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AIRCRAFT/STORE ELECTRICAL INTERCONNECTION SYSTEM

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DEPARTMENT OF THE AIR FORCE
Washington DC 20301

AIRCRAFT/STORE ELECTRICAL INTERCONNECTION SYSTEM

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FOREWORD

Prior to this standard, an aircraft and the stores which it carried were typically developed independently of each other or were developed exclusively for each other. This usually resulted in unique aircraft/store electrical interconnection requirements and the general proliferation of overall store interface designs. The lack of standards within DoD for the aircraft/store electrical interconnection led to low levels of interoperability and costly aircraft modifications to achieve required store utilization flexibility. Trends in store technology toward more complex store functions which require increasing amounts of avionics data and control information from aircraft systems were predicted to lead to insurmountable aircraft/store interfacing problems.

This standard significantly reduces the aircraft/store electrical integration problem by specifying requirements for one standard electrical interconnection system for aircraft and stores. The interconnection system described herein is based on recognized trends in stores management systems which use serial digital transmission for control, monitor, and release of stores. It is not intended that this standard specify the requisite signals to achieve emergency jettison of stores. This does not, however, preclude the use of these signals in this standard if they are compatible with the requirements for emergency jettison. Application of this standard to new and existing aircraft and new stores will serve to significantly reduce and stabilize the number and variety of signals required at aircraft/store interfaces, minimize the impact of new stores on future stores management systems, and increase store interoperability among the services, within NATO, and with other allies.

Limitations. The following areas are not covered in this standard:

a. Requirements for mechanical, aerodynamic, logistic, and operational compatibility.

b. Since factors such as size, shape, loads, clearances and functional limitations are not specified, full operability of stores on aircraft cannot be assured.

c. The rail launch MSI intermateability characteristics.

d. Simple store MSI signal set and intermateability characteristics.

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1. SCOPE

1.1 Scope. This standard defines implementation requirements for the Aircraft/Store Electrical Interconnection System (AEIS) in aircraft and stores. This interconnection system provides a common interfacing capability for the operation and employment of stores on aircraft, and includes the following.

1.1.1 The electrical (and fiber optic) interfaces at aircraft store stations and the interface on mission stores.

1.1.2 Interrelationships between aircraft and store interfaces.

1.1.3 Interrelationships between the interfaces at different store stations on an aircraft.

1.2 Purpose. The purpose of this standard is to minimize the proliferation of electrical interfacing variations required in aircraft for operating stores. The implementation of this standard shall enhance the interoperability of stores and aircraft by defining specific electrical and physical requirements for the AEIS.

1.3 Application. This standard applies to all aircraft and stores that electrically interface with each other. This coverage encompasses stores and aircraft presently in concept development stages and future aircraft and store development. This standard also applies to existing aircraft which are required to carry MIL-STD-1760 compatible stores.

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 document 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-B-5087	Bonding, Electrical and Lightning Protection for Aerospace Systems
MIL-E-6051	Electromagnetic Compatibility Requirements, Systems
MIL-A-8591	Airborne Stores, Suspension Equipment and Aircraft-Store Interface (Carriage Phase); Gen Design Criteria For
MIL-C-38999	Connectors, Electrical, Circular, Gen Spec For
MIL-C-39029	Contacts, Electrical Connector, Gen Spec For

STANDARDS

Military

MIL-STD-461	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference
MIL-STD-462	Electromagnetic Emission and Susceptibility, Test Methods For
MIL-STD-704	Aircraft Electric Power Characteristics
MIL-STD-1498	Circuit Breakers, Selection and Use Of
MIL-STD-1553	Digital Time Division Command/Response Multiplex Data Bus
MIL-STD-1560	Insert Arrangements for MIL-C-38999 and MIL-C-27599 Electrical, Circular Connectors

NATO

STANAG 3350AVS	Monochrome Video Standard for Aircraft System Applications

HANDBOOKS

Military

MIL-HDBK-235	Electromagnetic (Radiated) Environmental Considerations for Design and Procurement of Electrical and Electronic Equipment

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks shall be available from the Naval Publications and Forms Center, ATTN: NPODS, 5801 Tabor Avenue, Philadelphia PA 19120-5099.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issues of the documents cited in the solicitation.

EIA-STD-RS-170	Electrical Performance Standards - Monochrome Television Studio Facilities
EIA-STD-RS-343	Electrical Performance Standards - High Resolution Monochrome Closed Circuit Television Camera
EIA-STD-RS-485	Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems

(Application for copies should be addressed to the Electronics Industries Association, 2001 Eye Street NW, Washington DC 20006.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations, unless a specific exemption has been obtained.

3. DEFINITIONS

3.1 Definitions. Definitions applicable to this standard shall be as specified below.

3.1.1 Aircraft. Any vehicle designed to be supported by air, being borne up either by the dynamic action of the air upon the surfaces of the vehicle, or by its own buoyancy. The term includes fixed and movable wing airplanes, helicopters, gliders, and airships, but excludes air-launched missiles, target drones, and flying bombs.

3.1.2 Aircraft/store electrical interconnection system. The AEIS is a system composed of a collection of electrical (and fiber optic) interfaces on aircraft and stores through which aircraft energize, control and employ stores. The AEIS consists of the electrical interfaces and interrelationships between the interfaces necessary for the transfer of electrical power and data between aircraft and stores and from one store to another store via the aircraft.

3.1.3 Electrical interface types. The four electrical interface types for the aircraft/store electrical interconnection system shall be as specified below.

3.1.3.1 Aircraft station interface. The electrical interface(s) on the aircraft structure where the mission or carriage store(s) is electrically connected. The connection shall usually be on the aircraft side of an aircraft-to-store umbilical cable. The aircraft station interface locations include, but not limited to, pylons, conformal and fuselage hard points, internal weapon bays, and wing tips (see 4.1).

3.1.3.2 Carriage store interface. The electrical interface on the carriage store structure where the aircraft is electrically connected. This connection is usually on the store side of an aircraft-to-store umbilical cable (see 4.1 and 6.3.8).

3.1.3.3 Carriage store station interface. The electrical interface(s) on the carriage store structure where the mission store(s) are electrically connected. This connection is usually on the carriage store side of an umbilical cable (see 4.1 and 6.3.8).

3.1.3.4 Mission store interface. The electrical interface on the mission store external structure where the aircraft or carriage store is electrically connected. This connection is usually on the mission store side of an umbilical cable (see 4.1).

3.1.4 Provisions. Space in all feed-through connections and in all wire runs that will allow future incorporation in the aircraft or store without modification other than the addition or changes to connectors, cables and hardware/software necessary to control the added functions.

3.1.5 Store. Any device intended for internal or external carriage and mounted on an aircraft suspension and release equipment, whether or not the item is intended to be separated in flight from the aircraft. Storesare classified in two categories as specified below.

3.1.5.1 Carriage stores. Suspension and release equipment that is mounted on aircraft on a non-permanent basis as a store are classified as a carriage store. Pylons and primary racks (such as a MAU-12 and BRU-10) are not considered carriage stores (see 6.3.8).

3.1.5.2 Mission stores. All stores excluding suspension and release equipment (carriage stores) are classified as mission stores. In general, these stores directly support a specific mission of an aircraft.

3.1.6 Stores management system. The avionics subsystem which controls and monitors the operational state of aircraft installed stores and provides and manages the communications between aircraft stores and other aircraft subsystems.

3.1.7 Suspension and release equipment. All airborne devices used for carriage, suspension, employment, and jettison of stores, such as, but not limited to, racks, adapters, launchers, and pylons.

3.2 Acronyms and abbreviations. Acronyms and abbreviations applicable to this standard shall be as specified below.

AEIS	Aircraft/Store Electrical Interconnection System
ANSI	American National Standards Institute
A/R	As Required
ASCII	American Standard Code for Information Interchange
ASI	Aircraft Station Interface
BC	Bus Controller
BCH	Bose-Chaudhuri (codes)
BIT	Built-In-Test
CSI	Carriage Store Interface
CSSI	Carriage Store Station Interface
dB	Decibel
dBm	Decibels above 1 Milliwatt
DoDISS	Department of Defense Index of Specifications and Standards
EIA	Electronic Industries Association
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
GHz	GigaHertz
HB	High Bandwidth
Hz	Hertz
ICD	Interface Control Document
ISO	International Standards Organization

ISP	Intermediate Significant Part
kHz	kiloHertz
kVA	kiloVolt-Ampere
LB	Low Bandwidth
LLSP	Lower Least Significant Part
LSB	Least Significant Bit
LSP	Least Significant Part
MHz	MegaHertz
ms	millisecond
MSI	Mission Store Interface
MSB	Most Significant Bit
MSP	Most Significant Part
MUX	Multiplex (Digital Data Interface)
NATO	North Atlantic Treaty Organization
pp	peak-to-peak
PRF	Pulse Repetition Frequency
RMS	Root Mean Squared
RT	Remote Terminal
S&RE	Suspension and Release Equipment
SMS	Stores Management System
STANAG	NATO Standardization Agreement
TC	Transfer Control
TD	Transfer Data
TM	Transfer Monitor
VSWR	Voltage Standing Wave Ratio

4. GENERAL REQUIREMENTS

4.1 Aircraft/store configurations. This standard provides for a variety of aircraft/store configurations, as depicted in Figure 1, by specifying requirements measurable at the Aircraft Station Interface (ASI) and at the Mission Store Interface (MSI). Although detailed requirements for the Carriage Store Interface (CSI) and the Carriage Store Station Interface (CSSI), as depicted in Figure 1b, are not specified in this standard, the requirements on the ASI and MSI allow for possible installation of a carriage store between the ASI and MSI.

4.2 Interface classes. All functions of the AEIS shall be allocated between two separate signal sets; the primary interface signal set and the auxiliary power signal set. Separate connectors shall be required for each set. The ASI shall implement, and the MSI shall be compatible with, one of the following interface classes.

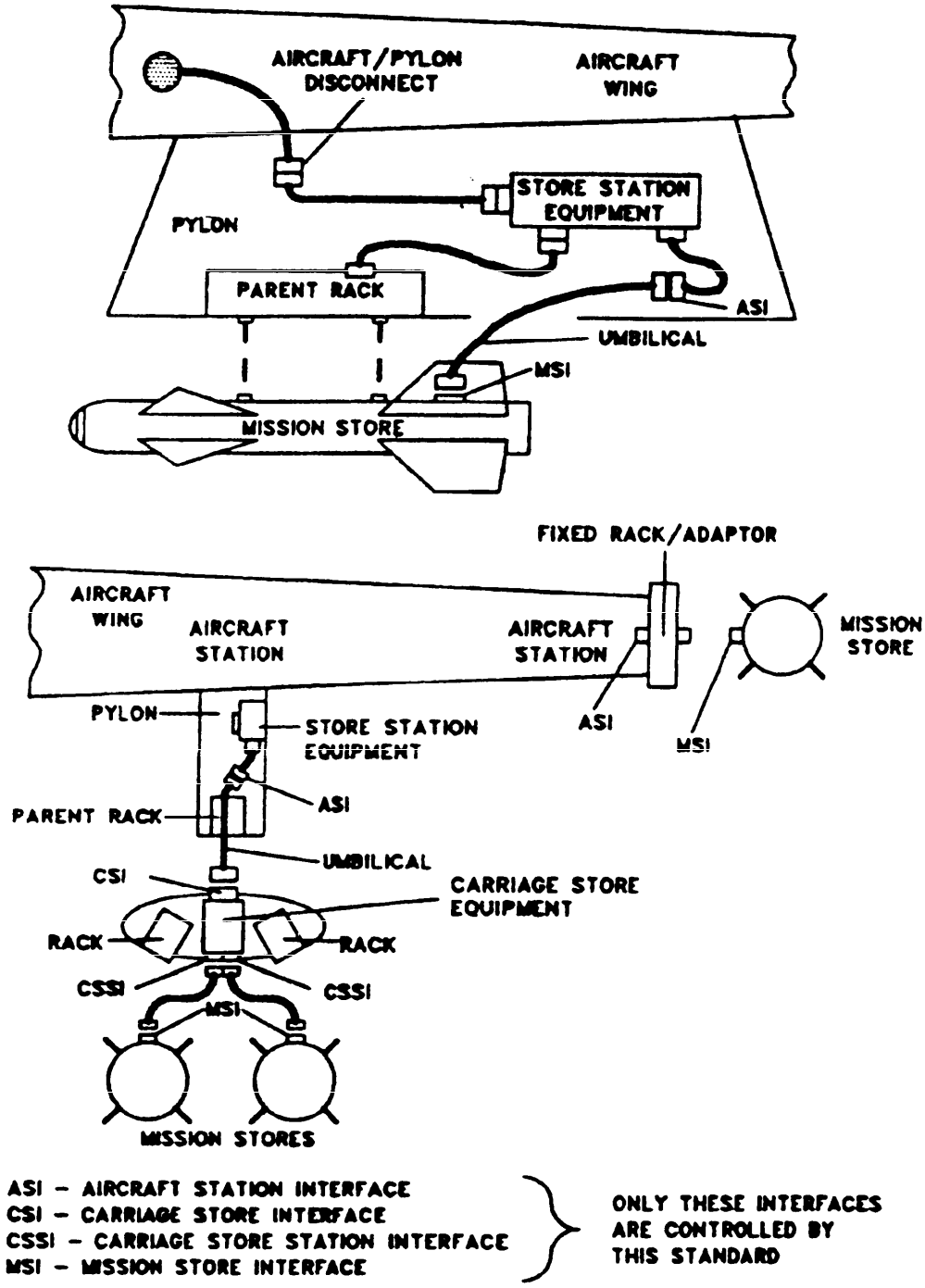


Figure 1. Aircraft-store configurations.

4.2.1 Class I. Class I shall be the full primary interface.

4.2.2 Class IA. Class IA shall consist of Class I, plus the auxiliary power interface.

4.2.3 Class II. Class II shall be the full primary interface without high bandwidth 2 and 4, fiber optic channels 1 and 2, 270V DC power and 270V DC return.

4.2.4 Class IIA. Class IIA shall consist of Class II, plus the auxiliary power interface.

4.3 Primary interface. The primary interface shall include requirements for the primary interface signal set and its connector. The primary interface requirements shall apply to the interface classes defined under 4.2.

4.3.1 Primary interface signal set. The primary interface signal set, as shown in Figure 2, shall be comprised of interfaces for high bandwidth signals, redundant multiplex data bus signals, low bandwidth signals, fiber optic signals, a specified number of dedicated discrete signals, and aircraft power. Detailed electrical requirements for each of these functions at the ASI and MSI shall comply with the requirements of section 5 herein.

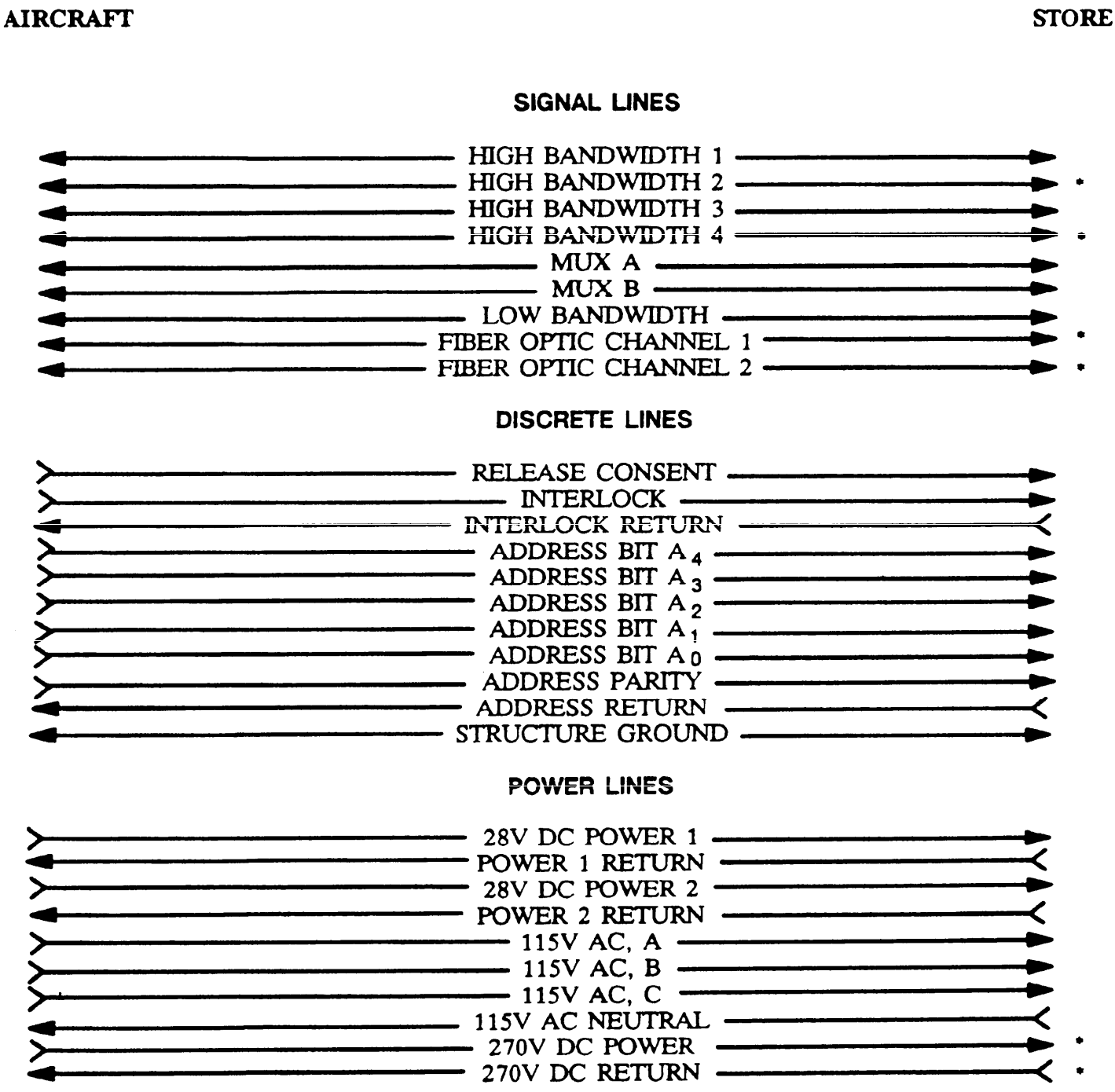
4.3.1.1 High bandwidth (HB) interfaces. Four bi-directional interfaces (HB1, HB2, HB3, and HB4) shall be capable of transferring two general signal types (Type A and Type B) as specified herein. The aircraft shall assign, control, and route these signals to their proper destinations. HB line applications shall include transfer of video, radio frequency, and time synchronization signals.

4.3.1.1.1 Type A signal transfer. Four HB interfaces (HB1, HB2, HB3, HB4) shall be capable of transferring Type A signals (20 Hz to 20 MHz passband) between stores installed at different aircraft stations and between aircraft and attached stores. Type A signals shall include composite video and time synchronization signals.

4.3.1.1.2 Type B signal transfer. One HB interface (HB1) shall be capable of transferring Type B signals (20 MHz to 1.6 GHz) between aircraft and attached stores. Type B signals shall include low power level radio frequency signals such as receiver inputs.

4.3.1.2 Digital multiplex data interface. The digital multiplex data interface shall provide redundant channels (Mux A and Mux B) for transferring digital information, store control and store status data between aircraft and stores. The signals crossing the interface shall comply with the requirements of MIL-STD-1553 as augmented by the requirements of section 5 herein.

4.3.1.3 Low bandwidth (LB) interface. The LB interface shall be capable of transferring bi-directional LB (DC to 50 kHz) signals between the aircraft and stores. Currently, the only LB signals allowed shall be tones and voice grade audio (see 6.3.9). This interface shall not be used for discrete functions.



*NOT APPLICABLE TO THE CLASS II INTERFACE

Figure 2. Primary interface signal set.

4.3.1.4 Fiber optic (FO) interface. Provisions shall be included in Class I interface connectors for two fiber optic communications channels (FO Channel 1 and FO Channel 2). As military fiber optic standards evolve, the fiber optic requirements in this standard shall be expanded to incorporate the fiber optic military standards. The fiber optic provisions in the interfaces shall not be utilized until added to this standard.

4.3.1.5 Release consent interface. The release consent interface shall be a low power discrete used only to enable, and inhibit, safety critical store functions which are commanded by the aircraft over the digital multiplex data interface (see 4.3.1.2).

CAUTION

The release consent interface is provided to satisfy an aircraft safety function. Consent shall be enabled only when the aircraft determines that safety criteria for store employment sequence has been met.

4.3.1.6 Primary interlock interface. The interlock interface shall be available for the aircraft to monitor the electrically mated status of the primary interface connector between stores and aircraft.

CAUTION

The interlock interface shall not be used as the sole criteria for functions which could result in an unsafe condition if the interlock circuit fails open.

4.3.1.7 Address interface. The address interface shall be used to assign a unique MIL-STD-1553 remote terminal address to the connected store. The address interface shall contain a set of six discretes (five binary weighted address bit discretes A0 through A4 and one parity discrete) and one common address return.

4.3.1.8 Primary structure ground. A dedicated circuit shall be provided between the aircraft and store structure grounds. It shall provide an electrical connection between aircraft and store structures to minimize shock hazards to personnel, in accordance with MIL-B-5087. This circuit shall not be used as a signal or power return path.

4.3.1.9 Primary power. The aircraft shall supply and control all power to stores through the ASI. All ASIs shall provide two 28V DC channels and one channel of three phase, four wire, wye-connected, 400 Hz, 115V/200V AC. In addition, provisions shall be included at the ASI for one channel of 270V DC. A dedicated power return shall be provided through the AEIS for each power channel. Mission stores may utilize any combination of 28V DC and 115V/200V AC power available at the MSI. The activation of power shall not be used for discrete functions.

4.3.2 Primary signal set connector. The primary signal set connector, Class I or Class II, shall be in accordance with the requirements specified in 5.1.2.1 and 5.2.2.1.

4.4 Auxiliary power interface. The auxiliary power interface shall include the requirements for the auxiliary power signal set and its connector. The auxiliary power interface requirements shall apply to interface Classes IA and IIA defined in 4.2.

4.4.1 Auxiliary power signal set. The auxiliary power signal set, as shown in Figure 3, shall include interfaces for aircraft power, structure ground, and interlock discrete. Detailed electrical requirements at the ASI and MSI shall be in accordance with section 5 herein.

4.4.1.1 Auxiliary power. The aircraft shall supply and control all auxiliary power to stores through the ASI. The auxiliary power interface at an ASI shall include one 28V DC power channel and one channel of three phase, four wire, wye-connected, 400 Hz, 115V/200V AC. In addition, provisions shall be included at the ASI for one channel of 270V DC. A dedicated power return shall be provided through the AEIS for each power channel. Mission stores may utilize any combination of 28V DC and 115V/200V AC power available at the MSI. The activation of power shall not be used for discrete functions.

4.4.1.2 Auxiliary interlock interface. An auxiliary interlock interface shall be available for the aircraft to monitor the electrically mated status of the auxiliary power interface connector between stores and aircraft.

CAUTION

The interlock interface shall not be used as the sole criteria for functions which could result in an unsafe condition if the interlock circuit fails open.

4.4.1.3 Auxiliary structure ground. A dedicated circuit shall be provided between the aircraft and store structure grounds. It shall provide an electrical connection between aircraft and store structures to minimize shock hazards to personnel, in accordance with MIL-B-5087. This circuit shall not be used as a signal or power return path.

4.4.2 Auxiliary power signal set connector. The auxiliary power signal set connector shall be in accordance with the requirements specified in 5.1.2.2 and 5.2.2.2.

5. DETAILED REQUIREMENTS

5.1 Aircraft requirements (measured at the ASI). The aircraft shall provide the ASI with the characteristics specified herein.

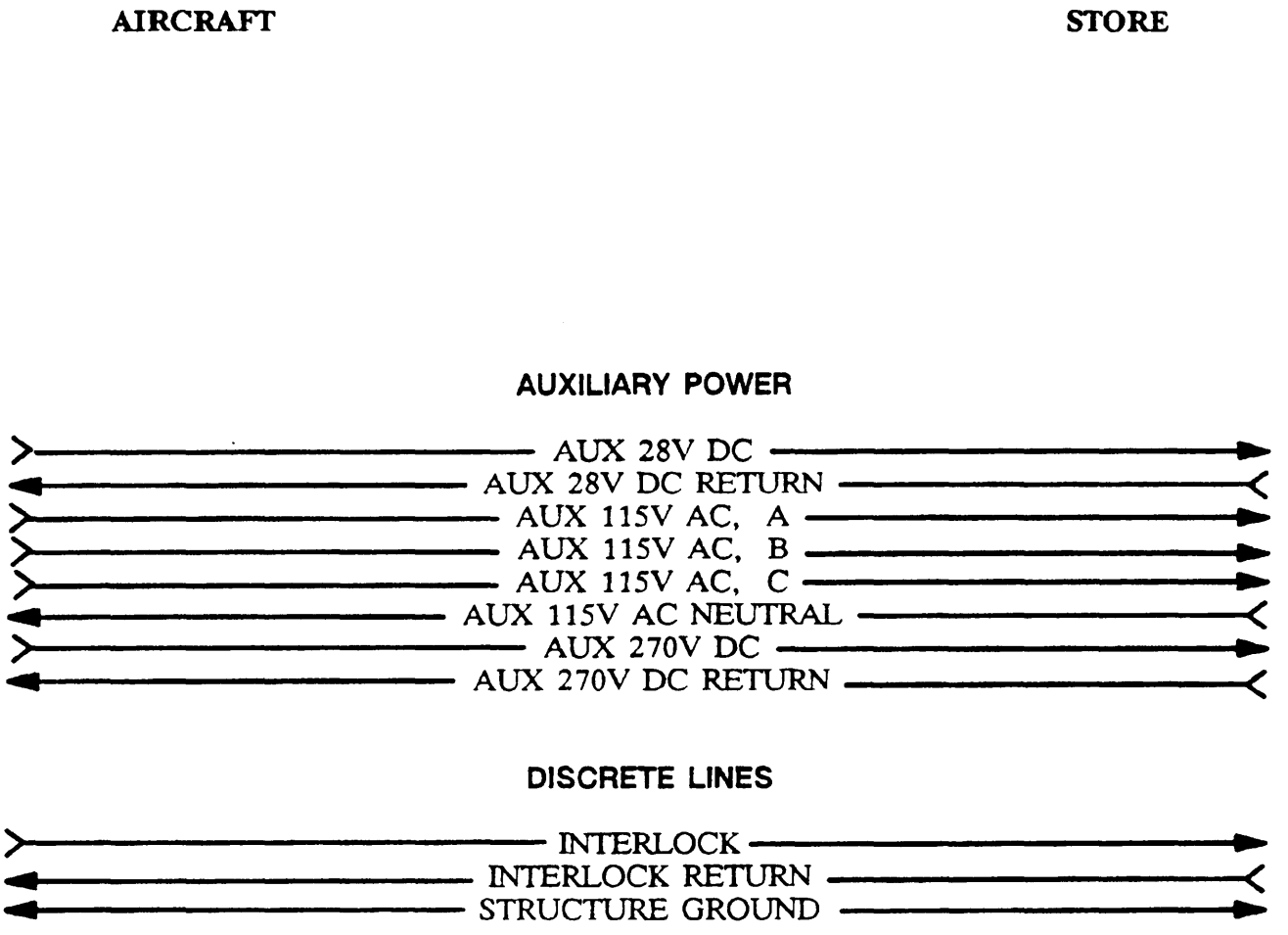


Figure 3. Auxiliary power signal set.

5.1.1 Interface electrical requirements

5.1.1.1 Aircraft HB interfaces. The aircraft shall provide HB interfaces at each primary signal set ASI for bi-directional simplex transfer of Type A and Type B signals, in accordance with the requirements specified herein. Each HB interface shall include a signal connection and a signal return (shield) connection. The requirements specified shall be based on the ASI containing all four HB interfaces (HB1, HB2, HB3, and HB4) as required by interface Classes I and IA. For interface Classes II and IIA, requirements associated with HB2 and HB4 shall not apply.

5.1.1.1.1 Minimum transfer capacity. The aircraft shall support the transfer of one Type B signal or one Type A signal on HB1, simultaneously with the transfer of Type A signals on HB2, HB3, and HB4 through an ASI (see 6.3.3).

5.1.1.1.2 Electrical characteristics. The aircraft shall be capable of transferring Type A and Type B signals through the ASI with the electrical characteristics as specified herein. The Type B requirements shall apply to HB1 only, and the Type A requirements shall apply to HB1, HB2, HB3 and HB4. Unless otherwise specified herein, the performance requirements shall apply at the ASI, looking into the aircraft, and shall include the effect of the ASI mating connector.

5.1.1.1.2.1 Signal characteristics. Type A and Type B signals shall comply with the general characteristics of Table I.

a. Signals for monochrome raster composite video shall comply with EIA-STD-RS-170, EIA-STD-RS-343 or STANAG 3350, with the following two exceptions.

(1) The sync pulse amplitude shall be 28.6 ±5 percent of the composite signal peak-to-peak amplitude.

(2) The composite signal peak-to-peak amplitude shall be 1.40V to 3.50V at the ASI for aircraft sourced video.

b. The aircraft shall be compatible with received video (store sourced video) with a composite signal peak-to-peak amplitude of 1.80V to 3.50V at the ASI.

5.1.1.1.2.2 Signal assignment. The aircraft shall limit the transfer of signals on the HB interfaces to the following:

a. Radio frequency signals which comply with the Type B signal characteristics shall be transferred on HB1.

b. Time correlation (synchronization, clocking and blanking) signals shall be transferred on HB1 or HB2, or both.

c. Raster composite video signals shall be transferred on HB3 or HB4, or both.

5.1.1.1.2.3 Characteristic impedance. The nominal characteristic impedance at the ASI shall be 50 ohms for HB1 and HB2, and 75 ohms for HB3 and HB4.

TABLE I. High bandwidth general signal characteristics.

CHARACTERISTIC	SIGNAL TYPE	
	TYPE A	TYPE B
Signal frequency		
Minimum	20 Hz	20 MHz
Maximum	20 MHz	1.60 GHz
Full scale signal voltage		
Minimum	1.0V pp	0.01 microvolt pp
Maximum	12.0V pp	1.0V pp
Signal voltage dynamic range	30 dB	30 dB
Maximum power		
HB1	300 milliwatts 1/	10 dBm 2/
HB2	300 milliwatts 1/	(Not applicable)
HB3, HB4	200 milliwatts 1/	(Not applicable)

1/ The average power level shall not exceed the value specified when measured over any one second interval.

2/ The instantaneous power level shall not exceed the value specified.

5.1.1.1.2.4 Voltage standing wave ratio (VSWR). The aircraft shall comply with the VSWR requirements of Table II. The VSWR shall include the effects of the mated AEIS connectors shown in Figures 4 and 5. The aircraft shall be compatible with the mission stores which impose, at the ASI, a Type A or Type B signal load with a VSWR of 2.0 maximum. When applicable, the aircraft shall be compatible with carriage stores which impose, at the ASI, a Type A or Type B signal load with a VSWR of 3.20 maximum. The VSWR produced at the ASI by the carriage store includes the effect of mission stores connected to the carriage store (see 5.1.1.1.2.11).

5.1.1.1.2.5 ASI-to-ASI attenuation. The maximum effective signal attenuation from one ASI to another ASI shall not exceed 6.0 dB for any frequency component over the band from 20 Hz to 20 MHz.

5.1.1.1.2.6 ASI-to-ASI attenuation flatness. The difference between the minimum and maximum actual attenuation over the frequency band from 20 Hz to 20 MHz for any specific ASI-to-ASI path shall not exceed 5.0 dB.

5.1.1.1.2.7 Propagation delay. All frequency components between 5 MHz and 20 MHz of a signal injected at one ASI shall appear at the associated ASI (of an ASI-to-ASI transfer path) within 3.0 microseconds maximum.

5.1.1.1.2.8 Signal dispersion. The variation in propagation delay of the different frequency components (between 5 MHz and 20 MHz) of any Type A signal shall not exceed 50.0 nanoseconds when transferred from one ASI to another ASI.

5.1.1.1.2.9 Harmonic distortion. When sinusoidal test signals over the Type A frequency range are injected into an ASI, the harmonic distortion (third harmonic) in the signal appearing at an associated ASI (for ASI-to-ASI transfer) shall be at least 30.0 dB below the input signal level.

5.1.1.1.2.10 Routing control. The aircraft shall be capable of rerouting signals between different AEIS end points (such as between ASIs and between ASIs and applicable aircraft equipment).

5.1.1.1.2.11 Unterminated HB interface. The aircraft shall not be functionally damaged by the removal of a matched termination (see 5.1.1.1.2.4) on any HB interface in equipment (such as stores, umbilical cables) connected to an ASI.

5.1.1.1.2.12 Ground reference. The signal return (shield), see 6.11, of the HB interfaces shall comply with the following ground requirements when measured at the ASI (looking into the aircraft). The aircraft shall be compatible with stores which connect HB1, HB2, HB3, and HB4 signal returns to applicable store grounds.

a. HB1 and HB2 signal return. The signal return shall be electrically connected to aircraft structure ground.

TABLE II. Aircraft VSWR requirements.

CONDITION	APPLICATION	MAXIMUM VSWR	FREQUENCY RANGE 1/
Figure 4a	2/	1.75	5 MHz to 1.60 GHz
Figure 4b	3/	2.00	5 MHz to 1.60 GHz
Figure 5a	4/	1.75	5/
Figure 5b	6/	2.00	5/

1/ Frequencies from 20 MHz to 1.60 GHz apply to HB1 only.

2/ Applicable to all ASI-to-ASI signal paths.

3/ Applicable to installations where an ASI-to-MSI (or ASI-to-CSI) interconnection mechanism (such as an umbilical cable) is furnished as part of the aircraft equip ment.

4/ Applicable to specific systems where the Type A or Type B signal load is located on the aircraft side of the ASI.

5/ The frequency range over which the VSWR is applicable is 5 MHz to 1.6 GHz or, when applicable, a smaller band within this range as determined by the specific Type A or Type B signal load equipment.

6/ Applicable to specific systems where the Type A or Type B signal load is located on the aircraft side of the ASI and where an ASI-to-MSI (or ASI-to-CSI) intercon nection mechanism (such as an umbilical cable) is furnished as part of the aircraft equipment.

b. HB3 and HB4 signal return. For ASI to aircraft signal paths, the signal return shall be electrically isolated from aircraft structure ground and from HB3 and HB4 signal returns at all other ASIs. For ASI to ASI signal paths, the signal return shall be electrically isolated from aircraft structure ground (when measured with the associated stores disconnected) and from all other HB3 and HB4 signal returns except the other signal return associated with the connected ASI to ASI signal path.

5.1.1.2 Aircraft digital multiplex data interface. The aircraft shall provide two digital interfaces (Mux A and Mux B) at each primary signal set ASI for the transfer of digital messages through the ASI to a MIL-STD-1553 compliant remote terminal in the connected store. Each digital interface shall contain a data high connection, a data low connection and a shield connection.

5.1.1.2.1 Functional characteristics

a. The aircraft shall transfer data between the aircraft and stores connected to the ASIs.

b. The aircraft shall be responsible for the bus controller function as defined in MIL-STD-1553. The Mux A and Mux B interfaces at each ASI shall be operated in a dual standby redundant mode as described in MIL-STD-1553.

c. The aircraft shall also control digital information transfer from a remote terminal below any ASI to a remote terminal below any other ASIs. The aircraft shall communicate with the remote terminal (connected to an ASI) with:

(1) messages whose terminal address corresponds to the address encoded in the address interface (see 5.1.1.6) at the ASI, or

(2) MIL-STD-1553 broadcasted messages.

d. Subaddress fields of 10011 and 11011 binary shall only be used for communications with nuclear stores. The subaddress 10011 and 11011 restriction applies to all messages detectable at any ASI.

e. The aircraft shall communicate with stores through the Mux A and Mux B interfaces in accordance with the requirements of Appendix B.

5.1.1.2.2 Electrical characteristics. The aircraft shall comply with the electrical characteristics defined herein at the ASI. The characteristics defined apply when measured on the data high connection referenced to the data low connection. Data high is that connection which is positive referenced to the data low connection in the first part of a MIL-STD-1553 command or status word sync waveform.

5.1.1.2.2.1 Output characteristics. The aircraft shall deliver, at each ASI, MIL-STD-1553 compatible digital data waveforms except that the peak-to-peak, line-to-line voltage shall be within the envelope of Figure 6. The maximum zero crossing deviation from the ideal (with respect to the previous zero crossing) shall not exceed 150 nanoseconds (see 6.3.4).

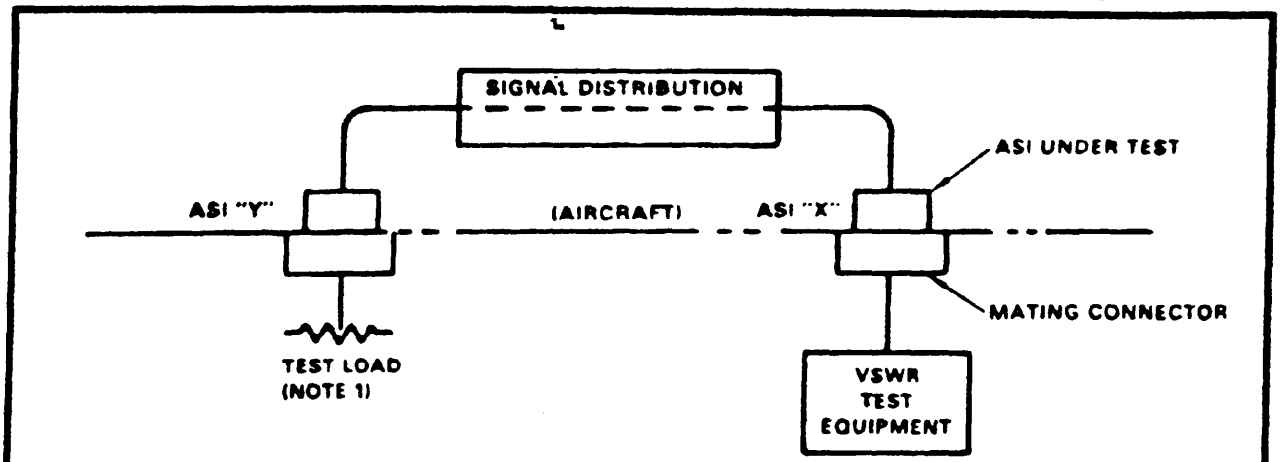
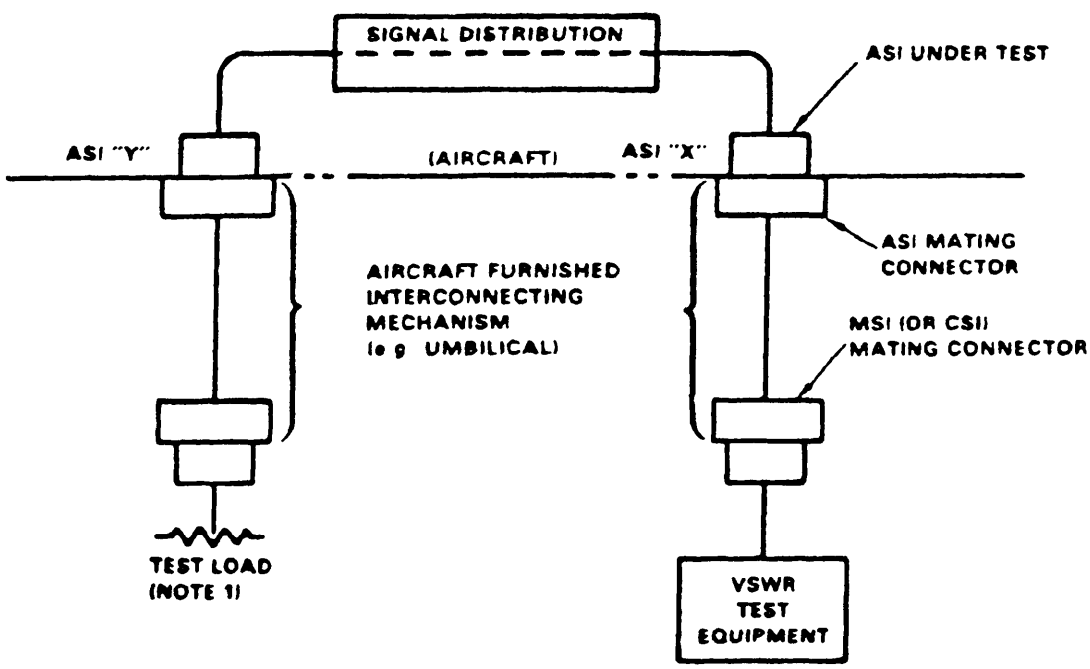


Figure 4a. Test at ASI.



