

# COMPANY CONFIDENTIAL

3T77

## 3T77 CALIBRATION OUTLINE

1. POWER SUPPLIES:  
+19.5 v and -20 v  $\pm$  3%

Ripple less than 1 mv

### PRESETS

SWEEP MODE: Manual  
TRIGGER SENS: cw  
TIME/DIV: 10 nsec

2. GAIN ADJ (R356): 1 v/cm  $\pm$  2%

Fluke MANUAL SWEEP OUT over 10 cm

### PRESETS

SWEEP MODE: Normal  
DELAY: ccw  
TRIGGER SENS: 12 o'clock

TO ADJUST R24 (CURRENT RANGE) -  
PROBE TOP END OF BACK DIODE (D18) AND  
ADJUST FOR 10 PULSES WITH SYNC KNOB  
PULLED OUT AND SENSITIVITY FULLY CW

3. TRIG SENS RANGE (R21)

TRIG SENS 12 o'clock  $\pm$  10° (Probe Q24  
collector on TIME/CM switch and  
monitor HOLDOFF waveform) PROBE ON COMMON  
CAPACITOR TIE-POINT TIME/CM/SWITCH.

4. TRIG REGEN SENS (R44)

Probe TRIG OUT connector and check for  
stable 100kc (approx.) display when  
rotating RECOVERY TIME. Min signal 150  
mv  $\pm$  50 mv. Check for no scaling.

5. INVERTER INPUT ZERO (R63):  
0 v +100 mv

Probe Q63 base on bottom of TIME/CM  
switch (GRAY-GN-GN COAX ON 2ND WAFER)

6. DELAY ZERO (R58)

Leading edge of pulse waveform always  
moves to left as TIME/CM is rotated CCW  
from 10 ns to 0.1  $\mu$ s. (Registry to 0.2  $\mu$ s  
after SN 840)

7. MAG REGISTRATION (R341)

Proper centering of magnified and normal  
displays

8. STAIRCASE DC LEVEL (R181)

Same beam starting position in EXT and  
NORMAL sweep modes (MAN SCAN CCW)

9. SWEEP LENGTH (R145)

10.5 cm

10. SWEEP CAL (R85)

5  $\mu$ sec range

11. 1  $\mu$ sec ADJ (R79A)

12. 0.1  $\mu$ sec ADJ (R79B)



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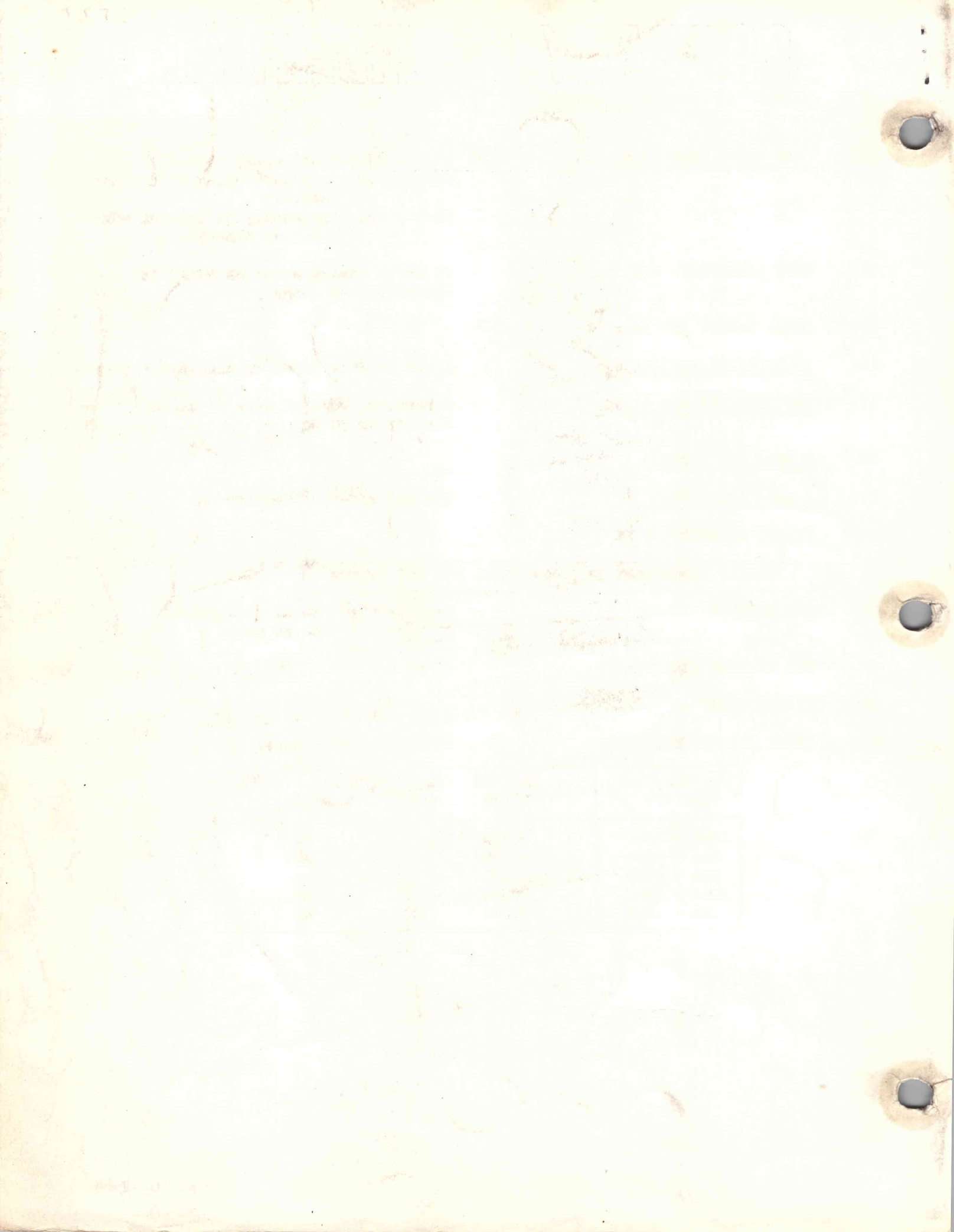
## 3T77 CALIBRATION OUTLINE (Continued)

