

58MM thermal printer Programming Manual

Format Specification

The commands of this programming manual including the following parts:

1) Summary of the name and function

This is the first part of command description, show the command and its function of ASCII Code.

2) Format

This part using ASCII coded form, hexadecimal coded form and decimal coded form to describe this command, and the value range in the following content are the decimal number unless noted otherwise.

3) Range. The range of the variable

4) Description. Detailed description and explanation of the command

5) Note. Pointing the attentions of the command. The commands will influence each other when it cooperate with other commands and in different mode. So we show parts of these details.

6) Reference. Show the relevant and similar commands

---> ESC SP n Real time state transfer

---> [Format] ASCII code ESC SP n

 Hexadecimal code 1B 20 n

 Decimal code 27 32 n

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

---> [Description] real time transmit the state of printer specified by parameter "n"

---> [Note] printer will return to the relevant state as soon as it receive the command

---> [Reference]

HT

[Name] Horizontal positioning

[Format] ASCII code HT
 Hexadecimal code 09
 Decimal code 09

[Description] move the print position to next horizontal anchor point

[Note] • If there is no setting about the position of next horizontal anchor point, this command will be ignored.
• If the position of horizontal anchor point is outside the print area, the print position will moved to "print area width+1"
• Setting the position of horizontal anchor point by ESCD command
• If receiving the command when the print position is in " print area width+1", the printer will performing as "printer buffer is full, then print the current line, and processing horizontal positioning at the beginning of next line. "

[Reference] ESC D

LF

[Name] Print and line feed

[Format] ASCII code LF
 Hexadecimal code 0A
 Decimal code 10

[Description] Print the data in print buffer, and move forward the print paper for 1line according to the current line spacing.

[Note] The command set print position to the beginning of one line

[Reference] ESC 2, ESC 3

DLE DC4 n m t

[Name] Real-time pulse

[Format] ASCII code DLE DC4 n m t
 Hexadecimal code 10 14 n m t
 Decimal code 16 20 n m t

[Range] n=1,m=0,1, 1≤t≤8

[Description] Output pulse is specified by the parameter "t" to connection pins, m is shown below :

m	Connect the pin
0	Cashbox connection pins 2
1	Cashbox connection pins 5

[Note] • The time of high level for pulse is [t*100 ms] and the low level time is [t*100ms].

• When the printer is on the box open command (ESC p or DEL DC 4) , this command will be ignored.
• Under serial interface mode, the printer will execute this command immediately after receiving it.
• Under parallel interface mode, the printer may not execute this command if it is busy.
• If the print data contains the same content with this command, this data will be execute as the command line. Users must consider the situation.
• Try not to insert this command into the command sequence which including 2 or more bytes.
• Even if the printer is set to ban by ESC Command (= select peripheral) , this command is still

[Reference] ESC p

ESC SP n

[Name] Setting the right side character spacing
 [Format] ASCII code ESC SP n
 Hexadecimal code 1B 20 n
 Decimal code 27 32 n

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

[Description] Set the right side spacing of the characters to $[n * 0.125 \text{mm}]$.

[Note] • For double width mode, The right side spacing of the character is the twice of the general mode .When the character is amplified, the right side character spacing is the n times of the general mode

□ • This command does not affect the setting of Chinese characters.

□ • This command can set the value standard patterns in each mode independent .

[Default Value] n=0

ESC SO

[Name] Setting the double width mode of Chinese characters

[Format] ASCII code ESC SO
 Hexadecimal code 1B 0E
 Decimal code 27 14

[Description] Setting the double width of Chinese character and character

ESC DC4

[Name] Cancel the Chinese characters double width mode

[Format] ASCII code ESC DC4
 Hexadecimal code 1B 14
 Decimal code 27 20

[Description] Cancel the double width setting of Chinese character and character

ESC ! n

[Name] Selecting print mode

[Format] ASCII code ES ! n
 Hexadecimal code 1B 21 n
 Decimal code 27 33 n

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

[Description] Selecting the print mode according to the value of specified parameter n.
 The parameter n is defined as follows

Position	off/on	Hexadecimal code	Decimal code	function
0	off	00	0	Character fonts A (12*24)
	on	01	1	Character fonts B (9*17)
1	-	-	-	undefined
2	-	-	-	undefined
3	off	00	0	cancel bold mode
	on	08	8	Start bold mode
4	off	00	0	Cancel double height mode
	on	10	16	start double height mode
5	off	00	0	Cancel double width mode

	on	20	32	Start double width mode
6	-	-	-	undefined
7	off	00	0	Cancel underline mode
	on	80	128	Start underline mode

[Note] • When choose the double width mode and double height mode at the same, the characters printed are the 4 times of the normal state.

• The printer can underline every characters except the blank made by HT command and the characters Clockwise rotated 90 °

• The thickness of underline is set by ESC, and independent on the size of characters.

• If there are some double height characters or higher character in a line, all characters in this line align along the baseline alignment

• ESC M also can set the font type of characters, and the command set received finally is valid.

• ESC E also can set or cancel the bold mode, and the command set received finally is valid

• ESC - also can set or cancel the underline mode, and the command set received finally is valid

• GS ! Also can set the size of characters, and the command set received finally is valid

• Bold mode is valid for both English characters, numeric characters and Chinese characters, and

• All of other print mode are valid only for English characters and numeric characters.

[Default Value] n=0

[Reference] ESC -, ESC E, GS !

ESC \$ n L n H

[Name] Setting the absolute print position

[Format]	ASCII code	ESC	\$	nL	nH
	Hexadecimal code	1B	24	nL	nH
	Decimal code	27	36	nL	nH

[Range] $0 \leq nL \leq 55$

$0 \leq nH \leq 255$

[Description] Setting the distance between the beginning of a line to the position of character which will print

[Note] • The distance between the beginning of a line to the print position is $[(nL + nH * 256) * 0.125 \text{mm}]$.

• The setting about the area outside the specific print area will be ignored.

• In the standard model, using the horizontal motor unit - (x).

[Reference] ESC \, GS \$, GS \

ESC % n

[Name] Choose/cancel the user-defined character set

[Format]	ASCII code	ESC	%	n
	Hexadecimal code	1B	25	n
	Decimal code	27	37	n

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

[Description] • Choose/cancel the user-defined character set

• When the least significant bit of n is 0, cancel the user-defined character set

• When the least significant bit of n is 1, choose the user-defined character set

[Note] • When cancel the least significant bit, choose the internal character set automatically

• n is useful only when it is in least significant bit.

[Default Value] n=0

[Reference] ESC &, ESC ?

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

[Name] Define the user-defined character

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

Hexadecimal code 1B 26 y c1 c2 [x1 d1...d(y□x1)]...[xk d1...d(y□xk)]

Decimal code 2738 y c1 c2 [x1 d1...d(y□x1)]...[xk d1...d(y□xk)]

[Range] y=3

$32 \leq c1 \leq c2 \leq 126$

$0 \leq x \leq 12$ (When set the font A to (12×24))

$0 \leq x \leq 9$ (When set the font B to (9×17))

$0 \leq d1...d(yxk) \leq 255$

[Description] Define the user-defined character

□• y specifies the Bytes in vertical direction.

□• c1 Specify the starting character encoding, c2 Specify the ending character encoding

□• x Specify the points in horizontal points.

[Note] • To define the scope of the character encoding: ASCII Code from <20> to <7E> H (95 characters)

□• Can define the continuous character encoding of multiple characters. When only character needed, make $c1 = c2$.

