HORIZONTAL DEFLECTION ADJUSTMENTS AND HIGH VOLTAGE CHECK

STEP 1  SINE WAVE COIL (L131B)  
A. Tune receiver to an active channel and adjust contrast and 
brightness for normal picture.  
B. Disable sync by shorting C234 to ground at junction of C254 
and C255.  
C. When the sine wave coil L131B is grounded by connecting a 
shorting jumper between pin 8 of V204 and ground.  
D. Adjust the horizontal hold control, R121, so that the horizontal  
oscillator (picture sides vertical).  
E. Remove short from sine wave coil, L131B and adjust L131B  
so that picture sides are again vertical or drifting slowly  
horizontally.  
F. Remove jumper from C254 to ground.  
NOTE: Picture should lose sync at both ends of horizontal  
hold control. If not remove R110.

SECTION OF PW200 BOARD  
VIEWED FROM COPPER SIDE

STEP 2  HORIZONTAL EFFICIENCY COIL (L706)  
A. Disconnect the cathode jumper from pin 3 of the G6K6 hori-
   zontal output tube.  
B. Connect a 0.5mA meter between pin 3 of the G6K6 and ground.  
   Shunt the meter with a .47uF capacitor.  
C. Adjust L706 for minimum cathode current. Then, while monitor-
   ing the regulator current as outlined in step 3, advance the  
   core into the coil to increase the cathode current by 1 or 2 milli-
   amperes. Do not exceed 10mA. The core should be on the bottom or  
   board end of coil.

SECTION OF PW200 BOARD  
VIEWED FROM COPPER SIDE

STEP 3  REGULATOR CURRENT  
A. Connect a VOM across R100 which is in series with pin 1, the  
cathode of the G6K4 regulator tube. Use the 2.5v scale on the  
meter.  
B. When increasing the G6K4 cathode current in step 2, the regula-
tor current must also increase as shown by an increase in the  
voltage drop across R101. If the regulator current decreases, the  
core was turned the wrong direction from the dip.  
C. Turn brightness and contrast controls for minimum minimum (min-
imum) contrast and observe the regulator current. With blank picture,  
(high voltage set at 25V) the voltage drop across R101 must be at  
least 0.66v (660 vohm regulator current).

STEP 4  BRIGHTNESS LIMITER ADJUSTMENT  
A. Connect a VTMV using a high voltage probe to the second  
side of the picture tube. The VTMV should be set on  
1000V.  
B. Set the brightness control fully clockwise. Set the contrast  
control for maximum, then reading on VTMV. Adjust the  
brightness limiter so that the voltage drop dips 50V to 1V.  
C. Set the brightness control to minimum. Connect a 22K ohm  
resistor from the grid of the shunt regulator G6K4 tube (pin 8)  
to ground. The measured high voltage should be less than 385V  
(maximum) from this point.  
NOTE: This check verifies proper action of the shunt regulator  
"bleeder" circuit, thus assuring full protection from X-Ray  
radiation.  
D. Remove the resistor from pin 8 of the shunt regulator tube.  
Return brightness control to normal position and remove VTMV.
RF OVERALL ALIGNMENT CHECK

Set up Test Equipment and connect to receiver under test.
Disable Horizontal and Vertical Sweep Circuits.

STEP 1. Connect equipment as shown in illustration—
RF OUT cable from Sweep Generator to VHF antenna terminals,
DEMOD SIGNAL IN cable from Marker Adder to 2nd Detector Test Point (TP21) through 10k ohm resistor.
Maintain the same bias as for IF Sweep Alignment.

STEP 2. Disable AFT. Set Channel Selector to Channel 3 and adjust the fine tuning to the correct oscillator frequency as follows:
Connect one end of an insulated wire to the RF IN jack of the marker generator. Place the other end in close proximity of the oscillator-mixer circuit.
Set the Marker Generator frequency to the Channel 3 RF Oscillator frequency (100MHz).
Set CAL/MOD switch to External Calibration position.
Adjust the fine tuning until a zero beat is heard in the Marker Generator speaker.
Each channel may be checked accordingly. Refer to the RF Frequency Chart below.

