

WinPOS system. Co., Ltd.

WP-K837 series

Esc/POS Command specifications

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LF

Function : Prints buffered data and feeds one line.

Syntax : ASCII LF
 Hex 0A
 Decimal 10

Remarks : ● This command sets the printing position to the beginning of the line.

Reference : **ESC 2, ESC 3**

ESC d n

Function : Prints buffered data and feed n lines.

Syntax :

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

Parameter : $0 \leq n \leq 255$

Remarks :

- This command sets the print starting position to the beginning of the line.
- The maximum paper feed amount is 1016 mm {40"}. If the paper feed amount ($n \times$ line spacing) of more than 1016 mm {40"} is specified, the printer feeds the paper only 1016 mm {40"}.

Reference : **ESC 2, ESC 3**

ESC J n

Function : Prints buffered data and feeds paper.

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

Parameter : $0 \leq n \leq 255$: feeds [$n \times$ vertical or horizontal motion unit].

Remarks :

- This command sets the print starting position to the beginning of the line.
- The maximum line spacing is 1016mm {40"}. When the setting value exceeds the maximum, it is converted to the maximum automatically.

Reference : **GS P**

ESC \$ nL nH

Function : Moves the printing position absolutely along the row.

Syntax : $0 \leq nL \leq 255$

$0 \leq nH \leq 255$

Set absolute print position as $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$.

Remarks :

- This command is ignored when the new position exceeds the printing area.

Reference : ESC \, GS P

ESC \ nL nH

Function : Moves the printing position relatively along the row.

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

Parameter : $0 \leq nL \leq 255$
 $0 \leq nH \leq 255$

Remarks :

- This command is ignored when the new position exceeds the printing area.
- When pitch N is specified to the right:
 $nL + nH \times 256 = N$
- When pitch N is specified to the left (the negative direction), use the complement of 65536:
 $nL + nH \times 256 = 65536 - N$
- The print starting position moves from the current position to [N × horizontal or vertical motion unit]

Reference : **ESC \$, GS P**

ESC D n1...nk NUL

Function : Defines horizontal tab positions.

Syntax :	ASCII	ESC	D	n1...nk	NUL
	Hex	1B	44	n1...nk	00
	Decimal	27	68	n1...nk	0

Parameter : $0 \leq k \leq 32$
 $1 \leq n \leq 255$

- Remarks :**
- 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 overwrites the previous horizontal tab settings.
 - Up to 32 tab positions (k = 32) can be set. Data exceeding 32 tab positions is processed as normal data.
 - 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.
 - The default setting of the horizontal tab position for the paper roll is font A (12 × 24) every 8th character (9th, 17th, 25th, ... column).
 - **ESC D NUL** cancels all horizontal tab positions.
 - The horizontal tab positions previously specified do not change with change of character width.

Reference : HT

HT

Function : Moves the printing position to the next horizontal tab position.

Syntax :

ASCII	HT
Hex	09
Decimal	9

Remarks :

- Horizontal tab positions are set with **ESC D**.
- This command is ignored if the next horizontal tab position is absent
- If the next horizontal tab position exceeds the printing area, this command sets the printing position to [Printing area width + 1].
- 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**

GS V m (n)

Function : Cuts paper.

Syntax :	ASCII	GS	V	m	(n)
	Hex	1D	56	m	(n)
	Decimal	29	86	m	(n)

Parameter : m = 1, 49: Partial cut.
m = 66, $0 \leq n \leq 255$: Feeds (cutting position + $[n \times \text{vertical motion unit}]$), and partial cut.

- Remarks :
- When $n = 0$, the printer feeds the paper to the cutting position and cuts it.
 - When $n \neq 0$, the printer feeds the paper to (cutting position + $[n \times \text{vertical motion unit}]$) and cuts it.
 - The paper feed amount is calculated using the vertical motion unit (y). 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.

ESC p m t1 t2

Function : Generates a pulse on drawer kick-out connector.

Syntax :

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

Parameter : Generate a pulse on drawer kick-out connector on specified by parameter m:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Generate pulse on pin 2.
	On	01	1	Generate pulse on pin 5.
1	Off	00	0	Always off.
2	Off	00	0	Always off.
3	Off	00	0	Always off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always off.
7	Off	00	0	Always off.

$$0 \leq t1 \leq 255$$

$$0 \leq t2 \leq 255$$

Remarks :

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

Reference : **DLE DC4**

DLE DC4 1 m t

Function : Generate a pulse on drawer kick-out connector.

Syntax :

ASCII	DLE	DC4	1	m	t
Hex	10	14	1	m	t
Decimal	16	20	1	m	t

Parameter : Generates a pulse on drawer kick-out connector pin specified by parameter m:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Generate pulse on pin 2.
	On	01	1	Generate pulse on pin 5.
1	Off	00	0	Always off.
2	Off	00	0	Always off.
3	Off	00	0	Always off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always off.
7	Off	00	0	Always off.

$1 \leq t \leq 8$: The pulse ON time is $[t \times 100 \text{ ms}]$ and the OFF time is $[t \times 100 \text{ ms}]$.

- Remarks :**
- This command is executed once received.
 - With a serial interface model, this command is executed even when the printer is offline, the receive buffer is full, or there is an error status.
 - With a parallel interface model, this command cannot be executed when the printer is busy. This command is executed even when the printer is offline or there is an error status when DIP switch 2-1 is on.
 - This command is ignored when there is another pulse on the same connector pin.
 - This command remains effective even though the printer is not selected by **ESC =**.

Reference : **ESC p**

ESC = n

Function : Sets peripheral device.

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

Parameter : Selects device to which host computer sends data by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable printer.
	On	01	1	Enable printer. (Default)
1	Off	00	0	Disable customer display. (Default)
	On	02	2	Enable customer display.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

Remarks : ● When the printer is disabled, it ignores all data except for error-recovery commands (**DLE EOT**, **DLE DC4**) until it is enabled by this command.

ESC @

Function : Reinitialize device, clear buffered data and restore all default settings.

Syntax :

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

- Remarks :**
- The DIP switch settings are not checked again.
 - The data in the receive buffer is not cleared.
 - The NV bit image data is not cleared.
 - The data of the NV user memory is not cleared.

ESC SP n

Function : Defines right-side character spacing.

Syntax :

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

Parameter : $0 \leq n \leq 255$: Set right-side character spacing to [$n \times$ horizontal or vertical motion units].
Defaults: 0

Remarks :

- The right-side character spacing is n times normal value when characters are enlarged.
- This command does not affect the setting of Kanji characters.
- The maximum right-side spacing is 35.983 mm {255/180"}. Any setting exceeding the maximum is converted to the maximum automatically.

Reference : **GS P**

ESC 3 n

Function : Defines line spacing.

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

Parameter : $0 \leq n \leq 255$: Sets the line spacing to [$n \times$ vertical or horizontal motion unit].

