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Information technology — Control functions for text communication

Technologies de l'information — Fonctions de commande pour la communication de texte

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Contents

		Page
Section 1 - General		1
1	Scope	1
2	Conformance	1
2.1	Types of conformance	1
2.2	Conformance of information interchange	1
2.3	Conformance of devices	2
2.3.1	Device description	2
2.3.2	Originating devices	2
2.3.3	Receiving devices	2
3	Normative references	2
4	Definitions	2
4.1	active area	2
4.2	active field	2
4.3	active line	2
4.4	active page	2
4.5	active position	3
4.6	area	3
4.7	bit combination	3
4.8	byte	3
4.9	character	3
4.10	character path	3
4.11	character position	3
4.12	coded character set	3
4.13	coded-character-data-element (CC-data-element)	3
4.14	code extension	3
4.15	code table	3
4.16	control character	3

4.17 control function 3
4.18 control sequence 3
4.19 control string 3
4.20 cursor 3
4.21 default 4
4.22 to designate 4
4.23 device 4
4.24 display 4
4.25 document 4
4.26 document terminator 4
4.27 editor function 4
4.28 escape sequence 4
4.29 field 4
4.30 Final Byte 4
4.31 formator function 4
4.32 formattable text 4
4.33 formatted text. 4
4.34 graphic character 4
4.35 graphic rendition 4
4.36 graphic symbol 5
4.37 Intermediate Byte 5
4.38 to invoke 5
4.39 line 5
4.40 line home position 5
4.41 line limit position 5
4.42 line progression 5
4.43 page 5
4.44 page home position 5
4.45 page-image format 5
4.46 page limit position. 5
4.47 page terminator 5
4.48 Parameter Byte 5
4.49 position 5
4.50 repertoire 5
4.51 tabulation 5
4.52 tabulation stop 5
4.53 text area 5
4.54 user 6

5 Notation and names 6
5.1 Notation 6
5.2 Names 6

6 Categories of control functions 7

7 Coded representation 7
7.1 General 7
7.2 Elements of the C0 set 7
7.3 Elements of the C1 set 7
7.4 Control sequences 8
7.5 Independent control functions 8

8 Types of control functions 8

Section 2 - Control functions for page-image format (PIF) 9

9 Concepts relating to page-image format (PIF) 9

10 Repertoire of control functions 10

10.1 Format effectors 10
10.2 Presentation control functions 11
10.3 Introducers 11
10.4 Information Separators 11
10.5 Miscellaneous control functions 11

11 Definition of control functions 11

11.1 BS - BACKSPACE 11
11.2 CR - CARRIAGE RETURN 12
11.3 CSI - CONTROL SEQUENCE INTRODUCER 12
11.4 DT - DOCUMENT TERMINATOR
IS4 - INFORMATION SEPARATOR FOUR 12
11.5 ESC - ESCAPE 13
11.6 FF - FORM FEED 13
11.7 HPR - CHARACTER POSITION FORWARD 13
11.8 IGS - IDENTIFY GRAPHIC SUBREPERTOIRE 14
11.9 LF - LINE FEED 14
11.10 PFS - PAGE FORMAT SELECTION 14
11.11 PLD - PARTIAL LINE FORWARD 15
11.12 PLU - PARTIAL LINE BACKWARD 16
11.13 PT - PAGE TERMINATOR
IS3 - INFORMATION SEPARATOR THREE 16
11.14 SGR - SELECT GRAPHIC RENDITION 16
11.15 SHS - SELECT CHARACTER SPACING 17
11.16 SPD - SELECT PRESENTATION DIRECTIONS 18
11.17 SUB - SUBSTITUTE 18
11.18 SVS - SELECT LINE SPACING 18
11.19 VPR - LINE POSITION FORWARD 19

12 Levels of control functions 19

Section 3 - Control functions for formatted and formattable text 20

13 Concepts relating to formatted and formattable text 21

13.1 Formatted text 21
13.2 Formattable text 21
13.3 Unique representation of elements of text in interchange 22

14 Repertoire of control functions 22

14.1 Format effectors 22
14.2 Presentation control functions 23
14.3 Logical control functions 23
14.4 Introducers 23

14.5 Miscellaneous control functions 23

15 Definition of control functions 24

15.1 BPH - BREAK PERMITTED HERE 24
15.2 CR - CARRIAGE RETURN 24
15.3 CR FF - CARRIAGE RETURN / FORM FEED 24
15.4 CR / LF - CARRIAGE RETURN / LINE FEED 25
15.5 CSI - CONTROL SEQUENCE INTRODUCER 25
15.6 ESC - ESCAPE 25
15.7 FF - FORM FEED 25
15.8 GCC - GRAPHIC CHARACTER COMBINATION 26
15.9 HPB - CHARACTER POSITION BACKWARD 26
15.10 HPR - CHARACTER POSITION FORWARD 26
15.11 HT - CHARACTER TABULATION 27
15.12 IGS - IDENTIFY GRAPHIC SUBREPERTOIRE 27
15.13 LF - LINE FEED 27
15.14 NBH - NO BREAK HERE 28
15.15 NEL - NEXT LINE 28
15.16 NEL FF - NEXT LINE / FORM FEED 28
15.17 PEC - PRESENTATION EXPAND OR CONTRACT 28
15.18 PFS - PAGE FORMAT SELECTION 29
15.19 PLD - PARTIAL LINE FORWARD 30
15.20 PLU - PARTIAL LINE BACKWARD 30
15.21 PTX - PARALLEL TEXTS 31
15.22 SACS - SET ADDITIONAL CHARACTER SEPARATION 32
15.23 SAPV - SELECT ALTERNATIVE PRESENTATION VARIANTS 32
15.24 SCO - SELECT CHARACTER ORIENTATION 34
15.25 SCS - SET CHARACTER SPACING 34
15.26 SGR - SELECT GRAPHIC RENDITION 34
15.27 SHS - SELECT CHARACTER SPACING 36
15.28 SLH - SET LINE HOME 36
15.29 SLL - SET LINE LIMIT 37
15.30 SLS - SET LINE SPACING 37
15.31 SP - SPACE 37
15.32 SPD - SELECT PRESENTATION DIRECTIONS 38
15.33 SPH - SET PAGE HOME 38
15.34 SPL - SET PAGE LIMIT 39
15.35 SRCS - SET REDUCED CHARACTER SEPARATION 39
15.36 SRS - START REVERSED STRING 39
15.37 SSU - SELECT SIZE UNIT 40
15.38 SSW - SET SPACE WIDTH 40
15.39 SUB - SUBSTITUTE 40
15.40 SVS - SELECT LINE SPACING 41
15.41 TAC - TABULATION ALIGNED CENTRED 41
15.42 TALE - TABULATION ALIGNED LEADING EDGE 42
15.43 TATE - TABULATION ALIGNED TRAILING EDGE 42
15.44 TBC - TABULATION CLEAR 42
15.45 TCC - TABULATION CENTRED ON CHARACTER 42
15.46 TSR - TABULATION STOP REMOVE 43
15.47 VPB - LINE POSITION BACKWARD 43
15.48 VPR - LINE POSITION FORWARD 44

16 Levels of control functions 44

Annexes

A Text area formats 47

B Differences between Section 2 and CCITT Recommendation T.61 49

C Differences between Section 2 and Section 3 50

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for world-wide 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.

International Standard ISO/IEC 10538 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

Annexes A, B and C of this International Standard are for information only.

Introduction

This International Standard combines in one document the repertoires of control functions for text communication that were first published in Draft International Standard ISO/DIS 6937-3 (for the control functions for page-image format), and in the Draft Proposal for ISO 6937-4 (for the control functions for formatted and formattable text).

Because these repertoires of control functions are applicable to text communication in general, and can be used independently from ISO 6937, JTC 1/SC2 at its 21st plenary meeting in London in October 1988 decided in resolution 8 that the former ISO 6937-3 and ISO 6937-4 were to be published as a single new International Standard.

Information technology - Control functions for text communication

Section 1 - General

1 Scope

This International Standard defines the control functions, and their coded representations needed, for use in text communication.

Section 2 specifies the control functions for text in page-image format, Section 3 specifies the control functions for formatted and formattable text.

The control functions, with the exception of two, have been taken from ISO 6429. The definitions of the control functions in this International Standard are, in general, more specific than the corresponding definitions in ISO 6429.

The specifications in this International Standard apply to the interchange of text in the form of binary-coded representations of graphic characters and control functions. They are not intended for the actual processing of text.

Although, in general, text consists of characters and pictures, this International Standard applies only to text made up of characters.

The coded representations defined in this International Standard are intended for use when the control functions concerned are embedded in the communicated text, not when they are separated from the text as elements of a communication protocol, for example.

This International Standard does not define any control functions required for controlling the process of communication.

2 Conformance

2.1 Types of conformance

Full conformance to a standard means that all of its requirements are met. Conformance will only have a unique meaning if the standard contains no options. If there are options within the standard then they shall be clearly identified, and any claim of conformance shall include a statement that identifies those options that have been adopted.

This International Standard is of a different nature since it specifies for the applications in Section 2 and Section 3 a number of facilities from which different selections may be made to suit individual application requirements. These selections are identified as levels in clauses 12 and 16. They shall be identified at the time that a claim of conformance is made. Conformance to such an identified selection is known as limited conformance.

2.2 Conformance of information interchange

A coded-character-data-element (CC-data-element) within coded information for interchange is in conformance with a Section and a level of this International Standard if all coded representations of control functions within that CC-data-element conform either to the requirements of clause 12 or to those of clause 16.

A claim of conformance shall identify the Section and the level adopted.

2.3 Conformance of devices

A device is in conformance with this International Standard if it conforms to the requirements of 2.3.1, and either or both 2.3.2 and 2.3.3. Any claim of conformance shall identify the document which contains the description specified in 2.3.1, and shall identify Section and the level as well as the selected control functions.

2.3.1 Device description

A device that conforms to this International Standard shall be the subject of a description that identifies the means by which the user may supply the selected control functions or may recognize them when they are made available to him, as specified in 2.3.2. and 2.3.3, respectively.

2.3.2 Originating devices

An originating device shall allow its user to supply any sequence of control functions from the Section and level adopted, and shall be capable of transmitting their coded representation within a CC-data-element.

2.3.3 Receiving devices

A receiving device shall be capable of receiving and interpreting any coded representations of control functions that are within a CC-data-element, and that conform to 2.2, and shall make the corresponding control functions available to its user in such a way that the user can identify them from among those of the Section and level adopted, and can distinguish them from each other.

3 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2022:1986, *Information processing - ISO 7-bit and 8-bit coded character sets - Code extension techniques.*

ISO 6429:1988, *Information processing - Control functions for 7-bit and 8-bit coded character sets.*

ISO 7350:1991, *Text communication - Registration of graphic repertoires of characters from ISO 10367.*

4 Definitions

For the purpose of this International Standard, the following definitions apply.

4.1 active area: The area which contains the active position.

