TB 9-5915-214-35

CHANGE 2

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR TUNABLE ACTIVE FILTER KROHN-HITE, MODEL 3940

Headquarters, Department of the Army, Washington, DC
21 December 2006

TB 9-5915-214-35, 6 October 2004, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	**Insert Pages**
13 through 16	13 through 16

2. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the Secretary of the Army
0629807

Distribution:

To be distributed in accordance with IDN 344728, requirements for calibration procedure TB 9-5915-214-35.

TB 9-5915-214-35

CHANGE 1

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Headquarters, Department of the Army, Washington, DC
13 September 2005

TB 9-5915-214-35, 6 October 2004, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page.

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By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

SANDRA R. RILEY
Administrative Assistant to the Secretary of the Army

0519606

Distribution:
To be distributed in accordance with IDN 344728, requirements for calibration procedure TB 9-5915-214-35.

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DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR TUNABLE ACTIVE FILTER KROHN–HITE, MODEL 3940

Headquarters, Department of the Army, Washington, DC
6 October 2004

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.

*This bulletin supersedes TB 9-5915-214-35, dated 25 July 2001, including all changes.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Tunable Active Filter, Krohn–Hite, Model 3940. 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. Variations, among models, are described in text.

b. Time and Technique. The time required for this calibration is approximately 4 hours, using the dc and low frequency technique.

2. Forms, Records, and Reports. Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750–25.

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	20 Hz to 2 MHz
Cutoff frequency accuracy	±2%, 20 Hz to 500 kHz; ±5%, 500 kHz to 2 MHz
Relative Gain	Butterworth, -3 db; Bessel, -7.58 db; ±2%
Rate of attenuation	24 dB per octave
Insertion loss	± .5 dB, 0 to 2 MHz
Noise	Less than 200 μV with a detector bandwidth of 2 MHz
Maximum attenuation	Greater than 80 dB
Power supply	0 V, ±1 mV; -15 V to +1 V, ± .05 V

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. 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 accessories are required for this calibration: two 50 Ω feedthrough terminations, BNC plug to BNC jack, Hewlett-Packard Model 11048C (11048C), and the TI accessories 6 kHz high-pass and 2 MHz low-pass filters.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
CALIBRATOR	Range: 20 Hz to 1 MHz Accuracy: ±.25%	Fluke, Model 5720A (5700A/EP) (p/o MIS–35947); w amplifier, Fluke 5725A/AR (5725A/AR)
DIGITAL MULTIMETER	Range: 0 to 5 V dc Accuracy: ±.025%	Fluke, Model 8840A/AF-05/09 (AN/GSM-64D)
TRUE RMS VOLTMETER	Range: -2 to -25.4 dB Accuracy: ±.25%	Fluke, Model 8922A/AA (8922A/AA)

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 results 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 **7** through **12** are not within tolerance, perform Section IV, Adjustment Process. After adjustments are made, repeat paragraphs **7** through **12.** Do not perform Section IV 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 the 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 source.

NOTE

When **POWER** rocker switch is pressed to **ON**, TI automatically performs a self-test sequence. Upon successful completion of self-test, TI will be in normal operating mode.

b. Press **POWER** pushbutton to **ON** and allow at least 20 minutes for equipment to warm up.

NOTE

Perform dc adjustment checks **c** through **u** below for both **CH 1** and **CH 2**. When performing **CH 2** adjustments, add the number 200 to all resistor and capacitor references. For example referenced in step **g** below for **CH 1** is R253. When performing the same procedure for **CH 2**, the resistor would be R453.

NOTE

When performing **CH 1** adjustments, TP 4 is referenced; when performing **CH 2** adjustments, TP 11 needs to be referenced. When performing **CH 1** adjustments, TP 2 is referenced; when performing **CH 2** adjustments, TP 9 needs to be referenced.

c. Short rear panel **CH 1 INPUT**.

d. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **h.P**.

e. Press **OUTPUT GAIN(db) Δ** control key until display indicates **20**.

f. Connect digital multimeter to rear panel **CH 1 OUTPUT**.

g. Adjust DC ADJ R253 (fig. 2), located to the right of rear panel **CH 1 OUTPUT BNC** connector for digital multimeter indication of 0 V dc ±1 mVdc.

h. Press **OUTPUT GAIN(db) ∇** control key until display indicates **00**.

i. Adjust R268 (fig. 2) until multimeter indicates between 0 V dc ±1 mVdc.

j. Repeat **e** and **g** above.

k. Repeat **h** and **i** above.

l. Press corresponding keys as listed in (1) through (3) below and verify **CUTOFF FREQUENCY** indicates **2.000**.

