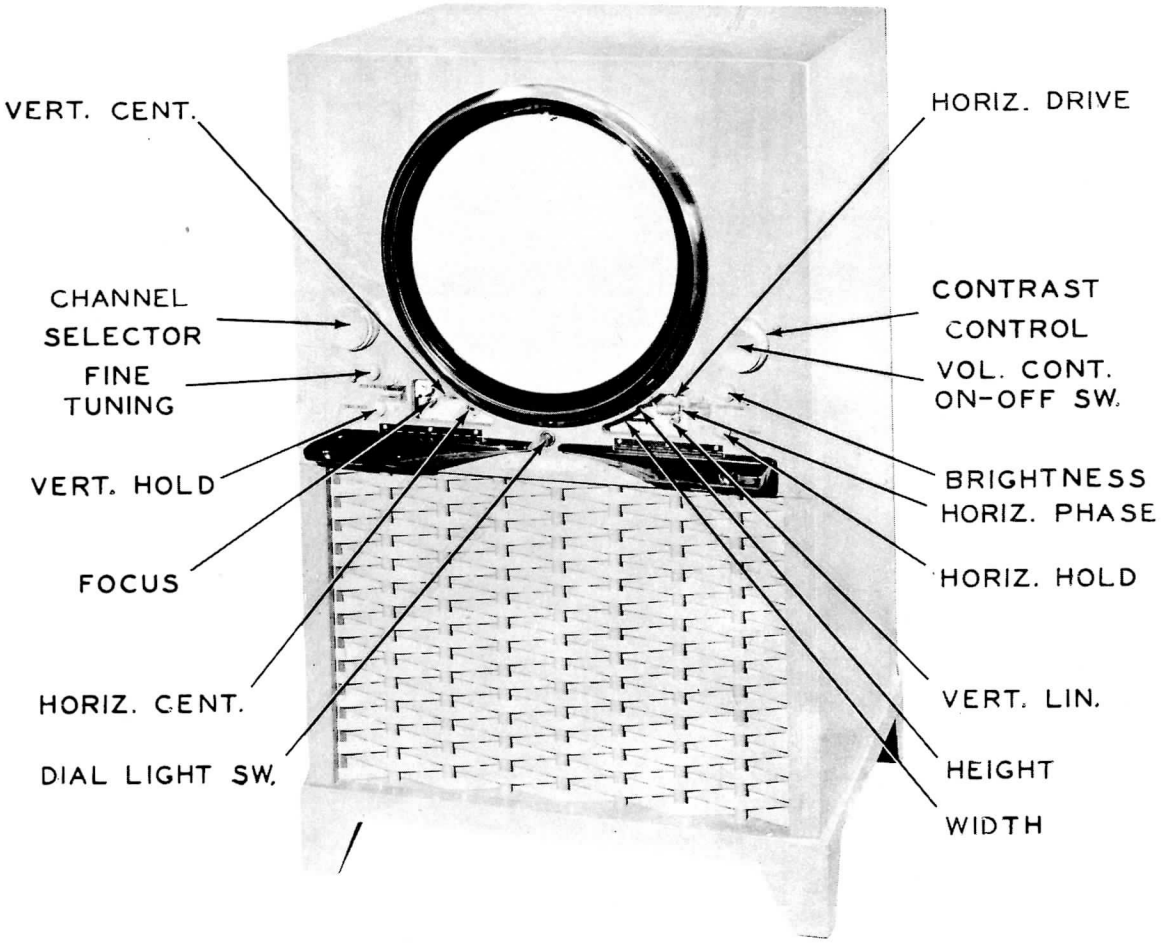
ZENITH MODELS 28T925, 28T960, 28T961, 28T962, 28T963



ZENITH MODELS 28T925, 28T960, 28T961, 28T962, 28T963

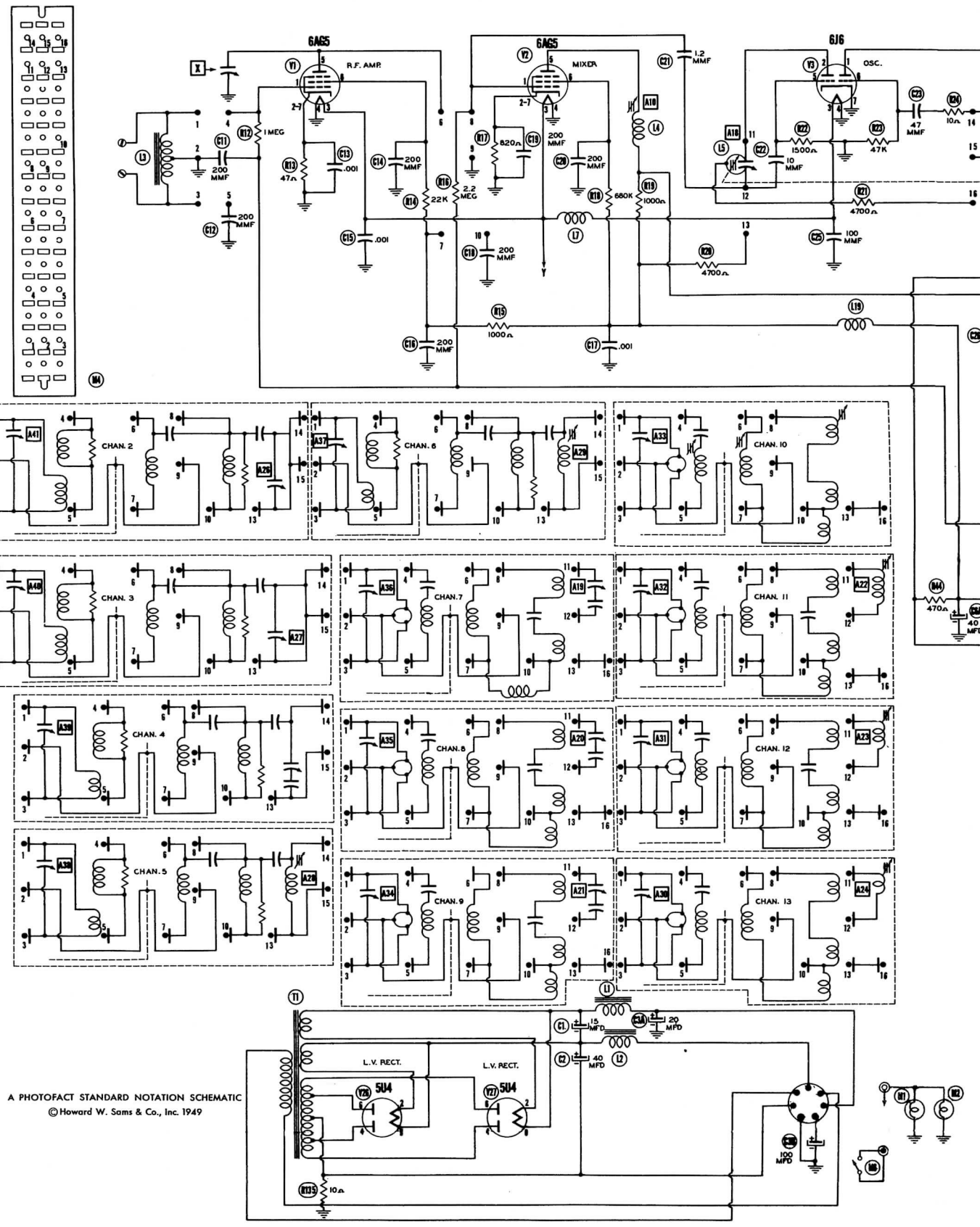
ZENITH MODEL 28T960

TRADE NAME	Zenith, Models 28T925, 28T960, 28T961, 28T962, 28T963. Chassis 28F20, 28F20Z, 28F21, 28F22.
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago, Illinois
TYPE SET	Television Receiver
TUBES	Twenty-eight
POWER SUPPLY	117 Volts, 60 Cycle AC
TUNING RANGE	Channels 2 through 13 RATING 3.11 Amps @ 117 Volts

