

JIS

JAPANESE INDUSTRIAL STANDARD

**File Specification for Japanese
Documents Interchange
(Geometric Graphics)**

JIS X 4003—1989

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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JAPANESE INDUSTRIAL STANDARD

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File Specification for Japanese Documents Interchange X 4003-1989
(Geometric Graphics)1. Scope

This Japanese Industrial Standard specifies the specifications of document files to be used in the case where the Japanese document interchanges based on characters and geometrical graphics are carried out, using flexible disk cartridges, between the Japanese word processors or between the information processing machines having functions equal to these.

This Standard specifies the following contents.

- (1) Configuration of the document file
- (2) Types and formats of information constituting the document file
- (3) Types and functions of character codes (graphic characters and control characters) to be used
- (4) Configuration of block data
- (5) Representation of geometrical graphics and storage formats of descriptive information

2. Definitions

For the purposes of this Standard, the following definitions apply, and the others are in accordance with the Japanese Industrial Standards related to information processing terms.

- (1) document Information represented in two-dimensional form so as to be comprehended by humans, for example, that which is printed on paper or displayed on screens. In this Standard, the document consists of not less than one page containing document format information which defines the initial value of the format at the time of the creation of the document.
- (2) document file A file consisting of one or more documents which are the objects of the interchange of Japanese documents. The document file consists of a document header part and a document data part. One document is stored on a medium in the form of a pair of the document header information in the document header part and the document substance in the document data part.

Applicable Standards and Reference Standards: See page 105.

- (3) file A string of related records to be treated as a single unit. The file can be stored either in the whole or part of one volume or extending over two or more volumes.
- (4) volume A physical unit of data medium which is capable of being attached or detached. In this Standard, the flexible disk cartridge corresponds to this. In one volume, one or more files can be stored.
- (5) record A set of continuous data constituting a unit of storing and reading on a medium. In this Standard, the length of a record is 256 bytes.
- (6) extent A string of records having continuous addresses of an ascending order.
- (7) system label An assembly of volume header label, file header label, etc. specified in JIS X 0603.
- (8) document header information Information which is placed before a document substance to be stored in a document file and which identifies each document and indicates its storing location, attributes of the document, etc.
- (9) document interchange level The level of a document classified in terms of the existence or nonexistence of blocks for graphics included in the document to be interchanged, the types of control characters to be treated, etc.
- (10) document format information The information which defines the dimensions of papers on which documents are to be printed, physical arrangement of characters on papers, method of physical representation of individual characters, etc. In this Standard, this information is used for defining the initial value of the format of interchanged document.
- (11) control function A control string which begins with control character or the particular function represented by this. In this Standard, 22 types of control functions given in Table 5 are used.
- (12) graphic characters Characters other than control characters having the visual representation of printing and displaying. In this Standard, the characters specified either in 2 to 7 row of the Roman character 7-bit code Table or 02 to 07 row of the Roman character 8-bit code Table of JIS X 0201 and the code table for graphic characters of JIS X 0208 are used.
- (13) text A string of graphic characters and control functions in a document composed of one or more pages.
- (14) page A unit of a text split in terms of physical restriction of paper or the style of document.
- (15) line A dimensional list of characters in a page which is a unit for dividing a page in the character direction.

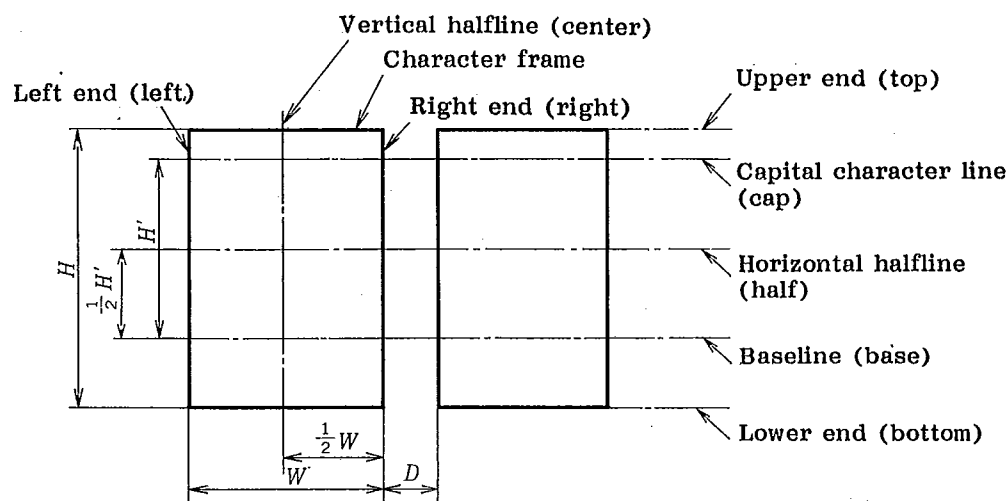
- (16) character pitch The feed amount of characters in arranging characters in a line.
- (17) line pitch The feed amount of lines in arranging lines.
- (18) character direction The direction of reading of characters.
- (19) line direction The direction vertical to the direction of reading of characters.
- (20) vertical writing The arrangement of characters in which the characters of each line are read vertically from the top to the bottom.
- (21) horizontal writing The arrangement of characters in which the characters of each line are read horizontally from the left to the right.
- (22) active position The position of the character to be processed next. After processing, the active position usually advances by one character.
- (23) home position of line The position where the first character of a line begins. This is the position where the leftmost character begins in the case of horizontal writing and the position where the uppermost character begins in the case of vertical writing, and this is the character position succeeding the margin corresponding to the number of characters of the margin column in the character direction of a document format information.
- (24) end position of line The position of the last character of a line, i.e., the position where the rightmost character terminates in the case of horizontal writing, and where the lowermost character terminates in the case of vertical writing, and this is the character position corresponding to the sum of the number of characters in the margin column in the character direction and the number of characters in the column of the number of characters per line of a document format information.
- (25) full size The size of a character which is normal in the character direction.
- (26) half size The size of a character which is 50 % of a full size in the character direction.
- (27) double size The size of a character which is 200 % of a full size in the character direction.
- (28) block A rectangular area for accommodating the graphs for business, geometrical graphics, etc. in a page of a document.
- (29) block format information Data in which the correspondence of the position of the block in document with the data such as graphs for business and geometric graphic and the dimensions of the block have been described.
- (30) geometrical graphic A graphic contained in a document, of which graphic primitives are generated from the display instruction and geometrical coordinate data.