Remarks :

- The horizontal and vertical motion units are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current line spacing.
- The maximum paper feed amount is 1016 mm {40"}. Even if a paper feed amount of more than 1016 mm {40"} is set, the printer feeds the paper only 1016 mm {40"}.

Reference : **ESC 2, GS P**

ESC 2

Function : Restores default line spacing (approximately 1/6").

Syntax :	ASCII	ESC	2
	Hex	1B	32
	Decimal	27	50

Remarks :

Reference : **ESC 3**

ESC R n

Function : Selects an international character set.

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

Parameter : Selects international character set by parameter n:

n	Character set	ASCII code (Hex)											
		23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	U.S.A	#	\$	@	[\]	^	`	{		}	~
1	France	#	\$	à	°	ç	§	^	`	é	ù	è	¨
2	Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3	U.K.	£	\$	@	[\]	^	`	{		}	~
4	Denmark I	#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ú
6	Italy	#	\$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain I	Pts	\$	@	ı	Ñ	¿	^	`	¨	ñ	}	~
8	Japan	#	\$	@	[¥]	^	`	{		}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ú
10	Denmark II	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ú
11	Spain II	#	\$	à	ı	Ñ	¿	é	`	ı	ñ	ó	ú
12	Latin	#	\$	à	ı	Ñ	¿	é	ü	ı	ñ	ó	ú
13	Korea	#	\$	@	[₩]	^	`	{		}	~
14	Slovenia/Croatia	#	\$	Ž	Š	Đ	Ć	Č	ž	š	đ	ć	č
15	China	#	¥	@	[\]	^	`	{		}	~

ESC t n

Function : Selects character code table.

Syntax :

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

Parameter : Selects character code table by parameter n:

n	Code table	Description
0	CP437 (Default)	U.S
1	Katakana	Japan
2	CP850	Multilingual Latin I
3	CP860	Portuguese
4	CP863	Canadian-French
5	CP865	Nordic
13	CP857	Turkish
16	WCP1252	Latin I
17	CP866	Cyrillic II
18	CP852	Latin II
19	CP858	Multilingual Latin I + Euro
23	Thai page.14	
36	CP862	Hebrew
51	WPC1257	Baltic

ESC a n

Function : Defines contents alignment.

Syntax :

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

Parameter : Defines contents alignment by parameter n:

Bit	Off/On	Hex	Decimal	Function
0, 1		00	0	Align left. (Default)
		01	1	Align center.
		02	2	Align Right
		03	3	-
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

- Remarks :
- This command executes justification in the printing area.
 - This command justifies the space area according to **HT**, **ESC \$** or **ESC **.

GS L nL nH

Function : Sets left margin.

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

Parameter : $0 \leq nL \leq 255$

Default: 0

$0 \leq nH \leq 255$

Default: 0

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

Remarks :

- 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.

Reference : **GS P, GS W**

GS W nL nH

Function : Defines printing area width.

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

Parameter : $0 \leq nL \leq 255$
 $0 \leq nH \leq 255$

($nL + nH \times 256$): printing area width.

Default for 58mm: 340

Default for 80mm: 512

Remarks :

- 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. The calculated result is truncated to the minimum value of the mechanical pitch.
- If the width set for the printing area is less than one line in vertical, the following processing is performed only on the line in question when data other than character data (e.g., bit image, user-defined bit image) is developed:
 1. The printing area width is extended to the right to accommodate one line in vertical for the bit image within the printable area.
 2. If the printing area width cannot be extended sufficiently, the left margin is reduced to accommodate one line in vertical.
- The commands which set the printing area width for bit image printing and its minimum widths are as follows:
 1. Bit image (**ESC ***):
 - Single density mode = 2 dots
 - Double density mode = 1 dot
 2. Downloaded bit image (**GS I**):
 - Double width mode or Quadruple mode = 2 dots
 - Normal mode or Double-height mode = 1 dot
 3. NV bit image (**FS p**):
 - Double width mode or Quadruple mode = 2 dots
 - Normal mode or Double-height mode = 1 dot
 4. Raster bit image (**GS v 0**):
 - Double width mode or Quadruple mode = 2 dots
 - Normal mode or Double-height mode = 1 dot

Reference : **GS L, GS P**

GS P x y

Function : Defines horizontal and vertical motion units.

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

Parameter : $0 \leq x \leq 255$
Default: 180

$0 \leq y \leq 255$
Default: 360

- Remarks :**
- The horizontal direction is perpendicular to the paper feed direction and the vertical direction is the paper feed direction.
 - Following commands use x or y, regardless of character rotation (upside-down or 90° clockwise rotation):
Commands using x: **ESC SP, ESC \$, ESC \, FS S, GS L, GS W**
Commands using y: **ESC 3, ESC J, 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.
 - When x and y are set to 0, the default setting of each value is used.

Reference : **ESC SP, ESC \$, ESC 3, ESC J, ESC \, GS L, GS V, GS W**

ESC M n

Function : Selects character font.

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

Parameter : Selects character font by parameter n:

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	Always Off.
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

Reference : **ESC !**

GS ! n

Function : Selects character size.

Syntax : ASCII GS ! n
 Hex 1D 21 n
 Decimal 29 33 n

Parameter : Selects character size by parameter n:

Bit	Off/On	Hex	Decimal	Function
0 -3		00	0	1x height. (Default)
		01	1	2x height.
		02	2	3x height.
		03	3	4x height.
		04	4	5x height.
		05	5	6x height.
		06	6	7x height.
		07	7	8x height.
4 -7		00	0	1x width. (Default)
		10	16	2x width.
		20	32	3x width.
		30	48	4x width.
		40	64	5x width.
		50	80	6x width.
		60	96	7x width.
		70	112	8x width.

- Remarks :
- This command is all characters (alphanumeric and Kanji) effective except for HRI characters.
 - This command is ignored if n is outside the defined range.
 - The definition of vertical and horizontal directions is 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.

Reference : **ESC !**

ESC - n

Function : Switch underline mode on/off.

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

Parameter : Switch underline mode on/off by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable underline mode. (Default)
	On	01	1	Enable underline mode.
1	Off	00	0	1 dot underline.. (Default)
	On	02	2	2 dots underline.
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

- Remarks :
- 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.
 - This command does not affect Kanji printing.

Reference : **ESC !**

ESC G n

Function : Switch double strike mode on/off.

Syntax :

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

Parameter : Switch double strike mode on/off by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable emphasized mode. (Default)
	On	01	1	Enable emphasized mode.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

Remarks : ● Printer output is the same in double-strike mode and in emphasized mode.

Reference : **ESC E**

ESC E n

Function : Switch emphasized mode on/off.

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

Parameter : Switch emphasized mode on/off by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable emphasized mode. (Default)
	On	01	1	Enable emphasized mode.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

Reference : **ESC !**

GS b n

Function : Switch smoothing mode on/off.

