TB 9-6625-2133-24

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR CHANNEL ALIGNMENT INDICATOR ID-1189/PR

Headquarters, Department of the Army, Washington, DC
16 October 2007

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 9-6625-2133-35, dated 22 April 1988, including all changes.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Channel Alignment Indicator ID-1189/PR. 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
Meter	Sensitivity: 50 μA Accuracy: ± 2%
Frequency	Range: 47 to 57 MHz Accuracy: ± 0.2 MHz
Voltage regulator stability (power supply)	6 V dc ± 0.4 V dc
Attenuator	Accuracy: ± 1 dB per step

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-287 and AN/GSM-705. Alternate items may be used by the calibrating activity when the equipment listed in table 2 is not available. 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 required for this calibration are common usage accessories, issued as indicated in paragraph **4** above, and are not listed in this calibration procedure. The following peculiar accessory is also required for this calibration: dc power supply, Sorenson, Model 20-250A (MIS-35935).

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
CALIBRATOR	Range: 0.5 to 2 V dc Accuracy: ± .5%	Fluke, Model 5720A (5720A) (p/o MIS-35947); w amplifier, Fluke 5725A/AR (5725A/AR)
FREQUENCY COUNTER	Range: 47 to 57 MHz Accuracy: .1%	Fluke, Model PM6681/656 (PM6681/656)
FUNCTION/ARBITRARY GENERATOR	Range: 5 to 455 kHz	Agilent, Model 33250A (33250A)
MULTIMETER	Range: 1 to 15 V dc Accuracy: ± .5%	Agilent, Model 3458A (3458A)
RESISTANCE STANDARD	Range: 50Ω to 4900Ω Accuracy: ± .5%	Biddle-Gray, Model 71-631 (7910328)
SIGNAL GENERATOR	Range: 10 to 100 MHz Accuracy: ± .4%	Aeroflex, Model 2023B (2023B) or (SG-1207/U)
SPECTRUM ANALYZER	Range: 47 to 57 MHz	(AN/USM-677)

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. Additional maintenance information is contained in 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 dc power supply to TI **XMTR BAT**, observing polarity.

b. Connect multimeter to dc power supply.

c. Set **FUNCTION** switch to **OFF**.

8. Transmitter Battery Circuit Test

a. Performance Check

(1) Set and hold **BAT TEST** switch to **XMTR** position while adjusting dc power supply for an indication exactly on upper edge of yellow area on TI meter. If multimeter does not indicate between 11.86 and 12.14 V dc, perform **b** below.

(2) Release **BAT TEST** switch and adjust dc power supply output fully ccw.

b. Adjustments

(1) Adjust dc power supply for an indication of 12 V dc on multimeter.

(2) Set and hold **BAT TEST** switch to **XMTR** position while adjusting R20 (fig. 1) for a meter indication at the upper edge of yellow area (R).

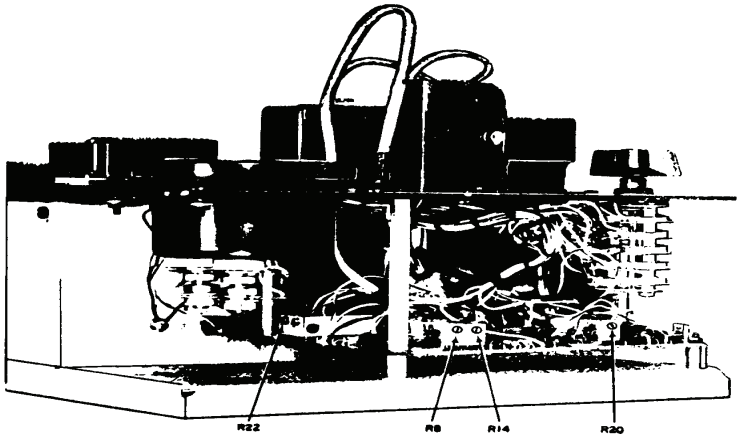

Figure 1. Channel alignment indicator - left side view.

9. Receiver Battery Circuit Test

a. Performance Check

(1) Disconnect dc power supply from **XMIT BAT** and connect to **RCVR BAT**, observing polarity (large pin positive).

(2) Set and hold **BAT TEST** switch to **RCVR** position while adjusting dc power supply for an indication at center of yellow area on TI meter. If multimeter does not indicate between 4.9 and 5.1 V dc, perform **b** below.

(3) Release **BAT TEST** switch and adjust dc power supply output fully ccw.

b. Adjustments

(1) Adjust dc power supply for an indication of 5 V dc on multimeter.

(2) Set and hold **BAT TEST** switch to **RCVR** position while adjusting R14 (fig. 1) for a meter indication at center of yellow area (R).

10. Internal Battery Circuit Test

a. Performance Check

(1) Disconnect dc power supply from **RCVR BAT** and connect to **INTERNAL BATTERY**, observing polarity.

NOTE

Upper left pin is positive, lower right pin is negative, located in TI **INTERNAL BATTERY** compartment.