NOTE: The test load shall have a VSWR of 1.05 maximum referenced to 50 ohms for HB1 and HB2 and referenced to 75 ohms for HB3 and HB4.

Figure 4b. Test at store mating connector.

Figure 4. VSWR measurement of ASI-to-ASI transfer.

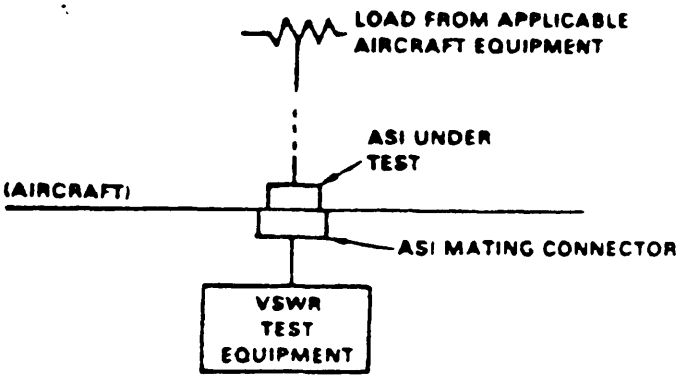


Figure 5a. Test at ASI.

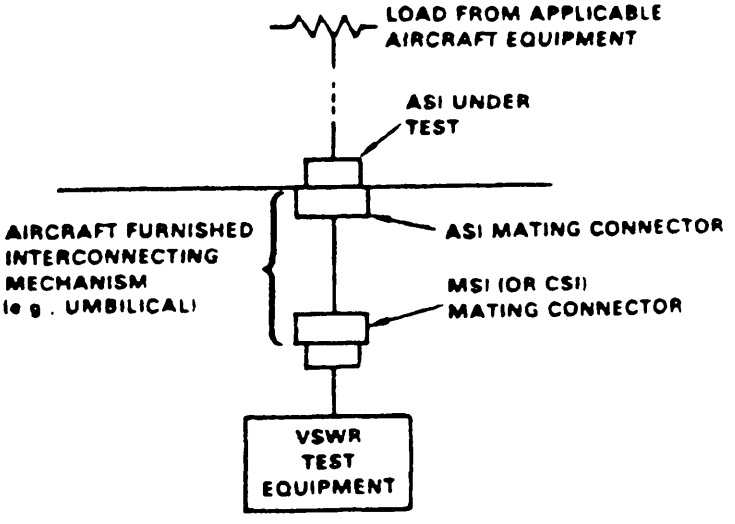


Figure 5b. Test at store mating connector.

Figure 5. VSWR measurement of ASI-to-aircraft transfer.

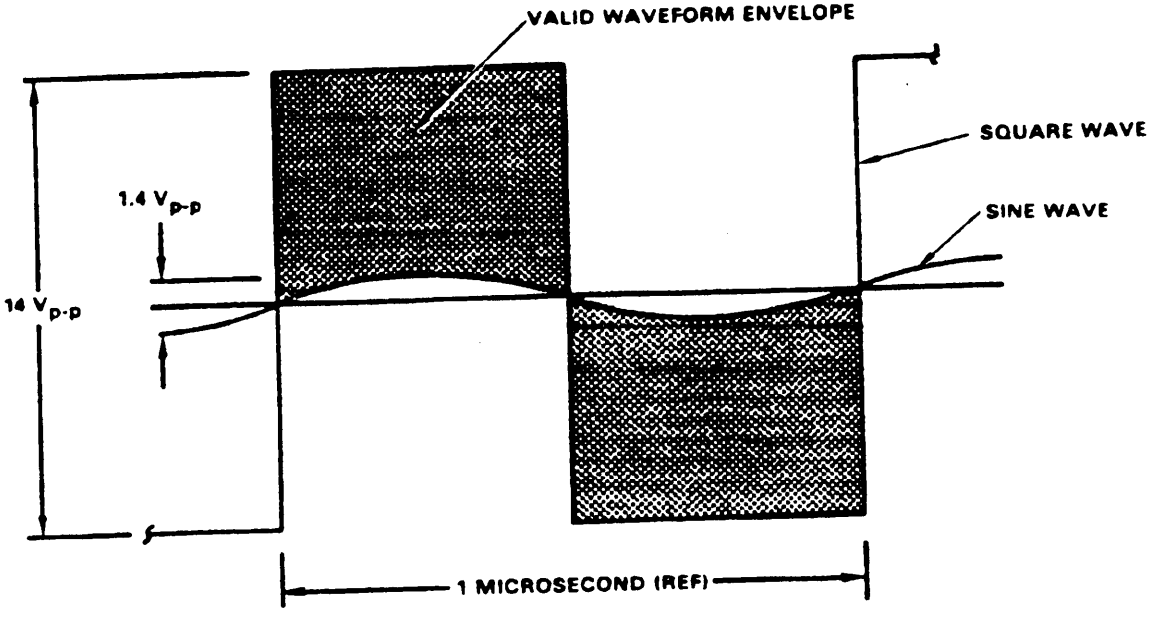


Figure 6. ASI output waveform envelope.

5.1.1.2.2.2 Input characteristics. The aircraft shall receive, and operate with, input signal waveforms at any ASI which comply with the output characteristics of a MIL-STD-1553 transformer coupled stub terminal.

5.1.1.2.2.3 Shield grounding. The aircraft shall connect the data bus stub shield of both Mux A and Mux B to aircraft structure ground.

5.1.1.3 Aircraft LB interface. The aircraft shall provide one LB interface at each primary signal set ASI for transferring LB signals in accordance with the requirements herein. Each LB interface shall include a non-inverting signal connection, an inverting signal connection, and a shield connection.

5.1.1.3.1 Transfer requirement. The aircraft shall support the transfer of a LB signal between any ASI and applicable aircraft equipment for applications where the signal source is located in either the aircraft or in the connected store. The aircraft shall be capable of rerouting the signals between aircraft equipment and each ASI.

5.1.1.3.2 Electrical characteristics

5.1.1.3.2.1 Input and output signal. The signal at the ASI (line-to-line and line-to-ground) shall be in the range of -12 volts to +12 volts and shall not exceed 150 milliamperes. The LB signal frequency components shall be contained within a passband of DC to 50 kHz. The LB signals allowed through the interface are tones and voice grade audio (see 6.3.9). This signal shall not be used for discrete functions.

5.1.1.3.2.2 Input impedance. The line-to-line impedance at the ASI (looking into the aircraft) shall be greater than 70 ohms over the frequency range of DC to 50 kHz. This requirement applies when the interface is deactivated and when the aircraft is not sourcing a signal.

5.1.1.3.2.3 Load impedance. The aircraft shall comply with the requirements herein when the line-to-line impedance connected to the store side of the ASI is 70 ohms minimum over a frequency range of DC to 50 kHz. This impedance applies when the connected store is deactivated and when the connected store is not sourcing a signal.

5.1.1.3.2.4 Shield grounding. When measured at the ASI, the shield shall be electrically connected to aircraft structure ground.

5.1.1.4 Aircraft release consent interface. The aircraft shall provide a release consent interface at each primary signal set ASI in accordance with the requirements herein for transferring an enable/inhibit signal to the connected store. Release consent, when in the enabled state, shall indicate aircraft consent for stores to perform safety-critical functions (such as store release from a carriage store, missile launch from a rail launcher or rocket firing from a pod) when commanded over the digital multiplex data interface (see 4.3.1.5).

5.1.1.4.1 Transfer requirement. The aircraft shall be capable of transferring a release consent signal through each ASI. The aircraft shall require positive crew action to generate the enabled state of the release consent signal. When in the inhibited state, the release consent interface at an ASI shall be electrically isolated from the release consent interface at all other ASIs. The isolation shall be 100 kilohms minimum at DC.

5.1.1.4.2 Electrical characteristics

5.1.1.4.2.1 Voltage level. The voltage level measured between the release consent connection and 28V DC power 2 return connection at the ASI shall be:

a. Steady State Conditions

(1) Enable: Minimum voltage of 19.0V DC
Maximum voltage, in accordance with MIL-STD-704 for 28V DC

(2) Inhibit: 1.50V DC (maximum)

b. Voltage transients shall comply with MIL-STD-704 limits for 28V DC applications.

c. Voltage spikes shall comply with MIL-E-6051 limits.

5.1.1.4.2.2 Current level. The aircraft shall provide a capacity of 100 milliamperes steady state minimum through the ASI during the enable state. The aircraft shall ensure that the current flow through the release consent interface does not exceed the maximum overcurrent limit of Figure 7. The aircraft shall comply with the requirements herein for store imposed load currents of 5.0 milliamperes minimum through the ASI.

5.1.1.4.2.3 Stabilization time. With any resistive load between 320 ohms and 3.8 kilohms connected between release consent and 28V DC power 2 return, the voltage at the ASI shall reach steady state levels (see 5.1.1.4.2.1.a) within 3 milliseconds during transition between enable and inhibit states.

5.1.1.4.2.4 Enable lead time. If release consent is required by a store, the release consent signal shall attain the enable state at least 20 milliseconds prior to transferring the safety critical command over the digital multiplex data interface or prior to the firing signal to the parent S&RE, as applicable.

5.1.1.4.2.5 Inhibit delay. If release consent at an ASI has been enabled, the aircraft shall operate under the assumption that the store(s) connected to that ASI may remain in an enable state for up to 20 milliseconds after the release consent signal has been returned to the inhibit state.

5.1.1.4.2.6 Ground reference. The 28V DC power 2 return connection shall be the ground reference for release consent.

loads ways the equipment might be dropped during field handl- capable of surviving shock

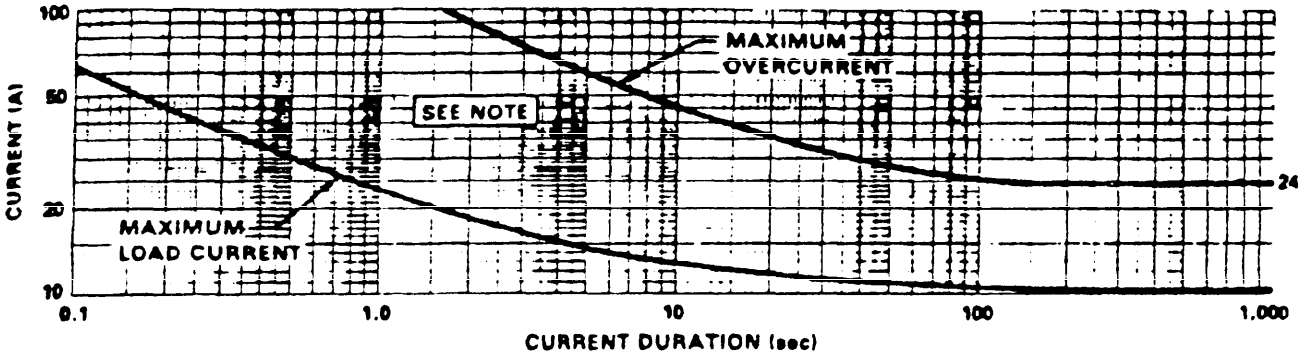


Figure 7. Primary interface current level.

NOTE: The curves of Figures 7 and 8 define a locus of discrete current-time points (such as 13 amperes for 10 seconds duration) and are not intended to represent a continuous profile of current versus time. The maximum load current locus defines the current-time combinations of maximum allowed fault-free load current required by a store. The maximum overcurrent locus defines the current-time combinations of maximum allowed fault induced overcurrent sourced by the aircraft. The area bounded by the maximum load current and maximum overcurrent curves defines the current-time band within which an aircraft's circuit protective devices must trip (see 6.3.10).

5.1.1.5 Aircraft interlock interface. The aircraft shall provide an interlock interface at each primary signal set ASI and auxiliary power signal set ASI for monitoring the mated status of the associated connectors. The interlock interface at each primary and auxiliary ASI consists of an interlock connection and an interlock return connection (see 6.3.6).

5.1.1.5.1 Electrical characteristics. If the aircraft monitors the interlock interface, then the aircraft shall comply with the following requirements. These requirements apply to the interlock connection referenced to the interlock return connection.

a. Open circuit voltage

(1) Minimum voltage of 4.0V DC

(2) Maximum voltage, in accordance with MIL-STD-704 for 28V DC

(3) Voltage transients shall comply with MIL-STD-704 for 28V DC

(4) Voltage spikes shall comply with MIL-E-6051

b. Excitation current

(1) Minimum current of 5.0 milliamperes

(2) Maximum current of 100 milliamperes

c. Impedance detection threshold. An interface disconnected condition shall be detected for any impedance level of 100 kilohms or greater. An interface connected condition shall be detected for any impedance level of 2.0 ohms or less. These impedance values apply over the frequency range of DC to 4 kHz.

5.1.1.6 Aircraft address interface. The aircraft shall provide an address interface at each primary signal set ASI for assigning a digital multiplex data bus address to the MIL-STD-1553 remote terminal in the store mated to the ASI. Each address interface shall include five binary encoded address bit connections (A0, A1, A2, A3, and A4), one address parity connection and one common address return connection. The address interface shall comply with the requirements specified herein.

5.1.1.6.1 Transfer requirement. The aircraft shall transfer a remote terminal address through each ASI to the connected store with the address interface. The aircraft shall use this interface only for assigning an address to the remote terminal associated with the directly connected carriage store or mission store, as applicable.

5.1.1.6.2 Address assignment. The aircraft shall supply a Logic 0 state or Logic 1 state on each of the five binary weighted address bit connections at each ASI. The remote terminal address assigned to an ASI shall be defined as follows:

a. Remote terminal address = $(A_4)x\ 2^4 + (A_3)x\ 2^3 + (A_2)x\ 2^2 + (A_1)x\ 2^1 + (A_0)x\ 2^0$

b. The aircraft shall supply a Logic 0 state or Logic 1 state on the address parity connection such that an odd number of Logic 1 states exist on the five address bit connections plus the address parity connection. The aircraft shall not modify the address assigned to an ASI whenever any power (see 5.1.1.8, 5.1.1.9, and 5.1.1.10) is applied to that ASI.

5.1.1.6.3 Electrical characteristics. The address interface electrical characteristics at the ASI shall comply with the following requirements. The characteristics defined apply to the address bit and parity connections referenced to the address return connection.

5.1.1.6.3.1 Address signal. The aircraft shall comply with the requirements herein when signals with the following characteristics are applied to the address interface at the ASI by the connected store:

a. Open circuit (Logic 1) voltage

(1) Minimum voltage of 3.5V DC

(2) Maximum voltage of 31.5V DC

(3) Voltage spikes in accordance with MIL-E-6051

(4) Rise and fall times of applied voltage less than 10 milliseconds

b. Logic 0 current

(1) Minimum current of 5.0 milliamperes DC

(2) Maximum current of 100 milliamperes DC through each address bit and parity connection

(3) Maximum current of 600 milliamperes DC through the address return connection

(4) Rise and fall times of applied current less than 10 milliseconds

5.1.1.6.3.2 Logic thresholds. The aircraft shall provide the following logic states under the voltage and current conditions of 5.1.1.6.3.1:

a. Logic 1 state characteristics. The aircraft shall maintain sufficient open circuit conditions between each Logic 1 set address bit (or parity) connection and the return connection such that when the voltages of 5.1.1.6.3.1 are applied across the connections, the current flow shall not exceed 300 microamperes.

b. Logic 0 state characteristics. The aircraft shall limit the voltage drop between each Logic 0 set address bit (or parity) connection and return connection at the ASI to 1.0 volts maximum when the current levels specified in 5.1.1.6.3.1 are applied. This maximum voltage drop applies when Logic 0 states exist at any or all address bit and parity connections.

5.1.1.6.3.3 Response characteristics. The aircraft shall produce valid address characteristics at the ASI within 10 milliseconds of excitation signal application from the store. The aircraft shall not require continuous application of the excitation signal.

5.1.1.6.3.4 Address isolation. The aircraft shall electrically isolate all address connections (including address return) at each ASI from the address connections at all other ASIs, from power returns and from aircraft structure. The isolation shall be 100 kilohms minimum over the frequency range of DC to 4 kHz.

5.1.1.7 Aircraft structure ground. The aircraft shall provide a connection in each ASI (primary signal set and auxiliary power signal set) which is terminated to aircraft structure ground and complies with the following requirements.

5.1.1.7.1 Structure ground characteristics. The aircraft shall provide a conductor path from the ASI to aircraft ground capable of carrying 10 amperes (continuous) for the primary signal set, and 30 amperes (continuous) for the auxiliary power signal set. The aircraft structure ground interface shall comply with the class H bonding requirements contained in MIL-B-5087. The structure ground interface shall not be used as a signal return or power return path.

5.1.1.8 Aircraft 28V DC power interface. The aircraft shall provide a set of 28V DC power interfaces at each ASI in accordance with the requirements defined herein. The primary signal set ASI shall contain 28V DC power 1 (and power 1 return) connections and 28V DC power 2 (and power 2 return) connections. The auxiliary power signal set ASI shall contain 28V DC power (and power return) connections.

5.1.1.8.1 Transfer requirements. The aircraft shall be capable of sourcing and independently controlling each 28V DC power interface through each primary signal set ASI and through each auxiliary power signal set ASI.

5.1.1.8.2 Electrical characteristics. The 28V DC power interfaces at each ASI shall comply with the electrical characteristic requirements specified herein.

5.1.1.8.2.1 Voltage level. The voltages at the ASI between each 28V DC power connection and the associated power return connection shall comply with the 28V DC normal and abnormal operation characteristics for utilization equipment defined in MIL-STD-704. The voltage spikes at the ASI shall comply with MIL-E-6051 and voltage transients at the ASI shall comply with MIL-STD-704. These voltage requirements shall apply for all valid load conditions.

5.1.1.8.2.2 Current capacity

5.1.1.8.2.2.1 Primary signal set. The aircraft shall be capable of sourcing the maximum load current levels of Figure 7 through the 28V DC power 1 interface and the maximum load current levels of Figure 7 through the 28V DC power 2 interface of the ASI (see 6.3.10). The aircraft shall be capable of sourcing a total of 20 amperes, continuously through the combination of 28V DC power 1 and 28V DC power 2 interfaces of the ASI.

5.1.1.8.2.2.2 Auxiliary power signal set. For interface Classes IA and IIA, the aircraft shall be capable of sourcing the maximum load current levels of Figure 8 through the 28V DC power interface of the auxiliary ASI (see 6.3.10).

5.1.1.8.2.2.3 Simultaneous current. The total 28V DC current available simultaneously from all ASIs shall comply with the aircraft system specification. The total 28V DC continuous current provided simultaneously through both the primary and auxiliary interfaces at any Class IA or IIA ASI need not exceed 30 amperes.

5.1.1.8.2.3 Overcurrent protection. The aircraft shall ensure that the current flow through any 28V DC power connection does not exceed the maximum overcurrent limits of Figures 7 and 8 for the primary and auxiliary ASIs, respectively. The aircraft may achieve this current limit operation by the deactivation of the appropriate power interface and any other power interface at the associated ASI (see 6.3.10).

5.1.1.8.2.4 Off-state leakage current. The off-state leakage current at the ASI between each 28V DC power and its respective return shall not exceed 1.0 milliampere DC with any valid load impedance. The off-state leakage current at the ASI between auxiliary 28V DC power and auxiliary power return shall not exceed 2.50 milliamperes DC with any valid load impedance.

5.1.1.8.2.5 Stabilization time. When tested with any valid resistive load connected to the ASI, the voltage at the ASI shall reach steady state levels (see 5.1.1.8.2.1) within 3.0 milliseconds of power turn-on and turn-off (see Figure 9).

5.1.1.8.2.6 Ground reference. The 28 V DC power return connections at the primary and auxiliary ASIs shall be the reference for each associated 28V DC power connection.

5.1.1.8.2.7 Power application. The aircraft shall only energize 28V DC power 2 and auxiliary 28V DC when the aircraft has determined that it is safe to do so. The aircraft operation shall consider that some stores may utilize 28V DC power 2 or auxiliary 28V DC for powering safety critical functions such that store safety may be degraded with activation of these power interfaces. The aircraft may energize 28V DC power 1 at any time under the assumption that all store functions so powered are either not safety critical or that multiple safety interlocks exist within the store such that store safety is not significantly degraded by activation of 28V DC power 1.

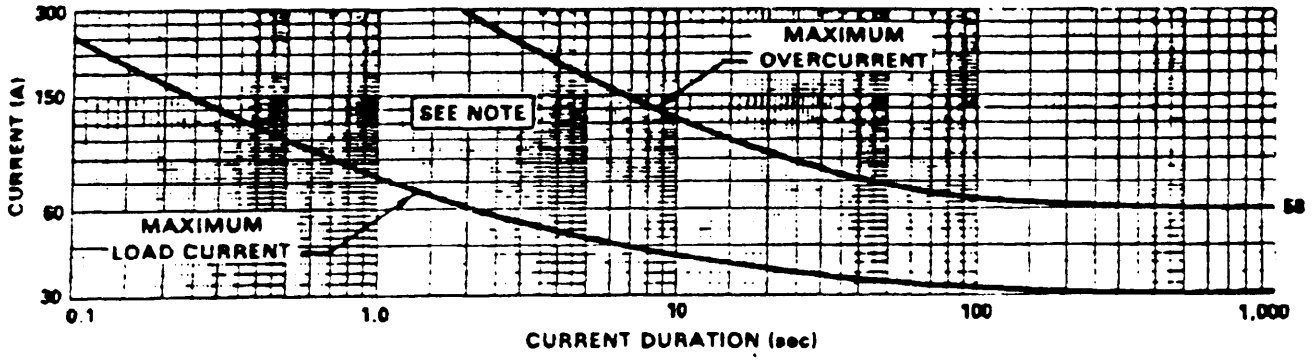


Figure 8. Auxiliary interface current level.

NOTE: The curves of Figures 7 and 8 define a locus of discrete current-time points (such as 13 amperes for 10 seconds duration) and are not intended to represent a continuous profile of current versus time. The maximum load current locus defines the current-time combinations of maximum allowed fault-free load current required by a store. The maximum overcurrent locus defines the current-time combinations of maximum allowed fault induced overcurrent sourced by the aircraft. The area bounded by the maximum load current and maximum overcurrent curves defines the current-time band within which an aircraft's circuit protective devices must trip (see 6.3.10).

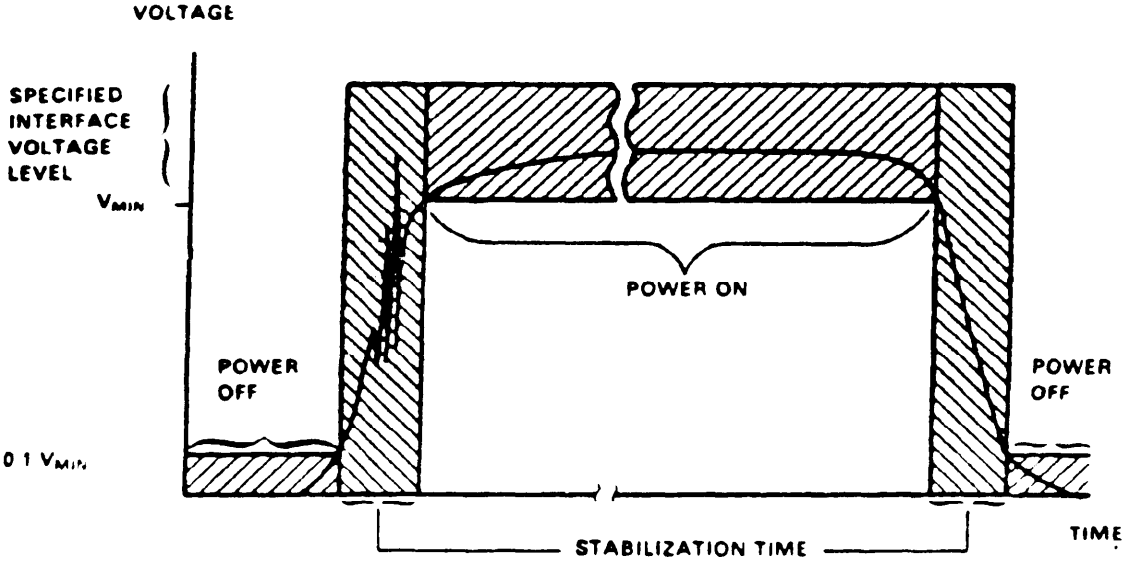


Figure 9. Stabilization time.

5.1.1.8.2.8 Power interruption. The aircraft shall be compatible with stores which request full or partial store system initialization following 28V DC power interrupts in excess of 200 microseconds.

5.1.1.8.2.8.1 Full initialization. If the store requests full initialization, then the aircraft shall use paragraphs 5.1.1.12 through 5.1.1.12.3 to satisfy the request. However, the aircraft shall not be required to request the store description message demanded in 5.1.1.12.3.

5.1.1.8.2.8.2 Partial initialization. If no partial initialization procedure has been agreed in the Interface Control Document between the aircraft and store, the aircraft shall substitute full initialization.

5.1.1.9 Aircraft 115V/200V AC power interface. The aircraft shall provide a set of three phase, four wire, wye-connected, 115V/200V AC power interfaces at each ASI in accordance with the requirements defined herein. The primary signal set ASI shall contain 115V AC phase A, phase B, phase C, and neutral connections. The auxiliary power signal set ASI shall contain 115V AC phase A, phase B, phase C, and neutral connections.

5.1.1.9.1 Transfer requirements. The aircraft shall be capable of sourcing and independently controlling the 115V/200V AC power interface through each primary interface signal set ASI and through each auxiliary power signal set ASI. The aircraft shall ensure that no AC power is applied to the ASI until an indication is available that the store is mated, such as the interlock circuit is complete. The aircraft shall also ensure that AC power is removed from the ASI prior to store separation or connector disconnect (see 6.3.12).

5.1.1.9.2. Electrical characteristics

5.1.1.9.2.1 Voltage level. The voltage at the ASI between each 115V AC phase connection and the associated 115V AC neutral connection shall comply with the 115V AC normal and abnormal operation characteristics for utilization equipment defined in MIL-STD-704. The voltage spikes at the ASI shall comply with MIL-E-6051 and voltage transients at the ASI shall comply with MIL-STD-704. These voltage requirements apply for all valid load conditions.

5.1.1.9.2.2 Current capacity

5.1.1.9.2.2.1 Primary signal set. The aircraft shall be capable of sourcing the maximum load current levels of Figure 7 simultaneously through each of the three 115V AC phases of the primary signal set ASI (see 6.3.10).

5.1.1.9.2.2.2 Auxiliary power signal set. For interface classes IA and IIA, the aircraft shall be capable of sourcing the maximum load current levels of Figure 8 simultaneously through each of the three 115V AC power phases of the auxiliary ASI (see 6.3.10).

5.1.1.9.2.2.3 Simultaneous current. The total 115V AC current available simultaneously from all ASIs shall comply with the aircraft system specification. The total 115V AC continuous current provided simultaneously through both primary and auxiliary interfaces at any class IA and IIA ASI need not exceed 30 amperes per phase.

5.1.1.9.2.3 Overcurrent protection. The aircraft shall ensure that the current flow through any 115V AC power phase connection does not exceed the maximum overcurrent limits of Figures 7 and 8 for the primary and auxiliary ASIs, respectively. The aircraft may achieve this current limit operation by the deactivation of the appropriate power interface and any other power interface at the associated ASI (see 6.3.10).

5.1.1.9.2.4 Off-state leakage current. The off-state leakage current at the ASI between any 115V AC phase and the associated 115V AC neutral shall be less than 2.0 milliamperes for the primary signal set ASI and shall be less than 5.0 milliamperes for the auxiliary power signal set ASI with any valid load impedance.

5.1.1.9.2.5 Stabilization time. When tested with any valid resistive load connected to the ASI, the voltage at the ASI shall reach steady state levels within 3.0 milliseconds of power turn-on and turn-off (see Figure 9).

5.1.1.9.2.6 Phase rotation. The three 115V AC, 400 Hz, power phases at the ASI shall comply with the phase sequence and voltage phase difference requirements of MIL-STD-704. The power phase assigned to contact location A in the auxiliary ASI connector shall be the identical phase as assigned to contact location P in the primary ASI connector at the same ASI location.

5.1.1.9.2.7 Load power factor. The electrical characteristics at the ASI shall comply with the requirements herein when loads with a power factor within the limits of Figure 10 are applied to the ASI. The power factor shall be defined as the ratio of true RMS input power to the true RMS input volt-amperes.

5.1.1.9.2.8 Phase power unbalance. The electrical characteristics at the ASI shall comply with the requirements herein when loads with a phase power unbalance within the limits of MIL-STD-704 are applied to the ASI.

5.1.1.9.2.9 Ground reference. Each 115V AC neutral connection in the primary signal set ASI and auxiliary power signal set ASI shall be the reference for its respective 115V AC power phase.

5.1.1.9.2.10 Power application. The aircraft may energize the 115V/200V AC power interface (primary and auxiliary) at any time under the assumption that all store functions so powered are either not safety critical or that multiple safety interlocks exist within the store such that store safety is not significantly degraded by activation of 115V/200V AC power.

5.1.1.9.2.11 Power interruption. The aircraft shall be compatible with stores which request full or partial store system initialization following 115V AC power interrupts in excess of 200 microseconds.

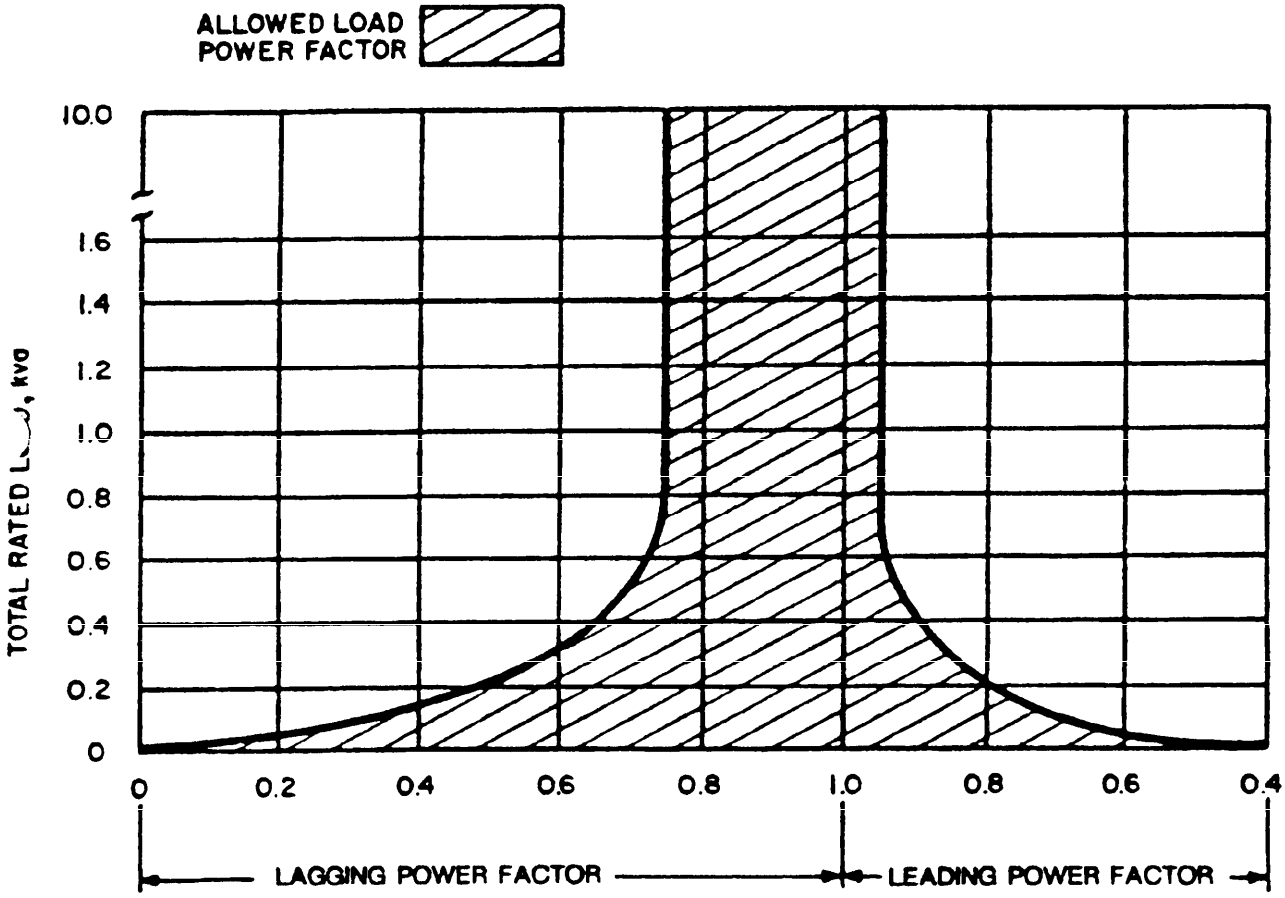


Figure 10. Power factor limits.

5.1.1.9.2.11.1 Full initialization. If the store requests full initialization, then the aircraft shall use paragraphs 5.1.1.12 through 5.1.1.12.3 to satisfy the request. However, the aircraft is not required to request the store description message demanded in 5.1.1.12.3.

5.1.1.9.2.11.2 Partial initialization. If no partial initialization procedure has been agreed in the Interface Control Document between the aircraft and store, the aircraft shall substitute full initialization.

5.1.1.10 Aircraft 270V DC power interface. The 270V DC power interface is a growth provision for future applications of 270V DC. The 270V DC power interfaces shall not be activated at an ASI until characteristics and performance details are added to this standard. All class I interface connectors at all ASIs shall include contacts (or plugged cavities) for 270V DC power and 270V DC power return. The general 270V DC electrical characteristics include voltage levels as defined in MIL-STD-704 for 270V DC and continuous current levels of 10 amperes for the primary ASI and 30 amperes for the auxiliary ASI (see 5.1.2).

5.1.1.11 Aircraft fiber optic interface. The two fiber optic interfaces are growth provisions for future applications. The fiber optic interfaces shall not be activated at an ASI until characteristics and performance details are added to this standard. All class I interface connectors at all ASIs shall include two 16 AWG size contact provisions (plugged cavities) for fiber optic channel 1 and channel 2 (see 5.1.2).

5.1.1.12 Initialization. The aircraft shall comply with the following default procedure (in the sequence presented) for initializing stores connected to ASIs. The aircraft may initialize stores using other procedures, provided the aircraft:

a. knows (prior to power application) the identity of the connected store, and

b. has a prior established alternate procedure for safely initializing that store.

5.1.1.12.1 Pre-initialization conditions. The aircraft shall provide the following pre-initialization conditions at the ASI:

a. All power interfaces shall be deactivated.

b. Release consent interface shall be in the inhibit state.

c. Address interface shall be set to a valid address.

NOTE: Digital multiplex data interface, interlock interface, high bandwidth interfaces, and low bandwidth interface may be active.

5.1.1.12.2 Power application. The aircraft shall apply primary 28V DC power 1 and primary 115/200V AC power to the ASI within 100 milliseconds of each other but without a required predetermined sequence. All other power interfaces at the ASI shall remain deactivated.

5.1.1.12.3 First communication. The aircraft shall send to the store (over the digital multiplex data interface) transmit command(s) for the store description message as defined in Appendix B. The aircraft shall not require a valid store response (see Appendix B) to any of these transmit commands if sent within 150 milliseconds after both AC and DC power application. The aircraft shall not require a "not busy" response (see Appendix B) to any of these transmit commands if sent within 500 milliseconds after both AC and DC power application.

5.1.2 ASI connector characteristics

5.1.2.1 Primary signal set connector. The primary signal set connector and insert arrangement shall be in accordance with Table III. The contact assignments shall be in accordance with Table IV.

5.1.2.2 Auxiliary power signal set connector. The auxiliary power signal set connector and insert arrangement shall be in accordance with Table V. The contact assignments shall be in accordance with Table VI.

5.1.2.3 Connector receptacle. The connector on the aircraft side of the ASI mated connector pair shall be a receptacle with socket contacts or with plugged cavities.

5.1.2.4 Connector orientation. The ASI connector location on the aircraft shall be compatible with store connector locations. The connector keyway orientation shall conform to the following:

a. With the interface connector positioned such that the longitudinal axis of the connector (the axis that traverses from the back of the connector through the center to the front of the connector) is in the horizontal plane of the aircraft and the connector face is facing forward on the aircraft, the major (large) keyway shall be located in the up position (see Figure 11a).

b. With the interface connector positioned such that the longitudinal axis of the connector is in the vertical plane of the aircraft and the connector face is facing down on the aircraft, the major (large) keyway shall be located in the forward position (see Figure 11b).

c. With the interface connector positioned such that the longitudinal axis of the connector is in the horizontal plane of the aircraft and the connector face is facing aft of the aircraft, the major (large) keyway shall be located in the down position (see Figure 11c.)

d. With the interface connector positioned such that the longitudinal axis of the connector is in the horizontal plane of the aircraft and the connector face is facing inboard or outboard of the aircraft, the major (large) keyway shall be located in the forward position (see Figure 11d).

