CONFIDENTIAL

PROGRAMMING MANUAL

Receipt Printer

BTP-R880NP

Shandong New Beiyang Information Technology Co., Ltd.

REVISION HISTORY

Date	Version	Description	Drafted by
2010-11-12	**V100**	**Primary version**	**Ding Jinfeng, Cao Yongkang**
2011-5-11	**V101**	**Change the command ESC t n**	**Sun Chuanliang**

Declaration

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Contents

1 Overview

This manual classifies the printer commands into several kinds based on its functions, and also describes the applications of relative commands in detail depending on its sorts. We hope that it is helpful for programmers to get known of those commands.

1.1 Commands classification

This receipt printer commands are classified as below:
Print commands: used for printing and feeding paper;
Position commands: to control the print position;
Character commands: to set character property;
Bitmap commands: to download bitmap and print, including NV and RAM bitmap;
Status commands: used for printer status query;
Barcode commands: barcode print and property settings;
Other commands: used for periphery control, Macro-definition and initialization;
Command instruction refers to the detailed function of relative commands.

1.2 Key terms

Real-time commands – These commands are acted on immediately upon being received by the printer;
Print buffers – used to store figure data to be printed;
Page mode –Under this mode, the printer stores all data in a specified memory and thinks of this as a virtual page. The page is printed when the printer receives print command either **FF** or **ESC FF**;
Standard mode – Standard mode is the default mode of printer, namely line mode. Under this mode, the printer prints data and feeds paper upon print line buffer full (data is enough for one print line) or receiving print command like **LF**;
HRI character – Barcode note character. Human Readable Interface;
NV – Non-volatile memory in which data stored does not loss when powered off. NV: Non-volatile;
RAM –Random Access Memory;
DPI – Print dots per inch (one inch equals to 25.4mm). It is used to identify the resolution of a printer. Example, 203DPI means 203 print dots per inch. **DPI: Dot Per Inch**
Baseline – The standard position where character data in print buffers are stored. The figure shows the position of ordinary characters in standard mode and page mode:

* When font A (12 x 24 dots) is selected, the height is 24 dots;
* When font B (9 x 17 dots) is selected, the height is 17 dots;

1.3 Command format

[Function] The name and function summary of commands;

[Format] The format of command data, such as ASCII, Hex and Decimal;

[Range] The value range of parameter in the command;

[Note] Explain the main features and application notices of commands;

[Default] The initial value used after the printer initialized;

[Relative] Other commands related to current command;

[Example] Example used for current or relative commands.

All command data in programming Demo use HEX. All normal font/characters are data. There is no explanation for the data of command such as 42 43 which is data. The font/character underlined and emphasized is a command such as **1B 40.** All the data inside parentheses after all commands in Demo is used to explain the meanings of this command. The parentheses and data inside it is not the command to be transmitted to the printer.

2 Command Description

2.1 Print command

LF

[Function] Print and line feed

[Format]

	ASCII	LF
	Hex	0A
	Decimal	10

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

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

FF

[Function] Print all data in the print buffers and return to the standard mode.

[Format]

	ASCII	FF
	Hex	0C
	Decimal	12

[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.

[Relative] ESC FF, ESC L, ESC S

CR

[Function] When the command is enabled, it equals to **LF**; it is ignored when disabled,

[Format]

	ASCII	CR
	Hex	0D
	Decimal	13

[Notes]
· Sets the print starting position to the beginning of the line.
· This command is set according to the printer configuration.

[Relative] **LF**

ESC FF

[Function] Print data in page mode

[Format]

	ASCII	ESC	FF
	Hex	1B	0C
	Decimal	27	12

[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.

[Relative] FF, ESC L, ESC S

ESC J n

[Function] Print and feed paper

[Format]

ASCII	ESC	J	n
Hex	1B	4A	n
Decimal	27	74	n

[Range] 0 ≤n ≤ 255

[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 is not affected by the values set by **ESC 2** or **ESC 3**.

The horizontal and vertical motion unit is 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:

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

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

The maximum paper feed amount is 1016mm (40 inches). When the setting value exceeds the maximum, it is converted to the maximum automatically.

[Relative] **GS P**

[Example] 1B 40 **(initialize printer)**

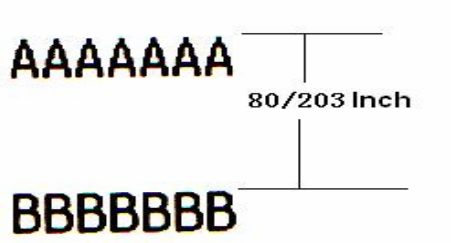
1D 50 CB CB (set the resolution 203×203)

41 41 41 41 41 41 41(data to be printed)

1B 4A 50 (print and feed paper 80/203 inches)

42 42 42 42 42 42 42 **0A** (data to be printed)

Results:



ESC d n

[Function] Print and feed n lines

[Format]

ASCII	ESC	d	n
Hex	1B	64	n

Decimal 27 100 n

[Range] 0 ≤n ≤ 255

[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. If the paper feed amount is more than 1016 mm , the printer feeds paper only 1016 mm.

[Relative] ESC 2, ESC 3

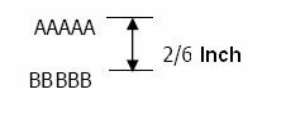
[Example] 1B 40**(initialize printer)**

41 41 41 41 41 41 41(data to be printed)

1B 64 02 (print and feed 2 character line spacing, 2/6 inches)

42 42 42 42 42 42 42 **0A**(data to be printed)

Results:



2.2 Location command

HT

[Function] Move the print position to the next tab position.

[Format] ASCII HT

Hex 09

Decimal 9

[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 [Print area width + 1].

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

· If this command is received when the printing position is at [print 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 is 8 ASCII characters (12×24).

· When current buffer is full, the printer shall execute the actions as below:

1) In standard mode, the printer shall print current line and set the print position to the beginning of next line;

2) In page mode, the printer shall shift the line and set the print position to the beginning of next line.

[Reference] **ESC D**

[Example] **0A** (set the print starting position to the beginning of the line)

1B 40 (initialize printer)

1B 53(enter standard mode)

33 33 33 33 33 33

1B 44 08 10 1C 00（set the horizontal tab position）

09（move the print position to the next tab）

33 33 33 33

09（the same as above）

33 33 33 33

09（the same as above）

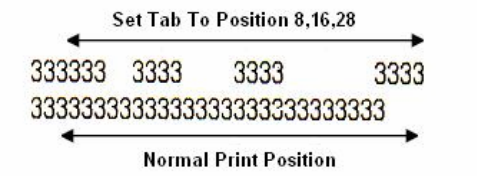
33 33 33 33

0A（print）

33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33

0A（print）

Results:



ESC $ nL nH

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

[Format]

ASCII	ESC	$	nL	nH
Hex	1B	24	nL	nH
Decimal	27	36	nL	nH

[Range] 0≤nL ≤ 255

0 ≤nH≤255

[Notes]

· Settings outside the specified printable area are ignored.

· The horizontal and vertical motion units 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 by **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

[Example] Refer to **ESC W**

ESC D n1...nk NUL

[Function] Set horizontal tab positions.

Set a tab position at the nth column from the beginning of the line.

There are k tab positions in all,

[Format]

ASCII	ESC	D	n1...nk	NUL	

Hex	1B	44	n1...nk	00
Decimal	27	68	n1...nk	0

[Range] 1 ≤ n ≤ 255

0 ≤ k ≤ 32

[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 settings.

·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**

[Example] Refer to **HT**

ESC T n

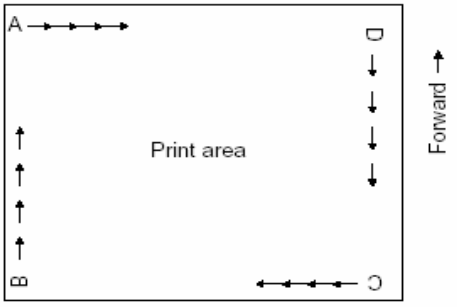
[Function] Select the print direction and starting position in page mode.

[Format]	ASCII	ESC	T	n
	Hex	1B	54	n
	Decimal	27	84	n

[Range] 0 ≤ n ≤ 3 48 ≤ n ≤ 51

n specifes print direction and starting position:

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.

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

1) 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 character width: **ESC SP, ESC $, ESC **

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

2) 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 \

[Example] **1B 4C (enter page mode)**

1D 50 CB CB（**set printer resolution**）

1B 57 20 00 00 00 40 02 90 02 （set the print area in page mode）

1B 54 00(select the print area direction in page mode)

30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 **0A** (newline)

1B 54 01(select the print area direction in page mode)

31 31 31 31 31 31 31 31 31 31 31 31 31 31 31 31 31 31 31 31 31 31 31 31 **0A**（newline）

1B 54 02(select the print area direction in page mode)

32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 **0A** (newline)

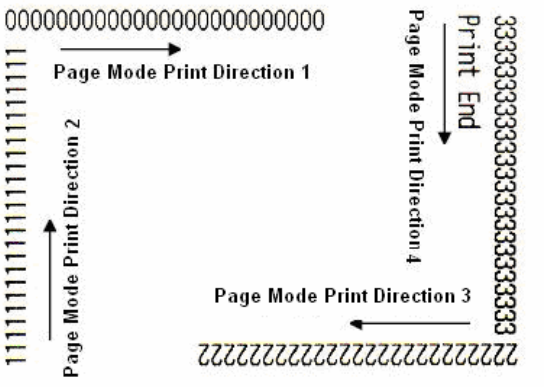
1B 54 03 (select the print area direction in page mode)

33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 **0A**（print）

50 72 69 6E 74 20 45 6E 64

0C（print）

Results:



ESC W xL xH yL yH dxL dxH dyL dyH

[Function] ·Define the horizontal starting position, vertical starting position, printing area width, and printing area height.

Horizontal starting position: x0 = [(xL + xH × 256) × (horizontal motion unit)]
Vertical starting posirion: y0 = [(yL + yH × 256) × (vertical motion unit)]
Print area width: dx = [(dxL + dxH × 256) ×(horizontal motion unit)]
Print area height: dy = [(dyL + dyH × 256) ×(vertical motion unit)]

[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)

[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.

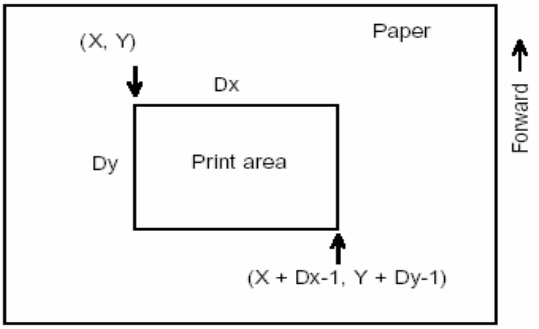
· If (horizontal starting position + printing area width) exceeds the printable area, the printing area width is automatically set to (horizontal printable area — horizontal starting position).

· 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 units 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] Decided by printer configuration

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

[Example] **0A**

1D 50 CB CB（set printer resolution 203×203）

1B 4C (enter page mode)

1B 57 20 00 00 00 40 01 90 01 （set print area in page mode）

1B 24 00 00（set absolute horizontal starting position to be starting point）

41

1B 24 32 00（set absolute horizontal starting position to be 50/203 inches）

42

1B 24 64 00（set absolute horizontal starting position to be 100/203 inches）

43

0A（newline）

1B 24 00 00（set absolute horizontal starting position to be starting point）

41

1B 5C 32 00（set relative horizontal starting position to be 50/203 inches）

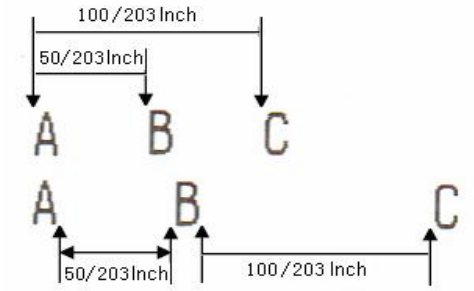
1B 5C 64 00（set relative horizontal starting position to be 100/203 inches）

43

0A（newline）

0C（print in page mode）

Results:



ESC \ nL nH

[Function] Set 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 the print position to be [(nL + nH × 256) × horizontal or vertical motion unit]

[Format]

ASCII	ESC	\	nL	nH
Hex	1B	5C	nL	nH
Decimal	27	92	nL	nH

[Range] 0 ≤ nL ≤ 255

0 ≤ nH ≤ 255

[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 units 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 direction and starting point of the printing area:

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 P

ESC a n

[Function] Align all the data in one line to the specified position

[Format]

ASCII	ESC	a	n
Hex	1B	61	n
Decimal	27	97	n

[Range] 0 ≤ n ≤ 2, 48 ≤ n ≤ 50

n selects the justification as follows:

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

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

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

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

[Default] n = 0

[Example] **0A**（Entering line mode）

1B 40（Initialization）

1B 61 00（Setting left justification）

41 42 43 **0A**

41 42 43 44 **0A**

41 42 43 44 45 **0A**

1B 61 01（Setting centering ）

41 42 43 **0A**

41 42 43 44 **0A**

41 42 43 44 45 **0A**

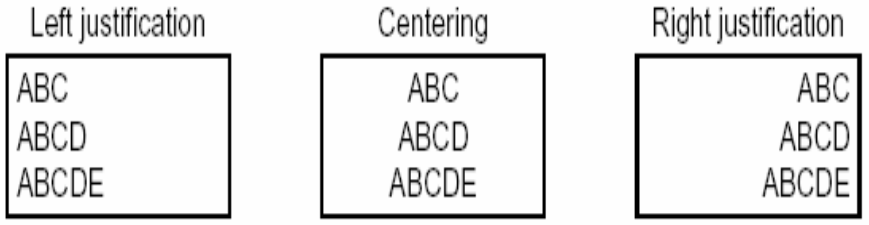
1B 61 02（Setting right justification）

41 42 43 **0A**

41 42 43 44 **0A**

41 42 43 44 45 **0A**

Results:



GS $ nL nH

[Function] This command sets the absolute vertical position.

[Format]

ASCII	GS	$	nL nH
Hex	1D	24	nL nH
Decimal	29	36	nL nH

[Range] 0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255

[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 after executing. this command.

·. The positions of relative commands are specified by **ESC T**.

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

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

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

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

[Reference] ESC $, ESC T, ESC W, ESC \, GS P, GS \

[Example] See ESC W

GS L nL nH

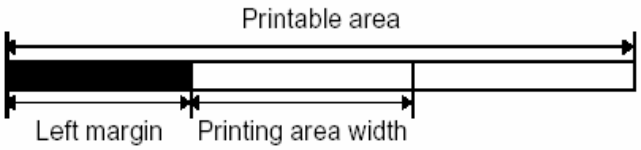
[Function] Set left margin to [(nL + nH × 256) × horizontal motion unit)] inches

[Format]

ASCII	GS	L	nL	nH
Hex	1D	4C	nL	nH
Decimal	29	76	nL	nH

[Range] 0 ≤ nL ≤ 255

0 ≤ nH ≤ 255



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

· If this command is input in page mode, it is disabled.