4.2 active field: The field which contains the active position.

4.3 active line: The line which contains the active position.

4.4 active page: The page which contains the active position.

4.5 active position: The character position which is to image the graphic symbol representing the next graphic character or relative to which the next control function is to be executed.

NOTE - In general, the active position is indicated by a cursor.

4.6 area: A series of successive character positions that are not necessarily on the same line.

4.7 bit combination: An ordered set of bits used for the representation of char-acters.

4.8 byte: A bit string that is operated upon as a unit.

4.9 character: A member of a set of elements used for the organization, control or representation of data.

4.10 character path: The direction of presentation of successive graphic characters along a line.

4.11 character position: The portion of a display that is imaging or is capable of imaging a graphic symbol.

4.12 coded character set; code: A set of unambiguous rules that establishes a character set and the one-to-one relationship between the characters of the set and their representation by one or more bit combinations.

4.13 coded-character-data-element (CC-data-element): An element of interchanged information that is specified to consist of a sequence of coded representations of characters, in accordance with one or more identified standards for coded character sets.

NOTES

1 In a communication environment according to the reference model for Open Systems Interconnection of ISO 7498, a CC-data-element will form all or part of the information that corresponds to the Presentation-Protocol-Data-Units (PPDU) defined in that International Standard.

2 When information interchange is accomplished by means of interchangeable media, a CC-data-element will form all or part of the information that corresponds to the user data, and not that recorded during formatting and initialization.

4.14 code extension: The techniques for the encoding of characters that are not included in the character set of a given code.

4.15 code table: A table showing the character allocated to each bit combination in a code.

4.16 control character: A control function the coded representation of which consists of a single bit combination.

4.17 control function: An element of a character set that effects the recording, processing, transmission, or interpretation of data, and that has a coded representation consisting of one or more bit combinations.

4.18 control sequence: A sequence of bit combinations starting with that representing the control character CONTROL SEQUENCE INTRODUCER (CSI), used for the coded representation of control functions with parameters.

4.19 control string: A delimited string of characters which may occur in the data stream as a logical entity for control purposes.

4.20 cursor: A special indicator used to mark the active position in a display.

4.21 default: A value or a state that is to be assumed when no value or state is explicitly specified.

4.22 to designate: To identify a set of characters that are to be represented, in some cases immediately and in others on the occurrence of a further control function, in a prescribed manner.

4.23 device: A component of information processing equipment which can transmit, and/or receive, coded information within CC-data-elements.

NOTE - It may be an input/output device in the conventional sense, or a process such as an application program or a gateway function.

4.24 display: The region for visual presentation of data on any type of character-imaging device, including printer, cathode ray tube and similar devices.

4.25 document: An ordered set of one or more pages intended by the sender to be regarded as an entity.

4.26 document terminator: A function that delimits the text that is part of a given document and separates it from the text of the next document, if any. The separator is either an occurrence of the control function DOCUMENT TERMINATOR (DT) (INFORMATION SEPARATOR FOUR (IS4)) embedded in the text, or the equivalent function as a protocol element.

4.27 editor function: Control function used for editing, altering or transposing the visual arrangement of data.

4.28 escape sequence: A bit string that is used for control purposes in code extension procedures and that consists of two or more bit combinations. The first of these bit combinations represents the character ESCAPE.

4.29 field: An area consisting of the character position at a character tabulation stop (beginning of the field) and the character positions up to, but not including, the character position at the following character tabulation stop (end of the field).

4.30 Final Byte: The bit combination that terminates an escape sequence or a control sequence.

4.31 formator function: Control functions (format effectors and presentation control functions) describing how the originator of the data stream wishes the information to be formatted or presented.

4.32 formattable text: Character-coded text that contains control functions intended by the sender to be usable to expedite the processing and/or the formatting of the text by the recipient.

4.33 formatted text: Character-coded text that contains control functions which determine the detail of the layout and appearance of text as presented.

4.34 graphic character: A character, other than a control function, that has a visual representation normally handwritten, printed or displayed, and that has a coded representation consisting of one or more bit combinations.

4.35 graphic rendition: The visual style of displaying a set of graphic symbols.

4.36 graphic symbol: A visual representation of a graphic character or a control function.

4.37 Intermediate Byte:

a) In an escape sequence, a bit combination that may occur between the control function ESCAPE (ESC) and the Final Byte;

b) In a control sequence, a bit combination that may occur between the control function CONTROL SEQUENCE INTRODUCER (CSI) and the Final Byte, or between a Parameter Byte and the Final Byte.

4.38 to invoke: To cause a designated set of characters to be represented by the prescribed bit combinations whenever those bit combinations occur.

4.39 line: A set of consecutive character positions.

4.40 line home position: A reference position on a line ahead of which the active position can normally not be moved.

4.41 line limit position: A reference position on a line beyond which the active position can normally not be moved.

4.42 line progression: The direction of presentation of successive lines.

4.43 page: A set of consecutive lines.

4.44 page home position: A reference position on a page ahead of which the active position can normally not be moved.

4.45 page-image format; PIF: A representation of the image of text which is for-matted by the sender for presentation by the recipient and which is not intended to be subjected to reformatting operations by the recipient.

4.46 page limit position: A reference position on a page beyond which the active position can normally not be moved.

4.47 page terminator: A function that delimits the text that is to be imaged on a given page and separates it from the text of the next page, if any, of the same document. The separator is either an occurrence of the control function PAGE TERMINATOR (PT) (INFORMATION SEPARATOR THREE (IS3)) or DOCUMENT TERMINATOR (DT) (INFORMATION SEPARATOR FOUR (IS4)) embedded in the text, or the equivalent function as a protocol element.

4.48 Parameter Byte: In a control sequence, a bit combination that may occur between the control function CONTROL SEQUENCE INTRODUCER (CSI) and the Final Byte, or between CSI and an Intermediate Byte.

4.49 position: The part of a code table identified by its column and row coordinates.

4.50 repertoire: A specified set of characters that are represented by one or more bit combinations of a coded character set.

4.51 tabulation: The technique of identifying character positions or lines in a dis-play for the purpose of arranging information systematically.

4.52 tabulation stop: The indication that a character position or a line is to be used for tabulation; a character tabulation stop may also serve as a boundary between fields.

4.53 text area: The image of the part of a page on which text may be presented.

4.54 user: A person or other entity that invokes the services provided by a device.

NOTES

1 This entity may be a process such as an application program if the "device" is a code converter or a gateway function, for example.

2 The characters, as supplied by the user or made available to him, may be in the form of codes local to the device, or of non-conventional visible representations, provided that 2.3 above is satisfied.

4.55 variable-spacing graphic symbol: The visible forms of graphic characters - letters, digits or symbols - in which their dimensions along the line may differ from one to the other.

5 Notation and names

5.1 Notation

The bits of the bit combinations of an 8-bit code are identified by b_8, b_7, b_6, b_5, b_4, b_3, b_2, and b_1, where b_8 is the highest-order, or most significant, bit and b_1 is the lowest-order, or least significant, bit.

Analogously, the bits of a 7-bit code are identified by b_7, b_6, b_5, b_4, b_3, b_2, and b_1, where b_7 is the highest-order, or most significant, bit and b_1 is the lowest-order, or least significant, bit.

The bit combinations may be interpreted to represent integers in the range 0 to 255 (0 to 127 in the case of a 7-bit code) in binary notation by attributing the following weights to the individual bits:

bit	b_8	b_7	b_6	b_5	b_4	b_3	b_2	b_1
weight	128	64	32	16	8	4	2	1

In this International Standard, the bit combinations are identified by notations of the form xx/yy, where xx is a number in the range 00 to 15 (00 to 07 in the case of a 7-bit code) and yy is a number in the range 00 to 15. The correspondence between the notations of the form xx/yy and the bit combinations consisting of the bits b_8 (b_7 in the case of a 7-bit code) to b_1 is as follows:

- xx is the number represented by b_8, b_7, b_6 and b_5 where these bits are given the weights 8, 4, 2 and 1, respectively;
- yy is the number represented by b_4, b_3, b_2 and b_1 where these bits are given the weights 8, 4, 2 and 1, respectively.

5.2 Names

This International Standard assigns one name to each control function. In addition, it specifies an acronym for each control function and for the character SPACE. By convention, only capital letters and hyphen are used for writing the names of graphic characters and control functions. For acronyms only capital letters and digits are used. It is intended that the acronyms and this convention be retained in all translations of the text.

6 Categories of control functions

The control functions in the repertoires of Sections 2 and 3 belong in all or some of the following categories:

a) format effectors, which cause the active position to be moved within the text area of a page, and from page to page;

b) presentation control functions, which specify presentation attributes, that is, ways in which subsequent text is to be presented. Examples of presentation attributes are page format, character rendition and tabulation;

c) introducers,

d) information separators,

e) logical control functions, which indicate where line-breaks may be made or should be avoided, and delimit character strings that are to be treated as single entities;

f) miscellaneous control functions, which do not fit in any of the preceding categories.

7 Coded representation

7.1 General

Each control function in Sections 2 and 3 belongs to one of the following types:

a) not an element of any set;
b) elements of the C0 set;
c) elements of the C1 set;
d) control sequences;
e) independent control functions.

7.2 Elements of the C0 set

These control functions are represented in 7-bit and 8-bit codes by bit combinations from 00/00 to 01/15.

The definitions and the coded representations of the control functions are specified in clauses 11 and 15.

7.3 Elements of the C1 set

These control functions are represented

a) in a 7-bit code by 2-character escape sequences of the form ESC Fe, where ESC is represented by bit combination 01/11 and Fe is represented by a bit combination from 04/00 to 05/15;

b) in an 8-bit code by bit combinations from 08/00 to 09/15; however, when the announcer sequence ESC 02/00 04/06 according to ISO 2022 is used, the control functions of the C1 set are represented by ESC Fe sequences.

The definitions and the coded representations of the control functions are specified in clauses 11 and 15.

7.4 Control sequences

A control sequence consists of a sequence of bit combinations starting with that representing the control character CONTROL SEQUENCE INTRODUCER (CSI) followed by one or more bit combinations representing parameters, if any, and by one or more bit combinations identifying the control function. The control character CSI itself is an element of the C1 set.

The format of a control sequence is

CSI P...P I...I F

where

a) CSI is represented by bit combination 01/11 (representing ESC) and 05/11 in a 7-bit code or by bit combination 09/11 in an 8-bit code, see 7.3;

b) P...P are Parameter Bytes, which, if present, consist of bit combinations from 03/00 to 03/15. The parameter representation, the format of the parameter string, and the types of parameters are specified in ISO 6429, 5.5.1, 5.5.2 and 5.5.3;

c) I...I are Intermediate Bytes, which, if present, consist of bit combinations from 02/00 to 02/15. Together with the Final Byte F, they identify the control function;

d) F is the Final Byte; it consists of a bit combination from 04/00 to 07/14; it terminates the control sequence and together with the Intermediate Bytes, if present, identifies the control function.