□• d is the point data of the characters. Point pattern is start on the left of horizontal direction, the remaining points on the right side is blank.

□• The date define the user-defined character is (y×x) byte.

□• Set the print points corresponding to 1 or the points not print corresponding to 0

□• The command can define different user-defined character pattern for each font by ESC ! or ESC M

□• The user-defined character cannot defined with the downlink bitmap at the same time. When the command is executed, the bitmap will be cleared.

□• The user-defined character will be cleared under the following cases:

1) when performing ESC @ .

2) when performing GS *.

3) when performing ESC ?.

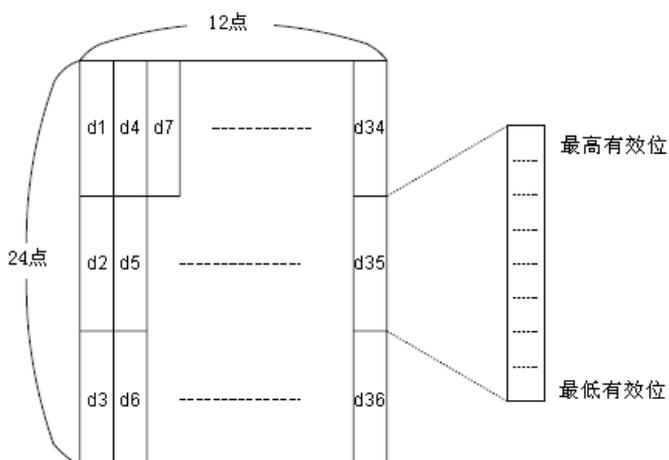
4) reset the printer or shut off the power.

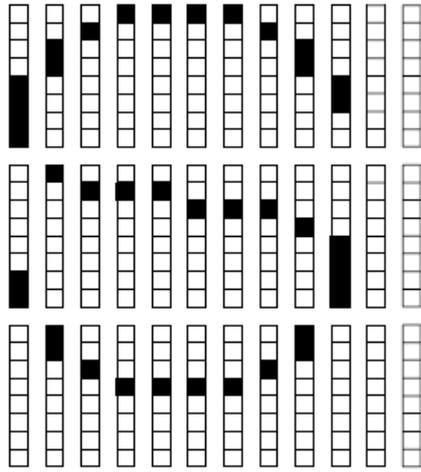
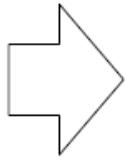
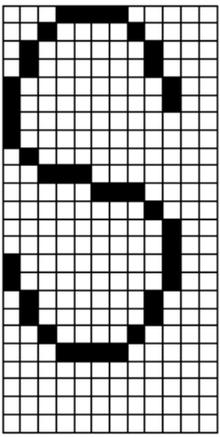
□• When the user-defined character is defined from the font B (9×17), only the least significant bit of the third byte of data vertical direction is effectively.

[Default Value] The internal character set

[Reference] ESC %, ESC ?

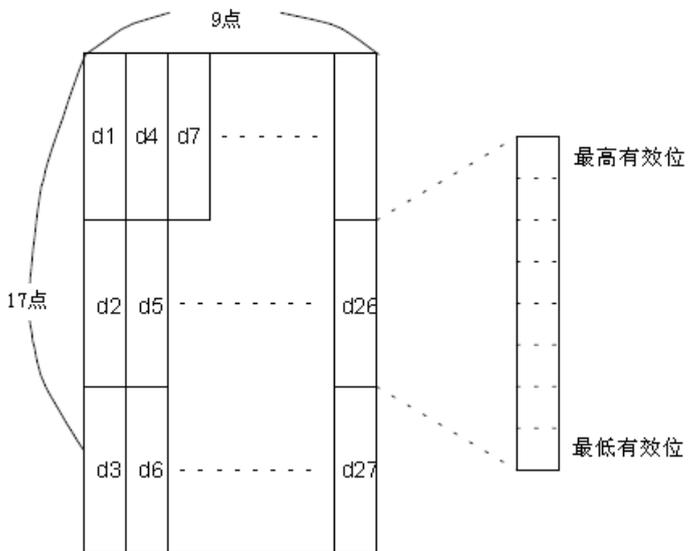
[Instance] When setting the font A to (12×24)

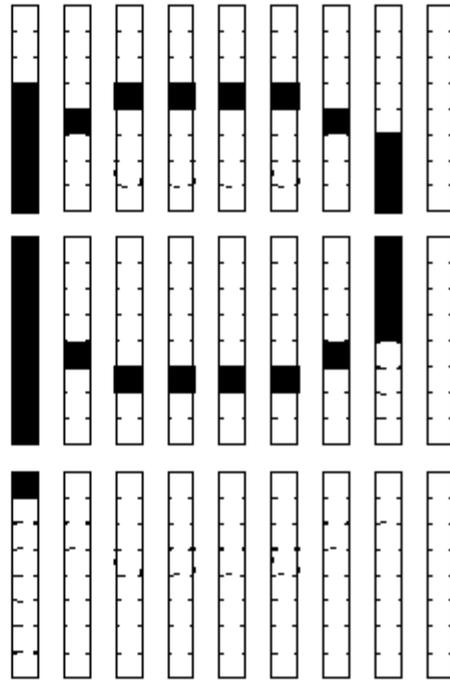
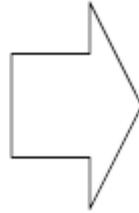
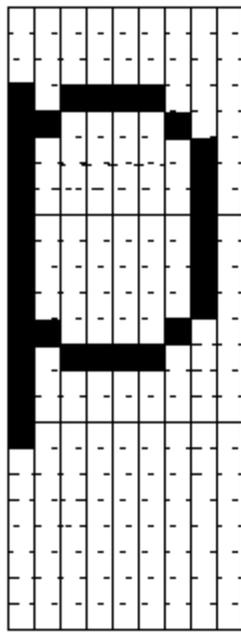




d1=<0F>H d4=<30>H d7=<40>H....
 d2=<03>H d5=<80>H d8=<40>H....
 d3=<00>H d6=<00>H d9=<20>H....

□ When setting the fontB to (9×17)





d1=<1F>Hd4= <08>Hd7=<10>H...
d2=<FF>Hd5= <08>Hd8=<04>H...
d3=<80>Hd6=<00>Hd9=<00>H...

ESC*mnLnHd1...dk

[Name] Select the bitmap mode

[Format] ASCII code ESC * mnL nH d1...dk
Hexadecimal code 1B 2Am nL nH d1...dk
Decimal code 27 42m nL nH d1...dk

[Range]m=0, 1, 32,33

0≤nL≤255

0≤nH≤3

0≤d≤255

[Description] using m to select the bitmap mode,the point of bitmap designated by the nL and nH, as shown below

m	mode	vertical direction		horizontal direction	
		points	Point density	Point	number of data(K)
0	8-point single-density	8	67.7dpi	101.6dpi	$nL + nH \div 256$
1	8-point dual density	8	67.7dpi	203.2dpi	$nL + nH \div 256$
32	24-point single-	24	203.2dpi	101.6dpi	$(nL + nH \div 256) \times 3$
33	24-point dual density	24	203.2dpi	203.2dpi	$(nL + nH \div 256) \times 3$

dpi:print points/25.4mm(1inch)

[Note]•If the value of m beyond the specified scope, then the nL and later data will be processed as normal data.

nL and nH represent the points of upper figure in horizontal direction,can calculate the points by $nL + nH \times 256$

□•If the bitmap data input is beyond the limit of point a line can be printed, the beyond data will be ignored.