· 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

[Exmple] **0A**（Setting printing position at the beginning of the line）

1B 40（Initialization）

30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39 **0A**

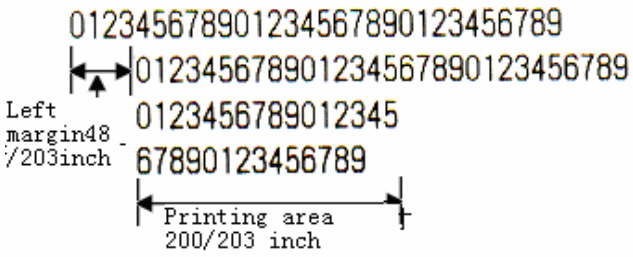
1D 4C 30 00（Setting left margin to 48/203 inches）

30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39 **0A**

1D 57 C8 00（Setting printing width to 200/203 inches）

30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39 **0A**

Results:



GS P x y

[Function] Set 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.

[Format]

ASCII	GS	P	x	y
Hex	1D	50	x	y
Decimal	29	80	x	y

[Range] 0 ≤ x ≤ 255

0 ≤ y ≤255

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

· 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):

1) Commands using x: ESC SP, ESC $, ESC \, FS S, GS L, GS W

2) Commands using y:ESC 3, ESC J, GS V

· In page mode, the following commands use x or y, depending on the direction and starting position of print area :

1) When the print starting position is set to the upper left (Printing direction from left to right)or lower right(Printing direction from right to left) of the printing area by **ESC T**:

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

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

2) When the print starting position is set to the upper right(Printing direction from top to down) or lower left (Printing direction from down to top)of the printing area by **ESC T**:

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.

· The minimum motion unit is the compositive result of this command and other commands.

· 1inch=25.4mm.

[Default] x = 203, y =203, at this time, one motion unit is a printing dot. The horizontal distances is about 1/8mm and the vertical distance is about 1/8mm.

[Reference] ESC S**P,** ESC **$,** ESC **3,** ESC **J,** ESC **W,** ESC **\,** GS **$,** GS **L,** GS **V,** GS **W,** GS \

GS W nL nH

[Function] Set printing area width

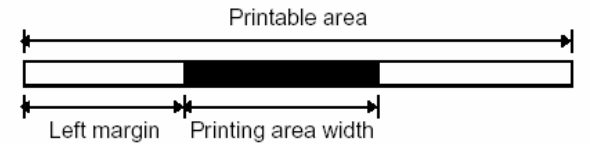
[Format]

ASCII	GS	W	nL	nH
Hex	1D	57	nL	nH
Decimal	29	87	nL	nH

[Range] 0 ≤ nL ≤ 255

0 ≤ nH ≤ 255

[Notes] · The printing area width is set to [(nL + nH × 256) × horizontal motion unit)] inches.



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

· In page mode, this command is disabled.

· This command does not affect the 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 or print area width.

· The horizontal motion unit (x) is used for calculating the printing area width.

[Default] nL = 76, nH = 2

[Reference] GS L, GS P

[Example] See **GS L**

GS \ nL nH

[Function] 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

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

· 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:nL + nH × 256 = 65536 - N

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

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

1) When the starting position is set to the upper left (printing from left to right)or lower right (printing from right to left)of the printing, the vertical motion unit (y) is used.

2) When the starting position is set to the upper right (printing from up to down)or lower left (printing from down to up)of the printing area, the horizontal motion unit (x) is used.

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

· The horizontal and vertical motion units can be changed by **GS P**.

[Reference] ESC $, ESC T, ESC W, ESC \, GS $, GS P

2.3 Character command

CAN

[Function] In page mode, delete all the print data in current area.

[Format] ASCII CAN

Hex 18

Decimal 24

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

·If the previously specifited printing data also exists in the currentlly specified printing area, it is deleted.

[Reference] ESC L, ESC W

[Example] 1B 40（Initialization ）

1D 50 CB CB（Setting resolution 203×203）

1B 4C （Enter page mode）

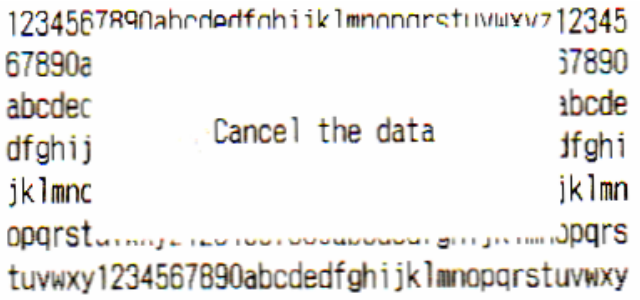
1B 57 00 00 00 00 20 02 E8 00（Setting printing width and height in page mode）

31 32 33 34 35 36 37 38 39 30 61 62 63 64 65 64 66 67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79 7A 31 32 33 34 35 36 37 38 39 30 61 62 63 64 65 64 66 67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79 7A 31 32 33 34 35 36 37 38 39 30 61 62 63 64 65 64 66 67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79 7A 31 32 33 34 35 36 37 38 39 30 61 62 63 64 65 64 66 67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79 7A 31 32 33 34 35 36 37 38 39 30 61 62 63 64 65 64 66 67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79 7A 31 32 33 34 35 36 37 38 39 30 61 62 63 64 65 64 66 67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79 7A 31 32 33 34 35 36 37 38 39 30 61 62 63 64 65 64 66 67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79 31 32 33 34 35 36 37 38 39 30 61 62 63 64 65 64 66 67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79

1B 57 44 00 10 00 7C 01 AA 00（Setting the size of page needed to be deleted ）

18（Delete data in page buffer）

1B 24 64 00（Setting abosulute horizontal print position as 100 dots）
1D 24 60 00（Setting abosulute vertical print position as 96 dots）
43 61 6E 63 65 6C 20 74 68 65 20 64 61 74 61 20
0A 0C（Printing）
Results:



ESC SP n

[Function] Set right-side character spacing

[Format]

ASCII	ESC	SP	n
Hex	1B	20	n
Decimal	27	32	n

[Range] 0 ≤ n≤255

[Notes]
· Set the character spacing for the right side of the character to [n×horizontal or vertical motion unit] inch.
· When characters are enlarged, the right-side character spacing is enlarged the same times.
· This command sets values independently in each mode (standard and page modes)
· The horizontal and vertical motion units 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 by **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 by **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

[Example] 1B 40
1B 20 00（Set right-side character spacing as 0）
41 41 41 41 41 **0A**
1B 20 06（Set character spacing as 6/203 inch）
42 42 42 42 42 **0A**
1B 20 0C（Set character spacing as 12/203 inch）
43 43 43 43 43 **0A**
Results:

AAAAA ←Without Character Spacing
BBBBB ← Character Spacing is 6/203 Inch
C C C C C ← Character Spacing is 12/203 Inch

ESC ! n

[Function] Select print mode(s)

[Format]

ASCII	ESC	!	n
Hex	1B	21	n
Decimal	27	33	n

[Range] 0 ≤ n ≤ 255

[Notes] · Select print mode(s) according to n as follow

Bit	1/0	HEX	Decimal	Function
0	0	00	0	Standard ASCII Font (12 × 24)
	1	01	1	Compressd ASCII Font (9 × 17)
1,2				Undefined
3	0	00	0	Emphasized mode not selected
	1	08	8	Emphasized mode selected
4	0	00	0	Double-height mode not selected
	1	10	16	Double-height mode selected
5	0	00	0	Double-width mode not selected
	1	20	32	Double-width mode selected
6				Undefined
7	0	00	0	Underline mode not selected
	1	80	128	Underline mode selected

· 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 decided by **ESC -**, regardless of the character size.

· When some characters in a line are double or higher, all the characters in 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 !

[Example] 1B 40（Initialize printer）
1B 21 00（Select normal print mode）
48
1B 21 01（Select compressed font mode）

48

1B 21 08（Select emphasized mode）

48

1B 21 10（Select double-height mode）

48

1B 21 20（Select double-width mode）

48

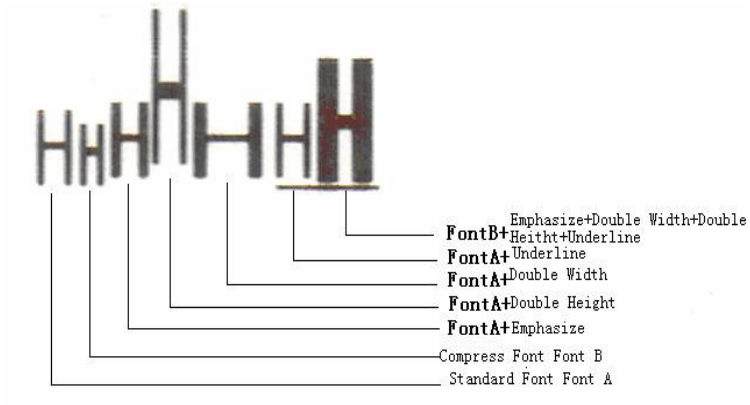
1B 21 80（Select underline mode）

48

1B 21 B9（Select compressed, emphasized,double-width,double-height and underline mode）

48 **0A**

Results:



ESC % n

[Function] Select/cancel user-defined character set

[Format]

ASCII	ESC	%	n
Hex	1B	25	n
Decimal	27	37	n

[Range] 0 ≤ n ≤255

[Notes] 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.
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)]

[Function] 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 ≤ 12 Standard ASCII font (12× 24)

0 ≤ x ≤ 9 Compressed ASCII font (9 × 17)

0 ≤ d1 ... d(y × xk) ≤ 255

· 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 data for downloaded characters. The dot pattern is in the horizontal direction from the left side.

· 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.

· The user-defined character definition is cleared when:

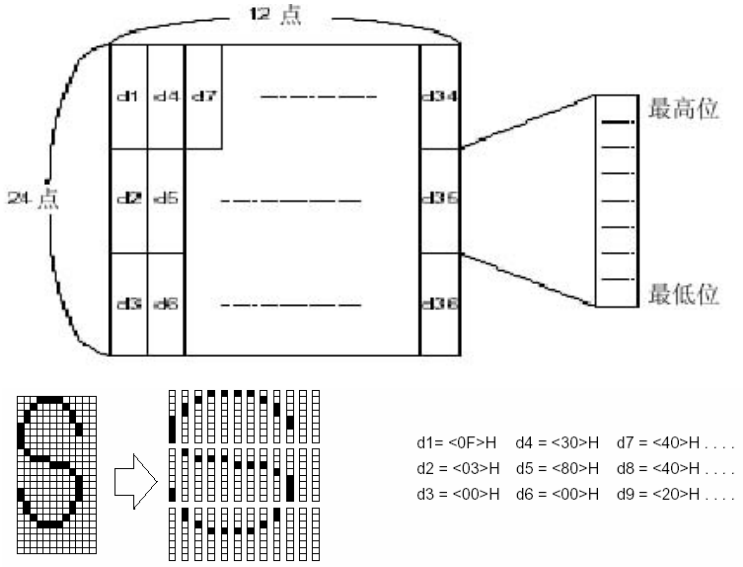
1) **ESC ?** is executed.

2)The power is turned off.

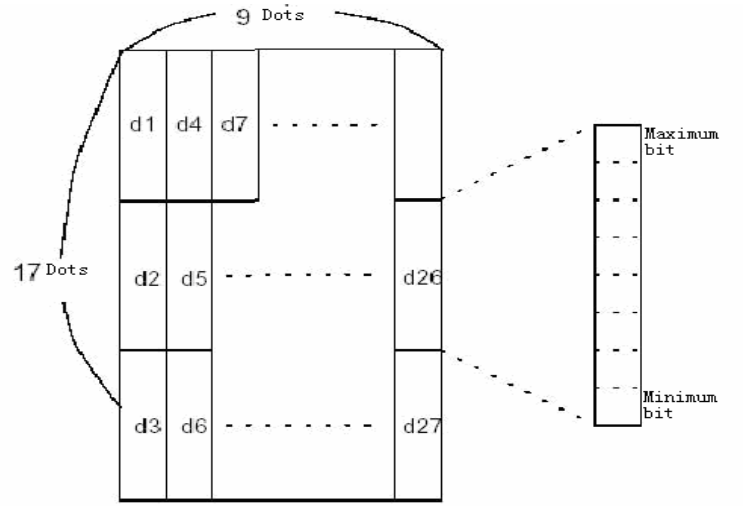
[Default] The internal character set

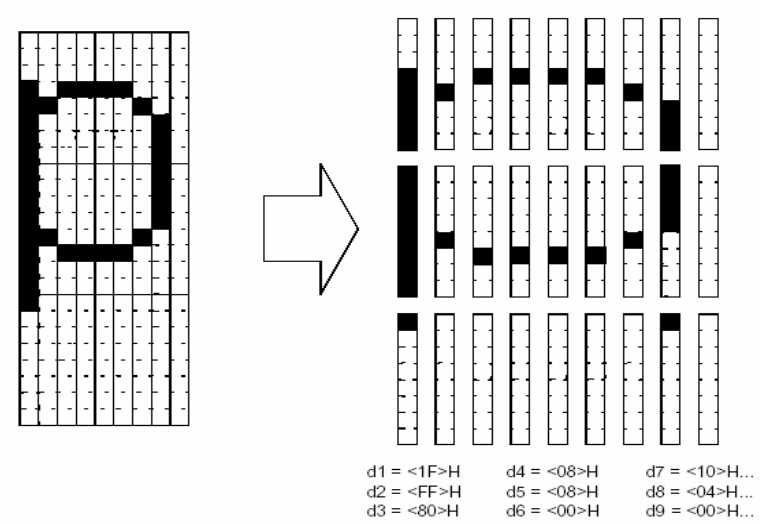
[Reference] ESC %, ESC ?

[Example] · When standard ASCII font (12 × 24) is selected



· When compressed ASCII font (9 × 17) is selected





ESC – n

[Function] Turn underline mode on/off

[Format]

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

[Range] 0 ≤ n ≤2, 48 ≤n ≤ 50

[Notes] Turn underline mode on or off, based on the following values of n:

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

· 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, 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 !

[Example] **1B 40**

1B 2D 02（2-dot thick underline）

41 41 41 41 41 41 **0A**

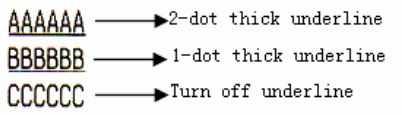
1B 2D 01（1-dot thick underline）

42 42 42 42 42 42 **0A**

1B 2D 00（Turn off underline）

43 43 43 43 43 43 **0A**

Results:



ESC ? n

[Function] Cancel user-defined characters

[Format]

ASCII	ESC	?	n
Hex	1B	3F	n
Decimal	27	63	n

[Range] 32 ≤n ≤127

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

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

[Reference] ESC &, ESC %

ESC E n

[Function] Turn emphasized mode on/off

[Format]

ASCII	ESC	E	n
Hex	1B	45	n
Decimal	27	69	n

[Range] 0 ≤ n ≤ 255

[Notes] · When the LSB of n is 0, emphasized mode is turned off.

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

· Only the least significant bit of n is enabled.

· This command and ESC ! turn on and off emphasized mode in the same way. The last received command is effective.

[Default] n = 0

[Reference] ESC !