The definitions and the coded representations of the control functions are specified in clauses 11 and 15.

7.5 Independent control functions

These control functions are represented in 7-bit and 8-bit codes by 2-character escape sequences of the form ESC Fs, where ESC is represented by bit combination 01/11 and Fs is represented by a bit combination from 06/00 to 07/14.

The definitions and the coded representations of the control functions are specified in clauses 11 and 15.

NOTE - ESC Fs sequences are registered in the ISO International Register of Coded Character Sets to be Used with Escape Sequences, which is maintained by the Registration Authority for ISO 2375. Any candidates for ESC Fs sequences have to be approved by ISO/IEC JTC1/SC2 for registration. The coding for the Final Byte, Fs, will then be assigned by the Registration Authority.

8 Types of control functions

There are different types of control functions. They are indicated by the following notations:

a) (Cx) : Not an element of any set

b) (C0) : Element of the C0 set

c) (C0 C0) : Two elements of the C0 set

d) (C1 C0) : One element of the C1 set, one element of the C0 set

e) (C1) : Element of the C1 set

f) (Pn) : Control sequence with a single numeric parameter

g) (Pn1;Pn2) : Control sequence with two numeric parameters

h) (Pn...) : Control sequence with any number of numeric parameters

i) (Ps) : Control sequence with a single selective parameter

j) (Ps1;Ps2) : Control sequence with two selective parameters

k) (Ps...) : Control sequence with any number of selective parameters

l) (Fs) : Independent control function, represented by an ESC Fs sequence.

Section 2 - Control functions for page-image format (PIF)

The control function repertoire of Section 2 was developed in parallel with CCITT Recommendations T.61 and T.100. In its original form it provided for page-image format text with the more common left-to-right direction of writing. Subsequently, an addendum was developed to provide also for text consisting of characters ordered other than from left to right along the lines of the page images.

This Section specifies a repertoire of control functions and their coded representations used in defining the images of pages of communicated text. Text communication in page-image format is an application where the sender of text embeds in the sequence of characters certain control functions that determine the layout and appearance of a page of text; and where the recipient, by using those control functions as specified, may reproduce the page of text with the same content, layout and appearance.

The control functions in this repertoire are intended to be used for applications in which the layout of the sender's and the recipient's text is the same; they are primarily useful when constant-spacing character pitch is employed. However, they may also be used where sender and recipient use the same font and size of variable-spacing graphic symbols. The dimensions on the page are determined by counts of character positions and lines. The control functions in this repertoire are suited to more simple applications, and are easier to implement and to use, than those of Section 3.

This Section provides for text consisting of characters ordered from left to right, but allows also other directions of writing. These different directions may be mixed on a page.

It applies only if the order in which the characters of the text are communicated is the order in which they appear along the lines of the page images, namely, that in which they are intended to be read.

9 Concepts relating to page-image format (PIF)

Text communicated in page-image format form consists of one or more documents; each document consists of one or more pages. Each page consists of lines, each line consists of character positions.

The communication or interchange of text in page-image format form implies the transfer of a stream of bit combinations representing graphic characters in the order in which they appear on the pages of the documents, starting with the first character in the first line of the text area of the first page of the first document, and proceeding character by character, line by line and page by page until the end of the last document.

Embedded in the data stream, there may be coded representations of control functions for various purposes, including the following:

a) to specify the size and the orientation of a page, and the size and the position of the text area on the page;

b) to specify the location of the next graphic character, if that location is other than at the character position following the one at which the previous graphic character on the same line was presented;

c) to specify the rendition aspects of graphic characters, such as character style and character emphasis, and the character spacing and the line spacing;

d) to mark the end of a page or the end of a document.

The interpretation of the control functions and of the coded representations of the graphic characters are unambiguous only if

a) the sequence of the text is followed as specified above;

b) no graphic character, including SPACE, is located outside the text area;

c) no more than one graphic character is located in any one character position on the page, unless a provision for the superimposition of characters forms part of the coding method for the graphic characters of the repertoire in use.

At the beginning of the communication of each document, all presentation attributes are assumed to be in the default state, and all presentation attributes are reset to the default state by a page terminator function or a document terminator function.

Text communication in page-image format is an application where the sender of text embeds in the sequence of characters certain control functions that determine the layout and appearance of a page of text; and where the recipient, by using those control functions as specified, may reproduce the page of text with the same content, layout and appearance.

10 Repertoire of control functions

The following list groups the control functions defined in this Section of this International Standard. This grouping is intended to aid in understanding the International Standard and does not restrict the use of the control functions to the indicated categories. These categories are listed in clause 6.

10.1 Format effectors

Acronym	Notation	Name	Defined in
BS	(C0)	BACKSPACE	11.1
CR	(C0)	CARRIAGE RETURN	11.2
FF	(C0)	FORM FEED	11.6
HPR	(Pn)	CHARACTER POSITION FORWARD	11.7
LF	(C0)	LINE FEED	11.9
PLD	(C1)	PARTIAL LINE FORWARD	11.11
PLU	(C1)	PARTIAL LINE BACKWARD	11.12

VPR	(Pn)	LINE POSITION FORWARD	11.19

10.2 Presentation control functions

Acronym	Notation	Name	Defined in
PFS	(Ps)	PAGE FORMAT SELECTION	11.10
SGR	(Ps...)	SELECT GRAPHIC RENDITION	11.14
SHS	(Ps)	SELECT CHARACTER SPACING	11.15
SPD	(Ps)	SELECT PRESENTATION DIRECTIONS	11.16
SVS	(Ps)	SELECT LINE SPACING	11.18

10.3 Introducers

Acronym	Notation	Name	Defined in
CSI	(C1)	CONTROL SEQUENCE INTRODUCER	11.3
ESC	(C0)	ESCAPE	11.5

10.4 Information Separators

Acronym	Notation	Name	Defined in
DT IS4	(C0)	DOCUMENT TERMINATOR INFORMATION SEPARATOR FOUR	11.4
PT IS3	(C0)	PAGE TERMINATOR INFORMATION SEPARATOR THREE	11.13

10.5 Miscellaneous control functions

Acronym	Notation	Name	Defined in
IGS	(Ps)	IDENTIFY GRAPHIC SUBREPERTOIRE	11.8
SUB	(C0)	SUBSTITUTE	11.17

11 Definition of control functions

The definitions of the control functions listed below are all more specific than the corresponding definitions in ISO 6429.

The control functions are listed in the alphabetical order of their acronyms. It is intended that the acronyms be retained in all translations of the text.

For an explanation of the different types of control functions as denoted by their notations see clause 8.

11.1 BS - BACKSPACE

Notation: (C0)
Representation: 00/08

BS causes the active position to be moved one character position in the direction opposite to that of the character path.

The direction of the character path depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is from left to right.

The amount of movement depends on the character spacing established by the most recent occurrence of SELECT CHARACTER SPACING (SHS), if any, or otherwise is the default character spacing.

BS shall not be used for combining the images of two or more graphic symbols in a single character position.

NOTE - The purpose of BS is to move the active position away from the line home position in the direction opposite to that of the character path, when needed, after an occurrence of CARRIAGE RETURN (CR).

11.2 CR - CARRIAGE RETURN

Notation: (C0)
Representation: 00/13

CR causes the active position to be moved to the line home position of the same line in the direction opposite to that of the character path (see Note 2).

The end of the line to which the line home position is near is specified by the most recent occurrence of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is the left end.

The direction of the character path depends on the parameter of SPD, if any, or otherwise is from left to right.

CR shall not be used to combine the images of two or more graphic symbols in a single character position.

NOTES

1 The line home position for various page formats is specified in annex A.

2 CR causes a movement in the direction of the character path, when the active position has been moved away from the line home position by the use of BACKSPACE (BS)) and has not subsequently been moved back to the line home position.

3 To cause the active position to be moved to the line home position at the beginning of a new line of text, CR is used in combination with LINE FEED (LF), FORM FEED (FF) or LINE POSITION FORWARD (VPR).

11.3 CSI - CONTROL SEQUENCE INTRODUCER

Notation: (C1)
Representation: 09/11 or ESC 05/11

CSI is used as the first character of a control sequence.

In this International Standard, CSI is used for the representation of parameterized control functions.

11.4 DT - DOCUMENT TERMINATOR
IS4 - INFORMATION SEPARATOR FOUR

Notation: (C0)
Representation: 01/12

This is an application-oriented use of the control function INFORMATION SEPARATOR FOUR (IS4), also called FILE SEPARATOR (FS), as a document terminator function. DT is

used to indicate the end of the text on a document. In addition, it has the same effect as the control function PAGE TERMINATOR (PT), namely:

It resets all representation attributes to the default state, cancels any graphic character subrepertoire identification, cancels all non-default designations and invocations of graphic character sets, and implicitly designates and invokes the default character sets, if any. Any such attribute, identification, etc. shall be (re)specified at the beginning of each page.

NOTE - In accordance with ISO 6429, this control function is given two names. The name INFORMATION SEPARATOR FOUR (IS4) is the general name. The name DOCUMENT TERMINATOR (DT) is the specific name. The information separators in this International Standard are used in hierarchical order. The ascending order is PT (IS3), DT (IS4).

11.5 ESC - ESCAPE

Notation: (C0)
Representation: 01/11

ESC causes the meaning of a limited number of bit combinations following it in the data stream to be changed.

In this International Standard, ESC is used for the representation of other control functions.

11.6 FF - FORM FEED

Notation: (C0)
Representation: 00/12

FF causes the active position to be moved to the corresponding character position on the first line of the text area of the next page. It indicates that the image of a new page is to begin.

The text area format is that specified by the most recent occurrence of PAGE FORMAT SELECTION (PFS), if any, or otherwise is the default text area format.

FF shall be used only in combination with CARRIAGE RETURN (CR) and a combination of FF and CR shall be used at the beginning of each page, including the first page of a document.

Following an occurrence of SELECT PRESENTATION DIRECTIONS (SPD) with another than the default parameter or an occurrence of PFS with a parameter value other than 0 to 9, FF shall be followed by CR in order to move the active position to the line home position of the first line of the new page.

11.7 HPR - CHARACTER POSITION FORWARD

Notation: (Pn)
Representation: CSI Pn 06/01

Parameter default value: Pn = 1

HPR causes the active position to be moved by n character positions in the direction of the character path, where n equals the value of Pn.

The direction of the character path depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is from left to right.

The amount of movement depends on the character spacing established by the most recent occurrence of SELECT CHARACTER SPACING (SHS), if any, or otherwise is the default character spacing.

NOTE - Although HPR has an effect similar to that of a sequence of SPACE characters, it does not have the graphic equivalence of SPACE. For example, if the graphic rendition aspect "underlined" is in effect, the space created by HPR will not be underlined.

