

FACTORY TEST LIMITS

QUALIFICATION

Factory test limits are qualified by the conditions specified in the main body of the calibration procedure. The numbers and letters to the left of the limits correspond to the factory calibration procedure steps where the check or adjustment is made. Instruments may not meet factory test limits if calibration or checkout methods and test equipment differ substantially from those in this procedure.

1. PRELIMINARY INSPECTION
 2. PRESETS
 3. RESISTANCE
 4. POWER SUPPLIES
 - * a. Adjust + and - 16V Supplies: +16V $\pm 0.1V$
 - * -16V $\pm 0.1V$
 - * b. Adjust +16V Ripple: 2mV P-P, max
 - * c. Check Regulation and Ripple:

<u>Supply</u>	<u>Regulation</u>	<u>Ripple</u>
+16V	$\pm 0.1V$	2mV, max
-16V	$\pm 0.1V$	2mV, max
 5. ATTENUATOR BALANCE 2mV shift, max
 6. OUTPUT DC LEVEL POSITION RANGE
 - b. Check OUTPUT DC LEVEL Position Range:
+1.2cm and -1.2cm, min
 7. PROBE UNLOCKED LIGHT
- * Indicates measurement characteristic; test equipment used must be traceable to the NBS for instrument certification.
8. DEGAUSS
 - b. Check Degauss Amplitude: $\geq 550mA$, P-P
 9. CURRENT/DIV BALANCE
 - b. Adjust CURRENT/DIV BALANCE:
 $\leq 1cm$ trace shift
 - c. Check CURRENT/DIV BALANCE Range;
 $\leq 55mA$
 10. GAIN AND CURRENT/DIV ACCURACY
 - * b. Adjust Gain: Gain Accuracy $\pm 2\%$
 - * c. Check CURRENT/DIV Accuracy: $\pm 2\%$
 11. FREQUENCY COMPENSATION & BANDWIDTH
 - b. Adjust Frequency Compensations for optimum response:
Aberrations:
During 1st 100ns, 1mA to 50mA,
3% P-P, max
During 1st 100ns, 100mA to 1A,
5% P-P, max
After 1st 100ns, 1mA to 1A,
3% P-P, max
 - * c. Check Bandwidth: $\geq 50MHz$ @ -3db
 12. DYNAMIC RANGE
 - b. Check AC Dynamic Range: 20A P-P $\pm 5\%$
 - c. Check DC Dynamic Range: + and - 10A
DC with $\leq 5\%$ AC signal compression or expansion
 13. NOISE
 - a. Check Noise: $\leq 0.5mA$
 - b. Check Random Trace Shift: $\leq 1.5mA$ P-P
 14. TEMPERATURE COMPENSATION
 - b. Adjust Temperature Compensation: $\pm 1cm$

1. PRELIMINARY INSPECTION

Check the probe amplifier for unsoldered joints, rosin joints, lead dress and long ends. Check all controls for smooth mechanical operation. Check for proper indexing and knob spacing from front panel.

Check the probe for any scratches, chips or obvious defect. Check that the sliding mechanism opens smoothly and firmly. Release the slide mechanism and note that it returns to a partially closed position and will indicate OPEN. Push the mechanism forward until the CLOSED position is indicated.

Remove the Line Voltage selector cover and check for proper fuses as indicated on back panel.

2. PRESETS

Set the probe amplifier controls:

CURRENT/DIV	1A
CURRENT/DIV BALANCE	midr
OUTPUT DC LEVEL	midr
Int Adjs	R16, R17 and R18 ccw
	All others, midr
Line Voltage Selector	M - 115

Set the TYPE 549 controls with TYPE W installed.

A TIME/CM	5 mSEC
VARIABLE TIME/CM	CAL
HORIZONTAL DISPLAY	A
A TRIGGERING	
LEVEL	cw
STABILITY	cw
MODE	AUTO
SLOPE	+
COUPLING	AC
SOURCE	NORM
ENHANCE MODE	FULL
ENHANCE LEVEL	cw
UPPER SCREEN STORAGE	OFF
LOWER SCREEN STORAGE	OFF
SCREEN SELECTOR	FULL
VIEWING TIME	midr
AUTO ERASE	OFF
NORM - SINGLE	
SWEEP - RESET	NORM

2. (cont'd)

Set the TYPE W controls:

DISPLAY	A-Vc
Vc Range	0
INPUT ATTEN	1
MILLIVOLTS/CM	2
VARIABLE	CALIB
POSITION	centered
A AC-DC-GND	DC
B AC-DC-GND	GND

Set the TYPE 647A controls with the TYPE 10A2A and 11B2A installed.

