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Alarm systems - Part 7-1: Message formats and protocols for serial data interfaces in alarm transmission systems - General

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Systèmes d'alarme - Partie 7-1: Formats de message et protocoles pour les interfaces de données série dans les systèmes de transmission d'alarme - Généralités

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Alarm systems –

Part 7-1:
Message formats and protocols for serial data interfaces in alarm transmission systems – General

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.

3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.

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6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60839-7-1 has been prepared by IEC technical committee 79: Alarm systems.

This bilingual version (2001-11) replaces the English version.

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

FDIS	Report on voting
79/198/FDIS	79/208/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.

Annexes A and B are for information only.

The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

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- withdrawn;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

IEC 60839-7-1 forms one of a series of publications presented under the general title: Alarm systems – Part 7: Message formats and protocols for serial data interfaces in alarm transmission systems.

IEC 60839-7-1: General

IEC 60839-7-2: Common application layer protocol

IEC 60839-7-3: Common data link layer protocol

IEC 60839-7-4: Common transport layer protocol

IEC 60839-7-5: Alarm system interfaces employing a two-wire configuration in accordance with ISO/IEC 8482

IEC 60839-7-6: Alarm system interfaces employing ITU-T Recommendation V.24/V.28 signalling

IEC 60839-7-7: Alarm system interfaces for plug-in alarm system transceivers

IEC 60839-7-11: Serial protocol for use by digital communicator systems using ITU-T Recommendation V.23 signalling at interfaces with the PSTN

IEC 60839-7-12: PTT interfaces for dedicated communications channels using ITU-T Recommendation V.23 signalling

IEC 60839-7-20: Terminal interfaces employing ITU-T Recommendation V.24/V.28 signalling

ALARM SYSTEMS –

Part 7-1: Message formats and protocols for serial data interfaces in alarm transmission systems – General

1 Scope

This part of IEC 60839 describes the requirements for standard serial data interfaces in alarm transmission systems. It gives an outline of how alarm transmission systems are connected and the various types of serial data interfaces that might be employed. This part includes a range of examples.

2 Normative references

The following referenced documents are indispensable for the application 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 60839-7-2, *Alarm systems – Part 7-2: Message formats and protocols for serial data interfaces in alarm transmission systems – Common application layer protocol*

IEC 60839-7-5, *Alarm systems – Part 7-5: Message formats and protocols for serial data interfaces in alarm transmission systems – Alarm system interface employing a two-wire configuration in accordance with ISO/IEC 8482*

IEC 60839-7-7, *Alarm systems – Part 7-7: Message formats and protocols for serial data interfaces in alarm transmission systems – Alarm system interface for plug-in alarm system transceivers*

IEC 60839-7-11, *Alarm systems – Part 7-11: Message formats and protocols for serial data interfaces in alarm transmission systems – Serial protocol for use by digital communicator systems using ITU-T Recommendation V.23 signalling at interfaces with the PSTN*

IEC 60839-7-12, *Alarm systems – Part 7-12: Message formats and protocols for serial data interfaces in alarm transmission systems – PTT Interfaces for dedicated communications using ITU-T Recommendation V.23 signalling*

IEC 60839-7-20, *Alarm systems – Part 7-20: Message formats and protocols for serial data interfaces in alarm transmission systems – Terminal interfaces employing ITU-T Recommendation V.24/V.28 signalling*

ISO/IEC 8482, *Information technology – Telecommunications and information exchange between systems – Twisted pair multipoint interconnections*

ITU-T Recommendation V.23, *600/1 200-baud modem standardized for use in the general switched telephone network*

ITU-T Recommendation V.24, *List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE)* [1)]

ITU-T Recommendation V.28, *Electrical characteristics for unbalanced double-current interchange circuits*

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1) To be published.

3 Definitions

For the purpose of this part of IEC 60839, the following definitions apply.

3.1
alarm system messages
messages that convey information about the status of an alarm system

These may comprise:

3.1.1
alarm messages
messages that convey the presence of a hazard or a potential hazard to life or property, or the removal of such a hazard, including messages that convey the status of an alarm since the alarm transmission system is only responsible for decoding the type of the transmitted message

3.1.2
commands
messages that give instructions to an alarm system or to part of the alarm transmission system

3.1.3
informative messages
messages that give information about the status of functions of an alarm system

3.1.4
transmission system messages
messages that convey the status of parts of the alarm transmission system, including messages which report the status of the alarm system transceiver

NOTE The format and treatment of such messages may be the same as for alarm system messages.

3.2
alarm channel
part of the logical alarm transmission path across which information about the status of separately identifiable logical functional parts of the connected alarm system are passed

3.3
functional part
logical function which may include individual detectors, groups of detectors and sections of the common parts of the system (for example power supply unit (PSU), warning device, etc.)

NOTE Such a functional part may be in one or more of the following states as shown below.

