



RCA VICTOR

COLOR TELEVISION RECEIVERS

MODELS

21-CT-660U, 21-CT-661U
21-CT-662U, 21-CT-663U
21-CT-664U

Chassis Nos. CTC4, CTC4A, CTC4B
— Mfr. No. 274 —

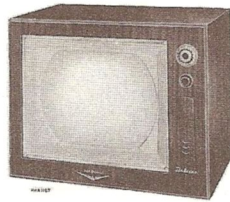
SERVICE DATA SUPPLEMENT

— 1957 No. T10 —

SUPPLEMENTING SERVICE DATA 1955 NO. T5

PREPARED BY COMMERCIAL SERVICE
RCA SERVICE CO., INC.
CAMDEN 8, N. J.

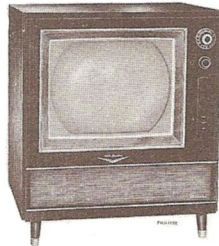
FOR
RADIO CORPORATION OF AMERICA
RCA VICTOR TELEVISION DIVISION



Model 21-CT-660U
"Haviland 21"
Mahogany Grain, Oak Grain



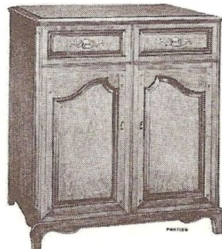
Model 21-CT-661U
"Seville 21"
Bl. Trop. Hardwood
Mahogany



Model 21-CT-662U
"Director 12"
Bl. Trop. Hardwood
Mahogany



Model 21-CT-663U
"Cheltenham 21"
Birch
Mahogany Fin.



Model 21-CT-664U
"Gainsborough 21"
Maple,
Natural Walnut

GENERAL INFORMATION

This Service Data supplements Service Data No. T5 covering the above models. The information contained in this supplement includes all production changes, oscilloscope waveform photographs, exploded view of the tuner unit, service suggestions and other information not included in previous Service Data.

All models are color television receivers, capable of reception of either black and white or color programs. The receivers employ a shadow mask, three gun, directly viewed metal kinescope.

The receivers feature: 12 channel VHF coverage plus any UHF channels desired; intercarrier FM sound system; stabilized horizontal AFC; magnetic convergence and electrostatic focus; crystal controlled AFC color synchronization; high level color demodulation; automatic color control and a color "killer" circuit to disable the color channel during black and white reception.

A removable top panel is provided to facilitate servicing and adjustment. Dual loudspeakers are provided in Model 21-CT-662U. Models 21-CT-663U and 21-CT-664U have three speakers arranged for Panoramic Sound reproduction.

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SUPPLEMENTARY INFORMATION

Issue	Subject

List related Supplements and Service Tips above.

ELECTRICAL SPECIFICATIONS

CHASSIS DESIGNATIONS

CHASSIS	TUNER	MODELS	LOUD-SPEAKERS
CTC4	KRK37	21CT660U 21CT661U	1—8 inch
CTC4A	KRK37	21CT662U	2—8 inch
CTC4B	KRK37	21CT663U 21CT664U	2—3½ inch 1—8 inch

RCA TUBE COMPLEMENT

Tube Used	Function
(1) RCA 6AF4A	UHF Oscillator
(2) RCA 6BQ7A	VHF R-F Amplifier UHF I-F Amplifier
(3) RCA 6X8	VHF R-F Oscillator & Mixer
(4) RCA 6AZ8	1st Picture I-F Amp. & Vert. Osc.
(5) RCA 6AZ8	2nd Picture I-F Amp. & 2nd Sync. Amp.
(6) RCA 6AN8	3rd Picture I-F Amp. & 1st Sync. Amp.

A 1N60 Crystal is used for the picture 2nd Detector.

RCA TUBE COMPLEMENT (continued)

Tube Used	Function
(7) RCA 6CL6	1st Video Amplifier
(8) RCA 6CL6	2nd Video Amplifier
(9) RCA 6U8	Sound I-F Amp. & Noise Inverter
(10) RCA 6T8	Ratio Det. & 1st Audio Amp.
(11) RCA 6AQ5	Audio Output
(12) RCA 6AQ5	Vertical Output
(13) RCA 6SN7GT	Horiz. Sweep Osc. & Control
(14) RCA 6CB5	Horiz. Sweep Output
(15) RCA 6U8	AGC Amp. & Burst Keyer
(16) RCA 6AU4GTA*	Damper
(17) RCA 1X2B	Focus Rectifier
(18) RCA 3B2	High Voltage Rectifier
(19) RCA 6BK4	Shunt Regulator
(20) RCA 6AZ8	Killer & Band Pass Amplifier
(21) RCA 6AN8	Blanking Amp. & Reactance
(22) RCA 6AL5	Phase Detector
(23) RCA 6AZ8	3.58 MC Osc. & "B-Y" Amp.
(24) RCA 6AG7	Demodulator Driver
(25) RCA 12BH7	"G-Y" & "R-Y" Demodulators
(26) RCA 21AXP22	Kinescope

Two selenium rectifiers are used for Low Voltage rectification

* In early production receivers the damper tube was a 6BL4.

The waveforms shown on the following pages are photographs of the waveforms obtained from a production model of a 21-CT-662U receiver. Since picture content varies widely it is not important to note the shape of video information. It is important, however, when making comparisons, to observe the waveshape and peak-to-peak voltage of sync pulses, oscillators and associated amplifiers.

The figures, shown in the lower left corner of the photographs, provide a reference to the schematic diagram, figure 58, indicating the points of observation.

An RCA WO-78A dual bandwidth oscilloscope was used for observation of the waveforms. However, the narrow bandwidth position of the oscilloscope was used except where noted in the caption.

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT COVER OPENED. BEFORE TURNING THE RECEIVER ON, INSURE THAT THE GROUND LEAD BETWEEN THE CHASSIS GROUNDING STRIP AND THE FRONT TRIM AND THE LEAD BETWEEN THE TRIM AND THE BOTTOM RETAINING ROD ARE FASTENED AND MAKING CONTACT. BE SURE THE GROUND LEAD TO THE TOP OF THE FRONT TRIM ASSEMBLY IS IN PLACE.

KINESCOPE HANDLING PRECAUTIONS

DO NOT REMOVE THE RECEIVER CHASSIS. INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For this reason, the kinescope must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. During service if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube.

WAVEFORM PHOTOGRAPHS

21-CT-660U to
21-CT-664U Incl.

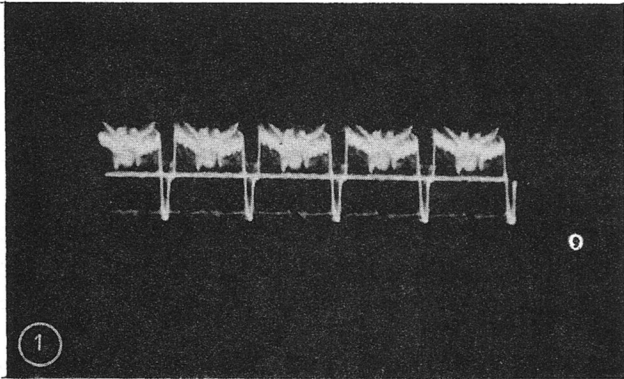


Fig. 1—Waveform at Grid of 1st Video Amplifier (Pin #2). Black-and-white Picture. Contrast Control Adjusted for Normal Reception. Color Control at Minimum. 10 volts peak to peak.

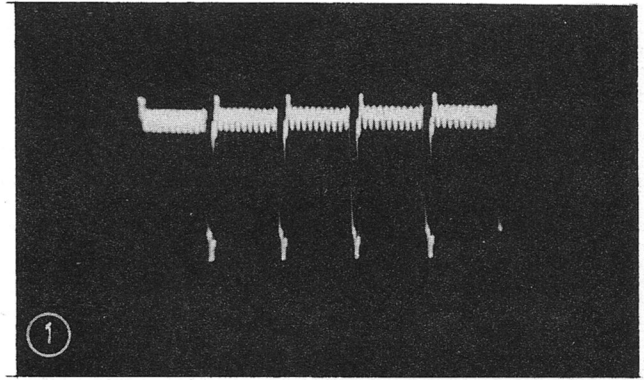


Fig. 2—Waveform at Grid of 1st Video Amplifier (Pin #2). Signal from RCA Color Bar Generator. Color Control at Maximum. Contrast Control at Maximum. 7.5 volts peak to peak.

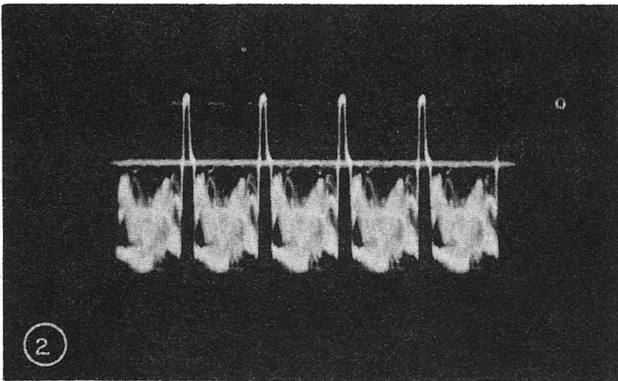


Fig. 3—Waveform at Plate of 1st Video Amplifier (Pin #6). Black-and-white Picture. Contrast Control Adjusted for Normal Reception. Color Control at Minimum. 45 volts peak to peak.