- (31) graphical primitives The fundamental minimum units to be used for configuring a graphic. For example, a dot, a segment of a line, a circular arc, a character, a polyline, etc.
- (32) attribute elements The physical characteristics which are bestowed on a graphical element, the name and quantity of which are capable of representing individual properties. For example, the type of line, line width, color, character height, etc.
- (33) geometrical graphic area A rectangular area established in a block in which the geometrical graphics are arranged.
- (34) virtual device coordinates The two-dimensional orthogonal coordinates independent of the device and having an infinite extent. Their positions on the coordinates are referred to by the absolute coordinates. This is also called VDC.
- (35) virtual device coordiante area A rectangular area established on the virtual device coordinates each side of which is parallel to the axes of coordinate system. By designating the origin of the area and the direction of the axis of the coordinate system, the graphic configured in the area is mapped in the geometrical graphic area (device coordinates). In this Standard, this is also called VDC extent.
- (36) geometrical graphic data The data which describe the geometrical graphic. In this Standard, these consist of the geometrical graphic attributes and geometrical graphic data string.
- (37) geometrical graphic attributes A part of the data which describe the geometrical graphic, and which, as that part, controls the interpretation of the coupling relations and positioning data of coordinates data, attributes data and graphics. In this Standard, these consist of the origin of virtual device coordinates, format attributes which designate the upper limit of their size and attribute data, and the predetermined value attributes which designate the interpretation when required attributes have not been clarified.
- (38) geometrical graphic data string Those data which have described the geometrical graphics included in the document in the order of their appearance, and which consist of the operation codes designating the graphic primitives or attribute elements and combinations of argument. In this Standard, the operation codes and argument are represented in accordance with Annex 5.
- (39) color table The table which defines colors by retaining as code values the quantitative mixing ratio of the three primary colors of the RGB color system. The number of the items of the table indicates the number of colors (excluding bbackground color) capable of being displayed simultaneously, and the position of the item is referred to by a color index.
- (40) color index The positive integer to be used for identifying the items of the color table.

- (41) enumerated values The integer values which are allotted to several defined conditions respectively, and the sizes of these values are determined by the order in which their names have been arranged in this Standard.
- (42) indices These are the enumerated values in the case where names not defined in this Standard are used, to which it is permitted to allot negative integers.
- (43) The names and meanings of individual parts related to the characters of the graphical elements are as given in the following (see Fig. 1).

<u>Character String</u>	A graphical element consisting of a string of characters.
<u>Character Frame</u>	In arranging characters, a rectangle which defines the whole aspect of the character shape.
<u>Character Width</u>	The size of the character frame vertical to the direction of the character.
<u>Character Spacing</u>	The distance between the right end of a character frame and the left end of the next character frame of the two adjoining character frames. This is also called the margin between characters. In this Standard, the distance is expressed by a ratio to the height of character.
<u>Character Height</u>	The distance between the base line and the capital character line.
<u>Baseline</u>	For the purpose of horizontal alignment of characters of a certain writing style, a line drawn in parallel to the bottom of a rectangle. For example, the capital characters and small characters without downward protrusions are aligned to this line. This is also called the "base".
<u>Capital Character Line</u>	An imaginary horizontal line obtained by connecting the uppermost ends of the characters of a certain writing style. This is also called the "cap".
<u>Vertical Halfline</u>	A line passing the center of the character frame vertically to the baseline. This is also called the "center".
<u>Horizontal Halfline</u>	A line bisecting the character height vertically to the vertical halfline. This is also called the "half".

Fig. 1. Parts and Names of Characters for Character-string



H : height of character frame

H' : height of character

W : character width

D : character spacing (margin between characters)

3. Configuration of Extended File for Japanese Documents Interchange (Geometrical Graphics)

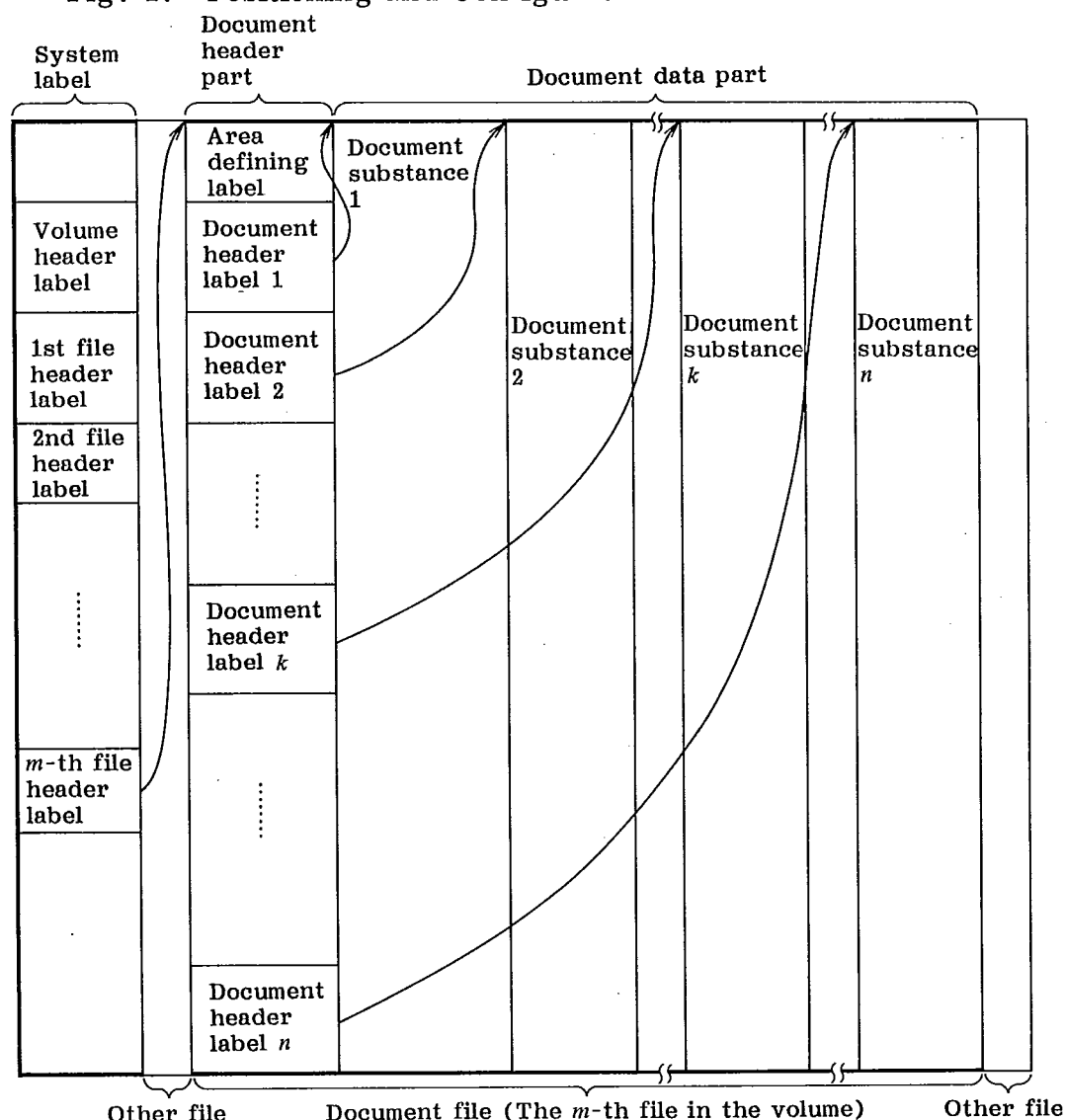
3.1 Document File The document file shall be the file constituted on the flexible disk cartridge in accordance with JIS X 0603, and this shall be the non-blocked format of 256 bytes per sector (basic level).

