

**JAL-1258**

Portable Thermal Printer

**Commands Manual  
(VER 1.00)**

(VER 1.00)

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## Format specification

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This section shows how to read and use the instructions of the manual. Please read it before programming.

This commands manual includes the below parts:

- 1) Description of Name and function of the command. This is the first part of the command instruction, which provide the command of ASCII form and the function description.
- 2) Format. In this part, using three kinds of form: the ASCII, HEX and Decimal, to describe the command. The default is Decimal if have no especial description, For example:  $1 \leq n \leq 4$ , 1 is Decimal 1, not the ASCII code 1.
- 3) Scope. Scope of the Variable is provided.
- 4) Description. Detailed explanation of the command is provided.
- 5) Notice. Some notes of the command is provided. Commands under different mode, or coordinating with different commands may cause interaction, so we provide some details here.
- 6) Reference. Some other commands which are interrelated or similar is provided.

--->	DLE EOT n		Real time transmission status		
<hr/>					
--->	[Format]	ASCII	DLE	EOT	n
		Hex	10	04	n
		Decimal	16	4	n
--->	[Range]	1 ≤ n ≤ 4			
--->	[Description]	Sending the printer state that designated by parameter n just in time			
		.....			
--->	[Notice]	When printer receives the command, returns to the interrelated status immediately....			
		.....			
--->	[Reference]				

## Character control command

### HT

---

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

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

- [Notice]
- This command is ignored unless the next horizontal tab position has been set.
  - If the next position of horizontal tab exceeds the printing area, the current position will be set as [printing width+1].
  - Horizontal tab positions are set with ESCD.
  - If the current position is at [ printing width+1] when receives the command, the printer will carry out the action in row buffer and move the printing position to the Zero position of next line.
  - The default value of tab position is every 8 standard ASCII characters (12\*24) a tab.
  - When the current row buffer is full, the printer will carry out the action below:  
Under standard mode, printer prints the content of current row and sets the Printing position at the zero position of next line

[Reference]                **ESC D**

## **LF**

---

[Name]            Printing and feeding line

[Format]	ASCII	LF
	Hex	0A
	Decimal	10

[Description]    Printing the datas in the print buffer and feeds one line

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

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

## **CR**

---

[Name]            Printing and entering

[Format]	ASCII	CR
	Hex	0D
	Decimal	13

[Description]        the same as LF when the command is permitted, if not , it will be ignored.

[NOTICE]            ·Setting the printing position at the beginning of the line.

[Reference]                **LF**

## **DLE EOT n**

---

[Name]            Real time status transmission

[Format]	ASCII	DLE	EOT	n
	Hex	10	04	n
	Decimal	16	4	n

[Range]             $1 \leq n \leq 4$

[Description]        Sending the printer state that designated by parameter n just in time:

- n=1: Sending state of the printer
- n=2: Sending off line state
- n=3: Sending error state
- n=4: Sending state of paper sensor

- [Notice]
- When printer receives the command, returns to the interrelated status immediately
  - Avoiding to put this command in the command sequence of more than 2 characters.
  - This command will be so valid even though the printer is set to be forbidden by the Command of ESC=(selecting peripheral).
  - When sending printer current state, each state is indicated by 1 byte
  - Transmission state value of the printer cannot confirm whether the master Computer received or not.
  - Printer will carry out the command immediately once received
  - This command is unavailable to the parallel printer. The printer will carry out the command immediately under any state
- n = 1: Printer status

Bit	0/1	HEX	Decimal	Function
0	0	00	0	Fix as 0
1	1	02	2	Fix as 1
2	0	00	0	Fix as 0
3	0	00	0	online
	1	08	8	offline
4	1	10	16	fix as 1
5,6	-	-	-	fix as 1
7	0	00	00	fix as 0

n = 2: off line status

Bit	0/1	HEX	Decimal	Function
0	0	00	0	fix as 0
1	1	02	2	fix as 1
2	0	00	0	fix as 0
3	0	00	0	Not holding down the feed button
	1	08	8	holding down the feed button
4	1	10	16	fix as 1
5	0	00	0	Printer is not out of paper
	1	20	32	Printer is out of paper
6	0	00	0	No error state
	1	40	64	error state
7	0	00	0	fix as 0

n = 3: error state

Bit	0/1	HEX	Decimal	Function
0	0	00	0	fix as 0

1	1	02	2	fix as 1
2	-	-	-	undefined
3	0	00	0	fix as 0
4	1	10	16	fix as 1
5	0	00	0	fix as 0
6	0	00	0	noun auto recoverable error
	1	40	64	have auto recoverable error
7	0	00	0	fix as 0

n = 4: paper sensor status

Bit	1/0	HEX	Decimal	Function
0	0	00	0	fix as 0
1	1	02	2	fix as 1
2,3	0	00	0	fix as 0
4	1	10	16	fix as 1
5,6	0	00	0	lack of paper sensor: have paper
	1	60	96	lack of paper sensor: noun paper
7	0	00	0	fix as 0

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

## ESC SP n

[Name] Setting the right space of characters

[Format] ASCII      ESC      SP      n

Hex          1B      20      n

Decimal          27      32      n

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

[Description] Setting the right space of character for [n\*units of vertical or lateral shifting]

[Note] -When the character enlarges, the space enlarges the sometimes.

- This command is valid for both Characters and Chinese.

- Units of vertical or lateral shifting area pointed by GSP. Changing units of vertical or lateral shifting does not change the current right space.

- The maximum right space is 255/203 inches. If setting beyond this value, it will

automatically change into the maximum distance.