HORIZONTAL	midr
FINE	midr

Set the TYPE 11B2A controls.

HORIZ DISPLAY	A
TIME/CM AND DELAY TIME	10 μ SEC
TRIG MODE	FREE RUN
TRIGGERING SLOPE	+
TRIGGERING COUPLING	AC
TRIGGERING SOURCE	INT
TRIG LEVEL	cw
HF STABILITY	cw

Set the TYPE 10A2A controls

MODE	CH1
TRIGGER	NORM
CH1 AC-GND-DC	DC
CH1 VOLTS/CM	.05
CH1 VARIABLE VOLTS/CM	CAL
CH1 POSITION	midr

Set the TYPE 1A7 controls:

VOLTS/CM	mVOLTS
VARIABLE VOLTS/CM	CALIBRATED
POSITION	midr
HIGH FREQ 3db POINT	100
LOW FREQ 3db POINT	DC
DC OFFSET	OFF
+ INPUT AC-GND-DC	DC
- INPUT AC-GND-DC	GND

3. RESISTANCE

a. Connect a 50Ω cable with a 50Ω termination attached to the probe amplifier output and check power supply resistance to ground.

<u>Check Point</u>	<u>Approx Resistance</u>
-16V (negative terminal of C177)	300Ω
+16V (positive terminal of C163)	400Ω

b. Select Hall Current Resistors

Connect the multimeter across the red and green lead connections located on the decoupler board. From the resistance measured, select and install the proper current resistors (R10 and R14) as indicated in the chart below:

<u>Measured Hall Resistance</u>	<u>R10 Use 1% Metal Film</u>	<u>R14 Use 1% Metal Film</u>
175Ω - 350Ω	665Ω	618
350Ω - 500Ω	590Ω	536
500Ω - 700Ω	499Ω	453
700Ω - 1000Ω	374Ω	324

Remove Q45, Q44, Q53 and Q54.

4. POWER SUPPLIES

a. Adjust + and -16V Supplies: +16V ±.1V
-16V ±.1V

Connect the probe amplifier to the TYPE 76TU set for 115 VAC and turn POWER ON. Connect the DC Voltage Bridge between ground and +16V supply (positive terminal of C163). Adjust R165 for +16V.

Connect the DC Voltage Bridge between ground and -16V supply (negative terminal of C177). Adjust R180 for -16V.

b. Adjust +16V Ripple: 2mV P-P max

Connect the DC Voltage Bridge between ground and +16V supply. Connect a 50Ω cable from the RIPPLE OUTPUT connector to the TYPE W A input. Adjust R157 for minimum ripple as indicated on the display: 1cm, max.

4. (Cont'd)

c. Check Regulation and Ripple

Using the DC Voltage Bridge and test scope at appropriate settings, check regulation and ripple of supplies as indicated below while varying the TYPE 76TU from 90 VAC to 136 VAC.

<u>Supply</u>	<u>Regulation</u>	<u>Ripple</u>
+16	± 0.1V	2mV, max
-16	± 0.1V	2mV, max

Remove the 50Ω cable from the TYPE W A INPUT.

d. Check Line Voltage Selector Switch

Connect a multimeter across pins 11 and 12 of the power transformer and adjust the TYPE 76TU for 25 VAC. While changing the Line Voltage Selector, check for voltages as indicated in the table below.

<u>Line Voltage Selector</u>	<u>Approx Voltage</u>
115V	
LO	29V
M	25V
HI	23V
230V	
LO	14V
M	12.5V
HI	11V

Return the Line Voltage Selector to 115V, M.

