

INCH POUND

MIL-G-50322B(AR)
 30 April 1990
 SUPERSEDING
 MIL-G-50322A(MU)
 15 April 1971

MILITARY SPECIFICATION

GENERATOR, DIGITAL: 10548613

This specification is approved for use within the U.S. Army Armament, Munitions and Chemical Command, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers a digital generator, hereinafter called a 7.5--MHz clock generator, used in Range Computer CP888/VPS-2, part of Radar Set AN/VPS-2 and in Subassembly MX-8048/TPM-22, part of Radar Test Set AN/TPM-22.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

MILITARY

MIL-F-13926 - Fire Control. Materiel, Manufacture and Inspection, General Specification for

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in Improving this document, should be addressed to: Commander U.S. Army ARDEC, ATTN: SMCAR-BAC-S, Picatinny Arsenal, New Jersey 07806-5000 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

MIL-G-50322B(AR)

MIL-I-45607 Inspection Equipment, Acquisition,
Maintenance and Disposition of

STANDARDS

MILITARY

MIL-STD-109 Quality Assurance Terms and Definitions
MIL-STD-810 Environmental Test Methods and Engineering
Guidelines
MIL-STD-2000 Standard Requirements for Soldering
Electrical and Electronic Assemblies

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are **available from the Military Specifications and Standards, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.**)

2.1.2 Other Government documents, drawings, and publications.
The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the **date of the solicitation.**

DRAWINGS (see **6.4**)

**U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING
CENTER (ARDEC)**

10548613 - 7.5-MHz Clock Generator

PACKAGING DATA SHEET

PS10548613 - Packaging of 7.5-MHz Clock Generator

(Copies of drawings, publications, and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards) , the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Materials. Materials shall be in accordance with the applicable drawings and specifications.

MIL-G-50322B(AR)

3.2 Components and assemblies. The components and assemblies shall comply with all requirements specified on Drawing 10548613, all associated drawings, and with all requirements specified in applicable specifications and standards. Where applicable, the 7.5-MHz clock generator shall meet the requirements of MIL-F-13926 as follows:

- a. Dimensions and tolerances
- b. Inorganic protective surface finishings
- c. Part identification and marking
- d. Workmanship

3.3 Environmental service conditions.

3.3.1 Vibration. The 7.5-MHz clock generator shall not suffer damage and shall meet the requirements of 3.4 and 3.5 after exposure to sinusoidal vibrations, in each of three mutually perpendicular axes, as follows:

<u>Frequency Range</u>	<u>Amplitude</u>
10 to 15 hertz	0.06 inches double amplitude
15 to 25 hertz	0.04 inches double amplitude
25 to 55 hertz	0.02 inches double amplitude

The frequency of vibration shall be swept logarithmically.
 The cycling time shall be 120 minutes per axis.
 The sweep rate shall be 3.75 minutes \pm 10% per decade.
 The 10-55-10 hertz sweep time is 3 minutes 45 seconds \pm 10%.

3.3.2 Shock. The 7.5-MHz clock generator shall not suffer damage and shall meet the requirements of 3.4 and 3.5 after exposure to a total of 18 impulse shocks consisting of three shock impulses of $15 \pm 10\%$ g's, $11 \pm 10\%$ milliseconds half-sine wave applied in each direction of 3 mutually perpendicular axes.

3.3.3 Altitude.

3.3.3.1 Operating. The 7.5-MHz clock generator shall meet the requirements of 3.4 and 3.5 during and after exposure to barometric pressure encountered at 10,000 feet above sea level (~~20.6~~ Inches of Hg).

3.3.3.2 Non-operating. The 7.5-MHz clock generator shall meet the requirements of 3.4 and 3.5 after exposure for not less than 10 minutes to barometric pressure encountered at 40,000 feet above sea level (5.5 inches of Hg).

3.3.4 Temperature.

3.3-.4.1 Operating. The 7.5-MHz clock generator shall meet the requirements of 3.4 and 3.5 when stabilized thermally at any temperature between -40 degrees F and +155 degrees F.