The document file shall be composed of a document header part and a document data part.

The document to be treated in this Standard shall consist of document header labels and document substances. These shall be represented respectively in correspondence with the document header part and the document data part on the document file. The positioning and configuration of the document file shall be as given in Fig. 2.

Further, one document file shall be stored in one volume.

Fig. 2. Positioning and Configuration of Document File



Remarks 1. The document k shall consist of the document header label k and the document substance k (k means from 1 to n).

2. The area defining label shall be in accordance with 4.2.

3.2 Document Header Part The document header part shall be positioned in the top part of the document file, and be composed of one area defining label and one or more document header labels. The area defining label shall be area defining information designating the area of document header part, and its contents shall be in accordance with 4.2.

The document header label shall be the document header information carrying out the identification of each document included in the document file, the designation of the places of storing them in the file, etc., and its contents shall be in accordance with 4.3.

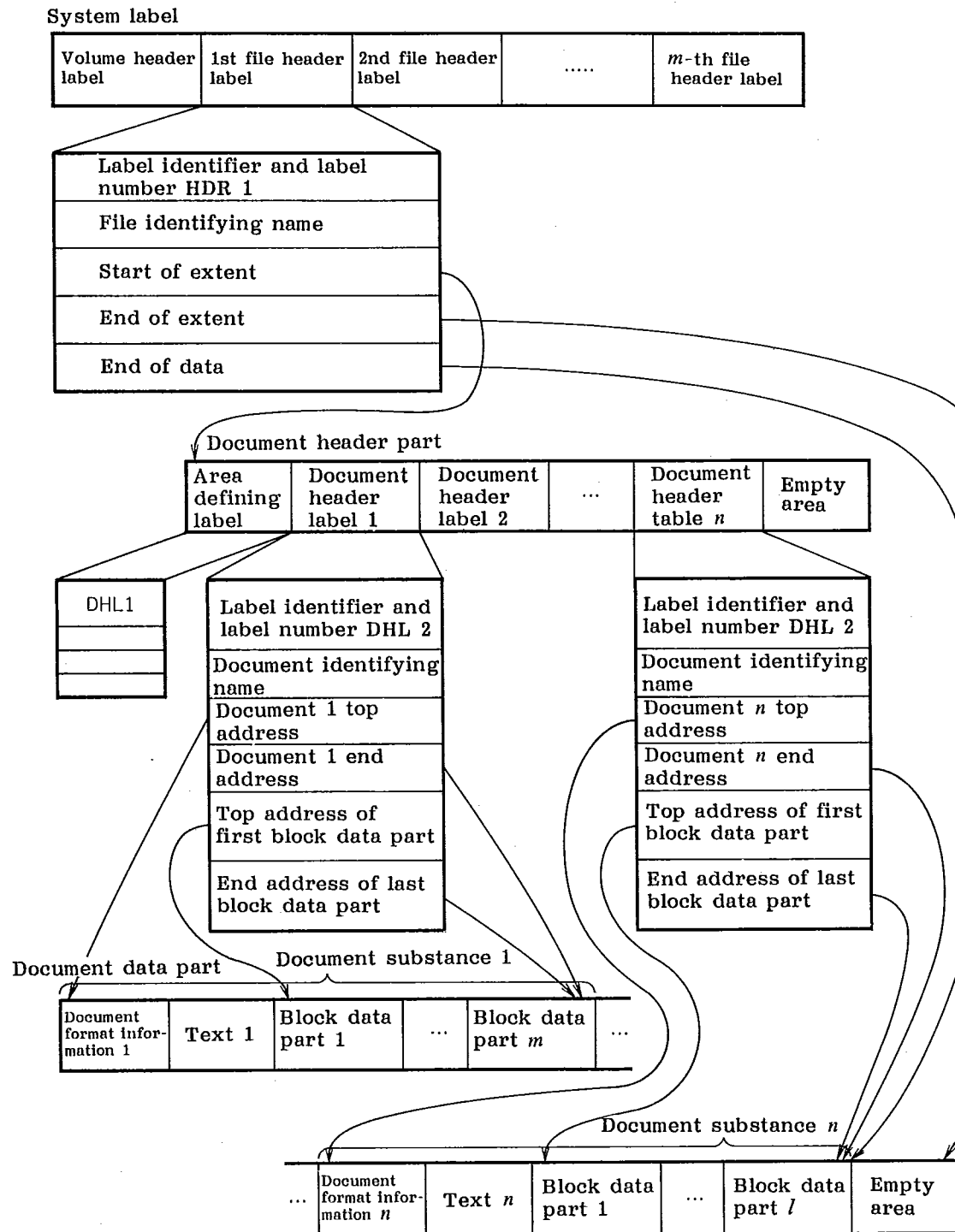
3.3 Document Data Part The document data part shall be composed of one or more document substances which are defined by the document header labels existing in the document header part. One document substance shall be composed of one document format information and one text and zero or more block data parts. The document format information shall be stored at the top of the document substance, and its contents shall be in accordance with 5.2. The text and the block data parts shall be as given in (1) to (6), and their contents shall be in accordance with 6. to 8., respectively.

