WINCOR NIXDORF

TH180

Thermal Printer

Programmer's Guide

Edition November 2012

Contents

Control Code List

Commands related to printing instructions

No.	Control code	Designation
1	LF	Print and line feed
2	FF	Print and return to standard mode (in page mode)
3	CR	Print and carriage return
4	ESC FF	Print data in page mode
5	ESC J n	Print and feed paper
6	ESC d n	Print and feed n lines

Commands related to printing characters

No.	Control code	Designation
1	CAN	Cancel print data in page mode
2	ESC SP n	Set right-side character spacing
3	ESC ! n	Select print mode(s)
4	ESC % n	Select/cancel user-defined character set
5	ESC & y c1 c2	Define user-defined characters
6	ESC – n	Turn underline mode on/off
7	ESC ? n	Turn emphasized mode on/off
8	ESC E n	Turn double-strike mode on/off
9	ESC G n	Turn double-strike mode on/off
10	ESC M n	Select character fonts
11	ESC R n	Select international character set
12	ESC V n	Turn 90°clockwise rotation mode on/off
13	ESC t n	Select character code table
14	ESC { n	Turn upside-down printing mode on/off
15	GS ! n	Set character size
16	GS B n	Turn white/black reverse printing mode on/off
17	GS b n	Select/cancel smoothing

Commands related to the print position

No.	Control code	Designation
1	HT	Horizontal tab
2	ESC $ nL nH	Set absolute print position
3	ESC D	Set horizontal tab positions
4	ESC T n	Select print direction in page mode
5	ESC W xL xH	Set printing area in page mode
6	ESC \ nL nH	Set relative print position
7	ESC a n	Select justification
8	GS $ nL nH	Set absolute position for character direction in page mode
9	GS L nL nH	Set left margin
10	GS W nL nH	Set printing area width
11	GS \ nL nH	Set relative position for character direction in page mode

Commands related to bit images

No.	Control code	Designation
1	ESC * m nL nH	Select bit-image mode
2	FS p n m	Print in NV bit mode image
3	FS q n	Define NV bit image mode
4	GS * x y	Define user-defined bit image
5	GS / m	Print user-defined bit image
6	GS v 0 m xL xH	Print a raster bit image

Commands related to macro functions

No.	Control code	Designation
1	GS :	Start/end macro definition
2	GS ^ r t m	Execute macro.

Commands related to bar code

Serial	Control code	Designation
1	GS H n	Select printing position for HRI character
2	GS f n	Select character font for HRI characters
3	GS h n	Select bar code height
4	GS k m	Print bar code (No. 1)
5	GS k m n	Print bar code (No. 2)
6	GS w n	Select bar code width

Commands related to new line quantities

No.	Control code	Designation
1	ESC 2	Select 1/6-inch line spacing
2	ESC 3 n	Set line spacing

Commands related to mechanical control

No.	Control code	Designation
1	GS V m	Cut paper (No. 1)
2	GS V m n	Cut paper (No. 2)
3	ESC i	Full cut
4	ESC m	Partial cut

Command related to paper detectors

No.	Control code	Designation
1	ESC c 3 n	Select paper sensor(s) to output paper out signals
2	ESC c 4 n	Select paper sensor(s) to stop printing

Commands related to the status

No.	Control code	Designation
1	DLE EOT n	Real-time status transmission
2	GS a n	Enable/disable automatic status back (ASB)
3	GS r n	Transmit status
4	ESC u n	Transmit peripheral device status
5	ESC v	Transmit paper detector status

Command related to the panel switches

No.	Control code	Designation
1	ESC c 5 n	Enable/disable panel buttons

Commands related to auxiliary functions

No.	Control code	Designation
1	DLE ENQ n	Real-time request to printer
3	ESC @	Initialize printer
4	ESC L	Select page mode
5	ESC S	Select standard mode
6	ESC p m t1 t2	Generate pulse
7	GS I n	Transmit printer ID
8	GS P x y	Set horizontal and vertical motion units
11	DLE DC4 1 m t	Real time generate pulse
12	DLE DC4 2 a b	Power off processing execution
13	DLE DC4 8 d1…d7	Buffer clear

Commands related to extension functions

No.	Control code	Designation
1	GS (A pL pH n m	Execute test print
2	GS (C pL pH fn b	Edit user NV memory
3	GS (D pL pH m	Valid / invalid real-time command
4	GS (E pL pH fn	User setting command group
5	GS (H pL pH fn m	Request of response sending.
6	GS (K pL pH fn m	Printing control method selection
7	GS (L pL pH m fn	Graphics data designation
8	GS 8 L p1 p2 p3 p4	Graphics data designation
9	GS (M pL pH fn m	Customize the printer
10	GS (N pL pH fn m	Designates character decoration
11	GS T n	Moves printing position to the beginning of the line

Commands related to the two-dimensional barcode

No.	Control code	Designation
1	GS (k pL pH cn fn	Print the two-dimensional barcode

Code Tables

Page 0 (PC437)

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0	1	0	0	4	EOT		$	4	D	T	d	t			๑	๑	๑	๑	๑	๑
0	1	0	1	5	ENQ		%	5	E	U	e	u		๑	๑	๑	๑	๑	๑	๑
0	1	1	0	6			&	6	F	V	f	v	๑	๑	๑	๑	๑	๑	๑	๑
0	1	1	1	7			'	7	G	W	g	w		๑	๑	๑	๑	๑	๑	๑
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1	0	0	1	9	HT		)	9	I	Y	i	y	๑	๑	๑	๑	๑	๑	๑	๑
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z	๑	๑	๑	๑	๑	๑	๑	๑
1	0	1	1	B		ESC	+	;	K	[	k	{	๑	๑	๑	๑	๑	■	๑	๑
1	1	0	0	C	FF	FS	,	<	L	\	l	|	๑	๑	๑	๑	๑	▄	๑	๑
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Page 251 (ISO8859-2)

					0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
					0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
					0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
					0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
					0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
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0	0	0	1	1		XON	!	1	A	Q	a	q			Ą	ą	Á	Ń	á	ń
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0	0	1	1	3		XOFF	#	3	C	S	c	s			Ł	ł	Ă	Ó	ă	ó
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Page 252 (ISO8859-7)

					0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
					0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
					0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
					0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
					0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p			SP	°	ΐ	Π	ΰ	π
0	0	0	1	1		XON	!	1	A	Q	a	q			‘	±	Α	Ρ	α	ρ
0	0	1	0	2			“	2	B	R	b	r			’	²	Β		β	ς
0	0	1	1	3		XOFF	#	3	C	S	c	s			£	³	Γ	Σ	γ	σ
0	1	0	0	4	EOT		$	4	D	T	d	t				΄	Δ	Τ	δ	τ
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1	0	1	0	A	LF	SUB	*	:	J	Z	j	z				Ί	Κ	Ϊ	κ	ϊ
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Page 253 (PC866 Type 2)

					0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
					0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
					0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
					0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
					0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p	А	Р	а				р	Ё
0	0	0	1	1		XON	!	1	A	Q	a	q	Б	С	б				с	ё
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0	0	1	1	3		XOFF	#	3	C	S	c	s	Г	У	г				у	
0	1	0	0	4	EOT		$	4	D	T	d	t	Д	Ф	д				ф	
0	1	0	1	5	ENQ		%	5	E	U	e	u	Е	Х	е				х	
0	1	1	0	6			&	6	F	V	f	v	Ж	Ц	ж				ц	
0	1	1	1	7			'	7	G	W	g	w	З	Ч	з				ч	
1	0	0	0	8		CAN	(	8	H	X	h	x	И	Ш	и				ш	
1	0	0	1	9	HT		)	9	I	Y	i	y	Й	Щ	й				щ	
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z	К	Ъ	к				ъ	
1	0	1	1	B		ESC	+	;	K	[	k	{	Л	Ы	л				ы	
1	1	0	0	C	FF	FS	,	<	L	\	l	|	М	Ь	м				ь	
1	1	0	1	D	CR	GS	-	=	M	]	m	}	Н	Э	н				э	
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Command Details

Commands related to printing instructions

LF

[Designation] Print and line feed

[Format] 0AH

[Valid limits] ---

[Initial value] ---

[Function] (1) Prints the data in the print buffer and executes line feed based on the specified amount of line feed. (Standard mode)

(2) After printing is finished, the beginning of a new line is set as the next print position.

(3) When the initial value of line feed increments is smaller than the height of printed data:
a. Line feed operation is performed according to line feed increments if no data is printed.
b. A line feed operation is performed according to the height of print data (including underlined data) if print data is included.

FF

[Designation] Print and return to standard mode (in page mode)

[Format] 0CH

[Valid limits] ---

[Initial value] ---

[Function] (1) Batch-prints the data expanded in all print areas and returns to standard mode.

(2) The expanded data is erased after printing.

(3) The specified print area is initialized using the Set printing area in page mode command (ESC W).

(4) The paper is not cut.

(5) After printing is finished, the beginning of a new line is set as the next print position.

CR

[Designation] Print and carriage return

[Format] 0DH

[Valid limits] ---

[Initial value] ---

[Function] (1) Executes the same operations as print and (LF) if automatic line feed is enabled. Ignores this command if automatic line feed is disabled.

(2) This command is ignored for serial and USB(V-COM) interface specifications.

(3) For USB (PRINTER) interface specifications, printing is set up using the SETUP (AUTO LF) at power on and reset.

(4) After printing is finished, the beginning of a new line is set as the next print position.

ESC FF

[Designation] Print data in page mode

[Format] 1BH, 0CH

[Valid limits] ---

[Initial value] ---

[Function] (1) Batch-prints the data expanded in all print areas in page mode.

(2) This command is valid only when page mode is selected.

(3) After printing is finished, the following information is saved:
a. Expanded data
b. Select print direction in page mode (ESC T)
c. Set printing area in page mode (ESC W)
d. Character expansion position

ESC J n

[Designation] Print and feed paper

[Format] 1BH, 4AH, n

[Valid limits 0 ≤ n ≤ 255

[Initial value] ---

[Function] (1) Prints the data in the print buffer and advances the paper [n × basic calculated pitch] inches.
(2) After printing is finished, the beginning of the new line is set as the next print position.
(3) This command does not affect a paper feed amount specified using the following commands:
a. Select 1/6-inch line spacing (ESC 2)
b. Set line spacing (ESC 3)
(4) The basic calculated pitch is set up using set horizontal and vertical motion unit (GS P).
(5) If the calculation result contains a fraction, the value is corrected using the minimum pitch of the mechanism. The remainder is then discarded.
(6) In standard mode, the vertical motion unit (y) is used.
(7) In page mode, the operations given below are executed based on the starting point:
a. The print position is moved in the paper feed direction if the starting point has been specified as upper left or lower right using the Select print direction in page mode command (ESC T).
At this time, the vertical motion unit (y) is used.
b. If the starting point has been specified as upper right or lower left using the Select print direction in page mode command (ESC T), the print position is moved in a direction perpendicular to the paper feed direction.
At this time, the horizontal motion unit (x) is used.
(8) If [n × (basic calculated pitch)] exceeds about 900 mm (35.4 inches), the paper is advanced about 900 mm (35.4 inches).

(9) When the initial value of line feed increments is smaller than the height of printed data:
a. Line feed operation is performed according to line feed increments if no data is printed.
b. A line feed operation is performed according to the height of print data (including underlined data) if print data is included.

ESC d n

[Designation] Print and feed n lines

[Format] 1BH, 64H, n

[Valid limits] 0 ≤ n ≤ 255

[Initial value] ---

[Function] (1) Prints the data in the print buffer and advances the paper n lines.

(2) After printing is finished, the beginning of the new line is set as the next print position.

(3) This command does not affect a paper feed amount specified using the following commands:
a. Select 1/6-inch line spacing (ESC 2)
b. Set line spacing (ESC 3)

(4) If [n×(basic calculated pitch)] exceeds about 900 mm (35.4 inches), the paper is advanced about 900 mm (35.4 inches).

(5) When the initial value of line feed increments is smaller than the height of printed data:
a. Line feed operation is performed according to line feed increments if no data is printed.
b. A line feed operation is performed according to the height of print data (including underlined data) if print data is included.

Commands related to printing characters

CAN

[Designation] Cancel print data in page mode

[Format] 18H

[Valid limits] ---

[Initial value] ---

[Function] (1) Erases all data in the print area currently set in page mode.

(2) This command is valid only when page mode is selected.

(3) Any data that has been previously set in a print area will be erased if it is included in the print area currently set.

ESC SP n

[Designation] Set right-side character spacing

[Format 1BH, 20H, n

[Valid limits] 0 ≤ n ≤ 255

[Initial value] n = 0

[Function] (1) Specifies the amount of space to be provided on the right side of a character to [n×basic calculated pitch] inches.

(2) If the character width-scaling factor of the character exceeds 2, the right-side spacing will increase based on the scaling factor.

(3) This command does not affect kanji characters.

(4) Right-side spacing can be set up separately for standard mode and page mode.

(5) The basic calculated pitch is set up using the Set horizontal and vertical motion unit (GS P).
In addition, the specified right-side spacing will not be changed even if the basic calculated pitch is changed using the Set horizontal and vertical motion unit (GS P) after the right-side spacing has been setup.

(6) If the calculation result contains a fraction, the value is corrected using the minimum pitch of the mechanism. The remainder is then discarded.

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

(8) In page mode, the operations given below are executed based on the starting point:
a. The print position is moved in the paper feed direction if the starting point has been specified as upper left or lower right using the Select print direction in page mode command (ESC T). At this time, the vertical motion unit (x) is used.
b. If the starting point has been specified as upper right or lower left using the Select print direction in page mode command (ESC T), the print position is moved in a direction perpendicular to the paper feed direction. At this time, the horizontal motion unit (y) is used.

(9) The maximum specifiable right-side spacing is about 31.875 mm (255/203 inches). The specified value beyond the maximum one is rounded down to the maximum value.

ESC ! n

[Designation] Select print mode(s)

[Format] 1BH, 21H, n

[Valid limits] 0≤n≤255

[Initial value] n = 0

[Function] (1) Batch-specifies print mode.

(2) The table below lists the bit definitions:

Bit	Function	Value	
		0	1
0	Character font	Font A is selected.	Font B/C is selected.
1	To be defined	—	—
2	To be defined	—	—
3	Emphasized printing	Cancel	Specify
4	Double character height	Cancel	Specify
5	Double character width	Cancel	Specify
6	To be defined	—	—
7	Underline	Cancel	Specify

(3) If both a double character height (bit 4 = 1) and a double character width (bit 5 = 1) are simultaneously specified, the character size quadruples.

(4) If underlining is specified, an entire character position, including the character's space specified by the Set right-side character spacing(ESC SP), is underlined. However, apparent space, which is generated using a horizontal tab, is not underlined. In addition, turn 90°clockwise rotation mode ON (ESC V) are not underlined.

(5) The thickness of the underline is not related to the character. The thickness specified using the Turn underline mode on/off command (ESC -) is used.

(6) The character base lines are justified if characters with different character height scaling factors are present on the same line.

(7) Also, emphasized printing can be specified using the Turn emphasis mode on/off command (ESC E). However, the most recently executed command is valid.

(8) Also, underlining can be specified using the Turn underline mode on/off (ESC -) command. However, the most recently specified type is valid.

(9) Also, the character size can be specified using the Set character size command (GS !). However, the most recently executed command is valid.

(10) The table below lists the font selections

Bit0	Font	ANK size
0	A	12×24 bits
1 (FONT B = MODE1)	C	8×16 bits
1 (FONT B = MODE2)	B	9×24 bits

(11) When characters are enlarged horizontally, the characters are enlarged to the right relative to the left edge of character space.

(12) In case of FONT A and FONT B
The underlined data is positioned on the 25th dot.
In case of FONT A and FONT C
The underlined data is positioned on the 17th dot.

ESC % n

[Designation] Select / cancel user-defined character set

[Format] 1BH, 25H, n

[Valid limits] 0 ≤ n ≤ 255

[Initial value] n = 0

[Function] (1) Specifies or cancels a user-defined character set.

(2) The table below lists the bit definitions:

Bit	Function	Value	
		0	1
0	User-defined character set	Cancel	Specify
1	To be defined	—	—
2	To be defined	—	—
3	To be defined	—	—
4	To be defined	—	—
5	To be defined	—	—
6	To be defined	—	—
7	To be defined	—	—

(3) Only the lowest-order bit of parameter n is valid.

(4) If a user-defined character set is canceled, the internal character set is specified automatically.

(5) Define user-defined character set (ESC &) and Define user-defined bit image (GS *) can be defined at the same time.

ESC & y c1 c2 [xld1 d(y×x1)]
[xkd1d (y×xk)]

[Designation] Define user-defined characters

[Format] 1BH, 26H, y, c1, c2, [xld1.... d (y×x1)].... [xkd1 .... d (y×xk)]

[Valid limits] y = 3 (font A,B)
y = 2 (font C)
32≤ c1 ≤ c2 ≤ 126
0 ≤ x ≤ 12 (font A)
0 ≤ x ≤ 10 (font B)
0 ≤ x ≤ 8 (font C)
0 ≤ d1 …. d (y× x×k) ≤ 255

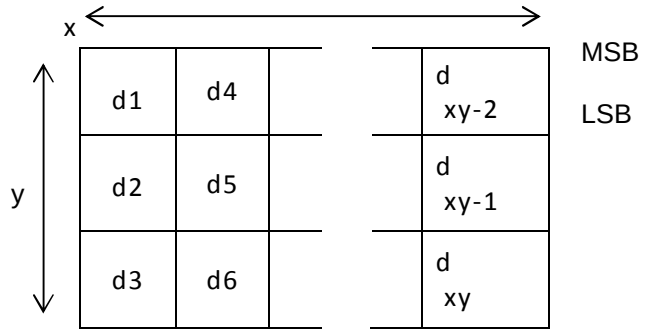
[Initial value] Same patterns as in the internal character set

[Function] (1) A specified character code is user-defined as a character.

(2) y is the number of bytes counted vertically and is fixed at 3.

(3) c1 is a definition start character code. c2 is a definition end character code.

(4) x is the number of definition dots defined horizontally.



(5) Definable character codes range from 20 H to 7EH in ASCII code.

(6) One sequence of the command can define two or more characters having consecutive character codes. If only one character is to be defined,c1 = c2 must be satisfied.

(7) d is definition data. It represents a pattern with horizontal "x" dots from the left end. If "x" is less than the number of character configuration dots, any dots left unused to the right are substituted by spaces.

(8) The data quantity required to user-define one character is "y×x" bytes.

ESC - n

[Designation] Turn underline mode on/off

[Format] 1BH, 2DH, n

[Valid limits] 0 ≤ n ≤ 2, 48 ≤ n ≤ 50

[Initial value] n = 0

[Function] (1) Selects or cancels an underline mode.

N	Function
0, 48	Cancel an underline mode.
1, 49	Set up the 1-dot wide underline mode and specify underlining.
2, 50	Set up the 2-dot side underline mode and specify underlining.

(2) If underlining is specified, an entire character position, including the character's space defined by the Set right-side character spacing (ESC SP), is underlined. However, apparent space, generated using a horizontal tab, is not underlined.

(3) Turn 90°clockwise rotation mode ON (ESC V command) and Turn white/black reverse printing mode ON (GS B command) are not underlined.

(4) If underlining is canceled using n = 0 or n = 48, the subsequent data is not underlined. However, the current underline width setting is preserved A one-dot underline width is initially selected.

(5) The underline width is not related to the character size. The underline width is consistent with the specified thickness.

(6) Also, underlining can be selected and canceled using the Select print mode (ESC !) command. However, the most recently issued command is valid. If ESC - is executed to cancel underlining after underlining is specified using ESC !, the specification of the previous command (ESC !) is canceled.

(7) This command does not affect kanji characters.

(8) The table below indicates dot locations.

	FONT A/B	FONT C
1-dot width	On the 25th dot	On the 17th dot
2-dot width	On the 25th and 26th dots	On the 17th and 18th dots

ESC ? n

[Designation] Cancel user-defined characters

[Format] 1BH, 3FH, n

[Valid limits] 32≤ n ≤ 126

[Initial value] ---

[Function] (1) Erases a character user-defined for a specified code.

(2) n is a character code corresponding to a definition pattern to be deleted. Once the definition pattern is deleted, the same pattern as for the internal corresponding character is printed.

(3) The specified code definition pattern of the character font selected using the Select print mode(s) (ESC !) in print mode is deleted.

(4) If a specified character code has not been defined, this command is ignored.

ESC E n

[Designation] Turn emphasized mode on/off

[Format] 1BH, 45H, n

[Valid limits] 0 ≤ n ≤ 255

[Initial value] n = 0

[Function] (1) Specifies or cancels emphasized printing.

(2) The table below lists the bit definitions:

Bit	Function	Value	
		0	1
0	Emphasized printing	Cancel	Specify
1	To be defined	—	—
2	To be defined	—	—
3	To be defined	—	—
4	To be defined	—	—
5	To be defined	—	—
6	To be defined	—	—
7	To be defined	—	—

(3) For parameter n, only the lowest-order bit is valid.

(4) Also, emphasized printing can be specified using the Select print mode (ESC !). However, the most recently executed command is valid.

ESC G n

[Designation] Turn double-strike mode on/off

[Format] 1BH, 47H, n

[Valid limits] 0 ≤ n ≤ 255

[Initial value] n = 0

[Function] (1) Specifies or cancels double-strike printing.

(2) The table below lists the bit definitions:

Bit	Function	Value	
		0	1
0	Double-strike printing	Cancel	Specify
1	To be defined	—	—
2	To be defined	—	—
3	To be defined	—	—
4	To be defined	—	—
5	To be defined	—	—
6	To be defined	—	—
7	To be defined	—	—

(3) For parameter n, only the lowest-order bit is valid.

(4) Double-strike printing cannot be done using this printer.
The result is the same as emphasized printing.

ESC M n

[Designation] Select character fonts

[Format] 1BH, 4DH, n

[Valid limits 0 ≤ n ≤ 2, 48 ≤ n ≤ 50, 128 ≤ n ≤ 130, 176 ≤ n ≤ 178

[Initial value] n = 0

[Function] (1) Selects a character font.

(2) The table below lists the parameter definitions.

n	Function
0, 48	Selects font A (12×24).
1, 49	Selects font B (MODE1) (10×24)
	Selects font B (MODE2) (9×24)
2, 50	Selects font C (8×16).
128, 176	Selects Extension font A (12×24).
129, 177	Selects Extension font B (MODE1) (10×24)
	Selects Extension font B (MODE2) (9×24)
130, 178	Selects font C (8×16).

