PROGRAMMING MANUAL

Receipt Printer

NIX

Elgin S/A

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1 Commands

The N printer has a series of programming commands that may be used in the remote mode. Two types of commands can be sent:

1.1 Direct command

In this mode, a simple ASCII code is enough to command the printer. For example:

ASCII CODE   :   LF

DECIMAL   :   10

HEXADECIMAL   :   0A

This command causes the printer to perform a line feed.

1.2 Control sequence

In this mode, more than one code may be sent to command or program the printer. This "control sequence" always starts with the ASCII code "ESC" or "GS". For example:

ASCII CODE   :   ESC W 1

DECIMAL   :   27 87 01

HEXADECIMAL   :   1B 57 01

This command switches the printing mode to "expanded".

Following is a summary of all commands accepted by the MP-4000 TH printer.

2 Using the command summary

The following section lists and describes all resident commands including command parameters. The command syntax is as follows:

◆   ESC P is a command without parameters;

◆   ESC Q n is a command with one parameter only;

◆   ESC K n1 n2 is a command with two parameters;

◆   ESC D n1...nk is a command with a variable number of parameters.

A character 'h' following an alphanumeric string represents an hexadecimal number. A number with no 'h' following it is in decimal mode. An *italic* item is a parameter to the escape function.

Note: NIX printer is capable of interpreting ESC/Elgin commands and ESC/POS commands.

Command Description
3. ESC/Elgin Commands

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HEXADECIMAL   :   1B 57 01

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Following is a summary of all commands accepted by the MP-4000 TH printer.

3.1 Operation Commands

The following section details each of the commands presented in the Command Table, ESC/Elgin section.

GS F9h 5 00h

[Function]	Select ESC/Elgin operation mode.	
[Format]	ASCII	GS F9h 5 00h
	Hexadecimal	1D F9 35 00
	Decimal	29 249 53 0
[Description]	Tells printer to interpret ESC/Elgin commands from now.	
[Notes]	This command saves data on printer flash memory and therefore is slow, which may affect printer performance and funcionality if mixed with other faster commands. **Please, use with caution**.	

GS F9h 20h 30h

[Function]	Select ESC/Elgin temporary operation mode.
[Format]	ASCII GS F9h 20h 30h
	Hexadecimal 1D F9 20 30
	Decimal 29 249 32 48
[Description]	Tells printer to interpret ESC/Elgin commands from now.
[Notes]	This command doesn't writes anything on flash memory, so it can be used anyway.

GS F9h 1Fh 31h

[Function]	Return to previous set of commands configured before temporary setting.
[Format]	ASCII GS F9h 1Fh 31h
	Hexadecimal 1D F9 1F 31
	Decimal 29 249 31 49
[Description]	Tells printer to interpret the command set that was configured before an temporary set has been done.

ESC @

[Function]	Initializes the MP-4000 TH printer.
[Format]	ASCII ESC @
	Hexadecimal 1B 40
	Decimal 27 64
[Description]	All settings, including character font, line spacing, left margin, right margin, intensity and inverted mode are canceled.

ESC b n

[Function]	Select sensor to signalize.
[Format]	ASCII ESC b n
	Hexadecimal 1B 62 n
	Decimal 27 98
[Range]	n = 0, 1, 48, 49
[Default]	n = 0
[Description]	When n = 1 (or n = 49), PE signal reflects drawer sensor. When n = 0

(or $n = 48$), PE signal reflects paper sensor.

[Notes]   PE is a signal from the parallel interface.

ESC v n

[Function]   Activate drawer.

[Format]   ASCII   ESC v *n*

                     Hexadecimal   1B 76 *n*

                     Decimal   27 118 *n*

[Description] Activate drawer pin for *n* milliseconds (50ms < *n* < 200ms).

ESC w

[Function]   Performs a full paper cut.

[Format]   ASCII   ESC w

                     Hexadecimal   1B 77

                     Decimal   27 119

[Description]   This command operates the auto cutter, performing a full cut in the paper.

[Notes]   When presenter is activated there is a minimum receipt size (roughly 3.3 inches) to avoid paper jam inside the presenter. If the receipt size is less than the minimum, the full cut command will automatically add line feeds to perform the cut.

ESC m

[Function]   Performs a partial paper cut.

[Format]   ASCII   ESC m

                     Hexadecimal   1B 6D

                     Decimal   27 109

[Description]   This command operates the auto cutter, performing a partial cut in the paper.

[Notes]   This command is available only if presenter is not activated.

ESC y n

[Function]   Enable / disable panel keys.

[Format]   ASCII   ESC y *n*

	Hexadecimal	1B 79 *n*
	Decimal	27 121 *n*

[Range]   *n* = 0,1

[Default]   *n* = 1

[Description]   Enables or disables the panel key.

✓   When *n* is 0 (00h or 30h), the panel key is disabled.

✓   When n is 1 (01h or 31h), the panel key is enabled.

[Notes]   When the panel key is disabled, no button on the panel is usable.

ESC x

[Function]   Enable Dump Mode.

[Format]   ASCII   ESC x

Hexadecimal   1B 78

Decimal   27 120

[Description]   Enables dump mode. In this mode advanced users and programmers can identify communication problems between the host and the printer or check if a certain programmed data is correctly being sent to the printer, thus being a debugging tool.

[Note]   The dump mode is disabled just resetting the printer.

ESC z n

[Function]   Enable / disable automatic line feed.

[Format]   ASCII   ESC z *n*

Hexadecimal   1B 7A *n*

Decimal   27 122 *n*

[Description]   Enables automatic line feed.

✓   When n is 1 (01h or 31h), the automatic line feed is enabled.

✓   When n is 0 (00h or 30h), the automatic line feed is disabled.

[**Notes**]   If automatic line feed is enabled, the printer will perform a LF if a CR is received.

Esc (A pL pH fn n1 n2 vol

[Function]   Activate/deactivate buzzer.

[Format]	ASCII	Esc (A *p*B*L*B *p*B*H*B *fn* *n*B*1*B *n*B*2*B *vol*
	Hexadecimal	1B 28 41 *p*B*L*B *p*B*H*B *fn* *n*B*1*B *n*B*2*B *vol*
	Decimal	27 40 65 *p*B*L*B *p*B*H*B *fn* *n*B*1*B *n*B*2*B *vol*

[Description]   Activate or deactivate printer buzzer.

(pBLB + pBHB × 256) = 4, i.e., pBLB must be 4 and pBHB must be 0.

fn = 1, 31h – activate buzzer

fn = 0, 30h – deactivate buzzer

n = (*n*B*1*B + *n*B*2*B × 256) – time in milliseconds

vol   – not used, can be any value.

3.2 Vertical positioning

ESC C n

[Function]	Set page size in lines.	
[Format]	ASCII	ESC C *n*
	Hexadecimal	1B 43 *n*
	Decimal	27 67 *n*
[Range]	0 < *n* < 256	
[Default]	*n* = 12	
[Description]	Sets the page size where *n* is the number of lines (single height).	

ESC c n1 n2

[Function]	Set page size in millimeters.	
[Format]	ASCII	ESC c *n1 n2*
	Hexadecimal	1B 63 *n1 n2*
	Decimal	27 99 *n1 n2*
[Range]	0 < *n1* < 256; 0 < *n2* < 256	
[Description]	Sets the page size in millimeters where size is 0,125mm*n1 *n2.	

ESC J n

[Function]	Performs a fine line feed.	
[Format]	ASCII	ESC J *n*
	Hexadecimal	1B 4A *n*

	Decimal	27 74 *n*
[Range]	0 < *n* < 256	
[Description]	Performs the feeding of *n**0,125mm of paper.	
[Notes]	This command is very useful in the graphic mode.	

FF

[Function]	Feeds one page.	
[Format]	ASCII	FF
	Hexadecimal	0C
	Decimal	12
[Description]	Performs a form feed to the top of the form.	
[Notes]	The form feed command can be disabled. Set the page size to zero.	

LF

[Function]	Feeds one line.	
[Format]	ASCII	LF
	Hexadecimal	0A
	Decimal	10
[Description]	Prints the contents of the buffer (if exists) and performs one line feed using the default line spacing.	
[Notes]	The next character print position is on the left margin of the next line.	

ESC 2

[Function]	Line feed of 1/6".	
[Format]	ASCII	ESC 2
	Hexadecimal	1B 32
	Decimal	27 50
[Description]	Sets the line feed of 1/6 inch. The line feed rate per line is specified by 1/6 inch.	
[Notes]	This is the default value when printer performed a reset or ESC @ was received.	

ESC 3 n

[Function]	Line feed of *n*/144 inch.	
[Format]	ASCII	ESC 3 *n*
	Hexadecimal	1B 33 *n*
	Decimal	27 51 *n*
[Range]	16 ≤ *n* ≤ 255	
[Description]	The line feed rate per line is specified by *n*/144 inch.	
[Notes]	This command takes effect immediately.	

ESC f 1 n

[Function]	Vertical skipping	
[Format]	ASCII	ESC f 1 *n*
	Hexadecimal	1B 66 31 *n*
	Decimal	27 102 49 *n*
[Range]	0 ≤ *n* ≤ 255	
[Description]	Performs a vertical skipping of *n* characters.	
[Notes]	The command 1Bh 66h 01h *n* has the same effect.	

ESC A n

[Function]	Feeding paper *n* * 0,375mm.	
[Format]	ASCII	ESC A *n*
	Hexadecimal	1B 41 *n*
	Decimal	27 65 *n*
[Range]	0 < *n* < 256	
[Description]	Performs the feeding of *n* * 0,375mm.	
[Notes]	If *n* < 17, the line feed will be equal to zero. For *n* > 100, the line feed will be equal to 32mm. For other values, the line feed is equal to *n**0,375mm.	

3.3 Horizontal positioning

ESC f 0 n

[Function]	Horizontal skipping	
[Format]	ASCII	ESC f 0 *n*

	Hexadecimal	1B 66 30 *n*
	Decimal	27 102 48 *n*

[Range]	0 ≤ *n* ≤ 255
[Description]	Performs a horizontal skipping of *n* characters.
[Notes]	The command 1B 66 00 *n* has the same effect.

ESC Q n

[Function]	Set right margin.	
[Format]	ASCII	ESC Q *n*
	Hexadecimal	1B 51 *n*
	Decimal	27 81 *n*
[Range]	0 < *n* < 256	
[Description]	define printing width	
[Notes]	it will be invalid if the printing width is over the max printing width.	

ESC l n

[Function]	Set left margin.	
[Format]	ASCII	ESC l *n*
	Hexadecimal	1B 6C *n*
	Decimal	27 108 *n*
[Range]	0 < *n* < 256	
[Description]	Sets left margin in characters from the default left margin.	
[Notes]	it will be effective right now if the current printing position is on the beginning of line. Otherwise, it will be effective on next line.	

ESC a n

[Function]	Aligning the characters	
[Format]	ASCII	ESC a *n*
	Hexadecimal	1B 61 *n*
	Decimal	27 97 *n*
[Range]	*n* = 0, 1	
[Default]	*n* = 0	
[Description]	This command sets the horizontal justification.	

✓   When n is 0 (00h or 30h), align is left justified.

✓   When n is 1 (01h or 31h), align is center justified.

[Notes]   The power on default is left justified.

3.4 Character Types

ESC - n

[Function]   Enable / disable underlined print mode

[Format]   ASCII   ESC - *n*

                        Hexadecimal   1B 2D *n*

                        Decimal   27 45 *n*

[Range]   *n* = 0,1

[Default]   *n* = 0

[Description]   Enables or disables the underlined print mode.

✓   When n is 1 (01h or 31h), underlined mode is enabled.

✓   When n is 0 (00h or 30h), underlined mode is disabled.

[Notes]   All subsequent text and spaces are underlined.

ESC 4

[Function]   Enable italic print mode

[Format]   ASCII   ESC 4

                        Hexadecimal   1B 34

                        Decimal   27 52

[Description]   Enables italic print mode.

[Notes]   Italic is available in all print modes.

ESC 5

[Function]   Disable italic print mode

[Format]   ASCII   ESC 5

                        Hexadecimal   1B 35

                        Decimal   27 53

[Description]   Disables italic print mode.

ESC E

[Function]   Enable emphasized print mode

[Format]	ASCII	ESC E
	Hexadecimal	1B 45
	Decimal	27 69

[Description]   Enables emphasized print mode.

[Notes]   Emphasized print is bolder than normal print. Emphasized print is available in all print modes.

ESC F

[Function]	Disable emphasized print mode	
[Format]	ASCII	ESC F
	Hexadecimal	1B 46
	Decimal	27 70

[Description]   Disables emphasized print mode.

ESC t n

[Function]	Selects code page	
[Format]	ASCII	ESC t n
	Hexadecimal	1B 74 n
	Decimal	27 116 n

[Range] $n = 2, 3, 4, 5$

[Default] $n = 2$

[Description] Selects character code page.

- ✓ When n is 1 (01h or 31h), CODEPAGE ABICOMP is selected.
- ✓ When n is 2 (02h or 32h), CODEPAGE 850 is selected.
- ✓ When n is 3 (03h or 33h), CODEPAGE 437 is selected.
- ✓ When n is 4 (04h or 34h), CODEPAGE 860 is selected.
- ✓ When n is 5 (05h or 35h), CODEPAGE 858 is selected.

[Notes]   CODEPAGE 850 is the default character code page.

ESC S n

[Function]	Enable superscript and / or subscript	
[Format]	ASCII	ESC S n
	Hexadecimal	1B 53 n
	Decimal	27 83 n

[Range] $n = 0, 1$

[Description]   Enables superscript character and or subscript.

- ✓ When n is 0 (00h or 30h), the superscript is enabled. The following characters are printed on the upper side of the print line.
- ✓ When n is 1 (01h or 31h), the subscript is enabled. The following characters are printed on the bottom side of the print line.

ESC T

[Function]   Disable superscript and subscript modes

[Format]   ASCII   ESC T

Hexadecimal   1B 54

Decimal   27 84

[Description]   Disables both superscript and subscript print modes.

ESC N n

[Function]   **Select Intensity Mode**

[Format]   ASCII   ESC N *n*

Hexadecimal   1B 4E *n*

Decimal   27 78 *n*

[Range] $n = 0, 1, 2, 3$

[Default] $n = 2$

[Description]   Selects intensity mode.

- ✓ When n is 0 (30h), the intensity selected is VERY WEAK.
- ✓ When n is 1 (31h), the intensity selected is WEAK.
- ✓ When n is 2 (32h), the intensity selected is NORMAL.
- ✓ When n is 3 (33h), the intensity selected is STRONG.
- ✓ When n is 4 (34h), the intensity selected is VERY STRONG.

ESC ! n

[Function]   Select print mode

[Format]   ASCII   ESC ! *n*

Hexadecimal   1B 21 *n*

Decimal   27 33 *n*

[Description]   Selects the print mode depending on byte *n* as shown in the table

below:

Bit	Function	Value	
		0	1
0	Undefined		
1	Undefined		
2	Undefined		
3	Emphasized	Canceled	Specified
4	Double height	Canceled	Specified
5	Double width	Canceled	Specified
6	Undefined		
7	Underlined	Canceled	Specified

ESC } n

[Function]	Enable / Disable Inverted mode	
[Format]	ASCII	ESC } *n*
	Hexadecimal	1B 7D *n*
	Decimal	27 125 *n*
[Range]	*n* = 0, 1	
[Default]	*n* = 0	
[Description]	Enables or disables inverted mode.	

- ✓   When n is 1 (01h or 31h), the inverted mode is enabled.
- ✓   When n is 0 (00h or 30h), the inverted mode is disabled.

3.5 Print width, character width and height

DC2

[Function]	Disable condensed mode	
[Format]	ASCII	DC2
	Hexadecimal	12
	Decimal	18
[Description]	Disables the condensed mod set by the ESC SI or SI command.	

DC4

[Function]	Disable on-line expanded print

[Format]	ASCII	DC4
	Hexadecimal	14
	Decimal	20
[Description]	Disables the on-line expanded print set by ESC SO or SO command.	

ESC d n

[Function]	Enable / Disable double height print mode	
[Format]	ASCII	ESC d *n*
	Hexadecimal	1b 64 *n*
	Decimal	27 100 *n*
[Range]	*n* = 0, 1	
[Default]	*n* = 0	
[Description]	Enables or disables double height print mode.	

- ✓ When n is 1 (01h or 31h), the double height is enabled.
- ✓ When n is 0 (00h or 30h), the double height is disabled.

ESC H

[Function]	Set default column per line	
[Format]	ASCII	ESC H
	Hexadecimal	1B 48
	Decimal	27 72
[Description]	Set the default cpl. All characters type can be set in this mode. See table 1 to know the number of cpl, according to your printer model.	

ESC P

[Function]	Set default column per line	
[Format]	ASCII	ESC P
	Hexadecimal	1B 50
	Decimal	27 80
[Description]	This command set the default cpl. All characters type can be set in this mode. See table 1 to know the number of cpl, according to your printer model. It is a copy of ESC H.	

ESC SI

[Function]	Set condensed mode	
[Format]	ASCII	ESC SI
	Hexadecimal	1B 0F
	Decimal	27 15
[Description]	This command set the ESC SI cpl. All characters type can be set in this mode. See table 1 to know the number of cpl, according to your printer model.	

ESC SO

[Function]	Set on-line expanded mode	
[Format]	ASCII	ESC SO
	Hexadecimal	1B 0E
	Decimal	27 14
[Description]	If this command is received in the beginning of the line, expanded is valid for all line. If already exist some characters in the line, next characters in this line (if any) will be in expanded mode. Next lines will be in normal mode.	

ESC V

[Function]	Set on-line double height mode	
[Format]	ASCII	ESC V
	Hexadecimal	1B 56
	Decimal	27 86
[Description]	If this command is received in the beginning of the line, double height is valid for all line. If already exist some characters in the line, next characters in this line (if any) will be in double height mode. Next lines will be in normal mode.	

ESC W n

[Function]	Enable / Disable expanded mode	
[Format]	ASCII	ESC W *n*
	Hexadecimal	1B 57n

Decimal   27 87 *n*

[Description] Set expanded mode (double width).

    ✓   When n is 1 (01h or 31h), the expanded mode is enabled.

    ✓   When n is 0 (00h or 30h), the expanded mode is disabled.

[Notes] This command can be sent at any time, even in the middle of the line.

SI

[Function]	Set condensed mode	
[Format]	ASCII	SI
	Hexadecimal	0F
	Decimal	15
[Description]	This command set the ESC SI cpl. All characters type can be set in this mode. See table 1 to know the number of cpl, according to your printer model. It is a copy of ESC SI command.	

SO

[Function]	Set on-line expanded mode	
[Format]	ASCII	SO
	Hexadecimal	0E
	Decimal	14
[Description]	If this command is received in the beginning of the line, expanded is valid for all line. If already exist some characters in the line, next characters in this line (if any) will be in expanded mode. Next lines will be in normal mode. It is a copy of ESC SO command.	

3.6 Bit images and graphics

3.6.1 24-bit graphics
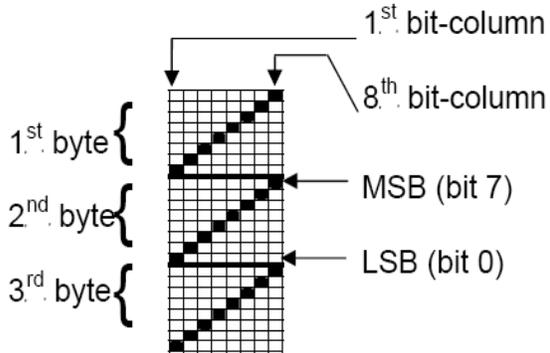
For this 24-bit graphic pattern we have eight bit-columns, each with a height of 3 bytes (24 bits). The printer must, after the command is stated, receive the 1PstP , 2PndP and 3PrdP bytes of the first bit-column, than the 1PstP , 2PndP and 3PrdP bytes of the second bit-column and so on, until the last bit

The command sequence to print this graphic pattern would be (numbers in decimal):

ESC * ! 8 0 1 1 1 2 2 2 4 4 4 8 8 8 16 16 16 32 32 32 64 64 64 128 128 128

Where you have 8 + 0 * 256 = 8 bit-columns to be filled, each with 3 bytes that will give us a total of 24 bytes to be sent (excluding the command sequence).