□•d represents the bitmap data,set the corresponding bit to 1 to print one point, or set the corresponding bit to 0 to avoid print one point.

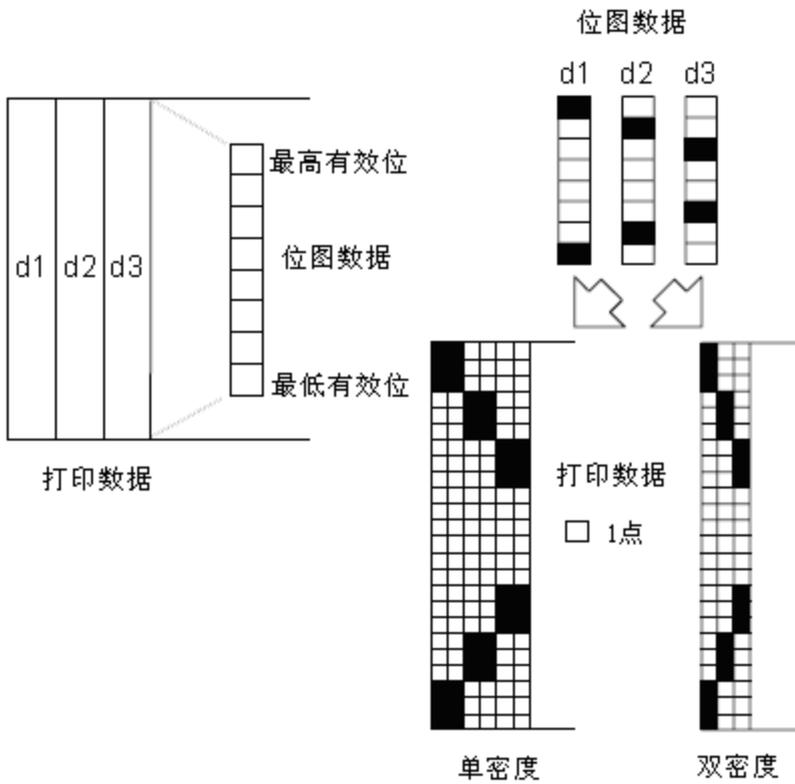
□•If the print width set by GSL and GSW is smaller than the requirement of data send by ESC * , following perform will made for the smaller one (the width cannot beyond the maximum printing range) :

①expanded the width of the print area to the right to adapt the amount of data

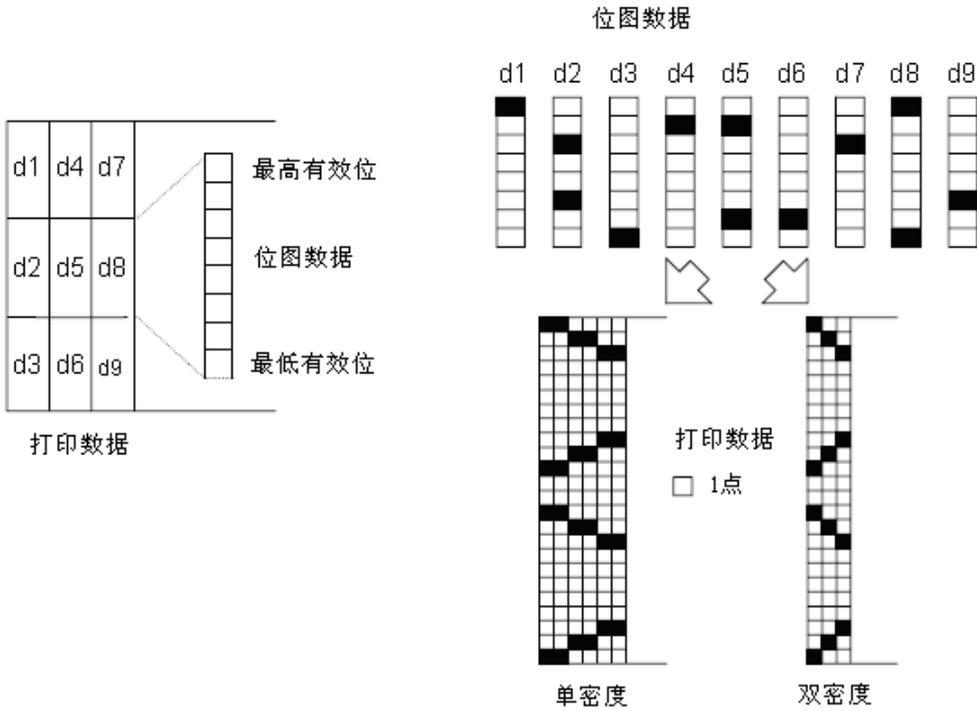
②If the step (1) can not provide enough width fro data, then left edge will reduced to adapt to the data.for

every point of data in the single density mode ($m = 0, 32$), the printer will print two points, and for every point of data in the dual density model ($m = 1$), the printer will print 1 point. these must be considered when calculating the amount of data that can be printed in 1 line

- The printer will back to regular data processing mode after printing a bitmap
- This command is not influenced by print mode (bold, underline, size, or white printing), unless it is reverse print mode.
- Followed diagram describe the relationship between the image data and the point printed.
- When the figure 8 - point is selected:



- When the figure 24 - point is selected:



ESC- n

[Name] Set/cancel underline

[Format] ASCII Code ES - n
 Hexadecimal Code 1B 2 n
 Decimal Code 27 45 n

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

[Description] Set/cancel underline mode based on the value of n:

n	Function
0, 48	cancel underline mode
1, 49	Start underline mode(1 point of coarse)
2, 50	Start underline mode(2 point of coarse)

[Note] • Printers can print underline for all characters (including the interval on the left of character), except the blank set by HT

• The printer cannot print underline for the characters clockwise rotated 90° and highlighted characters

□ • When cancel the underline mode by setting the value of n to 0 or 48, the following data will be printed without underline, and the roughness of underline set before underline canceled will not change. The roughness of default underline is 1 point.

□ • The change of character size does not affect the roughness of current underlined.

□ • ESC! also can set or cancel the underline mode, and the command finally received is valid.

[Default value] n=0

[Reference] ESC!

ESC2

[Name]	Select the default line		
[Format]	ASCII code	ESC	2
	Hexadecimal Code	1B	32
	Decimal Code	27	50

[Description] Select the default line spacing to 3.75mm(30*0.125mm)。

[Note] Line spacing can be set independently among the standard model.

[Reference] ESC3

ESC3n

[Name]	Set line			
[Format]	ASCII code	ESC	3	n
	Hexadecimal	1B	33	n
	Decimal Code	27	51	n
[Range]	0≤n≤255			

[Description] set the line spacing to[n *0.125mm].

[Note]•Line spacing can be set independently among the standard model and page setup

- Using the vertical motor unit (y) in the standard model.

[Default line]n=30

[Reference] ESC2

ESC? n

[Name]	Cancel the user-defined character		
[Format]	ASCII code	ESC	? n
	Hexadecimal Code	1B	3F n
	Decimal Code	27	63 n

[Range] 32□≤n□≤126

[Description] Cancel the user-defined character

[Note]•This command terminates the style for define character encoding, and the character encoding specified by n.After the user-defined character was canceled, printer will print according to the internal character pattern.

