iDiPOS

PROGRAM MANUAL

Thermal receipt printer TP-80

1. COMMANDS

1.1 Command Notation

[Name] The name of the command.

[Format] The code sequence.ASCII,Hex, Decimal 3 kinds of formats, default Decimal format.

[Range] Gives the allowable ranges for the arguments.

[Description] Describes the command's function.

[Details] Describes the usage of the command in detail.

[Notes] Provides important information on setting and using the printer command, if necessary.

[Default] Gives the default values, if any, for the command parameters.

[Reference] Lists related commands.

2. HT

[Name] Horizontal tab

[Format] ASCII HT

Hex 09

Decimal 9

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

[Details]
- This command is ignored unless the next horizontal tab position has been set.
- If the next horizontal tab position exceeds the printing area, the printer sets the printing position to [Printing area width + 1].
- Horizontal tab positions are set with **ESC D**.
- If this command is received when the printing position is at [printing area width + 1], the printer executes print buffer-full printing of the current line and horizontal tab processing from the beginning of the next line.
- The default setting of the horizontal tab position for the paper roll is font A (12 × 24) every 8th character (9th, 17th, 25th, ... column).

[Reference] **ESC D**

3. 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**

4. FF

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

[Format] ASCII FF

Hex 0C

Decimal 12

[Description] Prints the data in the print buffer collectively and returns to normal mode.

[Details]
- The buffer data is deleted after being printed.
- The printing area set by **ESC W** is reset to the default setting.
- The printer does not execute paper cutting.
- This command sets the print position to the beginning of the line.
- This command is enabled only in page mode.

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

5. CAN

[Name] Cancel print data in page mode

[Format] ASCII CAN

Hex 18

Decimal 24

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

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

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

6. DLE EOT n

[Name] Real-time status transmission

[Format]

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 off-line status

n = 3: Transmit error status

n = 4: Transmit paper roll sensor status

[Details]
- The status is transmitted whenever the data sequence.
- This command should not be used among the command that consists of 2 or more bytes.
- Even though the printer is not selected using **ESC =** (select peripheral device), this command is effective.
- The printer transmits the current status. Each status is represented by onebyte 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 ony available for serial port printer. The printer executes this command upon receiving it any status.

n = 1: Printer status

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

n = 2: Off-line status

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

n = 3: Error status

Bit	0/1	Hex	Decimal	Function
0	0	00	0	Fixed to “0”
1	1	02	2	Fixed to “1”
2	-	-	-	Undefined.
3	0	00	0	No auto-cutter error.
	1	08	8	Auto-cutter error occurs.
4	1	10	16	Fixed to “1”
5	0	00	0	No unrecoverable error.
	1	20	32	Unrecoverable error occurs.

6	0	00	0	Normal print head temperature and voltage
	1	40	64	Abnormal print head temperature and voltage
7	0	00	0	Fixed to “0”

n = 4: Continuous paper sensor status

Bit	0/1	Hex	Decimal	Function
0	0	00	0	Fixed to “0”.
1	1	02	2	Fixed to “1”.
2,3	0	00	0	Paper enough
	1	0C	12	Paper near-end
4	1	10	16	Fixed to “1”.
5,6	0	00	0	Paper enough
	1	60	96	Paper end
7	0	00	0	Fixed to “0”.

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

7. DLE ENQ n

[Name] Real-time request to printer

[Format]

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

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

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

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

[Details]
- This command is effective only when an auto-cutter error occurs.
- The printer starts processing data upon receiving this command under serial port.
- With a parallel interface model, this command can not be executed when the printer is busy.
- This command should not be contained within another command that consists of two or more bytes.
- When the printer is disabled with **ESC =** (Select peripheral device), the error recovery functions (**DLE ENQ 1** and **DLE ENQ 2**) are enabled, and the other functions are disabled.
- When the pulse is output to the connector pin specified while **ESC p** or **DEL DC4** is executed while this command is processed, this command is ignored.
- The printer executes this command upon receiving it under serial port.
- With a parallel interface model, this command cannot be executed when the printer is busy.
- If print data includes the same character strings as this command, the printer

performs the same operation specified by this command. The user must consider above condition.

- This command should not be used within the data sequence of another command that consists of 2 or more bytes.
- This command is effective even when the printer is disabled with **ESC =** (Select peripheral device).

[Reference] **ESC p**

8. ESC FF (*)

[Name] Print data in page mode

[Format]

ASCII	ESC	FF	
Hex	1B	0C	
Decimal	27	12	

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

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

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

9. ESC SP *n*

[Name] Set right-side character spacing

[Format]

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

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

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

[Details]
- When characters are enlarged n times, the right-side character spacing is n times normal value.
- This command sets values independently in each mode (standard and page modes).
- The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current right-side spacing.
- The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.
- In standard mode, the horizontal motion unit is used.
- In page mode, the horizontal or vertical motion unit differs in page mode, depending on starting position of the printable area as follows:
  1 When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit (x) is used.
  2 When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit (y) is used.
- The maximum right-side spacing is 31.91mm (255/203) inches. Any setting exceeding the maximum is converted to the maximum automatically.

[Default] *n* = 0

[Reference] **GS P**

10. ESC ! *n*

[Name] Select print mode(s)

[Format] ASCII ESC ! *n*

Hex 1B 21 *n*

Decimal 27 33 *n*

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

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

Bit	1/0	Hex	Decimal	Function
0	0	00	0	Character font A (12 × 24).
	1	01	1	Character font B (9 × 17).
1	-	-	-	Undefined.
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.

[Details]

- 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.
- Emphasized mode is effective for alphanumeric and Kanji. All print modes except emphasized mode is effective only for alphanumeric.

[Default] *n* = 0

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

11. ESC $ *nL nH*

[Name] Set absolute print position

[Format] ASCII ESC $ *nL* *nH*

Hex 1B 24 *nL* *nH*

Decimal 27 36 *nL* *nH*

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

$0 \leq nH \leq 255$

[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) × (vertical or horizontal motion unit)] inches.

[Details]
- Settings outside the specified printable area are ignored.
- The horizontal and vertical motion unit are specified by **GS P**.
- The GS P command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.
- In standard mode, the horizontal motion unit (x) is used.
- In page mode, horizontal or vertical motion unit differs depending on the starting position of the printable area as follows:
  1 When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit (x) is used.
  2 When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit (y) is used.

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

12. ESC % n

[Name] Select/cancel user-defined character set

[Format]

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

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

[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.

[Details]
- When the user-defined character set is canceled, the internal character set is automatically selected.
- *n* is available only for the least significant bit.

[Default] *n* = 0

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

13. 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*	*[× 1 d1...d(y × x1)]...[xk d1...d(y × xk)]*
Hex	1B	26	*y*	*c1*	*c2*	*[× 1 d1...d(y × x1)]...[xk d1...d(y × xk)]*
Decimal	27	38	*y*	*c1*	*c2*	*[× 1 d1...d(y × x1)]...[xk d1...d(y × xk)]*

[Range] *y* = 3

$32 \le c1 \le c2 \le 126$

$0 \le x \le 12$ Font A (12 × 24)

$0 \le x \le 9$ Font B (9 × 17)

$0 \le d1 \ldots d(y \times xk) \le 255$

[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.

[Details]
- 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.

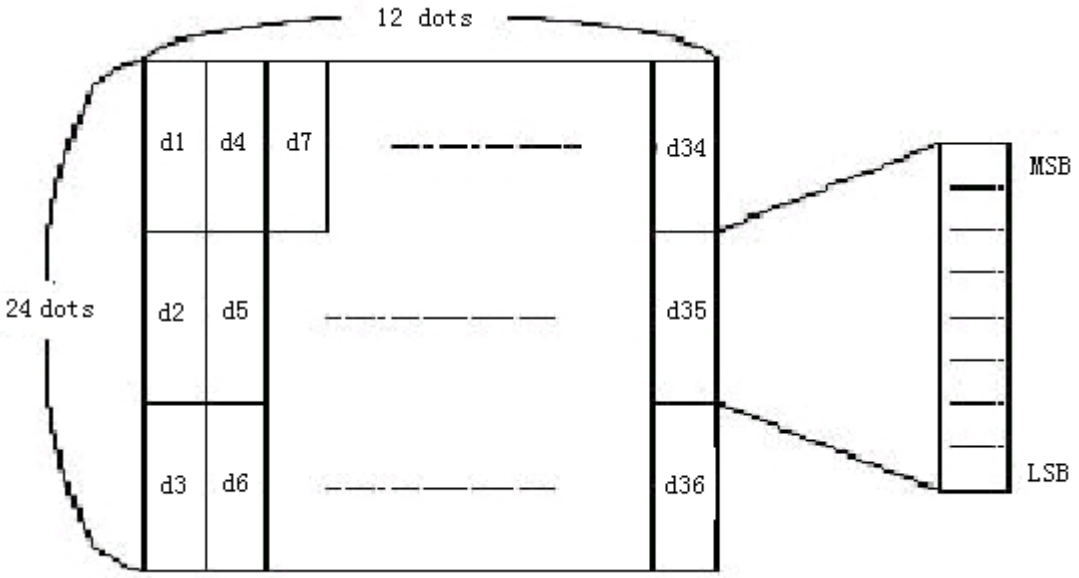
- The data to define a user-defined character is (y × x) bytes.
- Set a corresponding bit to 1 to print a dot or 0 to not print a dot.
- This command can define different user-defined character patterns by each fonts. To select a font, use **ESC !**
- A user-defined character and a downloaded bit image 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 **ESC ?** is executed.
  ③ **FS q** is executed.
  ④ **GS ∗**is executed.
  ⑤ The printer is reset or the power is turned off.
- When the user-defined characters are defined in font B (9 × 17), only the most significant bit of the 3rd byte of data in vertical direction is effective.

