*TB 9-6625-2102-35

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR SIGNAL GENERATOR SG-1171/U (WAVETEK, MODEL 148A W/OPTION 001)

Headquarters, Department of the Army, Washington, DC
14 May 2003

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 bulletin. For the World Wide Web, use: https://amcom2028.redstone.army.mil.

*This bulletin supersedes TB 9-6625-2102-35, 1 June 1992.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Signal Generator, SG-1171U (Wavetek, Model, 148A with Option 001). 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 4 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
Modulation generator:	
Frequency	Range: 0.1 Hz to 100 kHz
Symmetry	<1%, 1 Hz to 10 kHz
	<5%, 0.1 Hz to 100 kHz
Distortion	<5%
Main generator:	
Symmetry	±0.5% of X100 through X100K ranges (0.2 to 2.0 on dial)
	±5% on all other ranges (0.02 to 2.0 on dial)
Risetime and falltime	<25 ns into 50Ω
Distortion	<0.5% on X100 to X10K ranges, <1% on X.01 to X10 and X100K ranges
Frequency	Range: 0.0002 Hz to 20 MHz
	Accuracy: ±(1% setting +1% range) on X100 through X1M ranges
	±(2% settings +2% range) on X.01 through X10 and X10M ranges
Ac output	Range: 0 to 80 dB
	Accuracy: ±0.3 dB per 20 dB step at 2 kHz
Dc offset	At least ±7.2 V dc

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 the 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 also required for this calibration: 50Ω feedthrough termination, BNC plug to BNC jack, Hewlett-Packard, Model 11048C.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
AUDIO ANALYZER	Range: 100 Hz and 20 kHz Accuracy: ± 0.5% Capability: <0.125% distortion	Boonton, Model 1120-S/10 (MIS-35954/2)
MULTIMETER	Range: -14.97 to 15.03 V dc Accuracy: ± 0.05% Range: 4.5 mV to 5 V ac Accuracy: ±1 %	John Fluke, Model 3458A (3458A)
MEASURING RECEIVER	Range: 200 kHz and 12 MHz Accuracy: ± 0.5%	Hewlett-Packard, Model 8902A w/sensors, Hewlett-Packard, Model 11722A (11722A) and 11792A (11792A), and microwave converter, model 11793A (11783A)
OSCILLOSCOPE	Range: 15 V p-p Risetime: < 25 ns Range: 52 s to 50 ms Accuracy: ± 0.5%	Tektronix, Type 2430A Option 46 (OS-291/G)

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** through **17** are not within tolerance, perform the power supply check prior to making adjustments. After adjustments are made, repeat paragraphs **8** through **17**. 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.

NOTE

When indications specified in this procedure are not within tolerance, perform the power supply check prior to making adjustments.

a. Set **POWER** switch to **OFF** (out).

b. Remove protective cover from TI only as necessary to make adjustments. Replace cover upon completion of adjustments.

c. Connect TI to a 115 V ac source.

d. Position **MODULATION GENERATOR** controls as listed in (1) through (4) below:

(1) **TRIGGER** mode switch to **CONT** and **TRIGGER LEVEL** control fully ccw.

(2) **MODULATION AM FM/SWP & PM (Æ)** switches to **OFF** (center position)

(3) **FUNCTION** switch to ⎍ and **MOD AMPLITUDE** variable control fully ccw.

(4) **FREQ/PERIOD MULT (Hz/s)** switch to **1K/100K** and **VARIABLE** control fully cw.

e. Position main generator controls as listed in (1) through (5) below:

(1) **FREQ MULT (Hz)** switch to **100K** and **VERNIER** control fully cw to **CAL**.

(2) **SYMMETRY** control to **OFF** (ccw to detent).

(3) **DC OFFSET** control to **OFF** (ccw to detent).

(4) **FUNCTION** switch to ⎍ and **TRIG START/STOP** control to **0° CAL** (ccw detent).

(5) **ATTENUATION (dB)** switch to **20/ 0** and **AMPLITUDE** control fully ccw.

f. Set **POWER** switch to **ON** and allow at least 30 minutes for TI to reach operating temperature.