3.6.2 8-bit graphics
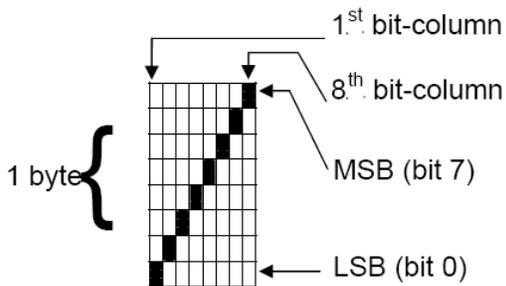
For this 8-bit graphic pattern we have eight bit-columns, each with a height of 1 byte (8 bits). The printer must, after the command is stated, receive the byte for the first bit-column, than the byte for the second bit-column and so on, until the last bit-column is filled. The resolution is lower but needs less bytes to be sent

The command sequence to print this graphic pattern would be (numbers in decimal):

ESC K 8 0 1 2 4 8 16 32 64 128

Where you have 8 + 0 * 256 = 8 bit-columns to be filled, each with 1 byte that will give us a total of 8 bytes to be sent (excluding the command sequence).

ESC $ n1 n2

[Function]	Fill in blank bit columns	
[Format]	ASCII	ESC $ *n1 n2*
	Hexadecimal	1B 24 *n1 n2*
	Decimal	27 36 *n1 n2*
[Description]	This command fills in blank bit columns, from the actual column until	

column number (*n1+n2*256)*, where *n1+n2*256<= N.* See '*N*' value in the table 2.

ESC * ! n1 n2 b1...bn

[Function]	24-bit graphics	
[Format]	ASCII	ESC * ! *n1 n2 b1...bn*
	Hexadecimal	1B 2A 21 *n1 n2 b1 ... bn*
	Decimal	27 42 33 *n1 n2 b1 … bn*

[Description]   This command programs bit image for 24 bits, in double density where *n1+n2*256* is the number of bit-columns that will be sent (see Bit images and graphics) and *b1...bn* are the bytes that compose the bit image. For each column one may need 3 bytes to complete. So, if you need to send an image with an 8-column width you may send 24 bytes to fill those columns. A full line has '*N*' bit columns so a full line will need *N*3* bytes. If the image you want to print has less than '*N*' graphic columns, a LF must be sent to complete line printing. Text and graphic can be mixed in the same line. If the printer is used with pograms that convert text to graphics, the printer is slower than if the printer is sent ASCII text. See *N* value in the Table 2.

ESC K n1 n2 b1...bn

[Function]	8-bit graphics	
[Format]	ASCII	ESC K *n1 n2 b1...bn*
	Hexadecimal	1B 4B *n1 n2 b1 ... bn*
	Decimal	27 75 *n1 n2 b1 … bn*

[Description]   Selects the "8 pin" bit image (compatible with matrix printers) where you use *n1+n2*256* columns, with 1 byte per column thus using a lower resolution and up to '*N*' columns. If the image you want to print has less than '*N*' graphic columns, a LF must be sent to complete line printing. Text and graphic can be mixed in the same line. See '*N*' value in the Table 2.

FS p n m

[Function]   Print NV bit image.

[Format]   ASCII   FS p *n m*

                                      Hexadecimal   1C 70 *n m*

                                      Decimal   28 112 *n m*

[Description]   Prints a NV bit image *n* using the mode specified by *m*.

m	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48	Normal	180 dpi	180 dpi
1, 49	Double-width	180 dpi	90 dpi
2, 50	Double-height	90 dpi	180 dpi
3, 51	Quadruple	90 dpi	90 dpi

[dpi: dots per 25.4 mm {1"}]

- *n* is the number of the NV bit image (defined using the FS q command).
- *m* specifies the bit image mode.
- NV bit image means a bit image which is defined in a non-volatile memory by FS q and printed by FS p.
- This command is not effective when the specified NV bit image has not been defined.

FS q n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n

[Function]   Define NV bit image.

[Format]   ASCII   FS q *n [x*B*L*B *x*B*H*B *y*B*L*B *y*B*H*B

                         *d*B*1*B...*d*B*k*B*]B*1*B...[*x*B*L*B *x*B*H*B *y*B*L*B *y*B*H*B *d*B*1*B...

                                                        *d*B*k*B*]B*n*B

                         Hexadecimal   1C 70 *n [x*B*L*B *x*B*H*B *y*B*L*B *y*B*H*B

                                                        *d*B*1*B...*d*B*k*B*]B*1*B...[*x*B*L*B *x*B*H*B *y*B*L*B *y*B*H*B

                                                        *d*B*1*B...*d*B*k*B*]B*n*B

                         Decimal   28 112 *n [x*B*L*B *x*B*H*B *y*B*L*B *y*B*H*B

                                                        *d*B*1*B...*d*B*k*B*]B*1*B...[*x*B*L*B *x*B*H*B *y*B*L*B *y*B*H*B

                                                        *d*B*1*B...*d*B*k*B*]B*n*

[Range] $1 \le n \le 255$

                         $0 \le xL \le 255$

                         $0 \le xH \le 3$ (when $1 \le (xL + xH \times 256) \le 1023$)

                         $0 \le yL \le 255$

                         $0 \le yL \le 1$ (when $1 \le (yL + yH \times 256) \le 288$)

                         $0 \le d \le 255$

                         $k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$

                         Total defined data area = 2M bits (256K bytes).

[Description]   Define *n* NV bit images.

• *n* specifies the number of defined NV bit images.

• *x*B*L*B, *x*B*H*B specifies (*x*B*L*B + *x*B*H*B × 256) × 8 dots in the horizontal direction for the NV bit image you are defining.

• *y*B*L*B, *y*B*H*B specifies (*y*B*L*B + *y*B*H*B × 256) × 8 dots in the vertical direction for the NV bit image you are defining.

• This command cancels all NV bit images that have already been defined by this command.

The printer can not redefine only one of several data definitions previously defined. In this case, all data needs to be sent again.
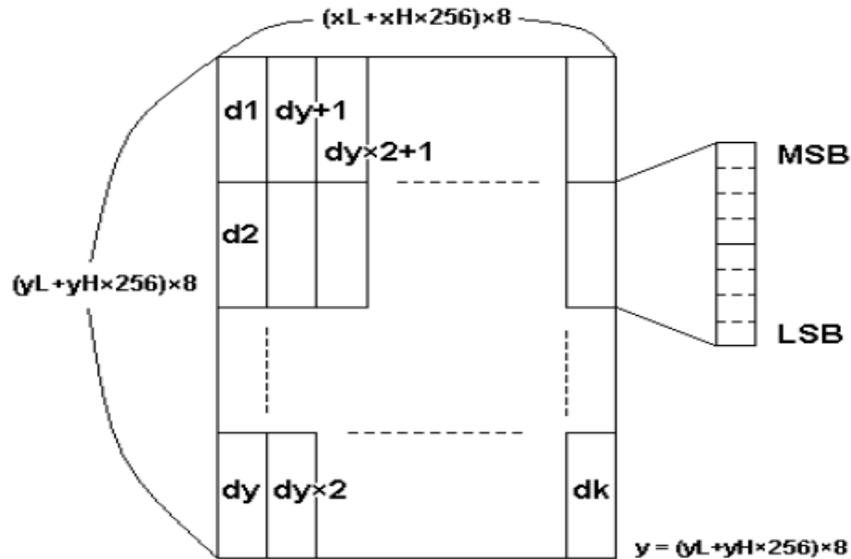
GS / m

[Function]   Print downloaded bit image.

[Format]   ASCII   GS / *m*

Hexadecimal   1D 2F *m*

Decimal   29 47 *m*

[Description]   Prints a downloaded bit image using the mode specified by *m*.

m	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48	Normal	180 dpi	180 dpi
1, 49	Double-width	180 dpi	90 dpi
2, 50	Double-height	90 dpi	180 dpi
3, 51	Quadruple	90 dpi	90 dpi

[dpi: dots per 25.4 mm {1"}]

• *m* specifies the bit image mode.

• This command is ignored if a downloaded bit image has not been defined.

GS * x y dB1B...dB(x × y × 8)

[Function]	Print NV bit image.	
[Format]	ASCII	GS * *x y d*B *1*B...*d*B *(x × y × 8)*B
	Hexadecimal	1D 2A *x y d*B *1*B...*d*B *(x × y × 8)*B
	Decimal	29 42 *x y d*B *1*B...*d*B *(x × y × 8)*

[Range]　　　　　　$1 \leq x \leq 255$

　　　　　　　　　　$1 \leq y \leq 64$

　　　　　　　　　　$x \times y \leq 2048$

　　　　　　　　　　$0 \leq d \leq 255$

　　　　　　　　　　Total defined data area = 16K bytes.

[Description]　　　Defines a downloaded bit image using the number of dots specified.

• *x* specifies the number of dots in the horizontal direction.

• *y* specifies the number of dots in the vertical direction.

• The number of dots in the horizontal direction is $x \times 8$, in the vertical direction it is $y \times 8$.

• The downloaded bit image definition is cleared when:

　　　　ESC @ is executed.

　　　　FS q is executed.

　　　　Printer is reset or the power is turned off.

• The following figure shows the relationship between the downloaded bit image and the printed data:
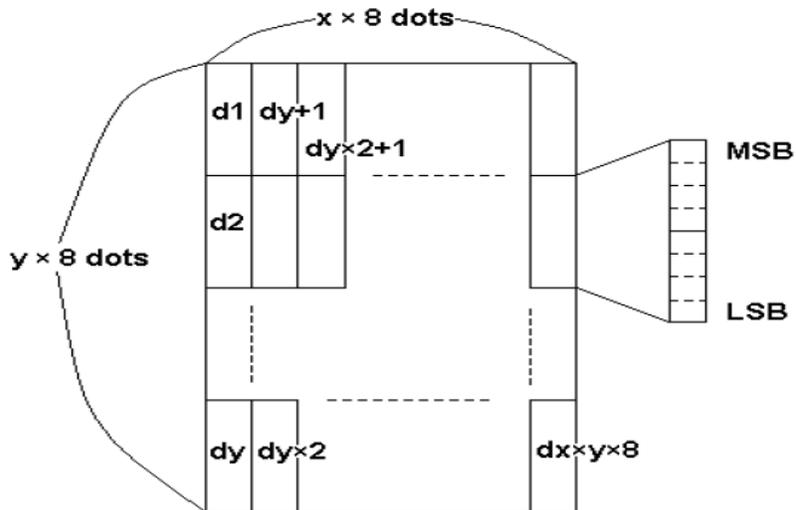
GS v 0 m xBLB xBHB yBLB yBHB dB1B...dBk

[Function]	Print Raster Bitmap.	
[Format]	ASCII	GS v 0 m xBLB xBHB yBLB yBHB dB1B...dBkB
	Hexadecimal	1D 76 30 m xBLB xBHB yBLB yBHB
	dB1B...dBkB	
	Decimal	29 118 48 m xBLB xBHB yBLB yBHB

dB1B...dBk

[Range]

0 ≤ m ≤ 3, 48 ≤ m ≤ 51

0 ≤ xBLB ≤ 255

0 ≤ xBHB ≤ 255

0 ≤ yBLB ≤ 255

0 ≤ yBHB ≤ 8

0 ≤ d ≤255

k = (xBLB + xBHB × 256) × (yBLB + yBHB × 256) ($k ≠ 0$)

[Description]   Print raster bitmap using the mode defined by m:

m	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48	Normal	180 dpi	180 dpi
1, 49	Double-width	180 dpi	90 dpi
2, 50	Double-height	90 dpi	180 dpi
3, 51	Quadruple	90 dpi	90 dpi

[dpi: dots per 25.4 mm {1"}]

• xL, xH, select the number of data bytes (xL+xH×256) in the horizontal direction for the bit image.

• yL, yH, select the number of data bytes (yL+yH×256) in the vertical direction for the bit image.

• Data outside the printing area is read in and discarded on a dot-by-dot basis.

• The position at which subsequent characters are to be printed for raster bit image is specified by HT (Horizontal Tab), ESC $ (Set absolute print position), ESC \ (Set relative print position), and GS L (Set left margin). If the position at which subsequent characters are to be printed is not a multiple of 8, print speed may decline.

• The ESC a (Select justification) setting is also effective on raster bit images.

• d indicates the bit-image data. Set time a bit to 1 prints a dot and

setting it to 0 does not print a dot.

[Example]   When printing 640 dots, $xBLB+xBHB\times256$ must be 80, as illustrated on

following figure:
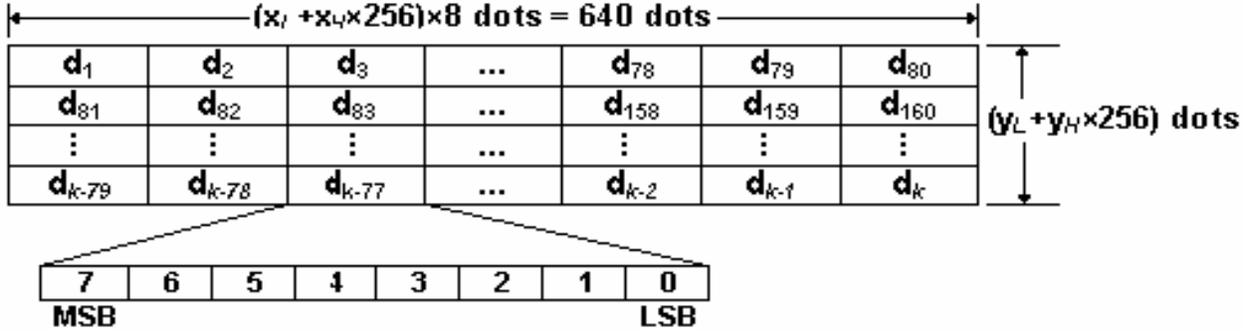
3.7 Communication

ENQ

[Function]	Serial communication status enquiry
[Format]	ASCII ENQ
	Hexadecimal 05
	Decimal 05
[Description]	After this command is issued, the printer returns a status by the serial RS-232 communication port, defined below.

3.7.1 Serial interface status byte

The serial interface status byte is composed of 8 bits – 7 through 0 – the most significant bit is Bit 7 and the least significant bit is Bit 0.

Status bit number	Logic "0"	Logic "1"
0	Printer Off Line	Printer On Line
1	Replicates Drawer status	
2*	Drawer pin low	Drawer pin high
3	Print head raised	Print head down
4	Paper Full	Paper Near End
5	Command not executed	Command executed
6 – 7	Not used (will always be logic "0")	

* Refer to your drawer's manual to know what this levels mean.

GS ° 1

[Function]	Serial / USB communication advanced status
[Format]	ASCII GS ° 1
	Hexadecimal 1D F8 31
	Decimal 29 248 49
[Description]	After this command is issued, the printer returns a status by the serial RS-232 communication port, defined below.

3.7.2 Serial / USB interface advanced status byte

The serial/usb interface status bytes is composed of 8 bits – 7 through 0 – the most significant bit is Bit 7 and the least significant bit is Bit 0.

1) Printer Status

7	6	5	4	3	2	1	0
1	Buffer status		Wait	On / Off line	Overrun Error	0	0

Bit 2: Overrun Error – indicates when data sent to printer will be losted.

       0 - data received will be printed

       1 - data received will be lost

Bit 3: On / Off line – indicates when printer is operational (on-line) or not.

       0 - on-line

       1 - off-line

Bit 4: Wait – indicates when printer is busy or not.

       0 – printer is busy and printing

       1 – printer has printed all buffer and is waiting for commands

Bit 6 & 5: Buffer status – details the status of the printer buffer.

       00 - buffer empty

       01 - buffer less 1/3 full

       10 - buffer more 1/3 full

       11 - buffer more 3/4 full

2) Off-line Status

7	6	5	4	3	2	1	0
Cover status	Error Reported	No paper	Drawer status	0	Paper sensor	Paper near end sensor	1

Bit 1: Paper near end sensor – informs the status of the paper near end sensor.

       0 – there's paper for printing

       1 - there's few paper for printing

Bit 2: Paper sensor – informs the status of the paper sensor.

       0 – there's paper on sensor

       1 – there's no paper on sensor

Bit 4: Drawer status – indicates status for drawer sensor.

       0 – drawer sensor is indicating low level (logical 0)

       1 – drawer sensor is indicating high level (logical 1)

Bit 5: No paper – indicates if there is available paper for printing.

       0 – there's paper available

       1 – no paper is available

Bit 6: Error Reported – informs if an error was reported on Error Status.

       0 – no error reported

       1 – there's error reported

Bit 7: Cover status – tells about the printer paper cover.

       0 – cover is open

       1 – cover is closed

3) Error Status

7	6	5	4	3	2	1	0
1	Recoverable error	Non recoverable error	1	Cutter error	Cutter presence	0	0

Bit 2: Cutter presence – indicates the presence of a cutter on printer.

       0 - cutter present

       1 - cutter absent

Bit 3: Cutter error

      0 – no cutter error

      1 - cutter error

Bit 5:

      0 - without non-recoverable error

      1 - an non-recoverable error occurred

Bit 6:

      0 - without recoverable error

      1 - an recoverable error occurred

4) Continuous Paper Sensor Status

1	0	0	1	0	Head temperature	0	1

Bit 2: Head temperature – informs about the printer head temperature

      0 - normal temperature

      1 - temperature above the normal

Bit 3: Paper eject error – informs when a paper jam occurs before paper sensor

      0 - printer without eject error

      1 - printer with eject error

Bit 5: 0 - printer without internal paper jam error (before presenter sensor)

      1 - printer with internal paper jam error

5) Firmware Version

0	Major firmware version digit	Minor firmware version digit

It is not necessary to send any command to the printer to receive the status using the parallel interface. The parallel interface provides status using hardware pins as shown below.

3.7.3 Parallel interface status byte

The table below shows the printer statuses obtained through the parallel interface, with the PC BIOS function "Get status printer" (Int 17h – Printer I/O):

Parallel Interface Status Byte									Description
/BUSY	/ACK	PE	SEL	ERROR	X	X	X	HEX	
1	0	0	1	0	0	0	0	90h	On Line (Remote mode)
1	0	1	0	1	0	0	0	A8h	Paper end
1	0	1	1	0	0	0	0	A0h/B0h	Near paper end
1	0	x	1	1	0	0	0	88h/B8h	Head Up

ETX

[Function]	End buffer	
[Format]	ASCII	ETX
	Hexadecimal	03
	Decimal	03

[Description]   The printer will be BUSY while the printing is performed, changing status only when the buffer is empty. On serial interfaces DTR (RTS) will be low while the printing is performed.

STX

[Function]   Clear buffer

[Format]   ASCII   STX

Hexadecimal   02

Decimal   02

[Description]   This commands clears the print buffer and any un-printed information in the printer receive before it. This command does not restore default conditions.

3.8 Data Control

CAN

[Function]   Cancel last line

[Format]   ASCII   CAN

Hexadecimal   18

Decimal   24

[Description]   This commands clears the last line sent to the printer. All other data is stored.

DEL

[Function]   Cancel last character

[Format]   ASCII   DEL

Hexadecimal   7F

Decimal   127

[Description]   This commands clears the last character sent to the printer. All other data is stored.

3.9 Barcodes

GS h n

[Function]   Sets the height n of the barcode generated

[Format]   ASCII   GS h n

Hexadecimal   1D 68 n

Decimal   29 104 n

[Description]   Each height unit corresponds to a dot of 0.125 mm, so the final height is n x 0.125 mm where $1 \leq n \leq 255$. The default is n=162.

GS w n

[Function]	Determines the width of the barcode	
[Format]	ASCII	GS w *n*
	Hexadecimal	1D 77 *n*
	Decimal	29 119 *n*
[Description]	This command changes the barcode width where *n*=2 correspond to normal width, *n*=3 is double width and *n*=4 is quadruple width. The default is *n*=3.	

