

*TB 9-6625-2069-35

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR PULSE GENERATOR HEWLETT-PACKARD, MODEL 8160A WITH OPTIONS 001 AND 020

Headquarters, Department of the Army, Washington, DC

4 April 2005

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REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: Commander, US Army Aviation and Missile Command, AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also provide DA Form 2028 information to AMCOM via e-mail, fax, or the World Wide Web. Our fax number is DSN 788-6546 or Commercial 256-842-6546. Our e-mail address is 2028@redstone.army.mil. Instructions for sending an electronic 2028 may be found at the back of this manual. For the World Wide Web, use <https://amcom2028.redstone.army.mil>.

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*This bulletin supersedes TB 9-6625-2069-35, dated 23 August 1988 including all changes.

SECTION I IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Pulse Generator, Hewlett-Packard, Model 8160A with Options 001 and 020. The manufacturer's manual was used as the prime data sources in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

a. Model Variations. Option 001 has four rear panel BNC input/output connectors. Option 020 has a second channel that includes delay, width, double pulse, transition times, and output amplifier.

b. Time and Technique. The time required for this calibration is approximately 8 hours, using the dc and low frequency technique.

2. Forms, Records, and Reports

a. Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25.

b. Adjustments to be reported are designated (R) at the end of the sentence in which they appear. When adjustments are in tables, the (R) follows the designated adjustment. Report only those adjustments made and designated with (R).

3. Calibration Description. TI parameters and performance specifications which pertain to this calibration are listed in table 1.

SECTION II EQUIPMENT REQUIREMENTS

4. Equipment Required. Table 2 identifies the specific equipment to be used in this calibration procedure. This equipment is issued with Secondary Transfer Calibration Standards Set AN/GSM-286 or AN/GSM-705. Alternate items may be used by the calibrating activity. The items selected must be verified to perform satisfactorily prior to use and must bear evidence of current calibration. The equipment must meet or exceed the minimum use specifications listed in table 2. The accuracies listed in table 2 provide a four-to-one ratio between the standard and TI. Where the four-to-one ratio cannot be met, the actual accuracy of the equipment selected is shown in parenthesis.

5. Accessories Required. The accessories listed in table 3 are issued as indicated in paragraph 4 above and are used in this calibration procedure. When necessary, these items may be substituted by equivalent items, unless specifically prohibited.

Table 1. Calibration Description

Test instrument parameters	Performance specifications
Period	Range: 20 ns to 999 ms Accuracy: \pm (3% of program value + 0.3 ns), <100 ns \pm (2% of program value), \geq 100 ns
Width	Range: 10 ns to 999 ms ¹ Accuracy: \pm (1% of program value + 1 ns)
Delay	Range: 0 ns to 999 ms (from 50% point of leading edge of trigger pulse to 50% point of leading edge of signal output) Accuracy: \pm (1% of program value + 1 ns), A SEP B, 50 Ω
Double pulse	Range: 20 ns to 999 ms ² Accuracy: \pm (1% of program value + 1 ns)
Transition times	Range: 6 ns to 9.99 ms LEE and TRE Accuracy: \pm (3% of program value + 1 ns), A SEP B, 50 Ω
Output level	Range: -9.89 to +9.99 V (HIL, 50 Ω) -9.99 TO +9.89 V (LOL, 50 Ω) -19.7 to +19.9 V (HIL, 1 k Ω) -19.9 to +19.7 V (LOL, 1 k Ω) Accuracy: \pm (1% of program value + 1% of amplitude +50 mV) at 50 Ω \pm (1% of program value + 1% of amplitude + 100 mV) at 1 k Ω
Pulse aberration	Preshoot, overshoot, ringing \pm (5% of amplitude + 10 mV)

¹Not calibrated above 900 ms.

