Thermal Line Printer
RX831-H120/80
Technical Manual (V1.2)

CONTENTS

Record of Revisions

Revision Version	Date	DESCRIPTION
1.1	2017.09.19.	Preliminary 1.1 Release
1.2	2018.01.16.	Change Dip S/W Information & Address

1   GENERAL SPECIFICATIONS

1.1   Printer Specifications

1.1.1 Printing method   :   Thermal line printing

1.1.2 Dot density   :   203 dpi   x   203 dpi

1.1.3 Printing direction   :   Unidirectional with friction feed

1.1.4 Printing width   :   72mm (576 Dot)

1.1.5 Characters per line

When FONT A is selected	When FONT B is selected	Kanji/China(GB18030) (option)
48	64	24

1.1.6 Character spacing (default)

- Font A   :   0.25mm (2dots)

- Font B   :   0.25mm (2dots)

- Kanji/China :   0mm (0dots) (default)

    Programmable by control command (in increments of 0.125mm)

1.1.7 Printing speed   :   Approximately Max. 200mm/sec

1.1.8 Paper feed speed   :   Approximately Max. 200mm/sec

1.1.9 Line spacing (default) :   30 Dots

    Programmable by control command (in increments of 0.125mm)

1.2   Character Specifications

1.2.1 Number of characters   Alphanumeric characters : 95

1.2.2 Characters structure   Font A   : 12 x 24

                                 Font B   : 9 x 17

                                 Multilingual   : 24 x 24

1.2.3 Characters size

	Standard	Double-height	Double width	Double width / Double-height
	W x H	W x H	W x H	W x H
Font A	1.25 x 3.0	1.25 x 6	2.5 x 3.0	2.5 x 6.0
Font B	0.88 x 2.13	0.88 x 4.25	1.76 x 2.13	1.76 x 4.25
Multilingual	3.0 x 3.0	3.0 x 6.0	6.0 x 3.0	6.0 x 6.0

1.3   Receive Buffer
- 4 K Byte

1.4   Electrical Characteristics

1.4.1 Supply voltage :   +24.0   VDC ± 1.2 V

1.4.2 Current consumption (at 24 V, 25 ℃)

PRINTING MODE	STANDBY
MEAN : APPROXIMATELY 1.7A PEAK : APPROXIMATELY 17.6A	APPROXIMATELY 0.5A

 *peak lead time : min 2msec

- PEAK   17.6 A   (576 dots , is pulsed //   0.03083 A / dot //   at 24V)
- 16 A   (519 dots, is pulsed   //   at 24V)

1.5   Environmental conditions

1.5.1 Operating Temperature :   5℃ ~ 55℃

1.5.2 Operating Humidity   :   10% ~ 90 %

1.5.3 Storage   Temperature :   -20℃ ~ 70℃ (except for paper)

1.5.4 Storage Humidity   :   10% ~ 90 %

1.6   Reliability (Tentative)

1.6.1 Print head life (Printing ratio 12.5%)

Pulse durability   : 1×10^8 pulses min.(with heat accumulation control)

Abrasion resistance   :   200km min. with TF50KS-E2C

(NIPPON PAPER INDUSTRLES CO.)

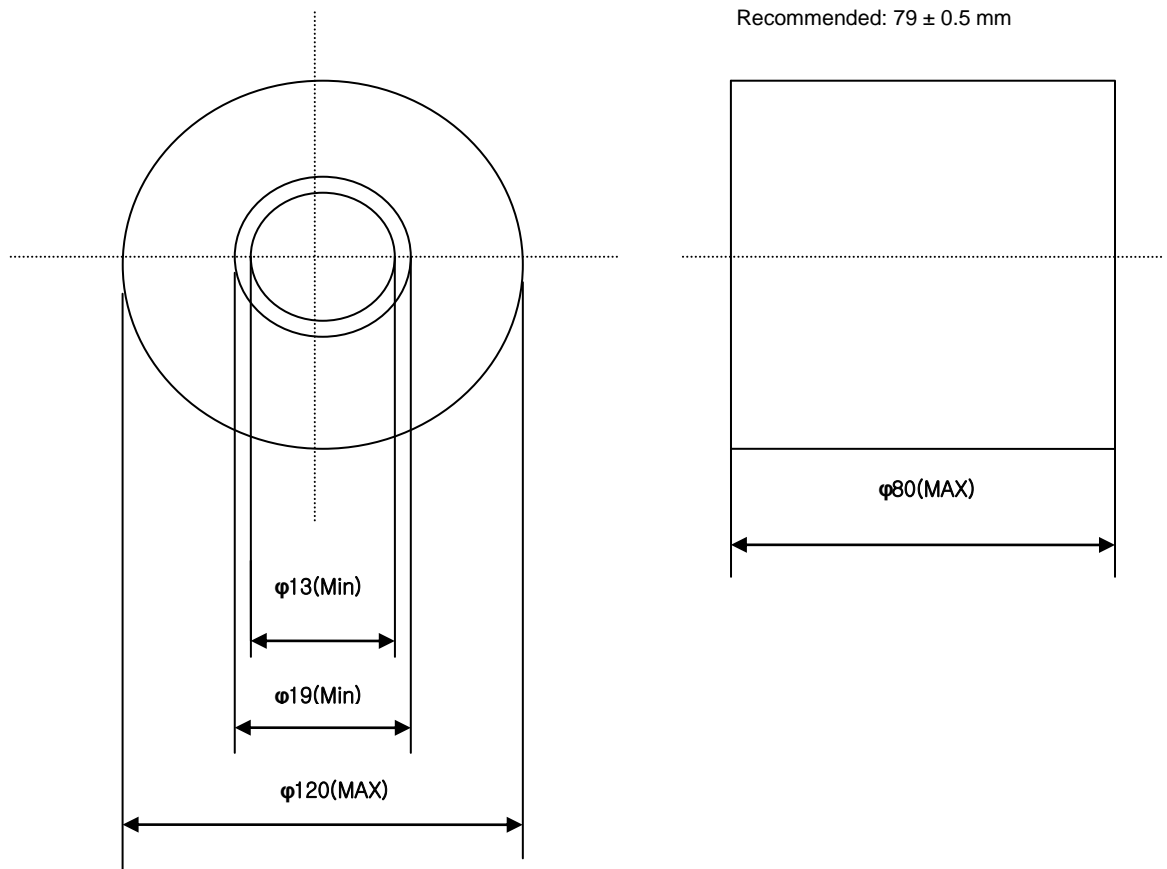Average resistance drift :   -15%≤ (∆Rav/Rav) ≤+15%

1.6.2 Printer mechanism Life

- Approx. 10,000,000 Lines
- MCBF: Approx. 10,000,000 lines

1.7   Thermal paper Specifications

* Materials : Top Coated Thermal Paper   62g ± 2g

* Paper Length : 170 Meter

Recommended: 79 ± 0.5 mm

φ13(Min)

φ19(Min)

φ120(MAX)

φ80(MAX)

1.7.1 Thickness   : 60 ~ 80μ㎜

1.7.2 Width   : 79 ± 0.5 mm

1.7.3 Outer Diameter : Ø 120 mm / Ø 80 mm

1.7.4 Roll Core

     - Inside diameter: Ø13 mm

     - Thickness   : 2~3mm

1.7.5 Strength for drawing-out of core : Greater than 4 kg

1.7.6 Preservation condition

     - Temperature   : 0 ~ 40℃

     - Humidity   : 30 ~ 80 % RH

1.7.7 Preservation condition

     Do not fold a paper and stain it with a adhesive.

2 CONFIGURATION

2.1 Interfaces

2.1.1 RS-232 Serial Interface

2.1.1.1 Specifications

- Data transmission   : Serial
- Synchronization   : Asynchronous
- Handshaking   : Hard Ware (DTR) / Soft Ware (Xon/ Xoff)
- Signal levels   mark = -3 to -15 V : logic "1" / off
                Space = +3 to +15 V : logic "0" / on
- Baud rate   : 9600, 19200, 38400, 115200 Bps
- Data word length   : 8 bits
- Parity Settings   : None , Even, Odd
- Stop bits   : 1
- Connector (printer side) :   DSUB   9PIN   Mail

2.1.1.2 Switching between online and offline

The printer does not have an on-line/off-line button. The printer goes online or off-line under the following condition.

