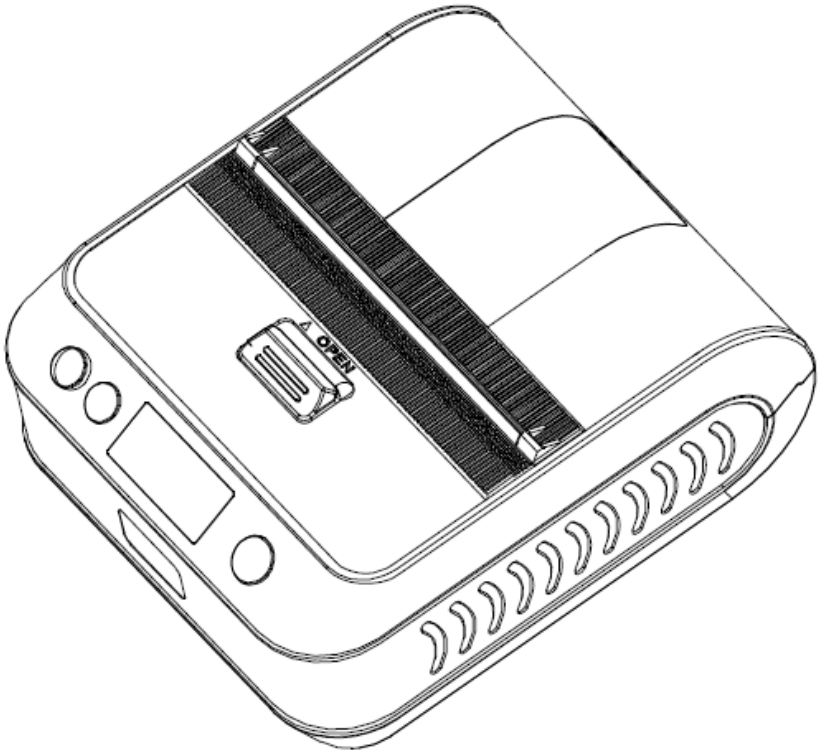
80mm mini portable thermal printer

PTP-III TECHNICAL MANUAL



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2.Control Commands

HT

[Name] Horizontal tab

[Format] ASCII HT

Hex 09

Decimal 9

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

[Notes]

- This command is ignored unless the next horizontal tab position has been set.
- If the next horizontal tab position exceeds the printing area, the printer sets the printing position to [printing area width + 1].
- Horizontal tab positions are set with **ESC D**.
- If this command is received when the printing position is at [printing area width + 1], the printer executes print buffer-full printing of the current line and horizontal tab processing from the beginning of the next line.

[Reference] **ESC D**

LF

[Name] Print and line feed

[Format] ASCII LF

Hex 0A

Decimal 10

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

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

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

CR

[Name] Print and carriage return

[Format] ASCII CR

Hex 0D

Decimal 13

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

[Notes] • This command line feed is ignored with a serial interface model.
• Sets the print starting position to the beginning of the line.

[Reference] **LF**

ESC SP n

[Name] Set right-side character spacing

[Format]

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

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

[Description] Sets the character spacing for the right side of the character to [n × 0.125 mm (n × 0.0049")].

[Notes] • The right-side character spacing for double-width mode is twice the normal value. When characters are enlarged, the right-side character spacing is n times normal value.
• This command does not affect the setting of Kanji characters
• This command sets values independently in standard mode.

[Default] n = 0

ESC ! n

[Name] Select print mode(s)

[Format]

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

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

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

ESC $ nL nH

[Name] Set absolute print position

[Format]

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

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

[Description] Sets the distance from the beginning of the line to the position at which subsequent characters are to be printed.
• The distance from the beginning of the line to the print position is [(nL + nH × 256) × 0.125 mm].

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

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

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

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character Font A (12×24).
	On	01	1	Character Font B (9×17).
1	Off	00	0	Turn white/black reverse printing mode not selected.
	On	02	2	Turn white/black reverse printing mode selected.
2	Off	00	0	Turn on/off upside-down printing mode not selected.
	On	04	4	Turn on/off upside-down printing mode selected.
3	Off	00	0	Emphasized mode not selected.
	On	08	8	Emphasized mode selected.
4	Off	00	0	Double-height mode not selected.
	On	10	16	Double-height mode selected.
5	Off	00	0	Double-width mode not selected.
	On	20	32	Double-width mode selected.
6	Off	00	0	Turn Deleteline mode on/off not selected.
	On	40	64	Turn Deleteline mode on/off selected.
7	-	-	-	Undefined.

ESC % n

[Name] Select/cancel user-defined character set

[Format] ASCII ESC % n

Hex 1B 25 n

Decimal 27 37 n

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

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

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

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

[Notes] • When the user-defined character set is canceled, the built-in character set is automatically selected.

• n is available only for the least significant bit.

[Default] n = 0

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

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

[Name] Define user-defined characters

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

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

× xk)]

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

[Range] y = 3

32 ≤ c1 ≤ c2 ≤ 126

0 ≤ x ≤ 12 (when Font A (12×24) is selected)

0 ≤ d1 ... d(y×xk) ≤ 255

[Description] Defines user-defined characters.

- y specifies the number of bytes in the vertical direction.
- c1 specifies the beginning character code for the definition, and c2 specifies the final code.
- x specifies the number of dots in the horizontal direction.

[Notes]

- The allowable character code range is from ASCII code <20>H to <7E>H (95 characters).
- It is possible to define multiple characters for consecutive character codes. If only one character is desired, use c1 = c2.
- d is the dot data for the characters. The dot pattern is in the horizontal direction from the left side. Any remaining dots on the right side are blank.
- The data to define user-defined characters is (y×x) bytes.
- Set a corresponding bit to 1 to print a dot or 0 not to print a dot.
- This command can define different user-defined character patterns for each font. To select a font, use **ESC !**
- User-defined characters and a downloaded bit image cannot be defined simultaneously. When this command is executed, the downloaded bit image is cleared.
- The user-defined character definition is cleared when:

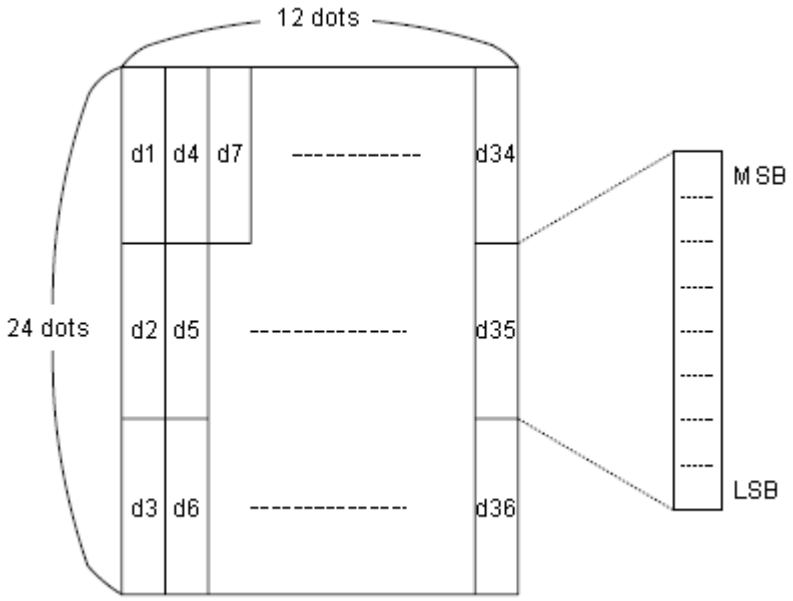
1) **ESC** @ is executed.
2) **GS** * is executed.
3) **ESC ?** is executed.
4) The power is turned off.