²Not calibrated above 80 ns.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
FREQUENCY COUNTER	Range: 19.1 ns to 1019 s Accuracy: \pm .075%	Fluke, Model PM6681/656 (PM6681/656)
MULTIMETER	Range: -20.4 to 20.4 V dc Accuracy: \pm 0.05%	Fluke, Model 8840A/AF05 (AN/GSM-64D)
OSCILLOSCOPE	Range: 1 ns to 10.2 ms Accuracy: (\pm 3%)	(OS-303/G)

Table 3. Accessories Required

Common name	Description (part number)
CABLE #1	Hewlett-Packard, Model 08160-61610
EXTENDER BOARD	Hewlett-Packard, Model 08160-66573
TERMINATION	Narda, Model 374BNM (374 BNM)

SECTION III CALIBRATION PROCESS

6. Preliminary Instructions

a. The instructions outlined in paragraphs 6 and 7 are preparatory to the calibration process. Personnel should become familiar with the entire bulletin before beginning the calibration.

b. Items of equipment used in this procedure are referenced within the text by common name as listed in tables 2 and 3.

c. Unless otherwise specified, verify the result of each test and, whenever the test requirement is not met, take corrective action before continuing with the calibration. Adjustments required to calibrate the TI are included in this procedure. Additional maintenance information is contained in the manufacturer's manual for this TI.

d. When indications specified in paragraphs 8 through 14 are not within tolerance, perform the power supply check prior to making adjustments. After adjustments are made, repeat paragraphs 8 through 14. Do not perform power supply check if all other parameters are within tolerance.

e. Unless otherwise specified all controls and controls settings refer to the TI.

7. Equipment Setup

WARNING

HIGH VOLTAGE is used or exposed during the performance of this calibration. DEATH ON CONTACT may result if personnel fail to observe safety precautions. REDUCE OUTPUT(S) to minimum after each step within the performance check where applicable.

NOTE

For option 020, a 4-step operation (parameter, channel/data and entry) is required when changing parameters except when changing pulse period or burst which is a 3-step operation (parameter, data, and entry). For standard model only, a 3-step operation (parameter, data, and entry) is required for all parameters.

NOTE

Remove protective cover when necessary to make adjustments and to locate test points.

- a. Set **VOLTAGE SELECTOR** switch (rear panel) to **115 V** position.
- b. Connect TI to 115 V ac power source.
- c. Press **RCL ON/OFF** pushbutton to **ON** position.

- d. Press **RCL** pushbutton and enter **0** into TI.

NOTE

Disregard display error until all data listed in **e** (1) through (9) below is entered into TI.

- e. Press pushbuttons and enter data as listed in (1) through (12) below: (Both channels for option 020.)

- (1) **PERIOD** to 20 ns.
- (2) **DBL PLS** to 20 ns.
- (3) **DELAY** to 0 ns.
- (4) **WIDTH** to 10 ns.
- (5) **LEE** to 3 ns.
- (6) **TRE** to 3 ns.
- (7) **BURST** to 0.
- (8) **HIL** to 1.0 V.
- (9) **LOL** to -1.0 V.
- (10) **OUTPUT MODE** to **ENABLE, A SEP B**.
- (11) **CHANNEL A** to **NORM, 50 Ω**.
- (12) **CHANNEL B** to **NORM, 50 Ω** (option 020).

- f. Allow 45 minutes for TI to warm up.

- g. Press line **ON/OFF** pushbutton to **OFF** and then press **ON/OFF** pushbutton to **ON**. If TI does not retain data entered in **e** (1) through (12) above, check TI batteries.

- h. Press **OUTPUT MODE** pushbutton to **ENABLE**.

8. Period Accuracy

a. Performance Check

- (1) Connect **TRIG OUTPUT** to frequency counter **A** input and set for period measuring function with 50Ω impedance.
- (2) If frequency counter does not indicate between 19.1 and 20.9 ns, perform **b** below.
- (3) Repeat technique of (2) above, using period data listed in table 4. If frequency counter does not indicate within limits specified for any period data and if adjustments were not performed in (2) above, perform **b** below.

b. Adjustments

- (1) Press **ON/OFF** pushbutton to **OFF** position.
- (2) Remove A23 board (fig. 1) from TI and reconnect, using extender board.

