FACTORY CALIBRATION PROCEDURE

CONTENTS:

This is the guide for calibrating new instruments in Product Manufacturing. The procedure consists of 4 sections:

Equipment Required

Factory Test Limits - Factory Test Limits are limits an instrument must meet before leaving Manufacturing. These limits are often more stringent than advertised performance requirements. This is to insure that the instrument will meet advertised requirements after shipment, allows for individual differences in test equipment used, and (or) allows for changes in environmental conditions.

Short Form Procedure - The Short Form Procedure has the same sequence of steps and the same limits on checks or adjustments as the Main Procedure.

Main Procedure - The Main Procedure gives more detailed instructions for the calibration of the instrument. This procedure may require that some checks and adjustments be made so that performance is better than that required by the Factory Test Limits. This insures the Factory Test Limits will be met when side panels are added, permits some normal variation in test equipment and plug-in scopes, etc.

Abbreviations in this procedure will be found listed in TEKTRONIX STANDARD A-100. Definitions of terms used in this procedure may be found in TEKTRONIX STANDARD A-101.

In this procedure, all front panel control labels and Tektronix instrument names are in capital letters (VOLT/DIV, etc). Internal adjustment labels are capitalized only (Gain Adj, etc).

This procedure is company confidential

106

June, 1969
For all serial numbers.

Supersedes
January 1967

CHANGE INFORMATION:

This procedure has been prepared by Test-Final Staff Engineering. For information on changes made to this procedure, to make suggestions for changing this procedure, or to order additional copies: please contact T-FSE, 39-307.

EQUIPMENT REQUIRED

All TEKTRONIX test equipment must be calibrated to Factory Test Limits using methods specified in the applicable TEKTRONIX Factory Calibration Procedure. Other test equipment should be calibrated to its manufacturer's specifications. Exceptions to calibration procedures, which are necessary to improve the measurement capability of some test equipment, e.g. calibrated to ±0.5% accuracy at some specific setting, are noted on this Equipment Required List.

Equivalent test equipment may be used. A Test-Final Staff Engineer must approve any substitutions.

a. TEKTRONIX Instruments

1 TYPE 546 (or 547) OSCILLOSCOPE
1 TYPE 1A1 DUAL TRACE PLUT-IN UNIT
1 TYPE 184 TIME MARK GENERATOR
1 TYPE 561B OSCILLOSCOPE
1 TYPE 3T2 SAMPLING VERTICAL
1 TYPE 3S1 SAMPLING SWEEP

b. Calibration Fixtures and Accessories

1 P6028 1X Probe (010-0074-00)
1 P6008 10X Probe (010-0129-00)
1 76 TU Line Voltage Control Unit (067-0048-00)
1 LF Sine Wave Generator (067-0542-99)
3 50Ω cables, BNC (012-0057-00)
2 5ns, RG8 cables, GR (017-0502-00)
1 50Ω 2X Attenuator, GR (017-0080-00)
2 50Ω 10X Attenuatur, GR (017-0078-00)
1 50Ω 2W Termination, GR to BNC (017-0083-00)
1 50Ω Termination, BNC (011-0049-00)
1 BNC T (103-0030-00)
1 GR to BNC Adapter (017-0063-00)
1 50Ω 5X Attenuator, BNC (011-0060-00)
1 Standard Amplitude Calibrator (067-0502-00)

c. Other Manufacturer's Equipment

1 Multimeter, 20,000Ω/VDC

Factory Test Limits are qualified by the conditions specified in the main body of the Factory Calibration Procedure. The numbers and letters to the left of the limits correspond to the procedure steps where the check or adjustment is made. Steps without Factory Test Limits (setups, presets, etc.) are not listed. Instruments may not meet Factory Test Limits if calibration or checkout methods and test equipment differ substantially from those in this procedure.