[Default] n = 0

[Reference] **GS P**

## ESC ! n

[Name] selecting print mode

[Format] ASCII      ESC      !      n

Hex          1B      21      n

Decimal      27      33      n

[Range] 0 ≤ n ≤ 255

[Description] Setting character print mode according to value of n

Bit	1/0	HEX	Decimal	Function
0	0	00	0	Standard ASCII style A (12x24)
	1	01	1	Compressing ASCII style B(9x17) ( When choosing ESC/POS commands set; Font is 8x16; 16x16)
1,2	0	00	0	Undefined
3	0	00	0	Cancel bold font
	1	08	8	Select bold font
4	0	00	0	Cancel double height mode
	1	10	16	Select double height mode
5	0	00	0	Cancel double width mode
	1	20	32	Select double width mode
6	0	00	0	undefined
7	0	00	0	Cancel underline mode
	1	80	128	Select underline mode

- [Notice]
- When selected double height or double width mode, double size characters are printed.
  - Any character can be added underline except the space set by HT and the characters clock wise 90 degrees.
  - Underline is not related to characters but confirmed by ESC-. This command is one dot width.
  - When some characters in a line are double or more height, all the characters on the line are aligned at the base line.
  - ESC E can also select or cancel bold font. However, the command of the setting of the last received command is effective.
  - ESC- can also turn on or off underline mode. However, the setting of the last received command is effective.
  - GS ! can also set the character boundary. However, the setting of the last received command is effective.
  - All effects are valid to both Characters and Chinese.

[Default] n = 0

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

## ESC \$ nL nH

[Name] Setting 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] Setting the distance from the beginning of the line to the position at which  
 (nL+  
 nHx256) x(vertical or horizontal motion unit)  
 [Notice] ·This command is ignored if the setting position is out of the printing area.  
 ·Vertical and horizontal motion units are set by GS P.  
 [Reference] **ESC \, GS \$, GS \, GS P**

## ESC % n

---

[Name] Selecting/Canceling self defined character  
 [Format] ASCII ESC % n  
 Hex 1B 25 n  
 Decimal 27 37 n  
 [Range]  $0 \leq n \leq 255$   
 [Description] Selecting/Canceling self defined character  
 ·When n(LSB)=0, cancel user defined characterset.  
 ·When n(LSB)=1, select user defined characterset.  
 [Notice] ·When cancel user defined character set, auto select built in character set.  
 · only n in LSB is available.  
 [Default] n = 0  
 [Reference] **ESC &, ESC ?**

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

---

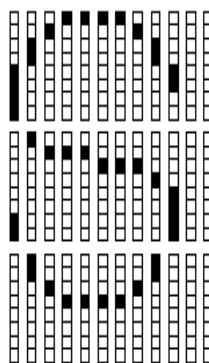
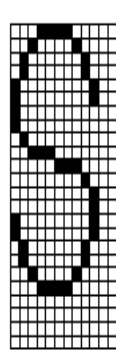
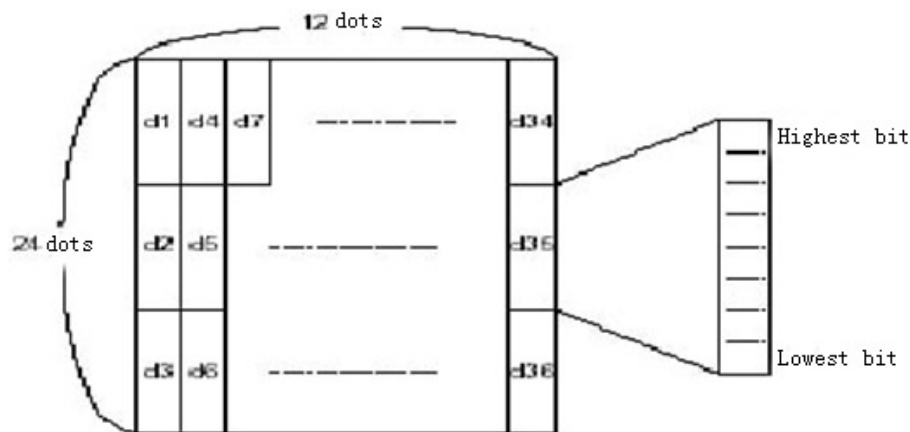
[Name] Define user defined character  
 [Format] ASCII ESC & y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]  
 Hex 1B 26 y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]  
 Decimal 27 38 y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]  
 [Range] y = 3  
 $32 \leq c1 \leq c2 \leq 126$   
 $0 \leq x \leq 12$  standard ASCII style A(12×24)  
 $0 \leq x \leq 9$  compressing ASCII style B (9 × 17)  
 $0 \leq d \leq 255$   
 $k = c2 - c1 + 1$   
 [Description] Define user defined character  
 · y specify the vertical byte number  
 ·c1 specify the code of initial character, c2 specify the code of terminal character.  
 ·x specify the vertical byte number  
 [Notice] · The code range of defined character:from<20>H to<7E>H. (90 characters)  
 · Can define the continuous codes for several characters.When only one character is needed,c1=c2.  
 ·d is the dot data of the downloaded character. Data of each dot begins from the left.

- Defining the data of user defined character is (y×x)bytes.
- Each dot of data is 1 to print this dot; or 0 to not print.
- The user defined characters will be deleted in the following situation:
  - ① ESC @ is carried out
  - ② ESC ? is carried out
  - ③ FS q is carried out
  - ④ **GS** \* is carried out
  - ⑤ Two barcode printing is carried out.
  - ⑥ The printer reset or power off.
  - ⑦ ·Only the MSB is valid at the vertical third byte when the self defined characters are style B(9\*17).

[Default] Built in character set.

