DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR RECEIVER TEST SET LITCOM MODEL NO. 4700

Headquarters, Department of the Army, Washington, D. C.
22 February 1972

SECTION I
GENERAL

1. Purpose and Scope. a. This bulletin contains calibration instructions for Receiver Test Set, Litcom Model No. 4700 (receiver test set), and is used by maintenance calibration personnel. Since maintenance calibration personnel are trained and qualified in the use of test and measuring equipment, detailed instruction concerning the operation and use of these equipments are not contained in this bulletin.

b. Integrated within this bulletin is an illustration (fig. 1) which shows location of controls utilized in this calibration procedure.

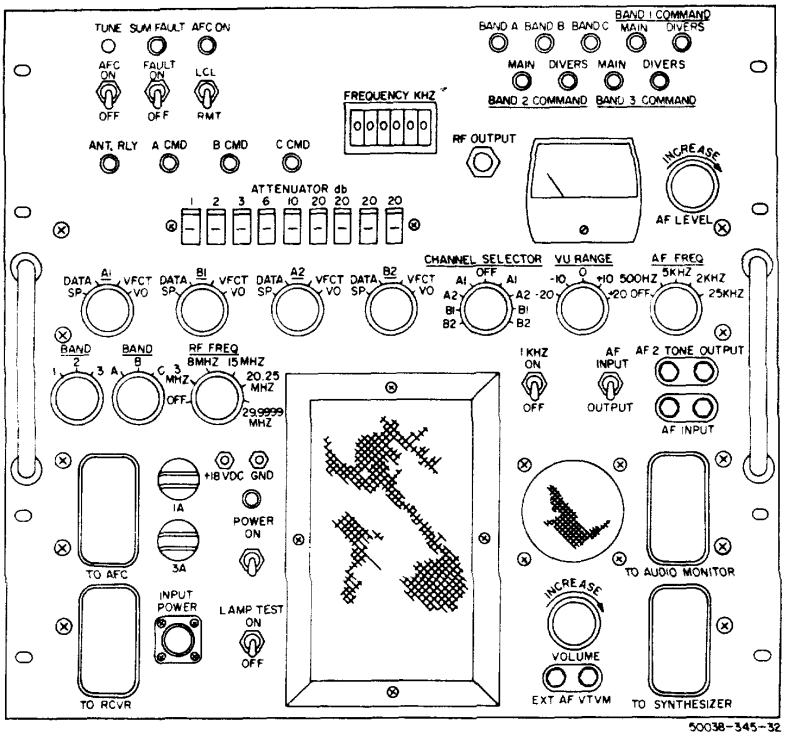

Figure 1. Receiver test set, controls and indicators.

2. Reporting of Technical Bulletin Improvements. Reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forward direct to Commanding General, U. S. Army Electronics Command, ATTN: AMSELMA-CFA, Fort Monmouth, N. J. 07703.

3. Description. *a.* The Receiver Test Set, Model 4700 (receiver test set) is a portable equipment that provides maintenance support for Receiving Set, Radio AN/FRR-79. The receiver test set checks five major components of the AN/FRR-79 and enables direct support maintenance personnel to test and troubleshoot the AN/FRR-79 and its components down to the card level. Each major component of the AN/FRR-79 is activated by stimuli from the receiver test set which simulates actual operating conditions. The receiver test set contains circuits which perform frequency mode selection, status display, audio (VU meter) and visual monitoring, attenuation, and remote control functions in the components of AN/ FRR-79. The transit case consists of a base and detachable cover. The cover contains a removable plate which stores the accessory items supplied with the receiver test set such as cables. The plate is secured to the cover by four fasteners. The base of the transit case contains two handles for lifting and carrying, and six latches that secure the cover to the base. Additional data is listed in a, b, and c below.

a. Identification.

Nomenclature . .....Receiver Test Set Litcom Model 4700.
Size . .....21 1/2 by 22 1/2 by 24 1/2 in.
Weight .....35 lbs (approx.)

b. Specifications.

Input requirement.....103.5 to 125.5 volts, 54 to 66 Hz single phase.
Power consumption.....150 watts.
Oscillator frequencies....3.0, 8.0, 15.0, 20.25, 29.99 MHz. (± percent)
Power supply output voltage .....18 volts dc. (+ 3 percent)

c. Program Data.