8. Modulation Generator Frequency

a. Performance Check

(1) Initiate audio analyzer and set to measure frequency.

(2) Connect TI **MODULATION GENERATOR OUT** (600Ω) to audio analyzer **INPUT HIGH**.

(3) Perform steps as listed in (a) through (c) below for each row in table 3.

(a) Set TI **FREQ/PERIOD MULT (Hz/s)** to switch settings.
(b) Adjust TI **VARIABLE** control to settings.
(c) Using audio analyzer, verify frequency indications.

NOTE

All out of tolerance indications, perform **b** below:

Table 3. Frequency

Test instrument **FREQ/PERIOD MULT (Hz/s)**		Audio analyzer indications
Switch settings	**VARIABLE** control fully	
1K/100K	cw	≥ 100 kHz
-	ccw	≤ 1 kHz
10/1k	cw	≥ 1kHz

(4) Disconnect TI from audio analyzer and connect to oscilloscope **CH1** input.

(5) Initiate oscilloscope and set up to measure frequency.

(6) Perform steps as listed in (a) through (c) below for each row in table 4.

(a) Set TI **FREQ/PERIOD MULT (Hz/s)** to switch settings.
(b) Adjust TI **VARIABLE** control to settings.
(c) Using oscilloscope, verify frequency indications.

NOTE

All out of tolerance indications, perform **b** below:

Table 4. Frequency

Test instrument **FREQ/PERIOD MULT (Hz/s)**		Oscilloscope indications
Switch settings	**VARIABLE** control fully	
10/1k	ccw	≤ 10 Hz
.1/10	cw	≥ 10 Hz
-	ccw	≤ .1 Hz

(7) Set up oscilloscope to measure frequency symmetry.

(8) Perform steps as listed in (a) through (c) below for each row in table 5.

(a) Set TI **FREQ/PERIOD MULT (Hz/s)** to switch settings.
(b) Adjust TI **VARIABLE** control to settings.
(c) Using oscilloscope, verify frequency symmetry indications.

NOTE

All-out-of-tolerance indications, perform **b** below:

Table 5. Frequency Symmetry

Test instrument **FREQ/PERIOD MULT (Hz/s)**		Oscilloscope symmetry indications (%)	
Switch settings	**VARIABLE** control fully	Min	Max
10/1k	cw	49	51
-	ccw	49	51
1K/100K	ccw	49	51
-	cw	45	55

(9) Disconnect TI from oscilloscope.

b. Adjustments.

(1) Connect TI **MODULATION GENERATOR OUT** (600Ω) to audio analyzer **INPUT HIGH**.

(2) Set up audio analyzer to measure frequency.

(3) Set **FREQ/PERIOD MULT (Hz/s**) switch to **1K/100K** and adjust **VARIABLE** control fully cw.

(4) Adjust R48 (fig 1) until audio analyzer indicates between 100.0 and 100.4 kHz (R).

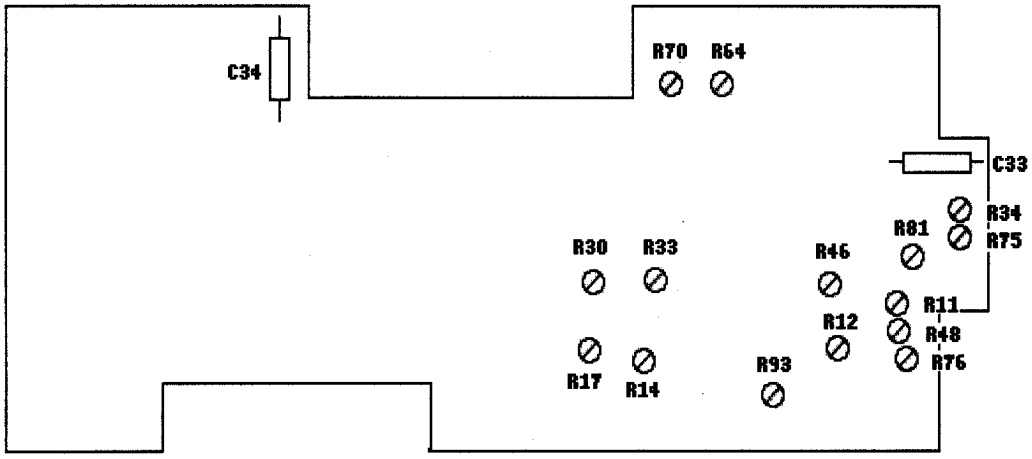

Figure 1. Test instrument – top view.

