TYPE 360 INDICATOR

F A C T O R Y

C A L I B R A T I O N P R O C E D U R E

Recommended Equipment:

Amplitude Calibrator. Scope square-wave calibrator.
105 SQUARE-WAVE GENERATOR
180 TIME MARK GENERATOR
160A POWER SUPPLY
162 WAVEFORM GENERATOR
P510 PROBE
190A SINE WAVE GENERATOR

PRELIMINARY INSPECTION:

Check for unsoldered joints, rosin joints, cabinet clearance of protruding parts, loose hardware, and shorted wiring.

1. CHECK RESISTANCE TO GROUND.

Check resistance to ground of all supply leads. Preset all pots and trimmers to mid-range and preset front panel controls:

INTENSITY	CCW
VOLTS/DIV	.5
POSITIONING	MID-RANGE
VARIABLE	CALIBRATED
AC/DC	DC

2. CHECK VOLTAGES AND ADJUST CRT.

Connect 360, 162, and 160A together and apply power to the 160A. Check voltages at 360. These voltages will be the same as the 160A excepting the +225 which will be approximately 10 volts low. Trigger the 162 with 1 millisecond markers from the 180. If the amplitude of the 180 markers is not enough to trigger the 162, it may be necessary to amplify them by running through the vertical of a scope and taking them from the vertical output jack or some other method. Jumper the 162 SAWTOOTH OUT to the SAWTOOTH INPUT of the 360. Advance INTENSITY, FOCUS and center the trace, align and clamp crt. It may be necessary to adjust the DC BAL pot to get the trace on the screen.

3. ADJUST HORIZONTAL GAIN.

With 10 millisecond sawtooth from the 162, apply 1 millisecond marks to the 360 VERTICAL INPUT. Adjust the FOCUS and ASTIGMATISM controls for optimum presentation. Rotate the SWEEP CAL. pot and note change in timing (10% min). Leave the pot at mid-range. Adjust H.V. ADJ. so that the second and ninth marks align with the corresponding graticule lines. Check the linearity of the sweep. The center mark should be within 3% of center graticule line. Check operation of the SAWTOOTH POLARITY switch.

4. CHECK HIGH VOLTAGE.

With the sweep calibrated, the high voltage should be between -1700 and -2000 volts. If it is beyond these limits, check the horizontal amplifier gain, 162 calibration, and the crt sensitivity. With the Intensity at maximum, varying the line voltage from 105 to 125 should cause no blooming.

5. CHECK CRT GEOMETRY.

While displaying the 1 millisecond markers, check the crt geometry. No more than 1 minor division of tilt or bow is allowable from the bottom to the top of the 8 division graticule.

6. CHECK UNBLANKING.

Apply GATE OUT from 162 to +GATE INPUT and see that the intensity of the trace is usable with the 1 millisecond marks, with and without the gate applied.

7. ADJUST DC BAL.

Rotate the VARIABLE control and adjust DC BAL so that the trace does not shift.

8. CHECK VERTICAL AMPLIFIER BALANCE.

Center the trace and with the DC BAL properly adjusted, short pin 1 of V50 to pin 1 of V52 and observe the trace shift. The shift must be under 3/4 of one major division. Next short pin 1 of V30 to pin 1 of V32. The shift here must be less than 4 major divisions.

9. SET VERT GAIN ADJ.

Apply 0.2 volts from a square wave calibrator to the VERTICAL INPUT with the VOLTS/DIV switch at 0.05 and adjust VERT GAIN ADJ. for 4 divisions of deflection while the presentation is centered on the crt. Check for at least 10% extra gain available at the maximum setting of the VERT GAIN ADJ.

10. CHECK COMPRESSION OF VERTICAL AMPLIFIER.

Check compression of the vertical amplifier using the vertical position control. Compression limits are 3/4 minor division at 4 major divisions above and below the center graticule line and 2 minor divisions at 5 above and below with 4 divisions of deflection. When the compression is in the upper half of the crt, generally it is caused by V52; when it is in the lower half of the crt, V50.

11. CHECK VOLTS/DIV STEPS AND VARIABLE CONTROL.

Check ranges against appropriate voltages from calibrator. These must be within 3% when accurately set on any one step. Check to see that the VARIABLE control attenuates the signal by a 10/1 ratio and check the control for erratic operation. These gain pots will be slightly uneven but they should not skip. Check the AC/DC positions of the AC/DC switch by observing the trace shift when it is switched with the signal applied.

12. ADJUST VOLTS/DIV SWITCH COMPENSATIONS.

Apply 1 kc square wave from 105 square wave generator to the input of the 360 through a P510 probe (10X). Adjust probe compensator for best level with 4 or 5 divisions of deflection in the .05 position. Adjust C1 and C2 in the 0.5 position. Adjust C4 and C5 in the 5.0 position. Check the 50 volt position for proper attenuator stacking (no adjustment).

13. CHECK VERTICAL RESPONSE.

With 6 divisions of deflection from a 190A at 50 kc switch to 500 kc and check that deflection is at least 4.2 divisions (30%).

14. CHECK FOR GAS.

Short the input to ground. Switch from AC to DC on input switch. The trace should shift less than 1 minor divison.

15. CHECK SCALE ILLUMINATION CONTROL OPERATION.