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

GENERAL INFORMATION

This Service Data supersedes 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.

INDEX

CHASSIS DESIGNATIONS ...........................................Page 2
DIAL CORD DIAGRAM ..............................................Page 15
PRINTED WIRING ASSEMBLIES .................................Page 18
REPLACEMENT PARTS ...........................................Pages 21 to 26
SCHEMATIC DIAGRAMS ..........................................Pages 17 to 20
SERVICE SUGGESTIONS ........................................Pages 12 to 14
TUBE COMPLEMENT .............................................Page 2
TUNER PARTS IDENTIFICATION ...............................Page 15
WAVEFORM PHOTOGRAPHS ....................................Pages 3 to 11

SUPPLEMENTARY INFORMATION

<table>
<thead>
<tr>
<th>Issue</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

List related Supplements and Service Tips above.

FIRST EDITION—FIRST PRINTING—9-4-57—SUPPLEMENTING SERVICE DATA 1955 NO. T5


Printed in U.S.A.
ELECTRICAL SPECIFICATIONS

CHASSIS DESIGNATIONS

<table>
<thead>
<tr>
<th>CHASSIS</th>
<th>TUNER</th>
<th>MODELS</th>
<th>LOUD-SPEAKERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTC4</td>
<td>KRX37</td>
<td>21CT760U</td>
<td>1—8 inch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21CT761U</td>
<td></td>
</tr>
<tr>
<td>CTC4A</td>
<td>KRK37</td>
<td>21CT762U</td>
<td>2—8 inch</td>
</tr>
<tr>
<td>CTC4B</td>
<td>KRK37</td>
<td>21CT763U</td>
<td>2—3½ inch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21CT764U</td>
<td>1—8 inch</td>
</tr>
</tbody>
</table>

RCA TUBE COMPLEMENT (continued)

<table>
<thead>
<tr>
<th>Tube Used</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>(7) RCA 6CL8</td>
<td>1st Video Amplifier</td>
</tr>
<tr>
<td>(8) RCA 6CL6</td>
<td>2nd Video Amplifier</td>
</tr>
<tr>
<td>(9) RCA 6U9</td>
<td>Sound 1F Amp. &amp; Noise Inverter</td>
</tr>
<tr>
<td>(10) RCA 6T8</td>
<td>Ratio Det. &amp; 1st Audio Amp.</td>
</tr>
<tr>
<td>(11) RCA 6A05</td>
<td>Audio Output</td>
</tr>
<tr>
<td>(12) RCA 6A05</td>
<td>Vertical Output</td>
</tr>
<tr>
<td>(13) RCA 6SN7GT</td>
<td>Horia. Sweep Osc. &amp; Control</td>
</tr>
<tr>
<td>(14) RCA 6CB5</td>
<td>Horia. Sweep Output</td>
</tr>
<tr>
<td>(15) RCA 6U8</td>
<td>AGC Amp. &amp; Burst Keyer</td>
</tr>
<tr>
<td>(16) RCA 6AU4GTA</td>
<td>Focus Rectifier</td>
</tr>
<tr>
<td>(17) RCA 1X2B</td>
<td>Shunt Regulator</td>
</tr>
<tr>
<td>(18) RCA 3B2</td>
<td>High Voltage Rectifier</td>
</tr>
<tr>
<td>(19) RCA 65K4</td>
<td>Killer &amp; Band Pass Amplifier</td>
</tr>
<tr>
<td>(20) RCA 6AN8</td>
<td>Blanking Amp. &amp; Reactance</td>
</tr>
<tr>
<td>(21) RCA 6A75</td>
<td>Phase Detector</td>
</tr>
<tr>
<td>(22) RCA 6A28</td>
<td>3.55 MC Osc. &amp; &quot;BY&quot; Amp.</td>
</tr>
<tr>
<td>(23) RCA 6AG7</td>
<td>Demodulator Driver</td>
</tr>
<tr>
<td>(24) RCA 12BH7</td>
<td>&quot;G-Y&quot; &amp; &quot;R-Y&quot; Demodulators</td>
</tr>
<tr>
<td>(25) RCA 21AXP22</td>
<td>Kinescope</td>
</tr>
</tbody>
</table>

Two selenium rectifiers are used for Low Voltage rectification

* In early production receivers the damper tube was a 68L4.

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 wave shapes 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 5B, 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


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 end, 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.
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.
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.
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 Control at Maximum. Expanded to Show Color Bars. 3 volts peak to peak.
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.
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. 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.
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 Cathode. Black-and-white Picture. 130 volts peak to peak.

Fig. 34—Waveform at Kinescope Cathode. 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.
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.
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. 63 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 6C6 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.
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 #1) 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.
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 T108 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:**
Check Bandpass Amplifier V121B and Demodulator Driver V123.