(2) Set **FUNCTION** switch to **INT BAT**.

(3) Adjust dc power supply for a TI meter indication at lower edge of yellow area. If multimeter does not indicate between 9.8 and 10.2 V dc, perform **b** below.

NOTE

Leave equipment setup connected for use in paragraph **11** below.

b. Adjustments

(1) Adjust dc power supply to 10 V dc.

(2) Adjust R8 (fig. 1) for a meter indication at lower edge of yellow area (R).

11. Dc Voltmeter Sensitivity

a. Performance Check

(1) Connect calibrator to **TEST PROBE TIP** and ground and set TI **FUNCTION** switch to **VFO** or **VCO**.

(2) Set calibrator for an output of 0.0 VDC.

(3) Adjust dc power supply output for a 12-V dc indication on multimeter. If TI meter does not indicate at center **ALIGN** mark, perform **b** below.

(4) Adjust calibrator for extreme right indication on TI meter scale. Calibrator will indicate between +1.25 and +1.4 V dc.

(5) Reverse calibrator leads. Adjust calibrator for extreme left indication on TI meter scale. Calibrator will indicate between -1.25 and -1.4 V dc. Disconnect calibrator from TI and adjust dc power supply output fully ccw.

b. Adjustments. Adjust R22 (fig. 1) for an **ALIGN** indication on meter of TI (R). Repeat technique of (2) through (5) above until no further adjustment is necessary.

12. Transmitter Current Test

a. Performance Check

(1) Disconnect dc power supply from **INTERNAL BATTERY** and connect to **XMTR BAT**, observing polarity.

(2) Connect resistance standard to **XMTR ALIGN** upper right and lower left jacks.

(3) Set **FUNCTION** switch to **XMTR RF.**

(4) Adjust resistance standard to **50Ω**.

(5) Disconnect multimeter from dc power supply output and connect across resistance standard.

(6) Adjust dc power supply to obtain a full-scale deflection on TI meter. Multimeter will indicate between 9.5 and 10.5 V dc or between -9.5 and -10.5 V dc.

(7) Adjust dc power supply output fully ccw.

b. Adjustments. No adjustments can be made.

13. Regulated Voltage Test

a. Performance Check

(1) Disconnect dc power supply from **XMTR BAT**, and connect to **INTERNAL BATTERY** observing polarity.

(2) Disconnect multimeter from resistance standard and connect to dc power supply.

(3) Disconnect resistance standard from **XMIT ALIGN** connection and connect to J11 (large hole positive and small hole negative) (fig. 2).

(4) Set resistance standard to 4900 Ω.

(5) Set **FUNCTION** switch to **RCVR OSC**.

(6) Adjust dc power supply for a 10 V indication on multimeter.

(7) Disconnect multimeter from dc power supply and connect across resistance standard. Multimeter will indicate greater than 5.6 V dc.

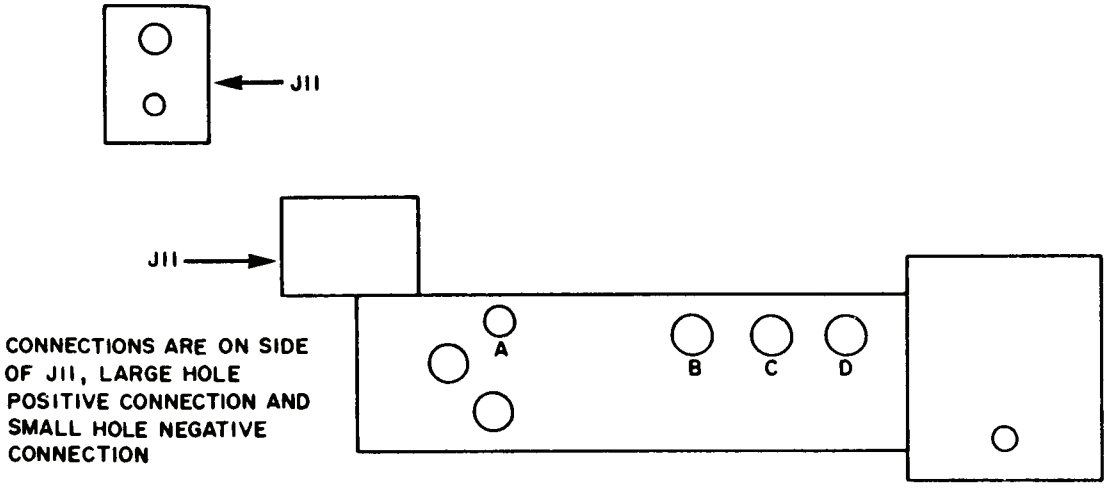

Figure 2. J11 Connection location on receiver alignment test receptacle.

(8) Repeat (2) above and adjust dc power supply for 16.5 V indication on multimeter.

(9) Repeat (7) above. Multimeter will indicate less than 6.4 V dc.

(10) Repeat (2) above and adjust dc power supply for 12 V dc indication on multimeter.

b. Adjustments. No adjustments can be made.

