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Definitions of CAMAC* Terms

U.S. NIM Committee

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ABSTRACT

This report provides definitions and concise explanations of terms used in documents concerning the CAMAC* modular instrumentation and digital interface system as adopted by the U. S. Department of Energy, its predecessor agencies and the ESONE Committee of European Laboratories, and subsequently adopted as Standards of the Institute of Electrical and Electronics Engineers (IEEE) and the American National Standards Institute (ANSI).

KEY WORDS

CAMAC
Definitions
Instrumentation
Instrumentation Standards
Standards

REFERENCES ANSI, IEEE & DOE PUBLICATIONS

ANSI/IEEE Std 583: CAMAC Specification
ANSI/IEEE Std 595: CAMAC Serial Highway
ANSI/IEEE Std 596: CAMAC Parallel Highway
ANSI/IEEE Std 675: Multiple Controllers in a CAMAC Crate
ANSI/IEEE Std 683: Block Transfers in CAMAC Systems
IEEE Std 726 : Real-Time BASIC for CAMAC
IEEE Std 758 : Subroutines for CAMAC
DOE Report 20893 : Standard Nuclear Instrument Modules (NIM)

U. S. DEPARTMENT OF ENERGY
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*Computer Automated Measurement and Control

CAMAC AND NIM STANDARDS AND REPORTS

Title	IEEE, ANSI Std	IEC	DOE	EURATOM (EUR) or ESONE
Modular Instrumentation and Digital Interfac System (CAMAC)	ANSI/IEEE 583*	516	TID-25875** & TID-25877**	EUR 4100e
Serial Highway Interface System (CAMAC)	ANSI/IEEE 595*	640	TID-26488**	EUR 6100e
Parallel Highway Interface System (CAMAC)	ANSI/IEEE 596*	552	TID-25876** & TID-25877**	EUR 4600e
Block Transfers in CAMAC Systems	ANSI/IEEE 683	677	TID-26616**	EUR 4100e suppl
CAMAC Instrumentation and Interface Standards***	SH06437*** (Library of Congr. # 76-39660)	-	-	-
Amplitude Analogue Signals with a 50 Ohm 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 675	†	DOE/EV-0007**	EUR 6500e
CAMAC Tutorial Articles	-	-	TID-26618	-
Real-Time BASIC for CAMAC	IEEE 726	†	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 583A	-	DOE/EV-0009**	ESONE/DOC/02
Subroutines for CAMAC	IEEE 758	†	DOE/EV-0016**	ESONE/SR/01
Standard Nuclear Instrument Modules (NIM)	-	547 ††	TID-20893	-

* Includes supplementary information.
** Superseded by corresponding IEEE Standard listed.
*** This hard cover book contains IEEE Stds 583, 595, 596, 683 and introductory material.
† In preparation.
†† Covers only mechanical features and connector pin assignments.

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 Geneve 20, Switzerland.
DOE & TID: 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.B. 1003, Lux.
ESONE : Commission of the European Communities, CGR-BCMN, B-2440 GEEL, Belgium, Attn: ESONE Secretariat, H. Meyer.

CONTENTS

DEFINITIONS OF CAMAC TERMS

1. Introduction

Numerous documents concerning the CAMAC modular instrumentation and digital interface system, as approved by the NIM Committee, have been issued by the U.S. Department of Energy and its predecessor organizations. Most of these have formed the basis for corresponding standards of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). The basic ANSI/IEEE specification for CAMAC is ANSI/IEEE Std 583. This process of converting the Standards to ANSI/IEEE documents has been deliberate to make them available to a broad body of manufacturers and users.

2. Object and Scope

The terms herein are particularly relevant to the following publications:

ANSI/IEEE Std 583: Modular Instrumentation and Digital Interface System (CAMAC)
ANSI/IEEE Std 595: Serial Highway Interface System (CAMAC)
ANSI/IEEE Std 596: Parallel Highway Interface System (CAMAC)
ANSI/IEEE Std 675: Multiple Controllers in a CAMAC System
ANSI/IEEE Std 683: Block Transfers in CAMAC Systems
U.S. Department of Energy Report TID-20893: Standard Nuclear Instrument Modules

Corresponding publications of the International Electrotechnical Commission (IEC) and the European Atomic Energy Agency (which publishes the reports on behalf of the ESONE Committee of European Laboratories) are included in the table of CAMAC and NIM Standards and Reports on page ii of this document.

