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Health informatics — Point-of-care medical device communication —

Part 10102: Nomenclature — Annotated ECG

Informatique de santé — Communication entre dispositifs médicaux sur le site des soins

Partie 10102: Nomenclature — ECG annoté

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ISO/IEEE 11073 consists of the following parts, under the general title *Health informatics — Personal health device communication* (text in parentheses gives a variant of subtitle):

— *Part 00103: Overview*

— *Part 10101: (Point-of-care medical device communication) Nomenclature*

— *Part 10102: (Point-of-care medical device communication) Nomenclature — Annotated ECG*

— *Part 10103: (Point-of-care medical device communication) — Nomenclature — Implantable device, cardiac*

— *Part 10201: (Point-of-care medical device communication) Domain information model*

— *Part 10404: Device specialization — Pulse oximeter*

— *Part 10406: Device specialization — Basic electrocardiograph (ECG) (1- to 3-lead ECG)*

— *Part 10407: Device specialization — Blood pressure monitor*

— *Part 10408: Device specialization — Thermometer*

— *Part 10415: Device specialization — Weighing scale*

— *Part 10417: Device specialization — Glucose meter*

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— *Part 91064: (Standard communication protocol) Computer-assisted electrocardiography*

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Part 10102: Nomenclature—Annotated ECG

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Part 10102: Nomenclature—Annotated ECG

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Abstract: The base IEEE 11073-10101 Nomenclature is extended by this standard to provide support for ECG annotation terminology. It may be used either in conjunction with other IEEE 11073 standards (e.g., ISO/IEEE 11073-10201:2001) or independently with other standards. The major subject areas addressed by the nomenclature include ECG beat annotations, wave component annotations, rhythm annotations, and noise annotations. Additional "global" and "per-lead" numeric observation identifiers, ECG lead systems, and additional ECG lead identifiers also are defined.

Keywords: annotated ECG, annotations, arrhythmias, cardiac rhythm, codes, ECG leads, ECG lead systems, ECG measurements, home monitoring, IEEE 11073-10102™, medical device communication, nomenclature, pacemaker, patient monitoring, remote monitoring, terminology

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Introduction

This introduction is not part of IEEE Std 11073-10102-2012, Health informatics—Point-of-care medical device communication—Nomenclature—Annotated ECG.

This standard extends the base ISO/IEEE 11073-10101:2004[a] nomenclature to provide support for electrocardiogram (ECG) annotation terminology. The major subject areas addressed by the nomenclature include ECG beat annotations, wave component annotations, rhythm annotations, and noise annotations. It also defines additional "global" and "per-lead" numeric observation identifiers, ECG lead systems, and additional ECG lead identifiers. The nomenclature extensions may be used in conjunction with other IEEE 11073 standard components (e.g., ISO/IEEE 11073-10201:2004 [B19][b]) or independently with other standards.

[a] Information on references can be found in Clause 2.

[b] The numbers in brackets correspond to those in the bibliography in Annex E.

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Health informatics—Point-of-care medical device communication

Part 10102: Nomenclature—Annotated ECG

1. Overview

1.1 Scope

This standard extends the base ISO/IEEE 11073-10101:2004[1] to provide support for ECG annotation terminology. Major subject areas addressed by the nomenclature include ECG beat annotations, wave component annotations, rhythm annotations, and noise annotations. It also defines additional "global" and "per-lead" numeric observation identifiers, ECG lead systems, and additional ECG lead identifiers. The nomenclature extensions may be used in conjunction with other IEEE 11073 standard components (e.g., ISO/IEEE 11073-10201:2004 [B19][2]) or independently with other standards.

1.2 Purpose

This standard provides a unified and comprehensive terminology for ECG annotation semantics, making it suitable for medical device data exchange that requires inclusion of ECG annotations. This standard consolidates numerous other standard and nonstandard terminologies that are in current use, resulting in the harmonization of how ECG annotation information is identified, enabling interoperability, and providing information exchange at the application level.

[1] Information on references can be found in Clause 2.
[2] The numbers in brackets correspond to those of the bibliography in Annex E.

Currently, many terminologies and protocols, both standard and vendor specific, are used to manage and exchange ECG annotation information. As a result, protocol converters and translators are required to integrate systems and applications, typically with some degree of semantic loss and noninteroperability. This standard provides a single terminology that is capable of supporting applications that require ECG annotations, including evaluation of patient condition (e.g., reviewing ECG data at the point-of-care or remotely) as well as clinical research (e.g., electronically submitting clinical drug trial evidence supporting the efficacy of a new medication). In addition to incorporating ECG annotations into an ISO/IEEE 11073-based information stream acquired at the bedside, the underlying nomenclature can also be used in other persistent and communication standards [e.g., Health Level Seven International (HL7) V2 and V3, and Digital Imaging and Communications in Medicine (DICOM)] for use by various applications, including clinical information systems, electronic patient records, and clinical research.

1.3 Audience

The audience for this document is those who work with monitoring and diagnostic ECG information in the context of systems integration. This may include but is not limited to the following roles:

- Cardiologist or electrophysiologist physicians
- Heart and device clinic specialists or staff
- Primary care physicians
- Clinic information technologists
- Clinic information system vendor engineers
- Academic and clinical research scientists
- Regulatory and quality management agencies
- Clincal trial and research results reporting
- Medical device and system development engineers

The following clinical applications are facilitated by this interoperability enabled by this standard. This may include but is not limited to the following activities:

- Clinical trial and research results reporting [HL7 annotated electrocardiogram (aECG), Clinical Data Interchange Standards Consortium (CDISC), and others]
- Transfer of ECG data in an interoperable manner [DICOM, HL7, IEEE 11073, Integrating the Healthcare Enterprise Patient Care Devices (IHE PCD), and other communication protocols]
- Algorithm development and performance evaluation
- Sophisticated real-time data exchange with option to retrospectively review and correct data

1.4 Context

This nomenclature has been developed within the context of the broader ISO/IEEE 11073 Health Informatics—Point-of-Care Medical Device Communication standards. Its goal is to be consistent with existing 11073 standards and information models.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so that each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

ANSI/AAMI EC71-2001, Standard Communications Protocol for Computer Assisted-Electrocardiography.[3]

ISO/IEEE 11073-10101:2004, Health informatics—Point-of-care medical device communication—Part 10101: Nomenclature.[4]

3. Definitions, acronyms, and abbreviations

3.1 Definitions

For the purposes of this document, the following terms and definitions apply. The *IEEE Standards Dictionary Online* should be consulted for terms not defined in this clause.[5]

annotation: An observation made on or associated with a time series of events, typically at a specific point in time or over an interval of time.

arrhythmia: Any abnormality of cardiac rhythm. Also termed “dysrhythmia.” Specific examples are bradycardia, tachycardia, and ventricular fibrillation.

base term: A fundamental semantic concept.

cardiac monitor: A device that acquires and analyzes the electrical waveforms of the cardiovascular system for measurement, display, and treatment.

cardiologist: Physician specializing in disorders of the heart.

co-constraint: A rule describing a constraint whose scope is inclusive of more than one term.

constraint: A restriction on the set of values being assigned.

control variable: In this nomenclature, an attribute that specifies some aspect of a device configuration, setting, or the observation method.

discriminators: A mechanism to provide additional semantic refinement to multiple base terms.

domain information model (DIM): The model describing common concepts and relationships for a problem domain.

[3] ANSI publications are available from the American National Standards Institute (http://www.ansi.org/).
[4] ISO/IEC publications are available from the ISO Central Secretariat (http://www.iso.org/). ISO publications are also available in the United States from the American National Standards Institute (http://www.ansi.org/).
[5] The *IEEE Standards Dictionary Online* subscription is available at http://www.ieee.org/portal/innovate/products/standard/standards_dictionary.html.

electrocardiogram (ECG): (**A**) A set of cardiac waveforms (leads) acquired over a contiguous period of time. (**B**) Traditionally 12 waveforms (leads) representing 10 s of cardiac activity while the patient is lying on his or her back at rest. It is the physical or electronic record of the patient's cardiac activity produced by an electrocardiograph.

electrocardiograph: A device that records the electrical activity of the patient's heart by tracing voltage versus time waveforms, either on paper or digitally.

electronic health records: A longitudinal collection of electronic health information about individual patients or populations. It is a record in digital format that is capable of being shared within or across different health care settings by being embedded in network-connected enterprise-wide information system.

electrophysiologist: A physician with advanced study of the electrical properties of the heart.

lead: A vector along which the heart's electrical activity is recorded as a waveform, either as a single "unipolar" lead with respect to a common reference voltage or as a "bipolar" lead that represents the voltage difference measured at two different sites.

nomenclature: A set of names or terms comprising a taxonomy for a specific domain.

pacemaker: A small, battery-powered electrical impulse generator which is implanted in patients to support or maintain heart rate. External pacemakers, typically used in a hospital setting, are also supported by this nomenclature.

reference ID (REFID): A unique, symbolic, and programmatic form for 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); in this standard, terms are typically prefixed with "MDC_ECG_" for consistency.

rhythm disturbance: An irregular heart beat or sequence of beats.

systematic name: An organization of differentiating, relational descriptors that are unique for each term.

terminology: A synonym for nomenclature.

3.2 Acronyms and abbreviations

aECG	annotated electrocardiogram
CDISC	Clinical Data Interchange Standards Consortium
DICOM	Digital Imaging and Communications in Medicine
DIM	domain information model
ECG	electrocardiogram
HL7	Health Level Seven
ID	identifier
IDC	implantable device cardiac
IDCO	implantable device cardiac observation
IHE PCD	Integrating the Healthcare Enterprise Patient Care Devices
MDC	medical device communication
REFID	IEEE 11073 reference identifier

4. Introduction to IEEE Std 11073-10102

The key objectives of this standard are as follows:

- Define a set of annotation mnemonics to describe beat, wave component, rhythm, and noise annotations to support detailed beat-by-beat information about the electrocardiogram.
- Extend the existing IEEE 11073-10101 ECG lead identifiers, including the ability to indicate "derived" leads for every "original" ECG lead.
- Extend the existing IEEE 11073-10101 "per-lead" and "global" ECG measurement identifiers to support the capabilities of contemporary 12-lead ECG analysis algorithms.
- Add additional semantic concept groups the define ECG lead systems (predefined configurations of multiple ECG leads) and control variables that specify ECG signal filter characteristics.
- Where possible, the nomenclature definitions should also support the following:
    1) Cardiologist-friendly labels, compatible with present-day cardiac nomenclature conventions, that can be used by clinicians when reviewing or editing annotated waveforms. These should leverage existing nomenclatures, where appropriate.
    2) ISO/IEEE 11073-10101 "programmer-friendly" reference identifiers, following existing 11073 labeling conventions wherever possible, and assigning numeric codes to each.
    3) Equivalent mappings, where possible, with existing annotated databases and tools, such as the MIT-BIH and PhysioNet annotated ECG databases.

The principal focus is beat and rhythm annotation, scalable from single-lead to 12-lead analysis, applicable to standard and advanced 12-lead ECG, Holter, and patient monitoring applications. In other words, this work extends the concepts typically used to describe simple rhythm monitoring to how a cardiologist would annotate a continuous 12-lead ECG record.

4.1 Clinical background

Millions of people experience irregular heartbeats at some point in their lives. Some of these irregularities may be due to cardiac rhythm disturbances (arrhythmias). Some arrhythmias are determined by medical professionals to be relatively benign, whereas other arrhythmias can be associated with variable degrees of clinical risk. There are certain more extreme cardiac rhythm disturbances that may be dangerous or even fatal.

Arrhythmias are caused by disorders of the heart's electrical system, which in a healthy state would function to help coordinate synchronous and mechanically advantageous electrical activation of the cardiac muscle. In the case of a cardiac arrhythmia, the heart rhythm may be too slow, too fast, or otherwise chaotic; in some instances, different portions of the heart are activated in a dyssynchronous manner. In any of these instances, functional efficiency of the heart suffers and cardiac performance may be significantly impaired.

One of the first steps in monitoring patients who exhibit arrhythmias is to obtain the ECG signal using an electrocardiograph to acquire a short-term (typically 10 s) electrocardiogram or acquiring the signal over several days using a Holter recorder and analyzing it later on. An event recorder can also be used to acquire and analyze the data and to save arrhythmia episodes considered important by the device's algorithms. More modern systems can combine long-term recording and real-time analysis and can upload the

information to a monitoring service, effectively combining the roles of real-time patient monitoring and sophisticated analysis and review of the data.

Central to these applications is the accuracy of the algorithms used to detect and classify ECG beats and rhythms. One of the most effective ways of documenting the algorithm output is to record each beat and rhythm detected by the algorithm, since this information provides the clinician (as well as the algorithm developer) a clear and unambiguous record of the analysis. The “beat-by-beat” and “rhythm-by-rhythm” representation also can support powerful “retrospective” review and editing tools that can enhance the accuracy of the final summary report. The corrections made on a retrospective data set can also be used to “prospectively” reduce the likelihood making the same error in the future in a real-time monitoring system.

The goal of this nomenclature extension is to provide a standard nomenclature for ECG beats, rhythms, and advanced diagnostic ECG measurements suitable for traditional 12-lead ECG analysis as well as for systems that acquire and analyze a smaller number of leads. It extends the nomenclature developed for earlier annotated data sets (e.g., MIT-BIH) by defining codes for more than 35 different beat types and more than 75 rhythms, commensurate with advanced 12-lead diagnostic ECG acquisition and analysis, acquired in the context of a traditional resting, stress, monitoring, telemetry, or long-term ambulatory ECG. Figure 1 illustrates several of these ECG nomenclature components.

Alternatively stated, a very strong attempt has been made to extend the existing terminology defined by ISO/IEEE 11073-10101:2004, ANSI/AAMI EC71-2001 [B7], and other standards to provide the message semantics required to support advanced 12-lead ECG, short of defining a standardized terminology and grammar for the summary diagnostic statement.

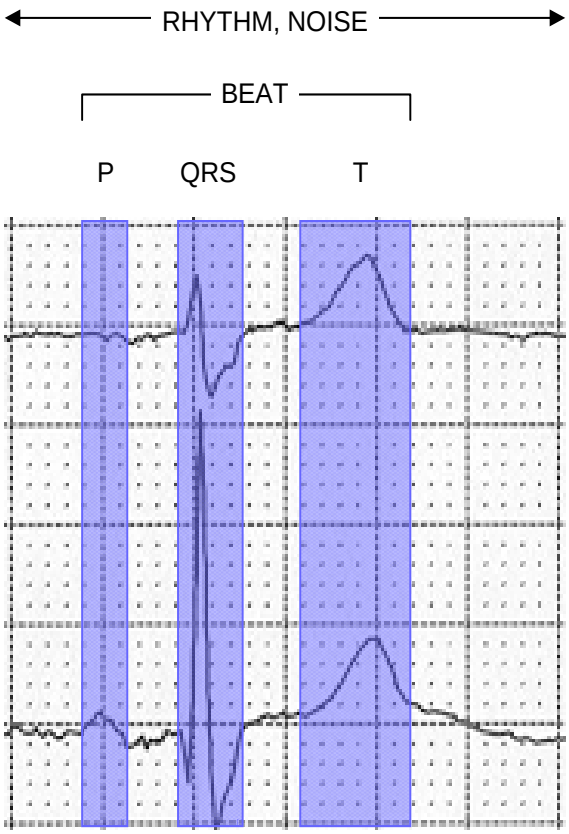

Figure 1—ECG rhythm, noise, beat, and wave components

5. Nomenclature requirements

5.1 Overview

The nomenclature in this standard defines normative text identifiers and numeric code identifiers for labeling electrocardiographic data. Requirements are defined by subject domain and industry experts.

The requirements for the nomenclature fall into multiple categories, as follows:

— The scope of the nomenclature

— The organizational structure of the nomenclature

— The semantics of the nomenclature

5.2 Scope requirements

The following requirements regarding the scope and content of the standard were used:

— Level of detail shall be summary information as specified and understood by subject domain experts

— Shall only define terms that are common across domain

— Shall allow for specific vendor enumerations of terms, if needed

5.3 Organizational structure requirements

The following requirements regarding the organization structure of the standard were used:

— Term identifiers shall be organized in a consistent hierarchical classification scheme

— Terms should be organized to minimize the need for postcoordination of multiple terms to define commonly used observation identifiers or concepts

5.4 Semantic requirements

The following requirements regarding the semantic definitions were used:

— Domain and industry experts will discuss and define term semantic requirements.

5.5 Distribution format requirements

The following requirements regarding the distribution format were used:

— The nomenclature shall be made available in a computable representation to facilitate incorporation into protocols, devices, systems, and message conformance test tools.

6. Nomenclature structure

The nomenclature in this standard is structured based on a hierarchical taxonomy. The base root node is MDC_ECG, which is short for Medical Device Communication—ECG. The MDC_ECG nomenclature term codes are assigned numeric codes that extend the existing set of ECG terms in the ISO/IEEE 11073 SCADA partition [PART=2] as well in a new partition [PART=10] allocated for advanced ECG terms.

The principal MDC_ECG terminology groups are listed in Table 1.

Discriminators are used to provide additional semantic refinement that can be applied to multiple terms. Discriminators are used to manage complexity within the nomenclature hierarchy and to promote uniformity of like-kind detailed semantic concepts.

A term is uniquely identified by a Reference ID, Systematic Name, and Code according to the scheme described in ISO/IEEE 11073-10101:2004. A term's Reference ID consists of following a sequential path through the nomenclature hierarchy from the root semantic concept to a leaf semantic concept. Each node on this path becomes a component of the term's Reference ID and Systematic Name, and it appropriately represents the semantic of the term.

After expanding all discriminators, a unique numeric code [CODE10] is assigned to each term from a 16-bit partition [PART] in which the term resides. A 32-bit "context free" numeric code [CF_CODE10] for each term is calculated by computing the sum of (65536 × PART) + CODE10 + any applicable discriminators.

7. Conformance

Conformance to definitions in this standard is specified primarily at the appropriate application or system interface. It is expected that this standard will be referenced by other healthcare systems integration standards or profiles that define specific applications of the nomenclature.

Table 1—Principal MDC_ECG terminology groups

Top level	Terminology groups
MDC_ECG_**LEAD**_	**ECG leads** (implemented as an eight-bit discriminator)
MDC_ECG_**WAVC**_	**ECG wave components** Normal wave components Composite wave components Abnormal wave components Segments ST measurement Miscellaneous
MDC_ECG_**WAVP**_	**ECG wave pacemaker components** Antibradycardia pace Antitachycardia pace Cardioversion (low-energy shock) Defibrillation (high-energy shock)
MDC_ECG_**BEAT**_	**ECG beats** Nonspecific beats Supraventricular extrasystole Ventricular extrasystole Escape beats Intraventricular block
MDC_ECG_**RHY**_	**ECG rhythms** Sinus rhythm Sinus arrhythmia (originating from the SA node) Atrial ectopic rhythm (atrial sites other than the SA node) Supraventricular (atrial or junctional) ectopic rhythms AV junctional rhythms Atrioventricular block and dissociation Sino-atrial exit block Ventricular ectopic rhythms Ventricular pre-excitation (WPW) rhythm Implanted pacemaker rhythm Pause Miscellaneous ECG rhythms and other interval events Pacemaker stimuli that were expected but are missing
MDC_ECG_**NOISE**_	**ECG noise levels**
MDC_ECG_ ***global***	**“Global” ECG measurements** (apply across multiple leads)
MDC_ECG_ ***per Lead***	**“Per-Lead” ECG measurements**
MDC_ECG_**LDSYS**_	**ECG lead systems** 12-lead ECG electrode placement XYZ electrode placement system Additional 3-lead systems Derived 12-lead systems 15- and 18-lead systems
MDC_ECG_**CTL_VBL**_	**ECG control variables**—filter and threshold settings
MDC_ECG_ ***info attr***	**ECG information attributes** Attributes that convey ECG beat, rhythm and signal types Attributes that convey ECG and pacemaker wave components Attributes that convey ECG interpretation
NOTE—AV = atrioventricular; SA = sinoatrial; ST = ECG voltage and time measurements related to the ST segment; WPW = Wolfe Parkinson White.[6]	

[6] Notes in text, tables, and figures of a standard are given for information only and do not contain requirements needed to implement this standard.

8. Extensibility and versioning

Normative specifications for term identifiers in this standard are immutable. Identifiers shall not be retired nor reused.

All other constraints and text within the standard can be revised. The standard shall carry a version number that specifies a revision. Modifications to the standard's text clauses, existing term constraints, or the addition of new text clauses or terms shall require a revision and new version number.

The version identifier shall be a string that consists of the following:

— The major version number—This is the leftmost integer value in a sequence of three such values separated by periods. The major version number may only be increased when beginning work toward a version with significant changes that impact backward compatibility.

— The minor version number —This is the middle integer value in a sequence of three such values separated by periods. The minor version number may only be increased when beginning work toward a version with incremental additions, improvements, or fixes over the last version.

— The point version number—This is the third integer in a sequence of three such values separated by periods. The point version number is increased for vendor-specific versions. Point or vendor-specific versions are not normative. If used, it should be followed by version qualifier string described below. The point version numbers shall be "0" for the balloted normative standard.

— The version qualifier string—This is a human-readable string (ideally consisting only of ASCII letters, digits, periods, and dashes) that uniquely identifies the vendor making a point revision. It should be and is only included in the version identifier for point versions. It should be consistent for subsequent point releases by the same vendor. Point or vendor versions are not considered normative.

An example version number could be "1.02.03_vendor" where "1" is the major version number, "02" is the minor version number, "03" is the point version number, and "_vendor" is the version qualifier string.

Annex A

(normative)

Base terms

A.1 Overview

Annex A presents the base terms of the nomenclature and their attributes. A base term is defined as a term prior to expansion of any included discriminators. Defining attributes at the base term level simplifies management of the nomenclature.

The base terms are defined in A.3 through A.13. For each base term group listed, the discriminators that apply to that group are shown first, followed by a tabular list of each base term within the group. The *total* number of discriminator bits used by each term group is also listed in Table A.1, and if multiple discriminators are used, then the total number is indicated as an arithmetic sum.

Table A.1—Base term groups

Clause	Base term group	tdBits
A.3	ECG lead identifiers	8
A.4	ECG WAVC wave components	2 + 4
A.5	ECG WAVP pacemaker components	4 + 4
A.6	ECG beats	4
A.7	ECG rhythms	4
A.8	ECG noise annotations and levels	4
A.9	ECG measurements—global	2
A.10	ECG measurements—per lead	8
A.11	ECG lead systems	0
A.12	Control variables	0
A.13	Information attributes	0

The discriminator tables that define the semantic modifiers for each term group are listed first. If multiple discriminator tables are used, then they are listed left to right, starting with the most significant discriminator bits first. The content of the discriminator tables is summarized in Table A.2.

Table A.2—Discriminator table content

Column	Description
dOffset	Discriminator value (offset) added to base term
dSuffix	Suffix appended to the REFID
dDescription	Description
bi-uni	For ECG leads, indicates bipolar or unipolar
pos	For ECG leads, indicates the positive electrode site
neg-ref	For ECG leads indicates the negative (for bipolar) or common reference (for unipolar)

The base terms for each term group are listed after the relevant discriminators. Table A.3 specifies the information provided for each base term within a group of terms.

Table A.3—Base term table content

Column	Description
SysName	Systematic Name
REFID	Reference Identifier
Mnemonic	Display mnemonic (informative)
Description	Description
PART	Nomenclature partition
CODE10	Numeric code within partition

SysName (*Systematic Name*) provides a structured representation of the semantic components that comprise the base term. The SysName may be used for term searching and comparison.

REFID (*Reference Identifier* or *Reference ID*) is a text token that uniquely identifies each term of the nomenclature. The majority of terms in this nomenclature extension start with MDC_ECG_. If discriminators are used to construct the term, then the dSuffix for each discriminator group is appended to the base term Reference ID.

Mnemonic is the preferred text phrase or acronym that describes a term and is suited for presenting terms on a report or user interface.

Description provides a formal statement that describes the meaning or semantic of the term.

PART specifies the IEEE 11073 partition that the term belongs to. This can be the SCADA partition [PART=2] or the partition assigned to the Annotated ECG nomenclature [PART=10].

CODE10 specifies the 16-bit numeric identifier, within the context of the partition that the term belongs to.

After expanding all discriminators, a unique numeric code **CODE10** can be calculated for each expanded term within the 16-bit partition **PART** in which the term resides. A 32-bit, context-free numeric code **CF_CODE10** may also be calculated for the expanded terms by computing the sum of (65536 × PART) + CODE10 plus any applicable discriminators (the CF_CODE10 is calculated for terms listed in Table B.1).

A.2 Discriminators—general

The discriminator sets used by the annotated ECG nomenclature are summarized in Table A.4. The discriminators specific to each term group are listed for each group and include a detailed explanation and rationale for the more complex discriminator concepts.

ECG lead identifiers are also specified as an eight-bit discriminator and are described in the next section.

Table A.4—Discriminators—general

MDC_ECG_discrim_	bits	dOffset	dSuffix	dDescription
WAVC_ASSN	2	0		{unknown association}
		1	_NA	Not associated with a beat
		2	_FB	Associated with following beat
		3	_PB	Associated with previous beat
WAVC_AOI	4	0		{area of interest not specified}
		1	_TIME_POINT	Point-in-time
		2	_DURN	Duration (width)—*time difference between actual _ONSET and _OFFSET*

MDC_ECG_discrim_	bits	dOffset	dSuffix	dDescription
		3	_PEAK	Peak (time-of)
		4	_ONSET	Actual onset point
		5	_OFFSET	Actual offset point
		6	_ONSET_IMPL	Implied onset point—*actual onset occurs before this point*
		7	_OFFSET_IMPL	Implied offset point—*actual onset occurs before this point*
		8	_AREA	Area—*integral calculated using absolute (positive) values only*
		9	_INTEGRAL	Integral
		10	*reserved*	
		11	*reserved*	
		12	*reserved*	
		13	*reserved*	
		14	*reserved*	
		15	*reserved*	
WAVP_APPR_ASSN	4	0		Pacing stimulus, unspecified appropriateness, unspecified capture
		1	_NC	Pacing stimulus, unspecified appropriateness, no capture
		2	_C	Pacing stimulus, unspecified appropriateness, captured
		3	_FSN	Pacing stimulus, unspecified appropriateness, fusion
		4	_APPR	Pacing stimulus, appropriate, unspecified capture
		5	_APPR_NC	Pacing stimulus, appropriate, no capture
		6	_APPR_C	Pacing stimulus, appropriate, captured
		7	_APPR_FSN	Pacing stimulus, appropriate, fusion
		8	_INAPPR	Pacing stimulus, inappropriate, unspecified capture
		9	_INAPPR_NC	Pacing stimulus, inappropriate, no capture
		10	_INAPPR_C	Pacing stimulus, inappropriate, captured
		11	_INAPPR_FSN	Pacing stimulus, inappropriate, fusion
		12	_EXCP	Pacing stimulus, transient/testing/manual exception, unspecified capture
		13	_EXCP_NC	Pacing stimulus, transient/testing/manual exception, no capture
		14	_EXCP_C	Pacing stimulus, transient/testing/manual exception, captured
		15	_EXCP_FSN	Pacing stimulus, transient/testing/manual exception, fusion
BEAT_RHYTHM_NOISE	4	0		{base pattern}
		1	_TIME_POINT	Time point
		2	_DURN	Duration
		3	_PEAK	Peak
		4	_ONSET	Onset (start)
		5	_OFFSET	Offset (end)
		6	_ONSET_IMPL	Implied onset (start)
		7	_OFFSET_IMPL	Implied offset (end)
		8	_EVENT	Event
		9	_COUNT	Count (of events)

MDC_ECG_discrim_	bits	dOffset	dSuffix	dDescription
		10	_RATE	Rate (of event)
		11	_RATE_MAX	Maximum rate
		12	_RATE_MIN	Minimum rate
		13	_RATE_MEAN	Mean (average) rate
		14	_TIME	Time of event (nonspecific)
		15	_ANNOT	Annotation
STATISTICAL	2	0		{not specified}
		1	_MAX	Maximum value observed over an interval
		2	_MIN	Minimum value observed over an interval
		3	_MEAN	Mean value observed over an interval
NOTE 1—Additional information regarding selected discriminator values is provided in *italics* above. NOTE 2—Detailed explanation and rationale for the more complex discriminator concepts are provided in their respective term groups.				

A.3 ECG lead identifiers

Table A.5 specifies the ECG lead designators that are defined as an 8-bit discriminator that are applied to all per-lead ECG measurements and waveform identifiers.

This work is an extension of the ECG lead identifiers originally defined by ANSI/AAMI EC71-2001 [B7] with the numeric identifiers 0 to 85, inclusive, and it maintains semantic compatibility with the original set of numeric identifiers.

This work is also an extension of the ECG lead identifiers that were originally defined in Table A.7.1.1 of ISO/IEEE 11073-10101:2004, having discriminator values 0 to 65, inclusive, and it maintains semantic compatibility with that set as well.[7] It is not compatible with the additional ECG lead discriminators [66–116] that were defined in B.3 of ISO/IEEE 11073-10101:2004.

This work expands the 35 original (not derived or calculated or interpolated) ECG leads defined in Table A.7.1.1 in ISO/IEEE 11073-10101:2004 to 92 original leads and 92 derived leads, including several suitable for canine studies.

To construct an identifier for a specific ECG lead (e.g., lead V2), the discriminator dSuffix value of _V2 is appended to the base MDC_ECG_LEAD to produce **MDC_ECG_LEAD_V2**, and the corresponding dOffset value of 4 is added to the base CODE10 for MDC_ECG_LEAD to yield a 16-bit, context-sensitive CODE10 value of 4 as well as a 32-bit, context-free CF_CODE10 value of 4.

For every original ECG lead, a derived lead is also defined. For example, the original lead MDC_ECG_LEAD_**V2** would have the derived lead identifier MDC_ECG_LEAD_**dV2**. This replaces the use of the ANSI/AAMI EC71-2001 [B7] "-cal" designator, and more importantly, it defines a derived or calculated identifier for *every* original lead (including the augmented leads aVR, aVL, and aVF). The "d" prefix essentially provides an orthogonal flag in the REFID lead designator to indicate the derived status, equivalent to the earlier ANSI/AAMI EC71 "–calculated" leads.[8, 9]

[7] As a consequence, the semantic meaning for ECG lead identifier codes [0–65] is identical for ANSI/AAMI EC71-2001 [B7], Table A.7.1.1 of ISO/IEEE 11073-10101:2004, and this standard.
[8] The "d" prefix need not be used in hardcopy and display applications; other characters such as * (asterisk) and ~ (tilde) may used for this purpose. That said, the "d" prefix is mandatory if the REFIDs are transmitted in the messaging protocol.
[9] In order to maintain backward compatibility with ANSI/AAMI EC71-2001 [B7], "-cal" leads, the numeric dOffset codes do not use an orthogonal binary flag bit to indicate their derived status.

The original and "derived" ECG lead REFIDs (and lead suffixes) are expressed using only uppercase and lowercase letters and numbers (and underscores) to facilitate use by modern-day programming languages.

In addition to the MDC_ECG_LEAD_*xxx* identifiers, the 8-bit ECG lead discriminator is used for all the per-lead ECG terms listed in Table A.13.

Table A.5—ECG lead identifiers

ECG lead identifiers (MDC_ECG_discrim_LEADS) dBits = 8					
dOffset	**dSuffix**	**description**	**bi-uni**	**pos**	**neg-ref**
0		Unspecified lead (else MDC_ECG_LEAD_CONFIG)			
1	_I	Lead I (see NOTE 1)	Bipolar	LA	RA
31	_dI				
2	_II	Lead II	Bipolar	LL	RA
32	_dII				
3	_V1	V1	Unipolar	1	WCT
33	_dV1				
4	_V2	V2	Unipolar	2	WCT
34	_dV2				
5	_V3	V3	Unipolar	3	WCT
35	_dV3				
6	_V4	V4	Unipolar	4	WCT
36	_dV4				
7	_V5	V5	Unipolar	5	WCT
37	_dV5				
8	_V6	V6	Unipolar	6	WCT
38	_dV6				
9	_V7	V7	Unipolar	7	WCT
39	_dV7				
10	_V2R	V2R (see NOTE 2)	Unipolar	2R	WCT
40	_dV2R				
11	_V3R	V3R	Unipolar	3R	WCT
41	_dV3R				
12	_V4R	V4R	Unipolar	4R	WCT
42	_dV4R				
13	_V5R	V5R	Unipolar	5R	WCT
43	_dV5R				
14	_V6R	V6R	Unipolar	6R	WCT
44	_dV6R				
15	_V7R	V7R	Unipolar	7R	WCT
45	_dV7R				
16	_X	X (see NOTE 3)	Frank or orthogonal		
46	_dX				
17	_Y	Y	Frank or orthogonal		
47	_dY				
18	_Z	Z	Frank or orthogonal		
48	_dZ				
19	_CC5	CC5, per V5 and V5R placement	Bipolar	5	5R
49	_dCC5				

ECG lead identifiers (MDC_ECG_discrim_LEADS) dBits = 8					
dOffset	**dSuffix**	**description**	**bi-uni**	**pos**	**neg-ref**
20	_CM5	CM5, per V5 placement	Bipolar	5	manubrium
50	_dCM5				
21	_LA	Left Arm	Unipolar	LA	RA+LA+LL=0
51	_dLA				
22	_RA	Right Arm	Unipolar	RA	RA+LA+LL=0
52	_dRA				
23	_LL	Left Leg	Unipolar	LL	RA+LA+LL=0
53	_dLL				
24	_fI	I (see NOTE 4)	Frank	fI	
54	_dfI				
25	_fE	E	Frank	fE	
55	_dfE				
26	_fC	C	Frank	fC	
56	_dfC				
27	_fA	A	Frank	fA	
57	_dfA				
28	_fM	M	Frank	fM	
58	_dfM				
29	_fF	F	Frank	fF	
59	_dfF				
30	_fH	H	Frank	fH	
60	_dfH				
61	_III	III	Bipolar	LL	LA
111	_dIII				
62	_AVR	aVR, augmented voltage, right	Unipolar	RA	(LL+LA)/2
112	_dAVR				
63	_AVL	aVL, augmented voltage, left	Unipolar	LA	(LL+RA)/2
113	_dAVL				
64	_AVF	aVF, augmented voltage, foot	Unipolar	LL	(RA+LA)/2
114	_dAVF				
65	_AVRneg	−aVR (see NOTE 5)	Unipolar	-LL	(RA+LA)/2
115	_dAVRneg				
66	_V8	V8 (see NOTE 6)	Unipolar	8	WCT
79	_dV8				
67	_V9	V9	Unipolar	9	WCT
80	_dV9				
68	_V8R	V8R	Unipolar	8R	WCT
81	_dV8R				
69	_V9R	V9R	Unipolar	9R	WCT
82	_dV9R				
70	_D	D (Nehb – Dorsal)	Bipolar		
83	_dD				
71	_A	A (Nehb – Anterior)	Bipolar		
84	_dA				
72	_J	J (Nehb – Inferior)	Bipolar		
85	_dJ				

ECG lead identifiers (MDC_ECG_discrim_LEADS) dBits = 8					
dOffset	**dSuffix**	**description**	**bi-uni**	**pos**	**neg-ref**
73	_DEFIB	Defibrillator lead (typically anterior-lateral)	Bipolar	anterior	lateral
135	_dDEFIB				
74	_EXTERN	External pacing lead (typically anterior-posterior)	Bipolar	anterior	posterior
136	_dEXTERN				
75	_A1	A1 (Auxiliary unipolar lead #1)	Unipolar	anywhere	WCT
137	_dA1				
76	_A2	A2 (Auxiliary unipolar lead #2)	Unipolar	anywhere	WCT
138	_dA2				
77	_A3	A3 (Auxiliary unipolar lead #3)	Unipolar	anywhere	WCT
139	_dA3				
78	_A4	A4 (Auxiliary unipolar lead #4)	Unipolar	anywhere	WCT
140	_dA4				
86	_C	Chest lead (see NOTE 7)	Generic		
116	_dC				
87	_V	Precordial lead	Bipolar	NOS	
117	_dV				
88	_VR	VR, nonaugmented voltage, vector of RA	Unipolar	RA	RA+LA+LL=0
118	_dVR				
89	_VL	VL, nonaugmented voltage, vector of LA	Unipolar	LA	RA+LA+LL=0
119	_dVL				
90	_VF	VF, nonaugmented voltage, vector of LL	Unipolar	LL	RA+LA+LL=0
120	_dVF				
91	_MCL	Modified chest lead (left arm indifferent)	Bipolar	NOS	CL
152	_dMCL				
92	_MCL1	MCL, per V1 placement	Bipolar	1	CL
141	_dMCL1				
93	_MCL2	MCL, per V2 placement	Bipolar	2	CL
142	_dMCL2				
94	_MCL3	MCL, per V3 placement	Bipolar	3	CL
143	_dMCL3				
95	_MCL4	MCL, per V4 placement	Bipolar	4	CL
144	_dMCL4				
96	_MCL5	MCL, per V5 placement	Bipolar	5	CL
145	_dMCL5				
97	_MCL6	MCL, per V6 placement	Bipolar	6	CL
146	_dMCL6				
98	_CC	Chest lead (symmetric placement)	Bipolar	NOS	NOS
153	_dCC				
99	_CC1	CC1, per V1 and V1R placement	Bipolar	1	1R
154	_dCC1				
100	_CC2	CC2, per V2 and V2R placement	Bipolar	2	2R
155	_dCC2				
101	_CC3	CC3, per V3 and V3R placement	Bipolar	3	3R
156	_dCC3				
102	_CC4	CC4, per V4 and V4R placement	Bipolar	4	4R
157	_dCC4				

ECG lead identifiers (MDC_ECG_discrim_LEADS) dBits = 8					
dOffset	**dSuffix**	**description**	**bi-uni**	**pos**	**neg-ref**
103	_CC6	CC6, per V6 and V6R placement (see NOTE 8)	Bipolar	6	6R
158	_dCC6				
104	_CC7	CC7, per V7 and V8R placement	Bipolar	7	7R
159	_dCC7				
105	_CM	Chest-manubrium	Bipolar	NOS	manubrium
160	_dCM				
106	_CM1	CM1, per V1 placement	Bipolar	1	manubrium
161	_dCM1				
107	_CM2	CM2, per V2 placement	Bipolar	2	manubrium
162	_dCM2				
108	_CM3	CM3, per V3 placement	Bipolar	3	manubrium
163	_dCM3				
109	_CM4	CM4, per V4 placement	Bipolar	4	manubrium
164	_dCM4				
110	_CM6	CM6, per V6 placement (see NOTE 9)	Bipolar	6	manubrium
165	_dCM6				
121	_CM7	CM7, per V7 placement	Bipolar	7	manubrium
166	_dCM7				
122	_CH5	— (see NOTE 10)	Bipolar	5	forehead
167	_dCH5				
123	_CS5	Negative: right infraclavicular fossa	Bipolar	5	rt infra fossa
168	_dCS5				
124	_CB5	Negative: low right scapula	Bipolar	5	lo rt scapula
169	_dCB5				
125	_CR5	—	Bipolar	5	RA
170	_dCR5				
126	_ML	ML, modified limb lead, ~ Lead II			
171	_dML				
127	_AB1	AB1 (auxiliary bipolar lead #1)	Bipolar		
172	_dAB1				
128	_AB2	AB2 (auxiliary bipolar lead #2)	Bipolar		
173	_dAB2				
129	_AB3	AB3 (auxiliary bipolar lead #3)	Bipolar		
174	_dAB3				
130	_AB4	AB4 (auxiliary bipolar lead #4)	Bipolar		
175	_dAB4				
131	_ES	EASI ES (see NOTE 11)	Bipolar	E (fE)	S
176	_dES				
132	_AS	EASI AS	Bipolar	A (fA)	S
177	_dAS				
133	_AI	EASI AI	Bipolar	A (fA)	I (fI)
178	_dAI				
134	_S	EASI upper sternum lead			
179	_dS				
147	_RL	Right leg			
180	_dRL				

ECG lead identifiers (MDC_ECG_discrim_LEADS) dBits = 8					
dOffset	**dSuffix**	**description**	**bi-uni**	**pos**	**neg-ref**
148	_CV5RL	Canine, fifth right intercostal space near the edge of the sternum at the most curved part of the costal cartilage (see NOTE 12)	Unipolar	~ rV2	WCT
181	_dCV5RL				
149	_CV6LL	Canine, sixth left intercostal space near the edge of the sternum at the most curved part of the costal cartilage	Unipolar	~ V2	WCT
182	_dCV6LL				
150	_CV6LU	Canine, sixth left intercostal space at the costochondral junction	Unipolar	~ V4	WCT
183	_dCV6LU				
151	_V10	Canine, over dorsal spinous process of the seventh thoracic vertebra	Unipolar	~ V10	WCT
184	_dV10				

NOTE 1—SCP: The Einthoven lead one (coded with the Roman I; lead IDs 1 and 31) should not be confused with the Frank electrode I (eye; lead IDs 24 and 54).

NOTE 2—V2R is identical to lead V1. Similarly, lead V1R is identical to lead V2.

NOTE 3—SCP: Leads X, Y, and Z can be recorded by an orthogonal system, such as Frank or McFee lead systems.

NOTE 4—Frank leads indicated by “f” for clarity and label uniqueness.

NOTE 5—The term “-aVR” is replaced with the more programming-friendly term “aVRneg.”

NOTE 6 —ANSI/AAMI EC71 ECG lead identifiers codes 66 to 85 are supported, in addition to codes 0 to 65.

NOTE 7 —ECG lead identifier codes 86 and above are new, relative to ANSI/AAMI EC71-2001 [B7].

NOTE 8 —CC5 was previously defined with code modifier 19.

NOTE 9—CM5 was previously defined with code modifier 20.

NOTE 10—CM5, CH5, CS5, CC5, CB5, and CR5 bipolar leads used in conjunction with stress testing (Macfarlane [B3], p. 323).

NOTE 11— EASI is a trademark in the U.S. Patent & Trademark Office, owned by the Philips Electronics North America Corporation and invented by Dr. Gordon Dower. Leads: S, upper sternum; E, lower sternum; A, under left arm, above V6; I, under right arm, above V6R.

NOTE 12—The canine leads are summarized in Macfarlane [B3], Volume 2, pp. 1270–1271. The abbreviations used in the left and right-most columns are based on Lannek [B20] modified for use with a Wilson central terminal. The subscripted terms used in the “+” column were proposed by the Committee of the American Academy of Veterinary Cardiology, and they are roughly similar to those used for humans.

NOTE 13—Codes 185 to 199 are reserved for future expansion. Codes 200 to 255 are reserved for manufacturer-specific codes.

A.4 ECG WAVC wave components

An ECG WAVC wave component and WAVP wave pacemaker component describes a wave, segment, or combination of waves that can be as follows:

— Declared as components that are associated with a BEAT

— Waveform fragments that are not associated with a BEAT

— Other nonbeat fragments such as artifact and noncaptured pacemaker spikes

The WAVC and WAVP annotations include a wave component association field that indicates its relationship to an adjacent BEAT annotation: unknown or “not otherwise specified” [0], none [1], following beat [2], and preceeding beat [3]. For WAVP annotations, the association field indicates capture state: unknown or uncertain [0], not captured [1], captured [2], or fused [3]. This relationship is specified by the 2-bit MDC_ECG_discrim_WAVC_ASSN discriminator described in Table A.6.

Table A.6—WAVC and WAVP component association (relationship to adjacent BEAT)

MDC_ECG_discrim_WAVC_ASSN			Association description
dOffset	**dSuffix**	**dDescription**	
0		Unknown or uncertain association	"**unknown or uncertain association**" with an adjacent BEAT annotation This indicates that a system, algorithm, or person did not attempt to associate this WAVC with an adjacent BEAT. In certain clinical trials, for example, only the P-waves may be annotated, with little interest with the timing details of the QRS complexes. *This discriminator would also be used if the association was described elsewhere in the protocol.*
1	_NA	Not associated with a beat	"**no association**" with an adjacent BEAT annotation This indicates that the WAVC is definitely not associated with an adjacent beat. For example, ectopic P-waves that do not result in "captured" QRS complexes are flagged as "not associated." *For paced WAVP components as well as cardioversion and defibrillation wave components,the nonassociated condition indicates "no capture" and is denoted by the suffix "_NC" rather than by "_NA."*
2	_FB	Associated with following beat	"**associated**" with an adjacent BEAT annotation This indicates that the WAVC belongs to (is a child of) a parent BEAT annotation. In a protocol that can natively show this parent–child relationship between a BEAT and one or more WAVCs, this relationship would be implied. If a binary format similar to the MIT-BIH or AHA is used, embedding this discriminator in the annotation type is very useful. For example, [2] indicates that the WAVC is associated with the immediately following BEAT and [3] indicates that it is associated with the immediately preceeding BEAT. This allows a specific BEAT and its associated WAVC components to be unambiguously identified and associated as a group. *For paced WAVP components as well as cardioversion and defibrillation wave components, the "associated" condition indicates whether the pacemaker stimulus was captured "_C" or fused "_FSN."*
3	_PB	Associated with previous beat	

An ECG WAVC wave component may be further characterized by its area of interest, which may include the following:

— Time fiducials onset, offset, and peak

— Other commonly measured aspects such as its area

The 2-bit MDC_ECG_discrim_WAVC_ASSN and 4-bit MDC_ECG_discrim_WAVC_AOI (area of interest) discriminators are encoded as the lowest 6 bits of the ECG WAVC wave component nomenclature. As an editorial convention, the discriminators used by a particular subset of terms (e.g., WAVC, WAVP, beats, rhythms, etc.) are listed immediately prior to the table that defines all the base terms that comprise the subset. The two discriminators and the base terms for ECG WAVC wave components are specified in Table A.7.

One or more NOTCH wave component(s) can be associated with any WAVC wave component (typically, QWAVE, RWAVE, and/or SWAVE). A NOTCH is a slight but distinct change in the direction of a WAVC deflection and is contained entirely within the time interval of the parent WAVC component (using conventional ECG definitions, a NOTCH does not extend to the baseline; otherwise, it would create an RRWAVE or other WAVC wave component). A NOTCH essentially defines a third level in our BEAT/WAVC/NOTCH hierarchy, and the child relationship to the parent WAVC component can be indicated either explicitly (by message structure) or implicitly (by the containing time interval).

Table A.7—ECG WAVC wave components

Discriminators (most significant on left side)					
MDC_ECG_discrim_WAVC_ASSN			MDC_ECG_discrim_WAVC_AOI		
dOffset	dSuffix	dDescription	dOffset	dSuffix	dDescription
0		Unknown association	0		{AOI NOS}
1	_NA	Not associated with a beat	1	_TIME_POINT	Point-in-time
2	_FB	Associated with following beat	2	_DURN	Duration (width)
3	_PB	Associated with previous beat	3	_PEAK	Peak (time-of)
			4	_ONSET	Actual onset point
			5	_OFFSET	Actual offset point
			6	_ONSET_IMPL	Implied onset point
			7	_OFFSET_IMPL	Implied offset point
			8	_AREA	Area
			9	_INTEGRAL	Integral
			10 to 15		{reserved}

WAVC wave components					
SysName	REFID	Mnemonic	Description	PART	CODE10
Pattern | Wave, Component, P wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_PWAVE	PWAVE	P wave	10	256
Pattern | Wave, Component, P' wave (2nd deflection in P wave), Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_PPWAVE	PPWAVE	P' wave (second deflection in P wave) (P and P' waves have opposite signs)	10	320
Pattern | Wave, Component, P'' wave (3rd deflection in P wave), Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_PPPWAVE	PPPWAVE	P'' wave (third deflection in P wave) (P' and P'' have opposite signs)	10	384
Pattern | Wave, Component, Q wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_QWAVE	QWAVE	Q wave	10	448

WAVC wave components					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern | Wave, Component, QS wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_QSWAVE	QSWAVE	QS wave	10	512
Pattern | Wave, Component, R wave, Following Beat, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_RWAVE	RWAVE	R wave	10	576
Pattern | Wave, Component, R' wave (2nd deflection in R Wave), Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_RRWAVE	RRWAVE	R' wave (second deflection in R wave) (R and R' waves have same sign)	10	640
Pattern | Wave, Component, R'' wave (3rd deflection in R Wave), Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_RRRWAVE	RRRWAVE	R'' wave (third deflection in R wave) (R, R', and R'' have same sign)	10	704
Pattern | Wave, Component, Notch, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_NOTCH	NOTCH	Notch, a slight but distinct change in the direction of a WAVC deflection, contained entirely within that deflection. Typically associated with Q, R, and/or S wave.	10	768
Pattern | Wave, Component, S wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_SWAVE	SWAVE	S wave (S and R/R' waves have opposite signs)	10	832
Pattern | Wave, Component, S' wave (2nd deflection in S Wave), Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_SSWAVE	SSWAVE	S' wave (second deflection in S wave) (S' and R'/R'' waves have opposite signs)	10	896
Pattern | Wave, Component, S'' wave (3rd deflection in S Wave), Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_SSSWAVE	SSSWAVE	S'' wave (third deflection in S wave) (S'' and R'/R'' waves have opposite signs)	10	960
Pattern | Wave, Component, T wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_TWAVE	TWAVE	T wave	10	1024

WAVC wave components					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern | Wave, Component, T' wave (2nd deflection in T Wave), Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_TTWAVE	TTWAVE	T' wave (second deflection in T wave) (T and T' waves have opposite signs)	10	1088
Pattern | Wave, Component, U wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_UWAVE	UWAVE	U wave	10	1152
Pattern | Wave, Component, Delta wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_DELTA	DELTA	Delta wave	10	1216
Pattern | Wave, Component, Isoelectric region between global QRS onset and actual onset or QRS in given lead., Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_IWAVE	IWAVE	Isoelectric region between global QRS onset and actual onset of QRS in given lead	10	1280
Pattern | Wave, Component, Isoelectric region between actual offset of QRS in given lead and global QRS offset., Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_KWAVE	KWAVE	Isoelectric region between actual offset of QRS in given lead and global QRS offset	10	1344
Pattern | Wave, Component, Osborne wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_JWAVE	JWAVE	Osborne wave, late and typically upright terminal deflection of QRS complex; amplitude increases as temperature decreases. ECG finding typically associated with hypothermia	10	1408
Pattern | Wave, Component, Entire beat (Pon to Toff excluding U), Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_PQRSTWAVE	PQRSTWAVE	Entire Beat (Pon to Toff, excluding U)	10	1472
Pattern | Wave, Component, Entire beat (Qon to Toffexcluding P and U), Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_QRSTWAVE	QRSTWAVE	Entire Beat (Qon to Toff, excluding P and U)	10	1536

WAVC wave components					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern | Wave, Component, Entire QRS wave (excluding PTand U), Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_QRSWAVE	QRSWAVE	Entire QRS (excluding P, T, and U)	10	1600
Pattern | Wave, Component, TU fused wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_TUWAVE	TUWAVE	TU fused wave	10	1664
Pattern | Wave, Component, Ventricular flutter wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_VFLWAVE	VFLWAVE	Ventricular flutter wave (optional) (the appropriate ventricular rhythm call is mandatory)	10	1728
Pattern | Wave, Component, Atrial flutter wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_AFLWAVE	AFLWAVE	Atrial flutter wave (optional) (the appropriate atrial rhythm call is mandatory)	10	1792
Pattern | Wave, Component, Isoelectric point or segment, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_ISO	ISO	Isoelectric point or segment	10	1856
Pattern | Wave, Component, PR Segment, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_PRSEG	PRSEG	PR Segment	10	1920
Pattern | Wave, Component, ST Segment, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_STSEG	STSEG	ST Segment	10	1984
Pattern | Wave, Component, J-point, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_STJ	STJ	J-point	10	2048
Pattern | Wave, Component, ST measurement point, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_STM	STM	ST measurement point	10	2112
Pattern | Wave, Component, Isolated QRS-like artifact, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_ARFCT	ARFCT	Artifact	10	2176

WAVC wave components					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern | Wave, Component, Calibration pulse (individual pulse), Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_CALP	CALP	Calibration pulse	10	2240
Pattern | Wave, Component, ST change, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_STCH	STCH	ST change	10	2304
Pattern | Wave, Component, T-wave change, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_TCH	TCH	T-wave change	10	2368
Pattern | Wave, Component, Ventricular Activation Time, Ass'n NOS, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVC_VAT	VAT	Ventricular activation time, also termed the intrinsic or intrinsicoid deflection (onset to peak of depolarization wave)	10	2432

A.5 ECG WAVP pacemaker components

The ECG WAVP pacemaker component annotations include an additional discriminator that combines two concepts: the “appropriate” concept that indicates whether the pacemaker spike was unspecified, appropriate, inappropriate, or a transient/testing/manual exception, and the “association” concept that indicates whether the capture state relative to depolarization of the paced chamber of the heart was uncertain, not captured, captured, or fusion. The two concepts are combined into the 4-bit discriminator MDC_ECG_discrim_WAVP_APPR_ASSN.

The 4-bit MDC_ECG_discrim_WAVC_AOI discriminator is used to indicate the area of interest, similar to ECG WAVC wave components.

The base pacemaker WAVP component terms in Table A.8 combine the following two most important aspects about a pacemaker spike into the base REFID:

— The purpose (energy level) of the spike (i.e., antibradycardia, antitachycardia, cardioversion, and defibrillation)

— The paced chamber (e.g., generic pace, atrial, ventricular, and transthoracic)

Table A.8—ECG WAVP pacemaker components

Discriminators (most significant on left side)					
MDC_ECG_discrim_WAVP_APPR_ASSN			MDC_ECG_discrim_WAVC_AOI		
dOffset	**dSuffix**	**dDescription**	**dOffset**	**dSuffix**	**dDescription**
0		Pacing stimulus, unspecified appropriateness, unspecified capture	0		{AOI NOS}
1	_NC	Pacing stimulus, unspecified appropriateness, no capture	1	_TIME_POINT	Point-in-time
2	_C	Pacing stimulus, unspecified appropriateness, captured	2	_DURN	Duration (width)
3	_FSN	Pacing stimulus, unspecified appropriateness, fusion	3	_PEAK	Peak (time-of)
4	_APPR	Pacing stimulus, appropriate, unspecified capture	4	_ONSET	Actual onset point
5	_APPR_NC	Pacing stimulus, appropriate, no capture	5	_OFFSET	Actual offset point
6	_APPR_C	Pacing stimulus, appropriate, captured	6	_ONSET_IMPL	Implied onset point
7	_APPR_FSN	Pacing stimulus, appropriate, fusion	7	_OFFSET_IMPL	Implied offset point
8	_INAPPR	Pacing stimulus, inappropriate, unspecified capture	8	_AREA	Area
9	_INAPPR_NC	Pacing stimulus, inappropriate, no capture	9	_INTEGRAL	Integral
10	_INAPPR_C	Pacing stimulus, inappropriate, captured	10 to 15		{reserved}
11	_INAPPR_FSN	Pacing stimulus, inappropriate, fusion			
12	_EXCP	Pacing stimulus, transient/testing/manual exception, unspecified capture			
13	_EXCP_NC	Pacing stimulus, transient/testing/manual exception, no capture			
14	_EXCP_C	Cing stimulus, transient/testing/manual exception, captured			
15	_EXCP_FSN	Pacing stimulus, transient/testing/manual exception, fusion			

Wave components (paced)					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, Wave, Pacemaker | Antibradycardia pace; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_PACE	PACE	Antibradycardia pace	10	4096
Pattern, Wave, Pacemaker | Antibradycardia pace, Atrium; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_PACE_ATR	APACE	Atrial antibradycardial pace	10	4352
Pattern, Wave, Pacemaker |	MDC_ECG_WAVP_PACE_ATR_R	RAPACE	Right atrial	10	4608

Wave components (paced)					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Antibradycardia pace, Right Atrium; Spike, AOI NOS | ECG, Heart | CVS			antibradycardial pace		
Pattern, Wave, Pacemaker | Antibradycardia pace, Left Atrium; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_PACE_ATR_L	LAPACE	Left atrial antibradycardial pace	10	4864
Pattern, Wave, Pacemaker | Antibradycardia pace, Ventricular; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_PACE_V	VPACE	Ventricular antibradycardial pace	10	5120
Pattern, Wave, Pacemaker | Antibradycardia pace, Right Ventricle; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_PACE_V_R	RVPACE	Right ventricular antibradycardial pace	10	5376
Pattern, Wave, Pacemaker | Antibradycardia pace, Left Ventricle; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_PACE_V_L	LVPACE	Left ventricular antibradycardial pace	10	5632
Pattern, Wave, Pacemaker | Antibradycardia pace, Transthoracic; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_PACE_EXT	XPACE	Transthoracic antibradycardial pace	10	5888
Pattern, Wave, Pacemaker | Antitachycardia pace; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_ATPACE	ATPACE	Antitachycardia pace	10	6144
Pattern, Wave, Pacemaker | Antitachycardia pace, Atrium; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_ATPACE_ATR	AATPACE	Atrial antitachycardia pace	10	6400
Pattern, Wave, Pacemaker | Antitachycardia pace,Ventricle; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_ATPACE_V	VATPACE	Ventricular antitachycardia pace	10	6656
Pattern, Wave, Pacemaker | Antitachycardia pace, Transthoracic; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_ATPACE_EXT	XATPACE	Transthoracic antitachycardia pace	10	6912
Pattern, Wave, Pacemaker | Cardioversion; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_CDVS	CDVS	Cardioversion (low-energy shock)	10	7168
Pattern, Wave, Pacemaker | Cardioversion, Atrium; Spike, AOI NOS |	MDC_ECG_WAVP_CDVS_ATR	ACDVS	Atrial cardioversion	10	7424

Wave components (paced)					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
ECG, Heart | CVS					
Pattern, Wave, Pacemaker | Cardioversion, Ventricle; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_CDVS_V	VCDVS	Ventricular cardioversion	10	7680
Pattern, Wave, Pacemaker | Cardioversion, Transthoracic; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_CDVS_EXT	XCDVS	Cardioversion	10	7936
Pattern, Wave, Pacemaker | Defibrillation; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_DEFIB	DEFIB	Defibrillation (high-energy shock)	10	8192
Pattern, Wave, Pacemaker | Defibrillation, Atrium; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_DEFIB_ATR	ADEFIB	Atrial defibrillation	10	8448
Pattern, Wave, Pacemaker | Defibrillation, Ventricle; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_DEFIB_V	VDEFIB	Ventricular defibrillation	10	8704
Pattern, Wave, Pacemaker | Defibrillation, Transthoracic; Spike, AOI NOS | ECG, Heart | CVS	MDC_ECG_WAVP_DEFIB_EXT	XDEFIB	Transthoracic defibrillation	10	8960

A.6 ECG beats

Beat labels are used to describe cardiac cycles on an individual “beat-by-beat” basis, extending the original beat-by-beat concepts in the earlier AHA and MIT-BIH annotated ECG databases for two-channel Holter to what is now possible with modern 12-lead resting and Holter ECG analysis.

