*TB 9-6625-2248-35

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR UNIVERSAL COUNTER HEWLETT-PACKARD MODELS 5315A AND 5315B

Headquarters, Department of the Army, Washington, DC
2 December 2002

Approved for public release; distribution is unlimited

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, 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 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.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Universal Counter, Hewlett-Packard, Models 5315A and 5315B. The manufacturer's manual was used as the prime data source in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

a. Model Variations. Model 5315B is designed for rack mounting and has a **REFERENCE INPUT/OUTPUT** 10 MHz jack located on rear panel.

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
Channel A and Channel B	Frequency range: 0 to 100 MHz, dc coupled 30 Hz to 100 MHz, ac coupled Sensitivity: 10 mV rms sine wave to 10 MHz 25 mV rms sine wave to 100 MHz
Channel C (option 003)	Frequency range: 50 to 1000 MHz Sensitivity: 15 mV rms sine wave (-23.5 dBm) to 650 MHz 75 mV rms sine wave (-9.5 dBm) to 1000 MHz

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. 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.

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)
FUNCTION GENERATOR	Range: 10 Hz to 10 MHz Amplitude: 1 to 28 mVp-p	(SG-1288/G)
MULTIMETER	Range: -5.2 to +5 V dc Accuracy: ±.05%	John Fluke, Model 8840A/AF-05/09 (AN/GSM-64D)
SIGNAL GENERATOR	Range: 10 to 1000 MHz Amplitude: 15 to 75 mV	(SG-1207/U)

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. When indications specified in paragraphs **8** and **9** are not within tolerance, perform the power supply check prior to making adjustments. After adjustments are made, repeat paragraphs **8** and **9**. Do not perform power supply check if all other parameters are within tolerance.

e. 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 TI to a 115 V ac power source.

b. Press **POWER STBY/ON** pushbutton to **ON** and allow sufficient time for stabilization.

c. Position controls as listed in (1) through (10) below:

(1) **CHANNEL A** and **CHANNEL B TRIGGER LEVEL/SENSITIVITY** pushbuttons pressed to **SENSITIVITY**.

(2) **CHANNEL A TRIGGER LEVEL/SENS/SENS C** control fully cw.

(3) **CHANNEL B TRIGGER LEVEL/SENS** control fully cw.

(4) **CHANNEL A** and **CHANNEL B AC/DC** pushbuttons pressed to **DC**.

(5) **CHANNEL A** and **CHANNEL B ATTN X1/X20** pushbuttons released to **X1**.

(6) **FILTER NORM/100 kHz** pushbutton released to **NORM**.

(7) **SEP/COM A** pushbutton released to **SEP**.

(8) **GATE TIME/DELAY** control fully ccw but not into detent.

(9) Blue function shift pushbutton released (out).

(10) **FREQ A** pushbutton pressed.

8. Sensitivity Channel A and B

a. Performance Check

(1) Connect function generator **Function Outputs Unbalanced** to TI **INPUT A** using 50Ω feedthrough termination.

(2) Set function generator for a sine wave, 10 Hz, 1 mVp-p, 50Ω output. Increase function generator amplitude until TI displays a stable indication of applied frequency. Function generator amplitude will not exceed 28 mVp-p.

(3) Repeat (2) above for frequencies from 10 Hz to 10 MHz.

(4) Release **CHANNEL A AC/DC** pushbutton to **AC**.

(5) Repeat (2) above for frequencies from 30 Hz to 10 MHz.

(6) Press **CHANNEL A AC/DC** pushbutton to **DC**.

(7) Disconnect function generator from TI.

(8) Connect signal generator **OUTPUT RF** to TI **INPUT A** using 50Ω feedthrough termination.

(9) Set signal generator amplitude to 25 mV and adjust frequency from 10 MHz to 100 MHz. TI will display a stable indication of applied frequency.

(10) Disconnect signal generator from TI.

(11) Connect function generator **Function Outputs Unbalanced** to TI **INPUT A** using 50Ω feedthrough termination.

(12) Press **RATIO A/B** pushbutton and press **SEP/COM A** pushbutton to **COM A**.

NOTE

TI will indicate 1.0 to 1.0000000 for (13) through (20) below depending upon frequency selections.

