

TECHNICAL MANUAL

**Operator, Organizational, Direct Support, General Support
and Depot Maintenance Manual
Including Repair Parts and Special Tools Lists**

DIGITAL READOUT ELECTRONIC COUNTER AN/USM-207A

(SERIAL NUMBERS 1A THROUGH 1100A)

This copy is a reprint which includes current
pages from Changes 1 and 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY

DECEMBER 1973

**Operator's, Organizational, Direct Support, and General Support
 Maintenance Manual Including Repair Parts and Special Tools List
 (Including Depot Maintenance Repair Parts and Special Tools)**

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 (SERIAL NUMBERS 1A THROUGH 1100A)
 (NSN 6625-00-044-3228)**

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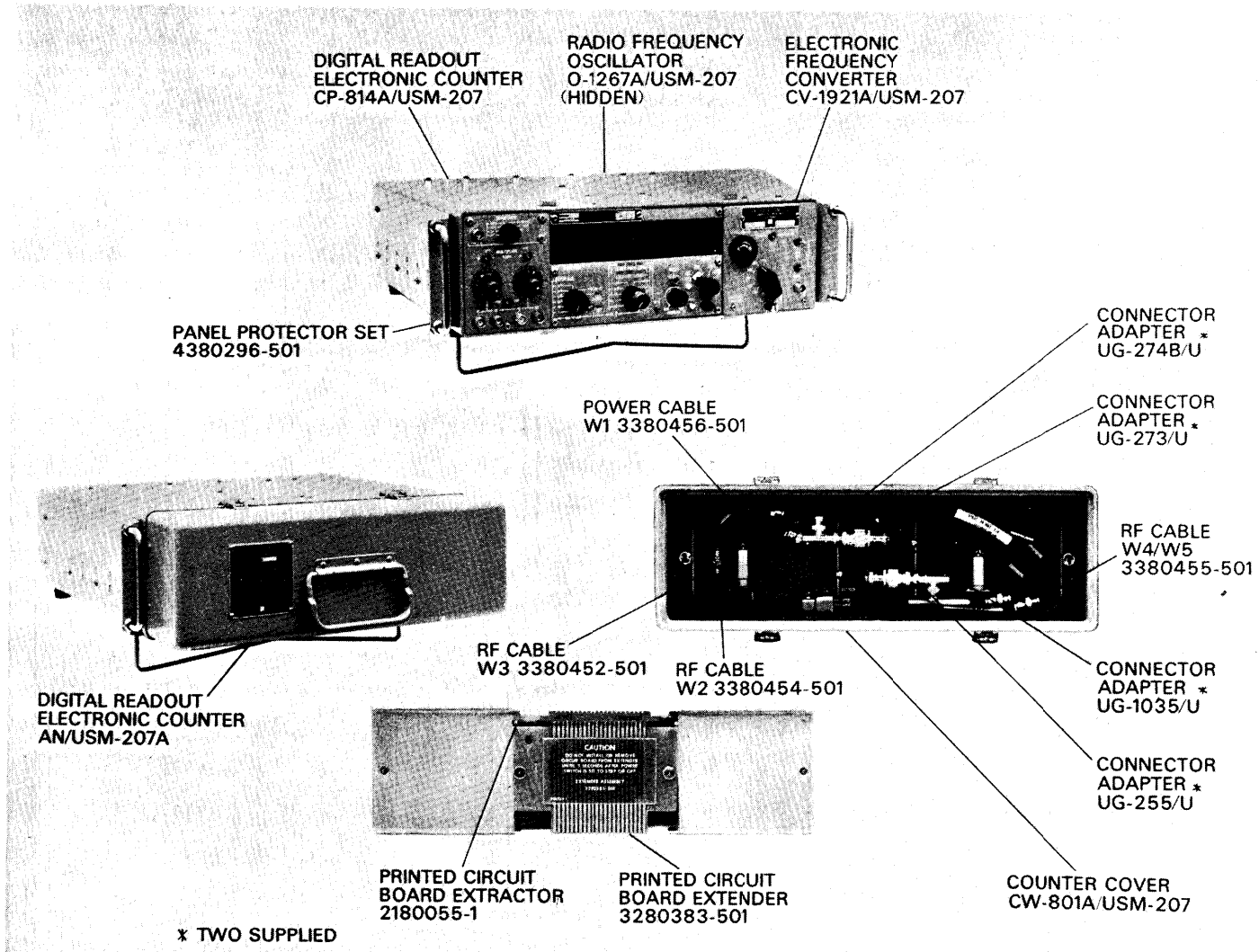


Figure 1-1. Digital Readout Electronic Counter AN/USM-207A

SECTION A GENERAL

A-1. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 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.

A-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 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A and DSAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33A/AFR 75-18/MCO P4610.19B and DSAR 4500.15,

A-3. 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 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703.

A-4. Administrative Storage.

Administrative of equipment issued to and used by Army activities shall be in accordance with TM 740-90-1.

A-5. Destruction of Army Electronics Materiel.

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

A-6. Reporting Equipment Improvement Recommendations (EIR).