- In the font choose by ESC!, the command remove the styleof specified coding definition .
- If a user-defined character is not defined, the printer will ignore this command.

[Reference] ESC&,ESC%

ESC@

[Name]	Initialize the printer		
[Format]	ASCII code	ESC	@
	Hexadecimal Code	1B	40
	Decimal Code	27	64

[Description] Clear the data in the print buffer, reset the printer mode to the effective mode you can see when open the printer.

[Note]DIP switch settings will no longer be checking.

- The data in receive and buffer section will not cleared.

ESC D n1...nk NUL

[Name]	Setting horizontal anchor point		
[Format]	ASCII code	ESC	D n1...nk NUL

Hexadecimal Code1B 44 n1...nk 00

Decimal Code27 68 n1...nk 0

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

$0 \leq k \leq 32$

[Description]Set up the horizontal positioning location

n specify the beginning column number of a line to set the level position location.

k present the total number of level positioning location will be set.

[Note] •The horizontal orientation position was stored as a value, and this value(=width of character*n) is measured from the beginning of a line. The character width including the space on the right side of the characters, and the double width was set as twice as ordinary characters .

• The command delete the horizontal positioning set before

• When setting $n = 8$ 時, the print position will moved to the ninth column by t sending HT.

• The limit of position is $k = 32$, the date exceed 32 positioning location will be processed as common data .

•Placing a NUL code 0 at the end according to ascending order transmission [n] k ,when [n] k is less than or equal to the front [n], k - 1, positioning setting ended, and the subsequent data will be processed as normal data .

ESC D NULcancel all the horizontal positioning location.

•Even if the character width change, the horizontal positioning location specified before remains the same

or standard type, the character width will remembered

[Default value]The default positioning location is the 8 characters intervals of type A (12 * 24) (column917 25...).

[Reference] HT

ESCEn

[Name] Set/cancel bold print

[Format] ASCII code ESC E n

Hexadecimal Code1B 45 n

Decimal Code27 69 n

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

[Description]set/cancel bold print mode

when the least significant bit of n is 0, cancel bold print mode

when the least significant bit of n is 1, start bold print mode

[Note]• Only the least significant bit of n is allowed to use

•This command and ESC! set and remove bold print mode in the same way.Be careful When they are used at the same time.

[Default value]n=0

[Reference] ESC!

ESCGn

[Name] Set/cancel overlapping print

[Format] ASCII codeESC G n

Hexadecimal Code1B 47n

Decimal Code27 71 n

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

[Description] set/cancel overlapping print mode

when the least significant bit of n is 0, cancel overlapping print mode

when the least significant bit of n is 1, start overlapping print mode

[Note]•only the least significant bit of n is allowed to use

•The output of printer are the under overlap mode and bold mode

[Default value]n=0

[Reference] ESCE

ESCJn

[Name] Print and paper feed

[Format] ASCII code ES J n
 Hexadecimal Code 1B 4A n
 Decimal Code 27 74 n

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

[Description] print the data print buffer and paper feed [n × 0.125mm].

[Note]• This command set the printer starting position to the beginning of line when the print finished.

□•The amount of feed set by this command does not affect the value set by ESC2 or ESC3

□•Under standard mode, printer use the vertical motor unit-(y)。

ESCMn

[Name] Select the font types

[Format] ASCII code ESC M n
 Hexadecimal Code 1B 4D n
 Decimal Code 27 77 n

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

[Description]Select the font types

The use of n as shown below:

n	function
0, 48	Choose font A(12*24)
1, 49	Choose font B(9*17)

[Note]ESC! also can choose the font type.But the setting by the finally command is effective。

[Reference] ESC!

ESCVn

[Name] set/cancel clockwise 90°rotating

[Format] ASCII code ESC V n
 Hexadecimal Code 1B 56 n
 Decimal Code 27 86 n

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

[Description] set/cancel clockwise

The use of n as shown below:

n	function
0,48	cancel the clockwise 90 ° rotation
1,49	Start the clockwise 90 ° rotation

[Note]•The command will affect the print under standard mode, and the set up is always valid.

□•The underline mode doesn't work for clockwise rotate 90 ° characterunder clockwise rotation 90° mode, the character print by double width and double height command is in the opposite direction to general case

[Default value]n=0

[Reference] ESC!, ESC-

ESC\nLnH

[Name] Set up relative print position

[Format] ASCII code ESC \ nL nH

Hexadecimal code 1B 5C nL nH

Decimal Code 27 92 nL nH

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

$0 \leq nH \leq 255$

[Description] Based on the current position, set the print starting position using horizontal or vertical motion unit

This command sets the print position to the $[nL + nH * 256 (nL) * 0.125 \text{ mm}]$ from the current position

[Note] • All the setting outside the printable area will be ignored.

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

• When the N is specified to the left using the complement of 65536: $nL + nH * 256 = 65536 - N$

• Using the horizontal motor unit under standard mode

[Reference] ESC\$

ESCan

[Name] select the

[Format] ASCII code ESC a n

Hexadecimal 1B 61 n

Decimal Code 27 97 n

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

[Description] Aligning the data line according to the specified location by choose the number of n

n	alignment
0, 48	left aligned
1, 49	center
2, 50	Right aligned

[Note] • Under standard mode, this command is valid only when processing the beginning of a line

• The command executes aligned in print area.

• The command aligns blank areas according to HT, ESC \$ or ESC \.

[Default value] n=0

ESCc5n

[Name] Activate/ prohibited panel key

[Format] ASCII code ESC c 5 n

Hexadecimal code 1B 63 35 n

Decimal Code 27 99 53 n

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

[Description] Activate/ prohibited panel key

when the least significant bit of n is 0, activate panel key

when the least significant bit of n is 1, prohibited panel key

[Note] • Use only the least significant bit of n.

• If the panel key is prohibited, all button doesn't work when closing the printer cover .

• For this printer, paper feed key is the only panel key

• When in a macro performing standby, no matter how the command set, paper feed key will activated.

But cannot feed the paper.

[Default value] n=0

ESC d n

[Name] Print and paper feed n line

[Format] ASCII code ESC d n

Hexadecimal code 1B 64 n

Decimal Code 27 100 n

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

[Description] Print and output the data in the buffer, and paper feed n line.

[Note] • The command to set the starting point of line as print starting position

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

□ • The max paper feed is 1016 mm (40 inch) If the specified paper feed (n line spacing) is more than 1016 mm (40 inches), the printer will feed only 1016 mm (40 inches).

[Reference] ESC2, ESC3

ESC p m t1 t2

[Name] pulse generating

[Format] ASCII code ESC p m t1 t2

Hexadecimal code 1B 70 m t1 t2

Decimal Code 27 112 m t1 t2

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

$0 \leq t1 \leq 255$

$0 \leq t2 \leq 255$

[Description] Send a pulse to the specified pin connection.

Boot time = $t1 \times 2$ millisecond

Off time = $t2 \times 2$ millisecond

m = 0/48, Pulse is sent to the cashbox output pin 2;

m = 1/49, Pulse is sent to the cashbox output pin 5.