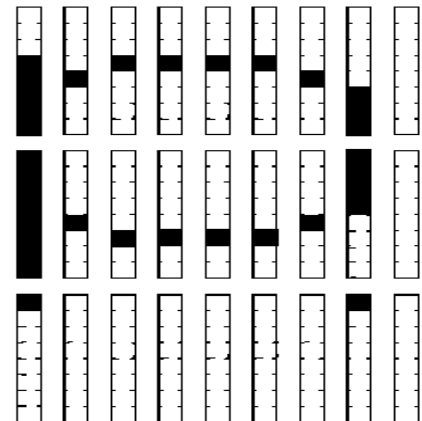
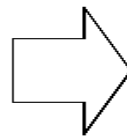
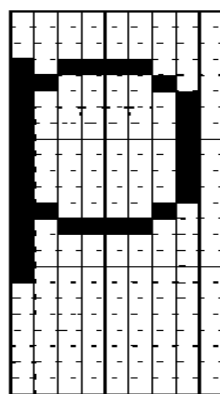
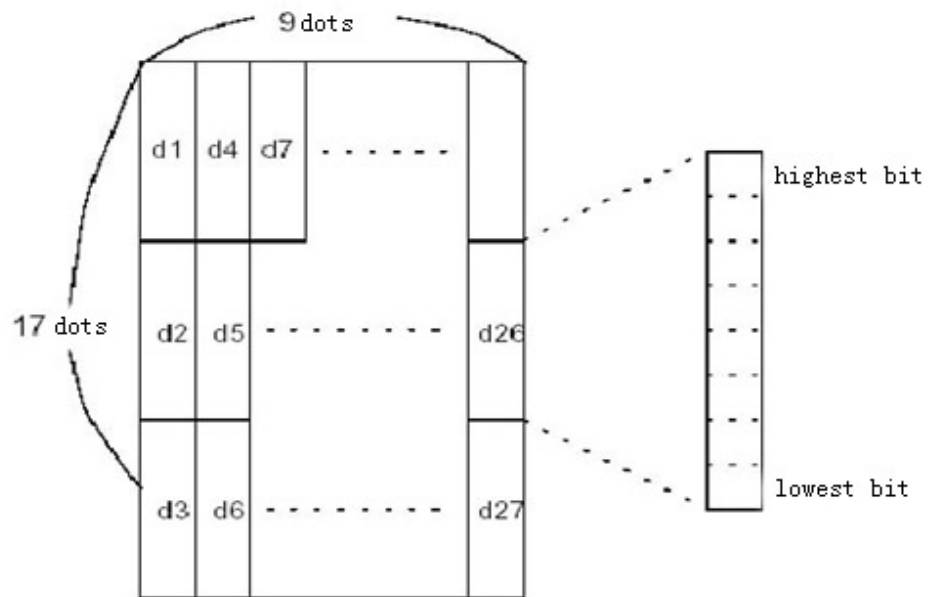
[Reference] ESC %, ESC ?

[Example] ·When select the standard ASCII style(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 select the compressing ASCII style (9×17)



d1 = <1F>H d4 = <08>H d7 = <10>H...  
d2 = <FF>H d5 = <08>H d8 = <04>H...  
d3 = <80>H d6 = <00>H d9 = <00>H...

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

[Name] Selecting bit map mode

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

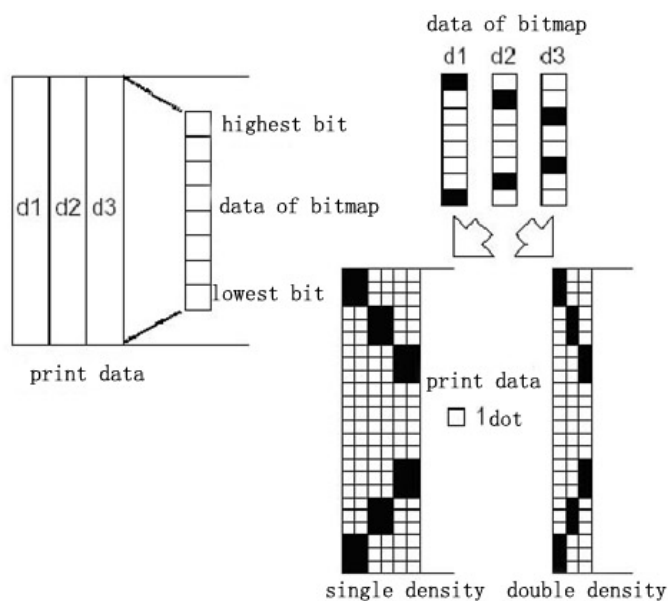
[Range] m = 0, 1, 32, 33  
 $0 \leq nL \leq 255$   
 $0 \leq nH \leq 3$   
 $0 \leq d \leq 255$

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

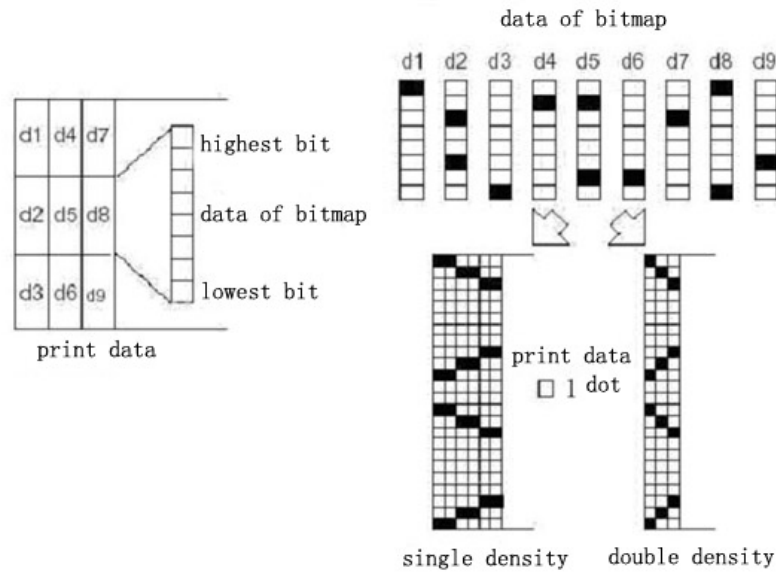
m	Mode	Vertical		Horizontal	
		dots	Dpi	Dpi	No.of datas (k)

0	8SD	8	68 DPI	101 DPI	$nL + nH \times 256$
1	8DD	8	68 DPI	203 DPI	$nL + nH \times 256$
32	24SD	24	203 DPI	101 DPI	$(nL + nH \times 256) \times 3$
33	24DD	24	203 DP	203 DPI	$(nL + nH \times 256) \times 3$

- [Notice]
- If the value of m goes beyond the range, nL and the data later will be regarded as normal data to deal with.
  - The dots number of horizontal printing depends on nL and nH, total number is  $nL + nH \times 256$ .
  - The part of the bit map that goes beyond the current area will be cut off
  - d is the data of bit map. Printing when the relevant position of every byte is 1, and when it is 0, will not print this point.
  - The printer will return to the mode of normal data processing after send the data of bit map.
  - Except inversion mode, this command will not be influenced by other modes. (black、double print、underline、enlarge character and invert)
  - Relationship between data and printing point is as below:
  - choosing 8 dots density:



- When choosing 24 dots density:



## ESC - n

[Name] Select / cancel underline

[Format] ASCII ESC - n

Hex 1B 2D n

Decimal 27 45 n

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

[Description] Selecting or canceling the underline mode according to the value of n

n	Function
0, 48	Cancel underline mode
1, 49	Select underline mode(1dot width)
2, 50	Select underline mode(2dots width)

- [Notice]
- Underline can be added under all characters (including right spacing), but not including the space set by HT
  - The underline cannot act on the characters of clockwise 90 degrees and inverting
  - The width of the underline will not be changed, and the character rest will not be underlined when cancel the underline mode. The default width is 1dot width.
  - Changing the character boundary will not influence the current underline width
  - Selecting/canceling the underline can also be set by ESC!. However, the setting of the last received command is effective.
  - The command doesn't affect the Chinese character setting.

[Default] n = 0

[Reference] ESC !

## ESC 2

---

[Name]	Setting default height of line			
[Format]	ASCII	ESC	2	
	Hex	1B	32	
	Decimal	27	50	
[Description]	Selecting 32 dots (4mm, about 1/7 inch) line height			
[Reference]	ESC 3			

## ESC 3 n

---

[Name]	Setting the height of the line			
[Format]	ASCII	ESC	3	n
	Hex	1B	33	n
	Decimal	27	51	n
[Range]	$0 \leq n \leq 255$			
[Description]	Setting [n*units of vertical or lateral shifting] inches as the height of the line			
[Notice]	· Units of vertical or lateral shifting are set by GSP, changing this setting will not influence current height of line			
[Default value]	The default height of line is 4mm (about 1/6 inch)			
[Reference]	ESC 2, GS P			

## ESC = n

[Name]	Selecting printer									
[Format]	ASCII	ESC	=	n						
	Hex	1B	3D	n						
	Decimal	27	61	n						
[Range]	0≤ n ≤ 255									
[Description]	Selecting printer,the printer selected can receive the data sent by main computer:									
	<table><tr><th>n</th><th>Function</th></tr><tr><td>1, 3</td><td>Permitting printer</td></tr><tr><td>2</td><td>Forbidding printer</td></tr></table>				n	Function	1, 3	Permitting printer	2	Forbidding printer
n	Function									
1, 3	Permitting printer									
2	Forbidding printer									
[Notice]	· When the printer is forbidden, the printer ignores all the commands except the real time command (DLEEOT, DLEENQ,DLEDC4) until the command is allowed.									
[Default value]	n = 1									

## ESC ? n

---

Cancel user self-defined character				
[Format]	ASCII	ESC	?	n
	Hex	1B	3F	n

	Decimal	27	63	n
[Range]	$32 \leq n \leq 127$			
[Description]	Cancel user self-defined character			
[Notice]	<ul style="list-style-type: none"> <li>· Cancel the character code n of user self-defined character. The character use built-in characters set after cancelling.</li> <li>· The command deletes from the matrix which is selected by the mould concentrates to the specified code of the selective ESC !</li> <li>· The command is ignored if the self-defined characters have no the character.</li> </ul>			
[Reference]	<b>ESC &amp;, ESC %</b>			

## ESC @

---

[Name]	Initializing the printer			
[Format]	ASCII	ESC	@	
	Hex	1B	40	
	Decimal	27	64	
[Description]	Clearing the data in the printing buffer;The printing mode is set to the default			
[Notice]	<ul style="list-style-type: none"> <li>· Retaining the content in command buffer</li> <li>· Retaining the macro definition</li> <li>· Flash bit map is not erased</li> <li>· Flash user data is not erased</li> <li>· Servicing counter value is not erased</li> <li>· The set value specified by GS(E is not erased.</li> </ul>			

## ESC D n1...nk NUL

---

[Name]	Setting horizontal tab positions			
[Format]	ASCII	ESC	D	n1...nk NUL
	Hex	1B	44	n1...nk 00
	Decimal	27	68	n1...nk 0
[Range]	$1 \leq n1 \leq n2 \leq \dots \leq nk \leq 255$ $0 \leq k \leq 32$			
[Description]	Setting horizontal tab positions <ul style="list-style-type: none"> <li>· N specifies the column number for setting a horizontal tab position from the beginning of the line.</li> <li>· There are k tab positions.</li> </ul>			
[Notice]	<ul style="list-style-type: none"> <li>· Horizontal tab positions can be gotten by the following formula:              The horizontal tab position is stored as a value of              [characterwidth×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.</li> <li>· This command cancels the previous horizontal tab settings.</li> </ul>			

- When setting n=8,the print position is moved to column 9
- Up to 32 tab positions (k=32)can be set. Data exceeding 32tab positions is processed as normal data
- Tab position is ordered by as sending and the end mark is NUL
- 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 independence under standard and page mode

[Default] The default tab positions are at intervals of 8 characters for font A(12'24).

[Reference] **HT**

## ESC E n

---

[Name] Select / Cancel bold font print

[Format]	ASCII	ESC	E	n
	Hex	1B	45	n
	Decimal	27	69	n

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

[Description] Select / Cancel bold font print

When the lowest bit of n is 0, cancel bold font print

When the lowest bit of n is 1, select bold font print

[Notice] ·Only the lowest bit of n is effective.

·Selecting/canceling bold font print can also be set by ESC!.

However, the setting of the last received command is effective.

[Default value] n = 0

[Reference] **ESC !**

## ESC G n

---

[Name] Selecting/canceling double print mode

[Format]	ASCII	ESC	G	n
	Hex	1B	47	n
	Decimal	27	71	n

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

[Description] Selecting/canceling double print mode

·When the lowest bit of n is 0, canceling double print mode

·When the lowest bit of n is 1, selecting double print mode

[Notice] ·Only the lowest bit of n is effective.

·The effect of this command is the same as bold font printing.