[Example] 1B 40

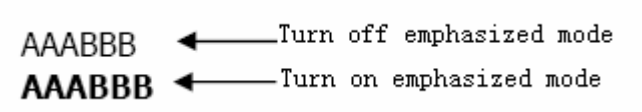
1B 45 01（Emphasized mode is selected）

41 41 41 41 41 **0A**

1B 45 00（Emphasized mode is not selected）

42 42 42 42 42 **0A**

Results:



ESC G n

[Function] Turn on/off double-strike mode

[Format]

ASCII	ESC	G	n
Hex	1B	47	n
Decimal	27	71	n

[Range] 0 ≤ n ≤ 255

[Notes]
· 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.
· 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

[Example] See ESC E

ESC M n

[Function] Select character font

[Format]

ASCII	ESC	M	n
Hex	1B	4D	n
Decimal	27	77	n

[Range] 0 ≤ n ≤3, 48 ≤n ≤ 51

n	Function
0,48	Standard ASCII Font (12 × 24) selected
1,49	Compressed ASCII font (9 × 17) selected
2,50	User-defined character selected
3,51	Chinese font (24 × 24) selected

[Example] 1B 40

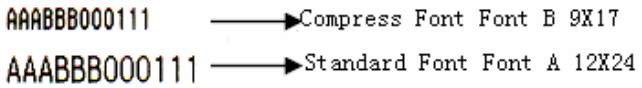
1B 4D 01（Compressed font selected）

41 41 41 42 42 42 30 30 30 31 31 31 **0A**

1B 4D 00（Standard font selected）

41 41 41 42 42 42 30 30 30 31 31 31 **0A**

Results:



ESC R n

[Function] Select an international character set

[Format]

ASCII	ESC	R	n
Hex	1B	52	n

Decimal 27 82 n

[Range] 0 ≤ n ≤ 13

[Notes] Select an international character set n from the following table:

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

[Default] n = 0

ESC V n

[Function] 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

[Notes] n is used as follows::

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

· This command is effective only in standard mode.

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

· 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

[Example] 1B 40

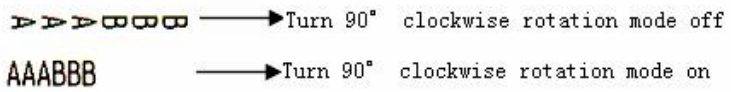
1B 56 01（Turn 90° clockwise rotation mode on）

41 41 41 42 42 42 0A

1B 56 00（Turn 90° clockwise rotation mode off）

41 41 41 42 42 42 0A

Results:



ESC t n

[Function] Set code page

[Format]

ASCII	ESC	t	n
Hex	1B	74	n
Decimal	27	116	n

[Range] 0≤n≤5, 13≤n≤24,26≤n≤29, 45≤n≤51 64≤n≤81

n=11,33,34,36,37,38, 41,43,54,56.

n	Code Page
0	PC437
1	Katakana
2	PC850
3	PC860
4	PC863
5	PC865
11	851[Greek]
13	PC857
14	737[Greek]
15	928[Greek]
16	WPC1252
17	PC866
18	PC852
19	PC858
20	Thai Tis42(Thai3)
21	Thai Tis11(Thai5)
22	Thai Tis(Thai2)
23	Thai Ku(Thai1)
24	Thai Tis14(Thai4)
26	Thai Tis18(Thai6)
27	Hebrew1
28	Hebrew2
29	Hebrew3
33	775[Baltic]
34	855[Cyrillic]
36	862[hebrew]
37	864[Arabic]
38	869[Greek]
41	Frasi
43	772[Lithuanian]
45	1250[Latin-2]
46	1251[Cyrillic]
47	1253[Greek]
48	1254[Turkish]
49	1255[Hebrew]
50	1256[Arabic]
51	1257[Baltic]

54	771
56	774[Lithuanian]
64	3840 (IBM-Russian)
65	3841 (Gost)
66	3843 (Polish)
67	3844 (CS2)
68	3845 (Hungarian)
69	3846 (Turkish)
70	3847 (Brazil-ABNT)
71	3848 (Brazil-ABICOMP)
72	1001
73	2001
74	3001 (Estonian-1)
75	3002 (Estonian-2)
76	3011 (Latvian-1)
77	3012 (Latvian-2)
78	3021 (Bulgarian)
79	3041 (Maltese)
80	8859
81	Persia

[Notes] This command is disabled in Chinese font

[Default] PC437 code

ESC { n

[Function] Turn on/off upside-down printing mode

[Format]

ASCII	ESC	{	n
Hex	1B	7B	n
Decimal	27	123	n

[Range] 0 ≤ n ≤ 255

[Notes]
· 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.
· Only the lowest bit of n is valid.
· This command is enabled only when processed at the beginning of the 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.

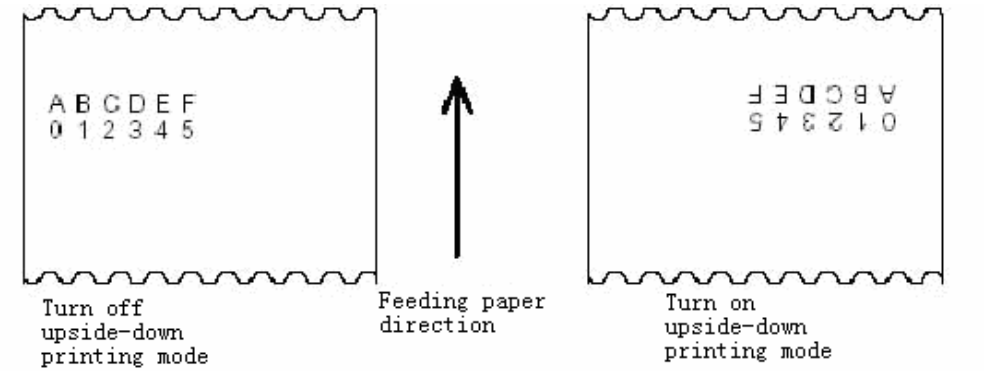
[Default] n = 0

[Example] 1B 40
1B 7B 01（Turn on upside-down printing mode）
41 42 43 44 45 46 **0A**
30 31 32 33 34 35 **0A**
1B 7B 00（Turn off upside-down printing mode）

41 42 43 44 45 46 **0A**

30 31 32 33 34 35 **0A**

Results:



GS ! n

[Function] 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)

[Notes] Select the character height using bits 0 to 3 and select the character width using bits 4 to 7 as follows:

Character Width Selection			Character Height Selection		
Hex	**Decimal**	**Width**	**Hex**	**Decimal**	**Height**
00	00	0(Normal)	00	0	1 (Normal)
10	16	2(Double width)	01	1	2(Double height)
20	32	3	02	2	3
30	48	4	03	3	4
40	64	5	04	4	5
50	80	6	05	5	6

This command is effective to all characters (ASCII and Chinese characters) except for HRI characters.

If n is outside of the defined range, this command will be 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, the relationship between vertical and horizontal directions is reversed.

In page mode, vertical and horizontal directions are based on the direction of print area.

When characters in one line are enlarged to different sizes, all the characters 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 !**

[Example] Refer to **ESC !**

GS B n

[Function] Turn white/black reverse printing mode

[Format]

ASCII	GS	B	n
Hex	1D	42	n
Decimal	29	66	n

[Range] 0 ≤ n ≤ 255

[Notes] 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 effective to all characters except for HRI characters..

· When white/black reverse printing mode is on, it also applies to character spacing set by **ESC SP**.

· This command does not affect bitmap, user-defined bitmap, barcode, HRI characters and spacing set 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

[Example] 1B 40

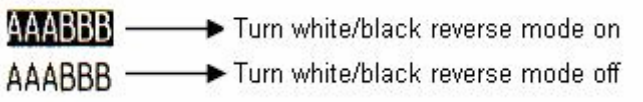
1D 42 01（Turn white/black reverse mode on）

41 41 41 42 42 42 **0A**

1D 42 00（Turn white/black reverse mode off）

41 41 41 42 42 42 **0A**

Results:



FS ! n

[Function] Set the print mode for Chinese characters.

Format]

ASCII	FS	!	n
Hex	1C	21	n
Decimal	28	33	n

[Range] 0 ≤n ≤ 255

[Description] Set the print mode forChinese characters, using n as follows:

Bit	0/1	Hex	Decimal	Function
0, 1				Undefined
2	0	00	0	Double-width mode is OFF
	1	04	4	Double-width mode is ON
3	0	00	0	Double-height mode is OFF.

	1	08	8	Double-height mode is ON
4-6				Undefined
7	0	00	0	Underline mode is OFF
	1	80	128	Underline mode is ON

[Notes] When both double-width and double-height modes are set (including right-side and left-side character spacing), quadruple-size characters are printed.

· The printer can underline all characters (including right- and left-side character spacing), but cannot underline the space set by **HT** and 90° clockwise-rotated characters.

· The thickness of the underline is specified by **FS** -, regardless of the character size.

· When some of the characters in one line are of different height, all the characters in the line are aligned at the baseline.

· It is possible to emphasize the characters with **FS W** or **GS !** and he setting of the last received command is effective.

· It is possible to turn underline mode on or off with **FS** -, and the setting of the last received command is effective.

[Default] n = 0

[Reference] **FS**-, **FS W**, **GS !**

[Example] Refers to **ESC !**

FS &

[Function] Select Chinese character mode

[Format]

ASCII	FS	&	
Hex	1C	26	
Decimal	28	38	

[Description] Select Kanji character mode.

[Notes] · When the Chinese character mode is selected, the printer checks whether the code is for Chinese or not. If it is, the printer first processes the first byte and then checks whether the second byte is the code for Chinese.

· Chinese character mode is selected automatically when the power is turned on.

[Reference] **FS**, **FS C**

FS - n

[Function] Turn underline mode on/off for Chinese characters

[Format]

ASCII	FS	-	n
Hex	1C	2D	n
Decimal	28	45	n

[Range] 0 ≤ n ≤ 2, 48 ≤ n ≤ 50

[Notes] Turn underline mode for Chinese characters on or off, based on the following values of n.

n	Function
0, 48	Turn off underline mode for Chinese characters
1, 49	Turn on underline mode for Chinese characters (1-dot thick)
2, 50	Turn on underline mode for Chinese characters (2-dot thick)

The printer can underline all characters (including right- and left-side character spacing),

but cannot underline the space set by **HT** and 90° clockwise-rotated characters.

· After the underline mode for Chinese characters is turned off, underline printing is no longer performed, but the previously specified underline thickness is not changed. The default underline thickness is 1 dot.

· The specifiedunderline thickness does not change even if the character size changes.

· It is possible to turn underline mode on or off by **FS** !, and the last received command is effective.

[Default] n = 0

[Reference] **FS !**

[Example] Refer to **ESC_**

FS .

[Function] Cancel Chinese character mode

[Format]

ASCII	FS	.
Hex	1C	2E
Decimal	28	46

[Notes] · When the Chinese character mode is not selected, all character codes are processed one byte at a time as ASCII code.

· Chinese character mode is selected when the power is turned on.

[Reference] **FS &, FS C**

FS 2 c1 c2 d1...dk

[Function] Define user-defined Chinese characters

[Format]

ASCII	FS	2	c1	c2	d1...dk
Hex	1C	32	c1	c2	d1...dk
Decimal	28	50	c1	c2	d1...dk

[Range] c1 and c2 indicate character codes for the defined characters.

c1 = FEH,

A1H ≤ c2 ≤ FEH

0 ≤ d ≤ 255

k = 72

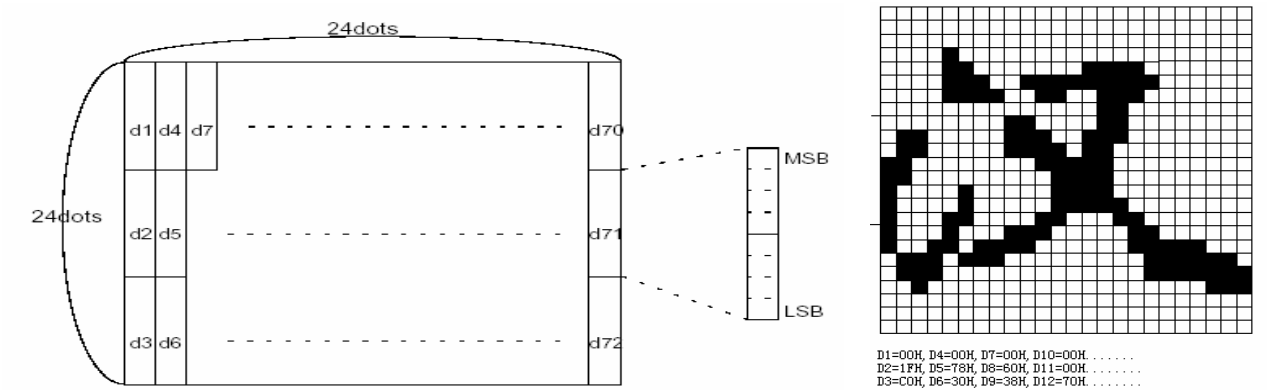
[Notes] · c1 and c2 indicate character codes for the user-defined Chinese characters. c1 specifies the first byte, and c2 the second byte.

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

[Default] No user-defined Chinese characters.

[Reference] **FS C**

The relationship between user-defined Chinese font and data:



FS C n

[Function] Select Japanese character mode.

[Format]

ASCII	FS	C	n
Hex	1C	43	n
Hecimal	28	67	n

[Range] 0 ≤ n ≤ 1, 48 ≤ n ≤ 49

[Notes] Select Japanese character mode according to the values of n:

n	Code mode
0,48	JIS code
1,49	SHIFT JIS code

· This commmand is enabled only in Japanese character mode.

· In JIS code mode, the following character codes are enabled:

First byte: <21>H to <7E>H

Second byte: <21>H to <7E>H

· In SHIFT JIS code mode, the following character codes are enabled:

First byte : <81>H to <9F>H 和 <E0>H to <EF>H

Second byte: <40>H to <7E>H 和<80>H to <FC>H

[Default] n = 0

FS S n1 n2

[Function] Set left-side and right-side Chinese character spacing

[Format]

ASCII	FS	S	n1	n2
Hex	1C	53	n1	n2
Decimal	28	83	n1	n2

[Range] 0 ≤ n1 ≤ 255

0 ≤ n2 ≤ 255

[Notes] Set left-side and right-side Chinese character spacing to n1 and n2 respectively.

· When the printer model used supports **GS P**, the left-side character spacing is [n1 × horizontal or vertical motion unit] inches, and the right-side character spacing is [n2 × horizontal or vertical motion units] inches.

·When double-width mode is selected, the left- and right-side character spacing is twice the normal value.

· The horizontal and vertical motion units are set by **GS** P. The previously specified character spacing does not change even if the horizontal or vertical motion unit is changed by **GS P**.

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

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

· The maximum Chinese character spacing is approximately 36 mm. Any setting exceeding the maximum is converted to the maximum automatically.

[Default] n1 = 0, n2 = 0

[Reference] **GS P**

[Example] Refer to **ESC SP**

FS W n

[Function] Turn quadruple-size mode on/off for Chinese characters

[Format]

ASCII	FS	W	n
Hex	1C	57	n
Decimal	28	87	n

[Range] 0 ≤ n ≤ 255

[Description] · When the LSB of n is 0, quadruple-size mode for Chinese characters is turned off.

· When the LSB of n is 1, quadruple-size mode for Chinese characters is turned on.

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

· In quadruple-size mode, the printer prints characters of the same size as when double-width and double-height modes are both turned on.

· When quadruple-size mode is turned off by this command, the following Chinese characters are printed in normal size.

