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DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR AUDIO OSCILLATORS, TS-421 ()/U (DATA ROYAL, MODEL F370A) AND SIGNAL GENERATOR HEWLETT-PACKARD, MODEL 205AG

Headquarters, Department of the Army, Washington, DC

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*This technical bulletin supersedes TB 9-6625-862-35, 3 July 1987, including all changes.

**SECTION I
IDENTIFICATION AND DESCRIPTION**

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Audio Oscillators, TS-421()/U (Data Royal, Model F370A); and Signal Generator, Hewlett-Packard, Model 205AG. The manufacturers' manuals and TM 11-6625-355-15-1 were used as the prime data sources in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

a. Model Variations. Variations are described in text.

b. Time and Technique. The time required for this calibration is approximately 2 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
Line voltage	115 V ac, $\pm 10\%$, 60 Hz
Frequency	Range: 20 Hz to 20 kHz Dial accuracy: $\pm 2\%$
Frequency response	Range: 20 Hz to 20 kHz Accuracy: ± 1 dB from 20 Hz to 20 kHz at output levels $< + 30$ dBm w/output meter reading held at $+ 37$ dB ± 1.5 dB from 20 Hz to 20 kHz at output levels $\geq + 30$ dBm w/output meter held at $+ 37$ dB (reference 1 kHz)
Distortion	$< 1\%$ at frequencies above 30 Hz
Input meter	Range: -5 to $+8$ dBm (0 to 2 V rms) Accuracy: $\pm 5\%$ of FS
Input attenuator	Range: 0 to 40 dB Accuracy: ± 0.1 dB
Output meter	Range: 0 to 65 V ac at 600 Ω Accuracy: $\pm 5\%$
Output attenuator 10 dB steps	Range: 0 to 110 dB Accuracy: ± 0.5 dB, 0 to 80 dB at 1 kHz ± 1.5 dB, 90 to 100 dB at 1 kHz ± 2.5 dB, 0 to 100 dB at 20 kHz
1 dB steps	± 0.25 dB, 0 to 10 dB at 20 kHz

**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; AN/GSM-287 or AN/GSM-705. 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 TI. Where the four-to-one ratio cannot be met, the actual accuracy of the equipment selected is shown in parenthesis.

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.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
AUDIO ANALYZER	Range: 35 Hz to 20 kHz Distortion: < 1%	Boonton, Model 1121 (1121)
AUTOTRANSFORMER	Range: 105 to 125 V ac Accuracy: 1%	General Radio, Type W10MT3AS3 (7910809), or Ridge, Model 9020A (9020A), or Ridge, Model 9020F (9020F)
FREQUENCY COUNTER	Range: 20 Hz to 21 kHz Accuracy: $\pm 0.5\%$	Fluke, Model PM6681/656 (PM6681/656)
MULTIMETER	Range: 0.46 mV to 79 V Accuracy: $\pm 0.29\%$	Fluke, Model 8840A/AF-05/09 (AN/GSM-64D)
STEP ATTENUATOR	Range: 40 dB Voltage: 50 V	Tech Laboratories, Model C-8756 (MIS-35949)

**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.