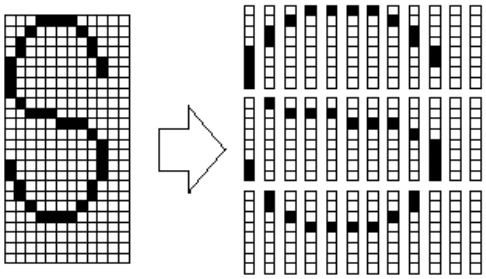
[Default] The internal character set

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

[Example]

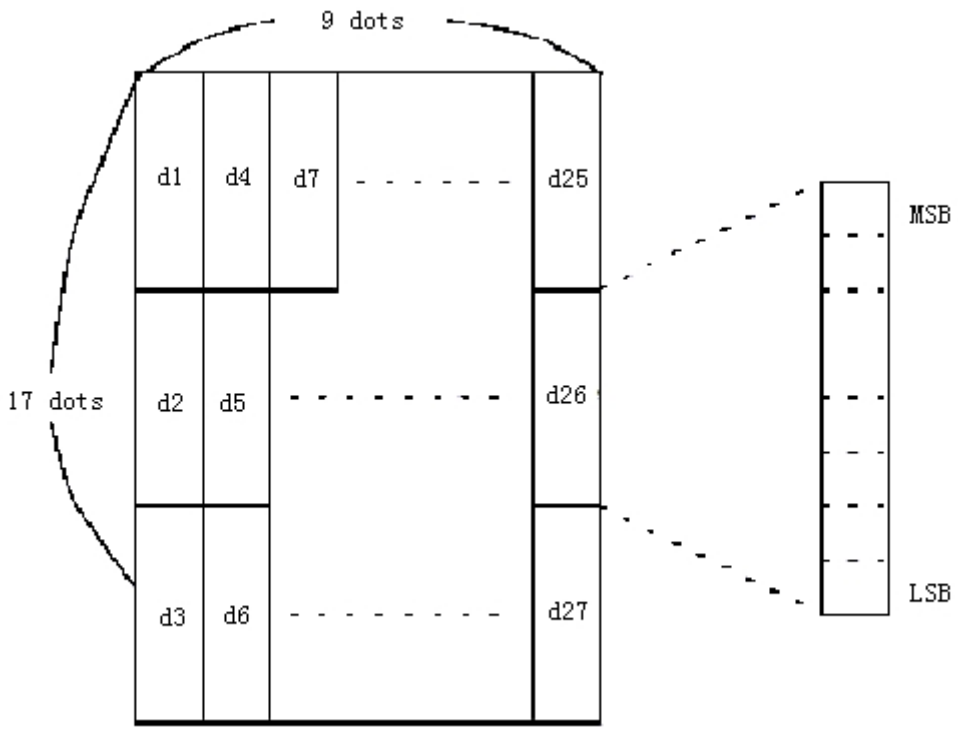
- When font A (12 × 24) is selected.

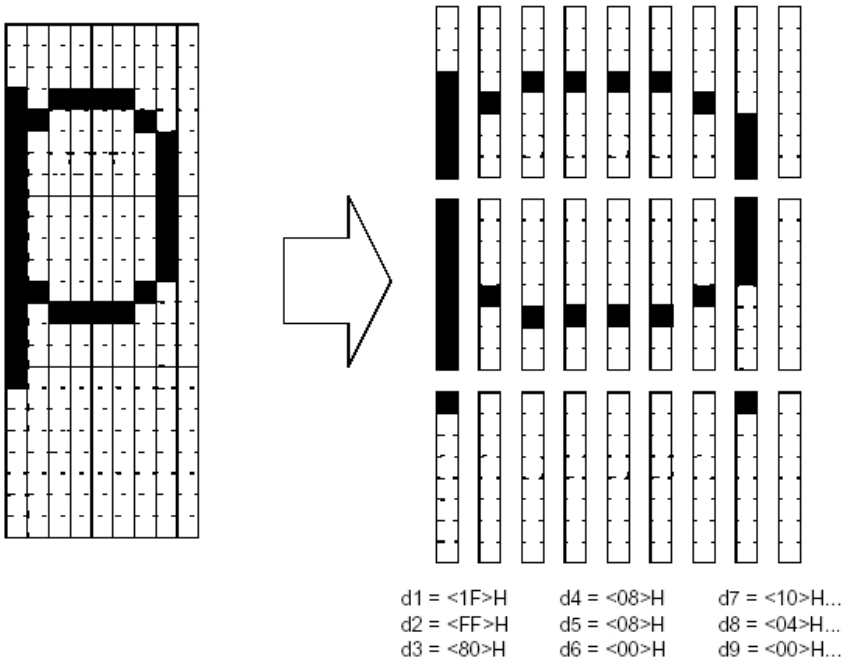




d1= <0F>H d4 = <30>H d7 = <40>H . . . .
d2 = <03>H d5 = <80>H d8 = <40>H . . . .
d3 = <00>H d6 = <00>H d9 = <20>H . . . .

- When font B (9 × 17) is selected.





14. 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] $m = 0, 1, 32, 33$

$0 \le nL \le 255$

$0 \le nH \le 3$

$0 \le d \le 255$

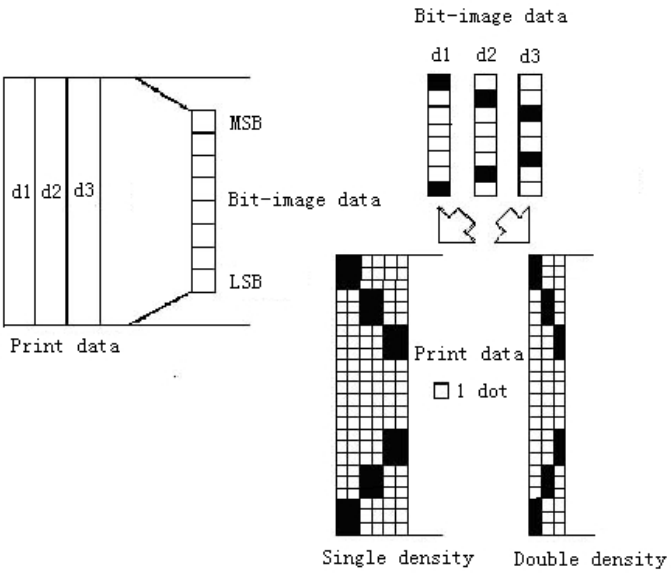
[Description] Selects a bit-image mode using m for the number of dots specified by *nL* and *nH*, as follows:

m	Mode	Vertical Direction		Horizontal Direction	
		Number of Dots	**Dot Density**	**Dot Density**	**Number of Data (K)**
0	8-dot single-density	8	67 DPI	100 DPI	*nL* + *nH* × 256
1	8-dot double-density	8	67 DP	200 DPI	*nL* + *nH* × 256
32	24-dot single-density	24	200DPI	100 DPI	(*nL* + *nH* × 256) × 3
33	24-dot double-density	24	200 DPI	200DPI	(*nL* + *nH* × 256) × 3

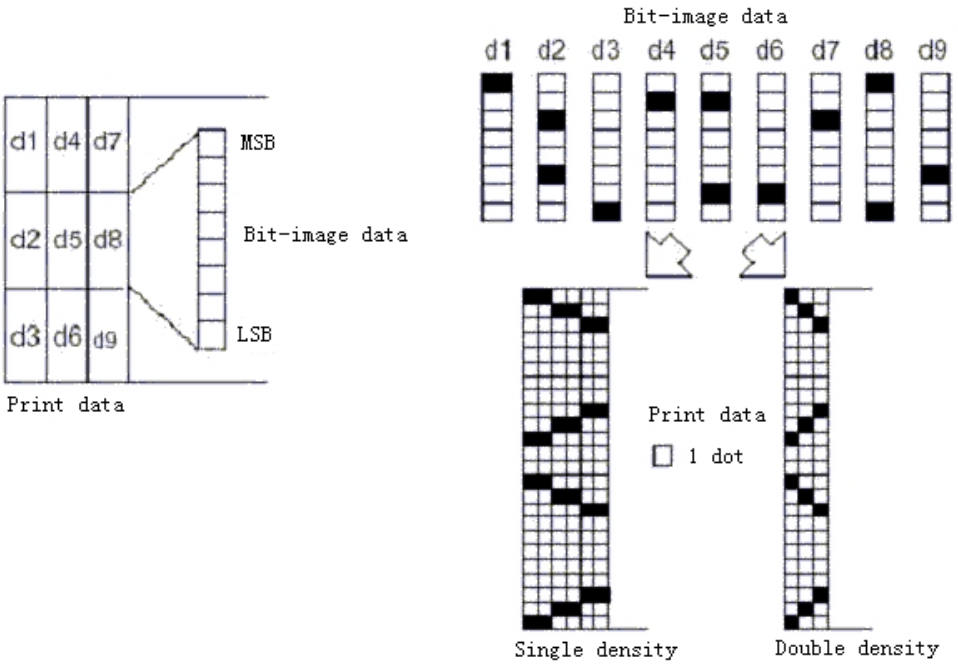
[dpi:dot/25.4mm{1”}]

[Details]

- If the values of *m* is out of the specified range, *nL* and data following are processed as normal data.
- The nL and nH indicate the number of dots of the bit image in the horizontal direction. The number of dots is calculated by *nL* + *nH* × 256.
- If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored.
- *d* indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.
- If the width of the printing area set by **GS L** and **GS W** less than the width required by the data sent with the **ESC ∗** command, the following will be performed on the line in question (but the printing cannot exceed the maximum printable area):
  ① The width of the printing area is extended to the right to accommodate the amount of data.
  ② If step ① does not provide sufficient width for the data, the left margin is reduced to accommodate the data.
- 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



15. 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 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)

[Details]
- 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 id 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.
- This command does not affect the setting of Kanji characters.

