

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.

*This procedure is
company confidential*

1A7A

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.

April 1968
For all serial
numbers.



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).

CHANGE INFORMATION:

This procedure has been prepared by Product Manufacturing Staff Engineering. For information on changes made to this procedure, to make suggestions for changing this procedure, or to order additional copies: please contact PMSE, 39-307. (JT)

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EQUIPMENT REQUIRED:

The following equipment is necessary to complete this procedure:

a. TEKTRONIX Instruments

- 1 TYPE 540B series OSCILLOSCOPE
- 1 TYPE 547 OSCILLOSCOPE
- 1 TYPE 1A1 DUAL TRACE PLUG-IN UNIT

b. Test Fixtures and Accessories

- *1 Standard Amplitude Calibrator (SAC) (067-0502-00) (with EXT mod)
- *1 Sine Wave Generator (067-0542-99) (with J series timing caps)
- 1 Normalizer, 47pF BNC (067-0541-00)
- 1 50 Ω Termination, BNC (011-0049-00)
- 2 10:1 Attenuators, BNC (011-0059-00)
- 1 Coax T connector, BNC (067-0525-00)
- 2 50 Ω Cables, BNC (012-0057-00)
- 1 600V Variable DC Supply PMPE Dwg # 1421A
- 1 250:1 Divider PMPE Dwg #2053-B
- 1 Variable Attenuator (067-0511-00)
- 1 67.5 Volt Bridge PMPE Dwg #1008A
- 2 Patch Cords BNC-BNC (012-0091-00)
- 1 1k 1% resistor
- 1 .01 capacitor (MYLAR)

- * This equipment must be traceable to NBS for certification of measurement characteristics.

Substitute test equipment may be used. The Plant Staff Engineer must approve any substitutions. All equipment listed must perform within its manufacturer's specifications, unless otherwise stated.

FACTORY TEST LIMITS

QUALIFICATION

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 (set-ups, 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.

3. BALANCE

- b. Variable Balance: 0.2cm, max

4. OUTPUT DC LEVEL

67.5% of main frame +100V, $\pm 2\%$, max

5. INPUT CURRENT AND DRIFT

- a. + Input: $\pm 16\text{pa}$, max
- b. - Input: $\pm 16\text{pa}$, max

6. NEUTRALIZATION

- b. - Neutralization: $\pm 1\%$, max
- c. + Neutralization: $\pm 1\%$, max

7. GAIN

- a. GAIN range + & - 6%, min
- *b. VARIABLE ratio: 2.5:1, min with GAIN ccw

8. POSITION RANGE + & - 9cm, min

9. VOLTS/CM ACCURACY

- * a. 1mV to 10 VOLTS/CM
 $\pm 1.5\%$, max
- * b. 1mV to 10 μ V
 $\pm 1.5\%$, max

10. SIGNAL OUTPUT

- b. DC Level: 0V, $\pm 3\text{V}$, max
Compensation $\pm 3\%$, max
- * d. Amplitude: 0.25V/cm, $\pm 10\%$ max
- e. Dynamic range: + & - 4.5 volts, min

11. INPUT CAPACITANCE AND ATTENUATOR COMPENSATION

- b. Input capacitance Aberration:
 $\pm 1\%$, max
- c. Attenuator compensation
Averration: $\pm 1\%$, max

*13. CMRR

- b. CMRR 125,000:1, min, DC to 100kHz
- c. AC coupled CMRR
25,000:1, min @ 100kHz
2,500:1, min @ 60Hz
- d. Attenuator CMRR
1000:1, min, @ 100kHz

*14. BANDWIDTH LIMIT

- b. 1MHz bandwidth 1MHz, +30% -0%
- c. HIGH FREQ -3dB POINT $\pm 10\%$, max
- d. LOW FREQ -3dB POINT $\pm 10\%$, max

15. OVERDRIVE RECOVERY

- b. Overdrive recovery 0.5% in 10 μ S

16. DC OFFSET

- a. +DC OFFSET +0.4V, $\pm 7.5\%$, max
- b. -DC OFFSET -0.4V, $\pm 7.5\%$, max

17. DYNAMIC RANGE AND INPUT OVERLOAD

- b. + Dynamic range and INPUT OVERLOAD
Range: 420mV, min
OVERLOAD light: before overload
- c. - Dynamic range and INPUT OVERLOAD
Range: 420mV, min
OVERLOAD light: before overload

