MDP 40B

Programmer Manual
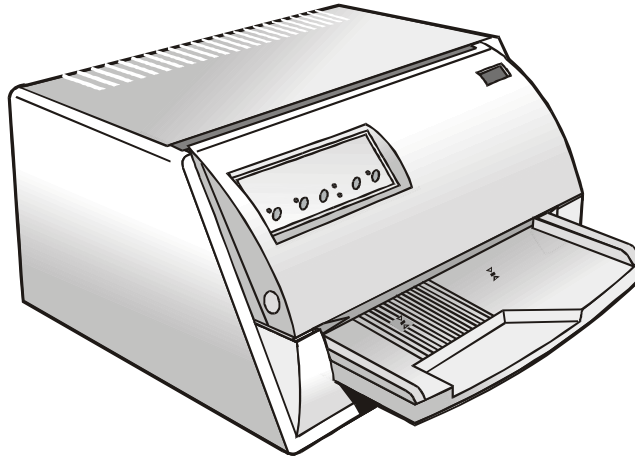
Compuprint

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Introduction

This appendix provides information about the commands supported by your printer. The commands are organized by function groups. Each command has both a brief and a detailed description.

Each command has the following structure:

- Name and function description. Information about protocol (IBM Proprinter XL24E, IBM Personal 2391+, EPSON ESC/P2)

- The hexadecimal and decimal codes for the command: *n* represents variable parameters of the command. The functions of these parameters are explained in its corresponding command description.

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EPSON/IBM Mode

This printer according to the IBM Proprinter XL24E, IBM 2391+ and EPSON ESC/P2 emulations supports the following printer commands.

Print and Line Feed Execution

CR
Prints all received data and the column counter is set to the left margin. (IBM,EPSON)

ASCII Code	CR
Hexadecimal Value	0D
Decimal Value	13

This code is a terminator code; when received, it causes any data in the buffer to be printed out. The print head then moves logically to the left margin position. The column counter is set to the left margin value and a line feed is inserted automatically after the carriage return (see the automatic carriage return function in the printer setup). The code resets the double width printing set by SO code.

ESC]
Sets a reverse line feed. (IBM)

ASCII Code	ESC]
Hexadecimal Value	1B 5D
Decimal Value	27 93

This code is a terminator code; when received, it causes the current contents of the print buffer to be printed out, before reversing the paper by one line at the current vertical spacing. If no data precedes this command or if the preceding data consists of spaces, the code causes only a reverse line feed to be performed. When the line counter is equal to or less than the top of the form value, the ESC] is ignored.

ESC 5
Sets an automatic line feed after a carriage return. (IBM)

ASCII Code	ESC 5 n
Hexadecimal Value	1B 35 n
Decimal Value	27 53 n

If n is equal to 1, this command sets an automatic line feed on receiving of a CR code. If n is equal to 0, this command cancels the automatic line feed.

n	Automatic line feed
0	Disabled
1	Enabled

ESC J
Advances paper n/180 inch. (EPSON)

ASCII Code   ESC J n
Hexadecimal Value   1B 4A n
Decimal Value   27 74 n
Range $0 \leq n \leq 255$

This is a terminator code; it therefore causes the current contents of the print buffer to be printed out before performing a single line LF of n/180 inch. This command is cancelled after the LF has been performed. The printing will restart after a line feed from the column at which the command was sent.

LF
Line Feed. (IBM, EPSON)

ASCII Code   LF
Hexadecimal Value   0A
Decimal Value   **10**

This is a terminator code; it therefore causes the current contents of the print buffer to be printed out before advancing the paper by one line at the current vertical spacing. If no data precedes the LF code, or if the preceding data consists of spaces, the code causes only a line feed.

When the line counter reaches the last line of the form (defined by software or function menu), the LF code causes a skip to the first line of the next form or ejects a cut sheet, if loaded. This code cancels the double width printing set by the SO code. In IBM mode, the column counter is set to the first column if the automatic carriage return is selected. In EPSON mode, the column is always set to the first column.

Format Control

ESC $
Sets the absolute printing position. (EPSON)

ASCII Code	ESC & n_1 n_2
Hexadecimal Value	1B 24 n_1 n_2
Decimal Value	27 36 n_1 n_2
Range	$0 \leq n_1 \leq 255$
	$0 \leq n_2 \leq 127$

This command specifies the distance from the left margin where you want to print subsequent characters. The default unit is 1/60 inch. The distance is in number of dots and must be calculated using the following formula:

Margin distance = $n_1 + (n_2 \times 256) \times 1/60"$ + (left margin)

Where n_2 is equal to:

$$\text{INIT} \frac{[(\text{horizontal position}) - (\text{left margin position})] \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

Where n_1 is equal to:

$$\text{MOD} \frac{[(\text{horizontal position}) - (\text{left margin position})] \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

If the selected position is outside the current right margin, the sequence will be ignored.

ESC (C
Sets page length in defined unit. (EPSON)

ASCII Code   ESC (C n_1 n_2 d_1 d_2
Hexadecimal Value   1B 28 43 n_1 n_2 d_1 d_2
Decimal Value   27 40 67 n_1 n_2 d_1 d_2
Range $n_1 = 2$
                           $n_2 = 0$
                           $0 \leq ((d_2 \times 256) + d_1) \times \text{(defined unit)} \leq 22$

This command sets the page length in the specified number of units (the default unit is 1/360 inch), previously defined with the ESC (U command according to the following formula:

Page length $= ((d_2 \times 256) + d_1) \times \text{(defined unit)}$

Where d_2 is equal to:

$$\text{INIT}\ \frac{\text{(page length)} \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

Where d_1 is equal to:

$$\text{MOD}\ \frac{\text{(page length)} \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

Set the page length before paper is loaded or when the print position is at the top-of-form position. Otherwise, the current print position becomes the top-of-form position. Setting the page length cancels the top and bottom-margin settings. If the defined unit is changed it does not affect the current page-length setting.

ESC (c
Sets Page Format. (EPSON)

ASCII Code	ESC (c n_1 n_2 t_1 t_2 b_1 b_2
Hexadecimal Value	1B 28 63 n_1 n_2 t_1 t_2 b_1 b_2
Decimal Value	27 40 99 n_1 n_2 t_1 t_2 b_1 b_2
Range	$n_1 = 4$
	$n_2 = 0$
	$((t_2 \times 256) + t_1) < ((b_2 \times 256) + b_1)$
	(defined unit) x $((b_2 \times 256) + b_1) \leq 22$

This command sets the top and bottom margins in the defined units, set with the ESC (U command, according to the following formulas:

Top margin = $((t_2 \times 256) + t_1)$ x (defined unit)

Where t_2 is equal to:

$$INIT \frac{(\text{top margin}) \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

Where t_1 is equal to:

$$MOD \frac{(\text{top margin}) \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

Bottom margin = $((b_2 \times 256) + b_1) \times$ (defined unit)

Where b_2 is equal to:

$$\text{INIT} \frac{\text{(bottom margin)} \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

Where b_1 is equal to:

$$\text{MOD} \frac{\text{(bottom margin)} \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

Send this command before paper is loaded or when paper is at the top-of-form position. Otherwise the current print position becomes the top-margin position. Measure both top and bottom margins from the top edge of the page. The baseline for printing characters on the first line is 20/180 inch below the top-margin position.

This command cancels any previous top and bottom-margin settings.

ESC (U
Sets units. (EPSON)

ASCII Code	ESC (U n_1 n_2 d
Hexadecimal Value	1B 28 55 n_1 n_2 d
Decimal Value	27 40 85 n_1 n_2 d
Range	$n_1 = 1$
	$n_2 = 0$
	d = 10, 20, 30, 40, 50,60

This command sets the unit to m/3600 inch. The printer uses this unit when moving the print position, setting the page length and setting the top and bottom margins with the following commands (the default units varies depending on the command and print quality):

Commands	Default Unit
ESC (V	1/360 inch
ESC (v	1/360 inch
ESC (C	1/360 inch
ESC (c	1/360 inch
ESC \ (LQ mode)	1/180 inch
ESC \ (Draft mode)	1/120 inch
ESC $	1/60 inch

ESC (V
Sets absolute vertical print position. (EPSON)

ASCII Code	ESC (V n_1 n_2 d_1 d_2
Hexadecimal Value	1B 28 56 n_1 n_2 d_1 d_2
Decimal Value	27 40 86 n_1 n_2 d_1 d_2
Range	$n_1 = 2$
	$n_2 = 0$
	$0 \leq d_1 \leq 255$
	$0 \leq d_2 \leq 127$

This command moves the vertical print position to the position specified by the following formula:

Vertical position = $(d_2$ x $256)+d_1)$ x (defined unit) + (top-margin position)

Where d_2 is equal to:

$$\text{INIT} \frac{[(\text{vertical position}) - (\text{top margin position})] \text{ x } \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

Where d_1 is equal to:

$$\text{MOD} \frac{[(\text{vertical position}) - (\text{top margin position})] \text{ x } \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

The default unit is 1/360 inch. The new position is measured in defined units from the current top-margin position. Moving the print position below the bottom-margin position moves the vertical print position to the top-margin position on the next page ejects a cut sheet, if loaded.

The printer ignores this command if the command would move the print position more than 179/360 inch in the negative direction or if the command would move the print position in the negative direction after a graphics command is sent on the current line or above the point where graphics have previously been printed.

ESC (v
Sets relative vertical print position. (EPSON)

ASCII Code	ESC (v n_1 n_2 d_1 d_2
Hexadecimal Value	1B 28 76 n_1 n_2 d_1 d_2
Decimal Value	27 40 118 n_1 n_2 d_1 d_2
Range	$n_1 = 2$
	$n_2 = 0$
	$0 \le d_1 \le 255$
	$0 \le d_2 \le 127$

This command moves the vertical print position up or down from the current position, as specified by the following formula

Vertical position = (d_2 x 256)+d_1) x (defined unit) + (current position)

For positive (down) movement:

Where d_2 is equal to:

$$INIT \quad \frac{[\text{(vertical position)} - \text{(current position)}] \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

Where d_1 is equal to:

$$\text{MOD} \quad \frac{[(\text{vertical position}) - (\text{current position})] \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

For negative (left) movement:

Where d_2 is equal to:

$$32768\text{-INIT} \quad \frac{[(\text{current position}) - (\text{vertical position})] \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

Where d_1 is equal to:

$$32768\text{-MOD} \quad \frac{[(\text{current position}) - (\text{vertical position})] \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

The default unit is 1/360 inch. The new position is measured in defined units from the current position. Moving the print position below the bottom-margin position, it moves the vertical print position to the top-margin position on the next page ejects a cut sheet, if loaded.

The printer ignores this command if this one would move the print position more than 179/360 inch in the negative direction or if the command would move the print position in the negative direction after a graphics command is sent on the current line or above the point where graphics have previously been printed. The command would move the print position above the top-margin position.

ESC [\
Sets vertical units. (IBM)

ASCII Code   ESC [\ m_1 m_2 t_1 … t_4
Hexadecimal Value 1B 5B 5C m_1 m_2 t_1 … t_4
Decimal Value   27 91 92 m_1 m_2 t_1 … t_4
Range $m_1 = 4$
                    $m_2 = 0$
                    $0 \leq t_1 \leq 255$
                    $0 \leq t_2 \leq 255$
                    $t_3 = 0$
                    $t_4 = 180$ or 216

This command changes the base units for the graphics line spacing commands (ESC J, ESC 3). The default value is 1/216 or 1/180 inch.

ESC \
Sets the relative horizontal print position. (EPSON)

ASCII Code   ESC \ n_1 n_2
Hexadecimal Value 1B 5C n_1 n_2
Decimal Value   27 92 n_1 n_2
Range $0 \leq n_1 \leq 255$
                    $0 \leq n_2 \leq 127$

This command moves the horizontal print position left or right from the current position as specified by the following formula:

Horizontal position = $(n_2$ x 256$) + n_1)$ x (defined unit) + (current position)

For positive (right) movement:

Where n_2 is equal to:

$$\text{INIT} \quad \frac{[\text{(horizontal position)} - \text{(current position)}] \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

Where n_1 is equal to:

$$\text{MOD} \quad \frac{[\text{(horizontal position)} - \text{(current position)}] \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

For negative (left) movement:

Where n_2 is equal to:

$$\text{32768-INIT} \quad \frac{[\text{(current position)} - \text{(horizontal position)}] \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

Where n_1 is equal to:

$$\text{32768-MOD} \quad \frac{[\text{(current position)} - \text{(horizontal position)}] \times \left(\dfrac{1}{\text{defined unit}} \right)}{256}$$

The default unit is 1/120 inch in Draft mode and 1/180 inch in LQ mode. If it would move the print position outside the printing area, the printer ignores this command.

ESC +
Sets *n*/360-inch line spacing. (EPSON)

ASCII Code	ESC + *n*
Hexadecimal Value	1B 2B *n*
Decimal Value	27 43 *n*
Range	$0 \leq n \leq 255$

This command sets the line spacing to *n*/360 inch. If the line spacing is changed, it does not affect previous settings for vertical tabs or page length.

ESC 0
Selects 1/8-inch line spacing. (IBM, EPSON)

ASCII Code	ESC 0
Hexadecimal Value	1B 30
Decimal Value	27 48

This command causes line spacing to be set to 1/8 inch. If the line spacing is changed, it does not affect previous settings for vertical tabs or page length.

ESC 1
Selects 7/72-inch line spacing. (IBM)

ASCII Code	ESC 1
Hexadecimal Value	1B 31
Decimal Value	27 49

This command causes line spacing to be set to 7/72 inch.

