INTERNATIONAL STANDARD 1745

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Information processing — Basic mode control procedures for data communication systems

Traitement de l'information — Procédures de commande pour transmission de données en mode de base

First edition — 1975-02-01

UDC 681.327.18.01 **Ref. No. ISO 1745-1975 (E)**

Descriptors : data processing, data transmission, control procedures, control characters.

Price based on 19 pages

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 1745 was drawn up by Technical Committee ISO/TC 97, *Computers and information processing*, and circulated to the Member Bodies in May 1973.

It has been approved by the Member Bodies of the following countries :

Australia	Japan	Switzerland
Brazil	Netherlands	Thailand
Canada	New Zealand	Turkey
Czechoslovakia	Poland	United Kingdom
Egypt, Arab Rep. of	Romania	U.S.A.
France	South Africa, Rep. of	U.S.S.R.
Hungary	Spain	Yugoslavia
Italy	Sweden	

The Member Bodies of the following countries expressed disapproval of the document on technical grounds :

Bulgaria
Germany

This International Standard cancels and replaces ISO Recommendation R 1745-1971, of which it constitutes a technical revision.

Printed in Switzerland

CONTENTS

This page intentionally left blank

Information processing — Basic mode control procedures for data communication systems

0 INTRODUCTION

0.1 General

A data communication system may be considered as the ensemble of the terminal installations and the interconnecting network that permits information to be exchanged.

A data link concept is identifiable when considering terminal installations connected to the same network, operating at the same speed, in the same code. Whenever actions on the respective transmission control characters take place, a separation of data links is constituted. Typical examples where this applies are : store and forward switching centres, concentrators, intermediate reformatting and speed-change devices.

The information transfer in a data link is monitored by data link control procedures where some characters, selected within a code set, are given particular meanings according to the transmission phase and are used for various purposes such as to delineate information, to reverse the direction of transmission, to ask questions, to answer, etc.

The data link control procedures are categorized in classes which are referred to as modes of operation. The present considerations relate to one class called "basic mode", which is defined as follows :

> In the basic mode all the necessary transmission control information (for example, message framing and supervisory instructions) passing from one station to another is carried over the link by discrete control characters selected from the ten transmission control characters which are defined in the ISO/CCITT 7-bit code (ISO 646). The information exchanges are carried out in the alternate mode on standard communication facilities. The control of the data link is not affected by any characters other than the ten transmission control characters. Other codes than the ISO/CCITT code may therefore be transmitted provided that they do not contain any of the ten transmission control characters in either heading or text. Sequences of transmission control character combinations such as DLE.XXX are not permitted, with the one exception DLE.EOT which is defined as "Disconnect".

Extensions to the basic mode are contained in the following International Standards :

> ISO 2111, *Basic mode control procedures — Code independent information transfer;*
>
> ISO 2628, *Basic mode control procedures — Complements;*
>
> ISO 2629, *Basic mode control procedures — Conversational information message transfer;*

and also in annexes B and C of this International Standard.

The following considerations have been taken into account in developing the rules for the basic mode :

The rules are based on the assumption that one of the stations in each connection would be either a computer or a device capable of handling automatically an exchange of information. The rules are designed to allow the complexity of operation to be increased from a basic level by adding options. These options are designed so that any number of stations can still communicate even though they normally operate at different levels of complexity.

It is desirable to reduce optional features in this International Standard to a minimum, but still retain a balance between an economic solution for the "low cost systems" and extendability for encompassing more complex systems. The rules may be difficult to implement in very simple systems involving low cost devices and human control. On the other hand, in complex high speed computer links, the rules may seriously restrict the throughput of information. These two cases are regarded as the upper and lower fringes of the present International Standard and may be the subject of future International Standards.

With the above considerations, typical limitations of basic mode control procedures are :

- restriction of efficiency by the time delay which is due to the alternate mode of operation;
- single link operation only.

0.2 Communication phases

The table below shows the various possible phases and sub-phases of a data communication.

Phases 1 and 5, which relate to the establishment and clearing of connections over the general switched network, are under the responsibility of the CCITT and are therefore not covered by this International Standard.

In each phase, one of the stations directs the operation and is responsible for the continuity of the communication. The other station or stations only react to the actions of the responsible station.

The transmission control characters which are shown alongside the various sub-phases are those which are involved in the basic mode of operation.

EOT is shown in parentheses in Phases 2 and 3 because its use within the phases initiates a changeover to Phase 4.

1 SCOPE AND FIELD OF APPLICATION

1.1 General

This International Standard specifies the method of implementation of the ISO/CCITT 7-bit coded character set[1] for information interchange on data transmission channels. It also defines the formats of the transmitted messages and the supervisory sequences which are part of the transmission control procedures. It covers the majority of existing data transmission systems and data link configurations used in conjunction with data processing systems.

These control procedures deal with transmission over one link at a time and do not describe the operation of data links in "tandem". They relate to the class of control procedures which is known as the basic mode and apply at the interface between data communication equipment and data terminal equipment.

Table of phases

Phase		Function Action / Reaction	Station's name Responsible / Responsive	Transmission control characters used in basic mode Forward / Backward	Notes
1 Establishment of connection over general network	*a)* Switching *b)* Identification				CCITT Responsibility
2 Establishment of data link	*a)* Switching	Call / Answer	Calling / Called		Not covered at present
	b) Polling	Poll / Reply	Control / Tributary	(EOT), ENQ / (EOT)	
	c) Selecting	Select / Reply	Master / Slave	(EOT), ENQ / ACK, NAK	
3 Information transfer		Transfer / Supervision	Master / Slave	SOH, STX ETB, ETX, (EOT) / ACK, NAK, (EOT)	
4 Termination	*a)* Return to neutral state	Terminate Interrupt	Master / Slave	EOT / EOT	
	b) Return to control station	Terminate Interrupt	Master / Slave	EOT / EOT	
	c) Disconnect	Disconnect Disconnect	Master / Slave	DLE, EOT / DLE, EOT	
5 Clearing of connection					CCITT Responsibility

1) See ISO 646. CCITT : Alphabet No. 5.

It is accepted that, in their present form, the control procedures are a framework upon which a system can be built and that, before the successful interconnection of equipment from different supplies can be ensured, it will be necessary to define additional details, such as :

— structure of prefixes or addresses when used;

— "time-out" procedures and the recovery procedures which follow the various time-out conditions (see ISO 2628).

This International Standard must be considered in conjunction with the following ISO publications :

1) ISO 1177, *Information processing — Character structure for start/stop and synchronous transmission;*

2) ISO 1155, *Information processing — Use of longitudinal parity to detect errors in information messages.*