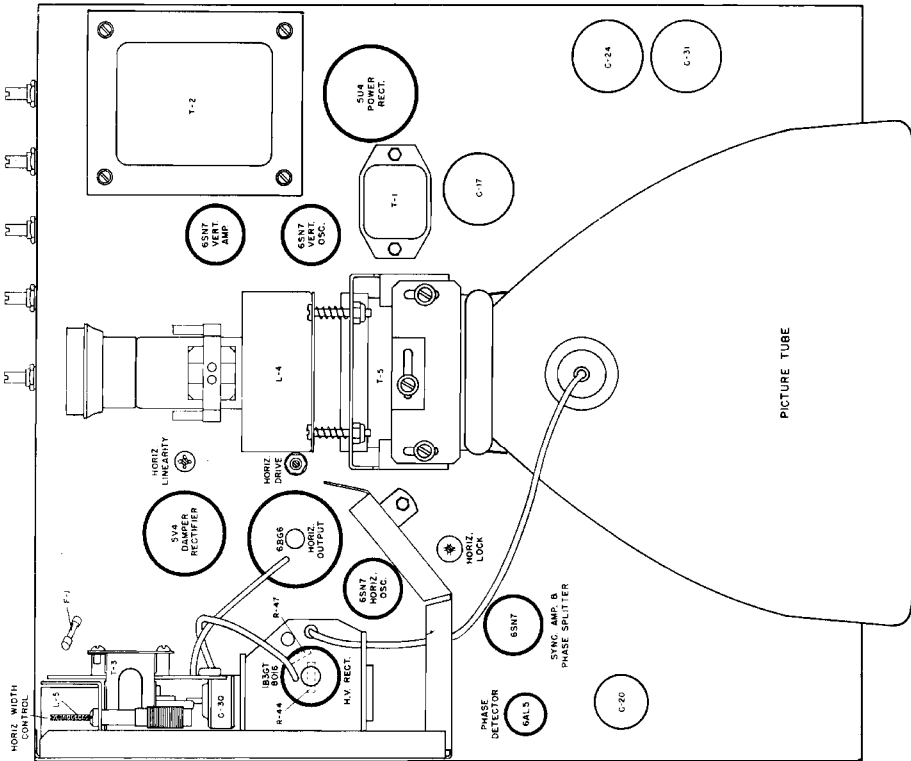


MODELS 401, 402, 406; Series



GENERAL

WHILE EACH RECEIVER IS CORRECTLY ALIGNED AT THE FACTORY, ROUGH HANDLING in transit, aging, drift, etc., MAY THROW THE RECEIVER OFF, so we suggest that the proper oscillator trimmers and the discriminator secondary adjustment—be checked for correct adjustment with a transmitted television station pattern, in the customer's home at the time of installation. Be sure to have the set operating for one-half to one hour before making these adjustment checks.

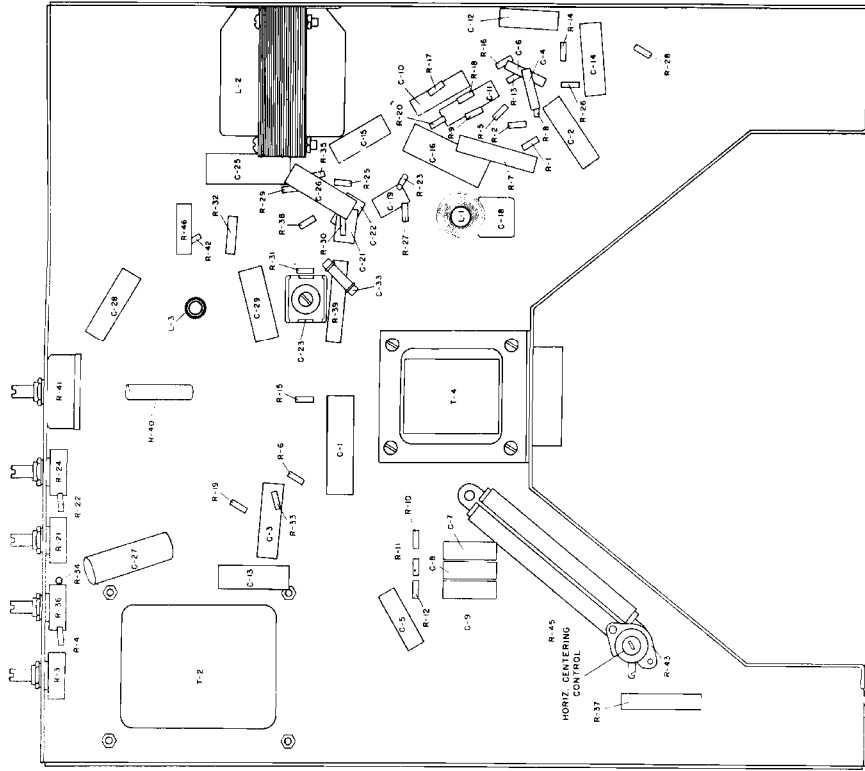
TO CHECK OSCILLATOR TRIMMER ADJUSTMENTS:

(A) Pull off the four front panel control knobs and remove the escutcheon underneath the knobs marked "Contrast," "On-Off-Vol.," "Bright-ness" and "Channel" by unscrewing the four screws holding the escutcheon to the front panel of the cabinet. The four oscillator trimmer screws are located around the Channel Selector Switch shaft. Starting with the first adjustment screw at the lower left side of the shaft and reading from left to right (clockwise), the first slotted round-head screw is Channel 13 Oscillator Trimmer adjustment screw. The second screw from the left is Channel 12 Oscillator Trimmer adjustment screw, the third is Channel 11, etc.

(B) Turn receiver Channel Selector Switch to channel on which TV station is transmitting its modulated test pattern and adjust Contrast and Brightness controls. There are 14 positions on the Channel Selector Switch. The MAXIMUM RIGHT and LEFT positions are NOT USED.

(C) Turn proper Oscillator Trimmer adjustment screw by bars across pattern and/or the lower vertical lines in pattern becoming wavy—then turn SAME Oscillator Trimmer adjustment screw counter-clockwise just to the point where the sound bars and/or wavy lines in pattern disappear.