<Conditions to go off line>

- Between when the power is turned on and when the printer is ready to receive data
- During the self-test.
- When the head module is open
- When the printer stops printing due to a paper end or error occurred

<Conditions to go on line>

- Automatically after the time when the power is turned on (including reset using the interface) when the printer is ready to receive data.
- Automatically after the self-test.
- Interface connector terminal assignments and signal functions

2.1.2 USB Interface

2.1.2.1 Specifications

- Data transmission   : USB 2.0 Compatible Bulk In / Out
- Connector   : USB   B   Type

2.2 Connectors
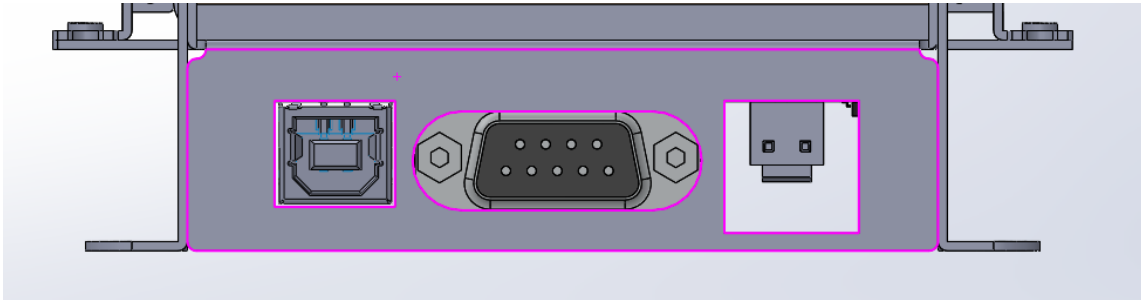
2.2.1 Serial Interface Connectors

- TYPE : DSUB 9 PIN MAIL
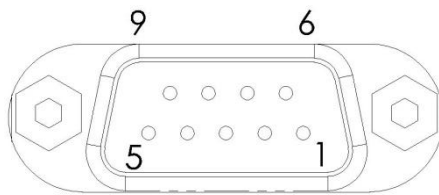
Pin number	Signal name	Signal direction	Function
2	RXD	INPUT	RECEIVE DATA
3	TXD	OUTPUT	TRANSMIT DATA
4	DTR	OUTPUT	PRINTER READY
5	SG	-	SIGNAL GROUND
6	DSR	INPUT	

2.2.2 Power Supply Connector

This connector is used to connector the printer to an external power source.
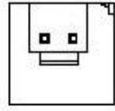
PCB : YAW396-02V
CABLE HOUSING : YH396-02JR

Pin No.	Signal Name	I/O	Description
1	+GND	-	Ground
2	+24V	I	Motor, printer head operating voltage

2.2.3 Near-End Sensor (J8) Connector

Pin No.	Wire Color	Signal Name
1	White	Paper Sensor Input
2	Black	GND
3	Red	VCC(+3.3V)

2.2.4 BUTTON PCB (J13) Connector(OPTION)

Pin No.	Wire Color	Signal Name
1	Black	GND
2		FEED BUTTON
3		PE LED
4		ERROR LED
5		VCC(+3.3V)

REXOD

2.2.5 MECHANISIUM (J2) Connector

Pin No.	Signal Name	Pin No.	Signal Name
1	V$_H$	16	GND
2	V$_H$	17	PE Signal
3	V$_H$	18	V$_{CC}$(+3.3V)
4	CLOCK	19	VCC(+3.3V)
5	LATCH	20	BM Signal
6	/STROBE 2	21	Head Up Signal
7	/STROBE 1	22	Cutter Home Signal
8	TM	23	Cutter Motor /B
9	DATA IN	24	Cutter Motor B
10	/STROBE 3	25	Cutter Motor A
11	/STROBE 4	26	Cutter Motor /A
12	Vdd(3.3V)	27	LF Motor /B
13	GND	28	LF Motor /A
14	GND	29	LF Motor B
15	GND	30	LF Motor A

3 External Dimensions
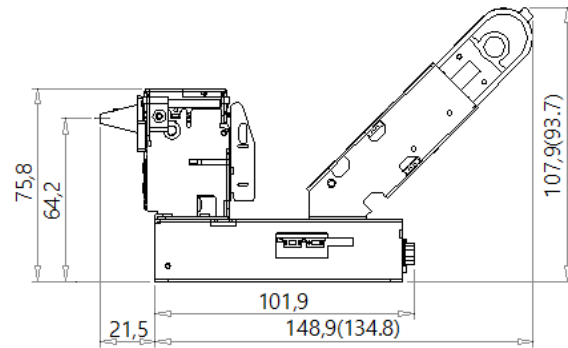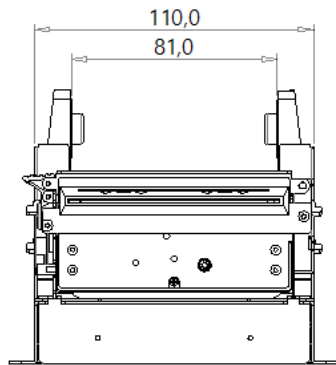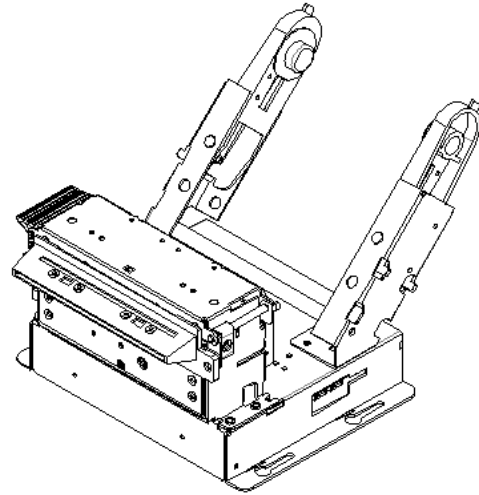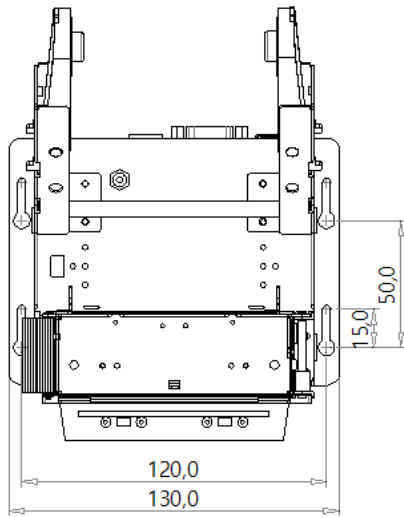
4 FUNCTIONS

4.1 List of Commands

		COMMAND	
1. Control command			
1.1	ESC @		Initialize printer
1.2	FF/GS FF		Print and paper to the next top (when only black mark for positioning)
1.3	LF		Print and line feed
1.4	GS (A		Execute test Print
1.5	ESC J n		Print and paper n vertical motion units
1.6	ESC d n		Print and feed n lines
1.7	HT		Moves the print position to the next horizontal tab position
2 Character Setting command			
2.1	ESC ! n		Set character printing mode
2.2	GS ! n		Set the size of characters
2.3	ESC M n		Set Print Fonts
2.4	ESC – n		Set / cancel underline Print
2.5	ESC E n		Set / cancel bold print
2.6	ESC G n		Set / cancel overlap (bold) printing effect with ESC E
2.7	GS B n		Turn white/black reverse printing mode on/off
2.8	ESC V n		Turn 90° clockwise rotation mode on/off
2.9	FS &		Select Kanji character mode
2.10	FS .		Cancel Kanji character mode
2.11	ESC R n		Select an international character set
2.12	ESC t n		Select character code table
2.13	ESC { n		Turn upside-down printing mode on/off
3 Print layout parameter setting command			
3.1	ESC $ nL nH		Set absolute print position
3.2	ESC D n1 n2…nk NULL		Set horizontal tab positions
3.3	ESC 2		Select default line spacing
3.4	ESC 3 n		Set line spacing
3.5	ESC SP n		Set right-side character spacing
3.6	ESC a n		Select justification
3.7	GS L		Set left margin
4 Graphics / image print command			
4.1	ESC * m nL nH d1…dk		Select bit-image mode

4.2	GS * x y d1…dk	Define downloaded bit image
4.3	GS / n	Print downloaded bit image
4.4	GS v m ...d1…dk	Print raster bit image
4.5	FS p n m	Print NV bit image
4.6	FS q n [xL xH yL yH d1..dk]1 ... [xL xH yL yH d1..dk]n	Define NV bit image
5	**Bar code print command**	
5.1	GS h n	Set bar code height
5.2	GS w n	Set bar code width
5.3	GS H n	Select printing position of HRI characters
5.4	GS f n	Select font for HRI characters
5.5	GS P n	Set horizontal and vertical motion units
5.6	GS k	Print bar code
6	**Printer Status Feedback**	
6.1	DLE EOT n	Real-time status transmission
6.2	GS r	Transmit status
6.3	ESC H	Real-time Transmit status
6.4	ESC Q n	Transmit Printer ID
7	**Cutter Control**	
7.1	GS V m n	Select cut mode and cut paper
7.2	ESC i	Full cut
7.3	ESC m	Partial cut

4.2 Dip Switches

ONE DIP switch are mounted on the RMC8300II.

NO	Function	ON	OFF	Defult
1	Serial Baud Rate	4.2.1 Reference		ON
2				ON
3	Flow Control	DTR	Xon/Xoff	ON
4	BM sensor	Enabled	Disabled	OFF

4.2.1 Serial baud rate Selection

	Baud Rate	Switch Number	
		1	2
1	115200 (Defult)	ON	ON
2	38400	OFF	OFF
3	19200	ON	OFF
4	9600	OFF	ON

4.3 Selt Test

1) The printer has a self-test function that checks the following:

- Control circuit functions

- Status of the printer mechanism which is connected to the RMC8300II

- Print quality

- Interface type and its operating condition

- Control software version

- DIP switch settings

2) Starting the self-test

Self Test Button Pushing

5 COMMANDS

5.1 Command Notation

[Name]   The name of the command.

[Format]   The code sequence.

               [ ]k indicates the contents of [ ] should be repeated k times.

[Range]   Gives the allowable ranges for the arguments.

[Description]   Describes the function of the command.

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

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

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

[Reference]   Lists related commands.

The numbers denoted by < >H are hexadecimal.

The numbers denoted by < >B are binary.

5.2   Control Command

HT

[Name]	Horizontal tab	
[Format]	ASCII	HT
	Hex	09
	Decimal	9

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

[Notes]
• This command is ignored unless the next horizontal tab position has been set.

