

CONFIDENTIAL

# **PROGRAMMING MANUAL**

## **KIOSK Printer**

### **BT-T080R**

Shandong New Beiyang Information Technology Co.,Ltd.

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## 1. General Information

### 1.1 Commands classification

This receipt printer commands are classified as below:

Print commands: used for printing and feeding paper;

Position commands: to control the print position;

Character commands: to set 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 (regardless the printer's busy or error status).

**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 uses to operate. 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**.

**Marked paper mode**– Configuration of printer is marked paper.

**HRI Characters** – Human readable interpretation of the barcode.

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

**RAM** – Random Access Memory

**Motion unit** – The motion unit has vertical motion unit and horizontal motion unit, which specify the least space for vertical motion and horizontal motion.

**ASB** – Auto status back

**DPI** – Print dots per inch (one inch equals to 25.4mm). It is used to identify the resolution of a printer. FI, 203DPI means 203 print dots per inch. DPI: Dot Per Inch.

**Font 0** – A standard character, Font A size for 203 DPI model is 12 x 24; the size for 300 DPI is 18 x 34;

**Font 1** – Compressed character, Font B size for 203 DPI model is 9 X 17; the size for 300 DPI is 13 X 24;

**Asia Character Set** – Double-byte code character used in Asia, the size for 203DPI is 24 x 24; the size for 300DPI is 36 x 36.

### 1.3 Command Explanation

- [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 ≤ n ≤ 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 Example 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 Example 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. Kiosk Command Set

### 2.1 Print Command

#### LF

---

**[Function]** Print and feeds one line.

**[Format]**

ASCII	LF
Hex	0A
Decimal	10

**[Note]** Under standard mode, prints the data in the print buffer and feeds one line. It only feeds one line when current buffer area is blank.

Under page mode, executes carriage return and moves the print position to the beginning of next line.

This command sets the print position to the beginning of th

**[Relative]** **ESC 2, ESC 3**

#### FF

---

**[Function]** Print and feed paper.

**[Format]**

ASCII	FF
Hex	0C
Decimal	12

**[Note]** Under page mode prints the data in the print buffer collectively and returns to standard mode.

- Under standard mode, this command functions the same as LF command.
- The buffer data is deleted after being printed.
- This command sets the print position to the beginning of the line.

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

#### CR

---

**[Function]** Print and carriage return

**[Format]**

ASCII	CR
Hex	0D
Decimal	13

**[Notes]**

- When automatic line feed is enabled, this command functions the same as **LF**;
- This command is disabled according to the printer configuration
- When automatic line feed is disabled, this command is ignored.

**[Relative]** **LF**

**ESC FF**

**[Function]** Print data in page mode

**[Format]**

ASCII	ESC	FF
Hex	1B	0C
Decimal	27	12

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

- This command is enabled only in page mode.
- After printing, the printer does not clear the buffered data, not change settings for **ESC T** and **ESC W**, and the position for buffering character data.

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

**ESC J n**

**[Function]** Print and feed paper

**[Format]**

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

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

**[Notes]** Prints the data in the print buffer and feeds the paper [ n × vertical or horizontal motion unit] inches.

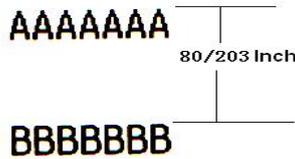
- After printing is completed, this command sets the print starting position to the beginning of the line.
- The paper feed amount set by this command is not affected by the settings of **ESC 2** or **ESC 3**.
- The horizontal and vertical motion units are specified by **GS P**.
- In standard mode, the printer uses the vertical motion unit (y).
- In page mode, this command functions as follows, depending on the starting position of the printable area for selecting vertical motion unit(y) or horizontal motion unit(x):
  - 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 print able area using **ESC T**, the horizontal motion unit (x) is used.
  - The maximum line spacing is 600mm (23.6 inches) for 300DPI printer and 900mm (35.4 inches) for 203DPI printer. When the setting value exceeds the maximum, it is converted to the maximum automatically.

**[Relative]** **GS P**

**[Example]** **1B 40** (initialize printer)  
**1D 50 CB CB** (set the resolution 203×203)  
 41 41 41 41 41 41 41(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:



**ESC d n**

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

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

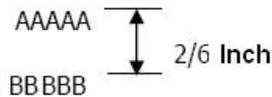
**[Range]** 0 ≤ n ≤ 255

- [Notes]** Prints the data in the print buffer and feeds n lines (character line).
- 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 600mm (23.6 inches) for 300DPI printer and is 900mm (35.4 inches) for 203DPI printers. If the paper feed amount (nx line spacing) of more than 600mm (300DPI) or 900mm (203DPI) is specified, the printer feeds the paper only 600mm (300DPI) or 900mm (203DPI).

**[Relative]** **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:



**2.2 Location command**

**HT**

**[Function]** Horizontal tab.

<b>[Format]</b>	ASCII	HT
	Hex	09
	Decimal	9

- [Notes]** Moves the print position to the next horizontal tab position.
- This command is ignored unless the next horizontal tab position has been set.



- [Range]**  $0 \leq nL \leq 255$   
 $0 \leq nH \leq 255$
- [Notes]** Sets the distance from the beginning of the line to the position at which subsequent characters are to be printed as below.
- $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$  inches.
  - 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 is selected 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.

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

**[Example]** Refer to **ESC W**

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

---

<b>[Function]</b>	Set horizontal tab positions				
<b>[Format]</b>	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]** Sets horizontal tab positions.
- n+1 specifies the column number for setting a horizontal tab position from the beginning of the line.
  - k indicates the total number of horizontal tab positions to be set.
  - 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.
  - 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 independent for each standard and page mode.

**[Default]** The default tab positions are at intervals of 8 standard ASCII characters (columns 9, 17, 25).

**[Relative]** HT

**[Example]** Refer to HT

**ESC T n**

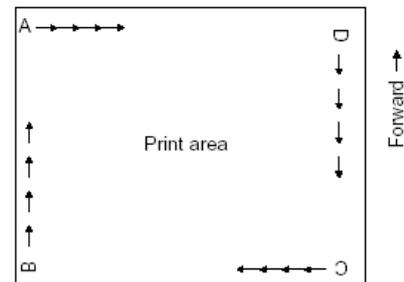
**[Function]** Select print direction in page mode.

<b>[Format]</b>	ASCII	ESC	T	n
	Hex	1B	54	n
	Decimal	27	84	n

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

**[Notes]** Select the print direction and starting position in page mode. n specifies the print direction and starting position as follows:

n	Print Direction	Starting Position
0, 48	Left to right	Upper left (A in the figure)
1, 49	Bottom to top	Lower left (B in the figure)
2, 50	Right to left	Lower right (C in the figure)
3, 51	Top to bottom	Upper right (D in the figure)



- 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 starting 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 \**

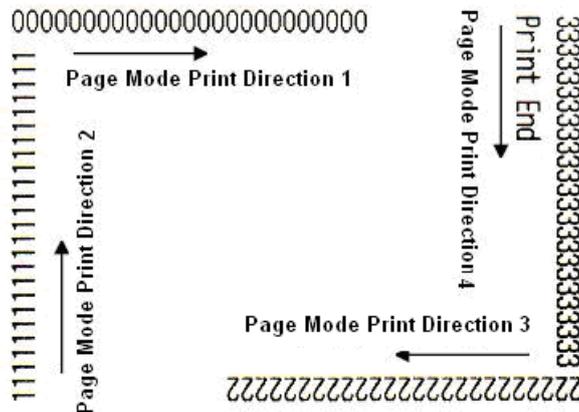
Commands using vertical motion units: **ESC SP, ESC \$, ESC \**

[Default] n = 0

[Relative] 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)  
 33  
**0A** (print)  
 50 72 69 6E 74 20 45 6E 64  
**0C** (print)

**Results:**



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

[Function] Set printing area in page mode

[Format] ASCII ESC W xL xH yL yH dxL dxH dyL dyH  
 Hex 1B 57 xL xH yL yH dxL dxH dyL dyH  
 Decimal 27 87 xL xH yL yH dxL dxH dyL dyH

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

[Notes] The horizontal starting position, vertical starting position, printing area width, and printing area height are defined as  $x_0, y_0, dx$  (inch),  $dy$  (inch), respectively. Each

setting for the printing area is calculated as follows:

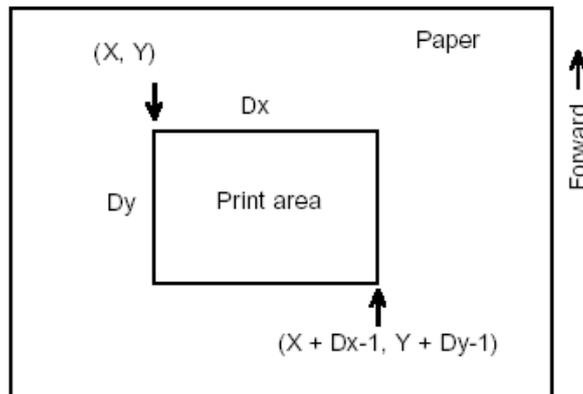
Horizontal starting position:  $x0 = [(xL + xH \times 256) \times (\text{horizontal motion unit})]$ inches

Vertical starting position:  $y0 = [(yL + yH \times 256) \times (\text{vertical motion unit})]$ inches

Printing area width:  $dx = [dxL + dxH \times 256] \times (\text{horizontal motion unit})$ inches

Printing area height:  $dy = [dyL + dyH \times 256] \times (\text{vertical motion unit})$ inches

- If this command is input in standard mode, the printer executes only internal flag operation. This command does not affect printing in standard mode.
- If the horizontal or vertical starting position is set outside the printable area, the printer stops command processing and processes the following data as normal data.
- If the printing area width or height is set to 0, the printer stops command processing and processes the following data as normal data.
- This command sets the position where data is buffered to the position specified by **ESC T** within the printing area.
- If (horizontal starting position + printing area width) exceeds the printable area, the printing area width is automatically set to (horizontal printable area- horizontal starting position).
- If (vertical starting position + printing area height) exceeds the printable area, the printing area height is automatically set to (vertical printable area – vertical starting position).
- The horizontal and vertical motion units are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current printing area.
- Use the horizontal motion unit (x) for setting the horizontal starting position and printing area width, and use the vertical motion unit (y) for setting the vertical starting position and printing area height.
- When the horizontal starting position, vertical starting position, printing area width, and printing area height are defined as X, Y, dx, and dy respectively, the printing area is set as shown in the figure below.



**[Default]** Decided by printer configuration

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

**[Example] 0A**

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

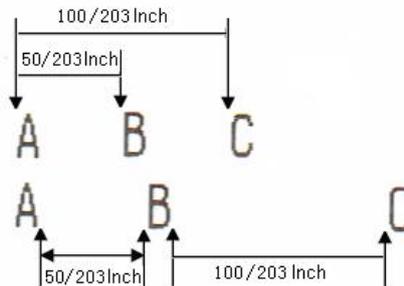
**1B 5C 64 00**(set relative horizontal starting position to be 100/203 inches)

43

**0A**(newline)

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

**Results:**



**ESC \ nL nH**

**[Function]** Set horizontal relative print position

<b>[Format]</b>	ASCII	ESC	\	nL	nH
	Hex	1B	5C	nL	nH
	Decimal	27	92	nL	nH

**[Range]** 0 ≤ nL ≤ 255  
0 ≤ nH ≤ 255

**[Notes]**

- Sets the print starting position based on the current position by using the horizontal or vertical motion unit.
- This command sets the distance from the current position to [(nL + nH × 256) × horizontal or vertical motion unit] inches

- 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):  $nL + nH \times 256 = 65536 - N$ .
- The print starting position moves from the current position to [N × horizontal or vertical motion unit]
- The horizontal and vertical motion units are specified by **GS P**.
- In standard mode, the horizontal motion unit is used.
- In page mode, the horizontal or vertical motion unit differs as follows, depending on the 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.

[Relative] ESC \$, GS P

**ESC a n**

[Function] Select justification

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

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

[Notes] Aligns all the data in one line to the specified position  
 n selects the justification as follows:

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

- The command is enabled only when processed at the beginning of the line in standard mode.
- If this command is input in page mode, the printer performs only internal flag operations.

[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
ABC ABCD ABCDE	ABC ABCD ABCDE	ABC ABCD ABCDE

**GS \$ nL nH**

**[Function]** Set absolute vertical print position in page mode

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

**Hex** 1D 24 nL nH

**Decimal** 29 36 nL nH

**[Range]** 0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255

**[Notes]**

- **[Notes]** Sets the absolute vertical print starting position for buffer character data in page mode.
- This command sets the absolute print position to [( nL + nH × 256) × (vertical or horizontal motion unit)] inches.
- This command is effective only in page mode.
- If the [(nL+ nH × 256) × (vertical or horizontal motion unit)] exceeds the specified printing area, this command is ignored.
- The horizontal starting buffer position does not move after enabling the command.
- The reference starting position is specified by **ESC T**.
- This command operates as follows, depending on the starting position of the printing area specified by **ESC T**:
  - ①When the starting position is set to the upper left or lower right, this command sets the absolute position in the vertical direction.
  - ②When the starting position is set to the upper right or lower left, this command sets the absolute position in the horizontal direction.
- The horizontal and vertical motion units are specified by **GS P**.

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

[Example] See ESC W

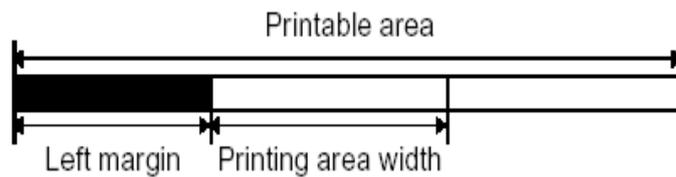
**GS L nL nH**

[Function] Set left margin

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

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

[Notes] Sets the left margin using nL and nH.  
 The left margin is set to  $[(nL + nH \times 256) \times \text{horizontal motion unit}]$  inches.



- This command is effective only processed at the beginning of the line in standard mode.
- If this command is input in page mode, the printer performs only internal flag operations.
- This command does not affect printing in page mode.
- If the setting exceeds the printable area, this command is ignored.
- 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

[Relative] GS P, GS W

[Exmple] 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

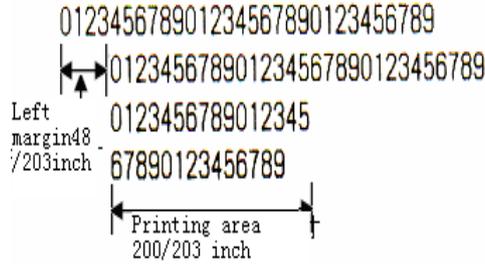
36 37 38 39 0A

1D 57 C8 00(Sets printing width to 200/203 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

Results:



**GS P xL xH yL yH**

**[Function]** Set horizontal and vertical motion units

<b>[Format]</b>	ASCII	GS	P	xL	xH	yL	yH
	Hex	1D	50	xL	xH	yL	yH
	Decimal	29	80	xL	xH	yL	yH

**[Range]**  $x=xL+xHx256,y=yL+yHy256$   
 $0 \leq x \leq 360, 0 \leq y \leq 360$   
 $0 \leq y \leq 360$

**[Notes]** Sets the horizontal and vertical motion units to approximately 25.4/ x mm {1/ x inches} and approximately 25.4/ y mm {1/ y inches} respectively. When x and y are set to 0, the default setting of each value is used.

- 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 or lower right of the printing area using **ESC T** (data is buffered in the direction perpendicular to the paper feed direction):

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

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

② When the print starting position is set to the upper right or lower left of the printing area using **ESC T** (data is buffered in the paper feed direction):

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

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

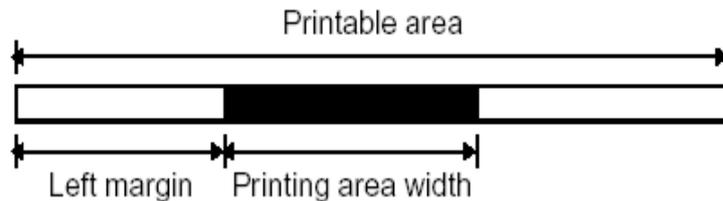
- If the related commands are not executed after changing motion unit, relative settings shall not be changed.
- The minimum motion unit is a combined result of this command and other commands.

[Default] 300 DPI model: x = 305, y = 305; 203 DPI model: x = 203, y = 203  
 [Relative] 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  
 Hecimal 29 87 nL nH  
 [Range]  $0 \leq nL \leq 255$   
 $0 \leq nH \leq 255$

[Notes] Sets the printing area width to the area specified by nL and nH.  
 The printing area width is set to  $[(nL + nH \times 256) \times \text{horizontal motion unit}]$  inches.



- This command is effective only processed at the beginning of the line in page mode.
- 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 and print area width.
- The horizontal motion unit (x) is used for calculating the printing area width.

[Relative] 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  
 Hecimal 29 92 nL nH  
 [Range]  $0 \leq nL \leq 255$   
 $0 \leq nH \leq 255$

[Notes] Set the absolute vertical print starting position from the current position in page mode.  
 This command sets the distance from the current position to  $[(nL + nH \times 256) \times$

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 (the negative direction).

$$nL + nH \times 256 = 65536 - N$$

- Any setting that exceeds the specified printing area is ignored.
- This command function as follows specify motion unit, depending on the print starting position set by **ESC T**:

- ① When the starting position is set to the upper left or lower right of the printing, the vertical motion unit (y) is used.
- ② When the starting position is set to the upper right or lower left of the printing area, the horizontal motion unit (x) is used.