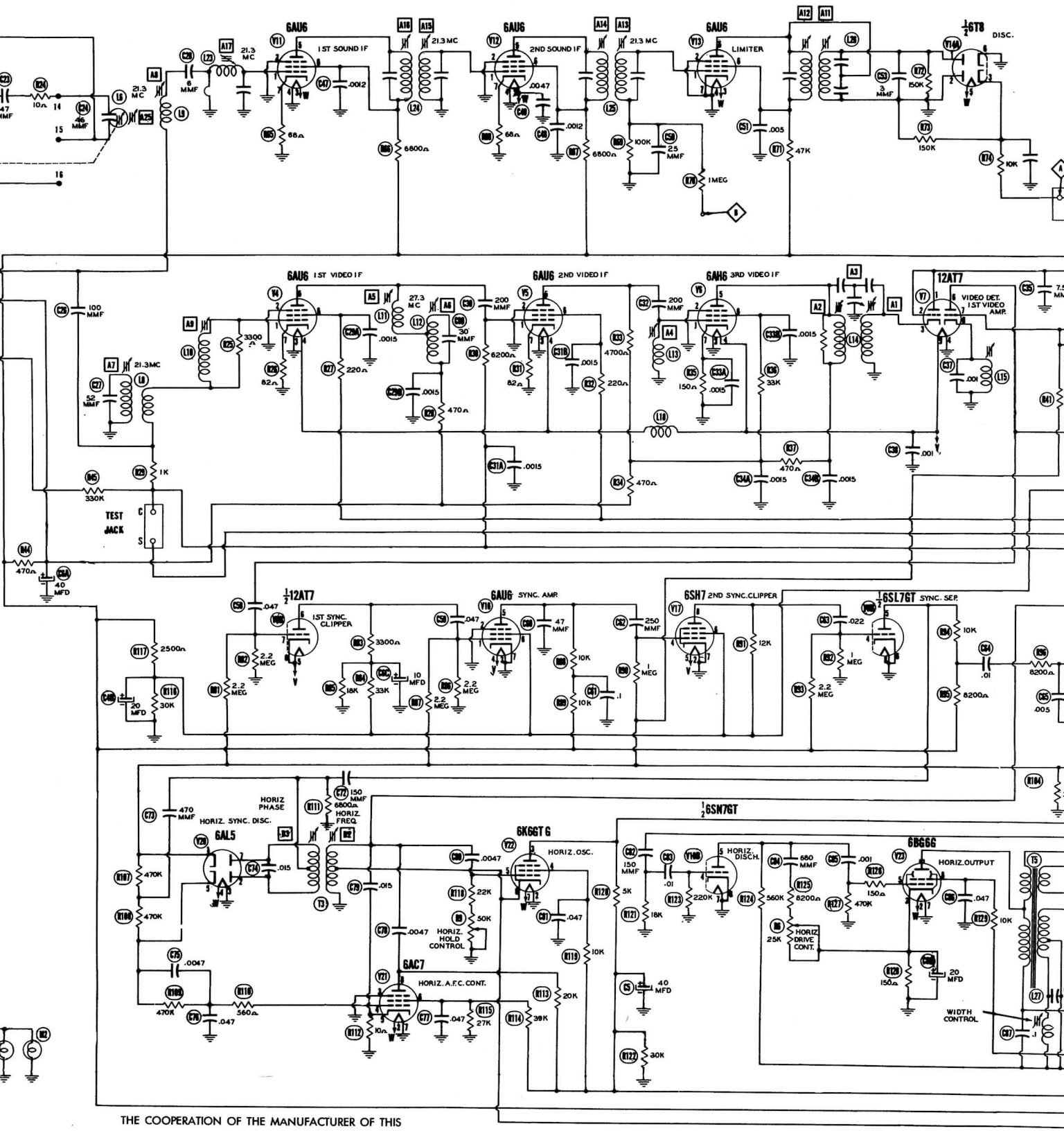
INDEX

HOWARD W. SAMS & CO., INC. • Indianapolis 7, Indiana

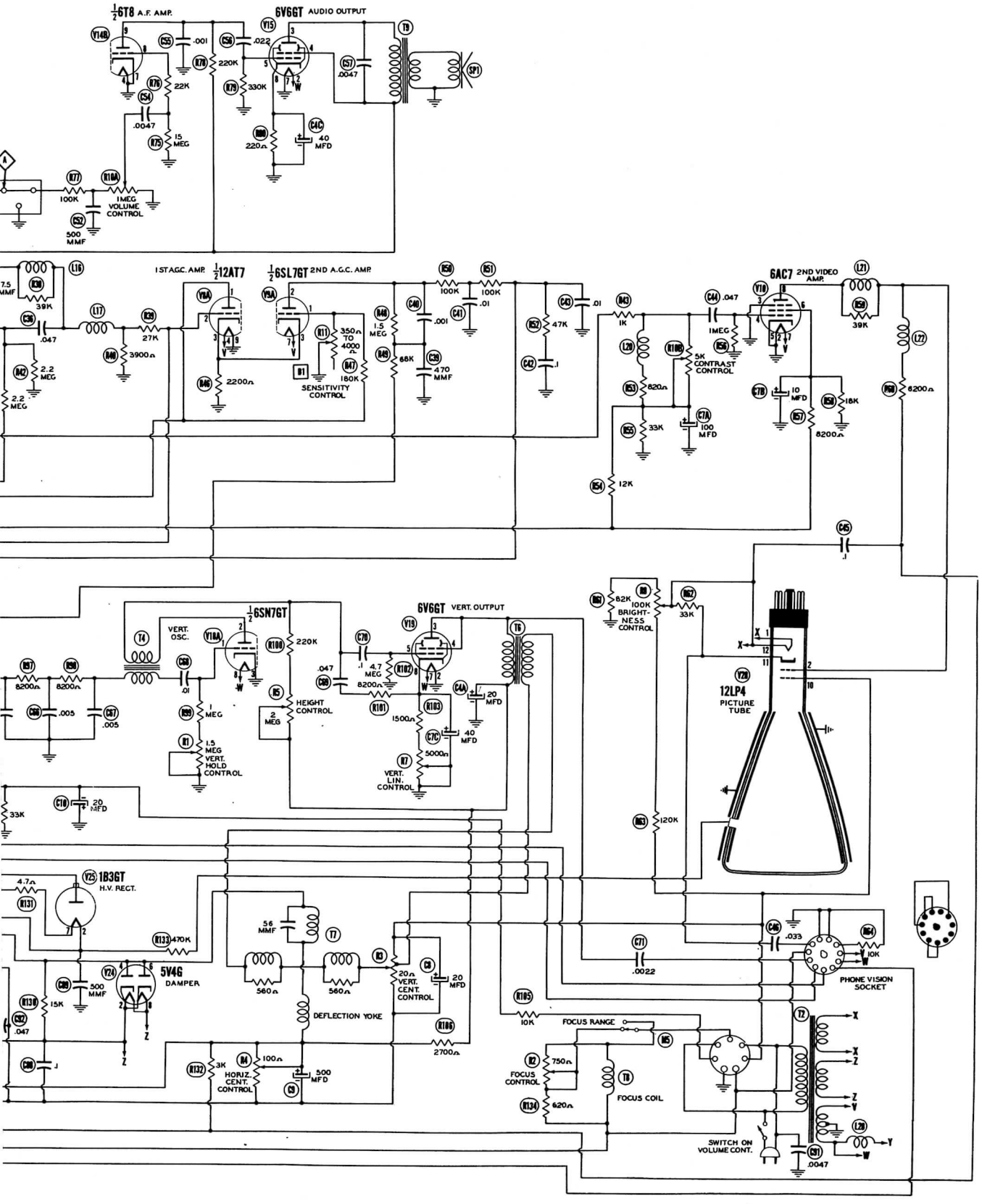
DATE 6/49 4912-15 SET #64 FOLDER 15

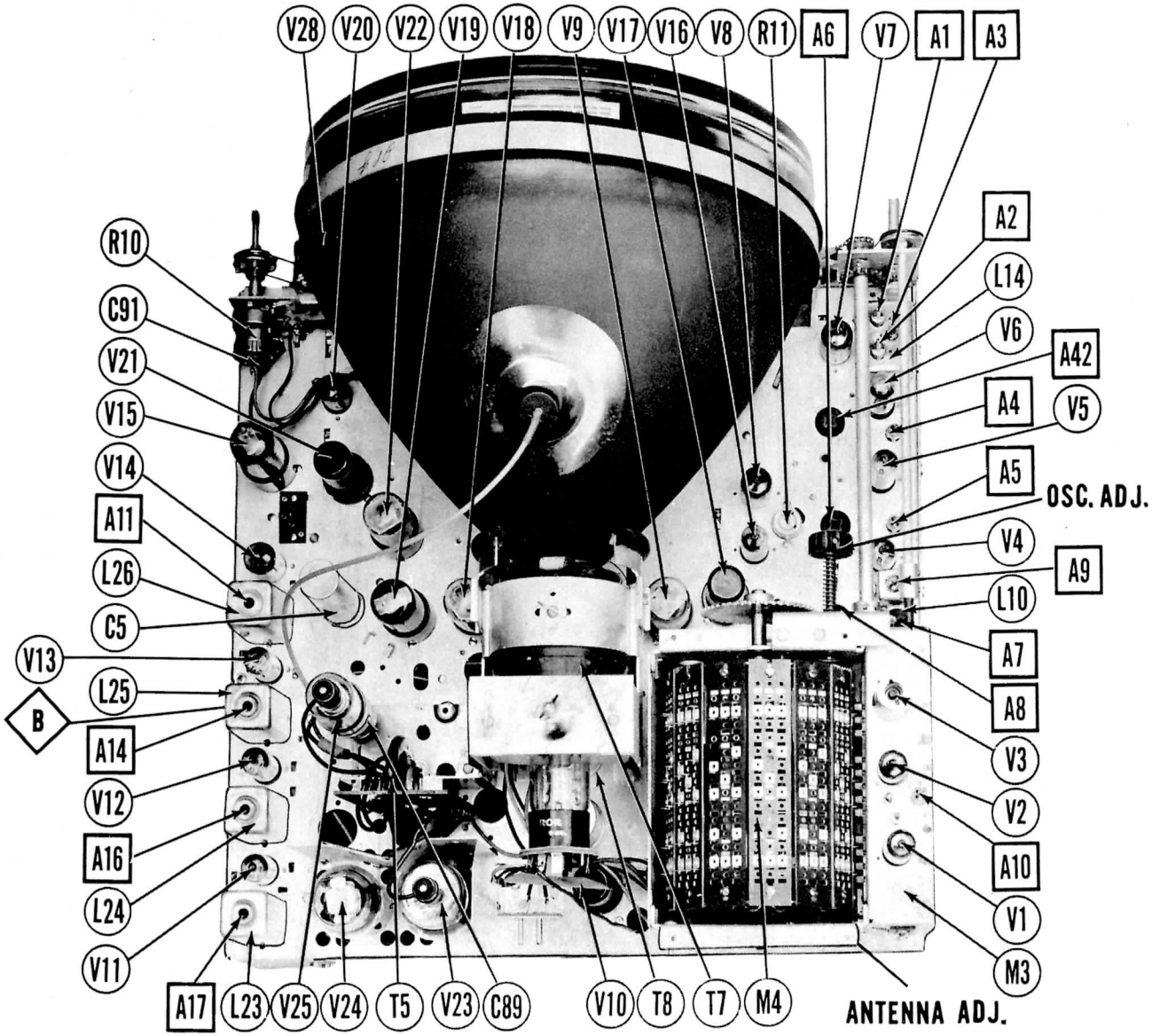


A PHOTOFACT STANDARD NOTATION SCHEMATIC

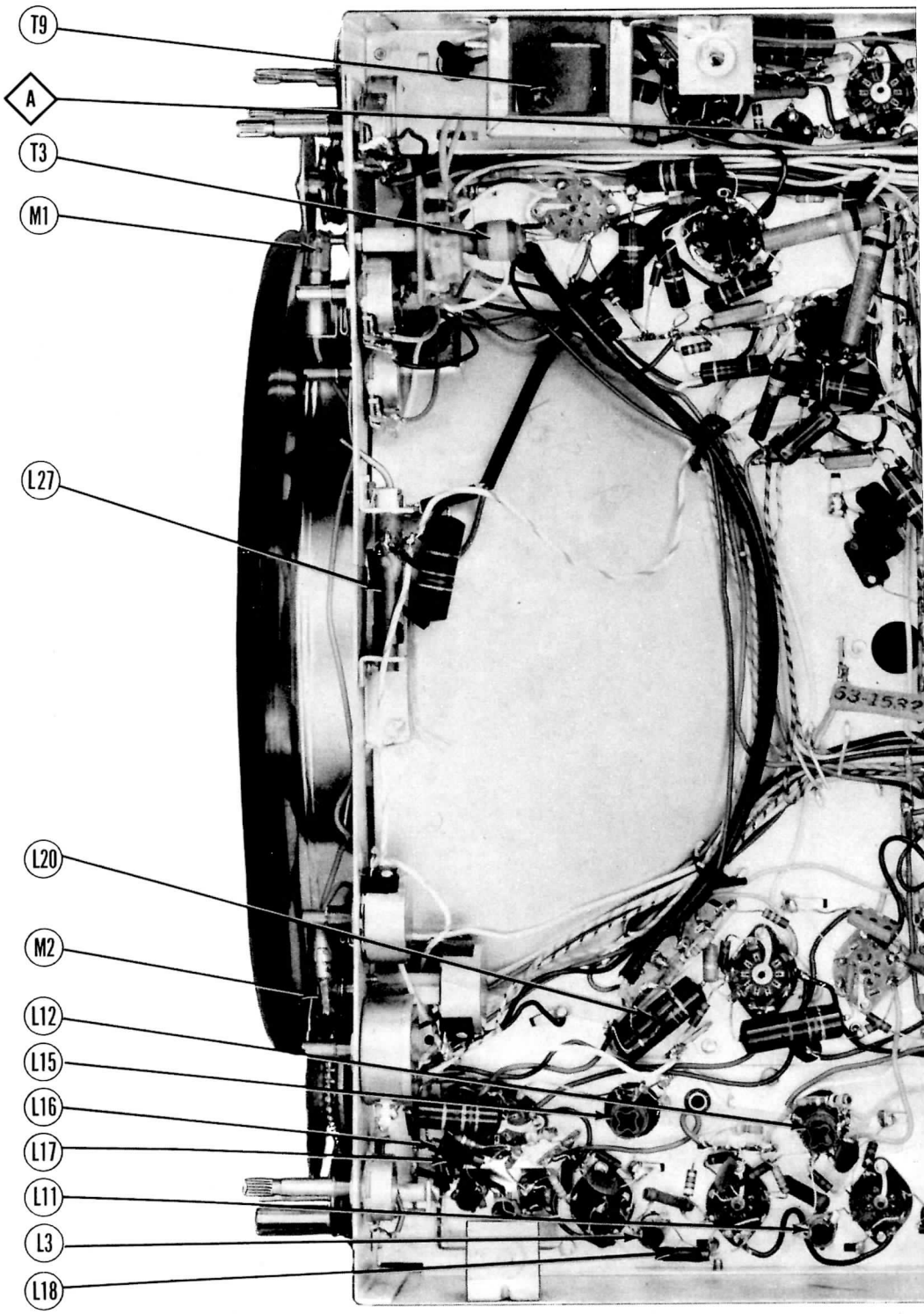


THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

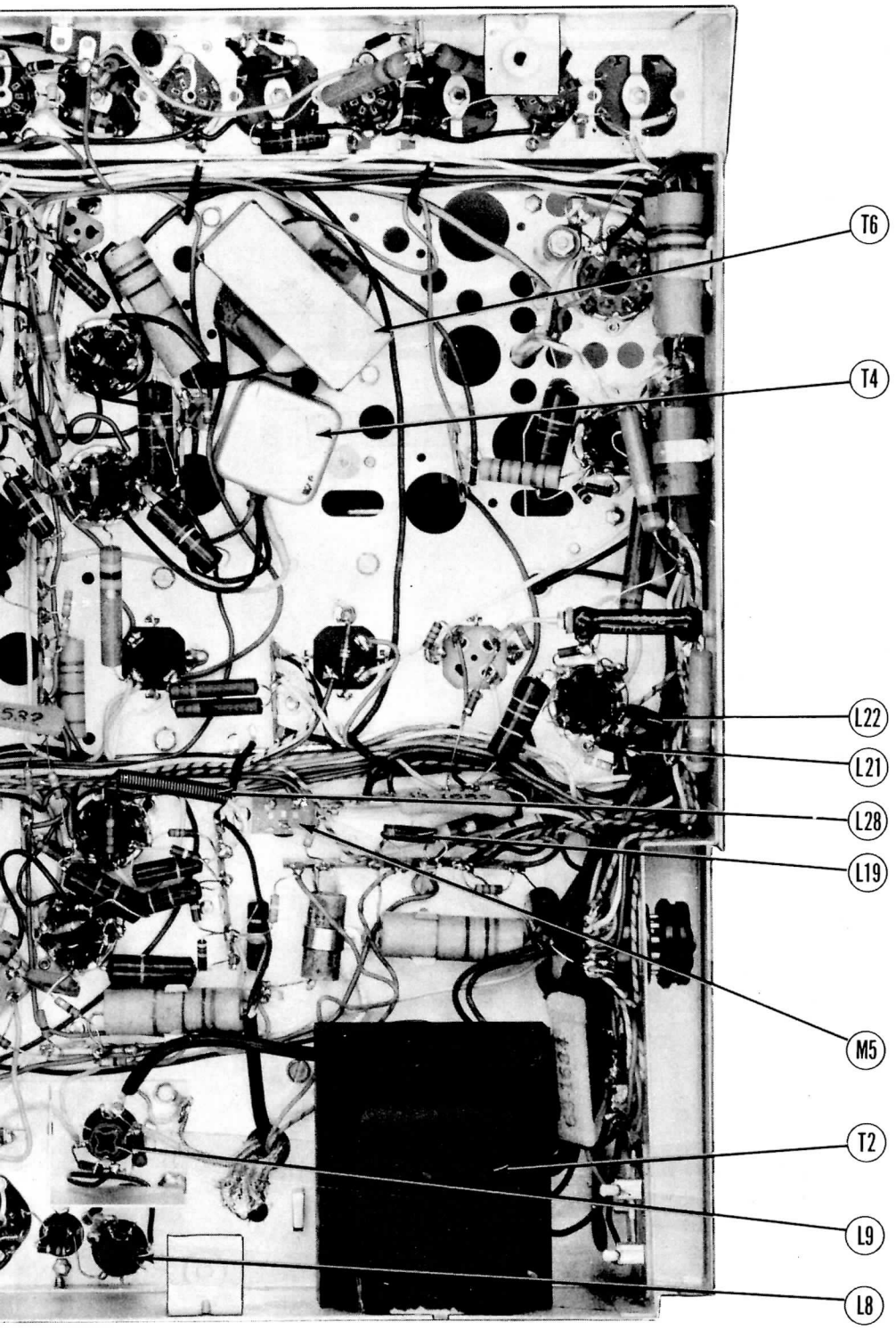

½6T8 A.F. AMP.
6V6GT AUDIO OUTPUT
1STAGC. AMP. ½12AT7
½6SL7GT 2ND A.G.C. AMP.
6AC7 2ND VIDEO AMP.
½6SN7GT
6V6GT VERT. OUTPUT
1B3GT H.V. RECT.
5V4G DAMPER
12LP4 PICTURE TUBE
VOLUME CONTROL
SENSITIVITY CONTROL
CONTRAST CONTROL
HEIGHT CONTROL
VERT. HOLD CONTROL
VERT. LIN. CONTROL
HORIZ. CENT. CONTROL
VERT. CENT. CONTROL
BRIGHTNESS CONTROL
FOCUS CONTROL
FOCUS COIL
FOCUS RANGE
DEFLECTION YOKE
PHONE VISION SOCKET
SWITCH ON VOLUME CONT.
VERT. OSC.