5.1.3 Electromagnetic compatibility (EMC). The aircraft shall comply with the EMC requirements of MIL-E-6051 and applicable sections of MIL-HDBK-235 when loaded with stores which comply with 5.2 and after store release.

TABLE III. Primary signal set connector requirements.

ASI connector characteristics:

Connector: The connector shall be in accordance with MIL-C-38999, Series III, Shell Size 25, Polarization Key Identification N

Contacts: The contacts shall be in accordance with the following slash sheets to MIL-C-39029.

Size	Slash Sheet	Abbreviated Title
20	/56	Contact, socket
20	/58	Contact, pin
16	/56	Contact, socket
16	/58	Contact, pin
12	/28	Contact, shielded, pin
12	/102	Contact, coaxial, pin
12	/75	Contact, shielded, socket
12	/103	Contact, coaxial, socket
8	/90	Contact, concentric twinax, pin
8	/91	Contact, concentric twinax, socket

Insert Arrangement: The insert arrangement shall be in accordance with MIL-STD-1560, Insert Arrangement No. 25-20.

MSI connector characteristics: The MSI primary signal set connector shall comply with the intermateability dimensions of MIL-C-38999, MIL-C-39029 and MIL-STD-1560 as specified above.

TABLE IV. Primary signal set contact functional assignment.

CONTACT LOCATION	SIZE	NOMENCLATURE
A	8	LB 1/
B	20	Interlock
C	16	28V DC power 1
D	16	28V DC power 1 return
E	16	28V DC power 2 return
F	16	28V DC power 2
G	20	Address parity
H	8	Mux B 2/
J	16	115V AC, phase C 4/
K	8	Mux A 2/
L	20	Address bit A0
M	16	115V AC, phase B 4/
N (Reserved)	16	270V DC return
P	16	115V AC, phase A 4/
R (Reserved)	16	270V DC power
S	20	Interlock return
T	16	Structure ground
U (Reserved)	16	Fiber optics channel 2
V	20	Address bit A4
W	12	HB 2 3/
X	20	Address bit A1
Y (Reserved)	16	Fiber optics channel 1
Z	16	115V AC neutral
1	20	Release consent
2	12	HB 4 3/
3	12	HB 3 3/
4	20	Address bit A3
5	12	HB 1 3/
6	20	Address return
7	20	Address bit A2

TABLE IV. Primary signal set contact functional assignment. (Continued)

1/ The LB contact is a twinaxial style contact. LB signal assignments within the contact are:

Center contact:	Non-inverting
Intermediate contact:	Inverting
Outer contact:	Shield

2/ The Mux A and B contacts are a twinaxial style contact. Mux A and Mux B signal assignments within the contact are:

Center contact:	Mux data high
Intermediate contact:	Mux data low
Outer contact:	Mux shield

3/ The HB contacts are a coaxial style contact. Signal assignments within the contact are:

Center contact:	Signal
Outer contact:	Signal return (shield)

4/ Phase rotation shall comply with the requirements of 5.1.1.9.2.6.

TABLE V. Auxiliary power signal set connector requirements.

ASI connector characteristics:

Connector: The connector shall be in accordance with MIL-C-38999, Series III, Shell Size 25, Polarization Key Identification A.

Contacts: The contacts shall be in accordance with the following slash sheets to MIL-C-39029.

Size	Slash Sheet	Abbreviated Title
20	/56	Contact, socket
20	/58	Contact, pin
10	/56	Contact, socket
10	/58	Contact, pin

Insert Arrangement: The insert arrangement shall be in accordance with MIL-STD-1560, Insert Arrangement No. 25-11.

MSI connector characteristics: The MSI auxiliary power signal set connector shall comply with the intermateability dimensions of MIL-C-38999, MIL-C-39029 and MIL-STD-1560 as specified above.

TABLE VI. Auxiliary power signal set contact functional assignment.

CONTACT LOCATION	SIZE	NOMENCLATURE
A	10	115V AC, Phase A 1/
B	10	28V DC
C	10	115V AC, Phase B 1/
D	10	28V DC return
E	10	115V AC, Phase C 1/
F (Reserved)	10	270V DC
G	10	115V AC neutral
H (Reserved)	10	270V DC return
J	10	Structure ground
K	20	Interlock
L	20	Interlock return

1/ Phase rotation shall comply with the requirements of 5.1.1.9.2.6.

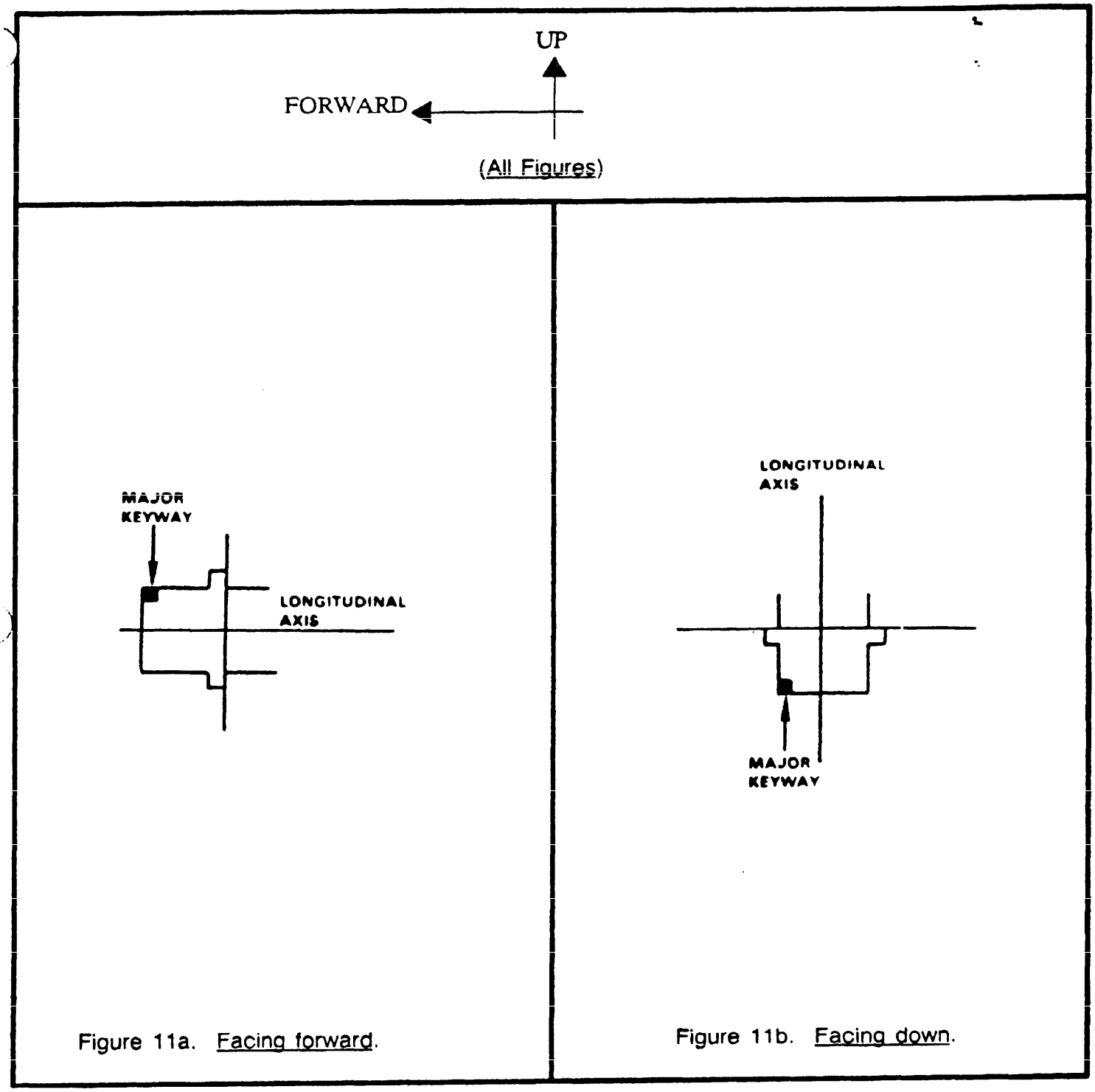


Figure 11a. Facing forward.

Figure 11b. Facing down.

Figure 11. Connector orientation.

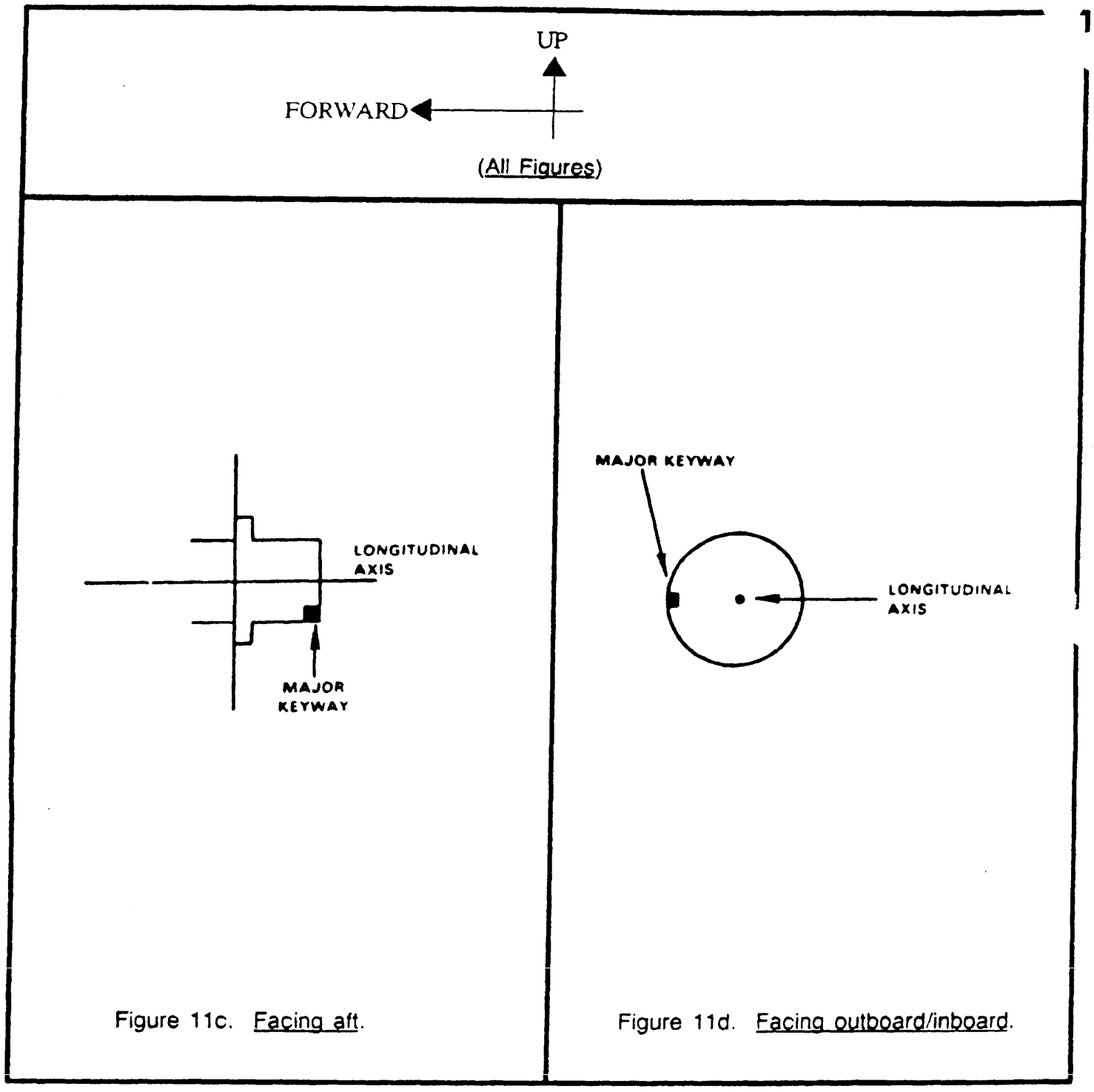


Figure 11c. Facing aft.

Figure 11d. Facing outboard/inboard.

Figure 11. Connector orientation. (Continued)

5.2 Mission store requirements (measured at the MSI). Mission stores shall provide Mission Store Interfaces (MSIs) with the characteristics defined herein.

5.2.1 Interface electrical requirements

5.2.1.1 Mission store HB interfaces. Mission stores with a Class I MSI shall provide connections for four HB interfaces (HB1, HB2, HB3 and HB4) at the primary signal set MSI. Mission stores with a Class II MSI shall provide connections for HB1 and HB3 interfaces at the primary signal set MSI. Each HB interface shall include a signal connection and a signal return (shield) connection at the MSI. The mission store shall not be required, however, to use any HB interface. If a HB interface is used, the mission store shall comply with the requirements below. If a HB interface is not used, the impedance between the signal and signal return connection at the MSI shall be greater than 45 ohms for HB1 and HB2 and greater than 68 ohms for HB3 and HB4.

5.2.1.1.1 Transfer requirements. The MSI shall include a maximum of two HB interfaces (HB1 and HB2) for 50 ohm applications and a maximum of two HB interfaces (HB3 and HB4) for 75 ohm applications (see 6.3.5).

5.2.1.1.2 Electrical characteristics. The mission store shall source or sink Type A and Type B signals through the MSI with the following electrical characteristics. Type A signal requirements apply to HB1, HB2, HB3 and HB4. Type B signal requirements apply to HB1 only. Unless otherwise specified, the performance requirements apply at the MSI, looking into the mission store and include the effect of the MSI mating connector.

5.2.1.1.2.1 Signal characteristics. Type A and Type B signals shall comply with the general characteristics of Table I. Signals for monochrome raster composite video shall comply with EIA-STD-RS-170, EIA-STD-RS-343, or STANAG 3350 with the following two exceptions:

a. The sync pulse amplitude shall be 28.6 percent $\pm$5 percent of the composite signal peak-to-peak amplitude; and

b. The composite signal peak-to-peak amplitude shall be 3.0V $\pm$0.5V at the MSI for store sourced video and 1.0V to 3.5V at the MSI for store received video (aircraft sourced video).

5.2.1.1.2.2 Signal assignment. The store shall limit the transfer of signals on the HB interfaces to the following:

a. Radio frequency signals which comply with the Type B signal characteristics shall be transferred on HB1.

b. Time correlation (synchronization, clocking and blanking) signals shall be transferred on HB1 or HB2, or both.

c. Raster composite video signals shall be transferred on HB3 or HB4, or both.

5.2.1.1.2.3 Characteristic impedance. The nominal characteristic impedance at the MSI shall be 50 ohms for HB1 and HB2 and shall be 75 ohms for HB3 and HB4.

5.2.1.1.2.4 VSWR. The mission store shall comply with the VSWR requirements of Table VII for applications where the signal load is on the mission store side of the MSI. The VSWR shall include the effects of the mated connectors shown on Figure 12. The mission store shall be compatible with aircraft which impose at the MSI, a Type A or Type B signal load with a VSWR of 2.0 maximum. When applicable, the mission store shall be compatible with carriage stores which impose at the MSI, a Type A or Type B signal load with a VSWR of 3.20 maximum. The VSWR produced at the MSI by the carriage store includes the effect of the aircraft to which the carriage store is connected (see 5.2.1.1.2.9).

5.2.1.1.2.5 MSI-to-MSI attenuation and attenuation flatness. Mission stores which require a HB interconnection (Type A signal) with another mission store shall be compatible with the applicable attenuation and attenuation flatness requirements of Table VIII.

5.2.1.1.2.6 Propagation delay. Mission stores requiring a HB interconnection with another mission store shall be compatible with networks which have a propagation delay of up to 3.0 microseconds for the different frequency components (between 5 MHz and 20 MHz) of the Type A signal transferred from one MSI to another MSI.

5.2.1.1.2.7 Signal dispersion. Mission stores requiring a HB interconnection with another mission store shall be compatible with networks which produce a variation in propagation delay up to 55 nanoseconds. This variation is the change in propagation delay of the different frequency components (between 5 MHz and 20 MHz) of the Type A signal transferred from one MSI to another MSI.

5.2.1.1.2.8 Harmonic distortion. The mission store shall be compatible with networks which produce third harmonic distortions up to 25 dB below the power level of the intentional Type A signal.

5.2.1.1.2.9 Unterminated HB interface. The mission store shall not be functionally damaged by the removal of a matched termination (see 5.2.1.1.2.4) on any HB interface in equipment (such as aircraft and carriage stores) connected to the MSI.

5.2.1.1.2.10 Ground reference. When measured at the MSI, the signal return of all implemented HB interfaces shall be electrically connected to a suitable mission store ground (see 6.11). The mission store shall be compatible with aircraft which connect HB1 and HB2 signal returns to aircraft structure ground and which isolate HB3 and HB4 signal returns from aircraft grounds. For applications requiring ASI-to-ASI transfers, the mission store shall be compatible with other mission stores which connect HB3 and HB4 signal returns to mission store ground.

5.2.1.1.3 Electrical characteristics

TABLE VII. Mission store VSWR load requirements.

CONDITION	APPLICATION	MAXIMUM VSWR 3/
Figure 12a	1/	1.75
Figure 12b	2/	2.00

1/ Applicable at all MSIs where the Type A or Type B signal load is located in the mission store.

2/ Applicable to installations where the MSI-to-ASI (or MSI-to-CSSI) interconnection mechanism (such as a umbilical cable) is furnished with the mission store and the Type A or Type B signal load is located in the mission store.

3/ These VSWR requiements apply over the frequency range applicable to the specific Type A or Type B signal load in the mission store.

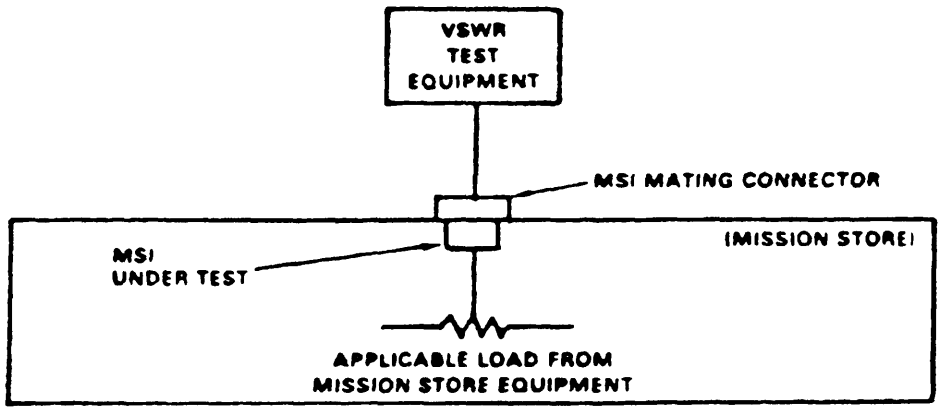


Figure 12a. Test at MSI.

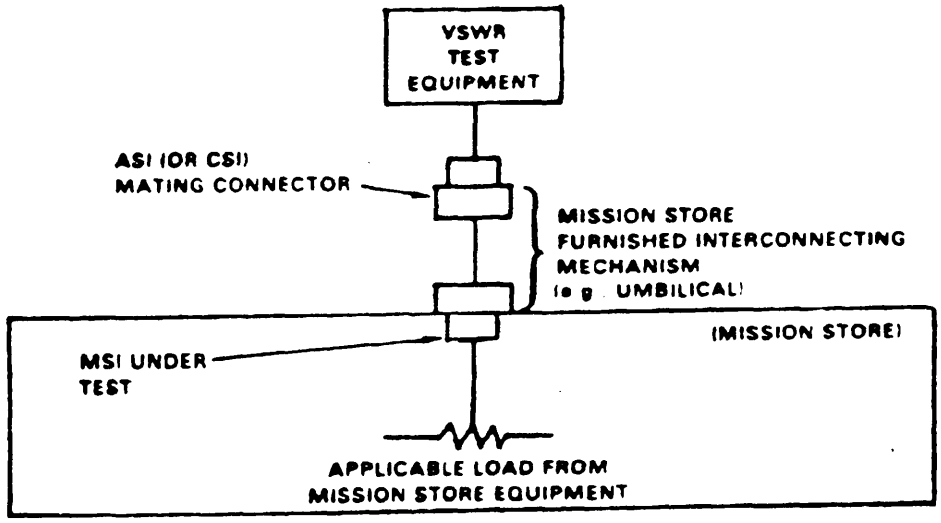


Figure 12b. Test at aircraft mating connector.

Figure 12. VSWR measurement of MSI load.

TABLE VIII. Mission store attenuation compatibility.

MEASUREMENT POINTS 1/	INTERVENING CARRIAGE STORE	ATTENUATION (dB)	ATTENUATION FLATNESS (dB) 2/
ASI to ASI	No	6.0	5.0
MSI to MSI	No	7.0	5.5
MSI to MSI	Yes	9.5	7.5

1/ Includes the effect of associated mating connectors.

2/ Attenuation flatness is the difference between minimum and maximum actual measured attenuation over the frequency band (20 Hz to 20 MHz) for any specific signal path.

5.2.1.2 Mission store digital multiplex data interface. The mission store shall provide connections for the digital multiplex data interface (Mux A and Mux B) in the primary signal set MSI. Each of the Mux A and Mux B connections shall include a data high, a data low, and a shield connection. The mission store is not required to use the interface. However, if the interface is used, the mission store shall comply with the MSI requirements below. If the interface is not used, the impedance between the data high and data low connections at the MSI shall be greater than 1000 ohms from 75 kHz to 1.0 MHz.

5.2.1.2.1 Functional characteristics.

a. The mission store shall provide a remote terminal function as defined in MIL-STD-1553. This remote terminal shall be accessible through the digital interface (Mux A and Mux B) at the MSI for a dual standby redundant, half duplex MIL-STD-1553 communication link with the aircraft or carriage store.

b. The mission store shall respond in accordance with MIL-STD-1553 to those messages whose MIL-STD-1553 command word terminal address corresponds to:

(1) the address encoded on the address interface (see 5.2.1.6) monitored at the MSI; and

(2) the broadcast address if implemented by the mission store.

c. Subaddress fields of 10011 and 11011 binary shall only be used for communications with nuclear stores. The subaddress 10011 and 11011 restriction applies to all messages detectable at any MSI.

d. The mission store shall respond in accordance with the requirements of Appendix B to commands received on the Mux A and Mux B interfaces.

5.2.1.2.2 Electrical characteristics. The mission store shall comply with the electrical characteristics defined herein at the MSI. The characteristics defined apply when measured on the data high connection referenced to the data low connection. Data high is that connection that is positive referenced to the data low connection in the first part of a MIL-STD-1553 command or status sync waveform.

5.2.1.2.2.1 Output characteristics. The mission store shall provide output characteristics defined here at the MSI which comply with the output characteristics of a MIL-STD-1553 transformer coupled stub terminal except the terminal output voltage shall be 20.0V to 27.0V pp, line-to-line.

5.2.1.2.2.2 Input characteristics. The mission store shall be capable of receiving and operating with input signals at the MSI which comply with the input waveform compatibility, common mode rejection and noise rejection requirements of MIL-STD-1553 for transformer coupled stub terminals. The magnitude of the line-to-line input impedance at the MSI, when the mission store terminal is not transmitting or has power removed, shall be a minimum of 300 ohms within the frequency range of 75 kHz to 1.0 MHz. The remote terminal contained within the mission store shall comply with the 1000 ohm minimum terminal input impedance required by MIL-STD-1553.

5.2.1.2.2.3 Shield grounding. The mission store shall connect the data bus stub shields of both Mux A and Mux B to a mission store structure ground.

5.2.1.3 Mission store LB interface. The mission store shall provide connections for an LB interface in the primary signal set MSI. The LB interface shall include a non-inverting, an inverting, and a shield connection. The mission store is not required to use the LB interface. However, if the LB interface is used, the mission store shall comply with the MSI requirements below. If the LB interface is not used, the impedance between the non-inverting and the inverting connections at the MSI shall be greater than 70 ohms.

5.2.1.3.1 Transfer requirements. The MSI shall include an LB interface for transferring an LB signal between the mission store and the connected aircraft. The mission store shall provide the signal source or signal load as applicable.

5.2.1.3.2 Electrical characteristics. The LB interface electrical characteristics at the MSI shall comply with the following requirements (see 6.3.9).

5.2.1.3.2.1 Signal characteristics. The LB signal at the MSI (line-to-line and line-to-ground) shall be in the range of -12 volts to +12 volts and shall not exceed 150 milliamperes. The LB signal frequency components shall be contained within a passband from DC to 50 kHz. The LB signals allowed through the interface are tones and voice grade audio (see 6.3.9). This signal shall not be used for discrete functions.

5.2.1.3.2.2 Load impedance. The mission store shall comply with the requirements herein when the line-to-line load impedance applied to the MSI by the aircraft is a minimum of 70 ohms over the frequency range of DC to 50 kHz.

5.2.1.3.2.3 Input impedance. Mission stores which sink a LB signal shall provide a line-to-line impedance of 70 ohms minimum over the frequency range of DC to 50 kHz.

5.2.1.3.2.4 Shield grounding. The mission store shall connect the LB shield to mission store structure ground.

5.2.1.4 Mission store release consent interface. The mission store shall provide connections for a release consent interface in the primary signal set MSI. The release consent interface shall include a release consent signal connection referenced to the 28V DC power 2 return connection (see 5.2.1.8). The mission store is required to use the release consent interface if the Commit to Separate Store or Submunition function (bit D8) or the Fire, Launch or Release function (bit D10) of the Critical Control 1 data word in the Mission Store Control message (see Appendix B) is implemented. The mission store is not required to use the release consent interface in other instances. However, if the release consent interface is used, the mission store shall comply with the MSI requirements below. If the release consent is not used, the impedance between the release consent connection and the 28V DC power 2 return connection shall be greater than 100 kilohms (at DC).

5.2.1.4.1 Transfer requirement. The mission store shall include a release consent interface for receiving an enable/inhibit signal from the aircraft. The store shall act on release consent interlocked safety critical commands received over the digital multiplex data interface only if the release consent signal is in the enabled state.

CAUTION

The release consent interface is provided to satisfy an aircraft safety function. Consent is enabled whenever the aircraft determines that safety criteria for store employment sequence has been met.

5.2.1.4.2 Electrical characteristics. The release consent interface electrical characteristics at the MSI shall comply with the following requirements.

5.2.1.4.2.1 Voltage level. The mission store shall establish the appropriate enable or inhibit state when the following voltage levels are applied to the release consent connection (referenced to the 28V DC power 2 return connection) at the MSI:

a. Steady-state voltages:

Enable: Minimum voltage of 15.0V DC
Maximum voltage as defined in MIL-STD-704 for 28V DC
Inhibit: 1.50V DC (maximum applied)

b. Voltage transients up to the limits of MIL-STD-704 for 28V DC.

c. Voltage spikes up to the limits of MIL-E-6051.

5.2.1.4.2.2 Current level. The mission store shall limit the load current to a range of 5.0 to 100 milliamperes when the steady state enable voltages (see 5.2.1.4.2.1) are applied to the MSI.

5.2.1.4.2.3 Stabilization time. The mission store shall be compatible with aircraft and carriage stores which deliver a signal to the MSI with a transition time (between enable and inhibit states) of up to 6.0 milliseconds when measured with a resistive load.

5.2.1.4.2.4 Enable response. The mission store shall be capable of accepting safety critical commands over the digital multiplex data interface within 10 milliseconds after a valid enable signal is applied to the MSI.

5.2.1.4.2.5 Inhibit response. The mission store shall functionally reject any safety critical commands over the digital multiplex data interface within 10 milliseconds after a valid inhibit signal is applied to the MSI.

5.2.1.4.2.6 Ground reference. The 28V DC power 2 return connection at the MSI shall be the ground reference for the release consent signal.

5.2.1.5 Mission store interlock interface. The mission store shall provide connections for an interlock interface in the primary signal set MSI (primary MSI) and in the auxiliary power signal set MSI (auxiliary MSI) which comply with the requirements below. The interlock interface at both the primary and auxiliary MSI shall include an interlock connection and an interlock return connection (see 6.3.6).

5.2.1.5.1 Transfer requirements. The primary MSI and, when implemented, the auxiliary MSI shall provide continuity between the interlock connection and the interlock return connection which complies with the requirements herein.

5.2.1.5.2 Electrical characteristics. The mission store shall provide a continuity path between the interlock and interlock return connections with an impedance of 500 milliohms maximum over the frequency range of DC to 4 kHz when measured at the MSI. This impedance applies for excitation current within the range of 5.0 to 100 milliamperes. The excitation current from the connected aircraft (see 5.1.1.5.1) may be continuously applied or periodically pulsed. The mission store shall comply with the requirements herein when the excitation signal open circuit voltage applied to the MSI by the aircraft is between 3.5V DC and MIL-STD-704 28V DC upper voltage limits. The mission store shall electrically isolate both the interlock and interlock return connections at the MSI from all mission store circuits and grounds. The isolation shall be 100 kilohms minimum over the frequency range of DC to 4 kHz.

5.2.1.6 Mission store address interface. The mission store shall include connections for an address interface in the primary signal set MSI for detecting the assigned store digital multiplex data bus address. If the mission store needs to determine the mated status of the MSI, it shall use the address interface (see 6.3.6). The address interface shall include five binary encoded address bit connections (A0, A1, A2, A3, and A4), one address parity connection and one common address return connection. Mission stores which implement the digital multiplex data interface (5.2.1.2) shall comply with the address interface requirements below. Mission stores which do not implement the digital multiplex data interface are not required to use the address interface.

5.2.1.6.1 Transfer requirement. The mission store shall energize the address interface at the MSI to monitor the digital multiplex data bus address assigned to the mission store by the connected aircraft.

5.2.1.6.2 Address assignment. The mission store shall monitor the five binary encoded address bit connections at the MSI for Logic 0 and Logic 1 states. The remote terminal address assigned to the MSI shall be defined as follows:

a. Remote terminal address = $(A_4)x2^4+(A_3)x2^3+(A_2)x2^2+(A_1)x2^1+(A_0)x2^0$

b. The mission store shall monitor the address parity connection at the MSI for Logic 0 and Logic 1 states. The mission store shall accept the assigned address as a valid remote terminal address if the address parity connection logic state indicates odd parity. Odd parity is defined as an odd number of Logic 1 states on the six-bit set composed of the five address bit connections plus the address parity connection. The mission store shall, as a minimum, determine its assigned address during the initialization sequence of 5.2.1.12.

5.2.1.6.3 Electrical characteristics. The characteristics defined below shall apply to the address bit and parity connections when referenced to the address return connection.

5.2.1.6.3.1 Address signal. The mission store shall provide excitation signals with the following characteristics:

a. Open circuit (Logic 1) voltage:

(1) Minimum voltage of 4.0V DC

(2) Maximum voltage of 31.5V DC

(3) Voltage spikes shall comply with MIL-E-6051

(4) Rise and fall times of applied voltage shall not exceed 10 milliseconds when measured with a resistive load.

b. Logic 0 current:

(1) Minimum current of 5.0 milliamperes DC

(2) Maximum current of 100 milliamperes through each address bit and parity connection

(3) Maximum current of 600 milliamperes through the address return connection

(4) Rise and fall times of applied current shall not exceed 10 milliseconds when measured with a resistive load.

5.2.1.6.3.2 Logic threshold. The mission store shall detect Logic 0 and Logic 1 states under the following conditions. The logic state detection conditions apply to all valid and invalid address assignment combinations.

a. Logic 1: Any current level of 300 microamperes or less out of any address bit or address parity connection when the excitation voltage of 5.2.1.6.3.1 is applied by the store shall be interpreted as a Logic 1 state.

b. Logic 0: Any voltage level of 1.50V or less between any address bit (or parity) connection and the address return connection when the excitation current of 5.2.1.6.3.1 is sourced by the store shall be interpreted as a Logic 0 state.

5.2.1.6.3.3 Response characteristics. The store shall allow 10 milliseconds minimum for logic state stabilization after application of the excitation signal.

5.2.1.7 Mission store structure ground. The mission store shall provide a connection in the primary signal set MSI and in the auxiliary power signal set MSI which is terminated to mission store structure and complies with the following requirements.

5.2.1.7.1 Structure ground characteristics. The mission store shall provide a conductive path from the MSI to mission store ground capable of carrying the overcurrent levels defined in Figures 7 and 8 for the primary MSI and auxiliary MSI, respectively. The mission store structure ground interface shall comply with the class H bonding requirements of MIL-B-5087. The structure ground interface shall not be used as a signal return or power return path.

5.2.1.8 Mission store 28V DC power interface. The mission store shall provide connections for the 28V DC power interface in the primary signal set MSI (primary MSI) and in the auxiliary power signal set MSI (auxiliary MSI). The primary MSI shall contain 28V DC power 1 and power 1 return connections and 28V DC power 2 and power 2 return connections. The auxiliary MSI shall contain a 28V DC power connection and a 28V DC power return connection. The mission store is not required to use any of the 28V DC power interfaces. However, if any 28V DC power interface is used, the mission store shall comply with the MSI requirements below. If any 28V DC power interface is not used, the impedance between the unused power connection and the associated return connection at the MSI shall be greater than 100 kilohms (at DC).

5.2.1.8.1 Transfer requirements. The mission store shall restrict its 28V DC power requirements (from the connected aircraft or carriage store) to characteristics as defined in 5.2.1.8.2 herein.

5.2.1.8.2 Electrical characteristics. The 28V DC power interfaces at the MSI shall comply with the following electrical characteristics.

5.2.1.8.2.1 Voltage level. The mission store shall be compatible with MSI voltages which comply with the 28V DC normal and abnormal characteristics and voltage transients for utilization equipment defined in MIL-STD-704 with the following additions. The mission store shall be compatible with applied voltages which are 0.0 to 2.0V DC less than the MIL-STD-704 characteristics defined for utilization equipment. The mission store shall comply with the voltage spike requirements of MIL-E-6051 at the MSI.

5.2.1.8.2.2 Load current. The mission store shall comply with the following load current requirements when the MSI voltage is within the range of 20.0V DC to 29.0V DC.

5.2.1.8.2.2.1 Primary signal set. Under fault free conditions, the mission store load applied at the primary MSI to each of the 28V DC power 1 and 28V DC power 2 connections shall not exceed the maximum load current level of Figure 7 (see 6.3.10).

5.2.1.8.2.2.2 Auxiliary power signal set. Under fault free conditions, the mission store load applied at the auxiliary MSI shall not exceed the maximum load current level of Figure 8 (see 6.3.7 and 6.3.10).

5.2.1.8.2.2.3 Simultaneous load. Under fault free conditions, mission stores with a class IA or IIA MSI shall limit the total simultaneous current on all 28V DC power interfaces in the primary and auxiliary MSI to the maximum load current level of Figure 8 (see 6.3.7).

5.2.1.8.2.3 Load isolation. The mission store shall provide a minimum isolation of 100 kilohms (at DC) between the primary MSI 28V DC power 1 connection, the primary MSI 28V DC power 2 connection and the auxiliary MSI 28V DC power connection. The mission store may provide continuity between the associated 28V DC power return connections.

5.2.1.8.2.4 Overcurrent compatibility. The mission store shall not become unsafe if fault currents up to the maximum overcurrent levels of Figures 7 and 8 are sourced into the primary and auxiliary MSIs, respectively (see 6.3.10).

5.2.1.8.2.5 Off-state leakage current. The mission store shall be compatible with off-state leakage currents supplied to the primary MSI up to 1.0 milliampere DC between each 28V DC power and its respective return. The mission store shall be compatible with off-state leakage currents supplied to the auxiliary MSI up to 2.50 milliamperes DC between auxiliary 28V DC power and the associated 28V DC power return.

5.2.1.8.2.6 Stabilization time. The mission store shall be compatible with MSI voltages which are below the levels of 5.2.1.8.2.1 herein for up to 6.0 milliseconds during power turn-on and turn-off (see Figure 9).

5.2.1.8.2.7 Power utilization. Mission stores shall utilize 28V DC power 2 or auxiliary 28V DC to power those safety critical functions for which insufficient interlocks exist in the store for assuring that the required level of store safety can be achieved once the associated power interface is activated. The store shall not arm or employ solely as a result of the activation of 28V DC power 2 or auxiliary 28V DC power. Mission stores may utilize 28V DC power 2 or auxiliary 28V DC for powering non-safety critical store functions with the understanding that the aircraft will not energize these power interfaces until the aircraft has determined that it is safe to do so. Mission stores shall utilize 28V DC power 1 only for powering those store functions which are not safety critical or which have sufficient safety interlocks such that store safety is not significantly degraded with the activation of 28V DC power 1. Mission stores shall withstand without functional damage, the activation of any 28V DC power interfaces prior to needed activation.

5.2.1.8.2.8 Ground reference. The 28V DC power return connections at the primary and auxiliary MSIs shall be the reference for each associated 28V DC power connection. The mission store shall be compatible with aircraft which connect the 28V DC returns to aircraft structure ground. The mission store shall also be compatible with aircraft which isolate the 28V DC returns from aircraft structure grounds.

5.2.1.8.2.9 Power interruption. Power interrupts of 200 microseconds or less shall have no effect on store function. Full function, including communication, shall be maintained during such interrupts and no power interrupt notification shall occur. For power interrupts greater than 200 microseconds, the store may request full or partial initialization (see 5.1.1.8.2.8.1 and 5.1.1.8.2.8.2).

5.2.1.9 Mission store 115V/200V AC power interface. The mission store shall provide connections for the 115V/200V AC power interface in the primary signal set MSI (primary MSI) and in the auxiliary power signal set MSI (auxiliary MSI). Both the primary MSI and auxiliary MSI shall contain 115V AC phase A, phase B, phase C and neutral connections. The mission store is not required to use any of the 115V AC phases. However, if any 115V AC phase is used, the mission store shall comply with the MSI requirements below. If any 115V AC phase is not used, the impedance between the unused phase connection and the associated neutral connection at the MSI shall be greater than 100 kilohms (at 400 Hz).

5.2.1.9.1 Transfer requirements. The mission store shall restrict its 115V/200V AC power requirements to characteristics as defined in 5.2.1.9.2 herein. The mission store shall not require the presence of AC power at the MSI during actual store separation from the aircraft or connector disconnect (see 6.3.12).

5.2.1.9.2 Electrical characteristics. The 115V/200V AC power interface at the MSI shall comply with the following electrical characteristics.

5.2.1.9.2.1 Voltage level. The mission store shall be compatible with MSI voltages which comply with the 115V AC normal and abnormal characteristics and voltage transients for utilization equipment defined in MIL-STD-704 with the following additions. The mission store shall be compatible with applied voltages which are 0.0 to 3.0V rms less than the MIL-STD-704 characteristics defined for utilization equipment. The mission store shall comply with the voltage spike requirements of MIL-E-6051 at the MSI.