11.8 IGS - IDENTIFY GRAPHIC SUBREPERTOIRE

Notation: (Ps)
Representation: CSI Ps 02/00 04/13

IGS is used to indicate that a subrepertoire of the graphic character repertoire of ISO 6937 is used in the subsequent text. All graphic character sets needed to represent the indicated graphic character subrepertoire shall be explicitly or implicitly designated, but need not be invoked, prior to the occurrence of IGS. The identification of the graphic character subrepertoire may be changed at any point within a document and takes effect immediately.

The effect of IGS ceases upon the next occurrence of

a) another IGS;
b) the control function PAGE TERMINATOR (PT);
c) the control function DOCUMENT TERMINATOR (DT);
d) the designation of any graphic character set.

The parameter value is the identifier assigned to a subrepertoire of the repertoire of ISO 6937 in accordance with the registration procedure specified in ISO 7350. In the absence of IGS, the entire repertoire of the currently designated graphic character set applies. An occurrence of IGS without a parameter value cancels any subrepertoire identification by a preceding IGS.

11.9 LF - LINE FEED

Notation: LF
Representation: 00/10

LF causes the active position to be moved to the corresponding character position of the next line in the direction of the line progression. It indicates that the image of a new line is to begin.

The direction of the line progression depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, prior to the most recent occurrence of FORM FEED (FF), or otherwise is from top to bottom.

The amount of movement depends on the line spacing established by the most recent occurrence of SELECT LINE SPACING (SVS), if any, or otherwise is the default line spacing.

To obtain the equivalent of "new line" LF shall be used in combination with CARRIAGE RETURN (CR).

11.10 PFS - PAGE FORMAT SELECTION

Notation: (Ps)
Representation: CSI Ps 02/00 04/10

Parameter default value: Ps = 0

PFS is used to establish the available area for the imaging of text based on paper size. The pages are introduced by subsequent occurrences of FORM FEED (FF) in the data stream. The established image area remains in effect until the next occurrence of PFS in the data stream.

The parameter values are:

0	tall basic text communication format
1	wide basic text communication format
2	tall basic A4 format
3	wide basic A4 format
4	tall North American letter format
5	wide North American letter format
6	tall extended A4 format
7	wide extended A4 format
8	tall North American legal format
9	wide North American legal format
10	A4 short lines format
11	A4 long lines format
12	B5 short lines format
13	B5 long lines format
14	B4 short lines format
15	B4 long lines format

NOTES

1 Dimensions and other properties of the text areas corresponding to the page formats specified by the parameter values of PFS are shown in annex A.

2 "Short lines" page formats have lines of text parallel to the shorter dimension of the text area; "long lines" page formats have lines of text parallel to the longer dimension of the text area.

11.11 PLD - PARTIAL LINE FORWARD

Notation: (C1)
Representation: 08/11 or ESC 04/11

PLD causes either the start of a subscript image or the end of a superscript image of graphic characters. Any occurrence of PLD to start a subscript image shall be followed by an occurrence of PARTIAL LINE BACKWARD (PLU) in the same line before another PLD, or LINE FEED (LF), or FORM FEED (FF), or LINE POSITION FORWARD (VPR) is used.

If PLD is used to start a subscript image while the graphic rendition aspects "underlined" (singly or doubly) or "crossed out" specified by a parameter of SELECT GRAPHIC RENDITION (SGR) are in effect, the subscript image does not affect the line or the part of the line in which the relevant graphic rendition aspects are in use.

NOTES

1 The subscript image initiated by PLD may be implemented by using special character fonts and/or by a movement of the active position in the direction of the line progression, not exceeding a half line space.

2 This International Standard does not specify the use of PLD with parameter values of SELECT PRESENTATION DIRECTIONS (SPD) other than 0 (the default value) or 3. When used in conjunction with

other parameter values of SPD, PLD may be taken to cause a movement of the active position not exceeding a half line space in the direction of the line progression.

11.12 PLU - PARTIAL LINE BACKWARD

Notation: (C1)
Representation: 08/12 or ESC 04/12

PLU causes either the start of a superscript image or the end of a subscript image of graphic characters. Any occurrence of PLU to start a superscript image shall be followed by an occurrence of PARTIAL LINE FORWARD (PLD) in the same line before another PLU or LINE FEED (LF), FORM FEED (FF) or LINE POSITION FORWARD (VPR) is used.

If PLU is used to start a superscript image while the graphic rendition aspects "underlined" (singly or doubly) or "crossed out" specified by a parameter of SELECT GRAPHIC RENDITION (SGR) are in effect, the superscript image does not affect the line or the part of the line in which the relevant graphic rendition aspects are in use.

NOTES

1 The superscript image initiated by PLU may be implemented by using special character fonts and/or by a movement of the active position in the direction opposite to that of the line progression, not exceeding a half line space.

2 This International Standard does not specify the use of PLU with parameter values of SELECT PRESENTATION DIRECTIONS (SPD) other than 0 (the default value) or 3. When used in conjunction with other parameter values of SPD, PLU may be taken to cause a movement of the active position not exceeding a half line space in the direction opposite to that of the line progression.

11.13 PT - PAGE TERMINATOR
IS3 - INFORMATION SEPARATOR THREE

Notation: (C0)
Representation: 01/13

This is an application-oriented use of the control function INFORMATION SEPARATOR THREE (IS3), also called GROUP SEPARATOR (GS), as a page terminator function. PT is used to indicate the end of the text on a page.

PT resets all representation attributes to the default state, cancels any graphic character subrepertoire identification, cancels all non-default designations and invocations of graphic character sets, and implicitly designates and invokes the default character sets, if any. Any such attribute, identification, etc. must be (re)specified at the beginning of each page.

NOTE - In accordance with ISO 6429, this control function is given two names. The name INFORMATION SEPARATOR THREE (IS3) is the general name. The name PAGE TERMINATOR (PT) is the specific name. The information separators in this International Standard are used in hierarchical order. The ascending order is PT (IS3), DT (IS4).

11.14 SGR - SELECT GRAPHIC RENDITION

Notation: (Ps...)
Representation: CSI Ps... 06/13

Parameter default value: Ps = 0

SGR is used to establish one or more graphic rendition aspects for subsequent text. The established aspects remain in effect until the next occurrence of SGR in the data stream.

Each graphic rendition aspect is specified by a parameter value:

0	default rendition (implementation defined), cancels the effect of any preceding occurrence of SGR in the data stream
1	bold or increased intensity
3	italicized
4	underlined
9	crossed-out (characters still legible but marked as to be deleted)
21	doubly underlined
26	variable-spacing character pitch may be used (see Note 4)

When SGR is used to start the graphic rendition aspects "underlined" (singly or doubly), or "crossed out", while a subscript or superscript image specified by PARTIAL LINE FORWARD (PLD) or PARTIAL LINE BACKWARD (PLU) is in effect, the relevant graphic rendition aspects also apply - in the appropriate form - to the subscript or the superscript image, respectively.

NOTES

1 Several parameter values can be used in combination in order to obtain, for example, the graphic rendition aspects "underlined italics". The maximum number of parameter values is four.

2 The default parameter value cannot be used in combination with any other parameter value.

3 The parameter values 4 and 21 cannot be used in combination with each other.

4 Parameter value 26 indicates that the text that follows may be presented with variable-spacing graphic symbols, if required by the recipient. When variable-spacing character pitch is invoked, the parameter value of SELECT CHARACTER SPACING (SHS) specifies the nominal character pitch. For interworking with devices not capable of variable-spacing character pitch, a line or part of a line with variable-spacing graphic symbols should not contain more characters than are permitted by the currently effective pitch specified by the parameter value of the most recent occurrence of SHS.

11.15 SHS - SELECT CHARACTER SPACING

Notation: (Ps)
Representation: CSI Ps 02/00 04/11

Parameter default value: Ps = 0

SHS is used to establish the character spacing for subsequent text. The established spacing remains in effect until the next occurrence of SHS or of a page terminator function or a document terminator function in the data stream.

The parameter values are:

0	10 characters per 25,4 mm
1	12 characters per 25,4 mm
2	15 characters per 25,4 mm
3	6 characters per 25,4 mm
4	3 characters per 25,4 mm
5	9 characters per 50,8 mm

6 4 characters per 25,4 mm

NOTES

1 The character spacing specified by the parameter value of SHS takes effect immediately. When it is required to specify the character spacing that will become effective with the beginning of a line, SHS should immediately precede the combination of CARRIAGE RETURN (CR) and LINE FEED (LF), or CR and FORM FEED (FF), that indicates the beginning of that line.

2 SHS affects the active position movements caused by subsequent occurrences of graphic characters including SPACE, or of the control functions BACKSPACE (BS), or CHARACTER POSITION FORWARD (HPR).

3 A change of character spacing may be taken to imply an appropriate change in the size of the graphic symbols representing the graphic characters of the subsequent text.

11.16 SPD - SELECT PRESENTATION DIRECTIONS

Notation: (Ps)
Representation: CSI Ps 02/00 05/03

Parameter default value: Ps = 0

SPD is used to establish for subsequent text the directions of the active position movement for graphic characters and for the control functions which initiate movement of the active position. The established directions remain in effect until the next occurrence of SPD or of a page terminator function or a document terminator function in the data stream.

The parameter values are:

0 the direction of the character path is from left to right; the direction of the line progression is from top to bottom

1 the direction of the character path is from top to bottom; the direction of the line progression is from right to left

3 the direction of the character path is from right to left; the direction of the line progression is from top to bottom

NOTE - A change in the direction of presentation for the writing of Japanese characters may be taken to imply a change in the orientation, relative positioning and/or font of some characters.

11.17 SUB - SUBSTITUTE

Notation: (C0)
Representation: 01/10

SUB is used in place of a character that has been found invalid or in error.

NOTE - This International Standard does not specify a graphical representation for the SUB character.

11.18 SVS - SELECT LINE SPACING

Notation: (Ps)
Representation: CSI Ps 02/00 04/12

Parameter default value: Ps = 0

SVS is used to establish the line spacing for subsequent text. The established spacing remains in effect until the next occurrence of SVS or of a page terminator function or a document terminator function in the data stream.

The parameter values are:

0	6 lines per 25,4 mm
1	4 lines per 25,4 mm
2	3 lines per 25,4 mm
3	12 lines per 25,4 mm
4	8 lines per 25,4 mm
5	6 lines per 30,0 mm
6	4 lines per 30,0 mm
7	3 lines per 30,0 mm
8	12 lines per 30,0 mm
9	2 lines per 25,4 mm

NOTES

1 SVS affects the active position movements caused by subsequent occurrences of LINE FEED (LF) or of LINE POSITION FORWARD (VPR).

2 When text contains both ideographic and non-ideographic characters, the line spacing should be selected so as to accommodate the ideographic characters.

11.19 VPR - LINE POSITION FORWARD

Notation: (Pn)
Representation: CSI Pn 06/05

Parameter default value: Pn = 1

VPR causes the active position to be moved by n lines in the direction of the line progression, where n equals the value of Pn.

The direction of the line progression depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is from top to bottom.

The amount of movement depends on the line spacing established by the most recent occurrence of SELECT LINE SPACING (SVS), if any, or otherwise is the default line spacing.