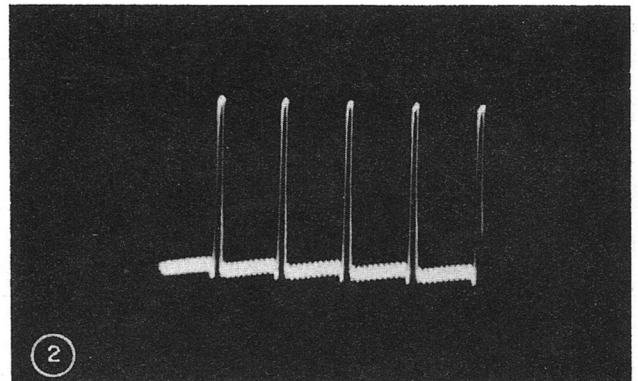


Fig. 4—Waveform at Plate of 1st Video Amplifier (Pin #6). Signal from RCA Color Bar Generator. Color Control at Maximum. Contrast Control at Maximum. 33 volts peak to peak.

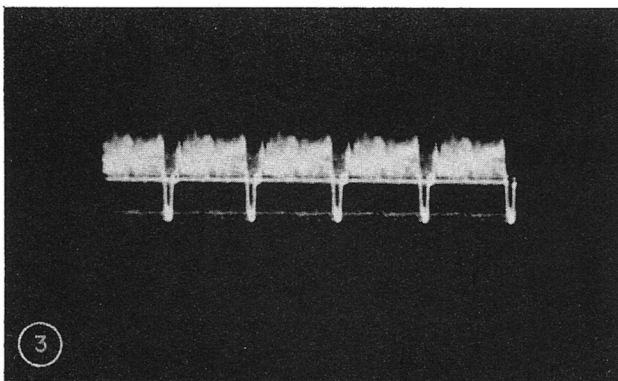


Fig. 5—Waveform at Cathode of 1st Video Amplifier (Pin #1). Black-and-white Picture. Contrast Control Adjusted for Normal Reception. Color Control at Minimum. 7.5 volts peak to peak.

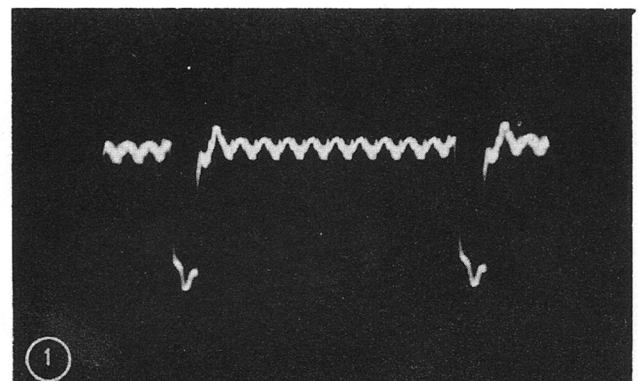


Fig. 6—Waveform at Grid of 1st Video Amplifier (Pin #2). Signal from RCA Color Bar Generator. Color Control at Maximum. Contrast Control at Maximum. Waveform same as Figure 2, Expanded to Show the 10 Color Bars. 7.5 volts peak to peak.

WAVEFORM PHOTOGRAPHS

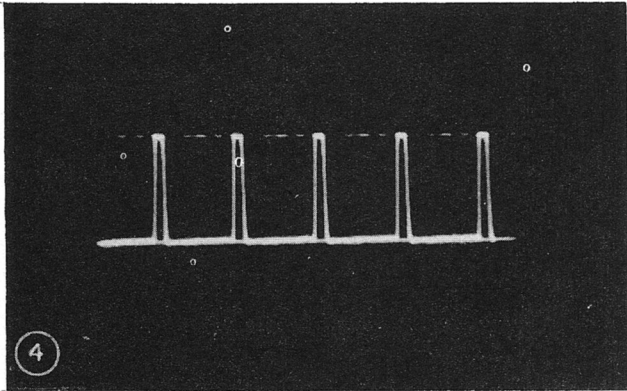


Fig. 7—Waveform at Grid (Pin #6) of 6AZ8 Bandpass Amplifier. Black-and-white Picture. Picture Control Adjusted for Normal Picture. Color Control at Minimum. 27 volts peak to peak.

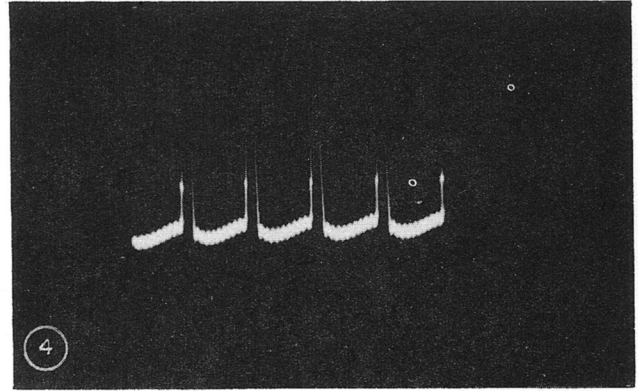


Fig. 8—Waveform at Grid (Pin #6) of 6AZ8 Bandpass Amplifier. Signal from Color Bar Generator. Picture Control at Maximum. Color Control at Maximum. 2.1 volts peak to peak.

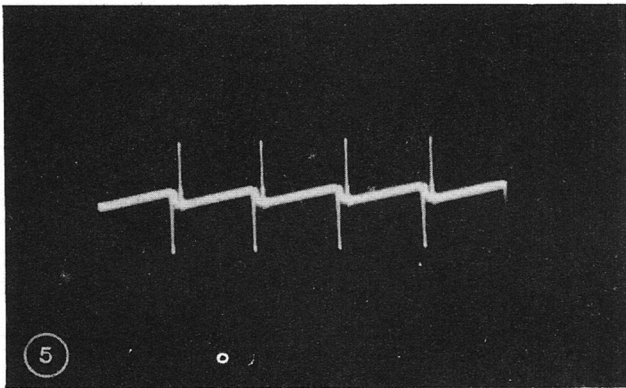


Fig. 9—Waveform of Horizontal Pulse at Plate (Pin #1) of 6AZ8 Bandpass Amplifier. Black-and-white Picture. Picture Control Adjusted for Normal Picture. Color Control at Minimum. 60 volts peak to peak.

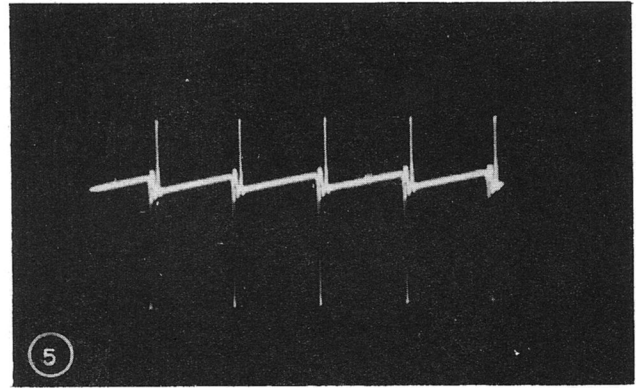


Fig. 10—Waveform of Horizontal Pulse at Plate (Pin #1) of 6AZ8 Bandpass Amplifier. Black-and-white Picture. Color Control at Maximum. 4.5 volts peak to peak.

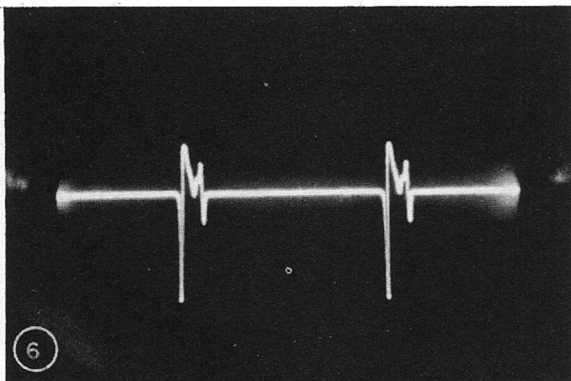


Fig. 11—Waveform at Terminal "C"—T-113, Black-and-white Picture. Color Control at Minimum. 6.9 volts peak to peak.

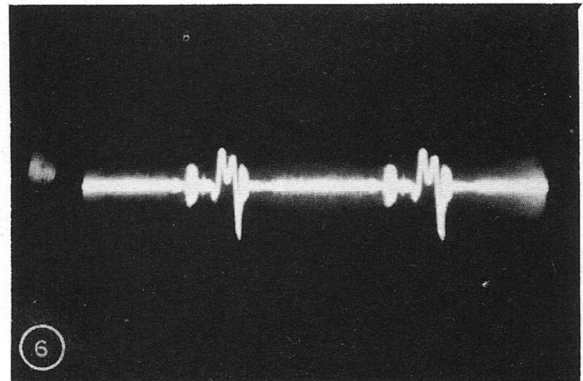


Fig. 12—Waveform at Terminal "C"—T-113. Black-and-white Picture with Color Stripe. Color Control Maximum. 3.9 volts peak to peak.

WAVEFORM PHOTOGRAPHS

21-CT-660U to
21-CT-664U Incl.

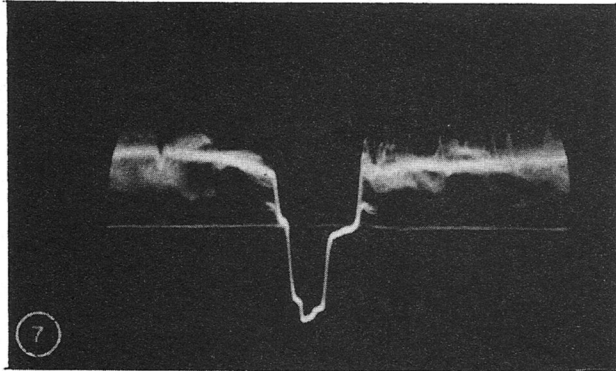


Fig. 13—Waveform at L-145 End of Delay Line—
Horizontal Sync.
7.5 volts peak to peak.

