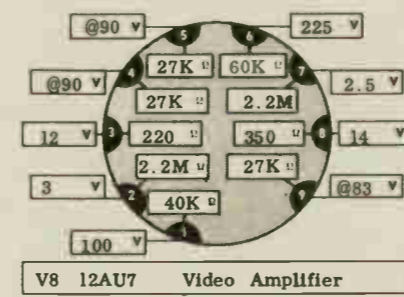
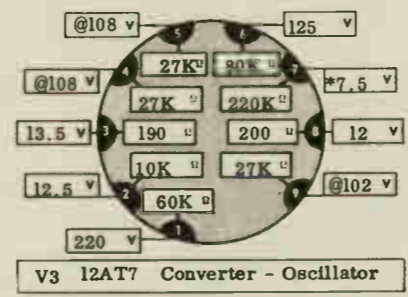
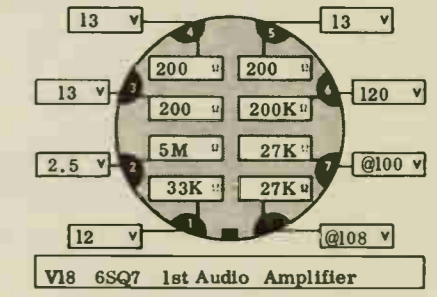
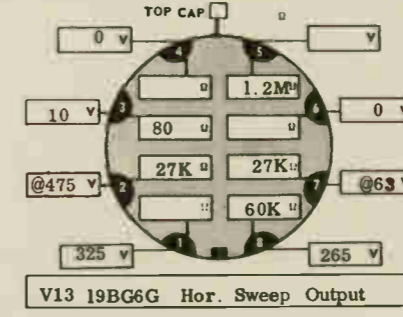
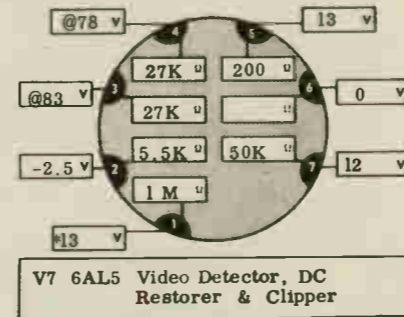
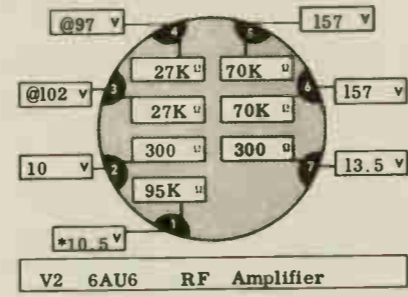
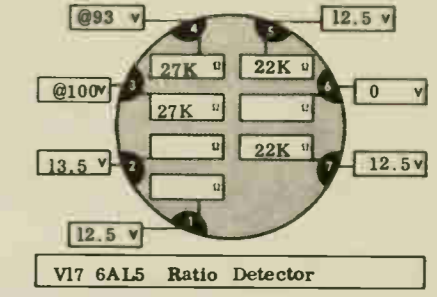
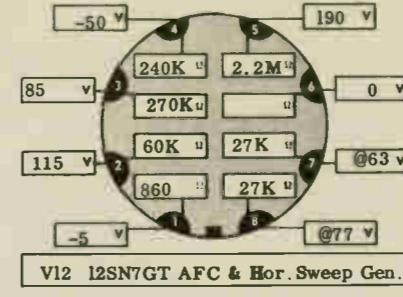
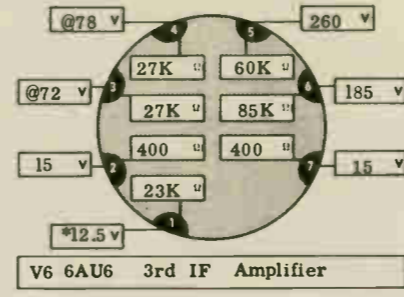
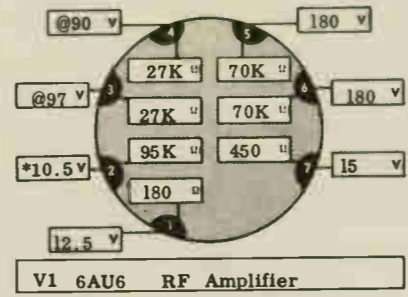
BOTTOM VIEW



THE ROTORS & SWITCH POINTS OF SWITCH S1 ARE SHOWN SCHEMATICALLY IN A STRAIGHT LINE FOR CLARITY. THE NUMBER ADJACENT TO THE SWITCH POINT CORRESPONDS TO THE CHANNEL AND THE ARROW INDICATES DIRECTION OF CLOCKWISE ROTATION AS VIEWED FROM FRONT OF RECEIVER.



ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C268	40 mf, 300V	RCE-088
C277	10 mf, 150V	RCE-088
C278	150 mf, 15V	RCE-088
C303	10 mf, 350V	RCE-089
C358	50 mf, 100V	RCE-089
C365	100 mf, 50V	RCE-089
C346	1mf, 50V	RCE-090
C371, 2, 3, 4	150 mf., 150V	RCE-091
C299	30 mf, 450V	RCE-092
C383	60 mf, 350V	RCE-094
384	SPECIAL	
C326	.0022 mf., 1K V	RCN-019
C327	HV, 500 mmf., 20KV	RCN-023
	TRIMMERS	
C319	45-380 mmf., horiz. drive.	RCY-051
C213	1.25-1.95 mmf., tuning control.	RCY-053
CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume dual, 100K	R366	RRC-104
Brightness	R226	RRC-102
Contrast	R263	RRC-102
Hor. Hold	R329	RRC-103
Vert. Hold	R307	RRC-103
Vert. Lin. 2000 ohm, 2W	R300	RRC-095
Height 3 meg	R302	RRC-096
Focus, dual, 500K	R365	RRC-104
WIREWOUND & SPECIAL		
Temp. comp., 42.5K ohms	R328	RRN-007
75 ohms, 10W.	R373, 4	RRW-041
COILS		
REF. NO.	DESCRIPTION	PART NO.
L201	Input	RLF-023
L202, 5	RF & osc. ch. -8.3 uh	RLI-032
L203	RF	RLI-083
L204	RF choke-31 uh.	RLF-024
L206,	249, 259, 372, 3, 4, 5	
	Heater choke coil	RLI-085
L207	RF	RLI-083
L242	Video IF plate	RPL-014
L243	Video IF plate	RPL-014
L244	Video IF plate	RPL-014
L248	IF choke-7.6 uh.	RLF-027
L249	Heater choke	RLI-085
L255, 6, 8	Vid. comp. choke	RLI-038
L257, 260	Vid. comp. choke	RLI-068
L313	Blocking oscillator	RLI-086
L314,	15, 16	
	Hor. width & linearity	RLD-014
L341	1st audio IF coil	RLI-069
L342	Focus w/PM magnet	RLF-017 (817)
	Focus w/wing nut assy.	RLF-028
	Broadcast filter	RLX-027
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T291	RTO-064
Hor. Output	T312	RTO-071
Audio output (821)	T343	RTO-072
Audio output (817)	T344	RTO-066
Ratio detector	T341	RTD-008
Reactor filter	L376	RTL-096
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
X371	Rectifier-Selenium	RER-004
X372	250 ma. RF Head End-completely aligned with tubes.	RJX-027
B371	Thermal cutout.	RSR-001
S341	Focus switch.	RSW-066
LS3	Speaker-4 in. PM Model 821.	UOP-477
LS4	Speaker-12 in. PM Model 817.	UOP-1247



### TEST CONDITIONS

#### Voltage Measured:

Volume	-	Min.
Focus	-	Normal
H. Hold	-	Normal
V. Hold	-	Normal
Brightness	-	Min.
Contrast	-	Max.

#### Meters:

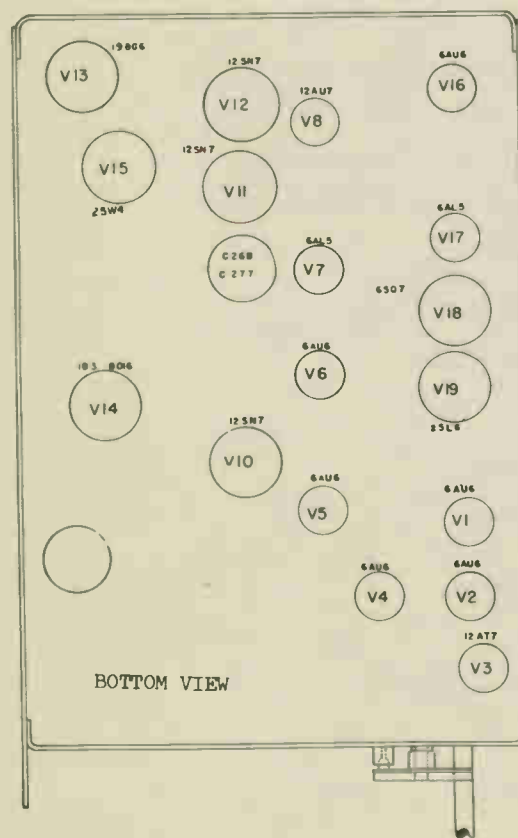
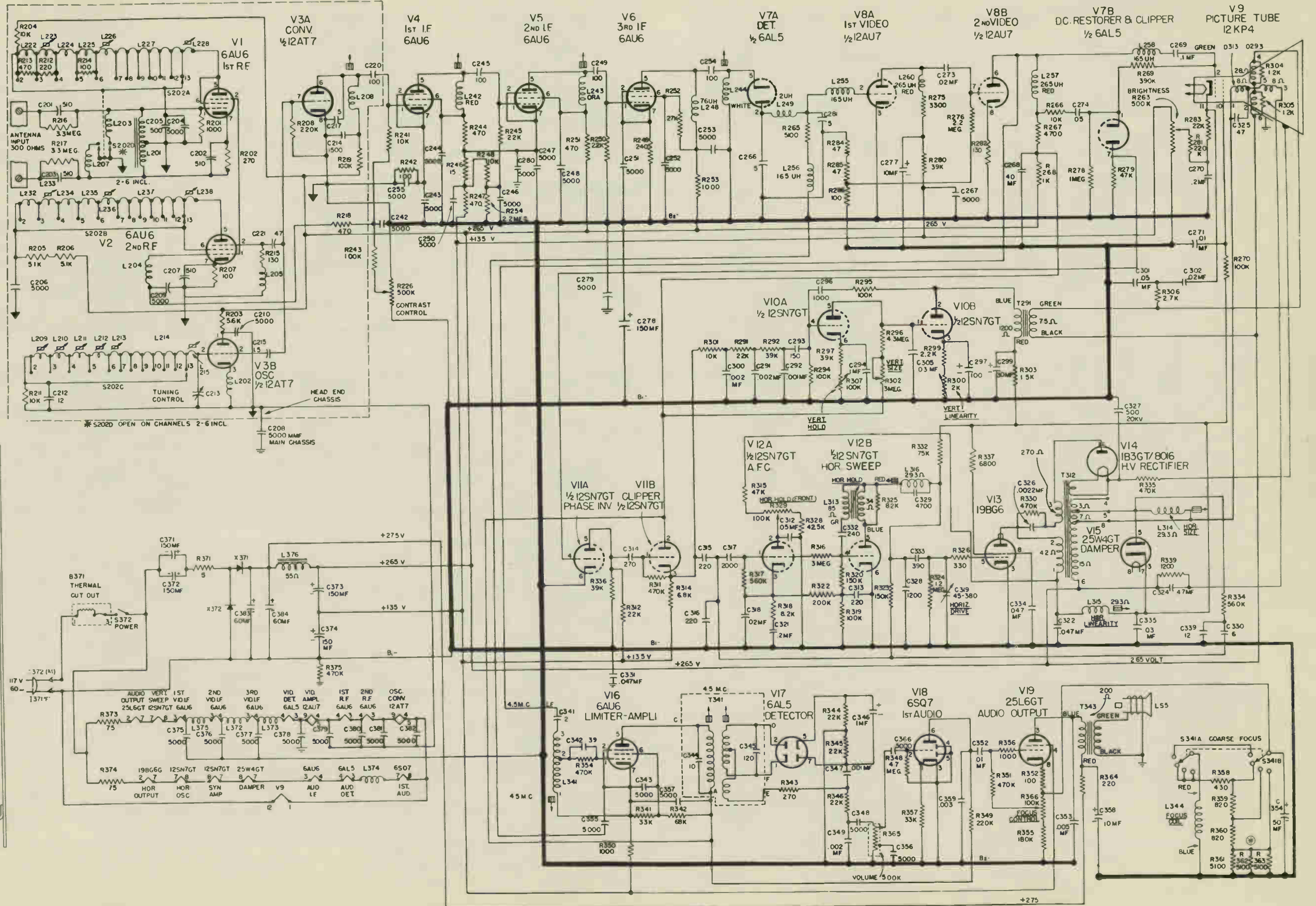
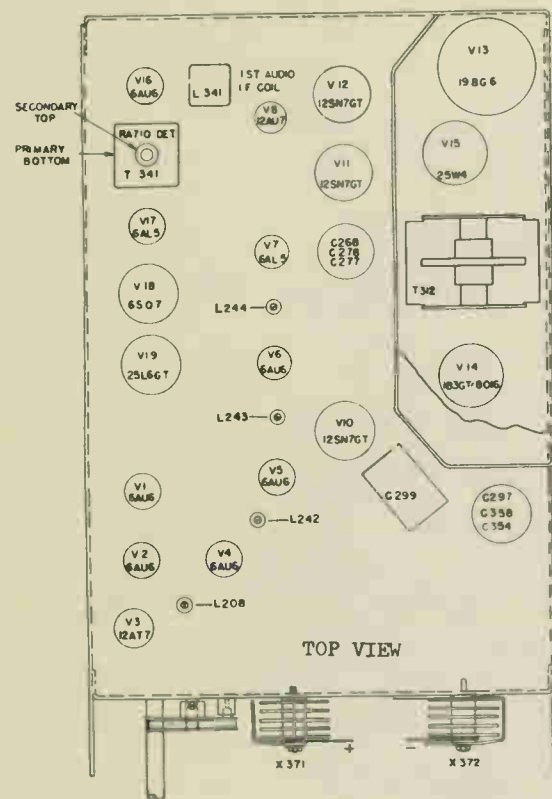
AC	1000 ohm/volt
DC	20,000 ohm/volt
Line volts	- 117V
@	AC voltage reading.
*	Use scale 50V or higher
†	Min.-Max. of Focus Control

#### Resistance Measured:

Volume	-	Min sw. off.
Focus	-	Max.
H. Hold	-	Max.
V. Hold	-	Max.
Brightness	-	Min.
Contrast	-	Max.
Focus sw.	-	Tap. 4
Meter:	20,000 ohm/volt	



For Production Changes, see Pages 107 and 108.



# 817, 821 (U and W)

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C257	10 mf., 45 V	RCE-100
C258	40 mf., 300V	RCE-100
C268	40 mf., 300V	RCE-088
C277	10 mf., 150V	RCE-088
C278	150 mf., 15V	RCE-088
C297	10 mf., 350V	RCE-089
C303	50 mf., 100V	RCE-089
C354	50 mf., 100V	RCE-089
C358,	365	
	100 mf., 50V	RCE-089
C299	30 mf., 450V	RCE-092
C346	1 mf., 50V	RCE-090
C371,2	3,4	
	150 mf., 150V	RCE-091
C383,4	60 mf., 350V	RCE-094
C406	10 mf., 150V	RCE-100
	SPECIAL	
C326	.0022 mf., 1K V	RCN-019
C327	HV, 500 mmf., 20K V	RCN-023
	TRIMMERS	
C213	1.25-1.95 mmf. tuning control	RCY-053

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume	R366	RRC-104
Brightness	R230	RRC-110
Contrast	R263	RRC-110
Hor. Hold	R329	RRC-103
Hor. Size		
Vert. Hold	R307	RRC-103
Vert. Size		
Vert. Lin. 2K, 2W	R300	RRC-095
Height 3 meg	R302	RRC-096
Focus, 500K	R365	RRC-104
25K ohms, drive	R402	RRC-108
WIREWOUND & SPECIAL		
Temp. comp. 42.5K ohms	R328	RRN-007
75 ohms, 10W	R373,4	RRW-041
5 ohms, 4W.	R371	RRW-043

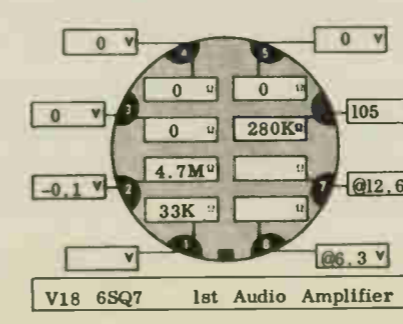
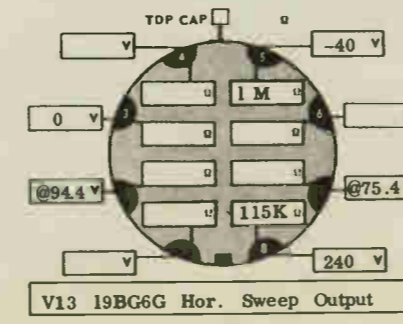
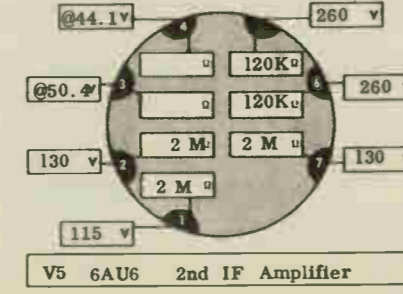
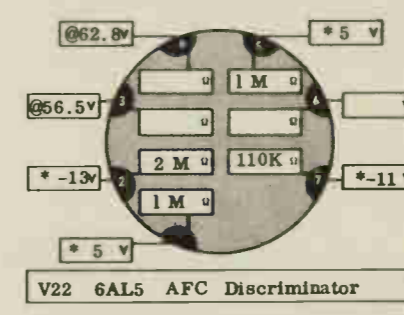
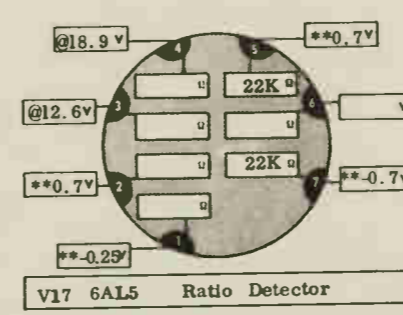
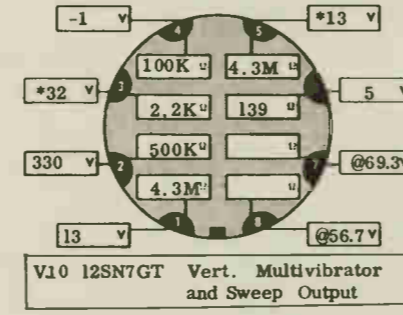
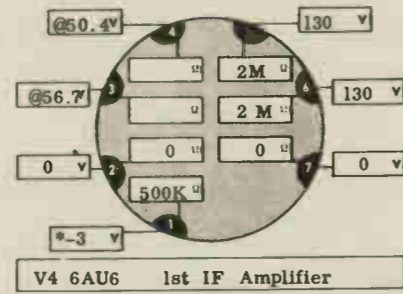
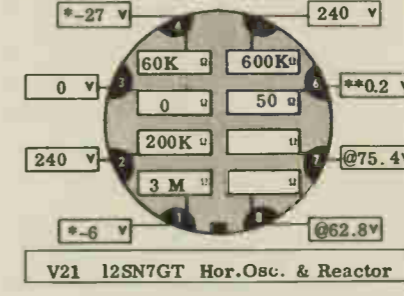
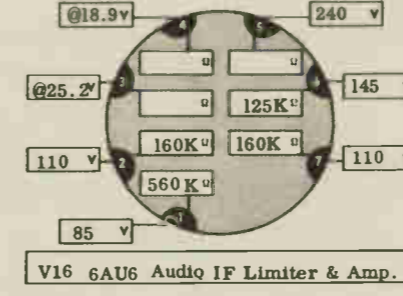
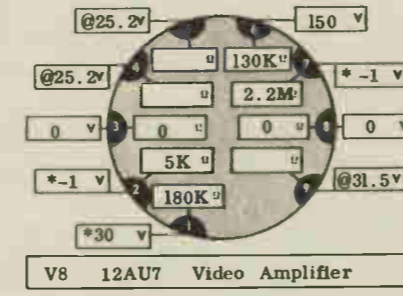
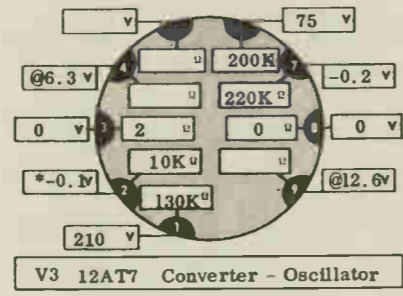
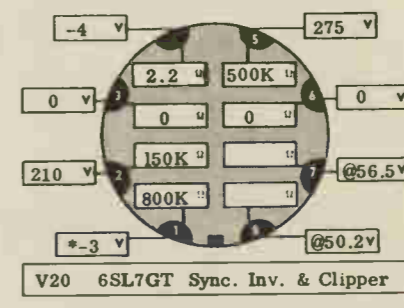
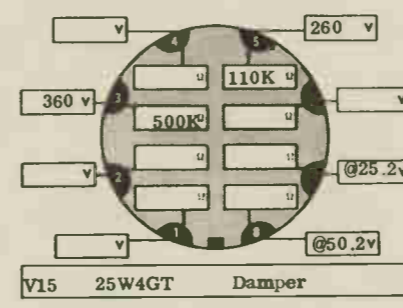
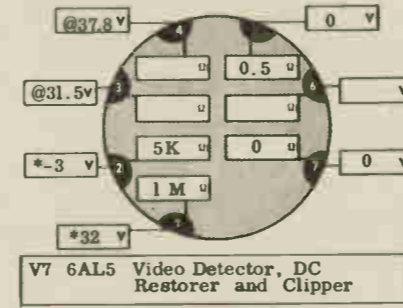
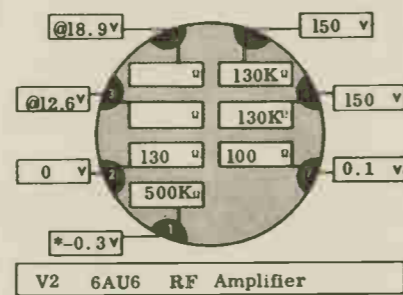
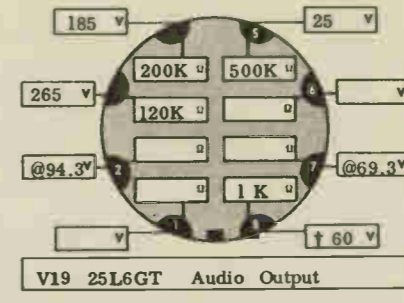
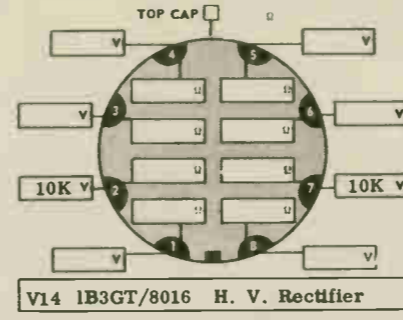
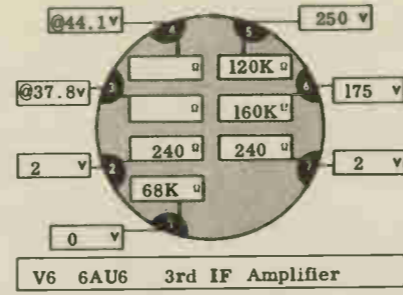
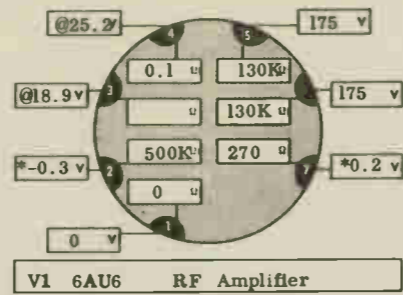
COILS		
REF. NO.	DESCRIPTION	PART NO.
L201	Input	RLF-023
L202,5	RF & Osc ch. 8.3 uh	RLI-032
L203,7	RF Coil	RLI-083
L204	RF Choke 31 uh	RLF-024
L206,2	9;259;372, 3, 4, 5	
	Heater Choke 2.0 uh	RLI-085
L242,3	4 Vid. IF Plate Coil	RLP-014
L248	IF Choke 76 uh	RLF-027
	Focus Coil	RLF-028
L342,4	Focus Coil (Model 817 w/PM magnet)	RLF-017
L255,6	8 Vid. Comp. Choke	RLI-038
L257,260	Vid. Comp. Choke	RLI-068
L314	15 Hor. width & Lin.	RLD-014
L316	Horizontal Osc.	RLC-091
L341	1st Audio IF	RLI-069

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Yoke	T291	RLD-015
Vert. output	T343	RTO-064
Audio output (821)	T343	RTO-072
Ratio detector	T341	RTD-008
Reactor filter	L376	RTL-096
Audio output (817)	T344	RTO-066
Hor. output	T312	RTO-071

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
B371	Broadcast filter	RLX-027
S341	RF Head end	RJX-027
LS3	Thermal cutout	RSR-001
LS4	Focus switch	RSW-066
X371,2	Speaker 4" PM(821)	UOP-477
	Speaker 12" PM (817)	UOP-1247
	Selenium rectifier 250 ma.	RER-004



### TEST CONDITIONS

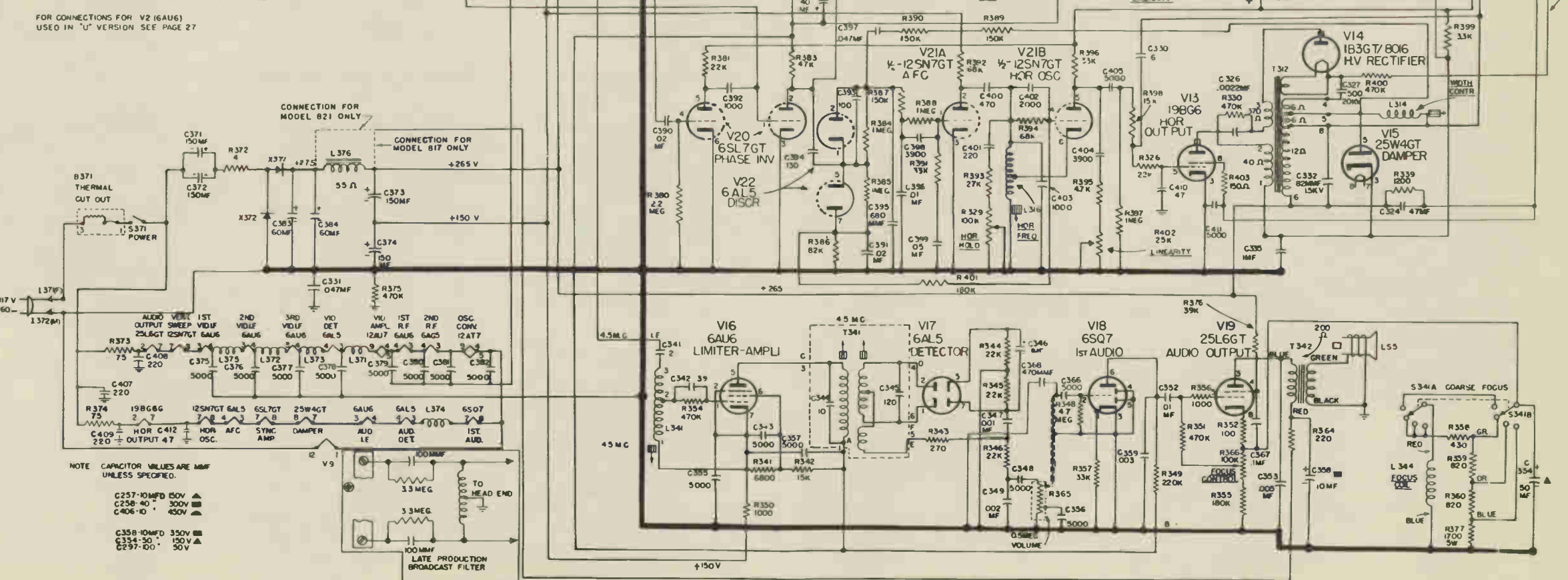
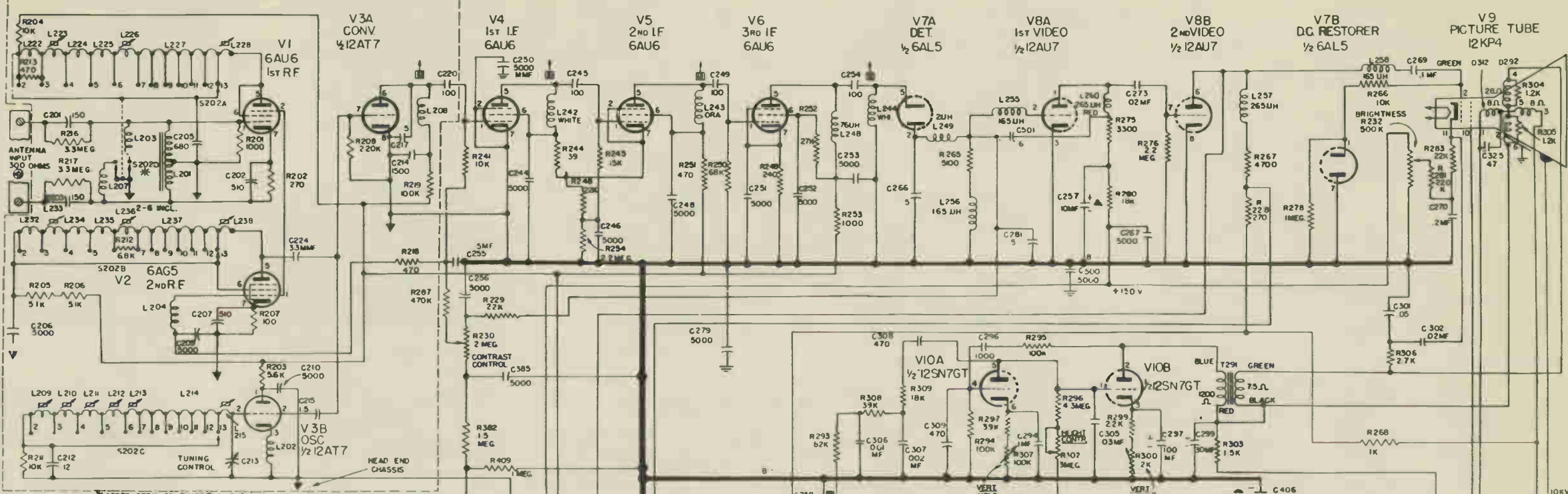
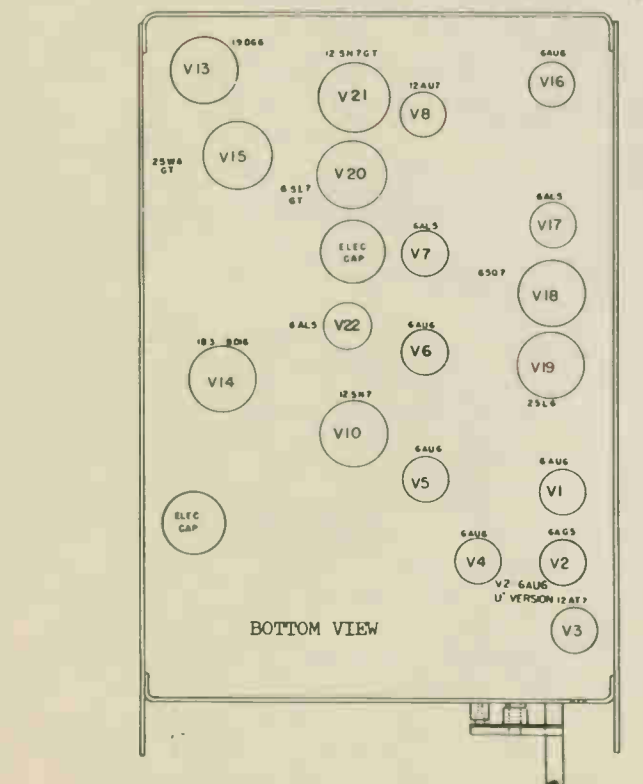
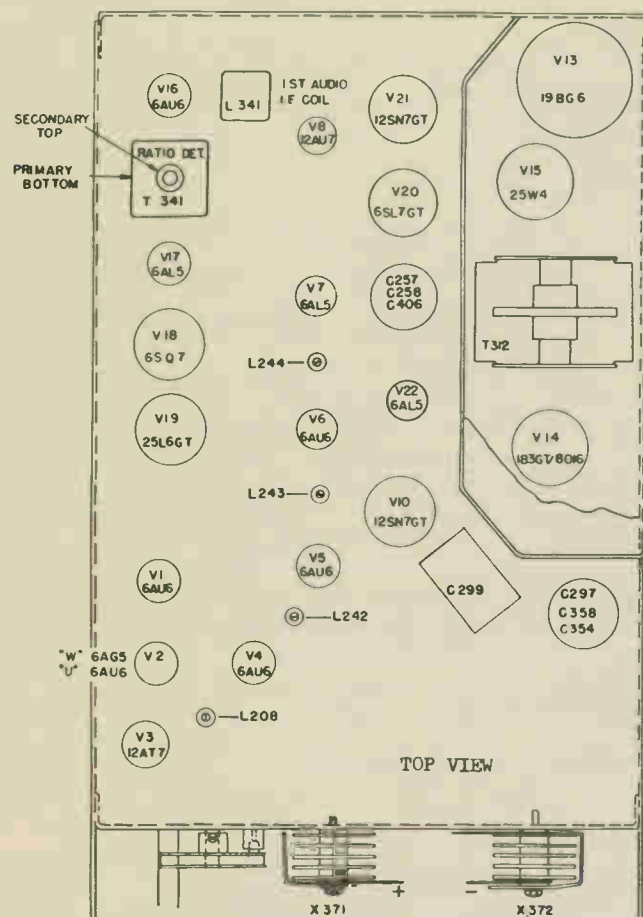
#### Voltagess Measured:

- \* Measured on 50V Scale
- † Focus Control Max. - Focus switch maximum clockwise
- @ AC voltage reading.
- All voltages DC unless otherwise noted.
- Volume - Control Off
- Focus - Control Normal
- Contrast - Maximum
- Brightness - Minimum
- H-Speed - Normal
- V-Speed - Normal

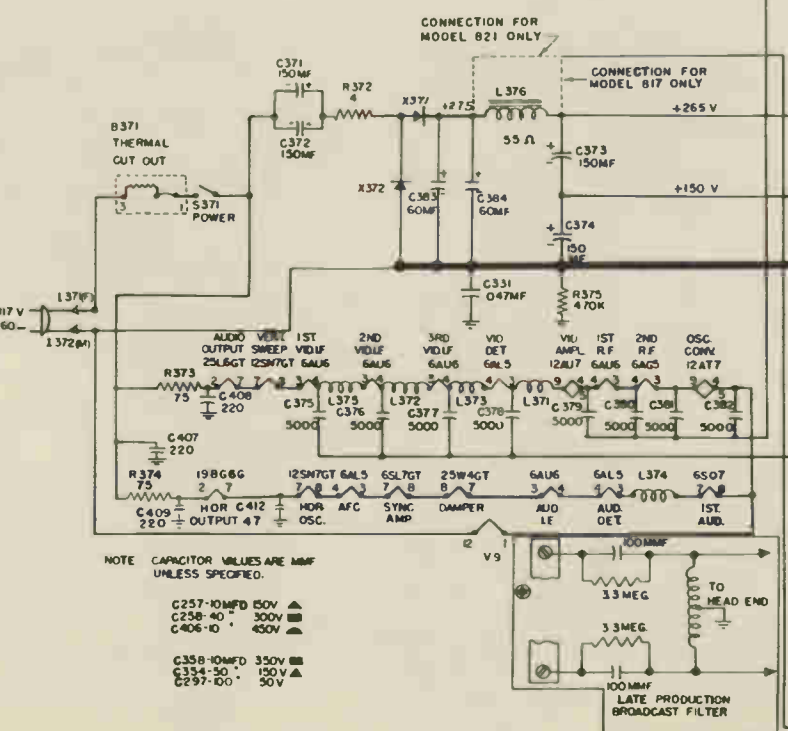
#### Resistance Measured:

- Power Cord Off
- Volume Control Minimum
- Focus Control Maximum
- H-Speed Control Maximum
- V-Speed Control Maximum
- Contrast Control Maximum
- Brightness Control Minimum
- Vert. Lin. Control Maximum
- Vert. Size Control Maximum
- Focus Sw. Control Maximum
- Hor. Lin. Control Maximum

For Production Changes, see Pages 107 and 108.



FOR CONNECTIONS FOR V2 (6AU6) USED IN "U" VERSION SEE PAGE 27



NOTE CAPACITOR VALUES ARE MMF UNLESS SPECIFIED.

C257-10MF 50V ▲  
 C258-40 300V ▲  
 C406-10 450V ▲

C358-10MF 350V ▲  
 C354-50 150V ▲  
 C297-00 50V ▲

LATE PRODUCTION BROADCAST FILTER

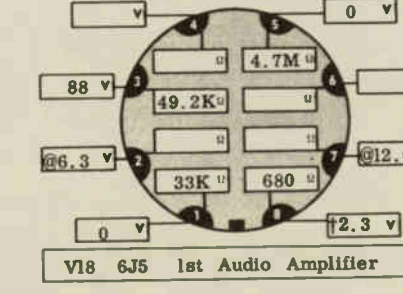
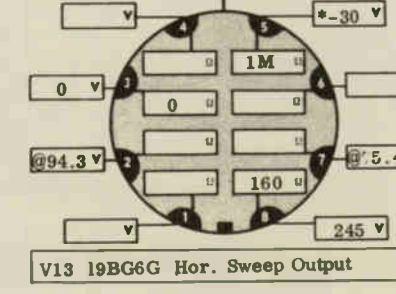
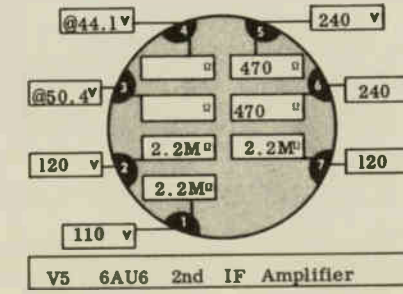
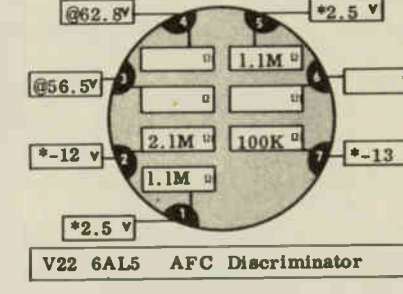
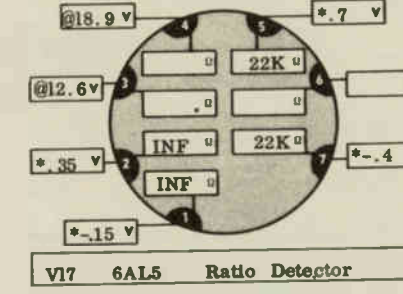
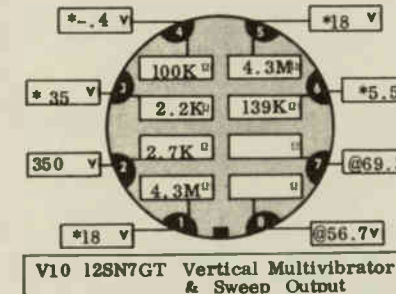
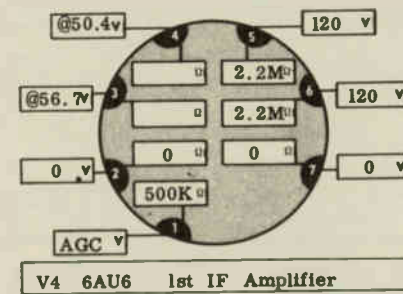
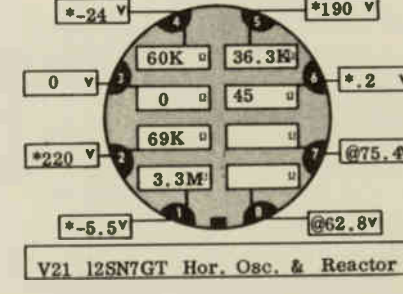
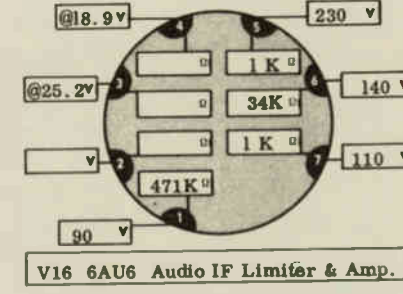
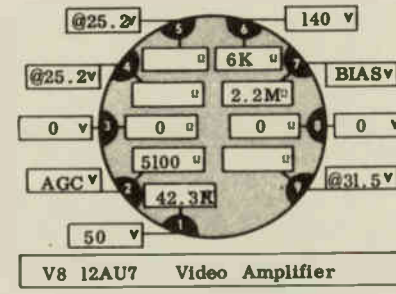
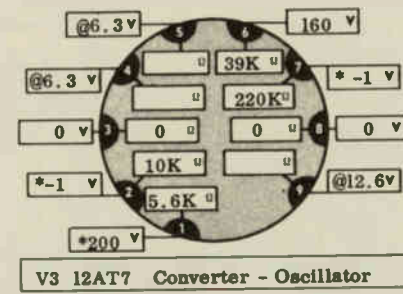
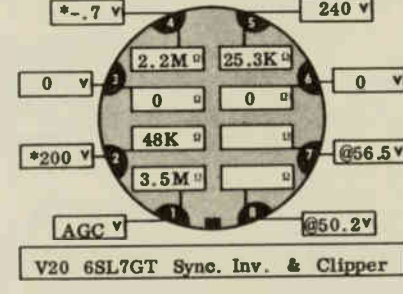
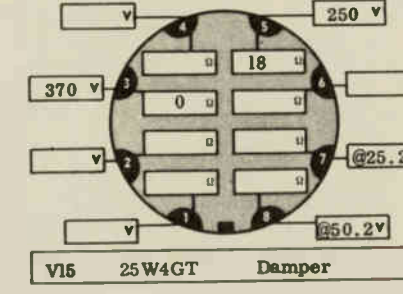
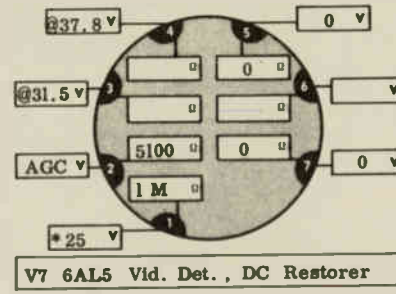
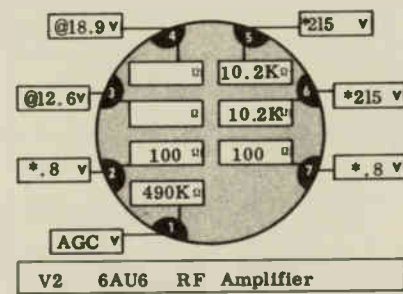
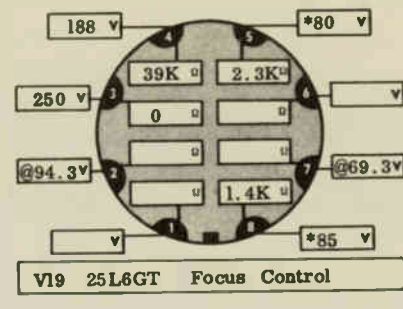
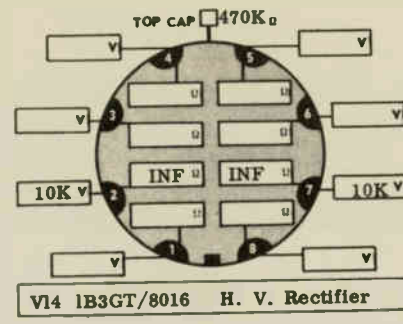
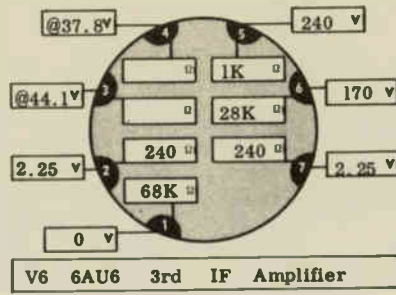
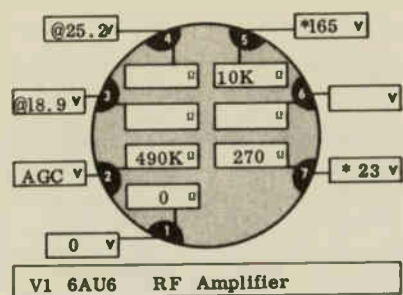
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C257	10 mf., 450V	RCE-100
C258	40 mf., 300V	RCE-100
C297	10 mf., 350V	RCE-089
C299	30 mf., 450V	RCE-092
C346	1 mf., 50V	RCE-090
C364	50 mf., 100V	RCE-089
C365	100 mf., 50V	RCE-089
C371,	2, 3, 4	
	150 mf., 150V	RCE-091
C383,4	60 mf., 350V	RCE-094
C406	10 mf., 150V	RCE-100
SPECIAL		
C227	3.3 mmf., silver mica	RCN-028
C224	3.3 mmf., silver mica	RCN-028
C327	500 mmf., 20K V HV	RCN-023
C331,	361, 397	
	.047 mf., 600V	RCN-014
C396	.01 mf., 600V	RCN-018
TRIMMERS		
C5	Cap., 2-20 mmfd.	RCY-034
C213	1.25-1.95 mf. head-end unit.	RCY-053

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume	500K	404 RRC-113
Brightness	500K	R263A RRC-110
Contrast	2 meg	R227B RRC-110
Hor. Hold	100K	R329 RRC-103
Vert. Hold	100K	R307 RRC-103
Vert. Size	3 meg	R302 RRC-096
Vert. Lin.	2K, 2W	R300 RRC-095
Focus	100K	R369 RRC-113
Horis. drive	25K, 1/2W	R402 RRC-108
WIREWOUND & SPECIAL		
Globar, 75 ohms	R373	RRW-041
	R374	
4 ohms, 1/2W	R371	RRW-044

COILS		
REF. NO.	DESCRIPTION	PART NO.
L201	Input	RLF-023
L202,5	RF & oscillator	RLI-032
L204	Choke-RF, 21 uh.	RLF-024
L242,3	1st, 2d, 3d, vid. IF conv.	RLP-014
L314	Horis. size	RLD-018
L316	Horis. oscillator	RLC-091
L341	Audio IF	RLI-069
L344	Focus	RLF-017
L371,	2, 3, 4	
	Heater choke, 2 uh.	RLI-085
L203,7	RF Input	RLI-083
L256	Vid. comp. (165 uh)	RLI-038
L376	Reactor-filter	RTL-096

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. output	T291	RTO-064
Ratio detector	T341	RTD-008
Interstage	T345	RTM-005
Horis. output	T312	RTO-076
Yoke		RLD-015

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
X371,2	Head End complete	RJX-027
	Selenium Rect., 250 ma	RER-004
B371	Thermal cutout	RSR-001
	Switch-push button	RSX-018
	Speaker-12" same as	UOP-1247
	Distributor speaker	S1200D-7



TEST CONDITIONS

Voltagages Measured:

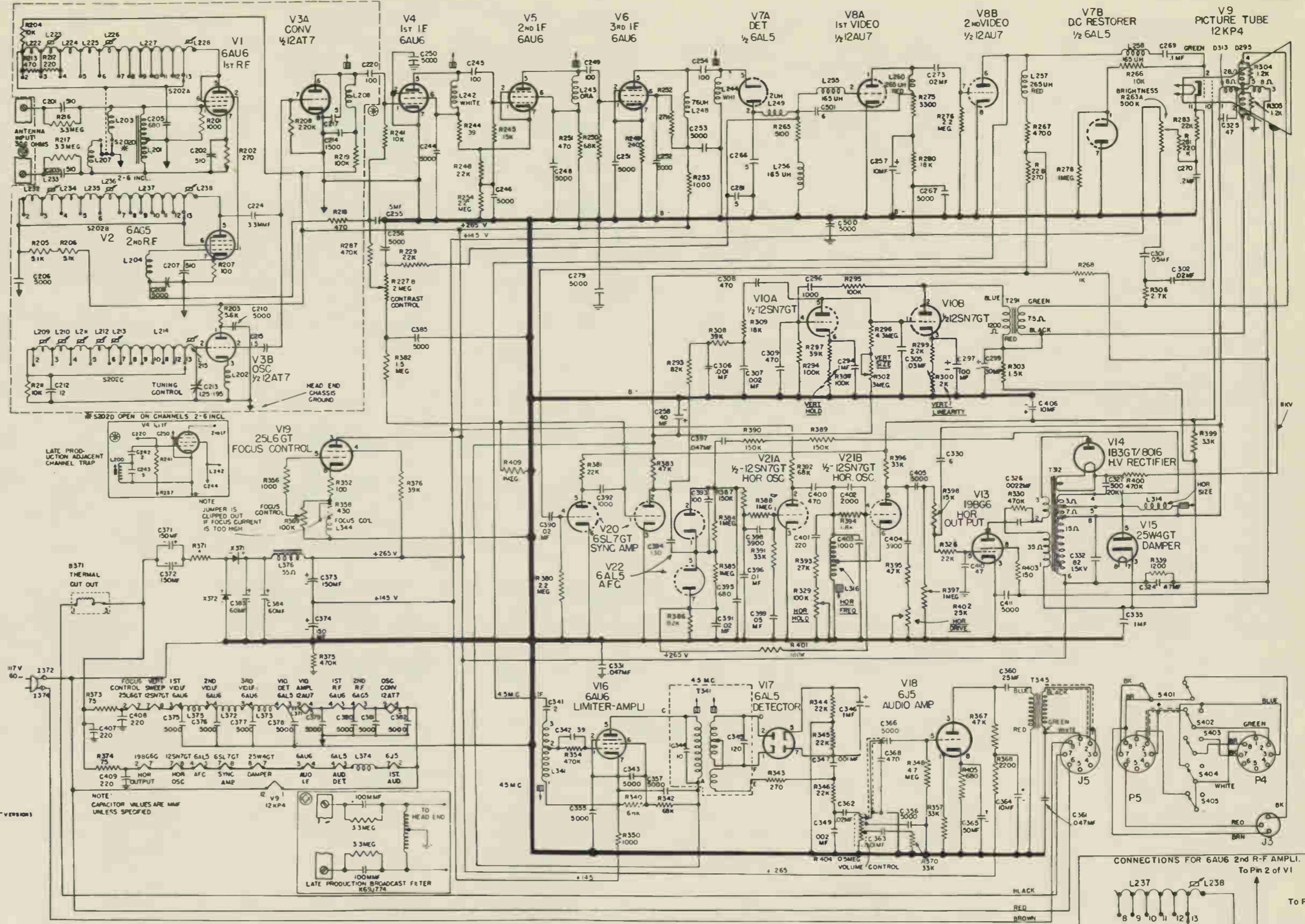
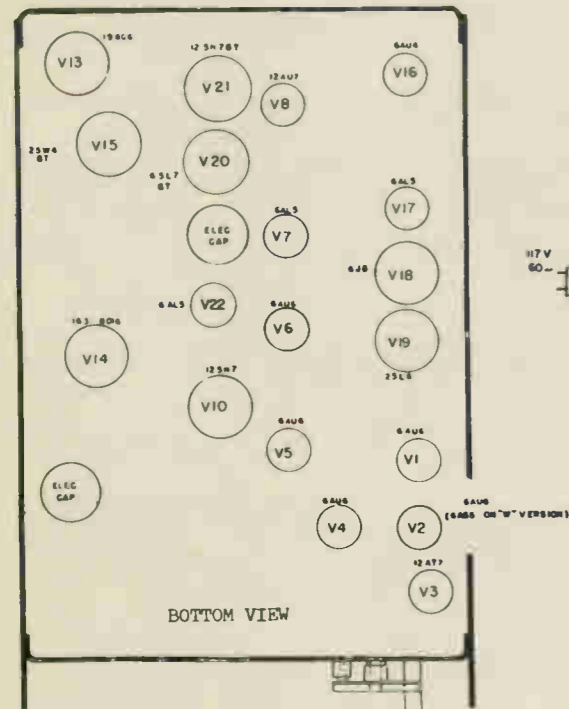
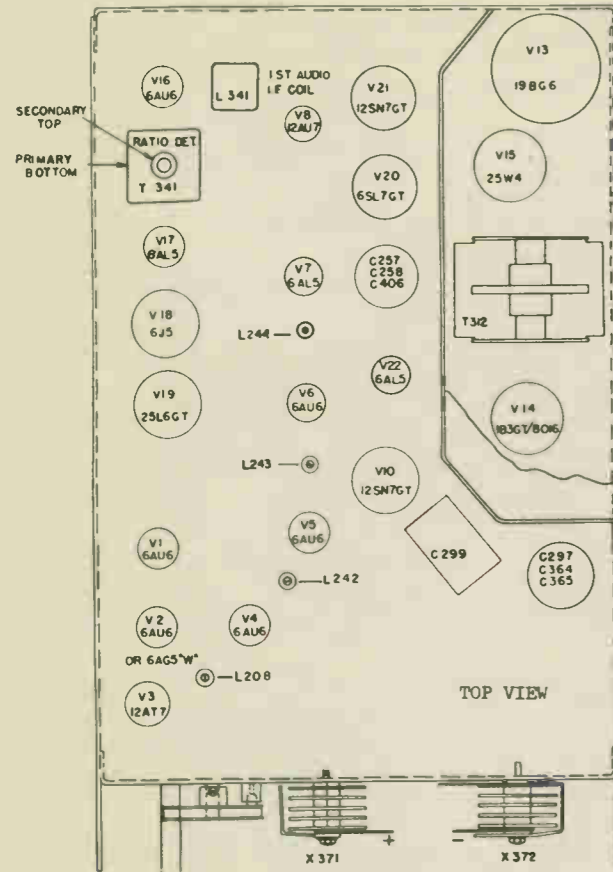
@ AC voltage reading.  
 All voltages DC unless otherwise noted.  
 † 2.5 volt range  
 \* Voltage will vary more than 20%.  
 Input 117V, 60.  
 All controls set for normal sweeps,  
 Focus and Brightness.  
 Measurements are in respect to B- with  
 a 20,000 ohm/volt meter.

Resistance Measured:

Short Capacitors C373 and C374  
 Short Pin 3, V15 to B-  
 Focus shunt R359 shorted.  
 Focus Control - Full CW  
 Contrast - Full CW  
 Brightness - Full CW  
 V. Hold - Full CW  
 V. Size - Full CW  
 V. Linearity - Full CW

NOTE: K = 1,000  
 M = 1,000,000  
 INF = Infinite Resistance

FOR RADIO USED WITH THESE CHASSIS, SEE PAGES 101, 102, 103.



**PRODUCTION CHANGES MODEL 818**

1. FLUTTER ON STRONG TELEVISION SIGNALS: Intermittent flutter of picture brilliance of a few cycles duration, similar to airplane flutter, at very strong signal strength which requires the contrast control set near minimum was corrected during production by changing C255

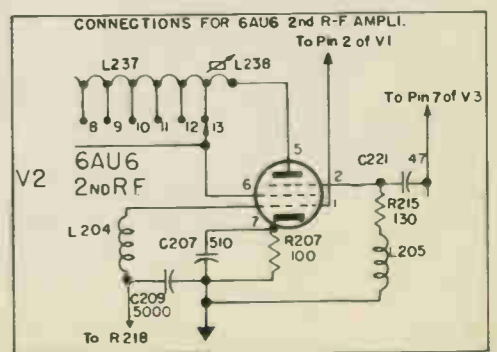
from a .05 mfd. to a .5 mfd., 200 volt paper capacitor and changing R280 from a 39K resistor to an 18,000 ohm, 1/2 watt resistor.

2. INCREASED RF GAIN: Early Model 818's were made with 6AUG second RF amplifier. During production, the second RF amplifier was changed to a 6AG5 to give increased RF gain. Chassis with this tube (6AG5) are marked

ed "W" on the front apron of the television chassis. Electrical connections for V2, 6AG5, second RF, are shown in schematic diagram.

If the head-end is rewired for a 6AUG second RF amplifier, it is necessary to realign the RF head-end circuits. The following inset shows the connections for a 6AUG second RF amplifier.

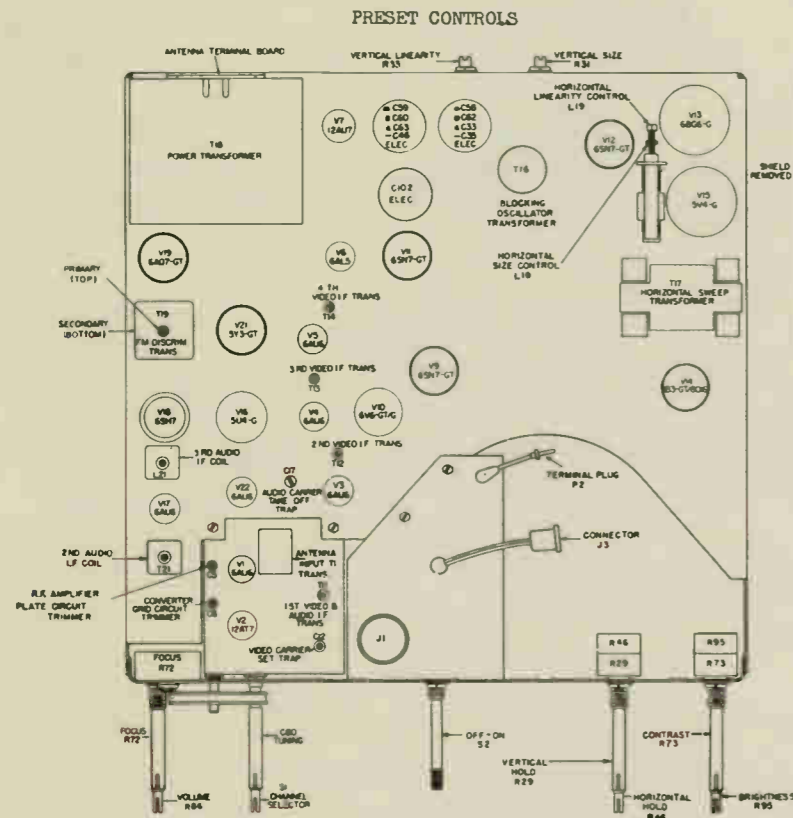
3. REGENERATION: Over-all regeneration on an advanced setting of the contrast control was removed by connecting a 5000 mfd. capacitor RCW-3014 from pin 4 of V7 to the B-bus of the terminal strip adjacent to the socket.



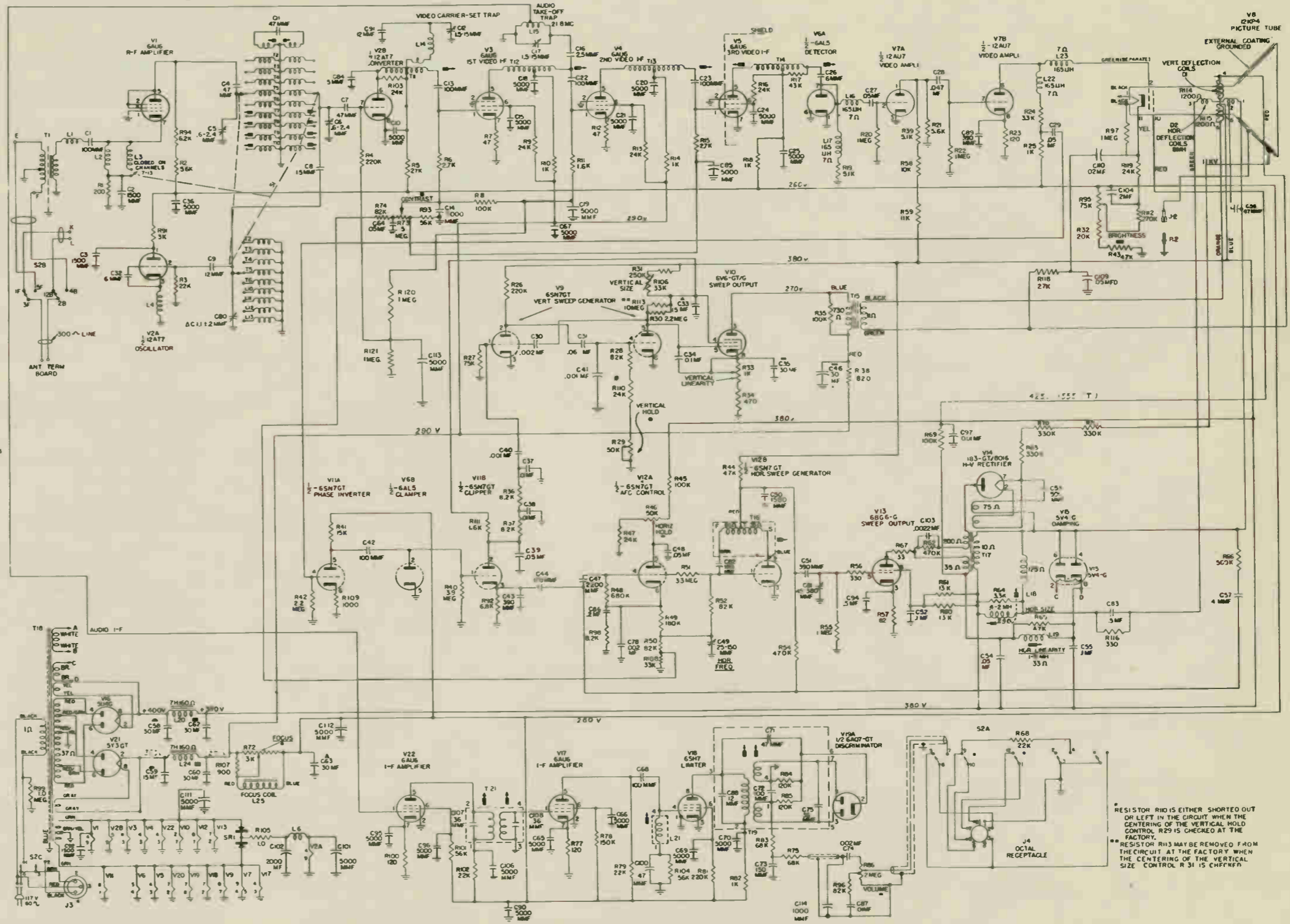
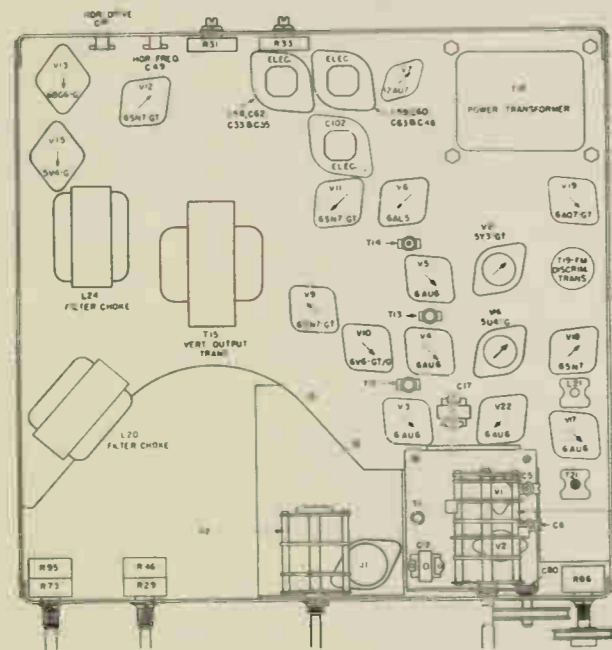


FOR RADIO USED WITH THESE CHASSIS, SEE PAGES 101, 102, 103.

For Production Changes, see Page 108.



TOP VIEW



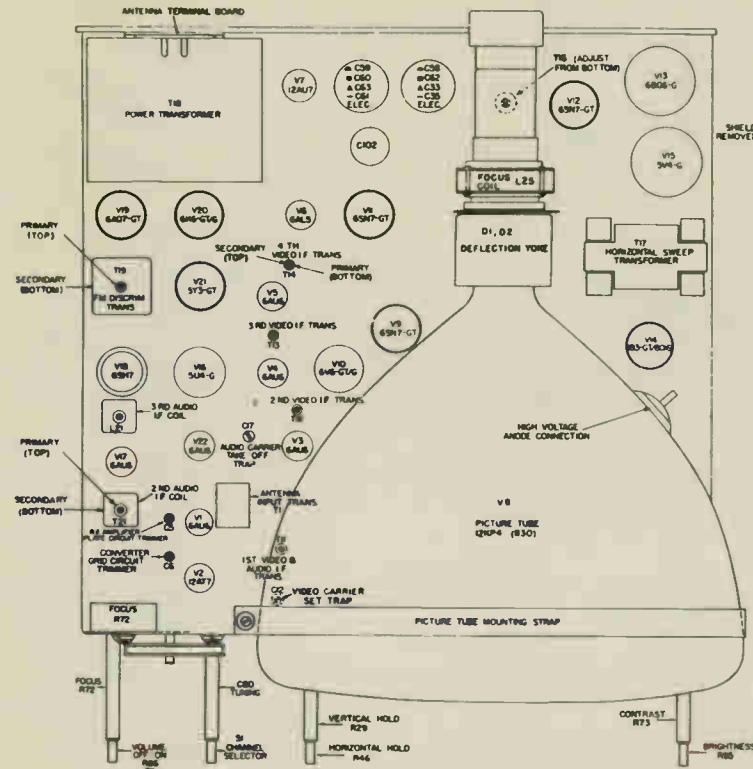
\* RESISTOR R10 IS EITHER SHORTED OUT OR LEFT IN THE CIRCUIT WHEN THE CENTERING OF THE VERTICAL HOLD CONTROL R29 IS CHECKED AT THE FACTORY.

\*\* RESISTOR R13 MAY BE REMOVED FROM THE CIRCUIT AT THE FACTORY WHEN THE CENTERING OF THE VERTICAL SIZE CONTROL R34 IS CHECKED.

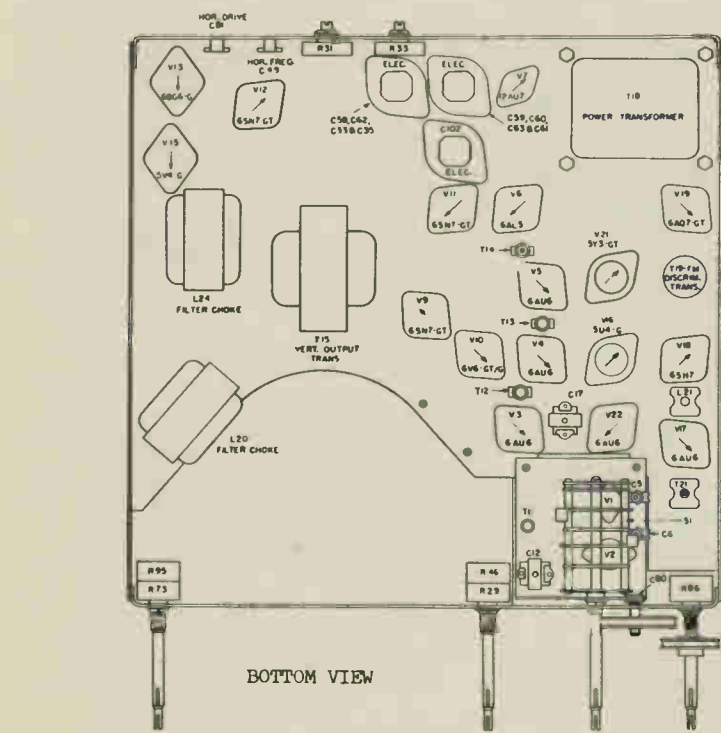




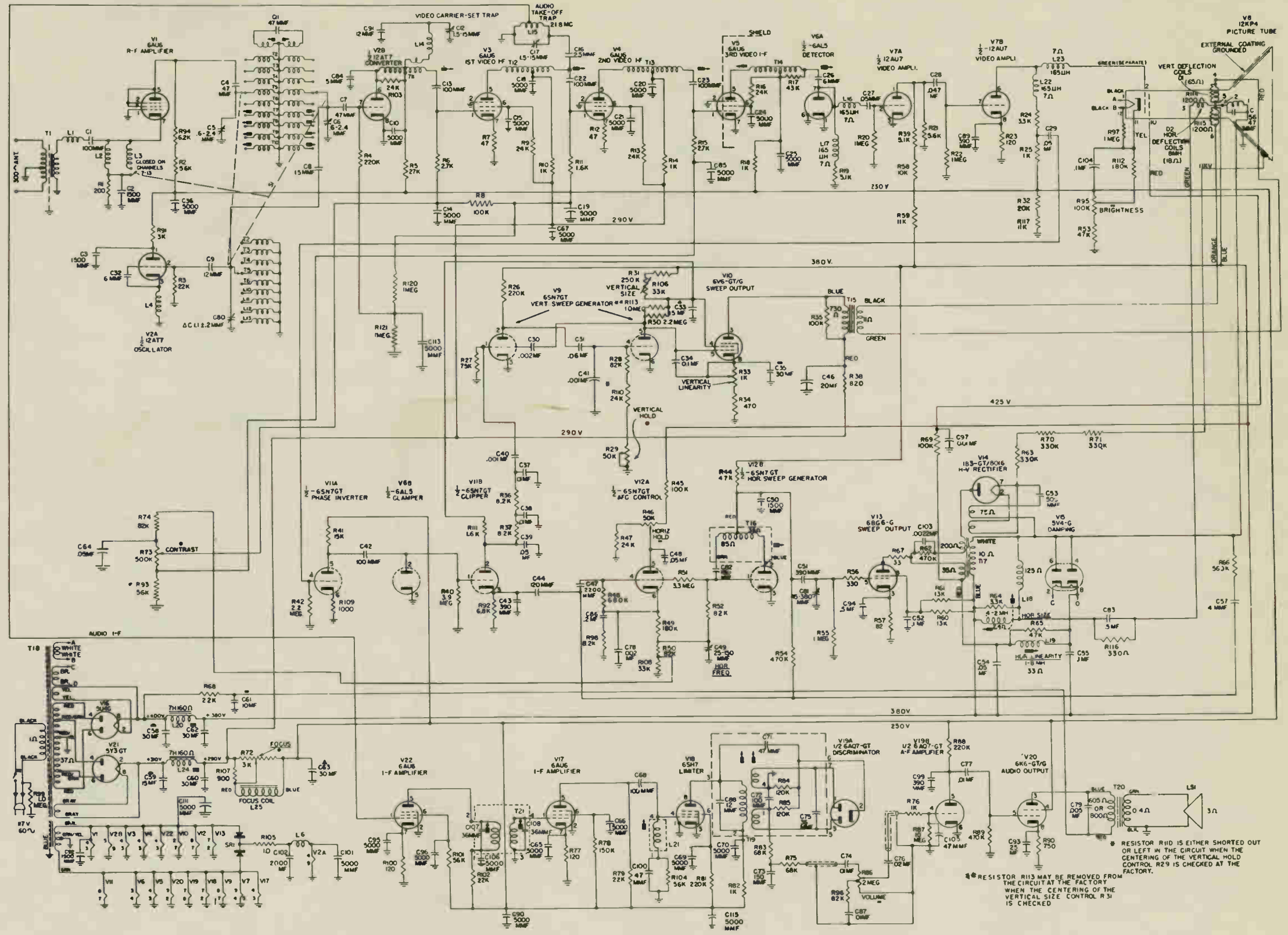
For Production Changes, see Page 108.



TOP VIEW



BOTTOM VIEW



\* RESISTOR R115 IS EITHER SHORTED OUT OR LEFT IN THE CIRCUIT WHEN THE CENTERING OF THE VERTICAL HOLD CONTROL R29 IS CHECKED AT THE FACTORY.

\*\* RESISTOR R113 MAY BE REMOVED FROM THE CIRCUIT AT THE FACTORY WHEN THE CENTERING OF THE VERTICAL SIZE CONTROL R31 IS CHECKED.

# 835 (EARLY and R)

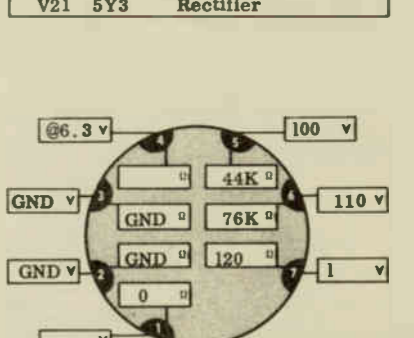
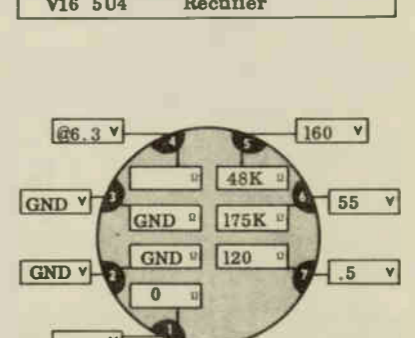
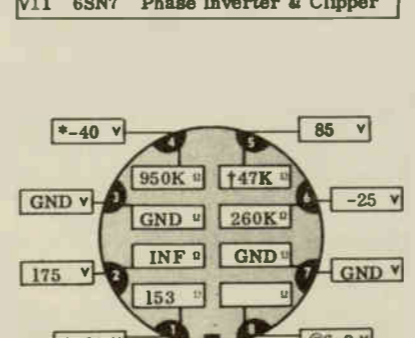
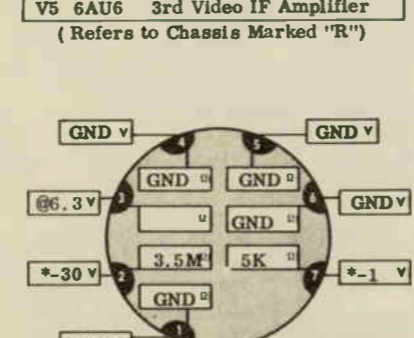
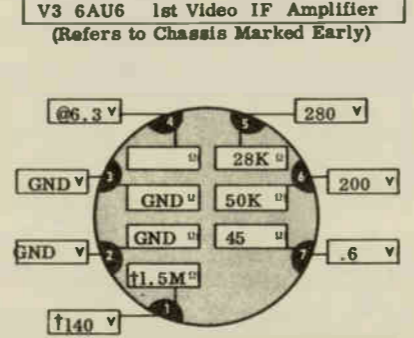
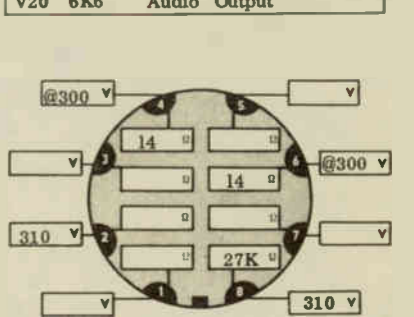
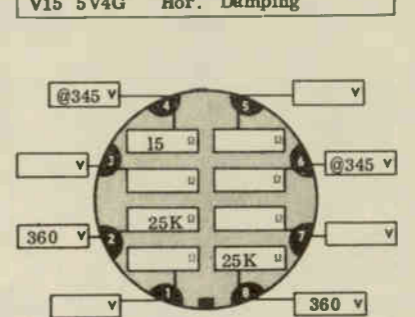
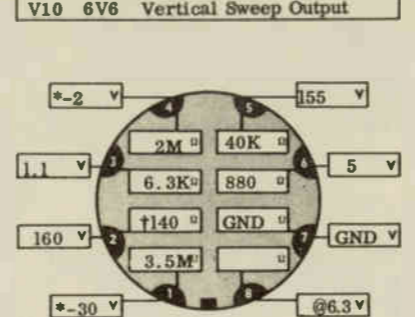
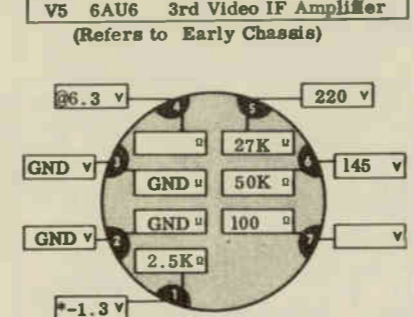
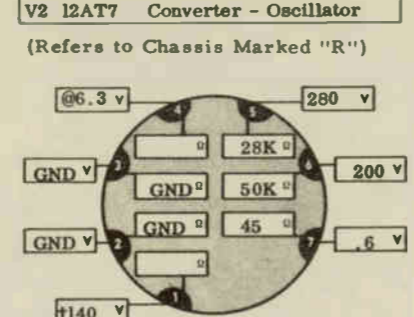
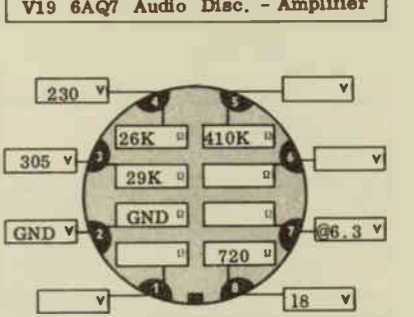
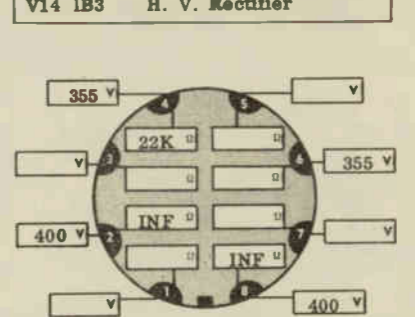
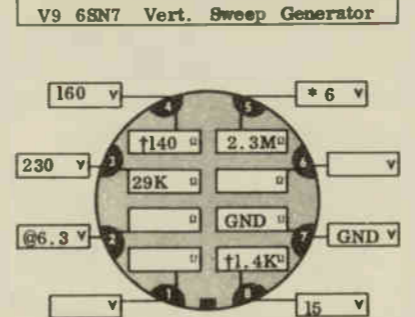
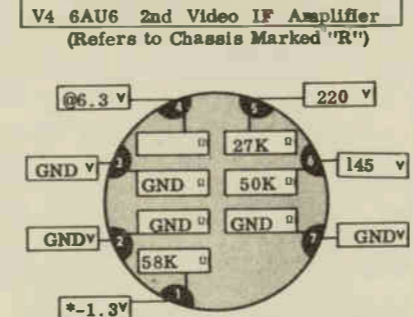
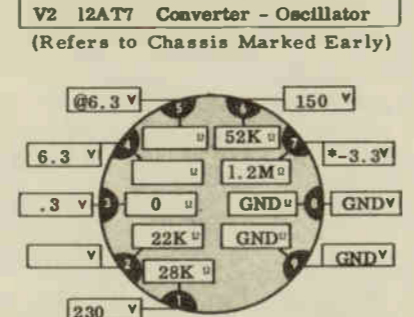
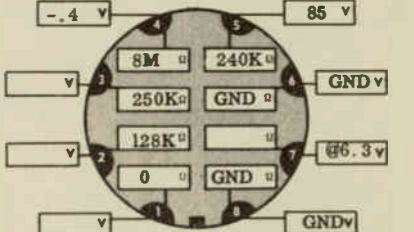
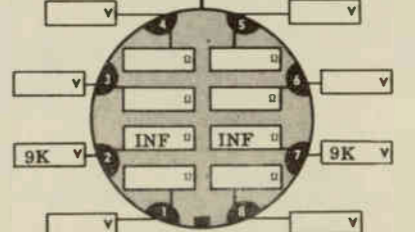
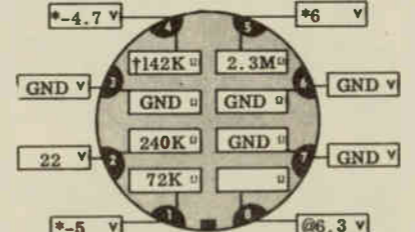
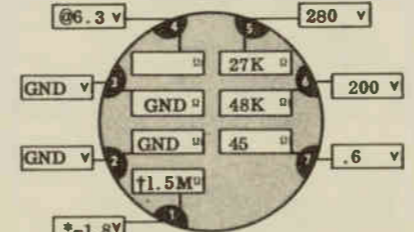
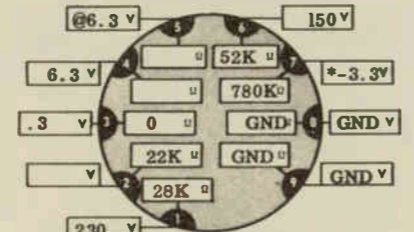
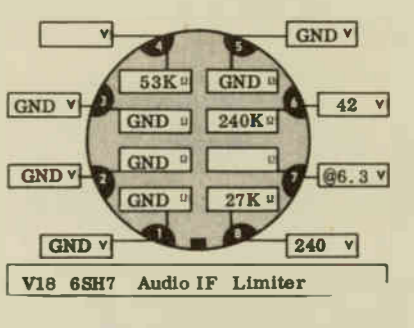
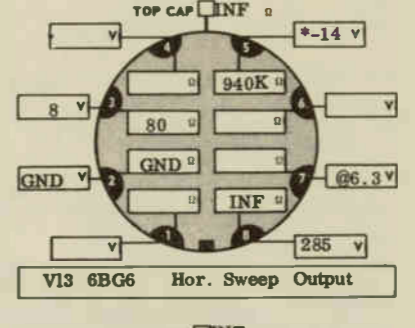
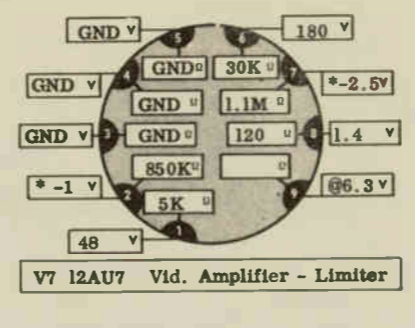
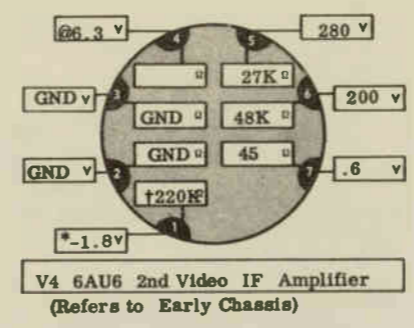
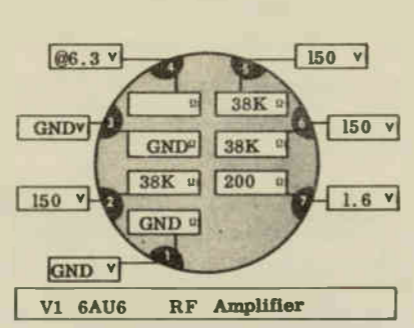
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C59	15 mfd., 450V	RCE-071
C60	30 mfd., 450V	RCE-071
C61	10 mfd., 450V	RCE-071
C63	30 mfd., 450V	RCE-071
C102	2K mfd.	RCE-083
C33,35	30, 30, 15 mfd.,	RCE-085
58, 62	450V, 100 mfd., 50V	
C93	25 mfd., 25V	RCE-086
C46	20 mfd., 450V	RCE-093
TRIMMERS		
C49, 81	25-150 mmf., mica	RCY-045
C80	1.25 mmf., variable tuning condenser	RCY-046
C12, 17	1.5-15 mmf., mica	RCY-047
C5, 6	0.4-2.4 mmf.,	RCY-048

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume (on-off) 2 meg.	R86	RCC-091
Contrast 500K	R73	RCC-101
Brightness 100K	R95	RCC-101
Contrast 2 meg	R73	RCC-105
Brightness 100K	R95	RCC-105
SPECIAL		
560 ohms, 7 w., w.w.	R70	RRW-028
65 ohm, 4 w., w.w.	R97	RRW-029
1.0 ohm, 1/2 w., w.w.	R105	RRW-034

COILS		
REF. NO.	DESCRIPTION	PART NO.
L1, 3	Choke RF input V2 cath	RLI-006
L2	Choke R-f (V2 cathode)	RLI-003
L4	Choke V2A osc. cath.	RLI-019
L6, 14	Choke Vid. carrier set trap	RLI-005
L15	Choke Audio take-off trap	RLI-061
L16, 17, 22, 23	Choke Video, 165 henry	RLI-038
L18	Horizontal sine	RLD-004
L19	Horizontal linearity	RLD-005
L20	Choke 7 henry HV fil.	RLI-059
L24	Choke 7 henry, LV fil.	RLI-060
L25	Focus	RLF-013

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Osc.	T15	RTO-061
Vert. Output	T17	RTO-071
Hor. Output	T18	RTP-062
Power 60 cycles	T20	RTO-052
Audio Output	D1, 2	RLD-006
Yoke		RKT-008
Hor. adapter kit		RTL-081
Video IF 1st	T11	RTL-082
Video IF 2nd	T12	RTL-082
Video IF 3rd	T13	RTL-083
Video IF 4th	T14	RTL-089
Audio IF, 1st & 2nd	L5,21	RTL-085
Audio IF 1st	T21	RTL-090
Antenna input	T1	RLA-031
Audio Disc.	T19	RTD-007
Hor. blocking osc.	T16	RTM-003

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
SR1	Centering Assy.	RAX-024
	Selenium rectifier	RER-003
	Loudspeaker 5 1/4" PM	UOP-577



**TEST CONDITIONS**

DC Measurements taken on a 20,000 ohm per volt meter.

Selector switch set at Channel No. 4

Normal Synced Picture, Normal Brilliance and Contrast.

Line voltage - 117V.

Values listed may have a tolerance of ± 20%

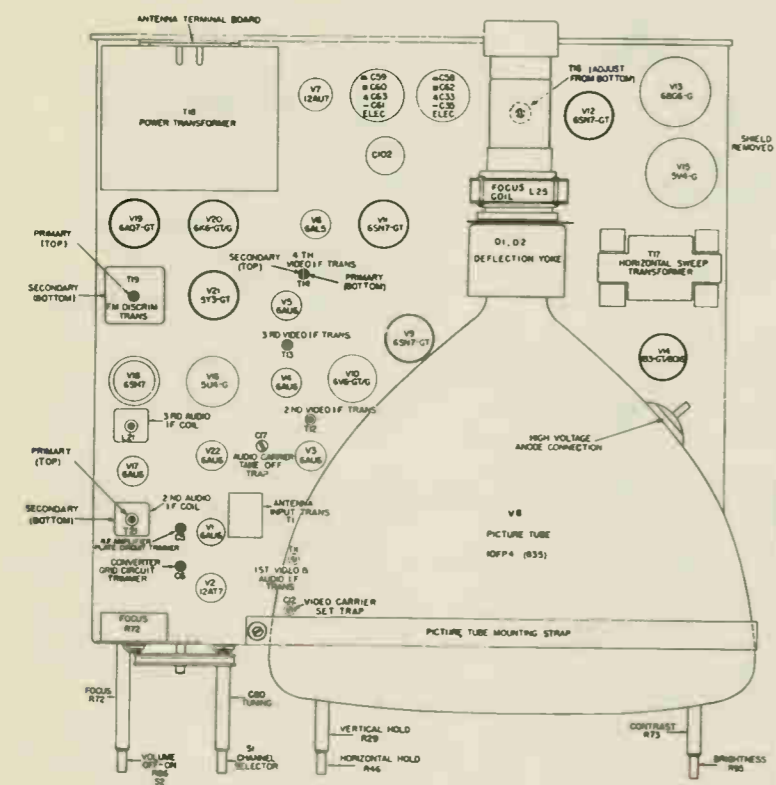
\* Measure with a VTVM through 1/2 megohm resistor.

† Resistance value varies with control settings.

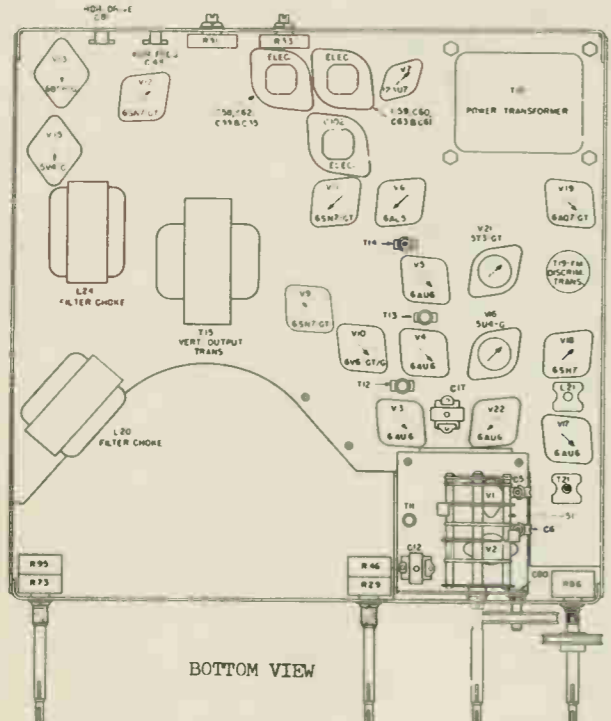
Value given is with control set giving maximum reading.

@ AC voltage Reading.

# 835 (EARLY and R)

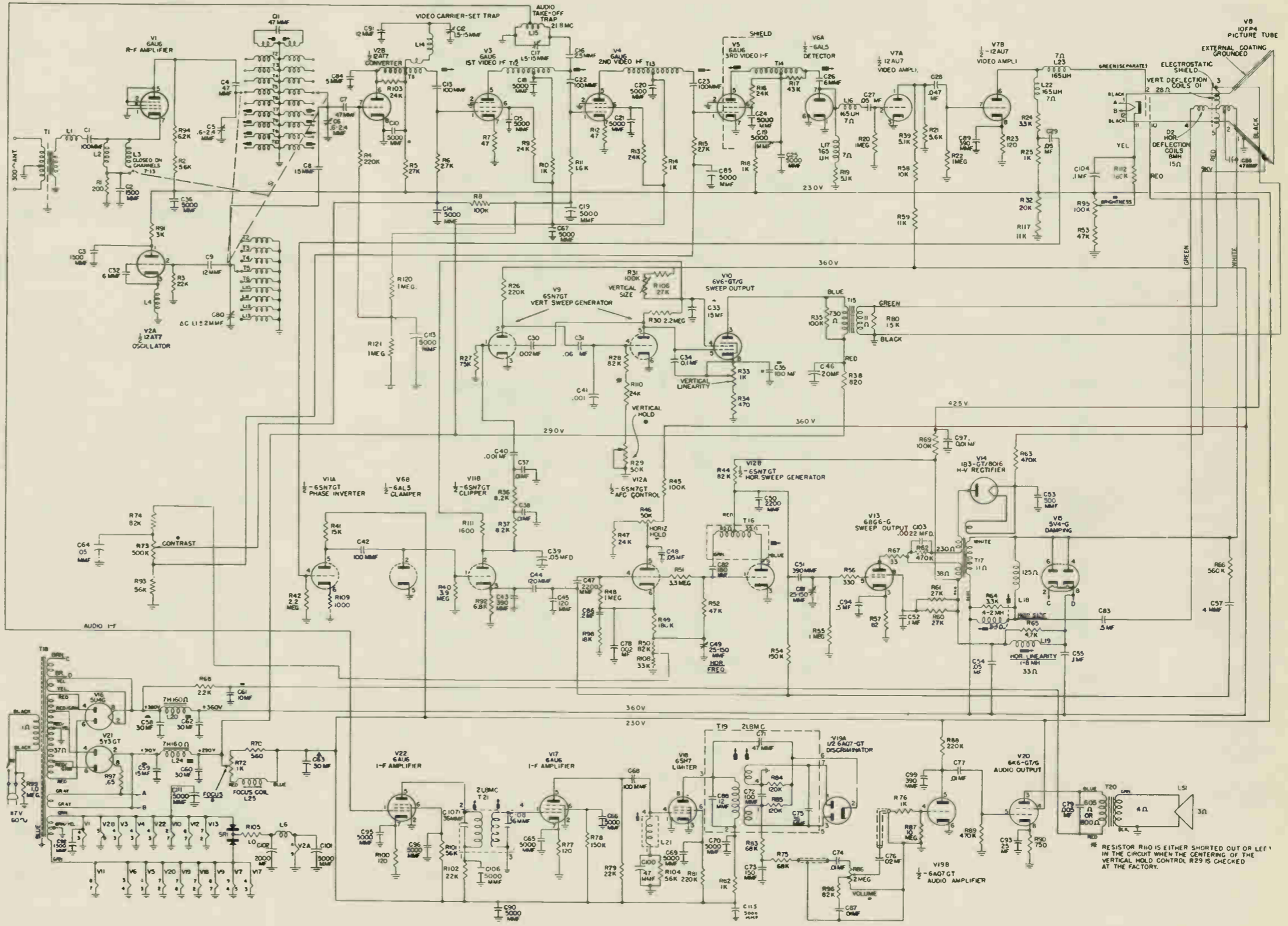


TOP VIEW



BOTTOM VIEW

For Production Changes, see Pages 108 and 109.



RESISTOR R10 IS EITHER SHORTED OUT OR LEFT IN THE CIRCUIT WHEN THE CENTERING OF THE VERTICAL HOLD CONTROL R29 IS CHECKED AT THE FACTORY.

ELECTROLYTIC CONDENSERS

REF. NO.	DESCRIPTION	PART NO.
C33, 35	30, 30, 30, 15 mf.	RCE-070
58, 62	2K mf.	RCE-083
C102	2K mf.	RCE-083
O46, 59	30, 30, 15, 30 mf	RCE-084
60, 63		
TRIMMERS		
C49	25-150 mmf., mica	RCY-045
C80	1.1 mmf.	RCY-046
C12, 17	1.5-15 mmf., mica	RCY-047
C5, 6	0.6-2.4 mmf	RCY-048
C81	45-380 mmf., mica	RCY-054

CONTROLS

DESCRIPTION	REF. NO.	PART NO.
Volume 2 meg	R86q	RRC-085
Brightness 7500 ohms	R95	RRC-089
Contrast 500K	R73	RRC-089
Hor. Hold 50K	R46	RRC-090
Hor. Size		
Vert. Hold 50K	R29	RRC-090
Vert. Size 250K	R31	RRC-084
Vert. Lin. 1K 2w., w.w.	R33	RRC-086
Focus 3K, 25 w.	R72	RRW-033
SPECIAL		
1.0 ohms, 1/2 w., w.w.	R105	RRW-034
900 ohms, 7 w., w.w.	R107	RRW-035

COILS

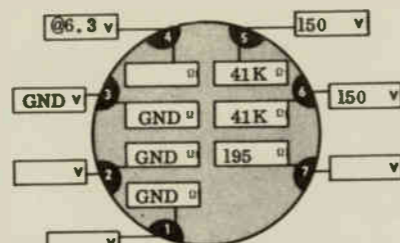
REF. NO.	DESCRIPTION	PART NO.
L1, 3	Choke RF input, V2 cath	RLI-006
L2	Choke RF (V2 cathode)	RLI-003
L4	Choke V2A osc cath	RLI-019
L6, 14	Choke V2 fil & Vid. carrier set trap	RLI-005
L15	Choke Television audio take-off trap	RLI-061
L16, 17, 22, 23	Choke Video 165 uh	RLI-038
L18	Coil Hor. size control	RLD-004
L19	Hor. linearity control	RLD-005
L19	Hor. width and Lin used with RTO-076	RLD-014
L18	Choke 7 henry HV, fil.	RLI-059
L20	TV audio (2nd I-F)	RTL-085
L24	Choke 7 henry LV, fil	RLI-060
	Focus coil and PM mag	RLF-021

TRANSFORMERS

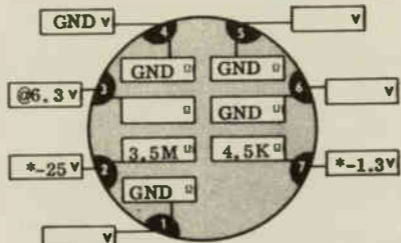
DESCRIPTION	REF. NO.	PART NO.
Vert. Osc.	T15	RTO-053
Vert. Output		
Hor. Output		
Power	T18	RTP-066
Audio Output		
Yoke		
Hor. Output	T17	RLD-010
Kit for old stylus transformer.	T17	RKT-009
Coils-pri & sec windings.	T17	RLT-004
Audio Disc.	T19	RTD-007
Video IF 1st	T11	RTL-081
Video IF 2nd	T12	RTL-082
Video IF 3rd	T13	RTL-083
Video IF 4th	T14	RTL-089
TV audio IF 1st	T21	RTL-090
Hor. sweep B. O.	T16	RTM-003
Antenna input	T1	RLA-031

MISCELLANEOUS

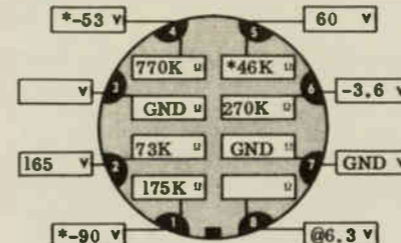
REF. NO.	DESCRIPTION	PART NO.
BR1	Centering ring and support assembly	RAX-025
	Selenium rectifier	RER-003
	Head end unit-R-F	RJX-023



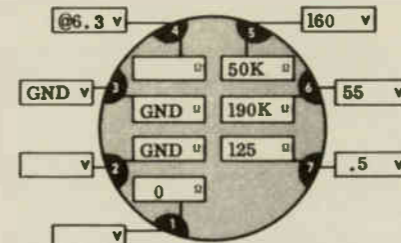
V1 6AU6 RF Amplifier



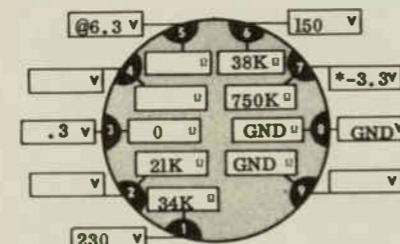
V6 6AU6 Vid. Det. & Clipper Rect.



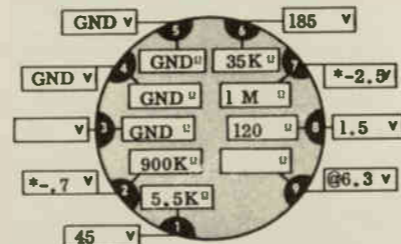
V12 6SN7 Hor. AFC & Sweep Gen.



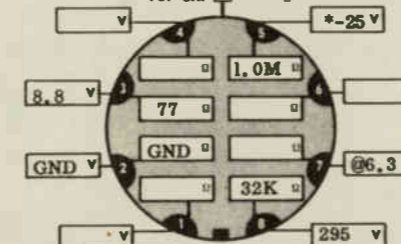
V17 6AU6 Audio IF Amplifier



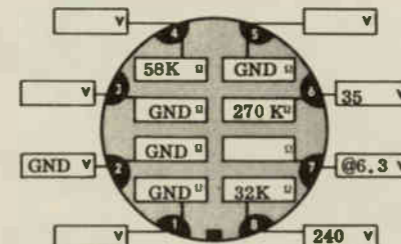
V2 12AT7 Converter - Oscillator



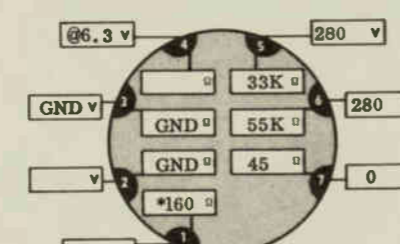
V7 12AU7 Video Limiter & Amp.



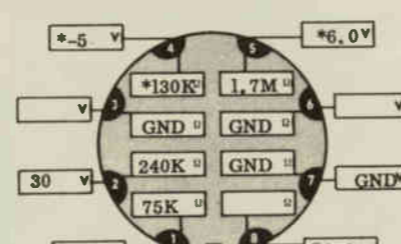
V13 6BG6G Hor. Sweep Output



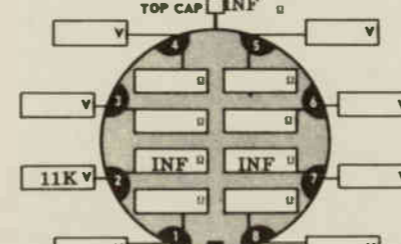
V18 6SH7 Audio FM Limiter



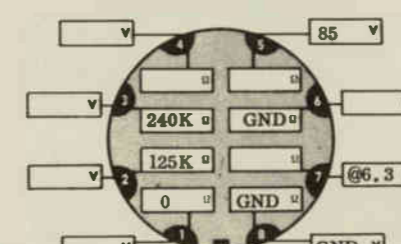
V3 6AU6 1st Video IF Amplifier



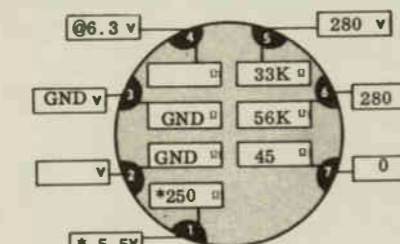
V9 6SN7GT Vert. Sweep Generator



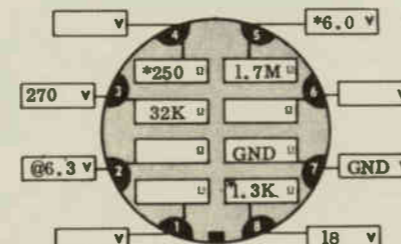
V14 1B3GT/8016 H. V. Rectifier



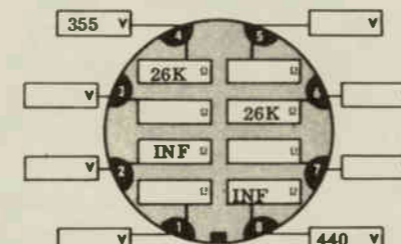
V19 6AQ7GT Audio FM Disc. & Amp.



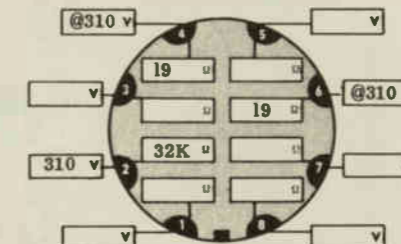
V4 6AU6 2nd Video IF Amplifier



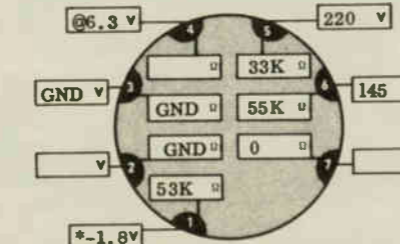
V10 6V6GT/G Vert. Sweep Output



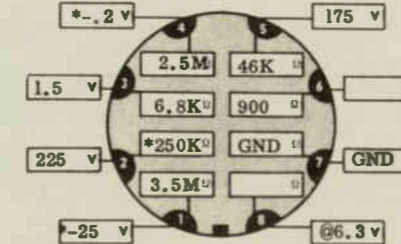
V15 5V4G Horizontal Damping



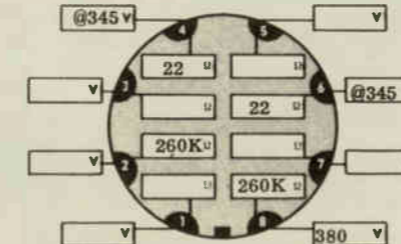
V21 5Y3GT Power Rectifier (L.V.)