5. ATTENUATOR BALANCE 2mV shift, max

Set the TYPE W MILLIVOLTS/CM to 10. Connect the 50Ω cable with the 50Ω termination from the probe amplifier to the TYPE W A input. While alternately shorting and unshorting to ground the center conductor of J80 (see Note), adjust atten BAL (R84) for minimum trace shift, 2mm, max. Rotate the CURRENT/DIV switch through its range. Check that trace shift does not exceed 2mm, max. Return CURRENT/DIV to the 1A position.

A convenient point to short the center conductor of J80 is on a contact of the rear wafer of the CURRENT/DIV switch. This contact is the termination of the shielded cable connected to J80.

6. OUTPUT DC LEVEL POSITION RANGE

a. *Adjust HF DC Output Level (R93)*

Set the TYPE W MILLIVOLTS/DIV to 50. Set the A AC-DC-GND to GND and with the POSITION control bring the trace to graticule center. Return the A AC-DC-GND to DC and recenter the trace with HF DC Output Level (R93).

b. *Check OUTPUT DC LEVEL Position Range: +1.2cm and -1.2cm, min*

Set the TYPE W INPUT ATTEN to 10. Rotate the probe amplifier OUTPUT DC LEVEL to both extremes. Check that the trace can be positioned +1.2cm and -1.2cm, min. Shut POWER OFF. Connect a multimeter from the junction of C59 and LR58 to ground. Check for approximately 50Ω . Insert Q42, Q44, Q53 and Q54. Turn POWER ON.

7. PROBE UNLOCKED LIGHT

Pull the probe sliding mechanism to the OPEN position and check that the PROBE UNLOCKED light turns on. Push the mechanism forward until its CLOSED position is indicated and check that the PROBE UNLOCKED light turns OFF. Return the probe to the degaussing chamber.

8. DEGAUSS

a. *Setup*

Connect a P6019 Passive Termination set at 2mA/mV position to the TYPE W B input. Connect a P6019 probe to the Passive Termination and attach the probe to the red and black on white wire located on the DEGAUSS switch.

Set the TYPE W DISPLAY control to Vc-B and MILLIVOLTS/CM to 10. Set the scope TIME/CM to 50mSEC.

b. *Check Degauss Amplitude: $\geq 550\text{mA}$, P-P*

While alternately depressing and releasing the DEGAUSS switch, check the display for a damped oscillating waveform that starts with a minimum peak amplitude of 550mA (2.75cm) and decays to zero in approximately 3cm. Remove the P6019 probe and Passive Termination.

9. CURRENT/DIV BALANCE*a. Setup*

Set the TYPE W DISPLAY to A-Vc. Set the INPUT ATTN to 1 and MILLIVOLTS/CM to 50. Set the scope TIME/CM to 1mSEC. Set the trace to graticule center with the probe amplifier OUTPUT DC LEVEL control.

b. Adjust CURRENT/DIV BALANCE: $\leq 1\text{cm}$ trace shift

Set the probe amplifier CURRENT/DIV to .1A, depress and release the DEGAUSS switch and note the direction of trace shift. If shift is in the negative direction, rotate R16 cw to return the trace to graticule center. If positive, rotate R17 cw to return the trace to graticule center. (See Note)

Set CURRENT/DIV to 10mA. Depress and release the DEGAUSS switch. Return the trace to graticule center with the same control (R16 or R17) as used at the .1A position.

Set CURRENT/DIV to 1mA. Depress and release the DEGAUSS switch. Again return the trace to graticule center with the same control (R16 or R17) as used at the .1A and 10mA positions. Remove the probe from the degauss chamber, open and close the probe and return to the chamber. Depress DEGAUSS and check trace shift to be 1cm or less.

c. Check CURRENT/DIV BALANCE Range: $\leq 55\text{mA}$

Set the probe amplifier CURRENT/DIV to 10mA and depress the DEGAUSS switch. Rotate the CURRENT/DIV BALANCE control from one extreme to the other. Check that total trace shift is 5.5cm minimum.

Adjust the CURRENT/DIV BALANCE for no trace shift while rotating the CURRENT/DIV switch through its range.

If the range is less than 5cm, rotate the resistor that was not used in step 9b several degrees in the cw direction. This will cause a trace shift opposite to that used in 9b. Depress and release the DEGAUSS switch and return the trace to the graticule center with the same resistor as that used in 9b. Repeat the last paragraph of 9b and proceed to 9c. This procedure may have to be repeated several times to accomplish proper CURRENT/DIV BALANCE range.

