

# INTERNATIONAL STANDARD

**IEC**  
**60839-7-2**

First edition  
2001-03

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## Alarm systems –

### Part 7-2:

### Message formats and protocols for serial data interfaces in alarm transmission systems – Common application layer protocol

*Systèmes d'alarme –*

*Partie 7-2:*

*Formats de message et protocoles pour les interfaces de  
données série dans les systèmes de transmission d'alarme –  
Protocole de la couche commune d'application*



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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

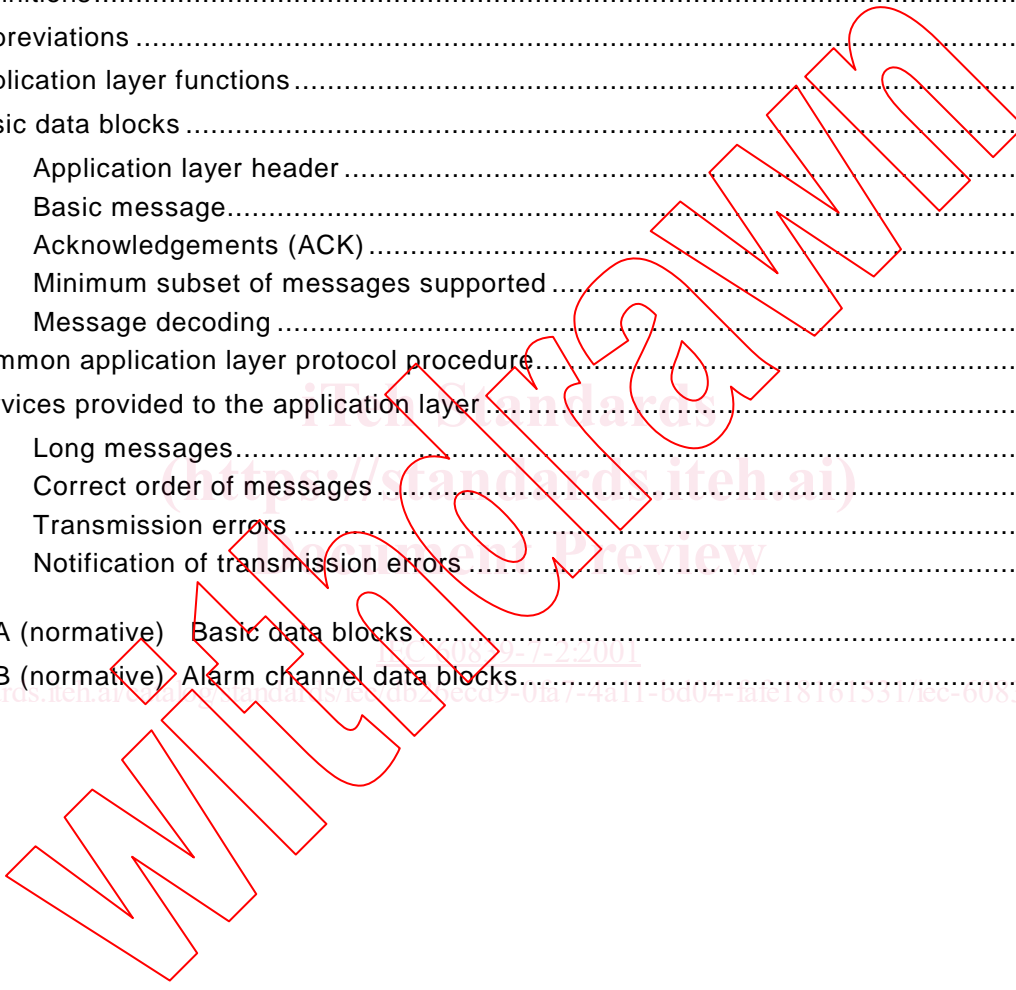
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## ALARM SYSTEMS –

**Part 7-2: Message formats and protocols for serial data interfaces  
in alarm transmission systems –  
Common application layer protocol**

## 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.
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International Standard IEC 60839-7-2 has been prepared by IEC technical committee 79: Alarm systems.