13. COMP REGEN SENS (R94) Stable output all sweep speeds.  
 SN 101-839: stable display with 1  $\mu$ sec marker  
 SN 840 up: Linearity on leading edge of 5 mc sinewave
14. RAMP LINEARITY:  $\pm 2\%$  20 ns/cm timing error as DELAY is operated over range
15. DELAY RANGE: 100 ns  $\pm 8\%$
16. 10 DOTS/DIV ADJ (C156) 1 row of dots (1  $\mu$ s/cm displaying 50 mc)
17. 100 DOTS/DIV ADJ (C158) 2 parallel rows of dots (1  $\mu$ s/cm displaying 50 mc)
18. 2 nsec ADJ (C88E)
19. 1 nsec ADJ (C88G) R94 may affect linearity
20. TIMING ACCURACY:  $\pm 2\%$

INSTALL INSTRUMENT IN COMPARTMENT FOR 567 SYSTEM

21. INT TRIGGER Sensitivity: 50 mv (2ns pulse)  
Jitter: 50 ps pulse
22. EXT TRIGGER SENSITIVITY 10 mv
23. SINGLE SWEEP
24. CHECK DIGITAL FUNCTIONS Resolution at 1 Sweep Lo

3T77 TIME/DIV	DECIMAL POINT	SPECIAL PURPOSE NIXIE
10 $\mu$ s - 2 $\mu$ s	000.0	$\mu$ s
1 $\mu$ s - .2 $\mu$ s	00.00	$\mu$ s
.1 $\mu$ s - 20 $\mu$ s	0.000	$\mu$ s
10ns - 2ns	000.0	ns
1ns - .2ns	00.00	ns





# 3T77 CALIBRATION OUTLINE

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Preliminary: The use of this procedure assumes that you have a properly operating 560 series mainframe to power the 3T77 and a properly operating compatible sampling vertical plugin such as a 3S76 or 3S1.

## 1. Check Power Supplies:

+19.5 Volts and -20 Volts. Within 3%. Ripple less than 1 mv.

```
*****
PRESETS:  SWEEP MODE:    Manual
          TRIGGER SENS:  Fully clockwise
          TIME/DIV:      10 nsec
*****
```

## 2. GAIN ADJUST (R356, screw driver adjustment located on front panel):

Use an accurate (0.1% or better) non-loading voltmeter to measure the voltage present at the front panel SWEEP OUTPUT connector. Adjust R356 to achieve 1 volt/division, within 2%, as the dot is moved across the 560 series scope screen from left to right for the full 10 divisions of the screen.