Table 4. Period Accuracy

Test instrument PERIOD data	Frequency counter indications (PERIOD)				
	Min		Max		
99.9 ns	96.6	ns	103.2	ns	
100 ns	98	ns	102	ns	
300 ns	294	ns	306	ns	
500 ns	490	ns	510	ns	
999 ns	979	ns	1019	ns	
1 μ s	0.98	μ s	1.02	μ s	
3 μ s	2.94	μ s	3.06	μ s	
5 μ s	4.90	μ s	5.10	μ s	
9 μ s	8.82	μ s	9.18	μ s	
1 ms	0.98	ms	1.02	ms	
3 ms	2.94	ms	3.06	ms	
5 ms	4.90	ms	5.10	ms	
9 ms	8.82	ms	9.18	ms	
999 ms	979	ms	1019	ms	

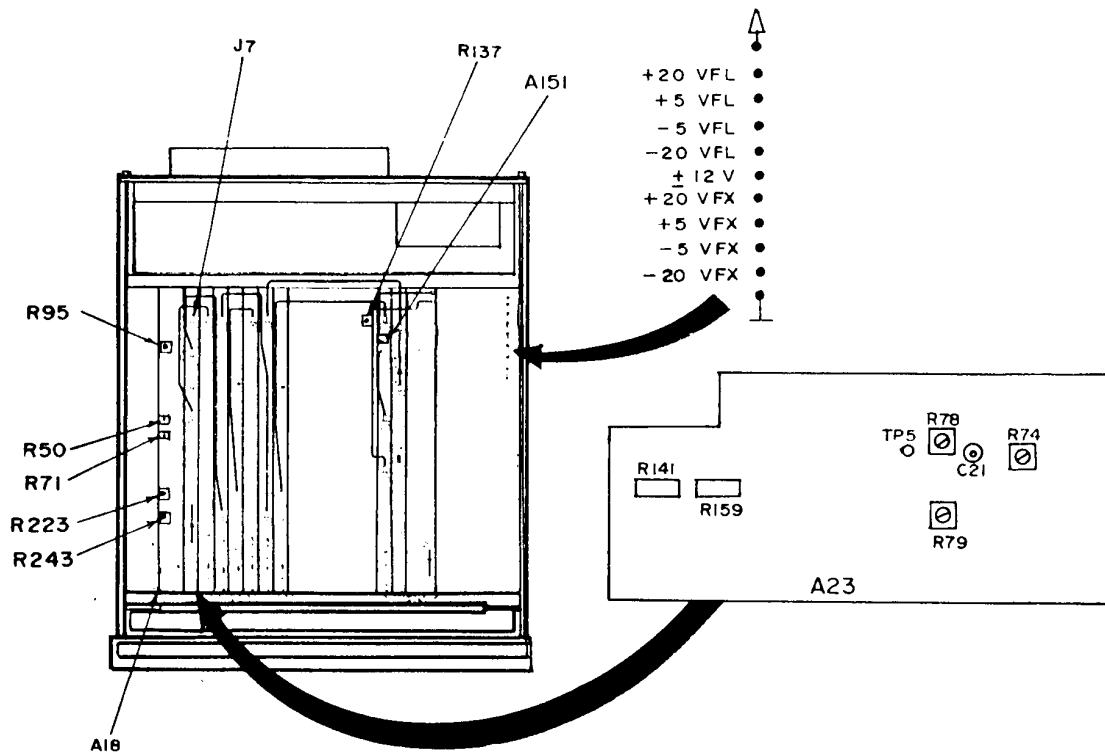


Figure 1. Test instrument - adjustment locations.