The object in preparing and compiling these definitions has been to provide concise explanations of the main aspects of each term. The definitions refer to the use of the terms in the context of CAMAC, though some of the terms are also used in other contexts. These definitions do not modify or supersede the more formal and comprehensive definitions contained in the publications listed above.

3. Definitions

An asterisk (*) indicates that a term is defined formally in the CAMAC Standards (see also Section 4, Index).

3.1 Names

3.1.1 *CAMAC

A standardized modular instrumentation and digital system as defined in ANSI/IEEE Std 583 (often treated as an acronym for "Computer Automated Measurement and Control".)

3.1.2 ESONE

A multi-national committee representating European nuclear laboratories. It produced the initial CAMAC specification and collaborated with NIM in the maintenance and extension of CAMAC.

3.1.3 NIM

1) A committee sponsored by the U.S. Department of Energy and associated with the U.S. National Bureau of Standards. It produced the NIM instrumentation system specifications, endorsed the use of CAMAC, and collaborated with ESONE in the maintenance and extension of CAMAC.

2) A standardized modular instrumentation system consisting of NIM MODULES and NIM BINS as defined in U.S. Department of Energy Report TID-20893.

3.2 Crates, Bins, Assemblies, Systems

3.2.1 Crate

General term referring to either a CAMAC CRATE or a CAMAC COMPATIBLE CRATE.

3.2.2 *CAMAC Crate

A mounting unit or housing for PLUG-IN UNITS that includes a DATAWAY and conforms to the requirements of ANSI/IEEE Std 583.

3.2.3 CAMAC Compatible Crate

A mounting unit or housing for PLUG-IN UNITS in which CAMAC MODULES can be mounted and operated in accordance with the DATAWAY requirements of ANSI/IEEE Std 583, but that does not conform to the full requirements for a CAMAC Crate.

3.2.4 CAMAC Crate Assembly

An assembly of a CRATE CONTROLLER and one or more CAMAC MODULES mounted in a CAMAC CRATE (or CAMAC COMPATIBLE CRATE) and operable in conformity with the DATAWAY requirements of ANSI/IEEE Std 583.

3.2.5 CAMAC System

A system including at least one CAMAC CRATE ASSEMBLY.

3.2.6 NIM Bin

A mounting unit or housing for NIM MODULES that includes bussed connectors at the rear for mating with connectors on the modules to provide power at the MODULES, and that conforms to the requirements of U.S. Department of Energy Report TID-20893.

3.3 Modules, Plug-in Units

3.3.1 Module

General term referring to CAMAC MODULES and NIM MODULES. The type (CAMAC or NIM) is made clear by the context in which the term is used.

3.3.2 *CAMAC Module

A modular functional PLUG-IN UNIT that mounts in one or more NORMAL STATIONS of a CAMAC CRATE and conforms to the requirements of ANSI/IEEE Std 583 including the use of DATAWAY lines as defined Section 5, therein (the term thus excludes CRATE CONTROLLERS that occupy the CONTROL STATION and AUXILIARY CONTROLLERS that occupy NORMAL STATIONS).

3.3.3 *Plug-in Unit

General term for modular units, including CAMAC MODULES and CRATE CONTROLLERS, that mount in CAMAC CRATES and conform to the requirements of ANSI/IEEE Std 583.

3.3.4 NIM Module, NIM Instrument

A modular functional unit or instrument that mounts in a NIM BIN and conforms to the requirements of U.S. Department of Energy Report TID-20893.

3.4 Controllers

3.4.1 *(Crate) Controller

A functional unit that mounts in the CONTROL STATION and one or more NORMAL STATIONS of a CAMAC CRATE (or CAMAC COMPATIBLE CRATE) and that controls DATAWAY OPERATIONS. It communicates with CAMAC MODULES via the DATAWAY in accordance with ANSI/IEEE Std 583, receiving or generating DATAWAY signals in accordance with Section 5, therein. In many instances it links the DATAWAY with external HIGHWAYS and computers.

3.4.2 Parallel Crate Controller

A CRATE CONTROLLER that serves as the communication link between the DATAWAY and a PARALLEL HIGHWAY.

