INTERNATIONAL STANDARD

ISO/IEEE 11073-10442

Health informatics — Personal health device communication —

Part 10442:
Device specialization — Strength fitness equipment

Informatique de santé — Communication entre dispositifs de santé personnels —

Partie 10442: Spécialisation des dispositifs — Équipement de mise en forme musculaire

iTeh STANDARD PREVIEW
(standards.iteh.ai)

COPYRIGHT PROTECTED DOCUMENT

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. The IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. While the IEEE administers the process and establishes rules to promote fairness in the consensus development process, the IEEE does not independently evaluate, test, or verify the accuracy of any of the information or the soundness of any judgments contained in its standards.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is called to the possibility that implementation of this standard may require the use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. ISO/IEEE is not responsible for identifying essential patents or patent claims for which a license may be required, for conducting inquiries into the legal validity or scope of patents or patent claims or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance or a Patent Statement and Licensing Declaration Form, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. Further information may be obtained from ISO or the IEEE Standards Association.

ISO/IEEE 11073-10442 was prepared by the IEEE 11073 Standards Committee of the IEEE Engineering in Medicine and Biology Society (as IEEE Std 11073-10442-2008). It was adopted by Technical Committee ISO/TC 215, *Health informatics*, in parallel with its approval by the ISO member bodies, under the "fast-track procedure" defined in the Partner Standards Development Organization cooperation agreement between ISO and IEEE. IEEE is responsible for the maintenance of this document with participation and input from ISO member bodies.

This corrected version of ISO/IEEE 11073-10442:2015 incorporates the following corrections:
— replacement of front page footer and deletion of watermark.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Health informatics—Personal health device communication

Part 10442: Device specialization— Strength fitness equipment

Sponsor

IEEE 11073™ Standard Committee

of the

IEEE Engineering in Medicine and Biology Society

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Approved 26 September 2008

IEEE-SA Standards Board

Abstract: Within the context of the ISO/IEEE 11073 family of standards for device communication, this standard establishes a normative definition of the communication between personal strength fitness devices and managers (e.g., cell phones, personal computers, personal health appliances, and set top boxes) in a manner that enables plug-and-play interoperability. It leverages appropriate portions of existing standards including ISO/IEEE 11073 terminology and information models. It specifies the use of specific term codes, formats, and behaviors in telehealth environments restricting optionality in base frameworks in favor of interoperability. This standard defines a common core of communication functionality for personal telehealth strength fitness devices. In this context, strength fitness devices are being used broadly to cover strength fitness devices that measure musculo-skeletal strength-conditioning activities.

Keywords: medical device communication, personal health devices, strength fitness equipment

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/IEEE 11073-10442:2015
https://standards.iteh.ai/catalog/standards/sist/20c72cfc-bbb4-48eb-a5c9-
ab0740cae657/iso-ieee-11073-10442-2015

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. The IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. While the IEEE administers the process and establishes rules to promote fairness in the consensus development process, the IEEE does not independently evaluate, test, or verify the accuracy of any of the information contained in its standards.

Use of an IEEE Standard is wholly voluntary. The IEEE disclaims liability for any personal injury, property or other damage, of any nature whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, use of, or reliance upon this, or any other IEEE Standard document.

The IEEE does not warrant or represent the accuracy or content of the material contained herein, and expressly disclaims any express or implied warranty, including any implied warranty of merchantability or fitness for a specific purpose, or that the use of the material contained herein is free from patent infringement. IEEE Standards documents are supplied "**AS IS**."

The existence of an IEEE Standard does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to the scope of the IEEE Standard. Furthermore, the viewpoint expressed at the time a standard is approved and issued is subject to change brought about through developments in the state of the art and comments received from users of the standard. Every IEEE Standard is subjected to review at least every five years for revision or reaffirmation. When a document is more than five years old and has not been reaffirmed, it is reasonable to conclude that its contents, although still of some value, do not wholly reflect the present state of the art. Users are cautioned to check to determine that they have the latest edition of any IEEE Standard.