Beat labels use the 4-bit MDC_ECG_discrim_BEAT_RHTYHM_NOISE discriminator to specify key time features of the beat as well as the count and rate of each beat type. The discriminators and base terms for ECG beats are specified in Table A.9.

Also, the <**Mnemonic**> column specifies a “cardiologist-friendly” term that could be used for display or publication purposes.

Not shown but available in the XML[10] on an informative basis are the following:

— The <**mit-bih**> element indicates mappings to the equivalent beat label in the MIT-BIH annotated ECG database.

— The <**scp**> element indicates mappings to the equivalent beat label in ANSI/AAMI EC71-2001 [B7].

Table A.9—ECG beats

MDC_ECG_discrim_BEAT_RHYTHM_NOISE		
dOffset	**dSuffix**	**dDescription**
0		{base pattern}
1	_TIME_POINT	Time point
2	_DURN	Duration
3	_PEAK	Peak
4	_ONSET	Onset (start)
5	_OFFSET	Offset (end)
6	_ONSET_IMPL	Implied onset (start)
7	_OFFSET_IMPL	Implied offset (end)
8	_EVENT	Event
9	_COUNT	Count (of events)
10	_RATE	Rate (of event)
11	_RATE_MAX	Maximum rate
12	_RATE_MIN	Minimum rate
13	_RATE_MEAN	Mean (average) rate
14	_TIME	Time of event (nonspecific)
15	_ANNOT	Annotation

[10] The XML Schema, XSLT transforms, and XML data files are available at the following URL: http://standards.ieee.org/downloads/11073/.

ECG beat annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, Beat (NOS), Base Pattern | ECG, Heart | CVS	MDC_ECG_BEAT	BEAT	Any beat (unspecified; included in heart rate)	10	8192
Pattern, Normal beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_NORMAL	NORMAL	Normal beat (sinus beat; normal conduction)	10	8208
Pattern, Abnormal beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_ABNORMAL	ABNORMAL	Abnormal beat	10	8224
Pattern, Dominant beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_DOMINANT	DOMINANT	Dominant beat	10	8240
Pattern, Supraventricular premature or ectopic beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_SV_P_C	SVPC	Supraventricular premature contraction (atrial or nodal premature beat with normal QRS morphology)	10	8256
Pattern, Atrial premature complex (beat), Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_ATR_P_C	APC	Atrial premature contraction (beat)	10	8272
Pattern, Junctional (nodal) premature beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_JUNC_P_C	JPC	Junctional (nodal) premature contraction	10	8288
Pattern, Aberrated atrial premature beat (Ashman), Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_ATR_P_C_ABERR	ABERR	Aberrated atrial premature beat (Ashman beat: atrial premature beat with abnormal QRS morphology)	10	8304
Pattern, Non-conducted p-wave beat (blocked), Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_ATR_PWAVE_BLK	NAPC	Nonconducted P-wave (blocked)	10	8320
Pattern, Premature ventricular contraction (beat), Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_V_P_C	VPC	Ventricular premature contraction (beat)	10	8336

ECG beat annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, Fusion of ventricular and normal beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_V_P_C_FUSION	FUSION	Fusion of ventricular and normal beat	10	8352
Pattern, R-on-T premature ventricular beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_V_P_C_RonT	RONT	R-on-T premature ventricular beat	10	8368
Pattern, Supraventricular escape beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_SV_ESC	SVESC	Supraventricular escape beat (least specific)	10	8384
Pattern, Atrial escape beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_ATR_ESC	AESC	Atrial Escape beat	10	8400
Pattern, Junctional (nodal) escape beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_JUNC_ESC	JESC	Junctional (nodal) escape beat	10	8416
Pattern, Ventricular escape beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_V_ESC	VESC	Ventricular escape beat	10	8432
Pattern, bundle branch block beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_BB_BLK	BBB	Bundle branch block beat (unspecified)	10	8448
Pattern, left bundle branch block beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_LBB_BLK_COMP	LBBB	Left bundle branch block beat	10	8464
Pattern, incomplete left bundle branch block beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_LBB_BLK_INCOMP	ILBBB	Incomplete left bundle branch block beat (see NOTE 1)	10	8480
Pattern, right bundle branch block beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_RBB_BLK_COMP	RBBB	Right bundle branch block beat	10	8496

ECG beat annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, incomplete right bundle branch block beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_RBB_BLK_INCOMP	IRBBB	Incomplete right bundle branch block beat	10	8512
Pattern, left anterior fascicular block beat (common), Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_BLK_ANT_L_HEMI	LAFB	Left anterior fascicular block beat (common)	10	8528
Pattern, left posterior fascicular block beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_BLK_POS_L_HEMI	LPFB	Left posterior fascicular block beat (rare)	10	8544
Pattern, bifascicular block beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_BLK_BIFAS	BIFAS	Bifascicular block beat	10	8560
Pattern, trifascicular block beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_BLK_TRFAS	TRFAS	Trifascicular block beat	10	8576
Pattern, bilateral bundle-branch block beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_BLK_BILAT	BILAT	Bilateral bundle-branch block beat	10	8592
Pattern, intraventricular conduction disturbance (non-specific block), Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_BLK_IVCD	IVCD	Intraventricular conduction disturbance (nonspecific block)	10	8608
Pattern, pre-excitation (least specific), Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_PREX	PREX	Preexcitation (least specific)	10	8624
Pattern,Wolf-Parkinson-White syndrome (less specific), Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_WPW_UNK	WPW	Wolf-Parkinson-White syndrome (less specific)	10	8640
Pattern,Wolf-Parkinson type A, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_WPW_A	WPWA	Wolf-Parkinson type A beat (see NOTE 2)	10	8656

ECG beat annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern,Wolf-Parkinson type B, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_WPW_B	WPWB	Wolf-Parkinson type B beat (see NOTE 3)	10	8672
Pattern, Lown-Ganong-Levine syndrome, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_LGL	LGL	Lown-Ganong-Levine syndrome beat (see NOTE 4)	10	8688
Pattern, Paced beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_PACED	PACED	Paced beat (with ventricular capture)	10	8704
Pattern, Pacemaker Fusion beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_PACED_FUS	PFUS	Pacemaker fusion beat	10	8720
Pattern, Unclassifiable beat, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_UNKNOWN	UNKNOWN	Unclassifiable beat	10	8736
Pattern,Learning, Base pattern | ECG, Heart | CVS	MDC_ECG_BEAT_LEARN	LEARN	Learning (beats during initial learning phase)	10	8752

NOTE 1—The term “incomplete” for IRBBB and ILBBB implies conduction is delayed, but not completely blocked.

NOTE 2—QRS is positive in leads V1 and V2, similar to RBBB.

NOTE 3—QRS is negative in leads V1 and V2, similar to LBBB.

NOTE 4—Unlike WPW, the QRS complex has normal morphology in LGL. Activation of the ventricles occurs entirely through the bundle of His and the bundle branches.

A.7 ECG rhythms

Rhythm annotations identify the state transitions of ECG rhythms. Multiple, concurrent rhythms are permitted. Rhythm annotations apply to all leads.

Rhythm labels use the 4-bit MDC_ECG_discrim_BEAT_RHYTHM_NOISE discriminator to specify key time features of a rhythm episode as well as the count and rate of rhythm episodes. The _ONSET and _OFFSET discriminators are used to indicate the *actual* onset (start) and offset (end) of a rhythm at a specified time. The _ONSET_IMPL and _OFFSET_IMPL discriminators are used to indicate when the *actual* onset occurs before and when the *actual* offset occurs after a specified time, and they would be used for a finite-length rhythm strip or display where the actual onset and offset is not visible. The discriminators and base terms for ECG rhythms are specified in Table A.10.

Not shown but available in the XML on an informative basis are the following:

— The <**mit-bih**> element indicates mappings to the equivalent beat label in the MIT-BIH annotated ECG database.

— The <**scp**> element indicates mappings to the equivalent beat label in ANSI/AAMI EC71-2001 [B7].

— The <**auxinfo**> element suggests additional criteria and thresholds for each rhythm.

Table A.10—ECG rhythms

MDC_ECG_discrim_BEAT_RHYTHM_NOISE		
dOffset	**dSuffix**	**dDescription**
0		{base pattern}
1	_TIME_POINT	Time point
2	_DURN	Duration
3	_PEAK	Peak
4	_ONSET	Onset (start)
5	_OFFSET	Offset (end)
6	_ONSET_IMPL	Implied onset (start)
7	_OFFSET_IMPL	Implied offset (end)
8	_EVENT	Event
9	_COUNT	Count (of events)
10	_RATE	Rate (of event)
11	_RATE_MAX	Maximum rate
12	_RATE_MIN	Minimum rate
13	_RATE_MEAN	Mean (average) rate
14	_TIME	Time of event (nonspecific)
15	_ANNOT	Annotation

ECG rhythm annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, Sinus Rhythm, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_SINUS_RHY	SR	Sinus rhythm	10	9216
Pattern, Normal Sinus Rhythm, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_SINUS_NORMAL_RHY	NSR	Normal sinus rhythm	10	9232
Pattern, Sinus Bradycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_SINUS_BRADY	SBRAD	Sinus bradycardia	10	9248
Pattern, Sinus Tachycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_SINUS_TACHY	STACH	Sinus tachycardia	10	9264
Pattern, Sinus Arrhythmia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_SINUS_ARRHY	SAR	Sinus arrhythmia	10	9280
Pattern, Respiratory Sinus Arrhythmia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_RESP_ARRHY	RSAR	Respiratory sinus arrhythmia	10	9296
Pattern, Non-Respiratory Sinus Arrhythmia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_NON_RESP_ARRHY	NRSAR	Nonrespiratory sinus arrhythmia	10	9312
Pattern, Wandering Sinus Pacemaker, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_WANDP_ARRHY	WANDP	Wandering sinus pacemaker	10	9328
Pattern, Wandering Pacemaker, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_WANDPAV_ARRHY	WANDPAV	Wandering pacemaker	10	9344
Pattern, Atrial Ectopic Rhythm, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_ATR_ECT_RHY	AER	Atrial ectopic rhythm	10	9360

ECG rhythm annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, Atrial Bigeminy, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_ATR_BIGEM	AB	Atrial bigeminy	10	9376
Pattern, Atrial Tachycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_ATR_TACHY	AT	Atrial tachycardia	10	9392
Pattern, Paroxsysmal Atrial Tachycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_ATR_TACHY_PAROX	PAT	Paroxsysmal atrial tachycardia (abrupt)	10	9408
Pattern, Multifocal Atrial Tachycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_ATR_TACHY_MF	MAT	Multifocal atrial tachycardia (chaotic)	10	9424
Pattern, Automatic Atrial Tachycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_ATR_TACHY_AUTO	AUTOTACH	Automatic atrial tachycardia (with warmup)	10	9440
Pattern, Atrial flutter, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_ATR_FLUT	AFLUT	Atrial flutter	10	9456
Pattern, Atrial fibrillation, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_ATR_FIB	AFIB	Atrial fibrillation	10	9472
Pattern, Supraventricular (atrial or junctional) ectopic rhythm, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_SV_ECT_RHY	SVER	Supraventricular (atrial or junctional) ectopic rhythm	10	9488
Pattern, Supraventricular tachycardia (atrial or junctional), Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_SV_TACHY	SVTACH	Supraventricular tachycardia (atrial or junctional)	10	9504

ECG rhythm annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, Supraventricular Paroxsysmal Tachycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_SV_TACHY_PAROX	SVPAT	Supraventricular paroxsysmal tachycardia	10	9520
Pattern, AV junctional (nodal) rhythm, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_JUNC_RHY	JUNC	AV junctional (nodal) rhythm (see NOTE 1)	10	9536
Pattern, AV junctional (nodal) escape rhythm, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_JUNC_ESC_BEATS	JESCR	AV junctional (nodal) escape rhythm	10	9552
Pattern, Accelerated AV junctional (nodal) rhythm, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_JUNC_ACCEL	JACLR	Accelerated AV junctional (nodal) rhythm	10	9568
Pattern, Junctional Tachycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_JUNC_TACHY	JTACH	Junctional tachycardia	10	9584
Pattern, AV reciprocating tachycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_AV_TACHY_RECIP	RECPTACH	AV reciprocating tachycardia	10	9600
Pattern, Reentrant AV nodal tachycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_AV_TACHY_REENTRANT	RAVTACH	Reentrant AV nodal tachycardia	10	9616
Pattern, First Degree AV Block, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_AV_HEART_BLK_DEG_1	1AVB	First-degree AV block	10	9632
Pattern, Second Degree AV Block, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_AV_HEART_BLK_DEG_2	2AVB	Second-degree AV block	10	9648

ECG rhythm annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, Second Degree AV Block Type I, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_AV_HEART_BLK_DEG_2_I	2AVBI	Second-degree AV block type I (Wenckebach) or (Mobitz type I)	10	9664
Pattern, Second Degree AV Block Type II, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_AV_HEART_BLK_DEG_2_II	2AVBII	Second-degree AV block type II (Mobitz type II)	10	9680
Pattern, Third Degree AV Block, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_AV_HEART_BLK_DEG_3	3AVB	Third-degree AV block (complete AV block)	10	9696
Pattern, AV Dissociation, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_AV_DISSOC	AVDIS	AV dissociation	10	9712
Pattern, AV dissociation with interference, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_AV_DISSOC_INT	AVDISINT	AV dissociation with interference	10	9728
Pattern, Isorhythmic AV dissociation, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_AV_DISSOC_ISO	AVDISISO	Isorhythmic AV dissociation	10	9744
Pattern, Complete AV dissociation, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_AV_DISSOC_COMP	AVDISCMP	Complete AV dissociation	10	9760
Pattern, First Degree SA Block, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_SA_HEART_BLK_DEG_1	1SAB	First-degree SA block	10	9776
Pattern, Second Degree SA Block Type I, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_SA_HEART_BLK_DEG_2_I	2SABI	Second-degree SA block type I (Wenckebach)	10	9792
Pattern, Second Degree SA Block Type II, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_SA_HEART_BLK_DEG_2_II	2SABII	Second-degree SA block type II	10	9808

ECG rhythm annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, Third Degree SA Block, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_SA_HEART_BLK_DEG_3	3SAB	Third-degree SA block (complete SA block)	10	9824
Pattern, Ventricular rhythm, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_RHY	VRHY	Ventricular rhythm	10	9840
Pattern, Idioventricular (ventricular escape) rhythm, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_IDIO_RHY	IVR	Idioventricular (ventricular escape) rhythm	10	9856
Pattern, Ventricular Parasystole, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_PARA	VPARA	Ventricular parasystole	10	9872
Pattern, Accelerated idioventricular rhythm, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_AIVR	AIVR	Accelerated idioventricular rhythm	10	9888
Pattern, Slow Ventricular Tachycardia (Idioventricular Tachycardia), Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_IDIO_TACHY	SLOVTACH	Slow ventricular tachycardia (idioventricular tachycardia)	10	9904
Pattern, Slow Ventricular Tachycardia (Idioventricular Tachycardia), Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_BRADY	VBRADY	Slow ventricular rate, beats likely of ventricular origin, but existence of P-waves is unknown	10	10464
Pattern, Ventricular Bigeminy, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_BIGEM	VBIGEM	Ventricular bigeminy	10	9920
Pattern, Ventricular Trigeminy, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_TRIGEM	VTRIGEM	Ventricular trigeminy	10	9936

ECG rhythm annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, Ventricular Couplet, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_P_C_CPLT	VCPLT	Ventricular couplet	10	9952
Pattern, Ventricular Run, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_P_C_RUN	VRUN	Ventricular run	10	9968
Pattern, Ventricular Tachycardia (nonparoxysmal), Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_TACHY	VTACH VT	Ventricular tachycardia (nonparoxysmal)	10	9984
Pattern, Ventricular Flutter, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_FLUT	VFLUT	Ventricular flutter	10	10000
Pattern, Ventricular Fibrillation ("chaotic"), Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_FIB	VFIB	Ventricular fibrillation (“chaotic”)	10	10016
Pattern, Nonsustained Ventricular Tachycardia (paroxysmal), Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_TACHY_PAROX	NSUSVT	Nonsustained ventricular tachycardia (paroxysmal)	10	10032
Pattern, Sustained Monomorphic Ventricular Tachycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_TACHY_MONO	SUSVT	Sustained monomorphic ventricular tachycardia	10	10048
Pattern, Polymorphic Ventricular Tachycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_TACHY_POLY	POLYVT	Polymorphic ventricular tachycardia	10	10064

ECG rhythm annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, Torsades de Pointes Ventricular Tachycardia, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_V_TACHY_TDP	TDPVT	Torsades de Pointes ventricular tachycardia	10	10080
Pattern, Pre-excitation (least specific), Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_PREX	PREX	Pre-excitation (least specific)	10	10096
Pattern, Wolf-Parkinson-White syndrome, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_WPW_UNK	WPW	Wolf-Parkinson-White syndrome (less specific)	10	10112
Pattern, Wolf-Parkinson Type A, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_WPW_A	WPWA	Wolf-Parkinson type A	10	10128
Pattern, Wolf-Parkinson Type B, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_WPW_B	WPWB	Wolf-Parkinson type B	10	10144
Pattern, Lown-Ganong-Levine syndrome, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_LGL	LGL	Lown-Ganong-Levine syndrome	10	10160
Pattern, Atrial Demand Mode Pacing, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPADM	EPADM	Atrial demand mode pacing	10	10176
Pattern, Atrial Capture, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPAC	EPAC	Atrial capture	10	10192
Pattern, Atrial Failure to Capture, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPAFC	EPAFC	Atrial failure to capture	10	10208

ECG rhythm annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, Atrial Failure to Sense, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPAFS	EPAFS	Atrial failure to sense	10	10224
Pattern, Ventricular Demand Mode, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPVDM	EPVDM	Ventricular demand mode	10	10240
Pattern, Ventricular Capture, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPVC	EPVC	Ventricular capture	10	10256
Pattern, Ventricular Failure to Capture, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPVFC	EPVFC	Ventricular failure to capture	10	10272
Pattern, Ventricular Failure to Sense, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPVFS	EPVFS	Ventricular failure to sense	10	10288
Pattern, Anti-Tachycardia Pacing, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPAVT	EPAVT	Antitachycardia pacing	10	10304
Pattern, Pause or missing beat, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_MISSB	MISSB	Pause or missing beat (due to any reason)	10	10320
Pattern, Asystole, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_ASYSTOLE	ASYSTOLE ASYS	Asystole	10	10336
Pattern, Irregular rhythm, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_IRREG	IRREG	Irregular rhythm	10	10352
Pattern, Low Heart Rate Variability, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_LHRV	LHRV	Low heart rate variability	10	10368

ECG rhythm annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, ST change from some baseline beyond some threshold, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_STELVATION	STELEVATION	ST change from some baseline beyond some threshold	10	10384
Pattern, Absolute ST measurement beyond some threshold, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_STHILOST	STHILOST	Absolute ST measurement beyond some threshold	10	10400
Pattern, T-wave alternans, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_TALT	TWA	T-wave alternans	10	10416
Pattern, Bradycardia of any type, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_BRADY	BRADY	Bradycardia of any type	10	10432
Pattern, Calibration signal, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_CALS	CALS	Calibration signal (sustained)	10	10448
Pattern, Atrial pacemaker spike expected but missing, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPAX	EPAX	Atrial spike expected, but missing	10	10480
Pattern, Atrial pacemaker spike expected but missing (failure to output), Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPAXLO	EPAXLO	Inadequate atrial spike, not capturable (loss of output)	10	10496
Pattern, Atrial pacemaker spike expected but missing (failure to output), Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPAXFO	EPAXFO	Atrial spike expected, but missing (failure to output)	10	10512

ECG rhythm annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Pattern, Ventricular pacemaker spike expected but missing, Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPVX	EPVX	Ventricular spike expected, but missing	10	10528
Pattern, Inadequate ventricular pacemaker spike, not capturable (loss of output), Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPVXLO	EPVXLO	Inadequate ventricular spike, not capturable (loss of output)	10	10544
Pattern, Ventricular pacemaker spike expected but missing (failure to output), Base pattern | ECG, Heart | CVS	MDC_ECG_RHY_EPVXFO	EPVXFO	Ventricular spike expected, but missing (failure to output)	10	10560
NOTE 1—Formerly called nodal, now AV junctional because the AV node itself has no automaticity (Brewer et al. [B14] and Scherlag et al. [B22]). The term “junctional” seems to be more widely used today, and several of the mnemonics shown here have been updated, including the NPC and NESC mnemonics originally used in the MIT-BIH database.					

A.8 ECG noise annotations and levels

Noise annotations can use a similar structure to rhythm annotations, except that they can apply to a single lead, a group of leads, or the entire set of leads. The four levels _CLEAN, _MODERATE, _SEVERE, and _NOSIGNAL are widely used throughout the industry and have a well-understood correspondence to the behavior of the ECG analysis algorithm. The discriminators and base terms for ECG noise annotations and levels are specified in Table A.11.

Table A.11—ECG noise annotations and levels

MDC_ECG_discrim_BEAT_RHYTHM_NOISE		
dOffset	**dSuffix**	**dDescription**
0		{base pattern}
1	_TIME_POINT	Time point
2	_DURN	Duration
3	_PEAK	Peak
4	_ONSET	Onset (start)
5	_OFFSET	Offset (end)
6	_ONSET_IMPL	Implied onset (start)
7	_OFFSET_IMPL	Implied offset (end)
8	_EVENT	Event
9	_COUNT	Count (of events)
10	_RATE	Rate (of event)
11	_RATE_MAX	Maximum rate
12	_RATE_MIN	Minimum rate
13	_RATE_MEAN	Mean (average) rate
14	_TIME	Time of event (nonspecific)
15	_ANNOT	Annotation

ECG noise annotations					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Type Enumeration | ECG, Noise Level, Clean | Heart | CVS	MDC_ECG_NOISE_CLEAN	Clean	No noise, beat detection and classification can be performed	10	11200
Type Enumeration | ECG, Noise Level, Moderate | Heart | CVS	MDC_ECG_NOISE_MODERATE	Moderate	Noise level such that beats can be detected but cannot be classified.	10	11216
Type Enumeration | ECG, Noise Level, Severe | Heart | CVS	MDC_ECG_NOISE_SEVERE	Severe	Noise level such that beats cannot be detected or classified.	10	11232
Type Enumeration | ECG, Noise Level, No Signal | Heart | CVS	MDC_ECG_NOISE_NOSIGNAL	NoSignal	Indicates that no signal is available due to communication or other loss.	10	11248

A.9 ECG measurements—global

Global ECG measurements apply to all ECG leads. For example, the global P-wave duration (evaluated over all leads) is identified as MDC_ECG_TIME_PD_P when using the global ECG numeric form.

The new global ECG measurement terms are located in the SCADA partition [PART = 2] and use the same statistical discriminators as the earlier global ECG terms defined by ISO/IEEE 11073-10101:2004(E). The statistical discriminators and base terms from both partitions are listed together in Table A.12.

Table A.12—Global ECG measurements

MDC_ECG_discrim_STATISTICAL		
dOffset	**dSuffix**	**dDescription**
0		Not specified
1	_MAX	Maximum value observed over an interval
2	_MIN	Minimum value observed over an interval
3	_MEAN	Mean value observed over an interval

ECG measurements, global					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Angle | ECG, J20, Azimuth | Heart | CVS	MDC_ECG_ANGLE_J20_AZIM		Azimuth of the vector at 20 ms after the end of QRS complex of ECG	2	16248
Angle | ECG, J80, Azimuth | Heart | CVS	MDC_ECG_ANGLE_J80_AZIM		Azimuth of the vector at 80 ms after the end of QRS complex of ECG	2	16284
Angle | ECG, J80, Elevation | Heart | CVS	MDC_ECG_ANGLE_J80_ELEV		Elevation of the vector at 80 ms after the end of QRS complex of ECG	2	16288
Angle | ECG, Jxx, Azimuth | Heart | CVS	MDC_ECG_ANGLE_Jxx_AZIM		Azimuth of the vector at xx ms after the end of QRS complex of ECG	2	16296
Angle | ECG, Jxx, Elevation | Heart | CVS	MDC_ECG_ANGLE_Jxx_ELEV		Elevation of the vector at xx ms after the end of QRS complex of ECG	2	16300
Angle | ECG, J, Azimuth | Heart | CVS	MDC_ECG_ANGLE_J_AZIM		Azimuth of the vector at the end of QRS complex (junctional point or J point)	2	16236
Angle | ECG, J, Elevation | Heart | CVS	MDC_ECG_ANGLE_J_ELEV		Elevation of the vector at the end of QRS complex (junctional point or J point)	2	16240
Angle | ECG, J20, Elevation | Heart | CVS	MDC_ECG_ANGLE_J20_ELEV		Elevation of the vector at 20 ms after the end of QRS complex of ECG	2	16252

ECG measurements, global					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Angle | ECG, J40, Azimuth | Heart | CVS	MDC_ECG_ANGLE_J40_AZIM		Azimuth of the vector at 40 ms after the end of QRS complex of ECG	2	16260
Angle | ECG, J40, Elevation | Heart | CVS	MDC_ECG_ANGLE_J40_ELEV		Elevation of the vector at 40 ms after the end of QRS complex of ECG	2	16264
Angle | ECG, J60, Azimuth | Heart | CVS	MDC_ECG_ANGLE_J60_AZIM		Azimuth of the vector at 60 ms after the end of QRS complex of ECG	2	16272
Angle | ECG, J60, Elevation | Heart | CVS	MDC_ECG_ANGLE_J60_ELEV		Elevation of the vector at 60 ms after the end of QRS complex of	2	16276
Angle | ECG, P, Azimuth, MaximumVector | Heart | CVS	MDC_ECG_ANGLE_P_AZIM		Azimuth angle of the electrical axis of the P wave of ECG	2	16204
Angle | ECG, P, Elevation, MaximumVector | Heart | CVS	MDC_ECG_ANGLE_P_ELEV		Elevation angle of the electrical axis of the P wave of ECG	2	16216
Angle | ECG, P, Frontal | Heart | CVS	MDC_ECG_ANGLE_P_FRONT	Paxis	Angle of the electrical axis of the P wave of ECG (in frontal plane)	2	16128
Angle | ECG, QRS, Azimuth, MaximumVector | Heart | CVS	MDC_ECG_ANGLE_QRS_AZIM		Azimuth of the electrical axis of the QRS complex of ECG	2	16208
Angle | ECG, QRS, Elevation, MaximumVector | Heart | CVS	MDC_ECG_ANGLE_QRS_ELEV		Elevation of the electrical axis of the QRS complex of ECG	2	16220
Angle | ECG, QRS, Frontal | Heart | CVS	MDC_ECG_ANGLE_QRS_FRONT	QRSaxis	Angle of the electrical axis of the QRS complex of ECG (in frontal plane)	2	16132
Angle | ECG, T, Azimuth, MaximumVector | Heart | CVS	MDC_ECG_ANGLE_T_ELEV		Elevation of the electrical axis of the T wave of ECG	2	16224
Angle | ECG, T, Elevation, MaximumVector | Heart | CVS	MDC_ECG_ANGLE_T_AZIM		Azimuth of the electrical axis of the T wave of ECG	2	16212

ECG measurements, global					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Angle | ECG, T, Frontal | Heart | CVS	MDC_ECG_ANGLE_T_FRONT	Taxis	Angle of the electrical axis of the T wave of ECG (in frontal plane)	2	16136
Duration | ECG, P | Heart | CVS	MDC_ECG_TIME_PD_P		Duration of the P wave of ECG (global)	2	16184
	MDC_ECG_TIME_PD_P_GL			2	16184
Duration | ECG, PP | Heart | CVS	MDC_ECG_TIME_PD_PP	PP	Duration of the interval between two consecutive P waves of ECG (global)	2	16140
	MDC_ECG_TIME_PD_PP_GL			2	16140
Duration | ECG, PQ | Heart | CVS	MDC_ECG_TIME_PD_PQ	PQint, PRint	Duration of the interval between P onset and QRS onset of ECG (global)	2	16144
Duration | ECG, PR | Heart | CVS	MDC_ECG_TIME_PD_PR	PRint	Duration of the interval between P onset and QRS onset of ECG R-wave (global)	2	15872
Duration | ECG, PQSegment | Heart | CVS	MDC_ECG_TIME_PD_PQ_SEG	PQseg	Duration of the interval between P offset and QRS onset of ECG (global) (synonymously to PR interval - American)	2	16148
Duration | ECG, QRS | Heart | CVS	MDC_ECG_TIME_PD_QRS		Duration of the QRS complex of ECG (global)	2	16156
	MDC_ECG_TIME_PD_QRS_GL			2	16156
Duration | ECG, QT | Heart | CVS	MDC_ECG_TIME_PD_QT	QT	Duration of the interval between the QRS onset and T wave offset of ECG (global)	2	16160
	MDC_ECG_TIME_PD_QT_GL			2	16160

ECG measurements, global					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Duration | ECG, QTc | Heart | CVS	MDC_ECG_TIME_PD_QTc	QTc	Duration of the interval between the QRS onset and T wave offset, related to heart rate 60 beats per minute of ECG (global), Bazett formula	2	16164
Duration | ECG, QTc, NOS | Heart | CVS	MDC_ECG_TIME_PD_QTC		Duration of the interval between the QRS onset and T wave offset, corrected for heart rate using an unspecified correction	2	15876
Duration | ECG, QTc, Bazett | Heart | CVS	MDC_ECG_TIME_PD_QTC_BAZETT		Duration of the interval between the QRS onset and T wave offset, corrected for heart rate using the Bazett formula	2	15880
Duration | ECG, QTc, Framingham | Heart | CVS	MDC_ECG_TIME_PD_QTC_FRAMINGHAM		Duration of the interval between the QRS onset and T wave offset, corrected for heart rate using the Framingham formula	2	15884
Duration | ECG, QTc, Hodges | Heart | CVS	MDC_ECG_TIME_PD_QTC_HODGES		Duration of the interval between the QRS onset and T wave offset, corrected for heart rate using the Hodges formula	2	15888
Duration | ECG, QTc, Frederica | Heart | CVS	MDC_ECG_TIME_PD_QTC_FREDERICA		Duration of the interval between the QRS onset and T wave offset, corrected for heart rate using the Frederica formula	2	15892
Duration | ECG, QTc, user defined | Heart | CVS	MDC_ECG_TIME_PD_QTC_USER		Duration of the interval between the QRS onset and T wave offset, corrected for heart rate using a user defined formula	2	15896

ECG measurements, global					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Duration | ECG, RR for QTC | Heart | CVS	MDC_ECG_TIME_PD_RR_GL	RR for QTC	Duration of the interval between two consecutive QRS complexes	2	16000
Duration | ECG, QTU | Heart | CVS	MDC_ECG_TIME_PD_QTU		Duration of the interval between the QRS onset and U wave offset for fused TU wave. Used when QT duration cannot be measured, so QTU duration is measured instead.	2	16004
Dispersion | ECG, QT | Heart | CVS	MDC_ECG_DISPERSION_QT		QT Dispersion	2	16008
Dispersion | ECG, QT, corrected | Heart | CVS	MDC_ECG_DISPERSION_QTC		QT Dispersion corrected	2	16012
Duration | ECG, RR | Heart | CVS	MDC_ECG_TIME_PD_RR	RR	Duration of the interval between two consecutive QRS complexes	2	16168
	MDC_ECG_TIME_PD_RR_GL			2	16168
Duration | ECG, STJxx | Heart | CVS	MDC_ECG_TIME_ST_Jxx	Tjxx	Definition of reference time point xx ms after the end of QRS complex in ECG for potential measurements in ST segment.	2	16304
Magnitude | ECG, J, Vector | Heart | CVS	MDC_ECG_MAG_J_VECT		Magnitude of the vector at the end of QRS complex (junctional point or J point) of ECG in specified {lead}	2	16232
Magnitude | ECG, J20, Vector | Heart | CVS	MDC_ECG_MAG_J20_VECT		Magnitude of the vector at 20 ms after the end of QRS complex of ECG in specified {lead}	2	16244
Magnitude | ECG, J40, Vector | Heart | CVS	MDC_ECG_MAG_J40_VECT		Magnitude of the vector at 40 ms after the end of QRS complex of ECG in specified {lead}	2	16256

ECG measurements, global					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Magnitude | ECG, J60, Vector | Heart | CVS	MDC_ECG_MAG_J60_VECT		Magnitude of the vector at 60 ms after the end of QRS complex of ECG in specified {lead}	2	16268
Magnitude | ECG, J80, Vector | Heart | CVS	MDC_ECG_MAG_J80_VECT		Magnitude of the vector at 80 ms after the end of QRS complex of ECG in specified {lead}	2	16280
Magnitude | ECG, Jxx, Vector | Heart | CVS	MDC_ECG_MAG_Jxx_VECT		Magnitude of the vector at xx ms after the end of QRS complex of ECG in specified {lead}	2	16292
Magnitude | ECG, P, Frontal | Heart | CVS	MDC_ECG_MAG_P_FRONT		Length of the vector of the P wave of ECG (in frontal plane)	2	16172
Magnitude | ECG, P, MaximumVector | Heart | CVS	MDC_ECG_MAG_P_VECT		Magnitude at the maximum vector of the P wave of ECG computed as square root of squared scalar magnitudes of X, Y, Z	2	16192
Magnitude | ECG, P, MaximumVector, FrontalPlane | Heart | CVS	MDC_ECG_MAG_P_VECT_FRONT		Magnitude at the maximum vector of the P wave of ECG in frontal plane computed as square root of squared scalar magnitudes of X, Y	2	16308
Magnitude | ECG, P, MaximumVector, HorizontalPlane | Heart | CVS	MDC_ECG_MAG_P_VECT_HORIZ		Magnitude at the maximum vector of the P wave of ECG in horizontal plane computed as square root of squared scalar magnitudes of X, Z	2	16312
Magnitude | ECG, P, MaximumVector, SagitalPlane | Heart | CVS	MDC_ECG_MAG_P_VECT_SAGI		Magnitude at the maximum vector of the P wave of ECG in sagital plane computed as square root of squared scalar magnitudes of Y, Z	2	16316

ECG measurements, global					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Magnitude | ECG, QRS, Frontal | Heart | CVS	MDC_ECG_MAG_QRS_FRONT		Length of the vector of the QRS complex of ECG (in frontal plane)	2	16176
Magnitude | ECG, QRS, MaximumVector | Heart | CVS	MDC_ECG_MAG_QRS_VECT		Magnitude at the maximum vector of the QRS complex of ECG computed as square root of squared scalar magnitudes of X, Y, Z	2	16196
Magnitude | ECG, QRS, MaximumVector, FrontalPlane | Heart | CVS	MDC_ECG_MAG_QRS_VECT_FRONT		Magnitude at the maximum vector of the QRS complex of ECG in frontal plane computed as square root of squared scalar magnitudes of X, Y	2	16320
Magnitude | ECG, QRS, MaximumVector, HorizontalPlane | Heart | CVS	MDC_ECG_MAG_QRS_VECT_HORIZ		Magnitude at the maximum vector of the QRS complex of ECG in horizontal plane computed as square root of squared scalar magnitudes of X, Z	2	16324
Magnitude | ECG, QRS, MaximumVector, SagitalPlane | Heart | CVS	MDC_ECG_MAG_QRS_VECT_SAGI		Magnitude at the maximum vector of the QRS complex of ECG in sagital plane computed as square root of squared scalar magnitudes of Y, Z	2	16328
Magnitude | ECG, T, Frontal | Heart | CVS	MDC_ECG_MAG_T_FRONT		Length of the vector of the T wave of ECG (in frontal plane)	2	16180
Magnitude | ECG, T, MaximumVector | Heart | CVS	MDC_ECG_MAG_T_VECT		Magnitude of the maximum vector of the T wave of ECG computed as square root of squared scalar magnitudes of X, Y, Z	2	16200

ECG measurements, global					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Magnitude | ECG, T, MaximumVector, FrontalPlane | Heart | CVS	MDC_ECG_MAG_T_VECT_FRONT		Magnitude at the maximum vector of the T wave of ECG in frontal plane computed as square root of squared scalar magnitudes of X, Y	2	16332
Magnitude | ECG, T, MaximumVector, HorizontalPlane | Heart | CVS	MDC_ECG_MAG_T_VECT_HORIZ		Magnitude at the maximum vector of the T wave of ECG in horizontal plane computed as square root of squared scalar magnitudes of X, Z	2	16336
Magnitude | ECG, T, MaximumVector, SagitalPlane | Heart | CVS	MDC_ECG_MAG_T_VECT_SAGI		Magnitude at the maximum vector of the T wave of ECG in sagital plane computed as square root of squared scalar magnitudes of Y, Z	2	16340
Rate | beats | Heart | CVS	MDC_ECG_HEART_RATE	HR	Rate of cardiac beats	2	16770
Rate | beats, ventricular | Heart | CVS	MDC_ECG_VENTRICULAR_RATE		Rate of ventricular beats	2	16016
Rate | beats, atrial | Heart | CVS	MDC_ECG_ATRIAL_RATE		Rate of atrial beats	2	16020
Count | beats, ventricular ectopic | Heart | CVS	MDC_ECG_VPC_COUNT		Count of VPC beats	2	16024
Rate | beats, atrial ectopic | Heart | CVS	MDC_ECG_SVPC_RATE		Rate of SVP beats	2	16028
Count | beats | Heart | CVS	MDC_ECG_BEAT_COUNT		Count of ANY beats	2	16032

A.10 ECG measurements—per lead

Per-lead ECG measurements apply to a specific ECG lead and include the 8-bit MDC_ECG_discrim_LEADS discriminator. For example, the P-wave duration in Lead V2 would be identified as MDC_ECG_TIME_PD_P_LEAD_V2. The global P-wave duration (evaluated over all leads) must be identified as MDC_ECG_TIME_PD_P_LEAD_CONFIG when using the per-lead ECG numeric form.

The new per-lead ECG measurements are located in the SCADA partition [PART = 2] along with the earlier per-lead ECG terms defined by ISO/IEEE 11073-10101:2004(E). The ECG lead discriminator and base terms from both partitions are listed together in Table A.13.

These terms do *not* support the 2-bit statistical discriminator (in addition to the 8-bit ECG lead discriminator) to avoid consuming 1024 numeric codes for each base per-lead term.

Table A.13—Per-lead ECG measurements

MDC_ECG_discrim_LEADS		
dOffset	**dSuffix**	**dDescription**
0-255	*	ECG leads

ECG measurements, per lead					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Duration | ECG {lead}, P | Heart | CVS	MDC_ECG_TIME_PD_P		Duration of the P wave of ECG in {lead}	2	6656
Timepoint | ECG {lead}, P, End | Heart | CVS	MDC_ECG_TIME_END_P	Poff	Time point of end of P wave in a specified {lead}	2	5888
Duration | ECG {lead}, P, FirstExtremum | Heart | CVS	MDC_ECG_TIME_PD_P1		Duration of the interval between P onset and the first extremum of the P wave of ECG in specified {lead}	2	4608
Duration | ECG {lead}, P, SecondExtremum | Heart | CVS	MDC_ECG_TIME_PD_P2		Duration of the interval between P onset and the second extremum of the P wave of ECG in specified {lead}	2	4864
Timepoint | ECG {lead}, P, Start | Heart | CVS	MDC_ECG_TIME_START_P	Pon	Time point of start of P wave in a specified {lead}	2	9472
Duration | ECG {lead}, P, ThirdExtremum | Heart | CVS	MDC_ECG_TIME_PD_P3		Duration of the interval between P onset and the third extremum of the P wave of ECG in specified {lead}	2	5120
Duration | ECG {lead}, PR | Heart | CVS	MDC_ECG_TIME_PD_PR	PR	Duration of the interval between P offset and QRS onset of ECG in {lead}	2	7168
Duration | ECG {lead}, Q | Heart | CVS	MDC_ECG_TIME_PD_Q		Duration of the Q wave of ECG in {lead}	2	7680
Duration | ECG {lead}, QRS | Heart | CVS	MDC_ECG_TIME_PD_QRS		Duration of the QRS complex of ECG in {lead}	2	7936
Timepoint | ECG {lead}, QRS, End | Heart | CVS	MDC_ECG_TIME_END_QRS	QRSoff	Time point of end of QRS complex in a specified {lead}	2	6144
Timepoint | ECG {lead}, QRS, Start | Heart | CVS	MDC_ECG_TIME_START_QRS	QRSon	Time point of start of QRS complex in a specified {lead}	2	9728
Duration | ECG {lead}, QT | Heart | CVS	MDC_ECG_TIME_PD_QT	QT	Duration of the interval between the QRS onset and T wave offset of ECG in {lead} (used for QT dispersion)	2	8192
Duration | ECG {lead}, QTc | Heart | CVS	MDC_ECG_TIME_PD_QT_CORR	QTc	Duration of the interval between the QRS onset and T wave offset, related to heart rate 60 beats per minute of ECG in {lead}, Bazett formula	2	8448
Duration | ECG {lead}, R1 | Heart | CVS	MDC_ECG_TIME_PD_R_1	R1	Duration of the R1 wave of ECG in {lead}	2	11264
Duration | ECG {lead}, R2 | Heart | CVS	MDC_ECG_TIME_PD_R_2	R2	Duration of the R2 wave of ECG in {lead}	2	11520
Duration | ECG {lead}, R3 | Heart | CVS	MDC_ECG_TIME_PD_R_3	R3	Duration of the R3 wave of ECG in {lead}	2	11776
Duration | ECG {lead}, S1 | Heart | CVS	MDC_ECG_TIME_PD_S_1	S1	Duration of the S1 wave of ECG in {lead}	2	12032
Duration | ECG {lead}, S2 | Heart | CVS	MDC_ECG_TIME_PD_S_2	S2	Duration of the S2 wave of ECG in {lead}	2	12288

ECG measurements, per lead					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Duration | ECG {lead}, S3 | Heart | CVS	MDC_ECG_TIME_PD_S_3	S3	Duration of the S3 wave of ECG in {lead}	2	12544
Timepoint | ECG {lead}, T, End | Heart | CVS	MDC_ECG_TIME_END_QRS	Toff	Time point of end of T wave in a specified {lead}	2	6400
Timepoint | ECG {lead}, T, Start | Heart | CVS	MDC_ECG_TIME_START_T	Ton	Time point of start of T wave in a specified {lead}	2	9984
Duration | ECG {lead}, VentricularActivation | Heart | CVS	MDC_ECG_TIME_PD_VENT_ACTIV	VAT	Ventricular activation time	2	11008
ElectricalPotential | ECG {lead} | Heart | CVS	MDC_ECG_ELEC_POTL	ECG-{lead}	ECG as recorded according to {lead} in specified position (time series)	2	256
ElectricalPotential | ECG {lead}, J | Heart | CVS	MDC_ECG_AMPL_J	ST-J	Amplitude at the end of QRS complex (junctional point or J point) of ECG in specified {lead}	2	1024
ElectricalPotential | ECG {lead}, J20 | Heart | CVS	MDC_ECG_ELEC_POTL_ST_20	ST-J20	Amplitude at 20 ms after the end of QRS complex of ECG in specified {lead}	2	14848
ElectricalPotential | ECG {lead}, J40 | Heart | CVS	MDC_ECG_ELEC_POTL_ST_40	ST-J40	Amplitude at 40 ms after the end of QRS complex of ECG in specified {lead}	2	15104
ElectricalPotential | ECG {lead}, J60 | Heart | CVS	MDC_ECG_ELEC_POTL_ST_60	ST-J60	Amplitude at 60 ms after the end of QRS complex of ECG in specified {lead}	2	14336
ElectricalPotential | ECG {lead}, J80 | Heart | CVS	MDC_ECG_ELEC_POTL_ST_80	ST-J80	Amplitude at 80 ms after the end of QRS complex of ECG in specified {lead}	2	14592
ElectricalPotential | ECG {lead}, P, FirstExtremum | Heart | CVS	MDC_ECG_AMPL_P_MAX	Pmax	Amplitude level of first extremum of the P wave of ECG in specified {lead} (mostly maximum of P, depends on morphology)	2	1280
ElectricalPotential | ECG {lead}, P, SecondExtremum | Heart | CVS	MDC_ECG_AMPL_P_MIN	Pmin	Amplitude level of the second extremum of the P wave of ECG in specified {lead} (often minimum of P, depends on morphology)	2	1536
ElectricalPotential | ECG {lead}, P, ThirdExtremum | Heart | CVS	MDC_ECG_AMPL_P3	P3	Amplitude level of the third extremum of the P wave of ECG in specified {lead}	2	3072
ElectricalPotential | ECG {lead}, Q | Heart | CVS	MDC_ECG_AMPL_Q		Amplitude of the Q wave of ECG in specified {lead}	2	1792
ElectricalPotential | ECG {lead}, R, Maximum | Heart | CVS	MDC_ECG_AMPL_R	Rmax	Maximum amplitude of R wave of ECG in specified {lead}	2	2048
ElectricalPotential | ECG {lead}, R1 | Heart | CVS	MDC_ECG_ELEC_POTL_R_1		Amplitude of the R1 wave of ECG in specified {lead}	2	12800

ECG measurements, per lead					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
ElectricalPotential | ECG {lead}, R2 | Heart | CVS	MDC_ECG_ELEC_POTL_R_2		Amplitude of the R2 wave of ECG in specified {lead}	2	13056
ElectricalPotential | ECG {lead}, R3 | Heart | CVS	MDC_ECG_ELEC_POTL_R_3		Amplitude of the R3 wave of ECG in specified {lead}	2	13312
ElectricalPotential | ECG {lead}, S, Maximum | Heart | CVS	MDC_ECG_AMPL_S	Smax	Maximum amplitude of S wave of ECG in specified {lead}	2	2304
ElectricalPotential | ECG {lead}, S1 | Heart | CVS	MDC_ECG_ELEC_POTL_S_1		Amplitude of the S1 wave of ECG in specified {lead}	2	13568
ElectricalPotential | ECG {lead}, S2 | Heart | CVS	MDC_ECG_ELEC_POTL_S_2		Amplitude of the S2 wave of ECG in specified {lead}	2	13824
ElectricalPotential | ECG {lead}, S3 | Heart | CVS	MDC_ECG_ELEC_POTL_S_3		Amplitude of the S3 wave of ECG in specified {lead}	2	14080
ElectricalPotential | ECG {lead}, T, Maximum | Heart | CVS	MDC_ECG_AMPL_T_MAX	Tmax	Amplitude of the T positive wave of ECG in specified {lead}	2	2560
ElectricalPotential | ECG {lead}, T, Minimum | Heart | CVS	MDC_ECG_AMPL_T_MIN	Tmin	Amplitude of the T negative wave of ECG in specified {lead}	2	2816
ElectricalPotential | ECG, lead set | Heart | CVS	MDC_ECG_ELEC_POTL	ECG	ECG as recorded from a set of leads (time sample array is unspecified lead as an composite element of specified or unspecified leads	2	256
ElectricalPotential | ECG{lead}, ST | Heart | CVS	MDC_ECG_AMPL_ST	ST-Jxx	Amplitude of the ST segment at xx ms after the end of QRS complex of ECG in specified {lead}. The time point xx is defined globally by item with code XXXXXX	2	768
Integral | ECG {lead}, P | Heart | CVS	MDC_ECG_INTEGRAL_P	Pintegral	Integral of the P wave of ECG in specified {lead} (mVolt × milisecond)	2	6912
Integral | ECG {lead}, P, Area | Heart | CVS	MDC_ECG_AREA_P	Parea	Area of the P wave of ECG in specified {lead} (mVolt × millisecond) by integrating absolute values	2	3840
Integral | ECG {lead}, Q | Heart | CVS	MDC_ECG_INTEGRAL_Q	Qintegral	Integral of the Q wave of ECG in specified {lead} (mVolt × millisecond)	2	7424
Integral | ECG {lead}, Q, Area | Heart | CVS	MDC_ECG_AREA_Q	Qarea	Area of the Q wave of ECG in specified {lead} (mVolt × millisecond) by integrating absolute values	2	3328

ECG measurements, per lead					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Integral | ECG {lead}, QRS | Heart | CVS	MDC_ECG_INTEGRAL_QRS	QRSintegral	Integral of the QRS complex of ECG in specified {lead} (mVolt × millisecond)	2	8704
Integral | ECG {lead}, QRS, Area | Heart | CVS	MDC_ECG_AREA_QRS	QRSarea	Area of the QRS complex of ECG in specified {lead} (mVolt × millisecond) by integrating absolute values	2	4096
Integral | ECG {lead}, ST | Heart | CVS	MDC_ECG_INTEGRAL_ST	ST-Tintegral	Integral of the ST-T segment computed between J point and the beginning of the T wave of ECG in specified {lead} (mVolt × millisecond)	2	9216
Integral | ECG {lead}, ST, Area | Heart | CVS	MDC_ECG_AREA_ST	ST-Tarea	Area of the ST-T segment computed between J point and the beginning of the T wave of ECG in specified {lead} (mVolt × millisecond) by integrating absolute values	2	4352
Integral | ECG {lead}, T | Heart | CVS	MDC_ECG_INTEGRAL_T	Tintegral	Integral of the T wave of ECG in specified {lead} (mVolt × millisecond)	2	8960
Integral | ECG {lead}, T, Area | Heart | CVS	MDC_ECG_AREA_T	Tarea	Area of the T wave of ECG in specified {lead} (mVolt × millisecond) by integrating absolute values	2	3584
Slope | ECG {lead}, QRS_offset_+_20ms_to_QRS_offset_+_60ms | Heart | CVS	MDC_ECG_SLOPE_ST		Slope of ST-segment between QRS offset plus 20 ms and QRS offset plus 60 ms of ECG in specified {lead}	2	5376
Duration | ECG {lead}, PP | Heart | CVS	MDC_ECG_TIME_PD_PP	PP	Time period, PP	2	32768
Duration | ECG {lead}, RR | Heart | CVS	MDC_ECG_TIME_PD_RR	RR	Time period, RR	2	33024
Duration | ECG {lead}, PQ | Heart | CVS	MDC_ECG_TIME_PD_PQ	PQ	Time period, PQ	2	33280
Duration | ECG {lead}, PQ segment | Heart | CVS	MDC_ECG_TIME_PD_PQ_SEG	Pqseg	Time period, PQ segment (?)	2	33536
Duration | ECG {lead}, QTc | Heart | CVS	MDC_ECG_TIME_PD_QTc	QTc	Time period, QT (correction specified as a separate attribute or unknown)	2	33792
Duration | ECG {lead}, QTcB | Heart | CVS	MDC_ECG_TIME_PD_QTcB	QTcB	Time period, QT (corrected) using Bazett’s correction formula	2	34048
Duration | ECG {lead}, QTcF | Heart | CVS	MDC_ECG_TIME_PD_QTcF	QTcF	Time period, QT (corrected) using Fredericia's correction formula	2	34304
Duration | ECG {lead}, QTU | Heart | CVS	MDC_ECG_TIME_PD_QTU	QTU	Time period, QTU	2	34560

ECG measurements, per lead					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
Shape | ECG {lead}, ST segment after J-point | Heart | CVS	MDC_ECG_SHAPE_ST		ST segment shape immediately after J-point (see NOTE 1)	2	34816
Shape | ECG {lead}, ST segment after ST-T inflection | Heart | CVS	MDC_ECG_SHAPE_ST_T		Second ST-T segment shape (after ST-T inflection point)	2	35072
NOTE 1—SHAPE_ST and SHAPE_ST_T can have the following enumerated values: concave_up, linear, concave_down, and unknown.					

A.11 ECG lead systems

Identifiers for standardized three and twelve lead ECG lead systems that are currently in use are listed in Table A.14.

Table A.14—ECG lead systems

ECG lead systems					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
12-lead, unspecified | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_UNSPECIFIED	SCP_12LD_0	Unspecified. Systems that do not record the electrode placement information should use this term.	10	11264
12-lead, standard | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_STD	SCP_12LD_1	Standard 12-lead positions: RA, RL, LA, and LL are placed at limb extremities. V1 to V6 at standard positions on the chest. All electrodes are placed individually. This lead positioning supports the standard 12 leads I, II, III, aVR, aVL, aVR, V1, V2, V3, V4, V5, V6 and the Cabrera 12 leads aVL, I, aVR, II, aVF, III, V1, V2, V3, V4, V5, V5, V6.	10	11265
12-lead, Mason-Likar | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_MASON_LIKAR	SCP_12LD_2	RA, RL, LA, and LL are placed on the torso (Mason-Likar positions). V1 to V6 are placed at standard positions on the chest. All electrodes are placed individually.	10	11266
12-lead, V-Pad | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_VPAD	SCP_12LD_3	RA, RL, LA, and LL are placed on the torso (Mason-Likar positions). These limb electrodes are individually placed. V1 to V6 on the chest as part of a single electrode pad (V1 to V6 are NOT placed individually).	10	11267
12-lead, Pad | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_PAD	SCP_12LD_4	RA, RL, LA, LL, and V1 to V6 (all electrodes) are on the chest in a single electrode pad (such as Omnitrode). (None of the electrodes are placed individually)	10	11268

ECG lead systems					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
12-lead from Frank XYZ | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_FROM_FRANK	SCP_12LD_5	12-lead ECG is derived from Frank XYZ leads.	10	11269
12-lead, non-standard | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_NON_STANDARD	SCP_12LD_6	12-lead ECG is derived from non-standard leads.	10	11270
12-lead, bicycle | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_BICYCLE		Standard leads for bicycle exercise testing in Europe (Germany, Finland, etc.) where bicycle tests in upright position are performed the limb leads are often positioned not on the chest (Mason-Likar) but on the back (shoulder and on the hips) of the patient. Doing this has a practical reason because the patient bows his back during bicycling and the limb lead electrodes applied on the chest would be disturbed.	10	11271
12-lead, raised intercostal | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_RAISED_INTERCOSTAL		Standard leads one intercostal space higher. The Wilson electrodes are applied one intercostal space higher the limb electrodes remain on their position. I..aVF, V1', V2' ... V6'.	10	11272
XYZ, unspecified | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_XYZ_UNSPECIFIED	SCP_XYZ_0	Unspecified. Systems that do not record the electrode placement information should use this term.	10	11273
XYZ, Frank | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_XYZ_FRANK	SCP_XYZ_1	Frank lead system (Frank [B15]).	10	11274
XYZ, McFee-Parungao | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_XYZ_MCFEE_PARUNAGO	SCP_XYZ_2	McFee-Parungao lead system (see Fig. 1.6 on p. 6 of Benchimol [B13]).	10	11275
XYZ, Cube	MDC_ECG_LDSYS_XYZ_CUBE	SCP_XYZ_3	Cube lead system (Grishman et al. [B16]).	10	11276
XYZ, Bipolar	MDC_ECG_LDSYS_XYZ_BIPOLAR	SCP_XYZ_4	Bipolar uncorrected XYZ lead system.	10	11277
XYZ, Pseudo-Orthogonal	MDC_ECG_LDSYS_XYZ_PSEUDO_ORTH	SCP_XYZ_5	Pseudo-orthogonal XYZ lead system (as used in Holter recording).	10	11278
XYZ, from 12-lead	MDC_ECG_LDSYS_XYZ_FROM_12LD	SCP_XYZ_6	XYZ leads derived from standard 12-lead ECG.	10	11279
3-lead, NEHB | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_3LD_NEHB		NEHB lead system (see also Annex CC of IEC 60601-2-51:2003 [B17]).	10	11280

ECG lead systems					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
3-lead, CC5-CM5-ML | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_3LD_CC5_CM5_ML		First electrode at mid-sternum at the second intercostal space and second electrode in the fifth intercostal space in the anterior axillary line (V5R/C5R).	10	11281
3-lead, CM5-CC5-CH5 | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_3LD_CM5_CC5_CH5		First electrode at mid-sternum at the second intercostal space; second electrode in the fifth intercostal space in the anterior axillary line (V5R/C5R) and third electrode on either side of neck above shoulders.	10	11282
12-lead from Dower | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_FROM_DOWER		12-lead from Frank leads (X, Y, Z) leads by Dower transformation.	10	11283
12-lead from EASI | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_FROM_EASI		12-lead from EASI leads (ES, AS, AI) by Dower/EASI transformation.	10	11284
12-lead from Limb | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_FROM_LIMB		12-lead from Limb Leads (I, II) and one or more V leads.	10	11285
12-lead and XYZ | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_STD_AND_XYZ		Standard 12-lead and XYZ.	10	11286
12-lead and NEHB | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_STD_AND_NEHB		Standard 12-lead and NEHB.	10	11287
12-lead and CC5-CM5-ML | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_STD_AND_CC5_CM5_ML		Standard 12-lead and CC5-CM5-ML.	10	11288
12-lead and CM5-CC5-CH5 | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_STD_AND_CM5_CC5_CH5		Standard 12-lead and CM5-CC5-CH5.	10	11289
12-lead extended | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_STD_EXTD		Standard 12-lead with extra leads to the right and/or left sides, specified by their lead labels.	10	11290
12-lead extended right | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_STD_EXTD_RIGHT		Standard 12-lead extended to the right by V5R, V4R, V3R (see Annex CC of IEC 60601-2-51:2003 [B17]).	10	11291

ECG lead systems					
SysName	**REFID**	**Mnemonic**	**Description**	**PART**	**CODE10**
12-lead extd left | ECG, lead system | Heart | CVS	MDC_ECG_LDSYS_12LD_STD_EXTD_LEFT		Standard 12-lead extended to the left by V7, V8, V9 (see Annex CC of IEC 60601-2-51:2003 [B17]).	10	11292

A.12 Control variables

The control variables listed in Table A.15 are used to specify sample rate, filter characteristics, criteria, and other attributes regarding the acquisition and processing of the ECG data.