• If the next horizontal tab position exceeds the printing area, the printer sets the printing position to [printing area width + 1].

• Horizontal tab positions are set with **ESC D**.

• If this command is received when the printing position is at [printing area width +1], the printer executes print buffer-full printing of the current line and horizontal tab processing from the beginning of the next line.

[Reference]   **ESC D**

LF

[Name]	Print and line feed	
[Format]	ASCII	LF
	Hex	0A
	Decimal	10

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

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

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

FF

[Name]	Print and return to standard mode in page mode	
[Format]	ASCII	FF
	Hex	0C
	Decimal	12
[Description]	Prints the data in the print buffer collectively and returns to standard mode.	
[Notes]	• This command is enabled only in page mode.	
	• The buffer data is deleted after being printed.	
	• This command sets the print position to the beginning of the line.	
[Reference]	**ESC FF**, **ESC L, ESC S**	

ESC SP *n*

[Name]	Set right-side character spacing		
[Format]	ASCII	ESC SP	*n*
	Hex	1B 20	*n*
	Decimal	27 32	*n*
[Range]	$0 \leq n \leq 255$		
[Description]	Sets the character spacing for the right side of the character to [n x 0.125 mm]		
[Notes]	• The right-side character spacing for double-width mode is twice the normal value.		
	• When characters are enlarged, the right-side character spacing is *n* times normal value.		
	• This command sets values independently in each mode (standard and page modes).		
[Default]	*n* = 0		

ESC ! *n*

[Name]	Select print mode(s)		
[Format]	ASCII	ESC !	*n*
	Hex	1B 21	*n*
	Decimal	27 33	*n*

[Range]   0 ≤ *n* ≤ 255

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

Bit	Off / On	Hex	Decimal	Function
0	Off	00	0	Character Font A (12x24)
	On	01	1	Character Font B (9x17)
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	Off	00	0	Emphasized mode not selected.
	On	08	8	Emphasized mode selected.
4	Off	00	0	Double - Height mode not selected.
	On	10	16	Double - Height mode selected.
5	Off	00	0	Double - Width mode not selected.
	On	20	32	Double - Width mode selected.
6	-	-	-	Not used.
7	Off	00	0	Underline mode not selected.
	On	80	128	Underline mode selected.

[Notes]   • When both double-height and double-width modes are selected, quadruple-size characters are printed.

• The printer can underline all characters, but cannot underline the space set by **HT** or 90/180/270   clockwise rotated characters

• The thickness of the underline is that selected by ESC - , regardless of the character size.

ESC $ nL nH

[Name]	Set absolute print position			
[Format]	ASCII	ESC	$	*nL*	*nH*
	Hex	1B	24	*nL*	*nH*
	Decimal	27	36	*nL*	*nH*

[Range]   0 ≤ *nL* ≤ 255

0 ≤ *nH* ≤ 255

[Description]   Sets the distance from the beginning of the line to the position at which subsequent characters are to be printed.

•   The distance from the beginning of the line to the print position is [(*nL* + *nH* x 256) x 0.125 mm].

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

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

•   In page mode, horizontal or vertical motion units differ depending on the starting position of the printable area, as follows:

[Reference]   **ESC **

ESC -*n*

[Name]	Turn underline mode on/off		
[Format]	ASCII	ESC	-	*n*

[Format]	ASCII	ESC	-	*n*
	Hex	1B	2D	*n*
	Decimal	27	45	*n*

[Range]   0 ≤ *n* ≤ 255

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

n	Function
0,48	Turns off underline mode
1,49	Turns on underline mode (1 dot thick)
2,50	Turns on underline mode (2 dots thick)
3,51	Turns on underline mode (3 dots thick)
4,52	Turns on underline mode (4 dots thick)
5,53	Turns on underline mode (5 dots thick)
6,54	Turns on underline mode (6 dots thick)
7,55	Turns on underline mode (7 dots thick)
n > 7, n > 55	Turns on underline mode (8 dots thick)

[Notes]   •   The printer can underline all characters (including right-side character spacing), but cannot underline the space set by **HT.**

•   The printer cannot underline 90 clockwise rotated characters and white/black inverted characters.

•   When underline mode is turned off by setting the value of *n* to 0 or 48, the following data is not underlined, and the underline thickness set before the mode is turned off does not change. The default underline thickness is 2 dot.

•   Changing the character size does not affect the current underline thickness.

Underline mode can also be turned on or off by using **ESC !**. Note, however, that the last received command is effective.

[Default]   *n* = 0

[Reference]   **ESC !**

REXOD

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

[Name]	Select bit-image mode

[Format]

	ASCII	ESC	*	*m*	*nL*	*nH*	*d1...dk*
	Hex	1B	2A	*m*	*nL*	*nH*	*d1...dk*
	Decimal	27	42	*m*	*nL*	*nH*	*d1...dk*

[Range] m = 0, 1, 32, 330 ≤ nL ≤ 255 0 ≤ nH ≤ 3   0 ≤ d ≤ 255

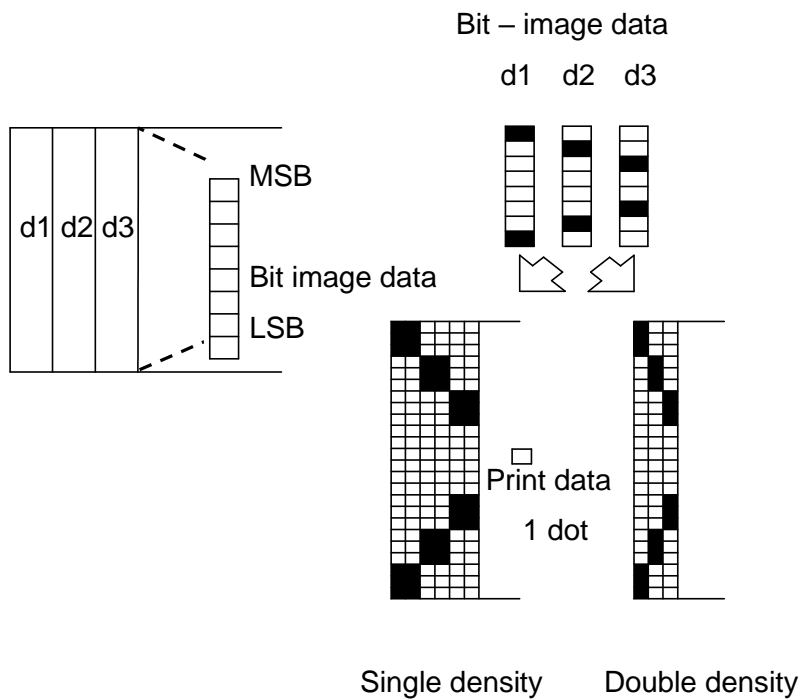[Description]   Selects a bit-image mode using m for the number of dots specified by nL and nH, as follows:

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

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

•   The nL and nH indicate the number of dots in the bit image in the horizontal direction.   The number of dots is calculated by $nL + nH$ x *256.*

•   If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored.

• d indicates the bit-image data.   Set a corresponding bit to 1 to print a dot or to 0

not to print a dot.

•   If the width of the printing area set by **GS L** and **GS W** less than the width required by the data sent with the **ESC**   command, the following will be performed on the line in question (but the printing cannot exceed the maximum printable area):

    1. The width of the printing area is extended to the right to ccommodate the amount of data.

    2. If step does not provide sufficient width for the data, the left

margin is reduced to accommodate the data.

For each bit of data in single-density mode (m = 0, 32), the printer prints two dots: for each bit of data in double-density mode (m = 1, 33), the printer prints one dot. This must be considered in calculating the amount of data that can be printed in one line.

• After printing a bit image, the printer returns to normal data processing mode.

• This command is not affected by print modes (emphasized, double-strike, underline, character size, or white/black reverse printing)

• When 8-dot bit image is selected:

Bit – image data

d1   d2   d3

MSB

d1 d2 d3

Bit image data

LSB

Print data

1 dot

Single density   Double density

- When 24-dot bit image is selected:

Bit-image data

d1   d2   d3   d4   d5   d6   d7   d8   d9

d1	d4	d7		MSB
d2	d5	d8		Bit-image data
d3	d6	d9		LSB

Print data

1 dot

Single density   Double density
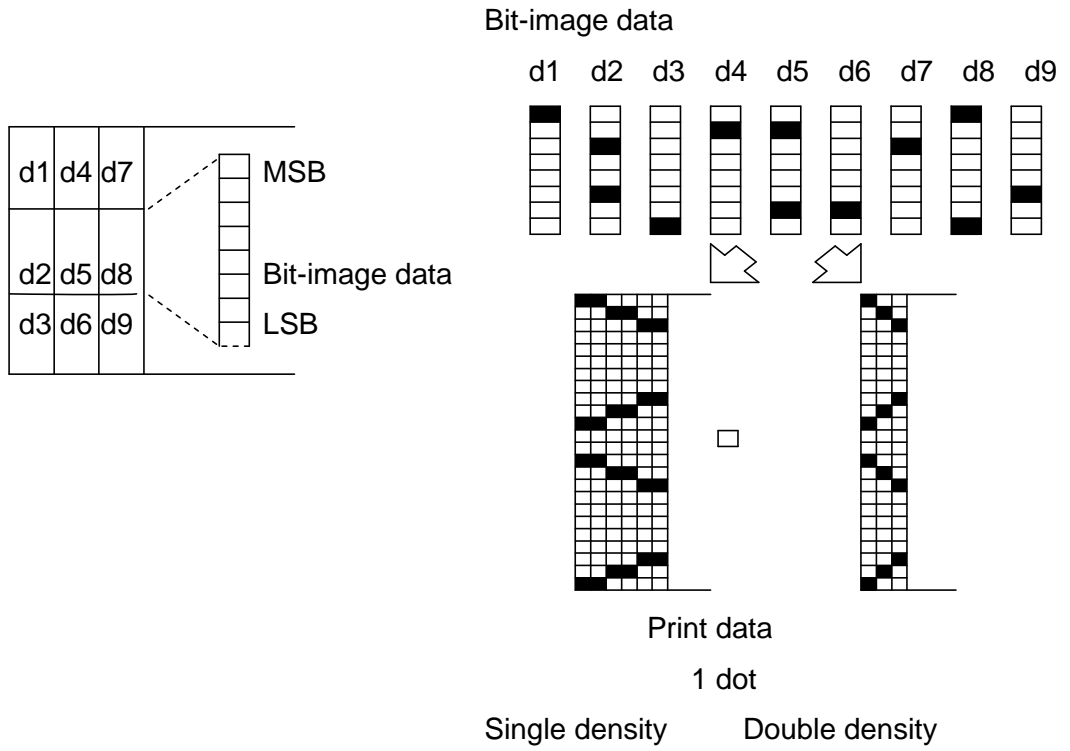
ESC 2

[Name]	Select default line spacing		
[Format]	ASCII	ESC	2
	Hex	1B	32
	Decimal	27	50

[Description]   Selects 1mm(8 x 0.125 mm) line spacing.

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

[Reference]   **ESC 3**

ESC 3 n

[Name]	Set line spacing			
[Format]	ASCII	ESC	3	*n*
	Hex	1B	33	*n*
	Decimal	27	51	*n*

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

[Description]   Sets the line spacing to [*n* x 0.125 mm]

[Notes]
- The line spacing can be set independently in standard mode and in page mode.
- In standard mode, the vertical motion unit (y) is used.
- In page mode, this command functions as follows, depending on the starting position of the printable area:
- When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the vertical motion unit (y) is used.
- When the starting position is set to the upper right or lower left of the print able area using **ESC T**, the horizontal motion unit (*x*) is used.

[Default]   *n* = 8

[Reference]   **ESC 2**

ESC @

[Name]	Initialize printer		
[Format]	ASCII	ESC	@
	Hex	1B	40
	Decimal	27	64

[Description]   Clears the data in the print buffer and resets the printer mode to the mode that was in effect when the power was turned on.

[Notes]   •   The data in the receive buffer is not cleared.

ESC E *n*

[Name]	Turn emphasized mode on/off			
[Format]	ASCII	ESC	E	*n*
	Hex	1B	45	*n*
	Decimal	27	69	*n*

[Range]   0 ≤ *n* ≤ 255

[Description]   Turns emphasized mode on or off

•   When the LSB of *n* is 0, emphasized mode is turned off.

•   When the LSB of *n* is 1, emphasized mode is turned on.

[Notes]   •   Only the lowest bit of *n* is enabled.

•   This command and **ESC !**   turn on and off emphasized mode in the same way. Be careful when this command is used with **ESC !**.

[Default]   *n* = 0

[Reference]   **ESC !**

ESC D *n1...nk NUL*

[Name]	Set horizontal tab positions			
[Format]	ASCII	ESC	D	*n1...nk NUL*
	Hex	1B	44	*n1...nk 00*
	Decimal	27	68	*n1...nk 0*

[Range]   1 ≤ *n* ≤ 255,   0 ≤ *k* ≤ 32

[Description]   Sets horizontal tab positions

•   *n* specifies the column number for setting a horizontal tab position from the beginning of the line.

•   *k* indicates the total number of horizontal tab positions to be set.

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

•   This command cancels the previous horizontal tab settings.

•   When setting *n* = 8, the print position is moved to column 9 by sending **HT**.

•   Up to 32 tab positions (*k* = 32) can be set. Data exceeding 32 tab positions is processed as normal data.

•   Transmit [*n*]*k* in ascending order and place a NUL code 0 at the end.

•   When [*n*]*k* is less than or equal to the preceding value [*n*]*k*-1, tab setting is finished and the following data is processed as normal data.

•   **ESC D NUL** cancels all horizontal tab positions.

•   The previously specified horizontal tab positions do not change, even if the character width changes.

•   The character width is memorized for each standard and page mode.

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

[Reference]   **HT**

ESC G *n*

[Name]	Turn on/off double-strike mode			
[Format]	ASCII	ESC	G	*n*
	Hex	1B	47	*n*
	Decimal	27	71	*n*

[Range]   0 ≤ *n* ≤ 255

[Description]   Turns double-strike mode on or off

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

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

[Notes]   • Only the lowest bit of *n* is enabled.

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

[Default]   *n* = 0

[Reference]   **ESC E**

ESC J *n*

[Name]	Print and feed paper			
[Format]	ASCII	ESC	J	*n*
	Hex	1B	4A	*n*
	Decimal	27	74	*n*

[Range]   0 ≤ *n* ≤ 255

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

[Notes]   • After printing is completed, this command sets the print starting position to the beginning of the line.

- The paper feed amount set by this command does not affect the values set by **ESC 2** or **ESC 3**.

- In standard mode, the printer uses the vertical motion unit (*y*).

- In page mode, this command functions as follows, depending on the starting position of the printable area:

REXOD

ESC M *n*

[Name]	Select character font
[Format]	ASCII ESC M *n*
	Hex 1B 4D *n*
	Decimal 27 77 *n*
[Range]	*n* = 0, 1, 48, 49
[Description]	Selects the character font

n	Function
0, 48	Character Font A (12 x 24) Selected.
1, 49	Character Font B (9 x 17) Selected.

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

ESC V *n*

[Name]	Turn 90°° clockwise rotation mode on/off
[Format]	ASCII	ESC	V	*n*
	Hex	1B	56	*n*
	Decimal	27	86	*n*

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

[Description] Turns 90°/180°/270° clockwise rotation mode on/off.

n is used as follows:

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

[Notes]   • This command affects printing in standard mode.   However, the setting
             is always effective.

           • When underline mode is turned on, the printer does not underline 90°
             clockwise-rotated characters.

           • Double-width and double-height commands in 90°/180°/270° rotation
             mode enlarge characters in the opposite directions from double-height
             and double- width commands in normal mode.

           • If this command is input in page mode, the printer performs only
             internal flag operations.

[Default]   *n* = 0

[Reference] **ESC !, ESC –**

ESC \ *nL nH*

[Name]	Set relative print position

[Format]

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

[Range]   0 ≤ *nL* ≤ 255

0 ≤ *nH* ≤ 255

[Description]   Sets the print starting position based on the current position using horizontal or vertical motion units.

[Notes]   • This command sets the distance from the current position to [(*nL* + *nH* x 256) 0.125 mm]

• Any setting that exceeds the printable area is ignored.

• When pitch *N* is specified to the right : *nL* + *nH* x 256 = *N*

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

• When pitch *N* is specified to the left : *nL* + *nH* x 256 = 65536 - *N*

In standard mode, the horizontal motion unit is used.

• In page mode, the horizontal or vertical motion unit differs as follows, depending on the starting point of the printing area:

• When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit (*x*) is used.

• When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit (*y*) is used.

[Reference]   **ESC $**

ESC a *n*

[Name]	Select justification
[Format]	ASCII ESC a *n*
	Hex 1B 61 *n*
	Decimal 27 97 *n*
[Range]	0 ≤ *n* ≤ 2, 48 ≤ *n* ≤ 50
[Description]	Aligns all the data in one line to the specified position

n selects the justification as follows:

n		Justification
Decimal	Hex	
0, 48	0,30	Left justification
1, 49	1, 31	Centering
2, 50	2, 32	Right justification

[Notes]
- The command is enabled only when processed at the beginning of the line in standard mode.
- If this command is input in page mode, the printer performs only internal flag operations.
- This command has no effect in page mode.
- This command executes justification in the printing area.
- This command justifies the space area according to **HT, ESC $** or **ESC \.**

[Default]   *n* = 0

[Example]

Left justification   Centering   Right justification

ABC		ABC		ABC
ABCD		ABCD		ABCD
ABCDE		ABCDE		ABCDE

ESC d *n*

[Name]	Print and feed *n* lines			
[Format]	ASCII	ESC	d	*n*
	Hex	1B	64	*n*
	Decimal	27	100	*n*
[Range]	0 ≤ *n* ≤ 255			

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

[Notes]   • This command sets the print starting position to the beginning of the line.

• This command does not affect the line spacing set by **ESC 2** or **ESC 3**.

• The maximum paper feed amount is 1016 mm {40"}.

• If the paper feed amount (*n* x line spacing) of more than 1016 mm {40"} is specified, the printer feeds the paper only 1016 mm {40"}.

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

GS (*A*

[Name]	Execute test Print		
[Format]	ASCII	GS	(	A
	Hex	1D	28	41
	Decimal	29	40	65

[Description]   • Executes a test print with a specified test pattern on a specified paper

• This command is enabled only when processed at the beginning of a line in standard mode.

• This command is no effect in page mode

• The printer cuts the paper at the end of the test print.

GS B *n*

[Name]	Turn white/black reverse printing mode		
[Format]	ASCII	GS	B	*n*
	Hex	1D	42	*n*
	Decimal	29	66	*n*

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

[Description]   Turns on or off white/black reverse printing mode

• When the LSB of *n* is 0, white/black reverse mode is turned off.