(1) **2** data entry key.

(2) **KILO** parameter key.

(3) **FREQ** parameter key.

m. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **L.P**.

n. Press **SHIFT** parameter key.

o. Press **TYPE** parameter key; **dC** should be displayed in the **CUTOFF FREQUENCY** display. If **CUTOFF FREQUENCY** display does not indicate **dC**, repeat steps **n** and **o** until **dC** is displayed.

p. Press **INPUT GAIN(db)** Δ control key until display indicates **20**.

q. While switching the **INPUT GAIN(db)** ∇ Δ controls between **20** and **00**, adjust R105 (fig. 2) for no change ±1 mVdc.

r. Press **INPUT GAIN(db)** ∇ control key until display indicates **00**.

s. Adjust R176 (fig. 2) for digital multimeter indication of 0 V dc ±1 mVdc.

t. Repeat **c** through **s** above for **CH2**.

u. Disconnect equipment setup.

8. Low Pass/High Pass Response

a. Performance Check

NOTE

Perform procedures of paragraphs **8** through **11** using **CH 1**, then repeat procedures using **CH 2**.

(1) Connect calibrator to **INPUT CH 1**.

(2) Connect true rms voltmeter to **OUTPUT CH 1**.

(3) Press **TYPE** parameter key until **CUTOFF FREQUENCY** display indicates **bu**.

(4) Press **INPUT(db)** ∇ and **OUTPUT GAIN(db)** ∇ control keys until displays indicate **00**.

(5) Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **L.P**.

(6) Press corresponding keys as listed in (a) through (c) below and verify **CUTOFF FREQUENCY** indicates **1.000**.

(a) **1** data entry key.
(b) **KILO** parameter key.
(c) **FREQ** parameter key.

(7) Adjust calibrator for a 100 Hz, 1 V output and reference true rms voltmeter to 0 dB.

(8) Adjust calibrator for initial output of 1 kHz, 1 V output and then adjust calibrator frequency to obtain a -3 dB true rms voltmeter indication. If calibrator frequency does not indicate 1 kHz, ±20 Hz, perform **b** below.

(9) Adjust calibrator for initial output of 2 kHz, 1 V output and then adjust calibrator frequency to obtain a -24 dB true rms voltmeter indication. If calibrator frequency does not indicate 2 kHz, ±40 Hz, perform **b** below.

(10) Press **TYPE** parameter key until **CUTOFF FREQUENCY** display indicates **bES**.

(11) Adjust calibrator for initial output of 2 kHz, 1 V output and then adjust calibrator frequency to obtain a -25.4 dB true rms voltmeter indication. If calibrator frequency does not indicate 2 kHz, ±40 Hz, perform **b** below.

(12) Adjust calibrator for initial output of 1 kHz, 1 V output and then adjust calibrator frequency to obtain a -7.6 dB true rms voltmeter indication. If calibrator frequency does not indicate 1 kHz, ±20 Hz, perform **b** below.

(13) Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **h.P**.

(14) Press **TYPE** parameter key until **CUTOFF FREQUENCY** display indicates **bu**.

(15) Adjust calibrator for a 10 kHz, 1 V output and reference true rms voltmeter to 0 dB.

(16) Adjust calibrator for initial output of 1 kHz, 1 V output and then adjust calibrator frequency to obtain a -3 dB true rms voltmeter indication. If calibrator frequency does not indicate 1 kHz, ±20 Hz, perform **b** below.

(17) Adjust calibrator for initial output of 500 Hz, 1 V output and then adjust calibrator frequency to obtain a -24 dB true rms voltmeter indication. If calibrator frequency does not indicate 500 Hz, ±10 Hz, perform **b** below.

(18) Press **TYPE** parameter key until **CUTOFF FREQUENCY** display indicates **bES**.

(19) Adjust calibrator for initial output of 500 Hz, 1 V output and then adjust calibrator frequency to obtain a -25.4 dB true rms voltmeter indication. If calibrator frequency does not indicate 500 Hz, ±10 Hz, perform **b** below.

