

RESISTOR AND INDUCTOR IDENTIFICATION



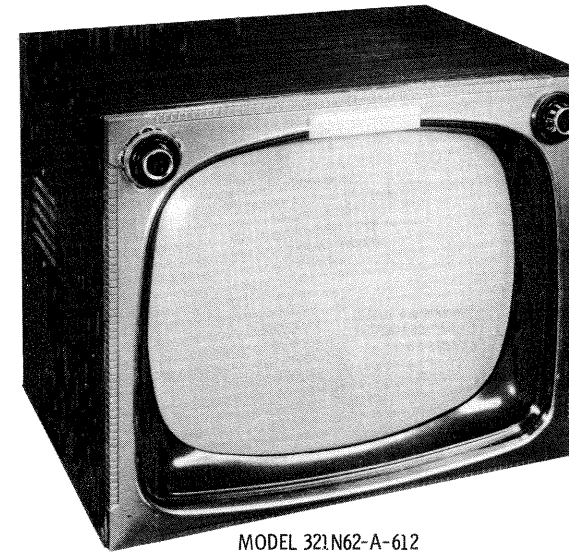
DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 wood screws and the rear cover.
2. Remove 2 speaker leads.
3. Remove the antenna terminal board by loosening 2 wood screws.
4. Remove 2 metal screws holding the top of the chassis to the rear of the cabinet.
5. Remove 2 metal screws from inside the cabinet, holding the bottom of the chassis to 2 lower brackets.
6. Remove chassis by sliding out from the front of the cabinet.
7. Remove 4 speaker nuts and the speaker.

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.



MODEL 321N62-A-612

MODELS

321N62-A-612, 321N62U-A-612, 321N62-A-672, 321N62U-A-672, 2321N62-A-614, 2321N62U-A-614, 2321N62-A-674, 2321N62U-A-674

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

1. Remove the name plate by pulling straight out.
2. Remove 2 metal screws and the retainer bracket.
3. Remove the safety glass.

FOCUS

Adjust the ion trap for the best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Set the horizontal hold control to the center of its range

and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate audio detector buzz, adjust the buzz control for MINIMUM buzz and maximum sound. (For location see tube placement chart).

FUSES

A thermal circuit breaker is used for LV power supply protection and may be closed by means of a reset button. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

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DATE 9-57

SET 369

FOLDER 19

WELLS-GARDNER MODELS 321N62/U-A-612, 321N62/U-A-672, 2321N62/U-A-614, 2321N62/U-A-674

CHASSIS REMOVAL

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the bottom of the
6. Remove chassi
the cabinet.
7. Remove 4 spea

ONE SIDE OF A
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TUNER OSCILLAT

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PICTURE TUBE S.

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2. Remove 2 metal
3. Remove the saf