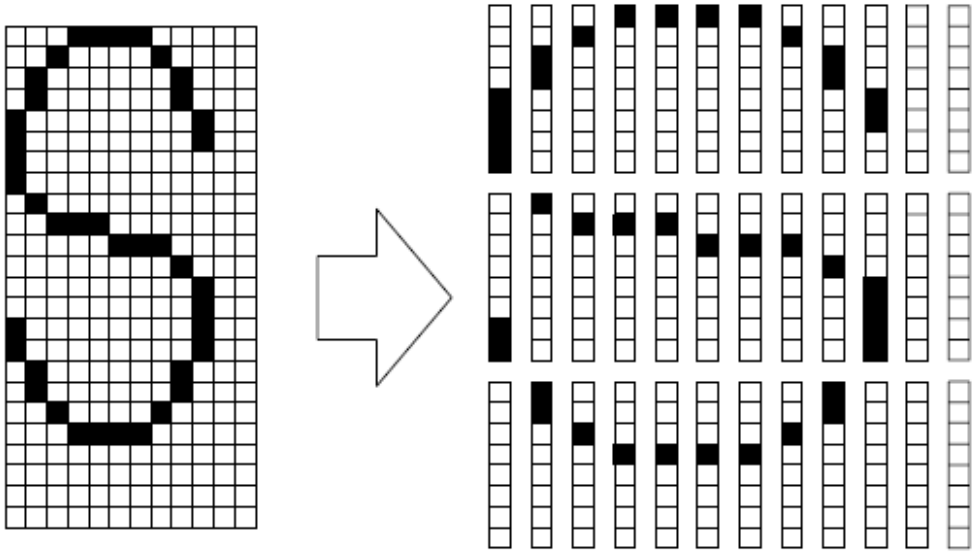
[Default] The internal character set

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

[Example]

- When Font A (12× 24) is selected.





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

ESC * m nL nH d1...dk

[Name]	Select bit-image mode						
[Format]	ASCII	ESC	*	m	nL	nH	d1...dk
	Hex	1B	2A	m	nL	nH	d1...dk
	Decimal	27	42	m	nL	nH	d1...dk
[Range]	m = 0, 1, 32, 33						
	0 ≤ nL ≤ 255						
	0 ≤ nH ≤ 3						

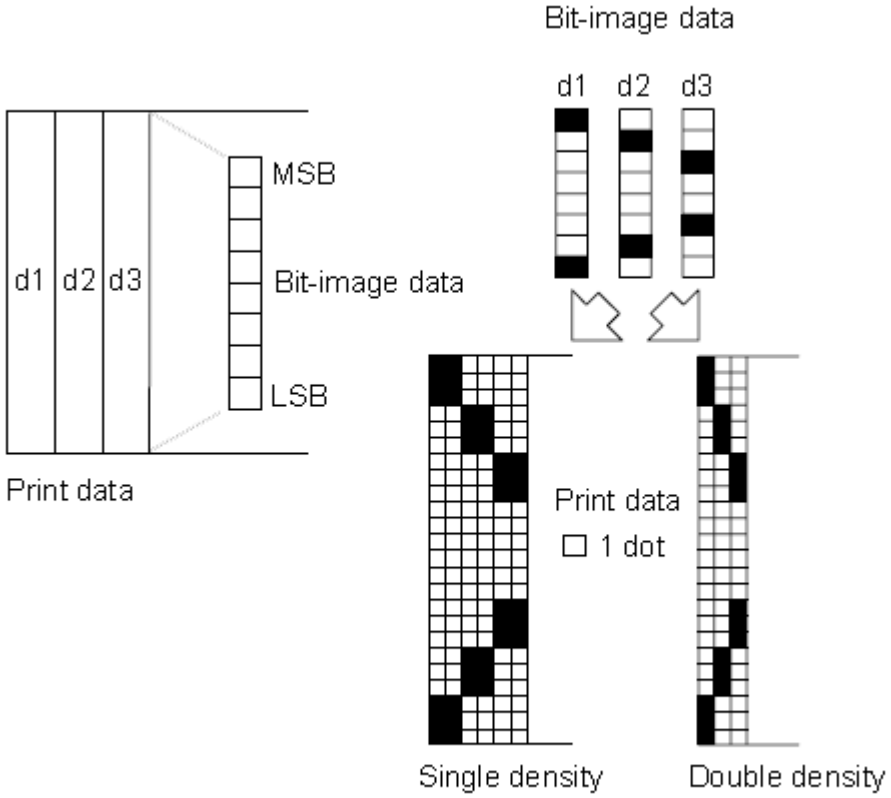
$0 \leq d \leq 255$

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

m	Mode	Vertical Direction		Horizontal Direction	
		Number of Dots	Dot Density	Dot Density	Number of Data (K)
0	8-dot single-density	8	67.7 dpi	101.6 dpi	nL + nH ×256
1	8-dot double-density	8	67.7 dpi	203.2 dpi	nL + nH × 256
32	24-dot single-density	24	203.2 dpi	101.6 dpi	(nL + nH× 256) ×3
33	24-dot double-density	24	203.2 dpi	203.2 dpi	(nL + nH × 256) ×3