(20) Adjust calibrator for initial output of 1 kHz, 1 V output and then adjust calibrator frequency to obtain a -7.6 dB true rms voltmeter indication. If calibrator frequency does not indicate 1 kHz, ±20 Hz, perform **b** below.

(21) Repeat technique of (1) through (20) above for **CH 2**.

b. Adjustments. Perform adjustments as indicated in Section IV if not previously performed.

9. Cutoff Frequency Accuracy

a. Performance Check

(1) Connect calibrator to **INPUT CH 1**.

(2) Connect true rms voltmeter to **OUTPUT CH 1**.

(3) Press **TYPE** parameter key until **CUTOFF FREQUENCY** display indicates **bu**.

(4) Press **INPUT(db)** ∇ and **OUTPUT GAIN(db)** ∇ control keys until displays indicate **00**.

(5) Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **L.P**.

(6) Press corresponding keys as listed in (a) through (c) below and verify **CUTOFF FREQUENCY** indicates **1.000**.

(a) **1** data entry key.
(b) **KILO** parameter key.
(c) **FREQ** parameter key.

(7) Adjust calibrator for a 50 Hz, 1 V output and reference true rms voltmeter to 0 dB.

(8) Adjust calibrator for initial output of 1 kHz, 1 V output and then adjust calibrator frequency to obtain a -3 dB true rms voltmeter indication. If calibrator frequency does not indicate 1 kHz, ±20 Hz, perform **b** below.

(9) Press corresponding keys as listed in (a) through (e) below and verify **CUTOFF FREQUENCY** indicates **100.0**.

(a) **1** data entry key.
(b) **0** data entry key.
(c) **0** data entry key.
(d) **KILO** parameter key.
(e) **FREQ** parameter key.

(10) Adjust calibrator for initial output of 100 kHz, 1 V output and then adjust calibrator frequency to obtain a -3 dB true rms voltmeter indication. If calibrator frequency does not indicate 100 kHz, ±2 kHz, perform **b** below.

(11) Press corresponding keys as listed in (a) through (e) below and verify **CUTOFF FREQUENCY** indicates **500.0**.

(a) **5** data entry key.
(b) **0** data entry key.
(c) **0** data entry key.
(d) **KILO** parameter key.
(e) **FREQ** parameter key.

(12) Adjust calibrator for a 500 kHz, 1 V output and adjust frequency to obtain a -3 dB true rms voltmeter indication. If calibrator frequency does not indicate 500 kHz, ±10 kHz, perform **b** below.

(13) Press corresponding keys as listed in (a) through (c) below and verify **CUTOFF FREQUENCY** indicates **1.000.**

(a) **1** data entry key.
(b) **MEGA** parameter key.
(c) **FREQ** parameter key.

(14) Adjust calibrator for initial output of 1 MHz, 1 V output and then adjust calibrator frequency to obtain a -3 dB true rms voltmeter indication. If calibrator frequency does not indicate 1 MHz, ±50 kHz, perform **b** below.

(15) Repeat (5) through (14) above, except make the following changes as listed in (a) and (b) below:

(a) In step (5), press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **h.P**.

(b) In step (7) adjust calibrator for a 20 kHz, 1 V output and reference true rms voltmeter to 0 dB.

(16) Repeat technique of (1) through (15) above for **CH 2**.

b. Adjustments. Perform adjustments as indicated in Section IV if not previously performed.

10. Stopband Attenuation

NOTE

If TI covers have been removed, the covers need to be re-installed to minimize outside distortion.

a. Performance Check

(1) Connect calibrator to **INPUT CH 1**.

(2) Connect true rms voltmeter to **OUTPUT CH 1** using 6 kHz high-pass filter.

(3) Press **TYPE** parameter key until **CUTOFF FREQUENCY** display indicates **bu**.

(4) Press **INPUT(db)** ∇ and **OUTPUT GAIN(db)** ∇ control keys until displays indicate **00**.

(5) Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **h.P**.

(6) Press corresponding keys as listed in (a) through (c) below and verify **CUTOFF FREQUENCY** indicates **1.000**.

(a) **1** data entry key.
(b) **KILO** parameter key.
(c) **FREQ** parameter key.

(7) Adjust calibrator for a 20 kHz, 3 V output and reference true rms voltmeter to 0 dB.

