PIE: Cell Adjustment

Connect lead of voltmeter to pin 7 of V7 and adjust the following sgs for maximum output at frequencies indicated:

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Adjust sgs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500</td>
<td>1.5 MC</td>
</tr>
<tr>
<td>3000</td>
<td>2.5 MC</td>
</tr>
<tr>
<td>5000</td>
<td>3.5 MC</td>
</tr>
<tr>
<td>7000</td>
<td>4.5 MC</td>
</tr>
<tr>
<td>9000</td>
<td>5.5 MC</td>
</tr>
<tr>
<td>11000</td>
<td>6.5 MC</td>
</tr>
</tbody>
</table>

Revised Pie Transformer Adjustment

Disconnect RF signal generator leads and connect hot lead of generator to coupling loop on transformer tube to chassis.

Connect vertical output terminal of oscilloscope to pin 7 of V7 (via detector). Connect ground lead of scope to chassis.

Connect 1/2B flashlight battery with positive terminal to connect oscilloscope to 750 mV output of V7 (via detector). Set oscilloscope to a scale of 25 times vertical sensitivity when observing oscilloscope on this frequency, it will show an adjacent channel should be used.

Set sweep generator frequency to 1500 MC and observe the trace obtained. The trace should be a straight horizontal line.

Lack of a horizontal line indicates that the output of the sweep generator is not being applied to the vertical deflection plates of the oscilloscope. Connect the output of the sweep generator to the vertical deflection plates of the oscilloscope and observe the trace obtained. The trace should be a straight horizontal line.

If the line is not straight, check the connection between the sweep generator and the oscilloscope. If the line is still not straight, check the oscilloscope for a possible internal fault.

Model TV-947, TV-949, TV-950

Oscillator Alignment

1. Connect 1/2B flashlight battery to pin 1 of V7 (6C5).
2. Connect signal generator to antenna terminal and ground.
3. Set signal generator to frequency of 1500 MC.
4. Connect electronic voltmeter to pin 2 of V7 (6C5) and adjust for zero reading.
5. Adjust 300, 3000 and 30000 for flat top response curve. Check that the response curves shown previously for all frequencies are shown for the given frequency.

AGC Adjustment

1. Connect signal generator to antenna terminal and ground.
2. Set signal generator to frequency of 1500 MC.
3. Connect electronic voltmeter to pin 2 of V7 (6C5) and adjust for zero reading.
4. Adjust 300, 3000 and 30000 for flat top response curve. Check that the response curves shown previously for all frequencies are shown for the given frequency.

Oscillator Output

1. Connect signal generator to antenna terminal and ground.
2. Set signal generator to frequency of 1500 MC.
3. Connect electronic voltmeter to pin 2 of V7 (6C5) and adjust for zero reading.
4. Adjust 300, 3000 and 30000 for flat top response curve. Check that the response curves shown previously for all frequencies are shown for the given frequency.

Oscillator Output

1. Connect signal generator to antenna terminal and ground.
2. Set signal generator to frequency of 1500 MC.
3. Connect electronic voltmeter to pin 2 of V7 (6C5) and adjust for zero reading.
4. Adjust 300, 3000 and 30000 for flat top response curve. Check that the response curves shown previously for all frequencies are shown for the given frequency.

Oscillator Output

1. Connect signal generator to antenna terminal and ground.
2. Set signal generator to frequency of 1500 MC.
3. Connect electronic voltmeter to pin 2 of V7 (6C5) and adjust for zero reading.
4. Adjust 300, 3000 and 30000 for flat top response curve. Check that the response curves shown previously for all frequencies are shown for the given frequency.

Oscillator Output

1. Connect signal generator to antenna terminal and ground.
2. Set signal generator to frequency of 1500 MC.
3. Connect electronic voltmeter to pin 2 of V7 (6C5) and adjust for zero reading.
4. Adjust 300, 3000 and 30000 for flat top response curve. Check that the response curves shown previously for all frequencies are shown for the given frequency.
After G67 has been found oscillating, or if oscillation has been restored and still no TV is being developed, check these symptoms.