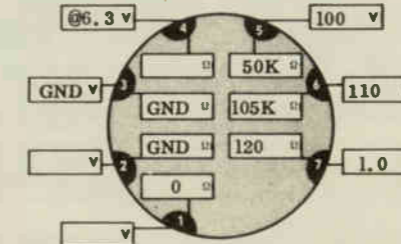
V5 6AU6 3rd Video IF Amplifier



V11 6SN7GT Phase Inverter & Clipper



V16 5U4G Power Rectifier (H.V.)



V22 6AU6 Audio IF Amplifier

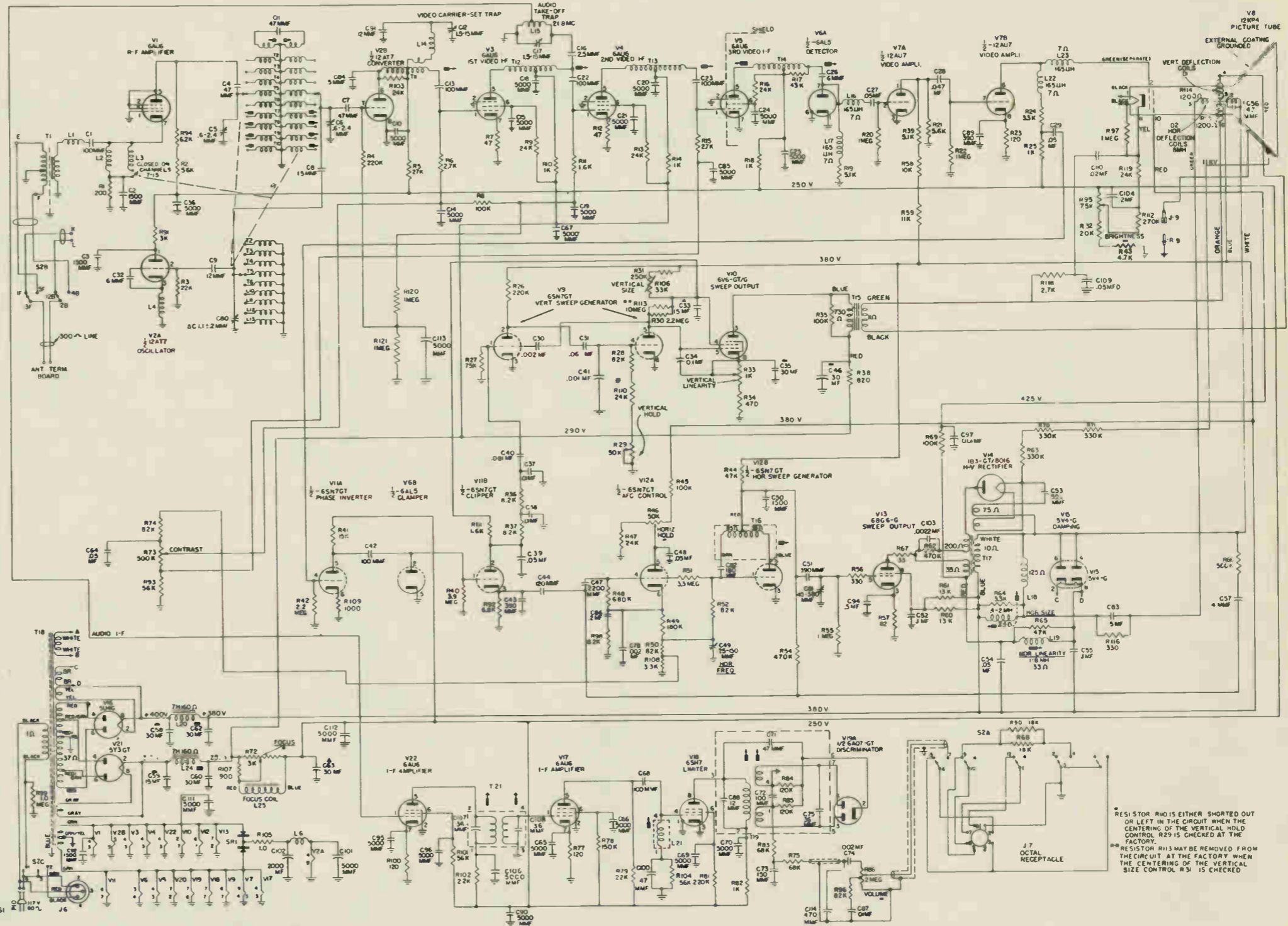
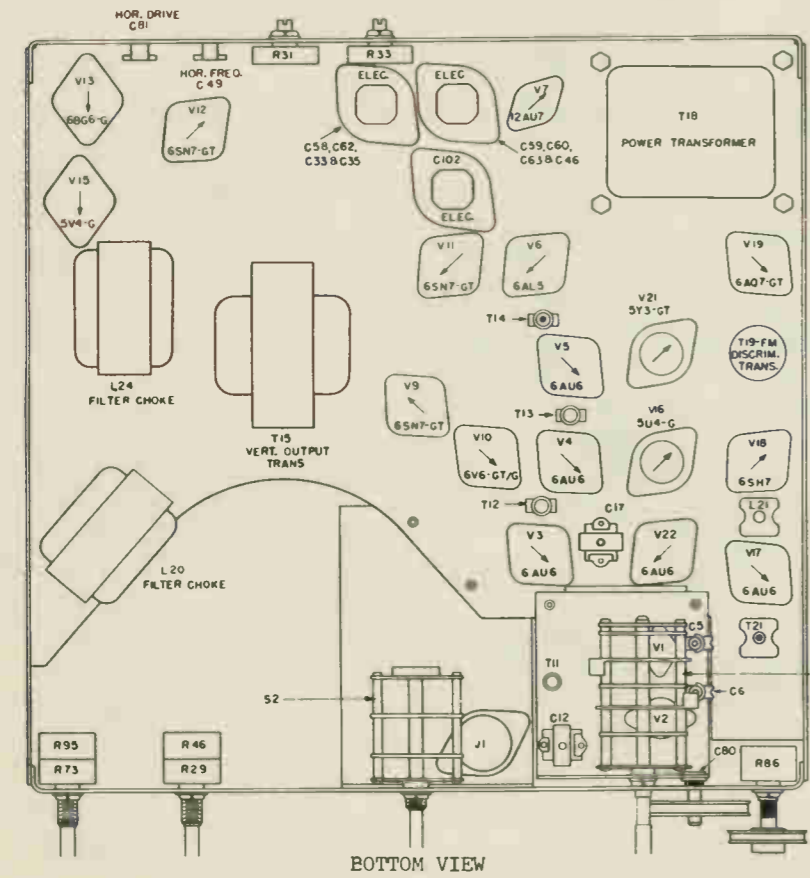
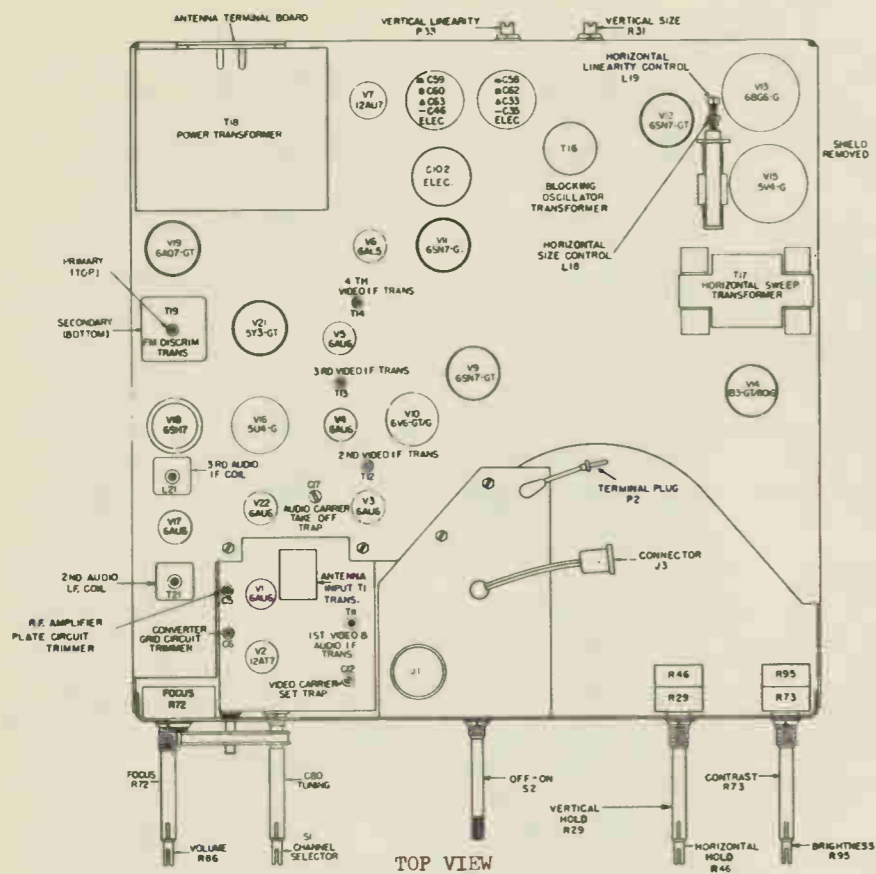
TEST CONDITIONS

DC Measurements taken on a 20,000 ohm per volt meter. Selector switch set at Channel No. 4. Normal Synced Picture, Normal Brilliance and Contrast. Line voltage 117V. Values listed may have a tolerance of +20%.

\* Measure with a VTVM through 1/2 meg ohm resistor.  
@ AC voltages.  
All voltages DC unless otherwise noted.

FOR RADIO USED WITH THESE CHASSIS, SEE PAGES 101, 102, 103.

SEE AUDIO AND RADIO POWER CHASSIS, PAGE 102.



**PRODUCTION CHANGES MODEL 840**

The following changes were made in production to improve audio frequency response, and to insure against excessive bass response causing low frequency rumble when playing the phonograph and radio.

- A. TELEVISION AUDIO RESPONSE:
  - a) C114 at the television volume control was changed

- from 1000 mmfd. to 470 mmfd.
- b) C135 in the radio receiver chassis television audio input circuit was changed from 470 mmfd. to 1000 mmfd. It is recommended that the above changes be made to all receivers which have not been modified. Note that no additional components are necessary since they are interchanged.

- B. RADIO AND PHONOGRAPH RESPONSE:
  - a) R39 was removed from the Radio Bass Control circuit.
  - b) Removal of R39 disconnected C82, C83, and C84 from the remainder of the circuit. These capacitors remain in the chassis and become ineffective. The schematic diagram shows R39 dotted, representing early production.

RESISTOR R103 IS EITHER SHORTED OUT OR LEFT IN THE CIRCUIT WHEN THE CENTERING OF THE VERTICAL HOLD CONTROL R29 IS CHECKED AT THE FACTORY.

RESISTOR R113 MAY BE REMOVED FROM THE CIRCUIT AT THE FACTORY WHEN THE CENTERING OF THE VERTICAL SIZE CONTROL R31 IS CHECKED.

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C91A, B	15 mfd., 350V	RCE-002
C37, 2C2	30 mfd., 250V	RCE-009
C42A, B, C, D; C107A, B, C, D;	172A, B, C, D. 40mfd. 350V, 30mfd., 350V, 10mfd., 350V, 50mfd. 50V	RCE-058
C203	100 mfd., 25V	RCE-060
C204A	30 mfd., 25V	RCE-061
C204B	30 mfd., 100V	RCE-061
C205, 6	.5 ohms @15 kc., 3V	RCE-062
C35	1 ohms @ 60 cy. 3V	RCE-063
C198	200 mfd., 25V	RCE-064
C201A	30 mfd., 450V	RCE-072
C201B	90 mfd., 450V	RCE-072
C76	200-250 mmf.	RCX-016
C148	280-380 mmf.	RCX-016
C149	475-575 mmf.; strip	RCX-016
C71	45-80 mmf.	RCX-022
C72	475-575 mmf.	RCX-022
C73	280-380 mmf.	RCX-022
C78	34-70 mmf.	RCX-022
C81	2-20 mmf.; strip	RCX-022
C63, 80	4-50 mmf. 34-70mmf.	RCX-023
C58, 9	3-30 mmf. 80-130mmf.	RCX-024
C79	3-30 mmf., mica	RCY-011
C160	Air for TV Tuning	RCY-015
C153, 6	3-30 mmf., air	RCY-017

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Hor. Hold 500K	R37	RRC-067
Vert. Hold 1 meg	R49	RRC-068
Vert. Size 2 meg	R50	RRC-069
Vert. Lin. 5K	R45	RRC-070
Hor. Lin. #1 1K ohms w.w.	R212	RRC-072
Hor. Lin. #2&3 -250K ohms	R209, 11	RRC-073
Vert. centering 20 ohms, 4W	R44	RRC-071
Volume, 2 meg.	R117	RRC-064
Brightness, 5K	R12	RRC-065
Contrast, 5K	R83	RRC-065
Focus, 6 meg.	R161	RRC-066
Hor. phase det. bal., 1K	R30	RRC-020
Hor. centering 20 ohms, 4W	R218	RRC-071

SPECIAL		
DESCRIPTION	REF. NO.	PART NO.
1K meg. 26kv. anode Volt. bleeder	R245, 6	RRN-005
500 ohms, 6W w.w.	R159	RRW-021
1500 ohms, 5W w.w.	R204	RRW-022
150 ohms, 6W w.w.	R101, 2D2	RRW-023
6K ohms, 6W w.w.	R85	RRW-024

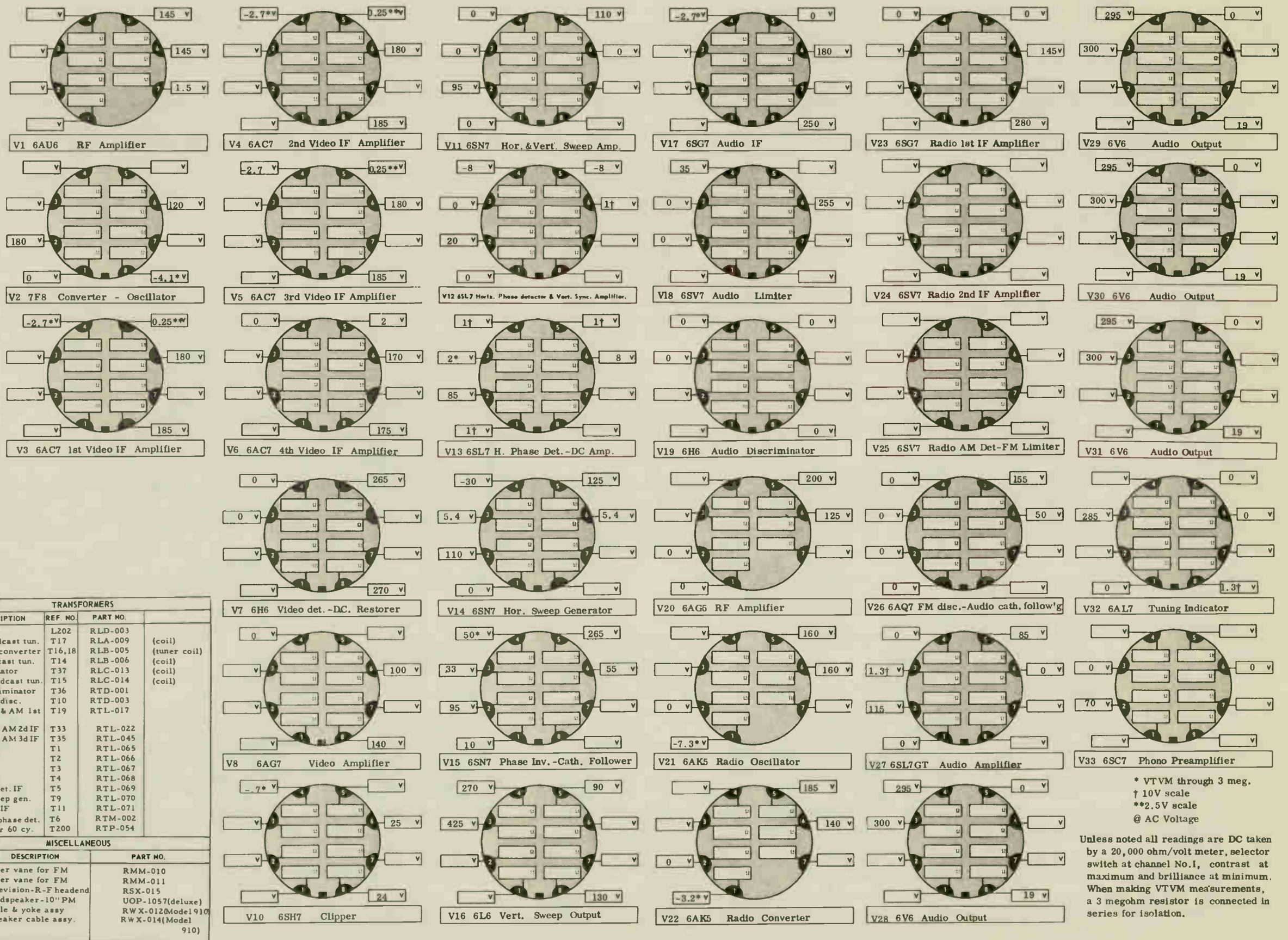
COILS		
REF. NO.	DESCRIPTION	PART NO.
L2	TV Antenna input	RLF-009
L1	TV osc. V2B, cathode	RLI-019
L4	Vid. det. series peaking	RLI-009
L6, P9	Cabinet back and loop	RAB-065 (901 only)
L6, P9	Loop board-Ant. loop and plug assembly	RAB-066 (910 only)
L7	V20 ch. RF pl. SW1&2 band	RLB-008
L8	FM RF plate choke	RLB-010
L9	V20 RF pl. dummy load	RLB-009
L12	V21 Osc. s.w. loading	RLC-015
L13	"Osc" B-Band shunt	RLC-016
L14	Cathode choke (FM)	RLB-007
L15	Vid. amp. series peak'g	RLI-045
L17	Vid det. series peaking	RLI-047
L18	TV RF V1, cathode	RLI-003
L21, 24	Choke FM band, 2 osc.	RLA-011
L22	Vid. amp. shunt peaking	RLI-046
L33	Conv. s.w. input load'g	RLC-017
L35, 6	p, 40, 1, 2, 3, 4, 5, 204	
	Choke filament	RLF-007
L200, 1	Ch. Radio pwr sup. filter	RLF-011
L11	Radio osc. V21 plate	RLP-006
L20	Hor. cath. (hor. freq. control)	RLI-055
L23	FM 1st IF plate peaking	RIP-005
L37	Wave trap, 21.9 mc (TV 4th IF)	RLW-003
L38	Wave trap, 21.9 mc (TV diode detector)	RLW-002
L203	Hor. size	RLM-012

TRANSFORMERS			
DESCRIPTION	REF. NO.	PART NO.	
Yoke	L202	RLD-003	
Ant. broadcast tun.	T17	RLA-009	(coil)
FM RF & converter	T16, 18	RLB-005	(tuner coil)
RF broadcast tun.	T14	RLB-006	(coil)
FM oscillator	T37	RLC-013	(coil)
Osc. broadcast tun.	T15	RLC-014	(coil)
FM discriminator	T36	RTD-001	
TV audio disc.	T10	RTD-003	
Radio FM & AM 1st IF.	T19	RTL-017	
Radio FM, AM 2d IF	T33	RTL-022	
Radio FM, AM 3d IF	T35	RTL-045	
TV IF 1st	T1	RTL-065	
TV IF 2nd	T2	RTL-066	
TV IF 3rd	T3	RTL-067	
TV IF 4th	T4	RTL-068	
TV diode det. IF	T5	RTL-069	
Vert. sweep gen.	T9	RTL-070	
TV Audio IF	T11	RTL-071	
Hor. AFC phase det.	T6	RTM-002	
Rad. power 60 cy.	T200	RTP-054	

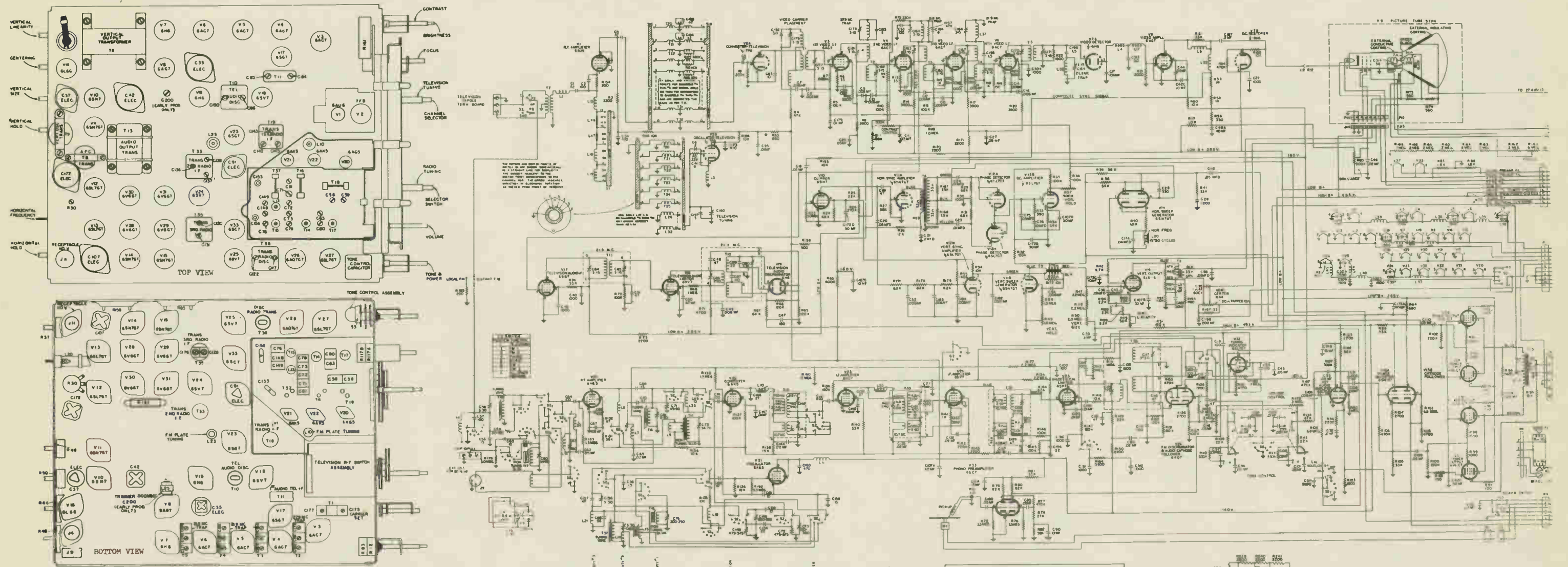
  

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
TI6, 8	Tuner vane for FM	RMM-010
T37	Tuner vane for FM	RMM-011
	Television-R-F headend	RSX-015
	Loudspeaker -10" PM	UOP-1057(deluxe)
	Cable & yoke assy	RWX-012(Model 910)
	Speaker cable assy.	RWX-014(Model 910)



\* VTVM through 3 meg.  
 † 10V scale  
 \*\*2.5V scale  
 @ AC Voltage

Unless noted all readings are DC taken by a 20,000 ohm/volt meter, selector switch at channel No.1, contrast at maximum and brilliance at minimum. When making VTVM measurements, a 3 megohm resistor is connected in series for isolation.



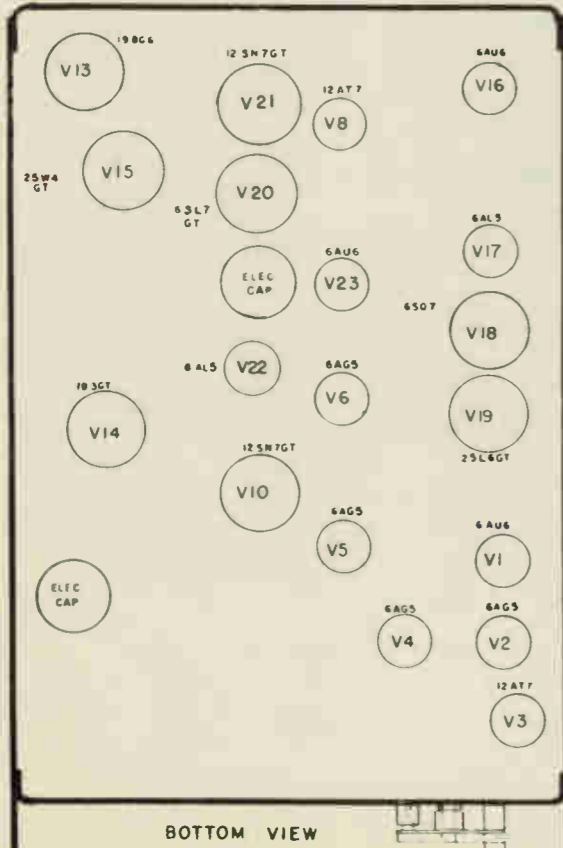
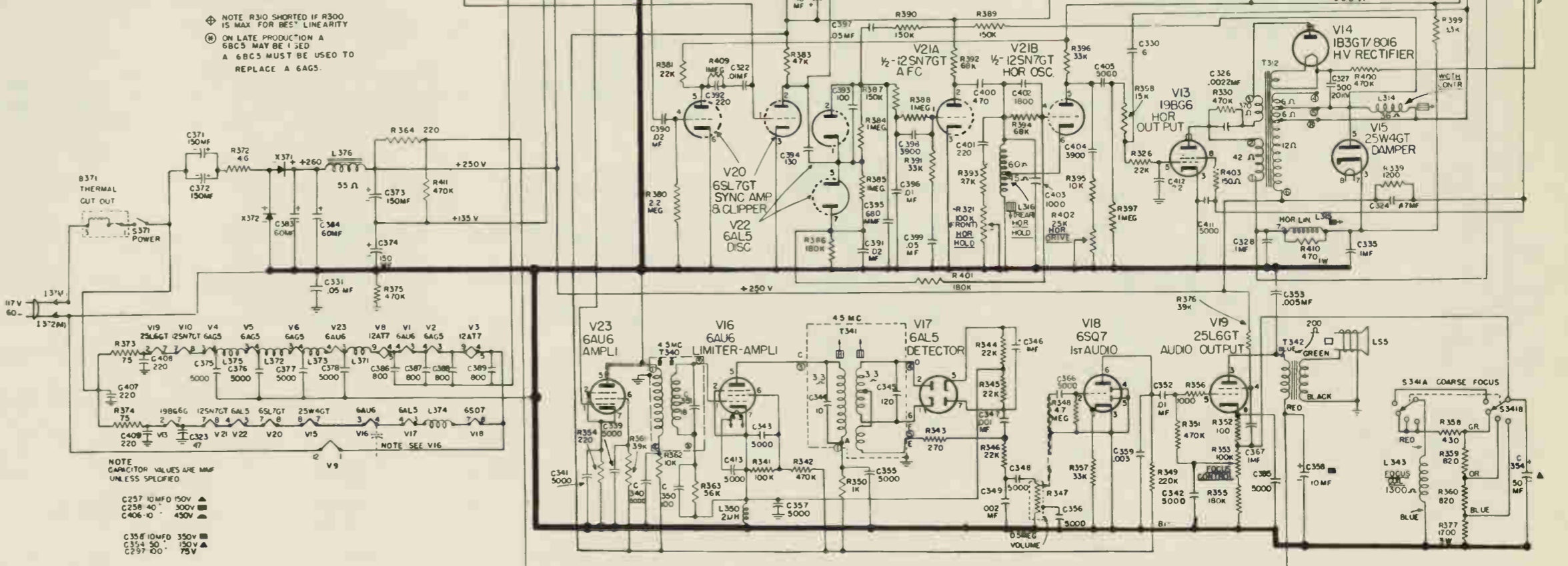
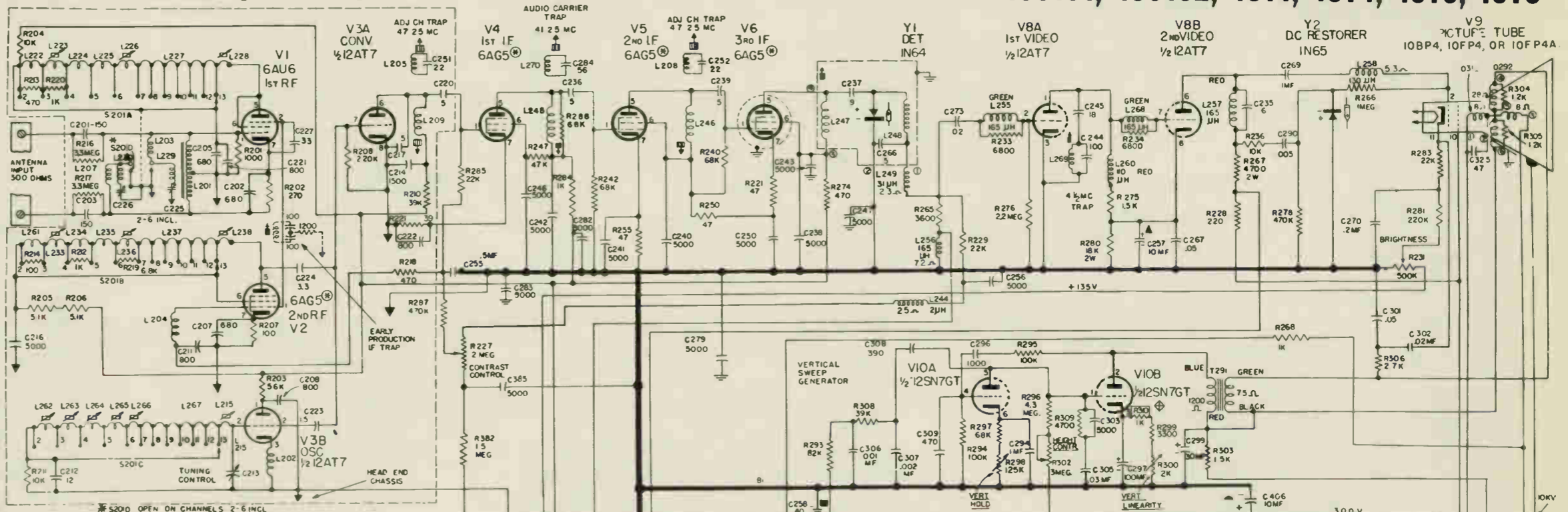
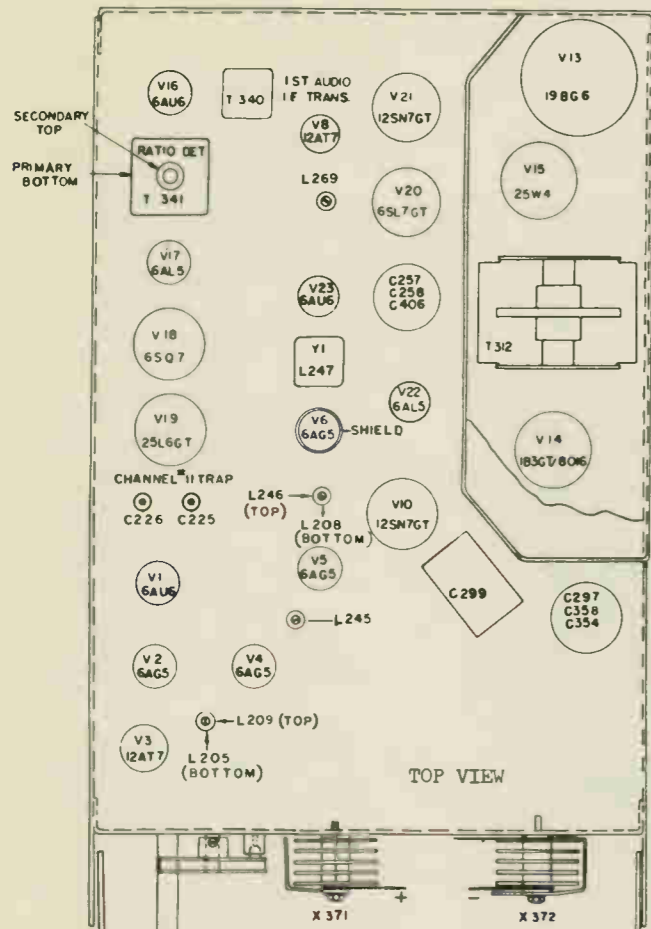
SCHEMATIC OF POWER CHASSIS





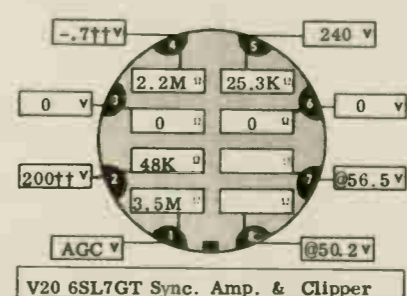
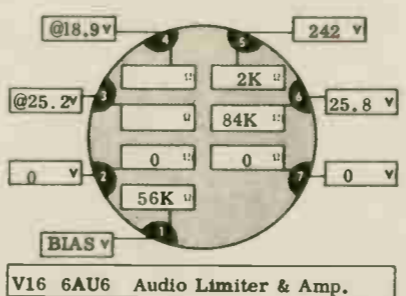
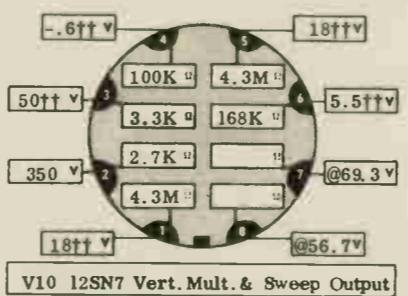
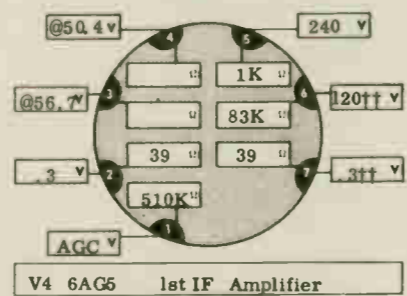
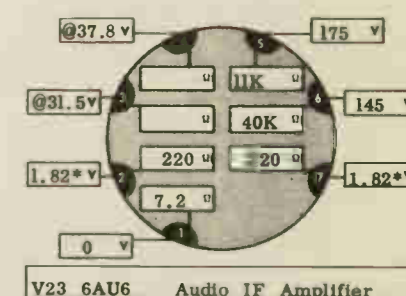
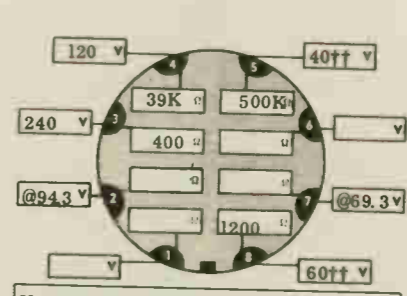
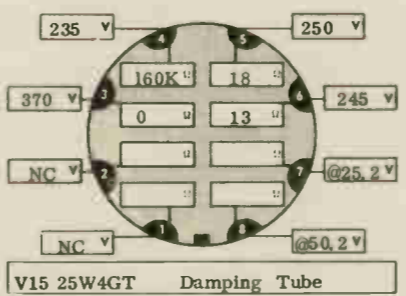
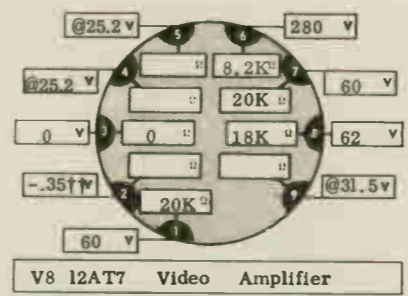
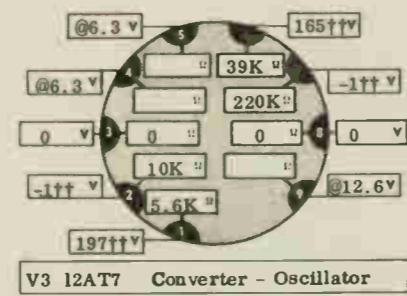
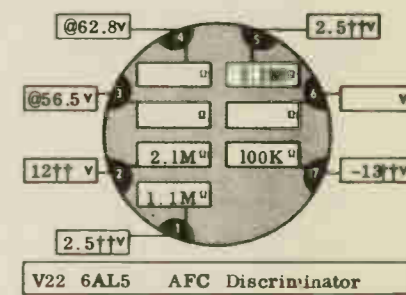
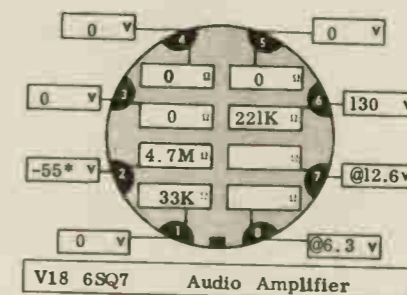
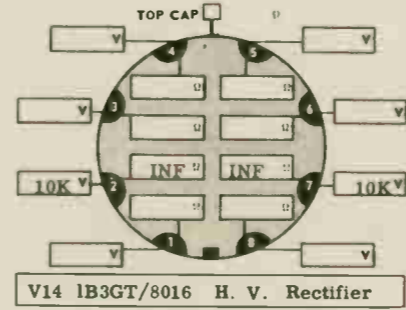
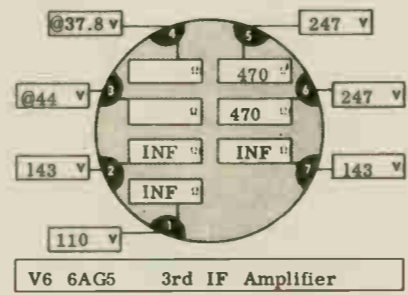
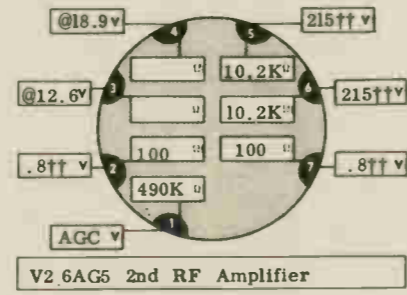
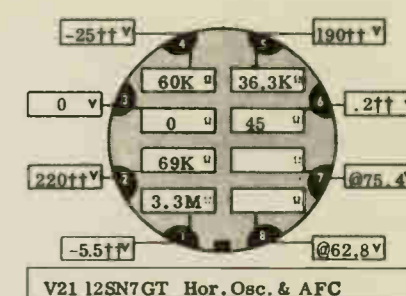
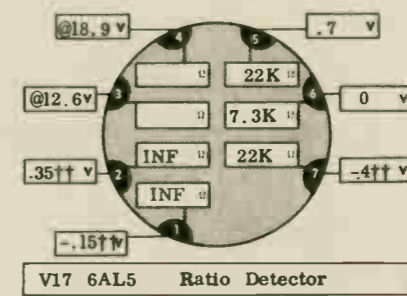
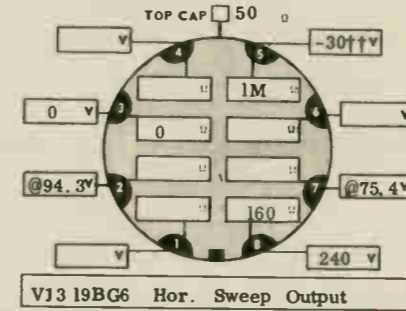
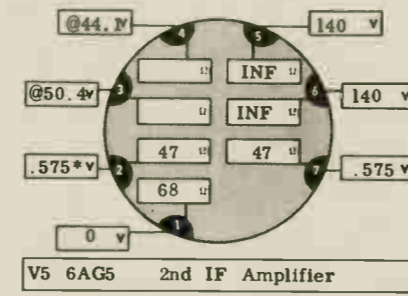
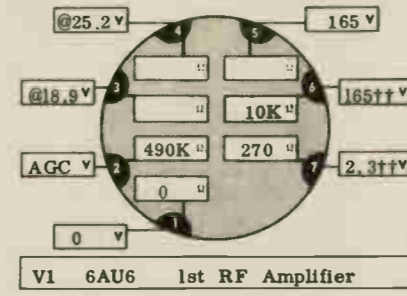
# 10C101, 10C102, 10T1, 10T4, 10T5, 10T6

For Production Changes, see Page 109.



# 12C101, 12C102, 12C105, 12T1

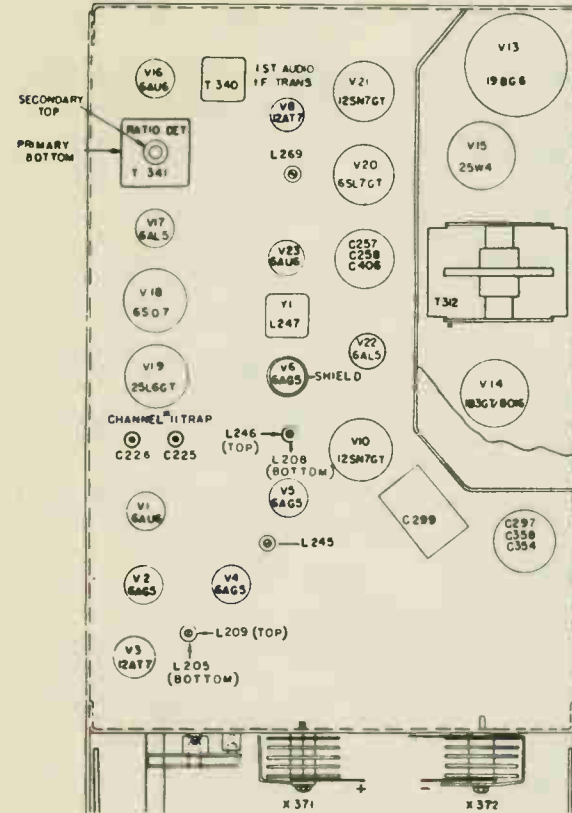
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C299	30 mf., 450V	RCE-092
C383,4	60 mf., 350V	RCE-094
C257	10 mf., 450V	RCE-100
C258	40 mf., 300V	RCE-100
C406	10 mf., 150V	RCE-100
C297	10 mf., 350V	RCE-089
C354	50 mf., 100V	RCE-089
C358	100 mf., 50V	RCE-089
C346	1 mf., 50V	RCE-090
C371	150 mf., 150 V	RCE-091
2, 3, 4		
SPECIAL		
C322	.01 mf., 600V	RCN-018
C396		
C326	.0022 mf., 1K V	RCN-019
C327	500 mmf., HV	RCN-023
C211	800-800 mmf.	RCN-027
C386	450V, ceramic	RCN-027
C224,7	3,3mmf., silver mica	RCN-028
C237	9 mmf., silver mica	RCN-029
TRIMMERS		
C213	Tuning control .2-1 mmf.	RCY-059
C225,6	High channel trap .7-7 mmf.	RCY-060
CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Lin. 2K, 2W	R300	RRC-095
Height 3 meg.	R302	RRC-096
Hor. Drive 25K, 1/2W	R402	RRC-108
Vert. Hold 100K	R307	RRC-103 (12T1, C101, 2)
Vert. Hold 100K	R309	RRC-125 (12C105)
Hor. Hold 100K	R329	RRC-103 (12T1, 12C101, 2)
Hor. Hold	R329	RRC-125 (12C105)
Volume 500K	R366	RRC-104 (12T1)
Volume 500K	R366	RRC-122 (12C101, 2)
Volume	R366	RRC-123 (12C105)
Focus 100K	R365	RRC-104 (12T1)
Focus 110K	R365	RRC-122 (12C101, 2)
Focus	R365	RRC-123 (12C105)
Brightness 500K	R230	RRC-110 (2T1, 12C101, 2)
Brightness 500K	R230	RRC-124 (12C105)
Contrast 2 meg	R232	RRC-110 (2T1, 12C101, 2)
Contrast 2 meg	R232	RRC-124 (12C105)
WIREWOUND		
Globar, 75 ohms 10W	R373,4	RRW-041
1700 ohms, 5W	R377	RRW-045
4.6 ohms	R372	RRW-048
COILS		
REF. NO.	DESCRIPTION	PART NO.
L201	Input	RLF-023
L202	Cathode, 1.4 mic.	RLI-003
L203,7	RF input	RLI-083
L204,48	49 RF ch., 31 mic. for vid. det. ass'y	RLF-024
L205,9	Converter plate	RLP-016
L208,40	IF coil	RLI-110
L245	IF coil	RLI-096
L247,8	Vid. det. ass'y	RLX-029
L255,68	Vid. comp. ch., 165 mic.	RLI-093
L258	Choke vid. comp. 130 mic.	RLI-109
L256,7	Vid. comp. ch., 165 mic.	RLI-038
L260	Vid. peaking	RLI-108
L269	Vid. trap, 4.5 mc	RLI-100
L315	Hor. lin.	RLD-020
L316	Hor. oscillator	RLC-091
L317	Width control	RLD-018
L344	Focus	RLF-028
L376	Filter reactor	RTL-096
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T291	RTO-064
Hor. Output	T312	RTO-076
Audio Output	T340	RTO-077 (12T1)
Audio Output	T344	RTO-066 (12C101, 102, 105)
Audio IF 1st	T340	RLI-097
Yoke		RLD-013
Ratio detector	T341	RTD-008
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
	Selenium rect. 250 ma.	RER-004
	R-F Head-end	RJX-037
	R-F Head-end	RJX-038 (12C105-6)
	Thermal cutout	RSR-002
	Switch-focus	RSW-066
	Detector-Germ. xtal	IN65
	Detector	IN64
	Speaker 12" PM	UOP-247 (12C101, 2, 5)
	Speaker-5 1/4" PM	UOP-577 (12T1)



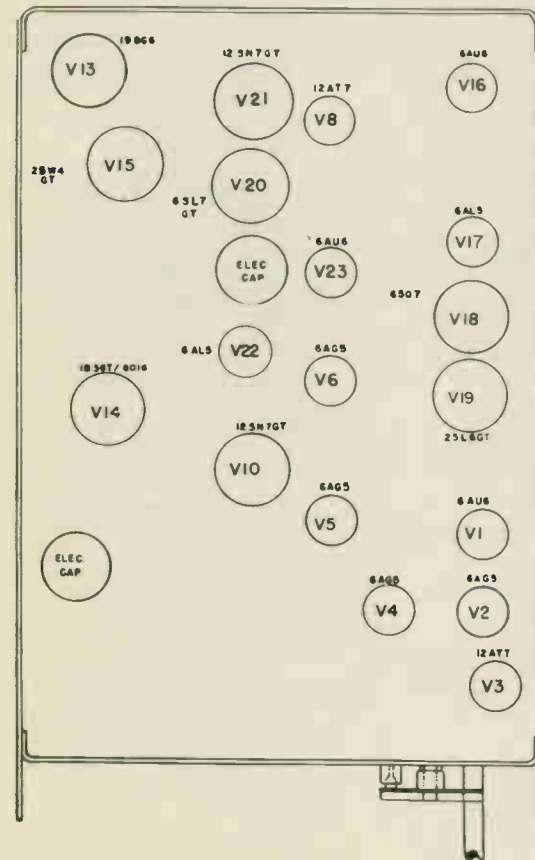
**TEST CONDITIONS**  
**Voltage Measurements:**  
 VOLTAGE MEASUREMENT IN RESPECT TO B-. METER  
 20K OHMS/VOLT LINE VOLTS 117V, 60 CYCLES.  
 ALL CONTROLS SET FOR NORMAL SWEEPS.  
 \* USE 2.5 VOLT RANGE.  
 †† VOLTAGE VARY MORE THAN 20%.  
 ‡ AC VOLTAGE READING.  
**Resistance Measurements:**  
 SHORT CAPACITORS C373 AND C374.  
 SHORT PIN 3 OF V15 TO B-.  
 INF. DENOTES INFINITE RESISTANCE.  
 TURN THE FOLLOWING CONTROLS FULL CLOCKWISE:  
 FOCUS CONTROL, CONTRAST, BRIGHTNESS, VER-  
 ICAL HOLD, VERTICAL SIZE, VERTICAL LINE AMTY.  
 VALUES LISTED MAY HAVE A TOLERANCE OF 20%.  
 DMM - DO NOT MEASURE.

# 12C101, 12C102, 12C105, 12T1

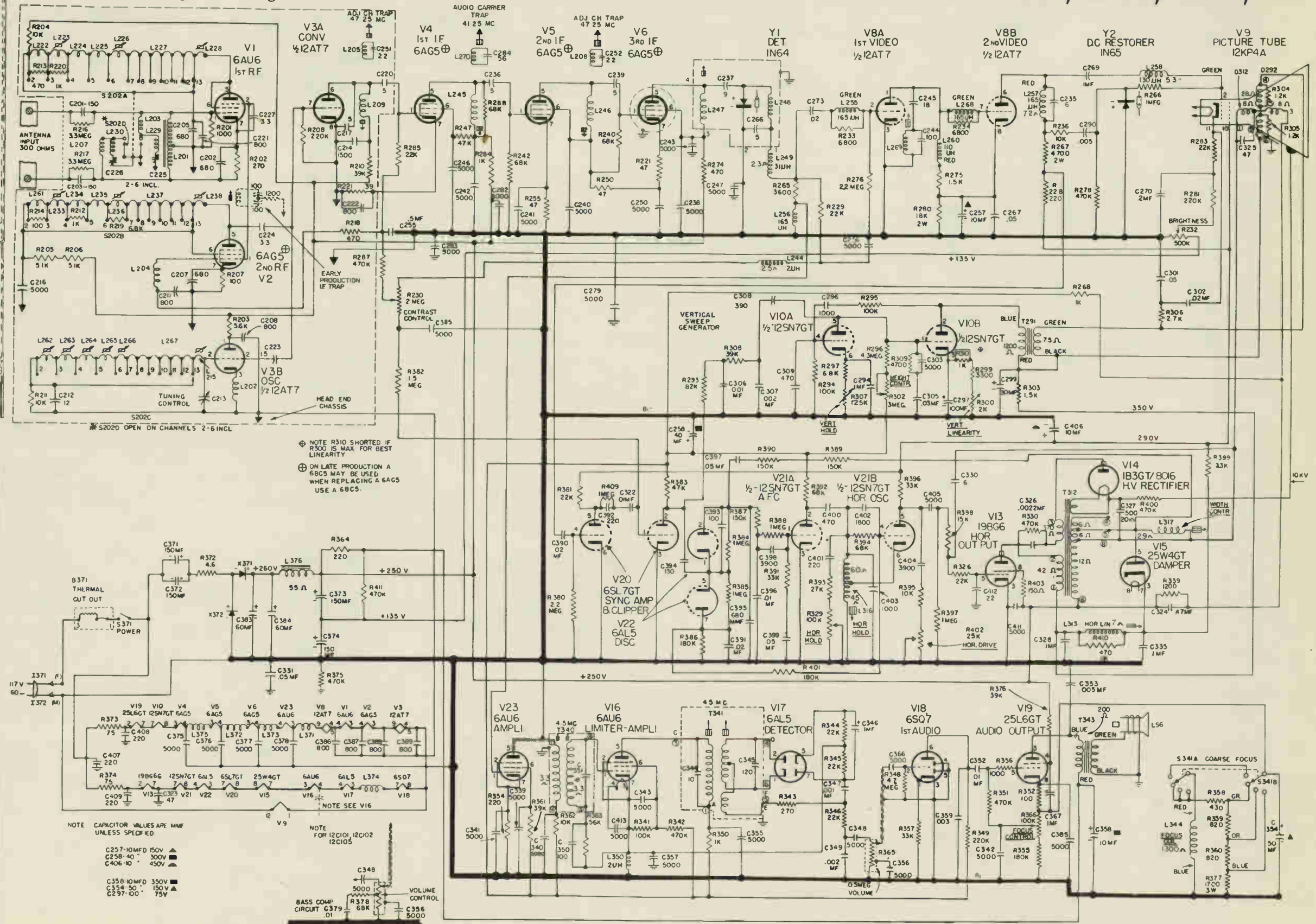
For Production Changes, see Page 109.



TOP VIEW



BOTTOM VIEW



NOTE CAPACITOR VALUES ARE MMF UNLESS SPECIFIED

C257-10MFD 150V ▲  
 C258-40 300V ▲  
 C406-10 450V ▲

C358 10MFD 350V ▲  
 C359 50 150V ▲  
 C297-00 75V ▲

NOTE SEE V16

NOTE FOR 12C101, 12C102, 12C105

VOLUME CONTROL

BASS COMP. CIRCUIT C379 01

NOTE R310 SHORTED IF R300 IS MAX FOR BEST LINEARITY

⊕ ON LATE PRODUCTION A 6BC5 MAY BE USED WHEN REPLACING A 6AG5 USE A 6BC5.

# 12C107, 12C108, 12C109, 12T3, 12T4

## PRODUCTION CHANGES MODELS 12T3, 12T4, 12C107, 12C108 AND 12C109

1. Early production models did not incorporate the 41.25 mc trap on IF coil L265.
2. Early models used a high gm 6AG5 tube in place of a 6BC5 for the second RF amplifier V2. When it is necessary to replace this 6AG5, a 6BC5 tube should be used for replacement.
3. Some of the receivers use for the crystal diode Y2 the Type 1N48 instead of 1N65 which does not change the performance of the receiver.
4. In order to improve electrical performance of the Vertical Hold Potentiometer, R305, the value was increased from 100,000 ohm (RRC-129) to 125,000 ohm and the new catalog is RRC-136.
5. Because of procurement difficulties, the capacitor C451 will be replaced by two 150 mf (RCE-091) capacitors; the capacitor C452 will be replaced by two 60 mf (RCE-094) capacitors.

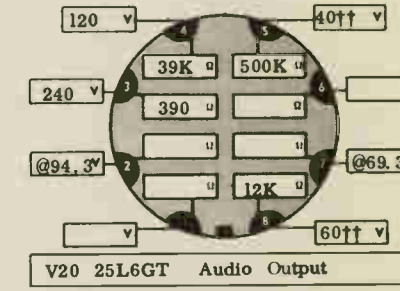
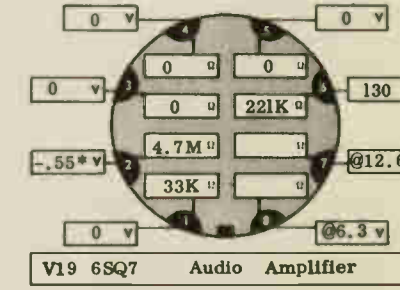
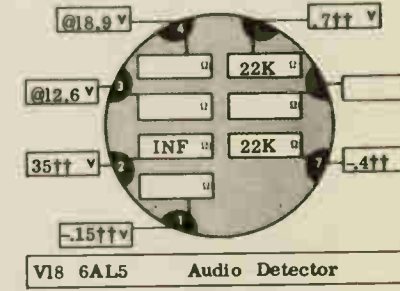
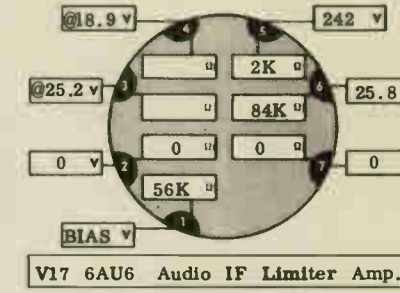
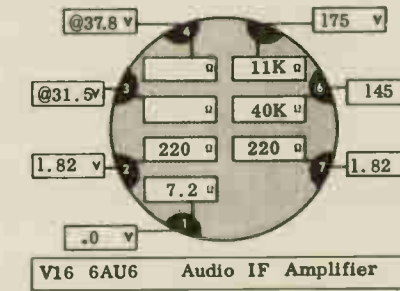
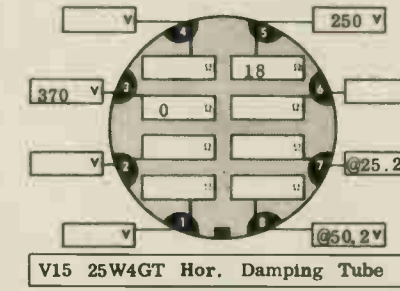
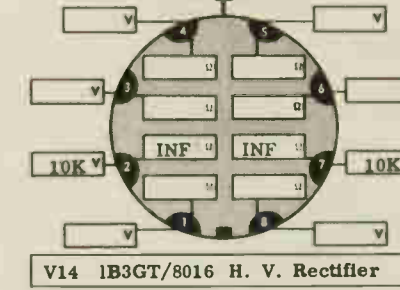
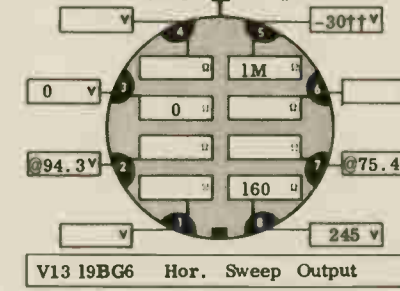
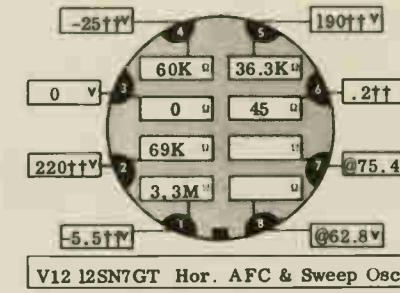
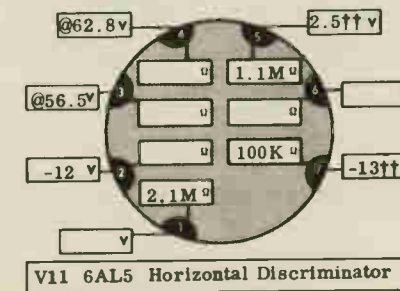
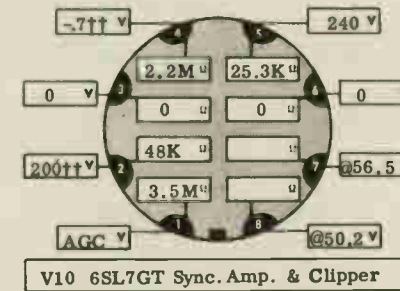
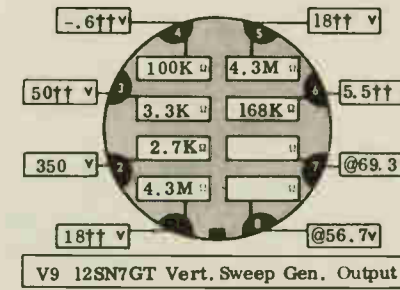
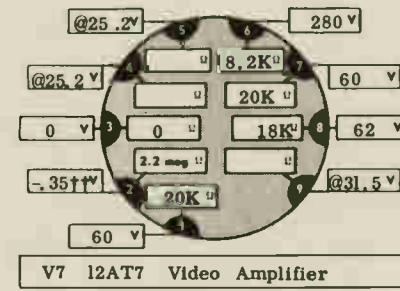
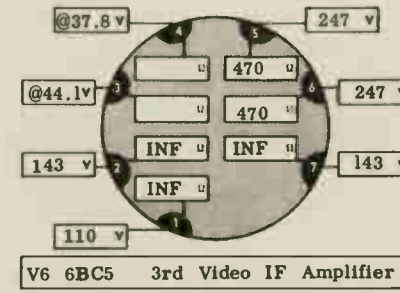
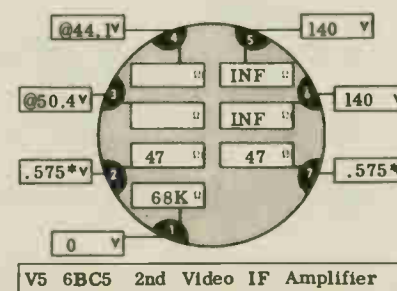
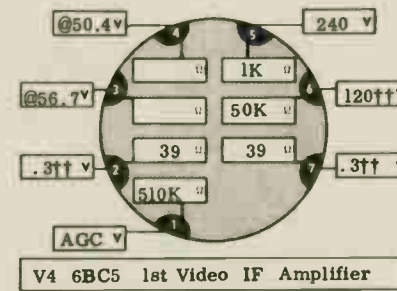
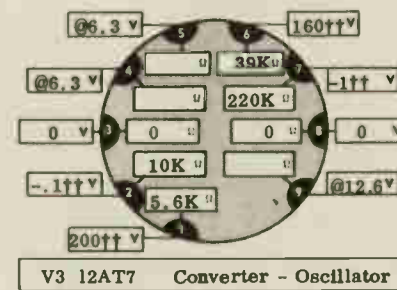
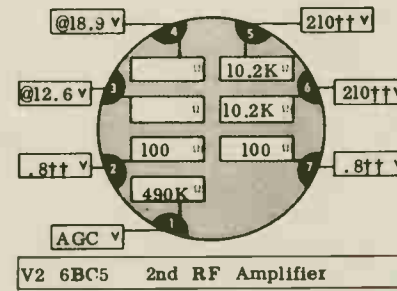
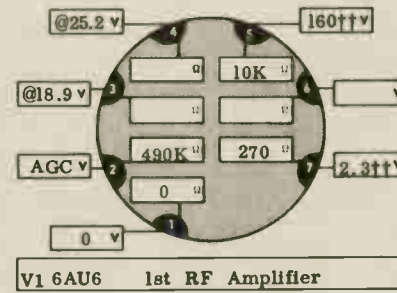
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C309	10 mf., 350V	RCE-089
C454	50 mf., 100V	RCE-089
G423	100 mf., 75V	RCE-089
C410	1 mf., 50 V	RCE-090
C310	30 mf., 450V	RCE-092
C272	10 mf., 450V	RCE-100
C355	40 mf., 300V	RCE-100
C379	10 mf., 150V	RCE-100
C451	300 mf., 150V	RCE-110
C452	125 mf., 350V	RCE-111
C453	80 mf., 300V	RCE-112
TRIMMERS		
C212	Tuning capacitor	RCY-059
C219	#11 channel trap	RCY-060
C220	.7-7.0 mmf.	

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume		
Brightness 500K	R421	RRC-130
Contrast		
Hor. Hold 125K	R365	RRC-135
Hor. Size		
Vert. Hold 100K	R305	RRC-135
Vert. Size		
Vert. Lin. 4K, 2w.	R311	RRC-127
Height 3 meg	R308	RRC-096
Hor. Drive 25K, 1/2w.	R369	RRC-108
Volume 500K	R262	RRC-128
Volume 500K	R262	RRC-131
Contrast 2 meg	R412	RRC-128
Contrast 2 meg	R413	RRC-131
Focus 100K	R276	RRC-130
WIREWOUND		
Globar, 75 ohms, 10 w.	R454, 5	RRW-041
1700 ohms, 3 w.	R427	RRW-045
4.6 ohms 5 w.	R451	RRW-048
350 ohms, 0.6 amp., Globar	R455	RRW-054

COILS		
REF. NO.	DESCRIPTION	PART NO.
L201, 202	RF input	RLI-083
L203	Input	RLF-023
L218	Cathode ch., 1.4 mic.	RLI-003
L218, 226, 7.	Conv. plate	RPL-016
L251, 265.	IF with trap	RLI-123
L252, 253.	IF Coil	RLI-110
L254, 255.	Vid Det Ass'y	RLX-029
L259	Vid. comp. choke 165 mic	RLI-093
L260	4.5 mc vid. trap	RLI-100
L261	Vid. peaking	RLI-108
L263, 257.	Vid comp. 165mic.	RLI-038
L264	Vid. comp. choke	RLI-109
L351	Hor. oscillator	RLC-091
L352	Hor. Lin. control	RLD-020
L353	Width control	RLD-014
L401	Focus	RLF-028
L451	Filter reactor	RTL-096
L211, 234, 5, 6.	RF choke, 31 mic. for Vid. det.	RJX-039
		RLF-024

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T301	RTO-064
Hor. Output	T351	RTO-076
Power		
Audio Output	T403	RTO-081
Yoke	D301	RLD-013
Audio Output *	T404	RTO-086
Audio IF 1st	T401	RLI-097
Ratio detector	T402	RTD-008

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
X451, 2	Rectifier - 300ma, Selenium	RER-009
B451	Thermal cutout	RSR-002
	Switch-Focus	RSW-066
Y2	Detector-Germanium crystal	1N65
Y1	Detector Germanium crystal	1N64
	Speaker - 12" PM	S1200D-2
	Speaker - 5 1/4" PM	S527D-7



### TEST CONDITIONS

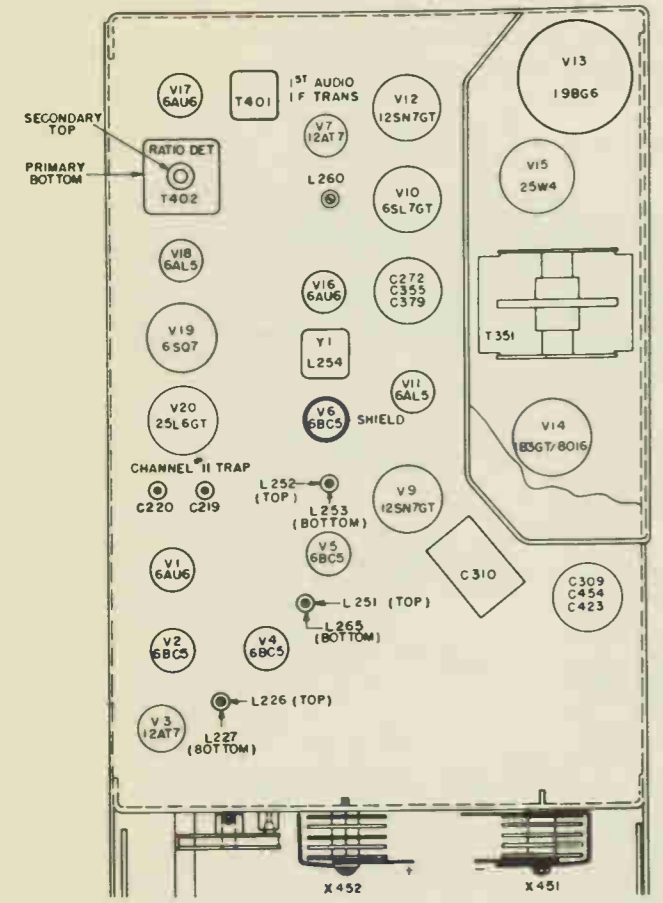
#### Voltage Measurements:

VOLTAGE MEASUREMENTS IN RESPECT TO B- METER  
20K OHM/VOLT LINE VOLTS 117V, 60 CYCLES.  
ALL CONTROLS SET FOR NORMAL SWEEPS.  
\* USE 2.5 VOLT RANGE.  
M VOLTAGE VARY MORE THAN 20%.  
@ AC VOLTAGE READING.

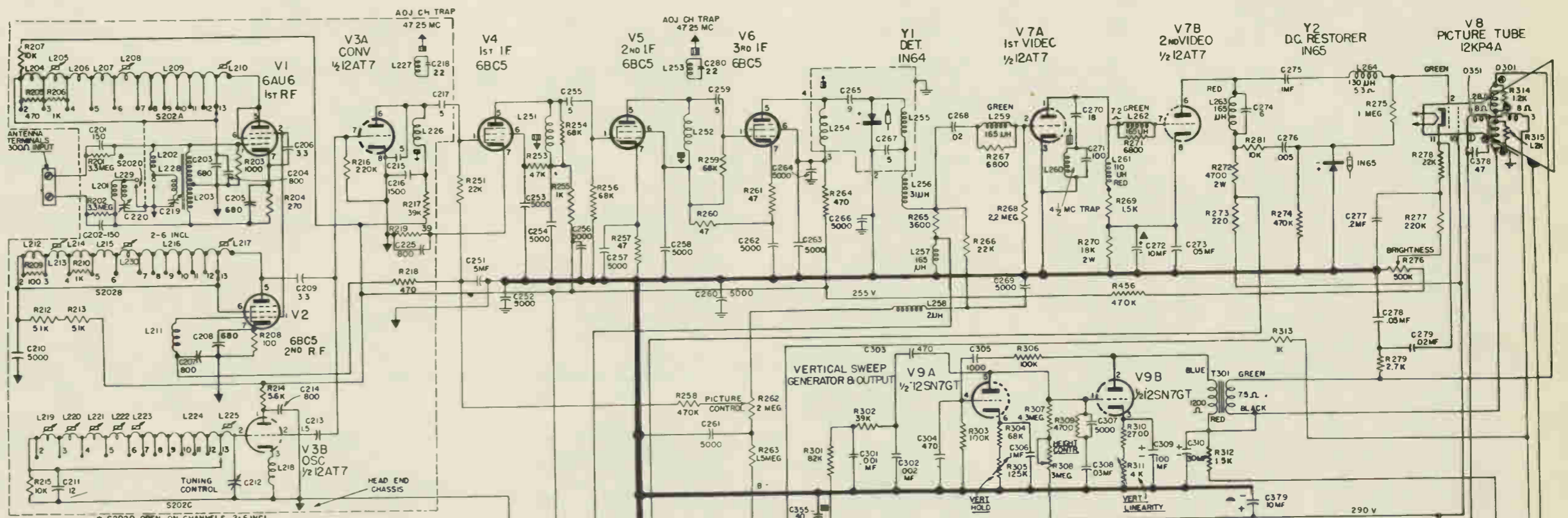
#### Resistance Measurements:

SHORT PIN 3 OF V15 TO B-.  
INF. DENOTES INFINITE RESISTANCE.  
TURN THE FOLLOWING CONTROLS FULL CLOCKWISE:  
FOCUS CONTROL, CONTRAST, BRIGHTNESS, VERTICAL HOLD, VERTICAL SIZE, VERTICAL LINEARITY  
VALUES LISTED MAY HAVE A TOLERANCE OF 20%.  
DNM - DO NOT MEASURE.

# 12C107, 12C108, 12C109, 12T3, 12T4

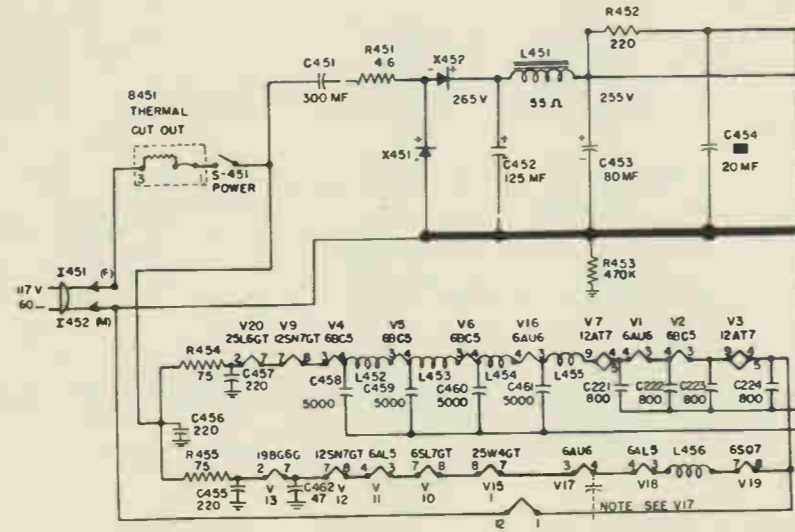


TOP VIEW



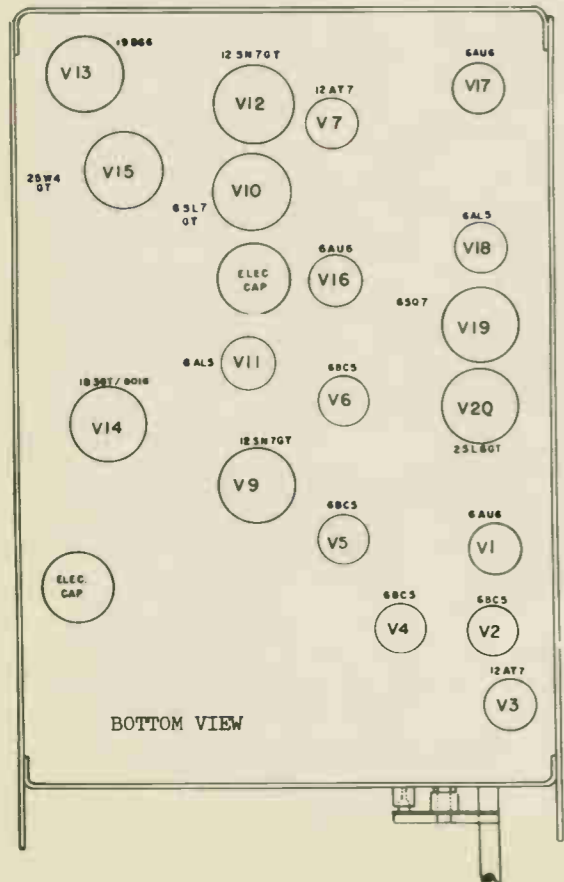
NOTE: CAPACITOR VALUES ARE MUF UNLESS SPECIFIED

- C272-10MF 150V
- C355-40MF 300V
- C379-10MF 450V
- C454-20MF 300V
- C423-50MF 150V
- C309-100MF 75V



NOTE FOR 12C107, 12C108, 12C109

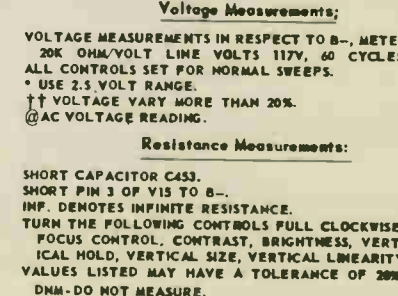
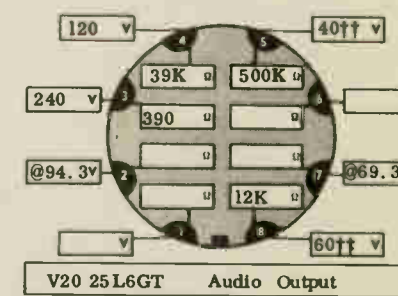
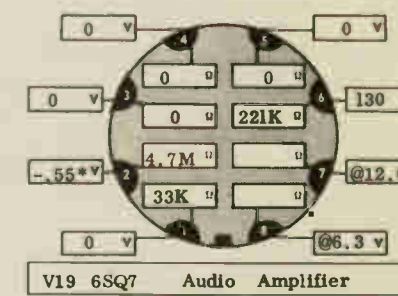
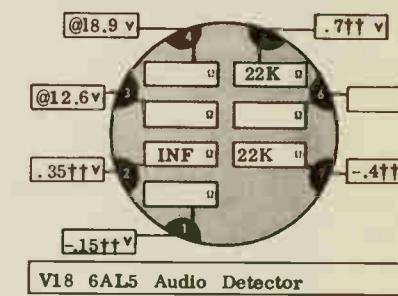
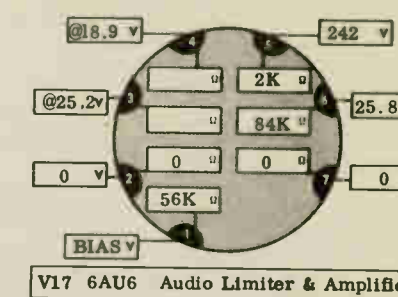
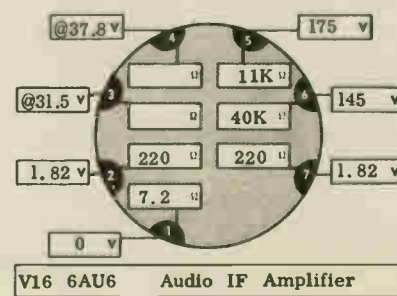
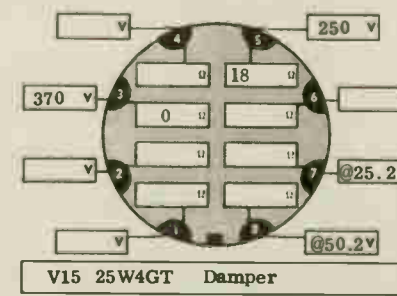
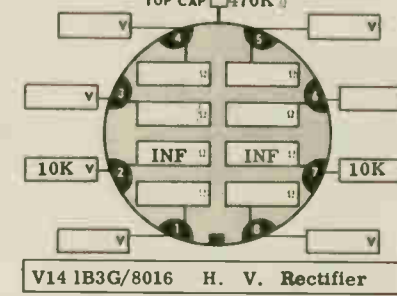
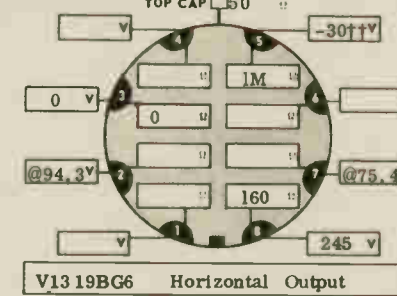
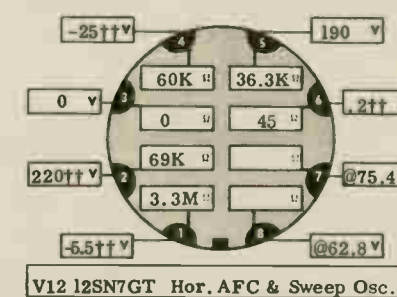
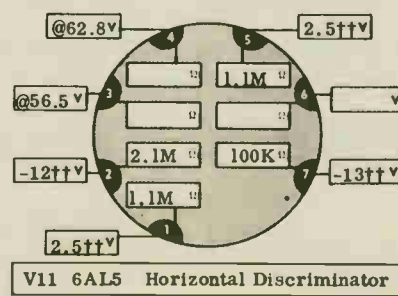
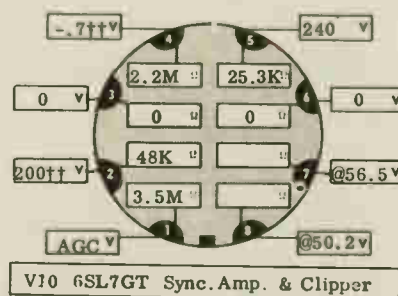
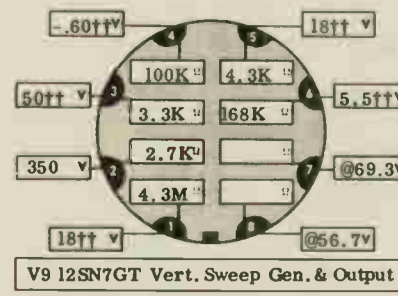
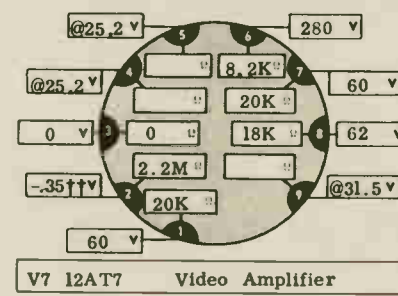
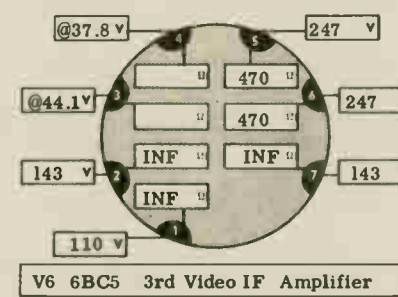
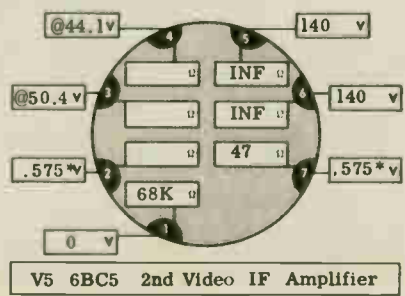
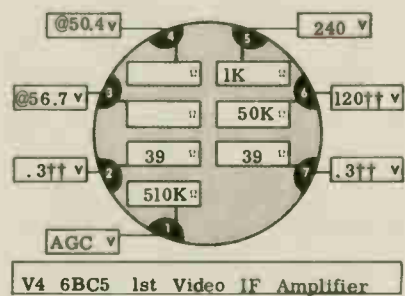
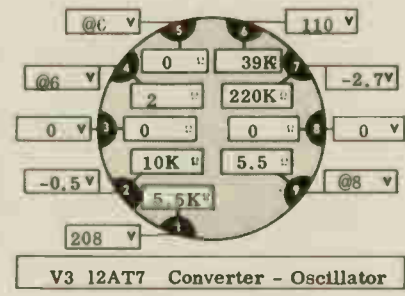
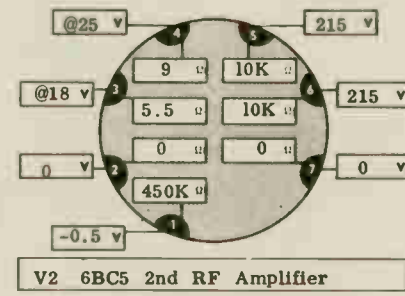
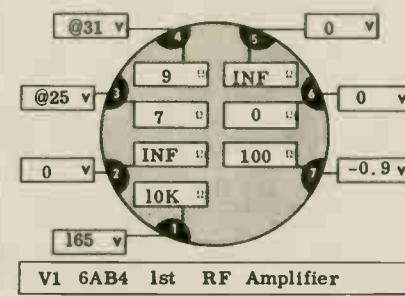
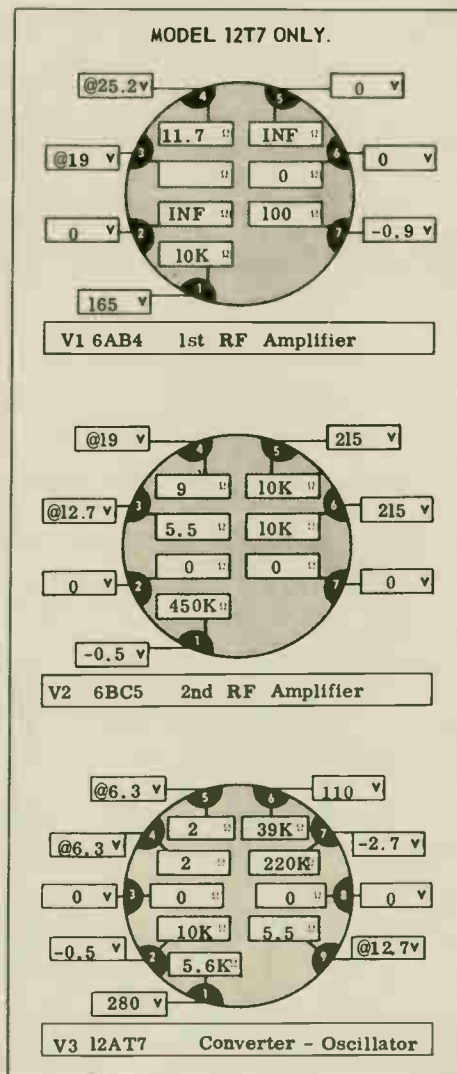
BASS COMP. CIRCUIT: C416 0.1MF, R414 68K, C413 5000, R413 0.5MEG VOLUME CONTROL, C415 5000



BOTTOM VIEW

# 12C107, 12C108, 12C109, 12T3, 12T4, 12T7 (B version)

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C410	1 mf., 50V	RCE-090
C310	30 mf., 450V	RCE-092
C272	10 mf., 450V	RCE-100
C355	40 mf., 300V	RCE-100
C379	10 mf., 150V	RCE-100
C451	300 mf., 150V	RCE-110
C452	125 mf., 350V	RCE-111
C453	80 mf., 300V	RCE-112
C309	20 mf., 300V	RCE-115
C423	50 mf., 100V	RCE-115
C454	100 mf., 75V	RCE-115
SPECIAL		
C419	.01 mf., 600V	RCN-018
C372	.0022 mf., 1K V	RCN-019
C376	500 mmf., 20K V	RCN-023
C361	.01 mf., 600V	RCN-025
C265	9 mmf. silver mica	RCN-029
C365	1800 mmf., 600V	RCN-033
C362, 7	3900 mmf., 500V	RCN-034
TRIMMERS		
C207	Trimmer	RCY-048
C230	Trimmer	RCY-048
C213	Tuning capacitor	RCY-059
C206	For #11 channel trap, 7-7.0 mmf.	RCY-060
CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume, 500K	R412	RCC-128
Brightness, 500K	R276	RCC-130
Hor. Hold, 125K	R365	RRC-136
Vert. Hold, 100K	R305	RRC-136
Vert. Lin. 4K, 2w.	R311	RRC-127
Height 3 meg	R308	RRC-096
Picture 2 meg	R262	RCC-128
Focus 100K	R421	RCC-130
Hor. Drive 25K, 1/2 w.	R369	RRC-140
WIREWOUND		
4.6 ohms, 5w., w. w.	R451	RRW-048
1700 ohms, 3w., w. w.	R427	RRW-045
43 ohms, 4w., w. w.	R220	RRW-049
Globar, 35 ohms, 0.6 amp	R455	RRW-054
COILS		
REF. NO.	DESCRIPTION	PART NO.
L201	Input	RLA-036
L202	Choke	RLI-006
L202	Choke	RLI-106
L218	Cathode choke, 1.4 mh.	RLI-003
L226, 7	Converter plate	RLP-016
L251	IF coil	RLI-096
L252, 3	IF coil	RLI-110
L254, 5	.6. RF choke, 31 mic. for vid. detector	RLF-024
L254, 5	Video detector ass'y	RLX-029
L257, 6	Vid. comp., ch. 165 mic	RLI-038
L259, 2	Vid. comp., ch. 165 mic	RLI-093
L260	Trap, 4.5 mc Video	RLI-100
L261	Video Peaking, 110 uh.	RLI-108
L264	Video comp., 130 uh.	RLI-109
L351	Hor. Osc.	RLC-091
L352	Hor. lin.	RLD-020
L353	Width	RLD-014
L401	Focus	RLF-026
L451	Reactor filter	RTL-096
L258, 4, 2, 4, 5, 6.	Heater choke, 2 mic.	RLI-122
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T301	RTO-064
Hor. Output	T351	RTO-076
Audio Output	T403	RTO-081
Yoke	D301	RLD-013
Audio IF 1st	T401	RLI-097
Ratio detector	T402	RTD-008
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
S401, 2	Switch-focus	RSW-066
Y1	Detector-Germ. xtal	IN64
	Speaker, 5 1/4" PM	S-527D-7
X451, 2	Selenium rect. 300 ma.	RER-009
	Ion Trap	RET-005
	R-F Head-end	RJX-040
B451	Thermal cutout	RSR-002

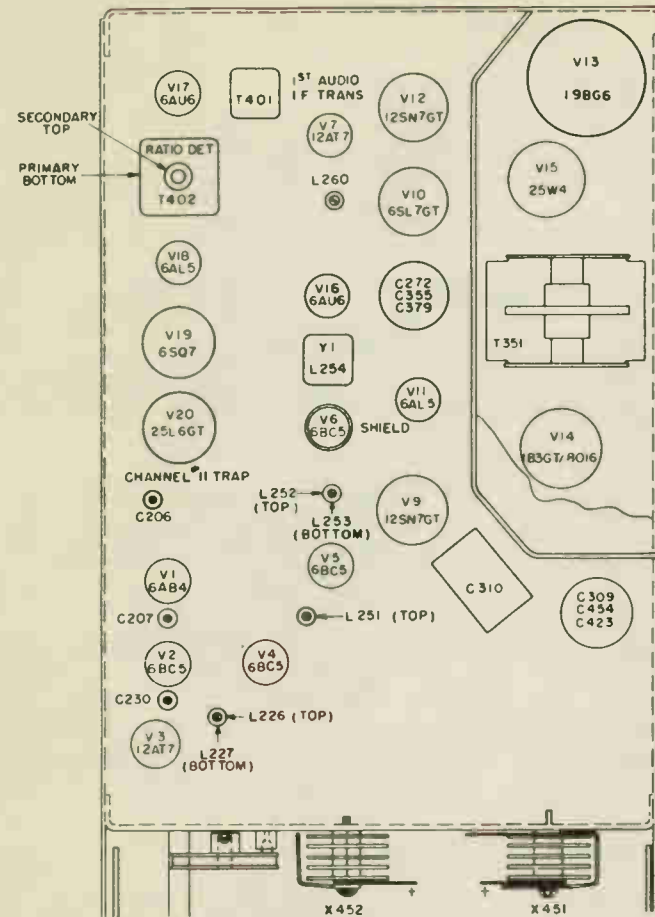


**TEST CONDITIONS**  
**Voltage Measurements:**  
 VOLTAGE MEASUREMENTS IN RESPECT TO B-. METER 20K OHM/VOLT LINE VOLTS 117V, 60 CYCLES. ALL CONTROLS SET FOR NORMAL SWEEPS. \* USE 2.5 VOLT RANGE. †† VOLTAGE VARY MORE THAN 20%. @ AC VOLTAGE READING.

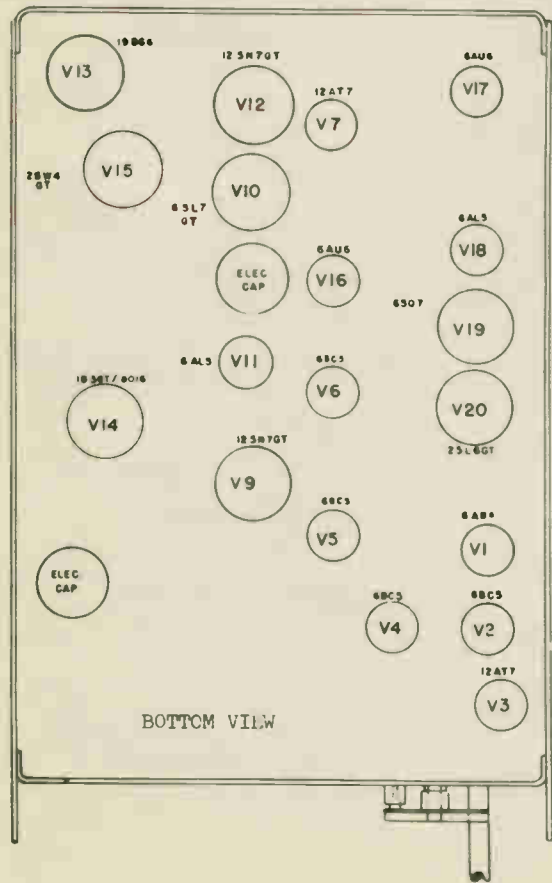
**Resistance Measurements:**  
 SHORT CAPACITOR C453. SHORT PIN 3 OF V15 TO B-. INF. DENOTES INFINITE RESISTANCE. TURN THE FOLLOWING CONTROLS FULL CLOCKWISE: FOCUS CONTROL, CONTRAST, BRIGHTNESS, VERTICAL HOLD, VERTICAL SIZE, VERTICAL LINEARITY. VALUES LISTED MAY HAVE A TOLERANCE OF 20%. DNM-DO NOT MEASURE.

# 12C107, 12C108, 12C109, 12T3, 12T4, 12T7 (B version)

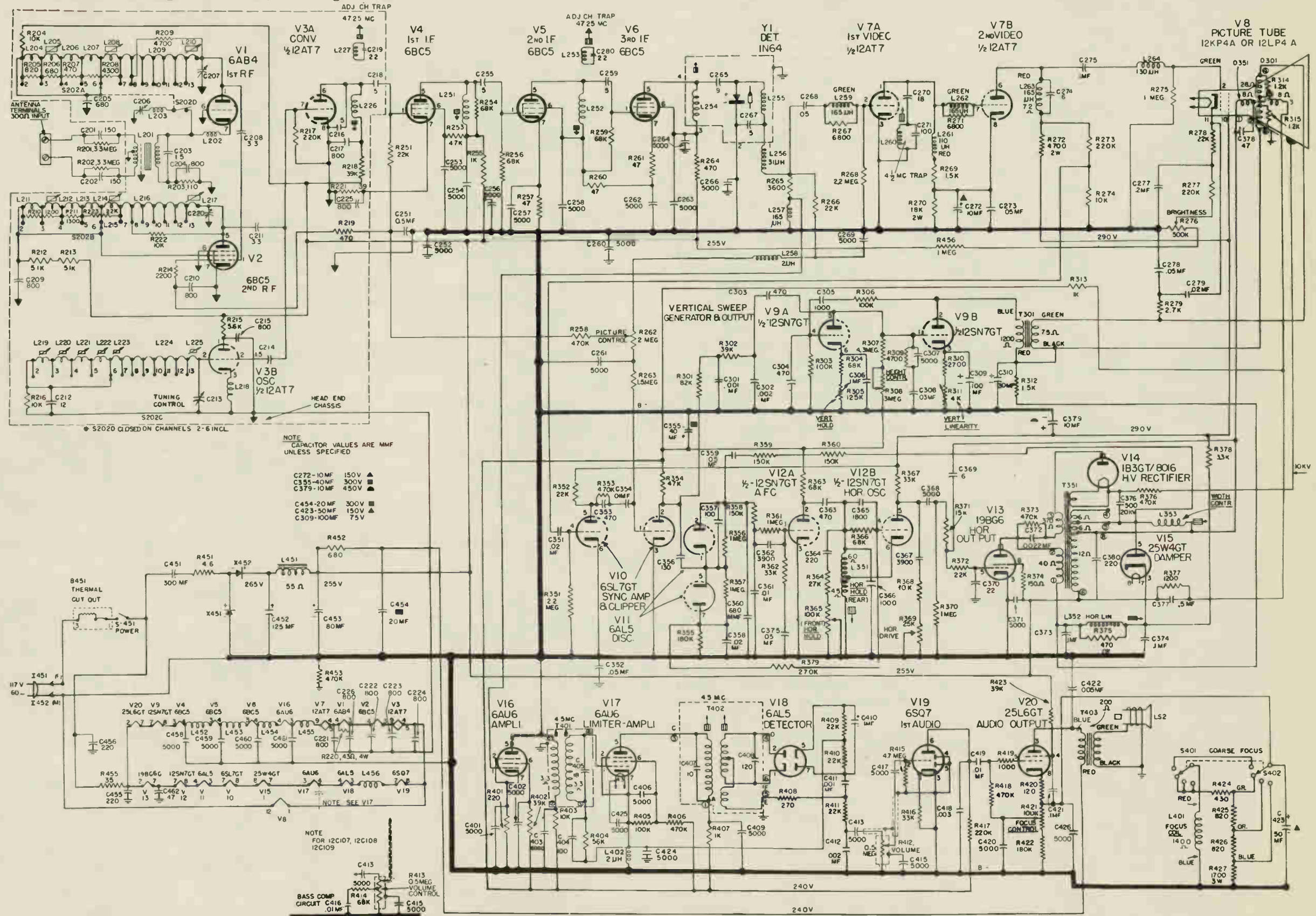
For Production Changes for 12T7, see Page 109.



TOP VIEW



BOTTOM VIEW



NOTE: CAPACITOR VALUES ARE MMF UNLESS SPECIFIED

- C272-10MF 150V ▲
- C355-40MF 300V ▲
- C379-10MF 450V ▲
- C454-20MF 300V ■
- C423-50MF 150V ▲
- C309-100MF 75V ■

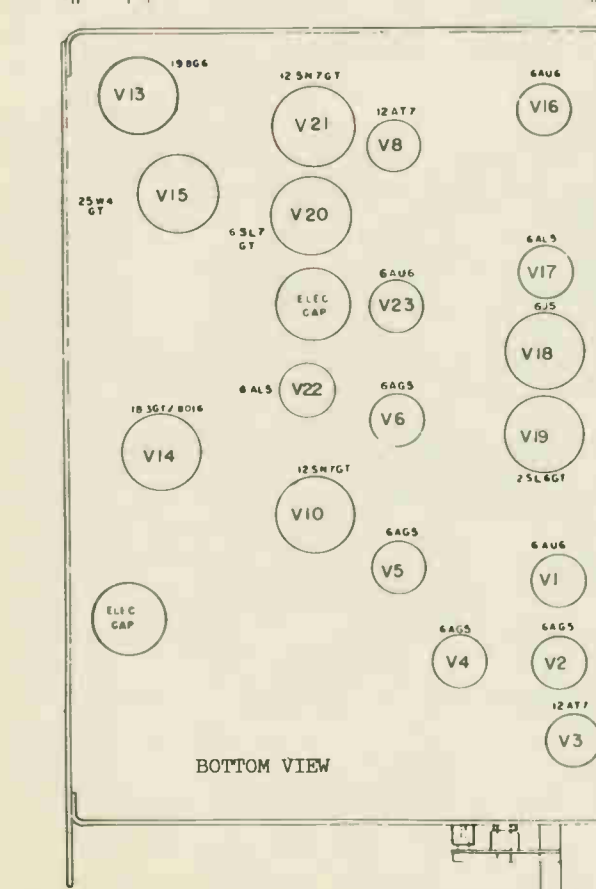
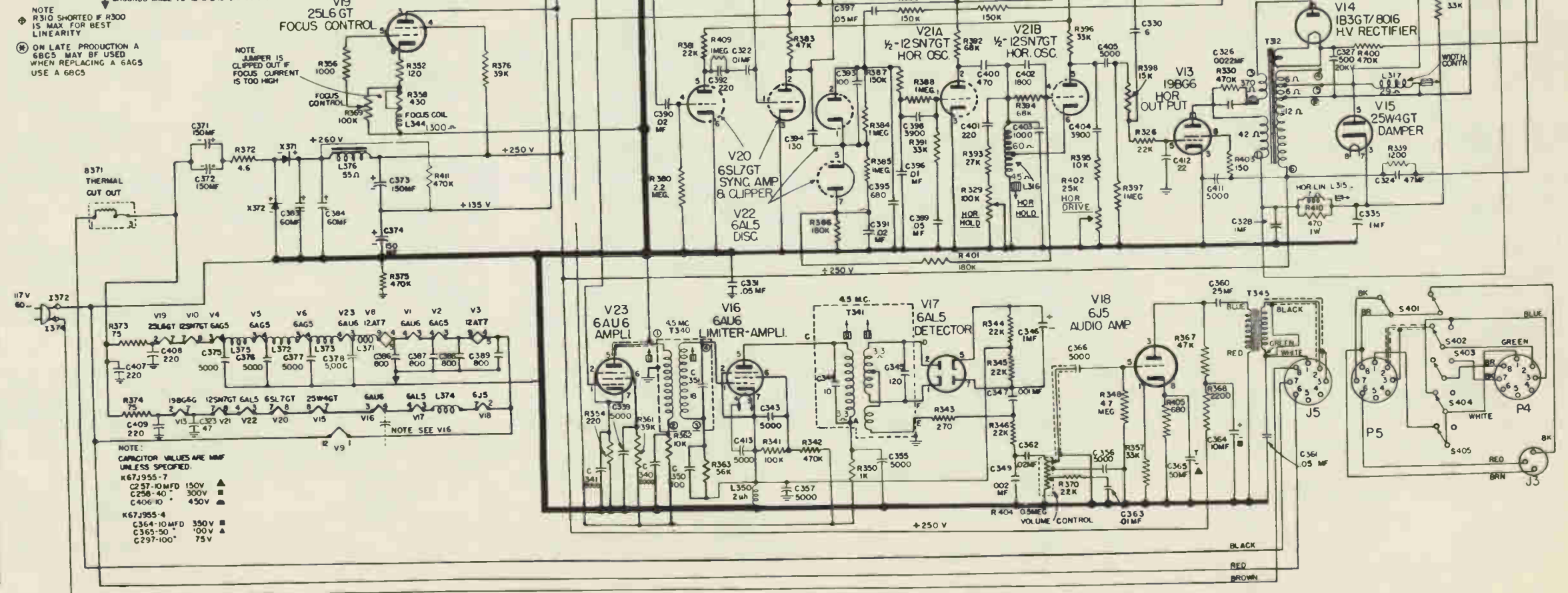
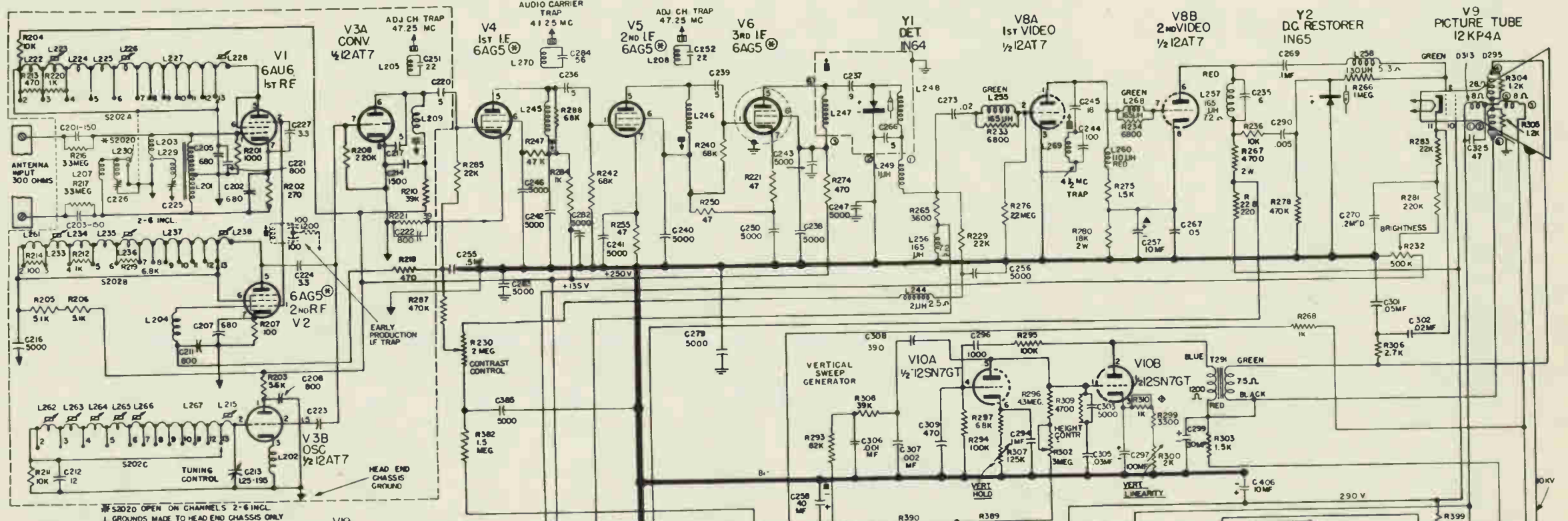
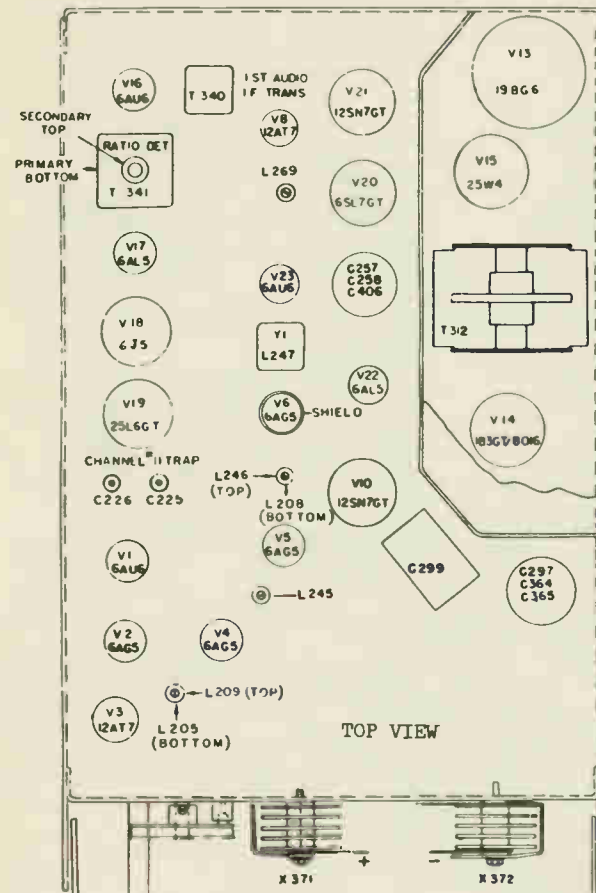
NOTE FOR 12C107, 12C108, 12C109

- R413 0.5MEG VOLUME CONTROL
- C416 0.01MF BASS COMP. CIRCUIT





FOR RADIO USED WITH THESE CHASSIS, SEE PAGES 101, 102, 103.  
For Production Changes, see Page Opposite and Page 109.



