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**Receipt Printer**  
**BTP-R880NP**

**PROGRAMMING MANUAL**

REVISION HISTORY

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# 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 label 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 characters 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, Micro-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 possesses all data in 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** – Human Readable Interface;

**NV** – Non-volatile memory in which data stored does not loss when power 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.

**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 command expressed in ASCII, Hex and Decimal separately. If not specified, the value in “range” part is decimal. For instance, in range”  $1 \leq n \leq 4$ ”, ‘1’ is not an ASCII code but a decimal number;
- [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.  
 [Relevant command] 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.

[Relevant command] 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.

[Relevant command] 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.
- [Relevant command]      FF, ESC L, ESC S

**[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]**       $0 \leq n \leq 255$

- [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 does not affect the values set by **ESC 2** or **ESC 3**.
  - The horizontal and vertical motion unit are specified by **GS P**.
  - In standard mode, the printer uses the vertical motion unit (y).
  - In page mode, this command functions as follows, depending on the starting position of the printable area:
    - 1) When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the vertical motion unit (y) is used.
    - 2) When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the horizontal motion unit (x) is used.
  - The maximum line spacing is 1016mm (40 inches). When the setting value exceeds the maximum, it is converted to the maximum automatically.

[Relevant command]      GS P

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

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

41 41 41 41 41 41 41 41(datas waiting for printing)

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

42 42 42 42 42 42 42 0A (datas waiting for printing)

### **Results:**

```

AAAAAAA |
          | 80/203 Inch
          |
BBBBBBB |
  
```

**ESC d n****[Function]** Print and feed n lines

<b>[Format]</b>	ASCII	ESC	d	n
	Hex	1B	64	n
	Decimal	27	100	n

**[Range]**  $0 \leq n \leq 255$ 

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

[relevant command] ESC 2, ESC 3

[example] 1B 40(initialize printer)

41 41 41 41 41 41 41 (datas waiting for printing)

1B 64 02 (print and feed 2 characters line spacing, 2/6 inches)42 42 42 42 42 42 42 0A (datas waiting for printing)**Results:**

AAAAA  
BBBBB

2/6 Inch

## 2.2 Location command

**HT****[Function]** Moves the print position to the next horizontal tab position.

<b>[Format]</b>	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 [Printing area width + 1].
- Horizontal tab positions are set with **ESC D**.
- If this command is received when the printing position is at [printing area width + 1], the printer executes print buffer-full printing of the current line and horizontal tab processing from the beginning of the next line.
- The default setting of the horizontal tab position for the paper roll is font A (12×24) every 8th character.

- When current buffer is full, the printer shall execute the actions as below:  
In standard mode, the printer shall print current line and set the print position to the beginning of next line;
- 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 start position to the beginning of the ling)

**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)

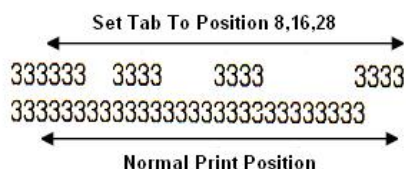
33 33 33 33

**0A** (print)

[illegible]

**0A** (print)

### Results:



ESC \$ nL nH

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

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

<b>[Format]</b>	ASCII	ESC	\$	nL	nH
-----------------	-------	-----	----	----	----

Hex 1B 24 nL nH

Decimal      27      36   nL   nH

**[Range]**  $0 \leq nL \leq 255$

$$0 \leq n_H \leq 255$$

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

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

[Example] Refer to **ESC W**

## **ESC D n1...nk NUL**

[Function] Set horizontal tab positions

[Format]	ASCII	ESC	D	n1...nk	NUL
	Hex	1B	44	n1...nk	00
	Decimal	27	68	n1...nk	0

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

$1 \leq k \leq 32$

[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.
- 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**

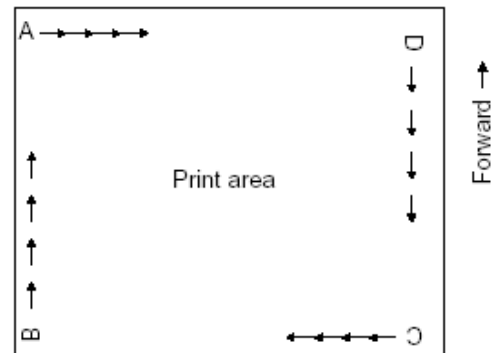
[Function] Selects the print direction and starting position in page mode.

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

[Range]  $0 \leq n \leq 3$   $48 \leq n \leq 51$

$n$  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 horizontal motion units: **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 **0A**  
(newline)

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

31 **0A**  
(newline)

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

32 **0A**  
(newline)

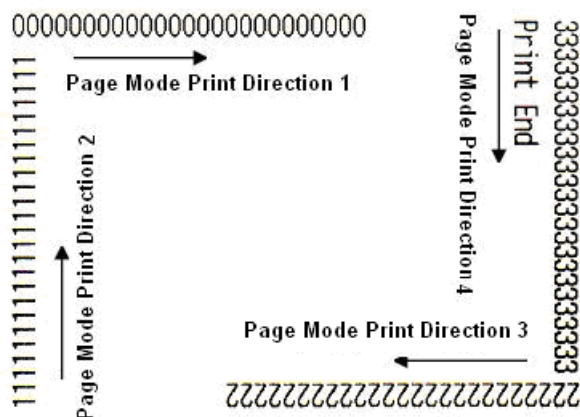
**1B 54 03** (select the print area direction in page mode)

[illegible]

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.

<b>[Format]</b>	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]**  $0 \leq x_L, x_H, y_L, y_H, dx_L, dx_H, dy_L, dy_H \leq 255$  (except  $dx_L = dx_H = 0$  or  $dy_L = dy_H = 0$ )

**[Notes]** · If this command is input in standard mode, the printer executes only internal flag Each the horizontal starting position, vertical starting position, printing area width, and printing area height are defined as x0、y0、dx、dy setting for the printing area is calculated as follows:

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

$$y_0 = [(y_L + y_H \times 256) \times (\text{vertical motion unit})]$$

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

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

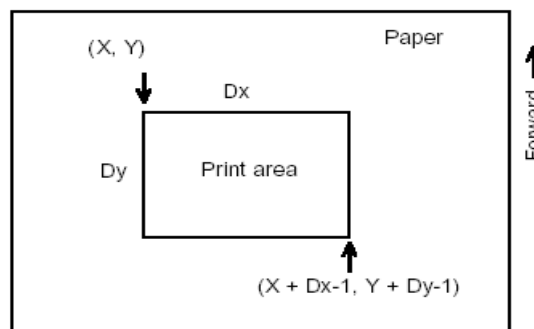
The printing area is set as shown in the figure below.

This command does not affect printing in standard mode.

- If the horizontal or vertical starting position is set outside the printable area, the printer stops command processing and processes the following data as normal data.
- If the printing area width or height is set to 0, the printer stops command processing and processes the following data as normal data.
- This command sets the position where data is buffered to the position specified by **ESC T** within the printing area.
- If (horizontal starting position + printing area width) exceeds the printable area, the

printing area width is automatically set to (horizontal printable area horizontal starting position).

- If (vertical starting position + printing area height) exceeds the printable area, the printing area height is automatically set to (vertical printable area – vertical starting position).
- The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current printing area.
- Use the horizontal motion unit (x) for setting the horizontal starting position and printing area width, and use the vertical motion unit (y) for setting the vertical starting position and printing area height.
- When the horizontal starting position, vertical starting position, printing area width, and printing area height are defined as X, Y, Dx, and Dy respectively, the printing area is set as shown in the figure below.



**[Default]** 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 absolute horizontal starting position to be 50/203 inches)

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

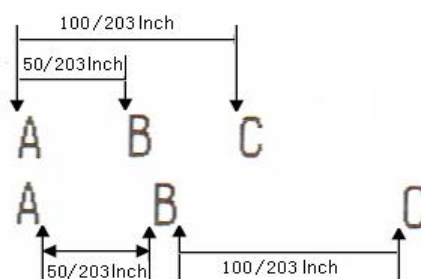
43

**0A** (newline)

**0C** (print in page mode)

**Results:**





## ESC \ nL nH

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

- This command sets the distance from the current position to  $[(nL + nH \times 256) \times \text{horizontal or vertical motion unit}]$

**[Format]**

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

**[Range]**  $0 \leq nL \leq 255$

$0 \leq nH \leq 255$

- [Notes]**
- Any setting that exceeds the printable area is ignored.
  - When pitch N is specified to the right:  $nL + nH \times 256 = N$   
When pitch N is specified to the left (the negative direction), use the complement of 65536.  
When pitch N is specified to the left:  $nL + nH \times 256 = 65536 - N$
  - The print starting position moves from the current position to  $[N \times \text{horizontal or vertical motion unit}]$
  - 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 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]** Aligns all the data in one line to the specified position

**[Format]**

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

**[Range]**  $0 \leq n \leq 2, 48 \leq n \leq 50$

n selects the justification as follows:

n	Justification
	Left justification
	Centering
	Right justification

- [Notes]**
- This command is enable 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 justifies 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:

Left justification	Centering	Right justification
<div style="border: 1px solid black; padding: 5px;">           ABC ABCD ABCDE         </div>	<div style="border: 1px solid black; padding: 5px;">           ABC ABCD ABCDE         </div>	<div style="border: 1px solid black; padding: 5px;">           ABC ABCD ABCDE         </div>

## GS \$ nL nH

**[Function]** This command sets the absolute print position to  $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$  inches.

