*TB 9-6625-1360-24

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR FREQUENCY CONVERTER, HEWLETT-PACKARD MODEL 5253B (CV-2002/U)

Headquarters, Department of the Army, Washington, DC
3 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.

			Paragraph	Page
SECTION	I.	IDENTIFICATION AND DESCRIPTION		
		Test instrument identification	1	2
		Forms, records and reports	2	2
		Calibration description	3	2
	II.	EQUIPMENT REQUIREMENTS		
		Equipment required	4	2
		Accessories required	5	2
	III.	CALIBRATION PROCESS		
		Preliminary instructions	6	3
		Equipment setup	7	3
		Frequency and sensitivity	8	4
		Final procedure	9	5

*This bulletin supersedes TB 9-6625-1360-35, dated 29 June 1979.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Frequency Converter, Hewlett-Packard Model 5253B (CV2002/U). 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. None.

b. Time and Technique. The time required for this calibration is approximately 2 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.

Table 1. Calibration Description

Test instrument parameters	Performance specifications
Frequency range	50 to 512 MHz
Input sensitivity	50 mV rms

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 Sets, AN/GSM-286, AN/GSM-287, AN/GSM-705 or Secondary Reference 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 actual accuracy of the equipment 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 the calibration procedure. The following peculiar accessory is also required for this calibration: Extension Cable (7913217).

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
FREQUENCY COUNTER	Range: 50 μHz to 500 MHz Accuracy: Aging rate (after 24 hour warm-up): $< 5 \times 10^{-10}$ per day	Agilent, Model 5345A (MIS-28754/1 Type 1)
MULTIMETER	Range: 0.1 mV to 10 V ac Accuracy: ± 0.5%	Fluke, Model 8840A/AF05 (AN/GSM-64D)
SIGNAL GENERATOR	Range: 50 to 512 MHz Accuracy: ± 1%	(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. 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. Insert TI into frequency counter.

b. Connect frequency counter to 115 V ac source.

c. Position frequency counter controls as listed in (1) through (3) below:

(1) **SIGNAL INPUT** switch to **PLUG-IN**.

(2) **TIME BASE** switch to **1s**.

(3) **FUNCTION** switch to **FREQUENCY**.

d. Energize equipment and allow 30 minutes for equipment to warm-up and stabilize.

e. Turn frequency counter off and wait 1 minute. If meter pointer on TI does not indicate 0 (zero), remove TI from frequency counter and adjust to 0 (zero) by turning adjustment screw located in hole on top-rear of meter.

f. Repeat **a** above.

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

8. Frequency and Sensitivity

a. Performance Check

(1) Connect signal generator to INPUT connector of TI, using adapter and cable.

(2) Adjust signal generator output to 55 MHz at 100 mV.

(3) Turn TI frequency dial to 50 and tune frequency dial for maximum indication in green portion of meter scale. Frequency counter will indicate approximately 5 MHz.

(4) Reduce signal generator output voltage until TI level indicator meter indicates at red-green border. Frequency counter indication will remain at approximately 5 MHz and signal generator output voltage will be 50 mV or less.

(5) Repeat (2) through (4) above, using settings and indications listed in table 4.

Table 4. Frequency Check

Signal generator setting (MHz)	Test instrument dial setting	Frequency counter indication (MHz)
115	110	5
155	150	5
205	200	5
305	300	5
405	400	5
475	470	5

b. Adjustments

(1) Remove TI from frequency counter and reconnect, using extension cable (B3).

(2) Repeat **a** (1) above.

(3) Adjust signal generator for an output of 472 MHz at 100 mV.

(4) Connect multimeter to XA1pin 15 of connector (fig. 1).

(5) Turn frequency dial to 470 and tune for maximum indication on multimeter.

(6) Adjust signal generator output voltage until TI level indicator meter indicates at red-green border

(7) Adjust A3C5 (fig. 2) for maximum indication on multimeter (R).

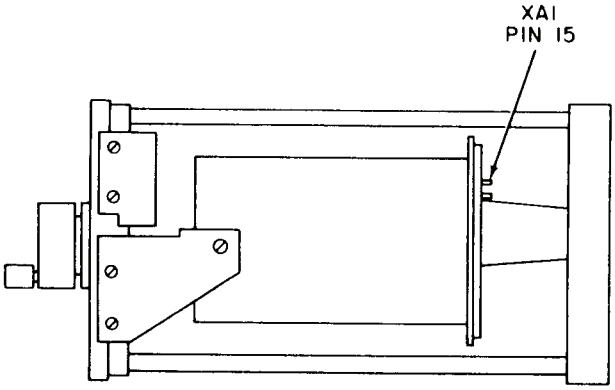

Figure 1. Frequency converter - top view.

NOTE

Tune A3C5 through hole in harmonic generator assembly shield cover.

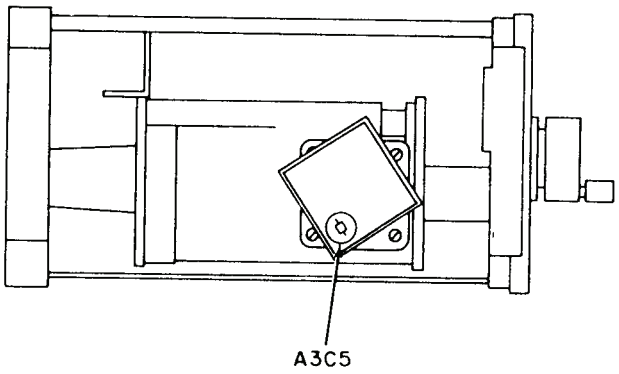

Figure 2. Frequency converter - left side view.

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:

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

Official:

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

0803809

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 343005, requirements for calibration procedure TB 9-6625-1360-24.

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.