TB 11-6625-620-35-2

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR TELETYPEWRITER TEST SET TS-800/UGM-l

Headquarters, Department of the Army, Washington, DC
16 May 1974

SECTION I
INTRODUCTION AND DESCRIPTION

1-1. Purpose and Scope. This bulletin Provides for the periodic calibration of Teletypewriter Test Set TS-80/UGM-1. It is to be used by personnel trained and qualified in the use of calibration equipment. Since calibration personnel are trained and qualified in the usage of test and measuring equipment, detailed instructions concerning the operation and use of these equipments are not contained in this bulletin.

1-2. Reporting of Technical Bulletin Improvements. The reporting of errors, omissions, and recommendations for improving this bulletin by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-DS, Fort Monmouth, NJ 07703.

1-3. Descriptive Data. The Teletypewriter Test Set TS-80/UGM-1 (distortion analyzer) indicates the amount of distortion present in a start-stop telegraph signal and compares the position of the input signal transitions to an accurate time-base signal that is generated in the time base circuits, and indicates whether the signal transitions are occurring at the correct time, early, or late. Additional data is listed in *a, b,* and *c* as follows:

a. Identification.

Nomenclature	Test Set, Teletypewriter TS-800/UGM-1
Federal stock number	6625-965-0197
Size	8-23/32x17-1/8x8-7/16 in.
Weight	17-1/2 lbs
References	TM 114625-62045-2, TM 11-6625-620-12

b. Specifications.

(1) *Types of input current.*

Neutral operation	20 mA; 60 mA
Polar operation	30 mA; polar
Input rate acceptance	7-unit code at 45 and 150 bauts; 7.5-unit code at 45, 50, 74 and 75 bauds; dot cycles at 23, 37, 37.5, 75, or 100 Hz

(2) ***Types of distortion indicated.*** Types of distortion are total peak, early peak, late peak and average for mark-to-space or space-to-mark transitions.

(3) ***Distortion indicators.*** The percent distortion meter is a 250° front panel milliammeter calibrated 0% to 50% (±2%) with a 1 mA sensitivity at 53 millivolts. Meter resistance is 53 ohms. There is one EARLY indicator lamp and one LATE indicator lamp.

(4) *Power requirements.*

Voltage	115 or 230 ± 10 volts ac, single phase
Frequency	50 to 400 Hz
Power consumption	16.5 watts

c. Calibration.

Interval	In accordance with TB 43-180.
Time required	2 hrs
Technique	DC-low frequency

1-4. General Instructions. ***a. Calibration Reporting.***

(1) Forms, records, and reports required for calibration personnel at all levels are prescribed by TM 38-750. DA Form 2416 (Calibration Data) must be annotated in accordance with TM 38-750 for each calibration performed.

(2) Adjustments to be reported on DA Form 2416 are designated (R) at the end of the sentence in which they appear. When adjustments are in tables, the (R) will follow the designated adjustment. Report only those adjustments made and designated with (R).

b. Test Instrument. Teletypewriter Test Set TS-800/UGM-1 will be referred to as the Test Instrument.

SECTION 11
EQUIPMENT REQUIREMENTS

NOTE

Minimum use specifications are the principal parameters required for performance of the calibration, and are included to assist in the selection of alternate equipment, which may be used at the discretion of the calibrating activity. Satisfactory performance of alternate items shall be verified prior to use. All applicable equipment must bear evidence of current calibration.

2-1. Equipment Required. The equipment required for the calibration performance test is listed below.

Item	*Minimum use specificatians*	*Calibration equipment*
Multimeter	Range: °to 150 Vdc Accuracy: ± 3% fs	TS-362 B/U
Teletypewriter Test Set	Functions as a pattern and distortion generator; transmits "quick brown fox" message; alternate R and Y and selected characters; and reversal (dot cycle).	TS-799/UGM-l

2-2. Accessories Required. The accessory required for the calibration performance test is a 30-inch length of 50-ohm coaxial cable using two (2) plugs, type PJ-055B, for connectors.

SECTION 111
PRELIMINARY OPERATIONS

NOTE

It is recommended that personnel familiarize themselves with the entire procedure before performing calibration.

3-1. Precautions. Before individual test equipment is connected into the calibration system, the following steps must be taken:

a. Verify that the POWER switch is set to OFF.

b. Mechanically zero DISTORTION meter if required.

c. Set the POWER switch to 115V or 230V position allowed by the locking guard. Disregard all other switch settings at this time,

NOTE

When directions for control setting are not given, the controls may be set to any position. However, if the controls had been set to a particular position in a previous step, do not change the control setting unless directed.

d. Energize the Test Instrument and allow 10 minutes for it to warm up and stabilize before making any connections.

3-2. Test Instrument Setup. *a. Connections.* Connect one end of the plug (PJ 055B) test cable to the SIGNAL INPUT jack of the Test Instrument, and connect the other end of the plug (PJ 055) into the SIGNAL OUTPUT jack of the pattern generator.

b. Control Setting for Test Instrument.