(3) Although an appropriate font can be selected by collectively specifying the printing mode (ESC !), the last processed command settings are valid.

(4) The letter face of the extension font is bigger than the letter face of a standard font. (The body face is the same.)

ESC R n

[Designation] Select an international character set

[Format] 1BH, 52H, n

[Valid limits] 0 ≤ n ≤ 15

[Initial value] n = 0

[Function] (1) Selects the international character set as listed in the table below:

Parameter / Code	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
n=0 (USA)	#	$	@	[	\	]	^	`	{	|	}	~
n=1 (France)	#	$	à	°	ç	§	^	`	é	ù	è	¨
n=2 (Germany)	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	β
n=3 (United Kingdom)	£	$	@	[	\	]	^	`	{	|	}	~
n=4 (Denmark)	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
n=5 (Sweden)	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
n=6 (Italy)	#	$	@	°	\	é	^	ù	ä	ò	è	ì
n=7 (Spanish)	Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
n=8 (Japan)	#	$	@	[	¥	]	^	`	{	|	}	~
n=9 (Norway)	#	¤	É	Æ	Ø	Å	Ü	É	æ	ø	å	ü
n=10(Denmark)	#	$	É	Æ	Ø	Å	Ü	É	æ	ø	å	ü
n=11(Spanish)	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
n=12(Latin America)	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú
n=13(Korea)	#	$	@	[	₩	]	^	`	{	|	}	~
n=14(Slovenia/ Croatia)	#	$	Ž	Š	Đ	Ć	Č	ž	š	đ	ć	č
n=15(China)	#	¥	@	[	\	]	^	`	{	|	}	~

Note: The above table is different from actual printing character.

ESC V n

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

[Format] 1BH, 56H, n

[Valid limits] 0 ≤ n ≤ 1, 48 ≤ n ≤ 49

[Initial value] n = 0

[Function] (1) Selects/cancels 90-degree clockwise rotation of characters.

(2) Parameter n is defined as listed below.

n	Function
0, 48	Cancels 90-degree clockwise rotation of characters.
1, 49	Specifies 90-degree clockwise rotation of characters.
2,50	

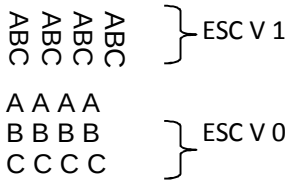
(3) Even when underlining is specified (ESC !, ESC -, FS -), characters are not underlined if 90-degree clockwise rotation is specified for them.

(4) When 90-degree clockwise rotation of characters is specified, the directions of their double-width expansion and double-height expansion are the reverses of those when 90-degree clockwise rotation of characters is canceled.

(5) The setting of this command has no effect in page mode.

(6) When page mode is selected, entering this command only manipulates the internal flags of the printer.

(7) When characters rotated 90 degrees clockwise are printed, the line and character spacing's of these characters are specified using the Set right-side character spacing (ESC SP) and line spacing commands, respectively.



ESC t n

[Designation] Select character code table

[Format] 1BH, 74H, n

[Valid limits] 0 ≤ n ≤ 5, 16 ≤ n ≤ 19, n = 8,26,40,254,255, 249 ≤ n ≤ 253

[Initial value] n = 0

[Function] (1) Selects page n of the character code table.

(2) Parameter n is defined as listed below.

n	Function
0	PC437 (USA: Standard Europe)
1	Katakana
2	PC850 (Multilingual)
3	PC860 (Portuguese)
4	PC863 (Canadian-French)
5	PC865 (Nordic)
16	WPC1252
17	PC866
18	PC852(Latin2)
19	PC858(Euro)
254	MIK
255	Blank page
8	PC857(Turkish)
26	Thai code 18
40	PC864(Arabic without BOX DRAWINGS below 20)
249	PC851(Greece – obsolete)
250	PC869(Greece)
251	ISO8859-2(1999 Latin Alphabet No.2)
252	ISO8859-7(1987 Latin Greek Alphabet)
253	PC866 Type2

ESC { n

[Designation] Turn upside-down printing mode on/off

[Format] 1BH, 7BH, n

[Valid limits] 0 ≤ n ≤ 255

[Initial value] n = 0

[Function] (1) Specifies or cancels inverted printing.

(2) Each bit of parameter n is defined as listed below.

Bit	Function	Value	
		0	1
0	Upside-down printing	Cancel	Specify
1	To be defined	—	—
2	To be defined	—	—
3	To be defined	—	—
4	To be defined	—	—
5	To be defined	—	—
6	To be defined	—	—
7	To be defined	—	—

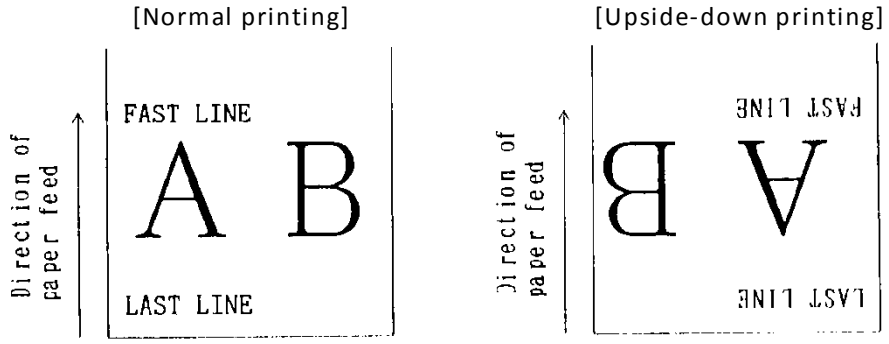
(3) For parameter n, only the lowest-order bit is valid.

(4) When standard mode is selected, this command is valid only when entered at the beginning of a line.

(5) When page mode is selected, entering this command only manipulates the internal flags of the printer.

(6) The setting of this command has no effect in page mode.

(7) In inverted printing, characters are printed upside down. However, the sequence of print lines is not inverted.



GS ! n

[Designation] Set character size

[Format] 1DH, 21H, n

[Valid limits] 0 ≤ n ≤ 255
1 ≤ Character height scaling factor ≤ 8
1 ≤ Character width scaling factor ≤ 8

[Initial value] n = 0

[Function] (1) Specifies the character size (character height scaling factor/character width scaling factor).

Bit	Function	Value	
		0	1
0	Character height scaling factor	See Table 2	
1			
2			
3			
4	Character width scaling factor	See Table 1	
5			
6			
7			

[Table 1]

b7	b6	b5	B4	
0	0	0	0	1 time (standard)
0	0	0	1	2 times (double character width)
0	0	1	0	3 times
0	0	1	1	4 times
0	1	0	0	5 times
0	1	0	1	6 times
0	1	1	0	7 times
0	1	1	1	8 times

[Table 2]

b3	b2	b1	b0	
0	0	0	0	1 time (standard)
0	0	0	1	2 times (double character height)
0	0	1	0	3 times
0	0	1	1	4 times
0	1	0	0	5 times
0	1	0	1	6 times
0	1	1	0	7 times
0	1	1	1	8 times

(2) When b7 or b3 is 1, the command becomes invalid.

(3) Except for HRI characters, this command is valid for all characters (ANK characters and kanji characters).

(4) This command is ignored if the character height scaling factor or character width scaling factor is outside the definition area.

(5) In standard mode, vertical is the paper feed direction. Horizontal is the direction perpendicular to the paper feed direction. Therefore, when 90-degree clockwise rotation of characters is specified, the relationship between vertical and horizontal for the characters is reversed.

(6) In page mode, vertical is the vertical direction for the characters. Horizontal is the horizontal direction for the characters.

(7) If characters with different character-height scaling factors are present on the same line, the characters are enlarged and disposed so as to be set on the base line (the line positioned on the 21st dot).

(8) Double character width and double character height can be specified using the Select print mode (ESC !). However, the most recently executed command is valid.

(9) When characters are enlarged horizontally, the characters are enlarged to the right relative to the left edge of character space.

GS B n

[Designation] Turn white/black reverse printing mode on/off

[Format] 1DH, 42H, n

[Valid limits] 0 ≤ n ≤ 255

[Initial value] n = 0

[Function] (1) Turns reverse printing mode on/off.

(2) The table below lists the bit definitions:

Bit	Function	Value	
		0	1
0	White/black reverse printing	Cancel	Specify
1	To be defined	—	—
2	To be defined	—	—
3	To be defined	—	—
4	To be defined	—	—
5	To be defined	—	—
6	To be defined	—	—
7	To be defined	—	—

(3) For parameter n, only the lowest-order bit is valid.

(4) Internal characters and user-defined characters are subject to reverse printing.

(5) The spacing on the right side of characters specified using the Set right-side character spacing command (ESC SP) are also subject to reverse printing.

(6) This command does not affect the spaces between lines.

(7) The reverse printing specification has priority over the underline specification. Therefore, even if underlining is specified, underlines will not be added for characters for which reverse printing has been specified. The underline status is not changed.

(8) This command is also applicable to external kanji characters.

GS b n

[Designation] Select/cancel smoothing

[Format] 1DH, 62H, n

[Valid limits] 0 ≤ n ≤ 255

[Initial value] n = 0

[Function] (1) Turns smoothing mode on/off.

Bit	Function	Value	
		0	1
0	Smoothing	Cancel	Specify
1	Smoothing Mode	Mode1	Mode2
2	To be defined	—	—
3	To be defined	—	—
4	To be defined	—	—
5	To be defined	—	—
6	To be defined	—	—
7	To be defined	—	—

(2) For parameter n, only the 0bit/1bit is valid.

(3) Internal characters and user-defined characters are subject to smoothing.

(4) Even if smoothing is specified, smoothing is not performed if the character height scaling factor or character width scaling factor is single.

(5) This command is also applicable to external kanji characters.

(6) As for Mode2, the smoothing processing is done more beautifully than Mode1.

Commands related to the print position

HT

[Designation] Horizontal tab

[Format] 09 H

[Valid limits] ---

[Initial value] ---

[Function] (1) Moves the print position to the next horizontal tab position.

(2) This command is ignored if there is no tab position ahead.

(3) If the next tab position is beyond the end of the print area, the print position is set to: "print area width + 1"

(4) Horizontal tab positions are specified using the Set horizontal tab position (ESC D) command.

(5) If the print position is at "print area width + 1", this command prints the contents of the buffer of the current line and processes the horizontal tab position starting from the beginning of the next line.

(6) Horizontal tab positions are initially set at every 8 characters of an initially selected character size.

ESC $ nL nH

[Designation] Set absolute print position

[Format] 1BH, 24H, nL, nH

[Valid limits] 0 ≤ nL ≤ 255
0 ≤ nH ≤ 255

[Initial value] ---

[Function] (1) Specifies the next print start position using the absolute print position relative to the left margin position.

(2) The position moved [(nL+nH×256)×basic calculated pitch] inches from the left margin position is the next print start position.

(3) A position specified out of the print area is ignored.

(4) The basic calculated pitch is set up using the Set horizontal and vertical motion unit (GS P).

(5) If the calculation result contains a fraction, the value is corrected using the minimum pitch of the mechanism. The remainder is then discarded.

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

(7) In page mode, the operations given below are executed based on the starting point:

a. The print position is moved in the paper feed direction if the starting point has been specified as upper left or lower right using the Select print direction in page mode command (ESC T). At this time, the vertical motion unit (x) is used.

b. The print position is moved in a direction perpendicular to the paper feed direction if the starting point has been specified as upper right or lower left using the Select print direction in page mode command (ESC T). At this time, the horizontal motion unit (y) is used.

ESC D n1~nk NULL

[Designation] Set horizontal tab positions

[Format] 1BH, 44H, n1 ~ nk, 00H (k ≠ 0)

k bytes

Or 1BH, 44H, 00H (k = 0)

[Valid limits] 0 ≤ k ≤ 32
1 ≤ data ≤ 255

[Initial value] Every eight characters where font A (12 × 24) is selected and the right-side spacing amount of the characters is 0 (character position 9, 17, 25, ...).

[Function] (1) Sets up horizontal tab positions.

(2) Parameter n indicates the left margin or the number of positions from the beginning of the line to the position setting.

(3) Parameter k indicates the number of horizontal tab position data items to be set.

(4) The horizontal tab position is set to [n×character width] counted from the beginning of a line. The character width here includes the space defined by the Set right-side character spacing (ESC SP). This space is doubled if a double character width is specified.

(5) Executing this command resets previously set horizontal tab positions.

(6) If n = 8 is specified for horizontal tab positions, executing the Horizontal tab (HT) command shifts the print position to character position 9.

```
   1       2       3
12345678901234567890123456789 0
  ▲       ▲       ▲      ←print position
```

(7) Up to 32 horizontal tab positions can be set up (k = 32). If k is greater than 32, the excessive data is processed as ordinary data.

(8) Horizontal tab position (from n1 to nk) must be entered in as sending order and followed by 00H. If a newly entered data is not larger than the previous data, the position setting of the horizontal tab is terminated immediately. Also, the new data is processed as ordinary data.

(9) To reset all horizontal tap positions, use ESC D NULL.

(10) Once the position setting of the horizontal tab is set, changing the character width does not affect the tab settings.

(11) If the Kanji character mode (FS &) is specified, the horizontal tab positions are set up in ANK pitch units.

(12) If parameter n exceeds the printable area, the horizontal tab position is set to the maximum number of print positions + 1.

(13) "Horizontal tab positions" at the time of the 90 degrees turn of the standard mode

[n x character Height] + [right-side character spacing (ESC SP)] x [cross direction magnification].

The height of the character.
Font A - 24
Font B - 24
Font C - 16

ESC T n

[Designation] Select print direction in page mode

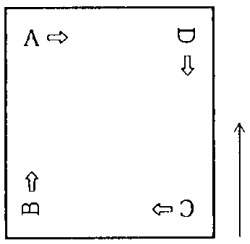
[Format] 1BH, 54H, n

[Valid limits] $0 \le n \le 3$, $48 \le n \le 51$

[Initial value] n = 0

[Function] (1) Selects the print direction in page mode and the starting point.

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



(2) When standard mode is selected, entering this command manipulates only the internal flags of the printer.
In this case, the command does not affect printing in standard mode.

(3) Character expansion is started at the starting point in the print area specified using the Set printing area in page mode command (ESC W).

(4) The motion unit (x or y) used in the commands given below depends on the starting point:

a. If the starting point is upper left or lower right

(a) Commands that use x

Set right-side character spacing (ESC SP)
Set absolute print position (ESC $)
Set relative print position (ESC \)

(b) Commands that use y

Set line spacing (ESC 3)
Print and feed paper (ESC J)
Set absolute position for character direction in page mode (GS $)
Set relative position for character direction in page mode (GS \)

b. If the starting point is upper right or lower left

(a) Commands that use x

Set line spacing (ESC 3)
Print and feed paper (ESC J)
Set absolute position for character direction in page mode (GS $)
Set relative position for character direction in page mode (GS \)

(b) Commands that use y

Set right-side character spacing (ESC SP)
Set absolute print position (ESC $)
Set relative print position (ESC \)

ESC W xL xH yL yH dxL dxH dyL dyH

[Designation] Set printing area in page mode

[Format] 1BH, 57H, xL, xH, yL, yH, dxL, dxH, dyL, dyH

[Valid limits] 0 ≤ xL, xH, yL, yH, dxL, dxH, dyL, dyH ≤ 255
This does not apply for dxL = dxH = 0 or dyL = dyH = 0.

[Initial value]

Horizontal :

Paper width is 80mm 48 column
: xL = xH = 0,dxL = 40H, dxH = 02H

Paper width is 80mm 42 column
: xL = xH = 0,dxL = 00H, dxH = 02H

Paper width is 58mm 35 column
: xL = xH = 0,dxL = A4H, dxH = 01H

Paper width is 58mm 32 column
: xL = xH = 0,dxL = 80H, dxH = 01H

Vertical

Color: MONO
: yL = yH = 0, dxL = C4H, dxH = 05H

Color: 2 Color
: yL = yH = 0 ,dxL = C4H, dxH = 05H

[Function] (1) Sets the position and size of the print area.
Horizontal starting point: [(xL+xH×256)×basic calculated pitch] inches
Vertical starting point: [(yL+yH×256)×basic calculated pitch]inches
Horizontal length: [(dxL+dxH×256)×basic calculated pitch]inches
Vertical length: [(dyL +dyH×256)×basic calculated pitch] inches

(2) When standard mode is selected, entering this command manipulates only the internal flags of the printer.
In this case, the command does not affect printing in standard mode.

(3) Command processing is canceled if the horizontal or vertical starting point is outside the printable area. The next data is then processed as normal data.

(4) Command processing is canceled if the horizontal or vertical length is 0. The next data is then processed as normal data.

(5) Character expansion is started in the print area at the starting point specified using the Select print direction in page mode command (ESC T).

(6) If the (horizontal starting point + horizontal length) exceeds the printable area horizontally, the (printable area horizontally- horizontal starting point) is used as the horizontal length.

(7) If the (vertical starting point + vertical length) exceeds the printable area vertically, the (printable area vertically - vertical starting point) is used as the vertical length.

(8) The basic calculated pitch is set up using the Set horizontal and vertical motion unit (GS P).
In addition, the specified printable area will not be changed even if the basic calculated pitch is changed using the Set horizontal and vertical motion unit (GS P) after the printable area has been set up.

(9) If the calculation result contains a fraction, the value is corrected using the minimum pitch of the mechanism. The remainder is then discarded.

(10) The motion unit (x) is used for the basic pitch of the horizontal starting point and horizontal length. The motion unit (y) is used for the basic pitch of the vertical starting point and vertical length.

(11) The maximum value of the vertical direction length.
Color: MONO
: dxL = FCH, dxH = 0CH
Color: 2 Color
: dxL = 06H, dxH = 0CH

ESC \ nL nH

[Designation] Set relative print position

[Format] 1BH, 5CH, nL, nH

[Valid limits] 0 ≤ nL ≤ 255
0 ≤ nH ≤ 255

[Initial value] ---

[Function] (1) Specifies the next print start position using the print position relative to the current position, which is the origin.

(2) The position moved [(nL+nH×256)×basic calculated pitch] inches from the current position is the next print start position.

(3) A position specified out of the print area is ignored.

(4) A positive number is used to specify a position to the right of the current print position. A negative number is used to specify a position to the left of the current print position.

(5) Negative numbers are displayed as complements of 65536.
For example, for N-pitch movement to the left,
nL+nH×256=65536 - N.

(6) The basic calculated pitch is set up using the Set horizontal and vertical motion unit (GS P).

(7) If the calculation result contains a fraction, the value is corrected N using the minimum pitch of the mechanism. The remainder is then discarded.

(8) In standard mode, the horizontal basic calculated pitch is used.

(9) In page mode, the operations given below are executed based on the starting point:

a. The print position is moved in the paper feed direction if the starting point has been specified as upper left or lower right using the Select print direction in page mode command (ESC T).
At this time, the vertical motion unit (x) is used.

b. The print position is moved in a direction perpendicular to the paper feed direction if the starting point has been specified as upper right or lower left using the Select print direction in page mode command (ESC T). At this time, the horizontal motion unit (y) is used.

ESC a n

[Designation] Select justification

[Format] 1BH, 61H, n

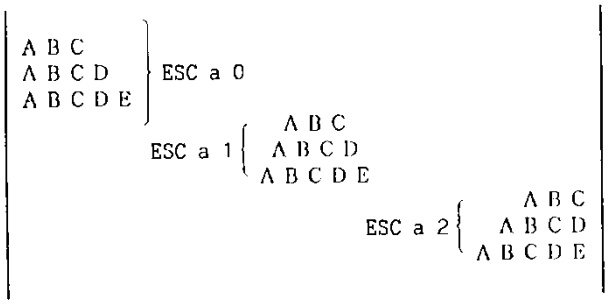
[Valid limits] $0 \le n \le 2$, $48 \le n \le 50$

[Initial value] n = 0

[Function] (1) Justifies all print data on a line to the specified position.

(2) Available types of position alignment are as listed below:

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



(3) When standard mode is selected, this command is valid only when entered at the beginning of a line.

(4) When page mode is selected, entering this command manipulates only the internal flags of the printer.

(5) The command does not affect page mode.

(6) The command justifies the positions within the specified print area width.

(7) Portions skipped using the following commands are included in targets of Positioned alignment.

a. Horizontal tab (HT)
b. Set absolute print position (ESC $)
c. Set relative print position (ESC \)

GS $ nL nH

[Designation] Set absolute position for character direction in page mode

[Format] 1DH, 24H, nL, nH

[Valid limits] 0 ≤ nL ≤ 255
0 ≤ nH ≤ 255

[Initial value] ---

[Function] (1) Specifies the position of characters vertically at the data expansion start position in page mode using the print position as the starting point, which is the absolute position.

(2) The position moved [(nL+nH×256)×basic calculated pitch] inches from the starting point is the position of the vertical character of the next data expansion start position.

(3) This command is ignored if page mode is not selected.

(4) Absolute print positions that exceed the specified print area are ignored.

(5) The positions of horizontal characters of data expansion start positions are not moved.

(6) The ESC T command is used to specify the starting point used for reference.

(7) The operations given below are executed based on the starting point specified using the Select print direction in page mode command (ESC T):
a. If the starting point has been specified as upper left or lower right, the absolute print position in the paper feed direction is specified.
At this time, the vertical motion unit (y) is used.
b. If the starting point has been specified as upper right or lower left, the absolute print position perpendicular to the paper feed direction is specified.
At this time, the horizontal motion unit (x) is used.

(8) The basic calculated pitch is set up using the Set horizontal and vertical motion unit (GS P).

(9) If the calculation result contains a fraction, the value is corrected using the minimum pitch of the mechanism. The remainder is then discarded.

GS L nL nH

[Designation] Set left margin

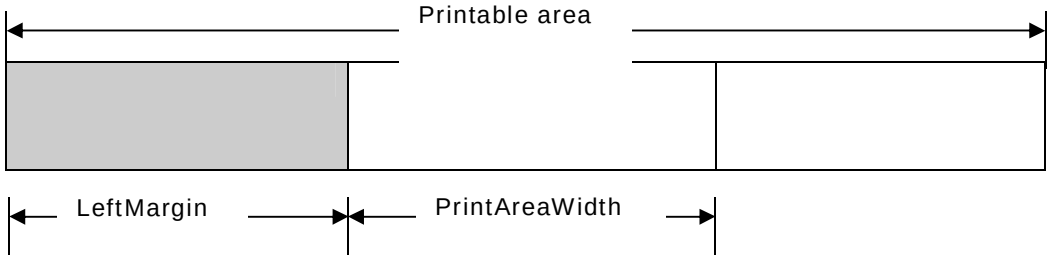
[Format] 1DH, 4CH, nL, nH

[Valid limits] 0 ≤ nL ≤ 255
0 ≤ nH ≤ 255

[Initial value] nL = 0, nH =0

[Function] (1) Sets up the left margin specified using nL and nH.

