1. Power Supplies — Should regulate from 100 to 126 VAC

Supply	Tol.	Ripple	Adjust
-150	1.5v	5mv	R1498
100	1v	5mv	R1459
225	.625v	10mv	R1439
350	10.5v	15mv	fixed

Note: 225v supply tolerance is referenced to the 100v supply.

2. Calibrator — 2%--R1628 located bottom of scope near Power Supply adjustments--Check other ranges.

3. High Voltage -1850V — Both beams within 55v (3%)

4. Beam Rotation — Center of Trace Separation pot on front panel.

5. Beam Finder

6. Geometry — Two adjustments located near HV supplies.

LEFT VERTICAL AMPLIFIER

7. Vert. Amp DC Bal — Check for Grid I

8. Alternate & Chopped — Check with Upper Beam Display in both A & B for Left Plug-in

9. Vertical Gain — Upper Beam Display: A, Left Plug-in. Observe 4cm with 100v Cal signal.

10. Compression & Expansion — .5mm max with 2cm signal positioned over 6cm vertical scan area.

11. Common Mode Rejection — 3mm max with 1v Cal signal applied with Test Load in Common Mode position.

12. Vert Drift with Line Changes — 2mm max from center over normal line range. Allow 2 minutes for amp to stabilize.

13. 8608 Bias (R69) — Use Test Load Plus Pulse, Low Rep Rate. Adjust for flat top with 5cm of signal. Check front corner for changes with vert position (1mm max). Check with Minus Pulse.

1. Power Supplies — Should regulate from 100 to 125 VAC

Supply	Tol.	Ripple	Adjust
-150	1.5v	5mv	R4?8
100	1v	5mv	R4?9
225	.025v	10mv	R4?9
350	10.5v	15mv	fixed

Note: 225v supply tolerance is referenced to the 100v supply.

2. Calibrator — 2%--R1028 located bottom of scope near Power Supply adjustments--Check other ranges.

3. High Voltage — Check — Both beams within 5%v (3%)

4. Beam Rotation — Center of Trace Separation pot on front panel.

5. Beam Finder

6. Geometry — Two adjustments located near HV supplies.

LEFT VERTICAL AMPLIFIER

7. Vert. Amp DC Bal — Check for Grid I

8. Alternate & Chopped — Check with Upper Beam Display in both A & B for Left Plug-in

9. Vertical Gain — Upper beam Display: A, Left Plug-in. Observe 4cm with 100v Cal signal.

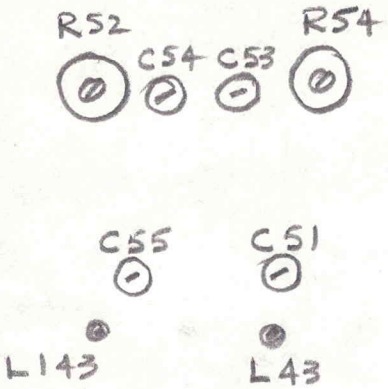
10. Compression & Expansion — 5mm max with 2cm signal positioned over 6cm vertical scan area.

11. Common Mode Rejection — 3mm max with 1v Cal signal applied with Test Load in Common Mode position.

12. Vert Drift with Line Changes — 2mm max from center over normal line range. Allow 2 minutes for amp to stabilize.

13. 8000 Bias (R69) — Use Test Load Plus Pulse, Low Rep Rate. Adjust for flat top with 5cm of signal. Check front corner for change with vert position (1mm max). Check with Minus Pulse.