5.2.1.9.2.2 Load current. The mission store shall comply with the following load current requirements when the MSI voltage is within the range of 105 and 118 volts rms.

5.2.1.9.2.2.1 Primary signal set. Under fault free conditions, the mission store load applied at the MSI to each 115V AC phase connection shall not exceed the maximum load current level of Figure 7. Mission stores designed for operation through carriage stores shall limit the phase load at the MSI to 90 percent of the maximum load current level of Figure 7 (see 6.3.7 and 6.3.10).

5.2.1.9.2.2.2 Auxiliary power signal set. Under fault free conditions, the mission store load applied at the MSI to each 115V AC phase connection shall not exceed the maximum load current level of Figure 8 (see 6.3.7 and 6.3.10).

5.2.1.9.2.2.3 Simultaneous load. Under fault free conditions, mission stores with a class IA or IIA MSI shall limit the total simultaneous per phase current on all 115V AC phase connections in the primary MSI and auxiliary MSI to the maximum load current level of Figure 8. Mission stores designed for operation through carriage stores, shall not exceed a 29 ampere continuous per phase load.

5.2.1.9.2.3 Load isolation. The mission store shall provide a minimum isolation of 100 kilohms (at 400 Hz) between the primary MSI 115V AC phase connections and the auxiliary MSI 115V AC phase connections. The mission store may provide continuity between the associated 115V AC neutral connections.

5.2.1.9.2.4 Overcurrent compatibility. The mission store shall not become unsafe if fault currents up to the maximum overcurrent levels of Figures 7 and 8 are sourced into the primary and auxiliary MSI, respectively (see 6.3.10).

5.2.1.9.2.5 Off-state leakage current. The mission store shall be compatible with off-state leakage currents applied to the primary MSI up to 2.0 milliamperes between each 115V AC power phase and the 115V AC neutral. The mission store shall be compatible with off-state leakage currents supplied to the auxiliary MSI up to 5.0 milliamperes between each auxiliary 115V AC power phase and the associated 115V AC neutral.

5.2.1.9.2.6 Stabilization time. The mission store shall be compatible with MSI voltages which are below the levels of 5.2.1.9.2.1 herein for up to 6.0 milliseconds during power turn-on and turn-off (see Figure 9).

5.2.1.9.2.7 Load power factor. The mission store load for each phase at the MSI shall have a power factor within the limits of Figure 10.

5.2.1.9.2.8 Phase unbalance. The mission store load at the MSI shall comply with the AC phase power utilization requirements of MIL-STD-704.

5.2.1.9.2.9 Power utilization. Mission stores shall utilize 115/200V AC power (primary and auxiliary) only for powering those store functions which are not safety critical or which have sufficient safety interlocks such that store safety is not significantly degraded with the activation of 115/200V AC. The mission store shall withstand without damage, the activation or loss of any 115V AC power phase at any time.

5.2.1.9.2.10 Ground reference. The 115V AC neutral connections in the primary and auxiliary MSIs shall be the reference for each associated 115V AC phase connection. The mission store may connect any or all of the 115V AC neutrals routed through the MSI to mission store structure. The mission store shall be compatible with aircraft which connect (or isolate) the 115V AC neutrals to (or from) aircraft structure grounds.

5.2.1.9.2.11 Power interruption. Power interrupts of 200 microseconds or less shall have no effect on store function. Full function, including communication, shall be maintained during such interrupts and no power interrupt notification shall occur. For power interrupts greater than 200 microseconds, the store may request full or partial initialization (see 5.1.1.9.2.11.1 and 5.1.1.9.2.11.2).

5.2.1.10 Mission store 270V DC power interface. The 270V DC power interface is a growth provision for future application of 270V DC. The 270V DC power interfaces shall not be utilized at the MSI until characteristics and performance details are added to this standard. All class I interface connectors at all MSIs shall include contacts (or plugged cavities) for 270V DC power and 270V DC power return. The general 270V DC electrical characteristics include voltage levels as defined in MIL-STD-704 for 270V DC and continuous current levels of 10 amperes for the primary MSI and 30 amperes for the auxiliary MSI (see 5.2.2).

5.2.1.11 Mission store fiber optic interface. The two fiber optic interfaces are growth provisions for future applications. The fiber optic interfaces shall not be utilized at an MSI until characteristics and performance details are added to this standard. All Class I primary signal set interface connectors at all MSIs shall include two 16 AWG size contact provisions (plugged cavities) for fiber optic channel 1 and fiber optic channel 2 (see 5.2.2).

5.2.1.12 Store initialization. Stores shall comply with the following initialization requirements in the sequence presented.

5.2.1.12.1 Pre-initialization conditions. The following pre-initialization conditions shall be provided to the store at the MSI (see 5.1.1.12.1):

a. All power interfaces deactivated.

b. Release consent interface in the inhibit state.

c. Address interface stabilized.

NOTE: Digital multiplex data interface, interlock interface, high bandwidth interfaces, and low bandwidth interface may be active.

5.2.1.12.2 Power application. The store shall be compatible with simultaneous (within 100 milliseconds) application of primary 28V DC power 1 and primary 115/200V AC power to the MSI in a non-predetermined sequence. The store shall not require the application of any other interface power for completing the initialization requirements specified herein.

5.2.1.12.3 Address determination. Within 150 milliseconds of interface power application (AC, DC or both, as required by the store), the store shall interrogate the address discretes (5.2.1.6.2) and accept the assigned address as the store's digital multiplex data interface address.

5.2.1.12.4 First response. Within 150 milliseconds of interface power application (AC, DC or both, as required by the store), the store shall be capable of responding to valid commands received over the digital multiplex data interface. The required store response shall be either:

a. A Valid status word indicating a busy condition, or

b. A valid status word indicting a non-busy condition plus the appropriate data words. If a store receives any commands before the 150 ms has transpired, the store shall either respond as defined above, or shall not respond at all.

5.2.1.12.5 First required non-busy response. Within 500 ms of interface power application (AC, DC or both, as required by the store), the store shall be capable of responding to a valid store description message transmit command. This response shall be a valid status word indicating a non-busy condition plus the appropriate data words as defined in Appendix B.

5.2.2 MSI connector characteristics

5.2.2.1 Primary signal set connector. The primary signal set connector and insert arrangement shall be in accordance with table III. The contact assignments shall be in accordance with table IV.

5.2.2.2 Auxiliary power signal set connector. The auxiliary power signal set connector and insert arrangement shall be in accordance with table V. The contact assignments shall be in accordance with table VI.

5.2.2.3 Connector receptacle. The mission store connector shall be a receptacle with socket contacts or with plugged cavities for those interface signals not used by the mission store. The major keyway shall be located forward on a connector mounted on the store top surface and shall be located up on any aft vertical surface.

5.2.2.4 Connector location and orientation. The MSI connector location and orientation shall conform to MIL-A-8591 for ejection launched mission stores.

5.2.3 Electromagnetic interference (EMI). When required by the system specification to be tested in accordance with MIL-STD-462 to determine compliance with the applicable requirements of MIL-STD-461 and MIL-HDBK-235, mission stores shall be tested using the cables defined in Appendix A herein (see 6.3.13).

6. NOTES

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

6.1 Intended use. This standard is intended to be used for airborne, military applications and applies to all aircraft and stores that electrically interface with each other.

6.1.1 Implementation and application of the standard are the responsibility of each military service, with technical guidance and direction provided by appropriate service program offices. For additional information in regard to aircraft and store implementation policies and plans, personnel using this standard are referred to each military services's MIL-STD-1760 Implementation Plan (Army: Commander, AVSCOM/AMSAV-ES, 4300 Goodfellow Blvd, St Louis MO 63120; Navy: Commander, NAVAIR Code AIR-511, Washington DC 20361; and Air Force: ASD-AFALC/AX, W-PAFB OH 45433).

6.2 International standardization agreements. Certain provisions of this standard are subject to international standardization agreements: NATO STANAG and ASCC Air Standard. When change notice, revision or cancellation of this standard is proposed that will modify the international agreement concerned, the preparing activity will take appropriate action through international standardization channels, including departmental standardization offices, to change the agreement or make other appropriate accommodations. It is intended that MIL-STD-1760 will be compatible with the following documents:

a. STANAG 3350AVS, Monochrome Video Standard for Aircraft System Applications;

b. STANAG 3837AA, Standard Aircraft/Store Electrical Interface; and

c. STANAG 3838AVS, Digital Time Division Command/Response Data Bus.

6.3 Guidance

6.3.1 Tailoring guidance. The major tailoring task required when implementing this standard, will be to specify a high bandwidth signal network with the capacity to meet the needs of the specific aircraft. This tailoring is necessary because each aircraft will have a different network capacity need based on its mission(s) and the stores it is approved to carry.

6.3.2 Video signals. The NATO STANAG 3350 Monochrome Video Standard for Aircraft System Applications has been proposed for NATO video applications. This STANAG is currently undergoing revision and is expected to be ratified in the near term. Since it is not presently ratified by the U.S., the video signal requirements in Section 5 herein, allow the use of video signals similar to EIA RS-170 and EIA RS-343. The revised and ratified STANAG is expected to include a class C video which is very similar to the RS-170 video characteristics. As a result, the intent is that upon ratification of STANAG 3350, the EIA video reference in section 5 will be removed, and STANAG 3350 class C added.

6.3.3 HB network capability. The network transfer capacity requirement imposed on the aircraft in 5.1.1.1.1 establishes the minimum required capacity. It is expected that for any aircraft to meet its mission requirements, a higher level of HB network capacity than required by this standard may be needed. The actual network capacity required (that is, the number of simultaneous HB signals flowing through the aircraft stores management system) will tend to vary with each aircraft and with each store loadout on a given aircraft. As a goal, the aircraft should support the following minimum HB network capacity:

a. Simultaneous transfer through the 50 ohm network of one Type B signal (on HB1) and two Type A signals (on HB1 and HB2) between ASIs and internal aircraft equipment plus one Type A signal (on HB1 and HB2) between any two ASIs.

b. Simultaneous transfer through the 75 ohm network of two Type A signals between ASIs and internal aircraft equipments plus one Type A signal between any two ASIs.

6.3.3.1 Figure 13a illustrates this minimum aircraft capacity as a collection of HB channels which is transparent to the various technologies which could be used to implement the aircraft network. Figure 13b illustrates the same network capacity when implemented with a centralized "crosspoint" style switching matrix. It is not intended that Figure 13b be interpreted as a required (or acceptable) design for the network, but simply as an illustration of the recommended network capacity.

6.3.4 ASI test conditions for Mux A and Mux B. The following termination conditions are recommended for evaluating compliance with the output characteristics (5.1.1.2.2.1) and input characteristics (5.1.1.2.2.2) requirements for the Mux A and Mux B ASI interfaces:

a. All ASIs terminated with a 1000 ohm $\pm$5 percent resistive load at the end of the 20-foot long MIL-STD-1553 compliant cable,

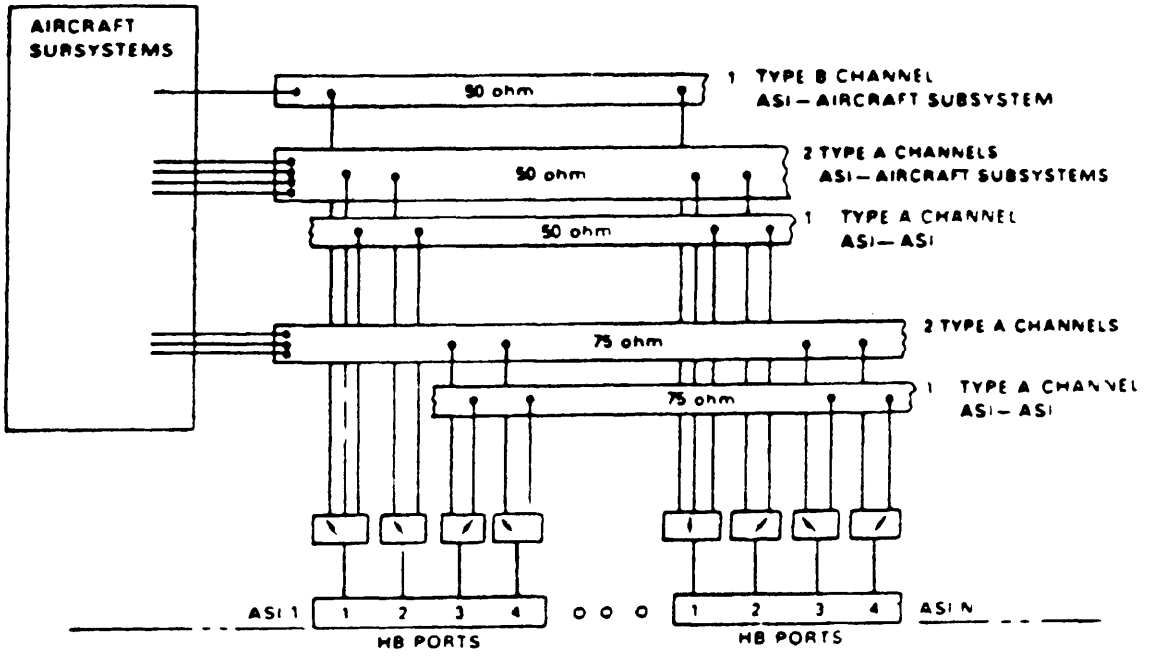


Figure 13a. Recommended channel capacity.

Figure 13. Suggested aircraft high bandwidth network capacity.

1. The aircraft shall provide a capacity of two multiplexers

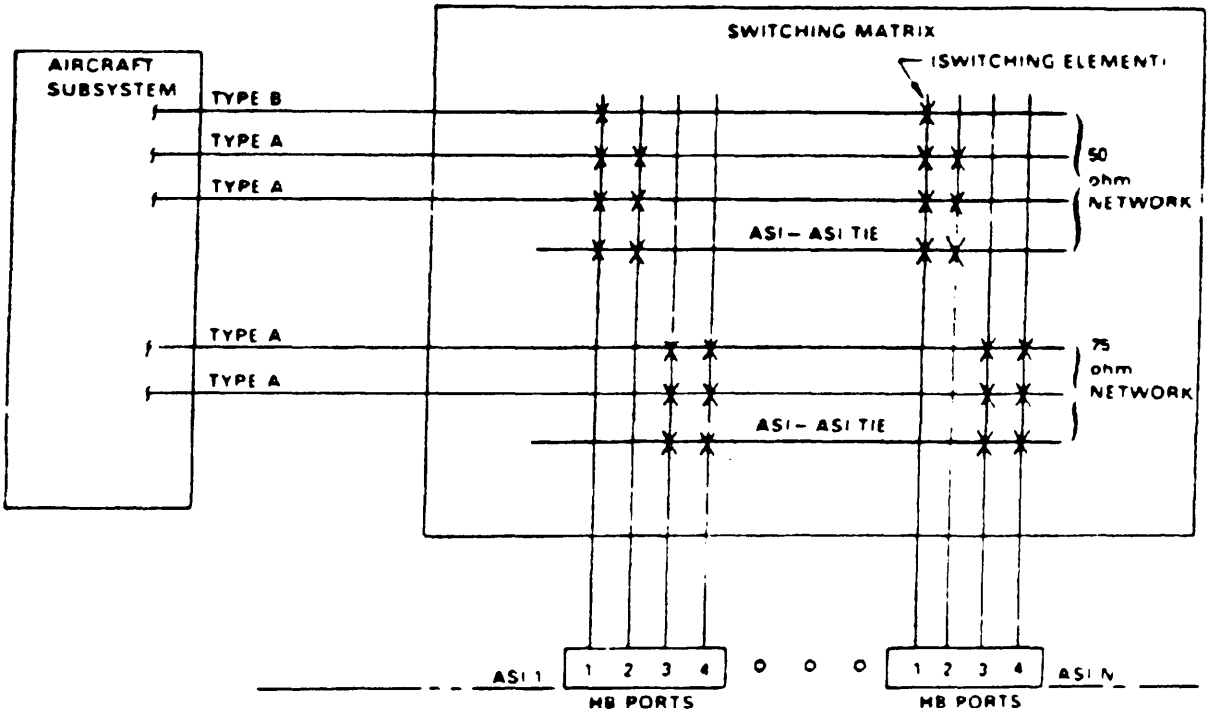


Figure 13b. Centralized switching matrix example.

Figure 13. Suggested aircraft high bandwidth network capacity. (Continued)

b. All ASIs (except ASI under test) disconnected (that is Mux A and Mux B open circuited), and

c. All ASIs in the terminated conditions expected (such as opened or shorted) during aircraft operation, including stores release.

6.3.5 Mission store use of HB interfaces. It is highly recommended that mission stores which require HB services limit their HB interface requirements to HB1 and HB3. This suggestion is presented because some aircraft will implement Class II or Class IIA interfaces at some ASIs, and Class II and Class IIA interfaces do not contain HB2 and HB4 connections. Therefore, a mission store which requires HB2 or HB4 interfaces will not be able to operate from Class II or Class IIA ASIs.

6.3.6 Use of interlock and address for mated status. Figure 14 presents an example of one possible mated status monitor implementation for both aircraft and mission stores. Mission store designers who choose to monitor the electrical interface for mated status (with the aircraft) should include logic in the store that indicates a valid mated condition whenever continuity is seen on any of the address discretes. All valid addresses sent to the store will always have continuity between at least one of the address bit or parity connections and the address return connection. As with the interlock interface, the address interface could indicate a non-mated condition if a line breaks or a faulty connection exists in the interface. As a result, the store and aircraft must not rely solely on these mating status signals for activating any safety critical functions, that is, the store and aircraft must fail safe with respect to the mating indication.

6.3.7 Mission store power utilization. Mission stores should be designed to (a) minimize the power required from the aircraft, and (b) avoid requiring the use of the auxiliary power signal set. This latter recommendation is made because the auxiliary power signal set is an option for both Class I and Class II ASIs. As a result, it is expected that the auxiliary power will only be available at a limited number of ASIs. For maximum installation flexibility, therefore, the mission store designer should attempt to stay within the power rating available through the primary signal set.

6.3.8 Carriage store interfaces. Detail interface requirements for the CSI and CSSI are not included in MIL-STD-1760B. However, the detail requirements for the ASI and MSI contained herein include signal loss allocations for the carriage store (and any associate umbilical cables). Any carriage store which is required to carry a MIL-STD-1760 compliant mission store on a MIL-STD-1760 compliant aircraft station would be designed such that the CSI is compatible with ASI characteristics and the CSSI is compatible with MSI characteristics.

6.3.9 LB interface utilization. The LB interface is provided to transfer low frequency, low power level signals which for various reasons are inappropriate for transfer over the Mux A or Mux B interface. Tones and voice grade audio currently represent the only allowed signals on the LB interface. The LB interface characteristics have, however, been defined to accommodate the potential future application of the LB interface for transferring low speed serial digital data using balanced line differential receivers and drivers such as those defined by EIA Standard RS-485.

detection threshold. An interface disconnected condition shall be

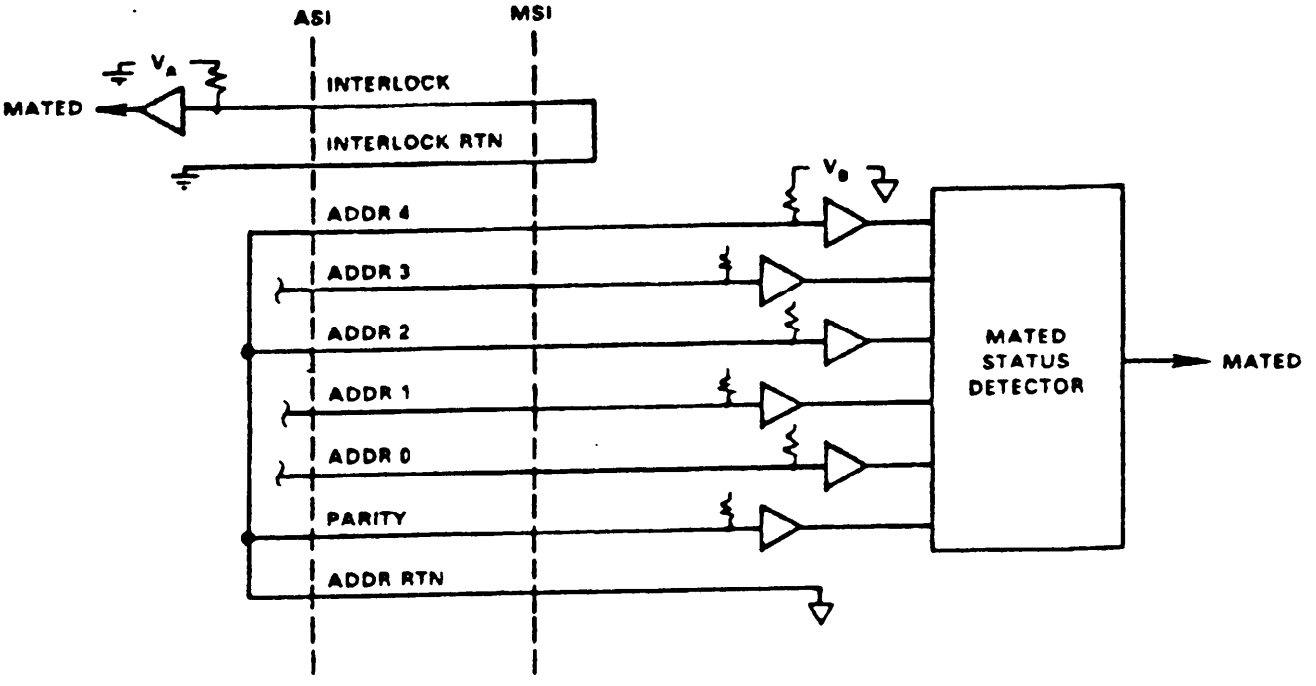


Figure 14. Mated status monitor example.

6.3.10 28V DC and 115V/200V AC power interface current limits. The maximum overcurrent and maximum load current curves of Figures 7 and 8 were derived from the trip and no-trip calibration data for MIL-STD-1498 circuit protection devices. These curves represent a locus of time-current points (such as a 23 ampere current for one second duration, or a 13 ampere current for ten seconds duration). The curves are not intended to be a continuous profile of current versus time.

6.3.10.1 Store electrical load. Under fault free conditions, a store must limit its applied load (as measured at the MSI) such that the maximum load current locus is not exceeded. A conservative indication of this compliance would occur if the maximum true RMS of the load current profile averaged over all time intervals does not exceed the current associated with the same time intervals as defined by the maximum load current locus. Under conditions of internal store power interface faults, the store must be capable of safely withstanding (operational impairment expected) overcurrents for the duration defined by the maximum overcurrent locus of Figures 7 or 8, as applicable.

6.3.10.2 Aircraft electrical capability. The aircraft must be capable of sourcing through an ASI any current for the duration defined by the locus of points designated by the maximum load current curve in Figures 7 or 8, as applicable. The aircraft may remove power from an ASI (by tripping a circuit breaker, for example) whenever the ASI load current exceeds any point defined by the maximum load current locus. The aircraft must remove power from any ASI before the current exceeds the maximum overcurrent locus in Figure 7 or 8, as applicable. The maximum load current curve and maximum overcurrent curve, therefore, define the area of a current time band within which an aircraft's circuit protection devices must trip.

6.3.11 Cable selection for HB interfaces. The use of concentric triaxial cable in aircraft and stores for implementing the HB interfaces is highly recommended. Recent aircraft implementations have shown improved signal quality when triaxial cable is used instead of coaxial cable. These improvements are due to the protection afforded by the triaxial cable from both magnetic field and electric field interference to which low frequency signals are particularly susceptible. The interface definition in this standard allows use of triaxial cable even though only coaxial style contacts are contained within the interface connector. This apparent connector limitation can be overcome by electrically terminating the outer shield of the triaxial cable to the conductive backshells of the interface connectors. This termination can be made by means of a multishield terminating device such as an inverted-cone contact ring or tag ring (or other techniques). The inner shield of the triaxial cable is used for signal return for the high bandwidth signal.

6.3.12 Power deadfacing. The aircraft should ensure that unmated ASI connectors are not powered. As a minimum, the aircraft should ensure that no power is applied to a store until store presence is assured. As soon as is practical, power deadfacing should be carried out on receipt of store-gone signals.

6.3.13 HB radiated emissions. Table I defines the maximum allowed signal power levels for HB signals as part of the HB general signal characteristics. Specific HB signals currently defined for the HB interfaces have power levels significantly lower than these maximum ratings. The maximum allowed signal power levels in this standard are relatively high when electromagnetic interference radiated emissions are considered. Aircraft, stores and the associated umbilicals may require additional cable shielding to maintain radiated emissions within required limits when signals near these maximum allowed power levels are used.

*6.4 Keyword listing

aircraft
aircraft station
audio signals
avionics
bus controller
data word
discrete signals
electrical connector
electrical interface
electrical power
high bandwidth signals
low bandwidth signals
remote terminal
serial time division multiplex data bus
store
stores management system
suspension and release equipment
video signals

6.5 Changes from previous issue. The margins of this standard are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
Air Force - 11
Navy - AS

Review activities:
Air Force - 15, 18
Navy - EC, SH, OS, MC, TD

Preparing activity:
Air Force - 11

Project No. GDRQ-XXXX

CABLES FOR ELECTROMAGNETIC INTERFERENCE (EMI) TESTING OF MISSION STORES

A.10 SCOPE

A.10.1 Scope. This appendix covers the requirements for the test cables to be used for EMI testing of mission stores.

A.10.2 Purpose. This appendix shall be contractual implemented when mission stores are tested in accordance with MIL-STD-462.

A.20 APPLICABLE DOCUMENTS

A.20.1 Government documents

A.20.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document 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-C-17/94	Cables, Radio Frequency, Flexible Coaxial, 75 OHMS
MIL-C-17/113	Cable, Radio Frequency, Flexible Coaxial, 50 OHMS
MIL-C-17/176	Cables, Radio Frequency, Flexible, Twinaxial
MIL-W-22759/16	Wire, Electric, Fluoropolymer Insulated, Extruded Estfe, Medium Weight, Tin Coated Copper Conductor, 600-Volt, +150 Degrees Celsius

STANDARDS

Military

MIL-STD-462	Electromagnetic Interference Characteristics, Measurement of

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks shall be available from the Naval Publications and Forms Center, ATTN: NPODS, 5801 Tabor Avenue, Philadelphia PA 19120-5099.)

A.20.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations, unless a specific exemption has been obtained.

A.30 DEFINITIONS

Not applicable.

A.40 REQUIREMENTS

A.40.1 Mission store testing. If tested in accordance with the requirements of MIL-STD-462, mission stores shall use cables which comply with the requirements of Table A-I. These test cables shall be used to interconnect the MSI to the simulated (or actual) aircraft loads and sources. For MIL-STD-462 RS03 tests, the mission store shall be tested at 200 volts/meter with shielded test cables 1 and 1A (see Table A-I) and at 20 volts/meter with unshielded test cables 2 and 2A (see Table A-I). Test cables 2 and 2A shall be used for all other MIL-STD-462 EMI tests.

TABLE A-I. EMI test cable requirements.

SIGNAL NAME	CABLE REQUIREMENTS		
	WIRE SPECIFICATION SHEET AND SIZE	WIRE TWISTS/METER	TEST CABLE 1/
Primary signal set			1 of 2
HB 1 & 2	MIL-C-17/113 (RG316)	-	
HB 3 & 4	MIL-C-17/94 (RG179)	-	
Mux A, Mux B, LB	MIL-C-17/176	-	
Fiber optic channel 1 & 2	(No line required)	-	
Release consent	MIL-W-22759/16-20	-	
Interlock and interlock return	MIL-W-22759/16-20	Pair: 15±3	
Address bit A4 Address bit A3 Address bit A2 Address bit A1 Address bit A0 Address parity Address return	MIL-W-22759/16-20	Set: 15±3	
Structure ground	MIL-W-22759/16-16	-	
28V DC power 1 and 28V DC power 1 return	MIL-W-22759/16-16	Pair: 15±3	
28V DC power 2 and 28V DC power 2 return	MIL-W-22759/16-16	Pair: 15±3	

TABLE A-I. EMI test cable requirements. (Continued)

SIGNAL NAME	CABLE REQUIREMENTS		
	WIRE SPECIFICATION SHEET AND SIZE	WIRE TWISTS/METER	TEST CABLE 1/
115V AC phase A, B, C and neutral	MIL-W-22759/16-16	Quad: 15±3	
270V DC power and 270V DC power return	(No line required)		
Auxiliary power signal set			1A and 2A
Interlock and interlock return	MIL-W-22759/16-20	Pair: 15 ±3	
28V DC power and 28V DC power return	MIL-W-22759/16-10	Pair: 15 ±3	
115V AC phase A, B, C and neutral	MIL-W-22759/16-10	Quad: 15 ±3	
270V DC power and 270V DC power return	(No line required)		
Structure ground	MIL-W-22759/16-10		

1/ The test cables shall comply with the following requirements:

1 and 1A: The cable assembly shall be enclosed by a braided wire shield with 80 to 95 percent optical coverage. The shield shall have a 360 degree connection to the connector assembly at each end of the cable. The cable length, measured between the front faces of the two connectors, shall be two meters, plus or minus two percent. The "aircraft end" cable connector shall be a D38999/26WJ20PN plug for test cable 1 and a D38999/26WJ11PA plug for test cable 1A.

2 and 2A: The cable assembly shall provide no gross shielding other than that provided by the connector assembly. The cable length measured between the front faces of the two connectors shall be two meters, plus or minus two percent. The "aircraft end" cable connector shall be a D38999/26WJ20PN plug for test cable 2 and a D38999/26WJ11PA plug for test cable 2A.

DIGITAL MULTIPLEX COMMUNICATION RULES AND MESSAGE REQUIREMENTS

B.10 SCOPE

B.10.1 Purpose. This appendix shall be used to establish requirements on aircraft and stores for message formatting, data encoding, information transfer rules, timing and other characteristics required for using the Digital Multiplex Data Interface of the AEIS.

B.20 APPLICABLE DOCUMENTS

B.20.1 Government documents

B.20.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document 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.

STANDARDS

Military

MIL-STD-1553	Aircraft Internal Time Division Command/Response Multiplex Data Bus

HANDBOOKS

Military

MIL-HDBK-1553	Multiplex Application Handbook

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks shall be available from the Naval Publications and Forms Center, ATTN: NPODS, 5801 Tabor Avenue, Philadelphia PA 19120-5099.)

B.20.1.2. Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solication.

DEFENSE MAPPING AGENCY

WGS-84	Department of Defense World Geodetic System 1984

(Application for copies should be addressed to the Public Affairs Officer, Defense Mapping Agency Hydrographic/Topographic Center, Washington DC 20315-0030.)

AMAC Standard

Aircraft Monitor and Control (AMAC) Project Officers Group (POG) Standard No. SYS 2001-01 System 2.

(Application for copies should be addressed to WL/NTSAC, AMAC/POG, Kirtland AFB NM 87117.)

B.20.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issues of the documents cited in the solicitation.

B.20.2.1 AMERICAN NATIONAL STANDARDS INSTITUTE

ANSI X3.4 Code for Information Interchange

(Application for copies should be addressed to the American National Standards Institute, Inc, 1430 Broadway, New York NY 10018.)

B.20.2.2 INTERNATIONAL STANDARDS ORGANIZATION

ISO 3166 Codes for the Representation of Names of Countries

(Application for copies should be addressed to the International Organization for Standardization, 1, rue de Varembe, Geneve, Switzerland.)

B.20.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations, unless a specific exemption has been obtained.

B.30 DEFINITIONS

B.30.1 Definitions. Definitions applicable to this standard shall be as specified below.

B.30.1.1 Data entity. A data word which is encoded to represent specific information and which uses a defined data word format.

B.30.1.2 Data set. A group of data entities that are useful when taken together and are contained in a single message or group of messages.

B.30.1.3 Data validity. The condition in which the information encoded in the designated data word is sufficiently accurate for the application intended.

B.30.1.4 Mass data transfer. Mass data transfer refers to the transfer of data sets between aircraft and stores (or between stores) where the data set consists of more data words than can be transferred with only a few messages. Each data set is defined as a file. The protocol handles up to 255 files. Mass data transfer is implemented through the use of Transfer Control, Transfer Monitor and Transfer Data messages.

B.30.1.4.1 Back-back transfer. Back-back transfer is defined as a mass data transfer operation in which data blocks (for either the same record or for different records or files) are moved between aircraft and store through separate Transmit Data messages (with different subaddresses) with minimum intermessage gap. Back-back transfer is typically used to reduce the time required for transferring large files. MIL-STD-1760B

B.30.1.4.2 Block. A block is a record subset which can be transferred with one message transaction (BC-RT, RT-BC, or RT-RT). A block contains 29 sixteen bit words of file data. Blocks which do not contain file data in all 29 words are zero filled to complete the 29 word field. The 29 word field may include error detection word(s) in addition to file data.

B.30.1.4.3 Download. Download is defined as the process of transferring files into a store.

B.30.1.4.4 File. A file is a set of data related to specific information such as an operational flight program, a test or maintenance program, mission data, bit patterns for memory test, etc. A file contains one to 255 data records.

B.30.1.4.5 Record. A record is a data subset containing one to 255 data blocks which when combined with other records forms a file.

B.30.1.4.6 Upload. Upload is defined as the process of transferring files out of the store.

*B.30.2 Acronyms and abbreviations. Acronyms and abbreviations applicable to this standard shall be as specified below.

AEIS	Aircraft/Store Electrical Interconnection System
BC	Bus Controller
RT	Remote Terminal

B.40 REQUIREMENTS

B.40.1 Communication Rules. The digital multiplex data interface shall comply with the Test and Operating Requirements, Data Bus Operation, Characteristics, and Terminal Operation requirements of MIL-STD-1553 with the additional requirements defined herein. The aircraft shall be responsible for the bus controller function for the interface. The mission store shall provide the remote terminal function as defined in MIL-STD- 1553. The mission store shall be capable of operating in Bus Controller (BC)-to-Remote Terminal (RT), RT-BC and RT-RT message transfer modes.

B.40.1.1 Command word. Command words shall be as defined by MIL-STD-1553. All command words shall be generated by an AEIS bus controller. Operation and application of command word fields shall be as specified herein.

B.40.1.1.1 Remote terminal address field. The remote terminal address field shall be used to address the required store.

B.40.1.1.2 Subaddress/mode field. The subaddress/mode field shall be used for message identification and as a mode code indicator as defined in table B-I.

B.40.1.1.3 Mode commands. Aircraft and stores shall implement mode commands as defined herein. Aircraft and stores shall utilize a subaddress of 11111 (binary) as a mode code indicator. Stores shall also utilize subaddress 00000 (binary) as a mode code indicator.

B.40.1.1.3.1 Mandatory mode commands. Stores shall implement the mode commands as specified in B.40.1.1.3.1.1 through B.40.1.1.3.1.7. Aircraft shall, as a minimum, implement the mode commands specified in B.40.1.1.3.1.5 and B.40.1.1.3.1.6. If the aircraft uses the other mode commands defined in B.40.1.1.3.1.1 through B.40.1.1.3.1.7, the implementation shall comply with these specified requirements.

* B.40.1.1.3.1.1 Transmit status word. Stores shall implement and respond to valid transmit status word mode codes as required by MIL-STD-1553.

B.40.1.1.3.1.2 Transmitter shutdown. Stores shall implement and respond to valid transmitter shutdown mode codes as required by MIL-STD-1553. The shutdown transmitter shall not generate any bus activity until the mode code is overridden by either an override transmitter shutdown mode code or a reset remote terminal mode code received on the non-shutdown bus.

B.40.1.1.3.1.3 Override transmitter shutdown. Stores shall implement and respond to valid override transmitter shutdown mode codes as required in MIL-STD-1553 and B.40.1.1.3.1.2.

B.40.1.1.3.1.4 Reset remote terminal. Stores shall implement and respond to valid reset remote terminal mode codes as required by MIL-STD-1553. Receipt of this mode code shall re-enable all shutdown transmitters. The remote terminal is the only element that shall be reset; the subsystem shall be unaffected.

B.40.1.1.3.1.5 Transmit vector word. Stores shall implement and respond to valid transmit vector word mode codes as required by MIL-STD-1553. The associated data word formats shall be as specified by tables B-II and B-III. The aircraft shall issue transmit vector word mode codes during the request servicing process defined in B.40.1.5.5.

B.40.1.1.3.1.6 Synchronize with data word. Stores shall implement and respond to valid synchronize with data word mode codes as required by MIL-STD-1553. The synchronize data word formats shall be as defined in tables B-IV, B-V and B-VI.

B.40.1.1.3.1.7 Transmit last command. Stores shall implement and respond to valid transmit last command mode codes as required by MIL-STD-1553.

B.40.1.1.3.2 Prohibited mode commands. Aircraft shall not transmit the dynamic bus control mode command, nor any of the reserved mode codes designated in MIL-STD-1553, nor any mode code not defined in MIL-STD-1553. If a store receives a prohibited mode command, the store shall not alter the state of the store subsystem.

B.40.1.1.3.3 Permitted mode commands. Stores may implement mode commands not defined as mandatory or prohibited. Stores implementing the inhibit terminal flag bit mode command shall implement the override inhibit terminal flag bit mode command. No store or aircraft shall require for operation that an aircraft or store implement a permitted mode command.

B.40.1.2 Status word. The status word shall be as defined by MIL-STD-1553. The status word bits at bit times 10, 12, 13, 14 and 18 shall be set to a logic zero. The message error and broadcast command received bits shall be used as defined in MIL-STD-1553. The service request, busy, subsystem flag and terminal flag bits shall be used as defined herein.

B.40.1.2.1 Service request bit. The status word bit at bit time 11 shall be utilized only for request notification as specified in B.40.1.5.4.

*B.40.1.2.2 Busy bit. The status word bit at bit time 16 shall be set to Logic 1 only to notify that the RT is unable to move data to or from the store subsystem in compliance with a command. The busy bit shall only be set temporarily to a Logic 1 and shall comply with B.40.1.5.3. The busy bit shall be the only indication that a message has thus been discarded and no additional notification shall be implemented.

*B.40.1.2.3 Subsystem flag bit. The status word bit at bit time 17 shall be used to indicate the presence of fault condition(s) within the store or store-to-terminal interface which destroys the credibility of data words at the multiplex interface. The bus controller shall interpret the subsystem flag bit as a total loss of store function. A logic zero shall indicate the absence of such an aforementioned store fault.

B.40.1.2.4 Terminal flag bit. The status word bit at bit time 19 shall be set to Logic 1 only to indicate a detected fault in the RT hardware. Stores not implementing the inhibit terminal flag bit mode command as specified in B.40.1.1.3.3 shall set the terminal flag bit only if the fault is in that portion of the redundant RT to which the preceding command was sent. Stores detecting an interface address discrete error shall not interpret that error as a RT hardware fault.