(2) The left margin is [(nL+nH×256)×basic calculated pitch] inches.



(3) This command is valid only when entered at the beginning of the line.

(4) When page mode is selected, entering this command manipulates only the internal flags of the printer.

(5) The command does not affect page mode.

(6) The maximum specifiable left margin is the same size as the printable area in the horizontal direction. If the maximum value is exceeded, the value will be rounded off to the maximum value.

(7) The basic calculated pitch is set up using the Set horizontal and vertical motion unit (GS P).
In addition, the specified left margin will not be changed even if the basic calculated pitch is changed using the Set horizontal and vertical motion unit (GS P) after the left margin has been set up.

(8) The horizontal motion unit (x) of the Set horizontal and vertical motion unit (GS P) is used for calculating the left margin.

(9) If the calculation result contains a fraction, the value is corrected using the minimum pitch of the mechanism. The remainder is then discarded.

(10) If the specified print area width is less than the amount for one character of the character width currently specified, the processing given below is executed for that line. This applies when character data is expanded.

a. The print area is enlarged to the right up to an amount equivalent to one character of the specified character type. The print area is enlarged in the range where the print area width is not exceeded.
b. If the processing operation in a. above cannot allocate area equivalent to one character, the print area is enlarged to the left.
(The left margin is reduced.)

(11) If the specified print area width is less than nine dots, the processing given below is executed for that line. This applies when non-character data (bit images, user-defined bit images, and bar codes) is expanded.

a. The print area is enlarged up to nine dots in the range where the print area width is not exceeded.
b. If the processing operation in a. above cannot allocate area up to nine dots, the print area is enlarged to the left. (The left margin is reduced.)

GS W nL nH

[Designation] Set printing area width

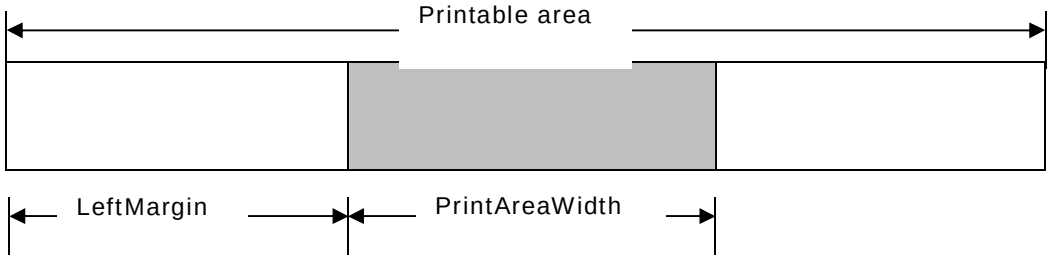
[Format] 1DH, 57H, nL, nH

[Valid limits] 0 ≤ nL ≤ 255
0 ≤ nH ≤ 255

[Initial value]
Paper width is 80mm 48 column
: nl = 40H , nH = 02H
Paper width is 80mm 42 column
: nl = 00H , nH = 02H
Paper width is 58mm 35 column
: nl = A4H , nH = 01H
Paper width is 58mm 32 column
: nl = 80H , nH = 01H

[Function] (1) Sets up the print area width specified using nL and nH.

(2) The print area width is [(nL+nH×256)×basic calculated pitch] inches.



(3) This command is valid only when entered at the beginning of the line.

(4) When page mode is selected, entering this command manipulates only the internal flags of the printer.

(5) The command does not affect page mode.

(6) If a value exceeding the printable area of one line is entered, the entire area excluding the left margin is set up as the print area width.

(7) The basic calculated pitch is set up using the Set horizontal and vertical motion unit (GS P). In addition, the specified print area width will not be changed even if the basic calculated pitch is changed using the Set horizontal and vertical motion unit (GS P) after the print area width has been set up.

(8) The horizontal motion unit (x) of the Set horizontal and vertical motion unit (GS P) is used for calculating the print area width.

(9) If the calculation result contains a fraction, the value is corrected using the minimum pitch of the mechanism. The remainder is then discarded.

(10) If the print area width is smaller than the width (right space included) of the character to be expanded, the processing given below is executed for that line. This applies when the first character at the beginning of the line is expanded.

a. The print area is enlarged to the right up to the size that can accommodate the character. The print area is enlarged in the range where the print area width is not exceeded.

b. If the processing operation in a. above cannot allocate sufficient area, the print area is enlarged to the left. (The left margin is reduced.)

c. The right space is reduced if the processing operation in b. above cannot allocate sufficient area.

(11) If the print area width is smaller than the minimum horizontal width (2 dots for single density or 1 dot for double density) of the bit image, the processing given below is executed for that line. This applies when bit images (or user-defined bit images) are expanded.

a. The print area is enlarged to the right until it is equivalent to the minimum horizontal width of the bit image. The print area is enlarged in the range where the print area width is not exceeded.

b. If the processing operation in a. above cannot allocate sufficient area, the print area is enlarged to the left. (The left margin is reduced.)

GS \ nL nH

[Designation] Set relative position for character direction in page mode

[Format] 1DH, 5CH, nL, nH

[Valid limits] 0 ≤ nL ≤ 255
0 ≤ nH ≤ 255

[Initial value] ---

[Function] (1) Specifies the position of characters vertically at the data expansion start position in page mode using the print position relative to the current point, which is the origin.

(2) The position moved [(nL+nH×256)×basic calculated pitch] inches from the current position is the next data expansion start position.

(3) This command is ignored if page mode is not selected.

(4) If a position in the downward direction from the current position is specified for a character, a positive numbers (plus) will result. If a position in the upward direction is specified, a negative number (minus) will result.

(5) Negative numbers are displayed as complements of 65536.
For example, for N-pitch movement upward,
nL+nH×256=65536 - N.

(6) Relative print positions that exceed the specified print area are ignored.

(7) The operations given below are executed by the Select print direction in page mode command (ESC T):
a. If the starting point has been specified as upper left or lower right, the relative print position in the paper feed direction is specified. At this time, the vertical motion unit (y) is used.
b. If the starting point has been specified as upper right or lower left, the relative print position perpendicular to the paper feed direction is specified. At this time, the horizontal motion unit (x) is used.

(8) The basic calculated pitch is set up using the Set horizontal and vertical motion unit (GS P).

(9) If the calculation result contains a fraction, the value is corrected using the minimum pitch of the mechanism. The remainder is then discarded.
(10) For JIS notation characters, the \ symbol is equivalent to the ＼ symbol.

Commands related to bit images

ESC * m nL nH d1 ~ dk

[Designation] Select bit image mode

[Format] 1BH, 2AH, m, nL, nH, d1 ... dk

[Valid limits] m = 0, 1, 32, 33
0 ≤ nL ≤ 255
0 ≤ nH ≤ 3
0 ≤ d ≤ 255

[Initial value] Cancel

[Function] (1) Specifies the mode m bit image for the number of dots specified in nL and nH.

m	Mode	Number of vertical dots	Vertical dot density	Horizontal dot density	Number of bytes transferred
0	8-dot single density	8 dots	203/3 DPI	203/3 DPI	nL+nH×256
1	8-dot double density	8 dots	203/3	203	"
32	24-dot single density	24 dots	203	203/3	(nL+nH×256)×3
33	24-dot double density	24 dots	203	203	"

(2) If parameter m is out of the valid range, nL and all subsequent data are processed as ordinary data.

(3) The parameters nL and nH indicate the number of horizontal dots in an image to be printed. Specifically: nL+nH×256

(4) If the bit image data entered exceeds the number of dots printable on one line, the excessive data is skipped.

(5) The parameter d indicates the bit image data. In this data, a 1 bit corresponds to a dot to be printed. A 0 bit corresponds to a dot not to be printed.

(6) If the print area width specified using the Set left margin command (GS L) or Set printing area width command (GS W) is smaller than the minimum horizontal width (2 dots for single density or 1 dot for double density) of the bit image, the processing given below is executed for that line:

a. The print area is enlarged to the right until it is equivalent to the minimum horizontal width of the bit image. The print area is enlarged in the range where the print area width is not exceeded.

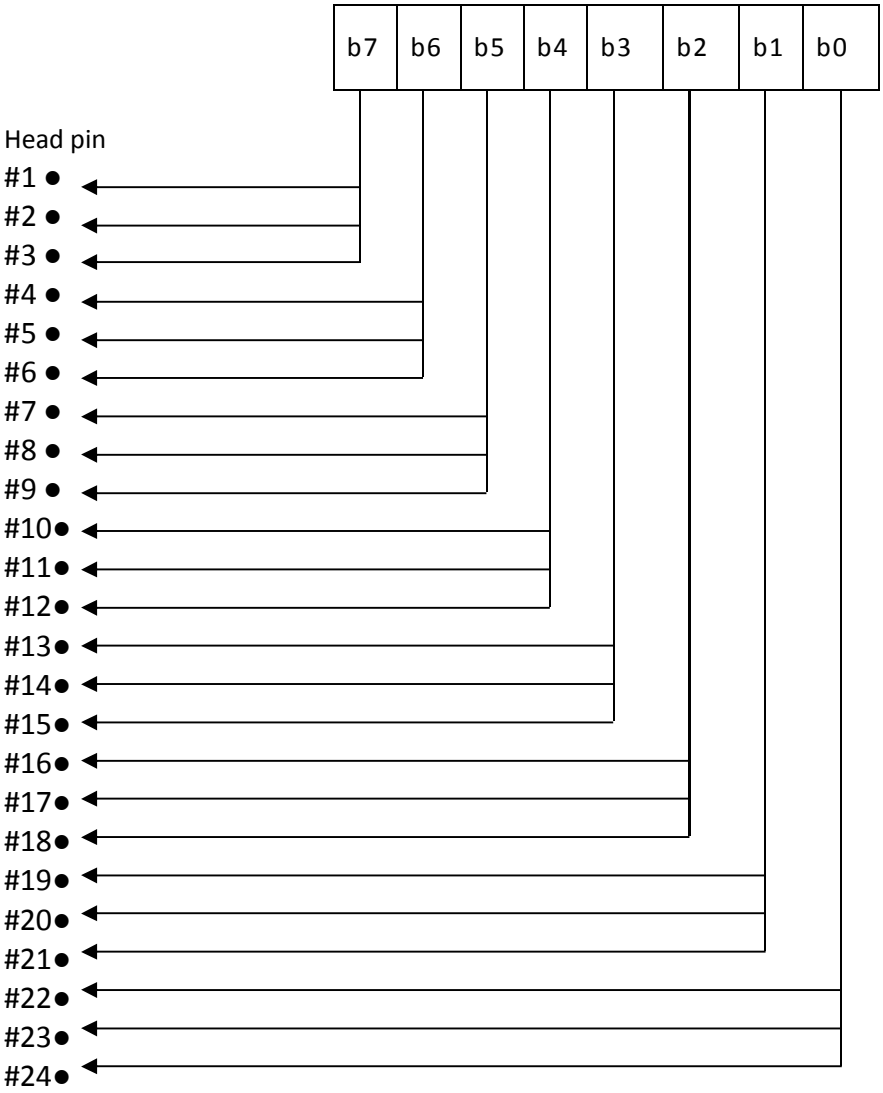
b. If the processing operation in a. above cannot allocate sufficient area, the print area is enlarged to the left. (The left margin is reduced.)

(7) Once bit image processing is completed, ordinary data processing is resumed.

(8) This command does not affect print modes (such as emphasized printing, underlining, and character size specification) other than inverted printing.

(9) The relationships between the bit image and printed data are as follows:

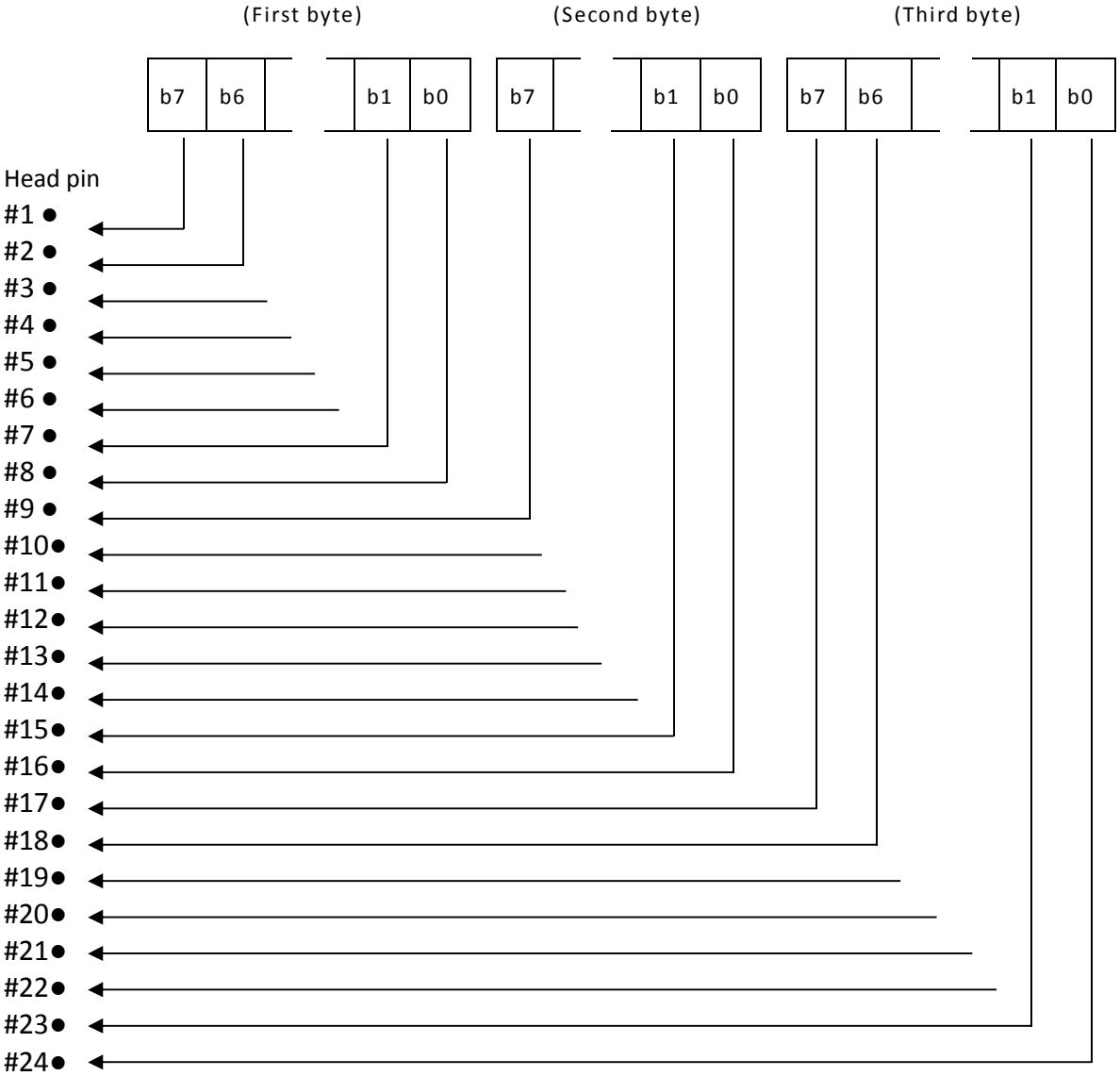
a. 8-bit image (if m = 0 or 1)



● : Pin to print

○ : Pin not to print

b. 24-dot image (if m = 32 or 33)

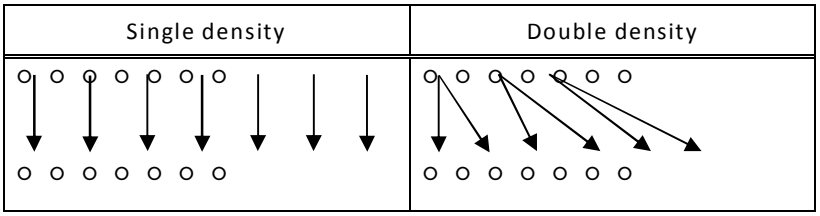


(10) The maximum number of printable character positions is as follows;

a. Paper width is 80mm and 48 column : 576
b. Paper width is 80mm and 42 column : 512
c. Paper width is 58mm and 35 column : 420
d. Paper width is 58mm and 32 column : 384

(11) This command can be used together with ANK and kanji characters.

(12) The following gives the processing of horizontal direction.



FS p n m

[Designation] Print in NV bit mode image

[Format] 1CH, 70H, n, m

[Valid limits] 1 ≤ n ≤ 255
0 ≤ m ≤ 3, 48 ≤ m ≤ 51

[Initial value] Cancel

[Function] (1) Prints NV bit image n in mode m.

m	Mode	Vertical dot density	Horizontal dot density
0, 48	Normal mode	203 DPI	203 DPI
1, 49	Double character width mode	203 DPI	101 DPI
2, 50	Double character height mode	101 DPI	203 DPI
3, 51	Quadruple size mode	101 DPI	101 DPI

(2) n specifies an NV bit image number.

(3) m specifies bit image mode.

(4) The NV bit image is such that a NV defines a non-volatile memory bit image (FS q) to enable printing by this command.

(5) This command is invalid if specified NV bit image n is undefined.

(6) With standard mode selected, this command is valid only if the print buffer contains no data.

(7) With page mode selected, this command is invalid.

(8) This command does not affect print modes (such as emphasized printing, double printing, underlining, character size specification, white/black reverse printing, and 90-degree right rotation) other than inverted (upside-down) printing.

(9) If the print area width specified using the Set left margin command (GS L) or the Set printing area command (GS W) is smaller than the minimum horizontal width in NV bit image mode, the processing given below is performed only for that line.
The minimum horizontal width is one dot for normal mode (m = 0, 48) and double character height mode (m = 2, 50), two dots for double character width mode (m = 1, 49) and quadruple size mode (m = 3, 51).

a. The print area is enlarged to the right until it is equivalent to the minimum horizontal width of the NV bit image.
b. If the processing operation in a. above cannot allocate a sufficient area, the print area is enlarged to the left. (The left margin is reduced.)

(10) If a bit images with a size exceeding the print area have been specified, data in the print area is printed, but data outside of this area is not printed.

(11) Regardless of the set initial value of line feed increments (ESC 2), and of set line feed increments (ESC 3), a paper feed by dots (corresponding to the height of NV bit image n) is executed in normal mode and double character width mode. And a paper feed by dots (corresponding to two times the height of NV bit image n) is executed in double character height mode and quadruple size mode.

(12) After termination of printing this bit image, the next character is printed at the line start, with ordinary data processing performed.

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

[Valid limits] $1 \le n \le 255$
$0 \le xL \le 255$
$0 \le xH \le 3$ where, $1 \le (xL+xH\times256) \le 1023$
$0 \le yL \le 255$
$0 \le yH \le 1$ where, $1 \le (yL+yH\times256) \le 288$
$0 \le d \le 255$
$k = (xL+xH\times256) \times (yL+yH\times256) \times 8$

[Initial value] ---

[Function] (1) Defines a specified NV bit image.

(2) n specifies the number of NV bit images to be defined.

(3) xL and xH set the width of one NV bit image at (xL + xH×256)×8 dots.

(4) yL and yH set the height of one NV bit image at (yL + yH×256)×8 dots.

(5) All defined NV bit images are erased by processing by this command. Only one of defined data pieces cannot, therefore, be redefined. In this case, all data must be resent.

(6) The NV bit image can be printed (FS p) if the non-volatile memory is defined by this command.

(7) This command is valid only when processing is performed at a line start with standard mode selected.

(8) This command is invalid with page mode selected.

(9) This command becomes valid when seven bytes of FS to yH are processed as normal values.

(10) If a number of data pieces that exceeds the left capacity of a defined area have been specified by xL, xH, yL and yH, arguments out of the defined area are processed.

(11) If an argument out of a defined area has been processed in the first NV bit image data group, this command is invalid.

(12) If an argument out of a defined area has been processed in the subsequent NV bit image data group, processing by this command is stopped, and processing for programming the non-volatile memory is started.
Although the NV bit image being defined becomes invalid (undefined), the preceding NV bit images are valid.

(13) d indicates defined data.The bit corresponding to a dot to be printed is set at "1," while the bit corresponding to a dot not defined is set at "0."

(14) n NV bit images are defined in ascending order from NV bit image number 01H.
The first data group [xL xH yL yH d1 ... dk], therefore, becomes the NV bit image with number 01H, while the last data group [xL xH yL yH d1... dk] becomes the NV bit image with number n. These numbers agree with NV bit image numbers specified for printing NV bit images (FS p).

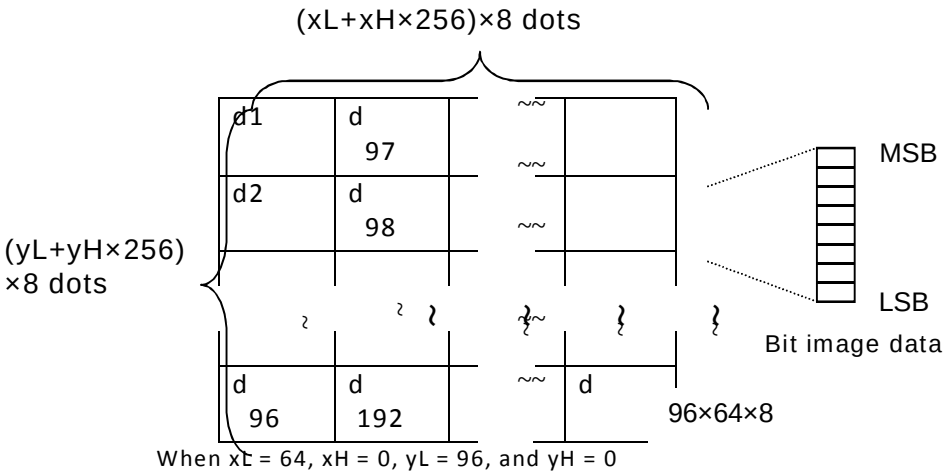
(15) Data defined for one NV bit image consists of [xL xH yL yH d1 ... dk].

(16) The defined area for this printer consists of up to 2M bits (256K bytes). More than one NV bit image can be defined. However, bit image data exceeding 2M bits (256K bytes) as the total size of all bit image data and the header cannot be defined.

(17) If this command is processed during macro definition, the macro definition is suspended, with processing of this command started.

(18) This command only defines an NV bit image, and does not support printing operation. A particular command is used to print a NV bit image (FS p).

