MILITARY STANDARD

TEST PROVISIONS FOR ELECTRONIC SYSTEMS AND ASSOCIATED EQUIPMENT, DESIGN CRITERIA FOR

TO ALL HOLDERS OF MIL-STD-415D:

1. The following pages of MIL-STD-415D have been revised and supersede the pages listed:

New Pages	Date	Superseded Pages	Date
1 and 1a	8 October 71	1	1 October 69
5 and 5a	8 October 71	5	1 October 69
9	8 October 71	9	1 October 69

2. RETAIN THIS NOTICE AND INSERT BEFORE THE TABLE OF CONTENTS.

Custodians:
Army - EL
Navy - SH
Air Force - 11

Review activities:
Army - AV, EL
Navy - AS, EC, SH
Air Force - 13, 17, 19, 22, 82

Preparing activity:
Air Force - 11

Project No. MISC-0758

FSC MISC

TEST PROVISIONS FOR ELECTRONIC SYSTEMS AND ASSOCIATED EQUIPMENT, DESIGN CRITERIA FOR

1. SCOPE

1.1 Coverage. - This standard establishes design criteria for test provisions that permit the functional and static parameters of electronic systems and associated equipment to be monitored, evaluated, or isolated. These test provisions consist of the following:

(a) An external test receptacle for connecting automatic, semi-automatic, or manual checkout equipment or automatic monitoring equipment (see 5.2.2).

(b) A built-in test capability (see 5.2.3).

(c) Test points (see 5.2.4).

1.2 Purpose. - The purpose of this standard is to provide test provisions that will adequately support a defined maintenance concept.

1.3 Classification of test provisions. - For the purpose of this standard, test provisions are classified by the item level of maintenance they are to support. Some provisions may support more than one maintenance level.

1.3.1 Class A test provisions. - Class A test provisions evaluate item performance of the equipment. This class provides the means to determine if the equipment is functioning within the performance limits specified in the specification.

1.3.2 Class B test provisions. - Class B test provisions isolate malfunctions to a replaceable unit (RU).

1.3.3 Class C test provisions. - Class C test provisions isolate malfunctions to a replaceable module (RM) or other replaceable assembly.

1.3.4 Class D test provisions. - Class D test provisions consist of test points; i.e., jacks, terminal boards, circuit junctions, or electrical receptacles, for test that isolate malfunctions of modules or other replaceable assemblies that have fixed circuitry (such as printed circuits, circuit cards, or assemblies) to an individual circuit and piece part level.

2. REFERENCED DOCUMENTS

2.1 The following document, of the issue in effect on date of invitation for bids or request for proposal, forms a part of this standard to the extent specified herein:

MIL-STD-1472	Human Engineering Design Criteria for Military Systems, Equipment and Facilities.

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5.2.2.2 On-board/on-site automatic monitoring capability. - The on-board/on-site automatic monitoring capability shall permit automatic monitoring equipment (AME) to conduct analysis of functional or static parameters of an item to evaluate the degree of performance degradation and to determine location of a malfunction.

5.2.2.2.1 Applicability of test provision classes. - Class A, B, and C test provisions shall be applicable to the on-board/on-site automatic monitoring capability.

5.2.2.3 External receptacle(s). - Automatic checkout or automatic monitoring of an item shall be accomplished by the availability of an accessible electrical receptacle(s) that is flush mounted on the item. The electrical receptacle(s) for automatic checkout and monitoring shall be readily accessible for connection to ACE and AME. When ACE receptacles are available on the item, AME shall make maximum use of these receptacles.

5.2.2.3.1 The external receptacle(s) will be utilized by either automatic or semi-automatic checkout equipment.

5.2.2.3.2 The external receptacle(s) shall be provided to facilitate the automatic checkout capability or the automatic monitoring capability, even though a built-in test capability or test points exist in the design of the item.

5.2.2.3.3 The arrangement of receptacle(s) shall provide maximum utilization of the space available on the accessible surface of the item. Where multiple receptacles are used, the space between such receptacles shall not be less than 1 inch. Receptacles shall be of the quick-disconnect type.

5.2.2.4 Internal receptacle(s). - When specifically determined that internal test provisions will consist of only electrical receptacles to fulfill the class D test provisions, these receptacles shall be located on the surface or peripheral of modules or replaceable assemblies that are accessible for testing of the item when removed from the equipment. When the item is removed from the unit or equipment, each module or assembly shall possess input and output connections to permit the application of externally generated stimulus, and external measurement of the item performance. These connections shall permit bench testing for localizing the malfunction to the piece part level.

5.2.2.4.1 The internal electrical test connector(s) shall be utilized by either automatic, semi-automatic, or manual checkout equipment.

5.2.2.4.2 The internal electrical connector(s) shall be provided to facilitate automatic, semi-automatic, or manual checkout, even though built-in test capability exists in the item.

5.2.2.4.3 Electrical connector(s) located on modules or assemblies, wherever possible, shall be of the same type and configuration, except polarizing (coding) shall be applied to prevent plugging into the wrong receptacle. Physical modification of electrical connector(s) for the purpose of polarizing is prohibited.

5.2.3 BIT capability. - The built-in-test (BIT) capability shall be incorporated as required by the contract to assure effective implementation of the defined maintenance concept. The built-in-test capability shall consist of the following:

(a) Self-test provisions: Self-test provisions shall be an inherent part of an item. These provisions shall serve a dual function; item performance evaluation, and complementing BIT provisions to provide item testing. When self-test provisions are practical, the contractor shall use them; however, their use shall not jeopardize the operation or performance of the item.

(b) Marginal testing: When critical item parameters or characteristics are subject to change or drift and BIT capabilities must be used, these areas shall be tested by marginal testing techniques as defined in this standard.

5.2.3.1 Applicability of test provision classes. - Class A and B test provisions shall be applicable to the BIT capability.

5.2.3.2 BIT provisions. - BIT provisions shall be added to an item for the sole purpose of testing the item. They shall be simple in design and operation, accurate, easily maintained, preferably more reliable than the circuitry providing performance, and shall not degrade the performance of the item in which they are incorporated.

(e) Loading
(f) Waveforms
(g) Test equipment recommended.

6.3.5 The contractor shall prepare a brief theory of operation for the end item which shall be directly correlatible to the block diagrams and shall be of sufficient engineering detail to permit a clear understanding of the information incorporated in the diagrams.

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