[Default] *n* = 0

[Reference] **ESC !**

16. ESC 2

[Name] Select default line spacing

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

[Description] Selects 3.75mm line spacing.

[Details] •The line spacing can be set independently in standard mode and in page mode.

[Reference] **ESC 3**

17. 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* × vertical or horizontal motion unit] inches.

[Details]
- The line spacing can be set independently in standard mode and in page mode.
- The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current line spacing.
- The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum vertical movement amount, and it must be in even units of the minimum vertical movement amount.
- In standard mode, the vertical motion unit (y) is used.
- In page mode, this command functions as follows, depending on the starting position of the printable area:
  ① When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the vertical motion unit (y) is used.
  ② When the starting position is set to the upper right or lower left of the print able area using **ESC T**, the horizontal motion unit (x) is used.
- The maximum paper feed amount is 956mm . Even if a paper feed amount of more than 956mm is set, the printer feeds the paper only 956mm.

[Default] Line spacing equivalent to approximately 3.75mm.

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

18. ESC = *n*

[Name] Choose printer

[Format] ASCII ESC = *n*
Hex 1B 3D *n*
Decimal 27 61 *n*

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

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

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

[Details] When the printer is disabled, it ignores all data except for error-recovery commands (**DLE EOT, DLE ENQ, DLE DC4**).

[Default] *n* = 1

19. ESC ? *n*

[Name] Cancel user-defined characters

[Format]

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

[Range] $32 \leq n \leq 127$

[Description] Cancels user-defined characters.

[Details]
- This command cancels the pattern defined for the character code specified by *n*. After the user-defined characters is canceled, the corresponding pattern for the internal character is printed.
- If a user-defined character has not been defined for the specified character code, the printer ignores this command.

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

20. 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 power on.

[Details]
- The DIP switch settings are not checked again.
- The data in the receive buffer is not cleared.
- The macro definition is not cleared.
- The NV bit image data is not cleared.
- The data of the user NV memory is not cleared.

21. 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] $1 \leq n \leq 255$

$0 \leq k \leq 32$

[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.

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

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

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

[Reference] **HT**

22. ESC E n

[Name] Turn emphasized mode on/off

[Format]

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

[Range] 0 n 255

[Description] Turns emphasized mode on or off

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

[Details]
- 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 !**

23. 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.

[Details]
- 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**

24. ESC J *n*

[Name] Print and feed paper

[Format]

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

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

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

[Details]
- After printing is completed, this command sets the print starting position to the beginning of the line.
- The paper feed amount set by this command does not affect the values set by **ESC 2** or **ESC 3**.
- The horizontal and vertical motion unit are specified by **GS P**.
- The **GS P** command can change the vertical (and horizontal) motion unit. However, the value cannot be less than the minimum vertical movement amount, and it must be in even units of the minimum vertical movement amount.
- In standard mode, the printer uses the vertical motion unit (y).
- In page mode, this command functions as follows, depending on the starting position of the printable area:
  ① When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the vertical motion unit (y) is used.
  ② When the starting position is set to the upper right or lower left of the print able area using **ESC T**, the horizontal motion unit (x) is used.
- The maximum line spacing is 956mm. When the setting value exceeds the maximum, it is converted to the maximum automatically.

[Reference] **GS P**

25. ESC L

[Name] Select page mode

[Format]

ASCII	ESC	L
Hex	1B	4C
Decimal	27	76

[Description] Switches from normal mode to page mode.

[Details]
- This command is enabled only when processed at the beginning of a line in standard mode.
- This command has no effect in page mode.
- After printing by **FF** is completed or by using **ESC S**, the printer returns to standard mode.
- This command sets the position where data is buffered to the position specified by **ESC T** within the printing area defined by **ESC W**.
- This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for page mode:
  ① Set right-side character spacing: **ESC SP, FS S**
  ② Select default line spacing: **ESC 2, ESC 3**
- Only valve settings is possible for the following commands in page mode; these commands are not executed.
  ① Turn 90° clockwise rotation mode on/off: **ESC V**
  ② Select justification: **ESC a**

③ Turn upside-down printing mode on/off: **ESC {**
④ Set left margin: **GS L**
⑤ Set printable area width: **GS W**

- The following command is ignored in page mode:
  ① Execute test print: **GS (A**
- The following command is not available in page mode:
  ① Print NV bit image: **FS p**
  ② Define NV bit image: **FS q**
  ③ Write to user NV memory: **FS g 1**
  ④ Print raster bit image: **GS v 0**
- The printer returns to standard mode when power is turned on, the printer is reset, or **ESC @** is used.

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

26. ESC M n (*)

[Name] Select character font

[Format]

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

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

[Description] Selects character fonts.

n	**Function**
0,48	Character font A (12 × 24) selected.
1,49	Character font B (9 × 17) selected.

27. 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 an international character set *n* from the following table:

n	Character
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
13	Korea
14	Slovenia/Croatia
15	Chinese

[Default] n = 0

28. ESC S (*)

[Name] Select standard mode

[Format]

ASCII	ESC	S
Hex	1B	53
Decimal	27	83

[Description] Switches from page mode to standard mode.

[Details]

- This command is effective only in page mode.
- Data buffered in page mode are cleared.
- This command sets the print position to the beginning of the line.
- The printing area set by **ESC W** are initialized.
- This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for standard mode:

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

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

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

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

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

- The following commands are ignored in standard mode.

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

② Set relative vertical print position in page mode: **GS **

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

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

29. ESC T n (*)

[Name] Select print direction in page mode

[Format]

ASCII	ESC	T	n
Hex	1B	54	n
Decimal	27	84	n

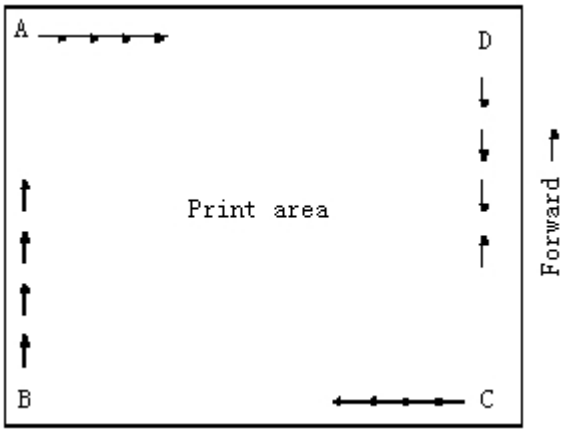
[Range] $0 \le n \le 3$

$48 \le n \le 51$

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

n specifies the print direction and starting position as follows:

n	Print Direction	Starting Position
0, 48	Left to right	Upper left
1, 49	Bottom to top	Lower left
2, 50	Right to left	Lower right
3, 51	Top to bottom	Upper right



[Details]

- When the command is input in standard mode, the printer executes only internal flag operation. This command does not affect printing in standard mode.
- This command sets the position where data is buffered within the printing area set by **ESC W**.
- Parameters for horizontal or vertical motion units (x or y) differ as follows, depending on the starting position of the printing area:
  - ① If the starting position is the upper left or lower right of the printing area, data is buffered in the direction perpendicular to the paper feed direction:
    Commands using horizontal motion units: **ESC SP**, **ESC $**, **ESC **
    Commands using vertical motion units: **ESC 3**, **ESC J**, **GS $**, **GS **
  - ② If the starting position is the upper right or lower left of the printing area, data is buffered in the paper feed direction:
    Commands using horizontal motion units: **ESC 3**, **ESC J**, **GS $**, **GS **
    Commands using vertical motion units: **ESC SP**, **ESC $**, **ESC **

[Default] n = 0

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

30. 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

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

[Default] n = 0

[Reference] **ESC !, ESC** –

31. ESC W x_L x_H y_L y_H dx_L dx_H dy_L dy_H (*)

[Name] Set printing area in page mode

[Format]

ASC II	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] $0 \le xL, xH, yL, yH, dxL, dxH, dyL, dyH \le 255$ (except dxL= dxH=0 or dyL= dyH=0)

[Description]
- The horizontal starting position, vertical starting position, printing area width, and printing area height are defined as x0, y0, dx (inch), dy (inch), respectively. Each setting for the printing area is calculated as follows:

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

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

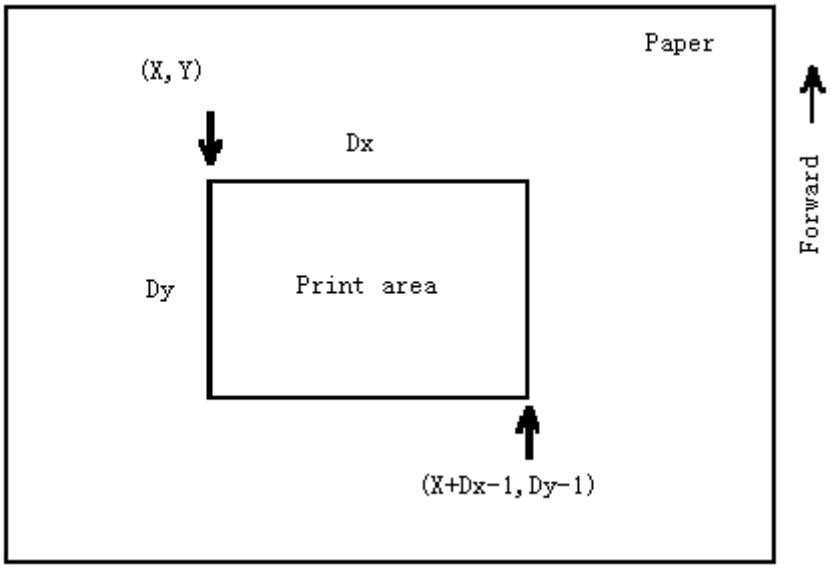
  $dx = [dxL + dxH \times 256] \times (\text{horizontal motion unit})]$

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

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

[Details]
- If this command is input in standard mode, the printer executes only internal flag operation. This command does not affect printing in standard mode.
- If the horizontal or vertical starting position is set outside the printable area, the printer stops command processing and processes the following data as normal data.
- If the printing area width or height is set to 0, the printer stops command processing and processes the following data as normal data.
- This command sets the position where data is buffered to the position specified by **ESC T** within the printing area.
- If (horizontal starting position + printing area width) exceeds the printable area, the printing area width is automatically set to (horizontal printable area - horizontal starting position).
- If (vertical starting position + printing area height) exceeds the printable area, the printing area height is automatically set to (vertical printable area - vertical starting position).

- The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current printing area.
- The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of minimum horizontal movement amount.
- 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.



- This printable area for this printer is approximately 73 mm in the horizontal direction and approximately 150mm in the vertical direction.

[Default] xL = xH = yL = yH = 0
dxL = 72, dxH = 2, dyL = 176, dyH = 4

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

32. ESC \ *nL nH*

[Name] Set relative print position

[Format]

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

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

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

[Details]
- Any setting that exceeds the printable area is ignored.
- When pitch N is specified to the right:
  nL+ *nH* × 256 = *N*

When pitch N is specified to the left (the negative direction), use the complement of 65536.
When pitch N is specified to the left:
nL+ nH × 256 = 65536 - *N*

- The print starting position moves from the current position to [N × horizontal or vertical motion unit]
- The horizontal and vertical motion unit are specified by **GS P**.
- The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.
- 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:
  ①When 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.
  ②When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit (y) is used.

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

33. ESC a n

[Name] Select justification

[Format]

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

[Range] 0 ≤ n ≤ 2, 48 ≤ n ≤ 50

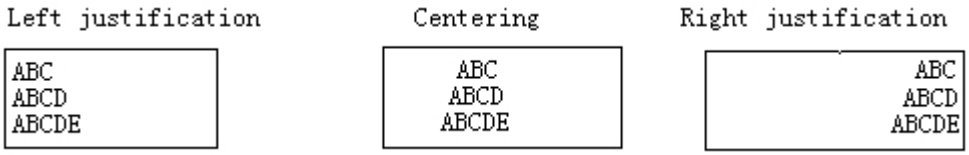
[Description] Aligns all the data in one line to the specified position
n selects the justification as follows:

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

[Details]
- The command is enabled only when processed at the beginning of the line in standard mode.
- If this command is input in page mode, the printer performs only internal flag operations.
- This command executes justification in the printing area.
- This command justifies the space area according to **HT, ESC $** or **ESC **.

[Default] n = 0

[Example]



34. ESC c 3 n

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

[Format]

ASCII	ESC	c	3	*n*
Hex	1B	63	33	*n*

Decimal 27 99 51 *n*

[Range] 0 ≤ *n* ≤ 255

[Description] Selects the paper sensor(s) to output paper end signals

- Each bit of *n* is used as follows:

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

[Note]
- It is possible to select multiple 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.
- Sensor is switched when executing this command. The paper end signal switching be delayed depending on the receive buffer state.
- If either bit 0 or bit 1 is on, the paper roll near-end sensor is selected as the paper sensor outputting paper-end signals
- If either bit 2 or bit 3 is on, the paper roll end sensor is selected as the paper sensor outputting paper-end signals.
- When all the sensors are disabled, the paper end signal always outputs a paper present status.

[Default] *n* = 0

35. ESC c 4 n

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

[Format] ASCII ESC c 4 *n*

Hex 1B 63 34 *n*

Decimal 27 99 52 *n*

[Range] 0 ≤ *n* ≤255

[Description] Selects the paper sensor(s) used to output paper short singnal.

using *n* as follows:

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

2-7	-	-	-	Undefined

[Details]
- When one paper sensor is enabled with this command, printing is stopped only when the corresponding paper is selected for printing.
- When a paper-end is detected by the paper roll sensor, the printer goes offline after printing stops.
- When either bit 0 or 1 is on, the printer selects the paper roll near-end sensor for the paper sensor to stop printing.

[Default] *n* = 0

36. ESC c 5 n

[Name] Enable/disable panel buttons

[Format]

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

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

[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.

[Details]
- Only the lowest bit of n is valid.
- When the panel buttons are disabled, none of them are usable when the printer cover is closed.
- In this printer, the panel buttons are the FEED button.
- In the macro ready mode, the FEED button are enabled regardless of the settings of this command; however, the paper cannot be fed by using these buttons.

[Default] *n* = 0

37. ESC d n

[Name] Print and feed *n* lines

[Format]

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

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

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

[Details]
- 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 (*nx* 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**

38. ESC p m t1 t2

[Name] Generate pulse

[Format]

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

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

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

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

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

[Details]
- The pulse ON time is [*t1* × 2 ms] and the OFF time is [*t2* × 2 ms].
- If *t2* < *t1*, the OFF time is [*t1*x 2 ms]

[Reference] **DLE DC4**

39. ESC t n

[Name] Select character code table

[Format]

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

[Range] $0 \leq n \leq 10$, $16 \leq n \leq 19$

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

n	Page
0	PC437 [U.S.A.Standard Europe]
1	Katakana
2	PC850:Multilingual
3	PC860:Portuguese
4	PC863 [Canadian French]
5	PC865:Nodic
6	West Europe
7	Greek
8	Hebrew
9	PC755:East Europe
10	Iran
16	WPC1252
17	PC866:Cyrillic#2
18	PC852:Latin2
19	PC858
20	IranII
21	Latvian

[Default] $n = 0$

40. ESC { n

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

[Format]

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

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

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

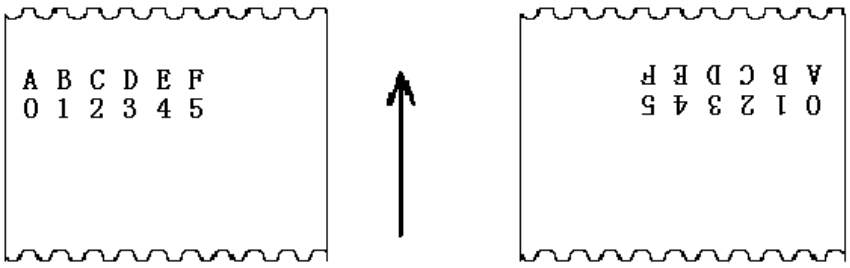
- When the LSB of n is 0, upside-down printing mode is turned off.
- When the LSB of n is 1, upside-down printing mode is turned on.

[Details]

- Only the lowest bit of n is valid.
- This command is enabled only when processed at the beginning of a line in standard mode.
- When this command is input in page mode, the printer performs only internal flag operations.
- This command does not affect printing in page mode.
- In upside-down printing mode, the printer rotates the line to be printed by 180° and then prints it.

[Default] n = 0

[Example]



41. 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 a NV bit image *n* using the mode specified by *m*.

m	**Mode**	**Vertical Dot Density**	Horizontal Dot Density
0, 48	Normal	200 dpi	200 dpi
1, 49	Double-width	200 dpi	100 dpi
2, 50	Double-height	100 dpi	200 dpi
3, 51	Quadruple	100 dpi	100 dpi

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

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

[Details]

- NV bit image means a bit image which is defined in a non-volatile memory by **FS q** and printed by **FS p**.
  - This command is not effective when the specified NV bit image has not been defined.
  - In standard mode, this command is effective only when there is no data in the print buffer.
- In page mode, this command is not effective.
  - 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 printing area width set by **GS L** and **GS W** for the NV bit image is less than one vertical line, the following processing is performed only on the line in question. However, in NV bit image mode, one vertical line means 1 dot in normal mode (*m*=0, 48) and in double-height mode (*m*=2, 50), and it means 2 dots in double-width mode (*m*=1, 49) and in quadruple mode(*m*=3, 51).
    ①The printing area width is extended to the right in NV bit image mode up to one line vertically. In this case, printing does not exceed the printable area.
    ②If the printing area width cannot be extended by one line vertically, the left margin is reduced to accommodate one line vertically.
  - 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-widthmodes, and (for the height *n* · 2 of the NV bit-image) in double-height and quadruple modes,regardless of the line spacing specified by **ESC 2** or **ESC 3**.
  - After printing the bit image, this command sets the print position to the beginning of the lineand processes the data that follows as normal data.