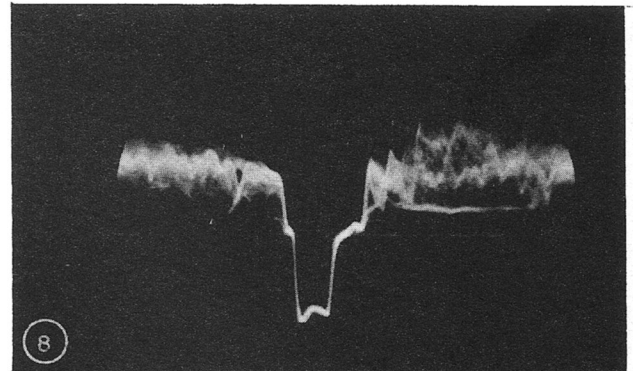


Fig. 14—Waveform at R-134 End of Delay Line—
Horizontal Sync.
7.5 volts peak to peak.

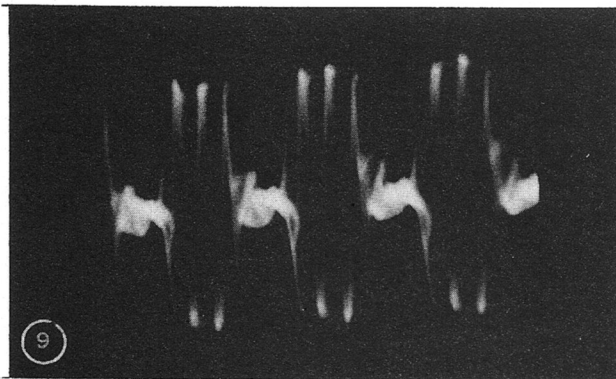


Fig. 15—Waveform at Plate of 2nd Video—Color Bars—
Expanded—Wideband Position of Oscilloscope.
100 volts peak to peak.

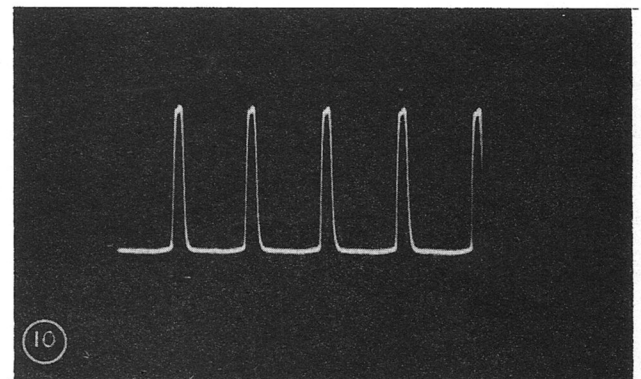


Fig. 16—Waveform at Grid (Pin #9) of Burst Keyer. Black-
and-white Picture. Contrast and Brightness Controls Adjusted
for Normal Picture Reception. Color Control at Minimum.
51 volts peak to peak.

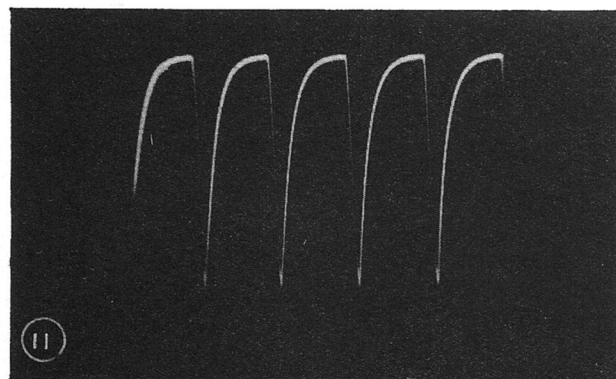


Fig. 17—Waveform at Plate (Pin #1) of Burst Keyer. Black-
and-white Picture. Contrast and Brightness Controls Adjusted
for Normal Picture Reception. Color Control at Minimum.
18 volts peak to peak.

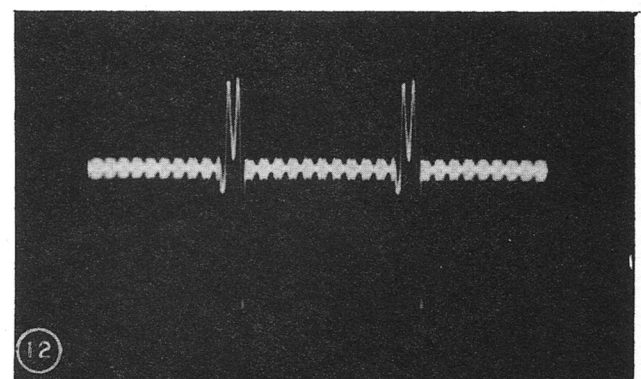


Fig. 18—Waveform at Cathode (Pin #8) of Keyer. Signal
from RCA Color Bar Generator. Contrast and Brightness
Controls Adjusted for Normal Picture Reception. Color Con-
trol at Maximum. Expanded to Show Color Bars.
3 volts peak to peak.

WAVEFORM PHOTOGRAPHS

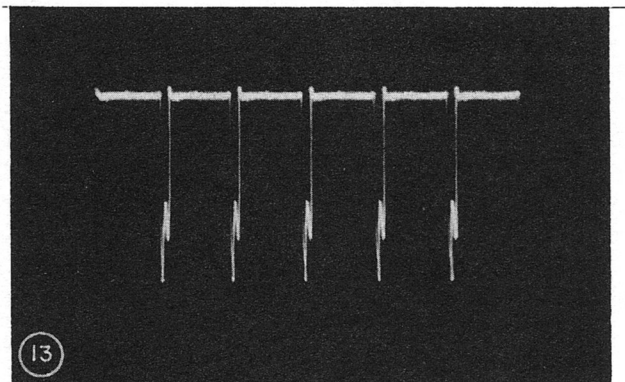


Fig. 19—Waveform at Grid (Pin #9) of Killer. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture Reception. Color Control at Minimum. 12 volts peak to peak

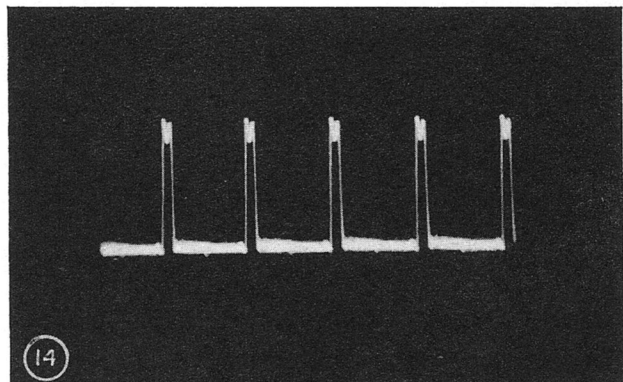


Fig. 20—Waveform at Plate (Pin #8) of Killer. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture Reception. Color Control at Minimum. 33 volts peak to peak.

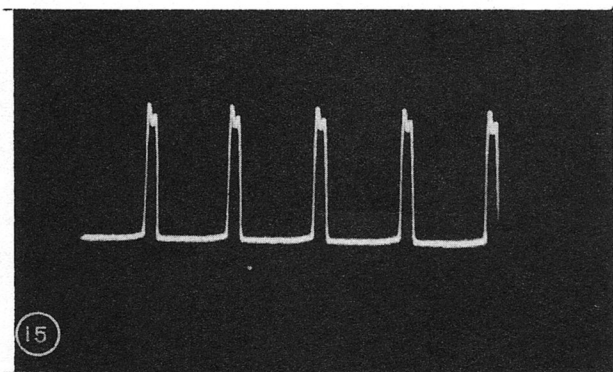


Fig. 21—Waveform at Grid (Pin #2) of Blanking Amplifier. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 150 volts peak to peak.

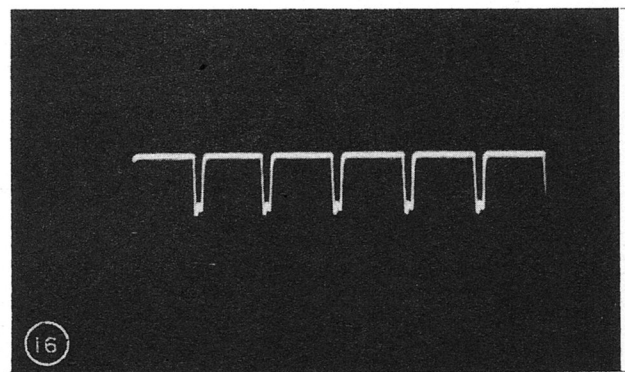


Fig. 22—Waveform at Plate (Pin #1) of Blanking Amplifier. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 220 volts peak to peak.

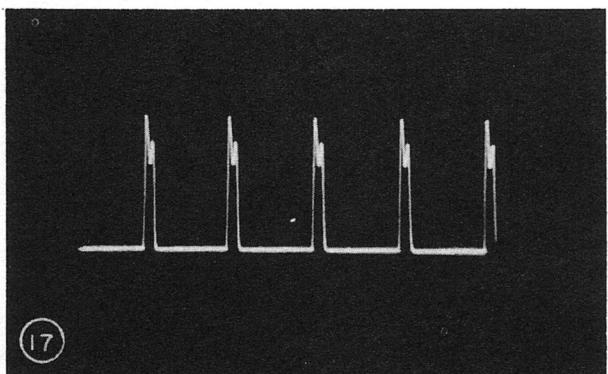


Fig. 23—Waveform at Cathode (Pin #3) of Blanking Amplifier. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 51 volts peak to peak.