(5) Adjust **VARIABLE** control fully ccw.

(6) Adjust R93 (fig 1) until audio analyzer indicates between 960 and 1000 Hz (R).

(7) Disconnect TI from audio analyzer and connect to oscilloscope **CH1** input.

(8) Set up oscilloscope to measure frequency symmetry.

(9) Set **FREQ/PERIOD MULT (Hz/s)** switch to **10/1K** and adjust **VARIABLE** control fully cw.

(10) Adjust R14 until the oscilloscope indicates a duty cycle between 49 and 51% (R).

(11) Adjust **VARIABLE** control fully ccw.

(12) Adjust R17 until the oscilloscope indicates a duty cycle between 49 and 51% (R).

(13) Set **FREQ/PERIOD MULT (Hz/s)** switch to **1K/100K**.

(14) Adjust R75 until the oscilloscope indicates a duty cycle between 49 and 51%.

(15) Repeat this adjustment procedure for best in-tolerance condition on all ranges.

9. Modulation Generator Zero

a. Performance Check

(1) Connect **MODULATION GENERATOR OUT** (600Ω) to audio analyzer **INPUT HIGH.**

(2) Set up audio analyzer as listed in (a) through (c) below:

(a) **INIT**.

(b) **SPCL 17** (slow detector).

(c) **LEVEL**.
(d) Enable **DC** (low-pass filter).

(3) Set **FREQ/PERIOD MULT (Hz/s)** switch to **10/1K** and adjust **VARIABLE** control fully cw.

(4) Set TI **MODULATION GENERATOR FUNCTION** switch to ∿. If audio analyzer does not indicate within limits in table 6, perform **b**(l) below.

Table 6. Triangle Wave Zero

Audio analyzer indications (DC V)	
Min	Max
- 0.010	+ 0.010

(4) Set **MODULATION GENERATOR FUNCTION** switch to ⊓. If audio analyzer does not indicate within limits in table 7, perform **b**(2) below.

Table 7. Square Wave Zero

Audio analyzer indications (DC V)	
Min	Max
- 0.010	+ 0.010

(5) Set **MODULATION GENERATOR FUNCTION** switch to ∿. If audio analyzer does not indicate within limits in table 8, perform **b**(3) below.

Table 8. Sine Wave Zero

Audio analyzer indications (DC V)	
Min	Max
- 0.010	+ 0.010

b. Adjustments

(1) Adjust R34 (fig. 1) for minimum indication less 10 mV on audio analyzer (R).
(2) Adjust R33 (fig. 1) for minimum indication less 10 mV on audio analyzer (R).
(3) Adjust R76 (fig. 1) for minimum indication less 10 mV on audio analyzer (R).

10. Modulation Generator Distortion

a. Performance Check

(1) Ensure audio analyzer is connected to **MODULATION GENERATOR OUT** (600Ω).

(2) Set up audio analyzer to measure distortion.

(3) Ensure **MODULATION GENERATOR, FREQ/PERIOD MULT (Hz/s)** switch is set to **10/1K** and adjust **VARIABLE** control fully cw.

(4) Ensure **MODULATION GENERATOR, FUNCTION** switch is set to ∿ .

(5) If audio analyzer does not indicate within limits in table 9, perform **b** below.

Table 9. Distortion Accuracy

Audio analyzer distortion indications (<%)
5

NOTE

If adjustments are made, repeat paragraph **9** above.

b. Adjustments. Adjust R11 and R12 (fig. 1) in increments for minimum distortion less than 5 percent (R) on audio analyzer.

