INTERNATIONAL STANDARD

ISO/IEC 7816-3

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AMENDMENT 1
1992-12-01

Identification cards – Integrated circuit(s) cards with contacts –

Part 3 :
Electronic signals and transmission protocols

AMENDMENT 1 : Protocol type T = 1, asynchronous half duplex block transmission protocol

Cartes d'identification – Cartes à circuit(s) intégré(s) à contacts –

Partie 3 : Signaux électroniques et protocoles de transmission

AMENDEMENT 1 : Type de protocole T = 1, protocole de transmission par blocs half-duplex asynchrone

Reference number
ISO/IEC 7816-3:1989/Amd.1:1992(E)

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Amendment 1 to International Standard ISO/IEC 7816-3:1989 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

ISO/IEC 7816-3 consists of the following parts, under the general title *Identification cards – Integrated circuit(s) cards with contacts*

- *Part 1 : Physical characteristics*
- *Part 2 : Dimensions and location of the contacts*
- *Part 3 : Electronic signals and transmission protocols*

Annex A of this amendment to ISO/IEC 7816-3 is for information only.

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Identification cards – Integrated circuit(s) cards with contacts –

Part 3 :
Electronic signals and transmission protocols

AMENDMENT 1 : Protocol type T = 1, asynchronous half duplex block transmission protocol

Replace the existing clause 9 and add a new annex A as follows:

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9 Protocol type T=1, asynchronous half duplex block transmission protocol

This transmission protocol is defined as the protocol type T=1 in a TD_i byte of the Answer-to-Reset (see 6.1.4.3). This clause defines the structure and processing of commands for transmission control and for IC card specific control in an asynchronous half duplex block transmission protocol. These commands may be initiated either by the interface device or the card.

The main characteristics of the block transmission protocol are the following:

a) A block is the smallest data unit which can be transmitted between an IC card (ICC) and an interface device (IFD).

   A block may be used to convey

   (1) application data which is transparent to the transmission protocol;

   (2) transmission control data including transmission error handling, (see 9.1).

b) The definition of the block structure allows the correct reception of the whole block to be checked before processing the data conveyed by the block.

c) The identification of a block (recognizing the start and the end of a block) is handled in the character component of the data link layer.

d) The protocol starts either after the answer to reset or the protocol type selection (PTS) (clause 7) with a first block sent by the IFD and continues with alternating right to send a block.

This protocol uses the character frame defined in the answer to reset and the physical parameters defined by the global interface bytes (see 6.1.4.4) unless modified by the protocol type selection. This clause covers the frame structure of a block and organization of

- Data transmission control such as flow control, block chaining, and error correction
- Specific interface control

This protocol is designed according to the principle of layering of the OSI reference model, with particular attention to the minimization of interactions across boundaries. Three layers are defined:

- The physical layer exchanges bits according to 6.1
- The data link layer is defined by the character component and block component. The character component exchanges characters according to 6.1.2. The character repetition and error signalling described in 6.1.3 shall not be used, so that the minimum delay between two consecutive characters may be reduced to 11 etu, according to the interface character TC1. The block component exchanges blocks defined in 9.6.2.
- The application layer processes commands, which involves the exchange of at least one block or chain of blocks in each direction.

9.1 Definitions and abbreviations

9.1.1 Definitions

For the purposes of this part of ISO/IEC 7816, the following definitions apply to clause 9.

9.1.1.1 block: A succession of characters comprising two or three fields defined as prologue field, information field and epilogue field.

9.1.1.2 destination node address; DAD: The portion of the subfield node address (NAD) which is used to identify the intended receiver of the block.

9.1.1.3 epilogue field: The final field of a block. It contains the error detection code (EDC) byte(s).

9.1.1.4 error detection code; EDC: The result of an error checking method, applied to all characters in the prologue field and in the information field. It is transmitted in the epilogue field.

9.1.1.5 field: One of the three components of the block defined as prologue, information or epilogue.

9.1.1.6 information block; I-block: A block whose primary purpose is to transmit application layer information.

9.1.1.7 information field; INF: The field of a block which contains data (generally application data).

9.1.1.8 length; LEN: A subfield of the prologue field. It contains the number of bytes transmitted in the information field of the block.

9.1.1.9 node address; NAD: A subfield of the prologue field. It indicates both destination and source node addresses of the block and VPP state control.

9.1.1.10 prologue field: The first field of a block. It contains subfields for node address (NAD), protocol control byte (PCB) and length (LEN).

