

IEEE Standard for Futurebus+™, Profile M (Military): Errata, Corrections, and Clarifications

Sponsor

**Bus Architecture Standards Committee
of the
IEEE Computer Society**

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IEEE Standards Board

Abstract: The supplement contains errata, corrections, and clarifications to IEEE Std 896.5-1993. Futurebus+™ standards provide system developers with a set of tools with which high performance bus-based systems may be developed. This architecture provides a wide range of performance scalability over both cost and time for multiple generations of single- and multiple-bus multiprocessor systems. This document, a companion standard to ISO/IEC 10857: 1994 [ANSI/IEEE Std 896.1, 1994 Edition], builds on the logical layer by adding requirements for three military profiles. It is to these profiles that products will claim conformance. Other specifications that may be required in conjunction with this standard are IEEE Std 896.2-1991, IEEE Std 896.2a-1994, IEEE Std 896.3-1993, IEEE Std 896.4-1993, IEEE Std 1101.3-1993, IEEE Std 1101.4-1993, IEEE Std 1194.1-1991, IEEE P1394, the IEEE 1301 series of standards, and ISO/IEC 13213: 1994 [ANSI/IEEE Std 1212, 1994 Edition].

Keywords: bus architecture, error logging, fault logging, Futurebus+™, live insertion, military profiles, multiprocessor systems, node management, open architecture, Serial Bus, software debug

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Introduction

(This introduction is not a part of IEEE Std 896.5a-1994, IEEE Standard for Futurebus+™, Profile M (Military): Errata, Corrections, and Clarifications.)

During the implementation of IEEE Std 896.5-1993, entitled IEEE Standard for Futurebus+™, Profile M (Military), designers identified errors and ambiguities in the specification. The purpose of this document, IEEE Std 896.5a-1994, is to correct errors and clarify ambiguities found in IEEE Std 896.5-1993. This document should be used as a supplement until a revised edition of IEEE Std 896.5, which incorporates this errata, is published. Members of the 896.5a Working Group have made a diligent effort to ensure completeness, but errors and ambiguities have undoubtedly been missed. Questions and comments may identify additional errors or ambiguities in this standard; these should be forwarded to the IEEE Standards Board, who will pass them on to the Bus Architecture Standards Committee (BASC) for action.

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IEEE Standard for Futurebus+™, Profile M (Military): Errata, Corrections, and Clarifications

This supplement provides errata, corrections, and clarifications to IEEE Std 896.5-1993. These are presented as a list of changes, replacements, and additions or deletions to the existing text of IEEE Std 896.5-1993.

Changes are shown, as often as possible and reasonable, within their context; for example, a sentence or paragraph, in which a change or changes are to be made, is presented in its entirety with old text ~~struck through~~ and new text underlined. Text shown in ***bold italics*** provides instructions necessary to incorporating these changes into the base document. The clause, subclause, figure, and table numbering in the following list corresponds to the numbering in the base document: IEEE Std 896.5-1993, IEEE Standard for Futurebus+™, Profile M (Military).

1.1 Scope

Make the following changes to the second sentence of the first paragraph (p. 1):

. . . agreed to join the IEEE in revising IEEE Std 896.1-1994¹87.

2. References

Make the following changes to the references (pp. 2–3):

EIA-IS-64, 2 mm Two Part Connector for Use with Printed Board and Backplanes.²

~~IEEE Std 896.1-1991, IEEE Standard Backplane Bus Specification for Multiprocessor Architectures:
Futurebus+™ Logical Layer Specification (ANSI).~~³

~~IEEE Std 896.2-1991, IEEE Standard for Futurebus+™—Physical Layer and Profile Specification (ANSI).~~⁴

IEEE Std 896.3-1993, IEEE Recommended Practices for Futurebus+™ (ANSI).⁵

IEEE Std 896.4-1993, IEEE Standard for Conformance Test Requirements for Futurebus+™ (ANSI).

IEEE Std 1101.3-1993, IEEE Mechanical Standard for Conduction-Cooled and Air-Cooled 10SU Modules (ANSI).

IEEE Std 1101.4-1993, IEEE Standard for Military Modules, Format E Form Factor (ANSI).

IEEE Std 1156.1-1993, IEEE Standard for Microcomputer Environmental Specifications for Computer Modules (ANSI).

IEEE Std 1194.1-1991, IEEE Standard Electrical Characteristics of Backplane Transceiver Logic (BTL) Interface Circuits (ANSI).

IEEE Std 1212.1-1993, IEEE Standard for Communication Among Processors and Peripherals Using Shared Memory (Direct Memory Access—DMA) (ANSI).