(8) Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **L.P**.

(9) If true rms voltmeter does not indicate –80 dB or less, perform **b** below.

(10) Repeat technique of (1) through (9) above for **CH 2**.

b. Adjustments: Perform adjustments as indicated in Section IV if not previously performed.

11. Noise Level

NOTE

If TI covers have been removed, the covers need to be re-installed to minimize outside distortion.

a. Performance Check

(1) Short **INPUT CH 1**.

(2) Press **INPUT(db)** ∇ and **OUTPUT GAIN(db)** ∇ control keys until displays indicate **00**.

(3) Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **L.P**.

(4) Press **TYPE** parameter key until **CUTOFF FREQUENCY** display indicates **bu**.

(5) Press corresponding keys as listed in (a) through (c) below and verify **CUTOFF FREQUENCY** indicates **2.000**.

(a) **2** data entry key.

(b) **MEGA** parameter key.

(c) **FREQ** parameter key.

(6) Connect true rms voltmeter to **OUTPUT CH 1** using 2 MHz low-pass filter.

(7) If true rms voltmeter does not indicate <200 μV, perform **b** below.

(8) Press corresponding keys as listed in (a) through (e) below and verify **CUTOFF FREQUENCY** indicates **200.0**.

(a) **2** data entry key.

(b) **0** data entry key.

(c) **0** data entry key.

(d) **KILO** parameter key.

(e) **FREQ** parameter key.

(8) If true rms voltmeter does not indicate <200 μV, perform **b** below.

(9) Repeat technique of (1) through (8) above for **CH 2**.

b. Adjustments. Perform adjustments as indicated in Section IV if not previously performed.

12. Final Procedure

a. Deenergize and disconnect all equipment.

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

SECTION IV
ADJUSTMENT PROCESS

13. Preliminary Instructions. The procedure in paragraphs **14** through **19** should be performed only if an out-of-tolerance condition exists in paragraphs **7** through **12** above.

14. Equipment Setup

WARNING

HIGH VOLTAGE is used or exposed during the performance of the 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. Remove top and bottom protective covers from TI to gain access to test points and to make adjustments if necessary.

b. Connect TI to a 115 V ac source.

c. Press **POWER** pushbutton to **ON** and allow at least 20 minutes for equipment to warm up.

15. Power Supply And dc Adjustments

a. Connect digital multimeter to microprocessor card TP 6 and card ground (fig. 1).

b. Adjust R105 (fig. 1), located to the left of the rear panel **CH 1 INPUT BNC** connector for digital multimeter indication of -15 V ±0.05 V.

c. Connect digital multimeter to microprocessor card TP 5 and card ground (fig. 1).

d. Adjust R102 (fig. 1) for digital multimeter indication of +15 V ±0.05 V.

e. Connect digital multimeter to microprocessor card TP 7 and TP 8 individually, and card ground (fig. 1).

f. Verify digital multimeter indicates +5 V ±0.2 V for both test points.

16. 1st Quadriatic Frequency

NOTE

Perform procedures of paragraphs **16** through **19** using **CH 1**, then repeat procedures using **CH 2**. When performing **CH 2** adjustments, add the number **200** to all capacitor or resistor references. For example referenced in step **j** below for **CH 1** is C167. When performing the same procedure for **CH 2**, the capacitor would be C367.

a. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **L.P**.

b. Press **INPUT(db)** ∇ and **OUTPUT GAIN(db)** ∇ control keys until displays indicate **00**.

c. Press **TYPE** parameter key until **CUTOFF FREQUENCY** display indicates **bu**.

d. Press **SHIFT** parameter key.

e. Press **TYPE** parameter key; **dC** should be displayed in the **CUTOFF FREQUENCY** display. If **CUTOFF FREQUENCY** display does not indicate **dC**, repeat steps **d** and **e** until **dC** is displayed.

f. Press corresponding keys as listed in (1) through (4) below and verify **CUTOFF FREQUENCY** indicates **25.00**.

(1) **2** data entry key.
(2) **5** data entry key.
(3) **KILO** parameter key.
(4) **FREQ** parameter key.