[Default value] n = 0

[Reference] **ESC E**



## ESC J n

---

[Name]	Printing and feeding paper			
[Format]	ASCII	ESC	J	n
	Hex	1B	4A	n
	Decimal	27	74	n
[Range]	$0 \leq n \leq 255$			
[Description]	Printing data in print buffer and feeding paper for [n*units of vertical or lateral shifting] inches			
[Notice]	·The current print position will be set to the beginning of the line after printing.			
	·The ESC 2 and ESC 3 commands set does affect the feeding distance.			
	·Units of vertical or lateral shifting are set by GSP			
	· The maximum distance of feeding paper is 1016mm (40inches).If it is beyond this distance, taking the maximum distance.			
[Reference]	<b>GS P</b>			

## ESC M n

[Name] Select font

[Format] ASCII ESC M n

Hex 1B 4D n

Decimal 27 77 n

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

[Description] select font

n	Function
0,48	select standard ASCII style(12*24)
1,49	select compressing ASCII style (9*17) When ESC/POS commands set is used, Font is 8x16, 16x16.

[Default value] n = 0

## ESC R n

[Name]	Selecting international characters set			
[Format]	ASCII	ESC	R	n
	Hex	1B	52	n
	Decimal	27	82	n
[Range]	0 ≤ n ≤ 15			
[Description]	Selecting an international character set n from the table below			
	n	Character Set		
	0	U.S.A.		
	1	France		
	2	Germany		

3	U.K.
4	Denmark I
5	Sweden
6	Italy
7	Spain I
8	Japan
9	Norway
10	Denmark II
11	Spain II
12	Latin
13	Korea
14	Slovenia/Croatia
15	China

[Default]    n = 15    [GBK]  
                  n = 0    [the model except GBK]

## ESC U n

---

[Name]: Enlarge in Horizontal direction

[Format]: ASCII        ESC U n

          Hex        1B 55 n

          Decimal    27 85 n

[Range]     $1 \leq n \leq 8$

[Description]: The characters and bitmaps will be printed at the speed of n times of normal speed after this command is input. n = 1~8

[Default]    n = 1

## ESC V n

---

[Name]: Enlarge in Vertical direction

[Format]: ASCII        ESC V n

          Hex        1B 56 n

          Decimal    27 86 n

[Range]         $1 \leq n \leq 4$

[Description] : The characters and bitmaps will be printed at the speed of n times of normal speed after this command is input. n = 1~4

[Default]        n = 1

[Notice] · When ESC/POS commands set is choose, this command is same as FS I (1C 49).

## ESC W n

---

[Name]: Enlarge in Horizontal&Vertical direction

[Format]:   ASCII       ESC   W   n  
                   Hex       1B   57   n  
                   Decimal    27   87   n

[Range]       1 ≤ n ≤ 8

[Description] : The characters and bitmaps will be printed at the speed of n times of normal speed after this command is input. n = 1~8

Because the max times to enlarge in vertical direction is 4, when n is larger than 4, the times to enlarge in vertical direction is 4.

[Default]     n = 1

## ESC \ nL nH

[Name]       Setting relative printing 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 lateral relative position based on the current position by using the Horizontal or vertical motion unit

·This command sets the distance from the current position to n[(nL+nH×256) horizontal motion unit]

[Notice]     ·Any setting that exceeds the printable area is ignored.

·When printing position moves to the right: nL+nH×256=N

·When printing position moves to the left,using radix complement:

nL+nH×256=65536-N。

·The print starting position moves from the current position to[N×horizontal motion unit]

·Vertical and horizontal motion units are set by GSP command.

[Reference]   **ESC \$, GS P**

## ESC a n

[Name]       Selecting alignment mode

[Format]     ASCII       ESC   a       n  
                   Hex       1B       61       n  
                   Decimal    27       97       n

[Range]     0 ≤ n ≤ 2, 48 ≤ n ≤ 50

[Description] Making all the printing datas array in appointed alignment

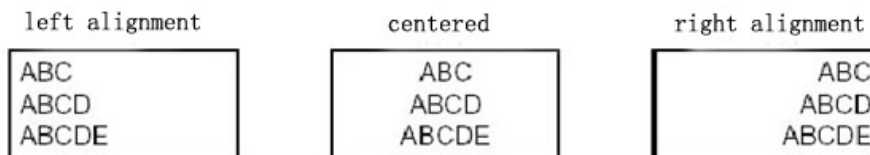
Relationship between value of n and alignment are as below:

n	Alignment
0, 48	Alignleft
1, 49	Aligncenter
2, 50	Alignright

- [Notice] · This command is just available at the zero position of the line and under Standard mode.
- This command just changes the internal mark position under page mode.
- This command revises the blank area according to HT,ESC\$ or ESC\.

[Default] n = 0

[Example]



## ESC c n

---

[Name] Permitting/Forbidding Reverse Printing

[Format]	ASCII	ESC	c	n
	Hex	1B	63	n
	Decimal	27	99	n

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

[Description] Permitting/Forbidding Reverse Printing

- The effect is same as **ESC {** , select/cancel invert printing mode
- When n = 0, forbid reverse printing
- When n = 1, permit reverse printing

[Notice] In invert printing mode, printer will print after the printed line is rotated 180°

[Default] n = 0

## ESC c 5 n

---

[Name] Permitting/Forbidding keystoke

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

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

[Description] Permitting/Forbidding keystoke.

- When the lowest bit of n is 0,keystoke works
- When the lowest bit of n is 1,keystoke is forbidden.

[Notice] · Only the lowest bit of n is effective.

- When the keystoke is forbidden, it does not work

[Default] n = 0

## ESC d n

---

[Name] Printing and feeding paper forward for n lines

[Format]	ASCII	ESC	d	n
----------	-------	-----	---	---

Hex            1B        64        n  
 Decimal            27        100        n

[Range]         $0 \leq n \leq 255$

[Description] Printing the datas in print buffer and feeding paper forward for n lines(character row)

[Notice] · This command sets the loading position at the beginning of the row  
 · This command does not influence the line space which is set by ESC 2 or ESC 3  
 · The maximum distance of feeding paper is 1016mm.If it is beyond this distance, taking the maximum distance.

