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Alarm systems - Part 7-3: Message formats and protocols for serial data interfaces in alarm transmission systems - Common data link layer protocol

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Systèmes d'alarme - Partie 7-3: Formats de message et protocoles pour les interfaces de données série dans les systèmes de transmission d'alarme - Protocole de la couche commune de liaison de données

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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.
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International Standard IEC 60839-7-3 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
79/200/FDIS	79/210/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- withdrawn;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 60839-7-3 forms one of 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 signals

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 7-3: Message formats and protocols for serial data interfaces in alarm transmission systems – Common data link layer protocol

1 Scope

This part of IEC 60839 specifies the data link layer message structure, formats and transmission procedures which should be used at standard serial data interfaces in alarm transmission systems where the transmission network employed does not offer a standard protocol. This is necessary in order to ensure compatibility of equipment from different suppliers.

The 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 protocol is based on a simple poll response algorithm, with a single MASTER and one or more SLAVEs. The protocol defined allows for point-point and point-multipoint operation. Multipoint to multipoint operation is not supported, however the structure does support the transmission of messages from one SLAVE to another, using the MASTER as a simple router.

The structure follows the OSI recommendations for a layered protocol to allow flexibility in the use of the physical layer.

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 60839-5-1, *Alarm systems – Part 5-1: Requirements for alarm transmission systems – General requirements for systems*

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

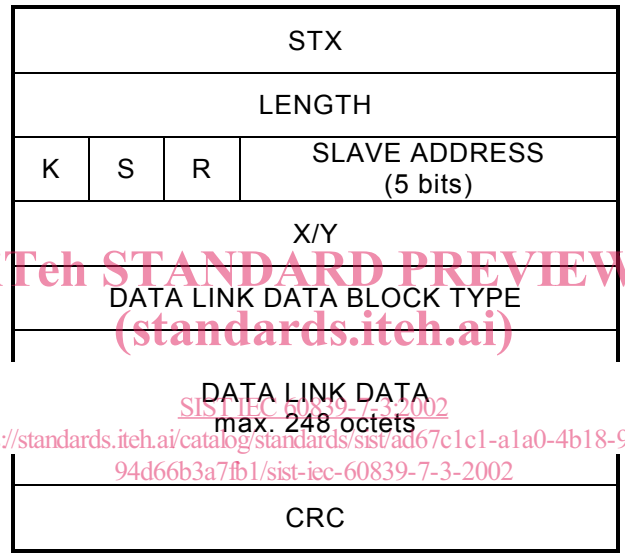
The basic protocol employed is a poll-response, with a single MASTER. Where there is more than a single SLAVE, the MASTER will normally poll each slave in turn.

Messages requiring transmission shall be formatted into one or more data link data blocks, which shall be transmitted in order to the intended destination.

Each transmitted data link data block shall be explicitly acknowledged before the transmission of a subsequent block.

6 Data link data block

The data link shall transmit messages with the following structure:



The STX octet shall be 02 HEX.

The message LENGTH shall be the number of octets following the LENGTH octet up to (and including) the CRC.

The bit K (bit 7 of 3rd octet) shall be set (=1) to specify a message in which the data link layer authentication (DLLA) function is active, and unset (=0) where it is not.

The bit R (bit 5 of 3rd octet) is reserved and should be unset (=0).

The bit S (bit 6 of 3rd octet) is a sequence bit, and shall initially be unset (=0). The bit shall be set (=1) in the INIT DLLA data link data block type and shall be toggled for each new message transmitted by the MASTER. A SLAVE shall always set the S bit equal to the corresponding bit in the incoming message.

The X/Y octet is set to X for messages transmitted from the MASTER, and to Y for messages transmitted from a SLAVE.

The CRC shall be a 2-octet cyclic redundancy check computed using the polynomial generator $X^{16}+X^{12}+X^5+1$.

NOTE This standard mostly refers to the communications between a MASTER and a single SLAVE. In practice, the MASTER will communicate with several SLAVEs, interspersing their messages on the common transmission medium. The values of X, Y and S are particular to an individual SLAVE and are not affected by intervening communications with other SLAVEs. For example, if the value of S used to poll one SLAVE is 1 then, irrespective of the number of other SLAVEs polled after that, the next poll to the original SLAVE will use S=0 (assuming the original poll was successful).

7 Basic transmission protocol

Unless otherwise stated the protocol between the MASTER and each SLAVE is independent of the communication with other SLAVEs.

The following applies to the communication with an individual SLAVE. Intervening communications with other SLAVEs is not shown.

Details of data link data block types are given in annex A.

7.1 Message time-out

Message time-out is defined as the maximum allowable time between the end of a message sent and the reception of the first octet of the corresponding response. The message time-out will be equal for all types of messages. The message time-out time is related to the transmission delay stated in table 1 of IEC 60839-5-1.

7.2 Restart time-out

Restart time-out is defined as the minimum time a potential MASTER shall see no activity on the network before it attempts to become MASTER itself. For each network a time-out value (in milliseconds) shall be calculated as follows:

Time-out = (ADD × 50 ms) + 3 000 ms

Where ADD is the network address of the node. A tolerance of +10 ms is allowed on this value.

7.3 Network addresses

Each node on the network shall be allocated a unique address.

The protocol does not include any features to detect or inhibit the multiple use of an address (except that this would cause a message clash and hence multiple message errors).

Valid addresses are in the range 01-1F HEX

NOTE 01-1F HEX = 0000 0001 – 0001 1111 binary system and 01-1F HEX = 1-31 decimal system.

7.4 MASTER initialization

Whilst there can only be one working MASTER on a network, it is possible for several items on a network to have the capability of being a MASTER. This allows the possibility of automatic reconfiguration in the event of failure of the MASTER (see 7.12.5).