In publishing and making this document available, the IEEE is not suggesting or rendering professional or other services for, or on behalf of, any person or entity. Nor is the IEEE undertaking to perform any duty owed by any other person or entity to another. Any person utilizing this, and any other IEEE Standards document, should rely upon the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

Interpretations: Occasionally questions may arise regarding the meaning of portions of standards as they relate to specific applications. When the need for interpretations is brought to the attention of IEEE, the Institute will initiate action to prepare appropriate responses. Since IEEE Standards represent a consensus of concerned interests, it is important to ensure that any interpretation has also received the concurrence of a balance of interests. For this reason, IEEE and the members of its societies and Standards Coordinating Committees are not able to provide an instant response to interpretation requests except in those cases where the matter has previously received formal consideration. At lectures, symposia, seminars, or educational courses, an individual presenting information on IEEE standards shall make it clear that his or her views should be considered the personal views of that individual rather than the formal position, explanation, or interpretation of the IEEE.

Comments for revision of IEEE Standards are welcome from any interested party, regardless of membership affiliation with IEEE. Suggestions for changes in documents should be in the form of a proposed change of text, together with appropriate supporting comments. Comments on standards and requests for interpretations should be addressed to:

Secretary, IEEE-SA Standards Board
445 Hoes Lane
Piscataway, NJ 08854
USA

Introduction

This introduction is not part of IEEE Std 11073-10442-2008, Health informatics—Personal health device communication—Part 10442: Device specialization—Strength fitness equipment.

ISO/IEEE 11073 standards enable communication between medical devices and external computer systems. This document uses the optimized framework created in IEEE Std 11073-20601[a] and describes a specific, interoperable communication approach for strength fitness equipment. These standards align with and draw on the existing clinically focused standards to provide easy management of data from either clinical or personal health devices.

Notice to users

Laws and regulations

Users of these documents should consult all applicable laws and regulations. Compliance with the provisions of this standard does not imply compliance to any applicable regulatory requirements. Implementers of the standard are responsible for observing or referring to the applicable regulatory requirements. IEEE does not, by the publication of its standards, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

This document is copyrighted by the IEEE. It is made available for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of engineering practices and methods. By making this document available for use and adoption by public authorities and private users, the IEEE does not waive any rights in copyright to this document.

Updating of IEEE documents

Users of IEEE standards should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of amendments, corrigenda, or errata. An official IEEE document at any point in time consists of the current edition of the document together with any amendments, corrigenda, or errata then in effect. In order to determine whether a given document is the current edition and whether it has been amended through the issuance of amendments, corrigenda, or errata, visit the IEEE Standards Association Web site at http://ieeexplore.ieee.org/xpl/standards.jsp, or contact the IEEE at the address listed previously.

For more information about the IEEE Standards Association or the IEEE standards development process, visit the IEEE-SA Web site at http://standards.ieee.org.

Errata

Errata, if any, for this and all other standards can be accessed at the following URL: http://standards.ieee.org/reading/ieee/updates/errata/. Users are encouraged to check this URL for errata periodically.

Interpretations

Current interpretations can be accessed at the following URL: http://standards.ieee.org/reading/ieee/interp/.

Patents

Attention is called to the possibility that implementation of this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. A patent holder or patent applicant has filed a statement of assurance that it will grant licenses under these rights without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination to applicants desiring to obtain such licenses. Other Essential Patent Claims may exist for which a statement of assurance has not been received. The IEEE is not responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of Patents Claims, or determining whether any licensing terms or conditions are reasonable or non-discriminatory. Further information may be obtained from the IEEE Standards Association.

---

[a] For information on references, see Clause 2.