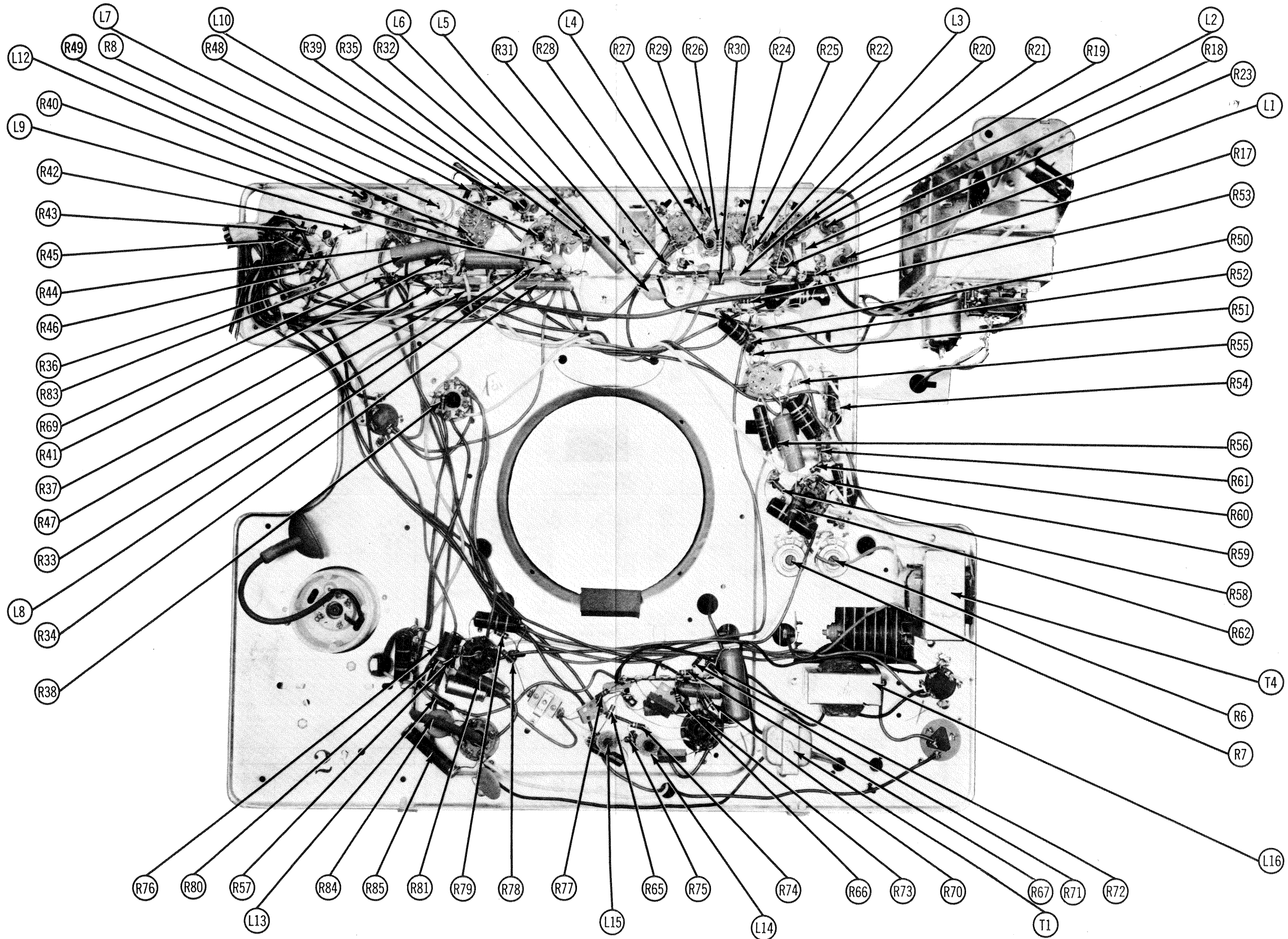
FOCUS

Adjust the ion trap
maximum brightne

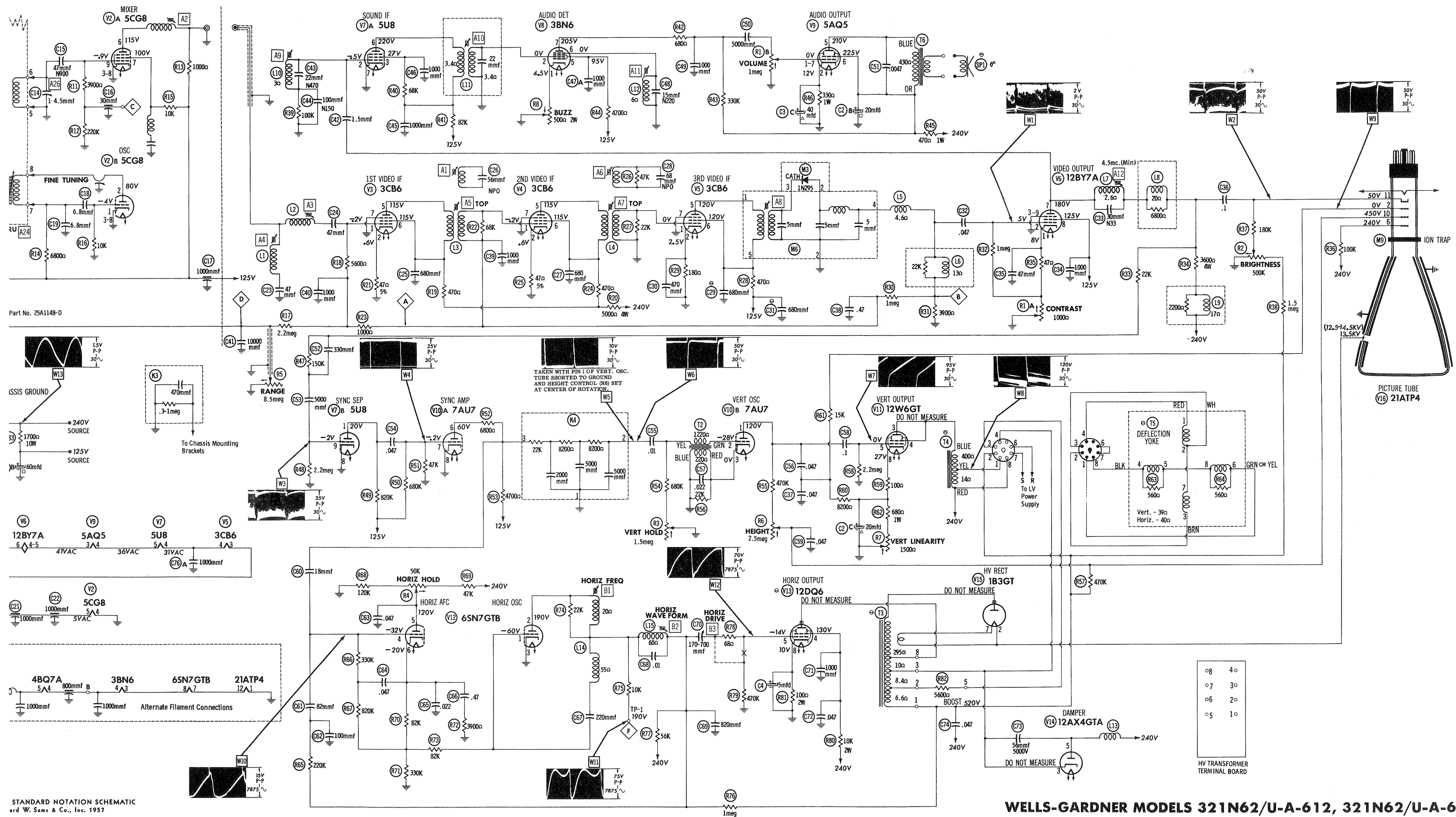
HORIZONTAL OSC

Set the horizontal t

"The listing of any availabl
case a recommendation, w
as to the quality and suitab
parts have been compiled f
Inc., by the manufacturers
"Reproduction or use, with
G921R