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

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

### 2.3 Character command

#### CAN

**[Function]** Cancel print data in page mode.

[Format]	ASCII	CAN
	Hex	18
Hecimal	24	

**[Notes]** In page mode, deletes all print data in the print buffer.

- This command is enabled only in page mode.
- If data that existed in the previously specified printing area also exists in the currently specified printing area, it is deleted.

[Relative]        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 abosolute horizontal print position as 100 dots)

1D 24 60 00 (Setting abosolute 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:

```

1234567890ahcededdfghijklmnnnnrstuvwxyzv712345
67890a                               37890
abcdec                               abcde
dfghij          Cancel the data      fghij
jklmnc                               jklmn
opqrstuvwxy1234567890abcdeedfghijklmnopqrstuvwxy
    
```

**ESC SP n**

[Function]	Set right-side character spacing		
[Format]	ASCII	ESC	SP n
	Ex	1B	20 n
Hecimal	27	32	n
[Range]	0 ≤ n ≤ 255		

**[Description]**

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

**[Notes]**

- The horizontal and vertical motion units are specified by **GS P**.
- Without setting of right character spacing, only changing the horizontal or vertical motion unit does not affect the current right-side spacing.
- The right-side character spacing for double-width mode is twice the normal value. When characters are enlarged, the right-side character spacing is enlarged accordingly.
- This command sets values independently in each mode (standard and page modes).
- In standard mode, the horizontal motion unit is used.
- In page mode, the horizontal or vertical motion unit is specified depending on starting position and direction 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.

- For 300DPI printers, the maximum right-side spacing is 288/305 inches. Any setting exceeding the maximum is converted to the maximum automatically.
- For 203DPI printers, the maximum right-side spacing is 288/203 inches. Any setting exceeding the maximum is converted to the maximum automatically.

[Default] n = 0

[Relative] GS P

[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	0	00	0	Standard ASCII Font (12 × 24)
	1	01	1	Compress ASCII Font (9 × 17)
1,2				Undefined
3	0	00	0	Emphasized mode not selected
	1	08	8	Emphasized mode selected
4	0	00	0	Double-height mode not selected
	1	10	16	Double-height mode selected
5	0	00	0	Double-width mode not selected

	1	20	32	Double-width mode selected
6				Undefined
7	0	00	0	Underline mode not selected
	1	80	128	Underline mode selected

- When both double-height and double-width modes are selected, quadruple size characters are printed.
- The printer can underline all characters, but can not underline the space set by HT or 90° clockwise rotated characters.
- The thickness of the underline is 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

[Relative] ESC -, ESC E, GS !

[Example] 1B 40(Initialization)

1B 21 00(Select normal print mode)

48

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)

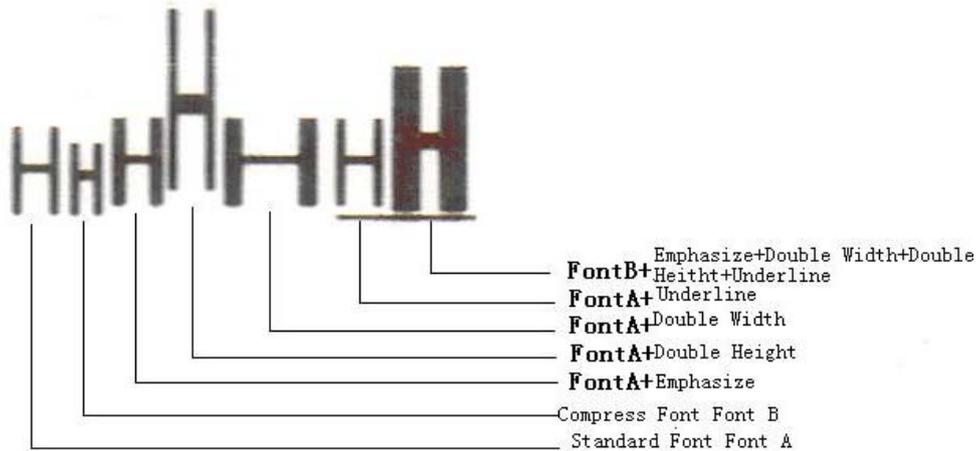
48

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 ≤ n ≤ 255

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

- When the LSB of n is 0, the user-defined character set is canceled.
- When the LSB of n is 1, the user-defined character set is selected.
- 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

[Relative] 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] 203DPI model:

- y = 3
- 32 ≤ c1 ≤ c2 ≤ 127
- 0 ≤ x ≤ 12 Standard ASCII font
- 0 ≤ x ≤ 9 Compressed ASCII font

300DPI model:

- y = 5 Standard ASCII font
- y = 3 Compressed font

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

$$0 \leq x \leq 18 \quad \text{Standard ASCII font}$$

$$0 \leq x \leq 12 \quad \text{Compressed ASCII font}$$

**[Notes]**  $0 \leq d1 \dots d(y \times xk) \leq 255$

Defines user-defined characters.

- y specifies the number of bytes in the vertical direction.
- c1 specifies the beginning character code for the definition, and c2 specifies the final code.
- x specifies the number of dots in the horizontal direction.
- The allowable character code range is from ASCII code <20>H to <7F>H (96 characters).
- It is possible to define multiple characters for consecutive character codes. If only one character is desired, use  $c1 = c2$ .
- d is the data for the downloaded characters. The dot pattern is in the horizontal direction from the left side.
- The data to define a user-defined character is  $(y \times x)$  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.

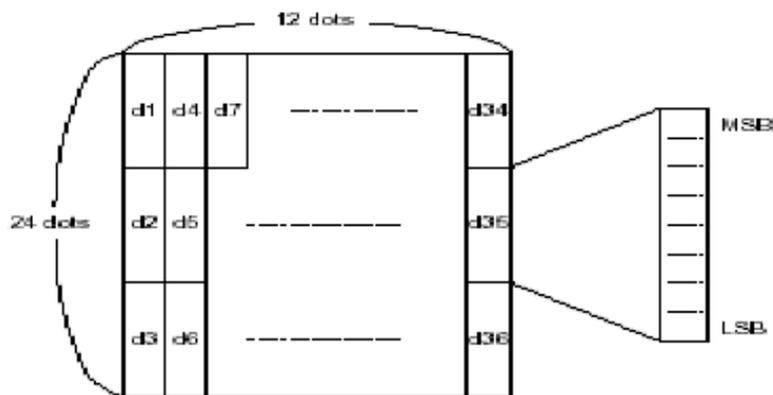
All user-defined Characters defined with this command will be cleared when the

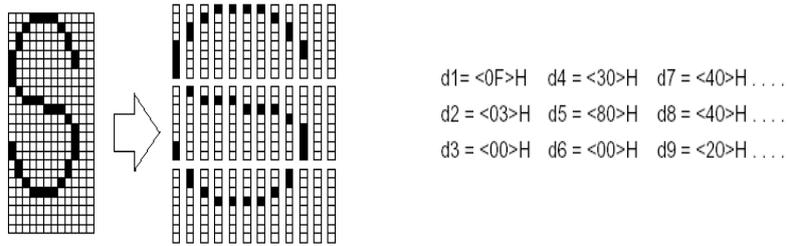
GS \* command is executed

**[Relative]** **ESC %, ESC ?**

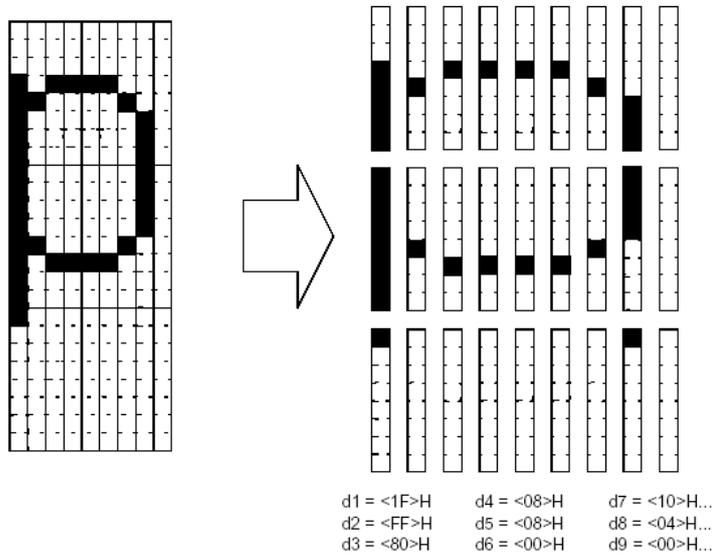
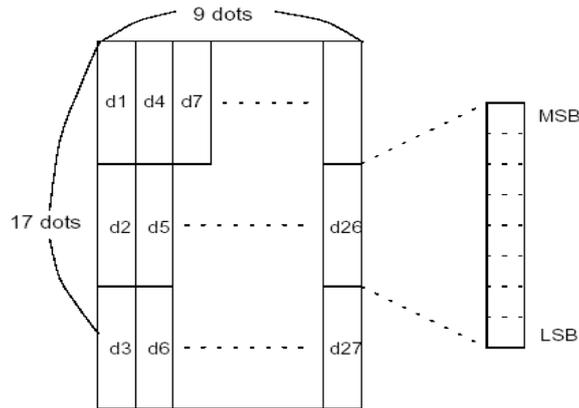
**[Example]** 203 DPI model

When standard ASCII font (12 × 24) is selected.





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



**ESC – n**

[Function]	Turn underline mode on/off
[Format]	ASCII    ESC    -    n
Hex	1B    2D    n
Hecima	1 27    5    n
[Range]	0 ≤ n ≤ 2, 48 ≤ n ≤ 50
[Notes]	Turns underline mode on or off, based on the following values of n:

n	Function
0, 48	Turns off underline mode

1, 49	Turns on underline mode (1-dot thick)
2, 50	Turns on underline mode (2-dots thick)

- 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.
- 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

[Relative] 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

Hecimal 27 63 n

[Range] 32 ≤ n ≤ 127

[Notes] Cancels user-defined characters.

- 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.

[Relative] ESC &, ESC %

### ESC E n

[Function]	Turn emphasized mode on/off
[Format]	ASCII      ESC    E    n
Hex	1B      45    n
Hecimal	27      69    n
[Range]	$0 \leq n \leq 255$
[Notes]	Turns emphasized mode on or off <ul style="list-style-type: none"> <li>▪ When the LSB of n is 0, emphasized mode is turned off.</li> <li>▪ When the LSB of n is 1, emphasized mode is turned on.</li> <li>▪ Only the least significant bit of n is effective.</li> <li>▪ <b>ESC !</b> turn on and off emphasized mode in the same way, the last received command is available.</li> <li>▪ Printer output is the same in double-strike mode and in emphasized mode.</li> </ul>
[ Default ]	n = 0
[Relative]	ESC !, ESC G
[Example]	<u>1B 40</u> <u>1B 45 01</u> (Emphasized mode is selected) 41 41 41 41 41 41 <u>0A</u> <u>1B 45 00</u> (Emphasized mode is not selected) 42 42 42 42 42 42 <u>0A</u>

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
Hecimal	27      71    n
[Range]	$0 \leq n \leq 255$
[Notes]	Turns double-strike mode on or off. <ul style="list-style-type: none"> <li>▪ When the LSB of n is 0, double-strike mode is turned off.</li> <li>▪ When the LSB of n is 1, double-strike mode is turned on.</li> <li>▪ Only the least significant bit of n is effective.</li> <li>▪ Printer output is the same in double-strike mode and in emphasized mode.</li> <li>▪ <b>ESC !</b> can turn emphasized mode on/off, the last received command is effective.</li> </ul>
[ Default ]	n = 0

[Relative] ESC E, ESC !

[Example] See ESC E

**ESC M n**

[Function] Select character font

[Format] ASCII ESC M n

Hex 1B 4D n  
 Hecimal 27 77 n

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

[Notes] Selects character fonts.

N	Function
0,48	Select standard ASCII font
1,49	Select compressed ASCII font:
2,50	Select user defined character
3,51	Select Asian font, include: 1) Simplified Chinese(GB2312) 2) Traditional Chinese(BIG5) 3) Japanese (JIS/SJIS/EUC) 4) Korean (KSC5601/EUC)  The printer will print selected Chinese font [simplified Chinese, traditional Chinese, Japanese (EUC) or Korean (EUC)] according to its configuration

- When Chinese font is selected, Chinese font and western font can be printed together. The font code in <20>H~<FE>H is identified as Western font automatically, and those in <A1>H~<FE> are Chinese font.
- When Japanese is selected, the command switches western font to Japanese.
- After Chinese font is selected, Font A is also enabled automatically.

[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, see below

n	Country	ASCII Code (Hex)											
		23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	U.S.A	#	\$	@	[	\	]	^	`	{		}	~
1	France	#	\$	à	°	ç	§	^	`	é	ù	è	¨
2	Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3	U.K.	£	\$	@	[	\	]	^	`	{		}	~
4	Denmark I	#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	\$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain I	Pt	\$	@	í	Ñ	¿	^	`	¨	ñ	}	~
8	Japan	#	\$	@	[	¥	]	^	`	{		}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Denmark II	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
11	Spain II	#	\$	á	í	Ñ	¿	é	`	í	ñ	ó	ú
12	Latin America	#	\$	á	í	Ñ	¿	é	ü	í	ñ	ó	ú
13	Korea	#	\$	@	[	₩	]	^	`	{		}	~

This command is only enabled for 203DPI printer.

[Default] n = 0

**ESC V n**

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

[Format] ASCII      ESC      V    n  
 Hex            1B      56   n  
 Hecimal      27      86   n

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

[Notes] Turns 90° clockwise rotation mode on/off. n is used as follows:

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

This command only affects printing in standard mode.

When underline mode is turned on, the printer does not underline 90° clockwise rotation.

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

[Relative] ESC !, ESC -

[Example] 1B 40

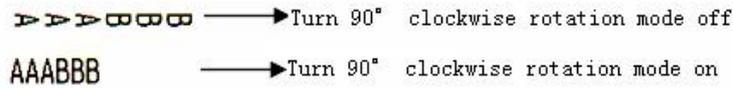
1B 56 01(Turn 90° clockwise rotation mode on)

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] Select character code table

[Format] ASCII      ESC    t      n  
 Hex            1B    74    n  
 Decimal        27    116   n

[Range]        0 ≤ n ≤ 5, 16 ≤ n ≤ 19,

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

n	Page
0	PC437
1	Katakana
2	PC850
3	PC860
4	PC863
5	PC865
16	WPC1252
17	PC866
18	PC852
19	PC858

[Notes]

- This command is enabled only for 203 DPI printers.
- If the character set in printer is Chinese font, this command is not effective.
- If printer font is Chinese character font, use **ESC M n** command to select English font first, then select page code with this command.
- Details see appendix 2 (Character code table)

[Default]        n = 0

**ESC { n**

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

[Format]        ASCII      ESC    {      n  
 Hex            1B      7B    n  
 Hecimal        27      123   n

[Range]        0 ≤ n ≤ 255

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

- When the LSB of n is 0, upside-down printing mode is turned off.
- When the LSB of n is 1, upside-down printing mode is turned on.
- Only the LSB 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.

[Default ] n = 0

[Example] 1B 40

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

41 42 43 44 45 46 0A

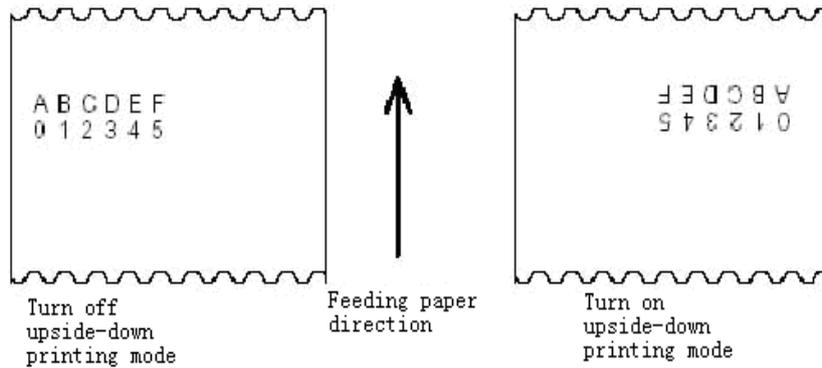
30 31 32 33 34 35 0A

1B 7B 00(Turn off upside-down printing mode)

41 42 43 44 45 46 0A

30 31 32 33 34 35 0A

Results:



**GS ! n**

[Function] Select character size

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

[Range] 0 ≤ n ≤ 255

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

[Notes] 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

**[Relative]** **ESC !**

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

**GS B n**

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

**[Format]**

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

**[Range]** 0 ≤ n ≤ 255

**[Notes]** Turn 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.
- Only the LSB of n is valid.
- This command is available for all built-in characters and user-defined characters except 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 bit image, user-defined bit image, bar code, HRI

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

- This command does not affect the space between lines.

Underline mode is disabled when White/black reverse mode is selected. Otherwise it is enabled when white/black reverse mode is turned off.