**[Format]** ASCII GS \$ nL nH

Hex 1D 24 nL nH

Decimal 29 36 nL nH

**[Range]**  $0 \leq nL \leq 255, 0 \leq nH \leq 255$

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

• If the  $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$  exceeds the specified printing area, this command is ignored.

• The horizontal starting buffer position does not move after run this command.

Relative starting position is that specified by **ESC T**.

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

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

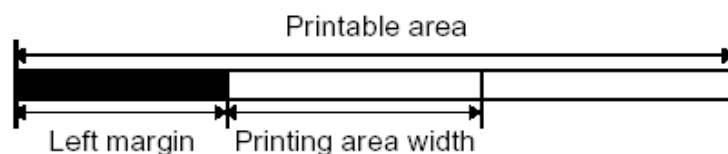
**[Example]** See ESC W

## GS L nL nH

**[Function]** Set left margin to  $[(nL + nH \times 256) \times \text{horizontal motion unit}]$  inches

**[Format]** ASCII GS L nL nH

Hex 1D 4C nL nH



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

• If this command is input in page mode, this command is not effective and the printer regard this command as normal character to dispose.

- 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

**[Example]** **0A** (Sets printing position at the begin of the line)

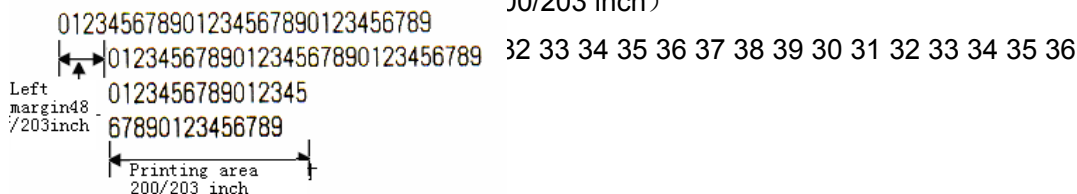
**1B 40** (Initialization)

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** (Sets left margin to 48/203 inch)

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 00 00** (Sets printing width to 200/203 inch)



## GS P x y

**[Function]** Sets the horizontal and vertical motion units to approximately 25.4/ x mm { 1/ x inches} and approximately 25.4/ y mm {1/ y inches}, respectively.

**[Format]** ASCII GS P x y

Hex 1D 50 x y

Decimal 29 80 x y

**[Range]**  $0 \leq x \leq 255$

$0 \leq y \leq 255$

**[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 command use x or y, depending on character orientation:

- 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 using **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 using **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 results of this command and other command motion.
- 1inch=25.4mm.

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

**[Reference]** ESC SP, 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

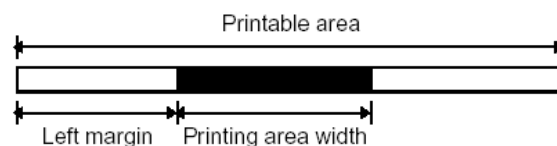
Hex 1D 57 nL nH

Decimal 29 87 nL nH

**[Range]**  $0 \leq nL \leq 255$

$0 \leq nH \leq 255$

**[Notes]** • The printing area width is set to  $[(nL + nH \times 256) \times \text{horizontal motion unit}]$  inches.



- The command is effective only processed at the beginning of the line.
- In page mode, this command is void and command data is disposed as normal character.
- This command does not affect printing in page mode.
- If the [left margin + printing area width] exceeds the printable area, [printable area width - left margin] is used.
- The horizontal and vertical motion units are specified by **GS P**. Changing the horizontal and vertical motion units does not affect the current left margin.
- The horizontal motion unit ( x ) is used for calculating the printing area width.

**[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]**  $0 \leq nL \leq 255$

$0 \leq nH \leq 255$

**[Notes]** • This command sets the distance from the current position to  $[(nL + nH \times 256) \times \text{vertical or horizontal motion unit}]$  inches.

• This command is ignored unless page mode is selected.

• When pitch N is specified to the movement downward:  $nL + nH \times 256 = N$

When pitch N is specified to the movement upward:  $nL + nH \times 256 = 65536 - N$

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

• This command function as follows, depending on the print starting position set by

**ESC T:**

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

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 unit are specified by **GS P**.

• The horizontal and vertical motion unit is changed by **GS P**.

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

## 2.3 Character command

### **CAN**

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

**[Format]** ASCII CAN

Hex 18

Decimal 24

**[Notes]** • This command is enable only in page mode.

• If data that existed in 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 need to be deleted )

**18** (Delete data in page buffer)**1B 24 64 00** (Setting absolute horizontal print position as 100 dots)**1D 24 60 00** (Setting absolute 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:

```

1234567890abcdefghijklmnopqrstuvwxyz12345
67890a                                37890
abcdec                                abcde
dfghij                                dfghi
jklmnc                                jklmn
opqrst                                opqrs
tuvwxyz1234567890abcdefghijklmnopqrstuvwxyz

```

Cancel the data

**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]**

- Sets 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 n times normal value.

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

- The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current right-side spacing.
- In standard mode, the horizontal motion unit is used.
- In page mode, the horizontal or vertical motion unit differs in page mode, depending on starting position of the printable area as follows:
  - 1) When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit (x) is used.
  - 2) When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit (y) is used.
- The maximum right-side spacing is 255/180 inches. Any setting exceeding the maximum is converted to the maximum automatically.

[Default]      n = 0

[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]**       • Selects print mode(s) using n as follows

Bit	1/0	HEX	Decimal	Function
			0	Standard ASCII Font (12 × 24)
				Compress ASCII Font (9 × 17)
				Undefined



				Emphasized mode not selected
				Emphasized mode selected
				Double-height mode not selected
				Double-height mode selected
				Double-width mode not selected
				Double-width mode selected
				Undefined
				Underline mode not selected
				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 that selected by **ESC -**, regardless of the character size.
- When some characters in a line are double or more height, all the characters on the line are aligned at the baseline.
- **ESC E** can also turn on or off emphasized mode. However, the setting of the last received command is effective.
- **ESC -** can also turn on or off underline mode. However, the setting of the last received command is effective.
- **GS !** can also select character size. However, the setting of the last received command is effective.

[Default]      n = 0

[Reference]    ESC -, ESC E, GS !

[Example]    **1B 40** (Initialization)

**1B 21 00** (Select normal print mode)

**1B 21 01** (Select compress 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

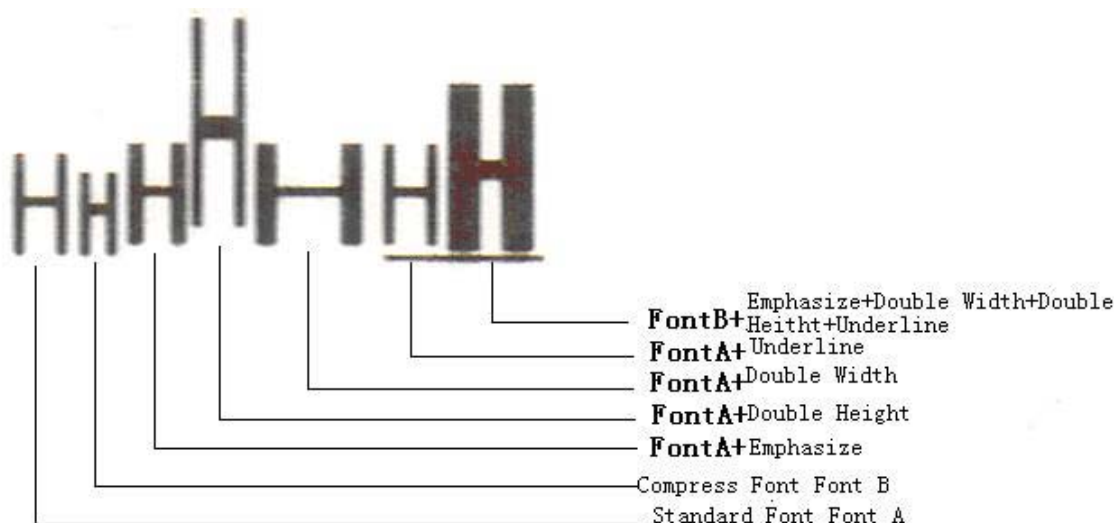
**1B 21 80** (Select underline mode)

48

**1B 21 B9** (Select compress, 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]**  $0 \leq n \leq 255$

**[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

$32 \leq c1 \leq c2 \leq 127$

$0 \leq x \leq 12$  Standard ASCII font (12 × 24)

$0 \leq x \leq 9$  Compress ASCII font (9 × 17)

$0 \leq d1 \dots d(y \times xk) \leq 255$

• 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 dot data for the 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:

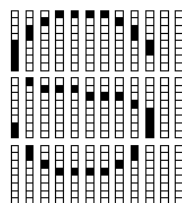
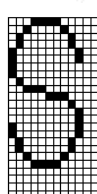
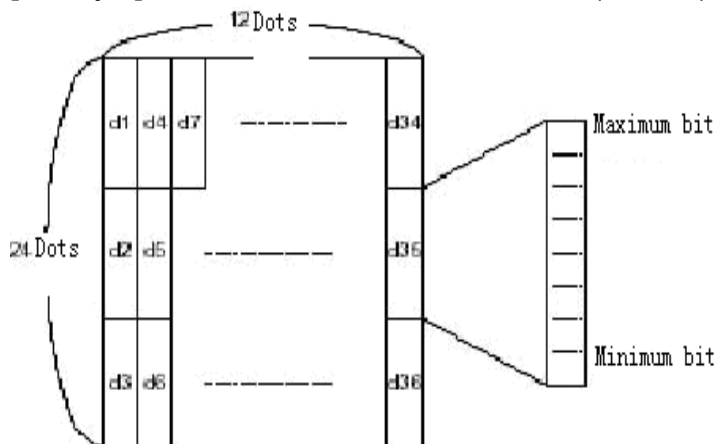
1) **ESC ?** is executed.