18. DISPLAYED NOISE

- b. Displayed noise measured
tangentially: 16 μ V, max

19. DRIFT 5 μ V, max, in one minute

[NOTE: THE FOLLOWING CHECKS ARE NOT MADE
ON 100% OF THE INSTRUMENTS BUT ARE DONE
ON SAMPLING BASIS]

20. AC LF RESPONSE

- b. AC LF response 1.6Hz, min

21. SIGNAL OUTPUT RESISTANCE

- b. SIGNAL OUTPUT resistance:
750 Ω , max

THE END

* Indicates measurement characteristic; test equipment must be traceable to the
NBS for instrument certification.

SHORT FORM PROCEDURE

Factory TEST LIMITS are limits an instrument must meet 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, it is necessary to set up some circuits so their performance is better than required by Factory Test Limits. Therefore, the instructions given in the Factory Calibration Procedure may call for checks or adjustments which result in less error than that allowed by the Factory Test Limits.

1. PRESETS

- a. Preset TYPE 1A7A
- b. Preset TYPE 547

2. CHECK RESISTANCE

3. BALANCE

- a. Adjust AC Atten Bal
- b. Adjust Variable Bal: $\pm 0.2\text{cm}$, max
- c. Adjust Coarse Bal

- 4. OUTPUT DC LEVEL 67.5% of
 main frame +100V,
 $\pm 2\%$, max

5. INPUT CURRENT AND DRIFT

- a. Adjust + Input Zero: $\pm 14\text{pA}$, max
- b. Adjust - Input Zero: $\pm 14\text{pA}$, max

6. NEUTRALIZATION

- a. Setup
- b. Adjust - neutralization
 Aberration: $\pm 1\%$, max
- c. Adjust + neutralization
 Aberration: $\pm 1\%$, max

7. GAIN

- a. Check GAIN range + & - 6%, min
- b. Check VARIABLE ratio: 2.5:1, min,
 with GAIN ccw.

8. POSITION RANGE + & - 9cm, min

9. VOLTS/CM ACCURACY

- a. Check 1mV to 10 VOLTS/CM
 Error: $\pm 1.5\%$, max
- b. Check 1mV to 10 μV
 Error: $\pm 1.5\%$, max

10. SIGNAL OUTPUT

- a. Setup
- b. Adjust DC Level $\pm 5\text{V}$, max
- c. Adjust compensation $\pm 3\%$, max
- d. Check amplitude .25V/cm $\pm 10\%$, max
- e. Check dynamic range + & - 4.5
 Volts, min

11. INPUT CAPACITANCE AND ATTENUATOR COMPENSATION

- a. Setup
- b. Adjust C112 (C212) aberration:
 $\pm 1\%$, max
- c. Adjust attenuator compensation
 aberration: $\pm 1\%$, max

12. ATTENUATOR DC CMRR

13. CMRR

- a. Adjust CMRR 125,000:1, min
- b. Check CMRR 125,000:1, min, DC to
 1 00kHz
- c. Check AC coupled CMRR
 25,000:1 @100kHz
 2,500:1 @60Hz
- d. Check attenuator CMRR 1000:1,
 min, @100kHz

14. CHECK BANDWIDTH LIMIT

- a. Setup
- b. Check 1MHz bandwidth 1MHz, +30%
-0%
- c. Check HIGH FREQ -3dB POINT $\pm 10\%$, max
- d. Check LOW FREQ -3dB POINT $\pm 10\%$, max

15. OVERDRIVE RECOVERY

- a. Setup
- b. Check overdrive recovery .5% in 10 μ S

16. DC OFFSET

- a. Check + DC OFFSET +.4V, $\pm 7.5\%$, max
- b. Check -DC OFFSET -.4V, $\pm 7.5\%$, max

17. DYNAMIC RANGE AND INPUT OVERLOAD

- a. Setup
- b. Check + dynamic range and INPUT OVERLOAD
Range: 420mV, min
OVERLOAD light: before overload
- c. Check - dynamic range and INPUT OVERLOAD
Range: 420mV, min
OVERLOAD light: before overload