Table A.15—Control variables

ECG control variables			
REFID	**Description**	**PART**	**CODE10**
MDC_ECG_CTL_VBL	Generic control variable	10	11392
MDC_ECG_CTL_VBL_SAMPLE_RATE	Sample rate	10	11393
MDC_ECG_CTL_VBL_SENSITIVITY	Sensitivity	10	11394
MDC_ECG_CTL_VBL_ZERO_OFFSET	Zero offset	10	11395
MDC_ECG_CTL_VBL_VALID_RANGE	Valid range	10	11396
MDC_ECG_CTL_VBL_PAD_VALUE	Pad value	10	11397
MDC_ECG_CTL_VBL_TIME_SKEW	Time skew	10	11398
MDC_ECG_CTL_VBL_SAMPLE_SKEW	Sample skew	10	11399
MDC_ECG_CTL_VBL_TIME_OFFSET	Time offset	10	11400
MDC_ECG_CTL_VBL_QTC_METHOD	QTc correction method	10	11401
MDC_ECG_CTL_VBL_ATTR_FILTER_LOW_PASS	Low pass filter	10	11402
MDC_ECG_CTL_VBL_ATTR_FILTER_CUTOFF_FREQ	Low pass filter cutoff freq	10	11403
MDC_ECG_CTL_VBL_ATTR_FILTER_HIGH_PASS	High pass filter	10	11404
MDC_ECG_CTL_VBL_ATTR_FILTER_ORDER	High pass filter order	10	11405
MDC_ECG_CTL_VBL_ATTR_FILTER_DESCRIPTION	High pass filter description	10	11406
MDC_ECG_CTL_VBL_ATTR_FILTER_NOTCH	Notch filter	10	11407
MDC_ECG_CTL_VBL_ATTR_FILTER_NOTCH_FREQ	Notch filter frequency	10	11408
MDC_ECG_CTL_VBL_ATTR_FILTER_NOTCH_BANDWIDTH	Notch filter bandwidth	10	11409
MDC_ECG_CTL_VBL_ATTR_FILTER_DESCRIPTION	Notch filter description	10	11410
MDC_ECG_CTL_VBL_BASELINE	Baseline	10	11411
MDC_ECG_CTL_VBL_BASELINE_DESC	Baseline description	10	11412
MDC_ECG_CTL_VBL_BASELINE_ORDER	Baseline order	10	11413
MDC_ECG_CTL_VBL_INTERPOLATOR	Interpolator	10	11414
MDC_ECG_CTL_VBL_INTERPOLATOR_SRC_SAMP_RATE	Interpolator source sample rate	10	11415
MDC_ECG_CTL_VBL_INTERPOLATOR_DESC	Interpolator description	10	11416
MDC_ECG_CTL_VBL_INTERPOLATOR_ORDER	Interpolator order	10	11417
MDC_ECG_CTL_VBL_INTERPOLATOR_SNR	Interpolator snr	10	11418
MDC_ECG_CTL_VBL_DISPLAYED_SIZE	Displayed size	10	11419
MDC_ECG_CTL_VBL_DISPLAYED_COLOR	Displayed color	10	11420
MDC_ECG_CTL_VBL_DISPLAYED_SWEEP_RATE	Displayed sweep rate	10	11421
MDC_ECG_CTL_VBL_ATTR_RHTYHM	Rhythm attribute	10	11422
MDC_ECG_CTL_VBL_ATTR_AV_COND	Rhythm attribute AV_Cond	10	11423
MDC_ECG_CTL_VBL_ATTR_SA_COND	Rhythm attribute SA_Cond	10	11424
MDC_ECG_CTL_VBL_ATTR_RHYTHM_CRITERIA	Rhythm criteria attribute	10	11425
MDC_ECG_CTL_VBL_ATTR_RHYTHM_CODE	Rhythm criteria attribute code	10	11426

ECG control variables			
REFID	**Description**	**PART**	**CODE10**
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_HIGH_GT	Rhythm criteria attribute rate hi GT limit	10	11427
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_HIGH_GE	Rhythm criteria attribute rate hi GE limit	10	11428
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_LOW_LT	Rhythm criteria attribute rate lo LT limit	10	11429
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_LOW_LE	Rhythm criteria attribute rate lo LE limit	10	11430
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_LOW_GT	Rhythm criteria attribute rate lo GT limit	10	11431
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_LOW_GE	Rhythm criteria attribute rate lo GE limit	10	11432
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_HIGH_LT	Rhythm criteria attribute rate hi LT limit	10	11433
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_HIGH_LE	Rhythm criteria attribute rate hi LE limit	10	11434

A.13 Information attributes

Table A.16 includes additional information attributes.

Table A.16—Information attributes

REFID	Mnemonic	Description	PART	CODE10
MDC_ECG_QRS_TYPE	QRStyp	Type of QRS complex of ECG observed (from Table A.9)	2	16188
MDC_ECG_QRS_MORPH_NUM		QRS morphology class number	10	11328
MDC_ECG_VPC_FOCUS_NUM		VPC focus number	10	11329
MDC_ECG_NOISE_TYPE		Signal Quality	10	11330
MDC_ECG_BEAT_TOC	TOC	Timing fiducial for beat	10	11331
MDC_ECG_RHYTHM_TYPE		Rhythm type (from Table A.10)	10	11332
MDC_ECG_RHYTHM_AV_COND		AV conduction ratio, N P-waves to M QRS complexes	10	11333
MDC_ECG_RHYTHM_SA_COND		SA conduction ratio, N P-waves to M QRS complexes	10	11334
MDC_ECG_WAVC_TYPE		Wave component type	10	11335
MDC_ECG_WAVP_TYPE		Wave pacemaker type	10	11336
MDC_ECG_WAVC_ONSET		Area of interest	10	11337
MDC_ECG_WAVC_OFFSET		Area of interest	10	11338
MDC_ECG_WAVC_PEAK		Area of interest	10	11339
MDC_ECG_WAVC_OTHER		Area of interest	10	11340
MDC_ECG_INTERPRETATION		Interpretation	10	11341
MDC_ECG_INTERPRETATION_STATEMENT		Interpretation statement	10	11342
MDC_ECG_INTERPRETATION_COMMENT		Interpretation comment	10	11343
MDC_ECG_INTERPRETATION_SUMMARY		Interpretation summary	10	11344

Annex B

(normative)

Expanded terms and numeric codes

B.1 Overview

Annex B presents the expanded terms with reference identifier and numeric codes.

Due to the large number of expanded terms (more than 18600), only the discriminators for the first-base term of each file are expanded and highlighted in light gray in Table B.1 (the expanded terms for the MDC_ECG_LEAD* designators are not highlighted so that the first WAVC base term is clearly visible).

The table includes the expanded REFID strings, PART, CODE10, and CF_CODE10 values previously described in A.1.

B.2 Expanded terms and numeric codes

Table B.1 Expanded terms with discriminators and numeric codes

REFID	PART	CODE10	CF_CODE10
MDC_ECG_LEAD_CONFIG	0	0	0
MDC_ECG_LEAD_I	0	1	1
MDC_ECG_LEAD_dI	0	31	31
MDC_ECG_LEAD_II	0	2	2
MDC_ECG_LEAD_dII	0	32	32
MDC_ECG_LEAD_V1	0	3	3
MDC_ECG_LEAD_dV1	0	33	33
MDC_ECG_LEAD_V2	0	4	4
MDC_ECG_LEAD_dV2	0	34	34
MDC_ECG_LEAD_V3	0	5	5
MDC_ECG_LEAD_dV3	0	35	35
MDC_ECG_LEAD_V4	0	6	6
MDC_ECG_LEAD_dV4	0	36	36
MDC_ECG_LEAD_V5	0	7	7
MDC_ECG_LEAD_dV5	0	37	37
MDC_ECG_LEAD_V6	0	8	8
MDC_ECG_LEAD_dV6	0	38	38
MDC_ECG_LEAD_V7	0	9	9
MDC_ECG_LEAD_dV7	0	39	39
MDC_ECG_LEAD_V2R	0	10	10
MDC_ECG_LEAD_dV2R	0	40	40
MDC_ECG_LEAD_V3R	0	11	11
MDC_ECG_LEAD_dV3R	0	41	41
MDC_ECG_LEAD_V4R	0	12	12
MDC_ECG_LEAD_dV4R	0	42	42

REFID	PART	CODE10	CF_CODE10
MDC_ECG_LEAD_V5R	0	13	13
MDC_ECG_LEAD_dV5R	0	43	43
MDC_ECG_LEAD_V6R	0	14	14
MDC_ECG_LEAD_dV6R	0	44	44
MDC_ECG_LEAD_V7R	0	15	15
MDC_ECG_LEAD_dV7R	0	45	45
MDC_ECG_LEAD_X	0	16	16
MDC_ECG_LEAD_dX	0	46	46
MDC_ECG_LEAD_Y	0	17	17
MDC_ECG_LEAD_dY	0	47	47
MDC_ECG_LEAD_Z	0	18	18
MDC_ECG_LEAD_dZ	0	48	48
MDC_ECG_LEAD_CC5	0	19	19
MDC_ECG_LEAD_dCC5	0	49	49
MDC_ECG_LEAD_CM5	0	20	20
MDC_ECG_LEAD_dCM5	0	50	50
MDC_ECG_LEAD_LA	0	21	21
MDC_ECG_LEAD_dLA	0	51	51
MDC_ECG_LEAD_RA	0	22	22
MDC_ECG_LEAD_dRA	0	52	52
MDC_ECG_LEAD_LL	0	23	23
MDC_ECG_LEAD_dLL	0	53	53
MDC_ECG_LEAD_fI	0	24	24
MDC_ECG_LEAD_dfI	0	54	54
MDC_ECG_LEAD_fE	0	25	25
MDC_ECG_LEAD_dfE	0	55	55
MDC_ECG_LEAD_fC	0	26	26
MDC_ECG_LEAD_dfC	0	56	56
MDC_ECG_LEAD_fA	0	27	27
MDC_ECG_LEAD_dfA	0	57	57
MDC_ECG_LEAD_fM	0	28	28
MDC_ECG_LEAD_dfM	0	58	58
MDC_ECG_LEAD_fF	0	29	29
MDC_ECG_LEAD_dfF	0	59	59
MDC_ECG_LEAD_fH	0	30	30
MDC_ECG_LEAD_dfH	0	60	60
MDC_ECG_LEAD_III	0	61	61
MDC_ECG_LEAD_dIII	0	111	111
MDC_ECG_LEAD_AVR	0	62	62
MDC_ECG_LEAD_dAVR	0	112	112
MDC_ECG_LEAD_AVL	0	63	63
MDC_ECG_LEAD_dAVL	0	113	113
MDC_ECG_LEAD_AVF	0	64	64
MDC_ECG_LEAD_dAVF	0	114	114

REFID	PART	CODE10	CF_CODE10
MDC_ECG_LEAD_AVRneg	0	65	65
MDC_ECG_LEAD_dAVRneg	0	115	115
MDC_ECG_LEAD_V8	0	66	66
MDC_ECG_LEAD_dV8	0	79	79
MDC_ECG_LEAD_V9	0	67	67
MDC_ECG_LEAD_dV9	0	80	80
MDC_ECG_LEAD_V8R	0	68	68
MDC_ECG_LEAD_dV8R	0	81	81
MDC_ECG_LEAD_V9R	0	69	69
MDC_ECG_LEAD_dV9R	0	82	82
MDC_ECG_LEAD_D	0	70	70
MDC_ECG_LEAD_dD	0	83	83
MDC_ECG_LEAD_A	0	71	71
MDC_ECG_LEAD_dA	0	84	84
MDC_ECG_LEAD_J	0	72	72
MDC_ECG_LEAD_dJ	0	85	85
MDC_ECG_LEAD_DEFIB	0	73	73
MDC_ECG_LEAD_dDEFIB	0	135	135
MDC_ECG_LEAD_EXTERN	0	74	74
MDC_ECG_LEAD_dEXTERN	0	136	136
MDC_ECG_LEAD_A1	0	75	75
MDC_ECG_LEAD_dA1	0	137	137
MDC_ECG_LEAD_A2	0	76	76
MDC_ECG_LEAD_dA2	0	138	138
MDC_ECG_LEAD_A3	0	77	77
MDC_ECG_LEAD_dA3	0	139	139
MDC_ECG_LEAD_A4	0	78	78
MDC_ECG_LEAD_dA4	0	140	140
MDC_ECG_LEAD_C	0	86	86
MDC_ECG_LEAD_dC	0	116	116
MDC_ECG_LEAD_V	0	87	87
MDC_ECG_LEAD_dV	0	117	117
MDC_ECG_LEAD_VR	0	88	88
MDC_ECG_LEAD_dVR	0	118	118
MDC_ECG_LEAD_VL	0	89	89
MDC_ECG_LEAD_dVL	0	119	119
MDC_ECG_LEAD_VF	0	90	90
MDC_ECG_LEAD_dVF	0	120	120
MDC_ECG_LEAD_MCL	0	91	91
MDC_ECG_LEAD_dMCL	0	152	152
MDC_ECG_LEAD_MCL1	0	92	92
MDC_ECG_LEAD_dMCL1	0	141	141
MDC_ECG_LEAD_MCL2	0	93	93
MDC_ECG_LEAD_dMCL2	0	142	142

REFID	PART	CODE10	CF_CODE10
MDC_ECG_LEAD_MCL3	0	94	94
MDC_ECG_LEAD_dMCL3	0	143	143
MDC_ECG_LEAD_MCL4	0	95	95
MDC_ECG_LEAD_dMCL4	0	144	144
MDC_ECG_LEAD_MCL5	0	96	96
MDC_ECG_LEAD_dMCL5	0	145	145
MDC_ECG_LEAD_MCL6	0	97	97
MDC_ECG_LEAD_dMCL6	0	146	146
MDC_ECG_LEAD_CC	0	98	98
MDC_ECG_LEAD_dCC	0	153	153
MDC_ECG_LEAD_CC1	0	99	99
MDC_ECG_LEAD_dCC1	0	154	154
MDC_ECG_LEAD_CC2	0	100	100
MDC_ECG_LEAD_dCC2	0	155	155
MDC_ECG_LEAD_CC3	0	101	101
MDC_ECG_LEAD_dCC3	0	156	156
MDC_ECG_LEAD_CC4	0	102	102
MDC_ECG_LEAD_dCC4	0	157	157
MDC_ECG_LEAD_CC6	0	103	103
MDC_ECG_LEAD_dCC6	0	158	158
MDC_ECG_LEAD_CC7	0	104	104
MDC_ECG_LEAD_dCC7	0	159	159
MDC_ECG_LEAD_CM	0	105	105
MDC_ECG_LEAD_dCM	0	160	160
MDC_ECG_LEAD_CM1	0	106	106
MDC_ECG_LEAD_dCM1	0	161	161
MDC_ECG_LEAD_CM2	0	107	107
MDC_ECG_LEAD_dCM2	0	162	162
MDC_ECG_LEAD_CM3	0	108	108
MDC_ECG_LEAD_dCM3	0	163	163
MDC_ECG_LEAD_CM4	0	109	109
MDC_ECG_LEAD_dCM4	0	164	164
MDC_ECG_LEAD_CM6	0	110	110
MDC_ECG_LEAD_dCM6	0	165	165
MDC_ECG_LEAD_CM7	0	121	121
MDC_ECG_LEAD_dCM7	0	166	166
MDC_ECG_LEAD_CH5	0	122	122
MDC_ECG_LEAD_dCH5	0	167	167
MDC_ECG_LEAD_CS5	0	123	123
MDC_ECG_LEAD_dCS5	0	168	168
MDC_ECG_LEAD_CB5	0	124	124
MDC_ECG_LEAD_dCB5	0	169	169
MDC_ECG_LEAD_CR5	0	125	125
MDC_ECG_LEAD_dCR5	0	170	170

REFID	PART	CODE10	CF_CODE10
MDC_ECG_LEAD_ML	0	126	126
MDC_ECG_LEAD_dML	0	171	171
MDC_ECG_LEAD_AB1	0	127	127
MDC_ECG_LEAD_dAB1	0	172	172
MDC_ECG_LEAD_AB2	0	128	128
MDC_ECG_LEAD_dAB2	0	173	173
MDC_ECG_LEAD_AB3	0	129	129
MDC_ECG_LEAD_dAB3	0	174	174
MDC_ECG_LEAD_AB4	0	130	130
MDC_ECG_LEAD_dAB4	0	175	175
MDC_ECG_LEAD_ES	0	131	131
MDC_ECG_LEAD_dES	0	176	176
MDC_ECG_LEAD_AS	0	132	132
MDC_ECG_LEAD_dAS	0	177	177
MDC_ECG_LEAD_AI	0	133	133
MDC_ECG_LEAD_dAI	0	178	178
MDC_ECG_LEAD_S	0	134	134
MDC_ECG_LEAD_dS	0	179	179
MDC_ECG_LEAD_RL	0	147	147
MDC_ECG_LEAD_dRL	0	180	180
MDC_ECG_LEAD_CV5RL	0	148	148
MDC_ECG_LEAD_dCV5RL	0	181	181
MDC_ECG_LEAD_CV6LL	0	149	149
MDC_ECG_LEAD_dCV6LL	0	182	182
MDC_ECG_LEAD_CV6LU	0	150	150
MDC_ECG_LEAD_dCV6LU	0	183	183
MDC_ECG_LEAD_V10	0	151	151
MDC_ECG_LEAD_dV10	0	184	184
MDC_ECG_WAVC_PWAVE	10	256	655616
MDC_ECG_WAVC_PWAVE_TIME_POINT	10	257	655617
MDC_ECG_WAVC_PWAVE_DURN	10	258	655618
MDC_ECG_WAVC_PWAVE_PEAK	10	259	655619
MDC_ECG_WAVC_PWAVE_ONSET	10	260	655620
MDC_ECG_WAVC_PWAVE_OFFSET	10	261	655621
MDC_ECG_WAVC_PWAVE_ONSET_IMPL	10	262	655622
MDC_ECG_WAVC_PWAVE_OFFSET_IMPL	10	263	655623
MDC_ECG_WAVC_PWAVE_AREA	10	264	655624
MDC_ECG_WAVC_PWAVE_INTEGRAL	10	265	655625
MDC_ECG_WAVC_PWAVE_NA	10	272	655632
MDC_ECG_WAVC_PWAVE_NA_TIME_POINT	10	273	655633
MDC_ECG_WAVC_PWAVE_NA_DURN	10	274	655634
MDC_ECG_WAVC_PWAVE_NA_PEAK	10	275	655635
MDC_ECG_WAVC_PWAVE_NA_ONSET	10	276	655636
MDC_ECG_WAVC_PWAVE_NA_OFFSET	10	277	655637

REFID	PART	CODE10	CF_CODE10
MDC_ECG_WAVC_PWAVE_NA_ONSET_IMPL	10	278	655638
MDC_ECG_WAVC_PWAVE_NA_OFFSET_IMPL	10	279	655639
MDC_ECG_WAVC_PWAVE_NA_AREA	10	280	655640
MDC_ECG_WAVC_PWAVE_NA_INTEGRAL	10	281	655641
MDC_ECG_WAVC_PWAVE_FB	10	288	655648
MDC_ECG_WAVC_PWAVE_FB_TIME_POINT	10	289	655649
MDC_ECG_WAVC_PWAVE_FB_DURN	10	290	655650
MDC_ECG_WAVC_PWAVE_FB_PEAK	10	291	655651
MDC_ECG_WAVC_PWAVE_FB_ONSET	10	292	655652
MDC_ECG_WAVC_PWAVE_FB_OFFSET	10	293	655653
MDC_ECG_WAVC_PWAVE_FB_ONSET_IMPL	10	294	655654
MDC_ECG_WAVC_PWAVE_FB_OFFSET_IMPL	10	295	655655
MDC_ECG_WAVC_PWAVE_FB_AREA	10	296	655656
MDC_ECG_WAVC_PWAVE_FB_INTEGRAL	10	297	655657
MDC_ECG_WAVC_PWAVE_PB	10	304	655664
MDC_ECG_WAVC_PWAVE_PB_TIME_POINT	10	305	655665
MDC_ECG_WAVC_PWAVE_PB_DURN	10	306	655666
MDC_ECG_WAVC_PWAVE_PB_PEAK	10	307	655667
MDC_ECG_WAVC_PWAVE_PB_ONSET	10	308	655668
MDC_ECG_WAVC_PWAVE_PB_OFFSET	10	309	655669
MDC_ECG_WAVC_PWAVE_PB_ONSET_IMPL	10	310	655670
MDC_ECG_WAVC_PWAVE_PB_OFFSET_IMPL	10	311	655671
MDC_ECG_WAVC_PWAVE_PB_AREA	10	312	655672
MDC_ECG_WAVC_PWAVE_PB_INTEGRAL	10	313	655673
MDC_ECG_WAVC_PPWAVE	10	320	655680
MDC_ECG_WAVC_PPPWAVE	10	384	655744
MDC_ECG_WAVC_QWAVE	10	448	655808
MDC_ECG_WAVC_QSWAVE	10	512	655872
MDC_ECG_WAVC_RWAVE	10	576	655936
MDC_ECG_WAVC_RRWAVE	10	640	656000
MDC_ECG_WAVC_RRRWAVE	10	704	656064
MDC_ECG_WAVC_NOTCH	10	768	656128
MDC_ECG_WAVC_SWAVE	10	832	656192
MDC_ECG_WAVC_SSWAVE	10	896	656256
MDC_ECG_WAVC_SSSWAVE	10	960	656320
MDC_ECG_WAVC_TWAVE	10	1024	656384
MDC_ECG_WAVC_TTWAVE	10	1088	656448
MDC_ECG_WAVC_UWAVE	10	1152	656512
MDC_ECG_WAVC_DELTA	10	1216	656576
MDC_ECG_WAVC_IWAVE	10	1280	656640
MDC_ECG_WAVC_KWAVE	10	1344	656704
MDC_ECG_WAVC_JWAVE	10	1408	656768
MDC_ECG_WAVC_PQRSTWAVE	10	1472	656832
MDC_ECG_WAVC_QRSTWAVE	10	1536	656896

REFID	PART	CODE10	CF_CODE10
MDC_ECG_WAVC_QRSWAVE	10	1600	656960
MDC_ECG_WAVC_TUWAVE	10	1664	657024
MDC_ECG_WAVC_VFLWAVE	10	1728	657088
MDC_ECG_WAVC_AFLWAVE	10	1792	657152
MDC_ECG_WAVC_ISO	10	1856	657216
MDC_ECG_WAVC_PRSEG	10	1920	657280
MDC_ECG_WAVC_STSEG	10	1984	657344
MDC_ECG_WAVC_STJ	10	2048	657408
MDC_ECG_WAVC_STM	10	2112	657472
MDC_ECG_WAVC_ARFCT	10	2176	657536
MDC_ECG_WAVC_CALP	10	2240	657600
MDC_ECG_WAVC_STCH	10	2304	657664
MDC_ECG_WAVC_TCH	10	2368	657728
MDC_ECG_WAVC_VAT	10	2432	657792
MDC_ECG_WAVP_PACE	10	4096	659456
MDC_ECG_WAVP_PACE_TIME_POINT	10	4097	659457
MDC_ECG_WAVP_PACE_DURN	10	4098	659458
MDC_ECG_WAVP_PACE_PEAK	10	4099	659459
MDC_ECG_WAVP_PACE_ONSET	10	4100	659460
MDC_ECG_WAVP_PACE_OFFSET	10	4101	659461
MDC_ECG_WAVP_PACE_ONSET_IMPL	10	4102	659462
MDC_ECG_WAVP_PACE_OFFSET_IMPL	10	4103	659463
MDC_ECG_WAVP_PACE_AREA	10	4104	659464
MDC_ECG_WAVP_PACE_INTEGRAL	10	4105	659465
MDC_ECG_WAVP_PACE_NC	10	4112	659472
MDC_ECG_WAVP_PACE_NC_TIME_POINT	10	4113	659473
MDC_ECG_WAVP_PACE_NC_DURN	10	4114	659474
MDC_ECG_WAVP_PACE_NC_PEAK	10	4115	659475
MDC_ECG_WAVP_PACE_NC_ONSET	10	4116	659476
MDC_ECG_WAVP_PACE_NC_OFFSET	10	4117	659477
MDC_ECG_WAVP_PACE_NC_ONSET_IMPL	10	4118	659478
MDC_ECG_WAVP_PACE_NC_OFFSET_IMPL	10	4119	659479
MDC_ECG_WAVP_PACE_NC_AREA	10	4120	659480
MDC_ECG_WAVP_PACE_NC_INTEGRAL	10	4121	659481
MDC_ECG_WAVP_PACE_C	10	4128	659488
MDC_ECG_WAVP_PACE_C_TIME_POINT	10	4129	659489
MDC_ECG_WAVP_PACE_C_DURN	10	4130	659490
MDC_ECG_WAVP_PACE_C_PEAK	10	4131	659491
MDC_ECG_WAVP_PACE_C_ONSET	10	4132	659492
MDC_ECG_WAVP_PACE_C_OFFSET	10	4133	659493
MDC_ECG_WAVP_PACE_C_ONSET_IMPL	10	4134	659494
MDC_ECG_WAVP_PACE_C_OFFSET_IMPL	10	4135	659495
MDC_ECG_WAVP_PACE_C_AREA	10	4136	659496
MDC_ECG_WAVP_PACE_C_INTEGRAL	10	4137	659497

REFID	PART	CODE10	CF_CODE10
MDC_ECG_WAVP_PACE_FSN	10	4144	659504
MDC_ECG_WAVP_PACE_FSN_TIME_POINT	10	4145	659505
MDC_ECG_WAVP_PACE_FSN_DURN	10	4146	659506
MDC_ECG_WAVP_PACE_FSN_PEAK	10	4147	659507
MDC_ECG_WAVP_PACE_FSN_ONSET	10	4148	659508
MDC_ECG_WAVP_PACE_FSN_OFFSET	10	4149	659509
MDC_ECG_WAVP_PACE_FSN_ONSET_IMPL	10	4150	659510
MDC_ECG_WAVP_PACE_FSN_OFFSET_IMPL	10	4151	659511
MDC_ECG_WAVP_PACE_FSN_AREA	10	4152	659512
MDC_ECG_WAVP_PACE_FSN_INTEGRAL	10	4153	659513
MDC_ECG_WAVP_PACE_APPR	10	4160	659520
MDC_ECG_WAVP_PACE_APPR_TIME_POINT	10	4161	659521
MDC_ECG_WAVP_PACE_APPR_DURN	10	4162	659522
MDC_ECG_WAVP_PACE_APPR_PEAK	10	4163	659523
MDC_ECG_WAVP_PACE_APPR_ONSET	10	4164	659524
MDC_ECG_WAVP_PACE_APPR_OFFSET	10	4165	659525
MDC_ECG_WAVP_PACE_APPR_ONSET_IMPL	10	4166	659526
MDC_ECG_WAVP_PACE_APPR_OFFSET_IMPL	10	4167	659527
MDC_ECG_WAVP_PACE_APPR_AREA	10	4168	659528
MDC_ECG_WAVP_PACE_APPR_INTEGRAL	10	4169	659529
MDC_ECG_WAVP_PACE_APPR_NC	10	4176	659536
MDC_ECG_WAVP_PACE_APPR_NC_TIME_POINT	10	4177	659537
MDC_ECG_WAVP_PACE_APPR_NC_DURN	10	4178	659538
MDC_ECG_WAVP_PACE_APPR_NC_PEAK	10	4179	659539
MDC_ECG_WAVP_PACE_APPR_NC_ONSET	10	4180	659540
MDC_ECG_WAVP_PACE_APPR_NC_OFFSET	10	4181	659541
MDC_ECG_WAVP_PACE_APPR_NC_ONSET_IMPL	10	4182	659542
MDC_ECG_WAVP_PACE_APPR_NC_OFFSET_IMPL	10	4183	659543
MDC_ECG_WAVP_PACE_APPR_NC_AREA	10	4184	659544
MDC_ECG_WAVP_PACE_APPR_NC_INTEGRAL	10	4185	659545
MDC_ECG_WAVP_PACE_APPR_C	10	4192	659552
MDC_ECG_WAVP_PACE_APPR_C_TIME_POINT	10	4193	659553
MDC_ECG_WAVP_PACE_APPR_C_DURN	10	4194	659554
MDC_ECG_WAVP_PACE_APPR_C_PEAK	10	4195	659555
MDC_ECG_WAVP_PACE_APPR_C_ONSET	10	4196	659556
MDC_ECG_WAVP_PACE_APPR_C_OFFSET	10	4197	659557
MDC_ECG_WAVP_PACE_APPR_C_ONSET_IMPL	10	4198	659558
MDC_ECG_WAVP_PACE_APPR_C_OFFSET_IMPL	10	4199	659559
MDC_ECG_WAVP_PACE_APPR_C_AREA	10	4200	659560
MDC_ECG_WAVP_PACE_APPR_C_INTEGRAL	10	4201	659561
MDC_ECG_WAVP_PACE_APPR_FSN	10	4208	659568
MDC_ECG_WAVP_PACE_APPR_FSN_TIME_POINT	10	4209	659569
MDC_ECG_WAVP_PACE_APPR_FSN_DURN	10	4210	659570
MDC_ECG_WAVP_PACE_APPR_FSN_PEAK	10	4211	659571

REFID	PART	CODE10	CF_CODE10
MDC_ECG_WAVP_PACE_APPR_FSN_ONSET	10	4212	659572
MDC_ECG_WAVP_PACE_APPR_FSN_OFFSET	10	4213	659573
MDC_ECG_WAVP_PACE_APPR_FSN_ONSET_IMPL	10	4214	659574
MDC_ECG_WAVP_PACE_APPR_FSN_OFFSET_IMPL	10	4215	659575
MDC_ECG_WAVP_PACE_APPR_FSN_AREA	10	4216	659576
MDC_ECG_WAVP_PACE_APPR_FSN_INTEGRAL	10	4217	659577
MDC_ECG_WAVP_PACE_INAPPR	10	4224	659584
MDC_ECG_WAVP_PACE_INAPPR_TIME_POINT	10	4225	659585
MDC_ECG_WAVP_PACE_INAPPR_DURN	10	4226	659586
MDC_ECG_WAVP_PACE_INAPPR_PEAK	10	4227	659587
MDC_ECG_WAVP_PACE_INAPPR_ONSET	10	4228	659588
MDC_ECG_WAVP_PACE_INAPPR_OFFSET	10	4229	659589
MDC_ECG_WAVP_PACE_INAPPR_ONSET_IMPL	10	4230	659590
MDC_ECG_WAVP_PACE_INAPPR_OFFSET_IMPL	10	4231	659591
MDC_ECG_WAVP_PACE_INAPPR_AREA	10	4232	659592
MDC_ECG_WAVP_PACE_INAPPR_INTEGRAL	10	4233	659593
MDC_ECG_WAVP_PACE_INAPPR_NC	10	4240	659600
MDC_ECG_WAVP_PACE_INAPPR_NC_TIME_POINT	10	4241	659601
MDC_ECG_WAVP_PACE_INAPPR_NC_DURN	10	4242	659602
MDC_ECG_WAVP_PACE_INAPPR_NC_PEAK	10	4243	659603
MDC_ECG_WAVP_PACE_INAPPR_NC_ONSET	10	4244	659604
MDC_ECG_WAVP_PACE_INAPPR_NC_OFFSET	10	4245	659605
MDC_ECG_WAVP_PACE_INAPPR_NC_ONSET_IMPL	10	4246	659606
MDC_ECG_WAVP_PACE_INAPPR_NC_OFFSET_IMPL	10	4247	659607
MDC_ECG_WAVP_PACE_INAPPR_NC_AREA	10	4248	659608
MDC_ECG_WAVP_PACE_INAPPR_NC_INTEGRAL	10	4249	659609
MDC_ECG_WAVP_PACE_INAPPR_C	10	4256	659616
MDC_ECG_WAVP_PACE_INAPPR_C_TIME_POINT	10	4257	659617
MDC_ECG_WAVP_PACE_INAPPR_C_DURN	10	4258	659618
MDC_ECG_WAVP_PACE_INAPPR_C_PEAK	10	4259	659619
MDC_ECG_WAVP_PACE_INAPPR_C_ONSET	10	4260	659620
MDC_ECG_WAVP_PACE_INAPPR_C_OFFSET	10	4261	659621
MDC_ECG_WAVP_PACE_INAPPR_C_ONSET_IMPL	10	4262	659622
MDC_ECG_WAVP_PACE_INAPPR_C_OFFSET_IMPL	10	4263	659623
MDC_ECG_WAVP_PACE_INAPPR_C_AREA	10	4264	659624
MDC_ECG_WAVP_PACE_INAPPR_C_INTEGRAL	10	4265	659625
MDC_ECG_WAVP_PACE_INAPPR_FSN	10	4272	659632
MDC_ECG_WAVP_PACE_INAPPR_FSN_TIME_POINT	10	4273	659633
MDC_ECG_WAVP_PACE_INAPPR_FSN_DURN	10	4274	659634
MDC_ECG_WAVP_PACE_INAPPR_FSN_PEAK	10	4275	659635
MDC_ECG_WAVP_PACE_INAPPR_FSN_ONSET	10	4276	659636
MDC_ECG_WAVP_PACE_INAPPR_FSN_OFFSET	10	4277	659637
MDC_ECG_WAVP_PACE_INAPPR_FSN_ONSET_IMPL	10	4278	659638
MDC_ECG_WAVP_PACE_INAPPR_FSN_OFFSET_IMPL	10	4279	659639

REFID	PART	CODE10	CF_CODE10
MDC_ECG_WAVP_PACE_INAPPR_FSN_AREA	10	4280	659640
MDC_ECG_WAVP_PACE_INAPPR_FSN_INTEGRAL	10	4281	659641
MDC_ECG_WAVP_PACE_EXCP	10	4288	659648
MDC_ECG_WAVP_PACE_EXCP_TIME_POINT	10	4289	659649
MDC_ECG_WAVP_PACE_EXCP_DURN	10	4290	659650
MDC_ECG_WAVP_PACE_EXCP_PEAK	10	4291	659651
MDC_ECG_WAVP_PACE_EXCP_ONSET	10	4292	659652
MDC_ECG_WAVP_PACE_EXCP_OFFSET	10	4293	659653
MDC_ECG_WAVP_PACE_EXCP_ONSET_IMPL	10	4294	659654
MDC_ECG_WAVP_PACE_EXCP_OFFSET_IMPL	10	4295	659655
MDC_ECG_WAVP_PACE_EXCP_AREA	10	4296	659656
MDC_ECG_WAVP_PACE_EXCP_INTEGRAL	10	4297	659657
MDC_ECG_WAVP_PACE_EXCP_NC	10	4304	659664
MDC_ECG_WAVP_PACE_EXCP_NC_TIME_POINT	10	4305	659665
MDC_ECG_WAVP_PACE_EXCP_NC_DURN	10	4306	659666
MDC_ECG_WAVP_PACE_EXCP_NC_PEAK	10	4307	659667
MDC_ECG_WAVP_PACE_EXCP_NC_ONSET	10	4308	659668
MDC_ECG_WAVP_PACE_EXCP_NC_OFFSET	10	4309	659669
MDC_ECG_WAVP_PACE_EXCP_NC_ONSET_IMPL	10	4310	659670
MDC_ECG_WAVP_PACE_EXCP_NC_OFFSET_IMPL	10	4311	659671
MDC_ECG_WAVP_PACE_EXCP_NC_AREA	10	4312	659672
MDC_ECG_WAVP_PACE_EXCP_NC_INTEGRAL	10	4313	659673
MDC_ECG_WAVP_PACE_EXCP_C	10	4320	659680
MDC_ECG_WAVP_PACE_EXCP_C_TIME_POINT	10	4321	659681
MDC_ECG_WAVP_PACE_EXCP_C_DURN	10	4322	659682
MDC_ECG_WAVP_PACE_EXCP_C_PEAK	10	4323	659683
MDC_ECG_WAVP_PACE_EXCP_C_ONSET	10	4324	659684
MDC_ECG_WAVP_PACE_EXCP_C_OFFSET	10	4325	659685
MDC_ECG_WAVP_PACE_EXCP_C_ONSET_IMPL	10	4326	659686
MDC_ECG_WAVP_PACE_EXCP_C_OFFSET_IMPL	10	4327	659687
MDC_ECG_WAVP_PACE_EXCP_C_AREA	10	4328	659688
MDC_ECG_WAVP_PACE_EXCP_C_INTEGRAL	10	4329	659689
MDC_ECG_WAVP_PACE_EXCP_FSN	10	4336	659696
MDC_ECG_WAVP_PACE_EXCP_FSN_TIME_POINT	10	4337	659697
MDC_ECG_WAVP_PACE_EXCP_FSN_DURN	10	4338	659698
MDC_ECG_WAVP_PACE_EXCP_FSN_PEAK	10	4339	659699
MDC_ECG_WAVP_PACE_EXCP_FSN_ONSET	10	4340	659700
MDC_ECG_WAVP_PACE_EXCP_FSN_OFFSET	10	4341	659701
MDC_ECG_WAVP_PACE_EXCP_FSN_ONSET_IMPL	10	4342	659702
MDC_ECG_WAVP_PACE_EXCP_FSN_OFFSET_IMPL	10	4343	659703
MDC_ECG_WAVP_PACE_EXCP_FSN_AREA	10	4344	659704
MDC_ECG_WAVP_PACE_EXCP_FSN_INTEGRAL	10	4345	659705
MDC_ECG_WAVP_PACE_ATR	10	4352	659712
MDC_ECG_WAVP_PACE_ATR_R	10	4608	659968

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MDC_ECG_WAVP_PACE_ATR_L	10	4864	660224
MDC_ECG_WAVP_PACE_V	10	5120	660480
MDC_ECG_WAVP_PACE_V_R	10	5376	660736
MDC_ECG_WAVP_PACE_V_L	10	5632	660992
MDC_ECG_WAVP_PACE_EXT	10	5888	661248
MDC_ECG_WAVP_ATPACE	10	6144	661504
MDC_ECG_WAVP_ATPACE_ATR	10	6400	661760
MDC_ECG_WAVP_ATPACE_V	10	6656	662016
MDC_ECG_WAVP_ATPACE_EXT	10	6912	662272
MDC_ECG_WAVP_CDVS	10	7168	662528
MDC_ECG_WAVP_CDVS_ATR	10	7424	662784
MDC_ECG_WAVP_CDVS_V	10	7680	663040
MDC_ECG_WAVP_CDVS_EXT	10	7936	663296
MDC_ECG_WAVP_DEFIB	10	8192	663552
MDC_ECG_WAVP_DEFIB_ATR	10	8448	663808
MDC_ECG_WAVP_DEFIB_V	10	8704	664064
MDC_ECG_WAVP_DEFIB_EXT	10	8960	664320
MDC_ECG_BEAT	10	8192	663552
MDC_ECG_BEAT_TIME_POINT	10	8193	663553
MDC_ECG_BEAT_DURN	10	8194	663554
MDC_ECG_BEAT_PEAK	10	8195	663555
MDC_ECG_BEAT_ONSET	10	8196	663556
MDC_ECG_BEAT_OFFSET	10	8197	663557
MDC_ECG_BEAT_ONSET_IMPL	10	8198	663558
MDC_ECG_BEAT_OFFSET_IMPL	10	8199	663559
MDC_ECG_BEAT_EVENT	10	8200	663560
MDC_ECG_BEAT_COUNT	10	8201	663561
MDC_ECG_BEAT_RATE	10	8202	663562
MDC_ECG_BEAT_RATE_MAX	10	8203	663563
MDC_ECG_BEAT_RATE_MIN	10	8204	663564
MDC_ECG_BEAT_RATE_MEAN	10	8205	663565
MDC_ECG_BEAT_TIME	10	8206	663566
MDC_ECG_BEAT_ANNOT	10	8207	663567
MDC_ECG_BEAT_NORMAL	10	8208	663568
MDC_ECG_BEAT_ABNORMAL	10	8224	663584
MDC_ECG_BEAT_DOMINANT	10	8240	663600
MDC_ECG_BEAT_SV_P_C	10	8256	663616
MDC_ECG_BEAT_ATR_P_C	10	8272	663632
MDC_ECG_BEAT_JUNC_P_C	10	8288	663648
MDC_ECG_BEAT_ATR_P_C_ABERR	10	8304	663664
MDC_ECG_BEAT_ATR_PWAVE_BLK	10	8320	663680
MDC_ECG_BEAT_V_P_C	10	8336	663696
MDC_ECG_BEAT_V_P_C_FUSION	10	8352	663712
MDC_ECG_BEAT_V_P_C_RonT	10	8368	663728

REFID	PART	CODE10	CF_CODE10
MDC_ECG_BEAT_SV_ESC	10	8384	663744
MDC_ECG_BEAT_ATR_ESC	10	8400	663760
MDC_ECG_BEAT_JUNC_ESC	10	8416	663776
MDC_ECG_BEAT_V_ESC	10	8432	663792
MDC_ECG_BEAT_BB_BLK	10	8448	663808
MDC_ECG_BEAT_LBB_BLK_COMP	10	8464	663824
MDC_ECG_BEAT_LBB_BLK_INCOMP	10	8480	663840
MDC_ECG_BEAT_RBB_BLK_COMP	10	8496	663856
MDC_ECG_BEAT_RBB_BLK_INCOMP	10	8512	663872
MDC_ECG_BEAT_BLK_ANT_L_HEMI	10	8528	663888
MDC_ECG_BEAT_BLK_POS_L_HEMI	10	8544	663904
MDC_ECG_BEAT_BLK_BIFAS	10	8560	663920
MDC_ECG_BEAT_BLK_TRFAS	10	8576	663936
MDC_ECG_BEAT_BLK_BILAT	10	8592	663952
MDC_ECG_BEAT_BLK_IVCD	10	8608	663968
MDC_ECG_BEAT_PREX	10	8624	663984
MDC_ECG_BEAT_WPW_UNK	10	8640	664000
MDC_ECG_BEAT_WPW_A	10	8656	664016
MDC_ECG_BEAT_WPW_B	10	8672	664032
MDC_ECG_BEAT_LGL	10	8688	664048
MDC_ECG_BEAT_PACED	10	8704	664064
MDC_ECG_BEAT_PACED_FUS	10	8720	664080
MDC_ECG_BEAT_UNKNOWN	10	8736	664096
MDC_ECG_BEAT_LEARN	10	8752	664112
MDC_ECG_RHY_SINUS_RHY	10	9216	664576
MDC_ECG_RHY_SINUS_RHY_TIME_POINT	10	9217	664577
MDC_ECG_RHY_SINUS_RHY_DURN	10	9218	664578
MDC_ECG_RHY_SINUS_RHY_PEAK	10	9219	664579
MDC_ECG_RHY_SINUS_RHY_ONSET	10	9220	664580
MDC_ECG_RHY_SINUS_RHY_OFFSET	10	9221	664581
MDC_ECG_RHY_SINUS_RHY_ONSET_IMPL	10	9222	664582
MDC_ECG_RHY_SINUS_RHY_OFFSET_IMPL	10	9223	664583
MDC_ECG_RHY_SINUS_RHY_EVENT	10	9224	664584
MDC_ECG_RHY_SINUS_RHY_COUNT	10	9225	664585
MDC_ECG_RHY_SINUS_RHY_RATE	10	9226	664586
MDC_ECG_RHY_SINUS_RHY_RATE_MAX	10	9227	664587
MDC_ECG_RHY_SINUS_RHY_RATE_MIN	10	9228	664588
MDC_ECG_RHY_SINUS_RHY_RATE_MEAN	10	9229	664589
MDC_ECG_RHY_SINUS_RHY_TIME	10	9230	664590
MDC_ECG_RHY_SINUS_RHY_ANNOT	10	9231	664591
MDC_ECG_RHY_SINUS_NORMAL_RHY	10	9232	664592
MDC_ECG_RHY_SINUS_BRADY	10	9248	664608
MDC_ECG_RHY_SINUS_TACHY	10	9264	664624
MDC_ECG_RHY_SINUS_ARRHY	10	9280	664640

REFID	PART	CODE10	CF_CODE10
MDC_ECG_RHY_RESP_ARRHY	10	9296	664656
MDC_ECG_RHY_NON_RESP_ARRHY	10	9312	664672
MDC_ECG_RHY_WANDP_ARRHY	10	9328	664688
MDC_ECG_RHY_WANDPAV_ARRHY	10	9344	664704
MDC_ECG_RHY_ATR_ECT_RHY	10	9360	664720
MDC_ECG_RHY_ATR_BIGEM	10	9376	664736
MDC_ECG_RHY_ATR_TACHY	10	9392	664752
MDC_ECG_RHY_ATR_TACHY_PAROX	10	9408	664768
MDC_ECG_RHY_ATR_TACHY_MF	10	9424	664784
MDC_ECG_RHY_ATR_TACHY_AUTO	10	9440	664800
MDC_ECG_RHY_ATR_FLUT	10	9456	664816
MDC_ECG_RHY_ATR_FIB	10	9472	664832
MDC_ECG_RHY_SV_ECT_RHY	10	9488	664848
MDC_ECG_RHY_SV_TACHY	10	9504	664864
MDC_ECG_RHY_SV_TACHY_PAROX	10	9520	664880
MDC_ECG_RHY_JUNC_RHY	10	9536	664896
MDC_ECG_RHY_JUNC_ESC_BEATS	10	9552	664912
MDC_ECG_RHY_JUNC_ACCEL	10	9568	664928
MDC_ECG_RHY_JUNC_TACHY	10	9584	664944
MDC_ECG_RHY_AV_TACHY_RECIP	10	9600	664960
MDC_ECG_RHY_AV_TACHY_REENTRANT	10	9616	664976
MDC_ECG_RHY_AV_HEART_BLK_DEG_1	10	9632	664992
MDC_ECG_RHY_AV_HEART_BLK_DEG_2	10	9648	665008
MDC_ECG_RHY_AV_HEART_BLK_DEG_2_I	10	9664	665024
MDC_ECG_RHY_AV_HEART_BLK_DEG_2_II	10	9680	665040
MDC_ECG_RHY_AV_HEART_BLK_DEG_3	10	9696	665056
MDC_ECG_RHY_AV_DISSOC	10	9712	665072
MDC_ECG_RHY_AV_DISSOC_INT	10	9728	665088
MDC_ECG_RHY_AV_DISSOC_ISO	10	9744	665104
MDC_ECG_RHY_AV_DISSOC_COMP	10	9760	665120
MDC_ECG_RHY_SA_HEART_BLK_DEG_1	10	9776	665136
MDC_ECG_RHY_SA_HEART_BLK_DEG_2_I	10	9792	665152
MDC_ECG_RHY_SA_HEART_BLK_DEG_2_II	10	9808	665168
MDC_ECG_RHY_SA_HEART_BLK_DEG_3	10	9824	665184
MDC_ECG_RHY_V_RHY	10	9840	665200
MDC_ECG_RHY_V_IDIO_RHY	10	9856	665216
MDC_ECG_RHY_V_PARA	10	9872	665232
MDC_ECG_RHY_V_AIVR	10	9888	665248
MDC_ECG_RHY_V_IDIO_TACHY	10	9904	665264
MDC_ECG_RHY_V_BRADY	10	10464	665824
MDC_ECG_RHY_V_BIGEM	10	9920	665280
MDC_ECG_RHY_V_TRIGEM	10	9936	665296
MDC_ECG_RHY_V_P_C_CPLT	10	9952	665312
MDC_ECG_RHY_V_P_C_RUN	10	9968	665328

REFID	PART	CODE10	CF_CODE10
MDC_ECG_RHY_V_TACHY	10	9984	665344
MDC_ECG_RHY_V_FLUT	10	10000	665360
MDC_ECG_RHY_V_FIB	10	10016	665376
MDC_ECG_RHY_V_TACHY_PAROX	10	10032	665392
MDC_ECG_RHY_V_TACHY_MONO	10	10048	665408
MDC_ECG_RHY_V_TACHY_POLY	10	10064	665424
MDC_ECG_RHY_V_TACHY_TDP	10	10080	665440
MDC_ECG_RHY_PREX	10	10096	665456
MDC_ECG_RHY_WPW_UNK	10	10112	665472
MDC_ECG_RHY_WPW_A	10	10128	665488
MDC_ECG_RHY_WPW_B	10	10144	665504
MDC_ECG_RHY_LGL	10	10160	665520
MDC_ECG_RHY_EPADM	10	10176	665536
MDC_ECG_RHY_EPAC	10	10192	665552
MDC_ECG_RHY_EPAFC	10	10208	665568
MDC_ECG_RHY_EPAFS	10	10224	665584
MDC_ECG_RHY_EPVDM	10	10240	665600
MDC_ECG_RHY_EPVC	10	10256	665616
MDC_ECG_RHY_EPVFC	10	10272	665632
MDC_ECG_RHY_EPVFS	10	10288	665648
MDC_ECG_RHY_EPAVT	10	10304	665664
MDC_ECG_RHY_MISSB	10	10320	665680
MDC_ECG_RHY_ASYSTOLE	10	10336	665696
MDC_ECG_RHY_IRREG	10	10352	665712
MDC_ECG_RHY_LHRV	10	10368	665728
MDC_ECG_RHY_STELVATION	10	10384	665744
MDC_ECG_RHY_STHILOST	10	10400	665760
MDC_ECG_RHY_TALT	10	10416	665776
MDC_ECG_RHY_BRADY	10	10432	665792
MDC_ECG_RHY_CALS	10	10448	665808
MDC_ECG_RHY_EPAX	10	10480	665840
MDC_ECG_RHY_EPAXLO	10	10496	665856
MDC_ECG_RHY_EPAXFO	10	10512	665872
MDC_ECG_RHY_EPVX	10	10528	665888
MDC_ECG_RHY_EPVXLO	10	10544	665904
MDC_ECG_RHY_EPVXFO	10	10560	665920
MDC_ECG_NOISE_CLEAN	10	11200	666560
MDC_ECG_NOISE_CLEAN_TIME_POINT	10	11201	666561
MDC_ECG_NOISE_CLEAN_DURN	10	11202	666562
MDC_ECG_NOISE_CLEAN_PEAK	10	11203	666563
MDC_ECG_NOISE_CLEAN_ONSET	10	11204	666564
MDC_ECG_NOISE_CLEAN_OFFSET	10	11205	666565
MDC_ECG_NOISE_CLEAN_ONSET_IMPL	10	11206	666566
MDC_ECG_NOISE_CLEAN_OFFSET_IMPL	10	11207	666567

REFID	PART	CODE10	CF_CODE10
MDC_ECG_NOISE_CLEAN_EVENT	10	11208	666568
MDC_ECG_NOISE_CLEAN_COUNT	10	11209	666569
MDC_ECG_NOISE_CLEAN_RATE	10	11210	666570
MDC_ECG_NOISE_CLEAN_RATE_MAX	10	11211	666571
MDC_ECG_NOISE_CLEAN_RATE_MIN	10	11212	666572
MDC_ECG_NOISE_CLEAN_RATE_MEAN	10	11213	666573
MDC_ECG_NOISE_CLEAN_TIME	10	11214	666574
MDC_ECG_NOISE_CLEAN_ANNOT	10	11215	666575
MDC_ECG_NOISE_MODERATE	10	11216	666576
MDC_ECG_NOISE_SEVERE	10	11232	666592
MDC_ECG_NOISE_NOSIGNAL	10	11248	666608
MDC_ECG_ANGLE_J20_AZIM	2	16248	147320
MDC_ECG_ANGLE_J20_AZIM_MAX	2	16249	147321
MDC_ECG_ANGLE_J20_AZIM_MIN	2	16250	147322
MDC_ECG_ANGLE_J20_AZIM_MEAN	2	16251	147323
MDC_ECG_ANGLE_J80_AZIM	2	16284	147356
MDC_ECG_ANGLE_J80_ELEV	2	16288	147360
MDC_ECG_ANGLE_Jxx_AZIM	2	16296	147368
MDC_ECG_ANGLE_Jxx_ELEV	2	16300	147372
MDC_ECG_ANGLE_J_AZIM	2	16236	147308
MDC_ECG_ANGLE_J_ELEV	2	16240	147312
MDC_ECG_ANGLE_J20_ELEV	2	16252	147324
MDC_ECG_ANGLE_J40_AZIM	2	16260	147332
MDC_ECG_ANGLE_J40_ELEV	2	16264	147336
MDC_ECG_ANGLE_J60_AZIM	2	16272	147344
MDC_ECG_ANGLE_J60_ELEV	2	16276	147348
MDC_ECG_ANGLE_P_AZIM	2	16204	147276
MDC_ECG_ANGLE_P_ELEV	2	16216	147288
MDC_ECG_ANGLE_P_FRONT	2	16128	147200
MDC_ECG_ANGLE_QRS_AZIM	2	16208	147280
MDC_ECG_ANGLE_QRS_ELEV	2	16220	147292
MDC_ECG_ANGLE_QRS_FRONT	2	16132	147204
MDC_ECG_ANGLE_T_ELEV	2	16224	147296
MDC_ECG_ANGLE_T_AZIM	2	16212	147284
MDC_ECG_ANGLE_T_FRONT	2	16136	147208
MDC_ECG_TIME_PD_P	2	16184	147256
MDC_ECG_TIME_PD_P_GL	2	16184	147256
MDC_ECG_TIME_PD_PP	2	16140	147212
MDC_ECG_TIME_PD_PP_GL	2	16140	147212
MDC_ECG_TIME_PD_PQ	2	16144	147216
MDC_ECG_TIME_PD_PR	2	15872	146944
MDC_ECG_TIME_PD_PQ_SEG	2	16148	147220
MDC_ECG_TIME_PD_QRS	2	16156	147228
MDC_ECG_TIME_PD_QRS_GL	2	16156	147228

REFID	PART	CODE10	CF_CODE10
MDC_ECG_TIME_PD_QT	2	16160	147232
MDC_ECG_TIME_PD_QT_GL	2	16160	147232
MDC_ECG_TIME_PD_QTc	2	16164	147236
MDC_ECG_TIME_PD_QTC	2	15876	146948
MDC_ECG_TIME_PD_QTC_BAZETT	2	15880	146952
MDC_ECG_TIME_PD_QTC_FRAMINGHAM	2	15884	146956
MDC_ECG_TIME_PD_QTC_HODGES	2	15888	146960
MDC_ECG_TIME_PD_QTC_FREDERICA	2	15892	146964
MDC_ECG_TIME_PD_QTC_USER	2	15896	146968
MDC_ECG_TIME_PD_RR_GL	2	16000	147072
MDC_ECG_TIME_PD_QTU	2	16004	147076
MDC_ECG_DISPERSION_QT	2	16008	147080
MDC_ECG_DISPERSION_QTC	2	16012	147084
MDC_ECG_TIME_PD_RR	2	16168	147240
MDC_ECG_TIME_PD_RR_GL	2	16168	147240
MDC_ECG_TIME_ST_Jxx	2	16304	147376
MDC_ECG_MAG_J_VECT	2	16232	147304
MDC_ECG_MAG_J20_VECT	2	16244	147316
MDC_ECG_MAG_J40_VECT	2	16256	147328
MDC_ECG_MAG_J60_VECT	2	16268	147340
MDC_ECG_MAG_J80_VECT	2	16280	147352
MDC_ECG_MAG_Jxx_VECT	2	16292	147364
MDC_ECG_MAG_P_FRONT	2	16172	147244
MDC_ECG_MAG_P_VECT	2	16192	147264
MDC_ECG_MAG_P_VECT_FRONT	2	16308	147380
MDC_ECG_MAG_P_VECT_HORIZ	2	16312	147384
MDC_ECG_MAG_P_VECT_SAGI	2	16316	147388
MDC_ECG_MAG_QRS_FRONT	2	16176	147248
MDC_ECG_MAG_QRS_VECT	2	16196	147268
MDC_ECG_MAG_QRS_VECT_FRONT	2	16320	147392
MDC_ECG_MAG_QRS_VECT_HORIZ	2	16324	147396
MDC_ECG_MAG_QRS_VECT_SAGI	2	16328	147400
MDC_ECG_MAG_T_FRONT	2	16180	147252
MDC_ECG_MAG_T_VECT	2	16200	147272
MDC_ECG_MAG_T_VECT_FRONT	2	16332	147404
MDC_ECG_MAG_T_VECT_HORIZ	2	16336	147408
MDC_ECG_MAG_T_VECT_SAGI	2	16340	147412
MDC_ECG_HEART_RATE	2	16770	147842
MDC_ECG_VENTRICULAR_RATE	2	16016	147088
MDC_ECG_ATRIAL_RATE	2	16020	147092
MDC_ECG_VPC_COUNT	2	16024	147096
MDC_ECG_SVPC_RATE	2	16028	147100
MDC_ECG_BEAT_COUNT	2	16032	147104
MDC_ECG_TIME_PD_P	2	6656	137728