Syntax :

ASCII	GS	b	n
Hex	1D	62	n
Decimal	29	98	n

Parameter : Switch smoothing mode on/off by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable smoothing mode. (Default)
	On	01	1	Enable smoothing mode.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

Remarks : ● Smoothing mode is available for built-in, user-defined characters.

Reference : **ESC !, GS !**

GS B n

Function : Switch white/black reverse printing mode on/off.

Syntax :

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

Parameter : Switch white/black reverse printing mode on/off by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable white/black reverse printing mode. (Default)
	On	01	1	Enable white/black reverse printing mode.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

- Remarks :
- 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 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.

ESC { n

Function : Switch upside-down printing mode on/off.

Syntax :

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

Parameter : Switch upside-down printing mode on/off by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable upside-down printing mode. (Default)
	On	01	1	Enable upside-down printing mode.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

Remarks :

- This command is enabled only when processed at the beginning of a line.
- In upside-down printing mode, the printer rotates the line to be printed by 180°, and then prints it.

ESC V n

Function : Switch 90° clockwise rotation mode on/off.

Syntax :

ASCII	ESC	V	n
Hex	1B	56	n
Decimal	27	86	n

Parameter : Switch 90° clockwise rotation mode on/off by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable 90° clockwise rotation mode. (Default)
	On	01	1	Enable 90° clockwise rotation mode.
1	Off	00	0	Always Off.
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

Remarks : ● This command affects printing in line mode. However, the setting is always effective.

Reference : **ESC !, ESC -**

ESC ! n

Function : Select print mode(s)

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

Parameter : Selects print mode(s) using n as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Font.A (12 ×24)
	On	01	1	Font.B (9 ×7)
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	Off	00	0	Disable emphasized mode.
	On	08	8	Enable emphasized mode.
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	-	-	-	Undefined
7	Off	00	0	Disable underline mode.
	On	80	128	Enable underline mode.

- Remarks :
- The printer can underline all characters, but cannot underline the space set by **HT** or 90° clockwise rotated characters.
 - When some characters in a line are double or more height, all the characters on the line are aligned at the baseline.
 - Emphasized mode is effective for alphanumeric and Kanji. All print modes except emphasized mode is effective only for alphanumeric.

Reference : **ESC -, ESC E, ESC M, GS !**

FS ! n

Function : Select print mode(s).

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

Parameter : Selects print mode(s) using n as follows:

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	Undefined.
1	-	-	-	Undefined.
2	Off	00	0	Disable double width mode. (Default)
	On	04	4	Enable double width mode.
3	Off	00	0	Disable double height mode. (Default)
	On	08	8	Enable double height mode.
4	-	-	-	Undefined
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Disable underline mode. (Default)
	On	80	128	Enable underline mode.

- Remarks :
- 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.

Reference : **FS -**, **FS W**, **GS !**

ESC * n nL nH d₁...d_k

Function : Prints a bit image.

Syntax : ASCII ESC * n nL nH d₁...d_k
 Hex 1B 2A n nL nH d₁...d_k
 Decimal 27 42 n nL nH d₁...d_k

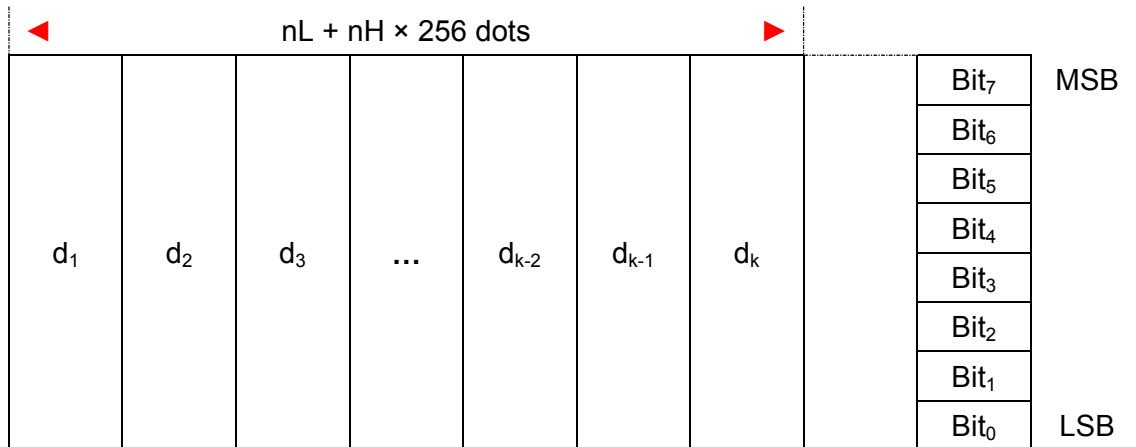
Parameter : Printing mode is specified by parameter n:

Bit	Off/On	Hex	Decimal	Definition
0	Off	00	0	Single density (horizontal 90dpi).
	On	01	1	Double density (horizontal 180dpi).
1	Off	00	0	Always Off.
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4	Off	00	0	Always Off.
5	Off	00	0	8 dots mode (vertical 60dpi): $k = (nL + nH \times 256)$
	On	20	32	24 dots mode (vertical 180dpi): $k = (nL + nH \times 256) \times 3$
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

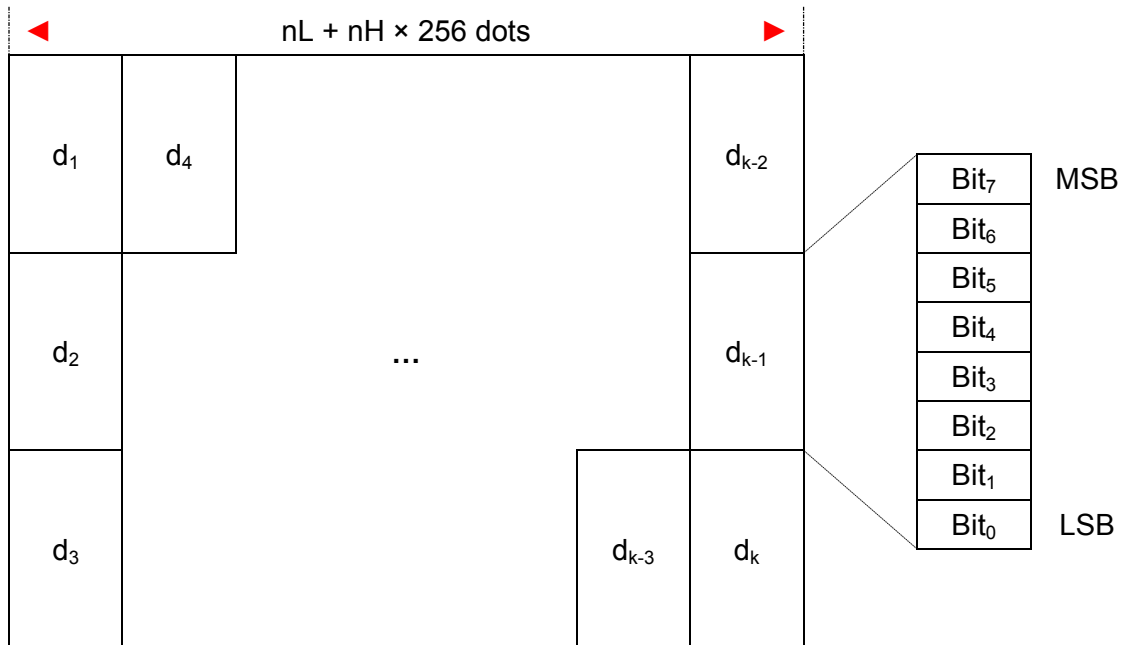
$1 \leq nL + nH \times 256 \leq 576$: specifies the width (dots) of the image.