- (3) Connect multimeter negative terminal to ground and positive terminal to TP5 (fig. 1).
- (4) Press **ON/OFF** pushbutton to **ON**.
- (5) Press pushbuttons and enter data as listed in (a) through (c) below:

- (a) **DEL** to 0 ns.
 - (b) **WIDTH** to 8 ns.
 - (c) **PERIOD** to 100 ns.
- (6) Adjust R141 (fig. 1) for a $-5\text{ V} \pm 20\text{ mV}$ indication on multimeter (R).
 - (7) Press **PERIOD** pushbutton and enter 99.9 ns. Adjust R159 (fig. 1) for a $-500\text{ mV} \pm 2\text{ mV}$ indication on multimeter.
 - (8) Repeat (5), (6), and (7) above until voltages are within tolerance (R).
 - (9) Disconnect cable A23 J7 (fig. 1) and connect frequency counter to J7 using cable #1.
 - (10) Press **PERIOD** pushbutton and enter 999 ns. Adjust R141 (fig. 1) for a $999\text{ ns} \pm 3\text{ ns}$ indication on frequency counter (R).
 - (11) Press **PERIOD** pushbutton and enter 100 ns. Adjust R79 (fig. 1) for a $99.5\text{ ns} \pm 0.3\text{ ns}$ indication on frequency counter (R).
 - (12) Repeat (10) and (11) above until periods are within tolerance.
 - (13) Press **PERIOD** pushbutton and enter 99.9 ns. Adjust C21 (fig. 1) for a $99.9\text{ ns} \pm 0.3\text{ ns}$ indication on frequency counter (R).
 - (14) Press **PERIOD** pushbutton and enter 20 ns. Adjust R78 (fig. 1) for a $20\text{ ns} \pm 0.1\text{ ns}$ indication on frequency counter (R). Repeat (13) above.
 - (15) Press **PERIOD** pushbutton and enter 20 ns. Record frequency counter indication.
 - (16) Press **PERIOD** pushbutton and enter 35 ns. Record frequency counter indication.
 - (17) Calculate relative error of values recorded in (15) and (16) above.
 - (18) If error at 20 ns is higher, press **PERIOD** pushbutton and enter 20 ns. Adjust R78 for a $20\text{ ns} \pm 0.2\text{ ns}$ indication on frequency counter (R).
 - (19) If error at 35 ns is higher, press **PERIOD** pushbutton and enter 35 ns. Adjust R74 (fig. 1) for a $35\text{ ns} \pm 0.3\text{ ns}$ indication on frequency counter (R).
 - (20) Repeat (15) through (19) until period at 20 and 35 ns are within ± 1.5 percent of setting.
 - (21) Press **PERIOD** pushbutton and enter 99.9 ns. Adjust C21 for a $99.9\text{ ns} \pm 0.3\text{ ns}$ indication on frequency counter (R).
 - (22) Press **ON/OFF** pushbutton to **OFF**.
 - (23) Remove extender board and reconnect A23 board to TI.
 - (24) Replace TI top cover. Press **ON/OFF** pushbutton to **ON** and allow TI to warm- up for 20 minutes. Repeat **8 a** above. It may be necessary to repeat this adjustment procedure.

9. Delay/Double Pulse Accuracy

a. Performance Check

- (1) Connect **OUTPUT A** to oscilloscope channel 1 and connect **TRIG OUTPUT** to oscilloscope channel 2. Set oscilloscope to view both channels.

NOTE

Cables must be of equal length.

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(2) Press pushbuttons and enter data as listed in (a) through (i) below (both channels for option 020).

- (a) **PERIOD** to 100 ns.
- (b) **DELAY** to 0 ns.
- (c) **HIL** to 1 V.
- (d) **LOL** to 0 V.
- (e) **WIDTH** to 10 ns.
- (f) **LEE** to 3 ns.
- (g) **TRE** to 3 ns.
- (h) **BURST** to 0.
- (i) **INPUT MODE** to **NORM**.

(3) Measure delay, between trigger output and pulse at 50 percent amplitude as indicated on oscilloscope (fig. 2). Delay will be ≤ 1 ns.