REFID	PART	CODE10	CF_CODE10
MDC_ECG_TIME_PD_P_I	2	6657	137729
MDC_ECG_TIME_PD_P_dI	2	6687	137759
MDC_ECG_TIME_PD_P_II	2	6658	137730
MDC_ECG_TIME_PD_P_dII	2	6688	137760
MDC_ECG_TIME_PD_P_V1	2	6659	137731
MDC_ECG_TIME_PD_P_dV1	2	6689	137761
MDC_ECG_TIME_PD_P_V2	2	6660	137732
MDC_ECG_TIME_PD_P_dV2	2	6690	137762
MDC_ECG_TIME_PD_P_V3	2	6661	137733
MDC_ECG_TIME_PD_P_dV3	2	6691	137763
MDC_ECG_TIME_PD_P_V4	2	6662	137734
MDC_ECG_TIME_PD_P_dV4	2	6692	137764
MDC_ECG_TIME_PD_P_V5	2	6663	137735
MDC_ECG_TIME_PD_P_dV5	2	6693	137765
MDC_ECG_TIME_PD_P_V6	2	6664	137736
MDC_ECG_TIME_PD_P_dV6	2	6694	137766
MDC_ECG_TIME_PD_P_V7	2	6665	137737
MDC_ECG_TIME_PD_P_dV7	2	6695	137767
MDC_ECG_TIME_PD_P_V2R	2	6666	137738
MDC_ECG_TIME_PD_P_dV2R	2	6696	137768
MDC_ECG_TIME_PD_P_V3R	2	6667	137739
MDC_ECG_TIME_PD_P_dV3R	2	6697	137769
MDC_ECG_TIME_PD_P_V4R	2	6668	137740
MDC_ECG_TIME_PD_P_dV4R	2	6698	137770
MDC_ECG_TIME_PD_P_V5R	2	6669	137741
MDC_ECG_TIME_PD_P_dV5R	2	6699	137771
MDC_ECG_TIME_PD_P_V6R	2	6670	137742
MDC_ECG_TIME_PD_P_dV6R	2	6700	137772
MDC_ECG_TIME_PD_P_V7R	2	6671	137743
MDC_ECG_TIME_PD_P_dV7R	2	6701	137773
MDC_ECG_TIME_PD_P_X	2	6672	137744
MDC_ECG_TIME_PD_P_dX	2	6702	137774
MDC_ECG_TIME_PD_P_Y	2	6673	137745
MDC_ECG_TIME_PD_P_dY	2	6703	137775
MDC_ECG_TIME_PD_P_Z	2	6674	137746
MDC_ECG_TIME_PD_P_dZ	2	6704	137776
MDC_ECG_TIME_PD_P_CC5	2	6675	137747
MDC_ECG_TIME_PD_P_dCC5	2	6705	137777
MDC_ECG_TIME_PD_P_CM5	2	6676	137748
MDC_ECG_TIME_PD_P_dCM5	2	6706	137778
MDC_ECG_TIME_PD_P_LA	2	6677	137749
MDC_ECG_TIME_PD_P_dLA	2	6707	137779
MDC_ECG_TIME_PD_P_RA	2	6678	137750
MDC_ECG_TIME_PD_P_dRA	2	6708	137780

REFID	PART	CODE10	CF_CODE10
MDC_ECG_TIME_PD_P_LL	2	6679	137751
MDC_ECG_TIME_PD_P_dLL	2	6709	137781
MDC_ECG_TIME_PD_P_fI	2	6680	137752
MDC_ECG_TIME_PD_P_dfI	2	6710	137782
MDC_ECG_TIME_PD_P_fE	2	6681	137753
MDC_ECG_TIME_PD_P_dfE	2	6711	137783
MDC_ECG_TIME_PD_P_fC	2	6682	137754
MDC_ECG_TIME_PD_P_dfC	2	6712	137784
MDC_ECG_TIME_PD_P_fA	2	6683	137755
MDC_ECG_TIME_PD_P_dfA	2	6713	137785
MDC_ECG_TIME_PD_P_fM	2	6684	137756
MDC_ECG_TIME_PD_P_dfM	2	6714	137786
MDC_ECG_TIME_PD_P_fF	2	6685	137757
MDC_ECG_TIME_PD_P_dfF	2	6715	137787
MDC_ECG_TIME_PD_P_fH	2	6686	137758
MDC_ECG_TIME_PD_P_dfH	2	6716	137788
MDC_ECG_TIME_PD_P_III	2	6717	137789
MDC_ECG_TIME_PD_P_dIII	2	6767	137839
MDC_ECG_TIME_PD_P_AVR	2	6718	137790
MDC_ECG_TIME_PD_P_dAVR	2	6768	137840
MDC_ECG_TIME_PD_P_AVL	2	6719	137791
MDC_ECG_TIME_PD_P_dAVL	2	6769	137841
MDC_ECG_TIME_PD_P_AVF	2	6720	137792
MDC_ECG_TIME_PD_P_dAVF	2	6770	137842
MDC_ECG_TIME_PD_P_AVRneg	2	6721	137793
MDC_ECG_TIME_PD_P_dAVRneg	2	6771	137843
MDC_ECG_TIME_PD_P_V8	2	6722	137794
MDC_ECG_TIME_PD_P_dV8	2	6735	137807
MDC_ECG_TIME_PD_P_V9	2	6723	137795
MDC_ECG_TIME_PD_P_dV9	2	6736	137808
MDC_ECG_TIME_PD_P_V8R	2	6724	137796
MDC_ECG_TIME_PD_P_dV8R	2	6737	137809
MDC_ECG_TIME_PD_P_V9R	2	6725	137797
MDC_ECG_TIME_PD_P_dV9R	2	6738	137810
MDC_ECG_TIME_PD_P_D	2	6726	137798
MDC_ECG_TIME_PD_P_dD	2	6739	137811
MDC_ECG_TIME_PD_P_A	2	6727	137799
MDC_ECG_TIME_PD_P_dA	2	6740	137812
MDC_ECG_TIME_PD_P_J	2	6728	137800
MDC_ECG_TIME_PD_P_dJ	2	6741	137813
MDC_ECG_TIME_PD_P_DEFIB	2	6729	137801
MDC_ECG_TIME_PD_P_dDEFIB	2	6791	137863
MDC_ECG_TIME_PD_P_EXTERN	2	6730	137802
MDC_ECG_TIME_PD_P_dEXTERN	2	6792	137864

REFID	PART	CODE10	CF_CODE10
MDC_ECG_TIME_PD_P_A1	2	6731	137803
MDC_ECG_TIME_PD_P_dA1	2	6793	137865
MDC_ECG_TIME_PD_P_A2	2	6732	137804
MDC_ECG_TIME_PD_P_dA2	2	6794	137866
MDC_ECG_TIME_PD_P_A3	2	6733	137805
MDC_ECG_TIME_PD_P_dA3	2	6795	137867
MDC_ECG_TIME_PD_P_A4	2	6734	137806
MDC_ECG_TIME_PD_P_dA4	2	6796	137868
MDC_ECG_TIME_PD_P_C	2	6742	137814
MDC_ECG_TIME_PD_P_dC	2	6772	137844
MDC_ECG_TIME_PD_P_V	2	6743	137815
MDC_ECG_TIME_PD_P_dV	2	6773	137845
MDC_ECG_TIME_PD_P_VR	2	6744	137816
MDC_ECG_TIME_PD_P_dVR	2	6774	137846
MDC_ECG_TIME_PD_P_VL	2	6745	137817
MDC_ECG_TIME_PD_P_dVL	2	6775	137847
MDC_ECG_TIME_PD_P_VF	2	6746	137818
MDC_ECG_TIME_PD_P_dVF	2	6776	137848
MDC_ECG_TIME_PD_P_MCL	2	6747	137819
MDC_ECG_TIME_PD_P_dMCL	2	6808	137880
MDC_ECG_TIME_PD_P_MCL1	2	6748	137820
MDC_ECG_TIME_PD_P_dMCL1	2	6797	137869
MDC_ECG_TIME_PD_P_MCL2	2	6749	137821
MDC_ECG_TIME_PD_P_dMCL2	2	6798	137870
MDC_ECG_TIME_PD_P_MCL3	2	6750	137822
MDC_ECG_TIME_PD_P_dMCL3	2	6799	137871
MDC_ECG_TIME_PD_P_MCL4	2	6751	137823
MDC_ECG_TIME_PD_P_dMCL4	2	6800	137872
MDC_ECG_TIME_PD_P_MCL5	2	6752	137824
MDC_ECG_TIME_PD_P_dMCL5	2	6801	137873
MDC_ECG_TIME_PD_P_MCL6	2	6753	137825
MDC_ECG_TIME_PD_P_dMCL6	2	6802	137874
MDC_ECG_TIME_PD_P_CC	2	6754	137826
MDC_ECG_TIME_PD_P_dCC	2	6809	137881
MDC_ECG_TIME_PD_P_CC1	2	6755	137827
MDC_ECG_TIME_PD_P_dCC1	2	6810	137882
MDC_ECG_TIME_PD_P_CC2	2	6756	137828
MDC_ECG_TIME_PD_P_dCC2	2	6811	137883
MDC_ECG_TIME_PD_P_CC3	2	6757	137829
MDC_ECG_TIME_PD_P_dCC3	2	6812	137884
MDC_ECG_TIME_PD_P_CC4	2	6758	137830
MDC_ECG_TIME_PD_P_dCC4	2	6813	137885
MDC_ECG_TIME_PD_P_CC6	2	6759	137831
MDC_ECG_TIME_PD_P_dCC6	2	6814	137886

REFID	PART	CODE10	CF_CODE10
MDC_ECG_TIME_PD_P_CC7	2	6760	137832
MDC_ECG_TIME_PD_P_dCC7	2	6815	137887
MDC_ECG_TIME_PD_P_CM	2	6761	137833
MDC_ECG_TIME_PD_P_dCM	2	6816	137888
MDC_ECG_TIME_PD_P_CM1	2	6762	137834
MDC_ECG_TIME_PD_P_dCM1	2	6817	137889
MDC_ECG_TIME_PD_P_CM2	2	6763	137835
MDC_ECG_TIME_PD_P_dCM2	2	6818	137890
MDC_ECG_TIME_PD_P_CM3	2	6764	137836
MDC_ECG_TIME_PD_P_dCM3	2	6819	137891
MDC_ECG_TIME_PD_P_CM4	2	6765	137837
MDC_ECG_TIME_PD_P_dCM4	2	6820	137892
MDC_ECG_TIME_PD_P_CM6	2	6766	137838
MDC_ECG_TIME_PD_P_dCM6	2	6821	137893
MDC_ECG_TIME_PD_P_CM7	2	6777	137849
MDC_ECG_TIME_PD_P_dCM7	2	6822	137894
MDC_ECG_TIME_PD_P_CH5	2	6778	137850
MDC_ECG_TIME_PD_P_dCH5	2	6823	137895
MDC_ECG_TIME_PD_P_CS5	2	6779	137851
MDC_ECG_TIME_PD_P_dCS5	2	6824	137896
MDC_ECG_TIME_PD_P_CB5	2	6780	137852
MDC_ECG_TIME_PD_P_dCB5	2	6825	137897
MDC_ECG_TIME_PD_P_CR5	2	6781	137853
MDC_ECG_TIME_PD_P_dCR5	2	6826	137898
MDC_ECG_TIME_PD_P_ML	2	6782	137854
MDC_ECG_TIME_PD_P_dML	2	6827	137899
MDC_ECG_TIME_PD_P_AB1	2	6783	137855
MDC_ECG_TIME_PD_P_dAB1	2	6828	137900
MDC_ECG_TIME_PD_P_AB2	2	6784	137856
MDC_ECG_TIME_PD_P_dAB2	2	6829	137901
MDC_ECG_TIME_PD_P_AB3	2	6785	137857
MDC_ECG_TIME_PD_P_dAB3	2	6830	137902
MDC_ECG_TIME_PD_P_AB4	2	6786	137858
MDC_ECG_TIME_PD_P_dAB4	2	6831	137903
MDC_ECG_TIME_PD_P_ES	2	6787	137859
MDC_ECG_TIME_PD_P_dES	2	6832	137904
MDC_ECG_TIME_PD_P_AS	2	6788	137860
MDC_ECG_TIME_PD_P_dAS	2	6833	137905
MDC_ECG_TIME_PD_P_AI	2	6789	137861
MDC_ECG_TIME_PD_P_dAI	2	6834	137906
MDC_ECG_TIME_PD_P_S	2	6790	137862
MDC_ECG_TIME_PD_P_dS	2	6835	137907
MDC_ECG_TIME_PD_P_RL	2	6803	137875
MDC_ECG_TIME_PD_P_dRL	2	6836	137908

REFID	PART	CODE10	CF_CODE10
MDC_ECG_TIME_PD_P_CV5RL	2	6804	137876
MDC_ECG_TIME_PD_P_dCV5RL	2	6837	137909
MDC_ECG_TIME_PD_P_CV6LL	2	6805	137877
MDC_ECG_TIME_PD_P_dCV6LL	2	6838	137910
MDC_ECG_TIME_PD_P_CV6LU	2	6806	137878
MDC_ECG_TIME_PD_P_dCV6LU	2	6839	137911
MDC_ECG_TIME_PD_P_V10	2	6807	137879
MDC_ECG_TIME_PD_P_dV10	2	6840	137912
MDC_ECG_TIME_END_P	2	5888	136960
MDC_ECG_TIME_PD_P1	2	4608	135680
MDC_ECG_TIME_PD_P2	2	4864	135936
MDC_ECG_TIME_START_P	2	9472	140544
MDC_ECG_TIME_PD_P3	2	5120	136192
MDC_ECG_TIME_PD_PR	2	7168	138240
MDC_ECG_TIME_PD_Q	2	7680	138752
MDC_ECG_TIME_PD_QRS	2	7936	139008
MDC_ECG_TIME_END_QRS	2	6144	137216
MDC_ECG_TIME_START_QRS	2	9728	140800
MDC_ECG_TIME_PD_QT	2	8192	139264
MDC_ECG_TIME_PD_QT_CORR	2	8448	139520
MDC_ECG_TIME_PD_R_1	2	11264	142336
MDC_ECG_TIME_PD_R_2	2	11520	142592
MDC_ECG_TIME_PD_R_3	2	11776	142848
MDC_ECG_TIME_PD_S_1	2	12032	143104
MDC_ECG_TIME_PD_S_2	2	12288	143360
MDC_ECG_TIME_PD_S_3	2	12544	143616
MDC_ECG_TIME_END_QRS	2	6400	137472
MDC_ECG_TIME_START_T	2	9984	141056
MDC_ECG_TIME_PD_VENT_ACTIV	2	11008	142080
MDC_ECG_ELEC_POTL	2	256	131328
MDC_ECG_AMPL_J	2	1024	132096
MDC_ECG_ELEC_POTL_ST_20	2	14848	145920
MDC_ECG_ELEC_POTL_ST_40	2	15104	146176
MDC_ECG_ELEC_POTL_ST_60	2	14336	145408
MDC_ECG_ELEC_POTL_ST_80	2	14592	145664
MDC_ECG_AMPL_P_MAX	2	1280	132352
MDC_ECG_AMPL_P_MIN	2	1536	132608
MDC_ECG_AMPL_P3	2	3072	134144
MDC_ECG_AMPL_Q	2	1792	132864
MDC_ECG_AMPL_R	2	2048	133120
MDC_ECG_ELEC_POTL_R_1	2	12800	143872
MDC_ECG_ELEC_POTL_R_2	2	13056	144128
MDC_ECG_ELEC_POTL_R_3	2	13312	144384
MDC_ECG_AMPL_S	2	2304	133376

REFID	PART	CODE10	CF_CODE10
MDC_ECG_ELEC_POTL_S_1	2	13568	144640
MDC_ECG_ELEC_POTL_S_2	2	13824	144896
MDC_ECG_ELEC_POTL_S_3	2	14080	145152
MDC_ECG_AMPL_T_MAX	2	2560	133632
MDC_ECG_AMPL_T_MIN	2	2816	133888
MDC_ECG_ELEC_POTL	2	256	131328
MDC_ECG_AMPL_ST	2	768	131840
MDC_ECG_INTEGRAL_P	2	6912	137984
MDC_ECG_AREA_P	2	3840	134912
MDC_ECG_INTEGRAL_Q	2	7424	138496
MDC_ECG_AREA_Q	2	3328	134400
MDC_ECG_INTEGRAL_QRS	2	8704	139776
MDC_ECG_AREA_QRS	2	4096	135168
MDC_ECG_INTEGRAL_ST	2	9216	140288
MDC_ECG_AREA_ST	2	4352	135424
MDC_ECG_INTEGRAL_T	2	8960	140032
MDC_ECG_AREA_T	2	3584	134656
MDC_ECG_SLOPE_ST	2	5376	136448
MDC_ECG_TIME_PD_PP	2	32768	163840
MDC_ECG_TIME_PD_RR	2	33024	164096
MDC_ECG_TIME_PD_PQ	2	33280	164352
MDC_ECG_TIME_PD_PQ_SEG	2	33536	164608
MDC_ECG_TIME_PD_QTc	2	33792	164864
MDC_ECG_TIME_PD_QTcB	2	34048	165120
MDC_ECG_TIME_PD_QTcF	2	34304	165376
MDC_ECG_TIME_PD_QTU	2	34560	165632
MDC_ECG_SHAPE_ST	2	34816	165888
MDC_ECG_SHAPE_ST_T	2	35072	166144
MDC_ECG_LDSYS_12LD_UNSPECIFIED	10	11264	666624
MDC_ECG_LDSYS_12LD_STD	10	11265	666625
MDC_ECG_LDSYS_12LD_MASON_LIKAR	10	11266	666626
MDC_ECG_LDSYS_12LD_VPAD	10	11267	666627
MDC_ECG_LDSYS_12LD_PAD	10	11268	666628
MDC_ECG_LDSYS_12LD_FROM_FRANK	10	11269	666629
MDC_ECG_LDSYS_12LD_NON_STANDARD	10	11270	666630
MDC_ECG_LDSYS_12LD_BICYCLE	10	11271	666631
MDC_ECG_LDSYS_12LD_RAISED_INTERCOSTAL	10	11272	666632
MDC_ECG_LDSYS_XYZ_UNSPECIFIED	10	11273	666633
MDC_ECG_LDSYS_XYZ_FRANK	10	11274	666634
MDC_ECG_LDSYS_XYZ_MCFEE_PARUNAGO	10	11275	666635
MDC_ECG_LDSYS_XYZ_CUBE	10	11276	666636
MDC_ECG_LDSYS_XYZ_BIPOLAR	10	11277	666637
MDC_ECG_LDSYS_XYZ_PSEUDO_ORTH	10	11278	666638
MDC_ECG_LDSYS_XYZ_FROM_12LD	10	11279	666639

REFID	PART	CODE10	CF_CODE10
MDC_ECG_LDSYS_3LD_NEHB	10	11280	666640
MDC_ECG_LDSYS_3LD_CC5_CM5_ML	10	11281	666641
MDC_ECG_LDSYS_3LD_CM5_CC5_CH5	10	11282	666642
MDC_ECG_LDSYS_12LD_FROM_DOWER	10	11283	666643
MDC_ECG_LDSYS_12LD_FROM_EASI	10	11284	666644
MDC_ECG_LDSYS_12LD_FROM_LIMB	10	11285	666645
MDC_ECG_LDSYS_12LD_STD_AND_XYZ	10	11286	666646
MDC_ECG_LDSYS_12LD_STD_AND_NEHB	10	11287	666647
MDC_ECG_LDSYS_12LD_STD_AND_CC5_CM5_ML	10	11288	666648
MDC_ECG_LDSYS_12LD_STD_AND_CM5_CC5_CH5	10	11289	666649
MDC_ECG_LDSYS_12LD_STD_EXTD	10	11290	666650
MDC_ECG_LDSYS_12LD_STD_EXTD_RIGHT	10	11291	666651
MDC_ECG_LDSYS_12LD_STD_EXTD_LEFT	10	11292	666652
MDC_ECG_CTL_VBL	10	11392	666752
MDC_ECG_CTL_VBL_SAMPLE_RATE	10	11393	666753
MDC_ECG_CTL_VBL_SENSITIVITY	10	11394	666754
MDC_ECG_CTL_VBL_ZERO_OFFSET	10	11395	666755
MDC_ECG_CTL_VBL_VALID_RANGE	10	11396	666756
MDC_ECG_CTL_VBL_PAD_VALUE	10	11397	666757
MDC_ECG_CTL_VBL_TIME_SKEW	10	11398	666758
MDC_ECG_CTL_VBL_SAMPLE_SKEW	10	11399	666759
MDC_ECG_CTL_VBL_TIME_OFFSET	10	11400	666760
MDC_ECG_CTL_VBL_QTC_METHOD	10	11401	666761
MDC_ECG_CTL_VBL_ATTR_FILTER_LOW_PASS	10	11402	666762
MDC_ECG_CTL_VBL_ATTR_FILTER_CUTOFF_FREQ	10	11403	666763
MDC_ECG_CTL_VBL_ATTR_FILTER_HIGH_PASS	10	11404	666764
MDC_ECG_CTL_VBL_ATTR_FILTER_ORDER	10	11405	666765
MDC_ECG_CTL_VBL_ATTR_FILTER_DESCRIPTION	10	11406	666766
MDC_ECG_CTL_VBL_ATTR_FILTER_NOTCH	10	11407	666767
MDC_ECG_CTL_VBL_ATTR_FILTER_NOTCH_FREQ	10	11408	666768
MDC_ECG_CTL_VBL_ATTR_FILTER_NOTCH_BANDWIDTH	10	11409	666769
MDC_ECG_CTL_VBL_ATTR_FILTER_DESCRIPTION	10	11410	666770
MDC_ECG_CTL_VBL_BASELINE	10	11411	666771
MDC_ECG_CTL_VBL_BASELINE_DESC	10	11412	666772
MDC_ECG_CTL_VBL_BASELINE_ORDER	10	11413	666773
MDC_ECG_CTL_VBL_INTERPOLATOR	10	11414	666774
MDC_ECG_CTL_VBL_INTERPOLATOR_SRC_SAMP_RATE	10	11415	666775
MDC_ECG_CTL_VBL_INTERPOLATOR_DESC	10	11416	666776
MDC_ECG_CTL_VBL_INTERPOLATOR_ORDER	10	11417	666777
MDC_ECG_CTL_VBL_INTERPOLATOR_SNR	10	11418	666778
MDC_ECG_CTL_VBL_DISPLAYED_SIZE	10	11419	666779
MDC_ECG_CTL_VBL_DISPLAYED_COLOR	10	11420	666780
MDC_ECG_CTL_VBL_DISPLAYED_SWEEP_RATE	10	11421	666781
MDC_ECG_CTL_VBL_ATTR_RHTYHM	10	11422	666782

REFID	PART	CODE10	CF_CODE10
MDC_ECG_CTL_VBL_ATTR_AV_COND	10	11423	666783
MDC_ECG_CTL_VBL_ATTR_SA_COND	10	11424	666784
MDC_ECG_CTL_VBL_ATTR_RHYTHM_CRITERIA	10	11425	666785
MDC_ECG_CTL_VBL_ATTR_RHYTHM_CODE	10	11426	666786
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_HIGH_GT	10	11427	666787
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_HIGH_GE	10	11428	666788
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_LOW_LT	10	11429	666789
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_LOW_LE	10	11430	666790
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_LOW_GT	10	11431	666791
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_LOW_GE	10	11432	666792
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_HIGH_LT	10	11433	666793
MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_HIGH_LE	10	11434	666794
MDC_ECG_QRS_TYPE	2	16188	147260
MDC_ECG_QRS_MORPH_NUM	10	11328	666688
MDC_ECG_VPC_FOCUS_NUM	10	11329	666689
MDC_ECG_NOISE_TYPE	10	11330	666690
MDC_ECG_BEAT_TOC	10	11331	666691
MDC_ECG_RHYTHM_TYPE	10	11332	666692
MDC_ECG_RHYTHM_AV_COND	10	11333	666693
MDC_ECG_RHYTHM_SA_COND	10	11334	666694
MDC_ECG_WAVC_TYPE	10	11335	666695
MDC_ECG_WAVP_TYPE	10	11336	666696
MDC_ECG_WAVC_ONSET	10	11337	666697
MDC_ECG_WAVC_OFFSET	10	11338	666698
MDC_ECG_WAVC_PEAK	10	11339	666699
MDC_ECG_WAVC_OTHER	10	11340	666700
MDC_ECG_INTERPRETATION	10	11341	666701
MDC_ECG_INTERPRETATION_STATEMENT	10	11342	666702
MDC_ECG_INTERPRETATION_COMMENT	10	11343	666703
MDC_ECG_INTERPRETATION_SUMMARY	10	11344	666704

Annex C

(informative)

Schema and XML for annotated ECG nomenclature

C.1 Overview

This annex includes the Schema and XML files that specify the computable representation of this nomenclature and the XSLT transforms that were used to prepare it for publication as this standard.

A notable contribution of this work is that it defines a unified representation that has been used by other standardization efforts that extend the IEEE 11073 nomenclature, including IEEE Std 11073-10103 nomenclature, the Integrating the Healthcare Enterprise Patient Care Devices (IHE PCD) Rosetta Terminology Mapping (RTM), and NIST Rosetta Terminology Mapping Management System (RTMMS), in addition to this standard. In particular, the «**terms.8f.xsd**», «**discrims.8f.xsd**» Schema and «**tableOutput.8g.xsl**» transform can be, and have been, used interchangeably across all three nomenclature efforts. As a consequence, these files support additional capabilities not necessarily required for this standard that are invoked when specific data fields are present (or not).

The subsequent sections contain the following:

- C.2: The XML Schema for the files that define the normative base nomenclature «**terms.8f.xsd**».
- C.3: The XML Schema for the files that define the discriminators «**discrims.8f.xsd**».
- C.4: The XML document that defines the discriminators referenced by the base nomenclature **«ECG_ANN_discrims.8g.xml»**.
- C.5 through C.15: The XML documents that define the normative base nomenclature.
- C.16: The XSLT transform used to produce the tabular listings of base terms in A.3 through A.13. *This transform is applied to each of the files in C.5 through C.15 (e.g., «**tableOutput.8g.xsl**» is applied to «ECG_RHY_terms.8g.xml» to produce «ECG_RHY_**tableOutput.**8g.**html**»).*
- C.17: The XSLT transform used to expand *all* the base terms using discriminators and to calculate numeric codes for each of the expanded terms. *This transform is applied to each of the files in C.5 through C.15 (e.g., «**codeOutput.8g.xsl**» is applied to «ECG_RHY_terms.8g.xml» to produce «ECG_RHY_**codeOutput**.8g.**xml**». The latter set of files is used as input by «consolidatedTableOutput.8g.xsl»).*
- C.18: The XSLT transform used to produce the consolidated tabular listing of expanded based terms in B.2. *The «**consolidatedTableOutput.8g.xsl**» transform references each of the «xxx_**codeOutput**.8g.**xml**» files previously created into a single table listing the REFID, PART, CODE10, and CF_CODE10. Due to the size of the consolidated table, the expanded discriminator terms are included only for the first base term of each file followed by the remaining unexpanded base terms.*
- C.19: Example of a subset of the expanded base terms and codes produced by «codeOutput.8g.xsl».

NOTE—The XML Schema, XSLT transforms, and XML data files contained in this annex are available at the following URL: http://standards.ieee.org/downloads/11073/.

C.2 Schema for terms «terms.8f.xsd»

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2008 rel. 2 sp1 (http://www.altova.com) by Paul Schluter (GE Healthcare) -->
<!-- file:  terms.8f.xsd -->
<!-- Schema for IEEE Std 11073-10102 aECG and IEEE Std 11073-10103 IDC Nomenclature Terms -->
<!-- Paul Schluter  2009-04-30T16 -->
<xs:schema xmlns="http://www.ieee.org/11073/nomenclature" xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://www.ieee.org/11073/nomenclature" elementFormDefault="qualified">
   <!-- -->
   <!-- Type definitions -->
   <!-- -->
   <xs:simpleType name="ListOfUnitsIEEE">
      <xs:list itemType="xs:token"/>
   </xs:simpleType>
   <xs:simpleType name="ListOfUnitsUCUM">
      <xs:list itemType="xs:token"/>
   </xs:simpleType>
   <xs:simpleType name="ListOfEnums">
      <xs:list itemType="xs:token"/>
   </xs:simpleType>
   <xs:simpleType name="ListOfEnumGroups">
      <xs:list itemType="xs:token"/>
   </xs:simpleType>
   <xs:simpleType name="ListOfUnitGroups">
      <xs:list itemType="xs:token"/>
   </xs:simpleType>
   <xs:simpleType name="ListOfEnumCard">
      <xs:restriction base="xs:string">
         <xs:pattern value="(0\.\.1|0\.\.\*|1\.\.1|1\.\.\*)(\s((token(\srefid)?)|(refid(\stoken)?)))?"/>
      </xs:restriction>
   </xs:simpleType>
   <xs:simpleType name="CanonicalUnitDimensions">
      <xs:restriction base="xs:string">
         <xs:pattern value="(L-?\d?)?(M-?\d?)?(T-?\d?)?(I-?\d?)?(Q-?\d?)?(N-?\d?)?(J-?\d?)?(\[arb\])?"/>
      </xs:restriction>
   </xs:simpleType>
   <xs:simpleType name="ListOfVendorID">
      <xs:list itemType="xs:token"/>
   </xs:simpleType>
   <xs:simpleType name="ListOfDataType">
      <xs:list itemType="xs:token"/>
   </xs:simpleType>
   <!-- -->
   <!-- Term partition definition -->
   <!-- -->
   <xs:element name="partition">
      <xs:complexType>
         <xs:sequence>
            <!-- -->
            <xs:element name="partitionDescription">
               <xs:complexType>
                  <xs:sequence>
                     <xs:element name="title" type="xs:string"/>
                     <xs:element name="date" type="xs:date"/>
                     <xs:element name="version" type="xs:string"/>
                     <xs:element name="component" type="xs:string" minOccurs="0"/>
                     <xs:element name="discriminatorRef" minOccurs="0" maxOccurs="10">
                        <xs:complexType>
                           <xs:attribute name="idref" type="xs:token" use="required"/>
                        </xs:complexType>
                     </xs:element>
                     <xs:element name="basePart" type="xs:unsignedShort" minOccurs="0"/>
                     <xs:element name="baseCode" type="xs:unsignedShort" minOccurs="0"/>
                  </xs:sequence>
               </xs:complexType>
            </xs:element>
            <!-- -->
            <xs:element name="Terms" minOccurs="0">
               <xs:complexType>
                  <xs:sequence maxOccurs="unbounded">
                     <xs:element name="term" minOccurs="0" maxOccurs="unbounded">
                        <xs:complexType>
                           <xs:sequence>
                              <xs:sequence maxOccurs="unbounded">
                                 <xs:choice>
                                    <xs:element name="REFID" type="xs:string"/>
                                    <xs:element name="SysName" type="xs:string"/>
```

```
                    <xs:element name="Description">
                      <xs:complexType mixed="true">
                        <xs:sequence minOccurs="0" maxOccurs="unbounded">
                          <xs:element name="sidenote" type="xs:string" minOccurs="0"/>
                          <xs:element name="bullet" type="xs:string" minOccurs="0"/>
                          <xs:element name="footnote" type="xs:string" minOccurs="0"/>
                        </xs:sequence>
                      </xs:complexType>
                    </xs:element>
                    <xs:element name="DisplayName" type="xs:string" minOccurs="0"/>
                    <xs:element name="CommonTerm" type="xs:string" minOccurs="0"/>
                    <xs:element name="Mnemonic" minOccurs="0">
                      <xs:complexType>
                        <xs:simpleContent>
                          <xs:extension base="xs:string">
                            <xs:attribute name="indent" type="xs:unsignedShort" default="0"/>
                          </xs:extension>
                        </xs:simpleContent>
                      </xs:complexType>
                    </xs:element>
                    <xs:element name="PART" type="xs:unsignedShort" minOccurs="0"/>
                    <xs:element name="CODE10" type="xs:unsignedShort"/>
                    <xs:element name="CF_CODE10" type="xs:unsignedInt" minOccurs="0"/>
                    <xs:element name="UOM_UCUM" type="ListOfUnitsUCUM" minOccurs="0"/>
                    <xs:element name="UOM_MDC" type="ListOfUnitsIEEE" minOccurs="0"/>
                    <xs:element name="UPART" type="xs:unsignedShort" minOccurs="0"/>
                    <xs:element name="UCODE10" type="xs:unsignedShort" minOccurs="0">
                      <xs:annotation>
                        <xs:documentation>(deprecated)</xs:documentation>
                      </xs:annotation>
                    </xs:element>
                    <xs:element name="CF_UCODE10" type="xs:unsignedInt" minOccurs="0">
                      <xs:annotation>
                        <xs:documentation>(deprecated)</xs:documentation>
                      </xs:annotation>
                    </xs:element>
                    <xs:element name="DIM" type="CanonicalUnitDimensions" minOccurs="0"/>
                    <xs:element name="Enum_Values" type="ListOfEnums" minOccurs="0"/>
                    <xs:element name="Enum_Card" type="ListOfEnumCard" minOccurs="0"/>
                    <xs:element name="External_Sites" type="ListOfEnums" minOccurs="0"/>
                    <xs:element name="DataType" type="ListOfDataType" minOccurs="0"/>
                    <!-- the following columns/elements provide additional information about each term -->
                    <xs:element name="scp" type="xs:string" minOccurs="0"/>
                    <xs:element name="scp-ref" type="xs:string" minOccurs="0"/>
                    <xs:element name="mit-bih" type="xs:string" minOccurs="0"/>
                    <xs:element name="other" type="xs:string" minOccurs="0"/>
                    <xs:element name="auxinfo" type="xs:string" minOccurs="0"/>
                    <xs:element name="note" type="xs:string" minOccurs="0"/>
                  </xs:choice>
                </xs:sequence>
                <xs:sequence>
                  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
              </xs:sequence>
              <xs:attribute name="exclude" type="xs:string"/>
            </xs:complexType>
          </xs:element>
          <xs:element name="termSectionTitle" minOccurs="0">
            <xs:complexType mixed="true">
              <xs:sequence minOccurs="0" maxOccurs="unbounded">
                <xs:element name="footnote" type="xs:string" minOccurs="0"/>
              </xs:sequence>
            </xs:complexType>
          </xs:element>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <!-- -->
    <xs:element name="note" type="xs:string" minOccurs="0" maxOccurs="unbounded"/>
    <!-- -->
    <xs:element name="Enums" minOccurs="0">
      <xs:annotation>
        <xs:documentation>Local enums are searched first followed by common enums in an external file.</xs:documentation>
      </xs:annotation>
      <xs:complexType>
        <xs:sequence>
          <xs:element name="term" minOccurs="0" maxOccurs="unbounded">
            <xs:complexType>
              <xs:sequence>
                <xs:sequence maxOccurs="unbounded">
```

```
                        <xs:choice>
                          <xs:element name="_ENUM_GROUPS" type="ListOfEnumGroups"/>
                          <xs:element name="GroupDescription" type="xs:string"/>
                          <xs:element name="TOKEN" type="xs:string"/>
                          <xs:element name="REFID" type="xs:token"/>
                          <xs:element name="PART" type="xs:unsignedShort" minOccurs="0"/>
                          <xs:element name="CODE10" type="xs:unsignedShort" minOccurs="0"/>
                          <xs:element name="CF_CODE10" type="xs:unsignedInt" minOccurs="0"/>
                          <xs:element name="DisplayName" type="xs:string" minOccurs="0"/>
                          <xs:element name="CommonTerm" type="xs:string" minOccurs="0"/>
                          <xs:element name="Description" type="xs:string" minOccurs="0"/>
                          <xs:element name="ApplicationDescription" type="xs:string" minOccurs="0"/>
                          <xs:element name="VendorID" type="ListOfVendorID" minOccurs="0"/>
                          <xs:element name="Discussion" type="xs:string" minOccurs="0"/>
                        </xs:choice>
                      </xs:sequence>
                    </xs:sequence>
                  </xs:complexType>
                </xs:element>
              </xs:sequence>
            </xs:complexType>
          </xs:element>
          <!-- -->
          <xs:element name="Units" minOccurs="0">
            <xs:annotation>
              <xs:documentation>Units are located in a common external file.</xs:documentation>
            </xs:annotation>
            <xs:complexType>
              <xs:sequence>
                <xs:element name="term" maxOccurs="unbounded">
                  <xs:complexType>
                    <xs:all>
                      <xs:element name="Dimension" type="xs:string" minOccurs="0"/>
                      <xs:element name="Unit_of_Measure" type="xs:string" minOccurs="0"/>
                      <xs:element name="Symbol" type="xs:unsignedShort" minOccurs="0"/>
                      <xs:element name="UOM_UCUM" type="ListOfUnitsUCUM"/>
                      <xs:element name="REFID" type="xs:token"/>
                      <xs:element name="CODE10" type="xs:unsignedShort" minOccurs="0"/>
                      <xs:element name="DIM" type="CanonicalUnitDimensions" minOccurs="0"/>
                      <xs:element name="_UOM_GROUPS" type="ListOfUnitGroups" minOccurs="0"/>
                      <xs:element name="Discussion" type="xs:string" minOccurs="0"/>
                    </xs:all>
                  </xs:complexType>
                </xs:element>
              </xs:sequence>
            </xs:complexType>
          </xs:element>
          <!-- -->
        </xs:sequence>
      </xs:complexType>
    </xs:element>
</xs:schema>
```

C.3 Schema for Discriminators «discrims.8f.xsd»

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2008 rel. 2 sp1 (http://www.altova.com) by Paul Schluter (GE Healthcare) -->
<!-- file: discrims.v0.8f.xsd -->
<!-- Schema for IEEE Std 11073-10102 aECG and IEEE Std 11073-10103 IDC Discriminators -->
<!-- Paul Schluter 2009-04-30 -->
<!-- Added support for local <Enum> table based on IHE PCD RTM 2009-01-17 -->
<!-- 2009-04-30 Edited/transformed to conform to terms.8f.xsd (harmonized with IDCO and RTM) -->
<xs:schema xmlns="http://www.ieee.org/11073/nomenclature" xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://www.ieee.org/11073/nomenclature" elementFormDefault="qualified">
  <xs:element name="discriminators">
    <xs:complexType>
      <xs:sequence maxOccurs="unbounded">
        <xs:element name="discriminator" maxOccurs="unbounded">
          <xs:annotation>
            <xs:documentation>Discriminator set.</xs:documentation>
          </xs:annotation>
          <xs:complexType>
            <xs:sequence>
              <xs:element name="dDescription1" type="xs:string">
                <xs:annotation>
                  <xs:documentation>Primary descriptive text.</xs:documentation>
                </xs:annotation>
              </xs:element>
```

```
<xs:element name="dDescription2" type="xs:string" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Secondary descriptive text.</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="date" type="xs:date" minOccurs="0"/>
<xs:element name="version" type="xs:string" minOccurs="0"/>
<xs:element name="dCase" type="xs:string">
  <xs:annotation>
    <xs:documentation>Short token identifier.</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="dBits" type="xs:string">
  <xs:annotation>
    <xs:documentation>Width in bits.</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="discrim" maxOccurs="unbounded">
  <xs:complexType>
    <xs:all>
      <xs:element name="dSuffix" type="xs:string">
        <xs:annotation>
          <xs:documentation>Suffix for RefID, e.g. _MIN.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="dOffset" type="xs:string">
        <xs:annotation>
          <xs:documentation>Offset, 0 - ...</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="dDescription" minOccurs="0">
        <xs:annotation>
          <xs:documentation>Descriptive text.</xs:documentation>
        </xs:annotation>
        <xs:complexType mixed="true">
          <xs:sequence minOccurs="0" maxOccurs="unbounded">
            <xs:element name="footnote" type="xs:string" minOccurs="0"/>
            <xs:element name="note" type="xs:string" minOccurs="0"/>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
      <xs:element name="UOM_UCUM" type="xs:string" minOccurs="0">
        <xs:annotation>
          <xs:documentation>UOM_UCUM override.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="UOM_MDC" type="xs:string" minOccurs="0">
        <xs:annotation>
          <xs:documentation>UOM_MDC override.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="DataType" type="xs:string" minOccurs="0">
        <xs:annotation>
          <xs:documentation>DataType override.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <!-- the following columns/elements provide additional information about each discriminator -->
      <xs:element name="bi-uni" type="xs:string" minOccurs="0">
        <xs:annotation>
          <xs:documentation>ECG leads: bipolar-unipolar.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="pos" type="xs:string" minOccurs="0">
        <xs:annotation>
          <xs:documentation>+/exploring electrode site.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="neg-ref" type="xs:string" minOccurs="0">
        <xs:annotation>
          <xs:documentation>-/reference electrode site.</xs:documentation>
        </xs:annotation>
      </xs:element>
    </xs:all>
  </xs:complexType>
</xs:element>
</xs:sequence>
<xs:attribute name="id" type="xs:string" use="required">
  <xs:annotation>
    <xs:documentation>Discriminator set identifer.</xs:documentation>
  </xs:annotation>
```

```
            </xs:attribute>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

C.4 ECG Annotation Discriminators «ECG_ANN_discrims.8g.xml»

```
<?xml version="1.0" encoding="UTF-8"?>
<discriminators xmlns="http://www.ieee.org/11073/nomenclature" xsi:schemaLocation="http://www.ieee.org/11073/nomenclature
discrims.8f.xsd" xmlns:v="http://www.vendor.com" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <!-- 2007-09-03    Originally created/edited by Paul Schluter to fully conform to ecg_nom5c.doc -->
  <!-- 2008-01-16    Added ECG lead discriminators -->
  <!-- 2009-04-30    Edited/transformed to conform to discrims.8f.xsd (harmonized with IDCO and RTM) -->
  <!-- 2012-06-13 8g   Changed ECG_LEAD dSuffix _CONFIG to <null> for dOffset = 0 (for all perLead variables).
                       The term MDC_ECG_LEAD_CONFIG (CF_CODE = 0) is now handled as a special case by XSLT. -->
  <!-- 2012-09-26 8g   Based on recommendations by Dr. Paul Steiner (Heart Rhythm Society), the following changes were made:
                       The formerly unused WAVP discriminators 3, 7, 11 and 15 now indicate pacemaker "fusion".
                       Reworded concept descriptions regarding {unspecified appropriateness, appropriate, inappropriate and
transient/testing/manual}
                       The last set of four discriminators (12-15) now indicate transient/testing/manual exception codes.
                       The concepts {spike expected but missing, loss of output and failure to output} are now conveyed by MDC_ECG_RHY_
... .
                       This is version "8g" (0.8.7) for publication in IEEE 11073-10102 (D03)  -->
  <!-- 2012-09-27 8g   Updated several footnotes to match IEEE publication needs. -->
  <!-- -->
  <!-- WAVC ASSN -->
  <!-- -->
  <discriminator id="MDC_ECG_discrim_WAVC_ASSN">
    <dDescription1>WAVC Association (ASSN) discriminators</dDescription1>
    <dDescription2>Choices=4, Default=0:  null.  Choices restricted per WAVC type.</dDescription2>
    <dCase>ASSN</dCase>
    <dBits>2</dBits>
    <discrim>
      <dSuffix/>
      <dOffset>0</dOffset>
      <dDescription>Unknown Association</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_NA</dSuffix>
      <dOffset>1</dOffset>
      <dDescription>Not Associated with a beat</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_FB</dSuffix>
      <dOffset>2</dOffset>
      <dDescription>Associated with Following Beat</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_PB</dSuffix>
      <dOffset>3</dOffset>
      <dDescription>Associated with Previous Beat</dDescription>
    </discrim>
  </discriminator>
  <!-- -->
  <!-- WAVC and WAVP AOI -->
  <!-- -->
  <discriminator id="MDC_ECG_discrim_WAVC_AOI">
    <dDescription1>WAVC and WAVP Area of Interest (AOI) discriminators</dDescription1>
    <dDescription2>Choices=16, Default=0:  null.</dDescription2>
    <dCase>AOI</dCase>
    <dBits>4</dBits>
    <discrim>
      <dSuffix/>
      <dOffset>0</dOffset>
      <dDescription>{AOI NOS}</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_TIME_POINT</dSuffix>
      <dOffset>1</dOffset>
      <dDescription>Point-in-time</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_DURN</dSuffix>
      <dOffset>2</dOffset>
      <dDescription>Duration (width)</dDescription>
```

```
    </discrim>
    <discrim>
      <dSuffix>_PEAK</dSuffix>
      <dOffset>3</dOffset>
      <dDescription>Peak (time-of)</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_ONSET</dSuffix>
      <dOffset>4</dOffset>
      <dDescription>Actual Onset Point</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_OFFSET</dSuffix>
      <dOffset>5</dOffset>
      <dDescription>Actual Offset Point</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_ONSET_IMPL</dSuffix>
      <dOffset>6</dOffset>
      <dDescription>Implied Onset Point</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_OFFSET_IMPL</dSuffix>
      <dOffset>7</dOffset>
      <dDescription>Implied Offset Point</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_AREA</dSuffix>
      <dOffset>8</dOffset>
      <dDescription>Area</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_INTEGRAL</dSuffix>
      <dOffset>9</dOffset>
      <dDescription>Integral</dDescription>
    </discrim>
  </discriminator>
  <!-- -->
  <!-- WAVP APPR and ASSN -->
  <!-- -->
  <discriminator id="MDC_ECG_discrim_WAVP_APPR_ASSN">
    <dDescription1>WAVP Appropriateness and Association discriminators</dDescription1>
    <dDescription2>Choices=16, Default=0:  null.</dDescription2>
    <dCase>APPR_ASSN</dCase>
    <dBits>4</dBits>
    <discrim>
      <dSuffix/>
      <dOffset>0</dOffset>
      <dDescription>pacing stimulus, unspecified appropriateness, uncertain capture</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_NC</dSuffix>
      <dOffset>1</dOffset>
      <dDescription>pacing stimulus, unspecified appropriateness, no capture</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_C</dSuffix>
      <dOffset>2</dOffset>
      <dDescription>pacing stimulus, unspecified appropriateness, captured</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_FSN</dSuffix>
      <dOffset>3</dOffset>
      <dDescription>pacing stimulus, unspecified appropriateness, fusion</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_APPR</dSuffix>
      <dOffset>4</dOffset>
      <dDescription>pacing stimulus, appropriate, uncertain capture</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_APPR_NC</dSuffix>
      <dOffset>5</dOffset>
      <dDescription>pacing stimulus, appropriate, no capture</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_APPR_C</dSuffix>
      <dOffset>6</dOffset>
      <dDescription>pacing stimulus, appropriate, captured</dDescription>
    </discrim>
```

```
    <discrim>
      <dSuffix>_APPR_FSN</dSuffix>
      <dOffset>7</dOffset>
      <dDescription>pacing stimulus, appropriate, fusion</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_INAPPR</dSuffix>
      <dOffset>8</dOffset>
      <dDescription>pacing stimulus, inappropriate, uncertain capture</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_INAPPR_NC</dSuffix>
      <dOffset>9</dOffset>
      <dDescription>pacing stimulus, inappropriate, no capture</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_INAPPR_C</dSuffix>
      <dOffset>10</dOffset>
      <dDescription>pacing stimulus, inappropriate, captured</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_INAPPR_FSN</dSuffix>
      <dOffset>11</dOffset>
      <dDescription>pacing stimulus, inappropriate, fusion</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_EXCP</dSuffix>
      <dOffset>12</dOffset>
      <dDescription>pacing stimulus, transient/testing/manual exception, uncertain capture</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_EXCP_NC</dSuffix>
      <dOffset>13</dOffset>
      <dDescription>pacing stimulus, transient/testing/manual exception, no capture</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_EXCP_C</dSuffix>
      <dOffset>14</dOffset>
      <dDescription>pacing stimulus, transient/testing/manual exception, captured</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_EXCP_FSN</dSuffix>
      <dOffset>15</dOffset>
      <dDescription>pacing stimulus, transient/testing/manual exception, fusion</dDescription>
    </discrim>
  </discriminator>
  <!-- -->
  <!-- BEAT, RHYTHM and NOISE discriminators -->
  <!-- -->
  <discriminator id="MDC_ECG_discrim_BEAT_RHYTHM_NOISE">
    <dDescription1>BEAT, RHYTHM and NOISE Discriminators</dDescription1>
    <dDescription2>Choices=16, Default=0:  null.</dDescription2>
    <dCase>BEAT_RHYTHM_NOISE</dCase>
    <dBits>4</dBits>
    <discrim>
      <dSuffix/>
      <dOffset>0</dOffset>
      <dDescription>{base pattern}</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_TIME_POINT</dSuffix>
      <dOffset>1</dOffset>
      <dDescription>time point</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_DURN</dSuffix>
      <dOffset>2</dOffset>
      <dDescription>duration</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_PEAK</dSuffix>
      <dOffset>3</dOffset>
      <dDescription>peak</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_ONSET</dSuffix>
      <dOffset>4</dOffset>
      <dDescription>onset (start)</dDescription>
    </discrim>
    <discrim>
```

```
      <dSuffix>_OFFSET</dSuffix>
      <dOffset>5</dOffset>
      <dDescription>offset (end)</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_ONSET_IMPL</dSuffix>
      <dOffset>6</dOffset>
      <dDescription>implied onset (start)</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_OFFSET_IMPL</dSuffix>
      <dOffset>7</dOffset>
      <dDescription>implied offset (end)</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_EVENT</dSuffix>
      <dOffset>8</dOffset>
      <dDescription>event</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_COUNT</dSuffix>
      <dOffset>9</dOffset>
      <dDescription>count (of events)</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_RATE</dSuffix>
      <dOffset>10</dOffset>
      <dDescription>rate (of event)</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_RATE_MAX</dSuffix>
      <dOffset>11</dOffset>
      <dDescription>maximum rate</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_RATE_MIN</dSuffix>
      <dOffset>12</dOffset>
      <dDescription>minimum rate</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_RATE_MEAN</dSuffix>
      <dOffset>13</dOffset>
      <dDescription>mean (average) rate</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_TIME</dSuffix>
      <dOffset>14</dOffset>
      <dDescription>time of event (nonspecific)</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_ANNOT</dSuffix>
      <dOffset>15</dOffset>
      <dDescription>annotation</dDescription>
    </discrim>
  </discriminator>
  <!-- -->
  <!-- Statistical Discriminators _MAX, _MIN, _MEAN -->
  <!-- -->
  <discriminator id="MDC_ECG_discrim_STATISTICAL">
    <dDescription1>Statistical Discriminators</dDescription1>
    <dDescription2>Choices=4, Default=0:  null.</dDescription2>
    <dCase>STATISTICAL</dCase>
    <dBits>2</dBits>
    <discrim>
      <dSuffix/>
      <dOffset>0</dOffset>
      <dDescription>not specified</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_MAX</dSuffix>
      <dOffset>1</dOffset>
      <dDescription>maximum value observed over an interval</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_MIN</dSuffix>
      <dOffset>2</dOffset>
      <dDescription>minimum value observed over an interval</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_MEAN</dSuffix>
```

```
      <dOffset>3</dOffset>
      <dDescription>mean value observed over an interval</dDescription>
    </discrim>
  </discriminator>
  <!-- -->
  <!-- PACEMAKER CHAMBER *** -->
  <!-- -->
  <discriminator id="CHAMBER">
    <dDescription1>Pacemaker Chamber</dDescription1>
    <dDescription2>Choices=4, no default permitted.</dDescription2>
    <dCase>CHAMBER</dCase>
    <dBits>2</dBits>
    <discrim>
      <dSuffix>_RA</dSuffix>
      <dOffset>0</dOffset>
      <dDescription>Right Atrial</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_RV</dSuffix>
      <dOffset>1</dOffset>
      <dDescription>Right Ventricular</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_LA</dSuffix>
      <dOffset>2</dOffset>
      <dDescription>Left Atrial</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_LV</dSuffix>
      <dOffset>3</dOffset>
      <dDescription>Left Ventricular</dDescription>
    </discrim>
  </discriminator>
  <!-- ------------------------------------------------------------ -->
  <!-- ECG LEADS -->
  <!-- ------------------------------------------------------------ -->
  <discriminator id="MDC_ECG_discrim_LEADS">
    <dDescription1>ECG Leads</dDescription1>
    <dDescription2>2008-01-16</dDescription2>
    <dCase>ECG_LEAD</dCase>
    <dBits>8</dBits>
    <discrim>
      <dSuffix/>
      <dOffset>0</dOffset>
      <dDescription>Unspecified lead (else MDC_ECG_LEAD_CONFIG)</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_I</dSuffix>
      <dOffset>1</dOffset>
      <dDescription>Lead I<note>SCP:  The Einthoven lead one (coded with the Roman I; lead ID's 1 and 31) should not be confused
with the Frank electrode I (eye; lead ID's 24 and 54).</note>
      </dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>LA</pos>
      <neg-ref>RA</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dI</dSuffix>
      <dOffset>31</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_II</dSuffix>
      <dOffset>2</dOffset>
      <dDescription>Lead II</dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>LL</pos>
      <neg-ref>RA</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dII</dSuffix>
      <dOffset>32</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_V1</dSuffix>
      <dOffset>3</dOffset>
      <dDescription>V1</dDescription>
      <bi-uni>unipolar</bi-uni>
      <pos>1</pos>
      <neg-ref>WCT</neg-ref>
    </discrim>
```

```
<discrim>
  <dSuffix>_dV1</dSuffix>
  <dOffset>33</dOffset>
</discrim>
<discrim>
  <dSuffix>_V2</dSuffix>
  <dOffset>4</dOffset>
  <dDescription>V2</dDescription>
  <bi-uni>unipolar</bi-uni>
  <pos>2</pos>
  <neg-ref>WCT</neg-ref>
</discrim>
<discrim>
  <dSuffix>_dV2</dSuffix>
  <dOffset>34</dOffset>
</discrim>
<discrim>
  <dSuffix>_V3</dSuffix>
  <dOffset>5</dOffset>
  <dDescription>V3</dDescription>
  <bi-uni>unipolar</bi-uni>
  <pos>3</pos>
  <neg-ref>WCT</neg-ref>
</discrim>
<discrim>
  <dSuffix>_dV3</dSuffix>
  <dOffset>35</dOffset>
</discrim>
<discrim>
  <dSuffix>_V4</dSuffix>
  <dOffset>6</dOffset>
  <dDescription>V4</dDescription>
  <bi-uni>unipolar</bi-uni>
  <pos>4</pos>
  <neg-ref>WCT</neg-ref>
</discrim>
<discrim>
  <dSuffix>_dV4</dSuffix>
  <dOffset>36</dOffset>
</discrim>
<discrim>
  <dSuffix>_V5</dSuffix>
  <dOffset>7</dOffset>
  <dDescription>V5</dDescription>
  <bi-uni>unipolar</bi-uni>
  <pos>5</pos>
  <neg-ref>WCT</neg-ref>
</discrim>
<discrim>
  <dSuffix>_dV5</dSuffix>
  <dOffset>37</dOffset>
</discrim>
<discrim>
  <dSuffix>_V6</dSuffix>
  <dOffset>8</dOffset>
  <dDescription>V6</dDescription>
  <bi-uni>unipolar</bi-uni>
  <pos>6</pos>
  <neg-ref>WCT</neg-ref>
</discrim>
<discrim>
  <dSuffix>_dV6</dSuffix>
  <dOffset>38</dOffset>
</discrim>
<discrim>
  <dSuffix>_V7</dSuffix>
  <dOffset>9</dOffset>
  <dDescription>V7</dDescription>
  <bi-uni>unipolar</bi-uni>
  <pos>7</pos>
  <neg-ref>WCT</neg-ref>
</discrim>
<discrim>
  <dSuffix>_dV7</dSuffix>
  <dOffset>39</dOffset>
</discrim>
<discrim>
  <dSuffix>_V2R</dSuffix>
  <dOffset>10</dOffset>
  <dDescription>V2R<note>V2R is identical to lead V1.  Similarly, lead V1R is identical to lead V2.</note>
```