STEP 3. Set the R F Sweep Generator to Channel 3.
Set the Marker Generator to 612.5MHz (VHF Carrier).
Set the CAL/MOD control to 4.5MHz MOD to obtain the sound carrier marker.
The RF overall response (Fig. 1 above) is a check of instrument performance. No attempt should be made to compensate for a channel not in limits by detuning the IF stages.
If Alignment is indicated, each section should be aligned individually in the following sequence:
RF, Picture I F, Sound I F and 4.5MHz trap, AFT, chroma bandpass, and AFTC.

IMPORTANT: The tuned circuits of these receivers can be aligned correctly only if all input signals and bias levels are as specified for that particular circuit. The amplitude as well as the shape of the response curve must be correct.
The peak-to-peak voltage should be read directly from the test point with a calibrated oscilloscope. If the Marker Adder is connected between the test point and oscilloscope, the Marker Adder must be calibrated.

SWEEP CIRCUIT INTERFERENCE
Interference from the sweep circuits of the receiver may appear on the response, making it difficult to observe a clearly defined trace. To prevent such interference, disable the horizontal and vertical circuits.
No equivalent load on the B+ is required.

### VHF/UHF TELEVISION FREQUENCY CHART

<table>
<thead>
<tr>
<th>Channel Number</th>
<th>Picture Carrier Freq. MHz</th>
<th>Sound Carrier Freq. MHz</th>
<th>Receiver RF Osc. Freq. MHz (Zero Beat)</th>
<th>Channel Number</th>
<th>Picture Carrier Freq. MHz</th>
<th>Sound Carrier Freq. MHz</th>
<th>Receiver RF Osc. Freq. MHz (Zero Beat)</th>
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### LF TELEVISION FREQUENCY CHART

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<th>Sound Carrier Freq. MHz</th>
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<th>Channel Number</th>
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Fig. 1
CTC39 1F SWEEP ALIGNMENT

**STEP 1**

**LINK ALIGNMENT**

Align L71 Mixer coil for 45.75MHz and 42.17MHz markers at equal height. (Outer peak)

Align T204. Bottom Core, for flat topped curve.

Align C208. trimmer, to set markers at 70%.

To align traps, disconnect the marker generator from the Adder and also disconnect IF/VP sweep out and hook cables together. Marker generator to go to P1 connector through pad. Tune each trap at frequency specified for minimum. Set marker generator CAL/MD control to 600 Hz modulation.

Align L201, 42.25MHz trap, for minimum at 472.5MHz.

Align L202, 41.25MHz trap, for maximum at 41.25MHz.

Top curve of T204 is used to adjust 42.25MHz rejection.

Repeat steps until curve is as shown in Figure 1.

**STEP 2**

**OVERALL 1F ALIGNMENT**

Remove detector from TP203 and connect scope to TP201 in series with 10K resistor. Calibrate scope for 2.5V P-P.

Adjust sweep input to maintain 2.5V P-P at TP201.

Adjust L203, 1st IF Coil, for maximum at 45.75MHz.

Adjust L204, 2nd IF Coil, for maximum at 41.17MHz. (Bottom Core)

Tune L205 for markers at equal height.

Tune T202 for flat top curve.

Set L208 trap for minimum at 41.25MHz.

Adjust L213 Top Slug for minimum at 38.75 MHz (using the same method as in Step 1). Place Generator input to TP203.

Repeat as necessary for flat top curve and traps set.

Tune L203, 1st IF Coil, to set 45.75MHz at 90%.

Tune L204, 2nd IF Coil, to set 41.17MHz at 90%.

Tune T202 for flat topped curve as in Figure 2.

**STEP 3**

**MARKER ALIGNMENT**

Align marker generator for maximum at 42.17MHz.

Align L202 for maximum at 41.25MHz.

Align L203 for maximum at 45.75MHz.

Adjust L213 for maximum at 38.75 MHz (using the same method as in Step 1). Place Generator input to TP203.

Repeat as necessary for flat top curve and traps set.

Tune L203, 1st IF Coil, to set 45.75MHz at 90%.

Tune L204, 2nd IF Coil, to set 41.17MHz at 90%.

Tune T202 for flat topped curve as in Figure 2.

**STEP 4**

**MARKER ADDER**

Align marker generator for maximum at 42.17MHz.

Align L202 for maximum at 41.25MHz.

Align L203 for maximum at 45.75MHz.

