

**HORIZONTAL LINEARITY:**

This is a slug-controlled inductance on the top and rear of the chassis under the tube cover. It has only slight effect on the center and right side of the picture, and normally should not require readjustment.

**HORIZONTAL HOLD:**

The control should be adjusted so that the picture drops into sync immediately after switching channels. For best results the contrast should be reduced when making the above adjustments.

**VERTICAL HOLD:**

The vertical hold control should be adjusted so that the blanking bar rises to the top of the picture and locks at the top when the signal is momentarily disturbed.

**HEIGHT AND VERTICAL LINEARITY:**

These controls have considerable effect on each other and when one is adjusted the other will frequently also have to be readjusted. They should be adjusted only when a test pattern is being received to produce a properly proportioned picture. If radical change of adjustment is made it will be necessary to readjust the vertical hold control.

**FOCUS:**

The focus control should be adjusted to produce the best compromise between perfect focus at the center of the picture and good focus over the entire picture. This should be made with the set thoroughly warmed up and operating normally in other respects.

**CENTERING PICTURE:**

Centering is accomplished by tilting the focus coil with respect to the axis of the CR tube. The focus coil is spring loaded and bears against four elastic stop nuts located around the neck of the CR tube and easily accessible from the rear. To properly position the picture in the mask or frame, adjust these nuts as required using a 3/8" spin-tight nut driver. A little experimentation will indicate which of the 4 nuts must be adjusted.

**CAUTION: DO NOT USE A PAIR OF PLIERS OR A WRENCH WHICH DOES NOT FIT. A SLIP MAY BREAK THE PICTURE TUBE!**

**OPERATING INSTRUCTIONS**

Turn the Volume Control (ON-OFF) knob about one-fourth of the way.

Turn Station Selector (Numbered knob) to the channel number of the station desired.

Allow tubes to warm up, then adjust Fine Tuning knob to the best reception of sound (least static and background noise and maximum eye deflection).

Disregard the appearance of the picture while making this adjustment.

Turn Contrast Control all the way down (counter clockwise).

Adjust Brightness Control until picture is faintly illuminated.

The Brightness and Contrast controls influence each other and it may be desirable to readjust them slightly for the most pleasing picture. When Brightness Control is properly set it will seldom require readjusting. The Contrast Control may require adjustment from station to station. After the set has been on for some time, the sound may be improved somewhat by slightly readjusting Fine Tuning.

It is not necessary to view the picture in a totally dark room but do not permit the light to shine directly on the picture tube.

**INSTALLATION NOTES**

**POWER REQUIREMENTS:**

Power consumption is approximately 230 watts. Power factor .85 or better. The ALC-201 television attachments are intended for use on 115 volt, 60 cycle power line. However, the sets may be operated from 50 cycle or 60 cycle power line. Frequency engine generator plants, without damage to the power transformer. On frequencies other than 60 cycle, a slight flicker may be noticeable, but should not be objectionable. 50 cycle flicker can be minimized by selection of hum-free tubes, particularly type 6SN7 multivibrator tubes.

**ANTENNA REQUIREMENTS:**

The input impedance of the receiver properly terminates a standard 300 ohm ribbon transmission line. This type of line gives the most satisfactory general performance and should be used except in cases where extreme electrical noise originates close to the receiver and the antenna cannot be located in an interference-free zone, or where it is necessary to run the lead-in through metal conduit. In these exceptional cases a twin coaxial line is indicated. This can be made up by running two pieces of RG-8U (72 ohm) coaxial cable taped together at frequent intervals, from the antenna to the set. The two center conductors should be connected to the dipole connections on the set and the shields connected to each other but not to the antenna. The two shields should be grounded to the chassis. An external ground may or may not improve the interference condition. An ungrounded, folded dipole type of antenna will usually prove more satisfactory.

**ADJUSTMENT OF CONTOURED CONTROLS**

**WIDTH:**

The width control is a slug-adjusted coil mounted on a bracket under the right side of the cathode ray tube cover viewing the set from the front. It should be adjusted with a long, small-bladed screw driver having a well insulated handle, or with the power off. Turning the screw clockwise makes the picture wider.

**SERVICE NOTES**

Most troubles are caused by tubes. Many of these bad tubes will test "Good" in a tube tester. Replace suspected tubes with new tubes known to be good. DO NOT RELY ON A TUBE TESTER.