IF STATION BUZZ is excessive and is NOT DUE to "Contrast" control being too far advanced in clockwise direction, adjust Discriminator. Secondary adjustment screw for MINIMUM buzz. MAKE SURE THAT THIS POSITION IS BETWEEN the two MAXIMUM buzz peaks that will be noticed when adjusting screw is turned to the right and left of the MINIMUM buzz position. This screw is located on top of the Discriminator Coil Shield Can which is mounted on Tuner Chassis between 6AL5 Sound Detector tube and 6AU6 Sound I.F. Amplifier tube.



POWER SUPPLY—This television receiver must be operated on a power supply of 110-120 volts A.C., 60 cycles only.

TUBES—All the tubes, including the picture tube, are properly packed in shipping containers. If a tube is shipped in a shipping container, it is a possibility, however, that (except for the tubes) they have worked loose during shipment. Press them (except the picture tube) firmly into the sockets.

ANTENNA—The wires of the antenna lead-in must be connected to the two posts marked "A" on the Tuner Chassis. When the installation is close to sources of man-made interference, a reduction in this interference may be made by attaching a ground to the post marked "G" on the chassis.

TELEVISION ANTENNA

A portable antenna which in many locations will eliminate the need of a permanent television antenna is available for use with this receiver. Since the results obtained with an indoor antenna will be determined by the type of building and the distance from the television station, it is important that you understand the proper use and limitations of a portable indoor antenna.

Unless the television station signal reaches the area in which the indoor portable antenna is located, NO television receiver will receive the signal. Do not be misled by the claims made by television stations: television signals reach only to the "edge of sight." The actual area covered by the television station

is from 20 to 30 miles, depending upon the height of the station and receiver antennas. In addition, steel constructed buildings, especially those with flat roofs, reflect television signals so that some locations are favorable and others are unfavorable. Generally, the best results are obtained when the television station is only a short distance away.

The two arms of the antenna should be placed in a horizontal position. (See instructions packed with antenna.) In general, the best results will be obtained when the antenna is broad-side to the television station; however, always slowly rotate the antenna and adjust the length of the arms to the position which gives the best results. The length of the two antenna arms will have to be. In changing from one television station to another, it may be necessary to readjust the antenna, as to length and position.

Placing the antenna near a window is ordinarily best, although sometimes better results will be obtained when it is in the center of the room, along one wall or mounted on the wall near the ceiling. Two convenient brackets for wall mounting can be extended by loosening a screw in the antenna base. In locations where it is impossible to obtain satisfactory results with the indoor portable antenna, the use of an outdoor antenna (located too far from the television stations) it will be necessary to use an outdoor television antenna.

MODELS 401, 402, 406; Series

ALIGNMENT INFORMATION

TWO alignment methods are shown. Procedures listed in Paragraphs (1), (2) and (3) require the use of a Marker Generator, Sweep Generator and Oscilloscope; procedures shown in Paragraphs (4), (5) and (6) require equipment more generally available to the service man.

DO NOT re-align receiver unless it has been definitely determined that this is necessary. When re-aligning, there are several precautions that should be kept in mind.

ALIGNMENT DATA

Alignment instructions in Paragraphs (1) to (3) inclusive cover procedure for alignment with the following equipment:

D.C. VACUUM TUBE VOLTMETER OF THE VOLTOHMIST TYPE.

MARKER GENERATOR having a coverage from 25.75 M.C. to 23.4 M.C. and 50 M.C. to 216 M.C.

SWEEP GENERATOR capable of covering from 20 M.C. to 30 M.C. and 50 M.C. to 216 M.C. with a 10 M.C. sweep.

OSCILLOSCOPE.

ACCURATELY CALIBRATED A.M. SIGNAL GENERATOR that will cover 25.75 M.C. modulated signal within 1/4 of 1% of this frequency.

6AG5 MODULATOR TUBE ADAPTER with a 1 1/2 volt battery. This adapter may be obtained from the Service Department, Sentinal Radio Corporation, Evanston, Illinois, or one may be made by following construction details in Fig. #1.

(1) PROCEDURE FOR VIDEO I.F. ALIGNMENT:

(A) Connect the Vacuum Tube Voltmeter across the 6AL5 video second detector 8200 Ohm load resistor. This resistor is in the Tuner Chassis and is attached to the center terminal of the 5-terminal tie-lug strip mounted on underside of chassis alongside of power transformer.

(B) Attach the flexible wire of the 6AG5 Adapter to the Grid (Pin #1) of the 6AG5 Modulator tube. Then connect the 1 1/2 volt battery to the 6AG5 Adapter through the 5-terminal tie-lug strip mounted on underside of chassis—this will hold adapter in place and provide ground connection.

(C) Connect the Marker Generator leads to the two 6AG5 adapter leads. This adapter will then feed the output of the Marker Generator between the grid (Pin #1) of the 6AG5 Modulator tube and ground, and will apply a 1 1/2 volt negative bias on grid of the 6AG5 Modulator tube.

(D) Set Marker Generator to deliver a 25.75 M.C. signal. KEEP OUTPUT OF GENERATOR SO THAT A READING OF APPROXIMATELY 3 VOLTS IS OBTAINED ON V.T.V.M.

(E) Adjust the fourth (4th) and second (2nd) Video I.F. adjustment screws (in that order) for maximum reading on the V.T.V.M.

The Video I.F. adjustment screws are mounted on top of the Tuner Chassis, adjacent to the three (3) 6AG5 and one (1) 6AL5 tubes. Looking at the front of the Tuner chassis, the first trimmer is the one to use for adjusting the first (1st) Video I.F., the second one for the second (2nd) Video I.F., the third one for the third (3rd) Video I.F., and the fourth one for the fourth (4th) Video I.F.

(F) Set Marker Generator to deliver a 23.4 M.C. signal. KEEP OUTPUT OF GENERATOR SO THAT A READING OF APPROXIMATELY 3 VOLTS IS OBTAINED ON V.T.V.M.

(G) Adjust the third (3rd) and first (1st) Video I.F. adjustment screws (in that order) for maximum reading on the V.T.V.M.

After these adjustments have been completed, remove the 6AG5 Modulator tube adapter.

(2) PROCEDURE FOR SOUND I.F. ALIGNMENT:

(A) Connect the V.T.V.M. across the 10 Mfd. electrolytic capacitor. This capacitor is connected between Pin #7 of the 6AL5 Sound Detector (Discriminator) tube sound and ground.