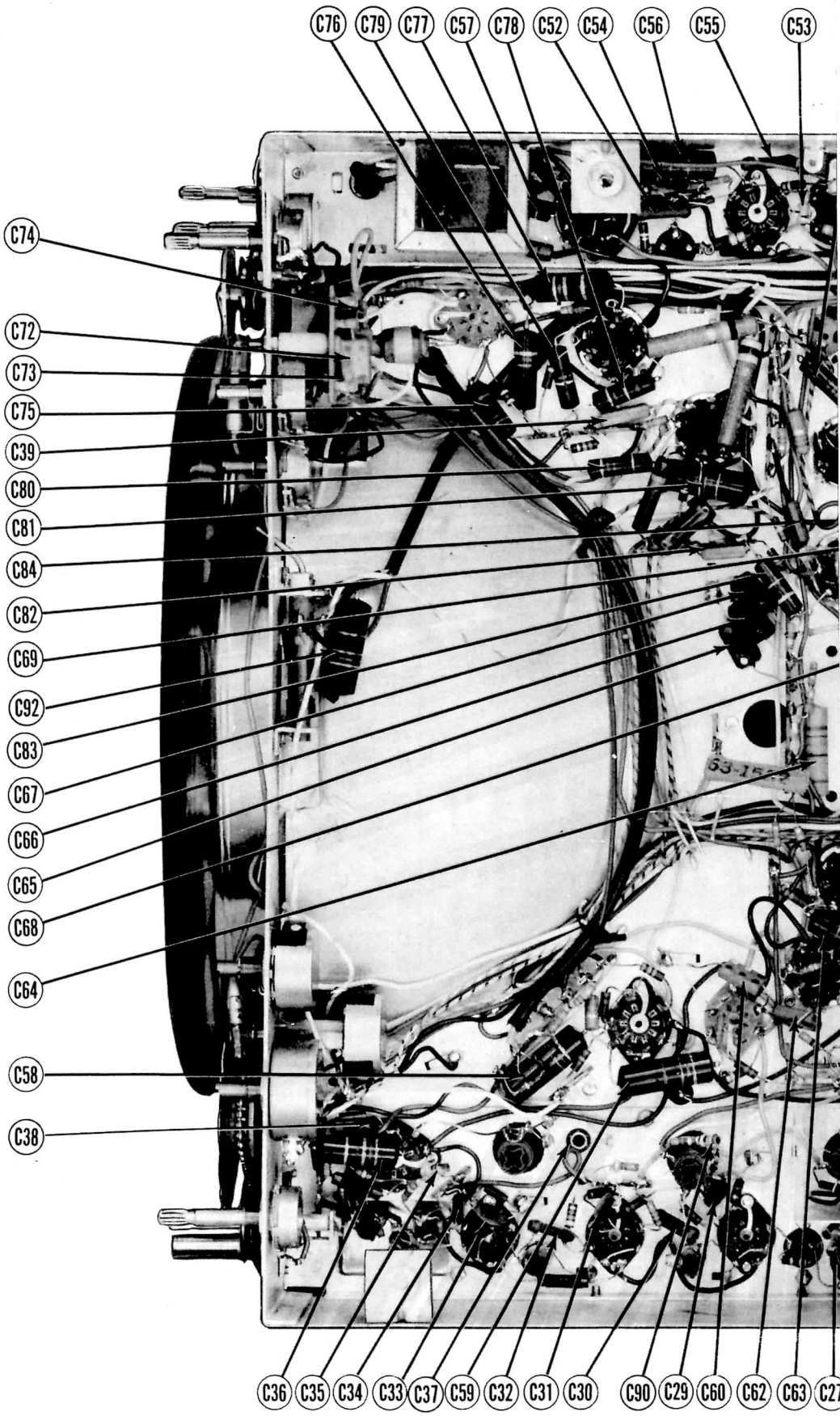
CHASSIS TOP VIEW



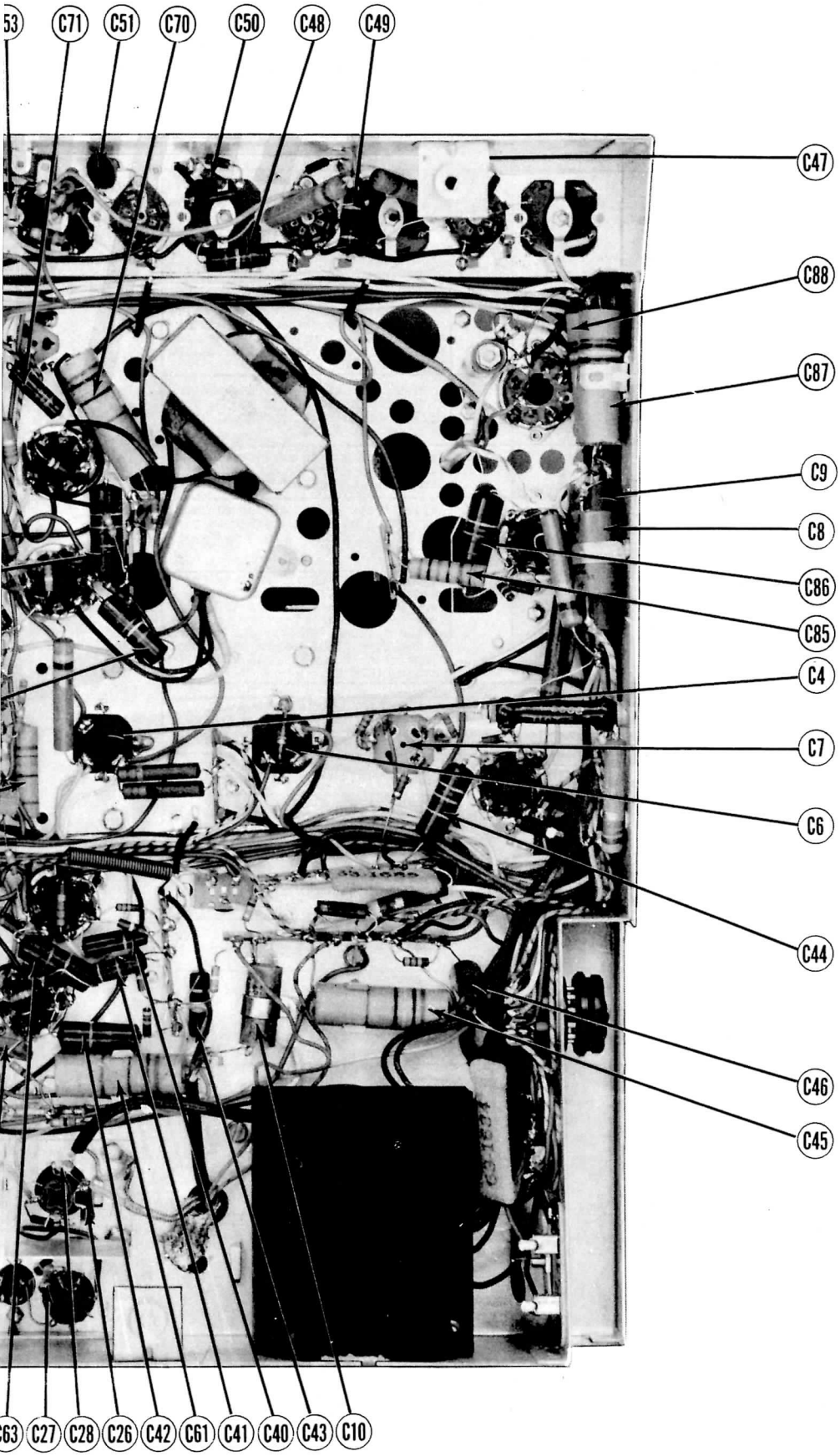
CHASSIS BOTTOM VIEW-TRANS., INDUC



UCTOR AND ALIGNMENT IDENTIFICATION



CHASSIS BOTTOM VIEW-CA



CAPACITOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

VIDEO IF ALIGNMENT

Connect a -1.5 volt bias battery to AGC line. Remove the AGC tube (V8) and connect the negative side of the bias battery to test jack "C" and the positive side to chassis.

Connect the synchronized sweep voltage from the signal generator to the oscilloscope horizontal amplifier input for horizontal deflection.

Remove the oscillator tube (V3) during the video IF alignment.

To disable the high voltage remove the horizontal oscillator tube (V22) from its socket.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	500MMF	High side to pin 1 (Grid) of 6AH6 (V6). Low side to chassis.	24MC (10MC Sweep)	21.6MC 25.9MC	Any	Vert. Amp. thru 100KΩ to test jack "S". Low side to chassis.	A1, A2 A3	Adjust A1 and A2 to obtain pattern as per Fig 1 with peaks being of equal amplitude and the 21.6MC marker properly placed on the pattern. Adjust A3 to place 25.9MC marker at the high freq. peak. Check position of 21.6MC marker. If necessary repeat adjustment of A1, A2 and A3.
2.	500MMF	High side to pin 1 (Grid) of 6AU6 (V5). Low side to chassis.	"	25.3MC	"	"	A4	Reduce sweep generator output until amplitude is approximately same as that obtained in step 1. Adjust A4 for pattern and placement of 25.3MC marker as per Fig 2.
3.	500MMF	High side to pin 1 (Grid) of 6AU6 (V4). Low side to chassis.	"	22.2MC 25.1MC	"	"	A5	Adjust for pattern and placement of 22.2MC marker as per Fig 3. The 25.1MC should fall approximately as shown in Fig 3.
4.	500MMF	"	"	27.3MC	"	"	A6	Use maximum marker amplitude and adjust trap A6 so 27.3MC marker disappears at "notch" as per Fig 3.
5.	Direct	High side to an ungrounded tube shield slipped over the converter tube. Low side to chassis.	"	21.3MC	"	"	A7, A8	Adjust traps A7 and A8 for minimum indication of 21.3MC marker as per Fig 4.
6.	Direct	"	"	21.3MC 22.2MC 25.1MC 25.8MC 27.3MC	"	"	A9,A10	Adjust A9 and A10 alternately for reasonably flat topped pattern as per Fig 4. Check markers to see that they appear at proper points on the pattern. The 25.8MC marker is located at 50% on the high freq. slope side of the overall video IF pattern (Fig 4).

SOUND IF ALIGNMENT

The sound IF transformers used in this receiver have specially designed slugs and require a special alignment tool. (Zenith Part No. 68-7). Both slugs of each transformer are accessible from the hole in the top of the transformer. The alignment wrench is partially inserted to align the top winding and fully inserted to adjust the slug for the bottom winding.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	500MMF	High side to pin 1 (Grid) of 6AU6 (V13) Low side to chassis.	24MC (1MC Sweep)	21.3MC	Any	Vert. Amp. to Point (A) Low side to chassis.	A11, A12	Adjust A11 and A12 for maximum amplitude and symmetry as per Fig 5 with 21.3MC marker at center. The peak to peak discriminator width is approximately 450KC.
8.	500MMF	High side to pin 1 (Grid) of 6AU6 (V12) Low side to chassis.	"	"	"	Vert. Amp. to Point (B) Low side to chassis.	A13, A14	Adjust for maximum amplitude and symmetry as per Fig 6.
9.	500MMF	High side to pin 1 (Grid) of 6AU6 (V11) Low side to chassis.	"	"	"	"	A15, A16	"
10.	500MMF	High side to an ungrounded tube shield placed over the mixer tube (V2). Low side to chassis.	"	"	"	"	A17	"

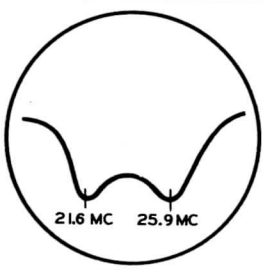


FIG. 1

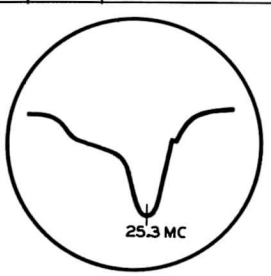


FIG. 2

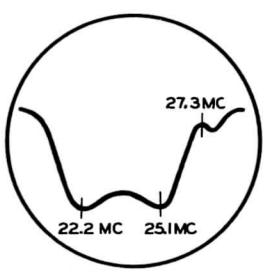


FIG. 3

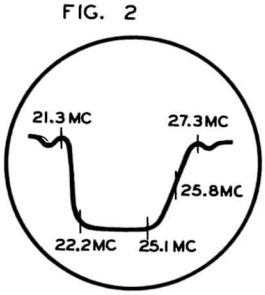


FIG. 4

OSCILLATOR ALIGNMENT

The trimmer X located in the plate circuit of the RF Amp. is for compensation of interelectrode capacity of the tube and capacity of the circuit wiring and is pre-set at the factory. Do not adjust in field unless proper equipment is available. It is suggested that the oscillator circuits be checked before attempting alignment to determine if adjustment is actually necessary. This is done by connecting the signal generator and VTVM as outlined below in step 11. Set the signal generator to the sound carrier frequency of the channel being checked and turn the fine tuning control. The VTVM will indicate both a positive and negative peak as the fine tuning control passes through resonance. The proper adjustment is the zero point between the two peaks. If the zero point cannont be obtained, alignment of the oscillator circuits should be performed in the order given starting with step 11. The oscillator adjustments are made by depressing knob at the front end of the tuner except for A18 and A25 which are shown in side view photograph of the tuner.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	Two 150Ω carbon res.	Across Antenna terminals with 150Ω resistor in each lead.	197.75MC	10	DC Probe to Point A Common to chassis.	A18	Pre-set the fine tuning control so that the widest area of the eccentric tuning slugs points upward. Insert a pointed tool thru one of the adjustment slots and turn A18 (air trimmer disc.) until zero point between the positive and negative peaks is obtained.
12.	Two 150Ω carbon res.	"	179.75MC 185.75MC 191.75MC 203.75MC 209.75MC 215.75MC	7 8 9 11 12 13	"	A19 A20 A21 A22 A23 A24	Pre-set fine tuning as above and adjust A19 thru A24 for zero reading at their respective channels.
13.	"	"	71.25MC	4	"	A25	Pre-set fine tuning control as above and adjust slug A25 for zero reading.
14.	"	"	59.75MC 65.75MC 81.75MC 87.75MC	2 3 5 6	"	A26 A27 A28 A29	Pre-set fine tuning control as above and adjust A26 thru A29 at their respective channels.

ANTENNA ALIGNMENT

Remove the AGC tube (V8) and connect -1.5 volt bias battery from test jack "C" to chassis.
The antenna adjustments are accessible through hole in rear of the tuner.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Two 150Ω carbon res.	Across Antenna terminals with 150Ω resistor in each lead.	213MC (10MC Sweep)	211.25MC 215.75MC	13	Vert. Amp. to test jack "S". Low side to chassis (If scope is not calibrated use VTVM and attenuate sweep generator to give 1.5 to 2 volt reading.	A30	Keep sweep generator attenuated so scope pattern does not exceed 3 volts peak to peak. Adjust trimmer for maximum amplitude and symmetry as per Fig 7. Check to see that markers appear at proper points on the pattern.
16.	Two 150Ω carbon res.	"	207MC (10MC Sweep)	205.25MC 209.75MC	12	"	A31	"
			201MC (10MC Sweep)	199.25MC 203.75MC	11		A32	
			195MC (10MC Sweep)	193.25MC 197.75MC	10		A33	
			189MC (10MC Sweep)	187.25MC 191.75MC	9		A34	
			183MC (10MC Sweep)	181.25MC 185.75MC	8		A35	
			177MC (10MC Sweep)	175.25MC 179.75MC	7		A36	
			85MC (10MC Sweep)	83.25MC 87.75MC	6		A37	
			79MC (10MC Sweep)	77.25MC 81.75MC	5		A38	
			69MC (10MC Sweep)	67.25MC 71.75MC	4		A39	
			63MC (10MC Sweep)	65.25MC 65.75MC	3		A40	
			57MC (10MC Sweep)	55.25MC 59.75MC	2		A41	

IMPORTANT: All other adjustments in the tuner are Pre-Set at the factory and should not be adjusted in the field.

4.5 MC TRAP ADJUSTMENT

Adjustment of this trap is usually not necessary unless the unit has been tampered with or a component replaced.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT RF-VTVM	ADJUST	REMARKS
17.	5000MMF	High side to pin 7 (Grid) of 12AT7 (V7). Low side to chassis.	4.5MC (Set very accurately)	Any	RF Probe to Picture tube grid (Pin 2 of V28). Common to chassis.	A42	Turn contrast control to give 1 volt reading on RF-VTVM. Adjust A42 for minimum indication.

