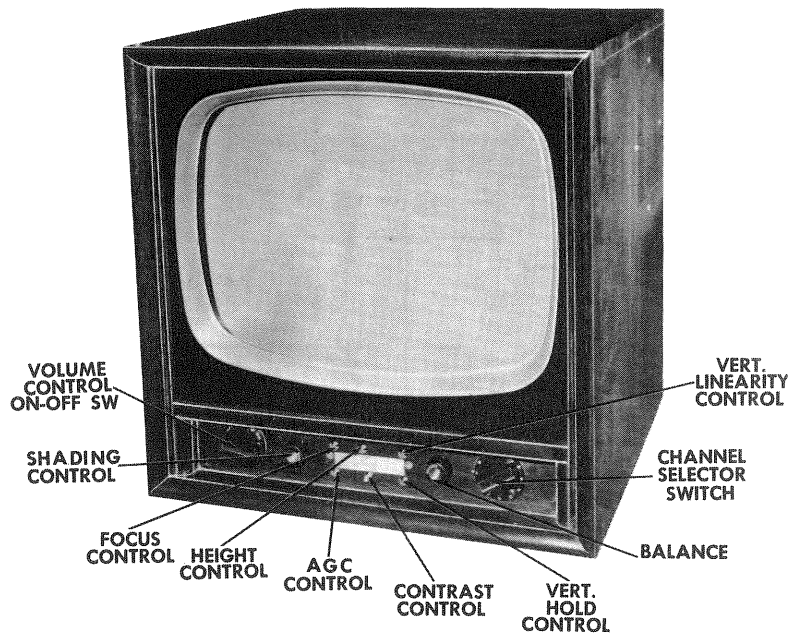


AND INDUCTOR IDENTIFICATION



Capehart Model 331MX

TRADE NAME	CAPEHART: The CX-33DX chassis has 6 production run versions. The production chassis and production run or "Series" numbers are stamped on both the front and rear aprons of the chassis. Example: A chassis stamped "CT-27-3" is the CT-27 version of the CX-33DX chassis-Production run "3". There have been two production runs of this chassis, those coded with a "-2" are the original production. The chassis are classified as follows.	
MODEL		CHASSIS
1T17MX	.....	CT-27
2T20MX	.....	CT-38
3C17MX, 319MX, BX, 320MX, BX,	.....	CT-27
321AMX, ABX, 322RAMX, RABX	.....	CT-27
324BX, 325AFX, 326MX	.....	CT-27
331MX, BX,	.....	CT-38
335MX, BX, 336CX, FX	.....	CT-38
338MX	.....	CT-45
339MX	.....	CT-38
340X	.....	CT-45
341X	.....	CT-45
MANUFACTURER	Capehart - Farnsworth Corp., Fort Wayne Ind.	
TYPE SET	Television Receiver	
TUBES	Twenty Three	
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 2.3Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13	

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Alignment Instructions	6, 7
Drive Cord Stringing	11
Disassembly Instructions	11
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Capacitor and Alignment Identification	4, 9
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RF Tuner	10
Resistor and Inductor Identification	15, 16
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Schematic (Alternate Tuner)	8
Schematic (TV)	2
Tube Placement Charts	5

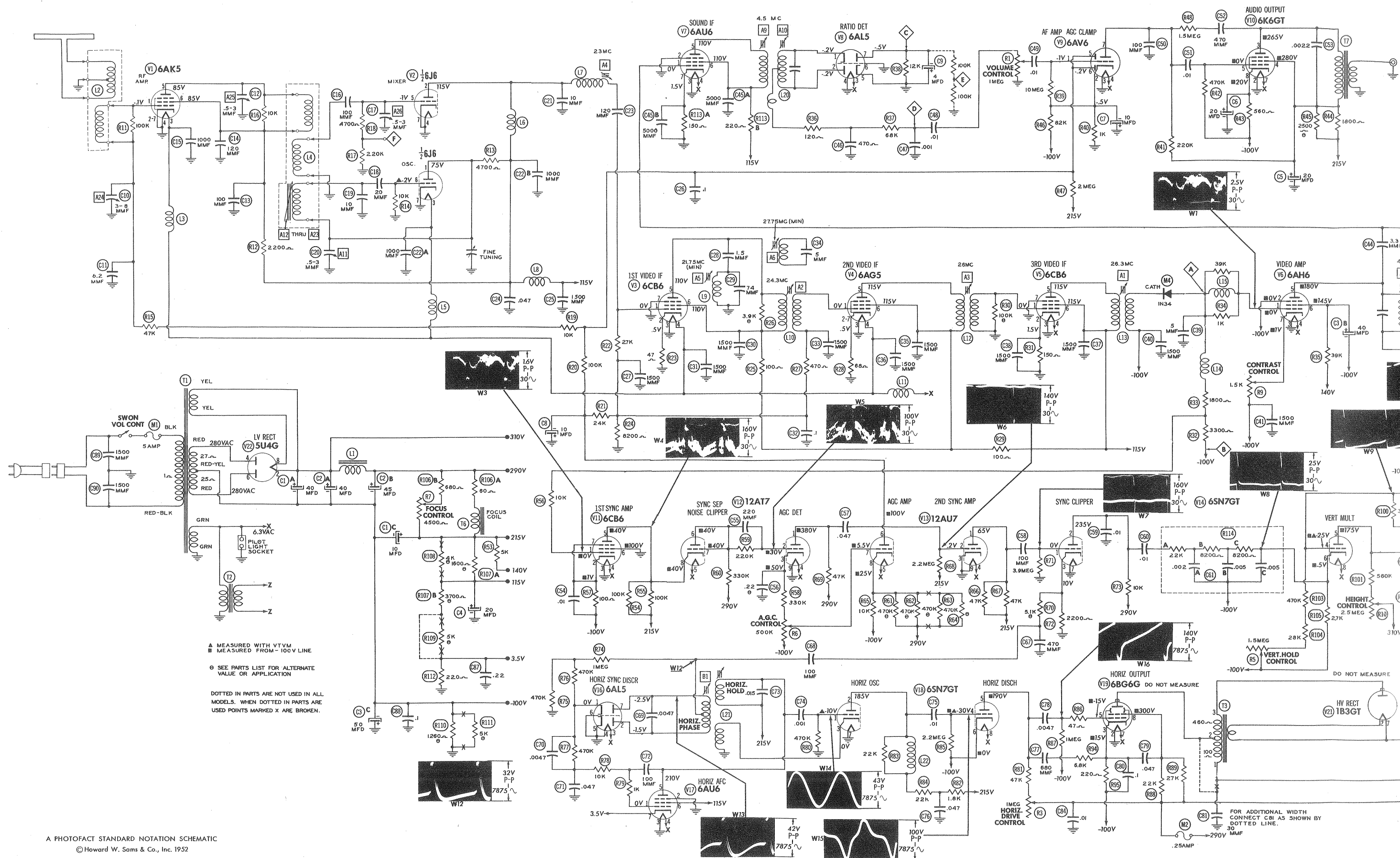
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