ESC t n

[Name] Select the character code table

[Format] ASCII code ES t n

Hexadecimal code 1B 7 n

Decimal Code 27 1 n

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

[Description] Select the page from the character code table n

[default value] n=0

[Reference] character code table

ESC { n

[Name] Set/remove reverse print mode

[Format] ASCII code ESC { n

Hexadecimal code 1B 7B n

Decimal Code 27 123 n

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

[Description] Set/remove reverse print mode

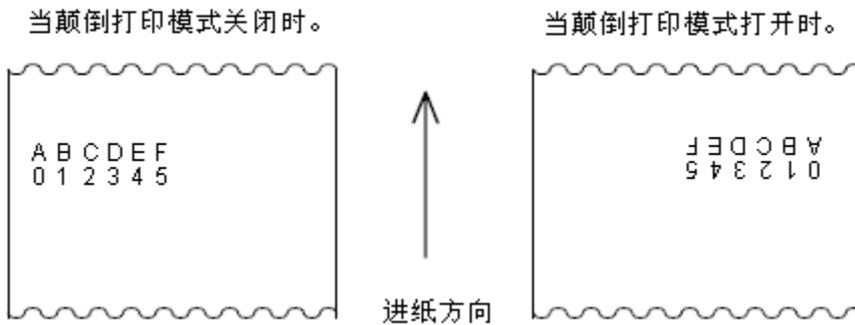
□ when the least significant bit of n is 0, remove reverse print mode

□ when the least significant bit of n is 1, start reverse print mode

[Note] • Only the least significant bit of n is effective.

□ • The command is valid only when input at the beginning of a line in the standard model

- Under reverse print mode, the printer should rotated the line for 180 ° first, then start print.
[Default value]n=0
[Instance]



FS p n m

[Name] Print NV bitmap
 [Format] ASCII code FS p n m
 Hexadecimal code 1C 70 n m
 Decimal Code 28 11 n m
 [Range] 1□ ≤ n □ ≤ 255

0 ≤ m ≤ 3, 48 ≤ m ≤ 51

[Description]print the NV bitmap n with the mode specified by m

m	mode	Vertical point density	horizontal point density
0, 48	normal	203.2dpi	203.2dpi
1, 49	Double width	203.2dpi	101.6dpi
2, 50	Double height	101.6dpi	203.2dpi
3, 51	4 times size	101.6dpi	101.6dpi

dpi:print point/25.4mm(1inch)

□n : quantity of NV bitmap(defined by FSq command)。

□m : bitmap mode。

[Note]•NV bitmap is a bitmap defined in the nonvolatile memory 。 Defined and print by FSq

□• The command is invalid when there is no specified NV bitmap

□•Under standard mode, this command is valid only when there is no data in the print buffer.

•This command is not affected by many print mode (bold print, overlapping, underline, character size,highlight or character 90 °), except the rotated and inverted print mode

• If the width of print section set by GSL and GS W is less than a vertical line,then perform the following idea for thisline. In NV bitmap mode, a vertical line means the next point of the normal mode (m = 0,48) and double height mode(m = 2, 50), the next 2 point of double width mode and model (m = 1,49) and four times size model (m = 3,51)

① The width of print area in NV bitmap mode is extended 1 vertical line to the right, and cannot exceed the print area.

② If the width of print area can not extend 1 vertical line, then the left blank should reduced to accommodate a vertical line.

□•If bitmap printed is more than 1 line, the excess data does not printed.

□• Under normal mode and double width mode, this command fed paper for n point (n is the height of NV bitmap),

and under double height and 4 times size mode, this command into the paper for 2n point, and it is irrelevant for the line spacing set by ESC2 and ESC3.

□• Print the bitmap after this command set the print position at the beginning of a line after print the bitmap, and process the subsequent data as the normal data .

[Reference] ESC*, FS q, GS /, GS v0

FSqn [xLxHyL yHd1...dk]1... [xLxHyLyHd1...dk]n

[Name] Define NV bitmap

[Format]	ASCII code	FS	q	n	[xL xH yL yHd1...dk]1...[xLxH yLyHd1...dk]n
	Hexadecimal code	1C	71	n	[xLxHyLyHd1...dk]1...[xLxHyLyHd1...dk]n
	Decimal Code	28	113	n	[xLxHyLyHd1...dk]1...[xLxHyLyHd1...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

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

and defined data area=192K byte

[Description] Define the NV bitmaps by specific value of n.

n specifies the number of specified NV bitmap.

xL,xH is the defined points of NV bitmap in the horizontal direction= $(xL + xH * 256) * 8$.

□yL,yH is the vertical defined points of NV bitmap in the horizontal direction= $(yL + yH * 256) * 8$.

[Note]•Frequently write command frequently may damage the NV memory. Therefore, we suggest that do not write the NV memory more than 10 times a day

□•After put an image in NV memory, the printer will perform a hardware reset operation, so the user custom characters, the bitmaps and macro should be defined after complete the command .Printer will clear the receive and print buffer, and reset to available mode as the mode of turning on the power , DIP switch should be checked again at that time.(hardware reset interface is not supported)

□•The command will cancel all the NV bitmap that have been defined by the command

□•start from process the command to the hardware reset finished, mechanical operation cannot performed(including when cover opened, print head position initialize and into paper with feed button etc.).

□•During processing this command, the printer will stop receiving when write data to users NV memory because of busy. So data transmission is forbidden during the execution of this command including real-time command.

□•NV bitmap is a bitmap that defined in the nonvolatile memory , defined and printed by FSq

□•Under standard mode, the command is valid only when processed at the beginning of a line

□• The command is valid when the 7 bytes < FS ~ yH > of this command is normally processed

□•When the amount of data exceed the left capacity defined by xL, xH, yL, yH, the printer will process the range defined by xL, xH, yL, yH outside the defined scope

□• In the first group of bitmap, the command will be banned when any parameter of xL, xH, yL yH is beyond the definition of scope

□•In a group of bitmap not from first group , when the xL, xH, yL, yH is beyond the scope definition, the printer will stop processing the command, and begin to write NV image. At this time, the NV bitmap have not been defined will be banned (undefined,) but the previously NV bitmap is still valid.

□•d represents define data. In data (d), a 1 bit specify a point to print, and a 0 bit specify a point than need not printed

□•This command define n as the number of NV bitmap, n is rise in order from 01 H bitmap. So the first data group [xL xH yL yH d1... dk] is NV bitmap 01 H, the final data group [xLxH yL yH d1... dk] is NV bitmap n. The total number is same with the NV bitmap set by FSq command.

□•The definition of a NV bitmap data consisting of [xLxHyLyHd1... dk]. Thus, there is only one NV bitmap, n = 1, the

printer only deals with data group-[xLxH yL yH d1... dk] for one time. Printers use $((\text{data: } (xL + xH * 256) * (yL + yH * 256) * 8) + (\text{header: } 4))$ bytes of NV memory.

□•This defined area of this printer is 192 k bytes (maximum). This command can define several bitmap, but cannot define the bitmap of which total data capacity [=bitmap data + head] is more than 192 k bytes

□•Even the ASB is set, printers don't transmit ASB or execution state detection during the command processed.