G67 not being driven. Determine by measuring across SSL (l Lf. P. v. between Horizontal Drive Trimmer and Terminal 52B). Drive Trimmer and SSL P. V. should be about 120 volts. Drive is sufficient if 5.0 to 7.5 volts. Insufficient drive can be caused by:
- Defective G67 (V13)
- Defective C70, 900 mfd (at Horizontal Oscillator Can or Horizontal Drive Trimmer). Replace.

Shorted C69 (Horizontal Drive Transformer). Remove Short.

After G67 has been found being driven or its drive restored, check whether screen (pin 8) reads +150 volts, grid (pin 4) 350 volts, plate (read return via flyback transformer in any lug of HV Fuse) +330 volts. Low plate reading indicates current consumption of 8661 is too high. Replace G67. Low grid reading indicates another or leaky C70 [900 mfd]. High screen and negative plate voltage indicates open flyback transformer. Not or burned-out B66 (82 ohms at each side of 8661) indicates C70 [900 mfd] shorted, or shorted C73 900 K-500W. After all voltages of 8661 have been found correct, and still no HV, replace 832 and 8506 HV rectifier. Do not interchange plates leads for L8 (red) and G805 (black traces). These leads away from all metal parts and surfaces.

- Background control defective. Check how voltage at arm (centerpoint of background control changes with respect to CH tube grid. The latter measured at peaking coil 120 microhenry (pin 6). 12A27 video output tube should read +105 volts. The voltage at arm of background control should vary from +10 to +225 volts. If this voltage cannot be brought down to be at least +103 volts, CH tube is out of focus and therefore dark.

2) Picture on CH Tube (For no picture see under "video"

- Picture appears in duplicate, triplicate or more:
  - Horizontal frequency too high. If readjusting of Horizontal Lock and Frequency Controls or decrease of horizontal voltage (L66) (inside chassis) does not change this condition sufficiently, replace G67 (V13). C69-1,000 mfd or C68-2,000 mfd. In some cases, horizontal control C69 may have to be replaced.

- Picture appears half or less or folded over:
  - Horizontal frequency too low. Same procedure as under (a).

- Picture does not shift enough: If adjustment of control does not sufficient, measure voltage at HV Fuse. If less than +330 volts, horizontal sweep will be insufficient. Replace G67, G805. Check all voltages of CH3. Check Control (if used). Check whether C69 or C70 is +225 volts and B-9 volts. Defective Horizontal Output Transformer or Defection Transformer. Defective C76 (47 mfd) across half of Horizontal Deflection Control.

- Incorrect horizontal linearity. Linearity coil may have to be shorted out, or shorting bar may have to be removed, by increasing capacity of C75 (0.0.5 mfd) by adding from .05 to .1 mfd. Reset drive control. Defective G67, Defective horizontal Drive Transformer.

- White vertical line of lines on left side: Damper-circuit not working properly. Replace G67, G805. Check linearity coil and C76-C77 (1.0 and 0.05 mfd). Check setting of drive control, be sure to occur counter-clockwise.

- Black vertical line on left side (when upper channels are being switched in): Barkhausen-effect. Address plate leads to 853 and 6500. If no improvement, replace G67, C69, G805.

- Horizontal lines at sides of picture if closed up noises present. G67 (V13) horizontal oscillator defective. Replace.

- Picture slippage, left or right, or shifting so that black blanking bar, dividing picture, can be seen. See under "Sync circuit".

3) Vertical Sweep Circuit

- Vertical sweep only: No Vertical sweep.
  - Defective G87 (V14). Replace.
  - G87 (V14) not oscillating. Determine by measuring plate pin a 350 volts, tube is oscillating. If negative voltage, tube does not oscillate. Symptoms:
    - Defective C31 500 mfd ceramic condenser, Replace.
    - Vertical Hold Drive trimmer open or shorted against ground. Vertical Height Control open or shorted against ground.
    - Blocking Transformer open.
  - G87 (V14) oscillating, but still no sweep indicates defective C69 (Horizontal Drive Transformer). Check voltage at pin 5 of G87 (V14) for open transformer.

- Picture Linearity Incorrect: Check C62 500 ohms at grid (pin of G87 (V14) and Vertical Linearity control).

- Picture Folding on top or bottom: Frequency Incorrect. Check C65 100 ohms at grid (pin of G87 (V14) and Vertical Linearity control).

- Picture movement up and down cannot be stopped. See under "Sync Circuit".