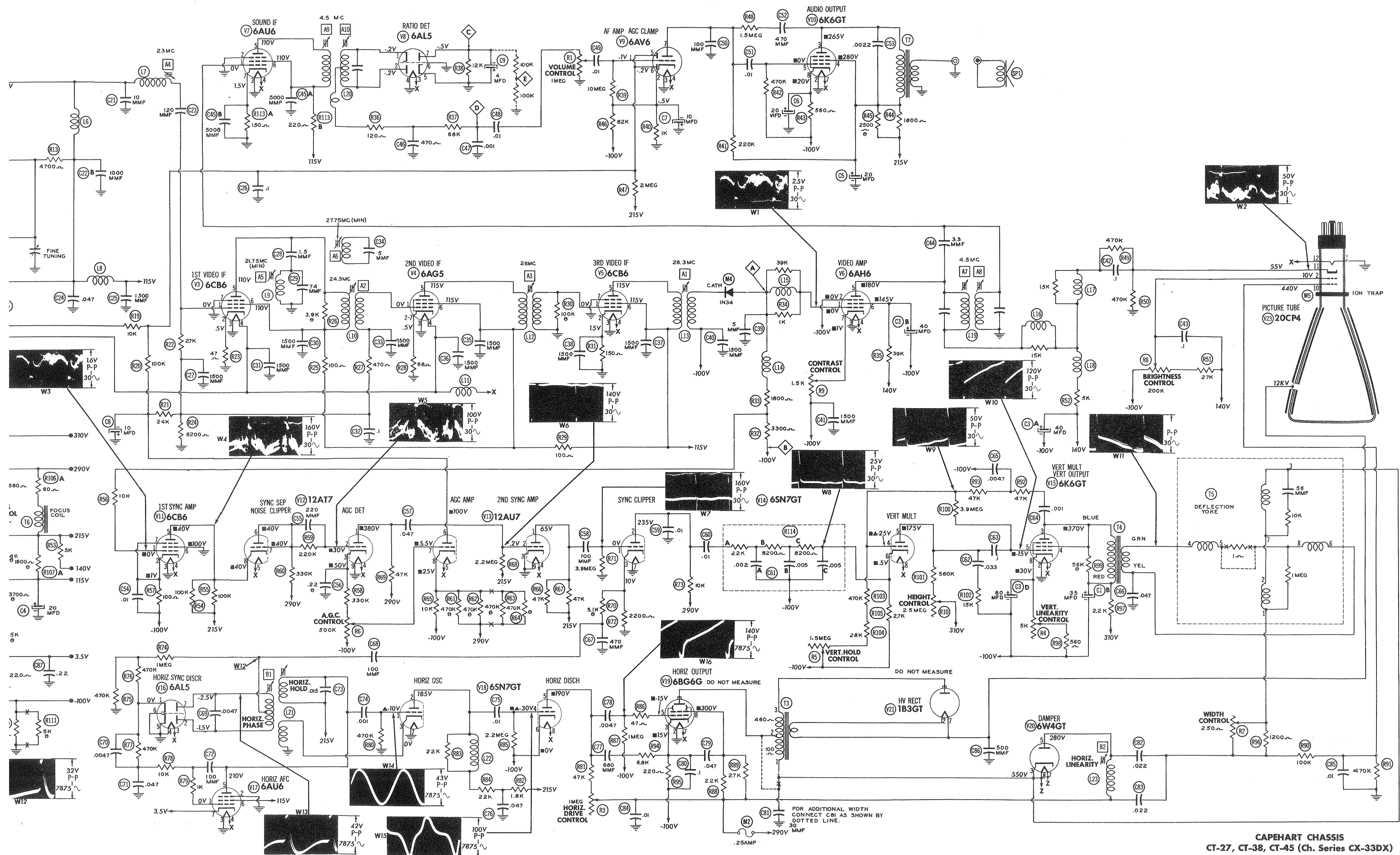
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W.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

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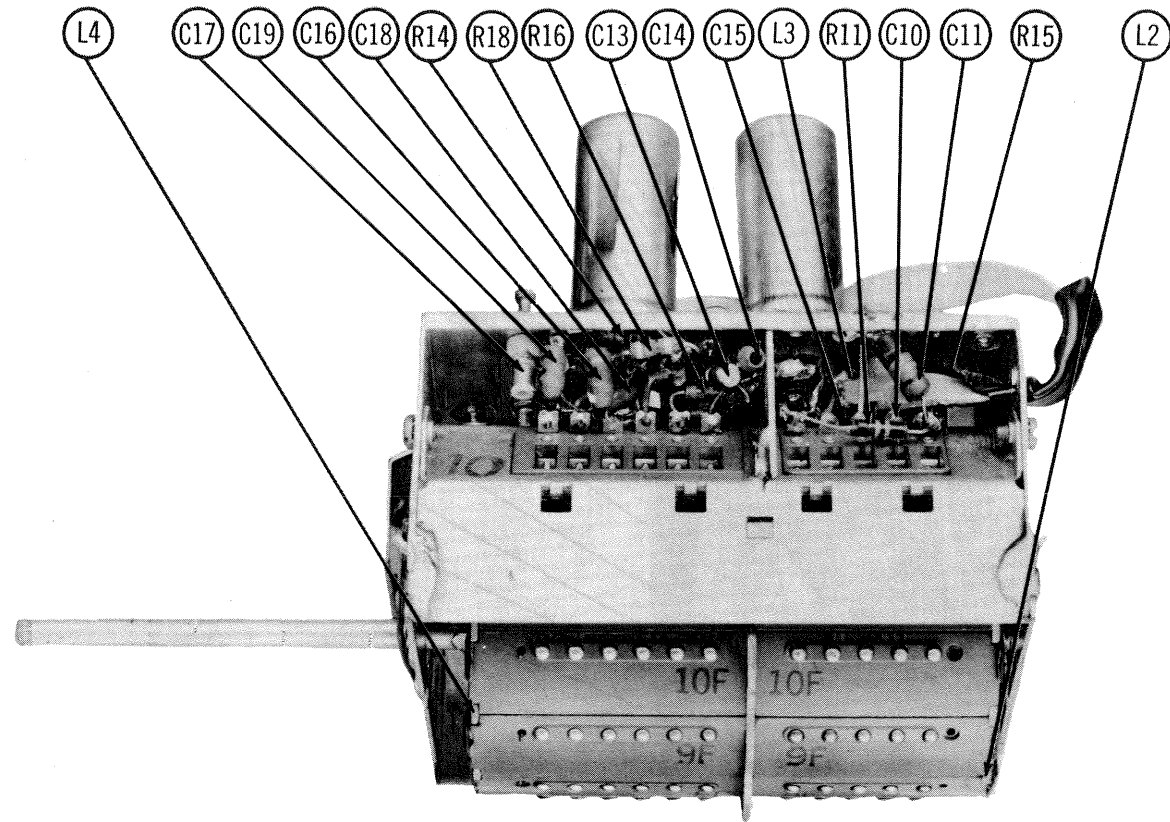
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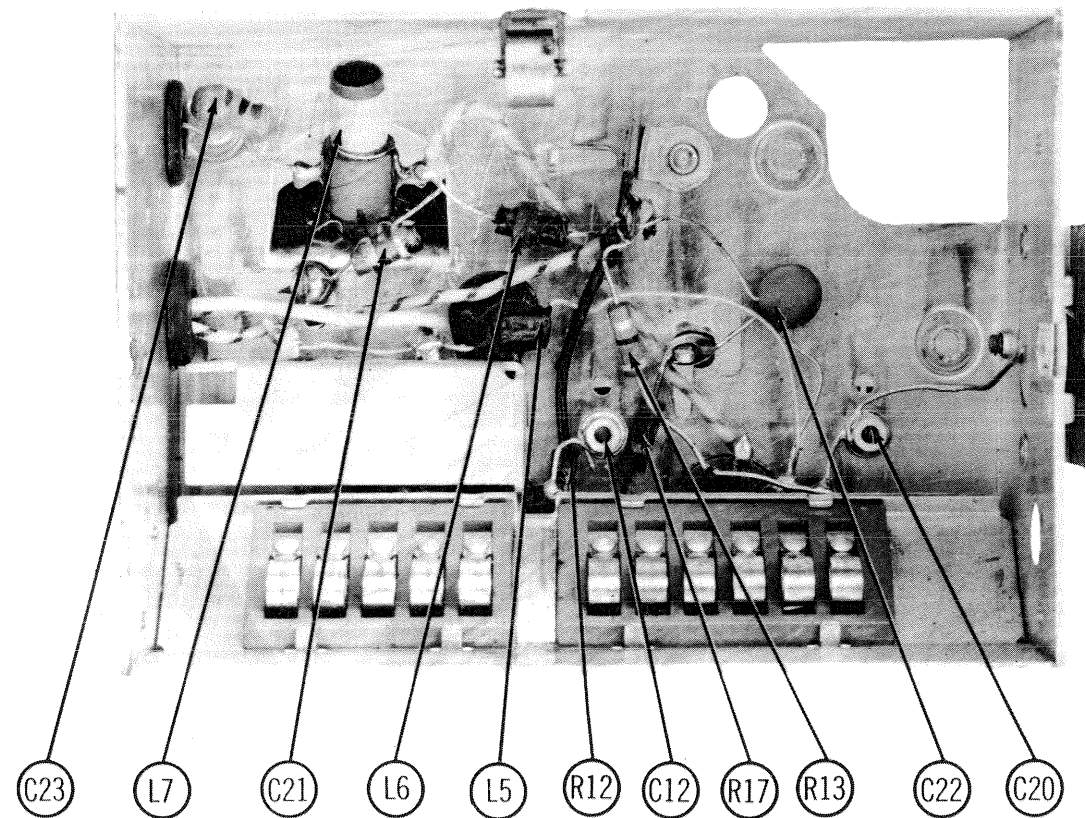