11. Modulation Generator Ramp

a. Performance Check

(1) Connect TI **MODULATION GENERATOR OUT (600**W**)** to oscilloscope **CH1** input.

(2) Set **FREQ/PERIOD MULT (Hz/s)** switch to **10/1k** and adjust **VARIABLE** control fully cw.

(3) Set TI **MODULATION GENERATOR FUNCTION** switch to positive going sawtooth then negative going sawtooth. If oscilloscope does not display optimum ramps in table 10, (same slopes with no double rising on edges) perform **b**(1) and (2) below:

Table 10. Ramp Accuracy

Optimum ramp indications (Yes/No)

(4) Electronically ground **CH1**, select dc input and position trace to center horizontal line using position control.

(5) Select **CH1** input and, if negative peak level in table 11 does not coincide with center horizontal center line MIN indication, perform b(3) below.

Table 11. Minimum Peak Level

Oscilloscope indications (DC V)	
Min	Max
- 0.010	+ 0.010

b. Adjustments

(1) Adjust R46 and R30 (fig.1) for optimum ramps.

(2) Repeat **a**(3) and **b**(l) above for optimum ramps.

(3) Adjust R81 (fig.1) until the negative peaks coincide with horizontal centerline on oscilloscope.

12. Main Generator Symmetry

a. Performance Check

(1) Connect TI **FUNCTION OUT** (50Ω) to oscilloscope **CH1** input.

(2) Position main generator controls as listed in (a) through (f) below:

(a) **FREQ/MULT (Hz)** switch to **100K** and **VERNIER** control fully cw to **CAL**.

(b) **SYMMETRY** control to **OFF** (ccw to detent).

(c) **DC OFFSET** control to **OFF** (ccw to detent).

(d) **FUNCTION** switch to **SQUARE WAVE** and **TRIG START/STOP** control to **0** degrees **CAL** (detent).

(e) **ATTENUATION (DB)** switch to **20/0** and **AMPLITUDE** control fully ccw.

(f) Frequency dial to **2.0.**

(3) Initiate oscilloscope **CH1** with 50Ω input and set to measure one duty cycle.

(4) If oscilloscope does not indicate within symmetry limits in table 12, perform **b**(1) below.

Table 12. Symmetry @ 200 kHz

Oscilloscope indications (%)	
Min	Max
49.5	50.5

(5) Adjust frequency dial to **.02**.

(6) Adjust main generator **FREQ MULT (Hz) VERNIER** control for and oscilloscope **CH1 FREQ** = **400 Hz** display.

(7) If oscilloscope does not indicate within symmetry limits in table 13, perform **b**(2) below.

Table 13. Symmetry @ 400Hz

Oscilloscope indications (%)	
Min	Max
45	55

b. Adjustments

(1) Adjust R36 (fig. 2) until oscilloscope indicates a duty cycle between 49.5% and 50.5% (R).

NOTE

R36 is effective on positive portion of square wave.

(2) Adjust R23 (fig. 2) until oscilloscope indicates a duty cycle between 45% and 55% (R).

NOTE

R23 is effective on negative portion of square wave.

(3) Repeat this performance check and adjustment procedure as necessary for a best in-tolerance condition.