MIL-G-50322B(AR)

3.3.4.2 Non-operating (storage). The 7.5-MHz clock generator shall not suffer permanent damage when subjected to the constant temperature extremes of -60 degrees F for a period of 24 hours and +160 degrees F for a period of 4 hours (after temperature stabilization) and shall meet the requirements of 3.4 and 3.5 when returned to room ambient.

3.3.5 Humidity (non-operating). The 7.5-MHz clock generator shall meet the requirements of 3.4 and 3.5 after exposure to an atmosphere with a relative humidity in excess of 95 percent for a period of 10 days.

3.4 Electrical. Each conductor shall be electrically continuous as specified on the schematic diagram of the 7.5 MHz clock generator.

3.5 Performance. When supplied with the inputs specified in Table I, the 7.5-MHz clock generator shall yield the output specified in Table I.

TABLE 1. Input and output characteristics

<u>REQUIREMENT</u>	<u>CHARACTERISTIC</u>	<u>TERMINALS</u>
Input voltage	+5.0 \pm 0.5 Vdc	C9(+), E7 (RET)
Input signal	2.12 \pm 0.37 Vac peak-to-peak; frequency 60 \pm 5 MHZ	J1
Output signal	Square wave, amplitude 2.0 - 3.5 Vdc; frequency exactly one eighth of frequency of input signal; into load not less than 100 ohms.	E8, E7 (RET)

3.6 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection in accordance with the technical provisions herein (see 4.3).

3.7 Workmanship. The workmanship requirements of MIL- 19926, shall apply, except for soldering.

3.8 Soldering. All soldering shall be in accordance with the general requirements of MIL-STD-2000 in addition to detail requirement (task)F of paragraph 1.2 of MIL-STD-2000.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or **any** other facilities

MIL-G-50322B(AR)

suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements. Reference shall be made to MIL-STD-109 to define quality assurance terms used herein.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5 and all applicable drawings. The inspections set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 General provisions. The component and subassembly inspection requirements of MIL-F-13926 form a part of the quality assurance provisions of this specification.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).
- c. Special sampling inspection (see 4.5).

4.2.1 Inspection conditions. Unless otherwise specified, all examinations and tests shall be conducted at the following standard ambient conditions:

- | | |
|----------------------|-------------------------------|
| a. Temperature | +50 deg to +90 deg F. |
| b. Relative humidity | 90% RH Max. |
| c* Pressure | 28 to 32 inches of Hg. |

4.3 First article inspection.

4.3.1 First article submission. The requirement for first article and the responsibility (Government or contractor) for the first article testing shall be as specified in the contract and the applicable drawing. The sample for the first article tests shall consist of three 7.5-MHz clock generators manufactured in the same manner, using the same materials, equipment, processes, and procedure as in regular production. All parts and materials, including packaging and packing, shall be obtained from the same source of supply as used in regular production.

4.3.1.1 Government testing. When the Government is responsible for conducting first article tests, the contractor,

MIL-G-50322B(AR)

prior to submitting the sample to the Government, shall inspect the sample to ensure that it conforms to all the requirements of the contract and the applicable drawings. The contractor shall submit a record of this inspection with the sample including certified test report (CTR) or certificate of conformance (COC) for the materials.

4.3.1.2 Contractor testing. When the Contractor is responsible for conducting first article tests, the sample shall be inspected by the contractor for all the requirements of the contract, all of the examinations and tests specified in Table II (Functional Tests) and Table III (Special Sampling) herein and to all requirements of the applicable drawings. The sample and a record of this inspection, including CTR/COC, shall be submitted for the Government approval. The Government reserves the right to witness the Contractor's inspection.

4.3.2 Rejection. If any assembly, component or test specimen fails to comply with any of the applicable requirements, the first article sample shall be rejected. The Government reserves the right to terminate its inspection upon any failure of any assembly, component or test specimen to comply with any of the stated requirements.

4.4 Quality conformance inspection.

4.4.1 Inspection lot formation. The term "inspection lot" is defined as a homogeneous collection of units of product from which a representative sample is drawn or which is inspected 100 percent to determine conformance with applicable requirements. Units of product selected for inspection shall represent only the inspection lot from which they are drawn and **shall not be construed to represent any prior or subsequent quantities presented for inspection.** Homogeneity shall be considered to exist provided the inspection lot has been produced by one manufacturer, in one unchanged process, using the same materials and methods, in accordance with the same drawings, same drawing revisions, same specifications and same specification revisions. All material submitted for inspection in accordance with this specification shall comply with the homogeneity criteria specified herein, regardless of the type of inspection procedure which is being applied to determine conformance with requirements.