14. Field Strength Monitor Test

a. Performance Check

(1) Disconnect resistance standard and connect signal generator output to **XMTR ANT** socket and chassis ground, using 50 Ω feedthrough.

(2) Set **FUNCTION** switch to **XMTR ANT**.

(3) Adjust signal generator frequency for 51 MHz and output for 200 mV. TI meter will indicate between left and right **ALIGN** marks.

(4) Disconnect signal generator setup from TI.

b. Adjustments. No adjustments can be made.

15. Signal Generator Output and Attenuation Test

a. Performance Check

(1) Connect spectrum analyzer to **RCVR ANT** jack and ground.

(2) Position controls as listed in (a) through (c) below:

(a) **FUNCTION** switch to **RCVR ANT.**
(b) **FREQUENCY MC** dial to **52**.
(c) **RCVR TEST SIG**. fully cw.

(3) Adjust spectrum analyzer for a 52 MHz display on crt. Spectrum analyzer will indicate between -52 and -49 dBm. Record dBm reading, this is a reference reading.

(4) Set **RCVR TEST SIG** switch ccw one stop. Spectrum analyzer will indicate a reading between -10.5 and -8.5 dBm difference from reference recorded in (3) above. Record dBm reading.

(5) Set **RCVR TEST SIG** switch ccw one stop. Spectrum analyzer will indicate a reading between -10.5 and -8.5 dBm difference from reference recorded in (4) above. Record dBm reading.

(6) Set **RCVR TEST SIG** switch ccw one stop. Spectrum analyzer will indicate a reading between -10.5 and -8.5 dBm difference from reference recorded in (5) above.

(7) Disconnect spectrum analyzer setup from TI.

b. Adjustments. No adjustments can be made.

16. Receiver Output Circuit Test

a. Performance Check

(1) Turn off dc power supply and connect calibrator positive lead to **RCVR OUTPUT** plug tip, and negative lead to chassis.

(2) Set **FUNCTION** switch to **SQUELCH**.

(3) Adjust calibrator for an indication at right **ALIGN** marker. Calibrator will indicate between 1.71 and 1.89 V dc.

b. Adjustments. No adjustments can be made.

17. OSC Circuit Check

a. Performance Check

(1) Connect calibrator positive lead to ground and negative lead to **TEST PROBE** tip.

(2) Set **FUNCTION** switch to **OSC**.

(3) Adjust calibrator for an indication of **ALIGN** on TI meter. Calibrator will indicate between 1.7 and 2 V dc.

(4) Remove calibrator setup from TI.

b. Adjustments. No adjustments can be made.

18. Coarse RF Check

a. Performance Check

(1) Connect **50Ω** output of function/arbitrary generator to **TEST PROBE** tip and ground, using 50 feedthrough termination.

(2) Set **FUNCTION** switch to **COARSE RF**. Adjust dc power supply for 12 V dc indication on multimeter.

(3) Adjust function/arbitrary generator frequency for 455 kHz and output to indicate **ALIGN** on TI meter. Function/arbitrary generator meter will indicate between 0.2 and 0.4 V.

b. Adjustments. No adjustments can be made.

19. Fine RF Check

a. Performance Check

(1) Disconnect function/arbitrary generator from **TEST PROBE** tip and connect to **RCVR OUTPUT** plug tip.

(2) Set **FUNCTION** switch to **FINE RF**.

(3) Adjust function/arbitrary generator frequency for 5 kHz and output for 350 mV. Meter on TI will Indicate between 1/4 and 3/4 full scale.

(4) Disconnect function/arbitrary generator setup from TI.

b. Adjustments. No adjustments can be made.

20. Output Frequency

a. Performance Check

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

(a) **FUNCTION** switch to **RCVR ANT**.
(b) **RCVR TEST SIG** control fully cw.
(c) **FREQUENCY MC** control to **47 MHz**.

(2) Connect **RCVR ANT** jack and ground to frequency counter.

(3) Verify that frequency counter indicates between 46.8 and 47.2 MHz.

(4) Adjust dc power supply for a +10-V dc indication on multimeter and verify frequency remains in tolerance.

(5) Adjust dc power supply for 12 V dc indication on multimeter and repeat technique of (3) and (4) above for frequency settings listed in table 3.

Table 3. Output Frequency Accuracy

Test instrument frequency MC dial settings	Spectrum analyzer indications (MHz)	
	Min	Max
52	51.8	52.2
57	56.8	57.2

(6) Connect **RCVR ANT** jack and ground to spectrum analyzer.

(7) Adjust spectrum analyzer for a 47 MHz indication on crt. Establish a frequency reference on crt.

(8) Disconnect cable from TI and connect to signal generator. Adjust frequency of signal generator to reference established in (7) above. Signal generator display will indicate between 46.8 and 47.2 MHz.

(9) Repeat technique of (4) and (6) through (8) above, for frequency settings listed in table 3.

b. Adjustments. No further adjustments can be made.

21. 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

0723401

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 342241, requirements for calibration procedure TB 9-6625-2133-24.

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.

PIN: 084259-000