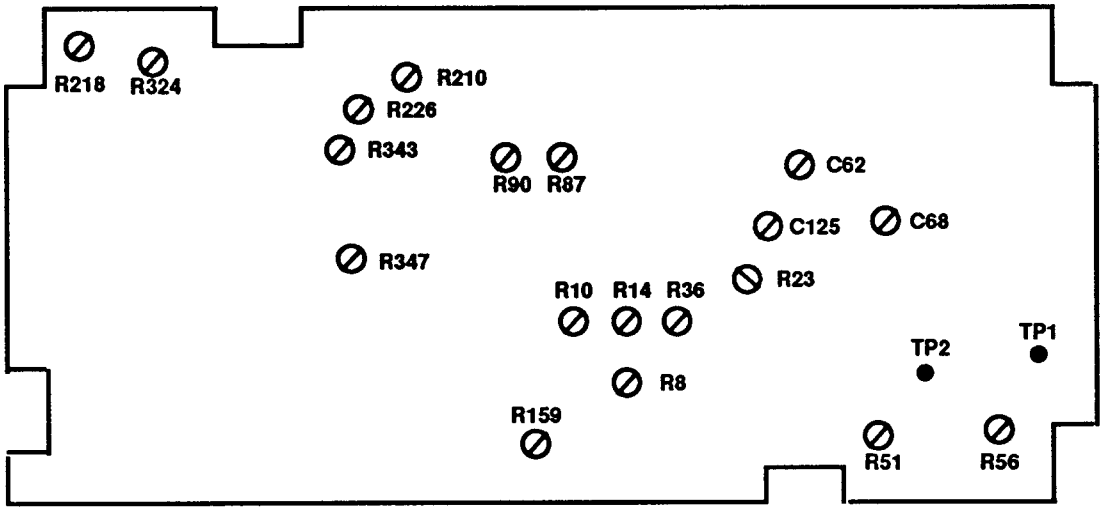

Figure 2. Test instrument - bottom view.

13. Main Generator Transition Time

a. Performance Check

(1) Connect TI **FUNCTION OUT (50**W**)** to oscilloscope **CH1** input.

(2) Initiate oscilloscope **CH1** with 50Ω input and set to measure rise- and falltime.

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

(a) **FREQ/MULT (Hz)** switch to **1M** and **VERNIER** control fully cw to **CAL**.

(b) Frequency dial to **1.0**.

(c) **AMPLITUDE** control for 6 divisions which is approximately 6 V on oscilloscope display **CH1 MAX**.

(4) Using oscilloscope measurement techniques, verify that the risetime is less than the limit specified in table 14.

Table 14. Risetime

Oscilloscope indications (<nS)
25

(5) Using oscilloscope measurement techniques, verify that the falltime is less than the limit specified in table 15.

Table 15. Falltime

Oscilloscope indications (<nS)
25

(6) Disconnect equipment.

b. Adjustments. No further adjustments can be made.

14. Main Generator Distortion

a. Performance Check

(1) Connect TI **FUNCTION OUT** (50Ω) to audio analyzer **INPUT HIGH** using 50Ω feedthrough termination.

(2) Initiate audio analyzer and set to measure level.

(3) Position controls as listed in (a) through (d) below:

(a) **FREQ/MULT(Hz)** switch to **1K** and **VERNIER** control fully cw to **CAL**.

(b) Frequency dial to **1.0**.

(c) Main generator **FUNCTION** switch to ∿ .

(d) **AMPLITUDE** control for **5 V** on audio analyzer.

(3) Set audio analyzer to measure distortion at 1 kHz. If audio analyzer does not indicate within limit shown in table 16, perform **b** below.

Table 16. Distortion Accuracy

Audio analyzer indications (<%)
0.5

(4) Set **FREQ/MULT (Hz)** switch to **100K**.

(5) Measure distortion at 100 kHz. Audio analyzer will indicate within limit shown in table 17.

Table 17. Distortion Accuracy

Audio analyzer indications (<%)
1

b. Adjustments. Adjust R87 and R90 (fig. 2) for minimum distortion, less than 0.5% as indicated on audio analyzer (R).

15. Main Generator Frequency

a. Performance Check

(1) Connect TI **FUNCTION OUT** (50Ω) to audio analyzer **INPUT HIGH** using 50Ω feedthrough termination.

(2) Set up audio analyzer to measure frequency.

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

(a) Adjust **AMPLITUDE** control fully ccw.
(b) Main generator **FUNCTION** switch to ∿ .
(c) **FREQ MULT (Hz) VERNIER** control fully cw to **CAL**.

(4) Set TI **FREQ/MULT(Hz)** to switch settings and frequency dial position for each row in table 18. If measured frequency using audio analyzer does not indicate within limits, perform **b**(1) below.