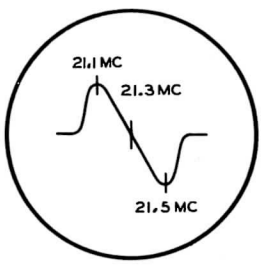


FIG. 5

FIG. 6

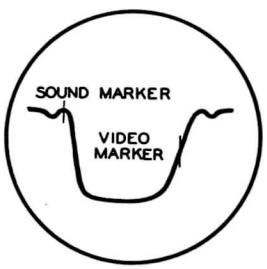
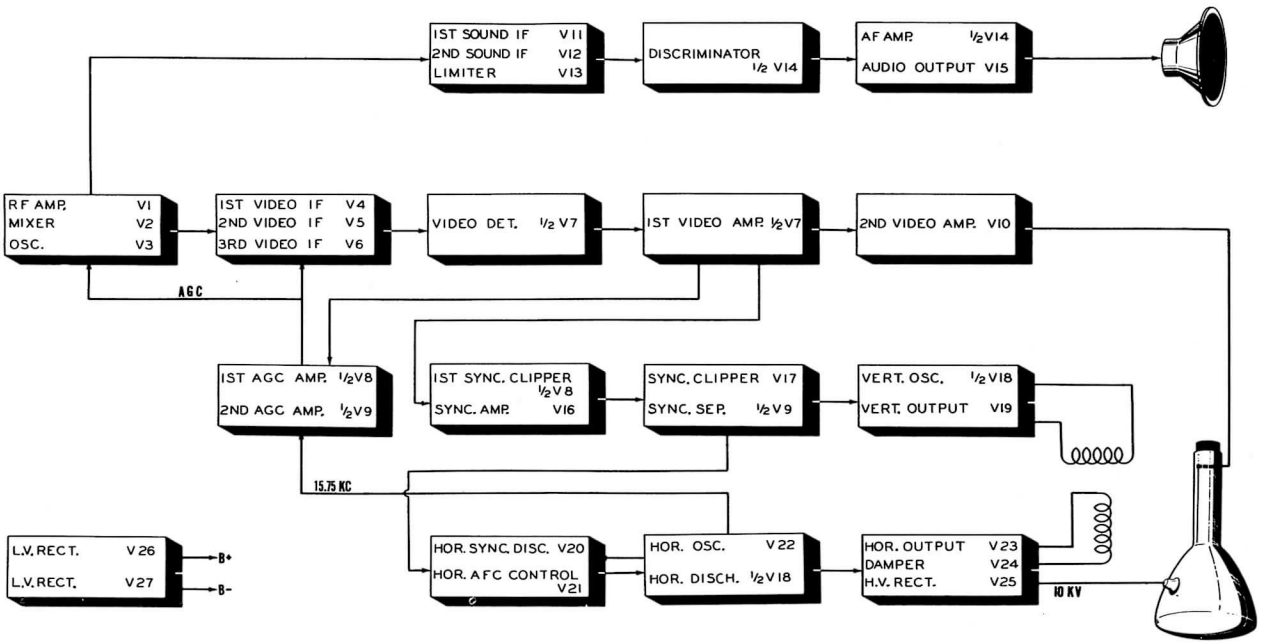
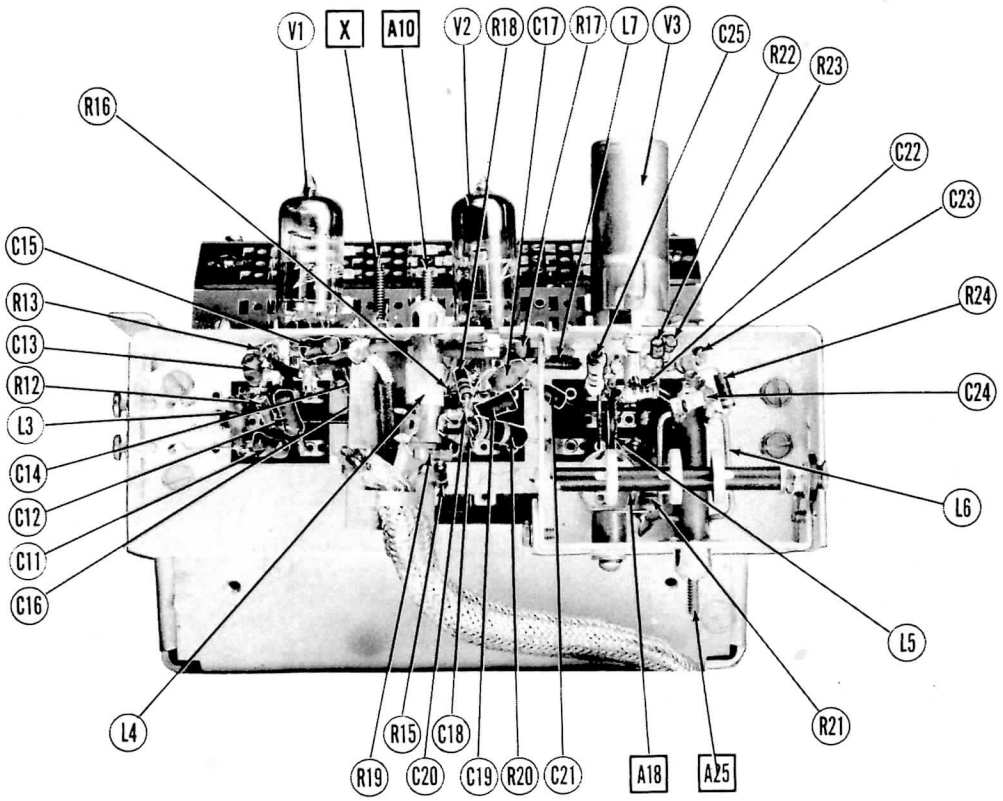


