



BSI Standards Publication

Health informatics - Point-of-care medical device communication

Part 10101: Nomenclature

National foreword

This British Standard is the UK implementation of EN ISO 11073-10101:2005+A1:2017. It is identical to ISO/IEEE 11073-10101:2004, incorporating amendment 1:2017. It supersedes BS EN ISO 11073-10101:2005, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee IST/35, Health informatics.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Health informatics - Point-of-care medical device communication - Part 10101: Nomenclature (ISO/IEEE 11073-10101:2004)

Informatique de santé - Communication entre dispositifs
médicaux sur le site des soins - Partie 10101:
Nomenclature (ISO/IEEE 11073-10101:2004)

Medizinische Informatik - Kommunikation patientennaher
medizinischer Geräte - Teil 10101: Nomenklatur

This European Standard was approved by CEN on 16 August 2005.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

European foreword

The text of ISO/IEEE 11073-10101:2004 has been prepared by Technical Committee ISO/TC 215 "Health informatics" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 11073-10101:2005 by Technical Committee CEN/TC 251 "Health informatics", the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2006, and conflicting national standards shall be withdrawn at the latest by February 2006.

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Endorsement notice

The text of ISO/IEEE 11073-10101:2004 has been approved by CEN as EN ISO 11073- 10101:2005 without any modifications.

Foreword to amendment A1

This document (EN ISO 11073-10101:2005/A1:2017) has been prepared by Technical Committee ISO/TC 215 "Health informatics" in collaboration with Technical Committee CEN/TC 251 "Health informatics" the secretariat of which is held by NEN.

This Amendment to the European Standard EN ISO 11073-10101:2005 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.

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Health informatics — Point-of-care medical device communication — Part 10101: Nomenclature

1. Scope

The scope of this standard is nomenclature architecture for point-of-care (POC) medical device communication (MDC). It consists of three parts: the body of the standard, which defines the overall architecture of the organization and relationships among nomenclature components; normative Annex A and Annex B, which provide specifications of semantics and syntaxes, respectively; and informative Annex C, the bibliography.

This standard is intended for use within the context of IEEE Std 1073,¹ which sets out the relationship between this and other documents in the POC MDC series.

2. Conformance

There are no particular implementation conformance requirements defined in this standard, but some requirements for nomenclature representation are established in this standard to guide specification of semantics and syntax in other parts of the overall standard.

3. Normative references

The following normative documents contain provisions that, through reference in this text, constitute provisions of ISO/IEEE 11073-10101. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on ISO/IEEE 11073-10101 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid international standards.

¹Information on references can be found in Clause 3.

CEN ENV 12611, Medical Informatics — Categorical structure of systems of concepts — Medical Devices.²

IEEE Std 1073™, IEEE Standard for Medical Device Communications—Overview and Framework.³

ISO/IEC 8824 (all parts), Information technology — Abstract Syntax Notation One (ASN.1).⁴

ISO/IEC 8825 (all parts), Information technology —ASN.1 encoding rules.

ISO/IEC 9596-1, Information technology — Open systems interconnection — Common Management Information Protocol — Part 1: Specification.

ISO/IEEE 11073-10201, Health informatics — Point-of-care medical device communication — Part 10201: Domain information model (referred to hereinafter as the “DIM”).

ISO/IEEE 11073-20101, Health informatics — Point-of-care medical device communication — Part 20101: Application profiles – Base standard.

4. Terms and definitions

For the purposes of this standard, the following terms and definitions apply. *The Authoritative Dictionary of IEEE Standards Terms*, Seventh Edition, [B10]⁵ should be referenced for terms not defined in this clause.

4.1 corollary: a semantic and a syntactical representation that are correlated by a unique code.

4.2 -tuple: a component of a relation; e.g., a 2-tuple has two relational components.

4.3 unique: nonredundant.

5. Symbols (and abbreviated terms)

API	application program interface
ASN.1	Abstract Syntax Notation One (ISO/IEC 8824)
BAEP	brainstem acoustic evoked potential
BCC	bedside communication controller
BER	basic encoding rules (ISO/IEC 8825-1).
CMDISE	communication medical device information service element (CEN ENV 13735 [B5])
CMIP	Common Management Information Protocol (ISO/IEC 9596-1)
CMIP*	Common Management Information Protocol using ISO/IEEE 11073 MDDL/ MDER
CNS	central nervous system

²CEN publications are available from the European Committee for Standardization (CEN), 36, rue de Stassart, B-1050 Brussels, Belgium (<http://www.cenorm.be>).

³IEEE publications are available from the Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Lane, Piscataway, NJ 08854, USA (<http://www.standards.ieee.org/>).

⁴ISO/IEC documents can be obtained from the ISO office, 1 rue de Varembé, Case Postale 56, CH-1211, Genève 20, Switzerland/Suisse (<http://www.iso.ch/>) and from the IEC office, 3 rue de Varembé, Case Postale 131, CH-1211, Genève 20, Switzerland/Suisse (<http://www.iec.ch/>). ISO/IEC publications are also available in the United States from the Sales Department, American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036, USA (<http://www.ansi.org/>).

⁵The numbers in brackets correspond to the numbers of the bibliography in Annex C.

CSF	cerebrospinal fluid
CVS	cardiovascular system
DCC	device communication controller
DIM	domain information model, as defined in vital signs information representation (VITAL), interoperability of patient-connected medical devices (INTERMED), and medical device data language (MDDL) (ISO/IEEE 11073-10201 ⁶)
ECG	electrocardiogram or electrocardiograph
ECoG	electrocochleograph
EEG	electroencephalogram or electroencephalograph
EMG	electromyogram or electromyograph
EOG	electrooculogram
ERG	electroretinogram or electroretinograph
FEF	file exchange format (CEN/TC251/PT-40 [B7])
FFT	fast Fourier transform
FSM	finite state machine
HL7 ^{®7}	Health Level Seven
ICU	intensive care unit
ID	identifier
INTERMED	interoperability of patient-connected medical devices (CEN ENV 13735 [B5])
LLAEP	long latency acoustic evoked potential
MDAP	medical device application profile (The acronym <i>MDAP</i> may be substituted for the phrase <i>ISO/IEEE 11073-20000 family of standards.</i>)
MDC	medical device communication
MDDL	medical device data language (The acronym <i>MDDL</i> may be substituted for the phrase <i>ISO/IEEE 11073-10000 family of standards.</i>)
MDER	medical device encoding rules, as defined in medical device application profile (MDAP)
MDIB	medical data information base, as defined in ISO/IEEE 11073-10201
MDS	medical device system, an abstraction for a medical device (ISO/IEEE 11073-10201)
MIB	management information base
MLAEP	middle latency acoustic evoked potential
NCS	nerve conductens study
NOS	not otherwise specified
OO	object-oriented
OID	object identifier
PCA	patient-controlled analgesia
PDU	protocol data unit (also referred to as a <i>message</i> ; by convention, the term <i>PDUs</i> is used in text to indicate multiplicity)
PFC	physiological function code, which represents a physiological concept such as heart rate, blood pressure, etc.
POC	point of care or point-of-care
SCADA	supervisory control and data acquisition
SCO	service and control object

⁶The DIM was originally defined in CEN ENV 13734 [B4] and CEN ENV 13735 [B5], which are now superseded by ISO/IEEE 11073-10201.

⁷HL7 is a registered trademark of Health Level Seven, Inc. (www.hl7.org).

SCP-ECG	Standard Communications Protocol for Computer-Assisted Electrocardiography (CEN ENV 1064 [B1])
SEP	somatosensory evoked potential (also <i>systolic ejection period</i> in the context of haemodynamic monitoring measurements)
SNOMED ^{®8}	Systematized Nomenclature of Medicine
VEP	visual evoked potential
VMD	virtual medical device; an abstraction of a medical device modality; e.g., a <i>vital signs monitor medical device system (MDS)</i> might comprise electrocardiogram (ECG), blood pressure, temperature, and other related VMDs (ISO/IEEE 11073-10201)
VMO	virtual medical object (ISO/IEEE 11073-10201)
VMS	virtual medical system (ISO/IEEE 11073-10201)
VITAL	vital signs information representation (CEN ENV 13734 [B4])
0x<value>	hexadecimal encoding; e.g., the notation 0x0001 implies a 16-bit code with a decimal value of 1

6. Application

Nomenclature in this standard is primarily intended to be used in protocol data units (PDUs) as values of fields, typically object-oriented attributes, which specify particular alternatives among a related semantic set. The following are the most common field types.

- *Managed object class ID*, e.g., MDS [medical device system], VMS [virtual medical system], VMD [virtual medical device], VMO [virtual medical object], Channel, Metric, Alert, Scanner, SCO [service and control object], etc.
- *Event type ID*, e.g., a numerical observation type of event report.
- *Attribute ID*: various attributes in the domain information model (DIM)
 - *Type ID*: in general, a concept not covered by a class definition per se, but by a well-known or commonly used type of a class, e.g., a VMD (e.g., ventilator, gas analyzer), Metric object class physiological function code (PFC) (e.g., heart rate, cerebral perfusion pressure), or the body site of a measurement (e.g., left toe).
 - *State*: mode, status or finite state machine (FSM) state, e.g., associated.
 - *Dimension*: unit of measurement, e.g., deciliters per hour [dl/h].
 - *Indication*: alarm, e.g., asystole, INOP (e.g., malfunction), or advisory (e.g., check calibration).
- *Action type ID*, e.g., activate.
- *External nomenclature ID*, e.g., Systematized Nomenclature for Medicine (SNOMED).

Technically, information is initially defined in an abstract syntax, e.g., Abstract Syntax Notation One (ASN.1) or medical device data language (MDDL), and then mapped to and interchanged through a transfer syntax, e.g., basic encoding rules (BER) or medical device encoding rules (MDER), typically for efficiency in the form of integers. However, abstract syntax languages are generally unsuitable for high-precision human understanding, especially of medical terms. As a result, both semantic and syntactical definitions are needed; as covered in Clause 7 and Clause 8.

7. Semantics

Clause 7 establishes specification guidelines. Refer to Annex A for the detailed specification.

⁸SNOMED is a registered trademark of the College of American Pathologists; Norfield, IL; (800) 323-4040 (<http://www.cap.org>).

7.1 Attribution

Nomenclature semantics are represented as a set of attributes, as shown in Table 1.

Table 1—Nomenclature attributes

Attribute	Description/Definition	Purpose	Interpretability	Presence
Systematic, or DIM name	An organization of differentiating, relational descriptors; see Table 2 and Table 3	Formal or semiformal but human-readable derivation	Shall be unambiguous	Mandatory
Common term	A brief description of the name	Human-readable identification or efficient lookup	Should be unambiguous	Optional
Acronym	An abbreviated form of the name	Mnemonic or parametric abbreviation	Should be unambiguous	Optional
Description/Definition	A long, or sentence, form of the name	Human-readable and as understandable as possible	Shall be unambiguous with the exception of synonyms	Mandatory
Reference ID	A symbolic, programmatic form of the term	Development of application program interfaces (APIs)	Shall be unambiguous	Mandatory
Code	[Alpha]numeric identifier	Human- and machine-readable and efficiently processable by machines	Shall be unique, but context-sensitive parts are permitted; see 7.2	Mandatory
Others	As appropriate for the semantic and as specified in the detailed tables in Annex A. For example, a Reference ID, or corollary to the programmatic form, may be used in some cases to facilitate table lookup.			

Refer to Table 2 for an example pertaining to medical device typology and to Table 3 for a partial derivation of the systematic name used for this partition. As is shown in Table 3, the systematic name is an <n>-tuple of a base concept and a series of differentiating criteria, and the value of the systematic name is a string separated by ”|” delimiters. [A null indicates not otherwise specified (NOS).]