Table 18. Main Generator Frequency

Test instrument		Audio analyzer indications (kHz)		Test instrument
FREQ MULT (Hz) switch settings	Frequency dial positions	Min	Max	Adjustments (fig. 2)
10K	2.0	19.6	20.4	R10, R8[1] (R)
10K	1.0	9.7	10.3	
1K	1.0	0.97	1.03	
1K	2.0	1.96	2.04	R56[2] (R)
100	2.0	0.196	0.204	
100	1.0	0.097	0.103	

[1]Set frequency dial to .02 and adjust R8 (fig. 2) for 200 Hz on frequency counter.

[2]Connect multimeter between TP1 and TP2 ground (fig. 2). Adjust R56 (fig. 2) for 0 ±1 mV dc on digital multimeter (R).

(5) Disconnect TI from audio analyzer and 50Ω feedthrough termination.

(6) Connect TI **FUNCTION OUT** (50Ω) to measuring receiver **INPUT 50**W.

(7) Set TI **FREQ/MULT(Hz)** to switch settings and frequency dial position for each row in table 19. If measured frequency using measuring receiver does not indicate within limits, perform **b**(2) below.

Table 19. Main Generator Frequency

Test instrument		Measuring receiver indications (MHz)		Test instrument
FREQ MULT (Hz) switch settings	Frequency dial positions	Min	Max	Adjustments (fig. 2)
10M	1.2	11.36	12.64	
10M	2.0	19.2	20.8	C68 (R)
1M	2.0	1.96	2.04	C125 (R)
100K	2.0	0.196	0.204	C62 (R)

(8) Disconnect TI from measuring receiver.

(9) Connect TI **FUNCTION OUT** (50Ω) to oscilloscope **CH1**.

(10) Set TI **FREQ/MULT(Hz)** to switch settings and frequency dial position for each row in table 20. If measured period using oscilloscope does not indicate within limits, perform **b**(3) below.

NOTE

The remaining tests are done using period measurements. Some checks take a long time.

Table 20. Main Generator Frequency

Test instrument		Oscilloscope indications (ms)		Test instrument
FREQ MULT (Hz) switch settings	Frequency dial positions	Min	Max	Adjustments (fig. 2)
10	2.0	48.07	52.08	R51 (R)
10	1.0	94.33	106.38	
1	1.0	943.3	1063.8	
1	2.0	480.7	520.8	
.1	2.0	4807.0	5208.0	
.01	2.0	48000.0	52000.0	

(11) Disconnect oscilloscope from TI.

b. Adjustments

(1) Perform adjustments listed in table 18 and repeat as required for in-tolerance condition.

(2) Perform adjustments listed in table 19 and repeat as required for in-tolerance condition

(3) Perform adjustments listed in table 20 and repeat as required for in-tolerance condition

16. Main Generator Balance and Zero

a. Performance Check

(1) Connect TI **FUNCTION OUT** (50Ω) to audio analyzer **INPUT HIGH** using a 50Ω-feedthrough termination.

(2) Initiate audio analyzer and set to measure level with DC low-pass filter on.

(3) Set main **FUNCTION** switch to **DC** and adjust **AMPLITUDE** control fully ccw.

(4) If audio analyzer is not within limits in table 21, perform **b**(l) below.

Table 21. Zero

Audio analyzer indications (mV)	
Min	Max
-.020	.020

(5) Disconnect TI from audio analyzer and 50Ω-feedthrough termination.

(6) Connect TI **FUNCTION OUT** (50Ω) to oscilloscope **CH1** input.

(7) Connect **MODULATION GENERATOR OUT** (600Ω) to **EXT MOD IN.**

(8) Position controls as listed in (a) through (i) below:

(a) **FREQ MULT (Hz)** switch to **100K** and **VERNIER** control cw to **CAL**.

(b) Main generator **FUNCTION** switch to ⊓.

(c) **MODULATION AM** switch to **EXT.**

(d) **MODULATION GENERATOR FUNCTION** switch to ∿ and **MOD AMPLITUDE** control fully cw.