NOTE: CAPACITOR VALUES ARE MUF UNLESS SPECIFIED.  
 K67J955-7  
 C257-10MFD 150V ▲  
 C258-40 300V ■  
 C406-10 450V ▲  
 K67J955-4  
 C364-10MFD 350V ■  
 C365-50 100V ▲  
 C297-100 75V ▲

# 14C101, 14C102, 14T2, 14T3

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C410	1 mf., 50V	RCE-090
C310	30 mf., 450V	RCE-092
C451	300 mf., 150V	RCE-110
C452	125 mf., 350V	RCE-111
C453	80 mf., 300V	RCE-112
C454	20 mf., 300V	RCE-115
C423	50 mf., 100V	RCE-115
C309	100 mf., 75V	RCE-115
C379	10 mf., 450V	RCE-118
C355	40 mf., 300V	RCE-118
C272	10 mf., 150V	RCE-118
TRIMMERS		
C207	.4-2.4 mmf.	RCY-048
C213	1.4-2.8 mmf	RCY-059
C206	For high trap .7-7 mmf.	RCY-060
C220	Trimmer	RCY-063

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Brightness 500K	R276	RRC-145
Hor. Hold 100K	R365	RRC-146
Vert. Hold 125K	R305	RRC-146
Vert. Lin. 4K, 2 w.	R311	RRC-127
Height 3 meg	R308	RRC-096
Hor. Drive 25K	R369	RRC-140
Focus 10K	R424	RRC-145
Volume 500K (14T2, 3)	R412	RRC-128(off-on)
Volume 500K (14C102, 3)	R412	RRC-131(off-on)
Contrast 2 meg (14T2, 3)	R262	RRC-128
Contrast 2 meg (14C102, 3)	R262	RRC-131
WIREWOUND & SPECIAL		
4.6 ohms, 5w.	R451	RRW-048
43 ohms, 4 w.	R220	RRW-049
20 ohms, Global temp.comp.	R454	RRW-051
10.5K, Global voltage sensitive resistor	R382	RRW-052
4K, 7 w.	R380	RRW-053

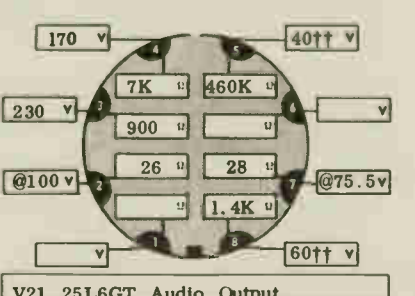
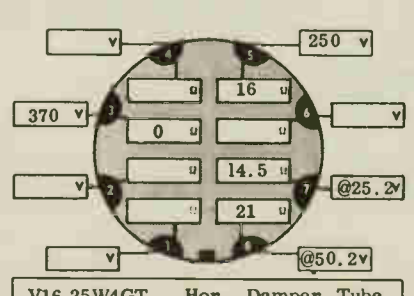
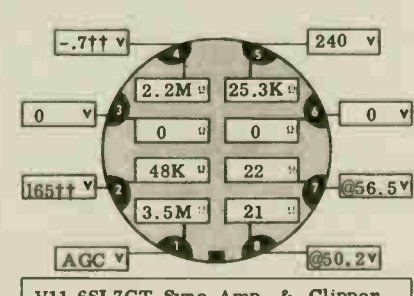
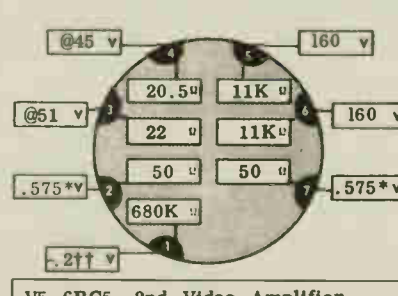
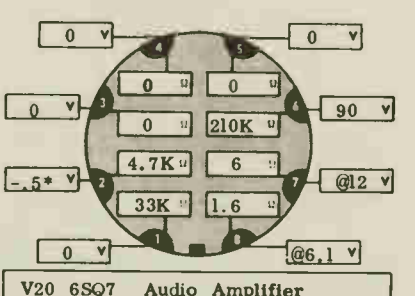
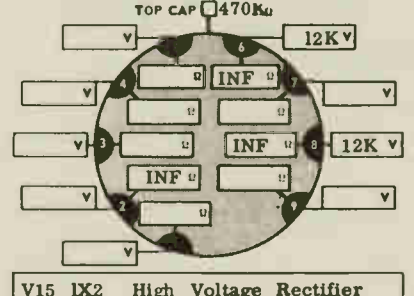
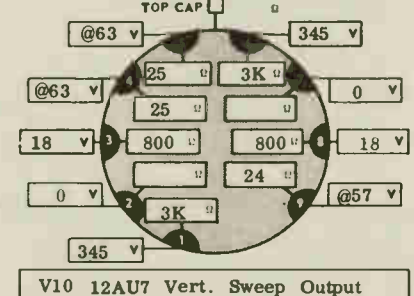
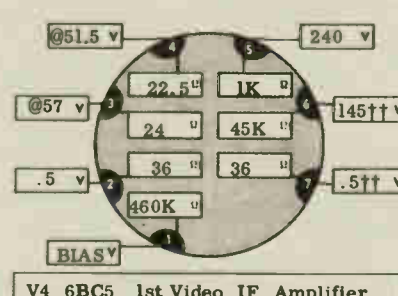
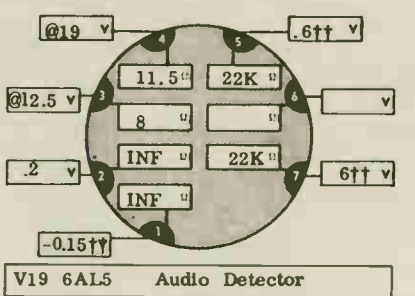
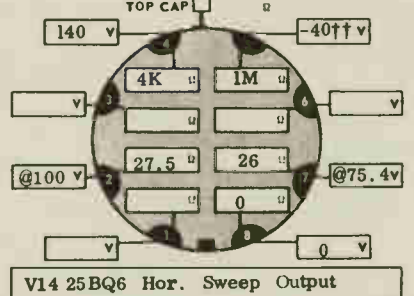
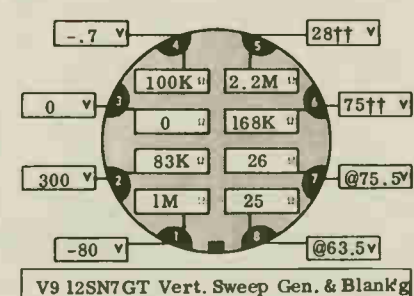
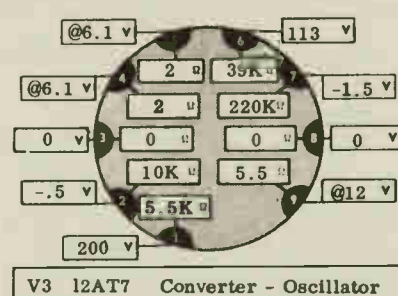
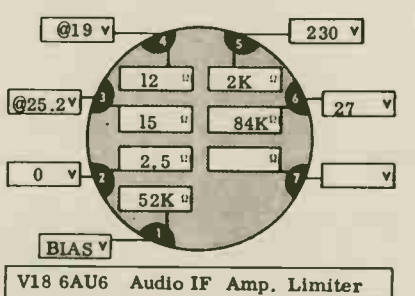
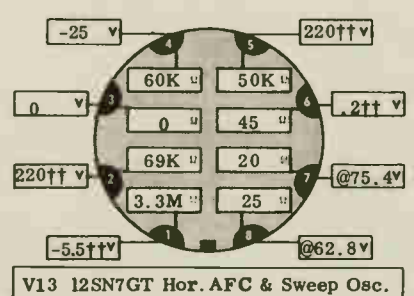
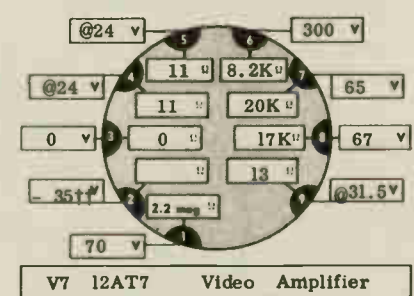
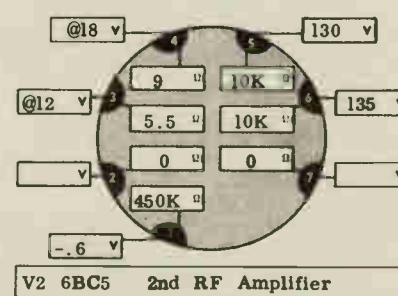
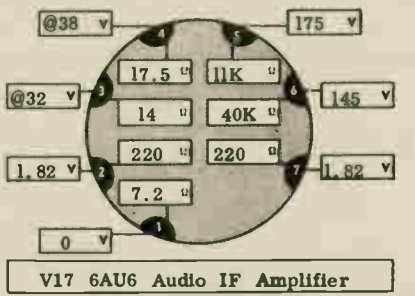
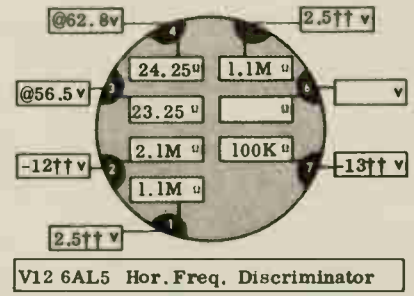
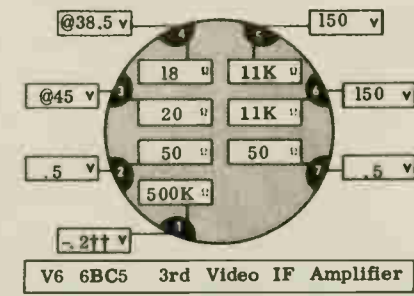
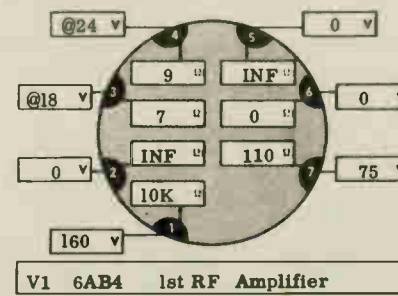
COILS		
REF. NO.	DESCRIPTION	PART NO.
L201	Antenna input	RLA-036
L202	Choke	RLI-106
L218	Cathode Choke	RLI-003
L226, 7	Converter plate	RLP-018
L252, 3	IF coil	RLI-110
L254, 5	Video detector Assy.	RLX-029
L256	Choke coil RF	RLF-024
L257, 63	Video choke coil	RLI-038
L259, 62, 67.	Video choke & reals.	RLI-093
L260	Trap 4.5 MC video	RLI-100
L261	Choke video	RLI-108
L264	Choke video	RLI-109
L351	Hor. oscillator	RLC-091
L352	Hor. linearity	RLD-016
L353	Width	RLD-014
L401	Focus	RLF-039
L451	Filter reactor	RTL-096

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Osc.	T301	RTO-064
Vert. Output	T351	RTO-090
Power	T403	RTO-081 (14T2, 14T3)
Audio Output	D301	RLD-025
Yoke	T403	RTO-086 (14C102, 103)
Audio Output	T401	RLI-097
Audio IF 1st	T402	RTD-008
Ratio detector		

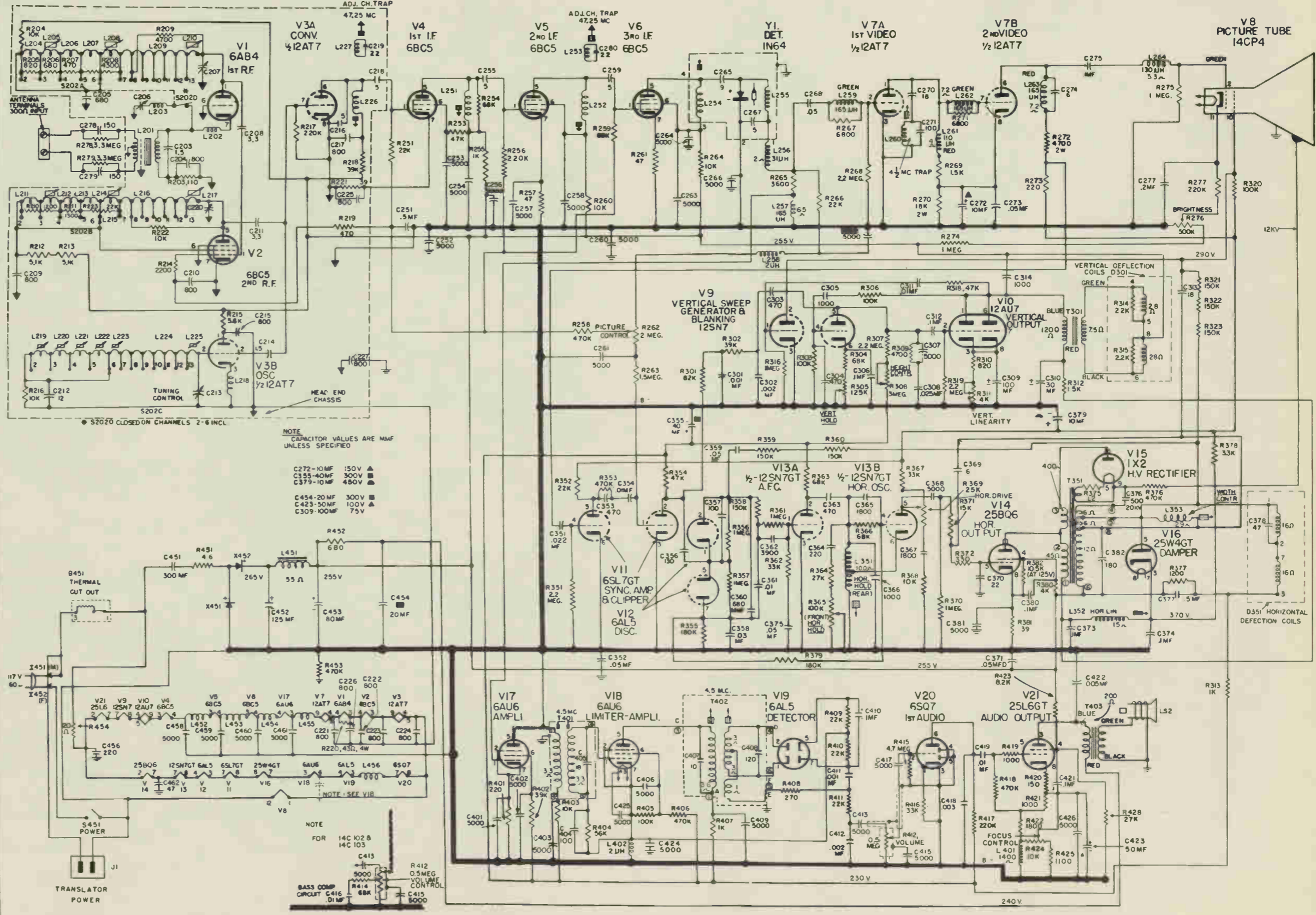
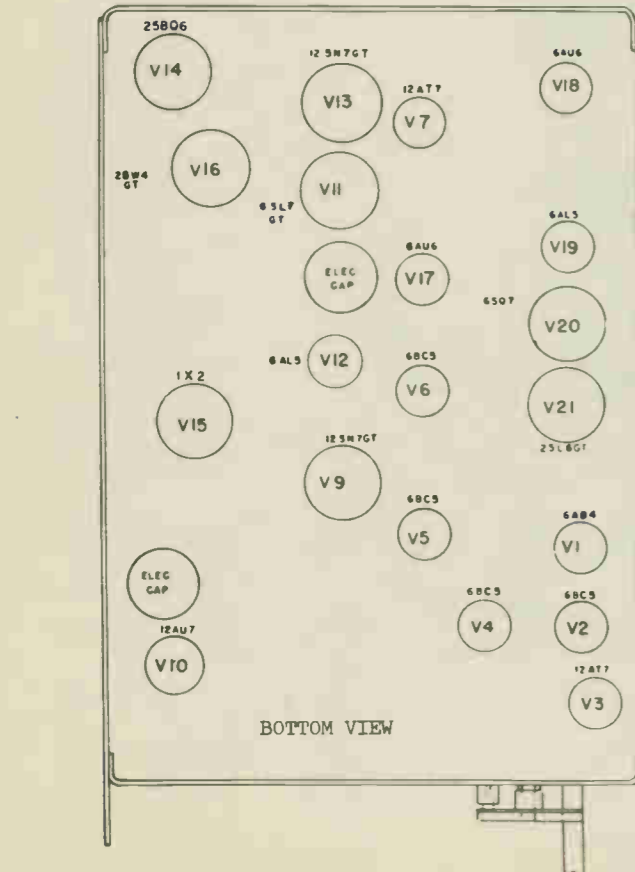
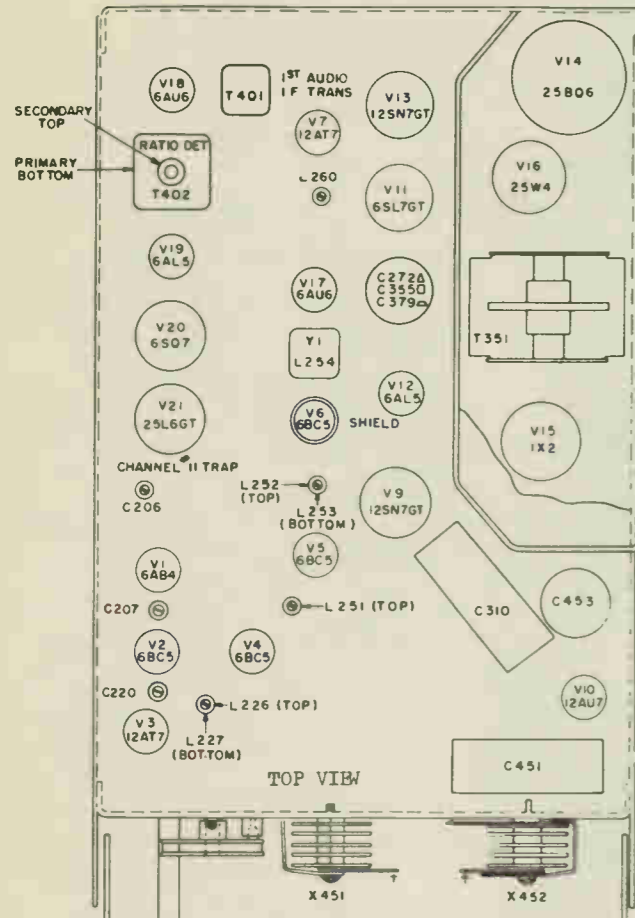
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
X451, 2	Selenium rect., 350 ma	RER-008
	Ion trap	RET-003
	Pin-speaker contact	RJC-001
	RF Head-end	RJX-043
B451	Cutout Thermal	RSR-002
	Speaker (14C102, 3)	S1200D7
	Speaker (14T2, 3)	S527D7
	Crystal (IN64)	Part of RLX-029



**TEST CONDITIONS**  
**Voltage Measurements:**  
 Inputs 117V, 60 cycles.  
 All controls set for normal sweeps.  
 Measurements are in respect to B- with a 20K ohms/volt meter.  
 \* 2.5 volt range.  
 †† Voltage will vary more than 20%.  
 @ - AC Voltage Reading.  
**Resistance Measurements:**  
 Short capacitor C453.  
 Short pin #3 of V16 to B-.  
 M denotes meg.  
 Inf. denotes infinite resistance.  
 Turn the following controls full clockwise: Focus control, contrast brightness, Vertical hold, vertical size, vertical linearity.  
 Values listed may have a tolerance of 20%.  
 DNM - Do Not Measure.

14C101, 14C102, 14T2, 14T3

For Production Changes, see Pages 109 and 110.



NOTE: CAPACITOR VALUES ARE MMF UNLESS SPECIFIED

- C272-10MF 150V
- C355-40MF 300V
- C379-10MF 450V
- C454-20MF 300V
- C423-50MF 100V
- C309-100MF 75V

NOTE: SEE V18 FOR 14C102 & 14C103

NOTE: BASS COMP. CIRCUIT C416 0.1MF R412 0.5MEG VOLUME CONTROL C415 5000

# 16C110, 16C111, 16C115, 16T1, 16T2

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C410	1 mf., 50V	RCE-090
C310	30 mf., 450V	RCE-092
C379	10 mf., 450V	RCE-100
C355	40 mf., 300V	RCE-100
C272	10 mf., 150V	RCE-100
C451	300 mf., 150V	RCE-110
C452	125 mf., 350V	RCE-111
C453	80 mf., 300V	RCE-112
C454	20 mf., 350V	RCE-115
C423	50 mf., 100V	RCE-115
C309	100 mf., 75V	RCE-115
TRIMMERS		
C207	Trimmer	RCY-048
C230	Trimmer	RCY-048
C213	Trimmer	RCY-059
C206	For high channel trap	RCY-060

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Brightness 500K	R276	RRC-130
Hor. Hold 125K	R365	RRC-136
Vert. Hold 100K	R305	RRC-136
Vert. Lin.	R311	RRC-127
Height 3 meg.	R308	RRC-096
Volume 500K	R412	RRC-128(16T1, 2)
Volume 500K	R412	RRC-131(16C110, 1, 5)
Picture, 2 meg.	R258	RRC-128 (16T1, 2)
Picture, 2 meg.	R258	RRC-131(16C110, 1, 5)
Focus 100K	R421	RRC-130
Hor. Drive 25K	R369	RRC-140
WIREWOUND & SPECIAL		
1700 ohms, 5W	R427	RRW-045
4.6 ohms, 5W	R451	RRW-048
20 ohms, Global temp. comp.	R454	RRW-051
43 ohms, 4W	R220	RRW-049
20 ohms, Global temp. comp.	R382	RRW-052
10.5K, Global Voltage sensitive resistor	R382	RRW-052
4K ohms, 7W	R380	RRW-053

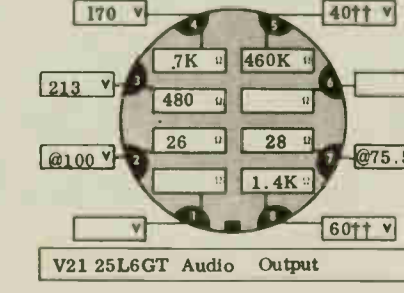
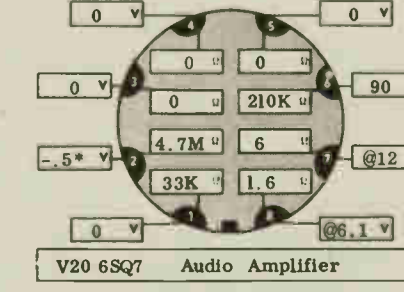
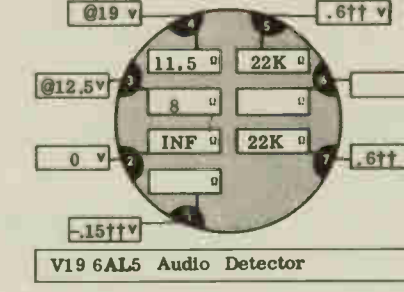
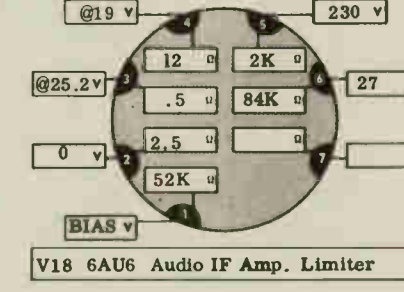
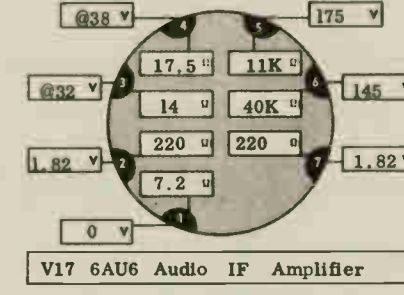
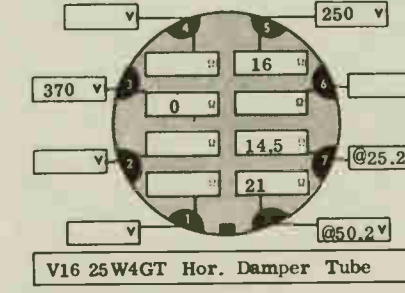
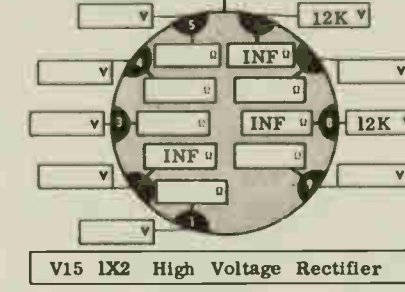
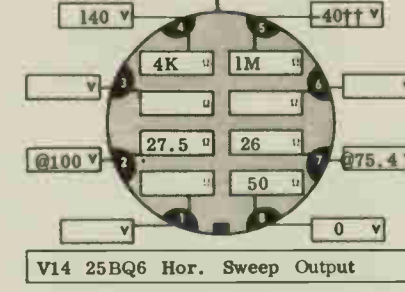
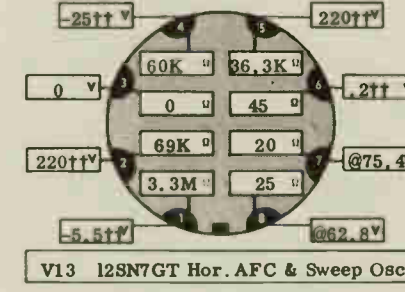
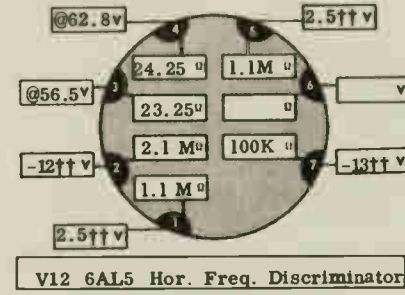
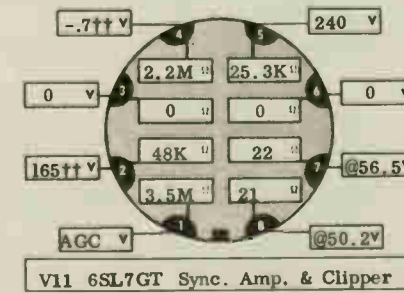
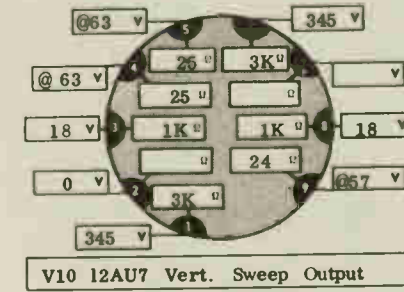
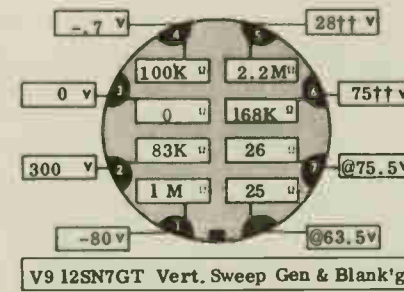
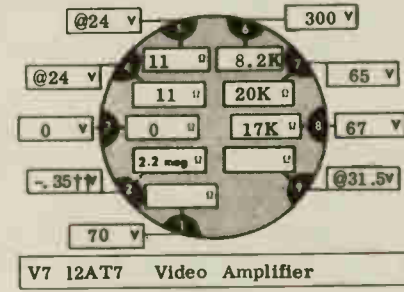
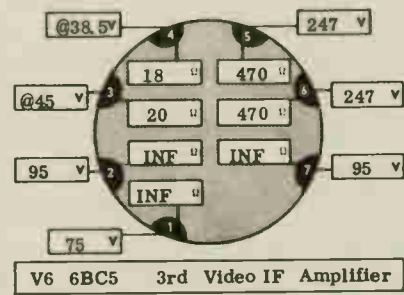
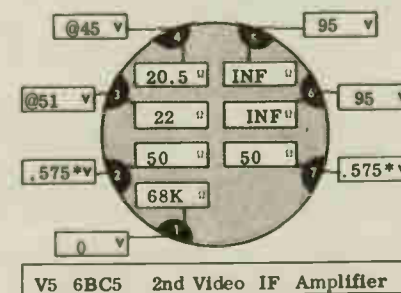
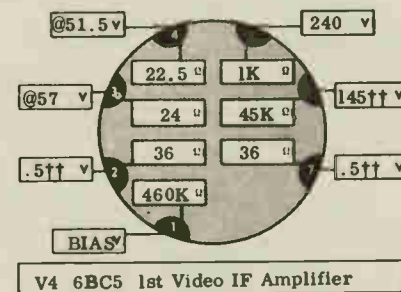
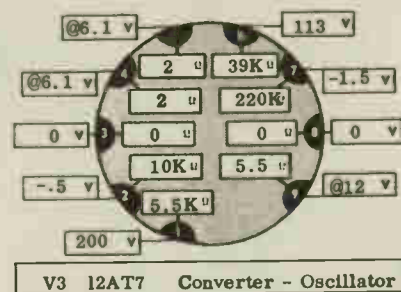
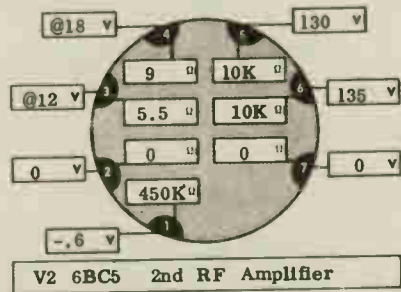
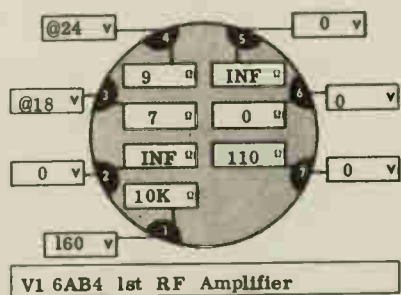
COILS		
REF. NO.	DESCRIPTION	PART NO.
L201	Input	RLA-034
L202	Choke	RLI-106
L353	Width control	RLD-014
L218	Cathode choke	RLI-003
L226, 7, 218, 19. Conv. plate		RLP-016
L251	2nd Video IF	RLI-096
L252, 43, IF Coil		RLI-110
L254, 45, Video detector		RLX-029
L256	Choke	RLF-024
L257, 53, Video Choke		RLI-038
L259	Video choke	RLI-093
L260, 0, 71, Trap 4.5 mc vid. trap		RLI-100
L264	Video choke	RLI-109
L261	Video choke	RLI-108
L351	Horizontal osc.	RLC-091
L352	Hor. linearity	RLD-016
L401	Focus	RLF-038
L402	Choke	RLI-085
L451	Filter reactor	RTL-096
L452, 53, 54, 55, 56, 58, Heater choke		RLI-122

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T301	RTO-064
Hor. Output	T351	RTO-085
Audio Output	T403	RTO-081 (16T1, 16T2)
Yoke	D351	RLD-024
Audio IF 1st	T401	RLI-097
Audio Output	T403	RTO-086 (16C110, 111, 115)
Ratio detector	T402	RTD-008

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
X451, 2	Selenium rectifier 300 ma.	RER-008
	Ion trap	RET-003
	RF tuner	RJX-040
B451	Cutout thermal	RSR-002
S401, 2	Switch focus	RSW-006
L52	Speaker (16C110, 11, 15)	S1200D7
L52	Speaker (16T1, 2)	S527D7

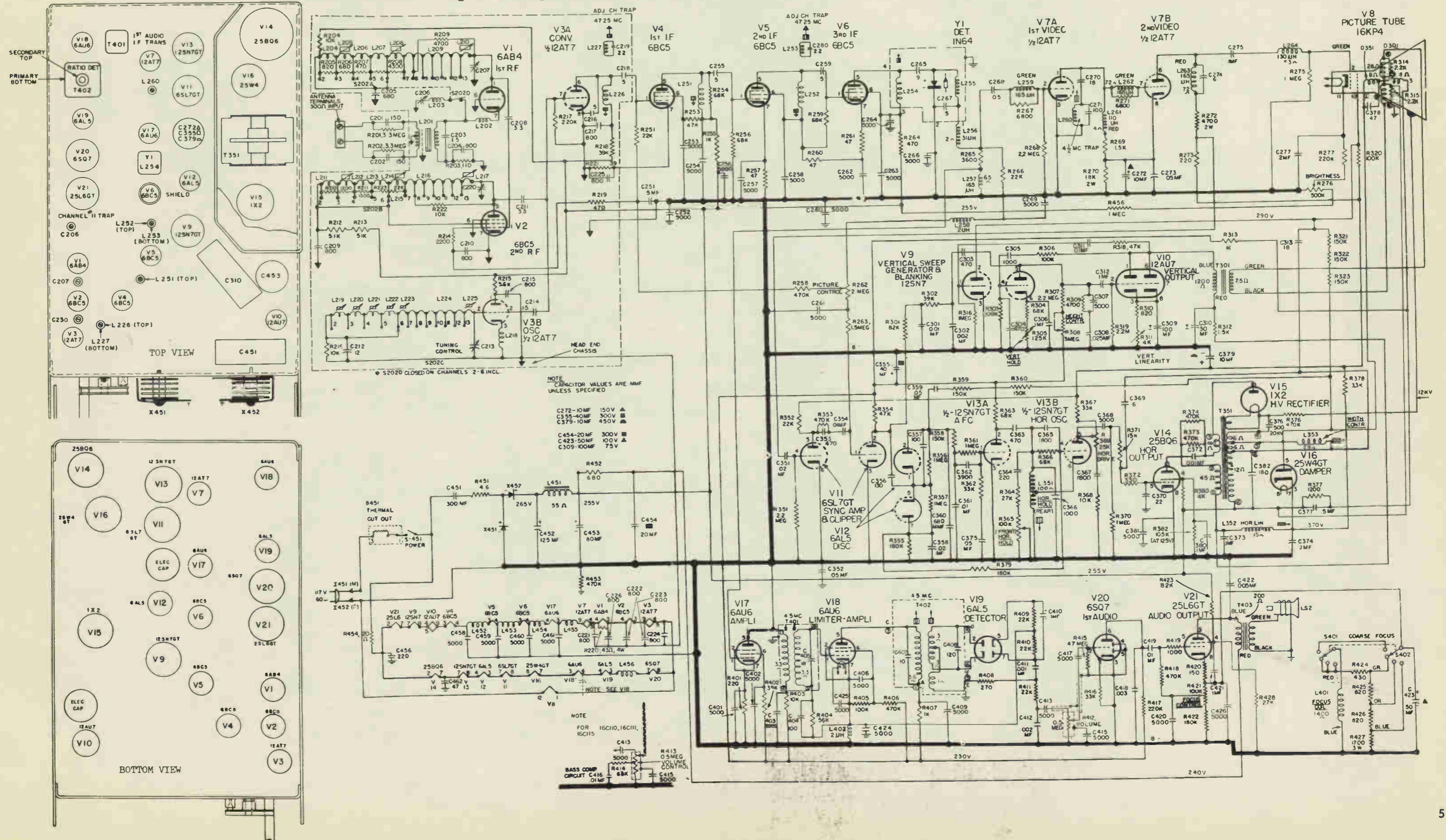


**TEST CONDITIONS**  
**Voltage Measurements:**  
 Input 117V, 60 cycles.  
 All controls set for normal sweeps.  
 Measurements are in respect to B- with a 20K ohms/volt meter.  
 \* 2.5 volt range.  
 †† Voltage will vary more than 20%.  
 @ - AC Voltage Reading.

**Resistance Measurements:**  
 Short capacitor c453.  
 Short pin 3 of V16 to B-.  
 M denotes meg.  
 Inf. denotes infinite resistance.  
 Turn the following controls full clockwise: Focus control, contrast, brightness, vertical hold, vertical size, vertical linearity.  
 Values listed may have a tolerance of 20%.  
 DNM - Do Not Measure.

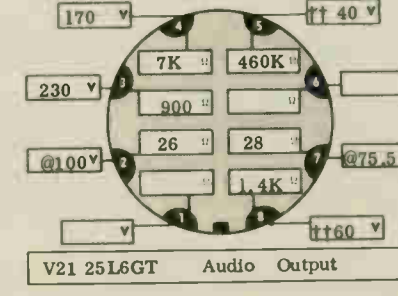
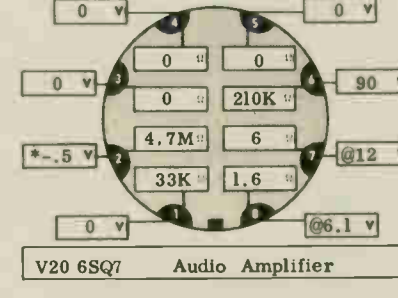
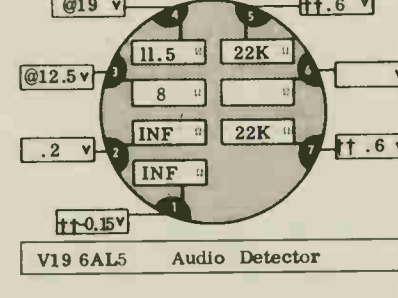
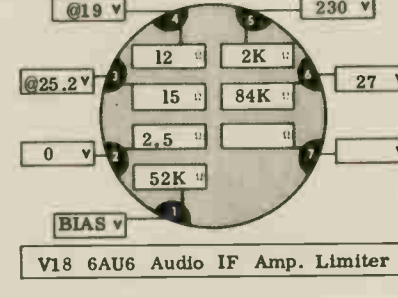
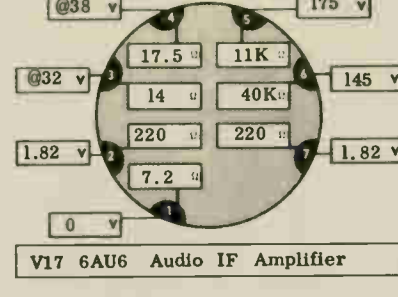
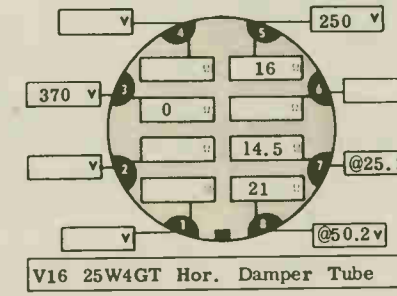
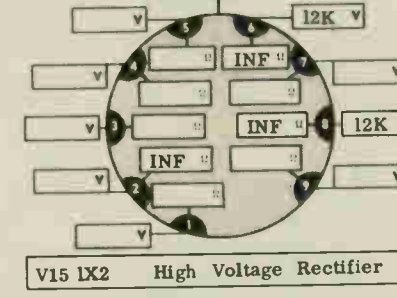
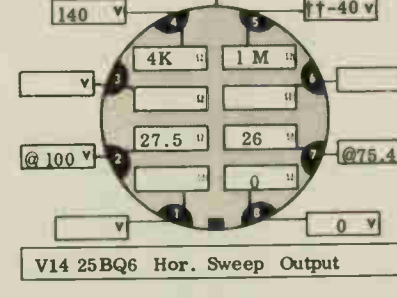
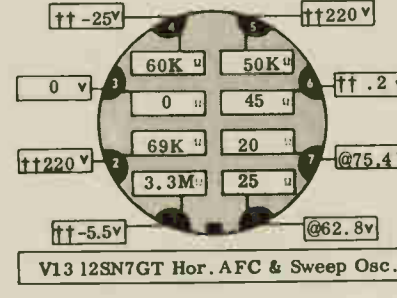
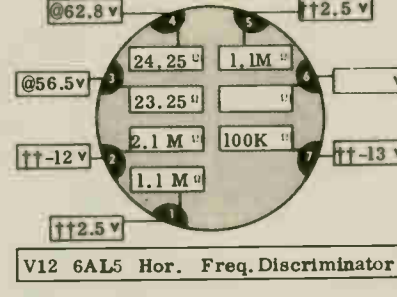
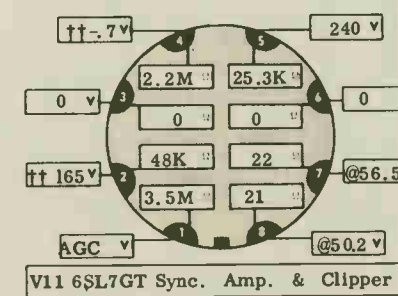
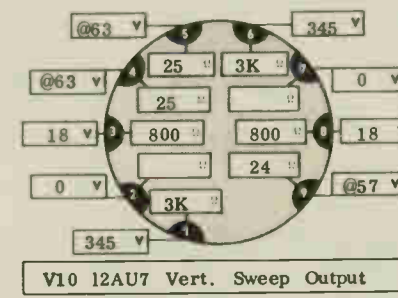
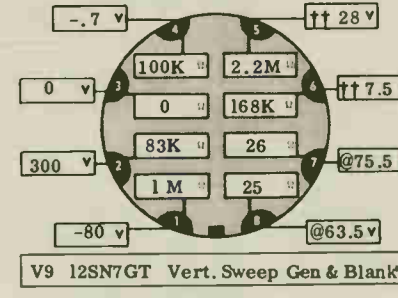
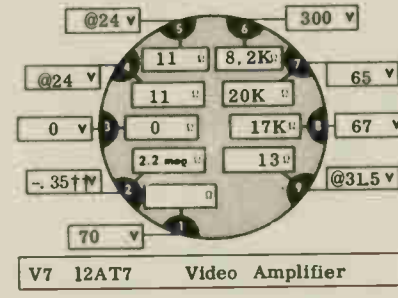
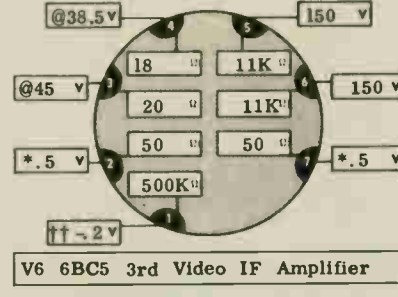
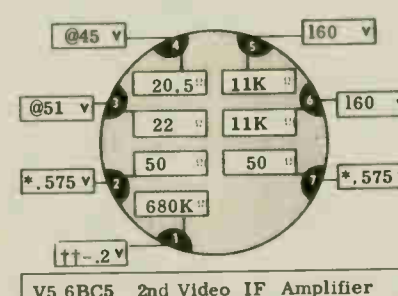
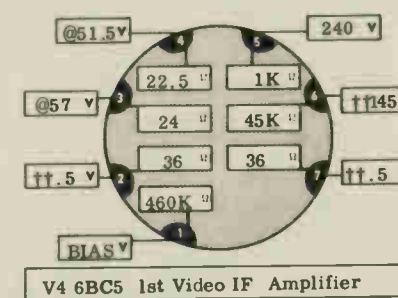
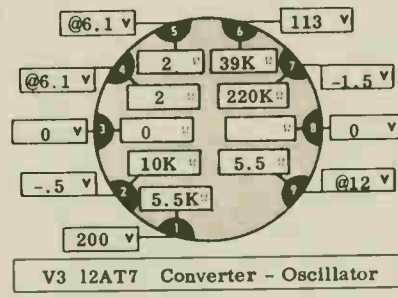
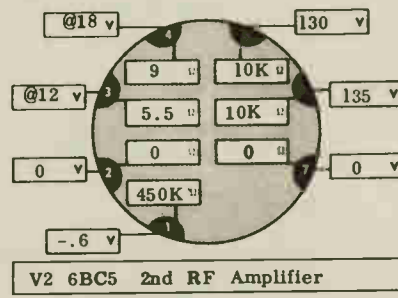
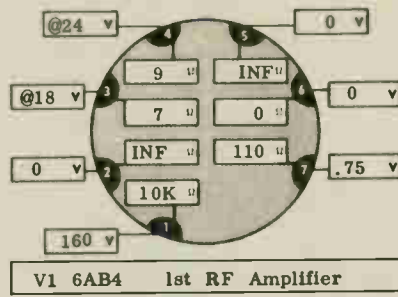
# 16C110, 16C111, 16C115, 16T1, 16T2

For Production Changes, see Page 109.



# 16C103, 16C104, 16C113, 16C116, 16T3, 16T4, 16T5, 16T6, 17C101, 17C102

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C410	1 mf., 50V	RCE-090
C310	30 mf., 450V	RCE-092
C451	300 mf., 150V	RCE-110
C452	125 mf., 350V	RCE-111
C453	80 mf., 300V	RCE-112
C454	20 mf., 350V	RCE-115
C423	50 mf., 100V	RCE-115
C309	100 mf., 75V	RCE-115
C272	40 mf., 300V	RCE-118
C355	10 mf., 150V	RCE-118
C379	10 mf., 450V	RCE-118
TRIMMERS		
C207	Trimmer	RCY-048
C213	Trimmer	RCY-059
C206	Trimmer for high Channel trap	RCY-060
C220	Trimmer	RCY-063
SPECIAL		
C354	.19, .311, .01mf., .1kV	RCN-018
C361	.01 mf., 10% 600V	RCN-025
C265	9mmf., silver mica.	RCN-029
C275	.1 mf., 600V	RCN-031
C365	67, 1800mmf., .600V	RCN-033
C362	3900 mmf., 10% 600V	RCN-034
C376	500 mf., 20K V HV	RCN-035
C378	47 mmf., 1500V mica	RCN-037
C351	.02 mfd., molded	RCN-044
CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Brightness	R276	RRC-145
Hor. Hold	R365	RRC-146
Vert. Hold	R305	RRC-146
Vert. Lin.	R311	RRC-127
Height, 3 meg.	R308	RRC-096
Contrast, 2 meg.*	R262	RRC-128
Contrast, 2 meg.**	R262	RRC-131
Volume, 500K *	R412	RRC-128
Volume, 500K **	R412	RRC-131
Hor. Drive, 25K	R369	RRC-140
Focus	R242	RRC-145
WIREWOUND & SPECIAL		
4.6 ohms, 5W	R451	RRW-048
43 ohms, 4W	R220	RRW-049
20 ohms, Globar temp comp.	R454	RRW-051
10.5K, Globar	R382	RRW-052
4K, 7W	R380	RRW-053
1.2 ohms, 1/2 w	R375	RRW-058
39 ohms, 1W	R381	RRW-059
COILS		
REF. NO.	DESCRIPTION	PART NO.
L201	Input	RLA-036
L202	Choke	RLI-106
L218, 19	26, 27, Converter plate	RLP-016
L251	2nd Video IF	RLI-096
L252, 53	IF	RLI-110
L254, 55	Video detector ass'y	RLX-029
L255, 56	Choke RF coil	RLF-024
L257, 63	Video choke	RLI-038
L259	Video	RLI-093
L260, 70, 71,	Trap 4.5MC video	RLI-100
L261	Choke Video	RLI-108
L264	Choke video	RLI-109
L351	Hor. oscillator	RLC-091
L352	Hor. Lin.	RLD-016
L353	Width	RLD-014
L401	Focus	RLF-039
L451	Reactor filter	RTL-096
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. output	T301	RTO-064
Hor. output	T351	RTO-090
Audio output**	T403	RTO-081
Audio output***	T403	RTO-086
Audio IF 1st	T401	RLI-097
Yoke	D301	RLD-025
Ratio detector	T402	RTD-008
Reactor filter	L451	RTL-096
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
X451, 2	Selenium rect., 350 ma.	RER-008
	Ion trap	RET-003
	RF tuner	RJK-043
B451	Thermal outcut	RSR-002
S201	Selector switch	RSW-082
	Speaker *	SS27D7
	Speaker †	SI200D7
	Diode Germ. crystal	IN64
	Speaker, 12" PM ††	12I2D7

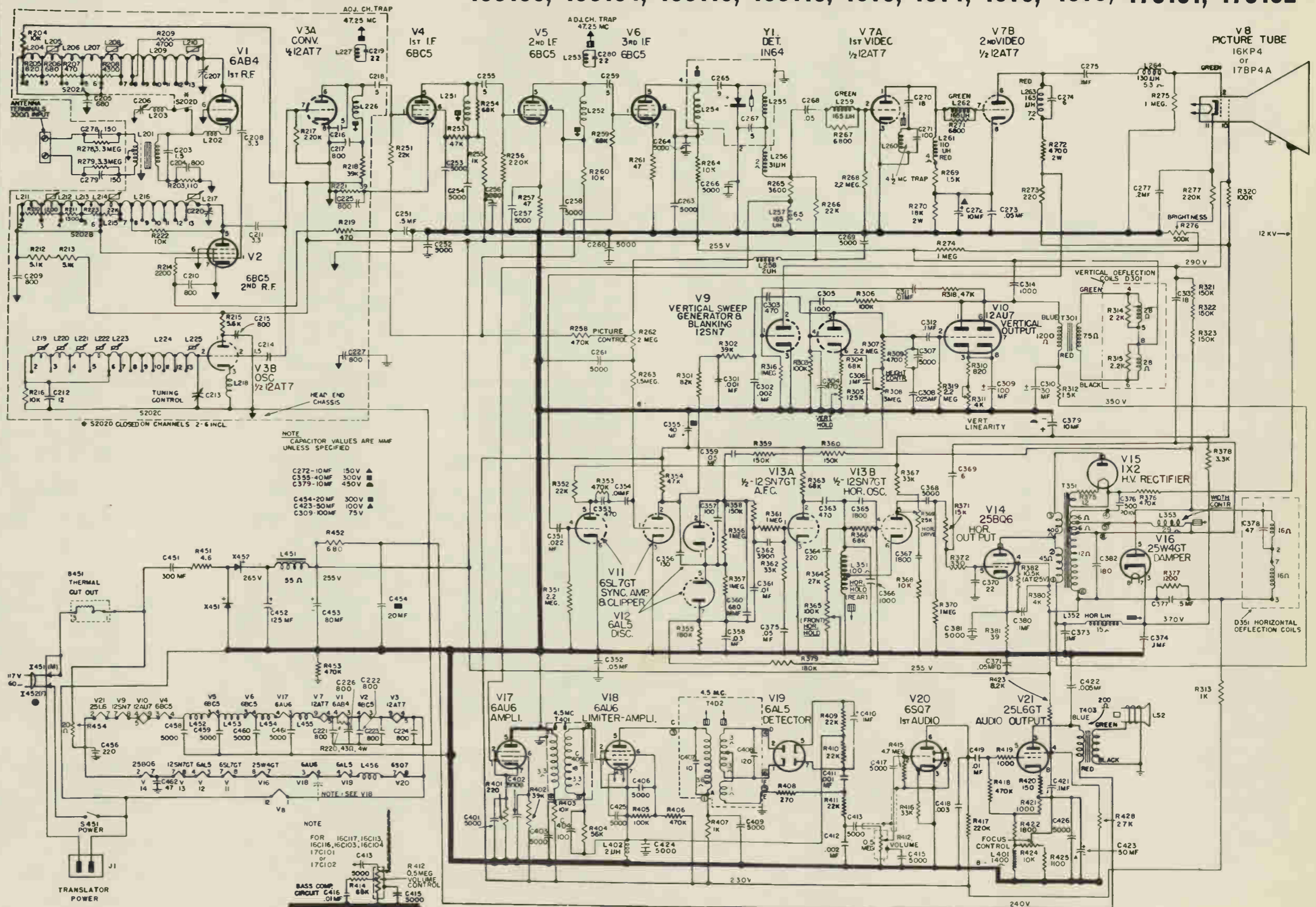
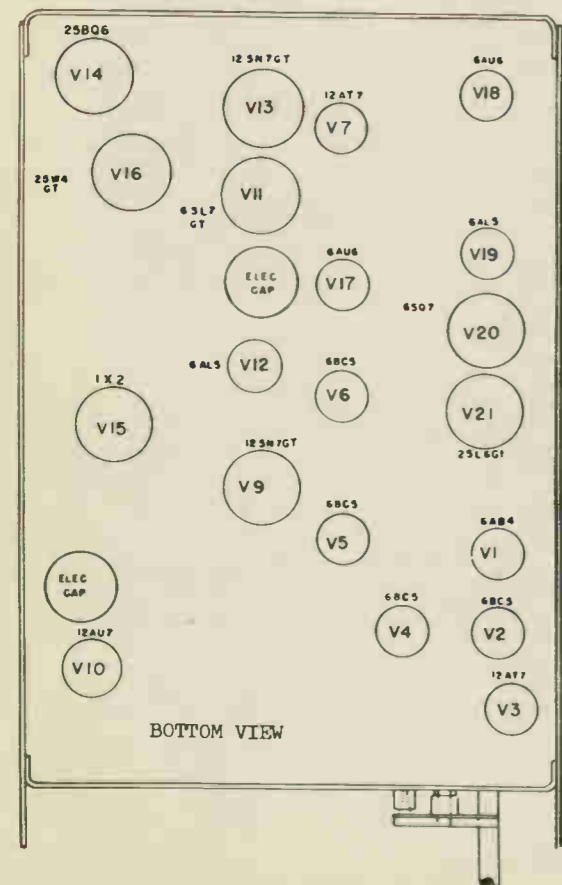
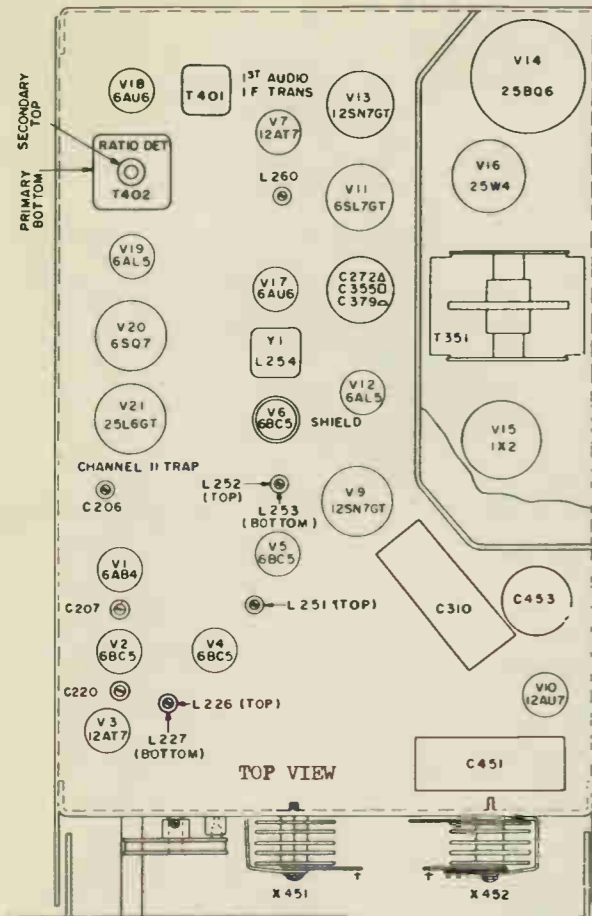


**TEST CONDITIONS**  
Voltage Measurements:  
Input 117V, 60 cycles  
All controls set for normal sweeps.  
Measurements are in respect to B- with a 20K ohm/volt meter.  
\* 2.5 volt range.  
†† Voltage will vary more than 20% @ - AC Voltage Reading.

**Resistance Measurements:**  
Short capacitor C453.  
Short pin 3 of V16 to B-M denotes meg.  
Inf. denotes infinite resistance.  
Turn the following controls full clockwise: Focus control, contrast, brightness, vertical hold vertical size, vertical linearity  
Values listed may have a tolerance of 20%.  
DNM - Do Not Measure

# 16C103, 16C104, 16C113, 16C116, 16T3, 16T4, 16T5, 16T6, 17C101, 17C102

For Production Changes, see Pages 109 and 110.



ELECTROLYTIC CONDENSERS

REF. NO.	DESCRIPTION	PART NO.
C410	1 mf., 50V	RCE-090
C310	30 mf., 450V	RCE-092
C379	10 mf., 450V	RCE-100
C355	40 mf., 300V	RCE-100
C272	10 mf., 150V	RCE-100
C451	300 mf., 150V	RCE-110
C452q	125 mf., 350V	RCE-111
C453	80 mf., 300V	RCE-112
C454	20 mf., 350V, 50 mf.	RCE-115
C309	100V, 100mf., 75V	
C272	10 mf., 450V	RCE-118
C355	40 mf., 300V	RCE-118
C379	10 mf., 150V	RCE-118
TRIMMERS		
C207	6-2.4 mmf.	RCY-048
C213	2-1 mmf.	RCY-059
C206	For high channel trap .7-7 mmf.	RCY-060
C220	3-1.4 mmf.	RCY-063

CONTROLS

DESCRIPTION	REF. NO.	PART NO.
Volume, 0.5 meg.	R430	RRC-147
Brightness, 500K	R286	RRC-144
Hor. Hold, 100K	R381	RRC-146
Vert. Hold, 125K	R305	RRC-146
Vert. Size, 3 meg.	R308	RRC-096
Vert. Lin. 4K, 2W	R311	RRC-127
Hor. Drive, 25K, 1/2W	R369	RRC-140
Focus, 100K	R435	RRC-144
Contrast, 2 meg.	R285	RRC-147
WIREWOUND		
4.6 ohms, 5W	R451	RRW-048
43 ohms, 4W	R220	RRW-049
20 ohms, Globar temp comp	R454	RRW-051
10,500 ohms, Globar	R382	RRW-052
4K, 7W	R380	RRW-053

COILS

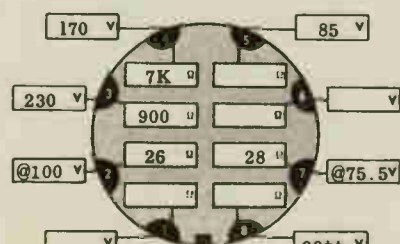
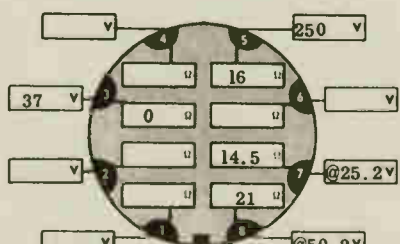
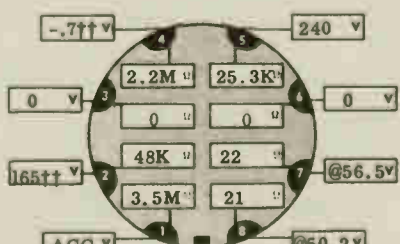
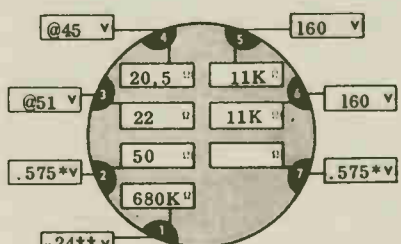
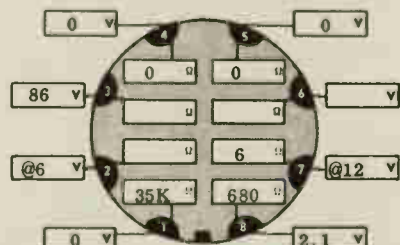
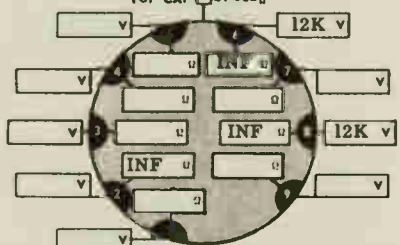
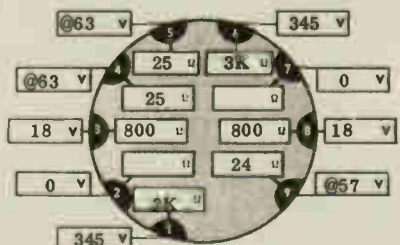
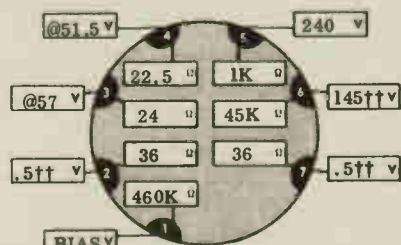
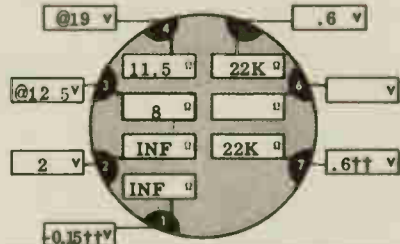
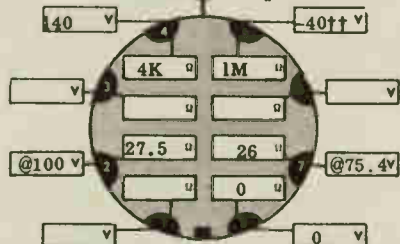
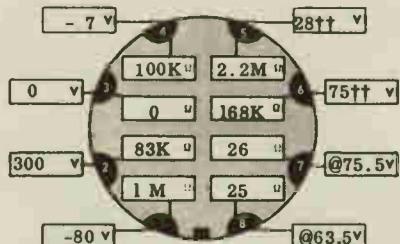
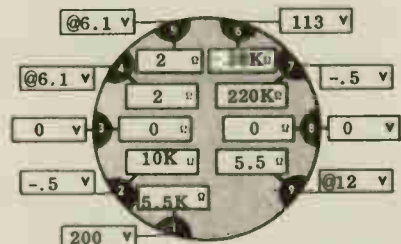
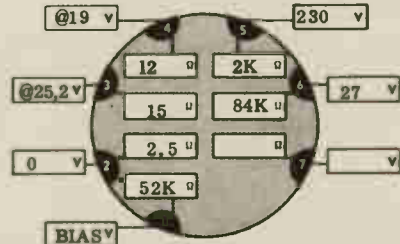
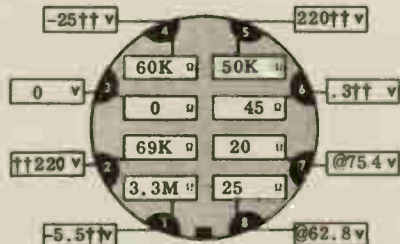
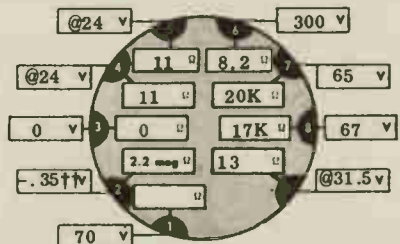
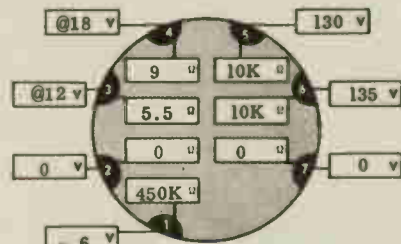
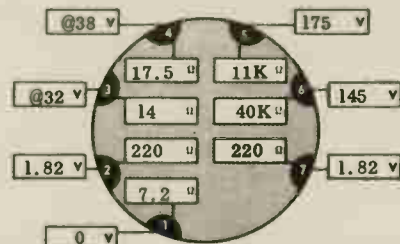
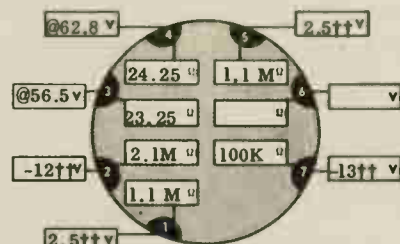
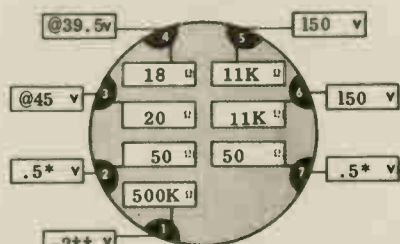
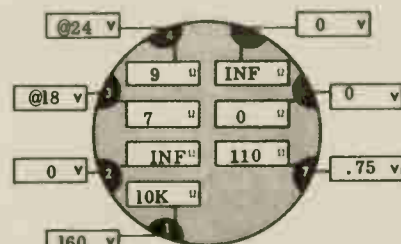
REF. NO.	DESCRIPTION	PART NO.
L201	Input transformer	RLA-036
L202	RF choke	RLI-006
L218	Cathode choke	RLI-003
L226, 7	Converter plate	RLP-016
L251	2nd Video IF	RLI-096
L252, 3	IF plate	RLI-110
L254, 5	Video detector assy.	RLX-029
L256	RF, 31 uh.	RLF-024
L257, 6	Vid. choke, 165 mic.	RLI-038
L259	Vid. choke, 165 mic.	RLI-093
L260, 7, 71	4.5 mc vid. trap	RLI-100
L261	Vid. choke, 110 mic.	RLI-108
L264	Vid. choke, 130 mic.	RLI-109
L351	Horizontal oscillator	RLC-091
L352	Hor. Linearity	RLD-016
L353	Width control	RLD-014
L451	Reactor filter	RTL-096
	RF Head-end	RJX-043
	AM loop assembly	RLL-0404
L401	Focus	RLF-039

TRANSFORMERS

DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T301	RTO-064
Hor. Output	T351	RTO-090
Yoke	D301	RLD-025
Audio IF 1st	T401	RLI-097
Ratio detector	T402	RTD-008
Reactor filter	L451	RTL-096
Interstage	T406	RTM-005

MISCELLANEOUS

REF. NO.	DESCRIPTION	PART NO.
X451, 2	Selenium rectifier 350 ma.	RER-008
	Ion trap, single magnet	RET-003
B451	Cut out Thermal	RSR-002
S202	Channel selector switch	RSW-082
S403, 7	Pushbutton switch	RSW-083
	Crystal diode	IN64
	Record changer - 3 speed changer	P15
	12" PM speaker	S1212D-7

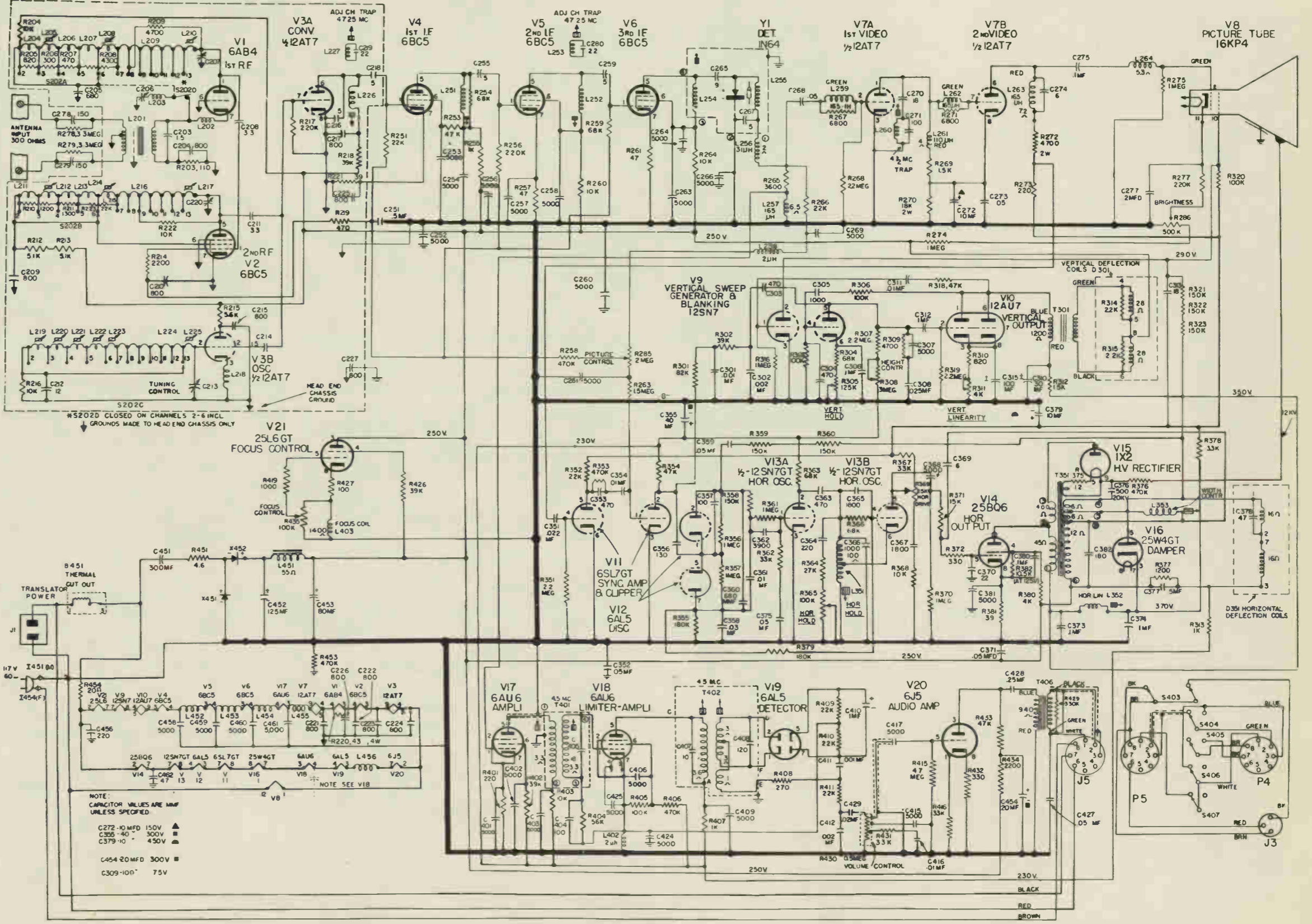
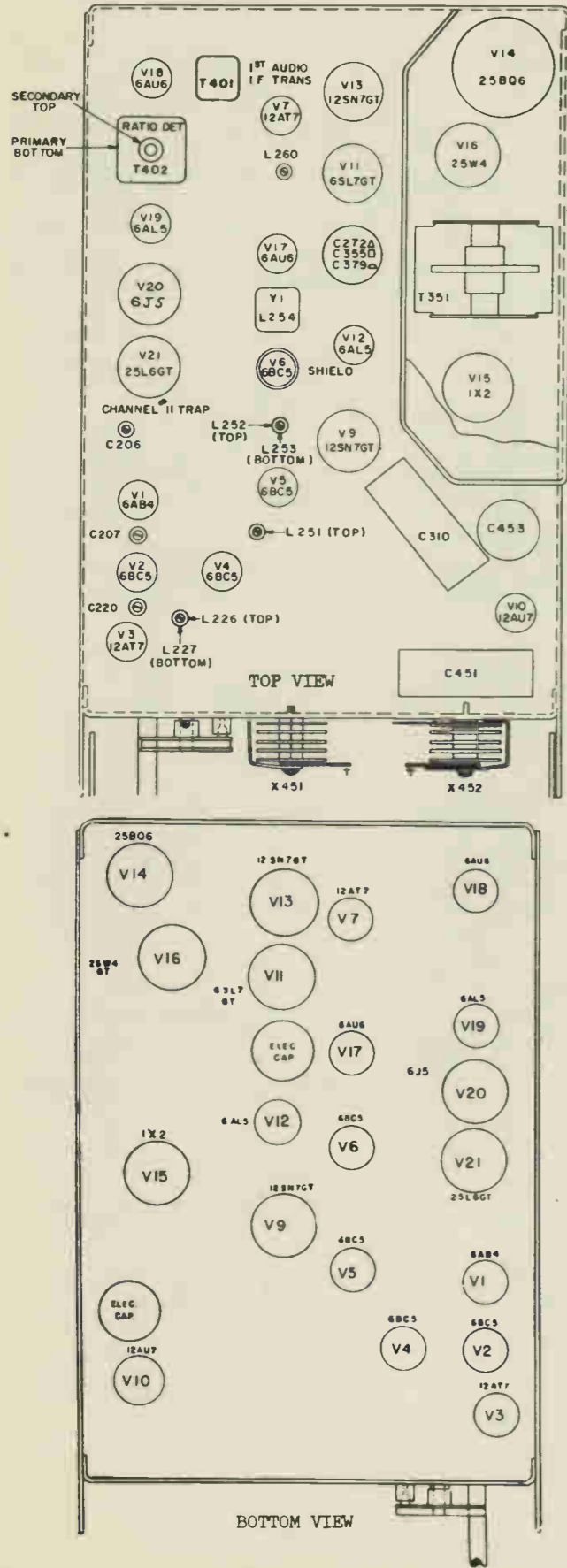


**TEST CONDITIONS**  
**Voltage Measurements:**  
 Input 117V, 60 cycles.  
 All controls set for normal sweeps.  
 Measurements are in respect to B- with a 20K ohms/volt meter.  
 \* 2.5 volt range.  
 †† Voltage will vary more than 20%.  
 @ - AC Voltage Reading.

**Resistance Measurements:**  
 Short capacitor C453.  
 Short pin 3 of V16 to B-.  
 M denotes meg.  
 Inf. denotes infinite resistance.  
 Turn the following controls full clockwise: Focus control, contrast Brightness, vertical hold, vertical size, vertical linearity.  
 Values listed may have a tolerance of 20%.  
 DNM - Do Not Measure.



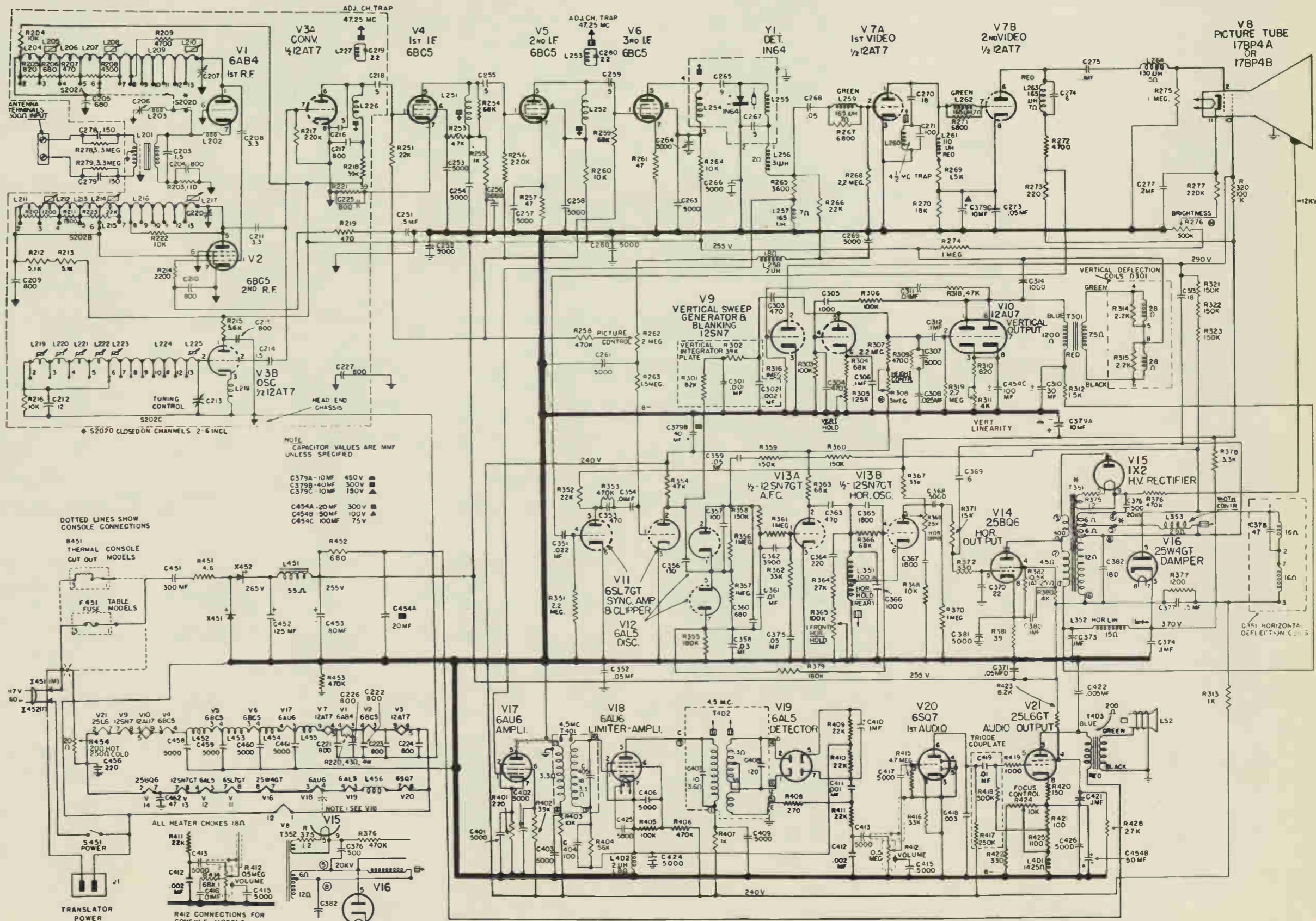
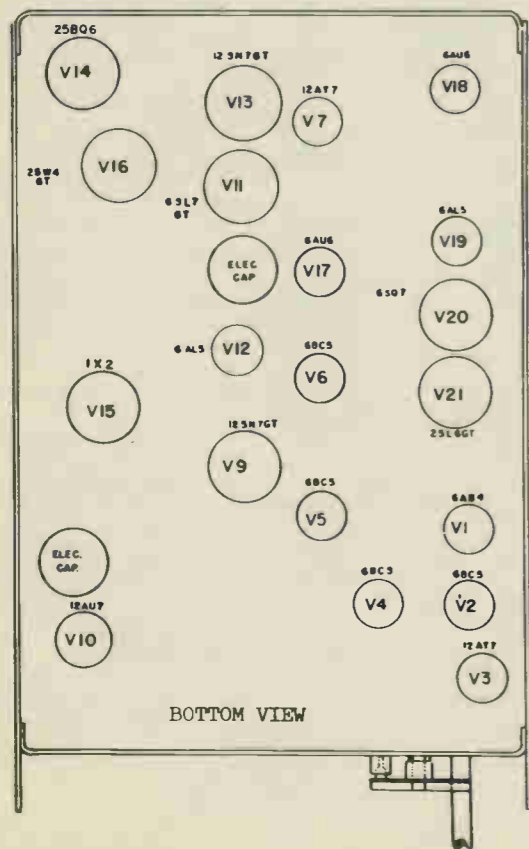
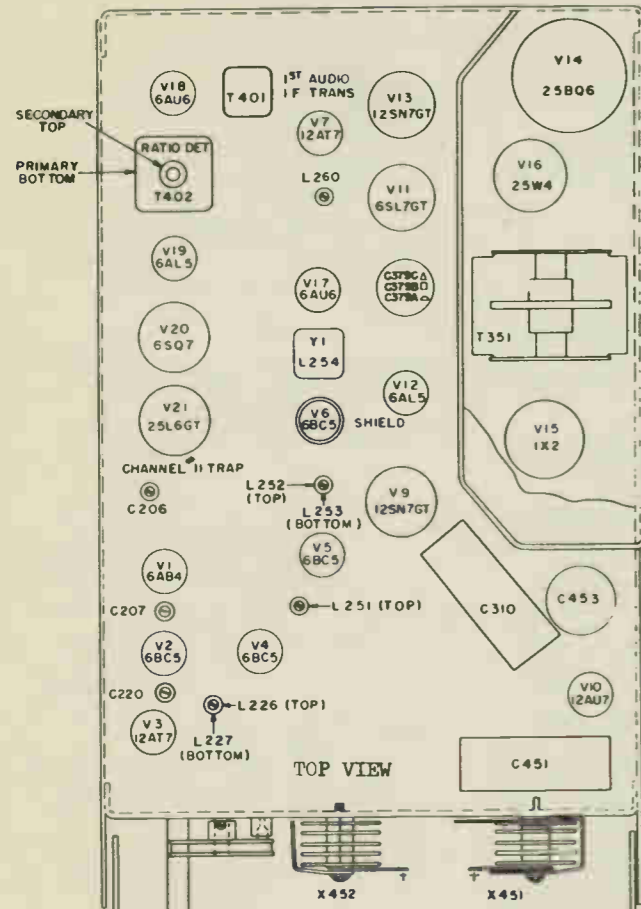
FOR RADIO USED WITH THESE CHASSIS, SEE PAGES 101, 102, 103.





For Production Changes, see Page 110.

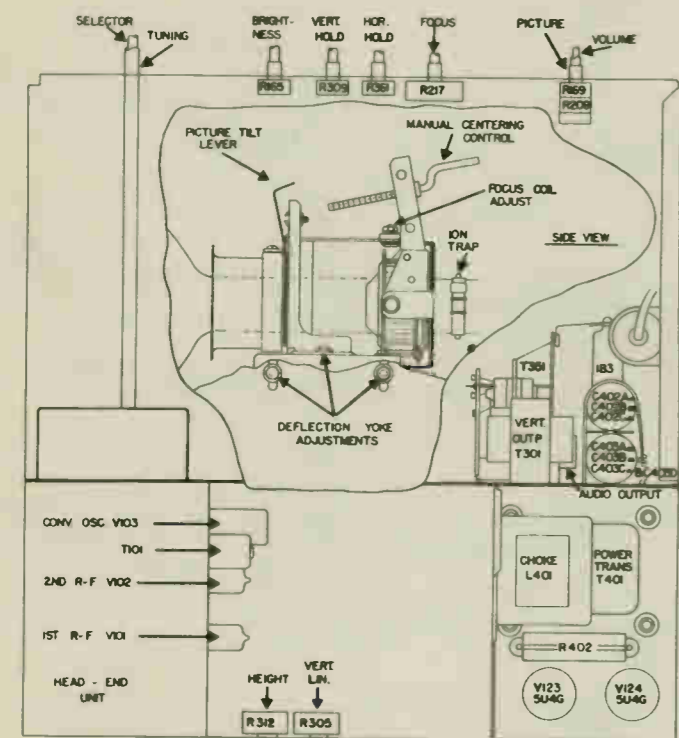
# 17C103, 17C104, 17C105, 17C107, 17C108, 17C109, 17C112, 17C114, 17T1, 17T2, 17T3, 17T4, 17T5, 17T6



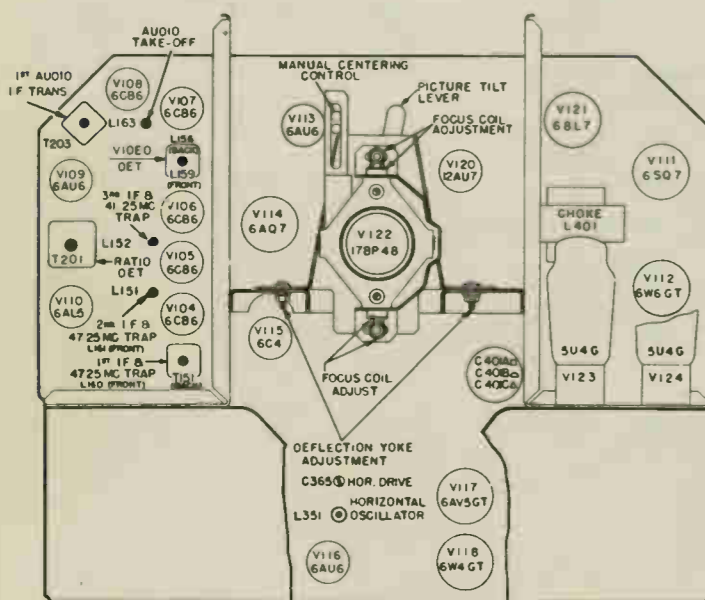


FOR "EARLY" AND "D" VERSION TUNERS, SEE PAGE 100.

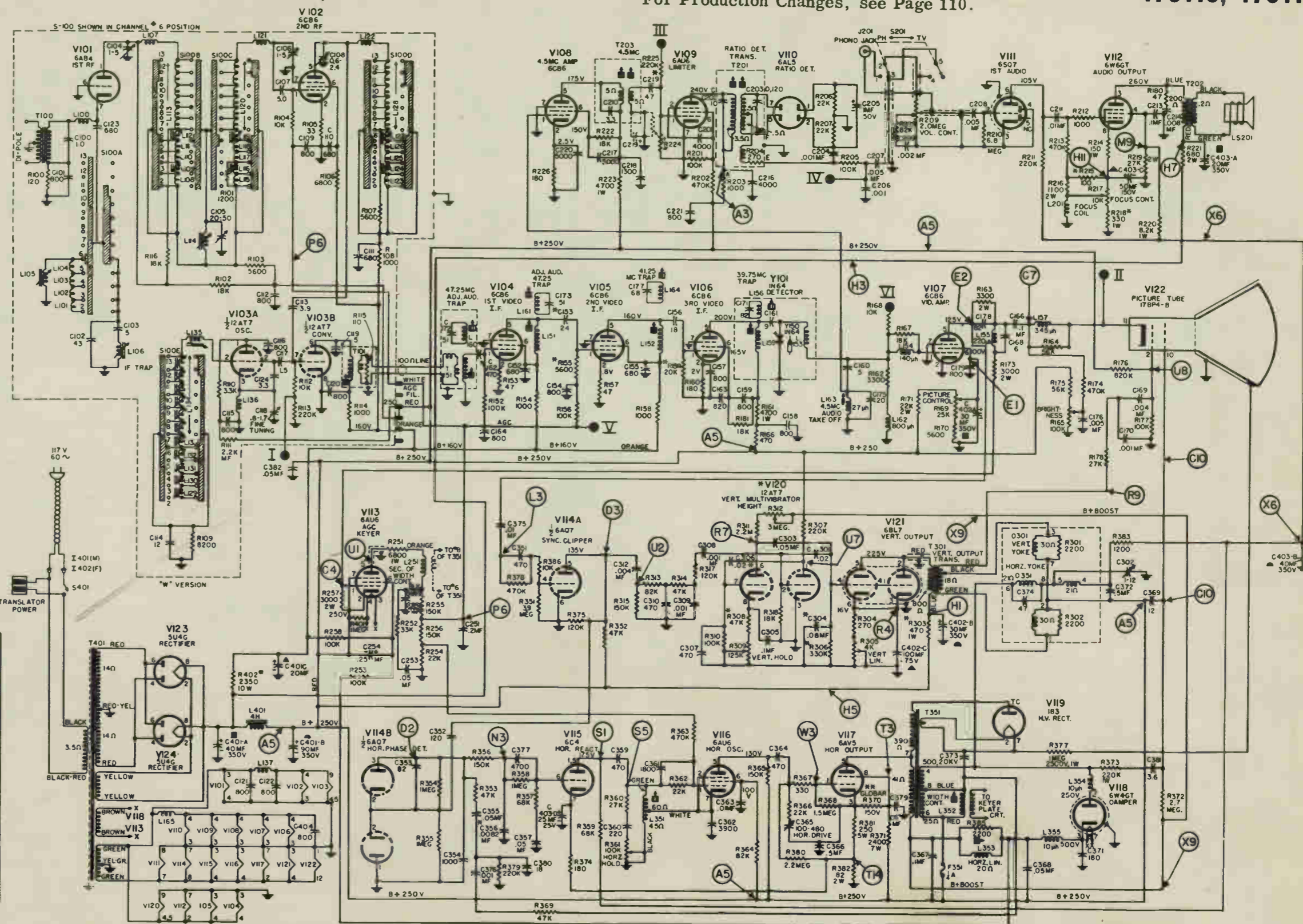
For Production Changes, see Page 110.



TOP VIEW



BACK VIEW



NOTE: IN EARLY PRODUCTION RECEIVERS THE FOLLOWING COMPONENTS WERE USED WITH DIFFERENT VALUES AS MARKED:  
 R115 - 9100Ω  
 R119 - 12000Ω  
 R175 - 100000Ω & 82000Ω  
 R181 - 33000Ω  
 R215 - 1000Ω  
 R218 - 1800Ω  
 R306 - 33000Ω  
 R402 - 2000Ω  
 C108 - .002MF  
 C133 - .01MF  
 C156 - .24MF  
 C356 - .015MF

V120 WAS 12AU7 WITH THE FOLLOWING CIRCUIT VALUES:  
 R303 - 1500Ω  
 R306 - 2.2MEG  
 R308 - 82000Ω  
 C304 - .04MF  
 C306 - .0033MF  
 † REWIRE

INDICATES TEST POINT.  
 ALL CAPACITY VALUES ARE IN MMF UNLESS OTHERWISE SPECIFIED.  
 ALL RESISTORS ARE 1/2 WATT  
 ††† OPEN RESISTOR DOES NOT INDICATE DEFECTIVE COMPONENT.

# 17T7, 17C113, 17C115, 17C117, 17C120

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C310	30 mf., 450V	RCE-136
C379A	10 mf., 450V	RCE-118
C379B	40 mf., 300V	RCE-118
C379C	10 mf., 150V	RCE-118
C410	1 mf., 50 V	RCE-090
C451	300 mf., 150V	RCE-110
C452	125 mf., 350V	RCE-111
C453	80 mf., 300V	RCE-112
C454A	20 mf., 300V	RCE-134
C454B	100 mf., 75V	RCE-134
TRIMMERS		
C104,6	1-5 mmf.	RCY-065
C105	20-50 mmf.	RCY-066
C108	.6-2.4 mmf.	RCY-048
C118	8-1.7 mmf., fine tuning control	RCY-067

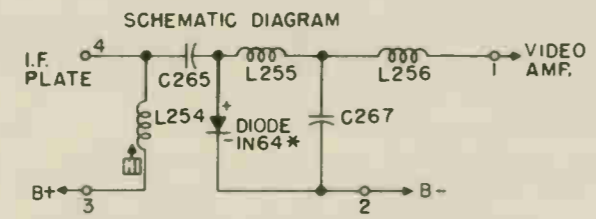
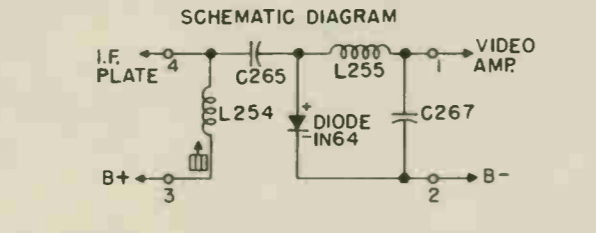
CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Brightness, 500K	R276	RRC-175
Hor. Hold, 100K	R365	RRC-173
Vert. Hold, 125K	R305	RRC-174
Vert. Lin., 4K, 2W	R311	RRC-127
Height, 3 meg.	R308	RRC-096
Hor. Drive, 25K, 20%, 1/2W	R369	RRC-140
Volume, 500K	R413	RRC-176
Volume (17C120 only)	R413	RRC-182
Volume (17T7 only)	R413	RRC-183
Contrast, 2 meg.	R280	RRC-176
Contrast (17C120 only)	R280	RRC-182
Contrast (17T7 only)	R280	RRC-183
WIREWOUND		
Triode coupler-.01 mfd.	C419	REK-002
250K, 500K	R417,8	
Vert. Integrator -.001 mfd.	C301,2	REK-003
.002 mfd., 39K, 82K		
4.6 ohms, 5w.	R451	RRW-048
4K, 7w	R380	RRW-053
31 ohms, Globar	R454	RRW-054
1.2 ohms, 1/2 w	R375	RRW-058
5600 ohms., 5w	R282	RRW-079
20 ohms,	R455	RRW-081
1500 ohms, 5w	R452	RRW-082
1400 ohms Globar, 140V	R382	RRW-088
2200ohms 5w	R281	RRW-092

COILS		
REF. NO.	DESCRIPTION	PART NO.
L100	Choke RF input V1	RLI-165
L106	Trap IF	RLI-159
L136	Choke 1.4uh osc. "K"	RLI-136
L137	Choke .56 uh. V2, V3	RLI-144
L138	Choke RF	RLI-154
L251	2nd Video IF	RLI-096
L252,3	3rd IF coil & trap	RLI-110
L254	Video detector assy.	RLX-035
L255,6	Choke 31 uh. R.F.	RLF-024
L257,263	Choke 165 uh. video	RLI-162
L259	Video comp choke	RLI-093
L260	Trap 4.5mc video	RLI-100
L261	Choke 110 uh.	RLI-108
L262	Choke video	RLI-161
L264	Choke 130 uh.	RLI-109
L351	Horiz. hold	RLC-091
L352	Horiz. lin.	RLD-016
L353	Width control	RLD-014
L451	Filter choke	RTL-096
L258,402,452,3,4,5,6.	2 uh. Heater choke	RLI-122

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Hor. Output	T351	RTO-114
Audio Output	T404	RTO-032
Yoke	D301	RLD-040
Coil 1st Audio I-F	T401	RLI-097
Sweep Output	T301	RTO-064
Output (17T7)	T404	RTO-081
Output (17C117)	T404	RTO-082
Fl. V1, V2, V3	T451	RTF-002
Filter choke	L451	RTL-096
Video I-F	T101	RTL-126
Video I-F input	T200	RTL-127
Ratio detector	T402	RTD-008
Antenna input	T100	RLA-037

## PRODUCTION CHANGES MODELS 17T7, 17C113 17C115, 17C117, AND 17C120

**REDUCTION OF CHANNEL 6 "TWEET"** - To reduce channel 6 "tweet" the choke L256 was incorporated into the detector assembly which carries the new part No. RLX-034, see below. When replacing the old assembly with the new one, it will be necessary to short out the old L256 choke.

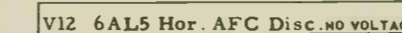
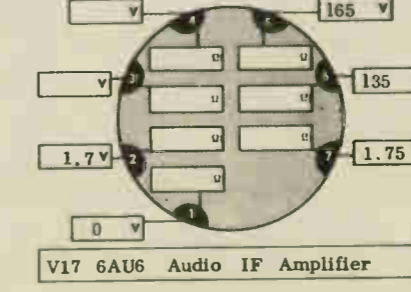
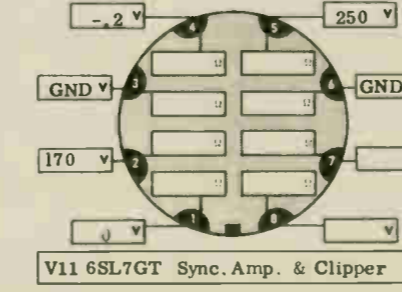
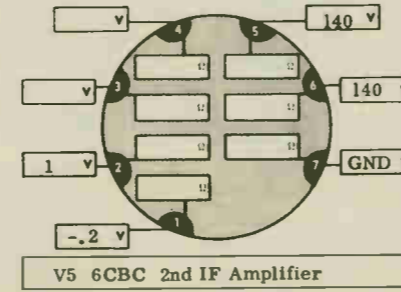
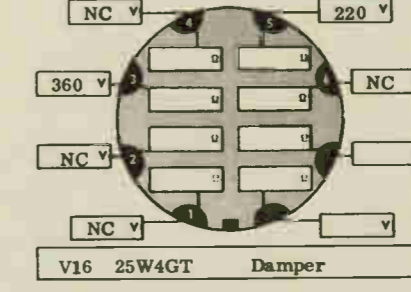
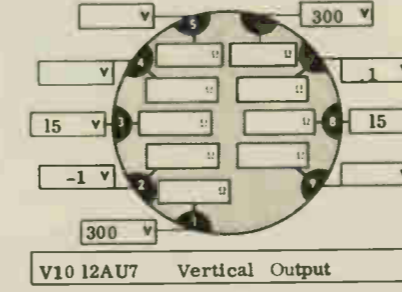
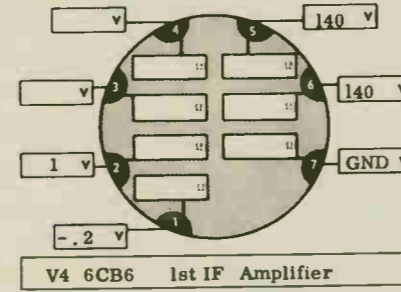
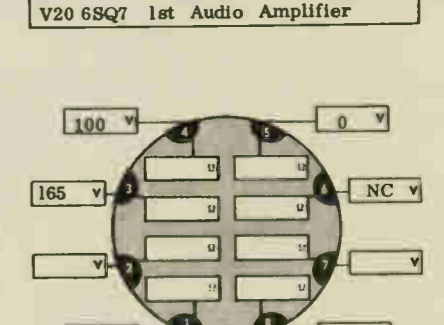
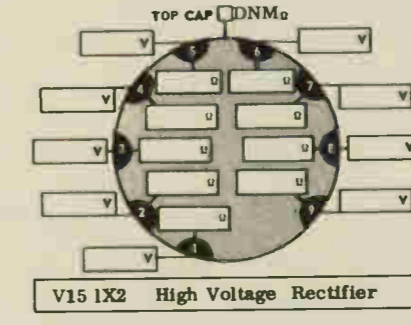
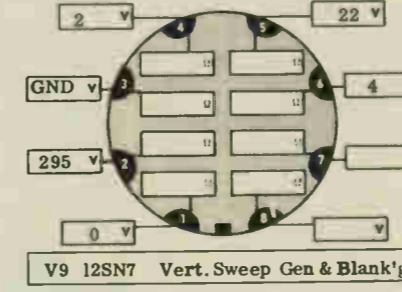
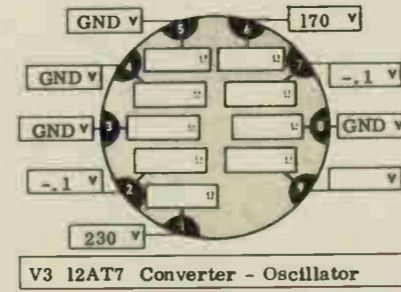
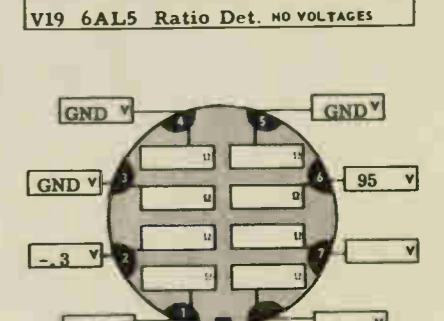
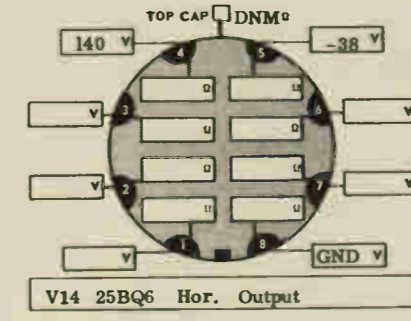
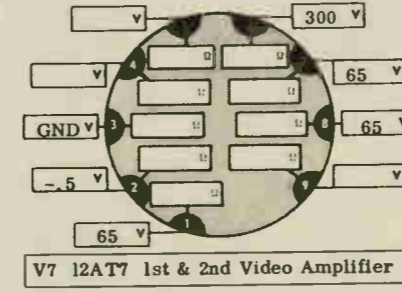
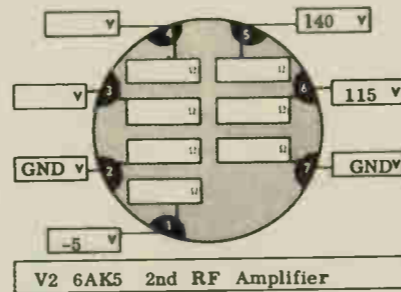
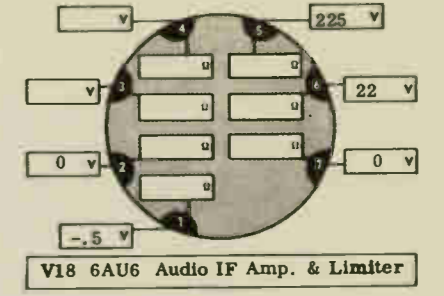
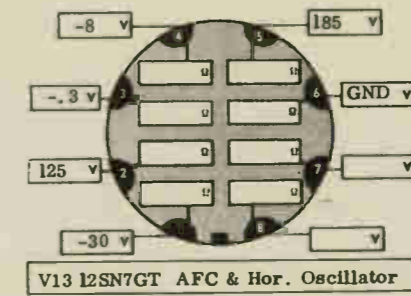
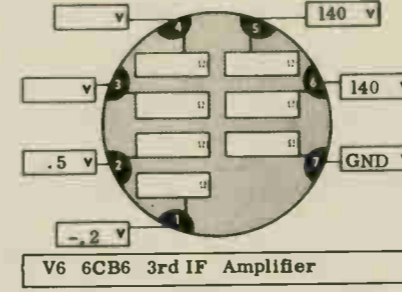
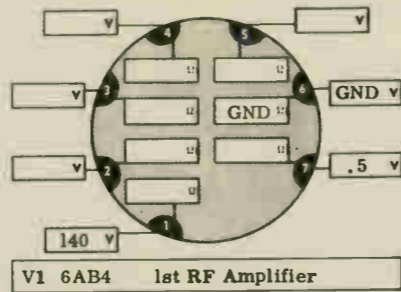


### VIDEO DETECTOR ASSEMBLY VERSIONS

To facilitate replacement of the diode an improved design RLX-035 (marked with a red dot on top of the assembly) was used to provide top mounting of the diode. It is merely necessary to slip off the cover of the assembly to expose the diode.