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



WELLS-GARDNER MODELS 321N62/U-A-612, 321N62/U-A-672, 2321N62/U-A-614, 2321N62/U-A-674

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	2BN4	0 Ω	2Meg	1.5 Ω	1 Ω	\uparrow 2700 Ω	0 Ω	1Meg		
V2	5CG8	10K	\uparrow 8500 Ω	0 Ω	0 Ω	1 Ω	\uparrow 2700 Ω	\uparrow 12K	0 Ω	220K
V3	3CB6	1Meg	47 Ω	5 Ω	6 Ω	\uparrow 5500 Ω	\uparrow 5500 Ω	0 Ω		
V4	3CB6	1Meg	47 Ω	6 Ω	7 Ω	\uparrow 5500 Ω	\uparrow 5500 Ω	0 Ω		
V5	3CB6	1 Ω	180 Ω	7 Ω	8.5 Ω	\uparrow 2200 Ω	\uparrow 2200 Ω	0 Ω		
V6	12BY7A	\bullet 300 Ω	1Meg	0 Ω	13 Ω	13 Ω	14 Ω	\uparrow 3700 Ω	\uparrow 1700 Ω	0 Ω
V7	5U8	\uparrow 820K	100K	\uparrow 150K	8.5 Ω	10 Ω	\uparrow 82K	0 Ω	0 Ω	2.2Meg
V8	3BN6	\bullet 450 Ω	3.4 Ω	4.5 Ω	5 Ω	\uparrow 6500 Ω	6 Ω	\uparrow 330K		
V9	5AQ5	55 Ω	330 Ω	13 Ω	10 Ω	\uparrow 950 Ω	\uparrow 500 Ω	55 Ω		
V10	7AU7	\uparrow \bullet 2.3Meg	\bullet 1.1Meg	22K	14 Ω	14 Ω	\uparrow 13K	38K	0 Ω	15 Ω
V11	12W6GT	TP	17 Ω	\uparrow 400 Ω	\uparrow 400 Ω	2.2Meg	TP	15 Ω	\bullet 1000 Ω	
V12	6SN7GTB	400K	\uparrow 56K	0 Ω	1.5Meg	\bullet \uparrow 55K	400K	3 Ω	4.5 Ω	
V13	12DQ6	NC	20 Ω	TP	\uparrow 10K	470K	TP	17 Ω	100 Ω	TOP CAP \neq 10 Ω
V14	12AX4GTA	TP	NC	\neq	NC	\uparrow 40 Ω	NC	20 Ω	22 Ω	
V15	1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP \neq 305 Ω
V16	21ATP4	1.5 Ω	23K	PIN 6 \uparrow 100K	PIN 10 \neq 470K	PIN 11 170K	PIN 12 3 Ω			

The diagram illustrates the bottom view of a television control panel, detailing the layout of electronic components and their interconnections. The components are organized as follows:

- Top Section (Control Panel Mounts):** Includes an inset diagram of the control panel with labels for OFF-ON SWITCH, HORIZ HOLD, RANGE, VERT HOLD, OFF-ON (BUSH BUTTON), CONTRAST, VOLUME, and BRIGHTNESS. Below this, a label indicates "CONTROL PANEL MOUNTS UPPER RIGHT IN CABINET (REAR VIEW)".
- Left Side Components:**
 - BUZZ CONTROL (represented by a bell icon)
 - SOUND IF SYNC SEP (V7 SUB)
 - SYNC & SOUND (V6 12BY7A)
 - VIDEO OUTPUT
 - 3RD VIDEO IF (V5 3CB6)
 - 1ST VIDEO IF (V3 3CB6)
 - 2ND VIDEO IF (V4 3CB6)
 - VIDEO DET 1N295 (represented by a diode symbol)
 - AUDIO DET (V8 3N6)
 - AUDIO OUTPUT (V9 54D5)
- Center Components:**
 - Yoke Socket (represented by a circle with a cross)
 - Yoke (V16 Z1A1P4) and Picture Tube (represented by a large circle)
 - Yoke Drive (represented by a diamond with a cross)
 - HORIZ DRIVE
 - HORIZ WAVE FORM (represented by a sine wave symbol)
 - HORIZ FREQ ADJ. (represented by a potentiometer symbol)
 - HORIZ AFC HORIZ OSC (V12 6SN7GTB)
 - CIRCUIT BREAKER RESET (represented by a switch symbol)
- Right Side Components:**
 - FINE TUNING (represented by a circle with a cross)
 - CHANNEL SELECTOR
 - V2 9CG8 MIXER OSC
 - V1 20MA RF AMP
 - VERT OSC (V10 7AU7)
 - VERT OUTPUT (V11 12W6GT)
 - VERT LIN (represented by a circle with a cross)
 - HEIGHT (represented by a circle with a cross)
- Bottom Left Components:**
 - Yoke Socket
 - V15 18X5T HV RECT
 - HORIZ OUTPUT (V13 12DQ6 12DQ6-1A 12C-0A1)
 - DAMPER (V14 12AX6GT A)

TOP VIEW

INDICATES BLANK PIN OR LOCATING KEY ON Yoke SOCKET

YOKE
V16
21A7M4
PICTURE TUBE

VERT ADJ
V10
7A07
VERT OSC

VERT OUTPUT
V11
12W6GT

HEIGHT
V12
6SN7GT6
HORIZ AFC
HORIZ OSC

VERT LIN

CIRCUIT BREAKER RESET

HORIZ DRIVE
V13
12SD4
(12BQ4-GA 12CU4)