• When the LSB of *n* is 1, white/black reverse mode is turned on.

[Notes] • Only the lowest bit of *n* is valid.

• This command is available for built-in characters and user-defined characters.

• When white/black reverse printing mode is on, it also applies to character spacing set by **ESC SP**.

• This command does not affect bit images, user-defined bit images, bar codes, HRI characters, and spacing skipped by **HT**, **ESC $**, and **ESC **.

• This command does not affect the space between lines.

• White/black reverse mode has a higher priority than underline mode. Even if underline mode is on, it is disabled (but not canceled) when white/black reverse mode is selected.

[Default]   *n* = 0

GS L *nL nH*

[Name]	Set left margin				
[Format]	ASCII	GS	L	*nL*	*Nh*
	Hex	1D	4C	*nL*	*nH*
	Decimal	29	76	*nL*	*nH*

[Range]   0 ≤ *nL* ≤ 255

0 ≤ *nH* ≤ 255

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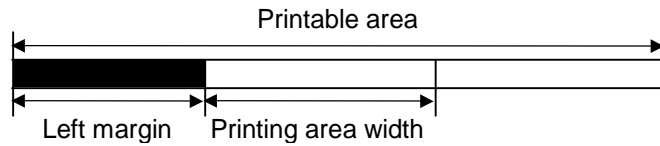
Printable area

Left margin   Printing area width

[Notes]   • This command is effective only when processed at the beginning of the line in standard mode.

• If this command is input in page mode, the printer performs only internal flag operations.

• This command does not affect printing in page mode.

• If the setting exceeds the printable area, the maximum value of the printable area is used.

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

[Reference] **GS W**

GS P n

[Name] Set bar code justification

[Format] ASCII   GS   P   n

         Hex   1D   50   n

         Decimal   29   80   n

[Range]   0 ≤ n ≤ 2 , 48 ≤   *n* ≤ 50

[Description]

n		Justification
Decimal	Hex	
0, 48	0,30	Left justification
1, 49	1, 31	Centering
2, 50	2, 32	Right justification

GS W *nL nH*

[Name] Set printing area width

[Format]   ASCII   GS   W   *nL*   *nH*

            Hex   1D   57   *nL*   *nH*

            Decimal   29   87   *nL*   *nH*

[Range]   0 ≤ *nL* ≤ 255

            0 ≤ *nH* ≤ 255

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

The printing area width is set to [(*nL* + *nH* x 256) x 0.125mm

Printable area

Left margin   Printing area width
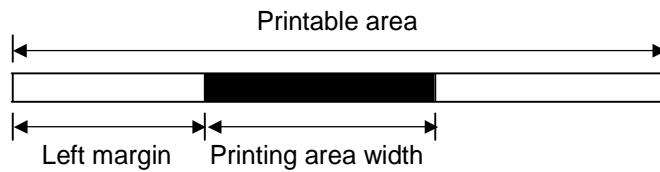
[Notes]   •   This command is effective only when processed at the beginning of the line.

•   If this command is input in page mode, the printer performs only internal flag operations.

•   This command does not affect printing in page mode.

•   If the setting exceeds the printable area, the maximum value of the printable area is used.

•   The setting by **GS L** takes precedence over the setting by **GS W**.   If the [left margin + printing area width] exceeds the printable area, the printer uses

[Printable area width - left margin].   However, the setting by **GS W** is still reserved, even when it is not used in the current printing..

GS h *n*

[Name]	Select bar code height			
[Format]	ASCII	GS	h	*n*
	Hex	1D	68	*n*
	Decimal	29	104	*n*

[Range]   1 ≤ *n* ≤ 255

[Description]   Select the height of the bar code.

n specifies the number of dots in the vertical direction.

[Default]   *n* = 162

[Reference]   **GS k**

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

[Name]	Print bar code						
[Format]	1)	ASCII	GS	k	*m*	*d1...dk*	*NUL*
		Hex	1D	6B	*m*	*d1...dk*	*00*
		Decimal	29	107	*m*	*d1...dk*	*0*
	2)	ASCII	GS	k	*m*	*n*	*d1...dn*
		Hex	1D	6B	*m*	*n*	*d1...dn*
		Decimal	29	107	*m*	*n*	*d1...dn*

[Range]   1)   0 ≤ *m* ≤ 6 (*k* and *d* depend on the bar code system used)

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

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

m selects a bar code system as follows:

	m	Bar Code System	Number of Characters	Remarks
1)	0	UPC-A	11≤*k*≤12	48≤*d*≤57
	1	UPC-E	11≤*k*≤12	48≤*d*≤57
	2	JAN13 (EAN13)	12≤*k*<13	48≤*d*≤57
	3	JAN 8 (EAN8)	7<*k*≤8	48≤*d*≤57
	4	CODE39	1≤*k*	48≤*d*≤57, 65≤*d*≤90,32,36,37,43,45,46,47
	5	ITF	1≤*k*≤255(even)	48≤*d*≤57
	6	CODABAR	1≤*k*	48≤*d*≤57, 65≤*d*≤68 ,36,43,45,46,47,58
	7	CODE93	1≤*n*≤255	0≤*d*≤127

	8	CODE128	2≤*n*≤255	0≤*d*≤127
	7	PDF417	1≤*k*≤54	48≤*d*≤57, 65≤*d*≤68,36,43,45,46,47,58
2)	65	UPC-A	11≤*n*≤12	48≤*d*≤57
	66	UPC-E	11≤*k*≤12	48≤*d*≤57
	67	JAN13 (EAN13)	12≤*k*<13	48≤*d*≤57
	68	JAN 8 (EAN8)	7<*k*≤8	48≤*d*≤57
	69	CODE39	1≤*n*≤255	48≤*d*≤57, 65≤*d*≤90,32,36,37,43,45,46,47 d1 = dk = 42(1)
	70	ITF	1≤*n*≤255(even)	48≤*d* ≤57
	71	CODABAR	1≤*n*≤255	48≤*d*≤57, 65≤*d*≤68,36,43,45,46,47,58
	72	CODE93	1≤*n*≤255	0≤*d*≤127
	73	CODE128	2≤*n*≤255	0≤*d*≤127
	74	PDF417	1≤*k*≤54	48≤*d*≤57, 65≤*d*≤68, 36,43,45,46,47,58

[Notes for 1)]

• This command ends with a NUL code.

• When the bar code system used is UPC-A or UPC-E, the printer prints the bar code data after receiving 12 bytes of bar code data and processes the following data as normal data.

[Notes for 2)]

• The number of data for the ITF bar code must be even numbers.

• Odd number of bytes of data is input, the printer ignores the last received data.

• *n* indicates the number of bar code data bytes, and the printer processes *n* bytes from the next character data as bar code data.

• If *n* is outside the specified range, the printer stops command processing and processes the following data as normal data.

[Notes in standard mode]

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

• If the horizontal size exceeds printing area, the printer only feeds the paper. This command feeds as much paper as is required to print the bar

code, regardless of the line spacing specified by **ESC 2** or **ESC 3**.

• This command is enabled only when no data exists in the print buffer. When data exists in the print buffer, the printer processes the data following *m* as normal data.

• After printing the bar code, this command sets the print position to the beginning of the line.

• This command is not affected by print modes (emphasized, double-strike, underline, character size, white/black reverse printing, or 90/180/270 rotated character, etc.)

[Notes in page mode]

• This command develops bar code data in the print buffer, but does not print it. After processing bar code data, this command moves the print position to the right side dot of the bar code.

• If *d* is out of the specified range, the printer stops command processing and processes the following data as normal data.   In this case the data buffer position does not change.

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

• If the height of the bar code will not fit on the current label, the excess is printed on the next label.

Control character			HRI character	Control character			HRI character
ASCII	Hex	Decimal		ASCII	Hex	Decimal	
NUL	00	0	U	DLE	10	16	P
SOH	01	1	A	DC1	11	17	Q
STX	02	2	B	DC2	12	18	R
ETX	03	3	C	DC3	13	19	S
EOT	04	4	D	DC4	14	20	T
ENQ	05	5	E	NAK	15	21	U
ACK	06	6	F	SYN	16	22	V
BEL	07	7	G	ETB	17	23	W
BS	08	8	H	CAN	18	24	X
HT	09	9	I	EM	19	25	Y
LF	0A	10	J	SUB	1A	26	Z

VT	0B	11	K	ESC	1B	27	A
FF	0C	12	L	FS	1C	28	B
CR	0D	13	M	GS	1D	29	C
SO	0E	14	N	RS	1E	30	D
SI	0F	15	O	US	1F	31	E
				DEL	7F	127	T

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

□Code■M93□

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

• Refer to Appendix F for the information for the CODE128 bar code and its code table.

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

1. The top of the bar code data string must be the code set selection character

   (CODE A, CODE B, or CODE C), which selects the first code set.

2. Special characters are defined by combining two characters "{" and one character. The ASCII character "{" is defined by transmitting "{" twice consecutively.

Specific character	Transmit data		
	ASCII	Hex	Decimal
SHIFT	{S	7B, 53	123, 83
CODE A	{A	7B, 41	123, 65
CODE B	{B	7B, 42	123, 66
CODE C	{C	7B, 43	123, 67
FNC1	{1	7B, 31	123, 49
FNC2	{2	7B, 32	123, 50
FNC3	{3	7B, 33	123, 51

| FNC4 | {4 | 7B, 34 | 123, 52 |
| "{" | {{ | 7B, 7B | 123, 123 |

[Example]   Example data for printing "No. 123456"

In this example, the printer first prints "No." using CODE B, then prints the following numbers using CODE C.