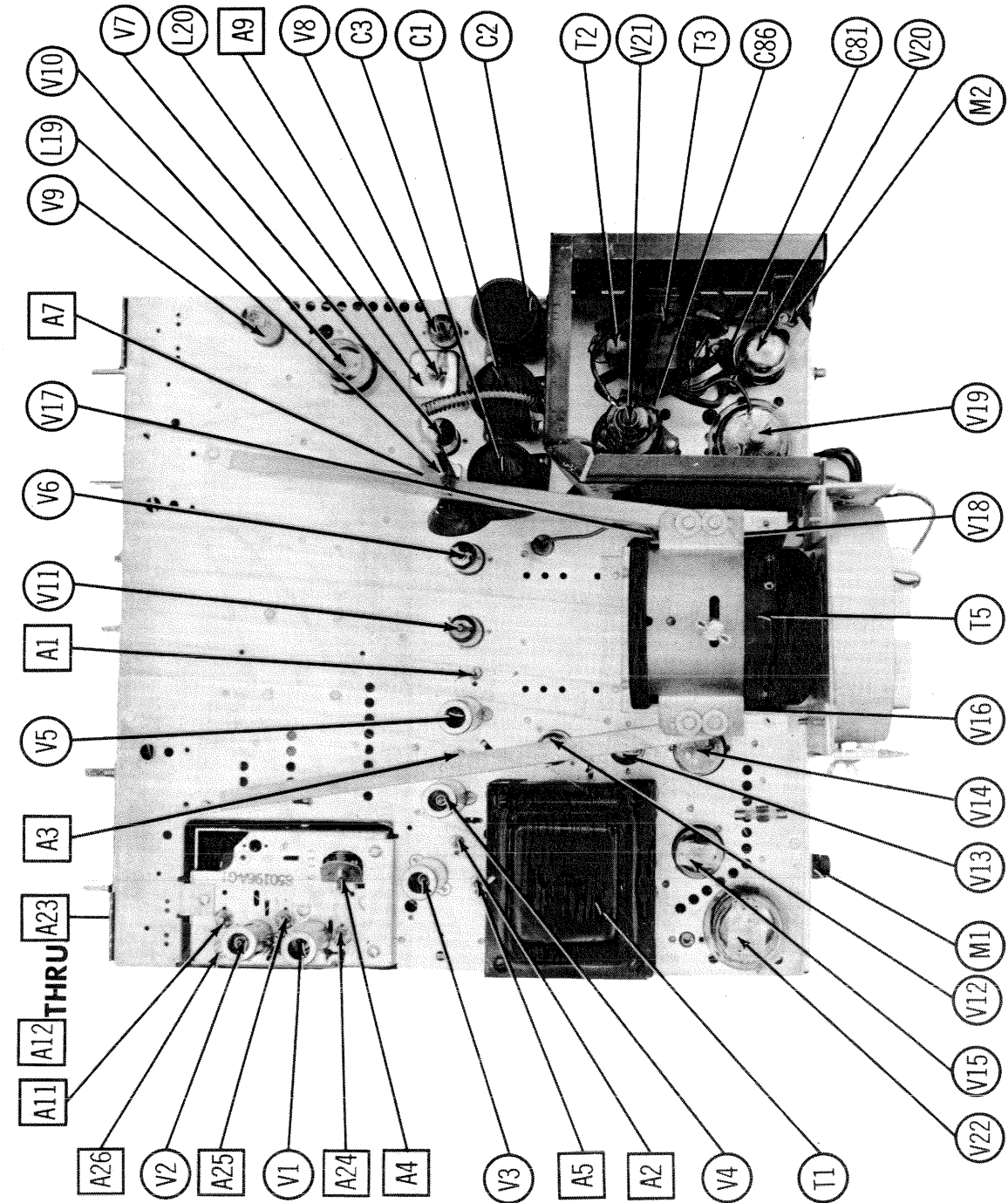
CAPEHART CHASSIS
CT-27, CT-38, CT-45 (Ch. Series CX-33DX)



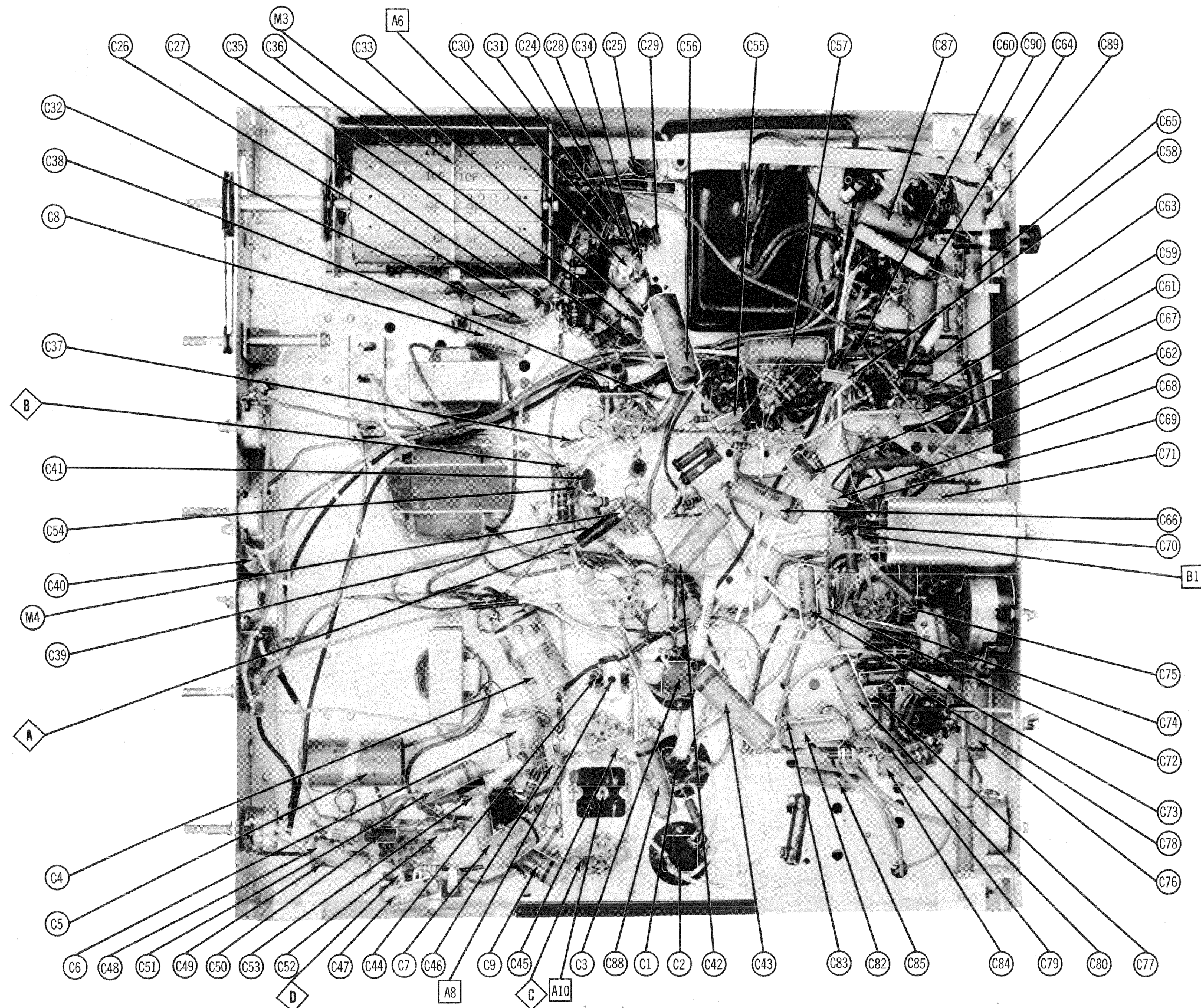
RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CAPEHART CHASSIS
CT-27, CT-38, CT-45 (Ch. Series CX-33DX)
MAIN TOP VIEW