4. POWER SUPPLIES

*c. AMPLITUDE range unterminated: 7V P-P, max to 120V P-P, min
AMPLITUDE range into 50Ω: 0.5V P-P, max to 12V P-P, min

d. A supply regulation, OUTPUT terminated, ≤10% change from amplitude at 115VAC

e. Tilt 100Hz: 5% tilt, max
10Hz: 15% tilt, max

g. Voltage and ripple

Supply	Tolerance	max line freq ripple
+10	±15%	.1V P-P
-10	±15%	.1V P-P
A -20V	±10%	.75VP-P
A+150V	±10%	.75VP-P
A-150V	±10%	.75VP-P
A supply	---	.75VP-P

5. SYMMETRY

a. Bias Level: stable square-wave from 103.5 to 126.5VAC

b. Symmetry Range: 50% duty cycle at 50kHz

c. SYMMETRY Duty cycle: adjustable from 45 to 55%

d. Rep rate change with SYMMETRY: 10%, max.

*7. REPETITION RATE RANGE AND MULTIPLIER ACCURACY

±10%, max

8. SYNC INPUT

b. Square-wave sync: 2 to 50V P-P

c. Sinewave sync: 5V P-P at 100Hz and 1MHz

9. TRIGGER OUTPUT

*b. Amplitude: 0.1V, min, into 50Ω

*c. Rate of rise into 50Ω: 50ns, max, from 0V to 0.1V

*d. Delay time: 50ns, max

10. HIGH AMPLITUDE NO LOAD RISETIME

120ns, max

11. FAST RISE AMPLITUDE AND SYMMETRY

* a. + and - TRANSITION AMPLITUDE
ccw: 50mV, max; cw: 500mV, min
b. Symmetry/amplitude change:
150ns, max

12. FAST RISE COMPENSATION

* b. + OUTPUT
Risetine into 50Ω: 1ns, max at 500mV
Aberrations: + & -2%, or + & -6mV,
whichever is greater
* c. - OUTPUT
Risetime into 50Ω: 1ns, max, at 500mV
Aberrations: + & -2%, or + & -6mV,
whichever is greater

13. HI AMPLITUDE INTO 50Ω

*b. Risetime: 10ns, max, at 12V;
18ns, max at 0.5V
Aberrations, 1st 100ns: + & -2%, max
from 12V to 0.5V

* 14. TRIGGER JITTER 250ps, max

THE END

* Indicates measurement characteristic

This instrument must meet Factory Test Limits before it leaves Manufacturing; therefore, it must be possible to inspect to these limits. Because of normal variations in test equipment and plug-in scopes, addition of side panels, etc, this procedure may require that some checks and adjustments be made so that performance is better than that required by Factory Test Limits.

1. PRELIMINARY INSPECTION

a. Install current modifications
b. Check fuse

115V operation	159-0023-00	1.25A	slo-blo
230V operation	159-0023-00	0.6A	slo-blo

2. PRESET CONTROLS

Preset external controls of TYPE 106
Preset all internal adjustments to midr

3. RESISTANCE CHECKS

Check power supply resistance--negative meter lead to gnd

4. POWER SUPPLY

a. Apply power
b. Check AMPLITUDE control (A supply)
c. Adjust Amplitude Cal (R247)
AMPLITUDE Range unterminated: 7V P-P, max to 120V P-P,max
AMPLITUDE range into 50Ω: 0.5V P-P, max to 12V P-P, min
d. Check A supply regulation, OUTPUT terminated ≤10% change, for amplitude at 115VAC
e. Check tilt 100Hz: 5% tilt, max
10Hz: 15% tilt, max
f. Check elevated filaments
g. Check voltage and ripple

Supply	Tolerance	max line freq ripple
+10	±15%	.1V P-P
-10	±15%	.1V P-P
A -20V	±10%	.75V P-P
A +150V	±10%	.75V P-P
A - 150V	±10%	.75V P-P
A supply	---	.75V P-P

h. Check 230V operation

5. SYMMETRY

a. Adjust Bias Level (R39): stable square-wave at 103.5 to 126.5 VAC
b. Adjust Symmetry Range (R9): 50% duty cycle at 50kHz
c. Check Symmetry duty cycle: adjust from 45 to 55%
d. Check Rep Rate change with symmetry 10%, max.