10. GAIN AND CURRENT/DIV ACCURACY*a. Setup*

Remove the 50Ω termination from the TYPE W input (do not disconnect it from the 50Ω cable connected to the probe amplifier OUTPUT) and set A AC-DC-GND to AC. Set the COMPARISON VOLTAGE to 5.00 and the scope TIME/CM to $20\mu\text{SEC}$.

Connect the Current Adapter input cable to the TYPE 190B SIGNAL AND POWER TO ATTENUATOR connector. Set the Current Adapter mA switch to 40mA and the TYPE 190B RANGE SELECTOR to 50KC. Connect a 50Ω cable from the Current Adapter 10V P-P output connector to the TYPE W A INPUT. Set the TYPE W V_c RANGE switch to -11 and adjust the TYPE 190B OUTPUT AMPLITUDE control for approximately 10 volts as indicated on its meter. With the TYPE W POSITION control, set the bottom of the display to the graticule center. Set the V_c RANGE to +11 and adjust the TYPE 190B OUTPUT AMPLITUDE control to position the top of the display to the graticule center. Repeat until the top and bottom of the display fall at the same point on the graticule when the V_c RANGE is switched from -11 to +11.

Set the V_c RANGE to 0, the A AC-DC-GND switch to DC and remove the 50Ω cable. Set the scope TIME/CM to $.5\text{mSEC}$. Connect a 50Ω cable from the Standard Amplitude Calibrator (SAC) to the TYPE W A input. Set the SAC AMPLITUDE control for .2 VOLTS and adjust the TYPE W GAIN for exactly 4cm of deflection. Remove the SAC signal.

Connect the 50Ω termination and cable from the probe amplifier to the TYPE W A input. Set the scope TIME/DIV to $20\mu\text{SEC}$. Set the Current Adapter CURRENT/DIV to the 4mA position and the probe amplifier CURRENT/DIV to 1mA.

10. (Cont'd)

b. *Adjust Gain: Gain Accuracy ±2%*

Connect the probe to the current loop on the Current Adapter and adjust R107 for a 4cm display.

c. *Check CURRENT/DIV Accuracy: ±2%*

Set the Current Adapter CURRENT/DIV switch and the probe amplifier CURRENT/DIV switch as follows and check display amplitude as indicated:

<u>Current Adapter CURRENT/DIV</u>	<u>Probe Amp CURRENT/DIV</u>	<u>Deflection ±.8mm, max</u>
4mA	1mA	4cm
8	2	4cm
20	5	4cm
40	10	4cm
80	20	4cm
200	50	4cm
400	.1 AMP	4cm
800	.2	4cm
2 AMP	.5	4cm
4	1	4cm

Remove the probe from the Current Adapter.

11. FREQUENCY COMPENSATION AND BANDWIDTH

a. *Setup*

Remove the 50Ω termination and cable from the TYPE W and connect them to the TYPE 10A2A CH 1 INPUT. Connect the 50Ω current loop to the TYPE 106 FAST RISE + OUTPUT and attach the probe. Set the probe amplifier CURRENT/DIV to 1mA. Set the TYPE 106 REPETITION RATE RANGE to 10 kHz and adjust the + TRANSITION AMPLITUDE control for a 4cm display. Set the TYPE 11B2A TRIG MODE to NORM and adjust the HF STABILITY and TRIG LEVEL controls for a stable display.

b. *Adjust Frequency Compensations for optimum response: Aberrations*

During first 100ns, 1mA to 50mA, 3% P-P, max

During first 100ns, 100mA to 1A, 5% P-P, max

After first 100ns, 1mA to 1A, 3% P-P, max

Adjust R102 for optimum flat top of the display. Set the TYPE 106 REPETITION RATE RANGE

11b. (Cont'd)

to 100 kHz and the TYPE 11B2A to .1 μ SEC. Set the MAG to X10, position the fast rise portion of the display to the graticule center and adjust R105, R100 and C100 for optimum response. Set the 11B2A TIME/CM to 20 μ SEC. Adjust R18 and R24 for optimum square-wave response.