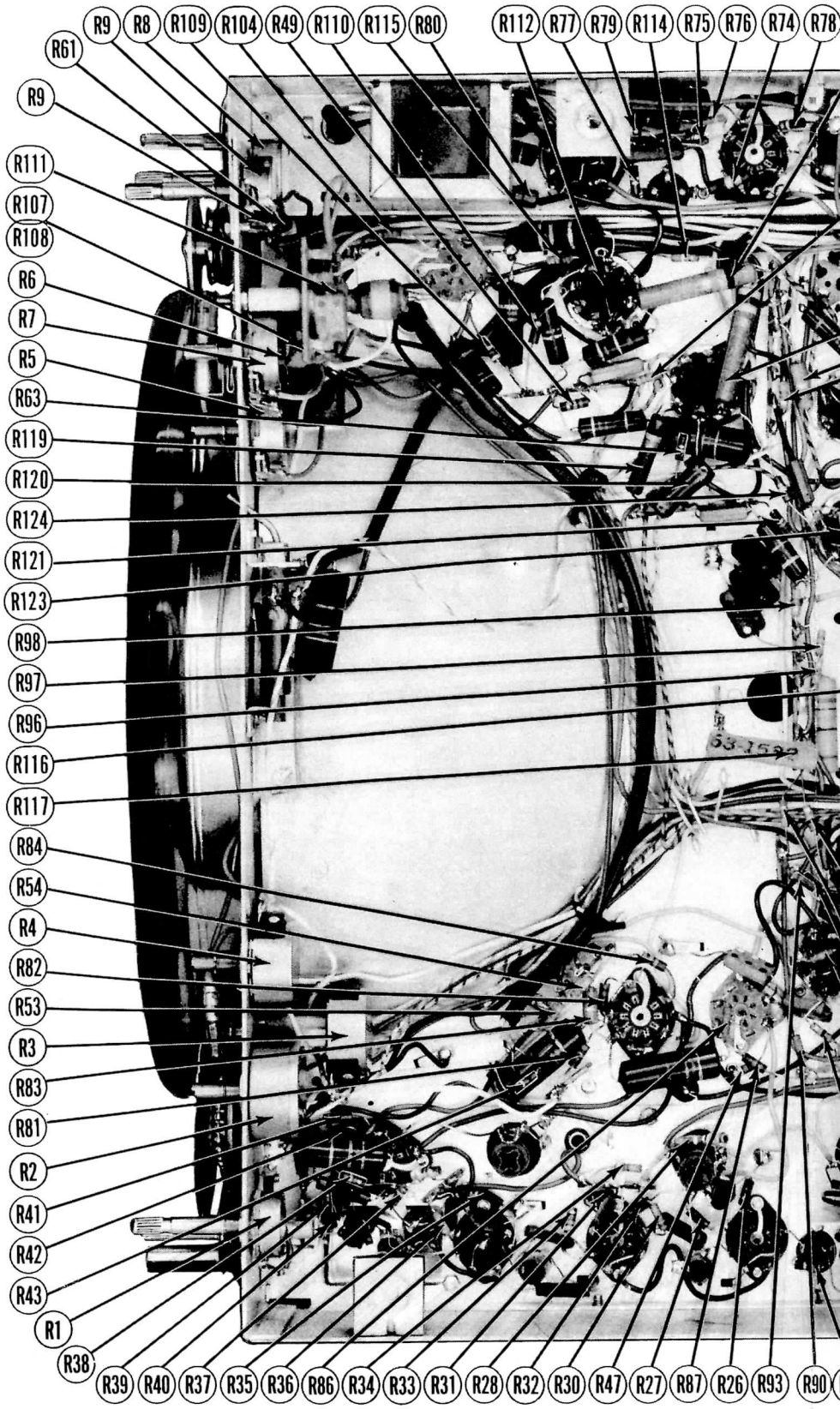
FIG. 7



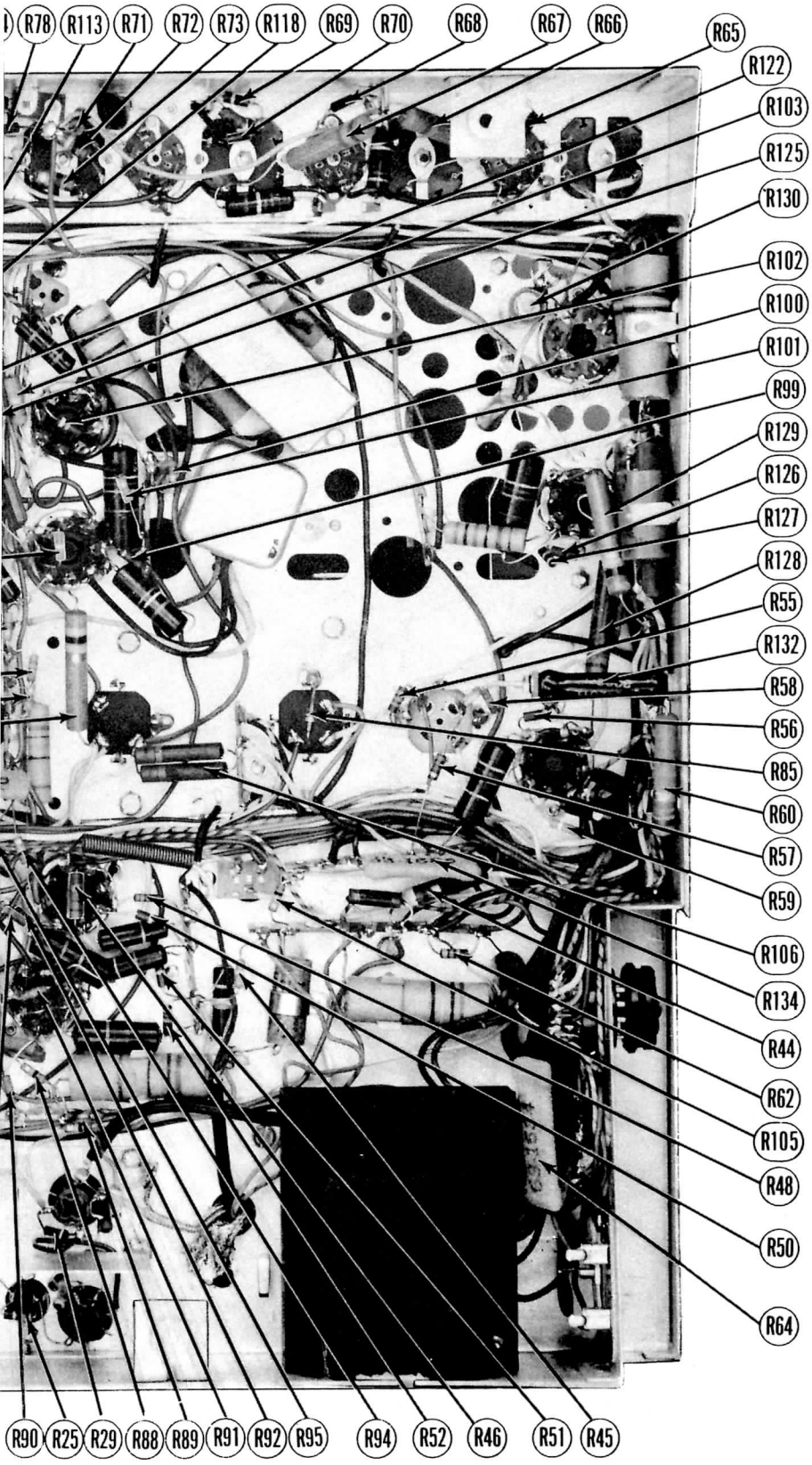
BLOCK DIAGRAM



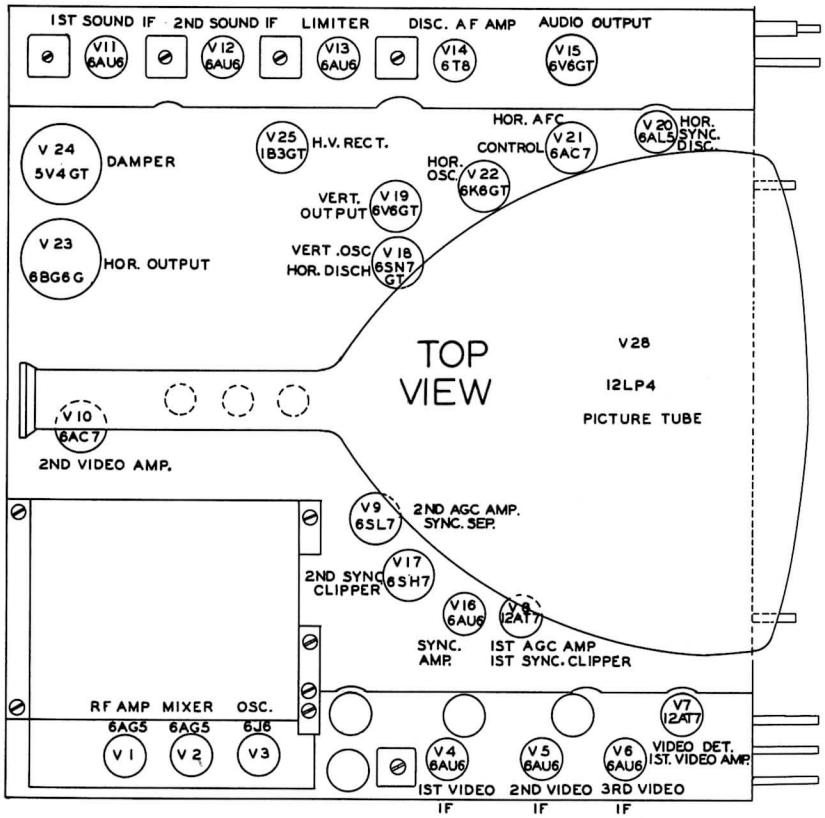
RF TUNER-LEFT SIDE

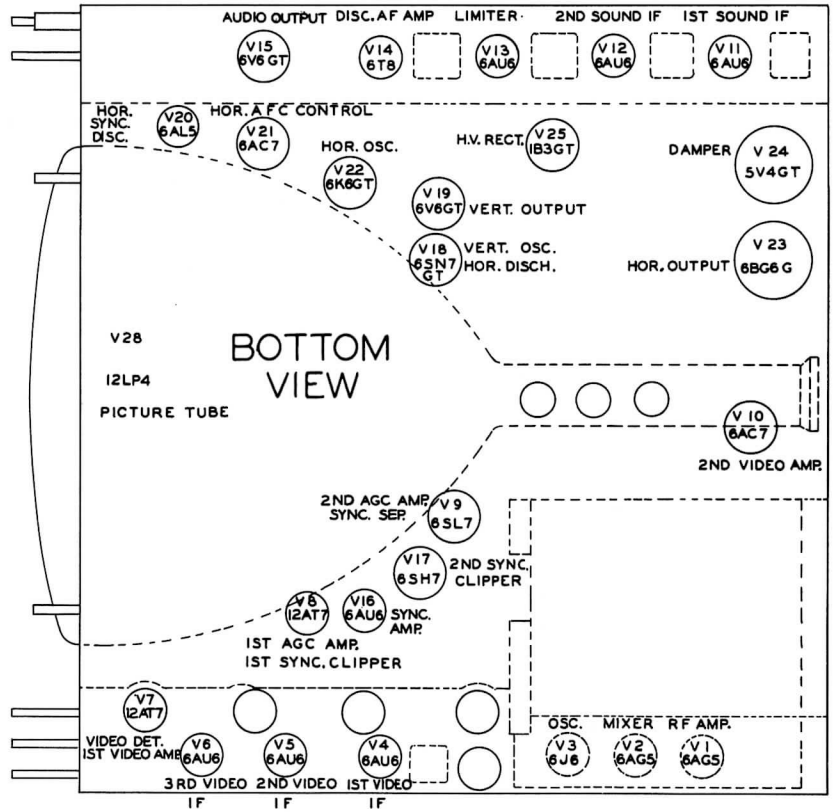


CHASSIS BOTTOM VIEW-RE



RESISTOR IDENTIFICATION





TUBE PLACEMENT CHART

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	-5.8VDC	.7VDC	6.3VAC	0V	195VDC	115VDC	.7VDC		
V 2	6AG5	-1.6VDC	.8VDC	6.3VAC	0V	195VDC	55VDC	.8VDC		
V 3	6J6	120VDC	‡95VDC	6.3VAC	0V	‡§ -4.2VDC	§-5VDC	0V		
V 4	6AU6	-.2VDC	0V	6.3VAC	0V	200VDC	140VDC	.6VDC		
V 5	6AU6	-.2VDC	0V	6.3VAC	0V	175VDC	140VDC	.6VDC		
V 6	6AH6	0V	0V	6.3VAC	0V	200VDC	135VDC	1.4VDC		
V 7	12AT7	-.6VDC	-.6VDC	0V	0V	0V	95VDC	-.5VDC	0V	6.3VAC
V 8	12AT7	140VDC	-.2VDC	2.3VDC	6.3VAC	6.3VAC	50VDC	-.5VDC	0V	0V
V 9	6SL7GT	.2VDC	-.1VDC	2.3VDC	-2.2VDC	185VDC	0V	6.3VAC	0V	
V 10	6AC7	0V	0V	0V	-.4VDC	0V	80VDC	6.3VAC	190VDC	
V 11	6AU6	0V	0V	6.3VAC	0V	135VDC	135VDC	.8VDC		
V 12	6AU6	0V	0V	6.3VAC	0V	135VDC	135VDC	.8VDC		
V 13	6AU6	-.7VDC	0V	6.3VAC	0V	55VDC	55VDC	0V		
V 14	6T8	-.5VDC	-.5VDC	4.6VDC	0V	6.3VAC	0V	0V	-.5VDC	75VDC
V 15	6V6GT	0V	6.3VAC	200VDC	225VDC	0V	0V	0V	9.8VDC	
V 16	6AU6	-.6VDC	0V	0V	6.3VAC	55VDC	135VDC	0V		
V 17	6SH7	0V	0V	0V	-.8VDC	0V	135VDC	6.3VAC	100VDC	
V 18	6SN7GT	-10VDC	140VDC 300VDC	0V	-20VDC	36VDC	0V	0V	6.3VAC	
V 19	6V6GT	0V	0V	330VDC	330VDC	0V	0V	6.3VAC	28VDC 42VDC	
V 20	6AL5	-2.6VDC	-9VDC	0V	6.3VAC	-1.2VDC	0V	-8.5VDC		
V 21	6AC7	0V	0V	0V	-.9VDC	0V	90VDC	6.3VAC	220VDC	
V 22	6K6GT-G	0V	0V	160VDC	180VDC	-18VDC	400VDC	6.3VAC	.4VDC	
V 23	6BG6G	0V	6.3VAC	14VDC	6.3VAC	1VDC	1VDC	0V	270VDC	TOP CAP †
V 24	5V4G	0V	480VDC	0V	400VDC	0V	400VDC	0V	480VDC	
V 25	1B3GT	† DO NOT MEASURE								
V 26	5U4G	0V	340VDC	0V	320VAC	0V	320VAC	0V	340VDC	
V 27	5U4G	0V	430VDC	0V	390VAC	300VDC	390VAC	0V	430VDC	
V28B	12KP4	*215VDC	205VDC	PIN 10 390VDC	PIN 11 215VDC	PIN 12 *215VDC				

Measurements taken on channel 4 unless otherwise stated
† Do not measure
§ Taken with vacuum tube voltmeter
* 6.3VAC measured between filament pins
‡ Measured on channel 10

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	2.5 Meg.	47Ω	.2Ω	0Ω	*2KΩ	*24KΩ	47Ω		
V 2	6AG5	3.5 Meg.	820Ω	.2Ω	0Ω	*2KΩ	*550KΩ	820Ω		
V 3	6J6	*6KΩ	*10KΩ	.2Ω	0Ω	1500Ω	47KΩ	0Ω		
V 4	6AU6	1.5 Meg.	0Ω	.2Ω	0Ω	*1500Ω	*3KΩ	82Ω		
V 5	6AU6	1.5 Meg.	0Ω	.2Ω	0Ω	*6KΩ	*3KΩ	82Ω		
V 6	6AH6	.2Ω	0Ω	.2Ω	0Ω	2KΩ	*36KΩ	150Ω		
V 7	12AT7	4KΩ	4KΩ	.1Ω	0Ω	0Ω	*12KΩ	1 Meg.	0Ω	.2Ω
V 8	12AT7	*2.8KΩ	32KΩ	2.2KΩ	.2Ω	.2Ω	*18KΩ	1 Meg.	0Ω	0Ω
V 9	6SL7GT	300Ω	1.3 Meg.	2.2KΩ	600KΩ	*20KΩ	0Ω	.2Ω	0Ω	
V 10	6AC7	0Ω	0Ω	0Ω	1 Meg.	0Ω	*8.5KΩ	.2Ω	**9KΩ	
V 11	6AU6	.1Ω	0Ω	.2Ω	0Ω	*7.5KΩ	*7.5KΩ	68Ω		
V 12	6AU6	.1Ω	0Ω	.2Ω	0Ω	*7.5KΩ	*7.5KΩ	68Ω		
V 13	6AU6	100KΩ	0Ω	.2Ω	0Ω	*47KΩ	*47KΩ	0Ω		
V 14	6T8	150KΩ	150KΩ	250KΩ	0Ω	.2Ω	0Ω	0Ω	15 Meg.	*220KΩ
V 15	6V6GT	0Ω	.2Ω	*1200Ω	*520Ω	330KΩ	24Ω	0Ω	220Ω	
V 16	6AU6	1 Meg.	0Ω	0Ω	.2Ω	*20KΩ	*2.8KΩ	0Ω		
V 17	6SH7	0Ω	0Ω	0Ω	850KΩ	0Ω	*2.8KΩ	.2Ω	*15KΩ	
V 18	6SN7GT	2.8 Meg.	**2.2Meg **90KΩ	0Ω	220KΩ	**580KΩ	0Ω	0Ω	.2Ω	
V 19	6V6GT	0Ω	0Ω	**3KΩ	**3KΩ	4.7 Meg.	Inf.	.2Ω	6.5KΩ 1500Ω	
V 20	6AL5	7.5KΩ	470KΩ	0Ω	.2Ω	1 Meg.	0Ω	470KΩ		
V 21	6AC7	0Ω	0Ω	0Ω	1.4Meg.	10Ω	**26KΩ	.2Ω	**23KΩ	
V 22	6K6GT-G	Inf.	0Ω	**8KΩ	**13KΩ	70KΩ	22KΩ	.2Ω	15Ω	
V 23	6BG6G	Inf.	.2Ω	150Ω	.2Ω	500KΩ	500KΩ	0Ω	**10KΩ	TOP CAP **15KΩ
V 24	5V4G	Inf.	**14KΩ	Inf.	**160Ω	Inf.	**160Ω	Inf.	**14KΩ	
V 25	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP **15KΩ
V 26	5U4G	Inf.	6KΩ	Inf.	20Ω	Inf.	20Ω	Inf.	6KΩ	
V 27	5U4G	Inf.	20KΩ	Inf.	22Ω	6KΩ	22Ω	Inf.	20KΩ	
V28B	12KP4	80KΩ	**9KΩ	PIN 10 **130Ω	PIN 11 120KΩ	PIN 12 80KΩ				

* Measured from pin 8 of V26
** Measured from pin 8 of V27

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.

ZENITH MODELS 28925, 28960, 28961, 28962, 28963

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.	6AG5	6AG5	7BD	
V2	Mixer	6AG5	6AG5	7BD	
V3	Oscillator	6J6	6J6	7BF	
V4	1st Video IF	6AU6	6AU6	7BK	
V5	2nd Video IF	6AU6	6AU6	7BK	
V6	3rd Video IF	6AH6	6AH6		
V7	Video Det.-1st Video Amp.	12AT7	12AT7		
V8	1st AGC Amp.-1st Sync.Clipper	12AT7	12AT7		
V9	2nd AGC Amp.-Sync . Sep.	6SL7GT	6SL7GT	8BD	
V10	2nd Video Amp.	6AC7	6AC7	8N	
V11	1st Sound IF	6AU6	6AU6	7BK	
V12	2nd Sound IF	6AU6	6AU6	7BK	
V13	Limiter	6AU6	6AU6	7BK	
V14	Disc.-AF Amp.	6T8	6T8		
V15	Audio Output	6V6GT	6V6GT	7AC	
V16	Sync. Amp.	6AU6	6AU6	7BK	
V17	2nd Sync. Clipper	6SH7	6SH7	8BK	
V18	Vert.Osc.-Horiz Disch.	6SN7GT	6SN7GT	8BD	
V19	Vert. Output	6V6GT	6V6GT	7AC	
V20	Horiz. Sync. Disc.	6AL5	6AL5	6BT	
V21	Horiz. AFC Control	6AC7	6AC7	8N	
V22	Horiz. Osc.	6K6GT	6K6GT	7S	
V23	Horiz. Output	6BG6G	6BG6G	5BT	
V24	Damper	5V4G	5V4G	5L	
V25	HV Rect.	1B3GT	1B3GT	3C	
V26	LV Rect.	5U4G	5U4G	5T	
V27	LV Rect.	5U4G	5U4G	5T	
V28A	Picture Tube	12LP4	12LP4		Used on 28F20 and 28F20Z Chassis
B	Picture Tube	12KP4	12KP4		" " " " " "
C	Picture Tube	10BP4	10BP4		Used on 28F21 and 28F22 Chassis
D	Picture Tube	10FP4	10FP4		" " " " " "