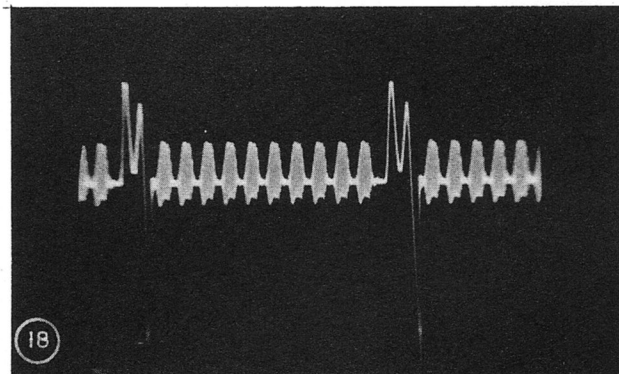


Fig. 24—Waveform at Grid (Pin #4) of Demodulator Driver. Signal from Color Bar Generator. Picture Control Adjusted for Normal Contrast. Color Control at Maximum. Waveform Expanded to Show Detail. 15 volts peak to peak.

WAVEFORM PHOTOGRAPHS

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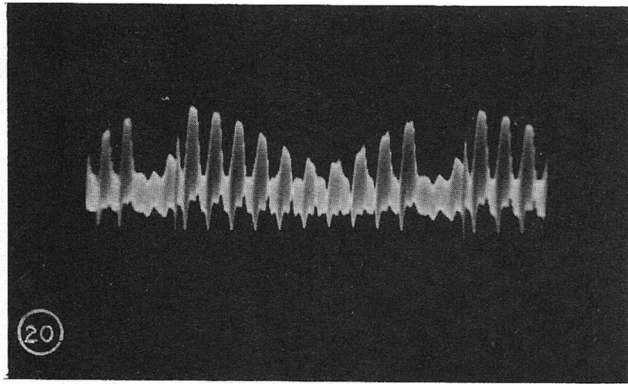


Fig. 25—Waveform at Terminal "A" T-114, Demodulator Driver Transformer. Signal from Color Bar Generator. Picture Control Adjusted for Normal Contrast. Color Control at Maximum. Hue Control Incorrectly Adjusted. Waveform Expanded to Show Detail.
180 volts peak to peak.

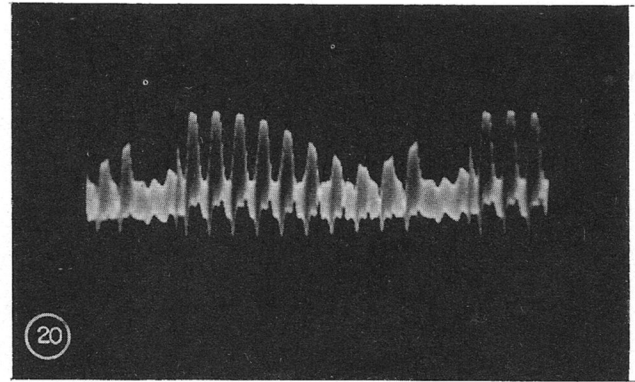


Fig. 26—Waveform at Terminal "A" T-114, Demodulator Driver Transformer. Signal from Color Bar Generator. Picture Control Adjusted for Normal Contrast. Color Control at Maximum. Hue Control Adjusted Correctly. Compare with Figure 25.
180 volts peak to peak.

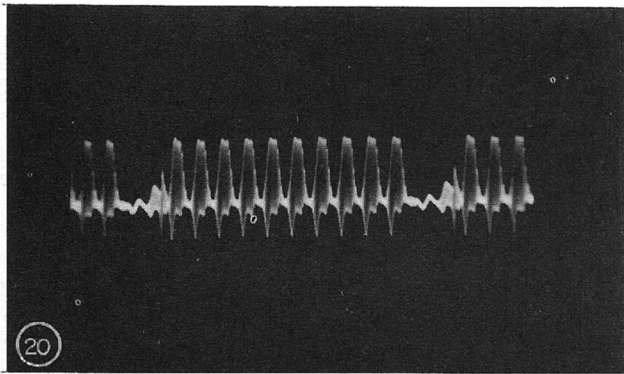


Fig. 27—Waveform at Terminal "A" T-114, Demodulator Driver Transformer. Signal from Color Bar Generator. Picture Control Adjusted for Normal Contrast. Color Control at Maximum. Hue Control Incorrectly Adjusted. 3.58 mc. Oscillator Operating Normally.
180 volts peak to peak

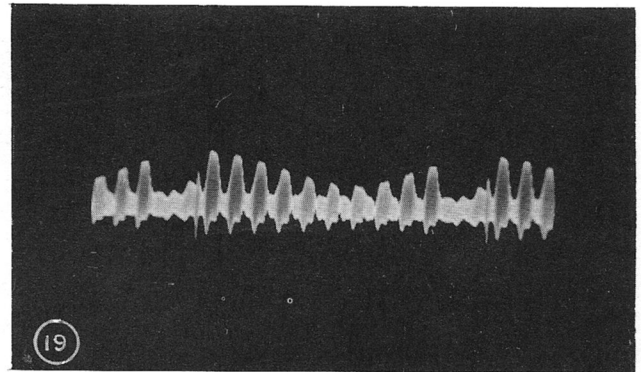


Fig. 28—Waveform at Terminal "D" T-114, Demodulator Driver Transformer. Signal from Color Bar Generator. Picture Control Adjusted for Normal Contrast. Color Control at Maximum. Hue Control Misadjusted. Note Difference in Amplitude when Compared with Figure 25.
110 volts peak to peak.

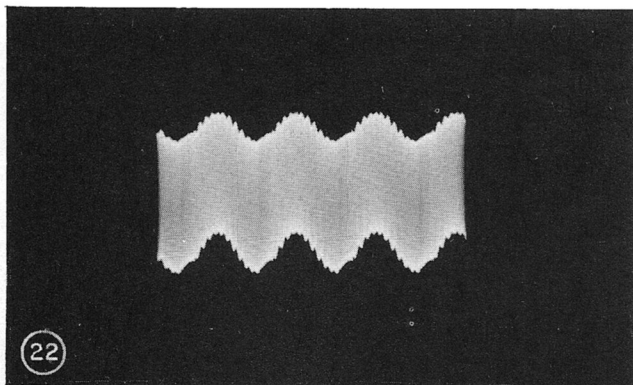


Fig. 29—Waveform at Grid (Pin #7) of G-Y Demodulator. Signal from Color Bar Generator. Picture Control Adjusted for Normal Contrast. Color Control at Maximum.
60 volts peak to peak.

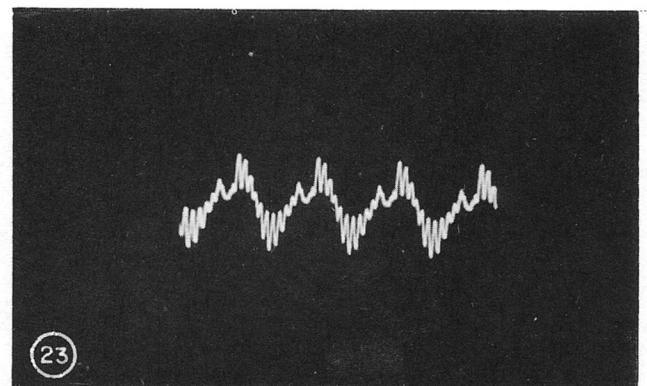


Fig. 30—Waveform at Grid (Pin #9) of B-Y Amplifier. Signal from Color Bar Generator. Picture Control Adjusted for Normal Contrast. Color Control at Maximum. Note that Signal has been Demodulated.
30 volts peak to peak

WAVEFORM PHOTOGRAPHS

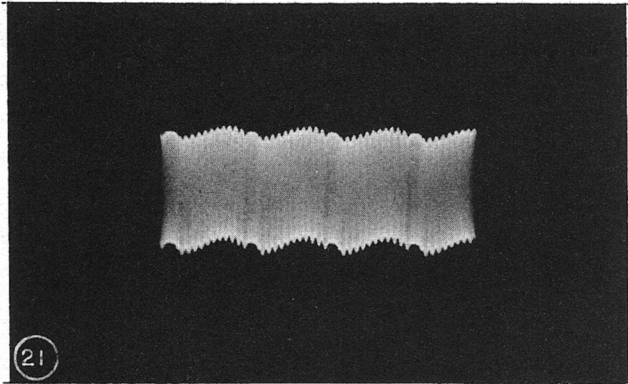


Fig. 31—Waveform at Grid (Pin #2) of R—Y Demodulator. Signal from Color Bar Generator. Picture Control Adjusted for Normal Contrast, Color Control at Maximum. 260 volts peak to peak.

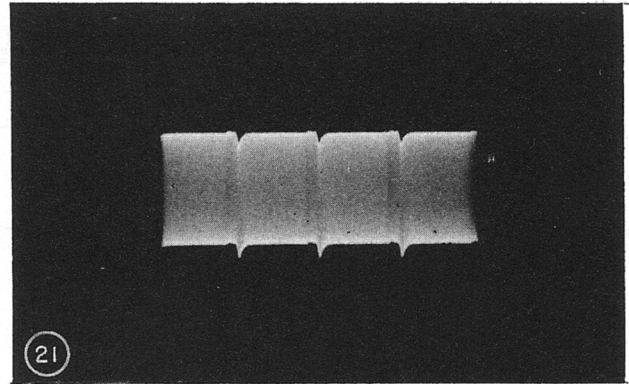


Fig. 32—Waveform at Grid (Pin #2) of R—Y Demodulator. Signal from Color Bar Generator. Picture Control Adjusted for Normal Contrast, Color Control at Minimum. Compare with Figure 31. 260 volts peak to peak.