3.4.3 *Serial Crate Controller

A CRATE CONTROLLER that serves as the communication link between the DATAWAY and a SERIAL HIGHWAY.

3.4.4 *Auxiliary Crate Controller

A controller that mounts in one or more NORMAL STATIONS of a CRATE and that can control DATAWAY OPERATIONS in order to communicate via the DATAWAY, utilizing the AUXILIARY CONTROLLER BUS.

3.4.5 *Crate Controller Type A1

A CRATE CONTROLLER, defined by ANSI/IEEE Std 596, for use with the CAMAC BRANCH-HIGHWAY.

3.4.6 *Crate Controller Type A2

A CRATE CONTROLLER, defined by ANSI/IEEE Std 675 for, use with the CAMAC BRANCH-HIGHWAY and containing features that permit operation with one or more AUXILIARY CONTROLLERS within a CRATE via an AUXILIARY CONTROLLER BUS.

3.4.7 *Serial Crate Controller Type L2

A SERIAL CRATE CONTROLLER defined by ANSI/IEEE Std 595 for use with the CAMAC SERIAL HIGHWAY.

3.5 Highways, Drivers

3.5.1 Highway

General term referring to PARALLEL HIGHWAY and SERIAL HIGHWAY.

3.5.2 Highway for a CAMAC System

An interconnection between CAMAC CRATE ASSEMBLIES or between one or more CAMAC CRATE ASSEMBLIES and an external controller.

3.5.3 CAMAC Highway

A HIGHWAY for a CAMAC SYSTEM that conforms to the requirements of the CAMAC BRANCH-HIGHWAY of ANSI/IEEE Std 596 or the CAMAC SERIAL HIGHWAY of ANSI/IEEE Std 595.

3.5.4 Parallel Highway

A HIGHWAY for a CAMAC System in which BITS comprising a DATA WORD, a COMMAND or other information are transmitted simultaneously on multiple lines.

3.5.5 *CAMAC Branch-Highway

A PARALLEL HIGHWAY that conforms to the requirements of ANSI/IEEE Std 596. It consists of a multi-wire digital HIGHWAY interconnecting up to 7 CRATE CONTROLLERS and a BRANCH DRIVER. Also referred to as a CAMAC PARALLEL HIGHWAY.

3.5.6 CAMAC Parallel Highway

Synonymous with CAMAC BRANCH-HIGHWAY.

3.5.7 Serial Highway

A HIGHWAY for a CAMAC System in which DATA, COMMANDS and other information are transmitted in BIT-SERIAL or BYTE-SERIAL MODE (see also BIT-SERIAL HIGHWAY and BYTE-SERIAL HIGHWAY).

3.5.8 *CAMAC Serial Highway

A SERIAL HIGHWAY that conforms to the requirements of ANSI/IEEE Std 595. It may be either BIT-SERIAL or BYTE-SERIAL (in 8-bit BYTES), and can accommodate up to 62 CAMAC CRATES or other controlled devices in a loop configuration.

3.5.9 Bit-Serial Highway

A SERIAL HIGHWAY in which DATA, COMMANDS and other information are transmitted in BIT-SERIAL mode.

3.5.10 Byte-Serial Highway

A SERIAL HIGHWAY in which DATA, COMMANDS and other information are transmitted in BYTE-SERIAL mode.

3.5.11 *Branch

An assembly of up to seven CAMAC CRATES and a BRANCH DRIVER conforming to the requirements of ANSI/IEEE Std 596.

3.5.12 Highway Driver

A unit that communicates with a CAMAC SYSTEM via a HIGHWAY and that in many instances interfaces to a computer or other external controller.

3.5.13 *CAMAC Branch Driver

A HIGHWAY DRIVER for the CAMAC BRANCH-HIGHWAY that can control BRANCH operations in conformity with the requirements of ANSI/IEEE Std 596.

3.5.14 *CAMAC Serial Driver

A HIGHWAY DRIVER for the CAMAC SERIAL HIGHWAY, that can control operations in conformity with the requirements of ANSI/IEEE Std 595.

3.5.15 *Port

A defined interface between a HIGHWAY and a CRATE CONTROLLER or HIGHWAY DRIVER. (The CAMAC branch and serial highways are defined primarily in terms of their characteristics at their ports.)

