DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR

OSCILLATOR I MODULATOR TEST SET

LITCOM MODEL NO. 4401

Headquarters, Department of the Army, Washington, D. C.

23 February 1972

SECTION I

GENERAL

1. Purpose and Scope. *a.* This bulletin contains calibration instructions for Oscillator/Modulator Test Set, Litcom Model No. 4401 (oscillator/modulator 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 which shows front panel 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 (Recommend Changes to Publications) and forwarded direct to Commanding General, US Army Electronics Command, ATTN: AMSEL-MA-CFA, Fort Monmouth, NJ 07703.

3. Description. The oscillator/modulator test set is a portable equipment that provides maintenance support for Transmitting Set, Radio AN/FRT-76 and -77. The oscillator/modulator test set enables direct support maintenance personnel to test and troubleshoot the AN'FRT-76 and -77 and its components down to the card level. Each major component of the AN/FRT-76 and -77 is activated by stimuli from the oscillator/modulator test set which simulates actual operating conditions. The oscillator/modulator test set contains circuits which perform frequency mode selection, status display, audio monitoring (VU meter), attenuation, and remote control functions in the AN/FRT-76 and -77. The oscillator/ modulator test set overall assembly is housed in an aluminum transit case. The transit case consists of a base and detachable cover. The cover contains a removable plate which stores the accessory items supplied with the oscillator/modulator test set such as cables. The plate is secured to the cover by four fasteners. All operating controls of the oscillator,/' modulator test set are mounted on the front panel assembly. Two handles are provided on the front panel assembly for convenience in removal of the oscillator/modulator test set overall assembly from the transit case for servicing. The front panel controls and indicators of the oscillator/modulator test set are illustrated in figure 1. Additional data is listed in *a*, *b*, and *c* below.