Participants

At the time this standard was completed, the Personal Health Devices Working Group had the following membership:

Douglas P. Bogia, *Chair*
Eric White, *Vice Chair*

Karsten Aalders
Charles R. Abbruscato
Maher Abuzaid
Manfred Aigner
Murtaza Ali
Deepak Ayyagari
Merat Bagha
Doug Baird
David Baker
Terry Bartlett
David Bean
Rudy Belliardi
Denis Bettini
Ola Björsne
Thomas Blackadar
Marc Blanchet
Douglas P. Bogia
Terry Bourk
Bernard Burg
Lyle G. Bullock, Jr.
Chris Burns
Anthony Butt
Carole C. Carey
Randy Carroll
Casper Chen
James Cheng
Silviu Chiricescu
Rick A. Cnossen
Moshe Cohen
John T. Collins
Cory Condek
Todd Cooper
Jim DelloStritto
Matthew d'Entremont
Kent Dicks
Jakob Ehrensvard
Roger M. Ellingson
Michihiro Enokida
Mika Erkkilä
Javier Escayola Calvo
Leonardo Estevez
Laurent Falconieri
Gear Fisher
Julie N. Fleischer
Joeseph W. Forler
Eric Freudenthal
Miguel Galarraga
John Garguilo
Igor Gejdos
Chris Gough
Channa Gowda
Niclas Granqvist
Jeff Guttmacher
Christian Habermann
Michael Hagerty
Rickey L. Hampton
Sten Hanke

Jack Harrington
Kai Hassing
Hiroshi Hayashi
Torstein Heggebø
Ron Hegli
Rose Higgins
Kaoru Hiramatsu
Allen Hobbs
Alex Holland
Kirsten Howard
Robert Hoy
Robert D. Hughes
Nick Hunn
Yutaka Ikeda
Philip Isaacson
Ho-In Jeon
Chris Johnson
Krishna Jonnalagadda
Akiyoshi Kabe
Steve Kahle
Tomio Kamioka
Kyung Hee Kang
Ulf Karlsson
Andy Kaschl
Junzo Kashihara
Kohichi Kashiwagi
Ralph Kent
Kurt Kermes
Ikuo Keshi
John Keys
Alfred Kloos
Jeongmee Koh
Alexander Kraus
Falko Kuester
Nandu Kushalnagar
Daniel Lager
Pierre Landau
Sungkee Lee
Yonghee Lee
Kathryn A. Lesh
Qiong Li
Wei-Jung Lo
Sandra Martinez
Miguel Martínez de Espronceda
    Cámara
Jim McCain
Richard McPartland
Jinsei Miyazaki
Brian Møller
Darr Moore
Joe Morrissey
Yoshihiko Motohashi
Alex Neefus
Michael E. Nidd
Hiroaki Niwamoto
Thomas Norgall
Yoshiteru Nozoe
Mikey Paradis

Jayant Parthasarathy
Phillip E. Pash
Thomas Plasa
Arif Rahman
Robert E. Ranslam
Barry Reinhold
Melvin I. Reynolds
Jeffrey S. Robbins
Timothy Robertson
Michael B. Robkin
Bill Saltzstein
Stefan Sauermann
Naveen Saxena
Paul S. Schluter
Lars Schmitt
Mark Schnell
Richard A. Schrenker
Aravind Seshagiri
Marco Sgroi
Mazen Shihabi
Robert Smith
Motoki Sone
Emily Sopensky
Ryan Spring
Nick Steblay
Lars Steubesand
John (Ivo) Stivoric
Ravi Swami
Xiaorong Tai
Kunihiro Takiuchi
Francis Tam
Haruyuyki Tatsumi
Randy Thomas
Brad Tipler
Bob Tripp
Gary Tschautscher
Masato Tsuchid
Ken Tubman
Yoshihiro Uchida
Sunil Unadkat
Alpo Värri
Mark Walters
Jerry P. Wang
Jeff Warner
Toru Watsuji
Jeff Webber
Eric White
David L. Whitlinger
Vernon C. Williams
Paul Williamson
Jan Wittenber
Ariton Xhafa
Ricky Yang
Done-Sik Yoo
Thomas Zhao
Daidi Zhong
Szymon Zysko

v

The following members of the individual balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

Thomas Blackadar	Julie N. Fleischer	Atsushi Ito
Douglas P. Bogia	Sergiu Goma	Piotr Karocki
Lyle G. Bullock, Jr.	Randall Groves	Kurt Kermes
Randy Carroll	Michael Hagerty	Jayant Parthasarathy
Keith Chow	Kai Hassing	James E. Smith
Malcolm Clarke	Werner Hoelzl	Lars Steubesand
Rick A. Cnossen	Philip Isaacson	Eric White