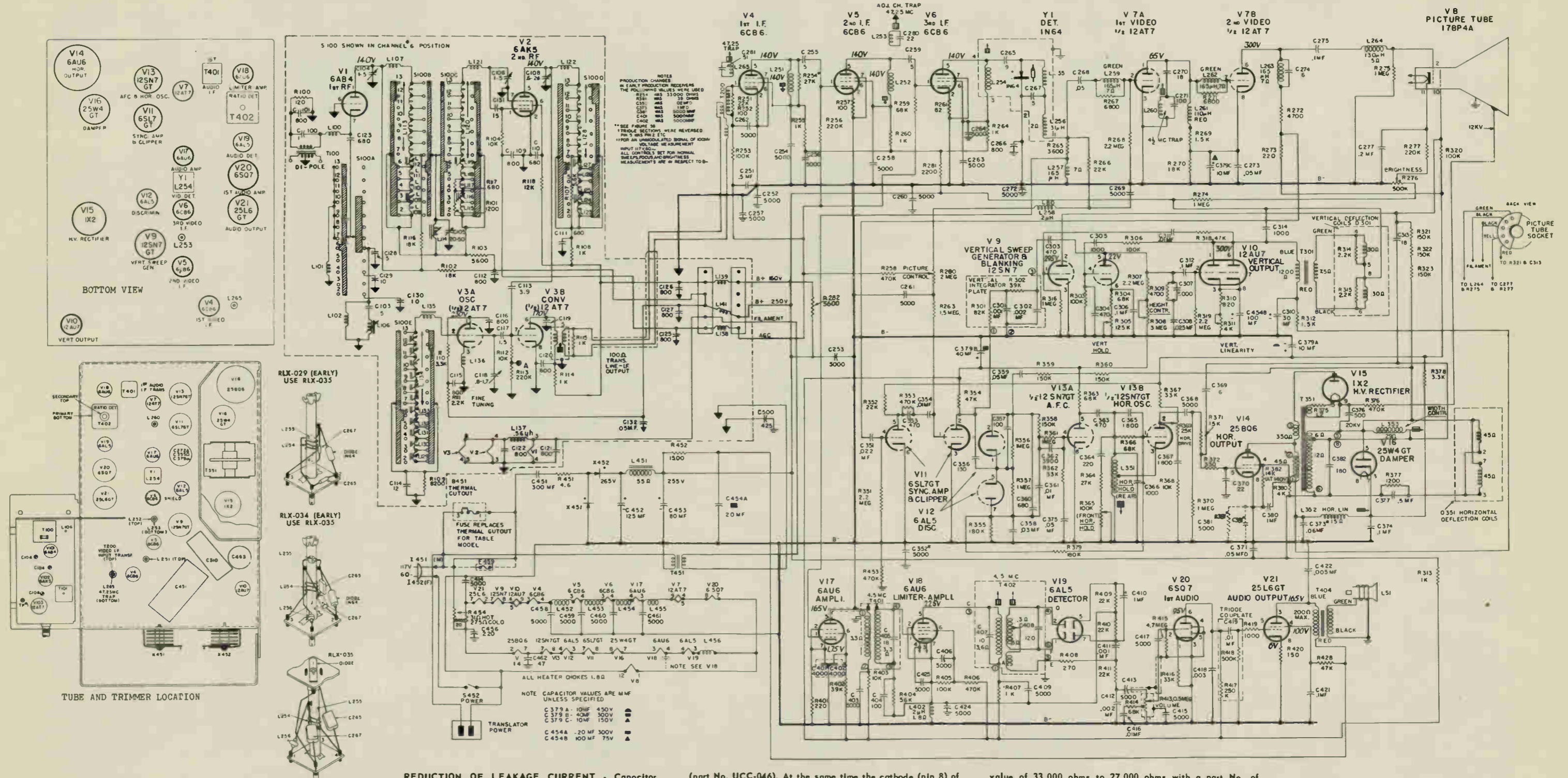
In some assemblies a special high efficiency diode is used, marked with a red dot. To maintain the same Q of the circuit and to obtain proper IF bandwidth a resistor of 12,000 is connected across the diode. In replacing this diode with normal stock do not use this resistor. In case of doubt check for proper bandwidth.

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
X451,2	Cap-MV rectifier	REC-006
	Selen. Rect. 350 ma.	RER-008
	Ion trap (for 17BP4B)	RET-003
	Ion trap without spring	RET-012
	PM Focus unit	RLF-049
B451	Thermal cutout	RSR-002 (console)
L51	Speaker, 5 1/4" PM	S527D (17T7)
LS1	Speaker, 12" PM	S1212D (console)
Y1	IN64 Crystal Diode	(Used in RLX-029)
	Crystal Detector	(Used in RLX-035)
S451	Switch	Part of RRC-176



### TEST CONDITIONS

All controls set for normal sweeps, focus and brightness.  
Measurements are in respect to B- with a 20,000 ohm/volt meter.  
All readings DC unless otherwise noted.



**REDUCTION OF LEAKAGE CURRENT** - Capacitor C352, from B- to ground was changed from a value of .05 mfd. to .02 mfd., UCC-041.

**BOWING OF VERTICAL LINES** - In order to improve horizontal linearity, capacitor C373 in horizontal linearity circuit was changed from a value of .1 mf. to .06 mf.

(part No. UCC-046). At the same time the cathode (pin 8) of horizontal output tube V14, 25BQ6 was connected directly to ground, removing R381 and C381. In late production receivers Ion trap RET-003 was replaced by a cunifee ring type RET-012 to further improve horizontal linearity.

**IMPROVEMENT OF 1ST VIDEO IF**-To equalize gain of the staggered IF stages resistor R254 was changed from a

value of 33,000 ohms to 27,000 ohms with a part No. of URD-083.

**6. CHANGE IN AUDIO IF**-The 5000 mmf. capacitors C402 and C401 were changed to a dual type of a value of 4000 mmf. each with the new part No. RCN-047.

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C22A	30 mf., 450V	RCE-103
C22B	200 mf., 50V	RCE-103
C32A	15 mfd., 450V	RCE-113
C32B	15 mfd., 450V	RCE-113
C32C	15 mfd., 450V	RCE-113
C35,6	60 mf., 300V	RCE-094
95,6		
C45A	30-30 mf., 450V	RCE-114
B,C	30 mf., 50V	RCE-019
C45A,B	30-30-15 mf., 450V	RCE-019
	30 mf., 50V	
C60	50 mf., 25V	RCE-048
C91	90 mf., 450V	RCE-017
C92	100 mf., 25V	RCE-108
C93	200 mf., 50V	RCE-104
C97,8	30-30 mf., 300V	RCE-009
C115	1K mf., 6V	RCE-106
C120	4K mf., 10V	RCE-096
C112	Air for TV tuning	RCY-062

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume, 2 meg.	R69A	RRC-079
Brightness, 2 meg.	R84B	RRC-117
Contrast, 500K	R84A	RRC-117
Vert. Hold 2 meg	R35	RRC-114
Vert. Size		
Vert. Lin. 2K, 2 w.	R40	RRC-133
Tone 500K	R69B	RRC-079
Height 250K	R36	RRC-115
Hor. peaking 10K	R50	RRC-116
Hor. cent., 500 ohms, 4w, w.w.	R87	RRC-120
Vert. centering 20, w.w.C.T.	R88	RRC-121
Focus 300 ohms, 25 w.w., w.w.	R74	RRC-132
SPECIAL		
55 ohms, 7 w., w.w.	R73	RRW-046
2.7 ohms, 1/2 w., w.w.	R51	RRW-050

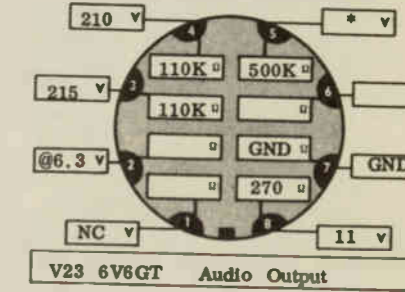
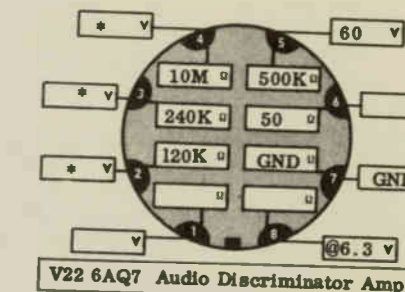
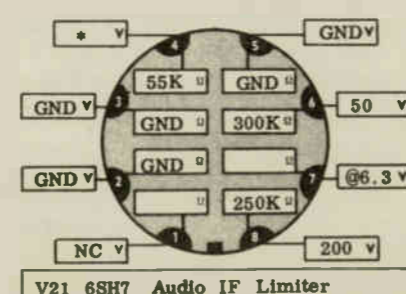
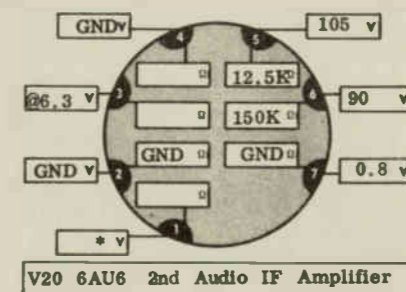
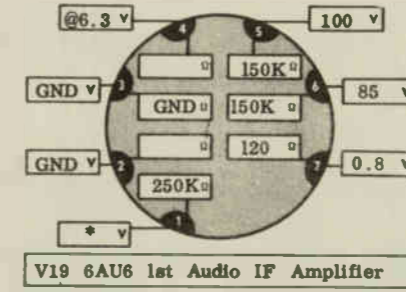
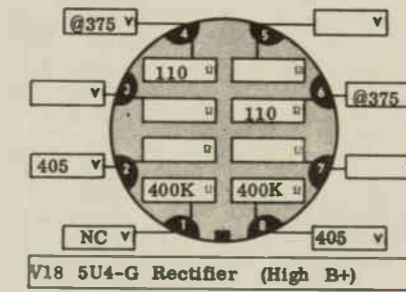
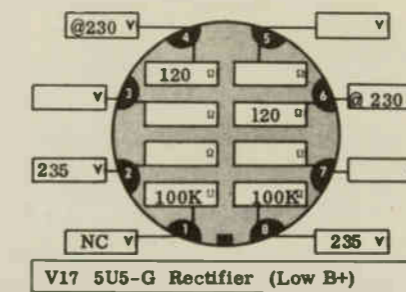
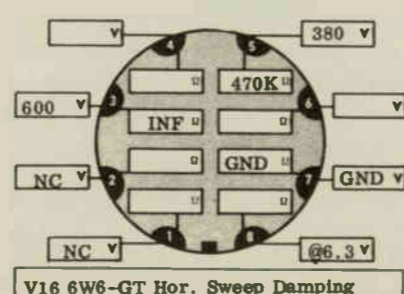
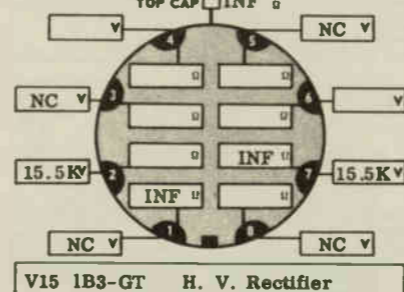
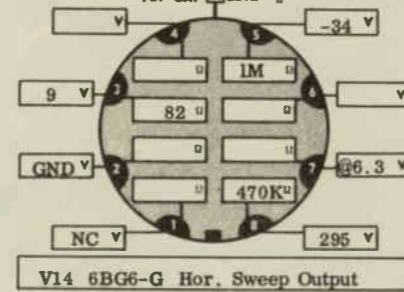
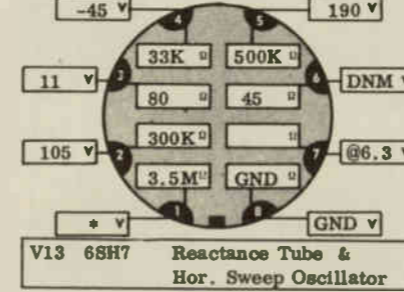
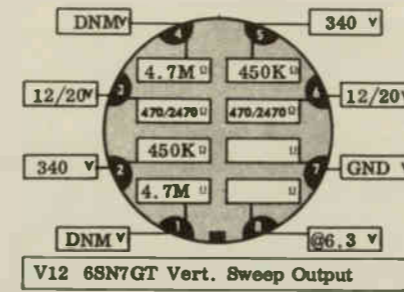
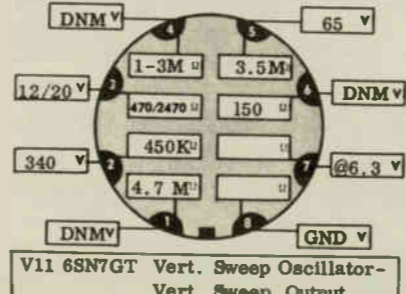
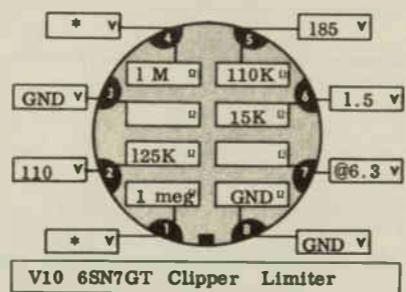
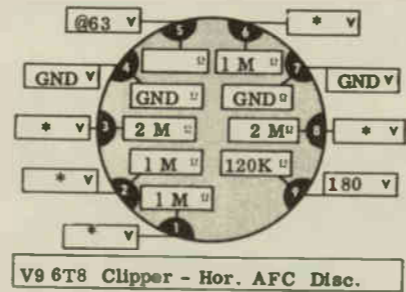
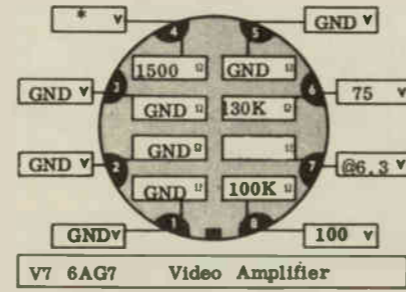
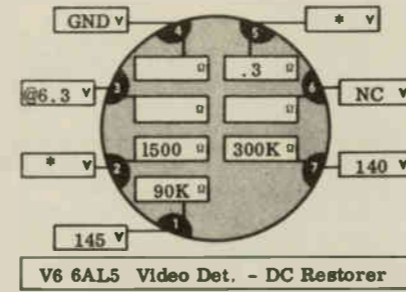
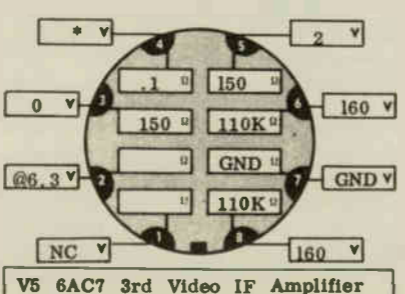
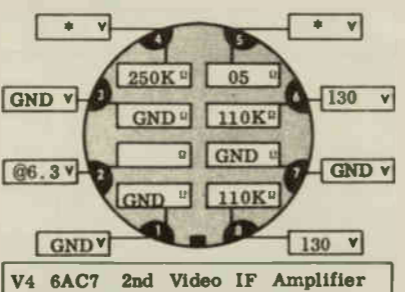
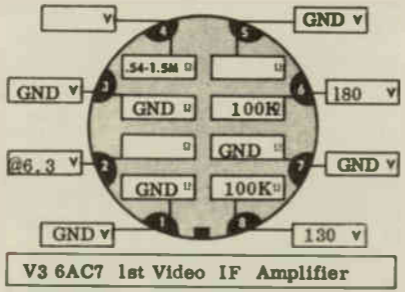
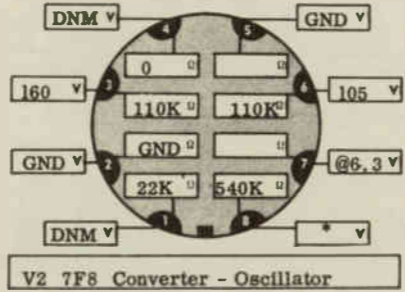
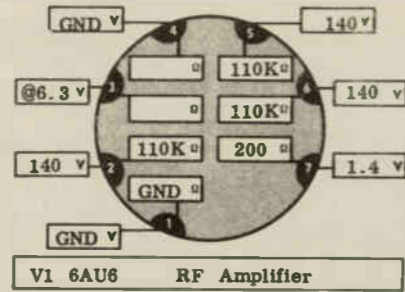
COILS		
REF. NO.	DESCRIPTION	PART NO.
L1	Filter choke, 7 hy., 140 ma. (plate supply)	RLF-018
L2	Filter choke, 7 hy., 140 ma. (plate supply)	RLF-019
L3, 10, 19	Choke R-F coupling	RLI-006
L4	Hor. linearity	RLD-014
L6	Osc. cathode	RLI-032
L7	Width control No. 1	RLD-018
L8	Focus	RLF-037
L9	Deflection yoke	RLD-023
L11	Filter choke (focus)	RLF-032
L12	Audio I-F	RLI-090
L13	Filter choke (plate sply)	RLF-031
L14	Plate video amplifier	RLI-039
L15	Plate video amplifier	RLI-038
L18	R-F coupling choke	RLI-003
L20	Choke-cathode I-F	RLI-033
L21	Horizontal speed	RLC-091
L23	Width control No. 2	RLD-019
L25	4.5 mc trap	RLI-111
L5, 22, 24	Audio trap	RLW-002

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Osc. Blkg	T27	RTM-007
Vert. Output	T26	RTO-074
Hor. Output	T9	RTO-088
Power	T25	RTP-303
Audio Output	T10	RTO-084
Yoke		
FM discr	T7	RTD-009
1st Video I-F	T1	RTL-101
2nd or 3rd vid. IF	T2, 3	RTL-102
4th Video I-F	T4	RTL-104
Antenna input	T5	RLA-033

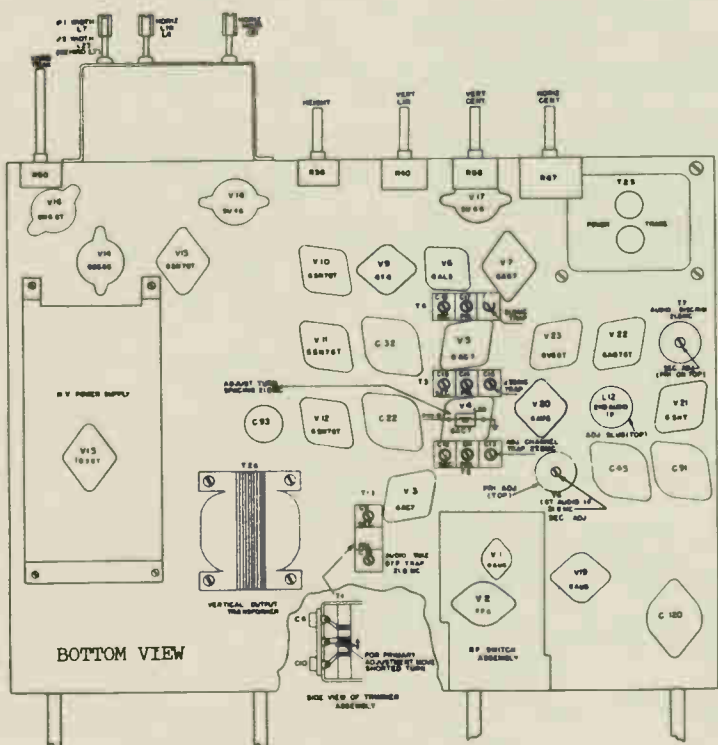
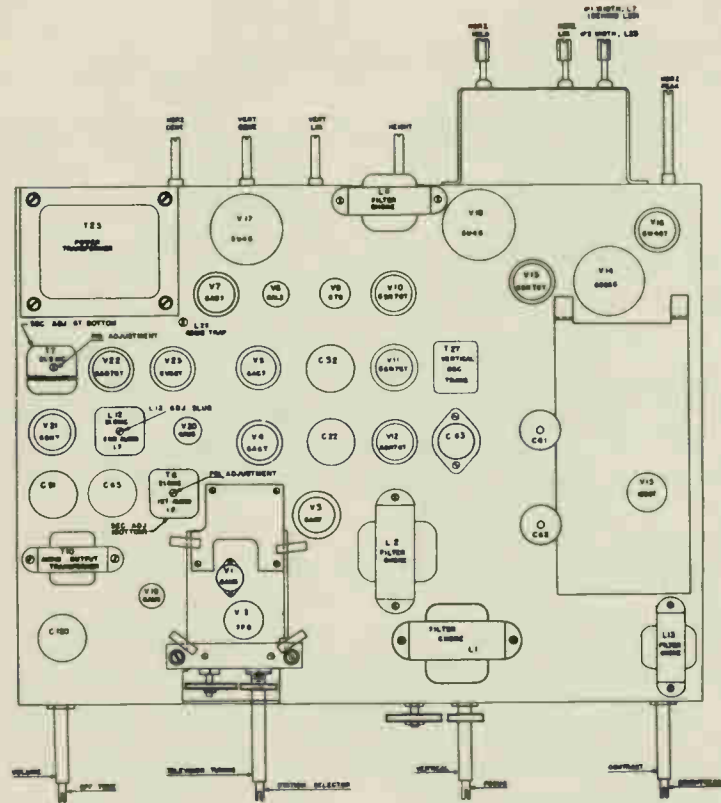
  

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
SR1	Selenium rectifier	RER-005
	Ion trap	RET-006
V3, 4, 5	Tube socket (octal)	RJS-030
7, 10, 13		
15, 21, 22, 23		
V9	Tube socket	RJS-139
V8	Tube socket	RJS-142
	R-F Head end Ass'y	RJX-041
LS1	Loudspeaker-12" PM	S1200D7



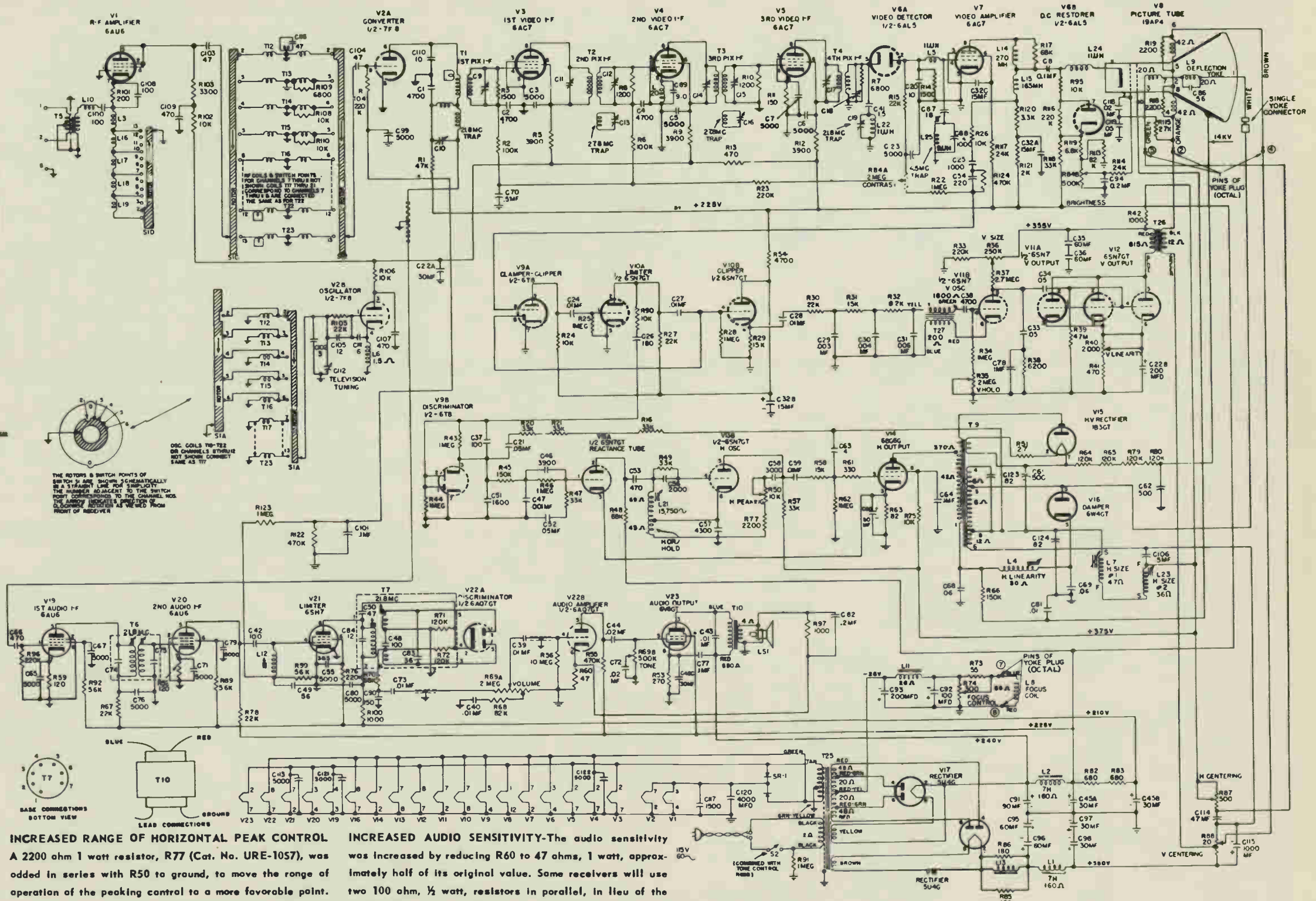
@ AC voltage reading.  
 \* Voltage varies with signal.  
 All readings with voltmeter 20,000 ohms per volt.





**PRODUCTION CHANGES MODEL 19C101**

All but a limited quantity of the early production receivers incorporated the changes described in the following paragraphs.



**INCREASED RANGE OF HORIZONTAL PEAK CONTROL**  
A 2200 ohm 1 watt resistor, R77 (Cat. No. URE-10S7), was added in series with R50 to ground, to move the range of operation of the peaking control to a more favorable point.

**REDUCTION OF VERTICAL WHITE BARS IN PICTURE**  
To reduce vertical white bars in the picture as the Horizontal Peaking control is adjusted to one of its extreme positions, an 82 mmf. 1500 volt mica capacitor (C123, Cat. No. RCU-289) was connected between terminals No. 4 and No. 8 of T9. Another capacitor (C124) of the same value and rating was connected from terminal No. 8 of T9 to chassis ground.

**INCREASED AUDIO SENSITIVITY**-The audio sensitivity was increased by reducing R60 to 47 ohms, 1 watt, approximately half of its original value. Some receivers will use two 100 ohm, 1/2 watt, resistors in parallel, in lieu of the single resistor Cat. No. URD-017, 47 ohms, 1 watt.

**WIRING CHANGE OF DEFLECTION YOKE CONNECTING PLUGS** - To increase the insulation between connections of the male and female plugs connecting the yoke assembly to the chassis, two of the leads have been rearranged as follows. Reference is made to the schematic, which incorporates the plug lead arrangement.

1. The orange lead from yoke to T26 originally connected through pin No. 1 was moved to pin No. 2.
  2. The brown lead from yoke to arm of R88 originally connected through pin No. 3 was moved to pin No. 4.
- Receivers incorporating this wiring change in production are identified by the letter "G" stamped upon the rear chassis apron.

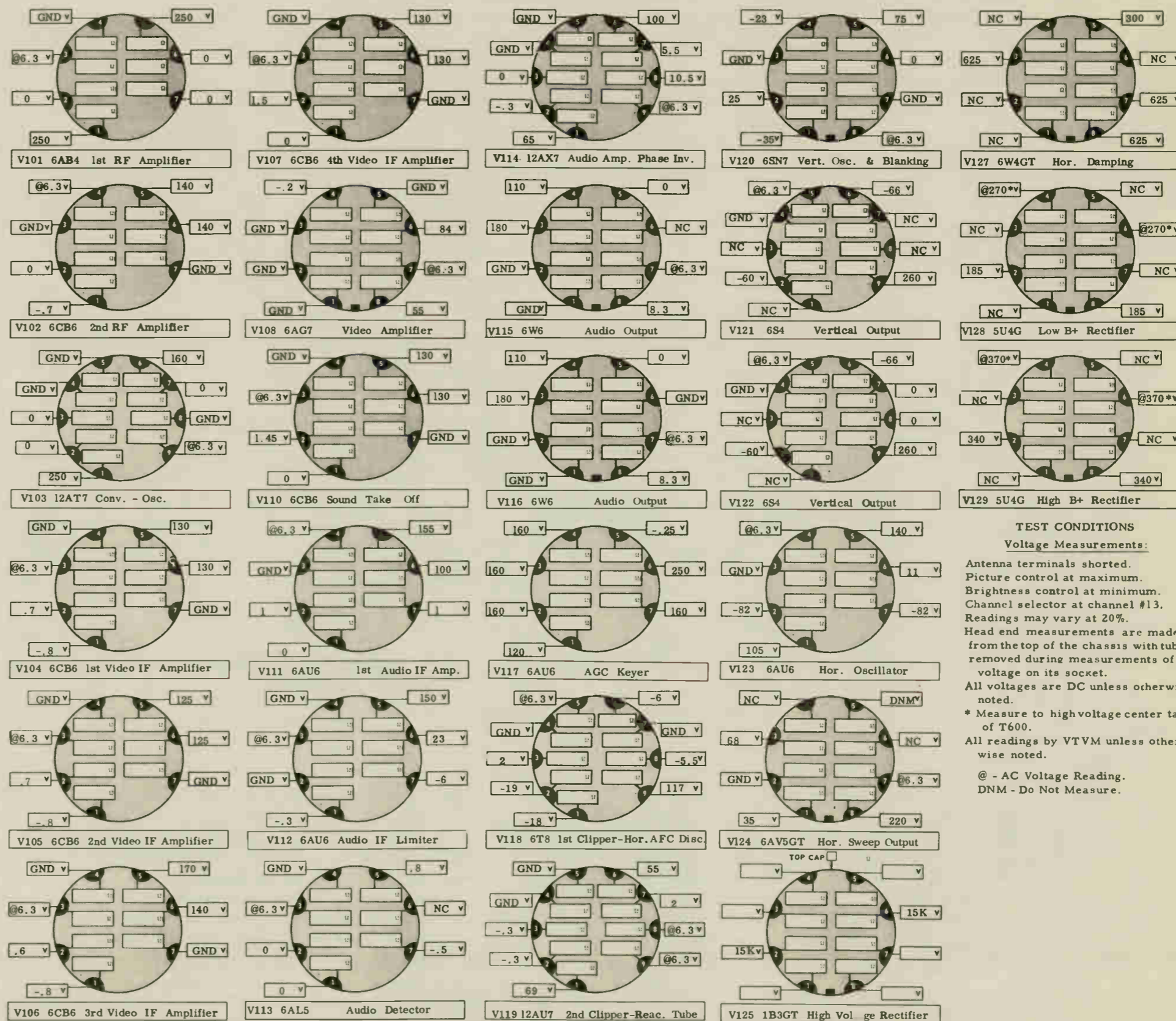
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C311	1 mf., 50V	RCE-090
C406	5 mf., 150V	RCE-056
C457	100 mf., 150V	RCE-123
C517	500 mf., 15V	RCE-126
C605	500 mf., 15V	RCE-126
C600A	60 mf., 350V	RCE-124
C600B	30 mf., 450V	RCE-124
C602A	40 mf., 450V	RCE-122
C602B	30 mf., 350V	RCE-122
C602C	15 mf., 350V	RCE-122
C602D	30 mf., 25V	RCE-122
C603A	30 mf., 450V	RCE-121
C603B	15 mf., 350V	RCE-121
C603C	30 mf., 250V	RCE-121
C603D	25 mf., 25V	RCE-121
C604	500 mf., 125V	RCE-125
C606	1K mf., 6V	RCE-106
TRIMMERS:		
C104	6-1.5 mmf.	RCY-065
C105	20-50 mmf.	RCY-066
C108	6-2.4 mmf.	RCY-048
C118	8-1.7 mmf.	RCY-067
C465	1-12 mmf.	RCY-069
C515	110-580 mmf.	RCY-064

fine tun'g control  
yoke balancing  
Hor. Drive

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume (on-off) 2 meg	R350	RRC-161
Brightness 2 meg	R611	RRC-158
Contrast 10K w. w.(on-off)	R401	RRC-161
Hor. Hold 100K	R510	RRC-160
Hor. Size		
Vert. Hold 1 meg	R456	RRC-157
Vert. Size 3 meg	R458	RRC-159
Vert. Lin. 2K, 2w., w. w.	R462	RRW-068
AGC 25K	R425	RRC-140
Focus 400 ohms, 25w. w. w.	R601	RRW-065
Hor. centering 500 ohms	R604	RRW-066
2w., w. w.		
Vert. centering 20 ohms	R605	RRW-067
2w., w. w.		
WIREWOUND		
Capacitor resistor network	C451, 2	REK-001
002 mf., .005mf., .005mf	453	
22K, 8.2K, 8.2K ohms, 1/2W	R452, 3	
resistors; molded integ-	454	
rating network		
10, 500 ohms, Globar	R451	RRW-052
Voltage Sensitive		
475 ohms, 15 w.	R518	RRW-060
16, 500 ohms @ 155 V Globar	R520	RRW-061
voltage sensitive resistor		
3K 5%, 7 w.	R522	RRW-062
470 ohms, 25 w.	R602	RRW-063
1K, 15 w.	R603	RRW-064

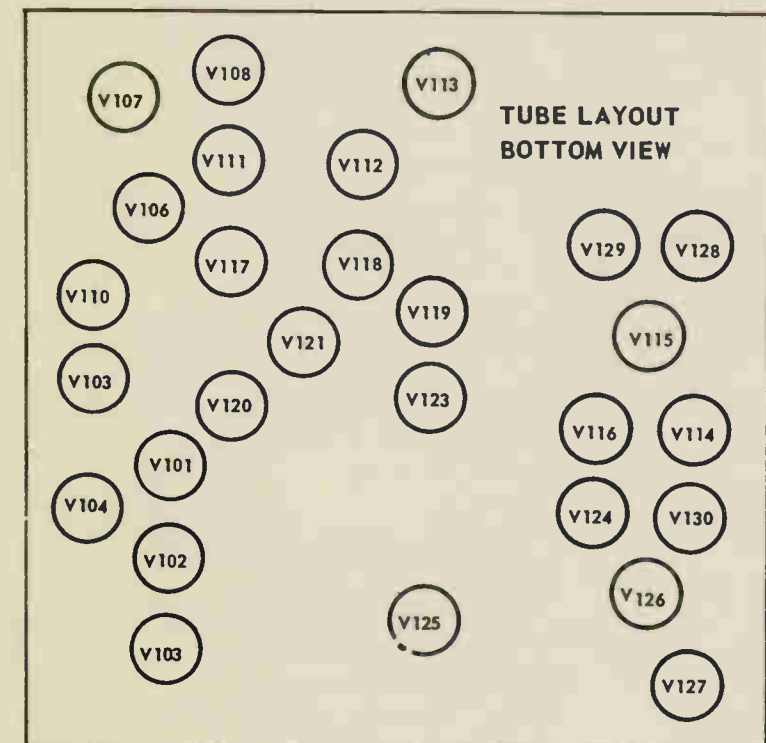
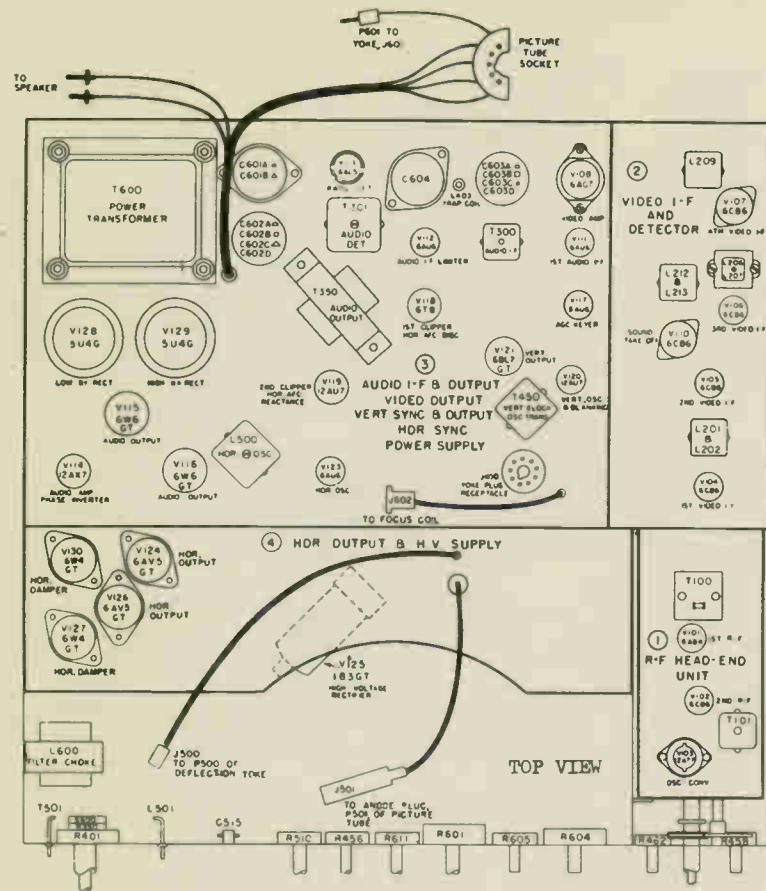
COILS		
REF. NO.	DESCRIPTION	PART NO.
L209, 16	Det., in shield can	RLX-031
L106	IF trap & core	RLI-159
L136	Choke-1.4 uh.	RLI-136
L137	Choke-.56 uh.	RLI-144
L138	Choke-33 uh. RFFil. for	RLI-154
L139, 40	AGC, conv. plate or osc	
L201, 2	1st Video IF	RLI-133
L203	2nd Video IF & tun'g cord	RLI-131
L206, 7	3rd Video IF	RLI-132
L210	Choke-250 uh.	RLI-156
L211	Choke-110 uh., video	RLI-108
400		
L212, 3	Detector-sound	RLX-032
L214	4.5 mc and core	RLI-139
L215	Choke-1.4 uh.	RLI-142
L218, 20	5% filament	
L216	Choke-31 uh.	RLF-024
L217	Trap-4th Video IF	RLI-135
L221, 1	Choke 2.2 uh.	RLI-122
404,		
503		
L401	Choke 1Kuh., AGC keyer	RLI-155
L402	Choke 220 uh., video	RLI-143
L403	Trap-10uh. 4%, 4.5 mc	RLI-140
L500	Hor. osc. coil & slug	RLC-107
L501	Hor. lin. & tun'g core	RLD-027
L504,		
505, 6	Choke - 10 uh.	RLI-138
L600	Choke 5 henries	RLF-040
L601	Choke 5 henries	RLF-041
L602	Focus	RLF-042

TRANSFORMERS			
DESCRIPTION	REF. NO.	PART NO.	
Vert. Osc.	T450	RLC-108	
Vert. Output	T451	RTO-097	
Hor. Output	T500	RTO-109	
Power, 60cy, 115V	T600	RTP-308	
Audio Output	T350	RTO-096	
Yoke	D600	RLD-039	
Antenna input	T100	RLA-037	
Width & AGC c'pl'g	T501	RLD-028	
Rat. detector	T301	RTD-008	
Input trap	T200	RTL-118	
Trap	T201	RTL-119	
Sound I-F	T300	RTL-120	
39.75 mc trap	T202	RTL-122	
I-F output	T101	RTL-126	
MISCELLANEOUS			
REF. NO.	DESCRIPTION	PART NO.	
	Ion trap PM magnet	RET-011	
	Tuner-RF headend assy	RJX-044C (Early)	
	Tuner-RF headend assy	RJX-044W (W)	
	Tuner-RF headend assy	RJX-048WK (WK)	
	Tuner-RF headend assy	RJX-048CK (CK)	
S350	Television phono sw.	RSS-005	
	Socket-Pix tube	RWX-041	
LS350	Loudspeaker-12"	S121D7	
Y200,1	Crystal diode	IN64	
	Crystal IN64	RLX-032 (Part of)	

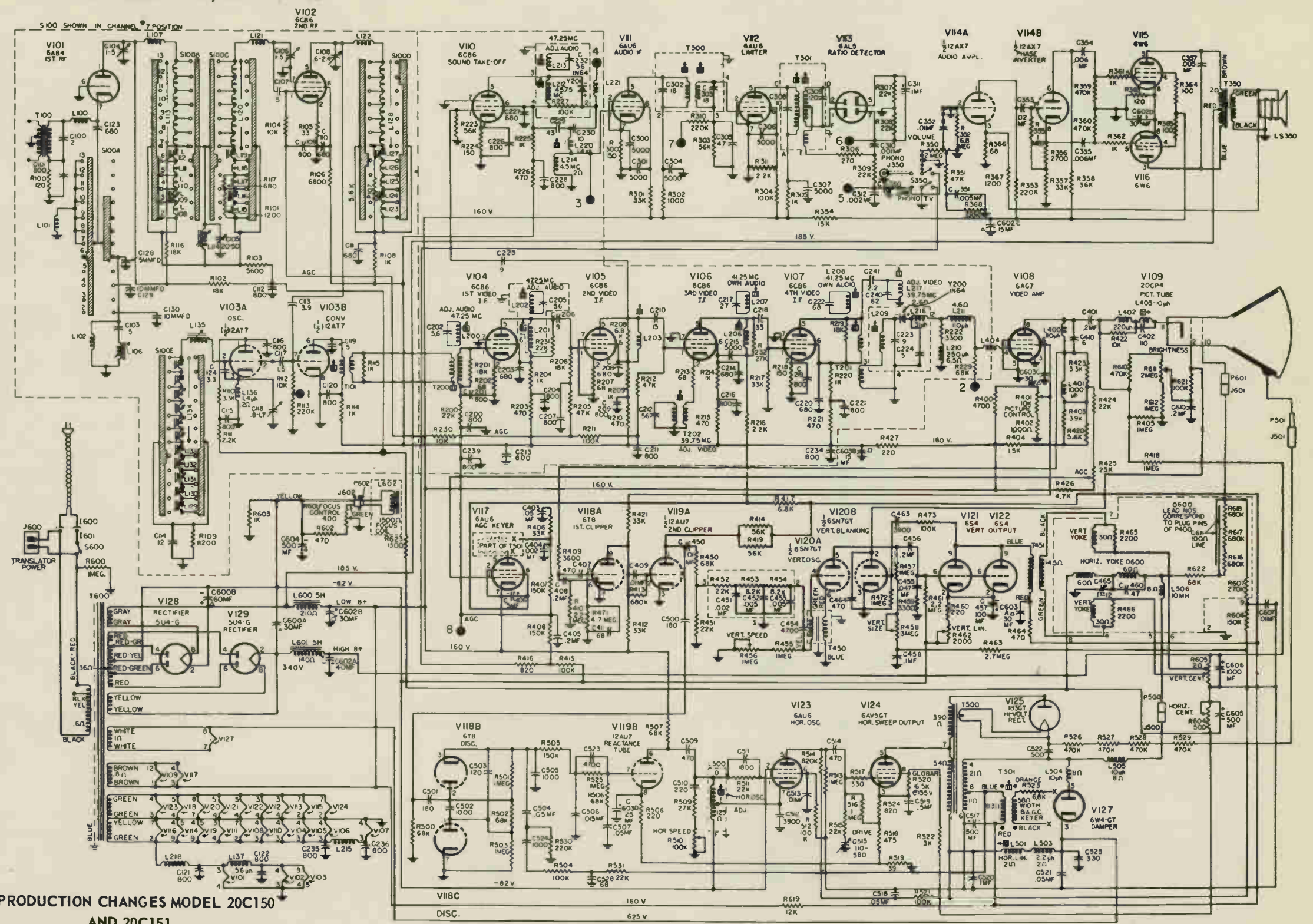


**TEST CONDITIONS**

Voltage Measurements:  
Antenna terminals shorted.  
Picture control at maximum.  
Brightness control at minimum.  
Channel selector at channel #13.  
Readings may vary at 20%.  
Head end measurements are made from the top of the chassis with tube removed during measurements of voltage on its socket.  
All voltages are DC unless otherwise noted.  
\* Measure to high voltage center tap of T600.  
All readings by VTVM unless otherwise noted.  
@ - AC Voltage Reading.  
DNM - Do Not Measure.



FOR OTHER TUNERS USED, SEE PAGE 100.



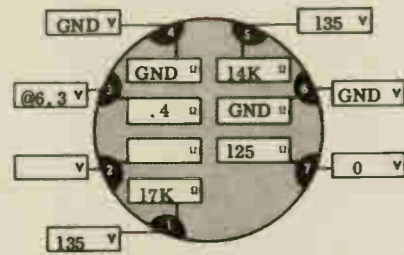
PRODUCTION CHANGES MODEL 20C150 AND 20C151

1. Vertical output grid coupling. C459 changed from .2 mfd. to .1 mfd. in late production.
2. Vertical oscillator plate resistor R470 changed from 1 megohm to 2.2 megohms, in late production.
3. Horizontal output screen by-pass, C516 added in later production receivers.
4. Primary power fuse, F600 Cat. No. REF-007, added in late production.

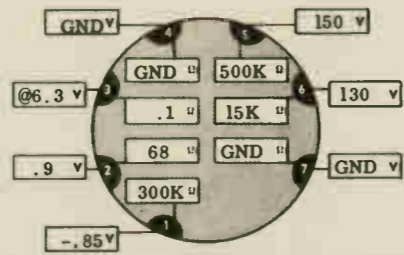
5. Video coupling choke L405 changed from 2.2 to 10.0 microhenries in all receivers employing a 6AK5, 2nd RF amplifier (WK or CK tuners).
6. RF decoupling capacitor, C213, added to IF strip in receivers using rubber stamped "W", "WK", and "CK" RF tuners.

ALL CAPACITOR VALUES ARE MMF UNLESS OTHERWISE SPECIFIED

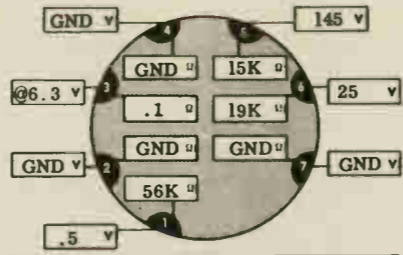
• DENOTES TEST POINT



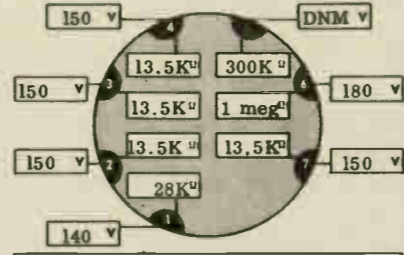
V101 6AB4 1st RF Amplifier



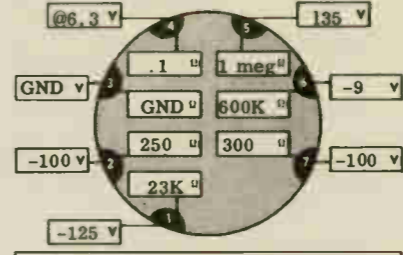
V106 6CB6 3rd Video IF Amplifier



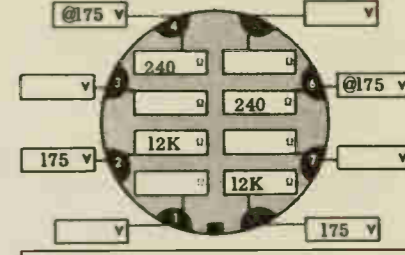
V112 6AU6 Audio IF Limiter



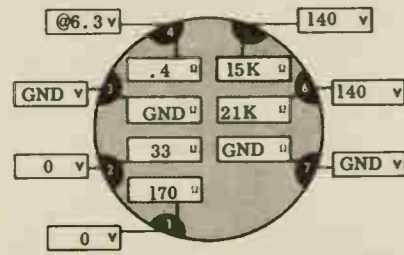
V117 6AU6 AGC Keyer



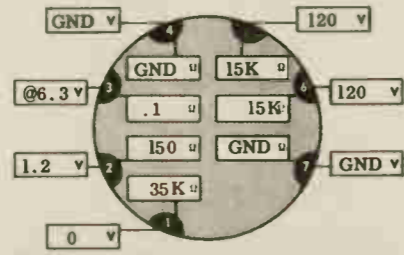
V123 6AU6 Horizontal Oscillator



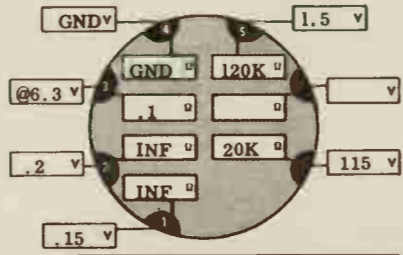
V128 5U4G Low B+ Rectifier



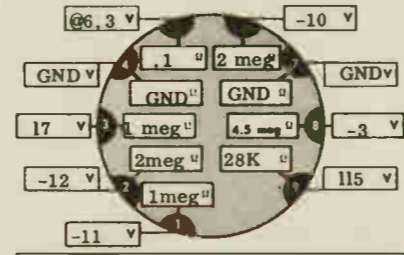
V102 6CB6 2nd RF Amplifier



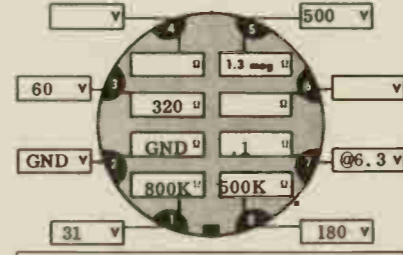
V107 6CB6 4th Video IF Amplifier



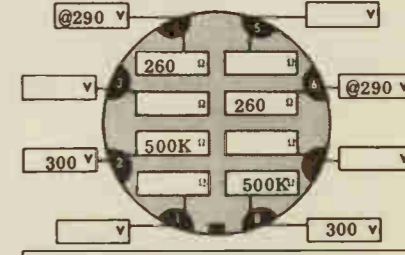
V113 6AL5 Ratio Detector



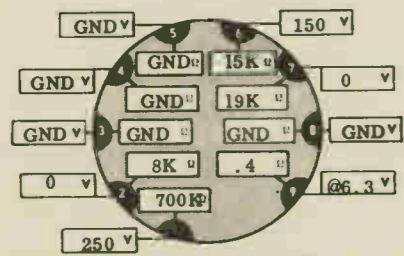
V118 6T8 1st Clipper-Hor. AFC Disc.



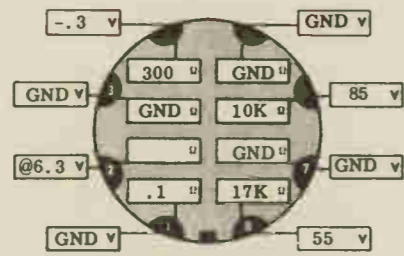
V124 6AV5GT Hor. Sweep Output



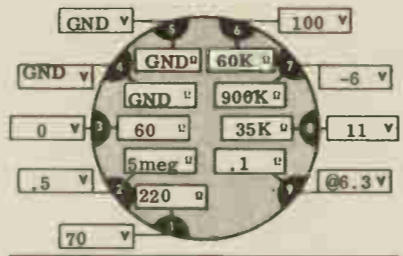
V129 5U4G High B+ Rectifier



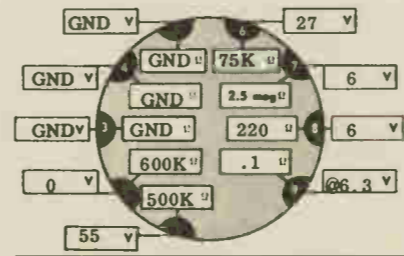
V103 12AT7 Converter-Oscillator



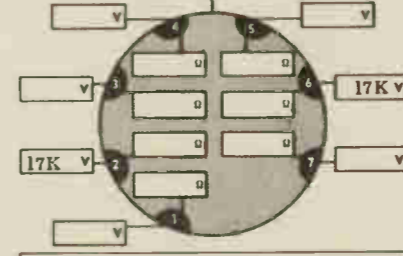
V108 6AG7 Video Amplifier



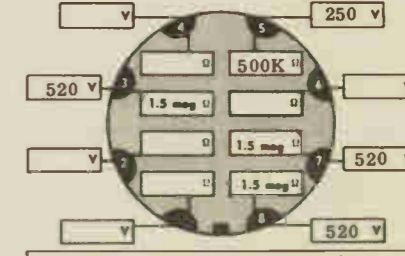
V114 12AX7 Audio Amp. Phase Inv.



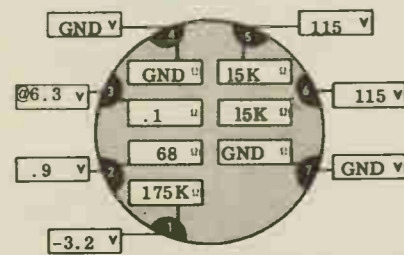
V119 12AU7 2nd CLIPPER React. Tube



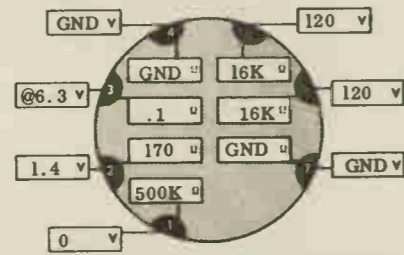
V125 1B3GT High Voltage Rectifier



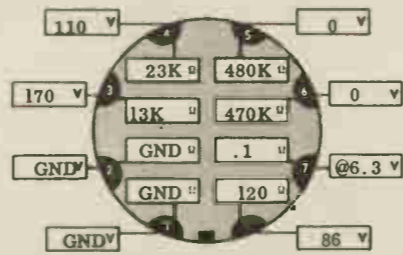
130 6W4 Hor. Sweep Damping



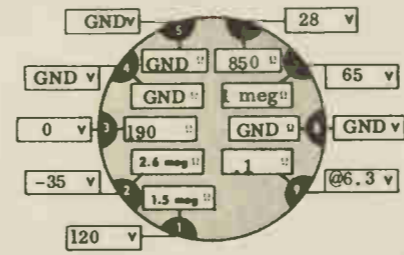
V104 6CB6 1st Video IF Amplifier



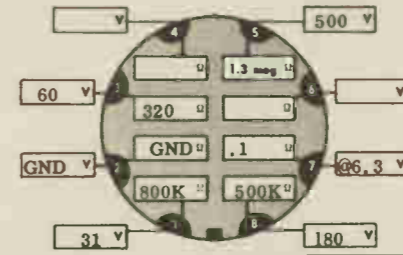
V110 6CB6 Sound Take OFF



V115 6W6 Audio Output



V120 12AU7 Vert. Osc. & Blanking

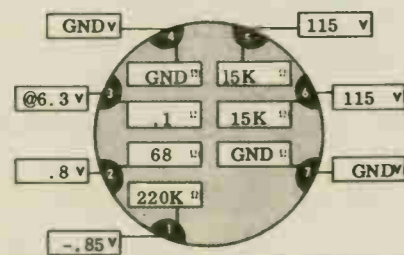


V126 6AV5GT Hor. Sweep Output

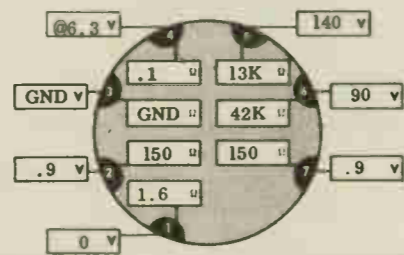
**TEST CONDITIONS**  
**Voltage Measurements:**  
 Antenna terminals shorted.  
 Picture controls at maximum.  
 Brightness control at minimum.  
 Channel selector at channel #13.  
 All voltage are DC unless otherwise noted.  
 Readings may vary 20%.  
 Voltage readings by VTVM unless otherwise noted.

**Resistance Measurements:**  
 Receiver power disconnected.  
 All potentiometer controls at maximum clockwise position.  
 Readings may vary 20%.

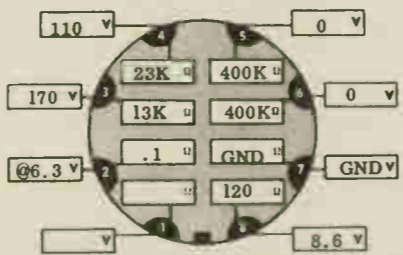
@ - AC Voltage Reading.  
 DNM - Do Not Measure.



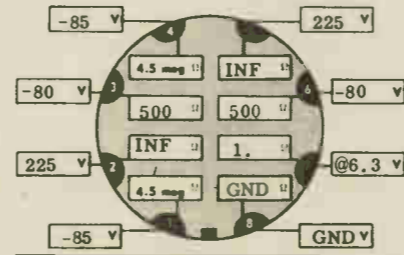
V105 6CB6 2nd Video IF Amplifier



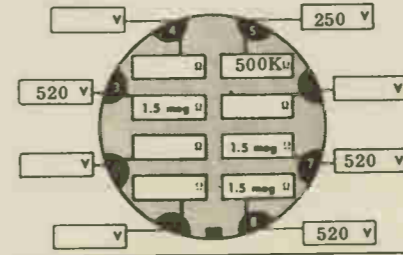
V111 6AU6 1st Audio IF Amplifier



V116 6W6 Audio Output

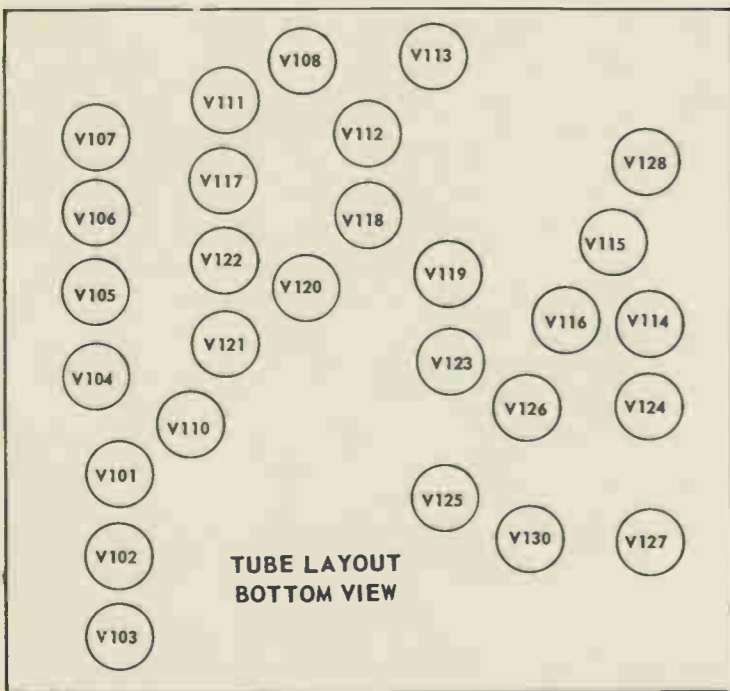
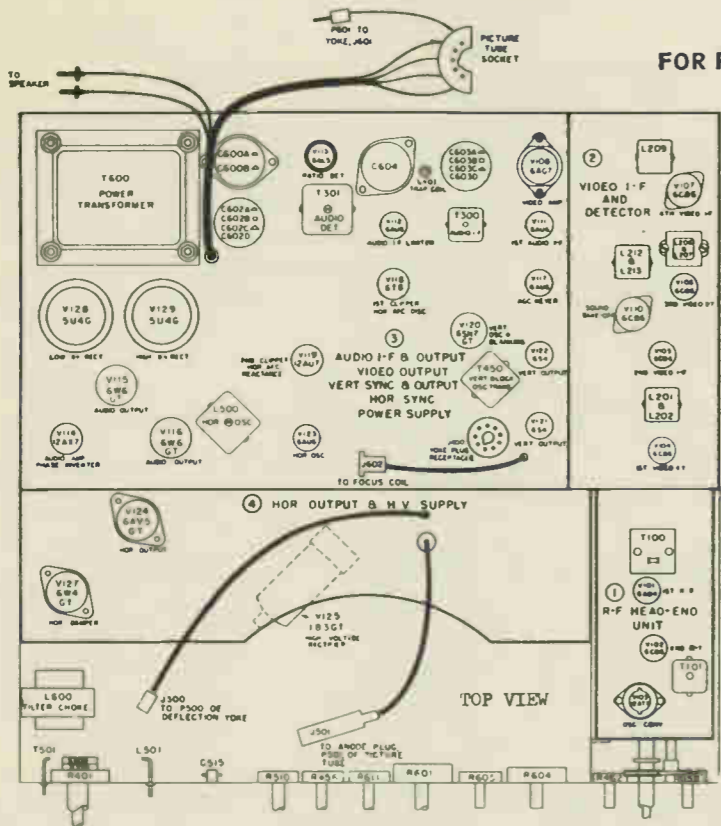


V121 6BL7 Vert. Output



V127 6W4 Hor. Sweep Damping

FOR PARTS LIST, SEE PAGE 100.  
FOR OTHER TUNERS USED, SEE PAGE 100.



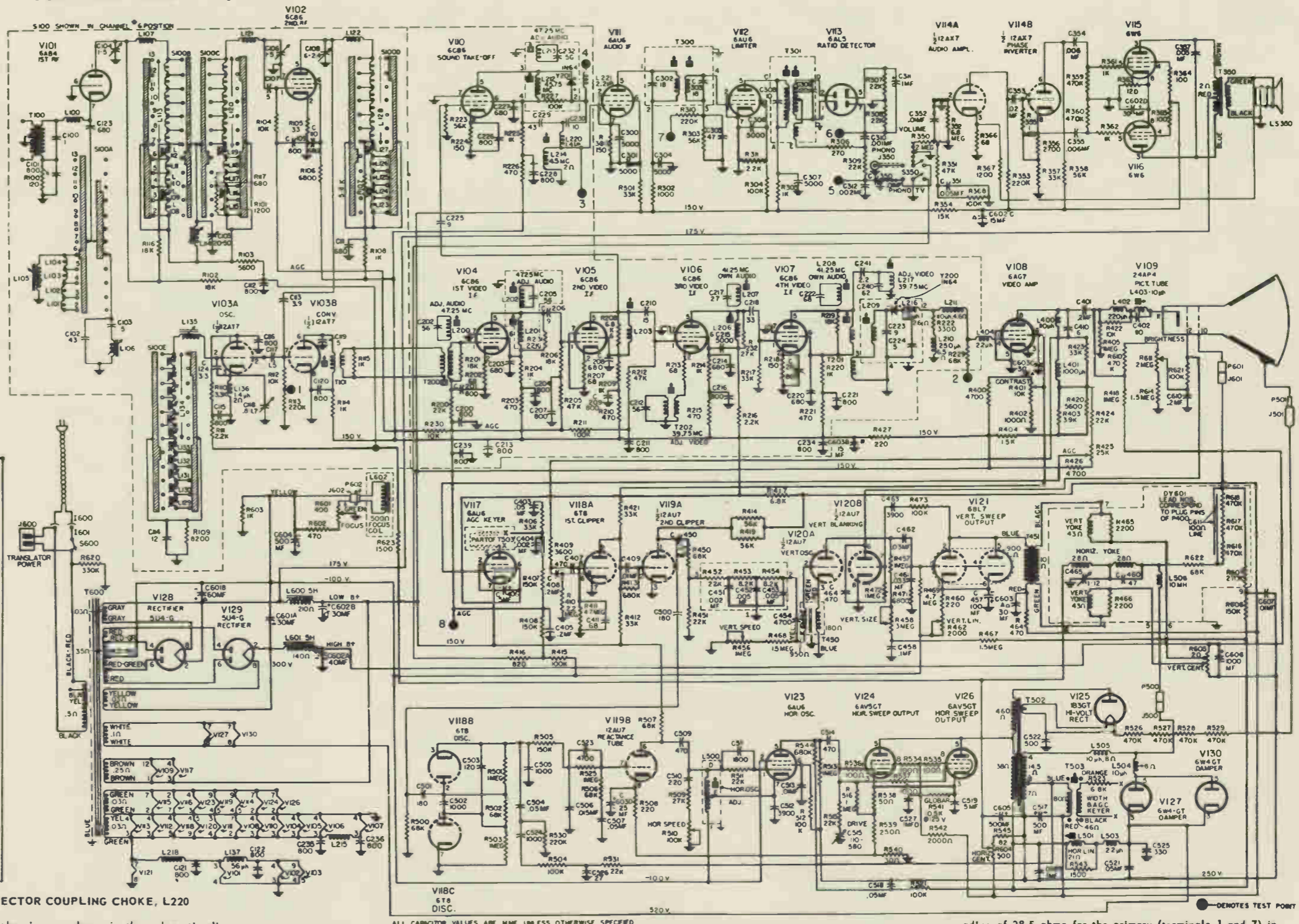
PRODUCTION CHANGES MODEL 24C101  
C213, LOW B PLUS BY-PASS IN IF STRIP

This is a ceramic 800 mmf. capacitor which was added to the IF strip at the terminal board adjacent to the 1st IF plate coupling coil, L201. This addition was necessary to provide an RF by-pass for the low B plus circuit of the "W" production version of RF tuner.

SOUND DETECTOR COUPLING CHOKE, L220

L220 is 1.4 microhenries as shown in the schematic diagram for later production receivers. Coincident with this choke change from the 2.2 microhenry value for early receivers, the sound take-off circuit coil L212 was aligned to a new amplitude ratio of 7 to 1 between picture and

sound markers on the sound detector output response curve. These changes contribute to greater audio sensitivity and better sound IF limiting.



HORIZONTAL SWEEP OUTPUT TRANSFORMER

A late production run of catalogue No. RTO-104 Horizontal Sweep and High Voltage transformers was improved to increase the temperature rise limits of these units. The late transformers will bear the code number 31 and the replacement parts catalogue No. RTO-104. These transformers may also be identified by the lower resistance

reading of 28.5 ohms for the primary (terminals 1 and 7) in contrast to 38 ohms for the early production units

When using this transformer as a replacement for the early production transformer, it is necessary to remove the 300 ohm wire-wound tapped resistor strip R538, R539 in the cathode circuit of the horizontal sweep output tubes V124 and V126 and replace it with a new resistor strip RRW-093 450 ohms tapped at 50 ohms.

# 20T2, 20C105, 20C106, 21C200

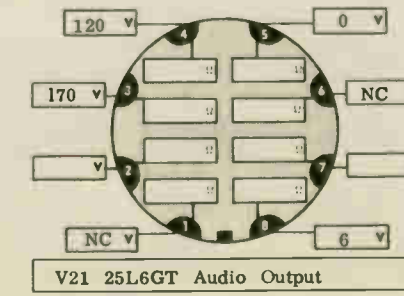
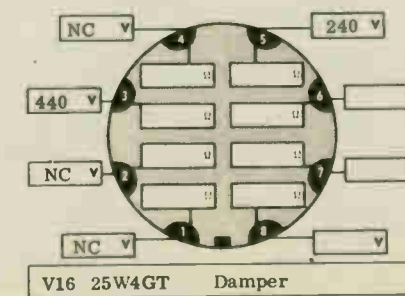
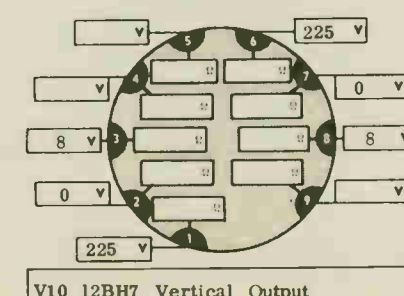
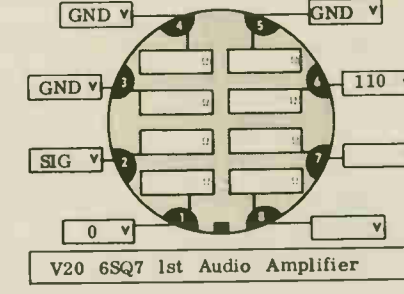
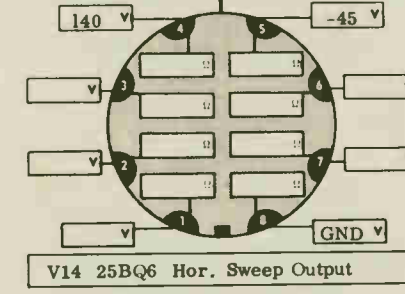
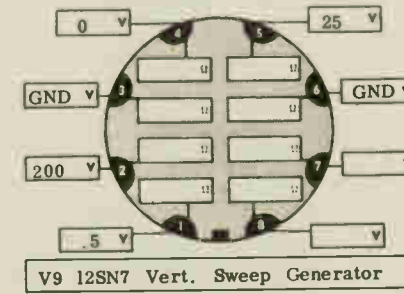
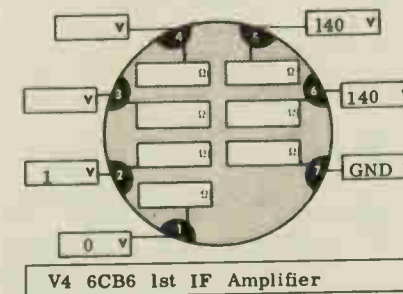
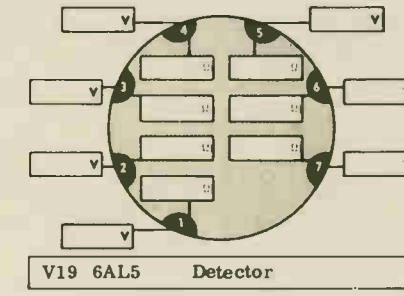
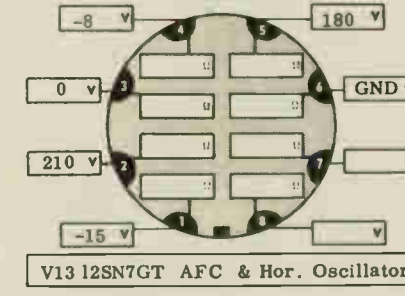
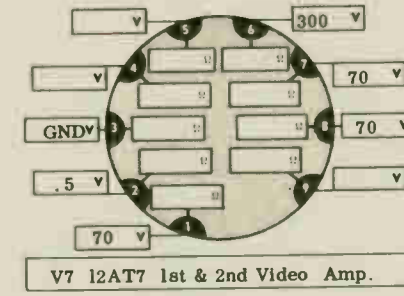
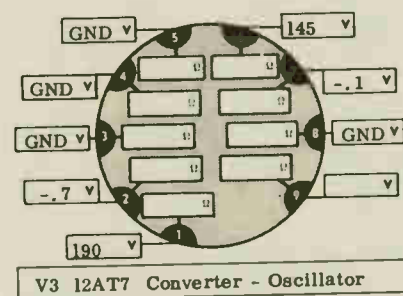
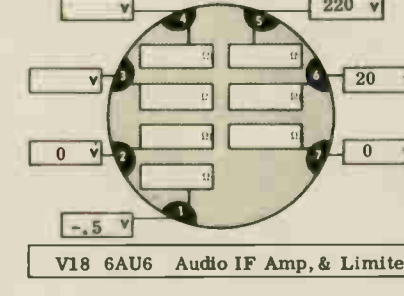
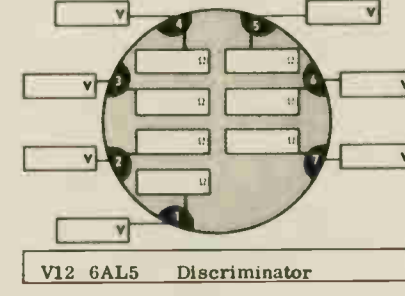
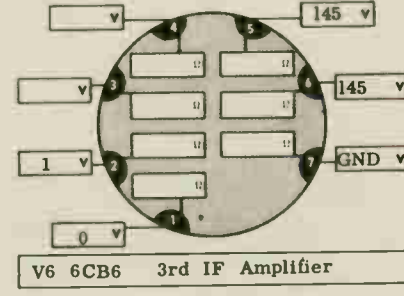
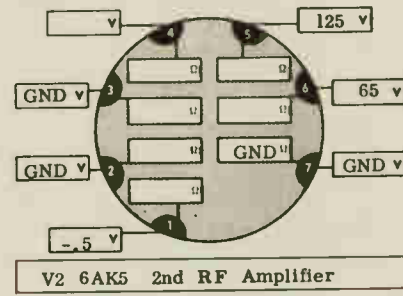
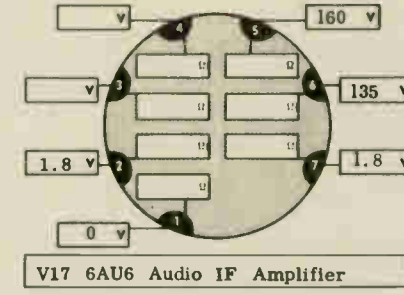
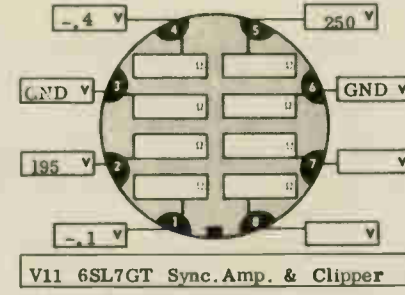
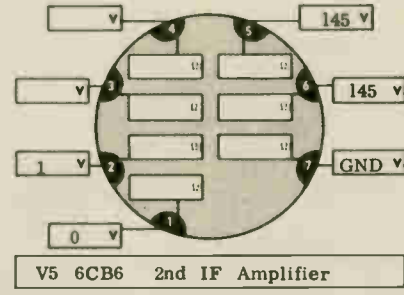
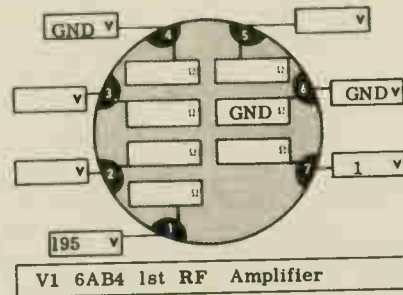
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C310	30 mf., 450V	RCE-136
C379A	10 mf., 450V	RCE-118
C379B	40 mf., 300V	RCE-118
C379C	10 mf., 150V	RCE-118
C410	1 mf., 50V	RCE-090
C451	300 mf., 150V	RCE-110
C452	125 mf., 350V	RCE-111
C453	80 mf., 300V	RCE-112
C454A	20 mf., 300V	RCE-134
C454B	100 mf., 75V	RCE-134
TRIMMERS:		
C104	1-5 mmf.	RCY-065
C106	1-5 mmf.	RCY-065
C105	20-50 mmf.	RCY-066
C108	.6-2.4 mmf.	RCY-048
C118	.8-1.7 mmf.	RCY-067 (Fine tun'g)

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume		
Brightness 500K	R276	RRC-175
Contrast		
Hor. Hold 100K	R365	RRC-173
Hor. Size		
Vert. Hold 125K	R305	RRC-174
Vert. Size		
Vert. Lin. 4K	R311	RRC-127
Height 3 meg	R308	RRC-096
Hor. Drive 25K 1/2w.	R369	RRC-140
Picture 2 meg (Console)	R284	RRC-184
Picture 2 meg (20T2 only)	R413	RRC-186
Volume 5 meg (Console)	R413	RRC-184
Volume 500K (20T2 only)	R284	RRC-186
WIREWOUND		
Triode couplate-.01 mfd.	C419	REK-002
25K, 500K	R417,8	
Vert. Integrator-.001 mf.	C301,2	REK-003
.002 mf., 39K, 82K	R302,1	
4.6 ohms, 5W	R451	RRW-048
20 ohms, Globar	R457	RRW-051
4K, 10%, 7W	R380	RRW-053
1/2 ohms, 10%, 1/2W	R375	RRW-058
5600 ohms, 10%, 5W	R282	RRW-079
1500 ohms, 10%, 5W	R452	RRW-082
14K, 15%, 140V, Globar	R382	RRW-088
2200 ohms, 5W	R281	RRW-092
31 ohms, Globar	R456	RRW-094

COILS		
REF. NO.	DESCRIPTION	PART NO.
L100	Ch. RF input V1 assy.	RLI-165
L106	IF trap & tuning core	RLI-159
L136	Ch. 1.4uh. V3A osc. "K"	RLI-145
L137	Ch. .56uh. V2, V3 heater	RLI-144
L138,9	RF choke	RLI-154
L141	RF choke	RLI-152
L251	2nd Video IF & tun'g	RLI-096
L252,3	3rd IF, trap & adj. core	RLI-110
L254,	Video detector assy.	RLX-035
255,6	(incl. crystal IN64)	
L255,6	31 uh. RF choke	RLF-024
L257	Video compensating	RLI-162
263	choke 165 uh.	
L259	Video comp. ch.	RLI-093
L260	4.5 mc video trap	RLI-100
L261	110 uh. video comp.	RLI-108
	ch. plate circuit of V7A	
L262	Ch. Video compensat'g	RLI-161
L264	130 uh. video comp ch.	RLI-109
L351	Hor. hold & adj. slug	RLC-091
L352	Hor. lin. & tuning core	RLD-016
L353	Width control	RLD-014
L354	Plate ch. 10 uh.	RLI-138
L451	B+ supply filter ch. .9H	RLF-051

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Osc.		
Vert. Output	T302	RTO-117
Hor. Output	T352	RTO-116
Audio Output	T404	RTO-082
Audio Output	T404	RTO-081
Yoke	D302	RLD-041
Antenna input	T100	RLA-037
1st Audio I-F coil	T401	RLI-097
Ratio detector assy	T402	RTD-008
Filament trans'f	T451	RTF-002
Video IF headend	T101	RTL-126
output		
Video IF input	T200	RTL-127

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
LS1	Picture tube socket	RWX-045
LS2	Speaker, 5 1/4" PM	SS27D7 (20T2)
X451,2	Speaker, 12" PM	SI212D7 (console)
	Selenium rectifier, 350 ma	REK-008
	PM Focus unit	RLF-052
	PM Focus unit (21C200)	RLF-053
S200	Switch, Local-Distant	RSW-067

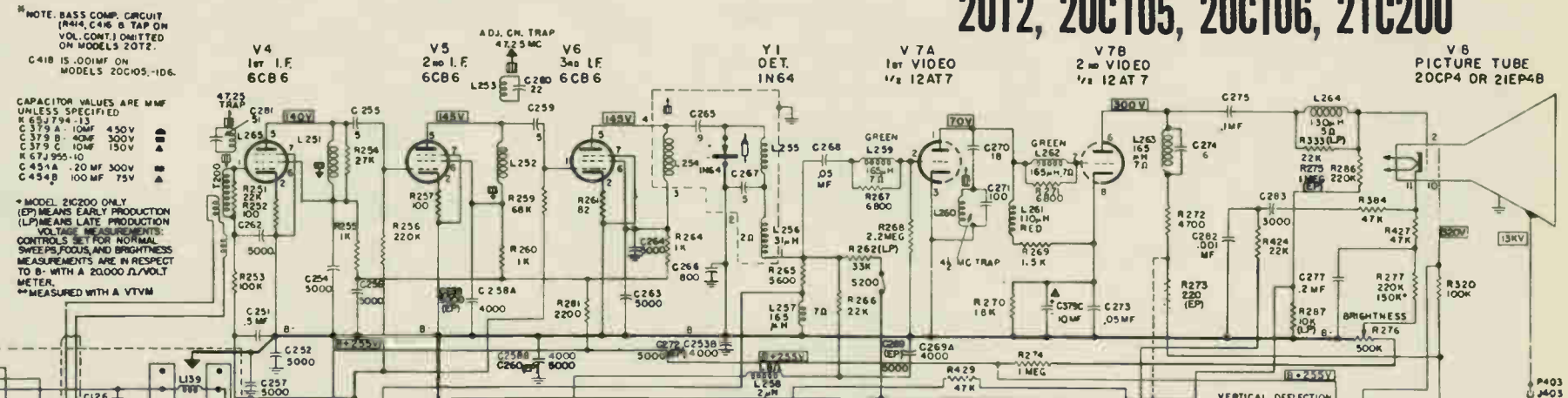
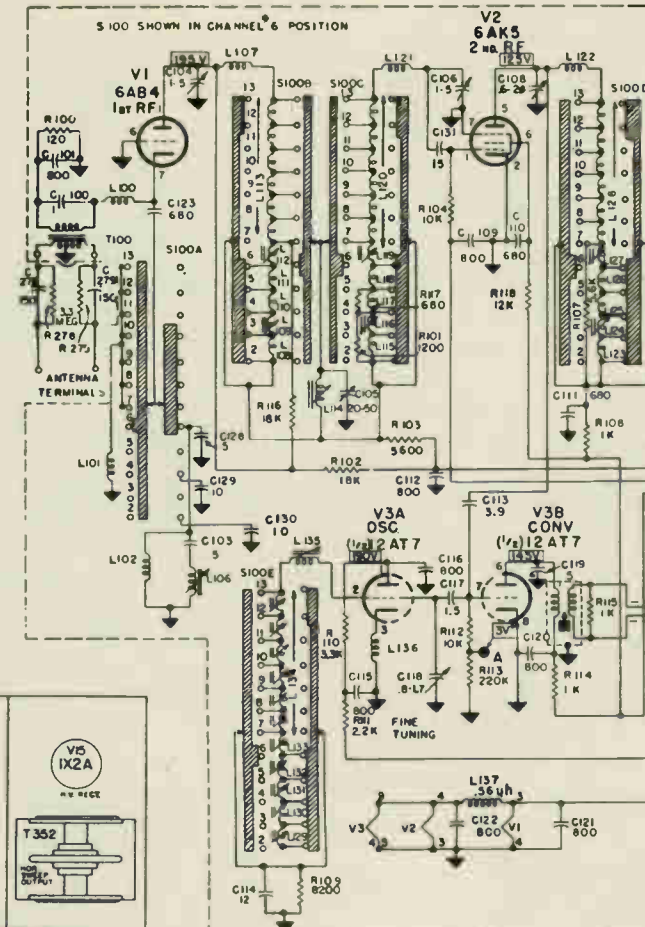
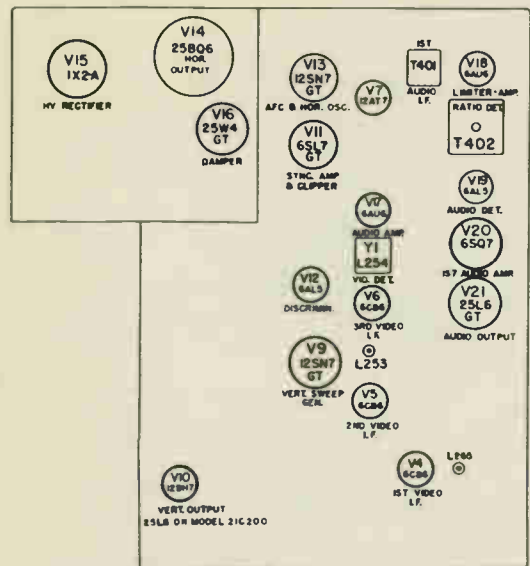


## TEST CONDITIONS

All controls set for normal sweeps, focus and brightness. Measurements are in respect to B- with a 20,000 ohms/volt meter. All readings DC unless otherwise noted.

# 20T2, 20C105, 20C106, 21C200

For Production Changes, see Pages 110 and 111.



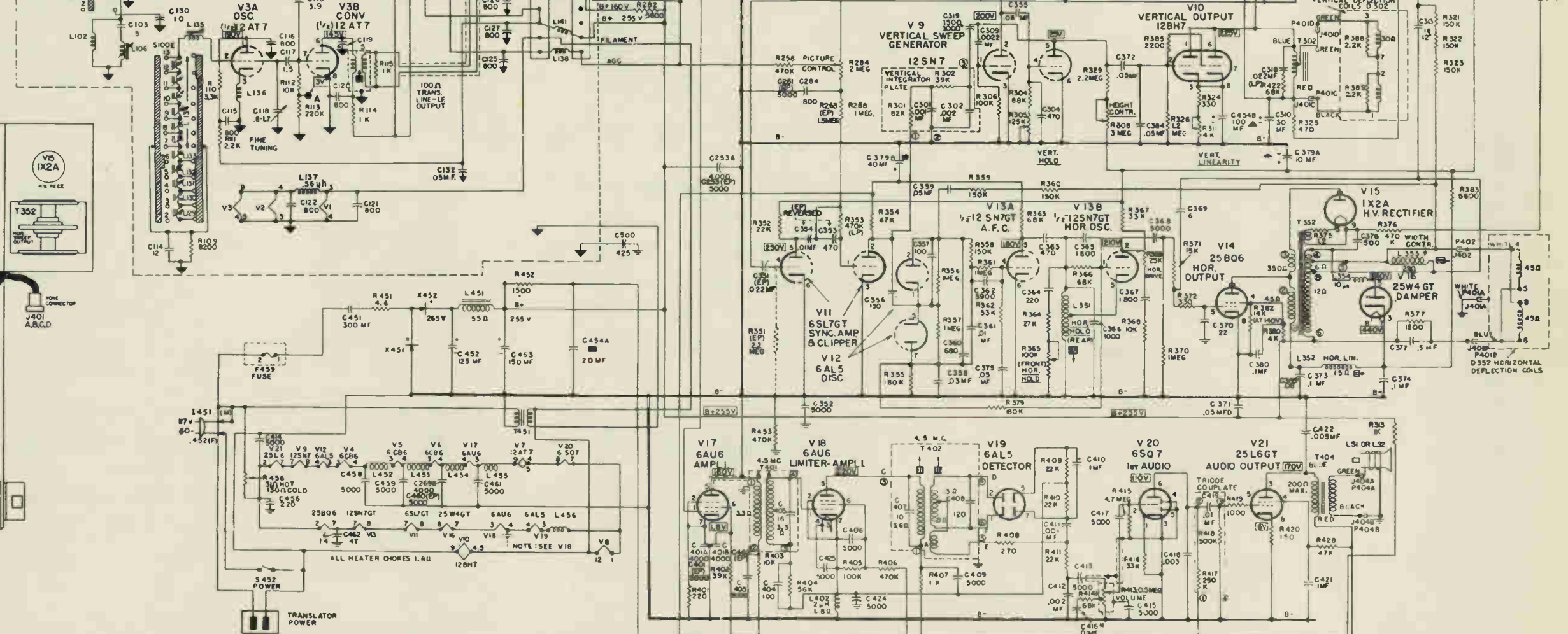
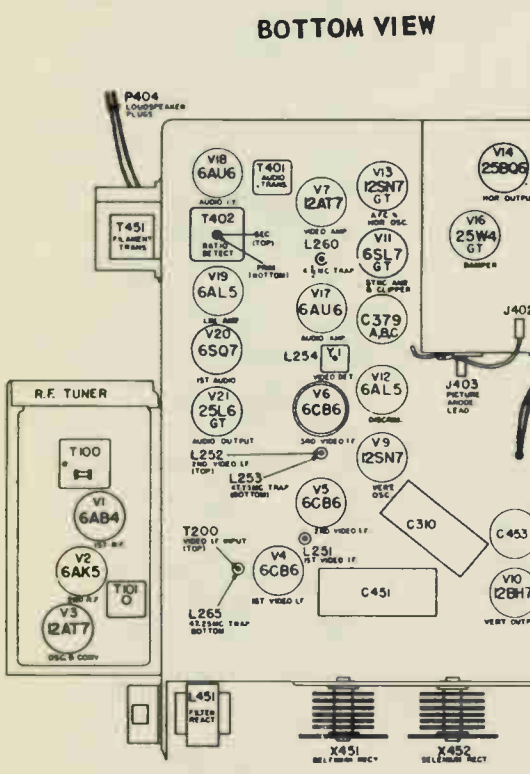
NOTE: BASS COMP. CIRCUIT (R44, C46, B TAP ON VOL. CONT.) OMITTED ON MODELS 20T2, 20C105, 20C106, 21C200.

CAPACITOR VALUES ARE MUF UNLESS SPECIFIED

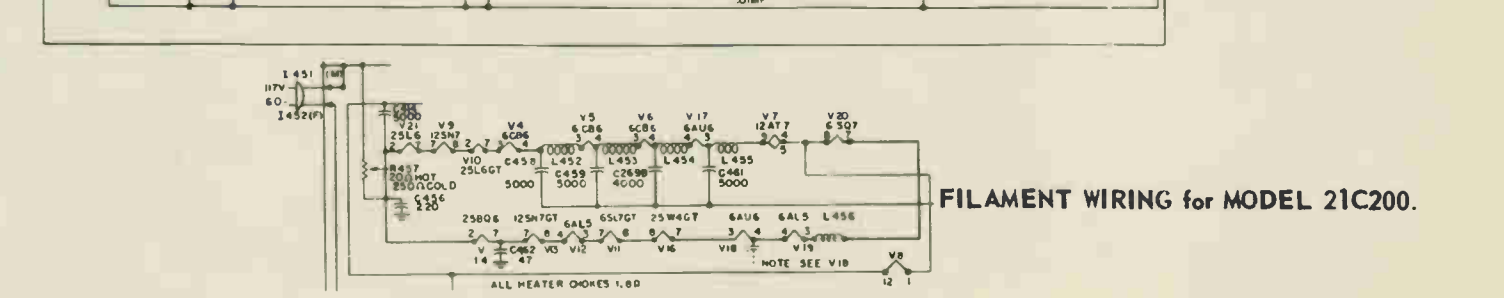
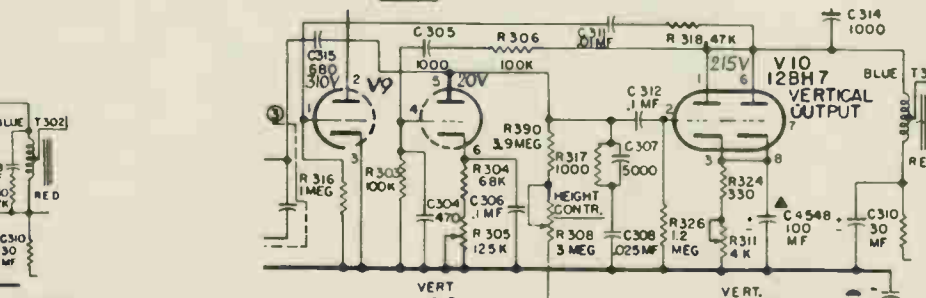
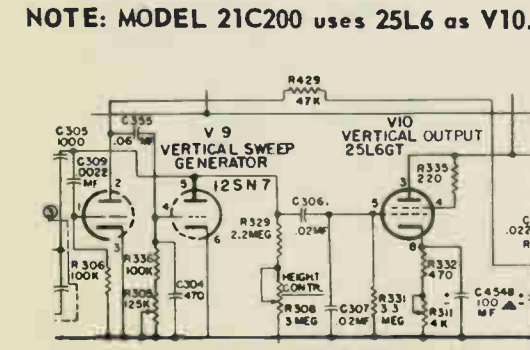
\*MODEL 21C200 ONLY (EP) MEANS EARLY PRODUCTION (LP) MEANS LATE PRODUCTION

†VOLTAGE MEASUREMENTS: CONTROLS SET FOR NORMAL SWEEPS, FOCUS, AND BRIGHTNESS MEASUREMENTS ARE IN RESPECT TO B - WITH A 20000 Ω/VOLT METER.

\*\*MEASURED WITH A VTVM



NOTE: MODEL 21C200 uses 25L6 as V10.



# 21T4, 21T5

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C311	30 mf., 300V	RCE-141
C315	1 mf., 50V	RCE-090
C410	1 mf., 50V	RCE-090
C379A	10 mf., 450V	RCE-118
C379B	40 mf., 300V	RCE-118
C379C	10 mf., 150V	RCE-118
C431A	20 mf., 300V	RCE-142
C431B	100 mf., 75V	RCE-142
C451	300 mf., 150V	RCE-110
C464	150 mf., 300V	RCE-143
C465	125 mf., 350V	RCE-140
TRIMMERS:		
C104	1-5 mmf.,	RCY-065 (glass tube type)
C105	20-50 mmf.,	RCY-066 (temp.comp type)
C108	.6-2.4 mmf.,	RCY-048
C118	.8-1.7 mmf.,	RCY-067 (fine tuning)
CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume 5 meg	R413	RRC-186
Brightness 500K	R276	RRC-175
Contrast		
Hor. Hold 100K	R365	RRC-173
Hor. Size		
Vert. Hold 125K	R305	RRC-174
Vert. Size		
Vert. Lin. 4K	R311	RRC-127
Height 3 meg	R308	RRC-096
Picture 2 meg	R284	RRC-186
Hor. Drive 5K, 1/2W	R388	RRC-195
Picture stabilizer 3 meg	R341	RRC-196
WIREFOUND		
Triode couplet-.01 mf., 250K, 500K	C419	REK-002
	R417, 8	
4.6 ohms, 5W, 20%	R451	RRW-048
20 ohms, Globar	R457	RRW-051
4K, 7w.	R380	RRW-053
1.2 ohms, 10%, 1/2W	R375	RRW-058
5,600 ohms, 5W.	R282	RRW-079
1,500 ohms, 10%, 5W	R452	RRW-082
14K, 140V, Globar 15%	R382	RRW-088
2,200 ohms, 5W	R281	RRW-092
3,300 ohms, 10W	R297	RRW-098
COILS		
REF. NO.	DESCRIPTION	PART NO.
L100	Choke R-F input	RLI-165
L106	IF trap & tuning core	RLI-159
L136	1.4 uh, V3A osc. cath.	RLI-145
L137	V2, V3 heater choke	RLI-144
L138, 9	R-F choke	RLI-154
L141	R-F choke	RLI-152
L251	2nd vid. IF & tun'g core	RLI-096
L254	Vid. comp. ch.	RLI-093
L254, 6	Vid. Detector assy.	RLX-035
Z55, 6		
L255, 6	31 uh. R-F choke	RLF-024
L257	Vid. comp. ch. 165 uh.	RLI-162
L260	4.5mc., vid. trap & adj.	RLI-100
L261	110 uh. vid. comp. ch. plate circuit of V7A	RLI-108
L262	Vid. comp. ch.	RLI-161
L264	Vid. comp.	RLI-109
L266, 277	3rd vid. IF & tun'g core	RLI-173
L269	Vid. comp. ch. 80 uh.	RLI-174
L270	Ch. plate, 10 uh.	RLI-138
L351	Hor. hold & adj. slug	RLC-091
L352	Hor. lin. & tun'g core	RLD-016
L353	Width control w/adj. core	RLD-014
L451	B+ supply fil. ch. .9H Head end RF assy.	RLF-051 RJX-050

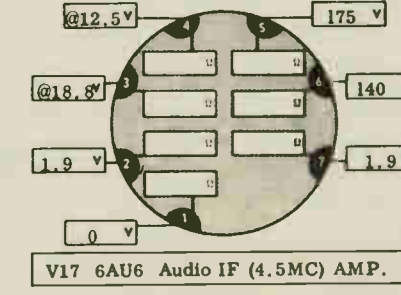
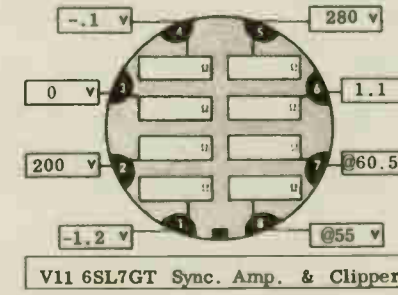
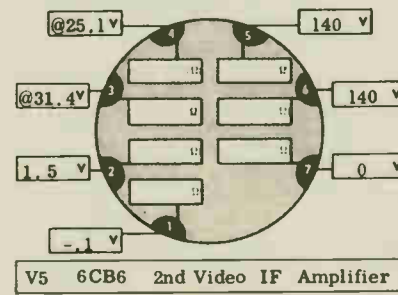
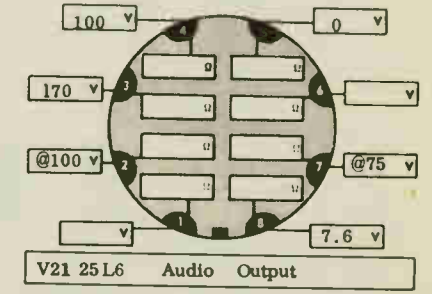
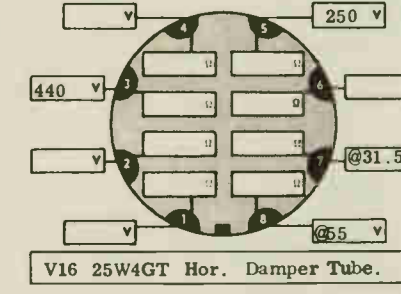
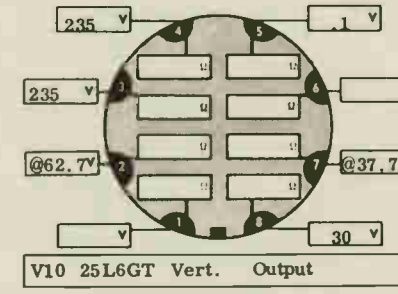
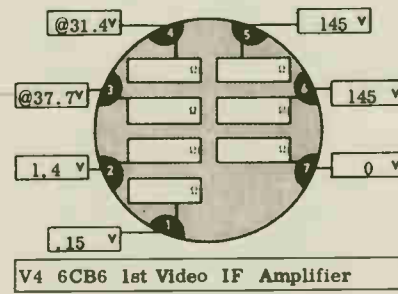
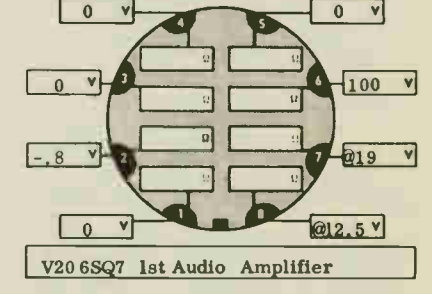
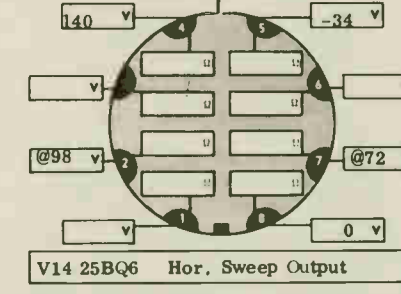
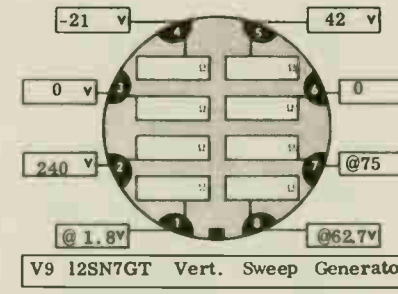
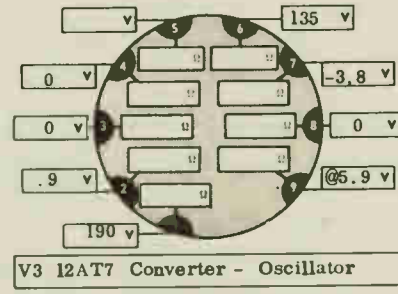
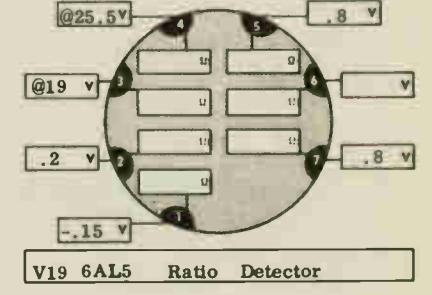
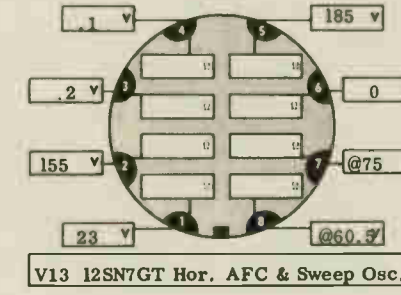
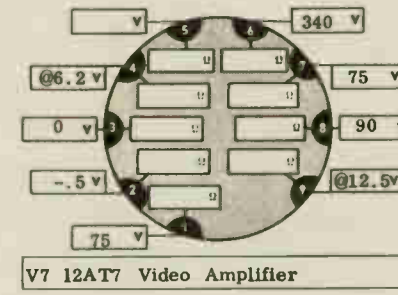
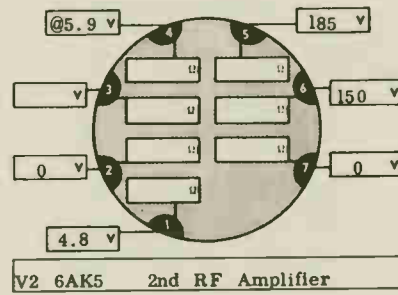
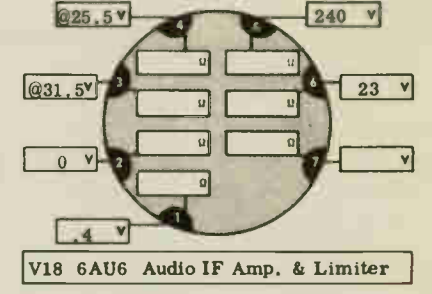
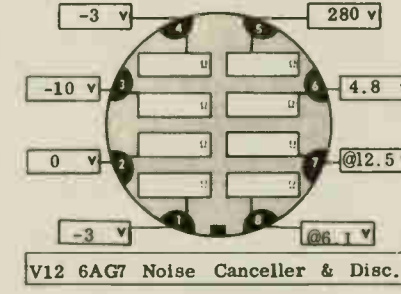
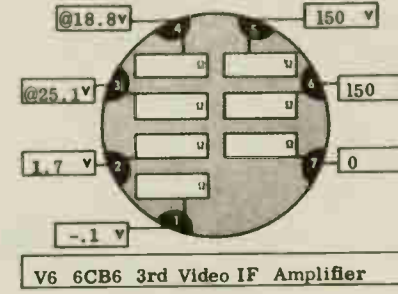
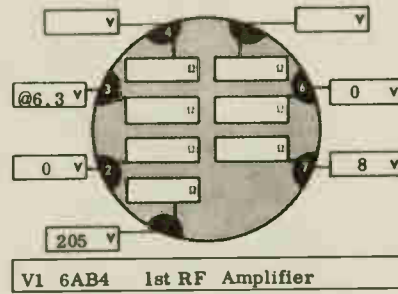
## PRODUCTION CHANGES MODELS 21T4 & 21T5

**1. PROTECTION OF HORIZONTAL OUTPUT TUBE 25BQ6**  
In order to reduce the danger of overdriving the horizontal output tube, 25BQ6 the Horizontal Drive potentiometer was changed from a value of 25,000 ohms to 5000 ohms.

**2. TO IMPROVE VERTICAL SYNC-In** order to increase vertical sync tightness the capacitor C305, 1000 mmf in the grid circuit of the vertical sweep V9, 12SN7 was changed to C316, 1200 mmf. Some receivers had a 220 mmf mica capacitor added to the 1000 mmf capacitor.

**3. IMPROVEMENT OF VERTICAL SYNC STABILITY-In** late production receivers the stability of the vertical sync was improved by disconnecting the AGC to the 3rd IF tube, V6, 6CB6; the grid was connected to ground.

