

TYPE 570 CHARACTERISTIC-CURVE TRACER

FACTORY

CALIBRATION PROCEDURE

First, make a visual mechanical inspection. Check for long ends, unsoldered joints, wire dress, etc. Preset all pots and trimmers to mid-range, and preset front panel controls as follows:

<u>RANGE DC VOLTS</u>		<u>140</u>
<u>INDICATION</u>	<u>VOLT METER</u>	<u>+DC</u>
<u>STEPS/FAMILY</u>		mid-range
<u>STEPS/SEC</u>		<u>120 (ccw)</u>
<u>START ADJUST</u>	<u>GRID-STEP GENERATOR</u>	mid-range
<u>VOLTS/STEP</u>		<u>1</u>
<u>VERTICAL</u>		<u>PLATE</u>
<u>MA/DIV</u>		<u>1</u>
<u>HORIZONTAL</u>	<u>CRT DISPLAY</u>	<u>PLATE</u>
<u>VOLTS/DIV</u>		<u>1</u>
<u>PEAK VOLTS</u>		<u>100</u>
<u>SERIES LOAD</u>	<u>PLATE SWEEP GENERATOR</u>	<u>10K</u>
<u>HEATER</u>		<u>6.3</u>
<u>VARIABLE (HEATER)</u>		full left (ccw)
<u>+DC</u>		<u>100</u>
<u>VARIABLE (+DC)</u>	<u>OPERATING VOLTAGES</u>	full right (cw)
<u>-DC</u>		full left (ccw)
<u>MAIN POWER</u>		<u>OFF</u>
<u>TEST POWER</u>		<u>ON</u>

1. CHECK RESISTANCE TO GROUND OF TRANSFORMER PRIMARY AND ALL LOW-VOLTAGE SUPPLIES.

With the TEST POWER switch ON, the resistance to ground should be approximately:

Main Supply:	-150v	9K	Floating Supply:	+400v	over 100K ohms
	+100v	15K		-300v	over 100K ohms
	+300v	25K			
	+400	25K			

Check transformer primary for infinite resistance to ground. Check the -150 27K jack on the Test Panel for 27KΩ between the jack and the -150v supply.

2. ADJUST -150 AND CHECK RIPPLE AND REGULATION.

Turn the MAIN POWER switch ON. Set the -150 ADJ. for exactly +100v at the +DC jack on the Test Panel. Check the -150v, +100v and 300 v supplies to be within ±2% of their rated value. Unregulated supplies may vary from their rated value by approximately 5%. Maximum ripple on all supplies is as follows:

-150v	--	5mv	+400	--	4.5v (unregulated)
+100v	--	5mv	+400	--	.5v (floating supply)
+300v	--	30mv (usually higher at 105v ac line)	-300	--	.5v (floating supply)

Check regulation of all supplies between 105v and 125v ac line.

3. ADJUST THE HIGH-VOLTAGE SUPPLY.

Set the -1700 ADJ. for -1700v at the crt filament leads. Check hv regulation at maximum intensity.

4. CHECK RANGE DC VOLTS OF VOLTMETER AGAINST STANDARD METER AND +DC SUPPLY.

With an accurate volt meter on the +DC jack on the Test Panel, compare the readings on the front panel meter against the test meter. The meter accuracy should be within  $\pm 2\%$  on all ranges and should be checked as follows:

<u>RANGE DC VOLTS</u>	INDICATION
700	Check at 300v
350	Check at 300v, 200v and 100v
140	Set meter to indicate 70v
70	Check for 70v, set meter to indicate 35v
35	Check for 35v, set meter to indicate 14v
14	Check for 14v, set meter to indicate 7v
7	Check for 7v

5. CHECK THE OPERATION OF THE -DC CONTROL.

Vary the -DC control through its range for an indication from 0 to -100v on the panel meter and at the -DC jack.

6. CHECK (GRID A, GRID B AND -150 27K) OUTPUT JACKS FOR PROPER VOLTAGES.

With the TEST POSITION switch at GRID A or OFF, the GRID B jack on the Test Panel should be biased about -125v. When the TEST POSITION switch is at GRID B or OFF, the GRID A jack should read approximately -125v. The -150 27K jack should read -150v. By using a meter a 300 v range you should read -125 v. A meter with a 250 v range you should read 110 volts.

Turn the TEST POWER switch on. Advance the INTENSITY control and position the spot to the central area of the graticule. Check the FOCUS and ASTIGMATISM controls for proper operation. Obtain a horizontal trace by switching HORIZONTAL VOLTS/DIV to .2, or for sufficient horizontal trace to align with the graticule. Push crt against graticule and align trace with the horizontal graticule lines. Tighten crt clamp.