**[Default]** n = 0

**[Example]** 1B 40

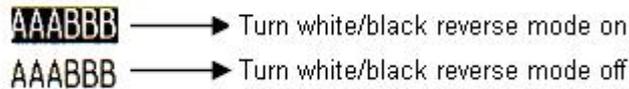
1D 42 01(Turn white/black reverse mode on)

41 41 41 42 42 42 0A

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

41 41 41 42 42 42 0A

Results:



**FS ! n**

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

**[Format]** ASCII FS ! n  
 Hex 1C 21 n  
 Decimal 28 33 n

**[Range]** 0 ≤ n ≤ 255

**[Description]** Set the print mode for Chinese character, using n as follows:

Bit	0/1	Hex	Decimal	Function
0, 1	--	--	--	Undefined
2	0	00	0	Double-width mode is off
	1	04	4	Double-width mode is on
3	0	00	0	Double-height mode is off
	1	08	8	Double-height mode is on
4-6	--	--	--	Undefined
7	0	00	0	Underline mode is off
	1	80	128	Underline mode is on

- [Notes]**
- When double-width and double-height mode are set(including right and left side character spacing),the width and height are doubled at the same time.
  - The printer can underling all the characters (including right and left side character spacing), except the space by HT and 90 degree clockwise-rotated characters
  - The thickness of underline is specified by FS, regardless with the character size
  - When some of the characters on a line are not in the same height, all the characters on the line are aligned at the baseline.
  - It is possible to emphasize the Chinese character by **FS W** or **GS!**, the last received

command is effective.

- It is possible to choose underline mode by **FS -**, the last received command is effective.

**[Default]** n = 0

**[Relative]** **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 Chinese character mode.

**[Notes]**

- When the Chinese character mode is selected, the printer checks the code is for Chinese character or not,then process the first byte and the second byte if the code is for Chinese.
- When use Chinese GB18030 character set, the printer process the third and the forth byte if the Chinese character is forth-byte code.
- The printer select Chinese character mode automatically when the power is turned on.

**[Relative]** **FS . , FS C**

**FS - n**

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

**[Format]**

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

**[Range]** 0 ≤ n ≤ 2, 48 ≤ n ≤ 50

**[Description]** Turn underling mode off/on for Chinese character,based on the value of the n:

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

**[Notes]**

- The printer can underline all the characters(including right and left side character spacing),except the space by HT and 90 degree clockwise-rotated characters.
- When the underline mode for Chinese character is turned off,underline printing is no longer executed,but the previously specified thickness is not changed,the default

thickness is 1 dot.

- The thickness of underling will not changed even the size of character changes.
- It is possible to turn off the underling mode for Chinese character by FS !, the last received command is effective.

[Default] n = 0

[Relative] 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]

- When Chinese character mode is canceled, all the characters are processed one byte for one times as ASCII code.
- The printer select Chinese character mode automatically when the power is turned on.

[Relative] 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

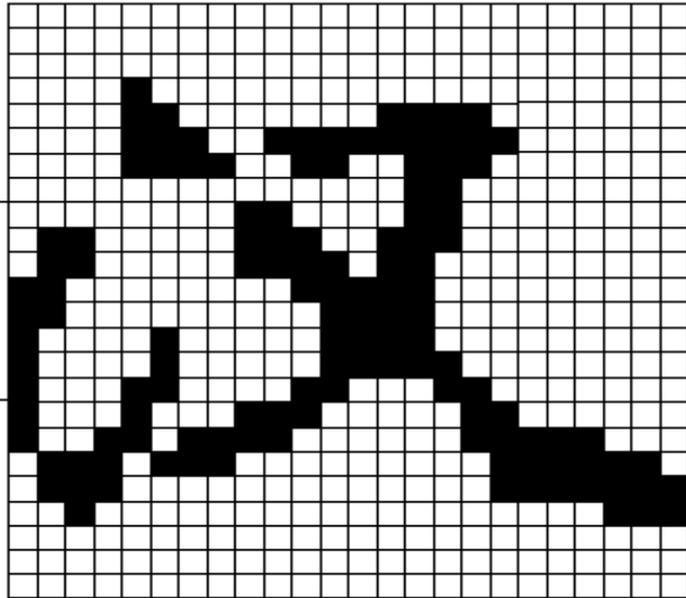
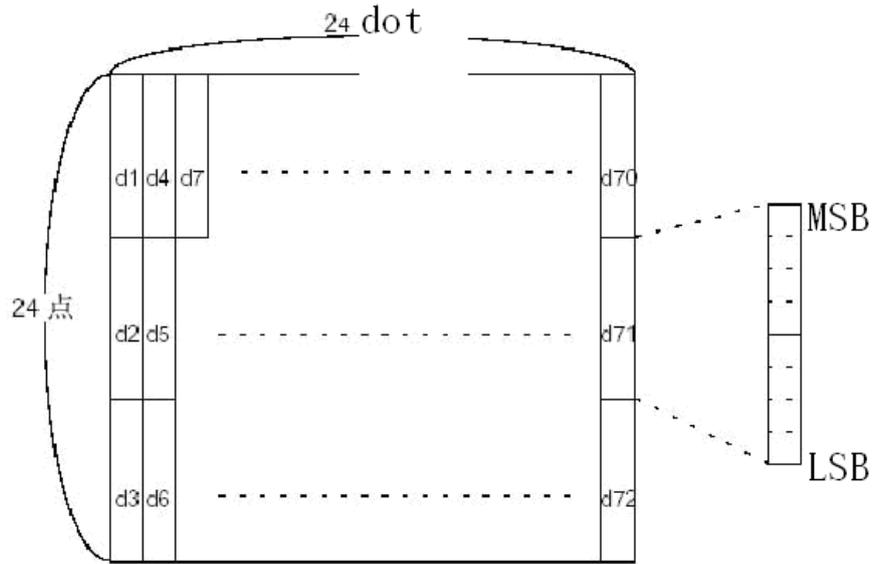
[Description] Defined user-defined Chinese character specified by c1 and c2.

- [Notes]
- c1, c2 indicate character code for the defined character, c1 specifies first byte, c2 specifies the second byte.
  - d indicate data. 1 indicate to print 1 dot ,0 indicate not print a dot.

[Default] No user defined Chinese Kanji.

[Relative] FS C

The relationship of user-defined Chinese character and the data is described as following:



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 S n1 n2**

**[Function]** Set the right and left 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 the right spacing and the left spacing to n1 and n2 respectively.

- The left spacing is [n1 × horizontal or vertical motion unit] inch, and the right spacing is [n2 × horizontal or vertical motion unit] inch.

- [Notes]**
- When double-width is set, the right and the left spacing is doubled.
  - In standard mode, the horizontal motion unit is used.
  - In page mode, it is depending on starting position of the printable area as follows:
    - ① When the starting position is set to the upper left or lower right, the horizontal motion unit is used.
    - ② When the starting position is set to the upper right or lower left, the vertical motion unit is used.
    - ③ The maximum spacing of Chinese character is 36 mm, all setting exceeding the maximum is converted to the maximum automatically.

**[Default]** n1 = 0, n2 = 0

**[Relative]** **GS P**

**[Example]** Refers to **ESC SP**

**FS W n**

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

<b>[Format]</b>	ASCII	FS	W	n
	Hex	1C	57	n
	Decimal	28	87	n

**[Range]** 0 ≤ n ≤ 255

**[Description]** Select/cancel quadruple-size mode of Chinese character .

- When the LSB of n is 0, quadruple-size mode of Chinese character is turned off.
- When the LSB of n is 1, quadruple-size mode of Chinese character is turned on.

- [Notes]**
- Only the LSB of n is effective.
  - When quadruple-size mode is turned on, the size of Chinese character is same as when double-width mode and double-height mode are both turned on.
  - When quadruple-size mode is turned off, the characters are printed in normal size.
  - All the characters are aligned at the baseline.
  - **FS !** or **GS !** also can select or cancel quadruple-size mode of Chinese character, the last received command is effective..

**[Default]** n = 0

**[Relative]** **FS !, GS !**

**2.4 Bitmap Command**

**ESC \* m nL nH d1... dk**

**[Function]** Download and print bit-image

<b>[Format]</b>	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, 35

$$0 \leq nL \leq 255$$

$$0 \leq nH \leq 3$$

$$0 \leq d \leq 255$$

**[Notes]**

Selects a bit-image mode with m for the number of dots specified by nL and nH, d1...dk is data, of which number is decided by horizontal dots number and selected bit-image mode as follows:

**203DPI**

m	Bit-Image Mode	Vertical Direction		Horizontal Direction	
		Number of Dots	Dot Density	Dot density	Number of Data (K)
0	8-dot single-density	8	67 DPI	101 DPI	$nL + nH \times 256$
1	8-dot double-density	8	67 DPI	203 DPI	$nL + nH \times 256$
32	24-dot single-density	24	203 DPI	101 DPI	$(nL + nH \times 256) \times 3$
33,35	24-dot double-density	24	203 DP	203 DPI	$(nL + nH \times 256) \times 3$

**300DPI**

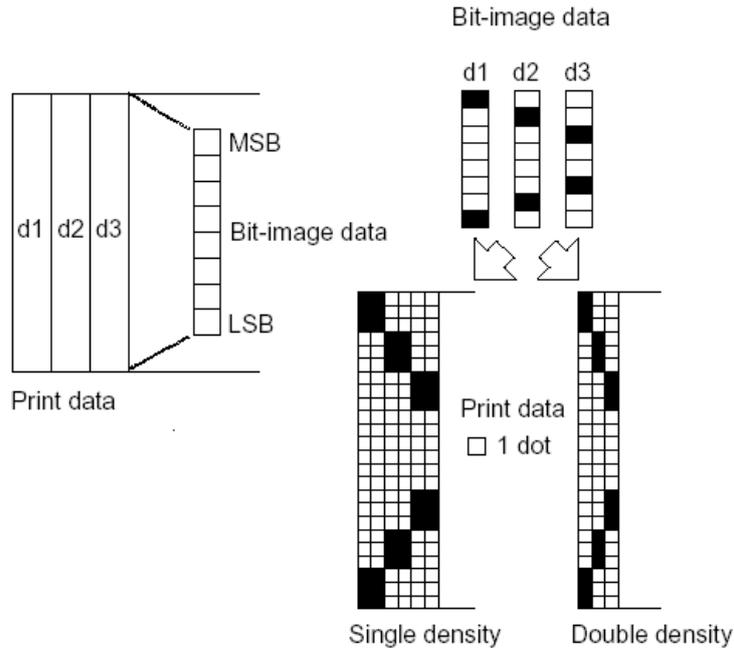
m	Mode	Vertical Direction		Horizontal Direction	
		Number of Dots	Dot Density	Dot density	Number of Data (K)
0	8-dot single-density	8	100 DPI	150 DPI	$nL + nH \times 256$
1	8-dot double-density	8	100 DPI	300 DPI	$nL + nH \times 256$
32	24-dot single-density	24	300 DPI	150 DPI	$(nL + nH \times 256) \times 3$
33,35	24-dot double-density	24	300 DPI	300 DPI	$(nL + nH \times 256) \times 3$

**[Notes]**

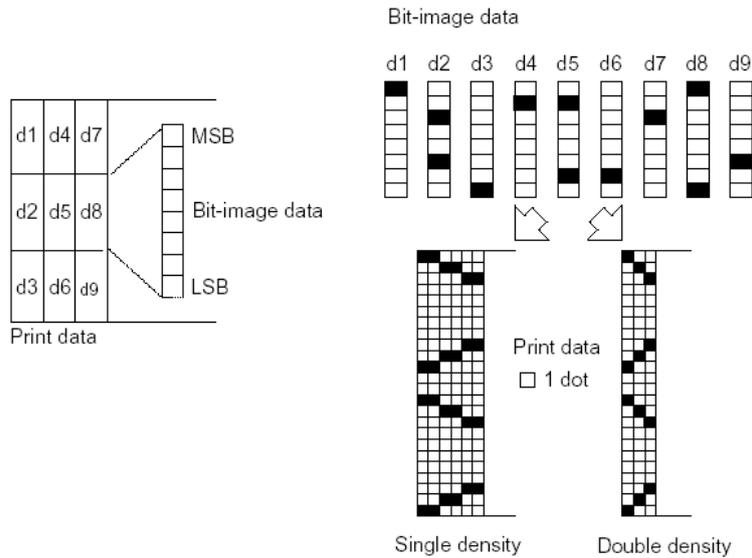
If the value of m is out of the specified range, nL and data following are processed as normal data.

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

When 8-dot bit image is selected:



When 24-dot bit image is selected:



**GS # n**

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

<b>[Format]</b>	ASCII	GS	#	n
	Hex	1D	23	n
	Decimal	29	35	n

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

**[Description]** Specify 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.

**[Relative]** ESC 3

**GS \* x y d1...d(x × y × 8)**

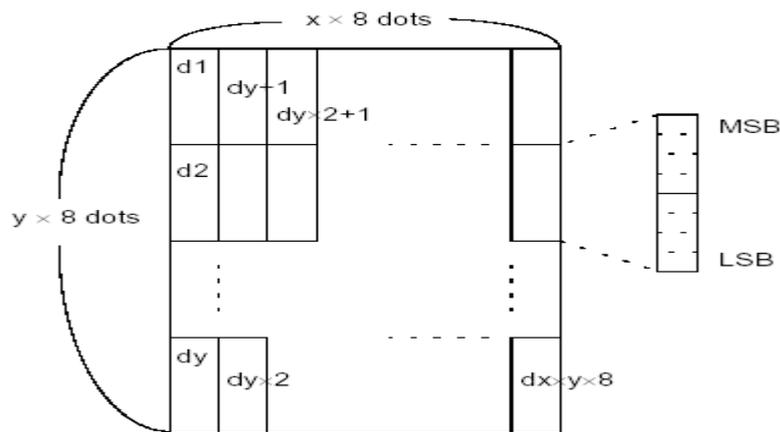
**[Function]** Define downloaded bit image

**[Format]** ASCII GS \* x y d1...d(x × y × 8)  
 Hex 1D 2A x y d1...d(x × y × 8)  
 Decimal 29 42 x y d1...d(x × y × 8)

**[Range]**  $1 \leq x \leq 255, 1 \leq y \leq 255$   
 $x \times y \leq 2048$   
 $0 \leq d \leq 255$

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

- x specifies the number of dots in the horizontal direction.
- y specifies the number of dots in the vertical direction.
- The number of dots in the horizontal direction is  $x \times 8$ , in the vertical direction it is  $y \times 8$ .
- If  $x \times y$  is out of the specified range, this command is disabled.
- The maximum capacity for bit-images in RAM is 16K bytes.
- The execution of **ESC &** command will erase the bit-images in RAM downloaded with this command.
- The d indicates bit-image data. Data (d) specifies a bit printed to 1 and not printed to 0.
- The downloaded bit image definition is cleared when printer is reset or the power is turned off.
- The number for the bit-image downloaded is defined by **GS #** command.
- The following figure shows the relationship between the downloaded bit image and the printed data.



**[Relative]** GS /

**GS / m**

**[Function]** Print downloaded bit image

**[Format]** ASCII GS / m  
 Hex 1D 2F m

Decimal 29 47 m

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

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

m selects a mode from the table below:

203DPI:

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

300DPI:

m	Mode	Vertical Dot Density (DPI)	Horizontal Dot Density (DPI)
0, 48	Normal	300	300
1, 49	Double-width	300	150
2, 50	Double-height	150	300
3, 51	Quadruple	150	150

[Notes]

- This command is ignored if a downloaded bit image has not been defined.
- 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.
- The command sets the position after printing to the beginning of next line.
- If the downloaded bit-image to be printed exceeds the printable area, the excess data is not printed.
- The command prints bit-images in RAM and not that in NV memory. The number for the bit-image to be printed is defined by **GS #** command.

[Relative] **GS \***, **GS #**

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

[Function] Print raster bit image

[Format] ASCII GS v 0 m xL xH yL yH d1...dk  
 Hex 1D 76 30 m xL xH yL yH d1...dk  
 Decimal 29 118 48 m xL xH yL yH d1...dk

[Range]  $0 \leq m \leq 3, 48 \leq m \leq 51$   
 $0 \leq xL \leq 255$   
 $0 \leq xH \leq 255$   
 $0 \leq yL \leq 255$   
 $0 \leq d \leq 255$



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

300DPI:

m	Mode	Vertical Dot Density (DPI)	Horizontal Dot Density (DPI)
0.48	Normal	300	300
1.49	Double-width	300	150
2.50	Double-height	150	300
3.51	Quadruple	150	150

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

[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 bit image

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

[Range]  $1 \leq n \leq 255$   
 $0 \leq xL \leq 255$   
 $1 \leq (xL + xH \times 256) \leq 1023$   
 $1 \leq (yL + yH \times 256) \leq 8191$   
 $0 \leq d \leq 255$   
 $k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$   
 Total defined data area(MAX) = 512K bits (64K bytes)

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

- n specifies the number of the defined NV bit image.
- xL, xH specifies  $(xL + xH \times 256) \times 8$  dots in the horizontal direction for the NV

bit image you are defining.