2) The power is turned off.

**[Default]** The internal character set

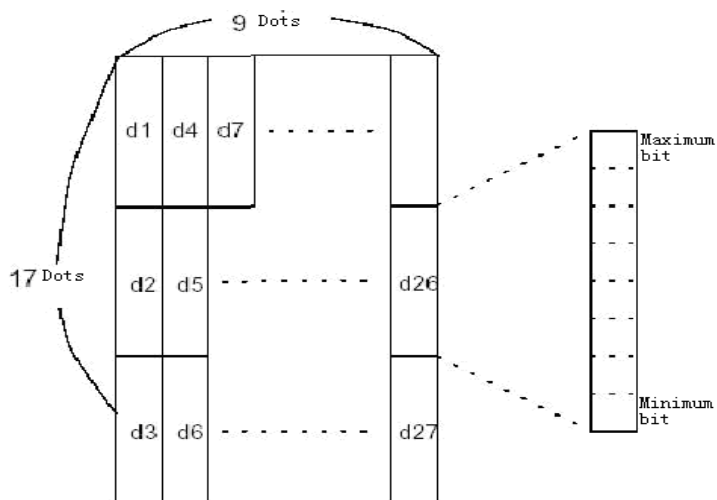
**[Reference]** ESC %, ESC ?

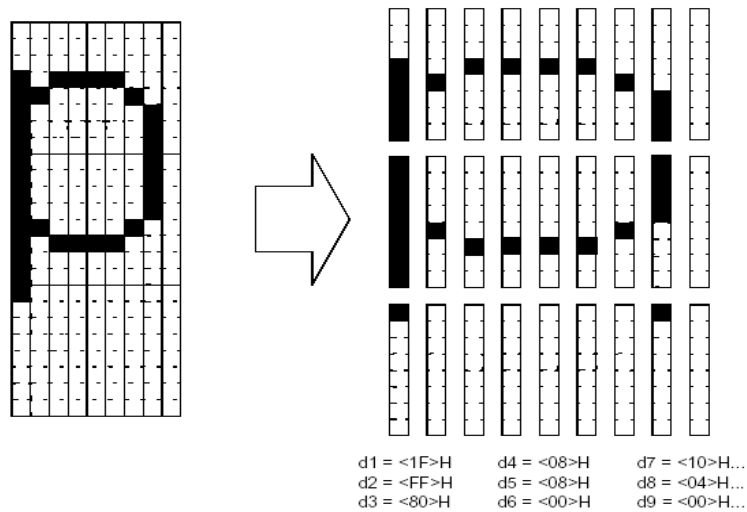
**[Example]** • When standard ASCII font (12 × 24) is selected



d1 = <0F>H   d4 = <30>H   d7 = <40>H....  
 d2 = <03>H   d5 = <80>H   d8 = <40>H....  
 d3 = <00>H   d6 = <00>H   d9 = <20>H....

• When compress 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]**        Turns underline mode on or off, based on the following values of n:

n	Function
	Turns off underline mode
	Turns on underline mode (1-dot thick)
	Turns 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:

AAAAAA → 2-dot thick underline  
BBBBBB → 1-dot thick underline  
 CCCCCC → Turn off underline

## 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.

[ 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:

**AAABBB**   ← Turn off emphasized mode

**AAABBB**   ← Turn on emphasized mode

## 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]**     n = 0, 1, 2,3,48, 49,50,51

n	Function
	Standard ASCII Font (12 × 24) selected

	Compress ASCII font (9 × 17) selected
	User defined character selected
	Chinese font (24 × 24) selected

[Example] 1B 40

1B 4D 01 (Compress 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:

AAABBB000111 → Compress Font Font B 9X17

AAABBB000111 → Standard Font Font A 12X24

## ESC R n

**[Function]** Select an international character set

**[Format]**

ASCII	ESC	R	n
Hex	1B	52	n
Decimal	27	82	n

**[Range]**  $0 \leq n \leq 13$

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

	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

**[Description]**      Turn 90° clockwise rotation mode on/off

**[Format]**      ASCII ESC    V    n

Hex      1B   56    n

Decimal   27   86    n

**[Range]**       $0 \leq n \leq 1$ ,  $48 \leq n \leq 49$

**[Notes]**      n is used as follows::

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

- his command effective only in standard mode.
- When underline mode is turned on, the printer does not underline 90° clockwise-rotated.
- Double-width and double-height commands in 90° rotation mode enlarge characters in the opposite directions from double-height and double- width commands in normal mode.

[Default]      n = 0

[Reference]   ESC !,   ESC

[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]**      Selects character code table

**[Format]**      ASCII ESC    t    n

Hex      1B   74    n

Decimal   27   116   n

**[Range]**       $0 \leq n \leq 5$ ,  $16 \leq n \leq 19$

n	Code	n	Code
0	PC437	12	PC857
1	Katakana	16	WPC1252
2	PC850	17	PC866
3	PC860	18	PC852
4	PC863	19	PC858
5	PC865	38	WPC1257

**[Notes]** This command is unable in Chinese font

**[Default]** PC437 code

## ESC { n

**[Function]** Turns on/off upside-down printing mode

**[Format]** ASCII ESC { n

Hex 1B 7B n

Decimal 27 123 n

**[Range]**  $0 \leq n \leq 255$

**[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 a line in standard mode.

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

• This command does not affect printing in page mode.

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

**[Default]** n = 0

**[Example]** 1B 40

**1B 7B 01** (Turn on upside-down printing mode)

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

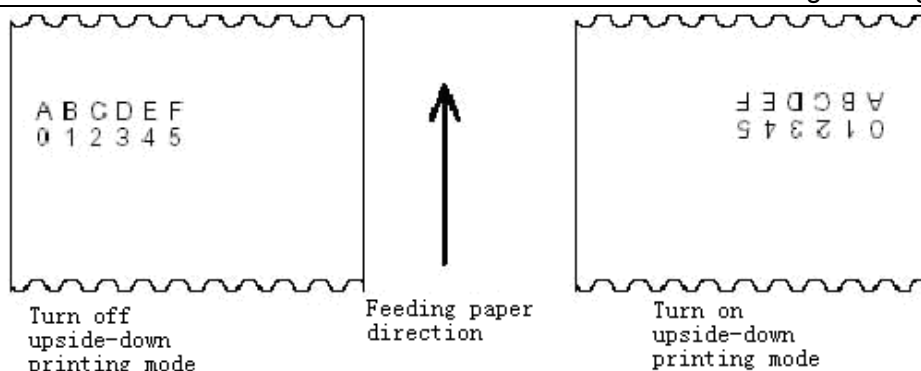
30 31 32 33 34 35 **0A**

**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]**

Format	ASCII	Hex	Decimal	Value
ASCII	GS	!	n	
Hex		1D	21	n
Decimal		29	33	n

**[Range]**  $0 \leq n \leq 255$

( $1 \leq \text{vertical number of times} \leq 6$ ,  $1 \leq \text{horizontal number of times} \leq 6$ )

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

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

Table 1 Character Width Selection			Table 2 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 (alphanumeric and Kanji) 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 character orientation. When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.

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

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

**[Default]** n = 0

**[Reference]** **ESC !**

**[Example]** Refers to **ESC !**

## GS B n

**[Function]** Turn white/black reverse printing mode

<b>[Format]</b>	ASCII	GS	B	n
	Hex	1D	42	n
	Decimal	29	66	n

**[Range]**  $0 \leq n \leq 255$

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

- When the LSB of n is 0, white/black reverse mode is turned off.
- When the LSB of n is 1, white/black reverse mode is turned on.

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

- This command is effective to all characters (alphanumeric and Kanji) except for HRI characters..
- When white/black reverse printing mode is on, it also applied to character spacing set by **ESC SP**.
- This command does not affect bitmap, user-defined bitmap, bar code, 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:

<b>AAABBB</b>	→	Turn white/black reverse mode on
<b>AAABBB</b>	→	Turn white/black reverse mode off

## FS ! n

**[Function]** Set print mode(s) for Kanji characters

<b>[Format]</b>	ASCII	FS	!	n
	Hex	1C	21	n
	Decimal	28	33	n

**[Range]**  $0 \leq n \leq 255$

**[Description]** Sets the print mode for Kanji characters, using *n* as follows:

Bit	0/1	Hex	Decimal	Status for ASB
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- 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 that specified by **FS -**, regardless of the character size.
- When some of the characters in a line are double or more height, all the characters on the line are aligned at the baseline.
- It is possible to emphasize the Kanji character using **FS W** or **GS !**, the setting of the last received command is effective.
- It is possible to turn under line mode on or off using **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 Kanji character mode

**[Format]**

ASCII	FS	&
Hex	1C	26
Decimal	28	38

**[Description]** Select Kanji character mode.

- [Notes]**
- When the kanji character mode is selected, the printer checks whether the code is for Kanji or not, then processed the first byte and the second byte if the code is for Kanji.
  - Kanji codes are processed in the order of the first byte and second byte.
  - Kanji character mode is not selected when the power is turned on.