GS H n

[Function]	Choose the position of the human readable information (HRI) of the barcode	
[Format]	ASCII	GS H *n*
	Hexadecimal	1D 48 *n*
	Decimal	29 72 *n*
[Description]	*n*=0: No HRI	
	n=1: On top of the barcode (default)	
	n=2: On the bottom of the barcode	
	n=3: Both on top and on the bottom of the barcode	

GS f n

[Function]	Sets the font used to print the human readable information (HRI)	
[Format]	ASCII	GS f *n*
	Hexadecimal	1D 66 *n*
	Decimal	29 102 *n*
[Description]	For a normal font ('*N*' characters per line), *n*=0 or *n*=48. For a condensed font ('*N*' characters per line), *n*=1 or *n*=49. The default is normal font.	

GS k 0 d1…d11 NUL

[Function]	Prints an UPC-A barcode	
[Format]	ASCII	GS k 0 *d*B*1*B…*d*B*11*B NUL
	Hexadecimal	1D 6B 00 *d*B*1*B…*d*B*11*B 00
	Decimal	29 107 0 *d*B*1*B…*d*B*11*B 0
[Description]	*d*B*1*B…*d*B*11*B is a sequence of 11 bytes containing the barcode information with 48 ≤ *d* ≤ 57. A check sum digit will be added automatically.	

GS k 65 11 d1…d11

[Function]	Prints an UPC-A barcode	
[Format]	ASCII	GS k 65 11 dB1B…dB11B
	Hexadecimal	1D 6B 41 0B dB1B…dB11B
	Decimal	29 107 65 11 dB1B…dB11B
[Description]	It is a copy of GS k 0 dB1B…dB11 BNUL command.	

GS k 1 d1…d6 NUL

[Function]	Prints an UPC-E barcode	
[Format]	ASCII	GS k 1 dB1B…dB6B NUL
	Hexadecimal	1D 6B 01 dB1B…dB6B 00
	Decimal	29 107 1 dB1B…dB6B 0
[Description]	dB1B...dB6B is a sequence of 6 bytes containing the barcode information with 48 ≤ d ≤ 57. A check sum digit will be added automatically.	

GS k 66 6 d1…d6

[Function]	Prints an UPC-E barcode	
[Format]	ASCII	GS k 66 6 dB1B…dB6B
	Hexadecimal	1D 6B 42 06 dB1B…dB6B
	Decimal	29 107 66 6 dB1B…dB6B
[Description]	It is a copy of GS k 1 $d1…d$B6B NUL command.	

GS k 2 d1…d12 NUL

[Function]	Prints an EAN-13 barcode	
[Format]	ASCII	GS k 2 dB1B…dB12B NUL
	Hexadecimal	1D 6B 02 dB1B…dB12B 00
	Decimal	29 107 2 dB1B…dB12B 0
[Description]	$d1...d1$B2B is a sequence of 12 bytes containing the barcode information with 48 ≤ d ≤ 57. The printer generates automatically the 13PthP digit.	

GS k 67 12 d1…d12

[Function]	Prints an EAN-13 barcode	
[Format]	ASCII	GS k 67 12 dB1B…dB12B
	Hexadecimal	1D 6B 43 0C dB1B…dB12B
	Decimal	29 107 67 12 dB1B…dB12B
[Description]	It is a cop of command GS k 2 dB1B…dB12B NUL.	

GS k 3 d1…d7 NUL

[Function]	Prints an EAN-8 barcode	
[Format]	ASCII	GS k 3 dB1B…dB7B NUL
	Hexadecimal	1D 6B 03 dB1B…dB7B 00
	Decimal	29 107 3 dB1B…dB7B 0

[Description] dB1B…dB7B is a sequence of 7 bytes containing the barcode information with $48 \leq d \leq 57$. The printer generates automatically the 8PthP digit.

GS k 68 7 d1…d7

[Function]	Prints an EAN-8 barcode	
[Format]	ASCII	GS k 68 7 dB1B…dB7B
	Hexadecimal	1D 6B 44 07 dB1B…dB7B
	Decimal	29 107 68 7 dB1B…dB7B

[Description]   It is a copy of GS k 3 dB1B…dB7B NUL command.

GS k 4 d1…dn NUL

[Function]	Prints a CODE 39 barcode	
[Format]	ASCII	GS k 4 dB1B…dBnB NUL
	Hexadecimal	1D 6B 04 dB1B…dBnB 00
	Decimal	29 107 4 dB1B…dBnB 0

[Description] dB1B…dBnB is the sequence of n bytes containing the barcode information. The bytes that can be used in d are 32, 36, 37, 42, 43, 45 to 57 and 65 to 90 (upper case letters) *or* 97 to 122 (lower case letters). Lower case and upper case letters can't be combined in the same barcode. A check sum digit will be added automatically. Number of digits in the barcode limited by the print field as well as the configured barcode width.

GS k 69 n d1…dn

[Function]	Prints a CODE 39 barcode	
[Format]	ASCII	GS k 69 n dB1B…dBnB
	Hexadecimal	1D 6B 45 n dB1B…dBnB
	Decimal	29 107 69 n dB1B…dBnB

[Description]   It is a copy of the command GS k 4 dB1B…dBnB NUL.

GS k 5 d1…dn NUL

[Function]	Prints an ITF barcode	
[Format]	ASCII	GS k 5 dB1B…dBnB NUL
	Hexadecimal	1D 6B 05 dB1B…dBnB 00
	Decimal	29 107 5 dB1B…dBnB 0
[Description]	dB1B…dBnB is the sequence of n bytes containing the barcode information with $48 \le d \le 57$. Number of digits in the barcode limited by the print field as well as the configured barcode width.	

GS k 70 n d1…dn

[Function]	Prints an ITF barcode	
[Format]	ASCII	GS k 70 n dB1B…dBnB
	Hexadecimal	1D 6B 46 n dB1B…dBnB
	Decimal	29 107 70 n dB1B…dBnB
[Description]	It is a copy of the command GS k 5 dB1B…dBnB NUL	

GS k 6 d1…dn NUL

[Function]	Prints a CODABAR barcode	
[Format]	ASCII	GS k 6 dB1B…dBnB NUL
	Hexadecimal	1D 6B 06 dB1B…dBnB 00
	Decimal	29 107 6 dB1B…dBnB 0
[Description]	dB1B…dBnB is the sequence of n bytes containing the barcode information. The bytes that can be used in d are 36, 43, 45 to 57 and 65 to 68 (upper case letters) *or* 97 to 100 (lower case letters). Lower case and upper case letters can't be combined in the same barcode. A check sum digit will be added automatically. Number of digits in the barcode limited by the print field as well as the configured barcode width. If the first character is a letter, the last character must also be a letter. Excluding these two characters (the first and the last one), any other character can be a letter.	

GS k 71 n d1…dn

[Function]	Prints a CODABAR barcode	
[Format]	ASCII	GS k 71 n dB1B…dBnB
	Hexadecimal	1D 6B 47 n dB1B…dBnB
	Decimal	29 107 71 n dB1B…dBnB
[Description]	It is a copy of the command GS k 6 dB1B…dBnB NUL	

GS k 72 d1…dn

[Function]	Prints a CODE 93 barcode	
[Format]	ASCII	GS k 72 *d*B*1*B…*d*B*n*B
	Hexadecimal	1D 6B 48 *n* *d*B*1*B…*d*B*n*B
	Decimal	29 107 72 *n* *d*B*1*B…*d*B*n*B

[Description] *n* indicates the number of bytes that will be sent and *d*B*1*B…*d*B*n*B is the sequence of *n* bytes containing the barcode information. This code can use all bytes from 0 to 127. A check sum digit will be added automatically. Number of digits in the barcode limited by the print field as well as the configured barcode width.

GS k 73 n d1…dn

[Function]	Prints a CODE 128 barcode	
[Format]	ASCII	GS k 73 *n* *d*B*1*B…*d*B*n*B
	Hexadecimal	1D 6B 49 *n* *d*B*1*B…*d*B*n*B
	Decimal	29 107 73 *n* *d*B*1*B…*d*B*n*B

[Description] *n* indicates the number of bytes that will be sent and *d*B*1*B…*d*B*n*B is the sequence of *n* bytes containing the barcode information. This code can use all bytes from 0 to 127. The subset is automatically chosen by the printer based on the data received. A check sum digit will be added automatically. Number of digits in the barcode limited by the print field as well as the configured barcode width.

GS k 128 n1 n2 n3 n4 n5 n6 d1…dn

[Function]	**Prints a PDF-417 barcode**	
[Format]	ASCII	GS k 128 *n*B*1*B *n*B*2*B *n*B*3*B *n*B*4*B *n*B*5*B *n*B*6*B *d*B*1*B…*d*B*n*B
	Hexadecimal	1D 6B 80 *n*B*1*B *n*B*2*B *n*B*3*B *n*B*4*B *n*B*5*B *n*B*6*B *d*B*1*B…*d*B*n*B
	Decimal	29 107 128 *n*B*1*B *n*B*2*B *n*B*3*B *n*B*4*B *n*B*5*B *n*B*6*B *d*B*1*B…*d*B*n*B

[Description] *n*B*1*B is the ECC level (from 0 to 8) (Error correction level).

*n*B*2*B is the pitch height (from 1 to 8) where height=*n*B*2*B x 0.125mm.

*n*B*3*B is the pitch width (from 1 to 4) where width=*n*B*3*B x 0.125mm.

*n*B*4*B is the number of codewords per row – if *n*B*4*B is 0, the maximum number of columns allowed for the pitch width informed will be used. If the barcode can't fit the print width the printer automatically adjusts it for the maximum permitted width within the line field.

*n*B*5*B and *n*B*6*B indicate the number of bytes that will be coded, where total=*n*B*5*B+ *n*B*6*B x 256, and total must be less than 900.

*d*B*1*B…*d*B*n*B is the actual sequence of bytes that will be coded.

GS k 21 d1…d9 NUL

[Function]	Prints an ISBN barcode	
[Format]	ASCII	GS k 21 *d*B*1*B…*d*B*9*B NUL
	Hexadecimal	1D 6B 15 *d*B*1*B…*d*B*9*B 00
	Decimal	29 107 21 *d*B*1*B…*d*B*9*B 0

[Description]   *d*B*1*B…*d*B*9*B is the sequence of 9 bytes containing the barcode information. The bytes that can be used in *d* are 45, 48 to 57 and 88. If hyphens were included in the information as in the example below, they will not be computed as a byte received. After the ninth valid digit, an hyphen can be added followed by an "X" (58h) or any other digit (30h to 39h). In this case there are two options:

1. Send the 00h and the barcode will be printed

2. Send space (20h) and more 5 digits (30h to 39h)

Example: 1-56592-292-X 90000

1-56592-292-1 90000

1-56592-292-X

1-56592-292-1

GS k 22 d1…dn NUL

[Function]	Prints a MSI barcode	
[Format]	ASCII	GS k 22 *d*B*1*B…*d*B*n*B NUL
	Hexadecimal	1D 6B 16 *d*B*1*B…*d*B*n*B 00
	Decimal	29 107 22 *d*B*1*B…*d*B*n*B 0

[Description]   *d*B*1*B…*d*B*n*B is the sequence of *n* bytes containing the barcode information. The bytes that can be used in *d* are 48 to 57. The limitation of size for this barcode is given by the print field as well as the configured bar width. A check sum digit will be added automatically.

GS k 130 n d1…dn

[Function]	Prints a MSI barcode	
[Format]	ASCII	GS k 130 *n* *d*B*1*B…*d*B*n*B
	Hexadecimal	1D 6B 82 *n* *d*B*1*B…*d*B*n*B
	Decimal	29 107 130 *n* *d*B*1*B…*d*B*n*B

[Description]   It is a copy of the command GS k 22 *d*B*1*B…*d*B*n*B NUL

GS k 23 d1…dn NUL

[Function]	Prints a PLESSEY barcode	
[Format]	ASCII	GS k 23 dB1B…dBnB NUL
	Hexadecimal	1D 6B 17 dB1B…dBnB 00
	Decimal	29 107 23 dB1B…dBnB 0

[Description] dB1B…dBnB is the sequence of n bytes containing the barcode information. The bytes that can be used in d are 48 to 57 plus 65 to 70 (upper case letters) or 97 to 102 (lower case letters). Lower case and upper case letters can't be combined in the same barcode. The limitation of size for this barcode is given by the print field as well as the configured bar width. A check sum digit will be added automatically.

GS k 131 n d1…dn

[Function]	Prints a PLESSEY barcode	
[Format]	ASCII	GS k 131 n dB1B…dBnB
	Hexadecimal	1D 6B 83 n dB1B…dBnB
	Decimal	29 107 131 n dB1B…dBnB

[Description]   It is a copy of the command GS k 23 dB1B…dBnB NUL

GS k 132 n1 n2

[Function]	Programs barcode's left margin
[Format]	ASCII GS k 132 nB1B nB2B
	Hexadecimal 1D 6B 84 nB1B nB2B
	Decimal 29 107 132 nB1B nB2B

[Description]   Programs the position of the barcode's left margin position given by nB1 B$+$ nB2 Bx 256.

4 ESC/POS Commands

GS F9h 5 01h

[Function]	Select ESC/POS operation mode.	
[Format]	ASCII	GS F9h 5 01h
	Hexadecimal	1D F9 35 01
	Decimal	29 249 53 1

[Description]   Tells printer to interpret ESC/POS commands from now.

[Notes]   This command saves data on printer flash memory and therefore is slow, which

may affect printer performance and funcionality if mixed with other faster commands. **Please, use with caution**.

GS F9h 20h 31h

[Function]	Select ESC/POS temporary operation mode.	
[Format]	ASCII	GS F9h 20h 31h
	Hexadecimal	1D F9 20 31
	Decimal	29 249 31 49
[Description]	Tells printer to interpret ESC/Elgin commands from now.	
[Notes]	This command doesn't writes anything on flash memory, so it can be used anyway.	

GS F9h 1Fh 31h

[Function]	Return to previous set of commands configured before temporary setting.	
[Format]	ASCII	GS F9h 1Fh 31h
	Hexadecimal	1D F9 1F 31
	Decimal	29 249 31 49
[Description]	Tells printer to interpret the command set that was configured before an temporary set has been done.	

HT

[Name]	Horizontal	tab
[Format]	ASCII	HT
	Hex	09
	Decimal	9

[Description] Moves the print position to the next horizontal tab position.

[Notes]   • This command is ignored unless the next horizontal tab position has been set.

• If the next horizontal tab position exceeds the printing area, the printer sets the printing position to [Printing area width + 1].

• Horizontal tab positions are set with **ESC D**.

• If this command is received when the printing position is at [printing area width + 1], the printer executes print buffer-full printing of the current line and horizontal tab processing from the beginning of the next line.

• The default setting of the horizontal tab position for the paper roll is font A(12×24) every 8th character.

[Reference]   ESC D

LF

[Name]	Print and line feed	
[Format]	ASCII	LF

Hex	0A
Decimal	10

[Description] Prints the data in the print buffer and feeds one line based on the current line spacing.

[Note] This command sets the print position to the beginning of the line.

[Reference] **ESC 2**, **ESC 3**

FF

[Name] Print and return to standard mode in page mode.

[Format]	ASCII	FF
	Hex	0C
	Decimal	12

[Description] Prints the data in the print buffer collectively and returns to standard mode in page mode, prints the data in the print buffer and feeds one line based on the current line spacing in standard mode.

[Notes] · This command is valid only in page mode.

· The buffer data is deleted after being printed.

· The printer does not execute paper cutting.

· This command sets the print position to the beginning of the line.

[Reference] **ESC FF, ESC L, ESC S**

CR

[Name] Print and carriage return

[Format]	ASCII	CR
	Hex	0D
	Decimal	13

[Description] When automatic line feed is enabled, this command functions the same as **LF**; when automatic line feed is disabled, this command is ignored.

[Notes] · Sets the print starting position to the beginning of the line.

· This command is set according to the printer configuration.

[Reference] **LF**

CAN

[Name] Cancel print data in page mode

[Format]	ASCII	CAN
	Hex	18
	Decimal	24

[Description] In page mode, deletes all the print data in the current area.

[Notes] · This command is enabled only in page mode.

· If data that existed in the previously specified printing area also exists in the currently specified printing area, it is deleted.

[Reference] **ESC L**, **ESC W**

DLE EOT n

[Name]	Real-time status transmission

[Format]	ASCII	DLE	EOT	n
	Hex	10	04	n
	Decimal	16	4	n

[Range]   1 ≤ n ≤ 4

[Description] Transmits the selected printer status specified by n in real-time, according to the following

parameters:

n = 1: Transmit printer status

n = 2: Transmit off-line status

n = 3: Transmit error status

n = 4: Transmit paper roll sensor status

[Notes]   · The status is transmitted whenever the data sequence of <10>H<04>H< n>

(1 ≤ n ≤ 4) is received.

Example:

In **ESC * m nL nH d1...d**k, d1=<10>H, d2=<04>H, d3=<01>H

· This command should not be used within the data sequence of another command that

consists of 2 or more bytes.

Example:

If you attempt to transmit **ESC 3 n** to the printer, but DTR (DSR for the host computer)

goes to MARK before n is transmitted and then **DLE EOT 3** interrupts before n is received,

the code <10>H for **DLE EOT 3** is processed as the code for **ESC 3** <10>H.

· Even though the printer is not selected using **ESC =** (select peripheral device), this

command is effective.

· The printer transmits the current status. Each status is represented by one-byte data.

· The printer transmits the status without confirming whether the host computer can receive

data.

· The printer executes this command upon receiving it.

· This command is executed even when the printer is off-line, the receive buffer is full, or

there is an error status with a serial interface model.

· With a parallel interface model, this command is ignored.

· When Auto Status Back (ASB) is enabled using the **GS a** command, the status

transmitted by the **DLE EOT** command and the ASB status must be differentiated.

n = 1: Printer status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	On	02	2	Not used. Fixed to On
2	Off	00	0	Drawer open/close signal is LOW (connector pin 3)
	On	04	4	Drawer open/close signal is HIGH (connector pin 3)

3	Off	00	0	On-line.
	On	08	8	Off-line
4	On	10	16	Not used. Fixed to On
5,6				Undefined
7	Off	00	00	Not used. Fixed to Off.

n = 2: Off-line status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	On	02	2	Not used. Fixed to On
2	Off	00	0	Cover is closed.
	On	04	4	Cover is open
3	Off	00	0	Paper is not being fed by using the FEED button
	On	08	8	Paper is being fed by the FEED button
4	On	10	16	Not used. Fixed to On
5	Off	00	0	No paper-end stop.
	On	20	32	Printing is being stopped.
6	Off	00	0	No error.
	On	40	64	Error occurs
7	Off	00	0	Not used. Fixed to Off

Bit 5: Becomes on when the paper end sensor detects paper end and printing.

n = 3: Error status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	On	02	2	Not used. Fixed to On
2				Undefined
3	Off	00	0	No auto-cutter error
	On	08	8	Auto-cutter error occurs.
4	On	10	16	Not used. Fixed to On
5	Off	00	0	No unrecoverable error
	On	20	32	Unrecoverable error occurs
6	Off	00	0	No auto-recoverable error.
	On	40	64	Auto recoverable error occurs
7	Off	00	0	Not used. Fixed to Off

Bit 3: If these errors occur due to paper jams or the like, it is possible to recover by correcting the cause of the error and executing DLE ENQ n (1 ≤ n ≤ 2). If an error due to a circuit failure (e.g. wire break) occurs, it is impossible to recover.

Bit 6: When printing is stopped due to high print head temperature until the print head temperature drops sufficiently or when the paper roll cover is open during printing, bit 6 is On.

n = 4: Continuous paper sensor status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	On	02	2	Not used. Fixed to On

2,3	Off	00	0	Paper roll near-end sensor: paper adequate
	On	0C	12	Paper near-end is detected by the paper roll near-end
4	On	10	16	Not used. Fixed to On.
5,6	Off	00	0	Paper roll sensor: Paper present
	On	60	96	Paper roll end detected by paper roll sensor.
7	Off	00	0	Not used. Fixed to Off

[Reference]   **DLE ENQ**, **GS a**, **GS r**

DLE ENQ n

[Name]   Real-time request to printer

[Format]   ASCII   DLE   ENQ   n

Hex   10   05   n

Decimal   16   5   n

[Range]   1 ≤n ≤ 2

[Description] Responds to a request from the host computer, n specifies the requests as follows:

n	Request
1	Recover from an error and restart printing from the line where the error occurred
2	Recover from an error after clearing the receive and print buffers

[Notes]   · This command is effective only when an auto-cutter error occurs.