**NO RASTER:** (CR tube does not light up at all.)

- Bad 6SN7 (DC restorer) V14
- Bad 6SR7 (horizontal sync) V15
- Bad 6SL7 (horizontal amplifier) V16
- Bad 6SB6 (no. 1 horizontal tube) V18
- Ion magnet (if any) out of adjustment

If the horizontal and high voltage system is operating normally, a high pitched whistle (15-75 KC) can be heard coming from the high voltage transformer.

**PICTURE ZADUS AND SIZE OF PICTURE CHANGES:**

Weak high voltage rectifier; LB3/6016 V18

Caution: Dress plate cap wire of V18 up away from other leads and especially picture tube anode wire.

**BRIGHT HORIZONTAL LINE:** (No vertical deflection)

- Bad 6SN7 (vertical MV) V19
- Bad 6R6GT (vertical amplifier) V20

**SYNC/HORIZONTALIZATION POOR OR ABSENT:** (Both vertical and horizontal)

- Bad 6SN7 (phase separator) V12
- Bad 6SL7 (sync amplifier) V14
- Leaky coupling condenser C19

**NO HORIZONTAL SYNC:** (vertical sync OK)

- Bad 646 (phase detector) V11
- Bad 6SR7 (sync amplifier) V14
- Shorted C37 or C38

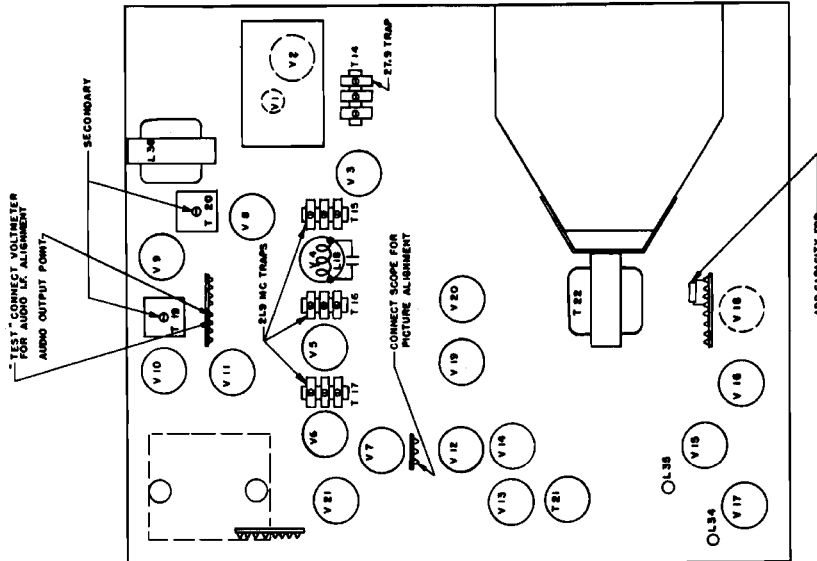
**PICTURE TWISTS OR DISTORTS ON SOME CHANNELS:**

Contrast control operated too high. Trouble may originate at transmitter. May be minimized by careful adjustment of horizontal hold control.

**NOTE:** In remote, noisy areas, the horizontal hold circuits can be nearly immunized against frequency changes by increasing the value of C82 to 20 MFD, and decreasing the value of R60 to 1000 ohms or less. This change is not recommended for general application for two reasons: (1) The horizontal pull-in range is reduced and adjustment of the horizontal hold control may be required occasionally. (2) The receiver will then show up unstable sync generators still in use at some transmitters, particularly those tightly locked into the power line frequency.

**HORIZONTAL "JITTER" OR ERRATIC CHANGES IN WIDTH:**

- Bad 6866G horizontal amplifier



**EQUIPMENT REQUIRED:****ALIGNMENT**

Accurate signal generator covering the ranges 20 to 30 MC., 50 to 90 MC., and 175 to 240 MC.

"Sweeper" signal generator covering the above frequencies with a bandwidth of at least 10 MC.

General purpose oscilloscope, preferably one with a large tube.