7. ADJUST PHASE A AND B.

Obtain a vertical bar pattern by switching the HORIZONTAL control to GRID, patch the P jack to one of the ground jacks on the Test Panel. Adjust the STEPS/FAMILY control for 6 to 10 steps. With the STEPS/SEC control at the 120 (ccw) position, adjust the PHASE ADJ A control for optimum flatness at the bottom of the display. With the STEPS/SEC control at the 120 (cw) position, adjust the PHASE ADJ B control for optimum flatness at the top of the display. Check the 240 STEPS/SEC position for alternate switching.

8. SET CRT GEOM. ADJ.

With the same display as in Step 7, adjust GEOM ADJ for minimum curvature of the vertical traces. (1 minor division of bow allowed per 6 major divisions.)

9. ADJUST VERT. GAIN AND CHECK VERTICAL MA/DIV SWITCH

Switch the VERTICAL (CRT DISPLAY) to SCREEN and the MA/DIV control to 0.1. Switch the INDICATION control to +DC and set the +DC VARIABLE control for exactly 140 v, with range DC volts at 140. Switch the meter to HTR and position the spot to the bottom graticule line. Switch the meter to +DC and adjust the VERT GAIN ADJ for a deflection of 10 divisions. Switch back and forth between the HTR and +DC positions until all interaction has been compensated for.

Adjust the +DC VARIABLE control for 100 v and switch the INDICATION control to HTR. Switch the VERTICAL MA/DIV control to 50 and position the spot to the bottom graticule line. Plug the special calibrator unit into the +DC jack and ground jack on the Test Panel. There should now be 2 divisions of deflection. Switch the VERTICAL MA/DIV control to 20 for 5 divisions of deflection, and then to 10 for 10 divisions of deflection. Check all positions of the VERTICAL MA/DIV control using the special calibrator unit. The accuracy must be within  $\pm 3\%$ .

10. ADJUST VOLTS/DIV BAL.

Connect the P jack to the K jack on the test panel. Switch HORIZONTAL to PLATE. Rotate the VOLTS/DIV switch and adjust the VOLTS/DIV BAL (under the chassis) for no horizontal shifting of the spot.

11. SET VOLTS/STEP ZERO ADJ.

Switch the HORIZONTAL control to GRID and VOLTS/DIV to .1. Turn the START ADJUST full left (ccw). Ground pin 8 of V115. Depress the ZERO BIAS button and place the spot under the center graticule line. Release the switch and with the VOLTS/STEP ZERO ADJ. return the spot to the center.

12. CHECK START ADJUST POSITION AND RANGE.

With the START ADJUST in the full left (ccw) position, the first step should be slightly to the left of the zero bias point. With the control in the full right position, there should be 6 or more steps to the right of the zero bias point. The index on the START ADJUST knob should point to the 0 on the front panel when the first step is at the zero bias point.

13. ADJUST HORIZONTAL GAIN.

With the +DC control at 100, switch the HORIZONTAL control to PLATE. Switch the VOLTS/DIV control to 10 and the SERIES LOAD control to 1M. Alternately connect the P jack on the Test Panel between GND and +DC. Adjust the HOR. GAIN for 10 divisions of deflection.

14. SET THE VOLTS/STEP ADJ.

Switch the HORIZONTAL control to GRID and the VOLTS/DIV control to .1. Switch the VOLTS/STEP control to .1. Set the VOLTS/STEP ADJ. for 1 step per graticule division.

15. SET VOLTS/DIV CAL (R227).

Switch HORIZONTAL VOLTS/DIV control to 10 and the VOLTS/STEP control to 10. Adjust R227 (on HORIZONTAL VOLTS/DIV switch) for 1 step per graticule division. The horizontal gain and the setting of R227 will interact; therefore, Steps 13, 14 and 15 must be rechecked until all interaction is minimized. Check all positions of the VOLTS/STEP switch against the VOLTS/DIV switch.

16. ADJUST MIN. NO. CURVES TO 5 CURVES AND CHECK MAXIMUM NUMBER.

Turn the STEPS/FAMILY control full left (ccw) and adjust the MIN. NO. CURVES control for four steps (5 dots). Turn the STEPS/FAMILY control right (cw) and check to see that there are at least 12 steps before the generator drops out. With the STEPS/FAMILY in the full right position, check the SINGLE FAMILY button for a single display of steps.