For correct positions of pips. The twelve (12) Oscillator Trimmer adjustment screws are located around the Channel Selector Switch shaft, and are accessible through holes in the front of the Tuner Chassis. Looking from the front of the Tuner chassis, and reading from right to left, the first slotted round-head screw is Channel 13, the second is Channel 12, the third is Channel 11, etc. The individual channel oscillator trimmer adjustments are independent of each other and can be aligned in any order. How-

ever, if any channel cannot be aligned properly, because of insufficient oscillator trimmer adjustment, the Channel Selector Switch shaft, and are accessible through holes in the front of the Tuner Chassis. The Padder Trimmer screw located above the Channel Selector Switch shaft. It is very important to remember that adjusting this Padder will necessitate the re-alignment of ALL of the oscillator trimmers.

THE ABOVE PROCEDURES COVER ALL ADJUSTMENTS. THE ANTENNA AND R.F. STAGES ARE FACTORY PRE-SET AND, BECAUSE THEY ARE SUFFICIENTLY BROAD, WILL NOT REQUIRE ADJUSTMENT.

ALTERNATE ALIGNMENT

This receiver can be aligned WITHOUT the use of a Marker Generator or an Oscilloscope. However, to do this correctly, the A.M. Signal Generator MUST be accurate within 1/4 of 1% at 4.5 M.C., and within 1% at 25.75 M.C. and 23.4 M.C.

Required equipment:

Vacuum Tube Voltmeter that will supply a 4.5 M.C. signal within 1/4 of 1% of this frequency and 23.4 M.C. and 25.75 M.C. signals within 1% of these frequencies.

AM Signal Generator that will supply a 4.5 M.C. signal within 1/4 of 1% of this frequency and 23.4 M.C. and 25.75 M.C. signals within 1% of these frequencies.

6AG5 Modulator Tube Adapter with a 1 1/2 volt battery. This adapter may be obtained from the Service Department, Sentinal Radio Corporation, Evanston, Illinois, or one may be made by following construction details in Fig. #1.

FOR THE OSCILLATOR ADJUSTMENT, IT IS NECESSARY TO USE A PATTERN TRANSMITTED BY THE TELEVISION STATION OPERATING ON THE CHANNEL REQUIRING ALIGNMENT.

(4) PROCEDURE FOR VIDEO I.F. ALIGNMENT:

(A) Connect the V.T.V.M. across the Video Second Detector 8200 ohm load resistor. This resistor is in the Tuner Chassis and is attached to the center terminal of the 5-terminal tie-lug strip mounted on underside of chassis alongside of power transformer.

(B) Attach the flexible wire of the 6AG5 Adapter to the Grid (Pin #1) of the 6AG5 Modulator tube. Then connect the 1 1/2 volt battery to the 6AG5 Adapter through the 5-terminal tie-lug strip mounted on underside of chassis—this will hold adapter in place and provide ground connection.

(C) Connect the A.M. Signal Generator leads to the two 6AG5 Adapter leads. This adapter will then feed the output of the Signal Generator between the grid (Pin #1) of the 6AG5 Modulator tube and ground, and will apply a 1 1/2 volt negative bias on grid of the 6AG5 tube.

(D) Set A.M. Signal Generator to deliver a 25.75 M.C. signal. IMPORTANT—this must be within 1/4 of 25.75 M.C. KEEP OUTPUT OF GENERATOR SO THAT A READING OF APPROXIMATELY 3 VOLTS IS OBTAINED ON V.T.V.M.

(E) Adjust the fourth (4th) and second (2nd) Video I.F. adjustment screws (in that order) for maximum reading on the V.T.V.M.

The Video I.F. adjustment screws are mounted on top of the Tuner Chassis, adjacent to the three (3) 6AG5 and one (1) 6AL5 tubes. Looking at the front of the Tuner Chassis, the first trimmer is the one to use for adjusting the first (1st) Video I.F., the second one for the second (2nd) Video I.F., the third one for the third (3rd) Video I.F., and the fourth one for the fourth (4th) Video I.F.

(F) Set A.M. Signal Generator to deliver a 23.4 M.C. signal. IMPORTANT—this must be within 1/4 of 23.4 M.C. KEEP OUTPUT OF GENERATOR SO THAT A READING OF APPROXIMATELY 3 VOLTS IS OBTAINED ON V.T.V.M.

(G) Adjust the third (3rd) and first (1st) Video I.F. adjustment screws (in that order) for maximum reading on the V.T.V.M.

ALIGNMENT

(H) Check Video bandwidth by setting the A.M. Signal Generator first to 25.75 M.C. and then to 23.4 M.C. and noting the reading on the V.T.V.M. obtained with each of these signals. Voltage reading should be approximately the same for both. If the band width is not correct, as indicated by substantially different V.T.V.M. readings, a slight adjustment of the first (1st) Video I.F. adjustment screw probably will be sufficient to improve the band width.

NOTE: Slight differences in V.T.V.M. readings may be due to difference in A.M. Signal Generator output at 25.75 M.C. and 23.4 M.C. Always adjust A.M. Signal Generator output to same level for each frequency.

After these adjustments have been completed, remove the 6AG5 Modulator tube adapter.

(5) PROCEDURE FOR SOUND I.F. ALIGNMENT:

Follow same procedure given in visual alignment Paragraph (2)—Procedure for Sound I.F. Alignment."

(6) PROCEDURE FOR OSCILLATOR ALIGNMENT:

For Oscillator Alignment, the television station operating on the channel to be aligned must be transmitting its test pattern and modulating its sound carrier.

(A) Turn receiver Channel Selector Switch to the channel requiring alignment.

(B) Turn proper Oscillator Trimmer adjustment screw clockwise until sound appears on pattern—indicated by bars across pattern and/or the lower vertical lines in pattern become wavy.—then turn SAME Oscillator Trimmer Adjustment screw counter-clockwise just to the point where the sound bars and/or wavy lines in pattern disappear.