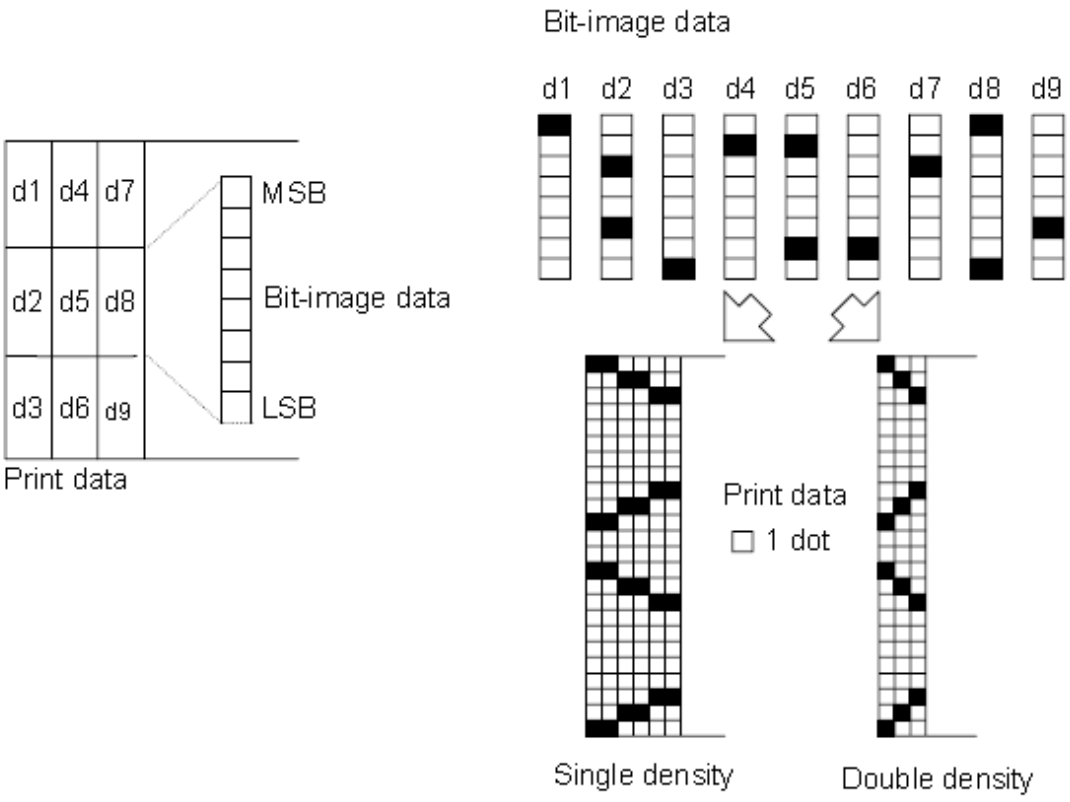
[Notes]

- If the value of m is out of the specified range, nL and nH the data following are processed as normal data.
- The nL and nH indicate the number of dots in the bit image in the horizontal direction. The number of dots is calculated by nL + nH × 256.
- If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored.
- d indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 not to 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 described in Figure 3.11.3.
- When 8-dot bit image is selected:



3.11.3

- When 24-dot bit image is selected:



ESC - n

[Name] Turn underline mode on/off

[Format] ASCII ESC - n

Hex 1B 2D n

Decimal 27 45 n

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

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

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

[Notes]
- The printer can underline all characters (including right-side character spacing), but cannot underline the space set by **HT.**
- The printer cannot underline 90° clockwise rotated characters and white/black inverted characters.
- When underline mode is turned off by setting the value of n to 0 or 48, the following data is not underlined, and the underline thickness set before the mode is turned off does not change. The default underline thickness is 1 dot.
- Changing the character size does not affect the current underline thickness.
- Underline mode can also be turned on or off by using **ESC !**. Note, however, that the last received command is effective.

[Default] n = 0

[Reference] **ESC !**

ESC 2

[Name] Select default line spacing

[Format] ASCII ESC 2

Hex 1B 32

Decimal 27 50

[Description] Selects 3.75 mm (30× 0.125 mm) line spacing.

[Notes]
- The line spacing can be set independently in standard mode.

[Reference] **ESC 3**

ESC 3 n

[Name] Set line spacing

[Format] ASCII ESC 3 n
Hex 1B 33 n
Decimal 27 51 n
[Range] $0 \leq n \leq 255$
[Description] Sets the line spacing to [n × 0.125 mm].
[Notes] • The line spacing can be set independently in standard mode.
• In standard mode, the vertical motion unit (y) is used.
[Default] n = 30
[Reference] **ESC 2**

ESC ? n

[Name] Cancel user-defined characters
[Format] ASCII ESC ? n
Hex 1B 3F n
Decimal 27 63 n
[Range] $32 \leq n \leq 126$
[Description] Cancels user-defined characters.
[Notes] • This command cancels the patterns defined for the character codes specified by n. After the user-defined characters are canceled, the corresponding patterns for the internal characters are printed.
• This command deletes the pattern defined for the specified code in the font selected by **ESC !**.
• If a user-defined characters have not been defined, the printer ignores this command.
[Reference] **ESC &**, **ESC %**

ESC @

[Name] Initialize printer
[Format] ASCII ESC @
Hex 1B 40
Decimal 27 64
[Description] Clears the data in the print buffer and resets the printer mode to the mode that was in effect when the power was turned on.
[Notes] • The DIP switch settings are not checked again.
• The data in the receive buffer is not cleared.

ESC D n1...nk NUL

[Name] Set horizontal tab positions
[Format] ASCII ESC D n1...nk NUL

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

[Range] $1 \le n \le 255$
$0 \le k \le 32$

[Description] Sets horizontal tab positions.
- n specifies the column number for setting a horizontal tab position from the beginning of the line.
- k indicates the total number of horizontal tab positions to be set.

[Notes]
- The horizontal tab position is stored as a value of [character width × n]measured from the beginning of the line. The character width includes the right-side character spacing, and double-width characters are set with twice the width of normal characters.
- This command cancels the previous horizontal tab settings.
- When setting n = 8, the print position is moved to column 9 by sending **HT**.
- Up to 32 tab positions (k = 32) can be set. Data exceeding 32 tab positions is processed as normal data.
- Transmit [n]k in ascending order and place a NUL code 0 at the end. When [n]k is less than or equal to the preceding value [n]k-1, tab setting is finished and the following data is processed as normal data.
- **ESC D NUL** cancels all horizontal tab positions.
- The previously specified horizontal tab positions do not change, even if the character width changes.
- The character width is memorized for each standard mode.

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

[Reference] **HT**

ESC E n

[Name] Turn emphasized mode on/off

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

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

[Description] Turns emphasized mode on or off
When the LSB of n is 0, emphasized mode is turned off.
When the LSB of n is 1, emphasized mode is turned on.

[Notes]
- Only the least significant bit of n is enabled.
- This command and **ESC !** turn on and off emphasized mode in the same way. Be careful when this command is used with **ESC !**.

[Default] n = 0

[Reference] **ESC !**

ESC G n

[Name] Turn on/off double-strike mode

[Format]

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

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

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

- When the LSB of n is 0, double-strike mode is turned off.
- When the LSB of n is 1, double-strike mode is turned on.

[Notes]

- Only the lowest bit of n is enabled.
- Printer output is the same in double-strike mode and in emphasized mode.

[Default] n = 0

[Reference] **ESC E**

ESC J n

[Name] Print and feed paper

[Format]

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

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

[Description] Prints the data in the print buffer and feeds the paper [n× 0.125 mm (0.0049")].

[Notes]

- After printing is completed, this command sets the print starting position to the beginning of the line.
- The paper feed amount set by this command does not affect the values set by **ESC 2** or **ESC 3**.
- In standard mode, the printer uses the vertical motion unit (y).