18. DISPLAYED NOISE

- a. Setup
- b. Check displayed noise
measured tangentially: 14 μ V, max

19. DRIFT 5 μ V, max, in one minute

[NOTE: THE FOLLOWING CHECKS ARE NOT MADE
ON 100% OF THE INSTRUMENTS BUT ARE DONE
ON A SAMPLING BASIS]

20. AC LF RESPONSE

- a. Setup
- b. Check AC LF response 1.6Hz, min

21. SIGNAL OUTPUT RESISTANCE

- a. Setup
- b. Check SIGNAL OUTPUT resistance:
750 Ω , max

THE END

1. PRESETS*a. Preset TYPE 1A7A*

| | |
|--------------------------|----------|
| VOLTS/CM | 10mVOLTS |
| VARIABLE | CAL |
| POSITION | centered |
| HIGH FREQ -3dB POINT | 10kHz |
| LOW FREQ -3dB POINT | 10Hz |
| DC OFFSET switch | off |
| DC OFFSET | midr |
| DC OFFSET FINE | midr |
| GAIN | midr |
| STEP ATTEN DC BAL | midr |
| INPUT switches | GND |
| all internal adjustments | midr |

b. Preset TYPE 547

| | |
|--------------------|------------|
| HORIZONTAL DISPLAY | B |
| TIME BASE A & B | |
| TRIGGERING LEVEL | 0 |
| MODE | AUTO |
| SLOPE | + |
| COUPLING | AC |
| SOURCE | NORM |
| TIME/CM | .5mSEC |
| VARIABLE | CALIBRATED |

Leave controls and adjustments, for any step, as they were in the step preceding unless noted otherwise.

2. CHECK RESISTANCE

Check resistance to ground on 16 pin Amphenol connector (rear). Connect negative lead of VOM to gnd. Set VOM to X1k scale.

| <u>pin number</u> | <u>approximate resistance</u> | <u>use</u> |
|-------------------|-------------------------------|----------------------|
| 1 | 14k | output |
| 2 | 0 | gnd |
| 3 | 14k | output |
| 4, 5, 6, 7, 8 | inf | unused |
| 9 | 14k | -150v supply |
| 10 | 5.6k | +100v supply |
| 11, 12, 13, 14 | inf | unused |
| 15 | 500 Ω | +75v filament supply |
| 16 | inf | unused |

3. BALANCE*a. Adjust AC Atten Bal*

Position the trace to graticule center with the TYPE 1A7A POSITION control. Set VOLT/CM to 50 μ V. Adjust R505 to return trace as near to graticule center as possible.

b. Adjust Variable Balance $\pm .2$ cm, max

Set TYPE 1A7A VOLTS/CM to 10mV. Adjust R425 for no trace shift while rotating the VARIABLE control ccw and cw. Set VARIABLE to CAL.

c. Adjust Coarse Bal

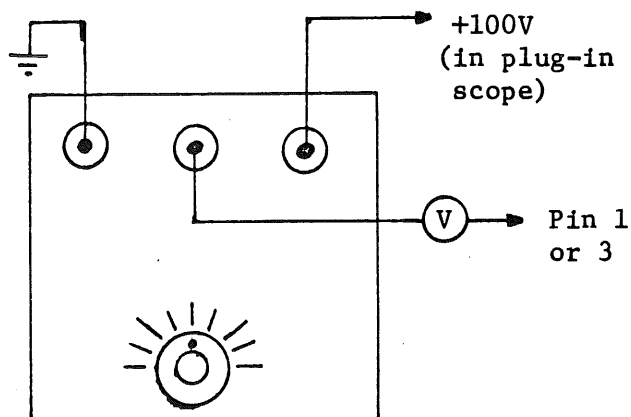
Position trace to graticule center with the TYPE 1A7A POSITION control. Set LOW FREQ -3dB POINT to DC. Set VOLTS/CM to .1mV. Adjust R345 to return trace to approximately graticule center. Adjust STEP ATTEN DC BAL for no trace shift while switching VOLTS/CM between .1mV and 10 μ V.

Set VOLTS/CM to 10mV and position trace to graticule center with TYPE 1A7A POSITION control.