Voltmeter. 20,000 ohms per volt, or VTVM

**PROCEDURE FOR ALIGNING SOUND AND SOUND TRAPS:**

Connect the signal generator to the grid (Pin #8) of the 7F8 converter tube through a small mica condenser. Set the generator accurately to 21.9 MC with tone modulation. Connect the oscilloscope through a 10K or 20K resistor to the output of the video amplifier. ("Hot" end of R15-2 watt resistor).

The wave form of the tone modulation may now be seen on the test scope. Adjust the three picture IF wave traps for minimum deflection on the scope. Connect the VTVM to the ratio detector AVC point.

Adjust all (h) of the sound IF trimmers for maximum (negative) indication on the meter.

One slug is on the top and one on the bottom of each can. (T19 & T20) Now connect the VTVM or sensitive meter between the junction of two 6800 ohm resistors (R92 and R93) and the junction of R28, C27, and C52. Read just the ratio coil secondary (bottom slug) for zero deflection on the meter. When correct adjustment is made, slight detuning of the screw one way will cause the meter to swing in a positive direction and detuning the screw the opposite way will cause the meter to swing in a negative direction.

As an alternate method of alignment, the sweeper oscillator may be fed into the mixer grid with a marker generator, and the test scope may be connected to the audio output of the ratio detector (junction of R28, C27, and C52).

The sound IF transformers then are aligned to produce a symmetrical "S" curve.

**PICTURE CHANNEL ALIGNMENT**

The sweeper and marker generators should be fed into the grid (Pin #8) of the 7F8 mixer. A dummy tube is used, with Pin #8 cut off and a slug soldered to the stub. The scope should be connected through an RF isolating resistor (See sound alignment) to the plate of the 6AC7 video amplifier. Set the contrast control from one-half to three-quarters of the way up. Be sure the signal generator output is low enough not to overload the amplifier under test. If the response curve is not substantially as shown in Figure #3, it will be desirable to realign the set stage by stage. This is done by connecting the sweeper through a small condenser on the order of .005 MFD. to the grid stage under test. The primary associated with this winding must be shorted out temporarily with a short piece of heavy wire or a small condenser to prevent it from acting like a wave trap and putting a hole in the response curve. Each stage is adjusted to produce a curve as nearly like the illustration as possible. The IF component of the picture current (C24 R6) must be located at a point on the curve which is 50% of the amplitude on the flat top portion of the curve when overall alignment is completed.

**IMPROVED TRANSIENT RESPONSE (VIDEO PEAKING):**

The picture quality has been improved by the addition of a network consisting of a 2200 ohm resistor and a 300 microhenry coil connected in series, the network being connected from pin 5 of the 6H6 (V6) to ground. In areas of very weak signal (as indicated by excessive snow) this network should be disconnected.

**CAUTION:**

Do not attempt to align the set until you are sure it is necessary, and then only when proper equipment is available. It is impossible to align the sound circuits "by eye", i.e., by watching the picture, and any attempt to do so will result in destroying the sensitivity and/or picture quality of the set.

The overall response curve is the criterion of correct alignment. Slight deficiencies of one stage may be compensated for in another stage without ill effect.

**POOR HORIZONTAL LINEARITY:**

Check 6866 cathode resistor R73.  
Try a .1 MFD. condenser from either terminal of linearity adjustment coil (L34) to ground.

**BRIGHT WHITE VERTICAL LINE ON LEFT SIDE OF PICTURE:**

Too much drive. Parallel C41 with 500 MFD. condenser.

**RIPPLE: (Alternate light and dark vertical bands)**

Open neutralizing condenser C67  
This condenser is located inside the yoke.

**INSUFFICIENT WIDTH:**

Replace 6866 (horizontal amplifier) V16  
Check width control L33 for broken core  
Connect a small mica condenser (250 MFD. approximately) in parallel with C41.  
Connect a 250 MFD. 1500 V. mica condenser between terminals 4 and 5 of R23 (high voltage transformer). These terminals are accessible below the chassis on the tie point strip. Two 500 MFD. 600 V condensers in series may be substituted if a 1500 V. condenser is not available.