3.5.16 *D-Port

A defined PORT for the CAMAC SERIAL HIGHWAY, conforming fully with ANSI/IEEE Std 595. Each CAMAC SERIAL DRIVER and SERIAL CRATE CONTROLLER has two D-Ports, one for input and one for output.

3.5.17 *U-Port

A PORT for the CAMAC SERIAL HIGHWAY, conforming with the message structure defined in ANSI/IEEE Std 595, but using signals that are undefined in IEC CAMAC publications.

3.5.18 System Crate

A CAMAC CRATE ASSEMBLY in which specialized PLUG-IN UNITS are used to link one or more sources of COMMANDS to one or more HIGHWAY DRIVERS.

3.6 General Terms, in the Context of CAMAC

3.6.1 Bit

A binary digit. A signal or item of information with only two permitted values, 0 and 1.

3.6.2 Byte

A groups of BITS, typically 8 BITS, usually constituting a fraction of a WORD or MESSAGE.

3.6.3 Word

A group of BITS, typically the maximum group that is processed as a unit within a computer or other controller. Hence a group of 24 bits in CAMAC. In general, the grouping of bits into a word does not necessarily imply their relative numerical values.

3.6.4 *Field

A subdivision of a CAMAC SERIAL HIGHWAY MESSAGE, consisting of a group of BITS in one or more BYTES, and containing a unit of information, e.g., CRATE ADDRESS, COLUMN-PARITY, READ DATA.

3.6.5 *Bit Serial

The mode of transmission on the CAMAC SERIAL HIGHWAY in which all the BITS constituting a BYTE or MESSAGE are transmitted through the PORT in time sequence on one pair of lines.

3.6.6 *Byte Serial

The mode of transmission on the CAMAC SERIAL HIGHWAY in which the BITS constituting a BYTE are transmitted through the PORT simultaneously on eight pairs of lines, and the BYTES constituting a MESSAGE are transmitted in time sequence.

3.6.7 *Data

Information carried by the READ and WRITE lines of the CAMAC DATAWAY or BRANCH-HIGHWAY or by data FIELDS of CAMAC SERIAL HIGHWAY MESSAGES.

3.6.8 *Read

1) The direction of DATA transfer from controlled devices toward controllers. (In CAMAC, specifically from MODULES to CRATE CONTROLLERS or AUXILIARY CRATE CONTROLLERS and from CRATE CONTROLLERS to HIGHWAY DRIVERS and external controllers).

2) DATAWAY and HIGHWAY lines assigned to READ DATA.

3.6.9 *Write

1) The direction of DATA transfer from controller towards controlled devices. (On the CAMAC DATAWAY, from the CRATE CONTROLLER or AUXILIARY CRATE CONTROLLER to CAMAC MODULES; on HIGHWAYS, from an external controller to HIGHWAY DRIVERS and so to CRATE CONTROLLERS.)

2) DATAWAY and HIGHWAY lines assigned to WRITE DATA.

3.6.10 *Message

A group of BYTES transmitted through a CAMAC SERIAL HIGHWAY PORT, and forming a syntactical unit whose beginning and end are indicated by DELIMITER BYTES.

3.6.11 Handshake

An interlocked exchange of signals between a DATA source and DATA acceptor, controlling the transfer of DATA. (Used on the CAMAC BRANCH-HIGHWAY and on the external connections to many CAMAC MODULES.)

3.6.12 *Start Bit

A synchronizing BIT, indicating the beginning of a BYTE in BIT-SERIAL transmission.

3.6.13 *Stop Bit

A synchronizing BIT, indicating the end of a BYTE in BIT-SERIAL transmission.

3.6.14 *Byte Frame

An 8-bit BYTE, together with a START BIT and one or more STOP BITS, and transmitted in BIT-SERIAL mode through the D-PORTS of the CAMAC SERIAL HIGHWAY.

3.7 Specialized Terms for CAMAC equipment

3.7.1 *Dataway

A multi-wire assembly at the rear of a CAMAC Crate that:

1) interconnects the STATIONS;

2) serves as a communication link between PLUG-IN UNITS within a CAMAC CRATE;

3) provides power to the PLUG-IN UNITS via power busses that are part of the DATAWAY, and

4) conforms to the requirements for a DATAWAY as specified in ANSI/IEEE Std 583.

3.7.2 *Station

A general term referring to NORMAL STATIONS and CONTROL STATIONS of a CAMAC CRATE.