(13) Set function generator for a sine wave, 10 Hz, 1 mVp-p, 50Ω output. Increase function generator amplitude until TI displays a stable indication. Function generator amplitude will not exceed 28 mVp-p.

(14) Repeat (13) above for frequencies from 10 Hz to 10 MHz.

(15) Release **CHANNEL A** and **CHANNEL B AC/DC** pushbuttons to **AC**.

(16) Repeat (13) above for frequencies from 30 Hz to 10 MHz.

(17) Press **CHANNEL A** and **CHANNEL B AC/DC** pushbuttons to **DC**.

(18) Disconnect function generator from TI.

(19) Connect signal generator **OUTPUT RF** to TI **INPUT A** using 50Ω feedthrough termination.

(20) Set signal generator amplitude to 25 mV and adjust frequency from 10 to 100 MHz. TI will display a stable indication.

b. Adjustments. No adjustments can be made.

9. Sensitivity Channel C (Option 003)

a. Performance Check

(1) Press **FREQ C** pushbutton and adjust **GATE TIME/DELAY** control to **MIN**.

(2) Connect signal generator **OUTPUT RF** to TI **INPUT C**.

(3) Set signal generator amplitude to 15 mV and frequency to 50, 150, 350, and 650 MHz. TI will display a stable indication of applied frequency.

(4) Set signal generator amplitude to 75 mV and frequency to 650, 900, and 1000 MHz. TI will display a stable indication of applied frequency.

b. Adjustments. No adjustments can be made.

10. Power Supply

a. Performance Check

NOTE

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

(1) Connect multimeter **INPUT HI** to +5 V (fig. 1) and **LO** to GND (fig. 1). If multimeter does not indicate between +4.99 and +5.01 V dc, perform **b**(1) below.

(2) Connect multimeter **INPUT HI** to +3 V (fig. 1). If multimeter does not indicate between +2.99 and +3.01 V dc, perform **b**(2) below.

(3) Connect multimeter **INPUT HI** to -5.2 V (fig. 1). If multimeter does not indicate between -5.19 and -5.21 V dc, perform **b**(3) below.

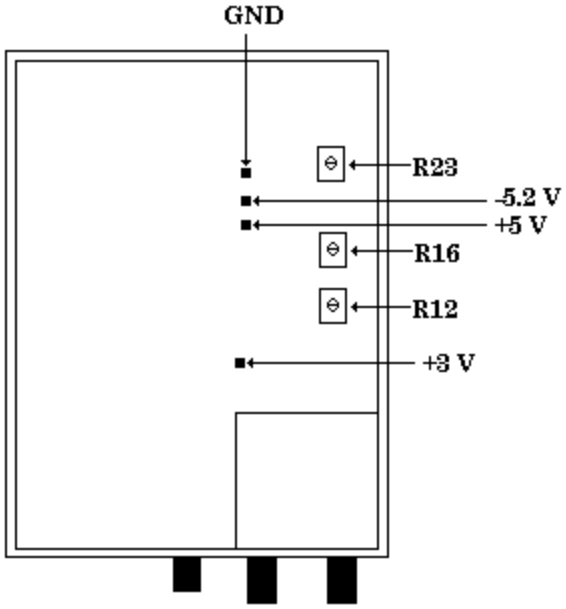

Figure 1. Test instrument - top view.

b. Adjustments

(1) Adjust Rl6 (fig. 1) for +5 V dc (R).

(2) Adjust Rl2 (fig. 1) for +3 V dc (R).

(3) Adjust R23 (fig. 1) for -5.2 V dc (R).

11. Final Procedure

a. Deenergize and disconnect all equipment.

b. Annotate and affix DA label/forms in accordance with TB 750-25.

THESE ARE THE INSTRUCTIONS FOR SENDING 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@avma27.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**: TB 9-6625-xxxx-35
9. **Pub Title**: Calibration Procedure for ...
10. **Publication Date**:
11. Change Number:
12. **Submitted Rank**: MSG
13. **Sumitter 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.

By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

OFFICIAL:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0227703

Distribution:

To be distributed in accordance with initial identification number (IDN) 344353, requirements for calibration procedure TB 9-6625-2248-35.

PIN: 046536-000