(e) **FREQ/PERIOD MULT (Hz/s)** switch to **10/1K** and **VARIABLE** control fully cw.

(9) Set oscilloscope for proper signal display.

(10) If oscilloscope display is not a balanced signal as shown in figure A, perform **b**(2) below.

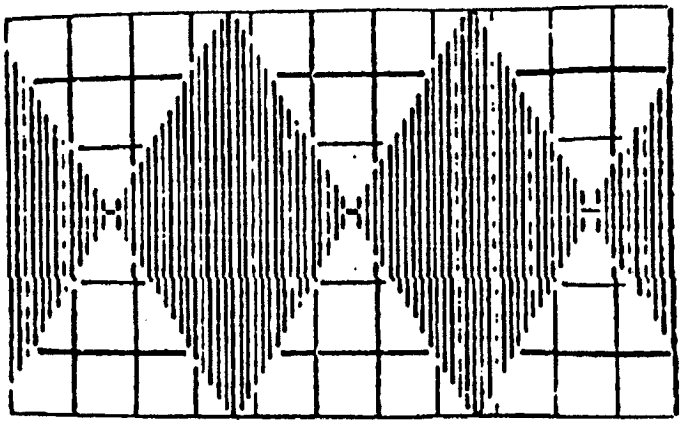

Figure A. Carrier balance.

(11) Set **MODULATION GENERATOR FUNCTION** switch to ∿ .

(12) If oscilloscope display is not a balanced signal as shown in figure B, perform **b**(2) below.

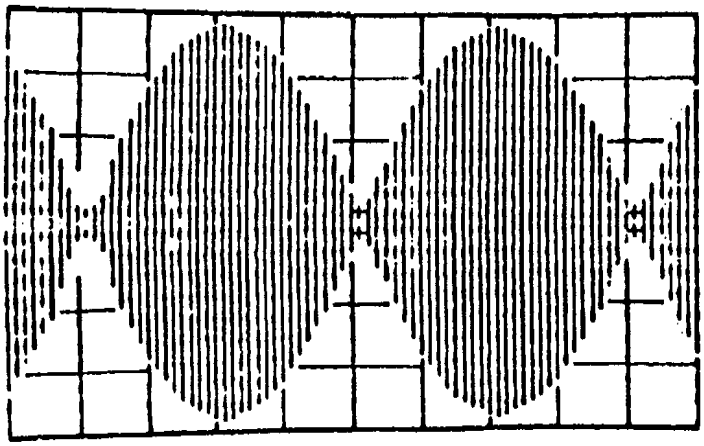

Figure B. Modulation linearization.

(13) Position TI controls as listed in (a) through (d) below:

(a) Main generator **FUNCTION** switch to ⊓ .

(b) **FREQ/MULT (Hz)** switch to **1K**.

(c) **MODULATION AM** switch to **OFF**.
(d) **AMPLITUDE** control fully cw.

NOTE

If signal is distorted, slowly turn **AMPLITUDE** control ccw until signal is no longer distorted.

Overload indicator will light when signal is distorted.

(14) If oscilloscope display is not within limits shown in table 22, perform **b**(3) below.

Table 22. Square Wave Amplitude

Oscilloscope indications (≥V p-p)
15

(15) Set main generator **FUNCTION** switch to ∿ and adjust **AMPLITUDE** control fully ccw.

(16) Disconnect TI from oscilloscope **CH1** and connect TI to audio analyzer **INPUT HIGH** using 50Ω-feedthrough termination.

(17) Initiate audio analyzer.

(18) If audio analyzer is not within limits shown in table 23, perform **b**(4) below.

Table 23. Sine Wave Zero

Audio analyzer indications (V)	
Min	Max
–.020	.020

(19) Position TI controls as listed in (a) through (d) below:

(a) **MODE** switch to **INT TRIG**.
(b) Frequency dial to **1.0**.
(c) Main generator **FUNCTION** switch to ∿.
(d) **AMPLITUDE** control fully cw.

