

TB 9-5915-214-35

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

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

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REPORTING OF ERRORS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedure, please let us know. Mail your letter or DA Form 2028 to: Commander, U. S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5230. 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 FAX 256-842-6546/DSN 788-6546.

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**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, where appropriate, 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 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.

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 50Ω feedthrough terminations, BNC T to BNC jack (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: \pm .25%	John Fluke, Model 5700A/CT (p/o MIS-35947); w/power amplifier, John Fluke, Model 5215A/CT (5215A/CT) w/transconductance amplifier, John Fluke, Model 5220A/CT (5220A/CT); w/ac divider, John Fluke, Model 7405A-2407 (7405A-4207)
DIGITAL MULTIMETER	Range: 0 to 5 V dc Accuracy: \pm .025%	John Fluke, Model 8840A/AF-05/09 (AN/GSM-64D)
TRUE RMS VOLTMETER	Range: -2 to -25.4 dB Accuracy: \pm .25%	John 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.

8. Low Pass/High Pass Response

a. Performance Check

NOTE

Perform procedures of paragraphs **8** through **12** 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) Ñ** and **OUTPUT GAIN(db) Ñ** 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) Adjust calibrator for a 10 kHz, 1 V output and reference true rms voltmeter to 0 dB.

(15) 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.

(16) 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.

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

(18) 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.

(19) 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.

(20) Repeat technique of (1) through (19) 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) Ñ** and **OUTPUT GAIN(db) Ñ** 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.**

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- (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)** \tilde{N} and **OUTPUT GAIN(db)** \tilde{N} 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 20 kHz, 3 V output and reference true rms voltmeter to 0 dB.

(8) If true rms voltmeter does not indicate $<300 \mu\text{V}$, 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.

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**.

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(2) Press **INPUT(db)** \bar{N} and **OUTPUT GAIN(db)** \bar{N} 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 $<200 \mu\text{V}$, 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 $<200 \mu\text{V}$, 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 $-15\text{ V} \pm 0.05\text{ V}$.
- c. Connect digital multimeter to microprocessor card TP 5 and card ground (fig. 1).
- d. Adjust R102 (fig. 1) for digital multimeter indication of $+15\text{ V} \pm 0.05\text{ V}$.
- e. Connect digital multimeter to microprocessor card TP 7 and TP 8 individually, and card ground (fig. 1).
- f. Verify digital multimeter indicates $+5\text{ V} \pm 0.2\text{ V}$ for both test points.

NOTE

Perform dc adjustment checks **g** through **bb** 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 **k** 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.