**BLACK VERTICAL LINE NEAR LEFT SIDE OF PICTURE:**

Caused by Barkhausen oscillations of 6866 V16  
Replace V16 -- Try more than one tube  
Add 1K Resistor in series with control grid of V16  
Add 100 ohm resistor in series with screen grid of V16

**PICTURE GRADUALLY GETS TOO SMALL:**

Loose 6866 horizontal amplifier V16 (Plates may get red hot)  
Leaky horizontal coupling condenser (C42)  
Weak 5045 rectifier V21

**INSUFFICIENT HEIGHT:**

Bad 6K6GT vertical deflecting tube V20  
Change vertical HV plate resistor (R67) to slightly smaller size

**NARROW WHITE HORIZONTAL LINE THROUGH PICTURE:**

Bad 6K6 vertical amplifier V20

**POOR VERTICAL HOLD:**

Bad vertical oscillator V19  
Bad sync separator V12  
Leaky sync separator coupling condenser (C19)  
Check IF alignment for picture carrier placement at 50% point  
Be sure adjacent channel trap (located on T14) is not tuned to 26.4 MC

**POWER SUPPLY SHORT CIRCUITS:**

A shorted filter condenser or other B plus short or overload will result in burning out protective resistor R94 located under power transformer. R94 should be replaced only with a 1 watt 15 ohm wire wound resistor after the trouble has been cleared. Total current drain may be conveniently checked by connecting a voltmeter across this resistor. A reading of approximately 3.0 volts indicates normal 210 ma drain.

**POOR FOCUS CONTROL OPERATION:**

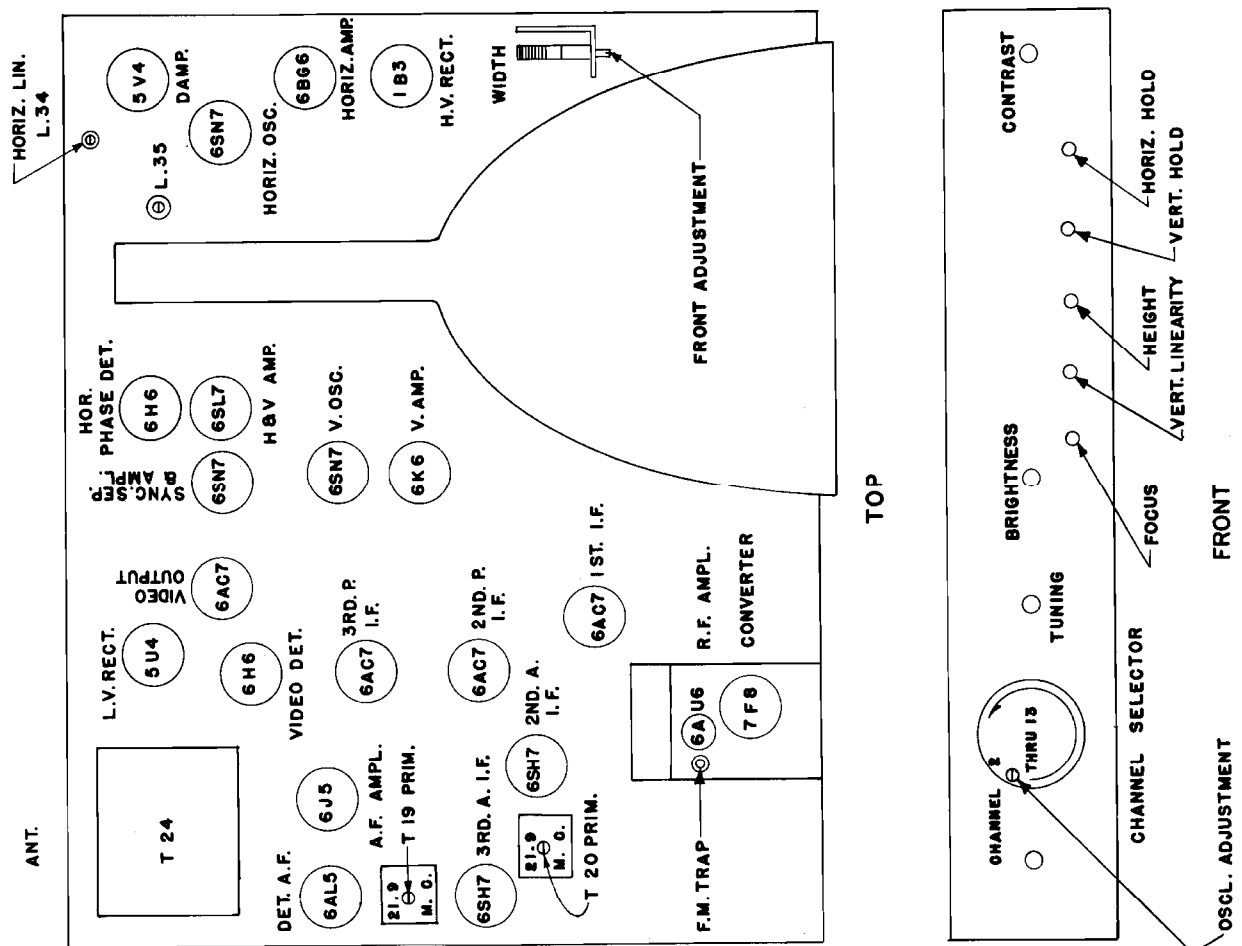
If set focuses best with focus control at extreme counter clockwise position  
Low line voltage  
Weak tube magnets in set, especially 5U6G or 6AC7  
Improperly positioned focus coil. Tighten all four centering adjustment screws to move focus coil closer to rear of set.