Remarks :

- Each bit of the bit image data **d** specifies one dot of the image, 1 (MARK) is going to be printed, 0 (SPACE) is passed.
- 8 dots mode:



- 24 dots mode:



GS v 0 n xL xH yL yH d₁...d_k

Function : Prints a raster bit image.

Syntax :

ASCII	GS	v	0	n	xL	xH	yL	yH	d ₁ ...d _k
Hex	1D	76	30	n	xL	xH	yL	yH	d ₁ ...d _k
Decimal	29	118	48	n	xL	xH	yL	yH	d ₁ ...d _k

Parameter : Printing mode is specified by parameter n:

Bit	Off/On	Hex	Decimal	Definition
0	Off	00	0	Normal width (horizontal 180dpi).
	On	01	1	Double width (horizontal 90dpi).
1	Off	00	0	Normal height (vertical 180dpi).
	On	02	2	Double height (vertical 90dpi).
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

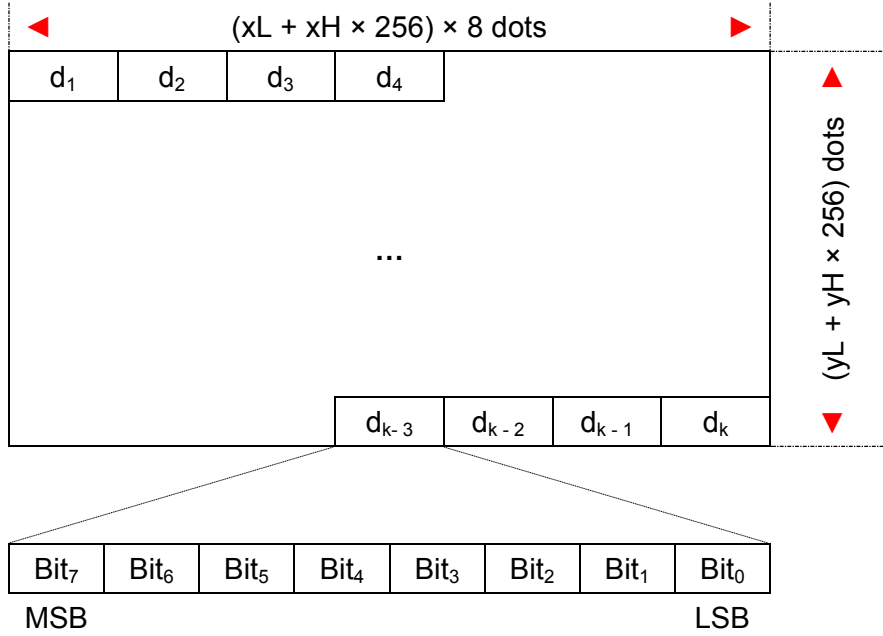
xL + xH × 256: specifies the width (8 dots) of the image.

yL + yH × 256: specifies the height (dots) of the image.

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

Remarks :

- This command is effective only when the printing position is at the head of the row under the line mode.
- Image data outside the printing area is discarded on a dot-by-dot basis.
- The **ESC a** (Select justification) setting is also effective on raster bit images.
- Each bit of the bit image data **d** specifies one dot of the image, 1 (MARK) is going to be printed, 0 (SPACE) is passed.
- Example:



GS * x y d₁...d_k

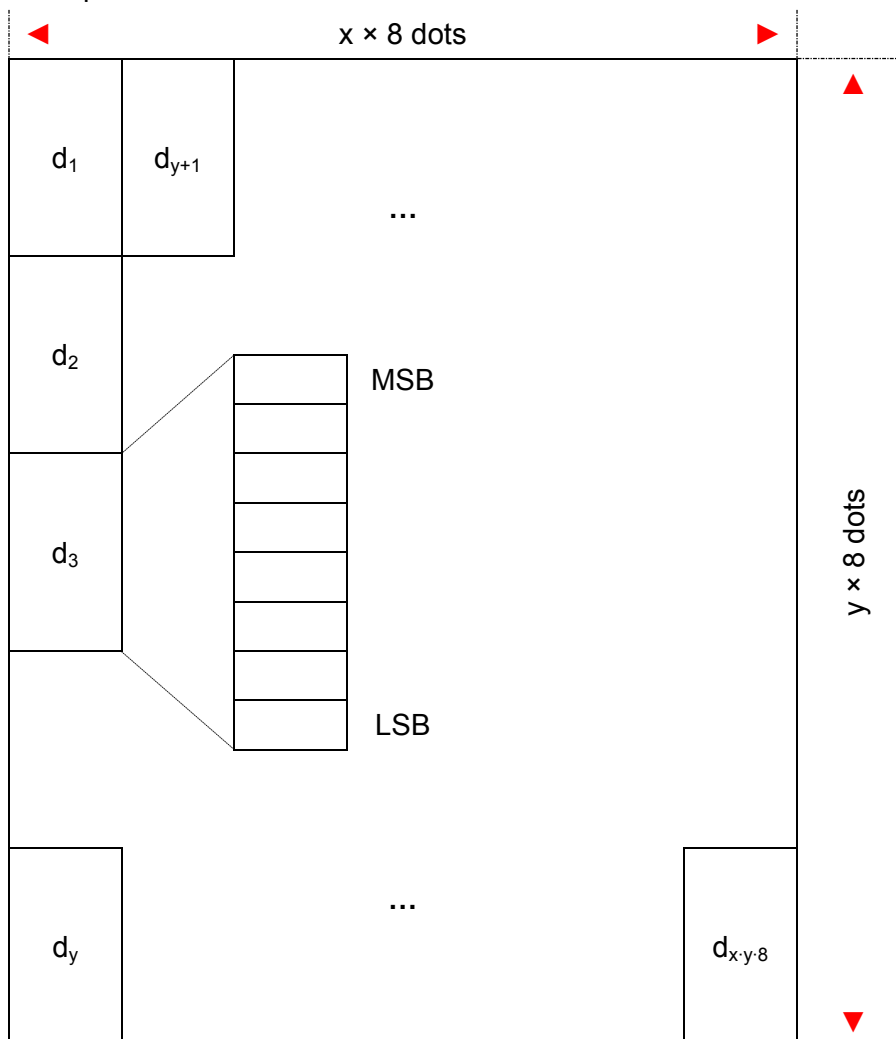
Function : Defines a bit image within volatile memory.