ESC 2
Selects 1/6-inch line spacing. (EPSON)

ASCII Code	ESC 2
Hexadecimal Value	1B 32
Decimal Value	27 50

This command causes the line spacing to be set to 1/6 inch. If the line spacing is changed, it does not affect previous settings for vertical tabs or page length.

ESC 2
Enables the line spacing set by ESC A command. (IBM)

ASCII Code	ESC 2
Hexadecimal Value	1B 32
Decimal Value	27 50

This command starts line spacing at a value that was set by ESC A.

ESC 3
Sets *n*/180-inch line spacing. (EPSON)

ASCII Code	ESC 3 *n*
Hexadecimal Value	1B 33 *n*
Decimal Value	27 51 *n*
Range	$0 \leq n \leq 255$

This command sets the line spacing to *n*/180 inch. If the line spacing is changed, it does not affect previous settings for vertical tabs or page length.

ESC 3
Sets graphics line spacing at *n*/216 inch. (IBM)

ASCII Code	ESC 3 *n*
Hexadecimal Value	1B 33 *n*
Decimal Value	27 51 *n*
Range	$0 \leq n \leq 255$

This command sets graphics line spacing at *n* default unit defined by the ESC [\ command. To move exactly *n*/216 inch, *n* must be an integer multiple of 3.

ESC 4
Sets top of form (first printable line). (IBM)

ASCII Code	ESC 4
Hexadecimal Value	1B 34
Decimal Value	27 52

This sequence sets the first line of the fanfold paper as the current paper position of the form.

ESC A
Sets text line spacing at *n*/60 inch. (EPSON)

ASCII Code	ESC A *n*
Hexadecimal Value	1B 41 *n*
Decimal Value	27 65 *n*
Range	$0 \leq n \leq 85$

This command changes the default line spacing to *n*/60 inch. The new line spacing value is immediately activated.

ESC A
Sets text line spacing at *n*/72 inch. (IBM)

ASCII Code	ESC A *n*
Hexadecimal Value	1B 41 *n*
Decimal Value	27 65 *n*

This command changes the line spacing to *n*/72 inch. The line spacing value is stored and activated only after the ESC 2 code is received.

ESC B
Sets vertical tabs. (IBM, EPSON)

ASCII Code	ESC B $n_1 \dots n_x$ 0
Hexadecimal Value	1B 42 $n_1 \dots n_x$ 00
Decimal Value	27 66 $n_1 \dots n_x$ 0
Range	$1 \leq n \leq 255$

In EPSON mode, sets vertical tab stops in the 0 Vertical Format Unit (VFU) channel. This code sets up to 16 vertical tab stops at the line specified by n_1, n_2 and so on in the 0 VFU channel. The tab stops are memorized as physical positions.

In IBM modes, this code sets up to 64 vertical tab stops at the line number specified by n_1, n_2 and so on in the 0 VFU channel. The line at top of form is line 1. The tab stops are memorized as logical positions.

ESC C 0
Sets form length to *n* inches. (IBM, EPSON)

ASCII Code	ESC C 0 n
Hexadecimal Value	1B 43 00 n
Decimal Value	27 67 0 n
Range	$1 \leq n \leq 22$

This command sets the form length to the number of inches specified by n. The current position of the paper is assumed as top of form. Setting the paper length cancels the top and bottom-margin settings.

ESC C

Sets form length to *n* lines. (IBM, EPSON)

ASCII Code	ESC C *n*
Hexadecimal Value	1B 43 *n*
Decimal Value	27 67 *n*
Range	1 $\leq$ *n* $\leq$ 127

This command sets the form length to the number of lines specified by *n* at the current vertical spacing. The current position of the paper is assumed as top of form.

ESC D

Sets horizontal tabs. (IBM, EPSON)

ASCII Code	ESC D n_1 n_2 … n_x 0
Hexadecimal Value	1B 44 n_1 n_2… n_x 00
Decimal Value	27 68 n_1 n_2… n_x 0
Range	1 $\leq$ *n* $\leq$ 255

This sequence sets up to 28 (IBM mode) or 32 (EPSON mode) horizontal tab stops after canceling the current setting. The n_1 to n_x parameters specify the number of columns at which horizontal tab stops are required and must be entered in the sequence in ascending numerical order. Any value outside this range will be ignored.

In IBM mode, the tab stop position is memorized as logical position in the page so that it is affected by changing the horizontal spacing. The columns are numbered 1 through 136.

In EPSON mode, the tab stop position set by ESC D is memorized as physical position in the page and therefore it is not affected by changing the horizontal spacing. The physical position of the tab stop depends on the horizontal spacing in operation when ESC D is used. The ESC D 0 cancels all active tab stops.

ESC d
Spaces forwards relative dot position. (IBM)

ASCII Code   ESC d n_1 n_2
Hexadecimal Value   1B 64 n_{1} n_{2}
Decimal Value   27 100 n_1 n_2
Range $0 \leq n_1, n_2 \leq 255$

This command moves the print carriage of a $(n_1 + (n_2 * 256))/120$ inch displacement on the right of its current dot position. If the selected position is outside the current right margin, it is forced to the last column.

ESC EM
Loading/ejection of paper. (EPSON)

ASCII Code   ESC EM n
Hexadecimal Value   1B 19 n
Decimal Value   27 25 n

This command controls the fanfold and cut sheet feeding according to the parameters below:

n	Description
0, R	Cut Sheet Ejection
8	Current Paper Parking
9	Current Paper Loading

The parameter "R" ejects the currently loaded cut sheet without printing data from the line buffer.

ESC J

Graphics variable line spacing (*n*/216 inch). (IBM)

ASCII Code	ESC J *n*
Hexadecimal Value	1B 4A *n*
Decimal Value	27 74 *n*

This command advances the paper in units of $n/216$ inch. The printer does not store graphics line spacing. You must send this command to the printer each time.

ESC l

Sets left margin (10 cpi). (EPSON)

ASCII Code	ESC l *n*
Hexadecimal Value	1B 6C *n*
Decimal Value	27 108 *n*
Range	$0 \le n \le 255$

This code sets the left margin at the current horizontal spacing. It must be sent at the beginning of the line. The n parameter specifies the number of columns. For each type of horizontal spacing there is a different range of possible values, as shown in the following table.

Character Width	Horizontal Spacing	Range of columns
Double Width	5	$0 \le n \le 67$
	6 cpi	$0 \le n \le 80$
	7.5 cpi	$0 \le n \le 100$
	8.5 cpi	$0 \le n \le 114$
	10 cpi	$0 \le n \le 134$
Normal	10 cpi	$0 \le n \le 134$
	12 cpi	$0 \le n \le 160$
	15 cpi	$0 \le n \le 201$
	17 cpi	$0 \le n \le 229$
	20 cpi	$0 \le n \le 255$

ESC N
Sets the skipover perforation to _n_ lines. (IBM, EPSON)

ASCII Code	ESC N _n_
Hexadecimal Value	1B 4E _n_
Decimal Value	27 78 _n_
Range	$1 \leq n \leq 127$ (EPSON mode)
	$1 \leq n \leq 225$ (IBM mode)

The skipover perforation is the sum of top and bottom margins values at the selected vertical spacing. The _n_ parameter must be less than the current form length. The skipover is memorized as physical position on the page. It is cancelled by ESC O or changing the form length. The skipover value, when accepted, will set the top and bottom margins according to the operator panel setting (see the User Manual):

If the top margin set via operator panel is greater than the skipover value, then the following value of the margins will be set:

Top margin = skipover value

Bottom margin = 0

If the top margin set via operator panel is less or equal to the skipover value, then the following value of the margins will be set:

Top margin = operator panel value

Bottom margin = the difference between skipover value and top margin value

If the sum of the top and bottom margins values set via operator panel is less than the skipover value, the following values for the margins will be set:

Top margin = operator panel value

Bottom margin = the difference between skipover value and top margin value

Changing the vertical spacing does not affect the skipover distance. This can be changed by a further ESC N command or can be reset by the ESC O command, which resets the skipover value to 0. The skipover perforation will be executed when the end of the page is reached with a LF, VT or FF code and not with the ESC J or ESC C command, the skipover perforation is cancelled and must therefore be set again.

ESC O
Disables the skipover perforation. (IBM, EPSON)

ASCII Code	ESC 0
Hexadecimal Value	1B 4F
Decimal Value	27 79

This sequence sets the number of lines of the skipover perforation to the value 0 and so any skip perforation set by ESC N is cancelled.

ESC Q
Sets the right margin (10 cpi). (EPSON)

ASCII Code	ESC Q n
Hexadecimal Value	1B 51 n
Decimal Value	27 81 n
Range	$1 \leq n \leq 255$

This code sets the line length at the current horizontal spacing. It must be sent at the beginning of the line. The n parameter specifies the number of columns and for each type of horizontal spacing there is a range of values, as shown in the following table:

Character Width	Horizontal Spacing	Range of columns
Double Width	5 cpi	$1 \leq n \leq 68$
	6 cpi	$2 \leq n \leq 81$
	7.5 cpi	$2 \leq n \leq 102$
	8.5 cpi	$2 \leq n \leq 116$
	10 cpi	$2 \leq n \leq 136$
Normal	10 cpi	$2 \leq n \leq 136$
	12 cpi	$4 \leq n \leq 163$
	15 cpi	$4 \leq n \leq 204$
	17 cpi	$4 \leq n \leq 233$
	20 cpi	$4 \leq n \leq 255$

Any value outside the accepted range is ignored and the previous setting remains in effect. The right margin must be greater than the left margin. The physical position set for the right margin does not change if the horizontal spacing is modified.

ESC R
Sets all tabs to power-on settings. (IBM)

```
ASCII Code          ESC R
Hexadecimal Value   1B 52
Decimal Value       27 82
```

This command sets horizontal tab stops every eight columns starting from column 9 and cancels all vertical tab stops.

ESC SP
Sets intercharacter space. (EPSON)

ASCII Code	ESC SP *n*
Hexadecimal Value	1B 20 *n*
Decimal Value	27 32 *n*
Range	$0 \leq n \leq 127$

This command sets the intercharacter space to n/120 inch in Draft printing and n/180 inch in Quality printing.

ESC X
Sets left and right margins. (IBM)

ASCII Code	ESC X n_1 n_2
Hexadecimal Value	1B 58 n_1 n_2
Decimal Value	27 88 n_1 n_2
Range	$0 \leq n_1, n_2 \leq 255$

This command specifies left and right margin positions. The n_1 and n_2 parameters indicate respectively the number of columns for the left and right margins at the current spacing. These margins are memorized in terms of absolute displacement from the physical left edge of the page.

If n_1 is equal to 0, the current left margin of the page is used. If n_2 is equal to 0, the current right margin of the page is used. The left margin value must be less than the right margin value. The right margin value must not exceed the physical right edge of the paper; otherwise the maximum acceptable value for the right margin will be set.

FF

Advances paper to the top of the next page. (IBM, EPSON)

ASCII Code   FF
Hexadecimal Value   0C
Decimal Value   12

This code is a terminator code, when received, causes all data in the print buffer to be printed out. Then it advances the paper to the first printable line of the next form. The line counter is set to the first line value and the column counter is set to the left margin value. This code cancels the double width printing set by SO code.

HT

Horizontal Tab. (IBM, EPSON)

ASCII Code   HT
Hexadecimal Value   09
Decimal Value   9

This code moves logically the print carriage to the next horizontal tab stop as defined by ESC D.

In IBM mode, up to 28 horizontal tab stops can be set. The HT code is ignored if no tab stop has been set or if the current print carriage position has moved past the last tab position or if the tab stop is on or beyond the right margin. At power on, the tab stops are set every eight columns (default). The horizontal tab stops can be changed by the ESC D command.

In EPSON mode, up to 32 horizontal tab stops can be set. The default tab stops are memorized as logical position in the page, so that are affected by changing the horizontal spacing. The tab stop positions set by ESC D are memorized as physical position in the page and therefore they are not affected by changing the horizontal

spacing. When the double width printing is selected, the tab stop setting must take account that each character occupies two columns. Character scoring (underline, overscore and strikethrough) is not printed between the current print position and the next tab when this command is sent.

VT
Vertical Tab. (IBM, EPSON)

ASCII Code	VT
Hexadecimal Value	0B
Decimal Value	11

This code is a terminator code and when received causes the contents of the print buffer to be printed before advancing paper to the next vertical tab stop set by the ESC B command.

This code will be executed normally, if vertical tab stops follow the current print position. It will be executed like a FF code (EPSON mode) or like a LF code (IBM mode), if the vertical tab stops follow the bottom of form position (which corresponds to the form length if the bottom of form has not been set) or if the current position is beyond the last vertical tab stop. It will be executed like an LF code if no vertical tab stops have been set by the ESC B command. In EPSON mode, the vertical tabulations are referred to the VHF channel selected by the ESC / *m*. If no VFU channels have been selected, the printer assumes as default channel 0.

This command resets the double width printing set by SO or ESC SO command.

Print Mode

DC2
Sets 10 cpi printing. (IBM)

```
ASCII Code          DC2
Hexadecimal Value   12
Decimal Value       18
```

This is a terminator code. It causes all data present in the print buffer to be printed. This command is accepted at any position within the line. The character that follows this command will be printed at 10 cpi. This command does not cancel doublewide printing.