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

42. 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]

$1 \le n \le 255$

$0 \le xL \le 255$

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

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

$0 \le d \le 255$

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

Total defined data area = 0.5M bits (64K 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* × 256) × 8 dots in the horizontal direction for the NV bit image you are defining.
  - *yL*, *yH* specifies (*yL* + *yH* ×256) × 8 dots in the vertical direction for the NV bit image you are defining.

[Details]

- This command cancels all NV bit images that have already been defined by this command.The printer can not redefine only one of several data definitions previously defined. In this case, all data needs to be sent again.
  - From the beginning of the processing of this command till the finish of hardware reset,mechanical operations (including initializing the position of the printer head when the cover is open, paper feeding by using the FEED button, etc.) cannot be performed.
  - During processing this command, the printer is in BUSY when writing the data to the NV user memory and stops receiving data. Therefore it is prohibitted to transmit the data including the real-time commands during the execution of this command.
  - 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.
- In page mode, this command is not effective.
  - This command is effective when 7 bytes <FS～yH> is processed as a normal value.
  - When the amount of data exceeds the capacity left in the range defined by *xL, xH, yL, yH*, the printer processes *xL, xH, yL, yH* out of the defined range.
  - In the first group of NV bit images, when any of the parameters *xL, xH, yL, yH* is out of the definition range, this command is disabled.
  - In groups of NV bit images other than the first one, when the printer processes *xL, xH, yL, yH* out of the defined range, it stops processing this command and starts writing into the NV images. At this time, NV bit images that haven¡¯t been defined are disabled (undefined), but any NV bit images before that are enabled.
  - The *d* indicates the definition data. In data (*d*) a 1 bit specifies a dot to be printed and a 0 bit specifies a dot not to be printed.
  - This command defines *n* as the number of a NV bit image. Numbers rise in order from NV bit image 01H. Therefore, the first data group *[xL xH yL yH d1...dk]* is NV bit image 01H, and the last data group *[xL xH yL yH d1...dk]* is NV bit image *n.* The total agrees with the number of NV bit images specified by command **FS p**.
  - A definition data of a NV bit image consists of *[xL xH yL yH d1...dk].* Therefore, when only one NV bit image is defined *n*=1, the printer processes a data group *[xL xH yL yH d1...dk]* once. The printer uses ([data: (*xL* + *xH*×256) ×(*yL* + *yH*×256) ×8] + [header :4])bytes of NV memory.
  - The definition area in this printer is a maximum of 0.5M 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 0.5M bits (64K bytes).
- The printer is busy immediately before writing into NV memory.
  - The printer does not transmit ASB status and perform status detection during processing of this command even when ASB is specified.

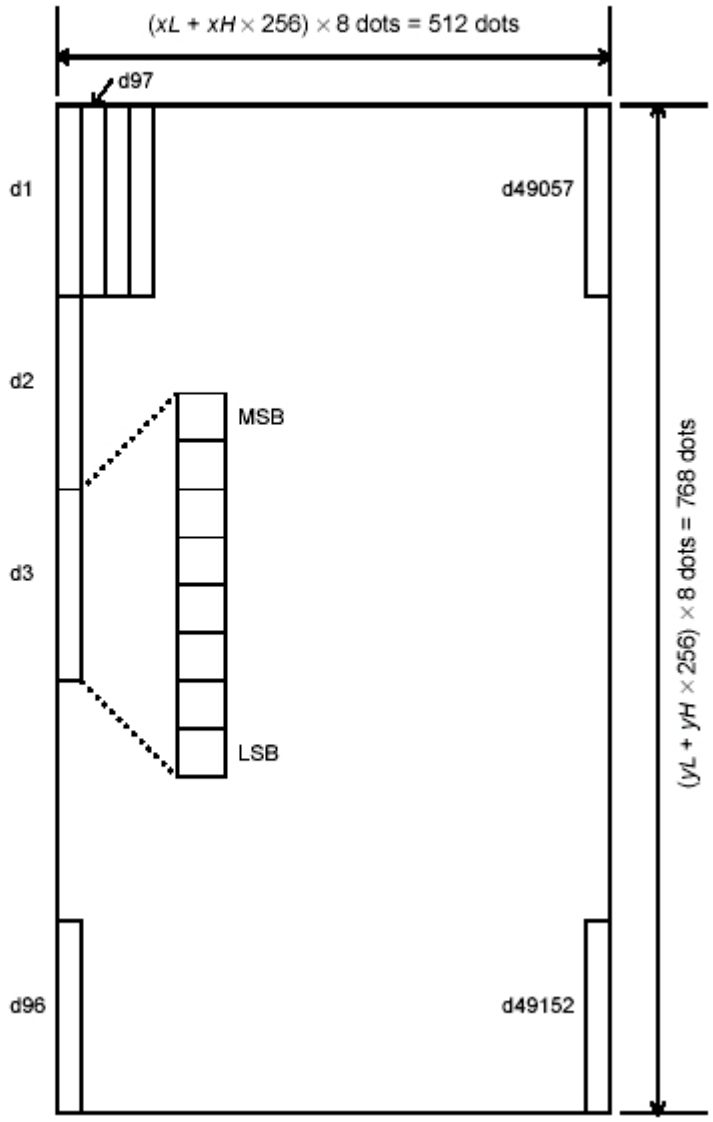
- When this command is received during macro definition, the printer ends macro definition,and begins performing this command.
- Once a NV bit image is defined, it is not erased by performing **ESC @**, reset, and power off.
- This command performs only definition of a NV bit image and does not perform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

[Details]

- Frequent write command execution may cause damage the NV memory. Therefore, it is recommended to write the NV memory 10 times or less a day.
- The printer performs a hardware reset after the procedure to place the image into the NV memory. Therefore, user-defined characters, downloaded bit images, and macros 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. At this time, DIP switch settings are checked again.

[Reference] **FS p**

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



43. 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
0~3	Character height selection. See Table 2.			
4~7	Character width selection. See Table 1.			

Table 1 Table 2

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

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

[Details]
- This command is all characters (alphanumeric and Kanji) effective except for HRI characters.
- If n is outside of the defined range, this command is ignored.
- In standard mode, the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction. However, when character orientation changes in 90° clockwise-rotation mode, the relationship between vertical and horizontal directions is reversed.

- In page mode, vertical and horizontal directions are based on the character orientation.
- When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.
- The **ESC !** command can also turn double-width and double-height modes on or off. However, the setting of the last received command is effective.

[Default] n = 0

[Reference] **ESC !**

44. GS $ nL nH

[Name] Set absolute vertical print position in page mode

[Format]

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

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

[Description]
- Sets the absolute vertical print starting position for buffer character data in page mode.
- This command sets the absolute print position to [(nL + nH × 256) × (vertical or horizontal motion unit)] inches.

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

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

45. 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] $1 \le x \le 255$

$1 \le y \le 48$

$x \le y \le 912$

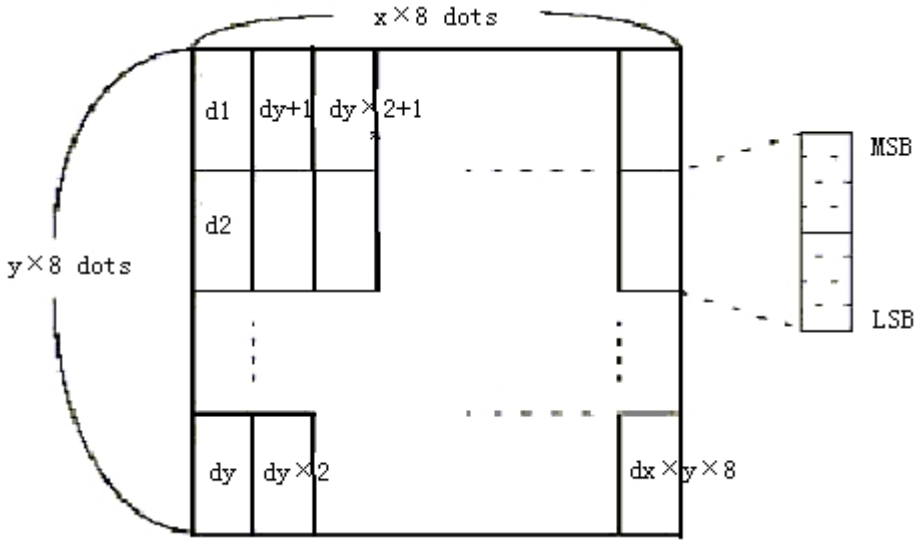
$0 \le d \le 255$

[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.

[Details]

- The number of dots in the horizontal direction is *x* × *8*, in the vertical direction it is *y* × *8*.
- If *x* × *y* is out of the specified range, this command is disabled.
- The *d* indicates bit-image data. Data (*d*) specifies a bit printed to 1 and not printed to 0.
- The downloaded bit image definition is cleared when:
  ① **ESC @** is executed.
  ② **ESC &** is executed.
  ③ **FS q** is executed.
  ④ Printer is reset or the power is off.
- The following figure shows the relationship between the downloaded bit image and the printed data.