- (1) The text shall begin immediately after the preceding document format information.
- (2) The block data part shall follow the text.
- (3) The overall text and the block data part shall be stored in the continuous records in the volume.
- (4) The top of the first block data part of the document data part shall be designated by the document header label concerned.
- (5) The length of each block data part shall be designated by the block format information concerned, and the next block data part shall begin from the succeeding record.
- (6) All the characters from the control function DT (document terminator) in the text of each document or in the block data part to the terminal of the document shall be ignored at the time of document interchange.

The positioning of the document header part and document data part on the document file shall be as given in Fig. 3.

Further, the format of system label shall be in accordance with Annex 1.

Fig. 3. Positioning of Document Header Part and Document Data Part on Document File



Remark 1. The details of the file header label shall be in accordance with Annex 1 Table 2.

2. One document substance shall consist of one document format information, one text and zero or more block data parts.

4. Document Header Part

4.1 Configuration of Document Header Part The document header part shall be positioned at the top of the document file, and shall consist of one area defining label and one or more document header labels.

4.2 Area Defining Label The area defining label shall indicate the area where the head label of a document contained in a document file is stored. The contents of the area defining label shall be as given in Table 1. The details shall be as given in (1) to (5).

Table 1. Area Defining Label

Position in label	Name	Length (Byte)	Content
1 to 3	Label identifier	3	Graphic characters "DHL"
4	Label number	1	Digit "1"
5 to 103	(To be secured for future standardization)	99	Spaces
104 to 108	Address of the last header label of document header part	5	Digits
109 to 113	End address of document header part	5	Digits
114 to 256	(To be secured for future standardization)	143	Spaces

Remark: The codes of characters representing the contents shall be in accordance with JIS X 0201.

- (1) Label Identifier (positions in label 1 to 3) This shall be the column for designating the label identifier, and its graphic characters shall be "DHL".
- (2) Label Number (position in label 4) This shall be the column for designating the label number, and shall be expressed by digit "1".
- (3) Address of Last Header Label of Document Header Part (positions in label 104 to 108) This shall be the column for indicating the record number of the last header label of document header part, and shall designate the corresponding record number counted from the top of file with the digits of five places. The number of the top record of the file shall be "00000".
- (4) End Address of Document Header Part (positions in label 109 to 113) This shall be the column for indicating the record number of the end of the document header part, and shall designate the corresponding record number counted from the top of the file with the digits of five places. The number of the top record of the file shall be "00000".

- (5) Columns to Be Secured for Future Standardization (positions in labels 5 to 103 and 114 to 256) These shall be the columns to be secured for future standardization, and shall be filled with spaces.

4.3 Document Header Label The document header label shall be made up for each document included in the document file, and shall indicate the identification of document, designation of storing place in the file, document interchange level, etc.

The first document header label shall be recorded immediately after the area defining label, that is, in the record number "00001".

The succeeding document header label shall be recorded immediately after the preceding document header label.

The contents of document header label shall be as given in Table 2. The details shall be as given in (1) to (20).

Table 2. Document Header Label

Position in label	Name	Length (Byte)	Content
1 to 3	Label identifier	3	Graphic characters "DHL"
4	Label number	1	Digit "2"
5	(To be secured for future standardization)	1	Space
6 to 65	Document indentifying name	60	Graphic characters (JIS X 0208)
66 to 85	Names of author	20	Graphic characters (JIS X 0208)
86 and 87	Edition number	2	Digits
88 to 95	Creation date	8	Digits
96 to 99	Number of pages	4	Digits
100	(To be secured for future standardization)	1	Space
101 and 102	Document interchange level	2	Digits "10", "11", "20" or "30"
103	(To be secured for future standardization)	1	Space
104 to 108	Top address of document substance	5	Digits

Table 2 (Continued)

Position in label	Name	Length (Byte)	Content
109 to 113	End address of document substance	5	Digits
114 to 116	Number of unused bytes of last record of text	3	Digits
117	Bypass indication	1	Graphic characters
118 to 125	Password	8	Graphic characters
126	(To be secured for future standardization)	1	Space
127 to 131	Top address of first block data part	5	Digits or spaces
132 to 136	End address of last block data part	5	Digits or spaces
137 to 180	(To be secured for future standardization)	44	Spaces
181	Graphic indication for business	1	Space or digit "1"
182	Geometrical graphic indication	1	Space or digit "1"
183	Raster graphic indication	1	Space
184 to 196	(To be secured for future standardization)	13	Spaces
197 to 256	Document memo	60	Graphic characters (JIS X 0208)

Remark: The code of characters for representing contents, unless referred to JIS X 0208, shall be in accordance with JIS X 0201.

- (1) Label Identifier (positions in label 1 to 3) This shall be the column for indicating the label identifier, and shall be expressed by graphic characters "DHL".
- (2) Label Number (position in label 4) This shall be the column for indicating the label number, and shall be expressed by digit "2".
- (3) Identification Name of Document (positions in label 6 to 65) This shall be the column for identifying document, and shall be expressed by graphic character. The identification name shall be designated for the document by the author of the document at the time of creation of the document.

- (4) Name of Author (positions in label 66 to 85) This shall be the column for indicating the author of the document, and shall be expressed by graphic character.
- (5) Edition Number (positions in label 86 and 87) This shall be the column for indicating the edition number of the document, and shall be expressed by digits.
- (6) Creation Date (positions in label 88 to 95) This shall be the column for indicating the date of creation of the document, and shall be expressed by the digits of 6 places consisting of lower 2 places of the year of A.D., 2 places of the month and 2 places of the day with hyphens "-" interposed between the year, month and day.
- (7) Page Number (positions in label 96 to 99) This shall be the column for indicating the number of pages contained in the document, and shall be expressed by digits.
- (8) Document Interchange Level (positions in label 101 and 102) This shall be the column for designating the existence or nonexistence of the block for graphics contained in the document and the types of control characters to be treated, and shall be indicated by the following digits.

Digits "10": This shall treat 21 types of control functions excluding BUS given in Table 5, and shall not include a block for graphics (fundamental type).

Digits "11": This shall treat 16 types of control functions excluding CHT, HTSA, JHY, NUL, DT and BUS given in Table 5, and shall not include a block for graphics (fundamental type).

Digits "20": This shall treat 22 types of control function given in Table 5, and shall include without fail the block of graphs for business specified in JIS X 4002 or blank block only.

Digits "30": This shall treat 22 types of control functions given in Table 5, and shall include without fail the block for geometrical graphics. However, this may include the block plus blank block of graphs for business.