TRANSFORMERS			
DESCRIPTION	REF. NO.	PART NO.	
Vert. Ouc	T302	RTO-117	
Vert. Output	T352	RTO-116	
Hor. Output			
Power	T405	RTO-081	
Audio Output	D302	RLD-041	
Yoke	T100	RLA-037	
Antenna input	T401	RLI-097	
1st Audio IF Coil	T402	RTD-008	
Ratio detector assy	T451	RTF-002	(for V1, 2, & 3)
Filament	T201	RTL-137	
Video IF input	T101	RTL-139	{headend out
Video IF			
MISCELLANEOUS			
REF. NO.	DESCRIPTION	PART NO.	
X451, 2	Cap-HV rectifier cap.	REC-006	
	Selenium rectifier 350 ma.	RER-008	
	Ion trap-PM magnet	RET-013	
	PM focus assembly	RLF-054	
	Speaker-5 1/2" PM	S527D7	



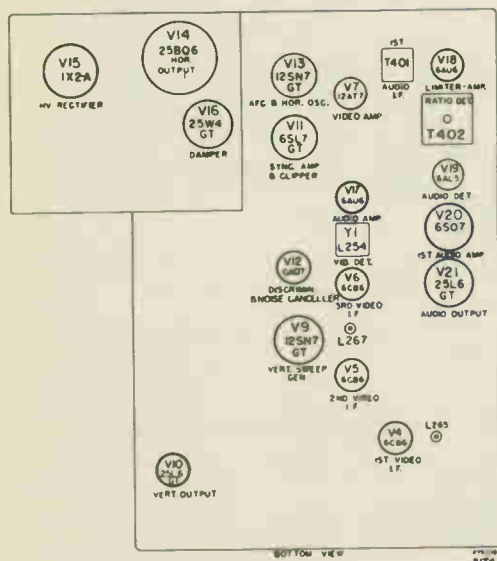
### TEST CONDITIONS

Voltage Measurements:

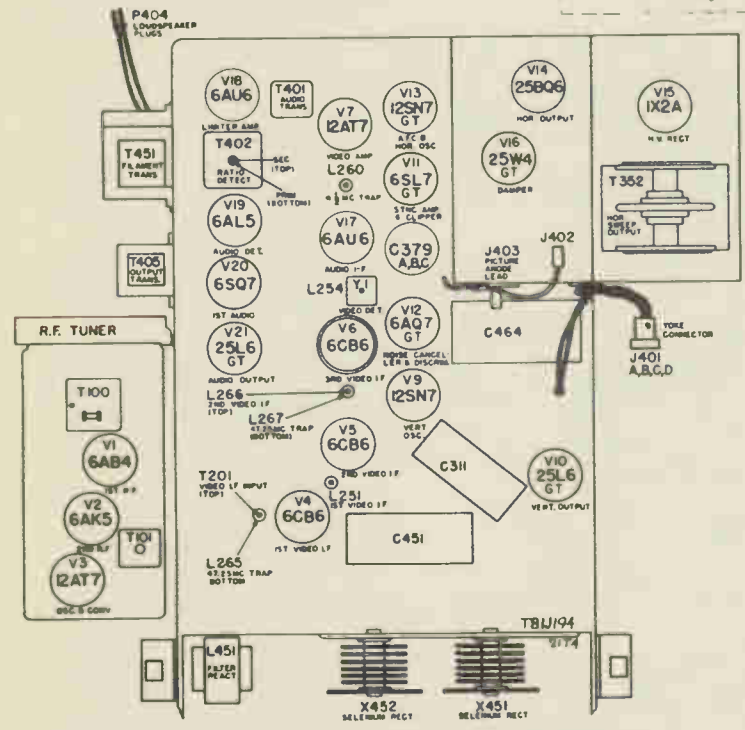
Input 117V, 60 cycles.  
All controls set for normal sweeps  
Antenna term shorted.  
Measured with VTVM unless otherwise noted.

@ - AC Voltage Reading.  
DNM - Do Not Measure.

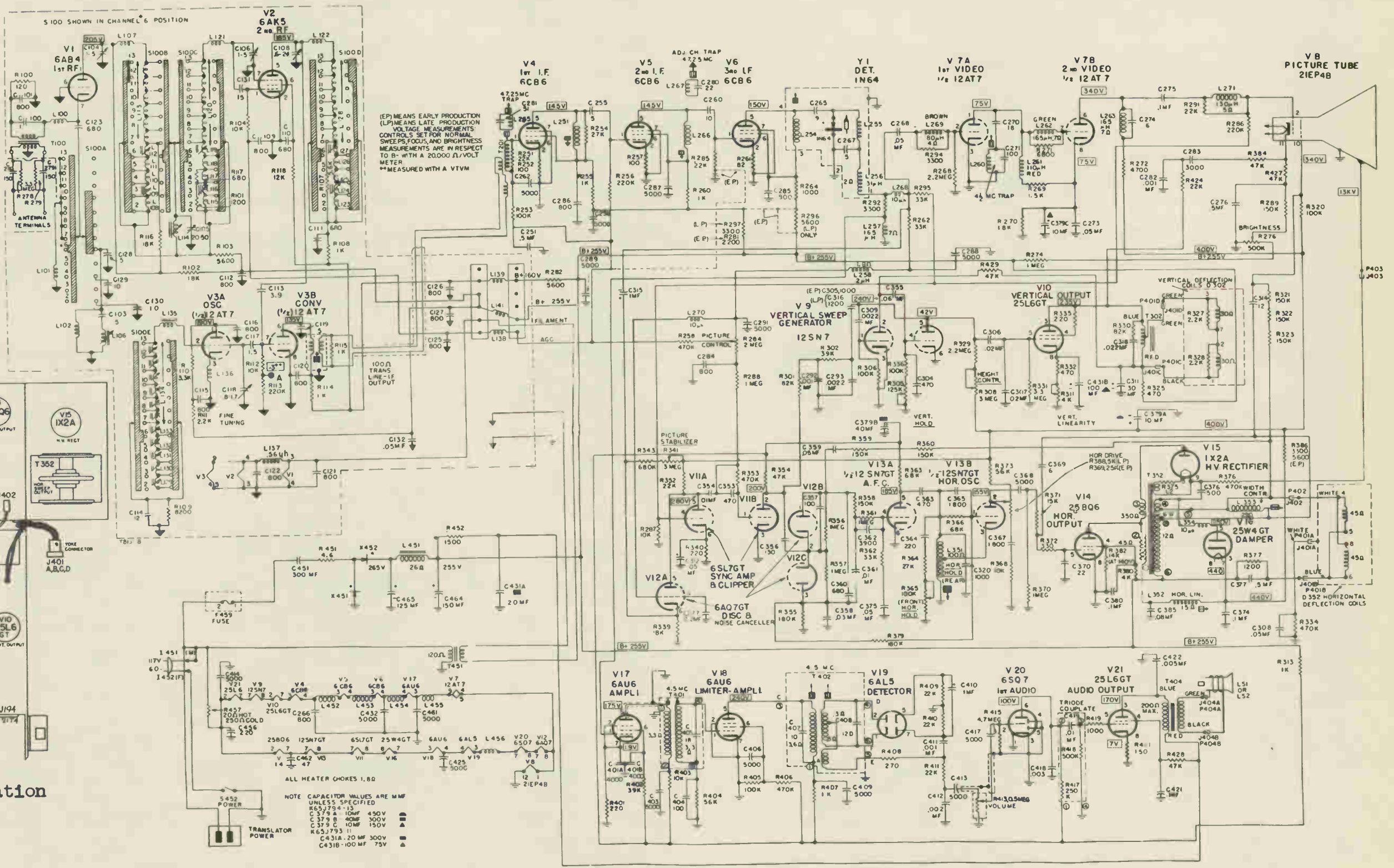




Tube Location



Tube and Trimmer Location (Top View)



(EP) MEANS EARLY PRODUCTION (LP) MEANS LATE PRODUCTION VOLTAGE MEASUREMENTS CONTROLS SET FOR NORMAL SWEEP, FOCUS, AND BRIGHTNESS MEASUREMENTS ARE IN RESPECT TO B- WITH A 20,000 Ω/VOLT METER \*MEASURED WITH A VTVM

NOTE CAPACITOR VALUES ARE MUF UNLESS SPECIFIED  
 R63.794-13  
 C 37.9 A-10MF 450V  
 C 37.9 B-40MF 300V  
 C 37.9 C-10MF 150V  
 R63.793-11  
 C 431A-20 MF 300V  
 C 431B-100 MF 75V

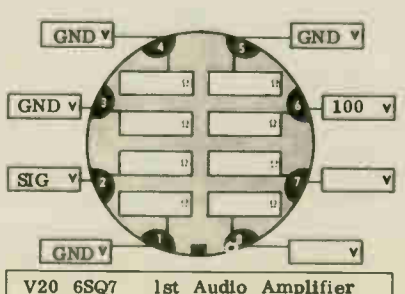
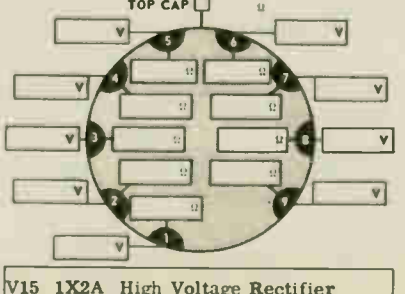
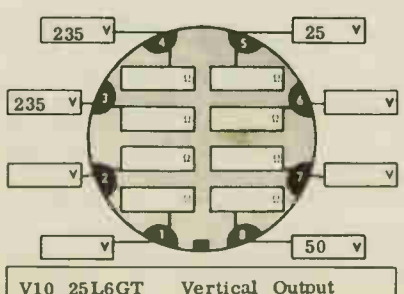
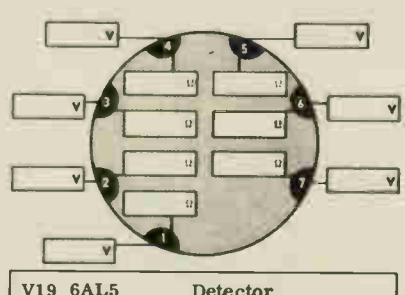
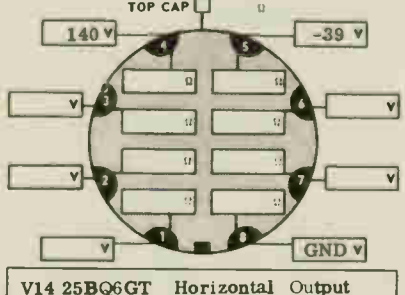
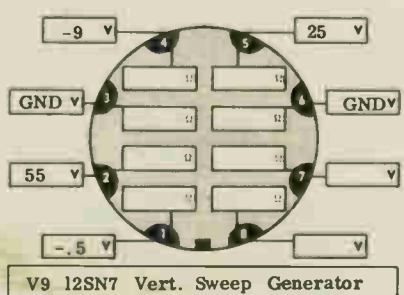
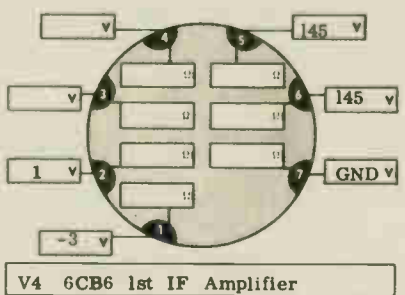
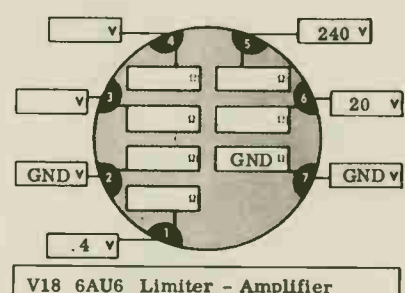
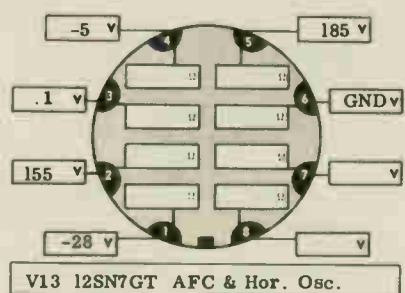
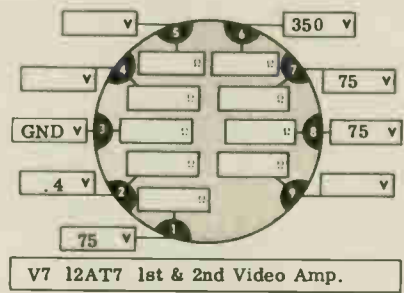
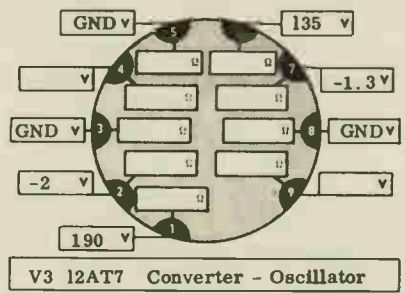
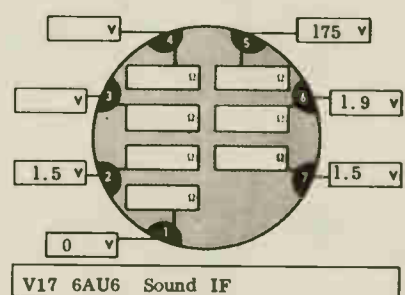
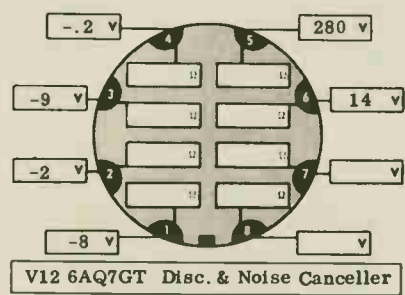
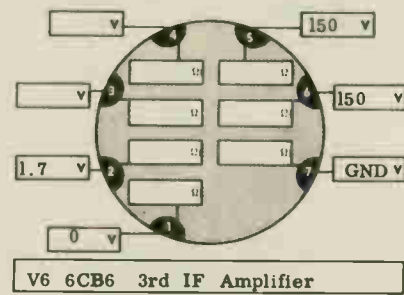
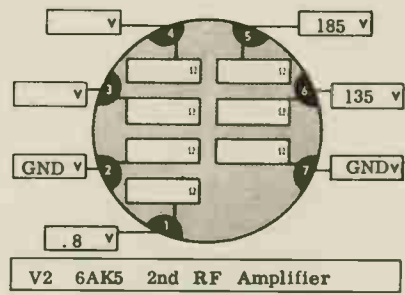
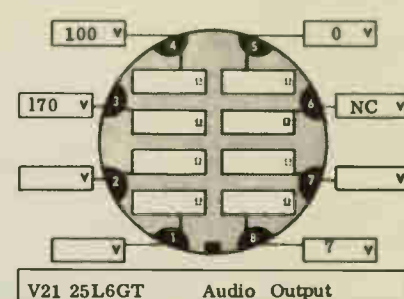
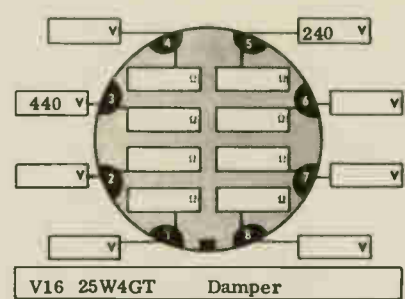
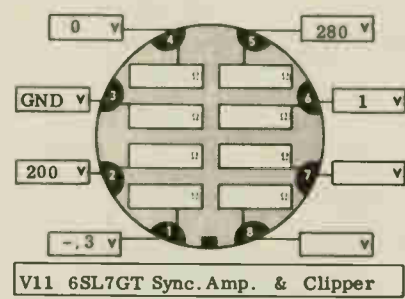
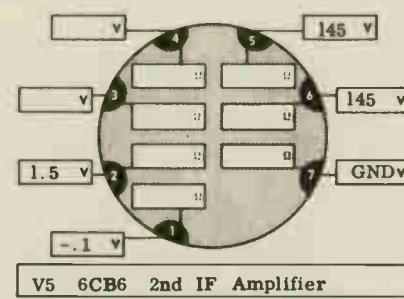
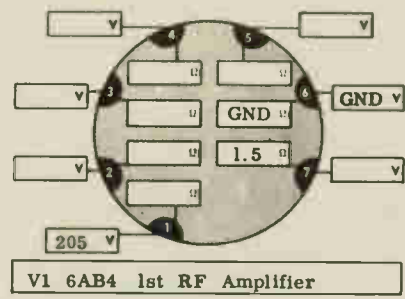
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C311	30 mf., 300V	RCE-141
C315, 4	10 1 mf., 50V	RCE-090
C379A	10 mf., 450V	RCE-118
C379B	40 mf., 300V	RCE-118
C379C	10 mf., 150V	RCE-118
C431A	20 mf., 300V	RCE-142
C431B	100 mf., 75V	RCE-142
C451	300 mf., 150V	RCE-110
C464	150 mf., 300V	RCE-143
C465	125 mf., 350V	RCE-140
TRIMMERS:		
C105	20-50 mmf.	RCY-066 (temp. comp.)
C104, 6	1-5 mmf.	RCY-065 (glass tube type)
C108	.6-2.4 mmf.	RCY-048
C118	.8-1.7 mmf.	RCY-067 (fine tuning)

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Lin. 4K, 2W	R311	RRC-127
Height 3 meg, 2W	R308	RRC-096
Hor. Hold 100K(21T2 only)	R365	RRC-173
Hor. Hold 100K(17" only)	R387	RRC-191
Vert. Hold 125K(21T2 only)	R305	RRC-174
Vert. Hold 125K(17" only)	R342	RRC-193
Brightness 500K(21T2 only)	R276	RRC-175
Brightness 500K(17" only)	R298	RRC-200
Picture 2 meg	R284	RRC-186
Volume .5 meg	R413	RRC-186
Hor. Drive 5K, 1/2W	R388	RRC-195
Picture Stabilizer 3 meg (21T2 only)	R341	RRC-196
Picture Stabilizer 3 meg (17" only)	R338	RRC-201
WIREWOUND		
Triode Couplate-.01 mf. 250K, 500K	C419	REK-002
Resistor-4.6 ohms, 5W 20%	R451	RRW-048
Resistor-20 ohms, Global 4K 7 W, 10%	R457	RRW-051
1.2 ohms, 10%, 1/2W	R380	RRW-053
5,600 ohms, 5W, 10%	R375	RRW-058
1,500 ohms, 10%, 5W	R282	RRW-079
14K, 140V, Global 15%	R452	RRW-082
3,300 ohms, 10W, 10%	R382	RRW-088
	R297	RRW-098

COILS		
REF. NO.	DESCRIPTION	PART NO.
L100	R-F input	RLI-165
L106	IF trap & tuning core	RLI-159
L136	1.4 uh., V3A osc. "K"	RLI-145
L137	Ch. .56 uh. heater	RLI-144
L138, 9	3.3 uh. choke, orange molded	RLI-154
L141	R-F choke	RLI-152
L254, 5, 6	Video detector assy.	RLX-035
L255, 6	31 mh. R-F choke	RLF-024
L257	Ch. -Video comp. 165uh 263	RLI-162
L262	Vid. comp. choke	RLI-161
L261	Ch. Vid. peak'g 110uh. 4.85 ohms	RLI-108
L266, 7	2nd Vid. IF & tun'g core	RLI-096
L266	3rd Video IF & tuning core	RLI-173
L277		
L269	Ch. -Video comp. 80 uh.	RLI-174
L270	Ch. -10 mh in hor. sweep output circuit	RLI-138
L271	Ch. -Video comp. 130uh	RLI-185
L351	Hor. hold & adj. slug	RLC-091
L352	Hor. lin. & tun'g core	RLD-016
L353	Width control w/adj. core	RLD-014
L451	B-supply filter choke	RLF-051

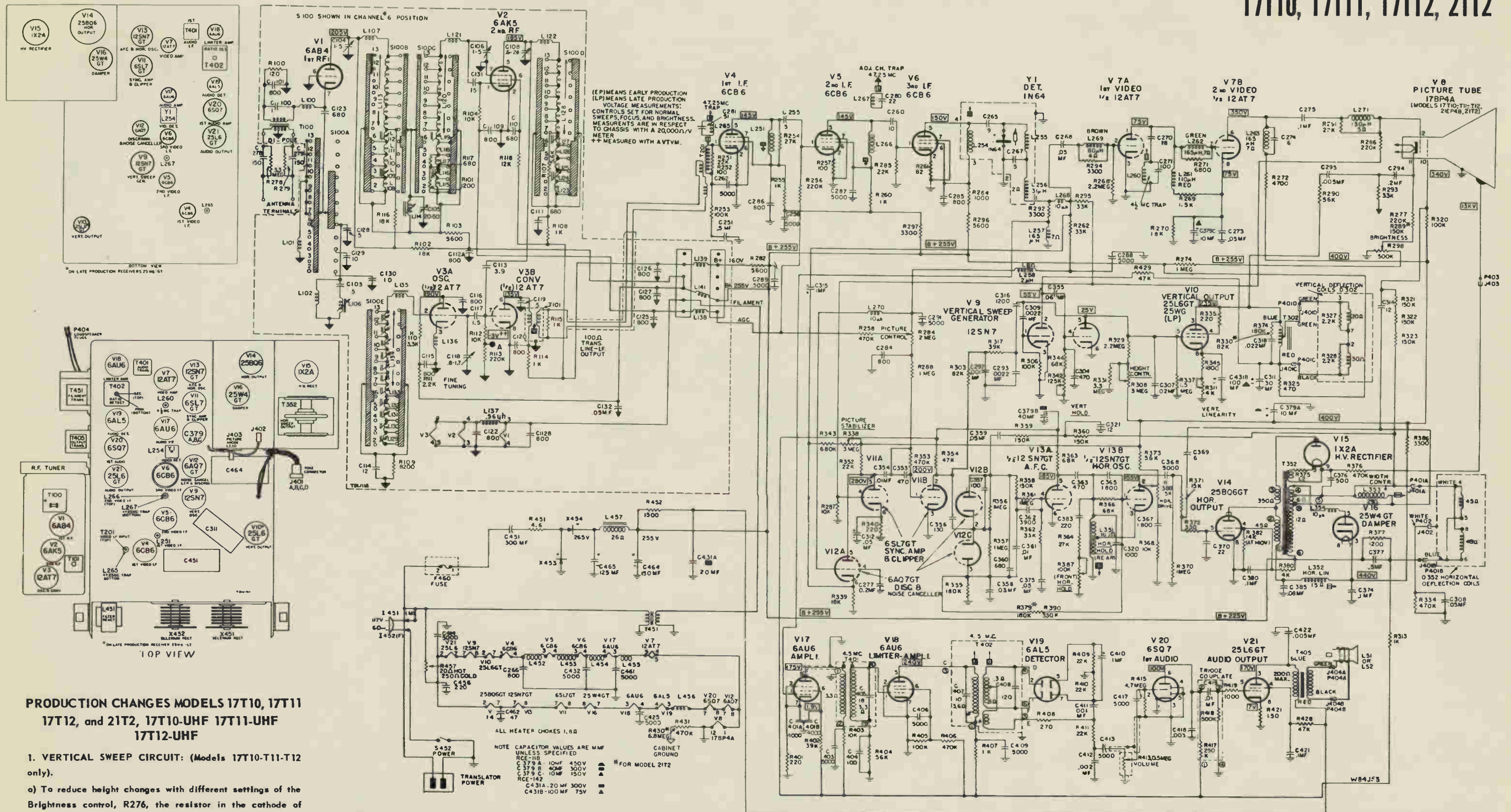
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. O'c.		
Vert. Output	T302	RTO-117
Hor. Output	T352	RTO-116
Power		
Audio Output	T405	RTO-081
Yoke	D302	RLD-045
Antenna input	T100	RLA-037
1st Audio IF	T401	RLI-097
Ratio detector assy.	T402	RTD-008
Filament	T451	RTF-002
I-F input	T201	RTL-137
Headend output	T101	RTL-139

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
IN64	PM focus assy. (17T10 & 21T1)	RLF-059
	PM focus assy. (17T11, 17T12)	RLF-060
LS1	Crystal diode	Part of RLX-035
	RF tuner, complete	RJX-050
	Speaker, 5 1/4" PM	S527D7
	Rect., Selenium, 350ma.	RER-015
	Ion trap - PM magnet	RET-014
	Head-end RF tuner assy	RLI-122



### TEST CONDITIONS

All controls set for normal sweeps, focus and brightness.  
Measurements are in respect to chassis with a 20,000 ohms/volt meter.  
All readings DC unless otherwise noted.



**PRODUCTION CHANGES MODELS 17T10, 17T11, 17T12, and 21T2, 17T10-UHF 17T11-UHF 17T12-UHF**

**1. VERTICAL SWEEP CIRCUIT: (Models 17T10-T11-T12 only).**

a) To reduce height changes with different settings of the Brightness control, R276, the resistor in the cathode of the picture tube was changed from R289, 150,000 ohms (URD-101) to R277, 220,000 ohms (URD-105).

b) To eliminate compression at the top of the picture, the resistor across the vertical output transformer, T302, was changed from R330, 82,000 ohms (URD-095) to R374, 180,000 ohms, (URD-103).

**2. HORIZONTAL SYNC CIRCUIT: (Models 17T10-T11-T12 only).** To improve horizontal sync stability under various conditions of signal strength levels, the feed-back resistor connected from the grid of the horizontal oscillator (V13B) to the discriminator (V12) plate was changed from R279, 180,000 ohms (URD-103) to R390, 330,000 ohms (URD-109).

**3. VERTICAL OUTPUT CIRCUIT:** To improve the vertical linearity, the vertical output tube was changed from 25L6-GT to 25W6-GT. These tubes are interchangeable and no change in tube socket wiring was necessary.

**4. UHF-103 in METAL CABINET 17T10, 21T2:** When the UHF-103 Tuner is installed in a metal cabinet-type re-

ceiver, there is a tendency for the cabinet to induce horizontal sync pulses into the vertical system. The condition is recognized by the fact that the vertical sync is weak and unstable.

To eliminate this trouble, connect a .01 mf. 600 v molded paper capacitor between the front control apron and chassis.

A convenient location for this capacitor is on the right-hand side of the chassis looking at the front. Connect one lead of the capacitor to the center ground lug of the existing terminal board and the other lead to a soldering lug to be mounted under one of the screws fastening the front chassis mounting foot.

# 17C125, 20C107, 21C201, 21C202, 21C204, 21C206, 21C208, 21C208U, 21C210, 21C214, 21T1, 21T1U, 21T3, 21T6

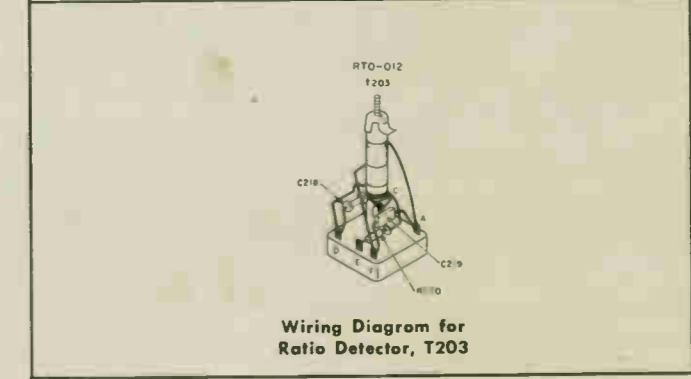
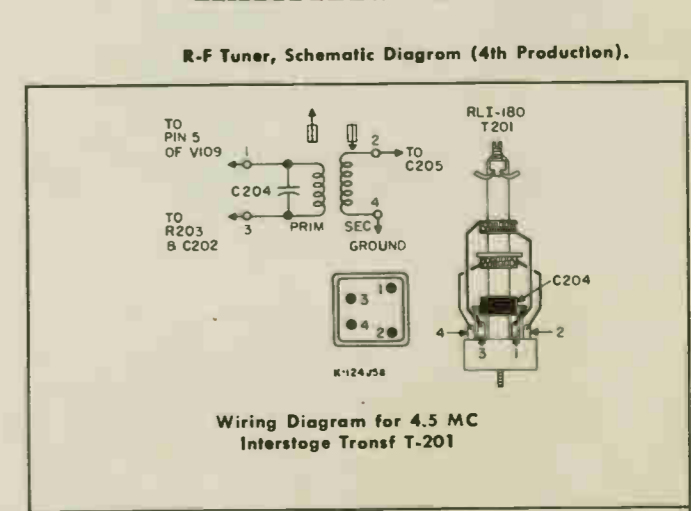
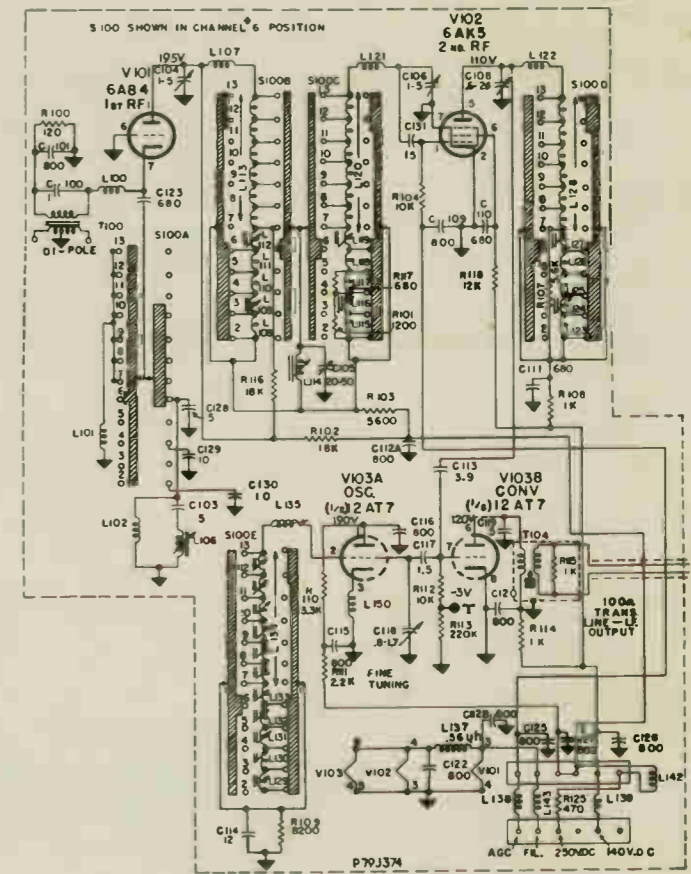
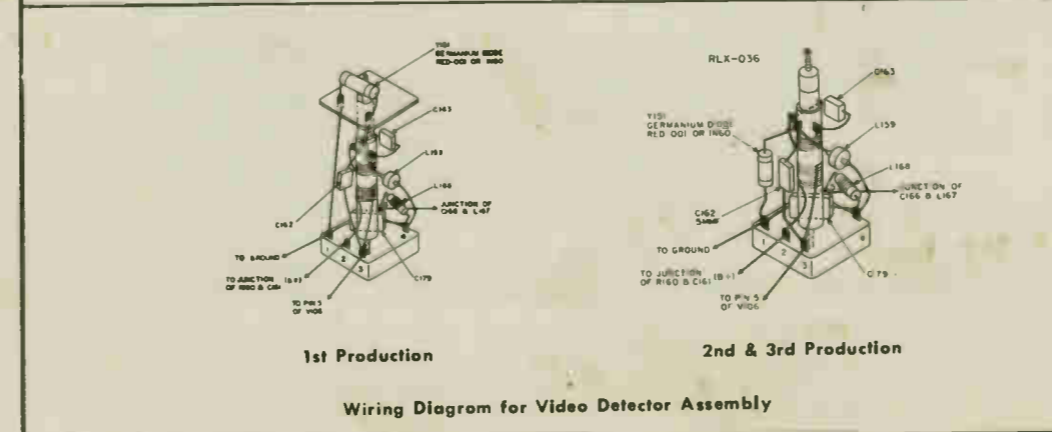
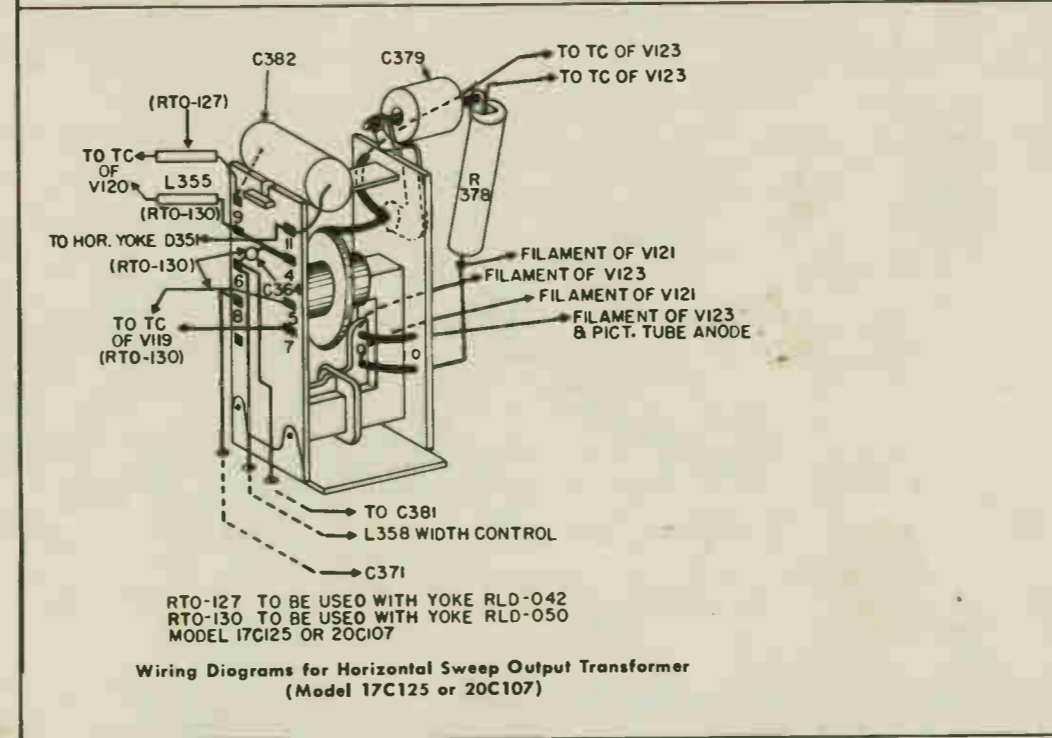
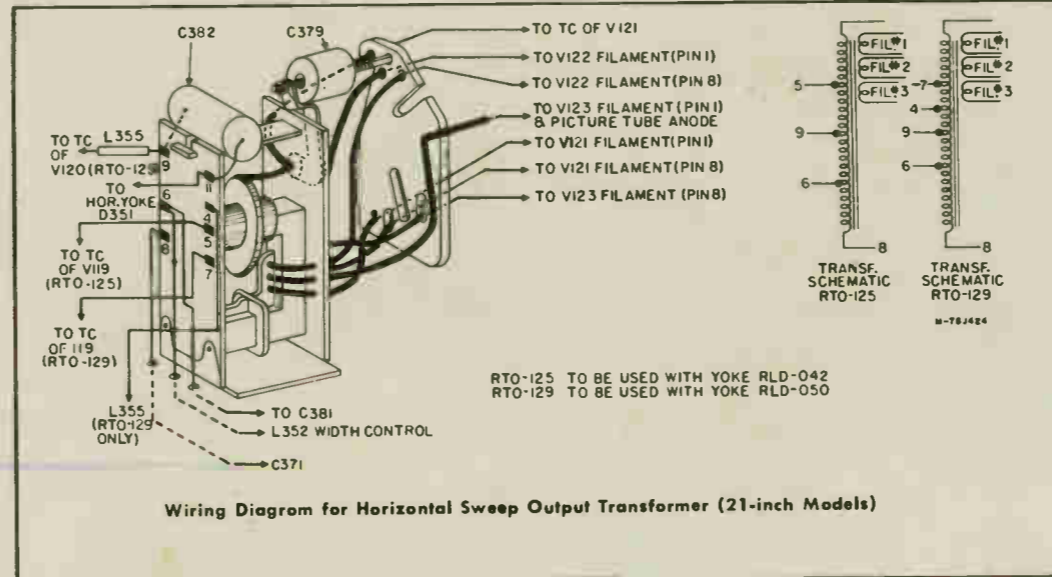
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C183	5 mf., 350V	RCE-153
C301, 214	.1 mf., 50V	RCE-090
C401	300 mf., 150V	RCE-148
C402	125 mf., 350V	RCE-140
C403A	125 mf., 350V	RCE-145***
C403B	100 mf., 75V	RCE-145***
C403C	5 mf., 200V	RCE-145***
C403A	125 mf., 350V	RCE-152 /
C403B	100 mf., 75V	RCE-152 /
C404A	50 mf., 25V	RCE-146 //
C404B	40 mf., 300V	RCE-146 //
C404C	30 mf., 300V	RCE-146 //
C404D	40 mf., 300V	RCE-146 //
C104, 6	1-5 mmf.	RCY-065 (glass tube type)
C105	20-50 mmf.	RCY-066 (Temp. comp.)
C108	.6-2.4 mmf.	RCY-048
C118	.8-1.7 mmf.	RCY-067 (Fine tuning)

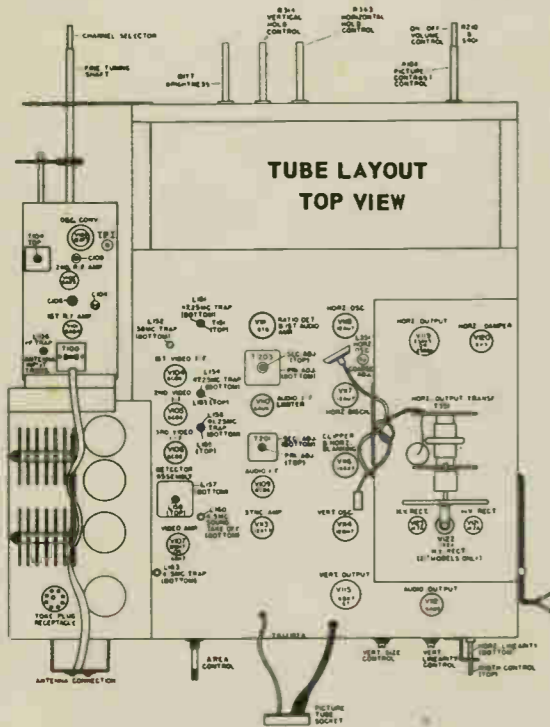
CONTROLS		
Brightness	R177	RRC-191
Hor. Hold 100K	R363	RRC-191
Vert. Hold 125K	R314	RRC-193
Vert. Lin. 2K	R325	RRC-095
Height 4 meg	R316	RRC-190
AGC 2 meg w/loc-distant	R171	RRC-194* & **
Volume 500K (21T1, T1U, T6)	R188	RRC-192
Volume 500K	R188	RRC-197
Contrast 3K (21T1, T1U, T6)	R210	RRC-192
Contrast 3K	R210	RRC-197
<b>WIREWOUND</b>		
Vert. Integrator couplate	P301	REK-001
4.6 ohms, 10% 5W	R401	RRW-048
5600 ohms, 5W	R406	RRW-079
3K ohms, 10%, 7.5W	R404	RRW-095* & **
4K ohms, 10%, 10W	R404	RRW-101** //
31 ohms, 300 ma., Globar	R402	RRW-097
5 meg. HV. (17C125, 20C107)	R378	RRW-099
150 ohms, 10%, 5W	R377	RRW-100
470 ohms, 5W	R318, 1	RRW-102

COILS		
REF. NO.	DESCRIPTION	PART NO.
L152	38 mc trap w/62 mmf.	RLI-179
L153, 4	1st vid. IF pl. coil, core & 47.25 mc trap	RLP-020
L155, 6	2nd vid. IF pl. coil & 41.25 mc trap w/cap & tuning cores	RLP-021
L155, 6	2nd vid. IF	RLP-022 /
L157, 8	Vid. det. can ass'y w/ diode receivers using 6BK7-A vid. ampl.	RLX-039
L157, 8	Vid. det. can ass'y w/ diode receivers using 12BH7 vid. ampl.	RLX-036
L159	Choke 31 mic.	RLI-182
L160	4.5 mc audio take-off peaking coil-120 mic.	RLI-182
L161	wound on 15K ohms, 1/2 W resistor	RLI-176
L162	Peaking coil 265 mic	RLI-184
L163	4.5 mc trap for use w/ receivers incorporating a 12BH7 vid. ampl.	RLI-181
L163	4.5 mc trap for use w/ receivers incorporating a 6BK7-A vid. ampl.	RLI-202
L164	Peaking coil-120 mic., wound on 3900 ohms	RLI-175***
L165	Peaking coil-425 mic.	RLI-186
L166	Peaking coil-125 mic., wound on 8200 ohms	RLI-183
L169	Choke coil 80 mic.	RLI-190 //
L170	Choke coil 6.8 mic.	RLI-191 //
L351	Hor. osc. coil	RLC-091
L352*	352*, 358#, // Width control coil & adj. core	RLD-049
L353*	353*, 359#, // Hor. lin. coil & adj. core	RLD-048
L401	Filter ch. lhy., 26 ohms	RLF-056
L402, 3	5 Choke 2.2 mic.	RLI-122
L167, 356, 357, 172 // ch.-10mic		RJX-049
L168, 404	Choke coil-1.4 mic.	RLI-138
		RLI-142
L202	Choke, 3.3 uh	RLI-154
L355	Choke, 30 uh, flexible	RLI-177

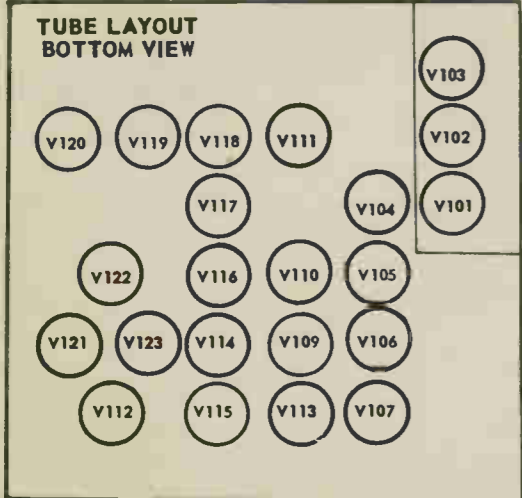
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T301	RTO-121
Yoke		RLD-050, //
Yoke		RLD-042* & **
Hor. output for use w/yoke RLD-042	T351	RTO-125* & ** (21" Model)
Hor. output for use w/yoke RLD-042	T351	RTO-127* & ** (17C25 & 20C107)
Hor. output for use w/yoke RLD-050	T351	RTO-129 // (21" Model)
Hor. output for use w/yoke RLD-050	T351	RTO-130 (17C125 & 20C107)
Audio Output	T202	RTO-123 (Table Model)
Audio Output	T202	RTO-124 (Console Model)
Interstage (4.5 mc)	T201	RLI-180
4.5 mc rat. det. ass'y	T203	RTD-012 (output @ 6 amp.)
Filament 6.3V	T401	RTF-003
Video IF input	T151	RTL-138 (with 12BH7)
Video IF	T151	RTL-147 (with 6BK7-A)

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
	Xtal Diode, 400 ua	
	17C125, 20C107, 21T1-T6, 21C201, C202-C204	
	C206-C208-C208-U-C210-C214	RED-001
	Picture Straightener 21T1 early & late; 21C201, 2, 4, 6; 21C24	REA-003
	Picture Straightener 21T1 Late; 21T1U; 21T3; 21T6; 21C201, 2, 6, 8, 8U; 21C20, 21C24	REA-004
	Grid Caps (for 6V3 in 21T1)	REC-006
	Fuse .16 amp., 125V	REF-008
	Selen. Rect. 350ma.	RER-015
	PM Focus Unit 21T1 (early) 21C204	RLF-055
	PM Focus Unit 17C125, 20C107, 21T1 (late)	
	21T1U, 21T3, 21T6; 21C201, 2, 6, 8, 8U; 21C210, 21C214	RLF-058
	<b>LOUDSPEAKERS</b>	
	5 1/4" PM -21T1 (early)	S527D-7
	6 1/2" PM -21T6	S650D-7
	8" Alnico PM, 3.2 ohms	S800D
	21T1 (late), 21T1U, 21T3	S810D-7
	8" Alnico PM, -17C125	S1012D07
	10" Alnico PM, -20C107	
	12" PM-12C201, 202, 204, 206, 208, 208U, 210, 214	S1212D-7
	8" PM, 2.3 ohms 21T1 (late) 21T1U, 21T3	ROP-025
	* 1st Production	
	** 2nd Production	
	*** 1st, 2nd, & 3rd Production	
	# 3rd Production	
	// 4th Production	

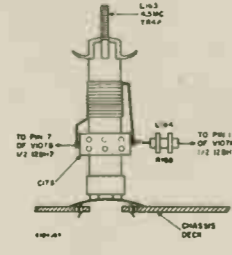
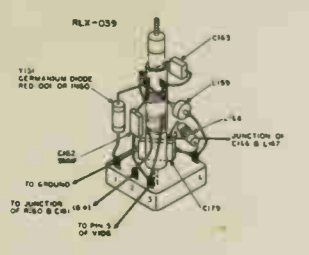
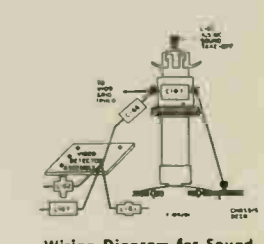
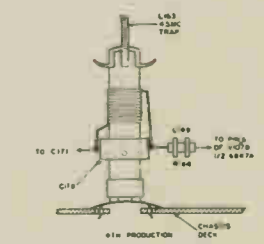
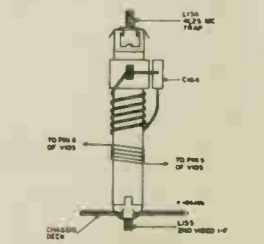
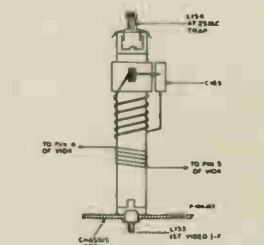
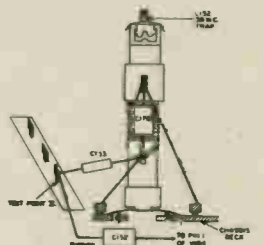
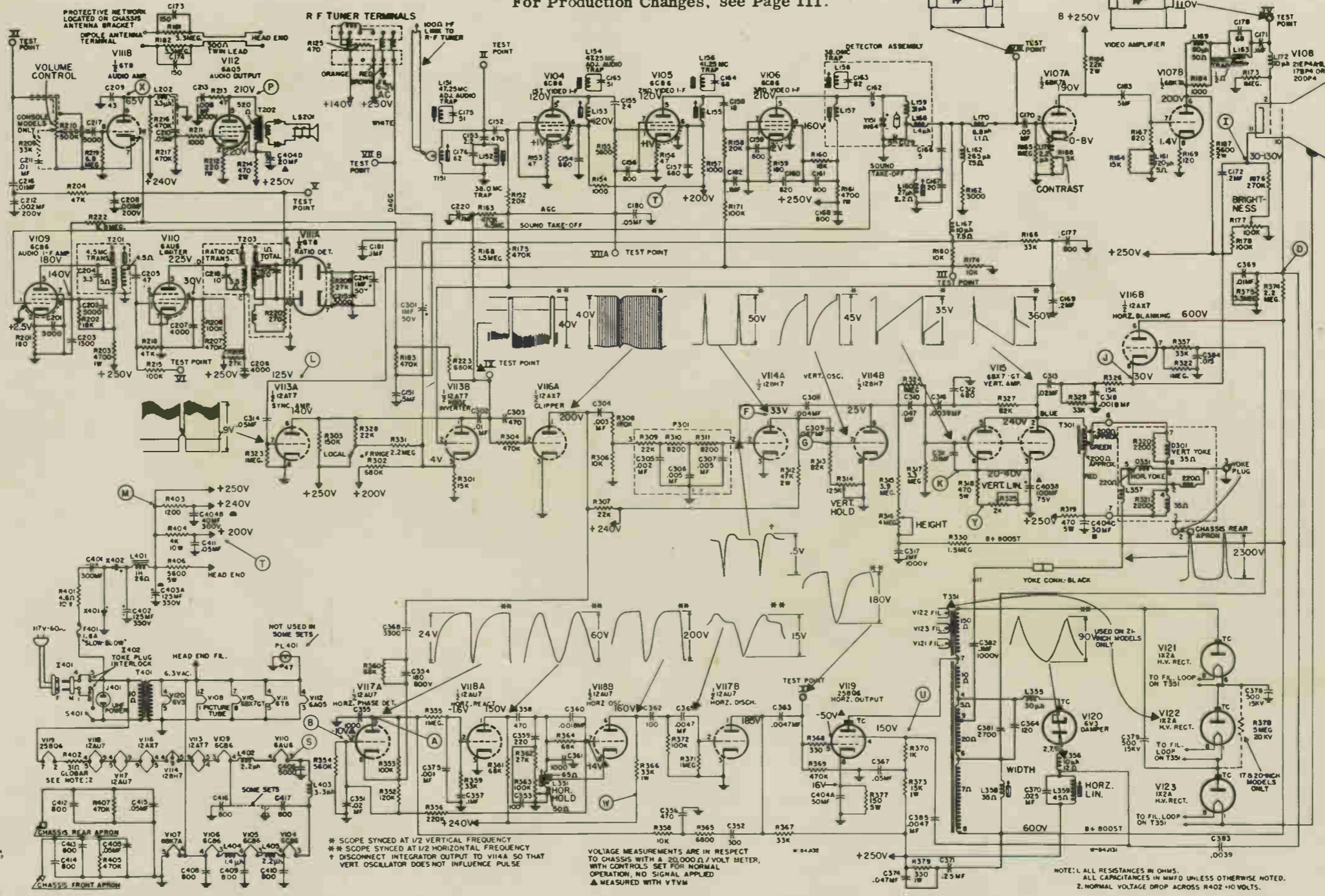




Tube and trimmer location  
Note: V122 not used on models 17C125



For Production Changes, see Page 111.



\* SCOPE SYNCED AT 1/2 VERTICAL FREQUENCY  
\*\* SCOPE SYNCED AT 1/2 HORIZONTAL FREQUENCY  
† DISCONNECT INTEGRATOR OUTPUT TO V114A SO THAT VERT. OSCILLATOR DOES NOT INFLUENCE PULSE

VOLTAGE MEASUREMENTS ARE IN RESPECT TO CHASSIS WITH A 20,000 Ω / VOLT METER, WITH CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED  
▲ MEASURED WITH VTVM

NOTE: ALL RESISTANCES IN OHMS, UNLESS OTHERWISE NOTED.  
2. NORMAL VOLTAGE DROP ACROSS R402 = 10 VOLTS.

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C210	1 mfd., 50V	RCE-090
C210	10 mfd., 50V	RCE-169
C302	1 mfd., 50V	RCE-090
C320	1 mfd., 50V	RCE-090
C401A	40 mfd., 350V	RCE-154
C401B	90 mfd., 350V	RCE-154
C402A	30 mfd., 350V	RCE-155
C402B	20 mfd., 350V	RCE-155
C402C	100 mfd., 75V	RCE-155
C403A	40 mfd., 350V	RCE-156
C403B	20 mfd., 350V	RCE-156
C403C	5 mfd., 350V	RCE-156
C403D	10 mfd., 25V	RCE-156

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume, 500K ohms	R220	RRC-216*
Volume, 3K ohms	R167	RRC-216*
Volume, 500K ohms	R220	RRC-192†
Brightness, 100K ohms	R176	RRC-213*
Brightness, 20K ohms	R372	RRC-213*
Brightness, 100K ohms	R176	RRC-210†
Brightness, 20K ohms	R372	RRC-210†
Contrast, 3K ohms	R167	RRC-192†
Hor. Hold, 100K ohms	R360	RRC-207
Vert. Hold, 175K ohms	R318	RRC-215*
Vert. Hold, 175K ohms	R318	RRC-223†
Vert. Lin, 2K ohms	R324	RRC-208
Height, 4 meg.	R320	RRC-209

WIREWOUND		
DESCRIPTION	REF. NO.	PART NO.
4K ohms, 10W	R402	RRW-053
120 ohms, 5W	R369	RRW-103
3.3 ohms, 1/2W	R373	RRW-106
5K ohms, 10W	R380	RRW-106
5600 ohms, 5W	R403	RRW-079
3750 ohms, 10W	R404	RRW-104

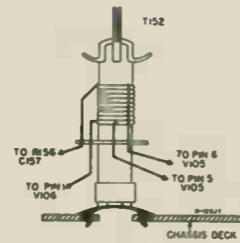
COILS		
REF. NO.	DESCRIPTION	PART NO.
L154	1st Video IF	RLI-192
L155	150 mic Choke, wound on R172	RLI-193
L157	4.5MC Audio Take-off	RLI-182
L158	270 mic. Choke	RLI-209
L159	31 mic Choke	RLI-196
L161	120 mic Choke wound on R159	RLI-212
L162	220 mic choke	RLI-197
L164	120 mic Choke	RLI-205
L351	Hor. Osc.	RLC-125
L352, 7	Width	RLD-053
L353	Hor. Lin.	RLD-054
L401	Filter Choke, 4 hy	RLF-061

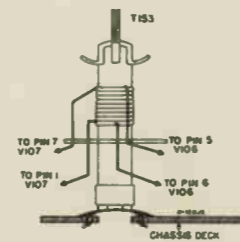
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T301	RTO-136
Hor. Output	T351	RTO-131
Audio Output	T203	RTO-135*
Audio Output	T203	RTO-134†
Power	T401	RTP-314
3rd Video IF	T153	RTL-145
1st & 2nd Video IF	T151, 2	RTL-144
Ratio Detector, 4.5MC	T202	RTD-013
Audio IF, 4.5MC	T201	RLI-180

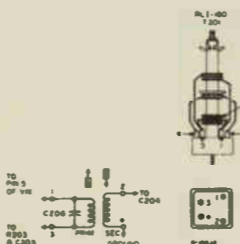
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
Yoke		RLD-062
Video Detector Ass'y complete		RLX-038
Diode Crystal, Germanium		RED-003
Tuner Unit, complete		RJX-051
Speaker, 5 1/4" PM		8S27D*
Speaker, 6 1/2" PM		8S50D-7†
Speaker, 3.2 ohms V.C.		
Speaker, 6 1/2" PM		
Speaker, 3.2 ohms VC		



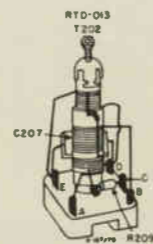
Wiring Diagram for T152



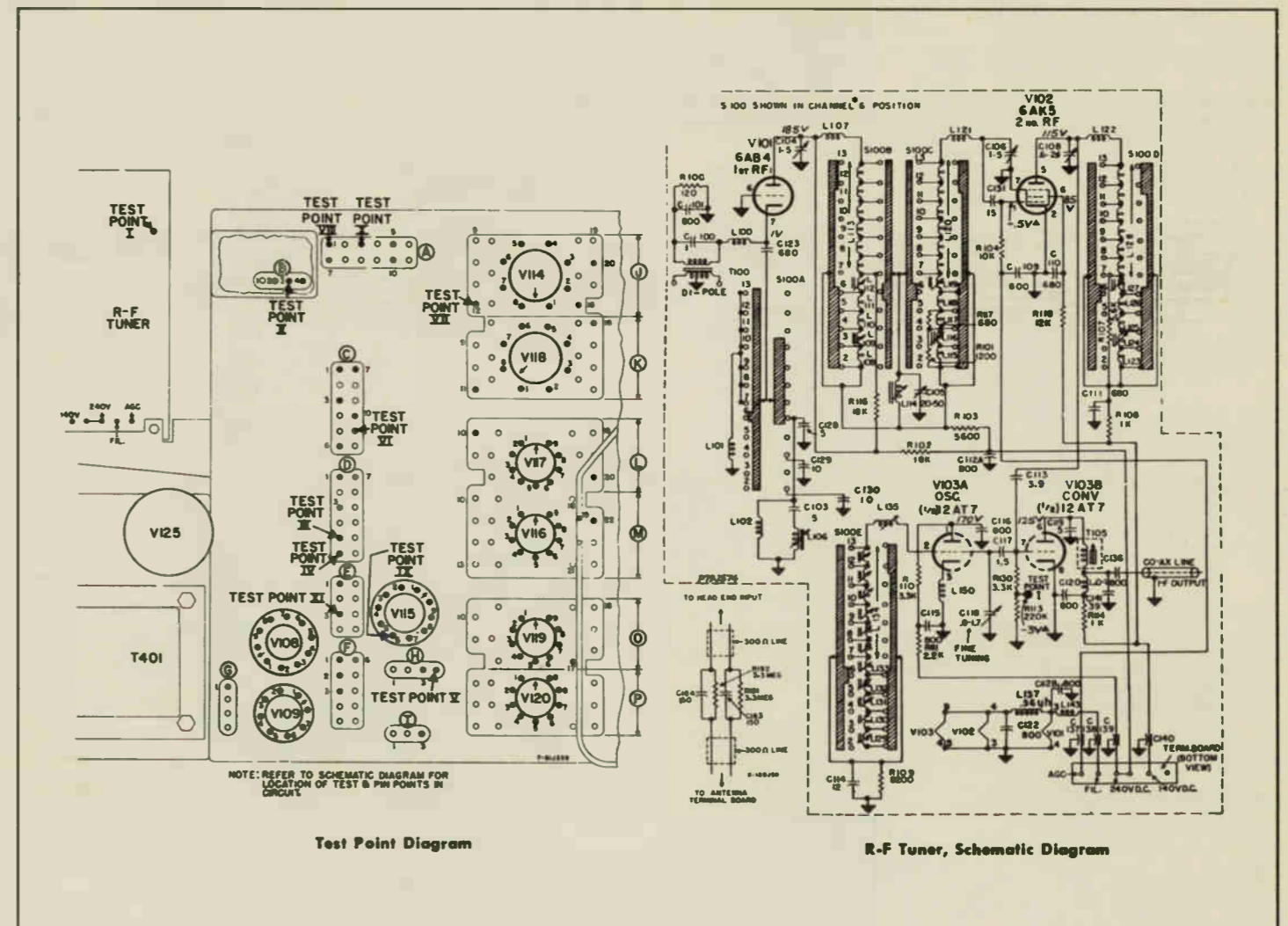
Wiring Diagram for T153



4.5 mc Interstage Transformer Wiring

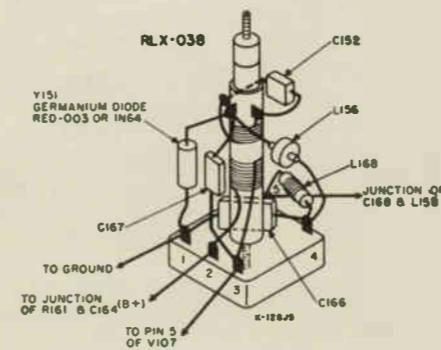


Ratio Detector Wiring

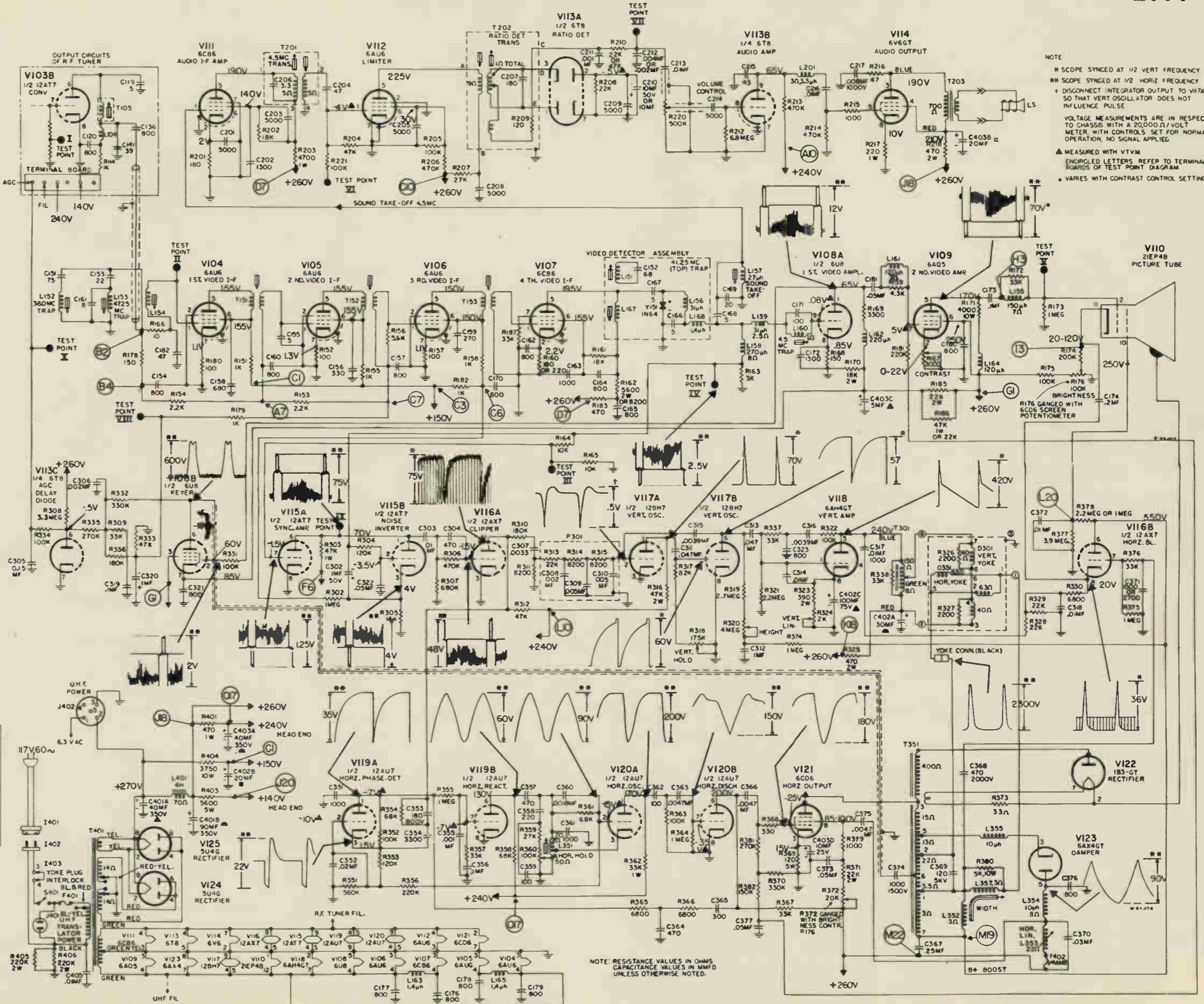
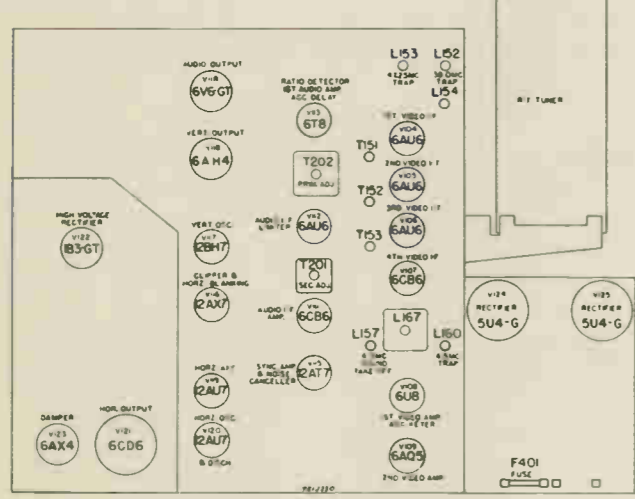
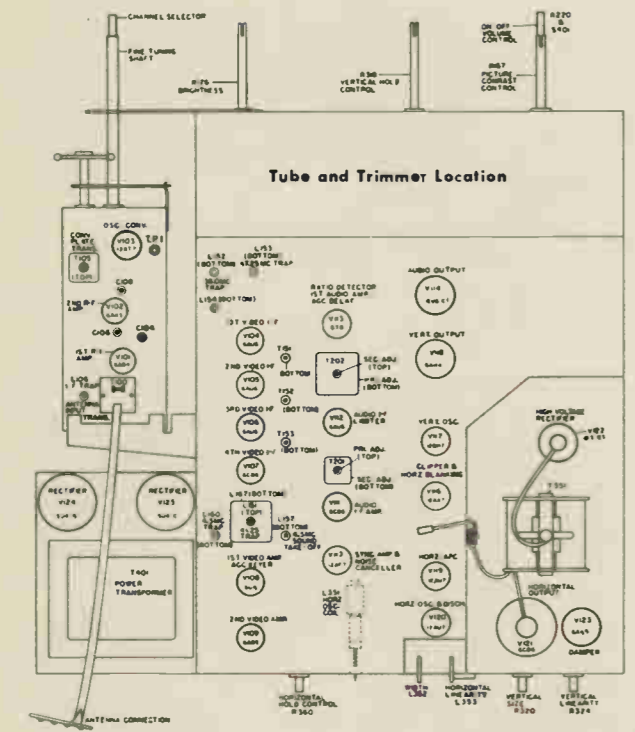


Test Point Diagram

R-F Tuner, Schematic Diagram



Video Detector Wiring Diagram



NOTE  
 \* SCOPE SYNCED AT 1/2 VERT. FREQUENCY  
 \*\* SCOPE SYNCED AT 1/2 HORIZ. FREQUENCY  
 † DISCONNECT INTEGRATOR OUTPUT TO V17A SO THAT VERT. OSCILLATOR DOES NOT INFLUENCE PULSE  
 ‡ VOLTAGE MEASUREMENTS ARE IN RESPECT TO CHASSIS WITH A 20,000 Ω/VOLT METER WITH CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED  
 ▲ MEASURED WITH VTVM  
 ● ENCIRCLED LETTERS REFER TO TERMINAL BLOCKS OF TEST POINT DIAGRAM  
 ○ VARIES WITH CONTRAST CONTROL SETTING

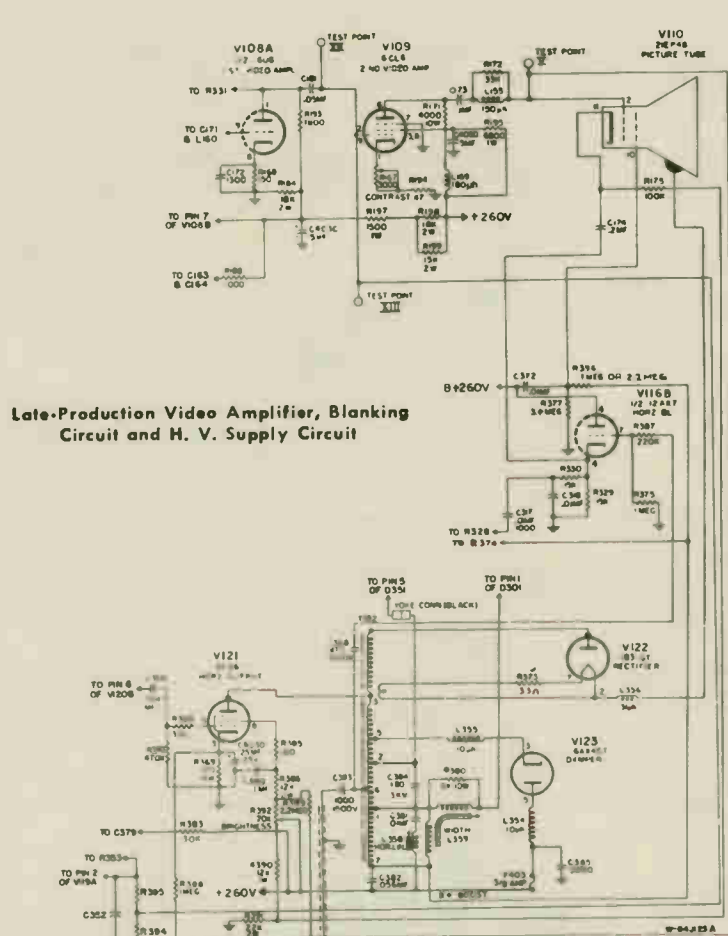
NOTE: RESISTANCE VALUES IN OHMS  
 CAPACITANCE VALUES IN MMFD  
 UNLESS OTHERWISE NOTED.

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C210	1 mfd., 50V	RCE-090*
C210	10 mfd., 50V	RCE-170†
C210	10 mfd., 50V	RCE-170**
C320	1 mfd., 50V	RCE-090
C302	1 mfd., 50V	RCE-090
C401A	40 mfd., 350V	RCE-154
C401B	90 mfd., 350V	RCE-154
C402A	30 mfd., 350V	RCE-155
C402B	20 mfd., 350V	RCE-155
C402C	100 mfd., 75V	RCE-155*
C403A	40 mfd., 350V	RCE-156
C403B	20 mfd., 350V	RCE-156
C403C	5 mfd., 350V	RCE-156
C403D	10 mfd., 25V	RCE-156*
C403A	40 mfd., 350V	RCE-167
C403B	20 mfd., 350V	RCE-167
C403C	5 mfd., 350V	RCE-167
C403D	25 mfd., 25V	RCE-167
C405A	30 mfd., 350V	RCE-168
C405B	20 mfd., 350V	RCE-168
C405C	5 mfd., 350V	RCE-168
C405D	100 mfd., 75V	RCE-168†
C405D	100 mfd., 75V	RCE-168**

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume, 500K ohms	R167	RRC-216*
Volume, 500K ohms	R167	RRC-217††
Brightness, 20K ohms	R392	RRC-245**†
Brightness, 100K ohms, dual	R176	RRC-213*
Brightness, 20K ohms, dual	R372	RRC-213*
Contrast, 3K ohms	R220	RRC-216*
Contrast, 3K ohms	R220	RRC-217††
Hor. Hold, 100K ohms	R360	RRC-207
Vert. Hold, 175K, dual, (long)	R318	RRC-215
Vert. Hold, 175K, dual, (short)	R318	RRC-244**†
Vert. Lin., 2K ohms	R324	RRC-208
Height, 4 meg.	R320	RRC-209
<b>WIREWOUND</b>		
4K ohms, 10W	R171	RRW-053
120 ohms, 5W	R369	RRW-103
3.3 ohms, 1/2W	R373	RRW-105
5K ohms, 10W	R380	RRW-106
5600 ohms, 5W	R403	RRW-079
3750 ohms, 5W	R404	RRW-104

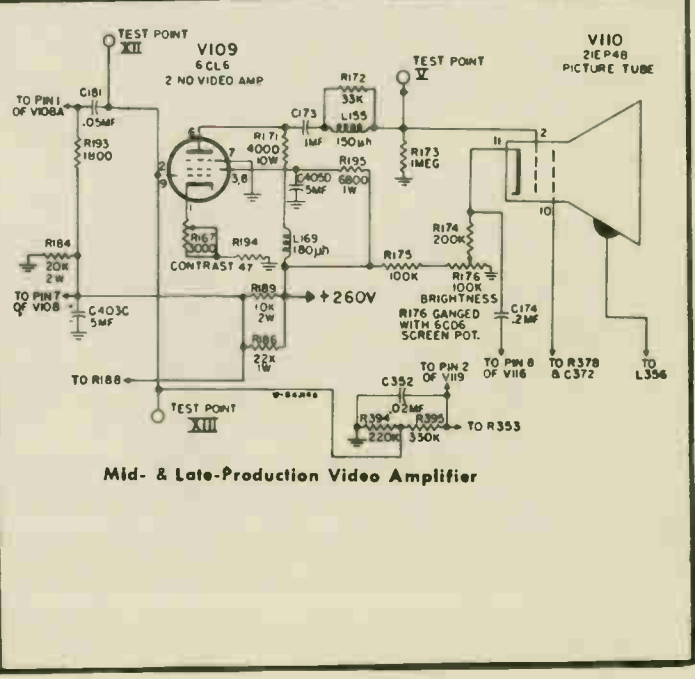
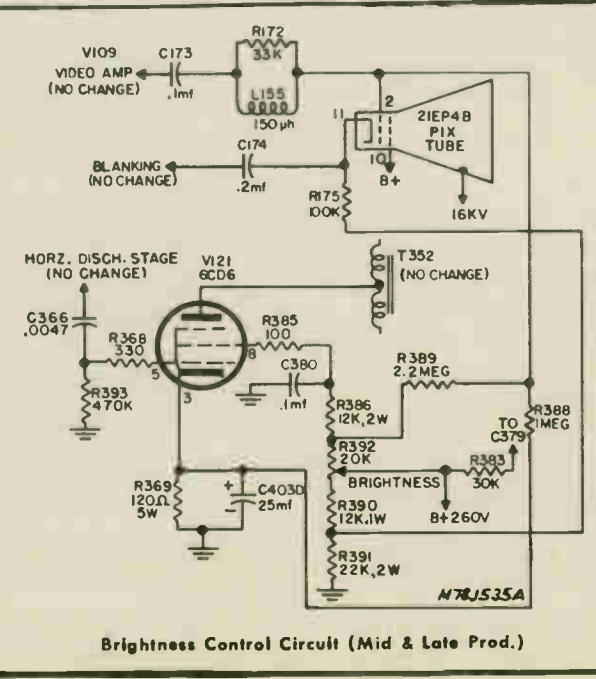
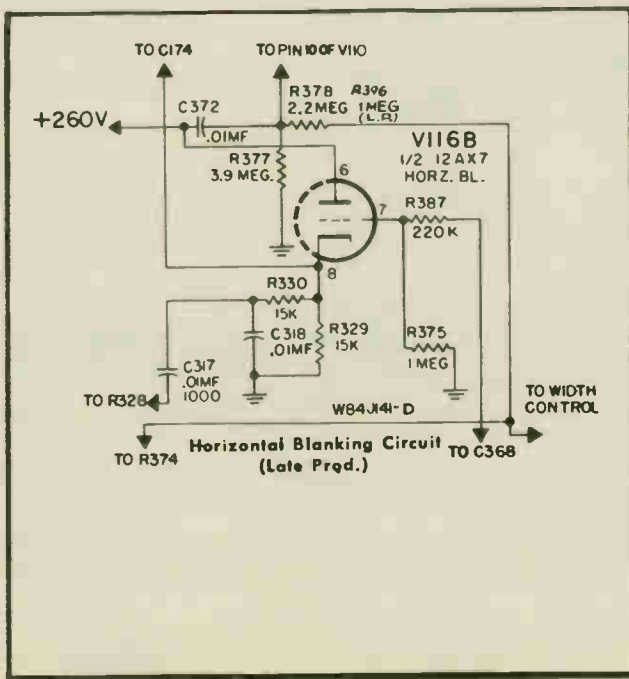
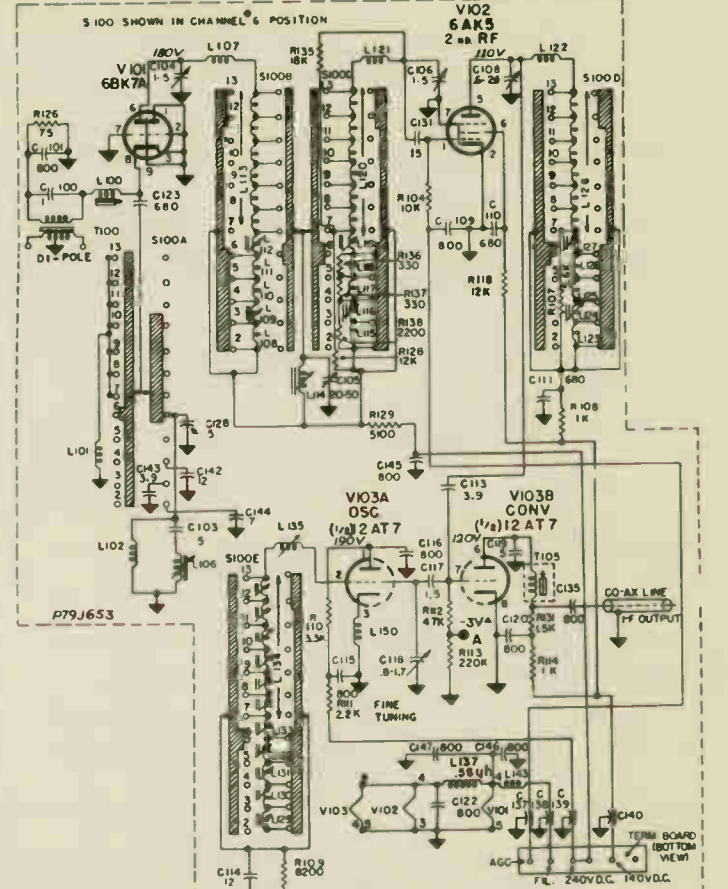
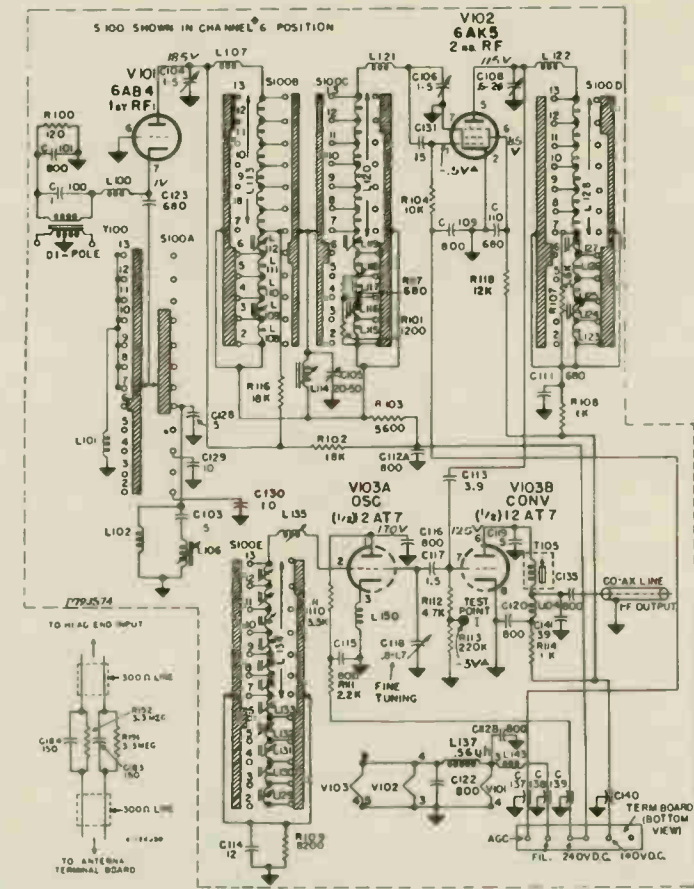
COILS		
REF. NO.	DESCRIPTION	PART NO.
L154	1st Video IF	RLI-192
L155	150 mic choke, wound on R172, 33K, 1/2W	RLI-193
L157	4.5 MC Audio Take-off	RLI-226
L157	4.5 MC Audio Take-off	RLI-182
L158	270 mic. choke	RLI-209
L181	120 mic choke wound on R159	RLI-212*
L164	120 mic. choke	RLI-205*
L164	120 mic. choke	RLI-205†
L166	Peaking, 220 mic.	RLI-197† & **
L162	Peaking, 220 mic.	RLI-197*
L169	Peaking, 180 mic.	RLI-220
L201	3.3 uh, choke	RLI-154
L351	Hor. Oscillator	RLC-091
L352, 57	Width	RLD-053*
L353	Hor. Linearity	RLD-054*
L358	Hor. Lin. must be used with RTO-146	RLD-056† & **
L359	Width, must be used with RTO-146	RLD-058† & **
L151, 56	.67 Video det. ass'y	RLX-038

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T301	RTO-136
Hor. Output, must be used with RLD-056 and RLD-058	T352	RTO-146**†
Hor. Output, must be used with RLD-053 and RLD-054	T351	RTO-131*
Audio Output	T203	RTO-134††
Audio Output	T203	RTO-135*
Power	T401	RTP-314
3rd Video IF	T153	RTL-145
1st and 2nd Video IF	T151, 2	RTL-144
Ratio Detector	T202	RTD-014
4.5 MC Audio	T201	RLI-228
IF 4.5 MC	T201	RLI-180



MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
1/2" PM Spkr. 3.2 ohms @ 400 cycles		RED-003
1/2" PM Spkr. 3.2 ohms @ 400 cycles		RLD-052
Crystal Diode, Germanium		RLD-052
RF Tuner - complete		RJX-054
RF Tuner - complete		RJX-056
Switch, local-fringe		RSS-005
Switch, area		RSW-067

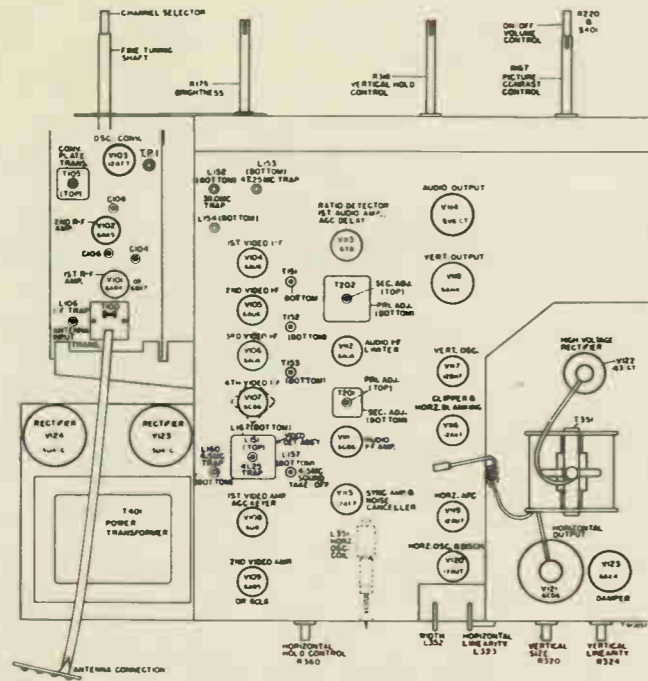
\* 1st Production  
 † 2nd Production  
 †† 3rd Production  
 \*\* Table Models  
 ††† Console Models



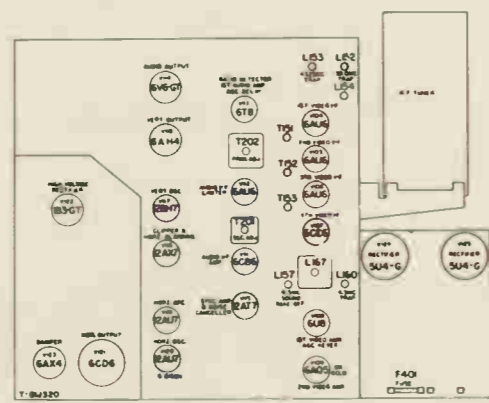


# 21C225 21C226 21C227 21C228 21C229 21C230 21C231 21C232 21C233 21T20 21T21

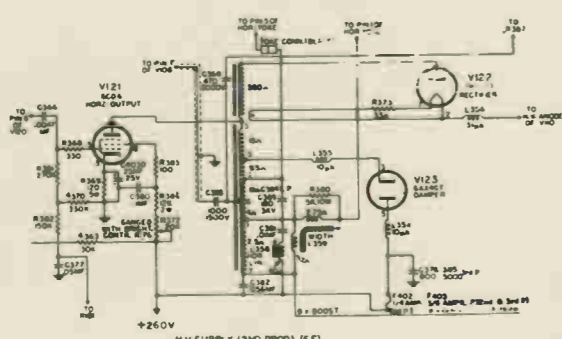
For Production Changes, see Page 111.



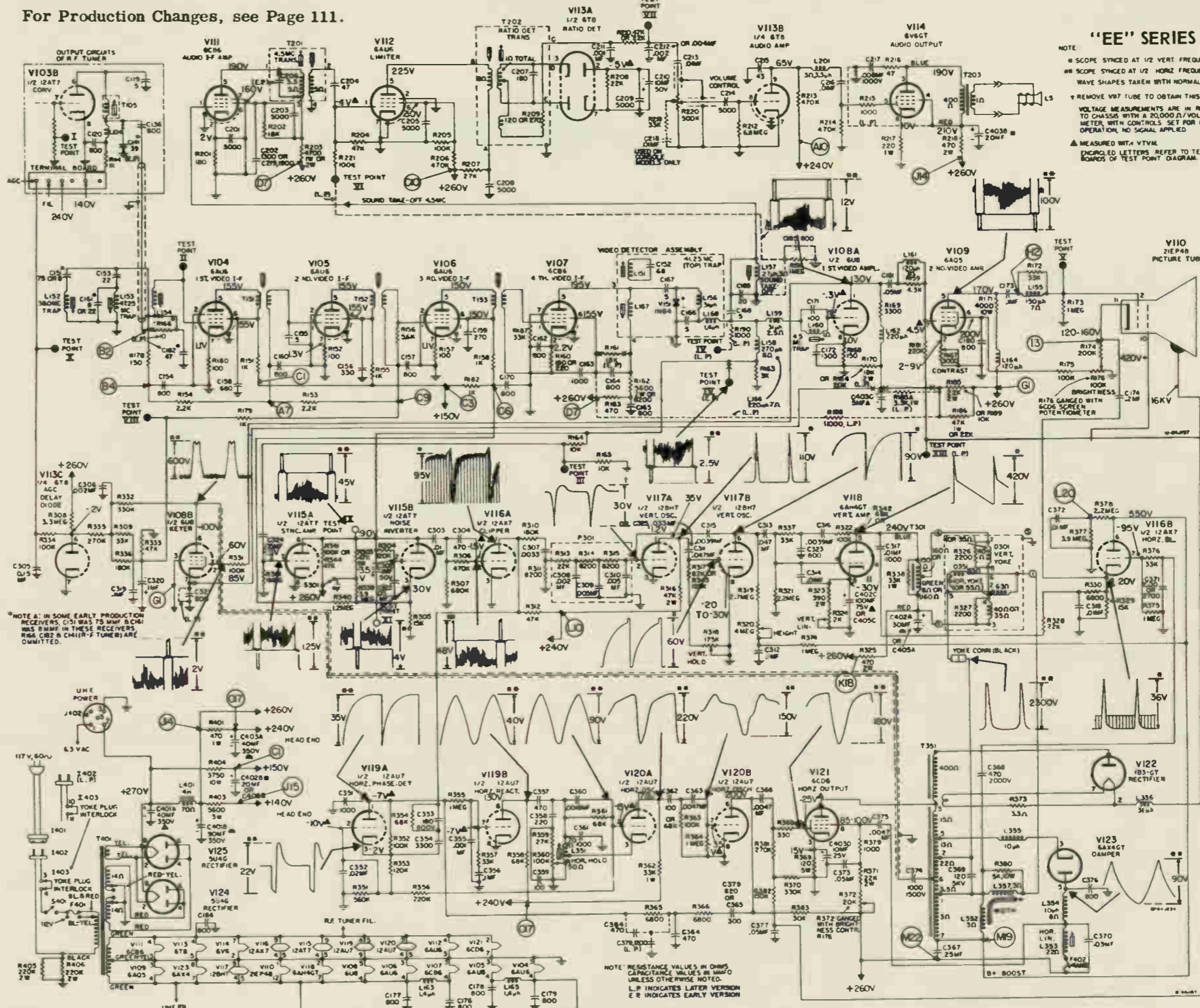
Tube and Trimmer Location



Tube Location, Bottom View

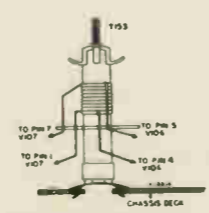


Mid-Production H. V. Supply Circuit

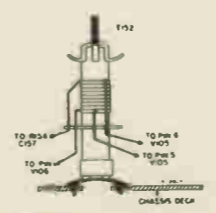


## "EE" SERIES

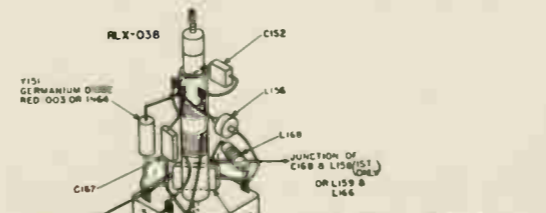
- NOTE
- # SCOPE SYNCED AT 1/2 VERT. FREQUENCY
  - # SCOPE SYNCED AT 1/2 HORIZ. FREQUENCY
  - WAVE SHAPES TAKEN WITH NORMAL SIGNAL APPLIED.
  - \* REMOVE V87 TUBE TO OBTAIN THIS WAVE SHAPE.
  - VOLTAGE MEASUREMENTS ARE IN RESPECT TO CHASSIS WITH A 20,000 Ω/VOLT METER WITH CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED.
  - ▲ MEASURED WITH VTVM
  - ENCIRCLED LETTERS REFER TO TERMINAL BOARDS OF TEST POINT DIAGRAM.



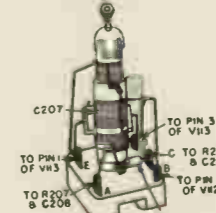
Wiring Diagram for T153



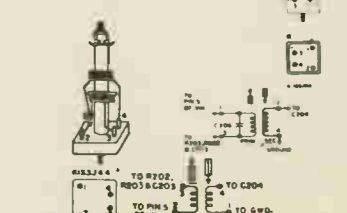
Wiring Diagram for T152



Video Detector Wiring Diagram



Ratio Detector Wiring



4.5 mc Interstage Transformer Wiring

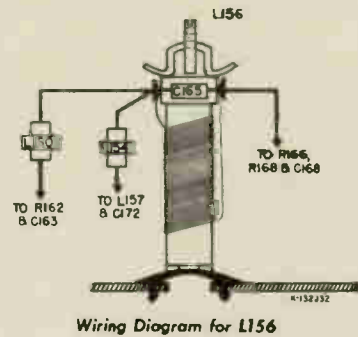
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C147	1 mfd., 50V	RCE-176
C309	10 mfd., 25V	RCE-170
C401A	90 mfd., 350V	RCE-163
C401B	30 mfd., 350V	RCE-163
C401C	5 mfd., 350V	RCE-163
C401D	100 mfd., 75V	RCE-163
C402A	40 mfd., 350V	RCE-161
C402B	40 mfd., 350V	RCE-161
C402C	30 mfd., 350V	RCE-161
C402D	10 mfd., 25V	RCE-161

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume, 500K, 1/8" Shaft	R178	RRC-211
Volume, 500K, 2 3/8" Shaft	R178	RRC-233
Volume, 500K, 3 1/4" Shaft	R178	RRC-236
Brightness, 100K, 2 1/2" Shaft	R175	RRC-191
Brightness, 100K, 2 9/16" Shaft	R175	RRC-222
Contrast, 700 ohms, 3 1/8" Shaft	R320	RRC-211
Contrast, 700 ohms, 2 3/8" Shaft	R320	RRC-233
Contrast, 750 ohms, 3 1/4" Shaft	R320	RRC-236
Hor. Hold, 200K ohms	R264	RRC-219
Vert. Hold, 125K, 2 9/16" Shaft	R205	RRC-237
Vert. Hold, 125K, 1 3/16" Shaft	R205	RRC-243
Vert. Hold, 125K, 2 1/2" Shaft	R205	RRC-193
Vert. Lin., 4K ohms, w.w.	R211	RRC-218
Height, 2 meg., Knurl Shaft	R188	RRC-225
Height, 3 meg., Knurl Shaft	R221	RRC-246
Area, 2 meg., Knurl Shaft	R207	RRC-225
Area, 2 meg., Slotted Shaft	R188	RRC-235
<b>WIREWOUND</b>		
4K ohms, 10W	R172	RRW-053
150 ohms, 4W	R270	RRW-100
5K ohms, 10W	R272	RRW-106* & †
3.3 ohms, 1/2 W	R273	RRW-105
3K ohms, 7.5W	R402	RRW-095
5,600 ohms, 5W	R404	RRW-079

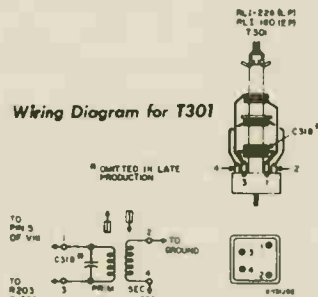
COILS		
REF. NO.	DESCRIPTION	PART NO.
L152	1st Video IF Grid	RLI-192
L154, 56 & 60	Trap Ass'y	RLI-215
L155	47 mic. cathode choke	RLI-214
L157 &	254 Choke, 10 mic.	RLI-138
L158	300 mic. plate coil	RLI-208
L159	270 mic. plate coil	RLI-209
L251	Hor. M. V. stabilizer	RLI-210
L252	Width	RLD-058
L253	Hor. linearity	RLD-057
L401	B+ Filter choke, 1.5 hy	RLF-062
L154	Choke, 31 uh	RLF-024
L160	Choke, 1.3 mh	RLI-216

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T201	RTO-142
Hor. Output	T251	RTO-141
Audio Output for ROP-Q8 & S121D-7	T303	RTO-140
Audio Output for S527-D7 & S625-D7	T303	RTO-139
1st and 2nd Vid. IF	T151-2	RTL-144
Ratio Detector	T302	RTD-014
Video Detector Ass'y	T153	RLX-042
IF Filter (40 MC)		RLW-010
Audio (4.5MC) 2 core-type	T301	RLI-228† & **
Interstage 3.3mmf	T301	RLI-180*
Power	T401	RTP-315

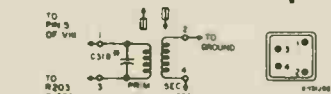
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
	Speaker, 5 1/4" PM	S-527-D7
	Speaker, 6 1/4" PM	S-625-D7
	Speaker, 10" PM	ROP-018
	Speaker, 12" PM	S-1212-D7
	RF Tuner Complete	RJX-052
	RF Tuner Complete	RJX-053
	RF Tuner "D" version Complete	RJX-057
	Yoke	RLD-052
	Crystal diode Germ.	RED-003



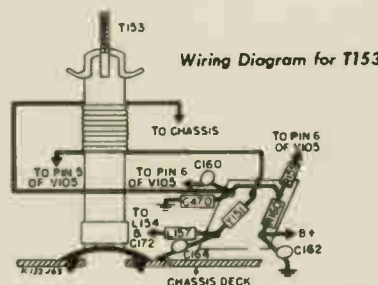
Wiring Diagram for L156



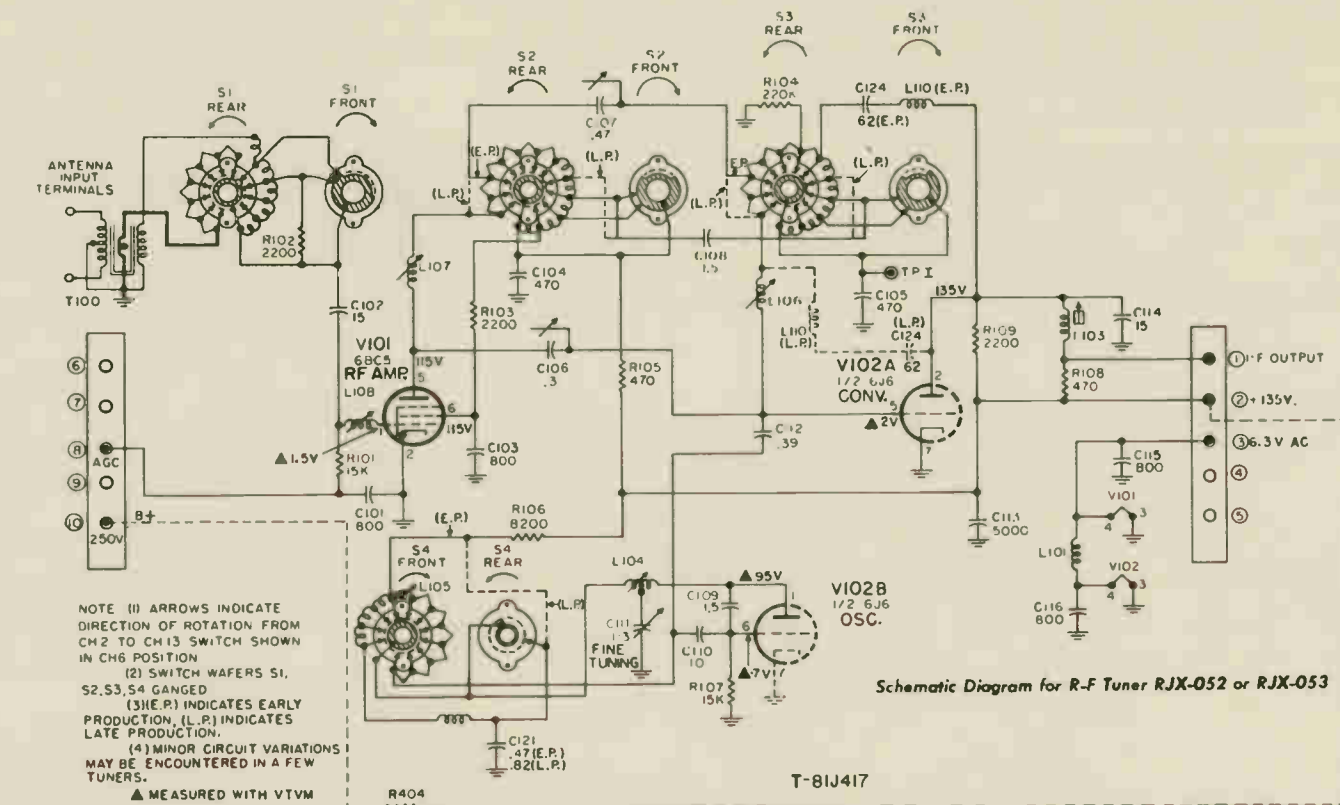
Wiring Diagram for T301



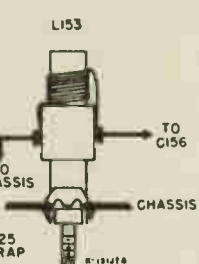
Wiring Diagram for T302



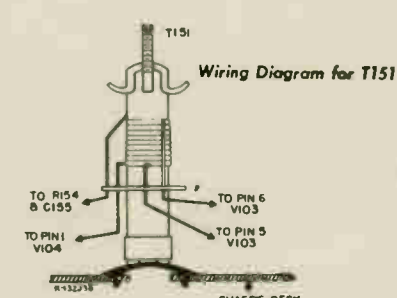
Wiring Diagram for T153



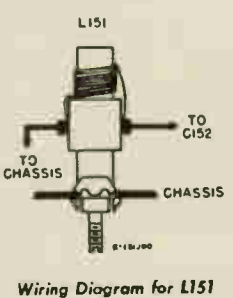
Schematic Diagram for R-F Tuner RJX-052 or RJX-053



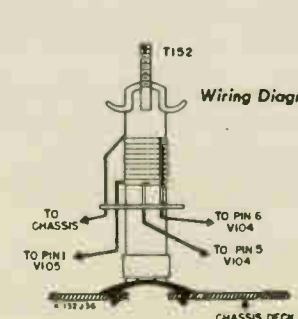
Wiring Diagram for L153



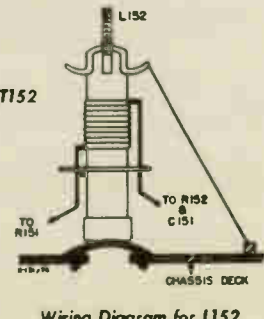
Wiring Diagram for T151



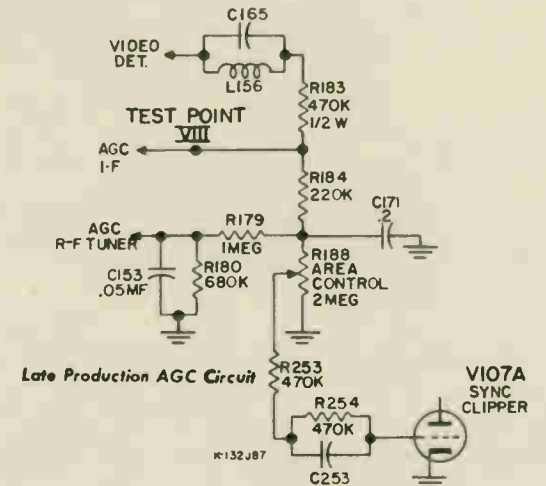
Wiring Diagram for L151



Wiring Diagram for T152



Wiring Diagram for L152



Late Production AGC Circuit

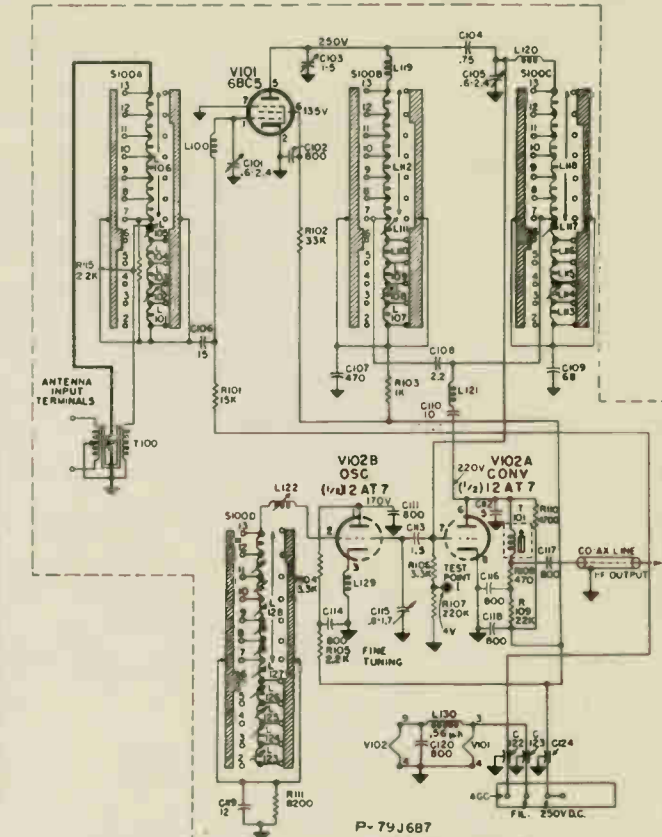
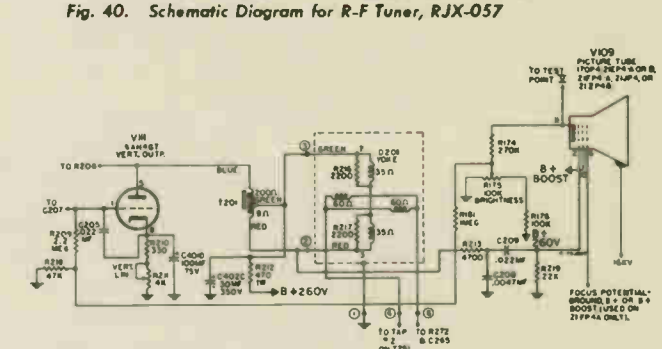
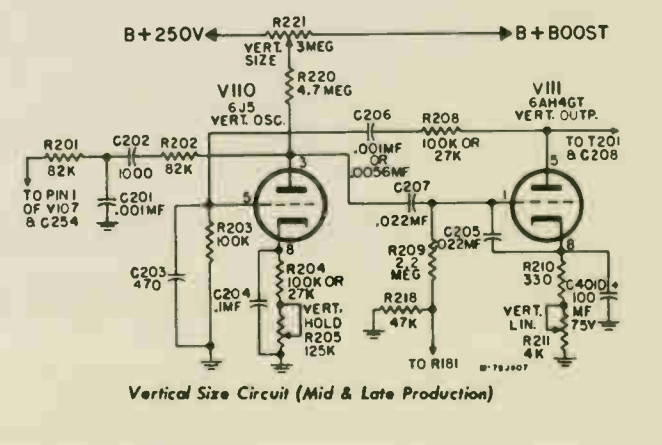


Fig. 40. Schematic Diagram for R-F Tuner, RJX-057



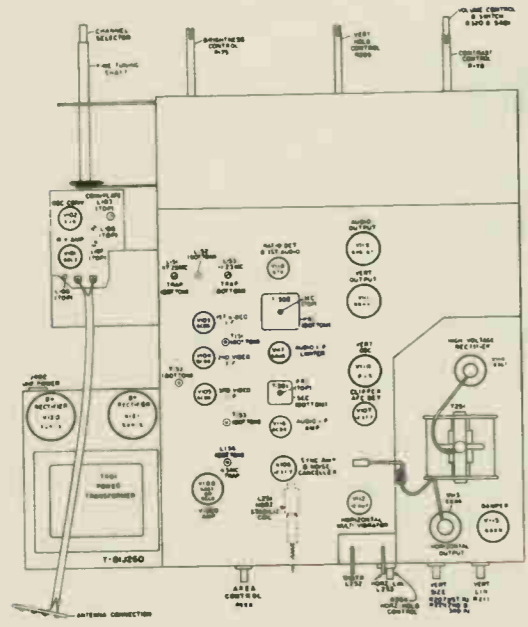
Vertical Output Blanking Circuit & Pix Tube Circuit (Mid & Late Production)



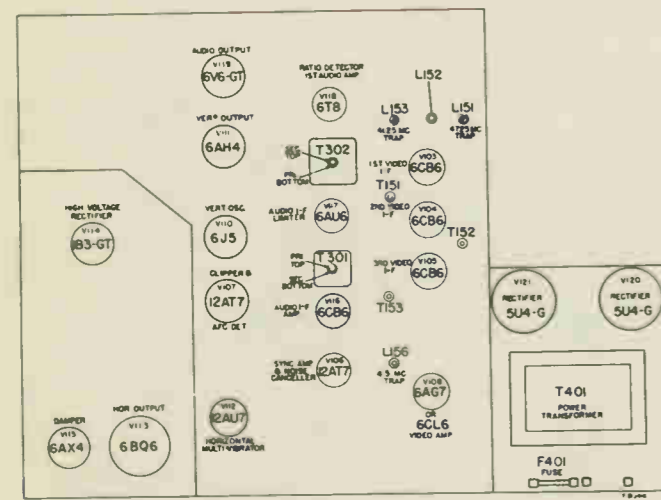
Vertical Size Circuit (Mid & Late Production)

"F" SERIES

For Production Changes, see Page 111.