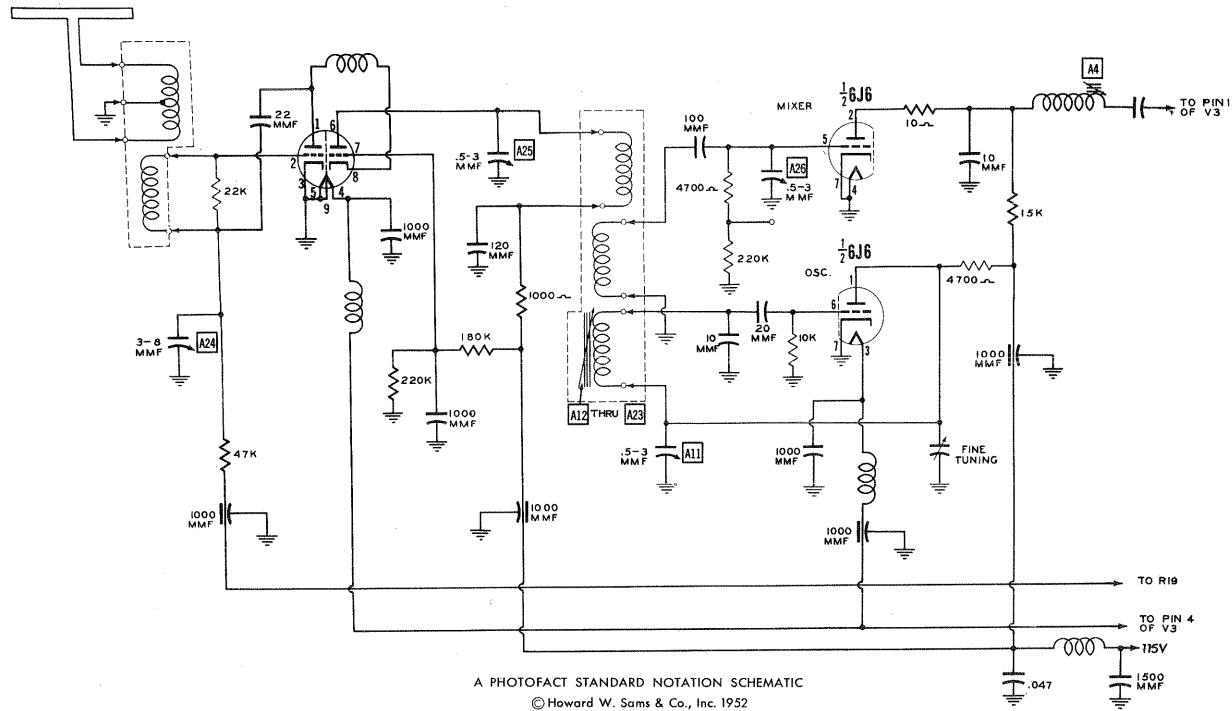
CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

CAPEHART CHASSIS
CT-27, CT-38, CT-45 (Ch. Series CX-33DX)

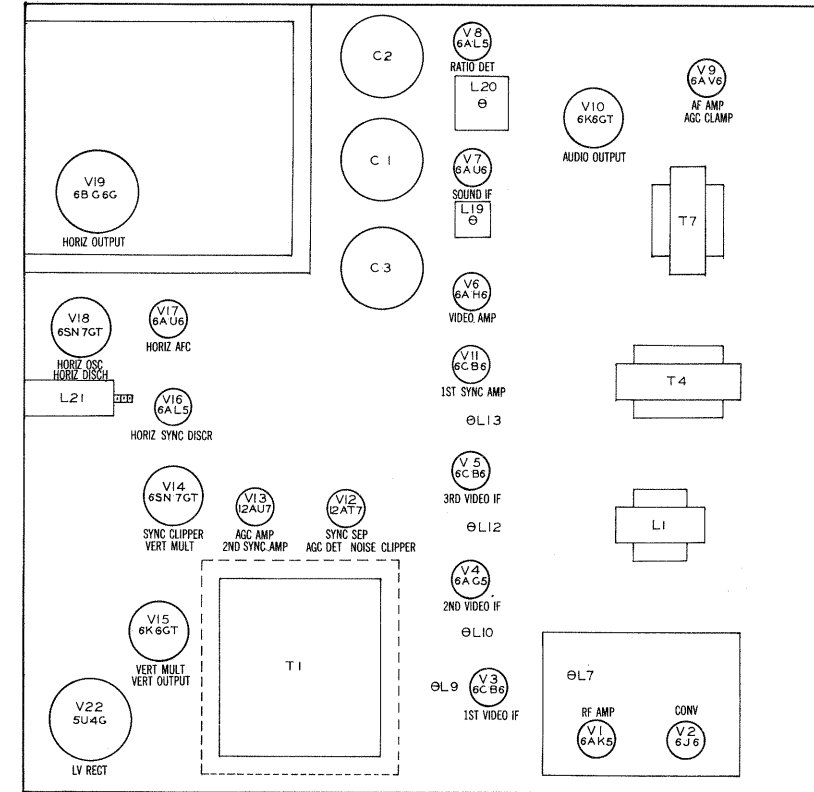
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AK5	190KΩ	0Ω	.1Ω	0Ω	†3.8KΩ	†3.8KΩ	0Ω		
V 2	6J6	†6.3KΩ	†1.6KΩ	.1Ω	0Ω	220KΩ	10KΩ	0Ω		
V 3	6BC6	35KΩ	47Ω	0Ω	.1Ω	†1.8KΩ	†1.8KΩ	0Ω		
V 4	6AG5	8.7KΩ	68Ω	0Ω	.1Ω	†1.7KΩ	†1.7KΩ	68Ω		
V 5	6CB6	.5Ω	150Ω	0Ω	.1Ω	†1.6KΩ	†1.6KΩ	0Ω		
V 6	6AH6	■5KΩ	■0Ω	0Ω	.1Ω	†10KΩ	†44KΩ	■75Ω		
V 7	6AU6	2Ω	0Ω	0Ω	.1Ω	†1.9KΩ	†1.9KΩ	150Ω		
V 8	6AL5	INF	INF	.1Ω	0Ω	0Ω	0Ω	12KΩ		
V 9	6AV6	10Meg	1KΩ	0Ω	.1Ω	130KΩ	130KΩ	†220KΩ		
V 10	6K6GT	INF	0Ω	†2KΩ	†1.5KΩ	■470KΩ	INF	.1Ω	■560Ω	
V 11	6CB6	■13KΩ	■100Ω	0Ω	.1Ω	†50KΩ	0Ω	■100Ω		
V 12	12AT7	†47KΩ	†550KΩ	■830KΩ	.1Ω	.1Ω	†330KΩ	†330KΩ	†50KΩ	0Ω
V 13	12AU7	†24KΩ	†2.2Meg	0Ω	.1Ω	.1Ω	32KΩ	■130KΩ	■8KΩ	0Ω
V 14	6SN7GT	3.9Meg	†10KΩ	2.2KΩ	■1.5Meg	†650KΩ	■2.7KΩ	0Ω	.1Ω	
V 15	6K6GT	INF	0Ω	†2.6KΩ	†2.6KΩ	■5.3Meg	†63Ω	.1Ω	■2.2KΩ	
V 16	6AL5	940KΩ	1.5Meg	.1Ω	0Ω	0Ω	0Ω	1.5Meg		
V 17	6AU6	1.4Meg	0Ω	0Ω	.1Ω	†600Ω	†1.6KΩ	220Ω		
V 18	6SN7GT	470KΩ	†4.5KΩ	11Ω	■2.2Meg	†210K	■0Ω	0Ω	.1Ω	
V 19	6BG6G	INF	0Ω	■220Ω	■7KΩ	■1Meg	†500Ω	.1Ω	†11KΩ	Top Cap #100Ω
V 20	6W4GT	INF	INF	600KΩ	INF	†100Ω	INF	#.3Ω	#0Ω	
V 21	1B3GT	PINS 1 THRU 8 HAVE INF RESISTANCE								Top Cap #560Ω
V 22	5U4G	INF	8KΩ	INF	■27Ω	INF	■25Ω	INF	8KΩ	
V 23	20CP4	0Ω	■55KΩ	Pin 10 #100KΩ	Pin 11 250KΩ	Pin 12 .1Ω				