```
        </dDescription>
        <bi-uni>unipolar</bi-uni>
        <pos>2R</pos>
        <neg-ref>WCT</neg-ref>
      </discrim>
      <discrim>
        <dSuffix>_dV2R</dSuffix>
        <dOffset>40</dOffset>
      </discrim>
      <discrim>
        <dSuffix>_V3R</dSuffix>
        <dOffset>11</dOffset>
        <dDescription>V3R</dDescription>
        <bi-uni>unipolar</bi-uni>
        <pos>3R</pos>
        <neg-ref>WCT</neg-ref>
      </discrim>
      <discrim>
        <dSuffix>_dV3R</dSuffix>
        <dOffset>41</dOffset>
      </discrim>
      <discrim>
        <dSuffix>_V4R</dSuffix>
        <dOffset>12</dOffset>
        <dDescription>V4R</dDescription>
        <bi-uni>unipolar</bi-uni>
        <pos>4R</pos>
        <neg-ref>WCT</neg-ref>
      </discrim>
      <discrim>
        <dSuffix>_dV4R</dSuffix>
        <dOffset>42</dOffset>
      </discrim>
      <discrim>
        <dSuffix>_V5R</dSuffix>
        <dOffset>13</dOffset>
        <dDescription>V5R</dDescription>
        <bi-uni>unipolar</bi-uni>
        <pos>5R</pos>
        <neg-ref>WCT</neg-ref>
      </discrim>
      <discrim>
        <dSuffix>_dV5R</dSuffix>
        <dOffset>43</dOffset>
      </discrim>
      <discrim>
        <dSuffix>_V6R</dSuffix>
        <dOffset>14</dOffset>
        <dDescription>V6R</dDescription>
        <bi-uni>unipolar</bi-uni>
        <pos>6R</pos>
        <neg-ref>WCT</neg-ref>
      </discrim>
      <discrim>
        <dSuffix>_dV6R</dSuffix>
        <dOffset>44</dOffset>
      </discrim>
      <discrim>
        <dSuffix>_V7R</dSuffix>
        <dOffset>15</dOffset>
        <dDescription>V7R</dDescription>
        <bi-uni>unipolar</bi-uni>
        <pos>7R</pos>
        <neg-ref>WCT</neg-ref>
      </discrim>
      <discrim>
        <dSuffix>_dV7R</dSuffix>
        <dOffset>45</dOffset>
      </discrim>
      <discrim>
        <dSuffix>_X</dSuffix>
        <dOffset>16</dOffset>
        <dDescription>X<note>SCP:  Leads X, Y and Z can be recorded by an orthogonal system, such as Frank or McFee lead systems,
etc.</note>
        </dDescription>
        <bi-uni>Frank or orthogonal</bi-uni>
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        <dSuffix>_dX</dSuffix>
        <dOffset>46</dOffset>
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   <dDescription>Y</dDescription>
   <bi-uni>Frank or orthogonal</bi-uni>
</discrim>
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   <dSuffix>_dY</dSuffix>
   <dOffset>47</dOffset>
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   <dDescription>Z</dDescription>
   <bi-uni>Frank or orthogonal</bi-uni>
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   <dOffset>48</dOffset>
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   <dOffset>19</dOffset>
   <dDescription>CC5, per V5 and V5R placement</dDescription>
   <bi-uni>bipolar</bi-uni>
   <pos>5</pos>
   <neg-ref>5R</neg-ref>
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   <dOffset>49</dOffset>
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   <dOffset>20</dOffset>
   <dDescription>CM5, per V5 placement</dDescription>
   <bi-uni>bipolar</bi-uni>
   <pos>5</pos>
   <neg-ref>manubrium</neg-ref>
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   <dOffset>50</dOffset>
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   <dSuffix>_LA</dSuffix>
   <dOffset>21</dOffset>
   <dDescription>Left Arm</dDescription>
   <bi-uni>unipolar</bi-uni>
   <pos>LA</pos>
   <neg-ref>RA+LA+LL=0</neg-ref>
</discrim>
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   <dSuffix>_dLA</dSuffix>
   <dOffset>51</dOffset>
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   <dOffset>22</dOffset>
   <dDescription>Right Arm</dDescription>
   <bi-uni>unipolar</bi-uni>
   <pos>RA</pos>
   <neg-ref>RA+LA+LL=0</neg-ref>
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   <dSuffix>_dRA</dSuffix>
   <dOffset>52</dOffset>
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   <dSuffix>_LL</dSuffix>
   <dOffset>23</dOffset>
   <dDescription>Left Leg</dDescription>
   <bi-uni>unipolar</bi-uni>
   <pos>LL</pos>
   <neg-ref>RA+LA+LL=0</neg-ref>
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   <dOffset>53</dOffset>
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   <dOffset>24</dOffset>
   <dDescription>I<note>Frank leads indicated by “f” for clarity and label uniqueness.</note>
   </dDescription>
   <bi-uni>Frank</bi-uni>
   <pos>fI</pos>
</discrim>
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   <dOffset>54</dOffset>
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   <dSuffix>_fE</dSuffix>
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   <dDescription>E</dDescription>
   <bi-uni>Frank</bi-uni>
   <pos>fE</pos>
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   <dOffset>55</dOffset>
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   <dDescription>C</dDescription>
   <bi-uni>Frank</bi-uni>
   <pos>fC</pos>
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   <dSuffix>_fA</dSuffix>
   <dOffset>27</dOffset>
   <dDescription>A</dDescription>
   <bi-uni>Frank</bi-uni>
   <pos>fA</pos>
</discrim>
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   <dOffset>57</dOffset>
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   <dOffset>28</dOffset>
   <dDescription>M</dDescription>
   <bi-uni>Frank</bi-uni>
   <pos>fM</pos>
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   <dOffset>58</dOffset>
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   <dOffset>29</dOffset>
   <dDescription>F</dDescription>
   <bi-uni>Frank</bi-uni>
   <pos>fF</pos>
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   <dOffset>59</dOffset>
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   <dDescription>H</dDescription>
   <bi-uni>Frank</bi-uni>
   <pos>fH</pos>
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      <dSuffix>_III</dSuffix>
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      <dDescription> III</dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>LL</pos>
      <neg-ref>LA</neg-ref>
    </discrim>
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      <dOffset>111</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_AVR</dSuffix>
      <dOffset>62</dOffset>
      <dDescription>aVR, augmented voltage, right</dDescription>
      <bi-uni>unipolar</bi-uni>
      <pos>RA</pos>
      <neg-ref>(LL+LA)/2</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dAVR</dSuffix>
      <dOffset>112</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_AVL</dSuffix>
      <dOffset>63</dOffset>
      <dDescription>aVL, augmented voltage, left</dDescription>
      <bi-uni>unipolar</bi-uni>
      <pos>LA</pos>
      <neg-ref>(LL+RA)/2</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dAVL</dSuffix>
      <dOffset>113</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_AVF</dSuffix>
      <dOffset>64</dOffset>
      <dDescription>aVF, augmented voltage, foot</dDescription>
      <bi-uni>unipolar</bi-uni>
      <pos>LL</pos>
      <neg-ref>(RA+LA)/2</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dAVF</dSuffix>
      <dOffset>114</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_AVRneg</dSuffix>
      <dOffset>65</dOffset>
      <dDescription>−aVR<note>The term “-aVR” is replaced with the more programming friendly term “aVRneg”.</note>
      </dDescription>
      <bi-uni>unipolar</bi-uni>
      <pos>-LL</pos>
      <neg-ref>(RA+LA)/2</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dAVRneg</dSuffix>
      <dOffset>115</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_V8</dSuffix>
      <dOffset>66</dOffset>
      <dDescription>V8<note>ANSI/AAMI EC71:2001 ECG lead identifier codes 66 to 85 are supported, in addition to codes 0 to
65.</note>
      </dDescription>
      <bi-uni>unipolar</bi-uni>
      <pos>8</pos>
      <neg-ref>WCT</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dV8</dSuffix>
      <dOffset>79</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_V9</dSuffix>
      <dOffset>67</dOffset>
      <dDescription>V9</dDescription>
      <bi-uni>unipolar</bi-uni>
      <pos>9</pos>
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```
    <neg-ref>WCT</neg-ref>
  </discrim>
  <discrim>
    <dSuffix>_dV9</dSuffix>
    <dOffset>80</dOffset>
  </discrim>
  <discrim>
    <dSuffix>_V8R</dSuffix>
    <dOffset>68</dOffset>
    <dDescription>V8R</dDescription>
    <bi-uni>unipolar</bi-uni>
    <pos>8R</pos>
    <neg-ref>WCT</neg-ref>
  </discrim>
  <discrim>
    <dSuffix>_dV8R</dSuffix>
    <dOffset>81</dOffset>
  </discrim>
  <discrim>
    <dSuffix>_V9R</dSuffix>
    <dOffset>69</dOffset>
    <dDescription>V9R</dDescription>
    <bi-uni>unipolar</bi-uni>
    <pos>9R</pos>
    <neg-ref>WCT</neg-ref>
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  <discrim>
    <dSuffix>_dV9R</dSuffix>
    <dOffset>82</dOffset>
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  <discrim>
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    <dOffset>70</dOffset>
    <dDescription>D (Nehb – Dorsal)</dDescription>
    <bi-uni>bipolar</bi-uni>
  </discrim>
  <discrim>
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    <dOffset>83</dOffset>
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  <discrim>
    <dSuffix>_A</dSuffix>
    <dOffset>71</dOffset>
    <dDescription>A (Nehb – Anterior)</dDescription>
    <bi-uni>bipolar</bi-uni>
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    <dSuffix>_dA</dSuffix>
    <dOffset>84</dOffset>
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  <discrim>
    <dSuffix>_J</dSuffix>
    <dOffset>72</dOffset>
    <dDescription>J (Nehb – Inferior)</dDescription>
    <bi-uni>bipolar</bi-uni>
  </discrim>
  <discrim>
    <dSuffix>_dJ</dSuffix>
    <dOffset>85</dOffset>
  </discrim>
  <discrim>
    <dSuffix>_DEFIB</dSuffix>
    <dOffset>73</dOffset>
    <dDescription>Defibrillator lead (typically anterior-lateral)</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>anterior</pos>
    <neg-ref>lateral</neg-ref>
  </discrim>
  <discrim>
    <dSuffix>_dDEFIB</dSuffix>
    <dOffset>135</dOffset>
  </discrim>
  <discrim>
    <dSuffix>_EXTERN</dSuffix>
    <dOffset>74</dOffset>
    <dDescription>External pacing lead (typically anterior-posterior)</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>anterior</pos>
    <neg-ref>posterior</neg-ref>
  </discrim>
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  <dOffset>136</dOffset>
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  <dSuffix>_A1</dSuffix>
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  <dDescription>A1 (Auxiliary unipolar lead #1)</dDescription>
  <bi-uni>unipolar</bi-uni>
  <pos>anywhere</pos>
  <neg-ref>WCT</neg-ref>
</discrim>
<discrim>
  <dSuffix>_dA1</dSuffix>
  <dOffset>137</dOffset>
</discrim>
<discrim>
  <dSuffix>_A2</dSuffix>
  <dOffset>76</dOffset>
  <dDescription>A2 (Auxiliary unipolar lead #2)</dDescription>
  <bi-uni>unipolar</bi-uni>
  <pos>anywhere</pos>
  <neg-ref>WCT</neg-ref>
</discrim>
<discrim>
  <dSuffix>_dA2</dSuffix>
  <dOffset>138</dOffset>
</discrim>
<discrim>
  <dSuffix>_A3</dSuffix>
  <dOffset>77</dOffset>
  <dDescription>A3 (Auxiliary unipolar lead #3)</dDescription>
  <bi-uni>unipolar</bi-uni>
  <pos>anywhere</pos>
  <neg-ref>WCT</neg-ref>
</discrim>
<discrim>
  <dSuffix>_dA3</dSuffix>
  <dOffset>139</dOffset>
</discrim>
<discrim>
  <dSuffix>_A4</dSuffix>
  <dOffset>78</dOffset>
  <dDescription>A4 (Auxiliary unipolar lead #4)</dDescription>
  <bi-uni>unipolar</bi-uni>
  <pos>anywhere</pos>
  <neg-ref>WCT</neg-ref>
</discrim>
<discrim>
  <dSuffix>_dA4</dSuffix>
  <dOffset>140</dOffset>
</discrim>
<discrim>
  <dSuffix>_C</dSuffix>
  <dOffset>86</dOffset>
  <dDescription>Chest lead<note>ECG lead identifier codes 86 and above are new, relative to ANSI/AAMI EC71:2001.</note>
  </dDescription>
  <bi-uni>generic</bi-uni>
</discrim>
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  <dSuffix>_dC</dSuffix>
  <dOffset>116</dOffset>
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  <dSuffix>_V</dSuffix>
  <dOffset>87</dOffset>
  <dDescription>Precordial lead</dDescription>
  <bi-uni>bipolar</bi-uni>
  <pos>NOS</pos>
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  <dSuffix>_dV</dSuffix>
  <dOffset>117</dOffset>
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<discrim>
  <dSuffix>_VR</dSuffix>
  <dOffset>88</dOffset>
  <dDescription>VR, nonaugmented voltage, vector of RA</dDescription>
  <bi-uni>unipolar</bi-uni>
  <pos>RA</pos>
```

```
    <neg-ref>RA+LA+LL=0</neg-ref>
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    <dSuffix>_dVR</dSuffix>
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  <discrim>
    <dSuffix>_VL</dSuffix>
    <dOffset>89</dOffset>
    <dDescription>VL, nonaugmented voltage, vector of LA</dDescription>
    <bi-uni>unipolar</bi-uni>
    <pos>LA</pos>
    <neg-ref>RA+LA+LL=0</neg-ref>
  </discrim>
  <discrim>
    <dSuffix>_dVL</dSuffix>
    <dOffset>119</dOffset>
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  <discrim>
    <dSuffix>_VF</dSuffix>
    <dOffset>90</dOffset>
    <dDescription>VF, nonaugmented voltage, vector of LL</dDescription>
    <bi-uni>unipolar</bi-uni>
    <pos>LL</pos>
    <neg-ref>RA+LA+LL=0</neg-ref>
  </discrim>
  <discrim>
    <dSuffix>_dVF</dSuffix>
    <dOffset>120</dOffset>
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    <dOffset>91</dOffset>
    <dDescription>Modified chest lead (left arm indifferent)</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>NOS</pos>
    <neg-ref>CL</neg-ref>
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  <discrim>
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    <dOffset>152</dOffset>
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    <dSuffix>_MCL1</dSuffix>
    <dOffset>92</dOffset>
    <dDescription>MCL, per V1 placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>1</pos>
    <neg-ref>CL</neg-ref>
  </discrim>
  <discrim>
    <dSuffix>_dMCL1</dSuffix>
    <dOffset>141</dOffset>
  </discrim>
  <discrim>
    <dSuffix>_MCL2</dSuffix>
    <dOffset>93</dOffset>
    <dDescription>MCL, per V2 placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>2</pos>
    <neg-ref>CL</neg-ref>
  </discrim>
  <discrim>
    <dSuffix>_dMCL2</dSuffix>
    <dOffset>142</dOffset>
  </discrim>
  <discrim>
    <dSuffix>_MCL3</dSuffix>
    <dOffset>94</dOffset>
    <dDescription>MCL, per V3 placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>3</pos>
    <neg-ref>CL</neg-ref>
  </discrim>
  <discrim>
    <dSuffix>_dMCL3</dSuffix>
    <dOffset>143</dOffset>
  </discrim>
  <discrim>
    <dSuffix>_MCL4</dSuffix>
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    <dOffset>95</dOffset>
    <dDescription>MCL, per V4 placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>4</pos>
    <neg-ref>CL</neg-ref>
  </discrim>
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    <dSuffix>_dMCL4</dSuffix>
    <dOffset>144</dOffset>
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  <discrim>
    <dSuffix>_MCL5</dSuffix>
    <dOffset>96</dOffset>
    <dDescription>MCL, per V5 placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>5</pos>
    <neg-ref>CL</neg-ref>
  </discrim>
  <discrim>
    <dSuffix>_dMCL5</dSuffix>
    <dOffset>145</dOffset>
  </discrim>
  <discrim>
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    <dOffset>97</dOffset>
    <dDescription>MCL, per V6 placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>6</pos>
    <neg-ref>CL</neg-ref>
  </discrim>
  <discrim>
    <dSuffix>_dMCL6</dSuffix>
    <dOffset>146</dOffset>
  </discrim>
  <discrim>
    <dSuffix>_CC</dSuffix>
    <dOffset>98</dOffset>
    <dDescription>Chest lead (symmetric placement)</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>NOS</pos>
    <neg-ref>NOS</neg-ref>
  </discrim>
  <discrim>
    <dSuffix>_dCC</dSuffix>
    <dOffset>153</dOffset>
  </discrim>
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    <dOffset>99</dOffset>
    <dDescription>CC1, per V1 and V1R placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>1</pos>
    <neg-ref>1R</neg-ref>
  </discrim>
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    <dSuffix>_dCC1</dSuffix>
    <dOffset>154</dOffset>
  </discrim>
  <discrim>
    <dSuffix>_CC2</dSuffix>
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    <dDescription>CC2, per V2 and V2R placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>2</pos>
    <neg-ref>2R</neg-ref>
  </discrim>
  <discrim>
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    <dOffset>155</dOffset>
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    <dOffset>101</dOffset>
    <dDescription>CC3, per V3 and V3R placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>3</pos>
    <neg-ref>3R</neg-ref>
  </discrim>
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    <dSuffix>_dCC3</dSuffix>
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    <dOffset>156</dOffset>
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    <dOffset>102</dOffset>
    <dDescription>CC4, per V4 and V4R placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>4</pos>
    <neg-ref>4R</neg-ref>
  </discrim>
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    <dOffset>157</dOffset>
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    <dOffset>103</dOffset>
    <dDescription>CC6, per V6 and V6R placement<note>CC5 was previously defined with code modifier 19.</note>
    </dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>6</pos>
    <neg-ref>6R</neg-ref>
  </discrim>
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    <dOffset>158</dOffset>
  </discrim>
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    <dOffset>104</dOffset>
    <dDescription>CC7, per V7 and V8R placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>7</pos>
    <neg-ref>7R</neg-ref>
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  <discrim>
    <dSuffix>_dCC7</dSuffix>
    <dOffset>159</dOffset>
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    <dSuffix>_CM</dSuffix>
    <dOffset>105</dOffset>
    <dDescription>Chest-manubrium</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>NOS</pos>
    <neg-ref>manubrium</neg-ref>
  </discrim>
  <discrim>
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  <discrim>
    <dSuffix>_CM1</dSuffix>
    <dOffset>106</dOffset>
    <dDescription>CM1, per V1 placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>1</pos>
    <neg-ref>manubrium</neg-ref>
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    <dDescription>CM2, per V2 placement</dDescription>
    <bi-uni>bipolar</bi-uni>
    <pos>2</pos>
    <neg-ref>manubrium</neg-ref>
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    <dSuffix>_dCM2</dSuffix>
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    <dOffset>108</dOffset>
    <dDescription>CM3, per V3 placement</dDescription>
    <bi-uni>bipolar</bi-uni>
```

```
      <pos>3</pos>
      <neg-ref>manubrium</neg-ref>
    </discrim>
    <discrim>
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      <dOffset>163</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_CM4</dSuffix>
      <dOffset>109</dOffset>
      <dDescription>CM4, per V4 placement</dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>4</pos>
      <neg-ref>manubrium</neg-ref>
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    <discrim>
      <dSuffix>_dCM4</dSuffix>
      <dOffset>164</dOffset>
    </discrim>
    <discrim>
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      <dOffset>110</dOffset>
      <dDescription>CM6, per V6 placement<note>CM5 was previously defined with code modifier 20.</note>
      </dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>6</pos>
      <neg-ref>manubrium</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dCM6</dSuffix>
      <dOffset>165</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_CM7</dSuffix>
      <dOffset>121</dOffset>
      <dDescription>CM7, per V7 placement</dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>7</pos>
      <neg-ref>manubrium</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dCM7</dSuffix>
      <dOffset>166</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_CH5</dSuffix>
      <dOffset>122</dOffset>
      <dDescription>-<note>CM5, CH5, CS5, CC5, CB5, CR5 bipolar leads used in conjunction with stress testing. Macfarlane, Volume 1,
page 323.</note>
      </dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>5</pos>
      <neg-ref>forehead</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dCH5</dSuffix>
      <dOffset>167</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_CS5</dSuffix>
      <dOffset>123</dOffset>
      <dDescription>negative:  right infraclavicular fossa</dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>5</pos>
      <neg-ref>rt infra fossa</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dCS5</dSuffix>
      <dOffset>168</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_CB5</dSuffix>
      <dOffset>124</dOffset>
      <dDescription>negative:  low right scapula</dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>5</pos>
      <neg-ref>lo rt scapula</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dCB5</dSuffix>
```

```
      <dOffset>169</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_CR5</dSuffix>
      <dOffset>125</dOffset>
      <dDescription>-</dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>5</pos>
      <neg-ref>RA</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dCR5</dSuffix>
      <dOffset>170</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_ML</dSuffix>
      <dOffset>126</dOffset>
      <dDescription>ML, modified limb lead, ~ Lead II</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_dML</dSuffix>
      <dOffset>171</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_AB1</dSuffix>
      <dOffset>127</dOffset>
      <dDescription>AB1 (auxiliary bipolar lead #1)</dDescription>
      <bi-uni>bipolar</bi-uni>
    </discrim>
    <discrim>
      <dSuffix>_dAB1</dSuffix>
      <dOffset>172</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_AB2</dSuffix>
      <dOffset>128</dOffset>
      <dDescription>AB2 (auxiliary bipolar lead #2)</dDescription>
      <bi-uni>bipolar</bi-uni>
    </discrim>
    <discrim>
      <dSuffix>_dAB2</dSuffix>
      <dOffset>173</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_AB3</dSuffix>
      <dOffset>129</dOffset>
      <dDescription>AB3 (auxiliary bipolar lead #3)</dDescription>
      <bi-uni>bipolar</bi-uni>
    </discrim>
    <discrim>
      <dSuffix>_dAB3</dSuffix>
      <dOffset>174</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_AB4</dSuffix>
      <dOffset>130</dOffset>
      <dDescription>AB4 (auxiliary bipolar lead #4)</dDescription>
      <bi-uni>bipolar</bi-uni>
    </discrim>
    <discrim>
      <dSuffix>_dAB4</dSuffix>
      <dOffset>175</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_ES</dSuffix>
      <dOffset>131</dOffset>
      <dDescription>EASI™ ES<note>EASI is a trademark in the U.S. Patent &amp;amp; Trademark Office, owned by the Philips Electronics North America Corporation and invented by Dr. Gordon Dower. Leads: S, upper sternum; E, lower sternum; A, under left arm, above V6; I, under right arm, above V6R.</note>
      </dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>E  (fE)</pos>
      <neg-ref>S</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dES</dSuffix>
      <dOffset>176</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_AS</dSuffix>
```

```
      <dOffset>132</dOffset>
      <dDescription>EASI AS</dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>A  (fA)</pos>
      <neg-ref>S</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dAS</dSuffix>
      <dOffset>177</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_AI</dSuffix>
      <dOffset>133</dOffset>
      <dDescription>EASI AI</dDescription>
      <bi-uni>bipolar</bi-uni>
      <pos>A  (fA)</pos>
      <neg-ref>I  (fI)</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dAI</dSuffix>
      <dOffset>178</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_S</dSuffix>
      <dOffset>134</dOffset>
      <dDescription>EASI upper sternum lead</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_dS</dSuffix>
      <dOffset>179</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_RL</dSuffix>
      <dOffset>147</dOffset>
      <dDescription>right leg</dDescription>
    </discrim>
    <discrim>
      <dSuffix>_dRL</dSuffix>
      <dOffset>180</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_CV5RL</dSuffix>
      <dOffset>148</dOffset>
      <dDescription>Canine, fifth right intercostal space near the edge of the sternum at the most curved part of the costal
cartilage<note>The canine leads are summarized in Macfarlane, Volume 2, pp. 1270-1271.  The abbreviations used in the left and right-
most columns are based on Lannek (1949) modified for use with a Wilson central terminal.  The subscripted terms used in the “+” column
were proposed by the Committee of the American Academy of Veterinary Cardiology, and are roughly similar to those used for
man.</note>
      </dDescription>
      <bi-uni>unipolar</bi-uni>
      <pos>~ rV2</pos>
      <neg-ref>WCT</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dCV5RL</dSuffix>
      <dOffset>181</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_CV6LL</dSuffix>
      <dOffset>149</dOffset>
      <dDescription>Canine, sixth left intercostal space near the edge of the sternum at the most curved part of the costal
cartilage</dDescription>
      <bi-uni>unipolar</bi-uni>
      <pos>~ V2</pos>
      <neg-ref>WCT</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dCV6LL</dSuffix>
      <dOffset>182</dOffset>
    </discrim>
    <discrim>
      <dSuffix>_CV6LU</dSuffix>
      <dOffset>150</dOffset>
      <dDescription>Canine, sixth left intercostal space at the costochondral junction</dDescription>
      <bi-uni>unipolar</bi-uni>
      <pos>~ V4</pos>
      <neg-ref>WCT</neg-ref>
    </discrim>
    <discrim>
      <dSuffix>_dCV6LU</dSuffix>
```

```
        <dOffset>183</dOffset>
      </discrim>
      <discrim>
        <dSuffix>_V10</dSuffix>
        <dOffset>151</dOffset>
        <dDescription>Canine, over dorsal spinous process of the seventh thoracic vertebra<note>Codes 185 to 199 are reserved for future
expansion.  Codes 200 to 255 are reserved for manufacturer specific codes.</note>
          <note>Is V10 the same as V9R in humans?</note>
        </dDescription>
        <bi-uni>unipolar</bi-uni>
        <pos>~  V10</pos>
        <neg-ref>WCT</neg-ref>
      </discrim>
      <discrim>
        <dSuffix>_dV10</dSuffix>
        <dOffset>184</dOffset>
      </discrim>
    </discriminator>
</discriminators>
```

C.5 ECG Lead Identifiers «ECG_LEADS_terms.8g.xml»

```
<?xml version="1.0" encoding="UTF-8"?>
<partition xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.ieee.org/11073/nomenclature"
xsi:schemaLocation="http://www.ieee.org/11073/nomenclature terms.8f.xsd">
  <!-- Edited and verified against ecg_nom5c.doc PSS 2007-09-04 -->
  <!-- 2009-04-30 Edited/transformed to conform to terms.8f.xsd (harmonized with IDCO and RTM) -->
  <partitionDescription>
    <title>ECG Leads</title>
    <date>2012-09-26</date>
    <version>0.8.7</version>
    <discriminatorRef idref="MDC_ECG_discrim_LEADS"/>
    <basePart>0</basePart>
    <baseCode>0</baseCode>
  </partitionDescription>
  <!-- -->
  <Terms>
    <term>
      <REFID>MDC_ECG_LEAD</REFID>
      <SysName/>
      <Description>ECG leads</Description>
      <CODE10>0</CODE10>
    </term>
  </Terms>
</partition>
```

C.6 ECG WAVC Wave Components «ECG_WAVC_terms.8g.xml»

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2008 rel. 2 sp1 (http://www.altova.com) by Paul Schluter (GE Healthcare) -->
<partition xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.ieee.org/11073/nomenclature"
xsi:schemaLocation="http://www.ieee.org/11073/nomenclature terms.8f.xsd">
  <!-- Edited and verified against ecg_nom5c.doc PSS 2007-09-04 -->
  <!-- Minor edits for v6.  PSS 2008-08-31 -->
  <!-- 2009-04-30 Edited/transformed to conform to terms.8f.xsd (harmonized with IDCO and RTM) -->
  <!-- 2012-06-16 Corrected CODE10 for _RWAVE to 576 (was 608) in version '8g' on 2012-06-16 -->
  <partitionDescription>
    <title>WAVC Wave Components</title>
    <date>2012-09-26</date>
    <version>0.8.7</version>
    <discriminatorRef idref="MDC_ECG_discrim_WAVC_ASSN"/>
    <discriminatorRef idref="MDC_ECG_discrim_WAVC_AOI"/>
    <basePart>10</basePart>
    <baseCode>256</baseCode>
  </partitionDescription>
  <!-- -->
  <Terms>
    <termSectionTitle>Normal components</termSectionTitle>
    <term>
      <REFID>MDC_ECG_WAVC_PWAVE</REFID>
      <SysName>Pattern | Wave, Component, P wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>P wave</Description>
      <DisplayName>P wave</DisplayName>
      <CODE10>256</CODE10>
      <Mnemonic>PWAVE</Mnemonic>
      <mit-bih>mit_24</mit-bih>
```

```
    </term>
    <term>
      <REFID>MDC_ECG_WAVC_PPWAVE</REFID>
      <SysName>Pattern | Wave, Component, P' wave (2nd deflection in P wave), Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>P' wave (second deflection in P wave) (P and P' waves have opposite signs)</Description>
      <DisplayName>P' wave</DisplayName>
      <CODE10>320</CODE10>
      <Mnemonic>PPWAVE</Mnemonic>
    </term>
    <term>
      <REFID>MDC_ECG_WAVC_PPPWAVE</REFID>
      <SysName>Pattern | Wave, Component, P'' wave (3rd deflection in P wave), Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>P'' wave (third deflection in P wave) (P' and P'' have opposite signs)</Description>
      <DisplayName>P'' wave</DisplayName>
      <CODE10>384</CODE10>
      <Mnemonic>PPPWAVE</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_QWAVE</REFID>
      <SysName>Pattern | Wave, Component, Q wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Q wave</Description>
      <DisplayName>Q wave</DisplayName>
      <CODE10>448</CODE10>
      <Mnemonic>QWAVE</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_QSWAVE</REFID>
      <SysName>Pattern | Wave, Component, QS wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>QS wave</Description>
      <DisplayName>QS wave</DisplayName>
      <CODE10>512</CODE10>
      <Mnemonic>QSWAVE</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_RWAVE</REFID>
      <SysName>Pattern | Wave, Component, R wave, Following Beat, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>R wave</Description>
      <DisplayName>R wave</DisplayName>
      <CODE10>576</CODE10>
      <Mnemonic>RWAVE</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_RRWAVE</REFID>
      <SysName>Pattern | Wave, Component, R' wave (2nd deflection in R Wave), Ass'n NOS, AOI NOS | ECG, Heart |
CVS</SysName>
      <Description>R' wave (second deflection in R wave) (R and R' waves have same sign)</Description>
      <DisplayName>R' wave</DisplayName>
      <CODE10>640</CODE10>
      <Mnemonic>RRWAVE</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_RRRWAVE</REFID>
      <SysName>Pattern | Wave, Component, R'' wave (3rd deflection in R Wave), Ass'n NOS, AOI NOS | ECG, Heart |
CVS</SysName>
      <Description>R'' wave (third deflection in R wave) (R, R' and R'' have same sign)</Description>
      <DisplayName>R'' wave</DisplayName>
      <CODE10>704</CODE10>
      <Mnemonic>RRRWAVE</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_NOTCH</REFID>
      <SysName>Pattern | Wave, Component, Notch, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Notch, a slight but distinct change in the direction of a WAVC deflection, contained entirely within that deflection.
Typically associated with Q-, R- and/or S-wave.</Description>
      <DisplayName>Notch</DisplayName>
      <CODE10>768</CODE10>
      <Mnemonic>NOTCH</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_SWAVE</REFID>
      <SysName>Pattern | Wave, Component, S wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>S wave (S and R/R' waves have opposite signs)</Description>
      <DisplayName>S wave</DisplayName>
      <CODE10>832</CODE10>
      <Mnemonic>SWAVE</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_SSWAVE</REFID>
      <SysName>Pattern | Wave, Component, S' wave (2nd deflection in S Wave), Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>S' wave (second deflection in S Wave)  (S' and R'/R'' waves have opposite signs)</Description>
```

```
      <DisplayName>S' wave</DisplayName>
      <CODE10>896</CODE10>
      <Mnemonic>SSWAVE</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_SSSWAVE</REFID>
      <SysName>Pattern | Wave, Component, S'' wave (3rd deflection in S Wave), Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>S'' wave (third deflection in S Wave) (S'' and R'/R'' waves have opposite signs)</Description>
      <DisplayName>S'' wave</DisplayName>
      <CODE10>960</CODE10>
      <Mnemonic>SSSWAVE</Mnemonic>
    </term>
    <term exclude="_NA _FB">
      <REFID>MDC_ECG_WAVC_TWAVE</REFID>
      <SysName>Pattern | Wave, Component, T wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>T wave</Description>
      <DisplayName>T wave</DisplayName>
      <CODE10>1024</CODE10>
      <Mnemonic>TWAVE</Mnemonic>
      <mit-bih>mit_27</mit-bih>
    </term>
    <term exclude="_NA _FB">
      <REFID>MDC_ECG_WAVC_TTWAVE</REFID>
      <SysName>Pattern | Wave, Component, T' wave (2nd deflection in T Wave), Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>T' wave (second deflection in T Wave) (T and T' waves have opposite signs)</Description>
      <DisplayName>T' wave</DisplayName>
      <CODE10>1088</CODE10>
      <Mnemonic>TTWAVE</Mnemonic>
    </term>
    <term exclude="_NA _FB">
      <REFID>MDC_ECG_WAVC_UWAVE</REFID>
      <SysName>Pattern | Wave, Component, U wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>U wave</Description>
      <DisplayName>U wave</DisplayName>
      <CODE10>1152</CODE10>
      <Mnemonic>UWAVE</Mnemonic>
      <mit-bih>mit_29</mit-bih>
    </term>
    <term exclude="_NA _FB">
      <REFID>MDC_ECG_WAVC_DELTA</REFID>
      <SysName>Pattern | Wave, Component, Delta wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Delta wave</Description>
      <DisplayName>Delta wave</DisplayName>
      <CODE10>1216</CODE10>
      <Mnemonic>DELTA</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_IWAVE</REFID>
      <SysName>Pattern | Wave, Component, Isoelectric region between global QRS onset and actual onset or QRS in given lead., Ass'n
NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Isoelectric region between global QRS onset and actual onset of QRS in given lead</Description>
      <DisplayName>I wave</DisplayName>
      <CODE10>1280</CODE10>
      <Mnemonic>IWAVE</Mnemonic>
    </term>
    <term exclude="_NA _FB">
      <REFID>MDC_ECG_WAVC_KWAVE</REFID>
      <SysName>Pattern | Wave, Component, Isoelectric region between actual offset of QRS in given lead and global QRS offset., Ass'n
NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Isoelectric region between actual offset of QRS in given lead and global QRS offset</Description>
      <DisplayName>K wave</DisplayName>
      <CODE10>1344</CODE10>
      <Mnemonic>KWAVE</Mnemonic>
    </term>
    <term exclude="_NA _FB">
      <REFID>MDC_ECG_WAVC_JWAVE</REFID>
      <SysName>Pattern | Wave, Component, Osborne wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Osborne wave, late and typically upright terminal deflection of QRS complex; amplitude increases as temperature
decreases.  ECG finding typically associated with hypothermia.</Description>
      <DisplayName>J wave</DisplayName>
      <CODE10>1408</CODE10>
      <Mnemonic>JWAVE</Mnemonic>
    </term>
    <termSectionTitle>Composite wave components</termSectionTitle>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_PQRSTWAVE</REFID>
      <SysName>Pattern | Wave, Component, Entire beat (Pon to Toff excluding U), Ass'n NOS, AOI NOS | ECG, Heart |
CVS</SysName>
      <Description>Entire Beat (Pon to Toff, excluding U)</Description>
      <DisplayName>PQRST wave</DisplayName>
```

```
      <CODE10>1472</CODE10>
      <Mnemonic>PQRSTWAVE</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_QRSTWAVE</REFID>
      <SysName>Pattern | Wave, Component, Entire beat (Qon to Toffexcluding P and U), Ass'n NOS, AOI NOS | ECG, Heart |
CVS</SysName>
      <Description>Entire Beat (Qon to Toff, excluding P and U)</Description>
      <DisplayName>QRST wave</DisplayName>
      <CODE10>1536</CODE10>
      <Mnemonic>QRSTWAVE</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_QRSWAVE</REFID>
      <SysName>Pattern | Wave, Component, Entire QRS wave (excluding PTand U), Ass'n NOS, AOI NOS | ECG, Heart |
CVS</SysName>
      <Description>Entire QRS (excluding P, T and U)</Description>
      <DisplayName>QRS wave</DisplayName>
      <CODE10>1600</CODE10>
      <Mnemonic>QRSWAVE</Mnemonic>
    </term>
    <term exclude="_NA _FB">
      <REFID>MDC_ECG_WAVC_TUWAVE</REFID>
      <SysName>Pattern | Wave, Component, TU fused wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>TU fused wave</Description>
      <DisplayName>TU wave</DisplayName>
      <CODE10>1664</CODE10>
      <Mnemonic>TUWAVE</Mnemonic>
    </term>
    <termSectionTitle>Abnormal wave components</termSectionTitle>
    <term exclude="_FB _PB">
      <REFID>MDC_ECG_WAVC_VFLWAVE</REFID>
      <SysName>Pattern | Wave, Component, Ventricular flutter wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Ventricular flutter wave (optional)  (the appropriate ventricular rhythm call is mandatory)</Description>
      <DisplayName>V flutter wave</DisplayName>
      <CODE10>1728</CODE10>
      <Mnemonic>VFLWAVE</Mnemonic>
      <mit-bih>mit_31</mit-bih>
    </term>
    <term exclude="_FB _PB">
      <REFID>MDC_ECG_WAVC_AFLWAVE</REFID>
      <SysName>Pattern | Wave, Component, Atrial flutter wave, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Atrial flutter wave (optional)  (the appropriate atrial rhythm call is mandatory)</Description>
      <DisplayName>Atrial flutter wave</DisplayName>
      <CODE10>1792</CODE10>
      <Mnemonic>AFLWAVE</Mnemonic>
    </term>
    <termSectionTitle>Segments</termSectionTitle>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_ISO</REFID>
      <SysName>Pattern | Wave, Component, Isoelectric point or segment, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Isoelectric point or segment</Description>
      <DisplayName>Isoelectric point</DisplayName>
      <CODE10>1856</CODE10>
      <Mnemonic>ISO</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_PRSEG</REFID>
      <SysName>Pattern | Wave, Component, PR Segment, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>PR Segment</Description>
      <DisplayName>PR Segment</DisplayName>
      <CODE10>1920</CODE10>
      <Mnemonic>PRSEG</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_STSEG</REFID>
      <SysName>Pattern | Wave, Component, ST Segment, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>ST Segment</Description>
      <DisplayName>ST Segment</DisplayName>
      <CODE10>1984</CODE10>
      <Mnemonic>STSEG</Mnemonic>
    </term>
    <termSectionTitle>ST Measurement</termSectionTitle>
    <term exclude="_NA _FB">
      <REFID>MDC_ECG_WAVC_STJ</REFID>
      <SysName>Pattern | Wave, Component, J-point, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>J-point</Description>
      <DisplayName>J-point</DisplayName>
      <CODE10>2048</CODE10>
      <Mnemonic>STJ</Mnemonic>
```

```
    </term>
    <term exclude="_NA _FB">
      <REFID>MDC_ECG_WAVC_STM</REFID>
      <SysName>Pattern | Wave, Component, ST measurement point, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>ST measurement point</Description>
      <DisplayName>ST meas point</DisplayName>
      <CODE10>2112</CODE10>
      <Mnemonic>STM</Mnemonic>
    </term>
    <termSectionTitle>Miscellaneous</termSectionTitle>
    <term exclude="_FB _PB">
      <REFID>MDC_ECG_WAVC_ARFCT</REFID>
      <SysName>Pattern | Wave, Component, Isolated QRS-like artifact, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Artifact</Description>
      <DisplayName>Artifact</DisplayName>
      <CODE10>2176</CODE10>
      <Mnemonic>ARFCT</Mnemonic>
      <mit-bih>mit_16</mit-bih>
    </term>
    <term exclude="_FB _PB">
      <REFID>MDC_ECG_WAVC_CALP</REFID>
      <SysName>Pattern | Wave, Component, Calibration pulse (individual pulse), Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Calibration pulse</Description>
      <DisplayName>Calibration pulse</DisplayName>
      <CODE10>2240</CODE10>
      <Mnemonic>CALP</Mnemonic>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_STCH</REFID>
      <SysName>Pattern | Wave, Component, ST change, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>ST change</Description>
      <DisplayName>ST change</DisplayName>
      <CODE10>2304</CODE10>
      <Mnemonic>STCH</Mnemonic>
      <mit-bih>mit_18</mit-bih>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_TCH</REFID>
      <SysName>Pattern | Wave, Component, T-wave change, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>T-wave change</Description>
      <DisplayName>T-wave change</DisplayName>
      <CODE10>2368</CODE10>
      <Mnemonic>TCH</Mnemonic>
      <mit-bih>mit_19</mit-bih>
    </term>
    <term exclude="_NA">
      <REFID>MDC_ECG_WAVC_VAT</REFID>
      <SysName>Pattern | Wave, Component, Ventricular Activation Time, Ass'n NOS, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Ventricular Activation Time, also termed the intrinsic or intrinsicoid deflection (onset to peak of depolarization
wave)</Description>
      <DisplayName>Ventricular Activation Time</DisplayName>
      <CODE10>2432</CODE10>
      <Mnemonic>VAT</Mnemonic>
    </term>
  </Terms>
  <note>The MIT-BIH annotations ARFCT, PWAVE, TWAVE and UWAVE are considered “artifact” and are noted on an informative and
infrequent basis if it was likely that they could be falsely detected as QRS complexes.  If transferred to this format, use [0,0] “unknown
association”.</note>
  <note>STCH, TCH and FLWAVE are considered “informative” in the MIT-BIH database.  If transferred to this format, use [0,0] “unknown
association”.</note>
</partition>
```

C.7 ECG WAVP Pacemaker Components «ECG_WAVP_terms.8g.xml»

```
<?xml version="1.0" encoding="UTF-8"?>
<partition xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.ieee.org/11073/nomenclature"
   xsi:schemaLocation="http://www.ieee.org/11073/nomenclature terms.8f.xsd">
   <!-- 2007-09-04 Edited by Paul Schluter to fully conform to ecg_nom5c.doc plus later updates -->
   <!-- 2009-04-30 Edited/transformed to conform to terms.8f.xsd (harmonized with IDCO and RTM) -->
   <partitionDescription>
      <title>Wave Components (Paced)</title>
      <date>2012-09-26</date>
      <version>0.8.7</version>
      <component>WAVP</component>
      <discriminatorRef idref="MDC_ECG_discrim_WAVP_APPR_ASSN"/>
      <discriminatorRef idref="MDC_ECG_discrim_WAVC_AOI"/>
      <basePart>10</basePart>
      <baseCode>4096</baseCode>
```

```
</partitionDescription>
<!-- -->
<Terms>
  <termSectionTitle>Antibradycardia pace</termSectionTitle>
  <term>
    <REFID>MDC_ECG_WAVP_PACE</REFID>
    <SysName>Pattern, Wave, Pacemaker | Antibradycardia pace; Spike, AOI NOS | ECG, Heart | CVS</SysName>
    <Description>Antibradycardia pace</Description>
    <CODE10>4096</CODE10>
    <Mnemonic>PACE</Mnemonic>
  </term>
  <term>
    <REFID>MDC_ECG_WAVP_PACE_ATR</REFID>
    <SysName>Pattern, Wave, Pacemaker | Antibradycardia pace, Atrium; Spike, AOI NOS | ECG, Heart | CVS</SysName>
    <Description>Atrial antibradycardial pace</Description>
    <CODE10>4352</CODE10>
    <Mnemonic indent="1">APACE</Mnemonic>
  </term>
  <term>
    <REFID>MDC_ECG_WAVP_PACE_ATR_R</REFID>
    <SysName>Pattern, Wave, Pacemaker | Antibradycardia pace, Right Atrium; Spike, AOI NOS | ECG, Heart | CVS</SysName>
    <Description>Right atrial antibradycardial pace</Description>
    <CODE10>4608</CODE10>
    <Mnemonic indent="2">RAPACE</Mnemonic>
  </term>
  <term>
    <REFID>MDC_ECG_WAVP_PACE_ATR_L</REFID>
    <SysName>Pattern, Wave, Pacemaker | Antibradycardia pace, Left Atrium; Spike, AOI NOS | ECG, Heart | CVS</SysName>
    <Description>Left atrial antibradycardial pace</Description>
    <CODE10>4864</CODE10>
    <Mnemonic indent="2">LAPACE</Mnemonic>
  </term>
  <term>
    <REFID>MDC_ECG_WAVP_PACE_V</REFID>
    <SysName>Pattern, Wave, Pacemaker | Antibradycardia pace, Ventricular; Spike, AOI NOS | ECG, Heart | CVS</SysName>
    <Description>Ventricular antibradycardial pace</Description>
    <CODE10>5120</CODE10>
    <Mnemonic indent="1">VPACE</Mnemonic>
  </term>
  <term>
    <REFID>MDC_ECG_WAVP_PACE_V_R</REFID>
    <SysName>Pattern, Wave, Pacemaker | Antibradycardia pace, Right Ventricle; Spike, AOI NOS | ECG, Heart | CVS</SysName>
    <Description>Right ventricular antibradycardial pace</Description>
    <CODE10>5376</CODE10>
    <Mnemonic indent="2">RVPACE</Mnemonic>
  </term>
  <term>
    <REFID>MDC_ECG_WAVP_PACE_V_L</REFID>
    <SysName>Pattern, Wave, Pacemaker | Antibradycardia pace, Left Ventricle; Spike, AOI NOS | ECG, Heart | CVS</SysName>
    <Description>Left ventricular antibradycardial pace</Description>
    <CODE10>5632</CODE10>
    <Mnemonic indent="2">LVPACE</Mnemonic>
  </term>
  <term>
    <REFID>MDC_ECG_WAVP_PACE_EXT</REFID>
    <SysName>Pattern, Wave, Pacemaker | Antibradycardia pace, Transthoracic; Spike, AOI NOS | ECG, Heart | CVS</SysName>
    <Description>Transthoracic antibradycardial pace</Description>
    <CODE10>5888</CODE10>
    <Mnemonic indent="1">XPACE</Mnemonic>
  </term>
  <termSectionTitle> Antitachycardia pace</termSectionTitle>
  <term>
    <REFID>MDC_ECG_WAVP_ATPACE</REFID>
    <SysName>Pattern, Wave, Pacemaker | Antitachycardia pace; Spike, AOI NOS | ECG, Heart | CVS</SysName>
    <Description>Antitachycardia pace</Description>
    <CODE10>6144</CODE10>
    <Mnemonic>ATPACE</Mnemonic>
  </term>
  <term>
    <REFID>MDC_ECG_WAVP_ATPACE_ATR</REFID>
    <SysName>Pattern, Wave, Pacemaker | Antitachycardia pace, Atrium; Spike, AOI NOS | ECG, Heart | CVS</SysName>
    <Description>Atrial antitachycardia pace</Description>
    <CODE10>6400</CODE10>
    <Mnemonic indent="1">AATPACE</Mnemonic>
  </term>
  <term>
    <REFID>MDC_ECG_WAVP_ATPACE_V</REFID>
    <SysName>Pattern, Wave, Pacemaker | Antitachycardia pace,Ventricle; Spike, AOI NOS | ECG, Heart | CVS</SysName>
    <Description>Ventricular antitachycardia pace</Description>
    <CODE10>6656</CODE10>
```

```
      <Mnemonic indent="1">VATPACE</Mnemonic>
    </term>
    <term>
      <REFID>MDC_ECG_WAVP_ATPACE_EXT</REFID>
      <SysName>Pattern, Wave, Pacemaker | Antitachycardia pace, Transthoracic; Spike, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Transthoracic antitachycardia pace</Description>
      <CODE10>6912</CODE10>
      <Mnemonic indent="1">XATPACE</Mnemonic>
    </term>
    <termSectionTitle>Cardioversion (low-energy shock)</termSectionTitle>
    <term>
      <REFID>MDC_ECG_WAVP_CDVS</REFID>
      <SysName>Pattern, Wave, Pacemaker | Cardioversion; Spike, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Cardioversion (low-energy shock)</Description>
      <CODE10>7168</CODE10>
      <Mnemonic>CDVS</Mnemonic>
    </term>
    <term>
      <REFID>MDC_ECG_WAVP_CDVS_ATR</REFID>
      <SysName>Pattern, Wave, Pacemaker | Cardioversion, Atrium; Spike, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Atrial cardioversion </Description>
      <CODE10>7424</CODE10>
      <Mnemonic indent="1">ACDVS</Mnemonic>
    </term>
    <term>
      <REFID>MDC_ECG_WAVP_CDVS_V</REFID>
      <SysName>Pattern, Wave, Pacemaker | Cardioversion, Ventricle; Spike, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Ventricular cardioversion </Description>
      <CODE10>7680</CODE10>
      <Mnemonic indent="1">VCDVS</Mnemonic>
    </term>
    <term>
      <REFID>MDC_ECG_WAVP_CDVS_EXT</REFID>
      <SysName>Pattern, Wave, Pacemaker | Cardioversion, Transthoracic; Spike, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Cardioversion </Description>
      <CODE10>7936</CODE10>
      <Mnemonic indent="1">XCDVS</Mnemonic>
    </term>
    <termSectionTitle>Defibrillation (high-energy shock) </termSectionTitle>
    <term>
      <REFID>MDC_ECG_WAVP_DEFIB</REFID>
      <SysName>Pattern, Wave, Pacemaker | Defibrillation; Spike, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Defibrillation (high-energy shock)</Description>
      <CODE10>8192</CODE10>
      <Mnemonic>DEFIB</Mnemonic>
    </term>
    <term>
      <REFID>MDC_ECG_WAVP_DEFIB_ATR</REFID>
      <SysName>Pattern, Wave, Pacemaker | Defibrillation, Atrium; Spike, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Atrial defibrillation</Description>
      <CODE10>8448</CODE10>
      <Mnemonic indent="1">ADEFIB</Mnemonic>
    </term>
    <term>
      <REFID>MDC_ECG_WAVP_DEFIB_V</REFID>
      <SysName>Pattern, Wave, Pacemaker | Defibrillation, Ventricle; Spike, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Ventricular defibrillation</Description>
      <CODE10>8704</CODE10>
      <Mnemonic indent="1">VDEFIB</Mnemonic>
    </term>
    <term>
      <REFID>MDC_ECG_WAVP_DEFIB_EXT</REFID>
      <SysName>Pattern, Wave, Pacemaker | Defibrillation, Transthoracic; Spike, AOI NOS | ECG, Heart | CVS</SysName>
      <Description>Transthoracic defibrillation</Description>
      <CODE10>8960</CODE10>
      <Mnemonic indent="1">XDEFIB</Mnemonic>
    </term>
  </Terms>
  <note>For paced, cardioversion and defibrillation wave components, “FC” indicates “failure to capture” and “C” indicates “capture”.</note>
  <note>The MIT-BIH annotation mit-26 “PACESP” (non-conducted pacer spike) is represented as “MDC_ECG_WAVP_PACE_FC” to indicate “failure to capture”.</note>
</partition>
```

C.8 ECG Beats «ECG_BEAT_terms.8g.xml»

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2008 rel. 2 sp1 (http://www.altova.com) by Paul Schluter (GE Healthcare) -->
```

```
<partition xsi:schemaLocation="http://www.ieee.org/11073/nomenclature terms.8f.xsd" xmlns="http://www.ieee.org/11073/nomenclature"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <!-- 2007-09-03 Edited by Paul Schluter to fully conform to ecg_nom5c.doc -->
  <!-- 2008-08-25 Added numeric code for "MDC_ECG_BEAT_DOMINANT" -->
  <!-- 2008-08-31 Renumbered codes using new baseCode -->
  <!-- 2009-04-29 Edited/transformed to conform to terms.8f.xsd (harmonized with IDCO and RTM) -->
  <partitionDescription>
    <title>ECG Beat Annotations</title>
    <date>2012-09-26</date>
    <version>0.8.7</version>
    <component>Beat</component>
    <discriminatorRef idref="MDC_ECG_discrim_BEAT_RHYTHM_NOISE"/>
    <basePart>10</basePart>
    <baseCode>8192</baseCode>
  </partitionDescription>
  <!-- -->
  <Terms>
    <termSectionTitle>Non-specific beats</termSectionTitle>
    <term>
      <REFID>MDC_ECG_BEAT</REFID>
      <SysName>Pattern, Beat (NOS), Base Pattern | ECG, Heart | CVS</SysName>
      <Description>Any beat (unspecified; included in heart rate)</Description>
      <CODE10>8192</CODE10>
      <Mnemonic>BEAT</Mnemonic>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_NORMAL</REFID>
      <SysName>Pattern, Normal beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Normal beat (sinus beat; normal conduction)</Description>
      <CODE10>8208</CODE10>
      <Mnemonic>NORMAL</Mnemonic>
      <mit-bih>mit_1</mit-bih>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_ABNORMAL</REFID>
      <SysName>Pattern, Abnormal beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Abnormal beat</Description>
      <CODE10>8224</CODE10>
      <Mnemonic>ABNORMAL</Mnemonic>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_DOMINANT</REFID>
      <SysName>Pattern, Dominant beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Dominant beat<sidenote>(typically normal, but may not be)</sidenote>
        <bullet>predominant morphology typically used for ST measurement)</bullet>
      </Description>
      <CODE10>8240</CODE10>
      <Mnemonic>DOMINANT</Mnemonic>
    </term>
    <termSectionTitle>Supraventricular extrasystole</termSectionTitle>
    <term>
      <REFID>MDC_ECG_BEAT_SV_P_C</REFID>
      <SysName>Pattern, Supraventricular premature or ectopic beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Supraventricular premature contraction (atrial or nodal premature beat with normal QRS morphology)</Description>
      <CODE10>8256</CODE10>
      <Mnemonic>SVPC</Mnemonic>
      <mit-bih>mit_9</mit-bih>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_ATR_P_C</REFID>
      <SysName>Pattern, Atrial premature complex (beat), Base pattern | ECG, Heart | CVS</SysName>
      <Description>Atrial premature contraction (beat)</Description>
      <CODE10>8272</CODE10>
      <Mnemonic indent="1">APC</Mnemonic>
      <scp>PAC APC</scp>
      <mit-bih>SVPB mit_8</mit-bih>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_JUNC_P_C</REFID>
      <SysName>Pattern, Junctional (nodal) premature beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Junctional (nodal) premature contraction</Description>
      <CODE10>8288</CODE10>
      <Mnemonic indent="1">JPC</Mnemonic>
      <mit-bih>NPC mit_7</mit-bih>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_ATR_P_C_ABERR</REFID>
      <SysName>Pattern, Aberrated atrial premature beat (Ashman), Base pattern | ECG, Heart | CVS</SysName>
      <Description>Aberrated atrial premature beat (Ashman beat: atrial premature beat with abnormal QRS morphology)</Description>
      <CODE10>8304</CODE10>
```