4.4.2 Examinations and tests.

4.4.2.1 Components, assemblies and subassemblies. All components, assemblies and subassemblies shall be inspected in accordance with the inspection provisions contained in this specification and the Quality Assurance Provisions (QAP) listed in the Technical Data Package (TDP). In the absence of QAP's, the applicable quality assurance provisions of MIL-F-13926 shall apply.

MIL-G-50322 B(AR)

4.4.2.2 Final acceptance inspection. Subsequent to first article approval, examination and tests related to Section 3 herein shall be performed in accordance with the sampling plans specified in 4.4.2.3 herein. Examination and test for packaging and marking shall be in accordance with Section 5 herein. The tabulated classification of defects in 4.4.2.3 shall constitute the minimum inspection to be performed by the supplier after first article approval and prior to Government acceptance or rejection by item or lot.

4.4.2.3 Functional tests. The tests in Table II shall be performed on a 100% basis.

TABLE II. Functional tests
(100% Inspection)

<u>CHARACTERISTIC</u>	<u>REQUIREMENT</u>	<u>TEST PROCEDURE</u>
<u>Critical:</u>	None	N/A
<u>Major:</u>		
101. Electrical	3.4	4.7.2
102. Performance	3.5	4.7.3
<u>Minor:</u>	None	N/A

4.5 Special sampling. One 7.5-MHz clock generator out of the first 50 produced and one out of each 100 produced thereafter shall be selected at random. The sample shall have met the requirements and tests of Table II and shall then meet the tests in Table 111. Unless otherwise specified in the contract the items shall be returned to the lot upon successful completion of testing.

TABLE 111. Special sampling

<u>CHARACTERISTIC</u>	<u>REQUIREMENT</u>	<u>TEST PROCEDURE</u>
<u>Critical:</u>	None	N/A
<u>Major:</u>		
103. Vibration	303.1	4.7.101
104. Shock	3.3.2	4.7.1.2
105. Altitude	3.3.3	4.7.1.3
106. Temperature	3.3.4	4.7.1.4
107. Humidity	3.3.5	4.7.1.5
<u>Minor:</u>	None	N/A

4.5.1 Failure of sample. Should any one item of a special sampling fail to meet any of the specified test requirements, acceptance of the product shall be suspended by the Government

MIL-G-50322 B(AR)

until necessary corrections to all production since the last test as well as to current production has been accomplished in accordance with the provisions of the contract.

4.6 Inspection equipment.

4.6.1 Government-furnished inspection equipment. Where the contract provides for Government-furnished test equipment, supply and maintenance of test equipment shall be in accordance with the applicable requirements of MIL-I-45607.

4.6.2 Contractor-furnished Inspection equipment.

4.6.2.1 Government design. Unless otherwise specified in the contract, all inspection equipment identified by drawing number in specifications or QAPS forming a part of the contract shall be supplied by the contractor in accordance with the design specified. The contractor may, however, propose alternatives to Government designs for approval in accordance with 6.3.

4.6.2.2 Contractor design. The contractor shall design and supply inspection equipment compatible with the "Methods of Inspection" specified in 4.7 of this specification and with the component inspection procedures specified in "Examination" and "Test Facilities" requirements of MIL-F-13926 whenever Government designs are not specified (see 4.6.2.1). Since tolerance of test equipment is normally considered to be within 10 percent of the product tolerance for which it is intended, this inherent error in the test equipment design must be considered as part of the prescribed product tolerance limit. Thus, concept, construction, materials, dimensions, and tolerances used in the design of test equipment shall be so selected and controlled **asto ensure that the test equipment will reliably indicate acceptability of a product which does not exceed 90 percent of the prescribed tolerance limit and permit** positive rejection when nonconforming. Construction shall be such as to facilitate routine calibration of test equipment. Contractor inspection equipment designs shall be submitted for approval in accordance with 6.3.