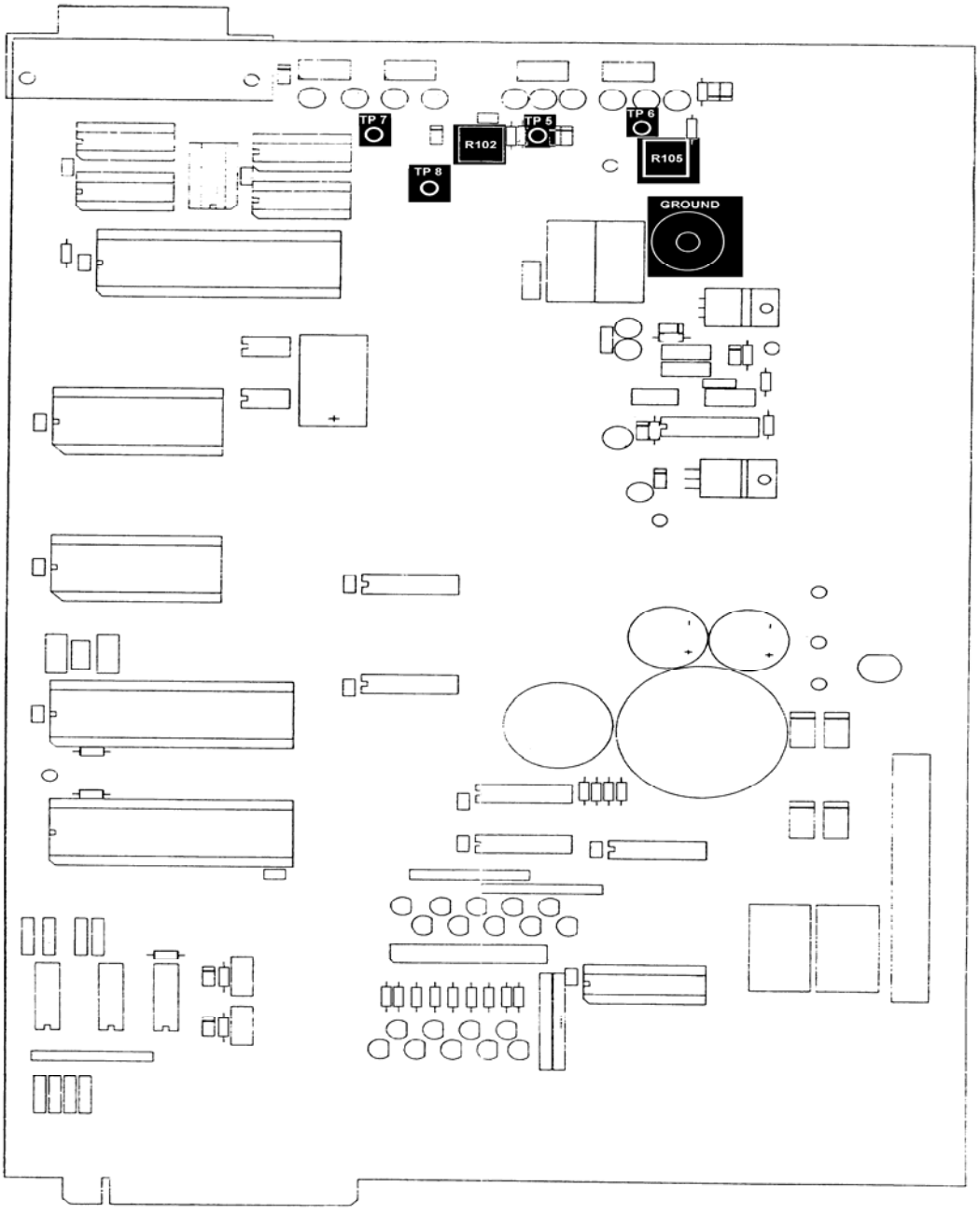

Figure 1. Microprocessor card.