· The printer starts processing data upon receiving this command.

· This command is executed even when the printer is off-line, the receive buffer is full, or there is an error status with a serial interface model.

· With a parallel interface model, this command can not be executed when the printer is busy.

· The status is also transmitted whenever the data sequence of <10>H<05>H< n> (1 ≤n ≤ 2) is received.

Example:

In **ESC** * **m nL nH dk, d1** = <10>H, d2 = <05>H, d3 = <01>H

· This command should not be contained within another command that consists of two or more bytes.

Example:

If you attempt to transmit **ESC 3 n** to the printer, but DTR (DSR for the host computer) goes to MARK before n is transmitted, and **DLE ENQ 2** interrupts before n is received, the code <10>H for **DLE ENQ 2** is processed as the code for **ESC 3** <10>H.

· **DLE ENQ 2** enables the printer to recover from an error after clearing the data in the receive buffer and the print buffer. The printer retains the settings (by **ESC !**, **ESC 3**, etc.) that were in effect when the error occurred. The printer can be initialized completely by using this command and **ESC @**. This command is enabled only for errors that have the possibility of recovery, except for print head temperature error.

· When the printer is disabled with **ESC =** (Select peripheral device), the error recovery functions **(DLE ENQ 1** and **DLE ENQ 2**) are enabled, and the other functions are disabled.

[Reference]   **DLE EOT**

DLE DC4 n m t

[Name]   Generate pulse at real-time

[Format]   ASCII   DLE   DC4   n   m   t

         Hex   10   14   n   m   t

         Decimal   16   20   n   m   t

[Range]   n = 1

         m = 0, 1

         1 ≤ t≤ 6

[Description] Outputs the pulse specified by t to connector pin m as follows:

m	Connector pin
0	Drawer kick-out connector pin 2
1	Drawer kick-out connector pin 5

The pulse ON time is [t × 100 ms] and the OFF time is [t × 100ms].

[Notes]   When the pulse is output to the connector pin specified while ESC p or DEL DC4 is executed while this command is processed, this command is ignored.

The printer executes this command upon receiving it.· With a serial interface model, this command is executed even when the printer is off-line, the receive buffer is full, or there is an error status.

· With a parallel interface model, this command cannot be executed when the printer is busy.

· If print data includes the same character strings as this command, the printer performs the same operation specified by this command. The user must consider this.

· This command should not be used within the data sequence of another command that consists of 2 or more bytes.

· This command is effective even when the printer is disabled with ESC = (Select peripheral device).

[Reference]   **ESC p**

ESC FF

[Name]   Print data in page mode

[Format]   ASCII   ESC   FF

                     Hex   1B   0C

                     Decimal   27   12

[Description] In page mode, prints all buffered data in the printing area collectively.

[Notes]   · This command is enabled only in page mode.

                 · After printing, the printer does not clear the buffered data, setting values for **ESC T** and **ESC W**, and the position for buffering character data.

[Reference]   **FF, ESC L, ESC S**

ESC SP n

[Name]   Set right-side character spacing

[Format]   ASCII   ESC   SP   n

                     Hex   1B   20   n

                     Decimal   27   32   n

[Range] $0 \le n \le 255$

[Description] Sets the character spacing for the right side of the character to [n × horizontal or vertical motion units].

[Notes]   The right-side character spacing for double-width mode is twice the normal value. When characters are enlarged, the right-side character spacing is n times normal value.

·This command sets values independently in each mode (standard and page modes).

·The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current right-side spacing.

·In standard mode, the horizontal motion unit is used.

·In page mode, the horizontal or vertical motion unit differs in page mode, depending on starting position of the printable area as follows:

1   When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit (x) is used.

2   When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit (y) is used.

·The maximum right-side spacing is 255/180 inches. Any setting exceeding the maximum is converted to the maximum automatically.

[Default]   n = 0

[Reference]   **GS P**

ESC ! n

[Name]   Select print mode(s)

[Format]   ASCII   ESC   !   n

Hex   1B   21 n

Decimal   27   33 n

[Range]   0 ≤ n ≤ 255

[Description] Selects print mode(s) using n as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A (12 × 24)
	On	01	1	Character font B (9 × 17)
1,2				Undefined.
3	Off	00	0	Emphasized mode not selected
	On	08	8	Emphasized mode selected
4	Off	00	0	Double-height mode not selected
	On	10	16	Double-height mode selected
5	Off	00	0	Double-width mode not selected
	On	20	32	Double-width mode selected
6				Undefined
7	Off	00	0	Underline mode not selected
	On	80	128	Underline mode selected

[Notes]   · When both double-height and double-width modes are selected, quadruple size characters are printed.

· The printer can underline all characters, but can not underline the space set by **HT** or 90° clockwise rotated characters.

· The thickness of the underline is that selected by **ESC -**, regardless of the character size.

· When some characters in a line are double or more height, all the characters on the line are aligned at the baseline.

· **ESC E** can also turn on or off emphasized mode. However, the setting of the last received command is effective.

· **ESC -** can also turn on or off underline mode. However, the setting of the last received

command is effective.

· **GS !** can also select character size. However, the setting of the last received command is effective.

[Default]   n = 0

[Reference]   **ESC -**, **ESC E**, **GS !**

ESC $ nL nH

[Name]   Set absolute print position

[Format]   ASCII   ESC $ nL   nH

                  Hex   1B   24   nL   nH

                  Decimal   27   36   nL   nH

[Range]   0≤nL ≤ 255

                  0 ≤nH≤255

[Description] Sets the distance from the beginning of the line to the position at which subsequent characters are to be printed.

· The distance from the beginning of the line to the print position is [($nL + nH \times 256$) × (vertical or horizontal motion unit)] inches.

[Notes]   · Settings outside the specified printable area are ignored.

· The horizontal and vertical motion unit are specified by **GS P**.

· In standard mode, the horizontal motion unit (x) is used.

· In page mode, horizontal or vertical motion unit differs depending on the starting position of the printable area as follows:

1   When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit (x) is used.

2   When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit (y) is used.

[Reference] **ESC **, **GS $**, **GS **, **GS P**

ESC % n

[Name]   Select/cancel user-defined character set

[Format]   ASCII   ESC   %   n

                  Hex   1B   25   n

                  Decimal   27   37   n

[Range]   0 ≤ n ≤255

[Description] Selects or cancels the user-defined character set.

· When the LSB of n is 0, the user-defined character set is canceled.

· When the LSB of n is 1, the user-defined character set is selected.

[Notes]   · When the user-defined character set is canceled, the internal character set is automatically selected.

· n is available only for the least significant bit.

[Default]   n = 0

[Reference]   **ESC** &, **ESC ?**

ESC & y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]

[Name]   Define user-defined characters

[Format]   ASCII   ESC & y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]

                  Hex   1B 26 y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]

                  Decimal   27 38 y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]

[Range]   y = 3

                  32 ≤ c1 ≤ c2 ≤ 127

                  0< x ≤ 24

                  0 ≤ d1 ... d(y × xk) ≤ 255

[Description] Defines user-defined characters.

                  · y specifies the number of bytes in the vertical direction.

                  · c1 specifies the beginning character code for the definition, and c2 specifies the final

                  code.

   · x specifies the number of dots in the horizontal direction.

[Notes]   · The allowable character code range is from ASCII code <20>H to <7F>H (96 characters).

                  · It is possible to define multiple characters for consecutive character codes. If only one

                  character is desired, use c1 = c2.

                  · d is the dot data for the characters. The dot pattern is in the horizontal direction from the

                  left side. Any remaining dots on the right side are blank.

                  · The data to define a user-defined character is (y × x) bytes.

                  · Set a corresponding bit to 1 to print a dot or 0 to not print a dot.

                  · A user-defined character and a downloaded bit image can be defined simultaneously.

                  · The user-defined character definition is cleared when:

                  □**ESC ?** is executed.

                  □The the power is turned off.

                  · When the user-defined characters are defined in font B (9 × 17), only the most significant

                  bit of the 3rd byte of data in vertical direction is effective.

[Default]   The internal character set

[Reference]   **ESC %**, **ESC ?**

[Example]   · When font A (12 × 24) is selected.
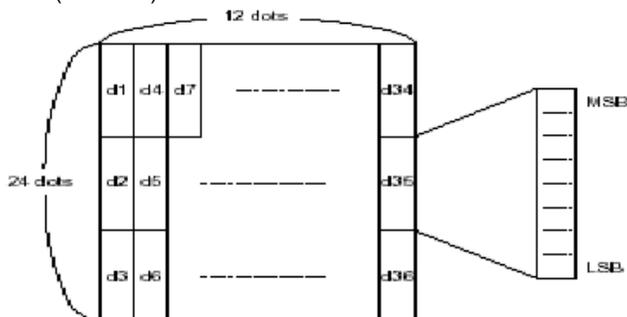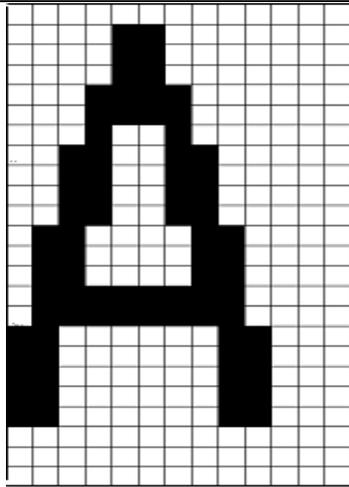
D1=00, D4=00, D7=01, ·········
D2=00, D5=1F, D8=FF, ·········
D3=F8, D6=F8, D9=00, ·········

· When font B (9×17) is selected.
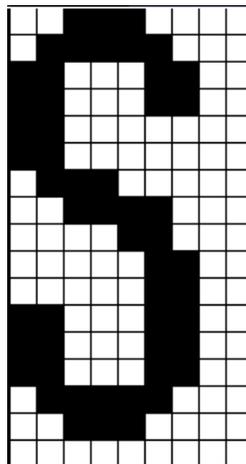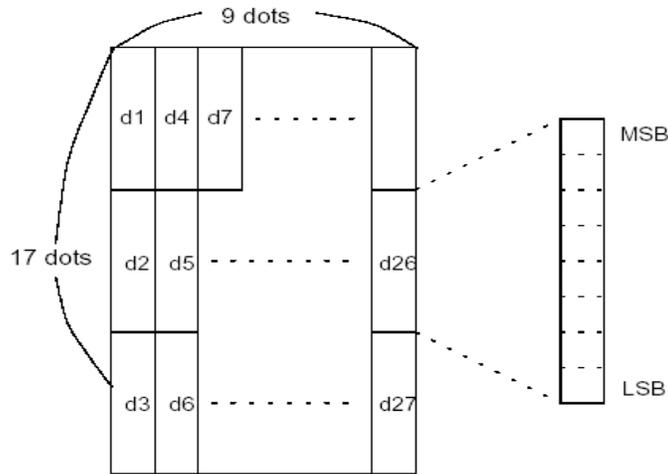
D1=3C, D4=7E, D7=C3, ···
D2=1C, D5=1E, D8=03, ···
D3=00, D6=00, D9=00, ···

ESC * m nL nH d1... dk

[Name]	Select bit-image mode	
[Format]	ASCII	ESC * m nL nH d1...dk
	Hex	1B 2A m nL nH d1...dk
	Decimal	27 42 m nL nH d1...dk

[Range]   m = 0, 1, 32, 33

0 ≤ nL ≤ 255

0 ≤ nH ≤ 3

0 ≤ d ≤255

[Description] Selects a bit-image mode using m for the number of dots specified by nL and nH,

as follows:

m	Mode	Vertical Direction		Horizontal Direction	
		Number of Dots	Dot Density	Dot density	Number of Data (K)
0	8-dot single-density	8	60 DPI	101 DPI	nL + nH × 256
1	8-dot double-density	8	60 DPI	203 DPI	nL + nH × 256
32	24-dot single-density	24	180 DPI	101 DPI	(nL + nH × 256) × 3
33	24-dot double-density	24	180 DP	203 DPI	(nL + nH × 256) × 3

[Notes]   If the values of m is out of the specified range, nL and data following are processed as

normal data.

The nL and nH indicate the number of dots of the bit image in the horizontal direction. The

number of dots is calculated by nL + nH × 256.

If the bit-image data input exceeds the number of dots to be printed on a line, the excess

data is ignored.

d indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 to not print a

dot.

After printing a bit image, the printer returns to normal data processing mode.

·This command is not affected by print modes (emphasized, double-strike, underline,

character size or white/black reverse printing), except upside-down printing mode.

· The relationship between the image data and the dots to be printed is as follows:

· When 8-dot bit image is selected:
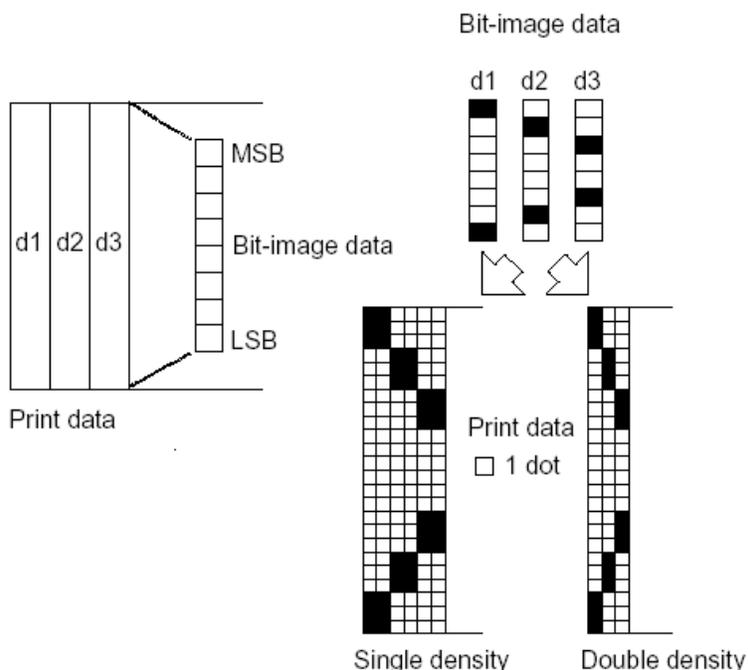
When 24-dot bit image is selected:

Bit-image data

d1 d2 d3 d4 d5 d6 d7 d8 d9

MSB

Bit-image data

LSB

Print data

Print data
□ 1 dot

Single density   Double density
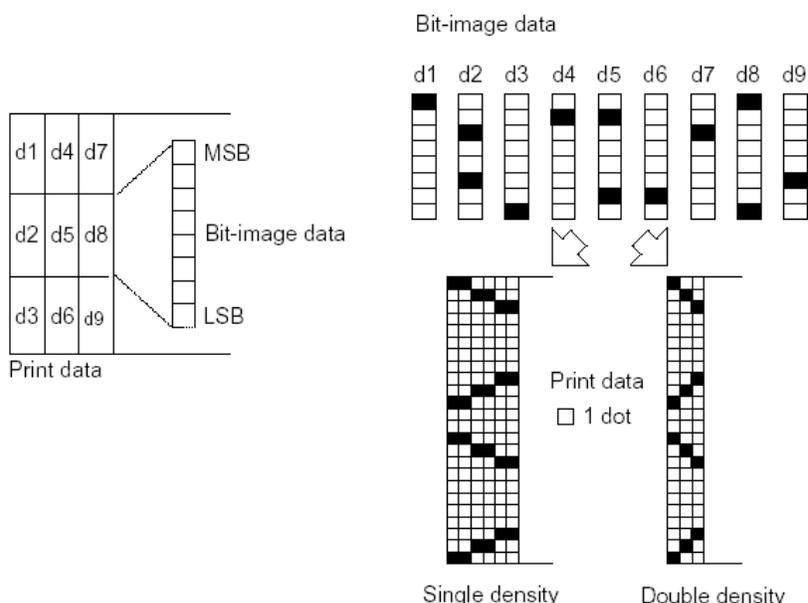
ESC - n

[Name]	Turn underline mode on/off

[Format]

ASCII	ESC	-	n	
Hex	1B	2D	n	
Decimal	27	45	n	

[Range]   0 ≤ n ≤2, 48 ≤n ≤ 50

[Description] Turns underline mode on or off, based on the following values of n:

n	Function
0, 48	Turns off underline mode
1, 49	Turns on underline mode (1-dot thick)
2, 50	Turns on underline mode (2-dots thick)

[Notes]   The printer can underline all characters (including right-side character spacing), but cannot underline the space set by **HT.**

The printer cannot underline 90° clockwise rotated characters and white/black inverted characters.

· When underline mode is turned off by setting the value of n to 0 or 48, the following data is not underlined, and the underline thickness set before the mode is turned off does not change. The default underline thickness is 1 dot.

Changing the character size does not affect the current underline thickness.

Underline mode can also be turned on or off by using ESC !. Note, however, that the last received command is effective.

[Default]   n = 0

[Reference]   ESC !

ESC 2

[Name]	Select default line spacing		
[Format]	ASCII	ESC	2
	Hex	1B	32
	Decimal	27	50

[Description] Selects 1/6-inch lines spacing (approximately 4.23mm).

[Notes] · The line spacing can be set independently in standard mode and in page mode.

[Reference] **ESC 3**

ESC 3 n

[Name]	Set line spacing			
[Format]	ASCII	ESC	3	n
	Hex	1B	33	n
	Decimal	27	51	n

[Range] 0 ≤ n ≤ 255

[Description] Sets the line spacing to [n × vertical or horizontal motion unit] inches.

[Notes] ·The line spacing can be set independently in standard mode and in page mode.

·The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current line spacing.

· In standard mode, the vertical motion unit (y) is used.

· In page mode, this command functions as follows, depending on the starting position of the printable area:

☐   When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the vertical motion unit (y) is used.

☐   When the starting position is set to the upper right or lower left of the print able area using **ESC T**, the horizontal motion unit (x) is used.

· The maximum paper feed amount is 1016 mm (40 inches). Even if a paper feed amount of more than 1016 mm (40 inches) is set, the printer feeds the paper only 1016 mm (40 inches).

[Default] Line spacing equivalent to approximately 4.23mm (1/6 inches).

[Reference] **ESC** 2, **GS P**

ESC = n

[Name]	Set peripheral device			
[Format]	ASCII	ESC	=	n
	Hex	1B	3D	n
	Decimal	27	61	n

[Range] 0 ≤ n ≤ 1

[Description] Selects device to which host computer sends data, using n as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Printer disabled
	On	01	1	Printer enabled
1-7				Undefined

[Notes]   · When the printer is disabled, it ignores all data except for error-recovery commands **(DLE EOT, DLE ENQ, DLE DC4)** until it is enabled by this command.

[Default]   n = 1

ESC ? n

[Name]   Cancel user-defined characters

[Format]   ASCII   ESC   ?   n

Hex   1B   3F   n

Decimal   27   63   n

[Range]   32 ≤n ≤127

[Description] Cancels user-defined characters.

[Notes]   ·This command cancels the pattern defined for the character code specified by n. After the user-defined characters is canceled, the corresponding pattern for the internal character is printed.

·This command deletes the pattern defined for the specified code in the font selected by **ESC !**.

· If a user-defined character has not been defined for the specified character code, the printer ignores this command.

[Reference]   ESC &, **ESC %**

ESC @

[Name]   Initialize printer

[Format]   ASCII   ESC   @

Hex   1B   40

Decimal   27   64

[Description] Clears the data in the print buffer and resets the printer mode to the mode that was in effect when the power was turned on.

[Notes]   · The DIP switch settings are not checked again.

· The data in the receive buffer is not cleared.

· The macro definition is not cleared.

· The NV bit image data is not cleared.

· The data of the user NV memory is not cleared.