[Reference]        **ESC 2, ESC 3**

## ESC i

---

[Name]        Permitting/Forbidding anti-white Printing

[Format]        ASCII        ESC        I        n  
                   Hex        1B        69        n  
                   Decimal        27        105        n

[Description] When n=1, permit anti-white printing; n=0, forbid anti-white printing.  
 Anti-white printing is to print white characters on the black background.

[Default]        n = 0

## ESC t n

---

[Name]        Selecting character codepage

[Format]        ASCII        ESC        t        n  
                   Hex        1B        74        n  
                   Decimal        27        116        n

[Range]         $0 \leq n \leq 255$

[Description]    Selecting code page n from character code table.Selection of n are as below:

n	代码页	Code Page
0	CP437 [美国, 欧洲标准]	CP437 [U.S.A., Standard Europe]
1	KataKana [片假名]	Katakana
2	PC850 [多语言]	PC850 [Multilingual]
3	PC860 [葡萄牙]	PC860 [Portuguese]
4	PC863 [加拿大-法语]	PC863 [Canadian-French]
5	PC865 [北欧]	PC865 [Nordic]
6	WCP1251 [斯拉夫语]	WCP1251 [Cyrillic]
7	CP866 斯拉夫 2	CP866 Cyrilliec #2
8	MIK[斯拉夫/保加利亚]	MIK[Cyrillic /Bulgarian]
9	CP755 [东欧, 拉脱维亚 2]	CP755 [East Europe, Latvian 2]

10	[伊朗，波斯]	Iran
11	保留	reserve
12	保留	reserve
13	保留	reserve
14	保留	reserve
15	CP862 [希伯来]	CP862 [Hebrew]
16	WCP1252 [拉丁语 1]	WCP1252 Latin I
17	WCP1253 [希腊]	WCP1253 [Greek]
18	CP852 [拉丁语 2]	CP852 [Latina 2]
19	CP858 [多种语言拉丁语 1+欧元符]	CP858 Multilingual Latin I +Euro)
20	伊朗 II [波斯语]	Iran II
21	拉脱维亚	Latvian
22	CP864 [阿拉伯语]	CP864 [Arabic]
23	ISO-8859-1 [西欧]	ISO-8859-1 [West Europe]
24	CP737 [希腊]	CP737 [Greek]
25	WCP1257 [波罗的海]	WCP1257 [Baltic]
26	[泰文 1]	Thai 1
27	CP720[阿拉伯语]	CP720[Arabic]
28	CP855	CP855
29	CP857[土耳其语]	CP857[Turkish]
30	WCP1250[中欧]	WCP1250[Central Eurpoe]
31	CP775	CP775
32	WCP1254[土耳其语]	WCP1254[Turkish]
33	WCP1255[希伯来语]	WCP1255[Hebrew]
34	WCP1256[阿拉伯语]	WCP1256[Arabic]
35	WCP1258[越南语]	WCP1258[Vietnam]
36	ISO-8859-2[拉丁语 2]	ISO-8859-2[Latin 2]
37	ISO-8859-3[拉丁语 3]	ISO-8859-3[Latin 3]
38	ISO-8859-4[波罗的语]	ISO-8859-4[Baltic]
39	ISO-8859-5[斯拉夫语]	ISO-8859-5[Cyrillic]
40	ISO-8859-6[阿拉伯语]	ISO-8859-6[Arabic]
41	ISO-8859-7[希腊语]	ISO-8859-7[Greek]
42	ISO-8859-8[希伯来语]	ISO-8859-8[Hebrew]
43	ISO-8859-9[土耳其语]	ISO-8859-9[Turkish]
44	ISO-8859-15[拉丁语 9]	ISO-8859-15 [Latin 3]
45	[泰文 2]	Thai2
46	CP856	CP856

[Default]

n = 0

[Notice]

- Thai characters are specially handled to conform the writing rules of Thai. When Codepage 26 or 45 is chose, the characters will be arranged according to the Thai manner. Detailed rules can be checked in Appendix C.

## ESC { n

[Name] Selecting/canceling invert printing mode

[Format]    ASCII        ESC    {        n  
              Hex        1B     7B       n  
              Decimal        27       123       n

[Range]     $0 \leq n \leq 255$

[Description]    Selecting/canceling invert printing mode

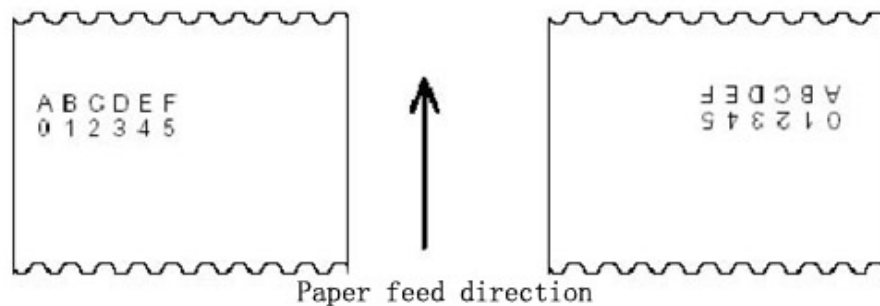
- When the lowest bit of n is 0, canceling invert printing mode
- When the lowest bit of n is 1, selecting invert printing mode.

[Notice]        ·Only the lowest bit of n is effective.

- Under invert printing mode, the printer will rotate the line of being printed for 180 degree firstly before printing.

[Default]        n = 0

[Example]



## FS I n

[Name] Selecting/canceling rotating 90 clockwise.

[Format]    ASCII        FS        I        n  
              Hex        1C        49        n  
              Decimal        28        73        n

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

[Description]    Selecting/canceling rotating 90 clockwise.

Value of n is as below:

n	Function
0, 48	Canceling rotating 90 clockwise
1, 49	Selecting rotating 90 clockwise
2, 50	

[Notice]        ·The underline will be not rotated 90 clockwise when select the underline mode.

- The double height and double width under 90 clockwise rotating model are be rotated in the opposite direction of the normal mode.