DC2
Cancels compressed printing. (EPSON)

```
ASCII Code          DC2
Hexadecimal Value   12
Decimal Value       18
```

This is a terminator code. It causes all data present in the print buffer to be printed. It is accepted at any position within the line. The character that follows this command will be printed as follows:

17 CPI	→	10 CPI
20 CPI	→	12 CPI

DC4
Cancels double width printing. (IBM, EPSON)

ASCII Code	DC 4
Hexadecimal Value	14
Decimal Value	20

This code cancels the double width printing set by SO or ESC SO code. It has no effect if the ESC W or ESC has set double width commands.

ESC -
Sets or cancels underlined printing. (IBM, EPSON)

ASCII Code	ESC - n
Hexadecimal Value	1B 2D n
Decimal Value	27 45 n

Enables or disables the underlined printing. See the following table:

n	Underlined Printing
1	enabled
0	disabled

ESC !
Master Select. (EPSON)

ASCII Code	ESC ! *n*
Hexadecimal Value	1B 21 *n*
Decimal Value	27 33 *n*
Range	$0 \leq n \leq 255$

This command selects any combination of several attributes. The parameter *n* is the sum up of the printing style values to be used. See the following table:

n	Style
0	10 cpi
1	12 cpi
4	Compressed
8	Emphasized
16	Double Strike
32	Double Width
64	Italic
128	Underlined

To print the desiderated combination of printing attributes, calculate the *n* parameter by adding up the values of each attribute.

ESC (-
Sets score line. (EPSON)

ASCII Code	ESC (- n_1 n_2 m d_1 d_2
Hexadecimal Value	1B 28 2D n_1 n_2 m d_1 d_2
Decimal Value	27 40 45 n_1 n_2 m d_1 d_2
Range	$n_1 = 3$
	$n_2 = 0$
	$m = 1$
	$1 \leq d_1 \leq 3$
	$d_2 = 1$

This command enables/disables scoring of all characters and spaces following this command according to the following parameters:

d_1	Line
1	Underline
2	Strikethrough
3	Overscore

d_2	Line
0	Cancel score line
1	Single continuous line
2	Double continuous line
5	Single broken line
6	Double broken line

Any combination of scoring may be set simultaneously. Each type is independent of other types. Graphics characters are not scored.

ESC :
Sets 12 CPI. (IBM)

ASCII Code	ESC :
Hexadecimal Value	1B 3A
Decimal Value	27 58

This is a terminator code. It causes all data present in the print buffer to be printed. Subsequent data will be printed at 12 cpi. This command is accepted at any position within the line. The setting of another horizontal spacing resets this command.

ESC [@
Sets double high printing and double line feed. (IBM)

ASCII Code	ESC [@ $l\ h\ m_1\ m_2\ m_3\ m_4$
Hexadecimal Value	1B 5B 40 $l\ h\ m_1\ m_2\ m_3\ m_4$
Decimal Value	27 91 64 $l\ h\ m_1\ m_2\ m_3\ m_4$

l =normally 4
h = normally 0
$m_1 = 0$
$m_2 = 0$

This command sets height, width and vertical spacing. The l and h parameters specify the number of mode bytes m_x contained in the sequence. The m_3 and m_4 parameters specify the printing characteristics.

m_3 controls both the line spacing and the character height. It has two parts: a high-order half-byte of m_3 controls the line spacing and the low-order half-byte controls the character height.

m_3	Character Height	Line Spacing
0	No change	No change
1	Standard character height	Line feeds unchanged
2	Double character height	Line feeds unchanged
16	Character height unchanged	Normal line feeds
17	Standard character height	Normal line feeds
18	Double character height	Normal line feeds
32	Character height unchanged	Double line feeds
33	Standard character height	Double line feeds
34	Double character height	Double line feeds

m_4 specifies the character width. Only the low-order half-byte is significant in this mode byte. The high-order half-byte is ignored.

m_4	Character Width	Line Spacing
0	No change	No change
1	Standard width character	No change
2	Double width character	No change

ESC [d
Set the print quality. (IBM 2391 only)

ASCII Code	ESC [d *1 0 n*
Hexadecimal Value	1B 5B 64 *01 00 n*
Decimal Value	27 91 100 *1 0 n*

This command sets the print quality to draft or LQ print. See the following table:

n	Types
0	No change
From 1 to 127	Draft
From 128 to 254	Letter Quality
255	Default Quality

ESC [I
Sets font and pitch of a character. (IBM 2391 only)

ASCII Code	ESC [I *2 0 m n*
Hexadecimal Value	1B 5B 49 *02 00 m n*
Decimal Value	27 91 73 *2 0 m n*

This command allows modifying the font and pitch type style of a character.

The values 2 and 0 are constants. If font lock and pitch lock are active, this command is ignored. To select the values for the variables *m* and *n*, which identify the pitch and the font type style to use, refer to the table below.

1. Identify the type style (pitch and font) to use in the left column (pitch).

2. For the hexadecimal values for *m n*, look across the row to the second column (Hex *m n*).

3. For the decimal values for *m n*, look across the row to the third column (Decimal *m n*).

Substitute these values for *m n* in the printer command syntax.

Pitch	Hexadecimal		Decimal		Decimal Value
	m	*n*	*m*	*n*	(m x 256 + n)
Courier					
10	00	0B	0	11	11
12	01	EB	1	235	491
15	01	EC	1	236	492
17	01	ED	1	237	493
20	01	EE	1	238	494
24	01	1E	1	30	286
PS	00	AB	0	171	171

Pitch	Hexadecimal		Decimal		Decimal Value
	m	*n*	*m*	*n*	(m x 256 + n)
Prestige					
10	00	0C	0	12	12
12	01	FE	1	239	495
15	01	OF	1	240	496
17	01	C9	1	201	457
20	01	CA	1	202	458
24	01	1F	1	31	287
PS	00	A4	0	164	164

Gothic					
10	00	24	0	36	36
12	01	8F	1	143	399
15	01	8E	1	142	398
17	01	8D	1	141	397
20	01	8C	1	140	396
24	01	20	1	32	288
PS	01	AE	1	174	174

Presentor					
10	00	19	0	25	25
12	01	D0	1	208	464
15	01	D1	1	209	465
17	01	D2	1	210	466
20	01	D3	1	211	467
24	01	23	1	35	291
PS	00	C7	0	199	199

Script					
10	01	D4	1	212	468
12	01	D5	1	213	469
15	01	D6	1	214	470
17	01	D7	1	215	471
20	01	D8	1	216	472
24	01	24	1	36	292
PS	00	C8	0	200	200

ESC _

Sets or cancels overscore printing. (IBM mode)

```
ASCII Code          ESC _ n
Hexadecimal Value   1B 5F n
Decimal Value       27 95 n
```

Enables or disables the overscore printing. See the following table:

n	Overscore Printing
1	Enabled (all spaces and characters that follow are overscored)
0	Disabled

ESC 4

Sets italics printing mode. (EPSON)

```
ASCII Code          ESC 4
Hexadecimal Value   1B 34
Decimal Value       27 52
```

Sets the style attribute of the font to italic. This command selects italic printing even if the italic character table is not selected.

ESC 5
Cancels italics printing. (EPSON)

ASCII Code	ESC 5
Hexadecimal Value	1B 35
Decimal Value	27 53

Sets the style attribute of the font to normal (cancels the italic style attribute previously selected with the ESC 4 command).

ESC c
Sets horizontal motion index (HMI). (IBM, EPSON)

ASCII Code	ESC c n_1 n_2
Hexadecimal Value	1B 63 n_1 n_2
Decimal Value	27 99 n_1 n_2
Range	$0 \leq n_2 \leq 4$
	$0 \leq n_1 \leq 255$
	$0 < ((n_2 \times 256) + n_1)) \leq 1080$
	HMI $\leq$ 3.00 inches

This command fixes the character width (HMI) according to the following formula:

Where HMI is equal to:

$$\frac{[(n_2 \times 256) + n_1]}{360} \text{ inch}$$

Where n_2 is equal to:

$$INT \frac{HMI \times 360}{256}$$

Where n_1 is equal to:

$$MOD \quad \frac{HMI \textbf{ x } 360}{256}$$

ESC E
Sets emphasized printing. (IBM, EPSON)

ASCII Code	ESC E
Hexadecimal Value	1B 45
Decimal Value	27 69

This command starts emphasized printing. The print head strikes each dot twice to produce a darker, bolder character. The second strike is offset horizontally.

ESC F
Cancels emphasized printing. (IBM, EPSON)

ASCII Code	ESC F
Hexadecimal Value	1B 46
Decimal Value	27 70

This command ends emphasized printing. This escape sequence cancels emphasized printing that was set by ESC E.

ESC G
Sets double strike printing. (IBM, EPSON)

ASCII Code	ESC G
Hexadecimal Value	1B 47
Decimal Value	27 71

This command starts double-strike printing. ESC G must be canceled by ESC H.

ESC g
Sets 15 CPI. (EPSON)

ASCII Code	ESC g
Hexadecimal Value	1B 67
Decimal Value	27 103

Subsequent data will be printed at 15 cpi. This command is accepted at any position within the line. This command resets the horizontal motion index (HMI) set with the ESC c command. If you change the pitch during proportional mode (selected with the ESC p command) the change takes effect when the printer exits proportional mode.

ESC H
Cancels double strike printing. (IBM, EPSON)

ASCII Code	ESC H
Hexadecimal Value	1B 48
Decimal Value	27 72

This command cancels double-strike printing with the ESC G command.

ESC I
Selects printing type for resident and DLL characters. (IBM)

ASCII Code   ESC I *n*
Hexadecimal Value   1B 49 *n*
Decimal Value   27 73 *n*

This command selects the resident or the download font in Draft o LQ printing mode. It is ignored if you select a font that has not been downloaded or has been overwritten. See the following table:

n	Resident font
0	Draft 10 cpi
2	LQ 10 cpi
3	Proportional
8	Draft 12 cpi
10	LQ 12 cpi
16	Draft 17 cpi
18	LQ 17 cpi

n	Download font
4	Draft 10 cpi
6	LQ 10 cpi
7	Proportional
12	Draft 12 cpi
14	LQ 12 cpi
20	Draft 17 cpi
22	LQ 17 cpi

ESC M
Selects 10.5 point, 12 cpi. (EPSON)

ASCII Code	ESC M
Hexadecimal Value	1B 4D
Decimal Value	27 77

This command selects 10.5-point, 12-cpi character printing. It resets the horizontal motion index (HMI) set with the ESC c command. If you change the pitch during proportional mode (selected with the ESC p command) the change takes effect when the printer exits proportional mode.

ESC P
Selects 10.5 point, 10 cpi. (EPSON)

ASCII Code	ESC P *n*
Hexadecimal Value	1B 50 *n*
Decimal Value	27 80 *n*

This command selects 10.5-point, 10-cpi character printing. It resets the horizontal motion index (HMI) set with the ESC c command. If you change the pitch during proportional mode (selected with the ESC p command) the change takes effect when the printer exits proportional mode.

ESC P
Sets or cancels proportional printing. (IBM)

ASCII Code	ESC P *n*
Hexadecimal Value	1B 50 *n*
Decimal Value	27 80 *n*

This code is a terminator code; when received it causes all data in the print buffer to be printed out. Then if *n* parameter is equal to 1, the subsequent data is printed in proportional mode. If *n* parameter is equal to 0, proportional mode is reset.

If the any horizontal spacing command is sent to the printer when the proportional printing is set, the command will be stored and will be activated as soon as the proportional printing will be reset.

ESC p
Sets or cancels proportional printing. (EPSON)

ASCII Code	ESC p *n*
Hexadecimal Value	1B 70 *n*
Decimal Value	27 112 *n*

This command selects the proportional or fixed spacing according to the following values:

n	Proportional Printing
0	Returns to current fixed character pitch
1	Selects proportional character spacing

It resets the horizontal motion index (HMI) set with the ESC c command. The changes made to the fixed-pitch setting with ESC P, ESC M or ESC g commands during proportional mode take effect when the printer exits proportional mode. The printer automatically switches to LQ mode when the printer exits proportional mode.

ESC q
Selects character style. (EPSON)

ASCII Code	ESC q *n*
Hexadecimal Value	1B 71 *n*
Decimal Value	27 113 *n*
Range	$0 \leq n \leq 3$

This command enables/disables outline and shadow printing according to the parameters below:

n	Style
0	Normal
1	Outline
2	Shadow
3	Outline with Shadow

ESC S
Sets subscript or superscript printing. (IBM, EPSON)

ASCII Code	ESC S *n*
Hexadecimal Value	1B 53 *n*
Decimal Value	27 83 *n*

Selects the subscript or the superscript printing. See the following table:

n	Selection
1	Subscript Print enabled
0	Superscript Print enabled

The proportional printing of the subscript or superscript characters is performed at 2/3 of the proportional character width. Use the ESC T command to cancel super/subscript printing.

ESC SI
Selects condensed mode. (IBM, EPSON)

```
ASCII Code          ESC SI
Hexadecimal Value   1B 0F
Decimal Value       27 15
```

This command selects the condensed mode in which character width is reduced as follows:

10 CPI	$\rightarrow$	17.14 CPI
12 CPI	$\rightarrow$	20 CPI
Proportional	$\rightarrow$	½ width

DC2 code cancels the condensed printing. This command resets the horizontal motion index (HMI) set with the ESC c command.

ESC SO
Sets double width printing (one line). (IBM, EPSON)

```
ASCII Code          ESC S0
Hexadecimal Value   1B 0E
Decimal Value       27 14
```

This code causes subsequent data in the same line to be printed as double width characters. It is canceled by the LF, VT, FF, DC4 and ESC W 0 commands or when the buffer is full. This command resets the horizontal motion index (HMI) set with the ESC c command.