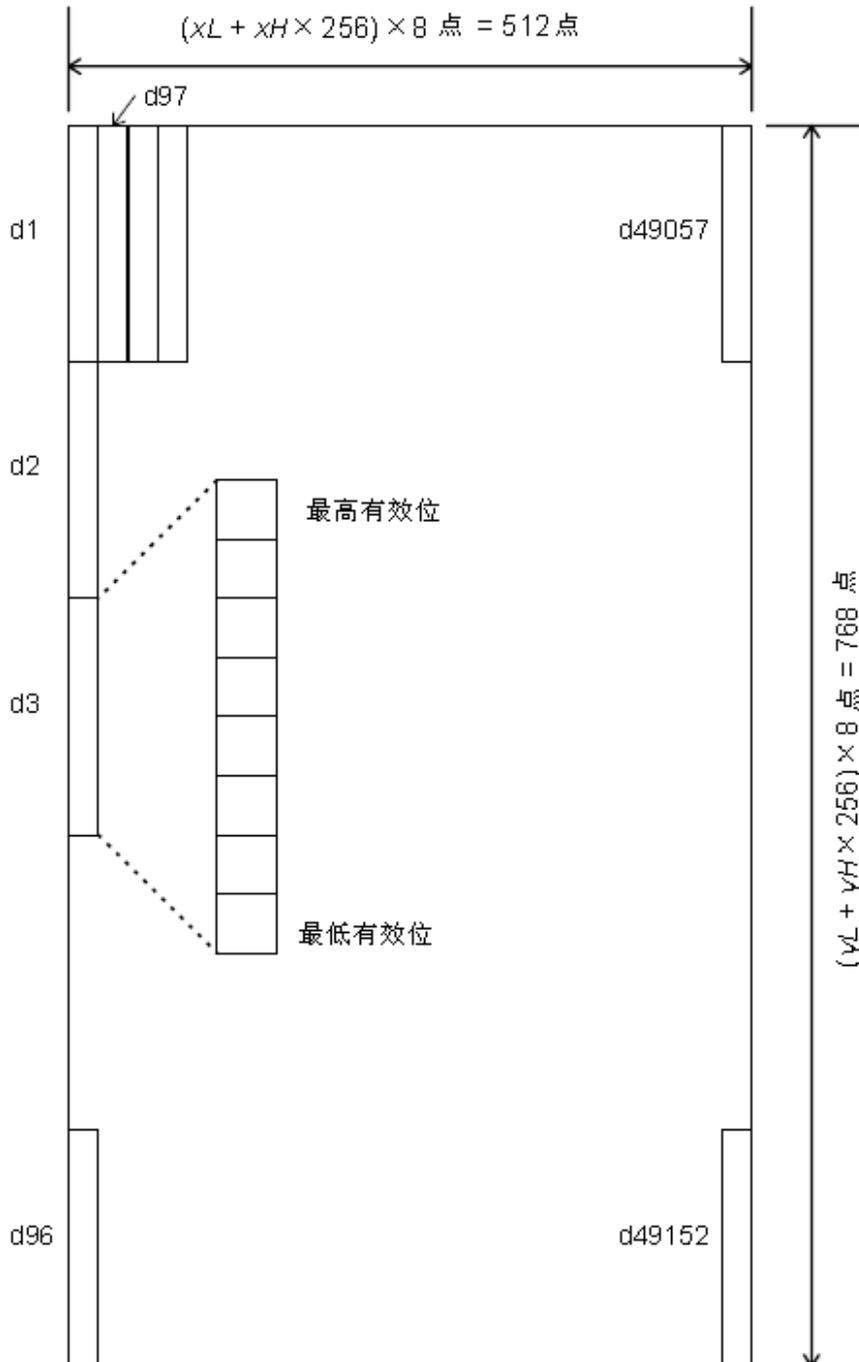
□• When receives the command during the macro definition, the printer will stop the macro definition, and begin to execute the command

□•Once a NV bitmap is defined , it cannot be ordered by ESC @, cannot be reset or deleted by power cut

□•The command only perform the definition by NV bitmap, does not perform print. The print of NV bitmap is execute through FSp command.

[Reference] FS p

[Instance] when $xL=64, xH=0,$



$yL=96, yH=0$

GS ! n

[Name] set the character size
 [Format] ASCII code GS ! n
 Hexadecimal 1D 21 n
 Decimal Code 29 33 n
 [Range] $0 \leq n \leq 255$

(1 \leq vertical multiple \leq 8, 1 \leq horizontal multiple \leq 8)

[Description] Use 0 to 2bit set the height of character, and 4 to 7 bit to set the width of character, as shown below

bit	off/on	hexadecimal	decimal	function
0				Set the height of character, see chart 2
1				
2				
3				
4				Set the width of character, see chart 1
5				
6				
7				

Chart 1: setting the width of character

chart2:setting the height of character

Hexadecimal	Decimal	Width/time
00	0	1
10	16	2
20	32	3
30	48	4
40	64	5
50	80	6
60	96	7
70	112	8

Hexadecimal	Decimal	Height/time
00	0	1
01	01	2
02	02	3
03	03	4
04	04	5
05	05	6
06	06	7
07	07	8

[Note]•The command is valid for all characters except the HRI character (including English characters , numeric characters andChinese characters)

- This command will ignored if the n is outside the define range.

- Under standard mode, the feed direction is the vertical direction.But when character direction clockwise rotate 90,the relationship between the vertical direction and horizontal direction become upside.

- When the size of character is enlarged with different times in a line, all the characters in this line align along the baseline

- The ESC!Command can set or remove the double width mode and double height mode.The command received last is set to effective.

[Default value]n=0

[Reference] ESC!

GS B n

[Name] Set/remove the white print mode

[Format] ASCII code GS B n

Hexadecimal code1D 42 n

Decimal Code 29 66 n

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

[Description] Set/remove the white print mode
 when the least significant bit of n is 0, remove the white print mode
 when the least significant bit of n is 1, start the white print mode

[Note] • Only the least significant bit of n is effective.

- The command is effective for both built-in character and user-defined character are effective
- When the reverse mode opened, it also effective to the blank set by ESC SP
- This command does not affect the bitmap, user-defined bitmap, bar code, HRI characters, and space by HT skip, ESC \$ and ESC \.
- This command does not affect line spacing.
- The reverse mode prior to the underline mode. When the white model set, the underline mode will be forbidden even it is open (but not canceled).

[Default value] n=0

GS H n

[Name] select the print position of HRI characters

[Format] ASCII code GS H n

Hexadecimal code 1D 48 n

Decimal Code 29 72 n

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

[Description] Select the print position of HRI characters when print barcode
 Using n to choose print position as shown below.

n	Print position
0,48	Do not print
1,49	above the bar code
2,50	at the bottom of the barcode
3,51	above and below the bar code

HRI represents readable bar code corresponding characters.

[Note] Use the fonts specified by GSf to print HRI characters

[Default value] n=0

[Reference] GS f, GS k

GS L nL nH

[Name] Set the left margin

[Format] ASCII code GS L nL nH

Hexadecimal code 1D 4C nL nH

Decimal Code 29 76 nL nH

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

$0 \leq nH \leq 255$

[Description] Set the left margin by nL and nH

[Note]

• Set the left margin to $[(nL + nH * 256) * 0.125 \text{mm}]$.

• In standard mode, the command is valid only when processing it in the starting position of a line.

□ • If the set is outside the printable scope, then use the maximum printing unit.

[Default value] nL=0, nH=0

[Reference] GS W

GS f n

[Name] Select the HRI character fonts

[Format] ASCII code GS f n

Hexadecimal code 1D 66 n

Decimal Code 29 102 n

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

[Description] choose a font for HRI characters when it used to print bar code

Using n to select the font:

n	font
0,48	fontA(12*24)
1,49	fontB(9*17)

[Note] HRI is the corresponding characters for readable bar code.

