

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR
ORGANIZATIONAL, DS, GS
AND DEPOT MAINTENANCE MANUAL
INCLUDING
REPAIR PARTS AND SPECIAL TOOL LISTS

FREQUENCY METERS
AN/USM-26 AND AN/USM-26A

This copy is a reprint which includes current
pages from Changes 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY

JULY 1969

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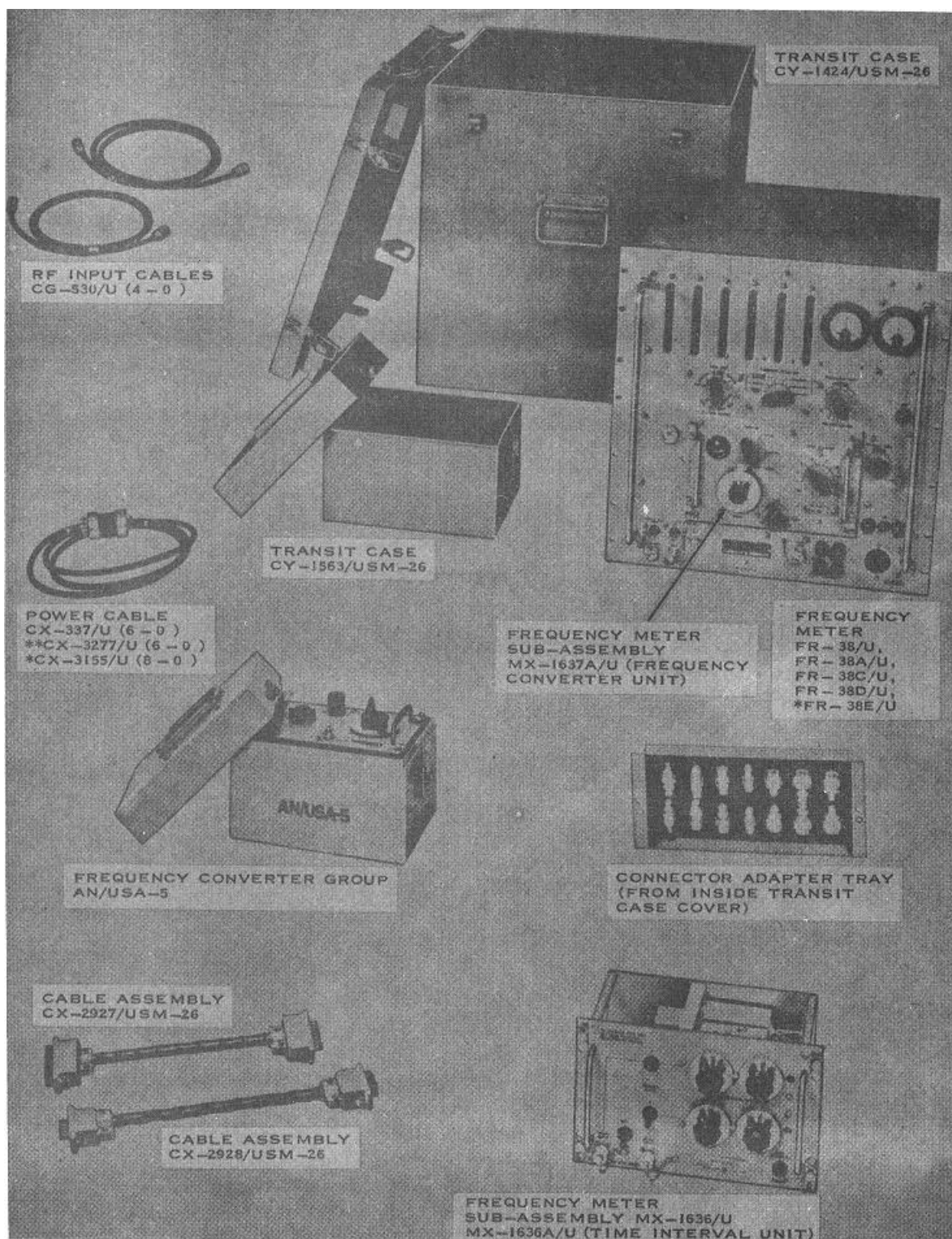
NOTE

This publication also covers Frequency Meter FR-38C/U and FR-38D/U as manufactured by Northeastern Engineering, Inc., Manchester, New Hampshire. All references to FR-38/U also apply to FR-38C/U and FR-38D/U except where differences are noted in the text.

Frequency Meter FR-38C/U and FR-38D/U may be used with a special frequency converter (not supplied) to extend the frequency range to 220 megacycles.

