

MIL-M-87153 (USAF)
7 May 1984

SUPERSEDING

MIL-M-9901A (USAF)
1 November 1969

MILITARY SPECIFICATION

MANUALS, TECHNICAL: OPERATOR TEST PROCEDURES MANUALS USING AUTOMATIC TEST EQUIPMENT

This specification is approved for use by the Department of Air Force and is available for use by all departments and agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the preparation of Operator Test Procedures Manuals, which are used in conjunction with Automatic Test Equipment (ATE). Manuals prepared to this specification must be compatible with the approved maintenance concept and related documents such as computer program source listing, flow charts, test requirements documents, etc.

1.2 Operator Test Manuals. Operator Test Manuals contain specific procedures for using one or more Computer Programs (CPs) with ATE to test/fault isolate/calibrate one or more Units Under Test (UTs).

2. APPLICABLE DOCUMENTS.

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

SPECIFICATIONS

MILITARY

MIL-M-38784

Manual, Technical: General Style and Format Requirements

MIL-P-38790

Printing Production of Technical Manuals: General Requirements for.

(Copies of specifications, standards, handbooks, drawings, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: HQ AFLC/MMAP, Wright-Patterson AFB, OH 45433 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

MIL-M-87153 (USAF)

2.1.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Preparation of manuals. The general manner of preparation shall be in accordance with MIL-M-38784 and MIL-P-38790. Manuals shall not repeat information contained in operation, organizational maintenance, intermediate maintenance, or overhaul manuals, unless such repetition is deemed necessary for clarity or continuity, or both.

3.1.1 Illustrations and diagrams. Illustrations and diagrams shall be provided to convey essential information or clarify instructions in the text. When requested by the acquiring activity, test diagrams (TDM) and diagnostic flow charts (DFC) shall be included in the manual. Electrical and electronic diagrams shall not be included. This type of information is found in applicable maintenance manuals and should be referenced if required. All illustrations and diagrams shall be in accordance with MIL-M-38784.

3.2 Contents and arrangement. Unless otherwise specified by the procuring activity, the operator test manual shall contain:

Front Matter

- Chapter 1 General information
- Chapter 2 Special tools, test equipment, computer software and list of consumables
- Chapter 3 Test procedures

3.2.1 Front matter. Front matter shall be prepared in accordance with the requirements of MIL-M-38784.

3.2.1.1 Foreword. The foreword shall be prepared in accordance with MIL-M-38784. A statement is required, concerning submission of improvement reports, and identifying the Air Force activity having technical responsibility for the manual. Also the scope as required by MIL-M-38784 shall include a brief outline describing the contents of each chapter.

3.2.2 Chapter I general information. This chapter shall describe the physical makeup of equipment to be tested and define the type and purpose of the test procedure(s). Text, charts and illustrations shall be used as necessary.

3.2.2.1 Purpose and use of manual. The intended function of the manual shall be described relative to the test equipment type, unit(s) to be tested, and applicable level of maintenance. These items will be described by nomenclature, type designation, reference designation, and part number, referring to the Table of Use and Applicability, if required (see 3.2.2.1.1).

MIL-M-87153 (USAF)

3.2.2.1.1 Table of use and applicability. This table shall specify in matrix form (see figure 1), the following information as a minimum:

a. Part number and unique reference designation number (if assigned) of each configuration of UUT which is supported by the manual. Identification shall be by brief nomenclature when part number and reference designator cannot be determined.

b. Part number and unique reference designation number of ATEs used to test each UUT.

c. Part number and unique reference designation number of Interface Adapter(s) (ITAs) required to test each UUT.

d. Identification of computer program(s) configuration(s) by computer program identification number (CPIN) is required to test each UUT. The applicable computer program revision number(s) required can be identified in the compendium. When multiple program storage media is used, the applicable call number(s) required to access each CP shall also be provided. The CPIN revision and date shall not be included in the manual.

e. Test time for each UUT.