6. REP RATE MULTIPLIER CAL

a. Setup
b. Adjust Rep Rate Multiplier Cal X10 (R6) for 10μs/cycle
c. Adjust Rep Rate Multiplier Cal X1 (R30) for 10μs/cycle

7. REPETITION RATE RANGE AND MULTIPLIER

±10% of indicated value at 1 and 10

8. SYNC INPUT

a. Setup
b. Check square-wave sync: 2 to 50V P-P
c. Check sine-wave sync: 5V P-P at 100Hz and 1mHz

9. TRIGGER OUTPUT

a. Setup
b. Check amplitude: 0.1V, min, into 50Ω
c. Check rate of rise into 50Ω: max from 0V to 0.1V
d. Check delay time: 50ns, max

10. HIGH AMPLITUDE NO LOAD RISETIME

120ns, max

11. FAST RISE AMPLITUDE AND SYMMETRY

a. Check + and - TRANSITION AMPLITUDE
ccw: 50mV, max
cw: 500mV, min
b. Check Symmetry/Amplitude change
150ns, max

12. FAST RISE COMPENSATION

a. Setup
b. Adjust C107, C118
Risetime into 50Ω: 1ns, max
at 500mV
Aberrations: + and - 2% or
+ and - 6mV, whichever is greater

13. HI AMPLITUDE INTO 50Ω

a. Setup
b. Check risetime and aberrations
risetime: 10ns, max, at 12V
18ns, max, at 0.5V
aberrations: 1st 100ns, + and
- 2% max from 12V
to 0.5V

14. TRIGGER JITTER

a. Setup
b. Check jitter 250ps, max.

THE END

1. PRELIMINARY INSPECTION

a. Install current modifications

b. Check fuse

115V operation 159-0023-00 1.25A mdl slo-blo
230V operation 159-0019-00 0.6 A mdl slo-blo

2. PRESETS

POWER	OFF
REPETITION RATE RANGE	1 kHz
MULTIPLIER	full cw
SYMMETRY	midr
AMPLITUDE	full ccw
+ TRANSITION AMPLITUDE	full ccw
- TRANSITION AMPLITUDE	full ccw
HI AMPLITUDE-FAST RISE	HI AMPLITUDE
115V↔230V (on rear panel)	115V

Set all internal adjustments to midr.

3. RESISTANCE CHECKS

Make the following resistance checks to ground using the 1k meter scale and negative lead to ground.

Supply	Approximate Resistance	Check
-10V	150Ω	Q217 emitter
+10V	3.5k	Q213 emitter
A -20V	4k	TP 269
A -150V	20k	TP 229
A +150V	20k	TP 259
A	3k	TP 249
T 201	inf	term 1 & 4

Set the 115V↔230V switch to 230V and check T 201 (term 1 & 4) for inf resistance to ground. Return switch to 115V position.

4. POWER SUPPLIES

a. Apply power

Connect the TYPE 106 to the TYPE 76 TU. Set the TYPE 76 TU to 115V and turn the TYPE 106 POWER switch ON. The POWER light must light.

b. Check AMPLITUDE control (A supply)

Connect the multimeter between A supply (TP 249) and ground. Check for a reading of approximately -8V. Turn AMPLITUDE control full cw, checking for a smooth increase in voltage to approximately -155V.

c. Adjust Amplitude Cal (R247)
AMPLITUDE range unterminated: 7V P-P, max to 120V P-P, min
AMPLITUDE range into 50Ω: 0.5V P-P, max to 12V P-P, min

Monitor OUTPUT voltage with test scope. Adjust Bias Level, R39 for a square-wave display. Turn AMPLITUDE full cw and set R247 for a test scope display of 120V P-P, min. Turn AMPLITUDE full ccw and check for 7V P-P, max.

Connect a 2W 50Ω Termination to OUTPUT and check OUTPUT voltage on test scope: 0.5V P-P, max. Turn AMPLITUDE full cw and check OUTPUT voltage: 12V P-P, min.

d. Check A supply regulation, OUTPUT terminated ≤10% change, from amplitude at 115 VAC

With AMPLITUDE full cw, check OUTPUT on test scope for ±10% amplitude change, or less, as line voltage is varied from 103.5 to 126.5 VAC. Return line to 115 VAC.

e. Check tilt 100 Hz: 5% tilt, max
10 Hz: 15% tilt, max

With AMPLITUDE full cw, check bottom of waveform for tilt at 100 Hz: 5%, max. Check at 10 Hz: 15%, max. Return REPETITION RATE RANGE to 1 kHz and MULTIPLIER full cw.

f. Check elevated filaments

Check T201 term 19 & 20 for A -150V (approx). Check T201 term 10 & 11 for A supply voltage (approx).

