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:

This control should be adjusted so that the picture drops into sync immediately after switching the channel switch off and back on again. If the setting is too narrow, the picture will drift away from the center of the raster. Adjust L57 until the picture is centered and will drift back 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 black bars rise to the top of the picture and lock at the top when the signal is momentarily disturbed.

VIDEO AND HORIZONTAL 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 viewed 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 lifting the focus coil with respect to the axis of the CRT. This coil is spring loaded and moves away from the CRT. Elastic stop nuts located around the neck of the CRT and easily accessible from the rear of the set. To properly position the picture in the center, or frame, adjust these nuts as required using a 3/8" pin-type nut driver. A little experimentation will indicate which of the 4 nuts must be adjusted.

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

OPERATING INSTRUCTIONS:

Turn the Volume Control (OFF-ON) 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 definition).

Now advance Contrast Control until picture is most pleasing. Now advance Brightness Control until screen is properly illuminated.

Do not make any abrupt changes in Controls, as this may cause the picture to disappear. If the picture disappears, try turning the Contrast and Brightness Controls back into position and then readjust

AVERT: Picture may be very cold, do not touch. Do not adjust Picture Volume or Picture Tint when set is on for too long. The sound may be improved by somewhat slighty readjusting Fine Tuning.

If 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:

FOUR REQUIREMENTS:

Power consumption is approximately 30 watts. Power factor 0.8 or better. The 6CE204 Television Attachments are intended for use on 115 volt, 60 cycle power line. However, the set may be operated from 50 cycle or 60 cycle nominal frequency engine generator plant, without damage to the power transformers. On frequencies other than 60 cycles, a slight flicker may be noticeable, but should not be objectionable. 50 cycle flicker can be eliminated by selection of non-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 results and should be used in cases where direct electrical noise originating close to the receiver and the antenna cannot be located or is due to human interference. The antenna should be located in an interference-free area, or where it is necessary to run the lead in through metal conduit. In these exceptional case a twin coaxial line may be used. In any case one end of the coaxial lead shall be grounded to the chassis. The center conductor should be connected to the dipole connections on the set and the shield connected to each other but not to the antenna. The two shield ends may be connected to the makers. In exceptional cases a ferrite bead may improve the interference condition. An undamaged, folded dipole type of antenna will usually prove most satisfactory.

ADJUSTMENT OF GAIN CONTROL:

The width control is a slug-adjusted coil mounted on a bracket under the right side of the cathode ray tube cover. It can be reached from the front of the set. It should be adjusted with a long, small-bladed screwdriver having a 3/8" insulated handle, or with the power off. Turn it, turn it, turn it, until the picture is wider.

ALIGNMENT NOTES:

Most trouble is 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 RUSH OR A TUBE TESTER!

NO RATCHET! (OR TUBE DOES NOT LIGHT UP AT ALL)

Bad 6J7 (200-2000) V8
Bad 6G70 (horizontal ampl) V11
Bad 6SN7 (vertical ampl) V15
Bad 6G6/2B (driving tube) V16
Bad 11G8/2B (driver tube) V16
Bad 194G (if any) out of adjustment

If the horizontal and vertical time is not adjustable, nor a high pitched whistle (117.25 kHz) can be heard coming from the high voltage transformer.

If the horizontal and vertical time is not adjustable, nor a high pitched whistle (117.25 kHz) can be heard coming from the high voltage transformer.

PICTURE PADS AND SIZE OF PICTURE CHARGES:

Weak high voltage rectifier: 120/240 V16
Caution: Do not plug in or turn on the receiver without an ordred plug.

HORIZONTAL LINE:

No vertical deflection.

Bad 6J7 (vertical) V19
Bad 607 (vertical inverter) V20
SYNCORNIZATION POINT OR ASSIGN:

Bad 6SN7 (phase changer) V2
Bad 6G70 (sync amplifier) V16
Leaky coupling condenser C15
NO HORIZONTAL Sync (vertical sync OK)
Bad 907 (phase detector) V11
Bad 6J7 (sync amplifier) V16
Shorted C17 or C18

PICTURE TWISTS OR DISTORTIONS OR SOME CAUSAL:

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

NOTES: In remote, noisy areas, the horizontal hold circuits may be needed to maintain clear picture by increasing the value of C20 to 20000 and doubling the value of R25 to 3300 ohms or less. The change is not recommended for general application for two reasons: (1) The horizontal pull-in range is reduced and adjustment of the horizontal control may be required occasionally. (2) The receiver will then show up unstable sygnal generators while is using some transistors, particularly those tightly located into the power line frequency.

HORIZONTAL "JITTER" OR HORIZONTAL CHANGES IN WIDTH:


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POOR HORIZONTAL LINEARITY:
Check 600Ω cathode resistor R71.
Try a .1 uf coupling cap from either terminals to linear adjustment
R51 to ground.

BRIGHT WHITE VERTICAL LINE ON LEFT SIDE OF PICTURE:
Too much drive. Parallel QL with 500 µFD condenser.

RIFFLE (Alternate light and dark vertical bars)
If unneutralizing condenser C5
This condenser is located inside the yoke.

INSUFFICIENT WIDTH:
Recheck 600Ω (horizontal amplifier) AND
Check with control L3 for broken core.
Connect a small mike condenser (250 µFD approx) in parallel
Connect 1500 volts, mike condenser between terminals, and 5 of
(12 high voltage transformer). These terminals are accessible below
the chassis at the tie point strip. Two 500 µFD, 6000 volts condensers in
series may be substituted if an 1500 volt condenser is not available.

