*TB 9-4931-498-40

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR TUNNEL DIODE PULSER TEKTRONIX, TYPE 067-0681-01 AND BALLANTINE, MODEL 61252A

Headquarters, Department of the Army, Washington, DC
29 April 2008

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, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also send in your comments electronically to our E-mail address: 2028@redstone.army.mil or by fax 256-842-6546/DSN 788-6546. For the World Wide Web use: https://amcom2028.redstone.army.mil. Instructions for sending an electronic 2028 can be found at the back of this manual.

*This bulletin supersedes TB 9-4931-498-50, dated 10 October 1990.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test instrument Identification. This procedure provides instructions for the calibration of Tunnel Diode Pulser, Tektronix, Type 067-0681-01 and Ballantine, Model 61252A. The manufacturers' manuals were 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. None.

b. Time and Technique. The time required for this calibration is approximately 1 hour, 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.

Table 1. Calibration Description

Test instrument parameters	Performance specifications
Risetime	≤125 ps
Amplitude	≈250 mV into 50 Ω
Aberrations	<1% in a 1 GHz system
Input	Voltage range: ±60 to 100 V Frequency range: 50 Hz to 100 kHz

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 Reference Calibration Standards Set NSN 4931-00-621-7878. 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 four-to-one accuracy of the equipment selected is shown in parenthesis.

5. Accessories Required. The accessories required for this calibration are common usage accessories issued as indicated in paragraph **4** above, and are not listed in this calibration procedure.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
OSCILLOSCOPE	Risetime: <31 ps	Tektronix, Type 7613 w/7S11, 7T11, and S4 (MIS-35808)
OSCILLOSCOPE CALIBRATOR	Frequency: 10 to 100 kHz High amplitude output: 60 V	Fluke, Model 5820A-5C-GHZ (5820A-5C-GHZ)

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 table 2.

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. Unless otherwise specified, all controls and control 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.

a. Connect **INPUT** to oscilloscope calibrator **CHAN 1** connector.

b. Connect **OUTPUT** to oscilloscope sampling head input connector.

c. Connect **EXT TRIG CHAN 5** to oscilloscope.

d. Energize equipment and allow sufficient time to warm-up and stabilize.

e. Position oscilloscope calibrator controls as listed in (1) through (3) below:

(1) Press the **MODE** softkey to “edge”.

(2) Press the **TDPULSE** softkey to “on”.

(3) Press **OPR/STBY**.

f. Position oscilloscope controls as listed in (1) through (12) below:

(1) **mVOLTS/DIV** switch to **50**.
(2) **DOT RESPONSE** control to center position.
(3) **NORMAL** pushbutton pressed.
(4) **+UP** pushbutton pressed.
(5) **SLOPE** pushbutton to **+**.
(6) **RANDOM** pushbutton pressed.
(7) **TRIG AMP** pushbutton to **Xl0**.
(8) **INT** pushbutton pressed.
(9) **SCAN MAN** pushbutton pressed.
(10) **SWEEP RANGE** switch to **50 ns**.
(11) **TIME/DIV** switch to **5 ns**.
(12) **STABILITY** control to cw.

NOTE
If excessive jitter (greater than 75 ps) is present on leading edge of TI pulse, TI should be repaired.

8. Pulse Characteristics

a. Performance Check

CAUTION
Do not exceed 100 V p-p input to TI.

NOTE
For Ballantine, Model 61252A, always adjust trigger level control to minimum position that will provide an output. If the control is adjusted above minimum triggering position, it will cause pulse to deviate as much as 5 percent from the ideal.

(1) Adjust controls of oscilloscope, oscilloscope calibrator, and TI trigger level control (Ballantine, Model 61252A) for an indication of 1 pulse on oscilloscope display.

NOTE
It may be easier to make the initial sync adjustment in **SCAN REP** mode and then switch to **MAN**.

(2) Adjust **TRIG LEVEL** control on oscilloscope to view the leading edge of the pulse.

(3) Adjust **TIME/DIV** switch towards 50 ps and use **TIME POSITION** control to keep leading edge of pulse visible.

(4) Readjust oscilloscope calibrator, TI trigger level (Ballantine, Model 61252A), and oscilloscope (**LEVEL**) controls for best risetime.

(5) Using standard measurement techniques, measure the pulse risetime, aberrations, and amplitude. The risetime will be 125 ps or less; aberrations will be less than 1 percent, and amplitude will be approximately 250 mV.

b. Adjustments. No adjustments can be made.

9. 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:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
0807004

Distribution:
To be distributed in accordance with STD IDS No. RLC-1500, 2 January 2003, requirements for calibration procedure TB 9-4931-498-40.

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.mil
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.

PIN: 084700-000