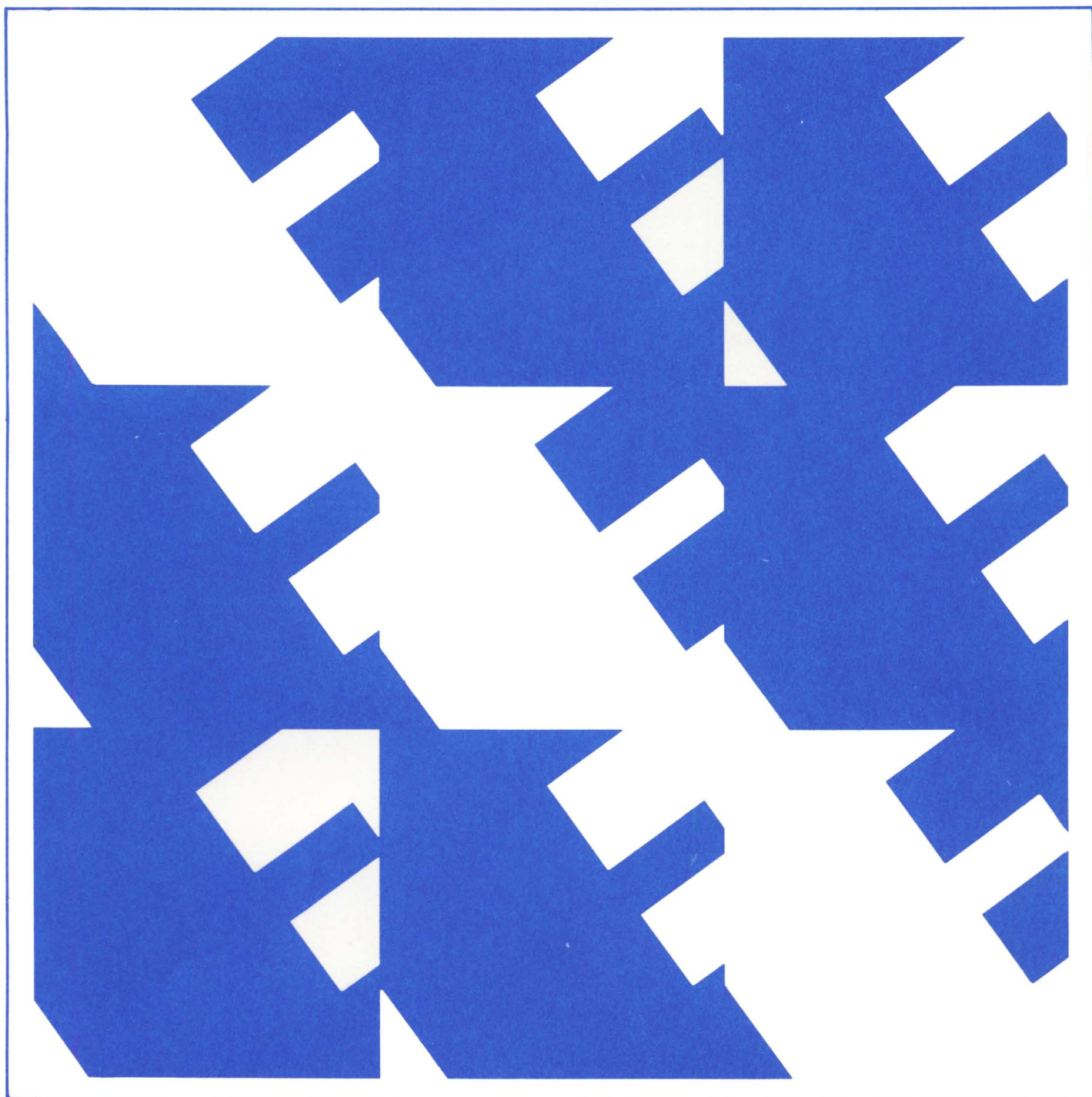


IEEE Standard Multiple Controllers in a CAMAC Crate

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Multiple Controllers in a CAMAC Crate

Sponsor

**Instruments and Detectors Committee of
the IEEE Nuclear and Plasma Sciences Society**

Approved December 6, 1978

American National Standards Institute

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Foreword

(This Foreword is not a part of ANSI/IEEE Std 675-1979, IEEE Standard, Multiple Controllers in a CAMAC Crate.)