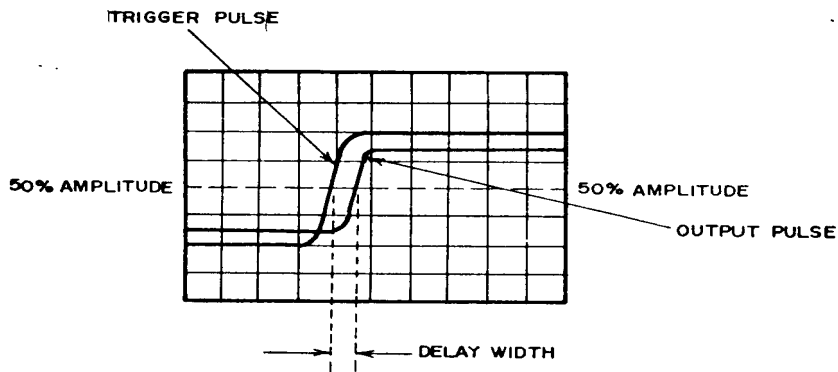


Figure 2. Delay width accuracy.

(4) Repeat technique of (3) above, using **DELAY** data listed in table 6. Oscilloscope indication will be within limits specified.

Table 6. Delay - Low Range

Test instrument DELAY data (ns)	Oscilloscope indications (ns)	
	Min	Max
5.4	4.3	6.5
9.6	8.5	10.7
40	38.6	41.4
50	48.5	51.5
99.9 ¹	97.9	101.9
100	98.0	102.0

¹Set **PERIOD** to 1 μ s.

(5) Press **DBL PLS** pushbutton and enter data of 20 ns.

(6) Measure delay between leading edge of first pulse and leading edge of second pulse, using standard measurement technique. Delay, as indicated on oscilloscope, will be between 18.8 and 21.2 ns.

- (7) Press **DBL PLS** pushbutton and enter data of 80 ns.
- (8) Repeat (6) above. Delay, as indicated on oscilloscope, will be between 78.2 and 81.8 ns.
- (9) Disconnect equipment setup.
- (10) Connect **OUTPUT A** to frequency counter input **B** and connect **TRIG OUTPUT** to frequency counter input **A**.
- (11) Set frequency counter for **TIME A-B** measuring function.
- (12) Press TI pushbuttons and enter data as listed in (a) and (b) below:
 - (a) **PERIOD** to 10 μ s.
 - (b) **DELAY** to 500 ns.
- (13) Press frequency counter **MEASUREMENT RESTART** key. Frequency counter will indicate between 494 and 506 ns.
- (14) Press pushbuttons and enter data as listed in table 7. Frequency counter will indicate within limits specified.
- (15) Repeat (1) through (14) above for **OUTPUT B** (option 020).

Table 7. Delay - High Range

Test Instrument		Frequency Counter Indications			
PERIOD data	DELAY data	Min		Max	
100 μ s	1.00 μ s	989	ns	1011	ns
1.00 ms	50.0 μ s	49.499	μ s	50.501	μ s
500 ms	1.00 ms	990	μ s	1010	μ s
999 ms	500 ms	495	ms	505	ms
999 ms	900 ms	891	ms	909	ms

b. Adjustments. No adjustments can be made.

10. Width Accuracy

a. Performance Check

- (1) Connect **OUTPUT A** to input **A** of frequency counter and set frequency counter for **P WIDTH A** measuring function. Set frequency counter for 50 Ω impedance.
- (2) Set **DELAY** switch to **0 ns** (both channels for option 020).
- (3) Set TI **PERIOD** data to 200 ns and **WIDTH** data to 10 ns.
- (4) Press frequency counter **MEASUREMENT RESTART** key. Pulse width as measured by frequency counter will be between 8.9 and 11.1 ns.
- (5) Repeat technique of (3) and (4) above, using **PERIOD** and **WIDTH** data listed in table 8. Pulse width will be within limits specified.

Table 8. Width Accuracy

Test instrument		Frequency counter indications	
PERIOD data	WIDTH data	Min	Max
200 ns	50 ns	48.5 ns	51.5 ns
200 ns	80 ns	78.2 ns	81.8 ns
1.00 ms	500 ns	494 ns	506 ns
1.00 ms	1.00 μs	989 μs	1011 μs
1.00 ms	50.00 μs	49.5 μs	50.5 μs
999 ms	500 ms	495 ms	505 ms
999 ms	900 ms	891 ms	909 ms

- (6) Repeat (1) through (5) above for **OUTPUT B** (option 020 only).
- (7) Disconnect equipment setup.

b. Adjustments. No adjustments can be made.