UUT	ATE	ITA	CPIN (The applicable CPIN revision number(s) and date is identified in the compendium)	TEST TIME
123456-1 (U1)	9999-1 (T1) or 9999-2 (T2)	69696-1 (A1) and 69697-1 (A2)	83C-SYK 1 (UNB2)-U001-00A	23 Min
123456-2 (U2)	9999-1 (T1) or 9999-2 (T2)	69696-1 (A1) and 69697-2 (A3)	83C-SYK 1 (UNB2)-U001-01A	26 Min

FIGURE 1. Table of use and applicability.

MIL-M-87153 (USAF)

3.2.2.1.2 Table for station utilization. This table shall specify in matrix form the minimum information necessary for the station operator to know what station components are required to be operational/installed to test each specific UTT.

3.2.2.2 Related publications. A list of all technical orders which supplement the information contained in the manual or which support the items listed in the Table of Use and Applicability shall be provided in tabular form. The information relative to listed publications shall be limited to the title and number. Publications shall be listed in alphanumerical order.

PUBLICATION LIST

TO NUMBER

TO TITLE

3.2.2.2.1 Additional reference material. Engineering data, such as specifications, drawings, etc., shall not be listed unless the information is essential to the use of the manual and approval for inclusion is specified by the acquiring activity. This information shall be in tabular form as approved by the acquiring activity.

3.2.2.3 Capabilities and limitations. The capabilities and limitations relative to test performance shall be specified in terms of the total test setup (ATE, UUT, ITA, CP, C&S and ancillary equipment). When applicable temperature, relative humidity, barometric pressure and other environmental factors which could affect testing shall be expressed in terms which apply to any testing configuration listed in the Table of Use and Applicability (see 3.2.2.1.1).

3.2.2.4 Operator participation. Conditions which will require participation by the operator during the testing process shall be fully described. This information shall be limited to description of circumstances which may occur and type of action to be taken. Instructions relative to specific programmed tests (see 3.2.4) shall not be repeated here.

3.2.3 Chapter 2, special tools, test equipment, computer software and list of consumables. The chapter shall list and illustrate the special tools and test equipment required for the work described. Such items shall be selected from the list of tools and test equipment approved by the Government by means of SE Listings, Provisioning Conferences, Engineering Change Proposals (ECPs), Procurement Documents. Standard types of tools, such as screwdrivers, pliers, shall not be listed. Standard types of test equipment, such as voltmeters, shall be listed but not illustrated. When a contractor cannot obtain an approved list, a manual shall show the contractor's recommended special tools and test equipment. However, these recommendations shall be changed promptly, if necessary, to conform to the official Government list as soon as such information is provided to the contractor.

3.2.3.1 Special tools list. The list of special tools shall be arranged in the following format. Tools not illustrated in use in other sections of the manual shall be illustrated following the Special Tools List in this section.

SPECIAL TOOLS LIST

Part (Tool) Number	Figure & Index No.	Nomenclature	Use
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MIL-M-87153 (USAF)

a. Part (tool) number. Tools shall be listed in alpha-numeric sequence by part (tool) number, manufacturer's five digit code, or manufacturer's name and city.

b. Figure and index number. Numbers of the figures and applicable index numbers that show and identify each tool shall be listed.

c. Nomenclature. Nomenclature shall be in accordance with the requirements of MIL-M-38784.

d. Use. The purpose of each tool shall be stated. If the use is described in any part of the manual, reference to the applicable paragraph will suffice.

3.2.3.2 Test equipment list. The list of test equipment shall be arranged in the following format. Test equipment not illustrated in use in other sections of the manual shall be illustrated following the Test Equipment List in this chapter (standard test equipment excepted).

TEST EQUIPMENT LIST

Type Designation	Alternate Type Designation	Figure & Index No.	Nomenclature	Use
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a. Type designation. Test equipment shall be listed in alphanumeric sequence by type designation, using the AN type designation, if assigned, manufacturer's five digit code, or manufacturer's name and city.

b. Alternate type designation. If an alternate item of test equipment can be used, its AN type designation, if assigned, or the commercial or manufacturer's designation shall be listed.

c. Figure and index number. Numbers of the figures and applicable index numbers that show and identify each item of test equipment shall be listed.

d. Nomenclature. Nomenclature shall be in accordance with the requirements of MIL-M-38784.

e. Use. The purpose of each item of test equipment shall be stated. If the use is described in any part of the manual, reference to the applicable paragraph will suffice.