14. <u>Left Vert HF Compensations</u>



L43	Leading Edge (adjust with L143)
L143	Leading Edge (adjust with L43)
L64	10ns (adjust with L164) Located near
L164	10ns (adjust with L64) CRT pins
R52	Slow Damping
R54	Fast Damping
C10	Leading Edge to 5ns (located on CS near bottom)
C17	330ns (Term Bump) Located on chassis near bottom
C51	Front Level. Use 10us/cm
C53	Leading Edge to 20ns
C54	Leading Edge to 5ns
C55	10 to 30ns

Risetime: 6.93ns or less

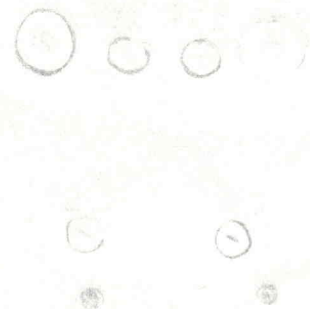
RIGHT VERTICAL AMPLIFIER

15. <u>Vert Amp DC Bal</u> — Check for Grid I

16. Alternate & Chopped — Right Plug-in always controls all positions. Trace Separation controls half of the traces.

Test Load	Upper Display	Lower Display	Observe
Alt	B, Right	B	4 traces, B Time/cm controls speed
Alt	A, Right	B	4 traces, B Time/cm controls two traces, A Time/cm controls two
Alt	A, Right	A (s/n 1000-up)	4 traces, A Time/cm controls speed
Chop	B, Right	B	2 chopping waveforms, B Time/cm controls both, transients blanked by appropriate switch
Chop	A, Right	B	2 chopping waveforms, A Time/cm controls one, B Time/cm controls other, transients blanked by appropriate switch
Chop	A,Right	A (s/n 1000-up)	2 chopping waveforms, A Time/cm controls both, transients blanked by appropriate switch

14. Left Vert HF Compensations



L43	Leading edge (adjust with LL43)
LL43	Leading Edge (adjust with L43)
L64	10ns (adjust with LL64) located near
LL64	10ns (adjust with L64) CRT pins
R52	Slow Damping
R54	Fast Damping
C10	Leading Edge to 5ns (located on C5 near bottom)
C17	330ns (Term Bump) located on chassis near bottom
C51	Front Level. Use 10ns/cm
C53	Leading Edge to 20ns
C54	Leading Edge to 5ns
C55	10 to 30ns

Risetime: 0.35ns or less

RIGHT VERTICAL AMPLIFIER

15. Vert Amp DC Bal

Check for Grid I

16. Alternate & Chopped

Right Plug-in always controls all positions. Trace separation controls half of the traces.

Test Load	Upper Display	Lower Display	Observe
Alt	B, Right	B	4 traces, B Time/cm controls speed
Alt	A, Right	B	4 traces, B Time/cm controls two traces, A Time/cm controls two
Alt	A, Right	A (s/m 1000-up)	4 traces, A Time/cm controls speed
Chop	B, Right	B	2 chopping waveforms, B Time/cm controls both, transients blanked by appropriate switch
Chop	A, Right	B	2 chopping waveforms, A Time/cm controls one, B Time/cm controls other, transients blanked by appropriate switch
Chop	A, Right	A (s/m 1000-up)	2 chopping waveforms, A Time/cm controls both, transients blanked by appropriate switch

For Steps 17 thru 21--Upper & Lower Beam Display: B, Right Plug-in

17. Vertical Gain — 4cm with 100v Cal signal

18. Crossover Gain — 4cm with 100v Cal signal

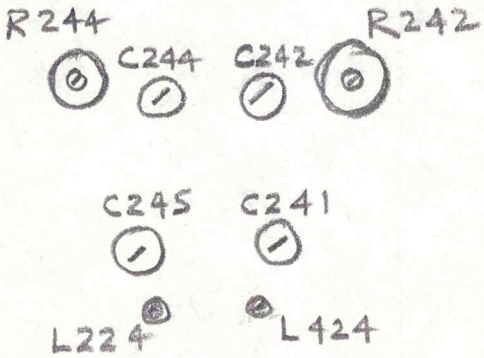
19. Compression & Expansion — Check Right vertical and Crossover. .5mm max with 2cm signal positioned over 6cm vertical scan area.

20. Common Mode Rejection — Check Right vertical and Crossover. 3mm max with 1v Cal signal applied with Test Load in Common Mode position.

21. Vert Drift with Line Changes — 2mm max from center over normal line range. Allow 2 minutes for amp to stabilize.

22. 8608 Bias (R259) — Use Test Load Plus Pulse, Low Rep Rate. Adjust for flat top with 5cm of signal. Check front corner for changes with vert position (1mm max). Check with Minus Pulse. Check Crossover.