· When some of the characters in one line are different in height, all the characters in the line are aligned at the baseline.

· **FS !** or **GS !** can also select or cancel quadruple-size mode by selecting double-height and double-width modes, and the setting of the last received command is effective.

[Default] n = 0

[Reference] **FS !, GS !**

2.4 Bitmap Command

ESC * m nL nH d1... dk

[Function] 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

[Notes] Select a bit-image mode using m with the number of dots specified by nL and nH, as follows:

m	Mode	Vertical Direction		Horizontal Direction	
		Number of Dots	Resolution	Resolution	Number of Data (K)
0	8-dot single-density	8	203/3 DPI	101 DPI	nL + nH × 256
1	8-dot double-density	8	230/3 DPI	203 DPI	nL + nH × 256
32	24-dot single-density	24	203 DPI	101 DPI	(nL + nH × 256) × 3
33	24-dot double-density	24	203 DPI	203 DPI	(nL + nH × 256) × 3

·If the value of m is out of the specified range, nL and the following data are processed as normal data.

· The nL and nH indicate the number of dots of the bitmap 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 in a line, the excess data is ignored.

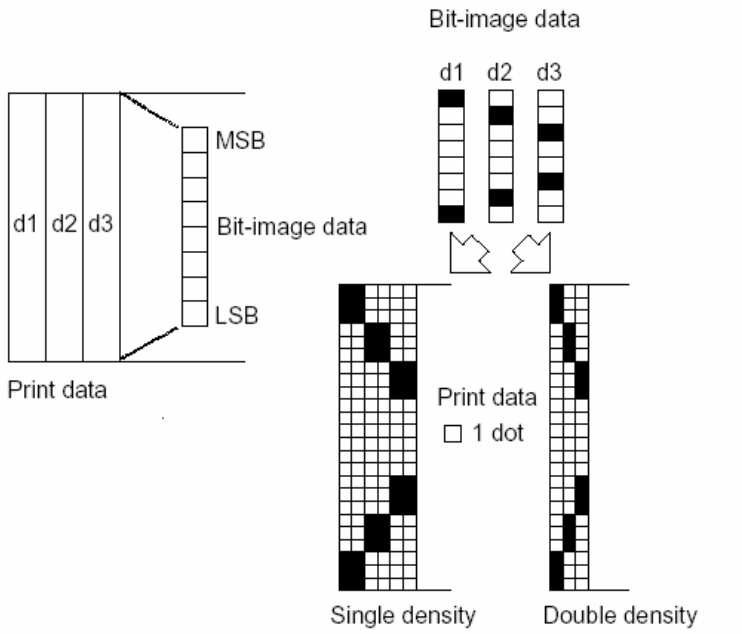
· d indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.

· After printing a bitmap, the printer returns to normal data processing mode.

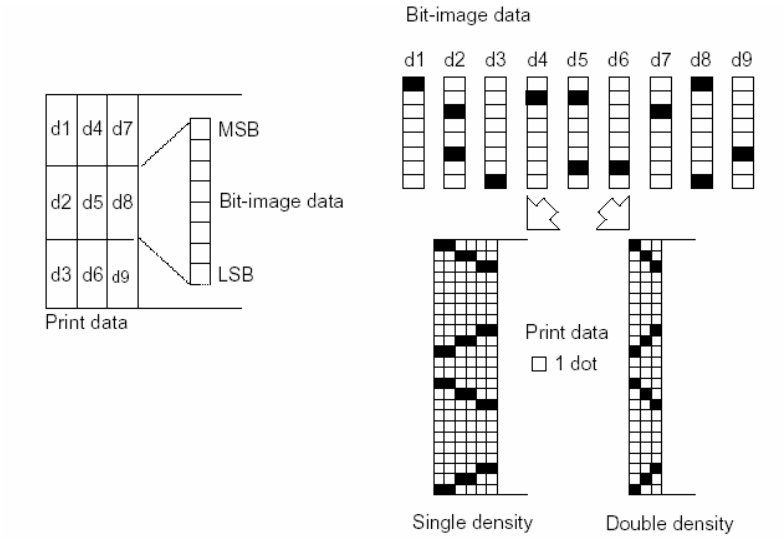
·This command is not affected by print modes (emphasized, double-strike, underline, character size enlargement or white/black reverse printing), except upside-down printing mode.

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

· When 8-dot bitmap is selected:



When 24-dot bitmap is selected:



ESC # n

[Function] Specify a number for the bit-image to be downloaded. This number is to be used when downloading and printing this bit-image.

[Format]

ASCII	GS	#	n
Hex	1D	23	n
Decimal	29	33	n

[Range] 0 ≤ n ≤ 7

[Notes] The command is only enabled for bit-images in RAM and the settings are erased when the printer is turned off.

The number does not apply to the bit-image to be downloaded in FLASH.

GS * x y d1...d(x × y × 8)

[Function] Define the bit-image to be downloaded.

[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 ≤ 48

x × y ≤ 912

0 ≤ d ≤ 255

[Description] · x specifies the number of bytes in the horizontal direction.

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

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

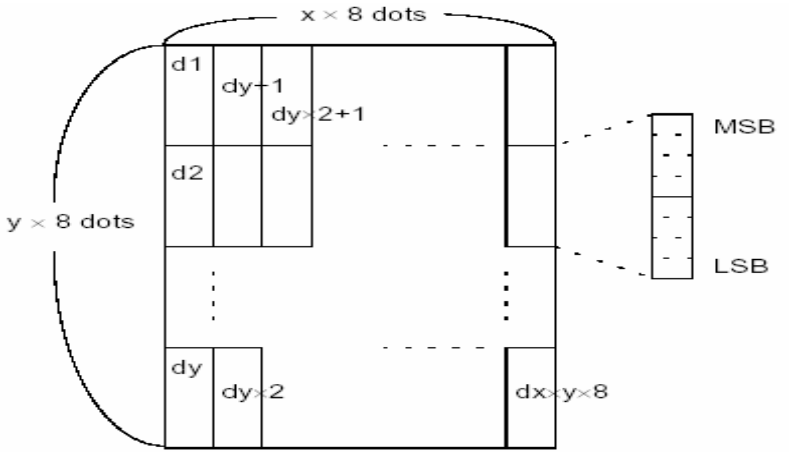
· If x × y is out of the specified range, this command is disabled.

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

· The downloaded bitmap is cleared when:

1) Printer is powered off.

· The following figure shows the relationship between the downloaded bitmap and the printed data.



[Reference] **GS /**

GS / m

[Function] Print downloaded bitmap

[Format] ASCII GS / m

Hex 1D 2F m

Decimal 29 47 m

[Range] 0 ≤ m ≤ 3, 48 ≤ m ≤ 51

[Description] Print a downloaded bitmap with the print mode specified by m.

m selects a mode from the table below:

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

[Notes] · This command is ignored if a downloaded bitmap 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.

·This command print bitmap in RAM but not in FLASH, the number of bitmap is defined by **GS #**.

[Reference] **GS** *, **GS #**

GS v 0 m xL xH yL yH d1....dk

[Function] Print raster bitmap

[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 ≤ m ≤ 3, 48 ≤ m ≤ 51

0 ≤ xL ≤ 255

0 ≤ xH ≤ 255

0 ≤ yL ≤ 255

0 ≤ d ≤ 255

k = (xL + xH × 256) × (yL + yH × 256) (k ≠ 0)

[Notes] Print Raster bit-image. The value of m selects the mode, as follows:

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

· xL, xH indicate the number of data bytes (xL+ xH × 256) in the horizontal direction of the bitmap.

· yL, yH indicate the number of data bytes (yL+ yH × 256) in the vertical direction of the bitmap.

· 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 enlargement, emphasized, double-strike, underline, white/black reverse printing, etc.) for raster bitmap.

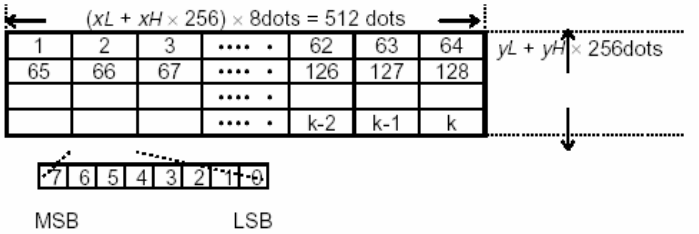
· Data outside the printing area is discarded.

· The **ESC a** (Select justification) setting is also effective on raster bitmaps.

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

[Example] When xL+ xH × 256 = 64



FS p n m

[Function] Print NV bitmap

[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

[Notes] Print a NV bitmap in the mode specified by m.

m	Mode	Vertical Resolution (DPI)	Horizontal Resolution (DPI)
0.48	Normal	203	203
1.49	Double-width	203	101
2.50	Double-height	101	203
3.51	Quadruple	101	101

· n is the number of the NV bitmap (defined by the **FS q** command).

· m specifies the bitmap mode.

· NV bitmap refers to a bitmap which is defined by **FS q,** storesd in a non-volatile memory and printed by **FS p**.

· NV grayscale bitmap refers to a bitmap which is defined by **FS r**, stored in a non-volatile memory and printed by **FS p.**

· This command is disabled when the specified NV bitmap has not been defined.

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

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

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

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

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

[Function] Define NV bitmap

[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 ≤ n ≤ 255

0 ≤ xL ≤ 255

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

$1 \le (yL + yH \times 256) \le 8190$

$0 \le d \le 255$

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

[Notes] ·The max capacity of Flash is decided by the configuration of the printer, which can be checked through printing self-test page.

· n specifies the number of the defined NV bitmap.

· xL, xH specifies (xL + xH × 256) × 8 dots in the horizontal direction for the NV bitmap.

· yL, yH specifies (yL + yH × 256) × 8 dots in the vertical direction for the NV bitmap.

· Frequent execution of the command may damage the NV memory. Therefore, it is recommended to write the NV memory 10 times or less a day.

·This command cancels all NV bitmaps 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.

· During the processing of this command, it writes data in Flash and stops receiving other commands, so sending other commands including real-time command to the printer are forbidden.

NV bitmap refers to a bitmap which is defined by **FS q**, stored in a non-volatile memory and printed by **FS p**.

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

· The 7 bytes <from FS~yH> is command data but not data of image.

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

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

· When downloading more than one bitmap, if any of xL, xH, yL, yH is out of the defined range, it stops processing this command. At this time, NV bitmaps that haven't been defined are disabled (undefined), but any NV bitmaps before that are enabled.

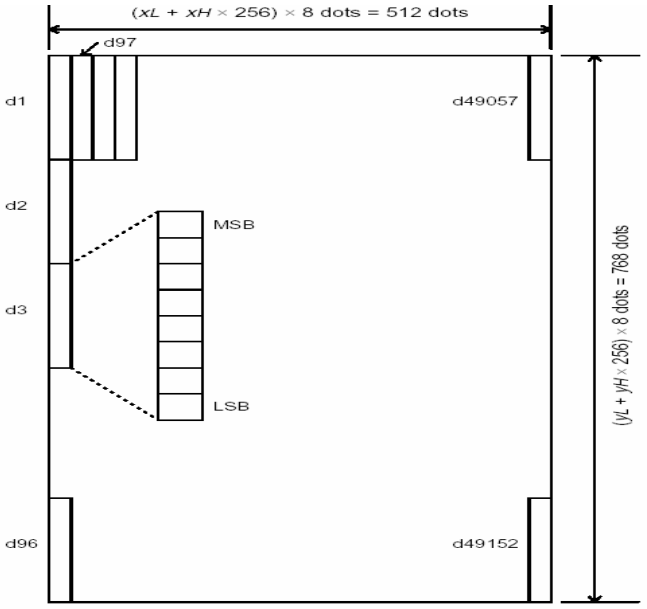
· The d indicates the definition data. In data (d) a 1 bit specifies a dot to be printed and a 0 bit specifies a dot not to be printed.

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

· A definition data of a NV bitmap consists of [xL xH yL yH d1...dk]. Therefore, when there is only one NV bitmap, n=1. The number of bytes in Flash memory occupied by the printer is as follows:

The printer uses ([data: (xL + xH × 256) × (yL + yH × 256) × 8] + [header:4]) bytes of NV memory.

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



· The download area in Flash of this printer is a maximum of 64K bits (8K bytes). This command can define several NV bitmaps, but cannot define a bitmap data whose total capacity [bitmap data + header] exceeds 64K bits (The download area is different according to different configuration).

·When processing this command, the printer does not process other commands.

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

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

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

[Reference] **FS p**

2.5 Status command

DLE EOT n

[Function] Real-time status transmission

[Format]

ASCII	DLE	EOT	n
Hex	10	04	n
Decimal	16	4	n

[Range] 1 ≤ n ≤ 4

· n = 1: Transmit printer status

· n = 2: Transmit off-line status

· n = 3: Transmit error status

· n = 4: Transmit paper sensor status

[Notes] · when the printer receives the command, it returns relative status immediately.

·Even though the printer is not selected by **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 effective to serial, bi-direction parallel and USB interface printer.

This command is executed immediately in any status.

n = 1: Printer status

Bit	0/1	Hex	Decimal	Function
0	0	00	0	Fixed to 0
1	1	02	2	Fixed to 1
2	0	00	0	1 or 2 drawer is open
	1	04	4	2 drawers are closed
3	0	00	0	On-line.
	1	08	8	Off-line
4	1	10	16	Fixed to 1
5,6				Undefined
7	0	00	00	Fixed to 0.

n = 2: Off-line status

Bit	0/1	Hex	Decimal	Function
0	0	00	0	Fixed to 0
1	1	02	2	Fixed to 1
2	0	00	0	Cover is closed.
	1	04	4	Cover is open
3	0	00	0	FEED button is not been pushed
	1	08	8	FEED button is been pushed
4	1	10	16	Fixed to 1
5	0	00	0	Paper is not end
	1	20	32	Paper is end
6	0	00	0	No error.
	1	40	64	Error occurs
7	0	00	0	Fixed to 0

n = 3: Error status

Bit	0/1	Hex	Decimal	Function
0	0	00	0	Fixed to 0
1	1	02	2	Fixed to 1
2	-	-	-	Undefined
3	0	00	0	No auto-cutter error
	1	08	8	Auto-cutter error occurs.
4	1	10	16	Fixed to 1
5	0	00	00	Fixed to 0
6	0	00	0	Temperature of print head is normal
	1	40	64	Temperature of print head is abnormal
7	0	00	0	Fixed to 0

n = 4: Paper feeding status

Bit	0/1	Hex	Decimal	Function
0	0	00	0	Fixed to 0
1	1	02	2	Fixed to 1
2,3	0	00	0	Non-paper near status
	1	0C	12	Paper near end status
4	1	10	16	Fixed to 1
5,6	0	00	0	Paper present
	1	60	96	Paper end
7	0	00	0	Fixed to 0

Please avoid inserting this command between 2 or more byte command.

For example:

In the process of sending **ESC 3 n** to printer, DTR turns into MARK(DSR is used to host computer) before sending n and **DLE EOT 3** is interrupted before receiving n, then the printer take code**<10>H** of **DLE EOT 3** as code **<10>H** of **ESC 3.**

[Reference] DLE ENQ, GS a, GS r

GS a n

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

[Format]

ASCII	GS	a	n
Hex	1D	61	n
Decimal	29	97	n

[Range] 0 ≤ n ≤ 255

[Notes] Decide the content of ASB. The meanings of parameter n are as follows:

· When n is not equal to 0, the printer automatically transmits the status whenever the enabled status item changes.