- (9) Top Address of Document Substance (positions in label 104 to 108) This shall be the column for indicating the top record number in which the document substance is stored, and shall designate the corresponding record number counted from the top of the file by the digits of 5 places. The top record number of the file shall be "00000".
- (10) End Address of Document Substance (positions in label 109 to 113) This shall be the column for indicating the number of the last record in which the document substance is stored, and shall designate the corresponding record number counted from the top of the file by the digits of 5 places. The number of the top record of the file shall be "00000".

- (11) Number of Unused Bytes in Last Record of Text (positions in label 114 to 116) The number of unused bytes in the last record of the text shall be designated by the digits of 3 places.
- (12) Bypass Indication (position in label 117) In the document interchange, this shall be the column for indicating whether that particular document is to be ignored or not, and shall be designated by the following character.
- Space: Not ignored.
Graphic character "B": Ignored.
- (13) Password (positions in label 118 to 125) This shall be the column for designating the password for the document, and shall be designated by the graphic character of 8 places. When a character string conforming to the password has been given, then the document can be read. Only in the case where all the graphic character strings of 8 places are spaces, there shall be no password.
- (14) Top Address of First Block Data Part (positions in label 127 to 131) This shall be the column for indicating the top record number in which the first block data part is stored, and shall designate the corresponding record number counted from the top of the file by the digits of 5 places. The number of the top record of the file shall be "00000". However, when the number of pieces of the block data part is zero, it shall be filled with spaces.
- (15) End Address of Last Block Data Part (positions in label 132 to 136) This shall be the column for indicating the last record number in which the last block data part is stored, and shall designate the corresponding record number counted from the top of the file by the digits of 5 places. The number of the top record of the file shall be "00000". However, when the number of pieces of the block data part is zero, it shall be filled with spaces.
- (16) Graphic Indication for Business (position in label 181) This shall be the column for indicating whether or not the block of graph for business is included in the document, and shall be designated by the following character:
- Space: Not including any block of graph for business.
Digit "1": Including the block of a graph for business.
- (17) Geometrical Graphic Indication (position in label 182) This shall be the column for indicating whether or not the block for geometrical graphics is included in the document, and shall be designated by the following character:
- Space: Not including the block of geometrical graphics.
Digit "1": Including the block of geometrical graphics.

- (18) Raster Graphic Indication (position in label 183) This shall be the column for indicating whether or not the block for raster graphic is included in the document, and shall be designated by the following character:

Space: Not including any block of raster graphics.

Position in the label: Each column in the positions in label 181 to 183 shall indicate the type of graphic contained in a document in the case where the document interchange level is "20" or "30".

When all of these positions are spaces, the document does not include a block for graphic.

- (19) Document Memo (positions in label 197 to 256) This shall be the column to be used for notes at the time of creating the document or at the time of document interchange, and shall be filled with the graphic characters.
- (20) Columns to Be Secured for Future Standardizations (positions in label 5, 100, 103, 126, 137 to 180, and 184 to 196) These shall be the columns to be secured for future standardizations, and shall be filled with spaces.

5. Document Data Part

5.1 Configuration of Document Data Part The document data part shall be composed of one or more document substances which have been defined by the document header label in the document header part. Each document substance shall consist of the document format information of 256 bytes and the text and block data part immediately succeeding it.

5.2 Document Format Information The document format information shall be the data which define the initial value of the format of the interchanging document, and its contents shall be as given in Table 3. The details shall be as given in (1) to (9). Part or all of the document format information may be omitted. When an omission is made, columns concerned shall be filled with spaces. The format for the omission of a whole part shall be in accordance with Annex 2.

Table 3. Document Format Information

Position in record	Name	Length (Byte)	Content
1 and 2	Page format	2	Digits
3	Selection of vertical writing or horizontal writing	1	Digit "0" or "1"
4 and 5	Character pitch	2	Digits
6 and 7	Line pitch	2	Digits
8 to 14	(To be secured for future standardization)	7	Spaces
15 to 17	Number of characters per line	3	Digits
18 to 20	Number of lines per page	3	Digits
21 and 22	Margin in line direction	2	Digits
23 and 24	Margin in character direction	2	Digits
25 to 256	(To be secured for future standardization)	232	Spaces

Remark: The codes of the characters for representing contents shall be in accordance with JIS X 0201.

- (1) Page Format (positions in record 1 and 2) This shall be the column for designating the format of each combination of the size and direction of paper, and shall designate it with the following digits of 2 places. When digits are omitted, they shall be considered to be "10".

Digits "00": the format of short-side direction line in common with A 4 and North American size

Digits "10": the format of A 4 size short-side direction line

Digits "11": the format of A 4 size long-side direction line

Digits "12": the format of B 5 size short-side direction line

Digits "13": the format of B 5 size long-side direction line

Digits "14": the format of B 4 size short-side direction line

Digits "15": the format of B 4 size long-side direction line

Remarks 1. The North American size shall be 215.9 mm x 279.4 mm.

2. The digits "00" shall be for the European documents, and the digits "10" to "15" shall be for the Japanese documents.

- (2) Vertical Writing and Horizontal Writing (position in record 3)
This shall be the column for designating the distinction between the vertical writing and horizontal writing, and shall be designated by the digit of one place given in the following:
When a digit is omitted, it shall be considered to be "0".
Digit "0": horizontal writing
Digit "1": vertical writing
Remark: The digit "0" shall be for the European documents, and the digit "0" and digit "1" shall be for the Japanese documents.
- (3) Character Pitch (positions in record 4 and 5) This shall be the column for designating the character pitch, and shall be designated by the digits of 2 places given in the following. When digits are omitted, they shall be considered to be "03".
Digits "00": 10 characters per 25.4 mm
Digits "03": 6 characters per 25.4 mm
Remark: The digits "00" shall be for the European documents, and the digits "03" shall be for the Japanese documents.
- (4) Line Pitch (positions in record 6 and 7) This shall be the column for designating the line pitch, and shall be designated by the digits of 2 places given in the following. When the digits are omitted, they shall be considered to be "01".
Digits "00": 6 lines per 25.4 mm
Digits "01": 4 lines per 25.4 mm
Digits "02": 3 lines per 25.4 mm
Digits "03": 12 lines per 25.4 mm
Remark: The digits "00" to "03" shall be for the European documents, and the digits "00" to "02" shall be for the Japanese documents.
- (5) Number of Characters per Line (positions in record 15 to 17)
This shall be the column for designating the number of characters per line, and shall be designated by the digits of 3 places. When digits are omitted, they shall be considered to be the value given in Annex 3 Table 1.
- (6) Number of Lines per Page (positions in record 18 to 20) This shall be the column for designating the number of lines per page, and shall be designated by the digits of 3 places. When digits are omitted, they shall be considered to be the value given in Annex 3 Table 2.
- (7) Margin in Line Direction (positions in record 21 and 22) This shall be the column for designating the margin from the end of paper to the first line, and the amount of margin shall be designated by the digits of 2 places. The amount of margin shall be expressed by the number of lines in the unit of line pitch defined in the line pitch [see (4)]. When omitted, the digits shall be considered to be "03".