IEEE ~~P~~Std 1275-1994, IEEE Standard for Boot (Initialization Configuration) Firmware: Core Requirements and Practices (ANSI).

IEEE P1275.4, Draft Standard for Boot (Initialization Configuration) Firmware: Bus Supplement for IEEE 896 (Futurebus+™). D14/August 1994.

IEEE Std 1301-1991, IEEE Standard for a Metric Equipment Practice for Microcomputers—Coordination Document (ANSI).

IEEE Std 1301.1-1991, IEEE Standard for a Metric Equipment Practice for Microcomputers—Convection-Cooled with 2 mm Connectors (ANSI).

IEEE P1394, Draft Standard for a High-Performance Serial Bus. ~~D6.3~~⁴17.1v/August-3, 1993⁴.

IEEE P1101.5, Draft Standard Mechanical Interface for a Military Module, Air-Flow-Through-Cooled, Format E Form Factor, D1.2/Mar. 2, 1995.

IEEE P1101.6, Draft Standard Mechanical Interface for an Air-Flow-Through-Cooled Module, 10SU Form Factor, D1.0/Oct. 20, 1993.

IEEE P1101.8, Draft Standard for Information Technology—Mechanical Interface for Liquid-Flow-Through Cooled Electronic Printed Wiring Assemblies, 10SU, D1.0/Oct. 1993.

IEEE P1101.9, Draft Standard for Information Technology—Mechanical Interface for Liquid-Flow-Through Cooled Electronic Printed Wiring Assemblies, Format E (396 pin connector only), D2.0/Dec. 7, 1994.

ISO/IEC 10857:1994 [ANSI/IEEE Std 896.1-1994 Edition], Information technology—Microprocessor systems—Futurebus+™ —Logical protocol specification.⁵

ISO/IEC 13213:1994 [ANSI/IEEE Std 1212, 1994 Edition], Information technology—Microprocessor systems—Control and Status Registers (CSR) Architecture for microcomputer buses.

MIL-HBK-217, Reliability of Electronic Equipment.⁷⁶

NAVSEA TE000-AB-GTP-010, Parts Applications and Reliability Information Manual for Navy Electronic Equipment.⁷

Make the following changes to internal references that occur throughout the text:

~~IEEE Std 896.1-1994~~ ISO/IEC 10857:1994

~~IEEE Std 1212-1994~~ ISO/IEC 13213:1994

IEEE ~~P~~Std 1275-1994

Make the following changes to the reference footnotes (pp. 2–3):

²EIA publications are available from Global Engineering, 1900 M Street NW, Suite 400, Washington, DC, 20036, USA.

³~~The anticipated publication date of the revised edition of IEEE Std 896.1 1991 is January 1994. The new title will be ISO/IEC 10857: 1994 [ANSI/IEEE Std 896.1, 1994 Edition], Information technology—Microprocessor systems—Futurebus™—Logical protocol specification. ISO publications are available from ISO, Case Postale 56, 1 rue de Varembe, CH 1211, Genève 20, Switzerland/Suisse. ISO/IEC publications are also available in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.~~

⁴⁻³IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA.

⁵~~As this standard goes to press, IEEE Std 896.3 1993, IEEE Std 896.4 1993, and IEEE Std 1212.1 1993 have not yet been published. They are, however, available in manuscript form from the IEEE Standards Department (908) 562 3800. The anticipated publication date is March 1994, at which point these standards will be available from IEEE Customer Service, 1 800 678 4333.~~

⁶⁻⁴Authorized standards projects, indicated by a P, were not approved by the IEEE Standards Board at the time this went to press. They are available from the IEEE.

⁵ISO/IEC publications are available from the ISO Central Secretariat. ISO/IEC [ANSI/IEEE] publications are also available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA.

⁷⁻⁶MIL and NAVSEA publications are available from the Director, US Navy Publications and Printing Service, Eastern Division, 700 Robbins Avenue, Philadelphia, PA 19111, USA.

⁷See footnote 6.

Table 4-1, Military Profile—MIL-12SU logical layer requirements

Make the following changes to the “Standard” and “Comments” columns of the “Arbitration messages” row (p. 8):

Functional requirement	Standard	Mandate	Comments
Arbitration messages Power fail All other messages	~~IEEE Std 896.1 1991~~ <u>ISO/IEC 10857: 1994</u>	Optional Optional	<u>See 4.4.1.2.8.</u>

Make the following change to the heading of table 4-2 (p. 9–11):

Table 4-2, Military Profile—MIL-12SU physical layer requirements

Make the following change to the “Mandate” column of the “Connector type: Keying” row (p. 9):

Functional requirement	Standard	Mandate	Comments
Connector type: Power: 4-8 blades Signal: 2-192 pins Keying	EIA-IS-64	Required Required ~~Required~~ <u>Optional</u>	2 mm pin-pin spacing 2A max per blade Analog pwr on signal pins 1 A max per pin