Adjust L213 for maximum at 38.75 MHz (using the same method as in Step 1). Place Generator input to TP203.

Repeat as necessary for flat top curve and traps set.

Tune L203, 1st IF Coil, to set 45.75MHz at 90%.

Tune L204, 2nd IF Coil, to set 41.17MHz at 90%.

Tune T202 for flat topped curve as in Figure 2.
CTC39 SOUND IF 4.5 MHz TRAP ALIGNMENT

STEP 1: 4.5MHz TRAP ALIGNMENT
Apply—67.5 volts to PW200-D. Set Service Switch to SERVICE position.
Disconnect horizontal output tube cathode jumper. Disable AFT.
Connect signal generator through .001 UF to PW200-TP2. Set generator to 4.5MHz/600Hz modulation.
Connect Oscilloscope through video detector shown (8B105 Probe) to V701-6.
Adjust core of L212 for minimum 600Hz output on scope (choose the null obtained with the core located nearest mounting end of coil form).

STEP 2: Disconnect Marker Generator.
Move detector probe, 8B105, to PW200-TP4 and connect output of probe to VTVM. Set service switch to NORMAL position and tune in strong local channel.
Disconnect bias at PW200-D. Attenuate signal with fine tuning (or remove antenna) to maintain 0.2 volts output from detector. Adjust T201 for maximum D.C. (choose the peak obtained with the core located nearest top of coil form).
Adjust bottom core of T202 for minimum D.C. (choose the null obtained with the core located nearest mounting end of coil form).

STEP 3: Remove all test equipment. Reduce signal level with fine tuning until hiss is heard in sound.
Adjust quadrature coil, T203, for maximum volume. Adjust top core of T202 for clearest sound.
CTC39X AFT ALIGNMENT

If circuit is completely misaligned, connect equipment as for IF Sweep Alignment and adjust input for Specified PP Voltage at 2nd Detector T.P.
Bias IF the same as in the IF Alignment.

Disconnect lead at “A” and connect Scope using Direct Probe.

L1303 is adjusted for maximum output (top and bottom curve flatness) and symmetrical width (X approximately = Y) when L1304 is adjusted for a 45.75 MHz crossover point.
Then L1301 is adjusted for maximum bandwidth on the high frequency side starting with the core initially set toward the top of the coil form. The curve at “B” should be the same as the curve at “A”—but INVERTED.

Remove the sweep and apply a 46.1 MHz CW signal in its place.
Set the input signal strength so that the reading at “B” falls between 7.5 and 9.0 V as measured with a VTVM.

STEP 1
Alternate between L1301 and L1303 and adjust for a maximum output peak, using additional input attenuation to keep the peak between 7.5 and 9.0 V, as the proper core settings are reached. (Watching a dip on “A” gives exactly the same alignment as watching the peak on “B”)

Remove the 46.1 MHz CW signal and apply a 45.75 MHz CW signal of sufficient strength to give a pix detector test point voltage of 1.25 V, which is the PP value of the normal IF sweep alignment waveform which occurs at this point (TP201).

STEP 2
Adjust L1304 for zero difference (+-0.5V) between “A” and “B”. This adjustment is somewhat critical but extremely important.

AFT check
With the AFT completely connected but disabled and after the discriminator secondary (L1304) adjustment has been touched up, bias the IF as for normal IF alignment and feed a channel 2 RF CW signal into the tuner input. Set tuner to channel 2. Then fine tune the receiver for zero difference between C134 and C138. This should yield a 45.75 MHz beat when the IF is sampled with a crystal calibrator (this is only a check).

Adjust the applied signal strength for an output of +1.25 V. D.C. at TP201. Fine tune the receiver 750 kHz high (IF frequency) so that pix carrier is placed at 46.50 MHz. Turn the AFT on. The system should pull the pix carrier back very closely (less than 50 kHz high) to 45.75 MHz with the correction voltage on C134 being no less than +3.5 V. Turn the AFT off.

Fine tune the receiver 1.0 MHz low (IF frequency) in order to yield at 44.75 MHz pix IF frequency. Turn the AFT on and the system should return the pix carrier back very closely (less than 50 kHz low) to 45.75 MHz with the correction voltage on C134 being no more than 9.5 V. Turn the AFT off.