ESC R n

[Name] Select an international character set

[Format]

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

[Range] $0 \le n \le 15$

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

n	Character set
0	U.S.A
1	France

2	Germany
3	U.K
4	Denmark I
5	Sweden
6	Italy
7	Spain I
8	Japan
9	Norway
10	Denmark II
11	Spain II
12	Latin America
13	Korea
14	Slovenia/Croatia
15	China

[Default] n = 0

ESC M n

[Name] Select character font

[Format] ASCII ESC M n

Hex 1B 4D n

Decimal 27 77 n

[Range] n =0,1,16,17,18,19

[Description] Selects the character font.

n	Function
0	Simplified Chinese character font（12×24）
1	Simplified Chinese character font（9×17）

[Notes]
- **ESC 2** can also select character font types.However the setting of the last received command is effective.

[Reference] **ESC ! ,ESC @**

ESC V n

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

[Format] ASCII ESC V n

Hex 1B 56 n

Decimal 27 86 n

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

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

n is used as follows:

n	**Function**
0,48	Turns off 90° clockwise rotation mode

1,49	Turns on 90° clockwise rotation mode

[Notes]
- This command affects printing in standard mode. However, the setting is always effective.
- When underline mode is turned on, the printer does not underline 90° clockwise-rotated characters.
- Double-width and double-height commands in 90° rotation mode enlarge characters in the opposite directions from double-height and double- width commands in normal mode.

[Default] n = 0

[Reference] **ESC !, ESC**

ESC a n

[Name] Select justification

[Format]

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

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

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

n selects the justification as follows:

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

[Notes]
- The command is enabled only when processed at the beginning of the line in standard mode.
- This command executes justification in the printing area.
- This command justifies the space area according to **HT, ESC $** .

[Default] n = 0

[Example]

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

ESC d n

[Name] Print and feed n lines

[Format]

ASCII	ESC	d	n
Hex	1B	64	n
Decimal	27	100	n

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

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

[Notes]
- This command sets the print starting position to the beginning of the line.
- This command does not affect the line spacing set by **ESC 2** or **ESC 3**.
- The maximum paper feed amount is 1016 mm (40 inches). If the paper feed amount (n × line spacing) of more than 1016 mm (40 inches) is specified, the printer feeds the paper only 1016 mm (40 inches).

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

ESC t n

[Name] Select character code table

[Format]

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

[Range] $0 \le n \le 5$, $16 \le n \le 19$, $n = 255$

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

N	Code Page	N	Code Page
0	CP437 [U.S.A., Standard Europe]	26	Thai
1	Katakana	27	CP720[Arabic]
2	CP850 [Multilingual]	28	CP855
3	CP860 [Portuguese]	29	CP857[Turkish]
4	CP863 [Canadian-French]	30	WCP1250[Central Eurpoe]
5	CP865 [Nordic]	31	CP775
6	WCP1251 [Cyrillic]	32	WCP1254[Turkish]
7	CP866 Cyrilliec #2	33	WCP1255[Hebrew]
8	MIK[Cyrillic /Bulgarian]	34	WCP1256[Arabic]
9	CP755 [East Europe，Latvian 2]	35	WCP1258[Vietnam]
10	Iran	36	ISO-8859-2[Latin 2]
11	reserve	37	ISO-8859-3[Latin 3]
12	reserve	38	ISO-8859-4[Baltic]
13	reserve	39	ISO-8859-5[Cyrillic]
14	reserve	40	ISO-8859-6[Arabic]
15	CP862 [Hebrew]	41	ISO-8859-7[Greek]
16	ＷCP1252 Latin I	42	ISO-8859-8[Hebrew]
17	WCP1253 [Greek]	43	ISO-8859-9[Turkish]
18	CP852 [Latina 2]	44	ISO-8859-15 [Latin 3]
19	CP858 Multilingual Latin Ⅰ+Euro)	45	Thai2
20	Iran II	46	CP856
21	Latvian	47	Cp874

22	CP864 [Arabic]
23	ISO-8859-1 [West Europe]
24	CP737 [Greek]
25	WCP1257 [Baltic]

[Default] n = 0

[Reference] Character Code Tables

ESC { n

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

[Format] ASCII ESC { n

Hex 1B 7B n

Decimal 27 123 n

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

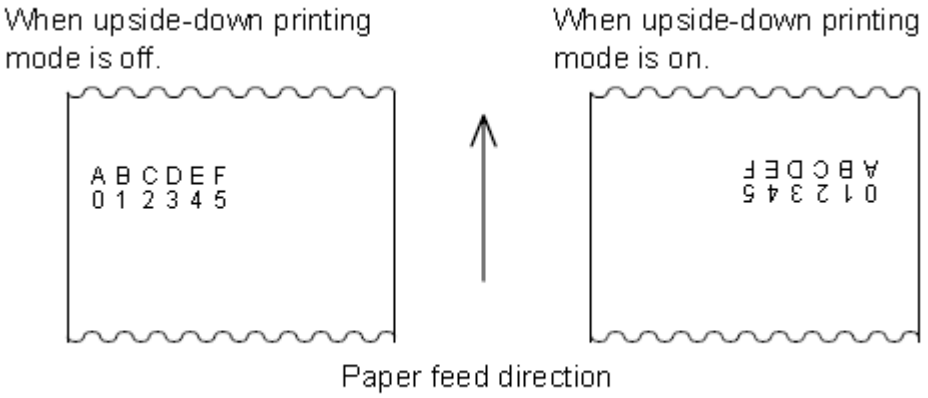
[Description] Turns upside-down printing mode on or off.

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

[Notes]
- Only the lowest bit of n is valid.
- This command is enabled only when processed at the beginning of a line in standard mode.
- In upside-down printing mode, the printer rotates the line to be printed by 180°and then prints it.

[Default] n = 0

[Example]



FS p n m

[Name] Print NV bit image

[Format] ASCII FS p n m

Hex 1C 70 n m

Decimal 28 112 n m

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

$0 \le m \le 3$, $48 \le m \le 51$

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

m	Mode	Vertical Dot Density	Horizontal Dot Density
0，48	Normal	203.2 dpi	203.2 dpi
1，49	Double-width	203.2 dpi	101.6 dpi
2，50	Double-height	101.6 dpi	203.2 dpi
3，51	Quadruple	101.6 dpi	101.6 dpi

- n is the number of the NV bit image (defined using the **FS q** command).
- m specifies the bit image mode.

[Detail]
- NV bit image is a bit image defined in non-volatile memory by **FS q** and printed by **FS p**.
- This command is not effective when the specified NV bit image has not been defined.
- In standard mode, this command is effective only when there is no data in the print buffer.
- This command is not affected by print modes (emphasized, underline, character size, white/black reverse printing, or 90° rotated characters, etc.), except upside-down printing mode.
- If the downloaded bit-image to be printed exceeds one line, the excess data is not printed.
- This command feeds dots (for the height n of the NV bit image) in normal and double-width modes, and (for the height n × 2 of the NV bit image) in doubleheight and quadruple modes, regardless of the line spacing specified by **ESC 2** or **ESC 3**.
- After printing the bit image, this command sets the print position to the beginning of the line and processes the data that follows as normal data.