This standard makes provision for the use of auxiliary controllers in a CAMAC crate to extend the capabilities and fields of application of the CAMAC modular instrumentation and interface system of ANSI/IEEE Std 583-1975, Modular Instrumentation and Digital Interface System (CAMAC). (Also Report EUR 4100e of the Commissions of the European Communities) The report on which this document is based, and with which it is technically identical (Dept of Energy Report DOE/EV-007), was prepared by the NIM Committee of the United States Department of Energy* and the ESONE Committee of European Laboratories†. The corresponding ESONE document is EUR 6500e.

Auxiliary Controllers (ACs), located in several crates on a CAMAC Command Highway (Parallel Branch or Serial) can provide the user with an extremely effective distributed processing capability. This capability is useful in both data acquisition and automatic control systems where parallel processing is desirable. Auxiliary controllers can be of various degrees of sophistication, and some may include processor elements for increased autonomy from central computers.

A further extension of the AC-based CAMAC system may include a special communication channel direct from an AC to another element in the system. High-speed block transfer of data can be effected to and from the AC in such a case.

To permit use of the ACs in CAMAC crates, this report defines the hardware and protocol so as to:

(1) Provide means for granting control of the Dataway to auxiliary controllers that request control and to provide a priority selection scheme to arbitrate in the case of simultaneous requests from multiple controllers.

(2) Provide means for the auxiliary controller to address (a) the dedicated module address lines and (b) the dedicated interrupt request LAM (Look-at-Me) lines, all of which terminate only at the crate controller station and at the module stations to which they are dedicated.

This standard was reviewed and balloted by the Nuclear Instruments and Detectors Committee of the IEEE Nuclear and Plasma Sciences Society. Because of the broad applicability of the CAMAC system, this standard was submitted for review to liaison representatives of numerous societies and committees including the Communications Society, Computer Society, Industry Applications Society, Industrial Electronics and Control Instrumentation Group, Instrumentation and Measurement Group, and the Power Generation and Nuclear Power Engineering Committees of the Power Engineering Society.

At the time of approval of this standard, the membership of the Nuclear Instruments and Detectors Committee of the IEEE Nuclear and Plasma Sciences Society was as follows:

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[‡]EDISG (European Distributed Intelligence Study Group) is a joint working group of the ESONE Committee, the European CAMAC Association (ECA), and Purdue Europe.

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CAMAC Specifications and Reports

Title	IEEE, ANSI Std No	IEC No	DOE No	EURATOM (EUR) or ESONE No
Modular Instrumentation and Digital Interface System (CAMAC)	ANSI/IEEE Std 583-1975*	516	†	EUR 4100e
Serial Highway Interface System (CAMAC)	ANSI/IEEE Std 595-1976*	§	†	EUR 6100e
Parallel Highway Interface System (CAMAC)	ANSI/IEEE Std 596-1976*	552	†	EUR 4600e
Block Transfers in CAMAC Systems	ANSI/IEEE Std 683-1976	§	†	EUR 4100 suppl
CAMAC Instrumentation and Interface Standards†	SH06437‡ (Library of Congress No 76-39660)	—	—	—
Amplitude Analogue Signals within a 50Ω System	—	—	TID-26614	EUR 5100e
The Definition of IML A Language for use in CAMAC Systems	—	—	TID-26615	ESONE/IML/01
Multiple Controllers in a CAMAC Crate	ANSI/IEEE Std 675-1979	—	DOE/EV-0007	EUR 6500e
CAMAC Tutorial Articles	—	—	TID-26618	—
Real-Time BASIC for CAMAC	IEEE Std 726-1979	—	TID-26619	ESONE/RTB/02
Recommendations for CAMAC Serial Highway Drivers and LAM Graders for the SCC-L2	—	—	DOE/EV-0006	ESONE/SD/02
Supplement to CAMAC Standards and Reports	IEEE Std 583A-1979	—	DOE/EV-0009	—

*Includes supplementary information.