CAPACITORS

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

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1	15	200	22-1826	AF3G	UP2025			TVL-70	Filter
C2	40	400	22-1827	AF8J	UP1111 45†			TVL-8	"
C3A	20	475	22-1828	AF4K20G	UP9BJ			TVL-19	◓ Filter
B	100	300			1016				▲ "
C4A	20	475	22-1836	AFH14K4G8A	UP7CJ			TVL-31	◓ Decoupling
B	20	300			1014				■ "
C	40	25							▲ Output Cath. Bypass
C5	40	450	22-1573	AF8J	UP4045			TVL-7	Filter
C6A	40	350	22-1837	AF862J4A*	UP7CJ			TVL-23	◓ Filter
B	20	300			971				■ Hor. Output Cath. Byp.
C	10	200							▲ Decoupling
C7A	100	200	22-1838	AFH202E8B	UP7CJ			TVL-21	◓ Low Pass Filter
B	10	200			1054				■ 2nd V. Amp. Screen Byp
C	40	50							Vert. Output Cath. Byp.
C8	20	25	22-1903	PRS25/25	BR202A			TVA-6	Vert. Cent. Bypass
C9	500	3	22-1904	PRS6/500	BRH605			UHC-506	Hor. Cent. Bypass
C10	20	25	22-1903	PRS25/25	BR202A			TVA-6	Bias Filter
C11	200		22-1668			GP2K-200			AGC Filter
C12	200		22-1668			GP2K-200			Fixed Padder
C13	.001		22-1888			GP2L-001			RF Cath. Bypass
C14	200		22-1668			GP2K-200			RF Screen Bypass
C15	.001		22-1888			GP2L-001			RF Fil. Bypass
C16	200		22-1668			GP2K-200			RF Decoupling
C17	.001		22-1888			GP2L-001			RF Bypass
C18	200		22-1668			GP2K-200			Fixed Padder
C19	200		22-1668			GP2K-200			Mixer Cath. Bypass
C20	200		22-1668			GP2K-200			Mixer Screen Bypass
C21	1.2		22-1765						Osc. Coupling
C22	10		22-1895			NP0K-10			Osc. Grid Cap.
C23	47		22-1876			GP1K-50			" " "
C24	46								Fixed Trimmer ±2.5%
C25	100		22-1947			GP1K-100			Osc. Fil. Bypass
C26	100		22-1947	1468-0001	5W5T1	GP1K-100	MO.5-31	1FM-31	IF Coupling
C27	52		22-1870	1469-00005	5R5Q5		MO.5-45	MS-45	Fixed Trimmer ± 5%
C28	6		22-1869						Fixed Trimmer " "
C29A	.0015		105-17	1467-0015	1W5D15	GP2L-0015	MW.5-215	1FM-215	1st V. IF Screen Bypass
B	.0015			1467-0015	1W5D15	GP2L-0015	MW.5-215	1FM-215	1st V. IF Plate Dec.
C30	200		22-1668	1468-0002	5W5T2	GP2K-200	MO.5-32	1FM-32	IF Coupling
C31A	.0015		105-17	1467-0015	1W5D15	GP2L-0015	MW.5-215	1FM-215	AGC Filter
B	.0015			1467-0015	1W5D15	GP2L-0015	MW.5-215	1FM-215	2nd V. IF Screen Bypass
C32	200		22-1668	1468-0002	5W5T2	GP2K-200	MO.5-32	1FM-32	IF Coupling
C33A	.0015		105-17	1467-0015	1W5D15	GP2L-0015	MW.5-215	1FM-215	3rd V. IF Cath. Bypass
B	.0015			1467-0015	1W5D15	GP2L-0015	MW.5-215	1FM-215	3rd V. IF Screen Bypass
C34A	.0015		105-17	1467-0015	1W5D15	GP2L-0015	MW.5-215	1FM-215	RF Bypass
B	.0015			1467-0015	1W5D15	GP2L-0015	MW.5-215	1FM-215	3rd V. IF Plate Dec.
C35	7.5		22-1898						Diode Filter ±10%
C36	.047	400	22-1775	P488-047	GT4S5		ST-4-05	TM-15	Video Coupling
C37	.001		27-108						Fixed Trimmer
C38	.001		22-1888	1468-0001	1W5D1	GP2L-001	MW.5-21	1FM-21	V. Det. & V. Amp. Fil. Byp
C39	470	500	22-1138	1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	AGC Filter
C40	.001	400	22-1839	P688-001	GT6D1	GP2L-001	ST-4-001	TM-21	" "
C41	.01	400	27-1809	P488-01					GT4
C42	.1	200	22-1777	P288-1					GT2
C43	.01	400	22-1809	P488-01					GT4
C44	.047	400	22-1775	P488-047					GT4
C45	.1	600	22-1841	P688-1					GT6
C46	.033	600	22-1901	P688-033					GT6
C47	.0012	600	22-1880	P688-001					GT6
C48	.0012	600	22-1880	P688-001					GT6
C49	.0047	400	22-1847	P688-0047					GT6
C50	25		22-1887	1468-000025					5W5
C51	.005		22-1706	1467-005					1D5
C52	500		22-1703	1468-0005					5W5
C53	3		22-1693						
C54	.0047	400	22-1811	P488-0047					GT6
C55	.001		22-1886	1468-001					1W5
C56	.022	600	22-1813	P688-022					GT6
C57	.0047	600	22-1782	P688-0047					GT6
C58	.047	600	22-1844	P688-047					GT6
C59	.047	600	22-1844	P688-047					GT6
C60	47	500	22-1674	1468-00005					5W5
C61	.1	600	22-1841	P688-1					GT6
C62	250	500	22-182	1468-00025					5W5
C63	.022	600	22-1845	P688-022					GT6
C64	.01	600	22-1779	P688-01					GT6
C65	.005	200	22-1842	P688-005					GT6
C66	.005	200	22-1842	P688-005					GT6
C67	.005	200	22-1842	P688-005					GT6
C68	.01	600	22-1843	P688-01					GT6
C69	.047	600	22-1844	P688-047					GT6
C70	.1	600	22-1841	P688-1					GT6
C71	.0022	600	22-1845	P688-0022					GT6
C72	150	500	22-1137	1468-00015					5W5
C73	470	500	22-1138	1468-0005					5W5
C74	.015	200	22-1850	P288-015					GT6
C75	.0047	400	22-1847	P488-0047					GT6
C76	.047	200	22-1778	P288-047					GT2
C77	.047	400	22-1775	P488-047					GT4
C78	.0047	600	22-1849	P688-0047					GT6
C79	.015	200	22-1850	P288-015					GT6
C80	.0047	400	22-1847	P488-0047					GT4
C81	.047	600	22-1844	P688-047					GT6
C82	150	500	22-1137	1468-00015					5W5
C83	.01	400	22-1846	P488-01					GT4
C84	680	500	22-1833	1479-0007					2R5
C85	.001	1000	22-1851	P1088-001					GT1
C86	.047	600	22-1844	P688-047					GT6
C87	.1	600	22-1841	P688-1					GT6
C88	.1	600	22-1841	P688-1					GT6
C89	500	20000	22-1832						
C90	30		22-1871						5R5
C91	.0047	600	22-1782	P688-0047					GT6
C92	.047	600	22-1844	P688-047					GT6

* Omit bypass section.
† Parallel sections to obtain desired capa
‡ Used only in chassis 28F20Z.

ITEM No.	RATING: RESIST-ANCE	RATING: WATTS	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.
R1A	1.5Meg.	½	63-1671	
B	Shaft		Not Req.	
R2	750Ω	4	63-1668	W-750#
R3	20Ω	1	63-1670	W20X10&S#
R4	100Ω	1	63-1669	W-100#
R5A	2 Meg.	½	63-1673	
B	Shaft		Not Req.	
R6A	25KΩ	½	63-1675	D11-120
B	Shaft		Not Req.	KSS-3#
R7A	5000Ω	½	63-1674	D11-114
B	Shaft		Not Req.	E #
R8A	100KΩ	½	63-1682	D11-128
B	Shaft		Not Req.	E
R9A	50KΩ	½	63-1672	D11-123
B	Shaft		Not Req.	E
R10A	1 Meg.	½	63-1667	
B	5000Ω	½		
R11	350Ω to 4000Ω	1	63-1690	

File shaft to duplicate original.

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ZENITH PART No.	IRC PART
R12	1 Meg.	½	63-1912	BTS-1 M
R13	47Ω	½	63-1729	
R14	22KΩ	½	63-1841	BTS-22K
R15	1000Ω	½	63-1785	BTS-100
R16	2.2 Meg.	½	63-1926	
R17	820Ω	½	63-1782	BTS-820
R18	680KΩ	½	63-1905	
R19	1000Ω	½	63-1785	BTS-100
R20	4700Ω	1	63-943	BTA-470
R21	4700Ω	1	63-943	BTA-470
R22	1500Ω	½	63-1792	BTS-150
R23	47KΩ	½	63-1855	BTS-47K
R24	10Ω	½	63-1701	
R25	3300Ω	½	63-1806	BTS-330
R26	82Ω	½	63-1740	
R27	220Ω	½	63-1758	
R28	470Ω	½	63-1772	BTS-470
R29	1000Ω	½	63-1786	BTS-100
R30	6200Ω	½	63-1818	

PARTS LIST AND DESCRIPTIONS

NOTES
3F20 and 28F20Z Chassis
" " " "
3F21 and 28F22 Chassis
" " " "

r Electrolytic
: Capacitors.

RAGUE RT No.	IDENTIFICATION CODES AND INSTALLATION NOTES
L-70	Filter
L-8	"
L-19	◓ Filter
	▲ "
L-31	◓ Decoupling
	■ "
	▲ Output Cath. Bypass
L-7	Filter
L-23	◓ Filter
	■ Hor. Output Cath. Byp.
	▲ Decoupling
L-21	◓ Low Pass Filter
	■ 2nd V. Amp. Screen Byp
	Vert. Output Cath. Byp.
A-6	Vert. Cent. Bypass
C-	Hor. Cent. Bypass
506	
A-6	Bias Filter
	AGC Filter
	Fixed Padder
	RF Cath. Bypass
	RF Screen Bypass
	RF Fil. Bypass
	RF Decoupling
	RF Bypass
	Fixed Padder
	Mixer Cath. Bypass
	Mixer Screen Bypass
	Osc. Coupling
	Osc. Grid Cap.
	" " "
	Fixed Trimmer ±2.5%
	Osc. Fil. Bypass
M-31	IF Coupling
-45	Fixed Trimmer ± 5%
	Fixed Trimmer " "
M-215	1st V. IF Screen Bypass
-215	1st V. IF Plate Dec.
-32	IF Coupling
-215	AGC Filter
-215	2nd V. IF Screen Bypass
-32	IF Coupling
-215	3rd V. IF Cath. Bypass
-215	3rd V. IF Screen Bypass
-215	RF Bypass
-215	3rd V. IF Plate Dec.
	Diode Filter ±10%
5	Video Coupling
	Fixed Trimmer
-21	V. Det. & V. Amp. Fil. Byp
-35	AGC Filter
21	" "

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C41	.01	400	27-1809	P488-01	GT4S1	GP2-335-01	ST-4-01	TM-11	AGC Filter
C42	.1	200	22-1777	P288-1	GT2P1		ST-2-1	TM-1	" "
C43	.01	400	22-1809	P488-01	GT4S1	GP2-335-01	ST-4-01	TM-11	" "
C44	.047	400	22-1775	P488-047	GT4S5		ST-4-05	TM-15	Video Coupling
C45	.1	600	22-1841	P688-1	GT6P1		ST-6-1	TM-1	Brightness Cont. Byp.
C46	.033	600	22-1901	P688-033	GT6S3		ST-6-03	TM-13	Pic.Tube Cath. Bypass
C47	.0012	600	22-1880	P688-001	GT6D1	GP2L-0015	ST-6-001	TM-21	1st S. Decoupling
C48	.0012	600	22-1880	P688-001	GT6D1	GP2L-0015	ST-6-001	TM-21	2nd S. Decoupling
C49	.0047	400	22-1847	P688-0047	GT6D5	GP2M-005	ST-6-005	TM-25	2nd S. Fil. Bypass
C50	25		22-1887	1468-000025	5W5Q25	GP1K-25	MO.5-425	MS-425	Limiter Grid Filter
C51	.005		22-1706	1467-005	1D5D5	GP2M-005	MW.5-25	1FM-25	Limiter Decoupling
C52	500		22-1703	1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	De-emphasis
C53	3		22-1693						Fixed Trimmer ±5%
C54	.0047	400	22-1811	P488-0047	GT6D5	GP2M-005	ST-6-005	TM-25	Audio Coupling
C55	.001		22-1886	1468-001	1W5D1	GP2L-001	MW.5-21	1FM-21	AF Plate Bypass
C56	.022	600	22-1813	P688-022	GT6S2		ST-6-02	TM-12	Audio Coupling
C57	.0047	600	22-1782	P688-0047	GT6D5		ST-6-005	TM-25	Output Plate Bypass
C58	.047	600	22-1844	P688-047	GT6S5		ST-6-05	TM-15	Video Coupling
C59	.047	600	22-1844	P688-047	GT6S5		ST-6-05	TM-15	Sync. Coupling
C60	47	500	22-1674	1468-00005	5W5Q5	GP2K-50	MO.5-45	1FM-45	RF Bypass
C61	.1	600	22-1841	P688-1	GT6P1		ST-6-1	TM-1	Sync. Amp. Plate Dec.
C62	250	500	22-182	1468-00025	5W5T25	GP2K-250	MO.5-325	1FM-325	Sync. Coupling
C63	.022	600	22-1845	P688-022	GT6S2		ST-6-02	TM-12	Sync. Coupling
C64	.01	600	22-1779	P688-01	GT6S1	GP2-335-01	ST-6-01	TM-11	Sync. Coupling
C65	.005	200	22-1842	P688-005	GT6D5	GP2M-005	ST-6-005	TM-25	Integrator Net.
C66	.005	200	22-1842	P688-005	GT6D5	GP2M-005	ST-6-005	TM-25	" "
C67	.005	200	22-1842	P688-005	GT6D5	GP2M-005	ST-6-005	TM-25	" "
C68	.01	600	22-1843	P688-01	GT6S1	GP2-335-01	ST-6-01	TM-11	Vert. Osc. Grid Cap.
C69	.047	600	22-1844	P688-047	GT6S5		ST-6-05	TM-15	Vert. Discharge
C70	.1	600	22-1841	P688-1	GT6P1		ST-6-1	TM-1	Vert. Coupling
C71	.0022	600	22-1845	P688-0022	GT6D2	GP2M-002	ST-6-002	TM-22	" "
C72	150	500	22-1137	1468-00015	5W5T15	GP2K-150	MO.5-315	1FM-315	Differentiator Net.
C73	470	500	22-1138	1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	Hor. Sync. Coupling
C74	.015	200	22-1850	P288-015	GT6S15				Fixed Trimmer
C75	.0047	400	22-1847	P488-0047	GT6D5	GP2M-005	ST-6-005	TM-25	Hor. Sync. Coupling
C76	.047	200	22-1778	P288-047	GT2S5		ST-4-05	TM-15	AFC Filter
C77	.047	400	22-1775	P488-047	GT4S5		ST-4-05	TM-15	Hor. AFC Screen Byp.
C78	.0047	600	22-1849	P688-0047	GT6D5	GP2M-005	ST-6-005	TM-25	AFC Coupling
C79	.015	200	22-1850	P288-015	GT6S15				Phase Shifter
C80	.0047	400	22-1847	P488-0047	GT4D5	GP2M-005	ST-6-005	TM-25	Hor. Osc. Grid Cap.
C81	.047	600	22-1844	P688-047	GT6S5		ST-6-05	TM-15	Hor. Osc. Screen Bypass
C82	150	500	22-1137	1468-00015	5W5T15	GP2K-150	MO.5-315	1FM-315	Differentiator Net.
C83	.01	400	22-1846	P488-01	GT4S1	GP2-335-01	ST-4-01	TM-11	" "
C84	680	500	22-1833	1479-0007	2R5T7		MWS.5-37	MS-37	Hor. Discharge ± 5%
C85	.001	1000	22-1851	P1088-001	GT16D1		STM-16-001	TR-21	Hor. Coupling
C86	.047	600	22-1844	P688-047	GT6S5		ST-6-05	TM-15	Hor. Output Screen Byp.
C87	.1	600	22-1841	P688-1	GT6P1		ST-6-1	TM-1	Damper Filter
C88	.1	600	22-1841	P688-1	GT6P1		ST-6-1	TM-1	" "
C89	500	20000	22-1832						HV Filter
C90	30		22-1871		5R5Q3		MOS.5-43	MS-43	Fixed Trimmer ± 10%
C91	.0047	600	22-1782	P688-0047	GT6D5		ST-6-005	TM-25	Line Filter
C92	.047	600	22-1844	P688-047	GT6S5		ST-6-05	TM-15	Fixed Trimmer ‡

* Omit bypass section.
† Parallel sections to obtain desired capacity.
‡ Used only in chassis 28F20Z.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	1.5Meg.	½	63-1671			Vert. Hold Control
B	Shaft		Not Req.			Attach to R1A Per Instructions
R2	750Ω	4	63-1668	W-750#	58-750#	Focus Control
R3	20Ω	1	63-1670	W20X10&S#		Vert. Centering Control Tapped @ 10Ω
R4	100Ω	1	63-1669	W-100#	43-100#	Horiz. Centering Control
R5A	2 Meg.	½	63-1673		AM-83-S	Height Control
B	Shaft		Not Req.		KSS-3#	Attach to R5A Per Instructions
R6A	25KΩ	½	63-1675	D11-120	AM-40-S	Horiz. Drive Control
B	Shaft		Not Req.	KSS-3#	KSS-3#	Attach to R6A Per Instructions
R7A	5000Ω	½	63-1674	D11-114	AM-19-S	Vert. Linearity Control
B	Shaft		Not Req.	E #	KSS-3#	Attach to R7A Per Instructions
R8A	100KΩ	½	63-1682	D11-128	AM-49-S	Brightness Control
B	Shaft		Not Req.	E	KSS-3	Attach to R8A Per Instructions
R9A	50KΩ	½	63-1672	D11-123	AM-44-S	Horiz. Hold Control
B	Shaft		Not Req.	E	KSS-3	Attach to R9A Per Instructions
R10A	1 Meg.	½	63-1667			Volume Control and Switch
B	5000Ω	½				Contrast Control
R11	350Ω to 4000Ω	1	63-1690			Sensitivity Control

File shaft to duplicate original.