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

No.123456

• If the top of the bar code data is not the code set selection character, the printer stops command processing and processes the following data as normal data.

• If the combination of "{" and the following character does not apply any special character, the printer stops command processing and processes the following data as normal data.

• If the printer receives characters that cannot be used in the special code set, the printer stops command processing and processes the following data as normal data.

• The printer does not print HRI characters that correspond to the shift characters or code set selection characters.

• HRI character for the function character is space.

• HRI characters for the control character (<00>H to <1F>H and <7F>H) are space.

<Others>   • Be sure to keep spaces on both right and left sides of a bar code.

(Spaces are different depending on the types of the bar code.)

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

[Name]	Print raster bit image

[Format]

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

[Range] $48 \le m \le 51$, $0 \le d \le 255$

$0 \le xL \le 255$, $0 \le xH \le 255$ where 1 $(xL + xH \times 256) \le 128$

$0 \le yL \le 255$, $0 \le yH \le 8$ where 1 $(yL + yH \times 256) \le 4095$

M	Mode	Vertical Dot Density	Horizontal Dot Density
48	Normal	203.2dpi	203.2dpi
49	Double-width	203.2dpi	101.6dpi
49	Double-height	101.6dpi	203.2dpi
51	Quadruple	101.6dpi	101.6dpi

•   *xL*, *xH*, select the number of data bytes ($xL+xH \times 256$) in the horizontal direction for the bit image.

•   *yL*, *yH*, select the number of data bits ($yL+yH \times 256$) in the vertical direction for the bit image.

[Notes]   •   In standard mode, this command is effective only when there is no data in the print buffer.

•   This command is not affected by print modes (character size, emphasized, double-strike, upside-down, underline, white/black reverse printing, etc.) for raster bit image.

•   If the printing area width set by **GS L** and **GS W** is less than the minimum width, the printing area is extended to the minimum width only on the line in question. The minimum width means 1 dot in normal (*m*=0, 48) and double-height (*m*=2,50), 2 dots in double-width (*m*=1, 49) and quadruple (*m*=3, 51) modes.

•   Data outside the printing area is read in and discarded on a dot-by-dot basis.

•   The position at which subsequent characters are to be printed for raster bit image is specified by **HT** (Horizontal Tab), **ESC $** (Set absolute print position), **ESC ** (Set relative print position), and **GS L** (Set left margin). If the position at which subsequent characters are to be printed

is a multiple of 8.

• The **ESC a** (Select justification) setting is also effective on raster bit images.

• When this command is received during macro definition, the printer ends macro definition, and begins performing this command. The definition of this command should be cleared.

GS w *n*

[Name]	Set bar code width

[Format]

	ASCII	GS	w	*n*
	Hex	1D	77	*n*
	Decimal		29	119	*n*

[Range]   2 ≤ *n* ≤ 6

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

n specifies the bar code width as follows:

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

• Multi-level bar codes are as follows:

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

• Binary-level bar codes are as follows:

CODE39, ITF, CODABAR

[Default]   *n* = 3

[Reference]   **GS k**

REXOD

ESC Q *n*

[Name]	Transmit Printer ID			
[Format]	ASCII	ESC	Q	*n*
	Hex	1B	51	*n*
	Decimal	27	81	*n*

[Range]　41 ≤ *n* ≤ 45(Hex)
　　　　　65 ≤ *n* ≤ 69(Decimal)

[Description]　　　Transmits the printer ID specified.

n			Description	Length
ASCII	HEX	Dec		
A	41	65	Firmware Version ID	6 byte
B	42	66	Manufacturing Company ID	9 byte
C	43	67	Printer Model ID	10 byte

STX	I	Return data	NULL	ETX	Firmware version ID (V2.03)
					Manufacturing Company ID (REXOD.co)
					Printer Model ID (RX830-H120)

ESC H

[Name]	Transmit Printer　Status	
[Format]	ASCII	ESC	H
	Hex	1B	48
	Decimal	27	72

[Description]　Transmits the printer STATUS specified.

RESPONSE DATA(Dec/Hex)		상태정보
1nd BYTE	2'nd BYTE	
0 [0x30]	0 [0x30]	정상 상태.
0 [0x30]	1 [0x31]	PAPER EMPTY .
0 [0x30]	2 [0x32]	HEAD-UP　SENSOR .
0 [0x30]	4 [0x34]	CUTTER Sensor
0 [0x30]	8 [0x38]	
1 [0x31]	0 [0x30]	NEAR-END SENSOR .
2 [0x32]	0 [0x30]	
4 [0x34]	0 [0x30]	Paper out Sensor
8 [0x38]	0 [0x30]	

REXOD

GS ! n

[Name]	Set character size	
[Format]	ASCII	GS ! n
	Hex	1D 21 n
	Decimal	29 33 n
[Range]	0≤n≤255	

(1≤vertical double counts≤8, 1≤horizontal double counts≤8)

[Description] Set the height of the character by bit 0 to 2, set the width of the character by bit 4 to 6. as below:

Bit	Off/On	Hex	Decimal	Function
0				
1				
2		Sets the height of character. See table 2.		
3				
4				
5		Sets the width of character. See table 1.		
6				
7				

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

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

Table 1   **Table 2**

[Note] .This command effects to all characters (English characters and Chinese) except for HRI character.

.If n is out of the definition range, this command will be ignored.

.At the standard mode, the vertical direction is the feed paper direction. However, when the character direction revolved clockwise 90°, the relation of vertical direction and horizontal direction will be reversed.

.When enlarges the characters in a line by the different size, all characters in a line will be paralleled along the baseline.

.Enable/disable the double width and double height mode by ESC ! command. The set of command which received at the last will be effected.

[Default] n = 0

[Reference] **ESC !**

FS &

[Name]	Set Chinese character mode
Format	ASCII FS &
	Hex 1C 26
	Decimal 28 38
[Description]	Select Chinese character mode.
[Specification]	·This command only effects when select GB18030 code system.
	·GB18030 only effects double byte 1,2,3,4,5 area.
	·When select Chinese character mode, the printer processes all the Chinese code, two bytes each time.
	·The sequence arranged the Chinese code according to the first and the second byte.
	·When turn the power on, the printer enters into Chinese mode automatically.
	·When select Chinese character mode, at first the printer checks the code whether the Chinese: If it is the Chinese, then processes the first and the second bytes of Chinese code.
[Reference]	FS FS C

FS .

[Name]	Cancel Chinese character
[Format]	ASCII FS .
	Hex 1C 2E
	Decimal 28 46
[Description]	Cancel the Chinese character mode
[Specification]	· This command only effects when select GB18030 code system.
	· When not select the Chinese character mode, all character code are ASCII code, per character processes each time.
	· When turns the power on, the printer enters into Chinese mode automatically.
[Reference]	FS &, FS C

ESC R n

[Name]	Select an international character set
[Format]	ASCII ESC R n
	Hex 1B 52 n
	Decimal 27 82 n
[Rang]	0≤n≤13
[Description]	Select the data of n according to the below table, set international character set.

n	Character Set
0	U.S.A.
1	France
2	Germany
3	England
4	Denmark I
5	Sweden
6	Italy
7	Spain I
8	Japan
9	Norway
10	Denmark II
11	Spain II
12	Latin America
13	Korea

[Default]	n = 0
[Reference]	International character set

ESC t n

[Name]	Select character code table
[Format]	ASCII ESC t n
	Hex 1B 74 n
	Decimal 27 116 n
[Range]	0≤n ≤5, 16≤n ≤19, n=255
[Description]	Select page n from the character code table:

n	Page
0	PC437[America, Europe standard]
1	Katakana
2	PC850[Multi-language]
3	PC860[Portuguese]
4	PC863[Canada-France]
5	PC865[North Europe]
16	WPC1252
17	PC866[Yugoslavia2]
18	PC852[Latin2]
19	PC858[Europe]
255	Space page

[Default]	n = 0
[Reference]	Character table (English version only)

GS * x y d1..d(x y 8)

[Name]	Define download bit image

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

[Range]　　$1 \leq x \leq 255$
　　　　　　$1 \leq y \leq 48 (x \times y \times 1536)$
　　　　　　$0 \leq d \leq 255$

[Description]　　Specifies dot counts by taking x and y and defines the download bit image.
　　　　　　　.x specifies the horizontal dot counts.
　　　　　　　.y specifies the vertical dot counts.

[Notes]　　　　.The dot counts of horizontal direction is x×8; the dot counts of vertical direction is y×8.
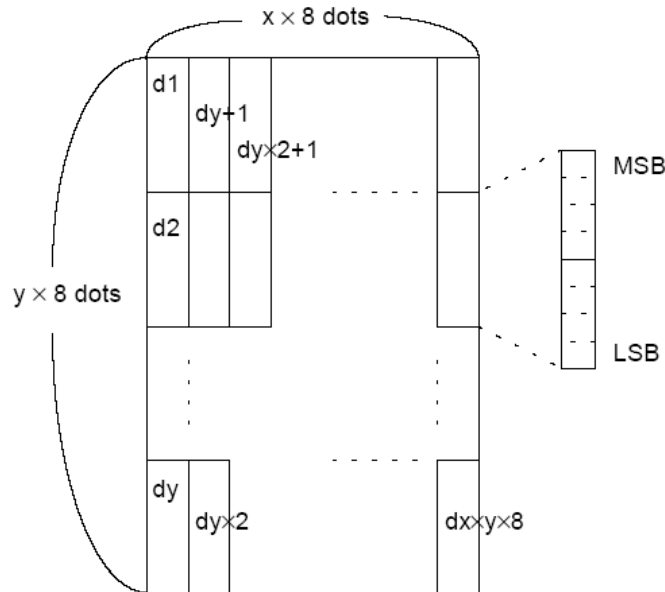　　　　　　　.If x×y over the specified scale, then this command will be disabled.
　　　　　　　.d indicates the bit image data. The data (d) specifies the print bit is 1 , the not print bit is 0.
　　　　　　　.At the below status, clean the download bit image definition:

　　　　① Execute ESC @.