ESC D n1...nk NUL

[Name]	Set horizontal tab positions				
[Format]	ASCII	ESC	D	n1...nk	NUL
	Hex	1B	44	n1...nk	00
	Decimal	27	68	n1...nk	0

[Range]   1 ≤ n ≤ 255

1 ≤ k ≤ 32

[Description] Sets horizontal tab positions.

·n specifies the column number for setting a horizontal tab position from the beginning of the line.

· k indicates the total number of horizontal tab positions to be set.

[Notes]   ·The horizontal tab position is stored as a value of [character width × n] measured from the beginning of the line. The character width includes the right-side character spacing, and double-width characters are set with twice the width of normal characters.

· This command cancels the previous horizontal tab settings.

·When setting n = 8, the print position is moved to column 9 by sending HT.

·Up to 32 tab positions (k = 32) can be set. Data exceeding 32 tab positions is processed as normal data.

·Transmit [n] k in ascending order and place a NUL code 0 at the end.

·When [n] k is less than or equal to the preceding value [n] k-1, tab setting is finished and the following data is processed as normal data.

·**ESC D NUL** cancels all horizontal tab positions.

·The previously specified horizontal tab positions do not change, even if the character width changes.

·The character width is memorized for each standard and page mode.

[Default]   The default tab positions are at intervals of 8 characters (columns 9, 17, 25,...) for font A (12 × 24).

[Reference] **HT**

ESC E n

[Name]	Turn emphasized mode on/off		
[Format]	ASCII	ESC	E	n
	Hex	1B	45	n
	Decimal	27	69	n

[Range]   0 ≤ n ≤ 255

[Description] Turns emphasized mode on or off

When the LSB of n is 0, emphasized mode is turned off.

When the LSB of n is 1, emphasized mode is turned on.

[Notes]   ·**Only the least significant bit of n is enabled.**

·This command and **ESC !** turn on and off emphasized mode in the same way. Be careful

when this command is used with **ESC !**.

[Default]   n = 0

[Reference] ESC !

ESC G n

[Name]   Turn on/off double-strike mode

[Format]   ASCII   ESC   G   n

Hex   1B   47   n

Decimal   27   71   n

[Range]   0 ≤ n ≤ 255

[Description] Turns double-strike mode on or off.

·When the LSB of n is 0, double-strike mode is turned off.

·When the LSB of n is 1, double-strike mode is turned on.

[Notes]   ·Only the lowest bit of n is enabled.

·Printer output is the same in double-strike mode and in emphasized mode.

[Default]   n = 0

[Reference]   ESC E

ESC J n

[Name]   Print and feed paper

[Format]   ASCII   ESC   J   n

Hex   1B   4A   n

Decimal   27   74   n

[Range]   0 ≤n ≤ 255

[Description] Prints the data in the print buffer and feeds the paper [n × vertical or horizontal motion

unit] inches.

[Notes]   ·After printing is completed, this command sets the print starting position to the beginning

of the line.

·The paper feed amount set by this command does not affect the values set by **ESC 2** or

ESC 3.

·The horizontal and vertical motion unit are specified by **GS P**.

·In standard mode, the printer uses the vertical motion unit (y).

·In page mode, this command functions as follows, depending on the starting position of

the printable area:

☐   When the starting position is set to the upper left or lower right of the printable area

using **ESC T**, the vertical motion unit (y) is used.

☐   When the starting position is set to the upper right or lower left of the print able area

using **ESC T**, the horizontal motion unit (x) is used.

·The maximum line spacing is 1016mm (40 inches). When the setting value exceeds the maximum, it is converted to the maximum automatically.

[Reference]   **GS P**

ESC L

[Name]   Select page mode

[Format]   ASCII   ESC   L

                 Hex   1B   4C

                 Decimal   27   76

[Description] Switches from standard mode to page mode.

[Notes]   ·This command is enabled only when processed at the beginning of a line in standard mode.

                 ·This command has no effect in page mode.

                 ·After printing by **FF** is completed or by using **ESC S**, the printer returns to standard mode.

                 ·This command sets the position where data is buffered to the position specified by **ESC T** within the printing area defined by **ESC W**.

                 ·This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for page mode:

                 ◻Set right-side character spacing: **ESC SP, FS S**

                 ◻Select default line spacing: **ESC 2, ESC 3**

                 · Only value settings is possible for the following commands in page mode; these commands are not executed.

                 ◻Turn 90° clockwise rotation mode on/off: **ESC V**

                 ◻Select justification: **ESC a**

                 ◻Turn upside-down printing mode on/off: **ESC {**

                 ◻Set left margin: **GS L**

                 ◻Set printable area width: **GS W**

                 ·The printer returns to standard mode when power is turned on, the printer is reset, or **ESC @** is used.

[Reference]   **FF, CAN, ESC FF, ESC S, ESC T, ESC W, GS $, GS **

ESC M n

[Name]   Select character font

[Format]   ASCII   ESC   M   n

                 Hex   1B   4D   n

                 Decimal   27   77   n

[Range]   n = 0, 1, 2,3,48, 49,50,51

[Description] Selects character fonts.

n	Function
0,48	Character font A (12 × 24) selected
1,49	Character font B (9 × 17) selected
2,50	User defined character selected
3,51	Chinese font(24 × 24) selected

ESC R n

[Name]   Select an international character set

[Format]   ASCII   ESC   R   n

                   Hex   1B   52   n

                   Decimal   27   82   n

[Range]   0 ≤ n ≤ 12

[Description] Selects an international character set n from the following table:

n	Character set	n	Character set
0	U.S.A.	7	Spain I
1	France	8	Japan
2	Germany	9	Norway
3	U.K.	10	Denmark II
4	Denmark I	11	Spain II
5	Sweden	12	Latin America
6	Italy	13	Korea

[Default]   n = 0

ESC S

[Name]   Select standard mode

[Format]   ASCII   ESC   S

                   Hex   1B   53

                   Decimal   27   83

[Description] Switches from page mode to standard mode.

[Notes]   · This command is effective only in page mode.

                   · Data buffered in page mode are cleared.

                   · This command sets the print position to the beginning of the line.

                   · The printing area set by **ESC W** are initialized.

                   · This command switches the settings for the following commands (in which the values can

                   be set independently in standard mode and page mode) to those for standard mode:

                     ▯Set right-side character spacing: **ESC SP, FS S**

                     ▯Select default line spacing: **ESC 2, ESC 3**

                   · The following commands are enabled only to set in standard mode.

                     ▯Set printing area in page mode: **ESC W**

                     ▯Select print direction in page mode: **ESC T**

· The following commands are ignored in standard mode.

    Set absolute vertical print position in page mode: **GS $**

    Set relative vertical print position in page mode: **GS **

· Standard mode is selected automatically when power is turned on, the printer is reset, or command **ESC @** is used.

[Reference]   **FF, ESC FF, ESC L**

ESC T n

[Name]   Select print direction in page mode

[Format]   ASCII   ESC   T   n

   Hex   1B   54   n

                Decimal   27   84   n

[Range] $0 \leq n \leq 3$

                $48 \leq n \leq 51$

[Description] Selects the print direction and starting position in page mode.

n specifies the print direction and starting position as follows:

n	Print Direction	Starting Position
0, 48	Left to right	Upper left (A in the figure)
1, 49	Bottom to top	Lower left (B in the figure)
2, 50	Right to left	Lower right (C in the figure)
3, 51	Top to bottom	Upper right (D in the figure)
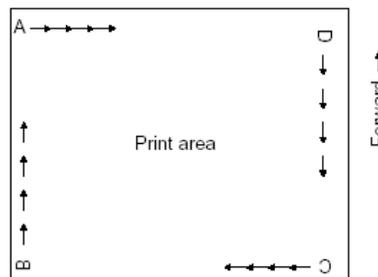
[Notes]   · When the command is input in standard mode, the printer executes only internal flag operation. This command does not affect printing in standard mode.

· This command sets the position where data is buffered within the printing area set by **ESC W**.

· Parameters for horizontal or vertical motion units (x or y) differ as follows, depending on the starting position of the printing area:

    If the starting position is the upper left or lower right of the printing area, data is buffered in the direction perpendicular to the paper feed direction:

         Commands using horizontal motion units: **ESC SP**, **ESC $**, **ESC **

         Commands using vertical motion units: **ESC 3**, **ESC J**, **GS $**, **GS **

    If the starting position is the upper right or lower left of the printing area, data is buffered in the paper feed direction:

         Commands using horizontal motion units: **ESC 3**, **ESC J**, **GS $**, **GS **

         Commands using vertical motion units: **ESC SP**, **ESC $**, **ESC **

[Default]   n = 0

[Reference] **ESC $, ESC L, ESC W, ESC \\, GS $, GS P, GS **

ESC V n

[Name]	Turn 90° clockwise rotation mode on/off			
[Format]	ASCII	ESC	V	n
	Hex	1B	56	n
	Decimal	27	86	n

[Range]   0 ≤ n ≤ 1, 48 ≤ n ≤ 49

[Description] Turns 90° clockwise rotation mode on/off

n is used as follows:

n	Function
0, 48	Turns off 90° clockwise rotation mode
1, 49	Turns on 90° clockwise rotation mode

[Notes]   · This command affects printing in standard mode. However, the setting is always effective.

· When underline mode is turned on, the printer does not underline 90° clockwise-rotated.

· Double-width and double-height commands in 90° rotation mode enlarge characters in the opposite directions from double-height and double- width commands in normal mode.

[Default]   n = 0

[Reference] **ESC !, ESC** -

ESC W xL xH yL yH dxL dxH dyL dyH

[Name]	Set printing area in page mode	
[Format]	ASCII	ESC W xL xH yL yH dxL dxH dyL dyH
	Hex	1B 57 xL xH yL yH dxL dxH dyL dyH
	Decimal	27 87 xL xH yL yH dxL dxH dyL dyH

[Range]   0 ≤ xL, xH, yL, yH, dxL, dxH, dyL, dyH ≤ 255 (except dxL= dxH=0 or dyL= dyH=0)

[Description] · The horizontal starting position, vertical starting position, printing area width, and printing area height are defined as x0, y0, dx (inch), dy (inch), respectively.

Each setting for the printing area is calculated as follows:

$x0 = [(\ xL + xH × 256) × (\text{horizontal motion unit})]$

$y0 = [(\ yL + yH × 256) × (\text{vertical motion unit})]$

$dx = [\ dxL + dxH × 256) × (\text{horizontal motion unit})]$

$dy = [\ dyL + dyH × 256) × (\text{vertical motion unit})]$

The printing area is set as shown in the figure below.

[Notes]   · If this command is input in standard mode, the printer executes only internal flag operation. This command does not affect printing in standard mode.

· If the horizontal or vertical starting position is set outside the printable area, the printer stops command processing and processes the following data as normal data.

· If the printing area width or height is set to 0, the printer stops command processing and processes the following data as normal data.

· This command sets the position where data is buffered to the position specified by **ESC T** within the printing area.

· If (horizontal starting position + printing area width) exceeds the printable area, the printing area width is automatically set to (horizontal printable area horizontal starting position).

· If (vertical starting position + printing area height) exceeds the printable area, the printing area height is automatically set to (vertical printable area – vertical starting position).

· The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current printing area.

· Use the horizontal motion unit (x) for setting the horizontal starting position and printing area width, and use the vertical motion unit (y) for setting the vertical starting position and printing area height.

· When the horizontal starting position , vertical starting position, printing area width, and printing area height are defined as X, Y, Dx, and Dy respectively, the printing area is set as shown in the figure below.
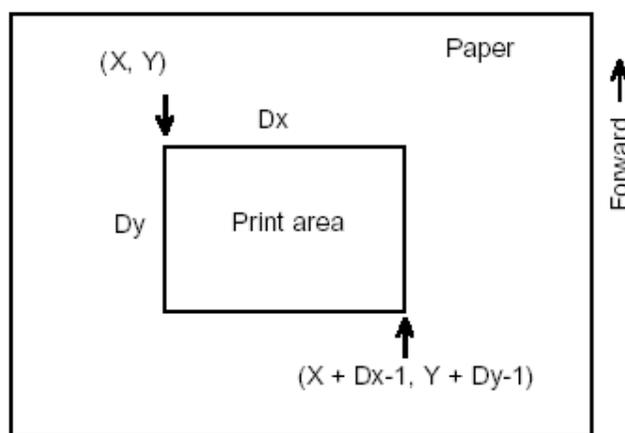
[Default]   xL = xH = yL = yH = 0

dxL, dxH, dyL, dyH is decided by printer configuration

[Reference]   **CAN, ESC L, ESC T, GS P**

ESC \ nL nH

[Name]	Set relative print position				
[Format]	ASCII	ESC	\	nL	nH
	Hex	1B	5C	nL	nH
	Decimal	27	92	nL	nH

[Range]   0 ≤ nL ≤ 255

0 ≤ nH ≤ 255

[Description] Sets the print starting position based on the current position by using the horizontal or vertical motion unit.

· This command sets the distance from the current position to [(nL + nH × 256) × horizontal or vertical motion unit]

[Notes]   · Any setting that exceeds the printable area is ignored.

· When pitch N is specified to the right: , nL+ nH × 256 = N

When pitch N is specified to the left (the negative direction), use the complement of 65536.

When pitch N is specified to the left: nL+ nH × 256 = 65536 - N

· The print starting position moves from the current position to [N × horizontal or vertical motion unit]

· The horizontal and vertical motion unit are specified by **GS P**.

· In standard mode, the horizontal motion unit is used.

· In page mode, the horizontal or vertical motion unit differs as follows,depending on the starting point of the printing area:

When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit (x) is used.

When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit (y) is used.

[Reference] ESC $, **GS P**

ESC a n

[Name]	Select justification			
[Format]	ASCII	ESC	a	n
	Hex	1B	61	n
	Decimal	27	97	n

[Range]   0 ≤ n ≤ 2, 48 ≤ n ≤ 50

[Description] Aligns all the data in one line to the specified position

n selects the justification as follows:

n	Justification
0,48	Left justification
1, 49	Centering
2, 50	Right justification

[Notes]   · The command is enabled only when processed at the beginning of the line in standard mode.

· If this command is input in page mode, the printer performs only internal flag operations.

· This command has no effect in page mode.

· This command executes justification in the printing area.

· This command justifies the space area according to **HT, ESC $** or **ESC** \.

[Default]   n = 0

[Example]

Left justification	Centering	Right justification
ABC ABCD ABCDE	ABC ABCD ABCDE	ABC ABCD ABCDE

ESC c 5 n

[Name]	Enable/disable panel buttons			
[Format]	ASCII	ESC	c 5	n
	Hex	1B	63 35	n
	Decimal	27	99 53	n

[Range] $0 \le n \le 255$

[Description] Enables or disables the panel buttons.

        · When the LSB of n is 0, the panel buttons are enabled.

        · When the LSB of n is 1, the panel buttons are disabled.

[Notes]   · Only the lowest bit of n is valid.

        · When the panel buttons are disabled, none of them are usable when the printer cover is closed.

        · In this printer, the panel buttons are the FEED button.

        · In the macro ready mode, the FEED button is enabled regardless of the settings of this command; however, the paper cannot be fed by using these buttons.

[Default]   n = 0

ESC d n

[Name]	Print and feed n lines		
[Format]	ASCII	ESC	d	n
	Hex	1B	64	n
	Decimal	27	100	n

[Range] $0 \le n \le 255$

[Description] Prints the data in the print buffer and feeds n lines.

[Notes]   · This command sets the print starting position to the beginning of the line.

        · This command does not affect the line spacing set by **ESC 2** or **ESC 3**.

        · The maximum paper feed amount is 1016 mm (40 inches). If the paper feed amount (n x line spacing) of more than 1016 mm (40 inches) is specified, the printer feeds the paper only 1016 mm (40 inches).

[Reference] **ESC 2**, **ESC 3**

ESC p m t1 t2

[Name]	Generate pulse				
[Format]	ASCII	ESC	p	m	t1	t2
	Hex	1B	70	m	t1	t2
	Decimal	27	112	m	t1	t2

[Range]   m = 0, 1, 48, 49

        $0 \le t1 \le 255, 0 \le t2 \le 255$

[Description] Outputs the pulse specified by t1 and t2 to connector pin m as follows:

m	Connector pin
0, 48	Drawer kick-out connector pin 2
1, 49	Drawer kick-out connector pin 5

[Notes]   · The pulse ON time is [t1 × 2 ms] and the OFF time is [t2 × 2 ms].

              · If t2 < t1, the OFF time is [t1 × 2 ms]

[Reference]   **DLE DC**4

ESC t n

[Name]   Select character code table

[Format]   ASCII   ESC   t   n

                Hex   1B   74   n

                Decimal   27   116   n

[Range]   0 ≤ n ≤3, 17 ≤ n ≤ 19

[Description] Selects a page n from the character code table.

n	Page
0	PC437 [U.S.A., Standard Europe]
1	ABICOMP
2	PC850 [Multilingual]
3	PC860 [Portuguese]
17	PC866 [Cyrillic #2]
19	PC858

[Default]   CODEPAGE 850 is the default character code page.

ESC { n

[Name]	Turns on/off upside-down printing mode		
[Format]	ASCII	ESC	{	n
	Hex	1B	7B	n
	Decimal	27	123	n

[Range] $0 \le n \le 255$

[Description] Turns upside-down printing mode on or off.

· When the LSB of n is 0, upside-down printing mode is turned off.

· When the LSB of n is 1, upside-down printing mode is turned on.

[Notes]   · Only the lowest bit of n is valid.

· This command is enabled only when processed at the beginning of a line in standard mode.

· When this command is input in page mode, the printer performs only internal flag operations.

· This command does not affect printing in page mode.

· In upside-down printing mode, the printer rotates the line to be printed by 180° and then prints it.

[Default]   n = 0

[Example]
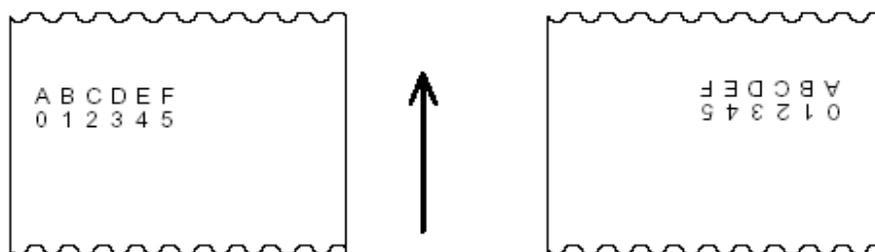
Paper feed direction

ESC (A pL pH fn n c t1 t2

[Name]   Activate buzzer.

[Format]   ASCII   ESC   (A   *pL*   *pH*   *fn*   *n*   *c*   *t1*   *t2*

Hex	1D	28	41	*pL*	*pH*	*fn*	*n*	*c*	*t1*	*t2*
Decimal	29	40	65	*pL*	*pH*	*fn*	*n*	*c*	*t1*	*t2*

[Description]   Beeps the integrated beeper.

               c specifies times of beeping.

               t1 specifies beeping time (t1 × 100 ms).

               t2 specifies time for stop beeping (t2 × 100 ms).

               [Notes] This function repeats integrated beeper control of [(t1 × 100 ms) beep/ (t2 × 100 ms) stop] c times.

      ✓ If this command is newly processed during beeping of the buzzer, the current process for beeping the buzzer is stopped and the new process for beeping the buzzer is started.

      ✓ Integrated beeper beeping by this function stops due to any of the following factors:

            - Finish specification of (c).

            - Reset or power off.

FS p n m

[Name]   Print NV bit image

[Format]

ASCII	FS	p	n	m
Hex	1C	70	n	m
Decimal	28	112	n	m

[Range]   1 ≤ n ≤ 255

             0 ≤ m ≤ 3 , 48 ≤ m ≤51

[Description] Prints a NV bit image n using the mode specified by m.

m	Mode	Vertical Dot Density (DPI)	Horizontal Dot Density (DPI)
0.48	Normal	180	203
1.49	Double-width	180	101
2.50	Double-height	90	203
3.51	Quadruple	90	101

       · n is the number of the NV bit image (defined using the **FS q** command).

       · m specifies the bit image mode.