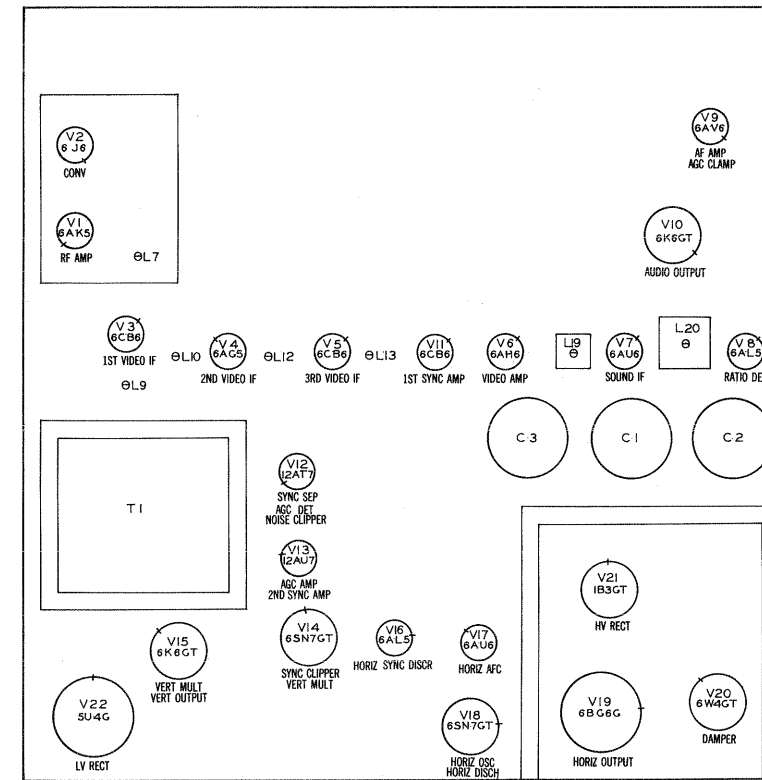
ALL CONTROLS SET FOR NORMAL OPERATION, NO SIGNAL APPLIED
 † MEASURED FROM PIN 2 OF V22
 # MEASURED FROM PIN 3 OF V20
 ■ MEASURED FROM -100VDC LINE



-ALTERNATE TUNER SCHEMATIC



BOTTOM VIEW



TOP VIEW

TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube, (V18), from its socket.

VIDEO IF ALIGNMENT

Remove the converter tube, (V2), and replace it with a 6J6 which has pin 1 removed. This will disable the local oscillator and prevent the possibility of erroneous indications.
Turn the AGC control to fully clockwise.
Connect the negative lead of a 3 volt battery to the ungrounded lead of C8, then connect the positive lead to chassis.
During video IF alignment the common lead of the VTVM is connected to approximately 100 volts with respect to chassis. Avoid touching or grounding the VTVM case.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1. Direct	High side to an ungrounded tube shield floating over dummy converter tube, (V2). Low side to chassis.	26.3MC (unmod)	Any	DC probe to point A. Common to point B.	A1	Adjust for maximum deflection.
2. "	"	24.3MC	"	"	A2	"
3. "	"	26MC	"	"	A3	"
4. "	"	23MC	"	"	A4	"
5. "	"	21.75MC	"	"	A5	Adjust for MINIMUM deflection.
6. "	"	27.75MC	"	"	A6	"

OVERALL VIDEO IF RESPONSE CHECK

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

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7. Direct	High side to an ungrounded tube shield floating over dummy converter tube, (V2). Low side to chassis.	25MC (10MC swp.)	21.75MC 22.75MC 25.5MC 26.25MC	Any	Vert. amp. to Point A. Low side to chassis.		Check for response curve similar to Fig. 1. If necessary retouch A1 thru A4 for proper response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point C to chassis. The junction of these two resistors is alignment point D as shown on the schematic.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8. 1500MMF	High side to pin 1, (grid) of 6AH6, (V6). Low side to chassis.	4.5MC (unmod)	Any	DC probe to point C. Common to chassis.	A7, A8, A9	Adjust for maximum deflection.
9. "	"	"	"	DC probe to point D. Common to point C.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

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

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8. 1500MMF	High side to Pin 1, (grid) of 6AH6, (V6). Low side to chassis.	4.5MC (450KC swp)	4.5MC	Any	Vert. amp. to Point C. Low side to chassis.	A7, A8, A9	Disconnect stabilizer capacitor C9. Adjust for maximum amplitude and symmetry as per Fig. 2.
9. "	"	"	"	"	Vert. amp. to Point D. Low side to chassis.	A10	Reconnect C9. Adjust A10 so 4.5MC occurs at center of crossover lines as per Fig. 3. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.

Complete oscillator alignment may not be necessary.

If the oscillator seems to be off frequency approximately the same amount for a majority of the channels, it may be possible to correct them in one step using A11. It should be noted that this is an all channel oscillator circuit adjustment and should not be adjusted for any individual channel.

If adjustment of A11 will not bring all channels well within the range of the fine tuning control, it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel strip adjustments are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.

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

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

Set the fine tuning control to the mid-position of its range.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10. See Fig. 5	Across antenna terminals.	213MC (10MC Swp.)	211.25MC 215.75MC	13	Vert. amp. to Point A. Low side to chassis.	A12	Adjust to place sound marker in trap "notch" as shown in Fig. 4. The video marker should fall between 45 & 60%.
		207MC (10MC swp)	205.25MC 209.75MC	12		A13	
		201MC (10MC swp)	199.25MC 203.75MC	11		A14	
		195MC (10MC swp)	193.25MC 197.75MC	10		A15	
		189MC (10MC swp)	187.25MC 191.75MC	9		A16	
		183MC (10MC swp)	181.25MC 185.75MC	8		A17	
		177MC (10MC swp.)	175.25MC 179.75MC	7		A18	
		85MC (10MC swp.)	83.25MC 87.75MC	6		A19	
		79MC (10MC swp.)	77.25MC 81.75MC	5		A20	
		69MC (10MC swp.)	67.25MC 71.75MC	4		A21	
		63MC (10MC swp.)	61.25MC 65.75MC	3		A22	
		57MC (10MC swp.)	55.25MC 59.75MC	2		A23	

ALIGNMENT INSTRUCTIONS (CONT.)

AGC ADJUSTMENT

Turn the set on and tune in the strongest available TV station. Turn the contrast control to maximum, (fully clockwise).
If the signal is strong turn the AGC control clockwise until the picture begins to bend at the top, then counter-clockwise just enough to remove the sync. distortion. If intercarrier buzz is objectional reduce the control just enough to remove the buzz.
If the signal is weak, turn the AGC control counter-clockwise until the picture begins to appear washed out, then rotate the control clockwise until the picture returns to normal. If more than one station is available in the area it may be necessary to make a compromise adjustment to obtain best results on all stations.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11. See Fig. 5	Across antenna terminals.	207MC (10MC swp)	205.25MC 209.75MC	12	Vert. amp. thru 10KΩ to Point A. Low side to chassis.	A24, A25, A26	Adjust for response curve similar to Fig. 6 with markers above 90%
12. "	"	213MC (10MC swp)	211.25MC 215.75MC	13	"		Check all channels for response curve similar to Fig. 6. If markers fall below 70% on any channel, make compromise adjustment of A24, A25 and A26 with channel switch set for that channel. Recheck all channels to see that they have not been seriously effected.
		201MC (10MC swp)	199.25MC 203.75MC	11			
		195MC (10MC swp.)	193.25MC 197.75MC	10			
		189MC (10MC swp.)	187.25MC 191.75MC	9			
		183MC (10MC swp.)	181.25MC 185.75MC	8			
		177MC (10MC swp.)	175.25MC 179.75MC	7			
		85MC (10MC swp.)	83.25MC 87.75MC	6			
		79MC (10MC swp.)	77.25MC 81.75MC	5			
		69MC (10MC swp.)	67.25MC 71.75MC	4			
		63MC (10MC swp.)	61.25MC 65.75MC	3			
		57MC (10MC swp.)	55.25MC 59.75MC	2			