3.7.3 *Normal Station

One of the mounting positions for PLUG-IN UNITS in a CAMAC CRATE, providing access to the DATAWAY. Accessed lines of the DATAWAY include the READ and WRITE lines and two individual lines that connect to the CONTROL STATION. One of the individual lines is for address (STATION NUMBER) and the other for DEMANDS (LOOK-AT-ME).

3.7.4 *Control Station

The single mounting position in a CAMAC CRATE reserved for the CRATE CONTROLLER and giving access to all the STATION NUMBER and LOOK-AT-ME lines, but not the DATA lines. The control station is the right-most position in a CAMAC CRATE.

3.7.5 *Bus-Line

A line in the DATAWAY that joins corresponding contacts at all NORMAL STATIONS and, in certain cases, the CONTROL STATION. All DATAWAY lines except STATION NUMBER and LOOK-AT-ME are bus-lines.

3.7.6 *Individual Line

A line in the DATAWAY that joins one contact at a NORMAL STATION to one contact at the CONTROL STATION. Individual lines are used for STATION NUMBER and LOOK-AT-ME.

3.7.7 *CAMAC Operation

A DATAWAY OPERATION or BRANCH OPERATION or SERIAL HIGHWAY COMMAND-REPLY TRANSACTION.

3.7.8 *Dataway Operation

A CAMAC DATA transfer or control operation on the DATAWAY, characterized by the generation of BUSY and STROBE signals (includes COMMAND OPERATIONS AND UNADDRESSED OPERATIONS).

3.7.9 *Command Operation

A CAMAC OPERATION or BRANCH OPERATION characterized by the presence of a COMMAND consisting of STATION NUMBER, SUBADDRESS and FUNCTION.

3.7.10 *Unaddressed Operation

A DATAWAY OPERATION characterized by one of the COMMON CONTROL signals, INITIALIZE or CLEAR, without a COMMAND.

3.7.11 *Graded-L Operation

A special form of COMMAND OPERATION on the CAMAC BRANCH-HIGHWAY, in which the Read-Write lines of the HIGHWAY are used to transfer a composite GRADED-L word from all CRATE CONTROLLERS to the BRANCH DRIVER.

3.7.12 *Command

Signals on the DATAWAY or HIGHWAY specifying one or more CRATES, one or more STATIONS, a SUBADDRESS, and a FUNCTION.

3.7.13 *Station Number

1) Identification asigned to a STATION in a CRATE ($1 \leq N \leq 25$). The station number is part of the COMMAND.

2) Individual DATAWAY lines or associated HIGHWAY lines or MESSAGE FIELDS addressing one or more STATIONS (and hence addressing the MODULES occupying the STATIONS).

3) The signals on these lines, or the contents of these FIELDS.

4) Identification asigned to an internal feature of a CRATE CONTROLLER ($26 \leq N \leq 32$).

3.7.14 *Subaddress

1) Identification assigned to a specific subsection of a CAMAC MODULE ($0 \leq A \leq 15$). The subaddress is part of the COMMAND.

2) DATAWAY bus lines or associated HIGHWAY lines or MESSAGE FIELDS carrying information which, when decoded in a CAMAC MODULE, addresses a subsection of the MODULE.

3) The signals on these lines, or the contents of these FIELDS.

3.7.15 *Function

1) Part of the COMMAND ($0 \leq F \leq 31$), specifying the action to be taken by a CAMAC MODULE and CRATE CONTROLLER during a COMMAND OPERATION.

2) DATAWAY bus lines or associated HIGHWAY lines or MESSAGE FIELDS carrying information which when decoded in a CAMAC MODULE, specify the action to be taken during a COMMAND OPERATION.

3) The signals on these lines, or the contents of these FIELDS.

3.7.16 *Crate Address

1) Identification assigned to a CAMAC CRATE ASSEMBLY in a multi-crate CAMAC SYSTEM. The crate address is part of the COMMAND in such systems.

2) Individual lines on the CAMAC BRANCH-HIGHWAY, or a FIELD of the COMMAND MESSAGE on the CAMAC SERIAL HIGHWAY, carrying the crate address information.

3.7.17 *Common Control Signals

DATAWAY signals INITIALIZE, CLEAR, and INHIBIT, which are used without an accompanying COMMAND.