- (8) Margin in Character Direction (positions in record 23 and 24)
This shall be the column for designating the margin from the end of paper to the first character position, and the amount of margin shall be designated by the digits of 2 places. The amount of margin shall be expressed by the number of characters in the unit of character pitch defined in the character pitch [see (3)]. When omitted, the digits shall be considered to be "06".
- (9) Areas to Be Secured for Future Standardizations (positions in record 8 to 14 and 25 to 256) These shall be the columns to be secured for future standardizations, and shall be filled with spaces.

6. Text

6.1 Configuration of Text The text shall consist of graphic characters and control functions.

6.2 Graphic Characters The text shall begin with the conditions specified in JIS X 0208. The graphic characters shall use both the character set of JIS X 0208 and the character set for Roman characters of JIS X 0201. The switchover of the two shall be designated by the escape sequences given in Table 4.

Further, among the graphic characters specified in JIS X 0208, the characters and symbols from the point No.13 to the point No. 18 of the 1st section (accent symbols) and the point No. 94 of the 2nd section (○ for composition) shall be used in combination with other graphic characters. The method of combination shall be in accordance with the processing system definition.

Table 4. Escape Sequences of Graphic Character Switchover

	7 bits	8 bits
Switchover to JIS X 0201	ESC 2/8 4/10	ESC 02/8 04/10
Switchover to JIS X 0208	ESC 2/4 4/2	ESC 02/4 04/2

6.3 Control Functions

6.3.1 Types and Representations of Control Functions The control functions shall use the combinations of the 22 characters given in Table 5.

Further, the code extension technique shall be in accordance with JIS X 0202.

- (1) In the Case of 8-bit Code The coded representations of control functions not accompanied with parameters shall be as given in Table 6. The coded representations of control functions accompanied with parameters shall be as given in Table 7.
- (2) In the Case of 7-bit Code The control functions not accompanied with parameters shall be as given in Table 8 and Table 9. The coded representations of control functions accompanied with parameters shall be as given in Table 7.

Table 5. Types and Classification of Control Functions

Division	Subdivision	Name	Symbol	Parameter	Applicable document interchange level
Information separation		Document terminator	DT		"10" "20" "30"
	Position control	Backspace	BS	n	"10" "11" "20" "30"
		Character direction tabulation advance	CHT		"10" "20" "30"
		Line feed	LF		"10" "11" "20" "30"
		Form feed	FF		"10" "11" "20" "30"
		Carriage return	CR		"10" "11" "20" "30"
		Space	SP		"10" "11" "20" "30"
Format control	Tabulation control	Character direction tabulation designation	HTSA	$n_1; n_2; \dots$	"10" "20" "30"
	Style control	Page format selection	PFS	s	"10" "11" "20" "30"
		Select presentation directions	SPD	s	"10" "11" "20" "30"
		Select line spacing	SVS	s	"10" "11" "20" "30"
		Select character spacing	SHS	s	"10" "11" "20" "30"
		Graphic size modification	GSM	$n_1; n_2$	"10" "11" "20" "30"
		Select graphic rendition	SGR	s	"10" "11" "20" "30"
		Jogging	JFY	s	"10" "20" "30"
		Block designation	BUS	n	"20" "30"

Table 5 (Continued)

Division	Subdivision	Name	Symbol	Parameter	Applicable document interchange level
Special control	Special format control	Partial line up	PLU		"10" "11" "20" "30"
		Partial line down	PLD		"10" "11" "20" "30"
	Escape control	Escape	ESC		"10" "11" "20" "30"
		Control sequence introducer	CSI		"10" "11" "20" "30"
	Others	Null character	NUL		"10" "11" "20" "30"
		Substitute character	SUB		"10" "11" "20" "30"

Remarks 1. % of the parameter shall indicate the numerical value parameter, and s the selection parameter.

2. Where parameter column is blank, it indicates that the control function concerned accompanies no parameter.

Table 6. Coded Representation of Control Characters in the Case of 8-bit Codes

								0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
								0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	1	1
								0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	1	1
								0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b ₈	b ₇	b ₆	b ₅	b ₄	b ₃	b ₂	b ₁	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	15	15
0	0	0	0	0	0	0	0	NUL		SP															
0	0	0	1	1	1	1	1																		
0	0	1	0	2																					
0	0	1	1	3																					
0	1	0	0	4																					
0	1	0	1	5																					
0	1	1	0	6																					
0	1	1	1	7																					
1	0	0	0	8	BS																				
1	0	0	1	9																					
1	0	1	0	10	LF	SUB																			
1	0	1	1	11		ESC										PLD	CSI								
1	1	0	0	12	FF	DT										PLU									
1	1	0	1	13	CR																				
1	1	1	0	14																					
1	1	1	1	15																					

Table 7. Coded Representation of Control Functions Accompanied with Parameters

Symbol	Coded representation
PFS	CSI <i>s</i> 02/0 04/10
SGR	CSI <i>s</i> 06/13
SHS	CSI <i>s</i> 02/0 04/11
SVS	CSI <i>s</i> 02/0 04/12
SPD	CSI <i>s</i> 02/0 05/3
GSM	CSI <i>n</i> ₁ ; <i>n</i> ₂ 02/0 04/2
JFY	CSI <i>s</i> 02/0 04/6
CHT	CSI <i>n</i> 04/9
HTSA	CSI <i>n</i> ₁ ; <i>n</i> ₂ ; ... 02/10 04/14
BUS	CSI <i>n</i> 02/0 04/15

- Remarks 1. *n* of the parameter shall indicate the numerical value parameter, and *s* the selection parameter. The parameter values thereof shall be as given in Table 11 and Table 12.
2. In the case of 7-bit codes, assumption shall be made by excluding the digit 0 at the top of the string number.