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

## FS - *n*

**[Function]** Turn underline mode on/off for Kanji characters

**[Format]**

ASCII	FS	-	<i>n</i>
Hex	1C	2D	<i>n</i>
Decimal	28	45	<i>n</i>

**[Range]**  $0 \leq n \leq 2$ ,  $48 \leq n \leq 50$

**[Description]** Turns underline mode for Kanji characters on or off, based on the following values of n.

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

**[Notes]** 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 Kanji 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 specified line thickness does not change even when the character size changes.

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

**[Default]** n = 0

**[Reference]** **FS !**

**[Example]** Refers to **ESC\_**

**FS .**

**[Function]** Cancel Kanji character mode

**[Format]**

ASCII	FS	.
Hex	1C	2E
Decimal	28	46

**[Description]** Cancels Kanji character mode.

**[Notes]** For Chinese Kanji model:

When the Kanji character mode is not selected, all character codes are processed one byte at a time as ASCII code.

Kanji character mode is selected when the power is turned on.

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

**FS 2 c1 c2 d1...dk**

**[Function]** Define user-defined Kanji 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

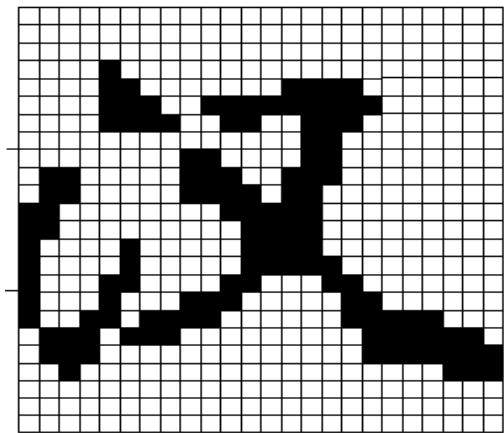
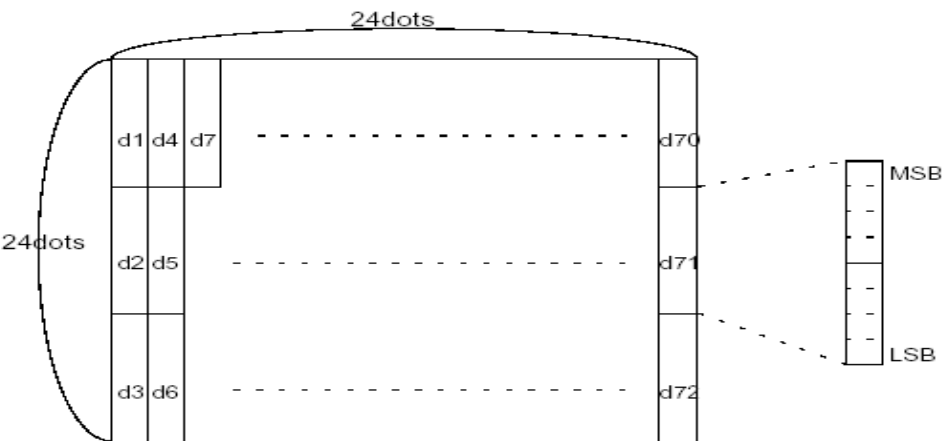
k = 72

**[Description]** c1 and c2 indicate character codes for the defined characters. c1 specifies for the first byte, and c2 for 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 Kanji.

**[Reference]** FS C

The relationship between user-defined Chinese Kanji and data:



D1=00H, D4=00H, D7=00H, D10=00H. ....  
D2=1FH, D5=78H, D8=60H, D11=00H. ....  
D3=C0H, D6=30H, D9=38H, D12=70H. ....

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]** choose Japanese character mode according to the value of n:

<b>n</b>	<b>Coding mode</b>
0,48	JIS code
1,49	SHIFT JIS code

• This command is valid only under Japanese character mode.

• Under JIS code mode, the following character codes are valid:

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

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

• Under SHIFT JIS code mode, the following character codes are valid:

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 Kanji character spacing

<b>[Format]</b>	ASCII	FS	S	n1	n2
	Hex	1C	53	n1	n2
	Decimal	28	83	n1	n2

**[Range]**      0 ≤ n1 ≤ 255

0 ≤ n2 ≤ 255

**[Description]** Set left-side and right-side Kanji 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 units], and the right-side character spacing is [n2 × horizontal or vertical motion units].

**[Notes]** When double-width mode is set, the left-side 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 using **GS P**.

· 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, 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.
- 3) The maximum Chinese Kanji 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]**      Refers to **ESC SP**



**FS W n**

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

**[Format]**

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

**[Range]**  $0 \leq n \leq 255$

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

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

**[Notes]**

· Only the lowest bit of n is valid.

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

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

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

· **FS !** or **GS !** can also select and 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]**  $m = 0, 1, 32, 33$

$0 \leq nL \leq 255$

$0 \leq nH \leq 3$

$0 \leq d \leq 255$

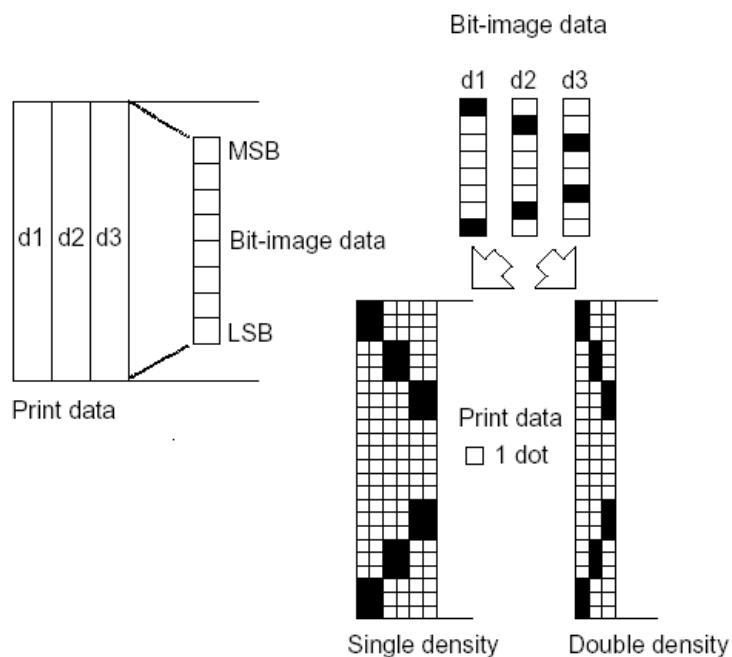
**[Notes]** Selects a bit-image mode using m for the number of dots specified by nL and nH, as follows:

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

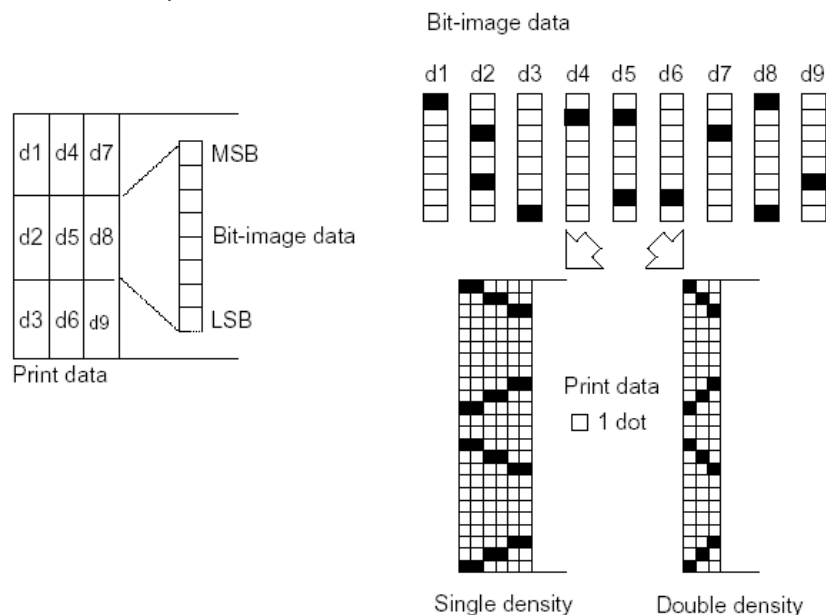
**[Notes]** · If the value of m is out of the specified range, nL and data following are processed as

normal data.