11. Transition Time

a. Performance Check

- (1) Connect **OUTPUT A** to oscilloscope channel 1.
- (2) Press pushbuttons and enter data as listed in (a) through (d) below (both channels for option 020).
 - (a) **PERIOD** to 200 ns.
 - (b) **WIDTH** to 50 ns.
 - (c) **LEE** to 6 ns.
 - (d) **TRE** to 6 ns.
- (3) Measure rise and falltime, using standard measurement technique. Rise and falltime, as indicated on oscilloscope, will be between 4.82 and 7.18 ns.
- (4) Repeat technique of (3) above, using TI data settings listed in table 9. Oscilloscope will indicate within limits specified.

Table 9. Transition Time

Test instrument				Oscilloscope indications	
PERIOD data	WIDTH data	LEE data	TRE data	Min	Max
200 ns	50 ns	20 ns	20 ns	18.4 ns	21.6 ns
200 ns	50 ns	30 ns	30 ns	28.1 ns	31.9 ns
10 μs	500 ns	200 ns	200 ns	193 ns	207 ns
1 ms	500 μs	1 μs	1 μs	969 ns	1.03 μs
1 ms	500 μs	100 μs	100 μs	97 μs	103 μs
10 ms	5 ms	1 ms	1 ms	0.970 ms	1.03 ms
100 ms	50 ms	9.9 ms	9.9 ms	9.60 ms	10.2 ms

- (5) Repeat (1) through (4) above for **OUTPUT B** (option 020).

b. Adjustments. No adjustments can be made.

12. Output Level Accuracy

a. Performance Check

- (1) Connect equipment as shown in figure 3.
- (2) Press pushbuttons and enter data as listed in (a) through (l) below: (Both channels for option 020).
 - (a) **PERIOD** to 999 ms.
 - (b) **DBL PLS** to 20 ns.
 - (c) **DELAY** to 0 ns.
 - (d) **WIDTH** to 10 ns.
 - (e) **LEE** to 3 ns.
 - (f) **TRE** to 3 ns.
 - (g) **BURST** to 0.
 - (h) **HIL** to .1 V.
 - (i) **LOL** to 0.0 V.
 - (j) **OUTPUT MODE** to **ENABLE, A SEP B.**
 - (k) **CHANNEL A** to **COMPL** and **50 Ω .**
 - (l) **CHANNEL B** to **COMPL** and **50 Ω** (option 020).

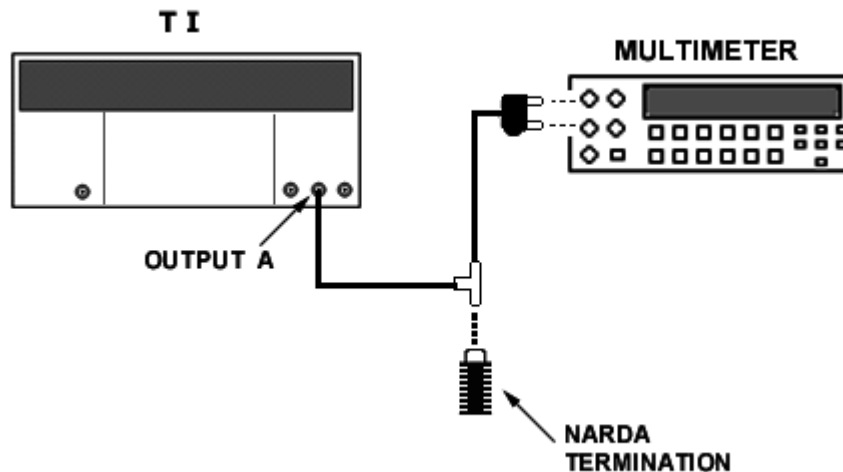


Figure 3. Output - equipment setup.