HORIZ FREQ ADJ.
V14
12AK6GT4
DAMPER

HORIZ OUTPUT
V15
18X6T
HV RECT

1ST VIDEO IF
V3
3C84

2ND VIDEO IF
V4
3C84

3RD VIDEO IF
V5
3C84

VIDEO OUTPUT
V6
12BY7A
SYNC & SOUND

SOUND IF
V7
5U8
SYNC SEP

AUDIO DET
V8
3BN6

AUDIO OUTPUT
V9
5A05

BUZZ CONTROL

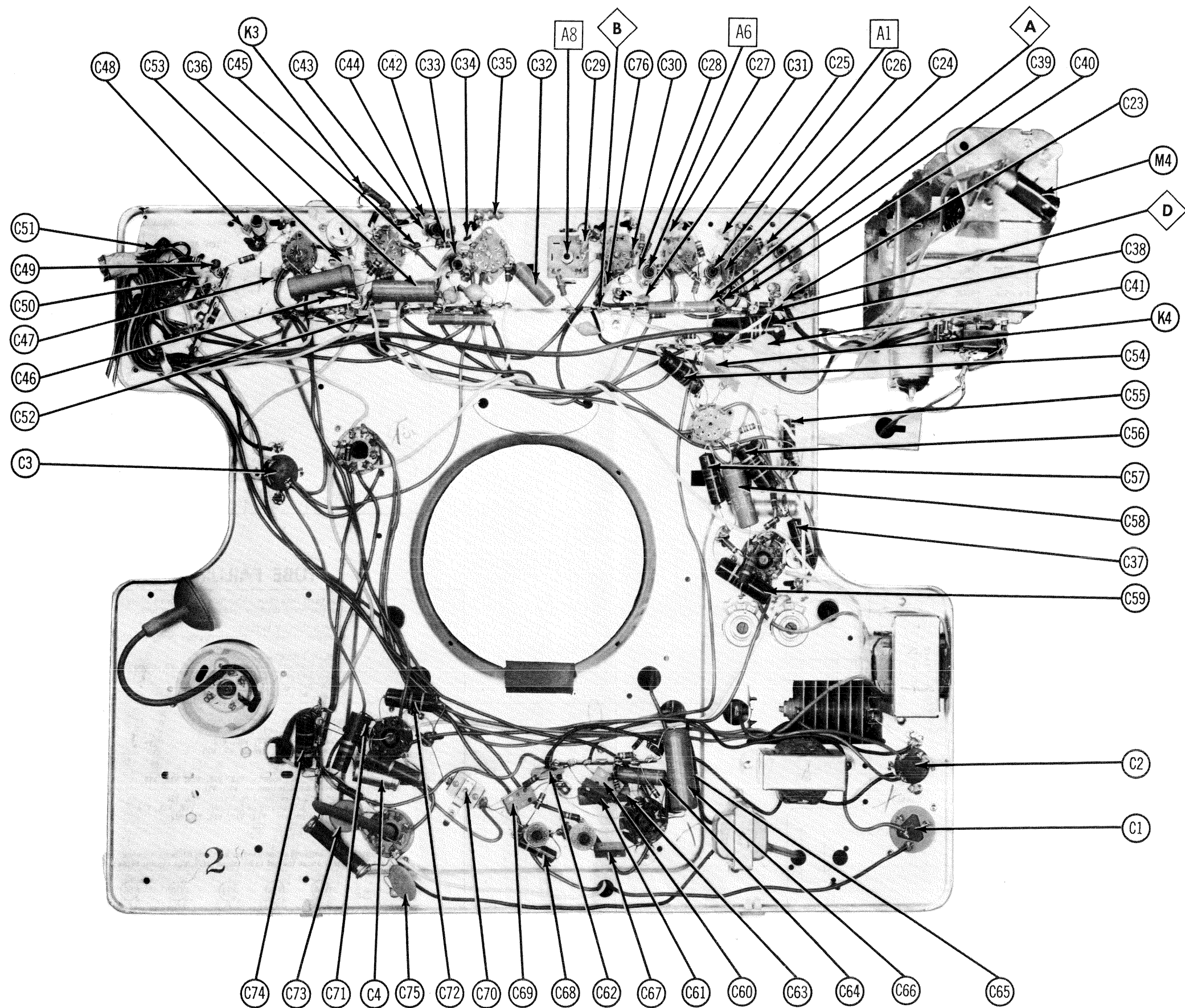
CONTROL PANEL MOUNTS UPPER RIGHT IN CABINET (REAR VIEW)

CONTRAST
VOLUME
BRIGHTNESS
RANGE
OFF-ON SWITCH
OFF-ON (PUSH BUTTON)

FINE TUNING
CHANNEL SELECTOR

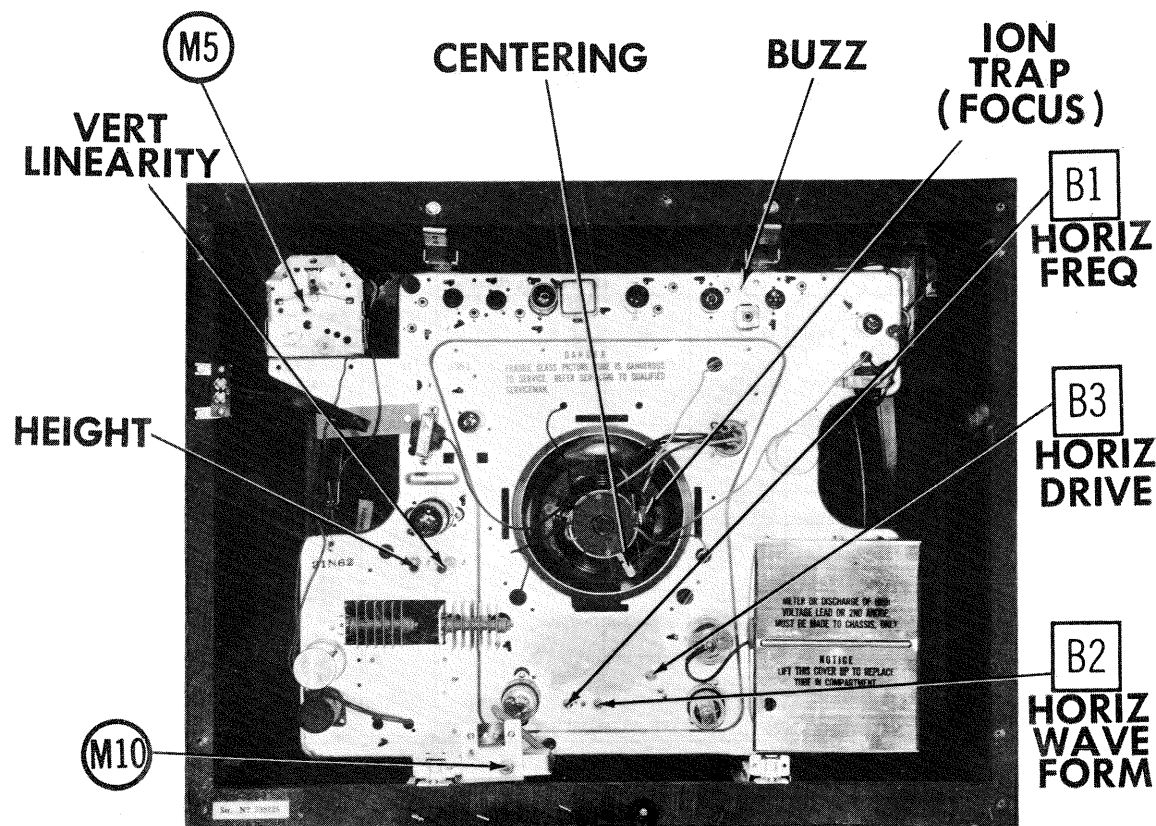
V1 25M4 RF AMP
V2 3C50B MIXER OSC

PAGE 3



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

WELLS-GARDNER MODELS 321N62/U-A-612, 321N62/U-A-672,
2321N62/U-A-614, 2321N62/U-A-674



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Turn the horizontal hold control to the center of its range. Connect a short clip lead across the horizontal waveform coil (L15). Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally. Remove the clip lead from L15. Connect the vertical amplifier of the scope thru a low capacity probe to point Φ . Low side to chassis.