[References] **ESC ∗, FS q, GS /**

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

[Name] Define NV bit image

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

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

$0 \le xL \le 255$

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

$0 \le yL \le 255$

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

$0 \le d \le 255$

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

Total defined data area = 192K bytes

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

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

[Notes]

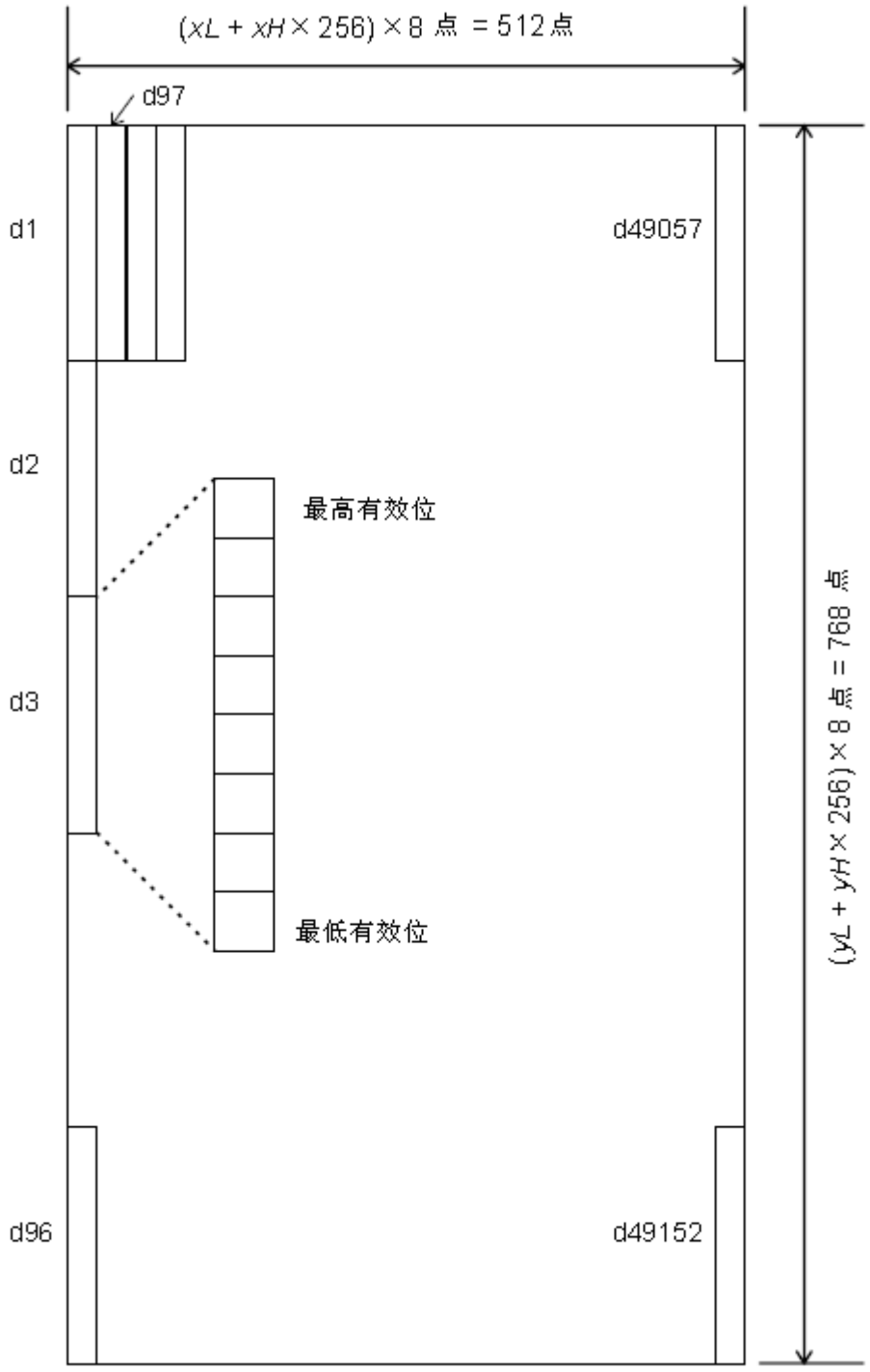
- Frequent write command executions may damage the NV memory. Therefore, it is recommended to write the NV memory 10 times or less a day.
- The printer performs a hardware reset after the procedure to place the image into the NV memory. Therefore, user-defined characters, downloaded bit images should be defined only after completing this command. The printer clears the receive and print buffers and resets the mode to the mode that was in effect at power on. (this version is not support hardware reset)
- This command cancels all NV bit images that have already been defined by this command.
- From the beginning of the processing of this command till the finish of hardware reset, mechanical operations (including initializing the position of the print head when the cover is open, paper feeding using the FEED button, etc.) cannot be performed.
- During processing of this command, the printer is BUSY when writing data to the user NV memory and stops receiving data. Therefore it is prohibited to transmit the data, including real-time commands, during the execution of this command.
- NV bit image is a bit image defined in non-volatile memory by **FS q** and printed by **FS p**.
- In standard mode, this command is effective only when processed at thebeginning of the line.
- This command is effective when 7 bytes <FS~yH> of the command areprocessed normally.
- When the amount of data exceeds the capacity left in the range defined by xL, xH, yL, yH, the printer processes xL, xH, yL, yH out of the defined range.
- In the first group of NV bit images, when any of the parameters xL, xH, yL, yH is out of the definition range, this command is disabled.
- In groups of NV bit images other than the first one, when the printer encounters 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 the command **FS p**.
- The definition data for an NV bit image consists of [xL xH yL yH d1...dk]. Therefore, when only one NV bit image is defined n=1, the printer processes a data group [xL xH yL yH d1...dk] once. The printer uses ([data: (xL + xH× 256) ×(yL + yH× 256) ×8] + [header :4]) bytes of NV memory.
- The definition area in this printer is a maximum of 192K bytes. This command can define several NV bit images, but cannot define bit image data whose total capacity [bit image data + header] exceeds 192K bytes.
- The printer does not transmit ASB status or perform status detection during processing of this command even when ASB is specified.
- Once an NV bit image is defined, it is not erased by performing **ESC** @, reset, and power off.
- This command performs only definition of an NV bit image and does not perform printing. Printing of the NV bit image is performed by the **FS p**command.