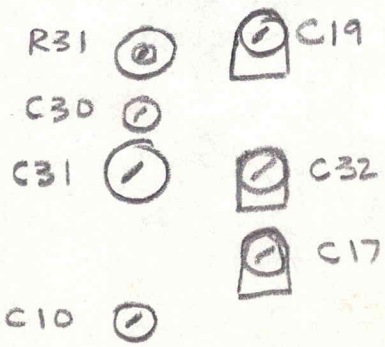
23. Right Vert HF Compensations



L224	Leading Edge (Adjust with L424)
L424	Leading Edge (adjust with L224)
L254	10ns (adjust with L454) Located near
L454	10ns (adjust with L254) CRT pins
R242	Slow Damping
R244	Fast Damping
C210	Leading Edge to 5ns (located on CS near bottom)
C218	330ns (Term Bump) Located on chassis near bottom
C241	Front Level. Use 10us/cm
C242	Leading Edge to 20ns
C244	Leading Edge to 5ns
C245	10 to 30ns

Risetime: 6.93ns or less

24. Crossover HF Compensations



R31	Adjust with C30 for Min ringing
C19	330ns (Term Bump)
C30	Adjust for Min ringing with R31
C31	Leading Edge to 75ns
C32	Front Level. Use 10us/cm

Risetime: 6.93ns or less

For steps 17 thru 21--Upper & Lower Beam Display: B, Right Plug-in

17. Vertical Gain — 4cm with 100v Cal signal

18. Crossover Gain — 4cm with 100v Cal signal

19. Compression & Expansion — Check Right vertical and Crossover. 5mm max with 2cm signal positioned over 6cm vertical scan area.

20. Common Mode Rejection — Check Right vertical and Crossover. 3mm max with 1v Cal signal applied with Test Load in Common Mode position.

21. Vert Drift with Line Changes — 2mm max from center over normal line range. Allow 2 minutes for amp to stabilize.

22. 6608 Bias (R259) — Use Test Load Plus Pulse, Low Rep Rate. Adjust for Flat top with 5cm of signal. Check front corner for changes with vert position (1cm max). Check with Minus Pulse. Check Crossover.

23. Right Vert HF Compensations

L254	Leading Edge (Adjust with L454)
L454	Leading Edge (adjust with L254)
L259	10ns (adjust with L459) located near
L459	10ns (adjust with L259) CRT pins
R252	Slow Damping
R244	Fast Damping
C210	Leading Edge to 5ns (located on C6 near bottom)
C212	330ns (Term Bump) located on chassis near bottom
C241	Front Level. Use 10ns/cm
C242	Leading Edge to 20ns
C244	Leading Edge to 5ns
C245	10 to 30ns

Risetime: 0.93ns or less

24. Crossover HF Compensations

R31	Adjust with C30 for Min ringing
C29	330ns (Term Bump)
C30	Adjust for Min ringing with R31
C31	Leading Edge to 75ns
C32	Front Level. Use 10ns/cm

Risetime: 0.93ns or less

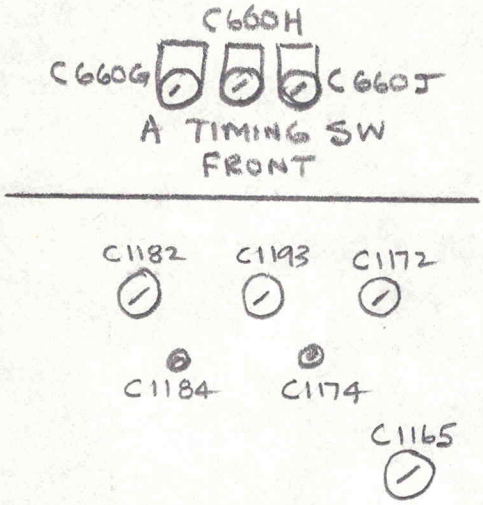
25.	Trig Level Centering and Sensitivity	Ground Pin Y on Trigger PC Board to disable Level. Adjust Level Centering and Sensitivity for plus and minus Triggering on 100mv but not on 50mv. Use Ext.
26.	Level Knob	Check for proper centering
27.	DC Triggering	
28.	Single Sweep & Ready Light	