3.2.3.3 Computer software. Descriptions of technical manual references to all associated software used with the automatic test equipment (ATE) for checkout of the unit under test (UUT) is required. Each software product will require identification in the technical manual by its associated Computer Program Identification Number (CPIN). The appropriate CPIN references should as a minimum include references as follows:

MIL-M-87153 (USAF)

- a. For the UUT test software.
- b. For the ATE operating system (and/or executive control testing).
- c. For the ATE self-test software (for ATE confidence testing).
- d. For the UUT interface test adapter self-test software (for active circuitry operational assurance).
- e. For the ATE support software (for online utilities such as editors, compilers, debuggers, media transfer, etc).

3.2.3.4 Consumables. Expendable items and support materials (consumables) shall be listed. Sealants, lubricants, gaskets, seals, cleaning solvents, paint, etc., are considered expendable items. The list will be in tabular form, in alphabetical order by nomenclature, as follows:

CONSUMABLES LIST

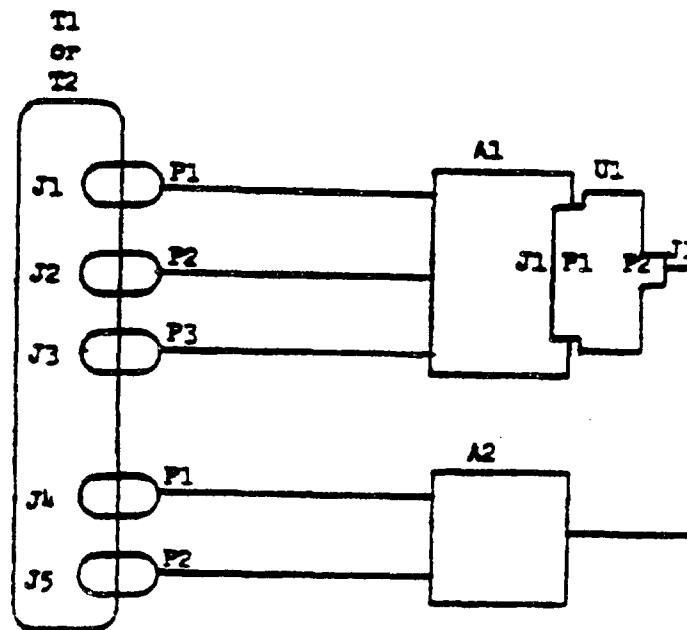
<u>Nomenclature</u>	<u>Specification(s)</u>	<u>Part number and FSCM</u>
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3.2.4 Chapter 3 test procedures. This chapter shall include complete information which will enable an operator to evaluate the performance of a UUT and diagnose the causes of any malfunction(s) encountered. All references to the UUT, ATE, and ITA(s) shall be exclusively by nomenclature or reference designation number, or both. References to the CPs or to related publications shall not include change, revision, or date. Information which is communicated to the operator by means of visual display shall not be repeated in this chapter except to the extent required for explanation of the meaning. This chapter may be broken down into sections to accommodate inclusion of two or more test procedures.

3.2.4.1 Preparation for testing. Complete step-by-step instructions shall be provided to effect all UUT, ITA, ATE interconnections (electronic and mechanical), physical positioning, switch/control settings, CP loading and any other actions required to establish the correct testing configuration for performing the programmed test procedures. ATE confidence testing, visual inspection of the UUT, safe-to-turn-on tests, and other pre-test checks shall be performed prior to connecting the UUT to ATE.

3.2.4.1.1 Test setup diagrams. Test Setup Diagrams (see figure 2) shall be used to supplement the Preparation for Testing instructions text. The number of diagrams shall be kept to the minimum required, consistent with the configurations contained in the Table of Use and Applicability. Interconnection detail shall be limited to the extent required for clarity. Wiring or circuitry internal to cables or equipment, pin numbers within connectors or similar information which is not critical to ensure a correct testing configuration shall not be included. Test setup diagrams shall depict connections for ducting, heat sinking etc., when they form a part of the test setup.

MIL-M-87153 (USAF)

FIGURE 2. Test setup diagram.