4.6.2.3 Test equipment. In conjunction with 4.6.2.1 and 4.6.2.2, the test equipment listed in Table IV shall be used in the performance of the applicable test methods and procedures as specified in 4.7.

MIL-G- 50322 B(AR)

TABLE IV. Test equipment list

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>
1. Oscillator	Capable of being set to and delivering 60 \pm 5 MHz variable output 0 to 3 Vrms into 50 ohms.
2. Oscilloscope	Dual channel. Vertical passband dc to 85 MHz. Rise time of scope plus measuring probe 27 ns or less. Sweep period 100 ns per cm or less. Input resistance greater than 1 megohm. Input capacitance less than 25 pi?.
3. Power supply	+5.0 \pm 0.6 vdc, current capacity 0.3 A, ripple voltage not greater than 10 mV rms.

Note: **Wire, cable, adapters, 100-ohm resistor, 50-ohm termination**
per Figure 1.

4.7 Methods of inspection.

4.7.1 Environmental. Environmental tests shall be conducted in accordance with the test conditions, general test performance guidance, and individual test methods of MIL-STD-810 except as specified herein. Test facilities, chambers and apparatus used in conducting the tests contained in this specification shall be capable of meeting the conditions required.

4.7.1.1 Vibration. The test shall be performed as specified in Method 514.3, Category 8, Procedure I, of MIL-STD-810 as modified by 3.3.1 herein. In Step 1 of Procedure I only steps 4 through 8 of paragraph 11-2.1 apply. The 7.5-MHz clock generator shall be attached to the vibration generator directly or with a fixture, and securely held by its normal means of attachment. After vibration, the 7.5-MHz clock generator shall be tested as specified in 4.7.2 and 4.7.3 herein to determine compliance with 303.1.

4.7.1.2 Shock. This test shall be performed as specified in Procedure I, Section II of Method 516.3 of MIL-STD-810 except that:

- a. The post test functional check (Step 5 of Procedure I) need not be conducted until completion of all shock impulses.
- b. The shock pulses shall be 15 g's \pm 10% amplitude and 11 ms \pm 10% duration.
- c. The maximum g shall occur at 5.5 milliseconds \pm 10%.
- d. The shock measuring system shall have a flat frequency response within \pm 10% from 20 to 2,000 hertz.

MIL-G-50322B(AR)

After the application of all the shock impulses, the 7.5-MHz clock generator shall be tested as specified in 4.7.2 and 4.7.3 to determine compliance with 3.3.2.

4.7.1.3 Altitude (operating and non-operating) This test shall be performed as specified in Procedures II and III, Method 500.2 of MIL-STD-810. The operational checkout shall be as specified in 4.7.2 and 4.7.3 for compliance with 3.3.3.

4.7.1.4 Temperature.

4.7.1.4.1 High (operating and non-operating). This test shall be performed as specified in Procedures I and II, Method 501.2 of MIL-STD-810 with constant temperature extremes as specified in 3.3.4. The operational checkout shall be as specified in 4.7.2 and 4.7.3 for compliance with 3.3.4.