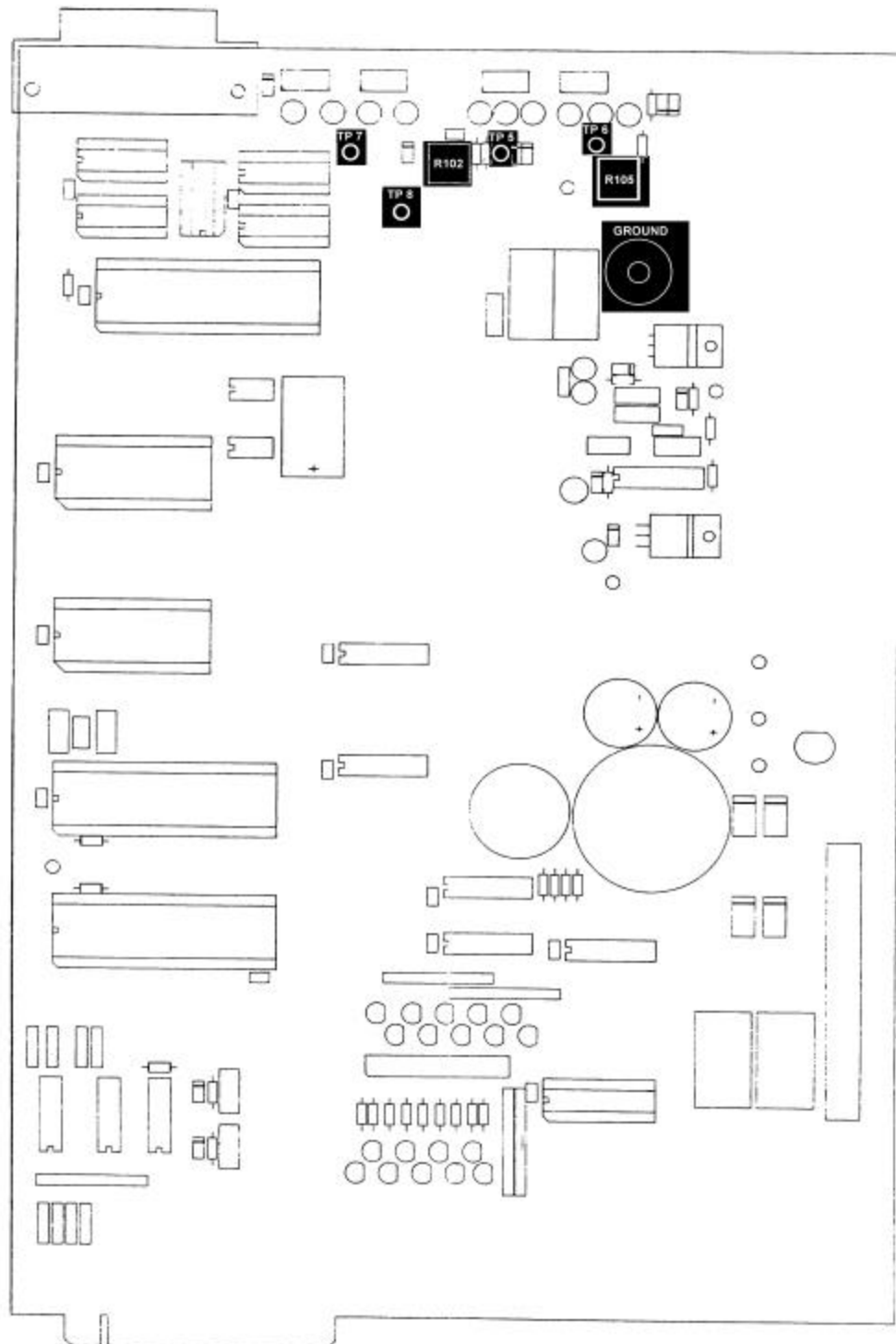


Figure 1. Microprocessor card.

- g.** Short rear panel **CH 1 INPUT**.
- h.** Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **h.P**.
- i.** Press **OUTPUT GAIN(db)** D control key until display indicates **20**.
- j.** Connect digital multimeter to rear panel **CH 1 OUTPUT**.
- k.** 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.
- l.** Press **OUTPUT GAIN(db)** Ñ control key until display indicates **00**.
- m.** Adjust R268 (fig. 2) until multimeter indicates between 0 V dc ± 1 mVdc.
- n.** Repeat **i** and **k** above.
- o.** Repeat **l** and **m** above.
- p.** 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.
- q.** Press **MODE** parameter key until **CUTOFF FREQUENCY** display indicates **L.P**.
- r.** Press **SHIFT** parameter key.
- s.** Press **TYPE** parameter key; **dC** should be displayed in the **CUTOFF FREQUENCY** display. If **CUTOFF FREQUENCY** display does not indicate **dC**, repeat steps **r** and **s** until **dC** is displayed.
- t.** Connect digital multimeter to rear panel **CH1 OUTPUT**.
- u.** Press **OUTPUT GAIN(db)** D control key until display indicates **20**.
- v.** Adjust DC ADJ R105 (fig. 2), located to the left of rear panel **CH 1 INPUT BNC** connector for digital multimeter indication of 0 V dc ± 1 mVdc.
- w.** Press **OUTPUT GAIN(db)** Ñ control key until display indicates **00**.
- x.** Repeat **v** above.
- y.** Repeat **u** through **x** until adjustment is within tolerance.
- z.** Repeat **w** above.
- aa.** Adjust R176 (fig. 2) for digital multimeter indication of 0 V dc ± 1 mVdc.
- bb.** Repeat technique of **g** through **aa** above for **CH 2**.