B.40.1.3 Data words. Data words shall comply with MIL-STD-1553 and shall be sequenced and formatted as specified in B.40.2.

B.40.1.4 Internal state change. Stores shall not change the store subsystem state as a direct result of receiving a transmit command nor as a direct result of receiving a receive command. (Store state changes shall occur when the contents of a receive message command a state change not because a receive message was only detected.)

B.40.1.5 Protocol execution

B.40.1.5.1 Protocol checks. Protocol checks shall include the following:

a. Verification of checksum, if implemented.

b. Verification of message header.

c. Verification of critical authority and critical control.

B.40.1.5.1.1 Detected errors in protocol checks shall be reported in accordance with B.40.2.2.2.

B.40.1.5.2 Checksum requirement. The use of checksums for the standard data messages specified in B.40.2.2.1, B.40.2.2.2, and B.40.2.2.3 are mandatory. The use of checksums for all other messages is optional and determined by the store. When utilized, the checksum shall occupy the last word position of both receive and transmit messages and shall be formatted as specified in B.40.1.5.2.1. When not utilized, the last word position shall be a data entity.

B.40.1.5.2.1 Checksum algorithm. All checksummed messages shall satisfy the algorithm specified herein. When each data word (including the checksum word) of a message is rotated right cyclically by a number of bits equal to the number of preceding data words in the message, and all the resultant rotated data words are summed using modulo 2 arithmetic to each bit (no carries), the sum shall be zero. The following are examples of messages satisfying the checksum algorithm.

EXAMPLE (a): FOUR WORD MESSAGE

1st	Word	0000-0000-0000-0001 (0001 hex.)	data
2nd	Word	1100-0000-0000-0000 (C000 hex.)	data
3rd	Word	0000-1111-0000-0000 (0F00 hex.)	data
4th	Word	0001-1110-0000-1011 (1E0B hex.)	checksum word

EXAMPLE (b): SIX WORD MESSAGE

1st	Word	0001-0010-0011-0100 (1234 hex.)	data
2nd	Word	0101-0110-0111-1000 (5678 hex.)	data
3rd	Word	1001-1010-1011-1100 (9ABC hex.)	data
4th	Word	1101-1110-1111-0000 (DEF0 hex.)	data
5th	Word	0000-0000-0000-0000 (0000 hex.)	data
6th	Word	1000-1111-0010-0000 (8F20 hex.)	checksum word

*B.40.1.5.3 Execution time. If a store is to reject further messages while executing protocol checks on a previous received message, the store shall set the busy bit in the status word. The busy bit may only be set for the time specified in B.40.1.5.3.2 and only if the following criteria are met.

a. Acceptance of a valid initiate RT self test or reset RT mode command as specified in MIL-STD-1553.

b. Acceptance of a valid receive command (including synchronize with data word mode command).

c. During the initialization sequence of 5.2.1.12, or as a consequence of store fault or failure resulting in the inability of the RT to move data to or from the subsystem.

*B.40.1.5.3.1 The aircraft shall be compatible with this execution time and busy bit application for store operation.

B.40.1.5.3.2 Busy time. Busy time is the duration for which the busy bit is set to Logic 1. The maximum busy time following the receipt of a valid initiate RT self test mode command or valid reset RT mode command shall comply with MIL-STD-1553. The maximum busy time following power application (AC, DC or both, as required by the store) shall not exceed 500 milliseconds. The maximum busy time for all other allowed busy conditions, shall not exceed 50 microseconds.

B.40.1.5.3.3 Busy time measurement. Busy time shall be the time measured from the zero crossing of the parity bit of the last word of the previous message to the zero crossing of the first command word sync which is accepted and whose status response has the busy bit set to Logic 0.

*B.40.1.5.4 Service request notification. Service request notification if implemented by stores, shall be accomplished by setting the service request bit in the status word to a Logic 1. Stores shall ensure that once the service request bit is set to Logic 1, the vector word as defined in B.40.1.1.3.1.5 is immediately available. The service request bit shall be reset to Logic 0 when, and only when, the store receives the transmit vector word mode command for the active service request.

B.40.1.5.4.1 Additional request for service. All requests for servicing shall be covered by the one service request notification. The vector word shall contain all the data concerning the request(s) for servicing indicated by the setting of status word bit time 11. However, if further request for servicing occurs after status word bit time 11 has been set, then that additional request for servicing shall be treated as a new arising and shall not be actioned by the store until the current service request has been completely dealt with. Stores shall not use multiple settings of status word bit time 11 to avoid packing of more than one service request into the vector word demand.

B.40.1.5.5 Request servicing. The aircraft shall interpret the receipt of a store status word with service request bit set to Logic 1 as a request for a transmit vector word mode command. The aircraft shall extract information from the store on the service request details by sending a transmit vector word command to the store. Acknowledgment of receipt of a valid vector word shall not be a requirement on the aircraft.

*B.40.1.5.6 Vector word demand. The store shall maintain the current contents of the vector word until a subsequent and different valid command has been received after receiving a transmit vector word mode command. When specified in the system specification or Interface Control Document (ICD), the store shall also maintain the current contents of any subaddress notified in the vector word until the requested data transaction has occurred and a subsequent and different valid command has been received.

B.40.1.5.7 General form of service request routine. The general form of a complete service request routine is shown in Figure B-1.

B.40.1.5.8 Mass data transfer. Applications which require transfer of large data files through the AEIS interface shall use the applicable options of the mass data transfer procedure and messages defined in B.40.2.3.

B.40.1.5.9 Carriage store routing. A procedure for the transfer of data through a carriage store (routing) has not been defined in this issue of the standard.

*B.40.1.5.10 Data consistency. The aircraft and store shall ensure that messages transmitted over the bus contain only mutually consistent samples of information. Different words in a message used to transmit multiple precision parameters shall all be members of the same set.

B.40.2 Message requirements. Aircraft and stores shall utilize the standard message formats specified in B.40.2.2 and the mass data transfer formats specified in B.40.2.3, as applicable. Safety critical data shall only be transferred in the standard message formats of B.40.2.2.1, B.40.2.2.2, B.40.2.2.4 and B.40.2.2.5. All messages required by a store which are not defined in B.40.2.2 or B.40.2.3 shall:

a. employ the base message format specified in B.40.2.1, and

b. use subaddresses selected in accordance with B.40.1.1.2.

B.40.2.1 Base message data format. All messages not covered by B.40.2.2 or B.40.2.3 shall use the base message format. The general form is shown in tables B-VII, B-VIII and B-IX. Messages for mission stores shall be of any length up to 30 data words.

B.40.2.1.1 Data word 1. The first word of the message shall be a HEADER word for message identification. The HEADER word shall be a hexadecimal code which complies with table B-X.

B.40.2.1.2 Data words 2-30. Data words 2-30 are available for the transfer of up to 29 words of message data which may include a checksum. These data words shall comply with B.40.3.

B.40.2.2 Standard messages. Standard AEIS messages are defined as standard message data formats for safety critical control and monitor functions of conventional and nuclear weapons and for store descriptions. A receive message is defined as the data word or words received by a store in conjunction with a receive command word and the status word response. A transmit message is defined as the status word and data word or words transmitted by a store resultant from a transmit command word.

B.40.2.2.1 Mission store control. The mission store control standard message shall be used for controlling the state of mission stores and specifically standardizes the format for safety critical commands. Aircraft shall be capable of issuing this message to the appropriate mission stores. Mission stores which require any of these safety critical commands shall implement this message. The mission store control message shall be a 30 data word receive message with a subaddress of 01011 binary and formatted as specified in table B-XI.

B.40.2.2.2 Mission store monitor. The mission store monitor standard message shall be used as a statusing message to reflect the safety critical condition of the mission store. The message also includes other non-safety critical store condition information. Aircraft shall be capable of issuing a transmit mission store monitor command and receiving the resulting monitor message response from the store. Mission stores shall be capable of responding to a transmit mission store monitor command with the required status and data words. The mission store monitor message shall be a 30 data word transmit message with subaddress 01011 binary and formatted as specified in Table B-XII.

*B.40.2.2.3 Store description. The store description standard message is provided for transferring store identity from the store to the aircraft. The store description message shall comply with the format of table B-XIII. The message includes a header word, country code word, store identification words, interruptive BIT word and a checksum word. The country code and store identification codes shall remain invariant through the life of the store or until modification to the store justifies a new store identity.

B.40.2.2.3.1 Header word. The store shall assign the header word 0421 hexadecimal as word 01.

B.40.2.2.3.2 Country code. The country code (word 02), in accordance with table B-XIV, is the code for the country which assigns the appropriate store identity code. It is used to distinguish between store identification codes which may be duplicative between different countries.

B.40.2.2.3.3 Store identity code. The store identity codes (word 03 and words 04-11) shall be either a binary code in accordance with Table B-XV, or an ASCII code in accordance with Table B-XVI, or both. When word 03 is not in use, it shall be set to 0000 hexadecimal. When words 04-11 are not in use, they shall be set to 0000 hexadecimal.

B.40.2.2.3.4 Interruptive BIT word. Interruptive BIT time (B.40.3.1.20) used by the store shall be notified to the aircraft in word 12. If interruptive BIT is not used by the store, the word shall be set to 0000 hexadecimal.

B.40.2.2.3.5 Checksum word. The store shall assign the checksum word, encoded as defined in paragraph B.40.1.5.2, as word 30. The aircraft has the option of verifying or not verifying that the message passes the checksum test.

B.40.2.2.4 Nuclear weapon control. Receive messages with a subaddress field of 10011 and 11011 binary shall only be used for control of nuclear weapons. For all aircraft applications, usage of subaddresses 19 and 27 (decimal) shall be in compliance with the System 2 specification: Aircraft Monitor and Control Project Officers Group Specification System 2001.

B.40.2.2.5 Nuclear weapon monitor. Transmit messages with a subaddress field of 10011 and 11011 binary shall only be used for monitor of nuclear weapons. For all aircraft applications, usage of subaddresses 19 and 27 (decimal) shall be in compliance with the System 2 specification: Aircraft Monitor and Control Project Officers Group Specification System 2001.

B.40.2.3 Mass data transfer messages. The mass data transfer messages shall be used for transferring large data files through the AEIS interfaces. Mass data transfer shall be implemented through the use of three message types. The Transfer Control (TC) message (B.40.2.3.3.1) is a receive message for controlling selection of the transfer operating modes, and designation of file, record and block numbers. The Transfer Monitor (TM) message (B.40.2.3.3.2) is a transmit message for monitoring the status of the mass data transfer operations in the store. The Transfer Data (TD) message (B.40.2.3.3.3) is a transmit or receive message for transferring the file data blocks between aircraft and stores (or between stores). Aircraft and stores which require mass data transfer operations shall utilize the applicable operations defined herein. The system specification or interface control document shall identify those options which are implemented by the specific aircraft and store. All mass data transfer requirements below shall be considered as options to the extent that a specific store may only be capable of operating under a subset of the provisions defined. For example, a specific store might only be capable of operating in a download mode with no erase capability using four predefined TD message subaddresses and loading a 4 Kword data file.

B.40.2.3.1 File structure. Each data file to be transferred using the mass data transfer protocol shall be divided into 1 to 255 records (Nr) with each record divided into 1 to 255 blocks (Nb). Each block is transferred with a single TD message and shall contain 29 words of file data. All records within a specific file shall contain the same number of blocks. Unused words in a file shall be zero-filled.

B.40.2.3.2 Modes of operation

B.40.2.3.2.1 Download mode operation. The general operating procedure for downloading data files consists of the following seven steps:

a. The aircraft sends a TC message to select the download mode and then monitors the store transfer mode status with the TM message.

b. The aircraft commands erasure of the file or record space in memory (when applicable) with the TC message and then monitors the store erase status with the TM message.

c. The aircraft sends a start new file/record command with a TC message designating the file and record characteristics and then monitors store transfer mode status with the TM message.

d. The aircraft transfers file data blocks to the store with TD messages.

e. At the completion of transferring all blocks of a record or file, the aircraft commands file/record checksum test (when applicable) with the TC message and then monitors the store checksum test status with the TM message.

f. Repeat steps B.40.2.3.2.1.c through B.40.2.3.2.1.e until all records of all required files are transferred.

g. The aircraft sends a TC message commanding exit of the file transfer mode or execution of system start and then monitors store transfer status with the TM message.

B.40.2.3.2.1.1 This sequence of steps is modified by B.40.2.3.2.3 if downloading of multiple files, records or blocks is implemented with back-back transfer (B.30.4.6).

B.40.2.3.2.2 Upload mode operation. The general operating procedure for uploading data files consists of the following eight steps:

a. The aircraft sends a TC message to select the upload mode and monitors the store transfer mode status with the TM message.

b. If interrogation of the store is required to determine the file, record or block numbers to be uploaded, the following procedure is used. The aircraft sends a start new file/record upload command with a TC message. The file, record and block number words (words 04, 05 and 06) of the TC message are set to 0000 hexadecimal. On receipt of a TM message transmit request, the store responds identifying the applicable values for Nf, Sf, Nr, Sr, Nb and Sb in words 05, 06 and 07 of the TM message.

c. The aircraft sends a start new file/record upload command with a TC message designating the file, record and block numbers for the requested file. The store sets the TM message reflecting upload status and the aircraft monitors this TM message.

d. Through transmit requests, the aircraft receives TD messages containing the file data blocks for the selected file or record. Following each TD message transmission, the store increments the block number (starting with Sb) until Nb blocks are transferred or until a start new file/record command is received in a TC message. The store also increments the record number (starting with Sr) each time the block number Sb rolls over from Nb to 1 until Nr records are transferred or until a start new file/record command is received in a TC message.

e. If the aircraft detects any block transmission errors, then the aircraft may request the entire file or record to be repeated or request transmission of the missing block(s) by sending a TC message commanding start new file/record with the appropriate values of Sf, Sr, Nb and Sb.

f. On completion of transferring all blocks of the applicable file or record, the aircraft may send a calculate file/record checksum command. The checksum word in the TC message is set by the aircraft based on its solution for the checksum using the received record data. Following comparison with the expected record checksum, the store identifies the pass/fail status in the TM message.

g. Repeat steps B.40.2.3.2.2.c through B.40.2.3.2.2.f until all required files or records are transferred.

h. The aircraft sends a TC message with an exit transfer command or sends a TC message with a system start. If system start is received, the store sets up the TM message for transmission with the file, record and block numbers at which execution is to start in the aircraft.

B.40.2.3.2.2.1 This sequence of steps is modified by B.40.2.3.2.3 if uploading of multiple files, records or blocks is implemented with back-back transfer (B.30.4.6).

B.40.2.3.2.3 Back-back transfer operation. For applications which implement back-back transfer of files, records or blocks, the following rules apply:

a. Different subaddresses shall be used for the back-back TD messages.

b. The system specification or interface control document shall define those subaddresses to be used for back-back TD messages. It shall also define any restrictions that apply for mapping files, records or blocks to different subaddresses.

c. Back-back transfer shall be set-up in one of two ways:

(1) Repeat B.40.2.3.2.1.c. or B.40.2.3.2.2.c, as applicable, until the mapping of each file, record or block to its subaddress is designated; or

(2) For back-back block transfers of a common record (or common file), define in the system specification or interface control document a fixed mapping of blocks (or records) to specific TD message subaddresses. (Step B.40.2.3.2.1.c of or B.40.2.3.2.2.c would be issued once to start the file or record.)

B.40.2.3.3 Message formats

B.40.2.3.3.1 Transfer Control (TC) message. The TC message shall be a 8 data word receive message at subaddress 14 in accordance with table B-XVII.

B.40.2.3.3.2 Transfer Monitor (TM) message. The TM message shall be a 9 data word transmit message at subaddress 14 in accordance with table B-XXIII.

B.40.2.3.3.3 Transfer Data (TD) message. The TD message shall comply with table B-XXV. It shall be a 30 data word receive or transmit message at subaddress S. The value(s) of S shall comply with the limitations defined herein and in the system specification or interface control document.

B.40.3 Standard Data Entities. All AEIS messages shall be composed from the data entities (see B.30.1.1) listed in table B-XXVI. If a store or aircraft requires a specific data entity not covered by this table, then use of a non-standard data entity is permitted if authorized by the contracting authority or specified in the approved ICD. The data word format of a non-standard data entity shall, in order of preference: (1) comply with the data word format requirements of table B-XXVII, (2) comply with the data word format requirements of MIL-HDBK-1553, or (3) use a unique user defined data word format.

B.40.3.1 Control/monitor and protocol entities. Control/monitor and protocol entities shall be selected from table B-XXVI and shall comply with the paragraphs below as referenced in the table.

B.40.3.1.1 Reserved. A reserved data entity shall have bit numbers 00-15 set to Logic 0. This entity shall be placed in transmitted or received messages to provide fixed message lengths while reserving some data word positions for future AEIS applications.

B.40.3.1.2 Invalidity. Invalidity shall be represented by an INVALIDITY data word as specified in table B-XXXI and shall be used to indicate invalidity of data entities.

B.40.3.1.3 Critical control 1. Critical control 1 shall be represented by a CRITICAL CONTROL 1 data word as specified in table B-XXXII and shall be used for sending safety critical control commands to a mission store.

B.40.3.1.4 Critical control 2. Critical control 2 shall be represented by a CRITICAL CONTROL 2 data word as specified in table B-XXXIII. This entity shall be used for sending safety critical control commands to a mission store.

B.40.3.1.5 Critical authority. Critical authority shall be represented by a CRITICAL AUTHORITY word as specified in table B-XXXIV. This entity shall be used as a coded check for the critical control words specified in B.40.3.1.3 and B.40.3.1.4. It shall not be used for error correction.

B.40.3.1.6 Critical monitor 1. Critical monitor 1 shall be represented by a CRITICAL MONITOR 1 data word as specified in table B-XXXV and shall be used to indicate both the demanded state (reflecting data bits D_{10} through D_3 as specified in B.40.3.1.3) and the current store state.

d as specified in Table B-XXVII and shall be used to indicate PRESSURE(L) data word

B.40.3.1.7 Critical monitor 2. Critical monitor 2 shall be represented by a CRITICAL MONITOR 2 data word as specified in table B-XXXVI and shall be used to indicate both the demanded state (reflecting data bits D_{10} through D_3 as specified in B.40.3.1.4) and the current store state.

B.40.3.1.8 Fuzing mode. Fuzing mode shall be represented by a FUZING MODE word as specified in Table B-XXXVII and shall be used (by stores with interface controllable post release operation) to enable or disable fuze modes as indicated in the Table.

B.40.3.1.9 Fuzing/arming mode status. Fuzing/arming mode status shall be represented by a FUZING/ARMING MODE STATUS data word as specified in table B-XXXVIII and shall be used by stores (when requested by the aircraft) to reflect the actual internal state of the fuzing/arming setting(s) whether or not demanded by table B-XXXVII using the appropriate bits.

B.40.3.1.10 Release-arm delay. Release-arm delay shall be represented by a TIME(F) data word as specified in Table B-XXVII and shall be used (by stores with interface controllable fuzing) as the time delay from separation from the aircraft to fuze arming.

B.40.3.1.11 Release-function delay. Release-function delay shall be represented by a TIME(F) data word as specified in Table B-XXVII and shall be used (by stores with interface controllable fuzing) as the time delay from separation from the aircraft to fuze function.

B.40.3.1.12 Impact-function delay. Impact-function delay shall be represented by a TIME(F) data word as specified in Table B-XXVII and shall be used (by stores with interface controllable fuzing) as the time delay from impact to fuze function.

B.40.3.1.13 Fuze function distance. Fuze function distance shall be represented by a DISTANCE(F) data word as specified in Table B-XXVII and shall be used (by stores with interface controllable fuzing) as the distance from the target required for function.

B.40.3.1.14 Fire interval. Fire interval shall be represented by a TIME(L) data word as specified in Table B-XXVII. It shall be used for setting the time interval between successive releases, launches or firings of associated munitions or submunitions.

B.40.3.1.15 Number to fire. Number to fire shall be represented by a NUMBER(L) data word as specified in Table B-XXVII. It shall be used for setting the number of munitions or submunitions to be released or fired for each release or fire commanded by Table B-XXXII, bit number 00.

B.40.3.1.16 Protocol status. Protocol status shall be represented by a PROTOCOL STATUS data word as specified in Table B-XXXIX. It shall be used to report digital multiplex data interface protocol errors detected by the applicable subsystem. (See B.40.1.5.1.)

B.40.3.1.17 Country code. Country code data entity shall be encoded in the COUNTRY CODE data word format of Table B-XIV, using the appropriate country code specified in ISO 3166. (Only upper case alphabetic characters shall be used.) Country code shall be used as a qualifier of store identity (binary) (B.40.3.1.18) and a store identity (ASCII) (B.40.3.1.19) codes to distinguish between store identity codes which may be duplicative between different countries.

B.40.3.1.18 Store identity (binary). When used, store identity (binary) shall be represented by a STORE IDENTITY (BINARY) data word as specified in Table B-XV. It shall be the binary code assigned by the DoD control point for store nomenclature. When not in use, the word shall be set to 0000 hexadecimal.

B.40.3.1.19 Store identity (ASCII). When used, store identity (ASCII) shall be represented by a STORE IDENTITY (ASCII) data word as specified in Table B-XVI. It shall be a 16 character maximum code assigned by the DoD control point for store nomenclature. It shall be left justified and blank filled into the eight store identity (ASCII) data words as shown in the above referenced table. When not in use, the words shall be set to 0000 hexadecimal.

Example: See Table B-XVI, Note 3.

B.40.3.1.20 Interruptive BIT time. Interruptive BIT time shall designate the maximum time duration the store subsystem may be non-operational while conducting interruptive Built-In-Test (BIT) commanded by the aircraft. The interruptive BIT time data entity shall be encoded in the TIME(F) data word format of Table B-XXVII.

B.40.3.1.21 Post launch operation delay MSP. Post launch operation delay MSP shall be represented by a TIME(M) data word as specified in Table B-XXVII. It shall be used to indicate the most significant part of delays required in operation of store assemblies, such as motor fire, flight control, etc. It shall not be used for fuzing/arming.

B.40.3.1.22 Post launch operation delay LSP. Post launch operation delay LSP shall be represented by a TIME(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.1.21.

B.40.3.1.23 Rounds remaining. Rounds remaining shall be represented by a NUMBER(L) data word as specified in Table B-XXVII and shall be used to indicate the number of submunitions or stores remaining within the store.

B.40.3.1.24 ASCII characters. ASCII characters shall be represented by an ASCII PACKED data word as specified in Table B-XL and shall be used for the transfer of ASCII encoded characters across the digital multiplex data interface.

B.40.3.1.25 Fuze function height. Fuze function height shall be represented by a DISTANCE(F) data word as specified in Table B-XXVII and shall be used (by stores with interface controllable fuzing) as the altitude or depth from local surface required for function. For pressure activated sensors, a surface air pressure of 82 kilopascals shall be assumed.

B.40.3.2 Carriage store entities. Not applicable for this issue of the standard.

B.40.3.3 Aircraft data entities. Aircraft data entities shall be selected from Table B-XXVI and shall comply with paragraphs B.40.3.3.82, B.40.3.3.83, B.40.3.3.85, and B.40.3.3.86.

B.40.3.3.1 Time MSP. Time MSP shall be represented by a TIME(M) data word as specified in Table B-XXVII and shall be used by aircraft or stores to indicate the most significant part of the time to, or from, the referenced event.

B.40.3.3.2 Time LSP. Time LSP shall be represented by a TIME(L) data word as specified in Table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.3.82.

B.40.3.3.3 Time tag MSP. Time tag MSP shall be represented by a TIME(M) data word as specified in Table B-XXVII. Time tag shall be inserted into the message by the source equipment responsible for the data entity(s) on which the time tag is to be used and shall be the most significant part of the aircraft time current at the data measurement or event.

B.40.3.3.4 Time tag LSP. Time tag LSP shall be represented by a TIME(L) data word as specified in Table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.3.85.

B.40.3.3.5 Indicated airspeed MSP. Indicated airspeed MSP shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the indicated airspeed of the aircraft. The airspeed shall be represented as positive when the aircraft is traveling through static air in the Xa direction defined in figure B-2.

B.40.3.3.6 Indicated airspeed LSP. Indicated airspeed LSP shall be represented by a VELOCITY(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.5.

B.40.3.3.7 True airspeed MSP. True airspeed MSP shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the true airspeed of the aircraft. The airspeed shall be represented as positive when the aircraft is traveling through static air in the Xa direction defined in figure B-2.

B.40.3.3.8 True airspeed LSP. True airspeed LSP shall be represented by a VELOCITY(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.7.

B.40.3.3.9 Calibrated airspeed MSP. Calibrated airspeed MSP shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the calibrated airspeed of the aircraft. The airspeed shall be represented as positive with the aircraft traveling through static air in the Xa direction defined in figure B-2.

B.40.3.3.10 Calibrated airspeed LSP. Calibrated airspeed LSP shall be represented by a VELOCITY(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.9.

B.40.3.3.11 Local windspeed north MSP. Local windspeed north MSP shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall indicate the most significant part of local windspeed with north defined as the component of the local windspeed measured relative to local surface in the North (N) axis as defined by figure B-3.

B.40.3.3.12 Local windspeed north LSP. Local windspeed north LSP shall be represented by a VELOCITY(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.11.

B.40.3.3.13 Local windspeed east MSP. Local windspeed east MSP shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall indicate the most significant part of local windspeed with east defined as the component of the local windspeed measured relative to local surface in the East (E) axis as defined by figure B-3.

B.40.3.3.14 Local windspeed east LSP. Local windspeed east LSP shall be represented by a VELOCITY(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.13.

B.40.3.3.15 Angle of attack. Angle of attack shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall indicate the angle of attack of the aircraft.

B.40.3.3.16 Angle of sideslip. Angle of sideslip shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall indicate the angle of sideslip of the aircraft.

B.40.3.3.17 Air temperature. Air temperature shall be represented by a TEMPERATURE data word as specified in Table B-XXVII and shall indicate the ambient temperature of the outside air.

B.40.3.3.18 Dynamic air pressure MSP. Dynamic air pressure MSP shall be represented by a PRESSURE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the dynamic air pressure.

B.40.3.3.19 Dynamic air pressure LSP. Dynamic air pressure LSP shall be represented by a PRESSURE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.18.

B.40.3.3.20 Static air pressure MSP. Static air pressure MSP shall be represented by a PRESSURE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the static air pressure.

B.40.3.3.21 Static air pressure LSP. Static air pressure LSP shall be represented by a PRESSURE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.20.

B.40.3.3.22 Sea level air pressure MSP. Sea level air pressure MSP shall be represented by a PRESSURE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the local sea level air pressure.

B.40.3.3.23 Sea level air pressure LSP. Sea level air pressure LSP shall be represented by a PRESSURE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.22.

B.40.3.3.24 Local surface flow north MSP. Local surface flow north MSP shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the North component of the velocity of the local surface flow relative to a fixed point but using the local vertical earth axis system as specified in figure B-3.

B.40.3.3.25 Local surface flow north LSP. Local surface flow north LSP shall be represented by a VELOCITY(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.24.

B.40.3.3.26 Local surface flow east MSP. Local surface flow east MSP shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the East component of the velocity of the local surface flow relative to a fixed point using the local vertical earth axis system as specified in figure B-3.

B.40.3.3.27 Local surface flow east LSP. Local surface flow east LSP shall be represented by a VELOCITY(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.26.

B.40.3.3.28 Water temperature. Water temperature shall be represented by a TEMPERATURE data word as specified in Table B-XXVII and shall be used to indicate the temperature of the local surface of the water.

B.40.3.3.29 Water depth MSP. Water depth MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the vertical depth of water in the target zone.

B.40.3.3.30 Water depth LSP. Water depth LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.29.

B.40.3.3.31 Wave height. Wave height shall be represented by a DISTANCE(S) data word as specified in Table B-XXVII and shall be used to indicate the average wave height measure peak to trough in the target zone and shall be represented as positive.

B.40.3.3.32 Water density. Water density shall be represented by a RATIO data word as specified in Table B-XXVII and shall be used to indicate the ratio of the density of the local water to a density of 1000 kilograms per cubic meter. The ratio shall increase for heavier local water.

B.40.3.3.33 Velocity of sound MSP. Velocity of sound MSP shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the velocity of sound for the specified area. (This may be for a specified depth of water for example.)

B.40.3.3.34 Velocity of sound LSP. Velocity of sound LSP shall be represented by a VELOCITY(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information defined in B.40.3.3.33.

B.40.3.3.35 Aircraft latitude MSP. Aircraft latitude MSP shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the geodetic latitude of the aircraft as defined in figure B-3.

B.40.3.3.36 Aircraft latitude LSP. Aircraft latitude LSP shall be represented by an ANGLE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.35.

B.40.3.3.37 Aircraft longitude MSP. Aircraft longitude MSP shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the geodetic longitude of the aircraft as defined in figure B-3.

B.40.3.3.38 Aircraft longitude LSP. Aircraft longitude LSP shall be represented by an ANGLE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.37.

B.40.3.3.39 Aircraft inertial height MSP. Aircraft inertial height MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the inertial height of the aircraft from the earth center as defined in figure B-3.

B.40.3.3.40 Aircraft inertial height LSP. Aircraft inertial height LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.39.

B.40.3.3.41 Aircraft-fixed point distance north MSP. Aircraft-fixed point distance north MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the North component (Na) of the current aircraft position displacement from the fixed point as shown in figure B-4. The coordinate system shall be the local fixed point earth axis system defined in figure B-3.

B.40.3.3.42 Aircraft-fixed point distance north LSP. Aircraft-fixed point distance north LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.41.

B.40.3.3.43 Aircraft-fixed point distance east MSP. Aircraft-fixed point distance east MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the East component (Ea) of the current aircraft position displacement from the fixed point as shown in figure B-4. The coordinate system shall be the local fixed point earth axis system defined in figure B-3.

B.40.3.3.44 Aircraft-fixed point distance east LSP. Aircraft-fixed point distance east LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.43.

B.40.3.3.45 Aircraft-fixed point distance down MSP. Aircraft-fixed point distance down MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the Down component (Da) of the current aircraft position displacement from the fixed point as shown in figure B-4. The coordinate system shall be the local fixed point earth axis system defined in figure B-3.

B.40.3.3.46 Aircraft-fixed point distance down LSP. Aircraft-fixed point distance down LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.45.

B.40.3.3.47 Height above ground level MSP. Height above ground level MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the height above ground level of the aircraft being defined as the distance between the aircraft and the local earth surface measured along the Down (D) axis defined in figure B-3. The distance shall be represented as positive.

B.40.3.3.48 Height above ground level LSP. Height above ground level LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.47.

B.40.3.3.49 Barometric altitude MSP. Barometric altitude MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the barometric altitude of the aircraft being defined as the distance between the aircraft and the local earth sea-level measured along the Down (D) axis defined in figure B-3. The distance shall be represented as positive.

B.40.3.3.50 Barometric altitude LSP. Barometric altitude LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.49.

B.40.3.3.51 Aircraft true heading. Aircraft true heading shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the heading of the aircraft relative to true North as defined in figure B-5 using the local vertical axis as defined in figure B-3.

B.40.3.3.52 Aircraft true ground track. Aircraft true ground track shall be represented by an ANGLE(M) data word as specified in Table B-XXVII. It shall be used to indicate the ground track of the aircraft relative to true North as defined in figure B-5 using the local vertical axis as defined in figure B-3.

B.40.3.3.53 Aircraft pitch. Aircraft pitch shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the pitch of the aircraft as defined in figure B-5 using the local vertical axis defined in figure B-3.

B.40.3.3.54 Aircraft roll. Aircraft roll shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the roll of the aircraft as defined in figure B-5 using the local vertical axis as defined in figure B-3.

B.40.3.3.55 Aircraft magnetic heading. Aircraft magnetic heading shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the heading of the aircraft relative to magnetic North as defined in figure B-5 using the local vertical axis as defined in figure B-3.

B.40.3.3.56 Aircraft-reference X axis offset. Aircraft-reference X axis offset shall be represented by a DISTANCE(S) data word as specified in Table B-XXVII and shall indicate the X component of the distance from the aircraft body axis or sensor axis to the reference axis (Dxa-r) as defined in figure B-6.

B.40.3.3.57 Aircraft-reference Y axis offset. Aircraft-reference Y axis offset shall be represented by a DISTANCE(S) data word as specified in Table B-XXVII and shall indicate the Y component of the distance from the aircraft body axis or sensor axis to the reference axis (Dya-r) as defined in figure B-6.

B.40.3.3.58 Aircraft-reference Z axis offset. Aircraft-reference Z axis offset shall be represented by a DISTANCE(S) data word as specified in Table B-XXVII and shall indicate the Z component of the distance from the aircraft body axis or sensor axis to the reference axis (Dza-r) as defined in figure B-6.

B.40.3.3.59 Aircraft-reference axis yaw. Aircraft-reference axis yaw shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall indicate the yaw angle between the aircraft body axis or sensor axis and the reference axis as defined by figure B-6. Positive angles shall indicate the reference axis is yawed right.

B.40.3.3.60 Aircraft-reference axis pitch. Aircraft-reference axis pitch shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall indicate the pitch angle between the aircraft body axis or sensor axis and the reference axis as defined by figure B-6. Positive angles shall indicate the reference axis is pitched up.

B.40.3.3.61 Aircraft-reference axis roll. Aircraft-reference axis roll shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall indicate the roll angle between the aircraft body axis or sensor axis and the reference axis as defined by figure B-6. Positive angles shall indicate the reference axis is banked right (right wing down).

B.40.3.3.62 Aircraft velocity north MSP. Aircraft velocity north MSP shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the North component of the velocity of the origin of the aircraft axis system as defined in figure B-2 using the local vertical earth axis coordinate system as defined in figure B-3.

B.40.3.3.63 Aircraft velocity north LSP. Aircraft velocity north LSP shall be represented by a VELOCITY(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.62.

B.40.3.3.64 Aircraft velocity east MSP. Aircraft velocity east MSP shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the East component of the velocity of the origin of the aircraft axis system as defined in figure B-2 using the local vertical earth axis coordinate system as defined in figure B-3.

B.40.3.3.65 Aircraft velocity east LSP. Aircraft velocity east LSP shall be represented by a VELOCITY(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.64.

B.40.3.3.66 Aircraft velocity down MSP. Aircraft velocity down MSP shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the Down component of the velocity of the origin of the aircraft axis system as defined in figure B-2 using the local vertical earth axis coordinate system as defined in figure B-3.

B.40.3.3.67 Aircraft velocity down LSP. Aircraft velocity down LSP shall be represented by a VELOCITY(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.3.66.

B.40.3.3.68 Aircraft heading rate. Aircraft heading rate shall be represented by an ANGULAR RATE(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.3.51.

B.40.3.3.69 Aircraft ground track rate. Aircraft ground track rate shall be represented by an ANGULAR RATE(M) data word as specified in table B-XXVII. It shall be used to indicate the rate of change of the information specified in B.40.3.3.52.

B.40.3.3.70 Aircraft pitch rate. Aircraft pitch rate shall be represented by an ANGULAR RATE(M) data word as specified in table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.3.53.

B.40.3.3.71 Aircraft roll rate. Aircraft roll rate shall be represented by an ANGULAR RATE(M) data word as specified in table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.3.54.

B.40.3.3.72 Aircraft system time at reset MSP. Aircraft system time at reset MSP shall be represented by a TIME(M) data word as specified in table B-XXVII and shall indicate the most significant part of the aircraft system time at the last reset of the aircraft system clock used by the aircraft as its reference for time tagging data. Stores using time tagged data shall utilize this data in conjunction with present system time to determine the age of the time tagged data.

B.40.3.3.73 Aircraft system time at reset LSP. Aircraft system time at reset LSP shall be represented by a TIME(L) data word as specified in table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.3.72.

B.40.3.3.74 Mach number. Mach number shall be represented by a NUMBER(S) data word as specified in table B-XXVII and shall be used to indicate the vehicle Mach number.

B.40.3.3.75 Direction cosine MSP. Direction cosine MSP shall be represented by a FRACTION(M) data word as specified in table B-XXVII. It shall indicate the most significant part of a matrix element of a 3 X 3 transformation matrix between the aircraft and reference coordinate systems in accordance with the following matrix equation: $Xr = C * Xap$; where C is the 3 X 3 transformation matrix and both Xr and Xap are column vectors as defined in figure B-6. The number of matrix elements in C and specific meaning of the matrix equation shall be defined in the store interface control document.

B.40.3.3.76 Direction cosine LSP. Direction cosine LSP shall be represented by a FRACTION(L) data word as specified in table B-XXVII. It shall indicate the least significant part of the information specified in B.40.3.3.75.

B.40.3.3.77 Initialization year. Initialization year shall be represented by a NUMBER(L) data word as specified in table B-XXVII and shall indicate the current year.

B.40.3.3.78 Initialization month. Initialization month shall be represented by a NUMBER(L) data word as specified in table B-XXVII and shall indicate the current month of the current year as specified in B.40.3.3.77.

B.40.3.3.79 Initialization day of month. Initialization day of month shall be represented by a NUMBER(L) data word as specified in Table B-XXVII and shall indicate the current day of the current month as specified in B.40.3.3.78.

B.40.3.3.80 Initialization day of year. Initialization day of year shall be represented by a NUMBER(L) data word as specified in Table B-XXVII and shall indicate the current day of the current year as specified in B.40.3.3.77 where January 1 is day 1.

B.40.3.3.81 Twenty-four hour period. Twenty-four hour period shall be represented by a NUMBER(L) data word as specified in Table B-XXVII. It shall be used by aircraft or stores to indicate the number of whole 24 hour periods to, or from, the referenced event. It is used as required to compliment the time data entity in paragraph B.40.3.3.82.

B.40.3.3.82 Time MSP. Time MSP shall be represented by a TIME(M) data word as specified in Table B-XXVII and shall be used by aircraft or stores to indicate the most significant part of the time to, or from, the referenced event.

B.40.3.3.83 Time LSP. Time LSP shall be represented by a TIME(L) data word as specified in Table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.3.82.

B.40.3.3.84 Time LLSP. Time LLSP shall be represented by a TIME(LL) data word as specified in Table B-XXVII and shall indicate the lower least significant part of the information specified in B.40.3.3.82.

B.40.3.3.85 Time tag MSP. Time tag MSP shall be represented by a TIME(M) data word as specified in Table B-XXVII. Time tag shall be inserted into the message by the source equipment responsible for the data entity(s) on which the time tag is to be used and shall be the most significant part of the aircraft time current at the data measurement or event.

B.40.3.3.86 Time tag LSP. Time tag LSP shall be represented by a TIME(L) data word as specified in Table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.3.85.

B.40.3.3.87 Time tag LLSP. Time tag LLSP shall be represented by a TIME(LL) data word as specified in Table B-XXVII and shall indicate the lower least significant part of the information specified in B.40.3.3.85.