Fine tune 2.25 MHz low in order to yield a 43.50 MHz pix IF frequency. Turn AFT on and the system should not return the pix carrier back to 45.75 MHz.

It can be verified that the AFT has pulled the mis-aligned carrier back to near 45.75 MHz (IF frequency) by noting if the pix detector voltage at TP201 has returned very closely back to its initial 45.75 MHz output of +1.25 V. D.C.
CTC 39 CHROMA BANDPASS ALIGNMENT

PRELIMINARY STEPS
Ground PW700-BG
—20V to V202-9
—6V to PW200-D

STEP 1
Video Sweep to first Bandpass Grid (V701-2) and scope at PW700-W with Video detector probe.
Adjust T701 primary and secondary for response having equal amplitude peaks and equal markers at 3.08MHz and 4.08MHz. When near alignment, adjust bottom core (primary) for equal amplitude peaks and top core (secondary) for marker position.

STEP 2
Move detector and scope to TP2.
Leave sweep at V701-2. Attenuate sweep for 2.5V P-P on scope.
Adjust T705 for response shown, core on bottom peak and markers equal.

STEP 3
Leave scope and detector on TP2.
Remove ground at PW700-BG and apply —2.5V Bias.
Set contrast and brightness controls maximum CW.
Connect test equipment as shown below and attenuate signal to produce 12V DC on VTVM at TP201.
Adjust peaker coil L701 for a symmetrical waveform about the 3.58MHz Marker. There should be no peak between the 3.58MHz and 4.08MHz Marker.
CTC 39 AFPC ALIGNMENT

Adjust Receiver for Normal Picture, connect color bar Generator to antenna terminals. Center tint control at 50% of mechanical range. Turn killer control full CDW. AFT off, ATG off, (CCW pos.)

PRELIMINARY STEPS

Ground Terminal BG to disable ACC.
Connect TP701 to +270V in series with 39K to cut off the burst amplifier.
Use C728 to keep oscillator in sync during alignment.

STEP 1

Connect VTVM in series with 470K to V703-2.
Adjust C728 for zero beat.
Tune T702 for minimum DC voltage.
Core on top peak.
Readjust C728 for zero beat.
Adjust L704 for exactly — 3.5V DC.
Use peak with core at mounting end of coil.
Readjust C728 for zero beat.
Remove short at BG and bias at TP701.

STEP 2

Set brightness control CCW.
Move VTVM to CRT02 anode.
Peak T703 for maximum DC and symmetrical drop off at both extremes of the tint control.
Use peak with core at mounting end of coil.
Voltages should be equal when tint control is either fully CW or fully CDW.
Remove VTVM and readjust for zero beat if necessary.
Connect oscilloscope to PW700-3 (R-Y output) and check for centering of the tint control.
Also check with scope PW700-12 (B-Y output), PW700-7 (G-Y output) for proper matrixing.
With R-Y as 100% reference, G-Y should be 30% ± 6% and B-Y should be 100% ± 20%.
Check that B-Y phase nulls at 3/2 and 9/3 bars ≈ 1/2 bar. Set ATC switch on (CW position). B-Y bar cancellation should increase approximately 1/2 bar (4th and 10th bar cancellation).
Set killer to just kill on blank noisy channel with color control fully CW and Tint control fully CDW. Check setting on a channel with color.

6th BAR NULLED AT TINT CONTROL MIDRANGE

Nulled at r 3 1/2 and 9 1/2 bars

PW700-3 R-Y

PW700-12 B-Y

PW700-7 G-Y
**INITIAL CONNECTION:**
Scope to J1 via 82 ohm detector.
Variable bias to C17.
Channel 10 sweep to J3 via T pad.
Calibrate Scope for 3V P-P.
Tuner on Channel 10.
Markers at (see frequency chart page 9).

**STEP 1**
Adjust L5, L10 and L13 for centering on Channel 10 pix and sound markers at equal height and 80% to 100% on curve.
Adjust L8 for best coupling with L8 centered between switches; re-adjust L5 and L10 for flat top curve (see response curves below).

**STEP 2**
Bias tuner to cut-off, —22 volts to C17.
Adjust C16 for minimum response between markers.

*UHF and VHF IF Response Curves*
**STEP 3** OSCILLATOR ADJUSTMENT

-2 Volts at C17, zero bias between C23 and C24 (KRK 173).