4) Sync Circuit

- Position of Sensitivity Switch will affect sync stability. Try both settings and use position giving strongest vertical hold.

- Picture moves in all directions, cannot be stopped: No vertical or horizontal sync. Symptoms:
  - Defective G87 (V14) Sync amplifier, Replace.
  - Plate pin 5 should read +150 volts. If higher, ground condenser may be loose (tube not drawing current). Pin 5 should read +25 volts. Check whether C31 500 mfd is defective. Replace.
  - C31 500 mfd condenser to sync amplifier may be defective. Replace.
  - C69 (1/2 div, 1/2 video detector) defective. Replace.
  - G67 (1/2 1st audio, 1/2 sync limiter) defective. Replace.

No Vertical Sync:

- Defective vertical hold control.
- G87 sync pulses too low. Increase contrast. If vertical looks in, but horizontal tears, realign I-F.

No Horizontal Sync:

- Check C35 120 ohm coupling Sync Amplifier to Horizontal.

- Check 829 Trimmer Horizontal Lock Control
  - Check 829 120 ohm parallel to Lock Control
  - Check 869 500,000 ohms
  - Check 877 4 mfd (in series with 869)

- Weak Vertical or skipping.
  - Sync pulses weak. Check I-F alignment.

- Weak Horizontal Sync (picture holds only at very small portion of Hold Control range)
  - B-low at output (pin 5) of G87 (V17) sync amplifier
  - Defective C67 4 mfd
  - Defective C68 120 mfd

- Upper edge of picture bends to one side:
  - Replace C77 4 mfd
  - Replace C69 120 mfd
  - Reset C74 (Horizontal Oscillator Gain)

- C69 120 ohm Horizontal Frequency Control
  - Check C74 Horizontal Lock Control

- Test Pattern Distorted:

- Picture does not fall into sync after change of station:
  - Reset C69 Horizontal Frequency Control
  - Reset C74 Horizontal Lock Control

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5) Video
   Master on CR Tube, but no picture, no sound
   If noise (spots and streaks travelling over tube face) is visible:
   (a) Check R.F. Tuner for defective or loose 6J6 oscillator tube.
   (b) Antenna-connections.
   If sound is audible, but no picture visible:
   (a) Check video I.F. for B+ voltages.
   (b) Check video I.F. for defective 6AG5 tubes.
   (c) Check for defective 6A5G detector tube.
   (d) Check for defective 12AU7 video output tube.
   (e) Check for shorts in I.F. section, and in tuner at 6J6 socket lugs.
   (f) Check for open peaking coils.

   Note: Realignment is not always necessary. Only in case of greater differences in tube capacities (lack of band width - vertical lines on test pattern not reaching middle at low contrast, or breaking into oscillation - wavy vertical lines or black smudges) realignment should take place. For procedure, see under "Alignment".

   Picture gray at full contrast, while neighboring sets show strong black-white pictures in same area.
   (a) Check for defective 6AG5 I.F. tubes (V10; V11; V12; V13)
   (b) Check for insufficient B+ in I.F. (115 to 135V with bias battery connected across C18 as indicated on circuit diagram).
   (c) Misalignment, particularly L-6 and L-8 Pix I.F. coils.
   (d) Check for defective 6AG5 R.F. tube in tuner.
   (e) Move Sensitivity Switch to "Fringe" position.

   Picture smears (letters, etc. having tails to the right).
   (a) Check for open peaking coils (L10; L11; L12; L13)
   (b) Check alignment, especially of L5 at 25.3 µC and L7 at 25.2 µC.
   (c) Defective C33 or C34 (0.05-100) condenser.

6) Sound
   If picture appears, but no sound:
   (a) Check audio output section (6A76, 6K6)
   (b) Check tubes in Sound I.F. V4; V5; V6.
   (c) Check B+ voltages in Sound I.F.

   If sound weak:
   Realign Sound I.F.
   Defective Sound I.F. tube of Discriminator tube V4; V5; V6; V7.
   Shorted or open Sound Traps L11 (on tuner).

   If noise comes through at sound peak:
   Realign Discriminator Transformer at Zero

   If sound does not coincide with picture:
   (a) I.F. misaligned. Picture carrier (25.75 µC) too low on I.F. response curve. See "Alignment" data.
   (b) Tuner misaligned. See Tuner adjustments.