12 Levels of control functions

In order to facilitate the definition of conformance with this Section, four levels are identified as follows:

a) **Level 1:** No control functions other than the following shall be used:

LINE FEED (LF);
FORM FEED (FF);
CARRIAGE RETURN (CR);
SUBSTITUTE (SUB);
PAGE TERMINATOR (PT), (INFORMATION SEPARATOR THREE (IS3));
DOCUMENT TERMINATOR (DT), (INFORMATION SEPARATOR FOUR (IS4));

also, any code extension control function needed to represent the graphic characters and the control functions in the communicated text.

This level is intended for interworking with simple terminal equipment.

b) **Level 2**: No control functions other than those specified for level 1 as well as the following shall be used:

BACKSPACE (BS);
PARTIAL LINE FORWARD (PLD);
PARTIAL LINE BACKWARD (PLU);
PAGE FORMAT SELECTION (PFS) with parameter values 0 and 4;
SELECT GRAPHIC RENDITION (SGR) with parameter value 0;
SELECT CHARACTER SPACING (SHS) with parameter value 0;
SELECT LINE SPACING (SVS) with parameter values 0, 1, 2, and 3;
CONTROL SEQUENCE INTRODUCER (CSI);
IDENTIFY GRAPHIC SUBREPERTOIRE (IGS);
SELECT PRESENTATION DIRECTIONS (SPD) with parameter values 0, 1 and 3.

This level is intended for interworking with the basic Teletex service.

c) **Level 3**: No control functions other than those specified for levels 1 and 2 as well as the following shall be used:

CHARACTER POSITION FORWARD (HPR);
LINE POSITION FORWARD (VPR);
PAGE FORMAT SELECTION (PFS) with parameter values 2, 3, 6 and 7;
SELECT GRAPHIC RENDITION (SGR) with parameter values 1, 3 and 9;
SELECT CHARACTER SPACING (SHS) with parameter values 1 and 2.

This level allows the use of internationally used parameter values, but not parameter values which are used only in one country or region.

d) **Level 4**: Any control function of the repertoire defined in this Section is used, that is, those specified for levels 1, 2 and 3 as well as the following:

PAGE FORMAT SELECTION (PFS) with parameter values 4, 5, 8 and 9;
SELECT GRAPHIC RENDITION (SGR) with parameter values 21 and 26;
SELECT CHARACTER SPACING (SHS) with parameter values 3 and 4, 5 and 6;
SELECT LINE SPACING (SVS) with parameter values 4, 5, 6, 7, 8 and 9.

This level allows the use of all the control functions defined in this Section.

Section 3 - Control functions for formatted and formattable text

The control function repertoire of Section 3 includes most of the functions of Section 2 (with some modifications) and goes further to provide control functions that the recipient of text may use in processing whereby content, layout or appearance of a page of text may be altered by automatic means.

The control functions in this repertoire are intended to be used for applications in which the layout of the sender's and the recipient's text may be reformatted; they are primarily useful when variable-spacing graphic symbols are employed, especially when sender and recipient use different fonts. However, they may also be used where sender and recipient use constant-spacing character pitch. The dimensions on the page are determined by linear measurements. Such formatting is determined by the control functions embedded in the encoded data stream. The reformatting is normally carried out by the recipient after interchange, but the encoded text is also suited for formatting by the sender. Reformatting permits changes to be made to the layout of a page of text while allowing the original author's intent to be maintained. Certain control functions permit to specify where changes to the format or layout shall not be made, for example, at the end of a paragraph. The control functions in this repertoire are suited to more sophisticated applications, and are more complex to implement and to use than those of Section 2.

The repertoire of control functions specified in this Section may also be used for applications in which the received text is to be presented in the same format as the originator's. This applies when either constant-spacing character pitch is used or when the same font and size of variable-spacing graphic symbols are used by both sender and recipient.

This Section provides for text consisting of characters ordered from left to right, but allows also other directions of writing. These different directions may be mixed on a page or in a line on a page.

13 Concepts relating to formatted and formattable text

13.1 Formatted text

The communication or interchange of text in formatted form implies the transfer of a stream of bit combinations representing graphic characters in the order in which they appear in the text.

Embedded in the data stream may be coded representations of control functions that determine the format of the text on a page of a document.

These encoded control functions may be used for various purposes, including the following:

a) to specify the size and the orientation of a page, and the size and the position of the text area on the page;

b) to specify the location of the next graphic character, if that location is other than at the character position following the one at which the previous graphic character on the same line was presented;

c) to specify the rendition aspects of graphic characters, such as character style and character emphasis, and the character spacing and the line spacing;

d) to mark the end of a page or the end of a document.

Text in such formatted form allows the presentation of a document as intended by the originator.

13.2 Formattable text

In addition to the above, the concept of formattable text implies that the representation of the text for interchange contains control functions that support processing operations intended to modify the format or the layout of the text on the page of the document.

The control functions provided in this Section expedite such formatting of the text. They are intended for those applications where the formatting is determined by the control functions embedded in the text, not by a higher-level protocol to determine the layout or the presentation.

The control functions for such purposes include

a) logical control functions, which may be used by the processing facility to modify the layout;

b) the character SPACE, being regarded as both a graphic character and as a control function that indicates where a line break may occur when text is presented.

13.3 Unique representation of elements of text in interchange

The interpretation of the control functions and of the coded representations of the graphic characters are unambiguous only if

a) the sequence of the text is followed as specified above;

b) no graphic character, including SPACE, is located outside the text area;

c) no more than one graphic character is located in any one character position on the page, unless a provision for the superimposition of characters forms part of the coding method for the graphic characters of the repertoire in use.

14 Repertoire of control functions

The following list groups the control functions defined in this Section. This grouping is intended to aid in understanding this International Standard and does not restrict the use of the control functions to the indicated categories. The categories are listed in clause 6.

14.1 Format effectors

Acronym	Notation	Name	Defined in
CR	(C0)	CARRIAGE RETURN	15.2
CR FF	(C0 C0)	CARRIAGE RETURN / FORM FEED	15.3
CR LF	(C0 C0)	CARRIAGE RETURN / LINE FEED	15.4
FF	(C0)	FORM FEED	15.7
HPB	(Pn)	CHARACTER POSITION BACKWARD	15.9
HPR	(Pn)	CHARACTER POSITION FORWARD	15.10
HT	(C0)	CHARACTER TABULATION	15.11
LF	(C0)	LINE FEED	15.13
NEL	(C1)	NEXT LINE	15.15
NEL FF	(C1 C0)	NEXT LINE / FORM FEED	15.16
PLD	(C1)	PARTIAL LINE FORWARD	15.19
PLU	(C1)	PARTIAL LINE BACKWARD	15.20
TBC	(Ps)	TABULATION CLEAR	15.44
TSR	(Pn)	TABULATION STOP REMOVE	15.46
VPB	(Pn)	LINE POSITION BACKWARD	15.47
VPR	(Pn)	LINE POSITION FORWARD	15.48

14.2 Presentation control functions

Acronym	Notation	Name	Defined in
PEC	(Ps)	PRESENTATION EXPAND OR CONTRACT	15.17
PFS	(Ps)	PAGE FORMAT SELECTION	15.11
SACS	(Pn)	SET ADDITIONAL CHARACTER SPACING	15.22
SAPV	(Ps...)	SELECT ALTERNATIVE PRESENTATION VARIANTS	15.23
SCO	(Ps)	SELECT CHARACTER ORIENTATION	15.24
SCS	(Pn)	SET CHARACTER SPACING	15.25
SGR	(Ps...)	SELECT GRAPHIC RENDITION	15.26
SHS	(Ps)	SELECT CHARACTER SPACING	15.27
SLH	(Pn)	SET LINE HOME	15.21
SLL	(Pn)	SET LINE LIMIT	15.29
SLS	(Pn)	SET LINE SPACING	15.30
SPD	(Ps)	SELECT PRESENTATION DIRECTIONS	15.32
SPH	(Pn)	SET PAGE HOME	15.33
SPL	(Pn)	SET PAGE LIMIT	15.34
SRCS	(Pn)	SET REDUCED CHARACTER SPACING	15.35
SSU	(Ps)	SELECT SIZE UNIT	15.37
SSW	(Pn)	SELECT SPACE WIDTH	15.31
SVS	(Ps)	SELECT LINE SPACING	15.40
TAC	(Pn)	TABULATION ALIGNED CENTRED	15.41
TALE	(Pn)	TABULATION ALIGNED LEADING EDGE	15.42
TATE	(Pn)	TABULATION ALIGNED TRAILING EDGE	15.43
TCC	(Pn1;Pn2)	TABULATION CENTRED ON CHARACTER	15.45

14.3 Logical control functions

Acronym	Notation	Name	Defined in
BPH	(C1)	BREAK PERMITTED HERE	15.1
GCC	(Ps)	GRAPHIC CHARACTER COMBINATION	15.15
NBH	(C1)	NO BREAK HERE	15.14
PTX	(Ps)	PARALLEL TEXTS	15.21
SP	(Cx)	SPACE	15.31
SRS	(Ps)	START REVERSED STRING	15.36

14.4 Introducers

Acronym	Notation	Name	Defined in
CSI	(C1)	CONTROL SEQUENCE INTRODUCER	15.5
ESC	(C0)	ESCAPE	15.6

14.5 Miscellaneous control functions

Acronym	Notation	Name	Defined in
IGS	(Ps)	IDENTIFY GRAPHIC SUBREPERTOIRE	15.12
SUB	(C0)	SUBSTITUTE	15.39

15 Definition of control functions

The definition of the control functions listed below are all more specific than the corresponding definitions in ISO 6429.

The control functions are listed in the alphabetical order of their acronyms. It is intended that the acronyms be retained in all translations of the text.

For an explanation of the different types of control functions as denoted by their notations see clause 8.

15.1 BPH - BREAK PERMITTED HERE

Notation: (C1)
Representation: 08/02 or ESC 04/02

BPH is used to indicate a point where a line break may occur when text is formatted. BPH may occur between two graphic characters, either or both of which may be SPACE.

NOTE - The effect of the use of a graphic character representing a hyphen that is immediately preceded by BPH and immediately followed by CARRIAGE RETURN (CR) and LINE FEED (LF) is equivalent to the use of the character SOFT HYPHEN (SHY).

15.2 CR - CARRIAGE RETURN

Notation: (C0)
Representation: 00/13

CR causes the active position to be moved to the line home position of the same line in the direction opposite to that of the character path (see note 1).

The line home position is established by the parameter of SET LINE HOME (SLH).

The end of the line to which the line home position is near is specified by the most recent occurrence of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is the left end.

The direction of the character path depends on the parameter of SPD, if any, or otherwise is from left to right.

CR shall not be used to combine the images of two or more graphic symbols in a single character position.

NOTES

1 CR causes a movement in the direction of the character path, when the active position has been moved away from the line home position and has not subsequently been advanced back to the line home position.