EIR's will be prepared using DA Form 2407, Maintenance Request. Instructions for preparing EIR's are provided in TM 38-750, the Army Maintenance Management System. EIR's should be mailed directly to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703. A reply will be furnished directly to you.

NOTE

The maintenance allocation chart is in appendix B. The repair parts list is in appendix C. Appendix C is current as of 19 October 1973.

SECTION 1

GENERAL INFORMATION

1-1. SCOPE .

This Technical Manual is in effect upon receipt. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

1-2. GENERAL DESCRIPTION.

The AN/USM-207A is a portable, solid-state electronic counter for precisely measuring and displaying on an 8-digit numerical readout the frequency and period of a cyclic electrical signal, the frequency ratio of two signals, the time interval between two points on the same or different signals, and the total number of electrical impulses (totalizing). The counter also provides the following types of output signals:

- a. Standard signals from 0.1 cps to 10 mc in decade steps derived from a 1-mc frequency standard, frequency dividers, and a frequency multiplier;
- b. Input signals divided in frequency by factors from 10 to 108 by a frequency divider;
- c. Digital data of the measurement in four-line binary-coded-decimal form with decimal point and control signals for operation of printers, data recorders, or control devices; and
- d. A 1-mc output from a frequency standard.

1-3. DESCRIPTION OF UNIT.

The AN/USM-207A consists of a major counter assembly, two plug-in assemblies which install in recesses on the front and rear panel, and a group of accessory cables and connectors stored in the detachable front cover.

DIGITAL READOUT ELECTRONIC COUNTER CP-814A/USM-207. - The major assembly Digital Readout Electronic Counter CP-814A/USM-207 contains the input amplifiers; gate control; display, reset and transfer control; frequency multipliers; time base dividers; decade and readout boards; numerical display tubes; decimal point and units indicators; power supply and regulator; and control associated with these circuits.

RADIO FREQUENCY OSCILLATOR 0-1267A/USM-207. - This plug-in assembly develops a 1-mc signal and includes its own power supply. The oscillator includes the 1-mc output receptacle which may be used as a source of that frequency when the oscillator is connected to ac power through the basic counter or when connected to the power line independently of the counter. The counter may be operated without the oscillator in totalizing, scaling the input signal, time interval with external clock, and frequency ratio measurements. For other measurements the counter does not require the oscillator when a separate external 100-kc or 1-mc signal is connected. In either of those two situations the oscillator may be left in the counter or removed. The oscillator plugs into the right rear of the counter.

ELECTRONIC FREQUENCY CONVERTER CV-1921A/USM-207. - This plug-in assembly permits measurement of frequencies up to 500 mc using the heterodyne principle. The unit consists of the broadband amplifier, mixer, multiplier, and controls and indicators associated with these circuits. When measurements other than heterodyne frequency measurement are made, the converter is not required, but need not be removed. The converter also permits the measurement of signals from 35 mc to 100 mc with a greater sensitivity than available with the basic counter. The converter plugs into the right front of the counter.

d. COUNTER COVER CW-801A/USM-207. - The CW-801A/USM-207 protects the front panel of the counter when not in use and provides storage space for the power cable, printed circuit board extender, printed circuit board extractor, two rf cables, six adapters, two tee connectors, two plug-in test cables, and the Operating Manual.

1-4. REFERENCE DATA.

The AN/USM-207A is designed for continuous operation in ambient temperatures from -28° C to + 65° C with relative humidity to 95 percent, except that performance above 50° C is limited to operation with an external frequency standard. Within this range, the equipment will operate with the performance and accuracy specified below.

- a. **FREQUENCY MEASUREMENT.** -
 - (1) Range (with converter): 0 cps to 500 mc.
 - (2) Range (without converter): 0 cps to 100 mc.
 - (3) Input channel: A (ac coupled), C (ac or dc coupled), or converter (ac coupled).
 - (4) Input amplitude.
 - (a) Channel A input: 0.1 to 300 volts rms from 1.0 cps to 10 mc with 8 db/octave roll-off below 10 cps; 0.1 volt rms to 100 volts rms from 10 mc to 100 mc.
 - (b) Channel C input 0.1 volt rms to 425 volts rms, from 0.0 cps to 1 mc when dc coupled; ac coupled same as dc coupled except lower limit is 10 cps.
 - (c) Converter input: 0.01 volt to 10 volts rms from 35 mc to 500 mc.
 - (5) Input impedance.
 - (a) Channel A input: 1 megohm \pm 10% shunted by 30 pf maximum.
 - (b) Channel C input: 1 megohm \pm 10% shunted by 30 pf maximum.
 - (c) Converter input: 50 ohms nominal.
 - (6) Readout units: In direct frequency measurement, readout is in kc and mc with automatically positioned decimal point; with frequency conversion, readout in mc is added to or subtracted from converter mixing frequency selector switch reading in mc.
 - (7) Gate times: 1 Wee, 10 Met, 100 μ sec, 1 ms, 10 ms, 100 ms, 1 second, 10 seconds.
 - (8) Accuracy: \pm 1 count \pm time-base accuracy.