· When n is equal to 0, the ASB function is ineffective.

· The following four status bytes are transmitted without confirming whether the host is ready to receive data.

· This command is executed with other command in turn, so there will be some time delay between sending command and setting ASB is available.

· Even if the printer is disabled by ESC =, the printer still performs ASB according to the configuration..

First byte (Printer information)

Bit	Off/On	Hex	Decimal	Printer status
0	Off	00	0	Not used. Fixed to 0.
1	Off	00	0	Not used. Fixed to 0.
2	Off	00	0	Drawer kick-out connector pin 3 is LOW.
	On	04	4	Drawer kick-out connector pin 3 is HIGH.
3	Off	00	0	On-line.
	On	08	8	Off-line.
4	On	10	16	Not used. Fixed to 1.
5	Off	00	0	Cover is closed.
	On	20	32	Cover is open.
6	Off	00	0	Paper is not being fed by using the PAPER FEED button.
	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	Printer Status
0	-	-	-	Undefined.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	Off	00	0	No auto cutter error.
	On	08	8	Auto cutter error occurs.
4	Off	00	0	Not used. Fixed to 0.
5	Off	00	0	No recoverable error.
	On	20	32	Recoverable error occurs.
6	Off	00	0	No automatically recoverable error.
	On	40	64	Automatically recoverable error occurs.
7	Off	00	0	Not used. Fixed to 0.

Bit 5: Errors like paper jam are recoverable errors.These errors can be eliminated and the printer can return to normal state by using **DLE ENQ n** $(1 \leq n \leq 2)$. Errors like control board damage are irrecoverable errors.

Bit 6: Errors like high print head temperature are automatically recoverable errors. When printing is stopped due to these errors, the printer can come back to normal state automatically.

Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Printer Status
0,1	Off	00	0	Paper is not near end
	On	03	3	Paper near end.
2,3	Off	00	0	Paper present
	On	0C	12	Paper end
4	Off	00	0	Not used. Fixed to 0.
5,6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to 0.

Fourth byte (paper sensor information)

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

GS r n

[Function] Status back

[Format]

ASCII	GS	r	n
Hex	1D	72	n
Decimal	29	114	n

[Range] 1 ≤ n≤ 2, 49 ≤ n ≤ 50

[Notes] Transmit the status specified by n as follows:

n	Function
1, 49	Transmit paper sensor status
2, 50	Transmit drawer kick-out connector status

· This command is valid for serial, bi-direction parallel and USB interface printer.

· This command is executed when the data in the receive buffer is processed. Therefore, there may be a time lag between receiving this command and transmitting the status,·

The corresponding relationship between different bits of status bytes are shown as below:

Paper sensor status (n = 1, 49):

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

Drawer kick-out connector status (n = 2, 50):

Bit	0/1	Hex	Decimal	Status for ASB
0	0	00	0	Drawer kick-out is open
	1	01	1	Drawer kick-out is closed
1- 3				Undefined
4	0	00	0	Not used. Fixed to 0
5, 6				Undefined
7	0	00	0	Not used. Fixed to0.

[Reference] DLE EOT, GS a

2.6 Barcode command

GS H n

[Function] Select the printing position of HRI characters when printing a barcode.

[Format]

ASCII	GS	H	n
Hex	1D	48	n
Decimal	29	72	n

[Range] 0 ≤ n ≤ 3, 48 ≤ n ≤ 51

[Notes] n specifies the printing position for HRI as follows:

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

· HRI refers ro the character which applies notes to barcodes.

· HRI character font is specified by **GS f**.

[Default] n = 0

[Reference] GS f, GS k

GS f n

[Function] Select a font for the HRI characters when printing a barcode.

[Format]

ASCII	GS	f	n
Hex	1D	66	n
Decimal	29	102	n

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

[Notes] n selects a font as follows:

n	Font
0,48	Standard ASCII character (12 × 24)
1,49	Compressed ASCII character (9 × 17)

HRI refers ro the character which applies notes to barcodes.

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

[Default] n = 0

[Reference] GS H, GS k

GS h n

[Function] Select barcode height

[Format]

ASCII	GS	h	n
Hex	1D	68	n
Decimal	29	104	n

[Range] 1 ≤ n ≤ 255

[Notes] The height of the barcode is n dots.

[Default] n = 162

[Reference] GS k

①GS k m d1...dk NUL②GS k m n d1...dn

[Function] Select a barcode type and print barcode

[Format]

①ASCII	GS	k	m	d1...d k		NUL
Hex	1D	6B	m	d1...d k		00
Decimal	29	107	m	d1...d k		0
②ASCII	GS	k	m	n	d1... dn	
Hex	1D	6B	m	n	d1... dn	
Decimal	29	107	m	n	d1... dn	

[Range] ①0 ≤ m ≤ 6 (The range of k and d depends on the barcode type used)

②65 ≤ m ≤ 73 (The range of n and d depends on the barcode type used)

[Range] m selects a bar code type as follows:

m		Bar Code type	Number of Characters	d
①	0	UPC-A	11 ≤ k ≤ 12	48 ≤ d ≤ 57
	1	UPC-E	11 ≤ k ≤ 12	48 ≤ d ≤ 57,d1=48
	2	JAN13 (EAN13)	12 ≤ k ≤ 13	48 ≤ d ≤ 57
	3	JAN 8 (EAN8)	7 ≤ k ≤ 8	48 ≤ d ≤ 57
	4	CODE39	1 ≤ k ≤ 255	45 ≤ d ≤ 57, 65 ≤ d ≤ 90, 32, 36, 37,43
	5	ITF	1 ≤ k ≤ 255	48 ≤ d ≤ 57
	6	CODABAR	1 ≤ k ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 68 , 36, 43, 45,46,47,58
	10	PDF417	1 ≤ k ≤ 255	0 ≤ d ≤ 255
	11	QRCODE	1 ≤ k ≤ 928	0 < d ≤ 255
	12	MAXICODE	1 ≤ k ≤ 84	48 ≤ d ≤ 57,65 ≤ d ≤ 90, 97 ≤ d ≤ 122
	13	GS1	No limit	Decided by GS1
②	65	UPC-A	11 ≤ n ≤ 12	48 ≤ d ≤ 57
	66	UPC-E	11 ≤ n ≤ 12	48 ≤ d ≤ 57,d1=48
	67	JAN13 (EAN13)	12 ≤n ≤ 13	48 ≤ d ≤ 57
	68	JAN 8 (EAN8)	7 ≤n ≤ 8	48 ≤ d ≤ 57
	69	CODE39	1 ≤ n ≤ 255	45 ≤ d ≤ 57, 65 ≤ d ≤ 90, 32, 36, 37,43
	70	ITF	1 ≤ n ≤255	48 ≤ d ≤ 57
	71	CODABAR	1 ≤ n ≤ 255	48 ≤ d ≤ 57 65 ≤ d ≤ 68, 36, 43,45,46,47 58
	72	CODE93	1 ≤ n ≤ 255	0 ≤ d ≤ 127
	73	CODE128	2 ≤ n ≤ 255	0 ≤ d ≤ 127
	75	PDF417	1 ≤ n ≤ 255	0 ≤ d ≤ 255
	76	QRCODE	1 ≤ n ≤ 255	0 ≤ d ≤ 255
	77	MAXICODE	1 ≤ n ≤ 84	48 ≤ d ≤ 57,65 ≤ d ≤ 90
	78	GS1	1 ≤ n ≤255	Decided by GS1

[Notes ①]

· This command ends with a NULL code.

·When UPC-A or UPC-E is selected, the characters after the first 12 bytes will be processed as normal characters after receiving12 bytes of barcode data.

·When JAN13 (EAN13) is selected, the characters after the first 13 bytes will be processed as normal characters after receiving 12 bytes of barcode data.

·When JAN8 (EAN8) is selected, the characters after the first 8 bytes will be processed as normal characters after receiving 8 bytes of barcode data.

· 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.

· The beginning code and the ending code of CODEBAR barcode must be one of A, B, C and D. The ending codes can be replaced with T, E, * and N.

· When QRCODE is selected, d1...d k（d1…dn）consist of 5 parts and the format is shown as below:

(1) Daabbcc

D: Link structure mode, input specific mark symbol"D". This mode is optional and the following three paramaters and separator should be assigned if this mode is selected.

aa: The position of the specific symbol; input 2 bytes decimal data

bb: The total number of the symbols; input 2 bytes decimal data

cc: The even and odd data; input 2bytes hexadecimal data

,,: are fixed separator symbol

(2) E: Error correction grade Range: L,M,Q,H. The correction grade is increasing from L to H.

(3) M: Mask image reference. Range: Default as automatic mask.

(4) M: Data input mode Range: A or M, A means automatic mode (Recommended).M means manual input mode. If A is selected, the character mode is not necessary to be assigned; If M selected, the character mode must be assigned. The default is A mode.

(5) <Character mode><DATA1>,

< Character mode ><DATA2>,

< Character mode ><DATA3>,

…….

< Character mode ><DATAn>

Note: n>=200

Character input mode<N,A,B,K>

N: Numbers(0~9)

A: Mixed by alphabet and numbers(0~9)(A~Z)(SP,$,%,*,+,-,.,/,:)

Bxxxx: 8 Bit byte mode(0x00~0xFF)

K: JIS

The legal width of the bar: The ratio of the bar is not changeable.

Example:

1D 6B 0B 51 41 2C 30 31 32 33 34 35 36 37 38 39 41 42 43 44 20 32 44 20 63 6F 64 65 00（Automatic mode is recommended and the character symbol A can be omitted）

1D 6B 4c 12 48 4D 2C 4E 31 32 33 34 35 36 37 38 39 31 32 33 34 35

1D 6B 0B 4D 4D 2C 41 41 43 2D 34 32 00

1D 6B 0B 4C 4D 2C 4E 30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 2C 41 41 42 43 2C 42 30 30 30 36 71 72 63 6F 64 65 00

1D 6B 0B 46 2C 4C 4D 2C 4E 30 31 32 33 34 35 36 37 38 39 2C 41 31 32 41 41 42 42 2C 42 30 30 30 36 71 72 63 6F 64 65 00

· When MAXICODE is selected, the length of d1...d k（d1…dn）should be less than 84 characters and it consists of 5 parts. The format is shown as below:

(1) The basic postal code in 5 numbers;

(2) The second postal code in 4 numbers;

(3) The country code in 3 numbers;

(4) The service class in 3 numbers;

(5) The character strings

Legal character: alphabet and numbers;

Length of variable: changeble;

Legal length of the bar: The ratio of the bar is not changeable.

Example:

1D 6B 0C 33 32 37 38 39 35 35 35 35 38 34 30 36 36 36 54 48 49 53 20 50 41 43 4B 41 47 45 49 53 20 47 4F 49 4E 47 20 54 4F 20 44 41 54 41 4D 41 58 43 4F 52 50 2E 00

[Notes ②]

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

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

[Notes (standard mode)]

· If d is outside the specified range, the command is disabled.

· If the horizontal size of the barcode exceeds printing area, the command is disabled.

· This command feeds as much paper as is required to print the barcode, 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 command is ignored.

· After printing barcode, 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° clockwise rotated character, etc.), except for upside-down printing mode.

[Notes in page mode]

· This command develops bar code data in the print buffer, but does not print it. After processing barcode data, this command moves the print position to the right side dot of the barcode.

· If d is out of the specified range, this command is ignored.

· If barcode width exceeds the printing area, this command is ignored.

When CODE128 (m = 73) is used:

· Refer to Appendix A for the information of the CODE 128 barcode and ithe character set.

· When using the CODE 128 in this printer, take the following points into account for data transmission:

1) Character set must be selected before the barcode data (one of CODE A, CODE B or CODE C).

2) Special characters are defined by combining two characters "{" and one character. The ASCII character "{" is defined by transmitting "{" twice consecutively.

Specific character set	Transmit data		
	ASCII	Hex	Decimal
SHIFT	{S	7B, 53	123,83
CODE A	{A	7B, 41	123, 65
CODE B	{B	7B, 42	123, 66
CODE C	{C	7B, 43	123, 67
FNC1	{1	7B, 31	123, 49
FNC2	{2	7B, 32	123, 50
FNC3	{3	7B, 33	123, 51
FNC4	{4	7B, 34	123, 52
"{"	{{	7B, 7B	123, 123

[Demo] Example data for printing "No. 123456"

In this example, the printer first prints "No." using CODE B, then prints the following numbers using CODE C.

GS k 73 10 123 66 78 111 46 123 67 12 34 56

· If the top of the barcode data is not the code set selection character, the printer stops command processing and processes the following data as normal data.

· If combination of "{" and the following character does not apply to any special character, the printer stops command processing and processes the following data as normal data.

· If the printer receives characters that cannot be used in the special code set, the printer stops command processing and processes the following data as normal data.

· The printer does not print HRI characters that correspond to the shift characters or code set selection characters.

· HRI characters for the function characters are not printed.

· HRI characters for the control characters (<00>H to <1F>H and <7F>H) are not printed.

The left- and right –side spacing which varies from one barcode type to another rmust be assured.

[**Relative**] GS H, GS f, GS h, GS w, GS s Appendix A

[Notes] **1B 40**（Initialize printer）

4A 41 4E 31 33 **0A**

1D 48 01（Set the width of the barcode unit 1）

1D 66 01（HRI characters use condensed character）

1D 77 01（HRI characters print above the barcode）

1D 68 40（Barcode height is 64/203 inch）

1D 6B 02 30 31 32 33 34 35 36 37 38 39 30 35 39 00 0A

1D 48 02（Set the width of the barcode unit 2）

1D 66 01（HRI characters use condensed character）

1D 77 02（HRI characters print under the barcode）

1D 68 80（Barcode height is 128/203 inch）

1D 6B 02 30 31 32 33 34 35 36 37 38 39 30 35 39 00 0A

1D 48 03（Set the width of the barcode unit 3）

1D 66 00（HRI characters use standard character）

1D 77 03（HRI characters print both above and under the barcode）

1D 68 C8（Barcode height is 162/203 inch）

1D 6B 02 30 31 32 33 34 35 36 37 38 39 30 35 39 00 0A

Result:

GS s n1 n2 n3 n4 n5 n6 n7 n8

[Function] Set parameters of GS1 barcode.