9.1.1.11 protocol control byte; PCB: A subfield of the prologue field. It contains transmission control information.

9.1.1.12 receive ready block; R-block: A block which contains positive or negative acknowledgements. It contains the block number of the expected I-block.

9.1.1.13 source node address; SAD: The portion of the subfield node address (NAD) which is used to identify the sender of the block.

9.1.1.14 subfield: A functional component of a field.

9.1.1.15 supervisory block; S-block: A block which contains transmission control information.

9.1.1.16 transmission control: A function used to control the data transmission between the interface device (IFD) and the IC card (ICC). It includes VPP state control, block transmission with sequence control, synchronization, and recovery of transmission errors.

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9.1.2 Abbreviations

BGT	Block guardtime
BWI	Block waiting time integer
BWT	Block waiting time
CRC	Cyclic redundancy check
CWI	Character waiting time integer
CWT	Character waiting time
DAD	Destination node address
EDC	Error detection code
I-block	Information block
ICC	Integrated circuit(s) card, IC card
IFD	Interface device
IFS	Information field size
IFSC	Information field size for the card
IFSD	Information field size for the interface device
IFSI	Information field size integer
INF	Information field
LEN	Length
LRC	Longitudinal redundancy check
NAD	Node address
OSI	Open systems interconnection
PCB	Protocol control byte
R-block	Receive ready block
R	Receive ready
SAD	Source node address
S-block	Supervisory block
WTX	Waiting time extension
XOR	Exclusive-OR

9.2 Character frame

The character frame is as defined for the answer to reset in 6.1.2 and 6.1.4.4 (last paragraph) unless modified by PTS in 7.2 (5th paragraph).

Parity checking may be used in addition to EDC (see 9.4.3) to determine the validity of a block.

9.3 Block frame

A block is a series of characters (9.2) containing data bytes (as defined in 6.1.2). A block consists of the following fields

- prologue field (mandatory)
- information field (optional)
- epilogue field (mandatory)

as shown in figure 9.

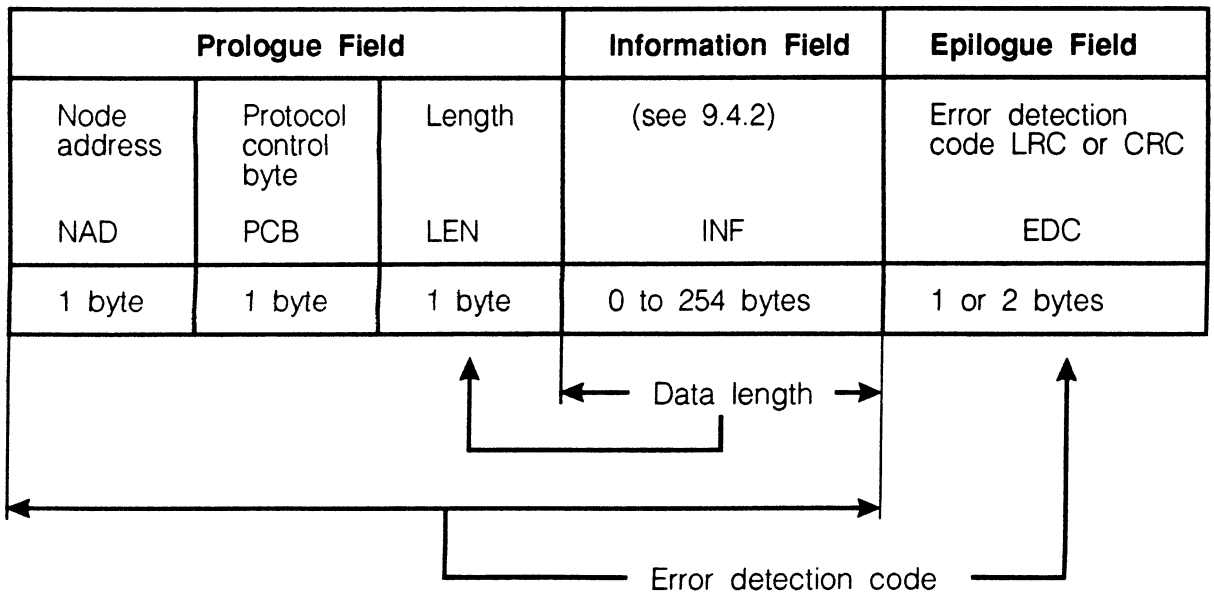

Figure 9 - Block Structure

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