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Information processing — Character structure for start/stop and synchronous character oriented transmission

Traitement de l'information — Structure des caractères pour la transmission arythmique et synchrone orientée caractère

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Foreword

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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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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International Standard ISO 1177 was prepared by Technical Committee ISO/TC 97, *Information processing systems*.

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ISO 1177 was first published in 1973. This second edition cancels and replaces the first edition, of which it constitutes a technical revision.

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Information processing — Character structure for start/stop and synchronous character oriented transmission

1 Scope and field of application

This International Standard specifies the character structure to be used for serial-by-bit start/stop and synchronous data transmission systems using the 7-bit coded character set which is the subject of ISO 646[1], the 8-bit coded character set which is the subject of ISO 4873 and extensions to these coded character sets which are the subject of ISO 2022.

It also specifies the parity sense to be used with the 7-bit coded character set.

It applies to the information transfer through the interface standardized by CCITT and IEC/ISO between the data terminal equipment, DTE, and data circuit-terminating equipment, DCE, as defined in the relevant CCITT V and X series Recommendations.

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2 References

ISO 646, *Information processing — ISO 7-bit coded character set for information interchange.*

ISO 2022, *Information processing — ISO 7-bit and 8-bit coded character sets — Code extension techniques.*[2]

ISO 2047, *Information processing — Graphical representations for the control characters of the 7-bit coded character set.*

ISO 4873, *Information processing — 8-bit code for information interchange — Structure and rules for implementation.*[3]

3 Bit sequencing — Start/stop and synchronous operation

In serial working data transmission systems, the chronological order of transmission of the information bits shall correspond to either

a) the bit identification b_1 to b_7 as defined in the 7-bit code table of ISO 646 with the least significant bit transmitted first; or

b) the bit identification b_1 to b_8 as defined in the 8-bit code table of ISO 4873 with the least significant bit transmitted first.

When the rank in the combination represents the order of the bit in binary numbering, the bits shall be transmitted in serial, working with the low order bit first.

The numerical meaning corresponding to each information bit considered in isolation is that of the digit

0 for a unit corresponding to condition A (Travail = Space), and

1 for a unit corresponding to condition Z (Repos = Mark),

in accordance with the definitions of these conditions for two-condition transmission systems.[4]

4 Parity bit — Start/stop and synchronous operation

For 7-bit working, a parity bit shall be added to every character and shall be located in the eighth position, b_8, and is therefore transmitted after the seven significant bits for the character.

5 Parity sense — Start/stop and synchronous operation

For start/stop systems using 7-bit working, the parity bit shall be chosen in such a way that the number of "ONE" bits is even in the sequence of eight bits thus formed.

1) This character set is also standardized by CCITT : International Alphabet No. 5, Recommendation V 3.

2) At present at the stage of draft. (Revision of ISO 2022-1982.)

3) At present at the stage of draft.

4) Condition A is that which corresponds to the start signal of a standardized start/stop apparatus, and condition Z is that which corresponds to a stop signal. For further details see the CCITT list of definitions of essential telecommunication terms.

For synchronous systems using 7-bit working, the parity bit shall be chosen in such a way that the number of "ONE" bits is odd in the sequence of eight bits thus formed.

6 DTE reaction to parity error

The detection of a character out-of-parity in 7-bit working may be represented by

a) a reverse question mark graphic character or a representation of the capital letter SB (see ISO 2047) provided that this letter occupies a single character position on screen or printer, and could have been entered by a single key stroke whilst recognizing that it may be difficult to achieve a legible "SB" character for some matrix printers or displays where the characters are printed or visually displayed; and/or

b) recording of the 1/10 (SUB) character in the tape or other storage medium, where provided.

Where a SUB character occurs in a received transmission, or is presented to a DTE via a storage medium, for example paper tape, then the reaction should be as in a) and b) above.

7 Character framing

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7.1 Start/Stop operation

In start/stop systems using the 7-bit or 8-bit coded character sets, ten or eleven unit elements shall be used per character.

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The first information bit of the transmitted coded combinations shall be preceded by a start element corresponding to condition A (Travail = Space). The duration of this start element shall be one unit interval at the data signalling rate at the transmitting interface.

The combination of seven information elements completed by its parity element or of eight information elements shall be followed by a stop element corresponding to condition Z (Repos = Mark).

As for the stop element duration the following provisions should be observed depending on the types of network used :

a) For systems using the 7-bit or 8-bit coded character sets over the general switched telephone and telegraph networks with electromechanical data terminal equipment operating at data signalling rates up to and including 200 bps, the stop element duration at the transmitter shall be TWO unit intervals at the data signalling rate of the transmitter.

In other cases the use of a stop element with a duration of ONE unit interval is recommended. However, this is subject to mutual agreement between the parties concerned.

Similar situations when a ONE unit interval stop element can be used may apply to leased circuits.

The start/stop receivers should be capable of correctly receiving start/stop signals comprising a single-unit stop element, whose duration will be reduced by a time interval equal to the deviation corresponding to the degree of gross start/stop distortion permitted at the receiver input. However, for electromechanical equipment which is required to use a two-unit stop element (11-unit alphabet) with a data signalling rate of 200 bps or less, receivers should be capable of correctly receiving signals with a stop element reduced to one unit.

b) For public asynchronous data networks, data terminal equipment using the 7-bit coded character set should use a stop element lasting at least two unit intervals. However, the receivers may only be capable of correctly receiving signals when the stop element is not reduced below one unit interval (even in the presence of distortion).

The time between the end of the stop element of a character and the beginning of the start element of the next character may be of any duration; the polarity of the signal during this time shall be the same as that of the stop element.

7.2 Synchronous operation

In synchronous systems eight bits per character shall be used. For 7-bit working, these eight bits comprise the seven information bits followed by the parity bit.

The time between the end of the last bit of a character and the beginning of the first bit of the next character shall be zero time or a multiple of the unit interval at the data signalling rate of the transmitter. When character synchronism is required to be maintained, this time interval shall be zero or a multiple of the character interval.

In systems that use the eighth bit for parity, the parity sense shall be maintained.