　　　　② Execute ESC &.

　　　　③ The printer reset or turn the power off.

　　　　.The connection between download bit image and print data as below:

[Reference]

GS / n

[Name]　　Print download bit image

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

[Range]　0≤m≤3, 48≤m≤51

[Description]　　Printed the download bit image by the mode which specified by m.
　　　　　　　m set the mode from the below table:

m	Mode	Vertical dot density	Horizontal dot density
0,48	Normal	203.2 dpi	203.2 dpi
1,49	Double width	203.2 dpi	101.6 dpi
2,50	Double height	101.6 dpi	203.2 dpi
3,51	Four times size	101.6 dpi	101.6 dpi

Dpi: per 25.4㎜{one inch} print dot count

[Notes]　　.If the bit image data undefined, then this command will be ignored.
　　　　　　.At the standard mode, this command effects only when there are no data in the print buffer area.
　　　　　　.This command is not effective at the print mode [bold, overlap, underline, character size or reverses blank printing], except for up-down print mode.
　　　　　　.If the near-printing download bit image over the printable area, then the over data will not print
　　　　.The download bit image at the page mode refer to picture.
　　　.If the printable width which set by GS L and GS W is less than the width needed by GS command to send the data, then executes the below continued operation for the problem lines [the print not over the max printable area].

　　　① The width of the printable area which extends to the right and holds the data capacity.

　　　② If the step ① haven't provided enough width for data, then narrows the left blank to hold the data.
　　　　Each data at the normal mode (m=0, 48) and double height mode (m=2,50), the printer prints one dot; Each data at the double width mode (m=1, 48) and four double mode (m=3, 51), the printer prints two dots.

[Reference]　　**GS ***

REXOD

GS H n

[Name]	Select the print position of HRI character

[Format] ASCII   GS   H   n
Hex   1D   48   n
Decimal   29   72   n

[Range]   0≤n≤3,   48≤n≤51

[Description]   When print bar code, select the print position of HRI character.
n selects the print position, the table as the below table:

n	Print position
0,48	Not print
1,49	Up the bar code
2,50	Below the bar code
3,51	Up and below the bar code

Note: The position of the printer prints HRI characters is not set according to the standard position.

.HRI (Human Readable Interpretation) indicates the readable bar code relevant characters .

[Note]   .Takes the characters which specified by GS f to print HRI characters.

[Default]   n = 0

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

DLE EOT n

[Name]	Transmit real-time status

[Format]

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

[Range]   1≤n≤5

[Description]   Transmit real-time status. Parameter n used to appoint printer status. the definition as below:

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

[Specification]   ·Transmit the current status, every status one byte.
·Printer can't sure whether the PC can receive data when transmitting status.
·Printer starts to execute when received this command.
·Under the serial interface mode, Even the printer is offline, the received buffer is full, or the error occurred, also execute this command.
. Under the parallel interface mode, when the printer is busy, can't execute this command.
. When enable ASB by GS a command, must distinguish the status which be sent by   DLE EOT or ASB status. (Refer to appendix C)
·Even the printer doesn't choose the external equipment command, the command which be selected by ESC= also effects.

[Notes]   henever received <10>H<04>H<n>(1≤n≤4) data sequence, the printer will still transmit status.

For example:

ESC * m nL nH d1...dK, d1=<10>H, d3=<01>H
·Do not use this command within two or more than two bytes command.

For example:

If want to transmit ESC 3 n to printer, before transmitting n, DTR(for the PC is DSR) will change to MARK, So, before receving n, occurs that DLE EOT 3 interrupted, the code<10>H of DLE EOT 3 will be dealt with as the code<10> of ESC 3.

n = 1: Printer status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	On	04	4	Not used. Fixed to On.
3	Off	00	0	Online.
	On	08	8	Offline.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Does not wait for online error recovery.
	On	20	32	Waits for online error recovery.
6	Off	00	0	FEED button is Off.
	On	40	64	FEED button is On.
7	Off	00	0	Not used. Fixed to Off.

n = 2: Offline status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	Platen is closed.
	On	04	4	Platen is open.
3	Off	00	0	Paper is not being fed by using the FEED button.
	On	08	8	Paper is being fed by the FEED button.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	No paper-end stop.
	On	20	32	Printing is being stopped.
6	Off	00	0	No error.
	On	40	64	Error occurred.
7	Off	00	0	Not used. Fixed to Off.

Bit 3:   Becomes same as bit 6 of Printer status (*n*=1), except during a macro execution with the FEED button.

Bit 5:   Becomes on when the paper end sensor detects paper end and printing stops.

n = 3: Error status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	No mechanical error.
	On	04	4	Mechanical error has occurred.
3	Off	00	0	No autocutter error.
	On	08	8	Autocutter error occurred.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurred.
6	Off	00	0	No auto-recoverable error.
	On	40	64	Auto recoverable error occurred.
7	Off	00	0	Not used. Fixed to Off.

Bit 6:   Bit 6 is On when printing is stopped due to high print head temperature until the print head temperature drops sufficiently or when the paper roll cover is opened during printing.

n = 4: Continuous paper sensor status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2, 3	Off	00	0	Paper roll near-end sensor: paper adequate.
	On	0C	12	Paper near-end is detected by the paper roll near-end sensor.
4	On	10	16	Not used. Fixed to On.
5, 6	Off	00	0	Paper roll sensor: Paper present.
	On	60	96	Paper roll end detected by paper roll sensor.
7	Off	00	0	Not used. Fixed to Off.

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

n = 5: Continuous paper out sensor status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Unused. Off
1	Off	00	0	Unused. off
2,	Off	04	4	Paper out sensor
	On	00	0	Paper out sensor detate
3	off	00	0	Unused. off
4	Off	00	0	Unused. off
5	Off	00	0	Unused. off
6,7	Off	00	0	Unused. Off

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

GS r n

[Name]	Transmit status			

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

[Range]   n=1, 49

[Description]   Transmits the status n which specified by n as below:

n	Function
1,49	Transmit the print paper sensor status

[Notes]   .When taking serial interface, If set DTR/DSR control, the printer only transmits one byte after be sure that the PC have received the date (DSR signal is SPACE). If the PC haven't got ready to receive data (DSR signal is MARK), the printer waited until the PC have got ready to.

If set SON/XOFF control, the printer only transmits one byte, and be not sure the DSR signal status.

.Execute this commands when the data affects in the printing buffer area. So, between receiving this command and transmitting status, may be have a time spacing, it decided by the status of receiving buffer area.

.When takes ASB by GS a, distinguished the transmitting status of GS r and ASB status which refers to the table in the appendix C.

.The transmitting status types as below:

The print paper sensor status (n=1,49)

Bit	Off/On	Hex	Decimal	ASB status
0,1	Off	00	0	Paper near-end sensor printing paper enough.
	On	03	3	Paper near-end sensor printing paper enough.
2,3	Off	00	0	Paper-end sensor: printing paper enough.
	On	(0C)	(12)	Paper-end sensor: withou paper.
4	Off	00	0	Unused. Off is fixed.
4,6	-	-	-	Undefined.
7	On	00	0	Unused. Off is fixed.

Bit 2 and 3: When the paper-end sensor tests the printing paper-end, the printer enters into offline. So, bit 2 and 3 not transmits without paper status.

[Reference]   DLE EOT, GS

①GS V m ②GS V m n

[Name]		Select cut paper mode and cut paper

[Format]

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

[Range]   ① m = 1, 49

② m = 66, 0 ≤ n ≤ 255

[Description]   Select one cut paper mode, and execute cut paper operation. Select model by taking the value of m, as below:

[The description for ① and ②]

.According to the different auto-cut paper machine type, the cut paper status is different.

.This command effects only when processing this command at the beginning of a line.

[The specification for ①]

.Only partial cut paper; not full cut paper.

[The specification for ②]

.When n =0, the printer feeds paper to cut paper position and cuts paper.

.When n≠0, the printer feeds paper to (cut paper position+[n×0.125㎜ {0.0049inch}] and cut paper.

ESC m

[Name]		Partial cut

[Format]

ASCII	ESC	m
Hex	1B	6d
Decimal	27	109

[Description]   The printer received this command, then executing partial cut at present position.

[Note]   As the printer do not feed paper when executing this command, so before executing this command in the next time, assure that feed paper at least 5mm or more, prevent cutter broken.

[Default]   Partial cut mode is default.

ESC i

[Name]	Full cut		
[Format]	ASCII	ESC	i
	Hex	1B	69
	Decimal	27	105
[Description]	After receiving this command, the printer executes full cut.		

[Note]   As it won't feed paper when executing this command, please assures that feed paper5mm or more before executing this command next time, to avoid that the cutter be damaged.

[Default]   The default is partial cut mode.