- $yL, yH$  specifies  $(yL + yH \times 256) \times 8$  dots in the vertical direction for the NV bit image you are defining.
- Frequent write command execution may cause damage to the NV memory. Therefore, it is recommended to write the NV memory 10 times or less a day.
- This command cancels all NV bit images that have already been defined by this command. The printer cannot redefine only one of several data definitions previously defined. In this case, all data needs to be sent again.
- During the processing of this command, the printer is busy to write data to NV memory and stops receiving any more commands. Therefore, before the ending of the processing of this command, do not send any other commands even real-time commands to the printer.
- NV bit image means a bit image which is defined in a non-volatile memory by **FS q** and printed by **FS p**.
- In standard mode, this command is effective only when processed at the beginning of the line.
- This command commences effective when 7 bytes <FS~yH> is processed as a normal value.
- When the amount of data exceeds the capacity left in the range defined by  $xL, xH, yL, yH$ , the printer processes the defined range by  $xL, xH, yL, yH$ .
- In the first group of NV bit images, when any of the parameters  $xL, xH, yL, yH$  is out of the definition range, this command is disabled.
- In groups of NV bit images other than the first one, when the printer processes  $xL, xH, yL, yH$  out of the defined range, it stops processing this command and starts writing into the NV images. At this time, NV bit images that haven't been defined are disabled (undefined), but any NV bit images before that are enabled.
- The  $d$  indicates the definition data. In data ( $d$ ) a 1 bit specifies a dot to be printed and a 0 bit specifies a dot not to be printed.
- This command defines  $n$  as the number of a NV bit image. Numbers rise in order from NV bit image 01H. Therefore, the first data group [ $xL xH yL yH d1...dk$ ] is NV bit image 01H, and the last data group [ $xL xH yL yH d1...dk$ ] is NV bit image  $n$ . The total agrees with the number of NV bit images specified by command **FS p**.
- A definition data of a NV bit image consists of [ $xL xH yL yH d1...dk$ ]. Therefore, when only one NV bit image is defined  $n=1$ , the printer processes a data group [ $xL xH yL yH d1...dk$ ] once. The printer uses  $([data: (xL + xH \times 256) \times (yL + yH \times 256) \times 8] + [header:4])$  bytes of NV memory.
- The definition area in this printer is a maximum of 512K bits (64K bytes). This command can define several NV bit images, but cannot define a bit image data

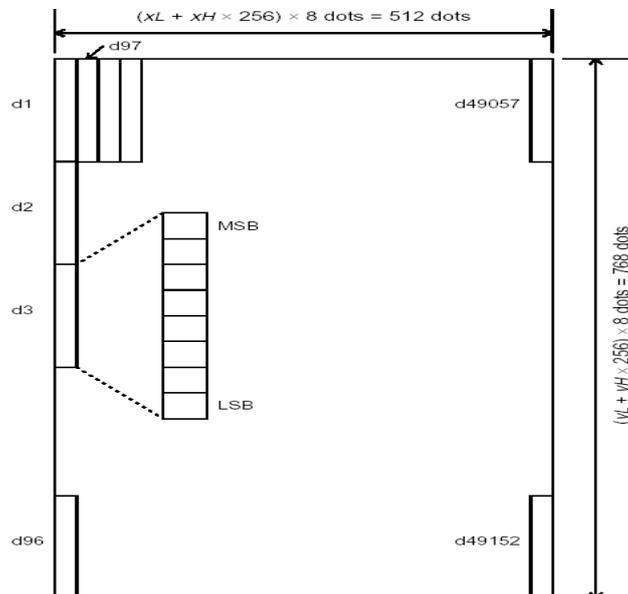
whose total capacity [bit image data + header] exceeds 512K bytes (64K bytes).

(Different printer download different space, please refer to printer configuration)

- During the processing of this command, the printer does not transmit status and does not respond to status inquiry as well.
- When this command is received during macro definition, the printer ends macro definition, and begins performing this command.
- Once a NV bit image is defined, it is not erased by performing **ESC @**, reset, and power off.
- This command performs only definition of a NV bit image and does not perform printing. Printing of the NV bit image is performed by the **FS p** command.

**[Relative] FS p**

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



## 2.5 Status command

### DLE EOT n

<b>[Name]</b>	Real-time status transmission			
<b>[Format]</b>	ASCII	DLE	EOT	n
	Hex	10	04	n
	Decimal	16	4	n

**[Range]**  $1 \leq n \leq 4$

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

- n = 1: Transmit printer status
- n = 2: Transmit offline status
- n = 3: Transmit error status
- n = 4: Transmit paper roll sensor status

**[Notes]**

- The status is transmitted whenever the command is received.
- Do not use this command within another command that consists of 2 or more bytes.

Example:

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

- The printer transmits the current status. Each status item is represented by one-byte of data.
- The printer transmits the status without confirming whether the host computer can receive data.
- The printer executes this command upon receiving it.
- This command is executed even when the printer is offline, the receive buffer is full, or there is an error status with a serial interface model.
- With a parallel interface model, this command cannot be executed when the printer is busy.
- When Auto Status Back (ASB) is enabled using the GS a command, the status transmitted by the DLE EOT command and the ASB status must be differentiated. (Refer to Appendix C, TRANSMISSION STATUS IDENTIFICATION.)

n = 1: Printer Status

Bit	0/1	HEX	Decimal	Function
0	0	00	0	Fixed to 0
1	1	02	2	Fixed to 1
2	0	00	0	Fixed to 1
3	0	00	0	Online
	1	08	8	Offline
4	1	10	16	Fixed to 1
5,6				Undefined
7	0	00	00	Fixed to 0

n = 2::Offline status

Bit	0/1	Hex	Decimal	Function
0	0	00	0	Fixed to 0
1	1	02	2	Fixed to 1
2	0	00	0	Top cover closed
	1	04	4	Top cover open
3	0	00	0	No FEED button action
	1	08	8	FEED button action

4	1	10	16	Fixed to 1
5	0	00	0	Paper adequate
	1	20	32	Paper end
6	0	00	0	Normal
	1	40	64	Error
7	0	00	0	Fixed to 0

n = 3: Error status

位	0/1	HEX	Decimal	Function
0	0	00	0	Fixed to 0
1	1	02	2	Fixed to 1
2	0	00	0	Normal
	1	04	4	Paper jam
3	0	00	0	Cutter normal
	1	08	8	Cutter error
4	1	10	16	Fixed to 1
5	0	00	0	No unrecoverable error
	1	20	32	Unrecoverable error occurred
6	0	00	0	Tph normal
	1	40	64	Tph overhot
7	0	00	0	Normal
	1	80	128	Ticket not be took out after cut paper

n = 4: 连续纸传感器状态

位	1/0	HEX	Decimal	Function
0	0	00	0	Fixed to 0
1	1	02	2	Fixed to 1
2,3	0	00	0	Paper roll near-end sensor: paper adequate.
	1	0C	12	Paper near-end is detected by the paper roll near-end sensor.
4	1	10	16	Fixed to 1
5,6	0	00	0	Paper roll sensor: Paper present.
	1	60	96	Paper roll end detected by paper roll sensor.
7	0	00	0	Fixed to 0

n = 5: Printer status

位	1/0	HEX	Decimal	Function
0	0	00	0	Normal
	1	01	1	Paper jam
1	1	02	2	Fixed to 1
2	0	00	0	Fixed to 0
3	0	00	0	Auto paper loading status Normal
	1	08	8	Auto paper loading status Error
4	1	10	16	Fixed to 1

5	0	00	0	Fixed to 0
6	1	00	0	Fixed to 0
7	0	00	0	Fixed to 0

**GS a n**

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

**[Format]** ASCII GS a n  
 Hex 1D 61 n  
 Decimal 29 97 n

**[Range]** 0 ≤ n ≤ 255

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

Bit	Off/On	Hex	Decimal	Status for ASB
0	OFF	00	0	Fixed to 0
1	OFF	00	0	Online/Offline status disabled.
	ON	02	2	Online/offline status enabled.
2	OFF	00	0	Error status disabled.
	ON	04	4	Error status enabled.
3	OFF	00	0	Paper roll sensor status disabled.
	ON	08	8	Paper roll sensor status enabled.
4-7	-	-	-	Undefined

- If any of the status items in the table above are enabled, the printer transmits the status when this command is executed. The printer automatically transmits the status whenever the enabled status item changes. The disabled status items may change, in this case, because each status transmission represents the current status.
- If all status items are disabled, the ASB function is also disabled.
- If the ASB is enabled as a default, the printer transmits the status when the printer data reception and transmission are possible at the first time from when the printer is turned on.
- The following four status bytes are transmitted without confirming whether the host is ready to receive data. The four status bytes must be consecutive, except for the XOFF code.
- Since this command is executed after the data is processed in the receive buffer, there may be a time lag between data reception and status transmission.

First byte (printer information)

Bit	Off/On	Hex	Decimal	Function
0	OFF	00	0	Fixed to 0
1	OFF	00	0	Fixed to 0
2	ON	04	4	Fixed to 1
3	OFF	00	0	Online

	ON	08	8	Offline
4	ON	10	16	Fixed to 0
5	OFF	00	0	Top cover closed
	ON	20	32	Top cover open
6	OFF	00	0	No FEED button action
	ON	40	64	FEED button action
7	OFF	00	0	Fixed to 0

## Second byte字节 (printer information)

Bit	Off/On	Hex	Decimal	Function
0	OFF	00	0	Not in online waiting status.
	ON	01	1	During online waiting status.
1	OFF	00	0	Paper FEED switch is turned Off.
	ON	02	2	Paper FEED switch is turned On.
2	OFF	00	0	Normal
	ON	04	4	Paper jam
3	OFF	00	0	Cutter normal
	ON	08	8	Cutter error
4	OFF	00	0	Auto paper loading status Normal
	ON	10	16	Auto paper loading status Error
5	OFF	00	0	No unrecoverable error
	ON	20	32	Unrecoverable error occurred
6	OFF	00	0	No automatically recoverable error.
	ON	40	64	Automatically recoverable error occurred.
7	OFF	00	0	Fixed to 0

## Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Function
0,1	OFF	00	0	Paper roll near-end sensor: paper adequate.
	ON	03	3	Paper roll near-end sensor: paper near end.
2,3	OFF	00	0	Paper roll end sensor: paper present.
	ON	0C	12	Paper roll end sensor: paper not present.
4	OFF	00	0	Fixed to 0
5	OFF	00	0	Print completed
	ON	20	32	Not print completed
6	OFF	00	0	Not be printing now
	ON	40	64	Be printing now
7	OFF	00	0	Fixed to 0

## Fourth byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Function
0-3	-	-	-	Undefined
4	OFF	00	0	Fixed to 0
5,6	-	-	-	Undefined
7	OFF	00	0	Fixed to 0

[Relative] DLE EOT n

**GS r n**

[Function] Transmit status

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

[Range] n = 1, 49

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

N	Function
1, 49	Transmits paper sensor status and paper end sensor status

[Notes]

- This command is valid for serial model and /or USB model only. If printer has both serial and USB interface, data return to serial and USB interface at the same time.
- 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
	On	03	3	Paper near-end sensor: paper near
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 0.
5,6				Undefined
7	Off	00	0	Not used. Fixed to 0.

- When using USB interface, the transmitted command format please refer to 3.4 Data return format of USB interface.

[Relative] 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 ≤ n ≤ 3, 48 ≤ n ≤ 51

[Description] Selects the printing position of HRI characters when printing a bar code. n selects the printing position as follows:

n	Printing position
0, 48	Not printed
1, 49	Above the bar code

2, 50	Below the bar code
3, 51	Both above and below the bar code

- HRI indicates Human Readable Interpretation.
- The commands (include white/black reverse, emphasized, character size, underline, 90° clockwise-rotation) don't affect HRI.
- HRI characters are printed using the font specified by **GS f**.

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

**[Default]** n = 0

**[Relative]** **GS f, GS k**

**GS f n**

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

<b>[Format]</b>	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	Standard ASCII characters :
	203DPI (12 x 24)
	300DPI (18 x 34)
1,49	Compressed ASCII characters:
	203DPI ( 9 x 17)
	300DPI (12 x 24)

**[Notes]**

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

**[Default]** n = 0

**[Relative]** **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 ≤ n ≤ 255

**[Description]** n specifies the number of dots in the vertical direction.

**[Default]** n = 216

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

**①GS k m d1...dk NUL** **②GS k m n d1...dn**

**[Function]** Select a barcode type and print barcode

**[Format]**

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

**[Range]** ①  $0 \leq m \leq 6$  (m and d depends on the bar code system used)

②  $65 \leq m \leq 73$  (m and d depends on the bar code system used)

**[Notes]** Selects a bar code type and prints the bar code.

m selects a bar code type as follows:

M	Bar Code	Number of	Remarks	
①	0	UPC-A	$11 \leq k \leq 12$ $48 \leq d \leq 57$	
	1	UPC-E	$11 \leq k \leq 12$ $48 \leq d \leq 57$	
	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	$1 \leq k \leq 255$ $32 \leq d \leq 255$		
②	65	UPC-A	$11 \leq n \leq 12$ $48 \leq d \leq 57$	
	66	UPC-E	$11 \leq n \leq 12$ $48 \leq d \leq 57$	
	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	$1 \leq n \leq 255$ $45 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37,43;$	
				$d1 = dk = 42$
	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	$1 \leq n \leq 255$ $0 \leq d \leq 255$		

**[Notes ①]**

- This command ends with a NULL code.
- When UPC-A or UPC-E barcode system is selected, if more than 12 bytes barcode data is received, the printer will process the excess data as normal data.
- When JAN13 (EAN13) barcode system is selected, if more than 13 barcodes data is received, the printer will process the excess data as normal data.
- When JAN8 (EAN8) barcode system is selected, if more than 8 bytes barcodes data is received, the printer will process the excess data as normal 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.

[Notes ②]

- n indicates the number of bar code data, and the printer processes n bytes from the next character data as bar code data.
- If n is outside of the specified range, the printer stops command processing and processes the following data as normal data.

[Notes (standard mode)]

- If d is outside of the specified range, the command is ineffective.
- If the horizontal size exceeds printing area, excess data is printed.
- This command feeds as much paper as is required to print the bar code, regardless of the line spacing specified by **ESC 2** or **ESC 3**.
- This command is enabled only when no data exists in the print buffer. When data exists in the print buffer, the printer processes the data following m as normal data.
- After printing bar code, this command sets the print position to the beginning of the line.
- This command is not affected by print modes (emphasized, double-strike, underline, character size, white/black reverse printing, or 90° rotated character, etc.), except for upside-down printing mode.

[Notes in page mode]

- This command develops bar code data in the print buffer, but does not print it. After processing bar code data, this command moves the print position to the right side dot of the bar code.
- If d is out of the specified range, the command is ignored.
- If bar code width exceeds the printing area, the printer does not print the bar code
- When using the CODE 128 ( m = 73) 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

**[Example]** 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 bar code data is not the code set selection character, the printer stops command processing and processes the following data as normal data.
- If combination of "{" and the following character does not apply 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 is space.
- HRI characters for the control character (<00>H to <1F>H and <7F>H) are not printed.

Be sure to keep spaces on both right and left sides of a bar code. (Spaces are different depending on the types of the bar code. Spaces mean blank space

**[Relative]** **GS H, GS f, GS h, GS w**

**[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)

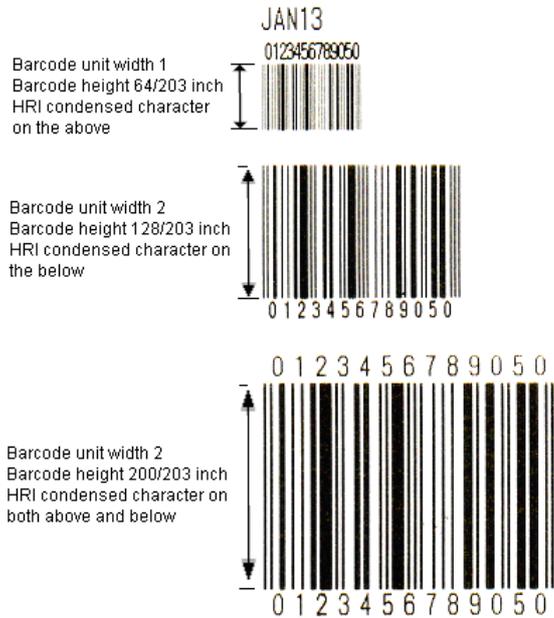
1D 68 80(Barcode height is 128/203 inch)

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 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 n is defined as follows:

parameters	meaning of the parameters
nA	Aspect scale factor of height
nB	Aspect Scale factor of width
nC	Number of rows
nD	Number of columns
nE	Width of basic cells
nF	Height of basic cells

**[Notes]** nA and nB is valid when nC and nD equals to zero.

**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 error correcting grade of PDF417

**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 bar code.

n specifies the bar code width as follows:

n	Module Width (dots) for Multi-level Bar Code	Binary-level Bar Code	
		Thin element width (dots)	Thick element width (dots)
2	2	2	5
3	3	3	8
4	4	4	10
5	5	5	13
6	6	6	15

- 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 Other commands**

**ESC 2**

[Function] Select default line spacing

[Format] ASCII ESC 2  
 Hex 1B 32  
 Decimal 27 50

[Notes] Select 1/6-inch line (approximately 4.23 mm) spacing.

- The line spacing can be set independently in standard mode and in page mode.

[Relative] **ESC 3**

**ESC 3 n**

[Function] Set line spacing

[Format] ASCII ESC 3 n

Hex	1B	33	n
Decimal	27	51	n

**[Range]** 0 ≤ n ≤ 255

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

The maximum paper feed amount is 600 mm (23.6 inches) for 300 DPI printer and 900mm (35.4 inches) for 203 DPI printer. If a paper feed amount of more than 600 mm (300DPI) or 900mm (203DPI) is set, the printer feeds the paper

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

**[Relative]** **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 ≤ n ≤ 1

**[Description]** Disable or enable peripheral device to which host computer sends data.

- [Notes]**
- The lowest bit of n is effective;
  - When the LSB of n is 0, printer is disabled;
  - When the LSB of n is 1, printer is enabled'
  - When the printer is enabled when power on

When the printer is disabled, it ignores all data except for real-time command (**DLE EOT**) 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]**

Clears the data in the print buffer and resets the printer mode to the default mode when the power was turned on.