4c. Varify test scope VOLTS/CM accuracy with the SAC.

R247 adjustment

Compromise the setting of R247 to bring the terminated and unterminated voltage ranges within limits.

4. (cont'd)

g. Check voltages and ripple

Check power supply voltages and ripple as given below. Check regulation and ripple from 103.5 to 126.5 VAC line, with OUTPUT's terminated and all AMPLITUDE controls full cw. Set HI AMPLITUDE-FAST RISE switch to FAST RISE when checking + and -10V supply ripple, then return to HI AMPLITUDE.

Supply	Tolerance	max line Freq ripple	check voltage from	to
+10V	±15%	0.1V PTP	Emitter Q213	gnd
-10V	±15%	0.1V PTP	Emitter Q217	gnd
A -20V	±10%	0.75V PTP	TP269	TP249
A +150V	±10%	0.75V PTP	TP259	TP249
A -150V	±10%	0.75V PTP	TP229	TP249
A supply	----	0.75V PTP	TP249	TP249

Disregard high frequency hash, spikes, transients, etc. Return line voltage to 115 VAC.

h. Check 230V operation

Check PTP voltage at term 16 of T201 with test scope. Set 115V↔230V switch to 230V. The voltage at term 16 should decrease about 50%. Note that fan operates at decreased speed.

Return 115V↔230V switch to 115V.

5. SYMMETRY

a. Adjust Bias Level (R39): stable square-wave at 103.5 to 126.5 VAC

Set REPETITION RATE RANGE to 100kHz and MULTIPLIER to 5. Set test scope TIME/CM to 1μSEC. Adjust R39 for a square-wave that remains symmetrical and stable (no scaling or oscillation) as the line voltage is varied from 103.5 to 126.5 VAC. Return line voltage to 115 VAC.

a. R39 adjustment

Optimum setting for R39 can be found by varying the line from 90-140 VAC. However, it is not necessary that the square-wave remain stable at these extremes.

b. Adjust Symmetry Range (R9): 50% duty cycle at 50 kHz

Connect OUTPUT to test scope through 50Ω 2W Termination. Set REPETITION RATE RANGE to 10kHz and MULTIPLIER to 5. With SYMMETRY at midr, adjust Symmetry Range R9 for 50% duty cycle.

5. (cont'd)

c. Check SYMMETRY duty cycle: adjustable from 45 to 55%

Set SYMMETRY full ccw, set the test scope TIME/CM to 2μSEC and adjust the TYPE 106 MULTIPLIER to display 1 cycle in 10cm on test scope.

Check negative 1/2 cycle for at least 5.5cm. Turn SYMMETRY full cw, adjust test scope to display 1 cycle in 10cm and check negative 1/2 cycle for no more than 4.5cm.

Set REPETITION RATE RANGE to 100 kHz, MULTIPLIER to 10 and test scope TIME/CM and TIME/CM VARIABLE to display 1 cycle in 10cm. Repeat check.

d. Check rep rate change with SYMMETRY 10%, max

Set REPETITION RATE RANGE to 10 kHz and set test scope to display 1 cycle in 5cm. Rotate SYMMETRY from cw to ccw and note that cycle length is from 4.5 to 5.5cm at any SYMMETRY setting. Set SYMMETRY for a 50% duty cycle.