Tuner and sweep on Channel 13. Turn fine tuning maximum clockwise. Using zero beat method, adjust L3 to set local oscillator at (2615 MHz) 5 MHz above nominal frequency (257 MHz).

Return fine tuning to nominal frequency (257 MHz) on Channel 13.

**STEP 4**

Tuner and Sweep on Channel 10.


**STEP 5**

Tuner and Sweep on Channel 6.

Adjust L20 for maximum output. L7 and L12 for proper response curve.

Rotate tuner and sweep Channels 5 thru 2 in descending order and adjust coils L18 thru L15 for flat topped curve on each channel.

**STEP 6**

Tuner in UHF Position.

Apply IF sweep to J2 via IF input head.

Adjust L21 for flat topped curve.

**STEP 7 A F T CHECK**

Apply ±6 volts between C23 and C24, oscillator frequency must be shifted ±1 MHz or more.
KRK132, KRK138 TUNER RF ALIGNMENT

GENERAL INFORMATION
Remove tuner and detent assembly. Apply 5 volts to C18 A F T (KRK 132).

AFT CHECK (KRK 132).
Apply 1-10 volts to C18. Marker should move a minimum of 3 MHz. Replace CR2 if not within limits.

TEST EQUIPMENT CONNECTIONS:

OSCILLOSCOPE Connect, through preamplifier, to output of UHF Alignment fixture. (Figure 2) Calibrate scope 2.2V P-P.

UHF SWEEP GENERATOR Connect to antenna terminals using 300 ohm pad supplied with generator. Set for maximum sweep width.

VHF SIGNAL GENERATOR Connect to R F (anode side) of crystal CR1 when aligning the oscillator, and to I F input on UHF alignment fixture during R F sweep alignment. (The former to be used only when the UHF generator does not have internal markers.)

MISCELLANEOUS (a) At any alignment point the best alignment (i.e., the lowest noise figure and the highest gain) will occur when the RF response curve is as narrow as possible. (b) Leave the oscillator inner shield in place during alignment.

---

**Figure 1** — Sweep Attenuator Pads. (Part of Sweep Gen. Cable)

**Figure 2** — UHF Alignment Fixture Schematic
Oscillator Injection Current Adjustment

Tune entire range and observe crystal injection level on UHF alignment fixture millimeter. The oscillator injection current should be between 0.2 and 2.5 mA, and is adjusted by orienting the injection loop L10, in the oscillator compartment, toward the transistor to increase injection, or away from the transistor to decrease injection. If satisfactory results cannot be obtained, change CR1. These injection limits can best be realized with R-F alignment and oscillator frequency approximately correct.

Oscillator Adjustment

Sweep and marker at 887 MHz, tuning capacitor on Channel 83. Adjust oscillator rotor segment 1 to set 887 MHz marker to coincide with 43.5 MHz I F marker.

Rotate tuning capacitor to 833 MHz on Channel 74, adjust oscillator segment 2, 761 MHz on Channel 62, adjust oscillator segment 3, 707 MHz on Channel 53, adjust oscillator segment 4, 653 MHz on Channel 44, adjust oscillator segment 5, 581 MHz on Channel 32, adjust oscillator segment 6, 527 MHz on Channel 23, adjust oscillator segment 7, 473 MHz on Channel 14, adjust oscillator segment 8 to set marker to coincide with 43.5 MHz I F marker.

Antenna and R-F Adjustment

Remove UHF marker. Sweep and tuning capacitor to Channel 83, adjust segment 1, 833 MHz on Channel 74, adjust segment 2, 761 MHz on Channel 62, adjust segment 3, 707 MHz on Channel 53, adjust segment 4, 653 MHz on Channel 44, adjust segment 5, 581 MHz on Channel 32, adjust segment 6, 527 MHz on Channel 23, adjust segment 7, 473 MHz on Channel 14, adjust segment 8 (on R-F and antenna rotor C2 and C4) to place sound marker (41.25 MHz) and pix marker (45.75 MHz) at peak of response curve.