Table 2—Attribution example

Systematic name	Common term	Description/Definition	Code
Analyzer			
Analyzer <type>	Generic analyzer	Instrument that analyzes acquired patient information	4100
Analyzer Concentration [Sat] Blood <type>	SpO ₂ monitor	Instrument that derives the % of arterial O ₂ and pulse rate parameters (blood flow)	4104

7.2 Coding

Several coding methods are used to promote interoperability.

Table 3—Systematic name derivation—medical device type example

Base concept	Differentiating criteria		
	1 st <Device>	2 nd <has target>	3 rd <type>
Analyzer, Filter, Calculator, ...	Concentration, Electrical Potential, Flow, ...	Airway, Blood, Body, ...	Nonspecific, MDS, VMD, Channel

7.2.1 Context-sensitivity

For processing efficiency, especially bandwidth conservation, some nomenclature codes are defined as fixed-length integer 2-tuples, consisting of a code block number and a term code (within the code block). Provided that the code block context can be properly mapped, e.g., by implicit syntactical parsing, the processor requires only the term code to correlate the semantic, in which case the term code is context-sensitive with respect to the code block, whereas the 2-tuple is context-free.

For additional processing efficiency, code block numbers and term codes are mapped to 16-bit and 32-bit words, as follows.

[context-free] Nomenclature Code == (Code Block number * 2^{**16}) + *[context-sensitive]* Term Code,

where

Term Code has the range 2^{**16} .

For example, the context-free nomenclature code for a term in code block number 1 whose term code=4100 is equal to $((1 * 2^{**16}) + 4100) = 65536 + 4100 = 69636$ (which uniquely identifies the SpO₂ monitor term in Table 2).

Refer to Figure 1 for an illustration of the relationship between code block number and term codes.

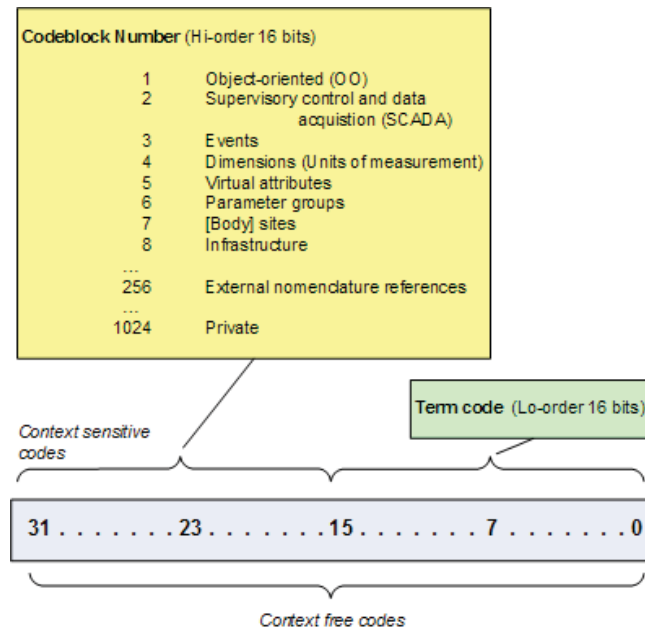


Figure 1—Context-sensitive coding illustration

Code interpretation may also be context-sensitive with respect to nomenclature versions; however, nomenclature revision coding is outside of the scope of this standard and should be provided by application PDUs during device association.

7.2.2 Grouping

Term codes may be grouped into code ranges as follows:

- A partition is a group of semantics that are assigned to a contiguous term code range within a code block and that have a categorical relationship. For example, object classes, attributes, and notifications are partitions of the object-oriented code block. Partitions are prefixed as high-order bit masks that are computed by offset, typically in multiples of binary orders of magnitude, e.g., 0x1000, 0x2000, etc.
- Code blocks or partitions may be designated as public and private. Syntactical conformance shall be mandatory for all code blocks and partitions, but semantic conformance for private code blocks or partitions shall not be mandatory. By convention, each code block should allocate private partitions consistently; the range 0xF000–0xFFFF is recommended.
- A discriminator is a group of related semantics assigned to a contiguous code range that have a regular relationship, e.g., maximum/minimum/mean or systolic/diastolic/mean. Discriminators are embedded as low-order bit code that are computed by relative offset to a base term.

For example, Table 1 is an example of a 2-bit device <type> discriminator, in which the relative offsets 0–3 correspond, respectively, with the following semantics:

- NOS, offset=0),
- MDS class [offset=1],
- VMD class [offset=2], and
- Channel class [offset=3], respectively.

8. Syntax

Nomenclature codes are intended to be mapped to machine-processable forms using various protocols (e.g., ISO/IEEE 11073-20101) and program (e.g., C++) presentation forms. However, because it is impractical to do all mappings, this standard shall provide mappings to a set of nominal forms, as follows:

- Transfer: numeric form suitable for use in transfer syntaxes; refer to 8.1.
- Programmatic: symbolic form suitable for use in programming languages; refer to 8.2.

8.1 Transfer

8.1.1 Types

There are several types of transfer forms:

- a) *Global* corresponds with Common Management Information Protocol (CMIP) *globalForm*, i.e., is an ISO ASN.1 object identifier (OID). This form is bandwidth-intensive; therefore, complete abstract and transfer syntaxes may not be explicitly enumerated.
- b) *Local* corresponds with CMIP *localForm*, i.e., is an unsigned integer. Various canonical forms are defined as follows:
 - 1) *Fixed-length* is intended to minimize bandwidth and takes two forms, as follows:
 - i) *Short*: a context-sensitive code; refer to 7.2.1. It is intended that the short form be used in real-time or monitoring applications with appropriate association controls, as defined in

medical device application profile (MDAP) and interoperability of patient-connected medical devices (INTERMED) profiles.

- ii) *Long*: a context-free code; refer to 7.2.1. It is intended that this form be used to export nomenclatures through a gateway or persistent medium.
- 2) *Variable-length* is intended to provide an efficient form for use with fully compliant CMIP-based syntaxes, using BER integers. Short and long forms may be presented analogous with the fixed-length form described in this subclause.

8.1.2 Notation

Refer to Figure 2, which lists ISO ASN.1 OID assignments for this standard.

An arc in the "iso(1) ... fixedForm(0)" branch indicates that the blockCode-termCode scheme defined in this standard is to be used during the association; refer to Clause 7 and Figure 1 for bit maps.

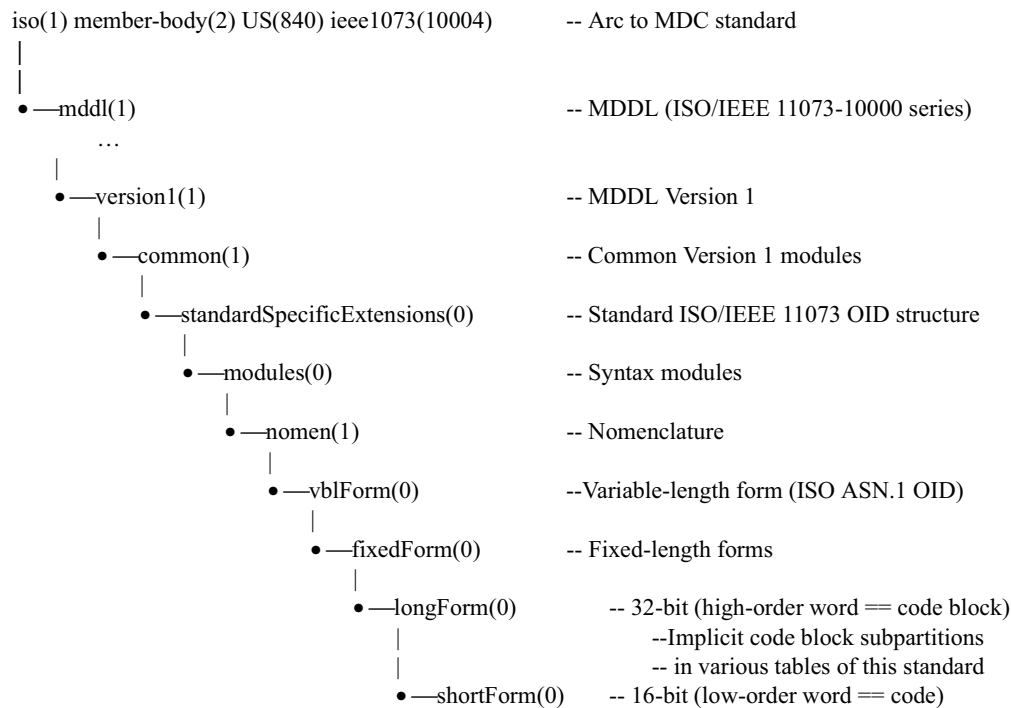


Figure 2—ISO ASN.1 OID assignments

8.2 Programmatic

Programmatic, or symbolic, form is intended to be used to develop APIs in a way that applications can reuse different implementations with minimum impact on symbol mapping.

8.2.1 Attribution

The term code is used as a reference in correlating semantic and syntactical definitions through the use of additional attributes, as follows:

- *Title, or Reference ID*: a symbolic, programmatic form of the term. The form is correlated to the context-free code (i.e., titles are by definition context-free with respect to all other titles); all terms are prefixed with “MDC_” for consistency.
- *AutoCode*: a numerical value associated with the term. The value is used as an generic identifier; the AutoCode is assigned at the time the term is created and remains assigned to that term independent of term code revisions. The AutoCode is not normative, but may be used for editorial, indexing purposes when context-sensitive components (i.e., Code Block and Term Code) are remapped.

8.2.2 Notation

While there are many program bases that could be used, the C[++] language is used as a canonical basis in this standard.

Notation conventions for the C[++] programming language are as follows:

```
#define    MDC_<TERM>        <Term Code>    /* <Acronym>  <Auto Code> */
```

where

#define denotes a static assignment, e.g., of the value <c> to the symbol <MDC_term>.

MDC_<TERM> is the nomenclature symbol (or title); the title is all uppercase.

- The prefix MDC_ is used for all terms in this standard.
- Partitions may be identified by common prefixes, e.g., _DEV or _LEAD.
- Discriminators are identified by regular suffixes, e.g., _MDS, _VMD, or _CHAN; see the example that follows.

<Term Code> is a decimal number in the range specified during association, e.g., 0–65535 for 16-bit, context-sensitive coding.

<Acronym> (may be absent) is an abbreviation.

<Auto Code> is the generic record number of the term.

The last components are enclosed in the syntax /* *//, which represents a comment.

For example, the SpO₂ Analyzer <types> in Table 2 are represented programmatically as follows:

#define	Term Title (or Reference ID)	Term Code	Auto Code
#define	MDC_DEV_ANALY_SAT_O2	4104 /*	2474 */
#define	MDC_DEV_ANALY_SAT_O2_MDS	4105 /*	4962 */
#define	MDC_DEV_ANALY_SAT_O2_VMD	4106 /*	5095 */
#define	MDC_DEV_ANALY_SAT_O2_CHAN	4107 /*	5227 */

The derived term titles post-fix <null>, _MDS, _VMD, and _CHAN, respectively. The <#define>, <Term Title>, and <Term Code> symbols are normative, while the comment < /* ... */ > and the AutoCode embedded in it are informative.

As these term codes are assigned to code block number 1, the context-free nomenclature codes are 1*65536+[4104 + [0,1,2,3]] ➔ 69640, ..., 69643.

9. Extensibility

Terms defined in Annex B shall not be normative unless a semantic corollary is specified in this standard. However, terms in Annex B may be reorganized for presentation, e.g., into sequential code order, as appropriate to facilitate application programming.

10. Version exporting

The syntax *ISO MDC <ver>*, where <ver> is the version ID as shown in Figure 2, should be used when nomenclatures of this standard are used in registered external data communications standards, e.g., Health Level Seven (HL7).

Annex A

(normative)

Nomenclature semantics

A.1 Overview of nomenclature for vital signs—semantics

A.1.1 Introduction

Annex A presents the medical data information base (MDIB), i.e., the set of objects and object instantiations occurring in any device of the communicating system as described in the DIM (see ISO/IEEE 11073-10201). This common data dictionary is the prerequisite for interoperability of medical devices and device systems.