Adjust the horizontal waveform slug (B2) for equal peaks of round and sharp peaks of waveform as in Fig. 6. While making this adjustment, keep the picture in sync with the horizontal hold control and B1. Adjust the horizontal drive trimmer (B3) clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

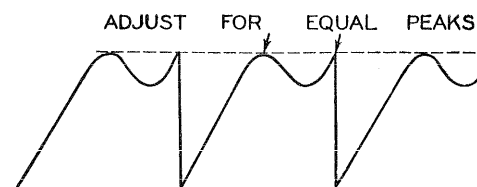
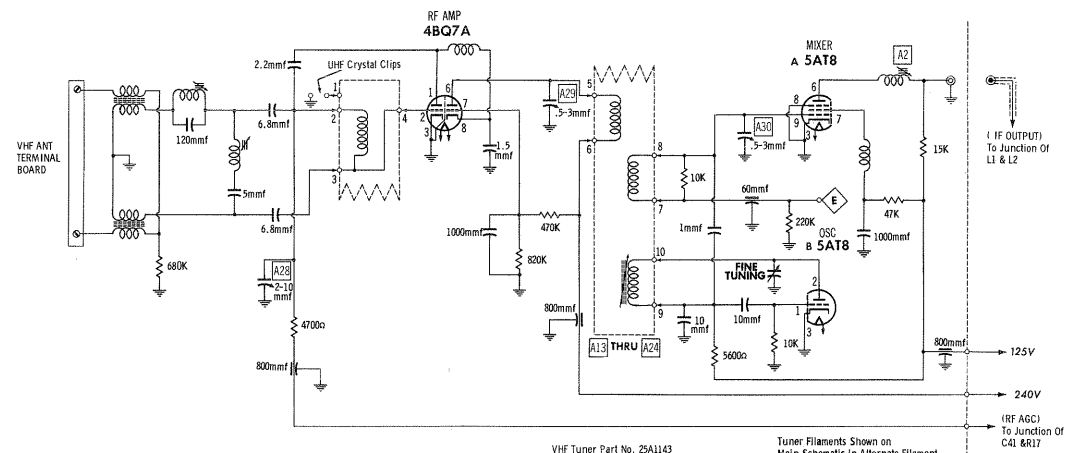
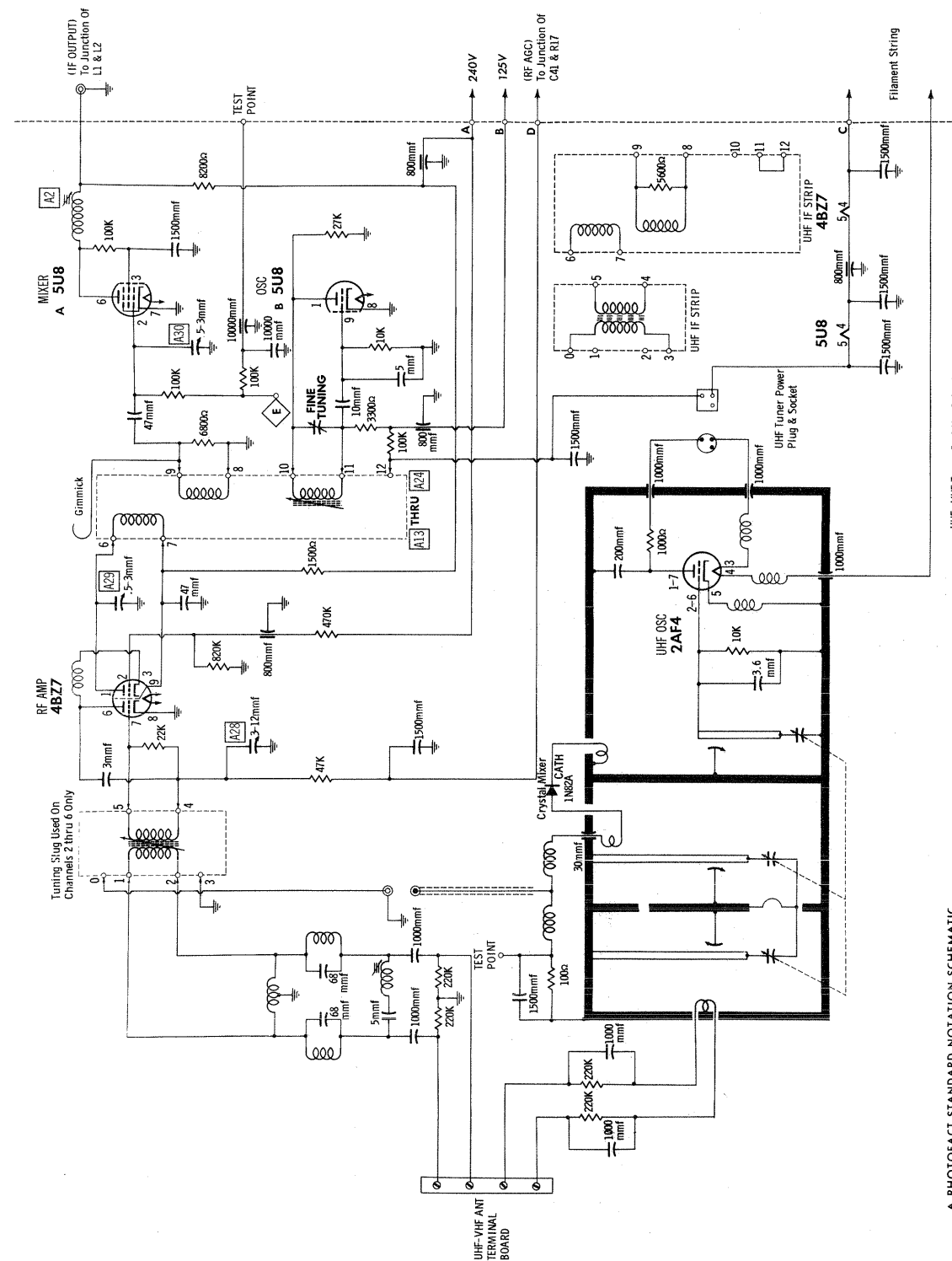