Remove the 50 Ω current loop with the probe attached and connect it to the TYPE 109 50 Ω OUTPUT. Connect two RG 213/U cables from the CHG LINE 1 and CHG LINE 2 connectors to the TYPE 113 DELAY CABLE.

Set the TYPE 11B2A TIME/CM to .2 μ SEC and adjust the HF STABILITY and TRIG LEVEL controls for a stable display. Adjust the TYPE 109 AMPLITUDE and VOLTAGE RANGE controls for a 5cm display. Check that aberrations with CURRENT/DIV settings from 1mA to 50mA are equal to or less than +3%, -3% but no greater than 3% P-P. Readjustment of the TYPE 109 AMPLITUDE and VOLTAGE RANGE controls will be necessary for each position of the CURRENT/DIV switch.

Set the CURRENT/DIV to .1A and set the TYPE 109 VOLTAGE RANGE to EXT PWR. Connect 2 50 Ω cables from the 0 to 300 V Variable Supply connectors to the CHG LINE 1 and CHG LINE 2 EXT POWER OR MONITOR connectors. Adjust the 0 to 300V VARIABLE control for a 5cm display. Check that aberrations with CURRENT/DIV settings from .1A to 1A are equal to or less than +5%, -5% but no greater than 5% P-P during the first 100ns and are equal to or less than +3%, -3% but no greater than 3% P-P after the first 100ns. Readjustment of the 0 to 300V VARIABLE control is necessary for each position of the CURRENT/DIV switch. With the CURRENT/DIV in the 1A position, adjust the 0 to 300V VARIABLE control for a 3cm display and check aberrations. Remove the 50 Ω Current Loop and probe from the TYPE 109.

c. Check Bandwidth: >50 MHz @ -3db

Connect the 50 Ω Current Loop with probe attached to the TYPE 191 OUTPUT connector. Set the probe amplifier CURRENT/DIV to 5mA and the TYPE 11B2A TIME/CM to .1mSEC. Set the TYPE 191 for a frequency of 50 kHz and adjust its

11c. (Cont'd)

AMPLITUDE and AMPLITUDE RANGE controls for a 4cm display. Increase the frequency until the display amplitude decreases to 2.8 cm. The frequency must be equal to or greater than 50 MHz.

12. DYNAMIC RANGE*a. Setup*

Make test setup as shown in diagram at end of procedure (set the DC Power Supply OFF). Set the TYPE W INPUT ATTEN to 10 and COMPARISON VOLTAGE to 1.00. Set the TYPE 549 TIME/CM to 20 μ SEC. Set the TYPE 11B2A TIME/CM to 50 μ SEC MAG to OFF and TRIG MODE to AUTO. Set the Dynamic Range Current Selector to AC and the probe amplifier CURRENT/DIV to 1A.

b. Check AC Dynamic Range: 20A P-P \pm 5%

Set the Sine Wave Generator to 50 kHz and while observing the display on the TYPE 549, adjust the 50 W Amplifier GAIN control and the Sine Wave Generator AMPLITUDE control for approximately 4cm of deflection. Set the TYPE W INPUT ATTEN to 1 and the Vc RANGE to -11. With the POSITION control, set the bottom of the display to the graticule center. Set the Vc RANGE to +11 and adjust the 50 W Amplifier GAIN control to position the top of the display to the graticule center. Repeat until the top and bottom of the display fall at the same point on the graticule when the Vc RANGE is switched from -11 to +11. Adjust the TYPE 10A2A CH 1 GAIN control for exactly 4cm of deflection as indicated on the TYPE 647A.

Set the TYPE W Vc RANGE to 0 the COMPARISON VOLTAGE to 5.00 and the INPUT ATTEN to 100. Adjust the 50 W Amplifier GAIN control for approximately 2cm of deflection, set the INPUT ATTEN to 1 and Vc RANGE to -11. Using the 50 W Amplifier GAIN control and TYPE W POSITION control, set the bottom of the display to the graticule center. Set the Vc RANGE to +11 and adjust the 50 W Amplifier GAIN control to position the top of the display to the graticule center. Repeat until the top and bottom of the display fall at

12b. (Cont'd)

the same point on the graticule when the Vc RANGE is switched from -11 to +11. Disconnect the 50 Ω cable from the 50 Ω termination at the 10A2A CH 1 INPUT and insert the 5X 50 Ω selected BNC attenuator. Check the TYPE 647A display to be 4cm \pm 5%.