6. REP RATE MULTIPLIER CAL

a. Setup

TYPE 106 OUTPUT -- 5ns cable -- 50Ω 2W Termination -- TYPE 1A1 CHANNEL 1 INPUT

TYPE 184 MARKER OUTPUT -- 50Ω cable -- 50Ω Termination -- TYPE 1A1 CHANNEL 2 INPUT

Set the test scope TIME/CM to 10μSEC, VARIABLE to CALIBRATED. Set TYPE 1A1 MODE to ALT, CHANNEL 1 VOLTS/CM to 5 and CHANNEL 2 VOLTS/CM to 2.

b. Adjust Rep Rate Multiplier Cal X10 (R6): 10μs/cycle

Set REPETITION RATE RANGE to 10 kHz and MULTIPLIER on 10. Apply 10μS markers from TYPE 184 to TYPE 1A1 and adjust R6 for 1 cycle/marker on test scope display.

b., c. The MULTIPLIER knob must be mechanically centered on the shaft. The mechanical range of the pot will then extend beyond 1 and 10 by a few degrees, allowing overlap of the frequency ranges.

c. Adjust Rep Rate Multiplier Cal X1 (R30): 10μs/cycle

Set REPETITION RATE RANGE to 100 kHz and apply 10μS markers from the TYPE 184. Set MULTIPLIER on 1. Adjust R30 for 1 cycle/marker on test scope display. Recheck step b.

7. REPETITION RATE RANGE AND MULTIPLIER

±10% of indicated value at 1 and 10

Connect the TYPE 106 and TYPE 184 to test scope as in the previous step. Check that repetition rate is continually variable between 10Hz and 1MHz. The repetition rate at 1 and 10 of MULTIPLIER must be within 10% of indicated value.

8. SYNC INPUT

a. Setup

Test scope AMPLITUDE CALIBRATOR --
BNC T -- 50Ω cable -- Test scope TRIGGER INPUT
-- 50Ω cable -- TYPE 106 SYNC INPUT

TYPE 106 OUTPUT -- GR to BNC adapter -- 50Ω 2W Termination -- 50Ω cable -- TYPE 1A1 CHANNEL 2 INPUT.

b. Check square-wave sync: 2 to 50V P-P

Set TYPE 1A1 CHANNEL 2 VOLTS/CM to 5 and MODE to CH 2. Set test scope TRIGGER SOURCE to EXT and AMPLITUDE CALIBRATOR to 2 VOLTS. Set REPETITION RATE RANGE and MULTIPLIER so that TYPE 106 is free running at a frequency slightly below the AMPLITUDE CALIBRATOR frequency.

Rotate MULTIPLIER (if necessary) until stable drift free display is obtained. Remove AMPLITUDE CALIBRATOR signal from SYNC INPUT and note display drift due to no sync signal. Set AMPLITUDE CALIBRATOR to 50 VOLTS. Connect to SYNC INPUT and note synchronized display.

Remove BNC T from AMPLITUDE CALIBRATOR and connect it to the LF Sine-Wave Generator.

8. (cont'd)

c. Check sinewave sync: 5V P-P at 100 Hz and 1 MHz

Apply 5V P-P of 100 Hz sinewave from the LF Sine Wave Generator to the TYPE 106 SYNC INPUT and test scope TRIGGER INPUT. Set TYPE 106 REPETITION RATE RANGE to 10 Hz and MULTIPLIER to about 10. Rotate MULTIPLIER slowly until stable drift free display is obtained.

Apply 5V P-P of 1 MHz sinewave from the LF Sine Wave Generator to the TYPE 106 SYNC INPUT and test scope TRIGGER INPUT. Set TYPE 106 REPETITION RATE RANGE to 100 kHz and rotate MULTIPLIER slowly until stable drift free display is obtained. Remove connections from test scope and TYPE 106.

9. TRIGGER OUTPUT

a. Setup

TYPE 106 TRIGGER OUTPUT -- 50Ω Termination -- 50Ω cable -- TYPE 1A1 CHANNEL 1 INPUT.

TYPE 106 OUTPUT -- 50Ω 2W Termination -- 50Ω cable -- TYPE 1A1 CHANNEL 2 INPUT.

Set TYPE 1A1; MODE, CH 1; CHANNEL 1 VOLTS/CM, .05; CHANNEL 2 VOLTS/CM, 5. Set test scope TIME/CM to 10μSEC and TRIGGER SOURCE to NORM.

b. Check Amplitude: 0.1V, min, into 50Ω

Set TYPE 106 REPETITION RATE RANGE to 100 kHz and MULTIPLIER to 1. Check both positive and negative trigger spikes for 0.1V peak, min. Set MULTIPLIER to 10 and repeat check. Return MULTIPLIER to 1.