2 The purpose of CR is to move the active position to the line home position at the beginning of a new line of text. CR is, therefore, used in combination with LINE FEED (LF), FORM FEED (FF) or LINE POSITION FORWARD (VPR).

15.3 CR FF - CARRIAGE RETURN / FORM FEED

Notation: (C0 C0)
Representation: 00/13 00/12

In the use of this International Standard, the sequence of control functions CARRIAGE RETURN followed immediately by FORM FEED shall indicate a page break that has been

introduced incidentally during formatting and that may be removed by a subsequent reformatting operation.

15.4 CR / LF - CARRIAGE RETURN / LINE FEED

Notation: (C0 C0)
Representation: 00/13 00/10

In the use of this International Standard, the sequence of control functions CARRIAGE RETURN followed immediately by LINE FEED shall indicate a line break that has been introduced incidentally during formatting and that may be removed by a subsequent reformatting operation.

15.5 CSI - CONTROL SEQUENCE INTRODUCER

Notation: (C1)
Representation: 09/11 or ESC 05/11

CSI is used as the first character of a control sequence.

In this International Standard, CSI is used for the representation of parameterized control functions.

15.6 ESC - ESCAPE

Notation: (C0)
Representation: 01/11

ESC causes the meaning of a limited number of bit combinations following it in the data stream to be changed.

In this International Standard, ESC is used for the representation of other control functions.

15.7 FF - FORM FEED

Notation: (C0)
Representation: 00/12

FF causes the active position to be moved to the corresponding character position at the page home position of the next page. The page home position is established by the parameter of SET PAGE HOME (SPH).

The text area format is that specified by the most recent occurrence of PAGE FORMAT SELECTION (PFS), if any, or otherwise is the default text area format.

At the beginning of each page, including the first page of a document, FF shall be used in combination with CARRIAGE RETURN (CR).

Following an occurrence of SELECT PRESENTATION DIRECTIONS (SPD) with a value other than the default parameter value or an occurrence of PFS with a parameter value other than 0 to 9, FF shall be followed by CR in order to move the active position to the line home position of the first line of the new page.

In the use of this International Standard, FF shall only be used when immediately preceded by CR, or NEXT LINE (NEL).

15.8 GCC - GRAPHIC CHARACTER COMBINATION

Notation: (Ps)
Representation: CSI Ps 02/00 05/15

Parameter default value: Ps = 0

GCC is used to indicate that two or more graphic characters are to be combined into one graphic symbol.

GCC with a parameter value of 0 indicates that the following two graphic characters are to be represented as a single graphic symbol; GCC with a parameter value of 1 and GCC with a parameter value of 2 indicate respectively the beginning and the end of a string of graphic characters which are to be combined into one graphic symbol for presentation.

NOTE - GCC does not explicitly specify the relative sizes or placements of the component parts of a composite graphic symbol. In the simplest case, two components may be "half-width" and side-by-side. For example, in Japanese text a pair of characters may be presented side-by-side, and occupy the space of a normal Kanji character.

15.9 HPB - CHARACTER POSITION BACKWARD

Notation: (Pn)
Representation: CSI Pn 06/10

Parameter default value: Pn = 1

HPB causes the active position to be moved by n units in the direction opposite to that of the character path, where n equals the value of Pn.

The unit in which the parameter value is expressed is that established by SELECT SIZE UNIT (SSU); if the unit is CHARACTER, the amount of movement is specified by the most recent occurrence of SELECT CHARACTER SPACING (SHS) or SET CHARACTER SPACING (SCS), if any, or otherwise is the default character spacing.

The direction of the character path depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is from left to right.

15.10 HPR - CHARACTER POSITION FORWARD

Notation: (Pn)
Representation: CSI Pn 06/01

Parameter default value: Pn = 1

HPR causes the active position to be moved by n units in the direction of the character path, where n equals the value of Pn.

The unit in which the parameter value is expressed is that established by SELECT SIZE UNIT (SSU); if the unit is CHARACTER, the amount of movement is specified by the most recent occurrence of SELECT CHARACTER SPACING (SHS) or SET CHARACTER SPACING (SCS), if any, or otherwise is the default character spacing.

The direction of the character path depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is from left to right.

NOTE - Although HPR has an effect similar to that of a sequence of SPACE characters, it does not have the graphic equivalence of SPACE. For example, if the graphic rendition aspect "underlined" is in effect, the space created by HPR will not be underlined.

15.11 HT - CHARACTER TABULATION

Notation: (C0)
Representation: 00/09

HT causes the active position to be moved to the following character tabulation stop.

In addition, if that following character tabulation stop has been set by TABULATION ALIGNED CENTRED (TAC), TABULATION ALIGNED LEADING EDGE (TALE), TABULATION ALIGNED TRAILING EDGE (TATE) OR TABULATION CENTRED ON CHARACTER (TCC), HT indicates the beginning of a string of text which is to be positioned within a line according to the properties of that tabulation stop. The end of the string is indicated by the next occurrence of HT or CARRIAGE RETURN (CR) or NEXT LINE (NEL) in the data stream.

The direction of the character path and the direction of the line progression depend on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise are from left to right and from top to bottom, respectively.

15.12 IGS - IDENTIFY GRAPHIC SUBREPERTOIRE

Notation: (Ps)
Representation: CSI Ps 02/00 04/13

IGS is used to indicate that a subrepertoire of the graphic character repertoire of ISO 6937 is used in the subsequent text. All graphic character sets needed to represent the indicated graphic character subrepertoire shall be explicitly or implicitly designated, but need not be invoked, prior to the occurrence of IGS. The identification of the graphic character subrepertoire may be changed at any point within a document and takes effect immediately.

The effect of IGS ceases upon the next occurrence of

a) another IGS
b) a page terminator function
c) a document terminator function
d) the designation of any graphic character set.

The parameter value is the identifier assigned to a subrepertoire of the repertoire of ISO 6937 in accordance with the registration procedure specified in ISO 7350. In the absence of IGS, the entire repertoire of the currently designated graphic character set applies. An occurrence of IGS without a parameter value cancels any subrepertoire identification by a preceding IGS.

15.13 LF - LINE FEED

Notation: (C0)
Representation: 00/10

LF causes the active position to be moved to the corresponding character position of the next line in the direction of the line progression. It indicates that the image of a new line is to begin.

The direction of the line progression depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, prior to the most recent occurrence of FORM FEED (FF), or otherwise is from top to bottom.

The amount of movement depends on the line spacing established by the most recent occurrence of SELECT LINE SPACING (SVS), or SET LINE SPACING (SLS), if any, or otherwise is the default line spacing.

In the use of this International Standard, LF shall be used only when immediately preceded by CARRIAGE RETURN (CR), or NEXT LINE (NEL), or another LF.

15.14 NBH - NO BREAK HERE

Notation: (C1)
Representation: 08/03 or ESC 04/03

NBH is used to indicate a point where a line break shall not occur when text is formatted. NBH may occur between two graphic characters, either or both of which may be SPACE.

NOTES

1 The effect of the use of a graphic character representing a hyphen that is immediately followed by NBH is equivalent to what is sometimes called a "hard hyphen"; the effect of the use of a SPACE character that is immediately followed by NBH is equivalent to what is sometimes called a "soft space".

2 The effect of the use of a SPACE character that is immediately preceded and followed by NBH is equivalent to the use of the character NO-BREAK SPACE (NBSP).

15.15 NEL - NEXT LINE

Notation: (C1)
Representation: 08/05

NEL causes the active position to be moved to the line home position of the following line.

The line home position is established by the parameter of SET LINE HOME (SLH).

The direction of the character path and the direction of the line progression depend on the parameter of SET PRESENTATION DIRECTIONS (SPD), if any, or otherwise are from left to right and from top to bottom, respectively.

In the use of this International Standard, the control function NEL shall indicate a line break that has been introduced deliberately, for example at the end of a paragraph, and that is not intended to be removed by a subsequent formatting operation, and that may indicate the end of a string of characters intended to be treated as an entity by a formatting process.

NOTE - The effect of the use of the control function LINE FEED (LF) that is immediately preceded and followed by the control function CARRIAGE RETURN (CR) is equivalent to that of the control function NEL.

15.16 NEL FF - NEXT LINE / FORM FEED

Notation: (C1 C0)
Representation: 08/05 00/12

In the use of this International Standard, the sequence of control functions NEXT LINE followed immediately by FORM FEED shall indicate a page break that has been introduced deliberately, for example before a Section or chapter heading, that is not intended to be removed by a subsequent reformatting operation, and that may indicate the end of a string of characters intended to be treated as an entity by a formatting process.

15.17 PEC - PRESENTATION EXPAND OR CONTRACT

Notation: (Ps)

Representation: CSI Ps 02/00 05/10

Parameter default value: Ps = 0

PEC is used to establish graphic characters' spacing and the extent for subsequent text. The spacing and the extent are specified in the direction parallel to the character path as multiples of the spacing explicitly established and the extent implicitly established by the most recent occurrence of SET CHARACTER SPACING (SCS), or of SELECT CHARACTER SPACING (SHS) in the data stream. The established spacing and extent remain in effect until the next occurrence of PEC, of SCS, or of SHS in the data stream.

The parameter values are:

0	normal (as specified by SHS or SCS)
1	expanded (multiplied by a factor not greater than 2)
2	condensed (multiplied by a factor not less than 0,5)

The direction of the character path depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is from left to right.

NOTES

1 PEC with a parameter value of 2 may be taken to imply that graphic characters are to be presented with their baselines parallel to the character path.

2 The PEC control function is only relevant for use with fonts that have constant-spacing character pitch.

15.18 PFS - PAGE FORMAT SELECTION

Notation: (Ps)
Representation: CSI Ps 02/00 04/10

Parameter default value: Ps = 0

PFS is used to establish the available area for the imaging of text based on paper size. The pages are introduced by subsequent occurrences of FORM FEED (FF) in the data stream. The established image area remains in effect until the next occurrence of PFS in the data stream.

The parameter values are:

0	tall basic text communication format
1	wide basic text communication format
2	tall basic A4 format
3	wide basic A4 format
4	tall North American letter format
5	wide North American letter format
6	tall extended A4 format
7	wide extended A4 format
8	tall North American legal format
9	wide North American legal format
10	A4 short lines format
11	A4 long lines format
12	B5 short lines format
13	B5 long lines format

14 B4 short lines format
15 B4 long lines format

The page home position is established by the parameter of SET PAGE HOME (SPH), the page limit position is established by the parameter of SET PAGE LIMIT (SPL).

NOTE - "Short lines" page formats have lines of text parallel to the shorter dimension of the text area; "long lines" page formats have lines of text parallel to the longer dimension of the text area.

15.19 PLD - PARTIAL LINE FORWARD

Notation: (C1)
Representation: 08/11 or ESC 04/11

PLD causes either the start of a subscript image or the end of a superscript image of graphic characters. Any occurrence of PLD to start a subscript image shall be followed by an occurrence of PARTIAL LINE BACKWARD (PLU) in the same line before another PLD, or CARRIAGE RETURN (CR), or LINE FEED (LF), or FORM FEED (FF), or NEXT LINE (NEL), or LINE POSITION BACKWARD (VPB), or LINE POSITION FORWARD (VPR) is used.