- The bit-image data or user-defined characters in RAM are cleared.
- The macro definition is not cleared.

The NV bit image data is not cleared.

**ESC L**

---

**[Function]** Select page mode

**[Format]** ASCII    ESC    L  
 Hex        1B    4C  
 Decimal    27    76

**[Notes]**

Switch from standard mode to page mode.

- 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 **ESC S**, the printer returns to standard mode.
- This command sets the position where data is buffered to the position specified by **ESC T** within the printing area defined by **ESC W**.
- This command switches the settings for the following commands to those for page mode:
  - ① Set right-side character spacing: **ESC SP**
  - ② Select line spacing: **ESC 2, ESC 3**
  - Only value settings is possible for the following commands in page mode; these commands are not executed until switch to standard mode.
    - ① Turn 90° clockwise rotation mode on/off: **ESC V**
    - ② Turn upside-down printing mode on/off: **ESC {**
    - ③ Set left margin: **GS L**
    - ④ Set printable area width: **GS W**
  - The printer returns to standard mode, after it is reset, or executes **ESC @**.

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

**ESC S**

---

**[Function]** Select standard mode

**[Format]** ASCII    ESC    S  
 Hex        1B    53  
 Decimal    27    83

**[Notes]**

Switches from page mode to standard mode.

- 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 mode zone is initialized as default.
- This command switches the settings for the following commands to those for standard mode:
  - ① Set right-side character spacing: **ESC SP**
  - ② Select default line spacing: **ESC 2, ESC 3**
- The following commands are enabled only to set in pagemode 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 the printer is reset, or command **ESC @** is used.

[Relative] **FF, ESC FF, ESC L**

**ESC c 0 n**

[Function] Select paper type to be used

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

[Range] n =0,1,2

[Notes] Select paper type specified by n as follows.

n	Paper type
0	Continuous paper
1,2	Marked paper

This command has no effect except n equals 0,1,2

[Default] n = 0

[Relative] **GS FF**

**ESC c 3 n**

[Function] Select paper-end signal of paper sensor

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

[Range] 0 ≤ n ≤ 255

[Description] Select paper sensor to output paper-end signal

• The definition of n bit is as follows:

Bit	0/1	Hex	Decimal	Function
0	0	00	0	undefined
1	0	00	0	Paper-near-end sensor is not available
	1	02	2	Paper-near-end sensor is available
2	0	00	0	undefined
3	0	00	0	Paper end sensor is not available
	1	08	8	Paper end sensor is available
4-7				undefined

**[Notes]**

- It is possible to select two sensors to output signals. Then, if any of the sensors detects a paper end, the paper end signal is output.
- The command is available only with a parallel interface and is ignored with a serial interface.

**[Default]** n = 0

**ESC c 1 nL nH**

**[Function]** Set cutting position

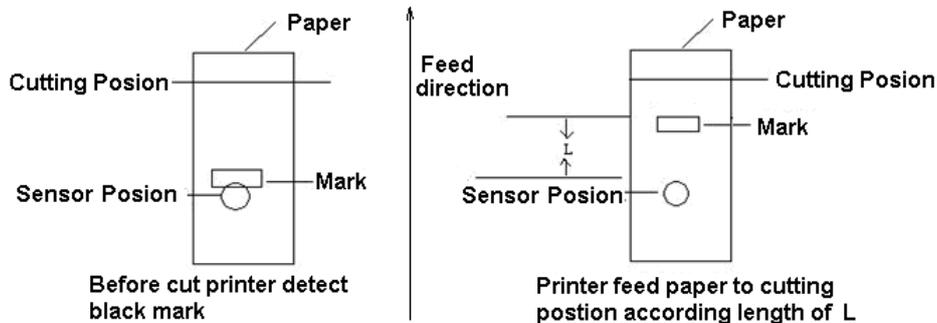
**[Format]** ASCII      ESC    c    1    nL nH  
 Hex            1B    63 31 nL nH  
 Decimal       27    99 49 nL nH

**[Range]**  $0 \leq nL \leq 255; 0 \leq nH \leq 255;$   
 $N=(nL + nH \times 256 )$  ( If n<19,so n = 19)

**[Description]** Set the cutting position to a place when marked paper is selected.

**[Notes]**

- Direction settings: feeding paper is front, reversing feed paper is back.
- The relationship between N and the cutting position is defined as below.  
 If n increase, the cutting position move backward; If n decrease, the position move forward :  $n/8(\text{mm})$ for 203DPI,  $n/12(\text{mm})$ for 300DPI.
- When  $nL = nH = 255$ , the N saved to printer will not loss even when printer is turned off/on.



The distance between cutter and TPH is 14.5mm. .

**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]**       $0 \leq n \leq 255$

**[Description]** Selects the paper sensor(s) used to stop printing when a paper-end is detected, using n as follows:

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

- [Notes]**
- When either bit 0 or 1 is on, the printer selects the paper roll near-end sensor. When the paper roll sensor detects a paper-end, the printer goes off-line after current printing stops.
  - When m=0,if the printer can't print because of paper near end ,this command can't recover the printer and print again and there will be effective until the paper near end error is clear.

**[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]**       $0 \leq n \leq 255$

**[Description]** Enables or disables the panel buttons.

- When the LSB of n is 0, the panel buttons are enabled.
- When the LSB of n is 1, the panel buttons are disabled.

**[Notes]**

- Only the LSB of n is valid.
- When the panel buttons are disabled, none of them are usable.
- In the macro ready mode, the panel buttons are always enabled.

**[Default]**      n = 0

**ESC c @ n**

**[Function]** Enable/disable real-time commands

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

Hex            1B        63 40 n  
 Decimal      27        99 64 n

**[Range]**      0 ≤ n ≤ 255

**[Description]**    Enables or disables the real-time commands.

- When the LSB of n is 0, the real-time commands are disabled.
- When the LSB of n is 1, the panel buttons are enabled.

**[Notes]**

- Only the LSB of n is valid.
- When the printer is turned on, the real-time commands are always enabled.
- When error occurs, the real-time commands are automatically enabled.

**[Relative]**    **DLE EOT n**

**ESC c A n**

**[Function]**    Set forward or backward distance before print

**[Format]**      ASCII        ESC        c    A    n  
 Hex            1B        63 41 n  
 Decimal      27        99 64 n

**[Range]**      0 ≤ n ≤ 255

**[Description]** Set forward or backward distance before print,units:mm。

- When n is positive,set the backward distance(maximum 2mm)
- When n is negative,set the forward distance (maximum 127mm)

**[Notes]**        The forward and backward set can not be valid at the same time  
 This function only valid in page mode.

**[Default]**     n = 0

**ESC i**

**[Function]**    Cut paper

**[Format]**      ASCII        ESC        i  
 Hex            1B        69  
 Decimal      27        105

**[Notes]**        Cut paper

**[Description]** If the paper feeding length (L1) is less than the minimum page length (L<sub>m</sub>) specified when executing this command, the printer feeds paper (L<sub>m</sub>-L1) long and cuts paper. Otherwise, the printer cuts paper directly.

- In marked paper mode, cutting position is specified with marks and cuts paper.

**ESC I n X0I X0h Y0I Y0h X1I X1h Y1I Y1h**

**[Function]**    Underline command

**[Format]**      ASCII        ESC        I            n    X0I X0h Y0I Y0h X1I X1h Y1I Y1h  
 Hex            1B        6C            n    X0I X0h Y0I Y0h X1I X1h Y1I Y1h

Decimal 27 108 n X0l X0h Y0l Y0h X1l X1h Y1l Y1h

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

**[Description]** Set the position of start point and end point, then make a line in printing buffer area.

n indicates the dots of thickness.

X0l X0h Y0l Y0h set the start point (X0,Y0),X1l X1h Y1l Y1h set the end point (X1,Y1).

$X0 = X0l + X0h \times 255, Y0 = Y0l + Y0h \times 255, X1 = X1l + X1h \times 255,$

$Y1 = Y1l + Y1h \times 255.$

**[Notes]**

- This command is effective only in page mode.
- This command can only make horizontal line and vertical line, so Y0 must equal to Y1 when X0 is unequal to X1, and X0 must equal to X1 when Y0 is unequal to Y1.
- This command is not effective when the start point and end point exceeds the printing area.

**ESC v**

**[Function]** Transmit device status

**[Format]** ASCII ESC v  
 Hex 1B 76  
 Decimal 27 118

**[Description]** Transmit the device status in one-byte data.

**[Notes]** Transmit the device status in one-byte data.

- The command is non-real time
- Transmits the status via serial interface and/or USB interface. If printer has both serial and USB interface, data return to serial and USB interface at the same time.

Define returned bytes as follows:

Bit	On/Off	Hex	Device Status
0	0/1	00/01	Paper adequate/Paper near end
1	0/1	00/02	Printhead close/Printhead open
2	0/1	00/04	Paper adequate/Paper end
3	0/1	00/08	Printhead normal/overheat
4	0/1	00/10	Cutter normal/Cutter error

**GS FF**

**[Function]** Feed label to print position

**[Format]** ASCII GS FF  
 Hex 1D 0C  
 Decimal 29 12

**[Description]** Feed paper until the next black mark reaches print position

**GS ( A pL pH n m**

**[Function]** Execute test print

**[Format]** ASCII GS ( A pL pH n m  
 Hex 1D 28 41 pL pH n m  
 Decimal 29 40 65 pL pH n m

**[Range]** ( pL+( pH × 56))=2 (pL=2, pH=0)  
 0 ≤ n ≤ 2, 48 ≤ n ≤ 50  
 1 ≤ m ≤ 2, 49 ≤ m ≤ 50

**[Description]** • Execute the test printing in the mode decided by n, m  
 m specifies a test pattern.

m	Test pattern
1, 49	Hexadecimal dump
2, 50	Print Selftest Page

**[Notes]**

- This command is enabled only when processed at the beginning of a line in standard mode.
- This command is not effective in page mode
- When this command is received during macro definition, the printer ends macro definition and begins performing this command.
- The printer cuts the paper at the end of the test print.

**[Example]** When m =1 ,use the command as follows:

1. reset the printer;
2. Using the command (1d 28 41 02 00 00 01),then the printer enter the Hexadecimal dump mode;
3. Send the print data as follows:
 

```
30 31 32 33 34 35 36 37
31 32 33 34 35 36 37 38
41 42 43 44 45 46 47 48
42 43 44 45 46 47 48 49
```
4. Press the feeding button three times ,then the printer end the Hexadecimal dump and print the note as follows:
 

```
***completed***
```

**Result:**

Hexadecimal Dump

To terminate hexadecimal dump,  
Press FEED button three times

```

30 31 32 33 34 35 36 37    01234567
31 32 33 34 35 36 37 39    12345679
41 42 43 44 45 46 47 48    ABCDEFGH
42 43 44 45 46 47 48 49    BCDEFGHI
    
```

\*\*\*completed\*\*\*

**GS :**

**[Function]** Start/end macro definition

**[Format]** ASCII GS :

Hex 1D 3A

Decimal 29 58

**[Description]** Starts or ends macro definition

**[Notes]**

- Macro definition starts when this command is received during normal operation. Macro definition ends when this command is received during macro definition.
- When **GS ^** is received during macro definition, the printer ends macro definition and clears the definition.
- When **GS \***、**FS q** is received during macro definition, the printer ends macro definition and clears the definition.
- Macro operates once automatically when macro definition is over.
- Macro is not defined when the power is turned on.
- The defined contents of the macro are not cleared by **ESC @**. Therefore, **ESC @** can be included in the contents of the macro definition.
- The contents of the macro can be defined up to 2042 bytes. If the macro definition exceeds 2042 bytes, excess data is processed as normal data.

**[Relative]** GS ^

**GS C 0 n m**

**[Function]** Select counter print mode

**[Format]** ASCII GS C 0 n m

Hex 1D 43 30 n m

Decimal 29 67 48 n m

**[Range]**  $0 \leq n \leq 5$

$0 \leq m \leq 2, 48 \leq m \leq 50$

**[Description]** Select a print mode for the serial number counter

n specifies the number of digitals to be printed as follows:

when n = 0, the printer prints the actual digits.

when n = 1 to 5, the printer prints the actual digits indicated by the number value.

m specifies the printing position within the entire range of printer digits as follow:

m	Printing position	Processing of digits less than those specified
0,48	Align right	Adds spaces to the left
1,49	Align right	Adds 0 to the left
2,50	Align left	Adds spaces to the right

- [Notes]**
- If n or m out of the defined range, the previously set print mode is not changed.
  - If n=0, modes not have any meaning.

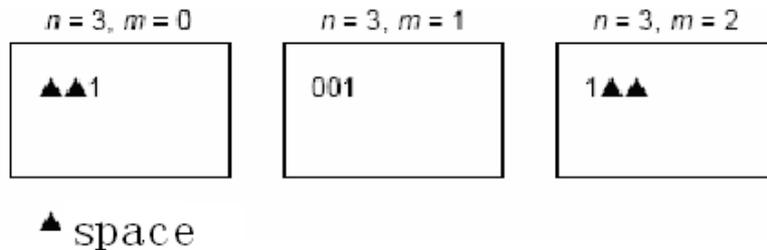
**[Default]** n = 0, m = 0

**[Relative]** GS C 1, GS C 2, GS C ;, GS c

**[Example]**

```
1d 43 30 03 00      ( Select counter print mode )
1d 43 31 01 00 09 00 01 01    ( Select count mode (A) )
1d 63                ( Enter count mode and print the value of counter )
0a
```

The Printing position of result is as follows:



**GS C 1 aL aH bL bH n r**

- [Function]** Select count mode (A)
- [Format]**
- |         |    |    |    |    |    |    |    |   |   |
|---------|----|----|----|----|----|----|----|---|---|
| ASCII   | GS | C  | 1  | aL | aH | bL | bH | n | r |
| Hex     | 1D | 43 | 31 | aL | aH | bL | bH | n | r |
| Decimal | 29 | 67 | 49 | aL | aH | bL | bH | n | r |
- [Range]**
- 0 ≤ aL ≤ 255
  - 0 ≤ aH ≤ 255
  - 0 ≤ bL ≤ 255
  - 0 ≤ bH ≤ 255
  - 0 ≤ n ≤ 255
  - 0 ≤ r ≤ 255

**[Description]** Select a count mode for the serial number counter.

- aL, aH, bL, bH specify the counter range.
- n indicates the stepping amount when counting up or down.
- r indicates the repetition number when the counter value is fixed.

**[Notes]**

Count-up mode is specified when

$$[aL + aH \times 256] < [bL + bH \times 256], n \neq 0 \text{ and } r \neq 0$$

- Count-down mode is specified when

$$[aL + aH \times 256] > [bL + bH \times 256], n \neq 0 \text{ and } r \neq 0$$

- Count stop when

$$[aL + aH \times 256] = [bL + bH \times 256], n = 0 \text{ or } r = 0$$

- If setting count-up mode, the minimum value of the counter is  $[aL + aH \times 256]$ , the maximum number is  $[bL + bH \times 256]$ . If counting up reaches a value exceeding the maximum, it is resumed with the minimum value.
- If setting count-down mode, the maximum value of the counter is  $[aL + aH \times 256]$ , the minimum number is  $[bL + bH \times 256]$ . If counting down reaches a value less than the minimum, it is resumed with the maximum value.
- When this command is executed, the internal counter that indicates the repetition number specified by r is cleared.

**[Default]**

aL = 1, aH = 0, bL = 255, bH = 255, n = 1, r = 1

**[Relative]**

.GS C 0, GS C 2, GS C ;, GS c

**[Example]**

Refer to the example for GS C 0.

**GS C 2 nL nH**

**[Function]** Select counter

<b>[Format]</b>	ASCII	GS	C	2	nL	mH
	Hex	1D	43	32	nL	mH
	Decimal	29	67	50	nL	mH

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

**[Description]** Set the serial number counter value.

nL and nH determine the value of the serial number set by  $[nL + nH \times 256]$ .

**[Notes]**

- In count-up mode, if the counter value specified by this command goes out of the counter operation range specified by GS C 1 or GS C ;, it is forced to convert to the minimum value.
- In count-down mode, if the counter value specified by this command goes out of the counter operation range specified by GS C 1 or GS C ;, it is forced to convert to the maximum value.

**[Default]**

nL = 1, nH = 0

**[Relative]**

GS C 0, GS C 1, GS C ; GS c

**[Example]**

1d 43 32 03 00 (Set the serial number counter value to 3)

1d 63 (Enter count mode and print the value of counter)

0a

Using the example ,it wil print the value of counter “3” every time.

**GS C : sa ; sb ; sn ; sr ; sc ;**

**[Function]** Select count mode

**[Format]** ASCII GS C ; sa ; sb ; sn ; sr ; sc ;  
 Hex 1D 43 3B sa 3B sb 3B sn 3B sr 3B sc 3B  
 Decimal 29 67 59 sa 59 sb 59 sn 59 sr 59 sc 59

**[Range]** “0” ≤ sa ≤ “65535”  
 “0” ≤ sb ≤ “65535”  
 “0” ≤ sn ≤ “255”  
 “0” ≤sr ≤“255”  
 “0” ≤sc ≤“255”

These values are all character strings.