- (3) Multimeter will indicate between 48 and 152 mV.
- (4) Repeat technique of (2) and (3) above, using data listed in table 10. Multimeter will indicate within limits specified.

Table 10. Output Level Accuracy

Test instrument HIL data (V) or LOL data (-V)	Multimeter indications (dc)			
	Min		Max	
0.49 ¹	430	mV ¹	550	mV ¹
0.99	920	mV	1060	mV
1.99	1.900	V	2.08	V
2.99	2.88	V	3.10	V
3.99	3.86	V	4.12	V
7.99	7.78	V	8.20	V
9.99	9.74	V	10.24	V
10 ²	9.70	V	10.30	V
13	12.64	V	13.36	V
17	16.56	V	17.44	V
19.9	19.40	V	20.40	V

¹When checking **LOL** data, all voltage indications will be negative.

²When checking **CHANNEL A**, press **1kΩ/50 Ω** pushbutton to **1kΩ** and **CHANNEL B**, press **1kΩ/50 Ω** pushbutton to **50 Ω** and visa versa when checking **CHANNEL B**.

NOTE

When checking **HIL** voltage, leave **LOL** at **0.0 V**.

(5) Press pushbuttons and enter data as listed in (a) through (d) below (both channels for option 020).

- (a) **CHANNEL A** for **50 Ω, NORM.**
- (b) **CHANNEL B** for **50 Ω, NORM.**
- (c) **LOL** to - 0.10 V.
- (d) **HIL** to 0 V.

(6) Multimeter will indicate between -48 and -152 mV.

(7) Repeat technique of (5) and (6) above using data listed in table 11. Multimeter will indicate within limits specified.

NOTE

When checking **LOL** voltage leave **HIL** at **0.0 V**.

(8) Press **CHANNEL A** and **CHANNEL B 1kΩ/50 Ω** pushbuttons to **50 Ω**.

(9) Press **LOL** pushbutton to **-1 V**.

(10) Repeat (1) through (9) above for **OUTPUT B** (option 020 only).

b. Adjustments. No adjustments can be made.

13. Amplitude A + B (Option 020 Only)

a. Performance Check

- (1) Connect equipment as shown in figure 3.
 - (2) Press pushbuttons and enter data as listed in (a) through (l) for both A and B channels.
 - (a) **INPUT MODE** to **NORM.**
 - (b) **EXT SLOPE** to **POS.**
 - (c) **PERIOD** to 999 ms.
 - (d) **DELAY** to 0 ns.
 - (e) **WIDTH** to 930 ns.
 - (f) **LEE** to 6 ns.
 - (g) **TRE** to 6 ns.
 - (h) **HIL** to 2.5 V.
 - (i) **LOL** to -2.5 V.
 - (j) **OUTPUT MODE** to **ENABLE A ADD B.**
 - (k) **CHANNEL A** to **50Ω NORM.**
 - (l) **CHANNEL B** to **50Ω, NORM.**
 - (3) Multimeter will indicate between 4.63 and 5.12 V.
 - (4) Repeat technique of (2) and (3) above using **HIL** and **LOL** data listed in table 11. Multimeter will indicate within limits specified.
 - (5) Press **HIL** pushbutton to **2.0 V** and press **LOL** pushbutton to 0.0 V for both channels.
- b. Adjustments.** No adjustments can be made.

Table 11. Output Level Accuracy

Test Instrument (Both Channels)		Multimeter Indications (V)	
HIL data	LOL data	Min	Max
3.75	-3.75	7.0	7.63
4.99	-4.99	9.35	10.1

14. Pulse Aberration

a. Performance Check

- (1) Connect **OUTPUT A** to oscilloscope channel 1. Connect **TRIG OUTPUT** to oscilloscope channel 2 and utilize channel 2 as external trigger.
- (2) Press pushbuttons and enter data as listed in (a) through (h) below (both channels for option 020).
 - (a) **PERIOD** to 1 μs.
 - (b) **DELAY** to 0 ns.
 - (c) **WIDTH** to 500 ns.
 - (d) **LEE** to 5 ns.
 - (e) **TRE** to 5 ns.
 - (f) **HIL** to 9.99 V.