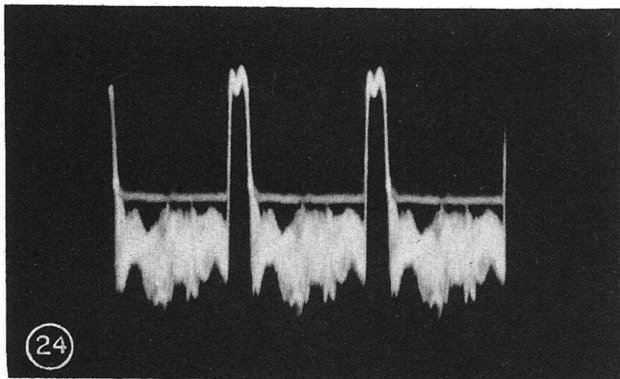


Fig. 33—Waveform at Kinescope Cathodes. Black-and-white Picture. 130 volts peak to peak.

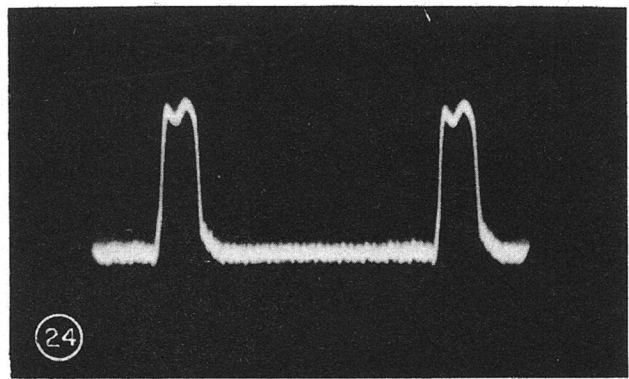


Fig. 34—Waveform at Kinescope Cathodes. Color Bar Signal. 70 volts peak to peak.

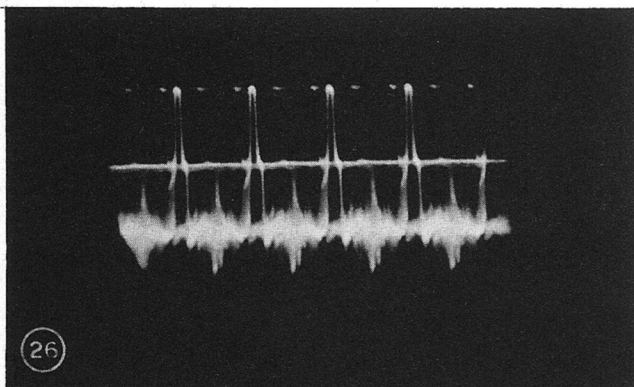


Fig. 35—Waveform at Grid (Pin #2) of AGC Amplifier. Black-and-white Picture. Picture and Brightness Controls Adjusted for Normal Picture. Color Control, at Minimum. 16 volts peak to peak.

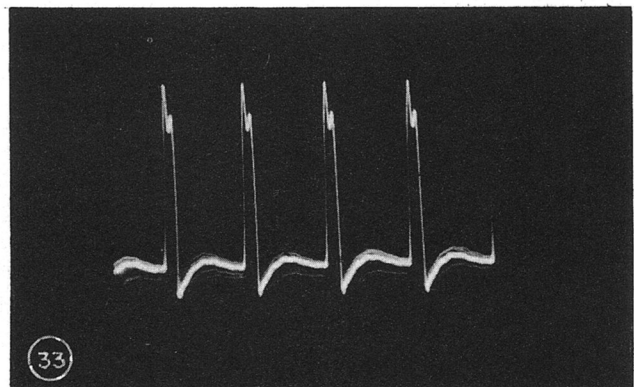


Fig. 36—Waveform at Plate (Pin #6) of AGC Amplifier. Black-and-white Picture. Picture and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 810 volts peak to peak.

WAVEFORM PHOTOGRAPHS

21-CT-660U to
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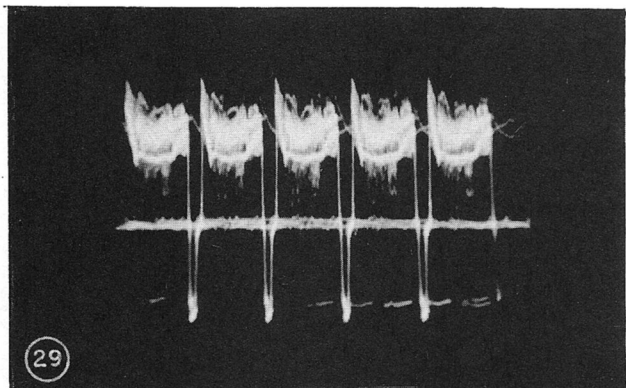


Fig. 37—Waveform at Cathode (Pin #8) of Noise Inverter. Black-and-white Picture. Picture and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 6 volts peak to peak.

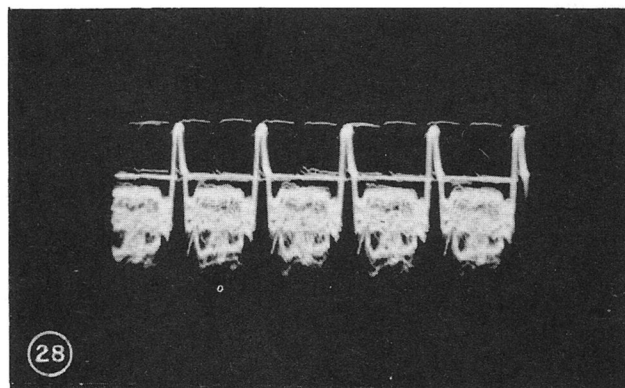


Fig. 38—Waveform at Plate (Pin #1) of Noise Inverter. Black-and-white Picture. Picture and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 42 volts peak to peak.

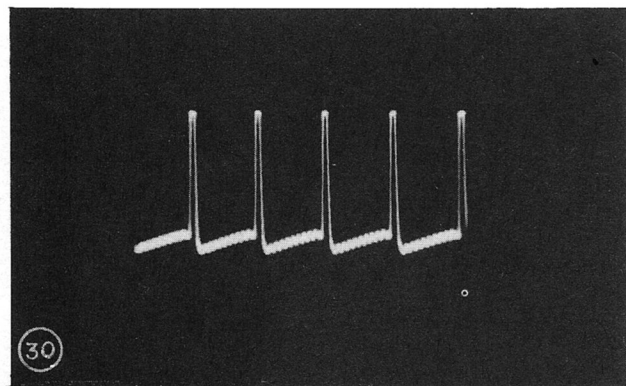


Fig. 39—Waveform at Grid (Pin #2) of 1st Sync Amplifier. Black-and-white Picture. Picture and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 30 volts peak to peak.

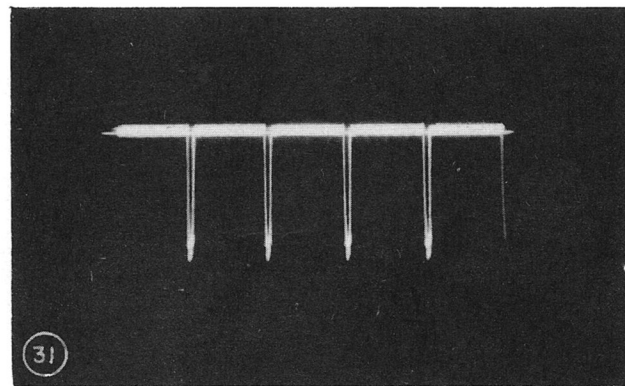


Fig. 40—Waveform at Plate (Pin #1) of 1st Sync Amplifier. Black-and-white Picture. Picture and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 14 volts peak to peak.

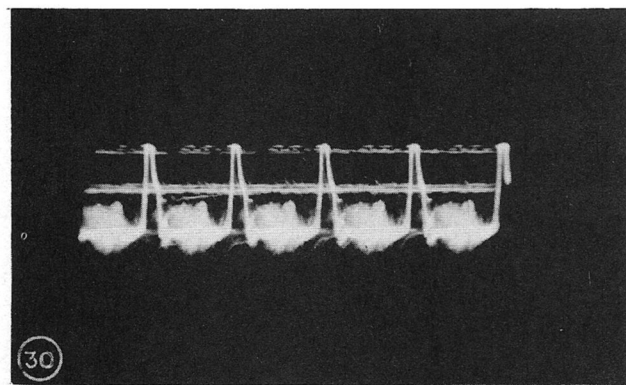


Fig. 41—Waveform at Grid (Pin #2) of 1st Sync Amplifier. Signal from Color Bar Generator. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Maximum. 27 volts peak to peak.

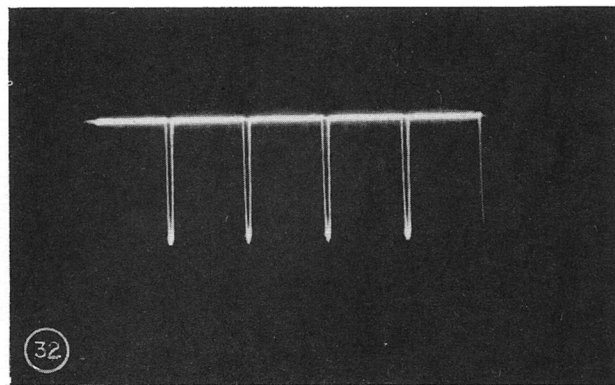


Fig. 42—Waveform at Grid (Pin #9) of 2nd Sync Amplifier. Black-and-white Picture. Picture and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 15 volts peak to peak.

WAVEFORM PHOTOGRAPHS

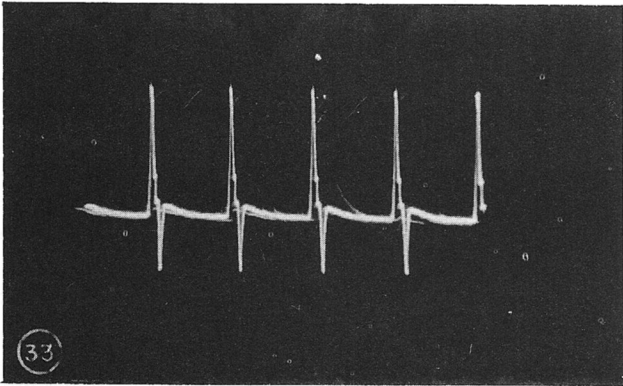


Fig. 43—Waveform at Plate (Pin #8) of 2nd Sync Amplifier. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 69 volts peak to peak.