Repeat step 12b at 100kHz.

c. Check DC Dynamic Range: + and -10A DC with \leq 5% AC signal compression or expansion

Remove the 50 Ω cable from the TYPE W A input and connect the 50 Ω termination and cable from the probe amplifier. Set the TYPE W INPUT ATTEN to 1 and the COMPARISON VOLTAGE to 0.25. Set the AC-DC-GND switch to AC. Set the Sine Wave Generator to 1 kHz and the Dynamic Range Current Selector to + (the DC Power Supply is OFF). Adjust the 50 W Amplifier for approximately 1cm of deflection. Set the TYPE W MILLIVOLTS/CM to 1 and Vc RANGE to -1.1. Using the 50 W Amplifier GAIN control and TYPE W POSITION control, set the bottom of the display to the graticule center. Set the Vc RANGE to +1.1 and adjust the 50 W Amplifier GAIN control to position the top of the display to the graticule center. Repeat until the top and bottom of the display fall at the same point on the graticule when the Vc RANGE is switched from -1.1 to +1.1.

Turn the DC Power Supply ON and adjust for 2.5A as indicated on its meter. While changing the TYPE 76TU from 104 - 126 VAC note that the top and bottom of the display remain within 2.5cm of graticule center when the Vc RANGE is switched from -1.1 to +1.1. Set the Dynamic Range Current Selector to - and repeat.

12c. (Cont'd)

Set the DC Power Supply for zero output current and remove the AC signal from the Dynamic Range Current Selector. Set the TYPE W V_c Range to 0, the MILLIVOLTS/CM to 50 and INPUT ATTEN to 1. Set the AC-DC-GND switch to DC. Disconnect the probe and adjust the CURRENT/DIV BALANCE for no trace shift while rotating the CURRENT/DIV switch through its range. Set CURRENT/DIV to .2A and connect the probe to the Dynamic Range Current Selector. Adjust the DC Power Supply for a 2.5cm shift as indicated on the test scope. Rotate the CURRENT/DIV throughout its range, remove the probe and check CURRENT/DIV BALANCE while again rotating the CURRENT/DIV switch through its range. Shift must not exceed 1cm.

13. NOISEa. Check Noise: $\leq 0.5mA$

Set the probe amplifier CURRENT/DIV to 1mA. Connect two 10X 50 Ω attenuators to the TYPE 106 HI AMPLITUDE OUTPUT connector and connect the 50 Ω Current Loop with the probe attached. Remove the 50 Ω termination and cable from the TYPE W and connect to the TYPE 10A2A CH 1 INPUT. Set the 11B2A TIME/CM to .1mSEC and TRIG MODE to FREE RUN. Note that the display consists of two free running traces. Reduce the displayed amplitude with the TYPE 106 AMPLITUDE control until the two traces just merge (the point where the dark band between the traces just vanishes).

Set the probe amplifier CURRENT/DIV switch to 10mA and remove the two 10X attenuators between the TYPE 106 OUTPUT connector and 50 Ω Current Loop. Connect the 50 Ω Current Loop to the OUTPUT connector and check that the displayed amplitude does not exceed 5cm. Remove the probe from the 50 Ω Current Loop.

13. (Cont'd)

b. *Check Random Trace Shift:* 1.5mA P-P

Remove the TYPE W from the TYPE 549 and insert the TYPE 1A7. Set the probe amplifier CURRENT/DIV to 1mA and set the trace to graticule center with the OUTPUT DC LEVEL control. Connect the 50 Ω cable with the 50 Ω termination from the probe amplifier to the TYPE 1A7 + INPUT. Set the scope UPPER SCREEN STORAGE and LOWER SCREEN STORAGE to STORE. Set AUTO ERASE to OFF and the NORM - SINGLE SWEEP - RESET switch to SINGLE SWEEP. Set TIME/CM to 1mSEC and while alternately pressing the ERASE AND RESET switch, decrease the INTENSITY control to the point where a trace is just stored. Set TIME/CM to 5 SEC and push the ERASE AND RESET switch. After one complete sweep check the stored display amplitude to be equal to or less than 1.5cm P-P.