(19) The following gives relationships between the NV bit image and printed data.



GS * x y [data] x × y × 8

[Designation] Define user-defined bit image

[Format] 1DH, 2AH, x, y, data 1 ... data x×y×8

[Valid limits] $1 \le x \le 255$
$1 \le y \le 48$
$x \times y \le 1536$
$0 \le d \le 255$

[Initial value] Clear

[Function] (1) Defines a user-definable bit image according to the number of dots specified in x and y.

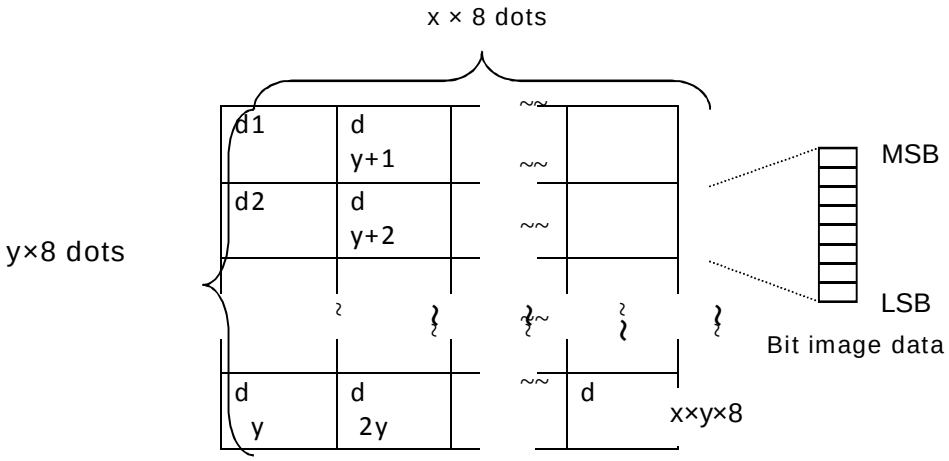
(2) The parameter x specifies the number of horizontal dots.

(3) The parameter y specifies the number of vertical bytes.

(4) The actual number of horizontal dots is determined by: x×8.
The actual number of vertical dots is determined by: y×8

(5) The parameter data indicates the bit image data. In this data, a 1 bit corresponds to a dot to be printed. A 0 bit corresponds to a dot not to be printed.

(6) The relationships between the user-defined bit image and printed data are as follows:



(7)user-defined bit image (GS *) and Define user-defined characters (ESC &) can be defined at the same time.

(8) User-defined characters (if any) are cleared when:
a. The Initialize printer (ESC @) command is executed.
b. The Define user-defined characters (ESC &) command is executed.
c. The define NV bit image (FS q) command is executed.
d. The power is switched off, or a reset signal is received.

GS / m

[Designation] Print user-defined bit image

[Format] 1DH, 2FH, m

[Valid limits] 0 ≤ m ≤ 3, 48 ≤ m ≤ 51

[Initial value] ---

[Function] (1) Prints a user-defined bit image.

(2) Parameter m specifies a print mode.

M	Mode	Vertical dot density	Horizontal dot density
0, 48	Normal mode	203 DPI	203 DPI
1, 49	Double character width mode	203 DPI	101 DPI
2, 50	Double character height mode	101 DPI	203 DPI
3, 51	Quadruple size mode	101 DPI	101 DPI

(3) This command is ignored if user-defined bit image data has not been defined.

(4) When standard mode is selected, this command is valid if there is no data in the print buffer.

(5) This command does not affect print modes (such as emphasized printing, underlining, and character size specification) other than inverted printing.

(6) If user-defined bit image data does not fit the print area, the excessive data is ignored.

(7) If the print area width specified using the Set left margin command (GS L) or Set printing area width command (GS W) is smaller than the minimum horizontal width (1 dot for normal mode and double character height mode or 2 dots for double character width mode and quadruple size mode) of the bit image, the processing given below is executed for that line:

a. The print area is enlarged to the right until it is equivalent to the minimum horizontal width of the bit image. The print area is enlarged in the range where the print area width is not exceeded.

b. If the processing operation in b. above cannot allocate sufficient area, the print area is enlarged to the left. (The left margin is reduced.)

(8) This command begins user-defined bit image printing at the left end, if only the print position is changed (without print data) by the following commands:

a. Horizontal tab (HT)

b. Set absolute print position (ESC $)

c. Set relative print position (ESC \)

GS v 0 m xL xH yL yH d1 ~ dk

[Designation] Print a raster bit image

[Format] 1DH, 76H, 30H, m, xL, xH, yL, yH, d1 to dk

[Valid limits] $0 \le m \le 3$, $48 \le m \le 51$
$0 \le xL \le 255$
$0 \le xH \le 255$
$0 \le yL \le 255$
$0 \le yH \le 8$
$0 \le d \le 255$
$k = (xL + xH \times 256) \times (yL + yH \times 256)$ where $k \neq 0$

[Initial value] ---

[Function] (1) Prints a raster bit image in mode m.

(2) m specifies print mode.

m	Mode	Vertical dot density	Horizontal dot density
0, 48	Normal mode	203 DPI	203 DPI
1, 49	Double character width mode	203 DPI	101 DPI
2, 50	Double character height mode	101 DPI	203 DPI
3, 51	Quadruple size mode	101 DPI	101 DPI

(3) xL and xH set the number of horizontal data pieces in a bit image at (xL + xH×256) bytes.

(4) yL and yH set the number of vertical data pieces in a bit image at (yL + yH×256) bytes.

(5) This command is only valid when the standard mode is selected and the print buffer contains no data.

(6) This command is valid when the page mode is selected, in a buffer data regardless of having or not to have.

(7) All print modes (such as character size specification, emphasized printing, double printing, inverted printing, underlining, and white/black reverse printing) do not affect a raster bit image.

(8) If the print area width specified using the Set left margin command (GS L) or the Set printing area width command (GS W) is smaller than the minimum horizontal width, the print area width is enlarged to the minimum horizontal width only for that line. The minimum horizontal width is one dot for normal mode (m = 0, 48) and double character height mode (m = 2, 50), and two dots for double character width mode (m = 1, 49) and quadruple size mode (m = 3, 51).

(9) Data out of a print area is discarded in units of dots.

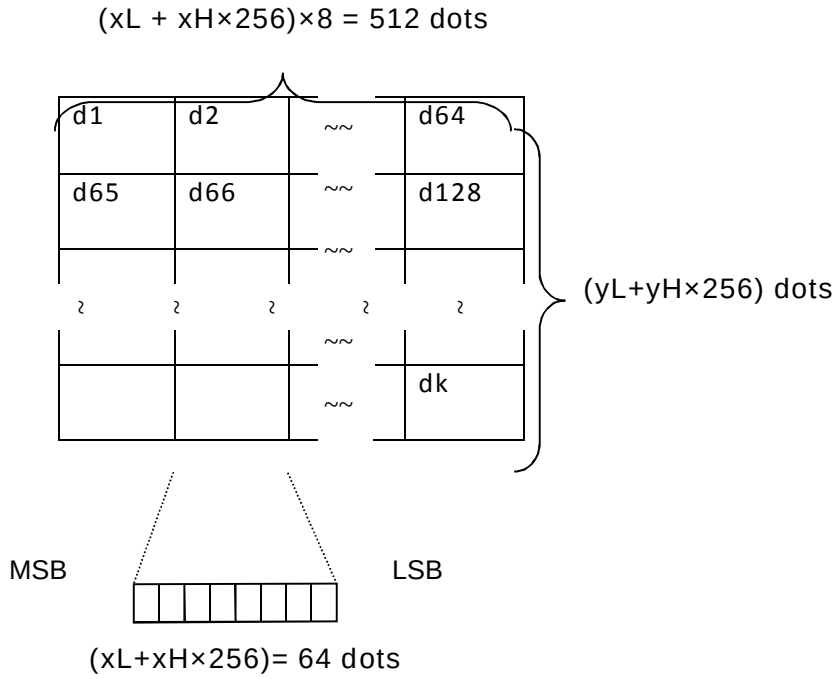
(10) The following commands enable specification of any print start position for a raster bit image.
  a. Horizontal tab (HT)
  b. Specify an absolute position (ESC $)
  c. Specify a relative position (ESC \)
  d. Set left margin command (GS L)

(11) Position arrangement (ESC a) is also applicable to a raster bit image.

(12) If this command has been executed during macro definition, the macro definition processing is stopped, and processing by this command is started. In this case, the macro is not defined.

(13) d indicates defined data.
The bit corresponding to a dot to be printed is set at "1," while the bit corresponding to a dot to be not printed is set at "0."

(14) The following gives relationships between a raster bit image and printed data.



Commands related to macro functions

GS :

[Designation] Start/end macro definition

[Format] 1DH, 3AH

[Valid limits] ---

[Initial value] Cleared

[Function] (1) Specifies to start or stop a macro definition.

(2) This command specifies to start a macro definition when entered during ordinary operation. If the command is entered when a macro definition is already started, it specifies to stop the macro definition.

(3) If an Execute macro (GS ^) command is entered when a macro is being defined, this command stops defining the macro and the macro definition being made is cleared.

(4) Initially, no macro is defined.

(5) No macro definition is cleared by the Initialize printer (ESC @) command.

(6) If this command (GS :) is entered twice consecutively, a macro becomes undefined.

(7) A macro definition can define up to 2048 bytes of data.
Data exceeding 2048 bytes cannot be defined.

(8) The Real-time status transmission (DLE EOT) command cannot be defined in a macro.

(9) In the case of the following, the macro that I defined is cleared.

a. Print a raster bit image command (GS v 0).
b. Print in NV bit mode image command (FS q).
c. Switch off the printer.
d. Reset command.

GS ^ r t m

[Designation] Execute macro.

[Format] 1DH, 5EH, r, t, m

[Valid limits] 0 ≤ r ≤ 255
0 ≤ t ≤ 255
0 ≤ m ≤ 1

[Initial value] Cleared

[Function] (1) Executes a macro definition.

(2) The parameter r specifies the number of times the macro is executed.

(3) The parameter t specifies the wait time for macro execution.

(4) The parameter m specifies a macro execution mode.

m	Function
0	The macro is executed r times at t intervals.
1	When t time elapses, an LED corresponding to the manual feed switch flashes to prompt the user to press the switch. The macro is executed once each time the manual feed switch is pressed. This is done r times.

(5) When parameter t is specified, processing is on standby for approximately (t×100 msec) after executing one macro definition.

(6) This command stops defining a macro and clears a macro definition if entered when a macro is being defined.

(7) If no macro is defined or r = 0, this command is ignored.

(8) The paper switch cannot be operated to advance the paper during macro execution with m = 1 specified.

(9) Send the (GS :) command to define a macro before and after the contents to be repeated.

Commands related to bar code

GS H n

[Designation] Select printing position for HRI character

[Format] 1DH, 48H, n

[Valid limits] 0 ≤ n ≤ 3, 48 ≤ n ≤ 51

[Initial value] n = 0

[Function] (1) Selects the print position of HRI characters when printing bar codes.

n	Print position
0, 48	Do not print HRI characters
1, 49	Print HRI characters above the bar code
2, 50	Print HRI characters below the bar code
3, 51	Print HRI characters both above and below the bar code

(2) HRI stands for Human Readable Interpretation.

(3) HRI characters are printed using the typeface selected using the Select character font for HRI characters command (GS f).

GS f n

[Designation] Select character font for HRI characters

[Format] 1DH, 66H, n

[Valid limits] n = 0, 1, 2, 48, 49, 50

[Initial value] n = 0

[Function] (1) Selects a typeface for HRI characters.

n	Typeface
0, 48	Font A
1, 49	Font B
2, 50	Font C

(2) HRI stands for Human Readable Interpretation.

(3) HRI characters are printed in the place(s) specified using the Select printing position for HRI characters (GS H) command.

GS h n

[Designation] Select bar code height

[Format] 1DH, 68H, n

[Valid limits] $1 \leq n \leq 255$

[Initial value] n = 162

[Function] (1) Sets the height of bar codes to n dots.

GS k m d1 ~ dk NULL

[Designation] Print bar code (No. 1)

[Format] 1DH, 6BH, m, d1 ~ dk 00H

[Valid limits] 0 ≤ m ≤ 6
32 ≤ d ≤ 126
1 ≤ k ≤ 255

[Initial value] ---

[Function] (1) Selects a bar code system and prints the bar code.

m	Bar code system	Number of bar code data items	Definition area of data
0	UPC-A	Fixed (11 ≤ k ≤ 12	48 ≤ data ≤ 57
1	UPC-E	Fixed (11 ≤ k ≤ 12)	48 ≤ data ≤ 57
2	JAN13(EAN)	Fixed (12 ≤ k ≤ 13)	48 ≤ data ≤ 57
3	JAN8(EAN	Fixed (7 ≤ k ≤ 8)	48 ≤ data ≤ 57
4	CODE39	Variable (1 ≤ k)	48 ≤ data ≤ 57 65 ≤ data ≤ 90 32, 36, 37, 43, 45, 46, 47
5	ITF	Variable (1 ≤ k; must be an even number)	48 ≤ data ≤ 57
6	CODABAR	Variable (1 ≤ k)	48 ≤ data ≤ 57 65 ≤ data ≤ 68 97 ≤ data ≤ 100 36, 43, 45, 46, 47, 58

(2) This command terminates in a NULL code.

(3) For UPC-A and UPC-E, the bar code is printed when 12 bytes of bar code data are entered. From the next data, the data is processed as normal data.

(4) For JAN-13, the bar code is printed when 13 bytes of bar code data are entered. From the next data, the data is processed as normal data.

(5) For JAN-8, the bar code is printed when eight bytes of bar code data are entered. From the next data, the data is processed as normal data.

(6) The number of data items of ITF bar codes must be an even number. If the number of data items is an uneven number, the last data item will be ignored.

(7) For standard mode
a. If parameter d is outside the definition area, only the paper is advanced. From the next data, the data is processed as normal data.
b. If the horizontal width of the bar code exceeds the print area of one line, only the paper is advanced. The bar code is not printed.
c. The paper is advanced for the height (including HRI characters when HRI character printing is specified) of the bar code regardless of the amount of line feed of the commands below:
(a) Select 1/6-inch line spacing (ESC 2)
(b) Set line spacing (ESC 3)
d. This command is valid only when there is no data in the print buffer.

If data is present in the print buffer, the data subsequent to parameter m is processed as normal data.

e. When bar code printing is finished, the beginning of the new line is set as the next print position.

f. Except for inverted printing, this command does not affect the print modes (emphasized printing, double-strike printing, underlining, and character size).

(8) For page mode

a. The bar code is only expanded. It is not printed. When bar code expansion is finished, the next dot of the final data of the bar code is set as the next data expansion start position.

b. If parameter d is outside the definition area, command processing is canceled. From the next data, the data is processed as normal data. The data expansion start position is not moved.

c. If the horizontal width of the bar code exceeds the print area of one line, the data expansion start position is moved to the left end outside the print area. The bar code is not printed.

(9) This command is ignored if:

a. The bar code data contains an undefined code.

GS k m n d1 ~ dn

[Designation] Print bar code (No. 2)

[Format] 1DH, 6BH, m, n, d1 ... dn

[Valid limits] 65 ≤ m ≤ 73
1 ≤ n ≤ 255
0 ≤ d ≤ 127

[Initial value] ---

[Function] (1) Selects a bar code system and prints the bar code.

m	Bar code system	Number of bar code data items	Definition area of data
65	UPC-A	Fixed (11 ≤ n ≤ 12)	48 ≤ data ≤ 57
66	UPC-E	Fixed (11 ≤ n ≤ 12)	48 ≤ data ≤ 57
67	JAN13(EAN)	Fixed (12 ≤ n ≤ 13)	48 ≤ data ≤ 57
68	JAN8(EAN	Fixed (7 ≤ n ≤ 8)	48 ≤ data ≤ 57
69	CODE39	Variable (1 ≤ n ≤ 255)	48 ≤ data ≤ 57 65 ≤ data ≤ 90 32, 36, 37, 43, 45, 46, 47
70	ITF	Variable (1≤ n ≤ 255; must be an even number)	48 ≤ data ≤ 57
71	CODABAR		48 ≤ data ≤ 57 65 ≤ data ≤ 68 97 ≤ data ≤ 100 36, 43, 45, 46, 47, 58
72	CODE93	Variable (1 ≤ n ≤ 255)	0 ≤ data ≤ 127
73	CODE128	Variable (2 ≤ n ≤ 255)	0 ≤ data ≤ 127

(2) Parameter n indicates the number of data items. From the next data, n bytes are processed as bar code data.

(3) If parameter n is outside the definition area, command processing is canceled. From the next data, the data is processed as normal data.

(4) For standard mode

a. If parameter d is outside the definition area, only the paper is advanced. From the next data, the data is processed as normal data.

b. If the horizontal width of the bar code exceeds the print area of one line, only the paper is advanced. The bar code is not printed.

c. The paper is advanced for the height (including HRI characters when HRI character printing is specified) of the bar code regardless of the amount of line feed of the commands below:

(a) Select 1/6-inch line spacing (ESC 2)

(b) Set line spacing (ESC 3)

d. This command is valid only when there is no data in the print buffer. If data is present in the print buffer, the data subsequent to parameter m is processed as normal data.

e. When bar code printing is finished, the beginning of the new line is set as the next print position.

f. Except for inverted printing, this command does not affect the print modes (emphasized printing, double-strike printing, underlining, and character size).

(5) For page mode

a. The bar code is only expanded. It is not printed.
When bar code expansion is finished, the next dot of the final data of the bar code is set as the next data expansion start position.

b. If parameter d is outside the definition area, command processing is canceled.
From the next data, the data is processed as normal data.
The data expansion start position is not moved.

c. If the horizontal width of the bar code exceeds the print area of one line, the data expansion start position is moved to the left end outside the print area.
The bar code is not printed.

(6) This command is ignored if:

a. The bar code data contains an undefined code.

GS w n

[Designation] Select bar code width

[Format] 1DH, 77H, n

[Valid limits] 1 ≤ n ≤ 6

[Initial value] n = 3

[Function] (1) Sets the bar code width size.

n	Multilevel bar code module width (mm)	Double value level bar code	
		Fine element width (mm)	Thick element width (mm)
1	0.128	0.125	0.375
2	0.25	0.25	0.625
3	0.375	0.375	1.125
4	0.5	0.5	1.375
5	0.625	0.625	1.75
6	0.75	0.75	2.25

(2) Multilevel bar code indicates the following bar code systems:

a. UPC-A
b. UPC-E
c. JAN13
d. JAN8
e. CODE39
f. CODE128

(3) Double value level bar code indicates the following bar code systems:

a. CODE39
b. ITF
c. CODABAR

Commands related to new line quantities

ESC 2

[Designation] Select 1/6-inch line spacing

[Format] 1BH, 32H

[Valid limits] ---

[Initial value] ---

[Function] (1) Sets the line spacing pitch to 3.75 mm (60/406 inches).

(2) The line feed amount can be set up separately for standard mode and page mode.

ESC 3 n

[Designation] Set line spacing

[Format] 1BH, 33H, n

[Valid limits] 0 ≤ n ≤ 255

[Initial value] n = 60

[Function] (1) Sets the line feed amount per line to [n×basic calculated pitch]inches.

(2) The line feed amount can be set up separately for standard mode and page mode.

(3) The basic calculated pitch is set up using the Set horizontal and vertical motion unit command (GS P).
Furthermore, the specified line feed amount will not be changed even if the basic calculated pitch is changed using the Set horizontal and vertical motion unit command (GS P) after the line feed amount has been set up.

(4) If the calculation result contains a fraction, the value is corrected using the minimum pitch of the mechanism. The remainder is then discarded.

(5) In standard mode, the vertical motion unit (y) is used.

(6) In page mode, the operations given below are executed based on the starting point:
a. The vertical motion unit (y) is used if the starting point has been specified as upper left or lower right using the Select print direction in page mode command (ESC T).
b. The horizontal motion unit (x) is used if the starting point has been specified as upper right or lower left using the Select print direction in page mode command (ESC T).

(7) Up to about 900 mm (35.4 inches) of line feed increments can be set. If the maximum value is exceeded, the value will be rounded off to the maximum value.

Commands related to mechanical control

GS V m

[Designation] Cut paper (No. 1)

[Format] 1DH, 56H, m

[Valid limits] m = 0,1, 48,49

[Initial value] ---

[Function] (1) Performs a cut operation of a specified type.

m	Function
1, 49	Perform partial-cut operation (with one point center uncut)

(2) This command is valid only when entered at the beginning of a line.

(3) This command partially cuts the paper (one point center uncut).

(4) In page mode, this command cuts the paper at once.

GS V m n

[Designation] Cut paper (No. 2)

[Format] 1DH, 56H, m, n

[Valid limits] m = 65,66
0 ≤ n ≤ 255

[Initial value] ---

[Function] (1) Performs a cut operation of a specified type.

m	Function
65	Not specified
66	Advance the paper (cut position + [n×basic calculated pitch]) and partially cut the paper (one point center uncut).

(2) This command is valid only when entered at the beginning of a line.

(3) If n = 0, the paper is cut off after it is advanced to the specified position.

(4) If n・ ≠ 0, the paper is cut off after it is advanced further through "n×basic calculated pitch" from a specified cut position.

(5) The basic calculated pitch is set up using the Set the basic calculated pitch command (GS P).

(6) The paper feed amount is calculated using the vertical basic calculated pitch (y). If the calculation result contains a fraction, the value is corrected using the minimum pitch of the mechanism. The remainder is then discarded.

(7) In page mode, this command cuts the paper at once.

ESC i

[Designation] Full cut (performs partial cut)

[Format] 1BH, 69H

[Valid limits] ---

[Initial value] ---

[Function] (1) Full cut the paper.

(2) This command is valid only when entered at the beginning of a line.

(3) In page mode, this command cuts the paper at once.

ESC m

[Designation] Partial cut

[Format] 1BH, 6DH

[Valid limits] ---

[Initial value] ---

[Function] (1) Cuts paper with one point center uncut.

(2) This command is valid only when entered at the beginning of a line.

Command related to paper detectors

ESC c 3 n

[Designation] Select paper sensor(s) to output paper out signals

[Format] 1BH, 63H, 33H, n

[Valid limits] 0 ≤ n ≤ 255

[Initial value] n = 0

[Function] (1) Selects the paper detectors to output the paper out signal when paper out status occurs.

(2) The table below lists the bit definitions.