4. OUTPUT DC LEVEL

67.5% of main frame
+100V, $\pm 2\%$, max

Connect the 67.5 volt bridge as shown:



Set the VOM to the most sensitive DC volts range. Check that zero volts can be obtained on the VOM with the dial on the 67.5 Volt bridge.

Disconnect 67.5 Volt bridge and VOM.

5. INPUT CURRENT AND DRIFT

a. Adjust + Input Zero $\pm 14\text{pA}$, max

Set HIGH FREQ -3dB POINT to 100Hz.
Set VOLTS/CM to $10\mu\text{V}$. Connect a .01 capacitor to the + INPUT. Position trace to graticule center with STEP ATTEN DC BAL. Adjust R115 for minimum trace shift while switching the + INPUT selector between GND and DC, 1.4cm, max. Set + INPUT to GND.

b. Adjust - Input Zero

Change the .01 capacitor to the - INPUT. Adjust R215 for minimum trace shift while switching the - INPUT selector between GND and DC, 1.4cm, max. Set - INPUT selector to GND.

Set HIGH FREQ -3dB POINT to 1MHz and VOLTS/CM to 10mV.

Note: The .01 cap should be enclosed in a holder such as the 204-0209-00 with a 134-0044 connector.

Note: Heating the leads of D133 and D233 to approximately solder melting temperature may cause sufficient additional leakage to compensate input current.

6. NEUTRALIZATION

a. Setup

Set TYPE 1A7A + INPUT to DC. Apply .1 VOLTS from TYPE 547 AMPLITUDE CALIBRATOR to TYPE 1A7A + INPUT. Set DC OFFSET to ON and position top of display to graticule center with COARSE control. Set VOLTS/CM to 1mV.

b. Adjust - neutralization: $\pm 1\%$, max

Adjust C231 for least change in front corner of waveshape when switching - INPUT from GND to DC. Aberration: $\pm 1\text{cm}$, max.

c. Adjust + neutralization: $\pm 1\%$, max

Set TYPE 1A7A - INPUT to DC. Change signal from + INPUT to - INPUT. Position bottom of display to graticule center with DC OFFSET

6c. (cont'd)

COARSE (approx 2.4 turns CW). Adjust C131 for least change in front corner of waveshape when switching + INPUT from GND to DC. Aberration: $\pm 1\text{cm}$, max. Remove signal. Set both INPUT switches to GND, and DC OFFSET to OFF.

7. GAIN

a. Check GAIN range + & - 6%, min

Connect a 5mVOLT square wave from the SAC to the TYPE 1A7A + INPUT. Set + INPUT selector to DC and - INPUT selector to GND. Rotate GAIN full cw and note deflection: 5.3cm, min. Rotate GAIN full ccw and note deflection: 4.7cm, max.

b. Check VARIABLE ratio: 2.5:1, min,
with GAIN full ccw

Rotate VARIABLE full ccw and note deflection: 2cm, max. Rotate VARIABLE to CAL. Adjust GAIN for exactly 5cm.

8. POSITION RANGE

+ & - 9cm, min

Set SAC AMPLITUDE to 10mV and MODE to +DC. Rotate TYPE 1A7A POSITION full ccw. Trace must position to within 1cm of graticule center. Set SAC MODE to -DC. Rotate TYPE 1A7A POSITION full cw. Trace must position to within 1cm of graticule center.

Set POSITION to midrange.

9. VOLTS/CM ACCURACY

a. Check 1mV to 10 VOLTS/CM

Error: $\pm 1.5\%$, max relative to 1mV/cm

Connect 100V @ 500Hz from Sine Wave Generator to SAC EXT INPUT. Set SAC MODE to EXT.

Note: Use a SAC with EXT MOD.

9a. (cont'd)

Adjust Sine Wave Generator AMPLITUDE MULTIPLIER for 6cm display. Maintain a 6cm display with the SAC AMPLITUDE switch while checking each position of the TYPE 1A7A VOLTS/CM switch from 1mV to 10 VOLTS: ± 0.09 cm, max error.

b. *Check 1mV to 10 μ V VOLTS/CM accuracy*
Error: $\pm 1.5\%$, max, relative to 1mV/cm

Set TYPE 1A7A HIGH FREQ -3dB POINT to 100Hz, LOW FREQ -3dB POINT to 10kHz, and VOLTS/CM to 1mV. Set SAC AMPLITUDE to 1 VOLT. Adjust Sine Wave Generator AMPLITUDE MULTIPLIER for exactly 6cm of display. Maintain a 6cm display with the SAC AMPLITUDE switch while checking each position of the TYPE 1A7A VOLTS/CM switch from 1mV to 10 μ V: ± 0.09 cm, max error.