[Default]        n = 0

[Reference]    **ESC !, ESC -**

## FS P n

[Name]	Printing the prestored bit map			
[Format]	ASCII	FS	P	n
	Hex	1C	50	n
	Decimal	28	80	n
[Range]	$0 \leq n \leq 7$			
[Description]	This command prints the 2 value bit map which is pre-stored in the printer and not easily lost. The bit map in memory which is not easily lost can be produced and written by the tool in PC. The max width is 576dots and max size is 64kb.			

[Notice]-Before the destination bit map code has not been defined, this command is not available.

- The bit map must be the 2 value bit map
- This command will not be influenced by printing mode.(bold、overlap、underline、character dimension or inverse print).
- If this command is under Page Mode, it will just change the inner mark position.
- If the width of being printed beyond one line, the out profile will not be printed.
- It needs special purpose tools to print the downloaded bit map, Please see Setting Toll of printer. The bit map by this mode will not be lost, unless download other bitmap to cover it .

## GS ! n

[Name]	Selecting character boundary			
[Format]	ASCII	GS	!	n
	Hex	1D	21	n
	Decimal	29	33	n
[Range]	$0 \leq n \leq 255$ ( $1 \leq \text{longitudinal magnification multiple} \leq 4$ , $1 \leq \text{lateral magnification multiple} \leq 4$ )			

[Description] Using 0 to 2 bits to select character height, 4 to 7 bits to select character width

As follows:

Bit	0/1	Hex	Decimal	Function
0~3	Selecting character height, see table1			
4~7	Selecting character width, see table2			

table1

table2

Selecting character height	Selecting character width
----------------------------	---------------------------



Hex	Decimal	longitudinal magnification	Hex	Decimal	lateral magnification;
00	0	1 (normal)	00	0	1 (normal)
01	1	2 (double height)	10	16	2 (double width)
02	2	3	20	32	3
03	3	4	30	48	4

- [Notice]
- This command is effective to all the characters(ASCII and Chinese characters) except HRI characters
  - If n is out of the range, this command will be neglected.
  - Under standard mode, lengthways is the direction of feeding paper,landscape is perpendicular to the direction of feeding paper. But when the character rotates 90 degree clockwise, lengthways and landscape are reversed
  - All the character are aligned baseline when the character of the same line enlarge different times
  - Selecting/canceling the double width and double height of the character can also be set by ESC ! command. However, the setting of the last received command is Effective.

[Default] n = 0

[Reference] **ESC !**

## GS ( A pL pH n m

[Name] Carry out test printing

[Format] ASCII GS ( A pL pH n m  
Hex 1D 28 41 pL pH n m  
Decimal 29 40 65 pL pH n m

[Range] ( pL+ pH × 256)=2 (pL=2, pH=0)  
0 ≤ n ≤ 2, 48 ≤ n ≤ 50  
1 ≤ m ≤ 3, 49 ≤ m ≤ 51

[Description] · Carry out test printing. The printing method is decided by n, m.  
· pL, pH(pL+pH×256) means the number of bytes of parameter (n,m) after pH.

n means the tested paper type

n	Paper type
0, 48	Basic type (roll paper)
1, 49	Roll paper
2, 50	

m decides the printed content

m	Printed content
1, 49	Hex unloading printing

2, 50	Inner configuration information printing
3, 51	Circulation characters printing

- [Notic]
- This command is only valid at the beginning of line
  - When this command ends, the printer will cut paper.
  - When carrying this command, the printer is in busy status, so can't receive other commands.

## GS ( D pL pH m [a1 b1] ... [ak bk]

- [Name] Permit/Forbid Real time command
- [Format]
- |         |    |    |    |    |    |   |                     |
|---------|----|----|----|----|----|---|---------------------|
| ASCII   | GS | (  | D  | pL | pH | m | [a1 b1] ... [ak bk] |
| Hex     | 1D | 28 | 44 | pL | pH | m | [a1 b1] ... [ak bk] |
| Decimal | 29 | 40 | 68 | pL | pH | m | [a1 b1] ... [ak bk] |
- [Range]
- $$3 \leq (pL + pH \times 256) \leq 65535 \quad (0 \leq pL \leq 255, 0 \leq pH \leq 255)$$
- m = 20
- a = 1, 2
- b = 0, 1, 48, 49
- [Description] Confirm to permit or forbid real time command through a
- pL,pH(pL+pH×256) means the bytes number of parameter (m,[a1 b1]...[ak bk]) after pH.

a	b	Function
1	0, 48	<b>DLE DC4 fn m t</b> (fn = 1): no processing (forbid)
	1, 49	<b>DLE DC4 fn m t</b> (fn = 1): processing (Permit)
2	0, 48	<b>DLE DC4 fn a b</b> (fn = 2): no processing (forbid)
	1, 49	<b>DLE DC4 fn a b</b> (fn = 2): processing (Permit)

- [Notice]
- If the graphic data includes the same data with **DLE DC4** (fn = 1 or 2), it suggests to forbid real time command by this command in advance.

## GS \* x y d1...d(x × y × 8)

- [Name] Defining downloaded bit map
- [Foramt]
- |         |    |    |   |   |         |
|---------|----|----|---|---|---------|
| ASCII   | GS | *  | x | y | d1...dk |
| Hex     | 1D | 2A | x | y | d1...dk |
| Decimal | 29 | 42 | x | y | d1...dk |
- [Range]
- $$1 \leq x \leq 255$$
- $$1 \leq y \leq 48$$
- $$x \times y \leq 700$$
- $$0 \leq d \leq 255$$
- $$k = x \times y \times 8$$
- [Description] Use appointed bit number by x and y to define the downloaded bit map
- x is the dot number of horizontal
  - y is the dot number of vertical

· d is data of specified bit map

[Notice] ·  $x \times 8$  is the dot number of horizontal.;  $y \times 8$  is the dot number of vertical.