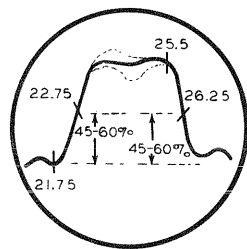


FIG. 1

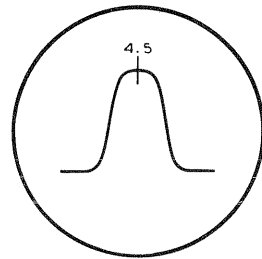


FIG. 2

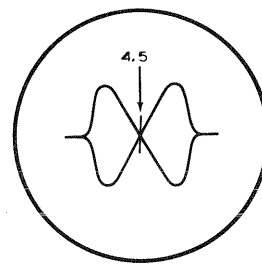


FIG. 3

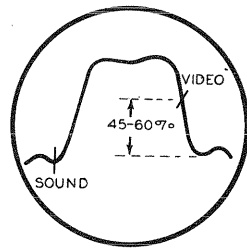


FIG. 4

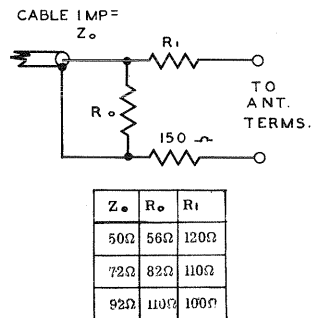


FIG. 5

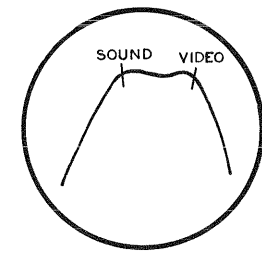


FIG. 6

CAPEHART CHASSIS
CT-27, CT-38, CT-45 (Ch. Series CX-33DX)

PARTS LIST AND DESCRIPTIONS (Continued)
TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	DC RESISTANCE		CAPEHART PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.					
T3	560Ω	0Ω	750163C-1	A-8131	HV0-8		Horiz. Output Trans.
T4	560Ω Tapped @100Ω						
T5A	400Ω	.4Ω	650238A-1	A-8140	A-3080 ①		Vert. Output Trans.
B	44Ω		750192C-2				Horiz. Deflection Coils
T6	4Ω						Vert. Deflection Coils
T6	440Ω		750149B-1	FC-11 ②	MF-2 ②		Focus Coil

① Drill New Mounting Holes
② Fabricate New Mounting Bracket

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		CAPEHART PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T7	7KΩ	3.3Ω	440Ω	.5Ω	650216A-1	A-8114 ③	A-3020	R0-201	③ Drill one new mounting hole

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	CAPEHART PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L1	.250ADC	63Ω	1.6HY	650215A-1	C-2326 ①	C-2991 ①	TR-3300①	① Drill new mounting holes.

COILS (RF-IF)

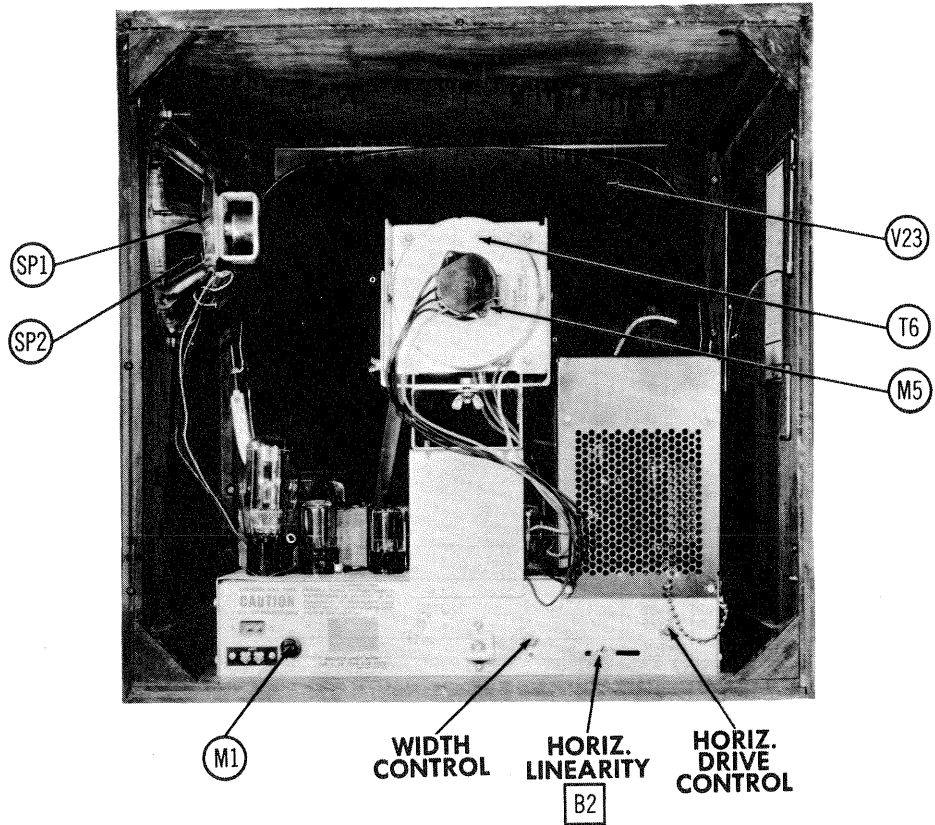
ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	CAPEHART PART No.	MERIT PART No.	IRC PART No.	
L2	Ant. Coil	0Ω		451294A-1			Channel 2
L3	Fil. Choke	0Ω		451029A-1			
L4	RF, Mixer Grid & Osc. Coils	0Ω		451046A-1			Channel 2
L5	Fil. Choke	0Ω		451030A-1			
L6	RF Choke	0Ω		451214A-1			
L7	1st Video IF	.2Ω		451209A-1			6.8Microhenries
L8	RF Choke	5.6Ω		470338A-1			
L9	Sound Trap	.2Ω		650275A-1			Includes Trap
L10	2nd Video IF	.3Ω	.3Ω	750261A-2			
L11	Fil. Choke	0Ω		452667A-1			
L12	3rd Video IF	.3Ω	.3Ω	650218A-1			
L13	4th Video IF	.3Ω	.3Ω	650218A-1			
L14	Peaking Coil	10.5Ω		650220A-1			500 Microhenries
L15	Peaking Coil	5.7Ω		650219A-1			180Microhenries Wound on 39KΩ resistor
L16	Peaking Coil	3.6Ω		650219A-3			98Microhenries Wound on 15KΩ resistor
L17	Peaking Coil	3.6Ω		650219A-3			98Microhenries, Wound on 15KΩ resistor
L18	Peaking Coil	7Ω		650220A-3			250Microhenries
L19	Sound IF	2Ω	2Ω	450518A-2			
L20	Ratio Det. Trans.	4.3Ω	.2Ω	650235A-1			Tap @ 1.2Ω
L21	Horiz. Osc.	72Ω	38Ω	650230A-1			Tap@ 36Ω, Tertiary Winding 10Ω
L22	Horiz. Ringing Coil	21Ω		650221A-1			11 Microhenries
L23	Horiz. Lin.	30Ω		450938A-1			

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA				REMARKS
			CAPEHART PART No.		LITTELFUSE PART No.		
			FUSE	HOLDER	FUSE	HOLDER	
M1	3AG	5A	450317A-3	452083A-1	312005	342001	
M2	3AG Pigtail	1/4A	450183A-1		318.250		