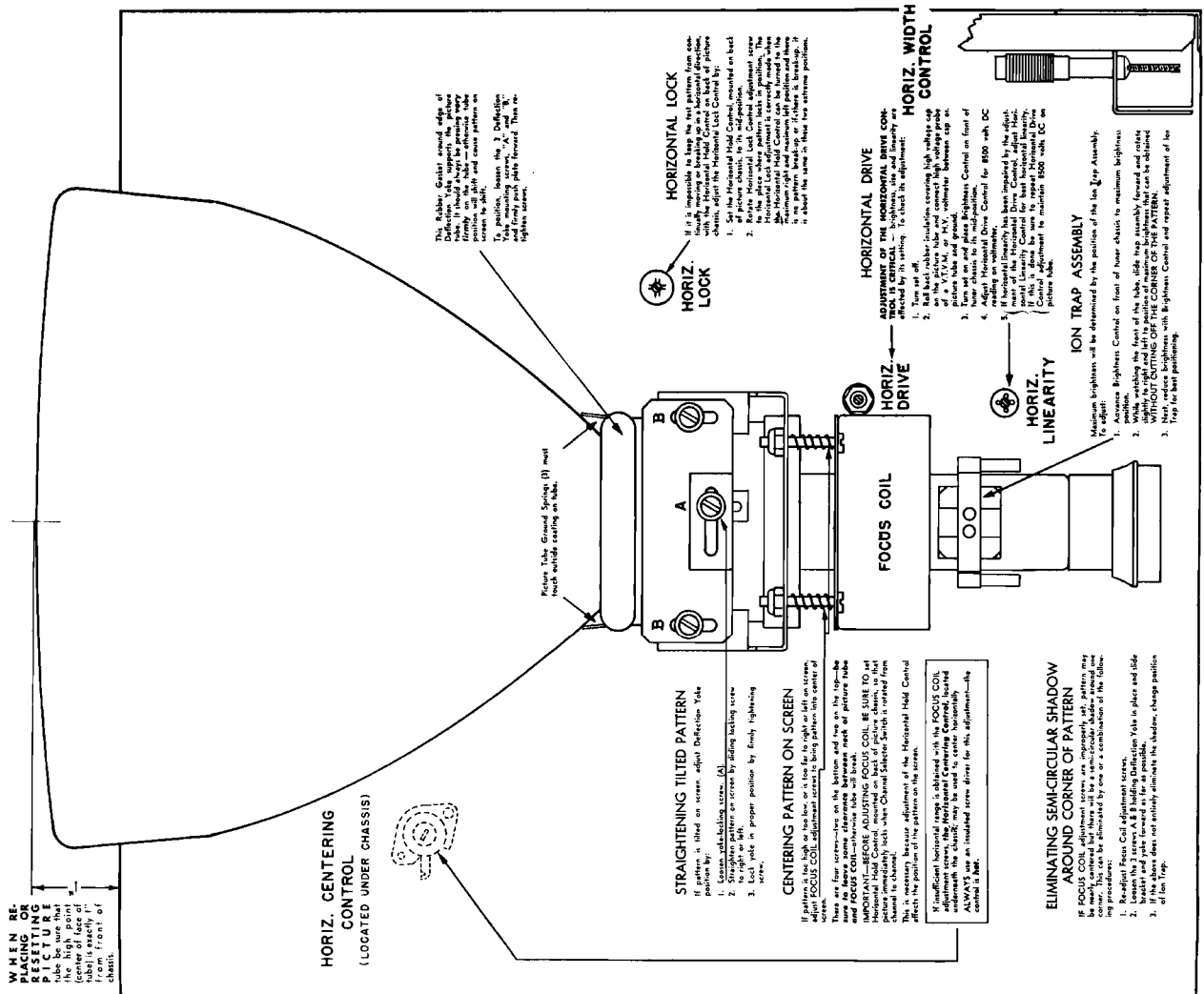
The twelve (12) Oscillator Trimmer adjustment screws are located around the Channel Selector Switch shaft and are accessible through holes in the front of the Tuner Chassis. Looking at the front of the Tuner Chassis, and reading from right to left (clockwise), the first slotted round-head screw is Channel 13, the second is Channel 12, the third is Channel 11, etc. The individual channel oscillator trimmer adjustments are independent of each other and can be aligned in any order. However, if any channel cannot be aligned properly, because of insufficient range of oscillator trimmer adjustment, the Channel Selector Switch shaft, and are accessible through holes in the front of the Tuner Chassis. The Padder Trimmer screw located above the Channel Selector Switch shaft. It is very important to remember that adjusting this Padder will necessitate the re-alignment of ALL of the Oscillator Trimmers.

THE ABOVE PROCEDURES COVER ALL ADJUSTMENTS. THE ANTENNA AND R.F. STAGES ARE FACTORY PRE-SET AND BECAUSE THEY ARE SUFFICIENTLY BROAD WILL NOT REQUIRE ADJUSTMENT.

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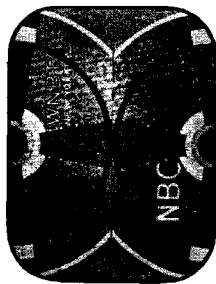
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DEFLECTION, FOCUS AND ION TRAP ADJUSTMENTS



MODELS 401, 402, 406, Series

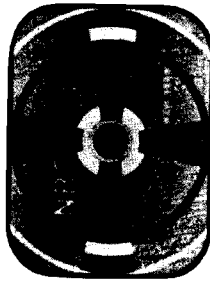
If the receiver is located near the edge of the area served by the television station or is being operated with an inadequate aerial, the picture will be very light with a snow effect and may not hold steady on the screen. No adjustment of the rear panel controls can correct this condition.



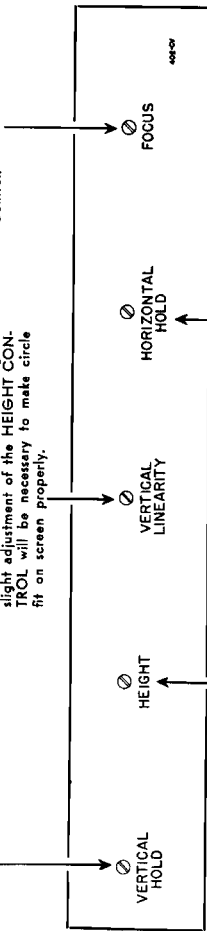
IF PATTERN continuously rolls across screen in vertical direction (up or down) ADJUST VERTICAL HOLD CONTROL so that pattern stops rolling and remains stationary on screen.