ESC T
Cancels subscript or superscript printing. (IBM, EPSON)

ASCII Code   ESC T
Hexadecimal Value   1B 54
Decimal Value   27 84

This command cancels subscript or superscript printing selected by ESC S command.

ESC W
Sets or cancels double width printing. (IBM, EPSON)

ASCII Code   ESC W *n*
Hexadecimal Value   1B 57 *n*
Decimal Value   27 87 *n*
Range $0 \leq n \leq 1$

Enables or disables the double width printing. See the following table:

n	Selection
1	Double Width Printing enabled
0	Double Width Printing disabled

ESC w
Sets or cancels double height printing. (EPSON)

ASCII Code	ESC w *n*
Hexadecimal Value	1B 77 *n*
Decimal Value	27 119 *n*
Range	$0 \leq n \leq 255$

Enables or disables the double-height printing of all characters. The first line of a page is not doubled if the ESC w command is sent on the first line; all following lines are printed at double-height. See the following table:

n	Selection
1	Double Height Printing enabled
0	Double Height Printing disabled

ESC X
Selects font by pitch and point. (EPSON)

ASCII Code	ESC x *m n_1 n_2*
Hexadecimal Value	1B 58 *m n_1 n_2*
Decimal Value	27 88 *m n_1 n_2*
Range	$5 \leq m \leq 127$
	$0 \leq n_1 \leq 255$
	$0 \leq n_2 \leq 127$

This command puts the printer in scalable font mode and selects the pitch (default value 10 cpi) of the font according to the following formula:

Where *m* defines the pitch:

> $m = 0$ maintains current density
> $m = 1$ sets proportional spacing
> $m > 5$ selects fixed pitch equal to 360/*m* cpi

This command overrides the current pitch setting.

This command selects the point (default value 10.5) attributes of the font according to the following formula:

$$\text{Point size} = \frac{(n_2 \times 256) + n_1}{2}$$

n_1 and n_2 define size by point (1 point equals 1/72 inch).

$$n_2 = \text{INT} \frac{(\text{point size}) \times 2}{256}$$

$$n_1 = \text{MOD} \frac{(\text{point size}) \times 2}{256}$$

The point sizes available are the following: 8, 10, (10.5), 12, 14, 16, 18, 20, (21), 22, 24, 26, 28, 30, 32.

ESC x
Selects Letter Quality or Draft printing. (EPSON)

ASCII Code	ESC x *n*
Hexadecimal Value	1B 78 *n*
Decimal Value	27 120 *n*

This command selects either LQ or Draft printing according to the following values:

n	Selection
0	Draft printing
1	Letter Quality printing

If you select proportional spacing with the ESC p command during Draft printing, the printer prints an LQ font instead. When you cancel proportional spacing with the ESC p command, the printer returns to Draft printing.

SI
Sets condensed printing. (IBM, EPSON)

```
ASCII Code         SI
Hexadecimal Value  OF
Decimal Value      15
```

This command selects the condensed mode in which character width is reduced as follows:

10 CPI	$\rightarrow$	17.14 CPI
12 CPI	$\rightarrow$	20 CPI
Proportional	$\rightarrow$	½ width

DC2 code cancels the condensed printing. This command resets the horizontal motion index (HMI) set with the ESC c command.

SO
Sets double width printing (one line). (IBM, EPSON)

ASCII Code	SO
Hexadecimal Value	0E
Decimal Value	14

This code causes subsequent data in the same line to be printed as double width characters. It is canceled by the LF, FF, VT, DC4, ESC W codes o when the buffer is full. This command is not canceled by the VT command when it functions the same as a CR command.

Character Set

ESC (^
Prints data as characters. (EPSON)

ASCII Code	ESC (^ $n_1\ n_2\ d_1 \ldots.\ d_k$
Hexadecimal Value	1B 28 5E $n_1\ n_2\ d_1 \ldots.\ d_k$
Decimal Value	27 40 94 $n_1\ n_2\ d_1 \ldots.\ d_k$
Range	$0 \leq n_1 \leq 255$
	$0 \leq n_2 \leq 127$

This command prints data bytes d_1 through d_k as characters not control codes. The amount of data to be sent is calculated as follows:

$$k = ((n_2 \text{ x } 256) + n_1)$$

Where n_2 is equal to:

$$\text{INIT} \frac{k}{256}$$

Where n_1 is equal to:

$$\text{MOD} \frac{k}{256}$$

The printer ignores data if no character is assigned to that character code in the currently selected character table.

ESC (t
Assigns character table. (EPSON)

ASCII Code	ESC (t n_1 n_2 d_1 d_2 d_3
Hexadecimal Value	1B 28 74 n_1 n_2 d_1 d_2 d_3
Decimal Value	27 40 116 n_1 n_2 d_1 d_2 d_3
Range	$n_1 = 3$
	$n_2 = 0$

This command assigns the d_2 registered character table to the d_1 character table according to the following values:

d_1:	
0 character set 0	Italic default
1 character set 0	Graphic default
2 character set 0	DLL default
3 character set 0	Graphic default

---

d_2	d_3		d_2	d_3	
1	0	PC 437	15	0	PC867
1	16	PC 437 G	25	0	PC877
3	0	PC850	x	x	GOST
4	0	PC851	x	x	TASS
5	0	PC853	29	1	8859/1
6	0	PC855	29	2	8859/2
7	0	PC860	29	3	8859/3
8	0	PC863	29	4	8859/4
9	0	PC865	29	5	8859/5
10	0	PC852	29	6	8859/6
11	0	PC857	29	7	8859/7
12	0	PC858	29	8	8859/8
13	0	PC864	29	9	8859/9
14	0	PC866	29	15	8859/15
x	x	PC862			

ESC [T
Selects a Code page. (IBM 2391 only)

ASCII Code	ESC [T *4 0 0 0 HC L.c*
Hexadecimal Value	1B 5B 54 *04 00 00 00 Hc Lc*
Decimal Value	27 91 84 *4 0 0 0 Hc Lc*

This sequence allows changing the current code page. If an unavailable code page is specified, this command is ignored.

The digits 04 00 00 00 (hexadecimal) and 4 0 0 0 (decimal) are constant.

To calculate Hc Lc for a code page that is not shown.

Divide the code page number, such as 437, by 256.

- The whole number result is the Hc value

- The remainder is the Lc value.

If your code page has an alphabetic character, such as 437G, add 10,000 to the code page number, then divide by 256.

Hc	Lc		Hc	Lc	
1	181	CP437	3	108	CP 876
33	122	CP437G	3	109	CP877
3	82	CP850	33	124	GOST
3	83	CP851	33	125	TASS
3	84	CP852	33	143	8859/1
3	85	CP853	33	144	8859/2
3	87	CP855	33	145	8859/3
3	89	CP857	33	146	8859/4
3	90	CP858	33	147	8859/5
3	92	CP860	33	148	8859/6
3	94	CP862	33	149	8859/7
3	95	CP863	33	150	8859/8
3	96	CP864	33	151	8859/9
3	97	CP865	3	155	8859/15
3	98	CP866			
3	99	CP867			

ESC \
Prints characters from all characters table. (IBM)

ASCII Code	ESC \ n_1 n_2
Hexadecimal Value	1B 5C n_1 n_2
Decimal Value	27 92 n_1 n_2
Range	$0 \leq n_1 \leq 255$
	$0 \leq n_2 \leq 255$

This command prints the next $n_1 + n_2$ x 256 characters from the table of all printable characters.

The total number of characters that will be printed from the table of all printable characters is equal to $n_1 + (n_2$ x 256). For example, to print 300 characters from the table of all printable characters: $n_1 = 44$, $n_2 = 1$. The control codes are not recognized as long as this sequence is active. The space character is printed as an unassigned character.

ESC ^
Prints a single character from the all characters table. (IBM)

ASCII Code	ESC ^ n
Hexadecimal Value	1B 5E n
Decimal Value	27 94 n
Range	$0 \leq n \leq 255$

This command prints the next character from the all characters table. This sequence prints only one character from the all character table.

ESC 6
Enables Upper Control Codes. (EPSON)

ASCII Code	ESC 6
Hexadecimal Value	1B 36
Decimal Value	27 54

This command enables the printing of upper control codes (from 128 to 159). These codes are treated as printable characters instead of control codes. This command has no effect when the italic character table is selected and remains in effect even if you change the character table.

ESC 7
Selects the Character Set 1. (IBM)

ASCII Code	ESC 7
Hexadecimal Value	1B 37
Decimal Value	27 55

This command selects the character set 1.

ESC 7
Enables Upper Control Codes. (EPSON)

ASCII Code	ESC 7
Hexadecimal Value	1B 37
Decimal Value	27 55

This command enables the printing of upper control codes (from 128 to 159). These codes are treated as control codes instead of printable characters This command remains in effect even if you change the character table.

ESC k
Selects LQ fonts. (EPSON)

ASCII Code   ESC k *n*
Hexadecimal Value   1B 6B *n*
Decimal Value   27 107 *n*

Selects one of the available fonts in Letter Quality mode. See the following table:

n	Types
0	Courier
1	Gothic
2	Courier
3	Prestige
4	Script
5	OCR-B
6	OCR-A
7	Presentor
11	Boldface

If the Draft mode is selected when this command is sent, the new LQ font will be selected when the printer returns to LQ printing.

ESC R
Selects an international character set. (EPSON)

ASCII Code	ESC R *n*
Hexadecimal Value	1B 52 *n*
Decimal Value	27 82 *n*
Range	$0 \leq n \leq 12$

This code causes the national character set to be selected according to the parameter *n*. See the following table:

n		*n*	
0	USA	7	Spain-I
1	France	8	Japan
2	Germany	9	Norway
3	United Kingdom	10	Denmark-II
4	Denmark-I	11	Spain-II
5	Sweden	12	Latin America
6	Italy		

ESC t
Selects characters table. (EPSON)

ASCII Code	ESC t *n*
Hexadecimal Value	1B 74 *n*
Decimal Value	27 116 *n*
Range	$0 \leq n \leq 3$

Selects the character table to be used for printing from among the four character tables described below:

n	Character Tables
0	Standard Italic Character Set
1	PC437
2	User-defined characters
3	PC437

Download Character

ESC %
Selects user-defined character set. (EPSON)

ASCII Code	ESC % *n*
Hexadecimal Value	1B 25 *n*
Decimal Value	27 37 *n*

This command switches between the normal (resident) and user-defined (downloaded) characters:

n	Selection
1	Selects the use of down-loaded character set in RAM
0	Selects the use of resident character set in ROM

ESC &
Defines user-defined characters. (EPSON)

The format for this command depends on whether you are defining draft characters or LQ characters.

Draft mode

ASCII Code	ESC & NUL n m $[a_0 a_1 a_2 d_1 d_2 ... d_k]$
Hexadecimal Value	1B 26 00 n m $[a_0 a_1 a_2 d_1 d_2 ... d_k]$
Decimal Value	27 38 0 n m $[a_0 a_1 a_2 d_1 d_2 ... d_k]$
Range	$0 \leq n \leq 127$
	$0 \leq m \leq 127$
	$n \leq m$
	$0 \leq a_1 \leq 15$
	$0 \leq a_0 + a_1 + a_2 \leq 18$

LQ mode

ASCII Code	ESC & NUL n m $[a_0 a_1 a_2 d_1 d_2 ... d_k]$
Hexadecimal Value	1B 26 00 n m $[a_0 a_1 a_2 d_1 d_2 ... d_k]$
Decimal Value	27 38 0 n m $[a_0 a_1 a_2 d_1 d_2 ... d_k]$
Range	$0 \leq n \leq 127$
	$0 \leq m \leq 127$
	$n \leq m$
	$0 \leq a_1 \leq 37$
	$0 \leq a_0 + a_1 + a_2 \leq 42$

The data within brackets above is repeated for each character you define.

The parameters in the command have the following meaning:

n and *m*   The *n* and *m* parameters are two decimal numbers that define the first and the last characters to be replaced in the character set in use.

a_0 It sets space to the left of each proportional user-defined character.

a_1 Actual width of user-defined characters.

a_2 It sets space to the right of each proportional user-defined.

$d_1...d_n$ They are the character data that is printed.

Maximum character width (height x width):

Print quality		10 cpi	12 cpi	15 cpi	Proportional
Draft		24 x 12	24 x 10	24 x 8	Not available
LQ	Normal size	24 x 36	24 x 30	24 x 24	24 x 42
	Super/subscript	16 x 36	16 x 30	16 x 24	16 x 42

ESC :
Copies characters from ROM to RAM. (EPSON)

ASCII Code   ESC : *NUL n m*
Hexadecimal Value   1B 3A *00 n m*
Decimal Value   27 58 *n m*
Range $0 \leq n \leq 127$
                    $m = 0$

This code copies the character generator in ROM into RAM area dedicated to the user-defined characters. The *n* parameter represents the LQ typestyle.

The following attributes are reflected in the copied font:

Typeface, international character set, size (super/subscript or normal), quality (draft/quality).

Before copying ROM characters to RAM, cancel italics with the ESC 5 command. After copying you can italicize characters by sending the ESC 4 command.