All subclauses in this annex that correspond to the code blocks in A.2.3 contain explanatory parts to support the understanding of this approach in the design of the data dictionary. After these explanations, a code table is presented. This structuring is designed to ease and promote maintenance. The authors are well aware that despite their strong efforts for completion during development of this standard, application-specific supplements are to be expected. Comments and proposals for improvement are most welcome.

Because the number of different object-oriented modelling elements resulting from the DIM is limited, no specific nomenclature has been designed for these elements. They are listed in the tables in A.3. Regarding the demographics, there are so few that they do not deserve semantic analysis and systematic names. They are listed in several tables in A.3.2.9.

Communication infrastructure is presented in A.4 due to its close relation to the Communication Package of the DIM. A set of tables gives the terms and corresponding code values for communication infrastructure objects and attributes. Objects in these tables (e.g., the Device Interface object, the MibElement [management information base element] object) and their attributes are not part of the MDIB.

The nomenclature, i.e., the systematic names, for the terms concerning devices, metrics (measurements and enumerations), alerts, etc., is presented in A.5 through A.10.

For the nomenclature of vital signs devices, for metrics (measurements and enumerations), for body sites, for alerts, etc., systematic names have been constructed following the methodology described in the European standard CEN ENV 12264 [B2]. The systematic name is constructed by means of generative patterns and consists of the base concept and two or three descriptors forming with the semantic links the differentiating criteria. Each differentiating criterion is built by means of a semantic link and an associated category (see Clause 7). The constituents of the systematic name are separated by vertical bars. Unused fields are left blank and identified by double bars.

In order to avoid a long list of similar terms, a variable field was employed in some terms. For instance, the signal from an electrocardiogram (ECG) obtained from different leads should be identified as ECG | I, ECG | II, ECG | III, etc. The corresponding term used in Table A.7.1.2 is *ECG <lead>* where *<lead>* stands for a general lead that has to be specified according to a separate code table.

The tables for metrics/enumerations in A.7 are mainly organized according to the target system (e.g., body compartment, body part, body function), following some anatomical systematics.

The tables in A.5 through A.10 show basically six columns: Systematic name, Common term, Acronym, Description/Definition, Reference ID, and Code. The common term is the name that is in common use in medicine and well-known to medical professionals. The same is true for the acronym except that it refers to the corresponding English abbreviations. Description/Definition gives a description, as precise as possible, to ensure the correct understanding. It is to be used as basic information for developing the systematic name.

A.2 Code assignment to the MDIB elements

A.2.1 Overview

Before embarking on the development of the vital signs nomenclature, an investigation was made to discover whether existing nomenclatures met the needs of POC MDC. A similar investigation had been instigated by the IEEE 1073 Working Group, and in both cases no appropriate nomenclature had been found. As a result, the CEN and IEEE teams collaborated on a vital signs nomenclature and coding system, which forms the bulk of this standard.

This standard is meant to be temporary, in that other efforts to incorporate the terms from this standard into a more global medical nomenclature effort may happen, either by incorporating the tables and codes from this standard directly into the larger nomenclature (using some referencing scheme to establish context) or by simply incorporating the terms and recoding them. In the meantime, the vital signs nomenclature and coding system in this standard should be used as a default.

A.2.2 Basic rules

The coding of the vital signs nomenclature is based on a number of basic rules:

- a) The codes should fit within 16 bits in order to minimize the resulting message lengths. Because the vital signs nomenclature is used for communication with some very small and cost-constrained devices, it was important to try to accommodate their needs to the extent possible and practical.
- b) As a result of the requirement to keep the codes less than 16 bits, the code space was separated into a number of context-sensitive, orthogonal spaces. As a result, the same code can mean different things depending on its context, an arrangement that is not appropriate in a more general coding effort, but works well in the context of this standard. In the general case, a prefix can be used to distinguish between similar codes; however, that practice will tend to double the size of each code.

- c) Each code space has a block of 4096 entries allocated for private use. The current nomenclature is not complete, and in addition, new relevant terms are created all the time. Therefore, space has been reserved for private codes that should be used until they are accepted as public and placed into the appropriate table.
- d) Reviewing the coding, one may find tables where the codes increment regularly, while others seem to be allocated randomly. These irregularities are generally side effects of how the codes were allocated and whether historically some term codes had already been allocated (e.g., by the original IEEE 1073 working group). In general, the codes are not meant to have any context, and it is dangerous to base implementations on any perceived order or range.
- e) In some cases, it may seem that codes are missing or were skipped. This situation may be due to the following:
 - 1) Nomenclature and resulting codes may have been used in early versions of the standard, but were not required in the CEN ENV 13735 [B5] vital signs nomenclature.
 - 2) Buffer space may have been allocated for future use.
- f) In many cases, the codes will jump by a step of 2, 4, etc. This practice is done to account for entries that have discriminators, which result in an offset from a base number to fully describe them. The use of these discriminators and resulting offsets is described in more detail for each coding space (see A.2.3).

A.2.3 Coding spaces

As previously mentioned, the coding space is separated into orthogonal independent spaces. Each space can use the full 16-bit (65 536 entry) coding space available. The spaces are as follows:

- Block A: Object-oriented elements
Device nomenclature
- Block B: Units of measurement
- Block C: Metrics
- Block D: Body sites
- Block E: Alerts
- Block F: External nomenclatures
- Block G: Communication infrastructure
- Block H: Reserved for file exchange format (FEF)

Of these coding spaces, the most densely populated is the metrics space (Block C), which contains many physiological measurement instantiations.

A.2.3.1 Block A

Block A is populated with the object-oriented elements and device nomenclature codes as follows:

Description	Current
Object-Oriented	0000–3343
Devices ^a	4000–4511
Private	61440–65535

^aEach device code is separated by a count of 4 to allocate space for the four different classes of device. These classes are defined as follows:

- 0 = Generic device
- 1 = MDS
- 2 = VMD
- 3 = Channel

A.2.3.2 Block B

Block B is populated with the units of measurement codes as follows:

Description	Current
Units of measurement ^a	00000–06047
Private	61440–65535

^aEach unit of measurement code is separated by a count of 32 to allocate space for the various orders of magnitude. These orders of magnitude are defined as follows (refer to Table A.6.1 for the complete list):

- | | | |
|-----------------------|-----------------------|------------------------------|
| 0 = 10 ⁰ | 1 = 10 ¹ | 2 = 10 ² |
| 3 = 10 ³ | | 16 = 10 ⁻¹ |
| 17 = 10 ⁻² | 18 = 10 ⁻³ | 19 = 10 ⁻⁴ , etc. |

A.2.3.3 Block C

Block C is populated with the metrics nomenclature codes as follows:

Description	Current
ECG metrics	
ECG leads	00000–00255
ECG measurements ^a	00256–16383
ECG diagnostic patterns	16384–17656
Haemodynamic metrics	
Haemodynamic ^b	18432–19368
Respiratory metrics	
Respiratory ^c	20480–21360
Ventilation modes	53280–53281
Blood gas, urine. etc., metrics	
Blood gas, urine, etc.	28676–28988
Fluid-related metrics	
Fluid output ^c	26624–26684
Pump data ^c	26688–26876
Substance/Type	53396–53408
Neurological metrics	
Neurological ^c	22528–23016
Neurological patterns ^d	23560–25160
Neurological stimulation	53504–53553
Miscellaneous measurements	
Miscellaneous ^c	57348–57672
Private	61440–65535

^aMost of the ECG measurement codes are offset by 8 bits (256 counts) to allocate space for up to 256 different ECG lead discriminators. These are defined as follows (refer to A.7.1 for the complete list):

0 = ECG lead unspecified

1 = ECG Lead I

2 = ECG Lead II

3 = ECG Lead V1

....

61 = ECG Lead III

62 = ECG Lead aVR, etc.

^bMost of the haemodynamic measurement codes are offset by 2 bits (4 counts) to allocate space for the following discriminators:

- 0 = Base measurement
- 1 = Systolic
- 2 = Diastolic
- 3 = Mean

^cThese codes are offset by 2 bits (4 counts) to allocate space for the following discriminators:

- 0 = Base measurement
- 1 = Maximum
- 2 = Minimum
- 3 = Mean

^dThe neurological pattern codes are offset by 3 bits (8 counts) to allocate space for the following discriminators:

- 0 = Base pattern
- 1 = Number of occurrences of the base
- 2 = Rate of counted events
- 3 = Maximum rate of counted events
- 4 = Minimum rate of counted events
- 5 = Mean rate of counted events

A.2.3.4 Block D

Block D is populated with the body sites codes as follows:

Description	Current
Body sites ^a	0000–1810
Neuro nerves	0000–0246
Neuro muscles	0248–0994
Electroencephalogram (EEG)	0996–1318
Electrooculogram (EOG)	1320–1402
Neuro monitoring	1404–1422
Cardio Coronary arteries	1424–1506 1812–1840
Miscellaneous sites	1508–1810
Private	61440–65535

^aExcept for entries that include specific discriminators, the codes are offset by 2 bits (4 counts) to allocate space for the following discriminators:

- 0 = Orientation - nominal
- 1 = Orientation - left
- 2 = Orientation - right

A.2.3.5 Block E

Block E is populated with alert/event codes as follows:

Description	Current
Alerts/Events ^a	0000–6600
Device events	0000–0596
Pattern events	3072–3294
Status events	6144–6730
Private	61440–65535

^aExcept for entries that include specific discriminators, the codes are offset by 1 bit (2 counts) to allocate space for the following discriminators:

0 = Refers to metric

1 = Refers to object

A.2.3.6 Block F

Block F is populated with external nomenclature codes as follows:

Description	Current
External nomenclatures ^a	0000–1600
Private	61440–65535

^aThe codes are offset by 6 bits (64 counts) to allocate space for the various new revisions of one external nomenclature.

A.2.3.7 Block G

Block G is populated with communication infrastructure codes as follows:

Description	Current
Infrastructure	0000–8194
Private	61440–65535

A.2.3.8 Block H

Block H is reserved for FEF codes as follows:

Description	Reserved
FEF	0000–61439
Private	61440–65535

A.3 Data dictionary and codes for object-oriented modeling elements (Block A)

A.3.1 Introduction

The purpose of this inventory is to provide a schematic presentation and identification scheme for all types of object-oriented modeling elements used in the DIM (see ISO/IEEE 11073-10201). These elements build up the different parts (subject areas or “packages”) of the DIM that refer to separate application areas.

- a) The tables in A.3 are ordered following the order of subject areas in the DIM:

- 1) General (or Top object in the DIM)
- 2) Medical Package
- 3) Alert Package
- 4) System Package
- 5) Control Package
- 6) Extended Services Package
- 7) Communication Package
- 8) Archival Package
- 9) Patient Package

For the communication infrastructure (Block G) objects and attributes that are closely related to the Communication Package, but use a different code block (see A.2.3.7), a separate set of tables is provided in A.4.

- b) For each of the subject areas, a set of five separate tables for the different types of object-oriented modeling elements used in the DIM is provided:
- 1) Object class items
 - 2) Attributes
 - 3) Attribute groups
 - 4) Behavior (methods)
 - 5) Notifications
- c) In order to enhance readability and usability of the tables, the scheme

**Table A.3.x.x—Object-oriented modeling elements:
[subject area]—[object-oriented modeling element type]**

is applied strictly in numbering the tables (even accepting that some tables remain empty).

Thus, to give an example, in Table A.3.9.2. for the Patient Package (subject area 9), the attributes (object-oriented modeling element type 2) are given.

- d) The name of the object-oriented modeling element item as introduced in the DIM appears in the first column, DIM name, of each table. The second column, Reference ID, provides equivalent systematic acronyms that allow direct mapping onto the MDIB database, which is also used for ISO/IEEE 11073 standardization activities in this field. The content of the third column in the object class item tables differs from all other tables (see next two paragraphs). The fourth column, Code, contains the corresponding codes from this database for each item, as far as exist at publication of this standard.