FIG. 6



A PHOTOFACT STANDARD NOTATION SCHEMATIC
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ALTERNATE TUNER SCHEMATIC



UHF-VHF Tuner Part No. 25A1145

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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WELLS-GARDNER MODELS 321N62/U-A-612, 321N62/U-A-672,
2321N62/U-A-614, 2321N62/U-A-674

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.

The High Voltage lead should be securely taped and kept away from the chassis.

Allow a 20 minute warm-up period for the receiver and test equipment.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volts bias supply to point Φ . For steps 3 thru 7 increase bias at point Φ to 4.5 volts. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Use only enough sweep generator output to provide usable pattern on scope.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1. Direct	High side to ungrounded tube shield floating over mixer-oscillator tube (V2). Low side to chassis	44.5MC (10MC Swp)	47.25MC	Any non-interfering channel	Vert. Amp. thru detector (Fig. 1) to pin 5 (plate) of 3CB6 (V3). Low side to chassis.	A1	Adjust to place marker in trap notch as in Fig. 2.
2. "	"	"	41.25MC 45.75MC	"	"	A2, A3, A4	Adjust for response curve similar to Fig. 2 with markers as indicated. A2 and A3 controls shape of curve top and positions 45.75MC marker. A3 positions 41.25MC marker. Both markers must be correctly positioned before proceeding with alignment.
3. "	"	"	42.8MC	"	Vert. Amp. thru 47K to point Φ . Low side to chassis.	A5	Adjust sweep output for 2 volts at point Φ . Adjust for maximum amplitude at marker.
4. "	"	"	41.25MC	"	"	A6	Adjust for MINIMUM amplitude at marker.
5. "	"	"	45.3MC	"	"	A7	Adjust for maximum amplitude at marker.
6. "	"	"	44.0MC	"	"	A8	"
7. "	"	"	41.25MC 42.4MC 42.8MC 44.0MC 44.5MC 45.3MC 45.75MC 47.25MC	"	"		Check for response curve similar to Fig. 3 with markers as indicated. If necessary SLIGHTLY retouch A1, and A4 thru A8 for desired response. DO NOT retouch A2 or A3.

SOUND IF ALIGNMENT

Turn the set on and tune in a TV station. Reduce the signal strength at the antenna terminals by using an attenuator or similar device until a "Hiss" is heard in the sound. Adjust A9, A10, A11 and buzz control (R8) for maximum undistorted sound and MINIMUM buzz. If the hiss disappears during alignment, reduce signal strength still further.

4.5MC TRAP ALIGNMENT

Use 0-10 volt scale on VTVM.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8. .001MFD	High side to pin 2 (grid) of 12BY7A (V6). Low side to chassis.	4.5MC (Unmod)	Any non-interfering	DC probe to pin 11 (cathode) of picture tube. Common to chassis.	A12	Adjust for MINIMUM deflection.

VHF OSCILLATOR ALIGNMENT

Connect the negative lead of 3 volt bias supply to point Φ . Positive to chassis. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Set the fine tuning control to the center of its range. Use only enough sweep generator output to provide usable pattern on scope.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9. Two 120 Ω Carbon Resistors	Across antenna terminals with 120 Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47K to point Φ . Low side to chassis.	A13	Adjust to place sound marker in trap notch as in Fig. 4. Video marker should fall at 50%.
		207MC (10MC Swp)	205.25MC 209.75MC	12		A14	
		201MC (10MC Swp)	199.25MC 203.75MC	11		A15	
		195MC (10MC Swp)	193.25MC 197.75MC	10		A16	
		189MC (10MC Swp)	187.25MC 191.75MC	9		A17	
		183MC (10MC Swp)	181.25MC 185.75MC	8		A18	
		177MC (10MC Swp)	175.25MC 179.75MC	7		A19	
		85MC (10MC Swp)	83.25MC 87.75MC	6		A20	
		79MC (10MC Swp)	77.25MC 81.75MC	5		A21	
		69MC (10MC Swp)	67.25MC 71.75MC	4		A22	
		63MC (10MC Swp)	61.25MC 65.75MC	3		A23	
		57MC (10MC Swp)	55.25MC 59.75MC	2		A24	

ALIGNMENT INSTRUCTIONS (cont)

VHF RF AND MIXER ALIGNMENT FOR TUNER #25A1148-D

Connect bias as under "VHF Oscillator Alignment". Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Use only enough sweep generator output to provide usable pattern on scope.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10. Two 120 Ω Carbon Resistors	Across antenna terminals with 120 Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point Φ . Low side to chassis.	A25, A26	Adjust A25 and A26 for response similar to Fig. 5 with markers on shoulders of curve.
11. "	"	195MC (10MC Swp)	193.25MC 197.75MC	"	"	A27	Adjust for MINIMUM amplitude.
12. "	"	213MC (10MC Swp) 207MC (10MC Swp) 201MC (10MC Swp) 189MC (10MC Swp) 183MC (10MC Swp) 177MC (10MC Swp) 85MC (10MC Swp) 79MC (10MC Swp) 69MC (10MC Swp) 63MC (10MC Swp) 57MC (10MC Swp)	211.25MC 215.75MC 205.25MC 209.75MC 199.25MC 203.75MC 187.25MC 191.75MC 181.25MC 185.75MC 175.25MC 179.75MC 83.25MC 87.75MC 77.25MC 81.75MC 67.25MC 71.75MC 61.25MC 65.75MC 55.25MC 59.75MC	13 12 11 9 8 7 6 5 4 3 2	"		Check for response similar to Fig. 5. If markers fall below 70% on any channel, make compromise adjustment of A25 and A26 with channel switch set to that channel. Check all other channels to see that they have not been seriously affected.