†Superseded by corresponding IEEE Standard listed.

‡This is a hard cover book that contains IEEE Stds 583-1975, 595-1976, 596-1976, and 683-1976, plus introductory material.

§ In preparation.

NOTE: Availability of Documents

IEEE	IEEE Service Center, 445 Hoes Lane, Piscataway, New Jersey 08854, U.S.A.
IEC	International Electrotechnical Commission, 1, rue de Varembe, CH-1211 Geneva 20, Switzerland.
DOE and TID Reports	National Bureau of Standards, Washington, D.C. 20234, U.S.A., Attn: L. Costrell.
EURATOM	Office of Official Publications of the European Communities, P.O. Box 1003, Luxembourg.
ESONE	Commission of the European Communities, CGR-BCMN, B-2440 GEEL, Belgium, Attn: ESONE Secretariat, H. Meyer.

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Multiple Controllers in a CAMAC Crate

1. Introduction

This standard defines a method for incorporating more than one source of control into a CAMAC crate. The standard fully conforms to the mechanical and signal standards of the CAMAC system as described in ANSI/IEEE Std 583-1975, Modular Instrumentation and Digital Interface System (CAMAC), or EUR 4100e.

In order to allow more than one Controller to access the Dataway of a CAMAC Crate, an Auxiliary Controller Bus (ACB) and priority arbitration protocol are fully defined. This permits the use of Auxiliary Controllers (ACs) in normal stations in the crate. The ACB carries encoded address information from an AC to the Crate Controller (CC) in the control station of a CAMAC crate, and carries Look-at-Me signals from the CC to the ACs. The ACB, connected between controllers, may also be used to establish priority for control of the CAMAC Dataway.

This standard is fully compatible with ANSI/IEEE Std 595-1976, Serial Highway Interface System (CAMAC), or EUR 6100e, and the ANSI/IEEE Std 596-1976, Parallel Highway Interface System (CAMAC) or EUR 4600e. It may also be used in autonomous systems (systems with no external highways) or in systems with Type U Crate Controllers (such as systems with a computer I/O bus as the highway).

Section A1 of the Appendix to this standard defines a Parallel Highway Crate Controller, Type A-2. This controller is similar to Crate Controller Type A-1 (as defined in Section A1 of the Appendix to ANSI/IEEE Std 596-1976 or EUR 4600e), except for the ACB connector and the priority arbitration protocol. When these two features are not required, Crate Controllers Types A-1 and A-2 are totally interchangeable.

Abbreviations used in this document are as follows:

AC	Auxiliary Controller
ACB	Auxiliary Controller Bus
ACL	Auxiliary Controller Lockout
CC	Crate Controller
R/G	Request Grant

2. Interpretation

This standard is a reference text describing and specifying multisource control within a CAMAC crate. It should be read in conjunction with, and is supplementary to, ANSI/IEEE Stds 583-1975, 595-1976, and 596-1976 or EUR 4100e, EUR 6100e, and EUR 4600e, respectively.

No part of this standard is intended to supersede or modify the above-mentioned standards.

In this standard there are mandatory requirements, recommendations, and examples of permitted practice.

Mandatory clauses of the standard are enclosed in a box, as here, and usually include the word "must."

Definitions of recommended practices (those to be followed unless there are sound reasons to the contrary) include the word "should."

Examples of permitted practice generally include the word "may," and leave freedom of choice to the designer or user.

In order to "conform" with the specifications of this standard, an equipment or system must satisfy all the mandatory requirements in this standard, excluding the Appendix. If constructed as a CAMAC plug-in unit, the equipment must also satisfy the mandatory requirements of ANSI/IEEE Std 583-1975 or EUR 4100e.