[Reference] **FS p**

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



GS ! n

[Name] Select character size

[Format] ASCII GS ! n

Hex 1D 21 n

Decimal 29 33 n

[Range] 0 ≤ n ≤ 255

(1 ≤ vertical number of times ≤ 8, 1 ≤ horizontal number of times ≤ 8)

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

Bit	Off/On	Hex	Decimal	Function
0	Character height selection. See Table 2.			
1				
2				
3				
4	Character width selection. See Table 1.			
5				
6				
7				

Table 1

Character Width Selection

Hex	Decimal	Width
00	0	1(normal)
10	16	2(double-width)
20	32	3
30	48	4
40	64	5
50	80	6
60	96	7
70	112	8

Table 2

Character Height Selection

Hex	Decimal	Width
00	0	1(normal)
01	1	2(double-height)
02	2	3
03	3	4
04	4	5
05	5	6
06	6	7
07	7	8

[Notes]
- This command is effective for all characters (alphanumeric and Kanji), except for HRI characters.
- If n is outside the defined range, this command is ignored.
- In standard mode, the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction. However, when character orientation changes in 90° clockwise-rotation mode, the relationship between vertical and horizontal directions is reversed.
- When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.
- The **ESC !** command can also turn double-width and double-height modes on or off. However, the setting of the last received command is effective.

[Default] n = 0

[Reference] **ESC !**

GS ∗ x y d1...d(x × y × 8)

[Name] Define downloaded bit image

[Format] ASCII GS ∗ x y d1...d(x×y×8)

Hex 1D 2A x y d1...d(x×y ×8)

Decimal 29 42 x y d1 ...d(x× y×8)

[Range] 1 ≤ x ≤ 255

1 ≤ y ≤ 48 (where x×y ≤ 1536)

0 ≤ d ≤ 255

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

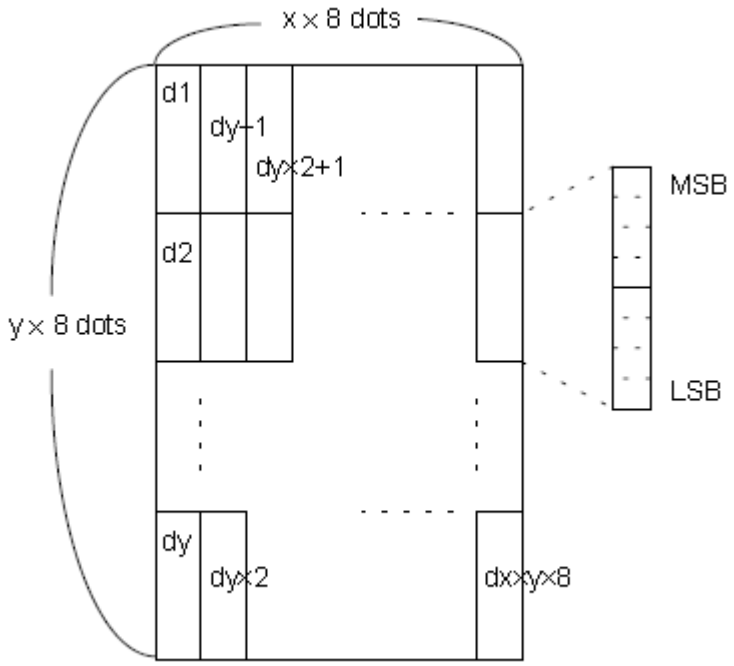
- x specifies the number of dots in the horizontal direction.
- y specifies the number of dots in the vertical direction.

[Notes]

- The number of dots in the horizontal direction is x×8; in the vertical direction it is y×8.
- If x×y is out of the specified range, this command is disabled.
- The d indicates bit-image data. Data (d) specifies a bit printed as 1 and not printed as 0.
- The downloaded bit image definition is cleared when:

1) **ESC** @ is executed.
2) **ESC &** is executed.
3) Printer is reset or the power is turned off.

- The following figure shows the relationship between the downloaded bit image and the printed data.



[Reference] **GS /**

GS / m

[Name] Print downloaded bit image

[Format] ASCII GS / m

Hex 1D 2F m

Decimal 29 47 m

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

[Description] Prints a downloaded bit image using the mode specified by m.
m selects a mode from the table below:

m	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48	Normal	203.2 dpi	203.2 dpi
1, 49	Double-width	203.2 dpi	101.6 dpi
2, 50	Double-height	101.6 dpi	203.2 dpi
3, 51	Quadruple	101.6 dpi	101.6 dpi

[Notes]
- This command is ignored if a downloaded bit image has not been defined.
- In standard mode, this command is effective only when there is no data in the print buffer.
- This command has no effect in the print modes (emphasized, double-strike, underline, character size, or white/black reverse printing), except for upsidedown printing mode.
- If the downloaded bit-image to be printed exceeds the printable area, the excess data is not printed.

[Reference] **GS** *

GS B n

[Name] Turn white/black reverse printing mode

[Format] ASCII GS B n

Hex 1D 42 n

Decimal 29 66 n

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

[Description] Turns on or off white/black reverse printing mode.
- When the LSB of n is 0, white/black reverse mode is turned off.
- When the LSB of n is 1, white/black reverse mode is turned on.

[Notes]
- Only the lowest bit of n is valid.
- This command is available for built-in characters and user-defined characters.
- When white/black reverse printing mode is on, it also applies to character spacing set by **ESC SP**.
- This command does not affect bit images, user-defined bit images, bar codes,HRI characters, and spacing skipped by **HT**, **ESC $**.
- This command does not affect the space between lines.
- White/black reverse mode has a higher priority than underline mode. Even if underline mode is on, it is disabled (but not canceled) when white/black reverse mode is selected.

[Default] n = 0

GS f n

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

[Format] ASCII GS f n

Hex 1D 66 n

Decimal 29 102 n

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

[Description] Selects a font for the HRI characters used when printing a bar code. n selects a font from the following table:

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

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

[Default] n = 0

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

GS H n

[Name] Select 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

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

[Default] n = 0

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

GS L nL nH

[Name] Set left margin

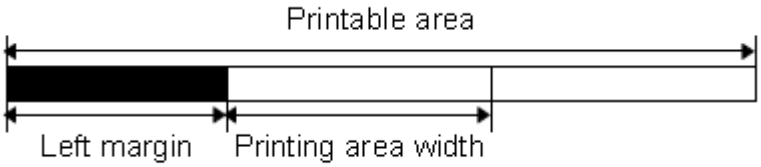
[Format] ASCII GS L nL nH

Hex 1D 4C nL nH

Decimal 29 76 nL nH

[Range] 0 ≤ nL ≤ 255
0 ≤ nH ≤ 255

[Description] Sets the left margin using nL and nH.
- The left margin is set to [(nL + nH ×256) × 0.125 mm].



[Notes]
- This command is effective only when processed at the beginning of the line in standard mode.
- If the setting exceeds the printable area, the maximum value of the printable area is used.

[Default] nL = 0, nH = 0

GS h n

[Name] Select bar code height

[Format]

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

[Range] 1 ≤ n ≤ 255

[Description] Selects the height of the bar code.
n specifies the number of dots in the vertical direction.