**[Description]** Select a count mode for the serial number counter.

- sa, sb, sn, sr and sc are all displayed in ASCII characters, using the codes for "0" to "9".
- sa and sb set the counter range.
- sn indicates the stepping amount of counting up or down.
- sr indicates the repetition number with the counter value fixed.
- sc indicates the counter value.

**[Notes]**

- Count-up mode is specified when: sa < sb ,sn ≠0 , sr ≠0.
- Count-down mode is specified when: sa > sb, sn ≠0, sr ≠0.
- Count stop when: sa = sb or sn = 0 or sr = 0.
- When count-up mode is specified,sa is the minimum counter value and sb is the maximum counter value.If the counter value set by sc is outside the counter operation range,the counter value is forced to convert to the minimum value.
- When count-down mode is specified,sa is the maximum counter value and sb is the minimum counter value.If the counter value set by sc is outside the counter operation range,the counter value is forced to convert to the maximum value.
- Parameters sa to sc can be omitted. If omitted, these argument values are unchanged.
- Parameters sa to sc must not contain characters, except 0 to 9.
- If an incorrect syntax is used, the corresponding parameter setting has no effect, and the data after that is processed as normal data.

**[Default]** sa = 1, sb = 65535, sn = 1, sr = 1, sc = 1

**[Relative]** GS C 0, GS C 1, GS C 2, GS c

**[Example]** example 1:

1D 43 3B 31 3B 39 3B 31 3B 31 3B 32 3B (Select count mode (B))  
 1D 63 (Enter count mode and print the value of counter)  
 0A

**example 2:**

1D 43 3B 31 3B 39 3B 31 3B 31 3B (Select count mode (B))  
 1D 63 (Enter count mode and print the value of counter)  
 0A

**GS I n**

**[Function]** Transmit printer configuration

**[Format]** ASCII GS I n  
 Hex 1D 49 n  
 Decimal 29 73 n

**[Range]** n = 68, 69, 153, 80, 81, 82, 83

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

- n = 68, transmit Firmware version of the printer  
 For example, "FV1.030";  
 Hereinto, FV is short for Firmware Version and meaning of the following figures "1.030" are as follows:  
 "1": when hardware changing made the firmware can not compatible afterward, this figure should be changed and thus the firmware version number updated.  
 "03": when faults modified and function updated, this number will be changed and thus the firmware version number updated.  
 "0": firmware branch number, for different customer requirements which are different with standard configurations, this figure will be changed. But as to a specific customer, this number will be fixed.
- n = 69, transmit Boot Loader version of the printer. For example, "FV1.000"
- n = 153, Transmit Printer Name of the printer.
- n = 80, transmit Part Number of the printer. The standard printer part number will be fixed to BK-T080II.
- n = 81, transmit Printer Serial number of the printer. Serial number of the printer will be wirted into printer when out of factory.
- n = 82, transmit Hardware Version of the printer.
- n = 83, Transmit Printer Production date

**[Notes]**

- This command is only enabled via serial and/or USB interfaces. If printer has both serial and USB interface, data return to serial and USB interface at the same time.
- When using USB interface, the transmitted command format please refer to 3.4

Data return format of USB interface.

**①GS V m ②GS V m n**

**[Function]** Select cut mode and cut paper

**[Format]**

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

**[Range]**

- ①m = 0, 48
- ②m = 66, 0 ≤ n ≤255

**[Description]** Selects a mode for cutting paper and executes paper cutting. The value of m selects the mode as follows:

M	Print mode
0,48	Full cut
66	Feeds paper (n × vertical motion unit) inches and cuts the paper fully.

**[Notes]**

- This command is effective only processed at the beginning of a line.
  - When m = 0 or 48, if the paper feed length (L1) is less than the minimum page length (L<sub>m</sub>) specified when executing this command, the printer feeds paper (L<sub>m</sub>-L1) long and cuts paper. Otherwise, the printer cuts paper directly.
  - When m=66, the printer feeds paper (n × vertical motion unit) first. If the totally paper feed length (L2) is less than the minimum page length (L<sub>m</sub>) specified when executing this command, the printer feeds paper (L<sub>m</sub>-L2) long and cuts paper. Otherwise, the printer cuts paper directly.
  - The horizontal and vertical motion units are specified by **GS P**.
  - The vertical motion unit (y) is used for calculating the paper feed length.
- In marked paper mode cutting position is set with mark and cut paper.

**GS c**

**[Function]** Print counter

**[Format]**

ASCII	GS	c
Hex	1D	63
Decimal	29	99

**[Description]** Sets the serial counter value in the print buffer and increments or decrements the counter value.

**[Notes]**

- After setting the current counter value in the print buffer as print data (a character string), the printer counts up or down based on the count mode set.

The counter value in the print buffer is printed when the printer receives a print command or is in the buffer-full state.

- The counter print mode is set by GS C 0.
- The counter mode is set by GS C 1 or GS C.
- In count-up mode, if the counter value set by this command goes out of the counter operation range set by GS C 1 or GS C ;, it is forced to convert to the minimum value.
- In count-down mode, if the counter value set by this command goes out of the counter operation range set by GS C 1 or GS C ;, it is forced to convert to the maximum value.

[Relative] GS C 0, GS C 1, GS C 2, GS C ;

**GS ^ r t m**

<b>[Function]</b>	Execute macro					
<b>[Format]</b>	ASCII	GS	^	r	t	m
	Hex	1D	5E	r	t	m
	Decimal	29	94	r	t	m
<b>[Range]</b>	0 ≤ r ≤ 255					
	0 ≤ t ≤ 255					
	m = 0, 1					
<b>[Description]</b>	Executes a macro.					
	<ul style="list-style-type: none"> <li>▪ r specifies the number of times to execute the macro.</li> <li>▪ t specifies the waiting time for executing the macro.</li> <li>▪ m specifies macro executing mode.</li> </ul>					
	<b>When m = 0:</b>					
	The macro executes r times continuously at the interval specified by t (t x 250 ms).					
	<b>When m = 1:</b>					
	After waiting for the period specified by t, the PAPER OUT LED indicators blink and the printer waits for the FEED button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats the operation r times.					

**[Notes]**

- The waiting time is t x 250 ms for every macro execution.
- If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.
- If the macro is not defined or if r is 0, the command is disabled.
- When the macro is executed (m = 1), paper always cannot be fed by using the FEED button.

[Relative] GS :

**GS . B E . . > n**

---

[Function] Transmit Mandatory and Statistic Data

[Format] ASCII GS . B E . . > n  
 Hex 1D 99 42 45 92 9b 3e n  
 Decimal 29 153 66 69 146 155 62 n

[Range] n = 0,1,2,3, 4

[Notes]

Transmit Mandatory and Statistic Data of the printer by sending command: 0x1d 0x99 0x42 0x45 0x92 0x9a0x3e, the data returned in decimal mode: (in the following example X presents data returned, not the numbers)

- n = 0 transmit printer feed paper length: Printed paper length.  
 Unit: mm. Printed paper length: XXXX
- n = 1, transmit total printed lines: Printed lines (Total). The data can not be cleared to zero even if a print head is changed. The original data is 0, when change a new print head, the Printed lines (Actual) will be added to the Printed lines (Total), and the current Printed lines (Actual) will be clear to zero.  
 Unit: dot line. Printed lines(Total): XXXX
- n = 2, Transmit current printed lines: Printed lines (Actual). The data needs to be cleared to zero when changing print head.  
 Unit: dot line. Printed lines(Actual): XXXX
- n = 3, Transmit total cut numbers: Number of Cuts (Total). The data can not be cleared to zero even if a new cutter is changed. The original data is 0, when change a new cutter, the Number of Cuts(Actual) will be added to the Number of Cuts (Total), and the current Number of Cuts(Actual) will be clear to zero.  
 Unit: times, Number of Cuts (Total): XXXX
- n = 4, Transmit current number of cuts: Number of Cuts(Actual). The date needs to be cleared to zero when changing cutter.  
 Unit: times. Number of Cuts(Actual): XXXX

[Relative] GS . B E . . ? n

[Note]

- When using USB interface, the transmitted command format please refer to 3.4 Data return format of USB interface.

**GS . B E . . ? n**

---

[Function] Clear Mandatory and Statistic Data

[Format] ASCII GS . B E . . ? n  
 Hex 1D 99 42 45 92 9b 3F n

Decimal 29 153 66 69 146 155 63 n

**[Notes]**

Clear Mandatory and Statistic Data when do print head or cutter mantainence of the printer. To assure the accurency of the Mandatory and Statistic Data, the current printed lines (Printed lines(Actual)) and current cut times (Number of Cuts(Actual)) needs to be cleared.

- n = 0x43, Add the current cut times (Number of Cuts(Actual)) to the total cut times (Number of Cuts (Total)), and clear the current cut times (Number of Cuts(Actual)).
- n = 0x50, Add the current printed lines (Printed lines(Actual)) to the total printed lines (Printed lines(Total)), and clear the current printed lines (Printed lines(Actual)).

**[Relative]** GS . B E . . > n

### 3. Programming Instructions

#### 3.1 General Information

- 1) The instructions are compiled to help users who use commands to control the printer quickly master the command set.
- 2) All programming examples are given in Hex.
- 3) Commands cited in the instructions are bolded and underlined. For instance, **1B 40**. Data following the commands are not underlined. For instance, 42 43.
- 4) Contents in parentheses are interpretations of the commands. Parentheses and contents in them are not parts of the commands transmitted to printer.

#### 3.2 Programming ABC

##### 3.2.1 Print modes

a) Standard mode (Line mode)

Standard mode is the default print mode of Kiosk series. In this mode, the printer prints data and feed paper as long as the line buffer full (data buffered is enough for one print line) or receiving a print command. For instance, **0A**.

**Examples:**

**1B 40** (Initialize the printer)

41 42 43 44 45 46

**0A** (Print)

**Printout:** ABCDEF

b) Page mode

In 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 **1B 0C** or **0C**.

**Examples:**

**1B 4C**(switch into page mode)

**1B 57 20 00 00 00 60 02 20 03** (set print area in page mode)

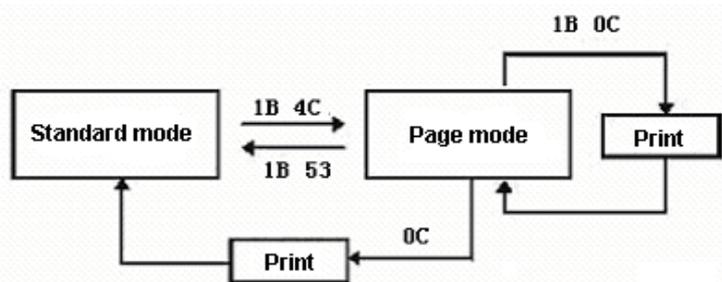
50 72 69 6E 74 20 49 6E 20 50 61 67 65 20 4D 6F 64 65 33 33 33

**0C**(print)

**1D 56 00**(cut paper).

**Printout:** Print In Page Mode 333

The standard mode is switched with page mode as follows.



### 3.2.2 Paper supported

**Black mark paper** is thermal sensitive paper on which black marks are published regularly. The black marks are referenced to set print area and cut position. Refer to relative user's manual for detailed black mark requirements.

**Examples:**

**1B 63 30 02** (select black mark paper)

**1D 0C** (move the next label to print position) 33 33 33 33 42 6C 61 63 6B 20 4D 61 72 6B  
20 50 61 70 65 72

**0A**(print)

**1D 56 00**(cut paper)

**Printout:** 3333Black Mark Paper

**Continuous paper** is normal thermal sensitive paper rolls which is not used for fixing position.

**Examples:**

**1B 63 30 00** (select continuous paper) 33 33 33 33 20 53 65 72 69 65 73 20 50 61 70 65  
72

**0A**(print)

**1D 56 00**(cut paper)

**Printout:** 3333 Series Paper

### 3.3 Programming examples

In this paragraph, the most commonly used five kinds of commands are outlined below (Refer to 2. command set for detailed usage). The general programming approach follow by programmers is "initialization—>set printing and print data—>print and present printout—>status check", read descriptions below carefully for quickly mastering this approach.

#### 3.3.1 Initialization

- 1) Initialize printer: **1B 40**.
- 2) Select paper type: **1B 63 30 n**, n = 0 (continuous paper); n = 2(black mark paper).
- 3) Select print mode: **1B 53** switch to standard mode (Default) **1B 4C** switch to page mode.
- 4) Select PRST action mode: **1B 63 38 n, 1B 63 39 n**.

#### 3.3.2 Set printing and print data(character /barcode/bit image)

##### 1) Set print area and print position

- a) Horizontal tab(**09**)
- b) Set horizontal absolute print position(**1B 24**)
- c) Set horizontal tab positions(**1B 44**)
- d) Select print direction in page mode(**1B 54 n**)
- e) Set print area in page mode(**1B 57**)
- f) Set relative print position(**1B 5C nL nH**)
- g) Select justification(**1B 61 n**)



**1B 4C**(switch to page mode)

**1B 57 20 00 00 00 60 02 20 03** (set print area in page mode)

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

30 30 30 30 30 30 30 30 30 30 30

**0A**(print)

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

31 31

**0A**(print)

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

32 32

**0A**(print)

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

33 33

**0A**(print)

50 72 69 6E 74 20 45 6E 64

**0C**(print)

**1D 56 00**(cut paper)

**2) Set character property**

- a) Turn underline mode on/off(1B 2D n)
- b) Select print mode(1B 21 n)
- c) Turn up-side-down printing mode on/off(1B 7B n)
- d) Select character size(1D 21)
- e) Turn white/black reverse printing mode on/off(1D 42 n)

**Examples:**

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

**1B 40** (Initialize printer)

**1B 53**(switch to standard mode)

33 33 53 6C 65 63 74 20 75 6E 64 65 72 6C 69 6E 65 20 70 72 69 6E 74 20 6D 6F 64 65  
20

**1B 2D 02**(turn underline mode on)

4E 6F 77 20 69 74 20 77 6F 72 6B 73 20 21 20 53 65 6C 65 63 74 20 20 20 20 20 50 72  
69 6E 74 20 6D 6F 64 65 20

**1B 21 01**(select print mode)

33 33 33 33 33 33 33

**1B 21 01**(select print mode)

20 4F 70 65 6E 20 69 6E 76 65 72 73 65 20 20 70 72 69 6E 74 20 6D 6F 64 65

**0A**(print)

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

33 33 33 33 33 4F 4B 21

**0A**(print)

**1B 7B 00**(turn upside-down printing mode off)

33 33 33 33 33 4F 4B 21 33 33 33 33 33 4E 6F 77 20 49 27 6C 6C 20 73 68 6F 77 20 79  
6F 75 20 7A 6F 6F 6D 20 69 6E 20 6D 6F 64 65 20

**0A**(print)

**1D 21 33**(select character size)

33 33 33 4F 4B 21 20 77 6F 72 6B 73 21 20

**0A**(print)

**1D 21 00**(select character size)

**1D 42 01**(turn white/black reverse printing mode on)

33 33 33 33 33 33 33

**1D 42 00**(turn white/black reverse printing mode off)

33 33 33 33 33

**0A**(print)

**1D 56 00**(cut paper)

### 3) Print character/barcode/bit image

#### a) Print characters

To print ASCII characters, send ASCII codes of characters to printer.

##### Examples:

**1B 40**(initialize printer)

53 68 61 6E 44 6F 6E 67 20 57 65 69 48 61 69 20 42 65 69 79 61 6E 67 20 43 6F 6D 70  
61 6E 79

**0A**(print)

**1D 56 00**(cut paper)

**Printout:** "ShanDong WeiHai Beiyang Company"

If the character set is Chinese font, send the area codes of wanted Chinese characters to print Chinese characters.

##### Examples:

**1B 40** (Initialize printer)

C9 BD B6 AB D0 C2 B1 B1 D1 F3 D0 C5 CF A2 BC BC CA F5 B9 C9 B7 DD D3 D0 CF  
DE B9 AB CB BE

**0A**(print)

**1D 56 00**(cut paper)

**Printout:** "Shandong WeiHai Beiyang Company"

#### b) Print barcode(Refer to 2.command set for detailed information)

- Select barcode height (1D 68)
- Select barcode width (1D 77)

- Select font for HRI characters (1D 66)
- Select printing position for HRI characters (1D 48)
- Print barcode(1D 6B)

**Example 1: print Code 128 in standard mode**

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

**1B 40** (Initialize printer)

**1B 53**(switch to standard mode)

33 33 33 50 72 69 6E 74 20 43 6F 64 65

**1D 68 78**(Select barcode height)

**1D 77 03**(Select barcode width)

**1D 66 00**(Select font for HRI characters)

**1D 48 03**(Select printing position for HRI characters)

**1D 6B 49 0B 7B 42 4E 6F 2E 31 32 33 34 35 36** (print barcode)

**1D 56 00**(cut paper)

**Example 2: print code128 in page mode**

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

**1B 4C**(switch to page mode)

**1B 57 20 00 00 00 60 02 20 03**(set print area in page mode)

**1D 5C 80 00**(set relative vertical print position in page mode)

**1D 68 78**(set barcode height)

**1D 77 03**(set barcode width)

**1D 66 00**(select font for HRI characters)

**1D 48 03**(select printing position for HRI characters)

**1D 6B 49 0B 7B 42 4E 6F 2E 31 32 33 34 35 36**(print barcode)

**0C** (print)

**1D 56 00** (cut paper)

Note: In page mode, the value for relative vertical print position shall be large than the selected barcode height. Otherwise, the barcode could not be printed completely.

c) Print bit images

User may download a bit image into RAM or Flash and print it (Refer to 2. Command set for details).