Table 8. Coded Representation of Control Characters in the Case of 7-bit Codes

							0	0	0	0	1	1	1	1
							0	0	1	1	0	0	1	1
							0	1	0	1	0	1	0	1
b ₇	b ₆	b ₅	b ₄	b ₃	b ₂	b ₁	00	01	02	03	04	05	06	07
			0	0	0	0	NUL		SP					
			0	0	0	1								
			0	0	1	0								
			0	0	1	1								
			0	1	0	0								
			0	1	0	1								
			0	1	1	0								
			0	1	1	1								
			1	0	0	0	8	BS						
			1	0	0	1	9							
			1	0	1	0	10	LF	SUB					
			1	0	1	1	11		ESC					
			1	1	0	0	12	FF	DT					
			1	1	0	1	13	CR						
			1	1	1	0	14							
			1	1	1	1	15							

Table 9. Coded Representation of Control Functions in the Case of 7-bit Codes

Symbol	Coded representation
PLD	ESC 4/11
PLU	ESC 4/12
CSI	ESC 5/11

6.3.2 Functions of Control Functions The functions of the control functions shall be as given in Table 10.

Table 10. Control Functions

Name	Function
Document terminator (DT)	The shall be the information separating function which indicates the termination of one document substance. Remark: This shall cancel release all of the graphic characters and control functions into the fundamental conditions.
Backspace (BS)	This shall be the format control function which allows the active position to retreat by one character in the same line. In this Standard, this shall be used for the sole purpose of allowing it to retreat from the first character position in a line (home position) by the number of characters in the left side margin in full size. Remark: When it is used for the purpose of composing two or more graphic characters, the composition achievement is not guaranteed.
Character direction tabulation advance (CHT)	This shall be the format control function which allows the active position to advance, in the same line, to the tabulation position n positions ahead of all the HTSA tabulation positions designated in advance. Remark: n shall be the numerical value parameter which allows the active position to advance to the position the number n in front. When the value of n has been omitted, it shall be allowed to advance to the next tabulation position on the assumption that $n = 1$ has been designated.
Line feed (LF)	This shall be the format control function which indicates the start of a new line. This only permits the active position, keeping the same character position, to advance to the next line, and shall not permit transfer in character direction. LF shall generally be used in a pair with CR.
Form feed (FF)	This shall be the format control function which permits the active position, keeping the same character position, to advance to the 1st line of the next page, and shall not permit transfer in character direction. FF shall generally be used in a pair with CR.

Table 10 (Continued)

Name	Function
Carriage return (CR)	This shall be the format control function which permits the active position to transfer to the character position of the start of the same line (home position), and shall not permit transfer in line direction. Remarks 1. CR shall generally be used in a pair with LF or FF. 2. CR, when used for the purpose of composing lines, the composition result is not guaranteed.
Space (SP)	This shall be the format control function which permits the active position, in the same line, to advance by one character. Remark: SP shall also be considered to be either a control function or a graphic character which is not printed.
Character direction tabulation designation (HTSA)	This shall be the format control function which designates one or more character direction tabulation positions equally for the lines coming after the next line in which the active position exists. Remarks 1. The plural number of tabulation position designations shall be carried out by designating the necessary number of pieces of numerical value parameters. By this control function, the character direction tabulation position which previously been established shall be cancel-released. 2. The value of parameter shall be designated by the number of characters of half size counted from the home position of line.
Page format selection (PFS)	The shall be the format control function which designates the page format succeeding a repagination, and it shall designate the formats of respective combinations of the sizes of paper and directions, using selection parameter. The number of characters per line and the number of lines per page for individual page formats shall be in accordance with Annex 3. This designation shall be valid until the next PFS appears. The value of parameter shall be as given in the following: Digit "0": Format of short-side direction line common to A 4 and the North American size Digits "10": Format of A 4 size short-side direction line Digits "11": Format of A 4 size long-side direction line Digits "12": Format of B 5 size short-side direction line Digits "13": Foramt of B 5 size long-side direction line

Table 10 (Continued)

Name	Function
(Cont'd)	Digits "14": Format of B 4 size short-side direction line Digits "15": Format of B 4 size long-side direction line Remark: The parameter value "0" shall be for the European documents, and "10" to "15" shall be for the Japanese documents.
Select presentation direction (SPD)	This shall be the format control function which designates the representing direction of the characters succeeding a repagination, and it shall designate the selection of vertical writing or horizontal writing using selection parameter. This designation shall be valid until the next SPD appears. The values of parameter shall be as given in the following: Digit "0": horizontal writing Digit "1": vertical writing Remark: The parameter value "0" shall be for the European documents, and "0" and "1" shall be for the Japanese documents.
Select line spacing (SVS)	This shall be the format control function which designates the line pitch for the succeeding text, and it shall designate the line pitch with a selection parameter. This designation shall be valid until the next SVS appears. The values of parameter shall be as given in the following: Digit "0": 6 lines per 25.4 mm Digit "1": 4 lines per 25.4 mm Digit "2": 3 lines per 25.4 mm Digit "3": 12 lines per 25.4 mm Remarks 1. SVS shall designate the line pitch after the next line feed. 2. Parameter values "0" to "3" shall be for the European documents, and "0" to "2" for the Japanese documents.
Select character pitch (SHS)	This shall be the format control function which designates the character pitch for the succeeding text, and it shall designate the character pitch with a selection parameter. This designation shall be valid until the next SHS appears. The values of parameter shall be as given in the following: Digit "0": 10 characters per 25.4 mm Digit "3": 6 characters per 25.4 mm Remarks 1. SHS shall also be valid for SP and BS. 2. The parameter value "0" shall be for the European documents, and "3" for the Japanese documents.

Table 10 (Continued)