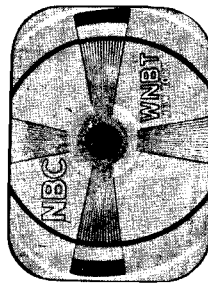
IF PATTERN is egg-shaped in vertical direction (flat top); adjust VERTICAL LINEARITY CONTROL to make pattern round. NOTE: If, after this adjustment, circle is round but is too small or too large, a slight adjustment of the HEIGHT CONTROL will be necessary to make circle fit on screen properly.



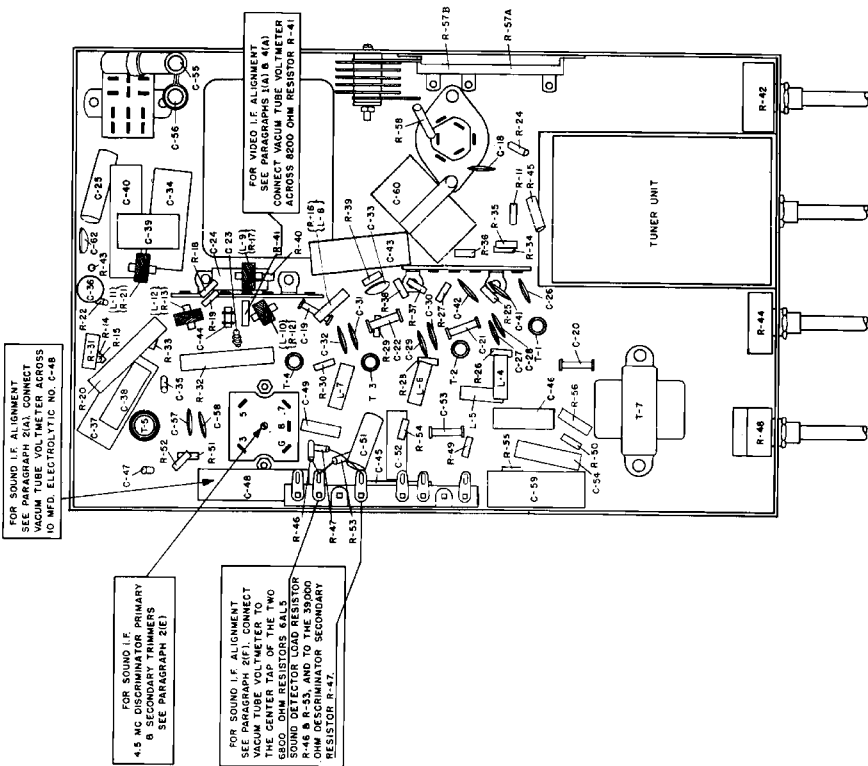
IF PATTERN IS FUZZY, ADJUST FOCUS CONTROL for sharpest definition. NOTE: Have "Brightness" and "Contrast" controls on front of cabinet properly adjusted before adjusting Focus Control.



IF PATTERN extends over top and bottom of screen (too large) or is too small, in a vertical direction, adjust HEIGHT CONTROL to make circle fit on screen. NOTE: If, after this adjustment, circle is not uniformly round, a slight adjustment of the VERTICAL LINEARITY CONTROL may be necessary.



IF PATTERN continuously breaks up in horizontal direction (LEFT TO RIGHT) ACROSS SCREEN, adjust HORIZONTAL HOLD CONTROL to bring pattern to stationary position on screen.



REAR PANEL CONTROL ADJUSTMENTS

DON'T FOOL WITH THE REAR PANEL CONTROLS UNNECESSARILY—IF THE PICTURE IS GOOD, LEAVE THEM ALONE. If a poor picture is noticed when a motion picture is being telecast, the difficulty may be due to the quality of the film being used by the station. Turn the "Channel Selector" knob to a different television station or wait until the end of the movie program. If there is no noticeable improvement in the picture, then adjustment of one or more of the controls on the back of the picture chassis may be necessary.

Before adjusting any of the rear controls, study the picture you are receiving and compare it with one of the illustrative patterns below having similar characteristics. If you find one similar to the picture you are receiving, ADJUST ONLY THE CONTROL INDICATED AS THE ONE TO BE USED TO correct that particular type of mis-adjustment. By having someone hold a mirror in front of screen or by placing the arm around the cabinet it is possible to adjust the acquired control and still look at the screen while making the adjustment. Turn the proper control slowly to the right or left until the picture is centered on the screen, stops rolling, becomes clear, etc.

Normally, after the receiver has been properly installed, only the front panel controls need be adjusted by the owner. ONLY when the picture is too high or too low or does not stay locked in the center of the screen, or is egg-shaped or very fuzzy, will it be necessary to adjust one of the controls mounted on back of picture chassis.

IMPORTANT: Interference caused by electrical equipment, flashing signs, auto. ignition systems, electric razors and medical short-wave diathermy machines may cause white streaks or herringbone bands across the picture. Aircraft in the immediate vicinity can cause fluctuation in sound volume and picture brightness. Double images on the screen can be caused by reflections from buildings, mountains, etc. **NONE OF THESE DISTURBANCES CAN BE ELIMINATED BY ADJUSTMENT OF THE FRONT OR REAR CONTROLS.** Illustrations of these types of disturbances are shown in "Interference Patterns" on the following page. If you experience a poor quality television picture, do not immediately assume that the difficulty is in your receiver. The cause may be due to temporary station transmitter difficulties.

MODELS 401, 402, 406; Series

TV-106

SERVICE HINTS ON MODELS 401, 402, 406 and 411 TV

1. WHEN VERTICAL RASTER IS SMALL OR VERTICAL LINEARITY IS VERY BAD, check for:

- Weak 6SN7 Vertical Oscillator Tube on picture chassis.
- Weak 6SN7 Vertical Amplifier Tube on picture chassis.
- Improperly adjusted Height Control on picture chassis.
- Improperly adjusted Linearity Control on picture chassis.
- Shorted 1000 mfd. cathode filter condenser C-17 in vertical amplifier located in picture chassis.