[Format]

ASCII	GS	s	n1 n2 n3 n4 n5 n6 n7 n8
Hex	1D	73	n1 n2 n3 n4 n5 n6 n7 n8
Decimal	29	115	n1 n2 n3 n4 n5 n6 n7 n8

[Range]

1 ≤ n1≤ 7

1 ≤ n2≤ 6

2 ≤ n3≤250

1 ≤ n4≤ 10

1 ≤ n5≤ 10

2 ≤ n6≤20 , 4 ≤ n6≤ 20

1 ≤ n7≤ 4

0≤ n8≤1

Parameter	Barcode type	Character set	Data length	Coding range
1	GS1DataBar Omnidirectional	Number 0-9	14bits, 13numbers+1bits of check characters	0000000000000 ~ 9999999999999
2	GS1DataBar Truncated	Number 0-9	14bits, 13numbers+1bits of check characters	0000000000000 ~ 9999999999999
3	GS1 DataBar Stacked	Number 0-9	14bits, 13numbers+1bits of check characters	0000000000000 ~ 9999999999999
4	GS1 DataBar Stacked Omnidirectional	Number 0-9	14bits, 13numbers+1bits of check characters	0000000000000 ~ 9999999999999
5	GS1 DataBar Limited	Number 0-9	14bits, 13numbers+1bits of check characters	0000000000000 ~ 1999999999999
6	GS1 DataBar Expanded	0 ~ 9、A ~ Z、 a ~ z ! " % & ' ( ) * + , - ./ : ; < = > ? _ space FNC1	Max 74numbers or 41 letters	
7	GS1 DataBar ExpandedStacked	0 ~ 9、A ~ Z、 a ~ z ! " % & ' ( ) * + , - ./ : ; < = > ? _ space FNC1	Max 74numbers or 41 letters	

[Notes] Whether GS1 barcode is separate or composite barcode is distinguished by data separator"|" If there is "|".in the programmed data, it is composite barcode; otherwise, it is separate DataBar. The part before | is DataBar of the composite barcode and the part after it is the data of 2D barcode.

• n1 indicates barcode type and character set as below::

· If the length is 13 bits, it will append the check character from the calculation of the first 13 bits tp the right of the data; If the length is 14 bits, the check character from the calculation of the first 13 bits will replace the 14th character(the printed 14th bit may be different from the inputted character); if the length is shorter than 13 bits, add 0 to the left of the data, and the bits after the first 14th bits will not be printed out.

·The character set of 2D barcode in composite barcode: 0 ~ 9, A ~ Z, a ~ z ! " % & ' ( ) * + , - ./ : ; < = > ? _ space FNC1（FNC1 is indicated by "{1"}.

·n2 indicates width of basic element

· n3 indicates the height of the DataBar,. Stacked, stacked omnidirectional, expanded stacked barcode indicate the height of each line of barcode.

· n4 indicates the basic element height of the 2D barcode in the composite barcode.

· n5 indicates the height of the separator. This parameter should be set in DataBar composite barcode or separate stacked, stacked omnidirectional, expanded stacked barcodes.

· n6 indicates the number of segments of each line of barcode. Only in expanded stacked barcodeshould this parameter be set.

Range of separate expanded stacked barcodes 2 ~ 20; range of composite expanded stacked barcodes 4 ~ 20

· n7 indicates the content of the note character

Parameter	Note character
1	DataBar and 2D in composite barcode DataBar only in separate barcode
2	Print DataBar in composite or separate barcode
3	Print 2D in composite barcode, no print in separate barcode
4	No note character

· n8 indicates whether to use AI(use identifier): 0 indicates to not use AI; 1 indicates to use AI.

[Reference] **GS k**

GS o n

[Function] Set parameters of QRCODE barcode

[Format]

ASCII	GS	o	m nA nB nC
Hex	1D	6F	m nA nB nC
Decimal	29	111	m nA nB nC

[Range] m = 0 ,1≤ nA ≤255 ,0≤nB≤1,1≤nC ≤2

The meaning of parameter n is shown as below:

Parameter	Meaning
nA	Basic element width
nB	Language mode 0:Chinese 1:Japanese
nC	Symbol type 1:Original type 2:Enhanced type(Recommended)

[Notes] When the value of parameter is outside the specified range, the command is not valid.

GS p n

[Function] Set size parameters of barcode 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

The meaning of parameter n is shown as below:

Parameter	Meaning
nA	Appearance to height
nB	Appearance to width
nC	Lines limit
nD	Columns limit
nE	X size
nF	line height

GS q n

[Function] Set correction grade of barcode PDF417

[Format]

ASCII	GS	q	n
Hex	1D	71	n
Decimal	29	113	n

[Range] 0≤ *n*≤8

[Notes] Set correction grade of PDF417 code, the higher the correction grade is, the bigger the capacity of the barcode is.

GS w n

[Function] Set barcode 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 barcode.

n specifies the barcode width as follows:

N	Module Width (mm) for Single -level Barcode	Module Width (mm) for Binary-level Barcode	
		Thin basic module(mm)	Thick basic module((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

· Single-level barcodes are as follows:

UPC-A, UPC-E, JAN13 (EAN13), JAN8 (EAN8), CODE93, CODE128

· Binary-level barcodes are as follows:

CODE39, ITF, CODABAR

[Default] n = 2

[Relative] **GS k**

2.7 Bi-colour command

ESC r n

[Function] enter/exit bi-colour print mode.

[Format]

ASCII	ESC	r	n
Hex	1B	72	n
Hecimal	27	114	n

[Range] 0 ≤n ≤ 1

[Notes] ·n=0，exit bi-colour mode.

·n=1，enter bi-colour mode.

[Default] n = 1

[Reference] ESC C

[Example] 1B 40

1B 72 01（enter bi-colour print mode.）

1D 21 11 (set double-height, double-width)

1B 43 01（select colour 2）
41
1B 43 00（select colour 1）
41
1B 43 01（select colour 2）
41
1B 43 00（select colour 1）
41
0A (print)
1B 72 01（exit bi-colour print mode）

Result:

ESC C n

[Function] select print colour..

[Format]

ASCII	ESC	C	n
Hex	1B	43	n
Hecimal	27	67	n

[Range] 0 ≤n ≤ 1

[Notes] · n=0, select colour one.
· n=1, select colour two.

[Reference] ESC r

GS (N pL pH fn a

[Function] bi-color print setting command, set to enter/exit bi-color mode and print color

[Format]

ASCII	GS	(	N	pL	pH	fn	a
Hex	1D	28	4E	pL	pH	fn	a
Hecimal	27	67	n				

[Range] pL = 2, pH = 0, fn = 48, a = 48, 49, 50

[Notes] • a=48, exit bi-color print mode.
• a=49, enter bi-color print mode and choose color one.
a=50, enter bi-color print mode and choose color two.

[Reference] ESC r, ESC C

2.8 Upside-down print command

GS (z nL nH 0 S

[Function] Enter upside-down print mode, start incepting upside-down data.

[Format]

ASCII	GS	(	z	nL	nH	0	S
Hex	1D	28	7A	nL	nH	30	53
Decimal	29	40	122	nL	nH	48	83

[Range] nL = 2 nH = 0

[Notes] · The difference between upside-down command and **ESC { n** upside-down printing: this

upside-down printing command can print the note upside down, while ESC { n can only print the character line upside down.

·This command is used at the beginning of the upsode-down page. The part behind the command is to be printed. It cannot be printed out immediately, but it is stored in the buffer. When the printer incepts the command to cut paper（**GS V**）or to exit upside-down print mode, the printer print upside down.

·This command can only be used at the beginning of the line, otherwise it will be ignored. This command should cooperate with cut paper command or exit upside-down print mode command; otherwise it will not be able to print upside down.

·The data to be printed in upside-down mode must be smaller than the command buffer (the capacity of buffer can be checked by priting self-test pages), for pages larger than command buffer:

a) Printer ignores print data;

b) If ending with exiting upside-down printing mode, the printer will enter normal print mode with no action;

c) If ending with cut paper command, the printer will enter normal print mode after the action of cutting paper.

· Forbid command

The following commands are not supported under upside-down printing mode.If sending the followingcommands under upside-down printing mode, the printer may not perform the expected result.

Command	Function
GS :	Start / end macro definition
GS ^	Perform macro definition
ESC D	Set horizontal tab position
FS q	Define NV bitmap
ESC =	Select printer
GS (A	Perform testing print
ESC c 7	Greyscale print function

Note: Although FS q command is not supported under upside-down printing mode, FS p command is supported. If NV bitmap is to be printed, enter upside-down printing mode by command. Before entering upside-down printing mode, first send **FS q** command to define NV bitmap. Example is as follows:

1C 71 01 (defineNV bitmap,……..stand for bitmap data)

1D 28 7A 02 00 30 53 （enter upside-down printing mode）

1C 70 01 00（print the bitmap downloaded in FLASH）

1D 28 7A 02 00 30 45（print NV bitmap and exit upside-down printing mode）

· perform the command immediately

In upside-down printing mode, this kind of command will be performed before printing. Details are as follows:

Command	Function
GS a	Automatically back to state
DLE ENQ n	Real-time request
DLE DC4	Real-time cash drawer pulse
GS r	Back to state
ESC p	Produce cash drawer control pulse

Steps to enter upside-down printing mode through command:

a) Send command of entering upside-down printing mode;

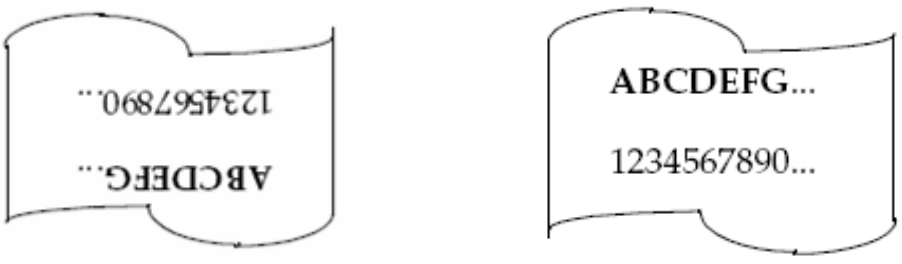
b) Send page;

c) Send command of exiting upside-down printing mode or cutting paper and print

sample page.

[Example] **1D 28 7A 02 00 30 53** (enter upside-down printing mode)
41 42 43 44 45 46 47 2E 2E 2E **0A 0A**
31 32 33 34 35 36 37 38 2E 2E 2E **0A** (print sample page)
1D 56 42 00 (cut paper and exit upside-down printing mode)

Normal print mode and upside-down print:



Normally printed note upside-down printed note

GS (z nL nH 0 E

[Function] print page data and exit upside-down printing mode and enter normal print mode.

[Format]

ASCII	GS	(	z	nL	nH	0	E
Hex	1D	28	7A	nL	nH	30	45
Decimal	29	40	122	nL	nH	48	69

[Range] nL = 2
nH = 0

[Notes] · This command should be used at the end of the upside-down page. After receiving the command, the page data will be printed upside down.
·This command can only be used at the beginning of each line, otherwise it will be ignored.
· This command should be used together with the command to enter upside-down printing mode, otherwise upside-down printing will not be able to perform.

2.9 water based print command

GS { w f n1 n2 n3 n4 n5

[Function] Set water based print bitmap parameters and enter water based print mode.

[Format]

ASCII	GS	{	w	f	n1	n2	n3	n4	n5
Hex	1D	7B	77	02	n1	n2	n3	n4	n5
Decimal	29	123	119	02	n1	n2	n3	n4	n5

[Range] 0 ≤ n1 ≤ 1
0 ≤ n2 ≤ 2
1 ≤ n3≤ 255
0 ≤ n4 ≤ 255
1 ≤ n5 ≤ 255

[Notes] · n1 indicates water based print mode:
n1 = 0:print water based print bitmap when feeding paper
n1 = 1:print water based print bitmap when printing
· n2 indicates water based print justification mode
n2 = 0:left justification
n2 = 1:centering

n2 = 2:right justification

· n3 indicates water based print enlargement mode, 0-3 selects height, 4-7 selects width, values are as below

Width			Height		
Hex	**Decimal**	**Horizontal enlargement**	**Hex**	**Decimal**	**Vertical enlargement**
10	16	1（normal）	01	1	1 （normal）
20	32	2（2double-width）	02	2	2（2double-height）
30	48	3	03	3	3
40	64	4	04	4	4
50	80	5	05	5	5
60	96	6	06	6	6

· n4 indicates water based print greyscale and luminosity adjustment, recommended value 0x20.

· n5 indicates the number of bitmap(defined by FS q command).

· This command should be used at the beginning of each line, otherwise it is dsabled.

· This command is valid only in line mode, not valid under page mode.

·Before using this command, use **FS q** to define NV bitmap.

[Example] **1D 7B 77 02 01 00 22 40 01**

Explanation

n1=0x01: Water based print bitmap is only printed when there is a printing task.

n2=0x00: water based print bitmap left justification.

n3=0x22: water based print bitmap is enlarged twicehorizontally and vertically respectively.

n4=0x40: luminosity of water based print is 0x40.

n1=0x01: regard number 1 NV bitmap as water based print bitmap.

GS { w n

[Function] enter\exit water based print mode.

[Format]

ASCII	GS	{	w	n
Hex	1D	7B	77	n
Decimal	29	123	119	n

[Range] 0 ≤ n ≤ 1

[Notes] · n = 0:exit water based print mode

· n = 1:enter water based print mode

· This command is valid only at the beginning of each line.

· Before using this command, use water based print setting command to set water based print parameters.

· after using this command to exit water based print mode, the printer comes back to normal printing mode.

2.10 Greyscale printing commannd

FS r n xl xh yl yh zl zh d1 d2 d3...d(k)

[Function] Define FLASH grayscale bitmap download

[Format] ASCII FS r n xL xH yL yH zL zH d1 d2 d3 ...d(k)
Hex 1C 72 n xL xH yL yH zL zH d1 d2 d3 ...d(k)
Decimal 28 114 n xL xH yL yH zL zH d1 d2 d3 ...d(k)

[Range] 1 ≤ n ≤ 255
xL = 1,xH = 0
1 ≤ (yL + yH × 256) ≤ 65536
1 ≤ (zL + zH × 256) ≤ 8190
0 ≤ d ≤ 255
k = (yL **+** yH × 256) × (zL **+** zH × 256) × 8

[Notes] ·The max capacity of Flash download is decided by the configuration of the printer, which can be checked through printing self-test page. The downloaded NV bitmap should be no larger than Flash download capacity, otherwise download will fail.

· n specifies the number of the defined NV bitmap

· yL、 yH specifies (yL + yH × 256) × 8 dots in the horizontal direction for the NV bitmap.

· zL、 zH specifies (zL + zH × 256) × 8 dots in the vertical direction for the NV bitmap.

· This command is disabled in upside-down printing mode.

· Frequent 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 bitmaps 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.

· In the process of processing this command, the printer writes data in Flash, and stops receiving other commands, therefore sending other commands including real-time command to the printer is forbidden.

· NV grayscale bitmap refers to a bitmap which is defined in a non-volatile memory by **FS r** and printed by **FS p**.

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

The 9 bytes <from FS~zH> is processed as command data but not data of image.

In the first group of NV bitmaps, when any of the parameters yL,yH,zL,zH is out of the definition range, this command is disabled.

In groups of NV bitmaps, when the printer processes yL,yH,zL,zH out of the defined range, it stops processing this command. At this time, NV bitmaps that haven't been defined are disabled (undefined), but any NV bitmaps before that are enabled.

The d indicates the defined bitmap data. Set a corresponding bit to 1 to print the dot or 0 to not ptrint the dot.

· This command defines n as the number of a NV bitmap. Numbers rise in order from NV bitmap 01H. Therefore, the first data group[yL yH zL zH d1...dk] is NV bitmap 01H, and the last data group[yLyH zL zHd1...dk] is NV bitmap n. The total agrees with the number of NV bitmaps specified by command FS p.

A definition data of a NV bitmap consists of [yL yH zL zH d1...dk]. Therefore, when only one NV bitmap is defined, n=1. The printer uses ([data:（ yL **+** yH × 256）×（ zL**+** zH × 256）× 8] + [header:4]) bytes of NV memory.