(1) CURRENT SELECT switch to 20.

(2) RATE switch to 75.

(3) TRANSITION SELECT switch to ALL.

(4) DISTORTION SELECT switches to AVERAGE and SPACE/MARK.

(5) FILTER switch to OUT.

(6) POLARITY switch to -.

3-3. Test Equipment (Pattern Generator) Control Setting. *a.* CURRENT SELECT switch to 20.

b. MESSAGE SELECT switch to ALT/R&Y.

c. BAUDS RATE switch to 7.5/75.

d. DISTORT SELECT switch to BIAS SPACE.

e. MESSAGE TRANSMIT switch to ON.

f. % DISTORT potentiometer to O.

NOTE

The following paragraphs are divided into subparagraph *a*, performance check, and subparagraph *b*, adjustments. When the performance check is within tolerance do not perform the corresponding adjustment. When the performance check is not within tolerance, perform the corresponding adjustment before continuing with the calibration procedure. When the performance check is not within tolerance and the adjustment cannot bring it into tolerance, the deficiency must be corrected before continuing with the procedure.

SECTION IV
CALIBRATION PROCESS

WARNING

HIGH VOLTAGE is used during the performance of this calibration.
DEATH ON CONTACT
may result if personnel fail to observe safety precautions.

4-1. Distortion Measurement Check. ***a. Performance Check.***

(1) Slowly adjust the pattern generator % DISTORT control from O to 50.

NOTE

The % DISTORT control must be moved slowly so that the meter pointer will not jump to off scale. If the meter pointer jumps to off scale, press the RESET button and repeat the % DISTORT control adjustment.

(2) The Test Instrument SIGNAL lamp shall flicker, LATE lamp will light and PERCENT DISTORTION meter indicator shall follow control O to 50.

(3) The indication on the PERCENT DISTORTION meter shall move from 0 to 49.2% distortion in 63 increments (this is derived from a binary count circuit).

(4) Set the Test Instrument DISTORTION SELECT switch to MARK/SPACE.

(5) Depress Test Instrument RESET switch.

(6) PERCENT DISTORTION meter indicator shall drop to 0.

(7) Set the pattern generator DISTORT SELECT switch to BIAS MARK and % DISTORT control to O.

(8) Set the Test Instrument DISTORTION SELECT switch to SPACE/MARK.

(9) Slowly adjust the pattern generator % DISTORT control from 0 to 50.

(10) Test Instrument EARLY lamp light and PERCENT DISTORTION meter indicator shall follow control 0 to 50.

(11) Depress Test Instrument RESET switch.

(12) PERCENT DISTORTION meter indicator shall drop to 0.

(13) Return the pattern generator to the same positions as indicated in paragraph 3-3 above.

(14) Set the Test Instrument DISTORTION SELECT switch to PEAK TOTAL.

(15) Slowly increase the pattern generator % DISTORT control from 0 to 40% and then return to 20% .

(16) The Test Instrument PERCENT DISTORTION meter indicator shall follow control to 40% and remain there until the Test Instrument RESET switch is depressed.

(17) Set the pattern generator % DISTORT control to 25%.

(18) Set the Test Instrument POLARITY switch to +.

(19) Depress Test Instrument RESET switch.

(20) PERCENT DISTORTION meter shall indicate 0.

(21) Set Test Instrument POLARITY switch to -.

(22) PERCENT DISTORTION meter will indicate beyond 25%.

(23) Depress Test Instrument RESET switch.

(24) PERCENT DISTORTION meter will indicate 25%.

(25) Make the Test Instrument and pattern generator switch settings shown in table 4-1, and indications shall be as indicated therein.

Table 4-1. Distortion Measurements

Pattern generator RATE switch (bauds)	*Test Instrument RATE switch (bauds)*	*Indication PERCENT DISTORTION meter (%)*
7.5/45.5	45.5	*24 t0 26
7.5/50	50	24 to %
7.5/74.2	74.2	24 to 26
7.0/150	150	20 to 25

* Depress Test Instrument RESET switch to obtain each indication.

b. Adjustments.

(1) With power cord disconnected, remove Test Instrument from case.

(2) Remove (12) screws from top panel of the Test Instrument.

(3) Remove card 1A2A15 from the Test Instrument. Remove extender card 1A2A7 from dummy socket and insert into 1A2A15 socket.

(4) Insert card 1A2A15 into the extender card 1A2A7.

(5) Set RATE switch to 75.

(6) Set CURRENT SELECT switch to 20).

(7) Set FILTER to OUT.

(8) Set DISTORTION SELECT switch to PEAK TOTAL.

(9) Connect the Test Instrument to an AC power source.

(10) Do not apply an input signal.

(11) Turn POWER switch to ON.

(12) Depress the Test Instrument RESET switch.

(13) Connect a lead momentarily between the chassis and base (2 contact printed circuit board connectors) of transistor Q6 on card 1A2A15.