Syntax :	ASCII	GS	*	x	y	d ₁ ...d _k
	Hex	1D	2A	x	y	d ₁ ...d _k
	Decimal	29	42	x	y	d ₁ ...d _k

Parameter : $1 \leq x \leq 255$: specifies the width (8 dots) of the image.
 $1 \leq y \leq 48$: specifies the height (8 dots) of the image.

$$1 \leq k = (x \times y) \leq 192$$

- Remarks :**
- The image size is defined as $x \times 8$ dots wide, and $y \times 8$ dots high.
 - Each bit of the bit image data **d** specifies one dot of the image, 1 (MARK) is going to be printed, 0 (SPACE) is passed.
 - The bit image defined by this command is cleared by **ESC @**, **ESC &**, **FS q**.
 - Example:



Reference : GS /

GS / n

Function : Prints a predefined bit image from volatile memory.

Syntax :

ASCII	GS	/	n
Hex	1D	2F	n
Decimal	29	47	n

Parameter : Printing mode is specified by parameter n:

Bit	Off/On	Hex	Decimal	Definition
0	Off	00	0	Normal width (horizontal 180dpi).
	On	01	1	Double width (horizontal 90dpi).
1	Off	00	0	Normal height (vertical 180dpi).
	On	02	2	Double height (vertical 90dpi).
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

- Remarks :**
- This command is ignored if no bit image has been defined by **GS ***.
 - This command is effective only when the printing position is at the head of the row under line mode.
 - This command has no effect in the print modes (emphasized, double-strike, underline, character size, or white/black reverse printing), except for upside-down printing mode.
 - Image data outside the printing area is discarded on a dot-by-dot basis.
 - If the printing area width set by **GS L** and **GS W** is less than one line in vertical, the following processing is performed only on the line in question:
 1. The printing area width is extended to the right up to one line in vertical. In this case, printing does not exceed the printable area.
 2. If the printing area width cannot be extended by one line in vertical, the left margin is reduced to accommodate one line in vertical.

Reference : **GS ***

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

Function : Defines a bit image(s) within none-volatile (NV) memory collectively.

Syntax :

ASCII	FS	q	n	[xL xH yL yH d ₁ ...d _k] ₁ ...[xL xH yL yH d ₁ ...d _k] _n
Hex	1C	71	n	[xL xH yL yH d ₁ ...d _k] ₁ ...[xL xH yL yH d ₁ ...d _k] _n
Decimal	28	113	n	[xL xH yL yH d ₁ ...d _k] ₁ ...[xL xH yL yH d ₁ ...d _k] _n

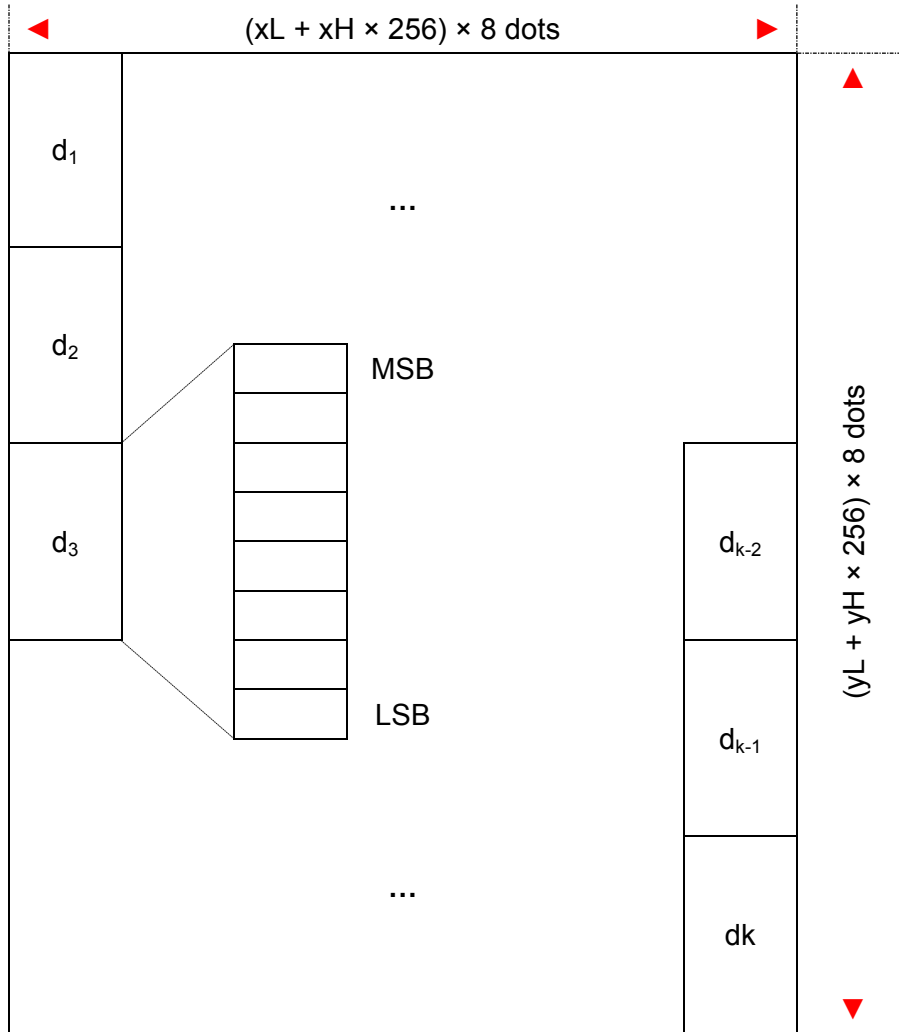
Parameter : $1 \leq (xL + xH \times 256) \leq 1023$: specifies the width (8 dots) of the image.
 $1 \leq (yL + yH \times 256) \leq 288$: specifies the height (8 dots) of the image.

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

Total defined data ≤ 256 K bytes

- Remarks :**
- This command is effective only when the printing position is at the beginning of current row.
 - Image data outside the printing area is discarded on a dot-by-dot basis.
 - Parameter **n** defines the number of NV bit image(s). All defined NV bit image(s) is cleared when **n** = 0.
 - Each bit of the bit image data **d** specifies one dot of the image, 1 (MARK) is going to be printed, 0 (SPACE) is passed.
 - This command performs a hardware reset after all write-in procedures are done. At this time, DIP switch settings are checked again.