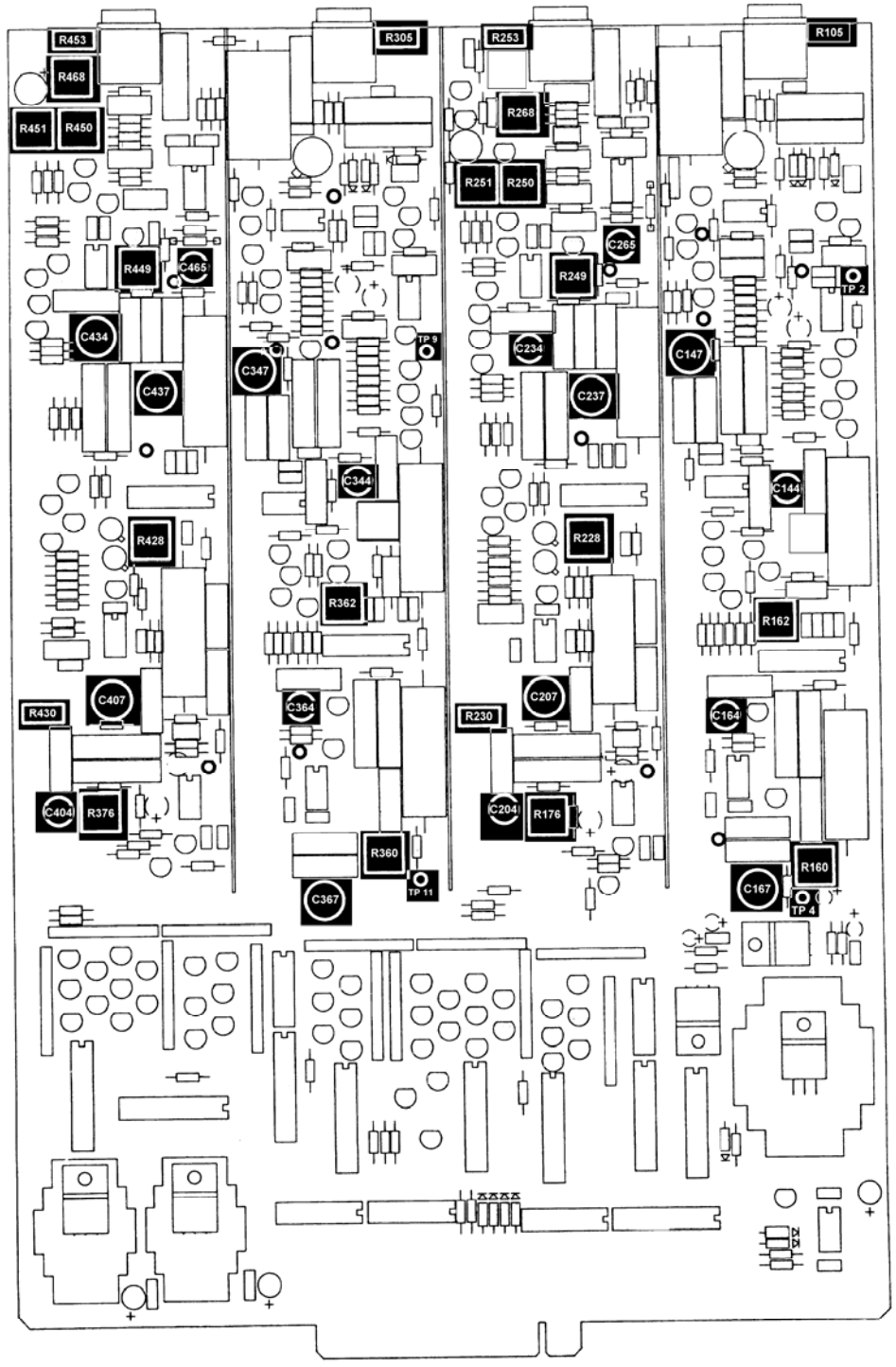

Figure 2. Motherboard.

g. Connect calibrator to **INPUT CH 1** using 50Ω termination.

h. Connect true rms voltmeter to test point TP 4 (fig. 2) and chassis ground.

i. Adjust calibrator for a 200 Hz, 1 V output and reference true rms voltmeter to 0 dB.

j. Alternate calibrator and TI frequencies between 25.6 kHz and 175 kHz using technique of **f** above to enter TI frequency. Adjust C167 (fig. 2) for a -5.33 dB true rms voltmeter indication or split the difference between the two readings.

k. Connect true rms voltmeter to TP 2 (fig. 2) and chassis ground.

l. Alternate calibrator and TI frequencies between 25.6 kHz and 175 kHz using technique of **f** above to enter TI frequency. Adjust C147 (fig. 2) for a -5.33 dB true rms voltmeter indication or split the difference between the two readings.

m. Adjust calibrator for a 2.1 kHz, 1 V output.

n. Press corresponding keys as listed in (1) through (5) below and verify **CUTOFF FREQUENCY** indicates **2.100**.