Examples: Download a bit image (bit image number 0) into RAM and print it.

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

**1B 53**(switch to standard mode)

**1D 23 00** (specify a number for the bit image to be downloaded)

**1D 2F 00** (print downloaded bit image)

**1D 2F 01** (print download bit image)

**1D 2F 02** (print downloaded bit image)

1D 2F 03 (print downloaded bit image)

1D 56 00(cut paper)

### 3.3.3 Print and cut paper

To print in line mode, use command 0A. To print in page mode, use command 0C or 1B 0C(do not clear buffer). Cut paper command is 1D 56 00.

#### Examples:

1B 4C(switch to page mode)

1B 57 20 00 00 00 60 02 20 03 (set print area in page mode)

50 72 69 6E 74 20 49 6E 20 50 61 67 65 20 4D 6F 64 65 33 33 33

1B 0C(print without clearing buffer)

1D 56 00(cut paper)

1B 0C(print without clearing buffer)

1D 56 00(cut paper)

0C(print and clear buffer)

1D 56 00(cut paper)

### 3.3.4 Status check

User may check the printer status (normal or error) through either real-time status transmission command or automatic status back function which can transmit status data to host automatically when error (paper end, printhead open, cutter error, paper jam etc.) occurs.

#### 1) Real-time status transmission (10 04 n) command

This command is automatically enabled when the printer is turned on or when error occurs after printer is powered on. User may also use real-time command enable/disable command (1B 63 40 n) to turn on / off real time commands. When print with printer drivers, the real-time command is automatically disabled by printer driver to avoid rubbish data from the printer. If user wants to check printer status with real-time status transmission command after printing, it is necessary to enable the real-time command first by using command 1B 63 40 n.

Note: do not check printer status during printing with printer driver due to following reasons.

- a) If the status inquiry command is sent to printer in API mode through USB port, the printer will process this command as normal bit image data and consequently cause abnormal printout.
- b) If the status inquiry command is sent to printer through serial interface and USB interface, the printer will also process this command data as normal bit image data and consequently cause abnormal printout.

#### 2) ASB(1D 61 n)

If the ASB command is enabled, the printer will automatically transmit a four-byte status to host when error occurs or specified printer status changes.

How to obtain correct printer status in use of **ASB**?

- a) First confirm if the fourth byte is synchronous data and frontal three bytes is complied to grammar.

- b) Printer process status is transmitted depending on the third byte of printer return value. The lower four bits of third byte gives information on what process the printer is in and whether there are any errors.
- c) The status of the first byte and second byte based on printer process status give exact printer status information.

For example, "01 04 15 F0" is returned by printer.

F0 is synchronous data which cannot be analyzed.

**15:** i.e. "10+05" and "05" means the printer is in PRST retraction process and "10" means that there are error occurs in this process.

**04:** means the PRST paper jam

**01:** means paper near end.

From information above, the user can learn that the printing has been finished but PRST fails to retract the printout after waiting time and the paper is near end, a new roll is to be prepared.

The detailed information refers to **1D 61 n**

**3.3.5 Download bit images into RAM or FLASH**

User may download one or more bit images into RAM (RAM bit images) or FLASH (FLASH bit images). Bit images in FLASH are retained when printer is powered off while those in RAM are cleared when printer is turned off or initialized by using command **1B 40**. Therefore, the user need to download the bit images into RAM again whenever the printer is restarted or initialized.

Refer to command **1D 2A** (download bit images into RAM) and **1C 71** (download bit images into NV) for detailed information on how to perform the download. In both RAM bit image download and NV bit image download, a number must be specified for the image to be downloaded. Please read carefully the commands **1D 2A** and **1C 71** for the difference between RAM bit image download and NV bit image download.

**Bit image data processing by taking an example of BMP format bit images.**

1. The data is arranged in column data type in the bit image download command. Refer to command **1D 2A** and **1C 71** for details.

2. BMP format bit image data is arranged in line data type. Normally, a monochromic BMP image is made of sixty two (62) bytes of BMP image attributes description (including bit image width and height etc.) and normal image data. The BMP image data is arranged in integral multiple of 4 bytes. For example, if the width is 34 dots, 8 bytes instead of 5 bytes are needed to store the data. Therefore, the total amount of bytes a bit image occupies in the memory is "(Line width in bits+31)/32\*4 \* line height in bits"

**Below is an example written under VC++ environment (for reference only).**

Note: A non-monochromic BMP image must be transformed into a monochromic image before downloading it to printer. And, both the height (in pixels) and width (in pixels) of BMP image shall be multiple of eight (8), otherwise the printer may not be able to handle the data correctly.

```
//*****//
```

```

//Function: AntiRotateBmp90D //
//Utility: Transform bmp format bit image into printer processable data //
//Parameter: pBmpData---Pointer to source data //
//      nPixelsOfWidth---bit image width(in dots) //
//      nPixelsOfHeight---bit image height(in dots) //
//      pBmpDataRotated---Pinter to target data //
//Value return: 1: data transformation ok. 0: parameter error. //
//*****//
int AntiRotateBmp90D(
    char *pBmpData,
    const int nPixelsOfWidth,
    const int nPixelsOfHeight,
    char *pBmpDataRotated
)
{
    // Define process variables
    int nBytesOfWidth = 0,nBytesOfHeight = 0;
    int i=0,col=0,row=0,index = 0,colbyte = 0;
    char* midData;
    unsigned char tempdata = 0,colnum = 0,rownum = 0;
    unsigned char temp[8] = {0x80,0x40,0x20,0x10,0x08,0x04,0x02,0x01};

    //Comparing parameters
    if (pBmpData == NULL || pBmpDataRotated == NULL) return 0;
    if (nPixelsOfWidth <= 0 || nPixelsOfHeight <= 0) return 0;
    if ((nPixelsOfWidth % 8) != 0 || (nPixelsOfHeight % 8) != 0) return 0;

    //get real image dimension
    nBytesOfWidth = (nPixelsOfWidth+31)/32*4;
    nBytesOfHeight = nPixelsOfHeight / 8;

    //White/black reverse,the value 1 in BMP data is for white which is contrary to the printer
    definition.
    midData = (char*)malloc(nBytesOfWidth*nPixelsOfHeight+1);
    for(i=0;i<nBytesOfWidth*nPixelsOfHeight;i++){midData[i] = 0xff-pBmpData[i];}

    //Rotation. BMP data is arranged in line data type while data downloaded to printer are
    arranged in column data type.

```





### 3.3.6 Recommendations on applicable flow for programm

Make good use of ASB command during programming, since the ASB command is able to automatically transmit all kinds of printer status. Remember to enable the ASB function by using command **1D 61** after the printer is turned on.

#### 1) Inquiry printer status

Make sure to send printing data only when the printer is in normal status. We provide all status of printer, at last printer transmits data to print in normal idle status.

#### 2) Transmits the data to be printed (include the command settings before printing)

If printed data is bit image, don't transmit status inquiry command when processing printing data.

#### 3) Check printer status after printing. If the ASB is enabled, the status is transmitted automatically.

## 3.4 Data return format of USB interface

### 3.4.1 Summary of inquiry commands

Host can inquire BK-T080II printer's status by the following inquiry commands:

- GS I n                    Transmit printer configuration
- GS . B E . . > n    Transmit Mandatory and Statistic Data
- DLE EOT n            Real-time status transmission
- GS a n                Enable/Disable Automatic Status Back (ASB)
- GS r n                Transmit status

### 3.4.2 Data return format of USB interface

- When printer work under class mode and the ASB function enabled, returned data format are as follows:

0x05 + ASB + returned data of the inquired commands

0x05: ASB return data length + 1

ASB: a four-byte auto status back data, for example (01 00 00 F0). This four bytes will change according to printer's status.

Return data of the Inquired command: return data of the inquired command send to the printer

#### For example:

When send command 1D 49 99 to inquire printer's name, the returned data will be as follows:

0x05 0x01 0x00 0x00 0xF0 0x42 0x4B 0x2D 0x54 0x30 0x38 0x30 0x49 0x49 0x28 0x55  
0x29 0x31

- When printer work under class mode and the ASB function disabled, the printer only return status data of some certain inquiry commands.

#### For example:

When send command 1D 49 99 to inquire printer's name, the returned data will be as follows:

0x42 0x4B 0x2D 0x54 0x30 0x38 0x30 0x49 0x49 0x28 0x55 0x29 0x31

- When printer work under API mode, returned data format are the same with that the printer work under class mode while the ASB function disabled.

## Appendix A: ASCII TABLE

ASCII	Decimal	HEX									
NULL	0	00	SP	32	20	@	64	40	`	96	60
SOH	1	01	!	33	21	A	65	41	a	97	61
STX	2	02	"	34	22	B	66	42	b	98	62
EXT	3	03	#	35	23	C	67	43	c	99	63
EOT	4	04	\$	36	24	D	68	44	d	100	64
ENQ	5	05	%	37	25	E	69	45	e	101	65
ACK	6	06	&	38	26	F	70	46	f	102	66
BEL	7	07	'	39	27	G	71	47	g	103	67
BS	8	08	(	40	28	H	72	48	h	104	68
HT	9	09	)	41	29	I	73	49	i	105	69
LF	10	0A	*	42	2A	J	74	4A	j	106	6A
VT	11	0B	+	43	2B	K	75	4B	k	107	6B
FF	12	0C	,	44	2C	L	76	4C	l	108	6C
CR	13	0D	-	45	2D	M	77	4D	m	109	6D
SO	14	0E	.	46	2E	N	78	4E	n	110	6E
SI	15	0F	/	47	2F	O	79	4F	o	111	6F
DLE	16	10	0	48	30	P	80	50	p	112	70
DC1	17	11	1	49	31	Q	81	51	q	113	71
DC2	18	12	2	50	32	R	82	52	r	114	72
DC3	19	13	3	51	33	S	83	53	s	115	73
DC4	20	14	4	52	34	T	84	54	t	116	74
NAK	21	15	5	53	35	U	85	55	u	117	75
SYN	22	16	6	54	36	V	86	56	v	118	76
ETB	23	17	7	55	37	W	87	57	w	119	77
CAN	24	18	8	56	38	X	88	58	x	120	78
EM	25	19	9	57	39	Y	89	59	y	121	79
SUB	26	1A	:	58	3A	Z	90	5A	z	122	7A
ESC	27	1B	;	59	3B	[	91	5B	{	123	7B
FS	28	1C	<	60	3C	\	92	5C		124	7C
GS	29	1D	=	61	3D	]	93	5D	}	125	7D
RS	30	1E	>	62	3E	^	94	5E	~	126	7E
US	31	1F	?	63	3F	_	95	5F		127	7F

## Appendix B: Code Page Table

### Code Page 0 (PC437: USA)

HEX	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
HEX BIN	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	NUL	00	16	32	48	64	80	96	112	128	144	160	176	192	208
1	0001	XON	01	17	33	49	65	81	97	113	129	145	161	177	193	209
2	0010		02	18	34	50	66	82	98	114	130	146	162	178	194	210
3	0011	XOFF	03	19	35	51	67	83	99	115	131	147	163	179	195	211
4	0100	EOT	04	20	36	52	68	84	100	116	132	148	164	180	196	212
5	0101	ENQ	05	21	37	53	69	85	101	117	133	149	165	181	197	213
6	0110		06	22	38	54	70	86	102	118	134	150	166	182	198	214
7	0111		07	23	39	55	71	87	103	119	135	151	167	183	199	215
8	1000	CAN	08	24	40	56	72	88	104	120	136	152	168	184	200	216
9	1001	HT	09	25	41	57	73	89	105	121	137	153	169	185	201	217
A	1010	LF	10	26	42	58	74	90	106	122	138	154	170	186	202	218
B	1011	ESC	11	27	43	59	75	91	107	123	139	155	171	187	203	219
C	1100	FF	12	28	44	60	76	92	108	124	140	156	172	188	204	220
D	1101	CR	13	29	45	61	77	93	109	125	141	157	173	189	205	221
E	1110		14	30	46	62	78	94	110	126	142	158	174	190	206	222
F	1111		15	31	47	63	79	95	111	127	143	159	175	191	207	223

Code Page 1(Katakana)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	128	144	160	176	192	208	224	240
1	0001	129	145	161	177	193	209	225	241
2	0010	130	146	162	178	194	210	226	242
3	0011	131	147	163	179	195	211	227	243
4	0100	132	148	164	180	196	212	228	244
5	0101	133	149	165	181	197	213	229	245
6	0110	134	150	166	182	198	214	230	246
7	0111	135	151	167	183	199	215	231	247
8	1000	136	152	168	184	200	216	232	248
9	1001	137	153	169	185	201	217	233	249
A	1010	138	154	170	186	202	218	234	250
B	1011	139	155	171	187	203	219	235	251
C	1100	140	156	172	188	204	220	236	252
D	1101	141	157	173	189	205	221	237	253
E	1110	142	158	174	190	206	222	238	254
F	1111	143	159	175	191	207	223	239	255

Code Page 2 ( PC850: Multilingual)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	⌘ 176	Ł 192	Š 208	Ó 224	— 240
1	0001	ü 129	æ 145	í 161	⌘ 177	ł 193	Đ 209	β 225	± 241
2	0010	é 130	Æ 146	ó 162	⌘ 178	ṽ 194	Ê 210	Ô 226	— 242
3	0011	â 131	ô 147	ú 163	 179	† 195	Ë 211	Ò 227	¼ 243
4	0100	ä 132	ö 148	ñ 164	† 180	— 196	È 212	Õ 228	¶ 244
5	0101	à 133	ò 149	Ñ 165	Á 181	† 197	ı 213	Ö 229	§ 245
6	0110	ä 134	û 150	ä 166	Â 182	ã 198	í 214	μ 230	÷ 246
7	0111	ç 135	ù 151	Ω 167	À 183	Ã 199	Î 215	þ 231	˘ 247
8	1000	ê 136	ÿ 152	ó 168	© 184	Ł 200	İ 216	Ɔ 232	° 248
9	1001	ë 137	Ö 153	® 169	† 185	ŕ 201	Ɔ 217	Ú 233	ˆ 249
A	1010	è 138	Û 154	¬ 170	 186	ł 202	ŕ 218	Û 234	· 250
B	1011	ï 139	ø 155	½ 171	† 187	ṽ 203	■ 219	Û 235	¹ 251
C	1100	î 140	£ 156	¼ 172	Ɔ 188	† 204	■ 220	Ÿ 236	³ 252
D	1101	ì 141	Ø 157	ı 173	Φ 189	= 205	İ 221	Ÿ 237	² 253
E	1110	Ä 142	× 158	« 174	¥ 190	† 206	Ï 222	238	■ 254
F	1111	Å 143	f 159	» 175	Ɔ 191	Ɔ 207	■ 223	239	SP 255

Code Page 3 (PC860: Portuguese)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	⌘ 176	Ł 192	⊥ 208	α 224	≡ 240
1	0001	ü 129	À 145	í 161	⌘ 177	⊥ 193	⊥ 209	β 225	± 241
2	0010	é 130	È 146	ó 162	⌘ 178	⊥ 194	⊥ 210	Γ 226	≥ 242
3	0011	â 131	ô 147	ú 163	 179	⊥ 195	⊥ 211	π 227	≤ 243
4	0100	ã 132	õ 148	ñ 164	† 180	— 196	⊥ 212	Σ 228	† 244
5	0101	à 133	ò 149	Ñ 165	† 181	† 197	⊥ 213	σ 229	‡ 245
6	0110	Á 134	Ú 150	à 166	† 182	† 198	⊥ 214	μ 230	÷ 246
7	0111	ç 135	ù 151	o 167	⊥ 183	† 199	⊥ 215	τ 231	≈ 247
8	1000	ê 136	î 152	ó 168	⊥ 184	⊥ 200	⊥ 216	Φ 232	° 248
9	1001	Ê 137	Ï 153	ò 169	⊥ 185	⊥ 201	⊥ 217	θ 233	• 249
A	1010	è 138	Û 154	¬ 170	 186	⊥ 202	⊥ 218	Ω 234	· 250
B	1011	í 139	ϕ 155	½ 171	⊥ 187	⊥ 203	■ 219	δ 235	√ 251
C	1100	ô 140	£ 156	¼ 172	⊥ 188	⊥ 204	■ 220	∞ 236	n 252
D	1101	ì 141	Ü 157	i 173	⊥ 189	— 205	■ 221	∅ 237	² 253
E	1110	Ã 142	Þ 158	« 174	⊥ 190	⊥ 206	■ 222	∈ 238	■ 254
F	1111	Â 143	Ó 159	» 175	⊥ 191	⊥ 207	■ 223	∩ 239	SP 255