ESC =
Defines downloaded characters. (IBM)

ASCII Code	ESC = *n m id p t*
Hexadecimal Value	1B 3D *n m id p t*
Decimal Value	27 61 *n m id p t*

This sequence allows you to design and then down-line load special characters not present in the character set in use. Whenever you would like to start the DLL setting procedure, proceed as follows:

- Copy the character generator in ROM into RAM

- Select the DLL generator

There are 256 entries of 9 bytes that compose the look up table of a character generator. One entry describes one character as follows:

Byte 1, 2   The absolute address of the character definition.

Byte 3 :

  - Bit 7   *1*: indicates that the character is a graphic character (connects at 6 lpi)

             0: indicates that the character is an alphanumerical character

  - Bit 6   *0*: indicates a DLL character

             1: indicates a resident character

  - Bit 5 to 0 These 6 bits indicate the effective number of dot columns of the character shape stored in memory.

Byte 4:

  - Bit 7, 6   Graphic character description:
             - *0*: shading character
             - *1*: line drawing character
             - *10*: underscored character
             - *11*: not supported

             All graphics characters are 30 dot high. An underscored character is defined as a blank graphic (all zeros) and it is automatically generated by the printer. A shading character repeats dots 1-6 of each column as dots 25 through 30 respectively. A line drawing character repeats dots 23 and 24 as the pairs 25 and 26, 27 and 28, 29 and 30.

  - Bit 5 to 0 The number of dot columns of the character shape minus one. For example: the character width of Draft generator is 10 dots and bit 5 to 0 must be set to 9.

- Bit 5 to 9   Compression mask description. It is used to optimize the memory occupation and it is based on the concept that a dot column on its left is not stored. You can calculate the compression mask of a character only after designing the entire character. Every bit is associated with a dot column with the bit 7 of byte 5 associated with the leftmost column. The bit is set to {1}, if the column is equal to the preceding one; otherwise, it is set to {0}. If the character is longer than 39 dot columns the remaining dot columns must be stored without compression. The bit 40 (bit 0 of byte 9) must be 0. If no compression is present in the character, byte 5 to 9 is composed by all zeros.

If you wish to copy an entry over another entry so that two characters with the same characteristics and different code are present in the same look up table, the DLL sequence ESC = *n m id p t* has the following meaning:

n and *m*	Indicate the byte number of the sequence *n* is the low part and *m* is the high part.
id:	Indicate the printer model. The *id* related to your printer is *23H*.
p and *t*	Indicate the memory address of the character that you wish to replace. *p* is the low part and *t* is the high part.
Data	Is the entry *9 bytes* of the character that you want to position at address specified by *p* and *t*.

Bit-Image

ESC (G
Selects Graphics Mode. (EPSON)

ASCII Code	ESC (G m n_1 n_2
Hexadecimal Value	1B 28 47 m n_1 n_2
Decimal Value	27 40 71 m n_1 n_2
Range	$m = 1, 49$
	$n_1 = 1$
	$n_2 = 0$

This command selects graphics mode and allows you to print raster graphics. This command clears all user-defined characters and tab settings. Only the following commands are available in graphics mode, the printer ignores all other commands: LF, FF, CR, ESC EM, ESC . , ESC @, ESC (c, ESC (C, ESC (V, ESC (v, ESC \, ESC $, ESC U, ESC +, ESC (U.

ESC *
Sets dot graphics printing. (EPSON)

ASCII Code	ESC * m n_1 n_2 d_1.. d_x
Hexadecimal Value	1B 2A m n_1 n_2 d_1.. d_x
Decimal Value	27 42 m n_1 n_2 d_1.. d_x

$m = 0,1,2,3,4,5,6,32,33,38,39,40,64,65,70,71,72,73$
$0 \leq n_1 \leq 255$
$0 \leq n_2 \leq 31$

This command prints dot-graphics in 8-dot columns, depending on the following parameters:

m		Specifies the dot density			
n_1, n_2		Specify the total number of columns of graphics data according to the formula:			

number of dot columns $= (n_1 + (n_2 \times 256))$

$$n_2 = INT \frac{(number\ of\ dot\ columns)}{256}$$

$$n_1 = MOD \frac{(number\ of\ dot\ columns)}{256}$$

$d_1 ... d_x$ Bytes of graphics data; *x* is determined by multiplying the total number of columns times the number of bytes required for each column. See the table below:

Parameter *m* in ESC * command	Horizontal density (dpi)	Vertical density (dpi)		Adjacent dot printing	Dots per column	Bytes per column
0	60	60	60	Yes	8	1
1	120	60	60	Yes	8	1
2	120	60	60	No	8	1
3	240	60	60	No	8	1
4	80	60	60	Yes	8	1
6	90	60	60	Yes	8	1
32	60	180	180	Yes	24	3
33	120	180	180	Yes	24	3
38	90	180	180	Yes	24	3
39	180	180	180	Yes	24	3
40	360	180	180	No	24	3

ESC .
Print Raster Graphics. (EPSON)

ASCII Code	ESC . c v h m n_1 n_2 d_1 d_2 … d_k
Hexadecimal Value	1B 2E c v h m n_1 n_2 d_1 d_2 … d_k
Decimal Value	27 46 c v h m n_1 n_2 d_1 d_2 … d_k
Range	$c = 0,1$
	$v = 10, 20$
	$h = 10, 20$
	$0 \le m \le 24$
	$0 \le n_1 \le 255$
	$0 \le n_2 \le 127$
	$0 \le d \le 255$

This command prints dot graphics in raster format (row by row, left to right) and can be used only during graphics mode entered by sending the ESC (G command. It allows compression of graphics data during raster graphics printing.

The parameters are used as described below:

c	equal to 0 specifies full graphics mode (no compressed) equal to 1 specifies compressed mode
v	vertical dot density (v/3600 dpi)
h	horizontal density (h/3600 dpi)
m	vertical dot count (rows of dot graphics)
n_1, n_2	horizontal dot count (columns of dot graphics), according to the following formula:

$$n_2 = INT \frac{(horizontal\ dot\ count)}{256}$$

$$n_1 = MOD \frac{(horizontal\ dot\ count)}{256}$$

k	total number of data bytes, according to the following formula:

$$k = m \times INT \left[\frac{(n_2 \times 256) + n_1 + 7}{8} \right]$$

$d_1 \ldots d_k$	During full graphics mode: graphics data.

During compressed mode: the first data byte is treated as a counter. Graphics data bytes then alternate with a data counter byte as follows:

$0 \leq$ (counter byte) ≤ 127

Counter specifies the number of data bytes following according to this formula:

(counter byte) + 1 = (number of data bytes to follow)

or

(counter byte) = (number of data bytes to follow) -1

$128 \leq$ (counter byte) ≤ 255

Counter specifies the number of times to repeat the next byte of data according to this formula:

256 - (counter byte) + 1 = (number of times to repeat next byte)

or

(counter byte) = 257 - (number of times to repeat next byte)

ESC ?
Reassigns dot graphics mode. (EPSON)

ASCII Code	ESC ? *n m*
Hexadecimal Value	1B 3F *n m*
Decimal Value	27 63 *n m*

Reassigns one of the dots graphics mode (described in the command ESC *) to one of the following commands: ESC K, ESC L, ESC Y and ESC Z. The parameter *n* specifies a character (K, L, Y or Z) which is reassigned to specific mode.

m = 0,1,2,3,4,6,32,33,38,39,40,64,65,70,71,72,73

m	n
0	(K): ESC K graphic command
1	(L): ESC L graphic command
2	(Y): ESC Y graphic command
3	(Z): ESC Z graphic command

ESC [g
High Resolution Graphics. (IBM)

ASCII Code	ESC [g *n m data*
Hexadecimal Value	1B 5B 67 *n m data*
Decimal Value	27 91 103 *n m data*

This command sends data for dot matrix graphics to the printer and allows the selection of eight modes for both 8-wire graphics and 24-wire graphics.

n (count)   Count is a two-byte value in the format of low byte, high byte that gives the number of bytes of graphic data plus one.

m (mode)   Mode is a one-byte value to select the graphics mode. Modes have a vertical wire count (8 or 24) and a horizontal density in dots per inch. See the following table:

Mode	Horizontal Density	Wires	Description
0	60	8	Same as ESC K graphic command
1	120	8	Same as ESC L graphic command
2	120	8	Same as ESC Y graphic command
3	240	8	Same as ESC Z graphic command
8	60	24	High resolution for ESC K
9	120	24	High resolution for ESC L
11	180	24	
12	360	24	

data   The graphic data is organized by byte.

For 8-wire modes, it is arranged and mapped to the wires identically to ESC K.

For 24-wire modes, the data has 3 bytes per slice, the most significant bit of the 1st byte mapping to the top wire and the least significant bit of the 3rd byte mapping to the bottom wire. The slices are in sequence from left to right.

ESC K
Normal density dot graphics printing (60 dpi). (IBM, EPSON)

ASCII Code	ESC K n_1 n_2 p_1 p_2... p_x
Hexadecimal Value	1B 4B n_1 n_2 p_1 p_2... p_x
Decimal Value	27 75 n_1 n_2 p_1 p_2 ... p_x
Range	$0 \leq n_1 \leq 255$
	$0 \leq n_2 \leq 31$
	$0 \leq p \leq 255$

Terminator code. This command prints dot graphics at 60 horizontal dot per inch by 60 vertical dpi. The parameter values should be calculated as follows:

n_1 Remainder of the number of column divided by 256.

n_2 Integer result of the previous division.

p_1 Sum of the values corresponding to the dots that should be printed in the first column of the graphics pattern.

p_2 Sum of the values corresponding to the dots that should be printed in the second column of the graphics pattern.

p_x Sum of the values corresponding to the dots that should be printed in the last column of the graphics pattern.

ESC L
Double density dot graphics printing (120 dpi). (IBM, EPSON)

ASCII Code	ESC L n_1 n_2 p_1 p_2... p_x
Hexadecimal Value	1B 4C n_1 n_2 p_1 p_2... p_x
Decimal Value	27 76 n_1 n_2 p_1 p_2 ... p_x
Range	$0 \leq n_1 \leq 255$
	$0 \leq n_2 \leq 31$
	$0 \leq p \leq 255$

Terminator code. This command prints dot graphics at 120 horizontal dot per inch by 60 vertical dpi. The parameter values should be calculated as follows:

n_1 Remainder of the number of column divided by 256.

n_2 Integer result of the previous division.

p_1 Sum of the values corresponding to the dots that should be printed in the first column of the graphics pattern.

p_2 Sum of the values corresponding to the dots that should be printed in the second column of the graphics pattern.

p_x Sum of the values corresponding to the dots that should be printed in the last column of the graphics pattern.

ESC Y

Double density dot graphics printing at double-speed graphics (120 virtual dpi). (IBM, EPSON)

ASCII Code	ESC Y n_1 n_2 p_1 p_2... p_x
Hexadecimal Value	1B 59 n_1 n_2 p_1 p_2... p_x
Decimal Value	27 89 n_1 n_2 p_1 p_2 ... p_x
Range	$0 \leq n_1 \leq 255$
	$0 \leq n_2 \leq 31$
	$0 \leq p \leq 255$

Terminator code. This command prints dot graphics at 120 horizontal dot per inch by 60 vertical dpi. The parameter values should be calculated as follows:

n_1 Remainder of the number of column divided by 256.

n_2 Integer result of the previous division.

p_1 Sum of the values corresponding to the dots that should be printed in the first column of the graphics pattern.

p_2 Sum of the values corresponding to the dots that should be printed in the second column of the graphics pattern.

p_x Sum of the values corresponding to the dots that should be printed in the last column of the graphics pattern.

ESC Z
Quadruple density dot graphics printing (240 virtual dpi). (IBM, EPSON)

ASCII Code	ESC Z n_1 n_2 $p_1 p_2$... p_x
Hexadecimal Value	1B 5A n_1 n_2 $p_1 p_2$... p_x
Decimal Value	27 90 n_1 n_2 $p_1 p_2$ ... p_x
Range	$0 \le n_1 \le 255$
	$0 \le n_2 \le 31$
	$0 \le p \le 255$

Terminator code. This command prints dot graphics at 240 horizontal dot per inch by 60 vertical dpi. The parameter values should be calculated as follows:

n_1 Remainder of the number of column divided by 256.

n_2 Integer result of the previous division.

p_1 Sum of the values corresponding to the dots that should be printed in the first column of the graphics pattern.

p_2 Sum of the values corresponding to the dots that should be printed in the second column of the graphics pattern.

Data Input Control

CAN
Cancels line. (EPSON)

ASCII Code	CAN
Hexadecimal Value	18
Decimal Value	24

This code clears all printable characters and bit-image graphics on the current line. This code moves the print position to the left-margin position.

CAN
Cancels data. (IBM)

ASCII Code	CAN
Hexadecimal Value	18
Decimal Value	24

This code clears all data stored in the preceding print buffer but does not change the current print position.

DC1
Selects printer. (IBM)

ASCII Code DC1
Hexadecimal Value 11
Decimal Value 17

This command causes the printer to be enabled after it has been disabled by the ESC Q command.

DC1
Selects printer. (EPSON)

ASCII Code DC1
Hexadecimal Value 11
Decimal Value 17

This command causes the printer to be enabled after it has been disabled by the DC3 command.

DC3
Deselects printer. (EPSON)

ASCII Code DC3
Hexadecimal Value 13
Decimal Value 19

This code deselects the printer. The printer remains deselected until it receives a DC1 command or power is turned off then on again. The printer ignores the ESC @ command (initialize printer) when it is deselected.