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

FDIS	Report on voting
79/199/FDIS	79/209/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 form an integral part of this standard.

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.

A bilingual version of this standard may be issued at a later date.

IEC 60839-7-2 forms one of a number of related parts 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 using ITU-T Recommendation V.23 signalling
- IEC 60839-7-20: Terminal interfaces employing ITU-T Recommendation V.24/V.28 signalling

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## ALARM SYSTEMS –

### Part 7-2: Message formats and protocols for serial data interfaces in alarm transmission systems – Common application layer protocol

#### 1 Scope

This part of IEC 60839 specifies a common application layer protocol (message structure, formats and transmission procedures) to be used at standard interfaces in alarm transmission systems. This should be used at all such interfaces where equipment from one supplier is intended to inter-work with equipment from other suppliers, where the underlying system architecture does not impose its own application layer on the interface (e.g. as in some bus systems).

The structure follows the OSI recommendations for a layered protocol to allow flexibility in the choice and use of lower level transmission media and protocols.

The common application layer protocol defined has a minimum subset that should be provided by all equipment which supports this standard, and has defined extensions which may be offered. The protocol is also designed such that it can be extended beyond the messages defined herein in order to provide further facilities and manufacturer specific extensions.

This standard applies equally to the transmission of alarms and other messages to/from intrusion, fire and social alarm systems, and to the transmission of information to/from other similar systems.

#### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60839. 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 60839 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 60839-7-1, *Alarm systems – Part 7-1: Message formats and protocols for serial data interfaces in alarm transmission systems – General*

IEC 60839-7-4, *Alarm systems – Part 7-4: Message formats and protocols for serial data interfaces in alarm transmission systems – Common transport layer protocol*

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

#### 3 Definitions

For the purpose of this part of IEC 60839, the definitions in IEC 60839-7-1 apply.

#### 4 Abbreviations

The definitions in IEC 60839-7-1 apply.

#### 5 Application layer functions

The application layer is responsible for the formatting of the basic messages required to transmit data through the alarm transmission system. It must also respond to basic messages from the remote application layer.

The following facilities, protocol, message structure and formats meet the basic requirements for serial data interfaces.