[Detail]   · NV bit image means a bit image which is defined in a non-volatile memory by **FS q** and printed by **FS p**.

       · This command is not effective when the specified NV bit image has not been defined.

       · In standard mode, this command is effective only when there is no data in the print buffer.

       · This command is not affected by print modes (emphasized, double-strike, underline, character size, white/black reverse printing, or 90° rotated characters, etc.), except upside-down printing mode.

       · If the downloaded bit-image to be printed exceeds one line, the excess data is not printed.

       · This command feeds dots (for the height n of the NV bit-image) in normal and double-width modes, and (for the height n × 2 of the NV bit-image) in double-height and

quadruple modes, regardless of the line spacing specified by **ESC 2** or **ESC 3**.

· After printing the bit image, this command sets the print position to the beginning of the
line and processes the data that follows as normal data.

[References] ESC *, FS q, GS /, GS v 0

FS q n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n

[Name]	Define NV bit image			
[Format]	ASCII	FS	q	n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n
	Hex	1C	71	n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n
	Decimal	28	113	n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n

[Range] $1 \le n \le 255$

$0 \le xL \le 255$

$0 \le xH \le 3$ (when $1 \le (xL + xH \times 256) \le 1023$

$0 \le yL \le 1$ (when $1 \le (yL + yH \times 256) \le 288$

$0 \le d \le 255$

$k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$

Total defined data area = 1M bits (128K bytes)

[Description] Define the NV bit image specified by n .

· n specifies the number of the defined NV bit image.

· xL, xH specifies ($xL + xH \times 256$) × 8 dots in the horizontal direction for the NV bit image
you are defining.

· yL, yH specifies ($yL + yH \times 256$) × 8 dots in the vertical direction for the NV bit image you
are defining.

[Notes]   Frequent write command execution may cause damage the NV memory. Therefore, it is
recommended to write the NV memory 10 times or less a day.

·This command cancels all NV bit images that have already been defined by this command.
The printer can not redefine only one of several data definitions previously defined. In this
case, all data needs to be sent again.

· Before the ending of the processing of this command mechanical operations   (including
initializing the position of the printer head when the cover is open,   paper feeding by
using the FEED button, etc.)cannot be performed. NV bit image means a bit image which
is defined in a non-volatile memory by **FS q** and printed by **FS p**.

· In standard mode, this command is effective only when processed at the beginning of the
line.

· This command is effective when 7 bytes <FS~yH> is processed as a normal value.

· When the amount of data exceeds the capacity left in the range defined by xL, xH, yL, yH,
the printer processes xL, xH, yL, yH out of the defined range.

· In the first group of NV bit images, when any of the parameters xL, xH, yL, yH is out of the
definition range, this command is disabled.

· In groups of NV bit images other than the first one, when the printer processes xL, xH, yL,

yH out of the defined range, it stops processing this command and starts writing into the NV images. At this time, NV bit images that haven't been defined are disabled (undefined), but any NV bit images before that are enabled.

· The d indicates the definition data. In data (d) a 1 bit specifies a dot to be printed and a 0 bit specifies a dot not to be printed.

· This command defines n as the number of a NV bit image. Numbers rise in order from NV bit image 01H. Therefore, the first data group [xL xH yL yH d1...dk] is NV bit image 01H, and the last data group [xL xH yL yH d1...dk] is NV bit image n. The total agrees with the number of NV bit images specified by command **FS p**.

· A definition data of a NV bit image consists of [xL xH yL yH d1...dk]. Therefore, when only one NV bit image is defined n=1, the printer processes a data group [xL xH yL yH d1...dk] once. The printer uses ([data: (xL + xH × 256) × (yL + yH × 256) × 8] + [header:4]) bytes of NV memory.

· The definition area in this printer is a maximum of 1M bits (128K bytes). This command can define several NV bit images, but cannot define a bit image data whose total capacity [bit image data + header] exceeds 1M bytes (128K bytes).

· The printer is busy immediately before writing into NV memory.

· When this command is received during macro definition, the printer ends macro definition, and begins performing this command.

· Once a NV bit image is defined, it is not erased by performing **ESC @**, reset, and power off.

· This command performs only definition of a NV bit image and does not perform printing. Printing of the NV bit image is performed by the **FS p** command.

[Reference] **FS p**

[Example] When xL = 64, xH = 0, yL = 96, yH = 0
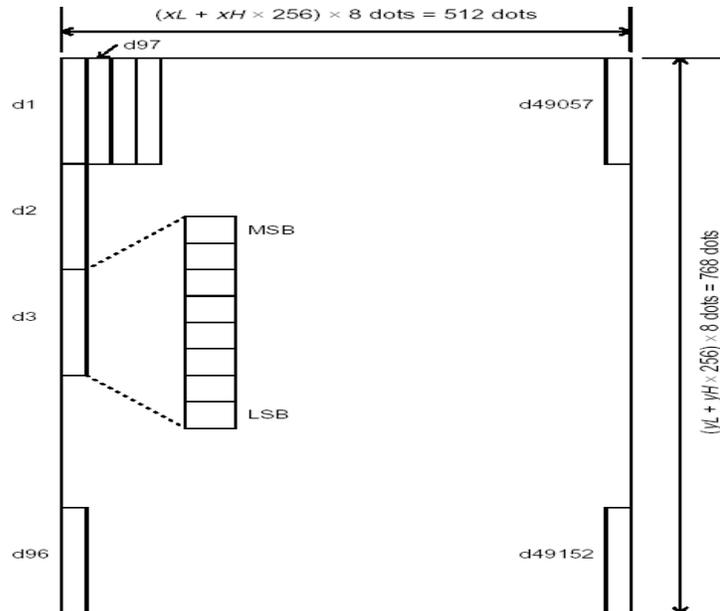
GS FF

[Name]	Feed label to print position		
[Format]	ASCII	GS	FF
	Hex	1D	0C
	Decimal	29	12

[Description] Feed label to print position.

[Notes]   . Feed paper until the next mark get to special position.

· This command is valid only when the paper type is set to marked paper.

Never use continuous paper when paper type is set to marked paper, otherwise **GS FF** command will cause the printer feeding too long.

Never use marked paper when paper type is set to continuous paper, otherwise printer will get error paper state.

[Reference]   **ESC c 0**

GS ! n

[Name]	Select character size			
[Format]	ASCII	GS	!	n
	Hex	1D	21	n
	Decimal	29	33	n

[Range]   0 ≤ n ≤ 255

(1 ≤ vertical number of times ≤ 6, 1 ≤ horizontal number of times ≤ 6)

[Description] Selects the character height using bits 0 to 2 and selects the character width using bits 4 to 7, as follows:

Bit	Off/On	Hex	Decimal	Function
0-3	Character height selection. See Table 2.			
4-7	Character width selection. See Table 1.			

Table 1 Character Width Selection		
Hex	**Decimal**	**Width**
00	0	1 (normal)
10	16	2(double-width)
20	32	3
30	48	4
40	64	5
50	80	6

Table 2 Character Height Selection		
Hex	**Decimal**	**Width**
00	0	1 (normal)
01	1	2 (double-height)
02	2	3
03	3	4

| 04 | 4 | 5 |
| 05 | 5 | 6 |

[Notes]   This command is all characters (alphanumeric and Kanji) effective except for HRI characters.

If n is outside of the defined range, this command is ignored.

In standard mode, the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction. However,

when character orientation changes in 90° clockwise-rotation mode, the relationship between vertical and horizontal directions is reversed.

In page mode, vertical and horizontal directions are based on the character orientation.

When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.

The **ESC !** command can also turn double-width and double-height modes on or off.

However, the setting of the last received command is effective.

[Default]   n = 0

[Reference] ESC !

GS $ nL nH

[Name]   Set absolute vertical print position in page mode

[Format]   ASCII   GS $ nL nH

                Hex   1D   24   nL nH

                Decimal   29   36   nL nH

[Range]   0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255

[Description] ·Sets the absolute vertical print starting position for buffer character data in page mode.

This command sets the absolute print position to [(nL + nH × 256) × (vertical or horizontal motion unit)] inches.

[Notes]   This command is effective only in page mode.

· If the [(nL + nH × 256) × (vertical or horizontal motion unit)] exceeds the specified printing area, this command is ignored.

· The horizontal starting buffer position does not move.

· The reference starting position is that specified by **ESC T**.

· This command operates as follows, depending on the starting position of the printing area specified by **ESC T**:

☐   When the starting position is set to the upper left or lower right, this command sets the absolute position in the vertical direction.

☐   When the starting position is set to the upper right or lower left, this command sets the absolute position in the horizontal direction.

· The horizontal and vertical motion unit are specified by **GS P**.

[Reference]   **ESC $**, **ESC T**, **ESC W, ESC** \, **GS P, GS** \, 3.12 Page Mode

GS (A pL pH n m

[Name]   Execute test print

[Format]   ASCII   GS (A pL pH n m

                 Hex   1D 28 41 pL pH n m

                 Decimal 29 40 65 pL pH n m

[Range]   (pL+(pH × 56))=2 (where pL=2, pH=0)

                 $0 \leq n \leq 2$, $8 \leq n \leq 50$

                 $1 \leq m \leq 3$, $9 \leq m \leq 51$

[Description] · Executes a test print with a specified test pattern on a specified paper. pL and pH

specifies the number of the parameter such as n, m to [pL + (pH × 256)]   bytes.

n specifies the paper to be tested.

n	Paper
0, 48	Basic sheet (paper roll)
1, 49	Paper roll
2, 50	

m specifies a test pattern.

m	Test pattern
1, 49	Hexadecimal dump
2, 50	Printer status print
3, 51	Rolling pattern print

[Description] · This command is enabled only when processed at the beginning of a line in standard

mode.

· This command is no effect in page mode.

· When this command is received during macro definition, the printer ends macro definition

and begins performing this command.

· After the test print is finished, the printer resets itself automatically. Therefore, the

already-defined data before this command is executed, such as an user-defined

characters, downloaded bit image, and macro, becomes undefined,

and the receive buffer and print buffer are cleared, and each setting returns to the default

value. The printer also re-reads the DIP switch settings.

· The printer cuts the paper at the end of the test print.

· The printer goes BUSY while this command is executed.

GS * x y d1...d(x × y × 8)

[Name]   Define downloaded bit image

[Format]   ASCII   GS   *   x y d1...d(x × y × 8)

Hex   1D   2A   x y d1...d(x × y × 8)

Decimal   29   42   x y d1...d(x × y × 8)

[Range]   1 ≤ x ≤ 255, 1 ≤ y ≤ 255

x × y ≤ 1024

0 ≤ d ≤ 255

[Description] Defines a downloaded bit image using the number of bytes specified by x and y

· x specifies the number of dots in the horizontal direction.

· y specifies the number of dots in the vertical direction.

[Notes]   · The number of dots in the horizontal direction is x × 8, in the vertical direction it is y × 8.

· If x × y is out of the specified range, this command is disabled.

· The d indicates bit-image data. Data (d) specifies a bit printed to 1 and not printed to 0.

· The downloaded bit image definition is cleared when:

　　　　　□　Printer is reset or the power is turned off.

·The following figure shows the relationship between the downloaded bit image and the printed data.
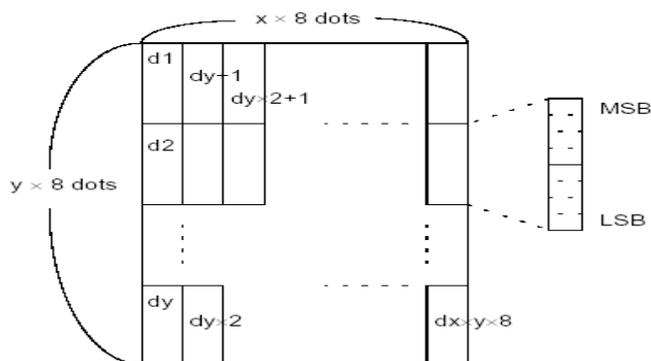
 [Reference] GS /

GS / m

[Name]   Print downloaded bit image

[Format]   ASCII   GS   /   m

Hex   1D   2F   m

Decimal   29   47   m

[Range]   0 ≤ m ≤ 3, 48 ≤ m ≤ 51

[Description] Prints a downloaded bit image using the mode specified by m.

m selects a mode from the table below:

m	Mode	Vertical Dot Density (DPI)	Horizontal Dot Density (DPI)
0, 48	Normal	180	203
1, 49	Double-width	180	101
2, 50	Double-height	90	203
3, 51	Quadruple	90	101

[Notes]   ·This command is ignored if a downloaded bit image has not been defined.

·In standard mode, this command is effective only when there is no data in the print buffer.

·This command has no effect in the print modes (emphasized, double-strike, underline, character size, or white/black reverse printing), except for upside-down printing mode.

·If the downloaded bit-image to be printed exceeds the printable area, the excess data is not printed.

[Reference]   GS *

GS :

[Name]   Start/end macro definition

[Format]   ASCII   GS   :

Hex   1D   3A

Decimal   29   58

[Description] Starts or ends macro definition.

[Notes]   ·Macro definition starts when this command is received during normal operation. Macro

definition ends when this command is received during macro definition.

· When **GS ^** is received during macro definition, the printer ends macro definition and

clears the definition.

· Macro is not defined when the power is turned on.

· The defined contents of the macro are not cleared by **ESC @**. Therefore, **ESC @** can be

included in the contents of the macro definition.

· If the printer receives **GS :** again immediately after previously receiving **GS :,** the printer

remains in the macro undefined state.

· The contents of the macro can be defined up to 2048 bytes. If the macro definition

exceeds 2048 bytes, excess data is not stored.

[Reference]   **GS ^**

GS B n

[Name]   Turn on or off white/black reverse printing mode

[Format]   ASCII   GS   B   n

Hex   1D   42   n

Decimal   29   66   n

[Range]   0 ≤ n ≤ 255

[Description] Turns on or off white/black reverse printing mode.

· When the LSB of n is 0, white/black reverse mode is turned off.

· When the LSB of n is 1, white/black reverse mode is turned on.

[Notes]   · Only the lowest bit of n is valid.

· This command is available for built-in characters and user-defined characters.

· When white/black reverse printing mode is on, it also applied to character spacing set by

ESC SP.

· This command does not affect bit image, user-defined bit image, bar code, HRI

characters, and spacing skipped by **HT**, **ESC $**, and **ESC **.

· This command does not affect the space between lines.

· White/black reverse mode has a higher priority than underline mode. Even if underline

mode is on, it is disabled (but not canceled) when white/black reverse mode is selected.

[Default]   n = 0

GS H n

[Name]   Select printing position for HRI characters

[Format]   ASCII   GS   H   n

Hex   1D   48   n

Decimal   29   72   n

[Range]   0 ≤ n ≤ 3, 48 ≤ n ≤ 51

[Description] Selects the printing position of HRI characters when printing a bar code.

n selects the printing position as follows:

n	Printing position
0, 48	Not printed
1, 49	Above the bar code
2, 50	Below the bar code
3, 51	Both above and below the bar code

· HRI indicates Human Readable Interpretation.

[Notes]   · HRI characters are printed using the font specified by **GS f**.

[Default]   n = 0

[Reference]   **GS f**, **GS k**

GS I n

[Name]   Transmit printer ID

[Format]   ASCII   GS I n

                  Hex   1D 49 n

                  Decimal   29 73 n

[Range]   1 ≤ n ≤ 3, 49 ≤ n ≤ 51, 65 ≤ n ≤ 69

[Description] Transmits the printer ID specified by n as follows:

n	Printer ID	Specification	ID (hexadecimal)
1,49	Printer model ID	BTP2002 series	20
2,50	Type ID	See table below.	
3,51	ROM version ID	Depends on ROM version.	
65	Firmware version	Depends on Firmware version.	
66	Manufacturer	ELGIN	
67	Printer name	NIX	
68	Serial number	Depends on serial number.	

n = 2, Type ID

Bit	Off/On	Hex	Decimal	Function
0	OFF	00	0	Two-byte character code not supported.
	ON	01	1	Two-byte character code supported.
1	ON	02	2	Auto-cutter equipped.
2	OFF	00	0	No direct connection with customer display
3	OFF	00	0	No MICR reader.
4	OFF	00	0	Not used. Fixed to Off.
5	_	_	_	Undefined.
6	_	_	_	Undefined.
7	OFF	00	0	Not used. Fixed to Off.

[Notes]   The printer ID is transmitted when the data in the receive buffer is developed. Therefore, there

may be a time lag between receiving this command and transmitting the status, depending on

the receive buffer status.

· When the printer ID transmission is specified with (1 ≤ n ≤ 3) or (49 ≤ n ≤ 51), one byte code is

transmitted.

· When Auto Status Back (ASB) is enabled using **GS a**, the status transmitted by **GS I** and the

ASB status must be differentiated.

· When the printer ID transmission is specified with (65 ≤ n ≤ 69), the following contents are

transmitted:

Header: Hexadecimal = 5FH / Decimal = 95 (1 byte)

Data: Printer information

NUL: Hexadecimal = 00H / Decimal = 0 (1 byte)

GS L nL nH

[Name]   Set left margin

[Format]   ASCII   GS   L   nL nH

Hex   1D   4C   nL nH

Decimal   29   76   nL nH

[Range]   0 ≤ nL ≤ 255

0 ≤ nH ≤ 255

[Description] Sets the left margin using nL and nH.

· The left margin is set to [(nL + nH × 256) × horizontal motion unit)] inches.
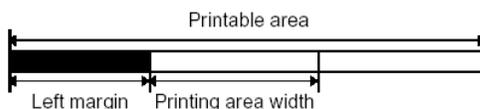
[Notes]   · This command is effective only processed at the beginning of the line in standard mode.

· If this command is input in page mode, the printer performs only internal flag operations.

· This command does not affect printing in page mode.

· If the setting exceeds the printable area, the maximum value of the printable area is used.

· The horizontal and vertical motion units are specified by **GS P**. Changing the horizontal

and vertical motion unit does not affect the current left margin.

[Default]   nL = 0, nH = 0

[Reference]   **GS P**, **GS W**

GS P x y

[Name]   Set horizontal and vertical motion units

[Format]   ASCII   GS   P   x   y

Hex   1D   50   x   y

Decimal   29   80   x   y

[Range]   0 ≤ x ≤ 255

0 ≤ y ≤255

[Description] Sets the horizontal and vertical motion units to approximately 25.4/ x mm { 1/ x inches}

and approximately 25.4/ y mm {1/ y inches}, respectively.

When x and y are set to 0, the default setting of each value is used.

[Notes]   The horizontal direction is perpendicular to the paper feed direction and the vertical

direction is the paper feed direction.

· In standard mode, the following commands use x or y, regardless of character rotation

(upside-down or 90° clockwise rotation):

Commands using x: **ESC SP**, **ESC $**, **ESC **, **FS S, GS L**, **GS W**

Commands using y: **ESC 3**, **ESC J**, **GS V**

· In page mode, the following command use x or y, depending on character orientation:

When the print starting position is set to the upper left or lower right of the printing area

using **ESC T** (data is buffered in the direction perpendicular to the paper feed direction):

Commands using x: **ESC SP**, **ESC $**, **ESC W**, **ESC **, **FS S**

Commands using y: **ESC 3**, **ESC J**, **ESC W**, **GS $**, **GS **, **GS V**

When the print starting position is set to the upper right or lower left of the printing area

using **ESC T** (data is buffered in the paper feed direction):

Commands using x: **ESC 3**, **ESC J**, **ESC W**, **GS $, GS **

Commands using y: **ESC SP**, **ESC $**, **ESC W**, **ESC **,**FS S**, **GS V**

· The command does not affect the previously specified values.

[Default]   x = 203, y = 180

[Reference]   **ESC SP**, **ESC $**, **ESC 3**, **ESC J**, **ESC W**, **ESC **, **GS $**, **GS L**, **GS V**, **GS W**, **GS **

GS V m   GS V m n

[Name]   Select cut mode and cut paper

[Format]   ASCII   GS   V   m

Hex   1D   56   m

Decimal   29   86   m

.ASCII   GS   V   m   n

Hex   1D   56   m   n

Decimal   29   86   m   n

[Range]   m = 1, 49

m = 66, 0 ≤ n ≤255

[Description] Selects a mode for cutting paper and executes paper cutting. The value of m

selects the mode as follows:

m	Print mode
0,48	Full cut
1,49	Partial cut (one point left uncut)
66	Feeds paper (cutting position + [n × (vertical motion unit)]), and cuts the paper partially (one point left uncut).