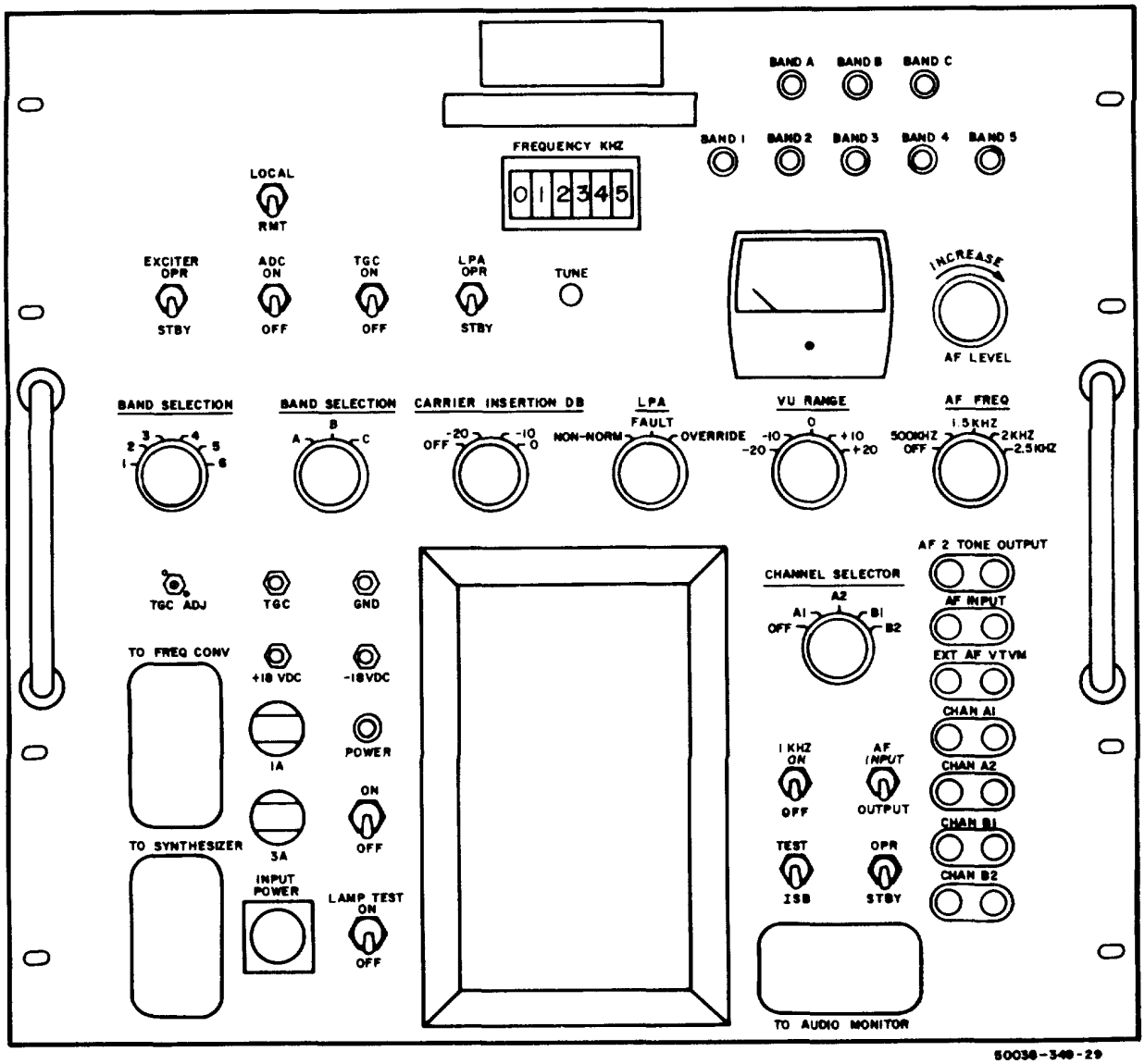

Figure 1. Oscillator/modulator test set controls and indicators.

a. Identification.

Nomenclature..... Oscillator/Modulator Test Set Litcom Model 4401.
Size ..... 21 1/2 by 22 1/2 by 24 1/2 in.
Weight ..... 45 lbs (approx.)

b. Specifications.

Input requirement..... 103.5 to 126.5 volts, 54 to 66 Hz, single phase.
Power supply output voltages +18, and -18 volts, dc (e 3 percent)

c. Program Data.

Calibration interval ..... In accordance with TB 750-236
Time required for calibration ..... 30 minutes
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. Oscillator/modulator 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 adjustment 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.

Table 1. Equipment Required

Item	*Minimum use specification*	*Calibration equipment*	*Military equivalent*
DC Voltmeter	18 Volts, dc accuracy ± 1 percent	John Fluke Model 803B	ME-202/U

The calibration equipment utilized in this procedure was selected from those known to 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.

NOTE

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

6. Preliminary Procedure. This section includes instructions to prepare the unit under test for the calibration procedures outlined in paragraph 7. The preliminary operating procedure places the power supplies (PS1 and PS2) in the unit under test in a turned-on condition. Verify the results of the following turn-on and take corrective action if the requirements are not met, before proceeding.

a. Operate unit under test 1 KHz and AF FREQ switches to OFF.

b. Disregard settings of remaining switches and controls.

c. Operate POWER switch to ON.

d. Observe that POWER indicator illuminates and fan motor operates.

NOTE

The following paragraph is 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.

7. Power Supplies PS1 and PS2 Calibration.

a. Performance Check.

(1) Connect dc voltmeter to test points on unit under test front panel as noted in table 2.

(2) Observe that dc voltmeter indicates within the limits specified in table 2.

Table 2. Power Supply Output Voltages

Unit under test		*Dc voltmeter indication (volts de)*	
Power supply	*Front panel test points*	*Minimum*	*Maximum*
PS1	+18 VDC and GND	+175	+1K5
PS2	-18 VDC and GND	-17.5	-18

b. Adjustments.

(1) Remove screws securing main assembly to protective case.

(2) Carefully remove unit under test from protective case.

(3) Rotate voltage adjust potentiometers (located on power supply circuit cards) on power supplies to obtain indications on dc voltmeter within the limits specified in table 2. (+18 volts, dc supply located on bottom, rear of main assembly and -18 volts, dc supply located on top center of main assembly.) (4) No further adjustments can be made.

8. Final Procedure. *a*. Deenergize unit under test disconnect dc voltmeter, and reinstall main assembly 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 Limited Use).

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

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The Adjutant General.

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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 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 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 milliliters = .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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