Bit	Function	Value	
		0	1
0	Roll paper near end detector	Disable	Enable
1	Roll paper near end detector	Disable	Enable
2	Roll paper end detector	Disable	Enable
3	Roll paper end detector	Disable	Enable
4	To be defined	---	---
5	To be defined	---	---
6	To be defined	---	---
7	To be defined	---	---

(3) Multiple paper detectors can be selected at the same time.
When multiple paper detectors are enabled, the paper out signal is output when any one of the paper detectors detects paper out.

(4) This command is valid for USB(PRINTER) specifications.
This command is ignored for serial interface and USB(V-COM) specifications.

(5) Executing this command switches the detectors. As a result, Command reception and paper out signal switching can be delayed depending on the receive buffer status.

(6) If bit 0 or 1 is 1, the roll paper near end detector is selected as the paper detector.

(7) If bit 2 or 3 is 1, the roll paper end detector is selected as the paper detector.

ESC c 4 n

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

[Format] 1BH, 63H, 34H, n

[Valid limits] 0 ≤ n ≤ 255

[Initial value] n = 0

[Function] (1) Selects the paper detectors to stop printing when paper out status occurs.

(2) Each bit of parameter n is defined as listed below:

Bit	Function	Value	
		0	1
0	Roll paper near end detector	Invalid	Valid
1	Roll paper near end detector	Invalid	Valid
2	To be defined	---	---
3	To be defined	---	---
4	To be defined	---	---
5	To be defined	---	---
6	To be defined	---	---
7	To be defined	---	---

(3) Printing is stopped after printing of the current line and papers feed are finished.

(4) The printer is set offline when printing is stopped.

(5) If bit 0 or 1 is 1, the roll paper near end detector is selected as the paper sensor(s) to stop printing.

Commands related to the status

DLE EOT n

[Designation] Real-time status transmission

[Format] 10H, 04H, n

[Valid limits] 1 ≤ n ≤ 4

[Initial value] ---

[Function] (1) Transmits real-time status information specified using parameter n.

n	Function
1	Transmits printer status
2	Transmits offline cause factor
3	Transmits error cause status
4	Transmits continuous forms detector status

(2) The status information reflects the current condition. Each piece of status information is 1 byte.

(3) The status information is transmitted no matter the state of the host.

(4) The status information is transmitted even when the reception buffer is full.

(5) This command is processed during reception.

(7) Details of status information transmitted are as follows:

a. When n = 1 (printer status)

Bit	Function	Value	
		0	1
0	Not used	Fixed at 0	
1	Not used	Fixed at 1	
2	State of drawer kick connector pin 3	Low	High
3	Online/offline condition	Online	Offline
4	Not used	Fixed at 1	
5	Online return waiting	Not wait	Wait
6	FEED switch	Not push	Push
7	Not used	Fixed at 0	

b. When n = 2 (offline cause status)

Bit	Function	Value	
		0	1
0	Not used	Fixed at 0	
1	Not used	Fixed at 1	
2	Cover state	Closed	Open
3	Paper feed by paper feed switch	Disabled	Eabled
4	Not used	Fixed at 1	
5	Printing suspension due to no paper	No printing suspesion	Printing supended
6	Error or no error	No error	Error
7	Not used	Fixed at 0	

*1 Bit 5:Printing is stopped if the roll paper end detector detects paper out or the roll paper near end detector has been enabled using ESC c 4. At this time, bit 5 is 1.

c. When n = 3 (error cause status)

Bit	Function	Value	
		0	1
0	Not used	Fixed at 0	
1	Not used	Fixed at 1	
2	Mechanical error (Cover open, Cutter jam)	No	Yes
3	Cutter jam error	No	Yes
4	Not used	Fixed at 1	
5	Unrecoverable error	No	Yes
6	Auto-recoverable error	No	Yes
7	Not used	Fixed at 0	

*1 Bit 3:

If this error occurs due to paper jam or other cause, correct the cause of the error. Then, recover using DLE ENQ n ($1 \leq n \leq 2$).
Recovery will be impossible if this error occurs due to a faulty circuit (disconnection and the like).
Bit 6:
Abnormally high temperature of the head has been detected. Bit 6 is set to 1 while printing is stopped until the temperature of the head goes down.

d. When n = 4 (continuous forms detector status)

Bit	Function	Value	
		0	1
0	Not used	Fixed at 0	
1	Not used	Fixed at 1	
2	Roll paper near end detector	Paper present	No paper
3			
4	Not used	Fixed at 1	
5	Roll paper end detector	Paper present	No paper
6			
7	Not used	Fixed at 0	

(8) This command is ignored if parameter n is outside the definition area.

(9) The auto cutter incurs no error.

(10) Errors are indicated with the status information listed below:

Status	Parameter	Status bit								Remark
		b7	b6	b5	b4	b3	b2	b1	b0	
Roll paper end detected	n = 1	0	×	×	1	1	×	1	0	State of drawer kick connector pin 3 may be superimposed.
	n = 2	0	×	1	1	×	×	1	0	Error status and paper feed by paper feed switch may be superimposed.
	n = 3	0	×	0	1	0	0	1	0	Auto-recoverable error may be superimposed.
	n = 4	0	1	1	1	1	1	1	1	
Roll paper near end detected	n = 1	0	×	×	1	×	×	1	0	State of drawer kick connector pin 3 may be superimposed.
	n = 2	0	×	×	1	× *1	×	1	0	Error status, printing suspension due to no paper, paper feed by paper feed switch, and cover status may be superimposed.
	n = 3	0	×	0	1	0	0	1	0	Auto-recoverable error, may be superimposed.
	n = 4	0	×	×	1	1	1	1	0	
Cover open detected	n = 1	0	×	×	1	1	×	1	0	State of drawer kick connector pin 3 may be superimposed.
	n = 2	0	×	×	1	×	1	1	0	Error status, printing suspension due to no-paper, paper feed by paper feed switch, and cover state may be superimposed.
	n = 3	0	×	0	1	0	0	1	0	Auto-recoverable, may be superimposed.
	n = 4	0	× *2	× *2	1	×	×	1	0	Receipt and journal near ends may be superimposed.

Status	Parameter	Status bit								Remark
		b7	b6	b5	b4	b3	b2	b1	b0	
Print head temperature high	n = 1	0	×	×	1	0	×	1	0	State of drawer kick connector pin 3 may be superimposed.
	n = 2	0	1	×	1	×	×	1	0	Printing suspension due to no paper, paper feed by paper feed switch, and cover state may be superimposed.
	n = 3	0	1	0	1	0	1	1	0	
	n = 4	0	×	×	1	×	×	1	0	Roll paper end and roll paper near end may be superimposed.
Unrecoverable error detected	n = 1	0	×	×	1	1	×	1	0	State of drawer kick connector pin 3 may be superimposed.
Abnormal voltage Watchdog timer error	n = 2	0	1	×	1	×	×	1	0	Printing suspension due to no paper, paper feed by paper feed switch, and cover state may be superimposed.
ROM/RAM error	n = 3	0	×	1	1	0	0	1	0	Auto-recoverable superimposed.
No print Head	n = 4	0	×	×	1	×	×	1	0	Roll paper end and roll Paper near end may be superimposed.
Cutter jam Error	n = 1	0	0	0	1	1	×	1	0	State of drawer kick connector pin 3 may be superimposed.
	n = 2	0	1	×	1	×	×	1	0	Printing suspension due to no paper, paper feed by paper feed switch, and cover state may be superimposed.
	n = 3	0	×	0	1	1	1	1	0	Auto-recoverable superimposed.
	n = 4	0	×	×	1	×	×	1	0	Roll paper end and roll Paper near end may be superimposed.

*1. Status changes by ESC c 4 n.
*2. It is not become paper end at cover open.
*3. When cover open,
(1)Not printing
bit3 of n=1 and bit2 of n=2 change, but bit2,6 of n=3 not change.
(2)Printing
bit3 of n=1 and bit2 of n=2 change
When set "COVER OPEN ERROR:AUTO RECOVERY":
bit6=1,bit2=0(n=3)
When set "COVER OPEN ERROR:RECOVERY BY CMND":
bit6=0,bit2=1(n=3)

GS a n

[Designation] Enable/disable automatic status back

[Format] 1DH, 61H, n

[Valid limits] 0 ≤ n ≤ 255 (n = CF : Fixed)

[Initial value] ALL value is enabled.

[Function] (1) Selects what status information to be subjected to automatic status back (ASB).

But, by this printer way, every function cannot perform effective / invalidity setting of ASB of the (as for every bit).
N = 0x00 (All ASB invalid) or n <> 0x00 (All ASB available)

Bit	Function	Value	
		0	1
0	State of drawer kick connector pin 3	Invalid	Valid
1	Online/offline	Invalid	Valid
2	Error condition	Invalid	Valid
3	Continuous forms	Invalid	Valid
4	To be defined	---	---
5	To be defined	---	---
6	Panel switch condition	Invalid	Valid
7	To be defined	---	---

(2) Status information, if valid, is transmitted when the command is executed. Also, this information is transmitted each time it is changed. This status information may change even if it is not selected as a target of the ABS function because the status bits reflect the state of the equipment in real-time.

(3) If all status bits are specified as invalid, the ASB function is disabled.

(4) If the ABS function is initially enabled, the status information is transmitted when communication becomes possible for the first time after the power is switched on.

(5) The 4 status bytes are consecutive except for the XOFF code.

(6) Even if the specification of the printer is canceled using the Select peripheral device command (ESC =), a 4-byte status will be sent if the status is changed.

(7) The following tables list the status information transferred.

a. First byte (printer information)

Bit	Function	Value	
		0	1
0	Not used	Fixed at 0	
1	Not used	Fixed at 0	
2	State of the drawer kick connector pin 3	Low	High
3	Online/offline	Online	Offline
4	Not used	Fixed at 1	
5	Cover state	Closed	Open
6	Paper feed by paper feed switch	Stopped	Operating
7	Not used	Fixed at 0	

b. Second byte (error information)

Bit	Function	Value	
		0	1
0	Macro executing	Not execute	execute
1	Panel switch	OFF	ON
2	Mechanical error (Cover open, Cutter jam)	No	Yes
3	Cutter jam	No	Yes
4	Not used	Fixed at 0	
5	Unrecoverable error	No	Yes
6	Auto-recoverable error detected	No	Yes
7	Not used	Fixed at 0	

c. Third byte (paper detector information)

Bit	Function	Value	
		0	1
0	Roll paper near end detector	Paper present	No paper
1			
2	Roll paper end detector	Paper present	No paper
3			
4	Not used	Fixed at 0	
5	Not used	Fixed at 0	
6	Not used	Fixed at 0	
7	Not used	Fixed at 0	

d. Fourth byte (paper detector information)

Bit	Function	Value	
		0	1
0	Not used	Fixed at 1	
1	Not used	Fixed at 1	
2	Not used	Fixed at 1	
3	Not used	Fixed at 1	
4	Not used	Fixed at 0	
5	F/W down load Fail	Not Fail	Fail
6	To be defined	---	---
7	Not used	Fixed at 0	

(8) Errors are indicated with the status information listed below:

Status	Parameter	Status bit								Remark
		b7	b6	b5	b4	b3	b2	b1	b0	
Roll paper end detected	First byte	0	×	×	1	1	×	0	0	Paper feed by paper feed switch and state of drawer kick connector pin 3 may be superimposed.
	Second Byte	0	×	×	0	0	×	×	×	Auto-recoverable and unrecoverable errors may be superimposed.
	Third byte	0	0	0	0	1	1	×	×	The roll paper near end detector may be superimposed.
	Fourth byte	0	0	×	0	1	1	1	1	F/W down load Fail
Roll paper near end detected	First Byte	0	×	×	1	×	×	0	0	Paper feed by paper feed switch, cover state, and drawer kick connector pin 3 may be superimposed.
	Second Byte	0	×	×	0	0	×	×	×	Auto-recoverable, and unrecoverable errors may be superimposed.
	Third Byte	0	0	0	0	×	×	1	1	The roll paper near end detector may be superimposed.
	Fourth Byte	0	0	×	0	1	1	1	1	F/W down load Fail
Cover open detected	First Byte	0	×	1	1	1	×	0	0	Paper feed by paper feed switch and state of drawer kick connector pin 3 may be superimposed.
	Second byte	0	×	×	0	0	×	×	×	Auto-recoverable, and unrecoverable errors may be superimposed.
	Third byte	0	0	0	0	×	×	×	×	The roll paper end and roll paper near end detectors may be superimposed.
	Fourth byte	0	0	×	0	1	1	1	1	F/W down load Fail

Status	Parameter	Status bit								Remark
		b7	b6	b5	b4	b3	B2	b1	b0	
Print head temperature high	First byte	0	×	×	1	1	×	0	0	Paper feed by paper feed switch, cover state, and state of the drawer kick connector pin 3 may be superimposed.
	Second Byte	0	1	×	0	0	×	×	×	Unrecoverable may be superimposed.
	Third Byte	0	0	0	0	×	×	×	×	The roll paper end and roll paper near end detectors may be superimposed.
	Fourth Byte	0	0	×	0	1	1	1	1	F/W down load Fail
Unrecoverable error detected { Abnormal voltage Watchdog timer error ROM/RAM error No print	First byte	0	×	×	1	1	×	0	0	Paper feed by paper feed switch, cover state, and state of the drawer kick connector pin 3 may be superimposed.
	Second byte	0	×	1	0	0	×	×	×	Auto-recoverable errors may be superimposed.
	Third byte	0	0	0	0	×	×	×	×	The roll paper end and roll paper near end detectors may be superimposed.
	Fourth byte	0	0	×	0	1	1	1	1	F/W down load Fail
Cutter jam Error	First byte	0	0	×	1	1	×	0	0	Cover state, and state of the drawer kick connector pin 3 may be superimposed.
	Second byte	0	×	0	0	1	1	×	×	Unrecoverable may be superimposed.
	Second byte	0	0	0	0	×	×	×	×	The roll paper end and roll paper near end detectors may be superimposed.
	Fourth byte	0	0	×	0	1	1	1	1	F/W down load Fail

* When cover open,

(1)Not printing

bit3 and bit5 of first byte change, but bit2,6 of second byte not change.

(2)Printing

bit3 and bit5 of first byte change

When set "COVER OPEN ERROR:AUTO RECOVERY":

bit6=1,bit2=0(second byte)

When set "COVER OPEN ERROR:RECOVERY BY CMND":

bit6=0,bit2=1(second byte)

(9) If the Real-time status transmission command (DLE EOT), Transmit printer ID command (GS I), and Transmit status command (GS r) are used, the states of these commands and the ASB status must be identified.

(10) A delay may occur between command reception and status transmission depending on the condition of the reception buffer because this command is executed during print buffer expansion.

GS r n

[Designation] Transmit status

[Format] 1DH, 72H, n

[Valid limits] 1 ≤ n ≤ 2, 49 ≤ n ≤ 50

[Initial value] ---

[Function] (1) Transmits status information specified using parameter n.

n	Function
1, 49	Transmits paper detector status
2, 50	Transmits drawer kick connector status

(2) Details of the transmitted status information are as follows:
a. When n = 1, 49 (paper detector status)

Bit	Function	Value	
		0	1
0	Roll paper near end detector	Paper present	No paper
1			
2	Roll paper end detector	Paper present	No paper
3			
4	Not used	Fixed at 0	
5	To be defined	---	---
6	To be defined	---	---
7	Not used	Fixed at 0	

*1 Bits 2 and 3:
If the paper end detector detects paper end, the printer will be set offline. Therefore, do not execute this command. Accordingly, the status of bit 2 = 1 or bit 3 = 1 is not sent.

b. When n = 2, 50 (drawer kick connector)

Bit	Function	Value	
		0	1
0	State of drawer1 kick connector pin 3	Low	High
1	To be defined	---	---
2	State of drawer2 kick connector pin 1	Fixed at 1(High)	
3	To be defined	---	---
4	Not used	Fixed at 0	
5	To be defined	---	---
6	To be defined	---	---
7	Not used	Fixed at 0	

(3) Roll paper end detector (n=1,49) is paper present (b3 = 0, b2 = 0) when the cover is open.

(4) After the mechanics operation ends, status is transmitted.

(5) After the host is confirmed to be ready to receive status information, this information is transmitted to the host if the DTR/DSR protocol is used. If the host is not ready to receive, transmission of the status information is deferred until the host is ready.

(6) If the XON/XOFF protocol is used, status information is transmitted to the host without checking whether the host is ready to receive.

(7) A delay may occur between command reception and status transmission depending on the condition of the reception buffer because this command is executed during print buffer expansion.

(8) The status of this command and the ASB status must be identified.

ESC u n

[Designation] Transmit peripheral device status

[Format 1BH, 75H, n

[Valid limits] n = 0

[Initial value] ---

[Function] (1) Transmits peripheral device status data (one byte length) corresponding to the connector pin specified by n.

n	Function
0	Specifies the No.3 pin of the drawer kick connector.

(2) The table below lists the status data transmitted.

Bit	Function	Value	
		0	1
0	State of drawer kick connector pin 3	Low	High
1	To be defined	---	---
2	To be defined	---	---
3	To be defined	---	---
4	Not used	Fixed at 0	
5	To be defined	---	---
6	To be defined	---	---
7	Not used	Fixed at 0	

(3) This command is valid only for serial interface and USB(VCOM) interface specifications.

(4) When the DTR/DSR protocol is used, the printer transmits status data after confirming that the host is ready to receive data. When the host is not ready to receive data, the printer waits until the host is ready.

(5) When the XON/XOFF protocol is used, the printer transmits status data without confirming that the host is ready to receive data.

(6) Since this command is processed during print buffer expansion, a delay may occur between command reception and status data transmission depending on reception buffer status.

ESC v

[Designation] Transmit paper detector status

[Format] 1BH, 76H

[Valid limits] ---

[Initial value] ---

[Function] (1) Transmits paper detector status data (one byte length) as shown below.

Bit	Function	Value	
		0	1
0	Roll paper near-end detector	With paper	Without paper
1	Roll paper near-end detector	With paper	Without paper
2	Roll paper end detector	With paper	Without paper
3	Roll paper end detector	With paper	Without paper
4	Not used	Fixed at 0	
5	Not used	Fixed at 0	
6	Not used	Fixed at 0	
7	Not used	Fixed at 0	

(2) This command is valid only for serial interface and USB (V-COM) interface specifications.

(3) When the DTR/DSR protocol is used, the printer transmits status data after confirming that the host is ready to receive data. When the host is not ready to receive data, the printer waits until the host is ready.

(4) When the XON/XOFF protocol is used, the printer transmits status data without confirming that the host is ready to receive data.

(5) Since this command is processed during print buffer expansion, a delay may occur between command reception and status data transmission depending on reception buffer status.

Command related to the panel switches

ESC c 5 n

[Designation] Enable/disable panel buttons

[Format] 1BH, 63H, 35H, n

[Valid limits] 0 ≤ n ≤ 255

[Initial value] n = 0

[Function] (1) Enables/disables the paper feed switch.

(2) Each bit of parameter n is defined as listed below:

Bit	Function	Value	
		0	1
0	Panel switch	Enabled	Disabled
1	To be defined	---	---
2	To be defined	---	---
3	To be defined	---	---
4	To be defined	---	---
5	To be defined	---	---
6	To be defined	---	---
7	To be defined	---	---

(3) Only the lowest-order bit of parameter n is valid.

(4) If the panel switch is disabled, all panel switches will be disabled.

(5) For this printer, the panel switch means the paper feed switch.

(6) At switch standby when the macro is executed, the paper feed switch is enabled regardless of the setting of this command. However, the paper is not advanced.

(7) Even if this command enables the panel switch, the switch will be disabled in the following cases:
a. There is no paper in the roll paper end detector.
b. The cover is open.

Commands related to auxiliary functions

DLE ENQ n

[Designation] Real-time request to printer

[Format] 10H, 05H, n

[Valid limits] 0 ≤ n ≤ 2

[Initial value] -

[Function] (1) Responds in real-time to requests from the host specified using parameter n.

(2) The table below lists the operations based on the value n:

n	Function
0	When switch pressing waiting of GS ^,the same processing as one switch pressing is executed.
1	Restarts printing from the beginning of the line where the error occurred after the cause of the error is corrected.
2	Recovers from the error after the receive and print buffers are cleared.

(3) This command(n=1,2) is valid only when a cover open error.

(4) This command is processed upon being received.

(5) The print start after recovers from an error by command(n=1), it is from the next line of the error generation.

(6) Processing is executed in offline, receive buffer full, or error states.

(7) The status when an error occurs is retained for the following settings:
a. Select print mode(s) command (ESC !)
b. Set line spacing (ESC 3)

(8) The printer is fully initialized using this command and the Initialize the printer command (ESC @).

(9) For other commands too, the same operation as this command is performed when a data sequence of 10H 05H n (1 ≤ n ≤ 2) is received. The user must be made a ware of this. For example, d1 = 10H, d2 = 05H, d3 = 01H for ESC * m nL nH [d]k

(10) This command cannot be placed between or among bytes that form the code sequence of another command, such as:
a. ESC sequence
b. GS sequence
For example, the data will be processed as ESC 3 10H if an attempt is made to send ESC 3 n from the host and DLE ENQ 2 is sent after ESC 3 is sent. The user must be made aware of this.

(11) For DLE ENQ 2, the printer is recovered from the error after the receive and print buffers are cleared.

ESC @

[Designation] Initialize printer

[Format] 1BH, 40H

[Valid limits] -

[Function] (1) Clears the print buffer and initializes the settings.

(2) The receive buffer data is retained.

(3) This command does not clear a macro definition.

(4) This command does not clear a NV bit image definition.

(5) This command does not clear a User NV memory and graphics.

(6) See Section 5, "Initial Operations" for initialization.

ESC L

[Designation] Select page mode

[Format] 1BH, 4CH

[Valid limits] ---

[Function] (1) Switches from standard mode to page mode.

(2) This command is valid only when entered at the beginning of the line.

(3) This command is ignored if entered in page mode.

(4) The commands given below return to standard mode:
a. After printing is finished using the Print and return to standard mode in page mode command (FF).
b. Upon receiving the Select standard mode command (ESC S).

(5) In the print area specified using the Set printing area in page mode command (ESC W), the point specified using the Select print direction in page mode command (ESC T) becomes the character expansion position.

(6) For the commands given below that have separate values for page mode and standard mode, the setting values are switched to those of page mode:
a. Set right-side character spacing command (ESC SP)
b. Set kanji spacing command (FS S)
c. Select 1/6-inch line spacing command (ESC 2)
d. Set line spacing command (ESC 3)

(7) For the commands given below, the settings are valid only in page mode:
a. Turn 90°clockwise-rotation mode on/off (ESC V)
b. Select justification command (ESC a)
c. Turn upside-down printing mode on/off (ESC {)
d. Set left margin command (GS L)
e. Set printing area width command (GS W)

(8) The Initialize the printer command (ESC @) returns to standard mode.