MISCELLANEOUS

ITEM No.	PART NAME	CAPEHART PART No.	NOTES
M3	RF Tuner	850196A-G1	Complete (1N34)
M4	Crystal	650161A-4	Double
M5A	Ion Trap	650276A1	Single
B	Ion Trap	650276A-4	Single
C	Ion Trap		
	Ant. Coil	451294A-1	Channel #2
	Ant. Coil	451295A-1	Channel #3
	Ant. Coil	451296A-1	Channel #4
	Ant. Coil	451297A-1	Channel #5
	Ant. Coil	451398A-1	Channel #6
	Ant. Coil	451039A-1	Channel #7
	Ant. Coil	451040A-1	Channel #8
	Ant. Coil	451041A-1	Channel #9
	Ant. Coil	451042A-1	Channel #10
	Ant. Coil	451043A-1	Channel #11
	Ant. Coil	451044A-1	Channel #12
	Ant. Coil	451045A-1	Channel #13
	RF Mixer & Osc.	451046A-1	Channel #2
	RF Mixer & Osc.	451047A-1	Channel #3
	RF Mixer & Osc.	451048A-1	Channel #4
	RF Mixer & Osc.	451049A-1	Channel #5
	RF Mixer & Osc.	451050A-1	Channel #6
	RF Mixer & Osc.	451051A-1	Channel #7
	RF Mixer & Osc.	451052A-1	Channel #8
	RF Mixer & Osc.	451053A-1	Channel #9
	RF Mixer & Osc.	451054A-1	Channel #10
	RF Mixer & Osc.	451055A-1	Channel #11
	RF Mixer & Osc.	451056A-1	Channel #12
	RF Mixer & Osc.	451057A-1	Channel #13



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold slug until the picture synchronizes horizontally.

Decrease the contrast and increase the shading until the normally blanked edges of the raster are visible. If necessary adjust the centering until the right hand edge of the raster is visible. Adjust the horizontal phasing slug, (B1), until one quarter inch on 17 in. tubes, three-eighths in. on 19 in. tube, of raster is visible beyond the right edge of the picture. If B1 requires considerable adjustment repeat the adjustment of the horizontal hold slug.

Turn the horizontal drive control clockwise until white vertical lines appear in the picture. If the white lines do not appear leave the control at maximum clockwise.

Adjust the width control until the picture is slightly wider than necessary to fill the mask horizontally.

Adjust the horizontal linearity slug, (B2), until the picture is symmetrical from left to right.

Since both width and horizontal linearity are effected by the drive it may be necessary to adjust them alternately for best results.

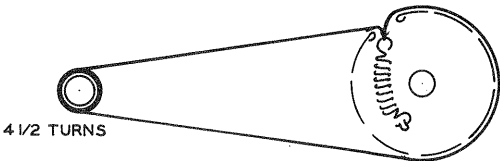
DISASSEMBLY INSTRUCTIONS

1. Remove 8 wood screws and antenna leads from rear cover. Remove cover.
2. Disconnect and remove speaker.
3. Remove 5 push-on type control knobs.
4. Remove 4 chassis bolts and remove chassis.

Note: For picture tube removal it is necessary to remove chassis as outlined above.

DRIVE CORD STRINGING

TUNING GANG FULLY CLOSED



PARTS LIST AND DESCRIPTIONS

CAPACITORS (CONT.)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		CAPEHART PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	6AK5	6AK5	7BD	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6AG5	6AG5	7BD	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Amp.	6AH6	6AH6	7BK	
V7	Sound IF Amp.	6AU6	6AU6	7BK	
V8	Ratio Det.	6AL5	6AL5	6BT	
V9	AF Amp.-AGC Clamper	6AV6	6AV6	7BT	
V10	Audio Output	6K8GT	6K8GT	7S	
V11	1st. Sync. Amp.	6CB6	6CB6	7CM	
V12	Sync. Sep.-AGC Det.-Noise Clipper	12AT7	12AT7	9A	
V13	AGC Amp.-2nd. Sync. Amp.	12AU7	12AU7	9A	
V14	Sync. Clipper Vert. Mult.	6SN7GT	6SN7GT	8A	
V15	Vert. Mult.-Vert. Output.	6K8GT	6K8GT	7S	
V16	Horiz. Sync. Discr.	6AL5	6AL5	6BT	
V17	Horiz. AFC	6AU6	6AU6	7BK	
V18	Horiz. Osc. Horiz. Disch.	6SN7GT	6SN7GT	8BD	
V19	Horiz. Output	6BG6G	6BG6G	5BT	
V20	Damper	6W4GT	6W4GT	4CG	
V21	HV Rect.	1B3GT	1B3GT	3C	
V22	LV Rect.	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA			RTMA BASE TYPE	NOTES
	CAPEHART PART No.	SYLVANIA PART No.	THOMAS PART No.		
V23	20CP4	20CP4	20CP4	12D	

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. VOLT	REPLACEMENT DATA				IDENTIFICATION CODES AND INSTALLATION NOTES
		CAPEHART PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	
C1A	40	475	750090B-12	AFH3-54	UP44150	TVL-4840
B	35	475				
C	10	475				
C2A	40	475	750090B-14	AFH2-72	UPT44150	TVL-2830
B	45	475				
C3A	40	475	750090B-13	AFH3-192	UPT303	
B	40	250		BR5015A		
C	50	150				
D	80	50				
C4	20	450	650228A-2	PRS450/20	BR2045A	TVA-1709
C5	20	450	650228A-2	PRS450/20	BR2045A	TVA-1709
C6	20	150	650228A-1	PRS150/20	BR2015A	TVA-1304
C7	10	50	650228A-3	PRS50/10	BR105	TVA-1304
C8	10	50	650228A-3	PRS50/10	BR105	TVA-1303
C9	4	50	650228A-4	PRS150/4	BR550	
C10	3-9		451245A-1			
C11	8.2		650030A-13			
C12	.5-3		451216A-1			
C13	100		451065A-1			
C14	120		451064A-1			
C15	1000		451061A-1			
C16	100		451065A-1			
C17	.5-3		451216A-1			
C18	20		451062A-1			
C19	10		451063A-1			
C20	.5-3		451216A-1			
C21	10		451063A-1			
C22A	1000		650030A-1			
B	1000					
C23	120		451064A-1			
C24	.047	600	2248-4730			
C25	1500		450469A-2			
C26	.1	200	2248-1040			
C27	1500		450469A-2			
C28	1.5		650030A-9			
C29	74					
C30	1500		450469A-2			
C31	1500		450469A-2			
C32	.1	200	2248-1040			
C33	1500		450469A-2			
C34	5					
C35	1500		450469A-2			
C36	1500		450469A-2			
C37	1500		450469A-2			
C38	1500		450469A-2			
C39	5		650030A-1			
C40	1500		450469A-2			
C41	1500		450469A-2			
C42	.1	200	2248-1040			
C43	.1	600	2248-1040			
C44	3.3		650030A-9			
C45A	5000		452268A-1			
B	5000					
C46	470	500	750272A-12			
C47	.001	600				
C48	.01	600	2248-1030			
C49	.01	600	2248-1030			
C50	.01	600	2248-1030			
C51	.01	600	2248-1030			
C52	.01	600	2248-1030			
C53	.0022	600	2248-2220			
C54	.01	600	2248-1030			
C55	.22	500	750272A-33			
C56	.22	400	2247-2240			
C57	.047	600	2248-4730			