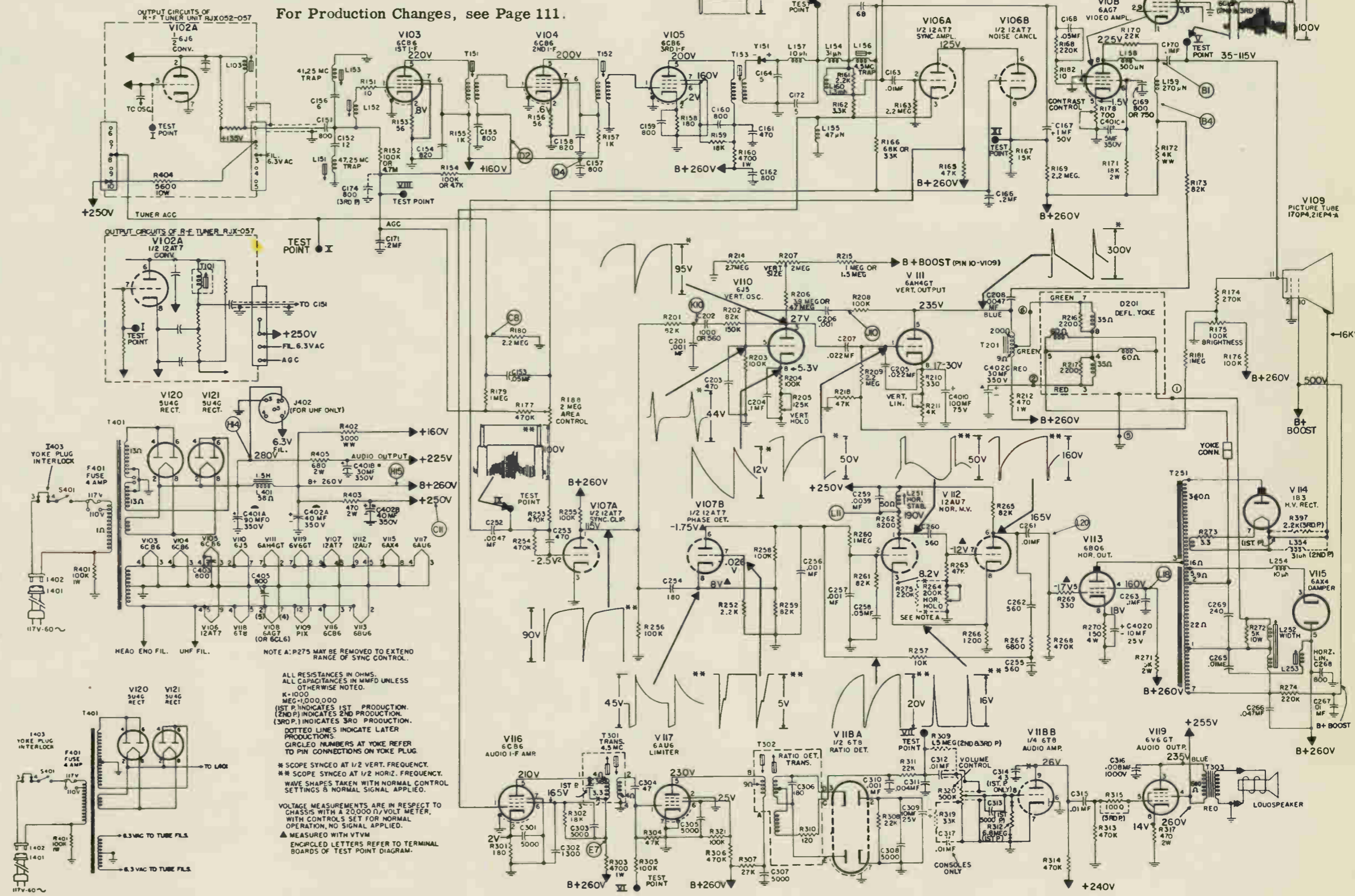


Tube and Trimmer Location



Tube and Trimmer Location, Bottom View

R263 at Horizontal Hold Control changed from 47K to 68K ohms in later production



Late Prod. Power Transformer Wiring

ALL RESISTANCES IN OHMS. ALL CAPACITANCES IN MMF UNLESS OTHERWISE NOTED.  
 K-1000 MEG-1000,000  
 (1ST P) INDICATES 1ST PRODUCTION. (2ND P) INDICATES 2ND PRODUCTION. (3RD P) INDICATES 3RD PRODUCTION. DOTTED LINES INDICATE LATER PRODUCTIONS. CIRCLED NUMBERS AT YOKE REFER TO PIN CONNECTIONS IN YOKE PLUG.  
 \* SCOPE SYNCED AT 1/2 VERT. FREQUENCY. \*\* SCOPE SYNCED AT 1/2 HORIZ. FREQUENCY. WAVE SHAPES TAKEN WITH NORMAL CONTROL SETTINGS & NORMAL SIGNAL APPLIED.  
 VOLTAGE MEASUREMENTS ARE IN RESPECT TO CHASSIS WITH A 20,000 Ω VOLT METER, WITH CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED.  
 ▲ MEASURED WITH VTVM ENCRICLED LETTERS REFER TO TERMINAL BOARDS OF TEST POINT DIAGRAM.

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C400A	60 mf, 350V.	RCE-173
C400B	80 mf, 350V.	RCE-173
C400C	40 mf, 350V.	RCE-173
C400D	20 mf, 350V.	RCE-173
C308	5 mf, 50V.	RCE-174
C235	20 mf, 300V.	RCE-175

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Brightness & Vert. Hold	R177	RRC-252
Volume dual, 500K ohms.	R307	*RRC-250
Contrast dual, 700K ohms.	R171	*RRC-250
Hor. Hold 100K ohms.	R255	RRC-247
Vert. Size 3 megohm.	R233	RRC-246
Vert. Lin. 2K ohms.	R236	RRC-248
100K ohms.	R400	RRF-001
4,000 ohms, 5W.	R175	RRW-053
3.3 ohms, 1/2W.	R268	RRW-105

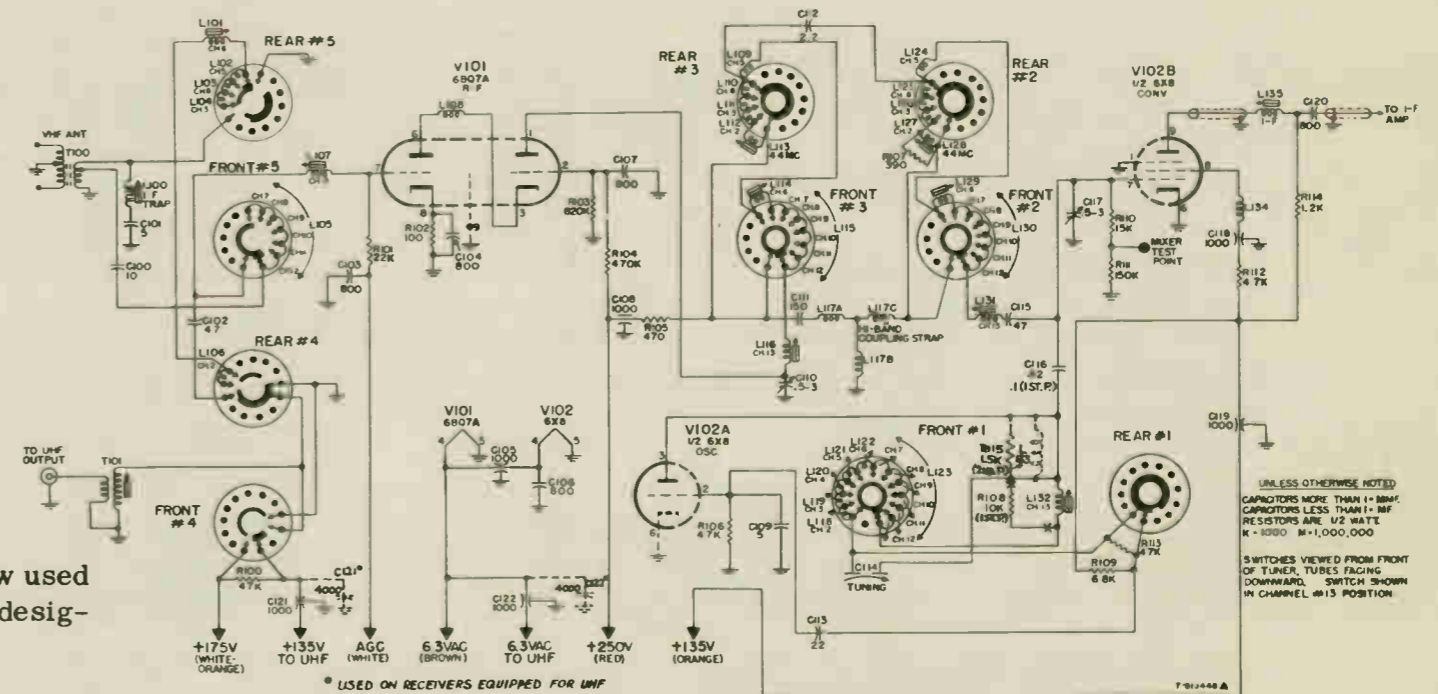
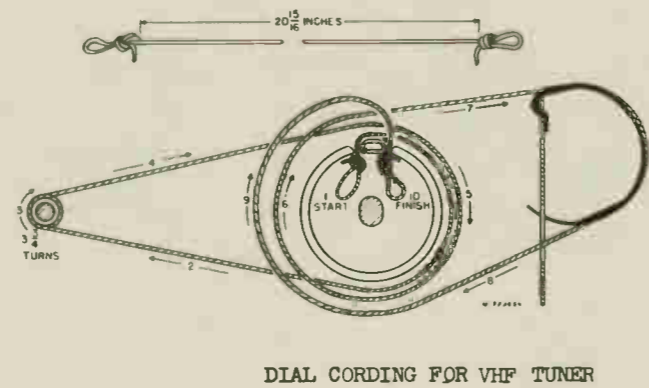
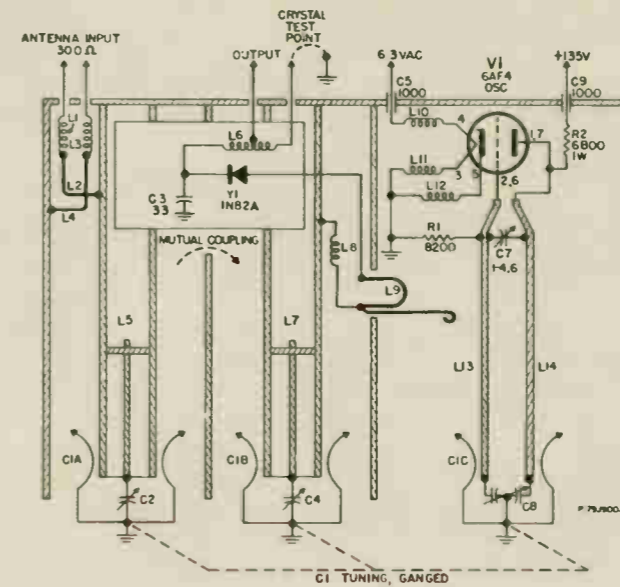
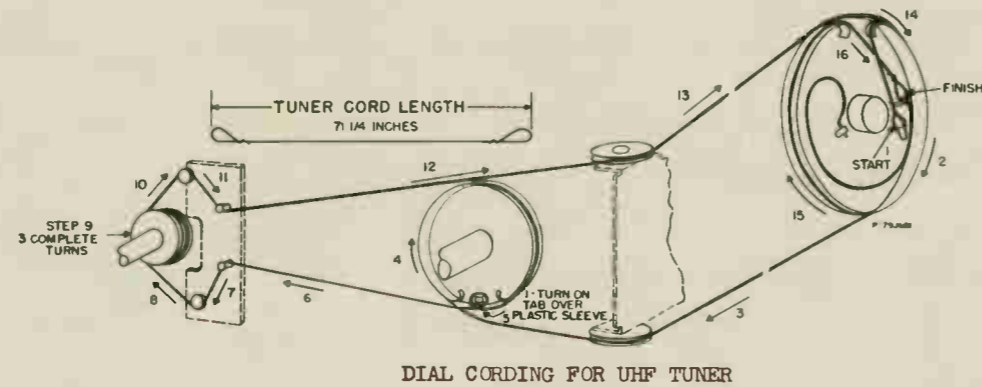
COILS		
REF. NO.	DESCRIPTION	PART NO.
L151	1st video IF.	RLI-192
L153	Choke 31 uh.	RLF-024
L154	Choke 330 uh.	RLI-194
L155	Choke, 10 uh.	RLI-138
L254	Choke, 10 uh.	RLI-138
L170	Choke, 100 uh.	RLI-241
L173	Choke, 180 uh.	RLI-220
L174	Choke, 390 uh.	RLI-270
L250	Hor. stabilizer coil.	RLI-247
L251	Horiz. size.	RLD-058
L252	Horiz. linearity.	RLD-060
L300	Sound take-off.	RLI-243

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T200	RTO-154
Hor. Output	T250	RTO-149
Power	T400	RTP-318
Audio Output	T301	RTO-156
3rd video IF coil.	T152	RLI-269
Ratio det. 4.5 mc.	T300	RTD-015
1st video IF.	T150	RTL-153
2nd video IF.	T151	RTL-155

MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
	VHF tuner complete.	RJX-059 or 062
	UHF tuner complete.	RUX-001
	UHF tuner complete.	RUX-002
	Spk-5 1/4" 3.2 ohms Alnico.	*S527D-7
	SPK-8" 3.2 ohms, PM Alnico models 21C103 and 21C104.	S825G-7

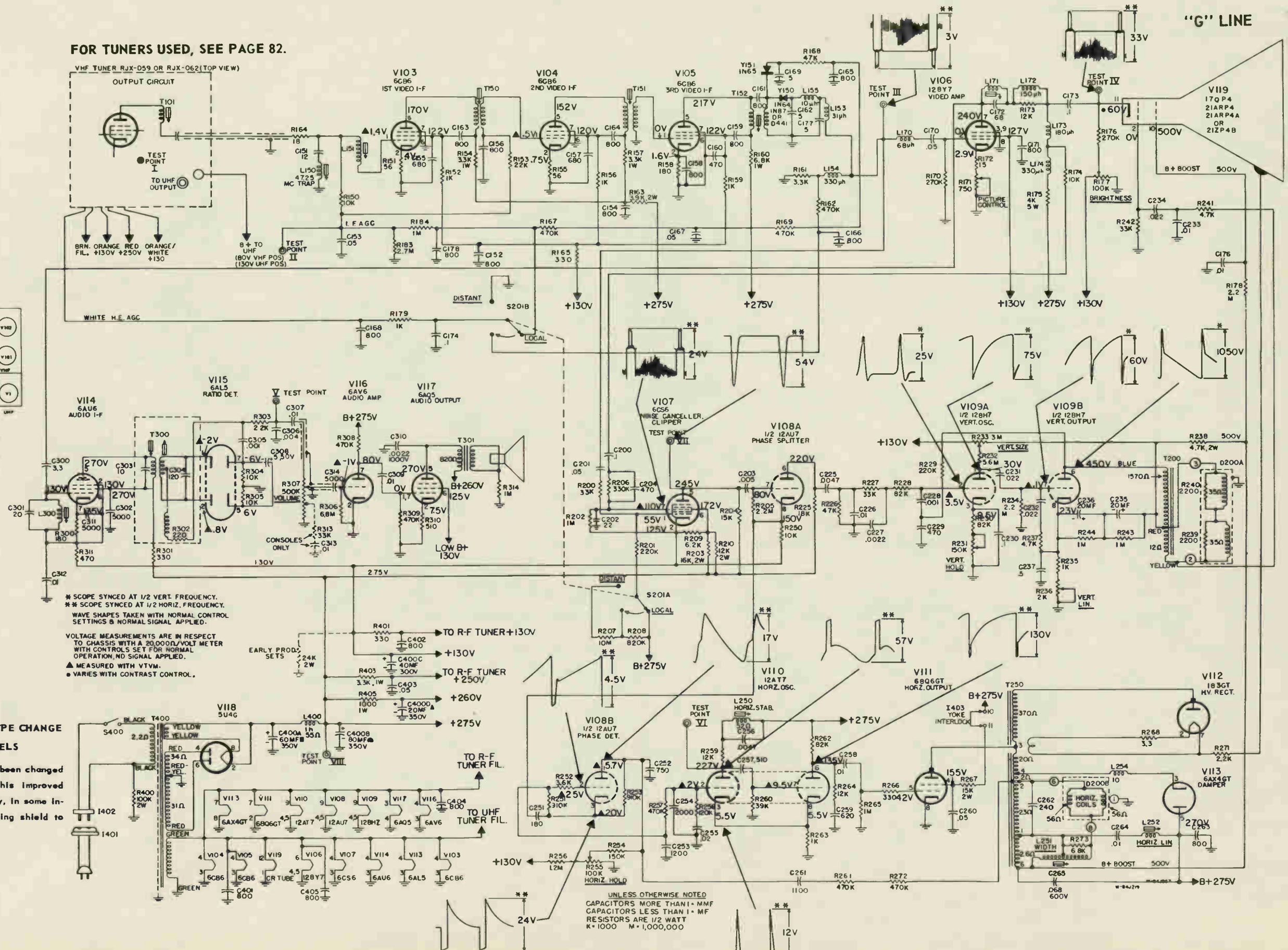
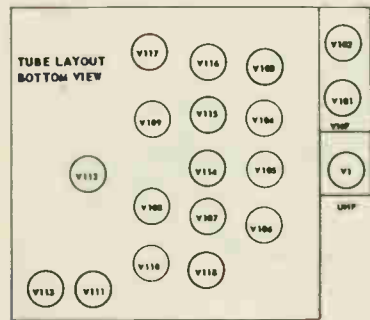
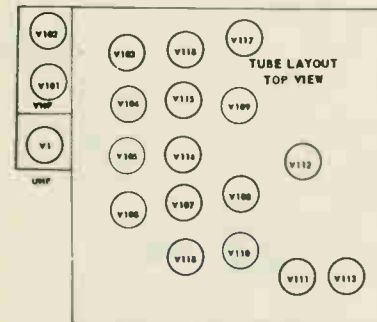


SCHMATIC FOR VHF TUNER (HEAD-END)

**Late Production Changes:**

- R230 changed to 100,000 ohms.
- Dotted resistor between plus 130V and ground (in power supply) now used in all chassis. Value changed to 22,000 ohms, 2W (URF-081) and designated R406.
- Horizontal Output tube changed from 6BQ6GT to 6BQ6GA.
- A 4.7 Meg resistor (URD-137), R269, has been added between plus 275V and the grid, pin 7, of Horizontal Oscillator V110, assuring positive starting of oscillator.

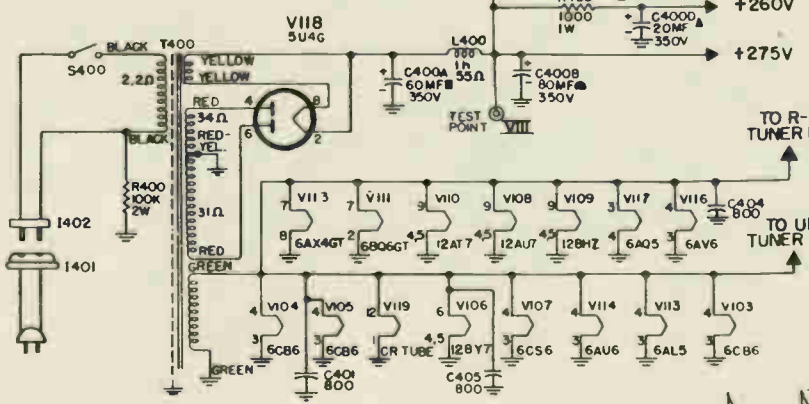
FOR TUNERS USED, SEE PAGE 82.



\* SCOPE SYNCED AT 1/2 VERT. FREQUENCY.  
 \*\* SCOPE SYNCED AT 1/2 HORIZ. FREQUENCY.  
 WAVE SHAPES TAKEN WITH NORMAL CONTROL SETTINGS & NORMAL SIGNAL APPLIED.  
 VOLTAGE MEASUREMENTS ARE IN RESPECT TO CHASSIS WITH A 20,000Ω/VOLT METER WITH CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED.  
 ▲ MEASURED WITH VTVM.  
 ● VARIES WITH CONTRAST CONTROL.

**HORIZONTAL OUTPUT TUBE TYPE CHANGE  
 ALL "G" AND "H" MODELS**

The horizontal output tube type has been changed from a 6BQ6GT to a 6BQ6GA. This improved tube is a direct replacement but may, in some instances, require bending of the spring shield to accommodate the larger bulb size.



UNLESS OTHERWISE NOTED  
 CAPACITORS MORE THAN 1-MMF  
 CAPACITORS LESS THAN 1-MMF  
 RESISTORS ARE 1/2 WATT  
 \* = 1000    \*\* = 1,000,000

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C402A	40 mf, 350V.	RCE-161
C402B	40 mf, 350V.	RCE-161
C402C	30 mf, 350V.	RCE-161
C402D	10 mf, 25V.	RCE-161
C401A	90 mf, 350V.	RCE-163
C401B	30 mf, 350V.	RCE-163
C401C	5 mf, 350V.	RCE-163
C401D	100 mf, 75V.	RCE-163
C404	10 mf, 350V.	RCE-188
C309	10 mf, 25V.	RCE-192

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Hold	150K ohms.	R205 RRC-252
Vert. Size	3 megohm.	R207 RRC-246
Vert. Lin.	2K ohms.	R211 RRC-208
Brightness	100K ohms.	R175 RRC-252
Horiz. Hold	25K ohms.	R264 RRC-276
Area & switch	2 meg. (S209)	R221 RRC-289
Volume	500K ohms.	R320 **RRC-286
Volume	550K ohms.	**RRC-287
Contrast	700K ohms.	R178 **RRC-286
Contrast	700K ohms.	R178 **RRC-287

WIRE WOUNDS		
DESCRIPTION	REF. NO.	PART NO.
4,000 ohms, 10W., ww	R172	RRW-053
3.3 ohms, 1/2 W., ww	R273	RRW-105
4,000 ohms, 5 W., ww	R227	RRW-101
8,300 ohms, 5 W., ww	R402	RRW-111
150 ohms, 4 W., ww	R270	RRW-120

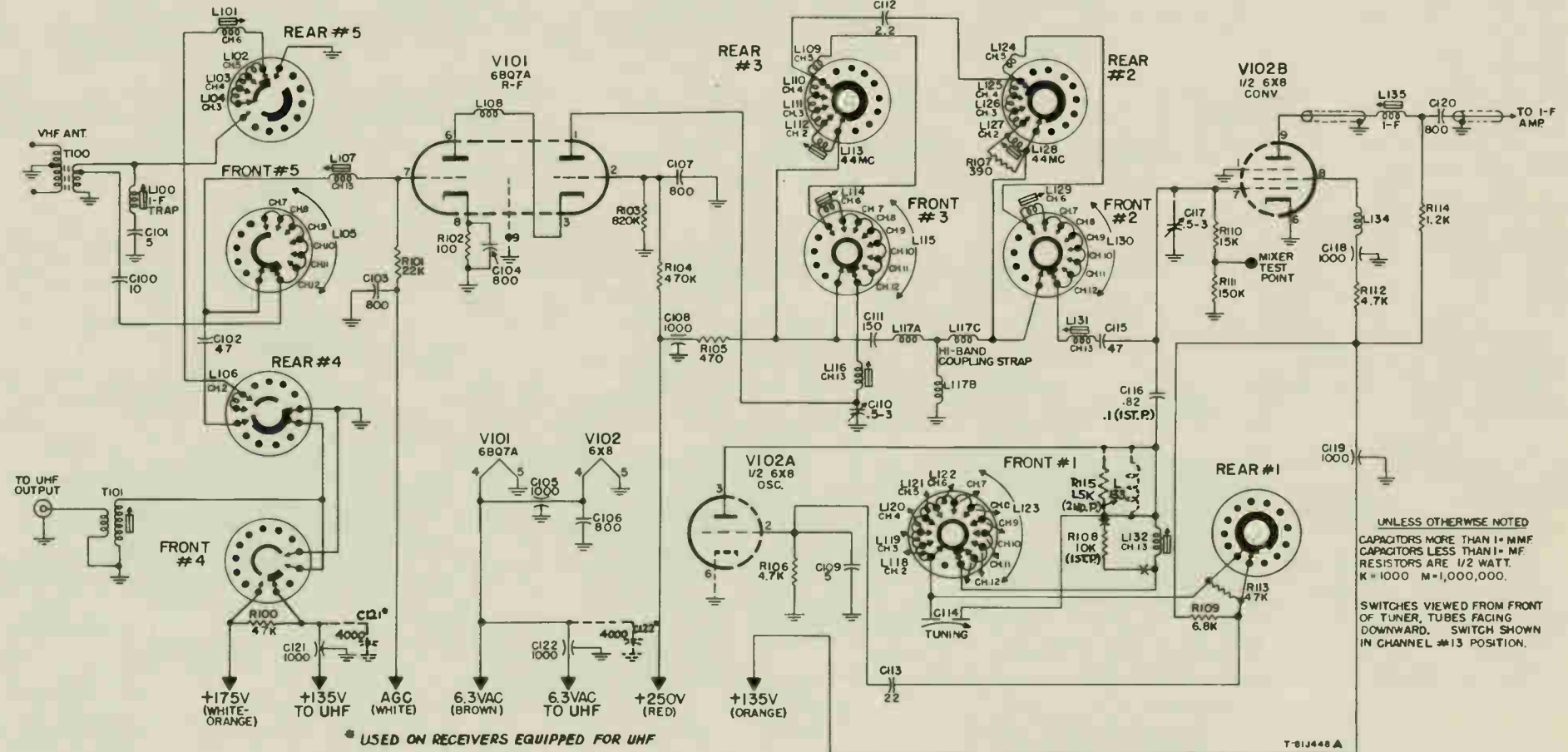
COILS		
REF. NO.	DESCRIPTION	PART NO.
L152	1st video IF grid.	RLI-192
L154	31 uh choke coil.	RLF-024
L155	159, 161	
	68 uh choke coil.	RLI-261
L162	3.3 uh choke coil.	RLI-154 (2nd Prod.)
L162	2.2 uh choke coil.	RLI-122
L158	180 uh on R170 12K.	RLI-300
L160	Choke-220 uh.	RLI-197
L160	Choke-150 uh.	RLI-263 (2nd Prod.)
L251	Horiz stabilizer.	RLI-247
L252	Hor size coil.	RLD-058
L253	Hor linearity.	RLD-060
L401	B plus filter choke.	RLF-062
L157	10 uh choke.	RLI-138
L254	10 uh choke.	RLI-138

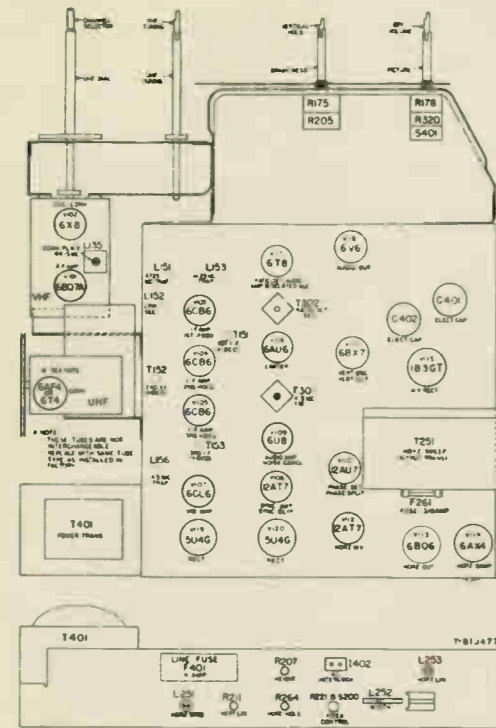
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Osc.	T201	RTO-159
Vert. Output	T251	RTO-150
Hor. Output	T401	RTP-321
Power		
4.5 mc audio IF.	T301	RLI-280
Ratio detector	T302	RTD-015
1st video IF.	T151	RTL-144
2nd video IF.	T152	RTL-144
Video detector	T153	RTL-154
Audio output	T303	**RTO-139
Audio output	T303	*RTO-140

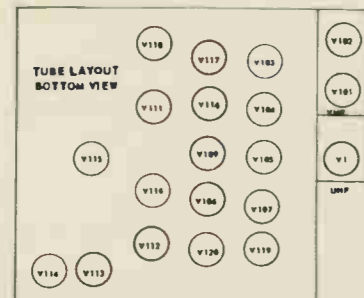
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
	RF tuner complete.	RJX-059 or 062
	UHF tuner complete.	RUX-001
	UHF tuner complete.	RUX-002
	Spk-10" 3.2 ohms PM Alnico.	*ROP-018
	Spk-6 1/2" 3.2. ohms PM Alnico.	**S650D-7
	* Models 21C240-C241	
	** Models 21T26-T27.	
	Yoke	RLD-052
	Crystal diode.	RED-001



FOR VHF TUNER RJX-062 SEE PAGE 84.  
 FOR UHF TUNER RUX-001 SEE PAGE 82.  
 FOR UHF TUNERS RUX-006/007 AND 003, SEE PAGE 103.



TUBE AND TRIMMER LOCATION

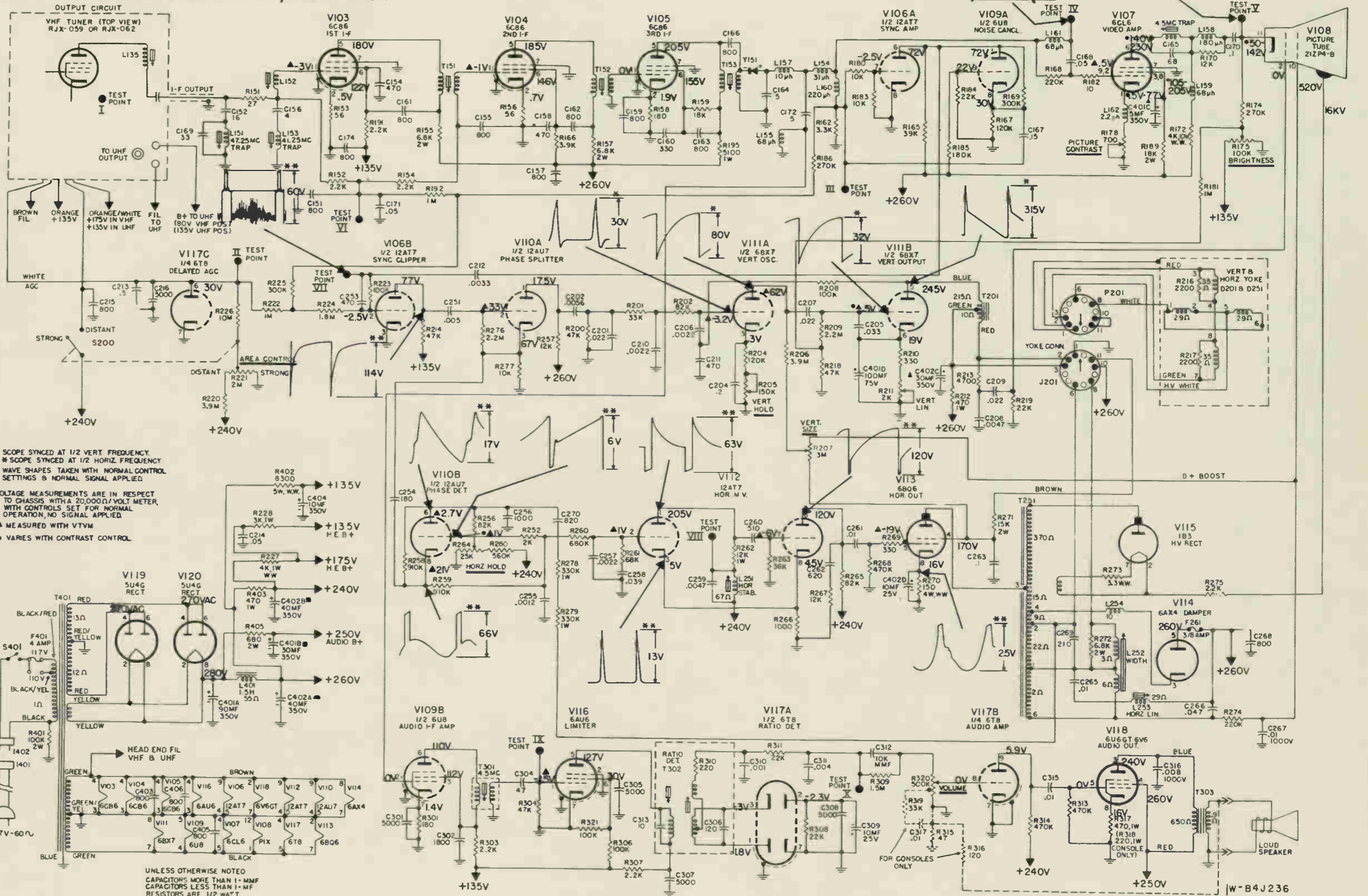


VHF TUNER RJX-059-062-"H" LINE TELEVISION RECEIVERS

Some early production tuners utilized only four leads for power connection to the main chassis. Late production tuners have five leads instead.

To replace a four lead tuner with a five lead tuner, a slight change in wiring is necessary. Originally, the orange lead of the four wire tuner was connected to the junction of R228 and C214 (plus 175 volts). When installing the five lead version, connect the orange/white lead to the junction of R228 and C214. Then, connect the plain orange lead to the opposite end of R228 to obtain the necessary plus 135 volts.

R228 (3000 ohms) is located on the front terminal board, near the IF shield. In receivers incorporating the four lead version, a dropping resistor for plus 135 volts was included in the tuner itself. Even those receivers had R228 physically mounted as described above, but unwired.



\* SCOPE SYNCED AT 1/2 VERT. FREQUENCY.  
 \*\* SCOPE SYNCED AT 1/2 HORIZ. FREQUENCY.  
 WAVE SHAPES TAKEN WITH NORMAL CONTROL SETTINGS & NORMAL SIGNAL APPLIED.  
 VOLTAGE MEASUREMENTS ARE IN RESPECT TO CHASSIS WITH A 20,000Ω/VOLT METER, WITH CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED.  
 ▲ MEASURED WITH VTVM  
 ● VARIES WITH CONTRAST CONTROL

UNLESS OTHERWISE NOTED CAPACITORS MORE THAN 1-MF CAPACITORS LESS THAN 1-MF RESISTORS ARE 1/2 WATT R-1000 M=1,000,000

W-B4J236

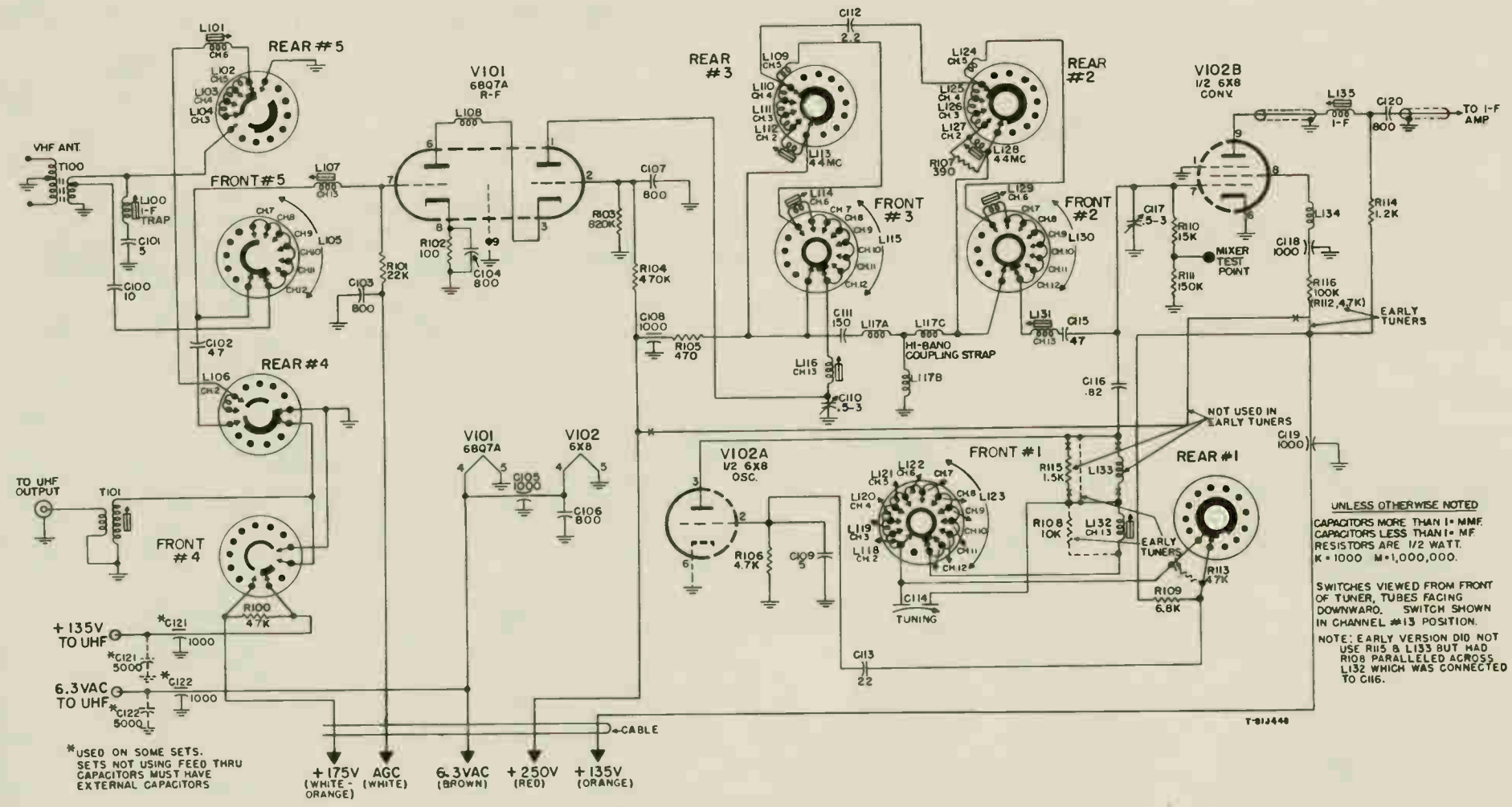
ELECTROLYTIC CONDENSERS			
REF. NO.	DESCRIPTION	PART NO.	AEROVOX NO.
C321	25 mf, 25V.	RCE-086	
C309	10 mf, 50V.	RCE-170	
C401A	110 mf, 350V.	RCE-199	
C401B	30 mf, 350V.	RCE-199	
C401C	5 mf, 350V.	RCE-199	
C401D	100 mf, 75V.	RCE-199	
C402A	40 mf, 350V.	RCE-201	
C402B	40 mf, 350V.	RCE-201	
C402C	30 mf, 350V.	RCE-201	
C402D	10 mf, 25V.	RCE-201	

CONTROLS			
DESCRIPTION	REF. NO.	PART NO.	
Volume	750K ohms	R178	RRC-286
Brightness	2 megohms	R210	RRC-283
Contrast	500K ohms	R210	RRC-286
Hor. Hold	100K ohms	R266	RRC-247
Hor. Size			
Vert. Hold	15K ohms	R271	RRC-283
Vert. Size	4 megohm	R220	RRC-281
Vert. Lin.	2K ohms	R218	RRC-291
Tone	1 megohm	R318	RRC-292
100K ohms, AGC		R180	RRC-293
WIRE WOUNDS			
4,000 ohms, 10 watts	R404	R172	RRW-053
4,700 ohms, 10 watts	R273		RRW-091
120 ohms, 5 watts	R270		RRW-103
5,000 ohms, 10 watts	R272		RRW-106

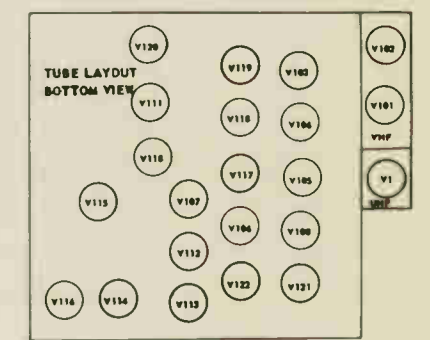
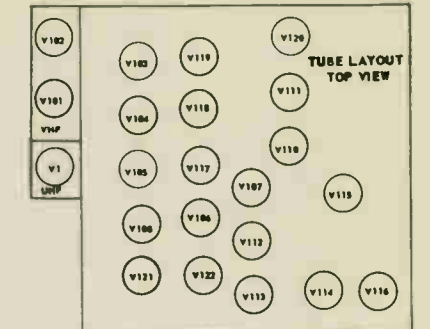
COILS			
REF. NO.	DESCRIPTION	PART NO.	
L152	1st video IF	RLI-192	
L155	Choke-220 uh	RLI-197	
L157	Choke-10 uh.	RLI-138	
L254	Choke-10uh.	RLI-138	
L159	68 uh comp choke.	RLI-260	
L160	Choke-2.2 uh.	RLI-122	
L162	Choke-68 uh.	RLI-295	
L164	Choke-31 uh.	RLF-024	
L165	180 uh choke-wound over 22K ohms R196	RLI-310	
L251	Horiz oscillator	RLD-091	
L252	Horiz size.	RLD-065	
L253	Horiz linearity	RLD-060	
L301	Audio IF	RLI-243	
L401	Power supply filter ck.	RLF-069	
L402	Choke, 1.4 uh	RLI-142	

TRANSFORMERS			
DESCRIPTION	REF. NO.	PART NO.	STANCOR NO.
Vert. Output	T201	RTO-155	
Hor. Output	T251	RTO-151	
Power60 cycles.	T401	RTP-322	
Audio Output	T303	RTO-140	
Audio IF.	T301	RLI-280	
Audio ratio det.	T302	RTD-015	
1st video IF.	T151	RTL-144	
2nd video IF.	T152	RTL-144	
3rd video IF.	T153	RTL-154	
Vert blocking osc.	T202	RTL-165	

MISCELLANEOUS			
REF. NO.	DESCRIPTION	PART NO.	
	Yoke	RLD-059	
	Crystal diode.	RED-001	
	Spk-6 1/2" PM (21T30-T31).	S-650D-7	
	Spk-10" PM(21C350-351).	S-1212D-7	



SCHEMATIC DIAGRAM FOR VHF TUNER (HEAD-END)



UNLESS OTHERWISE NOTED  
CAPACITORS MORE THAN 1 MMF.  
CAPACITORS LESS THAN 1 MMF  
RESISTORS ARE 1/2 WATT.  
K = 1000 M = 1,000,000.

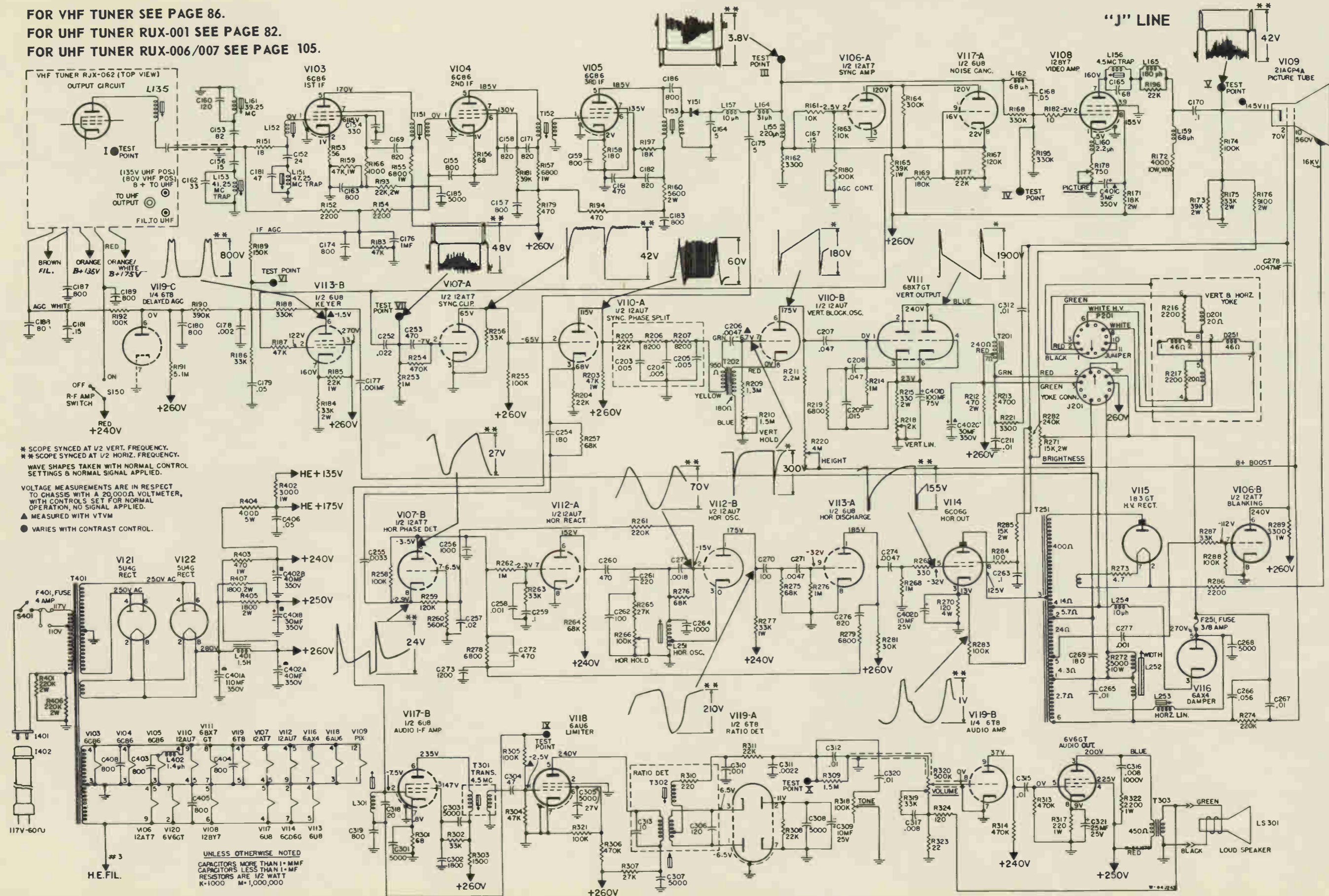
SWITCHES VIEWED FROM FRONT  
OF TUNER, TUBES FACING  
DOWNWARD. SWITCH SHOWN  
IN CHANNEL #13 POSITION.

NOTE: EARLY VERSION DID NOT  
USE R115 & L133 BUT HAD  
R108 PARALLELED ACROSS  
L132 WHICH WAS CONNECTED  
TO C116.

In late production R253 in grid section of V107A has been changed from 1 Meg to 2.2 Meg. This changes the sync clipping level and results in improved interlace.



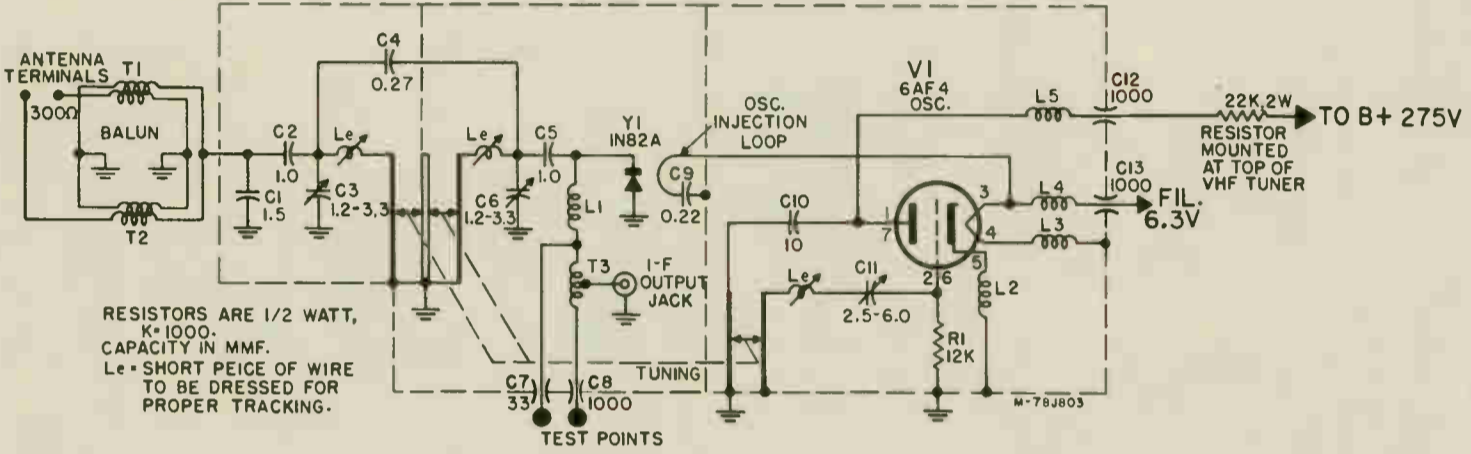
FOR VHF TUNER SEE PAGE 86.  
 FOR UHF TUNER RUX-001 SEE PAGE 82.  
 FOR UHF TUNER RUX-006/007 SEE PAGE 105.



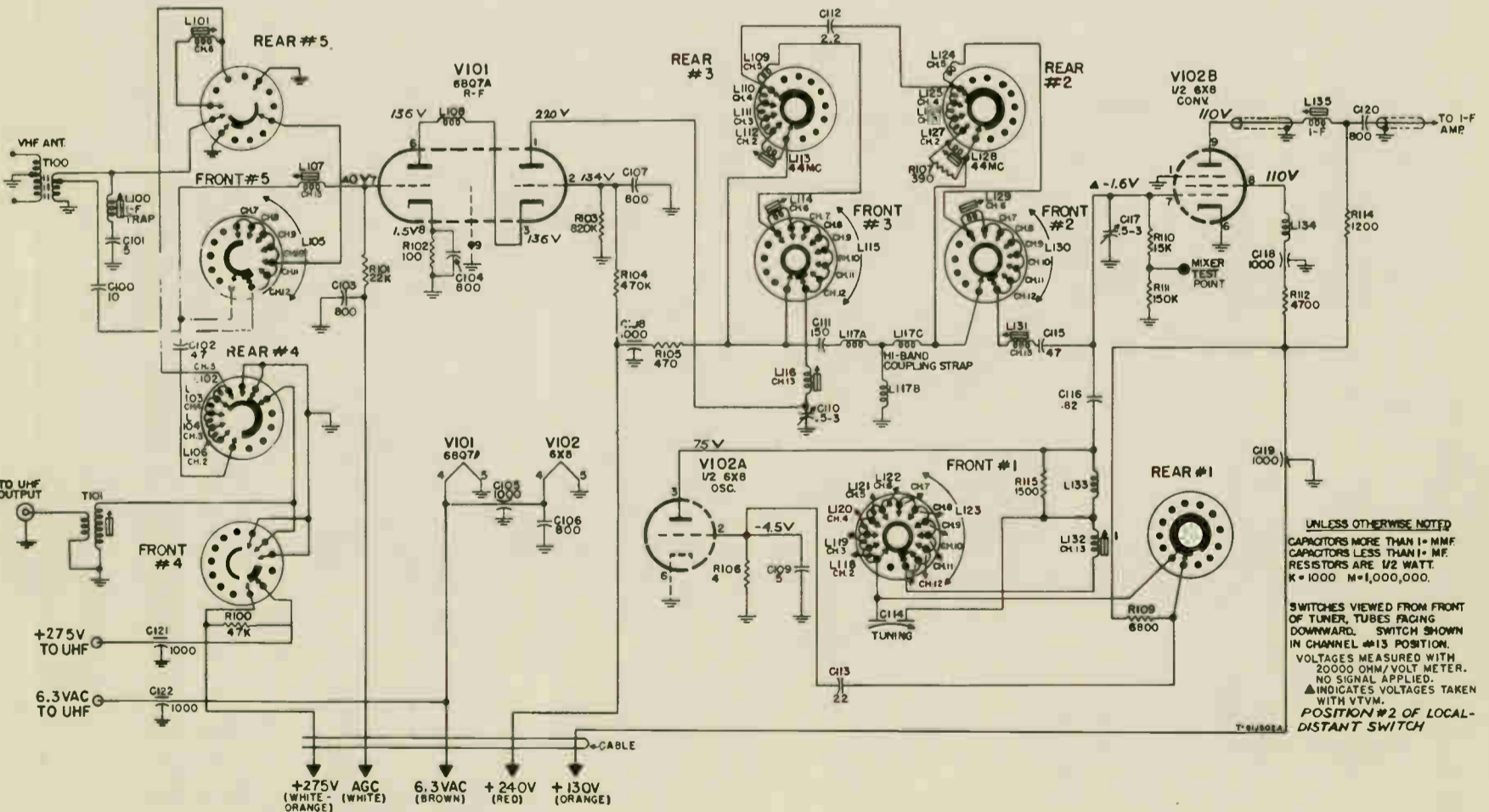
\* SCOPE SYNCED AT 1/2 VERT. FREQUENCY.  
 \*\* SCOPE SYNCED AT 1/2 HORIZ. FREQUENCY.  
 WAVE SHAPES TAKEN WITH NORMAL CONTROL SETTINGS & NORMAL SIGNAL APPLIED.  
 VOLTAGE MEASUREMENTS ARE IN RESPECT TO CHASSIS WITH A 20,000Ω VOLTMETER, WITH CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED.  
 ▲ MEASURED WITH VTVM  
 ● VARIES WITH CONTRAST CONTROL.

UNLESS OTHERWISE NOTED  
 CAPACITORS MORE THAN 1 μMF  
 CAPACITORS LESS THAN 1 μMF  
 RESISTORS ARE 1/2 WATT  
 K=1,000 M=1,000,000

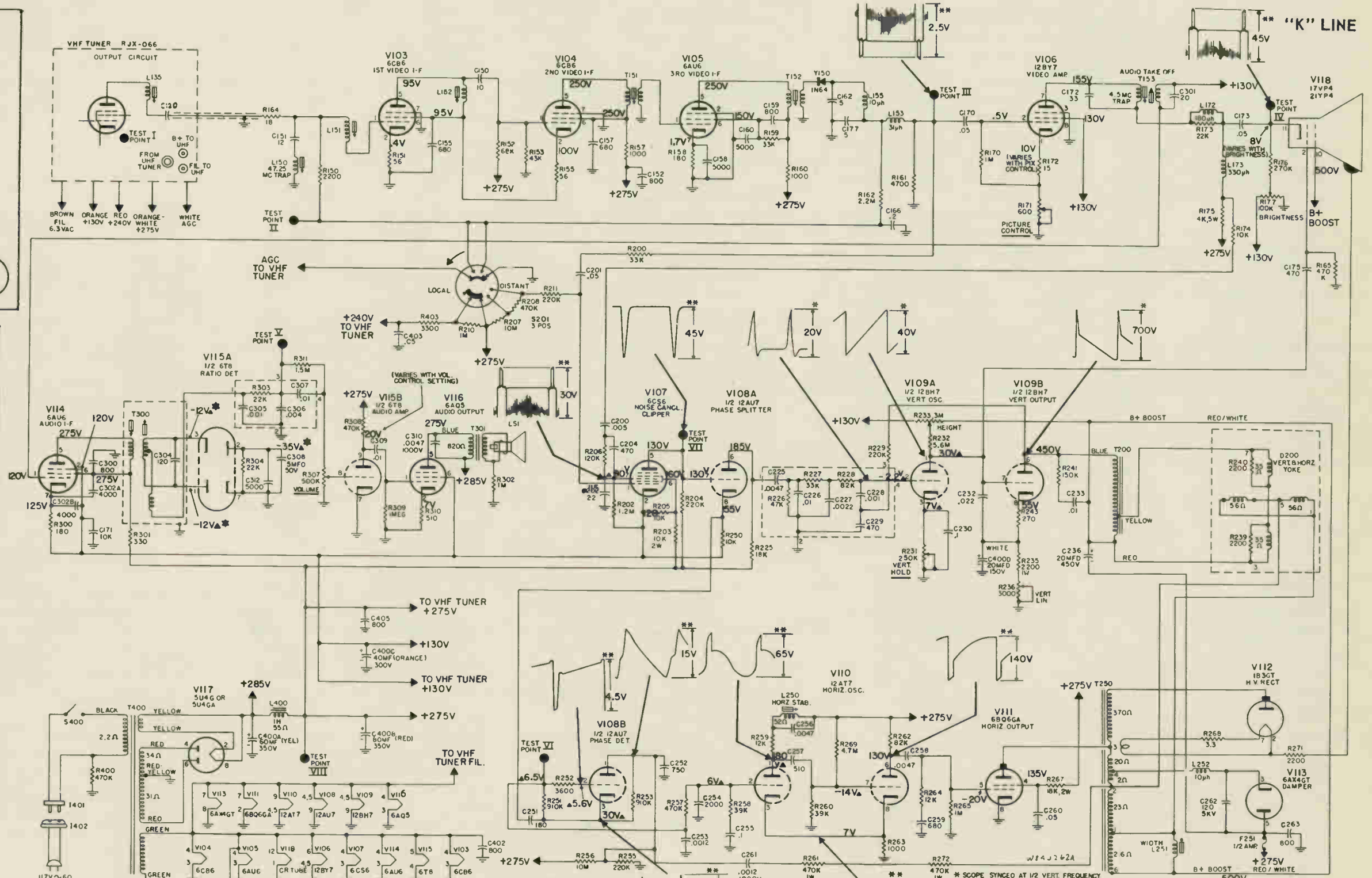
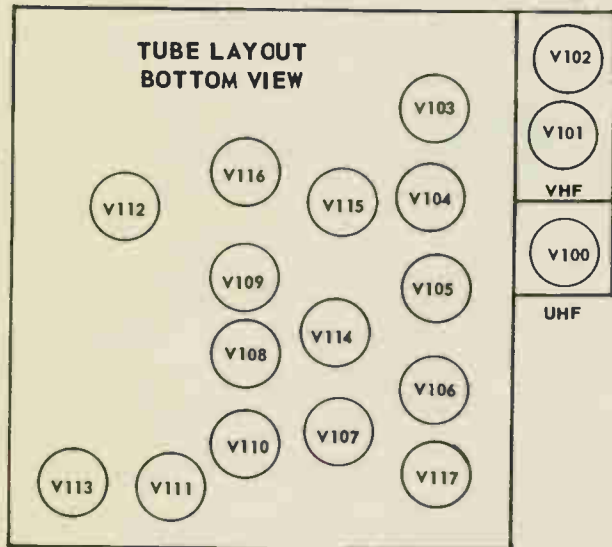
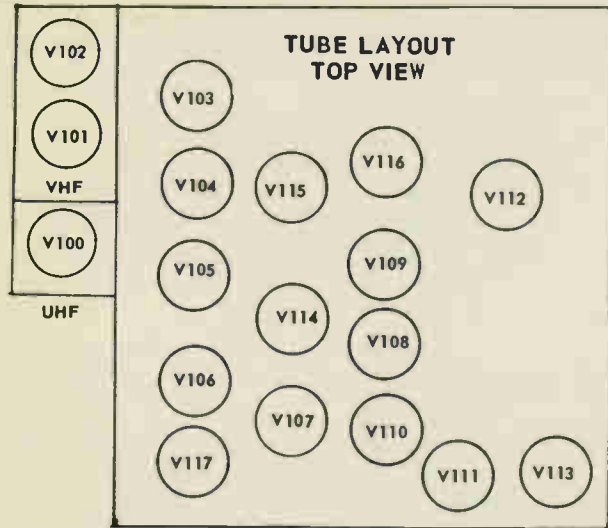
ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C236	5 mid., 475V	RCE-205
C308	5 mid., 50V	RCE-174
C400A	80 mid., 80V	RCE-204
C400B	80 mid., 80V	RCE-204
C400C	40 mid., 350V	RCE-204
C400D	20 mid., 150V	RCE-204
CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume, 600 ohms	R307	RRG-302
Brightness, 100K ohms	R177	RRG-303
Contrast, 500K ohms	R171	RRG-302
Vert. Hold, 250K ohms	R231	RRG-304
Vert. Lin., 3K ohms	R236	RRG-305
Height, 3 meg.	R233	RRG-301
WIREWOUND & SPECIALS		
3.3 ohms, 1/2w., w.w.	R268	RRW-105
4K ohms, 5w., w.w.	R175	RRW-124
COILS		
DESCRIPTION	REF. NO.	PART NO.
L150	47.25 mc trap coil	RLI-246
L151, 2	1st and 2nd video IF grid	RLI-192
L153	Coil, 31 mhc.	RLI-024
L155,252	Choke coil, 10 mhc.	RLI-138
L172	Choke, 180 mhc.	RLI-311
L173	Choke coil, 330 mhc.	RLI-194
L250	Hor. stabilizer coil	RLI-247
L251	Width	RLD-066
L400	Filter choke	RLP-068
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Output	T200	RTO-162
Hor. Output	T250	RTO-161
Power	T400	RTP-325
Audio Output	T301	RTO-153
2nd Video IF	T151	RTL-155
3rd Video IF	T152	RTL-154
Radio Detector	T300	RTD-018
Coil, 4.5 mc trap and sound tabloid	T153	RLI-312
UHF Antenna loop	RLI-057	RLI-057
MISCELLANEOUS		
DESCRIPTION	REF. NO.	PART NO.
VHF tuner	FJX-066	FJX-066
Yoke	RLD-052	RLD-052
UHF tuner	RUX-008	RUX-008
Crystal diode	RED-001	RED-001
Switch - Local - Diamant	RSW-108	RSW-108
Speaker, 4" PM, 3.2 ohms		
LS1		



SCHEMATIC DIAGRAM FOR UHF TUNER, RUX-008



SCHEMATIC DIAGRAM FOR VHF TUNER (HEAD-END)



**SOLDERLESS CONNECTION, "K" SERIES**

A few connections on some of the controls on the "K" series are made by means of a solderless wrap around process. We advise you of this so that you will realize that this is done deliberately and not an oversight on the part of the operator.

This type of connection was used quite extensively during the war on Army and Navy equipment and has proven to be thoroughly satisfactory. Our own Engineering Department in Syracuse has thoroughly tested this connection under all connections of humidity and also found it to be satisfactory.

# 15CL100 (COLOR MODEL)

## COLOR TV RECEIVER MODEL 15CL100 FIRST & SECOND PRODUCTION

The General Electric model 15CL100 is a twelve channel console color television receiver. Some 15CL100 receivers have been factory equipped with a UHF tuner unit which provides additional coverage from channel No. 14 through No. 83 by means of double conversion.

This instrument will reproduce monochrome or color programs and automatically shift its function from one to the other by means of an incorporated "color killer" circuit.

The model 15CL100 incorporates 36 tubes, 4 high voltage rectifiers, 2 selenium power rectifiers, 2 crystal diodes and a 3.58 mc piezo-electric crystal. Receivers incorporating UHF contain 2 more tubes and one additional crystal diode.

Among the features to be found in this receiver are keyed AGC, highly stabilized horizontal AFC, horizontal and vertical retrace blanking, an automatic "color killer", DC restoration, a three tube high efficiency high voltage doubler and a high voltage regulator tube and circuit. This receiver utilizes an aluminized planar type tricolor picture tube.

The following data includes installation instructions, preliminary service data including the required schematic diagrams, a receiver analysis based upon an accompanying block diagrams and a preliminary parts list containing the most essential items required for service.

Second production receivers differ somewhat from first production receivers insofar as the schematic diagram and component layout are concerned.

### SPECIFICATIONS

#### POWER INPUT RATING:

Frequency - 60 cycles.  
Voltage - 115 volts.  
Wattage - 425 watts.

#### RF FREQUENCY RANGE (VHF):

Channels - No. 2 through No. 13.  
Frequencies - 54-88 mc, 174-216 mc.

#### RECEIVERS EQUIPPED WITH UHF:

Channels - 14 thru 83, 470-890 mc

This coverage is in addition to above noted UHF channels.

#### OPERATIONAL FREQUENCIES:

Picture IF carrier - 45.75 mc.  
Adjacent channel audio trap - 47.25 mc.  
Adjacent channel video trap - 38.00 mc.  
Sound IF carrier - 41.25 mc.  
Inter-carrier sound take-off - 4.50 mc.  
Chrominance IF carrier - 42.17 mc.  
Chrominance signal take-off - 3.58 mc.

#### AUDIO POWER OUTPUT:

Undistorted - 2.5 watts.  
Maximum - 5.0 watts.

#### LOUDSPEAKER:

Type - Alnico PM.  
Cone Diameter - 10 inches.  
Impedance at 400 cycles - 3.2 ohms.

#### PICTURE TUBE:

Type - 15GP22. Size-15 inches, round.  
Deflection - electro-magnetic  
Deflection angle - 45 degrees  
Focus - electro-static.

### DANGER

The high voltages generated in these receivers are capable of delivering A LETHAL SHOCK! Extreme care should be exercised to avoid contact with high-voltage carrying leads or the final anode of the picture tube while the receiver is in operation. Under no conditions should makeshift picture tube connections be made which will defeat the purpose of the receiver's protective insulating devices thereby subjecting service personnel to dangerous shock hazard.

Also note: Mild x-rays are emitted by the Z-2188 high voltage regulator. Because of this and the dangerous shock hazard, never operate the receiver with the high-voltage compartment cover removed.

The picture tube is highly evacuated and if broken, glass fragments will be violently expelled. When handling the picture tube always wear goggles.

### GENERAL

The following procedure concerns the adjustment of those items which may, upon arrival of the receiver, require re-adjustment due to transportation handling etc. Fundamentally, these controls are adjusted in such a manner as to provide good monochrome picture reproduction. Once these controls have been adjusted for good monochrome reception, good color reproduction will be had, provided that the internal (top of chassis) adjustments have not been tampered with.

The following data describes the functions of the various controls and is tabulated in a sequence which should be followed in the event that a complete set-up procedure is required. Refer to figures 1, 2 and 3. The following adjustments should be made after the room has been darkened.

### INSTALLATION

The receiver is shipped with the tri-color picture tube installed and with all controls pre-adjusted for normal operation. If upon installation of the receiver, it is determined that certain control or picture tube adjustments are necessary, refer to the following procedures. The required adjustments are somewhat more complex than those previously encountered on monochrome receivers. Hence, only qualified technical service personnel should attempt these adjustments.

### EXTERNAL ANTENNA SYSTEMS

In general, existing monochrome antenna systems may be found satisfactory for good color program reception. It should be borne in mind however, that it is possible for a poorly installed or adjusted antenna system to provide poor color reception - particularly those systems which display a sharp frequency cut-off characteristic within the frequency limits of a locally active television channel. In all cases, the antenna system should be favorably located and checked for proper orientation and termination.

### EQUIPMENT REQUIRED

The only piece of equipment necessary to perform the installation adjustments, aside from the usual installation tools, is a dot generator. The dot generator should supply "white" dots (negative video modulation of a VHF channel carrier). The diameter of the dots should not exceed the approximate width of 2 or 3 scanning lines. Other dot generators also may be used which supply white "squares" or "rectangles", the edges of which are sharp or well defined. Do not attempt the following procedure with dot generators of the "black dot" variety.

### COLOR PURITY

These adjustments are required to assure that the electron beams of each picture tube gun will strike only their respective color phosphor dots throughout the entire screen area.

1. Set following controls fully counter-clockwise: picture contrast, chroma, brightness, blue and green G1 controls, green and blue gain controls, red, green and blue G2 controls, purity, DC convergence and field neutralizing control.

2. Apply power to receiver, antenna need not be connected.

3. Advance red G2 control and brightness control until screen is illuminated.

4. Loosen securing screw in neck shield assembly and rotate assembly so that blue beam positioning magnet lies directly over blue (top) gun in picture tube. Unscrew all three beam positioning magnets just short of the point at which they fall out of assembly.

5. Put on a pair of high quality high-voltage insulating gloves to prevent possible shock from yoke wiring. Loosen top and bottom yoke adjustment wing screws and slide yoke back and forth to obtain purest red field in center of raster. Tighten wing screws.

6. Adjust purity control (front chassis apron) for purest red field in center of raster. Simultaneously rotate purity coil (independently of neck shield) for purest red field in center of raster.

7. Adjust field neutralizing control (front panel) for uniform red field at edges of the raster.

8. If the entire raster is not pure red, loosen the top and bottom yoke adjustment wing screws and slightly tilt the yoke either forward or backward as required. Do not attempt to tilt yoke from side to side.

9. Check purity on blue and green fields separately. This is done by rotating the red G2 control fully counter-clockwise and turning up either the green or blue G2 control to produce a green or blue raster. When so doing, the red, green and blue fields should each be pure to within 1/4 inch from the raster edges.

### RASTER ADJUSTMENTS

These adjustments are performed to shape and frame the picture in a manner similar to monochrome practice.

1. Connect antenna and tune receiver to suitable test pattern. Leave the blue and green G1 controls fully counter-clockwise, but set the red, green and blue G2 controls at approximately mid-position.

2. Adjust the brightness and contrast controls for normal picture. (Disregard any color effects in the raster).

3. Adjust the horizontal drive control just below the point at which a bright vertical line appears on the raster.

4. Adjust the vertical size and linearity and the width and horizontal linearity controls for a linear raster which extends beyond the mask limits approximately 1/8 inch on all edges.

### BEAM POSITIONING MAGNETS

This adjustment is required to axially orient the individual electron guns in the picture tube so that they may be made to converge in the center of the screen.

1. Turn receiver off. Turn brightness control fully counter-clockwise. Connect "white" dot or generator signal into antenna terminals of receiver. Make the necessary contrast and brightness control adjustments. With all three (red,

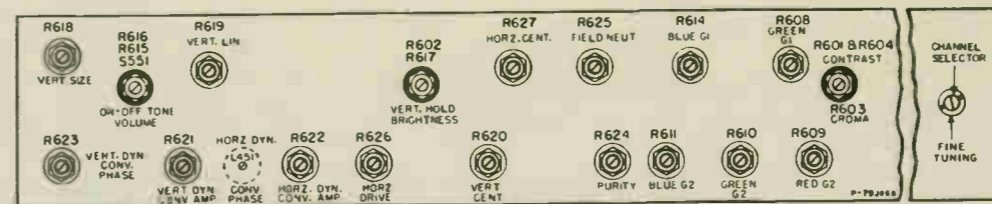


FIG. 1. FRONT PANEL ADJUSTMENTS

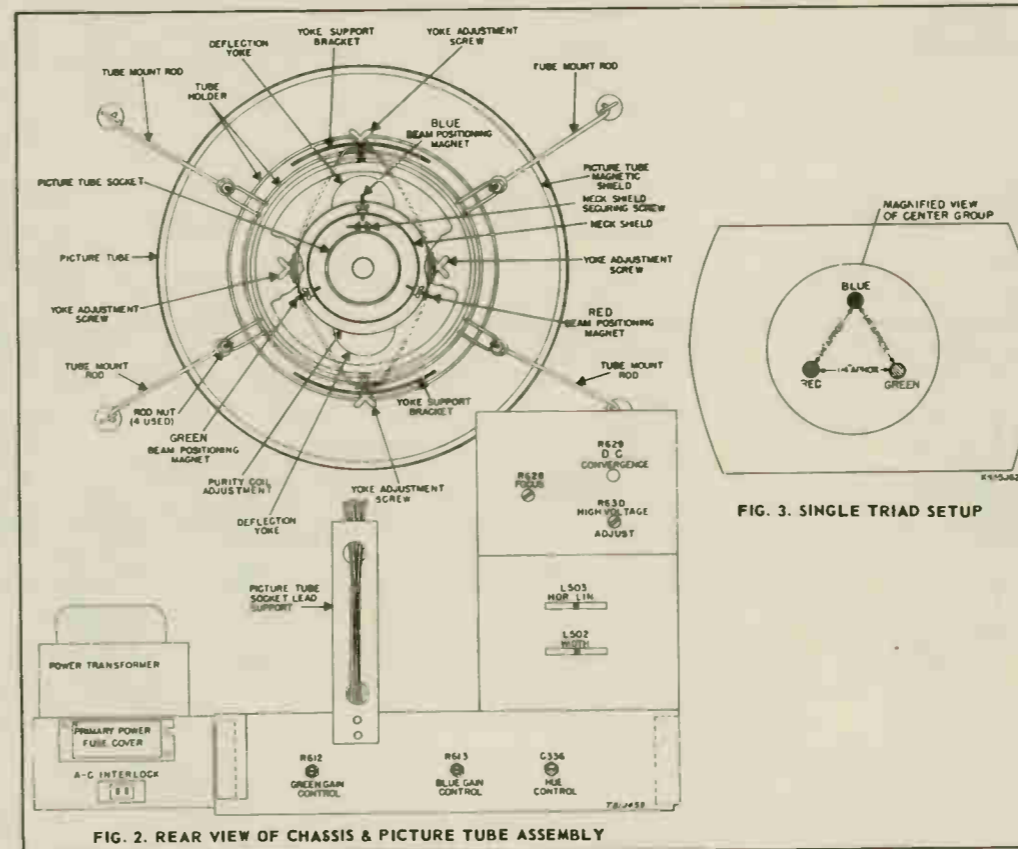


FIG. 2. REAR VIEW OF CHASSIS & PICTURE TUBE ASSEMBLY

green, and blue G2) controls turned up about half way set the brightness control to provide for low brightness dots. Turn the DC (static) convergence control located on the rear of the receiver counter-clockwise just enough so that the beams under-converge and hence form many groups of three separate dots each; that is, one red, one green and one blue dot in each group. Set the G2 controls for equal brightness of the dots and the brightness control for just sufficient visibility to permit adjustment.

2. The DC convergence control should be adjusted so that a displacement of approximately 1/4" exists between dot centers. Focus the dots with the focus control.

3. Starting with the three beam positioning magnets in their maximum outward position, screw each of them in, a little at a time, and note their effect upon the dot structure in one of the dot groups in the center of the raster. These magnets should each be screwed in just enough to form an equilateral triangle of dots in any center raster group or triad as shown in figure 3. If this cannot easily be achieved, the entire neck shield assembly may be rotated ± 15 degrees either side of the position at which the magnets lie directly over their respective guns. Do not rotate any more than 15 degrees in either direction. NOTE: The magnets should not be screwed in toward the tube guns any closer than absolutely necessary, since their magnetic influence tends to defocus the electron beams.

4. Adjust the DC convergence control until the three colored dots of the center raster groups superimpose. Refocus the dots as the DC convergence control is adjusted. The end result should be one white dot instead of colored groups in the center of the screen. Disregard the fact, at this time, that the dot groups at the outer extremities of the raster are not properly converged.

### DYNAMIC CONVERGENCE

These adjustments are necessary to create a perfectly converge condition throughout the entire screen area. These adjustments control the amplitude and phase or position of the dynamic convergence modulating voltages - both vertically and horizontally. This procedure also requires the use of a generator which supplies moderately small dots.

1. With the above noted dot generator signal fed into the receiver, proceed with the adjustments following. Adjust the contrast, brightness, and/or individual G2 controls so that all three colors in the pattern are visible at the raster edges.  
2. If DC convergence is set correctly center raster dots will be converged. Now proceed to converge the dots throughout raster area. The horizontal phasing control L451 should be adjusted so that the two end points or triads along the center horizontal line converge at the same time when the DC convergence control R629 is rotated.

3. Adjust the horizontal dynamic convergence amplitude control R622 so that all points along the horizontal axis equally misconverge. Readjust the DC convergence control R629, so that the horizontal lines converge throughout their entirety. If proper amplitude and phasing has been accomplished, all points along the horizontal axis will converge at the same setting of the DC convergence control.

4. With the vertical dynamic convergence amplitude control turned up about half way, adjust the vertical dynamic convergence phasing control R623 so that all points from the center of the raster on the vertical axis converge simultaneously when the DC convergence control R629 is varied.

5. Adjust the vertical dynamic convergence amplitude until all points along the vertical axis are equally misconverged.

NOTE: The vertical amplitude and vertical phasing controls are interacting and some readjustment of the phasing control may be required when the amplitude is varied.

6. Converge the dots vertically with the DC convergence control.

NOTE: The vertical and horizontal convergence adjustments are interacting. After Step 4 above has been completed. It may be necessary to readjust the horizontal amplitude control, R622.

### GREY SCALE ADJUSTMENTS

These adjustments are required to produce an untinted (white) raster and picture throughout the useful brightness and contrast range.

1. Blue and green gain controls (on rear of chassis) should be set fully counter-clockwise.

2. Tune in a monochrome test pattern then set the contrast control fully counter-clockwise.

3. Turn the brightness control fully clockwise.

4. Adjust the red, green, and blue G2 controls for a very low brightness untinted grey raster.

5. Turn up the contrast control for a normal picture.

6. Adjust the blue and green gain controls, (rear of chassis) to produce white picture highlights.

7. Adjust the brightness control for a low brightness picture.

8. Adjust the blue and green G1 controls for a grey untinted picture.

9. Check to see that untinted (only white or grey) highlights may be had throughout the useful range of the contrast and brightness controls.

### RECEIVER GENERAL DESCRIPTION

The color television receiver contains many circuits which are similar to those used in contemporary monochrome receivers. Additionally, the color receiver employs other circuitry necessary to decipher and reconstruct the original color information and to reproduce this information in terms of the Red, Green & Blue additive colorimetry on the face of a tri-color picture tube.

The receiver is shown in block form in figure 5. The RF amplifiers, converter and oscillator are all contained in a sub-assembly unit which bears great similarity to the RF tuner unit of present General Electric monochrome receivers. This unit, however, essentially differs from the monochrome unit in so far as the bandwidth and "tilt" limits are far more stringent than in monochrome practice since the higher frequency color sidebands must be preserved.

# 15CL100 (COLOR MODEL)

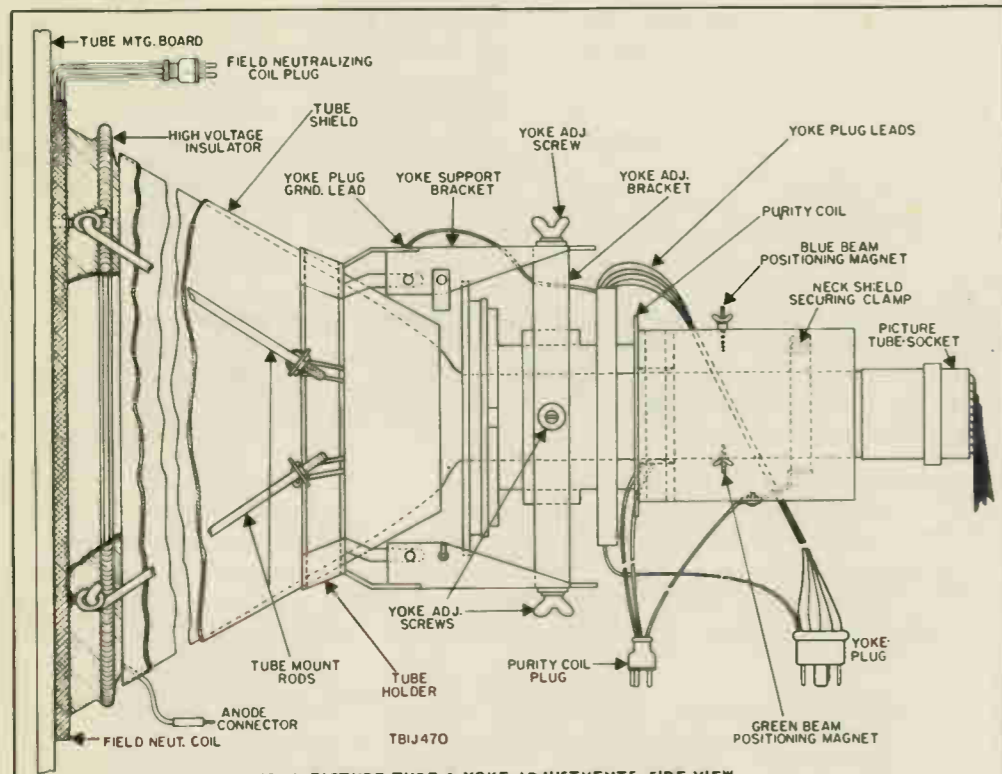


FIG. 4. PICTURE TUBE & YOKE ADJUSTMENTS, SIDE VIEW

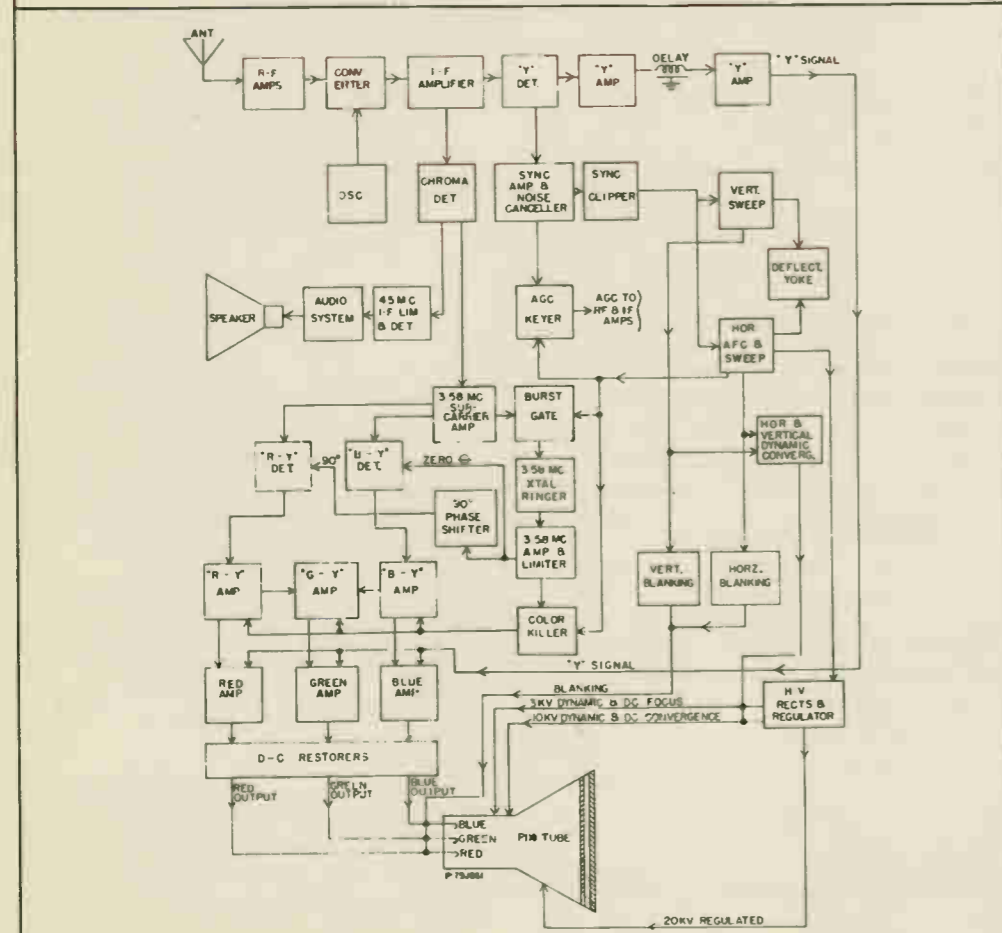


FIG. 5. BLOCK DIAGRAM OF COLOR TELEVISION RECEIVER

The output of the converter is link coupled into the IF system which employs four stages of amplification. The gain of the RF tuner and the IF system is controlled by AGC voltage derived from a conventional AGC keyer tube. The output of the IF system feeds two separate detector circuits.

One detector is designated as the "Y" detector, the output of which consists of the usual monochrome video and sync information. The other is the chrominance detector which delivers two output signals. One signal is the conventional 4.5 mc intercarrier sound IF signal which is then passed to a 4.5 megacycle amplifier, limiter, ratio detector and audio amplifiers in the usual manner. The other signal is the chrominance sub-carrier signal which is centered about the frequency of 3.58 megacycles. The signal output of this channel is split off in two directions. One signal is fed to the input of the two synchronous color detectors. The other chrominance signal is fed to a device called the burst gate. This stage is normally biased off and is driven into conduction by a pulse during the horizontal retrace interval. Thus, the burst gate will only pass the eight cycles of 3.58 mc "pilot" burst signal.

The 3.58 mc burst is then used to shock excite a 3.58 mc piezo-electric crystal, which in turn develops a continuous-wave 3.58 mc output voltage. This signal is next passed to a limiter, the output of which consists of two 90 degree out-of-phase voltages. One of these voltages fed to the B-Y synchronous detector and the other to the R-Y synchronous detector. By introducing these two out-of-phase voltages, we are, in effect, reinserting the 3.58 mc reference carrier, which of necessity, had been suppressed at the transmitter.

The output of the B-Y and R-Y detectors now consists of the "I" and "Q" color signals initially derived from the matrix amplifier at the transmitter, but both shifted 33 degrees in phase to produce instead, a "B-Y" and an "R-Y" color signal. The R-Y and B-Y signals are fed to their respective amplifiers.

The output voltages of these amplifiers are again divided into two separate signal paths. First, sample output voltages from both amplifiers are mixed in a simple adder to form a "G-Y" signal which is then amplified by the "G-Y" amplifier. Secondly, the output signals of the R-Y G-Y and B-Y amplifiers are fed to their respective Red, Green and Blue adders.

Before R-Y, G-Y and B-Y actually become R, G, and B, we must first add "Y" to each signal. As mentioned previously, the "Y" detector output contains all the monochrome detail information, which next is amplified by the "Y" amplifiers. Because the bandwidth of the 3.58 mc sub-carrier amplifier is made relatively narrow compared to the "Y" channel the color signals are somewhat delayed. Hence, the "Y" signals also must be accordingly delayed. A "lumped constant" delay line is inserted immediately ahead of the second "Y" amplifier to accomplish this end.

The "Y" signal is then added to the R-Y, G-Y and B-Y signals by means of simple resistive adders. The resulting R, G and B signals are amplified and then used to drive the R, G and B guns in the tri-color picture tube. DC restoration is incorporated in each gun circuit so that the black level reference will be maintained. If this facility were not incorporated, the picture background, on actually dark scenes, would not recede toward black but rather would assume some color other than that desired.

Since color television receivers will be called upon to also reproduce monochrome television programs, a means must be provided (preferably automatically) to disable the color circuits. It is generally true that in the absence of 3.58 mc side-bands, the R-Y and B-Y detectors will not function.

We should note however, that transmissions of a monochrome transmitter may include 3.58 mc side-band components which together with random noise may cause the synchronous detectors and the B-Y and R-Y amplifiers to function. This produces a spurious pattern called "parc", in the high detail portions of the picture, such as in the vertical wedge of a test pattern. A color killer circuit is incorporated so that in the absence of a 3.58 mc color transmission burst, the R-Y and B-Y amplifiers will be biased below condition and thus prevent the aforementioned objectionable color interference in the received monochrome picture.

The remainder of the receiver consists of those circuits required to generate and synchronize the various sweep waveforms, as well as to generate special dynamic convergence and focus waveforms required by the tri-color picture tube.

A sample of the detected "Y" signal is fed to the sync amplifier, noise canceller and clipper in the usual manner. The clipper supplies the vertical oscillator and horizontal phase detector with their respective synchronizing information.

The vertical oscillator and amplifier supply the required vertical sweep to the vertical deflection coils of the yoke. A portion of the vertical sweep waveform is picked off, shaped and then fed to a cathode follower. This blanking pulse is then impressed upon the cathode of each picture tube gun (R, G and B) to provide picture tube blanking during the vertical retrace interval. A parabolic waveform is also derived from the vertical output stage which is applied to a horizontal and vertical convergence tube. The dynamic convergence voltage developed by this tube is applied to the convergence electrode of the picture tube.

The horizontal phase detector functions in a manner similar to monochrome practice. It produces an automatic correcting voltage by virtue of a comparison between the phase and/or frequency of the incoming horizontal sync pulses and the pulses generated in the horizontal sweep system. The developed correction voltage is applied to a reactance tube which, in turn, controls the frequency of the horizontal oscillator. The horizontal discharge tube shapes the driving pulse which is applied to the horizontal output stage. This stage is coupled through the horizontal output transformer to the horizontal deflection coils of the sweep yoke assembly. As in monochrome practice, a diode damper is incorporated to dampen the undersized oscillations at the beginning of each horizontal sweep pulse and to use this energy, after rectification, to supply a boosted B plus supply voltage to the horizontal output stage and the vertical multivibrator.

Two high-voltage rectifier systems are connected to the horizontal output transformer. The first rectifier to be considered is the 20,000 volt high efficiency doubler type rectifier which supplies the final anode of the picture tube. A special regulator tube is incorporated in this circuit to automatically regulate the final anode voltage so that it will not vary with changes in the luminosity of the picture.

The second high-voltage rectifier develops a potential of approximately 3000 volts and is applied through a potentiometer to the focusing electrodes of the picture tube guns.

A sample of the horizontal output transformer pulse is fed to the horizontal blanking tube, the output of which is connected to the picture tube cathodes to provide blanking during the horizontal retrace interval.

A parabolic waveform is derived from the horizontal output stage which is also applied to the horizontal and vertical convergence tube. This provides a dynamic horizontal convergence voltage which is applied to the picture tube convergence electrode.

The "composite" parabolic dynamic voltages are also used to modulate the 3000 volt focusing DC voltages. This is required to maintain good focus throughout the entire raster area.

The low voltage power supply is quite conventional in its design. It primary consists of a full wave voltage doubler which delivers approximately 400 volts. The negative lead is returned to chassis through a low total DC resistance represented by the color purity coil circuits and the field neutralizing circuits. The negative return provides a 2 to 3 volt bias for use in various portions of the receiver.

## ALIGNMENT

The following data includes the alignment of the RF, IF, audio IF, chroma amplifier and subcarrier generator circuits. The procedure also includes the adjustment of the matrixing controls, i.e. R-Y gain, G-Y gain and G-Y ratio.

### RF ALIGNMENT

1. The RF tuner may be aligned without removing it from the main chassis. Disconnect the 300-ohm transmission line from the antenna input transformer, T107 and disconnect the B plus to the oscillator.
2. Connect the sweep generator to the RF tuner antenna input transformer using the G-E ST-8A balanced adapter to obtain 300 ohms output, see figure 6. The adapter should be connected to the RF tuner through approximately three feet of 300-ohm transmission line and a resistor pad, as shown in figure 3. When using other test equipment of the unbalanced output type, a pad as shown in figure 8 should be used instead.

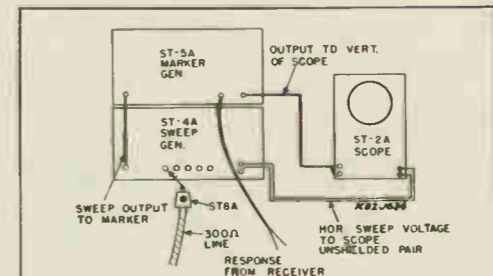


FIG. 6. RF SWEEP EQUIPMENT CONNECTION DIAGRAM

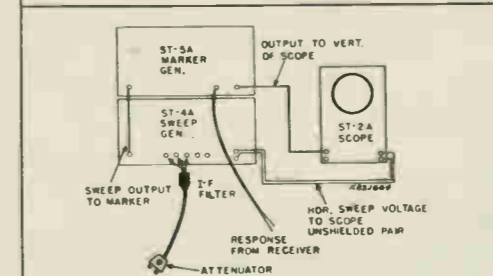


FIG. 7. IF SWEEP EQUIPMENT CONNECTION DIAGRAM

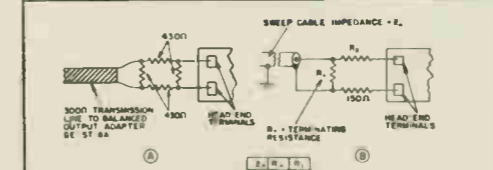


FIG. 8. SWEEP EQUIPMENT TERMINATION

3. Connect a 3-volt battery to the AGC terminal of the RF tuner, with the positive lead of the battery connected to the tuner chassis.

4. Should it become difficult to obtain proper tracking on channels 7-13 with the indicated adjustments, proper tracking may be achieved by adjusting the coil L157. If necessary, L153 and L121 should be knifed to provide correct response on channel 7, after C104, C106 and C108 have been correctly adjusted for channel 12. These coils should be dressed with an insulated tool to prevent a B plus short.

5. It is possible to obtain two different settings of C105, that will give the proper RF bandwidth. The correct setting may be determined by switching from channel 13 to channel 12 and observing the change in bandwidth. The correct setting will result in a slightly greater bandwidth on channel 12.

6. When proper tracking on the low channels cannot be achieved with the provided screw adjustments, the inductance of the coils, L108, L110, L111, L115, L117, L118, L144, L146, and L158 may be varied by inserting a knife blade between the windings. This method of adjustment requires the removal of the tuner shield, a procedure which will derange the circuits. However, in most cases the provided screw-type adjustments will suffice to achieve proper tracking through all channels after the shield has been replaced.

7. The picture and sound carrier marker should not be less than 90% of the peak of the RF response curve. Refer to the "limits" curves shown in the accompanying alignment chart.

8. Seal trimmer screws of C105 and the brass cores in the coils L114, L112, L119, L145, L109, L155, L159, with wax to prevent detuning. Seal the tuning screws in trimmers C104, C106, and C108, with glue. Reconnect the B plus oscillator lead on the RF tuner terminal board and connect the transmission line to RF tuner input transformer.

9. For receiver over-all alignment check, see IF Alignment Chart.

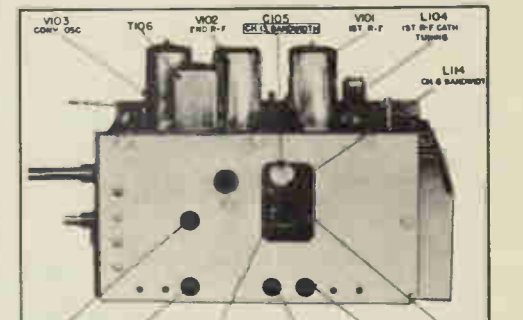


FIG. 9. RF TUNER ADJUSTMENTS, SIDE VIEW

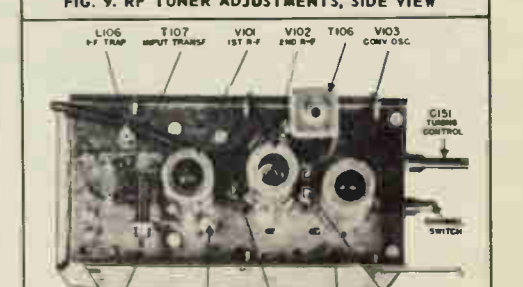

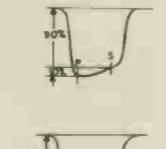



FIG. 10. RF TUNER ADJUSTMENTS, TOP VIEW

# 15CL100 (COLOR MODEL)

## RF ALIGNMENT CHART

- (a) Set generator sweep width to 10-15 mc.  
 (b) Signal input point at RF tuner input transformer, T107.  
 (c) Observe response curve at test point 1, figure 10, thru 10,000 ohm resistor. Connect test equipment ground lead to RF tuner chassis.  
 (d) Adhere to following order when performing a complete alignment.
- (e) When following the procedure below, an attempt should be made to obtain the indicated ideal response curves. Minor deviations from the ideal curves may occur, the maximum limits of "tilt" and/or bandwidth being shown in the "Remarks" column.

STEP	R'cvt. & Sweep Gen. Channel	Marker Frequency MC	ADJUST	REMARKS AND LIMITS	
1	No. 12	205.25 209.75		C104, C105 and C108 (Fig. 4 & 5) for maximum gain and proper bandwidth of 4.5 mc. to obtain curve "A" below. Limits are shown in last column.	
2	No. 13	211.25 215.75		 Ideal Curve	
3	No. 11	199.25 203.75			
4	No. 10	193.25 197.75	No adjustments; check tracking; obtain curve "A"; limits shown in last column. See notes 4, 5 and 7.		
5	No. 9	187.25 191.75			
6	No. 8	181.25 185.75			
7	No. 7	175.25 179.75			
8	No. 6	83.25 87.75	L112, L114, L119 and L159, for maximum gain, optimum curve flatness and 4.5 mc bandwidth; see curve "B" and Note 7.		 Tilt Limit Curves
9	No. 5	77.25 81.75	No adjustments, check tracking;		
10	No. 4	67.25 71.75	see curve "B" and Notes 6 & 7.		
11	No. 3	61.25 65.75	L109, L155 and L145 for maximum gain and optimum curve flatness. See curve "B".		
12	No. 2	55.25 59.75	No adjustments, check tracking; See curve "B".		
				 Ideal Curve	

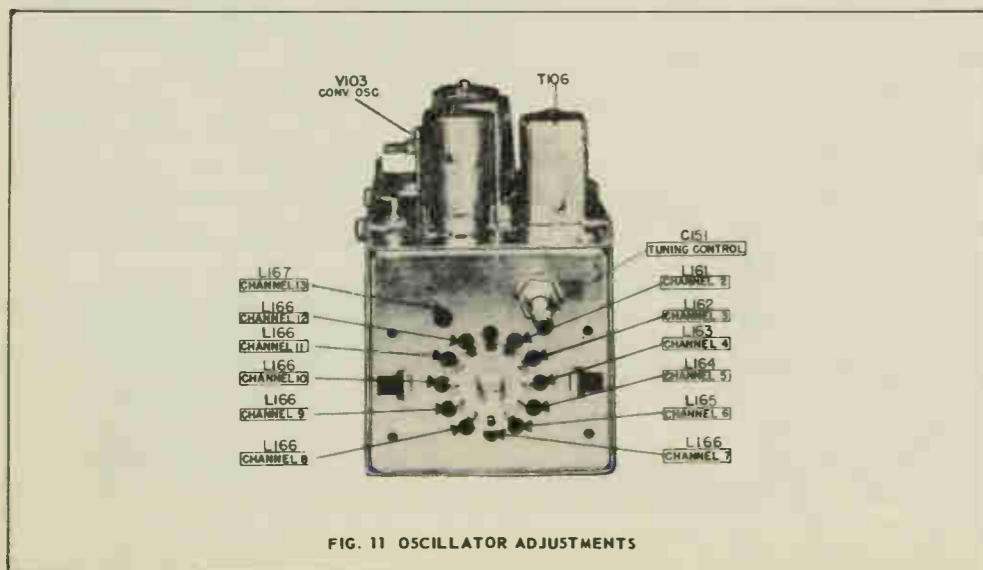


FIG. 11 OSCILLATOR ADJUSTMENTS

## OSCILLATOR ALIGNMENT

GENERAL: Two methods of oscillator frequency adjustment are given below. The first method uses a transmitting station for the adjustment while the second method requires a sweep generator to align the oscillator coils.

### A. "ON" STATION SIGNAL ALIGNMENT

RF and video IF alignment must be correct before attempting oscillator alignment. A transmitted station signal is needed for each one of the coils being adjusted. Tune in the stations starting with the highest frequency channels and adjust the tuning screws for all available stations so that with the fine tuning control in the full-clockwise position, audio is just visible in the picture. Then, check to see that best picture response on all channels takes place approximately in the center of the oscillator fine tuning range.

### B. SWEEP ALIGNMENT

1. RF and video IF must be properly aligned before aligning the oscillator.
2. Connect a 3 volt battery to the AGC terminal of the RF tuner with the positive lead of the battery connected to the tuner chassis.
3. Disconnect the 300 ohm transmission line from the antenna terminals to the RF terminals and connect the sweep generator to the RF tuner terminals as described in note 2 under RF Alignment.