```
    <Mnemonic>ABERR</Mnemonic>
    <mit-bih>mit_4</mit-bih>
  </term>
  <term>
    <REFID>MDC_ECG_BEAT_ATR_PWAVE_BLK</REFID>
    <SysName>Pattern, Non-conducted p-wave beat (blocked), Base pattern | ECG, Heart | CVS</SysName>
    <Description>Non-conducted P-wave (blocked)</Description>
    <CODE10>8320</CODE10>
    <Mnemonic>NAPC</Mnemonic>
    <mit-bih>mit_37</mit-bih>
  </term>
  <termSectionTitle>Ventricular Extrasystole</termSectionTitle>
  <term>
    <REFID>MDC_ECG_BEAT_V_P_C</REFID>
    <SysName>Pattern, Premature ventricular contraction (beat), Base pattern | ECG, Heart | CVS</SysName>
    <Description>Ventricular premature contraction (beat)</Description>
    <CODE10>8336</CODE10>
    <Mnemonic>VPC</Mnemonic>
    <scp>PVC VPC</scp>
    <mit-bih>PVC mit_5</mit-bih>
  </term>
  <term>
    <REFID>MDC_ECG_BEAT_V_P_C_FUSION</REFID>
    <SysName>Pattern, Fusion of ventricular and normal beat, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Fusion of ventricular and normal beat</Description>
    <CODE10>8352</CODE10>
    <Mnemonic indent="1">FUSION</Mnemonic>
    <mit-bih>mit_6</mit-bih>
  </term>
  <term>
    <REFID>MDC_ECG_BEAT_V_P_C_RonT</REFID>
    <SysName>Pattern, R-on-T premature ventricular beat, Base pattern | ECG, Heart | CVS</SysName>
    <Description>R-on-T premature ventricular beat</Description>
    <CODE10>8368</CODE10>
    <Mnemonic indent="1">RONT</Mnemonic>
    <mit-bih>mit_41</mit-bih>
  </term>
  <termSectionTitle>Escape beats</termSectionTitle>
  <term>
    <REFID>MDC_ECG_BEAT_SV_ESC</REFID>
    <SysName>Pattern, Supraventricular escape beat, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Supraventricular escape beat (least specific)</Description>
    <CODE10>8384</CODE10>
    <Mnemonic>SVESC</Mnemonic>
    <mit-bih>mit_35</mit-bih>
  </term>
  <term>
    <REFID>MDC_ECG_BEAT_ATR_ESC</REFID>
    <SysName>Pattern, Atrial escape beat, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Atrial Escape beat</Description>
    <CODE10>8400</CODE10>
    <Mnemonic indent="1">AESC</Mnemonic>
    <mit-bih>mit_34</mit-bih>
  </term>
  <term>
    <REFID>MDC_ECG_BEAT_JUNC_ESC</REFID>
    <SysName>Pattern, Junctional (nodal) escape beat, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Junctional (nodal) escape beat</Description>
    <CODE10>8416</CODE10>
    <Mnemonic indent="1">JESC</Mnemonic>
    <mit-bih>NESC mit_11</mit-bih>
  </term>
  <term>
    <REFID>MDC_ECG_BEAT_V_ESC</REFID>
    <SysName>Pattern, Ventricular escape beat, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Ventricular escape beat</Description>
    <CODE10>8432</CODE10>
    <Mnemonic>VESC</Mnemonic>
    <mit-bih>mit_10</mit-bih>
  </term>
  <termSectionTitle>Intraventricular block</termSectionTitle>
  <term>
    <REFID>MDC_ECG_BEAT_BB_BLK</REFID>
    <SysName>Pattern, bundle branch block beat, Base pattern | ECG, Heart | CVS</SysName>
    <Description>bundle branch block beat (unspecified)</Description>
    <CODE10>8448</CODE10>
    <Mnemonic>BBB</Mnemonic>
    <mit-bih>mit_25</mit-bih>
  </term>
  <term>
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```
      <REFID>MDC_ECG_BEAT_LBB_BLK_COMP</REFID>
      <SysName>Pattern, left bundle branch block beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>left bundle branch block beat</Description>
      <CODE10>8464</CODE10>
      <Mnemonic indent="1">LBBB</Mnemonic>
      <scp>LBBB</scp>
      <mit-bih>mit_2</mit-bih>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_LBB_BLK_INCOMP</REFID>
      <SysName>Pattern, incomplete left bundle branch block beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>incomplete left bundle branch block beat<footnote>The term “incomplete” for IRBBB and ILBBB implies conduction is
delayed, but not completely blocked.</footnote></Description>
      <CODE10>8480</CODE10>
      <Mnemonic indent="2">ILBBB</Mnemonic>
      <scp>ILBBB</scp>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_RBB_BLK_COMP</REFID>
      <SysName>Pattern, right bundle branch block beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>right bundle branch block beat</Description>
      <CODE10>8496</CODE10>
      <Mnemonic indent="1">RBBB</Mnemonic>
      <scp>RBBB</scp>
      <mit-bih>mit_3</mit-bih>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_RBB_BLK_INCOMP</REFID>
      <SysName>Pattern, incomplete right bundle branch block beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>incomplete right bundle branch block beat</Description>
      <CODE10>8512</CODE10>
      <Mnemonic indent="1">IRBBB</Mnemonic>
      <scp>IRBBB</scp>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_BLK_ANT_L_HEMI</REFID>
      <SysName>Pattern, left anterior fascicular block beat (common), Base pattern | ECG, Heart | CVS</SysName>
      <Description>left anterior fascicular block beat (common)</Description>
      <CODE10>8528</CODE10>
      <Mnemonic indent="1">LAFB</Mnemonic>
      <scp>LAFB</scp>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_BLK_POS_L_HEMI</REFID>
      <SysName>Pattern, left posterior fascicular block beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>left posterior fascicular block beat (rare)</Description>
      <CODE10>8544</CODE10>
      <Mnemonic indent="1">LPFB</Mnemonic>
      <scp>LPHB?</scp>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_BLK_BIFAS</REFID>
      <SysName>Pattern, bifascicular block beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>bifascicular block beat</Description>
      <CODE10>8560</CODE10>
      <Mnemonic indent="1">BIFAS</Mnemonic>
      <scp>BIFAS</scp>
      <note>{RBBB, (LAFB | LPFB )}</note>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_BLK_TRFAS</REFID>
      <SysName>Pattern, trifascicular block beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>trifascicular block beat</Description>
      <CODE10>8576</CODE10>
      <Mnemonic indent="1">TRFAS</Mnemonic>
      <scp>TRFAS</scp>
      <note>{RBBB, (LAFB|LPFB), (1AVB|2AVB)}</note>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_BLK_BILAT</REFID>
      <SysName>Pattern, bilateral bundle-branch block beat, Base pattern | ECG, Heart | CVS</SysName>
      <Description>bilateral bundle-branch block beat</Description>
      <CODE10>8592</CODE10>
      <Mnemonic indent="1">BILAT</Mnemonic>
      <note>{(RBBB|LBBB), (1AVB|2AVB)}</note>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_BLK_IVCD</REFID>
      <SysName>Pattern, intraventricular conduction disturbance (non-specific block), Base pattern | ECG, Heart | CVS</SysName>
      <Description>intraventricular conduction disturbance (non-specific block)</Description>
```

```
      <CODE10>8608</CODE10>
      <scp>IVCD</scp>
      <Mnemonic>IVCD</Mnemonic>
    </term>
    <term>
      <REFID>MDC_ECG_BEAT_PREX</REFID>
      <SysName>Pattern, pre-excitation (least specific), Base pattern | ECG, Heart | CVS</SysName>
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      <Description>Lown-Ganong-Levine syndrome<footnote>Unlike WPW, QRS complex has normal morphology in LGL. Activation of
the ventricles occurs entirely through the bundle of His and the bundle branches.</footnote>
      </Description>
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      <Description>learning (beats during initial learning phase)</Description>
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C.9 ECG Rhythms «ECG_RHY_terms.8g.xml»

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xsi:schemaLocation="http://www.ieee.org/11073/nomenclature terms.8f.xsd">
  <!-- Paul Schluter, GE Healthcare -->
  <!-- 2007-09-03 Edited to fully conform to ecg_nom5c.doc plus updates -->
  <!-- 2008-08-31 Renumbered codes with new baseCode -->
  <!-- 2009-04-29 Edited/transformed to conform to terms.8f.xsd (harmonized with IDCO and RTM) -->
  <!-- 2012-06-18 Correct Mnemonic for AV junctional (nodal) rhythm to JUNC (was UUNC). -->
  <!-- 2012-09-26 Added MDC_ECG_RHY_V_BRADY @ CODE10 = 10464 (10102-d02 Comment i-9) -->
  <!-- 2012-09-26 Added MDC_ECG_RHY_EPAX   @ CODE10 = 10480 (10102-d02 Comment HRS re WAVP) -->
  <!-- 2012-09-26 Added MDC_ECG_RHY_EPAXLO @ CODE10 = 10496 (10102-d02 Comment HRS re WAVP) -->
  <!-- 2012-09-26 Added MDC_ECG_RHY_EPAXFO @ CODE10 = 10512 (10102-d02 Comment HRS re WAVP) -->
  <!-- 2012-09-26 Added MDC_ECG_RHY_EPVX   @ CODE10 = 10528 (10102-d02 Comment HRS re WAVP) -->
  <!-- 2012-09-26 Added MDC_ECG_RHY_EPVXLO @ CODE10 = 10544 (10102-d02 Comment HRS re WAVP) -->
  <!-- 2012-09-26 Added MDC_ECG_RHY_EPVXFO @ CODE10 = 10560 (10102-d02 Comment HRS re WAVP) -->

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      <bullet>gradual positive/negative P-wave morphology changes, variable P'-R interval</bullet>
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    <CODE10>9408</CODE10>
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      <Description>Automatic Atrial Tachycardia (with "warmup" )</Description>
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until non-conducted P-wave occurs</bullet>
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occurs</bullet>
```

```
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the ventricles</bullet>
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      <CODE10>9824</CODE10>
      <Mnemonic>3SAB</Mnemonic>
      <auxinfo/>
    </term>
    <termSectionTitle>Ventricular Ectopic Rhythms</termSectionTitle>
    <term>
      <REFID>MDC_ECG_RHY_V_RHY</REFID>
      <SysName>Pattern, Ventricular rhythm, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Ventricular rhythm</Description>
      <CODE10>9840</CODE10>
      <Mnemonic>VRHY</Mnemonic>
      <auxinfo/>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_V_IDIO_RHY</REFID>
      <SysName>Pattern, Idioventricular (ventricular escape) rhythm, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Idioventricular (ventricular escape) rhythm<bullet>QRS complexes are wide and appear in a regular rhythm</bullet>
        <bullet>30 to 50 bpm, but may be as low as 15 bpm</bullet>
        <bullet>Atrial and ventricular activity are decoupled</bullet>
      </Description>
      <CODE10>9856</CODE10>
      <Mnemonic>IVR</Mnemonic>
      <auxinfo>_RATE_LIMIT_LOW_GE [15] _RATE_LIMIT_HIGH_LT [50]</auxinfo>
      <scp>IDIOR VESCR</scp>
      <mit-bih>(IVR</mit-bih>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_V_PARA</REFID>
      <SysName>Pattern, Ventricular Parasystole, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Ventricular Parasystole</Description>
      <CODE10>9872</CODE10>
      <Mnemonic>VPARA</Mnemonic>
      <auxinfo/>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_V_AIVR</REFID>
      <SysName>Pattern, Accelerated idioventricular rhythm, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Accelerated idioventricular rhythm<bullet>P-waves present, decreasing PR interval, then “disappear” in QRS
complex</bullet>
        <bullet>Wide QRS complexes, 60 to 120 bpm; onset is gradual</bullet>
      </Description>
      <CODE10>9888</CODE10>
      <Mnemonic>AIVR</Mnemonic>
      <auxinfo>_RATE_LIMIT_LOW_GE [60] _RATE_LIMIT_HIGH_LT [100]</auxinfo>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_V_IDIO_TACHY</REFID>
      <SysName>Pattern, Slow Ventricular Tachycardia (Idioventricular Tachycardia), Base pattern | ECG, Heart | CVS</SysName>
      <Description>Slow Ventricular Tachycardia (Idioventricular Tachycardia)</Description>
      <CODE10>9904</CODE10>
      <Mnemonic>SLOVTACH</Mnemonic>
      <auxinfo>_RATE_LIMIT_LOW_GE [?] _RATE_LIMIT_HIGH_LT [?]</auxinfo>
    </term>
    <term>      <!-- added 2012-09-26 -->
      <REFID>MDC_ECG_RHY_V_BRADY</REFID>
      <SysName>Pattern, Slow Ventricular Rate, beats likely of ventricular origin, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Slow Ventricular Rate, beats likely of ventricular origin, but existence of P-waves is unknown</Description>
      <CODE10>10464</CODE10>
      <Mnemonic>VBRADY</Mnemonic>
      <auxinfo>_RATE_LIMIT_LOW_GE [?] _RATE_LIMIT_HIGH_LT [?]</auxinfo>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_V_BIGEM</REFID>
      <SysName>Pattern, Ventricular Bigeminy, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Ventricular Bigeminy</Description>
      <CODE10>9920</CODE10>
      <Mnemonic>VBIGEM</Mnemonic>
      <auxinfo/>
      <mit-bih>(B</mit-bih>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_V_TRIGEM</REFID>
      <SysName>Pattern, Ventricular Trigeminy, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Ventricular Trigeminy</Description>
      <CODE10>9936</CODE10>
      <Mnemonic>VTRIGEM</Mnemonic>
      <auxinfo/>
      <mit-bih>(T</mit-bih>
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</term>
<term>
  <REFID>MDC_ECG_RHY_V_P_C_CPLT</REFID>
  <SysName>Pattern, Ventricular Couplet, Base pattern | ECG, Heart | CVS</SysName>
  <Description>Ventricular Couplet</Description>
  <CODE10>9952</CODE10>
  <Mnemonic>VCPLT</Mnemonic>
  <auxinfo/>
</term>
<term>
  <REFID>MDC_ECG_RHY_V_P_C_RUN</REFID>
  <SysName>Pattern, Ventricular Run, Base pattern | ECG, Heart | CVS</SysName>
  <Description>Ventricular Run</Description>
  <CODE10>9968</CODE10>
  <Mnemonic>VRUN</Mnemonic>
  <auxinfo/>
</term>
<term>
  <REFID>MDC_ECG_RHY_V_TACHY</REFID>
  <SysName>Pattern, Ventricular Tachycardia (nonparoxysmal), Base pattern | ECG, Heart | CVS</SysName>
  <Description>Ventricular Tachycardia (nonparoxysmal)</Description>
  <CODE10>9984</CODE10>
  <Mnemonic>VTACH VT</Mnemonic>
  <auxinfo>_RATE_LIMIT_LOW_GE [100] _RATE_LIMIT_HIGH_LT [250]</auxinfo>
  <mit-bih>(VT</mit-bih>
</term>
<term>
  <REFID>MDC_ECG_RHY_V_FLUT</REFID>
  <SysName>Pattern, Ventricular Flutter, Base pattern | ECG, Heart | CVS</SysName>
  <Description>Ventricular Flutter</Description>
  <CODE10>10000</CODE10>
  <Mnemonic>VFLUT</Mnemonic>
  <auxinfo>_RATE_LIMIT_LOW_GE [150] _RATE_LIMIT_HIGH_LT [300]</auxinfo>
  <mit-bih>(VFL</mit-bih>
</term>
<term>
  <REFID>MDC_ECG_RHY_V_FIB</REFID>
  <SysName>Pattern, Ventricular Fibrillation ("chaotic"), Base pattern | ECG, Heart | CVS</SysName>
  <Description>Ventricular Fibrillation ("chaotic")</Description>
  <CODE10>10016</CODE10>
  <Mnemonic>VFIB</Mnemonic>
  <auxinfo>_RATE_LIMIT_LOW_GE [150] _RATE_LIMIT_HIGH_LT [500]</auxinfo>
  <mit-bih>(VFIB</mit-bih>
</term>
<term>
  <REFID>MDC_ECG_RHY_V_TACHY_PAROX</REFID>
  <SysName>Pattern, Nonsustained Ventricular Tachycardia (paroxysmal), Base pattern | ECG, Heart | CVS</SysName>
  <Description>Nonsustained Ventricular Tachycardia (paroxysmal)</Description>
  <CODE10>10032</CODE10>
  <Mnemonic>NSUSVT</Mnemonic>
  <auxinfo>_RATE_LIMIT_LOW_GE [100?] _RATE_LIMIT_HIGH_LT [250?]</auxinfo>
</term>
<term>
  <REFID>MDC_ECG_RHY_V_TACHY_MONO</REFID>
  <SysName>Pattern, Sustained Monomorphic Ventricular Tachycardia, Base pattern | ECG, Heart | CVS</SysName>
  <Description>Sustained Monomorphic Ventricular Tachycardia</Description>
  <CODE10>10048</CODE10>
  <Mnemonic>SUSVT</Mnemonic>
  <auxinfo>_RATE_LIMIT_LOW_GE [100?] _RATE_LIMIT_HIGH_LT [250?]</auxinfo>
</term>
<term>
  <REFID>MDC_ECG_RHY_V_TACHY_POLY</REFID>
  <SysName>Pattern, Polymorphic Ventricular Tachycardia, Base pattern | ECG, Heart | CVS</SysName>
  <Description>Polymorphic Ventricular Tachycardia</Description>
  <CODE10>10064</CODE10>
  <Mnemonic>POLYVT</Mnemonic>
  <auxinfo/>
</term>
<term>
  <REFID>MDC_ECG_RHY_V_TACHY_TDP</REFID>
  <SysName>Pattern, Torsades de Pointes Ventricular Tachycardia, Base pattern | ECG, Heart | CVS</SysName>
  <Description>Torsades de Pointes Ventricular Tachycardia</Description>
  <CODE10>10080</CODE10>
  <Mnemonic>TDPVT</Mnemonic>
  <auxinfo/>
</term>
<termSectionTitle>Ventricular pre-excitation (WPW) rhythm</termSectionTitle>
<term>
  <REFID>MDC_ECG_RHY_PREX</REFID>
  <SysName>Pattern, Pre-excitation (least specific), Base pattern | ECG, Heart | CVS</SysName>
```

```
      <Description>Pre-excitation (least specific)</Description>
      <CODE10>10096</CODE10>
      <Mnemonic>PREX</Mnemonic>
      <auxinfo/>
      <scp>PREEX</scp>
      <mit-bih>(PREX</mit-bih>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_WPW_UNK</REFID>
      <SysName>Pattern, Wolf-Parkinson-White syndrome, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Wolf-Parkinson-White syndrome (less specific)</Description>
      <CODE10>10112</CODE10>
      <Mnemonic indent="1">WPW</Mnemonic>
      <auxinfo/>
      <scp>WPW</scp>
      <mit-bih>(PREX</mit-bih>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_WPW_A</REFID>
      <SysName>Pattern, Wolf-Parkinson Type A, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Wolf-Parkinson Type A</Description>
      <CODE10>10128</CODE10>
      <Mnemonic indent="2">WPWA</Mnemonic>
      <auxinfo/>
      <scp>WPWA</scp>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_WPW_B</REFID>
      <SysName>Pattern, Wolf-Parkinson Type B, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Wolf-Parkinson Type B</Description>
      <CODE10>10144</CODE10>
      <Mnemonic indent="2">WPWB</Mnemonic>
      <auxinfo/>
      <scp>WPWB</scp>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_LGL</REFID>
      <SysName>Pattern, Lown-Ganong-Levine syndrome, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Lown-Ganong-Levine syndrome</Description>
      <CODE10>10160</CODE10>
      <Mnemonic indent="1">LGL</Mnemonic>
      <auxinfo/>
    </term>
    <termSectionTitle>Implanted Pacemaker Rhythm<footnote>The pacemaker rhythm section could be expanded if there is sufficient
time and interest (most of this information can be conveyed using BEAT and WAVP annotations, however).</footnote>
    </termSectionTitle>
    <term>
      <REFID>MDC_ECG_RHY_EPADM</REFID>
      <SysName>Pattern, Atrial Demand Mode Pacing, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Atrial Demand Mode Pacing</Description>
      <CODE10>10176</CODE10>
      <Mnemonic>EPADM</Mnemonic>
      <auxinfo/>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_EPAC</REFID>
      <SysName>Pattern, Atrial Capture, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Atrial Capture</Description>
      <CODE10>10192</CODE10>
      <Mnemonic>EPAC</Mnemonic>
      <auxinfo/>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_EPAFC</REFID>
      <SysName>Pattern, Atrial Failure to Capture, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Atrial Failure to Capture</Description>
      <CODE10>10208</CODE10>
      <Mnemonic>EPAFC</Mnemonic>
      <auxinfo/>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_EPAFS</REFID>
      <SysName>Pattern, Atrial Failure to Sense, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Atrial Failure to Sense</Description>
      <CODE10>10224</CODE10>
      <Mnemonic>EPAFS</Mnemonic>
      <auxinfo/>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_EPVDM</REFID>
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    <SysName>Pattern, Ventricular Demand Mode, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Ventricular Demand Mode</Description>
    <CODE10>10240</CODE10>
    <Mnemonic>EPVDM</Mnemonic>
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  </term>
  <term>
    <REFID>MDC_ECG_RHY_EPVC</REFID>
    <SysName>Pattern, Ventricular Capture, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Ventricular Capture</Description>
    <CODE10>10256</CODE10>
    <Mnemonic>EPVC</Mnemonic>
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  </term>
  <term>
    <REFID>MDC_ECG_RHY_EPVFC</REFID>
    <SysName>Pattern, Ventricular Failure to Capture, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Ventricular Failure to Capture</Description>
    <CODE10>10272</CODE10>
    <Mnemonic>EPVFC</Mnemonic>
    <auxinfo/>
  </term>
  <term>
    <REFID>MDC_ECG_RHY_EPVFS</REFID>
    <SysName>Pattern, Ventricular Failure to Sense, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Ventricular Failure to Sense</Description>
    <CODE10>10288</CODE10>
    <Mnemonic>EPVFS</Mnemonic>
    <auxinfo/>
  </term>
  <term>
    <REFID>MDC_ECG_RHY_EPAVT</REFID>
    <SysName>Pattern, Anti-Tachycardia Pacing, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Anti-Tachycardia Pacing</Description>
    <CODE10>10304</CODE10>
    <Mnemonic>EPAVT</Mnemonic>
    <auxinfo/>
  </term>
  <termSectionTitle>Pause</termSectionTitle>
  <term>
    <REFID>MDC_ECG_RHY_MISSB</REFID>
    <SysName>Pattern, Pause or missing beat, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Pause or missing beat (due to any reason)</Description>
    <CODE10>10320</CODE10>
    <Mnemonic>MISSB</Mnemonic>
    <auxinfo/>
  </term>
  <term>
    <REFID>MDC_ECG_RHY_ASYSTOLE</REFID>
    <SysName>Pattern, Asystole, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Asystole</Description>
    <CODE10>10336</CODE10>
    <Mnemonic>ASYSTOLE ASYS</Mnemonic>
    <auxinfo/>
  </term>
  <termSectionTitle>Miscellaneous ECG Rhythms and other interval events</termSectionTitle>
  <term>
    <REFID>MDC_ECG_RHY_IRREG</REFID>
    <SysName>Pattern, Irregular rhythm, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Irregular rhythm</Description>
    <CODE10>10352</CODE10>
    <Mnemonic>IRREG</Mnemonic>
    <auxinfo/>
  </term>
  <term>
    <REFID>MDC_ECG_RHY_LHRV</REFID>
    <SysName>Pattern, Low Heart Rate Variability, Base pattern | ECG, Heart | CVS</SysName>
    <Description>Low Heart Rate Variability</Description>
    <CODE10>10368</CODE10>
    <Mnemonic>LHRV</Mnemonic>
    <auxinfo/>
  </term>
  <term>
    <REFID>MDC_ECG_RHY_STELVATION</REFID>
    <SysName>Pattern, ST change from some baseline beyond some threshold, Base pattern | ECG, Heart | CVS</SysName>
    <Description>ST change from some baseline beyond some threshold</Description>
    <CODE10>10384</CODE10>
    <Mnemonic>STELEVATION</Mnemonic>
    <auxinfo/>
  </term>
```

```
    <term>
      <REFID>MDC_ECG_RHY_STHILOST</REFID>
      <SysName>Pattern, Absolute ST measurement beyond some threshold, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Absolute ST measurement beyond some threshold</Description>
      <CODE10>10400</CODE10>
      <Mnemonic>STHILOST</Mnemonic>
      <auxinfo/>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_TALT</REFID>
      <SysName>Pattern, T-wave alternans, Base pattern | ECG, Heart | CVS</SysName>
      <Description>T-wave alternans</Description>
      <CODE10>10416</CODE10>
      <Mnemonic>TWA</Mnemonic>
      <auxinfo/>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_BRADY</REFID>
      <SysName>Pattern, Bradycardia of any type, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Bradycardia of any type</Description>
      <CODE10>10432</CODE10>
      <Mnemonic>BRADY</Mnemonic>
      <auxinfo>_RATE_LIMIT_LT [50]</auxinfo>
    </term>
    <term>
      <REFID>MDC_ECG_RHY_CALS</REFID>
      <SysName>Pattern, Calibration signal, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Calibration signal (sustained)</Description>
      <CODE10>10448</CODE10>
      <Mnemonic>CALS</Mnemonic>
      <auxinfo/>
    </term>
    <termSectionTitle>Pacemaker stimuli that were expected but are missing</termSectionTitle>        <!-- added 2012-09-26 -->
    <term>      <!-- added 2012-09-26 -->
      <REFID>MDC_ECG_RHY_EPAX</REFID>
      <SysName>Pattern, Atrial pacemaker spike expected but missing, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Atrial spike expected, but missing</Description>
      <CODE10>10480</CODE10>
      <Mnemonic>EPAX</Mnemonic>
      <auxinfo/>
    </term>
    <term>      <!-- added 2012-09-26 -->
      <REFID>MDC_ECG_RHY_EPAXLO</REFID>
      <SysName>Pattern, Inadequate atrial pacemaker spike, not capturable (loss of output), Base pattern | ECG, Heart |
CVS</SysName>
      <Description>Inadequate atrial spike, not capturable (loss of output)</Description>
      <CODE10>10496</CODE10>
      <Mnemonic>EPAXLO</Mnemonic>
      <auxinfo/>
    </term>
    <term>      <!-- added 2012-09-26 -->
      <REFID>MDC_ECG_RHY_EPAXFO</REFID>
      <SysName>Pattern, Atrial pacemaker spike expected but missing (failure to output), Base pattern | ECG, Heart | CVS</SysName>
      <Description>Atrial spike expected, but missing (failure to output)</Description>
      <CODE10>10512</CODE10>
      <Mnemonic>EPAXFO</Mnemonic>
      <auxinfo/>
    </term>
    <term>      <!-- added 2012-09-26 -->
      <REFID>MDC_ECG_RHY_EPVX</REFID>
      <SysName>Pattern, Ventricular pacemaker spike expected but missing, Base pattern | ECG, Heart | CVS</SysName>
      <Description>Ventricular spike expected, but missing</Description>
      <CODE10>10528</CODE10>
      <Mnemonic>EPVX</Mnemonic>
      <auxinfo/>
    </term>
    <term>      <!-- added 2012-09-26 -->
      <REFID>MDC_ECG_RHY_EPVXLO</REFID>
      <SysName>Pattern, Inadequate ventricular pacemaker spike, not capturable (loss of output), Base pattern | ECG, Heart |
CVS</SysName>
      <Description>Inadequate ventricular spike, not capturable (loss of output)</Description>
      <CODE10>10544</CODE10>
      <Mnemonic>EPVXLO</Mnemonic>
      <auxinfo/>
    </term>
    <term>      <!-- added 2012-09-26 -->
      <REFID>MDC_ECG_RHY_EPVXFO</REFID>
      <SysName>Pattern, Ventricular pacemaker spike expected but missing (failure to output), Base pattern | ECG, Heart |
CVS</SysName>
      <Description>Ventricular spike expected, but missing (failure to output)</Description>
```

```
      <CODE10>10560</CODE10>
      <Mnemonic>EPVXFO</Mnemonic>
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  </Terms>
</partition>
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C.10 ECG Noise Annotations and Levels «ECG_NOISE_terms.8g.xml»

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<?xml version="1.0" encoding="UTF-8"?>
<partition xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.ieee.org/11073/nomenclature"
xsi:schemaLocation="http://www.ieee.org/11073/nomenclature terms.8f.xsd">
  <!-- 2007-09-03 Edited to fully conform to ecg_nom5c.doc plus updates -->
  <!-- 2008-08-31 Renumbered codes with new baseCode -->
  <!-- 2009-04-30 Edited/transformed to conform to terms.8f.xsd (harmonized with IDCO and RTM) -->
  <partitionDescription>
    <title>ECG Noise Annotations</title>
    <date>2012-09-26</date>
    <version>0.8.7</version>
    <component>Rhythm</component>
    <discriminatorRef idref="MDC_ECG_discrim_BEAT_RHYTHM_NOISE"/>
    <basePart>10</basePart>
    <baseCode>11200</baseCode>
  </partitionDescription>
  <!-- -->
  <Terms>
    <term>
      <SysName>Type Enumeration | ECG, Noise Level, Clean | Heart | CVS</SysName>
      <DisplayName>Noise Clean</DisplayName>
      <Mnemonic>Clean</Mnemonic>
      <Description>No Noise, beat detection and classification can be performed</Description>
      <REFID>MDC_ECG_NOISE_CLEAN</REFID>
      <CODE10>11200</CODE10>
    </term>
    <term>
      <SysName>Type Enumeration | ECG, Noise Level, Moderate | Heart | CVS</SysName>
      <DisplayName>Noise Moderate</DisplayName>
      <Mnemonic>Moderate</Mnemonic>
      <Description>Noise Level such that beats can be detected but cannot be classified.</Description>
      <REFID>MDC_ECG_NOISE_MODERATE</REFID>
      <CODE10>11216</CODE10>
    </term>
    <term>
      <SysName>Type Enumeration | ECG, Noise Level, Severe | Heart | CVS</SysName>
      <DisplayName>Noise Severe</DisplayName>
      <Mnemonic>Severe</Mnemonic>
      <Description>Noise Level such that beats cannot be detected or classified.</Description>
      <REFID>MDC_ECG_NOISE_SEVERE</REFID>
      <CODE10>11232</CODE10>
    </term>
    <term>
      <SysName>Type Enumeration | ECG, Noise Level, No Signal | Heart | CVS</SysName>
      <DisplayName>No Signal</DisplayName>
      <Mnemonic>NoSignal</Mnemonic>
      <Description>Indicates that no signal is available due to communication or other loss.</Description>
      <REFID>MDC_ECG_NOISE_NOSIGNAL</REFID>
      <CODE10>11248</CODE10>
    </term>
  </Terms>
</partition>
```

C.11 ECG Measurements—Global «ECG_MEAS_GLOBAL_terms.8g.xml»

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<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2008 rel. 2 sp1 (http://www.altova.com) by Paul Schluter (GE Healthcare) -->
<partition xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.ieee.org/11073/nomenclature"
xsi:schemaLocation="http://www.ieee.org/11073/nomenclature terms.8f.xsd">
  <!-- Edited and verified against ecg_nom5c.doc PSS 2008-05-05 -->
  <!-- Final code assignments for 16 new terms starting at 2::15872 (64*4 block allocated by Jan on 2008-08-28). -->
  <!-- 2009-04-30 Edited/transformed to conform to terms.8f.xsd (harmonized with IDCO and RTM) -->
  <partitionDescription>
    <title>ECG Measurements, Global</title>
    <date>2012-09-26</date>
    <version>0.8.7</version>
    <discriminatorRef idref="MDC_ECG_discrim_STATISTICAL"/>
    <!-- <basePart> is not specified here since it is specified in each <term> -->
```

```
</partitionDescription>
<!-- -->
<Terms>
  <term>
    <SysName>Angle | ECG, J20, Azimuth | Heart | CVS</SysName>
    <Description>Azimuth of the vector at 20 ms after the end of QRS complex of ECG </Description>
    <REFID>MDC_ECG_ANGLE_J20_AZIM</REFID>
    <PART>2</PART>
    <CODE10>16248</CODE10>
  </term>
  <term>
    <SysName>Angle | ECG, J80, Azimuth | Heart | CVS</SysName>
    <Description>Azimuth of the vector at 80 ms after the end of QRS complex of ECG </Description>
    <REFID>MDC_ECG_ANGLE_J80_AZIM</REFID>
    <PART>2</PART>
    <CODE10>16284</CODE10>
  </term>
  <term>
    <SysName>Angle | ECG, J80, Elevation | Heart | CVS</SysName>
    <Description>Elevation of the vector at 80 ms after the end of QRS complex of ECG </Description>
    <REFID>MDC_ECG_ANGLE_J80_ELEV </REFID>
    <PART>2</PART>
    <CODE10>16288</CODE10>
  </term>
  <term>
    <SysName>Angle | ECG, Jxx, Azimuth | Heart | CVS</SysName>
    <Description>Azimuth of the vector at xx ms after the end of QRS complex of ECG </Description>
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    <PART>2</PART>
    <CODE10>16296</CODE10>
  </term>
  <term>
    <SysName>Angle | ECG, Jxx, Elevation | Heart | CVS</SysName>
    <Description>Elevation of the vector at xx ms after the end of QRS complex of ECG </Description>
    <REFID>MDC_ECG_ANGLE_Jxx_ELEV </REFID>
    <PART>2</PART>
    <CODE10>16300</CODE10>
  </term>
  <term>
    <SysName>Angle | ECG, J, Azimuth | Heart | CVS</SysName>
    <Description>Azimuth of the vector at the end of QRS complex (junctional point or J point) </Description>
    <REFID>MDC_ECG_ANGLE_J_AZIM</REFID>
    <PART>2</PART>
    <CODE10>16236</CODE10>
  </term>
  <term>
    <SysName>Angle | ECG, J, Elevation | Heart | CVS</SysName>
    <Description>Elevation of the vector at the end of QRS complex (junctional point or J point) </Description>
    <REFID>MDC_ECG_ANGLE_J_ELEV</REFID>
    <PART>2</PART>
    <CODE10>16240</CODE10>
  </term>
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    <SysName>Angle | ECG, J20, Elevation | Heart | CVS</SysName>
    <Description>Elevation of the vector at 20 ms after the end of QRS complex of ECG </Description>
    <REFID>MDC_ECG_ANGLE_J20_ELEV</REFID>
    <PART>2</PART>
    <CODE10>16252</CODE10>
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    <SysName>Angle | ECG, J40, Azimuth | Heart | CVS</SysName>
    <Description>Azimuth of the vector at 40 ms after the end of QRS complex of ECG </Description>
    <REFID>MDC_ECG_ANGLE_J40_AZIM</REFID>
    <PART>2</PART>
    <CODE10>16260</CODE10>
  </term>
  <term>
    <SysName>Angle | ECG, J40, Elevation | Heart | CVS</SysName>
    <Description>Elevation of the vector at 40 ms after the end of QRS complex of ECG </Description>
    <REFID>MDC_ECG_ANGLE_J40_ELEV</REFID>
    <PART>2</PART>
    <CODE10>16264</CODE10>
  </term>
  <term>
    <SysName>Angle | ECG, J60, Azimuth | Heart | CVS</SysName>
    <Description>Azimuth of the vector at 60 ms after the end of QRS complex of ECG </Description>
    <REFID>MDC_ECG_ANGLE_J60_AZIM</REFID>
    <PART>2</PART>
    <CODE10>16272</CODE10>
  </term>
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<term>
  <SysName>Angle | ECG, J60, Elevation | Heart | CVS</SysName>
  <Description>Elevation of the vector at 60 ms after the end of QRS complex of </Description>
  <REFID>MDC_ECG_ANGLE_J60_ELEV </REFID>
  <PART>2</PART>
  <CODE10>16276</CODE10>
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  <SysName>Angle | ECG, P, Azimuth, MaximumVector | Heart | CVS</SysName>
  <Description>Azimuth angle of the electrical axis of the P wave of ECG </Description>
  <REFID>MDC_ECG_ANGLE_P_AZIM</REFID>
  <PART>2</PART>
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  <SysName>Angle | ECG, P, Elevation, MaximumVector | Heart | CVS</SysName>
  <Description>Elevation angle of the electrical axis of the P wave of ECG </Description>
  <REFID>MDC_ECG_ANGLE_P_ELEV</REFID>
  <PART>2</PART>
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  <SysName>Angle | ECG, P, Frontal | Heart | CVS</SysName>
  <DisplayName>P wave axis</DisplayName>
  <Mnemonic>Paxis</Mnemonic>
  <Description>Angle of the electrical axis of the P wave of ECG (in frontal plane)</Description>
  <REFID>MDC_ECG_ANGLE_P_FRONT</REFID>
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  <SysName>Angle | ECG, QRS, Azimuth, MaximumVector | Heart | CVS</SysName>
  <Description>Azimuth of the electrical axis of the QRS complex of ECG </Description>
  <REFID>MDC_ECG_ANGLE_QRS_AZIM</REFID>
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<term>
  <SysName>Angle | ECG, QRS, Elevation, MaximumVector | Heart | CVS</SysName>
  <Description>Elevation of the electrical axis of the QRS complex of ECG </Description>
  <REFID>MDC_ECG_ANGLE_QRS_ELEV</REFID>
  <PART>2</PART>
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  <SysName>Angle | ECG, QRS, Frontal | Heart | CVS</SysName>
  <DisplayName>QRS axis</DisplayName>
  <Mnemonic>QRSaxis</Mnemonic>
  <Description>Angle of the electrical axis of the QRS complex of ECG (in frontal plane)</Description>
  <REFID>MDC_ECG_ANGLE_QRS_FRONT</REFID>
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  <SysName>Angle | ECG, T, Azimuth, MaximumVector | Heart | CVS</SysName>
  <Description>Elevation of the electrical axis of the T wave of ECG </Description>
  <REFID>MDC_ECG_ANGLE_T_ELEV</REFID>
  <PART>2</PART>
  <CODE10>16224</CODE10>
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<term>
  <SysName>Angle | ECG, T, Elevation, MaximumVector | Heart | CVS</SysName>
  <Description>Azimuth of the electrical axis of the T wave of ECG </Description>
  <REFID>MDC_ECG_ANGLE_T_AZIM</REFID>
  <PART>2</PART>
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</term>
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  <SysName>Angle | ECG, T, Frontal | Heart | CVS</SysName>
  <DisplayName>T wave axis</DisplayName>
  <Mnemonic>Taxis</Mnemonic>
  <Description>Angle of the electrical axis of the T wave of ECG (in frontal plane)</Description>
  <REFID>MDC_ECG_ANGLE_T_FRONT</REFID>
  <PART>2</PART>
  <CODE10>16136</CODE10>
</term>
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  <SysName>Duration | ECG, P | Heart | CVS</SysName>
  <DisplayName>P duration</DisplayName>
  <Description>Duration of the P wave of ECG (global)</Description>
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      <REFID>MDC_ECG_TIME_PD_P</REFID>
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      <CODE10>16184</CODE10>
    </term>
    <term>
      <REFID>MDC_ECG_TIME_PD_P_GL</REFID>
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    <term>
      <SysName>Duration | ECG, PP | Heart | CVS</SysName>
      <DisplayName>P-P interval</DisplayName>
      <Mnemonic>PP</Mnemonic>
      <Description>Duration of the interval between two consecutive P waves of ECG (global)</Description>
      <REFID>MDC_ECG_TIME_PD_PP</REFID>
      <PART>2</PART>
      <CODE10>16140</CODE10>
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      <REFID>MDC_ECG_TIME_PD_PP_GL</REFID>
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    <term>
      <SysName>Duration | ECG, PQ | Heart | CVS</SysName>
      <DisplayName>P-Q interval, P-R interval</DisplayName>
      <Mnemonic>PQint, PRint</Mnemonic>
      <Description>Duration of the interval between P onset and QRS onset of ECG (global)</Description>
      <REFID>MDC_ECG_TIME_PD_PQ</REFID>
      <PART>2</PART>
      <CODE10>16144</CODE10>
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      <SysName>Duration | ECG, PR | Heart | CVS</SysName>
      <DisplayName>P-R interval</DisplayName>
      <Mnemonic>PRint</Mnemonic>
      <Description>Duration of the interval between P onset and QRS onset of ECG R-wave (global)</Description>
      <REFID>MDC_ECG_TIME_PD_PR</REFID>
      <PART>2</PART>
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      <SysName>Duration | ECG, PQSegment | Heart | CVS</SysName>
      <DisplayName>P-Q segment</DisplayName>
      <Mnemonic>PQseg</Mnemonic>
      <Description>Duration of the interval between P offset and QRS onset of ECG (global) (synonymously to PR interval -
American)</Description>
      <REFID>MDC_ECG_TIME_PD_PQ_SEG</REFID>
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      <SysName>Duration | ECG, QRS | Heart | CVS</SysName>
      <DisplayName>QRS duration</DisplayName>
      <Description>Duration of the QRS complex of ECG (global)</Description>
      <REFID>MDC_ECG_TIME_PD_QRS</REFID>
      <PART>2</PART>
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    <term>
      <SysName>Duration | ECG, QT | Heart | CVS</SysName>
      <DisplayName>Q-T interval</DisplayName>
      <Mnemonic>QT</Mnemonic>
      <Description>Duration of the interval between the QRS onset and T wave offset of ECG (global)</Description>
      <REFID>MDC_ECG_TIME_PD_QT</REFID>
      <PART>2</PART>
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    <term>
      <SysName>Duration | ECG, QTc | Heart | CVS</SysName>
```

```
      <DisplayName>Q-T c</DisplayName>
      <Mnemonic>QTc</Mnemonic>
      <Description>Duration of the interval between the QRS onset and T wave offset, related to heart rate 60 beats per minute of ECG (global), Bazett formula</Description>
      <REFID>MDC_ECG_TIME_PD_QTc</REFID>
      <PART>2</PART>
      <CODE10>16164</CODE10>
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    <term>
      <SysName>Duration | ECG, QTc, NOS | Heart | CVS</SysName>
      <DisplayName>Q-T c (unspecified)</DisplayName>
      <Description>Duration of the interval between the QRS onset and T wave offset, corrected for heart rate using an unspecified correction</Description>
      <REFID>MDC_ECG_TIME_PD_QTC</REFID>
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      <SysName>Duration | ECG, QTc, Bazett | Heart | CVS</SysName>
      <DisplayName>Q-T c (Bazett)</DisplayName>
      <Description>Duration of the interval between the QRS onset and T wave offset, corrected for heart rate using the Bazett formula</Description>
      <REFID>MDC_ECG_TIME_PD_QTC_BAZETT</REFID>
      <PART>2</PART>
      <CODE10>15880</CODE10>
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      <SysName>Duration | ECG, QTc, Framingham | Heart | CVS</SysName>
      <DisplayName>Q-T c (Framingham)</DisplayName>
      <Description>Duration of the interval between the QRS onset and T wave offset, corrected for heart rate using the Framingham formula</Description>
      <REFID>MDC_ECG_TIME_PD_QTC_FRAMINGHAM</REFID>
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      <DisplayName>Q-T c (Hodges)</DisplayName>
      <Description>Duration of the interval between the QRS onset and T wave offset, corrected for heart rate using the Hodges formula</Description>
      <REFID>MDC_ECG_TIME_PD_QTC_HODGES</REFID>
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    <term>
      <SysName>Duration | ECG, QTc, Frederica | Heart | CVS</SysName>
      <DisplayName>Q-T c (Frederica)</DisplayName>
      <Description>Duration of the interval between the QRS onset and T wave offset, corrected for heart rate using the Frederica formula</Description>
      <REFID>MDC_ECG_TIME_PD_QTC_FREDERICA</REFID>
      <PART>2</PART>
      <CODE10>15892</CODE10>
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    <term>
      <SysName>Duration | ECG, QTc, user defined | Heart | CVS</SysName>
      <DisplayName>Q-T c (user defined)</DisplayName>
      <Description>Duration of the interval between the QRS onset and T wave offset, corrected for heart rate using a user defined formula</Description>
      <REFID>MDC_ECG_TIME_PD_QTC_USER</REFID>
      <PART>2</PART>
      <CODE10>15896</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG, RR for QTC | Heart | CVS</SysName>
      <DisplayName>R-R interval for QTC</DisplayName>
      <Mnemonic>RR for QTC</Mnemonic>
      <Description>Duration of the interval between two consecutive QRS complexes</Description>
      <REFID>MDC_ECG_TIME_PD_RR_GL</REFID>
      <PART>2</PART>
      <CODE10>16000</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG, QTU | Heart | CVS</SysName>
      <DisplayName>Q-TU</DisplayName>
      <Description>Duration of the interval between the QRS onset and U wave offset for fused TU wave. Used when QT duration cannot be measured, so QTU duration is measured instead.</Description>
      <REFID>MDC_ECG_TIME_PD_QTU</REFID>
      <PART>2</PART>
      <CODE10>16004</CODE10>
    </term>
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      <SysName>Dispersion | ECG, QT | Heart | CVS</SysName>
      <DisplayName>QT dispersion</DisplayName>
      <Description>QT Dispersion</Description>
      <REFID>MDC_ECG_DISPERSION_QT</REFID>
      <PART>2</PART>
      <CODE10>16008</CODE10>
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    <term>
      <SysName>Dispersion | ECG, QT, corrected | Heart | CVS</SysName>
      <DisplayName>QT dispersion corrected</DisplayName>
      <Description>QT Dispersion corrected</Description>
      <REFID>MDC_ECG_DISPERSION_QTC</REFID>
      <PART>2</PART>
      <CODE10>16012</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG, RR | Heart | CVS</SysName>
      <DisplayName>R-R interval</DisplayName>
      <Mnemonic>RR</Mnemonic>
      <Description>Duration of the interval between two consecutive QRS complexes</Description>
      <REFID>MDC_ECG_TIME_PD_RR</REFID>
      <PART>2</PART>
      <CODE10>16168</CODE10>
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    <term>
      <REFID>MDC_ECG_TIME_PD_RR_GL</REFID>
      <PART>2</PART>
      <CODE10>16168</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG, STJxx | Heart | CVS</SysName>
      <DisplayName>Time of STJxx</DisplayName>
      <Mnemonic>Tjxx</Mnemonic>
      <Description>Definition of reference time point xx ms after the end of QRS complex in ECG for potential measurements in ST
segment.</Description>
      <REFID>MDC_ECG_TIME_ST_Jxx</REFID>
      <PART>2</PART>
      <CODE10>16304</CODE10>
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    <term>
      <SysName>Magnitude | ECG, J, Vector | Heart | CVS</SysName>
      <Description>Magnitude of the vector at the end of QRS complex (junctional point or J point) of ECG in specified
{lead}</Description>
      <REFID>MDC_ECG_MAG_J_VECT</REFID>
      <PART>2</PART>
      <CODE10>16232</CODE10>
    </term>
    <term>
      <SysName>Magnitude | ECG, J20, Vector | Heart | CVS</SysName>
      <Description>Magnitude of the vector at 20 ms after the end of QRS complex of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_MAG_J20_VECT </REFID>
      <PART>2</PART>
      <CODE10>16244</CODE10>
    </term>
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      <SysName>Magnitude | ECG, J40, Vector | Heart | CVS</SysName>
      <Description>Magnitude of the vector at 40 ms after the end of QRS complex of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_MAG_J40_VECT</REFID>
      <PART>2</PART>
      <CODE10>16256</CODE10>
    </term>
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      <SysName>Magnitude | ECG, J60, Vector | Heart | CVS</SysName>
      <Description>Magnitude of the vector at 60 ms after the end of QRS complex of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_MAG_J60_VECT</REFID>
      <PART>2</PART>
      <CODE10>16268</CODE10>
    </term>
    <term>
      <SysName>Magnitude | ECG, J80, Vector | Heart | CVS</SysName>
      <Description>Magnitude of the vector at 80 ms after the end of QRS complex of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_MAG_J80_VECT</REFID>
      <PART>2</PART>
      <CODE10>16280</CODE10>
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      <SysName>Magnitude | ECG, Jxx, Vector | Heart | CVS</SysName>
      <Description>Magnitude of the vector at xx ms after the end of QRS complex of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_MAG_Jxx_VECT</REFID>
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      <Description>Length of the vector of the P wave of ECG (in frontal plane)</Description>
      <REFID>MDC_ECG_MAG_P_FRONT</REFID>
      <PART>2</PART>
      <CODE10>16172</CODE10>
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      <SysName>Magnitude | ECG, P, MaximumVector | Heart | CVS</SysName>
      <Description>Magnitude at the maximum vector of the P wave of ECG computed as square root of squared scalar magnitudes of X,
Y, Z</Description>
      <REFID>MDC_ECG_MAG_P_VECT</REFID>
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      <SysName>Magnitude | ECG, P, MaximumVector, FrontalPlane | Heart | CVS</SysName>
      <Description>Magnitude at the maximum vector of the P wave of ECG in frontal plane computed as square root of squared scalar
magnitudes of X, Y</Description>
      <REFID>MDC_ECG_MAG_P_VECT_FRONT</REFID>
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      <Description>Magnitude at the maximum vector of the P wave of ECG in horizontal plane computed as square root of squared
scalar magnitudes of X, Z</Description>
      <REFID>MDC_ECG_MAG_P_VECT_HORIZ</REFID>
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      <SysName>Magnitude | ECG, P, MaximumVector, SagitalPlane | Heart | CVS</SysName>
      <Description>Magnitude at the maximum vector of the P wave of ECG in sagital plane computed as square root of squared scalar
magnitudes of Y, Z</Description>
      <REFID>MDC_ECG_MAG_P_VECT_SAGI</REFID>
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      <SysName>Magnitude | ECG, QRS, Frontal | Heart | CVS</SysName>
      <Description>Length of the vector of the QRS complex of ECG (in frontal plane)</Description>
      <REFID>MDC_ECG_MAG_QRS_FRONT</REFID>
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      <SysName>Magnitude | ECG, QRS, MaximumVector | Heart | CVS</SysName>
      <Description>Magnitude at the maximum vector of the QRS complex of ECG computed as square root of squared scalar
magnitudes of X, Y, Z</Description>
      <REFID>MDC_ECG_MAG_QRS_VECT</REFID>
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      <SysName>Magnitude | ECG, QRS, MaximumVector, FrontalPlane | Heart | CVS</SysName>
      <Description>Magnitude at the maximum vector of the QRS complex of ECG in frontal plane computed as square root of squared
scalar magnitudes of X, Y</Description>
      <REFID>MDC_ECG_MAG_QRS_VECT_FRONT</REFID>
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      <SysName>Magnitude | ECG, QRS, MaximumVector, HorizontalPlane | Heart | CVS</SysName>
      <Description>Magnitude at the maximum vector of the QRS complex of ECG in horizontal plane computed as square root of
squared scalar magnitudes of X, Z</Description>
      <REFID>MDC_ECG_MAG_QRS_VECT_HORIZ</REFID>
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      <SysName>Magnitude | ECG, QRS, MaximumVector, SagitalPlane | Heart | CVS</SysName>
      <Description>Magnitude at the maximum vector of the QRS complex of ECG in sagital plane computed as square root of squared
scalar magnitudes of Y, Z</Description>
      <REFID>MDC_ECG_MAG_QRS_VECT_SAGI</REFID>
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      <Description>Length of the vector of the T wave of ECG (in frontal plane)</Description>
      <REFID>MDC_ECG_MAG_T_FRONT</REFID>
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      <SysName>Magnitude | ECG, T, MaximumVector | Heart | CVS</SysName>
      <Description>Magnitude of the maximum vector of the T wave of ECG computed as square root of squared scalar magnitudes of X,
Y, Z</Description>
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      <Description>Magnitude at the maximum vector of the T wave of ECG in frontal plane computed as square root of squared scalar
magnitudes of X, Y</Description>
      <REFID>MDC_ECG_MAG_T_VECT_FRONT</REFID>
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      <SysName>Magnitude | ECG, T, MaximumVector, HorizontalPlane | Heart | CVS</SysName>
      <Description>Magnitude at the maximum vector of the T wave of ECG in horizontal plane computed as square root of squared
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      <SysName>Magnitude | ECG, T, MaximumVector, SagitalPlane | Heart | CVS</SysName>
      <Description>Magnitude at the maximum vector of the T wave of ECG in sagital plane computed as square root of squared scalar
magnitudes of Y, Z</Description>
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      <DisplayName>heart rate, ventricular rate</DisplayName>
      <Mnemonic>HR</Mnemonic>
      <Description>Rate of cardiac beats</Description>
      <REFID>MDC_ECG_HEART_RATE</REFID>
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      <DisplayName>ventricular rate</DisplayName>
      <Description>Rate of ventricular beats</Description>
      <REFID>MDC_ECG_VENTRICULAR_RATE</REFID>
      <PART>2</PART>
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      <SysName>Rate | beats, atrial | Heart | CVS</SysName>
      <DisplayName>atrial rate</DisplayName>
      <Description>Rate of atrial beats</Description>
      <REFID>MDC_ECG_ATRIAL_RATE</REFID>
      <PART>2</PART>
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      <SysName>Count | beats, ventricular ectopic | Heart | CVS</SysName>
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      <Description>Count of VPC beats</Description>
      <REFID>MDC_ECG_VPC_COUNT</REFID>
      <PART>2</PART>
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      <SysName>Rate | beats, atrial ectopic | Heart | CVS</SysName>
      <DisplayName>SVPC rate</DisplayName>
      <Description>Rate of SVP beats</Description>
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      <CODE10>16028</CODE10>
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      <DisplayName>SVPC rate</DisplayName>
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      <PART>2</PART>
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C.12 ECG Measurements – Per Lead «ECG_MEAS_perLEAD_terms.8g.xml»

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  <!-- Edited and verified against ecg_nom5c.doc PSS 2008-05-05 -->
  <!-- Final code assignments for 10 new terms starting at 2::32768, using 16*256 block allocated by Jan. PSS 2008-08-31 -->
  <!-- Should consider reserving 32*256 rather than 16*256 codes if possible. -->
  <!-- perLead offset of 0 is "global"? -->
  <!-- 2009-04-30 Edited/transformed to conform to terms.8f.xsd (harmonized with IDCO and RTM) -->
  <partitionDescription>
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    <date>2012-09-26</date>
    <version>0.8.7</version>
    <discriminatorRef idref="MDC_ECG_discrim_LEADS"/>
    <!-- basePart is not used since each <term> conveys the partition -->
    <baseCode>0</baseCode>
  </partitionDescription>
  <!-- -->
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      <SysName>Duration | ECG {lead}, P | Heart | CVS</SysName>
      <DisplayName>P duration</DisplayName>
      <Description>Duration of the P wave of ECG in {lead}</Description>
      <REFID>MDC_ECG_TIME_PD_P</REFID>
      <PART>2</PART>
      <CODE10>6656</CODE10>
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      <SysName>Timepoint | ECG {lead}, P, End | Heart | CVS</SysName>
      <Mnemonic>Poff</Mnemonic>
      <Description>Time point of end of P wave in a specified {lead}</Description>
      <REFID>MDC_ECG_TIME_END_P</REFID>
      <PART>2</PART>
      <CODE10>5888</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG {lead}, P, FirstExtremum | Heart | CVS</SysName>
      <Description>Duration of the interval between P onset and the first extremum of the P wave of ECG in specified
{lead}</Description>
      <REFID>MDC_ECG_TIME_PD_P1</REFID>
      <PART>2</PART>
      <CODE10>4608</CODE10>
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    <term>
      <SysName>Duration | ECG {lead}, P, SecondExtremum | Heart | CVS</SysName>
      <Description>Duration of the interval between P onset and the second extremum of the P wave of ECG in specified
{lead}</Description>
      <REFID>MDC_ECG_TIME_PD_P2 </REFID>
      <PART>2</PART>
      <CODE10>4864</CODE10>
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    <term>
      <SysName>Timepoint | ECG {lead}, P, Start | Heart | CVS</SysName>
      <Mnemonic>Pon</Mnemonic>
      <Description>Time point of start of P wave in a specified {lead}</Description>
      <REFID>MDC_ECG_TIME_START_P</REFID>
      <PART>2</PART>
      <CODE10>9472</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG {lead}, P, ThirdExtremum | Heart | CVS</SysName>
      <Description>Duration of the interval between P onset and the third extremum of the P wave of ECG in specified
{lead}</Description>
      <REFID>MDC_ECG_TIME_PD_P3 </REFID>
```