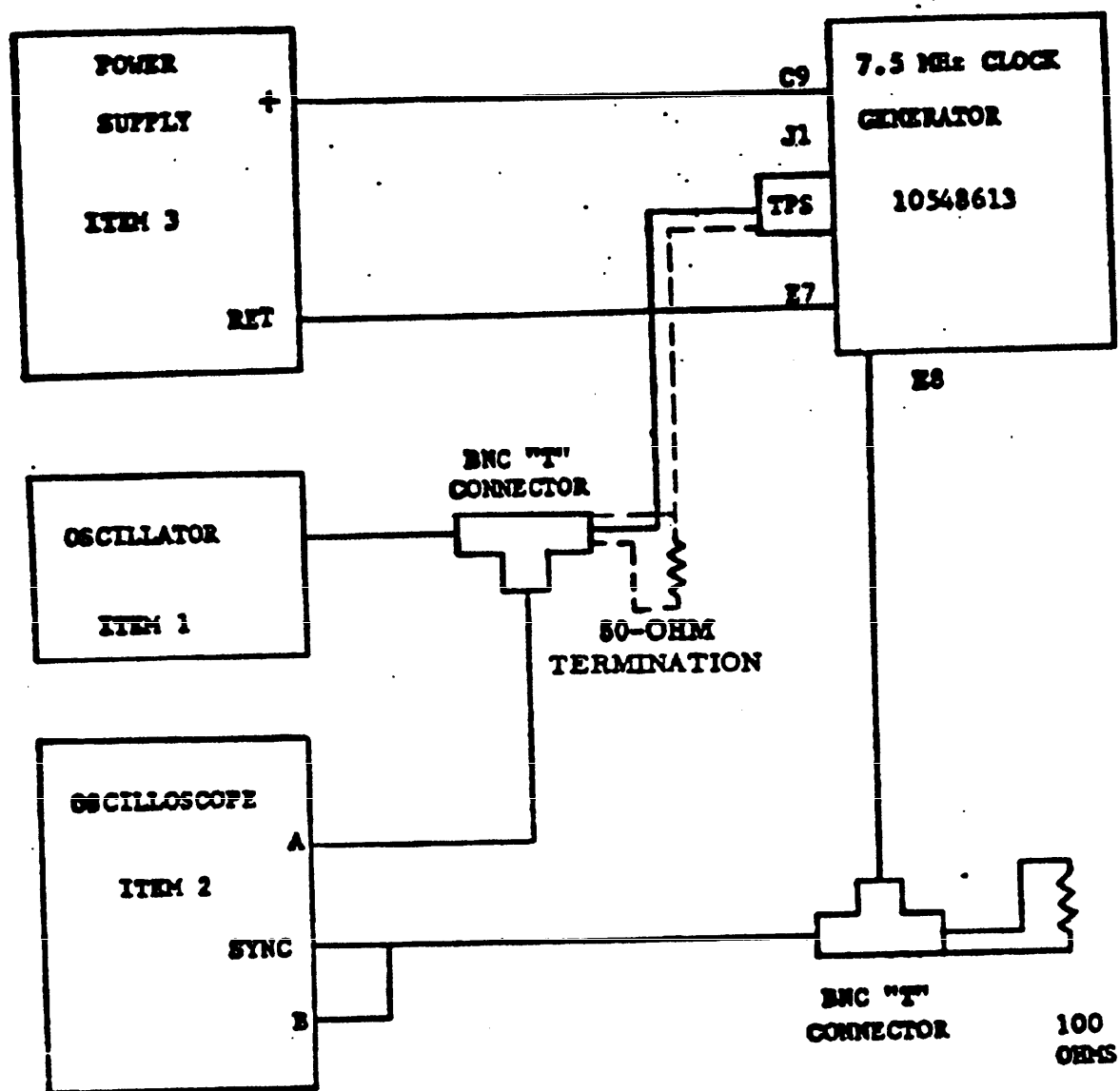
4.7.1.4.2 LOW (operating and non-operating). This test shall be performed as specified in Procedures I and II, Method 502.2 of MIL-STD-810 with constant temperature extremes as specifies in 3.3.4. The operational checkout shall be as specified in 4.7.2 and 4.7.3 for compliance with 3.3.4.

4.7.1.5 Humidity (non-operating) This test shall be performed in accordance with Procedure III, Method 507.2 of MIL-STD-810 except that in Step 7, checkout shall be performed at the conclusion of the test only, with the item at standard ambient conditions. The operational checkout shall be as specified in 4.7.2 and 4.7.3 for compliance with 3.3.5.

4.7.2 Electrical. Continuity shall be inspected by standard measuring equipment (SME) and visual examination for compliance with. 3.4.

4.7.3 Performance. The selected 7.5-MHz clock generator shall be tested as follows: Adjust power supply (Table IV, item 3) for $+5.0 \pm 0.1$ volts direct current (Vdc) and connect to 7.5-MHz clock generator as shown in Figure 1. Connect oscillator (Table IV, item

MIL-G-50322 B(AR)

FIGURE 1. Test setup for 7.5-MHz clock generator.