[Reference] **GS /**

46. GS (A pL pH n m

[Name] Save printed hex data

[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=2,pH=0;
n=0,48 ;m=1,49;

47. 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 (DPI)	Horizontal Dot Density (DPI)
0, 48	Normal	200	200
1, 49	Double-width	200	100
2, 50	Double-height	100	200
3, 51	Quadruple	100	100

[Details]
- 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 forupsidedownprinting mode.
- If the downloaded bit-image to be printed exceeds the printable area, the excess data is not printed.

[Reference] **GS ***

48. GS :

[Name] Start/end macro definition

[Format] ASCII GS :

Hex 1D 3A

Decimal 29 58

[Description] Starts or ends macro definition.

[Details]
- Macro definition starts when this command is received during normal operation. Macro definition ends when this command is received during macro definition.
- When **GS ^** is received during macro definition, the printer ends macro definition and clears the definition.
- Macro is not defined when the power is turned on.
- The defined contents of the macro are not cleared by **ESC @**. Therefore, **ESC @** can be included in the contents of the macro definition.
- If the printer receives **GS :** again immediately after previously receiving **GS :** the printer remains in the macro undefined state.
- The contents of the macro can be defined up to 2048 bytes. If the macro definition exceed 2048 bytes, excess data is not stored.

[Reference] **GS ^**

49. 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.

[Details]

- Only the lowest bit of n is valid.
- This command is available for all 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.
- 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

50. GS H n

[Name] Select printing position for HRI characters

[Format]

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

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

[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.

[Details]

- HRI characters are printed using the font specified by **GS f**.

[Default] n = 0

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

51. GS L nL nH

[Name] Set left margin

[Format]

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

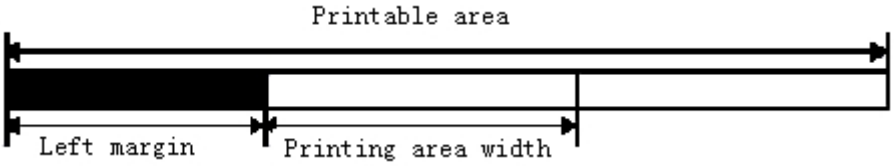
[Range] $0 \le nL \le 255$

$0 \le nH \le 255$

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

• The left margin is set to [(*nL* + *nH* × 256) × horizontal motion unit]] inches.
Printable area
Left margin Printing area width

[Details]
• This command is effective only processed at the beginning of the line in standard mode.
• If this command is input in page mode, the printer performs only internal flag operations.
• This command does not affect printing in page mode.
• If the setting exceeds the printable area, the maximum value of the printable area is used.
• The horizontal and vertical motion units are specified by **GS P**. Changing the horizontal and vertical motion unit does not affect the current left margin.
• The horizontal motion unit (x) is used for calculating the left margin. The calculated result is truncated to the minimum value of the mechanical pitch.



[Default] *nL* = 0, *nH* = 0

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

52、GS P x y

[Name] Set horizontal and vertical motion units

[Format]

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

[Range] 0 ≤ x ≤ 255
0 ≤ y ≤ 255

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

[Details]
• 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):
①Commands using x: **ESC SP**, **ESC $**, **ESC **, **FS S, GS L**, **GS W**
②Commands using y: **ESC 3**, **ESC J**, **GS V**
• In page mode, the following command use x or y, depending on character orientation:
①When 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**
②When the print starting position is set to the upper right or lower left of the printing area using **ESC T** (data is buffered in the paper feed direction):

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

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

- The command does not affect the previously specified values.
- The calculated result from combining this command with others is truncated to the minimum value of the mechanical pitch.

[Default] x = 200, y = 200, horizontal 1/8mm, vertical 1/7mm。

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

53. ①GS V m ②GS V m n

[Name] 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] ① *m =0, 48,* 1,49

② *m* = 66, 0 ≤ *n* ≤ 255

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

m	**Print mode**
0, 48	Full cut
1, 49	Partial cut
66	Feeds paper (cutting position + [*n* ╳ (vertical motion unit)]), and cuts the paper in partial

[Note]

- This command is effective only processed at the beginning of a line.
- When *m* = 0, 48, 1, 49, the printer cut paper directly.
- When *n* = 66, the printer feeds the paper to (cutting position + [*n*╳ vertical motion unit]) and cuts it.
- The horizontal and vertical motion unit are specified by **GS P**.
- The paper feed amount is calculated using the vertical motion unit (y).

54. GS W nL nH

[Name] Set printing area width

[Format]

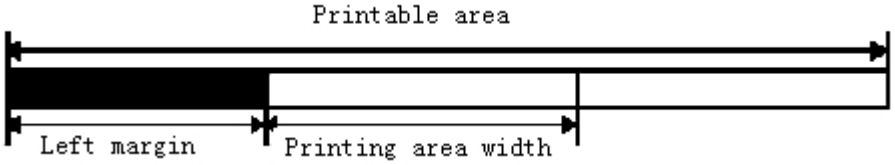
ASCII	GS	W	*nL*	*nH*
Hex	1D	57	*nL*	*nH*
Decimal	29	87	*nL*	*nH*

[Range] 0 ≤ *nL* ≤ 255

0 ≤ *nH* ≤ 255

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

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



[Details]

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

[Default] *nL* = 76, *nH* = 2

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

55. GS \ nL nH

[Name] Set relative vertical print position in page mode

[Format]

ASCII	GS	\	*nL*	*nH*
Hex	1D	5C	*nL*	*nH*
Decimal	29	92	*nL*	*nH*

[Range] 0 ≤ *nL* ≤ 255

0 ≤ *nH* ≤ 255

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

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

[Details]

- This command is ignored unless page mode is selected.
- When pitch *N* is specified to the movement downward:

  nL + *nH* × 256 = *N*

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

  When pitch *N* is specified to the movement upward:

  nL + *nH* × 256 = 65536 - *N*
- Any setting that exceeds the specified printing area is ignored.
- This command function as follows, depending on the print starting position set by **ESC T**:

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

  When the starting position is set to the upper right or lower left of the printing area, the horizontal motion unit (*x*) is used.
- The horizontal and vertical motion unit are specified by **GS P**.

• The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

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

56. GS ^ r t m

[Name] Execute macro

[Format]

ASCII	GS	^	r	t	m
Hex	1D	5E	r	t	m
Decimal	29	94	r	t	m

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

$0 \le t \le 255$

$m = 0, 1$

[Description] Executes a macro.

- r specifies the number of times to execute the macro.
- t specifies the waiting time for executing the macro.
- m specifies macro executing mode.

  When the LSB of m = 0:

  t × 100 ms as the waiting time, macro executes r times.

  When the LSB of m = 1:

  After waiting for the period specified by t × 100 ms, 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 for r times.

[Details]
- The waiting time is t × 100 ms for every macro execution.
- If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.
- If the macro is not defined or if r is 0, nothing is executed.
- When the macro is executed (m = 1), paper always cannot be fed by using the FEED button.

[Reference] **GS :**

57. GS a n

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

[Format]

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

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

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

Bit	Off/On	Hex	Decimal	Status for ASB

0	Off	00	0	Drawer kick-out connector pin 3 status disabled.
	On	01	1	Drawer kick-out connector pin 3 status enabled.
1	-	-	-	Undefined.
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.

First bit（printer status）:

Bit	Off/On	Hex	Decimal	Status for ASB
0,1	Off	00	0	Undefined. Default 0
2	On	04	4	Undefined. Default 1
3	Off	00	0	Undefined. Default 0
4	On	10	16	Undefined. Default 1
5	Off	00	0	Undefined. Default 0
6	Off	00	0	Feed paper without pressing on FEED
	On	40	64	Feed paper by pressing FEED
7	Off	00	0	Undefined. Default 0

Second bit (printer status):

Bit	Off/On	Hex	Decimal	Status for ASB
0-4	Off	00	0	Undefined. Default 0
5	Off	00	0	No unretrievable error
	On	20	32	With unretrievable error
6	Off	00	0	No retrievable error
	On	40	64	With retrievable error
7	Off	00	0	Undefined. Default 0

Third bit (printer status):

Bit	Off/On	Hex	Decimal	Status for ASB
0,1	Off	00	0	Undefined. Default 0
2,3	Off	00	0	Paper enough
	On	0C	12	Paper short
4-7	Off	00	0	Undefined. Default 0。

Fourth bit（Paper sensor status）：

Bit	Off/On	Hex	Decimal	Status for ASB
0,3	-	-	-	Undefined
4-7	Off	00	0	Undefined. Default 0

58. 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)

[Details] . HRI indicates Human Readable Interpretation.