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      <PART>2</PART>
      <CODE10>5120</CODE10>
    </term>
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      <SysName>Duration | ECG {lead}, PR | Heart | CVS</SysName>
      <DisplayName>P-R interval</DisplayName>
      <Mnemonic>PR</Mnemonic>
      <Description>Duration of the interval between P offset and QRS onset of ECG in {lead}</Description>
      <REFID>MDC_ECG_TIME_PD_PR</REFID>
      <PART>2</PART>
      <CODE10>7168</CODE10>
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      <SysName>Duration | ECG {lead}, Q | Heart | CVS</SysName>
      <DisplayName>Q wave duration</DisplayName>
      <Description>Duration of the Q wave of ECG in {lead}</Description>
      <REFID>MDC_ECG_TIME_PD_Q</REFID>
      <PART>2</PART>
      <CODE10>7680</CODE10>
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      <SysName>Duration | ECG {lead}, QRS | Heart | CVS</SysName>
      <DisplayName>QRS duration</DisplayName>
      <Description>Duration of the QRS complex of ECG in {lead}</Description>
      <REFID>MDC_ECG_TIME_PD_QRS</REFID>
      <PART>2</PART>
      <CODE10>7936</CODE10>
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      <SysName>Timepoint | ECG {lead}, QRS, End | Heart | CVS</SysName>
      <Mnemonic>QRSoff</Mnemonic>
      <Description>Time point of end of QRS complex in a specified {lead}</Description>
      <REFID>MDC_ECG_TIME_END_QRS</REFID>
      <PART>2</PART>
      <CODE10>6144</CODE10>
    </term>
    <term>
      <SysName>Timepoint | ECG {lead}, QRS, Start | Heart | CVS</SysName>
      <Mnemonic>QRSon</Mnemonic>
      <Description>Time point of start of QRS complex in a specified {lead}</Description>
      <REFID>MDC_ECG_TIME_START_QRS</REFID>
      <PART>2</PART>
      <CODE10>9728</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG {lead}, QT | Heart | CVS</SysName>
      <DisplayName>Q-T interval</DisplayName>
      <Mnemonic>QT</Mnemonic>
      <Description>Duration of the interval between the QRS onset and T wave offset of ECG in {lead} (used for QT
dispersion)</Description>
      <REFID>MDC_ECG_TIME_PD_QT</REFID>
      <PART>2</PART>
      <CODE10>8192</CODE10>
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    <term>
      <SysName>Duration | ECG {lead}, QTc | Heart | CVS</SysName>
      <DisplayName>Q-T c</DisplayName>
      <Mnemonic>QTc</Mnemonic>
      <Description>Duration of the interval between the QRS onset and T wave offset, related to heart rate 60 beats per minute of ECG in
{lead}, Bazett formula </Description>
      <REFID>MDC_ECG_TIME_PD_QT_CORR</REFID>
      <PART>2</PART>
      <CODE10>8448</CODE10>
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      <SysName>Duration | ECG {lead}, R1 | Heart | CVS</SysName>
      <DisplayName>R1 wave duration</DisplayName>
      <Mnemonic>R1</Mnemonic>
      <Description>Duration of the R1 wave of ECG in {lead}</Description>
      <REFID>MDC_ECG_TIME_PD_R_1</REFID>
      <PART>2</PART>
      <CODE10>11264</CODE10>
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      <SysName>Duration | ECG {lead}, R2 | Heart | CVS</SysName>
      <DisplayName>R2 wave duration</DisplayName>
      <Mnemonic>R2</Mnemonic>
      <Description>Duration of the R2 wave of ECG in {lead}</Description>
      <REFID>MDC_ECG_TIME_PD_R_2 </REFID>
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    <CODE10>11520</CODE10>
  </term>
  <term>
    <SysName>Duration | ECG {lead}, R3 | Heart | CVS</SysName>
    <DisplayName>R3 wave duration</DisplayName>
    <Mnemonic>R3</Mnemonic>
    <Description>Duration of the R3 wave of ECG in {lead}</Description>
    <REFID>MDC_ECG_TIME_PD_R_3</REFID>
    <PART>2</PART>
    <CODE10>11776</CODE10>
  </term>
  <term>
    <SysName>Duration | ECG {lead}, S1 | Heart | CVS</SysName>
    <DisplayName>S1 wave duration</DisplayName>
    <Mnemonic>S1</Mnemonic>
    <Description>Duration of the S1 wave of ECG in {lead}</Description>
    <REFID>MDC_ECG_TIME_PD_S_1 </REFID>
    <PART>2</PART>
    <CODE10>12032</CODE10>
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    <SysName>Duration | ECG {lead}, S2 | Heart | CVS</SysName>
    <DisplayName>S2 wave duration</DisplayName>
    <Mnemonic>S2</Mnemonic>
    <Description>Duration of the S2 wave of ECG in {lead}</Description>
    <REFID>MDC_ECG_TIME_PD_S_2</REFID>
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    <CODE10>12288</CODE10>
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    <SysName>Duration | ECG {lead}, S3 | Heart | CVS</SysName>
    <DisplayName>S3 wave duration</DisplayName>
    <Mnemonic>S3</Mnemonic>
    <Description>Duration of the S3 wave of ECG in {lead}</Description>
    <REFID>MDC_ECG_TIME_PD_S_3</REFID>
    <PART>2</PART>
    <CODE10>12544</CODE10>
  </term>
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    <SysName>Timepoint | ECG {lead}, T, End | Heart | CVS</SysName>
    <Mnemonic>Toff</Mnemonic>
    <Description>Time point of end of T wave in a specified {lead}</Description>
    <REFID>MDC_ECG_TIME_END_QRS</REFID>
    <PART>2</PART>
    <CODE10>6400</CODE10>
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  <term>
    <SysName>Timepoint | ECG {lead}, T, Start | Heart | CVS</SysName>
    <Mnemonic>Ton</Mnemonic>
    <Description>Time point of start of T wave in a specified {lead}</Description>
    <REFID>MDC_ECG_TIME_START_T</REFID>
    <PART>2</PART>
    <CODE10>9984</CODE10>
  </term>
  <term>
    <SysName>Duration | ECG {lead}, VentricularActivation | Heart | CVS</SysName>
    <DisplayName>Ventricular Activation Time</DisplayName>
    <Mnemonic>VAT</Mnemonic>
    <Description>Ventricular activation time</Description>
    <REFID>MDC_ECG_TIME_PD_VENT_ACTIV</REFID>
    <PART>2</PART>
    <CODE10>11008</CODE10>
  </term>
  <term>
    <SysName>ElectricalPotential | ECG {lead} | Heart | CVS</SysName>
    <DisplayName>ECG {lead code}</DisplayName>
    <Mnemonic>ECG-{lead}</Mnemonic>
    <Description>ECG as recorded according to {lead} in specified position (time series)</Description>
    <REFID>MDC_ECG_ELEC_POTL</REFID>
    <PART>2</PART>
    <CODE10>256</CODE10>
  </term>
  <term>
    <SysName>ElectricalPotential | ECG {lead}, J | Heart | CVS</SysName>
    <Mnemonic>ST-J</Mnemonic>
    <Description>Amplitude at the end of QRS complex (junctional point or J point) of ECG in specified {lead}</Description>
    <REFID>MDC_ECG_AMPL_J</REFID>
    <PART>2</PART>
    <CODE10>1024</CODE10>
  </term>
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    <term>
      <SysName>ElectricalPotential | ECG {lead}, J20 | Heart | CVS</SysName>
      <Mnemonic>ST-J20</Mnemonic>
      <Description>Amplitude at 20 ms after the end of QRS complex of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_ELEC_POTL_ST_20</REFID>
      <PART>2</PART>
      <CODE10>14848</CODE10>
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    <term>
      <SysName>ElectricalPotential | ECG {lead}, J40 | Heart | CVS</SysName>
      <Mnemonic>ST-J40</Mnemonic>
      <Description>Amplitude at 40 ms after the end of QRS complex of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_ELEC_POTL_ST_40</REFID>
      <PART>2</PART>
      <CODE10>15104</CODE10>
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    <term>
      <SysName>ElectricalPotential | ECG {lead}, J60 | Heart | CVS</SysName>
      <Mnemonic>ST-J60</Mnemonic>
      <Description>Amplitude at 60 ms after the end of QRS complex of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_ELEC_POTL_ST_60</REFID>
      <PART>2</PART>
      <CODE10>14336</CODE10>
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      <SysName>ElectricalPotential | ECG {lead}, J80 | Heart | CVS</SysName>
      <Mnemonic>ST-J80</Mnemonic>
      <Description>Amplitude at 80 ms after the end of QRS complex of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_ELEC_POTL_ST_80</REFID>
      <PART>2</PART>
      <CODE10>14592</CODE10>
    </term>
    <term>
      <SysName>ElectricalPotential | ECG {lead}, P, FirstExtremum | Heart | CVS</SysName>
      <DisplayName>Maximum P wave amplitude</DisplayName>
      <Mnemonic>Pmax</Mnemonic>
      <Description>Amplitude level of first extremum of the P wave of ECG in specified {lead} (mostly maximum of P, depends on
morphology)</Description>
      <REFID>MDC_ECG_AMPL_P_MAX</REFID>
      <PART>2</PART>
      <CODE10>1280</CODE10>
    </term>
    <term>
      <SysName>ElectricalPotential | ECG {lead}, P, SecondExtremum | Heart | CVS</SysName>
      <DisplayName>Minimum P wave amplitude</DisplayName>
      <Mnemonic>Pmin</Mnemonic>
      <Description>Amplitude level of the second extremum of the P wave of ECG in specified {lead} (often minimum of P, depends on
morphology)</Description>
      <REFID>MDC_ECG_AMPL_P_MIN</REFID>
      <PART>2</PART>
      <CODE10>1536</CODE10>
    </term>
    <term>
      <SysName>ElectricalPotential | ECG {lead}, P, ThirdExtremum | Heart | CVS</SysName>
      <Mnemonic>P3</Mnemonic>
      <Description>Amplitude level of the third extremum of the P wave of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_AMPL_P3</REFID>
      <PART>2</PART>
      <CODE10>3072</CODE10>
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      <SysName>ElectricalPotential | ECG {lead}, Q | Heart | CVS</SysName>
      <DisplayName>Q wave amplitude</DisplayName>
      <Description>Amplitude of the Q wave of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_AMPL_Q </REFID>
      <PART>2</PART>
      <CODE10>1792</CODE10>
    </term>
    <term>
      <SysName>ElectricalPotential | ECG {lead}, R, Maximum | Heart | CVS</SysName>
      <Mnemonic>Rmax</Mnemonic>
      <Description>Maximum amplitude of R wave of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_AMPL_R</REFID>
      <PART>2</PART>
      <CODE10>2048</CODE10>
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      <SysName>ElectricalPotential | ECG {lead}, R1 | Heart | CVS </SysName>
      <DisplayName>R1 wave amplitude</DisplayName>
      <Description>Amplitude of the R1 wave of ECG in specified {lead}</Description>
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      <REFID>MDC_ECG_ELEC_POTL_R_1</REFID>
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      <CODE10>12800</CODE10>
    </term>
    <term>
      <SysName>ElectricalPotential | ECG {lead}, R2 | Heart | CVS </SysName>
      <DisplayName>R2 wave amplitude</DisplayName>
      <Description>Amplitude of the R2 wave of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_ELEC_POTL_R_2</REFID>
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      <CODE10>13056</CODE10>
    </term>
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      <SysName>ElectricalPotential | ECG {lead}, R3 | Heart | CVS </SysName>
      <DisplayName>R3 wave amplitude</DisplayName>
      <Description>Amplitude of the R3 wave of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_ELEC_POTL_R_3</REFID>
      <PART>2</PART>
      <CODE10>13312</CODE10>
    </term>
    <term>
      <SysName>ElectricalPotential | ECG {lead}, S, Maximum | Heart | CVS</SysName>
      <Mnemonic>Smax</Mnemonic>
      <Description>Maximum amplitude of S wave of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_AMPL_S</REFID>
      <PART>2</PART>
      <CODE10>2304</CODE10>
    </term>
    <term>
      <SysName>ElectricalPotential | ECG {lead}, S1 | Heart | CVS</SysName>
      <DisplayName>S1 wave amplitude</DisplayName>
      <Description>Amplitude of the S1 wave of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_ELEC_POTL_S_1</REFID>
      <PART>2</PART>
      <CODE10>13568</CODE10>
    </term>
    <term>
      <SysName>ElectricalPotential | ECG {lead}, S2 | Heart | CVS</SysName>
      <DisplayName>S2 wave amplitude</DisplayName>
      <Description>Amplitude of the S2 wave of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_ELEC_POTL_S_2 </REFID>
      <PART>2</PART>
      <CODE10>13824</CODE10>
    </term>
    <term>
      <SysName>ElectricalPotential | ECG {lead}, S3 | Heart | CVS</SysName>
      <DisplayName>S3 wave amplitude</DisplayName>
      <Description>Amplitude of the S3 wave of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_ELEC_POTL_S_3</REFID>
      <PART>2</PART>
      <CODE10>14080</CODE10>
    </term>
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      <SysName>ElectricalPotential | ECG {lead}, T, Maximum | Heart | CVS</SysName>
      <DisplayName>Positive T wave amplitude</DisplayName>
      <Mnemonic>Tmax</Mnemonic>
      <Description>Amplitude of the T positive wave of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_AMPL_T_MAX</REFID>
      <PART>2</PART>
      <CODE10>2560</CODE10>
    </term>
    <term>
      <SysName>ElectricalPotential | ECG {lead}, T, Minimum | Heart | CVS</SysName>
      <DisplayName>Negative T wave amplitude</DisplayName>
      <Mnemonic>Tmin</Mnemonic>
      <Description>Amplitude of the T negative wave of ECG in specified {lead}</Description>
      <REFID>MDC_ECG_AMPL_T_MIN</REFID>
      <PART>2</PART>
      <CODE10>2816</CODE10>
    </term>
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      <SysName>ElectricalPotential | ECG, lead set | Heart | CVS</SysName>
      <DisplayName>ECG, Lead set</DisplayName>
      <Mnemonic>ECG</Mnemonic>
      <Description>ECG as recorded from a set of leads (time sample array is unspecified lead as an composite element of specified or
unspecified leads)</Description>
      <REFID>MDC_ECG_ELEC_POTL</REFID>
      <PART>2</PART>
      <CODE10>256</CODE10>
    </term>
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    <term>
      <SysName>ElectricalPotential | ECG{lead}, ST | Heart | CVS</SysName>
      <DisplayName>STTxx Amplitude</DisplayName>
      <Mnemonic>ST-Jxx</Mnemonic>
      <Description>Amplitude of the ST segment at xx ms after the end of QRS complex of ECG in specified {lead}. The time point xx is
defined globally by item with code XXXXXX</Description>
      <REFID>MDC_ECG_AMPL_ST</REFID>
      <PART>2</PART>
      <CODE10>768</CODE10>
    </term>
    <term>
      <SysName>Integral | ECG {lead}, P | Heart | CVS</SysName>
      <DisplayName>P wave integral</DisplayName>
      <Mnemonic>Pintegral</Mnemonic>
      <Description>Integral of the P wave of ECG in specified {lead} (mVolt x milisecond)</Description>
      <REFID>MDC_ECG_INTEGRAL_P</REFID>
      <PART>2</PART>
      <CODE10>6912</CODE10>
    </term>
    <term>
      <SysName>Integral | ECG {lead}, P, Area | Heart | CVS</SysName>
      <DisplayName>P wave area</DisplayName>
      <Mnemonic>Parea</Mnemonic>
      <Description>Area of the P wave of ECG in specified {lead} (mVolt x millisecond) by integrating absolute values.</Description>
      <REFID>MDC_ECG_AREA_P</REFID>
      <PART>2</PART>
      <CODE10>3840</CODE10>
    </term>
    <term>
      <SysName>Integral | ECG {lead}, Q | Heart | CVS</SysName>
      <DisplayName>Q wave integral</DisplayName>
      <Mnemonic>Qintegral</Mnemonic>
      <Description>Integral of the Q wave of ECG in specified {lead} (mVolt x millisecond)</Description>
      <REFID>MDC_ECG_INTEGRAL_Q </REFID>
      <PART>2</PART>
      <CODE10>7424</CODE10>
    </term>
    <term>
      <SysName>Integral | ECG {lead}, Q, Area | Heart | CVS</SysName>
      <DisplayName>Q wave area</DisplayName>
      <Mnemonic>Qarea</Mnemonic>
      <Description>Area of the Q wave of ECG in specified {lead} (mVolt x millisecond) by integrating absolute values.</Description>
      <REFID>MDC_ECG_AREA_Q</REFID>
      <PART>2</PART>
      <CODE10>3328</CODE10>
    </term>
    <term>
      <SysName>Integral | ECG {lead}, QRS | Heart | CVS</SysName>
      <DisplayName>QRS integral</DisplayName>
      <Mnemonic>QRSintegral</Mnemonic>
      <Description>Integral of the QRS complex of ECG in specified {lead} (mVolt x millisecond)</Description>
      <REFID>MDC_ECG_INTEGRAL_QRS</REFID>
      <PART>2</PART>
      <CODE10>8704</CODE10>
    </term>
    <term>
      <SysName>Integral | ECG {lead}, QRS, Area | Heart | CVS</SysName>
      <DisplayName>QRS area</DisplayName>
      <Mnemonic>QRSarea</Mnemonic>
      <Description>Area of the QRS complex of ECG in specified {lead} (mVolt x millisecond) by integrating absolute
values.</Description>
      <REFID>MDC_ECG_AREA_QRS</REFID>
      <PART>2</PART>
      <CODE10>4096</CODE10>
    </term>
    <term>
      <SysName>Integral | ECG {lead}, ST | Heart | CVS</SysName>
      <DisplayName>ST-T integral</DisplayName>
      <Mnemonic>ST-Tintegral</Mnemonic>
      <Description>Integral of the ST-T segment computed between J point and the beginning of the T wave of ECG in specified {lead}
(mVolt x millisecond)</Description>
      <REFID>MDC_ECG_INTEGRAL_ST</REFID>
      <PART>2</PART>
      <CODE10>9216</CODE10>
    </term>
    <term>
      <SysName>Integral | ECG {lead}, ST, Area | Heart | CVS</SysName>
      <DisplayName>ST-T area</DisplayName>
      <Mnemonic>ST-Tarea</Mnemonic>
```

```
      <Description>Area of the ST-T segment computed between J point and the beginning of the T wave of ECG in specified {lead}
(mVolt x millisecond) by integrating absolute values.</Description>
      <REFID>MDC_ECG_AREA_ST</REFID>
      <PART>2</PART>
      <CODE10>4352</CODE10>
    </term>
    <term>
      <SysName>Integral | ECG {lead}, T | Heart | CVS</SysName>
      <DisplayName>T wave integral</DisplayName>
      <Mnemonic>Tintegral</Mnemonic>
      <Description>Integral of the T wave of ECG in specified {lead} (mVolt x millisecond)</Description>
      <REFID>MDC_ECG_INTEGRAL_T</REFID>
      <PART>2</PART>
      <CODE10>8960</CODE10>
    </term>
    <term>
      <SysName>Integral | ECG {lead}, T, Area | Heart | CVS</SysName>
      <DisplayName>T wave area</DisplayName>
      <Mnemonic>Tarea</Mnemonic>
      <Description>Area of the T wave of ECG in specified {lead} (mVolt x millisecond) by integrating absolute values.</Description>
      <REFID>MDC_ECG_AREA_T</REFID>
      <PART>2</PART>
      <CODE10>3584</CODE10>
    </term>
    <term>
      <SysName>Slope | ECG {lead}, QRS_offset_+_20ms_to_QRS_offset_+_60ms | Heart | CVS</SysName>
      <Description>Slope of ST-segment between QRS offset plus 20 ms and QRS offset plus 60 ms of ECG in specified
{lead}</Description>
      <REFID>MDC_ECG_SLOPE_ST </REFID>
      <PART>2</PART>
      <CODE10>5376</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG {lead}, PP | Heart | CVS</SysName>
      <DisplayName>P-P interval</DisplayName>
      <Mnemonic>PP</Mnemonic>
      <Description>Time period, PP</Description>
      <REFID>MDC_ECG_TIME_PD_PP</REFID>
      <PART>2</PART>
      <CODE10>32768</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG {lead}, RR | Heart | CVS</SysName>
      <DisplayName>R-R interval</DisplayName>
      <Mnemonic>RR</Mnemonic>
      <Description>Time period, RR</Description>
      <REFID>MDC_ECG_TIME_PD_RR</REFID>
      <PART>2</PART>
      <CODE10>33024</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG {lead}, PQ | Heart | CVS</SysName>
      <DisplayName>P-Q interval</DisplayName>
      <Mnemonic>PQ</Mnemonic>
      <Description>Time period, PQ</Description>
      <REFID>MDC_ECG_TIME_PD_PQ</REFID>
      <PART>2</PART>
      <CODE10>33280</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG {lead}, PQ segment | Heart | CVS</SysName>
      <DisplayName>P-Q segment</DisplayName>
      <Mnemonic>Pqseg</Mnemonic>
      <Description>Time period, PQ segment (?)</Description>
      <REFID>MDC_ECG_TIME_PD_PQ_SEG</REFID>
      <PART>2</PART>
      <CODE10>33536</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG {lead}, QTc | Heart | CVS</SysName>
      <DisplayName>Q-Tc</DisplayName>
      <Mnemonic>QTc</Mnemonic>
      <Description>Time period, QT (correction specified as a separate attribute or unknown)</Description>
      <REFID>MDC_ECG_TIME_PD_QTc</REFID>
      <PART>2</PART>
      <CODE10>33792</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG {lead}, QTcB | Heart | CVS</SysName>
      <DisplayName>Q-TcB</DisplayName>
```

```
      <Mnemonic>QTcB</Mnemonic>
      <Description>Time period, QT (corrected) using Bazett's correction formula</Description>
      <REFID>MDC_ECG_TIME_PD_QTcB</REFID>
      <PART>2</PART>
      <CODE10>34048</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG {lead}, QTcF | Heart | CVS</SysName>
      <DisplayName>Q-TcF</DisplayName>
      <Mnemonic>QTcF</Mnemonic>
      <Description>Time period, QT (corrected) using Fredericia's correction formula</Description>
      <REFID>MDC_ECG_TIME_PD_QTcF</REFID>
      <PART>2</PART>
      <CODE10>34304</CODE10>
    </term>
    <term>
      <SysName>Duration | ECG {lead}, QTU | Heart | CVS</SysName>
      <DisplayName>Q-TU</DisplayName>
      <Mnemonic>QTU</Mnemonic>
      <Description>Time period, QTU</Description>
      <REFID>MDC_ECG_TIME_PD_QTU</REFID>
      <PART>2</PART>
      <CODE10>34560</CODE10>
    </term>
    <term>
      <SysName>Shape | ECG {lead}, ST segment after J-point | Heart | CVS</SysName>
      <Description>ST segment shape immediately after J-point<footnote>SHAPE_ST and SHAPE_ST_T can have the following
enumerated values: “concave_up”, “linear”, “concave_down” and “unknown”.</footnote>
      </Description>
      <REFID>MDC_ECG_SHAPE_ST</REFID>
      <PART>2</PART>
      <CODE10>34816</CODE10>
    </term>
    <term>
      <SysName>Shape | ECG {lead}, ST segment after ST-T inflection | Heart | CVS</SysName>
      <Description>Second ST-T segment shape (after ST-T inflection point)</Description>
      <REFID>MDC_ECG_SHAPE_ST_T</REFID>
      <PART>2</PART>
      <CODE10>35072</CODE10>
    </term>
  </Terms>
</partition>
```

C.13 ECG Lead Systems «ECG_LEAD_SYSTEMS_terms.8g.html»

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2008 rel. 2 sp1 (http://www.altova.com) by Paul Schluter (GE Healthcare) -->
<partition xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.ieee.org/11073/nomenclature"
xsi:schemaLocation="http://www.ieee.org/11073/nomenclature terms.8f.xsd">
  <!-- Edited and verified against ecgleadsys1j.doc PSS 2008-08-23 -->
  <!-- Numeric code numbers assigned. PSS 2008-09-01 -->
  <!-- 2009-04-30 Edited/transformed to conform to terms.8f.xsd (harmonized with IDCO and RTM) -->
  <partitionDescription>
    <title>ECG Lead Systems</title>
    <date>2012-09-27</date>
    <version>0.8.7</version>    <!-- "0.8.7" corresponds to "8g", updated on 2009-09-26 -->
    <!-- NO DISCRIMINATORS ARE USED -->
    <basePart>10</basePart>
    <baseCode>11264</baseCode>
  </partitionDescription>
  <!-- -->
  <Terms>
    <termSectionTitle>12-lead ECG Electrode placement</termSectionTitle>
    <term>
      <SysName>12-lead, unspecified | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic>SCP_12LD_0</Mnemonic>
      <REFID>MDC_ECG_LDSYS_12LD_UNSPECIFIED</REFID>
      <scp-ref>5.4.5-33-1-0</scp-ref>
      <Description>Unspecified. Systems that do not record the electrode placement information should use this term.</Description>
      <CODE10>11264</CODE10>
    </term>
    <term>
      <SysName>12-lead, standard | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic>SCP_12LD_1</Mnemonic>
      <REFID>MDC_ECG_LDSYS_12LD_STD</REFID>
      <scp-ref>5.4.5-33-1-1</scp-ref>
```

<Description>Standard 12-lead positions: RA, RL, LA, and LL are placed at limb extremities. V1 to V6 at standard positions on the chest. All electrodes are placed individually. This lead positioning supports the standard 12 leads I, II, III, aVR, aVL, aVR, V1, V2, V3, V4, V5, V6 and the Cabrera 12 leads aVL, I, aVR, II, aVF, III, V1, V2, V3, V4, V5, V5, V6.</Description>
<CODE10>11265</CODE10>
</term>
<term>
<SysName>12-lead, Mason-Likar | ECG, lead system | Heart | CVS</SysName>
<Mnemonic>SCP_12LD_2</Mnemonic>
<REFID>MDC_ECG_LDSYS_12LD_MASON_LIKAR</REFID>
<scp-ref>5.4.5-33-1-2</scp-ref>
<Description>RA, RL, LA, and LL are placed on the torso (Mason-Likar positions). V1 to V6 are placed at standard positions on the chest. All electrodes are placed individually.</Description>
<CODE10>11266</CODE10>
</term>
<term>
<SysName>12-lead, V-Pad | ECG, lead system | Heart | CVS</SysName>
<Mnemonic>SCP_12LD_3</Mnemonic>
<REFID>MDC_ECG_LDSYS_12LD_VPAD</REFID>
<scp-ref>5.4.5-33-1-3</scp-ref>
<Description>RA, RL, LA, and LL are placed on the torso (Mason-Likar positions). These limb electrodes are individually placed. V1 to V6 on the chest as part of a single electrode pad (V1 to V6 are NOT placed individually).</Description>
<CODE10>11267</CODE10>
</term>
<term>
<SysName>12-lead, Pad | ECG, lead system | Heart | CVS</SysName>
<Mnemonic>SCP_12LD_4</Mnemonic>
<REFID>MDC_ECG_LDSYS_12LD_PAD</REFID>
<scp-ref>5.4.5-33-1-4</scp-ref>
<Description>RA, RL, LA, LL, and V1 to V6 (all electrodes) are on the chest in a single electrode pad (such as Omnitrode). (None of the electrodes are placed individually)</Description>
<CODE10>11268</CODE10>
</term>
<term>
<SysName>12-lead from Frank XYZ | ECG, lead system | Heart | CVS</SysName>
<Mnemonic>SCP_12LD_5</Mnemonic>
<REFID>MDC_ECG_LDSYS_12LD_FROM_FRANK</REFID>
<scp-ref>5.4.5-33-1-5</scp-ref>
<Description>12-lead ECG is derived from Frank XYZ leads</Description>
<CODE10>11269</CODE10>
</term>
<term>
<SysName>12-lead, non-standard | ECG, lead system | Heart | CVS</SysName>
<Mnemonic>SCP_12LD_6</Mnemonic>
<REFID>MDC_ECG_LDSYS_12LD_NON_STANDARD</REFID>
<scp-ref>5.4.5-33-1-6</scp-ref>
<Description>12-lead ECG is derived from non-standard leads</Description>
<CODE10>11270</CODE10>
</term>
<term>
<SysName>12-lead, bicycle | ECG, lead system | Heart | CVS</SysName>
<Mnemonic/>
<REFID>MDC_ECG_LDSYS_12LD_BICYCLE</REFID>
<scp-ref/>
<Description>Standard leads for bicycle exercise testing in Europe (Germany, Finland, etc.) where bicycle tests in upright position are performed the limb leads are often positioned not on the chest (Mason-Likar), but on the back (shoulder and on the hips) of the patient. Doing this has a practical reason, since the patient bows his back during bicycling and the limb lead electrodes applied on the chest would be disturbed.</Description>
<CODE10>11271</CODE10>
</term>
<term>
<SysName>12-lead, raised intercostal | ECG, lead system | Heart | CVS</SysName>
<Mnemonic/>
<REFID>MDC_ECG_LDSYS_12LD_RAISED_INTERCOSTAL</REFID>
<scp-ref/>
<Description>Standard leads one intercostal space higher. The Wilson electrodes are applied one intercostal space higher the limb electrodes remain on their position. I..aVF, V1', V2' ... V6'.</Description>
<CODE10>11272</CODE10>
</term>
<termSectionTitle>XYZ Electrode Placement System</termSectionTitle>
<term>
<SysName>XYZ, unspecified | ECG, lead system | Heart | CVS</SysName>
<Mnemonic>SCP_XYZ_0</Mnemonic>
<REFID>MDC_ECG_LDSYS_XYZ_UNSPECIFIED</REFID>
<scp-ref>5.4.5-33-2-0</scp-ref>
<Description>Unspecified. Systems that do not record the electrode placement information should use this term.</Description>
<CODE10>11273</CODE10>
</term>
<term>
<SysName>XYZ, Frank | ECG, lead system | Heart | CVS</SysName>
<Mnemonic>SCP_XYZ_1</Mnemonic>

```
      <REFID>MDC_ECG_LDSYS_XYZ_FRANK</REFID>
      <scp-ref>5.4.5-33-2-1</scp-ref>
      <Description>Frank lead system (Frank, E., An accurate clinically practical system for spatial vectorcardiography. Circulation 13:737, 1956).</Description>
      <CODE10>11274</CODE10>
    </term>
    <term>
      <SysName>XYZ, McFee-Parungao | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic>SCP_XYZ_2</Mnemonic>
      <REFID>MDC_ECG_LDSYS_XYZ_MCFEE_PARUNAGO</REFID>
      <scp-ref>5.4.5-33-2-2</scp-ref>
      <Description>McFee-Parungao lead system (see Benchimol, Vectorcardiography, Williams &amp;amp; Wilkins, Baltimore, 1973, Fig 1.6 on page 6)</Description>
      <CODE10>11275</CODE10>
    </term>
    <term>
      <SysName>XYZ, Cube</SysName>
      <Mnemonic>SCP_XYZ_3</Mnemonic>
      <REFID>MDC_ECG_LDSYS_XYZ_CUBE</REFID>
      <scp-ref>5.4.5-33-2-3</scp-ref>
      <Description>Cube lead system (Grishman et al, Amer Heart J 1951; 41:483).</Description>
      <CODE10>11276</CODE10>
    </term>
    <term>
      <SysName>XYZ, Bipolar</SysName>
      <Mnemonic>SCP_XYZ_4</Mnemonic>
      <REFID>MDC_ECG_LDSYS_XYZ_BIPOLAR</REFID>
      <scp-ref>5.4.5-33-2-4</scp-ref>
      <Description>Bipolar uncorrected XYZ lead system</Description>
      <CODE10>11277</CODE10>
    </term>
    <term>
      <SysName>XYZ, Pseudo-Orthogonal</SysName>
      <Mnemonic>SCP_XYZ_5</Mnemonic>
      <REFID>MDC_ECG_LDSYS_XYZ_PSEUDO_ORTH</REFID>
      <scp-ref>5.4.5-33-2-5</scp-ref>
      <Description>Pseudo-orthogonal XYZ lead system (as used in Holter recording)</Description>
      <CODE10>11278</CODE10>
    </term>
    <term>
      <SysName>XYZ, from 12-lead</SysName>
      <Mnemonic>SCP_XYZ_6</Mnemonic>
      <REFID>MDC_ECG_LDSYS_XYZ_FROM_12LD</REFID>
      <scp-ref>5.4.5-33-2-6</scp-ref>
      <Description>XYZ leads derived from standard 12-lead ECG</Description>
      <CODE10>11279</CODE10>
    </term>
    <termSectionTitle>Additional 3-lead systems</termSectionTitle>
    <term>
      <SysName>3-lead, NEHB | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_3LD_NEHB</REFID>
      <scp-ref/>
      <Description>NEHB lead system (see also Annex CC of IEC 60601-2-51)</Description>
      <CODE10>11280</CODE10>
    </term>
    <term>
      <SysName>3-lead, CC5-CM5-ML | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_3LD_CC5_CM5_ML</REFID>
      <scp-ref/>
      <Description>First electrode at mid-sternum at the second intercostal space and second electrode in the fifth intercostal space in the anterior axillary line (V5R/C5R).</Description>
      <CODE10>11281</CODE10>
    </term>
    <term>
      <SysName>3-lead, CM5-CC5-CH5 | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_3LD_CM5_CC5_CH5</REFID>
      <scp-ref/>
      <Description>First electrode at mid-sternum at the second intercostal space; second electrode in the fifth intercostal space in the anterior axillary line (V5R/C5R) and third electrode on either side of neck above shoulders.</Description>
      <CODE10>11282</CODE10>
    </term>
    <termSectionTitle>Derived 12-lead systems</termSectionTitle>
    <term>
      <SysName>12-lead from Dower | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_12LD_FROM_DOWER</REFID>
      <scp-ref/>
```

```
      <Description>12-lead from Frank leads (X, Y, Z) leads by Dower transformation</Description>
      <CODE10>11283</CODE10>
    </term>
    <term>
      <SysName>12-lead from EASI | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_12LD_FROM_EASI</REFID>
      <scp-ref/>
      <Description>12-lead from EASI leads (ES, AS, AI) by Dower/EASI transformation</Description>
      <CODE10>11284</CODE10>
    </term>
    <term>
      <SysName>12-lead from Limb | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_12LD_FROM_LIMB</REFID>
      <scp-ref/>
      <Description>12-lead from Limb Leads (I, II) and one or more V leads</Description>
      <CODE10>11285</CODE10>
    </term>
    <termSectionTitle>15- and 18-lead systems</termSectionTitle>
    <term>
      <SysName>12-lead and XYZ | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_12LD_STD_AND_XYZ</REFID>
      <scp-ref/>
      <Description>Standard 12-lead and XYZ</Description>
      <CODE10>11286</CODE10>
    </term>
    <term>
      <SysName>12-lead and NEHB | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_12LD_STD_AND_NEHB</REFID>
      <scp-ref/>
      <Description>Standard 12-lead and NEHB</Description>
      <CODE10>11287</CODE10>
    </term>
    <term>
      <SysName>12-lead and CC5-CM5-ML | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_12LD_STD_AND_CC5_CM5_ML</REFID>
      <scp-ref/>
      <Description>Standard 12-lead and CC5-CM5-ML</Description>
      <CODE10>11288</CODE10>
    </term>
    <term>
      <SysName>12-lead and CM5-CC5-CH5 | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_12LD_STD_AND_CM5_CC5_CH5</REFID>
      <scp-ref/>
      <Description>Standard 12-lead and CM5-CC5-CH5</Description>
      <CODE10>11289</CODE10>
    </term>
    <term>
      <SysName>12-lead extended | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_12LD_STD_EXTD</REFID>
      <scp-ref/>
      <Description>Standard 12-lead with extra leads to the right and/or left sides, specified by their lead labels</Description>
      <CODE10>11290</CODE10>
    </term>
    <term>
      <SysName>12-lead extended right | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_12LD_STD_EXTD_RIGHT</REFID>
      <scp-ref/>
      <Description>Standard 12-lead extended to the right by V5R, V4R, V3R (see Annex CC of IEC 60601-2-51)</Description>
      <CODE10>11291</CODE10>
    </term>
    <term>
      <SysName>12-lead extd left | ECG, lead system | Heart | CVS</SysName>
      <Mnemonic/>
      <REFID>MDC_ECG_LDSYS_12LD_STD_EXTD_LEFT</REFID>
      <scp-ref/>
      <Description>Standard 12-lead extended to the left by V7, V8, V9 (see Annex CC of IEC 60601-2-51)</Description>
      <CODE10>11292</CODE10>
    </term>
  </Terms>
</partition>
```

C.14 ECG Control Variables «ECG_CTL_VBL_terms.8g.xml»

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2008 rel. 2 sp1 (http://www.altova.com) by Paul Schluter (GE Healthcare) -->
<partition xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.ieee.org/11073/nomenclature"
xsi:schemaLocation="http://www.ieee.org/11073/nomenclature terms.8f.xsd">
  <!-- Numeric code numbers assigned. PSS 2008-09-01 -->
  <!-- 2009-04-30 Edited/transformed to conform to terms.8f.xsd (harmonized with IDCO and RTM) -->
  <partitionDescription>
    <title>ECG Control Variables</title>
    <date>2012-09-26</date>
    <version>0.8.7</version>
    <!-- NO DISCRIMINATORS ARE USED -->
    <basePart>10</basePart>
    <baseCode>11392</baseCode>
  </partitionDescription>
  <!-- -->
  <Terms>
    <term>
      <SysName/>
      <REFID>MDC_ECG_CTL_VBL</REFID>
      <Description>Generic control variable</Description>
      <PART>10</PART>
      <CODE10>11392</CODE10>
    </term>
    <term>
      <SysName/>
      <REFID>MDC_ECG_CTL_VBL_SAMPLE_RATE</REFID>
      <Description>Sample rate</Description>
      <PART>10</PART>
      <CODE10>11393</CODE10>
    </term>
    <term>
      <SysName/>
      <REFID>MDC_ECG_CTL_VBL_SENSITIVITY</REFID>
      <Description>Sensitivity</Description>
      <PART>10</PART>
      <CODE10>11394</CODE10>
    </term>
    <term>
      <SysName/>
      <REFID>MDC_ECG_CTL_VBL_ZERO_OFFSET</REFID>
      <Description>Zero offset</Description>
      <PART>10</PART>
      <CODE10>11395</CODE10>
    </term>
    <term>
      <SysName/>
      <REFID>MDC_ECG_CTL_VBL_VALID_RANGE</REFID>
      <Description>Valid range</Description>
      <PART>10</PART>
      <CODE10>11396</CODE10>
    </term>
    <term>
      <SysName/>
      <REFID>MDC_ECG_CTL_VBL_PAD_VALUE</REFID>
      <Description>Pad value</Description>
      <PART>10</PART>
      <CODE10>11397</CODE10>
    </term>
    <term>
      <SysName/>
      <REFID>MDC_ECG_CTL_VBL_TIME_SKEW</REFID>
      <Description>Time skew</Description>
      <PART>10</PART>
      <CODE10>11398</CODE10>
    </term>
    <term>
      <SysName/>
      <REFID>MDC_ECG_CTL_VBL_SAMPLE_SKEW</REFID>
      <Description>Sample skew</Description>
      <PART>10</PART>
      <CODE10>11399</CODE10>
    </term>
    <term>
      <SysName/>
      <REFID>MDC_ECG_CTL_VBL_TIME_OFFSET</REFID>
```

```
    <Description>Time offset</Description>
    <PART>10</PART>
    <CODE10>11400</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_QTC_METHOD</REFID>
    <Description>QTc correction method</Description>
    <PART>10</PART>
    <CODE10>11401</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_FILTER_LOW_PASS</REFID>
    <Description>Low pass filter</Description>
    <PART>10</PART>
    <CODE10>11402</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_FILTER_CUTOFF_FREQ</REFID>
    <Description>Low pass filter cutoff freq</Description>
    <PART>10</PART>
    <CODE10>11403</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_FILTER_HIGH_PASS</REFID>
    <Description>High pass filter</Description>
    <PART>10</PART>
    <CODE10>11404</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_FILTER_ORDER</REFID>
    <Description>High pass filter order</Description>
    <PART>10</PART>
    <CODE10>11405</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_FILTER_DESCRIPTION</REFID>
    <Description>High pass filter description</Description>
    <PART>10</PART>
    <CODE10>11406</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_FILTER_NOTCH</REFID>
    <Description>Notch filter</Description>
    <PART>10</PART>
    <CODE10>11407</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_FILTER_NOTCH_FREQ</REFID>
    <Description>Notch filter frequency</Description>
    <PART>10</PART>
    <CODE10>11408</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_FILTER_NOTCH_BANDWIDTH</REFID>
    <Description>Notch filter bandwidth</Description>
    <PART>10</PART>
    <CODE10>11409</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_FILTER_DESCRIPTION</REFID>
    <Description>Notch filter description</Description>
    <PART>10</PART>
    <CODE10>11410</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_BASELINE</REFID>
    <Description>Baseline</Description>
    <PART>10</PART>
    <CODE10>11411</CODE10>
```

```
</term>
<term>
   <SysName/>
   <REFID>MDC_ECG_CTL_VBL_BASELINE_DESC</REFID>
   <Description>Baseline description</Description>
   <PART>10</PART>
   <CODE10>11412</CODE10>
</term>
<term>
   <SysName/>
   <REFID>MDC_ECG_CTL_VBL_BASELINE_ORDER</REFID>
   <Description>Baseline order</Description>
   <PART>10</PART>
   <CODE10>11413</CODE10>
</term>
<term>
   <SysName/>
   <REFID>MDC_ECG_CTL_VBL_INTERPOLATOR</REFID>
   <Description>Interpolator</Description>
   <PART>10</PART>
   <CODE10>11414</CODE10>
</term>
<term>
   <SysName/>
   <REFID>MDC_ECG_CTL_VBL_INTERPOLATOR_SRC_SAMP_RATE</REFID>
   <Description>Interpolator source sample rate</Description>
   <PART>10</PART>
   <CODE10>11415</CODE10>
</term>
<term>
   <SysName/>
   <REFID>MDC_ECG_CTL_VBL_INTERPOLATOR_DESC</REFID>
   <Description>Interpolator description</Description>
   <PART>10</PART>
   <CODE10>11416</CODE10>
</term>
<term>
   <SysName/>
   <REFID>MDC_ECG_CTL_VBL_INTERPOLATOR_ORDER</REFID>
   <Description>Interpolator order</Description>
   <PART>10</PART>
   <CODE10>11417</CODE10>
</term>
<term>
   <SysName/>
   <REFID>MDC_ECG_CTL_VBL_INTERPOLATOR_SNR</REFID>
   <Description>Interpolator snr</Description>
   <PART>10</PART>
   <CODE10>11418</CODE10>
</term>
<term>
   <SysName/>
   <REFID>MDC_ECG_CTL_VBL_DISPLAYED_SIZE</REFID>
   <Description>Displayed size</Description>
   <PART>10</PART>
   <CODE10>11419</CODE10>
</term>
<term>
   <SysName/>
   <REFID>MDC_ECG_CTL_VBL_DISPLAYED_COLOR</REFID>
   <Description>Displayed color</Description>
   <PART>10</PART>
   <CODE10>11420</CODE10>
</term>
<term>
   <SysName/>
   <REFID>MDC_ECG_CTL_VBL_DISPLAYED_SWEEP_RATE</REFID>
   <Description>Displayed sweep rate</Description>
   <PART>10</PART>
   <CODE10>11421</CODE10>
</term>
<term>
   <SysName/>
   <REFID>MDC_ECG_CTL_VBL_ATTR_RHTYHM</REFID>
   <Description>Rhythm attribute</Description>
   <PART>10</PART>
   <CODE10>11422</CODE10>
</term>
<term>
   <SysName/>
```

```
    <REFID>MDC_ECG_CTL_VBL_ATTR_AV_COND</REFID>
    <Description>Rhythm attribute AV_Cond</Description>
    <PART>10</PART>
    <CODE10>11423</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_SA_COND</REFID>
    <Description>Rhythm attribute SA_Cond</Description>
    <PART>10</PART>
    <CODE10>11424</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_RHYTHM_CRITERIA</REFID>
    <Description>Rhythm criteria attribute</Description>
    <PART>10</PART>
    <CODE10>11425</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_RHYTHM_CODE</REFID>
    <Description>Rhythm criteria attribute code</Description>
    <PART>10</PART>
    <CODE10>11426</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_HIGH_GT</REFID>
    <Description>Rhythm criteria attribute rate hi GT limit</Description>
    <PART>10</PART>
    <CODE10>11427</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_HIGH_GE</REFID>
    <Description>Rhythm criteria attribute rate hi GE limit</Description>
    <PART>10</PART>
    <CODE10>11428</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_LOW_LT</REFID>
    <Description>Rhythm criteria attribute rate lo LT limit</Description>
    <PART>10</PART>
    <CODE10>11429</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_LOW_LE</REFID>
    <Description>Rhythm criteria attribute rate lo LE limit</Description>
    <PART>10</PART>
    <CODE10>11430</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_LOW_GT</REFID>
    <Description>Rhythm criteria attribute rate lo GT limit</Description>
    <PART>10</PART>
    <CODE10>11431</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_LOW_GE</REFID>
    <Description>Rhythm criteria attribute rate lo GE limit</Description>
    <PART>10</PART>
    <CODE10>11432</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_HIGH_LT</REFID>
    <Description>Rhythm criteria attribute rate hi LT limit</Description>
    <PART>10</PART>
    <CODE10>11433</CODE10>
  </term>
  <term>
    <SysName/>
    <REFID>MDC_ECG_CTL_VBL_ATTR_RATE_LIMIT_HIGH_LE</REFID>
    <Description>Rhythm criteria attribute rate hi LE limit</Description>
    <PART>10</PART>
```

```
      <CODE10>11434</CODE10>
    </term>
  </Terms>
</partition>
```

C.15 ECG Information Attributes «ECG_INFO_ID_terms.8g.xml»

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2008 rel. 2 sp1 (http://www.altova.com) by Paul Schluter (GE Healthcare) -->
<partition xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.ieee.org/11073/nomenclature"
xsi:schemaLocation="http://www.ieee.org/11073/nomenclature terms.8f.xsd">
  <!-- Edited and verified against ecgleadsys1j.doc PSS 2008-08-23 -->
  <!-- Numeric code numbers assigned. PSS 2008-09-01 -->
  <!-- 2009-04-30 Edited/transformed to conform to terms.8f.xsd (harmonized with IDCO and RTM) -->
  <partitionDescription>
    <title>ECG Information Identifiers</title>
    <date>2012-09-26</date>
    <version>0.8.7</version>
    <!-- NO DISCRIMINATORS ARE USED -->
    <basePart>10</basePart>
    <!-- NOTE: there is at least one basePart = 2 term in this file! -->
    <baseCode>11328</baseCode>
  </partitionDescription>
  <!-- -->
  <Terms>
    <termSectionTitle>ECG Beat, Rhythm and Signal Types</termSectionTitle>
    <term>
      <SysName>Type | ECG, QRS | Heart | CVS</SysName>
      <DisplayName>QRS type</DisplayName>
      <Mnemonic>QRStyp</Mnemonic>
      <Description>Type of QRS complex of ECG observed.</Description>
      <REFID>MDC_ECG_QRS_TYPE</REFID>
      <PART>2</PART>
      <CODE10>16188</CODE10>
      <Enum_Values/>
    </term>
    <term>
      <SysName>Type number | ECG, QRS Morphology class | Heart | CVS</SysName>
      <DisplayName>QRS class number</DisplayName>
      <Mnemonic/>
      <Description>QRS morphology class number</Description>
      <REFID>MDC_ECG_QRS_MORPH_NUM</REFID>
      <PART>10</PART>
      <CODE10>11328</CODE10>
      <Enum_Values/>
    </term>
    <term>
      <SysName>Type number | ECG, VPC focus number | Heart | CVS</SysName>
      <DisplayName>VPC focus number</DisplayName>
      <Mnemonic/>
      <Description>VPC “focus” number</Description>
      <REFID>MDC_ECG_VPC_FOCUS_NUM</REFID>
      <PART>10</PART>
      <CODE10>11329</CODE10>
      <Enum_Values/>
    </term>
    <term>
      <SysName>Type | ECG, noise | Heart | CVS</SysName>
      <DisplayName>ECG Signal quality</DisplayName>
      <Mnemonic/>
      <Description>Signal Quality</Description>
      <REFID>MDC_ECG_NOISE_TYPE</REFID>
      <PART>10</PART>
      <CODE10>11330</CODE10>
      <Enum_Values/>
    </term>
    <term>
      <SysName>Time | ECG, QRS complex or wave fiducial | Heart | CVS</SysName>
      <DisplayName>TOC</DisplayName>
      <Mnemonic>TOC</Mnemonic>
      <Description>Timing fiducial for beat</Description>
      <REFID>MDC_ECG_BEAT_TOC</REFID>
      <PART>10</PART>
      <CODE10>11331</CODE10>
      <Enum_Values/>
    </term>
    <term>
      <SysName>Type | ECG, Rhythm | Heart | CVS</SysName>
      <DisplayName>ECG Rhythm</DisplayName>
```

```
    <Mnemonic/>
    <Description>Rhythm type</Description>
    <REFID>MDC_ECG_RHYTHM_TYPE</REFID>
    <PART>10</PART>
    <CODE10>11332</CODE10>
    <Enum_Values/>
  </term>
  <term>
    <SysName>Ratio | ECG, Rhythm, AV Conduction | Heart | CVS</SysName>
    <DisplayName>AVC N:M</DisplayName>
    <Mnemonic/>
    <Description>AV conduction ratio, N P-waves to M QRS complexes</Description>
    <REFID>MDC_ECG_RHYTHM_AV_COND</REFID>
    <PART>10</PART>
    <CODE10>11333</CODE10>
    <Enum_Values/>
  </term>
  <term>
    <SysName>Ratio | ECG, Rhythm, SA Conduction | Heart | CVS</SysName>
    <DisplayName>SAC N:M</DisplayName>
    <Mnemonic/>
    <Description>SA conduction ratio, N P-waves to M QRS complexes</Description>
    <REFID>MDC_ECG_RHYTHM_SA_COND</REFID>
    <PART>10</PART>
    <CODE10>11334</CODE10>
    <Enum_Values/>
  </term>
  <termSectionTitle>ECG and Pacemaker Wave Components</termSectionTitle>
  <term>
    <SysName>Type | ECG, QRS Wave Component | Heart | CVS</SysName>
    <DisplayName/>
    <Mnemonic/>
    <Description>Wave Component Type</Description>
    <REFID>MDC_ECG_WAVC_TYPE</REFID>
    <PART>10</PART>
    <CODE10>11335</CODE10>
    <Enum_Values/>
  </term>
  <term>
    <SysName>Type | ECG, Pacemaker Wave Component | Heart | CVS</SysName>
    <DisplayName/>
    <Mnemonic/>
    <Description>Wave Pacemaker Type</Description>
    <REFID>MDC_ECG_WAVP_TYPE</REFID>
    <PART>10</PART>
    <CODE10>11336</CODE10>
    <Enum_Values/>
  </term>
  <term>
    <SysName>Fiducial | ECG wave component, onset | Heart | CVS</SysName>
    <DisplayName>onset</DisplayName>
    <Mnemonic/>
    <Description>Area of Interest</Description>
    <REFID>MDC_ECG_WAVC_ONSET</REFID>
    <PART>10</PART>
    <CODE10>11337</CODE10>
    <Enum_Values/>
  </term>
  <term>
    <SysName>Fiducial | ECG wave component, offset | Heart | CVS</SysName>
    <DisplayName>offset</DisplayName>
    <Mnemonic/>
    <Description>Area of Interest</Description>
    <REFID>MDC_ECG_WAVC_OFFSET</REFID>
    <PART>10</PART>
    <CODE10>11338</CODE10>
    <Enum_Values/>
  </term>
  <term>
    <SysName>Fiducial | ECG wave component, peak | Heart | CVS</SysName>
    <DisplayName>peak</DisplayName>
    <Mnemonic/>
    <Description>Area of Interest</Description>
    <REFID>MDC_ECG_WAVC_PEAK</REFID>
    <PART>10</PART>
    <CODE10>11339</CODE10>
    <Enum_Values/>
  </term>
  <term>
    <SysName>Fiducial | ECG wave component, other | Heart | CVS</SysName>
```

```
      <DisplayName/>
      <Mnemonic/>
      <Description>Area of Interest</Description>
      <REFID>MDC_ECG_WAVC_OTHER</REFID>
      <PART>10</PART>
      <CODE10>11340</CODE10>
      <Enum_Values/>
    </term>
    <termSectionTitle>ECG Interpretation</termSectionTitle>
    <term>
      <SysName>Interpretation | ECG, Interpretation | Heart | CVS</SysName>
      <DisplayName>Interpretation</DisplayName>
      <Mnemonic/>
      <Description>Interpretation </Description>
      <REFID>MDC_ECG_INTERPRETATION</REFID>
      <PART>10</PART>
      <CODE10>11341</CODE10>
      <Enum_Values/>
    </term>
    <term>
      <SysName>Interpretation | ECG, Interpretation Statement | Heart | CVS</SysName>
      <DisplayName>Statement</DisplayName>
      <Mnemonic/>
      <Description>Interpretation statement</Description>
      <REFID>MDC_ECG_INTERPRETATION_STATEMENT</REFID>
      <PART>10</PART>
      <CODE10>11342</CODE10>
      <Enum_Values/>
    </term>
    <term>
      <SysName>Interpretation | ECG, Interpretation Comment | Heart | CVS</SysName>
      <DisplayName>Comment</DisplayName>
      <Mnemonic/>
      <Description>Interpretation comment</Description>
      <REFID>MDC_ECG_INTERPRETATION_COMMENT</REFID>
      <PART>10</PART>
      <CODE10>11343</CODE10>
      <Enum_Values/>
    </term>
    <term>
      <SysName>Interpretation | ECG, Interpretation Summary | Heart | CVS</SysName>
      <DisplayName>Summary</DisplayName>
      <Mnemonic/>
      <Description>Interpretation summary</Description>
      <REFID>MDC_ECG_INTERPRETATION_SUMMARY</REFID>
      <PART>10</PART>
      <CODE10>11344</CODE10>
      <Enum_Values/>
    </term>
  </Terms>
</partition>
```

C.16 XSLT for tabular summary «tableOutput.8g.xsl»

```
<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet version="2.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
  xmlns:fo="http://www.w3.org/1999/XSL/Format"
  xpath-default-namespace="http://www.ieee.org/11073/nomenclature"
  xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <!--
  tableOutput.8g.xsl  2012-09-26
  Display/print IEEE 11073 nomenclature partition of base terms with discriminator sets as html tables [8f].
  Includes Enum_Value with group expansion [8f].
  Version '8g' adds minor enhancements relative to '8f' to prepare for publication as IEEE Std 11073-10102.
   - Include additional "bi-uni", "pos" and "neg-ref" when outputing ECG lead discriminator table [8g]
   - If REFID = MDC_ECG_LEAD, print as MDC_ECG_LEAD_CONFIG as the "unspecified lead identifier" [8g]
   - Now supports automatic generation of "bi-uni", "pos" and "neg-ref" columns [8g] 2012-09-26
  Paul Schluter, GE Healthcare
  -->
  <!-- -->
  <xsl:output method="html"/>
  <!-- Filename for discriminators -->
  <xsl:variable name="discrimFileName" select="'ECG_ANN_discrims.8g.xml'"/>
  <!-- root template -->
  <xsl:template match="/">
    <html>
      <head>
        <title>
          <xsl:value-of select="//partitionDescription/title"/>
```

```
      </title>
    </head>
    <body>
      <!-- Output table of discriminators, if any are used -->
      <xsl:if test="boolean(//discriminatorRef)">
        <table border="1" cellpadding="2" cellspacing="0">
          <caption align="top">
            <b><xsl:value-of select="'Discriminators (most significant listed first)'"/></b>
          </caption>
          <tbody>
            <!-- Output sub-table(s) for each discriminator -->
            <xsl:apply-templates select="//discriminatorRef"/>
          </tbody>
        </table>
        <!-- Output blank line -->
        <xsl:text>
        </xsl:text>
      </xsl:if>
      <!-- -->
      <!-- Scan the partition for columns that are included only if they are present -->
      <!-- ENABLE with select="boolean(string-join(distinct-values(//SysName),'|'))" DISABLE with select="boolean(false)" -->
      <xsl:variable name="SysNameFlag" select="boolean(string-join(distinct-values(//SysName),'|'))"/>
      <xsl:variable name="MnemonicFlag" select="boolean(string-join(distinct-values(//Mnemonic),'|'))"/>
      <xsl:variable name="Enum_ValuesFlag" select="boolean(string-join(distinct-values(//Enum_Values),'|'))"/>
      <!-- -->
      <!-- Output table for all the partition terms -->
      <table border="1" cellpadding="2" cellspacing="0">
        <caption align="top">
          <b><xsl:value-of select="/partition/partitionDescription/title"/></b>
        </caption>
        <tbody>
          <tr align="left" bgcolor="D3D3D3">
            <xsl:if test="$SysNameFlag"><th>SysName</th></xsl:if>
            <th>REFID</th>
            <xsl:if test="$MnemonicFlag"><th>Mnemonic</th></xsl:if>
            <th>Description</th>
            <th align="right">PART</th>
            <th align="right">CODE10</th>
            <xsl:if test="$Enum_ValuesFlag"><th>Enum_REFID</th></xsl:if>
            <xsl:if test="$Enum_ValuesFlag"><th>Enum_TOKEN</th></xsl:if>
          </tr>
          <!-- Find each Term find a match -->
          <xsl:for-each select="/partition/Terms/term">
            <xsl:variable name="refid" select="REF_ID"/>
            <tr>
              <xsl:if test="$SysNameFlag">
                <td align="left"><xsl:value-of select="SysName"/></td>
              </xsl:if>
              <!-- If REFID = MDC_ECG_LEAD, print as MDC_ECG_LEAD_CONFIG as the "unspecified lead identifier" 2012-06-14 --
>
              <td align="left"><xsl:value-of select="if (REFID='MDC_ECG_LEAD') then 'MDC_ECG_LEAD_CONFIG' else
REFID"/></td>
              <xsl:if test="$MnemonicFlag">
                <td align="left">
                  <xsl:value-of select="Mnemonic"/>
                  <!-- THIS IS NOT DRAWING A BORDER AROUND NULL ENTRIES PSS 2009-05-02 -->
                  <xsl:if test="empty(Mnemonic)"><xsl:value-of select="' '"/></xsl:if>
                </td>
              </xsl:if>
              <td align="left"><xsl:apply-templates select="Description"/></td>
              <td align="right"><xsl:value-of select="(PART, /partition/partitionDescription/basePart, '?')[1]"/></td>
              <td align="right">
                <xsl:value-of select="CODE10"/>
                <xsl:if test="empty(CODE10)"><xsl:value-of select="'*'"/></xsl:if>
              </td>
              <xsl:if test="$Enum_ValuesFlag">
                <!-- Output Enumerations from main Rosetta table (with _ENUM_GROUP expansion) -->
                <td align="left" valign="top">
                  <xsl:variable name="enum1" select="distinct-values(tokenize(string-join(Enum_Values,' '), '\s+'))"/>
                  <xsl:variable name="enum2" select="for $x in $enum1 return if ($x='') then () else $x"/>  <!-- remove null string due
to empty element node(s) -->
                  <xsl:variable name="enum3" select="distinct-values(for $x in $enum2 return if (starts-with($x,'_')) then
(tokenize(string-join(/partition/Enums/term[_ENUM_GROUPS=$x]/(REFID),' '), '\s+')) else $x)"/>
                  <xsl:variable name="enum4" select="for $x in $enum3 return if ($x='') then () else $x"/>
                  <pre>
                    <xsl:value-of select="$enum4" separator="&#x000D;"/> <!-- use $enum2" for no _enum group expansion and
$enum4 for _enum group expansion -->
                    <xsl:if test="empty($enum4)"><xsl:value-of select="' '"/></xsl:if>  <!-- consider italicized period for greater
HTML viewer compatibility -->
                  </pre>
```

```
                        </td>
                        <td align="left" valign="top">
                           <xsl:variable name="enum1" select="distinct-values(tokenize(string-join(Enum_Values,' '), '\s+'))"/>
                           <xsl:variable name="enum2" select="for $x in $enum1 return if ($x='') then () else $x"/>  <!-- remove null string due
to empty element node(s) -->
                           <xsl:variable name="enum3" select="distinct-values(for $x in $enum2 return if (starts-with($x,'_')) then
(tokenize(string-join(/partition/Enums/term[_ENUM_GROUPS=$x]/(TOKEN),' '), '\s+')) else $x)"/>
                           <xsl:variable name="enum4" select="for $x in $enum3 return if ($x='') then () else $x"/>
                           <pre>
                              <xsl:value-of select="$enum4" separator="&#x000D;"/> <!-- use $enum2" for no _enum group expansion and
$enum4 for _enum group expansion -->
                              <xsl:if test="empty($enum4)"><xsl:value-of select="' "/></xsl:if>  <!-- consider italicized period for greater
HTML viewer compatibility -->
                           </pre>
                        </td>
                     </xsl:if>
                  </tr>
               </xsl:for-each>
            </tbody>
         </table>
         <!-- List footnote content at end of table -->
         <table border="0">
            <xsl:apply-templates select="//footnote" mode="footnote"/>
         </table>
      </body>
   </html>
</xsl:template>
<!-- -->
<!-- Process footnotes for selected Term child elements and output any remaining text -->
<xsl:template match="Description">
   <xsl:value-of select="text()"/>
   <xsl:apply-templates select="footnote"/>
</xsl:template>

<!-- Process footnote element (is xsl:number the right number?) -->
<xsl:template match="footnote">
   <xsl:variable name="inc"><xsl:number level="any" count="footnote"></xsl:number></xsl:variable>
   <xsl:text> </xsl:text><a href="#{$inc}" name="f{$inc}">[<xsl:value-of select="$inc"/>]</a>
</xsl:template>
<!-- List footnotes at end of table -->
<xsl:template match="footnote" mode="footnote">
   <xsl:variable name="incr"><xsl:number level="any" count="footnote"/></xsl:variable>
   <tr>
      <td class="right" valign="top"><a name="{$incr}"><sup><xsl:value-of select="$incr"/></sup></a></td>
      <td class="left"><xsl:value-of select="text()"/><xsl:text> </xsl:text><a href="#f{$incr}">back</a></td>
   </tr>
</xsl:template>

<!-- Output sub-table for each <discriminatorRef> discriminator set -->
<!-- If <discriminatorRef idref="MDC_ECG_discrim_LEADS">, output three additional columns for "bi-uni", "pos" and "neg-ref" -->
<xsl:template match="discriminatorRef">
   <xsl:variable name="ecgLeadExtras" select="if (@idref = 'MDC_ECG_discrim_LEADS') then 3 else 0"/>
   <!-- List the discriminator sub-table title -->
   <tr align="left" bgcolor="D3D3D3">
      <th colspan="3 + $ecgLeadExtras">
         <xsl:value-of select="document($discrimFileName)//discriminator[@id=current()/@idref]/dDescription[1]"/>
      </th>
   </tr>
   <!-- Column headings -->
   <tr align="left" bgcolor="E3E3E3">
      <th>dOffset</th>
      <th>dSuffix</th>
      <th>dDescription</th>
      <xsl:if test="$ecgLeadExtras ne 0">
         <th>bi-uni</th>
         <th>pos</th>
         <th>neg-ref</th>
      </xsl:if>
   </tr>
   <!-- List each discriminator term in set -->
   <xsl:for-each select="document($discrimFileName)//discriminator[@id=current()/@idref]/discrim">
      <tr align="left">
         <td><xsl:value-of select="dOffset"/></td>
         <td><xsl:value-of select="dSuffix"/> </td>
         <xsl:if test="$ecgLeadExtras eq 0">
            <td><xsl:value-of select="dDescription/text()"/> </td>
         </xsl:if>
         <!-- output all information for "original" ECG leads -->
         <xsl:if test="($ecgLeadExtras ne 0) and not (starts-with(dSuffix,'_d'))">
            <td><xsl:value-of select="dDescription/text()"/> </td>
```

```
            <td><xsl:value-of select="bi-uni"/> </td>
            <td><xsl:value-of select="pos"/> </td>
            <td><xsl:value-of select="neg-ref"/> </td>
          </xsl:if>
          <!-- output empty shaded cells for "derived" ECG leads -->
          <xsl:if test="($ecgLeadExtras ne 0) and (starts-with(dSuffix,'_d'))">
            <td bgcolor="D3D3D3"> </td>
            <td bgcolor="D3D3D3"> </td>
            <td bgcolor="D3D3D3"> </td>
            <td bgcolor="D3D3D3"> </td>
          </xsl:if>
        </tr>
      </xsl:for-each>
    </xsl:template>
    <!-- Fin -->
</xsl:stylesheet>
```