If PLD is used to start a subscript image while the graphic rendition aspects "underlined" (singly or doubly) or "crossed out" specified by a parameter of SELECT GRAPHIC RENDITION (SGR) are in effect, the subscript image does not affect the line or the part of the line in which the relevant graphic rendition aspects are in use.

NOTES

1 The subscript image initiated by PLD may be implemented by using special character fonts and/or by a movement of the active position in the direction of the line progression, not exceeding a half line space.

2 This International Standard does not specify the use of PLD with parameter values of SELECT PRESENTATION DIRECTIONS (SPD) other than 0 (the default value) or 3. When used in conjunction with other parameter values of SPD, PLD may be taken to cause a movement of the active position not exceeding a half line space in the direction of the line progression.

3 The control functions LINE POSITION FORWARD (VPR) and LINE POSITION BACKWARD (VPB) are included in this Section to allow subscripting and superscripting to be specified more precisely than is possible with PLD and PLU.

15.20 PLU - PARTIAL LINE BACKWARD

Notation: (C1)
Representation: 08/12 or ESC 04/12

PLU causes either the start of a superscript image or the end of a subscript image of graphic characters. Any occurrence of PLU to start a superscript image shall be followed by an occurrence of PARTIAL LINE FORWARD (PLD) in the same line before another PLU, or CARRIAGE RETURN (CR), or LINE FEED (LF), or FORM FEED (FF), or NEXT LINE (NEL), or LINE POSITION BACKWARD (VPB), or LINE POSITION FORWARD (VPR) is used.

If PLU is used to start a superscript image while the graphic rendition aspects "underlined" (singly or doubly) or "crossed out" specified by a parameter of SELECT GRAPHIC

RENDITION (SGR) are in effect, the superscript image does not affect the line or the part of the line in which the relevant graphic rendition aspects are in use.

NOTES

1 The superscript image initiated by PLU may be implemented by using special character fonts and/or by a movement of the active position in the direction opposite to that of the line progression, not exceeding a half line space.

2 This International Standard does not specify the use of PLU with parameter values of SELECT PRESENTATION DIRECTIONS (SPD) other than 0 (the default value) or 3. When used in conjunction with other parameter values of SPD, PLU may be taken to cause a movement of the active position not exceeding a half line space in the direction opposite to that of the line progression.

3 The control functions LINE POSITION FORWARD (VPR) and LINE POSITION BACKWARD (VPB) are included in this Section to allow subscripting and superscripting to be specified more precisely than is possible with PLD and PLU.

15.21 PTX - PARALLEL TEXTS

Notation: (Ps)
Representation: CSI Ps 05/12

Parameter default value: Ps = 0

PTX is used to delimit strings of graphic characters that are communicated one after another in the data stream but that are intended to be presented in parallel with one another, usually in adjacent lines.

The parameter values are:

0	end of parallel texts
1	beginning of a string of principal parallel text
2	beginning of a string of supplementary parallel text
3	beginning of a string of supplementary Japanese phonetic annotation
4	beginning of a string of supplementary Chinese phonetic annotation
5	end of a string of supplementary phonetic annotation

PTX with a parameter value of 1 indicates the beginning of the principal text intended to be presented in parallel with one or more strings of supplementary text.

PTX with a parameter value of 2, 3 or 4 indicates the beginning of a string of supplementary text that is intended to be presented in parallel with either a string of principal text or with the immediately preceding string of supplementary text, if any; at the same time it indicates the end of the preceding string of supplementary text, if any. The end of a string of supplementary text is indicated by a subsequent occurrence of PTX with a parameter value other than 1.

PTX with a parameter value of 0 indicates the end of the strings of text intended to be presented in parallel with one another.

The direction of the character path depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is from left to right.

NOTES

1 PTX does not explicitly specify the relative placement of the strings of principal and supplementary texts, or the relative sizes of graphic characters in the strings of parallel texts. A string of supplementary text is normally presented in a line adjacent to the line containing the string of principal text, or adjacent to the line containing the immediately preceding string of supplementary text, if any. The first graphic character of the string of principal text and the first graphic character of the string of supplementary text are normally presented in the same character position of their respective lines. However, a string of supplementary text longer (when presented) than the associated string of principal text may be centred on that string. In the case of long strings of text, such as the paragraphs in different languages, the strings may be presented in parallel columns, with their beginnings aligned with one another and the shorter of the paragraphs followed by an appropriate amount of "white space".

Japanese phonetic annotation typically consists of a few half-size or smaller Kana characters which indicate the pronunciation or interpretation of one or more Kanji characters and that are presented above those Kanji characters if the character path is horizontal, or to the right of them if the character path is vertical.

Chinese phonetic annotation typically consists of a few Pinyin characters which indicate the pronunciation of one or more Hanzi characters and that are presented above those Hanzi characters. Alternatively, the Pinyin characters may be presented in the same line as the Hanzi characters and following the respective Hanzi characters. The Pinyin characters will then be presented within enclosing pairs of parentheses.

2 ISO 8613 provides for alignment of the trailing edges (beginnings) of parallel strings of text. PTX should not be used where such alternative facilities are available and adequate; it is intended primarily to cater for parallel texts consisting of only a few characters, but could be used for other purposes by systems that handle only simple character coded text - perhaps as a means of "signifying intent" to more sophisticated systems.

3 Simple devices may present texts delimited by PTX in series rather than in parallel, with supplementary text(s) merely following the principal text, perhaps with graphic symbols representing PTX to provide visible delimiters, for example: {Kanji | Ruby} or

{English | Français | Deutsch | Lingua latina},
{thus | ainsi | so | sic }.

15.22 SACS - SET ADDITIONAL CHARACTER SEPARATION

Notation: (Pn)
Representation: CSI Pn 02/00 05/12

Parameter default value: Pn = 0

SACS is used to establish extra inter-character escapement for subsequent text. The established extra escapement remains in effect until the next occurrence of SACS or of SET REDUCED CHARACTER SEPARATION (SRCS) in the data stream or until it is reset to the default value by a subsequent occurrence of CARRIAGE RETURN / LINE FEED (CR LF) or of NEXT LINE (NEL) in the data stream.

Pn specifies the number of units by which the inter-character escapement is enlarged.

The unit in which the parameter value is expressed is the BASIC MEASUREMENT UNIT (BMU). See 15.37.

15.23 SAPV - SELECT ALTERNATIVE PRESENTATION VARIANTS

Notation: (Ps)
Representation: CSI Ps... 02/00 05/13

Parameter default value: Ps = 0

SAPV is used to specify one or more variants for the presentation of subsequent text. The established variants remain in effect until the next occurrence of SAPV in the data stream.

The parameter values are:

0 default presentation (implementation-defined); cancels the effect of any preceding occurrence of SAPV in the data stream

1 the decimal digits are presented by means of the graphic symbols used in the Latin script

2 the decimal digits are presented by means of the graphic symbols used in the Arabic script, i.e. the Hindi symbols

3 when the direction of the character path is from right to left, each of the graphic characters in the graphic character set(s) in use which is one of a left/right handed pair (parentheses, square brackets, curly brackets, greater-than/less-than signs, etc.) is presented as "mirrored", i.e. as the other member of the pair. For example, the coded graphic character given the name LEFT PARENTHESIS is presented as a RIGHT PARENTHESIS, and vice versa

4 when the direction of the character path is from right to left, all graphic characters which represent operators and delimiters in mathematical formulae and which are not symmetrical about a vertical axis are presented as mirrored about that vertical axis

5 the following graphic character is presented in its isolated form

6 the following graphic character is presented in its initial form

7 the following graphic character is presented in its medial form

8 the following graphic character is presented in its final form

9 where the bit combination 02/14 is intended to represent a decimal mark in a decimal number it shall be represented by means of the graphic symbol FULL STOP

10 where the bit combination 02/14 is intended to represent a decimal mark in a decimal number it shall be represented by means of the graphic symbol COMMA

11 vowels are presented above or below the preceding character

12 vowels are presented after the preceding character

13 contextual shape determination of Arabic scripts, including the LAM-ALEPH ligature but excluding all other Arabic ligatures

14 contextual shape determination of Arabic scripts, excluding all Arabic ligatures

15 cancels the effect of parameter values 3 and 4

16 vowels are not presented

17 when the direction of the character path is from right to left, italicized graphic characters are slanted to the left; when the direction of the character path is from left to right, italicized graphic characters are slanted to the right.

15.24 SCO - SELECT CHARACTER ORIENTATION

Notation: (Ps)
Representation: CSI Ps 02/00 06/05

Parameter default value: Ps = 0

SCO is used to establish the amount of rotation of the graphic characters following in the data stream. The established value remains in effect until the next occurrence of SCO in the data stream.

The parameter values are:

0	0°
1	45°
2	90°
3	135°
4	180°
5	225°
6	270°
7	315°

Rotation is positive, i.e. counter-clockwise and applies to the normal presentation of the graphic characters along the character path. The centre of rotation of the affected graphic characters is not defined by this International Standard.

The direction of the character path depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is from left to right.

15.25 SCS - SET CHARACTER SPACING

Notation: (Pn)
Representation: CSI Pn 02/00 06/07

Parameter default value: Pn = 120

SCS is used to establish the character spacing for subsequent text. The established spacing remains in effect until the next occurrence of SCS or of SELECT CHARACTER SPACING (SHS) in the data stream.

Pn specifies the character spacing.

The unit in which the parameter value is expressed is the BASIC MEASUREMENT UNIT (BMU). See 15.37.

15.26 SGR - SELECT GRAPHIC RENDITION

Notation: (Ps)
Representation: CSI Ps... 06/13

Parameter default value: Ps = 0

SGR is used to establish one or more graphic rendition aspects for subsequent text. The established aspects remain in effect until the next occurrence of SGR in the data stream.

Each graphic rendition aspect is specified by a parameter value:

0	default rendition (implementation defined), cancels the effect of any preceding occurrence of SGR in the data stream
1	bold or increased intensity
3	italicized
4	underlined
9	crossed-out (characters still legible but marked as to be deleted)
10	primary font
11	first alternative font
12	second alternative font
13	third alternative font
14	fourth alternative font
15	fifth alternative font
16	sixth alternative font
17	seventh alternative font
18	eighth alternative font
19	ninth alternative font
21	doubly underlined
26	variable-spacing character pitch may be used (see note 5)
53	overlined

When SGR is used to start the graphic rendition aspects "underlined" (singly or doubly), or "crossed-out", while a subscript or superscript image specified by PARTIAL LINE FORWARD (PLD) or PARTIAL LINE BACKWARD (PLU) is in effect, the relevant graphic rendition aspects also apply - in the appropriate form - to the subscript or the superscript image, respectively.