□ Print the HRI character on the position specified by GS H .

[Default value] n=0

[Reference] GS H, GS k

GS h n

[Name] Set the height of barcode

[Format] ASCII code G h n

Hexadecimal 1 6 n

Decimal Code 29 1 n

[Range] 1 ≤ n ≤ 255

[Description] Set the height of bar code, using n to set the point in vertical direction

[Default value] n=162

[Reference] GS k

① GS k m d1...dk NUL ② GS k m n d1...dk

[Name] Print bar code

[format] ① ASCII code GS k m d1...dk NUL

Hexadecimal 1D 6 m d1...dk 00
code B

Decimal Code 29 1 m d1...dk 0
0

② ASCII code GS k m n d1...dn

Hexadecimal 1D 6B m n d1...dn
code

Decimal Code 29 107 m n d1...dn

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

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

[Description] Selected the barcode system and print the barcode.

Choosing the value of m to decide bar code system:

m	Bar code system	number of characters	note	
①	0	UPC-A	$11 \leq k \leq 12$	$48 \leq d \leq 57$
	1	UPC-E	$11 \leq k \leq 12$	$48 \leq d \leq 57$
	2	JAN13(EAN13)	$12 \leq k \leq 13$	$48 \leq d \leq 57$
	3	JAN8(EAN8)	$7 \leq k \leq 8$	$48 \leq d \leq 57$
	4	CODE39	$1 \leq k'$	$48 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43, 45, 46, 47$
	5	ITF	$1 \leq k$ (even number)	$48 \leq d \leq 57$
	6	CODABAR	$1 \leq k'$	$48 \leq d \leq 57, 65 \leq d \leq 68, 36, 43, 45, 46, 47, 58$
②	65	UPC-A	$11 \leq n \leq 12$	$48 \leq d \leq 57$
	66	UPC-E	$11 \leq n \leq 12$	$48 \leq d \leq 57$
	67	JAN13(EAN13)	$12 \leq n \leq 13$	$48 \leq d \leq 57$
	68	JAN8(EAN8)	$7 \leq n \leq 8$	$48 \leq d \leq 57$
	69	CODE39	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43, 45, 46, 47$
	70	ITF	$1 \leq n \leq 255$ (even number)	$48 \leq d \leq 57$
	71	CODABAR	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 68, 36, 43, 45, 46, 47, 58$
	72	CODE93	$1 \leq n \leq 255$	$0 \leq d \leq 127$
	73	CODE128	$2 \leq n \leq 255$	$0 \leq d \leq 127$

[Note①] •The command is ended by NUL code

- When the using barcode system is UPC- A or UPC - E, the printer will print bar code after receiving 12 bytes data , and the subsequent data will be processed as normal data
- When the using barcode system is JAN13(EAN13) the printer will print bar code after receiving 13 bytes data , and the subsequent data will be processed as normal data.
- When the using barcode system is JAN8(EAN8),the printer will print bar code after receiving 8 bytes data , and the subsequent data will be processed as normal data
- The number of ITF barcode data must be even.When an odd number of data input , the printers will ignore the last data

[Note②] m specified the bytes of barcode data, and printer will process the n bytes of data as a bar code data from the next character

- If n is beyond the specified scope, the printer will stop the processing of the command, and the follow-up data will be processed as a common data .[pay attention of the standard mode]
- If d is beyond the specified scope, the printer will just feed and the subsequent data will be processed as normal data.
- If the dimension of horizontal direction is beyond the print area, the printer will just feed paper
- The command into the paper according to the requirement of the print bar code, regardless the line spacing set by the of ESC2 or ESC3
- The command is effective only when there is no data in the print buffer, when there is data in print buffer the subsequent data of m will be processed as normal data
- The command set the print position to the beginning of a line after print the barcode .
- This command is not affected by many print mode (bold print, overlapping, underline, character

size, highlighting or character 90 °), except the rotated and inverted print mode

- When using thermal label, if the height of bar code is not suitable for the current tag, then the extra part will be printed on the next label.
- When using CODE93 (m = 72) : The printer print a HRI character (□) in the beginning of the HRI string , as the starting word of HRI string
- The printer print a HRI character (□) in the ending of the HRI string , as the ending word of HRI string
- Printers print HRI character (□+ a literal characters) as control characters (00 <H> to < 1F> H and < 7 F>H) :
- Please consider the following factors about data transfer when the printer using CODE128 :
 - ①The head of the barcode data string must be the code set character (CODEA CODEB, or CODEC) , used to select the code set firstly use
 - ②using character "{" and " a character combinations to define the special characters. By transmitting "{" 2 times to define ASCII characters" {".

Special characters	Data Transmitting		
	ASCII code	Hexadecim	Decimal
SHIFT	{S	7B,53	123,83
CODEA	{A	7B,41	123,65
CODEB	{B	7B,42	123,66
CODEC	{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

[Instance]Print the "No. 123456" instance data

In this instance, printer print "No." first with CODEB , then use the CODEC to print the following number :GS k73 09 32 33 34 35, 36, 78, 111, 4631

- If the bar code data string head is not the code set choose character, the printer will stop command processing, and the follow-up data will processed as common data
- If the "{" and the subsequent characters combination do not apply to any special characters, the printer will stop command processing, and the follow-up data will processed as common data
- If the printer received any characters that cannot be used for special code set , the printer will stop command processing, and the follow-up data will processed as common data
- Printer does not print the corresponding characters to shift character or code set selected character
- The function character of HRI character is a space.
- The control characters (<> to < 1 > f H and H < 7 > f H) of HRI character is a space
- <Other>Confirm keep spacing on the left and right of bar code around (the spacing is vary with the different of bar code).

[Reference] GS H、GSf、GS h、GSw

GSv0m xlxHyLyHd1....dk

[Name] Print the grating bitmap

[Format] ASCII code GS v 0 m x x yL y d1...dk
 Hexadecimal 1D 76 30 m x x yL y d1...dk
 Decimal Code 29 11 48 m x x yL y d1...dk

[Range] $0 \leq m \leq 3$ $48 \leq m \leq 51$

$0 \leq xL \leq 255$

$0 \leq xH \leq 255$, and $1 \leq (xL + xH * 256) \leq 128$

$0 \leq yL \leq 255$

$0 \leq yH \leq 8$, and $1 \leq (yL + yH * 256) \leq 4095$

$0 \leq d \leq 255$

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

[Description] Print the grating bitmap by set the value of m :

m	mode	vertical point density	Horizontal point
0, 48	normal	203.2dpi	203.2dpi
1, 49	Double width	203.2dpi	101.6dpi
2, 50	Double height	101.6dpi	203.2dpi
3, 51	4 times size	101.6dpi	101.6dpi

(dpi:the print point/25.4mm{1inch})

xL,xH,Set the bitmap data bytes of horizontal direction= $(xL + xH * 256)$

yL,yH,Set the bitmap data bytes of vertical direction= $(yL + yH * 256)$

[Note]• In standard mode, the command is valid only when there is no data in printing buffer

•For grating bitmap print, this command is not affected by print mode (character size, bold, overlapping, top down printing, underline, reverse print mode, etc.).

•If the width of print section set by the GSL and GSW less than the minimum width, the printer will only narrow the problem line to the minimum width. For normal mode (m = 0,48) times and double height mode (m = 2, 50), minimum width is a bit, and for double width mode (m = 1,49) and four times size mode (m = 3 ,51),minimum width is two points.