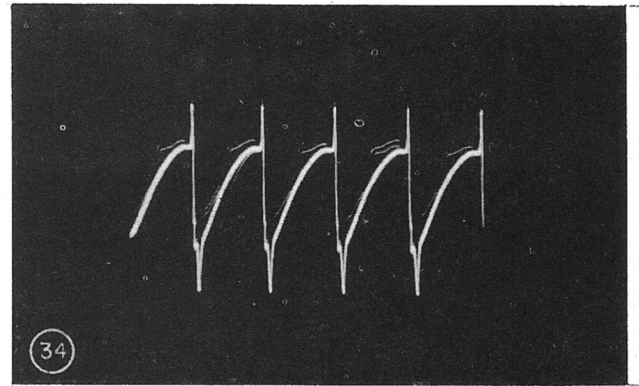


Fig. 44—Waveform at Grid (Pin #1) of Horizontal Oscillator Control Tube. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 750 volts peak to peak.

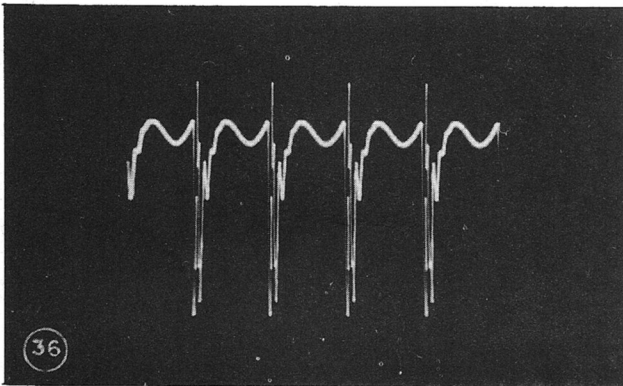


Fig. 45—Waveform at Plate (Pin #5) of Horizontal Oscillator. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 390 volts peak to peak.

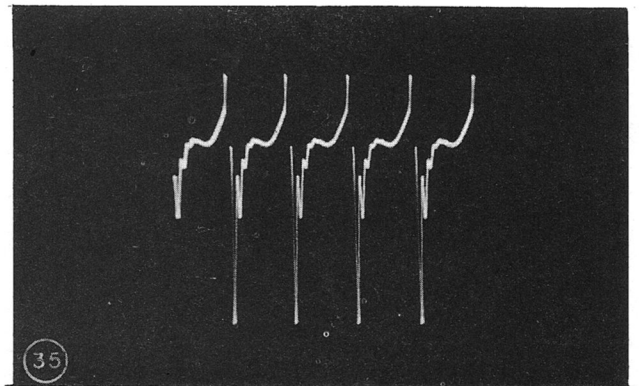


Fig. 46—Waveform at Grid (Pin #4) of Horizontal Oscillator. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 720 volts peak to peak.

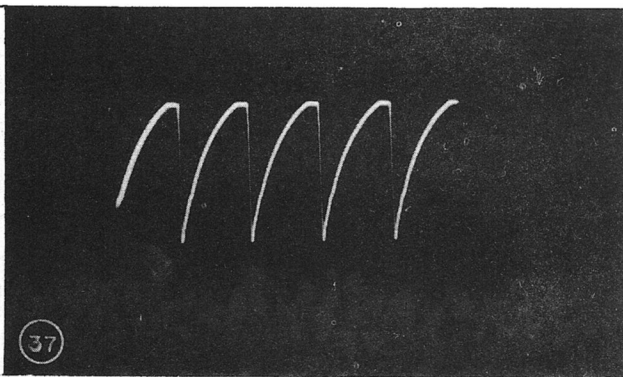


Fig. 47—Waveform at Grid (Pins 4-5) of 6CB5 Horizontal Output Tube. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 190 volts peak to peak.

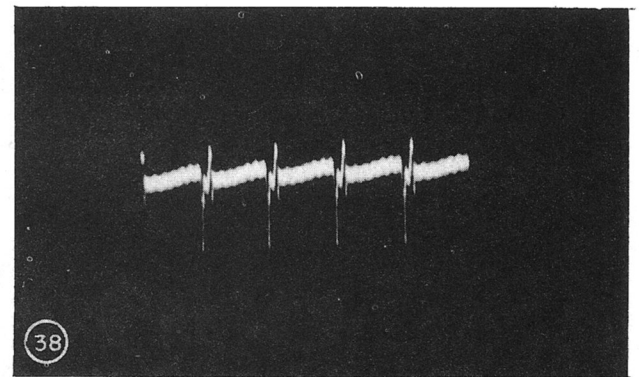


Fig. 48—Waveform at Cathode—Horizontal Output. 0.2 volt peak to peak.

WAVEFORM PHOTOGRAPHS

21-CT-660U to
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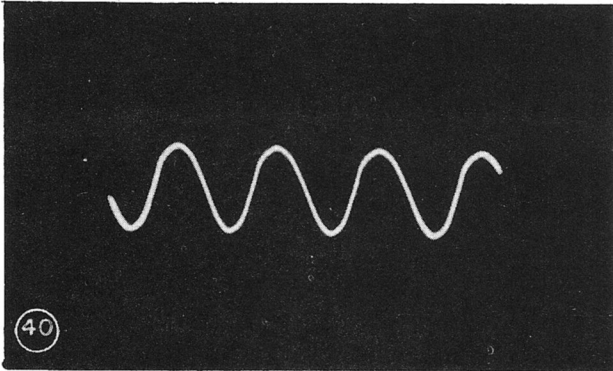


Fig. 49—Waveform at Plate (Pin #5) of Damper Tube. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 120 volts peak to peak.

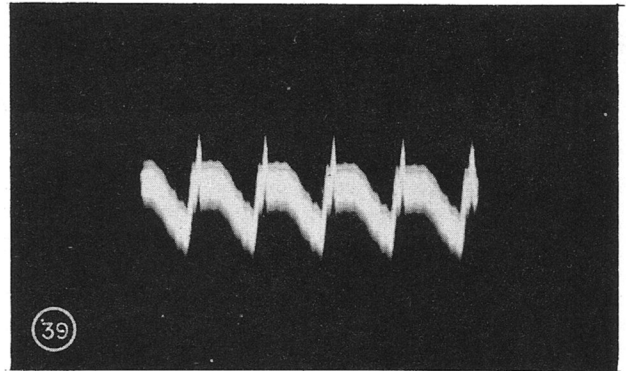


Fig. 50—Waveform at Cathode (Pin #3) of Damper Tube. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum.

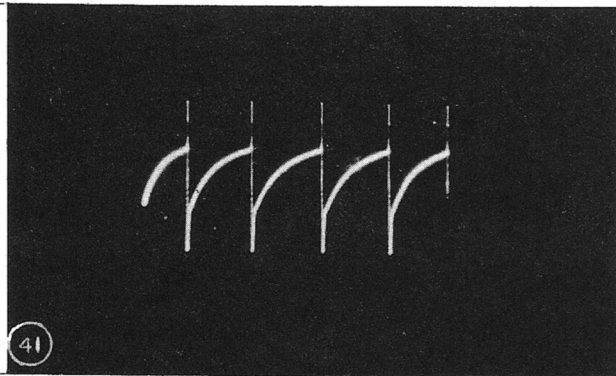


Fig. 51—Waveform at Grid (Pin #9) of Vertical Oscillator. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 180 volts peak to peak.

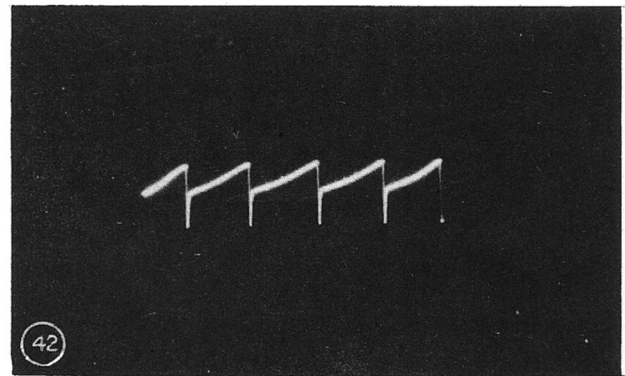


Fig. 52—Waveform at Plate (Pin #8) of Vertical Oscillator. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 78 volts peak to peak.

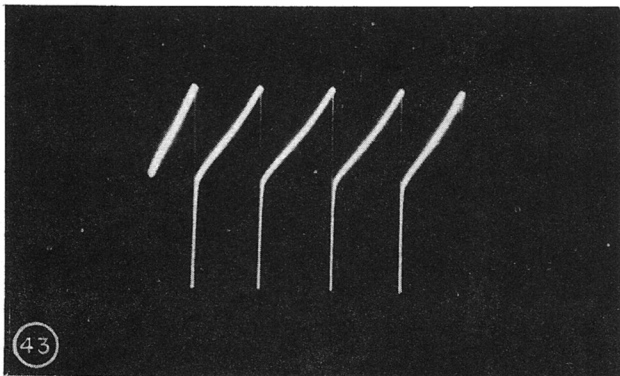


Fig. 53—Waveform at Grid (Pin #1) of Vertical Output. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 69 volts peak to peak.