[Default] n = 162

[Reference] **GS k**

① GS k m d1...dk NUL② GS k m n d1...dn

[Name] Print bar code

[Format]

①ASCII	GS	k	m	d1...dk	NUL
Hex	1D	6B	m	d1...dk	00
Decimal	29	107	m	d1...dk	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 ≤ m ≤ 6 (k and d depend on the bar code system used)
② 65 ≤m ≤ 73 (n and d depend on the bar code system used)

[Description] Selects a bar code system and prints the bar code.
m selects a bar code system as follows:

m	Bar Code System	Number of Characters	Remarks

①	0	UPC-A	11 ≤ k ≤ 12	48 ≤ d ≤ 57
	1	UPC-E	11 ≤ k ≤ 12	48 ≤ d ≤ 57
	2	JAN13 (EAN13)	12 ≤ k ≤ 13	48 ≤ d ≤ 57
	3	JAN 8 (EAN8)	7 ≤ k ≤ 8	48 ≤ d ≤ 57
	4	CODE39	1 ≤ k′	48 ≤ d ≤ 57, 65 ≤ d ≤ 90, 32, 36, 37, 43, 45, 46, 47
	5	ITF	1 ≤ k (even number)	48 ≤ d ≤ 57
	6	CODABAR	1 ≤ k′	48 ≤ d ≤ 57, 65 ≤ d ≤ 68 , 36, 43, 45, 46, 47, 58
②	65	UPC-A	11 ≤ n ≤ 12	48 ≤ d ≤ 57
	66	UPC-E	11 ≤ n ≤ 12	48 ≤ d ≤ 57
	67	JAN13 (EAN13)	12 ≤ n ≤ 13	48 ≤ d ≤ 57
	68	JAN 8 (EAN8)	7 ≤ n ≤ 8	48 ≤ d ≤ 57
	69	CODE39	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 90, 32, 36, 37, 43, 45, 46, 47
	70	ITF	1 ≤ n ≤ 255 (even number)	48 ≤ d ≤ 57
	71	CODABAR	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 68 , 36, 43, 45, 46, 47, 58
	72	CODE93	1 ≤ n ≤ 255	0 ≤ d ≤ 127
	73	CODE128	2 ≤ n ≤ 255	0 ≤ d ≤ 127

[Notes for ①]

- This command ends with a NUL code.
- When the bar code system used is UPC-A or UPC-E, the printer prints the bar code data after receiving 12 bytes of bar code data and processes the following data as normal data.
- When the bar code system used is JAN13 (EAN13), the printer prints the bar code after receiving 13 bytes of bar code data and processes the following data as normal data.
- When the bar code system used is JAN8 (EAN8), the printer prints the bar code after receiving 8 bytes of bar code data and processes the following data as normal data.
- The number of data for the ITF bar code must be even numbers. When an odd number of bytes of data is input, the printer ignores the last received data.

[Notes for ②]

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

[Notes in standard mode]

- If d is outside the specified range, the printer only feeds paper and processes the following data as normal data.
- If the horizontal size exceeds printing area, the printer only feeds the

paper.

- 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 datafollowing m as normal data.
- After printing the bar code, this command sets the print position to thebeginning 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.

Control character			HRI character	Control character			HRI character
ASCII	**Hex**	**Decimal**		**ASCII**	**Hex**	**Decimal**	
NUL	00	0	■U	DEL	10	16	■P
SOH	01	1	■A	DC1	11	17	■Q
STX	02	2	■B	DC2	12	18	■R
ETX	03	3	■C	DC3	13	19	■S
EOT	04	4	■D	DC4	14	20	■T
ENQ	05	5	■E	NAK	15	21	■U
ACK	06	6	■F	SYN	16	22	■V
BEL	07	7	■G	ETB	17	23	■W
BS	08	8	■H	CAN	18	24	■X
HT	09	9	■I	EM	19	25	■Y
LF	0A	10	■J	SUB	1A	26	■Z
VT	0B	11	■K	ESC	1B	27	■A
FF	0C	12	■L	FS	1C	28	■B
CR	0D	13	■M	GS	1D	29	■C
SO	0E	14	■N	RS	1E	30	■D
SI	0F	15	■O	US	1F	31	■E
				DEL	7F	127	■T

[Example] Printing **GS k** 72 7 67 111 100 101 13 57 51

When CODE128 (m = 73) is used:

- When using CODE128 in this printer, take the following points into account for data transmission:

① The top of the bar code data string must be the code set selection character (CODE A, CODE B, or CODE C), which selects the first code set.

②Special 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 the combination of "{" and the following character does not apply any special character, the printer stops command processing and processes the following data as normal data.
- If the printer receives characters that cannot be used in the special code set, the printer stops command processing and processes the following data as normal data.
- The printer does not print HRI characters that correspond to the shift characters or code set selection characters.
- HRI character for the function character is space.
- HRI characters for the control character (<00>H to <1F>H and <7F>H) are space.

<Others> Be sure to keep spaces on both right and left sides of a bar code. (Spaces are different depending on the types of the bar code.)

[Reference] **GS H**, **GS h**, **GS w**

① GS k m v r d1...dk NUL② GS k m v r nL nH d1...dn

[Name] Print QR CODE

[Format] ①m=32

ASCII	GS	k	m	v	r	d1...dk	NUL
Hex	1D	6B	m	v	r	d1...dk	00
Decimal	29	107	m	v	r	d1...dk	0

②m=97

ASCII	GS	k	m	v	r	nL	nH	d1...dn
Hex	1D	6B	m	v	r	nL	nH	d1...dn
Decimal	29	107	m	v	r	nL	nH	d1...dn

[Range] m=32 or 97

$1 \le v \le 17$, $1 \le r \le 4$

[Description] v is DQCODE version number

r=1 Error correction level is L

r=2 Error correction level is M

r=3 Error correction level is Q

r=4 Error correction level is H

nL, nH is the low and high of integer N,N is the printing bar code data length,Unit is bytes.

When using the first kind of format, the command to 00 at the end, d1 ... dk is the bar code data.

When using the second kind of format,printer to set N characters (d1…dn) behind nH as Bar code data.

[Note] •Because the paper width is limited, the version number of QRCODE maximum is 20.

GS x n

[Name] Set barcode printing left space

[Format]

ASCII	GS	x	n
Hex	1D	78	n
Decimal	29	120	n

[Description] The print bar code staring positions is: 0→255.