BLACK VERTICAL LINE HEAVY LEFT SIDE OF PICTURE:
Caused by variances of 600Ω AND
Check with control L3 for broken core.
Add 100 ohm resistor in series with control grid of AND
Add 100 ohm resistor in series with screen grid of AND

FIGURE GRADUALLY GETS TOO SMALL:
Easy 600Ω horizontal amplifier AND
(Plate may not red hot)
Leaky horizontal coupling condenser C22
Leaky horizontal coupling condenser C22
Easy 600Ω horizontal amplifier AND

INSUFFICIENT HEIGHT:
Easy 600Ω vertical deflecting tube V20
Change vertical Y plate resistor R67 to slightly smaller disc.

MARK BRIGHT HORIZONTAL LINE THROUGH PICTURE:
Easy 600Ω vertical amplifier V20

POOR VERTICAL HOLD:
Easy vertical amplifier V19
Easy sync separator V12
Leaky sync separator coupling condenser C19
Gain vertical alignment of Pictures C21 unless at 50% point
Be sure adjacent channel trap (located on 71L) is not tuned to 26,000
Cut power supply short circuits:
A shorted filter condenser or other B plus short or crowbar will re-
result in burning out protective resistor R101 located under power trans-
former. R101 should be replaced only with a 15 volt 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 1500 volts indicates normal 210 mA drain.

POOR FOCUS CONTROL OPERATION:
If set: focus best with focus control at extreme counter clockwise position
low line voltage,
Peak tube anywhere in set, especially 600Ω or 6AK7.
Properly positioned focus coils. Tighten all four centering adjust-
ment screws to move focus coil closer to rear of set.
Focus coil current may be increased if necessary by adding a 20,000
ohm 1 watt bleeder resistor from B plus to chassis. Locate this re-
sistor near brightness control with other 1 watt resistors.
If set: focus best with control near clockwise position:
Reduce resistor in series with focus coil (R01) as necessary.

EQUIPMENT REQUIRED:
ALIGNMENT
Accurate signal generator covering the ranges 20 to 30 MC, 50 to 90 MC,
and 175 to 200 MC.
"Sweepers" signal generator covering the above frequencies with a bandwidth
of at least 10 MC.
Purpose oscilloscope, preferably one with a large tube.
Voltmeter, 20,000 ohms per volt, or VTVM.

PROCEDURE FOR ALIGNING VIDEO AND SOUND TUBE:
Connect the signal generator to the grid (pin 8 of the 3PR5 converter tube) through
a small mike condenser. Set the generator accurately to 21,900 MC
with tone modulation. Connect the oscilloscope through a 10k or 20k re-
sistor to the output of the video amplifier. "{Hot}" and "lls" switch re-
sistor to the grid of a second tube.

The wave form of the output modulation may now be seen on the test oscilloscope.
Adjust the picture IF wave traps for maximum deflection on the screen.
Connect the VTVM to the radio detector AVC point.
Adjust all (1) of the sound IF trimmers for maximum (negative) indication on the meter.
A slug is on the top end of the bottom of each can. (71L, 71Y)
Now connect the VTVM or sensitive meter between the junction of two 6000
ohm resistors (R92 and R93) and the junction of 282, 287, and C52. Read-
just the radio coil secondary (bottom slug) for zero deflection on the meter:
If no correction adjustment is made, slight defocusing of the screen may
cause the meter to swing in a positive direction and defocusing the screen
the opposite way will cause the meter to swing in a negative direction.

As a method of alignment, the scanner oscillator may be fed into the mixer grid with a marker generator, and the test scope may be connected
at the audio output of the radio detector (junction of R92, 287, and C52)
The sound IF transformers then are aligned to produce a symmetrical "o" curve.

FIGURE CHAINS ALIGNMENT:
The scanner and marker generators should be fed into the grid (pin 6 of the
3PR5 mixer. A dummy tube is used, with pin 6 #2 cut off and a lead wire
soldered to the stub. The stub should be connected through an R8 injecting
resistor (see sound alignment) to the plate of the 1A7 video amplifier.

Connect a contrast control from one-half to three-quarters of the way up. Be
sure that the vertical output wave is low enough not to overdrive the next stage
under test. If the response curve is not substantially as shown in
Figure 9, it will be desirable to realign the vertical 1 stage. This is done by
connecting the scanner through a small condenser in the order of
.002 µFD, to the grid stage under test. The primary associated with the
winding must be shorted out temporarily with a short piece of heavy wire
or a small jumper to prevent it from acting as a wave trap and distorting the
response curve. Each stage is adjusted to produce a uniform response curve
as nearly as the illustration is possible. A 1000 ohm resistance in the grid of the
scope carrier (26,000 MC) 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 2000 ohm resistor and a 200 microfarad coil connected in series, the
network being connected between the pin 5 of the 1B6 (V6) to ground. In areas of
very weak signals (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
tuned circuits "by eye," i.e., by watching the picture, and any attempt to do
so will result in destroying the sensitivity of the 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.
I.F. ALIGNMENT CURVES (APPROXIMATE)

SOUND

PICTURE

GENERATOR INTO GRID, V5

LAST STAGE ONLY

GENERATOR INTO GRID, V4

LAST TWO STAGES

GENERATOR INTO GRID, V3

LAST THREE STAGES

GENERATOR INTO GRID, V2

OVERALL

ADJACENT CHANNEL TRAP 27.9 M.C.

PICTURE 26.4 M.C.

LIMIT OF VARIATIONS SHOULD NOT EXCEED 30% ABOVE OR 10% BELOW

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