## OSCILLATOR ALIGNMENT CHART

STEP	R'cvt. & Marker Position	Marker Generator Frequency	SIGNAL INPUT POINT	OBSERVE RESPONSE CURVE AT	ADJUST	SEE NOTE
13	No. 13	211.25 MC	Antenna terminals (see Note 3)	Test Point 4 (video detector diode load)	L167 Channel No. 13 oscillator adjustment.	1, 2, 3, 4, 5
14	No. 12	205.25 MC			L166 Channel No. 12 oscillator adjustment.	
15	No. 11	199.25 MC			L166 Channel No. 11 oscillator adjustment.	
16	No. 10	193.25 MC			L166 Channel No. 10 oscillator adjustment.	
17	No. 9	187.25 MC			L166 Channel No. 9 oscillator adjustment.	
18	No. 8	181.25 MC			L166 Channel No. 8 oscillator adjustment.	
19	No. 7	175.25 MC			L166 Channel No. 7 oscillator adjustment.	
20	No. 6	83.25 MC			L165 Channel No. 6 oscillator adjustment.	
21	No. 5	77.25 MC			L164 Channel No. 5 oscillator adjustment.	
22	No. 4	67.25 MC			L163 Channel No. 4 oscillator adjustment.	
23	No. 3	61.25 MC			L162 Channel No. 3 oscillator adjustment.	
24	No. 2	55.25 MC			L161 Channel No. 2 oscillator adjustment.	

### VIDEO IF ALIGNMENT

The following alignment data is divided into two separate procedures. Because of the extremely high adjacent channel trap attenuation, the conventional method of sweep observation of these traps becomes difficult. Hence all traps shall be pretuned by applying an amplitude-modulated signal and adjusted for minimum signal output.

The second portion of this procedure involves the shaping of the RF response curve in the conventional manner by the application of a sweep generator signal. During this procedure, observe the usual precautions regarding warm-up time, equipment cable lead dress and generator output cable termination, see figure 3.

### TRAP ALIGNMENT

General: As noted above, an AM signal is required for trap alignment. In many cases, the technician will have a suitable AM signal generator available. It should cover the range of 37 to 48 megacycles at fundamental frequency,

4. Set the fine tuning knob 180 degrees (½ turn) from the counter-clockwise limit of its rotation, i.e., rotate the fine tuning knob counter-clockwise to the end of its travel, then turn the fine tuning control knob 180 degrees (½ turn) clockwise. This setting of the fine tuning control should be maintained for all oscillator adjustments.

5. Make the indicated adjustments so that the picture carrier marker for the channel falls at 50% on the high frequency side of the response curve.

### Obtaining AM Output From G-E Sweep Equipment:

The General Electric ST-4A Sweep Generator will provide 60 cycle square-wave amplitude modulated signal. To obtain this signal proceed as follows:

1. Turn the sweep generator sweep width control fully counter-clockwise. This will provide a steady (zero sweep) carrier.
2. Turn the sweep generator blanking switch "On". This will square-wave modulate the carrier at a 60 cycle rate.
3. The next step is to calibrate the frequency of this AM carrier.

- a) Turn the marker generator "On" and set the dial to the desired frequency (4.5 mc, 38.0 mc, 41.25 mc, or 47.25 mc).
- b) Slowly tune the sweep generator through the desired frequency. As the desired frequency is approached, a strong beat signal will be observed on the oscilloscope. At exact resonance, a zero beat condition will be noticed on each side of which will appear a beat pattern. Minor sweep generator back and forth frequency drift may be noted. However, this drift is insignificant and may be disregarded.

### c) Turn off the marker output.

4. Apply this AM signal according to the instructions in the chart below.

5. The signal observed on the oscilloscope appears as two parallel lines. When the traps are properly tuned the distance between these lines will be at a minimum.

NOTE: It may be necessary to use full output of the sweep generator and near maximum oscilloscope gain to observe proper trap tuning.

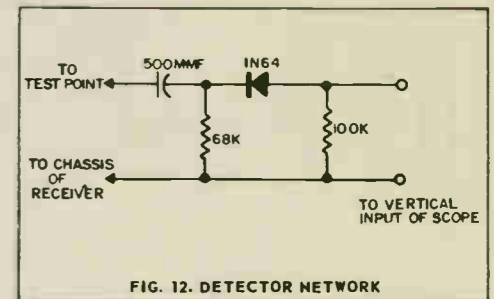


FIG. 12. DETECTOR NETWORK

STEP	AM-GENERATOR INPUT POINT	AM-GENERATOR FREQUENCY	ADJUST	REMARKS
1	Connect AM signal generator to TEST POINT 1 through .001 mf capacitor.	41.25 MC	L152	For minimum output
		47.25 MC	L153	
		41.25 MC	L158	
2		39.75 MC	L151	For maximum output
3		4.5 MC	L161	For minimum output
4	Connect AM signal generator to TEST POINT 5.	3.58 MC	L201	For minimum output

TRAP ALIGNMENT CHART

### IF SYSTEM SWEEP ALIGNMENT

GENERAL: After the traps have been set at their proper frequencies the IF curve may be shaped.

### NOTES:

1. Turn Picture Contrast control to minimum.
2. Connect oscilloscope to Test Point 4 through 20,000 ohms resistor. (It is necessary to shift oscilloscope from TP 4 to TP 5 to observe both sets of IF curves.)
3. Apply a negative 4½ volt battery bias voltage to Test Point 4 throughout IF alignment.
4. Calibrated scope for 2" deflection with ½ volt signal.
5. Note that the following procedure uses 45.0 mc as the 10% reference point. Maintain the sweep generator output so that the baseline-to-45.0 mc marker amplitude equals 2 inches. Align as indicated in the alignment chart.

### ALIGNMENT NOTES:

1. Remove the horizontal output tubes V131 and V132 from their sockets being careful that the plate connectors do not short to the chassis.
2. Remove the sync amplifier and noise canceller tube V113 from its socket.

3. Turn volume control and brightness control to minimum. Turn Contrast control to maximum.

4. Set channel selector to channel 11 position with Fine Tuning at the maximum clockwise position.

5. Connect oscilloscope in series with 20,000 ohm ½ watt carbon resistor to indicated Test Points. (20,000 ohm resistor is used throughout IF alignment.)

6. Allow receiver and test equipment to warm up at least 20 minutes. (Refer to Tube and Trimmer location drawing for adjustment locations.)

### AUDIO IF ALIGNMENT

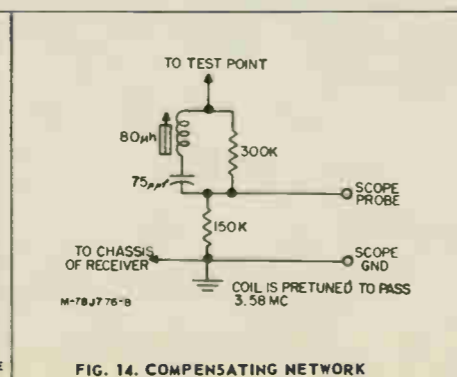
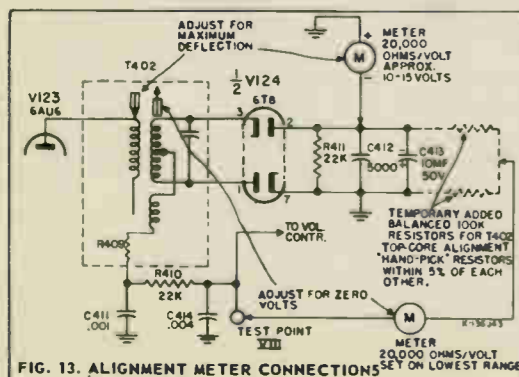
### NOTES:

1. Tune in a television signal. This will provide a 4.5 mc signal source for audio alignment. Keep the Volume control turned down unless the speaker is connected.
2. Figure 13 shows a simple resistor network needed for the alignment of T402 secondary. These two 100K resistors should be chosen as accurately as possible, for equal resistance. Be sure to remove these resistors after completing the alignment. Align as shown in chart.

# 15CL100 (COLOR MODEL)

IF ALIGNMENT CHART				
Step	CONNECT SWEEP GENERATOR	ADJUST or PEAK	DESIRED RESPONSE	REMARKS
1	Into Test Point 3 and chassis through .001 mf capacitor. Center sweep frequency approx. 44.0 mc. Sweep width approx. 10 mc.	L159 for maximum at 43.1 mc. L155 for maximum at 45.6 mc.		Observe response at Test Point 4. Make indicated adjustments to obtain maximum gain consistent with proper curve. Corners of curve peak must show slight rounding.
2				Check with scope on Test Point 5 for indicated response. It may be necessary to alternate scope observation between Test Points 4 and 5 to achieve proper response curves.
3	Into Test Point 1 & chassis through .001 mf capacitor. Center sweep frequency approx. 44.0 mc. Sweep width approx. 10 mc.	T153 for max at 42.2 mc T152 for max at 41.6 mc T151 for maximum at 45.15 mc T106 for maximum at 45.75 mc L154 for maximum at 43.8 mc		Check with scope on TEST POINT 5 for indicated curve. Adjust T151 to set 45.75 mc at 45%. Adjust L154 for good symmetry (No Tilt) at peak region of curve.
4	Sweep width approx. 10 mc.	See remarks columns.		Check with scope on Test Point 4 for indicated curve. If necessary, Adjust L151 to set 39.75 mc as shown. Adjust T153 to set flat "ahalf" about 42.2 mc. Alternate scope between Test Points 4 & 5 while making minor adjustments to obtain both proper curves of steps 3 & 4.
5	Into RF tuner input through balanced adapter & 300-ohm pad & line. Sweep channels 10 & 5. Sweep width approx. 10 mc.	C108 (RF tuner)		Align for zero "tilt" on ch. 10. Check chs. 7-13 and make further compromise adjustment so that each channel will have no more than 10% "tilt" with the Fine Tuning adjusted to provide the proper sound and picture IF markers.
6		L145-L159 (R-F Tuner)		Align for zero "tilt" on channel 5. Check channels 2-6 and make further compromise adjustment, so that each channel will have no more than 10% "tilt" with the Fine Tuning adjusted to provide the proper sound and picture IF markers.

AUDIO IF ALIGNMENT CHART				
Step	CONNECT VTVM or 20,000 ohms/volts METER	ADJUST	METER INDICATION	REMARKS
1	To test point 7 and chassis	L401 and T401 (top and bottom cores)	Adjust for maximum deflection.	Voltage to be read is negative with respect to chassis.
2	V124A, pin 2 and chassis	T402 primary (bottom core)		
3	Test Point 8 & center of two 100,000 ohm resistors. See Fig. 8.	T402 secondary (top core)	Adjust for zero volts DC output.	Repeat Steps 1, 2 & 3 to assure proper final adjustment.



## CHROMA CHANNEL ALIGNMENT

**INTRODUCTION:** The purpose of the Chroma Channel is to amplify the relatively low-detail color subcarrier information to the synchronous detectors and the subcarrier generating systems. The bandwidth of the Chroma Channel is quite narrow, being approximately 1.2 mc wide, measured at the maximum corner points of its amplitude response. It is most important that the 3.0 mc and 4.2 mc "corners" be accurately set since the .8 usec. delay incorporated in the "Y" channel is predicated upon the 1.2 mc passband of the chroma channel. Also, the 4.5 mc response must be at an

absolute minimum to prevent "900 KC" beat interference in the chroma channel. Be sure that the 4.5 mc marker lies on the response baseline as shown in the accompanying alignment chart.

### NOTES:

1. Connect -15 volt bias supply between Test Points 4 and 23 and ground.
2. Connect scope with detector network, (Fig. 7) to Test Point X.

CHROMA CHANNEL ALIGNMENT CHART				
Step	CONNECT SIGNAL	ADJUST	DESIRED RESPONSE	REMARKS
1		L302 for maximum at 3.58 mc.		Repeat steps 1, 2 and 3.
2	Apply AM signal through .001 mf capacitor to Test Point 4.	L301 for minimum at 4.5 mc.		
3		T301 secondary (bottom core) for maximum at 4.2 mc.		
4	To Test Point 4 connect sweep generator through a .001 mf capacitor.	T302 secondary (bottom core) to position 4.2 mc on corner as shown. T302 primary (top core) to flatten curve.		Check 3.0 mc point and adjust T302 secondary (bottom core) for desired curve.
5	Center sweep approx. 3.5 mc. Sweep width 5 mc.	T301 primary (top core) to "fill in" curve as shown. Adjust secondary (bottom core) to position 4.2 mc.		Minor saddles may occur on response peak. Duplicate curve as closely as possible.

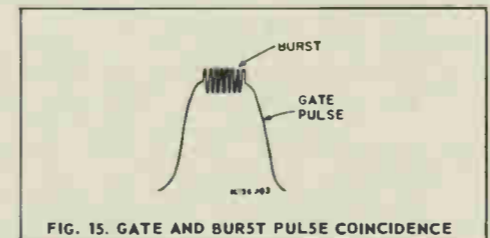
## SUBCARRIER GENERATOR ALIGNMENT

The alignment of this section of the receiver essentially consists of peaking the various tuned circuits to 3.58 mc as indicated by means of VTVM DC voltage readings. This procedure requires the use of a stable 3.58 mc crystal controlled signal from a suitable generator, or else it may be performed while the receiver is tuned to a station which is broadcasting a color program.

**GENERAL:** Before tuning the various circuits in the subcarrier generating system, a check should be made to assure that the gating pulse of the burst gate is properly phased. This can only be done while tuned to a color program or to a signal from a suitable color bar generator.

- 1) Tune receiver to color signal for normal picture.
- 2) Connect wide-band oscilloscope to Test Point 6. If wide band oscilloscope is not available connect network shown in figure 14 to input cable of General Electric ST-2A oscilloscope. This network increases the relative scope gain at 3.58 mc to allow easier observation of the burst signal. Tune the network coil to provide maximum 3.58 mc amplitude.
- 3) Adjust horizontal oscillator coil core (L501) so that picture locks in horizontally on weak signal as channel selector is switch on and off channel.
- 4) Adjust C515 (horiz. detector phasing) so that gate pulse is centered beneath burst signal as observed on oscilloscope. Composite signal should appear as shown in figure 15.

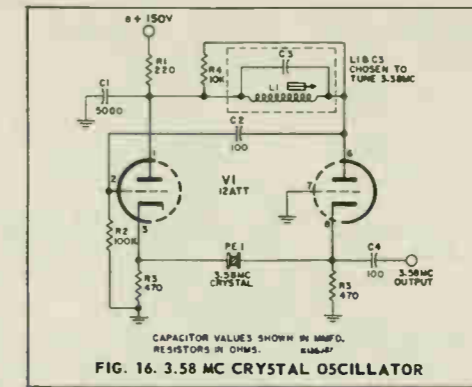
**NOTE:** Some early production receivers do not incorporate C515. In such receivers, the horizontal oscillator coil should first be adjusted to provide proper horizontal picture sync lock-in, and then be further adjusted to provide gate pulse and burst coincidence as shown in figure 15.



For those interested, a simple oscillator may be constructed according to the schematic diagram of Fig. 16. In this circuit a crystal of the type incorporated in the color receiver may be used. When using a signal of this type to align the subcarrier channel, insert the signal into test point 4 (chroma detector circuit).

### PROCEDURE:

1. Tune receiver to transmitted color program or insert 3.58 mc signal as noted above.
2. Set chroma gain and contrast control fully counter-clockwise.
3. Set Hue control capacitor (C336) to the middle of its range. Maintain this adjustment throughout remainder of procedure. This may require loosening of the Hue control shield. Move shield back just far enough to observe capacitor plates.
4. Adjust bottom core screw of T304 for exactly one inch exposure, measured from the core retaining clip to the slotted end of the core screw.
5. Place VTVM on Test Point 7 through 2.2 megohm resistor. Set T304 top core screw 1/2" out measured between the top core screw clip and the slotted end of core screw.
6. Tune L303 for maximum VTVM reading.



7. Adjust T304 top core for maximum VTVM reading.
8. Repeat steps 6 and 7 twice.
9. Peak L304 for maximum VTVM reading.
10. Connect VTVM through 2.2 megohm resistor to Test Point 24. Peak L305 for maximum VTVM reading.
11. Disconnect 3.58 mc signal source (generator or color program). Tune receiver for normal picture on monochrome signal. Turn contrast and chroma controls fully counter-clockwise and increase brightness control so that blank raster is visible.

Disable color killer circuits by by-passing plate of V120B (Pin 1) to chassis through .1 mf capacitor. Reduce picture width to minimum and adjust horizontal centering control so left edge of raster is visible.

## PHASING OF SYNCHRONOUS DETECTORS

If a color bar generator is not available for this procedure, turn the receiver station selector to a channel which is transmitting a color program or the standard color bar test signal. Make sure the "Hue" control is set in the middle of its range.

1. Couple a 45.75 mc signal to the input of the 1st IF amplifier tube V104. Adjust the fine tuning control for zero beat between the two 45.75 mc carriers. Leave tuning control set, as is, and disconnect 45.75 mc generator lead.

**NOTE:** The following procedure requires use of VTVM, on receivers incorporating common detector cathode connection as shown on schematic inset, connect VTVM ground lead to junction of R266 and R631 instead of to chassis. Other lead of VTVM should be connected as indicated below.

- a) Adjust the top slug of T303 all the way out.
- b) Connect a VTVM through a 2.2 meg resistor to test point 10. (Pin 1 of V121).
- c) Tune the bottom slug of T303 for maximum DC voltage reading on the VTVM.
- d) Connect VTVM through a 2.2 meg resistor to test point 14. (pin 1 of V116).
- e) Tune the top slug of T303 for a maximum DC voltage reading on VTVM.
- f) Repeat steps b, c, d, and e.

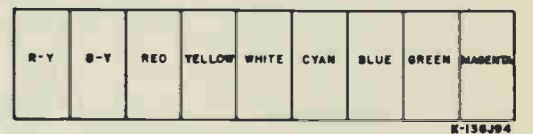
Steps "a" through "f" above, will bring the detectors very closely into phase and in many cases will suffice to provide good color accuracy. Should viewed programs or color bars appear slightly in error with respect to color accuracy (after matrixing procedure, below, has been accomplished),

adjust "Hue" control for color correction. Should the need for more accurate color phasing be indicated, follow the procedure listed below for accurate detector phasing.

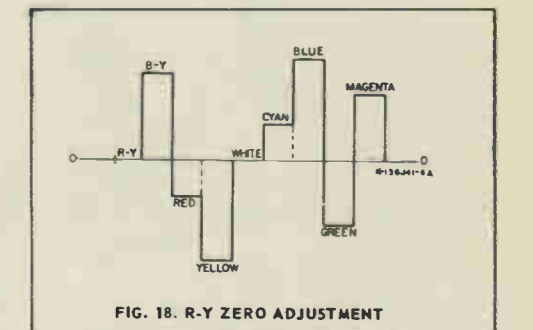
2. Tune receiver to color bar pattern. Set "Hue" control to middle of its range.
3. Adjust fine tuning control according to item 1, above.

**NOTE:** The following adjustments require that the technician be familiar with the sequence of colors and other information contained in the color bar pattern used. In the following procedure, the adjustments are made to "zero-out" the amplitude of the R-Y and B-Y bars. Proper phasing of the 90 degree displaced gating subcarrier voltages will produce zero B-Y output signal in the R-Y channel and zero R-Y output signal in the B-Y channel.

In the event that R-Y and B-Y bars are not included in the available color bar pattern, only the preceding "DC" alignment should be used and the following steps 4, 5 and 6 may be disregarded.

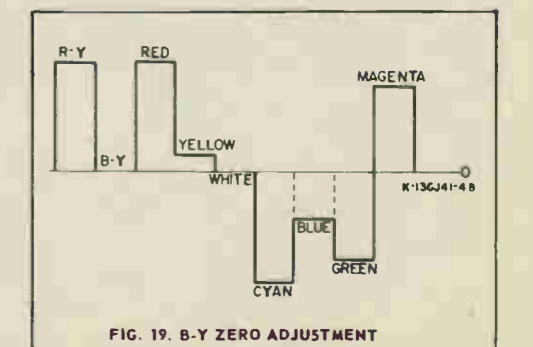


4. Connect scope synced of the horizontal sweep line rate to Test Point 15 (B-Y Amp.). Figure 17 indicates the possible sequence of information contained in a color bar test pattern. Tune the primary (bottom core) of T303 until zero amplitude of the R-Y bar is obtained as shown in Figure 18.



5. Connect scope synced as above, to Test Point 16 (R-Y Amp.). Tune secondary (top core) of T303 until zero amplitude of the B-Y bar is obtained as shown in Figure 19.

6. Repeat steps 4 and 5 above, to assure accurate quadrature voltage phase angle setting.
7. Note: On receivers equipped with hum canceller control, R631, remove all signal input to receiver. Connect scope to test point 19 and adjust R631 for minimum 60 cycle hum output.



# 15CL100 (COLOR MODEL)

## RECEIVER MATRIXING PROCEDURE

The term "matrixing" applies to those circuits which perform the function of combining the various color difference signals, in proper proportions, to eventually form the red, green and blue picture tube driving voltages.

Specifically, the R-Y and B-Y voltages are first adjusted in amplitude and then, from these proportioned voltages, the G-Y voltage is formed and adjusted in amplitude. It should be noted that misadjustment of the matrixing controls will cause erroneous picture color information just as readily as if the individual detector gate phases were improperly adjusted.

The following procedure should be followed in the sequence indicated.

1. Set channel selector to a standard color bar test signal. Couple a 45.75 mc signal to the input of the first IF amplifier V104. Adjust the fine tuning control for zero beat between the two 45.75 mc carriers. Leave fine tuning control set, as is and remove 45.75 mc signal lead.

(a) Turn chromo gain control, R603, fully counter-clockwise.  
(b) Place scope probe at Test Point 18. (pin 18 of V140).

### 2. Y, B-Y MATRIXING

(a) Adjust the contrast control to center position. Do not move this control again throughout the remainder of the matrixing procedure.

(b) Adjust the Chromo control until the response is like figure 20. Red and yellow should pass through zero at the same time Cyan and blue reach a maximum equal to the amplitude of the white bar. The Chromo control must remain fixed at this setting throughout the remainder of the matrixing procedure.

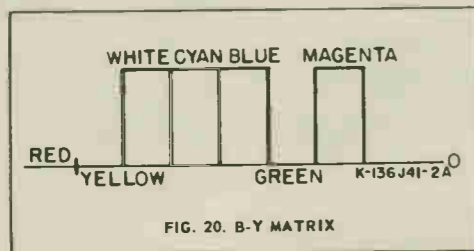


FIG. 20. B-Y MATRIX

### 3. Y, R-Y MATRIXING

(a) Place scope probe at test point 17, (pin 3 of V140).

(b) Adjust R-Y gain control (R605) until the response resembles figure 21. Red and yellow should reach a maximum equal to white, at the same time Cyan and blue reach zero amplitude.

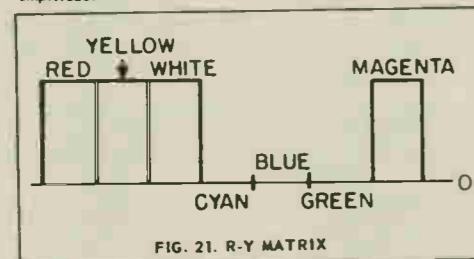


FIG. 21. R-Y MATRIX

### 4. Y, G-Y RATIO & MATRIXING

(a) Place scope probe on test point 19, (pin 8 of V140).

(b) Short test point 20 to ground. (Grid of V110A).

(c) Adjust the G-Y Ratio control, R606, for the response shown in figure 22. Note that the green and magenta bars

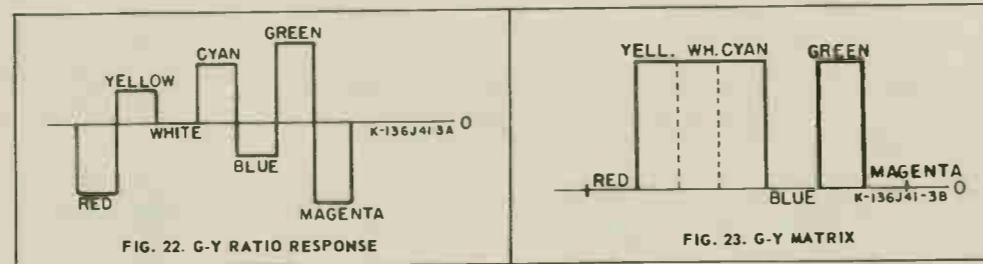


FIG. 22. G-Y RATIO RESPONSE

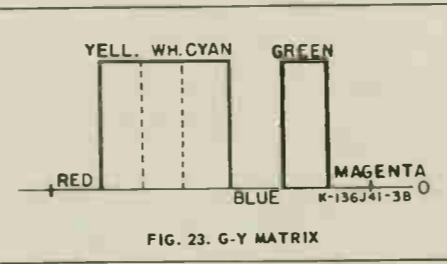


FIG. 23. G-Y MATRIX

are of equal amplitude but opposite polarity, as are the blue and yellow bars.

(d) Remove short from test point 20, (pin 9 of V110).

(e) Adjust the G-Y Gain control R607 for the response shown in figure 23. Yellow, green and Cyan should reach maximum equal to white, while red and blue reach zero.

ADJUSTMENT OF T502, HORIZONTAL DYNAMIC CONVERGENCE TRANSFORMER

Bring scope probe near lead from T502 to C461 and C465, (probe may be clipped on lead insulation). Sync scope at 1/2 horizontal rate. Peak T502 for maximum output.

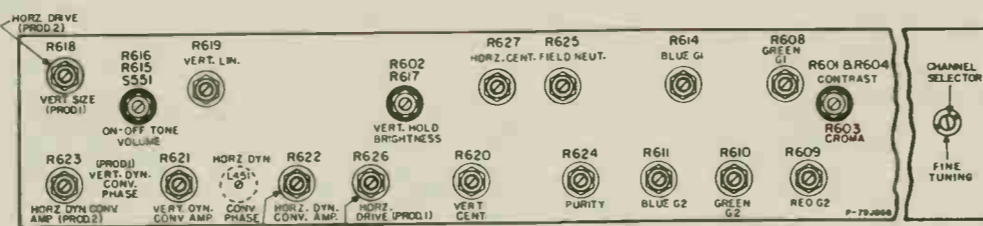
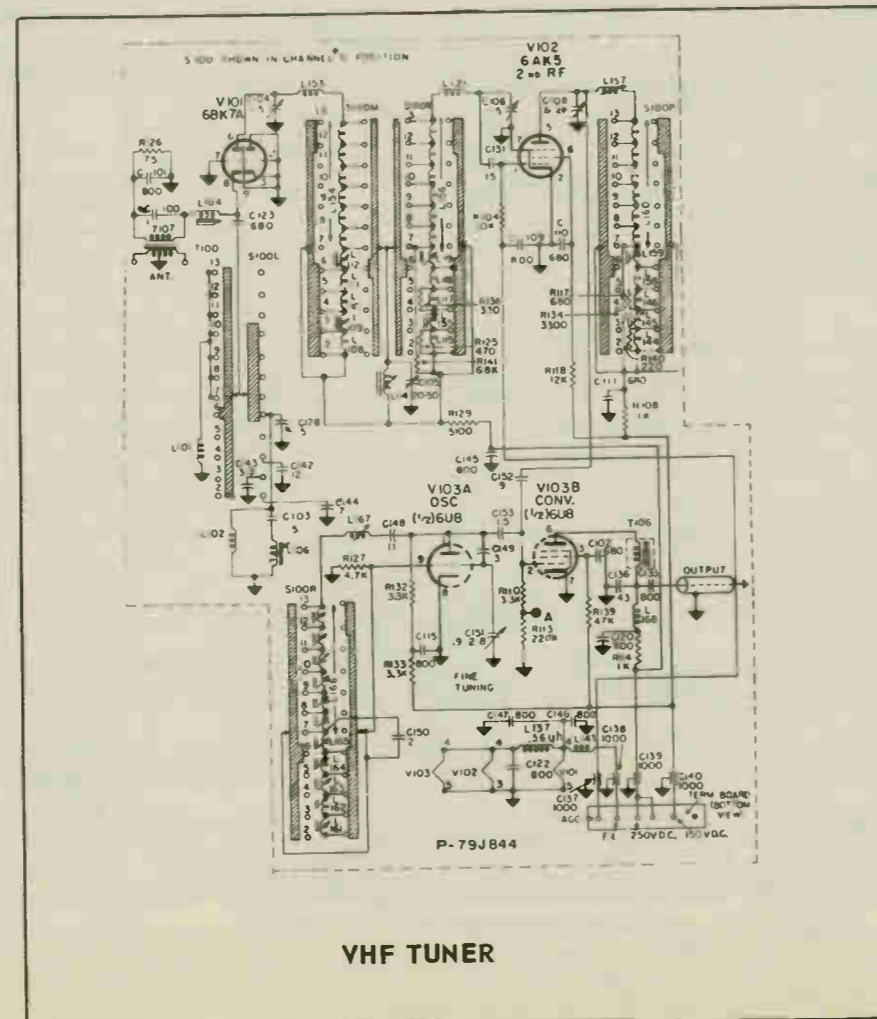


FIG. 24. FRONT PANEL ADJUSTMENTS, (1ST & 2ND PROD.)



VHF TUNER

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C203	5 mfd., 250V	RCE-178
C205	2 mfd., 250V	RCE-179
C206	25-25-25 mfd., 25V, 20 mfd., 150V	RCE-190
C351	1 mfd., 25V	RCE-189
C473	100 mfd., 50V	RCE-183
C526	25-25-25 mfd., 25V, 20 mfd., 150V	RCE-184
C551	150 mfd., 250V	RCE-180
C552	300 mfd., 250V	RCE-181
C553	80-30-30 mfd., 450V	RCE-185
C554	50 mfd., 25V	RCE-182
C554	150 mfd., 250V, 40 mfd., 450V, 5 mfd., 250V	RCE-186
C555	100 mfd., 250V, 2 mfd., 75V, 10-10 mfd., 25V	RCE-187
C559	160 mfd., 350V	RCE-191

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Master Brightness, 50K ohm	R602	RRC-258
Hor. Drive, 50K ohm	R626	RRC-265
Hor. Cent., .80 ohm C.T., w.w.	R627	RRC-273
Vert. Hold 175K ohm	R617	RRC-258
Vert. Cent., .20 ohm C.T., w.w.	R620	RRC-272
Vert. Lin., 5K ohms, w.w.	R619	RRC-271
Vert. Dynamic Convergence amplitude, 25K ohms	R621	RRC-264
Vert. Dynamic Convergence phase, 5 meg.	R623	RRC-267
Height, 4 meg.	R618	RRC-260
Focus, 5 meg. H.V. insulated	R628	RRC-261
Triple section, dual shaft 1K ohm - 500 ohm	R601, 3 & 4	RRC-257
Tone, Vol. 500K, 500K carbon dual shaft /AC switch S551	R616, 15	RRC-259
G-Y Ratio -10K ohm carbon	R606	RRC-262
Convergence -15 meg, 1W	R629	RRC-263
H.V. Reg. Adj., 2 meg.	R630	RRC-266
Red, Green, Blue G2 100K ohm	R609 to 611	RRC-268
Green & Blue Gain, 5K ohm	R612, 13	RRC-269
G-Y, R-Y Gain, 200 ohm, w.w.	R605, 7	RRC-270
Color purity, 10 ohm, 4W w.w.	R624	RRC-274
Field Neutralizing, 15 ohm, C.T. w.w.	R625	RRC-275
2K ohm, 5W	R417	RRW-116
1K ohm, 5W	R520	RRW-112
150 ohm, 10W	R523	RRW-111
3 ohm	R526	RRW-117

CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
5.6 ohm	R531	RRW-118
50 meg. H.V. type	R534	RRW-113
55 meg. H.V. type	R535	RRW-114
5K ohm, 5W	R171	RRW-110
2K ohm, 10W	R244	RRW-115

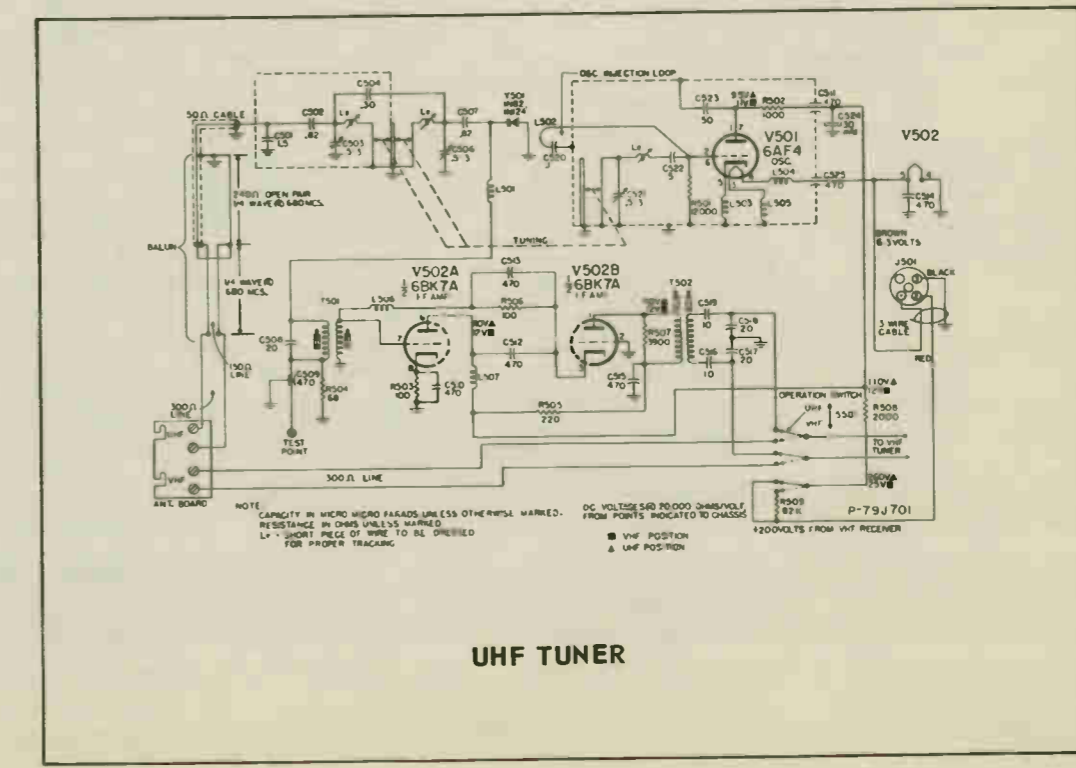
COILS		
REF. NO.	DESCRIPTION	PART NO.
L154	1st Video IF Grid	RLI-258
L155, 6, 8 & 163	Chroma det. ass'y (incl. C168, 9; R166; Y151)	RLX-045
L159, 60	"Y" det. ass'y (incl. R167; C171, 2; Y162)	RLX-046
L164	Comp. choke, 1000 mic.	RLI-261
L202, 4, 6	Choke, 240 mic.	RLI-262
L203, 5, 7	Comp. choke, 150 mic.	RLI-263
L251, 2	Comp. choke, 1,800 mic.	RLI-265
L302	3.58 MC tank circuit	RLI-268
L308	Choke, 68 uh	RLI-260
L401	Sound takeoff, 4.5 MC	RLI-266
L451	Hor. Convergence phase g	RLI-264
L501	Hor. Oscillator	RLC-130
L502	Width	RLD-062
L503	Hor. Linearity	RLD-063
L553	Color Purity	RLP-023
L555	Field Neutralizing	RLN-003

TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vertical Convergence	T503	RLC-131
Hor. Convergence	T503	RTC-001
Hor. Output	T501	RTO-158
Power	T551	RTP-320
Audio IF, 4.5 MC	T401	RTL-160
1st Chroma, 3.58 MC bandpass	T301	RTB-002
2nd Chroma bandpass 3.58 MC	T302, 4	RTB-003
Ratio Detector 4.5MC	T402	RTD-016
1st, 2d, 3d Video IF & 3	T151, 2 & 3	RTL-159
3.58 MC Quadrature Delay Line -.8 usec	T303 DL201	RTP-319 RWD-004

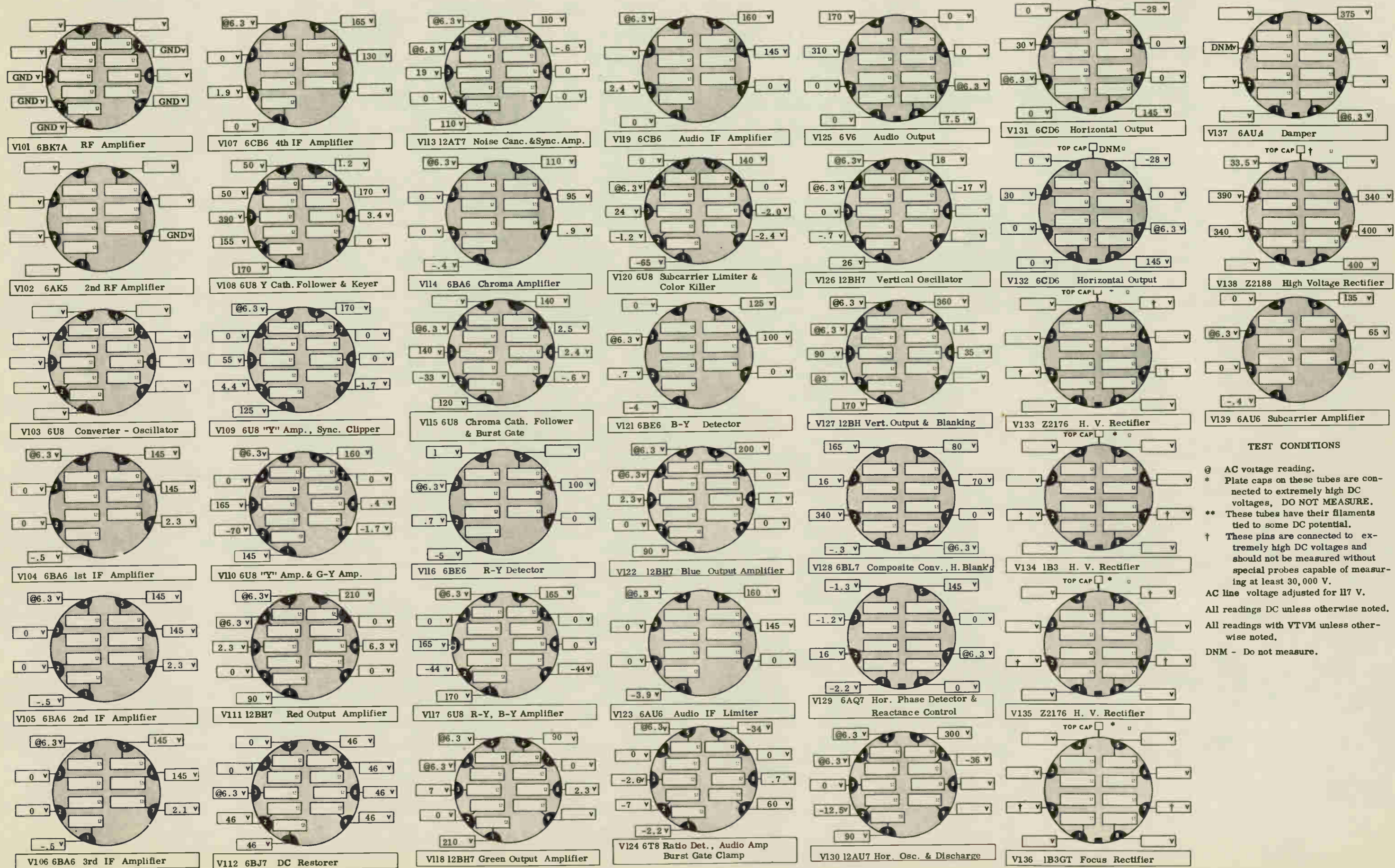
MISCELLANEOUS		
REF. NO.	DESCRIPTION	PART NO.
LSP401	Yoke	RLD-064
PE101	Speaker 8 1/2" (table mod.)	S-650D
	Crystal -3.579545 MC ± 100 cycles, quartz	REE-001
X552	Rectifier, selenium 350ma	RER-017
X551	Rectifier, selenium 800ma	RER-018



UHF TUNER



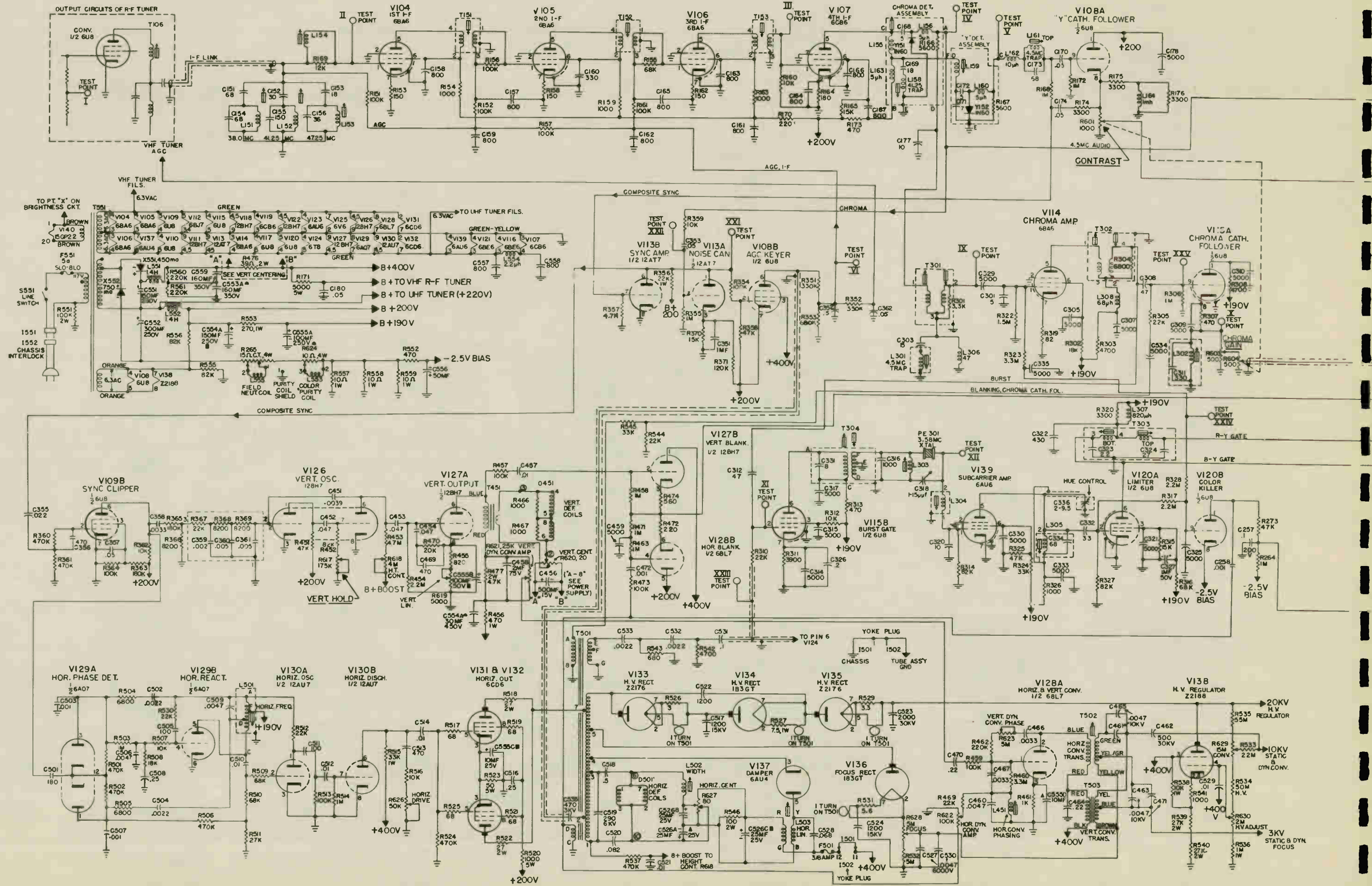
# 15CL100 (COLOR MODEL)

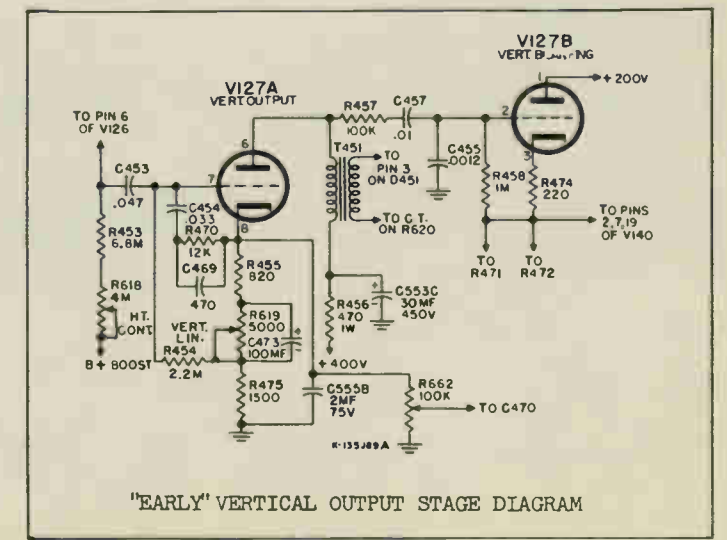
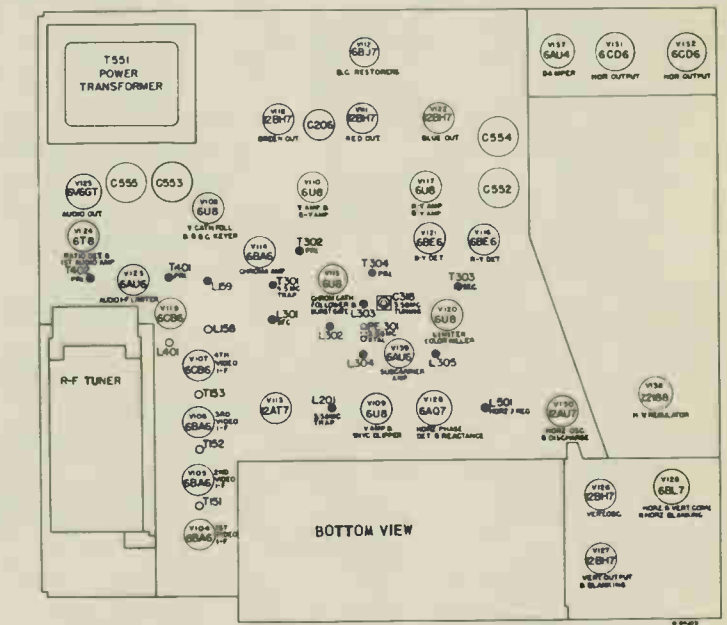
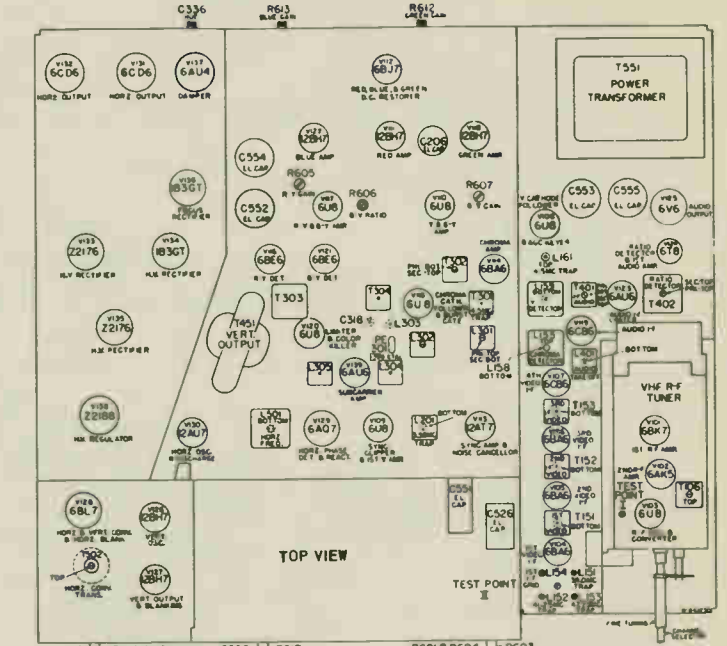
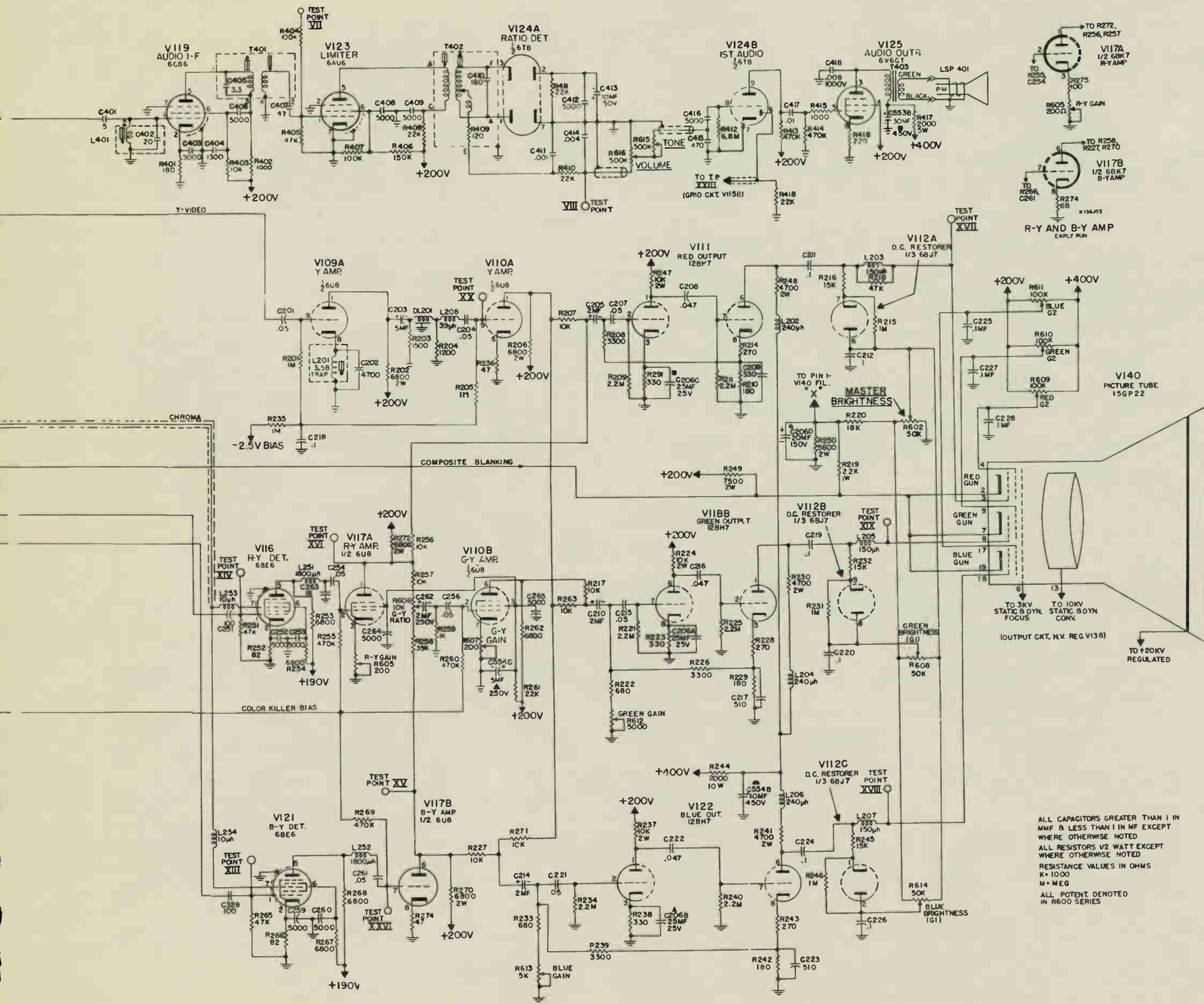


### TEST CONDITIONS

- @ AC voltage reading.
  - \* Plate caps on these tubes are connected to extremely high DC voltages, DO NOT MEASURE.
  - \*\* These tubes have their filaments tied to some DC potential.
  - † These pins are connected to extremely high DC voltages and should not be measured without special probes capable of measuring at least 30,000 V.
- AC line voltage adjusted for 117 V.  
All readings DC unless otherwise noted.  
All readings with VTVM unless otherwise noted.  
DNM - Do not measure.

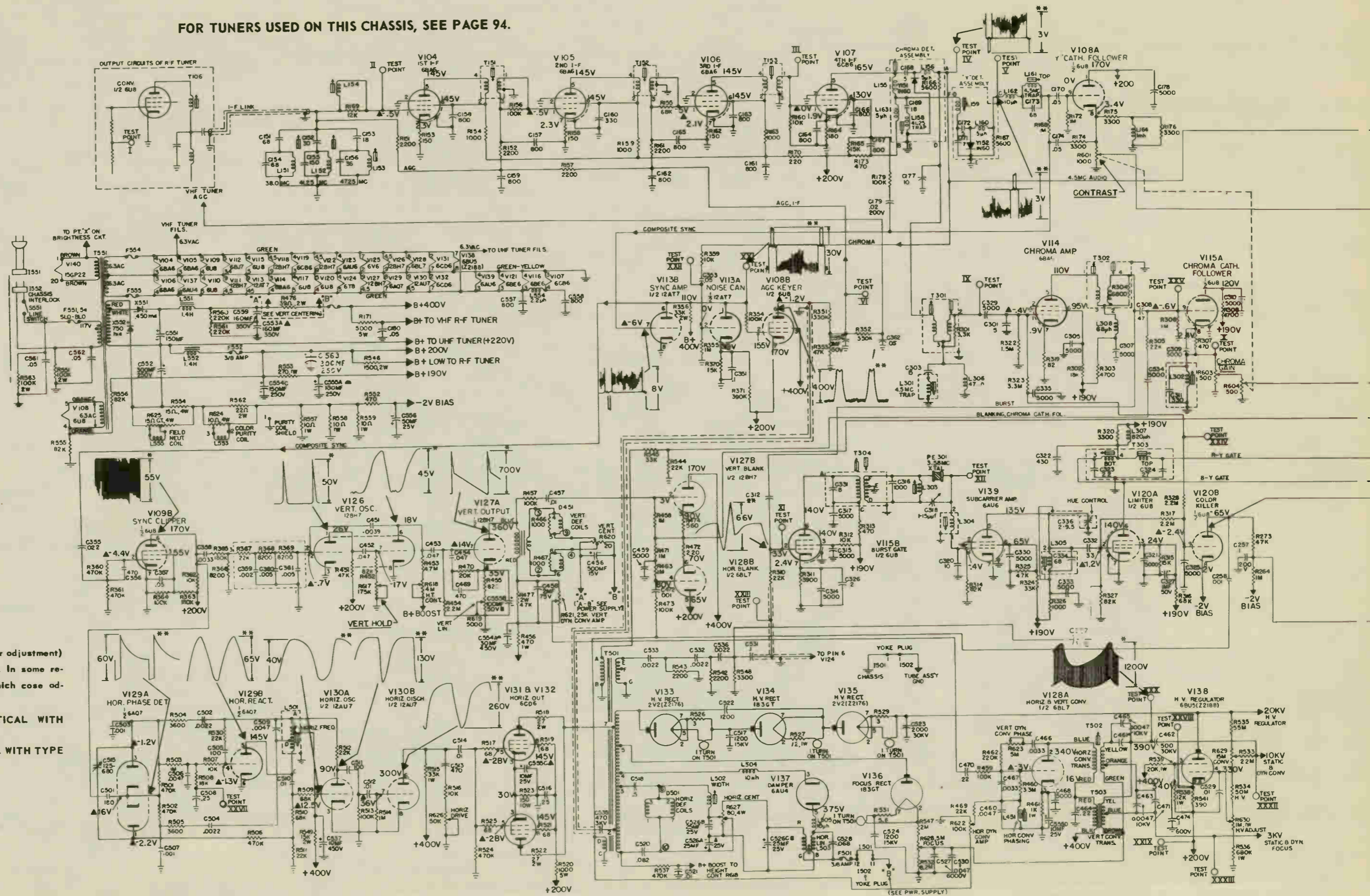
FOR TUNERS USED ON THIS CHASSIS, SEE PAGE 94.





ALL CAPACITORS GREATER THAN 1 IN MMF & LESS THAN 1 IN MF EXCEPT WHERE OTHERWISE NOTED  
 ALL RESISTORS 1/2 WATT EXCEPT WHERE OTHERWISE NOTED  
 RESISTANCE VALUES IN OHMS  
 K = 1000  
 M = MEG  
 ALL POTENT DENOTED IN R600 SERIES

FOR TUNERS USED ON THIS CHASSIS, SEE PAGE 94.

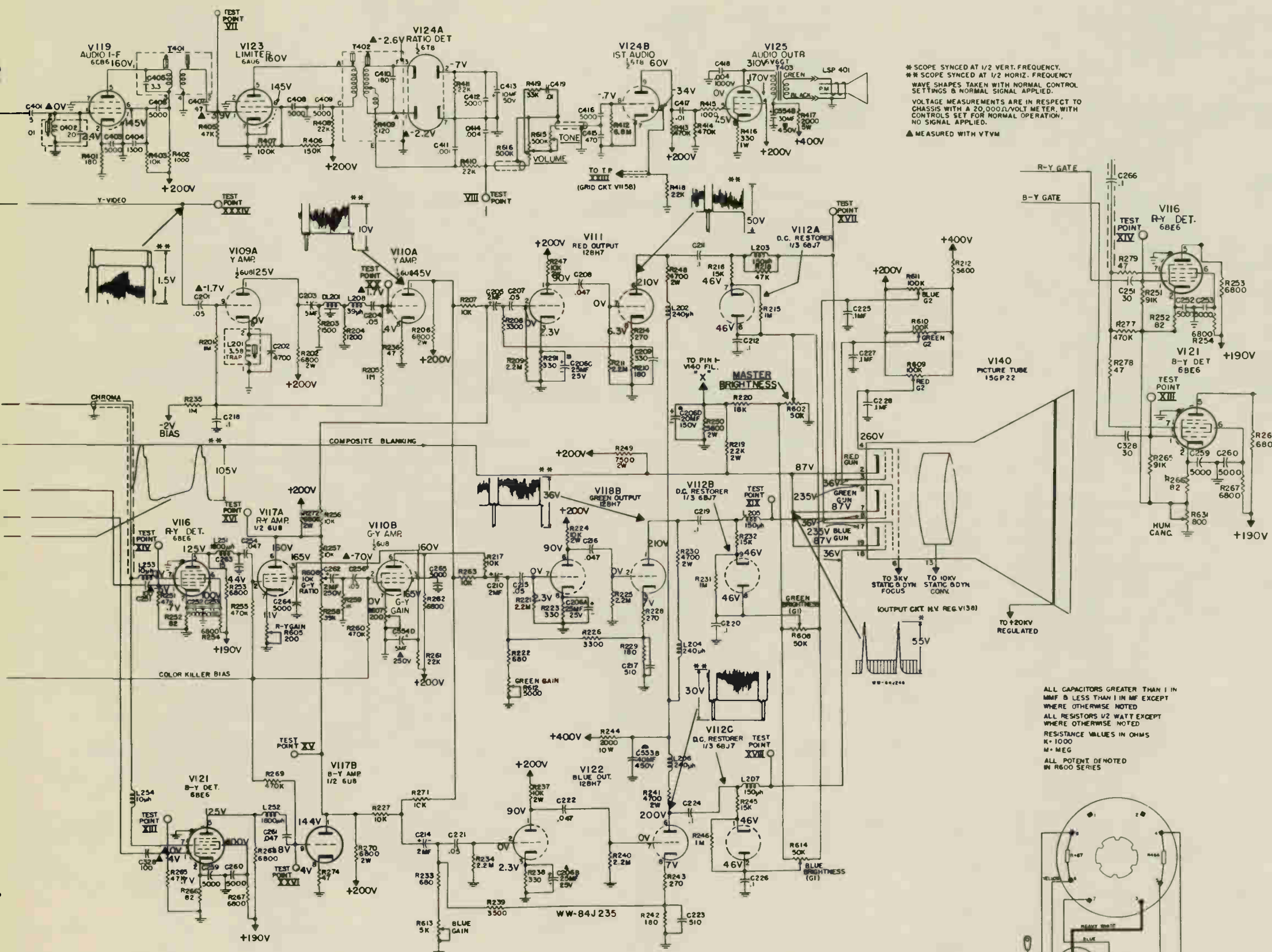


**NOTE**

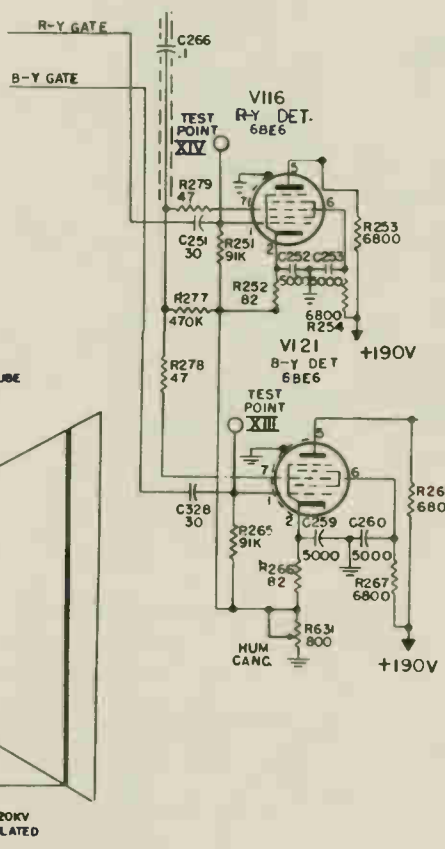
1. Adjust R630 (high voltage regulator adjustment) for 1/2 volt across R541 (390 ohms). In some receivers R541 is 1000 ohms, in which case adjust for 1 volt instead.

2. Z-2176 RECTIFIER IS IDENTICAL WITH TYPE 2V2 TUBE.

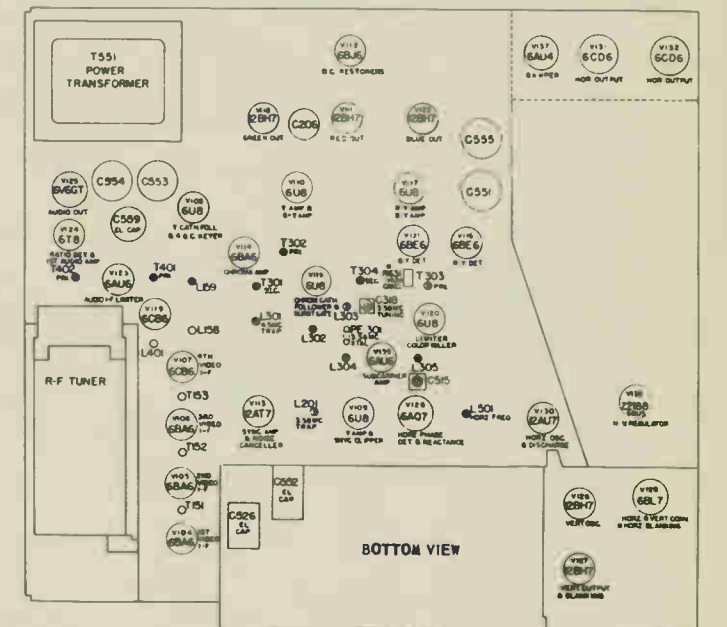
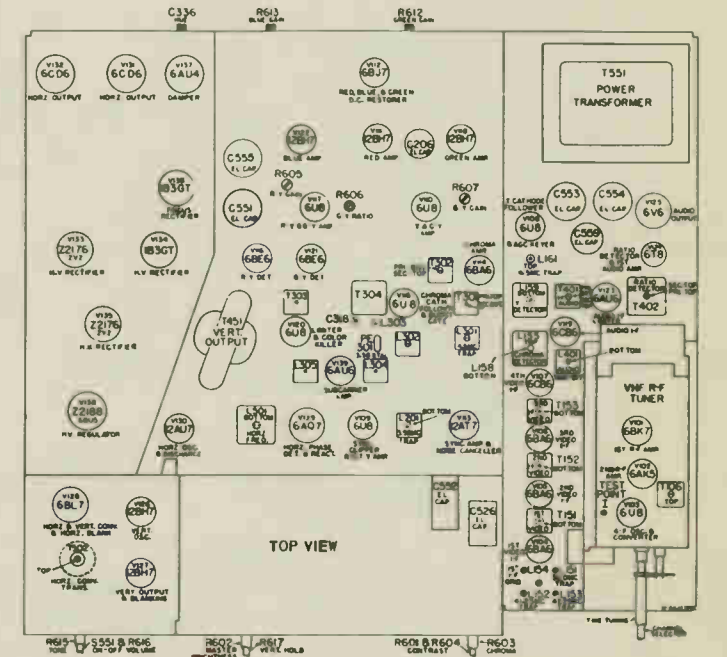
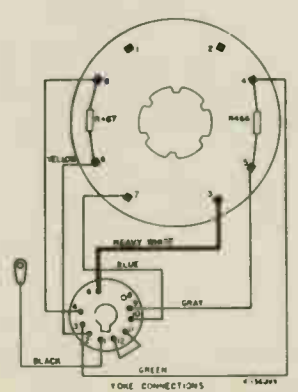
Z-2188 REGULATOR IS IDENTICAL WITH TYPE 6BU5 TUBE.



\* SCOPE SYNCED AT 1/2 VERT. FREQUENCY.  
 \*\* SCOPE SYNCED AT 1/2 HORIZ. FREQUENCY  
 WAVE SHAPES TAKEN WITH NORMAL CONTROL SETTINGS & NORMAL SIGNAL APPLIED.  
 VOLTAGE MEASUREMENTS ARE IN RESPECT TO CHASSIS WITH A 20,000Ω/VOLT METER, WITH CONTROLS SET FOR NORMAL OPERATION, WITH NO SIGNAL APPLIED.  
 ▲ MEASURED WITH VTVM



ALL CAPACITORS GREATER THAN 1 IN MMF & LESS THAN 1 IN MF EXCEPT WHERE OTHERWISE NOTED  
 ALL RESISTORS 1/2 WATT EXCEPT WHERE OTHERWISE NOTED  
 RESISTANCE VALUES IN OHMS  
 K=1000  
 M=MEG  
 ALL POTENT DENOTED IN R600 SERIES



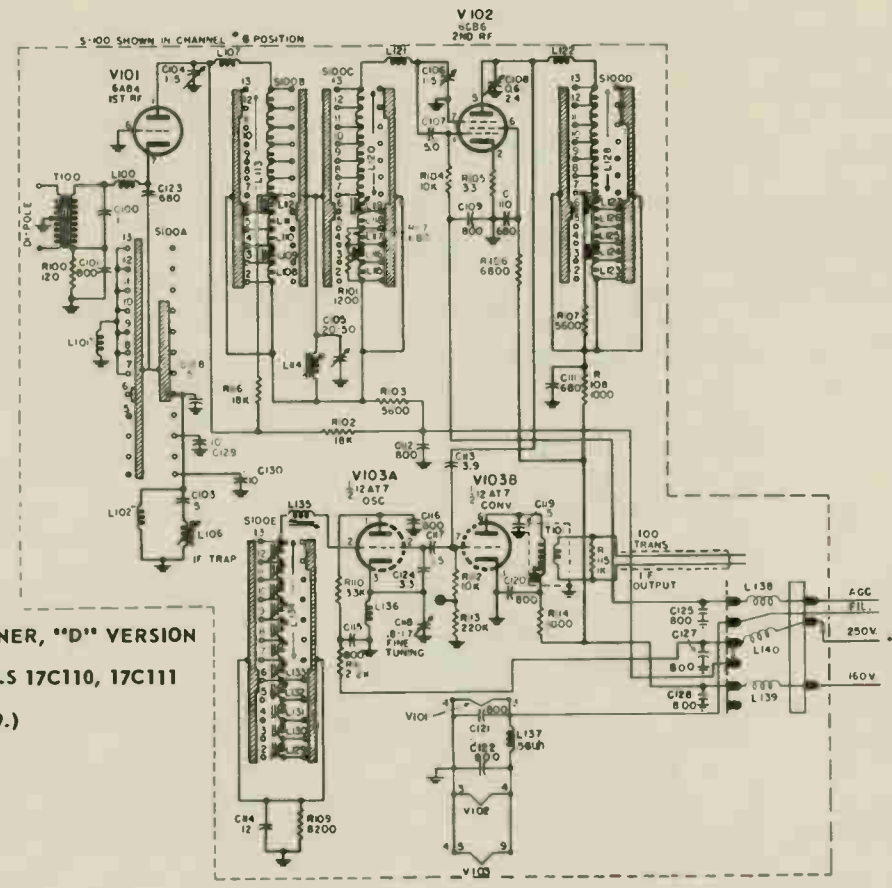
**PARTS LIST, MODEL 24C101**

ELECTROLYTIC CONDENSERS		
REF. NO.	DESCRIPTION	PART NO.
C311	1 mf., 50 V	RCE-090
C406	5 mf., 150V	RCE-056
C457	100 mf., 150V	RCE-123
C517	500 mf., 15V	RCE-126
C605	500 mf., 15V	RCE-126
C601A	30 mf., 450V	RCE-133
C601B	60 mf., 350V	RCE-133
C602A	40 mf., 450V	RCE-122
C602B	30 mf., 350V	RCE-122
C602C	15 mf., 350V	RCE-122
C602D	30 mf., 25V	RCE-122
C603A	30 mf., 450V	RCE-121
C603B	15 mf., 350V	RCE-121
C603C	30 mf., 150V	RCE-121
C603D	25 mf., 25V	RCE-121
C604	500 mf., 125V	RCE-125
C606	1K mf., 6V	RCE-106
TRIMMERS:		
C104	1-5 mmf.	RCY-065
C106	1-5 mmf.	RCY-065
C105	20-50 mmf.	RCY-066
C108	.6-2.4 mmf.	RCY-048
C118	.8-1.7 mmf.	RCY-067 (fine tun'g)
C465	1-12 mmf.	RCY-069 Yoke balancing
C515	110-580 mmf.	RCY-064 Hor. Drive

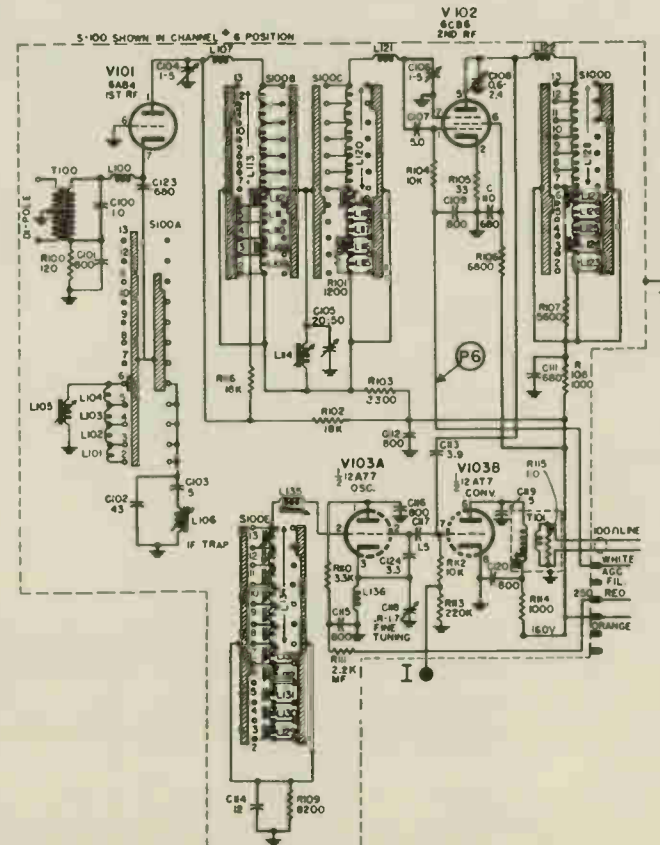
CONTROLS		
DESCRIPTION	REF. NO.	PART NO.
Volume 2 meg (on-off)	R350	RRC-161
Brightness 2 meg	R611	RRC-158
Contrast 10K	R401	RRC-161
Hor. Hold 100K	R510	RRC-160
Hor. Size		
Vert. Hold 1 meg	R456	RRC-157
Vert. Size 3 meg	R458	RRC-159
Vert. Lin. 2K, 2w., w.w.	R462	RRW-068
Focus 400 ohms, 25 w., ww	R601	RRW-065
Hor. centering 500 ohms 2w	R604	RRW-066
Vert. centering 20 ohms 2w	R605	RRW-067
AGC 25K	R425	RRC-140
WIREWOUND		
Capacitor resistor network 002mf., .005mf., .005mf. 22K, 82K, 82K ohms, 1/2w, molded integrating network 10,500 ohms, Globar voltage sensitive	C451, 2	REK-001
470 ohms, 25 w., ww	R602	RRW-063
1K, 15 w., w.w.	R603	RRW-064
50 ohm-250 ohm w.w.	R538, 9	RRW-074
1800 ohms, 10 w., w.w.	R542	RRW-075
50-400 ohms, w.w.	R538, 9	RRW-093

COILS		
REF. NO.	DESCRIPTION	PART NO.
L100	Choke - .56 uh	RLI-144
L100	Choke - .19 uh	RLI-146
L106	Trap IF coil & core	RLI-159
L136	Choke - 1.4 uh	RLI-136
L201, 2	1st Video IF	RLI-133
L203	2nd Video IF	RLI-131
L206, 7	3rd Video IF & cores	RLI-132
L209	Detector	RLX-031
L210	Choke-250 uh. video	RLI-156
L211	Choke-110 uh. video	RLI-108
L212, 3	Detector	RLX-032
L214	4.5 mc and core	RLI-139
L215, 1	1.4 uh 5% choke	RLI-142
L218, 20		
L216	Choke 31 uh.	RLF-024
L217	Trap-4th Video IF 39.75 mc trap coil	RLI-135
L221, 1	Choke 2.2 uh	RLI-122
L504, 5	6. Choke. 10uh, hor.	RLI-138
L401	Choke- 1000 uh.	RLI-155
L402	Choke-220 uh.	RLI-143
L403	10 uh. 4%	RLI-140
L500	Hor. osc. & adj. slug	RLC-107
L501	Hor. lin. & tuning core	RLD-027
L600	Filter choke, 5 hy.	RLF-040
L601	Filter choke, 5 hy.	RLF-041
L602	Focus	RLF-047
TRANSFORMERS		
DESCRIPTION	REF. NO.	PART NO.
Vert. Osc.	T450	RTO-103
Vert. Output	T451	RTO-097
Hor. Output	T502	RTO-104
Power, 60 cy, 115V	T601	RTP-310

TRANSFORMERS			
DESCRIPTION	REF. NO.	PART NO.	STANCOR NO.
Audio Output	T350	RTO-096	
Yoke	DY601	RLD-034	
Antenna input	T100	RLA-037	
Width & AGC c'pl'g	T503	RLD-033	
Ratio detector	T301	RTD-008	
Video I-F	T200	RTL-118	
4th Video I-F	T201	RTL-119	
Audio I-F	T300	RTL-120	
Filter choke, 5 hy.	T202	RTL-122	
Transformer	T101	RTL-126	
MISCELLANEOUS			
REF. NO.	DESCRIPTION	PART NO.	
RF Tuner (Early Models)		RJX-044C	
RF Tuner (W Models)		RJX-044W	
Loudspeaker, 12" PM		SI212D7	
Y200, 1	Crystal Diode 1N64	1N64	



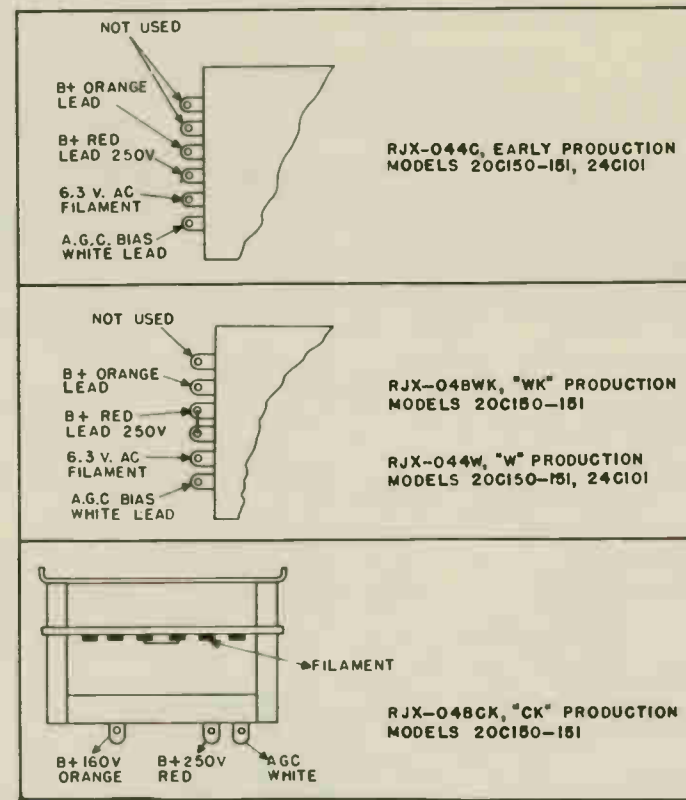
**RF TUNER, "D" VERSION**  
MODELS 17C110, 17C111  
(See Page S9.)



**RF TUNER, EARLY VERSION - MODELS 17C110, 17C111**

(See Page S9.)

(See Pages 65 and 67.)

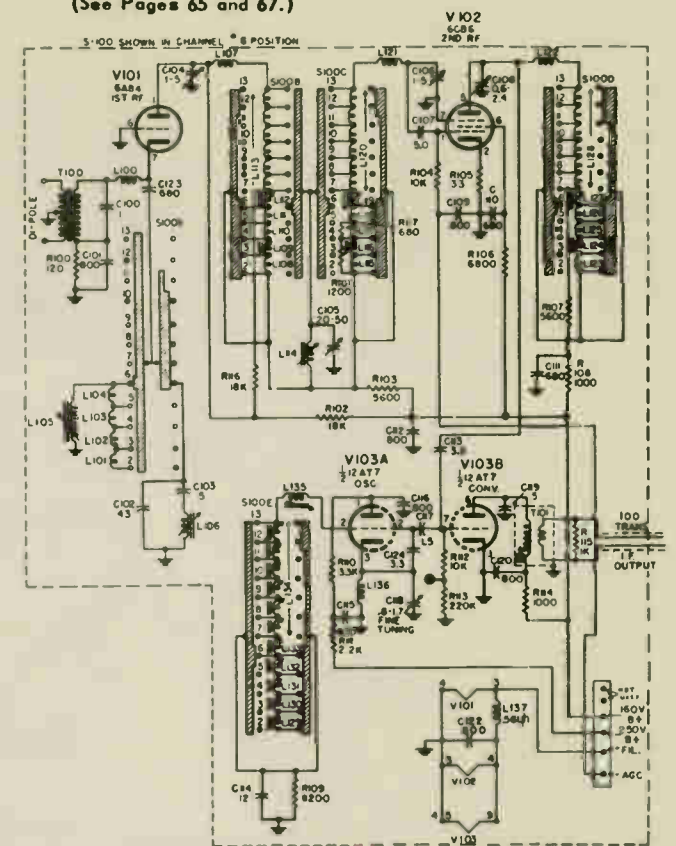


**R-F TUNER TERMINAL CONNECTIONS**

**R-F TUNER, RJX-048WK, "WK" PRODUCTION, MODELS 20C150-151**

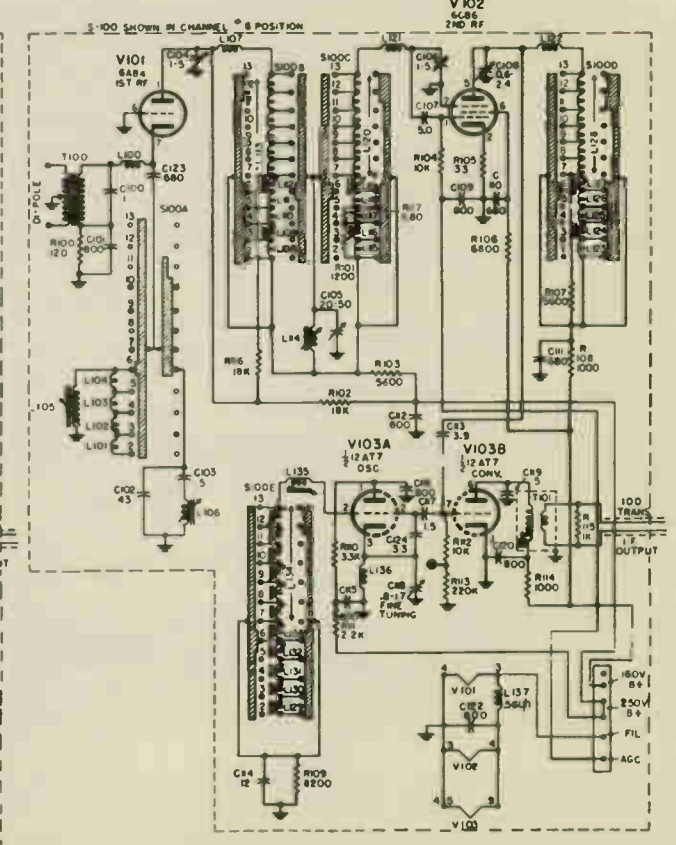
(See Pages 65 and 67.)

(See Pages 65 and 67.)



**R-F TUNER, RJX-044C, EARLY PRODUCTION, MODELS 20C150-151 AND 24C101**

(See Pages 65 and 67.)



**R-F TUNER, RJX-044W, "W" PRODUCTION, MODELS 20C150-151 AND 24C101**

840 RADIO PARTS LIST

Table listing parts for the 840 radio, categorized by Electrolytic Condensers, Controls, Coils, Transformers, and Miscellaneous. It includes reference numbers, descriptions, and part numbers.

818 AND 12K1 RADIO PARTS LIST

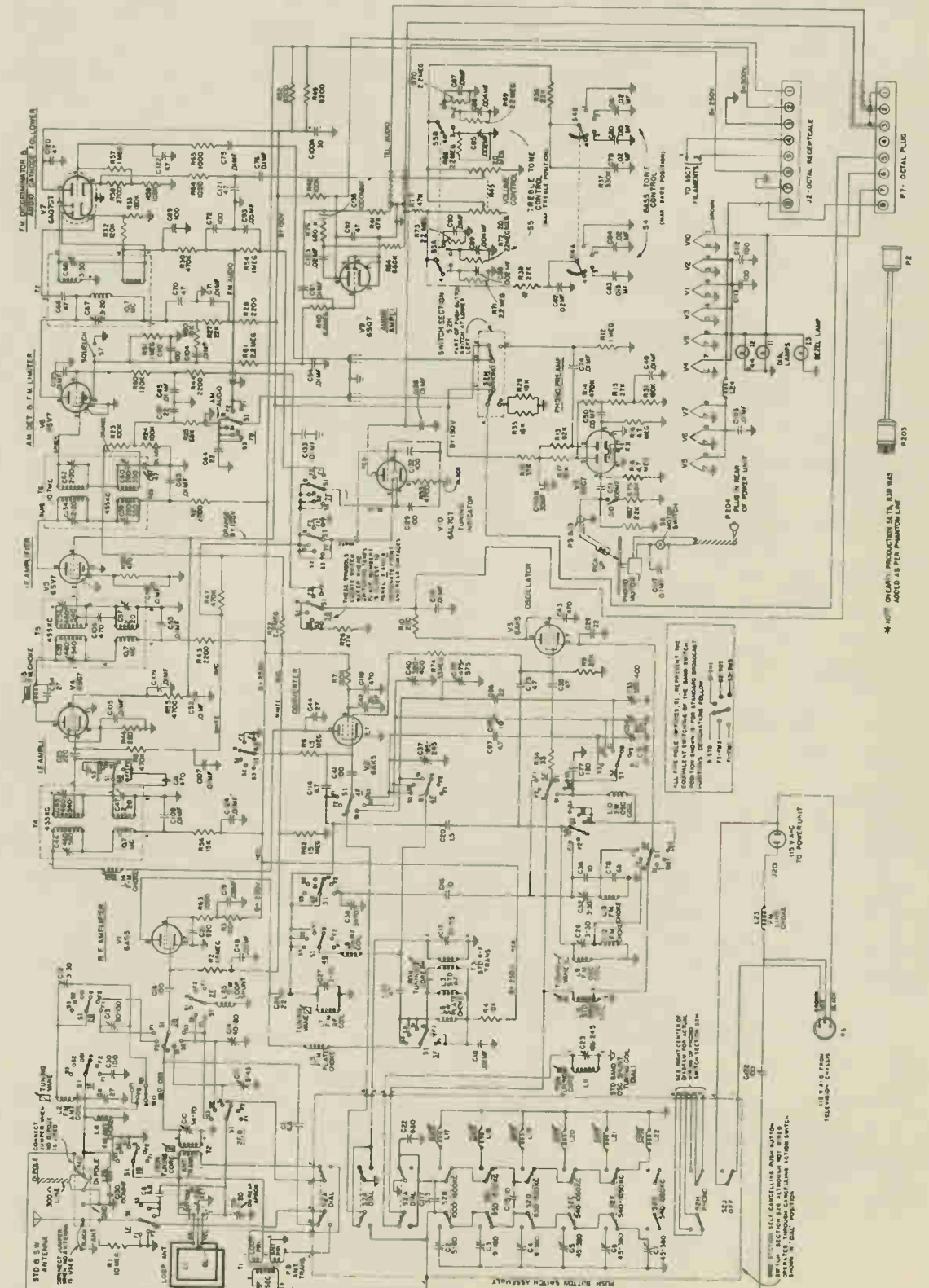
Table listing parts for the 818 and 12K1 radios, categorized by Electrolytic Condensers, Controls, Coils, Transformers, and Miscellaneous. It includes reference numbers, descriptions, and part numbers.

16K1 (Concluded)

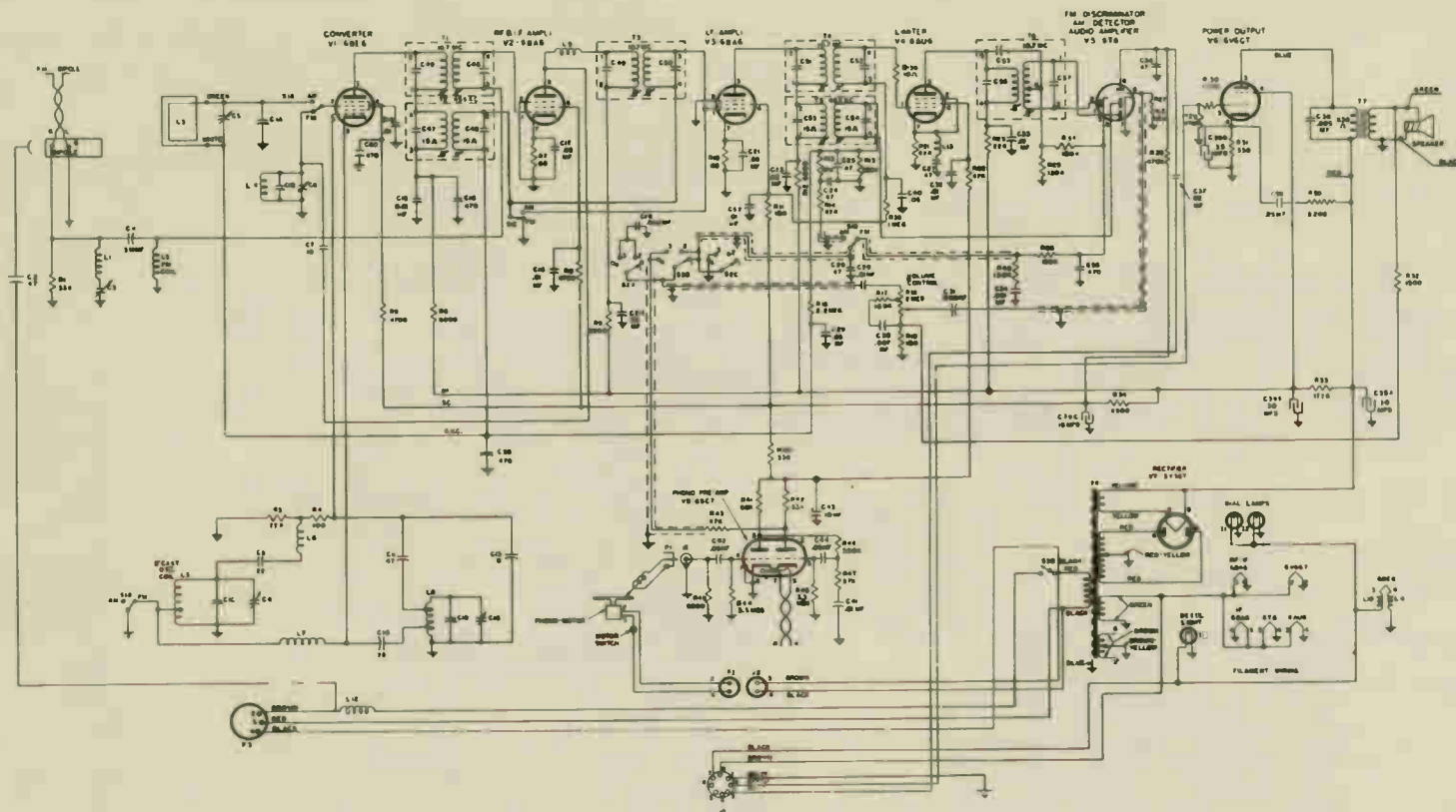
Table listing parts for the 16K1 radio, categorized by Miscellaneous, Electrolytic Condensers, Controls, Coils, Transformers, and Miscellaneous. It includes reference numbers, descriptions, and part numbers.

840 RADIO

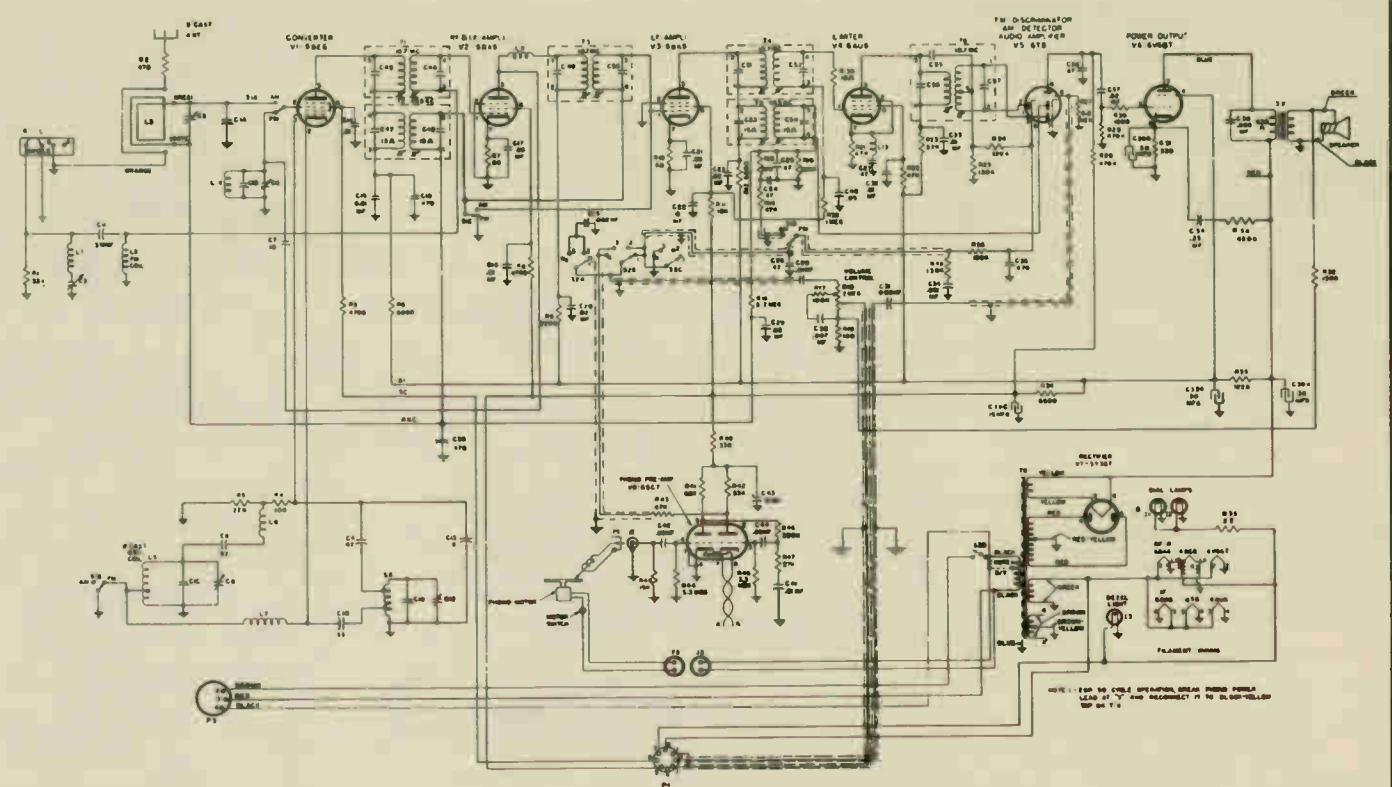
(See power supply Page 102.)



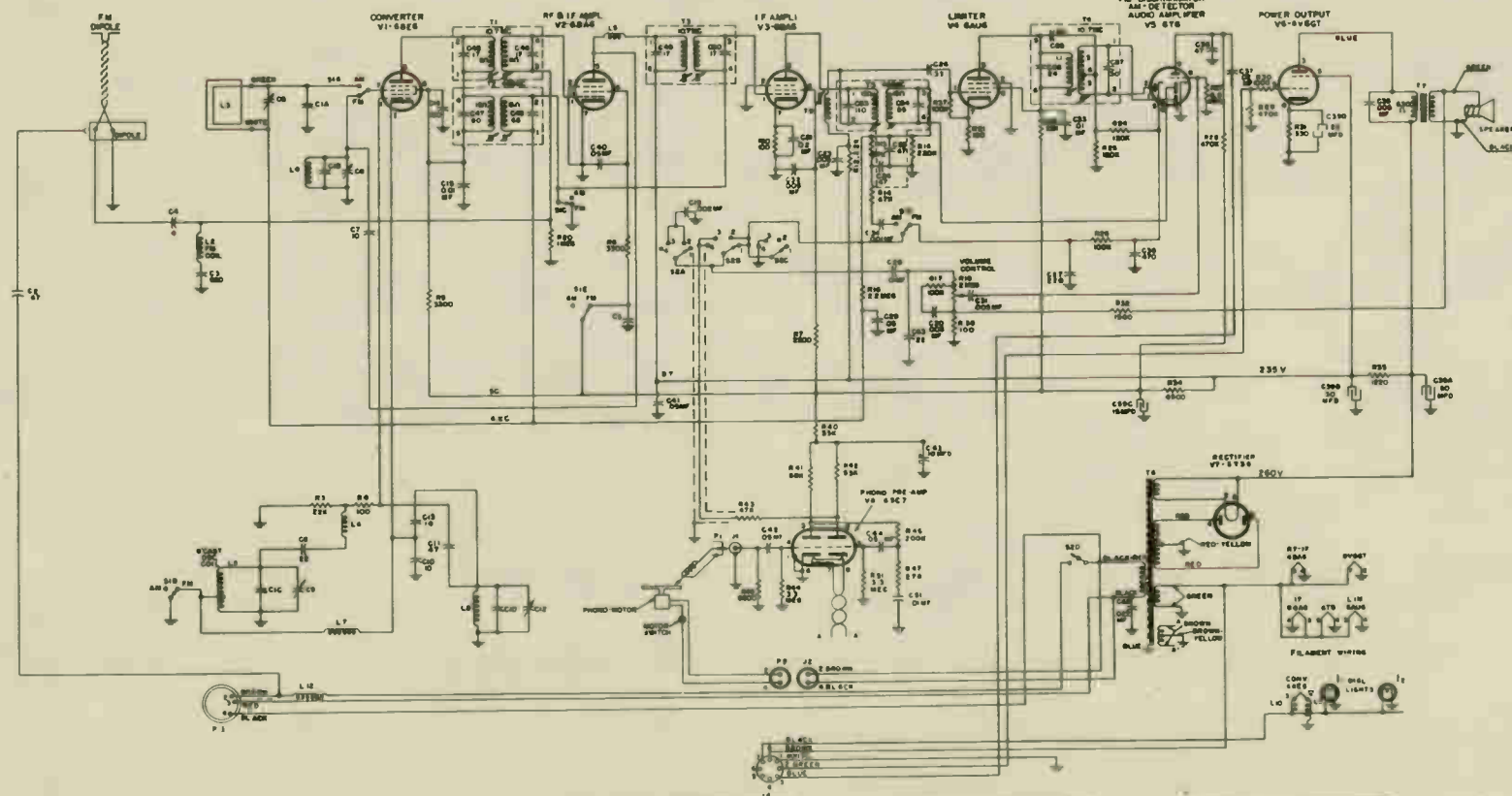
818 AND 12K1 RADIO



820 RADIO

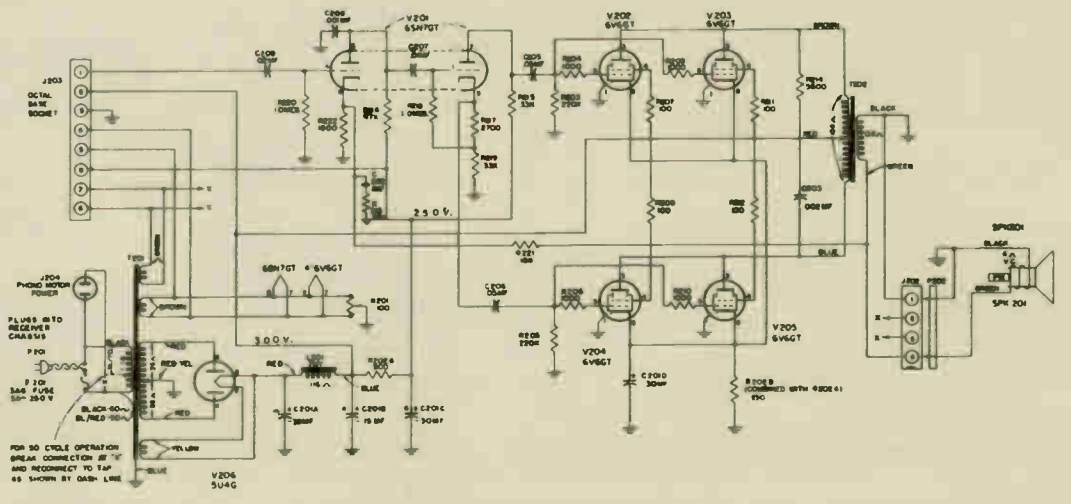


16K1 RADIO



840 RADIO POWER SUPPLY

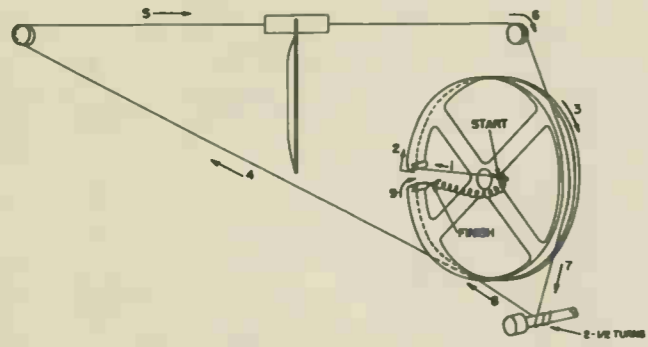
(See main radio schematic previous page.)



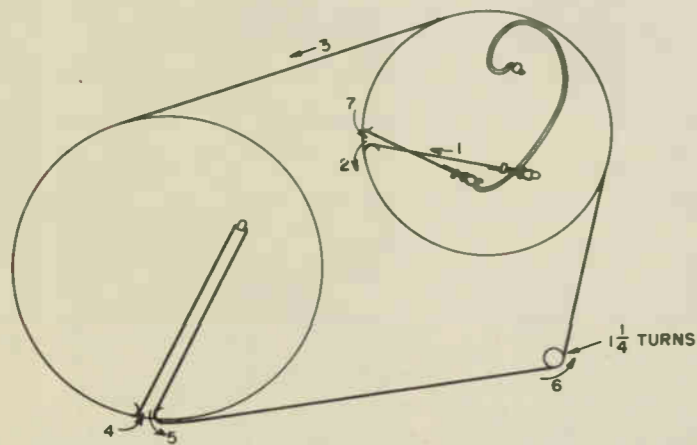
RADIO POWER SUPPLY SCHEMATIC



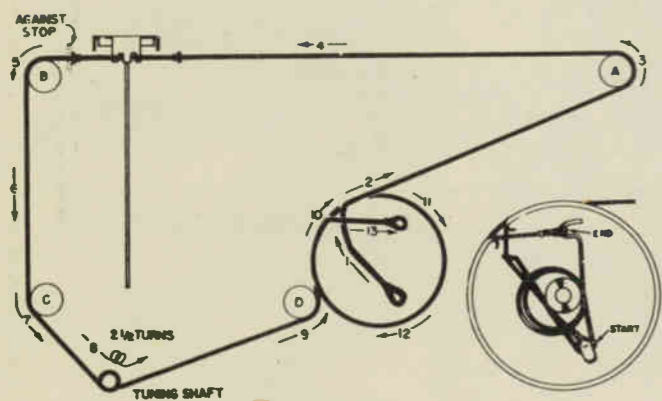
## DIAL CORD STRINGING



MODELS 12K1, 818, 820.