2. WHEN HORIZONTAL RASTER IS TOO SMALL, check for:

- Width Control improperly adjusted. (This control is located inside the H.V. Shield Compartment on the picture chassis and is accessible through the hole in the back of the shield.)
- Open 125 MF Condenser (C33) located inside the Deflection Yoke Assembly (looking at the back of the yoke, C33 is connected to the left side top and bottom lugs) on the picture chassis. In early production run sets, this condenser was located inside the picture chassis under the 6BG6 tube socket.
- Defective 6BG6 Horizontal Output Tube inside the shield compartment on the picture chassis.
- Defective 8016/1B3GT H.V. Rectifier tube inside the shield compartment on the picture chassis.
- Open .05 Mfd. condenser (C26) located in picture chassis.
- Open .1 Mfd. condenser (C29) located in picture chassis.
- Weak 5V4 Damper Rectifier Tube located inside shield compartment on the picture chassis.
- Improper adjustment of Drive Control. CAUTION! DO NOT TOUCH THIS CONTROL without first reading the service manual instructions for adjustment of the Horizontal Drive control given on the same page with Deflection, Focus and Ion Trap Adjustments.

3. WHEN HORIZONTAL RASTER IS TOO SMALL, WITH RIGHT HAND SIDE OF PICTURE EITHER CUTTING OFF OR FLATTENING OUT, check for:

- Defective 6BG6 Horizontal Output tube.

4. WHEN HORIZONTAL RASTER FOLDS OVER ON LEFT HAND SIDE, check for:

- Shorted .05 Mfd. 400 Volt Condenser (C-28) located in picture chassis.

5. WHEN HORIZONTAL RASTER IS TOO LARGE, check for:

- Shorted 1 Megohm Resistor (R47) H.V. filter located in H.V. shield compartment on picture chassis.
- Open Width Control (L5) located inside shield compartment on picture chassis.
- Improper adjustment of Drive Control (L5).
- Improper adjustment of Width Control. CAUTION! DO NOT TOUCH THIS CONTROL without first reading the service manual instructions for adjustment of the Horizontal Drive Control given on the same page with Deflection, Focus and Ion Trap Adjustments.

6. RASTER JUMPY HORIZONTALLY (does not seem to lock in steady), check for:

- Open .003 Mfd. condenser (C12) located in cathode circuit of the 6AL5 Phase Detector Tube in the picture chassis.
- Shorted .05 Mfd. Condenser (C15) located in the grid circuit of the 6SN7 Horizontal Oscillator Tube in the picture chassis.
- Defective 6AL5 Phase Detector Tube on picture chassis.

- Defective 6SN7 Sync Amplifier and Phase Splitter Tube on picture chassis.
- Microphonic 6SN7 Horizontal Oscillator Tube inside H.V. shield compartment on picture chassis.

7. RASTER BALLOONS WHEN ADJUSTING BRILLIANCE CONTROL (acts like Vertical and Horizontal Size Controls were being adjusted at the same time), check for:

- Open 1 Megohm Resistor (R47) H.V. filter located inside H.V. shield compartment on the picture chassis.

8. RASTER ASSUMES KEYSTONE EFFECT, WITH RIGHT AND LEFT SIDES SLOPING TO THE TOP, THE TOP OF THE RASTER BEING SMALLER THAN THE BOTTOM, check for:

- Shorted 50 MF Condenser (C32) located across lugs 1 and 2 on horizontal winding inside of Deflection Yoke (with back cover off, lugs 1 and 2 are the top and middle lugs on the left side when looking at the back of the Deflection Yoke) on the picture chassis.

9. NO RASTER BUT SOUND NORMAL, check for:

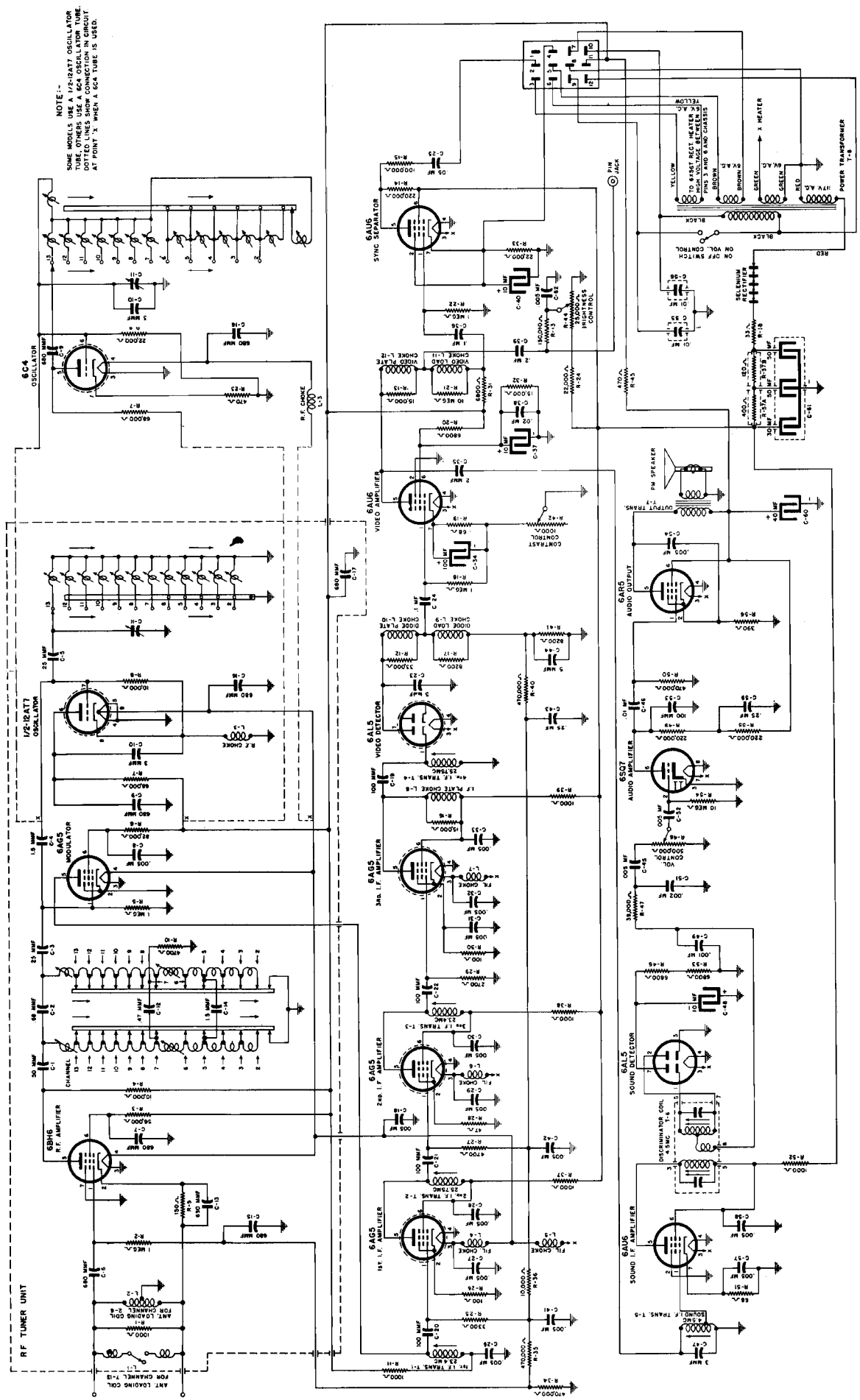
- Open fuse (F1) located in H.V. shield compartment on picture chassis.
- Defective picture tube.
- Defective 6SN7 Horizontal Oscillator tube in shield compartment on picture chassis.
- Defective 6BG6 Horizontal Output Tube in shield compartment on picture chassis.
- Defective 8016/1B3GT H.V. Rectifier Tube located in shield compartment on picture chassis.
- Defective 5V4 Damper Rectifier Tube in shield compartment on picture chassis.
- Open Horizontal Lock Coil (L-1) located in picture chassis.
- Shorted 340-460 MF Horizontal Drive condenser (C-23) located in picture chassis.
- Open or shorted 250 MF Condenser (C-21) coupling condenser to Horizontal Output Tube in picture chassis.
- Shorted 400 MF Horizontal discharge condenser (C-22) in picture chassis.
- Open winding on Horizontal Output Transformer (T-3) between lugs 1 and 2, or 3 and 2, or between 4 and 5, located in shield compartment on picture chassis.
- Defective Horizontal Output Transformer (T-3) located inside H.V. shield compartment on picture chassis. (Wave form appears as ripple instead of saw-tooth at Focus Control.)
- Shorted 500 MF Condenser (C-30) located in shield compartment on picture chassis.
- A shorted condenser in the Horizontal Oscillator and Output circuits.
- An open resistor in the Horizontal Oscillator and Output circuits.
- Improperly adjusted Ion Trap.
- Open or high resistance 6,800 ohm resistor (R-39) in screen of 6BG6 located in picture chassis.