For the object class item tables (A.3.*.1), the third column, Derived from, refers to the inheritance relation between each item and the object class item from which it is derived. The virtual object class item at the top of the inheritance hierarchy is denoted *Top*.

For all other tables (A.3.*.2–A.3.*.5), the third column, Belongs to object, indicates the assignment of attribute groups, attributes, notifications, or methods to corresponding object class items.

- e) For structural reasons related to the DIM, attributes or attribute groups are in some cases used with different objects that are not derived from each other by inheritance. This situation leads to duplicated terms that may cause problems when automated queries require unique matches, especially for table updates or changes. Therefore, duplicated or multiple terms are generally marked by an asterisk (*). Only the first occurrence of such a term is regarded as a code and reference ID definition and is marked by **bold letters** for the DIM name, the referenced object in the third column, and the code, as shown in the following example:

Start-Time *	MDC_ATTR_TIME_START	Metric and derived objects, Session Archive, Session Test, Session Notes	2538
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In addition to the asterisk on the DIM name, all further occurrences of the term explicitly refer to this first occurrence (by the expression: "see: <referenced object>/<subject area>" in the first column). The referenced object in the third column again is in **bold letters**, and the code value is set in parentheses (<code>), as shown in the following example:

Start-Time * (see: Metric/ Medical Package)	MDC_ATTR_TIME_START	Metric and derived objects, Session Archive, Session Test, Session Notes	(2538)
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This scheme is intended to be appropriate for the work with both the DIM and the MDIB.

A.3.2 Object-oriented modeling elements: inventory tables

A.3.2.1 General

Table A.3.1.1—Object-oriented modeling elements—general—object class items

DIM name	Reference ID	Derived from	Code
Top	MDC_MOC_TOP		70

Table A.3.1.2—Object-oriented modeling elements—general—attributes

DIM name	Reference ID	Belongs to object	Code
Class	MDC_ATTR_CLASS	Top and derived objects	2491
Name-Binding	MDC_ATTR_NAME_BINDING	Top and derived objects	2510
Locale	MDC_ATTR_LOCALE	Top and derived objects	2600

Table A.3.1.3—Object-oriented modeling elements—general—attribute groups

DIM name	Reference ID	Belongs to object	Code
This table has no content. Following the construction and ordering scheme (see item c in A.3.1), empty tables are not left out in order to enhance readability and usability of A.3.			

Table A.3.1.4—Object-oriented modeling elements—general—behavior

DIM name	Reference ID	Belongs to object	Code
This table has no content. Following the construction and ordering scheme (see item c in A.3.1), empty tables are not left out in order to enhance readability and usability of A.3.			

Table A.3.1.5—Object-oriented modeling elements—general—notifications

DIM name	Reference ID	Belongs to object	Code
Attribute-Update	MDC_NOTI_ATTR_UPDT	Top and derived objects	3330

A.3.2.2 Medical Package

Table A.3.2.1—Object-oriented modeling elements—Medical Package—object class items

DIM name	Reference ID	Derived from	Code
VMO	MDC_MOC_VMO	Top	1
VMD	MDC_MOC_VMO_VMD	VMO	2
Channel	MDC_MOC_VMO_CHAN	VMO	3
Metric	MDC_MOC_VMO_METRIC	VMO	4
Numeric	MDC_MOC_VMO_METRIC_NU	Metric	6
Sample Array	MDC_MOC_VMO_METRIC_SA	Metric	7
Real Time Sample Array	MDC_MOC_VMO_METRIC_SA_RT	Sample Array	9
Time Sample Array	MDC_MOC_VMO_METRIC_SA_T	Sample Array	10
Distribution Sample Array	MDC_MOC_VMO_METRIC_SA_D	Sample Array	8
Enumeration	MDC_MOC_VMO_METRIC_ENUM	Metric	5
PM-Store	MDC_MOC_VMO_PMSTORE	VMO	61
PM-Segment	MDC_MOC_PM_SEGMENT	Top	62
Complex Metric	MDC_MOC_VMO_METRIC_CMPLX	Metric	79

**Table A.3.2.2—Object-oriented modeling elements—
Medical Package—attributes**

DIM name	Reference ID	Derived from	Code
Type	MDC_ATTR_ID_TYPE	VMO and derived objects	2351
Handle *	MDC_ATTR_ID_HANDLE	VMO and derived objects, VMS and derived objects, Log and derived objects, Battery, Scanner and derived objects, Discriminator, Multipatient Archive, Patient Archive, Session Archive, Session Test, Session Notes, Physician, Patient Demographics	2337
Label	MDC_ATTR_ID_LABEL_STRING	VMO and derived objects	2343
Ext-Obj-Relations *	MDC_ATTR_EXT_OBJ_RELATION	VMO and derived objects, VMS and derived objects	2499
Vmd-Status	MDC_ATTR_VMD_STAT	VMD and derived objects	2466
Vmd-Model *	MDC_ATTR_ID_MODEL	VMD and derived objects, VMS and derived objects	2344
Instance-Number *	MDC_ATTR_ID_INSTNO	VMD and derived objects, PM-Segment, Operation and derived objects, Scanner and derived objects	2338
Production-Specification *	MDC_ATTR_ID_PROD_SPECN	VMD and derived objects, VMS and derived objects, Battery	2349
Compatibility-Id *	MDC_ATTR_ID_COMPAT	VMD and derived objects, VMS and derived objects	2336
Parameter-Group	MDC_ATTR_ID_PARAM_GRP	VMD and derived objects, Channel	2346
Position	MDC_ATTR_ID_POSN	VMD and derived objects	2348
Operating-Hours	MDC_ATTR_TIME_PD_OP_HRS	VMD and derived objects	2444
Operation-Cycles	MDC_ATTR_CYC_OP	VMD and derived objects	2325
Measurement-Principle	MDC_ATTR_MSMT_PRINCIPLE	VMD and derived objects, Channel	2560
Channel-Id	MDC_ATTR_CHAN_ID	Channel	2318
Channel-Status	MDC_ATTR_CHAN_STAT	Channel	2320
Physical-Channel-Number	MDC_ATTR_CHAN_NUM_PHYS	Channel	2319
Logical-Channel-Number	MDC_ATTR_CHAN_NUM_LOGICAL	Channel	2606
Color	MDC_ATTR_COLOR	Channel, Metric and derived objects	2321
Metric-Specification	MDC_ATTR_METRIC_SPECN	Metric and derived objects	2367
Max-Delay-Time	MDC_ATTR_DELAY_TIME_MAX	Metric and derived objects	2583
Metric-Status	MDC_ATTR_METRIC_STAT	Metric and derived objects	2368

**Table A.3.2.2—Object-oriented modeling elements—
Medical Package—attributes (continued)**

DIM name	Reference ID	Derived from	Code
Measurement-Status	MDC_ATTR_MSMT_STAT	Metric and derived objects	2375
Metric-Id	MDC_ATTR_ID_TYPE_METRIC_STA T	Metric and derived objects, PM-Segment	2353
Metric-Id-Ext	MDC_ATTR_ID_MSMT_EXT	Metric and derived objects, PM-Store	2502
Unit-Code *	MDC_ATTR_UNIT_CODE	Metric and derived objects, Set Value Operation, Limit Alert Operation	2454
Unit-Label-String	MDC_ATTR_UNIT_LABEL_STRING	Metric and derived objects	2457
Vmo-Source-List	MDC_ATTR_VMO_LIST_SRC	Metric and derived objects	2467
Metric-Source-List	MDC_ATTR_METRIC_LIST_SRC	Metric and derived objects	2366
Msmt-Site-List	MDC_ATTR_SITE_LIST_MSMT MDC_ATTR_SITE_LIST_MSMT_EXT	Metric and derived objects	2430 2551
Body-Site-List	MDC_ATTR_SITE_LIST_BODY MDC_ATTR_SITE_LIST_BODY_EXT	Metric and derived objects	2429 2550
Metric-Calibration	MDC_ATTR_METRIC_CALIB	Metric and derived objects	2362
Measure-Mode	MDC_ATTR_MODE_MSMT	Metric and derived objects	2373
Measure-Period	MDC_ATTR_TIME_PD_MSMT	Metric and derived objects	2443
Averaging-Period	MDC_ATTR_TIME_PD_AVG	Metric and derived objects	2535
Start-Time *	MDC_ATTR_TIME_START	Metric and derived objects, Session Archive, Session Test, Session Notes	2538
Stop-Time *	MDC_ATTR_TIME_STOP	Metric and derived objects, Session Archive, Session Test, Session Notes	2539
Metric-Info-Label-String	MDC_ATTR_METRIC_INFO_LABEL_ STR	Metric and derived objects	2365
Substance	MDC_ATTR_ID_SUBSTANCE	Metric and derived objects	2542
Substance-Label-String	MDC_ATTR_ID_SUBSTANCE_LABEL_ _STRING	Metric and derived objects	2508
Nu-Observed-Value	MDC_ATTR_NU_VAL_OBS	Numeric and derived objects	2384
Compound-Nu-Observed-Value	MDC_ATTR_NU_CMPD_VAL_OBS	Numeric and derived objects	2379
Absolute-Time-Stamp	MDC_ATTR_TIME_STAMP_ABS	Numeric, Time Sample Array, Distribution Sample Array, Enumeration and derived objects	2448
Relative-Time-Stamp	MDC_ATTR_TIME_STAMP_REL	Numeric, Time Sample Array, Distribution Sample Array, Enumeration and derived objects	2449

**Table A.3.2.2—Object-oriented modeling elements—
Medical Package—attributes (continued)**

DIM name	Reference ID	Derived from	Code
HiRes-Time-Stamp	MDC_ATTR_TIME_STAMP_REL_HI_RES	Numeric and derived objects, Time Sample Array, Distribution Sample Array, Enumeration and derived objects	2537
Nu-Measure-Range	MDC_ATTR_NU_RANGE_MSMT	Numeric and derived objects	2382
Nu-Physiological-Range	MDC_ATTR_NU_RANGE_PHYSIO	Numeric and derived objects	2383
Nu-Measure-Resolution	MDC_ATTR_NU_MSMT_RES	Numeric and derived objects	2381
Display-Resolution	MDC_ATTR_DISP_RES	Numeric and derived objects	2327
Accuracy	MDC_ATTR_NU_ACCUR_MSMT	Numeric and derived objects	2378
Sa-Observed-Value	MDC_ATTR_SA_VAL_OBS	Sample Array and derived objects	2414
Compound-Sa-Observed-Value	MDC_ATTR_SA_CMPD_VAL_OBS	Sample Array and derived objects	2407
Sa-Specification	MDC_ATTR_SA_SPECN	Sample Array and derived objects	2413
Sa-Marker-List	MDC_ATTR_SA_MARKER_LIST_I8 MDC_ATTR_SA_MARKER_LIST_I16 MDC_ATTR_SA_MARKER_LIST_I32	Sample Array and derived objects	2603 2582 2604
	MDC_ATTR_SA_FIXED_VAL_SPECN	(Synonym)	2582
Dsa-Marker-List	MDC_ATTR_DSA_MARKER_LIST	Sample Array and derived objects	2605
Compression	MDC_ATTR_COMPRES	Sample Array and derived objects	2322
Scale-and-Range-Specification	MDC_ATTR_SCALE_SPECN_I8	Sample Array and derived objects	2417
	MDC_ATTR_SCALE_SPECN_I16		2415
	MDC_ATTR_SCALE_SPECN_I32		2416
Sa-Physiological-Range	MDC_ATTR_SA_RANGE_PHYS_I8	Sample Array and derived objects	2412
	MDC_ATTR_SA_RANGE_PHYS_I16		2410
	MDC_ATTR_SA_RANGE_PHYS_I32		2411
Visual-Grid	MDC_ATTR_GRID_VIS_I8	Sample Array and derived objects	2332
	MDC_ATTR_GRID_VIS_I16		2330
	MDC_ATTR_GRID_VIS_I32		2331
Sa-Calibration-Data	MDC_ATTR_SA_CALIB_I8	Sample Array and derived objects	2406
	MDC_ATTR_SA_CALIB_I16		2404
	MDC_ATTR_SA_CALIB_I32		2405
Filter-Specification	MDC_ATTR_FILTER_SPECN	Sample Array and derived objects	2329
Filter-Label-String	MDC_ATTR_FILTER_LABEL_STRING	Sample Array and derived objects	2626
Sa-Signal-Frequency	MDC_ATTR_SA_FREQ_SIG	Sample Array and derived objects	2408
Sa-Measure-Resolution	MDC_ATTR_SA_MSMT_RES	Sample Array and derived objects	2409