9b. Varify test scope VOLTS/CM accuracy with the SAC.

c. Check rate of rise into 50Ω: 50ns, max from 0V to 0.1V

Set test scope TIME/CM to .1μSEC, SWEEP MAGNIFIER to 2X and check TRIGGER OUTPUT rate of rise: 50ns in first 100mV.

9c&d. Varify the TIME/CM accuracy with the TYPE 184.

d. Check delay time: 50ns, max

Connect a 50Ω cable from TYPE 1A1 CH 1 TRIGGER OUT to test scope TRIGGER INPUT and set test scope TRIGGER SOURCE to EXT. Set TYPE 1A1 MODE to ALT and check time difference between TRIGGER OUTPUT and HI AMPLITUDE OUTPUT: 50ns, max. Return test scope TRIGGER SOURCE to NORM. Remove connections from test scope and TYPE 106.

10. HIGH AMPLITUDE NO LOAD RISETIME 120ns, max

Connect a 10X probe from the TYPE 1A1 to TYPE 106 OUTPUT. Set test scope VOLTS/CM to 2, TIME/CM to .1μSEC, SWEEP MAGNIFIER to 2X. Set TYPE 106 REPETITION RATE RANGE to 100 kHz, MULTIPLIER to 5 and adjust AMPLITUDE for 5cm of display on test scope. Measure risetime: 120ns, max. Remove connections from test scope and TYPE 106.

11. FAST RISE AMPLITUDE AND SYMMETRY

a. Check + and - TRANSITION AMPLITUDE
ccw: 50mV, max cw: 500mV, min

11a. Varify the test scope VOLTS/CM accuracy with the SAC.

Connect the +OUTPUT to the TYPE 1A1 INPUT with a 5ns cable and 50Ω 2W Termination. Set the test scope SWEEP MAGNIFIER to X1 OFF, TIME/CM to 1μSEC and VOLTS/CM to .1. Set the TYPE 106 HI AMPLITUDE-FAST RISE switch to FAST RISE and check range of +TRANSITION AMPLITUDE: ccw, 50mV max; cw, 500mV min.

Move the 5ns cable from the +OUTPUT to the -OUTPUT and check range of -TRANSITION AMPLITUDE: ccw, 50mV max; cw, 500mV min.

b. Check symmetry/amplitude change
150ns, max

Set the test scope TIME/CM to .1μSEC. Adjust the TYPE 106 MULTIPLIER to display 1 cycle/ 10cm. Turn the -TRANSITION AMPLITUDE full cw and note symmetry at the 50% amplitude points. Turn -TRANSITION AMPLITUDE full ccw and note change of symmetry: 1.5cm, max.

Move the 5ns cable to the +OUTPUT and repeat check, using the +TRANSITION AMPLITUDE control. Remove connections from test scope and TYPE 106.

12. FAST RISE COMPENSATION

a. Setup

Insert the TYPE 3S1 and TYPE 3T2 into the TYPE 561B. Turn on the TYPE 561B and allow to warm up a few minutes. Preset as follows:

TYPE 3S1	
MODE	CH A
VERT POSITION	midr
DC OFFSET	midr
mVOLTS/DIV	100
VARIABLE	CAL
NORM-INVERT	NORM
INTERNAL TRIGGER	OFF

TYPE 3T2	
HORIZ POSITION	midr
TIME POSITION	midr
FINE	midr
TIME/DIV RANGE	100ns
START POINT	WITH TRIGGER
TIME/MAGNIFIER	X10
VARIABLE	CAL
SAMPLES/DIV	for max dot density with min flicker
DISPLAY MODE	NORMAL
TRIGGER SENSITIVITY	cw
RECOVERY TIME	midr
TRIGGER SOURCE	+ EXT

TYPE 184 HF OUTPUT---50Ω cable---BNC to GR adapter---TYPE 3S1 A INPUT

TYPE 184 TRIGGER OUTPUT---50Ω cable---5X Attenuator---TYPE 3T2 EXT TRIG

Set the TYPE 184 TRIGGER SELECTOR to 1μS and HF SELECTOR to 2nS. Adjust the TYPE 3T2 TRIGGER SENSITIVITY and RECOVERY TIME for a stable display. Adjust the TYPE 3T2 HORIZ GAIN for exactly 1 marker/2cm. Remove the signals from the TYPE 3T2.