- The nL and nH indicate the number of dots of the bitmap in the horizontal direction. The number of dots is calculated by  $nL + nH \times 256$ .
- If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored.
- d indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.
- After printing a bitmap, the printer returns to normal data processing mode.
- This command is not affected by print modes (emphasized, double-strike, underline, character size or white/black reverse printing), except upside-down printing mode.
- The relationship between the image data and the dots to be printed is as follows:
- When 8-dot bitmap is selected:



When 24-dot bitmap is selected:



**ESC # n**

**[Function]** Specify a number for the bit-image to be downloaded.

**[Format]**

ASCII	GS	#	n
Hex	1D	23	n
Decimal	29	35	n

**[Range]**  $0 \leq n \leq 7$

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

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

**[Reference]** **ESC 3**

**GS \* x y d1...d(x × y × 8)**

**[Function]** Define downloaded bitmap

**[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)

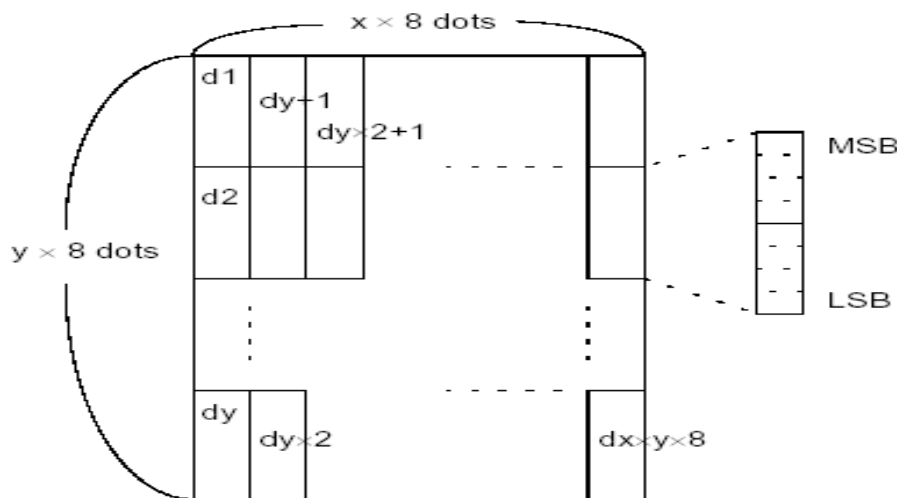
**[Range]**  $1 \leq x \leq 255, 1 \leq y \leq 48$

$x \times y \leq 912$

$0 \leq d \leq 255$

**[Description]** Defines a downloaded bitmap using the number of bytes specified by x and y.

- x specifies the number of dots in the horizontal direction.
- y specifies the number of dots in the vertical direction.
- The number of dots in the horizontal direction is  $x \times 8$ , in the vertical direction it's  $y \times 8$ .
- If  $x \times y$  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 definition is cleared when:
  - 1) Printer is reset or the power is turned 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]**         $0 \leq m \leq 3, 48 \leq m \leq 51$ **[Description]** Prints a downloaded bitmap using the 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

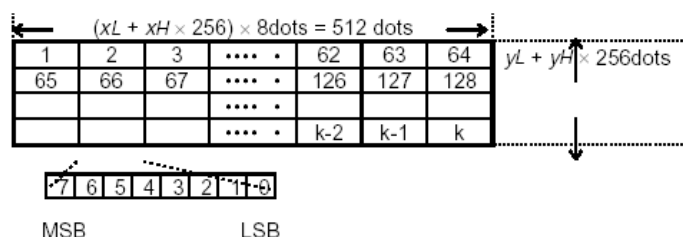
**[Range]**         $0 \leq m \leq 3, 48 \leq m \leq 51$  $0 \leq xL \leq 255$  $0 \leq xH \leq 255$  $0 \leq yL \leq 255$  $0 \leq d \leq 255$  $k = (xL + xH \times 256) \times (yL + yH \times 256) (k \neq 0)$ **[Notes]**        Selects Raster bit-image mode. The value of m selects the mode, as follows:

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 ( $xL + xH \times 256$ ) in the horizontal direction of the bitmap.

- $yL$ ,  $yH$  indicate the number of data bytes ( $yL + yH \times 256$ ) 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, emphasized, double-strike, upside-down, 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 bit to 1 prints a dot and setting it to 0 does not print a dot.

**[Example]** When  $xL + xH \times 256 = 64$



## 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]**  $1 \leq n \leq 255$   
 $0 \leq m \leq 3, 48 \leq m \leq 51$

**[Notes]** Prints a NV bitmap  $n$  using 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 using the **FS q** command).
- $m$  specifies the bitmap mode.
- NV bitmap means a bitmap which is defined in a non-volatile memory by **FS q** and printed by **FS p**.

NV bitmap means a bitmap which is defined in a non-volatile memory by **FS r** and printed by **FS p**.

- This command is not effective when the specified NV bitmap has not been defined.
- In standard mode, this command is effective only when there is no data in the print buffer.

- This command is not affected by print modes (emphasized, double-strike, underline, character size, white/black reverse printing, or 90° rotated characters, etc.), except upside-down printing mode.
- If the downloaded bit-image to be printed exceeds one line, the excess data is not printed.
- 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 Flash 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

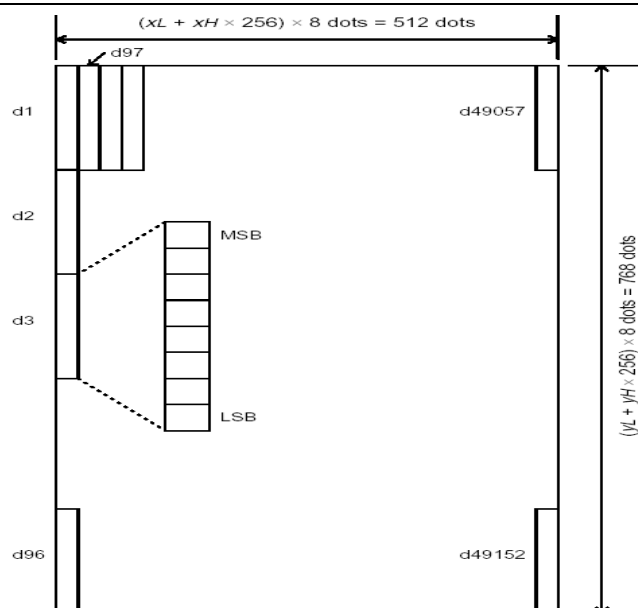
**[Range]**  $1 \leq n \leq 255$   
 $0 \leq xL \leq 255$   
 $1 \leq (xL + xH \times 256) \leq 1023$   
 $1 \leq (yL + yH \times 256) \leq 8190$   
 $0 \leq d \leq 255$   
 $k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$

- [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  $(xL + xH \times 256) \times 8$  dots in the horizontal direction for the NV bitmap you are defining.
  - yL, yH specifies  $(yL + yH \times 256) \times 8$  dots in the vertical direction for the NV bitmap you are defining.
  - Frequent write command execution may cause damage the NV memory. Therefore, it is recommended to write the NV memory 10 times or less a day.
  - This command cancels all NV 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.
  - Before the ending of the processing of this command mechanical operations (including initializing the position of the printer head when the cover is open, paper feeding by using the FEED button, etc.) cannot be performed, also sending command including real-time command is forbidden.
- NV bitmap means a bitmap which is defined in a non-volatile memory by **FS q** and printed by **FS p**.
- In standard mode, this command is effective only when processed at the beginning of the line.

- This 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 processes xL, xH, yL, yH out of the defined range.
- In the first group of NV bitmaps, when any of the parameters xL, xH, yL, yH is out of the definition range, this command is disabled.
- In groups of NV bitmaps other than the first one, when the printer processes xL, xH, yL, yH 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 a 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 only one NV bitmap is defined n=1, the printer processes a data group [xL xH yL yH d1...dk] once. The printer uses  $[(data: (xL + xH \times 256) \times (yL + yH \times 256) \times 8) + [header:4]]$  bytes of NV memory.
- 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**

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



## 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]**  $1 \leq n \leq 4$

n = 1: Transmit printer status

n = 2: Transmit off-line status

n = 3: Transmit error status

n = 4: Transmit paper roll sensor status

**[Description]** Transmits the selected printer status specified by n in real-time.

**[Notes]**

- Even though the printer is not selected using **ESC =** (select peripheral device), this command is effective.
- The printer transmits the current status. Each status is represented by one-byte data.
- The printer transmits the status without confirming whether the host computer can receive data.
- The printer executes this command upon receiving it.
- This command is effective to serial, bi-direction parallel and USB printer. This command is executed in any status.

n = 1: Printer status

Bit	0/1	Hex	Decimal	Function
0	0	00	0	Not used. Fixed to 0
1	1	02	2	Not used. 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	Not used. Fixed to 1
5,6				Undefined
7	0	00	00	Not used. Fixed to 0.

n = 2: Off-line status

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

n = 3: Error status

Bit	0/1	Hex	Decimal	Function
0	0	00	0	Not used. Fixed to 0
1	1	02	2	Not used. Fixed to 1
2	-	-	-	Undefined
3	0	00	0	No auto-cutter error
	1	08	8	Auto-cutter error occurs.
4	1	10	16	Not used. Fixed to 1
5	0	00	00	Not used. Fixed to 0
6	0	00	0	Temperature of printhead is normal
	1	40	64	Temperature of printhead is abnormal
7	0	00	0	Not used. Fixed to 0

n = 4: Paper feeding status

Bit	0/1	Hex	Decimal	Function
0	0	00	0	Not used. Fixed to 0
1	1	02	2	Not used. Fixed to 1
2,3	0	00	0	Non-paper near status

	1	0C	12	Paper near end status
4	1	10	16	Not used. Fixed to 1
5,6	0	00	0	Paper present
	1	60	96	Paper end
7	0	00	0	Not used. Fixed to 0

Please avoid to insert this command between 2 or more byte command.

For Example:

In the process of sending **ESC 3 n** to printer, DTR become to MARK(DSR is used to host) before sending n and **DLE EOT 3** 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]  $0 \leq n \leq 255$

[Notes] Enables or disables ASB and specifies the status items to include. The return information 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 turns, so there will have some time delay between sending command and setting ASB is available.
- Even the printer is disabled by ESC = (Select peripheral device), the four status bytes are transmitted whenever the status changes.

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 occurred.
4	Off	00	0	Not used. Fixed to Off.
5	Off	00	0	No recoverable error.
	On	20	32	Recoverable error occurred.
6	Off	00	0	No automatically recoverable error.
	On	40	64	Automatically recoverable error occurred.
7	Off	00	0	Not used. Fixed to Off.

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

**Bit 6:** When printing is stopped due to high print head temperature until the print head temperature drops sufficiently.