14. TEMPERATURE COMPENSATION

a. *Setup*

Shut the probe amplifier OFF and connect the plug from the Temperature Coefficient Test Fixture into the test socket. Set the Temperature Coefficient Test Fixture as follows: CURRENT PULSE ON-OFF to OFF; R11-R13 to R11; IN-OUT to OUT and RESISTANCE RANGE to 150 k.

14. (Cont'd)

b. Adjust Temp Compensation: $\pm 1\text{cm}$

Turn the probe amplifier ON and set CURRENT/DIV to 10mA. Set the TYPE 549 TRIGGERING MODE to AUTO. Set the LEVEL control to midrange and the STABILITY control to PRE-SET. Press the LOCATE switch and bring the displayed dot to the center vertical graticule line with the probe amplifier CURRENT/DIV BALANCE control. Press the scope ERASE AND RESET switch.

Set the Temperature Coefficient Test Fixture CURRENT PULSE ON-OFF switch ON. After approximately 5 seconds the TIMING LIGHT will come on. Immediately set the switch OFF and depress the DEGAUSS switch on the probe amplifier.

Note the stored display. If the start of the pulse is greater than 1cm in the positive direction and decays back to the center graticule line proceed as follows: Set the Temperature Coefficient Test Fixture IN-OUT switch to IN. Press the scope LOCATE switch and again bring the displayed dot to the vertical graticule center with the probe amplifier CURRENT/DIV BALANCE control. Depress the DEGAUSS switch and the scope RESET switch (not the ERASE AND RESET). Repeat test in previous paragraph and note the display. The second displayed pulse amplitude should be less than the first. The above procedure is repeated decreasing the selected resistance of the RESISTANCE RANGE switch each time until the proper value is found that will bring the probe and amplifier within limits. When the RESISTANCE RANGE switch is set to the VAR position the 0-50 k control is used. When the value of resistance is found for compensation, shut the probe amplifier OFF and remove the Temperature Coefficient Test Fixture plug from the test socket. Select and install a 1%, 1/8 watt metal film resistor of proper value for R11 (see Note).

If the resistance needed is above 50 k ohm, set R12 to 0 resistance (it does not add to the resistance selected). If the resistance needed is below 50 k ohms, select a resistor 5 k ohms below that measured and leave R12 centered. When selected resistor is installed, use R12 for fine adjustment.

14b. (Cont'd)

If the start of the pulse is greater than 1 cm in the negative direction and decays back to the center graticule line: Set the Temperature Coefficient Test Fixture R11-R13 switch to R13 and the IN-OUT switch to IN. The procedure to follow is the same as that used to select R11.

THE FOLLOWING CHECKS ARE NOT MADE ON 100% OF THE INSTRUMENTS. THE PERCENTAGE SAMPLED IS INDICATED AFTER THE STEP TITLE.