b. Adjust C107, C118 Risetime into 50Ω: 1ns, max at 500mV; aberrations: + and - 2% or + and - 6mV, whichever is greater

Connect the TYPE 106 + OUTPUT through a 5ns cable to the TYPE 3S1 A INPUT. Connect the TYPE 106 TRIGGER OUTPUT to the TYPE 3T2 EXT TRIG with a BNC 50Ω cable. Adjust TIME POSITION, VERT POSITION and TRIGGER SENSITIVITY to display the leading edge of the positive transition. Adjust + TRANSITION AMPLITUDE for 5cm of display. Adjust C118 for optimum risetime, 1ns or less, and C107 for optimum square corner and minimum ringing.

12b. (cont'd)

Change The TYPE 3S1 mVOLTS/DIV to 10. Use the DC OFFSET to reposition the leading corner onto the screen. Check for + and - 1div (+ and -2%) of aberrations in the first 5ns. Change the mVOLTS/DIV to 100. Adjust the TYPE 106 + TRANSITION AMPLITUDE for 3div (300mV). Change the TYPE 3S1 mVOLTS/DIV to 5 and check for + and - 5mV in the first 5ns. Change the mVOLTS/DIV to 10. Adjust the + TRANSITION AMPLITUDE for 5div (50mV). Check risetime, 1ns or less, and aberrations + and -6mV. Check aberrations throughout range of + TRANSITION AMPLITUDE (50-500mV): + and - 2% or + and 1 6mV, whichever is greater.

c. Adjust C127, C138: Risetime into 50Ω: 1ns, max at 500mV; Aberrations: + and -2%, or + and - 6mV, whichever is greater

Move the 5ns cable to the -OUTPUT. Repeat step b., displaying the leading edge of the negative transition and adjusting C127, C138. Remove FAST RISE signal from TYPE 3S1.

13. HI AMPLITUDE INTO 50Ω

a. Setup

TYPE 106 OUTPUT---10X Attenuator---5ns cable ---2X Attenuator---TYPE 3S1 A INPUT.

b. Check risetime and aberrations
Risetime: 10ns, max, at 12V
18ns, max, at 0.5V
Aberrations: 1st 100ns; + and -2%, max, from 12V to 0.5V

Set the TYPE 106 HI AMPLITUDE - FAST RISE switch to HI AMPLITUDE. Set the TYPE 3T2 TIME/MAGNIFIER to X2. Adjust the TIME POSITION, VERT POSITION and TRIGGER SENSITIVITY, to display the leading edge of the positive transition. Change the TYPE 3S1 mVOLTS/DIV to 200. Turn the TYPE 106 HI AMPLITUDE pot full cw and adjust the TYPE 3S1 VARIABLE for 5div of display. Check risetime, 10ns or less. Change the mVOLTS/DIV to 20 (be careful not to change VARIABLE). Check aberrations in first 100ns, + and -1div (+ and -2%). Turn HI AMPLITUDE pot ccw. Remove X10 and X2 attenuators.

13b. (Cont'd)

Change TYPE 3S1 mVOLTS/DIV to 100 and VARIABLE to CAL. Adjust HI AMPLITUDE pot for 5div (0.5V). Check risetime, 18ns or less. Remove 5ns cable. Leave the TRIGGER OUTPUT connected to TYPE 3T2.

14. TRIGGER JITTER 250ps, max

a. Setup

Connect the TYPE 106 + OUTPUT to the TYPE 3S1 A INPUT with a 5ns cable. Set the TYPE 106 HI AMPLITUDE - FAST RISE switch to FAST RISE and + TRANSITION AMPLITUDE cw.

Set TYPE 3T2 TIME/MAGNIFIER to X20. Adjust triggering for "clean" waveform display.

b. Jitter

Check TYPE 106 trigger jitter at all positions of Multiplier: 250ps (0.5div) max.

Move 5ns cable from + OUTPUT to - OUTPUT and repeat check.

Remove all cables from TYPE 106.

THE END