3.7.18 *Initialize

1) One of the COMMON CONTROL signals associated with an UNADDRESSED OPERATION, and typically used at switch-on to set a CAMAC SYSTEM or CRATE ASSEMBLY to a defined state.

2) The DATAWAY bus line and any corresponding HIGHWAY line carrying the Initialize signal.

3.7.19 *Inhibit

1) A COMMON CONTROL signal used to prevent action (such as data taking) in CAMAC MODULES.

2) The DATAWAY bus line carrying the Inhibit signal.

3.7.20 *Clear

1) A COMMON CONTROL signal, associated with an UNADDRESSED OPERATION, that serves to set data registers to zero.

2) The DATAWAY bus line carrying the CLEAR signal.

3.7.21 *Strobe

1) Specific timing signals (S1 and S2) that occur on the DATAWAY during COMMAND OPERATIONS and during UNADDRESSED OPERATIONS, and that must be present for actions to be initiated in the MODULE.

2) DATAWAY bus lines (S1 and S2) on which the strobe signals are carried.

3.7.22 *Busy

1) A signal indicating that a DATAWAY OPERATION is in progress.

2) The DATAWAY bus line on which the Busy signal is carried.

3.7.23 *Command Accepted

1) A binary indication whether an addressed MODULE has recognized the COMMAND.

2) The DATAWAY bus-line (X), BRANCH-HIGHWAY line (BX), and SERIAL HIGHWAY bit (SX), carrying this information.

3) The signals on these lines, or the value of the SX bit.

3.7.24 *Response

1) A binary indication of the state of an internal feature of an addressed MODULE.

2) The DATAWAY bus line (Q), BRANCH-HIGHWAY line (BQ), and SERIAL HIGHWAY bit (SQ) carrying this information.

3) The signals on these lines, or the value of the SQ bit.

3.7.25 *Demand

An unsolicited request for service (typically for a program interrupt or for a DATA transfer to or from memory) originating from a CAMAC MODULE. Demands are transmitted on the LOOK-AT-ME lines to the CRATE CONTROLLER. They may be processed by a LAM GRADER or SGL ENCODER, and transmitted by a GRADED-L OPERATION on a BRANCH-HIGHWAY, or a DEMAND MESSAGE on a SERIAL HIGHWAY.

3.7.26 *Demand Handling

The transmission of LOOK-AT-ME demands from MODULES via the DATAWAY and, as appropriate, via CRATE CONTROLLERS, LAM GRADERS, SGL ENCODERS, HIGHWAYS, HIGHWAY DRIVERS, and SYSTEM CRATES.

3.7.27 *LOOK-AT-ME

A common term for the means by which CAMAC MODULES generate DEMANDS for service (see LOOK-AT-ME LINE SIGNAL and LOOK-AT-ME REQUEST).

3.7.28 *LOOK-AT-ME Line Signal (L)

An INDIVIDUAL LINE in the DATAWAY, on which a CAMAC MODULE can generate DEMANDS (L signals) for interrupts or data transfers. There is one L line from each NORMAL STATION to the CONTROL STATION.

3.7.29 *LOOK-AT-ME Request (LAM)

An individual DEMAND within A CAMAC MODULE. One or more LAM requests within a module may be associated with the same DATAWAY L line.

3.7.30 *LAM Grader

A unit that selects, rearranges or combines the DATAWAY LOOK-AT-ME (L) signals within one CAMAC Crate to form a set of GRADED-L SIGNALS. Typically used as an ancillary to a CRATE CONTROLLER in a CAMAC BRANCH-HIGHWAY system.

3.7.31 *Graded-L Signals (GL)

A selection, rearrangement, or combination of the DATAWAY LOOK-AT-ME (L) signals, forming the Graded-L word.

3.7.32 *SGL Encoder

A unit that selects, rearranges or combines the DATAWAY LOOK-AT-ME (L) signals within one CAMAC CRATE to form the SERIAL GRADED-L FIELD of a DEMAND MESSAGE on a CAMAC SERIAL HIGHWAY. Typically used as an ancillary to a SERIAL CRATE CONTROLLER.

3.7.33 *Block Transfer

The sequential transfer of multiple words. (In CAMAC, specifically a sequence of single CAMAC OPERATIONS in response to a single special COMMAND).