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	IDENTIFICATION CODES All resistors are ± 10% unless otherwise stated.	
R12	1 Meg.	½	63-1912	BTS-1 Meg.	RF Grid	20%
R13	47Ω	½	63-1729		RF Cathode	
R14	22KΩ	½	63-1841	BTS-22K	RF Screen Decoupling	
R15	1000Ω	½	63-1785	BTS-1000	RF Decoupling	
R16	2.2 Meg.	½	63-1926		Mixer Grid	20%
R17	820Ω	½	63-1782	BTS-820	Mixer Cathode	
R18	680KΩ	½	63-1905		Mixer Screen Dropping	20%
R19	1000Ω	½	63-1785	BTS-1000	Mixer Plate	
R20	4700Ω	1	63-943	BTA-4700	Osc. Plate	
R21	4700Ω	1	63-943	BTA-4700	" "	
R22	1500Ω	½	63-1792	BTS-1500		
R23	47KΩ	½	63-1855	BTS-47K	Osc. Grid	
R24	10Ω	½	63-1701		" "	
R25	3300Ω	½	63-1806	BTS-3300	Parasitic Suppressor	
R26	82Ω	½	63-1740		1st Video IF Grid	
R27	220Ω	½	63-1758		1st Video IF Cathode	
R28	470Ω	½	63-1772	BTS-470	1st Video IF Screen Decoupling	20%
R29	1000Ω	½	63-1786	BTS-1000	1st Video IF Plate Decoupling	20%
R30	6200Ω	½	63-1818		AGC Network	20%
					2nd Video IF Grid	5%

ITEM No.	RATING RESISTANCE	RATING WATTS	Z P
R31	82Ω	½	63-1
R32	220Ω	½	63-1
R33	4700Ω	½	63-1
R34	470Ω	½	63-1
R35	150Ω	½	63-1
R36	33KΩ	½	63-1
R37	470Ω	½	63-1
R38	39KΩ	½	63-1
R39	27KΩ	½	63-1
R40	3900Ω	½	63-1
R41	2.2 Meg.	½	63-1
R42	2.2 Meg.	½	63-1
R43	1000Ω	½	63-1
R44	470Ω	1	
R45	330KΩ	½	63-1
R46	2200Ω	½	
R47	180KΩ	½	
R48	1.5 Meg.	½	63-1
R49	68KΩ	½	
R50	10uKΩ	½	63-1
R51	100KΩ	½	63-1
R52	47KΩ	½	63-1
R53	820Ω	½	63-1
R54	12KΩ	½	63-1
R55	33KΩ	½	63-1
R56	1 Meg.	½	63-1
R57	8200Ω	½	63-1
R58	18KΩ	½	63-1
R59	39KΩ	½	63-1
R60	6200Ω	2	63-1
R61	82KΩ	½	63-1
R62	33KΩ	½	63-1
R63	120KΩ	½	63-1
R64	10KΩ	7	63-1
R65	68Ω	½	63-1
R66	6800Ω	2	63-1
R67	6800Ω	2	63-1
R68	68Ω	½	63-1
R69	100KΩ	½	63-1
R70	1 Meg.	½	63-1
R71	47KΩ	1	63-1
R72	150KΩ	1	63-1
R73	150KΩ	1	63-1
R74	10KΩ	½	63-1
R75	15 Meg.	½	63-1
R76	22KΩ	½	63-1
R77	100KΩ	½	63-1
R78	220KΩ	1	63-1
R79	330KΩ	½	63-1
R80	220Ω	1	63-1
R81	2.2 Meg.	½	63-1
R82	2.2 Meg.	½	63-1
R83	3300Ω	½	63-1
R84	33KΩ	½	63-1
R85	18KΩ	½	63-1
R86	2.2 Meg.	½	63-1
R87	2.2 Meg.	½	63-1
R88	10KΩ	½	63-1
R89	10KΩ	½	63-1
R90	1 Meg.	½	63-1
R91	12KΩ	½	63-1
R92	1 Meg.	½	63-1
R93	2.2 Meg.	½	63-1
R94	10KΩ	½	63-1
R95	8200Ω	½	63-1
R96	8200Ω	½	63-1
R97	8200Ω	½	63-1
R98	8200Ω	½	63-1
R99	1 Meg.	½	63-1
R100	220KΩ	½	63-1
R101	8200Ω	½	63-1
R102	4.7 Meg.	½	63-1
R103	1500Ω	1	63-1
R104	33KΩ	½	63-1
R105	10KΩ	½	63-1
R106	2700Ω	2	63-1
R107	470KΩ	½	63-1
R108	470KΩ	½	63-1
R109	470KΩ	½	63-1
R110	560Ω	½	63-1
R111	6800Ω	½	
R112	10Ω	½	63-1
R113	20KΩ	2	63-1
R114	39KΩ	½	63-1
R115	27KΩ	½	63-1
R116	30KΩ	2	63-1
R117	2500Ω	5	63-1
R118	22KΩ	½	63-1
R119	10KΩ	1	63-1
R120	5KΩ	3	63-1
R121	18KΩ	½	
R122	30KΩ	3	63-1
R123	220KΩ	½	
R124	560KΩ	½	
R125	8200Ω	½	63-1
R126	150Ω	½	63-1
R127	470KΩ	½	63-1
R128	150Ω	2	63-1
R129	10KΩ	2	63-1
R130	15KΩ	20	63-1
R131	4.7Ω	1	63-1
R132	3000Ω	10	63-2
R133	470KΩ	1	63-1
R134	620Ω	10	63-1
R135	10Ω	5	63-1

Note 1. Some models use 2 5

ESCRIPTIONS

	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
01	ST-4-01	TM-11	AGC Filter
	ST-2-1	TM-1	" "
01	ST-4-01	TM-11	" "
	ST-4-05	TM-15	Video Coupling
	ST-6-1	TM-1	Brightness Cont. Byp.
	ST-6-03	TM-13	Pic.Tube Cath. Bypass
5	ST-6-001	TM-21	1st S. Decoupling
5	ST-6-001	TM-21	2nd S. Decoupling
	ST-6-005	TM-25	3rd S. Fil. Bypass
	MO.5-425	MS-425	Limiter Grid Filter
	MW.5-25	1FM-25	Limiter Decoupling
0	MO.5-35	1FM-35	De-emphasis
			Fixed Trimmer ±5%
5	ST-6-005	TM-25	Audio Coupling
	MW.5-21	1FM-21	AF Plate Bypass
	ST-6-02	TM-12	Audio Coupling
	ST-6-005	TM-25	Output Plate Bypass
	ST-6-05	TM-15	Video Coupling
	ST-6-05	TM-15	Sync. Coupling
	MO.5-45	1FM-45	RF Bypass
	ST-6-1	TM-1	Sync. Amp. Plate Dec.
0	MO.5-325	1FM-325	Sync. Coupling
	ST-6-02	TM-12	Sync. Coupling
01	ST-6-01	TM-11	Sync. Coupling
	ST-6-005	TM-25	Integrator Net.
5	ST-6-005	TM-25	" "
5	ST-6-005	TM-25	" "
01	ST-6-01	TM-11	Vert. Osc. Grid Cap.
	ST-6-05	TM-15	Vert. Discharge
	ST-6-1	TM-1	Vert. Coupling
2	ST-6-002	TM-22	" "
0	MO.5-315	1FM-315	Differentiator Net.
0	MO.5-35	1FM-35	Hor. Sync. Coupling
			Fixed Trimmer
5	ST-6-005	TM-25	Hor. Sync. Coupling
	ST-4-05	TM-15	AFC Filter
	ST-4-05	TM-15	Hor. AFC Screen Byp.
5	ST-6-005	TM-25	AFC Coupling
			Phase Shifter
5	ST-6-005	TM-25	Hor. Osc. Grid Cap.
	ST-6-05	TM-15	Hor. Osc. Screen Bypass
0	MO.5-315	1FM-315	Differentiator Net.
01	ST-4-01	TM-11	" "
	MWS.5-37	MS-37	Hor. Discharge ± 5%
	STM-16-001	TR-21	Hor. Coupling
	ST-6-05	TM-15	Hor. Output Screen Byp.
	ST-6-1	TM-1	Damper Filter
	ST-6-1	TM-1	" "
			HV Filter
	MOS.5-43	MS-43	Fixed Trimmer ± 10%
	ST-6-005	TM-25	Line Filter
	ST-6-05	TM-15	Fixed Trimmer +

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INSTALLATION NOTES
ert. Hold Control
ttach to R1A Per Instructions
ocus Control
ert. Centering Control Tapped @ 10Ω
oriz. Centering Control
eight Control
ttach to R5A Per Instructions
oriz. Drive Control
ttach to R6A Per Instructions
ert. Linearity Control
ttach to R7A Per Instructions
rightness Control
ttach to R8A Per Instructions
oriz. Hold Control
ttach to R9A Per Instructions
olume Control and Switch
ontrast Control
ensitivity Control

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IDENTIFICATION CODES	
esistors are ± 10% unless otherwise stated.	
d	20%
hode	
een Decoupling	
oupling	
Grid	20%
Cathode	
Screen Dropping	20%
Plate	
late	
"	
rid	
"	
tic Suppressor	
deo IF Grid	
deo IF Cathode	
deo IF Screen Decoupling	20%
deo IF Plate Decoupling	20%
twork	20%
deo IF Grid	5%

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	ALL RESISTOR ARE ± 10% UNLESS OTHERWISE STATED.
R31	82Ω	½	63-1740		2nd Video IF Cathode
R32	220Ω	½	63-1758		2nd Video IF Screen Decoupling 20%
R33	4700Ω	½	63-1816	BTS-4700-5%	2nd Video IF Plate 5%
R34	470Ω	½	63-1772	BTS-470	2nd Video IF Plate Decoupling 20%
R35	150Ω	½	63-1751		3rd Video IF Cathode 20%
R36	33KΩ	½	63-1848	BTS-33K	3rd Video IF Screen Dropping
R37	470Ω	½	63-1772	BTS-470	3rd Video IF Plate Decoupling 20%
R38	39KΩ	½	63-1852	BTS-39K	Peaking Coil Shunt
R39	27KΩ	½	63-1845	BTS-27K	AGC Amp. Grid
R40	3900Ω	½	63-1809	BTS-3900-5%	Video Det. Load 5%
R41	2.2 Meg.	½	63-1926	BTS-2.2 Meg.	Bias Voltage Divider
R42	2.2 Meg.	½	63-1926	BTS-2.2 Meg.	1st Video Amp. Grid
R43	1000Ω	½	63-1786	BTS-1000	1st Video Amp. Plate
R44	470Ω	1		BTA-470	Decoupling
R45	330KΩ	½	63-1890	BTA-330K	AGC Network 20%
R46	2200Ω	½		BTS-2200-5%	1st AGC Amp. Cathode 5%
R47	180KΩ	½		BTS-180K	Voltage Divider
R48	1.5 Meg.	½	63-1919	BTS-1.5 Meg.	2nd AGC Amp. Plate
R49	68KΩ	½		BTS-68K	" " " "
R50	10KΩ	½	63-1870	BTS-100K	AGC Filter 20%
R51	100KΩ	½	63-1870	BTS-100K	" " 20%
R52	47KΩ	½	63-1856	BTS-47K	" " 20%
R53	820Ω	½	63-1781	BTS-820K-5%	Video Amp. Plate 5%
R54	12KΩ	½	63-1831	BTS-12K	Voltage Divider
R55	33KΩ	½	63-1849	BTS-33K	" " 20%
R56	1 Meg.	½	63-1918	BTS-1 Meg.	2nd Video Amp. Grid 20%
R57	8200Ω	½	63-1824	BTS-8200	2nd Video Amp. Screen
R58	18KΩ	½	63-1827	BTS-18K	Voltage Divider
R59	39KΩ	½	63-1852	BTS-39K	Peaking Coil Shunt
R60	6200Ω	2	63-1579		2nd Video Amp. Plate 5%
R61	82KΩ	½	63-1866	BTS-82K	Voltage Divider
R62	33KΩ	½	63-1849	BTS-33K	Picture Tube Cathode 20%
R63	120KΩ	½	63-1873	BTS-120K	Voltage Divider
R64	10KΩ	7	63-1684	AB-10K	Bleeder
R65	68Ω	½	63-1737		1st Sound IF Cathode 20%
R66	6800Ω	2	63-1571	BT-2-6800	1st Sound IF Decoupling
R67	6800Ω	2	63-1571	BT-2-6800	2nd Sound IF Decoupling
R68	68Ω	½	63-1737		2nd Sound IF Cathode 20%
R69	100KΩ	½	63-1870	BTS-100K	Limiter Grid 20%
R70	1 Meg.	½	63-1912	BTS-1 Meg.	Isolation 20%
R71	47KΩ	1	63-1194	BTA-47K	Limiter Decoupling
R72	150KΩ	1	63-1876	BTA-150K-5%	Disc. Load 5%
R73	150KΩ	1	63-1876	BTA-150K-5%	" " 5%
R74	10KΩ	½	63-1828	BTS-10K	De-emphasis
R75	15 Meg.	½	63-1961	BTS-15 Meg.	AF Grid
R76	22KΩ	½	63-1842	BTS-22K	Tone Compensation 20%
R77	100KΩ	½	63-1869	BTS-100K	De-emphasis
R78	220KΩ	½	63-1883	BTS-220K	AF Plate
R79	330KΩ	½	63-1890	BTS-330K	Output Grid
R80	220Ω	1	63-1227	BW-1-220	Output Cathode
R81	2.2 Meg.	½	63-1926	BTS-2.2 Meg.	Voltage Divider 20%
R82	2.2 Meg.	½	63-1926	BTS-2.2 Meg.	Sync. Clipper Grid 20%
R83	3300Ω	½	63-1807	BTS-3300	Sync. Clipper Plate
R84	33KΩ	½	63-1849	BTS-33K	Sync. Clipper Plate 20%
R85	18KΩ	½	63-1827	BTS-18K	Voltage Divider
R86	2.2 Meg.	½	63-1926	BTS-2.2 Meg.	Sync. Amp. Grid
R87	2.2 Meg.	½	63-1926	BTS-2.2 Meg.	Voltage Divider
R88	10KΩ	½	63-1827	BTS-10K	Sync. Amp. Plate
R89	10KΩ	½	63-1827	BTS-10K	Sync. Amp. Plate Decoupling
R90	1 Meg.	½	63-1912	BTS-1 Meg.	2nd Sync. Clipper Grid 20%
R91	12KΩ	½	63-1831	BTS-12K	2nd Sync. Clipper Plate
R92	1 Meg.	½	63-1912	BTS-1 Meg.	Sync. Sep. Grid 20%
R93	2.2 Meg.	½	63-1926	BTS-2.2 Meg.	Voltage Divider
R94	10KΩ	½	63-1827	BTS-10K	Sync. Sep. Plate
R95	8200Ω	½	63-1824	BTS-8200	" " "
R96	8200Ω	½	63-1824	BTS-8200	Integrator Network
R97	8200Ω	½	63-1824	BTS-8200	" "
R98	8200Ω	½	63-1824	BTS-8200	" "
R99	1 Meg.	½	63-1912	BTS-1 Meg-5%	Vert. Osc. Grid 5%
R100	220KΩ	½	63-1884	BTS-220K	Vert. Osc. Plate
R101	8200Ω	½	63-1824	BTS-8200	Vert. Peaking
R102	4.7 Meg.	½	63-1940	BTS-4.7 Meg.	Vert. Output Grid 20%
R103	1500Ω	1	63-1967	BTA-1500	Vert. Output Cathode
R104	33KΩ	½	63-1848	BTS-33K	Bias Network
R105	10KΩ	½	63-1827	BTS-10K	" "
R106	2700Ω	2	63-1169	BT-2-2700	Filter See Note 1
R107	470KΩ	½	63-1896	BTS-470K	Horiz. Disc. Load
R108	470KΩ	½	63-1896	BTS-470K	" " "
R109	470KΩ	½	63-1896	BTS-470K	AFC Filter 20%
R110	560Ω	½	63-1775	BTS-560	Horiz. AFC Grid
R111	6800Ω	½		BTS-6800	Differentiator Net.
R112	10Ω	½	63-1701		Horiz. AFC Cathode
R113	20KΩ	2	63-1566		Horiz. AFC Plate 5%
R114	39KΩ	½	63-1852	BTS-39K	Horiz. AFC Screen Dropping
R115	27KΩ	½	63-1845	BTS-27K	Voltage Divider
R116	30KΩ	2	63-947	BT-2-27K	Bleeder
R117	2500Ω	5	63-1532	AB-2500	Filter
R118	22KΩ	½	63-1842	BTS-22K	Horiz. Osc. Grid 20%
R119	10KΩ	1	63-1071	BTA-10K	Horiz. Osc. Screen Dropping
R120	5KΩ	3	63-1533	AB-5000	Horiz. Osc. Plate
R121	18KΩ	½		BTS-18K	Differeniator
R122	30KΩ	3	63-1533	BT-2-27K	Bleeder
R123	220KΩ	½		BTS-220K	Horiz. Discharge Grid
R124	560KΩ	½		BTS-560K-5%	Horiz. Discharge Plate 5%
R125	8200Ω	½	63-1824	BTS-8200	Horiz. Peaking
R126	150Ω	½	63-1751		Parasitic Suppressor 20%
R127	470KΩ	½	63-1898	BTS-470K	Horiz. Output Grid
R128	150Ω	2	63-1578	BW-2-150	Horiz. Output Cathode
R129	10KΩ	2	63-1198	BT-2-10K	Horiz. Output Screen Dropping
R130	15KΩ	20	63-1679	DG-15K	Damper Filter
R131	4.7Ω	1	63-1581	BW-1-4.7	HV Rect. Filament
R132	3000Ω	10	63-2011	AB-3000	Filter
R133	470KΩ	1	63-1898		HV Filter
R134	620Ω	10	63-1685	AB-600	Focus Coil Shunt
R135	10Ω	5	63-1996	AB-10	Bias Network