Set + INPUT selector to GND. Remove signal.

10. SIGNAL OUTPUTa. *Setup*

Set the TYPE 1A7A VOLTS/CM to 10mV, HIGH FREQ -3dB POINT to 1MHz, and LOW FREQ -3dB POINT to DC. Position the trace to graticule center with the position control. Set TYPE 1A1 CHANNEL 1 VOLTS/CM to .5 and position trace to graticule center. Connect TYPE 1A7A SIGNAL OUTPUT to TYPE 1A1 CHANNEL 1 input.

b. *Adjust DC Level* $\pm .5V$, max

Adjust R550 for no trace shift on the test scope while switching TYPE 1A1 CHANNEL 1 INPUT SELECTOR between GND and DC.

c. *Adjust compensation*

Connect 50mV from the TYPE 547 AMPLITUDE CALIBRATOR to the TYPE 1A7A + INPUT. Set + INPUT selector to DC. Adjust C554 for best front corner compensation if test scope display.

10. (cont'd)

d. Check amplitude: 0.25V/cm, $\pm 10\%$, max

Set TYPE 1A1 VOLTS/CM to .2. Adjust TYPE 1A7A VARIABLE for 4cm on Plug-in scope display. Check amplitude of test scope display: 4.5cm, min; 5.5cm, max.

Remove TYPE 1A7A input. Set VARIABLE to CAL.

e. Check dynamic range + & - 4.5 Volts, min

Set TYPE 1A1 VOLTS/CM to 2. Set Sine Wave Generator to 1kHz and adjust AMPLITUDE until clipping occurs on the positive and negative peaks of the test scope display. Note amplitude of test scope display: + and - 2.25cm, min. Remove cable.

11. INPUT CAPACITANCE AND ATTENUATOR COMPENSATION

a. Setup

apply signal

TYPE 547 AMPLITUDE CALIBRATOR--50 Ω cable--
47pf INPUT TIME CONSTANT STANDARDIZER--TYPE
1A7 + INPUT

b. Adjust C112 (C212) Aberration: $\pm 1\%$, max

Set the + (-) INPUT switch to DC and the - (+) INPUT switch to GND. Apply 5cm of signal (.1 VOLTS) from the AMPLITUDE CALIBRATOR.

Adjust C112 (C212) for best square-wave.

c. Adjust attenuator compensation

Aberration: $\pm 1\%$, max

Set the AMPLITUDE CALIBRATOR for 5cm of deflection in each of the following steps.

11c. (cont'd)

Adjust for best front corner, then for level.

| | adjust | |
|----------------------|--------------------------|---------------|
| TYPE 1A7 VOLTS/CM | for best front corner | for level |
| 20mVOLTS | C105C (C205C) | C105B (C205B) |
| 50mVOLTS | check* | |
| .1 VOLTS | check* | |
| .2 VOLTS | C107C (C207C) | C107B (C207B) |
| .5 VOLTS | check* | |
| 1 VOLTS | check* | |
| 2 VOLTS | C109C (C209C) | C109B (C209B) |
| 5 VOLTS | check* | |
| 10 VOLTS | check* | |

* The rolloff, overshoot and level must be within 1%. If necessary, detune preceding variable capacitors (within 1%) to bring all positions involved within 1%.

Repeat step 11 for - INPUT.

Remove signal.

12. ATTENUATOR DC CMRR

Connect TYPE 547 AMPLITUDE CALIBRATOR through the coax T to TYPE 1A7A + and - INPUT. Set both input selectors to DC and adjust for minimum vertical deflection as in table below:

| <u>VOLTS/CM</u> | <u>CALIBRATOR</u> | <u>adjust</u> |
|-----------------|-------------------|---------------|
| 20mV | 2 VOLTS | R205E C205C |
| .2 V | 20 VOLTS | R207E C207C |
| 2 V | 100 VOLTS | R209E C209C |

Remove Cable from coax T.