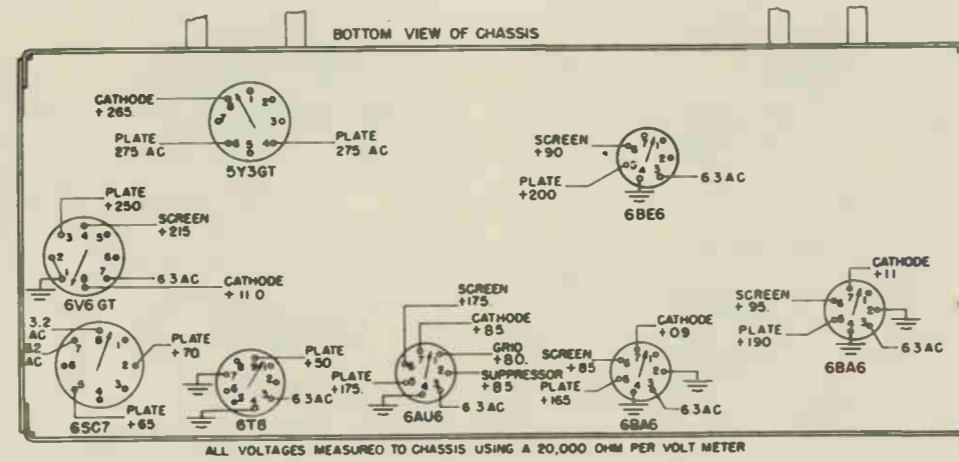


MODEL 16K1

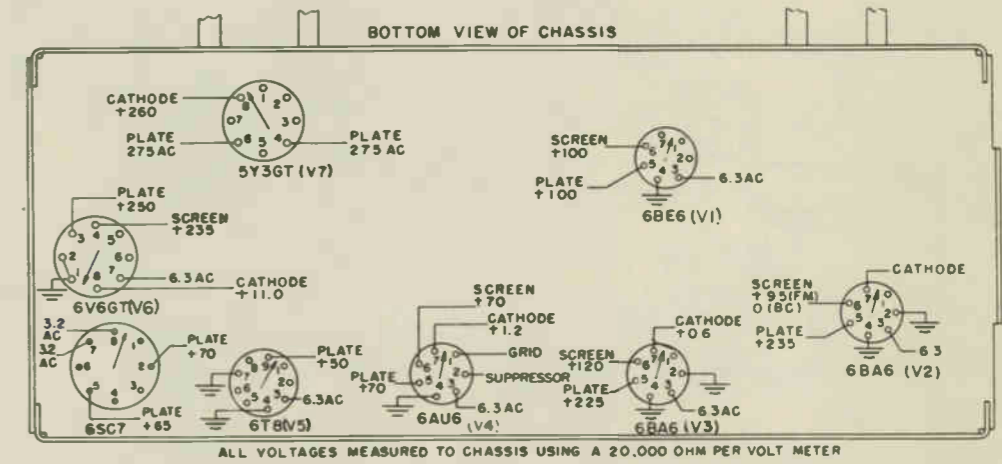


MODEL 840

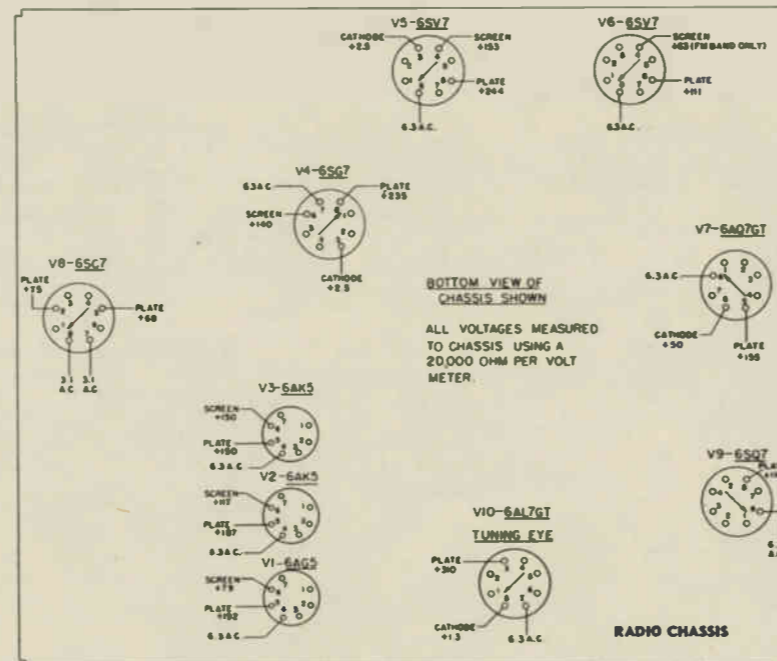
## SOCKET VOLTAGE DIAGRAMS



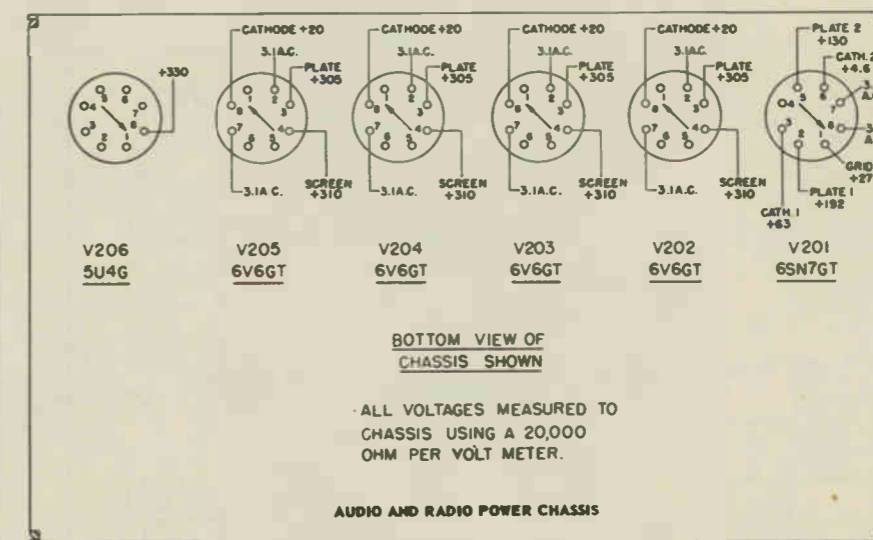
MODELS 12K1, 818, 820.



MODEL 16K1

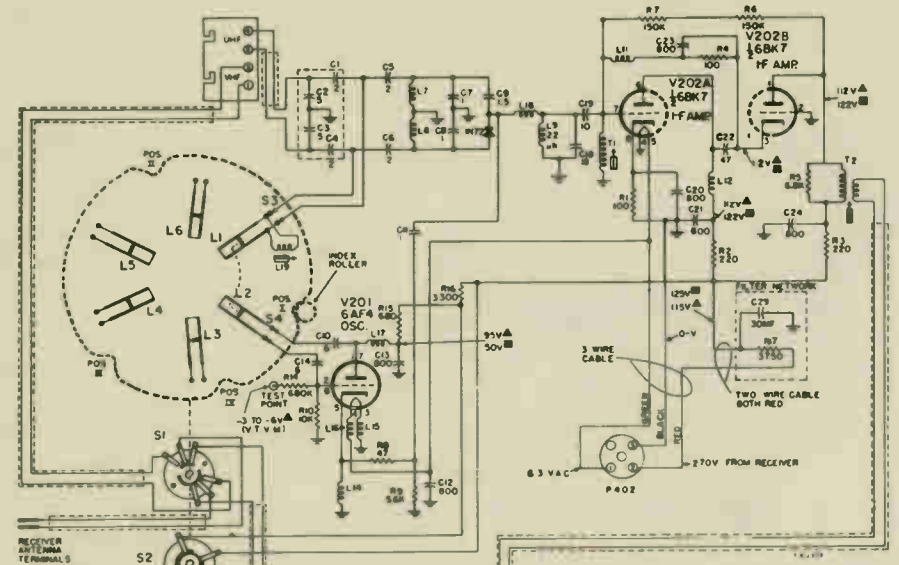


MODEL 840



# UHF TUNERS

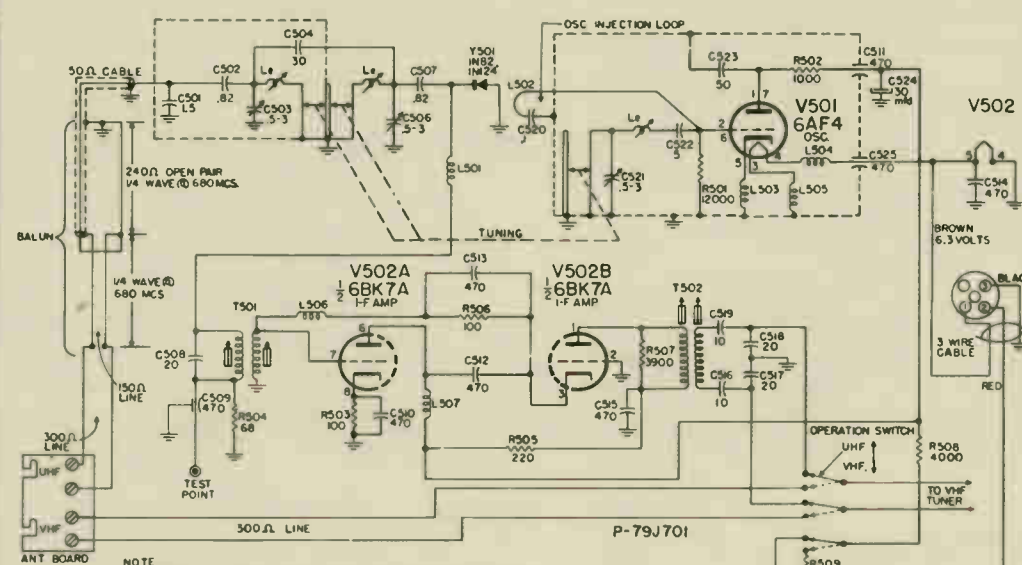
UHF - 70



SWITCH POSITIONS  
 POS 1 - CONTINUOUS OUTPUT TRANSF. T2 CON-  
 NECTED TO RECEIVER ANT.  
 POS 2 - UHF I VHF ANT. DISCONNECTED  
 POS 3 - UHF II VHF ANT. DISCONNECTED  
 POS 4 - VHF OUTPUT TRANSF. T2 DISCONNECTED  
 T2 SWITCHED INTO DROP B-4  
 VHF ANT. CONNECTED TO  
 RECEIVER ANT.

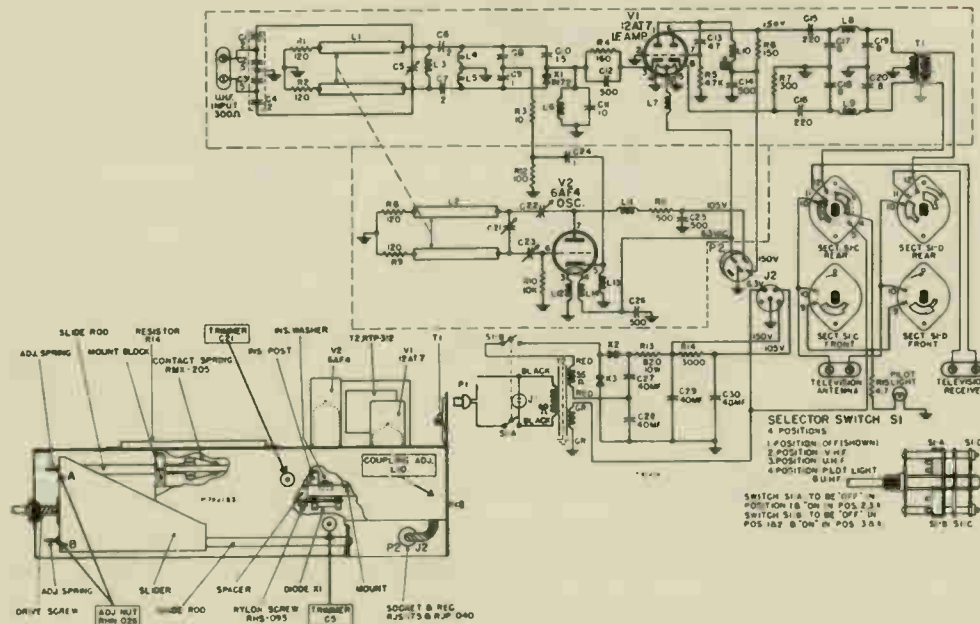
D.C. VOLTAGES @ 20,000 OHMS/VOLT, RTV LINE FROM TUBE PIN 6 -  
 VHF POSITION  
 UHF POSITION  
 RESISTORS IN OHMS - R-1,000,  
 CAPACITORS ARE MFD UNLESS OTHERWISE NOTED

UHF - 90



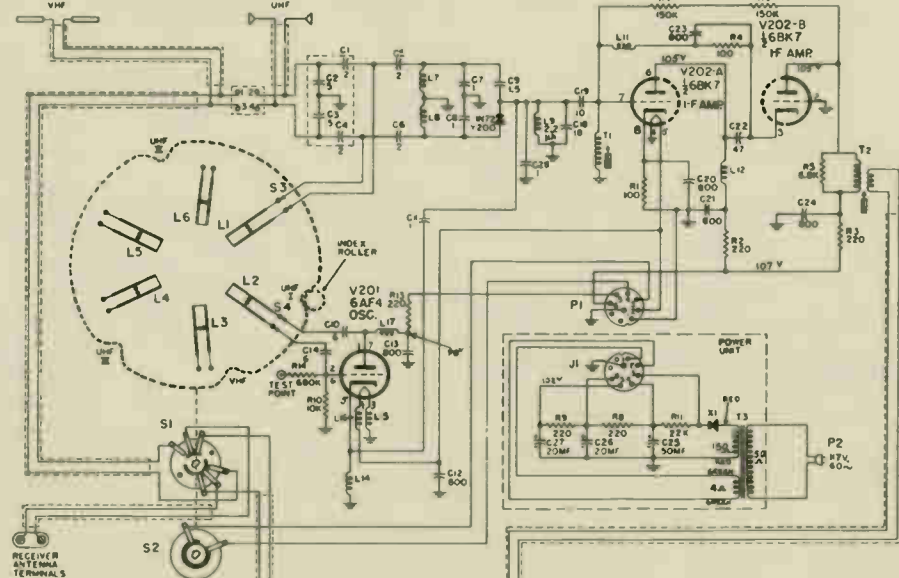
NOTE  
 CAPACITY IN MICRO MICRO FARADS UNLESS OTHERWISE MARKED.  
 RESISTANCE IN OHMS UNLESS MARKED  
 L = SHORT PIECE OF WIRE TO BE DRESSED  
 FOR PROPER TRACKING

UHF - 101



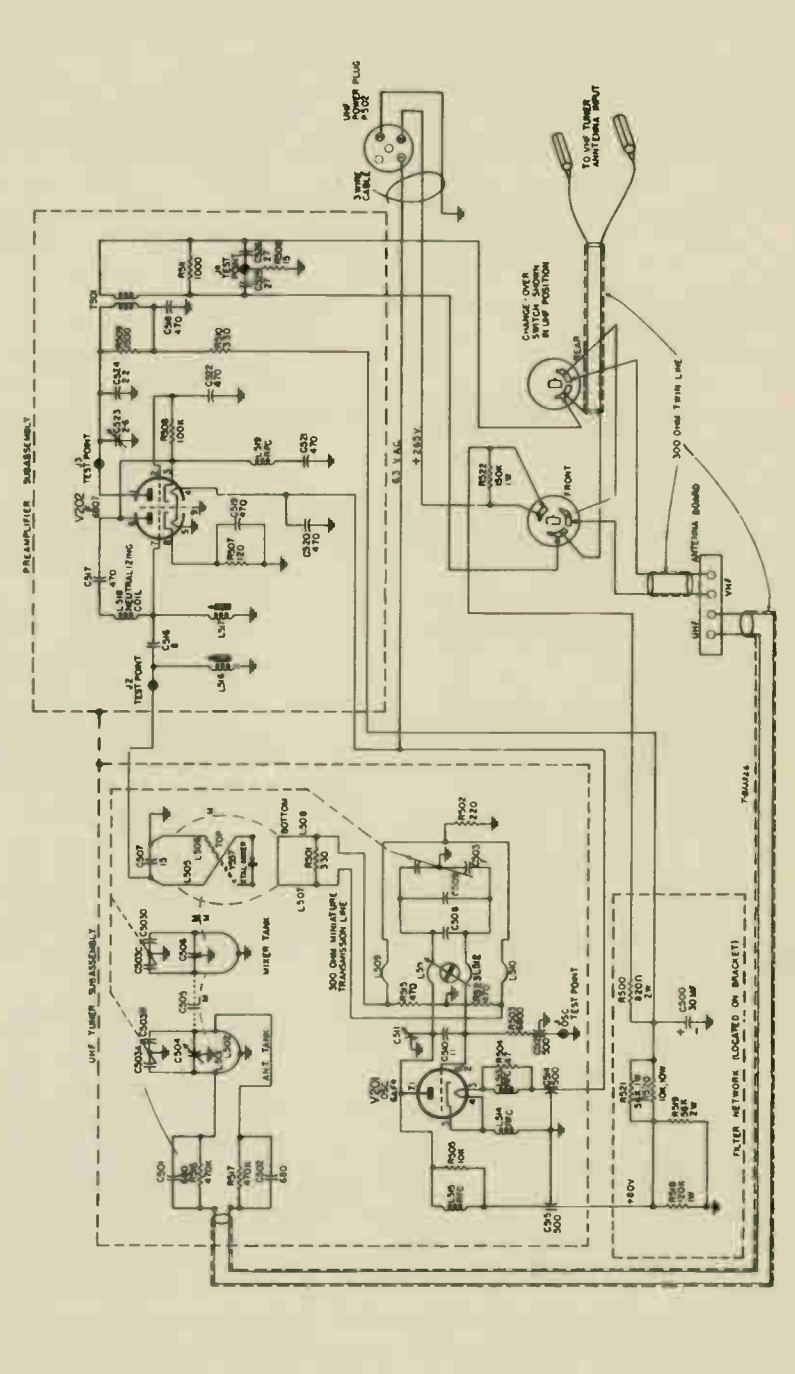
SELECTOR SWITCH S1  
 4 POSITIONS  
 1 POSITION - OFF (SHOWN)  
 2 POSITION - VHF  
 3 POSITION - UHF  
 4 POSITION - PLDT LIGHT  
 6.3V  
 SWITCH S1-A TO BE OFF IN  
 POSITION 1 OR IN POS. 2, 3  
 SWITCH S1-B TO BE OFF IN  
 POS. 1, 2 OR IN POS. 3, 4

UHF - 103

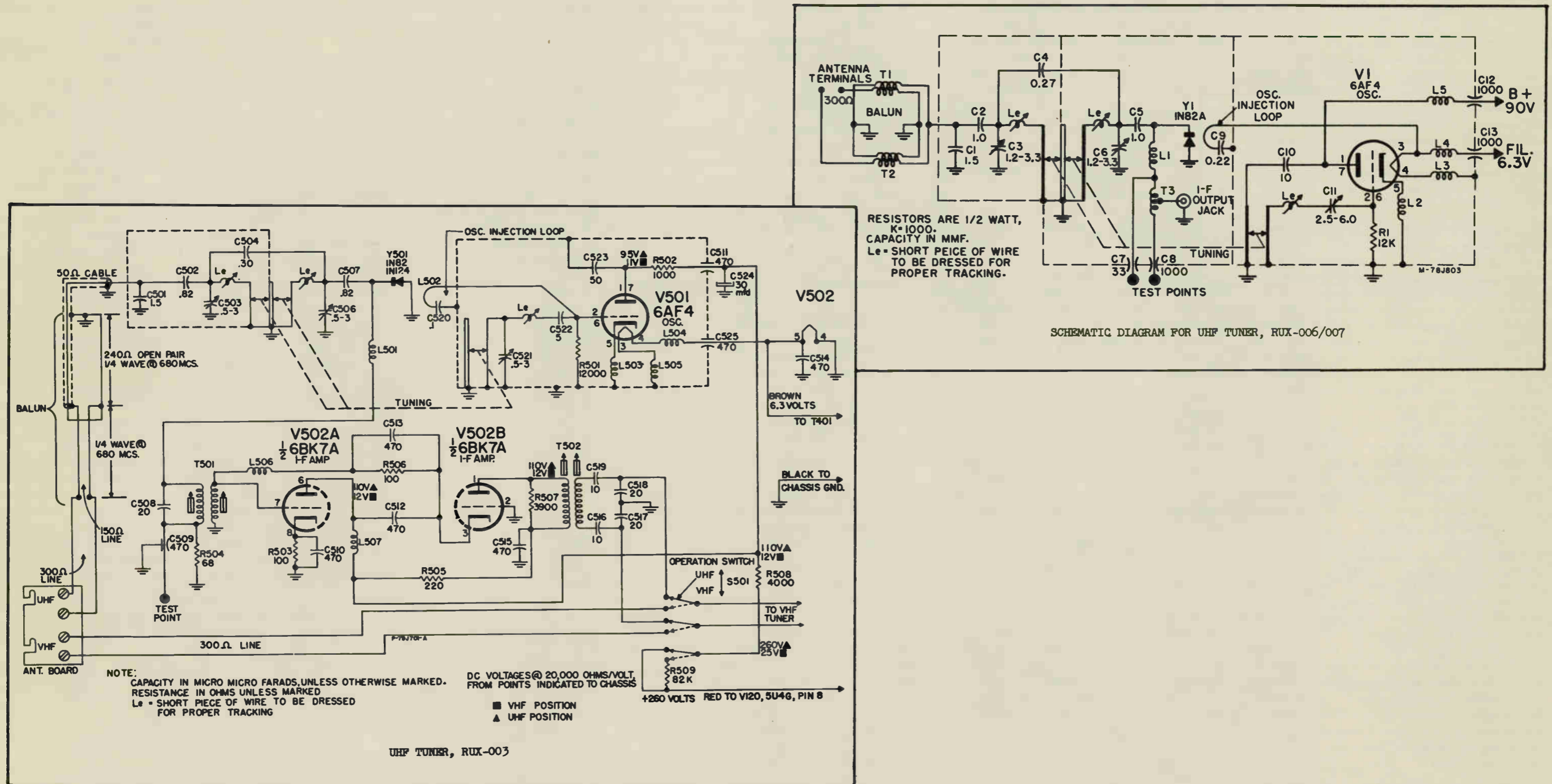


SWITCH POSITIONS  
 1ST UHF I OUTPUT TRANSF. DISCONNECTED  
 2ND UHF I DISCONNECTED TO RECEIVER ANT.  
 3RD UHF I DISCONNECTED TO RECEIVER ANT.  
 4TH UHF I OUTPUT TRANSF. T2 DISCONNECTED  
 T2 SWITCHED IN TO RECEIVER ANT.

UHF - 80



SWITCH POSITIONS  
 1ST UHF I OUTPUT TRANSF. DISCONNECTED  
 2ND UHF I DISCONNECTED TO RECEIVER ANT.  
 3RD UHF I DISCONNECTED TO RECEIVER ANT.  
 4TH UHF I OUTPUT TRANSF. T2 DISCONNECTED  
 T2 SWITCHED IN TO RECEIVER ANT.



# PRODUCTION CHANGES

## PRODUCTION CHANGES MODEL 801

In most cases the change can not be accurately identified with the serial number of the chassis. The order of listing below does not indicate the chronological order of the change.

1. **POWER TRANSFORMER, T14 and V23**-The original transformer, T14, supplied, gave insufficient B plus voltage (385 volts) when using a Type SY3GT rectifier tube, V23. This resulted in a low anode voltage of 7500 volts for the picture tube. To increase this voltage, a Type SY4G tube was substituted for the SY3G tube, V23. At approximately serial number 2500, a new transformer T14 having Stock No. RTP-040 was substituted, which gave the correct B plus voltage of 415 volts when a Type SY3G tube was used as V23. This B plus voltage gives an anode voltage to the picture tube of 8500 volts.

2. **TELEVISION TUNING TRIMMER C112**-For approximately the first 2000 receivers, the tuning trimmer C112 did not quite have the correct tuning range, making it necessary to add a fixed 10 mmf. capacitor C114 in series with it. The shunt capacitor C102 had a value of 4.7 mmf. Later production trimmer, C114, has the correct range. With this new value of trimmer, the shunt capacitor C112 was changed to 6.0 mmf. This shunt capacitor in a few receivers was merely a 5.0 mmf., while in most it will consist of two capacitors; a 5 mmf. and a 1.0 mmf. capacitor in parallel. The early production trimmer has a 1/4 inch O.D. shaft, while the late production trimmer is slightly larger and has a 3/16 inch O.D. shaft.

3. **TONE CONTROL, R69B**-The tone control R69B, on early production receivers was connected in series between the Volume Control R69A, movable arm, and C39. C72 was a 680 mmf. capacitor from C39 to ground. Hum in the audio dependent upon the tone control setting necessitated a revision as shown in the schematic.

4. **TUNED CIRCUIT, L20 and C89**-The capacitor, C89, was originally 240 mmf. and the coil, L20, was fixed-tuned and wound on a resistor form. This was later changed to 1000 mmf. and the coil turns were reduced and made variable, resulting in a high Q circuit. This change permitted adjustment of the trap.

5. **RESISTOR, R87**-This resistor was changed from 100,000 ohms to 330,000 ohms to prevent excessive beam current in the picture tube, V8. This excessive beam current caused the high voltage to be reduced when the Brilliance control was advanced to maximum with the result that the control reduced brightness at end of its clockwise travel instead of increasing brightness.

6. **RESISTOR, R47**-This resistor has been changed from 1/2 watt to a 1 watt size. In some cases, the original 1/2 watt resistor dissipation is exceeded, especially if the Width control iron core is nearly all the way in the coil, resulting in a reduction in the resistance value. This reduced resistance changes the waveshape across C29 so much that the horizontal multivibrator may lock in at half frequency or not lock at all. It may also result in the resistor burning out.

7. **CHANGE IN HORIZONTAL OUTPUT TRANSFORMER, T9-A** new design horizontal output transformer, T9, was used in late production receivers. This may be identified by the fact that it has two windings instead of the single winding design, as characterized the early production receivers. When the late production transformer is used, a 3900-ohm, 1-watt resistor must be added in series to the existing 6800 ohm, 1-watt resistor, R47. Do not use a single 1-watt resistor for this. The capacitor, C66, should be returned to ground when the new type transformer is used.

8. **HORIZONTAL MULTIVIBRATOR CATHODE SWITCHING** After the first 150 receivers were built, a shorting contact was added to the filament wiper of the Station Selector switch so as to stop the horizontal multivibrator as soon as the Station Selector was switched to "Radio" position. This connects the multivibrator cathode to ground through the filament circuit when switching to "Radio" so that "birdies" are not heard on the broadcast band as the television tubes cool off after switching from television to radio reception.

9. **SCREEN RESISTOR, R79**-This resistor was changed from an original 47,000 ohms to 33,000 ohms. This reduces the operating DC voltage on the plate of V7, and gives greater brightness.

10. **ADDITION OF C21-A** fixed 10 mmf. mica capacitor, C21, was added across C10 so that the trimmer C10 would peak at the center of its range.

11. **CHANGE IN R63**-The 330,000 ohm resistor, R63, was changed to 220,000 ohms so that the Vertical Hold control will operate near its mid-adjustment position.

12. **REMOVED OF R95**-To correct a transient which appeared in the vertical retrace as a white line at the top of the picture, the 2200 ohm resistor, R95, in series with capacitor, C37, was removed. The potentiometer, R58, was reconnected as a variable resistance as shown on the schematic.

13. **VALUE CHANGE OF C52**-The original capacity of C52 was 47 mmf. To improve vertical interlace, this capacitor was changed to 240 mmf.

14. **ADDITION OF TUNED CIRCUIT, L21 and C91-A** 15.75 kc tuned circuit was added to the cathode of the horizontal multivibrator, V11. This stabilizes the horizontal AFC circuit to the extent that it prevents picture wiggles on noise pulses and echoes. With this addition, the 240 mmf. capacitor, C56, should be changed to 150 mmf. and the 150,000 ohm resistor, R40, should be increased to 330,000 ohms. This prevents a white line at the left-center of the picture which may result with installation of L21-C91. With addition of L21, the capacitor, C30, was changed from a 40 mfd to a 1.0 mfd, and C92 was changed from 1.0 mfd to a .05 mfd.

15. **CONNECTION OF PRIMARY OF T11**-On early production receivers the primary of T11 was connected to a mid-top on choke L10. This connection caused a resonant condition to develop which affected the lower television bands. This was corrected temporarily by shunting a 47 mmf. capacitor between the midtop of L10 and ground. Later the primary of T11 was connected to the junction of L10 and C101 as shown on the schematic.

## PRODUCTION CHANGES MODELS 805, 806, 807 AND 809

(Early, T, S, U and W Versions)

1) **CHASSIS MARKINGS:** As production of these models proceeded, major production changes were identified by stamping a large letter on the chassis front apron. These letters are "T", "S", "U", or "W".

"T" VERSION: Change from a molded type horizontal output transformer T311 to a ceramic iron core type transformer T312. (See production change No. 9).

"S" VERSION: In addition to the "T" change a larger picture opening was incorporated into the cabinets. Chassis are marked "S". (See production change No. 16).

"U" VERSION: This change changed to a new Horizontal Automatic Frequency control and Automatic Gain control circuits. "U" also incorporates the "T" version changes.

"W" VERSION: This letter "W" is used to identify the change from a 6AU6 second RF amplifier (V2) to a 6AG5 second RF amplifier (V2). (See production change No. 15).

"T", "U", and "S" versions changes are also included in "W" version.

Note chassis marked BCF in addition to "U" or "W" have the broadcast filter added in the antenna circuit as described in Production Change No. 10.

2) **FOLD-OVER ON "T" VERSION RECEIVERS:** On "T" versions of these receivers, fold-over at the left edge of the picture when the horizontal hold control is set for best synchronization has been corrected in late production "T" versions by the following:

(a) Change R334 from 220K, to 560K, 1/2 watt resistor, Cat. No. URD-115.

(b) Connect a 12 mmf., 880 v., mica capacitor, C336, from the junction of R334 and C330 to B-, Cat. No. RCU-286.

(c) Disconnect R315 from 277 volt, B plus, and reconnect to the B plus boost voltage at the junction of C322 and L315.

(d) Change C315 from 68 mmf. to 220 mmf., mica, Cat. No. UCU-1036.

3) **AUDIO INSTABILITY (IN EARLY "T" VERSION RECEIVERS):** This appeared as tweets when operating the focus control at maximum clockwise rotation and has been cured in late production by reconnection of the 25L6GT (V19) screen by-pass capacitor, C367. On "T" version receivers, C367, ground connection was removed from the B - bus and connected to the junction of R352, R353, and S341.

(4) **TO IMPROVE THE VERTICAL LINEARITY:** R299 has been changed from 3K to 2.2K, 1 w. resistor. This change also centers the operation of the vertical linearity control.

(5) **HORIZONTAL LINEARITY "T" VERSION MODELS:** A transient oscillation which appears as wiggles on vertical running lines at the top one-half inch of the picture may be removed by shunting C324 (0.47 mfd.) with a 1200 ohm, 1/2w., carbon resistor (R339). C324 is the capacitor in series with the horizontal deflection coils.

(6) **IMPROVEMENT IN VERTICAL SYNC-EARLY AND "T" VERSIONS CHASSIS:** To improve vertical synchroniza-

tion under noisy conditions such as encountered in "fringe" areas, the following changes have been made in production:

(a) Short C265 with a bus wire.

(b) Remove V8-A grid resistor, R274 (2.2 meg.).

(c) Change value of R280 in plate circuit of V8-A from 8200 ohms to 39,000 ohms, 1/2w., carbon resistor, Cat. No. URD-087.

(d) Change value of C314 (coupler V11-A to V11-B) from 5000 mmf. to 1000 mmf., mica, Cat. No. UCU-052.

(e) Change the value of R311 (in grid of V11-B) from its 2.2 meg. to 470,000 ohms, 1/2w., carbon URD-113. R311 should be reconnected between pin 1 and pin 3 of V11-B.

(f) Change value of C293 (grid of V10-A) from .001 mfd. to a 150 mmf. mica capacitor, Cat. No. UCU-1532.

(7) **TO IMPROVE THE RF STABILITY WHEN OPERATING ON CHANNEL NO. 2 IN WEAK SIGNAL AREAS:** The following changes have been made in late production. When operating on Channel No. 2 with the contrast control near maximum clockwise, the picture may become streaked or blacked out entirely, due to regeneration. This may be corrected as follows:

(a) Replace or short out L206 with a piece of bus wire No. 20 or larger.

(b) At the rear of C213, the tuning capacitor is a terminal board mounted on the head-end unit. From the ground lug of this terminal board, connect a 5000 mmf. capacitor, C208, Cat. No. RCW-3014, to the main chassis. This main chassis ground may be made by adding a ground lug under the self-topping screw which holds the vertical sweep output transformer.

(8) **IMPROVED STABILITY OF HORIZONTAL SWEEP GENERATOR IN EARLY AND "T" VERSION RECEIVERS** A tuned circuit, L316, Cat. No. RLD-014, and capacitor C329, Cat. No. UCU-2568, is tuned to 15,750 cycles and will stabilize the blocking oscillator to reduce the effects of noise on sync.

For adjustment, see installation control adjustments, fly-wheel circuit.

L316 and C321 are added in the B plus supply of V21B as shown in schematics for "Early" and "T" versions. L316 is mounted at the rear of the chassis at the left-hand side, as shown below.

(9) **NEW TYPE TRANSFORMER ("T" VERSION):** In late production Model 805, 806, 807 and 809's, a new type horizontal sweep output transformer was employed. The new transformer uses a ceramic iron core. All receivers using this core will be identified by a large "T" ink-stamped on the chassis front apron. Receivers ink-stamped "U" "S" or "W" on the chassis front apron have this new transformer and other new developments incorporated, as explained below.

On early production receivers, a 25Z6GT damper tube was used. Because of the higher peak inverse voltage of this new transformer, it is necessary to use a 25W4GT damper tube which has a higher peak inverse voltage rating.

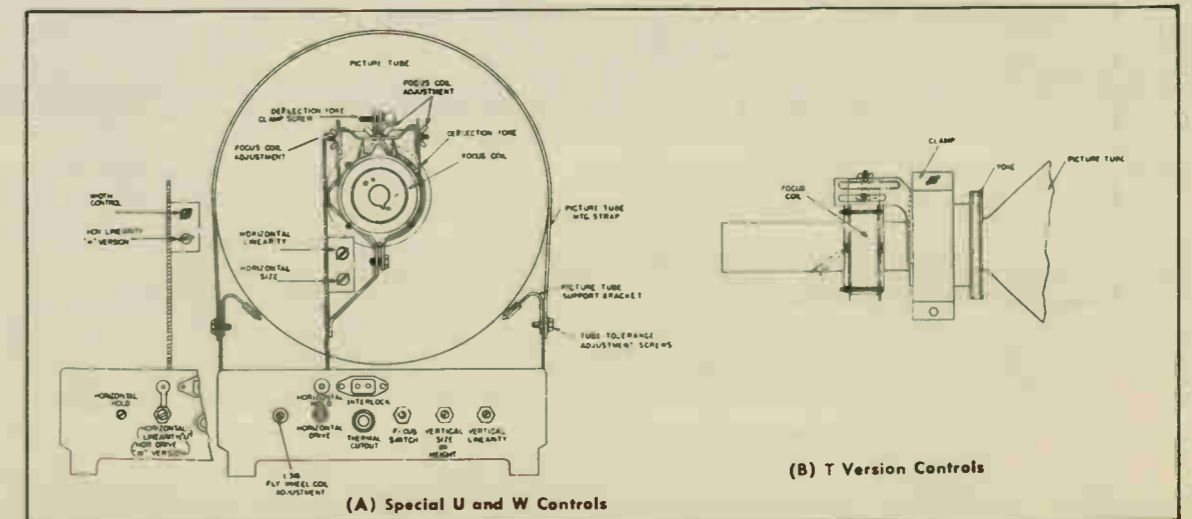
(10) **BROADCAST INTERFERENCE:** To eliminate interference from strong broadcast signals, which appear as RF interference in the picture, choke L259 was removed and B - bus was connected to B - bus directly with a short piece of bus wire. A broadcast filter has been added in the antenna input circuit, and is connected as shown on the schematic diagram for "U" and "W" versions.

(11) **NEW HORIZONTAL AUTOMATIC FREQUENCY CONTROL CIRCUIT AND AUTOMATIC GAIN CONTROL CIRCUIT ("U" AND "W" VERSIONS):** Chassis incorporating this change can be identified by the large "U" or "W" ink-stamped on the chassis front apron. (See schematic).

(12) **VOLTAGE DOUBLER CHANGE:** "Early" production receivers used a full-wave voltage doubler type of transformerless power supply. This is shown in schematic. "T" versions and "U" and "W" versions were changed to a half wave voltage doubler type of circuit shown in schematic diagrams.

(13) **SHIPMENT WITH PICTURE TUBE INSTALLED:** Late production receivers were shipped from the factory with the picture tube installed. Another picture tube mounting strap was added on these models to secure the picture tube. Though this extra strap does not have to be removed when the receiver is installed, it is not necessary to replace it when the picture tube has been removed or replaced, unless the receiver is to be reshipped.

(14) **LOW SENSITIVITY, EARLY PRODUCTION:** A few early production models were built with the plate of V6



# PRODUCTION CHANGES

(3rd video IF) amplifier connected to B plus supply through a 10K resistor, R278, or to B plus supply through R278 and choke L248 in parallel.

To improve the sensitivity of these models, R278 should be removed and pin 5 of V6 should be connected to the junction of R253, C253, and R252 through choke L248. Catalog number for L248 is RLF-027.

(15) SECOND RF AMPLIFIER ("W" VERSION): Early production chassis used a 6AU6 second RF amplifier V2. This tube was replaced by a 6AGS tube in later production. Connections for V2, 6AU6, "U" versions are the same as connections for V2, 6AU6 of "T" versions, on schematic.

Chassis with (V2) second RF amplifier 6AGS are stamped "W".

(16) CHANGE TO LARGER PICTURE ("5" VERSION): Models 806 and 809 stamped with a large 5 on the chassis front apron indicate a cabinet change from a picture size  $8\frac{1}{2}"$  wide, by  $6\frac{3}{8}"$ , to a picture size of  $9\frac{1}{2}"$  by  $7\frac{1}{2}"$ . Model 807 changed to  $9\frac{1}{2}"$  x  $7\frac{1}{2}"$  picture opening at the same time the "W" changes were incorporated. The left and right sides of the new large picture are now arcs of a circle  $9\frac{1}{2}"$  in diameter.

(17) FLUTTER ON STRONG SIGNALS "U" AND "W" VERSIONS: Intermittent flutter (similar to low frequency airplane flutter) of picture brilliance on "U" and "W" versions, in very strong signal areas, which requires the contrast control be set at minimum, has been corrected in production as follows:

Change C255 from a .05 mfd. capacitor to a .5 mfd. capacitor, 200 v., Cat. No. RCC-016. This capacitor is in the automatic gain control circuit.

Change R280 plate dropping resistor of V8A from 39,000 ohms to 18,000 ohms,  $\frac{1}{2}$  watt, Cat. No. URD-079.

(18) LINEARITY CONTROL ("U" VERSION): "U" version chassis were built with the potentiometer R402 acting as both linearity and drive control. L315 linearity control was removed and the junction of T312 terminal one and R303 was connected directly to the junction of C412, R303 and pin 3 of V15. Capacitor C335 was removed.

On "W" versions, L315 and C325 were added to give better linearity control and are connected as shown in schematic.

## PRODUCTION CHANGES MODEL 810

1. TUNING DRIVE: The early production rubber bushing on the tuning shaft used to drive the tuning condenser caused some slipping and backlash. This has been replaced by a new rubber bushing, Stock No. RMW-054, to correct the trouble. The early production bushing had Stock No. RMW-046.

2. HI-VOLTAGE FAILURE: Failure of insulator posts used for mounting the 8016/1B3GT tube socket was caused by corona leakage and eventually caused falling off of the high anode voltage. These early production posts were textolite Stock No. RII-014. These should be replaced by ceramic posts, Stock No. RII-017.

3. CONTRAST CONTROL TOO CRITICAL: In strong signal strength areas, it required adjustment at a critical point of

the contrast control taper. This was corrected by changing the voltage applied across the contrast control as follows:

Change R74 to a 82,000 ohm resistor, R50 was one resistor of 120,000 ohms, this now becomes two resistors of R50 82,000 ohms and R108 33,000 ohms with the bias for the contrast control taken off at the junction of these two resistors. See schematic.

4. ADDITION OF RECTIFIER TO OSCILLATOR FILAMENT: When the filament of the Type 12AT7 oscillator tube section was operated on 6.3 volts AC, hum modulation was introduced which became objectionable in some cases on the high channels. This was eliminated by operating the filament of V2A on DC, which was provided by rectifying the filament voltage by a full-wave selenium rectifier, SR1 (GE Cat. No. RER-003) and filtering the output by a 2000 mfd. capacitor, C102 (GE Cat. No. RCE-083). The choke L6 (GE Cat. No. RLI-005) and capacitor C101 (GE Cat. No. RCW-3014) were added to eliminate the possibility of any regeneration at the RF frequencies being introduced by this filament lead.

5. DRIFT OF HORIZONTAL HOLD ADJUSTMENT: The very early production receivers showed a tendency to warm up drift in reference to the Horizontal Hold Control. This condition was corrected by the following component changes:

(1) Removed R53 (10,000 ohms) resistor from across plate winding of T16. This requires removal of shield can on T16.

(2) Remove C46 (120 mmfd) which is in parallel with C49.

(3) Replace R50 (270,000 ohms) with two resistors in series. One resistor is R50 82,000 ohms from trimmer C49 to junction. Another resistor is R108 33,000 ohms and will go from junction to ground. R74 (see 7) will come off junction.

(4) Change R52 (100,000 ohms) to 47,000 ohms.

(5) Change R51 from 3.3 megohm,  $\frac{1}{2}$  watt rating, to same value 1 watt rating and mount resistor on full length leads so as to have resistor body hung vertically as far down away from chassis as possible. Mounting of this resistor is very important.

(6) Change R48 (560,000 ohms) to 1 megohm; All of the above mentioned resistors are critical as to temperature coefficient and should be ordered from General Electric replacement stock.

(7) Change R74 (470,000 ohms) to 82,000 ohms.

(8) Change R44 from 82,000 ohms,  $\frac{1}{2}$ w., to 2 watt rating.

(9) Change R45 to 100,000 ohms, 1 watt (Cat. No. URE-097), and reconnect R45 to high B plus (360v.) as shown on schematic.

(10) Change R47 to 24,000 ohms,  $\frac{1}{2}$  watt (Cat. No. URD-1082). After these changes are incorporated, it will be necessary to reset the horizontal blocking oscillator frequency. Following is the procedure:

a. Connect a VTVM to measure the voltage from the junction of R74 and potentiometer R73 to ground.

b. Tune the receiver to any suitable television signal.

c. Set the front panel Horizontal Hold Control R46 to the approximate mid-point of its resistance range. Then adjust

the iron core of the blocking oscillator coil T16 and the setting of the horizontal frequency control trimmer C49 to bring the picture into horizontal sync and to develop approx. -12 volts across the contrast control as measured on the VTVM. The iron core adjustment and the trimmer setting are interlocking and, therefore, it is necessary to adjust each of these controls in turn to bring the picture in sync and also obtain -12 volts.

d. At the completion of the above adjustments the range of the front panel horizontal hold control should be checked. The sync range should fall in the approximate center of the control and it should be possible to throw the circuit out of sync by turning the control to either end of its range. Receivers having the above changes made can be identified by noting that red glyptal cement has been applied on one of the nuts holding the shield can of T16.

6. VIDEO "TWEET" RESPONSE ON CHANNEL No. 7: A cross-hatch pattern on Channel No. 7 set up by local radiation from the 8th harmonic of the 21.9 mc (early production) sound is cured as follows:

(1) Change ground connection of C41 (.01 mfd.) from pin No. 1 of V6 socket to the ground terminal on the adjacent terminal board.

(2) Add copper ground strap to pin No. 5 of V18 socket with chassis ground as close to socket pin as possible.

(3) Change ground connection of C69 (5000 mmf.) from pin No. 1 of V18 socket to pin No. 5 of same socket.

(4) Change value of R78 (56,000 ohms) to 150,000 ohms.

7. CHANGE IN 2ND AND 3RD VIDEO IF TRANSFORMER: The plate winding of the video IF transformers, T12 and T13, has been increased in inductance to compensate for a recent lowering in the plate capacity of the Type 6AU6 tube. In early production receivers where the plate winding inductance is low, if a low capacity 6AU6 tube is substituted, the 26.3 mc marker will ride up too far on the selectivity curve. This condition can usually be corrected without changing the IF transformer by pushing the plate lead in this winding close to the coil form so as to increase the distributed capacity and thus compensate for the tube capacity. In the late production receivers with the higher inductance IF transformers, if a high capacity Type 6AU6 tube is used, it may be necessary to spread turns on the plate side of the transformer to affect proper tuning.

8. V2A OSCILLATOR DRIFT: The tube socket for tube V2 originally specified tube socket Stock No. RJS-120. This should be changed to read Stock No. RJS-127. This change in socket composition reduces warm-up drift considerably.

9. VIDEO AND SYNC AMPLIFIER LIMITING: On some receivers it was not possible to drive the picture tube to full contrast before the sync pulse would be limited with a resultant loss in vertical and horizontal sync. This was corrected in production by the following changes:

(1) Change R21 to 5600 ohms,  $\frac{1}{2}$  watt.

(2) Add resistor R109, 1000 ohms,  $\frac{1}{2}$  watt, between Pins 6 and 7 of V11 after removing the bus wire connecting these pins.

10. VERTICAL HOLD CONTROL RANGE: To give better

vertical hold control range and sync, the following changes were made in production.

(1) Remove R38 and connect R37 to Pin 2 of V11 as shown in the schematic.

(2) Change C39 to a .05 mf., 400 volt capacitor.

(3) Change C40 to a .001 mf., 400 volt capacitor, and connect between junction of C37 and R36, and Pin 1 of V9.

(4) Change C37 and C38 to .01 mf., 400 volt capacitors. These were originally .01 mf., 200 volt capacitors.

(5) Disconnect the B plus from Pin 2 of V11. Connect a resistor R111, 1600 ohms,  $\frac{1}{2}$  watt, from pin 2 of V11 to pin 4 of V10, as shown in the schematic.

(6) Remove Capacitor C41, .01 mf., 200 volt, from junction of R28 and R29. Connect a capacitor C41, .001 mf., 400 volts, from pin 4 of V9 to ground.

(7) Change Resistor R28 to 82,000 ohms,  $\frac{1}{2}$  watt.

(8) Change C30 to a .002 mf., 600 volt capacitor.

(9) Change C31 to a .062 mf., 600 volt capacitor. When these changes are made, it is necessary to check the vertical hold control to see whether it is possible to go through the 60 cycle speed. This 60 cycle speed setting should be at least 70 degrees from either end of the control. If the 60 cycle point is closer than 70 degrees from the CCW end of the control, or if the 60 cycle point cannot be reached at the CCW end of the control, a resistor, R110, 24,000 ohms,  $\frac{1}{2}$  watt, should be inserted between R28 and R29 and the control rechecked. It should always be possible to pull the multivibrator out of sync at the maximum CW end of the control, but it may not always be possible to pull it out of sync at the CCW end of the control.

11. BLOOM: This is caused by a difference in modulation level of the television signal, such as is encountered when switching from one television camera to another. This has been corrected in the Model 810 receiver by the following changes:

(1) Connect a 270,000 ohm,  $\frac{1}{2}$  watt, resistor, R112, between the yellow lead connected to pin 11 of the picture tube and the center tap of the brightness control, R95.

(2) Connect a .1 mf. capacitor, 600 volts (C102) between yellow lead connected to pin 11 of picture tube and the junction of R95 and the red B plus line.

12. AUDIO IF FREQUENCY CHANGE TO 21.8 MC: All Model 810 receivers marked with 11 in a circle in green ink on the chassis and on the carton, and subsequent Model 810 receivers will be aligned to 21.8 mc. This measure was taken to eliminate the video interference of a strong Washington, D.C. FM station operating at 93.9 mc beating with the Channel No. 4 video carrier (67.25 mc), and forming an IF frequency which showed on the screen as a herringbone pattern.

## PRODUCTION CHANGES MODELS 817 & 821

("T", "S", "U" & "W" VERSIONS)

NOTE: The circuit of the receiver passed through various stages and in order to easily identify the circuit contained in an individual chassis, it was marked with a letter according to the following designations:

"T" - Early production.

"5" - "T" version plus large picture frame.

"U" - "T" version plus incorporation of a new efficient AFC circuit and AGC.

"W" - "U" version plus replacement of 2nd RF amplifier tube 6AU6 by a 6AG5 tube.

1) FOLD-OVER ON "T" VERSION RECEIVERS: On "T" versions of these receivers, fold-over at the left edge of the picture when the horizontal hold control is set for best synchronization has been corrected in late production "T" versions by the following:

a) Change R334 from 220K, to 560K,  $\frac{1}{2}$  watt resistor, Cat. No. URD-115.

b) Connect a 12 mmf. 880 v., mica capacitor, C336, from the junction of R334 and C330 to B-, Cat. No. RCU-286.

c) Disconnect R315 from 277 volt, B plus, and reconnect to the B plus boost voltage at the junction of C322 and L315.

d) Change C315 from 68 mmf. to 220 mmf., mica, Cat. No. UCU-1036.

2) TO IMPROVE THE VERTICAL LINEARITY: R299 has been changed from 3K to 2.2K, 1w. resistor. This change also centers the operation of the vertical linearity control.

3) HORIZONTAL LINEARITY "T" VERSION MODELS: A transient oscillation which appears as wiggles on vertical running lines at the top one-half inch of the picture may be removed by shunting C324 (0.47 mfd.) with a 1200 ohm,  $\frac{1}{2}$ w., carbon resistor (R339). C324 is the capacitor in series with the horizontal deflection coils.

4) IMPROVEMENT IN VERTICAL SYNC - "T" VERSION CHASSIS: To improve vertical synchronization under noisy conditions such as encountered in "fringe" areas, the following changes have been made in production:

a) Short C265 with a bus wire.

b) Remove V8-A grid resistor, R274 (2.2 meg.).

c) Change value of R280 in plate circuit of V8-A from 8200 ohms to 39,000 ohms,  $\frac{1}{2}$ w., carbon resistor, Cat. No. URD-087.

d) Change value of C314 (couples V11-A to V11-B) from 5000 mmf. to 270 mmf. mica, Cat. No. UCU-052.

e) Change the value of R311 (in grid of V11-B) from its 2.2 meg. to 470,000 ohms,  $\frac{1}{2}$ w., carbon URD-113. R311 should be reconnected between pin 1 and pin 3 of V11-B.

f) Change value of C293 (grid of V10-A) from .001 mfd. to a 150 mmf. mica capacitor, Cat. No. UCU-1S32.

5) TO IMPROVE THE RF STABILITY WHEN OPERATING ON CHANNEL NO. 2 IN WEAK SIGNAL AREAS: The following changes have been made in late production. When operating on Channel No. 2 with the contrast control near maximum clockwise, the picture may become streaked or blacked out entirely, due to regeneration. This may be corrected as follows:

a) Replace or short out L206 with a piece of bus wire No. 20 or larger.

b) At the rear of C213, the tuning capacitor is a terminal board mounted on the head-end unit. From the ground lug of this terminal board, connect a 5000 mmf. capacitor, C208, Cat. No. RCW-3014, to the main chassis. This main chassis ground may be made by adding a ground lug under the self-

# PRODUCTION CHANGES

tapping screw which holds the vertical sweep output transformer.

**6) IMPROVED STABILITY OF HORIZONTAL SWEEP GENERATOR "T" VERSION RECEIVERS:** A tuned circuit, consisting of L316, Cat. No. RLD-014, and capacitor C329, Cat. No. UCU-2568, is connected in series with the B plus and is tuned to 15,750 cycles. This will stabilize the blocking oscillator to reduce the effects of noise on sync.

**8) BROADCAST INTERFERENCE:** To eliminate Interference from strong broadcast signals which appear as RF Interference in the picture choke L259 was removed and B - bus was connected to B - bus directly with a short piece of bus wire. A broadcast filter has been added in the antenna input circuit (RLX-027), and is connected as shown on the schematic diagram.

**9) NEW HORIZONTAL AUTOMATIC FREQUENCY CONTROL CIRCUIT AND AUTOMATIC GAIN CONTROL CIRCUIT:** Chassis incorporating this change can be identified by the large "U" ink-stamped on the chassis front apron.

**10) SHIPMENT WITH PICTURE TUBE INSTALLED:** Late production receivers were shipped from the factory with the picture tube installed. Two blocks were added on these models to secure the picture tube. Though these blocks do not have to be removed when the receiver is installed, it is not necessary to replace them when the picture tube has been removed or replaced, unless the receiver is to be reshipped.

**11) SECOND RF AMPLIFIER ("U" VERSION):** A few early production "U" version chassis used a 6AU6 second RF amplifier V2. This tube was replaced by a 6AG5 tube in later production. Connections for V2, 6AU6, early production "U" versions, are the same as connections for V2, 6AU6 of "T" version, as shown on schematic diagram for "T" version.

**12) PICTURE CENTERING:** Receivers using the large size mask might encounter centering difficulties. The picture cannot be centered to the right sufficiently far without neck shadowing. To remedy this condition, the following circuit change is suggested which will pass sufficient DC current through the horizontal deflection coils to move the picture about one inch to the right.

Disconnect the end of resistor R268 (at plate of V8-B) that ties to B plus and then reconnect it to the junction of C324 and the horizontal deflection coil. This coil is placed within the current path from B plus to the resistor R268 and the addition of this DC current helps to correct the centering defect.

**13) PICTURE TUBE SHIPPING HARNESS, MODEL 817:** The picture tube is pressed against the mask by means of a cable harness. This is made of stainless steel and may become magnetized sufficiently so as to affect the picture by shifting or distorting it. In order to prevent this undesired effect, it is recommended that this cable harness be removed and discarded at the time that the receiver is installed.

**14) SWIVEL FOCUS COIL, MODEL 821:** A new deflection yoke and focus coil assembly is incorporated in the "U"

and "W" versions of this receiver. The focus coil is fastened to a bracket which can be moved in any direction with respect to the neck of the picture tube. This permits more flexibility in centering and focusing the picture.

**15) FLUTTER ON STRONG SIGNALS ("U" & "W" VERSIONS):** Intermittent flutter (similar to low frequency airplane flutter) of picture brilliance on "U" and "W" versions, in very strong signal areas, which requires the contrast control be set at minimum, has been corrected in production as follows:

Change C255 from 0.05 mfd. capacitor to 0.5 mfd. capacitor, 200 v., Cat. No. RCC-016. This capacitor is in the automatic gain control circuit.

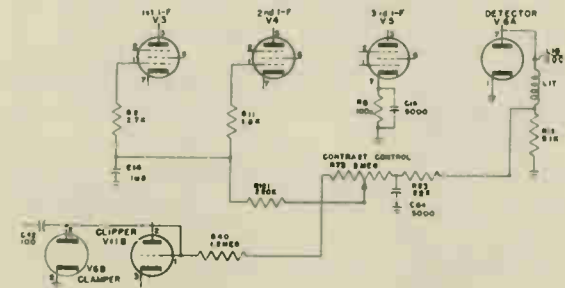
Change R280 plate dropping resistor of V8A from 39,000 ohms to 18,000 ohms, 1/2 watt, Cat. No. URD-079.

## PRODUCTION CHANGES MODEL 820

**1. AUDIO IF REGENERATION:** Audio regeneration which causes a click in the speaker as the tuning control is tuned through the station can be eliminated by the use of a 5000 mmf. capacitor, RCW-3014, across the audio IF B plus lead. This capacitor is connected between the B plus and ground terminals at the terminal board located between the limiter tube socket, V18, and the discriminator transformer, T19.

**2. AUTOMATIC GAIN CONTROL (AGC):** This circuit is used to make for greater ease in operation, as it eliminates to a large extent the necessity of changing the Contrast control each time that a stronger or weaker station is selected. It always produces a picture even in the extreme minimum setting and does not tend to overload on strong signals when in the maximum contrast position.

Chassis using AGC will be identified by the letter "R" stamped in ink, located on the chassis front apron and adjacent to the Contrast-Brightness control shaft.



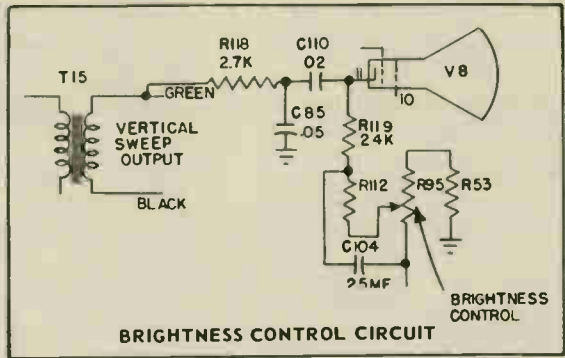
AGC DIAGRAM (R - CHASSIS)

**3. AUDIO FREQUENCY RESPONSE:** In order to extend the high frequency audio response and to reduce some of the "boom" base compensation, the following components should be removed:

- C87, .01 mfd. paper capacitor (Cat. No. UCC-630).
- C114, 1000 mmf. mica capacitor (Cat. No. UCU-052).
- R96, 82,000 ohm resistor (Cat. No. URD-095).

**4. REMOVAL OF RETRACE LINES:** This circuit is used to eliminate the need for readjustment of the Brightness or Contrast control to remove retrace lines from the background

of the picture when a change in cameras or program material takes place at the transmitter. The circuit is shown below.



**5. NEW HORIZONTAL SWEEP OUTPUT TRANSFORMER:** In late production receivers the Horizontal Sweep Output Transformer was changed from the molded coil and laminated iron core type to an open coil and ceramic iron type core. In this new type the danger of insulation breakdown is greatly reduced. The non-metallic core is composed of iron oxides embedded in a ceramic base. The core losses at the comparatively high scanning frequency of 15,750 cps are very low because the magnetic energy absorbed by the iron core is extremely small. The high voltage tertiary winding is wound over the primary and secondary winding, increasing its distance to the core, and further minimizes the probability of insulation breakdown and corona effects.

All receivers incorporating this new transformer will have a letter "T" stamped on the front apron of the chassis. This letter supersedes the "R" stamping (see paragraph No. 2).

**6. DRESS OF PICTURE TUBE ANODE LEAD:** The hi-voltage lead connecting between the picture tube anode and the 1B3GT rectifier tube should not touch the aquodag coating of the picture tube. This tube should be so oriented that it does not pull this lead out. In order to avoid any corona, this hi-voltage lead should be dressed away as far as possible from any surrounding object.

## PRODUCTION CHANGES MODEL 830

**CHASSIS IDENTIFICATION:** To identify the receiver chassis incorporating major modifications in production, the chassis are identified by a letter stamped upon the front chassis apron adjacent to the Contrast Control shaft. The following identifications are given with respective modification and schematic diagram reference.

Chassis Stamp	Modification
No marking	None (early production)
"R"	Automatic Gain Control added
"T"	AGC plus improved Horizontal Sweep Transformer and circuit

## AUTOMATIC GAIN CONTROL

Automatic Gain Control is incorporated in the most part of the Model 830 production except for an approximate 1000 early production units.

The AGC voltage is derived from the diode detector and clipper grid circuit. By connecting the contrast control into the clipper grid circuit, it provides a source of high bias voltage which varies directly with the amplitude of the video carrier. The other end of the contrast control connects to the video detector load resistor to provide a lower potential bias source with the same characteristic so that it will provide for a minimum AGC bias when operating at weak signal strengths.

AGC provides for greater ease in tuning, as it eliminates to a large extent the necessity of resetting the contrast control each time a new station is selected. It minimizes airplane flutter and other signal strength changes which would otherwise affect the picture. **BIAS RESISTOR R8, OF VS—** On some "R" chassis receivers, the bias resistor R8 was 1000 ohms. This was decreased to 100 ohms to increase receiver sensitivity.

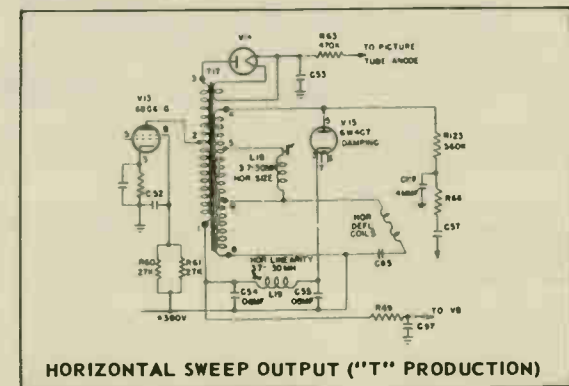
## HORIZONTAL SWEEP OUTPUT CIRCUIT

The use of a new and improved sweep output transformer and associated circuit was introduced after the "R" chassis production change. All parts with the value indicated below are common to the "T" chassis only.

This new transformer is an open coil type assembly with a ceramic iron core, in contrast to the earlier type molded coil assembly with laminated core used in the early and "R" production chassis. The high voltage tertiary winding is placed over the primary and secondary so that its distance to the core is increased, thus minimizing the probability of insulation breakdown and corona effect. The special core, composed of iron oxides suspended in a ceramic material, is more efficient in reduction of power losses than the more conventional solid metallic transformer cores used in earlier sweep output circuits. In addition, the core itself is an insulator.

**ADDITION OF C117, R123, AND C118:** The addition of these components were added in the greater part of "T" chassis production to improve horizontal sweep output phasing.

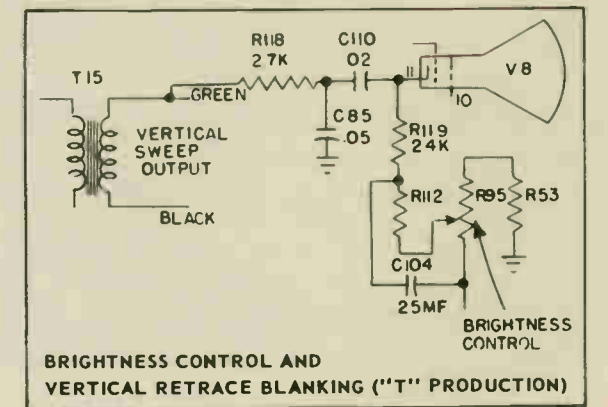
The components R123 and C118 are connected in the sweep output circuit at the damper tube, V15, plate as shown in the schematic below.



The capacitor C117 is connected across the cathode resistor R109 of the Phase Inverter Tube, V11A.

**PICTURE TUBE BRIGHTNESS:** R53, part of the picture tube brightness control circuit in "T" chassis receivers, was changed during this production to fix the minimum bias on the picture tube. This resistor, shown below, connected from the Brightness Control to ground, was changed to 220,000 ohms. This change prevents blooming of the picture (excess brightness), and change in picture size, as the Brightness control is advanced to maximum at the clockwise position.

**REMOVAL OF RETRACE LINES (R118, R119, C85 and C110):** The components R118, R119, C85 and C110 were added during "T" chassis production and are connected as shown below. The addition of these components results in a relatively high positive voltage supplied to the picture tube cathode from the vertical sweep output circuit during vertical retrace. The picture tube is biased to cut-off, resulting in most of the retrace lines being eliminated from the screen. This is an operating advantage since it eliminates the need for readjustment of the Brightness or Contrast Control, to remove retrace lines which oftentimes accompany a change in cameras or program material that takes place at the transmitter.



## PRODUCTION CHANGES MODEL 835

**AUTOMATIC GAIN CONTROL:** AGC (Automatic Gain Control) is incorporated in most production receivers except for an approximate 1000 early production units. To identify electrically the chassis having AGC, a letter "R" is stamped on the front apron of those chassis.

The AGC voltage is derived from the diode detector and clipper grid circuit. By connecting the contrast control into the clipper grid circuit, it provides a source of high bias voltage which varies directly with the amplitude of the video carrier. The other end of the contrast control connects to the video detector load resistor to provide a lower potential bias source with the same characteristic so that it will provide for a minimum AGC bias when operating at weak signal strengths.

AGC provides for greater ease in tuning, as it eliminates to a large extent the necessity of resetting the contrast control each time a new station is selected. It minimizes airplane flutter and other signal strength changes which would otherwise affect the picture.

# PRODUCTION CHANGES

**BIAS RESISTOR, R8, OF V5 ("R" CHASSIS RECEIVERS):** On some "R" chassis receivers, the bias resistor R8 was 1000 ohms. This was decreased to 100 ohms to increase sensitivity.

**REMOVAL OF RETRACE LINES:** By supplying to the picture tube cathode a relatively high positive voltage derived from the vertical sweep output circuit during vertical retrace, the picture tube is biased to cut-off, resulting in most of the retrace lines being eliminated from the screen. This is an operating advantage since it eliminates the need for readjustment of the Brightness or Contrast Control to remove retrace lines from the screen which oftentimes accompany a change in camera or program material that takes place at the transmitter.

## PRODUCTION CHANGES MODELS 12T1, 12C101, 12C102 AND 12C105 MODELS 10T1, 10T4, 10T6, 10C101, 10C102

**1. IF TRAP-**Early production receivers had an IF trap added in the head-end unit connected between pin 2 of tube V1 and pin 1 on tube V2. All sets with this trap had the coil detuned and the screw bent so that the slug could not be adjusted. On later production receivers, this trap was removed.

**2. IMPROVEMENT OF PICTURE QUALITY-**In order to improve the picture quality of this receiver, the plate load resistor (R275) of the first video amplifier, V8A, was reduced from 2200 ohms to 1500 ohms (URD-053). The reduction in gain effected by this change was compensated for by reducing the value of the screen resistor (R247) of the first video IF amplifier tube, V4, from 82,000 ohms to 47,000 ohms (URD-089).

**3. REDUCTION OF BACKGROUND NOISE DUE TO HARMONICS OF AUDIO IF -**Harmonics of the audio IF have a similar effect on the picture as noise under weaker signal reception. A simple check for this condition is to short the limiter, V16, grid to cathode and observe the picture when receiving a station. If there is a noticeable drop in noise, the following changes should be made:

An RF choke (L350), RL1-085, and a 5000 mmf. capacitor (C357), RCW-3014, is added to the sound IF amplifier. This involves the removal of the connection to the pin 7 of V16 and the junction of resistors R344 and R345 from the B- bus. These two points are then connected together and returned to B- through the RF choke (L350). The capacitor (C357) bypasses this choke and connects to chassis ground (not B-).

The choke location should be from pin 7 of V16 to the nearest B- bus point, while the capacitor (C357) should connect from pin 7 of V16 to a ground lug under the discriminator transformer mounting nut. On some receivers it will be found that the capacitor C357 is added between the junction of R344 and R345 to chassis ground. This capacitor location should be moved and connected as indicated in the above procedure.

**4. CHANGE OF BANDWIDTH-**Early production receivers had a bandwidth of 3.5 mc at the 50% response point. In

order to prevent sound in the picture, the IF bandwidth was reduced by 0.25 mc.

**5. CHANNEL No. 11 TRAP:** A trap was added to the head-end unit. Cat. No. RJX-037 is a head-end unit which incorporates the trap.

**6. 4.5 MC INTERFERENCE:** This causes similar condition described under paragraph (3). In order to completely eliminate this trouble, a 5000 mmf. capacitor (RCW-3014) was connected between socket terminals No. 4 and No. 7 of tube V16.

**7. CENTERING THE PICTURE:** Inability to center the picture horizontally without neck shadow or the swinging of the focus coil to an extreme angle from its normal plane, is caused by excessive current being "bled" through the horizontal deflection coils. To correct this condition, the screen voltage connection for the 19BG6 output tube (V13) was made directly to B plus as follows: remove the junction of R403 and C411 from junction of C324 and the horizontal deflection coils. Reconnect the junction of R403 and C411 to the plus 250-volt bus.

**8. NOISE AT LOW SETTING OF VOLUME CONTROL:** At low volume settings, the adjustment of the volume control produces noise in the speaker which is caused by a circulating current in the volume control induced through the 470 mmf. capacitor, C368. The noise may appear as a scratching sound similar to a "dirty" volume control or as a "bloop" as though the receiver was going in or out of oscillation.

The capacitor, C368 (470 mmf.), is of a molded mica type and runs from the B- bus to a terminal on the TB adjacent to the V18 tube socket base. Simply remove this capacitor from the circuit.

**9. REDUCTION OF REGENERATION ON CHANNEL NO. 6:**  
a) The 5000 mmf. capacitor (C283) adjacent to the 3rd video IF coil which connects between the B- bus and chassis, should have its leads shortened as much as possible. Proceed as follows: Shorten the lead to the ground lug as much as possible by soldering the lead to the chassis immediately below the point where this capacitor connects to the B- bus. Connect an 800 mmf. ceramic capacitor (RCW-3026) from pin No. 2 of V4 tube to the B- at the head-end at the edge of head-end plate next to the 3/16 inch diameter hole. Realign the video IF to give a flat top curve at a bias voltage of -4 volts.

b) The built-in antenna lead must be shortened by 4 feet. This length is taken off at the end of the lead which runs under the shelf of the chassis.

c) To reduce regeneration when using a regular antenna system, reverse the transmission leads at the antenna terminal board.

d) The bias to the 3rd video IF tube V6 is increased by reconnecting the ground return side of the grid resistor, R240, from the junction of R221 and R250 to the junction of R250 and L246. This connects R240 to the opposite end of the 47-ohm resistor R250.

**10. IMPROVEMENT OF HORIZONTAL PULL-IN RANGE:** To improve horizontal pull-in range, the limiting resistor (R395) in series with the drive control was changed from a

value of 4700 ohms to 10,000 ohms. At the same time the tolerance on the capacitor C403, 1000 mmf., was changed from 20% to 10%, the new Stock No. being UCU-1052.

**11. CHANGE FROM 6AG5 TO 6BC5 TUBES:** Early production model 10T6 used 6AG5 type tubes for V2, V4, V5 and V6. These were changed in late production to type 6BC5 tubes. When replacing any 6AG5 tubes use 6BC5 tube type for replacement.

## PRODUCTION CHANGES MODEL 12K1 (continued from Page 46.)

**7. CENTERING THE PICTURE:** Inability to center the picture horizontally without neck shadow or the swinging of the focus coil to an extreme angle with its normal plane, is caused by excessive current being "bled" through the horizontal deflection coils. To correct this condition, the screen voltage connection for the 19BG6 output tube (V13) was made directly to B plus as follows: Remove the junction of R403 and C411 from the junction of C324 and the horizontal deflection coils. Reconnect the junction of R403 and C411 to the plus 250 volt bus.

**8. NOISE AT LOW SETTING OF VOLUME CONTROL:** At low volume settings, the adjustment of the volume control produces noise in the speaker which is caused by a circulating current in the volume control induced through the 470 mmf. capacitor, C368. The noise may appear as a scratching sound similar to a "dirty" volume control or as a "bloop" as though the receiver was going in or out of oscillation.

The capacitor, C368 (470 mmf.), is of a molded mica type and runs from the B- bus to a terminal on the TB adjacent to the V18 tube socket base. Simply remove this capacitor from the circuit.

**9. REDUCTION OF REGENERATION OF CHANNEL NO. 6:**  
a. The 5000 mmf. capacitor (C283) adjacent to the 3rd video IF coil, which connects between the B- bus and chassis, should have its leads shortened as much as possible. Proceed as follows: Shorten the lead to the ground lug as much as possible by soldering the lead to the chassis immediately below the point where this capacitor connects to the B- bus. Connect an 800 mmf. ceramic capacitor (RCW-3026) from pin No. 2 of V4 tube to the B- at the head-end at the edge of head-end plate next to the 3/16 inch diameter hole. Realign the video IF to give a flat top curve at a bias voltage of -4 volts.

b. The built-in antenna lead must be shortened by 4 feet. This length is taken off at the end of the lead which runs under the shelf of the chassis.

c. To reduce regeneration when using a regular antenna system, reverse the transmission leads at the antenna terminal board.

d. The bias to the 3rd video IF tube V6 is increased by reconnecting the ground return side of the grid resistor, R240, from the junction of R221 and R250 to the junction of R250 and L246. This connects R240 to the opposite end of the 47 ohm resistor R250.

**10. IMPROVEMENT OF HORIZONTAL PULL-IN RANGE:** To improve horizontal pull-in range, the limiting resistor

(R395) in series with the drive control was changed from a value of 4700 ohms to 10,000 ohms. At the same time the tolerance on the capacitor C403, 1000 mmf. was changed from 20% to 10%, the new Stock NO. being UCU-1052.

## PRODUCTION CHANGES MODEL 12T7

**1. SUPPRESSION OF RF OSCILLATION-**To minimize the tendency to oscillate on Channel No. 12 and No. 13, a ceramic capacitor, C226, 800 mmf., has been added from pin 3 of the tube V3 to chassis in the head-end unit. Part No. is RCW-3026.

**2. INCREASE OF HORIZONTAL SWEEP-**In order to increase horizontal sweep, the following changes were incorporated during production: a capacitor, C380, was added across the terminals 6 and 8 of the horizontal sweep transformer. The type used is a 220 mmf. capacitor, 1500 volt, with a parts No. of RCU-295. At the same time the wiring of capacitor C376 was changed to connect to terminal 5 of the damper tube V15, 25W4GT.

In case a capacitor of 220 mmf., 1500 volts is not available, use two capacitors of values 390 mmf. (part No. UCU-1042, or 470 mmf. (part No. UCU-1044.) in series connection.

**3. INCREASE OF LOW FREQUENCY RESPONSE-**To increase the low frequency response of the video amplifier, the capacitor C268 was changed from a .02 mf. to a .05 mf. value. The new number is UCC-045.

**4. IMPROVEMENT OF HORIZONTAL PULL IN RANGE-**In the biasing network for the horizontal control tube, V12A, the resistor R379 was changed from a 180,000 to a 270,000 value with a part number of URD-107.

**5. TEMPORARY SUBSTITUTION-**Because of temporary procurement difficulties, some receivers were wired with the following changes:

Resistor R277: a substitution of 180,000 ohms was used instead of the correct value of 220,000 ohms.

Resistor R379: a substitution of 220,000 ohms was used instead of the correct value of 270,000 ohms.

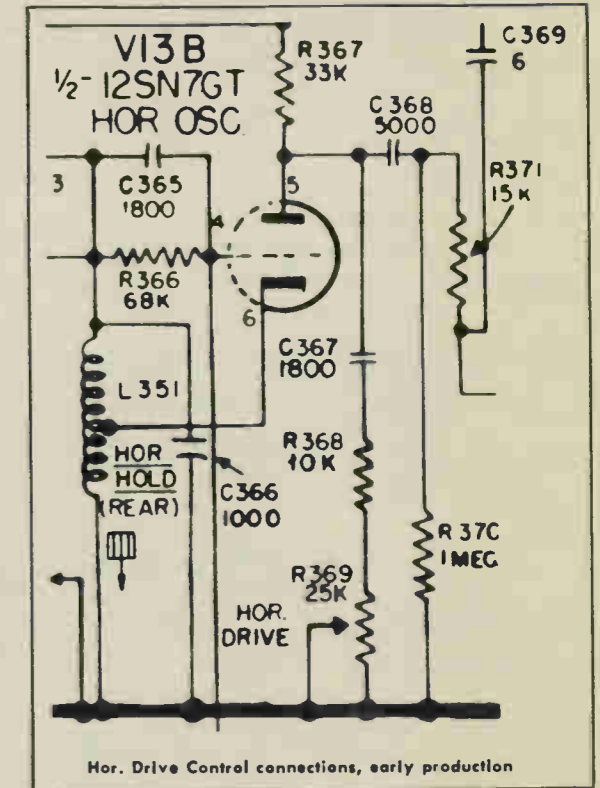
## PRODUCTION CHANGES MODELS 16T1, 16T2, 16C110, 16C111 AND 16C115

**1. The Horizontal Drive control R369** has been reconnected, to remove the effect of the drive control setting on the horizontal pull-in sensitivity.

If any early production receivers are rewired, R369 potentiometer should be changed to one of higher wattage rating. Catalog number for the higher wattage rating R369, 25K potentiometer, is RRC-140.

**2. Capacitor C268** has been changed from .02 mfd. to .05 mfd Cat. No. UCC-045. This change was made to improve the low frequency response of the video amplifier.

**3. To eliminate Barkhausen oscillation** (vertical black beady lines in raster when not receiving a station) the following resistor was added to early production receivers. Pin 8 of V14 was connected to B- through a 47 ohm, 1 watt, resistor, Cat. No. URE-017.

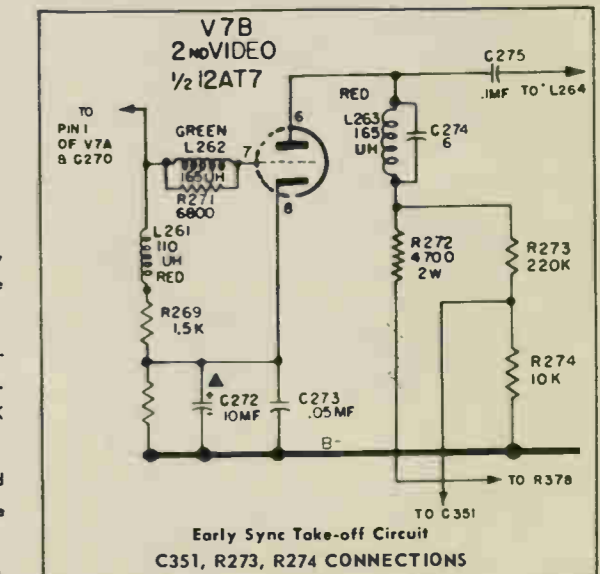


**4. Two mica capacitors, 390 mmf., 500 volt each,** were connected in series between terminals 6 and 8 of T351 as a substitute for C382, 180 mmf.

## PRODUCTION CHANGES

### 14T2, 14T3, 14C102 AND 14C103 16C113 AND 16C116 16T3, 16T4

**1. TO CORRECT BENDING AT TOP OF PICTURE-**In early production receivers R273, R274 and the sync voltage take-off capacitor C351 was connected as shown below.



In late production R274 was deleted, R273 was changed to 220 ohms and is reconnected in series with R272, C351, the sync coupling capacitor, is now connected at the junction of R272 and R273 as shown in the schematic diagram.

# PRODUCTION CHANGES

**2. ELIMINATION OF VERTICAL LINES AT LEFT SIDE OF PICTURE (ADDITION OF C371)**-Capacitor C371, .05 mfd., 600 volts, was added to later production receivers, to by-pass transient voltages developed by the horizontal sweep circuit at the B plus supply. These voltages would produce the effect of vertical, light and dark bars in the left part of the picture.

The capacitor, C371, is connected from the B plus terminal of the terminal strip adjacent to the damper tube, V16, on the chassis side apron and to the B- bus connection of C374.

## PRODUCTION CHANGES MODEL 16K1 or 16K2

**1. REDUCTION OF AUDIO BUZZ**-The following changes were made in the receiver at the start of production to reduce vertical sweep buzz in the audio output. These changes are incorporated in all receivers shipped.

a. In the cathode circuit of the audio amplifier tube V20 two capacitors, C426 (5000 mmf.) and C423 (50 mf.) were removed.

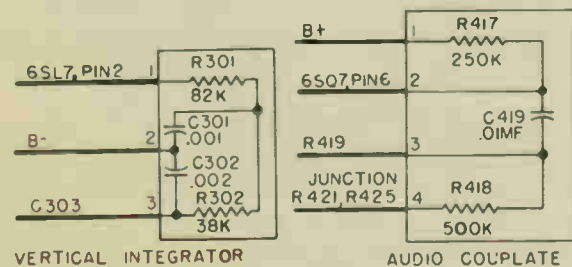
b. At the secondary of the audio interstage transformer (T406), a 330,000 ohm, 1/2 watt resistor, R429, was connected.

**2. REDUCTION OF "TWEET" ON CHANNEL NO. 4 AND OSCILLATION ON CHANNEL NO. 6** a. A capacitor of 800 mmf. was connected between the head-end unit and the main receiver. The change-over should be made as follows: With as short a lead as possible, solder one end of an 800 mmf. ceramic capacitor (C227) to the mounting clip of the top trimmer (C206) on the head-end unit. The other end of the capacitor is soldered to a lug fastened securely to the punched receiver chassis hole adjacent to the tube socket, V21.

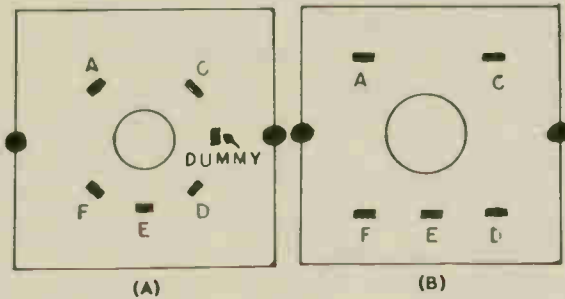
b. Relocation of the ceramic capacitor C252 from its present termination at the 7th B- bus hole of the terminal board No. 1 and the chassis weld between tube sockets, V5 and V6. Relocate this capacitor by soldering one end of it to the 1st hole in the B- bus of the same terminal strip. The other end is soldered to the chassis hole nearest L251. For convenience, the capacitor lead may be inserted through the 3/8 inch hole nearest L251 and then soldered from the top of the chassis to a cleaned and tinned top edge of the hole.

## PRODUCTION CHANGES MODELS 17T1, 17T2, 17T3, 17C103, 17C104, 17C105, 17C107, 17C108, 17C109

Some chassis may have ceramic couplers in the vertical interrotator circuit, or coupling the 1st and 2nd audio amplifiers. Wiring instructions are shown below.



Two different types of sound IF discriminator transformers have been used during the production of TV receivers which call for the Stock RTD-008 replacement transformer. These transformers are shown below as A and B, and have the same electrical characteristics. Since the type A does not have a lettered base, the orientation for connection is shown in the sketch.



## PRODUCTION CHANGES MODEL 17C110 AND 17C111

**1. VIDEO IF CHANGES:** Early production receivers used a resistor R155, 9100 ohms (URD-1096). When the core of the 1st video IF coil RLP-018 was changed, this resistor was changed to a value of 5600 ohms (URD-167). A change of the core of the 2nd video IF coil, RLP-019, necessitated a change of the resistor R159 from 12,000 ohms to 20,000 ohms (URD-1080). With the early core type the value of capacitor C153 was 18 mmf. and the value of C156 was 24 mmf.

**2. GENERAL IMPROVEMENTS:** In early production receivers the following components were used with the given value:

- C356 Capacitor — .015 mf., 200 v., RCN-042
- R215 Resistor — 1000 ohms, 1/2w., URD-049
- R218 Resistor — 1800 ohms, 1/2w., URE-055

Some early production receivers had a capacitor C222, 800 mmf. from No. 4 of V112 tube.

**3. VERTICAL MULTIVIBRATOR CIRCUIT:** Early production receivers used a 12AU7 tube type for V120 with the following component values:

- R303 - 1500 ohms, 1 watt
- R306 - 2.2 meg., 1/2 watt
- R308 - 82,000 ohm, 1/2 watt
- C304 - .04 mf., 600 v.
- C306 - .0033 mf., 600 v.

The switch-over to the new circuit was made gradually with some receivers still using one or two components of the original value.

**4. IF TWEETS:** In order to remove IF tweets a filament choke, L165 (RLF-048), was connected between terminal pin P4 and filament of tube 6AL5 (V110). Resistor R224 and capacitor C219 were rewired with the capacitor between secondary of T203 and the junction of R225 and grid connection (Pin 1) of V110 and the resistor R224 from this junction to ground. The bottom end of the secondary was connected to ground.

**5. INCREASE RANGE OF BRIGHTNESS CONTROL:** In order to increase the range of the brightness control resistor, R175 was changed from 100,000 ohms (URD-097) to a value of 82,000 ohms (URD-095).

**6. DEFLECTION YOKE CHANGES:** The early production yoke RLD-030 which is identified by the markings on the yoke as follows "M77J11-10-No. 33, blue code dot on the winding tape" is replaced by the yoke RLD-037. The use of this improved yoke necessitates the installation of a variable trimmer, C302, RCY-069. The trimmer is connected to the yoke terminal No. 8 and chassis ground. A lead is already provided on the yoke for this purpose.

The trimmer is a single hole mount type and is fastened to the blank hole between two terminal boards directly above the yoke assembly with the trimmer screw facing the back of the receiver. The ground connection is made automatically through the body of the trimmer capacitor.

Care should be exercised in tightening the mounting nut on the trimmer as the trimmer is fragile, and can easily be damaged. A locking nut is provided on the trimmer and should be screwed down against the mounting nut to hold the adjustment.

Because of different type deflection coils, it is necessary to use a different vertical sweep output transformer with this late type yoke. In order to avoid mistakes when replacing yokes and vertical output transformers, the following chart will be helpful:

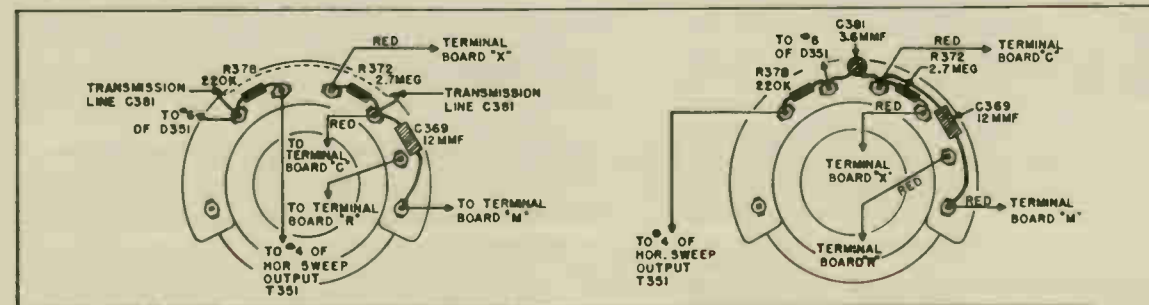
### EARLY PRODUCTION

YOKE		TRANSFORMER	
Cat. No.	Stamped on Unit	Cat. No.	Stamped on Unit
RLD-030	M77J11-10 Blue code dot on winding tape.	RTP-110	K82J183

### LATE PRODUCTION

YOKE		TRANSFORMER	
Cat. No.	Stamped on Unit	Cat. No.	Stamped on Unit
RLD-037	M77J11-15 Green code dot on winding tape.	RTO-102	K82J183-2

On some yokes the capacitor C381 (3.5 mmf.) will be a short piece of transmission line instead of the disk type capacitor. To accommodate these, the terminal board arrangement is slightly different on each yoke. The proper connection for each is shown below.



**7. SYNC CIRCUIT WIRING:** Late production receivers had some changes in the wiring of the horizontal sync circuit. Due to capacity effects of the various wires and the high voltage of this circuit the sync circuit did not operate properly at normal contrast control setting. To eliminate this trouble the wiring was changed. In case some early production receivers show this defect, rewire the set as follows:

- (1) Change deflection yoke lead from terminal C10 to R11.
- (2) Change pin connection C10 to R11.
- (3) Change video peaking coil connection from C9 to C7 to C6 and C5.
- (4) Lead on C6 change to C7.
- (5) Pin connection on C9 change to C6.
- (6) Pin connection on C6 change to C7.
- (7) Capacitor C166 connected to C7 change to C5.
- (8) Resistor R174, 470,000 ohms connected to C7 change to C5.

**8. BRIGHTNESS CONTROL:** The range of the Brightness control was increased by reducing the value of resistor R175 (82,000 ohms) to 56,000 ohms, Part No. URD-091.

**9. PLATE DISSIPATION OF TUBE V106:** The plate dissipation of the 3rd video IF tube, V106 (6CB6) was reduced by decreasing the resistance R181, 33,000 ohms to a value of 18,000 ohms, Parts No. URD-079. At the same time it is wired across the capacitor C159.

**10. INTERFERENCE REDUCTION "W" RF TUNER:** In order to reduce FM interference the resistance R103, 3300 ohms, 1/2w. was increased to a value of 5600 ohms, 1 watt, Part No. URE-067. The RF Tuner with this new resistor is stamped "W" for easy identification. To compensate for the higher voltage drop the B plus to the tube V101 was increased from 160 to 250 volts. This is accomplished by moving the orange wire (B plus 160 volt) to the second lug from the top and connecting the third lug with the fourth lug which connects the B plus for V102 to the B plus 250 volts red lead.

At the same time the resistance R402, 2000 ohms, w.w. 10 watt was changed to a value of 2350 ohms, Part No. RRW-083.

**11. VERTICAL SYNC:** In order to reduce vertical sync, capacitor C308 (.002 mf) was changed to a value of .001 mf. Parts No. UCC-035.

**12. RF TUNER, "D" VERSION:** In order to reduce oscillator radiation the RF tuner circuit was improved.

**13. IMPROVEMENT OF VERTICAL LINEARITY CIRCUIT:** Resistor R306, 330,000 ohms, 1/2w., was changed to a value of 820,000 ohms, URD-119 in order to improve the vertical linearity.

## PRODUCTION CHANGES MODELS 20T2, 20C105, 20T106 AND 21C200

**VIDEO DETECTOR ASSEMBLY RLX-035**-In some assemblies a special high efficiency diode is used marked with a red dot. To maintain the same Q of the circuit and to obtain proper bandwidth, a resistor of 12,000 ohms is connected across the diode. In replacing this diode with the normal type do not use this resistor. In case of doubt check for proper bandwidth.

On some assemblies the rectifier symbol is stamped on the top plate to indicate polarity of terminals. When replacing diode, check to see that both diode and plate markings are in the same direction.

**VERTICAL SWEEP CIRCUIT VERSIONS**-Four versions of this circuit were produced:

A. The early production receiver uses the circuit of schematic diagram. It bears no identification mark on the chassis.

B. The second version improved the vertical linearity by adding the following components:

1. A capacitor C318, .022 mf., 1000 v. (RCN-044) and a resistor R422, 6800 ohms, 1/2w. (URD-093) were added in series across the vertical output transformer T302.
2. A resistor, R385, 2200 ohms, 1/2w. (URD-057) was added as a grid suppressor in series with the grid pin of V10, 12BH7.

This version is rubber stamped "A" or "B" on the rear apron.

C. The third version uses a completely revised circuit to provide improved interlace. The circuit is shown in the schematic diagram and the chassis is identified by the rubber stamped letter "I".

D. Model 21C200 receivers use a different vertical output circuit using a 25L6GT tube instead of the 12BH7 (see schematic diagram); to compensate for the different filament voltage the Globar resistor in the filament string, R457, was reduced from 31 ohms to 20 ohms (RRW-051), with a different filament circuit. See schematic diagram.

Below follows a list of parts used for this circuit.

RCC-113	C306, 307	Capacitor .02 mf, 600v.
RRW-051	R457	Resistor, 20 ohms, Globar.
UCC-045	C276	Capacitor, .5 mf. 200v.
URD-095	R330, 336	Resistor 82K ohms, 1/2w.
URD-133	R331	Resistor, 330G ohms, 1/2w.
URE-041	R332	Resistor, 470 ohms, 1W.
URD-1033	R335	Resistor, 220 ohms, 1/2w.

**"LOCAL DISTANT" SWITCH CIRCUIT**-In order to prevent overloading of the sync circuit on very strong stations the sync is taken without amplification right after the video detector with switch on "local". For reception of other stations the switch takes the sync off after amplification by the video IF amplifier V7, 12AT7 on the "distant" position.



Below follows a list of parts used for this circuit.

RCW-3037	C284	Capacitor 800 mmf, ceramic.
RSW-067	S200	Switch, local-distant switch.
URD-073	R287	Resistor, 10K ohms, ½W.
URD-081	R333	Resistor, 22K ohms, ½W.
URD-085	R262	Resistor, 33K ohms, ½W.
URD-105	R286	Resistor, 220K ohms, ½W.
URD-121	R288	Resistor, 1 megohm, ½W.

**REDUCTION OF HUM AND PICTURE SLIDE-**Excessive hum modulation of the horizontal sweep was reduced by the following changes:

- Addition of another 80 mf capacitor, RCE-112 across capacitor C353 in the filter section.
- Lead dress changes: Red horizontal blanking lead going to the screen of the picture tube enters chassis through the slot between horizontal drive control and horizontal hold and goes directly to its original connection on the terminal board instead of entering chassis with other leads through rubber grommet.

The blue lead running from plate of sync amplifier tube, V11 to junction of R352, R353 and C353 was placed directly over the resistor R320, 100,000 ohms adjacent to R352 by taking up slack in the lead.

## PRODUCTION CHANGES MODELS 17C125, 20C107, 21C201-C202-C204-C206 21C208, 21C208U-C210-C214, 21T1-T1U-T3 T6

Several mechanical and electrical changes have occurred during the production of this family of receivers. Listed below are the various items to be considered with reference to specific production versions. It should be noted that electrical circuit changes are not chronologically related to those changes which occurred in the various mechanical assemblies. To prevent confusion, electrical circuit changes shall be denoted as 1st, 2nd, 3rd or 4th production versions, while mechanical assembly changes shall be referred to as "early," "mid" and "late" production items.

### DETECTOR CAN ASSEMBLY:

1st and 2nd production: The diode detector is located under the removable "hat".

3rd and 4th production: To change the diode or any other component within this assembly, it is merely necessary to remove the two self-tapping screws at the base of the assembly. The entire assembly may then be pulled off of the mounting plate. The shield can may then be removed from the assembly by compressing the two spring tabs on the top tuning core securing clip.

### ELECTRICAL ITEMS

- HORIZONTAL OUTPUT TUBE:** Horizontal output tube was changed from 25AV5 to 25BQ6. The 25AV5 tube was used in first production models only.
- IMPROVEMENT IN PICTURE QUALITY:** The diode load resistor, R162, was changed from 3900 ohms to 3000 ohms. For identification these receivers were rubber-stamped on the back apron of the chassis with No. 420.

**3. HORIZONTAL SWEEP OUTPUT TRANSFORMER AND YOKE:** In 3rd and 4th production models the horizontal output transformer and yoke were changed. Receivers using these revised sweep components bear a label on the high voltage compartment rear door which indicates the catalog numbers of the horizontal output transformer and yoke contained therein. Models 17C125 and 20C107 use horizontal output transformer RTO-130, 21 models use RTO-129. The yoke to be used with either of these transformers is RLD-050. These components should not be used in those receivers which used the "early" type transformer and yoke, unless a "late" transformer and a "late" yoke are simultaneously installed. These receivers using these "late" sweep components are rubber-stamped with No. 430 and include changes of No. 420.

**4. DELAYED AGC:** In order to improve the operation of the receiver a new AGC circuit was incorporated in the 3rd and 4th production. Receivers using this new circuit may be identified by noting the "Local-Fringe Stabilizer" two-position switch label located on the cabinet back. This control replaces the original potentiometer and switch, the label of which reads "Picture Stabilizer" or "Signal Strength Compensator."

The purpose of this new circuit is two-fold:

- To prohibit the development of AGC bias for the 2nd RF stage until a sufficiently strong signal is received which will remove all conversion noise in the picture. This results in an improvement of the signal-to-noise ratio on weak signals while still permitting AGC action by virtue of a non-delayed AGC voltage which is applied to the IF system.
- To make the AGC fully automatic, thus eliminating the necessity of adjusting an AGC level potentiometer to suit particular installation conditions. For easy identification these receivers were rubber-stamped with No. 401 which also include changes No. 420 and No. 430.

**5. NEW VIDEO AMPLIFIER:** A new video amplifier circuit using a 6BK7-A instead of 12BH7 tube was used in the 4th production receivers. Receivers and cartons bearing these receivers are stamped with the number 1140.

This new circuit has been incorporated, to increase the overall receiver bandwidth and to improve the video transient response. Since this circuit change was incorporated after the delayed AGC circuit, all receivers equipped with the new video amplifier also include delayed AGC.

Together with this circuit change, the capacitor C162 in the video detector is changed from 5 mmf to 9 mmf. The new type tube necessitated a change in the filament string wiring which permits the operation of a 450 ma. heater (6BK7-A) partially in series with other filaments and partially from the filament transformer.

When replacing the filament transformer, (4th production only) T401, be sure to measure the voltage at pin 3 of V106 (3rd video IF). This voltage should read approximately 12.0 volts. If zero or near zero volts are measured at this point the primary leads should be reversed. For easy identification receivers incorporating this circuit change were rubber-stamped with No. 1140. These receivers include a 3000-ohm diode load resistor and delayed AGC.

**6. CHANGE OF PICTURE TUBE IN MODEL 20C107 RECEIVERS:** Late production 20C107 receivers were equipped with a 20DP4A picture tube instead of 20CP4A as used in the earlier production. Receivers using a 20CP4A tube require two flat washers on each support rod as a spacing medium between the flux shield disk and the fibre yoke support.

Receivers using a 20DP4 picture tube require a "T" spacer and one flat washer on each support rod as is also required for the 21-inch models.

**7. "LATE" TYPE VIDEO DETECTOR ASSEMBLY:** First second and third production receivers incorporate a video detector assembly in which the value of C162 is 5 mmf. The video detector of 4th production receivers incorporate a 9 mmf. capacitor, C162. This change appears in all receivers which incorporate the 6BK7-A type video amplifier.

## PRODUCTION CHANGES MODELS 21C225, C226 C227, C228, C229, C230, C231, C232, C233 21T20-T21

**1. VIDEO IF AMPLIFIER:** During early production capacitor C151 in 38.0 mc trap circuit was changed from 75 to 8 mmf, capacitor C161 in 47.25 mc trap circuit was changed from 8 to 22 mmf. Together with this change capacitor R182 47 mmf and R166, 10 ohms at the bottom end of the IF grid coil, L154, were removed and the coil directly connected to the coaxial link from the RF tuner.

In receivers bearing these changes, capacitor C141, 39 mmf, at the output of the RF tuner is omitted. For early production receivers use replacement RF tuner RJX-056.

**2. RF TUNERS:** During the 1st production of these receivers two different types of the "EE" version tuner were used. Both types incorporate a 6AB4 tube as 1st RF amplifier. The early version incorporates the capacitor C141, see "EE" Version Tuner; this type is used together with the early type traps L152 and L153 using R166 and C182 in the video input IF circuit, see Deflection Yoke Wiring. Receivers using the later type traps without R166 and C181 in the input circuit use a "EE" tuner without the capacitor C141.

During the 2nd and 3rd production the "BK" version tuner was incorporated in the receiver, using a 6BK7 tube as 1st RF amplifier. Receivers with this tuner are stamped with the number "453" or higher. The tuner is easily identifiable by the tunable cathode choke coil, L100, mounted at the input transformer T100.

Early type tuners incorporate capacitor C141, so that they may be used with the early type traps L152 and L153. This capacitor is connected between the coaxial link and ground.

**3. HORIZONTAL SWEEP OUTPUT CIRCUIT:** The linearity of the horizontal sweep was improved by incorporating a new circuit which used the following new items:

- RLD-056 Horizontal Linearity Coil
- RLD-058 Horizontal Width Coil
- RTO-146 Horizontal Output Transformer

These items should not be used as replacement in earlier production chassis.

Chassis incorporating this production change bear a rubber stamp "548" and in most cases also bear a label on the high-voltage cage which calls attention to the above listed electrical items.

**4. REDUCTION OF IF INTERFERENCE:** To assist in the reduction of IF interference chassis bottom plate, RHS-119 and adjacent channel trap shield can, RHS-112 was added during the production run.

**5. VIDEO AMPLIFIER:** The video output tube 6AQ5 was changed to 6CL6 and the circuitry has been slightly modified as illustrated in Deflection Yoke Winding. Receivers incorporating this circuit may be identified by noting the 6CL6 tube type on the tube layout label affixed to the cabinet back.

**6. BRIGHTNESS CONTROL CIRCUIT:** To prove greater consistency of raster size with respect to changes in the brightness level a new brightness control circuit was used in late production receivers. The new brightness control Cat. No. is RRC-245.

## PRODUCTION CHANGES MODELS 17C127, 17T15-17, 21C114-C115-C116-C117-C119, 21C120-C121, 21T10-T11-T12-T14-T15-T19

**1. VIDEO AMPLIFIER TUBE CHANGE:** The video amplifier was changed during the production from a 6AG7 type to a 6CL6. No other video amplifier circuit changes were made at this time. Because of different pin connections a different socket adapter, RJS-194, for the 6CL6 is to be used.

**2. ELECTROSTATIC PICTURE TUBES (21FP4A):** Late production Models 21T10 and 21T11 use the electro-static picture tube type 21FP4A.

The receiver leaves the factory with the focus lead connected to ground. If the focus requires adjustment, connect the focus lead to B plus or B plus boost instead.

**3. VERTICAL LINEARITY CONTROL:** During production the value of this control was changed from 4000 ohms to 2000 ohms. For replacement purposes only the 4000-ohm unit will be supplied. This will have no effect upon the receiver performance.

**4. RF TUNER:** Some late production receivers use a new RF tuner, RJX-057. This tuner is interchangeable with the earlier type. This unit however requires different mounting brackets.

**5. POWER TRANSFORMER CHANGE:** Late production receivers use a power transformer with three secondary leads two for the rectifier plates and one center tap as compared with the early version transformer which has six secondary leads.

In order to use old type transformer for replacement of new type transformers merely disregard the red-yellow leads, ground the two brown leads and connect the two remaining red leads to the rectifier plates.

**6. AGC CIRCUIT CHANGE:** In late production receivers the AGC circuit was changed as indicated in the schematic. This change results in a wider range of the area control, permitting slightly increased sensitivity for fringe reception

and better picture stability in the very strong signal areas.

**7. VIDEO IF INPUT CHANGE:** Capacitor C174, 800 mmf was added in the input circuit of the video amplifier between resistors R152 and R154 and chassis during the last part of the third production.

**8. I.M.F. PICTURE TUBE, MODEL 21T10 ONLY:** Late production receivers have a picture tube installed with an internal magnetic focus unit.

**9. CHANGE OF VERTICAL OSCILLATOR CIRCUIT:** To give better interlace and vertical control range, the following components of the vertical oscillator circuits were changed as indicated in the following charts.

Old Part		Changed To		Cat. No.
Symbol	Value	Symbol	Value	
C206	.001 mf	C211	.0056 mf	RCN-087
R165	47,000 ohms	R164	56,000 ohms	URE-091
R204	100,000 ohms	R224	47,000 ohms	URD-089
R208	100,000 ohms	R225	27,000 ohms	URD-083

### DISTORTION IN PICTURE

Complaints have been received of extremely black pictures distorted picture, top of picture pulling and "S" shaped lines in picture on sets using the "F" chassis.

In most every case, these troubles are caused by improper setting of the "area" control on the rear of the set. If the control is set in its extreme clockwise position, the above picture defects are liable to be found. If the control is set to its minimum position (counter clockwise) or at too low a setting, a weak washed out picture containing very poor blacks will result.

For metropolitan areas, one half range is usually the best operating position.

In order to set the area control properly, adjust the contrast control to maximum and then adjust the area control on the rear of the set to a point where the picture comes in just a little too black (without pulling). The area control should then be left alone while the set remains in that location and various degrees of shading can be obtained by varying the contrast control as in other set.

### HORIZONTAL INSTABILITY

Adjustment of Horizontal Stabilizer Coil, L251:

- Remove tube V106. This will remove all sync signals from the sweep systems. Do not short pin 2, V112, to chassis as is stated in G.E. preliminary service notes. Use the weakest visible signal to complete the remainder of the procedure. L251 will tune to two positions which will bring the picture into sync. The correct core position is the one with the core almost all the way into the coil.
- Short-circuit terminals of coil, L251.
- Adjust horizontal hold control potentiometer to bring received picture closely into sync.
- Remove short-circuit from across terminals of L251.
- Tune L251 to bring picture back into a closely synced condition.
- Replace tube V106. Check lock-in ability of horizontal sync with strong and weak signals.





