IEC 61162-460

Edition 3.0 2024-04
COMMENTED VERSION

INTERNATIONAL STANDARD

colour inside

Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 460: Multiple talkers and multiple listeners – Ethernet interconnection – Safety and security

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 47.020.70

ISBN 978-2-8322-8715-6

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 460: Multiple talkers and multiple listeners – Ethernet interconnection – Safety and security

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

This commented version (CMV) of the official standard IEC 61162-460:2024 edition 3.0 allows the user to identify the changes made to the previous IEC 61162-460:2018+AMD1:2020 CSV edition 2.1. Furthermore, comments from IEC TC 80 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 61162-460 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems. It is an International Standard.

This third edition cancels and replaces the second edition published in 2018 and Amendment 1:2020. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) term application server in the 460-Gateway has been changed to application service and application services have been clarified;
b) based on field experience the alert limit of the network monitoring load has been changed from 80 % to 90 %;
c) default time for escalation of a warning to an alarm has been changed from max 60 seconds to max 5 minutes as allowed by IMO BAM rules and escalation from caution to warning has been removed from the use of direct access;
d) recorded event size in network monitoring function has been changed from 1 000 bytes to 1 472 bytes (i.e. size of an ethernet datagram in the network);
e) requirements have been incorporated for cyber resilience given by the International Association of Classification Societies (IACS) in their documents UR E26 and UR E27. A new Annex H has been added giving a cross reference between the IACS documents and this document.

The text of this International Standard is based on the following documents:

Draft	Report on voting
80/1103/FDIS	80/1112/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

This International Standard is to be used in conjunction with IEC 61162-450:2024.

A list of all parts in the IEC 61162 series, published under the general title *Maritime navigation and radiocommunication equipment and systems – Digital interfaces*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

The contents of the corrigendum 1 (2024-08) have been included in this copy.

~~Introduction to the Amendment~~

~~This amendment provides greater clarity to the external security requirements in 6.3, updates the alert management in 8.2.7 and associated tests in 10.11.6 to comply with bridge alert management and provides an improved test of firewalls in 10.8.4.~~

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 460: Multiple talkers and multiple listeners – Ethernet interconnection – Safety and security

1 Scope

This part of IEC 61162 is an add-on to IEC 61162-450 where higher safety and security standards are needed, for example due to higher exposure to external threats or to improve network integrity. This document provides requirements and test methods for equipment to be used in an IEC 61162-460 compliant network as well as requirements for the network itself and requirements for interconnection from the network to other networks. This document also contains requirements for a redundant IEC 61162-460 compliant network.

This document does not introduce new application level protocol requirements to those that are defined in IEC 61162-450.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60945, *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61162-450:~~2018~~2024 **1**, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 450: Multiple talkers and multiple listeners – Ethernet interconnection*

IEC 62923-1, *Maritime navigation and radiocommunication equipment and systems – Bridge alert management – Part 1: Operational and performance requirements, methods of testing and required test results*

IEC 62923-2, *Maritime navigation and radiocommunication equipment and systems – Bridge alert management – Part 2: Alert and cluster identifiers and other additional features*

IEEE 802.1D-2004, *IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges*

IEEE 802.1Q, *IEEE Standard for Local and metropolitan area networks: Virtual Bridged Local Area Networks*

~~INTERNET SOCIETY (~~ISOC~~).~~ RFC 792, *Internet Control Message Protocol (ICMP), Standard STD0005 (and updates)* ~~[online]. Edited by J. Postel. September 1981 [viewed 2018-01-08].~~ Available at https://tools.ietf.org/html/rfc792

~~INTERNET SOCIETY (~~ISOC~~).~~ RFC 1112, *Host Extensions for IP Multicasting* ~~[online]. Edited by S. Deering. August 1989 [viewed 2018-01-08].~~ Available at https://www.ietf.org/rfc/rfc1112.txt

~~INTERNET SOCIETY (~~ISOC~~).~~ RFC 1157, *A Simple Network Management Protocol (SNMP)* ~~[online]. Edited by J. Case et al. May 1990 [viewed 2018-01-08].~~ Available at https://tools.ietf.org/html/rfc1157

~~INTERNET SOCIETY (~~ISOC~~).~~ RFC 2021, *Remote Network Monitoring Management Information Base* ~~[online]. Edited by S. Waldbusser. January 1997 [viewed 2018-01-08].~~ *Version 2*
Available at https://tools.ietf.org/html/rfc2021

~~INTERNET SOCIETY (~~ISOC~~).~~ RFC 2236, *Internet Group Management Protocol, Version 2* ~~[online]. Edited by W. Fenner. November 1997 [viewed 2018-01-08].~~ Available at https://tools.ietf.org/html/rfc2236

~~INTERNET SOCIETY (~~ISOC~~).~~ RFC 2819, *Remote Network Monitoring Management Information Base*
~~[online]. Edited by S. Waldbusser. May 2000 [viewed 2018-01-08].~~ Available at https://tools.ietf.org/html/rfc2819

~~INTERNET SOCIETY (~~ISOC~~).~~ RFC 3411, *An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks*
~~[online]. Edited by D. Harrington. December 2002 [viewed 2018-01-08].~~ Available at https://www.ietf.org/rfc/rfc3411.txt