(1) **2** data entry key.
(2) **.** data entry key.
(3) **1** data entry key.
(4) **KILO** parameter key.
(5) **FREQ** parameter key.

o. Alternate between TP 2 and TP 4. Adjust R162 (fig. 2) for a -5.33 dB true rms voltmeter indication or split the difference between the two test point readings.

p. Connect true rms voltmeter to test point TP 4 (fig. 2) and chassis ground.

q. Press corresponding keys as listed in (1) through (5) below and verify **CUTOFF FREQUENCY** indicates **256.0.**

(1) **2** data entry key.
(2) **5** data entry key.
(3) **6** data entry key.
(4) **KILO** parameter key.
(5) **FREQ** parameter key.

r. Adjust calibrator for a 256 kHz, 1 V output. If true rms voltmeter does not indicate -5.33 dB, adjust C164 (fig. 2) until true rms voltmeter indicates -5.33 dB.

s. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **h.P**.

t. Connect true rms voltmeter to test point TP 2 (fig. 2) and chassis ground. If true rms voltmeter does not indicate -5.33 dB, adjust C144 (fig. 2) until true rms voltmeter indicates -5.33 dB.

u. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **L.P**.

v. Connect true rms voltmeter to test point TP 4 (fig. 2) and chassis ground.

w. Alternate calibrator and TI frequencies between 25 kHz and 250 kHz using technique of **f** above to enter TI frequency. Adjust R160 (fig. 2) for a -5.33 dB true rms voltmeter indication or split the difference between the two readings.

x. Repeat **p** through **t** above.

y. Repeat technique of **a** through **x** above for **CH 2**.

17. Passband Unity-Gain

a. Connect calibrator to **INPUT CH 1** using 50 Ω termination.

b. Connect true rms voltmeter to **OUTPUT CH 1**.

c. Press **MODE** parameter key until **CUTOFF FREQUENC**Y display indicates **bYP**.

d. Press corresponding keys as listed in (1) through (4) below and verify **CUTOFF FREQUENCY** indicates **25.00**.

(1) **2** data entry key.
(2) **5** data entry key.
(3) **KILO** parameter key.
(4) **FREQ** parameter key.

e. Adjust calibrator for a 200 Hz, 1 V output and reference true rms voltmeter to 0 dB.

f. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **L.P**. If true rms voltmeter does not indicate 0 dB, ±0.01 dB, adjust R250 (fig. 2) until true rms voltmeter indicates 0 dB, ±0.01 dB.

g. Press corresponding keys as listed in (1) through (4) below and verify **CUTOFF FREQUENCY** indicates **256.0**.

(1) **2** data entry key.
(2) **5** data entry key.
(3) **6** data entry key.
(4) **FREQ** parameter key.

h. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **bYP**.

i. Adjust calibrator for a 10 kHz, 1 V output and reference true rms voltmeter to 0 dB.

j. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **h.P**. If true rms voltmeter does not indicate 0 dB, ±0.01 dB, adjust R251 (fig. 2) until true rms voltmeter indicates 0 dB, ±0.01 dB.

k. Repeat technique of **a** through **j** above for **CH 2**.

18. Output Frequency Response

a Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **h.P**.

b. Press corresponding keys as listed in (1) through (3) below and verify **CUTOFF FREQUENCY** indicates **2.000**.

(1) **2** data entry key.
(2) **KILO** parameter key.
(3) **FREQ** parameter key.

c. Connect calibrator **WIDEBAND** output to **INPUT CH 1** using cable and termination supplied with calibrator and adjust calibrator for a 20 kHz, 0.1 V output.

d. Connect true rms voltmeter to rear panel **CH 1 OUTPUT** using 50Ω termination and reference true rms voltmeter to 0 dB.

e. Adjust calibrator for a 2 MHz, 0.1 V output. If true rms voltmeter does not indicate 0 dB, ±0.01 dB, adjust C265 (fig. 2) until true rms voltmeter indicates 0 dB, ±0.01 dB, or as close to 0 db as possible.

f Press corresponding keys as listed in (1) through (5) below and verify **CUTOFF FREQUENCY** indicates **1.500**.