B.40.3.3.88 Aircraft time MSP. Aircraft time MSP shall be represented by a TIME(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the aircraft time to be transmitted to the store to allow base time synchronization to take place. It shall be valid at the zero crossing of the parity bit of the associated command word received at the ASI, with the tolerance specified in the ICD.

B.40.3.3.89 Aircraft time LSP. Aircraft time LSP shall be represented by a TIME(L) data word as specified in Table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.3.88. It shall also be used for the synchronized data word (Table B-IV).

B.40.3.3.90 Aircraft time LLSP. Aircraft time LLSP shall be represented by a TIME(LL) data word as specified in Table B-XXVII and shall indicate the lower least significant part of the information specified in B.40.3.3.88.

B.40.3.4 Target data entities. Target data entities shall be selected from Table B-XXVI and shall comply with the paragraphs below as referenced in the Table B-XXVI.

B.40.3.4.1 Target time MSP. Target time MSP shall be represented by a TIME(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the system time as specified in Table B-XXVII at the point in time when the target position is valid.

B.40.3.4.2 Target time LSP. Target time LSP shall be represented by a TIME(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.1.

B.40.3.4.3 Waypoint number of target. Waypoint number of target shall be represented by an INTEGER data word as specified in Table B-XXVII and shall be used to indicate the waypoint number as specified in B.40.3.5.3 of the target position where a course to target trajectory defined by waypoints is used.

B.40.3.4.4 Target file number. Target file number shall be represented by a NUMBER(L) data word as specified in Table B-XXVII and shall be used to indicate the selected target file.

B.40.3.4.5 Target probability. Target probability shall be represented by a FRACTION(M) data word as specified in Table B-XXVII and shall indicate the probability that the target can be successfully intercepted by the store where all unknown factors are assumed to not adversely affect the probability.

B.40.3.4.6 Target discriminator. Target discriminator shall be represented by a DISCRIMINATOR DESCRIPTION data word as specified in Table B-XLI and shall indicate which of a group of targets shall be selected by terminal guidance.

B.40.3.4.7 Target pressure MSP. Target pressure MSP shall be represented by a PRESSURE(M) data word as specified in Table B-XXVII and shall be used to indicate the sea-level referenced air pressure at the target position.

B.40.3.4.8 Target pressure LSP. Target pressure LSP shall be represented by a PRESSURE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.7.

B.40.3.4.9 Target number. Target number shall be represented by a NUMBER(L) data word as specified in Table B-XXVII and shall be used to indicate the target number for which all information received by the store shall apply, and which shall also be the preferred target once the store is released. Stores implementing multiple targeting shall set the target number and once thus set all information received shall correspond to the new target number.

B.40.3.4.10 Target invalidity. Target invalidity shall be represented by an INVALIDITY data word as specified in Table B-XXXI and shall indicate the validity for sixteen targets where valid (Logic 0) shall equate to an available for use state.

B.40.3.4.11 Target latitude MSP. Target latitude MSP shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the geodetic latitude of the target position as defined in Figure B-3.

B.40.3.4.12 Target latitude LSP. Target latitude LSP shall be represented by an ANGLE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.11.

B.40.3.4.13 Target longitude MSP. Target longitude MSP shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the geodetic longitude of the target position as defined in Figure B-3.

B.40.3.4.14 Target longitude LSP. Target longitude LSP shall be represented by an ANGLE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.13.

B.40.3.4.15 Target inertial height MSP. Target inertial height MSP shall be represented by a Distance (M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the inertial height of the target position from the earth center as defined in Figure B-3.

B.40.3.4.16 Target inertial height LSP. Target inertial height LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.15.

B.40.3.4.17 Target-fixed point distance north MSP. Target-fixed point distance north MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the North component (Nt) of the current target position displacement from the fixed point as shown in Figure B-4. The coordinate system shall be the local fixed point earth axis system defined in Figure B-3.

B.40.3.4.18 Target-fixed point distance north LSP. Target-fixed point distance north LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.17.

B.40.3.4.19 Target-fixed point distance east MSP. Target-fixed point distance east MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the East component (Et) of the current target position displacement from the fixed point as shown in Figure B-4. The coordinate system shall be the local fixed point earth axis system defined in Figure B-3.

B.40.3.4.20 Target-fixed point distance east LSP. Target-fixed point distance east LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.19.

B.40.3.4.21 Target-fixed point distance down MSP. Target-fixed point distance down MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the Down component (Dt) of the current target position displacement from the fixed point as shown in Figure B-4. The coordinate system shall be the local fixed point earth axis system defined in Figure B-3.

B.40.3.4.22 Target-fixed point distance down LSP. Target-fixed point distance down LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.21.

B.40.3.4.23 Target-current position north MSP. Target-current position north MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the North component (Nt) of the target position displacement from the current aircraft position as shown in Figure B-8. The coordinate system shall be the local vertical earth axis system defined in Figure B-3.

B.40.3.4.24 Target-current position north LSP. Target-current position north LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.4.23.

B.40.3.4.25 Target-current position east MSP. Target-current position east MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the East component (Et) of the target position displacement from the current aircraft position as shown in Figure B-8. The coordinate system shall be the local vertical earth axis system defined in Figure B-3.

B.40.3.4.26 Target-current position east LSP. Target-current position east LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.4.25.

B.40.3.4.27 Target-current position down MSP. Target-current position down MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the Down component (Dt) of the target position displacement from the current aircraft position as shown in Figure B-8. The coordinate system shall be the local vertical earth axis system defined in Figure B-3.

B.40.3.4.28 Target-current position down LSP. Target-current position down LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.4.27.

B.40.3.4.29 Local target height MSP. Local target height MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the vertical displacement of the target position from the local surface level where negative values shall indicate that the position is sub-surface.

B.40.3.4.30 Local target height LSP. Local target height LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.29.

B.40.3.4.31 Target approach heading. Target approach heading shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the true heading as defined in Figure B-5 of the final approach course to the target position.

B.40.3.4.32 Target approach pitch. Target approach pitch shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the pitch as defined in Figure B-5 of the final approach course to the target position.

B.40.3.4.33 Target azimuth to aircraft. Target azimuth to aircraft shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the target azimuth as shown in Figure B-9 relative to the aircraft axis system as shown in Figure B-2.

B.40.3.4.34 Target elevation to aircraft. Target elevation to aircraft shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the target elevation as shown in Figure B-9 relative to the aircraft axis system as shown in Figure B-2.

B.40.3.4.35 Target slant range MSP. Target slant range MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII. It shall be used to indicate the most significant part of the slant range distance, as shown in Figure B-9, between the aircraft axis system origin, as shown in Figure B-2, and the target center. The slant range shall be represented as positive.

B.40.3.4.36 Target slant range LSP. Target slant range LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.35.

B.40.3.4.37 Target azimuth to reference system. Target azimuth to reference system shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the target azimuth as shown in Figure B-9 relative to the reference axis system as shown in Figure B-6.

B.40.3.4.38 Target elevation to reference system. Target elevation to reference system shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the target elevation as shown in Figure B-9 relative to the reference axis system as shown in Figure B-6.

B.40.3.4.39 Target latitude rate MSP. Target latitude rate MSP shall be represented by an ANGULAR RATE(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.11 and B.40.3.4.12.

B.40.3.4.40. Target latitude rate LSP. Target latitude rate LSP shall be represented by an ANGULAR RATE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.39.

B.40.3.4.41 Target longitude rate MSP. Target longitude rate MSP shall be represented by an ANGULAR RATE(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.13 and B.40.3.4.14.

B.40.3.4.42 Target longitude rate LSP. Target longitude rate LSP shall be represented by an ANGULAR RATE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.41.

B.40.3.4.43 Target height rate. Target height rate shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.15 and B.40.3.4.16.

B.40.3.4.44 Target-fixed point velocity north. Target-fixed point velocity north shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.17 and B.40.3.4.18.

B.40.3.4.45 Target-fixed point velocity east. Target-fixed point velocity east shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.19 and B.40.3.4.20.

B.40.3.4.46 Target-fixed point velocity down. Target-fixed point velocity down shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.21 and B.40.3.4.22.

B.40.3.4.47 Target-current position velocity north. Target-current position velocity north shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.23 and B.40.3.4.24.

B.40.3.4.48 Target-current position velocity east. Target-current position velocity east shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.25 and B.40.3.4.26.

B.40.3.4.49 Target-current position velocity down. Target-current position velocity down shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.27 and B.40.3.4.28.

B.40.3.4.50 Target azimuth rate to aircraft. Target azimuth rate to aircraft shall be represented by an ANGULAR RATE(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.33.

B.40.3.4.51 Target elevation rate to aircraft. Target elevation rate to aircraft shall be represented by an ANGULAR RATE(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.34.

B.40.3.4.52 Slant range rate. Slant range rate shall be represented by a VELOCITY(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.35 and B.40.3.4.36. Negative slant range rate shall indicate decreasing distance between aircraft and target.

B.40.3.4.53 Target azimuth rate to reference system. Target azimuth rate to reference system shall be represented by an ANGULAR RATE(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.37.

B.40.3.4.54 Target elevation rate to reference system. Target elevation rate to reference system shall be represented by an ANGULAR RATE(M) data word as specified in Table B-XXVII and shall be used to indicate the rate of change of the information specified in B.40.3.4.38.

B.40.3.4.55 Emission frequency MSP. Emission frequency MSP shall be represented by a FREQUENCY(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the frequency of the emissions to be used for target detection.

B.40.3.4.56 Emission frequency ISP. Emission frequency ISP shall be represented by a FREQUENCY(L) data word as specified in Table B-XXVII and shall be used to indicate the second most significant part of the information specified in B.40.3.4.55.

B.40.3.4.57 Emission frequency LSP. Emission frequency LSP shall be represented by a FREQUENCY(LL) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.55.

B.40.3.4.58 Emission bandwidth MSP. Emission bandwidth MSP shall be represented by a FREQUENCY(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the frequency bandwidth of the emissions to be used for target detection.

B.40.3.4.59 Emission bandwidth ISP. Emission bandwidth ISP shall be represented by a FREQUENCY(L) data word as specified in Table B-XXVII and shall be used to indicate the second most significant part of the information specified in B.40.3.4.58.

B.40.3.4.60 Emission bandwidth LSP. Emission bandwidth LSP shall be represented by a FREQUENCY(LL) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.58.

B.40.3.4.61 Emission PRF MSP. Emission PRF MSP shall be represented by a FREQUENCY(L) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the pulse repetition frequency of the emissions to be used for target detection.

B.40.3.4.62 Emission PRF LSP. Emission PRF LSP shall be represented by a FREQUENCY(LL) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.61.

B.40.3.4.63 Emission pulsewidth MSP. Emission pulsewidth MSP shall be represented by a TIME(L) data word as specified in Table B-XXVII and shall indicate the most significant part of the pulsewidth of the emissions to be used for target detection.

B.40.3.4.64 Emission pulsewidth LSP. Emission pulsewidth LSP shall be represented by a TIME(LL) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.4.63.

B.40.3.4.65 Emission code. Emission code shall be represented by a NUMBER(L) data word as specified in Table B-XXVII and shall be used to indicate a reference code for distinguishing between emitters.

B.40.3.4.66 Target altitude MSP. Target altitude MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII. It shall indicate the most significant part of the altitude of the target above mean sea level.

B.40.3.4.67 Target altitude LSP. Target altitude LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.4.66.

B.40.3.5 Trajectory data entities. Trajectory data entities shall be selected from Table B-XXVI and shall comply with the paragraphs below as referenced in the Table B-XXVI.

B.40.3.5.1 Time at waypoint MSP. Time at waypoint MSP shall be represented by a TIME(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the time as specified in B.40.3.3.1 at the required point in time when the waypoint position is achieved.

B.40.3.5.2 Time at waypoint LSP. Time at waypoint LSP shall be represented by a TIME(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.1.

B.40.3.5.3 Waypoint number. Waypoint number shall be represented by an INTEGER data word as specified in Table B-XXVII and shall be used to indicate the waypoint number for the information in the succeeding data words. Waypoint numbers shall increase for successive points in the store trajectory.

B.40.3.5.4 Waypoint file number. Waypoint file number shall be represented by a NUMBER(L) data word as specified in Table B-XXVII and shall be used to indicate the selected waypoint file.

B.40.3.5.5 Waypoint pressure MSP. Waypoint pressure MSP shall be represented by a PRESSURE(M) data word as specified in Table B-XXVII and shall be used to indicate the sea-level referenced air pressure at the waypoint position.

B.40.3.5.6 Waypoint pressure LSP. Waypoint pressure LSP shall be represented by a PRESSURE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.5.

B.40.3.5.7 Fire number. Fire number shall be represented by a NUMBER(L) data word as specified in Table B-XXVII and shall be used to indicate the fire number of the store. Fire number if implemented shall be used by stores in free flight to distinguish themselves from other stores in free flight.

B.40.3.5.8 Guidance code. Guidance code shall be represented by a NUMBER(L) data word as specified in Table B-XXVII and shall be used to indicate a reference code for coded transmissions to stores in free flight.

B.40.3.5.9 Guidance frequency MSP. Guidance frequency MSP shall be represented by a FREQUENCY(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the frequency utilized for post release guidance.

B.40.3.5.10 Guidance frequency LSP. Guidance frequency LSP shall be represented by a FREQUENCY(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.9.

B.40.3.5.11 Guidance bit length MSP. Guidance bit length MSP shall be represented by a TIME(L) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the length of time allocated to each data bit in post release guidance emission.

B.40.3.5.12 Guidance bit length LSP. Guidance bit length LSP shall be represented by a TIME(LL) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.11.

B.40.3.5.13 Guidance block size. Guidance block size shall be represented by a NUMBER(L) data word as specified in Table B-XXVII and shall be used to indicate the number of data bits to be received in the first post release guidance transmission.

B.40.3.5.14 Waypoint latitude MSP. Waypoint latitude MSP shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the geodetic latitude of the waypoint position, where latitude is as defined in Figure B-3.

B.40.3.5.15 Waypoint latitude LSP. Waypoint latitude LSP shall be represented by an ANGLE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.14.

B.40.3.5.16 Waypoint longitude MSP. Waypoint longitude MSP shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the geodetic longitude of the waypoint position, where longitude is as defined in Figure B-3.

B.40.3.5.17 Waypoint longitude LSP. Waypoint longitude LSP shall be represented by an ANGLE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.16.

B.40.3.5.18 Waypoint inertial height MSP. Waypoint inertial height MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the inertial height of the waypoint position from the earth center as defined in Figure B-3.

B.40.3.5.19 Waypoint inertial height LSP. Waypoint inertial height LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.18.

B.40.3.5.20 Waypoint-fixed point distance north MSP. Waypoint-fixed point distance north MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the North component (Nt) of the current waypoint position displacement from the fixed point as shown in Figure B-4. The coordinate system shall be the local fixed point earth axis system as defined in Figure B-3.

B.40.3.5.21 Waypoint-fixed point distance north LSP. Waypoint-fixed point distance north LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.20.

B.40.3.5.22 Waypoint-fixed point distance east MSP. Waypoint-fixed point distance east MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the East component (Et) of the current waypoint position displacement from the fixed point as shown in Figure B-4. The coordinate system shall be the local fixed point earth axis system as defined in Figure B-3.

B.40.3.5.23 Waypoint-fixed point distance east LSP. Waypoint-fixed point distance east LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.22.

B.40.3.5.24 Waypoint-fixed point distance down MSP. Waypoint-fixed point distance down MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the Down component (Dt) of the current waypoint position displacement from the fixed point as shown in Figure B-4. The coordinate system shall be the local fixed point earth axis system as defined in Figure B-3.

B.40.3.5.25 Waypoint-fixed point distance down LSP. Waypoint-fixed point distance down LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.24.

B.40.3.5.26 Waypoint-current position north MSP. Waypoint-current position north MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the North component (Nt) of the waypoint position displacement from the current aircraft position as shown in Figure B-8. The coordinate system shall be the local vertical earth axis system defined in Figure B-3.

B.40.3.5.27 Waypoint-current position north LSP. Waypoint-current position north LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.5.26.

B.40.3.5.28 Waypoint-current position east MSP. Waypoint-current position east MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the East component (Et) of the waypoint position displacement from the current aircraft position as shown in Figure B-8. The coordinate system shall be the local vertical earth axis system defined in Figure B-3.

B.40.3.5.29 Waypoint-current position east LSP. Waypoint-current position east LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.5.28.

B.40.3.5.30 Waypoint-current position down MSP. Waypoint-current position down MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall indicate the most significant part of the Down component (Dt) of the waypoint position displacement from the current aircraft position as shown in Figure B-8. The coordinate system shall be the local vertical earth axis system defined in Figure B-3.

B.40.3.5.31 Waypoint-current position down LSP. Waypoint-current position down LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall indicate the least significant part of the information specified in B.40.3.5.30.

B.40.3.5.32 Waypoint height MSP. Waypoint height MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the vertical displacement of the waypoint position from the local surface level where negative values shall indicate that the position is sub-surface.

B.40.3.5.33 Waypoint height LSP. Waypoint height LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.32.

B.40.3.5.34 Initial course azimuth. Initial course azimuth shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the azimuth of the initial store trajectory relative to the store axis system as shown in Figure B-7. Initial store trajectory shall be as shown in Figure B-9.

B.40.3.5.35 Initial course elevation. Initial course elevation shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the elevation of the initial store trajectory relative to the store axis system as shown in Figure B-7. Initial store trajectory shall be as shown in Figure B-9.

B.40.3.5.36 Initial course distance MSP. Initial course distance MSP shall be represented by a DISTANCE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the length of the initial store trajectory. The distance shall be represented as positive.

B.40.3.5.37 Initial course distance LSP. Initial course distance LSP shall be represented by a DISTANCE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.36.

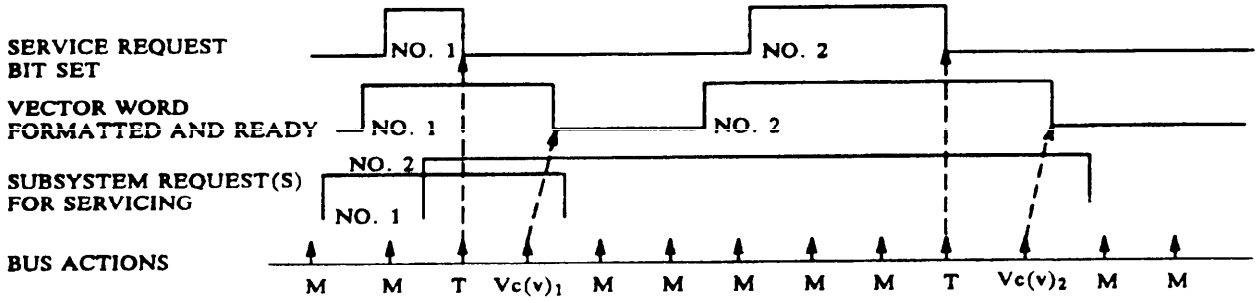
B.40.3.5.38 Waypoint number of launch point. Waypoint number of launch point shall be represented by an INTEGER data word as specified in Table B-XXVII and shall indicate the waypoint number at which the store is intended to be launched by the aircraft. The waypoint number shall be as specified in B.40.3.5.3 where a course to target trajectory defined by waypoints is used.

B.40.3.5.39 Launch point latitude MSP. Launch point latitude MSP shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the geodetic latitude of the store launch point position, where latitude is defined in Figure B-3.

B.40.3.5.40 Launch point latitude LSP. Launch point latitude LSP shall be represented by an ANGLE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.39.

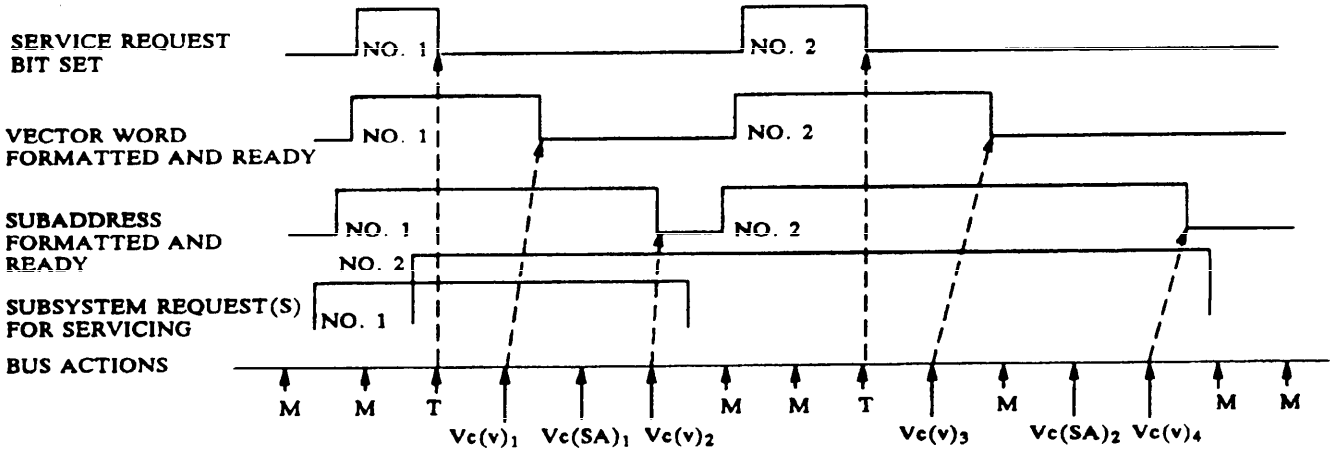
B.40.3.5.41 Launch point longitude MSP. Launch point longitude MSP shall be represented by an ANGLE(M) data word as specified in Table B-XXVII and shall be used to indicate the most significant part of the geodetic longitude of the store launch point position, where longitude is defined in Figure B-3.

B.40.3.5.42 Launch point longitude LSP. Launch point longitude LSP shall be represented by an ANGLE(L) data word as specified in Table B-XXVII and shall be used to indicate the least significant part of the information specified in B.40.3.5.41.



a)ASYNCHRONOUS REQUEST REPORTING

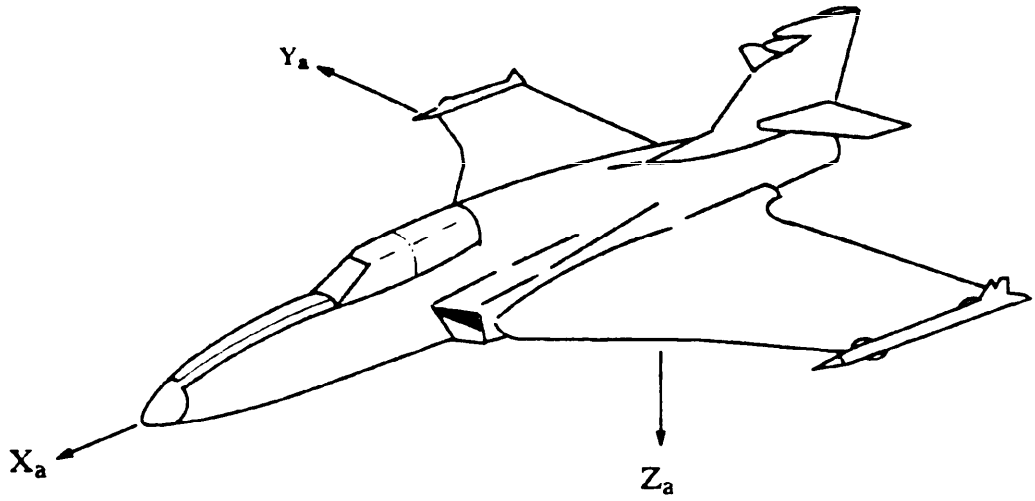
M = NORMAL MESSAGE
T = TRANSMIT VECTOR WORD
$Vc(v)2_n$ = NEXT DIFFERENT VALID COMMAND
$Vc(Sa)_n$ = REQUESTED DATA TRANSACTION



b)ASYNCHRONOUS MESSAGE (SUBADDRESS) REQUEST (SEE NOTE)

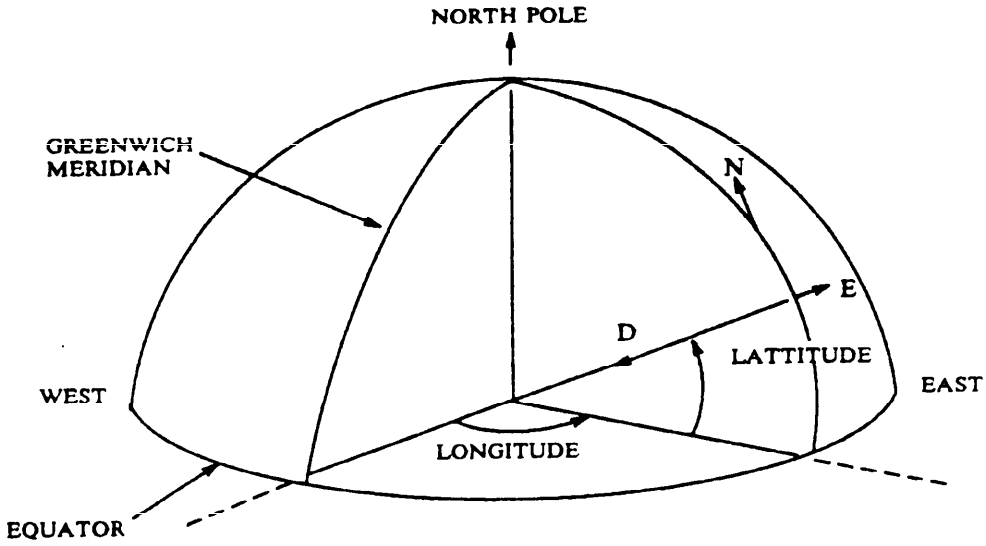
NOTE: THE REQUIREMENT FOR SUBADDRESS RETENTION IF REQUIRED BY THE SYSTEM SPECIFICATION OR ICD, SHALL BE SATISFIED BY THIS ROUTINE.

Figure B-1. Examples of general form of service request protocol.



NOTES:
1. The aircraft body axis system shall be an orthogonal triad of axis Xa, Ya, Za with origin 0a at the fixed location determined to be optimum for that aircraft.
2. The Xa axis is positive in the forward direction of the aircraft.
3. The Ya axis is positive to the right of the forward direction of the aircraft.
4. The Za axis is positive sense down through the belly of the aircraft.

Figure B-2. Aircraft body axis system.

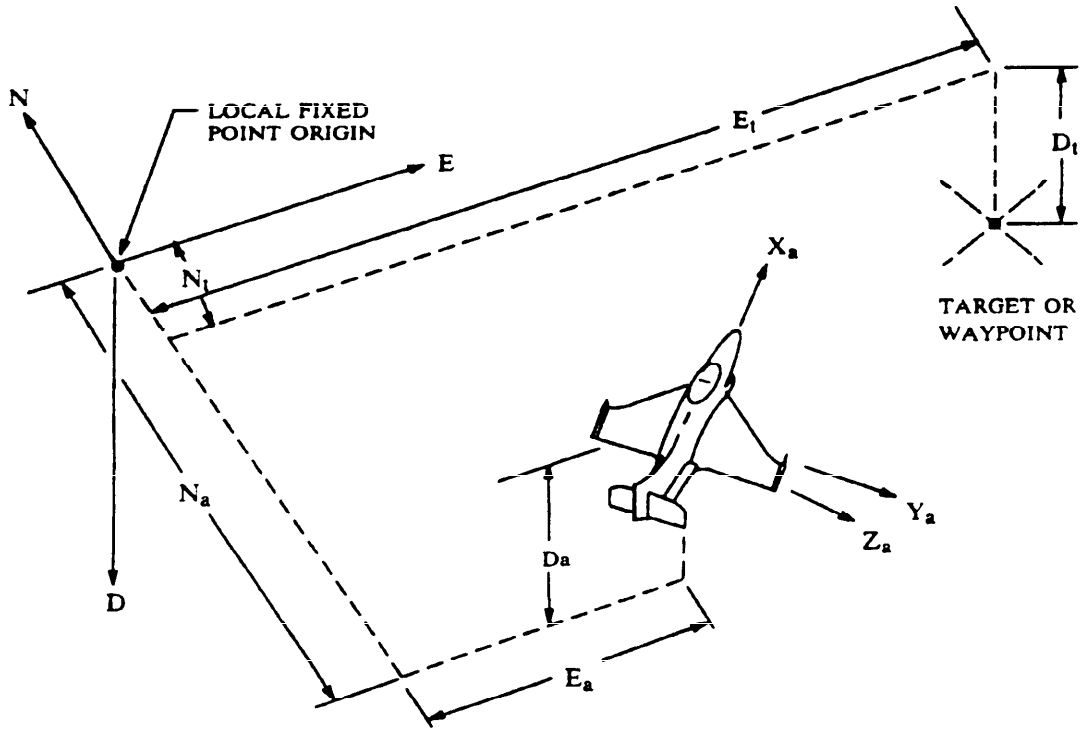


NOTES: 1. The coordinate system is the World Geodetic System of 1984.

2. The local vertical earth axis system shall have the origin coincident with the origin of the aircraft axis system specified in Figure B-2.

3. The local fixed point earth axis system shall have the origin coincident with a fixed point suitable for the operations required.

Figure B-3. Earth axis systems.



NOTE: 1. The local fixed point earth axis system defined in Figure B-3 shall be used as the coordinate system.

Figure B-4. Aircraft, target and waypoint position XYZ to fixed point.

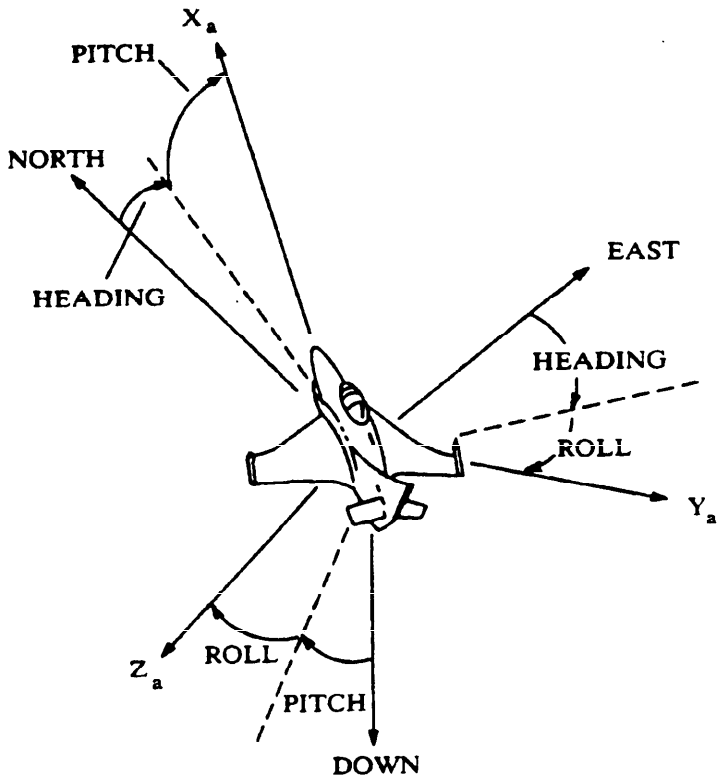


Figure B-5. Earth aircraft alignment.

NOTES:
1. Aircraft true heading, pitch and roll are defined as the angles through which the earth axis system N, E and D as defined by Figure B-3 has to be rotated to align with the aircraft axis system defined in Figure B-2. Euler angle rotation is taken in the order heading then pitch and finally roll.

2. When there is no aircraft pitch or roll, the true heading angle is the angle formed between the aircraft Xa direction and true North. Positive angles reflect that the aircraft is heading East if in forward flight.

3. When there is no aircraft heading or roll, the pitch angle is the angle formed between the aircraft Za direction and local vertical. Positive angles reflect that the aircraft is nose-up.

4. When there is no aircraft heading or pitch, the roll angle is the angle formed between the aircraft Ya direction and the east direction. Positive angles reflect that the aircraft is banked right.

5. Aircraft ground track is the rotation (positive clockwise) about the local vertical axis which brings North into coincidence with the projection of the aircraft total (North, East and Down) velocity vector in the local horizontal plane through the origin 0a.

6. Aircraft magnetic heading is defined identically to true heading except that magnetic North and East are substituted for true North and East.

Figure B-5. Earth aircraft alignment - Continued.

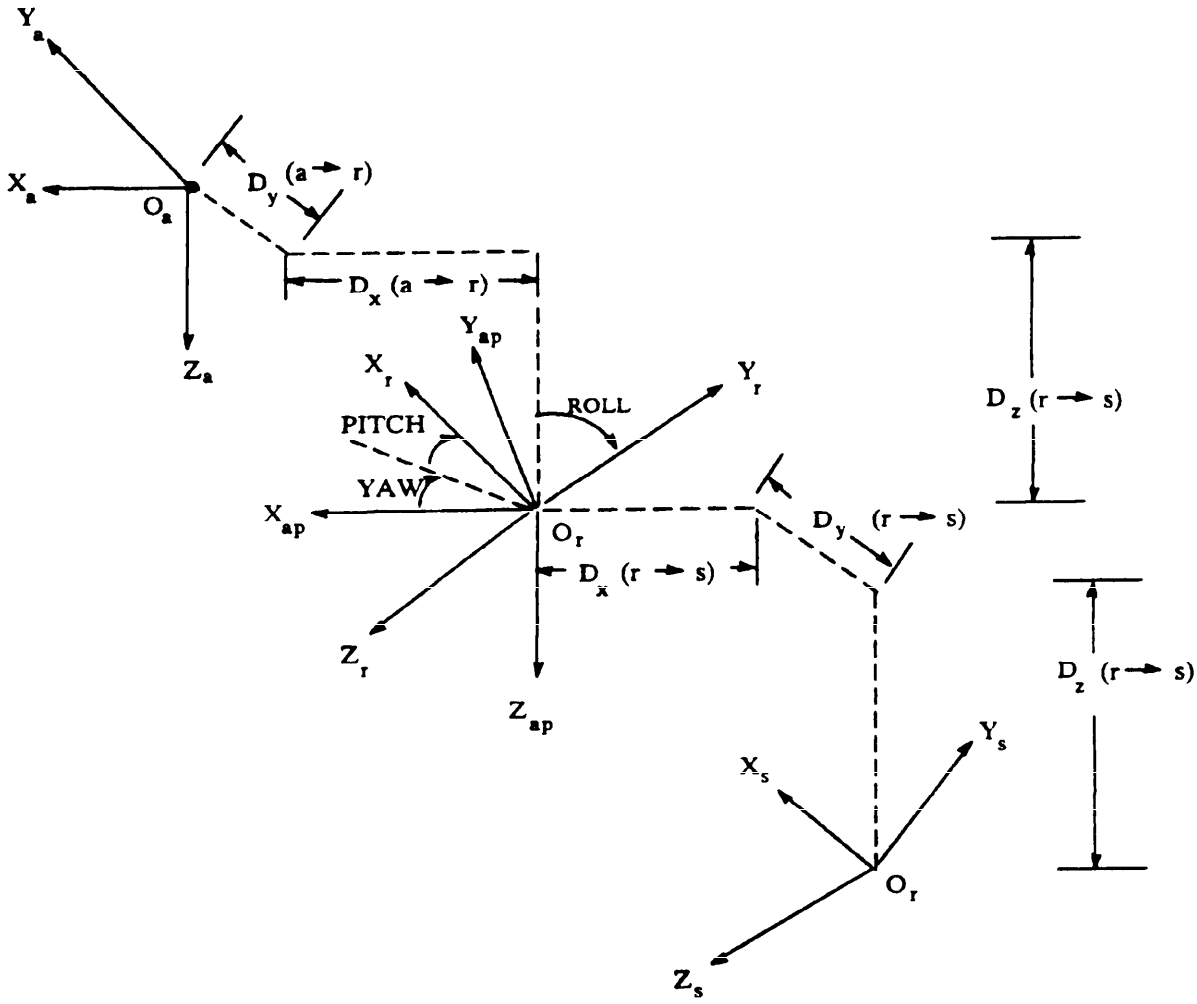


Figure B-6. Aircraft-store alignment.

NOTES:
1. The coordinate system Or, Xap,Yap, Zap is a coordinate system parallel to the aircraft coordinate system but with an origin coincident with the reference axis origin.

2. The coordinate system Oa, Xa, Ya, Za describes the axis system of the aircraft or an aircraft sensor.

3. The coordinate system Os, Xs, Ys, Zs describes the axis system of the store or store sensor.

4. The coordinate system Or, Xr, Yr, Zr describes the reference axis. The origin OR is defined as the reference point and is midway between the attachment points (such as lugs) of the store to the aircraft.

5. The reference axis yaw, pitch and roll alignment angles are defined by rotating the aircraft coordinate system Oa, Xa, Ya, Za through first yaw then pitch and finally roll angles to alight parallel to the reference axis Or, Xr, Yr, Zr.

6. The angle defined as pitch is the angular displacement of the Xr axis from the plane defined by the axis Xap, Yap.

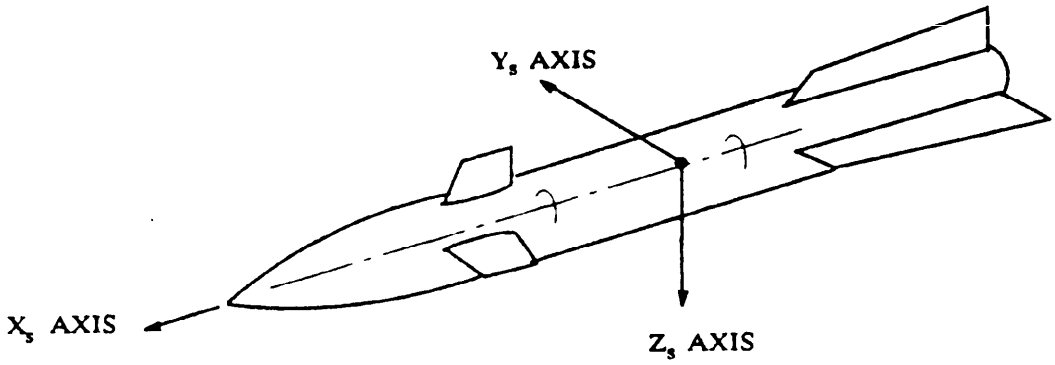
7. The angle defined as roll is the angular displacement of the Yr axis from the plane defined by the axis Xap, Yap.

8. The angle defined as yaw is the angular displacement of the Xr axis from the plane defined by the axis Xap, Zap.

9. The distances Dx(a-r), Dy(a-r), Dz(a-r) are defined as the offset distances from the aircraft axis origin Oa to the reference axis origin or.