(20) If audio analyzer does not indicate within limits shown in table 24, perform **b**(5) below.

Table 24. Zero

Audio analyzer indications (V)	
Min	Max
-.100	.100

(21) Adjust frequency dial to 2.

(22) If audio analyzer does not indicate within limits shown in table 25, perform **b**(5) below.

Table 25. Zero

Audio analyzer indications (V)	
Min	Max
-.100	.100

(23) Set mode switch to **CONT**.

b. Adjustments

NOTE

All adjustments interact. Repeat performance check and adjustments as necessary for best in-tolerance indications.

(1) Adjust R347 (fig. 2) for 0 V dc indication on audio analyzer.

(2) Adjust R210 and R343 and R226 (fig 2) for a balance display shown, while switching **MODULATION GENERATOR FUNCTION** between triangle (fig. A) and sine wave (fig. B).

(3) Adjust R324 (fig.2) for oscilloscope indication of $\geq$15 V p-p.

(4) Adjust R218 (fig.2) for audio analyzer indication of 0 $\pm$20 mV dc.

(5) Adjust R159 (fig.2) for audio analyzer indication of 0 ±100 mV dc.

17. AC Output and DC Offset

a. Performance Check

(1) Connect TI **FUNCTION OUT** (50Ω) to audio analyzer **INPUT HIGH** using a 50Ω-feedthrough termination**.**

(2) Adjust **AMPLITUDE** control fully ccw and set main generator **FUNCTION** switch to **DC**.

(3) Adjust **DC OFFSET** control just out of detent.

(4) Initiate audio analyzer and enable dc low-pass filter.

(5) Audio analyzer will indicate within limit shown in table 26.

Table 26. Voltage Offset

Audio analyzer indications ($\geq$V dc)
-7.2

(6) Adjust **DC OFFSET** control fully cw.

(7) Audio analyzer will indicate within limit shown in table 27.

Table 27. Voltage Offset

Audio analyzer indications (≥V dc)
+7.2

(8) Adjust **DC OFFSET** control to **OFF,** ensure mode switch is set to **CONT** and **MODULATION AM** switch to **OFF**.

(9) Set main generator **FUNCTION** switch to ∿ and adjust **AMPLITUDE** control for 5.00 V ac on audio analyzer.

(10) Using audio analyzer, disable all low-pass filters.

(11) Set TI **ATTENUATION (dB)** switch to **20/40**. Audio analyzer will indicate within limit shown in table 28.

Table 28. 20 dB Attenuation

Audio analyzer indications (V ac)	
Min	Max
.4830	.5176

(12) Set TI **ATTENUATION (dB)** switch to **40/60**. Audio analyzer will indicate within limit shown in table 29.

Table 29. 40 dB Attenuation

Audio analyzer indications (V ac)	
Min	Max
.04666	.05357

(13) Set TI **ATTENUATION (dB)** switch to **60/80.** Audio analyzer will indicate within limit shown in table 30.

Table 30. 60 dB Attenuation

Audio analyzer indications (V ac)	
Min	Max
.00450	.00555

b. Adjustments. No adjustments can be made.

18. Power Supply

NOTE

Do not perform power supply check if all other parameters are in tolerance.

a. Performance Check

(1) Connect digital multimeter between C33 + (fig. 1) and chassis ground, observing polarity. If digital multimeter does not indicate between +14.97 and +15.03 V dc, perform **b**(l) below.

(2) Move connection to C34 - (fig. 1). If digital multimeter does not indicate between -14.97 and -15.03 V dc, perform **b**(2) below.

b. Adjustments

(1) Adjust R64 (fig. 1) until digital multimeter indicates +15.00 ±0.03 V dc (R).

(2) Adjust R70 (fig. 1) until digital multimeter indicates -15.00 ±0.03 V dc (R).

19. 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:

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

OFFICIAL:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0307703

Distribution:

To be distributed in accordance with initial distribution number (IDN) 342233, requirements for calibration procedure TB-9-6625-2102-35.

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. **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: 052739-000