(14) Adjust R15 of card 1A2A15 for a 25 percent indication on the PERCENT DISTORTION meter (fig. 4-l). (R)

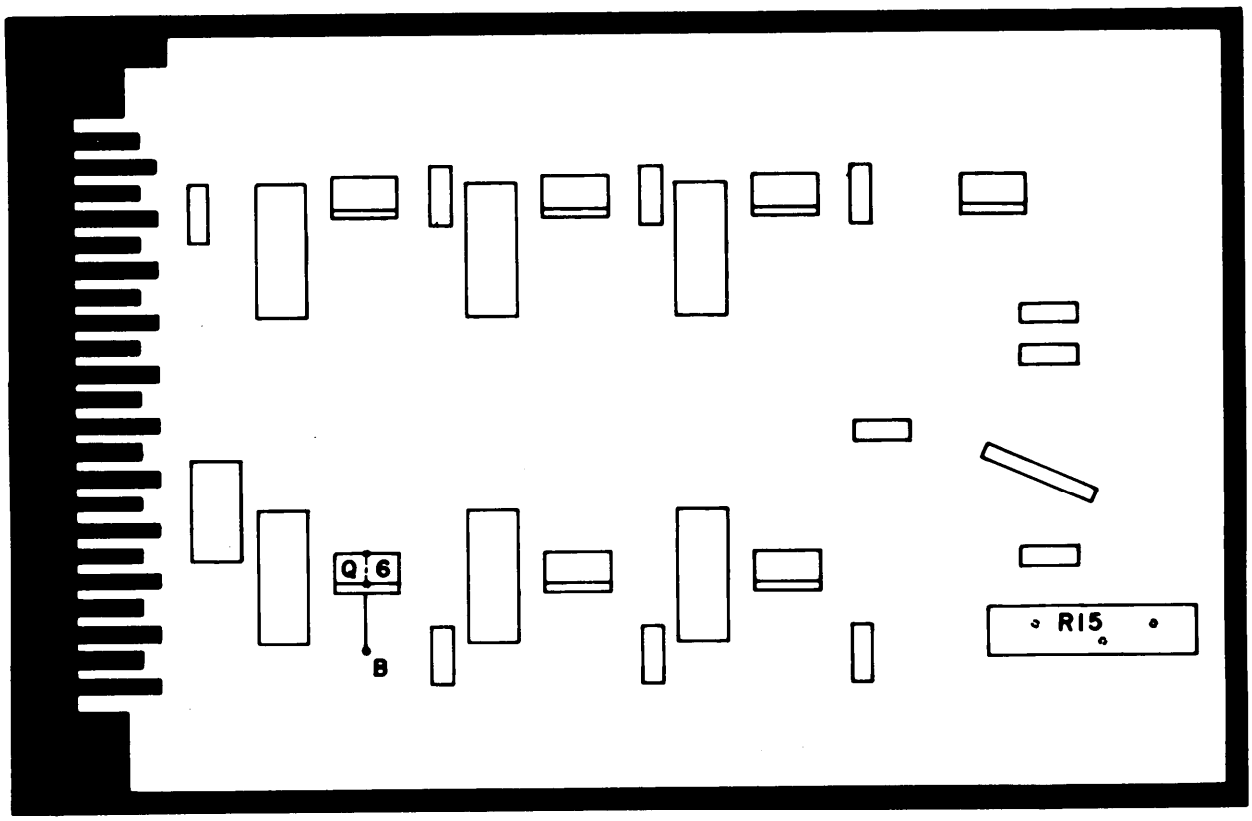

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Figure 4-1. Printed circuit card assembly 1A2A15 (80047080), component locations.

NOTE

The meter reads from 0 to 49.2 percent nominal.

(15) Adjust R15 of card 1A2A15 to halve the error between the 25 percent 49.2 percent indications.

NOTE

Perform the following power supply check only if the preceding performance checks or adjustments could not be obtained.

4-2. Power Supply Check. ***a. Performance Check.***

(1) Turn Test Instrument POWER switch to OFF and disconnect cables.

(2) Remove the Test Instrument protective cover. Making sure that nothing is touching any electrical components reconnect cables.

(3) Set POWER switch on Test Instrument either to 115V ON or 230V ON.

(4) Using multimeter, measure the voltage indications at Test Instrument jacks as shown in table 4-2 and GRD (J2).

b. Adjustments. No adjustments can be made.

4-3. Final Procedure. *a.* Reenergize and disconnect all equipment and reinsert boards to proper places.

b. Reinstall coverplate and cover to Test Instrument.

C. In accordance with TM 38-750, annotate and affix DA Label 80 (US Army Calibration System). When the Test Instrument cannot be adjusted within tolerance, annotate and affix red tag, DA Form 2417 (Unserviceable or Limited Use).

Table 4-2. Power Supply Measurement

Test instrument connector (jacks)	*Multimeter indications (dc voltage)*	
	Minimum	*Maximum*
+15V (J1)	+14.25	+ 15.75
-15V (J3)	-14.25	-15.75
-10V (J4)	+9.50	+ 10.50
-lmV (J5)	-114.00	-126.00

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