● Example:



Reference : **FS p**

FS p n m

Function : Prints a predefined bit image from none-volatile (NV) memory.

Syntax :

ASCII	FS	p	n	m
Hex	1C	70	n	m
Decimal	28	112	n	m

Parameter : $1 \leq n \leq 255$: specifies the NV bit image to be printed.

Printing mode is specified by parameter m:

Bit	Off/On	Hex	Decimal	Definition
0	Off	00	0	Normal width (horizontal 180dpi).
	On	01	1	Double width (horizontal 90dpi).
1	Off	00	0	Normal height (vertical 180dpi).
	On	02	2	Double height (vertical 90dpi).
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

- Remarks :**
- This command is effective only when the printing position is at the beginning of current row under line.
 - 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.
 - Image data outside the printing area is discarded on a dot-by-dot basis.

Reference : ESC *, FS q, GS /, GS v 0

GS k m d₁...d_k NUL

Function : Selects a bar code protocol and prints bar code.

Syntax :

ASCII	GS	k	m	d ₁ ...d _k	NUL
Hex	1D	6B	m	d ₁ ...d _k	00
Decimal	29	107	m	d ₁ ...d _k	0

Parameter : Bar code protocol is specified by parameter m:

m	Protocol	Content length	Notes
0	UPC-A	$11 \leq k \leq 12$	$48 \leq d \leq 57$
1	UPC-E	$11 \leq k \leq 12$	$48 \leq d \leq 57$
2	JAN13 (EAN13)	$12 \leq k \leq 13$	$48 \leq d \leq 57$
3	JAN8 (EAN8)	$7 \leq k \leq 8$	$48 \leq d \leq 57$
4	CODE39	$1 \leq k$	$48 \leq d \leq 57, 65 \leq d \leq 90,$ $d = 32, 36, 37, 43, 45 \sim 47$
5	ITF	$1 \leq k \leq 255$ (even number)	$48 \leq d \leq 57$
6	CODABAR	$1 \leq k \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 68,$ $d = 36, 43, 45 \sim 47, 58$

- Remarks :
- This command ends with a **NUL** code.
 - Exceeding data is processed 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.
 - Printing under line mode:
 1. If d is outside of the specified range, the printer only feeds paper and processes the following data as normal data.
 2. If the horizontal size exceeds printing area, the printer only feeds the paper.
 3. 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**.
 4. 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.
 5. 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.

Reference : **GS H, GS f, GS h, GS w**

GS k m n d₁...d_n

Function : Select bar code protocol and print bar code.

Syntax :

ASCII	GS	k	m	n	d ₁ ...d _n
Hex	1D	6B	m	n	d ₁ ...d _n
Decimal	29	107	m	n	d ₁ ...d _n

Parameter : Bar code protocol is specified by parameter m:

m	Protocol	Content length	Notes
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	JAN8 (EAN8)	7 ≤ n ≤ 8	48 ≤ d ≤ 57
69	CODE39	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 90, d = 32, 36, 37, 43, 45 ~47
70	ITF	1 ≤ n ≤ 255 (even number)	48 ≤ d ≤ 57
71	CODABAR	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 68, d = 36, 43, 45 ~47, 58
72	CODE93	1 ≤ n ≤ 255	0 ≤ d ≤ 127
73	CODE128	2 ≤ n ≤ 255	0 ≤ d ≤ 127

- Remarks :**
- n indicates the number of bar code data, and the printer processes n bytes from the next character data as bar code data.
 - Exceeding data is processed as normal data.
 - 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.

Reference : **GS H, GS f, GS h, GS w**

GS w n

Function : Define barcode width.

Syntax :	ASCII	GS	w	n
	Hex	1D	77	n
	Decimal	29	119	n

Parameter : $2 \leq n \leq 6$: n specifies the bar code width.
Default: 3

Remarks :

Reference : **GS k**

GS h n

Function : Define bar code height.

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

Parameter : $1 \leq n \leq 255$: n specifies the number of dots in the vertical direction.
Default: 162

Remarks :

Reference : **GS k**

GS f n

Function : Select font for Human Readable Interpretation (HRI) characters.

Syntax :

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

Parameter : Select HRI font by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Font A (12 × 24). (Default)
	On	01	1	Font B (9 × 17).
1	Off	00	0	Always Off.
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

Remarks :

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

Reference : GS H, GS k

GS H n

Function : Select position for Human Readable Interpretation (HRI) characters.

Syntax :

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

Parameter : Select HRI position by parameter n:

Bit	Off/On	Hex	Decimal	Function
0, 1		00	0	None.
		01	1	Above the bar code.
		02	2	Below the bar code.
		03	3	Both above and below the bar code.
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

Remarks :

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

Reference : **GS f**, **GS k**

GS I n

Function : Transmit device ID.

Syntax : ASCII GS I n
 Hex 1D 49 n
 Decimal 29 73 n

Parameter : Transmit device ID specified by parameter n:

n	Device ID	Specification
1, 49	Model ID	Depends on model.
2, 50	Type ID	
3, 51	ROM version	
65	Firmware version	
66	Manufacturer	
67	Device name	
68	Serial number	
69	Model type	

Response : n = 2, 50: Type ID

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Two-byte character code unsupported.
	On	01	1	Two-byte character code supported.
1	On	02	2	Autocutter equipped.
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4	Off	00	0	Always Off.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	Off	00	0	Always Off.

Remarks :

- When DTR/DSR control is selected in the serial interface model, the printer transmits the printer ID after confirming that the host is ready to receive data (DSR signal is SPACE). If the host computer is not ready to receive data (DSR signal is MARK), the printer waits until the host is ready.
- When XON/XOFF control is selected in the serial interface model, the printer transmits the printer ID without confirming the condition of the DSR signal.
- The printer ID is transmitted when the data in the receive buffer is developed. Therefore, there may be a time lag between receiving this command and transmitting the status, depending on the receive buffer status.
- When the printer ID transmission is specified with $(1 \leq n \leq 3)$ or $(49 \leq n \leq 51)$, one byte code is transmitted.
- When Auto Status Back (ASB) is enabled using **GS a**, the printer ID transmitted by **GS I** and the ASB status must be differentiated using the table in Appendix G.
- After the data is ready to be transmitted, the printer executes the following process.
- When the printer ID transmission is specified with $(65 \leq n \leq 68)$, the following contents are transmitted:

Header: Hexadecimal = 5FH / Decimal = 95 (1 byte)

Data: Printer information

NUL: Hexadecimal = 00H / Decimal = 0 (1 byte)

1. Executes READY to BUSY. If it is already BUSY, the printer executes nothing.
2. Transmits [Header + Data + NUL].
3. Executes BUSY to READY. If it is already BUSY from any other cause, the printer executes nothing.