VHF RF AND MIXER ALIGNMENT FOR TUNERS #25A1145 AND 25A1143

Connect bias as under "VHF Oscillator Alignment". Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Use only enough sweep generator output to provide usable pattern on scope.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13. Two 120 Ω Carbon Resistors	Across antenna terminals with 120 Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10K to point Φ . Low side to chassis.	A28, A29, A30	Adjust for response curve similar to Fig. 5, with markers above 90%.
14. "	"	213MC (10MC Swp) 201MC (10MC Swp) 195MC (10MC Swp) 189MC (10MC Swp) 183MC (10MC Swp) 177MC (10MC Swp) 85MC (10MC Swp) 79MC (10MC Swp) 69MC (10MC Swp) 63MC (10MC Swp) 57MC (10MC Swp)	211.25MC 215.75MC 199.25MC 203.75MC 193.25MC 197.75MC 187.25MC 191.75MC 181.25MC 185.75MC 175.25MC 179.75MC 83.25MC 87.75MC 77.25MC 81.75MC 67.25MC 71.75MC 61.25MC 65.75MC 55.25MC 59.75MC	13 11 10 9 8 7 6 5 4 3 2	"		Check for response similar to Fig. 5. If markers fall below 70% on any channel, make compromise adjustments of A28, A29, and A30 with channel switch set to that channel. Check all other channels to see that they have not been seriously affected.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

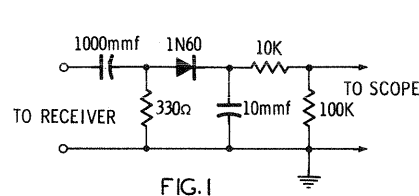


FIG. 1

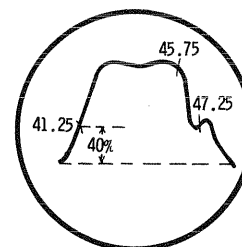


FIG. 2

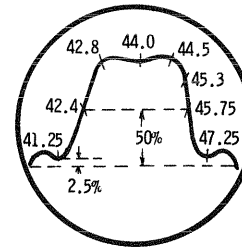


FIG. 3

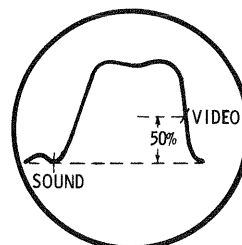


FIG. 4

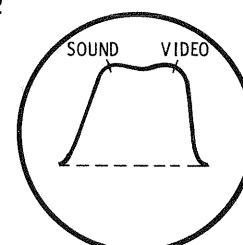


FIG. 5

WELLS-GARDNER MODELS 321N62/U-A-612, 321N62/U-A-672,
2321N62/U-A-614, 2321N62/U-A-674

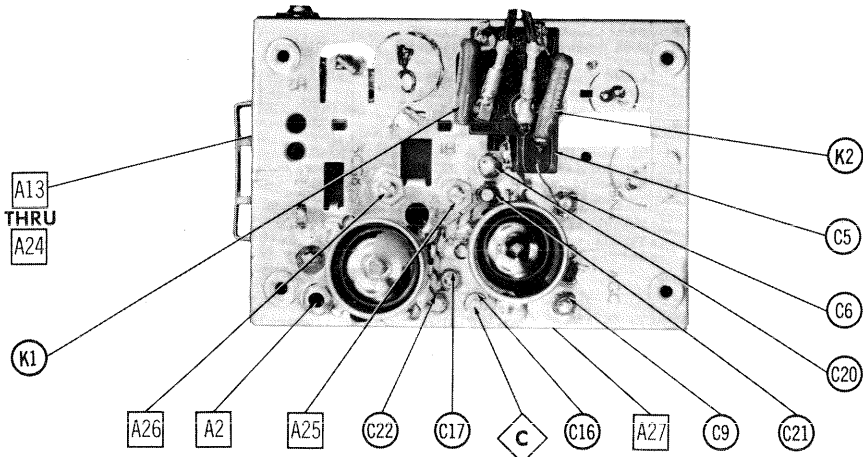
PARTS LIST AND DESCRIPTIONS (Continued)
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		Wells-Gardner PART No.	CBS PART No.	SYLVANIA PART No.	
M3	1N295 *		1N80	1N80	Video Det. (Pigtail)

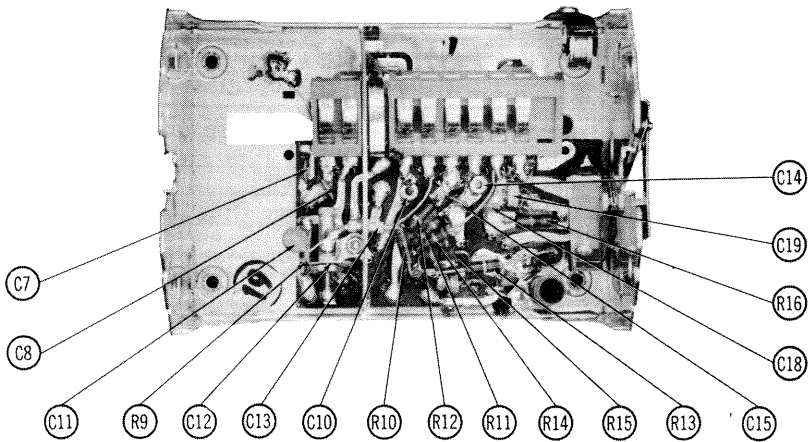
* A CK706 or 1N60 may be used in this application.