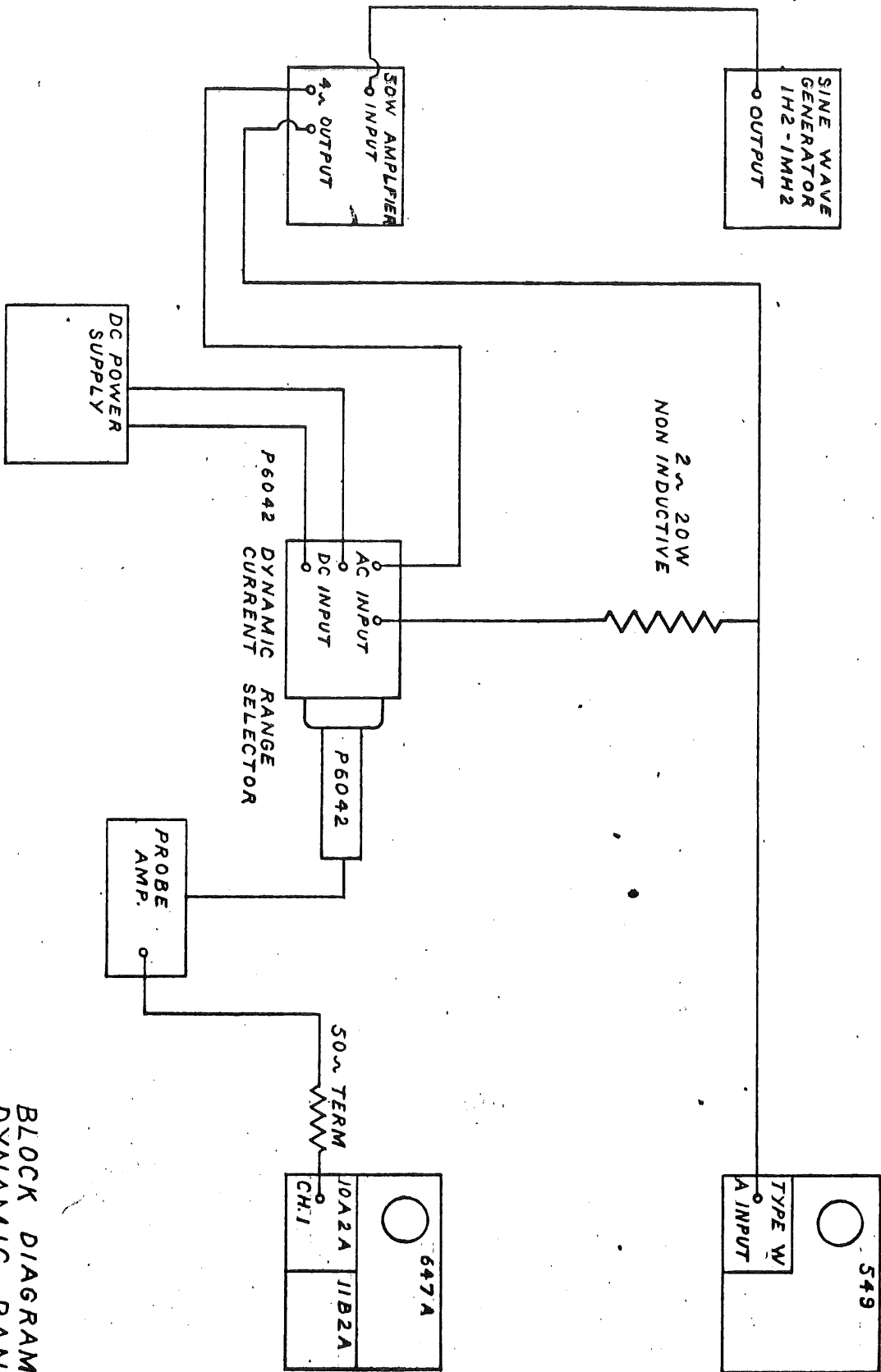
15. VOLTAGE FEEDTHROUGH 1% Sample Check*a. Setup*

Connect a 50 Ω cable with 50 Ω termination from the probe amplifier OUTPUT to the TYPE 10A2A CH 1 INPUT. Set the probe amplifier CURRENT/DIV to 1mA and the TYPE 10A2A CH 1 VOLTS/CM to .05. Connect a 10X probe to the CH 2 INPUT and set CH 2 VOLTS/CM to .1. Set MODE to CH 2 and TRIGGER to NORM. Set both CH 1 and CH 2 AC-GND-DC switches to DC. Set the TYPE 11B2A TIME/CM to .2mSEC and TRIG MODE to FREE RUN.

b. Check Voltage Feedthrough: $\leq 250\mu\text{A/V}$

Connect the Voltage Feedthrough Checker to the TYPE 191 OUTPUT connector and attach the 10X probe. Set the TYPE 191 frequency to 50 MHz and adjust the AMPLITUDE and VOLTAGE RANGE controls for a 4cm display. Remove the 10X probe, set the TYPE 10A2A MODE to CH 1 and attach the current probe. Check the display to be equal to or less than 1cm.

THE END



BLOCK DIAGRAM FOR
 DYNAMIC RANGE TEST
 Dr. By *ER* Date: 7-31-67