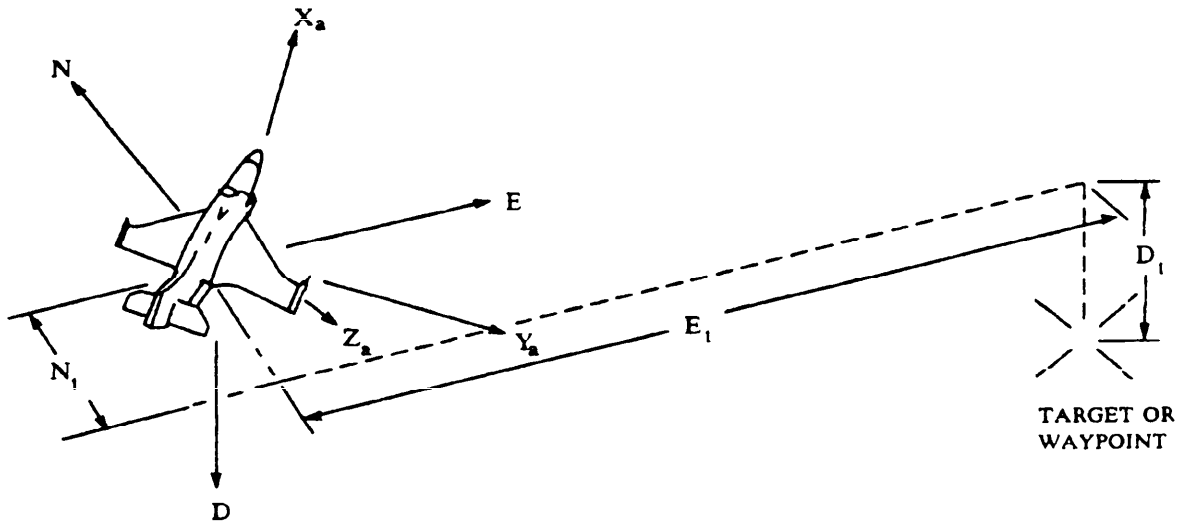
10. The distances Dx(r-s), Dy(r-s), Dz(r-s) are defined as the offset distances from the reference axis origin or to the store axis origin Os.

Figure B-6. Aircraft-store alignment - Continued.



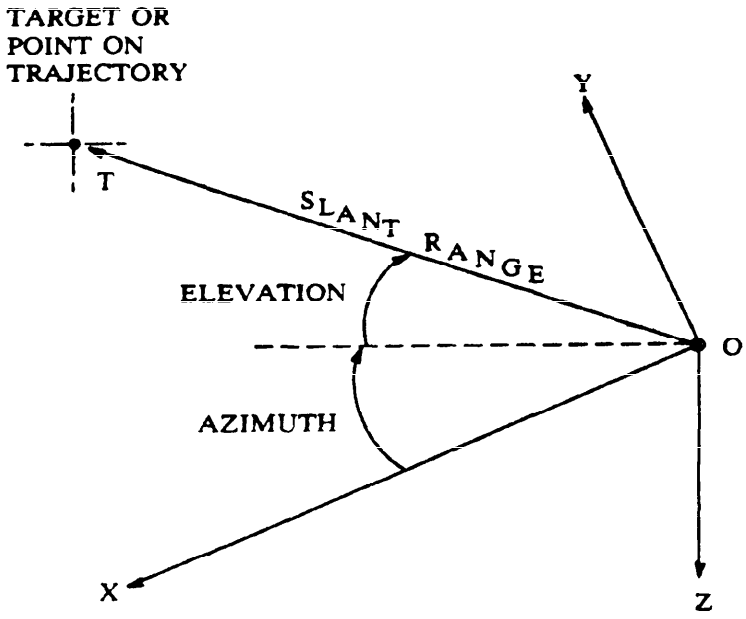
NOTES:
1. The store body axis system shall be an orthogonal triad of axis Xs, Ys, and Zs with origin 0s at the fixed location determined to be optimum for that store.
2. The Xs axis is positive in the forward direction of the store.
3. The Ys axis is positive to the right of the forward direction of the store.
4. The Zs axis is positive down through the belly of the store.

Figure B-7. Store body axis system.



NOTE: 1. The local vertical earth axis system defined in Figure B-3 shall be used as the coordinate system.

Figure B-8. Target and waypoint position XYZ from current position.

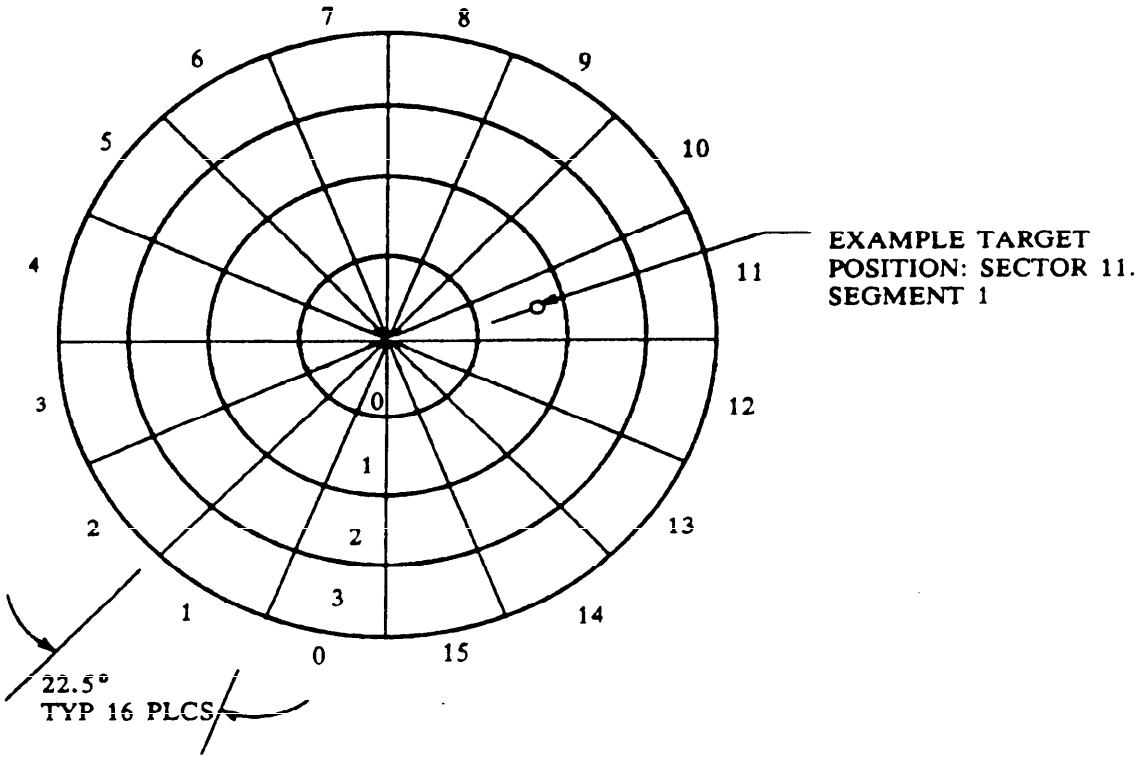


NOTES:
1. The reference coordinate system OXYZ is either the aircraft or store reference system defined in Figure B-2 and B-7 as defined for the relevant use.

2. The azimuth and elevation angles are defined by first rotating the reference system 0XYZ through an azimuth angle and then through an elevation angle to align the OX coordinate vector with the vector OT.

3. Positive azimuth and elevation equate to the upper right as viewed from the origin.

Figure B-9. Target position/store trajectory (polar).



NOTES:
1. This target sector and segment position pattern shall be used in conjunction with the DISCRIMINATOR DESCRIPTION data entity of B.40.3.4.6 and Table B-XLI.

2. Example of application: A bit pattern of 101101 in bit numbers 03 through 08 of the DISCRIMINATOR DESCRIPTION data entity indicates that the target is positioned in Sector 11, Segment 1.

3. The pattern should be positioned over the target group so as to encompass all targets under consideration. The pattern position, orientation, and scaling shall be specified in the system specification or ICD.

Figure B-10. Target sector and segment position.

TABLE B-I. Subaddress/mode field application.

SUBADDRESS FIELD	MESSAGE FORMATS (NOTES 1 and 2)		DESCRIPTION
	RECEIVE	TRANSMIT	
00000 (00)	B.40.1.1.3	B.40.1.1.3	MODE CODE INDICATOR
00001 (01)	USER DEFINED	B.40.2.2.3	STORE DESCRIPTION
00010 (02)	USER DEFINED	USER DEFINED	
00011 (03)	USER DEFINED	USER DEFINED	
00100 (04)	USER DEFINED	USER DEFINED	
00101 (05)	USER DEFINED	USER DEFINED	
00110 (06)	USER DEFINED	USER DEFINED	
00111 (07)	USER DEFINED	USER DEFINED	
01000 (08)	RESERVED	RESERVED	TEST ONLY (NOTE 3)
01001 (09)	USER DEFINED	USER DEFINED	
01010 (10)	USER DEFINED	USER DEFINED	
01011 (11)	B.40.2.2.1	B.40.2.2.2	MISSION STORE CONTROL/MONITOR
01100 (12)	USER DEFINED	USER DEFINED	
01101 (13)	USER DEFINED	USER DEFINED	
01110 (14)	B.40.1.5.8	B.40.1.5.8	MASS DATA TRANSFER
01111 (15)	USER DEFINED	USER DEFINED	
10000 (16)	USER DEFINED	USER DEFINED	
10001 (17)	USER DEFINED	USER DEFINED	
10010 (18)	USER DEFINED	USER DEFINED	
10011 (19)	B.40.2.2.4	B.40.2.2.5	NUCLEAR WEAPON
10100 (20)	USER DEFINED	USER DEFINED	
10101 (21)	USER DEFINED	USER DEFINED	
10110 (22)	USER DEFINED	USER DEFINED	
10111 (23)	USER DEFINED	USER DEFINED	
11000 (24)	USER DEFINED	USER DEFINED	
11001 (25)	USER DEFINED	USER DEFINED	
11010 (26)	USER DEFINED	USER DEFINED	
11011 (27)	B.40.2.2.4	B.40.2.2.5	NUCLEAR WEAPON
11100 (28)	USER DEFINED	USER DEFINED	
11101 (29)	USER DEFINED	USER DEFINED	
11110 (30)	USER DEFINED	USER DEFINED	DATA WRAPAROUND (NOTE 4)
11111 (31)	B.40.1.1.3	B.40.1.1.3	MODE CODE INDICATOR

TABLE B-I. Subaddress/mode field application - Continued.

1/ All message formats designated by USER DEFINED subaddresses shall comply with B.40.2.1.

2/ Command words with subaddress designated as RESERVED shall not be sent to AEIS stores.

3/ Subaddress 08 (decimal) is reserved to avoid misinterpretation of a status word (with service request set) as a command word for subaddress 08. This subaddress may, however, be used for test purposes at the user's risk.

4/ Reference MIL-STD-1553, paragraph 30.7.

TABLE B-II. Vector word (asynchronous message demand) format.

FIELD NAME	BIT NO.	DESCRIPTION
FORMAT FLAG	-00-	Shall be set to Logic 0.
RESERVED (NOTE 1)	-01-	RESERVED. Shall be set to Logic 0.
	-02-	RESERVED. Shall be set to Logic 0.
	-03-	RESERVED. Shall be set to Logic 0.
	-04-	RESERVED. Shall be set to Logic 0.
T/R (NOTE 1)	-05-	Shall be set to a Logic 1 to indicate that the requested message is a transmit command. (Logic 0 indicates a receive command request.)
SUBADDRESS (NOTE 1)	-06-	MSB=16) Bits 6 through 10 contain the
	-07-	) subaddress of the required
	-08-	) message.
	-09-	)
	-10-	LSB=1)
WORD COUNT (NOTE 1)	-11-	MSB=16) Bits 11 through 15 contain the
	-12-	) word count of the required
	-13-	) message.
	-14-	)
	-15-	LSB=1)

1/ The designated field definitions apply only when Bit Number 00 is set to Logic 0. See Table B-III for alternate vector word format.

2/ The vector word shall be set to 0000 hexadecimal, unless the service request notification protocol (B.40.1.5.4) is in progress.

TABLE B-III. Vector word (asynchronous action demand) format.

FIELD NAME	BIT NO.	DESCRIPTION
FORMAT FLAG	-00-	Shall be set to Logic 1.
NOTIFICATION FLAG (NOTE 1)	-01-	User defined.
	-02-	User defined.
	-03-	User defined.
	-04-	User defined.
	-05-	User defined.
	-06-	User defined.
	-07-	User defined.
	-08-	User defined.
	-09-	User defined.
	-10-	User defined.
	-11-	User defined.
	-12-	User defined.
	-13-	User defined.
	-14-	User defined.
	-15-	User defined.

1/ The user defined field definitions apply only when Bit Number 00 is set to Logic 1. See Table B-II for alternate vector word format.

2/ The vector word shall be set to 0000 hexadecimal, unless the service request notification protocol (B.40.1.5.4) is in progress.

TABLE B-IV. Synchronize data word (real time clock) format.

FIELD NAME	BIT NUMBER	DESCRIPTION
TIME	-00-	MSB = 2,097,152) Real time clock in microseconds.
	-01-	)
	-02-	)
	-03-	)
	-04-	)
	-05-	)
	-06-	)
	-07-	)
	-08-	)
	-09-	)
	-10-	)
	-11-	)
	-12-	)
	-13-	)
	-14-	LSB = 128)
FORMAT FLAG	-15-	Shall be set to Logic 0.

1/ The designated field definitions apply only when bit number 15 is set to Logic 0. See Tables B-V and B-VI for alternate synchronize data word formats.

TABLE B-V. Synchronize data word (minor cycle frame and memory map) format.

FIELD NAME	BIT NUMBER	DESCRIPTION
MINOR FRAME	-00- -01- -02- -03- -04- -05- -06-	MSB = 64)))) Minor cycle frame)) LSB = 1)
FUNCTION INDICATOR	-07-	Shall be set to Logic 0.
MEMORY MAP	-08- -09- -10- -11- -12- -13- -14-	MSB = 64))) Designates memory page) mapping for subaddress) memory mapping.) MSB = 1)
FORMAT FLAG	-15-	Shall be set to Logic 1.

1/ The designated field definitions apply only when bit number 07 is set to Logic 0 and bit number 15 is set to Logic 1. See Tables B-IV and B-VI for alternate synchronize data word formats.

n specified in P 40 3 3 24 used to indicate the least significant part of the informatio

TABLE B-VI. Synchronize data word (minor cycle frame and user defined) format.

FIELD NAME	BIT NUMBER	DESCRIPTION
MINOR FRAME	-00-	MSB = 64)
	-01-	)
	-02-	)
	-03-	) Minor cycle frame
	-04-	)
	-05-	)
	-06-	LSB = 1)
FUNCTION INDICATOR	-07-	Shall be set to Logic 1.
USER DEFINED	-08-	User defined.
	-09-	User defined.
	-10-	User defined.
	-11-	User defined.
	-12-	User defined.
	-13-	User defined.
	-14-	User defined.
FORMAT FLAG	-15-	Shall be set to Logic 1.

1/ The designated field definitions apply only when bit number 07 is set to Logic 1 and bit number 15 is set to Logic 1. See Tables B-IV and B-V for alternate synchronize data word formats.

TABLE B-VII. Base message format (BC-RT transfer).

WORD NO.	DESCRIPTION/COMMENT	PARAGRAPH
-CW-	COMMAND WORD (RECEIVE)	B.40.1.1
-01-	HEADER	B.40.2.1.1
-02-	)	
-03-	)	
-04-	)	
-05-	)	
-06-	)	
-07-	)	
-08-	)	
-09-	)	
-10-	)	
-11-	)	
-12-	)	
-13-	)	
-14-	)	
-15-	)	
-16-	) Word positions for user selected data	B.40.2.1.2
-17-	) entities and message checksum.	
-18-	)	
-19-	)	
-20-	)	
-21-	)	
-22-	)	
-23-	)	
-24-	)	
-25-	)	
-26-	)	
-27-	)	
-28-	)	
-29-	)	
-30-	)	
-SW-	STATUS WORD (RECEIVER)	B.40.1.2

TABLE B-VIII. Base message format (RT-BC transfer).

WORD NO.	DESCRIPTION/COMMENT	PARAGRAPH
-CW-	COMMAND WORD (TRANSMIT)	B.40.1.1
-SW-	STATUS WORD (TRANSMITTER)	B.40.1.2
-01-	HEADER	B.40.2.1.1
-02-	)	
-03-	)	
-04-	)	
-05-	)	
-06-	)	
-07-	)	
-08-	)	
-09-	)	
-10-	)	
-11-	)	
-12-	)	
-13-	)	
-14-	)	
-15-	)	
-16-	) Word positions for user selected data	B.40.2.1.2
-17-	) entities and message checksum.	
-18-	)	
-19-	)	
-20-	)	
-21-	)	
-22-	)	
-23-	)	
-24-	)	
-25-	)	
-26-	)	
-27-	)	
-28-	)	
-29-	)	
-30-	)	

TABLE B-IX. Base message format (RT-RT transfer).

WORD NO.	DESCRIPTION/COMMENT	PARAGRAPH
-CW-	COMMAND WORD (RECEIVE)	B.40.1.1
-CW-	COMMAND WORD (TRANSMIT)	B.40.1.1
-SW-	STATUS WORD (TRANSMITTER)	B.40.1.2
-01-	HEADER	B.40.2.1.1
-02-	)	
-03-	)	
-04-	)	
-05-	)	
-06-	)	
-07-	)	
-08-	)	
-09-	)	
-10-	)	
-11-	)	
-12-	)	
-13-	)	
-14-	)	
-15-	)	
-16-	)Word positions for user selected data	B.40.2.1.2
-17-	) entities and message checksum.	
-18-	)	
-19-	)	
-20-	)	
-21-	)	
-22-	)	
-23-	)	
-24-	)	
-25-	)	
-26-	)	
-27-	)	
-28-	)	
-29-	)	
-30-	)	
-SW-	STATUS WORD (RECEIVER)	B.40.1.2

TABLE B-X. Header word.

HEADER (HEXADECIMAL)	NOTE	APPLICATION
0000) THROUGH) 03FF)	1	User selected.
0400	-	Mission control message (B.40.2.2.1)
0401) THROUGH) 041F)	2	RESERVED
0420	-	Mission store monitor message (B.40.2.2.2)
0421	-	Store description message (B.40.2.2.3)
0422	-	Transfer control message (B.40.2.3.3.1)
0423	-	Transfer monitor message (B.40.2.3.3.2)
0424) THROUGH) 04FF)	3	RESERVED
0500) THROUGH) FFFF)	1	User selected.

1/ Codes in this block are available for application in user defined messages.

2/ Codes in this block are assigned for safety critical standard messages. Use of reserved codes in this block require approval from the contracting authority.

3/ Codes in this block are assigned for non-safety critical standard messages. Use of reserved codes in this block requires approval from the contracting authority.

TABLE B-XI. Mission store control (BC-RT transfer) (Note 1).

WORD NO.	DESCRIPTION/COMMENT	PARAGRAPH
-CW-	COMMAND WORD (Subaddress 01011 Binary)	B.40.1.1
-01-	HEADER (0400 hexadecimal)	B.40.2.1.1
-02-	Validity for words 01-16	B.40.3.1.2
-03-	Validity for words 17-30	B.40.3.1.2
-04-	Control of critical state of store -	B.40.3.1.3
-05-	Set 1 with critical authority	B.40.3.1.5
-06-	Control of critical state of store -	B.40.3.1.4
-07-	Set 2 with critical authority	B.40.3.1.5
-08-	Fuzing mode selection	B.40.3.1.8
-09-	Arm time from release	B.40.3.1.10
-10-	Fuze function time from release	B.40.3.1.11
-11-	Fuze function time from impact	B.40.3.1.12
-12-	Fuze function distance	B.40.3.1.13
-13-	Fire interval	B.40.3.1.14
-14-	Number to fire	B.40.3.1.15
-15-	Fuze function height	B.40.3.1.25
-16-	)	
-17-	)	
-18-	)	
-19-	)	
-20-	)	
-21-	)	
-22	)Reserved data words (0000 hexadecimal)	B.40.3.1.1
-23-	)	
-24-	)	
-25-	)	
-26-	)	
-27-	)	
-28-	)	
-29-	)	
-30-	Checksum word	B.40.1.5.2
-SW-	STATUS WORD	B.40.1.2

1/ The message format shown is for BC-RT transfers. The data entities and entity sequence for word numbers 01 through 30 may also be applied to RT-RT transfers providing that the transmitting RT is not an AEIS store.

TABLE B-XII. Mission store monitor (RT-BC transfer) (Note 1).

WORD NO.	DESCRIPTION/COMMENT	PARAGRAPH
-CW-	COMMAND WORD (Subaddress 01011 binary)	B.40.1.1
-SW-	STATUS WORD	B.40.1.2
-01-	HEADER (0420 hexadecimal)	B.40.2.1.1
-02-	Validity for words 01-16	B.40.3.1.2
-03-	Validity for words 17-30	B.40.3.1.2
-04-	Critical monitor 1	B.40.3.1.6
-05-	Critical monitor 2	B.40.3.1.7
-06-	Fuzing/arming mode status	B.40.3.1.9
-07-	Protocol status	B.40.3.1.16
-08-	Monitor of arm time from release	B.40.3.1.10
-09-	Monitor of fuze function time from release	B.40.3.1.11
-10-	Monitor of fuze function time from impact	B.40.3.1.12
-11-	Monitor of fuze function distance	B.40.3.1.13
-12-	Monitor of fire interval	B.40.3.1.14
-13-	Monitor of number to fire	B.40.3.1.15
-14-	Monitor of fuze function height	B.40.3.1.25
-15-	)	
-16-	)	
-17-	) Reserved words (0000 hexadecimal)	B.40.3.1.1
-18-	)	
-19-	)	
-20-	)	
-21-	)	
-22-	)	
-23-	)	
-24-	)	
-25-	)	
-26-	)	
-27-	)	
-28-	)	
-29-	)	
-30-	Checksum word	B.40.1.5.2

1/ The message format shown is for RT-BC transfers. The data entities and entity sequence for word numbers 01 through 30 may also be applied to RT-RT transfers provided that the receiving RT is not an AEIS store.

TABLE B-XIII. Store description message (Note 1).

WORD NO.	DESCRIPTION/COMMENT	PARAGRAPH
-CW-	COMMAND WORD (Subaddress 00001 binary)	B.40.1.1
-SW-	STATUS WORD	B.40.1.2
-01-	HEADER (0421 hexadecimal)	B.40.2.2.3.1
-02-	Country code	B.40.2.2.3.2
-03-	Store identity (binary)	B.40.2.2.3.3
-04-	Store identity (ASCII) 1	B.40.2.2.3.3
-05-	Store identity (ASCII) 2	B.40.2.2.3.3
-06-	Store identity (ASCII) 3	B.40.2.2.3.3
-07-	Store identity (ASCII) 4	B.40.2.2.3.3
-08-	Store identity (ASCII) 5	B.40.2.2.3.3
-09-	Store identity (ASCII) 6	B.40.2.2.3.3
-10-	Store identity (ASCII) 7	B.40.2.2.3.3
-11-	Store identity (ASCII) 8	B.40.2.2.3.3
-12-	Maximum interruptive BIT time	B.40.2.2.3.4
-13-	)	
-14-	)	
-15-	)	
-16-	)	
-17-	)	
-18-	)	
-19-	)	
-20-	)	
-21-	)	
-22-	)	
-23-	)	
-24-	)	
-25-	)	
-26-	) Reserved words (0000 hexadecimal)	B.40.3.1.1
-27-	)	
-28-	)	
-29-	)	
-30-	Checksum word	B.40.2.2.3.5

1/ The message format shown is for RT-BC transfers. The data entities and entity sequence for word numbers 01 through 30 may also be applied to RT-RT transfers provided that the receiving RT is not an AEIS store.

TABLE B-XIV. Country code.

FIELD NAME	BIT NUMBER	DESCRIPTION
CHARACTER 1	-00-	(Shall be set to Logic 0.)
	-01-	High Order Bit
	-02-	
	-03-	
	-04-	
	-05-	
	-06-	
	-07-	Low Order Bit
CHARACTER 2	-08-	(Shall be set to Logic 0.)
	-09-	High Order Bit
	-10-	
	-11-	
	-12-	
	-13-	
	-14-	
	-15-	Low Order Bit.

1/ The country code shall be represented by the character code set defined in ANSI X3.4 American Standard for Information Interchange (ASCII) using the appropriate country code specified in ISO 3166. (Only upper case alphabetic characters shall be used.)

2/ Bit numbers 00 and 08 shall be set to Logic 0.

3/ The country code shall be used as a qualifier of the store identity (binary) (Table B-XV) and store identity (ASCII) (Table B-XVI) to distinguish between store identification codes which may be duplicative between different countries.

concentration of Ou shall not exceed 1.1x10-7 grams per

TABLE B-XV. Store identity (binary).

FIELD NAME	BIT NUMBER	DESCRIPTION
STORE TYPE	-00-	MSB = 1024)
	-01-	)
	-02-	)
	-03-	)
	-04-	) Shall be set to indicate the
	-05-	) store type code value as assigned by the DoD control point for store nomenclature.
	-06-	)
	-07-	)
	-08-	)
	-09-	)
	-10-	LSB = 1)
STORE VARIANT	-11-	MSB = 16)
	-12-	) Shall be set to indicate the store variant code value as assigned by the DoD control point for store nomenclature.
	-13-	)
	-14-	)
	-15-	LSB = 1)

TABLE B-XVI. Store identity (ASCII).

FIELD NAME	BIT NUMBER	DESCRIPTION
CHARACTER 1	-00- -01- -02- -03- -04- -05- -06- -07-	(Shall be set to Logic 0.) High Order Bit Low Order Bit
CHARACTER 2	-08- -09- -10- -11- -12- -13- -14- -15-	(Shall be set to Logic 0.) High Order Bit Low Order Bit

1/ The characters shall be represented by the American National Standard for Information Interchange (ASCII) character code set defined in ANSI X3.4. Alphabetical characters shall be upper case.

2/ Bit numbers 00 and 08 shall be set to Logic 0.

3/ The store type designator shall be a 16 character maximum code assigned by the DoD control point for store nomenclature. The type designator shall be left justified blank filled into the eight store identity (ASCII) data words in the store description message (Table B-XIII).

Example: For type designators AGM-65C and AN/ALQ-137A(V)10:

Store identity (ASCII) word no.	1		2		3		4		5		6		7		8	
Character no.	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	G	M	-	6	5	C									
	A	N	/	A	L	Q	-	1	3	7	A	(	V	)	1	0

TABLE B-XVII. Transfer Control (TC) message format (Note 1).

WORD NO.	DESCRIPTION/COMMENT		PARAGRAPH/TABLE
-CW-	COMMAND WORD (Subaddress 01110 binary)		B.40.1.1
-01-	HEADER (0422 hexadecimal)		B.40.2.1.1
-02-	Instruction	(Note 1)	Table B-XVIII
-03-	Subaddress select		Table B-XXI
-04-	File number	(Note 2)	Table B-XXII
-05-	Record number	(Note 3)	Table B-XXII
-06-	Block number	(Note 4)	Table B-XXII
-07-	File/record checksum	(Note 5)	---
-08-	Checksum word position		B.40.1.5.2
-SW-	STATUS WORD		B.40.1.2

1/ All TC messages shall contain an instruction word with data bits set to one of the allowable combinations identified in Table B-XIX. All TC messages shall contain appropriate data in the message data words for the various instruction word commands as defined in Table B-XX.

2/ The NUMBER A field (Table B-XXII) shall be set to the total number of files (Nf) to be transferred (or erased) and the NUMBER B field shall be set to the number of the current selected file (Sf). Valid file numbers range from 1 through 255.

3/ The NUMBER A field (Table B-XXII) shall be set to the total number of records (Nr) in the selected file and the NUMBER B field shall be set to the number of the current selected record (Sr). Valid record numbers range from 1 through 255.

TABLE B-XVII. Transfer Control (TC) message format (Note 1) - Continued.

4/ The NUMBER A field (Table B-XXII) shall be set to the total number of blocks (Nb) in each record of the selected file (Sf). The NUMBER B field shall be set to the block number (Sb) at which transfer (or erase) will start. For download transfer modes, Nb shall be the total number of blocks in the designated record and Sb shall be 1. For upload transfer modes, Nb shall be the total number of blocks in the designated record and the starting block number (Sb) may be greater than 1. Valid block numbers range from 1 through 255.

5/ The checksum word shall either be used to validate the designated file/record or, if the checksum is embedded in the file/record data, this word shall be set to 0000 hexadecimal. If the checksum is embedded, the checksum algorithm shall be as specified in the system specification or interface control document.

6/ The values for Nr (Note 3) and Nb (Note 4) used for transfer of a specific file will be fixed for a particular upload or download operation for that file. Upon initiation of a new upload or download operation on the same file, Nr and Nb may be changed as specified by the ICD or system specification.

TABLE B-XVIII. Instruction word.

FIELD NAME	BIT NUMBER	DESCRIPTION
INSTRUCTION TYPE	-00-	No operation (Note 1)
	-01-	Select download mode (Note 2)
	-02-	Select upload mode (Note 3)
	-03-	Start new file/record (Note 4)
	-04-	Erase all files (Note 5)
	-05-	Erase designated file (Note 6)
	-06-	Erase designated record (Note 7)
	-07-	Select echo mode (Note 8)
	-08-	Calculate file checksum (Note 9)
	-09-	Calculate record checksum (Note 10)
	-10-	System start (Note 11)
	-11-	Exit transfer mode (Note 12)
RESERVED	-12-	Shall be set to a Logic 0.
	-13-	Shall be set to a Logic 0.
	-14-	Shall be set to a Logic 0.
	-15-	Shall be set to a Logic 0.

1/ A Logic 1 designates a command to the store to update the TM message with current status of the mass data transfer transactions associated with: (1) the TD subaddress designated in the subaddress select word (word 03) of this TC message, or (2) the file, record and block designated by data words 04, 05 and 06 of this message.

2/ A Logic 1 designates a command to the store to enter (or remain in) the download mass data transfer mode. A Logic 0 designates that entry into the download mode is not commanded. See Note 12 for download mode exit.

3/ A Logic 1 designates a command to the store to enter (or remain in) the upload mass data transfer mode. A Logic 0 designates that entry into the upload mode is not commanded. See note 12 for upload mode exit.

4/ A logic 1 designates a command to the store to prepare for receiving or transmitting, as applicable, Transfer Data (TD) messages (through the subaddress designated in word 03 of the TC message) containing file data designated by words 04, 05 and 06 in the TC message.

that fuel. In addition, the equipment shall be capable of

TABLE B-XVIII. Instruction word. - Continued.

5/ A Logic 1 designates a command to the store to erase data in all store contained memory addresses allocated to mass data transfer storage.

6/ A Logic 1 designates a command to the store to erase Ef memory addresses beginning at the memory location designated by Sf in word 04 of the TC message with Sr and Sb in words 05 and 06 set to 1. The value of Ef shall be Nr X Nb X 29 where Nr and Nb are defined in words 05 and 06, respectively, of the TC message.

7/ A Logic 1 designates a command to the store to erase Er memory addresses beginning at the memory location designated by Sf and Sr in words 04 and 05, respectively, of the TC message with Sb in word 06 set to 1. The value of Er shall be Nb X 29 where Nb is defined in word 06 of the TC message.

8/ A Logic 1 designates a command to the store to enter (or remain in) the TD echo mode. The TD echo mode applies only if the store is in the download transfer mode. Stores in the TD echo mode shall respond to transmit commands to the TD message subaddress. The required response shall be a valid status word and the commanded number of data words, where the data words are a copy of the last set of data words received by the store in the TD receive message at the same subaddress. A Logic 0 designates a command to the store to exit the TD echo mode.

9/ A Logic 1 designates a command to the store to run the file checksum test on the file designated in word 04 of this TC message. (See Note 5 of Table B-XVII.) The store shall reflect the resulting checksum status in the TM message.

10/ A Logic 1 designates a command to the store to run the record checksum test on the record designated in words 04 and 05 of this TC message (See Note 5 of Table B-XVII). The store shall reflect the resulting checksum status in the TM message.

TABLE B-XVIII. Instruction word. - Continued.

11/ A Logic 1 designates system start. Stores receiving this while in the system download mode shall initiate program execution at the memory location designated by Sf, Sr and Sb in words 04, 05 and 06, respectively, of this TC message. Stores receiving this while in the upload mode shall designate the memory location at which the aircraft is to initiate program execution by inserting the required values of Sf, Sr and Sb into words 05, 06 and 07, respectively, of the TM message. Also, if in the upload mode, the store shall ignore the contents of words 04, 05 and 06 of this TC message.

12/ A Logic 1 designates a command to the store to exit the mass data transfer mode. Re-entry into the mass data transfer mode shall only occur through receipt of download or upload mode select commands (Notes 2 and 3).

TABLE B-XIX. Allowable instruction word bit states.

INSTRUCTION WORD BIT NUMBER	BIT NAME	ALLOWABLE BIT COMBINATIONS													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	No operation	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Download	X	1	1	1	1	1	1	1	0	0	0	0	0	0
2	Upload	X	0	0	0	0	0	0	0	1	1	1	1	0	0
3	Start file/record	X	0	1	0	0	0	0	0	0	1	0	0	0	0
4	Erase all files	X	0	0	1	0	0	0	0	0	0	0	0	0	0
5	Erase designated file	X	0	0	0	1	0	0	0	0	0	0	0	0	0
6	Erase designated record	X	0	0	0	0	1	0	0	0	0	0	0	0	0
7	Select echo mode	X	X	X	X	X	X	X	X	0	0	0	0	0	0
8	Calculate file checksum	X	0	0	0	0	0	1	0	0	0	1	0	0	0
9	Calculate rcd checksum	X	0	0	0	0	0	0	1	0	0	0	1	0	0
10	System start	X	0	0	0	0	0	0	0	0	0	0	0	1	0
11	Exit transfer	X	0	0	0	0	0	0	0	0	0	0	0	1	1

1/ The table represents the 14 allowable bit combinations of the 12 bit instruction type field of Table B-XVIII.

2/ X = Don't care.

TABLE B-XX. TC message data word requirements.

DATA WORD	TC MESSAGE INSTRUCTION COMMAND (NOTES 1 AND 2)						
	DOWNLOAD SELECT	UPLOAD SELECT	START NEW FILE/RCD	ERASE	CALL CHKSUM	SYSTEM START	EXIT
HEADER	YES	YES	YES	YES	YES	YES	YES
INSTRUCTION	YES	YES	YES	YES	YES	YES	YES
SUBADDRESS SELECT	NO	NO	YES	NO	NO	NO	NO
FILE NO.	NO	NO	YES	YES	YES	YES	NO
RECORD NO.	NO	NO	YES	YES	(NOTE 3)	YES	NO
BLOCK NO.	NO	NO	YES	YES	NO	YES	NO
FILE/RCRD CHKSUM	NO	NO	NO	NO	YES	NO	NO
MSG CHECKSUM	YES	YES	YES	YES	YES	YES	YES

1/ Data words designated with a NO shall be set to 0000 hexadecimal.

2/ Data words designated with a YES shall be encoded as defined in Table B-XVII.

3/ The record number word shall be encoded as defined in Table B-XVII if calculate record checksum is commanded and shall be set to 0000 hexadecimal if calculate file checksum is commanded.

blank 0, the number of servicing points is to be the same

TABLE B-XXI. Subaddress select.

FIELD NAME	BIT NO.	DESCRIPTION
SUBADDRESS (NOTE 1)	-00-	MSB = 16
	-01-	
	-02-	Subaddress of TD message for designated file, record or block.
	-03-	
	-04-	LSB = 1
RESERVED	-05-	
	-06-	
	-07-	
	-08-	
	-09-	Shall be set to Logic 0.
	-10-	
	-11-	
	-12-	
	-13-	
	-14-	
	-15-	

1/ This bit field shall designate the transmit or receive subaddress for the TD message in applications where the store can use different subaddresses for file data transfer. The system specification shall identify those subaddresses available to the TD message and the number of different files, records or blocks that can be transferred back-back (see B.30.4.6) through these different subaddresses. As an alternative, the system specification or interface control document may pre-assign specific subaddresses to specific file, record or block numbers. Under this alternative, the subaddress select word shall be set to 0000 hexadecimal, or to the applicable pre-assigned subaddress.

Quick disconnect couplings used in connecting equip-

TABLE B-XXII. Dual binary number.

FIELD NAME	BIT NO.	DESCRIPTION
NUMBER A	-00-	MSB = 128)
	-01-	)
	-02-	)
	-03-	) Binary encoded number
	-04-	)
	-05-	)
	-06-	)
	-07-	LSB = 1)
NUMBER B	-08-	MSB = 128)
	-09-	)
	-10-	)
	-11-	) Binary encoded number
	-12-	)
	-13-	)
	-14-	)
	-15-	LSB = 1)

TABLE B-XXIII. Transfer Monitor (TM) message format.

WORD NO.	DESCRIPTION/COMMENT		PARAGRAPH/TABLE
-CW-	COMMAND WORD (Subaddress 01110 binary)		B.40.1.1
-SW-	STATUS WORD		B.40.1.2
-01-	HEADER (0423 hexadecimal)		B.40.2.1.1
-02-	Last received instruction	(Note 1)	Table B-XVIII
-03-	Transfer mode status	(Note 2)	Table B-XXIV
-04-	Current selected subaddress	(Note 3)	Table B-XXI
-05-	Current file number	(Note 4)	Table B-XXII
-06-	Current record number	(Note 5)	Table B-XXII
-07-	Current block number	(Note 6)	Table B-XXII
-08-	Current file/record checksum	(Note 7)	
-09-	Checksum word position		B.40.1.5.2

1/ This word shall be a copy of the current instruction word. The current instruction word is defined as the instruction word (received in an error-free TC message) associated with the TC message or TD message, whichever was last received. For back-back transfers where several messages at different TD subaddresses were received, the current instruction word is defined as the instruction associated with the last received TD subaddress.

2/ This word shall reflect the status of the store's mass data transfer operation associated with the TC message or the TD message, whichever was last received.

3/ This word shall reflect the subaddress selected in the TC message (data word 03) or the subaddress of the TD message, whichever was last received.

TABLE B-XXIII. Transfer Monitor (TM) message format - Continued.

4/ This word shall reflect the current file number information. The NUMBER A field shall reflect the total number of files (Nf) designated in the TC message. The NUMBER B field shall reflect the current active file number (Sf). The current active file number is defined as the number received in either the NUMBER B field of the TC message file number word or the file number associated with the TD message, whichever was received last.

5/ This word shall reflect the current record number information. The NUMBER A field shall reflect the total number of records (Nr) expected by the store for the current active file number (see Note 4). The NUMBER B field shall reflect the current active record number (Sr). The current active record number is defined as either the record number received in the TC message or the record number associated with a TD message transaction, whichever was last received. For download operations, the TD transaction record number is the value in the NUMBER A field of TD message data word 01. For upload operations, the TD message transaction record number is the record number after the block and record incrementing operation described in B.40.2.3.2.2.d.