3.3.1
normal condition
status of a functional part when it is fully operational and not in any other condition

3.3.2
alarm condition
status of a functional part which results from the response of that functional part to the presence of an abnormal condition indicating the presence of a hazard (or a potential hazard) which has not been acknowledged by either its successful transmission or by a local manual action

3.3.3
outstanding alarm
status of a functional part which results from the response of that functional part to the presence of an abnormal condition indicating the presence of a hazard (or a potential hazard) which has been acknowledged by either its successful transmission or by a local manual action

3.3.4
tamper
status of a functional part which results from the operation of a tamper device within that functional part

3.3.5
test condition
status of the functional part which results from changing the status out of normal condition for test purposes

3.3.6
disabled
status of the functional part in which the normal functions have been taken out of service

3.4
alarm system transceiver
alarm transmission equipment, which is located at the supervised premises or at a satellite station

3.5
master
item of equipment which controls the messages on the link and to which messages are either sent or received

3.6
slave
item of equipment on the link which is not in control and which can only transmit a message in response to the master, in response to a request from it

3.7
data link data
information element, a data link message or a message originating from LAYER 4 – TRANSPORT

3.8
originator
item of equipment which initiates the data communications on a link

NOTE This need not be the item which initiates the physical/logical connection.

3.9
receiver
item of equipment on a link which accepts data communication initiated on a link by another item of equipment (an ORIGINATOR)

3.10
message authentication code (MAC)
code ensuring that the message arrives from the correct source

3.11
window size
maximum number of messages which may be transmitted without receiving ACK.

4 Abbreviations

ACK	acknowledgement
CCTV	closed circuit television
ITU-T	International Telecommunication Union – Telecommunications
CIE	control and indicating equipment
CR	carriage return
CRC	cyclic redundancy check
DLLA	data link layer authentication
HEX	hexadecimal
ID	identity
INIT	initiated
ISO	International Standards Organization
ISDN	Integrated System Digital Network
Ki	secondary key
MAC	message authentication code
Mk	master key
LSB	least significant (byte) octet
OSI	open system interconnection
PSTN	Public Switched Telephone Network
PTT	Post, Telegraph and Telephone
R1	random number
Rs	random seed
STX	start of text
TTL	transistor transistor logic

5 OSI reference model

The open system interconnection (OSI) reference model was developed by the International Standards Organization (ISO) both to provide a commonly agreed way of describing, understanding and analyzing the various functions of complex communications systems. It also provides a framework for drafting international standards.

The reference model views the functions of a system as being divided into a number of layers. There are formally 7 LAYERS (1-7), though layers 0 and 8 are now commonly added as described below.

The layered structure enables changes to be made to the different functions without affecting the other layers. In actual systems, some layers may be omitted. Designers are free to implement the layers individually or to combine them.

It was also developed to enable a variety of applications to be operated over any combination of current or future network technologies without the need for changes in the applications themselves. Thus, there is a fundamental division in the model so as to provide a stable boundary between applications and the real networks being used. This occurs at LAYER 3 – NETWORK layer of the reference model.layers in the OSI reference model are shown below.

5.1 OSI layers

LAYER 0 – MECHANICAL is only required in cases where there is a need to specify the physical shape of connectors and modules that connect directly to each other. An example would be defining the maximum size and connector arrangements of plug-in digital communicators, so that manufacturers of control and indicating equipment could have a standard space and connector layout into which communicators from a number of other manufacturers could fit.

LAYERS 1 to 3 reflect the logical division of the functions in any network. LAYER 1 – PHYSICAL defines the physical and electrical interface characteristics of the interface to the actual transmission medium. It provides a totally transparent transmission path. LAYER 2 – DATA LINK is responsible for any low level formatting of the data into blocks and for the provision of error detection and/or correction. LAYER 3 – NETWORK provides addressing and routing in networks with multiple terminals, as well as basic call set-up and clear down procedures.

LAYER 4 – TRANSPORT – In some applications, these lower levels do not provide all the transmission features required by the application. Within the context of alarm transmission, this might apply to the provision of higher levels of error detection and correction, scrambling and encryption and linking short blocks together to form longer messages. These additional features are provided in this layer.

The layers above LAYER 4 are concerned with the management and synchronization of the data, and should be independent of the data transmission systems used. LAYER 5 – SESSION is used to manage systems where different applications share the same transmission system. LAYER 6 – PRESENTATION is responsible for changing the format of the data, where the two end applications have different ways of presenting the data. These two layers are unlikely to feature in an alarm transmission system.

LAYER 7 – APPLICATION is the top level that provides the actual transmission service to the application, it is the window through which the application sees the alarm transmission service.

LAYER 8 – NETWORK MANAGEMENT is a common format for the control and management of transmission equipment, particularly more complex switching and multiplexing equipment. It can be considered as a specialized, alternative presentation/application layer for use by the network managers to monitor the transmission system.