•The data outside the print area is read into, and is point to discard.

•If subsequent characters print position is multiples of 8. The subsequent will bitmap print as a grating of print characters, the HT (horizontal TAB), ESC \$(set absolutely print position) ESC \ (set the relative print position) and the GSL (set the left margin setting).

•ESCa (alignment) set is also effective for grating bitmap.

•When receives the command during the macro definition, the printer end the macro definition, and begin to execute the command.Should clear the definition of the command.

•D represents the bitmap data.the point will printed set to 1, not printed set to 0

GSwn

[Name] Set the width of bar code

[Format] ASCII code GS w n
 Hexadecimal 1D 77 n
 Decimal Code 29 119 n

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

[Description] Set the width of bar code by choose the value of n:

n	Multistage barcode unit/mm	Binary barcode	
		narrow width (mm)	article wide 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

The following is multistage barcode: UPC-A,UPC-E,JAN13(EAN13),JAN8(EAN8),CODE93,CODE128

The following is binary barcode: CODE39,ITF,CODABAR

[Default value]n=3

[Reference] GS k

GSxn

[Name] Set the left spacing of bar code printing

[Format] ASCII code GS xn

Hexadecimal code1D 78 n

Decimal Code 29 120 n

[Description]the starting position of bar code printing:0→255

FS ! n

[Name] Set up the Chinese characters printing mode combination

[Format] ASCII code FS ! n

Hexadecimal code1C 21 n

Decimal Code2833 n

[Range] 0 ≤ n ≤ 255

[Description]Set up the Chinese characters printing mode ,by set the position of n;

position	on/off	Hexadecimal	Decimal	ASB state
0	—	—	—	undefined。
1	—	—	—	undefined
2	off	00	0	Forbid ht double width mode
	on	04	4	Allow the double width mode
3	off	00	0	Forbid the double height mode
	on	08	8	Allow the double height mode
4	—	—	—	undefined
5	—	—	—	undefined
6	—	—	—	undefined
7	off	00	0	Forbid the underline mode 。
	on	80	128	Allow the underline mode

[Note] • Set up the double width mode and double height mode at same time, (including the right and left character spacing),the size of characters printed will be 4 times as normal

•The printer can underline all characters (including the right and left characters spacing) , except the space set by HT command and clockwise rotate 90 ° underlined characters.

•The width of underline is designated by FS , and is independent with the character size.

•If any characters in a line is in double height mode or double width mode, all the characters in this line will be aligned along the baseline

•You can use the GS! command to write bold Chinese characters, the last received command set valid.

•You can use the FS - command to set or cancel the underline mode, the last received command set valid.

[Default value]n=0

[Reference] FS -,GS !

FS &

[Name] Set the Chinese character mode

[Format] ASCII code FS &
Hexadecimal code 1C 26
Decimal Code 28 38

[Description] Select Chinese characters mode

[Note] For Chinese type:

- When choosing Chinese characters mode, the printer handle all the Chinese characters code, 2bytes/time.
- Processing the Chinese characters in the order of first byte, second byte, third byte.....
- Printer doesn't choose Chinese character mode when turn on the power

[Reference] FS .

FS - n

[Name] Set/cancel the underline mode of Chinese character

[Format] ASCII code FS - n
Hexadecimal code 1C 2D n
Decimal Code 28 45 n

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

[Description] Setting/cancel the underline mode of Chinese character by choose the value of n:

n	function
0, 48	cancel the underline mode of Chinese character
1, 49	Set the underline mode of Chinese character(1-point wide)
2, 50	Set the underline mode of Chinese character(2-point wide)。

[Note] • Printer can underlined all characters (including the right and left characters spacing), except the space set by HT command set Space, and the clockwise rotate 90 ° characters.

• By setting n to 0, cancel the underline mode of Chinese, the underline print will stopped, but underline width specified before remain unchanged. The default underline width is 1 point.

• Even if the character size changed, the specified width of underline remain unchanged.

• You can Set or cancel the underline mode by using the FS!, and the command received finally is effective.

[Default value] n=0

[Reference] FS !

FS .

[Name] Cancel the Chinese characters mode

[Format] ASCII code FS .
Hexadecimal code 1C 2E
Decimal Code 28 46

[Description] Cancel the Chinese characters mode

[Note] • Chinese character type:

• If not choosing Chinese characters mode, all characters will processed as ASCII code, and every character will processed.

• When turned on the power, the printer did not choose Chinese character mode.

[Reference] FS &

FSSn1n2

[Name] Set the Angle of Chinese character

[Format] ASCII code F S n1 n

Hexadecimal 1 53 n1 n
 Decimal Code 2 83 n1 n

[Range] 0≤n1≤255
 0≤n2≤255

[Description] Set the left and right Chinese characters spacing for n1 and n2.

The left side of character spacing is [n1] * 0.125 mm,

The right side of character spacing is [n2] * 0.125 mm.

[Note]•This command sets the left and right spacing of character of average size. Under double width mode,the left and right character spacing is twice as normal mode .

•The command can set separately under normal mode

• Using horizontal motor unit in standard mode .

[Default value]n1=0,n2=0

ESCZmn kdLdHd1...dn

[Name] Print the QR code

Format] ASC II ES Z m n k dL dH d1...dn
 Hexadecimal 1B 5A m n k dL dH d1...dn
 Decimal 27 90 m n k dL dH d1...dn

[Description]M specify the logo ofversion(1~40,0:autosize)

nspecify the EC level(L:7%,M:15%,Q:25%,H:30%)

k specify the component types(1~8)

Dis the length of the data and it contains 2 bytes.

dL:The first byte is low number.

dH: the second byte is superior.。

d1, dn are the bar code data.。

When m is 0, the printer will choose the barcode type automatically .

 The automatic method is proposed.

 《The QR CODE - type form (version)》

version	Capacity (code) by the EC level			
	L(7%)	M(15%)	Q(25%)	H(30%)
1	19	16	13	9
2	34	28	22	16
3	55	44	34	26
4	80	64	48	36
5	108	86	62	46
6	136	108	76	60
7	156	124	88	66
8	194	154	110	86
9	232	182	132	100
10	274	216	154	122
11	324	254	180	140
12	370	290	206	158
13	428	334	244	180
14	461	365	261	197
15	523	415	195	223
16	589	453	325	253
17	647	507	367	283

18	721	563	397	313
19	795	627	445	341

FSWn

[Name] Set/cancel 4 times the Angle of Chinese print

[Format] ASCII code FS W n

Hexadecimal code 1C 57 n

Decimal Code 28 87 n

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

[Description] Set/cancel 4 times the Angle of Chinese print

When the least significant bit of n is 0, cancel the 4 times the Angle of Chinese print

When the least significant bit of n is 1, set the 4 times the Angle of Chinese print

[Detailed information]

• Only the least significant bit of n is effective.

• Under the 4 times in the Angle of mode, the print size is as same as the size under double width mode and double height mode.

• When the command cancel the 4 times the Angle, the subsequent characters printed according to the size of the normal character

• When the height of some characters in a line is different with others, all the characters in this line based on baseline alignment.

• When characters enlarged at the horizontal direction, the direction is to the right side and the left side is the benchmark

• You also can use the FS! or GS! to set/remove 4 times Angle model by choose the double width mode and double height mode, and the set of finally receive command is effective.

[Default value] n=0

[Reference] FS !, GS !