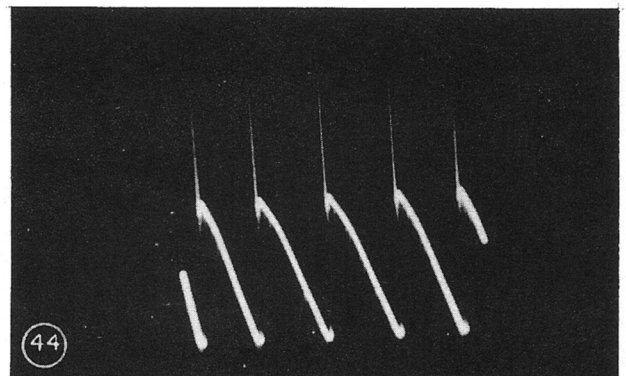


Fig. 54—Waveform at Plate (Pin #5) of Vertical Output. Black-and-white Picture. Contrast and Brightness Controls Adjusted for Normal Picture. Color Control at Minimum. 1700 volts peak to peak.

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21-CT-664U Incl.**

SERVICE SUGGESTIONS

Following is a list of symptoms of possible failures and an indication of some of the possible faults:

NO RASTER ON KINESCOPE:

V116 or V117 inoperative. Check waveforms on grids and plates.

No high voltage—if horizontal deflection is operating as evidenced by the correct waveform on terminal 1 of high voltage transformer, the trouble can be isolated to the 3B2 circuit. Either the T109 high voltage winding is open, the 3B2 tube is defective or its filament circuit is open.

Damper tube V115 inoperative.

No receiver plate voltage—filter capacitor shorted—or filter choke open.

NO VERTICAL DEFLECTION:

V107B or V118 inoperative. Check voltage and waveforms on grids and plates.

T110 open.

Vertical deflection coils open.

POOR VERTICAL LINEARITY:

If adjustments cannot correct, change V118.

Vertical output transformer T110 defective.

V107B defective—check voltage and waveforms on grid and plate.

C164, C166 or C167 defective.

Low plate voltage—check rectifiers and capacitors in supply circuits.

If height is insufficient, try changing V107B.

POOR HORIZONTAL LINEARITY:

If adjustments do not correct, change V115 or V116.

T109 or L117 defective.

SIGNAL AT KINESCOPE GRID BUT NO SYNC:

AGC control R186A misadjusted.

V119A, inoperative. Check voltage and waveforms at its grid and plate.

Noise Limiter control misadjusted.

SIGNAL ON KINESCOPE GRID BUT NO VERTICAL SYNC:

Check V107B and associated circuit.

Integrating network inoperative—Check.

C179 or C180 defective.

NO COLOR:

Station not transmitting color signal. Check with Color Bar Generator.

R-F oscillator off frequency. Adjust fine tuning.

Color control not correctly adjusted. Adjust Color control (clockwise).

Color signal not reaching chrominance channels of receiver.
Check Bandpass Amplifier V121B.
Check Killer Threshold control adjustment.
Check Demodulator Driver V123.

Antenna system not providing color signal information. Check antenna.

COLOR WEAK:

Weak signal. Check antenna, Fine Tuning, Color control, Killer Threshold adjustment.

Check Bandpass Amplifier V121B and Demodulator Driver V123.

FLICKERING IN COLOR AREAS:

Loss of color sync. Check V122B, L127 Reactance Coil.

Check V120 Phase Det. and associated circuit components.

PICTURE BLOOMING:

High voltage incorrect. Measure and adjust High Voltage to 25,000 volts.

Contrast and/or Brightness Control misadjusted. Adjust Contrast and Brightness control.

Adjust Red Screen control for low level with bias at -70 volts. Adjust Blue and Green screens and Background controls.

Check V113, Voltage regulator.

Open filaments in demodulator or phase inverter tubes. Check V125 and V124B. Check kinescope bias voltages.

LOW COLOR SATURATION:

RF-IF or Bandpass circuits misaligned.

Adjust AGC.

NO COLOR:

Burst Keyer (V119B) inoperative.

Phase Det. (V120) inoperative.

PICTURE APPEARS RED:

Red grid lead intermittent due to poor contact in kinescope socket.

Short in kinescope.

Cathode to grid short in kinescope.

PICTURE APPEARS GREEN:

Cathode to grid short in kinescope.

3.58 mc. crystal defective.

R-259, R-281 changed in value.

12BH7, R-259 defective.

INTERMITTENT GREEN PICTURE:

12BH7 G-Y and R-Y demodulators intermittent.

NO GREEN IN PICTURE:

C-241 high resistance short to ground.

C-217 leaky

SERVICE SUGGESTIONS

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PICTURE APPEARS BLUE:

Grid to cathode short in blue gun of kinescope.

PICTURE APPEARS YELLOW:

Grid to screen short in kinescope.

Blue screen control open.

B-Y amplifier, V124, defective.

NO BRIGHTNESS, BUZZ IN SOUND:

Red screen control defective.

R317 changed to lower value.

Blue screen control defective.

Green screen control defective.

R-292 and R317 open.

NO BRIGHTNESS, NO SOUND:

C-117A filter capacitor shorted.

COLOR "GHOSTS" IN PICTURE:

Misconvergence.

Low emission from one of the guns of the kinescope.

Reflections in signal.

COLORED "SNOW" IN PICTURE:

Killer Threshold misadjusted.

WRONG COLOR(S):

Hue coil or control misadjusted.

Demodulator tube (V124 or V125) defective.

Poor purity.

Magnetized kinescope.

BUZZ IN SOUND:

Ground lead from volume control to terminal board not connected.

HUM IN SOUND AND CRITICAL TUNING:

6U8 sound I-F tube defective.

DISTORTED SOUND:

6U8 sound I-F tube defective.

NO LOW FREQUENCY RESPONSE IN SOUND:

Speakers leads reversed. (CTC4B)

INTERMITTENT BRIGHTNESS:

6AU4GTA damper defective.

NO BRIGHTNESS:

Heaters in kinescope open.

6CL6 1st or 2nd Video amplifier tube defective.

Horizontal centering control open.

Arcing in HV transformer.

1X2B focus rectifier defective.

Fuse—F104 open.

Fuse—F101 open.

6BL4 HV regulator defective.

POOR FOCUS:

Focus control open.

UNSTABLE FOCUS—FOCUS CHANGES:

Focus control defective.

NO FOCUS, NO CONTROL OF BRIGHTNESS:

Short circuit between focus and green screen grid.

INSUFFICIENT WIDTH:

Ultor lead arcing.

NO SOUND:

6AQ5 audio output tube shorted causing R-114 and L-131 (filter choke) to overheat.

LOUD BUZZ:

Vertical output transformer.

POOR VERTICAL LINEARITY:

Height and/or linearity control misadjusted.

Vertical output transformer T-110 defective.

Vertical oscillator V107B defective.

C164, C166 or C167 defective.

NO SYNC:

Sync amplifier tubes V108 or V109 defective.

C188 open.

C189 shorted.

AGC misadjusted.

Noise Threshold misadjusted.

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SERVICE SUGGESTIONS

NO VERTICAL DEFLECTION:

Vertical osc. transformer winding open.
C-165 not soldered at terminal "U" of PC102C.
C-169 shorted, R214 open.
Vertical coils in yoke open.

VERTICAL ROLL:

6AZ8 vertical oscillator tube defective.
C179 or C180 defective.

PICTURE SHRINKS VERTICALLY:

6AZ8 vertical oscillator tube defective.

PICTURE OVERLOAD:

6U8 AGC amplifier tube defective.
AGC control misadjusted.
6CL6 2nd Video amplifier tube defective.

INTERMITTENT AGC OVERLOAD:

6AQ5 audio output tube making poor contact at socket.

POOR HORIZONTAL LINEARITY:

Horizontal drive, Width and Hor. Tuning misadjusted.
T109 defective.
L117 defective.

VOLTAGE ON CONTROLS AND CONTROL COVER:

Grounding spring to control cover not making proper contact.

ARCING IN PICTURE:

Horizontal centering control burned, C-148A open, C-148B shorted.
High voltage lead making poor contact.

ARCING IN KINESCOPE GUN:

Defective kinescope.

ARCING IN HIGH VOLTAGE:

High voltage transformer lead from plate cap 3B2 high voltage rectifier arcs to top of high voltage caps.
High voltage transformer arcing where lead from plate cap of 6CB5 attaches to transformer.

FLASHING IN PICTURE:

6CL6 1st Video tube defective.
Intermittent brill control R107A.

HUM IN PICTURE:

6U8 AGC amplifier tube defective.

INTERMITTENT HUM IN PICTURE AND SOUND; NO COLOR SYNC:

6U8 noise inverter tube defective.

NO PICTURE:

6CL6 1st Video—short at cathode.
6BQ7A R-F Amplifier tube defective.
R2 open.
6X8 R-F oscillator tube defective.
Short, term 1 to 2, tuner unit terminal board.
C30 open.

NO PICTURE ON HIGH CHANNELS:

C32 intermittent.

WEAK PICTURE:

6U8 AGC amplifier tube defective.

OSCILLATION IN PICTURE:

6CL6 2nd Video amplifier tube defective.

NO PICTURE, NO SOUND:

T105 shorted.

NO PICTURE, NO SOUND, HUM IN RASTER:

6AQ5 audio output tube, heater to cathode short.

NO PICTURE, NO SOUND:

6AQ5 audio output tube—open heater.
6U8 AGC amplifier tube defective.
C225B shorted.

SMEAR IN PICTURE:

6U8 noise inverter tube defective.

LOW CONTRAST:

6U8 noise inverter tube defective.