REPEAT STEPS 25 THRU 28 FOR B TRIGGER

29.	A 10X Cal	Use 1ms & 100us marks. Upper Beam Display: Left Plug-in, A. A Time/cm: 1ms
30.	A 1X Cal	
31.	Upper Beam Sweep Mag Regis	
32.	A Sweep Sawtooth Amplitude	10.5cm of sweeplength
33.	B Sawtooth Slope	Upper Beam Display: Left Plug-in, B R861--Located on rear of B Timing Switch
34.	B 10X Cal	Lower Beam Display: Right Plug-in, B B Time/cm: 1ms
35.	B 1X Cal	
36.	Lower Beam Sweep Mag Regis	
37.	B Sweep Sawtooth Amplitude	10.5cm of sweep length
38.	Lower Beam A Sweep Gain (s/n 1000-up)	Lower Beam Display: A
39.	A & B Sawtooth Currents	Probe bottom of Sawtooth Current Pots and adjust for 2 volts of sawtooth
40.	Time Delay Mult Stop	0.20
41.	Delay Stop and Start	A Sweep: 1ms B Sweep: 10us B Dly'd by A Check 5.00 for linearity: 2 minor div max
42.	Delay Time Jitter	B Sweep: 1us 0.5cm max jitter at 1.00 and 10.00

25. Trig Level Centering and Sensitivity	Ground Pin Y on Trigger PC Board to disable level. Adjust level centering and sensitivity for plus and minus Triggering on 100mv but not on 50mv. Use Exc.
26. Level Knob	Check for proper centering
27. DC Triggering	
28. Single Sweep & Ready Light	
SWEEP GTRS 29 THRU 36 FOR B TRIGGER	
29. A 10X Cal	Use 1ms & 100us marks. Upper Beam Display: Left Plug-in, A. A Time\cm: 1ms
30. A 1X Cal	
31. Upper Beam Sweep Mag Regis	
32. A Sweep Sawtooth Amplitude	10.5cm of sweeplength
33. B Sawtooth Slope	Upper Beam Display: Left Plug-in, B R681--Located on rear of B Timing Switch
34. B 10X Cal	Lower Beam Display: Right Plug-in, B B Time\cm: 1ms
35. B 1X Cal	
36. Lower Beam Sweep Mag Regis	
37. B Sweep Sawtooth Amplitude	10.5cm of sweep length
38. Lower Beam A Sweep Gain (a\a 1000-up)	Lower Beam Display: A
39. A & B Sawtooth Currents	Probe bottom of Sawtooth Current Pots and adjust for 2 volts of sawtooth
40. Time Delay Mult Step	0.20
41. Delay Step and Start	A Sweep: 1ms B Sweep: 10us B Dly'd by A Check 5.00 for linearity: 2 minor div max
42. Delay Time Jitter	B Sweep: 1us 0.5cm max jitter at 1.00 and 10.00

43. <u>A Timing</u>

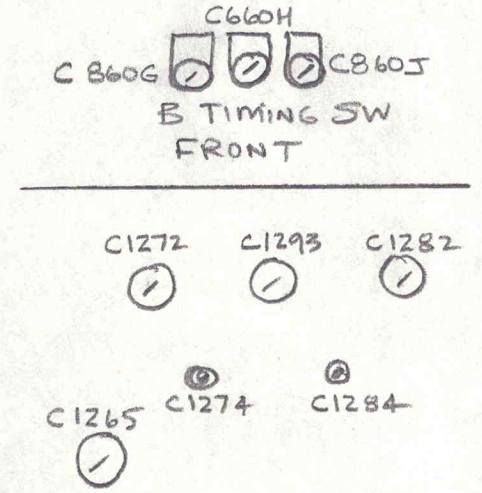


A Time/cm	184	Adjust	Observe
10us	10us	C660G	1 mark/cm
1us	1us	C660H	1 mark/cm
.5us	.5us	C660J	1 mark/cm
.1us	.1us	C681	1 mark/cm
C660J and C681 Interact--Repeat			
.1us X10	20ns	C1193	Max Expansion
		C1182	" "
		C1172	" "
		C1165	Proper Timing
		C1174	Linearity
		C1184	"
Interaction--Recheck all except C660G and C660H			