Note 1. Some models use 2 5100Ω resistors in parallel in this application.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	ZENITH PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.
T1A	117VAC @ 2.35A	790VCT @ .170 ADC 650VCT @ .210 ADC	5VAC @ 3A	5VAC @ 3A	95-1115‡		TP-390	

‡ Used in chassis 28F20, 28F21

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.
T1B	117VAC 2.35A	810VCT @ .170 ADC 660VCT @ .195 ADC	5VAC @ 3A	5VAC @ 3A	95-1124‡		TP-390	

‡ Used in chassis 28F22

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	ZENITH PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.
T2	117VAC @ .76A	5VAC @ 2A SEC. 4 6.4VAC @ 4.1A	6.4VAC @ .6A	6.4VAC @ 5A	95-1116			

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE		REPLACEMENT DATA				NOTES
	PRI.	SEC.	ZENITH PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.	
T3	67Ω CT	58Ω Tap @ 15Ω	S-15041				Horiz. Osc.-AFC Trans.
T4	57Ω	200Ω	95-1113	A-8121	TBO-1	A-4000	Vert. Block Osc. Trans
T5	455Ω Tap @ 80Ω	7Ω Tap @ .5Ω SEC. 2 0Ω	S-15015				Hor. Output Trans.
T6	590Ω	14Ω	95-1112	A-8115 Ø	TVO-1 Ø	A-3035 Ø	Vert. Output Trans.
T7A	14Ω		95-1110	DY-1			Hor. Deflection Yoke
B	60Ω						Vert. Deflection Yoke
T8	570Ω		95-1111	FC-10			Focus Coil

Ø Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ZENITH PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
T9	5100Ω	3.5Ω	570Ω	.6Ω	95-1108	A-3849	RO-9	A-2902	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	V. C. IMP.	ZENITH PART No.	JENSEN PART No.	QUAM PART No.	† Replace output transformer to match 6-8Ω voice coil.
SP1A	PM	3.5Ω	49-649 *	ST-120 MOD.P10-S†	10A31	
B	PM	3.5Ω	49-654 #	ST-107 MOD.P5-V	52A21	* Used in models 28T960,28T961 28T962, 28T963
	CONE DIA.	V. C. DIA.				# Used in model 28T925
SP2A	9 3/8"	3/4"				
B	5"	9/16"				

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	ZENITH PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	
L1	.170A	135Ω	5 Henry	95-1109	C-2325		C-2971	
L2	.210A	135Ω	5 Henry	95-1109	C-2325		C-2971	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

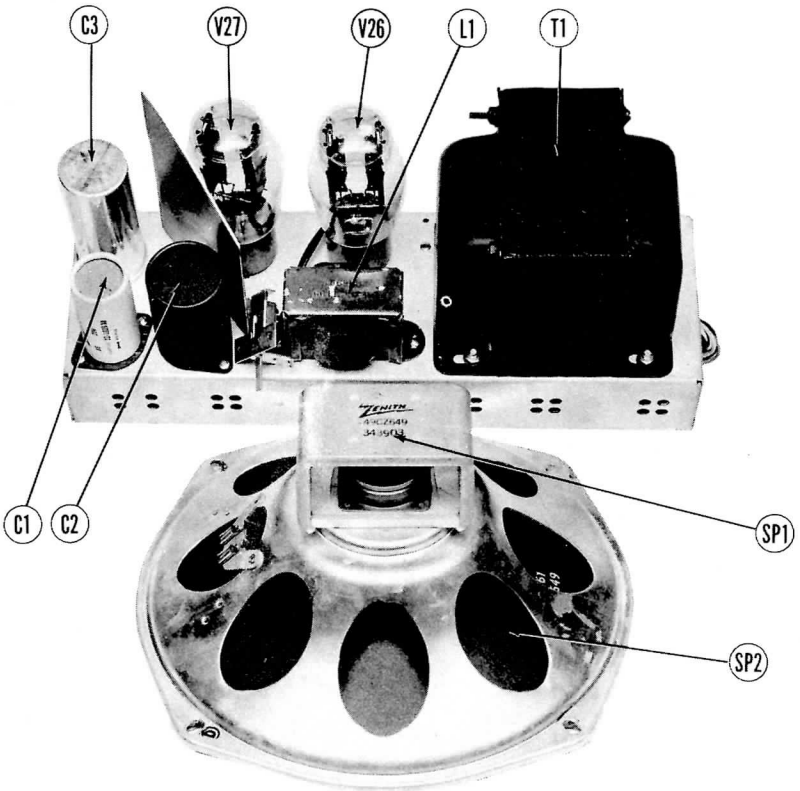
ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	
L3	Ant. Input	0Ω		S-15062		
L4	Mixer Plate	.5Ω		S-15064		
L5	High Freq. Osc.	0Ω		S-15043		
L6	Low Freq. Osc.	0Ω		S-15066		
L7	Fil. Choke	.1Ω		S-15065		
L8	1st Video IF	0Ω	0Ω	S-15048		
L9	Sound IF Trap	.2Ω		S-15050		
L10	Video IF Coupling	.2Ω		S-15049		
L11	2nd Video IF	.1Ω		S-15051		
L12	Adjacent Sound IF Trap	0Ω		S-15053		
L13	3rd Video IF	.1Ω		S-15052		
L14	4th Video IF	.1Ω	.1Ω	S-15054		
L15	Sound IF Trap	0Ω		S-15057		
L16	Peaking	5Ω		S-15058		
L17	Peaking	7Ω		S-15059		
L18	Fil. Choke	.1Ω		S-15060		
L19	RF Choke	1.5Ω		S-15128		
L20	Peaking	2Ω		S-15125		
L21	Peaking	8Ω		S-15127		
L22	Peaking	6Ω		S-15126		
L23	1st Sound IF	.2Ω		95-1121		
L24	2nd Sound IF	.1Ω	.1Ω	95-1118		
L25	3rd Sound IF	.1Ω	.1Ω	95-1119		
L26	Sound Disc. Transformer	.1Ω	.1Ω	95-1120		
L27	Width Control	.3Ω		S-15042		
L28	Fil. Choke			20-255		

DIAL LIGHTS

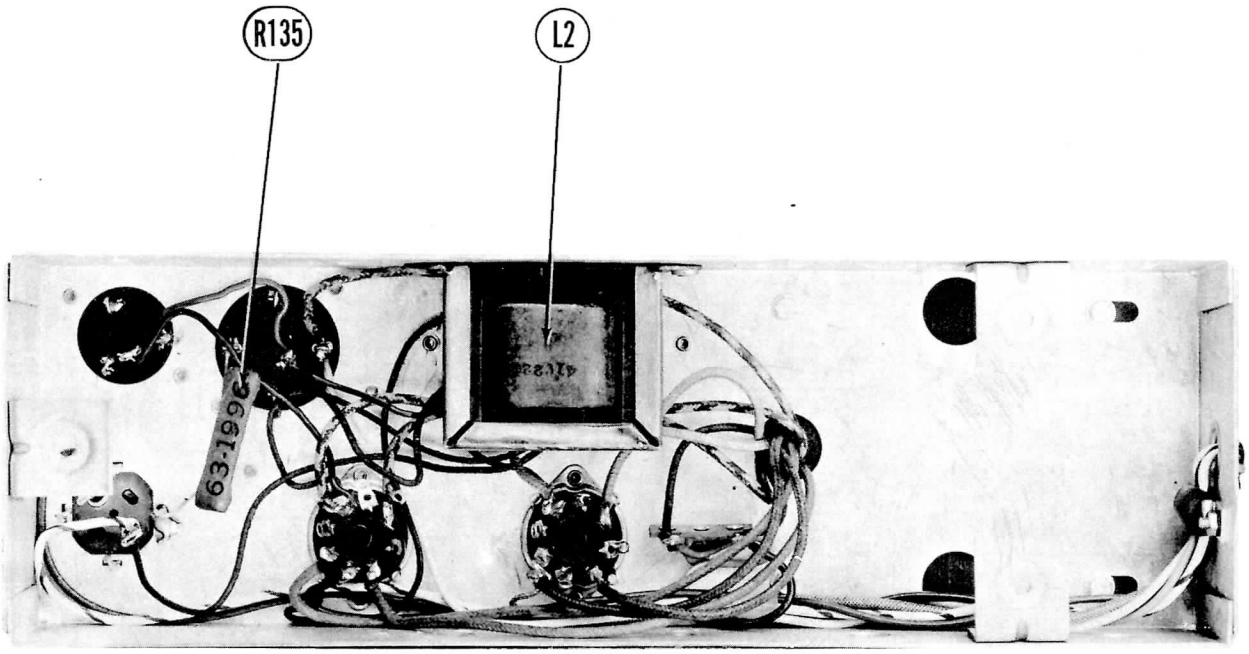
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					ZENITH PART No.		
M1	Bayonet	6-8V	0.25A	Blue	100-36		Type #44
M2	Bayonet	6-8V	0.25A	Blue	100-36		Type #44

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Tuner Assembly	S-15020	
M4	Channel Strip Assy.	S-15029	Channel #2-Channel number is stamped on each strip
		S-15030	Channel #3
		S-15031	Channel #4
		S-15032	Channel #5
		S-15033	Channel #6
		S-15034	Channel #7
		S-15035	Channel #8
		S-15036	Channel #9
		S-15037	Channel #10
		S-15038	Channel #11
		S-15039	Channel #12
		S-15040	Channel #13
M5	Focus Range Switch		
M6	Dial Light Switch		
	Ion Trap	S-15320	Used only with 10BP4 or 12LP4 Picture tube
	Socket and Wire Assy.	S-15207	Picture tube
	AC Plug & Bracket Assy.	S-15132	
	Channel Indicator Disc.	27-112	
	Contrast Indicator Disc.	27-113	
	Antenna Terminal Strip	83-1570	
	12" Safety Glass	192-122	
	10" Safety Glass	192-123	



POWER SUPPLY CHASSIS-TOP VIEW



POWER SUPPLY CHASSIS-BOTTOM VIEW

HORIZONTAL FREQUENCY ADJUSTMENT

1. Turn the horizontal hold control fully counter clockwise.
2. Adjust Horizontal Frequency adjustment B2 until picture locks in "sync".
3. Turn the horizontal hold fully clockwise. If picture loses "sync", slight readjustment is necessary. Readjustment is also necessary if receiver loses sync when the channel selector switch is turned to another channel and then returned to the original channel.

HORIZONTAL PHASE ADJUSTMENT

Turn adjustment screw B3 and the picture will move to the right or left side of the raster. When B3 is properly adjusted the picture is moved farthest to the right. A broad peak is noted at this point.

AGC ADJUSTMENT

The performance of the AGC circuit is checked and adjusted by applying a known voltage to the video detector test jack "S" and noting the corresponding voltage at the AGC test jack "C". To adjust the AGC circuit to the correct operating point proceed as follows:

1. Turn channel selector switch to a locally unused channel. Disconnect the antenna and short the antenna terminals.
2. Apply -1.5 Volts to test jack "S" (Positive to chassis). This voltage may be obtained from the center arm of a high value potentiometer with the outside terminals across a 3 volt battery.
3. Connect VTVM from test jack "C" to chassis.
4. Adjust B1 until -3.8 Volt reading is obtained on VTVM.
5. Readjust input to test jack "S" to -2 Volts. The corresponding voltage on the VTVM connected to test jack "C" should be -6 to -8 volts.