In the “Functional requirement” column, move the “Backplane connector pinout” list down by one line, such that “32-bit bus (FB+1)” lines up with “Required,” and make the other changes shown in the “Functional requirement” and “Comments” columns (p. 10):

Functional requirement	Standard	Mandate	Comments
Backplane connector pinout:			In cluster bus applications, not all slots must be bused.
32-bit Bbus (FB+ 1)		Required	
64-bit Bbus (FB+ 1)		Optional	Pins reserved
32-bit Bbus (FB+ 2)		Optional	Address/data pints reserved
Digital power		Required	
Analog power		Optional	Pins reserved
User-defined clock		Optional	Pins reserved
Local interconnect		Optional	
Other interconnects		Optional	e.g., switched network templates recommended
I/O		Optional	

In the “Comments” column, move the last four lines of comments for “Backplane voltages & power” down by one line, such that “5 V @ power up” lines up with “VBP—Required,” “2.1 V to 5 V @ power down” lines up with “Optional,” “Template provided” lines up with “+28 V—Optional,” and “Template provided” lines up with “–5 V—Optional” (p. 11):

Functional requirement	Standard	Mandate	Comments
Backplane voltages & power:			Current system dependent. Backplane must be wired for these, although they need not have power supplied.
5 V		Required	
3.3 V		Required	
± V		Required	
VBP		Required	
+15 V		Optional	5 V @ power up
–15 V		Required	2.1 V to 5 V @ power down
+28 V		Required	
–5 V		Optional	Template provided
		Optional	Template provided

4.1.4.1 Standards referenced

Make the following changes to the subclause (p. 12):

The following standards are referenced for ~~this profile~~ Profile MIL-12SU. Should any specific feature defined in the following standards be implemented, but not identified in this profile, the feature shall be implemented as specified in that standard.

~~EIA IS 64, 2mm Two Part Connector for Use with Printed Board and Backplanes.~~

~~IEEE Std 896.1 1991, IEEE Standard Backplane Bus Specification for Multiprocessor Architectures: Futurebus+™ Logical Layer Specification (ANSI).~~

~~IEEE Std 896.2-1991, IEEE Standard Backplane Bus Specifications for Multiprocessor Architectures: Futurebus+™ (ANSI).~~

~~IEEE Std 896.4-1993, IEEE Standard for Conformance Test Requirements for Futurebus+™.~~

~~IEEE Std 1212-1991, IEEE Standard Control and Status Register (CSR) Architecture for Microcomputer buses (ANSI).~~

~~IEEE Std 1212.1-1993, IEEE Standard for Communication Among Processors and Peripherals Using Shared Memory (Direct Memory Access—DMA).~~

~~IEEE Std 1301-1991, IEEE Standard for Metric Equipment Practice for Microcomputers—Coordination Document (ANSI).~~

~~IEEE Std 1301.1-1991, IEEE Standard for a Metric Equipment Practice for Microcomputers—Convection Cooled with 2 mm Connectors (ANSI).~~

~~IEEE Std 1156.1-1993, IEEE Standard for Microcomputer Environment Specifications for Computer Modules.~~

~~IEEE Std 1194.1-1991, IEEE Standard Electrical Characteristics of Backplane Transceiver Logic (BTL) Interface Circuits (ANSI).~~

~~IEEE P1275, Standard for Boot Firmware, Core Requirements and Practices.~~

~~IEEE P1394, Standard for a High Performance Serial Bus.~~

- ~~— EIA-IS-64~~
- ~~— IEEE Std 896.2-1991~~
- ~~— IEEE Std 896.4-1993~~
- ~~— IEEE Std 1156.1-1993~~
- ~~— IEEE Std 1194.1-1991~~
- ~~— IEEE Std 1212.1-1993~~
- ~~— IEEE Std 1275-1994~~
- ~~— IEEE Std 1301-1991~~
- ~~— IEEE Std 1301.1-1991~~
- ~~— IEEE P1394~~
- ~~— ISO/IEC 10857:1994~~
- ~~— ISO/IEC 13213:1994~~

4.2.2.1 Transaction types

Make the following changes to the second sentence of the first paragraph (p. 14):

... and record a capability error in the `PROTOCOL_ERROR` bit of the ~~Error_LO~~ ERROR_HI CSR as specified in ~~subclause 3.2.2.14.21~~ of IEEE Std 896.2-1991.

4.2.5 Tag bits

Delete the last sentence in the second paragraph (p. 15):

Tag bits may also be used for future fault detection mechanisms like the reserved field described in 5.2.11.