GS r n

Function : Transmit status.

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

Parameter : Transmit device status specified by parameter n:

Bit	Off/On	Hex	Decimal	Function
0, 1		00	0	Undefined.
		01	1	Transmit paper roll status.
		02	2	Transmit drawer kick-out connector status.
		03	3	Undefined.
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

Response : n = 1, 49: Paper roll status

Bit	Off/On	Hex	Decimal	Function
0, 1	Off	00	0	
	On	03	1	Paper near end.
2, 3	Off	00	0	
	On	0C	12	Paper end.
4	Off	00	0	Always Off.
5, 6	-	-	-	Undefined.
7	Off	00	0	Always Off.

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

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Drawer kick-out connector pin 3 is LOW.
	On	01	1	Drawer kick-out connector pin 3 is HIGH.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	Off	00	0	Always Off.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	Off	00	0	Always Off.

Remarks :

- When using a serial interface When DTR/DSR control is selected, the printer transmits only 1 byte after confirming the host is ready to receive data (DSR signal is SPACE). If the host computer is not ready to receive data (DSR signal is MARK), the printer waits until the host is ready. When XON/XOFF control is selected, the printer transmits only 1 byte without confirming the condition of the DSR signal.
- This command is executed when the data in the receive buffer is developed. Therefore, there may be a time lag between receiving this command and transmitting the status, depending on the receive buffer status.
- When Auto Status Back (ASB) is enabled using **GS a**, the status transmitted by **GS r** and the ASB status must be differentiated using the table in Appendix G.

Reference : **DLE EOT, GS a**

DLE EOT n

Function : Transmits printer status.

Syntax :

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

Parameter :

- n = 1: Transmit printer status
- n = 2: Transmit offline status
- n = 3: Transmit error status
- n = 4: Transmit paper roll sensor status
- n = 5: Transmit paper holder sensor status

Response : n = 1: Transmit printer status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Always Off.
1	On	02	2	Always On.
2	Off	00	0	Drawer signal LOW.
	On	04	4	Drawer signal HIGH.
3	Off	00	0	-
	On	08	8	Offline.
4	On	10	16	Always On.
5, 6	-	-	-	Undefined.
7	Off	00	0	Always Off.

n = 2: Transmit offline status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Always Off.
1	On	02	2	Always On.
2	Off	00	0	-
	On	04	4	Cover Open.
3	Off	00	0	-
	On	08	8	Paper fed by panel operation.
4	On	10	16	Always On.
5	Off	00	0	-
	On	20	32	Printing being Stopped.
6	Off	00	0	-
	On	40	64	Error occurred.
7	Off	00	0	Always Off.

n = 3: Transmit error status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Always Off.
1	On	02	2	Always On.
2	-	-	-	Undefined.
3	Off	00	0	-
	On	08	8	Cutter Fail.
4	On	10	16	Always On
5	Off	00	0	-
	On	20	32	Error Unrecoverable.
6	Off	00	0	-
	On	40	64	Error not Auto-Recoverable.
7	Off	00	0	Always Off.

n = 4: Transmit paper roll sensor status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Always Off.
1	On	02	2	Always On.
2, 3	Off	00	0	-
	On	0C	12	Paper Near End.
4	On	10	16	Always On
5, 6	Off	00	0	-
	On	60	96	Paper End.
7	Off	00	0	Always Off.

n = 5: Transmit paper roll sensor status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Always Off.
1	On	02	2	Always On.
2, 3	Off	00	0	-
	On	0C	12	Paper Holder Empty.
4	On	10	16	Always On
5, 6	Off	00	0	-
7	Off	00	0	Always Off.

Remarks :

- This command is executed once received, even when the printer is offline, the receive buffer is full, or there is an error status with a serial interface model.
- With a parallel interface model, this command cannot be executed when the printer is busy. This command is executed even when the printer is offline or there is an error

status when DIP switch 2-1 is on with a parallel interface model.

- The printer transmits the status ignoring whether the host computer can receive data.
- Each status is represented by one-byte data.
- This command remains effective even though the printer is not selected by **ESC =**.

Reference : **GS a, GS r**

GS a n

Function : Switch Automatic Status Back (ASB) mode on/off.

Syntax :

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

Parameter : Switch Automatic Status Back on/off by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable drawer kick-out connector pin 3 status back.
	On	01	1	Enable drawer kick-out connector pin 3 status back.
1	Off	00	0	Disable online/offline status back.
	On	02	2	Enable online/offline status back.
2	Off	00	0	Disable error status back.
	On	04	4	Enable error status back.
3	Off	00	0	Disable paper roll status back.
	On	08	8	Enable paper roll status back.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

Response : Automatic Status Back function returns 4 bytes:

1st byte: Printer information

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Always Off.
1	Off	00	0	Always Off.
2	Off	00	0	
	On	04	4	
3	Off	00	0	Online.
	On	08	8	Offline.
4	Off	10	16	Always On.
5	Off	00	0	
	On	20	32	Cover open.
6	Off	00	0	
	On	40	64	Paper fed by panel button.
7	Off	00	0	Always Off.

2nd byte: Printer information

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	Undefined.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	Off	00	0	
	On	08	8	Cutter error.
4	Off	00	0	Always Off.
5	Off	00	0	
	On	20	32	Unrecoverable error.
6	Off	00	0	
	On	40	64	Automatically recoverable error.
7	Off	00	0	Always Off.

3rd byte: Paper roll information

Bit	Off/On	Hex	Decimal	Function
0, 1	Off	00	0	
	On	03	3	Paper near end.
2, 3	Off	00	0	
	On	0C	12	Paper roll end.
4	Off	00	0	Always Off.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	Off	00	0	Always Off.

4th byte: Paper roll information

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	Undefined.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	Off	00	0	Always Off.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	Off	00	0	Always Off.

- Remarks :
- If any of the status items in the table above are enabled, the printer transmits the status when this command is executed. The printer automatically transmits the status whenever the enabled status item changes. The disabled status items may change, in this case, because each status transmission represents the current status.
 - If all status items are disabled, the ASB function is also disabled.
 - If the ASB is enabled as a default, the printer transmits the status when the printer data reception and transmission is possible at the first time from when the printer is turned on.
 - The following four status bytes are transmitted without confirming whether the host is ready to receive data. The four status bytes must be consecutive, except for the XOFF code.
 - Since this command is executed after the data is processed in the receive buffer, there may be a time lag between data reception and status transmission.
 - When the printer is disabled by **ESC =** (Select peripheral device), the four status bytes are transmitted whenever the status changes.
 - When using **DLE EOT**, **GS l**, or **GS r**, the status transmitted by these commands and ASB status must be differentiated, according to the procedure in Appendix G, Transmission Status Identification.