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- (g) **LOL** to 0 V.
- (h) **OUTPUT MODE** to **A SEP B**.

- (3) Set oscilloscope to display one complete cycle.
- (4) Measure preshoot, overshoot, and ringing, using standard measurement technique. If preshoot, overshoot, and ringing exceeds ± 5 percent of pulse amplitude ± 10 mV, perform **b** below.
- (5) Repeat (1) through (4) above for **OUTPUT B** (option 020).

b. Adjustments. Adjust R137 (fig. 1) until preshoot, overshoot, and ringing is within 5 percent or less of pulse amplitude ± 10 mV (R).

15. Power Supply

NOTE

Do not perform power supply check if all other parameters are within tolerance.

NOTE

Test points for power supply are located at right rear inside bottom of TI. To gain access to test points remove right side cover plate (fig. 1).

NOTE

Isolate TI and test equipment from ground during following checks.

CAUTION

Do not short between floating and fixed test points.

a. Performance Check

(1) Connect multimeter negative terminal to TI fixed ground (\perp) and positive terminal to +5 VFX (fig 1). If multimeter does not indicate between 4.99 and 5.01 V, perform **b** (1) below.

(2) Move positive lead to +20 VFX (fig. 1). If multimeter does not indicate between 19.98 and 20.02 V, perform **b** (2) below.

(3) Move positive lead to -20 VFX (fig. 1). If multimeter does not indicate between -19.98 and -20.02 V, perform **b** (3) below.

(4) Disconnect both leads from setup.

(5) Connect multimeter negative terminal to float ground (\downarrow) and positive terminal to +20 VFL (fig. 1). If multimeter does not indicate between 19.98 and 20.02 V, perform **b** (5) below.

(6) Move positive lead to -20 VFL (fig. 1). If multimeter does not indicate between -19.98 and -20.02 V, perform **b** (5) below.

b. Adjustments

- (1) Adjust R95 (fig. 1) for a 5.00 V indication on multimeter (R).
- (2) Adjust R50 (fig. 1) for a 20.00 V indication on multimeter (R).
- (3) Adjust R71 (fig. 1) for a -20.00 V indication on multimeter (R).
- (4) Adjust R223 (fig. 1) for a 20.00 V indication on multimeter (R).
- (5) Adjust R243 (fig. 1) for a -20.00 V indication on multimeter (R).

16. Final Procedure

- a. Deenergize and disconnect all equipment.
- b. Annotate and affix DA label/form in accordance with TB 750-25.

By Order of the Secretary of the Army:

Official



SANDRA R. RILEY

*Administrative Assistant to the
Secretary of the Army*

0504101

PETER J. SCHOOMAKER
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Distribution:

To be distributed in accordance with the initial distribution number (IDN) 342213,
requirements for calibration procedure TB 9-6625-2069-35.

Instructions for Submitting an Electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however, only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" whomever@redstone.army.milT
To: <2028@redstone.army.mil

Subject: DA Form 2028

1. **From:** Joe Smith
2. **Unit:** home
3. **Address:** 4300 Park
4. **City:** Hometown
5. **St:** MO
6. **Zip:** 77777
7. **Date Sent:** 19-OCT -93
8. **Pub no:** 55-2840-229-23
9. **Pub Title:** TM
10. **Publication Date:** 04-JUL-85
11. **Change Number:** 7
12. **Submitter Rank:** MSG
13. **Submitter FName:** Joe
14. **Submitter MName:** T
15. **Submitter LName:** Smith
16. **Submitter Phone:** 123-123-1234
17. **Problem:** 1
18. **Page:** 2
19. **Paragraph:** 3
20. **Line:** 4
21. **NSN:** 5
22. **Reference:** 6
23. **Figure:** 7
24. **Table:** 8
25. **Item:** 9
26. **Total:** 123
27. **Text**

This is the text for the problem below line 27.