(9) The data over bottom margin are discarded.

ESC S

[Designation] Select standard mode

[Format] 1BH, 53H

[Valid limits] ---

[Function] (1) Switches from page mode to standard mode.

(2) This command is valid only when entered in page mode.

(3) The data expanded in page mode is erased.

(4) After execution, the beginning of the new line is set as the next print start position.

(5) The print area specified using the Set printing area in page mode command (ESC W) is initialized.

(6) For the commands given below that have separate values for page mode and standard mode, the setting values are switched to those of standard mode:
a. Set right-side character spacing command (ESC SP)
b. Set kanji spacing command (FS S)
c. Select 1/6-inch line spacing command (ESC 2)
d. Set line spacing command (ESC 3)

(7) Standard mode is selected at power-on, reset, or execution of the Initialize the printer command (ESC @).

ESC p m t1 t2

[Designation] Generate pulse

[Format] 1BH, 70H, m, t1, t2

[Valid limits] 0 ≤ m ≤ 5, 48 ≤ m ≤ 53
0 ≤ t1 ≤ 255
0 ≤ t2 ≤ 255

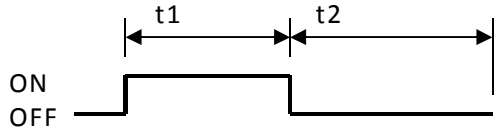
[Initial value] ---

[Function] (1) Outputs the signals specified using parameters t1 and t2 for the connector pin specified using parameter m.

(2) Parameter m defines as follows:

m	Connector pin
0, 48	Drawer kick drive signal 1 (pin 2)
1, 49	Drawer kick drive signal 2 (pin 5)
2, 50	Buzzer
3, 51	Buzzer(Interval & Repetition)
4, 52	Paper LED ON
5, 53	Error LED ON

(3) The times during which the drawer kick drive signal and buzzer is on and off is specified as "t1×2 ms" and "t2×2 ms," respectively.



Paper LED / Error LED ON:"t1×100ms", OFF:"t2×100ms"
(After the command ends, LED returns to the original condition.)

(4) If t1 > t2 is specified, t2 is assumed to be equal to t1. (m=0,1,2,48,49,50)

(5) If parameter m specifies a value out of the valid range, this command is ignored. The subsequent data is processed as ordinary data.

(6) At m=3(51), parameter 't3' becomes effective.

m		t1	t2	buzzer
3	51	0	0	It follows the setting of 'Buzzer Interval'.
		20	60	40msON / 120msOFF (Pattern 1)
		70	70	140msON / 140msOFF (Pattern 2)
		100	100	200msON / 200msOFF (Pattern 3)
		5	25	10msON / 50msOFF (Pattern 4)
		15	25	30msON / 50msOFF (Pattern 5)
		Other	Other	None

m		t3	buzzer
3	51	0	It follows the setting of 'Buzzer Repetition '.
		1	One
		2	Two
		3	Three
		4	Four
		5	Five
		Other	None

(7) The buzzer rings after the mechanism operation ends at m=3(51).

(8) Parameter 't3' is not added, except for m=3(51).

GS I n

[Designation] Transmit printer ID

[Format] 1DH, 49H, n

[Valid limits] 1 ≤ n ≤ 3, 49 ≤ n ≤ 51, 65 ≤ n ≤ 69, n=112

[Initial value] ---

[Function] (1) Transmits the following information after command execution, according to the setting of parameter n.

N	Printer ID type	Specification	ID
1, 49	Model ID	TH180	2EH
2, 50	Type ID	See the following table	02H
3, 51	ROM version	Depends on the ROM version	"A" to "Z"

(2) The type ID transmitted by this command is as follows:

Bit	Function	Value	
		0	1
0	2-byte code	Not supported	Supported
1	Auto-cutter	No	Yes
2	To be defined	Fixed at 0	
3	To be defined	Fixed at 0	
4	Not used	Fixed at 0	
5	To be defined	Fixed at 0	
6	To be defined	Fixed at 0	
7	Not used	Fixed at 0	

(3) Transmits the following information after command execution, according to the setting of parameter n.

N	Kind of printer information	Information
65	Firmware version	Firmware version
66	Maker	Wincor Nixdorf
67	Model	TH180
68	Serial No.	Serial No.
69	Kind of font	'' (None)
112	DIP switch condition	First byte = 40H Second byte = 40H

The transmission form of printer information is as follows;

Header	5FH
Data	Printer information
NUL	00H

(4) Table: DIP switch information

a. First byte = 40H
b. Second byte = 40H

(5) After the host is confirmed to be ready to receive (the DSR signal is in a space state) a printer ID, a printer ID is transmitted to the host if the DTR/DSR protocol is used. If the host is not ready to receive (the DSR signal is in a mark state), transmission of the printer ID is deferred until the host is ready.

(6) If the XON/XOFF protocol is used, a printer ID is transmitted to the host without checking whether the host is ready to receive.

(7) A delay may occur between command reception and printer ID transmission depending on the condition of the reception buffer because this command is executed during print buffer expansion.

(8) If ASB has been enabled using the Enable/disable automatic status back command (GS a), the printer ID of this command and the ASB status must be identified.

(9) This command is ignored if parameter n is outside the definition area.

GS P x y

[Designation] Set horizontal and vertical motion units

[Format] 1DH, 50H, x, y

[Valid limits] $0 \leq x \leq 255$
$0 \leq y \leq 255$

[Initial value] x = 203
y = 406

[Function] (1) Sets the horizontal basic calculated pitch to approximately 25.4/xmm [(1/x) inches] and the vertical basic calculated pitch to approximately 25.4/ymm [(1/y) inches].

(2) For x = 0, the horizontal basic calculated pitch is returned to the initial value.

(3) For y = 0, the vertical basic calculated pitch is returned to the initial value.

(4) Horizontal is the direction perpendicular to the paper feed direction. Vertical is the paper feed direction.

(5) In standard mode, the parameters given below are used regardless of the character orientation (inverted, 90-degree rotation, and so on):

a. Commands that use x
(a) Set right-side character spacing command (ESC SP)
(b) Set absolute print position command (ESC $)
(c) Set relative print position command (ESC \)
(d) Set kanji spacing command (FS S)
(e) Set left margin command (GS L)
(f) Set printing area width command (GS W)

b. Commands that use y
(a) Set line spacing command (ESC 3)
(b) Print and feed paper command (ESC J)

(6) In page mode, the parameters given below are used if the starting point has been specified as upper left or lower right using the Select print direction in page mode command (ESC T):

a. Commands that use x
(a) Set right-side character spacing command (ESC SP)
(b) Set absolute print position command (ESC $)
(c) Set area in page mode command (ESC W)
(d) Set relative print position command (ESC \)
(e) Set kanji spacing command (FS S)

b. Commands that use y
(a) Set line spacing command (ESC 3)
(b) Print and feed paper command (ESC J)
(c) Set printing area in page mode command (ESC W)
(d) Set absolute position for characters direction in page mode command (GS $)
(e) Set relative position for characters direction in page mode command (GS \)

(7) In page mode, the parameters given below are used if the starting point has been specified as upper right or lower left using the Select print direction in page mode command (ESC T):

a. Commands that use x
(a) Set line spacing command (ESC 3)
(b) Print and feed paper command (ESC J)
(c) Set printing area in page mode command (ESC W)
(d) Set absolute position for characters direction in page mode command (GS $)
(e) Set relative position of characters direction in page mode command (GS \)

b. Commands that use y
(a) Set right-side character spacing command (ESC SP)
(b) Set absolute print position command (ESC $)
(c) Set printing area in page mode command (ESC W)
(d) Set relative print position command (ESC \)
(e) Set kanji spacing command (FS S)

(8) Even if executed, this command does not affect the setting values that have already been set up.

(9) If the calculation result in combination with other commands contains a fraction, the value is corrected using the minimum pitch of the mechanism. The remainder is then discarded.

DLE DC4 n m t

[Designation] Real-time output of designated pulse

[Format] 10H, 14H, 01h, m, t

[Valid limits] $0 \leq m \leq 2$
$1 \leq t \leq 8$

[Function] (1) m corresponds to the designated connector pin and t outputs the designated signal in real time.

m	Designated connector pin
0	Drawer kick connector No. 2 pin
1	Drawer kick connector No. 5 pin
2	Buzzer

(2) The on/off time is respectively set as t x 100 ms.

(3) This command is ignored in the following states:
- During the signal output to the drawer kick connector
- During the occurrence of error

(4) If the code sequence that matches the codes that make up this command is received, the user must note that the same operation as the operation for this command will take place.
Example: If the relevant code sequence is included in bit image data.

(5) This command must not be inserted between other command codes for use.
Example: If this command is used in the bit image data.

DLE DC4 0x02 a b

[Designation] Execute power-off processing

[Format] 10H, 14H, 02H, a,

[Valid limits] a=1
b=8

[Function] (1) This command saves the maintenance counter value.

(2) This command places the interface in BUSY state.
(DTR=MARK, XOFF transmission, BUSY output)

(3) This command transmits power-off notification.

Header	Status	NULL
(3BH)	(30H)	(00H)

(4) This command executes power-off processing. The power-off processing by the hardware cannot be executed.

(5) After the processing of this command, further data is not processed.
Returning to the printable status requires the power to be turned on again or hardware to be reset.

(6) If the code sequence that matches the codes that make up this command is received, the user must note that the same operation as the operation for this command will take place.
Example: If the relevant code sequence is included in bit image data.

(7) This command must not be inserted between other command codes for use.
Example: If this command is used in the bit image data.

DLE DC4 08H d1…..d7

[Designation] Buffer clear

[Format] 10H, 14H, 08H, d1…….d7

[Valid limits] d1=1
d2=3
d3=20
d4=1
d5=6
d6=2
d7=8

[Function] (1) This command clears the receive buffer and all print buffer data.

(2) This command transmits the data group of 3 bytes that is shown below:

Header	Status	NULL
(37H)	(25H)	(00H)

(3) It is in standard mode selection status.

(4) If the code sequence that matches the codes that make up this command is received, the user must note that the same operation as the operation for this command will take place.
Example: If the relevant code sequence is included in bit image data.

(5) This command must not be inserted between other command codes for use.
Example: If this command is used in the bit image data.

Commands related to extension functions

GS (A pL pH n m

[Designation] Execute test print

[Format] 1DH, 28H, 41H, pL, pH, n, m

[Valid limits] (pL + pH × 256) = 2 (pL = 2, pH = 0)
0 ≤ n ≤ 2 , 48 ≤ n ≤ 50
1 ≤ m ≤ 4 , 49 ≤ m ≤ 52

[Function] (1) This command executes the designated test printing.
n selects the target paper for test printing.

n	Paper type
0,48	Roll paper
1,49	
2,50	

m designates the type of test printing.

m	Test printing type
1,49	Hex dump
2,50	Status print of printer
3,51	Test print
4,52	Alignment Pattern

Note: The printing can be stopped when the FEED switch is pressed during test printing.
The firmware chart number and the version are first printed depending on the firmware level.

(2) The printer executes the hardware reset when processing of this printer is over.
At that time, the receive buffer and print buffer is cleared and various settings (such as downloaded characters, macro, character decoration, etc.) return to the state when power goes on.

(3) This command is valid only when entered at the beginning of a line.

(4) This command is skipped when page mode.

GS (D pL pH m [a1 b1]…[ak bk]

[Designation] Valid / invalid real-time command

[Format] 1DH, 28H, 44H, pL, pH, m, [a1 b1 …[ak bk]

[Valid limits] 3 ≤(pL+pH×256) ≤65535
m=20
a=1,2
b= 0, 1, 48, 49

[Initial value]

a	Real-time command type	Initial value
1	DLE DC4 fn m t (fn=1): real-time output of the designated pulse	Valid (b=1)
2	DLE DC4 fn a b(fn=2): execution of the power-off processing	Valid (b=1)

[Function] (1) It designates the valid or invalid processing of real-time command as below:

a	b	Function
1	0, 48	No processing to DLE DC4 fn m t (fn=1) (invalid)
	1, 49	Processes the DLE DC4 fn m t (fn=1) (valid)
2	0, 48	No processing to the DLE DC4 fn a b (fn=2) (invalid)
	1, 49	Processes the DLE DC4 fn a b (fn=2) (valid)

pL, pH is m and it designates the subsequent byte value as (pL+pHx256).
a designates the real-time command type.
b designates whether it is valid or invalid.

(2) It is recommended that the real-time command be designated as invalid by this ommand in advance, if the data sequence that matches the codes, which make up the real time command during bit image data, exists.

GS (E pL pH fn [parameter]

[Designation] User setting command group

[Function] (1) The command in the user setting command group is used to control the values that are stored in the non-volatile memory. It also executes the functions that are designated by the function code (fn).

fn	Function No.	Function
1	Function 1	Moves to the user setting mode
2	Function 2	Finishes the user setting mode
3	Function 3	Sets the value of the memory switch
4	Function 4	Transmits the value of the memory switch
5	Function 5	Sets the customized value
6	Function 6	Transits the customized value
7	Function 7	Copies the user definition page
8	Function 8	Defines data according to the column format to the character code page in the operation area
9	Function 9	Defines data according to the raster format to the character code page in the operation area
10	Function 10	Deletes data of the character code page in the operation area
11	Function 11	Sets the communication conditions of the serial interface
12	Function 12	Transmits the communication conditions of the serial interface

pL, pH is m and it designates the subsequent byte value as (pL+pHx256).

(2) Software reset is executed by Function 2. The receive buffer and print buffer clears and various settings (download character, macro, character decoration, etc.) return to the state when power goes on.

(3) The stored value can be confirmed by functions 4, 6, 12 of this command without moving to the user setting mode.

(4) Using this command often may cause destruction of the non-volatile memory.
Use this command that writes data to the non-volatile memory less than 10 times per day.

<Function 1> GS (E pL pH fn d1 d2

[Format] 1DH, 28H, 45H, pL, pH, fn, d1, d2

[Valid limits] (pL+pH×256)=3 (pL=3, pL=0)
fn=1
d1=73("1")
d2=78("N")

[Function] (1) This command moves to the user setting mode and transmits the mode moving notification shown as below:

	Hex	Decimal	Data value
Header	37H	55	1 byte
Identification	20H	32	1 byte
N U L	00H	0	1 byte

(2) The following commands will activate in the user setting mode
a. This command Function 2,3,4,5,6,7,8,9,10,11,12
b. GS 1

<Function 2> GS (E pL pH fn d1 d2 d3

[Format] 1DH, 28H, 45H, pL, pH, fn, d1, d2, d3

[Valid limits] (pL+pH×256)=4 (pL=4, pL=0)
fn=2
d1=79 ("0")
d2=85 ("U")
d3=84 ("T")

[Function] (1) This command ends the user setting mode and executes the software reset.
At this time, the receive buffer and print buffer will be cleared and various settings (download character, macro, character decoration, etc.) will return to the state when the power goes on.

(2) This function only activates in the user setting mode.

<Function 3> GS (E pL pH fn [a1 b18 .. b11]..[ak bk8…bk1]

[Format] 1DH, 28H, 45H, pL, pH, fn, [a1 b18 .. b11]..[ak bk8…bk1]

[Valid limits] 10≤(pL+pH×256) ≤65535
fn=3
a=1, 2, 8,125,126,127
b=48, 49, 50

[Function] (1) The memory switch that designated a is changed to the value that is designated b.
b=48, designates the relevant bit to OFF.
b=49, designates the relevant bit to ON.
b=50, no change to the relevant bit.

(2) Sets the memory switch 1 (Msw1:a=1) as below:

Bit	Value setting(b)	Function
0	48	Power On Status : Disable
	49	Power On Status : Enable
1	48	Receive Buffer : 4Kbyte
	49	Receive Buffer : 45byte
2	48	Busy Condition : Offline/Bufferfull
	49	Busy Condition : Bufferfull
3	48	Receive Error : ?Print
	49	Receive Error : Ignore
4	48	Auto LF : Disable
	49	Auto LF : Enable
5	50	Reservation
6	48	DSR(#6)Reset : Disable
	49	DSR(#6)Reset : Enable
7	48	INIT(#25)Reset : Disable
	49	INIT(#25)Reset : Enable

(3) The configuration of the power on notice (Power On Status) is shown, as below:

	Hex	Decimal	Data number
Header	3BH	59	1 byte
Identification	31H	49	1 byte
N U L	00H	0	1 byte

(4) Set the memory switch 2 (Msw2:a=2), as below:

Bit	Value setting(b)	Function (memory switch 2)
0	48	USB Soft Reset : Disable
	49	USB Soft Reset : Enable
1~7	50	Reservation

Bit 1 is valid only during the central interface.

(5) This function only activates in the user setting mode.

Bit	Value setting(b)	Function (memory switch 8)
0~4	50	Reservation
5	48	Reservation
	49	Reservation
6	50	Reservation
7	48	Cover Open Error : Auto Recovery
	49	Cover Open Error : Recovery by CMND

(6) a=125 is valid. Sets the memory switch 125 (Msw125), as below:

Bit	Value setting(b)	Function
0	48	Batch (Other IF) : Disable
	49	Batch (Other IF) : Enable
1-7	48,49,50	Reservation

(7) a=126 is valid. Sets the memory switch 126 (Msw126), as below:

Bit	Value setting(b)	Function
0	48	Error : Recovery by CMND
	49	Error : Auto Recovery
1	48	PNE Detect : Disable
	49	PNE Detect : Enable
2	48	Serial Number : Enable
	49	Serial Number : Disable
3	48	Font-B : Mode1
	49	Font-B : Mode2
4	48,49,50	Reservation
5	48	USB : V-COM
	49	USB : Printer
6	48,49,50	Reservation
7	48,49,50	Reservation

(8) a=127 is valid. Sets the memory switch 127 (Msw127), as below:

Bit	Value setting(b)	Function
0	48	Batch (COM IF) : Disable
	49	Batch (COM IF) : Enable
	48	ASB : Disable
	49	ASB : Enable
	48	Cut at CoverClose : Disable
	49	Cut at CoverClose : Enable
3-7	48,49,50	Reservation

<Function 4> GS (E pL pH fn a

[Format] 1DH, 28H, 45H, pL, pH, fn, a

[Valid limits] (pL+pH×256)=2 (pL=2, pH=0)
fn=4
a=1,2,8,125,126,127

[Function] (1) It transmits the value setting of the memory switch designated by a.

	Hex	Decimal	Data number
Header	37H	55	1 byte
Identification	21H	33	1 byte
Data	30H or 31H	48 or 49	8 bytes
N U L	00H	0	1 byte

(2) Data transmits the value settings the data sequence of 8 bytes as below in the order of bit 7 …..bit 2, bit0.
OFF: Hex=30H/Decimal=48
ON : Hex=31H/Decimal=49

<Function 5> GS (E pL pH fn [a1 n1L n1H]..[ak nkL nkH]

[Format] 1DH, 28H, 45H, pL, pH, fn, [a n1L n1H]...[ak nkL nkH]

[Valid limits] 4 ≤(pL+pH×256) ≤65535
fn=5
a=1, 3, 5, 6, 124, 125, 126
1 ≤(nL+nH×256) ≤65535

[Initial value] ----

[Function] (1) a designates the customized value setting as (nL+nH×256).

a	Function
1	Selects the Graph/User NV-MEM
3	Selects the Paper Width
5	Selects the Print Density
6	Selects the Max Speed
124	Selects the Error Alert
125	Selects the Buzzer Interval
126	Selects the Buzzer Repetition

For a=1, the NV graphics memory / User NV memory capacity changes to the designated size by (nL+nH×256).

(nL+nH×256)	Memory capacity
1	576KB/0B
2	512KB/64KB
3	448KB/128KB
4	384KB/192KB

For a=3, the paper width changes to the designated size by (nL+nH×256).

(nL+nH×256)	Paper Width
48	80mm/48columns
42	80mm/42columns
35	58mm/35columns
32	58mm/32columns

For a=5, the printing density changes to the designated level by (nL+nH×256).

(nL+nH×256)	Print Density
65530	70%
65531	Undefined
65532	80%
65533	Undefined
65534	90%
65535	Undefined
0	100%
1	Undefined
2	110%
3	Undefined
4	120%
5	Undefined
6	130%

For a=6, the printing speed changes to the designated level by (nL+nH×256).

(nL+nH×256)	Max Speed
1	100mm/s
2	110mm/s
3	120mm/s
4	130mm/s
5	140mm/s
6	150mm/s
7	160mm/s
8	170mm/s
9	180mm/s

For a=124, it changes to the 'Error Alert' specified by (nL+nH×256).

(nL+nH×256)	Error Alert
1	None
2	One Time
3	Continuous

For a=125, it changes to the 'Buzzer Interval' specified by (nL+nH×256).

(nL+nH×256)	Buzzer Interval
1	Pattern 1
2	Pattern 2
3	Pattern 3
4	Pattern 4
5	Pattern 5

For a=126, it changes to the 'Buzzer Repetition' specified by (nL+nH×256).

(nL+nH×256)	Buzzer Repetition
0	Zero
1	One
2	Two
3	Three
4	Four
5	Five

(2) This function activates only in the user setting mode.

(3) As for the printing density setting, when the data length of the serial interface communication conditions is designated as 7 bit, it cannot be set from 70% to 90% times.

(4) The value changed by this command is invalid in the hardware reset due to the power restart or reset terminal.
Only the execution of this command <function 2> is valid.

<Function 6> GS (E pL pH fn a

[Format] 1DH, 28H, 45H, pL, pH, fn, a

[Valid limits] (pL+pH×256)=2 (pH=2, pH=0)
fn=6
a=1, 3, 5, 6, 124, 125, 126

[Function] (1) a transmits the value setting of the designated customized value.