MIL-G-50322B(AR)

1) via "T" connector to oscilloscope (Table IV, item 2). Connect 50-ohm termination to remaining port of "T" connector. Adjust oscillator to deliver 2.0 ± 0.1 volts (v) peak-to-peak, at 60 ± 0.5 megahertz (MHZ), into 50-ohm load. Remove 50-ohm termination and connect equipment as shown in Figure 1. Sync oscilloscope to output of 7.5-MHz clock generator. Verify that frequency of square wave output on channel B is exactly one eighth of input frequency on channel A. Verify that amplitude of output squarewave is as specified in Table I. Vary dc input voltage from $+4.5 \pm 0.1$ Vdc to $+5.5 \pm 0.1$ Vdc and observe that output of 7.5-MHz clock generator does not change. Reset dc input voltage to $+5.0 \pm 0.1$ Vdc. Vary oscillator output voltage from 1.75 ± 0.05 V peak-to-peak to 2.50 ± 0.05 V peak-to-peak and observe that output of 7.5-MHz clock generator does not change. Restore oscillator output voltage to 2.0 ± 0.1 V peak-to-peak. Vary oscillator output approximately ± 5 MHz from 60 MHz and verify that output frequency remains exactly one eighth of input frequency.

4.8 Soldering. Soldering processes shall be inspected by certified inspectors to the requirements and acceptance criteria of MIL-STD-2000 as specified in paragraph 3.7.

5. PACKAGING

5.1 General. Preservation, packing, and marking shall be in accordance with Packaging Data Sheet PS10548613. The level of protection shall be as specified in the procurement document.

6. NOTES

(This section contains information of a general or explicit nature that may be helpful, but is not mandatory.)

6.1 Intended use. The 7.5-MHz clock generator is used in Range Computer CP-888/VPS-2, part of Radar Set AN/VPS-2, and in Subassembly MX-8048/TPM-22, part of Radar Test Set AN/TPM-22. The 7.5-MHz clock generator is used to count down from 60 MHz, the **intermediate frequency (i-f) of the radar.** Its output is then counted down further to derive the pulse repetition frequency (PRF) of the radar.

6.2 Acquisition requirements. Procurement documents shall specify the following:

6.2.1 Procurement requirements.

- a. Title, number and date of this specification.
- b. Applicable stock number.
First Article Sample requirements.
- c. Packaging requirements, if other than specified in Section 5.
- e. serialization requirements, if applicable.

MIL-G-50322B(AR)

- f. Certificate of conformance for each lot or shipment of product.

6.3 Submission of contractor inspection equipment designs for approval. Submit two copies of designs as required to: Commander, U.S. Army AMCCOM, ATTN : AMSMC-QAF-I(D), Picatinny Arsenal, NJ 07806-5000. This address will be specified on the Contract Data Requirements List, DD Form 1423 in the contract. Unless otherwise specified, data item DI-R-1714 will apply.

6.4 Drawings. Drawings listed in Section 2 of this specification under the heading U.S. Army Armament Research, Development and Engineering Center (ARDEC), may also include drawings prepared by, and identified as, U.S. Army Armament, Research and Development Command (ARRADCOM), Frankford Arsenal, Rock Island Arsenal or Picatinny Arsenal drawings. Technical data originally prepared by these activities is now under cognizance of ARDEC .

6.5 Subject term (key word) listing.

Digital generator
Fire Control System
7.5-MHz clock generator
Radar Set AN/VPS-2
Radar Test Set AN/TPM-22
Range Computer CP-888/VPS-2
Subassembly Test Set MX-8048\TPM-22
VADS

6.6 Changes from previous issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodian:
Army-AR

Preparing activity:
Army-AR

(Project 1285-A699)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

1. RECOMMEND A CHANGE:		1. DOCUMENT NUMBER MIL-G-50322B (AR)	2. DOCUMENT DATE (YYMMDD) 30 April 1990
3. DOCUMENT TITLE GENERATOR, DIGITAL: 10548613			
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)			
5. REASON FOR RECOMMENDATION			
6. SUBMITTER			
a. NAME (Last, First, Middle Initial)		b. ORGANIZATION	
c. ADDRESS (Include Zip Code)		d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY			
a. NAME US Army ARDEC Standardization & Specification Office		b. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON 880-7774	
c. ADDRESS (Include Zip Code) ATTN: SMCAR-BAC-S Picatinny Arsenal, NJ 07806-5000		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	