Name	Function												
Graphic size modification (GSM)	This shall be the format control function which alters the size of the graphic character of 2-byte code. The sizes of the graphic characters of 2-byte codes shall be classified into three types of full size, half size and double size, and these shall be designated by parameters. This designation shall be valid until the next GSM appears. Remarks 1. This shall be designated by the 2 numerical values of the magnification in line direction (the first parameter) and the magnification in character direction (the second parameter) of the graphic character of 2-byte codes. 2. The unit of the parameter value shall be in percentage (%). 3. The characters covered by the half size shall be those included in JIS X 0201 as part of the character assemblies of JIS X 0208. The characters covered by the double size shall be all the characters excluding the characters from point 1 to point 32 of division 8 (ruled line elements) among the characters of JIS X 0208. The parameter values shall be as given in the following: <table><tr><th>Meaning</th><th>Parameter values</th><th>Coded representation</th></tr><tr><td>Full size</td><td>100 ; 100</td><td>CSI 3/1 3/0 3/0 3/11 3/1 3/0 3/0 2/0 4/2</td></tr><tr><td>Half size</td><td>100 ; 50</td><td>CSI 3/1 3/0 3/0 3/11 3/5 3/0 2/0 4/2</td></tr><tr><td>Double size</td><td>100 ; 200</td><td>CSI 3/1 3/0 3/0 3/11 3/2 3/0 3/0 2/0 4/2</td></tr></table>	Meaning	Parameter values	Coded representation	Full size	100 ; 100	CSI 3/1 3/0 3/0 3/11 3/1 3/0 3/0 2/0 4/2	Half size	100 ; 50	CSI 3/1 3/0 3/0 3/11 3/5 3/0 2/0 4/2	Double size	100 ; 200	CSI 3/1 3/0 3/0 3/11 3/2 3/0 3/0 2/0 4/2
Meaning	Parameter values	Coded representation											
Full size	100 ; 100	CSI 3/1 3/0 3/0 3/11 3/1 3/0 3/0 2/0 4/2											
Half size	100 ; 50	CSI 3/1 3/0 3/0 3/11 3/5 3/0 2/0 4/2											
Double size	100 ; 200	CSI 3/1 3/0 3/0 3/11 3/2 3/0 3/0 2/0 4/2											
Select graphic rendition (SGR)	This shall be the format control function having selection parameter which alters the display attributes of the succeeding graphic character string. This designation shall be valid until the next SGR appears. The parameter value shall be as given in the following: Digit "0": the termination of select graphic rendition Digit "4": the initiation of underlines Remarks 1. In the case of vertical writing, a right sideline shall be attached. 2. By using SGR, an underline may be attached to the partially lined-up characters or partially lined-down characters.												

Table 10 (Continued)

Name	Function
Joggling (JFY)	This shall be the format control function which designates the joggling of the graphic character strings of LF, FF or JFY indicating the termination of joggling, of all the succeeding graphic character strings, between the home position of line and the end of line. The types of joggling or termination of joggling shall be designated by the following selection parameters. Digit "0": the termination of joggling Digit "6": to joggle the center of graphic character string to the middle between home position of line and the end of line. Digit "7": to joggle the last character of graphic character line to the end of line.
Block designation (BUS)	This shall be the format control function which indicates the presence of a block. Using the numerical value parameters of four places, the corresponding block number shall be indicated. The block shall be secured by taking the character position of this control function as the reference point. The size of a block shall be designated in line direction and character direction from the reference point respectively, based on the line direction block dimension and the character direction block dimension indicated in block format information. Remarks 1. In the case where CR and LF or CR and FF have been given immediately before this control function, the reference point of block shall be the character position at the top of the next line or at the top of the next page. 2. The character position of the character code succeeding this control function shall be advanced to the position not overlapping the block to be secured. Further, no overlapping of the blocks is supposed to exist. 3. The reference point of block shall be in the left upper corner of this control function position in the case of horizontal writing, and in the right upper corner of this control function position in the case of vertical writing.

Table 10 (Continued)

Name	Function
Partial line-up (PLU)	This shall be the format control function which designates the start of partial line-up or the termination of partial line-down of graphic characters. In a condition where the partial line-down is valid, it shall be considered to be the termination of partial line-down, and in the other cases, it shall be considered to be the start of partial line-up. PLU shall be valid, in the case of the start of partial line-up, until PLD appears. In the case where an underline is designated in advance of PLU, the PLU shall give no influence to the underline. Remark: This shall be used for the purpose of providing a superscript or a subscript.
Partial line-down (PLD)	This shall be the format control function which designates the start of partial line-down or the termination of partial line-up of graphic characters. In a condition where the partial line-up is valid, it shall be considered to be the termination of partial line-up, and in the other cases, it shall be considered to be the start of partial line-down. PLD shall be valid, in the case of the start of partial line-down, until PLU appears. In the case where an underline is designated in advance of PLD, the PLD shall give no influence to the underline. Remark: This shall be used for the purpose of effecting a superscript and a subscript.
Escape (ESC)	This shall be the special control function for the purpose of effecting code extension.
Control sequence introducer (CSI)	This shall be the special control function for the purpose of effecting extension of control function.
Null character (NUL)	This shall be the special control function to fill the empty space of medium.
Substitute character (SUB)	This shall be the special control function for character substitution. When any abnormality of a code has been detected, SUB shall substitute for the code. This informs the operator, through its position of existence, of the existence of the abnormality and its position by printing or displaying the particular character which has been entrusted to the apparatus.

6.3.3 Representation of Control Functions The coded representation of control functions shall be as given in Table 11 and Table 12.

Table 11. Coded Representation of Control Functions in the Case of 8-bit Codes

Control characters	Parameter value	Coded representation
DT	—	01/12
BS	—	00/8
CHT	1	09/11 03/1 04/9
	2	09/11 03/2 04/9
	...	...
	n	09/11 n 04/9
LF	—	00/10
FF	—	00/12
CR	—	00/13
SP	—	02/0
HTSA	$n_1 ; n_2 ; \dots$	09/11 n_1 03/11 n_2 03/11.....02/0 04/14
PFS	0	09/11 03/0 02/0 04/10
	10	09/11 03/1 03/0 02/0 04/10
	11	09/11 03/1 03/1 02/0 04/10
	12	09/11 03/1 03/2 02/0 04/10
	13	09/11 03/1 03/3 02/0 04/10
	14	09/11 03/1 03/4 02/0 04/10
	15	09/11 03/1 03/5 02/0 04/10
	...	...
SPD	0	09/11 03/0 02/0 05/3
	1	09/11 03/1 02/0 05/3
SVS	0	09/11 03/0 02/0 04/12
	1	09/11 03/1 02/0 04/12
	2	09/11 03/2 02/0 04/12
	3	09/11 03/3 02/0 04/12
SHS	0	09/11 03/0 02/0 04/11
	3	09/11 03/3 02/0 04/11
GSM	100 ; 100	09/11 03/1 03/0 03/0 03/11 03/1 03/0 03/0 02/0 04/2
	100 ; 50	09/11 03/1 03/0 03/0 03/11 03/5 03/0 02/0 04/2
	100 ; 200	09/11 03/1 03/0 03/0 03/11 03/2 03/0 03/0 02/0 04/2
SGR	0	09/11 03/0 06/13
	4	09/11 03/4 06/13
JFY	0	09/11 03/0 02/0 04/6
	6	09/11 03/6 02/0 04/6
	7	09/11 03/7 02/0 04/6
BUS	n	09/11 n 02/0 04/15
PLD	—	08/11
PLU	—	08/12
ESC	—	01/11
CSI	—	09/11
NUL	—	00/0
SUB	—	01/10