**Table A.3.2.2—Object-oriented modeling elements—
Medical Package—attributes (continued)**

DIM name	Reference ID	Derived from	Code
Sample-Period	MDC_ATTR_TIME_PD_SAMP	Real Time Sample Array, Time Sample Array, PM-Store	2445
Sweep-Speed	MDC_ATTR_SPD_SWEEP_DEFAULT	Real Time Sample Array, Time Sample Array	2431
Tsa-Marker-List	MDC_ATTR_TSA_MARKER_LIST	Time Sample Array	2452
Distribution-Range-Specification	MDC_ATTR_RANGE_DISTRIB	Distribution Sample Array	2403
x-Unit-Code	MDC_ATTR_UNIT_CODE_X	Distribution Sample Array	2455
x-Unit-Label-String	MDC_ATTR_UNIT_LABEL_STRING_X	Distribution Sample Array	2458
Enum-Observed-Value	MDC_ATTR_VAL_ENUM_OBS	Enumeration	2462
Compound-Enum-Observed-Value	MDC_ATTR_VAL_ENUM_OBS_CMPD	Enumeration	2463
Enum-Measure-Range	MDC_ATTR_ENUM_RANGE_MSMT	Enumeration	2561
Enum-Measure-Range-Bit-String	MDC_ATTR_ENUM_RANGE_MSMT_BIT_STRING	Enumeration	2568
Enum-Measure-Range-Labels	MDC_ATTR_ENUM_RANGE_MSMT_LABELS	Enumeration	2627
Enum-Additional-Data	MDC_ATTR_ENUM_ADD_DATA	Enumeration	2498
Metric-Class	MDC_ATTR_METRIC_CLASS	PM-Store	2363
Store-Sample-Algorithm	MDC_ATTR_METRIC_STORE_SAMPLE_ALG	PM-Store	2371
Storage-Format	MDC_ATTR_METRIC_STORE_FORMAT	PM-Store	2370
Store-Capacity-Count	MDC_ATTR_METRIC_STORE_CAPACITY_CNT	PM-Store	2369
Store-Usage-Count	MDC_ATTR_METRIC_STORE_USAGE_CNT	PM-Store	2372
Operational-State *	MDC_ATTR_OP_STAT	PM-Store , Operation and derived objects, Scanner and derived objects, Discriminator	2387
Number-of-Segments	MDC_ATTR_NUM_SEG	PM-Store	2385
Vmo-Global-Reference	MDC_ATTR_VMO_REF_GLB	PM-Segment	2469
Segment-Start-Abs-Time	MDC_ATTR_TIME_START_SEG	PM-Segment	2450
Segment-End-Abs-Time	MDC_ATTR_TIME_END_SEG	PM-Segment	2442
Segment-Usage-Count	MDC_ATTR_SEG_USAGE_CNT	PM-Segment	2427
Segment-Data	MDC_ATTR_SEG_DATA_GEN MDC_ATTR_SEG_DATA_NU_OPT MDC_ATTR_SEG_DATA_RTSA_OPT	PM-Segment	2424 2425 2426

**Table A.3.2.2—Object-oriented modeling elements—
Medical Package—attributes (continued)**

DIM name	Reference ID	Derived from	Code
Average-Reporting-Delay	MDC_ATTR_REPORTING_DELAY_AVG	Real Time Sample Array	2616
Sample-Time-Sync	MDC_ATTR_SAMPLE_TIME_SYNC	Real Time Sample Array	2617
HiRes-Sample-Time-Sync	MDC_ATTR_SAMPLE_TIME_SYNC_HIRES	Real Time Sample Array	2618
Cmplx-Metric-Info	MDC_attr_cmplx_info	Complex Metric	2619
Cmplx-Observed-Value	MDC_attr_cmplx_val_obs	Complex Metric	2620
Cmplx-Dyn-Attr	MDC_attr_cmplx_dyn_attr	Complex Metric	2621
Cmplx-Static-Attr	MDC_attr_cmplx_static_attr	Complex Metric	2622
Cmplx-Recursion-Depth	MDC_attr_cmplx_recursion_depth	Complex Metric	2623

**Table A.3.2.3—Object-oriented modeling elements—
Medical Package—attribute groups**

DIM name	Reference ID	Belongs to object	Code
VMO Static Context Group *	MDC_ATTR_GRP_VMO_STATIC	VMO and derived objects, SCO and derived objects	2065
VMO Dynamic Context Group *	MDC_ATTR_GRP_VMO_DYN	VMO and derived objects, SCO and derived objects	2064
Relationship Attribute Group *	MDC_ATTR_GRP_RELATION	VMO and derived objects, VMS and derived objects	2072
VMD Application Attribute Group	MDC_ATTR_GRP_VMD_APPL	VMD and derived objects	2062
VMD Production Attribute Group	MDC_ATTR_GRP_VMD_PROD	VMD and derived objects	2063
Metric Observed Value Group	MDC_ATTR_GRP_METRIC_VAL_OBS	Metric and derived objects	2051
PM-Store Attribute Group	MDC_ATTR_GRP_PMSTORE	Persistent Metric Store	2054

Table A.3.2.4—Object-oriented modeling elements—Medical Package—behavior

DIM name	Reference ID	Belongs to object	Code
Clear-Segments	MDC_ACT_SEG_CLR	PM-Store	3084
Get-Segments	MDC_ACT_SEG_GET	PM-Store	3085
Get-Segment-Info	MDC_ACT_SEG_GET_INFO	PM-Store	3086

Table A.3.2.5—Object-oriented modeling elements—Medical Package—notifications

DIM name	Reference ID	Belongs to object	Code
This table has no content. Following the construction and ordering scheme (see item c in A.3.1), empty tables are not left out in order to enhance readability and usability of A.3.			

A.3.2.3 Alert Package

Table A.3.3.1—Object-oriented modeling elements—Alert Package—object class items

DIM name	Reference ID	Derived from	Code
Alert	MDC_MOC_VMO_AL	VMO	52
Alert Status	MDC_MOC_VMO_AL_STAT	VMO	53
Alert Monitor	MDC_MOC_VMO_AL_MON	VMO	54

Table A.3.3.2—Object-oriented modeling elements—Alert Package—attributes

DIM name	Reference ID	Belongs to object	Code
Alert-Condition	MDC_ATTR_AL_COND	Alert	2476
Limit-Specification	MDC_ATTR_AL_LIMIT	Alert	2477
Vmo-Reference *	MDC_ATTR_VMO_REF	Alert, SCO, Operation and derived objects	2468
Alert-Capab-List	MDC_ATTR_AL_STAT_AL_C_LIST	Alert Status	2312
Tech-Alert-List	MDC_ATTR_AL_STAT_T_AL_LIST	Alert Status	2315
Physio-Alert-List	MDC_ATTR_AL_STAT_P_AL_LIST	Alert Status	2314
Limit-Spec-List	MDC_ATTR_AL_LIMIT_SPEC_LIST	Alert Status, Alert Monitor	2305
Device-Alert-Condition	MDC_ATTR_DEV_AL_COND	Alert Monitor	2326
Device-P-Alarm-List	MDC_ATTR_AL_MON_P_AL_LIST	Alert Monitor	2306
Device-T-Alarm-List	MDC_ATTR_AL_MON_T_AL_LIST	Alert Monitor	2308
Device-Sup-Alarm-List	MDC_ATTR_AL_MON_S_AL_LIST	Alert Monitor	2307
Suspension-Period	MDC_ATTR_TIME_PD_AL_SUSP	Alert Monitor	2446

Table A.3.3.3—Object-oriented modeling elements—Alert Package—attribute groups

DIM name	Reference ID	Belongs to object	Code
VMO Static Context Group * (see: VMO/ Medical Package)	MDC_ATTR_GRP_VMO_STATIC	VMO and derived objects, SCO and derived objects	(2065)
VMO Dynamic Context Group * (see: VMO/ Medical Package)	MDC_ATTR_GRP_VMO_DYN	VMO and derived objects, SCO and derived objects	(2064)
Alert Group	MDC_ATTR_GRP_AL	Alert	2067
Alert Status Group	MDC_ATTR_GRP_AL_STAT	Alert Status	2050
Alert Monitor Group	MDC_ATTR_GRP_AL_MON	Alert Monitor	2049

Table A.3.3.4—Object-oriented modeling elements—Alert Package—behavior

DIM name	Reference ID	Belongs to object	Code
This table has no content. Following the construction and ordering scheme (see item c in A.3.1), empty tables are not left out in order to enhance readability and usability of A.3.			

Table A.3.3.5—Object-oriented modeling elements—Alert Package—notifications

DIM name	Reference ID	Belongs to object	Code
This table has no content. Following the construction and ordering scheme (see item c in A.3.1), empty tables are not left out in order to enhance readability and usability of A.3.			

A.3.2.4 System Package

Table A.3.4.1—Object-oriented modeling elements—System Package—object class items

DIM name	Reference ID	Derived from	Code
VMS	MDC_MOC_VMS	Top	32
MDS	MDC_MOC_VMS_MDS	VMS	33
Simple MDS	MDC_MOC_VMS_MDS_SIMP	MDS	37
Hydra MDS	MDC_MOC_VMS_MDS_HYD	MDS	36
Composite Single Bed MDS	MDC_MOC_VMS_MDS_COMPOS_SINGLE_BED	MDS	35
Composite Multiple Bed MDS	MDC_MOC_VMS_MDS_COMPOS_MULTI_BED	MDS	34
Log	MDC_MOC_LOG	Top	38
Event Log	MDC_MOC_LOG_EVENT	Log	72
Battery	MDC_MOC_BATT	Top	41
Clock	MDC_MOC_CLOCK	Top	78