10. NO RASTER BUT THIN VERTICAL LINE IS VISIBLE ON SCREEN, check for:

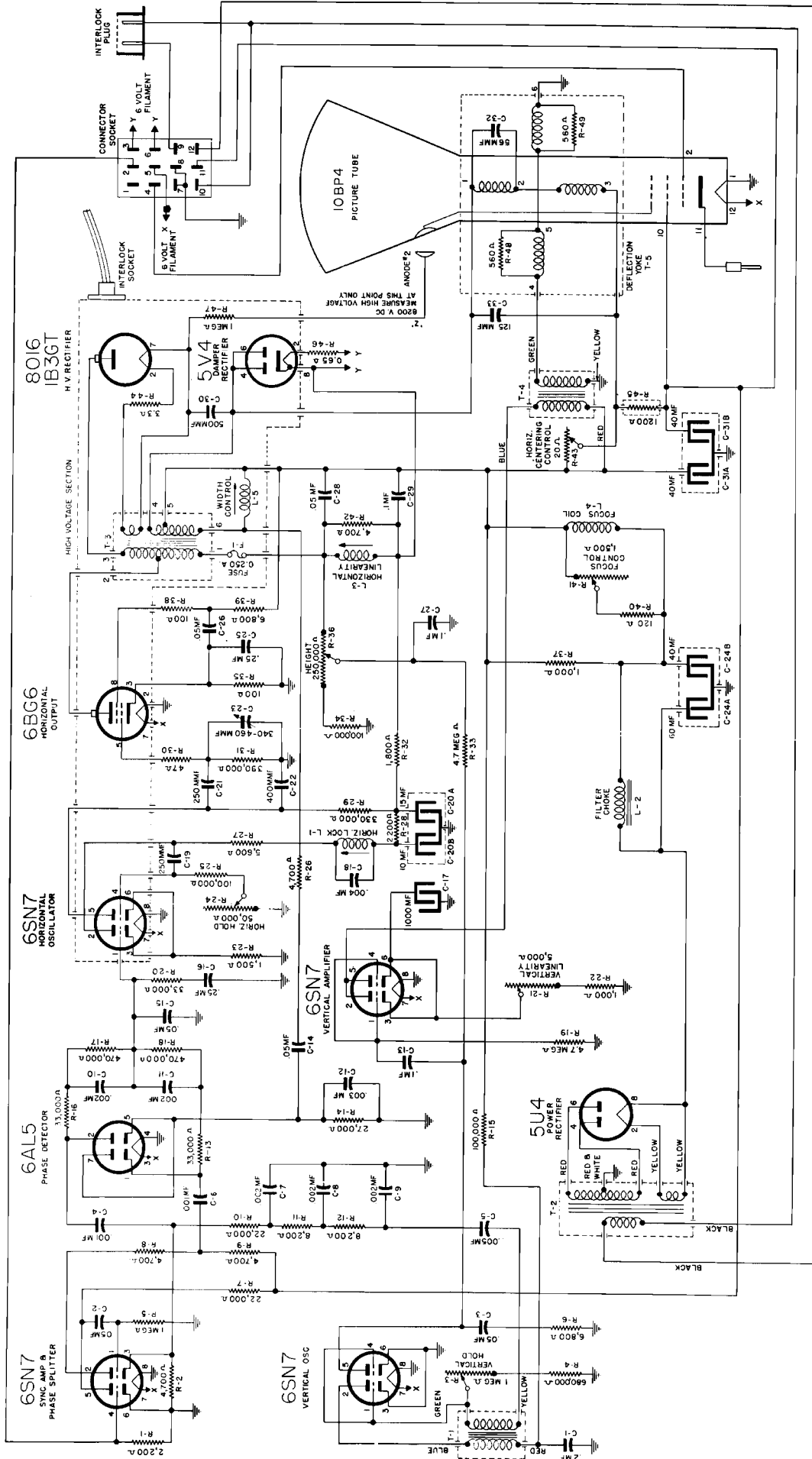
- Shorted or open Deflection Yoke (T-5) located on picture chassis.
- Shorted 126 MF Condenser (C-33) located across lugs 1 and 3 on horizontal winding inside of Deflection Yoke (with back cover off, lugs 1 and 3 are the top and bottom lugs on the left hand side when looking at the back of the Deflection Yoke) located on top of the picture chassis.