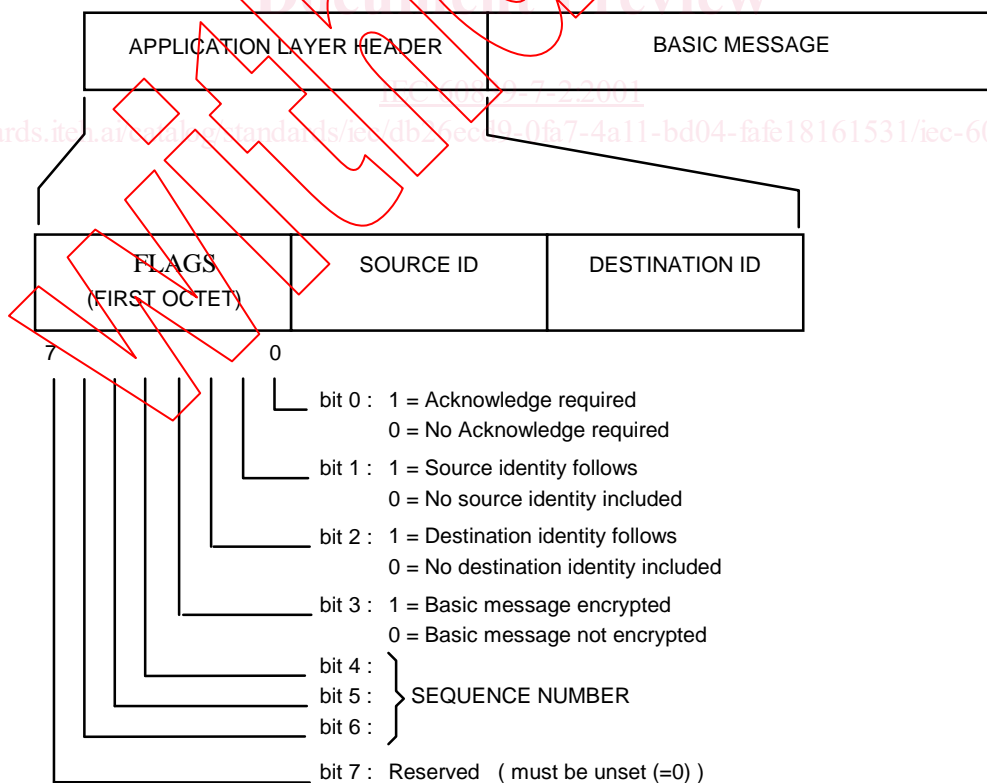
#### 6 Basic data blocks

Alarms and other information to be transmitted shall be formatted into basic data blocks. These shall comprise a two or more 8-bit octets. The first octet shall always be the number of octets in the block following the length octet, and the second shall be a block type descriptor.

Details of these basic data blocks are given in annex A. Where a date/time basic data block is included it shall refer to the data blocks that follow it in a message (where appropriate) until the end of the message block or until another date/time basic data block is encountered.

##### 6.1 Application layer header

Each basic message shall be formatted into an application layer message by it with an application layer header, as follows:



NOTE Bit 7 of the first octet is the end of the transport layer header (or a null transport layer – see IEC 60839-7-4) and will be set to 0 to indicate that an application layer header follows.

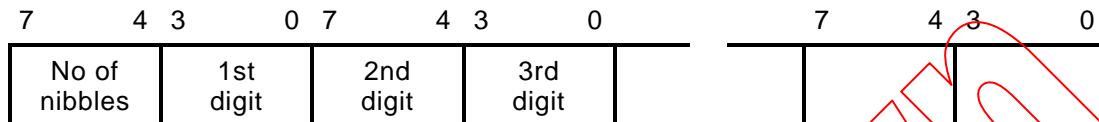


The sequence number may be initialized at any value. It shall be incremented by one for each successive application layer message transmitted (mod 8). A separate set of sequence numbers shall be used for each destination and for each direction of transmission.

The application layer header may include the source identity, the destination identity, both or neither as defined in the first octet of the header.

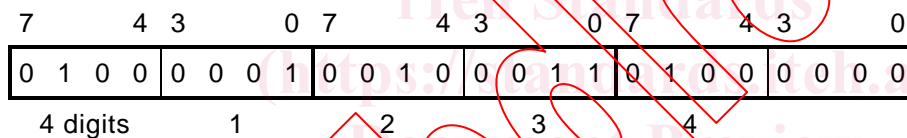
Where both identities are included the source identity shall always be first.

The format of the identity is as follows:



The first nibble (bits 4-7 of the first octet) is the number of digits in the address. The actual identity digits shall be contained in subsequent nibbles in HEX format, starting with the lower nibble of the first octet. The identity shall contain only sufficient octets to include the number of digits required. If the number of digits is even, the last nibble (bits 0-3 of the last octet) shall be zero.

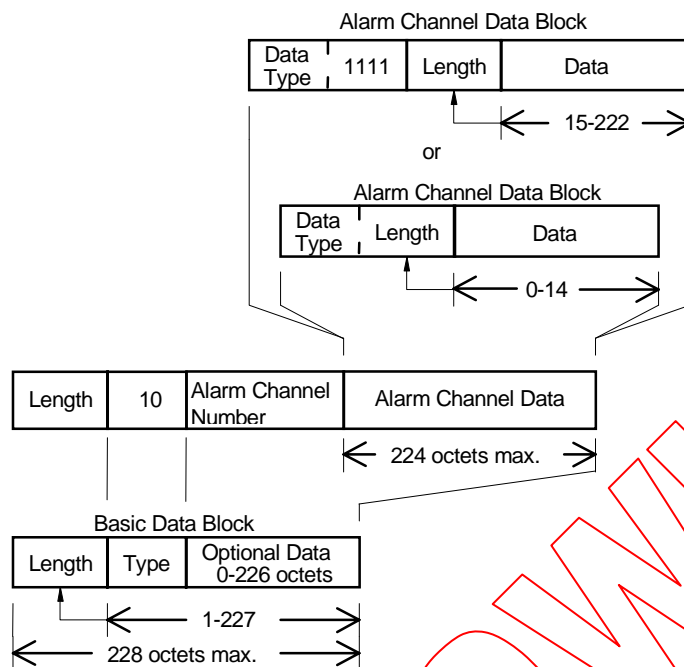
As an example, if the identity is 1234, this would be transmitted as follows:



## 6.2 Basic message

One or more basic data blocks may be concatenated together to form a basic message, subject to the maximum message length of 228 octets.