## 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 Off.
5,6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

## Fourth byte (paper sensor information)

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

## GS r n

**[Function]** Transmit status

**[Format]** ASCII      GS      r      n  
Hex      1D      72      n  
Decimal      29      114      n

**[Range]** n = 1, 2, 49, 50

**[Description]** Transmits the status specified by n as follows:

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

**[Notes]**

- This command is valid for serial, bi-direction parallel and USB printer only,
- 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, depending on the receive buffer status.

· The status types to be transmitted are shown below:

**Paper sensor status ( n = 1, 49):**

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

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

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

[Reference] **DLE EOT, GS a**

## 2.6 Barcode command

### GS H n

[Function] Select printing position for HRI characters

[Format]    ASCII      GS      H      n  
               Hex        1D      48      n  
               Decimal    29      72      n

[Range]       $0 \leq n \leq 3, 48 \leq n \leq 51$

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

n selects the printing position as follows:

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

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

[Default]    n = 0

[Reference]    **GS f, GS k**

### GS f n

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

[Format]    ASCII      GS      f      n  
               Hex        1D      66      n  
               Decimal    29      102    n

[Range]      n = 0, 1, 48, 49

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

n selects a font from the following table:

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

- [Notes]**
- HRI indicates Human Readable Interpretation.
  - HRI characters are printed at the position specified by **GS H**.

**[Default]** n = 0

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

**GS h n**

---

**[Function]** Select barcode height

<b>[Format]</b>	ASCII	GS	h	n
	Hex	1D	68	n
	Decimal	29	104	n

**[Range]**  $1 \leq n \leq 255$ **[Description]** Selects the height of the barcode.

n specifies the number of dots in the vertical direction.

**[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

<b>[Format]</b>	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]** ① $0 \leq m \leq 6$ ,  $10 \leq m \leq 12$  (k and d depends on the barcode system used)② $65 \leq m \leq 73$ ,  $75 \leq m \leq 77$  (n and d depends on the barcode system used)**[Range]** Selects a barcode type and prints the bar code.

m selects a bar code type as follows:

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

**[Notes ①]**

- This command ends with a NULL code.
- When UPC-A or UPC-E selected, printer ignores the following data after receiving 12 bytes of barcode data.
- When JAN13 (EAN13) selected, printer ignores the following data after receiving 13 bytes of barcode data.
- When JAN8 (EAN8) selected, printer ignores the following data after receiving 13 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 use T, E, \* and N to ends.
- When QRCODE selected,  $d1...dk(d1...dn)$  consist of 5 parts and the format is shown as below:

(1) Daabbcc

D: Link structure mode, input specific identify 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 2bytes hexadecimal data

bb: The total amount of the symbols; input 2bytes hexadecimal data

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

,: Fixed separator symbol

(2) E: Error correction grade Range: L,M,Q,H. The correction 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 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 ><DATA n>

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: 8Bit 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 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: Changeable;

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 of the specified range, the printer stops command processing and processes the following data as normal data.

#### [Notes ( standard mode)]

- If d is outside of the specified range, the command is ignored.
- If the horizontal size of the barcode exceeds printing area, the command is ignored.
- 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° 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, the printer stops command processing and processes the following data as normal data.
- If barcode width exceeds the printing area, the printer does not print the barcode.

When CODE128 ( m = 73) is used:

- Refer to Appendix A for the information of the CODE 128 barcode and its code table.
- When using the CODE 128 in this printer, take the following points into account for data transmission:

- 1)The top of the bar code data string must be code set selection character (any of CODE A, CODE B or CODE C) which selects
- 2)Special characters are defined by combining two characters "{" and one character. The ASCII character "{" is defined by transmitting "{" twice consecutively.

Specific character	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 ignore the following data.
- If combination of "{" and the following character does not apply any special character, the printer stops command processing and ignore the following data.
- If the printer receives characters that cannot be used in the special code set, the printer stops command processing and ignore the following data.
- The printer does not print HRI characters that correspond to the shift characters or code set selection characters.
- HRI character for the function character are not printed.
- HRI characters for the control character (<00>H to <1F>H and <7F>H) are not printed.

[Relative] GS H, GS f, GS h, GS w, 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 character use condensed character)

**1D 77 01** (HRI character 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 character use condensed character)

**1D 77 02** (HRI character 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)

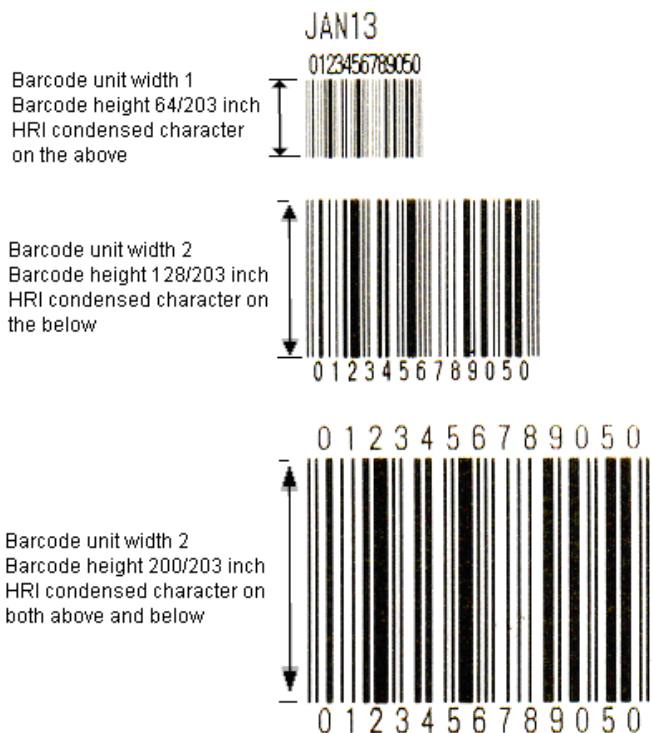
**1D 66 00** (HRI character use standard character)

**1D 77 03** (HRI character 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 Set barcode parameter of GS1.**

**[Function]** Set barcode parameter of GS1.

**[Format]** ASCII GS s n1 n2 n3 n4 n5 n6 n7 n8

Hex 1D 73 n1 n2 n3 n4 n5 n6 n7 n8

Hecimal 29 115 n1 n2 n3 n4 n5 n6 n7 n8

**[Range]**  $1 \leq n1 \leq 7$

$1 \leq n2 \leq 6$

$2 \leq n3 \leq 250$

$1 \leq n4 \leq 10$

$1 \leq n5 \leq 10$

$2 \leq n6 \leq 20, 4 \leq n6 \leq 20$

$1 \leq n7 \leq 4$

$0 \leq n8 \leq 1$

**[Notes]**

Whether GS1 barcode is separate or composite barcode is distinguished by data delimiter. 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 stands for barcode type and character set as below:

Parameter	Barcode type	Character set	Data length	Coding range
1	Omnidirectional	Number 0-9	14bits, 13bits, number+1bit check character	00000000000000 ~ 99999999999999

2	GS1 DataBar Truncated	Number 0-9	14bits, 13bits number+1bit check character	0000000000000 ~ 9999999999999
3	GS1 DataBar Stacked	Number 0-9	14bits, 13bits number+1bit check character	0000000000000 ~ 9999999999999
4	GS1 DataBar Stacked Omnidirectional	Number 0-9	14bits, 13bits number+1bit check character	0000000000000 ~ 9999999999999
5	GS1 DataBar Limited	Number 0-9	14bits, 13bits number+1bit check character	0000000000000 ~ 1999999999999
6	GS1 DataBar Expanded	0 ~ 9、A ~ Z、a ~ z ! " % & ' ( ) * + , - . / : ; < = > ? _ 空 格 FNC1	Max 74numbers or 41 letters	
7	GS1 DataBar Expanded Stacked	0 ~ 9、A ~ Z、a ~ z ! " % & ' ( ) * + , - . / : ; < = > ? _ 空 格 FNC1	Max 74numbers or 41 letters	

- If the length is 13 bits, it will append the check character which is from the calculateion automatically from the first 13 bits; If the length is 14 bits, the check character which is from the calculateion automatically from the first 13 bits will the 14<sup>th</sup> bit character(the printed 14<sup>th</sup> bit may be different from the input character); if the length is shorter than 13 bits, add 0 to the left of the data, and the bits after the first 14<sup>th</sup> bits will not be printed out.

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

- n2 indicates basic element length

- n3 indicates the height of the DataBar,. Stacked, stacked omnidirectional, expanded stacked barcode indicate the height of each row 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 segment number of each row of barcode. Only in expanded stacked barcodes should this parameter be set.

Separate expanded stacked barcode parameter range 2 ~ 20; composite expanded stacked barcode parameter range 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 not use; 1 indicates use AI.

[Reference] GS k

**GS o n**

**[Function]** Set barcode parameter of QRCODE

**[Format]**

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

**[Range]**  $m = 0, 1 \leq nA \leq 255, 0 \leq nB \leq 1, 1 \leq nC \leq 2$

**[Description]** The meaning of parameter n is shown as below:

Parameter	Meaning
m	m=0(Fixed)
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 the parameters is beyond the range, the command is not valid.