[Notes for   and   ]

· This command is effective only processed at the beginning of a line.

[Note for   ] · When n = 0, the printer feeds the paper to the cutting position and cuts it.

· Normally, the printer feeds the paper to (cutting position + [n × vertical motion unit]) and cuts it.

· The horizontal and vertical motion unit are specified by **GS P**.

GS W nL nH

[Name]   Set printing area width

[Format]   ASCII   GS   W   nL   nH

Hex   1D   57   nL   nH

Decimal   29   87   nL   nH

[Range]   0 ≤ nL ≤ 255

0 ≤ nH ≤ 255

[Description] Sets the printing area width to the area specified by nL and nH.

· The printing area width is set to [(nL + nH × 256) × horizontal motion unit)] inches.
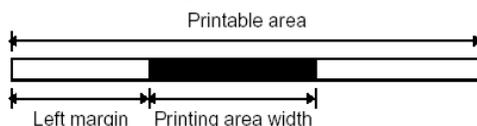
[Notes]   · This command is effective only processed at the beginning of the line.

· In page mode, the printer performs only internal flag operations.

· This command does not affect printing in page mode.

· If the [left margin + printing area width] exceeds the printable area, [printable area width - left margin) is used.

· The horizontal and vertical motion units are specified by **GS P**. Changing the horizontal and vertical motion units does not affect the current left margin.

· The horizontal motion unit (x) is used for calculating the printing area width. The calculated result is truncated to the minimum value of the mechanical pitch.

[Default]   nL = 80, nH = 2

[Reference]   **GS L**, **GS P**

GS \ nL nH

[Name]   Set relative vertical print position in page mode

[Format]   ASCII   GS   \   nL   nH

Hex   1D   5C   nL   nH

Decimal   29   92   nL   nH

[Range]   0 ≤ nL ≤ 255

0 ≤ nH ≤ 255

[Description] Sets the relative vertical print starting position from the current position in page mode.

· This command sets the distance from the current position to [(nL + nH × 256) × vertical or horizontal motion unit] inches.

[Notes]   · This command is ignored unless page mode is selected.

·When pitch N is specified to the movement downward:

 nL + nH × 256 = N

When pitch N is specified to the movement upward (the negative direction), use the

 complement of 65536.

When pitch N is specified to the movement upward:

 nL + nH × 256 = 65536 - N

·Any setting that exceeds the specified printing area is ignored.

·This command function as follows, depending on the print starting position set by **ESC T**:

☐   When the starting position is set to the upper left or lower right of the printing, the

 vertical motion unit (y) is used.

☐   When the starting position is set to the upper right or lower left of the printing area, the

 horizontal motion unit (x) is used.

·The horizontal and vertical motion unit are specified by GS P.

[Reference]   **ESC $**, **ESC T**, **ESC W**, **ESC **, **GS $**, **GS P**, 3.12 Page Mode

GS ^ r t m

[Name]	Execute macro					
[Format]	ASCII	GS	^	r	t	m
	Hex	1D	5E	r	t	m
	Decimal	29	94	r	t	m

[Range]   0 ≤ r ≤ 255

0 ≤ t ≤ 255

m = 0, 1

[Description] Executes a macro.

·r specifies the number of times to execute the macro.

·t specifies the waiting time for executing the macro.

·m specifies macro executing mode.

 When the LSB of m = 0:

     The macro executes r times continuously at the interval specified by t.

 When the LSB of m = 1:

 After waiting for the period specified by t, the PAPER OUT LED indicators blink ,and the

 printer waits for the FEED button to be pressed. After the button is pressed, the printer

 executes the macro once. The printer repeats the operation r times.

[Notes]   ·The waiting time is t × 100 ms for every macro execution.

·If this command is received while a macro is being defined, the macro definition is

 aborted and the definition is cleared.

·If the macro is not defined or if r is 0, nothing is executed.

·When the macro is executed (m = 1), paper always cannot be fed by using the FEED

 button.

[Reference]   GS :

GS a n

[Name]   Enable/Disable Automatic Status Back (ASB)

[Format]   ASCII   GS a n

                 Hex   1D 61 n

                 Decimal 29 97 n

[Range]   0 ≤ n ≤ 255

[Description] Enables or disables ASB and specifies the status items to include, using n as follows:

Bit	Off/On	Hex	Decimal	Status for ASB
0	off	00	0	Drawer kick-out connector pin 3 status disabled.
	on	01	1	Drawer kick-out connector pin 3 status enabled.
1	off	00	0	On-line/off-line status disabled.
	on	02	2	On-line/off-line status enabled.
2	off	00	0	Error status disabled.
	on	04	4	Error status enabled.
3	off	00	0	Paper roll sensor status disabled.
	on	08	8	Paper roll sensor status enabled.
4-7	-	-	-	Undefined.

[Notes]   If any of the status items in the table above are enabled, the printer transmits the status

                 when this command is executed. The printer automatically transmits the status whenever

                 the enabled status item changes. The disabled status items may change, in this case,

                 because each status transmission represents the current status.

                 If all status items are disabled, the ASB function is also disabled.

                 The following four status bytes are transmitted without confirming whether the host is ready

                 to receive data. The four status bytes must be consecutive, except for the XOFF code.

                 Since this command is executed after the data is processed in the receive buffer, there

                 may be a time lag between data reception and status transmission.

                 When the printer is disabled by **ESC =** (Select peripheral device), the four status bytes are

                 transmitted whenever the status changes.

                 When using **DLE EOT**, **GS I**, or **GS r**, the status transmitted by these commands and ASB

                 status must be differentiated.

                 The status to be transmitted are as follows:

First byte (printer information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Not used. Fixed to Off.
1	Off	00	0	Not used. Fixed to Off.
2	Off	00	0	Drawer kick-out connector pin 3 is LOW.
2	On	04	4	Drawer kick-out connector pin 3 is HIGH.
3	Off	00	0	On-line.
3	On	08	8	Off-line.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Cover is closed.
5	On	20	32	Cover is open.
6	Off	00	0	Paper is not being fed by using the PAPER FEED button.
6	On	40	64	Paper is being fed by using the PAPER FEED button.
7	Off	00	0	Not used. Fixed to Off.

Second byte (printer information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	-	-	-	Undefined.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	Off	00	0	No auto cutter error.
3	On	08	8	Auto cutter error occurred.
4	Off	00	0	Not used. Fixed to Off.
5	Off	00	0	No unrecoverable error.
5	On	20	32	Unrecoverable error occurred.
6	Off	00	0	No automatically recoverable error.
6	On	40	64	Automatically recoverable error occurred.
7	Off	00	0	Not used. Fixed to Off.

Bit 5: If these errors occur due to paper jams or the like, it is possible to recover by correcting the cause of the error and executing **DLE ENQ n** (1 ≤ n ≤ 2). If an error due to a circuit failure (e.g. wire break) occurs, it is impossible to recover.

Bit 6: When printing is stopped due to high print head temperature until the print head temperature drops sufficiently or when the paper roll cover is open during printing, bit 6 is On.

Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status for ASB
0,1	Off	00	0	Paper roll near-end sensor: paper adequate.
0,1	On	03	3	Paper roll near-end sensor: paper near end.
2,3	Off	00	0	Paper roll end sensor: paper present
2,3	On	0C	12	Paper roll end sensor: paper not present
4	Off	00	0	Not used. Fixed to Off.
5,6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

Fourth byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status for ASB
0-3	-	-	**-**	Undefined.
4	Off	00	0	Not used. Fixed to Off.
5,6	-	-	**-**	Undefined.
7	Off	00	0	Not used. Fixed to Off.

GS f n

[Name]	Select font for Human Readable Interpretation (HRI) characters

[Format]   ASCII   GS   f   n

Hex   1D   66   n

Decimal   29   102   n

[Range]   n = 0, 1, 48, 49

[Description] Selects a font for the HRI characters used when printing a bar code.

n selects a font from the following table:

n	Font
0,48	Font A (12 × 24)
1,49	Font B (9 × 17)

[Notes]   · HRI indicates Human Readable Interpretation.

· HRI characters are printed at the position specified by **GS H**.

[Default]   n = 0

[Reference]   **GS H**, **GS k**

GS h n

[Name]   Select bar code height

[Format]   ASCII   GS   h   n

Hex   1D   68   n

Decimal   29   104   n

[Range]   1 ≤ n ≤ 255

[Description] Selects the height of the bar code.

n specifies the number of dots in the vertical direction.

[Default]   n = 162

[Reference] GS k

GS k m d1...dk NUL   GS k m n d1...dn

[Name]   Print bar code

[Format]   □ASCII   GS   k   m   d1...d k NUL

Hex   1D   6B   m   d1...d k 00

Decimal   29   107   m   d1...d k 0

ASCII	GS	k	m	n	d1... dn
Hex	1D	6B	m	n	d1... dn
Decimal	29	107	m	n	d1... dn

[Range] $0 \le m \le 6$, m = 10 (k and d depends on the bar code system used)

                   $65 \le m \le 73$, m = 75 (n and d depends on the bar code system used)

[Description] Selects a bar code system and prints the bar code.

             m selects a bar code system as follows:

m		Bar Code System	Number of Characters	Remarks
	0	UPC-A	$11 \le k \le 12$	$48 \le d \le 57$
	1	UPC-E	$11 \le k \le 12$	$48 \le d \le 57$
	2	JAN13 (EAN13)	$12 \le k \le 13$	$48 \le d \le 57$
	3	JAN 8 (EAN8)	$7 \le k \le 8$	$48 \le d \le 57$
	4	CODE39	$1 \le k \le 255$	$45 \le d \le 57$, $65 \le d \le 90$, 32, 36, 37,43
	5	ITF	$1 \le k \le 255$	$48 \le d \le 57$
	6	CODABAR	$1 \le k \le 255$	$48 \le d \le 57$, $65 \le d \le 68$, 36, 43, 45,46,47,58
	10	PDF 417	$1 \le k \le 255$	$32 \le d \le 255$
	65	UPC-A	$11 \le n \le 12$	$48 \le d \le 57$
	66	UPC-E	$11 \le n \le 12$	$48 \le d \le 57$
	67	JAN13 (EAN13)	$12 \le n \le 13$	$48 \le d \le 57$
	68	JAN 8 (EAN8)	$7 \le n \le 8$	$48 \le d \le 57$
	69	CODE39	$1 \le n \le 255$	$45 \le d \le 57$, $65 \le d \le 90$, 32, 36, 37,43 d1 = dk = 42 (1)
	70	ITF	$1 \le n \le 255$	$48 \le d \le 57$
	71	CODABAR	$1 \le n \le 255$	$48 \le d \le 57$ $65 \le d \le 68$, 36, 43,45,46,47 58
	72	CODE93	$1 \le n \le 255$	$0 \le d \le 127$
	73	CODE128	$2 \le n \le 255$	$0 \le d \le 127$
	75	PDF417	$1 \le n \le 255$	$0 \le d \le 255$

[Notes for]

         · This command ends with a NUL code.

         · The number of data for ITF bar code must be even numbers. When an odd number of
           data is input, the printer ignores the last received data.

[Notes for]

         · n indicates the number of bar code data, and the printer processes n bytes from
         the next character data as bar code data.

         · If n is outside of the specified range, the printer stops command processing and
         processes the following data as normal data.

[Notes in standard mode]

         · If d is outside of the specified range, the printer only feeds paper and processes
         the following data as normal data.

         · If the horizontal size exceeds printing area, the command is ignored.

         · This command feeds as much paper as is required to print the bar code,

regardless of the line spacing specified by **ESC 2** or **ESC 3**.

· This command is enabled only when no data exists in the print buffer. When

data exists in the print buffer, the printer processes the data following m as

normal data.

· After printing bar code, this command sets the print position to the beginning of

the line.

· This command is not affected by print modes (emphasized, double-strike,

underline, character size, white/black reverse printing, or 90° rotated character,

etc.), except for upside-down printing mode.

<Others>   Be sure to keep spaces on both right and left sides of a bar code. (Spaces are different
depending on the types of the bar code.)

[Reference]   **GS H**, **GS f**, **GS h**, **GS w**.

GS p n

[Name]   Set all the parameters to define PDF417

[Format]   *ASCII   GS   p   nA nB nC nD nE nF*

Hex   1D   70   nA nB nC nD nE nF

Decimal   29   112   nA nB nC nD nE nF

[Range]   *1≤ nA ≤10 ， 1≤nB≤100，3≤nC ≤90，1≤nD ≤30，1≤nE ≤7，2≤nF ≤25*

[Description] The meaning of parameter n is shown as below:

Parameter	Meaning
nA	Aspect scale factor of height
nB	Aspect Scale factor of width
nC	Number of rows
nD	Number of columns
nE	Width of basic cells
nF	Height of basic cells

[Notes]   nA and nB is effective when nC and nD equals to zero. The printer will automatically adjust
the numbers of rows and columns when nA and nB is effective.

GS q n

[Name]   Set error correction grade of PDF417 code

[Format]   ASCII   GS   q   *n*

Hex   1D   71   *n*

Decimal   29   113   *n*

[Range]   0≤ *n*≤8

[Description] Set error correction grade of PDF417 code.

GS r n

[Name]   Transmit status

[Format]   ASCII   GS   r   n

Hex   1D   72   n

Decimal   29   114   n

[Range]   n = 1, 2, 49, 50

[Description] Transmits the status specified by n as follows:

n	Function
1, 49	Transmits paper sensor status
2, 50	Transmits drawer kick-out connector status

[Notes]   This command is valid for serial model only, The printer transmits only 1 byte without confirming the condition of the DSR signal.

· This command is executed when the data in the receive buffer is developed. Therefore, there may be a time lag between receiving this command and transmitting the status, depending on the receive buffer status.

· The status types to be transmitted are shown below:

Paper sensor status (n = 1, 49):

Bit	Off/On	Hex	Decimal	Status for ASB
0, 1	Off	00	0	Paper roll near-end sensor: paper adequate
	On	03	3	Paper roll near-end sensor: paper near end
2, 3	Off	00	0	Paper roll end sensor: paper adequate
	On	0c	12	Paper roll end sensor: paper near end
4	Off	00	0	Not used. Fixed to Off
5,6				Undefined
7	Off	00	0	Not used. Fixed to Off

 Bits 2 and 3: When the paper end sensor detects a paper end, the printer goes off-line and does not execute this command. Therefore, bits 2 and 3 do not transmit the status of paper end.

Drawer kick-out connector status (n = 2, 50):

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Drawer kick-out connector pin 3 is LOW
	On	01	1	Drawer kick-out connector pin 3 is HIGH
1- 3				Undefined
4	Off	00	0	Not used. Fixed to Off
5,6				Undefined
7	Off	00	0	Not used. Fixed to Off.

[Reference]   **DLE EOT**, **GS a**

GS v 0 m xL xH yL yH d1....dk

| **[Name]**	Print raster bit image				
[Format]	ASCII	GS	v	0	m xL xH yL yH d1...dk
	Hex	1D	76	30	m xL xH yL yH d1...dk
	Decimal	29	118	48	m xL xH yL yH d1...dk

[Range] $0 \le m \le 3$, $48 \le m \le 51$

$0 \le xL \le 255$

$0 \le xH \le 255$

$0 \le yL \le 255$

$0 \le d \le 255$

$k = (xL + xH \times 256) \times (yL + yH \times 256)$ $(k \ne 0)$

[Description] Selects Raster bit-image mode. The value of m selects the mode, as follows:

m	Mode	Vertical Dot Density (DPI)	Horizontal Dot Density (DPI)
0, 48	Normal	180 DPI	203 DPI
1, 49	Double-width	180 DPI	101 DPI
2, 50	Double-height	90 DPI	203 DPI
3, 51	Quadruple	90 DPI	101 DPI

· xL, xH, select the number of data bytes $(xL + xH \times 256)$ in the horizontal direction for the bit image.

· yL, yH, select the number of data bytes $(yL + yH \times 256)$ in the vertical direction for the bit image.

[Notes] · In standard mode, this command is effective only when there is no data in the print buffer.

· This command has no effect in all print modes (character size, emphasized, double-strike, upside-down, underline, white/black reverse printing, etc.) for raster bit image.

· Data outside the printing area is read in and discarded on a dot-by-dot basis.

· The position at which subsequent characters are to be printed for raster bit image is specified by **HT** (Horizontal Tab), **ESC $** (Set absolute print position),

   ESC ** (Set relative print position), and **GS L (Set left margin). If the position at which subsequent characters are to be printed is not a multiple of 8, print speed may decline.

· The **ESC a** (Select justification) setting is also effective on raster bit images.

· When this command is received during macro definition, the printer ends macro definition, and begins performing this command. The definition of this command should be cleared.

· d indicates the bit-image data. Set a bit to 1 prints a dot and setting it to 0 does not print a dot.

[Example]   When xL+ xH × 256 = 64
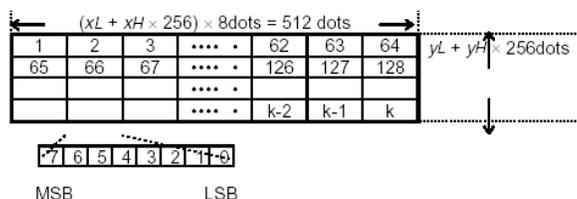
GS w n

[Name]	Set bar code width

[Format]   ASCII   GS   w   n

              Hex   1D   77   n

              Decimal   29   119   n

[Range]   2 ≤ n ≤ 6

[Description] Set the horizontal size of the bar code.

        n specifies the bar code width as follows:

n	Module Width (mm) for Multi-level Bar Code	Binary-level Bar Code	
		Thin element width (mm)	Thick element width (mm)
2	0.25	0.25	0.625
3	0.375	0.375	1.0
4	0.5	0.5	1.25
5	0.625	0.625	1.625
6	0.75	0.75	1.875

      · Multi-level bar codes are as follows:

       UPC-A, UPC-E, JAN13 (EAN13), JAN8 (EAN8), CODE93, CODE128

      · Binary-level bar codes are as follows:

       CODE39, ITF, CODABAR

[Default]   n = 2

[Reference]   GS k

Appendix B: Page Mode

B.1 General Description

The printer operates in two print modes only when the paper roll is selected as the print sheet: standard mode and page mode. In standard mode, the printer prints and feeds paper each time it receives print data or paper feed commands. In page mode, all the received print data and paper feed commands are processed in the specified memory, and the printer executes no operations. All the data in the memory is then printed when an **ESC FF** or **FF** command is received.

For example, when the printer receives the data "ABCDEF" <**LF**> in standard mode, it prints "ABCDEF" and feeds the paper by one line. In page mode, "ABCDEF" is written to the specified printing area in memory, and the position in memory for the next print data is shifted by one line.

The **ESC L** command puts the printer into page mode, and all commands received thereafter are processed in page mode. Executing an **ESC FF** command prints the received data collectively, and executing an **FF** command restores the printer to standard mode after the received data is printed collectively. Executing an **ESC S** command restores the printer to standard mode without printing the received data in page mode; the received data is cleared from memory instead.
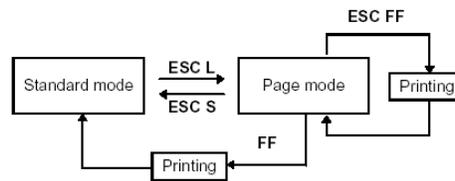
Figure B.1 Shifting Between Standard Mode and Page Mode

B.2 Setting Values in Standard and Page Modes

1) The available commands and parameters are the same for both standard and page modes. However, these values can be set independently in each mode for the **ESC SP**, **ESC 2**,**ESC 3**, and **FS S** commands. For these commands, different settings can be stored for each mode.