	Hex	Decimal	Data value
Header	37H	55	1 byte
Identification	27H	39	1 byte
Customized value number	30H~39H	48~57	1~3 bytes
Division mark	1FH	31	1 byte
Customized value	30H~39H	48~57	1~5 bytes
N U L	00H	0	1 byte

(2) Configuration of the customized value number

a	Transmission data		
	First byte	Second byte	Third byte
1	49	-	-
3	51	-	-
5	53	-	-
6	54		
124	49	50	52
125	49	50	53
126	49	50	54

(3) Configuration of the customized value

Designation of the NV graphics memory / User NV memory capacity (a=1)

Setting condition		Transmission data				
Stored value	Memory capacity	First byte	Second byte	Third byte	Fourth byte	Fifth byte
1	576KB/0B	49	-	-	-	-
2	512KB/64KB	50	-	-	-	-
3	448KB/128KB	51	-	-	-	-
4	384KB/192KB	52	-	-	-	-

Designation of the paper width (a=3)

Setting condition		Transmission data				
Stored value	Paper width	First byte	Second byte	Third byte	Fourth byte	Fifth byte
48	80 mm 48 column	52	56	-	-	-
42	80 mm 32 column	52	50	-	-	-
35	58 mm 35 column	51	53	-	-	-
32	58 mm 32 column	51	50	-	-	-

Designation of the print density (a=5)

Setting condition		Transmission data				
Stored value	Print density	First byte	Second byte	Third byte	Fourth byte	Fifth byte
65530	70%	54	53	53	51	48
65531	Undefined	-	-	-	-	-
65532	80%	54	53	53	51	50
65533	Undefined	-	-	-	-	-
65534	90%	54	53	53	51	52
65535	Undefined	-	-	-	-	-
0	100%	48	-	-	-	-
1	Undefined	-	-	-	-	-
2	110%	50	-	-	-	-
3	Undefined	-	-	-	-	-
4	120%	52	-	-	-	-
5	Undefined	-	-	-	-	-
6	130%	54	-	-	-	-

Designation of the max speed (a=6)

Setting condition		Transmission data				
Stored Value	Max speed	First byte	Second byte	Third byte	Fourth byte	Fifth byte
1	100mm/s	49	-	-	-	-
2	110mm/s	50	-	-	-	-
3	120mm/s	51	-	-	-	-
4	130mm/s	52	-	-	-	-
5	140mm/s	53	-	-	-	-
6	150mm/s	54	-	-	-	-
7	160mm/s	55	-	-	-	-
8	170mm/s	56	-	-	-	-
9	180mm/s	57	-	-	-	-

Designation of the error alert (a=124)

Setting condition		Transmission data				
Stored Value	Error alert	First byte	Second byte	Third byte	Fourth byte	Fifth byte
1	None	49	-	-	-	-
2	One Time	50	-	-	-	-
3	Continuous	51	-	-	-	-

Designation of the buzzer interval (a=125)

Setting condition		Transmission data				
Stored Value	Buzzer interval	First byte	Second byte	Third byte	Fourth byte	Fifth byte
1	Pattern 1	49	-	-	-	-
2	Pattern 2	50	-	-	-	-
3	Pattern 3	51	-	-	-	-
4	Pattern 4	52				
5	Pattern 5	53				

Designation of the buzzer repetition (a=126)

Setting condition		Transmission data				
Stored Value	Buzzer repetition	First byte	Second byte	Third byte	Fourth byte	Fifth byte
0	Zero	48	-	-	-	-
1	One	49	-	-	-	-
2	Two	50	-	-	-	-
3	Three	51				
4	Four	52				
5	Five	53				

<Function 7> GS (E pL pH fn a d1 d2

[Format] 1DH, 28H, 45H, pL, pH, fn, a, d1, d2,

[Valid limits] (pL+pH×256)=4 (pL=4, pH=0)
fn=7
a=12, 17, 18
30 ≤ d1 ≤ 31
30 ≤ d2 ≤ 31

[Function] (1) a executes the data copy of the designated font user-defined code page.

Font No. (a)	Font type	Data configuration	
		Horizontal dot value	Vertical dot value
12	12×24	12	24
17	8×16	8	16
18	10×24	10	24

d1	d2	Function
31	30	Loads the character code page data of the font designated by a from storage to operation.
30	31	Saves the character code page data of the font designated by a from operation to storage.

Operation: volatile memory (RAM)
Storage: non-volatile memory (flash ROM)
User-definited code page: page 255

(2) This function activates only in the user setting mode.

<Function 8> GS (E pL pH fn y c1 c2 [x d1 … d(y × x)]k

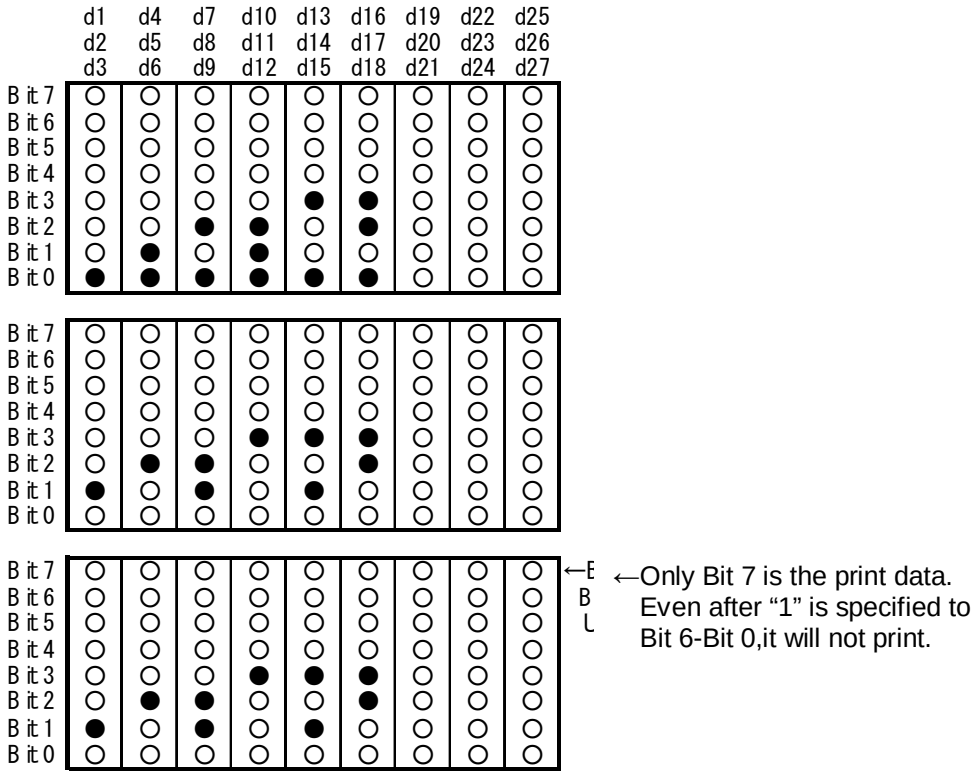
[Format] 1DH, 28H, 45H, pL, pH fn, y, c1, c2 , [x d1… d(y × x)]k

[Valid limits] 5 ≤(pL+pH×256) ≤65535
fn=8
y=2 (for font C selection)
y=3 (for selections except font C)
128 ≤c1≤c2≤255
0≤x≤12 (for font A selection)
0≤x≤9 (not support)
0≤x≤10 (for font B selection)
0≤x≤8 (for font C selection)
0≤d≤255
k=c2-c1+1

[Function] (1) The data is defined by the character unit, targeting the character code page in the operation area (RAM).
The definition data processes the character pattern as a column-type data.

(2) This function activates only in the user setting mode.

(3) The data configuration is shown as below (horizontal 9 dot × vertical 17 dot):



<Function 9> GS (E pL pH fn x c1 c2 [y d1… d(x × y)]k

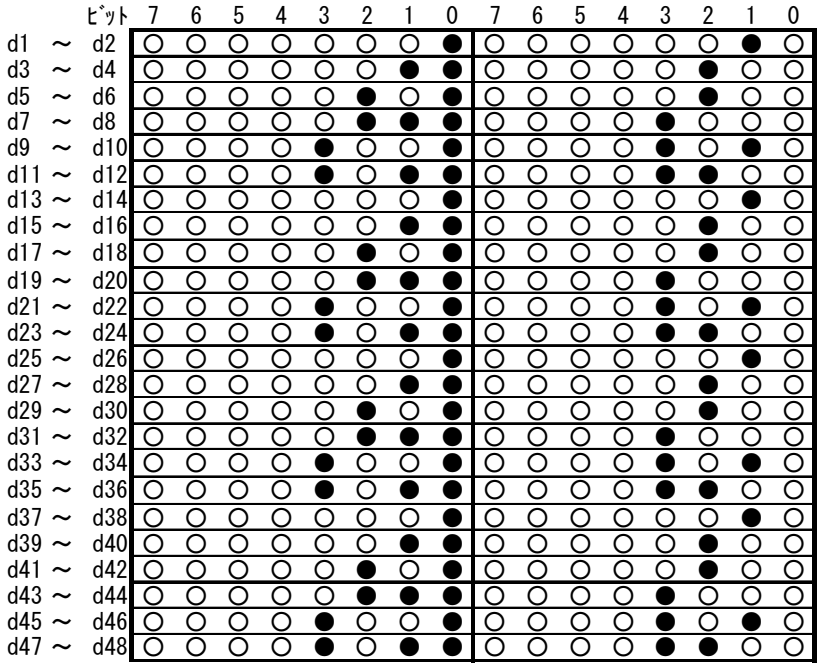
[Format] 1DH, 28H, 45H, pL, pH, fn, x, c1, c2, [y d 1… d(x × y)]k

[Valid limits] 5 ≤(pL+pH×256) ≤65535
fn=9
x=1 (for font C selection)
x=2 (for selections except font C)
128≤c1≤c2≤255
0≤y≤24 (for font A selection)
0≤y≤17 (not support)
0≤y≤4 (for font B selection)
0≤y≤16 (for font C selection)
0≤d≤255
k=c2-c1+1

[Function] (1) It defines the data by character unit, targeting the character code page in the operation (RAM). The definition data processes the character pattern as a column-type data.

(2) This function activates only in the user setting mode.

(3) The data configuration is shown as below (horizontal 12 dot × vertical 24 dot)



←All data in the odd byte line becomes print data Bit7~Bit 4 in the even byte line becomes print data Even after "1" is specified to Bit 3-Bit 0, it will not prinnt.

<Function 10> GS (E pL pH fn c1 c2

[Format] 1DH, 28H, 45H, pL, pH, fn, c 1, c 2

[Valid limits] (pL+pH×256)=3 (pL=3, pL=0)
fn=10
128≤c1≤c2≤255

[Function] (1) It clears the data by the character unit, targeting the character code page in the operation (RAM). It is filled by space pattern (no printing dot) after clearing data.

(2) This function activates only in the user setting mode.

<Function 11> GS (E pL pH fn a d1…d k

[Format] 1DH, 28H, 45H, pL, pH, fn, a , d1…dk

[Valid limits] 3 ≤ (pL+pH×256) ≤ 65535 (0 ≤ pL ≤ 255, 0 ≤ pH ≤ 255)
fn=11
1 ≤ a ≤ 4
48 ≤ d ≤ 57
1 ≤ k ≤ 6

[Initial value] Initial value of a=1: (d1…dk)="115200"
Initial value of a=2: d1=48
Initial value of a=3: d1=48
Initial value of a=4: d1=56

[Function] (1) a sets the designated serial interface communication conditions to d.

a	Communication conditions	d specification
1	Baud rate	K byte of (d1…dk)
2	Parity	1 byte of (d1)
3	Flow control	1 byte of (d1)
4	Data length	1 byte of (d1)

(d1…dk) changes to the setting of the baud rate. The baud rate that is possible for definition is shown as below:

Baud rate	d1	d2	d3	d4	d5	d6
2400	50	52	48	48	-	-
4800	52	56	48	48	-	-
9600	57	54	48	48	-	-
19200	49	57	50	48	48	-
38400	51	56	52	48	48	-
57600	53	55	54	48	48	-
115200	49	49	53	50	48	48

d1 changes the designated parity.

d1	Parity setting
48	Without parity
49	Odd number parity
50	Even number parity

d1 changes the designated flow control setting.

d1	Flow control setting
48	DSR/DTR control
49	XON/XOFF control

d1 changes the data length setting.

d1	Data length setting
55	7 bit long
56	8 bit long

(2) This command ignores the invalid value that designated by a, d1. (No changes to the setting)

(3) This function activates only in the user setting mode.

(4) The non-parity of 7 bit long data is not supported.
The designation becomes invalid.
The following designated order becomes invalid:
a. 8 bit / during non-parity setting, designate 7 bit
b. 7 bit / during odd- or even-number parity setting, designate non-parity

<Function 12> GS (E pL pH fn a

[Format] 1DH, 28H, 45H, pL, pH, fn, a

[Valid limits] (pL+pH×256)=2 (pL=2, pH=0)
fn=12
1 ≤ a ≤ 4

[Function] (1) It transmits the communication conditions of the serial interface that designated by a.

a	Communication conditions
1	Baud rate
2	Parity
3	Flow control
4	Data length

	Hex	Decimal	Data number
Header	37H	55	1 byte
Identification	33H	51	1 byte
Types of communication conditions	30H~34H	49~52	1 byte
Division mark	1FH	31	1 byte
Value Setting	30H ~ 39H	48 ~57	1~6 bytes
N U L	00H	0	1 byte

(2) Configuration of the value setting

Baudrate designation (a=1)

Baudrate setting	Transmission data					
	First byte	Second byte	Third byte	Fourth byte	Fifth byte	Sixth byte
2400	50	52	48	48	-	-
4800	52	56	48	48	-	-
9600	57	54	48	48	-	-
19200	49	57	50	48	48	-
38400	51	56	52	48	48	-
57600	53	55	54	48	48	-
115200	49	49	53	50	48	48

Parity designation (a=2)

Parity setting	Transmission data
	First byte
Without parity	48
Odd number parity	49
Even number parity	50

Flow control designation (a=3)

Flow control setting	Transmission data
	First byte
DSR/DRT control	48
XON/XOFF control	49

Data length designation (a=4)

Data length setting	Transmission data
	First byte
7 bit long	55
8 bit long	56

(3) This command ignores the invalid designated value by a.

GS (H pL pH fn m

[Designation] Request to response sending.

[Format] 1DH, 28H, 48H, pL, pH, fn, m

[Function] (1) It is selected processing about the response.
pL, pH is m and it designates the subsequent byte value as (pL+pHx256).
It also executes the functions that are designated by the function code (fn).
m refers to specifications every each function.

fn	Function No.	Code	Function
48	Function 48	GS (H pL pH fn m d1 d2 d3 d4	Selection of the process ID response.
49	Function 49	GS (H pL pH fn m d	Selection of the offline response.

(2) fn=49 is not supported. This command is skipped when received.

<Function 48> GS (H pL pH fn m d1 d2 d3 d4

[Designation] Selection of the process ID response.

[Format] 1DH, 28H, 48H, pL, pH, fn, m, d1, d2, d3, d4

[Valid limits] (pL+pH×256)=6 (pL=6, pH=0)
fn=48
m=48
32 ≤ d ≤ 126

[Function] (1) Appointed process ID(d1,d2,d3,d4) is connected with the data which I handled just before that. And it is saved.

	Hex	Decimal	Data number
Header	37H	55	1 byte
Identification	22H	34	1 byte
Process ID (d1, d2, d3, d4)	20H~7EH	32~126	4 byte
N U L	00H	0	1 byte

(2) The reply as follows. （The numerical value is a hex digit）.

<Example.1> Cover open at printing

a) Data send Print data + LF
b) Command send 1D 28 48 06 00 30 30 46 46 46 46
c) ASB 3C 40 00 FF (Cover open at printing.)
d) ASB 14 00 00 FF (Cover close.)
e) Command response 37 22 46 46 46 46 00

<Example.2> continuity printing.

a) Data send Print data + LF
b) Command send 1D 28 48 06 00 30 30 30 30 31 35
c) Data send Print data + LF
d) Command send 1D 28 48 06 00 30 30 30 30 31 36
e) Data send Print data + LF
f) Command send 1D 28 48 06 00 30 30 30 30 31 37
g) Data send Print data + LF
h) Command send 1D 28 48 06 00 30 30 30 30 31 38
g) Data send Print data + LF
h) Command send 1D 28 48 06 00 30 30 30 30 31 39
g) Data send Print data + LF
h) Command send 1D 28 48 06 00 30 30 30 30 31 41
g) Data send Print data + LF
h) Command send 1D 28 48 06 00 30 30 30 30 31 42

i) Command response 37 22 30 30 31 35 00
j) Command response 37 22 30 30 31 36 00
k) Command response 37 22 30 30 31 37 00
l) Command response 37 22 30 30 31 38 00
m) Command response 37 22 30 30 31 39 00
n) Command response 37 22 30 30 31 41 00
o) Command response 37 22 30 30 31 42 00

<Function 49> GS (H pL pH fn m d

[Designation] Selection of the offline response.

[Format] 1DH, 28H, 48H, pL, pH, fn, m, d1, d2, d3, d4

[Valid limits] (pL+pH×256)=3 (pL=3, pH=0)
fn=49
m=49
0 ≤ d ≤ 2 , 48 ≤ d ≤ 50

[Initial value] d = 0

[Function] (1) This command is not-supported.

GS (K pL pH fn m

[Designation] Printing control method selection

[Format] 1DH, 28H, 4BH, pL, pH, fn, m

[Function] (1) Function code (fn) sets the designated print control.

(2) This command is not supported.

GS (L pL pH m fn [parameter]

GS 8 L p1 p2 p3 p4 m fn [parameter]

[Designation] Graphics data designation

[Format] 1DH, 28H, 4CH, pL, pH, m, fn, [parameter]
1DH, 38H, 4CH, p1, p2, p3, p4, m, fn, [parameter]

*The format of GS (L is used to explain the different functions.
GS (L and G S 8 L are the same functions.
As for the different functions, once the [parameter]is over 65535 bytes, GS 8 L is used.

[Function] (1) Function code (fn) executes the designated graphics data processing.

fn	Format	Function No.	Function
0,48	GS (L pL pH m n	Function 48	Transmits the NV graphics memory capacity
2,50	GS (L pL pH m n	Function 50	Prints the stored graphics data in the print buffer
3,51	GS (L pL pH m n	Function 51	Transmits the NV graphics memory remaining capacity
64	GS (L pL pH m n d1 d2	Function 64	Transmits the NV graphics defined key code list
65	GS (L pL pH m n d1 d2 d3	Function 65	Clears all the NV graphics data collectively.
66	GS (L pL pH m n kc1 kc2	Function 66	Clears the designated NV graphics data
67	GS (L pL pH m n a kc1 kc2 b xL xH yL yH [c d1…dk]1…[c d1…dk]b	Function 67	Defines the raster format graphics data as non-volatile memory.
69	GS (L pL pH m n kc1 kc2 x y	Function 69	Prints the designated NV graphics
112	GS (L pL pH m n a bx by c xL xH yL yH d1…dk	Function 112	Stores the raster format graphics data to the print buffer.

pL,pH designates the subsequent byte counts of m as (pL+pHx256).

(2) Using this command often may cause destruction of the non-volatile memory.
Use this command that writes data to the non-volatile memory less than 10 times per day.

<Function 48> GS (L pL pH m f n

[Format] 1DH, 28H, 4CH, pL, pH, m, fn,

[Valid limits] (pL+pH×256)=2 (pL=2, pH=0)
m=48
fn=0, 48

[Function] (1) It transmits the total capacity of the NV graphics area in byte counts.

	Hex	Decimal	Data number
Header	37H	55	1 byte
Identification	30H	48	1 byte
Data	30H ~ 39H	48 ~57	1~8 byte
N U L	00H	0	1 byte

(2) The total capacity is expressed in decimal, changes to character code and transmits from the top digit.
The data number becomes a changeable length.
It is possible to designate the total definition area from one of the [384K, 448K, 512K, 576K]bytes from GS (E. The initial value is 384 byte.

<Function 50> GS (L pL pH m f n

[Format] 1DH, 28H, 4CH, pL, pH, m, fn

[Valid limits] (pL+pH×256)=2 (pL=2, pH=0)
m=48
fn=2, 50

[Function] (1) The process of <Function 112> prints the print buffer stored in the graphics data.
(2) It executes the paper-feed equivalent to the dot count in the Y-direction graphics stored in the printer buffer.

<Function 51> GS (L pL pH m fn

[Format] 1DH, 28H, 4CH, pL, pH, m, fn,

[Valid limits] (pL+pH×256)=2 (pL=2, pH=0)
m=48
fn=3, 51

[Function] (1) The NV graphics area transmits the remaining quantity (byte count of the unused area).

	Hex	Decimal	Data number
Header	37H	55	1 byte
Identification	31H	49	1 byte
Data	30H ~ 39H	48~57	1~8 bytes
N U L	00H	0	1 byte

(2) The remaining capacity quantity is expressed in decimal, changes to character code and transmits from the top digit.
The data number becomes a changeable length.

<Function 64> GS (L pL pH m fn d1 d2

[Format] 1DH, 28H, 4CH, pL, pH, m, fn, d1, d2

[Valid limits] (pL+pH×256)=4 (pL=4, pH=0)
m=48
fn=64
d1=75
d2=67

[Function] (1) It transmits the designated NV graphics key code list
With the key code

	Hex	Decimal	Data number
Header	37H	55	1 byte
Identification	72H	114	1 byte
Status	40H or 41H	64 or 65	1 byte
Data	30H ~ 39H	48~57	2~80 bytes
N U L	00H	0	1 byte

Without the key code

	Hex	Decimal	Data number
Header	37H	55	1 byte
Identification	72H	114	1 byte
Status	40H	64	1 byte
N U L	00H	0	1 byte

(2) It divides and transmits the key code with the upper limits of 40 when over 40 key codes exist.
The status is 41H if the continuous transmission data group exists.
The status is 40H if the continuous transmission data group does not exist.

(3) It receives a response from the host after transmission from the header to NUL and executes the following process corresponding to the response.

Status (with continuous block): Hex=41H/Decimal =65

Response		Processing items
ASCII	Decimal	
ACK	6	Transmits the next data group
NAK	21	Re-transmits the prior data group
CAN	24	Stops the process

Status (final block): Hex=40H/Decimal =64

Response		Processing items
ASCII	Decimal	
ACK	6	Finishes the process
NAK	21	Re-transmits the prior data group
CAN	24	Stops the process

<Function 65> GS (L pL pH m fn d1 d2 d3

[Format] 1DH, 28H, 4CH, pL, pH, m, fn, d1, d2, d3

[Valid limits] (pL+pH×256)=5 (pL=5, pH=0)
m=48
fn=65
d1=67
d2=76
d3=83

[Function] (1) It clears the NV graphics total definition data collectively.

<Function 66> GS (L pL pH m fn kc1 kc2

[Format] 1DH, 28H, 4CH, pL, pH, m, fn, kc1, kc2

[Valid limits] (pL+pH×256)=4 (pL=4, pH=0)
m=48
fn=66
d1=67
32 ≤ kc1 ≤ 126
32 ≤ kc2 ≤ 126

[Function] (1) Key code (kc1,kc2) clears the designated NV graphics data.