**GS p n**

**[Function]** Set barcode parameter 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]**  $1 \leq nA \leq 10, 1 \leq nB \leq 100, 3 \leq nC \leq 90, 1 \leq nD \leq 30, 1 \leq nE \leq 7, 2 \leq nF \leq 25$

**[Description]** 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	Basic element width
nF	Basic element 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]**  $0 \leq n \leq 8$

**[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 bar code width

**[Format]**

ASCII	GS	w	n
-------	----	---	---

Hex	1D	77	n
Decimal	29	119	n

**[Range]**  $2 \leq n \leq 6$

**[Description]** Set the horizontal size of the barcode.

n specifies the bar code width as follows:

n	Module Width (mm) for Single -level Barcode	Binary-level Barcode	
		Thin element width (mm)	Thick element width (mm)
2	0.25	0.25	0.625
3	0.375	0.375	1.0
4	0.5	0.5	1.25
5	0.625	0.625	1.625
6	0.75	0.75	1.875

· Single-level bar codes are as follows:

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

· Binary-level bar codes are as follows:

CODE39, ITF, CODABAR

**[Default]** n = 2

**[Relative]** **GS k**

## 2.7 Bi-colour command

### ESC r n enter /exit bi-colour print mode

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

**[Format]** ASCII ESC r n

Hex 1B 72 n

Decimal 27 114 n

**[Range]**  $0 \leq n \leq 1$

**[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:

AAAA

## ESC C n select print colour

[Function] select print colour..

[Format] ASCII ESC C n

Hex 1B 43 n

Decimal 27 67 n

[Range]  $0 \leq n \leq 1$

[Notes] • n=0, select colour one.

• n=1, select colour two.

[Reference] ESC r

## 2.8 Invert print command

### GS ( z nL nH 0 S enter upside-down printing mode

[Function] enter upside-down printing mode, start incepting inverted 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 printing mode 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 row upside down.
- This command is used in the beginning of the inverted page. The part behind the command is the content to be printed. It cannot be printed out immediately, but it is stored in page buffer. When the printer incept the cut paper command (GS V) or when it exits upside-down printing mode, print the content upside-down.
- This command can only be used in the beginning of the row, otherwise it will be ignored. This command should cooperate with cut paper command or exit upside-down printing command; otherwise it will not be able to print upside down.
- The print data under upside-down printing mode must be smaller than the command buffer (can check the size of buffer by printing self-test pages), for pages larger than command buffer:
  - a) Printer ignores print data;
  - b) If ending up with exiting upside-down printing mode, the printer will enter normal print mode with no operation;
  - c) If ending up with cut paper command, the printer will enter normal print mode after the operation of cutting paper.

- Forbid command

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

Command	Function
GS :	Start / end macro definition
GS ^	Perform macro definition
ESC D	Set lateral tab position
FS q	Define Flash 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 you want to print Flash bitmap upside down, enter upside-down printing mode by command mode. Before entering upside-down printing mode, send **FS q command to define** Flash bitmap. Example is as follows:

**1C 71 01** (define Flash 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 into FLASH)

**1D 28 7A 02 00 30 45** (print FLASH 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

- Procedures to enter upside-down printing mode through command:

- Send command of entering upside-down printing mode;
- Send page;
- send command of exiting upside-down printing mode or cutting paper and print sample page.

**[Example]**

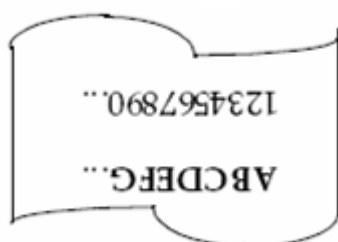
**1D 28 7A 02 00 30 53** (enter upside-down printing mode)

41 42 43 44 45 46 47 2E 2E 2E 0A 0A

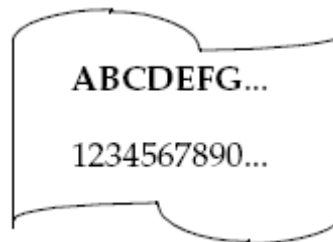
31 32 33 34 35 36 37 38 2E 2E 2E 0A (print sample page)

**1D 56 42 00** (cut paper and exit upside-down printing mode)

Normal print and inverted print:



Normally printed note



upside down printed note



## GS ( z nL nH 0 E print sample data and exit upside-down printing mode

**[Function]** print sample data and exit upside-down printing mode, entering 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 in the end of the inverted page. After incepting the command, the sample data will be printed upside down.
- This command can only be used in the beginning of each row, 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 print command

### GS { w f n1 n2 n3 n4 n5 water print bitmap parameter setting

**[Function]** Set water print bitmap parameter and enter water 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]**  $0 \leq n1 \leq 1$   
 $0 \leq n2 \leq 2$   
 $1 \leq n3 \leq 255$   
 $0 \leq n4 \leq 255$   
 $1 \leq n5 \leq 255$

**[Notes]**

- n1 indicates water print mode:  
 n1 = 0: Water print bitmap when feeding  
 n1 = 1: Water print bitmap when printing
- n2 indicates water print justification mode  
 n2 = 0: Left justification  
 n2 = 1: Centering  
 n2 = 2: Right justification
- n3 indicates water print enlargement mode, 0-3 indicates height, 4-7 indicates width, values are as below

Width			Height		
Hex	Decimal	Lateral enlargement	Hex	Decimal	Longitudinal 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 print grayscale and luminosity adjustment, recommended value 0x20.
- n5 indicates the symbol of bitmap( defined by FS q command).
- This command should be used in the beginning of each row, otherwise it will be ignored.
- This command is only valid under row mode, not valid under page mode.
- Before using this command, use FS q command to define Flash bitmap.

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

Explanation

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

n2=0x00: water print bitmap left justification.

n3=0x22: water print bitmap is enlarged twice laterally and vertically respectively.

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

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

## GS { w n enter\exit water print mode

**[Function]** enter\exit water print mode.

**[Format]** ASCII GS { w n  
Hex 1D 7B 77 n  
Decimal 29 123 119 n

**[Range]**  $0 \leq n \leq 1$

- [Notes]**
- n = 0: Exit water print mode
  - n = 1: Enter water print mode
  - This command is only valid in the beginning of each row.
  - Before using this command, use water print setting command to set water print parameter.
  - after use this command to exit water print mode, the printer comes back to normal printing mode.

## 2.10 Greyscale printing command

### FS r n xL xH yL yH zL zH d1 d2 d3...d(k) FLASH grayscale bitmap download

**[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]**  $1 \leq n \leq 255$

$xL = 1, xH = 0$

$1 \leq (yL + yH \times 256) \leq 65536$

$1 \leq (zL + zH \times 256) \leq 8190$

$0 \leq d \leq 255$

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

**[Notes]** • The max capacity of Flash is decided by the configuration of the printer,

which can be checked through printing self-test page. The download FLASH 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 you are defining.
- zL、 zH specifies ( zL + zH × 256 ) × 8 dots in the vertical direction for the NV bitmap you are defining.
- This command is disabled in upside-down printing mode.
- Frequent write command execution may cause damage the NV memory. Therefore, it is recommended to write the NV memory 10 times or less a day.
- This command cancels all NV 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.
- Before the ending of the processing of this command mechanical operations (including initializing the position of the printer head when the cover is open, paper feeding by using the FEED button, etc.) cannot be performed, also sending command including real-time command is forbidden.
- NV bitmap means a bitmap which is defined in a non-volatile memory by **FS** and printed by **FS p**.
  - · In standard mode, this command is effective only when processed at the beginning of the line.

This 9 bytes <from FS~zH> is 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 other than the first one, 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 definition data. In data (d) a 1 bit specifies a dot to be printed and a 0 bit specifies a dot not to be printed.

- This command defines n as the number of a NV 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 processes a data group [yL yH zL zH d1...dk] once. 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
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) RAM grayscale bitmap download

[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]  $0 \leq n \leq 7$

$0 \leq d \leq 255$

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

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

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

$k > 0$

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

- yl、 yH specifies  $(yl + yH \times 256) \times 8$  dots in the horizontal direction for the NV bitmap you are defining.

- zL、 zH specifies  $(zL + zH \times 256) \times 8$  dots in the vertical direction for the NV bitmap you are defining.

- 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
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 print RAM grayscale bitmap

**[Function]** Print downloaded bitmap.

**[Format]** ASCII ESC c 7 n

Hex 1B 63 37 n

Hecimal 27 99 55 n

**[Range]**  $0 \leq n \leq 7$

**[Notes]** • This command is ignored if a downloaded bitmap has not been defined.

- This command is disabled in 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 #**.

## 2.11 Other commands

### DLE ENQ n

**[Function]** Real-time request to printer

<b>[Format]</b>	ASCII	DLE	ENQ	n
	Hex	10	05	n
	Decimal	16	5	n

**[Range]**  $1 \leq n \leq 2$

**[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 label paper.
- The printer starts processing data upon receiving this command under serial mode.
- With a parallel interface model, this command can not be executed when the printer is busy.
- When the printer is disabled with **ESC =** (Select peripheral device), the command is still available.
- Do not insert the command into the data sequence of over 2 or more bytes.

**[Reference]** DLE EOT

### DLE DC4 n m t

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

<b>[Format]</b>	ASCII	DLE	DC4	n	m	t
	Hex	10	14	n	m	t
	Decimal	16	20	n	m	t

**[Range]**  $n = 1$   
 $m = 0, 1$   
 $1 \leq t \leq 6$

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

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

The pulse ON time is  $[t \times 100 \text{ ms}]$  and the OFF time is  $[t \times 100 \text{ ms}]$ .

- [Notes]**
- When the pulse is output to the connector pin specified while **ESC p** or **DEL DC4** is executed while this command is processed, this command is ignored.
  - The printer executes this command upon receiving it with a serial interface model.
  - this command cannot be executed when the printer is busy with a parallel interface model.
  - 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 over 2 or more bytes.