## 3. CURRENT RANGE ADJUST (R24, serial number 2000 and above, located on the underside of the circuit board):

Connect test scope probe to the top end of the back diode (D18) and adjust for 10 pulses with the front panel SYNC knob pulled out and the front panel SENSITIVITY fully clockwise.

```
*****
PRESETS:  SWEEP MODE:    Normal
          DELAY:         Fully counterclockwise
          TRIGGER SENS:  12 o'clock
*****
```

## 4. TRIG SENS RANGE (R21):

Connect test scope probe to Q24 collector which is also the common capacitor tie-point on the Time/Div Switch.  
(Unfortunately, my notes do not say what to look for while making this adjustment. If I remember right, there will be



a point at which the trigger circuit oscillates and you will want to adjust this pot slightly ccw from this point.)

5. TRIG REGEN SENS (R44):

Connect test scope probe to front panel TRIG OUT connector and check for a stable display (approximately 100 KHz) while rotating the front panel RECOVERY TIME control. Signal amplitude 150 mv + or - 50 mv.

Check for no scaling (drastic changes in repetition rate) as RECOVERY TIME is rotated.

6. INVERTER INPUT ZERO (R63):

Connect test scope probe to Q63 base (which is also the junction of a gray-green-green coax and a 220K resistor on the second wafer of the timing switch). Adjust for 0 volts within 100 mv.

7. DELAY ZERO (R58):

Adjust so that leading edge of a displayed fast pulse always moves to the left as the TIME/DIV switch is rotated ccw from 10 ns to 0.1 us. (After serial number 840, rotate TIME/DIV from 10 ns to 0.2 us.)

8. MAG REGISTRATION (R341):

Adjust for proper centering of magnified and normal displays.

9. STAIRCASE DC LEVEL (R181):

Adjust for same starting position in EXT and NORMAL sweep modes with MANUAL SCAN set ccw.

10. SWEEP LENGTH (R145):

Adjust for a sweep length of 10.5 cm.

11. SWEEP CAL (R85):

Adjust for correct timing on 5 us position of TIME/DIV switch.

12. (R79A):

Adjust for best timing on 1 us position of TIME/DIV switch.





## 13. (R79B):

Adjust for best timing on 0.1 us position of TIME/DIV switch.

## 14. COMP REGEN SENS (R94):

Adjust for a stable display on all sweep speeds.

SN 101-839: Stable display with 1 us time markers.

SN 840-up: Linearity on leading edge of 5 MHz sinewave.

## 15. RAMP LINEARITY:

Check for timing error on 20 NS/DIV as DELAY is operated over its range.

## 16. DELAY RANGE:

Check for a range of 100 ns + or - 8%.

## 17. 10 DOTS/DIV ADJUSTMENT (C156):

Display a 50 MHz sinewave at 1 us/div and adjust for one row of dots.

## 18. 100 DOTS/DIV ADJUSTMENT (C158A):

Display a 50 MHz sinewave at 1 us/div and adjust for two parallel rows of dots.

## 19. 2 NS ADJUSTMENT (C88E):

Adjust for best timing on 2 ns range of TIME/DIV switch.

## 20. 1 NS ADJUSTMENT (C88G):

Adjust for best timing on 1 ns range of TIME/DIV switch. R94 may affect 1 ns Linearity and may have to be slightly readjusted for this. Recheck step 14.

## 21. TIMING ACCURACY:

Check timing accuracy on all TIME/DIV ranges, within 2%.

## 22. INTERNAL TRIGGER SENSITIVITY and JITTER:

Check that instrument triggers on a 2 ns wide pulse with an amplitude of 50 mv and with less than 50 ps of jitter.



## 23. EXTERNAL TRIGGER SENSITIVITY:

Instrument should trigger externally on 10 mv of signal.

## 24. SINGLE DISPLAY:

Display should sweep once for each push of RESET button.

If the 3T77 is to be used in a 567 with a 6R1 or 6R1A Digital Readout Unit, the following checks should be made:

<u>3T77</u> <u>TIME/DIV</u>	<u>6R1/6R1A</u> <u>DECIMAL POINT</u>	<u>6R1/6R1A</u> <u>SPECIAL PURPOSE NIXIE</u>
10us - 2us	000.0	us
1us - 0.2us	00.00	us
0.1us - 20ns	0.000	us
10ns - 2ns	000.0	ns
1ns - 0.2ns	00.00	ns