11. NO RASTER BUT THIN HORIZONTAL LINE IS VISIBLE ON SCREEN, check for:
- Defective 6SN7 Vertical Oscillator Tube on picture chassis.
 - Defective 6SN7 Vertical Amplifier Tube on picture chassis.
 - Defective blocking oscillator transformer (T-1) on picture chassis.
 - Open vertical output transformer (T-4) located in H.V. shield compartment on picture chassis.
 - Open Deflection Yoke (T-5) on top of the picture chassis.
 - Shorted 1000 Mfd. condenser (C-17) cathode filter in Vertical Amplifier circuit on picture chassis.
 - Shorted .2 Mfd. condenser (C-1) vertical oscillator plate filter in picture chassis.
 - Open .1 Mfd. coupling condenser (C-13) in vertical amplifier grid in picture chassis.
12. NO PICTURE, SOUND WEAK, OR NO SOUND, check for:
- Weak 12AT7 or 6CL Oscillator Tube on tuner chassis.
 - Weak or dead 6BQ8 R.F. Amplifier tube on tuner chassis.
 - Weak or dead 6AG5 Modulator tube on tuner chassis.
 - Weak or dead 6AL5 Video Detector tube on tuner chassis.
 - Intermittent contact between eyelet holding switch contact to wiper and switch contact of Channel Switch assembly in R.F. Tuner unit. NOTE: Eyelet should be soldered to contact cautiously -- too much applied heat may damage switch assembly.
13. NO PICTURE OR SOUND AND SET SMOKES, OR PICTURE AND SOUND INTERMITTENT, check for:
- Unused ground contact, at the third I.F. amplifier socket under the I.F. plate choke (L-8) on tuner chassis, cutting into the choke.
 - Shorted .005 Mfd. condenser (C-26) in Modulator tube plate circuit in tuner chassis.
 - Shorted tube in tuner or picture chassis.
 - Shorted .005 Mfd. or 680 Mfd. condenser in R.F. tuner unit.
14. WHEN PICTURE WILL NOT LOCK EITHER HORIZONTALLY OR VERTICALLY, OR LOCKING IS VERY CRITICAL, check for:
- Defective 6AU6 Sync Separator tube on tuner chassis.
 - Defective 6SN7 Sync Amplifier and phase splitter tube located on picture chassis.
 - An open resistor in Sync Amplifier, Phase Splitter or Phase Detector circuit in picture chassis.
 - A shorted condenser in Sync Amplifier, Phase Splitter or Phase Detector circuit in picture chassis.
15. WHEN PICTURE WILL NOT LOCK HORIZONTALLY, check for:
- Defective 6AL5 Phase Detector tube on picture chassis.
 - Horizontal Lock Control on picture chassis improperly adjusted.
 - Open winding in Horizontal Output Transformer (T-3) between lugs 5 and 6 located in shield compartment on picture chassis.
 - Defective 6SN7 Horizontal Oscillator tube located in shield compartment on picture chassis.
 - Shorted .003 Mfd. (.01 Mfd. in early models) cathode bypass condenser (C-12) in phase detector circuit in picture chassis. Replace with .003 Mfd. condenser only.
15. (f) Open or missing 220,000 ohm resistor (R-50) in grid circuit of the horizontal oscillator.
- (g) Open or shorted .002 Mfd. condenser (C-10 or C-11) in the phase detector plate circuit in the picture chassis.
- (h) Open 470,000 ohm resistor (R-17 or R-18) in the phase detector plate circuit in the picture chassis.
16. WHEN PICTURE WILL NOT LOCK VERTICALLY, OR PICTURE LOCKS VERTICALLY BUT TWO SEPARATE PICTURES ARE VISIBLE (LOOKING AT 120 CYCLES), OR TOP HALF OF PICTURE AND BOTTOM HALF ARE SUPER-IMPOSED UPON EACH OTHER (LOOKING AT 30 CYCLES, check for:
- Defective 6SN7 Vertical Oscillator tube in picture chassis.
 - Open 1000 Mfd. condenser (C-17) cathode filter in vertical amplifier in picture chassis.
 - Vertical Hold Control (R-3) shorted by filings or solder, located on back of picture chassis.
 - The .005 Mfd. coupling condenser (C-5) to vertical oscillator in picture chassis has changed value.
 - The 680,000 ohm resistor (R-6) in series with Vertical Hold Control in picture chassis has changed value.
17. BAND SWITCH STICKS ON ANY CHANNEL, check for:
- One of the oscillator trimmer adjustment screws on the Channel Selector Switch in the tuner unit at the front of the tuner chassis may be out too far and may be hitting the stop arm on the Channel Switch.
18. RASTER AND PICTURE NORMAL, NO SOUND, check for:
- Defective 6AR5 Audio Output tube on tuner chassis.
 - Defective 6SQ7 Audio Amplifier tube on tuner chassis.
 - Defective 6AL5 Sound Detector tube on tuner chassis.
 - Defective 6AU6 Sound I.F. Amplifier tube on tuner chassis.
 - Defective component in sound section in tuner chassis.
- WHEN PICTURE CANNOT BE BROUGHT INTO FOCUS WITH FOCUS CONTROL BUT RASTER, PICTURE AND SOUND APPEAR NORMAL, check for:
- (a) Defective 240 Ohm Resistor (R-40) used in early models or 120 Ohm Resistor (R-40) used in later production, in series with the Focus Control.
- Always replace the 240 Ohm Resistor with a 120 Ohm Resistor and remove one of the 1000 Ohm Resistors (R-37) in parallel connected between C-24B and C-31A, located in the picture chassis.

MODELS 401, 402, 406; Series



NOTE:-
 SOME MODELS USE A 1/2-WATT OSCILLATOR TUBE, OTHERS USE A 6CA4 OSCILLATOR TUBE. DOTTED LINES SHOW CONNECTION IN CIRCUIT AT POINT "X" WHEN A 6CA4 TUBE IS USED.



These service notes cover two Sentinel television receivers—the major difference between the two chassis is in the size of the picture tube used.

All of the Model 401 and 402 Series use a 10-inch picture tube.

All of the Model 406 Series use a 12-inch picture tube.