· When processing this command, the printer does not process other commands.

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

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

Format of the greyscale bitmap: every dot line of greyscale image is indicated by four dot lines of data. The four dot lines of data form different rank correlation of the greyscale bitmap. The table below shows the greyscale rank of a dot and the data of the four dot lines of data. The corresponding relation is as below:

Real greyscale rank	Data of the first dot line	Data of the second dot line	Data of the third dot line	Data of the fourth dot line
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

[Reference] FS p

ESC c 6 n yl yh zl zh d1 d2 d3 ...d(k)

[Function] Define RAM grayscale bitmap download

[Format]

ASCII	ESC	c	6	n	yl	yh	zl	zh	d1	d2	d3 ...d(k)
Hex	1B	63	36	n	yl	yh	zl	zh	d1	d2	d3 ...d(k)
Hecimal	27	99	54	n	yl	yh	zl	zh	d1	d2	d3 ...d(k)

[Range] $0 \le n \le 7$

$0 \le d \le 255$

$(yL + yJ \times 256) > 0$

$(zL + zJ \times 256) > 0$

$k = (yL + yH \times 256) \times (zL + zH \times 256) \times 8$

$k > 0$

[Notes] n specifies the number of the defined RAM grayscale bitmap.

· yL、 yH specifies (yL + yH × 256) × 8 dots in the horizontal direction for the NV bitmap.

· zL、 zH specifies (zL + zH × 256) × 8 dots in the vertical direction for the NV bitmap.

·This command is disabled in upside-down printing mode.

·If any of the related parameters is out of the specified range, this command is disabled.

·If the defined RAM grayscale bitmap is beyond the max capacity of RAM128kB, this command is disabled.

·The downloaded RAM grayscale bitmap is cleared when printer is powered off.

·Format of the greyscale bitmap: every dot line of greyscale image is indicated by four dot lines of data. The four dot lines of data form different rank correlation of the greyscale bitmap. The table below shows the greyscale rank of a dot and the data of the four dot lines of data. The corresponding relation is as below:

Real greyscale rank	Data of the first dot line	Data of the second dot line	Data of the third dot line	Data of the fourth dot line
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

ESC c 7 n RAM

[Function] Print downloaded RAM greyscale bitmap and set print mode.

[Format] ASCII ESC c 7 n

Hex 1B 63 37 n

Hecimal 27 99 55 n

[Range] 0 ≤ n ≤ 255

(0 ≤ print mode ≤3, 0 ≤ bitmap number ≤ 7)

[Notes] • If the downloaded bitmap is not defined, the command will be ignored.

• The command is disabled in upside-down mode.

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

• This command print bitmap in RAM but not in FLASH, the number of bitmap is defined by ESC c.

Choose print mode			Choose bitmap number		
Hex	Decimal	mode	Hex	Decimal	位图号
00	0	Normal	00~07	00~07	00~07
10	16	Double-width			
20	32	Double-height			
30	48	Quadruple			

[Example] 1B 63 37 01 (choose bitmap one, normal mode)

1B 63 37 02 (choose bitmap two, normal mode)

1B 63 37 11 (choose bitmap one, double-width mode)

1B 63 37 21 (choose bitmap one, double-height)

1B 63 37 31 (choose bitmap one, choose Quadruple mode)

2.11 Other commands

ESC c : n

[Function] choose paper-saving mode and reduce ticket width

[Format]

ASCII	ESC	c	:	n
Hex	1B	63	3A	n
Decimal	27	99	58	n

[Range] 0 ≤ n ≤ 4

[Notes] Paper-saving function refers to vertical compression according to a proportionality factor set by user to reach the goal of saving paper.

• The command only refers to vertical compression.

• The command only works on compressible space. Compressible space includes: space between print data (except space caused by space characters); 1D barcode (The minimal height 1D barcode can be compressed is 30 dots).

• The command compresses compressible space according to a certain proportionality factor, which is set as follows:

m	Proportionality factor setting
0	No compression
1	Compress 25%
2	Compress 50%
3	Compress 75%
4	Compress 100%

•The command only works on the ticket sending this command.

• This command is enabled only in standard mode.

[Default] n = 0

DLE ENQ n

[Function] Real-time request to printer

[Format]

ASCII	DLE	ENQ	n
Hex	10	05	n
Decimal	16	5	n

[Range] 1 ≤n ≤ 2

[Note] 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

· This command is effective only when an auto-cutter error occurs or printer can not find marked error.

· The printer starts processing data upon receiving this command under serial mode.

· Under parallel mode, this command can not be executed when the printer is busy.

· When the printer is disabled by **ESC =** (Select peripheral device), the command is still available.

·Do not insert the command into the data sequence of 2 or more bytes.

[Reference] DLE EOT

DLE DC4 n m t

[Function] Generate pulse at real-time to open cash drawer

[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

[Notes] Output the pulse specified by the 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].

· When the printer is executing the command to open the cash drawer (**ESC p** or **DEL DC4)**, this command is ignored.

· The printer executes this command upon receiving it in serial interface mode.

·this command cannot be executed when the printer is busy in parallel interface mode.

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

·Do not insert the command into the data sequence of 2 or more bytes.

[Reference] ESC p

ESC 2

[Function] Select default line spacing to 1/6 inch (about 4.23mm)

[Format]

ASCII	ESC	2	
Hex	1B	32	
Decimal	27	50	

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

[Reference] ESC 3

ESC 3 n

[Function] Set line spacing

[Format]

ASCII	ESC	3	n
Hex	1B	33	n
Decimal	27	51	n

[Range] 0 ≤ n ≤ 255

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

·The horizontal and vertical motion units 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 direction and starting position of the printable area:

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

2) When the starting position is set to the upper right or lower left of the printable area by **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] The default line spacing is approximately 4.23mm (1/6 inches).

[Reference] ESC 2, GS P

ESC = n

[Function] Select printer to which host computer sends data

[Format]

ASCII	ESC	=	n
Hex	1B	3D	n
Decimal	27	61	n

[Range] 0 ≤ n ≤ 1

[Description] The meaning of n is as follows:

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

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

[Default] n = 1

ESC @

[Function] Initialize printer, clear data in print buffer and set print mode to the default mode when powered on.

[Format]

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

[Notes] · The data in the receive buffer is not cleared.

· The macro definition is not cleared.

· The NV bitmap data is not cleared.

ESC L

[Function] Transform from standard mode to page mode

[Format]

ASCII	ESC	L
Hex	1B	4C
Decimal	27	76

[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 to those for page mode:

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

2) Set line spacing: **ESC 2, ESC 3**

·This command can only change indication bit and perform after switching to standard mode.

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

2) Select justification: **ESC a**

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

4) Set left margin: **GS L**

5) 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 S

[Function] Select standard mode

[Format]

ASCII	ESC	S
Hex	1B	53
Decimal	27	83

[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 page area is initialized as default data.

· This command switches the settings for the following commands to those for standard mode:

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

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

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

1) Set printing area in page mode: **ESC W**

2)Select print direction in page mode: **ESC T**

· The following commands are ignored in standard mode:

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

2)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 c 0 n

[Function] Select the paper type

[Format]

ASCII	ESC	c	0	n
Hex	1B	63	30	n
Decimal	27	99	40	n

[Range] 0 ≤ n ≤ 2

[Notes] n = 0, set paper type as continuous paper roll.

n = 1, set paper type as marked paper.

Marked paper refers to paper with white/black marks.

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 alarm paper end.

[Default] n = 0

[Reference] GS FF

ESC c 3 n

[Function] Select paper sensor(s) to output paper end signals

[Format]

ASCII	ESC	c	3	n
Hex	1B	63	33	n
Decimal	27	99	51	n

[Range] 0 ≤ n ≤ 255

[Note] · Each bit of n is used as follows:

Bit	0/1	Hex	Decimal	Function
0	0	00	0	Paper near end sensor is disabled
	1	01	1	Paper near end sensor is enabled
1	0	00	0	Paper near end sensor is disabled
	1	02	2	Paper near end sensor is enabled
2	0	00	00	Paper near end sensor is disabled
	1	04	4	Paper near end sensor is enabled
3	0	00	00	Paper near end sensor is disabled
	1	08	8	Paper near end sensor is enabled
4-7				Undefined

· It is possible to select two sensors to output signals. Then, if any of the sensors detects paper end, the paper end signal can output.

· The command is available only with a parallel interface and is ignored with a serial interface.

· If either bit 0 or bit 1 is on (value is 1), the paper near end sensor is used to output paper end signal.

· If either bit 2 or bit 3 is on (value is 1), the paper end sensor is used to output paper end signal

· When two sensors are disabled, the paper end sensor is used to output paper end signal

[Default] n = 12

ESC c 4 n

[Function] Select paper sensor(s) to stop printing

[Format]

ASCII	ESC	c	4	n
Hex	1B	63	34	n
Decimal	27	99	52	n

[Range] 0 ≤ n ≤ 255

[Notes] n is defined as below:

Bit	0/1	Hex	Decimal	Function
0	0	00	0	Paper near end sensor disabled
	1	01	1	Paper near end sensor enabled
1	0	00	0	Paper near end sensor disabled
	1	02	2	Paper near end sensor enabled
2-7				Undefined

· When either bit 0 or 1 is on (value is 1), paper near-end sensor is enabled, and when the printer detects paper near end, it stops printing after completing the current task.

[Default] n = 0

ESC c 5 n

[Function] Enable/disable panel buttons

[Format]

ASCII	ESC	c	5	n
Hex	1B	63	35	n
Decimal	27	99	53	n

[Range] 0 ≤ n ≤ 255

[Notes] · When the lowest bit of n is 0, the panel buttons are enabled.

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

· Only the lowest bit of n is valid.

· When the panel buttons are disabled, none of them are usable when pressed.

· When executing macro commands, the panel buttons are always enabled.

[Default] n = 0

ESC p m t1 t2

[Function] Output the cash drawer control pulse to specified connector pin

[Format]

ASCII	ESC	p	m	t1	t2
Hex	1B	70	m	t1	t2
Decimal	27	112	m	t1	t2

[Range] 0 ≤ m ≤ 1, 48≤m ≤ 49

0 ≤ t1 ≤ 255, 0≤ t2 ≤ 255

[Notes] M selects drawer kick-out connector pin as follows:

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

· 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 DC4**

GS (A pL pH n m

[Function] Execute test printing.

[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 (pL=2, pH=0)

0 ≤ n ≤ 2, 48 ≤ n ≤ 50

1 ≤ m≤ 4, 49 ≤ m ≤ 52

[Notes] m decides printing data:

m	Data
1, 49	Hex unloading printing
2, 50	Configuration information printing
3, 51	Cyclic character printing
4, 52	Printer page check(enabled in label paper mode)

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

· This command is disabled in page mode.

·If this command is received in the process of macro definition, the printer will stop macro definition and execute this command.

· The printer resets automatically after performing this command.

· The printer cuts paper after executing this command.

· When performing this command, the printer is busy, so it does not receive other commands.

· When m = 4, the printer executes this command. After some paper feed amount, a diagnostic threshold is calculated, which is used for functions like page orientation.

GS

[Function] Start/end macro definition.

[Format]

ASCII	GS	:
Hex	1D	3A
Decimal	29	58

[Notes]
· The printer starts macro definition after receiving this command in normal mode. It ends macro definition after receiving this command in macro definition mode.
· If the printer receives GS ^ in macro definition mode, the printer will end macro defihntion and clear it.
· Macro definition is off when powered on.
· ESC @ cannot clear macro definition, so it can be iincluded in macro definition.
· The data of macro definition can be 2048 bytes. Data out of 2048 bytes will be processed as normal data.

[Reference] GS ^

①GS V m ②GS V m n

[Function] Select cut paper mode and cut paper.

[Format]

①ASCII	GS	V	m	
Hex	1D	56	m	
Decimal	29	86	m	
②.ASCII	GS	V	m	n
Hex	1D	56	m	n
Decimal	29	86	m	n

[Range]
①0 ≤ m ≤ 1, 48≤m ≤ 49
②m = 66, 0 ≤n ≤255

[Notes] m selects cut paper mode as follows:

m	Cut paper mode
0,48	Full cut
1,49	Half cut
66	Feed（[n ×（vertical motion unit）inches] (feed paper）and half cut

[Notes①]
· This command is enabled only when processed at the beginningg of the line.

[Notes②]
· This command is enabled only when processed at the beginningg of the line.
· m = 0,48,1, 49, printer cuts paper directly.
· When n = 66, the printer feeds [the distance between print position and cutter + n ×（vertical motion unit）] and cut paper.
· The horizontal and vertical motion units are specified by **GS P**.
· Paper feed amount is calculated by vertical motion unit.

GS ^ r t m

[Function] Execute macro definition.

[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
0 ≤ m ≤ 1,

[Notes] · r specifies times of macro definition.
· t specifies waiting time of macro execution.
· m specifies the mode of macro execution.
· When the LSB of m is 0, the interval time of macro is t × 100 ms, and the macro can be executed r times.
· When the LSB of m is 1, the printer waits for t × 100 ms and does not execute macro definition until user presses the Feed button with LED flashing. The process can continue r times.
· The waiting time is t × 100 ms.
· If receiving this command during macro definition, the printe will stop macro definition and the macro which is defined will be cleared.
· If the macro is undefined or r is 0, the command is disabled.
· In the process of macro execution (m = 1), the printer cannot feed by Feed button.

[Reference] GS :

3 Programming Process Guide

Because the different printing status and error can be transmitted by Auto Status Back (ASB) command, it is recommended that you can use ASB command to inquiry status. ASB command is effective when the printer is powered on and can be directly sent to inquiry the status.

The recommended programming process is shown as below:

1) Inquire the printer status

Make sure that the printer status is normal before sending data to print.

2) Intitialize the printer

Make sure that the previous setting does not affect the current printing.

3) Set the print content

Set the print content such as character property, bitmap property and barcode property etc for the needed printing effect.

4) Send the data for printing (including the setup command befor printing)

If the printing data is bitmap data, please do not send the status inquiry command before sending printing data.

5) Inquire the printer status after printing

If ASB is enabled, the printer will return the printer status automatically.

Appendix

Appendix A: Code128 Bar Code

A.1 Description of the CODE128 Bar Code

In CODE128 bar code system, it is possible to represent 128 ASCII characters, the one hundred numbers from 00 to 99 and some special characters with three code sets: A, B and C. Each code set is used for representing the following characters:

· Code set A: ASCII characters 00H to 5FH

· Code set B: ASCII characters 20H to 7FH

· Code set C: 100 numerals from 00 to 99

The following special characters are also available in CODE128:

· SHIFT characters

In code set A, the character just after SHIFT is processed as a character for code set B. In code set B, the character just after SHIFT is processed as a character for code set A.

SHIFT characters cannot be used in code set C.

· Code set selection character (CODE A, CODE B, CODE C).

This character switches the following code set to code set A, B, or C.

· Function character (FNC1, FNC2, FNC3, FNC4)

The usage of function characters depends on the application software. In code set C, only FNC1 is available.

