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IEC 61162-401

First edition
2001-11

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Maritime navigation and radiocommunication equipment and systems – Digital interfaces –

Part 401: Multiple talkers and multiple listeners – Ship systems interconnection – Application profile

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 401: Multiple talkers and multiple listeners – Ship systems interconnection – Application profile

FOREWORD

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International Standard IEC 61162-401 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

The text of this standard is based on the following documents:

FDIS	Report on voting
80/310/FDIS	80/325/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

The special typographical conventions and nomenclature used in this standard are defined in IEC 61162-400, annex A.

Annexes A, B and C form an integral part of this standard. Annex D is for information only.

The committee has decided that the contents of this publication will remain unchanged until June 2005. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

INTRODUCTION

International Standard IEC 61162 is a four-part standard which specifies four digital interfaces for applications in marine navigation, radiocommunication and system integration.

The four parts are:

IEC 61162-1 Single talker and multiple listeners

IEC 61162-2 Single talker and multiple listeners, high speed transmission

IEC 61162-3 Multiple talkers and multiple listeners – Serial data instrument network

IEC 61162-4 Multiple talkers and multiple listeners – Ship systems interconnection.

Part 4 of the standard is sub-divided into a number of individual standards with part numbers in the IEC 61162-400 series. A full reference to part 4 can be found in IEC 61162-400, clause 4.

This part of the standard, IEC 61162-401: A-profile specification, defines the application functionality and its implementation in an application layer protocol.

Relationship with the other parts of the IEC 61162 series of standards is defined in annex B to IEC 61162-400.

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MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 401: Multiple talkers and multiple listeners – Ship systems interconnection – Application profile

1 Scope

1.1 General

IEC 61162-4 series specifies a communication system for use in integrated ship control systems.

IEC 61162-400 defines the overall functional scope for the communication system.

1.2 Application profile

This part of IEC 61162 describes the application profile (A-profile – corresponding to ISO-OSI layers 5 to 7 [ISO 7498]) of the communication protocol which is the basis for the communication system. It relies on the realization of layers 1 to 4 (the T-profile) as described in part 410.

The description of the A-profile is in terms of services offered to the application using the protocol and of message contents and sequences used to realize these services.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61162. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61162 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 61162-400, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 400: Multiple talkers and multiple listeners – Ship systems interconnection – Introduction and general principles*

IEC 61162-410, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 410: Multiple talkers and multiple listeners – Ship systems interconnection – Transport profile requirements and basic transport profile*

IEC 61162-420, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 420: Multiple talkers and multiple listeners – Ship systems interconnection – Companion standard requirements and basic companion standards*

IEEE 754: *IEEE Standard for Binary Floating-Point Arithmetic*

ISO/IEC 8859-1, *Information technology – 8-bit single-byte coded graphic character sets – Part 1: Latin alphabet No. 1*

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ISO/IEC 10646-1, *Information Technology – Universal Multiple-Octet Coded Character Set (UCS) – Part 1: Architecture and Basic Multilingual Plane*

RFC 2500:1999, *Internet Official Protocol Standards – Internet Activities Board standard*

NOTE RFC (request for comments) is a document issued by the Internet engineering task force (IETF), the International standardization body for the Internet, that describes a part of the Internet protocol. Some RFCs are accepted as official Internet standards and listed in the "Internet Official Protocol Standards" itself an RFC.

3 Definitions

This clause is divided into definition of terms (terms), definition of abbreviations (abbreviations), definitions of nomenclature (conventions), definition of data types (data types) and definition of literal formats. Other definitions valid for this part of IEC 61162 are contained in part 400 of this standard.

3.1 Terms

For the purpose of this part of IEC 61162, the following terms apply:

3.1.1
anonymous broadcast (ABC)
a broadcast service where the sender does not know to which MAU it is sending data. Similarly the listener may not know which sender it should listen for

3.1.2
array
a linear indexed sequence of identical data types. The index runs from zero and upwards. Arrays can have variable lengths (with a fixed upper limit) or fixed lengths. The difference between these two types is normally only visible during transmission between modules where the real length of a variable length array is transmitted as an attribute

3.1.3
bit order
this standard numbers bits in an octet from zero to seven. Bit seven is the most significant bit; bit zero the least significant

3.1.4
character
this standard provides two mechanisms for the transmission of characters:

a) an 8-bit character based on ISO/IEC 8859-1 (also called ISO Latin-1). This set covers most national alphabets based on the Latin letters;

b) a 16-bit character based on ISO/IEC 10646-1. This standard specifies the use of the 16-bit form Universal Character Set 2 (UCS-2) which covers most of the commonly used character sets in the world

NOTE 1 Later revisions of the standard may also support 32-bit characters.