13. CMRR

a. *Adjust CMRR 125,000:1, min*

Set TYPE 1A7A VOLTS/CM to 1mV. Apply 20V at 100kHz from SINE WAVE GENERATOR to Coax T connector. Adjust C162 for minimum deflection. Set VOLTS/CM to .1mV and adjust C162 for minimum deflection, 1.6cm, max.

b. *Check CMRR 125,000:1, min*

Set SINE WAVE GENERATOR FREQUENCY MULTIPLIER to 10kHz, 1kHz, 100Hz, and 10Hz and note deflection: 1.6cm, max.

c. *Check AC coupled CMRR*
 25,000:1, min @100kHz
 2,500:1, min, @60Hz

Set TYPE 1A7A VOLTS/CM to 1mV and INPUT selectors to AC. Set Sine Wave Generator to 100kHz and note deflection: .8cm, max. Set TYPE 1A7A VOLTS/CM to 10mV. Set Sine Wave Generator to 60Hz and note deflection: .8cm, max.

d. *Check attenuator CMRR 1000:1, min, @100kHz*

Set both INPUT selectors to DC and check as in table:

| <u>Sine Wave Generator</u> | <u>VOLTS/CM</u> | <u>Adjust if necessary</u> | <u>deflection</u> |
|----------------------------|-----------------|----------------------------|-------------------|
| 20 Volts | 20mV | C205C | 1cm |
| 50 Volts | 50mV | | 1cm |
| 100 Volts | .1 Volts | | 1cm |
| 100 Volts | .2 | C207C | 0.5cm |
| 100 Volts | .5 | | 0.2cm |
| 100 Volts | 1 | | 0.1cm |
| 100 Volts | 2 | C209C | 0.1cm |

Remove inputs. Set the - INPUT selector to GND.

14. BANDWIDTH LIMIT*a. Setup*

Set TYPE 1A7A VOLTS/CM to 10mV.
Connect 5cm @1kHz from Sine Wave
Generator to TYPE 1A7A + INPUT.

b. Check 1MHz bandwidth 1MHz, +30% -0%

Set Sine Wave Generator to 1MHz and
note deflection: 3.5cm, min, 4.1cm, max.

c. Check HIGH FREQ -3dB POINT $\pm 10\%$, max

Set the TYPE 1A7A HIGH FREQ -3dB POINT
and the Sine Wave Generator to each front
panel frequency and note deflection: 3.4
cm, min, 3.7cm, max. Set HIGH FREQ -3dB
POINT to 1MHz.

d. Check LOW FREQ -3dB POINT $\pm 10\%$, max

Set TYPE 1A7A LOW FREQ -3dB POINT and Sine
Wave Generator to each front panel frequency
from 10kHz to 1Hz and note deflection: 3.4
cm, min, 3.7cm, max.

Remove input. Set LOW FREQ -3dB POINT to DC.

15. OVERDRIVE RECOVERY*a. Setup*

Set TYPE 1A7A VOLTS/CM to 1mV and + INPUT
selector to GND. Position trace to grati-
cule center. Set plug-in scope TRIGGERING
SLOPE to -, MODE to TRIG TIME/CM to 10 μ SEC,
and LEVEL full ccw. Increase INTENSITY
until a dot appears and position dot to left
edge of graticule. Connect +100V DC from
AMPLITUDE CALIBRATOR through 250:1 divider
to + INPUT.

b. Check overdrive recovery 0.5% in 10 μ S

Set TYPE 1A7A + INPUT selector to DC. After
one second, depress button on 250:1 divider.
Note: trace must return to within 2cm of
graticule center within 10 μ S. See Fig. 1.
Set + INPUT selector to GND.

Set TRIGGERING MODE to AUTO and decrease in-
tensity to normal.