3.7.34 *Auxiliary Controller Bus (ACB)

A bus linking AUXILIARY CRATE CONTROLLERS to a CRATE CONTROLLER. It allows the AUXILIARY CONTROLLERS to address all NORMAL STATIONS and to receive LOOK-AT-ME signals from all NORMAL STATIONS.

3.8 Specialized Terms for Messages on the CAMAC Serial Highway

3.8.1 *Command Message

A MESSAGE on the CAMAC SERIAL HIGHWAY, from the SERIAL DRIVER to a SERIAL CRATE CONTROLLER, that conveys a COMMAND and, if appropriate, WRITE DATA.

3.8.2 *Reply Message

A MESSAGE on the CAMAC SERIAL HIGHWAY, from a SERIAL CRATE CONTROLLER to the SERIAL DRIVER, in response to a COMMAND MESSAGE. It may convey READ DATA.

3.8.3 *Command-reply Transaction

The implementation of a COMMAND OPERATION on a CAMAC SERIAL HIGHWAY by means of a COMMAND MESSAGE and the resulting REPLY MESSAGE.

3.8.4 *Demand Message

An unsolicited MESSAGE on the CAMAC SERIAL HIGHWAY, from a SERIAL CRATE CONTROLLER to the SERIAL DRIVER, in response to a DATAWAY LOOK-AT-ME DEMAND. It includes a SERIAL GRADED-L-FIELD identifying the DEMAND.

3.8.5 *Serial Graded-L Field

A group of 5 BITS in a DEMAND MESSAGE on the CAMAC SERIAL HIGHWAY, carrying information identifying a DEMAND.

3.8.6 *Delimiter Byte

A BYTE that identifies the end of a MESSAGE on the CAMAC SERIAL HIGHWAY (see END BYTE, ENDSUM BYTE, and WAIT BYTE).

3.8.7 *Nondelimiter Byte

Any BYTE that is not a DELIMITER BYTE.

3.8.8 *Delimiter Bit

A BIT in a BYTE on the CAMAC SERIAL HIGHWAY that, when set (bit 7 = 1) identifies the BYTE as a DELIMITER BYTE.

3.8.9 *END Byte

A DELIMITER BYTE that terminates COMMAND MESSAGES on the CAMAC SERIAL HIGHWAY.

3.8.10 *WAIT Byte

One of a sequence of DELIMITER BYTES generated between messages on the CAMAC SERIAL HIGHWAY to permit the insertion and propagation of DEMAND MESSAGES.

3.8.11 *ENDSUM Byte

A DELIMITER BYTE that terminates each REPLY MESSAGE or DEMAND MESSAGE on the CAMAC SERIAL HIGHWAY. The ENDSUM byte carries the COLUMN-PARITY FIELD of the geometric error detection code.

3.8.12 *SUM Byte

A NONDELIMITER BYTE in a COMMAND MESSAGE on the CAMAC SERIAL HIGHWAY, carrying the COLUMN-PARITY FIELD of the geometric error detection code.

3.8.13 *Column-Parity Field

A FIELD in BITS 1-6 of the SUM and ENDSUM BYTES on the CAMAC SERIAL HIGHWAY that provides the column-parity component of the geometric error-detection scheme.

3.8.14 *Header Byte

The first BYTE of a COMMAND MESSAGE, REPLY MESSAGE, or DEMAND MESSAGE on the CAMAC SERIAL HIGHWAY, that includes the CRATE ADDRESS field.

3.8.15 *SPACE Byte

One of a sequence of NONDELIMITER BYTES in a COMMAND MESSAGE on the CAMAC SERIAL HIGHWAY, SPACE bytes are generated by the SERIAL DRIVER and, in normal operation, are subsequently replaced by a REPLY MESSAGE.

4. Index

1. See Section 2 for corresponding documents.
† U.S. Department of Energy Report TID-20893.
* See for definition.

Term	Term No.	Relevant ANSI/IEEE publications[1].		
D-PORT	3.5.16	595*		
DATA	3.6.7	583*		
DATAWAY	3.7.1	583*		
DATAWAY OPERATION	3.7.8	583*		
DELIMITER BIT	3.8.8	595*		
DELIMITER BYTE	3.8.6	595*		
DEMAND	3.7.25			
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1. See Section 2 for corresponding documents.
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