Reference : **DLE EOT, GS r**

ESC c 3 n

Function : Select paper sensor(s) to output paper end signal.

Syntax :

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

Parameter : Select paper sensor(s) to output paper end signal by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable near-end sensor.
	On	01	1	Enable near-end sensor.
1	Off	00	0	Disable near-end sensor.
	On	02	2	Enable near-end sensor.
2	Off	00	0	Disable paper-end sensor.
	On	04	4	Enable paper-end sensor.
3	Off	00	0	Disable paper-end sensor.
	On	08	8	Enable paper-end sensor.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

- Remarks :**
- 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.
 - When all the sensors are disabled, the paper end signal always outputs a paper present status.

ESC c 4 n

Function : Select paper sensor(s) to stop printing.

Syntax :

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

Parameter : Select paper sensor(s) to stop printing by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable near-end sensor. (Default)
	On	01	1	Enable near-end sensor.
1	Off	00	0	Disable paper-end sensor. (Default)
	On	02	2	Enable paper-end sensor.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

- Remarks :**
- When a 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.

ESC c 5 n

Function : Enable/Disable panel buttons.

Syntax :

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

Parameter : Enable/Disable panel buttons by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Enable panel buttons. (Default)
	On	01	1	Disable panel buttons.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

- Remarks :
- 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.

ESC % n

Function : Switch user-defined character set on/off.

Syntax :

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

Parameter : Switch user-defined character set on/off by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable user-defined character set. (Default)
	On	01	1	Enable user-defined character set.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

Remarks :

- When the user-defined character set is canceled, the internal character set is automatically selected.

Reference : **ESC &, ESC ?**

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

Function : Defines user-defined characters.

Syntax :

ASCII	ESC	&	y	c1	c2	[x d1...d(y ×x)]...[x d1...d(y ×x)]
Hex	1B	26	y	c1	c2	[x d1...d(y ×x)]...[x d1...d(y ×x)]
Decimal	27	38	y	c1	c2	[x d1...d(y ×x)]...[x d1...d(y ×x)]

Parameter : y = 3: the number of bytes in the vertical direction.

$32 \leq c1 \leq 126$: the beginning character code for the definition

$32 \leq c2 \leq 126$: the final character code for the definition

x = 12: while 12 ×24 font selected

x = 9: while 9 ×7 font selected

$0 \leq d1...d(y \times x) \leq 255$

- Remarks :**
- 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 for each font. 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. **FS q** is executed.
 3. **GS *** is executed.
 4. **ESC ?** 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.

Reference : **ESC %**, **ESC ?**

ESC ? n

Function : Cancel user-defined characters.

Syntax :

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

Parameter : $32 \leq n \leq 126$

- Remarks :
- 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.
 - This command deletes the pattern defined for the specified code in the font selected by **ESC !**.
 - If a user-defined character has not been defined for the specified character code, the printer ignores this command.

Reference : **ESC &**, **ESC %**

FS &

Function : Select Kanji character mode.

Syntax :	ASCII	FS	&
	Hex	1C	26
	Decimal	28	38

- Remarks :
- When the Kanji character code system is SHIFT JIS, the printer performs only internal flag operations. Printing is not affected.
 - For Japanese model:
 1. This command is effective only when the JIS code system is selected.
 2. When the Kanji character mode is selected, the printer processes all Kanji code for each two bytes.
 3. Kanji codes are processed in the order of the first byte and second byte.
 4. Kanji character mode is not selected when the power is turned on.
 5. Using **FS C**, the Kanji character code system is selected.
 - For Simplified Chinese/Traditional Chinese/Korean model:
 1. When the kanji character mode is selected, the printer checks whether the code is for Kanji or not, then processed the first byte and the second byte if the code is for Kanji.
 2. Kanji codes are processed in the order of the first byte and second byte.
 3. Kanji character mode is not selected when the power is turned on.

Reference : **FS .**, **FS C**

FS C n

Function : Select Kanji character code system.

Syntax :

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

Parameter : Select Kanji character code system by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	JIS code. (Default)
	On	01	1	SHIFT-JIS code.
1	Off	00	0	Always Off.
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

- Remarks :
- This command is effective only for Japanese model.
 - In the JIS code system, the following codes are available:
 Primary byte: <21>H to <7E>H
 Secondary byte: <21>H to <7E>H
 - In the SHIFT JIS code system, the following codes are available:
 Primary byte: <81>H to <9F>H and <E0>H to <EF>H
 Secondary byte: <40>H to <7E>H and <80>H to <FC>H

FS S n1 n2

Function : Defines left/right-side character spacing for Kanji character mode.

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

Parameter : $0 \leq n1 \leq 255$

Default: 0

$0 \leq n2 \leq 255$

Default: 0

- Remarks :**
- Sets left- and right-side Kanji character spacing n1 and n2, respectively.
 - When the printer model used supports **GS P**, the left-side character spacing is [$n1 \times$ horizontal or vertical motion units], and the right-side character spacing is [$n2 \times$ horizontal or vertical motion units].
 - When double-width mode is set, the left- and right-side character spacing is twice the normal value.
 - The horizontal and vertical motion units are set by **GS P**. The previously specified character spacing does not change, even if the horizontal or vertical motion unit is changed using **GS P**.
 - The value cannot be less than the minimum horizontal movement amount, and must be in even units of the minimum horizontal movement amount.

Reference : **GS P**

FS - n

Function : Switch underline mode on/off for Kanji characters.

Syntax :

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

Parameter : Switch underline mode on/off by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable underline mode. (Default)
	On	01	1	Enable underline mode.
1	Off	00	0	1 dot underline.. (Default)
	On	02	2	2 dots underline.
2	Off	00	0	Always Off.
3	Off	00	0	Always Off.
4, 5	-	-	-	Undefined.
6	Off	00	0	Always Off.
7	Off	00	0	Always Off.

- Remarks :**
- 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.

Reference : **FS !**

FS W n

Function : Switch quadruple-size mode on/off for Kanji characters.

Syntax :

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

Parameter : Switch quadruple-size mode on/off by parameter n:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable quadruple-size mode. (Default)
	On	01	1	Enable quadruple-size mode.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

- Remarks :**
- 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.

Reference : **FS !**, **GS !**

FS .

Function : Cancel Kanji character mode.

Syntax :

ASCII	FS	.
Hex	1C	2E
Decimal	28	46

- Remarks :
- For Japanese model:
 1. This command is effective only when the JIS code system is selected.
 2. When the Kanji character mode is not selected, all character codes are processed one byte at a time as ASCII code.
 3. Kanji character mode is not selected when the power is turned on.
 - For Simplified Chinese/Traditional Chinese/Korean model:
 1. When the Kanji character mode is not selected, all character codes are processed one byte at a time as ASCII code.
 2. Kanji character mode is selected when the power is turned on.

Reference : **FS &, FS C**

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