A.2 Code Tables

Printable characters in code set A

Character	Transmit Data		Character	Transmit Data		Character	Transmit Data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
NULL	00	0	(	28	40	P	50	80
SOH	01	1	)	29	41	Q	51	81
STX	02	2	*	2A	42	R	52	82
ETX	03	3	+	2B	43	S	53	83
EOT	04	4	,	2C	44	T	54	84
ENQ	05	5	-	2D	45	U	55	85
ACK	06	6	.	2E	46	V	56	86
BEL	07	7	/	2F	47	W	57	87
BS	08	8	0	30	48	X	58	88
HT	09	9	1	31	49	Y	59	89
LF	0A	10	2	32	50	Z	5A	90
VT	0B	11	3	33	51	[	5B	91
FF	0C	12	4	34	52	\	5C	92
CR	0D	13	5	35	53	]	5D	93
SO	0E	14	6	36	54	^	5E	94
SI	0F	15	7	37	55	_	5F	95
DLE	10	16	8	38	56	FNC1	7B,31	123,49
HC1	11	17	9	39	57	FNC2	7B,32	123,50
HC2	12	18	:	3A	58	FNC3	7B,33	123,51
HC3	13	19	;	3B	59	FNC4	7B,34	123,52
HC4	14	20	<	3C	60	SHIFT	7B,53	123,83
NAK	15	21	=	3D	61	CODEB	7B,42	123,66
SYN	16	22	>	3E	62	CODEC	7B,43	123,67
ETB	17	23	?	3F	63			
CAN	18	24	@	40	64			
EM	19	25	A	41	65			
SUB	1A	26	B	42	66			
ESC	1B	27	C	43	67			
FS	1C	28	D	44	68			
GS	1D	29	E	45	69			
RS	1E	30	F	46	70			
US	1F	31	G	47	71			
SP	20	32	H	48	72			
!	21	33	I	49	73			
"	22	34	J	4A	74			
#	23	35	K	4B	75			
$	24	36	L	4C	76			
%	25	37	M	4D	77			
&	26	38	N	4E	78			
'	27	39	O	4F	79			

Printable characters in code set B

Character	Transmit Data		Character	Transmit Data		Character	Transmit Data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
SP	20	32	H	48	72	p	70	112
!	21	33	I	49	73	q	71	113
"	22	34	J	4A	74	r	72	114
#	23	35	K	4B	75	s	73	115
$	24	36	L	4C	76	t	74	116
%	25	37	M	4D	77	u	75	117
&	26	38	N	4E	78	v	76	118
'	27	39	O	4F	79	w	77	119
(	28	40	P	50	80	x	78	120
)	29	41	Q	51	81	y	79	121
*	2A	42	R	52	82	z	7A	122
+	2B	43	S	53	83	{	7B,7B	123,123
,	2C	44	T	54	84	|	7C	124
-	2D	45	U	55	85	}	7D	125
.	2E	46	V	56	86	—	7E	126
/	2F	47	W	57	87	DEL	7F	127
0	30	48	X	58	88	FNC1	7B,31	123,49
1	31	49	Y	59	89	FNC2	7B,32	123,50
2	32	50	Z	5A	90	FNC3	7B,33	123,51
3	33	51	[	5B	91	FNC4	7B,34	123,52
4	34	52	\	5C	92	SHIFT	7B,53	123,83
5	35	53	]	5D	93	CODEA	7B,41	123,65
6	36	54	^	5E	94	CODEC	7B,43	123,67
7	37	55	_	5F	95			
8	38	56	`	60	96			
9	39	57	a	61	97			
:	3A	58	b	62	98			
;	3B	59	c	63	99			
<	3C	60	d	64	100			
=	3D	61	e	65	101			
>	3E	62	f	66	102			
?	3F	63	g	67	103			
@	40	64	H	68	104			
A	41	65	i	69	105			
B	42	66	j	6A	106			
C	43	67	k	6B	107			
D	44	68	l	6C	108			
E	45	69	m	6D	109			
F	46	70	n	6E	110			
G	47	71	o	6F	111			

Printable characters in code set C

Character	Transmit Data		Character	Transmit Data		Character	Transmit Data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
00	00	0	40	28	40	80	50	80
01	01	1	41	29	41	81	51	81
02	02	2	42	2A	42	82	52	82
03	03	3	43	2B	43	83	53	83
04	04	4	44	2C	44	84	54	84
05	05	5	45	2D	45	85	55	85
06	06	6	46	2E	46	86	56	86
07	07	7	47	2F	47	87	57	87
08	08	8	48	30	48	88	58	88
09	09	9	49	31	49	89	59	89
10	0A	10	50	32	50	90	5A	90
11	0B	11	51	33	51	91	5B	91
12	0C	12	52	34	52	92	5C	92
13	0D	13	53	35	53	93	5D	93
14	0E	14	54	36	54	94	5E	94
15	0F	15	55	37	55	95	5F	95
16	10	16	56	38	56	96	60	96
17	11	17	57	39	57	97	61	97
18	12	18	58	3A	58	98	62	98
19	13	19	59	3B	59	99	63	99
20	14	20	60	3C	60	FNC1	7B,31	123,49
21	15	21	61	3D	61	CODEA	7B,41	123,65
22	16	22	62	3E	62	CODEB	7B,42	123,66
23	17	23	63	3F	63			
24	18	24	64	40	64			
25	19	25	65	41	65			
26	1A	26	66	42	66			
27	1B	27	67	43	67			
28	1C	28	68	44	68			
29	1D	29	69	45	69			
30	1E	30	70	46	70			
31	1F	31	71	47	71			
32	20	32	72	48	72			
33	21	33	73	49	73			
34	22	34	74	4A	74			
35	23	35	75	4B	75			
36	24	36	76	4C	76			
37	25	37	77	4D	77			
38	26	38	78	4E	78			
39	27	39	79	4F	79			

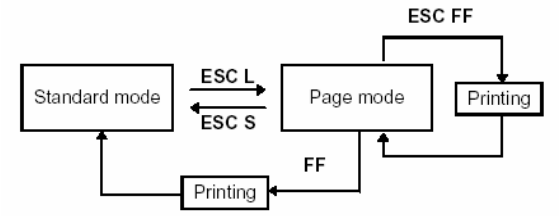
Appendix B: Print mode and its change

B.1 General Description

The printer operates in two print modes: 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 operation. 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.



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

1) The printable area is set by **ESC W**. If all printing and feeding operations 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.

3) If the print data (including character spacing) 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 (**203/203**) = 24

Therefore, 24 dots are required for feeding.

Use the following commands:

ESC W xL, **xH**, **yL**, **yH**, **dxL**, **dxH**, **dyL**, **dyH**

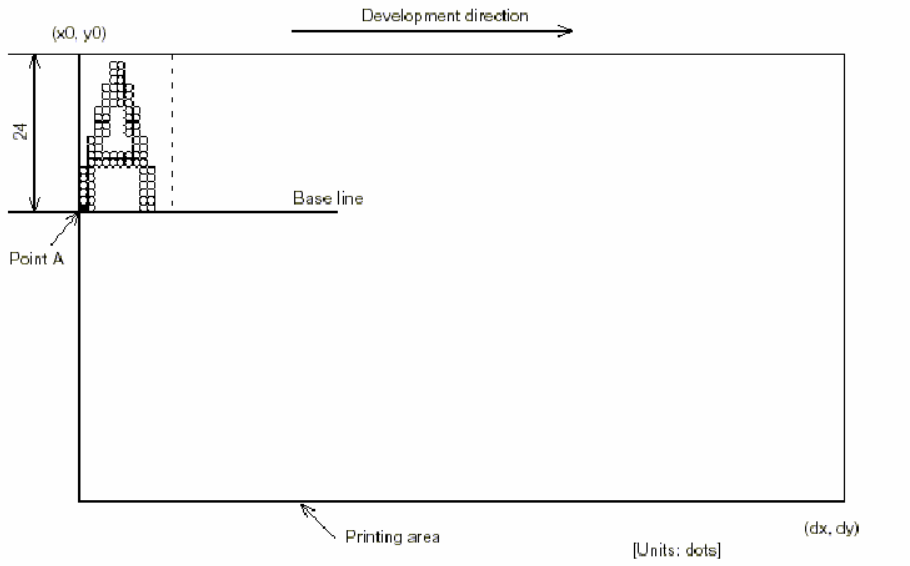
ESC T n

ESC 3 24 ¬ Set line spacing to be added.

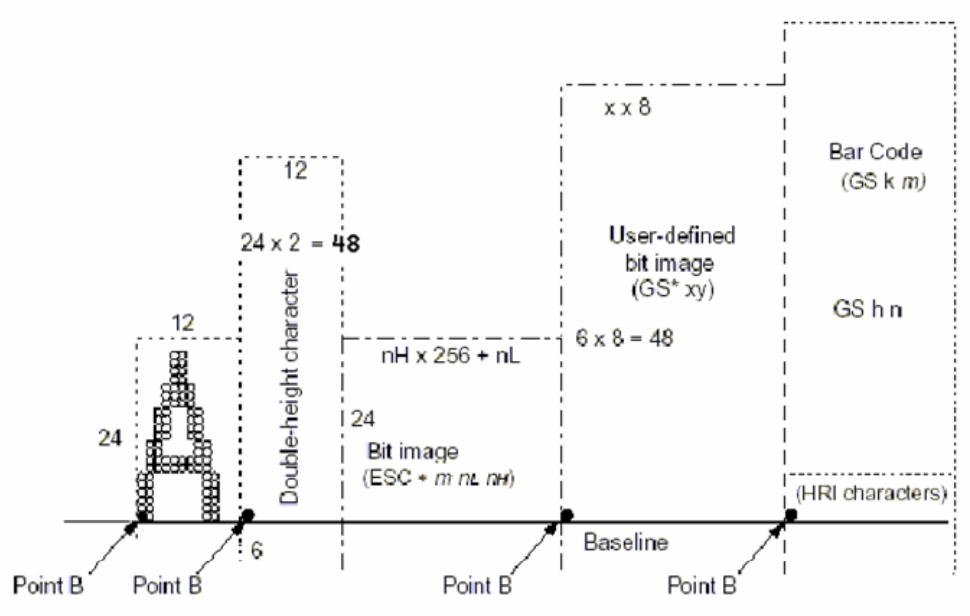
LF

GS / 1

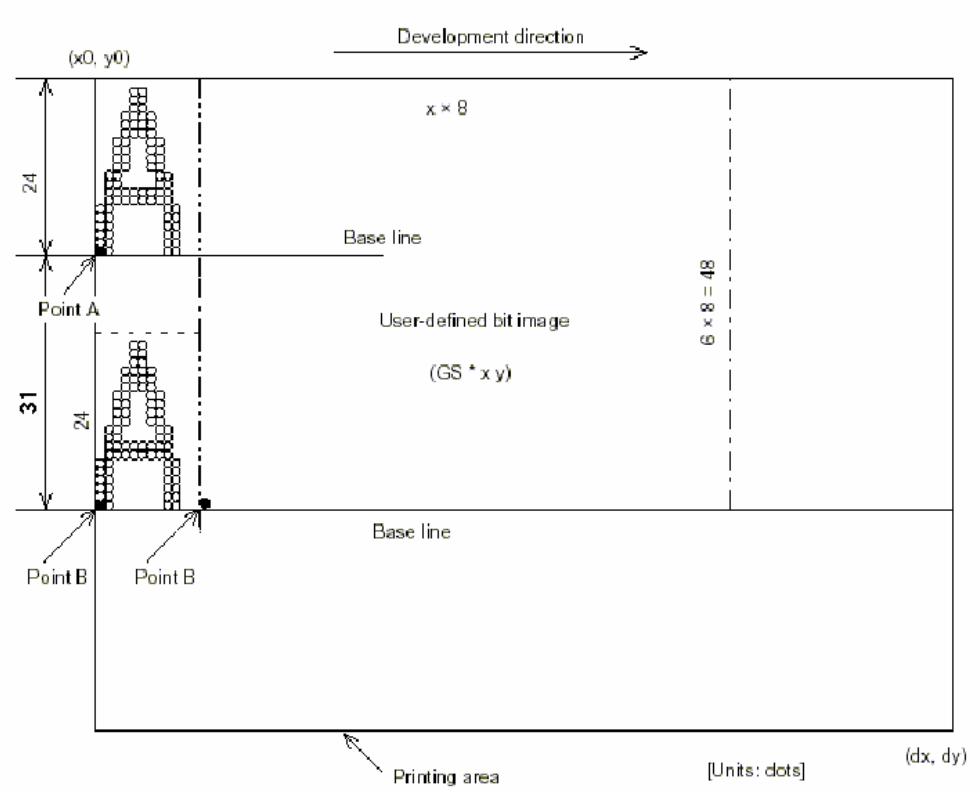
ESC 2 ¬ Reset the line spacing to 1/6 inch.



Character Data Developing Position



Print Data Developing Position



Downloaded Bit Image Developing Position

Appendix C: Control Sequences

Code	Function
HT	Horizontal tab
LF	Print and line feed
FF	Print and paper feed
CR	Print and carriage return
CAN	Cancel print data in page mode
DLE EOT	Real-time status transmission
DLE ENQ	Real-time request to printer
ESC FF	Print data in page mode
ESC SP	Set right-side character spacing
ESC !	Select print mode(s)
ESC $	Set absolute horizontal print position
ESC %	Select/cancel user-defined character set
ESC &	Define user-defined characters
ESC *	Select bit-image mode
ESC -	Turn underline mode on/off
ESC 2	Select default line spacing
ESC 3 n	Set line spacing
ESC ?	Cancel user-defined characters
ESC @	Initialize printer
ESC D	Set horizontal tab positions
ESC E	Turn emphasized mode on/off
ESC G	Turn double-strike mode on/off
ESC J	Print and feed paper
ESC L	Select page mode
ESC M	Select character font
ESC R	Select an international character set
ESC S	Select standard mode
ESC T	Select print direction in page mode
ESC V	Turn 90° clockwise rotation mode on/off
ESC W	Set printing area in page mode
ESC \	Set relative horizontal print position
ESC a	Select justification
ESC c 5	Enable/disable panel buttons
ESC d	Print and feed n lines
ESC t	Select code page
ESC {	Turn upside-down mode on/off
GS FF	Mark paper orientation

GS !	Select character size
GS $	Set absolute vertical print position in page mode
GS *	Define downloaded bit image
GS /	Print downloaded bit image
GS :	Start/end macro definition
GS B	Turn white/black reverse printing mode on/off
GS H	Select printing position of HRI characters
GS L	Set left margin
GS V	Select cut mode and cut paper
GS W	Set printing area width
GS \	Set relative vertical print position in page mode
GS ^	Execute macro
GS a	Enable/disable Automatic Status Back (ASB)
GS f	Select font for HRI characters
GS h	Set bar code height
GS k	Print bar code
GS r	Automatic Status Back
GS v 0	Print raster bit image
GS w	Set bar code width
FS !	Set print mode(s) for Kanji characters
FS &	Select Kanji character mode
FS -	Turn underline mode on/off for Kanji characters
FS .	Cancel Kanji character mode
FS 2	Define user-defined Kanji characters
FS S	Set Kanji character spacing
FS W	Turn quadruple-size mode on/off for Kanji characters
FS p	Print NV bit image
FS q	Define NV bitmap
GS s	Set GS1 barcode parameters
ESC r	Enter/exit bi-color mode
ESC C	Choose print color
ESC c :	Choose paper-saving mode
GS (	Upside-down mode command
GS {	Water based print mode command
FS r	Download greyscale NV bitmap
ESC c	Greyscale RAM bitmap command