Oscilloscope Preamplifier for UHF Alignment
KRK132 ALTERNATE UHF TUNER SCHEMATICS

KRK132JD

GANGED TUNING CAPACITORS

KRK132LD

GANGED TUNING CAPACITORS
KRK 174A/138KA VHF/UHF TUNER SCHEMATIC DIAGRAM

TRANSISTOR BIASING DIAGRAM
ALL RESISTANCE VALUES ARE IN OHMS 51K4K2K
ALL RESISTANCE VALUES ARE 1/4 WATT UNLESS INDICATED
ALL CAPACITANCE VALUES ARE IN PF
FRONT AND REAR SECTION OF ROTARY SWITCHES ARE VIEWED FROM FRONT, SHAFT IN CH13 POSITION
A DENOTES CH13 CONTACT CONNECTED TO CONTACT ON OPPOSITE SIDE OF SWITCH
@ DENOTES CH13 CONTACT INSULATED FROM CONTACT ON OPPOSITE SIDE OF SWITCH
TMA 402 AC, XZ LAYOUT AND EXTERNAL Wiring

External Wiring Diagram
TMA 402 AD, XZR LAYOUT AND EXTERNAL WIRING

External Wiring Diagram

- View A: (HF Tuner Top)
- View B: (HF DIAL DIAL LIGHT & LEAN)
- View C: (HF DIAL DRUM & BRACKET)

- Panel Keys: DIAL, BRIGHTNESS, APT
- Panel Connectors: S1002, S1003, S1004

- Gears: GEAR, DIAL DRIVE, GEAR

- Components: C63, C64, C92, C93, C97
CTP11 REMOTE RECEIVER ALIGNMENT

TEST EQUIPMENT CONNECTIONS:

GENERAL
The illustration below indicates adjustment points 1 through 7 and the corresponding frequency and function to be adjusted. Depress the appropriate transmitter function button as shown below and hold depressed while peaking each coil (L1101 to L1107).

SIGNAL SOURCE
A CRK 9 transmitter checked for accuracy by the beat frequency method, or checked with a CTP 11 receiver known to be correctly adjusted, may be used as a signal standard.

TRANSMITTER
The transmitter distance selected should provide a maximum VTVM reading of approximately ±7 volts peak. Or, a strip of tape may be placed over all or part of the transmitter transducer and adjusted to provide the correct attenuation.

VACUUM TUBE VOLTMETER
Adjust the VTVM on the ±15 volts DC scale, and connect the ground lead to terminal D (noted below). Then progressively connect the meter probe across each relay coil during the alignment procedure.

ALIGNMENT PROCEDURE

<table>
<thead>
<tr>
<th>STEP</th>
<th>TRANSMITTER OUTPUT FREQUENCY</th>
<th>TRANSMITTER FUNCTION BUTTON</th>
<th>VTVM CONNECTION</th>
<th>ADJUST FOR MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adjust up tint</td>
<td>34.25kHz</td>
<td>Depress and hold Tint up</td>
<td>D to K1101-4</td>
</tr>
<tr>
<td>2</td>
<td>Adjust down tint</td>
<td>35.75kHz</td>
<td>Depress and hold Tint down</td>
<td>D to K1102-3</td>
</tr>
<tr>
<td>3</td>
<td>Adjust up color</td>
<td>44.75kHz</td>
<td>Depress and hold Color up</td>
<td>D to K1103-3</td>
</tr>
<tr>
<td>4</td>
<td>Adjust down color</td>
<td>37.25kHz</td>
<td>Depress and hold Color down</td>
<td>D to K1104-3</td>
</tr>
<tr>
<td>5</td>
<td>Adjust up volume</td>
<td>43.25kHz</td>
<td>Depress and hold Volume up</td>
<td>D to K1105-3</td>
</tr>
<tr>
<td>6</td>
<td>Adjust down volume</td>
<td>38.75kHz</td>
<td>Depress and hold Volume down</td>
<td>D to K1106-3</td>
</tr>
<tr>
<td>7</td>
<td>Adjust Channel Selector</td>
<td>40.25kHz</td>
<td>Depress and hold Channel</td>
<td>D to H</td>
</tr>
</tbody>
</table>

VTVM PROBE CONNECTIONS STEPS 1 THROUGH 7

- VTVM PROBE CONNECTIONS:
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FREQUENCIES:
- 34.25 kHz
- 35.75 kHz
- 43.25 kHz
- 44.75 kHz
- 38.75 kHz
- 40.25 kHz

FUNCTIONS:
- CHANNEL
- UP VOL
- DOWN VOL
CRK 9 TRANSMITTER ALIGNMENT

TEST EQUIPMENT CONNECTIONS:

GENERAL
When depressing function buttons, depress fully and hold depressed as adjustment is made.