<Function 67> GS (L pL pH m fn a kc1 kc2 b xL xH yL yH [c d1…dk]1… [c d1…dk]b

[Format] 1DH, 28H, 4CH, pL, pH, m, fn, a, k c1, k c2, b, xL, xH , yL, yH, [c d1…dk]1…[c d1…dk]b

[Valid limits] (1) GS (L parameter
3 ≤ (pL+pH×256) ≤ 65535 (0 ≤ pL ≤ 255, 0 ≤ pH ≤ 255)

(2) GS 8 L parameter
3 ≤ (p1+p2x256+p3x65535+p4x16777216) ≤ 4294967295
(0 ≤ p1 ≤ 255, 0 ≤ p2 ≤ 255,0 ≤ p3 ≤ 255, 0 ≤ p4 ≤ 255)

(3) GS (L /GS 8 L common parameter
m=48
fn=67
a=48
32≤≦kc1≤≦126
32≤≦kc2≤≦126
b=1,2
1 ≤ (xL+xH×256) ≤ 8192
1 ≤ (yL+yH×256) ≤ 2304
c=49 (single-color paper designation)
c=49, 50 (two-color paper designation)
0 ≤ d≤ 255
k=(int((xL+xH×256)+7)/8)×(yL+yH×256)

It is possible to designate the total definition area from one of the[384K, 448K, 512K, 576K]byte from GS (E. The initial value is 384 K bytes.

[Function] (1) The raster format defines the graphics data to the non-volatile memory.
b designates the color number of the defined data.
xL, xH designates the horizontal direction of the defined data as (xL+xHx256) dot.
yL, yH designates the vertical direction of the defined data as (yL+yHx256) dot.
c designates the color of the defined data.

c	Defined data color
49	First color
50	Second color

The first color indicates the black color (high energy) of designated double-color thermal paper.
The second color indicates the red color (low energy) of designated double-color thermalpaper.

(2) If a number of colors are designated by b, or the same color is selected by c, the command process stops, validates the defined data up to that point and skips the remaining data.

(3) If this command is processed in the state defined by NV bit image of FS q, it defines the data according to this function after clearing all of the NV bit images.

<Function 69> GS (L pL pH m fn kc1 kc2 x y

[Format] 1DH, 28H, 4CH, pL, pH, m, fn, kc1, kc2, x, y

[Valid limits] (pL+pH×256)=6 (pL=6, pH=0)
m=48
fn=69
32 ≤ kc1 ≤ 126
32 ≤ kc2 ≤ 126
x=1, 2
y=1, 2

[Function] (1) Key code (kc1, kc2) prints the defined NV graphics data with horizontal x times/vertical y times.

<Function 112> GS (L pL pH m fn a bx by c xL xH yL yH d1…dk

[Format] 1DH, 28H, 4CH, pL, pH, m, fn, a, bx, by, c, xL, xH, yL, yH, d1…dk

[Valid limits] (1) GS (L parameter
11 ≤ (pL+pH×256) ≤ 65535 (0 ≤ pL ≤ 255, 0 ≤ pH ≤ 255)
(2) GS 8 L parameter
11 ≤ (p1+p2×256+p3×65535+p4×16777216) ≤ 4294967295
(0 ≤ p1 ≤ 255, 0 ≤ p2 ≤ 255, 0 ≤ p3 ≤ 255, 0 ≤ p4 ≤ 255)
(3) GS (L / GS 8 L common parameter
m=48
fn=112
a=48
bx=1, 2
by=1, 2
c=49 (single-color paper designation)
c=49, 50 (two-color paper designation)
1 ≤ (xL+xH×256) ≤ 1024

Single-color paper designation
1 ≤ (yL+yH×256) ≤ 1662 (by=1)
1 ≤ (yL+yH×256) ≤ 831 (by=2)

Two-color paper designation
1 ≤ (yL+yH×256) ≤ 831 (by=1)
1 ≤ (yL+yH×256) ≤ 415 (by=2)

0 ≤ d ≤ 255
k=(int((xL+xH×256)+7)/8)×(yL+yH×256)

[Function] (1) The raster format stores the graphics data in the print buffer by horizontal bx times/vertical by times.
xL, xH designates the defined data horizontal direction as (xL+xHx256) dot.
yL, yH designates the defined data vertical direction as (yL+yHx256) dot.
c designates the defined data color.

c	Color of the defined data
49	First color
50	Second color

The first color indicates the black color (high energy) of the designated two-color thermal paper.
The second color indicates the red color (low energy) of the designated two-color thermal paper.

GS (M pL pH fn n

[Designation] Customize the printer

[Format] 1DH, 28H, 4DH, pL, pH, fn, n

[Function] (1) It executes the processing of the value setting in the operation area by different commands or the save/ return of the defined data.

Fn	Function No.	Function
1,49	Function 1	Copies the value setting stored in the operation to storage area.
2,50	Function 2	Copies the value setting stored in storage to the operation area.
3,51	Function 3	Designates the value setting auto-load function as valid or invalid during the initialization.

Operation area: volatile memory (RAM)
Storage area: non-volatile memory (flash ROM)

(2) List of the commands that are processed by this function

Value setting	Command
About status	ESC c 3, GS a
Definition data	GS :
About character Character type	 ESC M, ESC R, ESC t ,
Decoration	ESC !, ESC -, ESC E, ESC G, ESC V, ESC {, GS !, GS B, GS b, GS (N
Other	ESC SP, ESC 2, ESC 3
Barcode	GS H, GS f, GS h, GS w
Two-dimension barcode (QR)	GS (k <function 065>~<function 070>
Two-dimension barcode (PDF417	GS (k <function 065>~<function 070>
Printing position	ESC D, ESC T, ESC a, GS L, GS W
Other	ESC c 4 ,ESC c 5, GS (D, GS P

<Function 1> GS (M pL pH f n m

[Format] 1DH, 28H, 4DH, pL, pH, fn, m

[Valid limits] (pL+pH×256)=2 (pL=2, pH=0)
fn=1,49
m=1,49

[Function] (1) It copies the value setting stored in the operation area to the storage area

(2) Using this command often may cause destruction of the non-volatile memory.
Use this command that writes data to the non-volatile memory less than 10 times per day.

<Function 2> GS (M pL pH fn m

[Format] 1DH, 28H, 4DH, pL, pH, fn, m

[Valid limits] (pL+pH×256)=2 (pL=2, pH=0)
fn=2,50
m=0, 1, 48, 49

[Function] (1) (m=0, 48) initializes the total value settings of the operation area as recorded values in the specification.

(2) (m=1,49) copies the value settings stored in the storage to the operation area
But , if the saved data in storage does not exist, it changes to the initial values recorded in the specification.

<Function 3> GS (M pL pH fn m

[Format] 1DH, 28H, 4DH, pL, pH, fn, m

[Valid limits] (pL+pH×256)=2 (pL=2, pH=0)
fn=3,51
m=0, 1, 48, 49

[Function] (1) (m=0,48) does not execute the load processing from the storage to the operation area during initialization.

(2) (m=1,49) executes the load processing from the storage to the operation area during the initialization.

GS (N pL pH fn [parameter]

[Designation] Designates character decoration

[Format] 1DH, 28H, 4EH, pL, pH, fn, [parameter]

[Function] (1) Function code (fn) executes the process regarding the designated character decoration.

fn	Format	Function No.	Function
48	GS (N pL pH fn m	Function 48	Selects the character color

<Function 48> GS (N pL pH fn m

[Format] 1DH, 28H, 4EH, pL, pH, fn, m

[Valid limits] (pL+pH×256)=2 (pL=2, pH=0)
fn=48
m=49 (single-color paper setting)
m=49, 50 (double-color paper setting)

[Initial value] m=49

[Function] (1) This subsequent command character prints the color designated by m.

m	Character color
49	First color
50	Second color

The first color indicates the black color (high energy) of the designated double-color thermal paper.
The second color indicates the red color (low energy) of the designated double-color thermal paper.

GS T n

[Designation] Moves printing position to the beginning of the line

[Format] 1DH, 54H, n

[Valid limits] n=0, 1, 48, 49

[Function] (1) It moves the printing position to the beginning of the line.

n designates the data processing in the print buffer during the execution of this command.

n	Function
0, 48	Moves the printing position after clearing the data in the print buffer
1, 49	Moves the printing position after printing the data in the print buffer

(2) It executes the data printing in the printing buffer and line-feed based on the setting line-feed quantity during the print designation (n=1,49).

(3) It executes the cancellation process of the printing data inside the current printing buffer and maintains other data and setting during the clearing designation (n=0,48).

The two-dimensional barcode

GS (k pL pH cn fn [parameter]

[Designation] Setting and the printing of the symbol

[Valid limits] ----

[Function] (1) It moves the printing position to the beginning of the line.

(2) the kind of the symbol a list shown below.

cn	Kind of symbol
48	Not defined
49	QR Code
57	Not defined

(3) Function Code (fn)

Cn	fn	Code	Func No.	Function
49	65	GS (k pL pH cn fn n1 n2	165	QRCode(model)
	67	GS (k pL pH cn fn n	167	QRCode(module size)
	69	GS (k pL pH cn fn n	169	QRCode(Error Level)
	80	GS (k pL pH cn fn m d1……dk	180	Symbol data save
	81	GS (k pL pH cn fn m	181	Print bar code.
	82	GS (k pL pH cn fn m	182	Size information

(4) At the time of the errors such as parameter errors, the command is ignored.

<Function 165> GS (k pL pH cn fn n1 n2

[Designation] Select a model (QR)

[Format] 1DH, 28H, 6BH, pL, pH, cn, fn, n1,n2

[Valid limits] pL=4, pH=0
cn=49
fn=65
n1 =49, 50, 51
n2 =0

[Initial value] n1 = 50 / n2 = 0

[Function] (1) Select a model
n1 = 49: MODEL 1
n1 = 50: MODEL 2
n1 = 51: MICRO QR

(2) This becomes the initial value by an initialization command (ESC @).

<Function 167> GS (k pL pH cn fn n

[Designation] Setting of module size (QR code)

[Format] 1DH, 28H, 6BH, pL, pH, cn, fn, n

[Valid limits] pL=3, pH=0
cn=49
fn=67
$1 \leq n \leq 16$

[Initial value] n = 3

[Function] (1) Set the size of one module of the symbol to a n dot.

(2) This becomes the initial value by an initialization command (ESC @).

[Note] (1) The size of one module recommends more than 3 dots.

<Function 169> GS (k pL pH cn fn n

[Designation] Setting of Error level(QR code)

[Format] 1DH, 28H, 6BH, pL, pH, cn, fn, n

[Valid limits] pL=3, pH=0
cn=49
fn=69
48 ≤ n ≤ 51

[Initial value] n = 48

[Function] (1) set the error correction level of the symbol.

n	function	Ability for reconstruction
48	Error Correction Level L	7
49	Error Correction Level M	15
50	Error Correction Level Q	25
51	Error Correction Level H	30

(2) This becomes the initial value by an initialization command (ESC @).

(3) At the time of the microQR cord, it cannot select error correction level H.

<Function 180> GS (k pL pH cn, fn, m, d1……dk

[Designation] Save the symbol data (QR code)

[Format] 1DH, 28H, 6BH, pL, pH, cn, fn, m, d1……dk

[Valid limits] 4 ≤ (pL+pH×256) ≤ 7092 （0 ≤ pL ≤ 255, 0 ≤ pH ≤28）
cn=49
fn=80
m=48,
0≦d≦255
k=(pL+pH×256)-3

[Initial value] --

[Function] (1) Save the symbol data.

(2) This becomes the initial value by an initialization command (ESC @).

<Function 181> GS (k pL pH cn fn m

[Designation] Print the symbol (QR code)

[Format] 1DH, 28H, 6BH, pL, pH, cn, fn, m

[Valid limits] pL=3, pH=0
cn=49
fn=81
m=48,

[Initial value] --

[Function] (1) Print the symbol.

(2) Please secure the quiet zone in the user side.

<Function 182> GS (k pL pH cn fn m

[Designation] Get the symbol information (QR code)

[Format] 1DH, 28H, 6BH, pL, pH, cn, fn, m

[Valid limits] pL=3, pH=0
cn=49
fn=82
m=48,

[Initial value] --

[Function] (1) Send the symbol size information.

Send data	Hex	Dec	Numberof
Header	37H	55	1 byte
Identifier	36H	54	1 byte
H-size	Fixed 30H	Fixed 48H	1 byte
separation	1FH	31	1 byte
V-size	Fixed 30H	Fixed 48H	1 byte
separation	1FH	31	1 byte
FIXED	31H	49	1 byte
separation	1FH	31	1 byte
Other Info.	30H or 31H	48 or 49	1 byte
Null	00H	0	1 byte

(2) 「Other Info」:
[30H / 48] indicate printable state.
[31H / 49] indicate can not print.

Initial Operations

	Power is switched on or a reset signal is received	Initialize printer (ESC @)
Cutter operation	Initialization	-
Reception buffer	Cleared	-
Page mode expansion buffer	Cleared	Cleared
Printing on-hold buffer	Cleared	Cleared
Print buffer	Cleared	Cleared
Character's right-hand side space	0	0
Character font selection	Font A	Font A
Emphasized printing	Canceled	Canceled
ANK double character height	Canceled	Canceled
ANK double character width	Canceled	Canceled
ANK underline mode	Canceled	Canceled
User-defined download character set	Canceled	Canceled
User-definable download character	To be defined	To be defined
Underline mode	Canceled	Canceled
ANK underline width	1-dot	1-dot
International character	Cleared（America)	Cleared (America)
90-degree character rotation	Canceled	Canceled
Character code table	Page 0 (PC 437)	Page 0 (PC 437)
Inverted character	Canceled	Canceled
Character size	Single (vertical) Single (horizontal)	Single (vertical) Single (horizontal)
Black & white reverse printing	Canceled	Canceled
Smoothing	Canceled	Canceled
Print position	Left end (character position 1)	Left end (character position 1)
Horizontal tab position	Every 8 characters	Every 8 characters
Character printing direction in page mode	From the left to the right	From the left to the right
Character printing area setting of the page mode	Starting point: 1 dot Right edge: 576 dots	Starting point: 1 dot Right edge: 576 dots
Vertical character printing position in page mode	Starting point: 1 dot Bottom edge: 831 dots	Starting point: 1 dot Bottom edge: 831 dots
Left margin	Left edge (First digit)	Left edge (First digit)
Printing width	576 dots	576 dots
Positional alignment	Left justification	Left justification
Bit image mode	Canceled	-
NV bit image printing	Canceled	-
NV bit image definition	Retained	-
User-defined download bit image definition	Undefined	Undefined
User-defined download bit image printing	Canceled	-
Raster bit image printing	Canceled	-
Marco definition	To be defined	-
Macro definition execution	Canceled	-
HRI character printing position	No print	No print
HRI character typeface	Font A	Font A

	Power is switched on or a reset	Initialize printer (ESC @)

	signal is received	
Barcode height	20.3 mm	20.3 mm
Barcode printing	Canceled	-
Barcode horizontal size	3 times	3 times
Line spacing	3.75 mm	3.75 mm
Paper cut	Canceled	-
Paper end detectors to stop printing	Roll paper near end detector disabled	Roll paper near end detector disabled
Status real-time transmission	Canceled	-
Automatic status back	Canceled	-
Status transmission	Canceled	
Peripheral device status data transmission	Canceled	-
Paper detector status data transmission	Canceled	-
Panel switch	Enabled	Enabled
Page mode selection	Canceled	Canceled
Pulse generation	Canceled	-
Printer ID transmission	Canceled	-
Basic calculated pitch specification	X=203, y=406	X=203, y=406
Real time output of the designated pulse	Canceled	-
Graphic data specification	Retain	-
Character decoration specification	First color	First color

Transmission Status Identification

(1) As the status transmitted by this command has fixed bit numbers, identifying the command status by the bit number is possible.

(2) First confirm the first byte and process the three succeeding bytes exclusive of XOFF as ASB data when using ASB.

(3) If confirmation is not carried out, the statuses like ESC u and the statuses of ASB after the second byte cannot be identified.

Command and function	Status
GS I	<0**0****>b
GS r	<0**0****>b
ESC u	<0**0****>b
ESC v	<0**0****>b
XON	<00010001>b
XOFF	<00010001>b
DLE EOT 1 to 4	<0**1**10>b
ASB (first byte)	<0**1**00>b
ASB (2^{nd} to 4^{th} byte)	<0**0****>b

Effective invalidity of the ornamentation

O：Enable、*：Disable、Blank：Print data canceled.

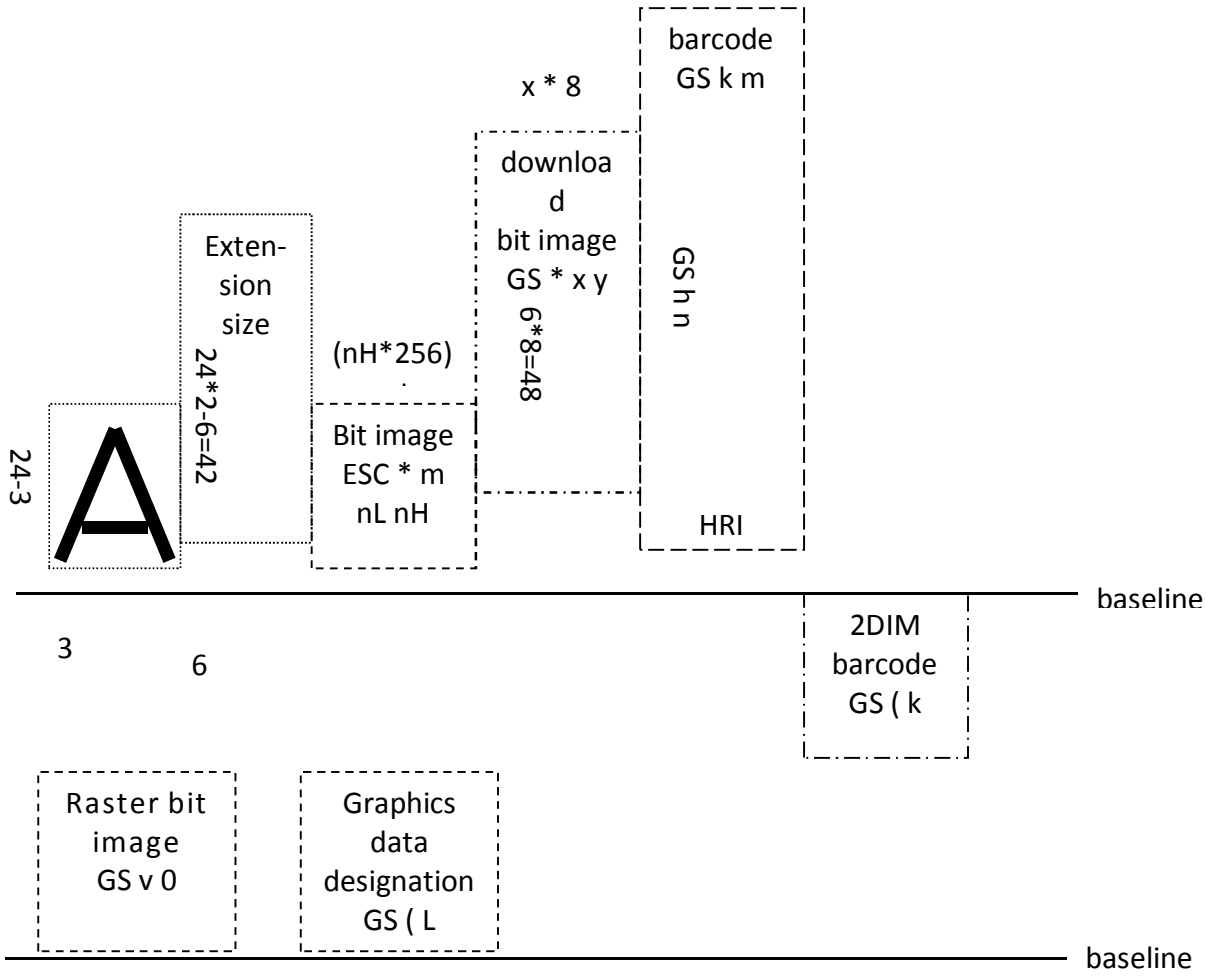
(1) Standard Mode

ornamentation / data	(ESC -)	(ESC E)	(ESC G)	(ESC V)	(ESC {)	(GS !)	(GS B)	(GS b)	(ESC a)	(FS -)	(FS W)
ANK	O	O	O	O	O	O	O	O	O	*	*
Download char	O	O	O	O	O	O	O	O	O	*	*
External char	*	O	O	O	O	O	O	O	O	O	O
(HT)	*	*	*	*	*	*	*	*	O	*	*
(ESC $)	*	*	*	*	*	*	*	*	O	*	*
(ESC \)	*	*	*	*	*	*	*	*	O	*	*
(ESC *)	*	*	*	*	O	*	*	*	O	*	*
(FS q)	*	*	*	*	O	*	*	*	O	*	*
(GS /)	*	*	*	*	O	*	*	*	O	*	*
(GS v 0)	*	*	*	*	*	*	*	*	O	*	*
(GS (L,GS 8 L)	*	*	*	*	O	*	*	*	O	*	*
(GS e v)	*	*	*	*	*	*	*	*	*	*	*
(GS k)	*	*	*	*	O	*	*	*	O	*	*
(GS H)	*	*	*	*	O	*	*	*	O	*	*
(GS (k)	*	*	*	*	O	*	*	*	O	*	*

(2) Page Mode

ornamentation / data	(ESC -)	(ESC E)	(ESC G)	(ESC V)	(ESC {)	(GS !)	(GS B)	(GS b)	(ESC a)	(FS -)	(FS W)
ANK	O	O	O	*	*	O	O	O	*	*	*
Download char	O	O	O	*	*	O	O	O	*	*	*
External char	*	O	O	*	*	O	O	O	*	O	O
(HT)	*	*	*	*	*	*	*	*	*	*	*
(ESC $)	*	*	*	*	*	*	*	*	*	*	*
(ESC \)	*	*	*	*	*	*	*	*	*	*	*
(ESC *)	*	*	*	*	*	*	*	*	*	*	*
(FS q)	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank
(GS /)	*	*	*	*	*	*	*	*	*	*	*
(GS v 0)	*	*	*	*	*	*	*	*	*	*	*
(GS (L,GS 8 L)	*	*	*	*	*	*	*	*	*	*	*
(GS e v)	*	*	*	*	*	*	*	*	*	*	*
(GS k)	*	*	*	*	*	*	*	*	*	*	*
(GS H)	*	*	*	*	*	*	*	*	*	*	*
(GS (k)	*	*	*	*	*	*	*	*	*	*	*

Development position with the page mode



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