DEL
Deletes the last character. (EPSON)

ASCII Code   DEL
Hexadecimal Value 7F
Decimal Value   127

This command causes the printer to delete the last printable character sent to the printer. Printer control codes are not affected. The printer ignores this command if it follows a command that moves the horizontal print position (ESC $, ESC \ or HT).

ESC
Cancels MSB control. (EPSON)

ASCII Code   ESC #
Hexadecimal Value 1B 23
Decimal Value   27 35

This command cancels any controls on the MSB (bit number 7) set by ESC = or ESC > commands; printer then accepts all MSB data as is.

ESC =
Sets MSB to 0. (EPSON)

ASCII Code   ESC =
Hexadecimal Value 1B 3D
Decimal Value   27 61

This command sets the Most Significant bit (bit number 7) of all incoming data to 0. All data is affected including graphics data.

ESC >
Sets MSB to 1. (EPSON)

ASCII Code   ESC >
Hexadecimal Value   1B 3E
Decimal Value   27 62

This command sets the Most Significant bit (bit number 7) of all incoming data to 1. All data is affected including graphics data.

ESC Q
Deselects Printer. (IBM)

ASCII Code   ESC Q *n*
Hexadecimal Value   1B 51 *n*
Decimal Value   27 81 *n*

This sequence tells the printer not to accept data from the host. The host must reset the printer or select the printer by using DC1 (Select Printer) to accept data. To deselect the printer, use ESC Q 35.

Miscellaneous

BEL
Buzzer. (EPSON)

ASCII Code   BEL
Hexadecimal Value 07
Decimal Value   7

This code sounds the printer's buzzer.

BS
Print and space back one position. (IBM, EPSON)

ASCII Code   BS
Hexadecimal Value   08
Decimal Value   8

This code causes the printing to be continued from one column to the left of the current carriage position.

The printer ignores this command if it would move the print position to the left of the left margin.

ESC @
Initializes the printer. (EPSON)

ASCII Code	ESC @
Hexadecimal Value	1B 40
Decimal Value	27 64

This sequence causes the printer to be initialized. This command, inserted in the input buffer, will be executed during data processing, so that data preceding this command will be printed according to the previous setting.

It causes the printer:

- To go back to the current printer setup settings
- To cancel any print attributes selected
- To initialize the printer carriage
- To reset the column counter
- To set the horizontal tabulations every 8 columns
- To clear all vertical tabulations

Only the selection of Draft/Quality printing, DDL and the selected character generator are maintained.

ESC [K
Sets initial conditions. (IBM 2391 only)

ASCII Code	ESC [K n_1 n_2 *init id*
Hexadecimal Value	1B 5B 4B $n_1$$n_2$ *init id*
Decimal Value	27 91 75 $n_1$$n_2$ *init id*

This command causes the printer to reset to its initial status:

n_1 *and* n_2 The *n* and *n* parameters specify the number of bytes in the escape sequence normally, n_1 = 2 and n_2 = always 0.

init The *init* parameter specifies to which condition the printer should initialize, normally *init* = 0,1,4,5,254,255:

    0 Initializes printer to user-default settings. The download font remains unchanged. If parameters are specified, they will overwrite the default settings. If the emulation mode is changed, the download font will be initialized. This command will only copy data from the selected macro, add parameter changes, if any, and store in working RAM; the data stored in the macro's non-volatile RAM will not be affected.

    1 Initializes printer to user-default settings. The download font is initialized. If parameters are specified, they will overwrite the default settings. This command will only copy data from the selected macro, add parameter changes, if any, and store in working RAM; the data stored in the macro's non-volatile RAM will not be affected.

    4 Initializes printer to factory settings. The download font remains unchanged. If parameters are specified, they will overwrite the default settings. If the emulation mode is changed, the download font will be initialized. This command will only copy the default settings from ROM, add parameter changes, if any, and store in working RAM; the data stored in the macro's non-volatile RAM will not be affected.

	5	Initializes printer to factory settings. The download font is initialized. If parameters are specified, they will overwrite the default settings. This command will only copy the default settings from ROM, add parameter changes, if any, and store in working RAM; the data stored in the macro's non-volatile RAM will not be affected.
	254	Initializes printer to user-default settings. The download font is initialized. If parameters are specified, they will overwrite the default settings. This command will change data stored in the selected macro. It will copy data from the selected macro, add parameter changes, if any, and store in working RAM and in the selected macro. It will also change the default macro to the value of parm 3.
	255	Initializes printer to default settings. The download font is initialized. If parameters are specified, they overwrite the default settings. This command will change data stored in the macro's non-volatile RAM. It will copy default settings from ROM, add parameter changes, if any, and store in working RAM and all macros. It will also set the default macro to disable.

id The *id* parameter specifies the printer for which the following parameter bytes are intended. If the ID does not address your printer, the mode bytes that follow are ignored. The ID values are Hex = B6, Dec = 182.

parm₁ Specifies the following functions:

Bit		*Not set*	*Set*
7	Discard byte	Process this byte	Ignore this byte
6	Reserved		
5	Alarm	Alarm enabled	Alarm disabled
4	Automatic CR	No CR on vertical movement	CR on vertical movement
3	Automatic LF	No LF after CR	LF after CR
2	Page length	11 inches	12 inches
1	Slashed zero	Zero without slash	Zero with slash
0	Character set	CS1	CS2

parm$_2$	Specifies the following functions:		

Bit		*Not set*	*Set*
7	Discard byte	Process this byte	Ignore this byte
6	Pass over from CP437-CP850	CP437	CP850
5	Reserved		
4	Reserved		
3	Reserved		
2	Reserved		
1	Line length	13.6 inch	8 inch
0	Reserved		

ESC U
Sets printing direction. (IBM, EPSON)

ASCII Code	ESC U *n*
Hexadecimal Value	1B 55 *n*
Decimal Value	27 85 *n*

Selects bidirectional or unidirectional printing, according to the parameters below:

n	Direction
0	Bidirectional printing
1	unidirectional (left to right) printing

Unidirectional printing provides better alignment of vertical lines while bidirectional printing is faster.

COMPUPRINT Mode

This printer according to the Native COMPUPRINT Mode supports the following printer commands.

Format Control

DC4 DC4 ESC 3 1
Sets vertical spacing 12 lines/30 mm. (Compuprint)

ASCII Code	DC4 DC4 ESC 3 1
Hexadecimal Value	14 14 1B 33 31
Decimal Value	20 20 27 51 49

This command sets vertical spacing to 12 lines per 30 mm.

DC4 DC4 ESC 3 3
Sets vertical spacing to 3 lines/30 mm. (Compuprint)

ASCII Code	DC4 DC4 ESC 3 3
Hexadecimal Value	14 14 1B 33 33
Decimal Value	20 20 27 51 51

This command sets vertical spacing to 3 lines per 30 mm.

DC4 DC4 ESC 3 4
Sets vertical spacing 4 lines/30 mm. (Compuprint)

```
ASCII Code          DC4 DC4 ESC 3 4
Hexadecimal Value   14 14 1B 33 34
Decimal Value       20 20 27 51 52
```

This command sets vertical spacing to 4 lines per 30 mm.

DC4 DC4 ESC 3 6
Sets vertical spacing 6 lines/30 mm. (Compuprint)

```
ASCII Code          DC4 DC4 ESC 3 6
Hexadecimal Value   14 14 1B 33 36
Decimal Value       20 20 27 51 54
```

This command sets vertical spacing to 6 lines per 30 mm.

DC4 DC4 ESC 3 8
Sets vertical spacing 8 lines/30 mm. (Compuprint)

```
ASCII Code          DC4 DC4 ESC 3 8
Hexadecimal Value   14 14 1B 33 38
Decimal Value       20 20 27 51 56
```

This command sets vertical spacing to 8 lines per 30 mm.

DC4 DC4 ESC A
Sets the horizontal spacing to 15, 17, 20, 24 CPI. (Compuprint)

ASCII Code	DC4 DC4 ESC A *n*
Hexadecimal Value	14 14 1B 41 *n*
Decimal Value	20 20 27 65 *n*

This is terminator code and therefore causes the current contents of the print buffer to be printed out. Then, the subsequent characters will be printed at the horizontal spacing specified by the *n* parameter.

n	Spacing
4	15 cpi
5	17 cpi
6	20 cpi
7	24 cpi

Native Character Set

DC4 DC4 ESC g
Selects LQ fonts (Compuprint).

ASCII Code   DC4 DC4 ESC g *n*
Hexadecimal Value   14 14 1B 67 *n*
Decimal Value   20 20 27 103 *n*

n	Setting
1	Gothic
2	Courier
3	Prestige
4	Script
5	OCR-B
6	OCR-A
7	Presentor
182	DLL

If the down-line loading is selected, the command is stored and will be activated as soon as the down-line loading will be canceled.

DC4 DC4 ESC S
Selects character set ISO Character Sets or Code Pages. (Compuprint)

```
ASCII Code          DC4 DC4 ESC S n
Hexadecimal Value   14 14 1B 53 n
Decimal Value       20 20 27 83 n
```

n	Character Set
1	ISO 8859/1 Latin 1
2	ISO 8859/2 Latin 2
3	ISO 8859/3 Latin 3
4	ISO 8859/4 Latin 4
5	ISO 8859/5 Latin/Cyrillic
6	ISO 8859/6 Latin/Arabic
7	ISO 8859/7 Latin/Greek
8	ISO 8859/8 Latin/Hebrew
9	ISO 8859/9 Latin 5
15	ISO 8859/15 Latin 9
128	CP 437 USA
129	CP 850 Multilingual
130	CP 860 Portugal
131	CP 863 Canada/France
132	CP 865 Denmark/Norway
133	CP 851 Greek
134	CP 862 Hebrew
135	CP 864 Arabic
136	TASS Cyrillic

n	Character Set
137	CP 852 Eastern Europe
138	CP 876 OCR-A
139	CP 877 OCR-B
140	CP 855 Cyrillic
141	CP 866 Russian
142	GOST Cyrillic
145	CP 437G Greek
146	CP 853 Turkish
147	CP 857 Turkish
148	CP 867 Turkish
149	CP 858 Euro PC Multilingual
199	96 Greek

Bar Codes

DC4 DC4 ESC !
Bar Code Selection

ASCII Code	DC4 DC4 ESC ! *h t f F r o q b s B S i EM*
Hexadecimal Value	14 14 1B 21 *h t f F r o q b s B S i EM*
Decimal Value	20 20 27 33 *h t f F r o q b s B S i EM*

h = Bar Code Height at n/6", $1 \leq h \leq 30$

t = Standard Bar Code to use

t	Name	
1	8-digits European Article Numbering	EAN-8
2	13-digits European Article Numbering	EAN-13
3	Universal Product Code Type A	UPC-A
4	Universal Product Code Type E	UPC-E
5	UPC/EAN 2 Digit Supplement	UPC-EAN 2
6	UPC/EAN 5 Digit Supplement	UPC-EAN 5
7, 8, 9	8-digits European Article Numbering	EAN-8
10	General Purpose Bar Code	Code GP
11	Code 2 of 5 3-BAR (Data Logic)	C25-3BAR
12	Binary Coded Decimal	CODE BCD
13	MSI-Plessey	MSI
14	AIM-USD-8 / Code-11	Code 11
15	AIM-USD-7 / Code-93	Code 93
16	Code 2 of 5 Bidirectional	C25-BID

t	Name	
17	Code 2 of 5 Interleaved	C25-INT
18	Code 2 of 5 Industrial	C25-IND
19	Code 2 of 5 Matrix	C25-MTX
20	Code 3 of 9	Code-39
21	8-digits European Article Numbering	EAN-8
22	Codabar (all types)	CODABAR
23	Code 128	CODE-128
24	USPS-PostNet	POSTNET

f = Readable character printing

> f = 1 printing enabled
>
> f = 0 printing disabled

F = Font selection for the printable characters

F	Selection
0	Selected font by r value
1	Default font for text
2	Special font for OCR-A o OCR-B bar codes according to the t value
3	Special font for OCR-A bar codes
4	Special font for OCR-B bar codes

r = Bar code rotation

r	Selection
0	No rotation
1	Rotation at 0°
2	Rotation at 90°
3	Rotation at 180°
4	Rotation at 270°

o = Check digit inserted as last character of the received string according to the bar code

q = Horizontal graphic density of the bar code

q	Selection
0	1/60"
1	1/180"

b = Narrow bar width in *n*/180", $3 < b < 18$

s = Narrow space width in *n*/180", $3 < s < 18$

B = Wide bar width in *n*/180", $6 < B < 72$

S = Wide space width in *n*/180", $6 < S < 72$

i = Spacing between characters in *n*/180", $3 < i < 72$

EM = Check sequence terminator

Bar Code Description

EAN-8	DC4 DC4 ESC! *n 1 p EM*
	The EAN-8 bar code data field must only contain numeric data, and must be eight bytes long, check digit included. The EAN-8 character repertoire provides 0 to 9 ASCII numeric figures. *n* indicates the bar code height in units of 1/6 inch and must be in the range 1 to 12. *p* must be NUL (hex. 00) if no Human Readable Characters are to be printed, and 1 (hex. 01) if they are to be printed. The range of values for *n* and *p* parameters can be increased of 32 dec.

EAN-13	DC4 DC4 ESC! *n 2 p EM*
	The EAN-13 bar code data field must only contain numeric data, and must be 13 bytes long, check digit included. The EAN-13 character repertoire provides 0 to 9 ASCII numeric figures. *n* indicates the bar code height in units of 1/6 inch and must be in the range 1 to 12. If you want to print the Human Readable Characters, *p* must have the value 1 (hex. 01); otherwise this value must be NUL (hex. 00). The range of values for *n* and *p* parameters can be increased of 32 dec.