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

[Name] Print raster bit image

[Format]

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

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

$0 \le xL \le 255$

$0 \le xH \le 255$ where $1 \le (xL + xH \times 256) \le 48$

$0 \le yL \le 255$

$0 \le yH \le 8$ where $1 \le (yL + yH \times 256) \le 4095$

$0 \le d \le 255$

$k = (xL + xH \times 256) \times (yL + yH \times 256)$ $(k \neq 0)$

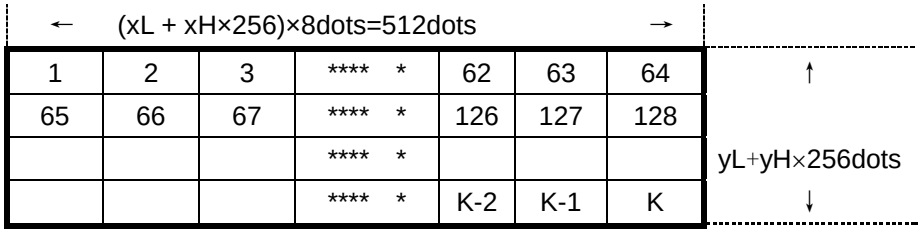
[Description] Selects raster bit-image mode. The value of m selects the mode, as follows:

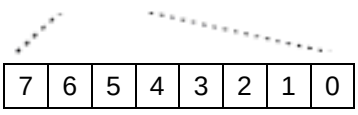
m	**Mode**	**Vertical Dot Density**	**Horizontal Dot Density**
0, 48	Normal	203.2 dpi	203.2 dpi
1, 49	Double-width	203.2 dpi	101.6 dpi
2, 50	Double-height	101.6 dpi	203.2 dpi
3, 51	Quadruple	101.6 dpi	101.6 dpi

- xL, xH, select the number of data bytes (xL+xH×256) in the horizontal direction for the bit image.
- yL, yH, select the number of data bits (yL+yH×256) in the vertical direction for the bit image.

[Notes]
- In standard mode, this command is effective only when there is no data in the print buffer.
- This command is not affected by print modes (character size, emphasized, double-strike, upside-down, underline, white/black reverse printing, etc.) for raster bit image.
- Data outside the printing area is read in and discarded on a dot-by-dot basis.
- The position at which subsequent characters are to be printed for raster bit image is specified by **HT** (Horizontal Tab), **ESC $** (Set absolute print position), and **GS L** (Set left margin). If the position at which subsequent characters are to be printed is a multiple of 8.
- The **ESC a** (Select justification) setting is also effective on raster bit images.
- d indicates the bit-image data. Setting a bit to 1 prints a dot and setting it to 0 does not print a dot.

[Example] When xL+xH×256=64





MSB LSB

GS w n

[Name] Set bar code width

[Format] ASCII GS w n

Hex 1D 77 n

Decimal 29 119 n

[Range] $2 \le n \le 6$

[Description] Sets the horizontal size of the bar code.

n specifies the bar code width as follows:

n	Module Width (mm) for Multi-level Bar Code	Binary-level Bar Code	
		Thin Element Width (mm)	Thick Element Width(mm)
2	0.250	0.250	0.625
3	0.375	0.375	1.000
4	0.560	0.500	1.250
5	0.625	0.625	1.625
6	0.750	0.750	2.000

- Multi-level bar codes are as follows:

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

- Binary-level bar codes are as follows:

CODE39, ITF, CODABAR

[Default] n = 3

[Reference] **GS k**

GS ‘

[Name] Print line section on a horizontal

[Format] ASCII GS ‘ n x1sL x1sH x1eL x1eH … xnsL xnsH xneL xneH

Hex 1D 27 n x1sL x1sH x1eL x1eH … xnsL xnsH xneL xneH

Decimal 29 39 n x1sL x1sH x1eL x1eH … xnsL xnsH xneL xneH

[Range] 0 ≤ n ≤ 8 [Description] Print amplification figure as shown below: The level of each curve segment by many (points can be regarded as segments of length 1) composition. The instructions for printing a line of n horizontal line segments, continuous use of the command the user can print out the required segments.

xksL ： The K line starting point is the low order of horizontal coordinate;

xksH ： The K line starting point is the high order of horizontal

coordinate;
xkeL : The K line end point is the low order of horizontal coordinate;
xkeH : The K line end point is the high order of horizontal coordinate;
Coordinates starting from the most left of printing area.The minimum is 0, maximum is 383, that xkeL + xkeH * 256 maximum is 383.

The data of line does not need to according to arrange in sequential order;

[Note] • When printing a point，xkeL=xksL, xkeH=xksH。

FS ! n

[Name] Set print mode(s) for Kanji characters

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

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

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

Bit	Off/On	Hex	Decimal	Function
0	—	—	—	Undefined.
1	—	—	—	Undefined.
2	Off	00	0	Double-width mode is OFF.
	On	04	4	Double-width mode is ON.
3	Off	00	0	Double-height mode is OFF.
	On	08		Double-height mode is ON.
4	—	—	—	Undefined.
5	—	—	—	Undefined.
6	—	—	—	Undefined.
7	Off	00	0	Underline mode is OFF.
	On	80	128	Underline mode is ON.

[Notes]
- When both double-width and double-height modes are set (including right- and left-side character spacing), quadruple-size characters are printed.
- The printer can underline all characters (including right- and left-side character spacing), but cannot underline the space set by **HT** and 90° clockwise-rotated characters.
- When some of the characters in a line are double or more height, all the characters on the line are aligned at the baseline.
- It is possible to emphasize the Kanji character using **GS !**; the setting of the last received command is effective.

[Default] n = 0

[Reference] **GS !**

FS &

[Name] Select Kanji character mode

[Format] ASCII FS &

Hex 1C 26

Decimal 28 38

[Description] Selects Kanji character mode.

[Notes] For Kanji model:

- When the Kanji character mode is selected, the printer processes all Kanji code as two bytes each.
- Kanji codes are processed in the order of the first byte and second byte.
- Kanji character mode is not selected when the power is turned on.

[Reference] **FS .**

FS .

[Name] Cancel Kanji character mode

[Format] ASCII FS .

Hex 1C 2E

Decimal 28 46

[Description] Cancels Kanji character mode.

[Notes] For Kanji model:

- When the Kanji character mode is not selected, all character codes areprocessed one byte at a time as ASCII code.
- Kanji character mode is not selected when the power is turned on.

[Reference] **FS &**

ESC = n

[Name] Set peripheral device

[Format] ASCII ESC = n

Hex 1b 3d n

Decimal 27 61 n

[Description] Set peripheral device：

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Printer offline，not receive print data.
	On	01	1	Printer online， receive print data.
1-7	-	-	-	Undefined.

FS 2 c1 c2 d1...dk

[Name] 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.

Model type	c1	c2
Chinese kanji supporting model	c1 = FEH	A1H ≤ c2 ≤ FEH

$0 \le d \le 255$

k = 32 (slip), k = 72 (paper roll)

[Description] Defines user-defined Kanji characters for the character codes specified by c1 and c2.

[Notes]
- c1 and c2 indicate character codes for the defined characters. c1 specifies for the first byte, and c2 for the second byte.
- d indicates the dot data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.
- The user-defined Kanji characters is printed on the selected paper set by the **ESC c 1** command.

[Default] All spaces.

[Reference] **ESC c 1**

ESC c 5 n(for buttons)

[Name] Enable/disable panel buttons

[Format]

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

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

[Description] Enables or disables the panel buttons.
- When the LSB of n is 1, the panel buttons are enabled.
- When the LSB of n is 0, the panel buttons are disabled.

[Default] n = 0

DC2 T

[Name] Printing test page

[Format]

ASCII	DC2	T
Hex	12	54
Decimal	18	94

[Description] Printing test page