ITEM No.	RATING CAP. VOLT	REPLACEMENT DATA						IDENTIFICATION CODES AND INSTALLATION NOTES
		CAPEHART PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C58	100	500	720272A-11	1488-0001	D6-101	5W5T1	GPIK-101	Sync. Coupling
C59	.01	600	2248-1030	P688-01	D6-103	PTE6S1	6TM-S1	Sync. Clipper Plate
C60	.002	600	2248-1030	P688-01	D6-103	PTE6S1	6TM-S1	Vert. Sync. Coupling
C61A	.005		452268A-1	P688-002		PTE6D2	10IC1	Vert. Integrator Net
B	.005			P688-005		PTE6D5		Vert. Integrator Net
C	.005			P688-005		PTE6D5		Vert. Integrator Net
C62	.033	600	2248-3335	P688-033		6TM-S3		Vert. Discharge
C63	.1	600	2248-1040	P688-1	DF-104	PTE6P1	6TM-P1	Vert. Sweep Coupling
C64	.001	1000	2248-1020	P1088-001		MB-D1		Vert. Feedback
C65	.0047	600	2248-4725	P688-0047	D6-472	PTE6D5	6TM-D47	Voltage Divider
C66	.047	600	2248-4730	P688-047	DF-503	PTE6S5	6TM-S47	Fixed Trimmer
C67	470	500	750272A-12	1469-0005		5R5T5	MS-35	Voltage Divider
C68	100	500	750272A-11	1468-0001	D6-101	5W5T1	GPIK-101	Horiz. Sync. Coupling
C69	.0047	600	2248-4725	P688-0047	D6-472	PTE6D5	6TM-D47	Fixed Trimmer
C70	.0047	600	2248-4725	P688-0047	D6-472	PTE6D5	6TM-D47	Fixed Trimmer
C71	.047	600	2248-4730	P688-047	DF-503	PTE6S5	6TM-S47	AFC Filter
C72	100	500	750272A-11	1468-0001	D6-101	5W5T1	GPIK-101	AFC Filter
C73	.015	400	2247-1535	P488-015				AFC Filter
C74	.001	600	2248-1020	P688-01	D6-102	PTE6S1	6TM-S1	Fixed Trimmer
C75	.01	600	2248-1030	P688-01	D6-103	PTE6S1	6TM-S1	Horiz. Osc. Grid Cap.
C76	.047	600	2248-4730	P688-047	DF-503	PTE6S5	6TM-S47	Vert. Sweep Coupling
C77	.0047	600	2248-4725	P688-0047	DF-503	PTE6S5	6TM-S47	RF Bypass
C78	.0047	600	2248-4725	P688-0047	DF-503	PTE6S5	6TM-S47	Horiz. Discharge
C79	.047	600	2248-4730	P688-047	DF-503	PTE6S5	6TM-S47	Horiz. Sweep Coupling
C80	.1	200	2248-1040	P288-1	DF-104	PTE4P1	2TM-P1	Horiz. Output Screen
C81	30	6000	452310A-1					Horiz. Output Cathode
C82	.022	600	2248-2230	P688-022	DF-203	PTE6S2	6TM-D22	Fixed Trimmer
C83	.022	600	2248-2230	P688-022	DF-203	PTE6S2	6TM-D22	Damper Filter
C84	.01	600	2248-1030	P688-01	D6-103	PTE6S1	6TM-S1	Damper Filter
C85	.01	600	2248-1030	P688-01	D6-103	PTE6S1	6TM-S1	RF Bypass
C86	500	20000	650153B-2	HV20C				HV Filter
C87	.22	200	2248-2240	P488-22	DF-104	PTE4P1	2TM-P22	RF Bypass
C88	.1	200	2248-1040	P288-1	DF-104	PTE4P1	2TM-P1	Bias Filter
C89	1500		450469A-2	BPD-0015	DD-152	1W5D15	5HK-D15	Line Filter
C90	1500		450469A-2	BPD-0015	DD-152	1W5D15	5HK-D15	Line Filter

Items C45A, C45B, R113A, R113B are combined in one unit.

Items C61A, C61B, C61C, R114A, R114B, R114C are combined in one unit.

Some models use .047MFD in this application (Part No. 2248-4730).

CONTROLS

ITEM No.	RATING RESISTANCE WATTS	REPLACEMENT DATA				INSTALLATION NOTES
		CAPEHART PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	
R1A	1Meg	450896B-1	Q13-137	AG-63-Z	B-70-S	Volume Control
B	Shaft		Not Req.	FS-3		Attach to R1A per instructions
C	Switch		76-1	SWB		Attach to R1A per instructions
R2A	250Ω	450896A-1		RTV-60	VK125	Width Control - Wire Wound
B	Shaft			Not Req.	AN-69	Attach to R2A per instructions
R3A	1Meg	450894A-1	Q11-137	AM-61-S	AK-1	Horizontal Drive Control
B	Shaft		Not Req.	FKS-1/4	AK-1	Attach to R3A per instructions
R4A	5KΩ	450893A-1	Q11-114	AM-19-S	AK-10	Vertical Linearity Control
B	Shaft		Not Req.	FKS-1/4	AK-1	Attach to 4A per instructions
R5A	1.5Meg	450892A-1	Q11-138	AG-83-S		Vertical Hold Control
B	Shaft		Not Req.	FKS-1/4		Attach to R5A per instructions
R6A	500KΩ	450897A-1	Q11-133	AG-58-S	B-59	AGC Set Control
B	Shaft		Not Req.	FKS-1/4		Attach to R6A per instructions
R7A	4500Ω	450891A-1	Q11-133	AG-52-S	AN10	Focus Control
B	Shaft		Not Req.	AK-1	B-46	Attach to R7A per instructions
R8A	200KΩ	452226A-1		FS-3		Brightness Control
B	Shaft			FS-3		Attach to R8A per instructions
R9A	1.5KΩ	750266A-2	Q11-239	AG-11-S		Contrast Control
B	Shaft		Not Req.	KSS-3		Attach to R9A per instructions
R10A	2.5Meg	452733A-1	Q11-239	AG-84-S	B-83	Height Control
B	Shaft		Not Req.	FKS-1/4		Attach to R10A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	CAPEHART PART No.	IRC PART No.	
					ALL RESISTORS ± 20% UNLESS OTHERWISE SPECIFIED
R11	100KΩ				Antenna Coil Shunt
R12	2200Ω		3229-222	BTS-2200	RF Amp. Decoupling
R13	4700Ω	10%	3229-472	BTS-4700	Osc. Plate
R14	10KΩ		3229-103	BTS-10K	Osc. Grid
R15	47KΩ		3229-473		RF Amp. Grid
R16	10KΩ		3229-103		RF Coil Shunt
R17	220KΩ		3229-224		Mixer Grid
R18	4700Ω		3229-472	BTS-4700	Mixer Grid
R19	10KΩ		3229-104		AGC Network
R20	100KΩ		3229-273		AGC Network
R21	24KΩ	5%	3228-243		AGC Network
R22	27KΩ	10%	3229-273		1st. Video IF Grid
R23	47Ω		3229-470		1st. Video IF Cathode
R24	8200Ω		3229-822		AGC Network
R25	100Ω		3229-392	BTS-100	1st. Video IF Decoupling
R26	3900Ω	10%	3229-392		1st. Video IF Coil Shunt - See Note 1
R27	470Ω	10%	3229-471	BTS-470	AGC Network
R28	68Ω		3229-680		2nd. Video IF Cathode
R29	100Ω	10%	3229-392	BTS-100	Decoupling
R30	100KΩ	10%	3229-103		2nd. Video IF Coil Shunt - See Note 2
R31	150Ω	10%	3229-151	BTS-150	3rd. Video IF Cathode
R32	3300Ω	10%	3229-332	BTS-3300	Video Detector Diode Load
R33	1800Ω	10%	3229-182	BTS-1800	Video Detector Diode Load
R34	1000Ω	10%	3229-102	BTA-1000	Peaking Coil Shunt
R35	39KΩ	10%	3229-393	BTS-39K	Video Amp. Screen
R36	120Ω		3229-121		Balancing
R37	68KΩ	10%	3229-683		De-emphasis
R38	12KΩ	10%	3229-121	BTS-12K	Ratio Detector Diode Load
R39	10Meg		3229-106	BTS-10Meg	AF Amp. Grid
R40	1KΩ		3229-105	BTS-1K	AF Amp. Cathode
R41	220KΩ		3229-224	BTS-220K	AF Amp. Plate
R42	470KΩ		3229-224	BTS-470K	Output Grid
R43	560Ω	10%	3232-561	BTA-560	Output Cathode
R44	1800Ω	10%	3232-182	BTS-1800	Output Decoupling
R45	2500Ω	10%	3232-222	BTA-700	Output Decoupling See Note 3
R46	82KΩ	10%	3229-823	BTS-82K	Bias Network
R47	2Meg	5%	3228-205	BTS-2Meg	AGC Network
R48	1.5Meg		3235-155	BTS-1.5Meg	Feedback