UPC-A	DC4 DC4 ESC! *n 3 p EM*
	The UPC-A bar code data field allows 10 numeric characters plus one system number digit and one check digit, at the leftmost and rightmost positions respectively. The UPC-A character repertoire provides 0 to 9 ASCII numeric figures. *n* indicates the bar code height in units of 1/6 inch and must be in the range 1 to 12. *p* must be NUL (hex. 00) if no Human Readable Characters are to be printed, and 1 (hex. 01) if they are to be printed. The range of values for *n* and *p* parameters can be increased of 32 dec.

UPC-E	DC4 DC4 ESC! *n 4 p EM*
	UPC-E bar code data fields contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible.
	If 12-digit strings will be received within a DC4 DC4 ESC (... EM control sequence and *o* check-digit option field is missing or takes values 0 or 2, the symbol is compressed as received to an 8-digit string and encoded, even though this may affect its readability; if *o* check digit option field takes values 1 or 3, the 12th digit is matched against the internally generated check digit. The question marks will be printed in place of HRC string when mismatch is found, if possible.
	If 11-digit strings will be received and *o* check digit field is missing or takes values 0 or 2, question marks will be printed in place of HRC string, when possible; if *o* field takes value 1, the 12th digit is inserted by the printer as result of the internally available algorithm applied to the received string.
	If 10-digit strings will be received and *o* check-digit is missing or takes NULL value, question marks will be printed in place of HRC string, if possible; if *o* field takes value 1, a default 0 System-Digit will be automatically inserted by the printer and the 12th digit will also be inserted as result of he internally available algorithm applied to the final string.
	If the final UPC-A string cannot be compressed to an 8-digits string or the received System-Digit is different than 0 or 1, question marks will be printed in place of HRC string, if possible.

	LEFT and RIGHT delimiters, the System-Digit and the Check-Digit will be printed as descending bars to make a field to host a 6-digits HRC string and the System-Digit HRC to the left of LEFT delimiter (at about the middle of the symbol) when *f* field is missing or set to 1; in this case, the Check-Digit will show in HRC to the right of the RIGHT delimiter (at about the middle of the symbol), when *o* field takes values 2 or 3: it will never show on HRC string otherwise.

UPC-EAN 2	DC4 DC4 ESC! *n 5 p EM*
	ADD ON-2 bar code data fields contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible.
	If 3-digit strings will be received within a DC4 DC4 ESC (... EM control sequence and *o* check-digit option field is missing or takes NULL value, the symbol will encode the first 2 digits and the 3rd received digit will be used as check digit, even though this may affect its readability; if *o* field takes 1 value, the 3rd digit is matched versus the internally generated check-digit an question marks will printed in place of HRC string when mismatching, if possible.
	If 2-digit strings will be received and *o* check digit field is missing or takes NULL value, question marks will be printed in place of HRC string, when possible; if *o* field takes value 1, the check digit will be computed applying the internally available algorithm to the received string in order to properly encode the symbol.
	If *f* field is missing or takes value 1, the 2-digits HRC string will be printed above the Bar/Spaces symbol and its height will be part of the overall symbol's height; the check-digit will never show on HRC string. If *f* field takes value 0, the symbol's encoding will print at full height.

UPC-EAN 5	DC4 DC4 ESC ! *n 6 p EM*
	ADD ON-5 bar code data fields contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible.

If 6-digit strings will be received within a DC4 DC4 ESC (... EM control sequence and *o* check-digit option field is missing or takes NULL value, the symbol will encode the first 5 digits and the 6th received digit will be used as check digit, even though this may affect its readability; if *o* check digit option takes 1 value, the 6th digit is matched versus the internally generated check-digit an question marks will printed in place of HRC string when mismatching, if possible.

If 5-digit strings will be received and *o* check digit field is missing or takes NULL value, question marks will be printed in place of HRC string, if possible; if *o* field takes value 1, the check digit will be computed applying the internally available algorithm to the received string in order to properly encode the symbol.

If *f* field is missing or takes value 1, the 5-digits HRC string will be printed above the Bar/Spaces symbol and its height will be part of the overall symbol's height; the check-digit will never show on HRC string. If f field takes value 0, the symbol's encoding will print at full height. |

CODE GP	DC4 DC4 ESC ! *n 10 p EM*
	CODE-GP bar code allows bar codes to be constructed from the two basic elements (BAR and SPACE) by sending 0,1 digits: digit 0 produces a BAR and digit 1 produces a SPACE.
	These two elements may be combined in any sequence, thus giving the possibility of producing bars and spaces of any width that is a multiple of the basic element width. Default bar/spaces width is 1/60" (q = 0,1) but these values may be set by the user according to its specific needs. Data fields do not have a defined format length and contain 0,1 data only; question marks will be printed in place of HRC string otherwise, if possible.
	No Human Readable Interpretation is possible, hence is the user task to provide a TEXT STRING below or above the bar/space symbol: *f* field is meaningless. No internal check digit algorithm is available: *o* field is meaningless.

C25-3BAR	DC4 DC4 ESC ! *n 11 p EM*
	C25-3BAR bar code data fields do not have a defined format length and contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible. If o check digit option field takes 1 value, an internally generated check digit complying with general 2/5 family algorithm will be added to the encoded string: however it will not show on the required HRC string.

Code BCD	DC4 DC4 ESC ! *n 12 p EM*
	CODE-BCD bar code data fields do not have a defined format length and contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible. No internal check digit algorithm is available for this standard: *o* field is meaningless.

MSI Plessey	DC4 DC4 ESC ! *n 13 p EM*		
	MSI bar code data fields do not have a defined format length and must contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible. To releaf the host from calculating MSI check digits, internal algorithms are provided that are accessible by the host application program giving the proper supported value to *o* check-digit option field, according to the following options*:*		
	0	Print the bar code symbol with no printer-generated check digits	
	1	Print the bar code symbol with IBM Modulus-10 check digit -generated by the printer and put at the end of the numeric string: this will be the 2nd check digit, the 1st check digit is IBM Modulus-10 also.	5

With the 5 column:

			5	Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2nd check digit is IBM Modulus-10, the 1st check digit is the complement to 11 of NCR Modulus-11 algorithm applied to the received string: if the modulus is 0 or 1 check digit is 0.

	2	Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2nd check digit is IBM Modulus-10; the 1st check digit is IBM Modulus-10 also.	6	Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2nd check digit is IBM Modulus-10, the 1st check digit is the complement to 11 of IBM Modulus-11 algorithm applied to the received string: if the modulus is 0 or 1 check digit is 0.
	3	Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2nd check digit is IBM Modulus-10, the 1st check digit is NCR Modulus-11: if modulus is 10, it is an error and question marks will be printed in place of HRC string, if possible.	7	Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2nd check digit is IBM Modulus-10, the 1st check digit is the complement to 11 of NCR Modulus-11 algorithm applied to the received string: if the modulus is 0 or 1. It is an error and question marks will be printed in place of HRC string, if possible.
	4	Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2nd check digit is IBM Modulus-10, the 1st check digit is IBM Modulus-11: if modulus is 10, it is an error and question marks will be printed in place of HRC string, if possible.	8	Print the bar code symbol with both check digits generated by the printer and put at the end of the data. The 2nd check digit is IBM Modulus-10, the 1st check digit is the complement to 11 of IBM Modulus-11 algorithm applied to the received string: if the modulus is 0 or 1. it is an error and question marks will be printed in place of HRC string, if possible.
	The printer-generated second check digit does not show on required HRC string.			

Code 11	DC4 DC4 ESC ! *n 14 p EM*
	CODE-11 bar code fields do not have a defined format length and contain data belonging to the following character set: 0 1 2 3 4 5 6 7 8 9 -
	Question marks will be printed in place of HRC string otherwise, if possible.
	This bar-code type defines a variable WIDE/NARROW ratio. This bar code is printed at 1/180" horizontal and vertical graphical printing resolution, to ensure high readability rate. Each digit encodation is separated from the next by a 1/90"-1/60 ", wide default InterCharacter Gap.
	CODE-11 has unique START/STOP character; the printer generates the couple related to each symbol. It is visually interpreted by an OPEN TRIANGLE and will always appear on the HRC string, because its size is usually varied to signify the number of check digits being used in the particular symbol:
	- SMALL open triangle means ONE check-digit
	- LARGE open triangle means TWO check-digit
	Due to this, *f* field is meaningless and always defaults to HRC string print.

Code 93	DC4 DC4 ESC ! *n 15 p EM*
	CODE-93 bar code fields do not have a defined format length and contain data belonging to the standard ASCII character set including control codes.
	Since GS and EM control codes used within COMPUPRINT DC4 DC4 ESC (... EM "Print bar-code" control sequence are part of the supported character set, the host application must SET THE HIGHER-ORDER BIT of the above control codes, to allow the printer distinguish between encodable data and string terminators.
	The complete ASCII standard character set is encoded by means of 47 combinations of 9 bar/space narrow elements arranged into 3 variable width bars with their adjacent variable width spaces: each of the bars in the supported combinations can be 1, 2 or 3 modules wide. The START/STOP character has a 4-module wide bar. CODE-93 directly implements the basic subset shown below:
	0 1 2 3 4 5 6 7 8 9 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z-.SPACES $ / + %
	($) (%) (/) (+) (as special control characters)
	# (as unique START/STOP character)
	The other STANDARD-ASCII codes not presented above will be represented by means of a combination of one control character in the above set followed by a symbol in the alphabetical set. The HRC string is printed BELOW the symbol when *f* field is set to 1, without check digits: ASCII non-printable characters are represented in the "control code" format (e.g. CR is ^M, where "control" is represented as DARK-SQUARE symbol).

2 of 5 **Bidirectional**	DC4 DC4 ESC! *n 16 p EM*
	BID-25 bar code data fields do not have a defined format length and contain numeric data only: question marks will be printed in place of HRC string otherwise, if possible. If *o* check digit option field takes 1 value an internally generated check digit will be added to the encoded string, that however will not show on the required HRC string.

2 of 5 **Interleaved**	DC4 DC4 ESC! *n 17 p EM*
	The 2/5-INTERLEAVED bar code does not have a defined format length. However, the total sum of the characters must be even. *n* indicates the bar code height and must be in the range 1 to 12. *p* must be NUL (hex. 00) if no Human Readable Characters are to be printed, and 1 (hex. 01) if they are to be printed.

2 of 5 **Industrial**	DC4 DC4 ESC ! *n 18 p EM*
	The 2/5 INDUSTRIAL bar code. Data format length is variable and the supported character set only provides ASCII numeric figures 0 to 9. *N* indicates the bar code height in units of 1/6 inch and must be in the range 1 to 12. The parameter *p* must be NUL (hex. 00) if no Human Readable Characters are to be printed, and 1 (hex. 01) if they are to be printed.

2 of 5 Matrix	DC4 DC4 ESC ! *n 19 p EM*
	The 2/5 MATRIX bar code. Data format length is variable and the supported character set only provides ASCII numeric figures 0 to 9. *N* indicates the bar code height in units of 1/6 inch and must be in the range 1 to 12. The parameter *p* must be NUL (hex. 00) if no Human Readable Characters are to be printed, and 1 (hex. 01) if they are to be printed.

Code 39	DC4 DC4 ESC ! *n* 20 *p* EM
	The CODE 39 bar code. Data format length is variable and must always start and end with an asterisk. It can contain the alphanumeric character listed below:
	0 1 2 3 4 5 6 7 8 9
	A B C D E F G H I J K L M N O P Q R S T U V W X Y Z -. SPACE $ / + % * (as start / stop character)
	The parameter indicates the bar code height in units of 1/6 inch and must be in the range 1 to 12. The *p* parameter must be NUL (hex. 00) if no Human Readable Characters are to be printed, and 1 (hex. 01) if they are to be printed.

CODABAR	DC4 DC4 ESC! *n* 22 *p* EM
	The Codabar bar code data fields do not have a defined format length and contain data belonging to the character set listed hereafter:
	0 1 2 3 4 5 6 7 8 9 - $: /. +
	A B C D E N T * a b c d e n t (only as START/STOP characters)
	The printer allows any combination of START/STOP characters. If the first and last characters of the received string do not belong to the START/STOP characters subset, question marks will be printed in place of HRC string, if possible.

CODE 128	DC4 DC4 ESC ! *n 23 p EM*
	The CODE-128 bar code data fields do not have a defined format length and contain data belonging to the standard ASCII character set, including control codes.
	Since GS and EM control codes used within the Compuprint DC4 DC4 ESC (...EM "Print Bar Code" control sequence are part of the supported character set, the host application must SET THE HIGHER-ORDER BIT of the above control codes to allow the printer distinguish between encodable data and string terminators.

POSTNET	DC4 DC4 ESC! *n 24 p EM*
	The POSTNET bar code data fields contain only numeric data and do not have a defined format length. POSTNET bar codes have no HRC string printed and the LOW/TALL bars that encode the symbol comply with the U.S.P.S standard; whatever will be *p* field value.

DC4 DC4 ESC (GS
Prints bar code symbols (Compuprint)

ASCII Code   DC4 DC4 ESC (GS n_1 data GS n_2 data ... EM

ASCII Code	DC4 DC4 ESC (GS n_1 data GS n_2 data ... EM
Hexadecimal Value	14 14 1B 28 1D n_1 data ... 19
Decimal Value	20 20 27 40 29 n_1 data... 25
Range	$1 \leq n \leq 12$
	$0 \leq p \leq 1$

This sequence causes the bar code symbol to be printed according to the previous selection. If you want to print more than one bar code symbol of the same type and height, *GS n* defines the distance from the beginning of the line or between two bar code symbols in multiples of 1/72 inch. At the end of the line, *EM* must close this command.