SIGNAL SOURCE
A separate CRK 9 transmitter, checked for accuracy and proper operation, is recommended as a signal standard to be used in aligning the transmitter. (Transmitters used as standard should be checked frequently against a crystal standard or several receivers known to be operating properly.)

TRANSMITTER STANDARD
Remove the complete back cover from the transmitter. Loosely couple the transmitter to the Horizontal input of the oscilloscope. To do this, place the probe of the oscilloscope approximately one inch in front of the transducer opening at the end of the transmitter. Ground the oscilloscope to the negative terminal of the battery.

TRANSMITTER BEING ALIGNED
Remove the complete cover from the transmitter. Loosely couple the transmitter to the Vertical input of the oscilloscope. Place the probe of the oscilloscope approximately one inch in front of the transducer opening at the end of the transmitter. Keep the transmitter being aligned about two feet from the transmitter standard. Ground the oscilloscope to the negative terminal of the battery.

OSCILLOSCOPE
Connect as shown below.

ELECTRICAL SPECIFICATIONS
Transmitter shall be tuned at only one frequency (44.750kHz). None of the other function frequencies are adjustable.

ALIGNMENT
Press the “Color Up” button and adjust 22003 for 44.750kHz ±20Hz. All other function frequencies shall be within ±150Hz of that listed in table below.

NOTE: Oscillator pre-set and sealed at factory.

<table>
<thead>
<tr>
<th>Fundamental Frequencies</th>
<th>Up</th>
<th>Down</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tint</td>
<td>44.750</td>
<td>45.750</td>
</tr>
<tr>
<td>Color</td>
<td>44.750</td>
<td>37.250</td>
</tr>
<tr>
<td>Volume</td>
<td>43.750</td>
<td>38.750</td>
</tr>
<tr>
<td>Channel</td>
<td>40.750</td>
<td>30.750</td>
</tr>
</tbody>
</table>
PICTURE TUBE GRID WAVEFORMS

The series of 18 waveforms below illustrate the demodulator gain and phase-angle changes resulting from the ACCU-TINT circuits. These were taken with a color bar pattern furnished by a WR-64B color-bar generator. Conditions of nominal phase, $+30^\circ$, and $-30^\circ$ are represented with the color circuits operating first with A-T "OFF" and second with A-T "ON".

### NOMINAL PHASE

- **A-T "OFF" R-Y 160V P-P**
  - NULL 6TH BAR

- **A-T "OFF" B-Y 130V P-P**
  - NULL 37/8 and 57/8 BARS

- **A-T "OFF" G-Y 48V P-P**
  - NULL 15TH and 7TH BARS

- **A-T "ON" R-Y 145 V P-P**
  - NULL 6TH BAR

- **A-T "ON" B-Y 105V P-P**
  - NULL 4TH and 15TH BARS

- **A-T "ON" G-Y 35V P-P**
  - NULL 15TH and 7TH BARS

### 30 DEGREES PHASE—PURPLE FLESH TONES

- **A-T "OFF" R-Y**
  - NULL 5TH BAR

- **A-T "OFF" B-Y**
  - NULL 27/8 and 57/8 BARS

- **A-T "OFF" G-Y**
  - NULL 6TH BAR

- **A-T "ON" R-Y**
  - NULL 5TH BAR

- **A-T "ON" B-Y**
  - NULL 3RD and 5TH BARS

- **A-T "ON" G-Y**
  - NULL 6TH BAR

### 30 DEGREES PHASE—GREEN FLESH TONES

- **A-T "OFF" R-Y**
  - NULL 7TH BAR

- **A-T "OFF" B-Y**
  - NULL 47/8 BARS

- **A-T "ON" R-Y**
  - NULL 7TH BAR

- **A-T "ON" B-Y**
  - NULL 5TH BAR

- **A-T "ON" G-Y**
  - NULL 2ND and 8TH BARS