**Table A.3.4.2—Object-oriented modeling elements—
System Package—attributes**

DIM name	Reference ID	Belongs to object	Code
Handle * (see: VMO/ Medical Package)	MDC_ATTR_ID_HANDLE	VMO and derived objects, VMS and derived objects, Log and derived objects, Battery, Scanner and derived objects, Discriminator, Multipatient Archive, Patient Archive, Session Archive, Session Test, Session Notes, Physician, Patient Demographics	(2337)
System-Type	MDC_ATTR_SYS_TYPE	VMS and derived objects	2438
System-Model * (see: VMD Model/ VMD/ Medical Package)	MDC_ATTR_ID_MODEL	VMD and derived objects, VMS and derived objects	(2344)
System-Id *	MDC_ATTR_SYS_ID	VMS and derived objects, Multipatient Archive, Patient Archive	2436
Compatibility-Id * (see: VMD/ Medical Package)	MDC_ATTR_ID_COMPAT	VMD and derived objects, VMS and derived objects	(2336)
Nomenclature-Version	MDC_ATTR_NOM_VERS	VMS and derived objects	2376
System-Capability	MDC_ATTR_SYS_CAPAB	VMS and derived objects	2435
System-Specification	MDC_ATTR_SYS_SPECN	VMS and derived objects	2437
Production-Specification * (see: VMD/ Medical Package)	MDC_ATTR_ID_PROD_SPECN	VMD and derived objects, VMS and derived objects, Battery	(2349)
Ext-Obj-Relations * (see: VMO/ Medical Package)	MDC_ATTR_EXT_OBJ_RELATION	VMO and derived objects, VMS and derived objects	(2499)
Mds-Status	MDC_ATTR_VMS_MDS_STAT	MDS and derived objects	2471
Bed-Label	MDC_ATTR_ID_BED_LABEL	MDS and derived objects	2334
Soft-Id	MDC_ATTR_ID_SOFT	MDS and derived objects	2350
Operating-Mode	MDC_ATTR_MODE_OP	MDS and derived objects	2374
Application-Area	MDC_ATTR_AREA_APPL	MDS and derived objects	2317
Patient-Type *	MDC_ATTR_PT_TYPE	MDS and derived objects, Patient Demographics	2402
Date-and-Time	MDC_ATTR_TIME_ABS	MDS and derived objects	2439
Relative-Time	MDC_ATTR_TIME_REL	MDS and derived objects	2447
HiRes-Relative-Time	MDC_ATTR_TIME_REL_HI_RES	MDS and derived objects	2536
Time Capabilities	MDC_ATTR_TIME_SUPPORT	Clock	2607
Time Status	MDC_ATTR_DATE_TIME_STATUS	Clock	2608
Date and Time in ISO Format	MDC_ATTR_TIME_ABS_ISO	Clock	2609

**Table A.3.4.2—Object-oriented modeling elements—
System Package—attributes (continued)**

DIM name	Reference ID	Belongs to object	Code
List of External (different format) Time Stamps	MDC_ATTR_TIME_STAMP_LIST_EXT	Clock	2610
Attribute for synchronization between Abs and Rel Times	MDC_ATTR_TIME_ABS_REL_SYNC	Clock	2611
Time Zone	MDC_ATTR_TIME_ZONE	Clock	2612
Info for daylight savings time transition	MDC_ATTR_TIME_DAYLIGHT_SAVINGS_TRANS	Clock	2613
Cumulative leap seconds	MDC_ATTR_CUM_LEAP_SECONDS	Clock	2614
Time stamp for next leap second	MDC_ATTR_NEXT_LEAP_SECOND	Clock	2615
Power-Status	MDC_ATTR_POWER_STAT	MDS and derived objects	2389
Altitude	MDC_ATTR_ALTITUDE	MDS and derived objects	2316
Battery-Level ("charge")	MDC_ATTR_VAL_BATT_CHARGE	MDS and derived objects	2460
Remaining-Battery-Time *	MDC_ATTR_TIME_BATT_REMAIN	MDS and derived objects, Battery	2440
Line-Frequency	MDC_ATTR_LINE_FREQ	MDS and derived objects	2357
Association-Invoke-Id	MDC_ATTR_ID_ASSOC_NO	MDS and derived objects	2333
Current-Log-Entries	MDC_ATTR_LOG_ENTRIES_CURR	Log and derived objects	2360
Max-Log-Entries	MDC_ATTR_LOG_ENTRIES_MAX	Log and derived objects	2361
Event-Log-Entry-List	MDC_ATTR_EVENT_LOG_ENTRY_LIST	Event Log	2564
Event-Log-Info	MDC_ATTR_EVENT_LOG_INFO	EventLog	2591
Log-Change-Count	MDC_ATTR_LOG_CHANGE_COUNT	Log and derived objects	2592
Battery-Status	MDC_ATTR_BATT_STAT	Battery	2484
Capacity-Remaining	MDC_ATTR_CAPAC_BATT_REMAIN	Battery	2488
Capacity-Full-Charge	MDC_ATTR_CAPAC_BATT_FULL	Battery	2487
Capacity-Specified	MDC_ATTR_CAPAC_BATT_SPECN	Battery	2489
Voltage	MDC_ATTR_BATT_VOLTAGE	Battery	2485
Voltage-Specified	MDC_ATTR_BATT_VOLTAGE_SPECN	Battery	2486
Current	MDC_ATTR_BATT_CURR	Battery	2483
Battery-Temperature	MDC_ATTR_TEMP_BATT	Battery	2534
Charge-Cycles	MDC_ATTR_BATT_CHARGE_CYCLES	Battery	2482

Table A.3.4.3—Object-oriented modeling elements—System Package—attribute groups

DIM name	Reference ID	Belongs to object	Code
System Identification Attribute Group	MDC_ATTR_GRP_SYS_ID	VMS and derived objects	2059
System Application Attribute Group	MDC_ATTR_GRP_SYS_APPL	VMS and derived objects	2058
System Production Attribute Group	MDC_ATTR_GRP_SYS_PROD	VMS and derived objects	2060
Relationship Attribute Group * (see: VMO/ Medical Package)	MDC_ATTR_GRP_RELATION	VMO and derived objects, VMS and derived objects	(2072)
Clock Attribute Group	MDC_ATTR_GRP_CLOCK	Clock	2078
Battery Attribute Group	MDC_ATTR_GRP_BATT	Battery	2069

Table A.3.4.4—Object-oriented modeling elements—System Package—behavior

DIM name	Reference ID	Belongs to object	Code
Mds-Set-Status	MDC_ACT_SET_MDS_STATE	MDS and derived objects	3087
Clear-Log	MDC_ACT_CLR_LOG	Log and derived objects	3075
Get-Event-Log-Entries	MDC_ACT_GET_EVENT_LOG_ENTRIES	EventLog	3092
Set-Time	MDC_ACT_SET_TIME	Clock	3095
Set-Time-Zone	MDC_ACT_SET_TIME_ZONE	Clock	3096
Set-Leap-Seconds	MDC_ACT_SET_LEAP_SECONDS	Clock	3097
Set-ISO-Time	MDC_ACT_SET_TIME_ISO	Clock	3098

Table A.3.4.5—Object-oriented modeling elements—System Package—notifications

DIM name	Reference ID	Belongs to object	Code
System-Error	MDC_NOTI_SYS_ERR	MDS and derived objects	3349
Mds-Create-Notification	MDC_NOTI_MDS_CREAT	MDS and derived objects	3334
Mds-Attribute-Update	MDC_NOTI_MDS_ATTR_UPDT	MDS and derived objects	3333
Date-Time Changed	MDC_NOTE_DATE_TIME_CHANGED	Clock	3355

A.3.2.5 Control Package

Table A.3.5.1—Object-oriented modeling elements—Control Package—object class items

DIM name	Reference ID	Derived from	Code
SCO	MDC_MOC_CNTRL_SCO	Top	43
Operation	MDC_MOC_CNTRL_OP	Top	44
Select Item Operation	MDC_MOC_CNTRL_OP_SEL_IT	Operation	45
Set Value Operation	MDC_MOC_CNTRL_OP_SEL_VAL	Operation	47
Set String Operation	MDC_MOC_CNTRL_OP_SET_STRIN G	Operation	73
Toggle Flag Operation	MDC_MOC_CNTRL_OP_TOG	Operation	49
Activate Operation	MDC_MOC_CNTRL_OP_ACTIV	Operation	50
Limit Alert Operation	MDC_MOC_CNTRL_OP_LIM	Operation	51
Set Range Operation	MDC_MOC_CNTRL_OP_SET_ RANGE	Operation	80

Table A.3.5.2—Object-oriented modeling elements—
Control Package—attributes

DIM name	Reference ID	Belongs to object	Code
Sco-Capability	MDC_ATTR_SCO_CAPAB	SCO	2422
Sco-Help-Text-String	MDC_ATTR_SCO_HELP_TEXT_STRIN G	SCO	2549
Vmo-Reference * (see: Alert/ Alert Package)	MDC_ATTR_VMO_REF	Alert, SCO, Operation and derived objects	(2468)
Activity-Indicator	MDC_ATTR_INDIC_ACTIV	SCO	2355
Lock-State	MDC_ATTR_STAT_LOCK	SCO	2432
Invoke-Cookie	MDC_ATTR_ID_INVOK_COOKIE	SCO	2339
Instance-Number * (see: VMD/ Medical Package)	MDC_ATTR_ID_INSTNO	VMD and derived objects, PM-Segment, Operation and derived objects, Scanner and derived objects	(2338)
Operation-Spec	MDC_ATTR_OP_SPEC	Operation and derived objects	2386
Operation-Text-String	MDC_ATTR_OP_TEXT_STRING	Operation and derived objects	2514
Operation-Text-String-Dynamic	MDC_ATTR_OP_TEXT_STRING_DY N	Operation and derived objects	2602
Operational-State * (see: PM-Store/ Medical Package)	MDC_ATTR_OP_STAT	PM-Store, Operation and derived objects, Scanner and derived objects, Discriminator	(2387)
Selected-Item-Index	MDC_ATTR_INDEX_SEL	Select Item Operation	2354

**Table A.3.5.2—Object-oriented modeling elements—
Control Package—attributes (continued)**

DIM name	Reference ID	Belongs to object	Code
Nom-Partition	MDC_ATTR_ID_NOM_PARTITION	Select Item Operation	2345
Select-List	MDC_ATTR_LIST_SEL	Select Item Operation	2358
Current-Value	MDC_ATTR_VAL_CURR	Set Value Operation	2461
Set-Value-Range	MDC_ATTR_VAL_RANGE	Set Value Operation, Limit Alert Operation	2464
Step-Width	MDC_ATTR_VAL_STEP_WIDTH	Set Value Operation	2465
Unit-Code * (see: Metric/ Medical Package)	MDC_ATTR_UNIT_CODE	Metric and derived objects, Set Value Operation, Limit Alert Operation	(2454)
Current-String	MDC_ATTR_STRING_CURR	Set String Operation	2565
Set-String-Spec	MDC_ATTR_SET_STRING_SPEC	Set String Operation	2567
Toggle-State	MDC_ATTR_STAT_OP_TOG	Toggle Flag Operation	2433
Toggle-Label-Strings	MDC_ATTR_TOG_LABELS_STRING	Toggle Flag Operation	2540
Alert-Op-Capability	MDC_ATTR_AL_OP_CAPAB	Limit Alert Operation	2309
Alert-Op-State	MDC_ATTR_AL_OP_STAT	Limit Alert Operation	2310
Limit Alert Operation	MDC_ATTR_LIMIT_CURR	Limit Alert Operation	2356
Alert-Op-Text-String	MDC_ATTR_AL_OP_TEXT	Limit Alert Operation	2311
Metric-Id ("Physio ID")	MDC_ATTR_ID_PHYSIO	Limit Alert Operation	2347
Current-Range	MDC_ATTR_RANGE_CURR	Set Range Operation	2624
Range-Op-Text	MDC_ATTR_RANGE_OP_TEXT STRING	Set Range Operation	2625

Table A.3.5.3—Object-oriented modeling elements—Control Package—attribute groups

DIM name	Reference ID	Belongs to object	Code
VMO Static Context Group * (see VMO/ Medical Package)	MDC_ATTR_GRP_VMO_STATIC	VMO and derived objects, SCO and derived objects	(2065)
VMO Dynamic Context Group * (see VMO/ Medical Package)	MDC_ATTR_GRP_VMO_DYN	VMO and derived objects, SCO and derived objects	(2064)
Operation Static Context Group	MDC_ATTR_GRP_OP_STATIC_CTXT	Operation and derived objects	2053
Operation Dynamic Context Group	MDC_ATTR_GRP_OP_DYN_CTXT	Operation and derived objects	2052
SCO Transaction Group	MDC_ATTR_GRP_SCO_ TRANSACTION	SCO, Operation and derived objects	2057

Table A.3.5.4—Object-oriented modeling elements—Control Package—behavior

DIM name	Reference ID	Belongs to object	Code
Operation-Invoke	MDC_ACT_SCO_OP_INVOK	SCO	3083
Get-Ctxt-Help	MDC_ACT_GET_CTXT_HELP	SCO	3077