NOTES

1 Several parameter values can be used in combination in order to obtain, for example, the graphic rendition aspects "underlined italics". The maximum number of parameter values is four.

2 The default parameter value cannot be used in combination with any other parameter value.

3 The parameter values 4 and 21 cannot be used in combination with each other.

4 The parameter values 10 to 19 cannot be used in combination with each other.

5 Parameter value 26 indicates that the text that follows may be presented with variable-spacing graphic symbols, if required by the recipient. When variable-spacing character pitch is invoked, the parameter value of SELECT CHARACTER SPACING (SRS) specifies the nominal character pitch. For interworking with devices not capable of variable-spacing character pitch, a line or part of a line with variable-spacing graphic symbols should not contain more characters than are permitted by the currently effective pitch specified by the parameter value of the most recent occurrence of SHS.

6 This International Standard does not specify the use of SGR in conjunction with parameter values of SELECT PRESENTATION DIRECTIONS (SPD) other than the default parameter value. For text consisting of graphic characters ordered other than from left to right along the lines of the page images, it may be that some parameter values of SGR have no meaning or only a meaning analogous to but not identical with the meaning defined in this International Standard. For example, Arabic script (written from right to left) might appear bold (drawn with thicker strokes) or with increased intensity and/or crossed out, but not italicized; for Japanese Kanji characters presented in vertical lines, the analogues of singly and doubly underlined may be taken to be straight and wavy vertical lines on the right of the highlighted characters.

15.27 SHS - SELECT CHARACTER SPACING

Notation: (Ps)
Representation: CSI Ps 02/00 04/11

Parameter default value: Ps = 0

SHS is used to establish the character spacing for subsequent text. The established spacing remains in effect until the next occurrence of SHS or of SET CHARACTER SPACING (SCS) in the data stream.

The parameter values are:

0	10 characters per 25,4 mm
1	12 characters per 25,4 mm
2	15 characters per 25,4 mm
3	6 characters per 25,4 mm
4	3 characters per 25,4 mm
5	9 characters per 50,8 mm
6	4 characters per 25,4 mm

NOTES

1 The character spacing specified by the parameter value of SHS takes effect immediately. When it is required to specify the character spacing that will become effective with the beginning of a line, SHS should immediately precede the combination of CARRIAGE RETURN (CR) and LINE FEED (LF), or CR and FORM FEED (FF), that indicates the beginning of that line.

2 SHS affects the active position movements caused by subsequent occurrences of graphic characters including SPACE, or of the control functions CHARACTER POSITION FORWARD (HPR), or CHARACTER POSITION BACKWARD (HPB).

3 A change of character spacing may be taken to imply an appropriate change in the size of graphic characters for subsequent text.

4 SHS with a parameter value of 0, 1, or 2 may be taken to imply that graphic characters are to be presented with their baseline parallel to the character path.

5 SHS is relevant only for use with constant-spacing graphic symbols. When variable-spacing graphic symbols are to be used, their spacing along the line will depend on the font in use. This is a matter outside the scope of this International Standard, and one to be determined by a higher-level protocol or by prior agreement, for example.

15.28 SLH - SET LINE HOME

Notation: (Pn)
Representation: CSI Pn 02/00 05/05

No parameter default value.

SLH is used to establish at position n within the active line and lines of subsequent text the position to which the active position will be moved by subsequent occurrences of CARRIAGE RETURN (CR) or of NEXT LINE (NEL) in the data stream; where n equals the value of Pn.

The established position is called the line home position and remains in effect until the next occurrence of SLH in the data stream.

The unit in which the parameter value is expressed is the BASIC MEASUREMENT UNIT (BMU). See 15.37.

The direction of the character path and the direction of the line progression depend on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise are from left to right and from top to bottom, respectively.

15.29 SLL - SET LINE LIMIT

Notation: (Pn)
Representation: CSI Pn 02/00 05/06

No parameter default value.

SLL is used to establish at position n within the active line and lines of subsequent text the position beyond which the active position can normally not be moved; where n equals the value of Pn.

The established position is called the line limit position and remains in effect until the next occurrence of SLL in the data stream.

The unit in which the parameter value is expressed is the BASIC MEASUREMENT UNIT (BMU). See 15.37.

The direction of the character path and the direction of the line progression depend on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise are from left to right and from top to bottom, respectively.

15.30 SLS - SET LINE SPACING

Notation: (Pn)
Representation: CSI Pn 02/00 06/08

Parameter default value: Pn = 200

SLS is used to establish the line spacing for subsequent text. The established spacing remains in effect until the next occurrence of SLS or of SELECT LINE SPACING (SVS) in the data stream.

Pn specifies the line spacing.

The unit in which the parameter value is expressed is the BASIC MEASUREMENT UNIT (BMU). See 15.37.

15.31 SP - SPACE

Notation: (Cx)
Representation: 02/00

In this International Standard SP has the properties of both a graphic character and a control function.

As a logical control function, SP acts as a word delimiter and indicates a potential line breaking point, except when it is immediately followed by another SP or by an occurrence of NO BREAK HERE (NBH). Any SPACEs that precede a line terminating control function and follow the last graphic character of that line, shall be ignored in processing.

As a graphic character, SP has a visual representation consisting of the absence of a graphic symbol. However, any graphic rendition aspect that is in effect, for example, "underlined", also applies to SP. SP causes the active position to be advanced by one character position in the direction of the character path.

The direction of the character path depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is from left to right.

15.32 SPD - SELECT PRESENTATION DIRECTIONS

Notation: (Ps)
Representation: CSI Ps 02/00 05/03

Parameter default value: Ps = 0

SPD is used to establish for subsequent text the directions of the active position movement for graphic characters and for the control functions which initiate movement of the active position. The established directions remain in effect until the next occurrence of SPD in the data stream.

The direction of the character path may be temporarily reversed by START REVERSED STRING (SRS).

The parameter values are:

0 the direction of the character path is from left to right; the direction of the line progression is from top to bottom

1 the direction of the character path is from top to bottom; the direction of the line progression is from right to left

3 the direction of the character path is from right to left; the direction of the line progression is from top to bottom

NOTE - A change in the direction of writing of Japanese characters may be taken to imply a change in the orientation, relative positioning and/or font of some characters.

15.33 SPH - SET PAGE HOME

Notation: (Pn)
Representation: CSI Pn 02/00 06/09

No parameter default value.

SPH is used to establish at position n within the active page and subsequent pages the position to which the active position will be moved by subsequent occurrences of FORM FEED (FF) in the data stream; where n equals the value of Pn.

The established position is called the page home position and remains in effect until the next occurrence of SPH in the data stream.

The unit in which the parameter value is expressed is the BASIC MEASUREMENT UNIT (BMU). See 15.37.

The direction of the line progression depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is from top to bottom.

NOTE - This control function is not part of the repertoire of ISO 6429:1988.

15.34 SPL - SET PAGE LIMIT

Notation: (Pn)
Representation: CSI Pn 02/00 06/10

No parameter default value.

SPL is used to establish at position n within the active page and subsequent pages the position beyond which the active position can normally not be moved; where n equals the value of Pn.

The established position is called the page limit position and remains in effect until the next occurrence of SPL in the data stream.

The unit in which the parameter value is expressed is the BASIC MEASUREMENT UNIT (BMU). See 15.37.

The direction of the line progression depends on the parameter of SELECT PRESENTATION DIRECTIONS (SPD), if any, or otherwise is from top to bottom.

NOTE - This control function is not part of the repertoire of ISO 6429:1988.

15.35 SRCS - SET REDUCED CHARACTER SEPARATION

Notation: (Pn)
Representation: CSI Pn 02/00 06/06

Parameter default value: Pn = 0

SRCS is used to establish reduced inter-character escapement for subsequent text. The established reduced escapement remains in effect until the next occurrence of SRCS or of SET ADDITIONAL CHARACTER SEPARATION (SACS) in the data stream or until it is reset to the default value by a subsequent occurrence of CARRIAGE RETURN / LINE FEED (CR LF) or of NEXT LINE (NEL) in the data stream.

Pn specifies the number of units by which the inter-character escapement is reduced.

The unit in which the parameter value is expressed is the BASIC MEASUREMENT UNIT (BMU). See 15.37.

15.36 SRS - START REVERSED STRING

Notation: (Ps)
Representation: CSI Ps 05/11

Parameter default value: Ps = 0

SRS is used to establish a direction for a string of graphic characters, the beginning and the end of which are indicated by SRS. This direction is opposite to the currently established one. The indicated text is to be presented following the preceding text.

The beginning of the string is indicated by SRS with a parameter value of 1. The end of the string is indicated by SRS with a parameter value of 0.

A string enclosed by SRS may contain one or more nested strings of graphic characters, the beginning and ends of which are indicated by SRS as described above.

After the end of the string, the direction is re-established to the one in effect prior to the indicated string, and the active position is moved to the character position following the graphic characters presented.

The parameter values are:

0 end of the string; the direction of the character path is re-established,

1 start of the string; the direction of the character path is reversed.

NOTE - This definition allows "reversed" strings to be nested within one another, for example, it permits a (left-to-right) Latin-alphabet text to include a (right-to-left) Arabic-alphabet or Hebrew-alphabet text which contains a (left-to-right) number or numbers, that is, numbers with the most-significant digit in the leftmost position.

The permitted depth (number of levels) of nesting will depend upon the implementation, the necessary depth upon the application; it may exceed that of the commonplace example above.

15.37 SSU - SELECT SIZE UNIT

Notation: (Ps)
Representation: CSI Ps 02/00 04/09

Parameter default value: Ps = 5

SSU is used to establish the unit in which the numeric parameters of certain control functions are expressed. The established unit remains in effect until the next occurrence of SSU in the data stream.

The parameter values are:

0 CHARACTER

5 BASIC MEASUREMENT UNIT, BMU - 0,021 17 mm (1/1 200 of 25,4 mm)

15.38 SSW - SET SPACE WIDTH

Notation: (Pn)
Representation: CSI Pn 02/00 05/11

No parameter default value.

SSW is used to establish for subsequent text the character escapement associated with the character SPACE. The established escapement remains in effect until the next occurrence of SSW in the data stream or until it is reset to the default value by a subsequent occurrence of CARRIAGE RETURN / LINE FEED (CR LF), or of CARRIAGE RETURN / FORM FEED (CR FF), or of NEXT LINE (NEL) in the data stream.

Pn specifies the escapement.

The unit in which the parameter value is expressed is the BASIC MEASUREMENT UNIT (BMU). See 15.37.

The default character escapement of SPACE is specified by the most recent occurrence of SET CHARACTER SPACING (SCS), or of SELECT CHARACTER SPACING (SHS) in the data stream if the current font has constant-spacing character pitch, or is specified by the nominal width of the character SPACE in the current font if that font has variable-spacing character pitch.

15.39 SUB - SUBSTITUTE

Notation: (C0)
Representation: 01/10

SUB is used in place of a character that has been found invalid or in error.