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

[Default] *n* = 0

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

59. 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**

60. ①GS k m d1...dk NUL②GS k m n d1...dn

[Name] Print bar code

[Format] ① ASCII GS k *m* *d1...dk* *NUL*

Hex 1D 6B *m* *d1...dk* *00*

Decimal 29 107 *m* *d1...dk* *0*

② ASCII 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* depends on the bar code system used)

② 65 ≤ *m* ≤73 (*n* and *d* depends on the bar code system used)

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

m selects a bar code system as follows:

m		Barcode type	Number of Characters	Character	Remark
①	0	UPC-A	11 ≤ k ≤ 12	0～9	48 ≤ d ≤ 57
	1	UPC-E	11 ≤ k ≤ 12	0～9	48 ≤ d ≤ 57
	2	JAN13 (EAN13)	12 ≤ k ≤ 13	0～9	48 ≤ d ≤ 57
	3	JAN8 (EAN8)	7 ≤ k ≤ 8	0～9	48 ≤ d ≤ 57
	4	CODE39	1 ≤ k ≤ 255	0～9， A～Z， SP，$，%，+， -，.，/ * (on/off)	45 ≤ d ≤ 57， 65 ≤ d ≤ 90， d = 32, 36, 37, 43, 45, 46, 47 d = 42(on/off)
	5	ITF	1 ≤ k ≤255（even）	0～9	48 ≤ d ≤ 57
	6	CODABAR	1 ≤ k ≤ 255	0～9, A～D $, +, -, ., /,:	48 ≤ d ≤ 57, 65 ≤ d ≤ 68, d = 36, 43, 45, 46, 47, 58
②	65	UPC-A	11 ≤ n ≤ 12	0～9	48 ≤ d ≤ 57
	66	UPC-E	11 ≤ n ≤ 12	0～9	48 ≤ d ≤ 57
	67	JAN13 (EAN13)	12 ≤ n ≤ 13	0～9	48 ≤ d ≤ 57
	68	JAN8 (EAN8)	7 ≤ n ≤ 8	0～9	48 ≤ d ≤ 57
	69	CODE39	1 ≤ n ≤ 255	0～9， A～Z， SP，$，%，+，-， .，/ * ((on/off))	45 ≤ d ≤ 57， 65 ≤ d ≤ 90， d = 32, 36, 37, 43, 45, 46, 47 d = 42((on/off))
	70	ITF	1 ≤ n ≤ 255（even）	0～9	48 ≤ d ≤ 57
	71	CODABAR	1 ≤ n ≤ 255	0～9, A～D $, +, -, ., /,:	48 ≤ d ≤ 57, 65 ≤ d ≤ 68, d = 36, 43, 45, 46, 47, 58
	72	CODE93	1 ≤ n ≤ 255	NUL～SP(7FH)	0 ≤ d ≤ 127
	73	CODE128	2 ≤ n ≤ 255	NUL～SP(7FH)	0 ≤ d ≤ 127

[Details 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 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 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 bar code data and processes the following 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.

[Details for 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 an processes the following data as normal data.

[Details in standard mode]

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

. If the horizontal size exceeds printing area, the 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 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.

[Details 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 printer stops command processing and processes the following data as normal data. In this case the data buffer position does not change.

. If bar code width exceeds the printing area, the printer does not print the bar code but moves the data buffer position to the left side out of the printing area.

When CODE128 (*m* = 73) is used:

• Refer appendix A，CODE 128 coding as following:

① Before making barcode data, choose one type of character from CODE A、CODE B and CODE C.

② Sending "{" and another character to choose character type. Sending "{" for two times to get ASCII characters.

Specific character	Sending 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

[For example] Print "No. 123456"

Print “No.” by CODE B，and then print next numbers by CODE C

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

- If it is not character option before barcode data, printer will stop excuting this command, and excute following as simple data.
- “ “{” +character” is not appointed string, printer will stop excuting command, and excute following as simple data.
- If the data printer received is not barcode data, printer will stop excuting this command, and excute following as simple data.
- .When printer prints an HRI character, without printing SHIFT characters and character type data.
- HRI characters for function won’t be printed out.
- HRI of controlling character（<00>H to <1F>H and <7F>H）won’t be printed out.

<Addition> Must be with spacing betweenleft and right side,gap is different with different barcode.

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

61、GS r n

[Name] Transmit status

[Format] ASCII GS r *n*

Hex 1D 72 *n*

Decimal 29 114 *n*

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

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

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

[Details] . This command is only available for serial interface

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

. The status types to be transmitted are shown below:

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

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

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

Cash drawer (n = 2, 50)：

Bit	0/1	Hex	Decimal	Status
0	0	00	0	Drawer kick-out
	1	01	1	Drawer doesn't kick-out
1-3		---	---	undefined
4	0	00	0	Not used. Fixed to 0
5，6		---	---	undefined
7	0	00	0	Not used. Fixed to 0

[Reference] **DLE EOT**，**GS a**

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

[Name] Print raster bit image

[Format] ASCII GS v 0 m xL xH yL yH d1...dk

Hex 1D 76 30 m xL xH yL yH d1...dk

Decimal 29 118 48 m xL xH yL yH d1...dk

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

$0 \le xL \le 255$

$0 \le xH \le 255$

$0 \le yL \le 255$

$0 \le d \le 255$

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

[Description] Selects Raster bit-image mode. selects the mode by "m" value, as follows:

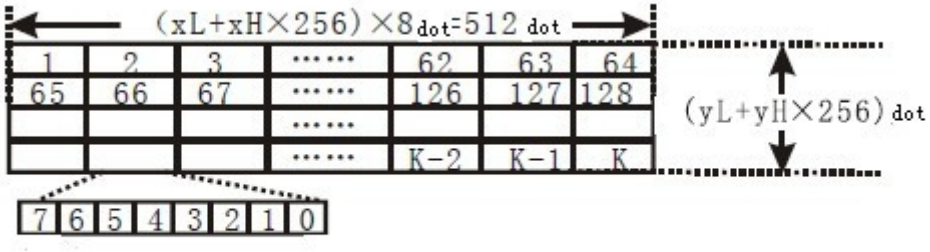
m	Mode	Vertical Dot Density	Horizontal Dot ensity
0, 48	Normal	200 DPI	200 DPI
1, 49	Double-width	200 DPI	100 DPI
2, 50	Double-height	100 DPI	200 DPI
3, 51	Quadruple	100 DPI	100 DPI

- xL, xH, select the number of data bits (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.

[Details]
- In standard mode, this command is effective only when there is no data in the print buffer.
- This command is invalid for character size, emphasized,double-strike, upside-down, underline, white/black reverse printing, etc.
- Image beyond print area won't be printed out.
- The **ESC a** (Select justification) setting is also effective on raster bit images.
- When this command is received during macro definition, the printer cancel macro definition, and begins performing this command. This command is not one part of macro definition.

- d indicates the bit-image data. Set time a bit to 1 prints the dot and setting it to 0 does not print the dot.

[For example] xL+ xH × 256 = 64



63. GS w n

[Name] Set bar code width

[Format] ASCII GS w *n*

Hex 1D 77 *n*

Decimal 29 119 *n*

[Range] 2≤ *n*≤ 6

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

n specifies the bar code width as follows:

n	**Module Width (mm) for Multi-level Bar Code**	**Binary-level bar codes**	
		Thin element width (mm)	**Thick element width (mm)**
2	0.25	0.25	0.625
3	0.375	0.375	1.0
4	0.5	0.5	1.25
5	0.625	0.625	1.625
6	0.75	0.75	1.875

. Multi-level bar codes are as follows:

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

. Binary-level bar codes are as follows:

CODE39, ITF, CODABAR

[Default] *n* = 3

[Reference] **GS k**

Kanji charaters command list

64. 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	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 OFF
	1	80	128	Underline ON

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

[Default] *n* = 0

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

65. FS &

[Name] Select Kanji character mode

[Format] ASCII FS &
Hex 1C 26
Decimal 28 38

[Description] Selects Kanji character mode.

[Reference] **FS .**

66. FS - n

[Name] Turn underline mode on/off for Kanji characters

[Format]

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

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

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

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

[Details]
- The printer can underline all characters (including right- and left-side character spacing), but cannot underline the space set by **HT** and 90° clockwise-rotated characters.
- After the underline mode for Kanji characters is turned off by setting *n* to 0, underline printing is no longer performed, but the previously specified underline thickness is not changed. The default underline thickness is 1 dot.
- The specified line thickness does not change even when the character size changes.
- It is possible to turn underline mode on or off using **FS !**, and the last received command is effective.

[Default] *n* = 0

[Reference] **FS !**

67. FS .

[Name] Cancel Kanji character mode

[Format]

ASCII	FS	.
Hex	1C	2E
Decimal	28	46

[Description] Cancels nKanji character mode.

[Reference] **FS &**

68. 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*

c1 = FEH

A1H ≤ c2 ≤ FEH

0 ≤ d ≤ 255

k = 72

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

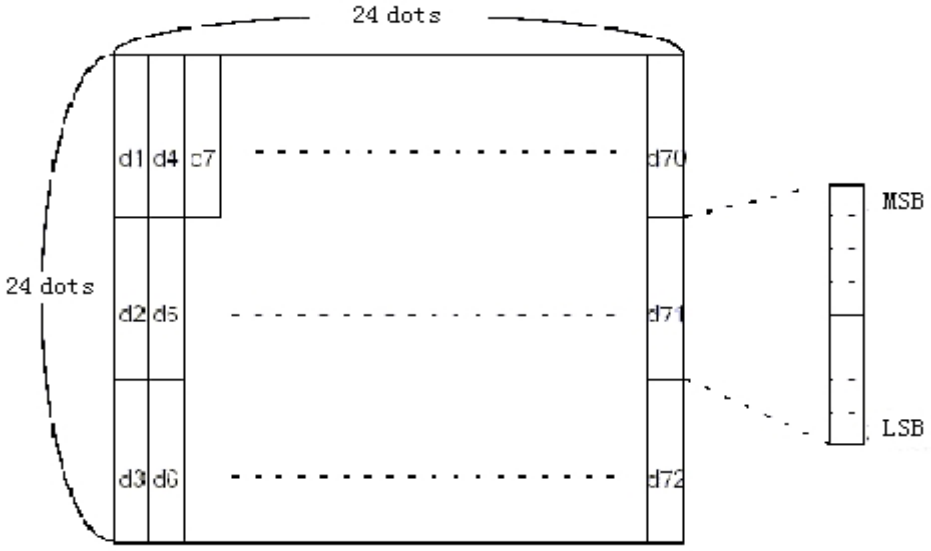
[Details]
- *c1* and *c2* indicate character codes for the defined characters. *c1* specifies for the first byte, and *c2* for the second byte.
- *d* indicates the dot data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.