This publication also covers Frequency Meter AN/USM-26A and its main components; Frequency Meter FR-38E/U, Frequency Meter Subassembly MX-1636A/U and Frequency Meter Subassembly MX-1637A/U as manufactured by Crescent Communications Corp., New London, Connecticut. All references to FR-38/U, MX-1636/U and MX-1637/U apply to FR-38E/U, MX-1636A/U and MX-1637A/u except where differences are noted in the text.

Frequency Meter FR-38E/U may be used with a special frequency converter (not supplied) to extend the frequency range to 510 megacycles.



** Used in FR-38D/U

* Used in AN/USM-26A

Figure 1-1. Frequency Meter AN/Usm-26 and Frequency Converter Group AN/USA-5, Equipment Supplied.

SECTION I INTRODUCTION

1-A.1. SCOPE.

a. This manual describes the general use and application, basic operating principles, installation, and detailed operating and repair procedures for Frequency Meters AN/USM-26 and AN/USM-26A and Frequency Converter Group AN/USA-5.

b. The basic issue items list appears in appendix B, the maintenance allocation chart appears in appendix C, and the repair parts and special tool lists appears in appendix D.

NOTE

Appendixes C, and D are current as of 31 March 1969.
Appendix B is current as of 11 June 1973.

1-1. INDEXES OF PUBLICATIONS.

a. *DA Pam 310-4.* Refer to the latest issue of DA Pam 3104 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. *DA Pam 310-7.* Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1-2. FORMS AND RECORDS.

a. *Reports of Maintenance and Unsatisfactory Equipment.* Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. *Report of Packaging and Handling Deficiencies.* Fill out and forward DD Form 6 (Report of Packaging and

Handling Deficiencies) as prescribed in AR 700-58/NAVSUP PUB 378/AFR 71-4/MCO P4030.29, and DSAR 4145.8.

c. *Discrepancy in Shipment report (DISREP) (SF .161).* Fill out and forward Discrepancy in Shipment Report (DISREP)(SF:361) as prescribed in AR55-38/NAVSUPINST 4610.33/AFM 75-18/MCO P4610.19A and DSAR 4500.15.

1-2.1. REPORTING OF ERRORS.

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 20,28 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-C, Fort Monmouth, NJ 0770:3.

1-3. PURPOSE OF EQUIPMENT.

1-4. Frequency Meter AN/USM-26 is a precision instrument that automatically measures frequencies to 100 megacycles and automatically displays its answers in digital form on an eight-place panel indicating system. Frequency Converter Group AN/USA-5 extends the frequency range to 220 megacycles. In addition to making direct measurements of frequency, Frequency Meter AN/USM-26 also measures period (time of one cycle of periodic wave), time intervals, frequency ratios and total events, and may be used to count random events such as those encountered in nuclear work. Table 1-1 summarizes the measurements that can be made with the equipment. The equipment further includes a self-check feature that enables the operator to verify the proper operation of the equipment for most types of measurements.

Table 1-1. Measurements Made by Frequency Meter AN/USM-26

1. FREQUENCY	10 cps to 220 megacycles. The frequency can be regular, as with electrical frequencies, or random, as with nuclear particles. Maximum pulse resolution is 0.1 microsecond for double pulses, 0.2 microsecond for triple pulses.
2. PERIOD	100 microseconds to 100 seconds (0.01 cps to 10 kc). A panel switch also permits measuring the average of 10 periods to obtain greater accuracy.
3. TIME INTERVAL	1.0 microsecond to 10,000,000 seconds. An adjustable "threshold" feature permits starting and stopping the measurement with signals of predetermined amplitude and polarity.
4. TOTAL EVENTS	1 to 100,000,000 events. Maximum pulse resolution of 0.1 microsecond when the unit is used as a high speed scaler and totalizer.
5. TIME OR FREQUENCY RATIOS	100,000,000: 1 maximum. The lower of the two frequencies can be as high as 10 kc; the higher can be as much as 10 mc.

1-5. Because of the accuracy with which it measures frequencies, the AN/USM-26 equipment can be considered to be a new type of secondary frequency standard that replaces more elaborate installations of conventional precision frequency-measuring equipment. For example, the meter has been found particularly useful for frequency measurements in quartz crystal grinding work as well as for general laboratory-quality frequency measurements. Other typical frequency-measurement applications for the equipment include calibration of transmitters, oscillators, signal generators, etc.

1-6. In combination with tachometer generators or other

suitable transducers, the equipment can be used to make precision tachometry measurements. In tachometry work it is particularly useful for measuring high speed devices.

1-7. Time measurements that the equipment will make include pulse length, pulse interval, time delay, etc.

1-8. Since the indicating system in the equipment presents the measured frequency in up to 8 significant figures, the equipment is especially useful for measuring very small frequency changes, such as are encountered when making measurements for frequency stability of oscillators and similar frequency generators.