3.2.4.2 Testing procedures. Procedures, in the proper sequence for conducting a complete end-to-end test of a UUT as programmed in the appropriate CP, shall be provided. Sufficient information shall be included to enable the operator to: start testing, intervene when required to perform manual operations, interpret automated or manual test results, identify cause(s) of malfunction(s), perform normal and emergency shutdown procedures, and to restart testing subsequent to intervention or shutdown. Instructions shall be provided to accomplish any manual testing that forms a part of the complete testing procedure. All necessary safety precautions shall be included.

3.2.4.2.1 Test start. These procedures shall instruct the operator in the proper method of starting UUT testing under CP control. When this information is contained in the applicable ATE manual(s), reference shall be made that familiarization with the procedures contained therein is required. That information shall be repeated in this manual only to the extent required to enable an operator, trained in the use of the applicable tester, to start testing.

MIL-M-87153 (USAF)

3.2.4.2.2 Operator intervention. When required to augment visual displays under program control and the information contained in Chapter I, Operator Participation (see 3.2.2.4), specific instructions shall be provided for performance of manual procedures. These instructions shall reference the applicable test indication number(s) and visual display data. Sufficient information shall be provided to enable the operator to determine required actions, make necessary calculations and decisions, perform manual operations and return testing to program control or terminate testing, as applicable.

3.2.4.2.3 Interpretation of test results. In addition to the operator intervention instructions, information shall be provided which clearly explains test results. This information shall reference the applicable test indication number(s) and visual display data.

3.2.4.2.4 Malfunction isolation. When isolation of malfunction cause(s) cannot be accomplished to the appropriate level under CP control, procedures for manual or manually assisted isolation shall be provided. These procedures shall meet the criteria of 3.2.4.2.2.

3.2.4.2.5 Termination and restart. These procedures shall instruct the operator in the proper method(s) to terminate testing under both routine and emergency conditions and to re-establish testing under CP control. When this information is contained in the applicable ATE manual(s), reference shall be made that familiarization with the procedures contained therein is required. That information shall be repeated in this manual only to the extent required to enable an operator, trained in the use of the applicable ATE to terminate and restart testing.

3.2.4.2.6 Test points. When testing and fault isolation procedures require manual probing of test points on the UUT, sufficient information in the form of text and illustrations to permit ready identification of each test point shall be provided. All necessary safety precautions shall be included.

3.2.4.2.7 Fault isolation loops. Fault isolation loops shall be provided for each functional testing area of UUTs. Loops will provide sufficient information to allow an operator to identify the cause of any malfunction be it the UUT, interconnecting adapters/cables or the ATE.

4. QUALITY ASSURANCE PROVISIONS

4.1 Quality conformance inspection. The quality assurance provisions of MIL-M-38784 and MIL-P-38790 apply.

5. PACKAGING

5.1 General. Packaging, packing, and marking for shipment shall be in accordance with MIL-M-38784 and MIL-P-38790.

MIL-M-87143(USAF)

6. NOTES

6.1 Intended use. Refer to 1.1 and 1.2.

6.2 Ordering data. In addition to the ordering data contained in MIL-M-38784, purchasers should exercise any desired options offered herein, and acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Inclusion of test diagrams and diagnostic flow charts (3.1.1).

6.3 Data requirements. When this specification is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When the provisions of DAR 7-104.9 (n) (2) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs.

Paragraph No.	Data Requirement Title	Applicable DID No.	Option
3.1	Technical Orders	DI-M-3407	Operators Test Procedures Manual

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5000.19L, Vol. II, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.4 DEFINITIONS

6.4.1 Diagnostic Flow Chart (DFC). Provides the detailed UUT oriented methods employed on a test-by-test basis showing all branching and including the purpose, methodology and expected results of each test.

6.4.2 Test Diagrams (TDM). Provides the UUT/ID/ATE interface information on a test-by-test basis. Two types of diagrams are required, a system diagram and TDM.

Custodian:
Air Force - 16

Preparing Activity:
Air Force - 16

Review Activity:
Air Force - 01, 10, 79, 99

User Activity:
Air Force 11, 13, 14, 70, 71,
79, 80, 82, 84

(Project TMSS-F465)

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