DC4 DC4 ESC 3
Reads bar code symbols (Compuprint)

ASCII Code	DC4 DC4 ESC ? n_1 n_2 options x y w t_1 … t_n NUL o_1 … o_n NUL
Hexadecimal Value	14 14 1B 3F n_1 n_2 options x y w t_1 … t_n 00 o_1 … o_n 00
Decimal Value	20 20 27 63 n_1 n_2 options x y w t_1 … t_n 0 o_1 … o_n 0
Range	$0 \leq n_1 \leq 23$
	$n_2 = 0$

options	bit 0x01 =	1	the barcode reading is performed vertically
		0	the barcode reading is performed horizontally
	bit 0x04 =	1	reading is performed in inverse direction, i.e. the horizontal reading is performed from the right to the left and the vertical reading is performed from the lower to the upper position
		0	reading is performed in normal direction
	bit 0x40 =	1	debug: the result of the decoding of the barcode will be sent together with the vector of the values read by the reading sensor
	bit 0x80 =	1	must always be 1

x   Distance from the first print position in mm of the highest leftmost point to be scanned (in case of cut sheets it is at 3 mm from paper margin)

y   Distance of the upper paper/page margin of the highest leftmost point to be scanned

w   Dimension of the scanning area including the clear area in mm

$t_1 \ldots t_n$ List of the recognized bar code types

0x11	128
0x01	3 of 9
0x0c	2 of 5 interleaved
0x19	2 of 5 IATA

If no bar code type is specified, they are all recognized.

$o_1 \ldots o_n$ Listing of the options. Each option is followed by the corresponding parameters. The options are:

0x01   Check digit
- 0   No check, the barcode string is returned as it is decoded
- 1   Check digit is checked: when the barcode is decoded, the printer checks that the check digit, if present, is correct. If it is not, the barcode scanning is not valid.

0x02   Ratio of the dimensions between the defined large and the small bar, one parameter:
- B Ratio multiplied by 10 (dimension of the large bar = $((b/10) * (B/10))$ mm), where $20 \leq B \leq 40$

0x03   Dimension of the small bar, one parameter:
- b Dimension of the small bar in 1/100 mm, where $20 \leq b \leq 255$

0x04   Dimension of the white space between a symbol and the following, one parameter
- i Dimension of the white space in 1/100 mm, where $20 \leq i \leq 255$

0x05   Dimension of the maximum retries in case the bar code was not read correctly, one parameter: $0 \leq rn \leq 10$

0x06   Offset from initial position, to be used in case of retry. One parameter:
- rof $0, 2 \leq rof \leq 20$. The offset is set in 1/10 mm. When using the horizontal scanning, the offset will be used starting from the y position, when using the vertical scanning, the offset will be used starting from the x position. For example, for the horizontal scanning:
  - The first retry is performed in position $(y+1*(0,1*rof))$ mm
  - The second in position $(y-1*(0,1*rof))$ mm
  - The third in position $(y+2*(0,1*rof))$ mm
  - The fourth in position $(y-2*(0,1*rof))$ mm, etc.

All parameters, except the *options* parameter, are optional. If they are not specified, they are set to their default values, which are the following:

x	10 mm
Y	10 mm
W	100 mm
$t_1...t_n$	Empty list, all types are accepted
B	25
B	0, not defined
I	0, not defined
Rn	0
rof	2 / 10 mm

Due to the physical position of the sensor, the scanning of the bars can be performed with the following horizontal position limitations:

CUT SHEET *x* The scanning area must be inside 19 cm from the left paper margin; the area may extend to 205 cm, but in this case the reading of the bars depends on the position in which the sheet is inserted.

FANFOLD   *x* The scanning area must be at least at 2 cm from the first printing position.

The background of the scanning area must have a clear color, whereas the bars must have a dark color (black, dark blue, etc.).

In case the horizontal scanning is performed normally:

between x, y and $(x + w), y$

In case the horizontal scanning is performed in inverse direction:

between $(x + w), y$ and x, y
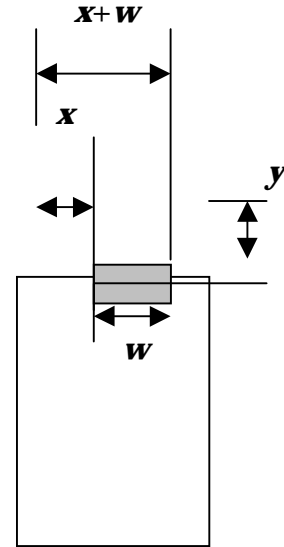
In case the vertical scanning is performed normally:

between x, y and $x, (y + w)$

In case the vertical scanning is performed in inverse direction:

between $x, (y + w)$ and x, y
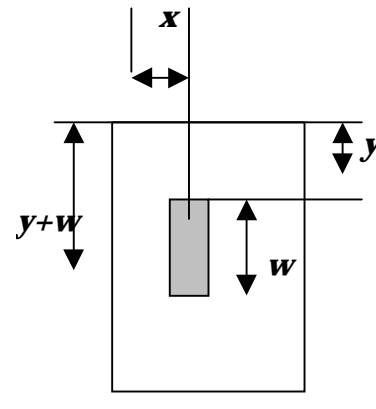
When the command is performed, the serial line sends the following message:

DC4 DC4 ESC ? *n*

Where *n* is a string of n bytes containing the decoded barcode.

If invalid parameters are encountered, or the scanning area goes outside the logical page margins, *n* will have the value 0. If the reading was not successful, *n* = and the string will be composed of 10 "?" characters.

If the debug flag (0x40) has been set, the described string is sent together with the vector of the values read by the reading sensor with the following format:

```
CR LF
n...n CR LF                   where n...n is the number of readings performed by the sensor, in ASCII
CR LF                         format


                              1st  scanning
1...1 CR LF                   where  1...1 is the first read value, in ASCII format
2...2 CR LF                   where  2...2 is the second read value, in ASCII format
...
N...N CR LF                   where  N...N is the Nth read value, in ASCII format
CR LF

                              2nd scanning (if rn ≥ 1 )
1...1 CR LF                   where  1...1 is the first read value, in ASCII format
2...2 CR LF                   where  2...2 is the second read value, in ASCII format
…………………………..
N...N CR LF                   where  N...N is the Nth read value, in ASCII format
CR LF

                              Other scanning procedures (if necessary; rn > 1 )

…………………………..

FF
```

Miscellaneous

DC4 DC4 ESC @
Re-initializes the printer. (Compuprint)

ASCII Code	DC4 DC4 ESC @
Hexadecimal Value	14 14 1B 40
Decimal Value	20 20 27 64

This command resets the printer mode and clears the buffer of printable data.

DC4 DC4 ESC J
Sets amplification factor. (Compuprint)

ASCII Code	DC4 DC4 ESC J *h v*
Hexadecimal Value	14 14 1B 4A *h v*
Decimal Value	20 20 27 74 *h v*

This command sets the required amplification factor to be applied to the current font.

h   It is the horizontal amplification factor, the value range is 1 to 4. It is applied to the basic symbols.

v   It is the vertical amplification factor, the value range is 1 to 255.

0 values for either *h* and *v* parameters keep the related current amplification factor unchanged.

The internally available symbol's amplification algorithms support the following character attributes, that may be selected by means of the available control sequences within the currently active emulation: double width, double-height, emphasized, double strike, subscript, superscript, italics, proportional, compressed.

Doublewide and double-high attributes must be lower than 2.

DC4 DC4 ESC R
String rotation. (Compuprint)

ASCII Code	DC4 DC4 ESC R *n string EM*
Hexadecimal Value	14 14 1B 52 *n string EM*
Decimal Value	20 20 27 82 *n string EM*

This command is used to set the string rotation.

n	Selection
0	No rotation
1	Rotation at 0°
2	Rotation at 90°
3	Rotation at 180°
4	Rotation at 270°

DC4 DC4 ESC r
Digit rotation. (Compuprint)

ASCII Code	DC4 DC4 ESC r
Hexadecimal Value	14 14 1B 72
Decimal Value	20 20 27 144

This command is used to set the required character rotation to be applied to the selected font.

n	Selection
0	No rotation
1	Rotation at 0°
2	Rotation at 90°
3	Rotation at 180°
4	Rotation at 270°

DC4 DC4 ESC Y
Selects emulation. (Compuprint)

ASCII Code   DC4 DC4 ESC Y *n*
Hexadecimal Value   14 14 1B 59 *n*
Decimal Value   20 20 27 89 *n*
Range

Selects the printer emulation type according to the *n* parameter value:

n	Emulation
1	EPSON LQ 2550/1050
2	IBM Proprinter XL 24
4	IBM Proprinter XL 24AGM
5	IBM 2391

DC4 DC4 ESC Z
Makes AGA in column. (Compuprint)

ASCII Code   DC4 DC4 ESC Z *n*
Hexadecimal Value   14 14 1B 5A *n*
Decimal Value   20 20 27 90 *n*

The parameter *n* is the column number at 10 cpi where the AGA (Automatic Gap Adjustment) is made.

DC4 DC4 ESC u
Selects the program setups. (Compuprint)

ASCII Code   DC4 DC4 ESC u *n*
Hexadecimal Value   14 14 1B 75 *n*
Decimal Value   20 20 27 117 *n*
Range $0 \leq n \leq 4$

n	Selection
1	Selects program setup 1
2	Selects program setup 2
3	Selects program setup 3
4	Selects program setup 4

DC4 DC4 ESC X
Reads the *id* of the cut sheets. (Compuprint)

ASCII Code   DC4 DC4 ESC X *n x y l*
Hexadecimal Value   14 14 1B 58 *n x y l*
Decimal Value   20 20 27 88 *n x y l*

This command reads the markers of the cut sheets.

n   Number of markers. $(1 \leq n \leq 32)$

x   Horizontal position from the center of the first marker in mm from the first prints position.

y   Vertical position from the center of the markers in mm from the upper page margin.

l   Distance between the markers in mm.

DC4 DC4 ESC VT
Search for a blank line (without any marker) - **(Compuprint)**

ASCII Code	DC4 DC4 ESC VT *o w*
Hexadecimal Value	14 14 1B 0B *o w*
Decimal Value	20 20 27 11 *o w*

This command searches for a blank line.

- *o*   Send a reply on the serial interface
  - *o* = 1, send a reply
  - *o* = 0, do not send a reply
- *w*   Marker width in 1/120"

DC4 DC4 ESC DC4
Printer functions.

ASCII Code	DC4 DC4 ESC DC4 *n₁ n₂ function arguments*
Hexadecimal Value	14 14 1B 14 *n₁ n₂ function arguments*
Decimal Value	20 20 27 20 *n₁ n₂ function arguments*

$n = (n_1) + 256 * (n_2)$ the character number that composes the command (*function* character included).

function = the function that performs the command.

function	Description
0x05	Sends Message to Printer Display
0x06	Sets Buzzer
0x07	Selects Cut Sheet Eject Side
0x08	Sets/Resets Security Mode
0x09	Sets Passbook Parameters

arguments = the different values of the function.

Function Description

0x05	DC4 DC4 ESC DC4 n_1 n_2 0x05 arguments
	Sends the message to the printer display. This function is only available with the printer models with the LCD display.
	n_1, n_2: the n and n parameters specify the number of characters that composes the command. n= 17
	function: 0x05
	arguments: the message shown in the display is composed by 16 characters.

0x06	DC4 DC4 ESC DC4 n_1 n_2 0x06 arguments	
	Sets the buzzer.	
	n_1, n_2:	The *n* and *n* parameters specify the number of characters that composes the command. $1 < n < 6$.
	function:	0x06
	arguments:	*mode:* | 0 : buzzer on 1 : buzzer off 2 : one shot 3 : blink 4 : multi shots *time on:* | Time on in decimal fraction of second ≤ 100 (default = 3) *time off:* | Time off in decimal fraction of second ≤ 100 (default = 2) *rep:* | In case of multi shots, the number of repetitive shots ≤ 100 (default =3)

0x07	DC4 DC4 ESC DC4 n_1 n_2 0x07 arguments	
	Selects the Cut Sheet Ejection Side.	
	n_1, n_2:	The *n* and *n* parameters specify the number of characters that composes the command. $n = 2$
	function:	0x07
	arguments:	*side:* | 0 : cut sheet ejection towards the front 1 : cut sheet ejection towards the rear

0x08	DC4 DC4 ESC DC4 *n₁ n₂ 0x08 arguments*	
	Sets/Resets the Security Mode.	
	n₁, n₂:	The *n* and *n* parameters specify the number of characters that composes the command. $n = 2$
	function:	0x08
	arguments:	*en:*	0 : security mode disabled
		1 : security mode enabled

0x09	DC4 DC4 ESC DC4 *n₁ n₂ 0x09 arguments*		
	Set Passbook Parameters.		
	n₁, n₂:	The *n* and *n* parameters specify the number of characters that composes the command. $n = 2,4$	
	function:	0x09	
	arguments:	*type:*	0 x 00 : fixed thickness
			0 x 01 : passbook with vertical fold
			0 x 02 : passbook with horizontal fold
			0 x 81 : special type
		width:	passbook width in mm (0 → auto)
		length:	passbook length in mm (0 → auto)