**FLICKERING IN COLOR AREAS:**
Loss of color sync. Check V122B, L127 Reactance Coll.
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

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-282 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.
6B14 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.
C188 shorted.
AGC misadjusted.
Noise Threshold misadjusted.
NO VERTICAL DEFLECTION:
Vertical osc. transformer winding open.
C-165 not soldered at terminal "U" of PC102C.
C-168 shorted, R214 open.
Vertical coils in yoke open.

VERTICAL ROLL:
6A28 vertical oscillator tube defective.
C179 or C180 defective.

PICTURE SHRINKS VERTICALLY:
6A28 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.
T108 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 6CS5 attaches to transformer.

FLASHING IN PICTURE:
6CL6 1st Video tube defective.
Intermittent brill control R107A.

SERVICE SUGGESTIONS

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.
When reassembling, locate 79403 between stop lugs of 79404 as shown.

To assemble cords, rotate drive shaft to a full counter-clockwise position against stop on front plate. Fasten pulley assembly 79407 as shown, with set screw in vertical position. Place flat on dial pulley in horizontal position and assemble cord. Before engaging gear 79406, position opening in intermediate gear (79373) to coincide with opening in front plate, then mesh gears and tighten set screw. (Provide .010 inch clearance between gear and plate.)

Position pulley 79402 with notch in vertical position and assemble cord.

Before assembling gear 79399 maintain counter-clockwise position of drive shaft then rotate scissors gear (79576) on UHF tuner pulley clockwise to stop. Advance the free riding gear one tooth clockwise, mesh gears and tighten set screw.

Fig. 55—KRK-37 UHF-VHF Tuner Unit—Assembly Detail
Fig. 36—PC101 Sound I-F Assembly Layout

Fig. 37—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. T19, dated 11/15/55.
In some receivers, C36, C37 and C38, in tuner assembly were omitted.

In some receivers, a .002 mf. capacitor (C142) was connected from the green screen control (R144-2) to ground.

In some receivers, a .003 mf. capacitor (C143) was connected from the red screen control (R144-2) to ground.

In some receivers, a .002 mf. capacitor (C144) was connected from the blue screen control (R144-2) to ground.

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

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

In some receivers, C158, at terminal U of PC102, was connected to ground.

In some receivers, C175, at pin 5 of V118, was 0.39 mf.

In some receivers, C198, in grid circuit of V122B, was .61 mf.

In some receivers, C2009, at V124-6, was 9.0 mfd.

In some receivers, C2103 in plate circuit of V124B, was .01 mf.

In some receivers, C2171, 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 mv.

In some receivers, C243, at terminal D of T114, was 35 mfd.

In some receivers, C245, at V134-4, was connected across R333.

In some receivers, C246, at pin 8 of V124B, was 2.0 mfd.

In some receivers, C247, at pin 9 of V124B, was 18 mfd.

In some receivers, C255, between R146-3 and +385 volt buss, was omitted.

In some receivers, C257, between S1A-13 and the junction of C32 and C38, was omitted.

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

In some receivers, C259, at speaker terminals, was omitted.

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

In some receivers, a .62 microhenry coil (L111) was connected between C246 and C240 at pin 7 of V124B.

In some receivers, a 1.0 MH coil (L129) was connected from pin 9 of V124B to the junction of R239 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, L146, at R177B-3, was omitted and R177B-3, R178B-3 and R179B-3 were connected to L129.

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 (across controls) were 500-000 ohms.

In some receivers, R203, a 3.3 megohm resistor, was connected between R196, noise threshold control and the junction of R199, C182, R201 and R197.

In some receivers, R290, at pin 1 of VIII, was omitted.

In some receivers, R291, at terminal A of T113, was 10,000 ohms.

In some receivers, R292, across terminals C and D of T113, was 2,000 ohms.

In some receivers, R293, at pins 4-9 of V110, was omitted.

In some receivers, R295 and R296 in plate circuit of R-Y Demodulator, was 35,000 ohms.

In some receivers, R295, at pin 9 of V124B, was 50,000 ohms.

In some receivers, R296, in plate circuit of V125B, was 50,000 ohms.

In some receivers, R297, in lead to V126-9 (kinescope), was 470,000 ohms.

In some receivers, a 56,000 ohm resistor (R281) was connected in parallel with R295 at V125B plate circuit.

In some receivers, R298, at pin 3 of V124B, was 56,000 ohms.

In some receivers, R299, at pin 7 of V124B, was 270 ohms, 2 watts.

In some receivers, R300, at pin 7 of V124B, was 700 ohms, 1 watt.

In some receivers, R300, 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 100 ohm resistor (R315) was connected between the junction of C249/L111 and ground.

In some receivers, R315, 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 V118A, was omitted and V118A-3 was connected to --285 volts.

In some receivers, R326, at R177B, 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 6SL4.

In some receivers, V112B-2 was connected to terminal A of T113.

In some receivers, Y135A pins 4 and 5 were connected to T1 instead of Y1.

In some receivers, the blue/yel lead of T117 was not connected to --30 volts and the blue 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.