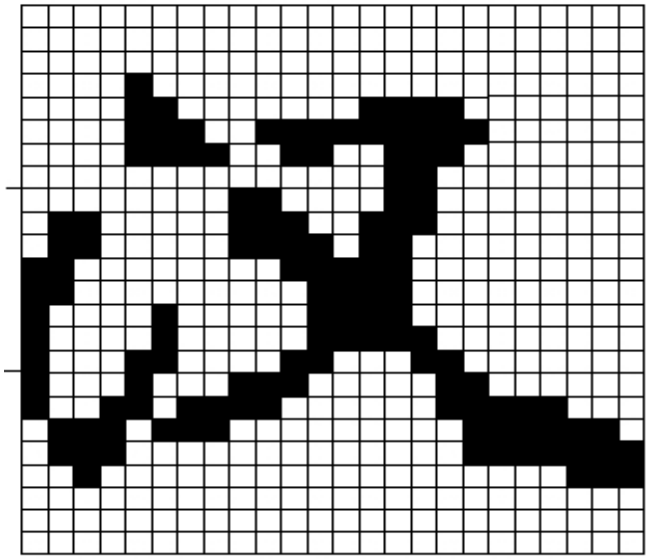
[Default] All spaces.

[Reference] **FS C**

[Default] No defined Kanji

Relation between User-defined Chinese character and data:





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

69. FS S n1 n2

[Name] Set left- and right-side Kanji character spacing

[Format]	ASCII	FS	S	*n 1*	*n2*
	Hex	1C	53	*n 1*	*n2*
	Decimal	28	83	*n 1*	*n2*

[Range] $0 \leq n\ 1 \leq 255$

$0 \leq n\ 2 \leq 255$

[Description] Sets left- and right-side Kanji character spacing *n1* and *n2*, respectively.

[Details]
- When the printer model used supports **GS P**, the left-side character spacing is [*n1* × horizontal or vertical motion units], and the right-side character spacing is [*n2* × horizontal or vertical motion units].
- When double-width mode is set, the left- and right-side character spacing is twice as the normal value.
- The horizontal and vertical motion units are set by **GS P**. The previously specified character spacing does not change, even if the horizontal or vertical motion unit is changed using **GS P**.
- In standard mode, the horizontal motion unit is used.
- In page mode, the horizontal or vertical motion unit differs in page mode, depending on starting position of the printable area as follows:
  ① When the starting position is set to the upper left or lower right of the printable area 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.
  ③ The maximum right-side spacing is 255/180 inches for the paper roll and is approximately 36mm. Any setting exceeding the maximum is converted to the maximum automatically.

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

[Reference] **GS P**

70. FS W n

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

[Format]	ASCII	FS	W	*n*
	Hex	1C	57	*n*
	Decimal	28	87	*n*

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

[Description] Turns quadruple-size mode on or off for Kanji characters.

- When the LSB of n is 0, quadruple-size mode for Kanji characters is turned off.
- When the LSB of n is 1, quadruple-size mode for Kanji characters is turned on.

[Details]
- Only the lowest bit of *n* is valid.
- In quadruple-size mode, the printer prints with same size characters as when double-width and double-height modes are both turned on.
- When quadruple-size mode is turned off using this command, the following characters are printed in normal size.
- When some of the characters on a line are different in height, all the characters on the line are aligned at the baseline.
- **FS !** or **GS !** can also select and cancel quadruple-size mode by selecting double-height and double-width modes, and the setting of the last received command is effective.

[Default] *n* = 0

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

Beeping commands

71. ESC B n t

[Name]	Beeping on printing job	(GP-80XXX series)			
[Format]	ASCII	ESC	B	n	t
	Hex	1B	42	n	t
	Decimal	27	66	n	t
[Range]	1<=n<=9，1<=t<=9				

[Description] printer beeps when it get a printing job.

- n indicates times of beeping
- t indicates beeping time (t × 50)ms.

72. ESC C m t n

[Name]	Beeping when printout and indiator flashing					(GP-80250 series)
[Format]	ASCII	ESC	C	m	t	n
	Hex	1B	43	m	t	n
	Decimal	27	67	m	t	n
[Range]	1<=m<=20，1<=t<=20，0<=n<=3,					

[Description] Beeping when printout and indiator flashing.

- m：1<=m<=20，times of indicator flashing or beeper sound
- t：1<=t<=20，time spacing between indicator flashing, or beeper sound (t*50 ms)
- n=0, no beeping, indicator not flashing
  n=1, beeping
  n=2, indicator flashing
  n=3, beeping and indicator flashing.

APPDENIX X: 128 code

X.1 128 Introduction:

128 code can alternate from character A, B, C, and code 128 ASCII characters, numbers from00~99, each character set as following:

- Character A： ASCII character 00H ~ 5FH
- Character B： ASCII character 20H ~ 7FH
- Character C： numbers 00~99

128code can code following character:

- SHIFT characters

  “SHIFT” convert the first character A following barcode SHIFT character to character B, or covert from character B to character. From the second character, will return back to character set before SHIFT, SHIFT characters only can alternated from character A and B, it can not use character C.
- Character options（CODE A、CODE B、 CODE C）

  These characters can convert following characters into character A, B, C.
- Function characters（FNC1、 FNC2、FNC3、FNC4）

  These characters are used for application software, only FNC1 is available in character C.

X.2 Character Set

Character A

Char	Sending data		Char	Sending data		char	Sending data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
NUL	00	0	(	28	40	P	50	80
L	01	1	)	29	41	Q	51	81
SOH	02	2	*	2A	42	R	52	82
STX	03	3	+	2B	43	S	53	83
ETX	04	4	,	2C	44	T	54	84
EOT	05	5	-	2D	45	U	55	85
ENQ	06	6	.	2E	46	V	56	86
ACK	07	7	/	2F	47	W	57	87
BEL	08	8	0	30	48	X	58	88
BS	09	9	1	31	49	Y	59	89
HT	0A	10	2	32	50	Z	5A	90
LF	0B	11	3	33	51	[	5B	91
VT	0C	12	4	34	52	\	5C	92
FF	0D	13	5	35	53	]	5D	93
CR	0E	14	6	36	54	^	5E	94
SO	0F	15	7	37	55	_	5F	95
SI	10	16	8	38	56	FNC	7B,31	123,49
DLE	11	17	9	39	57	1	7B,32	123,50
DC1	12	18	:	3A	58	FNC	7B,33	123,51
DC2	13	19	;	3B	59	2	7B,34	123,52
DC3	14	20	<	3C	60	FNC	7B,53	123,83
DC4	15	21	=	3D	61	3	7B,42	123,66
NAK	16	22	>	3E	62	FNC	7B,43	123,67
SYN	17	23	?	3F	63	4		
ETB	18	24	@	40	64	SHIF		
CAN	19	25	A	41	65	T		
EM	1A	26	B	42	66	COD		
SUB	1B	27	C	43	67	EB		
ESC	1C	28	D	44	68	COD		
FS	1D	29	E	45	69	EC		
GS	1E	30	F	46	70			

RS	1F	31	G	47	71			
US	20	32	H	48	72			
SP	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			

Character B

Char	Sending data		Char	Sending data		char	Sending data	
	Hex	Decimal		Hex	Decimal	Hex	Decimal	十进制码
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	FNC	7B,31	123,49
1	31	49	Y	59	89	1	7B,32	123,50
2	32	50	Z	5A	90	FNC	7B,33	123,51
3	33	51	[	5B	91	2	7B,34	123,52
4	34	52	\	5C	92	FNC	7B,53	123,83
5	35	53	]	5D	93	3	7B,41	123,65
6	36	54	^	5E	94	FNC	7B,43	123,67
7	37	55	_	5F	95	4		
8	38	56	`	60	96	SHIF		
9	39	57	a	61	97	T		
:	3A	58	b	62	98	COD		
;	3B	59	c	63	99	EA		
<	3C	60	d	64	100	COD		
=	3D	61	e	65	101	EC		
>	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			

Character C

Char	Sending data		Char	Sending data		char Hex	Sending data	
	Hex	Decimal		Hex	Decimal		Decimal	十进制码
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	FNC	7B,31	123,49
21	15	21	61	3D	61	1	7B,41	123,65
22	16	22	62	3E	62	COD	7B,42	123,66
23	17	23	63	3F	63	EA		
24	18	24	64	40	64	COD		
25	19	25	65	41	65	EB		
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			