(1) **1** data entry key.
(2) **.** data entry key.
(3) **5** data entry key.
(4) **MEGA** parameter key.
(5) **FREQ** parameter key.

g. Adjust calibrator for a 5 MHz, 0.1 V output. If true rms voltmeter does not indicate 0 dB, ±0.05 dB, adjust R249 (fig. 2) until true rms voltmeter indicates 0 dB, ±0.05 dB, or as close to 0 db as possible.

h. Repeat **b** through **g** above until both indications are within tolerance.

i. Repeat technique of **a** through **h** above for **CH 2**.

19. 2nd Quadriatic Frequency Calibration

a. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **bYP**.

b. Press **INPUT(db)** ∇ and **OUTPUT GAIN(db)** ∇ control keys until displays indicate **00**.

c. Press corresponding keys as listed in (1) through (5) below and verify **CUTOFF FREQUENCY** indicates **175.0**.

(1) **1** data entry key.
(2) **7** data entry key.
(3) **5** data entry key.
(4) **KILO** parameter key.
(5) **FREQ** parameter key.

d. Connect calibrator **WIDEBAND** output to **INPUT CH 1** using cable and termination supplied with calibrator.

e. Connect true rms voltmeter to **OUTPUT CH 1**.

f. Adjust calibrator for a 175 kHz, 0.1 V output and reference true rms voltmeter to 0 dB.

g. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **L.P**.

h. Alternate calibrator and TI frequencies between 25.6 kHz and 175 kHz using technique of **c** above to enter TI frequency. Adjust C237 (fig. 2) for a -3 dB true rms voltmeter indication or split the difference between the two readings.

i. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **h.P**.

j. Alternate calibrator and TI frequencies between 25.6 kHz and 175 kHz, using technique of **c** above to enter TI frequency. Adjust C207 (fig. 2) for a -3 dB true rms voltmeter indication or split the difference between the two readings.

k. Press corresponding keys as listed in (1) through (5) below and verify **CUTOFF FREQUENCY** indicates **2.100**.

(1) **2** data entry key.
(2) **.** data entry key.
(3) **1** data entry key.
(4) **KILO** parameter key.
(5) **FREQ** parameter key.

l. Adjust calibrator for a 2.1 kHz output.

m. Alternate between hP and LP. Adjust R230 (fig. 2) for a -3 dB true rms voltmeter indication or split the difference between the two readings.

n. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **L.P**.

o. Set calibrator and TI frequencies for a 256 kHz output, using technique of **c** above to enter TI frequency. If true rms voltmeter does not indicate -3 dB, adjust C234 (fig. 2) until true rms voltmeter indicates -3 dB.

p. Alternate calibrator and TI frequencies between 25 kHz and 250 kHz using technique of **c** above to enter TI frequency. Adjust R228 (fig. 2) for a -3 dB true rms voltmeter indication or split the difference between the two readings.

q. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **h.P**.

r. Set calibrator and TI frequencies for a 256 kHz output, using technique of **c** above to enter TI frequency. If true rms voltmeter does not indicate -3 dB, adjust C204 (fig. 2) until true rms voltmeter indicates -3 dB.

s. Set calibrator and TI frequencies for a 2 MHz output, using technique of **c** above to enter TI frequency, but press **MEGA** instead of **KILO**. If true rms voltmeter does not indicate between -2.36 and -3.75 dB, readjust C204 (fig. 2) until true rms voltmeter indicates between -2.36 and -3.75 dB.

t. Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **L.P**.

u. Set calibrator and TI frequencies for a 256 kHz output, using technique of **c** above to enter TI frequency. Verify true rms voltmeter indicates between -2.36 and -3.75 dB.

v. Set calibrator and TI frequencies for a 2 MHz output, using technique of **c** above to enter TI frequency, but press **MEGA** instead of **KILO**. If true rms voltmeter does not indicate between -2.36 and -3.75 dB, readjust C234 (fig. 2) until true rms voltmeter indicates between -2.36 and -3.75 dB.

w. Set calibrator and TI frequencies for a 256 kHz output, using technique of **c** above to enter TI frequency. Verify true rms voltmeter indicates between -2.76 and -3.29 dB.

x. Repeat technique of **a** through **w** above for **CH 2.**

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

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

0422216

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 344728 requirements for calibration procedure TB 9-5915-214-35.

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.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.