Focus coil current may be increased by adding a 20,000 ohm 10 watt bleeder resistor from B plus to chassis. Locate this resistor near brightness control with other 10 watt resistors.

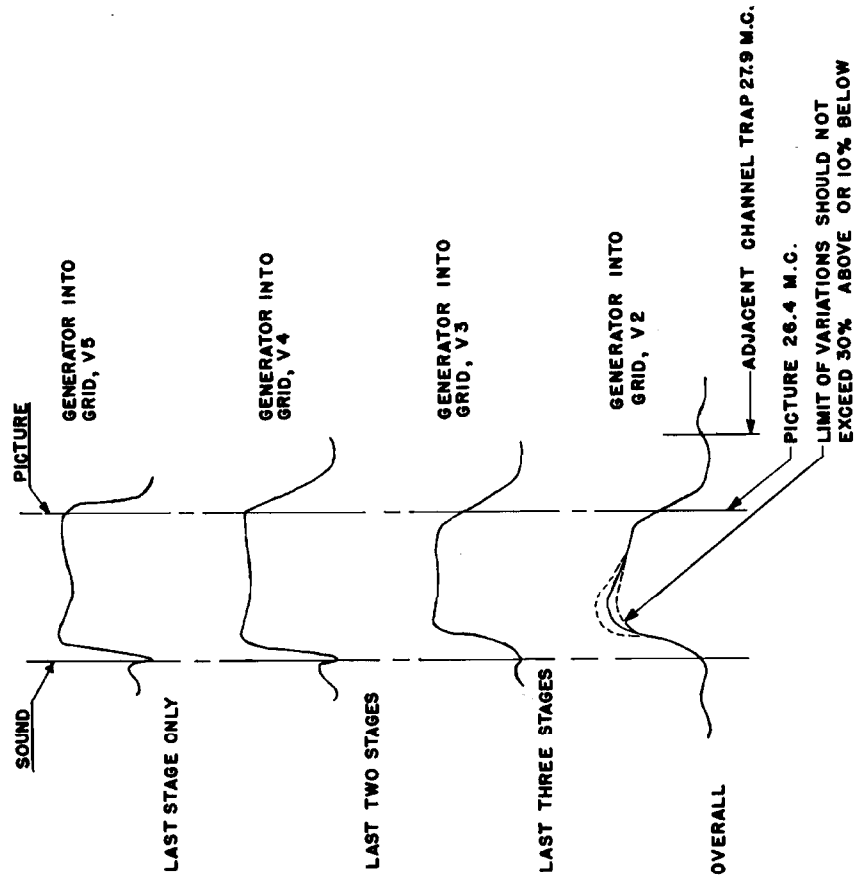
If set focuses best with control near clockwise position:

Reduce resistor in series with focus coil (R91) as necessary.

MODEL 201



I.F. ALIGNMENT CURVES (APPROXIMATE)



NOTE -  
CATHODE TRAP (L-18) MAY BE ADJUSTED BY SQUEEZING TURNS TO PRODUCE BROAD NULL WITH MINIMUM OVERSHOOT.