REXOD

FS p n m

[Name]   Print NV bit image

[Format]   ASCII   FS   p   n   m

             Hex   1C   70   n   m

             Decimal   28   112   n   m

[Range]   1≤n≤255

             0≤m≤3, 48≤m≤51

[Description]   Print NV bit image by m which be specified.

m	Mode	Vertical Density	Horizontal Density
0,48	Normal	203.2dpi	203.2 dpi
1,49	Double width	203.2 dpi	101.6 dpi
2,50	Double height	101.6 dpi	203.2 dpi
3,51	Four times size	101.6 dpi	101.6 dpi

Dpi: {1 inch} print dot per 25.4mm

.n is the quantity of NV bit image (defined by FS q).

.m specified bit image mode.

[Specification]   .NV bit image is a bit image which defined at the not easy losing memory. Defined by FS q , printed by FS q.

.This command will not effect when the specified NV bit image not existed.

.This command not be effected by the print mode (bold, repetition, underline, character size, or reverse blank printing), except the reversed print mode.

① At the NV bit image mode, the width of printable area right extends to a vertical line.   In such circumstances, Print can't over the printable area.

② If the width of printable area can't extend a vertical line, then the left blank will be narrowed and to held a vertical line.

.If the printable download bit image over a line, then the over data not to be printed.

.At the normal and double width mode, this command feed paper n dots, n is the height of NV bit image, Under the double height and four times size mode, this command feeds paper 2n dots, n is the height of NV bit image, it's not relevant to the line spacing which set by ESC 2 or ESC 3.

.After printing bit image, this command sets the print position at the beginning of a line, and deal with the continued data as the normal data.

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

REXOD

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

[Name]	Define NV bit image

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

　　　　　　Hex　　1C　71　　n　　[xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n

　　　　　　Decimal　28　113　n　　[xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n

[Range]　$1≤n≤255$

　　　　　$0≤xL≤255$

　　　　　$0≤xH≤3$(when $1≤(xl+xh×256) ≤1023$

　　　　　$0≤yl≤255$

　　　　　$0≤yh≤1$(when $1≤(yl+yh×256) ≤288$

　　　　　$0≤d≤255$

　　　　　$K=(xl+xh×256) ×(yl+yh×256) ×8$

　　　　　The total of defined data area=192k bytes

[Description]　　Define NV bit image which uses the specific value n.

　　　　　　　.n specifies the quantity of NV bit image.

　　　　　　　.xL, xH specifies the dot count of the horizontal direction in defined NV bit image,the dot count is $(xL+xH×256) ×8$.

　　　　　　　.yL, yH specifies the dot count of the vertical direction in defined NV bit image, the dot count is $(yL+yH×256) ×8$.

[Specification]　　.This command cancels the NV bit image which defined by this command. At the serial defined data, the printer can't define any one of data renewable. If renew to define certain data, then all data needs to send again.

　　　　　　　.From the beginning to deal with this command to finish hardware reset, can't execute mechanical operation(contains initialized print head position when opening the print head bar, feed paper used the paper feeding button and so on.)

　　　　　　　.During deal with this command, when writing data to user NV memory, the printer is busy and stops receiving data. So, Disabled sending　data during executing this command, contains real-time command.

　　　　　　.NV bit image is a bit image which defined at the not easy losing memory. Defines and prints FS p by FS q.

　　　　　　　.This command effects after the seven bytes<FS ~ yH> be dealt with normally.

　　　　　.When the data quantity over the left capacity of the scale which defined by xL, xH, yL, yH, the printer deals with xL, xH, yL, yH out of the defined scale.

　　　　　　　.At any one of group bit image except for the first group, when the printer meets that xL,xH, yL, yH over the defined scale, then stop dealing with this

command, and begin to write to NV image. At this moment disabled the undefined NV bit image (undefined), but any NV bit image defined before still effective.

.d indicates the defined data. At the data (d), one bit specified one print dot and one 0 bit specified one which can't print dot.

.n be defined the quantity of NV bit image by this command. The quantity goes up according to the sequence which begins from bit image 01H. Therefore the first data group [xL xH yL yH dl...dK] is the NV bit image 01H. The last data group [xL xH yL yH dl...dK] is the NV bit image n. The total count is consistent with the NV bit image which set by FS p command.

.The definition data of one NV bit image formed by [xL xH yLl xH dl...dK]. So, when only have one NV bit image n=1, the printer only deals with the data group [xL xH yL yH dl...dK] one time. The printer uses ([data:(xL+xH×256) × (yL+yH×256) × 8]+[header:4]) bytes of the NV memory.

.The definition area of this printer is 192K bytes (max). This command could define several bit images, but can't define the bit image which the total capacity [bit image data + head] over 192K bytes.

.Though defining ASB, the printer not send the ASB status or execute status test during dealing with this command.

.When received this command during macro definition, the printer stops macro definition and executes this command.

.Once define one NV bit image, it can't be executed ESC @ command, and deleted when reset and turn power off.

.This command only executes the definition of NV bit image, not executes printing. The printing of NV bit image executed by FS p command.

[Notes]   Frequently executes the written command which could be broken the NV memory. So, suggest that execute the written operation not over ten times for NV memory in a day.

.After the process of putting one bit image into NV memory, the printer executes one hardware reset operation. So, defines the user-defined character, downloads bit image and macro after finishing this command. The printer clears receiving and printing buffer area, and resets to the effective mode when connecting the power supply.

[Reference]   FS p

[For example]   When xL = 64, xH = 0, yL = 96, yH = 0
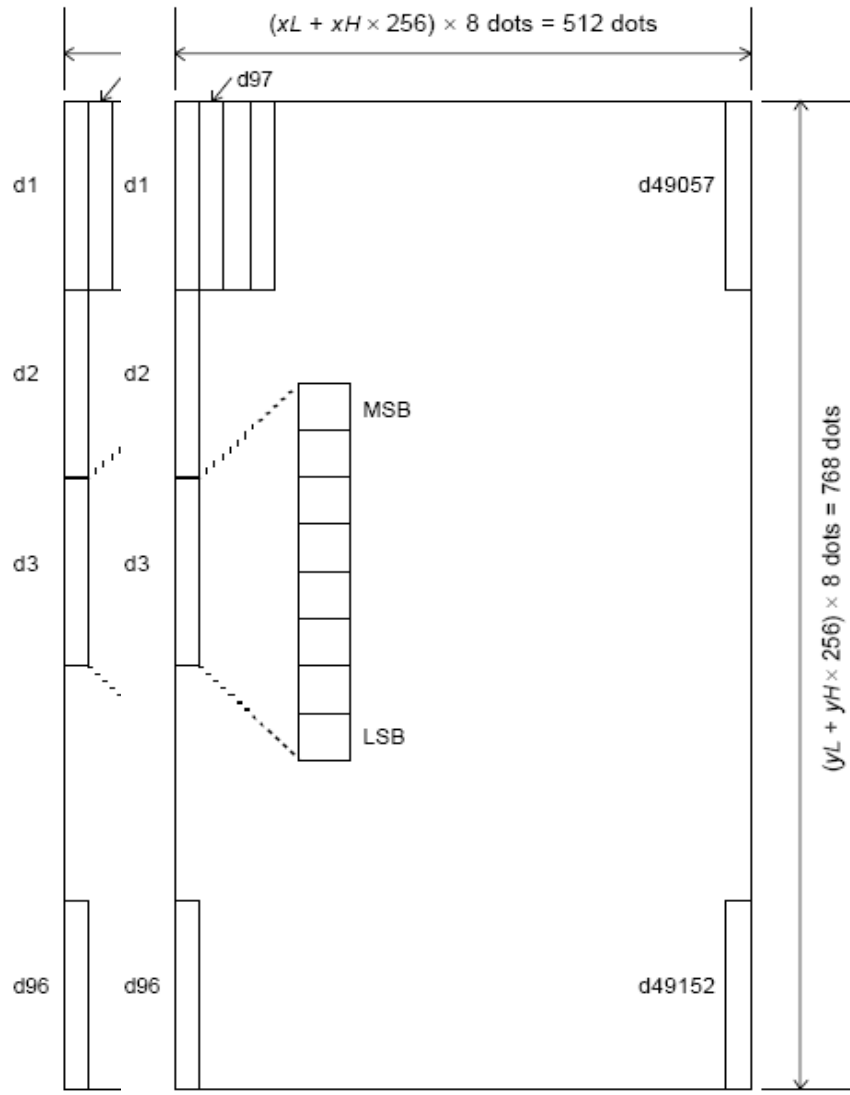
GS l xL   xH   R   EM   SL   SH d1...Dk

[Name]	QR CODE PRINT (2D BAR CODE)

[Format]   ASCII   GS   I   xL   xH   R   EM   SL   SH d1...Dk

Hex   1D   6C   xL   xH   R   EM   SL   SH d1...Dk

Decimal   29   108   xL   xH   R   EM   SL   SH d1...Dk

[Range]

   xL,xH :

      XL+XH*256=Xoffset,It decide the width of paper on the left of QR Code.

    R:
      0<= R<=3,It means Rotation ,0 to 270 degrees.

   EM:
      1<=EM<=18,Enlarge Multiple,Multiple of Width and Hight.

   SL, SH:
      SL+SH*256=Size of data,It means how many data is to be coded.
      (It seems that   Size can not be more than 230)

   d1......dk:
       data to be coded,handle by fuotion in lib file

[TEST CODE]

      1d 6c c8 00 01 0a 09 00 62 61 69 64 75 2e 63 6f 6d 0a 0a 0a 0a
      It will lead you to baidu.com