17. ADJUST R350 AND CHECK ALL HEATER SWITCH POSITIONS.

Plug an accurate ac voltmeter into the HTR connector on the Test Panel and adjust the VARIABLE HEATER control for an output voltage of exactly 6.3v. Set the INDICATION control to HTR and adjust R350 (mounted on the INDICATION switch) for a reading of 100% on the meter. Connect the P jack on the Test Panel to GND and position the spot under the left hand graticule line. Now connect the P jack to the HTR jack and observe a horizontal deflection. Check through the entire range of the HEATER switch keeping the VARIABLE control set to 100% ( $\pm 5\%$ ) at all times, or set 6.3 VAC for 8.9 CM of Deflection and use this as a standard.

<u>HEATER</u> (volts)	<u>VOLTS/DIV</u>	Deflections (divisions) of right hand half of trace.
<u>1.25</u>	<u>.2</u>	8.8
<u>1.4</u>	<u>.2</u>	9.9
<u>2.0</u>	<u>.5</u>	5.6
<u>2.35</u>	<u>.5</u>	6.6
<u>2.5</u>	<u>.5</u>	7.0
<u>3.15</u>	<u>.5</u>	8.9
<u>4.2</u>	<u>1</u>	5.9
<u>4.7</u>	<u>1</u>	6.6
<u>5.0</u>	<u>1</u>	7.0
<u>6.3</u>	<u>1</u>	8.9
<u>7.5</u>	<u>2</u>	5.3
<u>12.6</u>	<u>2</u>	8.9
<u>18.9</u>	<u>5</u>	5.3
<u>25</u>	<u>5</u>	7.0
<u>35</u>	<u>5</u>	9.9
<u>50</u>	<u>10</u>	7.0
<u>117</u>	<u>20</u>	8.3

18. CHECK PLATE SWEEP PEAK VOLTS SWITCH.

With the HORIZONTAL VOLTS/DIV control at .5 and PLATE and the SERIES LOAD at 300, check all positions of the PEAK VOLTS switch for the proper horizontal deflection.

<u>VOLTS/DIV</u>	<u>PEAK VOLTS</u>	Deflection
<u>.5</u>	<u>5</u>	10 divisions
<u>1</u>	<u>10</u>	10
<u>2</u>	<u>20</u>	10
<u>5</u>	<u>50</u>	10
<u>10</u>	<u>100</u>	10
<u>20</u>	<u>200</u>	10
<u>50</u>	<u>300</u>	6
<u>50</u>	<u>500</u>	10

19. CHECK VALUE OF SERIES LOAD RESISTORS

With the HORIZONTAL VOLTS/DIV control at PLATE, measure resistance between pin 3 of V315 and the P connector on the Test Panel. Check all positions of the SERIES LOAD switch for resistance as follows: ( $\pm 5\%$ )

<u>SERIES LOAD</u> switch	<u>Resistance</u>
300	0
1K	750
2K	1750
5K	4750
All others	Same as panel indication.

20. ADJUST PLATE SWEEP (C311) AND PLATE TRANS. (C315) BALANCE CAPACITORS.

Switch Meter to Heater Indication.

Switch the VERTICAL MA/DIV control to .02 and PLATE. Switch PEAK VOLTS to 500 and SERIES LOAD to 1M. Connect the ungrounded side of C315 to either terminal 5 or 7 of T310. C316 (terminal 5 to ground) may have to be moved to terminal 7 or removed in order to get minimum deflection. Both C315 and C311 are adjusted for a minimum trace width.

21. ADJUST GRID (C502) AND SCREEN (C509) BALANCE CAPACITORS.

Switch the VERTICAL control to GRID. C502 can be connected to either terminal 14 or 16 of T501. Adjust C502 for a minimum trace width. Switch the VERTICAL control to SCREEN. C509 can be connected to either terminal 7 or 9 of T501. Adjust C509 for a minimum trace width. Recheck the setting of C502 since there will be a slight interaction between C502 and C509.

22. PLACE A 6U8 IN POSITION, ADJUST C205 AND CHECK ZERO BIAS AND SINGLE FAMILY SWITCHES

Switch TEST POWER to OFF. Insert a 6U8 in the test socket and make all necessary connections from the pin jacks to the Test Panel. Set up the GRID-STEP GENERATOR and the CRT DISPLAY for the typical operating conditions of the tube under test. Switch the TEST POWER ON and adjust the OPERATING VOLTAGES and the PLATE SWEEP GENERATOR. Switch TEST POSITION switch to GRID A or B and observe a display of curves. Turn the VOLTS/DIV control to 20 or 50 and adjust C205 for optimum retrace. Check the operation of the SINGLE FAMILY control with the STEPS/FAMILY control turned full right (cw).

23. CHECK ALL ACCESSORIES. (ON Q.C.)

24. RECORD CRT TYPE AND SERIAL NUMBER ON THE CALIBRATION RECORD.