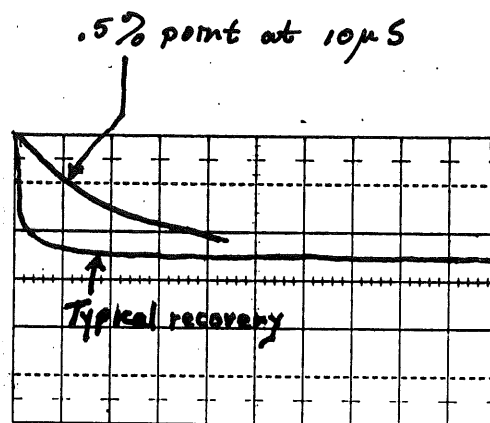


Fig #1

16. DC OFFSET

a. Check + DC OFFSET +.4V, $\pm 7.5\%$, max

Set TYPE 1A7A VOLTS/CM to 10mV, + INPUT selector to DC and DC OFFSET to ON. Rotate COARSE full ccw and note trace returns to graticule.

b. Check -DC OFFSET -.4V, $\pm 7.5\%$, max

Change 250:1 divider to - INPUT. Set + INPUT selector to GND and - INPUT selector to DC. Rotate COARSE full cw and note trace returns to graticule.

Rotate DC OFFSET fine and check for approximately 0.2cm of range.

Remove 250:1 divider. Set DC OFFSET to OFF. Set TIME/CM to .5mSEC.

17. DYNAMIC RANGE AND INPUT OVERLOAD

a. Setup

Connect Sine Wave Generator to TYPE 1A7A - INPUT. Adjust Sine Wave Generator for 4cm @1kHz. Set SAC to 5V +DC and connect through Variable Attenuator to TYPE 1A7A + INPUT. Set + INPUT selector to DC and LOW FREQ -3dB POINT to 10Hz.

b. Check + dynamic range and INPUT OVERLOAD
range: 420mV, min
OVERLOAD light: before overload

Adjust Variable Attenuator until display starts to compress. Note INPUT OVERLOAD light lights before display compresses.

Set TYPE 1A7A - INPUT Selector to GND and VOLTS/CM to .1. Set SAC MODE to square wave and note display amplitude: 4cm, min.

c. Check - dynamic range and INPUT OVERLOAD
range: 420mV, min
OVERLOAD light: before overload

Set SAC MODE to -DC. Set TYPE 1A7A VOLTS/CM to 10mV and -INPUT selector to DC. Adjust Variable Attenuator until display compresses.

17c. (cont'd)

Set SAC MODE to square wave. Set TYPE 1A7A - INPUT selector to GND and VOLTS/cm to .1. Note display amplitude: 4cm, min.

Set LOW FREQ -3dB POINT to DC.

18. DISPLAYED NOISE*a. Setup*

Remove Variable Attenuator from SAC OUTPUT and connect to TYPE 547 CAL OUT. Set AMPLITUDE CALIBRATOR to .2mVOLTS, TIME/CM to 20 μ SEC and TRIGGERING LEVEL full cw. Set TYPE 1A7A VOLTS/CM to .1mV.

*b. Check displayed noise
measured tangentially: 14 μ V, max*

Adjust Variable Attenuator until dark band vanishes. Set AMPLITUDE CALIBRATOR to 2mVOLTS and note display amplitude: 1.4cm, max.

Remove signal. Set TYPE 1A7A + INPUT switch to GND.

19. DRIFT

5 μ V, max, in one min

Set TYPE 1A7A HIGH FREQ -3dB switch to 100Hz. Observe trace shift for \approx one minute: 0.5cm, max

[NOTE: THE FOLLOWING CHECKS ARE NOT DONE ON 100% OF THE INSTRUMENTS BUT ARE DONE ON SAMPLING BASIS]

20. AC LF RESPONSE*a. Setup*

Set TYPE 1A7A + INPUT selector to AC. Connect Sine Wave Generator to + INPUT. Adjust Sine Wave Generator for 5cm @1kHz.

b. Check AC LF response 1.6Hz, max

Set Sine Wave Generator to 2Hz and note display amplitude: 3.85cm, min.

Set Sine Wave Generator to 1kHz.

SIGNAL OUTPUT RESISTANCE*a. Setup*

Connect TYPE 1A7A SIGNAL OUTPUT to TYPE 1A1 with patch cords, Set 1A1 VOLTS/CM to .2. Adjust Sine Wave Generator for 5cm on test scope display.

b. Check SIGNAL OUTPUT resistance:
750 Ω , max

Connect a 1k Ω 1% resistor from TYPE 1A7A SIGNAL OUTPUT to ground. Note test scope display amplitude: 2.9cm, min.

Remove cables from TYPE 1A7A.

THE END