6/ This word shall reflect the current block number information. The NUMBER A field shall reflect the total number of blocks (Nb) associated with each record of the current active file number (see Note 4). The NUMBER B field shall reflect the current active block number (Sb). The current active block number is defined as either the number received in the NUMBER B field of the TC message block number word or the block number associated with a TD message transaction, whichever was last received. For download operations, the TD transaction block number is the value in the NUMBER B field of TD message data word 01. For upload operations, the TD message transaction block number is the block number after the block incrementing operation described in B.40.2.3.2.2.d.

7/ This word shall reflect the current checksum calculated by the store for the current active file (see Note 4) or current active record (see Note 5), as applicable. If no file or record checksum calculation has been commanded by the TC message or if the commanded checksum calculation has not been completed, this word shall be set to 0000 hexadecimal (see Note 5 of Table B-XVII). This word shall be reset to 0000 hexadecimal when bit 7 (checksum calculation completed) of the transfer mode status is reset (see Note 7 of Table B-XXIV).

TABLE B-XXIV. Transfer mode status

FIELD NAME	BIT NO.	DESCRIPTION
MODE STATUS (Note 1)	-00-	In download mode
	-01-	In upload mode
	-02-	Ready for block (Note 2)
	-03-	Erase in progress (Note 3)
	-04-	Erase completed (Note 4)
	-05-	Echo mode selected (Note 5)
	-06-	Checksum calculation in progress (Note 6)
	-07-	Checksum calculation completed (Note 7)
	-08-	Checksum failed (Note 8)
	-09-	Execution started (Note 9)
	-10-	Exit in progress (Note 10)
RESERVED	-11-	Shall be set to a Logic 0.
	-12-	Shall be set to a Logic 0.
	-13-	Shall be set to a Logic 0.
	-14-	Shall be set to a Logic 0.
	-15-	Shall be set to a Logic 0.

1/ A Logic 1 set bit shall designate that the associated transfer mode state is active. A Logic 0 set bit shall indicate that the associated state is not active.

2/ This bit shall be set to a Logic 1 following a start new file/record command (see Note 4 of Table B-XVIII) when the store is ready to accept the TD messages to the subaddress designated by word 04 in this TM message.

3/ This bit shall be set to a Logic 1 when the store is in the process of erasing the current active file(s) or record(s) designated in this TM message. This bit shall be set to a Logic 0 when the store is not erasing the current active file(s) and record(s). (Note that an erase operation may, however, be in progress in a record space associated with a different back-back transfer operation.)

4/ This bit shall be set to a Logic 1 when the store has completed erasure of the current active file(s) or record(s) designated in this TM message. This bit shall be reset to a Logic 0 when a new TC message is received commanding operations on the same designated file(s) or record(s) or commanding the start of a new transfer on the same TD message subaddress.

TABLE B-XXIV. Transfer mode status - Continued.

5/ This bit shall be set to a Logic 1 when the store is in the echo mode for the designated TD message subaddress.

6/ This bit shall be set to a Logic 1 when the store is in the process of calculating the file or record checksum for the current active file or record designated in this TM message. This bit shall be reset to a Logic 0 when the checksumming is not in progress. (Note that checksumming may, however, be in progress for other files or records associated with back-back transfers.)

7/ This bit shall be set to a Logic 1 after the store completes the checksum test for the current active file or record designated in this TM message. This bit shall be set to a Logic 1 concurrent with the transition of bit number 06 (Note 6) from a Logic 1 to a Logic 0 state. This bit shall be set to a Logic 1 only when the state of bit number 08 (Note 8) reflects the result of the checksum test. This bit shall be reset to Logic 0 when a new TC message is received commanding operations on the same designated file or record or commanding the start of a new transfer through the same subaddress.

8/ This bit shall be set to a Logic 1 if the store computed checksum on the current active file or record, designated in this TM message, indicates checksum failure. This bit shall be set to a Logic 0 if the checksum test passes. This bit shall be set to a Logic 0 if bit number 07 (Note 7) is set to a Logic 0.

9/ This bit shall be set to a Logic 1 when the store starts program execution as commanded by the associated TC message. This bit shall be reset to Logic 0 when a new TC message is received commanding any new operation.

10/ This bit shall be set to a Logic 1 when the store is in the process of exiting the transfer mode. This bit shall be set to a Logic 0 once the exit process is complete. (At this point, the associated "in download mode" bit (bit 01) and "in upload mode" bit (bit 02) shall also be reset to a Logic 0.)

TABLE B-XXV. Transfer Data (TD) message format (Note 1).

WORD NO.	DESCRIPTION/COMMENT	PARAGRAPH/TABLE
-CW-	COMMAND WORD (Subaddress A/R)	B.40.1.1
-01-	Record/block number (Note 2)	Table B-XXII
-02-	)	
-03-	)	
-04-	)	
-05-	)	
-06-	)	
-07-	)	
-08-	)	
-09-	)	
-10-	)	
-11-	)	
-12-	)	
-13-	)	
-14-	)	
-15-	) File data (Note 3)	
-16-	)	
-17-	)	
-18-	)	
-19-	)	
-20-	)	
-21-	)	
-22-	)	
-23-	)	
-24-	)	
-25-	)	
-26-	)	
-27-	)	
-28-	)	
-29-	)	
-30-	)	
-SW-	STATUS WORD	B.40.1.2

TABLE B-XXV. Transfer Data (TD) message format (Note 1) - Continued.

1/ This is a 30 word fixed length message.

2/ This word shall be encoded with the record and block number of the file data contained in this TD message. The NUMBER A field shall reflect the current record number (Sr) and the NUMBER B field shall reflect the current block number (Sb). A zero set Sb shall indicate a no-operation condition: The file data in the message shall be discarded, but the TM message shall be updated to reflect the current status of the last TD message transaction at this TD subaddress. Stores which receive a zero set Sr or an Sr value that has not been initialized shall discard the file data received in this TD message and shall not update the TM message.

3/ Word positions 02 through 30 shall be filled with either words of operational file data or sufficient words of 0000 hexadecimal value to maintain the fixed message length criteria. The file data shall be positioned in the message such that message data word 02 shall be placed in memory location N, message data word 03 shall be placed in memory location N+1, and so forth. The value of N shall be determined based on the selected file, record and block number.

TABLE B-XXVI. Data entity list.

CATEGORY	DATA ENTITY		PARAGRAPH
Time	Arm delay from release		B.40.3.1.10
	Function delay from release		B.40.3.1.11
	Function delay from impact		B.40.3.1.12
	Fire interval		B.40.3.1.14
	Interruptive BIT time		B.40.3.1.20
	Post launch operation delay	(MSP and LSP)	B.40.3.1.21-22
	Aircraft system time at reset	(MSP and LSP)	B.40.3.3.72-73
	Time	(MSP, LSP and LLSP)	B.40.3.3.82-84
	Time tag	(MSP, LSP and LLSP)	B.40.3.3.85-87
	Aircraft time	(MSP, LSP and LLSP)	B.40.3.3.88-90
	Time at indicated target position	(MSP and LSP)	B.40.3.4.1-2
	Target emission pulsewidth	(MSP and LSP)	B.40.3.4.63-64
	Time at indicated waypoint position	(MSP and LSP)	B.40.3.5.1-2
	Guidance data bit length	(MSP and LSP)	B.40.3.5.11-12
Frequency	Target emission frequency	(MSP, ISP and LSP)	B.40.3.4.55-57
	Target bandwidth	(MSP, ISP and LSP)	B.40.3.4.58-60
	Target PRF	(MSP and LSP)	B.40.3.4.61-62
	Mid-course guidance data link frequency	(MSP and LSP)	B.40.3.5.9-10
Distance	Fuze function distance		B.40.3.1.13
	Fuze function height		B.40.3.1.25
	Depth of water	(MSP and LSP)	B.40.3.3.29-30
	Wave height		B.40.3.3.31
	Inertial height of aircraft	(MSP and LSP)	B.40.3.3.39-40
	Aircraft-fixed point distance North	(MSP and LSP)	B.40.3.3.41-42
	Aircraft-fixed point distance East	(MSP and LSP)	B.40.3.3.43-44
	Aircraft-fixed point distance Down	(MSP and LSP)	B.40.3.3.45-46
	Height above ground level	(MSP and LSP)	B.40.3.3.47-48
	Barometric altitude	(MSP and LSP)	B.40.3.3.49-50
	X distance between reference and aircraft origins		B.40.3.3.56
	Y distance between reference and aircraft origins		B.40.3.3.57
	Z distance between reference and aircraft origins		B.40.3.3.58
	Target inertial height	(MSP and LSP)	B.40.3.4.15-16
	North target distance from fixed point origin	(MSP and LSP)	B.40.3.4.17-18
	East target distance from fixed point origin	(MSP and LSP)	B.40.3.4.19-20
	Target distance down from fixed point origin	(MSP and LSP)	B.40.3.4.21-22
	North target distance from current position	(MSP and LSP)	B.40.3.4.23-24
	East target distance from current position	(MSP and LSP)	B.40.3.4.25-26
	Down target distance from current position	(MSP and LSP)	B.40.3.4.27-28

TABLE B-XXVI. Data entity list - Continued.

CATEGORY	DATA ENTITY		PARAGRAPH
Distance	Target height from surface	(MSP and LSP)	B.40.3.4.29-30
	Target slant range (polar coordinate)	(MSP and LSP)	B.40.3.4.35-36
	Target altitude	(MSP and LSP)	B.40.3.4.66-67
	Waypoint inertial height	(MSP and LSP)	B.40.3.5.18-19
	Waypoint-fixed point distance North	(MSP and LSP)	B.40.3.5.20-21
	Waypoint-fixed point distance East	(MSP and LSP)	B.40.3.5.22-23
	Waypoint-fixed point distance Down	(MSP and LSP)	B.40.3.5.24-25
	Waypoint-current position distance North	(MSP and LSP)	B.40.3.5.26-27
	Waypoint-current position distance East	(MSP and LSP)	B.40.3.5.28-29
	Waypoint-current position distance Down	(MSP and LSP)	B.40.3.5.30-31
	Waypoint height above surface	(MSP and LSP)	B.40.3.5.32-33
	Length of initial store trajectory		B.40.3.5.36-37
Velocity	Indicated airspeed	(MSP and LSP)	B.40.3.3.5-6
	True airspeed	(MSP and LSP)	B.40.3.3.7-8
	Calibrated airspeed	(MSP and LSP)	B.40.3.3.9-10
	Windspeed North	(MSP and LSP)	B.40.3.3.11-12
	Windspeed East	(MSP and LSP)	B.40.3.3.13-14
	Surface flow North	(MSP and LSP)	B.40.3.3.24-25
	Surface flow East	(MSP and LSP)	B.40.3.3.26-27
	Velocity of sound	(MSP and LSP)	B.40.3.3.33-34
	Aircraft velocity North	(MSP and LSP)	B.40.3.3.62-63
	Aircraft velocity East	(MSP and LSP)	B.40.3.3.64-65
	Aircraft velocity Down	(MSP and LSP)	B.40.3.3.66-67
	Target inertial height rate of change		B.40.3.4.43
	Target-fixed point distance North rate of change		B.40.3.4.44
	Target-fixed point distance East rate of change		B.40.3.4.45
	Target-fixed point distance Down rate of change		B.40.3.4.46
	Target-current position distance North rate of change		B.40.3.4.47
	Target-current position distance East rate of change		B.40.3.4.48
	Target-current position distance Down rate of change		B.40.3.4.49
	Slant range rate of change		B.40.3.4.52
Angle	Angle of attack		B.40.3.3.15
	Angle of sideslip		B.40.3.3.16
	Aircraft latitude	(MSP and LSP)	B.40.3.3.35-36
	Aircraft longitude	(MSP and LSP)	B.40.3.3.37-38
	Aircraft true heading		B.40.3.3.51
	Aircraft true ground track		B.40.3.3.52
	Aircraft pitch		B.40.3.3.53
	Aircraft roll		B.40.3.3.54
	Aircraft magnetic heading		B.40.3.3.55

TABLE B-XXVI. Data entity list - Continued.

CATEGORY	DATA ENTITY		PARAGRAPH
Angle	Difference between reference and aircraft axis - Yaw		B.40.3.3.59
	Difference between reference and aircraft axis - Pitch		B.40.3.3.60
	Difference between reference and aircraft axis - Roll		B.40.3.3.61
	Target latitude	(MSP and LSP)	B.40.3.4.11-12
	Target longitude	(MSP and LSP)	B.40.3.4.13-14
	Target approach true heading		B.40.3.4.31
	Target approach pitch		B.40.3.4.32
	Target azimuth to aircraft		B.40.3.4.33
	Target elevation to aircraft		B.40.3.4.34
	Target azimuth to reference system		B.40.3.4.37
	Target elevation to reference system		B.40.3.4.38
	Waypoint latitude	(MSP and LSP)	B.40.3.5.14-15
	Waypoint longitude	(MSP and LSP)	B.40.3.5.16-17
	Initial store course azimuth		B.40.3.5.34
	Initial store course elevation		B.40.3.5.35
	Launch point latitude	(MSP and LSP)	B.40.3.5.39-40
	Launch point longitude	(MSP and LSP)	B.40.3.5.41-41
Angular Rate	Aircraft heading rate		B.40.3.3.68
	Aircraft ground track rate		B.40.3.3.69
	Aircraft pitch rate		B.40.3.3.70
	Aircraft roll rate		B.40.3.3.71
	Target latitude rate	(MSP and LSP)	B.40.3.4.39-40
	Target longitude rate	(MSP and LSP)	B.40.3.4.41-42
	Target azimuth rate to aircraft		B.40.3.4.50
	Target elevation rate to aircraft		B.40.3.4.51
	Target azimuth rate to reference system		B.40.3.4.53
	Target elevation rate to reference system		B.40.3.4.54
Temperature	Outside air temperature		B.40.3.3.17
	Water temperature		B.40.3.3.28
Pressure	Dynamic air pressure	(MSP and LSP)	B.40.3.3.18-19
	Static air pressure	(MSP and LSP)	B.40.3.3.20-21
	Sea level air pressure	(MSP and LSP)	B.40.3.3.22-23
	Sea level air pressure at target	(MSP and LSP)	B.40.3.4.7-8
	Sea level air pressure at waypoint	(MSP and LSP)	B.40.3.5.5-6

TABLE B-XXVI. Data entity list. - Continued.

CATEGORY	DATA ENTITY	PARAGRAPH
Number	Number to fire	B.40.3.1.15
	Rounds remaining	B.40.3.1.23
	Mach number	B.40.3.3.74
	Twenty-four hour period	B.40.3.3.81
	Target file number	B.40.3.4.4
	Current active target number	B.40.3.4.9
	Reference code for emission	B.40.3.4.65
	Waypoint file number	B.40.3.5.4
	Fire number of store	B.40.3.5.7
	Reference for coded transmission	B.40.3.5.8
	Number of data bits per update	B.40.3.5.13
	Initialization year	B.40.3.3.77
	Initialization month	B.40.3.3.78
	Initialization day of month	B.40.3.3.79
	Initialization day of year	B.40.3.3.80
Integer	Waypoint number of target	B.40.3.4.3
	Waypoint number of trajectory	B.40.3.5.3
	Waypoint number of launch point	B.40.3.5.38
Ratio	Water density	B.40.3.3.32
Special	Reserved	B.40.3.1.1
	Invalidity	B.40.3.1.2
	Critical control 1	B.40.3.1.3
	Critical control 2	B.40.3.1.4
	Critical authority	B.40.3.1.5
	Critical monitor 1	B.40.3.1.6
	Critical monitor 2	B.40.3.1.7
	Fuzing mode	B.40.3.1.8
	Fuzing/arming mode status	B.40.3.1.9
	Protocol status	B.40.3.1.16
	Country code	B.40.3.1.17
	Store identity (binary)	B.40.3.1.18
	Store identity (ASCII)	B.40.3.1.19
	Target discriminator	B.40.3.4.6
	Target invalidity	B.40.3.4.10
ASCII Packed	ASCII characters	B.40.3.1.24
Fraction	Direction cosine (MSP and LSP)	B.40.3.3.75-76
	Target probability	B.40.3.4.5

TABLE B-XXVII. Linear data entities.

WORD NAME	FORMAT AS TABLE	MSB VALUE	LSB VALUE
TIME(M) (MICROSECONDS)	B-XXIX (UNSIGNED)	2^{37} (1.37×10^{11})	2^{22} (4.19×10^{6})
TIME(L) (MICROSECONDS)	B-XXIX (UNSIGNED)	2^{21} (2.1×10^{6})	2^{6} (64)
TIME(LL) (MICROSECONDS)	B-XXIX (UNSIGNED)	2^{5} (32)	2^{-10} (9.77×10^{-4})
TIME(F) (MICROSECONDS)	B-XXX (SCIENTIFIC)	INTEGER:-2^{11}(-2048) EXPONENT: 16^{8}	INTEGER: 2^{0}(1) EXPONENT: 16^{0}
FREQUENCY(M) (MHz)	B-XXIX (UNSIGNED)	2^{24} (1.68×10^{7})	2^{9} (512)
FREQUENCY(L) (MHz)	B-XXIX (UNSIGNED)	2^{8} (256)	2^{-7} (7.8×10^{-3})
FREQUENCY(LL) (MHz)	B-XXIX (UNSIGNED)	2^{-8} (3.9×10^{-3})	2^{-23} (1.19×10^{-7})
DISTANCE(M) (METRES)	B-XXVIII (2's COMPLEMENT)	-2^{24} (-1.68×10^{7})	2^{9} (512)
DISTANCE(L) (METRES)	B-XXIX (UNSIGNED)	2^{8} (256)	2^{-7} (7.8×10^{-3})
DISTANCE(S) (METRES)	B-XXVIII (2's COMPLEMENT)	-2^{8} (-256)	2^{-7} (7.8×10^{-3})
DISTANCE(F) (METRES)	B-XXVIII (2's COMPLEMENT)	-2^{14} (-16384)	2^{-1} (0.5)
VELOCITY(M) (METRES/SECOND)	B-XXVIII (2's COMPLEMENT)	-2^{13} (-8192)	2^{-2} (0.25)
VELOCITY(L) (METRES/SECOND)	B-XXIX (UNSIGNED)	2^{-3} (0.125)	2^{-18} (3.8×10^{-6})
ACCELERATION(M) (METRES/SECOND^2)	B-XXVIII (2's COMPLEMENT)	-2^{-10} (-1024)	2^{-5} (3.1×10^{-2})
ACCELERATION(L) (METRES/SECOND^2)	B-XXIX (UNSIGNED)	2^{-6} (1.56×10^{-2})	2^{-21} (4.77×10^{-7})

TABLE B-XXVII. Linear data entities - Continued.

WORD NAME	FORMAT AS TABLE	MSB VALUE	LSB VALUE
ANGLE(M) (SEMICIRCLES)	B-XXVIII (2's COMPLEMENT)	2^{0} (-1)	2^{-15} (3.05×10^{-5})
ANGLE(L) (SEMICIRCLES)	B-XXIX (UNSIGNED)	2^{-16} (1.53×10^{-5})	2^{-31} (4.66×10^{-10})
ANGULAR RATE (M) (SEMICIRCLES/SEC)	B-XXVIII (2's COMPLEMENT)	-2^{2} (-4)	-2^{-13} (1.22×10^{-4})
ANGULAR RATE(L) (SEMICIRCLES/SEC)	B-XXIX (UNSIGNED)	2^{-14} (6.10×10^{-5})	2^{-29} (1.86×10^{-9})
TEMPERATURE (DEGREES CELSIUS)	B-XXVIII (2's COMPLEMENT)	-2^{11} (-2048)	2^{-4} (0.0625)
PRESSURE(M) (KILOPASCALS)	B-XXVIII (2's COMPLEMENT)	-2^{15} (-32768)	2^{0} (1)
PRESSURE(L) (KILOPASCALS)	B-XXIX (UNSIGNED)	2^{-1} (0.5)	2^{-16} (1.53×10^{-5})
INTEGER	B-XXVIII (2's COMPLEMENT)	-2^{15} (-32768)	2^{0} (1)
NUMBER(L)	B-XXIX (UNSIGNED)	2^{15} (32768)	2^{0} (1)
NUMBER(S)	B-XXVIII (2's COMPLEMENT)	-2^{5} (-32)	2^{-10} (9.77×10^{-4})
FRACTION(M)	B-XXVIII (2's COMPLEMENT)	-2^{0} (-1)	2^{-15} (3.05×10^{-5})
FRACTION(L)	B-XXIX (UNSIGNED)	2^{-16} (1.53×10^{-5})	2^{-31} (4.66×10^{-10})
RATIO	B-XXIX (UNSIGNED)	2^{7} (128)	2^{-8} (3.91×10^{-3})

TABLE B-XXVIII. 2's complement format.

FIELD NAME	BIT NUMBER	DESCRIPTION
MSB	-00-	MOST SIGNIFICANT DATA BIT
	-01-	
	-02-	
	-03-	
	-04-	
	-05-	
	-06-	
	-07-	
	-08-	
	-09-	
	-10-	
	-11-	
	-12-	
	-13-	
	-14-	
LSB	-15-	LEAST SIGNIFICANT DATA BIT

1/ Bit Numbers 00 through 15 shall be encoded in 2's complement format. To obtain a negative of the number, all bits are inverted and one LSB is added to the resulting number.

EXAMPLE: FFFF (hexadecimal) shall indicate -1 (decimal).

TABLE B-XXIX. Unsigned format.

FIELD NAME	BIT NUMBER	DESCRIPTION
MSB	-00-	MOST SIGNIFICANT DATA BIT
	-01-	
	-02-	
	-03-	
	-04-	
	-05-	
	-06-	
	-07-	
	-08-	
	-09-	
	-10-	
	-11-	
	-12-	
	-13-	
	-14-	
LSB	-15-	LEAST SIGNIFICANT DATA BIT

1/ For applications where an "unsigned" formatted data word is used as the least significant part of a two word data parameter, this least significant word shall be encoded consistent with the encoding of the most significant word in the set. If the most significant word is encoded as a 2's complement, then this least significant word shall represent a continuation of a 2's complemented value.

EXAMPLE: A/ Two word unsigned value:

System time 6,400,000 (decimal) microseconds using TIME(M) and TIME(L) -

MSP = 0001 Hexadecimal
LSP = 86A0 Hexadecimal

EXAMPLE: B/ Two word signed value:

Aircraft distance north of 1967 (decimal) meters using DISTANCE(M) and DISTANCE(L) -

MSP = 0003 Hexadecimal
LSP = D780 Hexadecimal

Aircraft distance north of-1967 (decimal) meters using DISTANCE(M) and DISTANCE(L) -

MSP = FFFC Hexadecimal
LSP = 2880 Hexadecimal

TABLE B-XXX. Binary scientific notation format.

FIELD NAME	BIT NUMBER	DESCRIPTION
MSB	-00-	= -2048 UNITS)
	-01-	)
	-02-	)
	-03-	) 2's COMPLEMENT BINARY INTEGER
	-04-	)
	-05-	)
	-06-	)
	-07-	)
	-08-	)
	-09-	)
	-10-	)
LSB	-11-	= 1 UNIT)
EXPONENT MSB	-12-	= 8)
	-13-	) BINARY INTEGER
	-14-	)
LSB	-15-	= 1)

1/ The value represented by this format is given by:

$$(\text{Integer}) \times 16^{(\text{Exponent})}$$

EXAMPLE: 0142 (hexadecimal) shall equate to 20 x 162 (decimal) or 5120 (decimal)

TABLE B-XXXI. Invalidity word.

FIELD NAME	BIT NUMBER	DESCRIPTION
INVALIDITY	-00-	INVALIDITY OF ENTITY 1
	-01-	INVALIDITY OF ENTITY 2
	-02-	INVALIDITY OF ENTITY 3
	-03-	INVALIDITY OF ENTITY 4
	-04-	INVALIDITY OF ENTITY 5
	-05-	INVALIDITY OF ENTITY 6
	-06-	INVALIDITY OF ENTITY 7
	-07-	INVALIDITY OF ENTITY 8
	-08-	INVALIDITY OF ENTITY 9
	-09-	INVALIDITY OF ENTITY 10
	-10-	INVALIDITY OF ENTITY 11
	-11-	INVALIDITY OF ENTITY 12
	-12-	INVALIDITY OF ENTITY 13
	-13-	INVALIDITY OF ENTITY 14
	-14-	INVALIDITY OF ENTITY 15
	-15-	INVALIDITY OF ENTITY 16

NOTES: 1/ Invalidity Bit set to Logic 1 shall indicate that an entity is invalid.

2/ The validity of an entity shall be marked as valid if the associated data word does not exist in the message.

3/ Where used to indicate invalidity of data words, entities 1 through 16 shall indicate invalidity of words 1 through 16 in a message and entities 1 through 14 (in a second word) shall indicate the invalidity of words 17 through 30 in a message. Bits 15 and 16 in the second word shall always be set to zero.

TABLE B-XXXII. Critical control 1.

FIELD NAME	BIT NUMBER	DESCRIPTION
STORE CONTROL (Note 1)	-00- -01- -02- -03- -04- -05- -06- -07-	D_{10} = Fire, Launch, or Release D_9 = Jettison D_8 = Commit to Separate Store or Submunition D_7 = Execute Arming D_6 = Preset Arming D_5 = Select Store D_4 = Initiate Interruptive BIT D_3 = RESERVED. Shall be set to Logic 0
IDENTIFIER	-08- -09- -10-	D_2) D_1) See Note 2. D_0)
ADDRESS CONFIRM	-11- -12- -13- -14- -15-	A_4) Shall be set to match the logic state A_3) of the corresponding interface address A_2) discrete lines A4 through A0 as A_1) specified in 5.1.1.6 and 5.2.1.6. A_0)

1/ Data bits set to a Logic 0 shall indicate that the associated function is required to be inactive. Data bits set to a Logic 1 shall indicate that the associated function is required to be active. Data bits reset to a Logic 0 shall indicate that the associated function is required to be deactivated as applicable.

2/ The IDENTIFIER FIELD shall be set as indicated below.

D_2	D_1	D_0	
0	0	0	RESERVED
0	0	1	Mission Store
0	1	0	Carriage Store
0	1	1	RESERVED
	thru		
1	1	1	RESERVED

TABLE B-XXXII. Critical control 1. - Continued

3/ Stores shall discard any message found to contain a critical control word detected as invalid. Stores shall not enable any safety critical process not demanded by a critical control word detected as valid.

4/ The probability of inadvertent generation of a valid critical control word with a valid critical authority word and with a data field requesting critical action shall not exceed 1 in 10^5 flight hours per data field combination.

5/ D_{10} when received set to Logic 1 shall be used to initiate potentially irreversible firing (including processes such as lasing), launching or release processes. (See 5.2.1.4.)

6/ D_9 when received set to a Logic 1 shall be used by the store to initiate jettison processes.

7/ D_8 when received set to a Logic 1 shall be used to initiate potentially irreversible processes associated with arming or to prepare for a store separation demand. (See 5.2.1.4.)

8/ D_7 when received set to a Logic 1 shall be used to initiate reversible arming or safety degradation processes.

9/ D_6 when received set to a Logic 1 shall be used to preset the arming processes or safety degradation processes.

10/ D_5 when received set to a Logic 1 shall be used to initiate store activity.

11/ D_4 when received set to a Logic 1 shall be used to initiate built-in-test processes that may interrupt store subsystem operation. The built-in-test shall not, however, prevent the store from communicating with the aircraft on the digital multiplex data interface while BIT is in process.

TABLE B-XXXIII. Critical control 2.

FIELD NAME	BIT NUMBER	DESCRIPTION
STORE CONTROL (Note 1)	-00- -01- -02- -03- -04- -05- -06- -07-	D_{10} = Erase command/authority D_9 = RF jam command/authority D_8 = RF emission activate command/authority D_7 = RESERVED. Shall be set to Logic 0 D_6 = RESERVED. Shall be set to Logic 0 D_5 = RESERVED. Shall be set to Logic 0 D_4 = RESERVED. Shall be set to Logic 0 D_3 = RESERVED. Shall be set to Logic 0
IDENTIFIER	-08- -09- -10-	D_2) D_1) See Note 2. D_0)
ADDRESS CONFIRM	-11- -12- -13- -14- -15-	A_4) Shall be set to match the logic state A_3) of the corresponding interface address A_2) discrete lines A4 through A0 as A_1) specified in 5.1.1.6 and 5.2.1.6. A_0)

1/ Data bits set to a Logic 0 shall indicate that the associated function is required to be inactive. Data bits set to a Logic 1 shall indicate that the associated function is required to be active. Data bits reset to a Logic 0 shall indicate that the associated function is required to be deactivated as applicable.

2/ The IDENTIFIER FIELD shall be set as indicated below.

D_2	D_1	D_0	
0	0	0	RESERVED
0	0	1	Mission Store
0	1	0	Carriage Store
0	1	1	RESERVED
	thru		
1	1	1	RESERVED

3/ Stores shall discard any message found to contain a critical control word detected as invalid. Stores shall not enable any safety critical process not demanded by a critical control word detected as valid.

TABLE B-XXXIV. Critical authority.

FIELD NAME	BIT NUMBER	DESCRIPTION
CODED CHECK	-00-	$C14 = D_{10} + D_9 + D_6 + D_1 + D_0$
	-01-	$C13 = D_9 + D_8 + D_5 + D_0$
	-02-	$C12 = D_8 + D_7 + D_4$
	-03-	$C11 = D_7 + D_6 + D_3$
	-04-	$C10 = D_{10} + D_9 + D_5 + D_2 + D_1 + D_0$
	-05-	$C9 = D_{10} + D_8 + D_6 + D_4$
	-06-	$C8 = D_{10} + D_7 + D_6 + D_5 + D_3 + D_1 + D_0$
	-07-	$C7 = D_{10} + D_5 + D_4 + D_2 + D_1$
	-08-	$C6 = D_{10} + D_6 + D_4 + D_3$
	-09-	$C5 = D_9 + D_5 + D_3 + D_2$
	-10-	$C4 = D_{10} + D_9 + D_8 + D_6 + D_4 + D_2 + D_0$
	-11-	$C3 = D_9 + D_8 + D_7 + D_5 + D_3 + D_1$
	-12-	$C2 = D_{10} + D_9 + D_8 + D_7 + D_4 + D_2 + D_1$
	-13-	$C1 = D_{10} + D_8 + D_7 + D_3$
	-14-	$C0 = D_{10} + D_7 + D_2 + D_1 + D_0$
RESERVED	-15-	RESERVED. Shall be set to Logic 0

1/ Coded check bits shall be generated using modulo 2 arithmetic.

2/ D_0 through D_{10} refer to bits D_0 through D_{10} as defined in Tables B-XXXII and B-XXXIII, as applicable.

3/ The coded check bits are based on the BCH 31, 16, 3 polynomial:

$$X_{15}+X_{11}+X_{10}+X_9+X_8+X_7+X_5+X_3+X_2+X+1$$

TABLE B-XXXV. Critical monitor 1.

FIELD NAME	BIT NUMBER	DESCRIPTION
STORE STATE (Note 1)	-00-	Fired, Launched or Released
	-01-	Jettisoned
	-02-	Committed to Store or Submunitions Separation
	-03-	Armed
	-04-	Arming Preset
	-05-	Store Selected
	-06-	Store in Interruptive BIT
	-07-	RESERVED. Shall be set to Logic 0.
DEMANDED STATE (Note 2)	-08-	D_{10}
	-09-	D_9
	-10-	D_8
	-11-	D_7
	-12-	D_6
	-13-	D_5
	-14-	D_4
	-15-	D_3

1/ Bit numbers 00 through 07, set to Logic 1, shall indicate that the associated store state is true.

2/ The demanded state shall be a monitor of the last received state demanded of the store in Critical Control 1 (Table B-XXXII).

TABLE B-XXXVI. Critical monitor 2.

FIELD NAME	BIT NUMBER	DESCRIPTION
STORE STATE (Note 1)	-00-	Erase on/authorized.
	-01-	RF jam on/authorized.
	-02-	RF emission on/authorized.
	-03-	RESERVED. Shall be set to Logic 0.
	-04-	RESERVED. Shall be set to Logic 0.
	-05-	RESERVED. Shall be set to Logic 0.
	-06-	RESERVED. Shall be set to Logic 0.
	-07-	RESERVED. Shall be set to Logic 0.
DEMANDED STATE (Note 2)	-08-	D_{10}
	-09-	D_9
	-10-	D_8
	-11-	D_7
	-12-	D_6
	-13-	D_5
	-14-	D_4
	-15-	D_3

1/ Bit numbers 00 through 07, set to Logic 1, shall indicate that the associated store state is true.

2/ The demanded state shall be a monitor of the last received state demanded of the store in Critical Control 2 (Table B-XXXIII).

TABLE B-XXXVII. Fuzing mode.

FIELD NAME	BIT NUMBER	DESCRIPTION
FUZE CONTROL	-00-	D_{15} = Function at impact.
	-01-	D_{14} = Function on time after release. (Note 2)
	-02-	D_{13} = Function on time after impact. (Note 3)
	-03-	D_{12} = Function at altitude. (Note 4)
	-04-	D_{11} = Function at depth. (Note 4)
	-05-	D_{10} = Function on proximity. (Note 4)
	-06-	D_9 = Function at position of target.
	-07-	D_8 = Function on interference.
	-08-	D_7 = RESERVED. Shall be set to Logic 0.
	-09-	D_6 = RESERVED. Shall be set to Logic 0.
	-10-	D_5 = RESERVED. Shall be set to Logic 0.
	-11-	D_4 = RESERVED. Shall be set to Logic 0.
POST RELEASE	-12-	D_3 = Enable store retard mechanism.
	-13-	D_2 = Enable post release fuze control.
	-14-	D_1 = RESERVED. Shall be set to Logic 0.
	-15-	D_0 = RESERVED. Shall be set to Logic 0.

1/ Data bits set to a Logic 1 shall indicate that the associated function is required to be active.

2/ The designated time is given in data word 10 of Table B-XI.

3/ The designated time is given in data word 11 of Table B-XI.

4/ The designated distance is given in data word 12 of Table B-XI.

TABLE B-XXXVIII. Fuzing/arming mode status.

FIELD NAME	BIT NUMBER	DESCRIPTION
STORE STATE	-00-	Function at impact is set.
	-01-	Function on time after release is set.
	-02-	Function on time after impact is set.
	-03-	Function at altitude is set.
	-04-	Function at depth is set.
	-05-	Function on proximity is set.
	-06-	Function at position of target is set.
	-07-	Function on interference is set.
	-08-	RESERVED. Shall be set to Logic 0.
	-09-	RESERVED. Shall be set to Logic 0.
	-10-	RESERVED. Shall be set to Logic 0.
	-11-	RESERVED. Shall be set to Logic 0.
	-12-	Store retard mechanism is enabled.
	-13-	Post release fuze control is enabled.
	-14-	RESERVED. Shall be set to Logic 0.
	-15-	RESERVED. Shall be set to Logic 0.

1/ Bit numbers 00 through 15, all set to Logic 0, shall indicate that the store is safe.

2/ Bit numbers 00 through 15, set to Logic 1, shall indicate that the associated store state is true.

TABLE B-XXXIX. Protocol status.

FIELD NAME	BIT NUMBER	DESCRIPTION
ERROR FLAG (Note 1)	-00-	Commanded word count not implemented.
	-01-	Illegal header for commanded subaddress.
	-02-	Message checksum failure.
	-03-	Critical control/authority 1 failure.
	-04-	Critical control/authority 2 failure.
	-05-	RESERVED. Shall be set to Logic 0.
	-06-	RESERVED. Shall be set to Logic 0.
	-07-	RESERVED. Shall be set to Logic 0.
	-08-	RESERVED. Shall be set to Logic 0.
	-09-	RESERVED. Shall be set to Logic 0.
	-10-	RESERVED. Shall be set to Logic 0.
SUBADDRESS (Note 1)	-11-	MSB = 16) Subaddress of last erroneous message.
	-12-	)
	-13-	)
	-14-	)
	-15-	LSB = 1)

1/ Error flag data bit(s) set to Logic 1 shall designate the error(s) detected in the last erroneous message received by the subsystem. Bit numbers 11 through 15 shall designate the subaddress of this last erroneous message. Subsequent receipt of an error-free message to this designated subaddress shall result in resetting of this data word to 0000 hexadecimal.

TABLE B-XL. ASCII packed.

FIELD NAME	BIT NUMBER	DESCRIPTION
CHARACTER 1	-00-	High Order Bit (Note 2)
	-01-	
	-02-	
	-03-	
	-04-	
	-05-	
	-06-	
	-07-	Low Order Bit
CHARACTER 2	-08-	High Order Bit (Note 2)
	-09-	
	-10-	
	-11-	
	-12-	
	-13-	
	-14-	
	-15-	Low Order Bit

1/ The characters shall be represented by the American National Standard for Information Interchange (ASCII) character code set defined in ANSI X3.4.

2/ This format is for eight bit ASCII code. However, should seven bit ASCII code be required, then bit numbers 00 and 08 shall be set to Logic 0 and bit numbers 01 and 09 shall be allocated to high order bit usage.

TABLE B-XLI. Discriminator description.

FIELD NAME	BIT NUMBER	DESCRIPTION
DISCRIMINATOR ENABLES (Note 1)	-00-	Store should select target by position.
	-01-	Store should select target by size.
	-02-	Store should select targets by size and then target by position.
TARGET POSITION IN GROUP (Operative when bit 00 or 02 = Logic 1.) (Note 2)	-03-	MSB = 8
	-04-	Indicates the sector (1 of 16) of the pattern (Figure B-10) in which the target is positioned.
	-05-	
	-06-	LSB = 1
	-07-	MSB = 2
	-08-	LSB = 1 Indicates the segment (1 of 4) of the pattern (Figure B-10) in which the target is positioned.
NUMBER OF TARGETS IN GROUP	-09-	MSB = 8
	-10-	Indicates the number of targets in the group. To be used in conjunction with bits 13-15 inclusive, when bit 01 = Logic 1.
	-11-	
	-12-	LSB = 1
TARGET SIZE IN GROUP (Operative when bit 01 = Logic 1.)	-13-	MSB = 4 Shall indicate the number of the target when the smallest = one.
	-14-	
TARGET SIZE IN GROUP (Operative when bit 02 = Logic 1.)	-15-	LSB = 1 Shall indicate the targets' size in the group when the smallest = one.

1/ Data bits set to a Logic 1 shall indicate that the associated function is true.

2/ Figure B-10 illustrates the way in which this target position procedure should be employed.

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 contractural requirments.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE *(YYMMDD)*
3. DOCUMENT TITLE		
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	b. TELEPHONE *(Include Area Code)* (1) Commercial (2) AUTOVON	
c. ADDRESS *(Include Zip Code)*	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) 7567-2340 AUTOVON 289-2340	

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