Code Page 4 (PC863: Canadian- French)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	Ï 160	Ï 176	Ł 192	Ł 208	ɑ 224	≡ 240
1	0001	ü 129	È 145	' 161	Ï 177	Ł 193	Ŧ 209	β 225	± 241
2	0010	é 130	Ê 146	Ó 162	Ï 178	Ŧ 194	Π 210	Γ 226	≥ 242
3	0011	â 131	ô 147	ú 163	 179	† 195	Ł 211	π 227	≤ 243
4	0100	À 132	È 148	" 164	† 180	— 196	Ł 212	Σ 228	ƒ 244
5	0101	à 133	Ï 149	ˆ 165	† 181	† 197	Ŧ 213	σ 229	J 245
6	0110	† 134	û 150	³ 166	† 182	† 198	Ŧ 214	μ 230	÷ 246
7	0111	ç 135	ù 151	— 167	† 183	† 199	† 215	τ 231	≈ 247
8	1000	ê 136	Ϡ 152	î 168	† 184	Ł 200	† 216	Φ 232	° 248
9	1001	ë 137	ô 153	ˆ 169	† 185	Ŧ 201	† 217	θ 233	• 249
A	1010	è 138	Û 154	ˆ 170	 186	Ł 202	Ŧ 218	Ω 234	· 250
B	1011	ï 139	Ϡ 155	½ 171	† 187	Ŧ 203	■ 219	δ 235	√ 251
C	1100	î 140	£ 156	¼ 172	† 188	† 204	■ 220	∞ 236	n 252
D	1101	= 141	Û 157	¾ 173	† 189	= 205	■ 221	∅ 237	² 253
E	1110	À 142	Ô 158	« 174	† 190	† 206	■ 222	€ 238	■ 254
F	1111	š 143	f 159	» 175	† 191	Ł 207	■ 223	∩ 239	SP 255

Code Page 5 (PC865: Nordic)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	⌘ 176	Ł 192	⊥ 208	α 224	≡ 240
1	0001	ü 129	æ 145	í 161	⌘ 177	Ł 193	⊥ 209	β 225	± 241
2	0010	é 130	Æ 146	ó 162	⌘ 178	⊥ 194	⊥ 210	Γ 226	≥ 242
3	0011	â 131	ô 147	ú 163	⌘ 179	⊥ 195	⊥ 211	π 227	≤ 243
4	0100	ä 132	ö 148	ñ 164	⌘ 180	— 196	⊥ 212	Σ 228	† 244
5	0101	à 133	ò 149	Ñ 165	⌘ 181	+ 197	⊥ 213	σ 229	‡ 245
6	0110	å 134	û 150	ä 166	⌘ 182	⊥ 198	⊥ 214	μ 230	÷ 246
7	0111	ç 135	ù 151	ó 167	⌘ 183	⊥ 199	⊥ 215	τ 231	≈ 247
8	1000	ê 136	ÿ 152	ô 168	⌘ 184	⊥ 200	⊥ 216	Φ 232	° 248
9	1001	ë 137	ö 153	⊥ 169	⌘ 185	⊥ 201	⊥ 217	θ 233	• 249
A	1010	è 138	Û 154	⊥ 170	⌘ 186	⊥ 202	⊥ 218	Ω 234	· 250
B	1011	ï 139	ø 155	½ 171	⌘ 187	⊥ 203	■ 219	δ 235	√ 251
C	1100	î 140	£ 156	¼ 172	⌘ 188	⊥ 204	■ 220	∞ 236	∞ 252
D	1101	ì 141	Ø 157	ı 173	⌘ 189	= 205	■ 221	∅ 237	² 253
E	1110	Ä 142	ƒ 158	« 174	⌘ 190	⊥ 206	■ 222	ε 238	■ 254
F	1111	Å 143	f 159	⊥ 175	⌘ 191	⊥ 207	■ 223	∩ 239	SP 255

Code Page 6 (PC852 Latin2 )

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	⌘ 176	Ł 192	đ 208	Ó 224	- 240
1	0001	ū 129	Ĺ 145	í 161	⌘ 177	Ł 193	Đ 209	ß 225	" 241
2	0010	é 130	í 146	ó 162	■ 178	Ł 194	Ď 210	Ô 226	‘ 242
3	0011	â 131	ô 147	ú 163	Ł 179	Ł 195	Ě 211	Ň 227	ˇ 243
4	0100	ä 132	ö 148	À 164	Ĥ 180	Ł 196	ď 212	ń 228	˘ 244
5	0101	û 133	Ľ 149	ą 165	Á 181	Ł 197	Ń 213	ň 229	§ 245
6	0110	ć 134	ĩ 150	ż 166	Â 182	Å 198	ı 214	š 230	÷ 246
7	0111	ç 135	ś 151	ź 167	Ě 183	ã 199	î 215	š 231	• 247
8	1000	ł 136	ś 152	Ę 168	Ş 184	Ł 200	ě 216	Ř 232	° 248
9	1001	ē 137	Ö 153	ę 169	Ĥ 185	Ł 201	ĵ 217	Ú 233	˘ 249
A	1010	ö 138	Û 154	170	Ł 186	Ł 202	Ł 218	ı 234	• 250
B	1011	õ 139	Ť 155	ź 171	Ł 187	Ł 203	■ 219	Ů 235	ũ 251
C	1100	î 140	ř 156	Č 172	Ł 188	Ł 204	■ 220	ý 236	Ř 252
D	1101	Ž 141	Ł 157	š 173	Ž 189	Ł 205	Ť 221	Ý 237	ř 253
E	1110	Ä 142	× 158	« 174	ž 190	Ł 206	Û 222	ł 238	■ 254
F	1111	Ć 143	č 159	» 175	Ł 191	Ł 207	■ 223	’ 239	SP 255

Code Page 7 (PC858)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	⌘ 176	Ł 192	š 208	Ó 224	— 240
1	0001	ü 129	æ 145	í 161	⌘ 177	ł 193	Đ 209	β 225	± 241
2	0010	é 130	Æ 146	ó 162	⌘ 178	τ 194	Ê 210	Ò 226	— 242
3	0011	â 131	ô 147	ú 163	 179	† 195	Ë 211	Ó 227	¼ 243
4	0100	ä 132	ö 148	ñ 164	† 180	— 196	È 212	õ 228	¶ 244
5	0101	à 133	ò 149	Ñ 165	Á 181	† 197	€ 213	ø 229	§ 245
6	0110	â 134	û 150	ä 166	Â 182	ã 198	í 214	μ 230	÷ 246
7	0111	ç 135	ù 151	ó 167	À 183	Ã 199	î 215	þ 231	· 247
8	1000	ê 136	ÿ 152	¿ 168	© 184	Ł 200	ï 216	þ 232	° 248
9	1001	ë 137	Ö 153	® 169	† 185	ŕ 201	ƒ 217	Ú 233	” 249
A	1010	è 138	Û 154	¬ 170	 186	ł 202	ŕ 218	Û 234	· 250
B	1011	ï 139	ø 155	½ 171	¶ 187	τ 203	■ 219	Ü 235	¹ 251
C	1100	î 140	£ 156	¼ 172	ƒ 188	† 204	■ 220	Ý 236	³ 252
D	1101	ì 141	Ø 157	ı 173	ϕ 189	— 205	ı 221	Ÿ 237	² 253
E	1110	Ä 142	× 158	« 174	¥ 190	† 206	İ 222	— 238	■ 254
F	1111	Å 143	f 159	» 175	ˆ 191	◻ 207	■ 223	' 239	SP 255

Code Page 8 (PC866: Cyrillic #2)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	А 128	Р 144	а 160	Ѡ 176	Љ 192	Ў 208	р 224	Ѣ 240
1	0001	Б 129	С 145	б 161	ѡ 177	Њ 193	Ѱ 209	с 225	ѣ 241
2	0010	В 130	Т 146	в 162	Ѣ 178	Ћ 194	ѱ 210	т 226	Ѥ 242
3	0011	Г 131	У 147	г 163	ѣ 179	Ќ 195	Ѳ 211	у 227	ѥ 243
4	0100	Д 132	Ф 148	д 164	Ѥ 180	Ѝ 196	ѳ 212	ф 228	Ѧ 244
5	0101	Е 133	Х 149	е 165	Ѧ 181	Ў 197	Ѵ 213	х 229	ѧ 245
6	0110	Ж 134	Ц 150	ж 166	ѧ 182	Џ 198	ѵ 214	ц 230	Ѩ 246
7	0111	З 135	Ч 151	з 167	Ѩ 183	Џ 199	Ѷ 215	ч 231	ѩ 247
8	1000	И 136	Ш 152	и 168	ѩ 184	Џ 200	ѷ 216	ш 232	Ѱ 248
9	1001	Й 137	Щ 153	й 169	Ѱ 185	Џ 201	Ѹ 217	щ 233	ѱ 249
A	1010	К 138	Ъ 154	к 170	ѱ 186	Џ 202	ѹ 218	ъ 234	Ѳ 250
B	1011	Л 139	Ы 155	л 171	Ѳ 187	Џ 203	Ѻ 219	ы 235	ѳ 251
C	1100	М 140	Ь 156	м 172	ѳ 188	Џ 204	ѻ 220	ь 236	Ѵ 252
D	1101	Н 141	Э 157	н 173	Ѵ 189	Џ 205	Ѽ 221	э 237	ѵ 253
E	1110	О 142	Ю 158	о 174	ѵ 190	Џ 206	ѽ 222	ю 238	Ѷ 254
F	1111	П 143	Я 159	п 175	Ѷ 191	Џ 207	Ѿ 223	я 239	ѷ 255

Code Page 9 (WPC1252)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	€ 128	SP 144	SP 160	° 176	À 192	Ð 208	à 224	ð 240
1	0001	SP 129	' 145	í 161	± 177	Á 193	Ñ 209	á 225	ñ 241
2	0010	' 130	' 146	¢ 162	± 178	Â 194	Ò 210	â 226	ò 242
3	0011	f 131	“ 147	£ 163	± 179	Ã 195	Ó 211	ã 227	ó 243
4	0100	” 132	” 148	¤ 164	· 180	Ä 196	Ô 212	ä 228	ô 244
5	0101	… 133	· 149	¥ 165	µ 181	Å 197	Õ 213	å 229	õ 245
6	0110	† 134	- 150	¡ 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
7	0111	‡ 135	- 151	§ 167	· 183	Ç 199	× 215	ç 231	+ 247
8	1000	ˆ 136	- 152	¨ 168	· 184	È 200	Ø 216	è 232	ø 248
9	1001	‰ 137	™ 153	© 169	· 185	É 201	Ù 217	é 233	ù 249
A	1010	Š 138	š 154	ª 170	º 186	Ê 202	Ú 218	ê 234	ú 250
B	1011	‹ 139	› 155	« 171	» 187	Ë 203	Û 219	ë 235	û 251
C	1100	Œ 140	œ 156	¬ 172	¼ 188	Ì 204	Ü 220	ì 236	ü 252
D	1101	SP 141	SP 157	· 173	½ 189	Í 205	Ý 221	í 237	ý 253
E	1110	Ž 142	ž 158	® 174	¾ 190	Î 206	Þ 222	î 238	þ 254
F	1111	SP 143	ÿ 159	- 175	¿ 191	Ï 207	ß 223	ï 239	ÿ 255

## Appendix C: Code 128 Bar Code

### 1. Description of the CODE128 Bar Code

In code 128 bar code system, it is possible to represent 128 ASCII characters, 2-digit numerals and some special characters in using one bar code character that is defined by combining one of code set A, code set B and code set C. Each code set is used for representing the following characters:

Code set A: ASCII characters 00H to 5FH

Code set B: ASCII characters 20H to 7FH

Code set C: 2-digit numeral characters using one character (100 numerals from 00 to 99)

The following special characters are also available in CODE128:

SHIFT characters

In code set A, the character just after SHIFT is processed as a character for code set B. In code set B, the character just after SHIFT is processed as a character for code set A. The character recovers the previous code set before SHIFT when starting from the second character. SHIFT characters are used only for Switch between code set A and code set B, but cannot make the current code set enter or exit code set c status.

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

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

Function character (FNC1, FNC2, FNC3, FNC4)

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

### 2. Character Set

Characters in Code Set A:

Character	Transmit data		Character	Transmit data		Character	Transmit data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
NULL	00	0	(	28	40	P	50	80
SOH	01	1	)	29	41	Q	51	81
STX	02	2	*	2A	42	R	52	82
ETX	03	3	+	2B	43	S	53	83
EOT	04	4	,	2C	44	T	54	84
ENQ	05	5	-	2D	45	U	55	85
ACK	06	6	.	2E	46	V	56	86
BEL	07	7	/	2F	47	W	57	87
BS	08	8	0	30	48	X	58	88
HT	09	9	1	31	49	Y	59	89
LF	0A	10	2	32	50	Z	5A	90
VT	0B	11	3	33	51	[	5B	91
FF	0C	12	4	34	52	\	5C	92
CR	0D	13	5	35	53	]	5D	93

SO	0E	14	6	36	54	^	5E	94
SI	0F	15	7	37	55	_	5F	95
DLE	10	16	8	38	56	FNC1	7B,31	123,49
DC1	11	17	9	39	57	FNC2	7B,32	123,50
DC2	12	18	:	3A	58	FNC3	7B,33	123,51
DC3	13	19	;	3B	59	FNC4	7B,34	123,52
DC4	14	20	<	3C	60	SHIFT	7B,53	123,83
NAK	15	21	=	3D	61	CODEB	7B,42	123,66
SYN	16	22	>	3E	62	CODEC	7B,43	123,67
ETB	17	23	?	3F	63			
CAN	18	24	@	40	64			
EM	19	25	A	41	65			
SUB	1A	26	B	42	66			
ESC	1B	27	C	43	67			
FS	1C	28	D	44	68			
GS	1D	29	E	45	69			
RS	1E	30	F	46	70			
US	1F	31	G	47	71			
SP	20	32	H	48	72			
!	21	33	I	49	73			
"	22	34	J	4A	74			
#	23	35	K	4B	75			
\$	24	36	L	4C	76			
%	25	37	M	4D	77			
&	26	38	N	4E	78			
'	27	39	O	4F	79			

Characters in Code Set B:

Character	Transmit data		Character	Transmit data		Character	Transmit data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
SP	20	32	H	48	72	p	70	112
!	21	33	I	49	73	q	71	113
"	22	34	J	4A	74	r	72	114
#	23	35	K	4B	75	s	73	115
\$	24	36	L	4C	76	t	74	116
%	25	37	M	4D	77	u	75	117
&	26	38	N	4E	78	v	76	118
'	27	39	O	4F	79	w	77	119
(	28	40	P	50	80	x	78	120
)	29	41	Q	51	81	y	79	121
*	2A	42	R	52	82	z	7A	122
+	2B	43	S	53	83	{	7B,7B	123,123
,	2C	44	T	54	84		7C	124
-	2D	45	U	55	85	}	7D	125
.	2E	46	V	56	86	—	7E	126

/	2F	47	W	57	87	DEL	7F	127
0	30	48	X	58	88	FNC1	7B,31	123,49
1	31	49	Y	59	89	FNC2	7B,32	123,50
2	32	50	Z	5A	90	FNC3	7B,33	123,51
3	33	51	[	5B	91	FNC4	7B,34	123,52
4	34	52	\	5C	92	SHIFT	7B,53	123,83
5	35	53	]	5D	93	CODEA	7B,41	123,65
6	36	54	^	5E	94	CODEC	7B,43	123,67
7	37	55	_	5F	95			
8	38	56	`	60	96			
9	39	57	a	61	97			
:	3A	58	b	62	98			
;	3B	59	c	63	99			
<	3C	60	d	64	100			
=	3D	61	e	65	101			
>	3E	62	f	66	102			
?	3F	63	g	67	103			
@	40	64	h	68	104			
A	41	65	i	69	105			
B	42	66	j	6A	106			
C	43	67	k	6B	107			
D	44	68	l	6C	108			
E	45	69	m	6D	109			
F	46	70	n	6E	110			
G	47	71	o	6F	111			

Characters in Code Set C

Character	Transmit data		Character	Transmit data		Character	Transmit data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
0	00	0	40	28	40	80	50	80
1	01	1	41	29	41	81	51	81
2	02	2	42	2A	42	82	52	82
3	03	3	43	2B	43	83	53	83
4	04	4	44	2C	44	84	54	84
5	05	5	45	2D	45	85	55	85
6	06	6	46	2E	46	86	56	86
7	07	7	47	2F	47	87	57	87
8	08	8	48	30	48	88	58	88
9	09	9	49	31	49	89	59	89
10	0A	10	50	32	50	90	5A	90
11	0B	11	51	33	51	91	5B	91
12	0C	12	52	34	52	92	5C	92
13	0D	13	53	35	53	93	5D	93
14	0E	14	54	36	54	94	5E	94
15	0F	15	55	37	55	95	5F	95

16	10	16	56	38	56	96	60	96
17	11	17	57	39	57	97	61	97
18	12	18	58	3A	58	98	62	98
19	13	19	59	3B	59	99	63	99
20	14	20	60	3C	60	FNC1	7B,31	123,49
21	15	21	61	3D	61	CODEA	7B,41	123,65
22	16	22	62	3E	62	CODEB	7B,42	123,66
23	17	23	63	3F	63			
24	18	24	64	40	64			
25	19	25	65	41	65			
26	1A	26	66	42	66			
27	1B	27	67	43	67			
28	1C	28	68	44	68			
29	1D	29	69	45	69			
30	1E	30	70	46	70			
31	1F	31	71	47	71			
32	20	32	72	48	72			
33	21	33	73	49	73			
34	22	34	74	4A	74			
35	23	35	75	4B	75			
36	24	36	76	4C	76			
37	25	37	77	4D	77			
38	26	38	78	4E	78			
39	27	39	79	4F	79			