44. A Timing — 3% all ranges X1 5% X10

45. A Timing Using Delay Time Mult — 8 minor Div max error

46. <u>B Timing</u>



B Time/cm	184	Adjust	Observe
10us	10us	C860G	1 mark/cm
1us	1us	C860H	1 mark/cm
.5us	.5us	C860J	1 mark/cm
.1us	.1us	C881	1 mark/cm
C860J and C881 Interact--Repeat			
.1us X10	20ns	C1293	Max Expansion
		C1282	" "
		C1272	" "
		C1265	Proper Timing
		C1274	Linearity
		C1284	"
Interaction--Recheck all except C860G and C860H			

47. B Timing — 3% all ranges X1 5% X10

48. <u>B Crossover Compensation</u> — Upper Display: Right Plug-in, B .1us/cm, .1us marks, adjust C882

49. <u>A Crossover Compensation</u> (S/n 1000-up) — Lower Display: A .1us/cm, .1us marks, adjust ~~C863~~ C683

50. A & B Var Time/cm and Uncal Lights

43. A Timing

A Time/cm	18h	Adjust	Observe
10us	10us	C660C	1 mark/cm
1us	1us	C660H	1 mark/cm
.5us	.5us	C6607	1 mark/cm
.1us	.1us	C681	1 mark/cm
C6607 and C681 Interact--Repeat			
.1us X10	20ns	C1293	Max Expansion
		C1282	" "
		C1272	" "
		C1265	Proper Timing
		C1274	Linearity
		C1284	"
Interaction--Recheck all except C660C and C660H			

44. A Timing 3% all ranges X1 5% X10

45. A Timing Using Delay Time Mult 8 minor Div max error

46. B Timing

B Time/cm	18h	Adjust	Observe
10us	10us	C660C	1 mark/cm
1us	1us	C660H	1 mark/cm
.5us	.5us	C6607	1 mark/cm
.1us	.1us	C681	1 mark/cm
C6607 and C681 Interact--Repeat			
.1us X10	20ns	C1293	Max Expansion
		C1282	" "
		C1272	" "
		C1265	Proper Timing
		C1274	Linearity
		C1284	"
Interaction--Recheck all except C660G and C660H			

47. B Timing 3% all ranges X1 5% X10

48. B Crossover Compensation Upper Display: Right flug-in, B .1us/cm, .1us marks, adjust C682

49. A Crossover Compensation (5/n 1000-up) Lower Display: A .1us/cm, .1us marks, adjust C683

50. A & B Var Time/cm and Uncal Lights

51.	Ext Horiz Grid I	Use X10. 2mm max.
52.	Ext Horiz DC Bal	Located near HV
53.	X10 Comp	Located on CS near Intensity Pot
54.	X1 Comp	Located on Display Switch
55.	10:1 Attenuation	3%
56.	Variable	Range and noise

REPEAT STEPS 51 THRU 56 FOR OTHER EXT HORIZ

57.	Front Panel Waveforms	A & B Sawtooth: Approx. 100V A & B Gate: 10v min Dly'd Trig: 7v min

51. EXT Horiz Grid I	Use X10. 2mm max.
52. EXT Horiz DC Bal	Located near HV
53. X10 Comp	Located on C5 near Intensity Pot
54. X1 Comp	Located on Display Switch
55. 10:1 Attenuation	3%
56. Variable	Hunge and noise

NUMERAL STEPS 51 THRU 56 FOR OTHER EXT HORIZ

57. Front Panel Waveforms	A & B Sawtooth: Approx. 100V A & B Gate: 10v min Dly'd Trig: 7v min