NOTE 2 Any reference to *character* in this standard implies the 8-bit character if not otherwise stated.

3.1.5
companion standard
these are the mechanisms to define and describe how the A-profile services are used to implement some application functions and interfaces (see IEC 61162-420)

3.1.6
connection
an association between two interfaces or two MCPs, one each on a server and a client MAU. A connection must be established before transactions can be activated

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There is also a connection between each pair of LNAs and between each MAU and its LNA. Although similar in concept, they are not directly associated with the activation of transactions.

3.1.7
data type
this standard defines a set of data types that have a machine and T-profile independent interpretation. The types cover, for example characters, signed and unsigned integers and floating point containers as well as some other derived types. The data types are defined in 3.4

3.1.8
format string
a text string that defines the structure of certain data records that are transmitted via the T-profile. It also contains information about the function supported by data objects. See clause 8.4.3.5 for more information

3.1.9
interface
a collection of MCPs (references to data objects) implemented on a server or client MAU which behaves similarly to MCPs in that operations on interfaces effect all MCPs in the interface

3.1.10
IP – internet protocol
references in this standard refer to the protocol defined in RFC 2500. Part 410 of IEC 61162 specifies a T-profile using version 4 of the internet protocol (IPV4), but additional parts may in the future define T-profiles using newer versions of the protocol

3.1.11
IPV4 – internet protocol version 4
is currently the most used version of the internet protocol (IP). See IEC 61162-410 for more details

3.1.12
magic number
The first field of all messages which will be common to a group of messages. It can be used by the protocol software to identify and verify messages and message boundaries. See annex A

3.1.13
maximum message size
this protocol is based on the exchange of messages between various modules. The T-profile may impose limits on the maximum size of these messages. See clause 4 for more information

3.1.14
message
one of the basic components of this standard. They are collections of information items with a defined format that are exchanged between various modules to achieve some service or part service. The message formats are defined in clause 8. The exchange patterns are defined as sequence diagrams in clause 7

3.1.15
module
entities (programs or host computers) between messages that are sent which are either an LNA (application independent network communication manager) or a MAU (the application program module)

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3.1.16
network bit order
the A-profile definition is resolved to the octet level. The ordering of bits within each octet is defined by the T-profile in use. See clause 4 for more information

3.1.17
network octet order
all multi-octet entities (messages or fragments of messages) are defined to be transferred in a T-profile and host computer independent format. This format is defined in 8.4.3.5

3.1.18
null MCP
an MCP associated with the MAU itself. It will have a reference code of zero. It can be manipulated similarly to a normal MCP through the MAU control data object (see 6.5) and it can also be used to transfer information to MAU call back routines (see 5.2.4). The null MCP cannot be connected to from remote MAUs and it is not associated with any interface

3.1.19
octet
the smallest information entity that the A-profile protocol considers which consists of 8 bits transmitted by the T-profile in some specific sequence. This standard requires that a group of octets can be transmitted as a message and that the received message has the same sequence of octets as the sent message and that each received octet has the same bit pattern as the sent octet. The protocol does not specify any particular ordering of bits within octets as long as it is consistent over the network

NOTE One entity of the Boolean type can be represented as a bit within an octet, but any number of Boolean entities will be transmitted as an integral number of octets.

3.1.20
record
a sequence of different or identical data types given a fixed definition and an associated type name

3.1.21
sequence diagram
a representation of how messages are transferred between the modules of the protocol system. The format is defined in 3.3.3

3.1.22
session
the term is used to identify a connection from a client MAU to a server MAU. It represents one unbroken connection where the LNAs guarantee that no other client MAU has replaced the originally connecting MAU. The death of a client MAU will be reported to the server MAU as a closed session

3.1.23
T-profile network
a collection of network nodes (host computers) that can communicate with each other following this standard. The concept is defined in IEC 61162-410.

This standard does not specify how nodes on two different T-profile networks shall communicate

NOTE The standard does, however, specify that one node shall be able to be connected to more than one T-profile network at one time and this can be used to develop gateway nodes.

3.1.24
TCP/IP – transmission control protocol / internet protocol
for version 4 of the internet protocol (IPV4) is defined in RFC793. See IEC 61162-410 for more details

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