MISCELLANEOUS

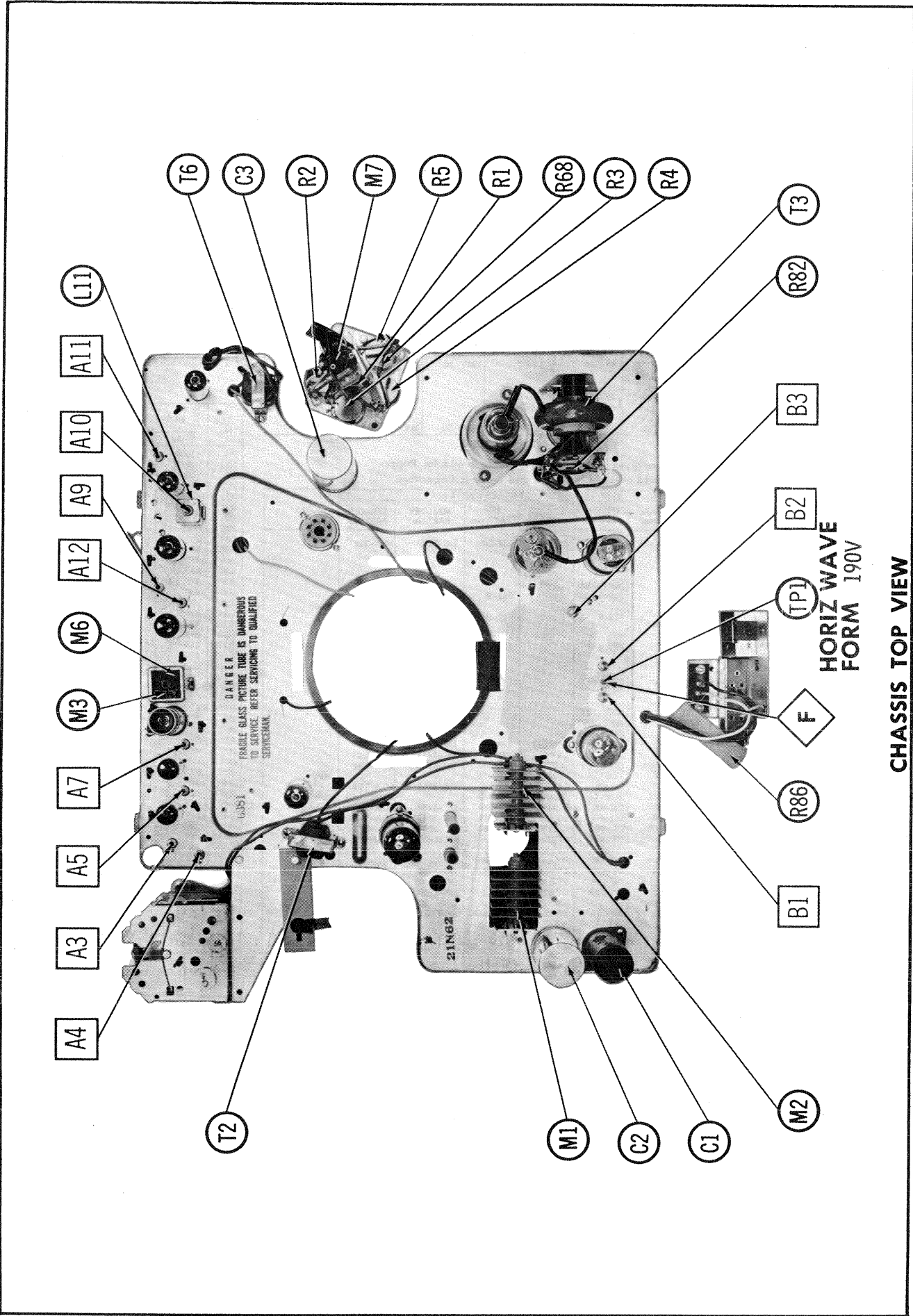
ITEM No.	PART NAME	Wells-Gardner PART No.	NOTES
M4	Dial Light	25A1148-D	#51 Type (A type #15 may be used in some versions)
M5	Tuner	25A1145	VHF
M6	Tuner	25A1143	UHF-VHF
M7	Video Det. Assy.	9A2370	VHF
M8	Switch	2A464	Includes 4th. Video IF, peaking coil, caps., M3
M9	Centering Device	2A435	On-off (Push type)
M10	Ion Trap	2A421	Includes rear yoke cover
	Circuit Breaker	2A461	
	Safety Glass	17X193-1	Tinted
	Knob	10A861-1	Control (4 used)
	Knob	10A870-11	Channel Selector (VHF, Mahogany Cabinet)
	Knob	10A871-1	Fine Tuning (VHF, Mahogany Cabinet)
	Knob	10A872-1	Volume (VHF, Mahogany Cabinet)
	Knob	10A873-1	Contrast (VHF, Mahogany Cabinet)
	Knob	10A870-12	Channel Selector (VHF, Oak Cabinet)
	Knob	10A871-2	Fine Tuning (VHF, Oak Cabinet)
	Knob	10A872-2	Volume (VHF, Oak Cabinet)
	Knob	10A873-2	Contrast (VHF, Oak Cabinet)
	Knob	10A875-1	VHF Channel Selector (UHF, Mahogany Cabinet)
	Knob	10A876	UHF Channel Selector (UHF, Mahogany Cabinet)
	Knob	S-38A186	Fine Tuning (UHF, Mahogany Cabinet)
	Knob	10A874-1	Volume (UHF, Mahogany Cabinet)
	Knob	S-38A187	Contrast (UHF, Mahogany Cabinet)
	Knob	10A875-2	VHF Channel Selector (UHF, Oak Cabinet)
	Knob	S-38A186	UHF Channel Selector (UHF, Oak Cabinet)
	Knob	10A877-1	Fine Tuning (UHF, Oak Cabinet)
	Knob	10A874-2	Volume (UHF, Oak Cabinet)
	Knob	S-38A187	Contrast (UHF, Oak Cabinet)



RF TUNER TOP VIEW



RF TUNER BOTTOM VIEW



HORIZ WAVE
FORM 190V

VIEW DOT SIS5VHC

WELLS-GARDNER MODELS 321N62/U-A-612, 321N62/U-A-672,
2321N62/U-A-614, 2321N62/U-A-674