When the IEEE-SA Standards Board approved this standard on 26 September, 2008, it had the following membership:

Robert M. Grow, *Chair*
Tom A. Prevost, *Vice Chair*
Steve M. Mills, *Past Chair*
Judith Gorman, *Secretary*

Victor Berman	James Hughes	Ronald C. Petersen
Richard DeBlasio	Richard H. Hulett	Chuck Powers
Andrew Drozd	Young Kyun Kim	Narayanan Ramachandran
Mark Epstein	Joseph L. Koepfinger*	Jon Walter Rosdahl
Alexander Gelman	John Kulick	Anne-Marie Sahazizian
William R. Goldbach	David J. Law	Malcolm V. Thaden
Arnold M. Greenspan	Glenn Parsons	Howard L. Wolfman
Kenneth S. Hanus		Don Wright

*Member Emeritus

Also included are the following nonvoting IEEE-SA Standards Board liaisons:

Satish K. Aggarwal, *NRC Representative*
Michael H. Kelley, *NIST Representative*

Don Messina
IEEE Standards Program Manager, Document Development

Kathryn Cush
IEEE Standards Program Manager, Technical Program Development

Contents

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/IEEE 11073-10442:2015
https://standards.iteh.ai/catalog/standards/sist/20c72cfc-bbb4-48eb-a5c9-ab0740cae657/iso-ieee-11073-10442-2015

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/IEEE 11073-10442:2015
https://standards.iteh.ai/catalog/standards/sist/20c72cfc-bbb4-48eb-a5c9-
ab0740cae657/iso-ieee-11073-10442-2015

Health informatics—Personal health device communication

Part 10442: Device specialization—
Strength fitness equipment

IMPORTANT NOTICE: This standard is not intended to assure safety, security, health, or environmental protection in all circumstances. Implementers of the standard are responsible for determining appropriate safety, security, environmental, and health practices or regulatory requirements.

This IEEE document is made available for use subject to important notices and legal disclaimers. These notices and disclaimers appear in all publications containing this document and may be found under the heading "Important Notice" or "Important Notices and Disclaimers Concerning IEEE Documents." They can also be obtained on request from IEEE or viewed at http://standards.ieee.org/IPR/disclaimers.html.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

1. Overview

ISO/IEEE 11073-10442:2015
https://standards.iteh.ai/catalog/standards/sist/20c72cfc-bbb4-48eb-a5c9-
ab0740cae657/iso-ieee-11073-10442-2015

1.1 Scope

Within the context of the ISO/IEEE 11073 family of standards for device communication, this standard establishes a normative definition of the communication between personal strength fitness devices and managers (e.g., cell phones, personal computers, personal health appliances, and set top boxes) in a manner that enables plug-and-play interoperability. It leverages appropriate portions of existing standards, including ISO/IEEE 11073 terminology and information models. It specifies the use of specific term codes, formats, and behaviors in telehealth environments restricting optionality in base frameworks in favor of interoperability. This standard defines a common core of communication functionality for personal telehealth strength fitness devices. In this context, strength fitness devices are being used broadly to cover strength fitness devices that measure musculo-skeletal strength-conditioning activities.

1.2 Purpose

This standard addresses a need for an openly defined, independent standard for controlling information exchange to and from personal health devices and managers (e.g., cell phones, personal computers, personal health appliances, and set top boxes). Interoperability is the key to growing the potential market for these devices and to enabling people to be better-informed participants in the management of their health.

IEEE Std 11073-10442-2008
Health informatics—Personal health device communication
Part 10442: Device specialization—Strength fitness equipment

1.3 Context

See IEEE Std 11073-20601™ for an overview of the environment within which this standard is written.

This document, IEEE Std 11073-10442 defines the device specialization for the strength fitness device, being a specific agent type, and it provides a description of the device concepts, its capabilities, and its implementation according to this standard.