Within the application layer the basic data block may be further subdivided in order to provide one or more alarm channel data blocks. This is shown below:



### 6.3 Acknowledgements (ACK)

The application layer may transmit messages not requiring to be acknowledged by the remote application layer provided that the underlying layers and network can accept them.

The application layer may request an acknowledgement from the remote application layer for an individual message (either always or as required) by setting bit 0 (acknowledge required) in the layer message header.

Where an acknowledgement is requested, not more than four messages may be transmitted without their corresponding acknowledgement having been received (i.e. the window size is 4). In a series of messages, the recipient must only acknowledge messages in sequence, and must not acknowledge a message if the previous message (as identified by its sequence number) has not been received.

If an acknowledgement is not received for one message of a sequence of messages requiring acknowledgements then that message, together with all messages which have been subsequently sent shall be re-transmitted with the original sequence number.

Where an acknowledgement is received which does not contain the next expected sequence number, it may be assured that previous outstanding messages are acknowledged.

### 6.4 Minimum subset of messages supported

Equipment claiming to have an interface that complies with this standard need not be capable of supporting all of the basic data blocks defined in annex A.

However, in order to ensure successful transmission of basic alarm messages, the correct handling of faults and a proper response to messages that are not supported by all equipment at an interface, the following shall apply.

- a) All equipment shall be capable of transmitting and receiving basic data blocks of type 78 (reception error) and type 79 (transmission error detected) at any standard interface.
- b) Equipment shall be capable of transmitting basic data blocks of type 70 (Acknowledgement) at interfaces which are towards the alarm system.
- c) Equipment shall be capable of receiving basic data blocks of type 70 (Acknowledgement) at interfaces which are towards the alarm receiving centre or monitoring centre.
- d) Equipment shall be capable of transmitting basic data blocks of type 10 (alarm system status) and type 12 (change of state) at interfaces which are towards the alarm receiving centre or monitoring centre.
- e) Equipment shall be capable of receiving basic data blocks of type 10 (alarm status) and type 12 (change of state) at interfaces which are towards the alarm system.

For (d) and (e), equipment shall be capable of transmitting or receiving alarm channel data blocks of type 1 (alarm event/status data) with up to three data octets (see annex B).

### 6.5 Message decoding

Where a valid message is received each included data block should be examined. Where a basic data block is received which cannot be decoded (either because the block type is not supported by the receiver, or because the block contains more data than is supported), a message (basic data block reception error or transmission error detected) shall be returned to the sender to indicate the mismatch and what action, if any, has been taken.

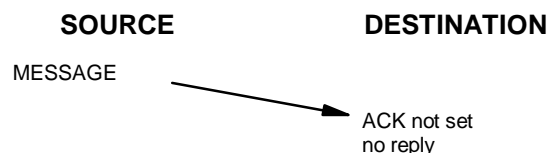
## 7 Common application layer protocol procedure

The following message sequences apply to the transmission and reception of all message types.

One or more messages form a sequence which shall obey the following rules. The initial message is considered to be generated spontaneously and presented to the lower layers for transmission. Subsequent messages are generated as an immediate response to received messages or to a failure in the system as described below.

Messages which are generated as a result of a received message, but which require processing in the application layer before a decision as to the format or the reply should not be considered as part of the sequence; they should be considered as being the start of a new sequence.

The reception of a basic message which does not have an acknowledgement request bit set in the application layer header shall not result in the return of an acknowledgement basic data block (as defined in annex A).



The reception of a basic data block which has the acknowledgement request bit set in the application layer header shall initiate the transmission of an acknowledgement basic data block to the sender of the received message or a specific response message, provided that the received message type is understood and that its length can be processed.