C.17 XSLT for expanded discriminators and codes «codeOutput.8g.xsl»

```
<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet version="2.0"
  xpath-default-namespace="http://www.ieee.org/11073/nomenclature"
  xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns:fo="http://www.w3.org/1999/XSL/Format">
    <!--
    codeOutput.8g.xsl  2012-06-14T16
    Expand IEEE P11073 nomenclature partition of base terms that has zero or more discriminators.
    2009-01-14 Added support the "named" discriminator groups, e.g. _[CHAMBER] for IDC nomenclature.
    2009-05-01 Changed tag names to match version 8f; added "part" attribute to <xid> output elements.
    2009-05-02 Create a dtoken list (rather than subtree) to avoid namespace issues. WORKS with no default IEEE namespace.
    2009-05-12 Added number(...) to several variables to work around XSLT type errors.
    2012-06-14 8g If PART="0" and CODE="0", "MDC_ECG_LEAD_CONFIG" is output (otherwise <null> is used instead of _CONFIG).
    Paul Schluter and Nate Stoddard, GE Healthcare
    - - -
    Outputs xml file containing expanded RefID strings and code values, e.g. <xid part="10" code="256">MDC_ECG_WAVC_PWAVE</xid>
    - - -
    Limitations:
    1. The input file is a single IEEE P1073 nomenclature partition; batch processing of multiple partitions currently not supported.
    2. Optimize (speed) by using a xsl:for-each to process least significant discriminator.
    - - -
    -->
    <xsl:output method="xml"/>
    <!-- Filename for discriminators (need to add wildcard support for aECG, IDC and other partitions -->
    <!-- <xsl:variable name="discrimFileName" select="'ECG_ANN_discrims.8f.xml'"/> -->
    <!-- <xsl:variable name="discrimFileName" select="'IDC_discrims.8f.xml'"/> -->
    <xsl:variable name="discrimFileName" select="'ECG_ANN_discrims.8g.xml'"/>
    <!-- root template -->
    <xsl:template match="/">
      <!-- -->
      <xsl:text>
        </xsl:text>
      <xsl:element name="terms">
        <!-- Find each <term> find a match -->
        <xsl:apply-templates select="/partition/Terms/term" mode="TermSearch"/>
      </xsl:element>
    </xsl:template>
    <!-- Find each term -->
    <xsl:template match="term" mode="TermSearch">
      <!-- -->
      <!-- Build a temporary dtokens list of the idref attribute value for each discriminator. -->
      <xsl:variable name="dtokens" as="xs:token*">
        <xsl:analyze-string select="./REFID" regex="(_\[(.+?)\])">    <!-- regex-group(2) will have desired discrim ID string -->
          <xsl:matching-substring>
            <xsl:sequence select="xs:token(regex-group(2))"/>  <!-- select substring inside [ ... ] -->
          </xsl:matching-substring>
        </xsl:analyze-string>
        <xsl:for-each select="/partition/partitionDescription/discriminatorRef">
          <xsl:sequence select="current()/@idref"/>
        </xsl:for-each>
      </xsl:variable>
      <!-- -->
      <!-- -->
      <xsl:choose>
        <xsl:when test="count($dtokens) = 0">
          <!-- Discriminators are not used for this term. Just list code and ReferenceID. -->
          <xsl:element name="xid">
            <xsl:attribute name="part"><xsl:value-of select="(./PART, /partition/partitionDescription/basePart, '?')[1]"/></xsl:attribute>
            <xsl:attribute name="code"><xsl:value-of select="(./CODE10, '?')[1]"/></xsl:attribute>
```

```
            <xsl:value-of select="./REFID"/>
          </xsl:element>
          <!-- Output new line for readability -->
          <xsl:text>
          </xsl:text>
        </xsl:when>
        <!-- -->
        <xsl:otherwise>
          <!-- Discriminators are used with this term: process "named" and "tail-end" discriminators for each term -->
          <xsl:call-template name="Discriminator">
            <xsl:with-param name="ptokens" as="xs:token*" select="$dtokens"/>
            <xsl:with-param name="counter" select="1"/>
            <xsl:with-param name="string" select="./REFID"/>
            <xsl:with-param name="part" select="(./PART, /partition/partitionDescription/basePart, '?')[1]"/>
            <xsl:with-param name="code" select="./CODE10"/>
            <xsl:with-param name="runningOffset" select="0"/>
            <xsl:with-param name="parentIndex" select="0"/>
            <xsl:with-param name="excludeList" select="concat(normalize-space(@exclude),' ')"/>
          </xsl:call-template>
        </xsl:otherwise>
      </xsl:choose>
    </xsl:template>
    <!-- -->
    <!-- Template: Output a row for each Discriminator -->
    <!-- -->
    <xsl:template name="Discriminator">
      <xsl:param name="ptokens"/>
      <xsl:param name="counter"/>
      <xsl:param name="string"/>
      <xsl:param name="part"/>
      <xsl:param name="code"/>
      <xsl:param name="runningOffset"/>
      <xsl:param name="parentIndex"/>
      <xsl:param name="excludeList"/>
      <!-- Walk through all the Discriminators -->
      <xsl:for-each select="$ptokens">
        <xsl:if test="$counter = position()">
          <xsl:variable name="cIDREF" select="current()"/>                    <!-- current discrim IDREF without underscore
and braces -->
          <xsl:variable name="_cIDREF" select="concat( '_[', $cIDREF, ']')"/>          <!-- _[IDREF] with underscore and braces -->
          <xsl:variable name="rgx_cIDREF" select="concat( '_\[', $cIDREF, '\]')"/> <!-- _[IDREF] as a regex target string ("." in "[1..10]" ok ;-)
-->
          <xsl:variable name="currentBits" select="number(document($discrimFileName)//discriminator[@id=current()]/dBits)"/>
          <xsl:variable name="currentSpan" select="number(subsequence(('1', '2', '4', '8', '16', '32', '64', '128', '256'), $currentBits+1, 1))"/>
          <xsl:for-each select="document($discrimFileName)//discriminator[@id=current()]/discrim">
            <xsl:variable name="suffix" select="dSuffix"/>
            <xsl:variable name="pos" select="dOffset"/>
            <!-- Some interesting math here
                 pos = the position of this Discriminator
                 currentOffset = using all the parents offsets (index * span), plus the running offset from our direct parent,.
                 thisOffset = the end offset of this subterm... uses the pos along with previously calculated offsets.
            -->
            <xsl:variable name="currentOffset" select="($currentSpan * (number($parentIndex) + number($runningOffset)))"/>
            <xsl:variable name="thisOffset" select="$currentOffset + number($pos) + 0"/>
            <!-- If this is the lowest level discriminator, then output XML, otherwise pass to the next level -->
            <xsl:choose>
              <xsl:when test="count($ptokens) = $counter">
                <!-- Here we have valid combination of a Reference ID and discriminator terms. -->
                <!-- Determine whether the Reference ID contains any excluded discriminator terms. -->
                <xsl:variable name="has-token">
                  <xsl:call-template name="contains-token">
                    <xsl:with-param name="refidString" select="if (contains($string, $_cIDREF)) then replace($string, $rgx_cIDREF,
$suffix) else concat($string, $suffix)"/>
                    <xsl:with-param name="discrimList" select="$excludeList"/>
                  </xsl:call-template>
                </xsl:variable>
                <!-- If no excluded terms, then output the <xid> element containing the RefID and numeric code -->
                <xsl:if test="$has-token='false'">
                  <xsl:element name="xid">
                    <!-- Output partition number -->
                    <xsl:attribute name="part"><xsl:value-of select="$part"/></xsl:attribute>
                    <!-- Add the code for this term to the offset and output code attribute -->
                    <xsl:attribute name="code"><xsl:value-of select="$thisOffset+$code"/></xsl:attribute>
                    <!-- Output the REFID -->
                    <xsl:choose>
                      <xsl:when test="($part+$thisOffset+$code) = 0">
                        <!-- Output 'MDC_ECG_LEAD_CONFIG' when PART and CODE10 = 0 (added as special case on 2012-06-14) --
>
                        <xsl:value-of select="'MDC_ECG_LEAD_CONFIG'"/>
                      </xsl:when>
```

```
                        <xsl:otherwise>
                          <!-- Join the parent string with this subterm to create final REFID (as typical case) -->
                          <xsl:value-of select="if (contains($string, $_cIDREF)) then replace($string, $rgx_cIDREF, $suffix) else
concat($string, $suffix)"/>
                        </xsl:otherwise>
                      </xsl:choose>
                    </xsl:element>
                    <!-- Output new line for readability -->
                    <xsl:text>
                    </xsl:text>
                  </xsl:if>
                </xsl:when>
                <xsl:otherwise>
                  <!-- Call the template again, with the updated offsets, and joined strings -->
                  <xsl:call-template name="Discriminator">
                    <xsl:with-param name="ptokens" select="$ptokens"/>
                    <xsl:with-param name="counter" select="$counter+1"/>
                    <xsl:with-param name="string" select="if (contains($string, $_cIDREF)) then replace($string, $rgx_cIDREF, $suffix) else
concat($string, $suffix)"/>
                    <xsl:with-param name="part" select="$part"/>
                    <xsl:with-param name="code" select="$code"/>
                    <xsl:with-param name="runningOffset" select="$currentOffset"/>
                    <xsl:with-param name="parentIndex" select="$pos"/>
                    <xsl:with-param name="excludeList" select="$excludeList"/>
                  </xsl:call-template>
                </xsl:otherwise>
              </xsl:choose>
            </xsl:for-each>
          </xsl:if>
        </xsl:for-each>
    </xsl:template>
    <!-- -->
    <!-- Template: Test ReferenceID string to see if it contains any excluded discriminators -->
    <!-- -->
    <xsl:template name="contains-token">
      <xsl:param name="refidString"/>
      <xsl:param name="discrimList"/>
      <xsl:variable name="nlist" select="concat(normalize-space($discrimList), ' ')"/>
      <xsl:variable name="first" select="substring-before($nlist, ' ')"/>
      <xsl:variable name="rest" select="substring-after($nlist, ' ')"/>
      <xsl:choose>
        <xsl:when test="$first">
          <xsl:choose>
            <xsl:when test="contains(concat($refidString, '_'), concat($first, '_'))">true</xsl:when>
            <xsl:otherwise>
              <xsl:call-template name="contains-token">
                <xsl:with-param name="refidString" select="$refidString"/>
                <xsl:with-param name="discrimList" select="$rest"/>
              </xsl:call-template>
            </xsl:otherwise>
          </xsl:choose>
        </xsl:when>
        <xsl:otherwise>false</xsl:otherwise>
      </xsl:choose>
    </xsl:template>
    <!-- Fin -->
</xsl:stylesheet>
```

C.18 XSLT for consolidated listing «consolidatedTableOutput.8g.xsl»

```
<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet version="2.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform" xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:fo="http://www.w3.org/1999/XSL/Format">
    <!--
    consolidatedTableOutput.8g.xsl  2012-06-15T09
    LIsts <xid> elements in <*_codeOutput.*.xml> into consolidated html table.
    Paul Schluter, GE Healthcare
    - - -
    Outputs html file containing expanded REFID strings, PART, CODE10 and CF_CODE10 values.
    The first base term of each file and expanded discriminators (if any) are highlighted in light grey.
    - - -
    LIMITATIONS:
    1. Currently uses a modulus test to determine whether a term is a "base term" or not.
       Does not work for MDC_ECG_HEART_RATE (CODE10=16770) since it is not divisible by four,
       MDC_ECG_HEART_RATE_MIN (CODE10=16772) is listed instead (which is correct, but is not
       the desired MDC_ECG_HEART_RATE, so the consolidated output file was manually edited.)
    - - -
    -->
    <xsl:output method="html"/>
```

```
  <!-- List of files to be processed, in order specified, with discriminator modulus -->
  <xsl:variable name="fileNames" as="xs:string+" select="
    “ECG_LEADS_codeOutput.8g.xml 256”,
    “ECG_WAVC_codeOutput.8g.xml 64”,
    “ECG_WAVP_codeOutput.8g.xml 256”,
    “ECG_BEAT_codeOutput.8g.xml 16”,
    “ECG_RHY_codeOutput.8g.xml 16”,
    “ECG_NOISE_codeOutput.8g.xml 16”,
    “ECG_MEAS_GLOBAL_codeOutput.8g.xml 4”,
    “ECG_MEAS_perLEAD_codeOutput.8g.xml 256”,
    “ECG_LEAD_SYSTEMS_codeOutput.8g.xml 1”,
    “ECG_CTL_VBL_codeOutput.8g.xml 1”,
    “ECG_INFO_ID_codeOutput.8g.xml 1”
    "/>
  <!-- partition size = 2^16 -->
  <xsl:variable name="partSize" select="65536"/>
  <!-- root template -->
  <xsl:template match="/">
    <html>
      <head>
        <title>
          <xsl:value-of select="'Consolidated List of Annotated ECG Terms'"/>
        </title>
      </head>
      <!-- Output table for all the partition terms -->
      <body>
        <table border="1" cellpadding="2" cellspacing="0">
          <caption align="top">
            <b>
              <xsl:value-of select="/partition/partitionDescription/title"/>
            </b>
          </caption>
          <tbody>
            <tr align="left" bgcolor="D3D3D3">
              <th>REFID</th>
              <th>PART</th>
              <th>CODE10</th>
              <th>CF_CODE10</th>
            </tr>
            <!-- -->
            <xsl:for-each select="$fileNames">
              <xsl:variable name="currentFileName" select="substring-before(string(.),' ')"/>
              <xsl:variable name="discrimMod" select="substring-after(string(.),' ') cast as xs:integer"/>
              <xsl:for-each select="document($currentFileName)">
                <xsl:variable name="firstCode" select="//xid[1]/@code cast as xs:integer"/>
                <xsl:for-each select="/terms/xid">
                  <!-- <xsl:variable name="expFlag" select="1"/> --> <!-- enable this statement to list all expanded terms -->
                  <xsl:variable name="expFlag" select="(@code cast as xs:integer ge $firstCode) and (@code cast as xs:integer lt
($firstCode + $discrimMod))"/>
                  <xsl:if test="((@code mod $discrimMod) = 0) or $expFlag">
                    <xsl:variable name="bgcolor1" select="if ($expFlag and ((((@part * $partSize) + @code) ge 256)) then 'E0E0E0' else
'FFFFFF'"/>
                    <tr bgcolor="{$bgcolor1}">
                      <td><xsl:value-of select="text()"/></td>
                      <td align="right"><xsl:value-of select="@part"/></td>
                      <td align="right"><xsl:value-of select="@code"/></td>
                      <td align="right"><xsl:value-of select="(@part * $partSize) + @code"/></td>
                    </tr>
                  </xsl:if>
                </xsl:for-each>
              </xsl:for-each>
            </xsl:for-each>
          </tbody>
        </table>
      </body>
    </html>
  </xsl:template>
  <!-- Fin -->
</xsl:stylesheet>
```

C.19 Example output file «ECG_BEAT_codeOutput.8g.partial.xml»

```
<?xml version="1.0" encoding="UTF-8"?>
<terms>
  <xid part="10" code="8192">MDC_ECG_BEAT</xid>
  <xid part="10" code="8193">MDC_ECG_BEAT_TIME_POINT</xid>
  <xid part="10" code="8194">MDC_ECG_BEAT_DURN</xid>
  <xid part="10" code="8195">MDC_ECG_BEAT_PEAK</xid>
  <xid part="10" code="8196">MDC_ECG_BEAT_ONSET</xid>
```

```
    <xid part="10" code="8197">MDC_ECG_BEAT_OFFSET</xid>
    <xid part="10" code="8198">MDC_ECG_BEAT_ONSET_IMPL</xid>
    <xid part="10" code="8199">MDC_ECG_BEAT_OFFSET_IMPL</xid>
    <xid part="10" code="8200">MDC_ECG_BEAT_EVENT</xid>
    <xid part="10" code="8201">MDC_ECG_BEAT_COUNT</xid>
    <xid part="10" code="8202">MDC_ECG_BEAT_RATE</xid>
    <xid part="10" code="8203">MDC_ECG_BEAT_RATE_MAX</xid>
    <xid part="10" code="8204">MDC_ECG_BEAT_RATE_MIN</xid>
    <xid part="10" code="8205">MDC_ECG_BEAT_RATE_MEAN</xid>
    <xid part="10" code="8206">MDC_ECG_BEAT_TIME</xid>
    <xid part="10" code="8207">MDC_ECG_BEAT_ANNOT</xid>
    <xid part="10" code="8208">MDC_ECG_BEAT_NORMAL</xid>
    <xid part="10" code="8209">MDC_ECG_BEAT_NORMAL_TIME_POINT</xid>
    <xid part="10" code="8210">MDC_ECG_BEAT_NORMAL_DURN</xid>
    <xid part="10" code="8211">MDC_ECG_BEAT_NORMAL_PEAK</xid>
    <xid part="10" code="8212">MDC_ECG_BEAT_NORMAL_ONSET</xid>
    <xid part="10" code="8213">MDC_ECG_BEAT_NORMAL_OFFSET</xid>
    <xid part="10" code="8214">MDC_ECG_BEAT_NORMAL_ONSET_IMPL</xid>
    <xid part="10" code="8215">MDC_ECG_BEAT_NORMAL_OFFSET_IMPL</xid>
    <xid part="10" code="8216">MDC_ECG_BEAT_NORMAL_EVENT</xid>
    <xid part="10" code="8217">MDC_ECG_BEAT_NORMAL_COUNT</xid>
    <xid part="10" code="8218">MDC_ECG_BEAT_NORMAL_RATE</xid>
    <xid part="10" code="8219">MDC_ECG_BEAT_NORMAL_RATE_MAX</xid>
    <xid part="10" code="8220">MDC_ECG_BEAT_NORMAL_RATE_MIN</xid>
    <xid part="10" code="8221">MDC_ECG_BEAT_NORMAL_RATE_MEAN</xid>
    <xid part="10" code="8222">MDC_ECG_BEAT_NORMAL_TIME</xid>
    <xid part="10" code="8223">MDC_ECG_BEAT_NORMAL_ANNOT</xid>
    <xid part="10" code="8224">MDC_ECG_BEAT_ABNORMAL</xid>
    <xid part="10" code="8225">MDC_ECG_BEAT_ABNORMAL_TIME_POINT</xid>
    <xid part="10" code="8226">MDC_ECG_BEAT_ABNORMAL_DURN</xid>
    <xid part="10" code="8227">MDC_ECG_BEAT_ABNORMAL_PEAK</xid>
    <xid part="10" code="8228">MDC_ECG_BEAT_ABNORMAL_ONSET</xid>
    <xid part="10" code="8229">MDC_ECG_BEAT_ABNORMAL_OFFSET</xid>
    <xid part="10" code="8230">MDC_ECG_BEAT_ABNORMAL_ONSET_IMPL</xid>
    <xid part="10" code="8231">MDC_ECG_BEAT_ABNORMAL_OFFSET_IMPL</xid>
    <xid part="10" code="8232">MDC_ECG_BEAT_ABNORMAL_EVENT</xid>
    <xid part="10" code="8233">MDC_ECG_BEAT_ABNORMAL_COUNT</xid>
    <xid part="10" code="8234">MDC_ECG_BEAT_ABNORMAL_RATE</xid>
    <xid part="10" code="8235">MDC_ECG_BEAT_ABNORMAL_RATE_MAX</xid>
    <xid part="10" code="8236">MDC_ECG_BEAT_ABNORMAL_RATE_MIN</xid>
    <xid part="10" code="8237">MDC_ECG_BEAT_ABNORMAL_RATE_MEAN</xid>
    <xid part="10" code="8238">MDC_ECG_BEAT_ABNORMAL_TIME</xid>
    <xid part="10" code="8239">MDC_ECG_BEAT_ABNORMAL_ANNOT</xid>
  </terms>
```

Annex D

(informative)

Cross-references to other ECG standards

This annex lists other ECG standards that are related to this standard, including antecedent standards (ANSI/AAMI EC71-2001 [B7], ISO/IEEE 11073-10101:2004), standards that were co-developed with this standard (HL7 V3 IG aECG [B10], EN1064:2005+A1:2007 [B9]), and standards that later adopted terminology from this standard (NEMA PS3/ISO 12052-2006 [B11], NEMA PS3.16-2011 [B12]). The major areas of compatibility are also noted. Complete bibliographic citations are provided in Annex E.

D.1 ANSI/AAMI EC71-2001 [B7]

The ANSI/AAMI EC71-2001 [B7] standard identifies ECG leads with numeric codes 0 to 85 that are semantically equivalent to the ECG lead numeric identifier codes defined by this standard.

Although ANSI/AAMI EC71-2001 [B7] does not define normative text identifiers for ECG leads, the text string definitions are largely isomorphic with the REFID ECG lead suffixes defined in this standard, with the exception that the former standard uses the "-cal" suffix and the latter standard uses the "d" prefix for the "derived" (otherwise known as "calculated") leads.

D.2 HL7 V3 IG aECG [B10] and ANSI/HL7 V3 ECG, R1-2004 (R2009) [B8]

The HL7 V3 ECG Implementation Guide [B10] uses a subset of 105 leads from IEEE Std 11073-10102. All leads are referenced by MDC_ECG_LEAD_*xxx* or by the *_xxx* suffix used by per-lead ECG terms; numeric lead identifiers are not used. HL7 V3 ECG uses lead suffixes _aVR, _aVL, and _aVF instead of _AVR, _AVL, and _AVF specified by IEEE Std 11073-10102.

NOTE—HL7 V3 IG aECG [B10] only uses the base terms from IEEE Std 11073-10102; discriminators are not used. Identifiers are specified solely by their REFIDs; numeric CODE10 and CF_CODE10 identifiers are not used.

Table D.1—HL7 V3 IG aECG [B10] references to IEEE 11073-10102 base terms

-10102 Terminology group	Notes (HL7 V3 IG aECG [B10] vocabulary name)
ECG lead	105 leads are used (ECGLeadTypeMDC)
ECG WAVC wave components	All are used (ECGAnnotationType)
ECG WAVP pacemaker components	All are used (ECGAnnotationType)
ECG beats	All are used (ECGAnnotationType)
ECG rhythms	All are used (ECGAnnotationType)
ECG noise annotations and levels	All are used (ECGAnnotationType)
ECG measurements—global	All are used (ECGAnnotationType)
ECG measurements—per lead	All are used (ECGAnnotationType)
ECG lead systems	Not used: defined after HL7 V3 ECG was published
Control variables	All are used (ECGControlVariableMDC)
Information attributes	All are used (ECGControlVariableMDC)

D.3 ISO/IEEE 11073-10101:2004

The ECG lead identifiers [codes 0–65] defined in Annex A of ISO/IEEE 11073-10101:2004 are semantically compatible with those defined in this standard. The REFIDs are identical except that this standard uses the "d" prefix instead of the "-cal" suffix and that X, Y, and Z is used instead of VX, VY, and VZ.

The additional ECG lead identifier codes [66–116] defined in Annex B of ISO/IEEE 11073-10101:2004 are *not* semantically compatible with codes [66–85] defined by ANSI/AAMI EC71-2001 [B7] and are *not* semantically compatible with codes [66–116] defined by this standard.

This standard includes the global and per-lead ECG numeric terms defined originally in ISO/IEEE 11073-10101:2004 and is compatible with the corresponding base terms in Annex A and Annex B.

D.4 EN1064:2005+A1:2007 [B9]

EN1064:2005+A1:2007 [B9], file «64_e_stm_ver22.pdf» was approved in 2005 and amended in 2007, and it was later also published as ISO/DIS 11073-91064 [B18].

The EN1064:2005+A1:2007 standard identifies ECG leads with numeric codes 0 to 184 that are semantically equivalent to the ECG lead numeric identifier codes defined by this standard.

NOTE—The EN1064:2005+A1:2007 [B9] text descriptions use a lowercase convention for the following ECG lead identifiers that is different than the uppercase convention used by this standard (the latter enclosed in parentheses): aVR (AVR), aVL (AVL), aVF (AVF), aVRneg (AVRneg), Defib (DEFIB), Extern (EXTERN), Chest (C), daVR (dAVR), daVL (dAVL), daVF (dAVF), daVRneg (dAVRneg), dChest (dC), dDefib (dDEFIB), and dExtern (dEXTERN).

D.5 DICOM NEMA PS3/ISO 12052-2006 [B11] and NEMA PS3.16-2011 [B12]

The DICOM NEMA PS3/ISO 12052-2006 [B11] and NEMA PS3.16-2011 [B12] originally adopted the IEEE 11073-10102 terminology for cardiac stress test structured reports. Practically all of the base terms from IEEE Std 11073-10102 are used, as summarized in Table D.2.

Table D.2—DICOM NEMA PS3/ISO 12052-2009 [B11] and NEMA PS3.16-2011 [B12])

-10102 Terminology group	Notes (and DICOM Context Identifier)
ECG lead	ECG Leads (CID 3001)
ECG WAVC wave components	ECG Annotations (CID 3335)
ECG WAVP pacemaker components	ECG Annotations (CID 3335)
ECG beats	ECG Findings (CID 3230), ECG Annotations (CID 3335)
ECG rhythms	ECG Findings (CID 3230), Cardiac Rhythms (CID 3415)
ECG noise annotations and levels	ECG Annotations (CID 3335), ECG Lead Noise Descriptions (CID3680)
ECG measurements—global	Global and per-lead QTc, timing, and axis measurements (CID 3227, CID 3228, CID 3229), Electrophysiology Waveform Durations and Voltages (CID 3687, CID 3688), ECG Global Waveform Durations (CID 3689)
ECG measurements—per lead	Global and per-lead QTc, timing, and axis measurements (CID 3227, CID 3228, CID 3229)
ECG lead systems	Electrode Placement Values (CID 3263)
Control variables	ECG Control Variables Numeric (CID 3690), ECG Control Variables Text (CID 3691)
Information attributes	

D.6 Detailed comparison of ECG lead identifiers

Table D.3 lists the ECG lead identifiers for this and related standards, using the numeric discriminator “dOffset” as a common index. For comparison purposes, the semantic meaning of each row is anchored to the ECG lead definitions defined by IEEE Std 11073-10102.

The cells for the three standards (Annex B of ISO/IEEE 11073-10101:2004, NEMA PS3.16-2011 [B12], and EN1064(2005)+A1(2007) [B9]) that are compared with IEEE Std 11073-10102 are highlighted with light gray and tagged with an equals sign "=" if, for the same discriminator offset "dOffset", the REFID or ECG lead suffix are identical (with the "-cal" suffix converted to a "d" prefix prior to the comparison).

For several standards, the lowercase "a" designator for the augmented ECG leads (e.g., aVR) rather than the uppercase convention used by this standard, or lowercase letters are used in the text description that was used for the comparison. These cells are not shaded and are tagged with "≈" symbol to indicate that they have the same numeric code and are semantically equivalent even though the strings are not identical.

Cells that are not shaded and not tagged with either an "=" or "≈" symbol are not equivalent (this applies primarily to the ECG lead codes [66–116] defined in Annex B of ISO/IEEE 11073-10101:2004).

Applications should disclose the nomenclature that was used in their product documentation (labeling).

Table D.3—ECG lead identifiers

dOffset	IEEE Std 11073-10102	Annex B of ISO/IEEE 11073-10101:2004	DICOM	EN1064(2005+A1:2007) [B9]
0	MDC_ECG_LEAD_CONFIG	MDC_ECG_LEAD_CONFIG =	2:0 (CONFIG) =	CONFIG =
1	MDC_ECG_LEAD_I	MDC_ECG_LEAD_I =	2:1 (I) =	I =
2	MDC_ECG_LEAD_II	MDC_ECG_LEAD_II =	2:2 (II) =	II =
3	MDC_ECG_LEAD_V1	MDC_ECG_LEAD_V1 =	2:3 (V1) =	V1 =
4	MDC_ECG_LEAD_V2	MDC_ECG_LEAD_V2 =	2:4 (V2) =	V2 =
5	MDC_ECG_LEAD_V3	MDC_ECG_LEAD_V3 =	2:5 (V3) =	V3 =
6	MDC_ECG_LEAD_V4	MDC_ECG_LEAD_V4 =	2:6 (V4) =	V4 =
7	MDC_ECG_LEAD_V5	MDC_ECG_LEAD_V5 =	2:7 (V5) =	V5 =
8	MDC_ECG_LEAD_V6	MDC_ECG_LEAD_V6 =	2:8 (V6) =	V6 =
9	MDC_ECG_LEAD_V7	MDC_ECG_LEAD_V7 =	2:9 (V7) =	V7 =
10	MDC_ECG_LEAD_V2R	MDC_ECG_LEAD_V2R =	2:10 (V2R) =	V2R =
11	MDC_ECG_LEAD_V3R	MDC_ECG_LEAD_V3R =	2:11 (V3R) =	V3R =
12	MDC_ECG_LEAD_V4R	MDC_ECG_LEAD_V4R =	2:12 (V4R) =	V4R =
13	MDC_ECG_LEAD_V5R	MDC_ECG_LEAD_V5R =	2:13 (V5R) =	V5R =
14	MDC_ECG_LEAD_V6R	MDC_ECG_LEAD_V6R =	2:14 (V6R) =	V6R =
15	MDC_ECG_LEAD_V7R	MDC_ECG_LEAD_V7R =	2:15 (V7R) =	V7R =
16	MDC_ECG_LEAD_X	MDC_ECG_LEAD_VX ≈	2:16 (X) =	X =
17	MDC_ECG_LEAD_Y	MDC_ECG_LEAD_VY ≈	2:17 (Y) =	Y =
18	MDC_ECG_LEAD_Z	MDC_ECG_LEAD_VZ ≈	2:18 (Z) =	Z =
19	MDC_ECG_LEAD_CC5	MDC_ECG_LEAD_CC5 =	2:19 (CC5) =	CC5 =
20	MDC_ECG_LEAD_CM5	MDC_ECG_LEAD_CM5 =	2:20 (CM5) =	CM5 =
21	MDC_ECG_LEAD_LA	MDC_ECG_LEAD_LA =	2:21 (LA) =	LA =
22	MDC_ECG_LEAD_RA	MDC_ECG_LEAD_RA =	2:22 (RA) =	RA =
23	MDC_ECG_LEAD_LL	MDC_ECG_LEAD_LL =	2:23 (LL) =	LL =
24	MDC_ECG_LEAD_fI	MDC_ECG_LEAD_fI =	2:24 (fI) =	fI =
25	MDC_ECG_LEAD_fE	MDC_ECG_LEAD_fE =	2:25 (fE) =	fE =
26	MDC_ECG_LEAD_fC	MDC_ECG_LEAD_fC =	2:26 (fC) =	fC =
27	MDC_ECG_LEAD_fA	MDC_ECG_LEAD_fA =	2:27 (fA) =	fA =
28	MDC_ECG_LEAD_fM	MDC_ECG_LEAD_fM =	2:28 (fM) =	fM =
29	MDC_ECG_LEAD_fF	MDC_ECG_LEAD_fF =	2:29 (fF) =	fF =
30	MDC_ECG_LEAD_fH	MDC_ECG_LEAD_fH =	2:30 (fH) =	fH =
31	MDC_ECG_LEAD_dI	MDC_ECG_LEAD_Ical =	2:31 (dI) =	dI =
32	MDC_ECG_LEAD_dII	MDC_ECG_LEAD_IIcal =	2:32 (dII) =	dII =
33	MDC_ECG_LEAD_dV1	MDC_ECG_LEAD_V1cal =	2:33 (dV1) =	dV1 =
34	MDC_ECG_LEAD_dV2	MDC_ECG_LEAD_V2cal =	2:34 (dV2) =	dV2 =
35	MDC_ECG_LEAD_dV3	MDC_ECG_LEAD_V3cal =	2:35 (dV3) =	dV3 =
36	MDC_ECG_LEAD_dV4	MDC_ECG_LEAD_V4cal =	2:36 (dV4) =	dV4 =

dOffset	IEEE Std 11073-10102	Annex B of ISO/IEEE 11073-10101:2004	DICOM	EN1064(2005+A1:2007) [B9]
37	MDC_ECG_LEAD_dV5	MDC_ECG_LEAD_V5cal =	2:37 (dV5) =	dV5 =
38	MDC_ECG_LEAD_dV6	MDC_ECG_LEAD_V6cal =	2:38 (dV6) =	dV6 =
39	MDC_ECG_LEAD_dV7	MDC_ECG_LEAD_V7cal =	—	dV7 =
40	MDC_ECG_LEAD_dV2R	MDC_ECG_LEAD_V2Rcal =	—	dV2R =
41	MDC_ECG_LEAD_dV3R	MDC_ECG_LEAD_V3Rcal =	—	dV3R =
42	MDC_ECG_LEAD_dV4R	MDC_ECG_LEAD_V4Rcal =	—	dV4R =
43	MDC_ECG_LEAD_dV5R	MDC_ECG_LEAD_V5Rcal =	—	dV5R =
44	MDC_ECG_LEAD_dV6R	MDC_ECG_LEAD_V6Rcal =	—	dV6R =
45	MDC_ECG_LEAD_dV7R	MDC_ECG_LEAD_V7Rcal =	—	dV7R =
46	MDC_ECG_LEAD_dX	MDC_ECG_LEAD_VXcal ≈	—	dX =
47	MDC_ECG_LEAD_dY	MDC_ECG_LEAD_VYcal ≈	—	dY =
48	MDC_ECG_LEAD_dZ	MDC_ECG_LEAD_VZcal ≈	—	dZ =
49	MDC_ECG_LEAD_dCC5	MDC_ECG_LEAD_C5cal ≈	—	dCC5 =
50	MDC_ECG_LEAD_dCM5	MDC_ECG_LEAD_CM5cal =	—	dCM5 =
51	MDC_ECG_LEAD_dLA	MDC_ECG_LEAD_LAcal =	—	dLA =
52	MDC_ECG_LEAD_dRA	MDC_ECG_LEAD_RAcal =	—	dRA =
53	MDC_ECG_LEAD_dLL	MDC_ECG_LEAD_LLcal =	—	dLL =
54	MDC_ECG_LEAD_dfI	MDC_ECG_LEAD_fIcal =	—	dfI =
55	MDC_ECG_LEAD_dfE	MDC_ECG_LEAD_fEcal =	—	dfE =
56	MDC_ECG_LEAD_dfC	MDC_ECG_LEAD_fCcal =	—	dfC =
57	MDC_ECG_LEAD_dfA	MDC_ECG_LEAD_fAcal =	—	dfA =
58	MDC_ECG_LEAD_dfM	MDC_ECG_LEAD_fMcal =	—	dfM =
59	MDC_ECG_LEAD_dfF	MDC_ECG_LEAD_fFcal =	—	dfF =
60	MDC_ECG_LEAD_dfH	MDC_ECG_LEAD_fHcal =	—	dfH =
61	MDC_ECG_LEAD_III	MDC_ECG_LEAD_III =	2:61 (III) =	III =
62	MDC_ECG_LEAD_AVR	MDC_ECG_LEAD_AVR =	2:62 (AVR) =	aVR ≈
63	MDC_ECG_LEAD_AVL	MDC_ECG_LEAD_AVL =	2:63 (AVL) =	aVL ≈
64	MDC_ECG_LEAD_AVF	MDC_ECG_LEAD_AVF =	2:64 (AVF) =	aVF ≈
65	MDC_ECG_LEAD_AVRneg	MDC_ECG_LEAD_AVRneg =	—	aVRneg ≈
66	MDC_ECG_LEAD_V8	MDC_ECG_LEAD_C	—	V8 =
67	MDC_ECG_LEAD_V9	MDC_ECG_LEAD_V	2:67 (V9) =	V9 =
68	MDC_ECG_LEAD_V8R	MDC_ECG_LEAD_VR	2:68 (V8R) =	V8R =
69	MDC_ECG_LEAD_V9R	MDC_ECG_LEAD_VL	2:69 (V9R) =	V9R =
70	MDC_ECG_LEAD_D	MDC_ECG_LEAD_VF	2:70 (D) =	D =
71	MDC_ECG_LEAD_A	MDC_ECG_LEAD_V8	2:71 (A) =	A =
72	MDC_ECG_LEAD_J	MDC_ECG_LEAD_Dn	2:72 (J) =	J =
73	MDC_ECG_LEAD_DEFIB	MDC_ECG_LEAD_An	2:73 (DEFIB) =	Defib ≈
74	MDC_ECG_LEAD_EXTERN	MDC_ECG_LEAD_Jn	2:74 (EXTERN) =	Extern ≈
75	MDC_ECG_LEAD_A1	MDC_ECG_LEAD_MCL	2:75 (A1) =	A1 =
76	MDC_ECG_LEAD_A2	MDC_ECG_LEAD_MCL1	2:76 (A2) =	A2 =
77	MDC_ECG_LEAD_A3	MDC_ECG_LEAD_MCL2	2:77 (A3) =	A3 =
78	MDC_ECG_LEAD_A4	MDC_ECG_LEAD_MCL3	2:78 (A4) =	A4 =
79	MDC_ECG_LEAD_dV8	MDC_ECG_LEAD_MCL4	—	dV8 =
80	MDC_ECG_LEAD_dV9	MDC_ECG_LEAD_MCL5	—	dV9 =
81	MDC_ECG_LEAD_dV8R	MDC_ECG_LEAD_MCL6	—	dV8R =
82	MDC_ECG_LEAD_dV9R	MDC_ECG_LEAD_C1FR	—	dV9R =
83	MDC_ECG_LEAD_dD	MDC_ECG_LEAD_C2FR	—	dD =
84	MDC_ECG_LEAD_dA	MDC_ECG_LEAD_C3FR	—	dA =
85	MDC_ECG_LEAD_dJ	MDC_ECG_LEAD_C4FR	—	dJ =
86	MDC_ECG_LEAD_C	MDC_ECG_LEAD_C4RFR	2:86 (C) =	Chest ≈
87	MDC_ECG_LEAD_V	MDC_ECG_LEAD_C5FR	2:87 (V) =	V =
88	MDC_ECG_LEAD_VR	MDC_ECG_LEAD_C6FR	2:88 (VR) =	VR =
89	MDC_ECG_LEAD_VL	MDC_ECG_LEAD_C7FR	2:89 (VL) =	VL =
90	MDC_ECG_LEAD_VF	MDC_ECG_LEAD_C8FR	2:90 (VF) =	VF =
91	MDC_ECG_LEAD_MCL	MDC_ECG_LEAD_ECGLD91	2:91 (MCL) =	MCL =
92	MDC_ECG_LEAD_MCL1	MDC_ECG_LEAD_ECGLD92	2:92 (MCL1) =	MCL1 =

dOffset	IEEE Std 11073-10102	Annex B of ISO/IEEE 11073-10101:2004	DICOM	EN1064(2005+A1:2007) [B9]
93	MDC_ECG_LEAD_MCL2	MDC_ECG_LEAD_ECGLD93	2:93 (MCL2) =	MCL2 =
94	MDC_ECG_LEAD_MCL3	MDC_ECG_LEAD_ECGLD94	2:94 (MCL3) =	MCL3 =
95	MDC_ECG_LEAD_MCL4	MDC_ECG_LEAD_ECGLD95	2:95 (MCL4) =	MCL4 =
96	MDC_ECG_LEAD_MCL5	MDC_ECG_LEAD_ECGLD96	2:96 (MCL5) =	MCL5 =
97	MDC_ECG_LEAD_MCL6	MDC_ECG_LEAD_ECGLD97	2:97 (MCL6) =	MCL6 =
98	MDC_ECG_LEAD_CC	MDC_ECG_LEAD_ECGLD98	2:98 (CC) =	CC =
99	MDC_ECG_LEAD_CC1	MDC_ECG_LEAD_ECGLD99	2:99 (CC1) =	CC1 =
100	MDC_ECG_LEAD_CC2	MDC_ECG_LEAD_ES	2:100 (CC2) =	CC2 =
101	MDC_ECG_LEAD_CC3	MDC_ECG_LEAD_AS	2:101 (CC3) =	CC3 =
102	MDC_ECG_LEAD_CC4	MDC_ECG_LEAD_AI	2:102 (CC4) =	CC4 =
103	MDC_ECG_LEAD_CC6	MDC_ECG_LEAD_dI	2:103 (CC6) =	CC6 =
104	MDC_ECG_LEAD_CC7	MDC_ECG_LEAD_dII	2:104 (CC7) =	CC7 =
105	MDC_ECG_LEAD_CM	MDC_ECG_LEAD_dIII	2:105 (CM) =	CM =
106	MDC_ECG_LEAD_CM1	MDC_ECG_LEAD_daVR	2:106 (CM1) =	CM1 =
107	MDC_ECG_LEAD_CM2	MDC_ECG_LEAD_daVL	2:107 (CM2) =	CM2 =
108	MDC_ECG_LEAD_CM3	MDC_ECG_LEAD_daVF	2:108 (CM3) =	CM3 =
109	MDC_ECG_LEAD_CM4	MDC_ECG_LEAD_dV1	2:109 (CM4) =	CM4 =
110	MDC_ECG_LEAD_CM6	MDC_ECG_LEAD_dV2	2:110 (CM6) =	CM6 =
111	MDC_ECG_LEAD_dIII	MDC_ECG_LEAD_dV3	2:111 (dIII) =	dIII =
112	MDC_ECG_LEAD_dAVR	MDC_ECG_LEAD_dV4	2:112 (dAVR) =	daVR ≈
113	MDC_ECG_LEAD_dAVL	MDC_ECG_LEAD_dV5	2:113 (dAVL) =	daVL ≈
114	MDC_ECG_LEAD_dAVF	MDC_ECG_LEAD_dV6	2:114 (dAVF) =	daVF ≈
115	MDC_ECG_LEAD_dAVRneg	MDC_ECG_LEAD_RL	—	daVRneg ≈
116	MDC_ECG_LEAD_dC	MDC_ECG_LEAD_EASI_S	—	dChest ≈
117	MDC_ECG_LEAD_dV	—	—	dV =
118	MDC_ECG_LEAD_dVR	—	—	dVR =
119	MDC_ECG_LEAD_dVL	—	—	dVL =
120	MDC_ECG_LEAD_dVF	—	—	dVF =
121	MDC_ECG_LEAD_CM7	—	2:121 (CM7) =	CM7 =
122	MDC_ECG_LEAD_CH5	—	2:122 (CH5) =	CH5 =
123	MDC_ECG_LEAD_CS5	—	2:123 (CS5) =	CS5 =
124	MDC_ECG_LEAD_CB5	—	2:124 (CB5) =	CB5 =
125	MDC_ECG_LEAD_CR5	—	2:125 (CR5) =	CR5 =
126	MDC_ECG_LEAD_ML	—	2:126 (ML) =	ML =
127	MDC_ECG_LEAD_AB1	—	2:127 (AB1) =	AB1 =
128	MDC_ECG_LEAD_AB2	—	2:128 (AB2) =	AB2 =
129	MDC_ECG_LEAD_AB3	—	2:129 (AB3) =	AB3 =
130	MDC_ECG_LEAD_AB4	—	2:130 (AB4) =	AB4 =
131	MDC_ECG_LEAD_ES	—	2:131 (ES) =	ES =
132	MDC_ECG_LEAD_AS	—	2:132 (AS) =	AS =
133	MDC_ECG_LEAD_AI	—	2:133 (AI) =	AI =
134	MDC_ECG_LEAD_S	—	2:134 (S) =	S =
135	MDC_ECG_LEAD_dDEFIB	—	—	dDefib ≈
136	MDC_ECG_LEAD_dEXTERN	—	—	dExtern ≈
137	MDC_ECG_LEAD_dA1	—	—	dA1 =
138	MDC_ECG_LEAD_dA2	—	—	dA2 =
139	MDC_ECG_LEAD_dA3	—	—	dA3 =
140	MDC_ECG_LEAD_dA4	—	—	dA4 =
141	MDC_ECG_LEAD_dMCL1	—	—	dMCL1 =
142	MDC_ECG_LEAD_dMCL2	—	—	dMCL2 =
143	MDC_ECG_LEAD_dMCL3	—	—	dMCL3 =
144	MDC_ECG_LEAD_dMCL4	—	—	dMCL4 =
145	MDC_ECG_LEAD_dMCL5	—	—	dMCL5 =
146	MDC_ECG_LEAD_dMCL6	—	—	dMCL6 =
147	MDC_ECG_LEAD_RL	—	2:147 (RL) =	RL =
148	MDC_ECG_LEAD_CV5RL	—	2:148 (CV5RL) =	CV5RL =

dOffset	IEEE Std 11073-10102	Annex B of ISO/IEEE 11073-10101:2004	DICOM	EN1064(2005+A1:2007) [B9]
149	MDC_ECG_LEAD_CV6LL	—	2:149 (CV6LL) =	CV6LL =
150	MDC_ECG_LEAD_CV6LU	—	2:150 (CV6LU) =	CV6LU =
151	MDC_ECG_LEAD_V10	—	2:151 (V10) =	V10 =
152	MDC_ECG_LEAD_dMCL	—	—	dMCL =
153	MDC_ECG_LEAD_dCC	—	—	dCC =
154	MDC_ECG_LEAD_dCC1	—	—	dCC1 =
155	MDC_ECG_LEAD_dCC2	—	—	dCC2 =
156	MDC_ECG_LEAD_dCC3	—	—	dCC3 =
157	MDC_ECG_LEAD_dCC4	—	—	dCC4 =
158	MDC_ECG_LEAD_dCC6	—	—	dCC6 =
159	MDC_ECG_LEAD_dCC7	—	—	dCC7 =
160	MDC_ECG_LEAD_dCM	—	—	dCM =
161	MDC_ECG_LEAD_dCM1	—	—	dCM1 =
162	MDC_ECG_LEAD_dCM2	—	—	dCM2 =
163	MDC_ECG_LEAD_dCM3	—	—	dCM3 =
164	MDC_ECG_LEAD_dCM4	—	—	dCM4 =
165	MDC_ECG_LEAD_dCM6	—	—	dCM6 =
166	MDC_ECG_LEAD_dCM7	—	—	dCM7 =
167	MDC_ECG_LEAD_dCH5	—	—	dCH5 =
168	MDC_ECG_LEAD_dCS5	—	—	dCS5 =
169	MDC_ECG_LEAD_dCB5	—	—	dCB5 =
170	MDC_ECG_LEAD_dCR5	—	—	dCR5 =
171	MDC_ECG_LEAD_dML	—	—	dML =
172	MDC_ECG_LEAD_dAB1	—	—	dAB1 =
173	MDC_ECG_LEAD_dAB2	—	—	dAB2 =
174	MDC_ECG_LEAD_dAB3	—	—	dAB3 =
175	MDC_ECG_LEAD_dAB4	—	—	dAB4 =
176	MDC_ECG_LEAD_dES	—	—	dES =
177	MDC_ECG_LEAD_dAS	—	—	dAS =
178	MDC_ECG_LEAD_dAI	—	—	dAI =
179	MDC_ECG_LEAD_dS	—	—	dS =
180	MDC_ECG_LEAD_dRL	—	—	dRL =
181	MDC_ECG_LEAD_dCV5RL	—	—	dCV5RL =
182	MDC_ECG_LEAD_dCV6LL	—	—	dCV6LL =
183	MDC_ECG_LEAD_dCV6LU	—	—	dCV6LU =
184	MDC_ECG_LEAD_dV10	—	—	dV10 =

NOTE 1—The identifiers listed in the “DICOM” column include three corrections (lead III was corrected to 2:61, chest-manubrium 5 to 2:20, and chest lead to 2:86) relative to the identifiers published in NEMA PS3.16-2011 [B12]. Also, the IEEE ECG lead suffixes listed in NEMA PS3.16-2011 [B12] were incorrectly listed as daVR, daVL, and daVF, and the correct suffixes dAVR, dAVL, and dAVF are listed in the DICOM column as well. Both sets of corrections are already “in process” and will appear in the next release of NEMA PS3.16.

NOTE 2—The HL7 V3 IG aECG Implementation Guide [B10] uses a subset of 105 leads from IEEE Std 11073-10102. All leads are referenced by MDC_ECG_LEAD_*xxx* or by the *_xxx* suffix used by per-lead ECG terms; numeric lead identifiers are not used. HL7 V3 IG aECG [B10] uses lead suffixes _aVR, _aVL, and _aVF instead of _AVR, _AVL, and _AVF specified by IEEE Std 11073-10102.

Annex E

(informative)

Bibliography

Bibliographical references are resources that provide additional or helpful material but do not need to be understood or used to implement this standard. Reference to these resources is made for informational use only.

Cardiology and pacing references

[B1] El-Sherif, N., and P. Samet, *Cardiac Pacing and Electrophysiology*, 3d ed. Philadelphia, PA: W. B. Saunders, 1991.

[B2] Goldman, M. J. *Principles of Clinical Electrocardiography*, 12th ed. Los Altos, CA: Lange Medical Publishers, 1986.

[B3] Macfarlane, P. W., and T. D. V. Lawrie, , eds., *Comprehensive Electrocardiology: Theory and Practice in Health and Disease*. New York: Pergamon Press, 1989.

[B4] Mangiola, S., and M. C. Ritota, *Cardiac Arrhythmias, Practical ECG Interpretation*, 2d ed. Baltimore, MD: Lippincott, 1982.

Standards referenced by IEEE Std 11073-10102 (for ECG numeric lead identifiers)

[B5] AAMI SCP-ECG-1998, Proposal for ISO Standard based on CEN prENV 1064.00 “Standard Communications Protocol for Computer-Assisted Electrocardiograph, with modifications proposed by AAMI SCP-ECG Working Group, Revision 1.0, Feb. 17.[11]

[B6] AAMI SCP-ECG-2000, Standard Communications Protocol for Computer-Assisted Electrocardiography.

[B7] ANSI/AAMI EC71-2001, Standard Communications Protocol for Computer-Assisted Electrocardiography.[12]

NOTE 1—ANSI/AAMI EC71-2001 is listed as listed as a normative reference in Clause 2 but is included here to show the historical relationship with its predecessor AAMI and CEN prENV standards.

Standards that were co-developed with IEEE Std 11073-10102 to promote standards harmonization

[B8] ANSI/HL7 V3 ECG, R1-2004 (R2009), HL7 Version 3 Standard: Regulated Studies—Annotated ECG, Release 1.

[B9] EN1064 (EN1064:2005+A1:2007, Health informatics—Standard communication protocol—Computer-assisted electrcardiography.[13]

NOTE 2—EN1064:2005+A1:2007 was also published as ISO/DIS 11073-91064, as part of the ISO/IEEE 11073 family of medical device connectivity standards.

[B10] HL7 V3 IG aECG—HL7 Version 3 Implementation Guide: aECG, Release 1, March 2005.[14]

[11] AAMI publications are available from the Association for the Advancement of Medical Instrumentation (http://www.aami.org/).
[12] ANSI publications are available from the American National Standards Institute (http://www.ansi.org/).
[13] EN publications are available from the European Committee for Standardization (CEN) (http://www.cen.eu/).
[14] HL7 publications are available from Health Level Seven International (www.hl7.org/).

Standards that reference IEEE Std 11073-10102 to promote standards harmonization

[B11] NEMA PS3/ISO 12052-2006, Digital Imaging and Communications in Medicine (DICOM) Standard.[15]

[B12] NEMA PS3.16-2011, Digital Imaging and Communications in Medicine (DICOM)—Part 16: Content Mapping Resource.

Additional resources

[B13] Benchimol, A., *Vectorcardiography*. Baltimore, MD: Williams & Wilkins, 1973.

[B14] Brewer, D. L., R. H. Bilbro, and A. G. Bartel, Myocardial infarction as a complication of coronary bypass surgery, *Circulation*, vol. 47, no. 1, pp. 58–64, 1973.

[B15] Frank, E., An accurate clinically practical system for spatial vectorcardiography. *Circulation*, vol. 13, p. 737, 1956.

[B16] Grishman, A., E. R. Borun, and H. L. Jaffe. Spatial vectorcardiography: Technique for the simultaneous recording of the frontal, sagittal, and horizontal projections. *American Heart Journal*, vol. 41, no. 6, pp. 483–493, 1951.

[B17] IEC 60601-2-51:2003, Medical electrical equipment—Part 2-51: Particular requirements for safety, including essential performance, of recording and analysing single channel and multichannel electrocardiographs.[16]

[B18] ISO DIS 11073-91064-2007, Health informatics—Point-of-care medical device communication—Part 91064: Standard communication protocol—Computer-assisted electrocardiography.[17]

[B19] ISO/IEEE 11073-10201:2004, Health informatics—Point-of-care medical device communication—Part 10201: Domain information model.[18]

[B20] Lannek, N., *A Clinical and Experimental Study on the Electrocardiogram in Dogs*. Stockholm, Sweden: Haeggström, 1949.

[B21] Moody, G. B., *MIT-BIH Database Programmer's Guide and Related Documentation*. Cambridge, MA: Massachusetts Institute of Technology, 1997.[19]

[B22] Scherlag, B. J., R. Lazzara, and R. H. Helfant, Differentiation of "A–V" junctional rhythms, *Circulation*, vol. 48, no. 2, pp. 304–312, 1973.

[15] NEMA publications are available from Global Engineering Documents (http://global.ihs.com/).
[16] IEC publications are available from the International Electrotechnical Commission (http://www.iec.ch/). IEC publications are also available in the United States from the American National Standards Institute (http://www.ansi.org/).
[17] ISO publications are available from the ISO Central Secretariat (http://www.iso.org/). ISO publications are also available in the United States from the American National Standards Institute (http://www.ansi.org/).
[18] ISO/IEC publications are available from the ISO Central Secretariat (http://www.iso.org/). ISO publications are also available in the United States from the American National Standards Institute (http://www.ansi.org/).
[19] This document is available from http://ecg.mit.edu/dbpg/.

Annex F
(informative)

IEEE list of participants

Participants

At the time this standard was submitted to the IEEE-SA Standards Board for approval, the Engineering in Medicine and Biology (EMB/11073/EMBS_WG) Working Group had the following membership:

Jan Wittenber, *Chair*
Paul Schluter, *Vice Chair*

Barry Brown	Todd Cooper	Harry Solomon
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Abstract: ISO/IEEE 11073-10102:2014 extends the IEEE 11073-10101 Nomenclature by providing support for ECG annotation terminology. It may be used either in conjunction with other IEEE 11073 standards (e.g. ISO/IEEE 11073-10201:2001) or independently with other standards. The major subject areas addressed by the nomenclature include ECG beat annotations, wave component annotations, rhythm annotations, and noise annotations. Additional "global" and "per-lead" numeric observation identifiers, ECG lead systems, and additional ECG lead identifiers also are defined.

Keywords: annotated ECG, annotations, arrhythmias, cardiac rhythm, codes, ECG leads, ECG lead systems, ECG measurements, home monitoring, IEEE 11073-10102TM, medical device communication, nomenclature, pacemaker, patient monitoring, remote monitoring, terminology

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