~~INTERNET SOCIETY (~~ISOC~~).~~ RFC 3577, *Introduction to the Remote Monitoring RMON family of MIB modules* ~~[online]. Edited by S. Waldbusser. August 2003 [viewed 2018-01-08].~~ Available at https://tools.ietf.org/html/rfc3577

~~INTERNET SOCIETY (~~ISOC~~).~~ RFC 4604, *Using Internet Group Management Protocol Version 3 (IGMPv3) and Multicast Listener Discovery Protocol Version 2 (MLDv2) for Source-Specific Multicast*
~~[online]. Edited by H. Holbrook et al. August 2006 [viewed 2018-01-08].~~ Available at https://tools.ietf.org/html/rfc4604

~~INTERNET SOCIETY (~~ISOC~~).~~ RFC 5424, *The Syslog Protocol*
~~[online]. Edited by R. Gerhards. March 2009 [viewed 2018-01-08].~~ Available at https://tools.ietf.org/html/rfc5424

IEC 61162-460

Edition 3.0 2024-04

INTERNATIONAL STANDARD

colour inside

Maritime navigation and radiocommunication equipment and systems – Digital interfaces –
Part 460: Multiple talkers and multiple listeners – Ethernet interconnection – Safety and security

IEC 61162-460:2024-04(en)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 460: Multiple talkers and multiple listeners – Ethernet interconnection – Safety and security

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61162-460 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems. It is an International Standard.

This third edition cancels and replaces the second edition published in 2018 and Amendment 1:2020. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) term application server in the 460-Gateway has been changed to application service and application services have been clarified;
b) based on field experience the alert limit of the network monitoring load has been changed from 80 % to 90 %;

c) default time for escalation of a warning to an alarm has been changed from max 60 seconds to max 5 minutes as allowed by IMO BAM rules and escalation from caution to warning has been removed from the use of direct access;

d) recorded event size in network monitoring function has been changed from 1 000 bytes to 1 472 bytes (i.e. size of an ethernet datagram in the network);

e) requirements have been incorporated for cyber resilience given by the International Association of Classification Societies (IACS) in their documents UR E26 and UR E27. A new Annex H has been added giving a cross reference between the IACS documents and this document.

The text of this International Standard is based on the following documents:

Draft	Report on voting
80/1103/FDIS	80/1112/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

This International Standard is to be used in conjunction with IEC 61162-450:2024.

A list of all parts in the IEC 61162 series, published under the general title *Maritime navigation and radiocommunication equipment and systems – Digital interfaces*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

The contents of the corrigendum 1 (2024-08) have been included in this copy.

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 460: Multiple talkers and multiple listeners – Ethernet interconnection – Safety and security

1 Scope

This part of IEC 61162 is an add-on to IEC 61162-450 where higher safety and security standards are needed, for example due to higher exposure to external threats or to improve network integrity. This document provides requirements and test methods for equipment to be used in an IEC 61162-460 compliant network as well as requirements for the network itself and requirements for interconnection from the network to other networks. This document also contains requirements for a redundant IEC 61162-460 compliant network.

This document does not introduce new application level protocol requirements to those that are defined in IEC 61162-450.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60945, *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61162-450:2024, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 450: Multiple talkers and multiple listeners – Ethernet interconnection*

IEC 62923-1, *Maritime navigation and radiocommunication equipment and systems – Bridge alert management – Part 1: Operational and performance requirements, methods of testing and required test results*

IEC 62923-2, *Maritime navigation and radiocommunication equipment and systems – Bridge alert management – Part 2: Alert and cluster identifiers and other additional features*

IEEE 802.1D-2004, *IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges*

IEEE 802.1Q, *IEEE Standard for Local and metropolitan area networks: Virtual Bridged Local Area Networks*

ISOC RFC 792, *Internet Control Message Protocol (ICMP), Standard STD0005 (and updates)*
Available at https://tools.ietf.org/html/rfc792

ISOC RFC 1112, *Host Extensions for IP Multicasting*
Available at https://www.ietf.org/rfc/rfc1112.txt

ISOC RFC 1157, *A Simple Network Management Protocol (SNMP)*
Available at https://tools.ietf.org/html/rfc1157

ISOC RFC 2021, *Remote Network Monitoring Management Information Base Version 2*
Available at https://tools.ietf.org/html/rfc2021

ISOC RFC 2236, *Internet Group Management Protocol, Version 2*
Available at https://tools.ietf.org/html/rfc2236

ISOC RFC 2819, *Remote Network Monitoring Management Information Base*
Available at https://tools.ietf.org/html/rfc2819

ISOC RFC 3411, *An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks*
Available at https://www.ietf.org/rfc/rfc3411.txt

ISOC RFC 3577, *Introduction to the Remote Monitoring RMON family of MIB modules*
Available at https://tools.ietf.org/html/rfc3577

ISOC RFC 4604, *Using Internet Group Management Protocol Version 3 (IGMPv3) and Multicast Listener Discovery Protocol Version 2 (MLDv2) for Source-Specific Multicast*
Available at https://tools.ietf.org/html/rfc4604

ISOC RFC 5424, *The Syslog Protocol*
Available at https://tools.ietf.org/html/rfc5424