Table A.3.5.5—Object-oriented modeling elements—Control Package—notifications

DIM name	Reference ID	Belongs to object	Code
Sco-Operating-Request	MDC_NOTI_SCO_OP_REQ	SCO	3347
Sco-Operation-Invoke-Error	MDC_NOTI_SCO_OP_INVOK_ERR	SCO	3346

A.3.2.6 Extended Services Package**Table A.3.6.1—Object-oriented modeling elements—
Extended Services Package—object class items**

DIM name	Reference ID	Derived from	Code
Scanner	MDC_MOC_SCAN	Top	16
Configurable Scanner	MDC_MOC_SCAN_CFG	Scanner	17
Episodic Configurable Scanner	MDC_MOC_SCAN_CFG_EPI	Configurable Scanner	18
Periodic Configurable Scanner	MDC_MOC_SCAN_CFG_PERI	Configurable Scanner	19
Fast Periodic Configurable Scanner	MDC_MOC_SCAN_CFG_PERI_FAST	Periodic Configurable Scanner	20
Unconfigurable Scanner	MDC_MOC_SCAN_UCFG	Scanner	21
Context Scanner	MDC_MOC_SCAN_UCFG_CTXT	Unconfigurable Scanner	23
Alert Scanner	MDC_MOC_SCAN_UCFG_ALSTAT	Unconfigurable Scanner	22
Operating Scanner	MDC_MOC_SCAN_UCFG_OP	Unconfigurable Scanner	24
Discriminator	MDC_MOC_DISCRIM	Top	66

**Table A.3.6.2—Object-oriented modeling elements—
Extended Services Package—attributes**

DIM name	Reference ID	Belongs to object	Code
Handle * (see: VMO/ Medical Package)	MDC_ATTR_ID_HANDLE	VMO and derived objects, VMS and derived objects, Log and derived objects, Battery, Scanner and derived objects, Discriminator, Multipatient Archive, Patient Archive, Session Archive, Session Test, Session Notes, Physician, Patient Demographics	(2337)
Instance-Number * (see: VMD/ Medical Package)	MDC_ATTR_ID_INSTNO	VMD and derived objects, PM-Segment, Operation and derived objects, Scanner and derived objects	(2338)
Operational-State * (see: PM-Store/ Medical Package)	MDC_ATTR_OP_STAT	PM-Store , Operation and derived objects, Scanner and derived objects, Discriminator	(2387)
Scan-List	MDC_ATTR_SCAN_LIST	Configurable Scanner and derived objects	2420
Confirm-Mode	MDC_ATTR_CONFIRM_MODE	Configurable Scanner and derived objects	2323
Confirm-Timeout	MDC_ATTR_CONFIRM_TIMEOUT	Configurable Scanner and derived objects, Unconfigurable Scanner and derived objects	2324
Transmit-Window	MDC_ATTR_TX_WIND	Configurable Scanner and derived objects, Unconfigurable Scanner and derived objects	2453
Scan-Config-Limit	MDC_ATTR_SCAN_CFG_LIMIT	Configurable Scanner and derived objects	2558
Scan-Extensibility	MDC_ATTR_SCAN_EXTEND	Periodic Configurable Scanner and derived objects	2419
Reporting-Interval	MDC_ATTR_SCAN_REP_PD	Periodic Configurable Scanner and derived objects, Alert Scanner	2421
Context-Mode	MDC_ATTR_SCAN_CTXT_MODE	Context Scanner	2418
Discriminator-Construct	MDC_ATTR_DISCRIM_CONSTRUCT	Discriminator	2497

**Table A.3.6.3—Object-oriented modeling elements—
Extended Services Package—attribute groups**

DIM name	Reference ID	Belongs to object	Code
Scanner Attribute Group	MDC_ATTR_GRP_SCAN	Scanner and derived objects	2056
Discriminator Attribute Group	MDC_ATTR_GRP_DISCRIM	Discriminator	2070

Table A.3.6.4—Object-oriented modeling elements—Extended Services Package—behavior

DIM name	Reference ID	Belongs to object	Code
Refresh-Episodic-Data	MDC_ACT_REFR_EPI_DATA	Episodic Configurable Scanner and derived objects	3080
Refresh-Context	MDC_ACT_REFR_CTXT	Context Scanner	3079
Refresh-Operation-Context	MDC_ACT_REFR_OP_CTXT	Operating Scanner	3082
Refresh-Operation-Attributes	MDC_ACT_REFR_OP_ATTR	Operating Scanner	3081

**Table A.3.6.5—Object-oriented modeling elements—
Extended Services Package—notifications**

DIM name	Reference ID	Belongs to object	Code
Unbuf-Scan-Report	MDC_NOTI_UNBUF_SCAN_RPT	Episodic Configurable Scanner and derived objects	3350
Buf-Scan-Report	MDC_NOTI_BUF_SCAN_RPT	Periodic Configurable Scanner and derived objects	3331
Fast-Buf-Scan-Report	MDC_NOTI_FAST_BUF_SCAN_RPT	Fast Periodic Configurable Scanner	3332
Object-Create-Notification	MDC_NOTI_OBJ_CREAT	Context Scanner, Operating Scanner	3336
Object-Delete-Notification	MDC_NOTI_OBJ_DEL	Context Scanner, Operating Scanner	3338
Alert-Scan-Report	MDC_NOTI_AL_STAT_SCAN_RPT	Alert Scanner	3329
Oper-Create-Notification	MDC_NOTI_OP_CREAT	Operating Scanner	3340
Oper-Delete-Notification	MDC_NOTI_OP_DEL	Operating Scanner	3341
Oper-Attribute-Update	MDC_NOTI_OP_ATTR_UPDT	Operating Scanner	3339

A.3.2.7 Communication Package

**Table A.3.7.1—Object-oriented modeling elements—
Communication Package—object class items**

DIM name	Reference ID	Derived from	Code
Communication Controller	MDC_MOC_CC	Top	28
DCC [device communication controller]	MDC_MOC_DCC	Communication Controller	76
BCC [bedside communication controller]	MDC_MOC_BCC	Communication Controller	77

Table A.3.7.2—Object-oriented modeling elements—Communication Package—attributes

DIM name	Reference ID	Belongs to object	Code
Handle * (see: VMO/ Medical Package)	MDC_ATTR_ID_HANDLE	VMO and derived objects, VMS and derived objects, Log and derived objects, Battery, Scanner and derived objects, Discriminator, Communication Controller Multipatient Archive, Patient Archive, Session Archive, Session Test, Session Notes, Physician, Patient Demographics	(2337)
Capability	MDC_ATTR_CC_CAPAB	Communication Controller	2593
CC-Type	MDC_ATTR_CC_TYPE	Communication Controller	2594
Number-Of-Difs	MDC_ATTR_CC_NUM_DIFS	Communication Controller	2595
This-Connection-Dif-Index	MDC_ATTR_CC_THIS_DIF_INDEX	Communication Controller	2596
Cc-Ext-Mgmt-Proto-Id	MDC_ATTR_CC_EXT_MNG_PROT	Communication Controller	2597

**Table A.3.7.3—Object-oriented modeling elements—
Communication Package—attribute groups**

DIM name	Reference ID	Belongs to object	Code
Communication Controller Attribute Group	MDC_ATTR_GRP_CC	Communication Controller	2077

Table A.3.7.4—Object-oriented modeling elements—Communication Package—behavior

DIM name	Reference ID	Belongs to object	Code
Clear-Segments	MDC_ACT_GET_MIB_DATA	Communication Controller	3093
Poll Clear-Segments	MDC_ACT_POLL_MDIB_DATA	Communication Controller	3094

Table A.3.7.5—Object-oriented modeling elements—Communication Package—notifications

DIM name	Reference ID	Belongs to object	Code
This table has no content. Following the construction and ordering scheme (see item c in A.3.1), empty tables are not left out in order to enhance readability and usability of A.3.			

A.3.2.8 Archival Package**Table A.3.8.1—Object-oriented modeling elements—Archival Package—object class items**

DIM name	Reference ID	Derived from	Code
Multipatient Archive	MDC_MOC_ARCHIVE_MULTI_PT	Top	63
Patient Archive	MDC_MOC_ARCHIVE_PT	Top	64
Session Archive	MDC_MOC_ARCHIVE_SESSION	Top	65
Physician	MDC_MOC_PHYSICIAN	Top	67
Session Test	MDC_MOC_SESSION_TEST	Top	69
Session Notes	MDC_MOC_SESSION_NOTES	Top	68

Table A.3.8.2—Object-oriented modeling elements—Archival Package—attributes

DIM name	Reference ID	Belongs to object	Code
Handle * (see: VMO/ Medical Package)	MDC_ATTR_ID_HANDLE	VMO and derived objects, VMS and derived objects, Log and derived objects, Battery, Scanner and derived objects, Discriminator, Multipatient Archive, Patient Archive, Session Archive, Session Test, Session Notes, Physician, Patient Demographics	(2337)
System-Id * (see: VMS/ System Package)	MDC_ATTR_SYS_ID	VMS and derived objects, Multipatient Archive Patient Archive	(2436)
Location	MDC_ATTR_LOCATION	Multipatient Archive	2509

**Table A.3.8.2—Object-oriented modeling elements—
Archival Package—attributes (continued)**

DIM name	Reference ID	Belongs to object	Code
Study-Name	MDC_ATTR_NAME_STUDY	Multipatient Archive	2531
Version	MDC_ATTR_ARCHIVE_VERS	Multipatient Archive	2480
System-Name	MDC_ATTR_NAME_SYS	Patient Archive	2543
Processing-History	MDC_ATTR_PROC_HIST	Patient Archive	2517
Protection	MDC_ATTR_PROTECTION	Patient Archive, Session Archive, Session Test, Session Notes	2519
S-Archive-Id	MDC_ATTR_ID_SESS_ARCHIVE	Session Archive	2507
S-Archive-Name	MDC_ATTR_NAME_SESS_ARCHIVE	Session Archive	2513
S-Archive-Comments	MDC_ATTR_SESS_ARCHIVE_COMMENTS	Session Archive	2530
Start-Time * (see: Metric/ Medical Package)	MDC_ATTR_TIME_START	Metric and derived objects, Session Archive, Session Test, Session Notes	(2538)
Stop-Time * (see: Metric/ Medical Package)	MDC_ATTR_TIME_STOP	Metric and derived objects, Session Archive, Session Test, Session Notes	(2539)
Physician-Id	MDC_ATTR_ID_Physician	Physician	2503
Authorization-Level	MDC_ATTR_Auth_Level	Physician	2481
Name	MDC_ATTR_PHYSICIAN_NAME	Physician	2544
Given-Name	MDC_ATTR_PHYSICIAN_NAME_GIVEN	Physician	2546
Family-Name	MDC_ATTR_PHYSICIAN_NAME_FAMILY	Physician	2545
Middle-Name	MDC_ATTR_PHYSICIAN_NAME_MIDDLE	Physician	2547
Title-Name	MDC_ATTR_PHYSICIAN_NAME_TITLE	Physician	2548
St-Archive-Id	MDC_ATTR_ID_SESS_TEST_ARCHIVE	Session Test	2506
St-Archive-Name	MDC_ATTR_NAME_SESS_TEST_ARCHIVE	Session Test	2512
St-Archive-Comments	MDC_ATTR_SESS_TEST_ARCHIVE_COMMENTS	Session Test	2529
Sn-Id	MDC_ATTR_ID_SESS_NOTES_ARCHIVE	Session Notes	2505
Sn-Name	MDC_ATTR_NAME_SESS_NOTES_ARCHIVE	Session Notes	2511
Sn-Comments	MDC_ATTR_SESS_NOTES_ARCHIVE_COMMENTS	Session Notes	2528
Findings	MDC_ATTR_Findings	Session Notes	2500

**Table A.3.8.2—Object-oriented modeling elements—
Archival Package—attributes (continued)**

DIM name	Reference ID	Belongs to object	Code
Diagnostic-Codes	MDC_ATTR_CODE_DIAGNOSTIC	Session Notes, Patient Demographics	2492
Diagnosis-Description	MDC_ATTR_DESC_Diagnostic	Session Notes	2494
Procedure-Codes *	MDC_ATTR_Code_Procedure	Session Notes, Patient Demographics	2493
Procedure-Description *	MDC_ATTR_DESC_PROCEDURE	Session Notes, Patient Demographics	2495

Table A.3.8.3—Object-oriented modeling elements—Archival Package—attribute groups

DIM name	Reference ID	Belongs to object	Code
Archival Attribute Group	MDC_ATTR_GRP_ARCHIVE	Multipatient Archive, Patient Archive, Session Archive, Session Test, Session Notes	2068
Physician Attribute Group	MDC_ATTR_GRP_PHYSICIAN	Physician	2071

Table A.3.8.4—Object-oriented modeling elements—Archival Package—behavior

DIM name	Reference ID	Belongs to object	Code
This table has no content. Following the construction and ordering scheme (see item c in A.3.1), empty tables are not left out in order to enhance readability and usability of A.3.			

