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

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Systèmes d'alarme - Partie 7-4: Formats de message et protocoles pour les interfaces de données série dans les systèmes de transmission d'alarme - Protocole de la couche commune de transport

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Alarm systems –

Part 7-4:
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ALARM SYSTEMS –

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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.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

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 60839-7-4 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
79/201/FDIS	79/211/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.

Annex A forms 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.

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

1 Scope

This part of IEC 60839 specifies the transport layer 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 interwork with equipment from other suppliers, and where the underlying system architecture does not provide the necessary facilities to support the common application layer.

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, whilst maintaining support for the common application layer protocol.

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

The physical management of the authentication keys required by this standard is not included.

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 60839-7-1, *Alarm systems – Part 7-1: Message formats and protocols for serial data interfaces in alarm transmission systems – General*

3 Definitions

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

4 Abbreviations

The abbreviations in IEC 60839-7-1 apply.

5 General

The transport layer is responsible for the formatting of messages from the application layer into a form suitable for transmission to the remote location, and for the addition of facilities not available from the underlying transport mechanism.

Although a link using this protocol may be point-multipoint, or multipoint-multipoint, the transport layer described here presumes that such systems will comprise a number of logical point-point communications which will proceed independently.

In such communications, one device is defined as the ORIGINATOR and one as the RECEIVER in order that the standard may be defined generally. The calling standard shall identify which of these functions is assigned to which equipment.

6 Transport layer message format

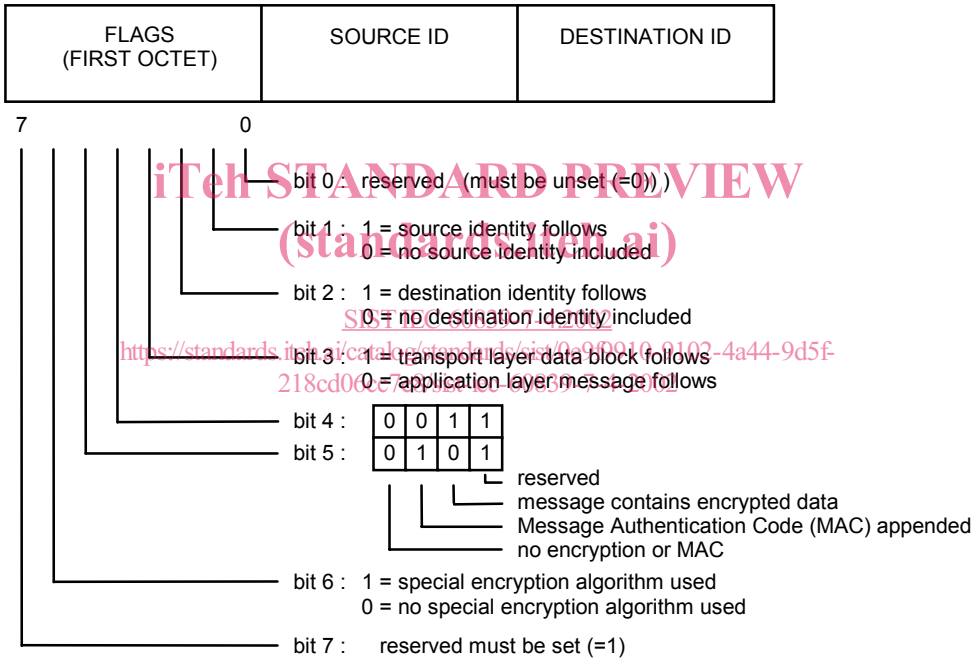
Each application layer message or transport layer data block shall be formatted into transport layer message with the addition of a header as defined below.

6.1 Transmission of transport layer data block

Transport layer data shall be formatted in accordance with annex A and transmitted with a transport layer header as defined in 6.2.

6.2 Transport layer header

The transport layer header shall be as follows:



Bit 4 should be set when the application message or the transport data are encrypted. Bit 5 should be set to indicate that the message contains a message authentication code (MAC). The option of using encryption and a MAC should not be used since this effectively lowers the security. Where a special high security algorithm is used for either the encryption or the MAC bit 6 should be set, otherwise the standard algorithm defined in this standard should be used.

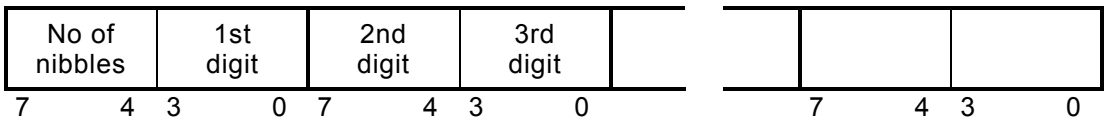
Bit 3 indicates whether the data is a transport layer data block or an application layer message.

The transport layer header may include the source identity, the destination identity, both or neither as defined in bits 1 and 2.

Maximum length for SOURCE ID and DESTINATION ID is eight octets equal to seven digits each.

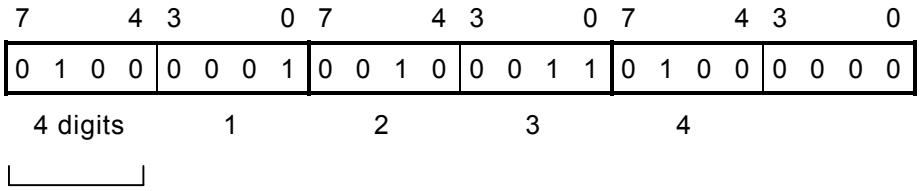
Where both identities are included, the source identity shall always be first.

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:



7 Authentication

The following procedure shall be adopted following the establishment of the connection in order to confirm the identity of the equipment.

7.1 Configuration

As part of their initialization/configuration each item of equipment shall be programmed with a master key (Mk).

7.2 Initialization

With a connection established, the ORIGINATOR shall generate two random numbers R1 and Rs, and shall transmit R1 to the RECEIVER encrypted with Mk as transport layer message type 1 (see annex A). Rs is the random seed used by the encryption algorithm for the transmission of R1.

The RECEIVER shall decode R1 and shall then generate a random number R2, together with a secondary key Ki. It shall then return a transport layer message type 2 to the ORIGINATOR which contains R2 together with R1 and Ki. This message shall be encrypted using Mk and Ki as shown below and in annex A.

The value of the secondary key (Ki) and the random numbers R1 and R2 shall only be stored in volatile memory and should not be capable of being displayed in either the RECEIVER or ORIGINATOR.

The ORIGINATOR shall decode the message to evaluate R1, R2 and Ki. The correct reception of R1 confirms the identity of the RECEIVER. If correct, it shall then send a transport layer message type 3 containing R2 encrypted using Ki. The correct decoding of R2 at the RECEIVER confirms the identity of the ORIGINATOR.

A message shall be generated to both the alarm system and the annunciation equipment to indicate that the value of Ki has been set.