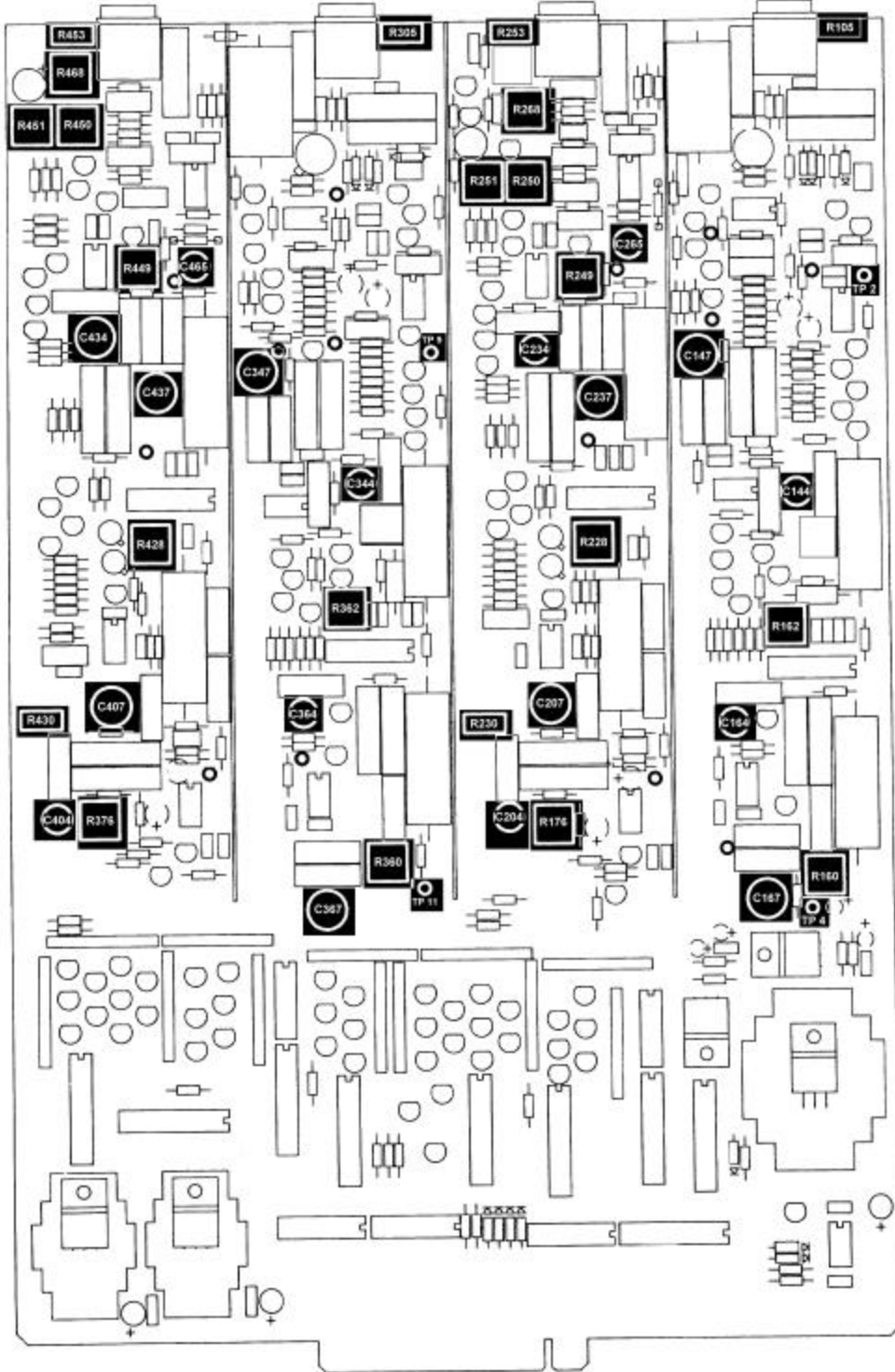


Figure 2. Motherboard.

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) Ñ** and **OUTPUT GAIN(db) Ñ** 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.
- 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.

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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 FREQUENCY** 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 to **INPUT CH 1** using 50 Ω termination and adjust calibrator for a 20 kHz, 0.1 V output.

d. Connect true rms voltmeter to rear panel **CH 1 OUTPUT** using 50 Ω 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.

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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) Ñ** and **OUTPUT GAIN(db) Ñ** 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 to **INPUT CH 1** using 50 Ω termination.

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.

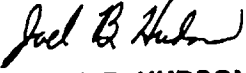
x. Repeat technique of **a** through **w** above for **CH 2**.

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By Order of the Secretary of the Army:

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

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