B.3 Formatting of Print Data in the Printable Area

Formatting of print data in the printable area is performed as follows:

1) The printable area is set using **ESC W**. If all printing and feeding are complete before the printer receives the **ESC W** command, the left side (as you face the printer) is taken as the origin (x0, y0) of the printable area. The printable rectangular area is defined by the length (dx dots) extending from and including the origin (x0, y0) in the x direction (perpendicular to the paper feed direction), and by the length (dy dots) in the y direction (paper feed direction). (If the **ESC W** command is not used, the printable area remains the default value.)

2) When the printer receives print data after **ESC W** sets the printable area and **ESC T** sets the printing direction, the print data is formatted within the printable area so that point A in Figure B.2 is at the beginning of the printable area as a default value. (When a character is printed, point A is the baseline.) Print data containing downloaded bit images or bar codes is formatted so that the bottom point of the left side of the image data (point B in Figure B.3) is aligned with the baseline. However, any Human Readable Interpretation (HRI) characters are printed under the baseline. At the points labeled Point B, if characters (such as double-height characters) higher than normal size characters or downloaded bit image characters are received, any part of the character higher than the normal-size character is not printed.

3) If the print data (including the space to the right of a character) exceeds the printable area before the printer receives a command (e.g., **LF** or **ESC J**) that includes line feeding, a line feed is executed automatically within the printable area. The print position, therefore, moves to the beginning of the next line. The line feed amount depends on the values set by commands (such as **ESC 2** and **ESC 3**).

4) The default value of the line spacing is set to 1/6 inch and corresponds to 31 dots in the vertical direction. If print data for the next line contains extended characters that are higher than double-height characters, bit images taking up two or more lines, or bar codes higher than normal characters, the amount of line feeding may be insufficient, resulting in overlapping of the characters' higher-order dots with the previous line. To avoid this, increase the amount of line spacing.

Example

When printing a downloaded bit image of six bytes in the vertical direction, use the following formula:

{number of vertical dots (8×6) - number of dots for feeding at the beginning of the printable

area (24)} × vertical motion unit conversions (180/180) = 24

Therefore, 24 dots are required for feeding.

Use the following commands:

ESC W xL, **xH**, **yL**, **yH**, **dxL**, **dxH**, **dyL**, **dyH**

ESC T n

ESC 3 24 ¬ Set line spacing to be added.

LF

GS / 1

ESC 2 ¬ Reset the line spacing to 1/6 inch.

NOTE: Vertical and horizontal motion units are 1/180 in the vertical direction and 1/203 in the horizontal

direction; therefore, the position you specify varies depending on the printing direction. Setting the vertical motion unit to 1/180 using the **GS P** command does not change the current print position.
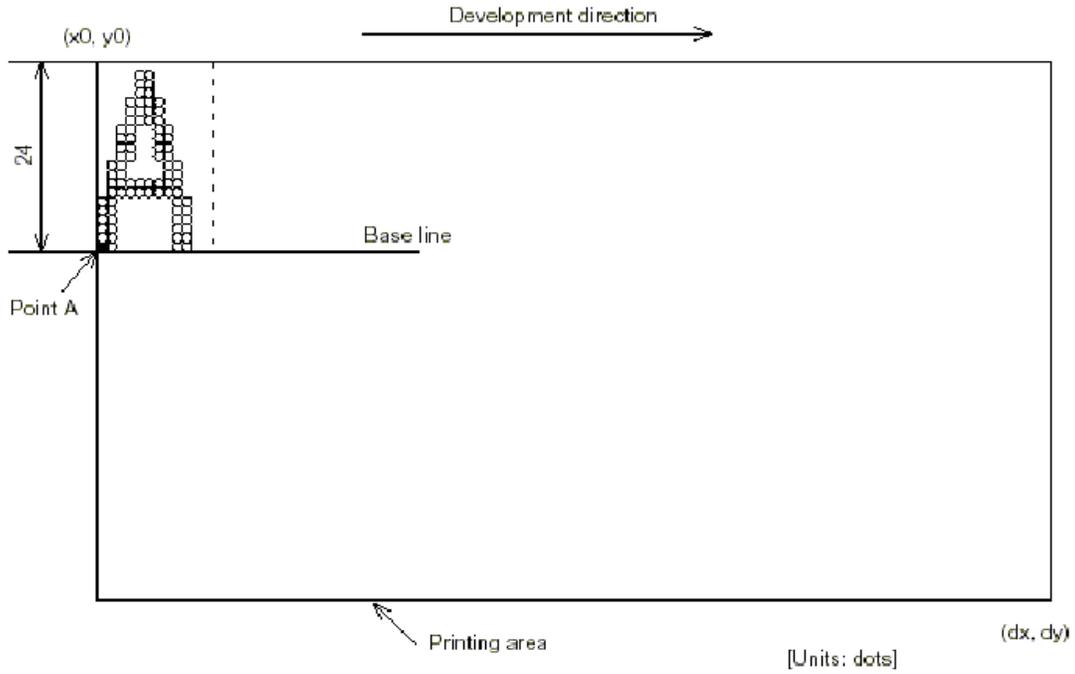
Figure B.2 Character Data Developing Position
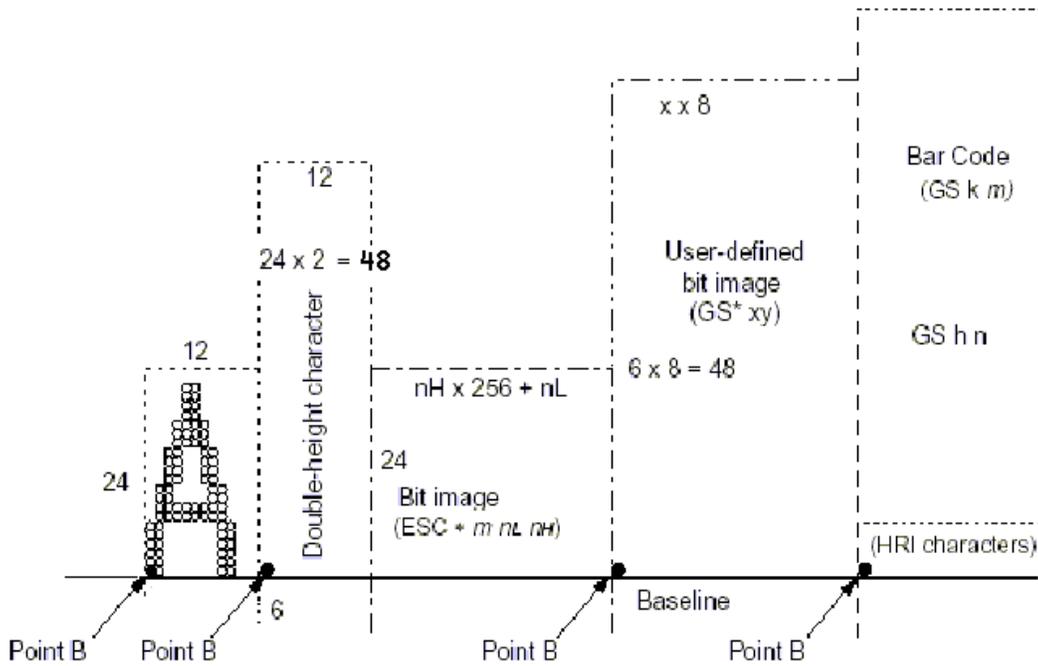
Figure B.3 Print Data Developing Position
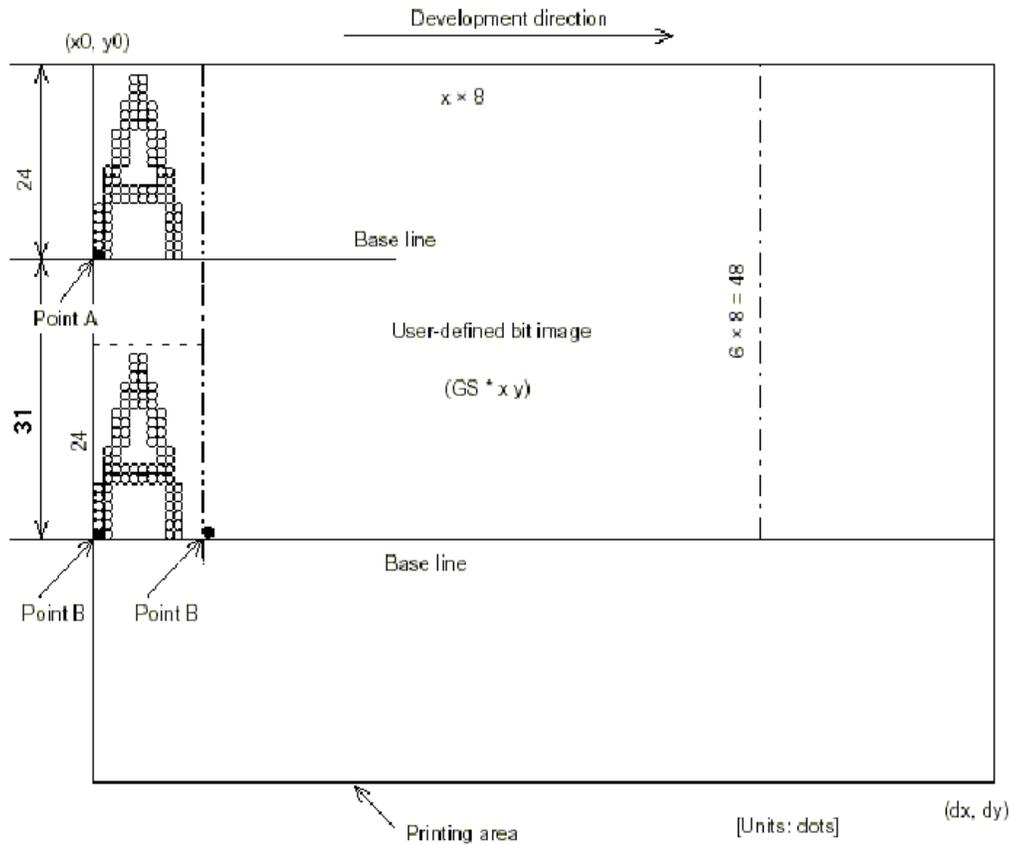
Figure B.4 Downloaded Bit Image Developing Position

Appendix II – Character Tables

ASCII

The codes from 00h up to 7Fh are shown below:

Code (Hex)	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL							BEL	BS	HT	LF	VT	FF	CR	SO	SI
1		DC1	DC2	DC3	DC4				CAN			ESC				
2	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6	`	A	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{			}	~	DEL

ABICOMP

The ABICOMP table is the standard Brazilian characters. It is from 00h up to F0h the same that the ASCII table. It just takes the codes between A0h and F0h.

H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
A	SP	À	Á	Â	Ă	Ä	Ç	È	É	Ê	Ē	Ì	Í	Î	Ï	Ń
B	Ò	Ó	Ô	Ő	Ō	Œ	Ù	Ú	Û	Ü	Ÿ	-	£	´	§	o
C	¡	à	á	â	ã	ă	ç	è	é	ê	ё	ì	í	î	ï	ñ
D	ò	ó	ô	õ	ð	œ	ù	ú	û	ü	ÿ	ß	a	o	¿	±

Code Page 437

Code (Hex)	2_	3_	4_	5_	6_	7_	8_	9_	A_	B_	C_	D_	E_	F_
_0	(space)	0	@	P	`	p	Ç	É	á	░	└	╨	α	≡
_1	!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	ß	±
_2	"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
_3	#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
_4	$	4	D	T	d	t	ä	ö	ñ	┤	─	╘	Σ	⌠
_5	%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
_6	&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
_7	'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
_8	(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
_9	)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	∙
_A	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
_B	+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
_C	,	<	L	\	l	¦	î	£	¼	╝	╠	▄	∞	ⁿ
_D	-	=	M	]	m	}	ì	¥	¡	╜	═	▌	φ	²
_E	.	>	N	^	n	~	Ä	₧	«	╛	╬	▐	ε	■
_F	/	?	O	_	o		Å	ƒ	»	┐	╧	▀	∩	

Code Page 850

Code Page 850 character set is from 00h up to 7Fh and is the same characters as the ASCII table. Characters between 80h and FFh are available for use for international languages.

Code (Hex)	2_	3_	4_	5_	6_	7_	8_	9_	A_	B_	C_	D_	E_	F_
_0	(space)	0	@	P	`	p	Ç	É	á	▓	└	ð	Ó	-
_1	!	1	A	Q	a	q	ü	æ	í	▓	┴	Đ	ß	±
_2	"	2	B	R	b	r	é	Æ	ó	▓	┬	Ê	Ô	=
_3	#	3	C	S	c	s	â	ô	ú	│	├	Ë	Ò	¾
_4	$	4	D	T	d	t	ä	ö	ñ	┤	─	È	õ	¶
_5	%	5	E	U	e	u	à	ò	Ñ	Á	┼	ı	Õ	§
_6	&	6	F	V	f	v	å	û	ª	Â	ã	Í	µ	÷
_7	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	Þ	¸
_8	(	8	H	X	h	x	ê	ÿ	¿	©	╚	Ï	þ	°
_9	)	9	I	Y	i	y	ë	Ö	®	╣	╔	┘	Ú	¨
_A	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Û	·
_B	+	;	K	[	k	{	ï	ø	½	╗	╦	█	Ù	¹
_C	,	<	L	\	l	¦	î	£	¼	╝	╠	▄	ý	³
_D	-	=	M	]	m	}	ì	Ø	¡	¢	=	¦	Ý	²
_E	.	>	N	^	n	~	Ä	×	«	¥	╬	Ì	¯	■
_F	/	?	O	_	o		Å	ƒ	»	┐	¤	■	´	

Code Page 858

Code (Hex)	2_	3_	4_	5_	6_	7_	8_	9_	A_	B_	C_	D_	E_	F_
_0	(space)	0	@	P	`	p	Ç	É	á	▒	└	ð	Ó	-
_1	!	1	A	Q	a	q	ü	æ	í	▒	┴	Đ	ß	±
_2	"	2	B	R	b	r	é	Æ	ó	▓	┬	Ê	Ô	=
_3	#	3	C	S	c	s	â	ô	ú	│	├	Ë	Ò	¾
_4	$	4	D	T	d	t	ä	ö	ñ	┤	─	È	õ	¶
_5	%	5	E	U	e	u	à	ò	Ñ	Á	┼	€	Õ	§
_6	&	6	F	V	f	v	å	û	ª	Â	ã	Í	µ	÷
_7	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	Þ	,
_8	(	8	H	X	h	x	ê	ÿ	¿	©	╚	Ï	þ	°
_9	)	9	I	Y	i	y	ë	Ö	®	╣	╔	┘	Ú	¨
_A	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Û	·
_B	+	;	K	[	k	{	ï	ø	½	╗	╦	█	Ù	¹
_C	,	<	L	\	l	¦	î	£	¼	╝	╠	■	ý	³
_D	-	=	M	]	m	}	ì	Ø	¡	¢	=	¦	Ý	²
_E	.	>	N	^	n	~	Ä	×	«	¥	╪	Ì	─	■
_F	/	?	O	_	o		Å	ƒ	»	┐	¤	■	'	■

Code Page 860

Code (Hex)	2_	3_	4_	5_	6_	7_	8_	9_	A_	B_	C_	D_	E_	F_
_0	(space)	0	@	P	`	p	Ç	É	á	▒	└	╨	α	≡
_1	!	1	A	Q	a	q	ü	À	í	▒	┴	╤	ß	±
_2	"	2	B	R	b	r	é	È	ó	▓	┬	╥	Γ	≥
_3	#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
_4	$	4	D	T	d	t	ã	õ	ñ	┤	─	╘	Σ	⌠
_5	%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
_6	&	6	F	V	f	v	Á	Ú	ª	╢	╞	╓	µ	÷
_7	'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
_8	(	8	H	X	h	x	ê	Ì	¿	╕	╚	╪	Φ	°
_9	)	9	I	Y	i	y	Ê	Õ	Ò	╣	╔	┘	Θ	·
_A	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
_B	+	;	K	[	k	{	Í	¢	½	╗	╦	█	δ	√
_C	,	<	L	\	l	¦	Ô	£	¼	╝	╠	■	∞	ⁿ
_D	-	=	M	]	m	}	ì	Ù	¡	╜	=	█	φ	²
_E	.	>	N	^	n	~	Ã	Pt	«	╛	╪	█	ε	■
_F	/	?	O	_	o		Â	Ó	»	┐	╧	■	∩	

International Character Set

	ASCII code (Hex)											
Country	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
U.S.A	#	$	@	[	\	]	^	`	{	|	}	~
France	#	$	à	°	ç	§	^	`	é	ù	è	¨

Control Sequences（POS）

The control sequences of the printer controller are POS compatible.

Code	Hex	Dec	Function
HT	09	09	Horizontal tab
LF	0A	10	Print and line feed
FF	0C	12	Print and return to standard mode (in page mode)
CR	0D	13	Print and carriage return
CAN	18	24	Cancel print data in page mode
DLE EOT	10 04	16 04	Real-time status transmission
DLE ENQ	10 05	16 05	Real-time request to printer
DLE DC4	10 14	16 20	Generate pulse at real-time
ESC FF	1B 0C	27 12	Print data in page mode
ESC SP	1B 20	27 32	Set right-side character spacing
ESC !	1B 21	27 33	Select print mode(s)
ESC $	1B 24	27 36	Set absolute print position
ESC %	1B 25	27 37	Select/cancel user-defined character set
ESC &	1B 26	27 38	Define user-defined characters
ESC *	1B 2A	27 42	Select bit-image mode
ESC -n	1B 2D	27 45	Turn underline mode on/off
ESC 2	1B 32	27 50	Select default line spacing
ESC 3	1B 33	27 51	Set line spacing
ESC =	1B 3D	27 61 n	Select peripheral device
ESC ?	1B 3F	27 63 n	Cancel user-defined characters
ESC @	1B 40	27 64	Initialize printer
ESC D	1B 44	27 68	Set horizontal tab positions
ESC E	1B 45	27 69	Turn emphasized mode on/off
ESC G	1B 47	27 71	Turn double-strike mode on/off
ESC J	1B 4A	27 74 n	Print and feed paper
ESC L	1B 4C	27 76	Select page mode
ESC M	1B 4D	27 77	Select character font
ESC R	1B 52	27 82	Select an international character set
ESC S	1B 53	27 83	Select standard mode
ESC T	1B 54	27 84	Select print direction in page mode
ESC V	1B 56	27 86	Turn 90° clockwise rotation mode on/off
ESC W	1B 57	27 87	Set printing area in page mode

**ESC **	1B 5C	27 92	Set relative print position
ESC a	1B 61	27 97	Select justification
ESC c 5	1B 63 35	27 99 53	Enable/disable panel buttons
ESC d	1B 64	27 100	Print and feed n lines
ESC p	1B 70	27 112	General pulse
ESC {	1B 7B	27 123	Select character code table
FS p	1C 70	28 112	Print NV bit image
FS q	1C 71	28 113	Define NV bit image
GS !	1D 21	29 33	Select character size
GS $	1D 24	29 36	Set absolute vertical print position in page mode
GS *	1D 2A	29 42	Define downloaded bit image
GS (A	1D 28 41	29 40 65	Execute test print
GS /	1D 2F	29 47	Print downloaded bit image
GS :	1D 3A	29 58	Start/end macro definition
GS B	1D 42	29 66	Turn white/black reverse printing mode on/off
GS H	1D 48	29 72	Select printing position of HRI characters
GS I	1D 47	29 73	Transmit printer ID
GS L	1D 4C	29 76	Set left margin
GS P	1D 50	29 80	Set horizontal and vertical motion units
GS V	1D 56	29 86	Select cut mode and cut paper
GS W	1D 57	29 87	Set printing area width
**GS **	1D 5C	29 92	Set relative vertical print position in page mode
GS ^	1D 5E	29 94	Execute macro
GS a	1D 61	29 97	Enable/disable Automatic Status Back (ASB)
GS f	1D 66	29 102	Select font for HRI characters
GS h	1D 68	29 104	Set bar code height
GS k	1D 6B	29 107	Print bar code
GS r	1D 72	29 114	Transmit status
GS v 0	1D 76 30	19 118 48	Print raster bit image
GS w	1D 77	29 119	Set bar code width