Table A.3.8.5—Object-oriented modeling elements—Archival Package—notifications

DIM name	Reference ID	Belongs to object	Code
This table has no content. Following the construction and ordering scheme (see item c in A.3.1), empty tables are not left out in order to enhance readability and usability of A.3.			

A.3.2.9 Patient Package**Table A.3.9.1—Object-oriented modeling elements—Patient Package—object class items**

DIM name	Reference ID	Derived from	Code
Patient Demographics	MDC_MOC_PT_DEMOG	Top	42

**Table A.3.9.2—Object-oriented modeling elements—
Patient Package—attributes**

DIM name	Reference ID	Belongs to object	Code
Handle * (see: VMO/ Medical Package)	MDC_ATTR_ID_HANDLE	VMO and derived objects, VMS and derived objects, Log and derived objects, Battery, Scanner and derived objects, Discriminator, Multipatient Archive, Patient Archive, Session Archive, Session Test, Session Notes, Physician, Patient Demographics	(2337)
Pat-Demo-State	MDC_ATTR_PT_DEMOG_ST	Patient Demographics	2391
Patient-Id	MDC_ATTR_PT_ID	Patient Demographics	2394
Name	MDC_ATTR_PT_NAME	Patient Demographics	2395
Given-Name	MDC_ATTR_PT_NAME_GIVEN	Patient Demographics	2397
Family-Name	MDC_ATTR_PT_NAME_FAMILY	Patient Demographics	2396
Middle-Name	MDC_ATTR_PT_NAME_MIDDLE	Patient Demographics	2399
Birth-Name	MDC_ATTR_PT_NAME_BIRTH	Patient Demographics	2398
Title-Name	MDC_ATTR_PT_NAME_TITLE	Patient Demographics	2400
Sex	MDC_ATTR_PT_SEX	Patient Demographics	2401
Race	MDC_ATTR_PT_RACE	Patient Demographics	2526
Patient-Type * (see: MDS/ System Package)	MDC_ATTR_PT_TYPE	MDS and derived objects, Patient Demographics	(2402)
Date-Of-Birth	MDC_ATTR_PT_DOB	Patient Demographics	2392
Patient-General-Info	MDC_ATTR_PT_GEN_INFO	Patient Demographics	2393
Patient-Age	MDC_ATTR_Pt_Age	Patient Demographics	2520
Gestational-Age	MDC_ATTR_Pt_Age_Gest	Patient Demographics	2521
Patient-Height	MDC_ATTR_Pt_Height	Patient Demographics	2524
Patient-Weight	MDC_ATTR_Pt_Weight	Patient Demographics	2527
Patient-Birth-Length	MDC_ATTR_Pt_Birth_Length	Patient Demographics	2522
Patient-Birth-Weight	MDC_ATTR_Pt_Birth_Weight	Patient Demographics	2523
Mother-Patient-Id	MDC_ATTR_ID_PT_Mother	Patient Demographics	2504
Mother-Name	MDC_ATTR_Pt_Name_Mother	Patient Demographics	2525
Patient-Head-Circumference	MDC_ATTR_CIRCUM_HEAD	Patient Demographics	2490
Patient-Bsa	MDC_ATTR_PT_BSA	Patient Demographics	2390
Bed-Id	MDC_ATTR_ID_BED	Patient Demographics	2501
Diagnostic-Info	MDC_ATTR_Diagnostic_Info	Patient Demographics	2496

**Table A.3.9.2—Object-oriented modeling elements—
Patient Package—attributes (continued)**

DIM name	Reference ID	Belongs to object	Code
Diagnostic-Codes	MDC_ATTR_CODE_DIAGNOSTIC	Session Notes, Patient Demographics	2492
Admitting-Physician	MDC_ATTR_Physician_Admit	Patient Demographics	2515
Attending-Physician	MDC_ATTR_Physician_ATTEND	Patient Demographics	2516
Date-Of-Procedure	MDC_ATTR_Procedure_DATE	Patient Demographics	2518
Procedure-Codes * (see: Session Notes/ Archival Package)	MDC_ATTR_Code_Procedure	Session Notes, Patient Demographics	(2493)
Procedure-Description * (see: Session Notes/ Archival Package)	MDC_ATTR_DESC_Procedure	Session Notes, Patient Demographics	(2495)
Anesthetist	MDC_ATTR_Anaesthetist	Patient Demographics	2479
Surgeon	MDC_ATTR_Surgeon	Patient Demographics	2532
Patient-Lean-Body-Mass	MDC_ATTR_PT_LBM	Patient Demographics	2601

Table A.3.9.3—Object-oriented modeling elements—Patient Package—attribute groups

DIM name	Reference ID	Belongs to object	Code
Patient Demographics Attribute Group	MDC_ATTR_GRP_PT_DEMOG	Patient Demographics	2055

Table A.3.9.4—Object-oriented modeling elements—Patient Package—behavior

DIM name	Reference ID	Belongs to object	Code
Discharge-Patient	MDC_ACT_DISCH_PT	Patient Demographics	3076
Admit-Patient	MDC_ACT_ADMIT_PT	Patient Demographics	3074
Pre-Admit-Patient	MDC_ACT_PRE_ADMIT_PT	Patient Demographics	3078

Table A.3.9.5—Object-oriented modeling elements—Patient Package—notifications

DIM name	Reference ID	Belongs to object	Code
Patient-Demographics-Modified	MDC_NOTI_PT_DEMOG_MOD	Patient Demographics	3342
Patient-Demographics-State-Change	MDC_NOTI_PT_DEMOG_ST_MOD	Patient Demographics	3343

A.4 Data dictionary and codes for communication infrastructure (Block G)

The communication infrastructure tables are closely related to the Communication Package of the DIM. Therefore, this clause follows A.3, which discusses the object-oriented modeling elements code block (Block A), although that code block (which includes the communication controller object class) and the separate communication infrastructure code block (Block G) are not consecutive (see A.2.3).

Terms and corresponding code values in these tables are used to describe properties of the Device Interface (object) for profile identification and model extensions. However, communication infrastructure objects are not part of the MDIB. Hence, they are not accessible by communication medical device information service element (CMDISE) services, but can be retrieved only by the special Communication Controller object method.

For consistency, the usual scheme introduced in A.3.1 was adopted, resulting in a set of five tables:

- 1) Object class items
- 2) Attributes
- 3) Attribute groups
- 4) Behavior (methods)
- 5) Notifications

These tables are supplemented by three additional tables:

- 6) Profile support attributes
- 7) Optional package identifiers
- 8) System specification components

A.4.1 Communication infrastructure: inventory tables

Table A.4.1—Communication infrastructure—object class items

DIM name	Reference ID	Derived from	Code
Device Interface	MDC_CC_DIF	Top	513
MibElement	MDC_CC_MIB_ELEM	Top	1025
Device Interface MibElement	MDC_CC_MIB_ELEM_DIF	MibElement	1026
General Communication Statistics MibElement	MDC_CC_MIB_ELEM_GEN_COMM_STATS	MibElement	1027
11073-30100 Port Configuration MibElement	MDC_CC_MIB_ELEM_1073_3_1_PORT_CFG	MibElement	1028
11073-30100 Link Access MibElement	MDC_CC_MIB_ELEM_1073_3_1_LINK_ACC	MibElement	1029
11073-30100 Current Performance MibElement	MDC_CC_MIB_ELEM_1073_3_1_PERF_CURR	MibElement	1030
11073-30100 Physical Configuration MibElement	MDC_CC_MIB_ELEM_1073_3_1_CONFIG_PHYS	MibElement	1031
11073-30100 Fault Threshold MibElement	MDC_CC_MIB_ELEM_1073_3_1_FAULT_THRES	MibElement	1932
11073-30200 Configuration MibElement	MDC_CC_MIB_ELEM_1073_3_2_CONFIG	MibElement	1033

Table A.4.2—Communication infrastructure—attributes

DIM name	Reference ID	Belongs to object	Code
Mib-Ext-Oid	MDC_CC_MIB_DATA_EXT_OID	MibElement	2048
Dif-Id	MDC_CC_MIB_DATA_DIF_ID	Device Interface MibElement	2049
Port-State	MDC_CC_MIB_DATA_DIF_PORT_ST	Device Interface MibElement	2050
Dif-Type	MDC_CC_MIB_DATA_DIF_TYPE	Device Interface MibElement	2051
Active-Profile	MDC_CC_MIB_DATA_PROFILE_ID	Device Interface MibElement	2052
Supported-Profiles	MDC_CC_MIB_DATA_SUPP_PROFILES	Device Interface MibElement	2053
MTU	MDC_CC_MIB_DATA_MTU	Device Interface MibElement	2054
Link-Speed	MDC_CC_MIB_DATA_LINK_SPEED	Device Interface MibElement	2055
Mib-Element-List	MDC_CC_MIB_DATA_MIB_ELEM_LIST	Device Interface MibElement	2056
Packets In	MDC_CC_MIB_DATA_PACK_IN	General Communication Statistics MibElement	2057
Packets Out	MDC_CC_MIB_DATA_PACK_OUT	General Communication Statistics MibElement	2058
Octets In	MDC_CC_MIB_DATA_OCT_IN	General Communication Statistics MibElement	2059
Octets Out	MDC_CC_MIB_DATA_OCT_OUT	General Communication Statistics MibElement	2060
Discarded-Packets-In	MDC_CC_MIB_DATA_DISC_PACK_IN	General Communication Statistics MibElement	2061
Discarded-Packets-Out	MDC_CC_MIB_DATA_DISC_PACK_OUT	General Communication Statistics MibElement	2062
Unknown-Protocol-Packets-In	MDC_CC_MIB_DATA_UNK_PROT_PACK_IN	General Communication Statistics MibElement	2063
Queue-Len-In	MDC_CC_MIB_DATA_QUEUE_LEN_IN	General Communication Statistics MibElement	2064
Queue-Len-Out	MDC_CC_MIB_DATA_QUEUE_LEN_OUT	General Communication Statistics MibElement	2065
Dif-Admin-Status	MDC_CC_MIB_DATA_DIF_STATE	General Communication Statistics MibElement	2066
Dif-Oper-Status	MDC_CC_MIB_DATA_CUR_DIF_STATE	General Communication Statistics MibElement	2067
Dif-Last-Change	MDC_CC_MIB_DATA_TIME_DIF_LAST_CHANGE	General Communication Statistics MibElement	2068
Errors-In	MDC_CC_MIB_DATA_ERRS_IN	General Communication Statistics MibElement	2069
Errors-Out	MDC_CC_MIB_DATA_ERRS_OUT	General Communication Statistics MibElement	2070
Generic-Mode	MDC_CC_MIB_DATA_COMM_MODE	General Communication Statistics MibElement	2071
Average Speed	MDC_CC_MIB_DATA_AVG_SPEED	General Communication Statistics MibElement	2072