This standard is based on IEEE Std 11073-20601, which in turn draws information from both ISO/IEEE 11073-10201:2004 [B3][1] and ISO/IEEE 11073-20101:2004 [B4]. The medical device encoding rules (MDER) used within this standard are fully described in IEEE Std 11073-20601.

This standard reproduces relevant portions of the nomenclature found in ISO/IEEE 11073-10101:2004 [B2] and adds new nomenclature codes for the purposes of this standard. Between this standard and IEEE Std 11073-20601, all required nomenclature codes for implementation are documented.

NOTE—In this standard, IEEE Std 11073-104zz is used to refer to the collection of device specialization standards that utilize IEEE Std 11073-20601, where zz can be any number from 01 to 99, inclusive.[2]

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.

IEEE Std 11073-20601™-2008, Health informatics—Personal health device communication—Part 20601: Application profile—Optimized exchange protocol.[3],[4]

See Annex A for all informative material referenced by this standard.

3. Definitions, acronyms, and abbreviations

3.1 Definitions

For the purposes of this standard, the following terms and definitions apply. The *Authoritative Dictionary of IEEE Standards Terms* [B1] should be referenced for terms not defined in this clause.

3.1.1 agent: A node that collects and transmits personal health data to an associated manager.

3.1.2 class: In object-oriented modeling, a class describes the attributes, method, and events that objects instantiated from the class utilize.

3.1.3 compute engine: *See*: **manager.**

3.1.4 device: A term used to refer to a physical apparatus implementing either an agent or a manager role.

---

[1] The numbers in brackets correspond to those of the bibliography in Annex A.

[2] Notes in text, tables, and figures are given for information only and do not contain requirements needed to implement the standard.

[3] The IEEE standards or products referred to in this clause are trademarks of the Institute of Electrical and Electronics Engineers, Inc.

[4] IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, Piscataway, NJ 08854, USA (http://standards.ieee.org/).

IEEE Std 11073-10442-2008
Health informatics—Personal health device communication
Part 10442: Device specialization—Strength fitness equipment

3.1.5 handle: An unsigned 16-bit number that is locally unique and identifies one of the object instances within an agent.

3.1.6 manager: A node receiving data from one or more agent systems. Some examples of managers include a cellular phone, health appliance, set top box, or a computer system.

3.1.7 obj-handle: *See:* **handle.**

3.1.8 object: In object-oriented modeling, a particular instantiation of a class. The instantiation realizes attributes, methods, and event from the class.

3.1.9 personal health device: A device used in personal health applications.

3.1.10 personal telehealth device: *See:* **personal health device.**

3.2 Acronyms and abbreviations

APDU	application protocol data unit
ASN.1	Abstract Syntax Notation One
DIM	domain information model
EUI-64	extended unique identifier (64 bits)
ICS	implementation conformance statement
MDC	medical device communication
MDER	medical device encoding rules
MDS	medical device system
MOC	medical object class
OID	object identifier
PDU	protocol data unit
PHD	personal health device
RT-SA	real-time sample array
VMO	virtual medical object
VMS	virtual medical system

4. Introduction to ISO/IEEE 11073 personal health devices

4.1 General

This standard and the remainder of the series of ISO/IEEE 11073 personal health device (PHD) standards fit in the larger context of the ISO/IEEE 11073 series of standards. The full suite of standards enables agents to interconnect and interoperate with managers and with computerized health-care information systems. See IEEE Std 11073-20601 for a description of the guiding principles for this series of ISO/IEEE 11073 personal health device standards.

IEEE Std 11073-20601 supports the modeling and implementation of an extensive set of personal health devices. This standard defines aspects of the strength fitness device. It describes all aspects necessary to implement the application layer services and data exchange protocol between an ISO/IEEE 11073 PHD strength fitness agent and a manager. This standard defines a subset of the objects and functionality contained in IEEE Std 11073-20601 and extends and adds definitions where appropriate. All new definitions are given in Annex B in Abstract Syntax Notation One (ASN.1). Nomenclature codes referenced in this standard, which are not defined in IEEE Std 11073-20601, are normatively defined in Annex C.