**[Reference]** **ESC p**

---

## **ESC 2**

**[Function]** Select default line spacing

<b>[Format]</b>	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

<b>[Format]</b>	ASCII	ESC	3	n
	Hex	1B	33	n
	Decimal	27	51	n

**[Range]**  $0 \leq n \leq 255$

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

**[Notes]**

- The line spacing can be set independently in standard mode and in page mode.
- The horizontal and vertical motion 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 starting position of the printable area:
  - 1) When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the vertical motion unit (y) is used.
  - 2) When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the horizontal motion unit (x) is used.
- The maximum paper feed amount is 1016 mm (40 inches). Even if a paper feed amount of more than 1016 mm (40 inches) is set, the printer feeds the paper only 1016 mm (40 inches).

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

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

---

## **ESC = n**

**[Function]** Set peripheral device

<b>[Format]</b>	ASCII	ESC	=	n
	Hex	1B	3D	n
	Decimal	27	61	n

**[Range]**  $0 \leq n \leq 1$

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

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

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

**[Default]** n = 1

## ESC @

**[Function]** Initialize printer

<b>[Format]</b>	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]** Select page mode

<b>[Format]</b>	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 (in which the values can be set independently in standard mode and page mode) to those for page mode:

- 1) Set right-side character spacing: **ESC SP**, **FS S**
- 2) Select default line spacing: **ESC 2**, **ESC 3**

· Only indication bit can be changed in page mode; switch to standard mode are not executed.

- 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

<b>[Format]</b>	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 are initialized as default data.
  - This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for standard mode:
    - 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]** Selects the paper type

**[Format]**

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

**[Range]**  $0 \leq n \leq 2$

**[Notes]** Selects the paper type

n = 0, set paper type as continuous paper roll.

n = 2, set paper type as label paper.

Never use continuous paper when paper type is set to label paper, otherwise **GS FF** command will cause the printer feeding too long. Never use label 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]**  $0 \leq n \leq 255$

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

Bit	0/1	Hex	Decimal	Function
				Paper near end send is disabled
				Paper near end send is enabled
				Paper near end send is disabled
				Paper near end send is enabled
				Paper near end send is disabled
				Paper near end send is enabled
				Paper near end send is disabled
				Paper near end send is enabled
Undefined				

- It is possible to select two sensors to output signals. Then, if any of the sensors detects a 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 selected as the paper sensor outputting paper-end signals.
- If either bit 2 or bit 3 is on (value is 1), the paper end sensor is selected as the paper sensor outputting paper-end signals
- When two sensors are disabled, the paper end signal always outputs a paper present status.

**[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]**  $0 \leq n \leq 255$

**[Notes]** n is defined as below:

Bit	Off/On	Hex	Decimal	Function
-----	--------	-----	---------	----------

0	Off	00	0	Paper near end sensor disabled
	On	01	1	Paper near end sensor enabled
1	Off	00	0	Paper near end sensor disabled
	On	02	2	Paper near end sensor enabled
2-7				Undefined

- When either bit 0 or 1 is on, paper near-end sensor enabled, and it stops printing after printer 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]  $0 \leq n \leq 255$

- [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 execute macro commands, the FEED button is always enabled.

[Default] n = 0

## ESC p m t1 t2

[Function] Outputs the pulse specified by t1 and t2 to connector pin

[Format]

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

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

$0 \leq t1 \leq 255, 0 \leq t2 \leq 255$

[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  $[t1 \times 2 \text{ ms}]$  and the OFF time is  $[t2 \times 2 \text{ ms}]$ .
- If  $t2 < t1$ , the OFF time is  $[t1 \times 2 \text{ ms}]$ .

[Reference] DLE DC4

Code	Hex	Dec	Function
HT	09	09	Horizontal tab
LF	0A	10	Print and line feed
FF	0C	12	Print and return to standard mode (in page mode)

<b>CR</b>	0D	13	Print and carriage return
<b>CAN</b>	18	24	Cancel print data in page mode
<b>DLE EOT</b>	10 04	16 04	Real-time status transmission
<b>DLE ENQ</b>	10 05	16 05	Real-time request to printer
<b>DLE DC4</b>	10 14	16 20	Generate pulse at real-time
<b>ESC FF</b>	1B 0C	27 12	Print data in page mode
<b>ESC SP</b>	1B 20	27 32	Set right-side character spacing
<b>ESC !</b>	1B 21	27 33	Select print mode(s)
<b>ESC #</b>	1B 23	27 35	Specify a number for the bit-image to be downloaded
<b>ESC \$</b>	1B 24	27 36	Set absolute print position
<b>ESC %</b>	1B 25	27 37	Select/cancel user-defined character set
<b>ESC &amp;</b>	1B 26	27 38	Define user-defined characters
<b>ESC *</b>	1B 2A	27 42	Select bit-image mode
<b>ESC -n</b>	1B 2D	27 45	Turn underline mode on/off
<b>ESC 2</b>	1B 32	27 50	Select default line spacing
<b>ESC 3</b>	1B 33	27 51	Set line spacing
<b>ESC =</b>	1B 3D	27 61 n	Select peripheral device
<b>ESC ?</b>	1B 3F	27 63 n	Cancel user-defined characters
<b>ESC @</b>	1B 40	27 64	Initialize printer
<b>ESC D</b>	1B 44	27 68	Set horizontal tab positions
<b>ESC E</b>	1B 45	27 69	Turn emphasized mode on/off
<b>ESC G</b>	1B 47	27 71	Turn double-strike mode on/off
<b>ESC J</b>	1B 4A	27 74 n	Print and feed paper
<b>ESC L</b>	1B 4C	27 76	Select page mode
<b>ESC M</b>	1B 4D	27 77	Select character font
<b>ESC R</b>	1B 52	27 82	Select an international character set
<b>ESC S</b>	1B 53	27 83	Select standard mode
<b>ESC T</b>	1B 54	27 84	Select print direction in page mode
<b>ESC V</b>	1B 56	27 86	Turn 90° clockwise rotation mode on/off
<b>ESC W</b>	1B 57	27 87	Set printing area in page mode
<b>ESC \</b>	1B 5C	27 92	Set relative print position
<b>ESC a</b>	1B 61	27 97	Select justification
<b>ESC c 0</b>	1B 63 30	27 99 48	Selects the paper type
<b>ESC c 3</b>	1B 63 33	27 99 51	Select paper sensor(s) to output paper-end signals
<b>ESC c 4</b>	1B 63 34	27 99 52	Select paper sensor(s) to stop printing
<b>ESC c 5</b>	1B 63 35	27 99 53	Enable/disable panel buttons
<b>ESC c P</b>	1B 63 50	27 99 80	选择出纸模式
<b>ESC d</b>	1B 64	27 100	Print and feed n lines
<b>ESC p</b>	1B 70	27 112	General pulse
<b>ESC t</b>	1B 74	27 116	Selects character code table
<b>ESC {</b>	1B 7B	27 123	Select character code table
<b>FS p</b>	1C 70	28 112	Print NV bitmap
<b>FS q</b>	1C 71	28 113	Define NV bitmap
<b>GS !</b>	1D 21	29 33	Select character size
<b>GS \$</b>	1D 24	29 36	Set absolute vertical print position in page mode
<b>GS *</b>	1D 2A	29 42	Define downloaded bitmap
<b>GS ( A</b>	1D 28 41	29 40 65	Execute test print
<b>GS /</b>	1D 2F	29 47	Print downloaded bitmap

<b>GS :</b>	1D 3A	29 58	Start/end macro definition
<b>GS B</b>	1D 42	29 66	Turn white/black reverse printing mode on/off
<b>GS H</b>	1D 48	29 72	Select printing position of HRI characters
<b>GS I</b>	1D 47	29 73	Transmit printer ID
<b>GS L</b>	1D 4C	29 76	Set left margin
<b>GS P</b>	1D 50	29 80	Set horizontal and vertical motion units
<b>GS V</b>	1D 56	29 86	Select cut mode and cut paper
<b>GS W</b>	1D 57	29 87	Set printing area width
<b>GS \</b>	1D 5C	29 92	Set relative vertical print position in page mode
<b>GS ^</b>	1D 5E	29 94	Execute macro
<b>GS a</b>	1D 61	29 97	Enable/disable Automatic Status Back (ASB)
<b>GS f</b>	1D 66	29 102	Select font for HRI characters
<b>GS h</b>	1D 68	29 104	Set bar code height
<b>GS k</b>	1D 6B	29 107	Print bar code
<b>GS p</b>	1D 70	29 112	Set barcode parameter of barcode PDF417
<b>GS q</b>	1D 71	29 113	Set correction grade of barcode PDF417
<b>GS r</b>	1D 72	29 114	Transmit status
<b>GS v 0</b>	1D 76 30	19 118 48	Print raster bitmap
<b>GS w</b>	1D 77	29 119	Set bar code width
<b>FS !</b>	1C 21	28 33	Set print mode(s) for Kanji characters
<b>FS &amp;</b>	1C 26	28 38	Select Kanji character mode
<b>FS -</b>	1C 2D	28 45	Turn underline mode on/off for Kanji characters
<b>FS .</b>	1C 2E	28 46	Cancel Kanji character mode
<b>FS2</b>	1C 32	28 50	Define user-defined Kanji characters
<b>FS S</b>	1C 53	28 83	Set Kanji character spacing
<b>FS W</b>	1C 57	28 87	Turn quadruple-size mode on/off for Kanji characters