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Definitions of CAMAC terms used in IEC publications

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### DEFINITIONS OF CAMAC TERMS USED IN IEC PUBLICATIONS

**Définitions de termes CAMAC  
utilisés dans les publications de  
la CEI**

**Definitionen von CAMAC-Begriffen,  
die in IEC-Publikationen verwendet  
werden**

#### BODY OF HD

The Harmonization Document consists of:

- IEC 678 (1980 - 1st edition IEC TC 45), not appended

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This Harmonization Document was approved by CENELEC on 7 July 1982.

The English and French versions of this HD are provided by the text of the IEC publication and the German version is the official translation of the IEC text.

According to the CENELEC Internal Regulations the CENELEC member National Committees are bound:

to announce the existence of this Harmonization Document at national level

by or before **1983-06-01**

to publish their new harmonized national standard

by or before **1984-01-01**

to withdraw all conflicting national standards

by or before **1984-01-01**.

Harmonized national standards are listed on the HD information sheet, which is available from the CENELEC National Committees or from the CENELEC General Secretariat.

The CENELEC National Committees are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

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NORME DE LA CEI

INTERNATIONAL ELECTROTECHNICAL COMMISSION  
IEC STANDARD

**Publication 678**

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1980

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**Définitions de termes CAMAC utilisés dans les publications de la CEI**

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**Definitions of CAMAC terms used in IEC publications**

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**Mots clés:** instrumentation nucléaire; mesures électriques de grandeurs de la technologie nucléaire; commande et acquisition de mesures automatisées par calculateur; définitions.

**Key words:** nuclear instrumentation; electrical measurements of nuclear technology quantities; computer automated measurement and control; definitions.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DEFINITIONS OF CAMAC TERMS  
USED IN IEC PUBLICATIONS**

FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by IEC Technical Committee No. 45: Nuclear Instrumentation.

A first draft was discussed at the meeting held in Nice in 1978; it was revised at the meeting in Warsaw in 1979. As a result of this meeting, a draft, Document 45(Central Office)133, was submitted to the National Committees for approval under the Six Months' Rule in September 1979.

The National Committees of the following countries voted explicitly in favour of publication:

Australia	Italy
Austria	Netherlands
Belgium	Poland
Canada	South Africa (Republic of)
China	Spain
Egypt	Sweden
Finland	Turkey
France	Union of Soviet
German Democratic Republic	Socialist Republics
Germany	

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## DEFINITIONS OF CAMAC TERMS USED IN IEC PUBLICATIONS

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### 1. Introduction

Specifications of the CAMAC modular instrumentation and digital interface system appear in several IEC publications as listed in Clause 2.

The basic specification for CAMAC is IEC Publication 516, which defines the mechanical construction of plug-in units in a rack-mounting crate, and the communication protocol via a Dataway. The system capability is extended by the other publications listed below.

A parallel highway for system configurations with up to seven CAMAC crates and short-to-medium interconnections is defined in IEC Publication 552. A serial highway suitable for system configurations with up to sixty-two CAMAC crates and longer interconnections in noisy environments is defined in IEC Publication 640. A distributed processing capability, provided by multiple controllers in a CAMAC crate, is defined in IEC Publication 000 (in preparation).

This standard consists of CAMAC terms — identified by asterisks — that are defined formally in these IEC publications. Subsidiary entries without asterisks provide links to equivalent terms used in other CAMAC publications, to other well-established terms in common use, and to related features of the NIM instrumentation system (IEC Publication 547).

### 2. Object and scope

This standard defines selected terms that are relevant to the following IEC publications:

- IEC Publication 516: A Modular Instrumentation System for Data Handling; CAMAC System.
- IEC Publication 547: Modular Plug-in Unit and Standard 19-inch Rack Mounting Unit Based on NIM Standard.
- IEC Publication 552: CAMAC — Organization of Multi-crate Systems. Specification of the Branch-highway and CAMAC Crate Controller Type A1.
- IEC Publication 640: CAMAC — Serial Highway Interface System.
- IEC Publication 677: Block Transfers in CAMAC Systems.
- IEC Publication 000: Multiple Controllers in a CAMAC Crate (*in preparation*).

The object has been to provide concise explanations of the main aspects of each term. In this standard the definitions refer to the use of the terms in the context of CAMAC, although 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 IEC publications listed above.



### 3. Definitions

An asterisk (\*), indicates that a term is defined formally in IEC CAMAC publications.

#### 3.1 Names

##### 3.1.1 \*CAMAC

A standardized modular instrumentation and digital interface system as defined in IEC Publication 516 (often treated as an acronym for “Computer Automated Measurement and Control”).

##### 3.1.2 ESONE

A multi-national committee representing 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 IEC Publication 547.

#### 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 IEC Publication 516.

##### 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 IEC Publication 516, 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 IEC Publication 516.

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##### 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 IEC Publication 547.

### 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 IEC Publication 516, including the use of DATAWAY lines as defined in Sub-clause 3.2 (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 IEC Publication 516.

#### 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 IEC Publication 547. In general NIM MODULES can also be mounted in CAMAC CRATES, provided special connector adaptors are used.

### 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 IEC Publication 516, receiving or generating DATAWAY signals in accordance with Sub-clause 3.2. 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 with MODULES via the DATAWAY, utilizing the AUXILIARY CONTROLLER BUS.

3.4.5 \* *Crate controller Type A1*

A CRATE CONTROLLER, defined by IEC Publication 552, for use with the CAMAC BRANCH-HIGHWAY.

3.4.6 \* *Crate controller Type A2*

A CRATE CONTROLLER, defined by IEC Publication 000, 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 IEC Publication 640, 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 IEC Publication 552 or the CAMAC SERIAL HIGHWAY of IEC Publication 640.

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 IEC Publication 552. It consists of a multi-wire digital HIGHWAY interconnecting up to seven CRATE CONTROLLERS and a BRANCH DRIVER. Also referred to as a CAMAC PARALLEL HIGHWAY.

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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 informations are transmitted in BIT-SERIAL or BYTE-SERIAL MODE (see also BIT-SERIAL HIGHWAY and BYTE-SERIAL HIGHWAY).