PRINTED WIRING ASSEMBLIES

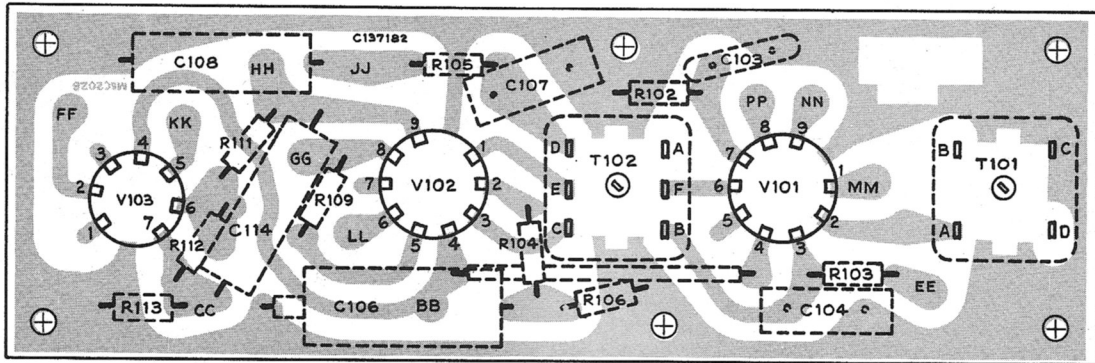


Fig. 56—PC101 Sound I-F Assembly Layout

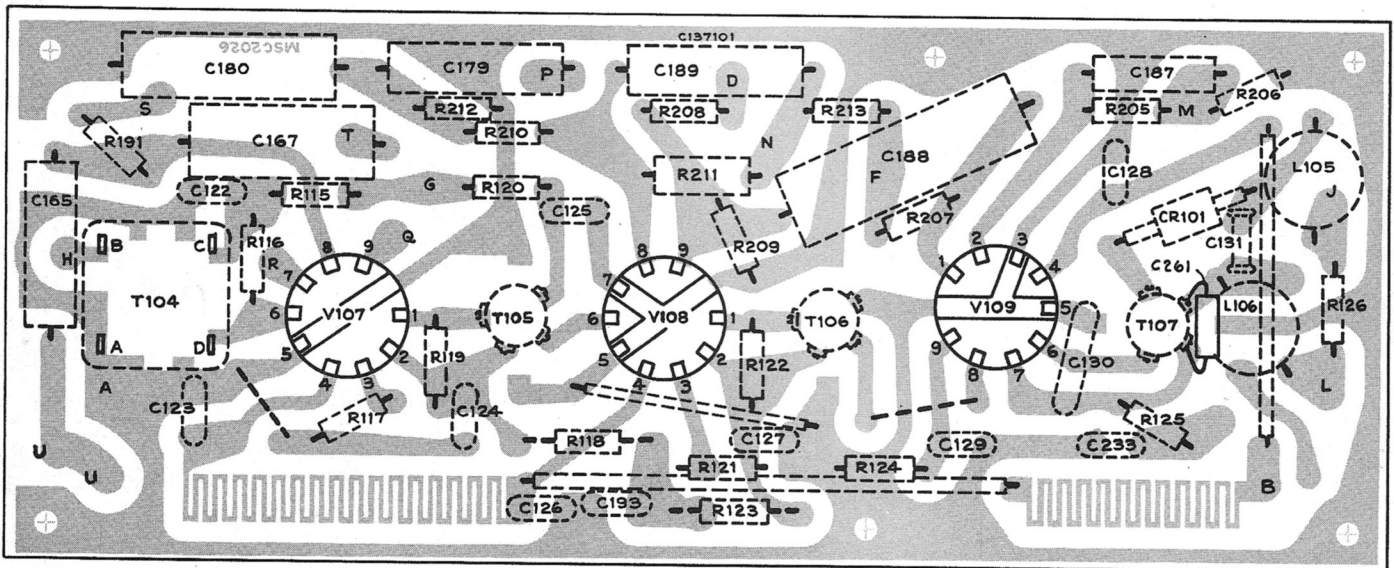


Fig. 57—PC102 Picture I-F Assembly Layout

The assemblies represented above are viewed from the printed wiring side of the boards and are oriented as they will usually be viewed when the chassis is in position for servicing.

The components are shown by dotted lines to indicate they are on the reverse side of the board. This will enable circuit tracing without referring to both sides of the board.

Component replacement, when necessary, should be made following the techniques outlined in PRINTED CIRCUIT BOARD SERVICE DATA, 1955 No. T13, dated 11/15/55.

PRODUCTION CHANGES IN CTC4 AND CTC4A

In some receivers, C36, C37 and C38, in tuner assembly were omitted.

In some receivers, a .082 mf. capacitor (C142) was connected from the green screen control (R144-2) to ground.

In some receivers, a .082 mf. capacitor (C143) was connected from the red screen control (R145-2) to ground.

In some receivers, a .082 mf. capacitor (C144) was connected from the blue screen control (R146-2) to ground.

In some receivers, C148 across terminals 1 and 2 of R154, horizontal centering control, was 10 mf.

In some receivers, a 10 mf. capacitor (C148A) was connected across terminals of 1 and 3 of R154, horizontal centering control.

In some receivers, C166, at terminal U of PC102, was connected to ground.

In some receivers, C175, at pin 5 of V118, was .039 mf.

In some receivers, C198, in grid circuit of V122B, was .01 mf.

In some receivers, C209, at V124-6, was 6.8 mmf.

In some receivers, C215 in plate circuit of V124B, was .01 mf.

In some receivers, C217, in plate circuit of V125B, was .01 mf.

In some receivers, C236, in plate circuit of V125A, was .01 mf.

In some receivers, C240, at pin 7 of V124B, was 270 mmf.

In some receivers, C243, at terminal D of T114, was 39 mmf.

In some receivers, C245, at V123-6, was connected across R233.

In some receivers, C246, at pin 9 of V124B, was 2.0 mmf.

In some receivers, C247 was 18 mmf. and was connected between the junction of R305/R255 and ground.

In some receivers, C248, was .0012 mf., and was connected from the junction of L112/R314 to L111.

In some receivers, C254, in grid circuit of V122B, was omitted.

In some receivers, C255, at pin 2 of V118, was omitted.

In some receivers, C256, at pin 1 of V111, was omitted.

In some receivers, C257, at pin 3 of V119A, was omitted.

In some receivers, C258 across terminals 2 and 3 of R154, horizontal centering control, was omitted.

In some receivers, C259, between R146-3 and +385 volt buss, was omitted.

In some receivers, L56 was connected between S1A-13 and the junction of C32 and C28.

In some receivers, L70 in tuner assembly, was omitted.

In some receivers, C260, at speaker terminals, was omitted.

In some receivers, C261, at T107, was omitted.

In some receivers, a 62 microhenry coil (L111) was connected between C248 and C240 at pin 7 of V124B.

In some receivers, a 1.0 MH coil (L128) was connected from pin 9 of V124B to the junction of R283 and R256.

In some receivers, L129, at pin 1 of V125A, was 1.7 MH.

In some receivers, L142, at V124-3, was 12 microhenries.

In some receivers, L143, at pin 8 of V124B, was 1.7 MH.

In some receivers, L148, at R177B-3, was omitted and R177B-3, R178B-3 and R179B-3 were connected to L120.

In some receivers, R20 and R21, in tuner assembly, were omitted.

In some receivers, R118, at pin 2 of V107A, was 10,000 ohms.

In some receivers, R123, at pin 2 of V108A, was 10,000 ohms.

In some receivers, R144, R145 and R146 (screen controls) were 500,000 ohms.

In some receivers, R203, a 3.3 megohm resistor, was connected between R186, noise threshold control and the junction of R199, C182, R201 and R197.

In some receivers, R230, at pin 1 of VIII, was omitted.

In some receivers, R231, at terminal A of T113, was 10,000 ohms.

In some receivers, R232, across terminals C and D of T113, was 2,200 ohms.

In some receivers, R234, at pins 2-9 of V110, was omitted.

In some receivers, R252 and R293 in plate circuit of R-Y Demodulator, was 56,000 ohms.

In some receivers, R256, at pin 9 of V124B, was 120,000 ohms.

In some receivers, R259, in plate circuit of V125B, was 56,000 ohms.

In some receivers, R276, in lead to V126-9 (kinescope), was 470,000 ohms.

In some receivers, a 56,000 ohm resistor (R281) was connected in parallel with R259 at V125B plate circuit.

In some receivers, R283, at pin 9 of V124B, was 56,000 ohms.

In some receivers, R292, at R146-1, was 56,000 ohms, 2 watts.

In some receivers, R297, at pin 7 of V124B was 2700 ohms, 2 watts.

In some receivers, R306, in lead to V126-9 (kinescope), was 470,000 ohms.

In some receivers, a 470 ohm resistor (R312) was connected between pin 6 of V116 and -20 volt buss.

In some receivers, R314, at pin 13 of kinescope, V126, was 470 ohms and was connected between the junction L112/C248 and the +285 volt buss.

In some receivers, a 180 ohm resistor (R315) was connected between the junction of C240/L111 and ground.

In some receivers, R319, at T104 input, was omitted.

In some receivers, R320 and R321, between terminal C of PC102 and +285 volt buss, were omitted.

In some receivers, R322, in grid circuit of V122B, was omitted.

In some receivers, R323, at terminal A of T113, was omitted.

In some receivers, R325, at pin 3 of V119A, was omitted and V119A-3 was connected to +285 volts.

In some receivers, R326, at R179B, vertical amplitude control, was omitted.

In some receivers, R327, at R177B-3, was omitted.

In some receivers, R328, in plate circuit of R-Y Demodulator, was omitted.

In some receivers, terminal U1 of T109 was -70 volts.

In some receivers, V111-4 was connected to Y1 instead of Y.

In some receivers, V115 was a 6BL4.

In some receivers, V121B-2 was connected to terminal A of T113.

In some receivers, V125A pins 4 and 5 were connected to Y instead of Y1.

In some receivers, the blu/yel lead of T117 was not connected to +380 volts and the blu lead of T117 was grounded.

In some receivers, the convergence circuit was connected as shown in the small circuit shown at the upper right hand corner of the schematic diagram.