Calibration interval ..... In accordance with TB 750-236
Time required for calibration .....1 hour.
Calibration level .....Maintenance

4. General Instructions. a. Calibration Reporting. During the performance of the calibration procedures included in this manual, annotate DA Form 2416 (Calibration Data Card) in accordance with TM 38-750.

b. Removal. Do not remove unit under test from its protective case unless adjustment is required.

c. *Unit under test*. Receiver test set will be referred to as "unit under test" throughout this procedure.

SECTION II
CALIBRATION

5. Equipment Required. Equipment required for calibration performance checks and adjustments is listed in table 1.

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.

6. Preliminary Procedure. This section includes instructions to prepare the unit under test for the calibration procedures outlined in paragraphs 7 and 8. These preliminary operating procedures place power supply PS1 and RF oscillators A4 through A8 in the unit under test in a turned-on condition. Verify the results of each step and take corrective action whenever the requirement is not met, before proceeding.

a. Operate unit under test POWER switch to ON. Observe that POWER indicator illuminates and blower motor operates.

b. Operate 1KHZ and AF FREQ switches to OFF.

c. Disregard settings of remaining switches and controls.

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

Table 1A. Equipment Required

Item	Minimum use specification	Calibration equipment [1]	Military equivalent
Frequency counter	Frequency range, 0 to 35 MHz ±1 percent	Systron-Donner Model 1037	AN/USM-257A
DC voltmeter	18 volts dc Accuracy ± 1 percent	John Fluke Model 803B	ME-202/U

[1] The calibration equipment utilized in this procedure was selected from those known h, be available at Department of Defense facilities and the listing by make or model number carries no, implication of preference, recommendation, or approval by the Department of Defense for use by other agencies. It is recognized that equivalent equipment produced by other manufacturers may be capable of equally satisfactory performance in the procedure.

Table 1B. Authorized Accessories

Nomenclature	Description
RF Cable Assembly	BNC plug to BNC plug, Pomona 2249-C-36
Cable Assembly	Banana plug to test prod (2 required)

NOTE

It is recommended that personnel familiarize themselves with the entire procedure before performing calibration, tolerance and the adjustment cannot bring it into tolerance, the deficiency must be corrected before continuing with the procedure.

7. Power Supply PSI Calibration. *a. Performance Check.*

(1) Connect dc voltmeter between + 18VDC test point and GND test point on unit under test observing polarity.

(2) Observe that dc voltmeter indicator between 17.5 and 18.5 volts, dc.

b. Adjustments.

(1) Set POWER switch to down (off) position.

(2) Remove holding screws securing front panel to protective case.

(3) Carefully remove unit under test overall assembly from protective case.

(4) Set POWER switch to ON.

(5) Locate voltage adjust potentiometer on power supply card (accessible through port on right side, facing unit under test front panel).

CAUTION

Use insulated adjustment tool.

(6) Rotate voltage adjust potentiometer to obtain 18 volts, dc indication on dc voltmeter.

8. Oscillators A4 through A8 Calibration. *a. . Performance Check.*

(1) Connect RF OUTPUT terminal on front panel of unit under test to A INPUT terminal of the frequency counter, using RF cable assembly BNC plug to BNC plug.

(2) Set RF FREQ switch to positions noted in table 2.

(3) Observe that the frequency counter indicates within the limits specified in table 2.

b. Adjustments.

(1) Place unit under test POWER switch in down (off) position.

(2) Remove holding screws securing front panel to protective case.

(3) Carefully remove unit under test overall assembly from protective case.

(4) Remove cover plate from RF housing assembly (top center).

(5) Place unit under test POWER switch to ON.

Table 2. Oscillator Output Frequencies.

Unit under test		Frequency counter indication (MHz)	
Oscillator	RF FREQ switch position	Minimum	Maximum
A4	3 MHZ	2.97	3.03
A5	8 MHZ	7.92	8.08
A6	15 MHZ	14.85	15.15
A7	20.25 MHZ	20.047	20.4525
A8	29.9999 MHZ	29.6999	30.29989

(6) Rotate frequency adjustment of each oscillator to obtain indication within the limits specified in table 2.

(7) Reinstall cover plate on RF housing assembly.

(8) No further adjustments can be made.

9. Final Procedure. a. Deenergize unit under test and disconnect all equipment. Reinstall unit under test in protective case.

b. In accordance with TM 38-750, annotate and affix calibration DA Label 80 U.S. Army Calibration System). When the unit under test cannot be adjusted to within tolerance, annotate and affix DA Form 2417 (Unserviceable Test Instrument or Limited Use).

By Order of the Secretary of the Army:

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General, United States Arm/y,
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P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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