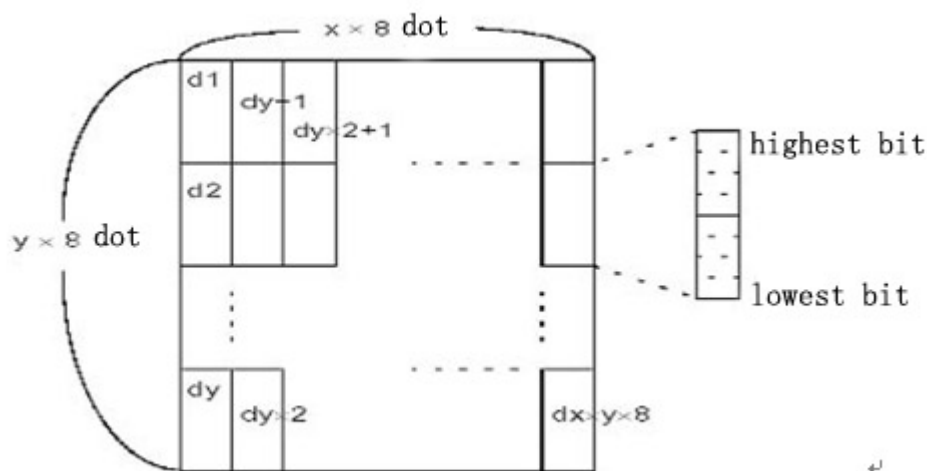
· If  $x \times y$  is of flimit, then the command is invalid.

· d means the image data. 1 print, 0 not print

· In the following circumstances, clear the downloaded bit image.:

- ① carry out ESC@ command
- ② carry out ESC & command
- ③ carry out FS q command
- ④ carry out two-dimension barcode printing
- ⑤ Turn off the printer power or restoration.

Relationship between print data and download bit map is as below:



[Reference] **GS /**

## GS / m

[Name] Printing downloaded bitmap

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

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

[Description] Printing mode is appointed by m when print a bit map  
m printing mode selections are as below:

m	mode	vertical (DPI)	horizontal (DPI)
0, 48	normal	203	203
1, 49	Double width	203	101
2, 50	Double height	101	203
3, 51	Double width and height	101	101

[Notice] · This command will be ignored if the downloaded bit map is not defined.  
· The command is effective only when the reiso data in the printing buffer

under

standard mode

- Except inversion mode,other modes have no effect on it(include bold、double print、underline、enlarge font and invert printing, etc.
- The out profile will not be printed if the bit map out of the range.
- This command prints the bit map downloaded in RAM but not Flash.

[Reference] **GS \***

## **GS B n**

---

[Name] Selecting/canceling black white revert printing mode

[Format]    ASCII        GS        B        n  
              Hex        1D        42        n  
              Decimal        29        66        n

[Range]     $0 \leq n \leq 255$

[Description] Selecting/canceling black white revert printing mode

- When the lowest bit of n is 0,canceling black white reverse printing mode.
- When the lowest bit of n is 1,selecting black white reverse printing mode.

[Notice]    · Only the lowest bit of n is effective

- This command is available to all the characters (except HRI characters)
- After selecting black white reverse printing,the space between characters which is set by ESC SP command is also reversing.

·This command does not influence bit map, user defined bit map, barcode, HRI

character and blank space which is set by HT,ESC \$ and ESC\

·This command does not influence the blank space between lines.

·Priority of black white reverse printing mode is higher than it of underline mode.

When selecting black white reverse printing mode,underline mode is not effective.It will be effective after canceling black white reverse printing mode.

[Default]    n = 0

## **GS I n**

---

[Name]    Inquire priner ID number

[Format]    ASCII        GS        I        n  
              Hex        1D        49        n  
              Decimal        29        73        n

[Range]     $1 \leq n \leq 3, 49 \leq n \leq 51, 65 \leq n \leq 69$

[Description] Inquiry printer ID number. The ID number type is decided by value of n.

n	Printer ID number	Return Parameter	ID (hexadecimal)
1, 49	Printer ID number	SP-T58 series	20

2, 50	Printer Type ID	As below table
3, 51	ROM Type ID	Related with printer model and Production Date
65	Firmware Type ID	Related with printer model and Production Date
66	Manufacturer	Related with actual manufacturer
67	Printer name	Related with actual printer name
68	Printer Serial number	Related with printer model and Production Date
69	Chinese Type supported	Simplified Chinese: Chinese Traditional Chinese: Chinese-BIG5 Traditional Chinese: Chinese-GB12345 Japan Chinese: Japanese-ShiftJIS

n = 2, printer type ID

Bit	1/0	Hex	Decimal	Function
0	0	00	0	Double byte character code non supported
	1	01	1	Double byte character code supported
1	0	00	0	Without cutter
	1	02	2	With cutter
2	0	00	0	Non used
3	0	00	0	Non used
4	0	00	0	Fix as 0
5	-	-	-	Defined
6	-	-	-	Defined
7	0	00	0	Fix as 0

- [Notice]
- When  $1 \leq n \leq 3$  or  $49 \leq n \leq 51$ , printer will return single byte ID
  - When  $65 \leq n \leq 69$ , the return format is as below:  
Header information: Hexadecimal = 5FH / Decimal = 95 (1 byte)  
Data: Printer information  
NUL: Hexadecimal = 00H / Decimal = 0 (1 byte)

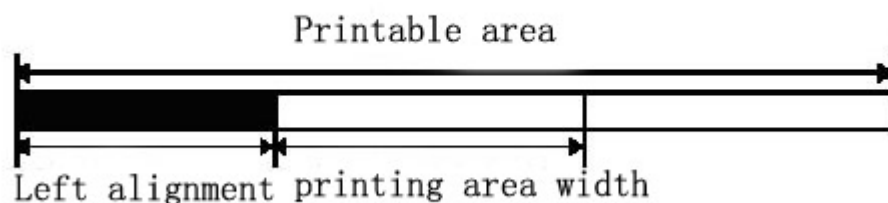
## GS L nL nH

[Name] Setting left margin

[Format] ASCII GS L nL nH  
Hex 1D 4C nL nH  
Decimal 29 76 nL nH

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

[Description] · Setting left margin by nL and nH  
· Setting left margin at  $[(nL+nH \times 256) \times \text{horizontal motion unit}]$  inches.



[Notice] · This command is just available at the zero position of the line and under standard

- It is not available under page mode, the printer will handle it as normal datas
- This command does not influence the printing under page mode
- Taking the Max-width is it goes beyond the max printing width
- Vertical and horizontal motion units are set by GSP. Changing the motion will not influence the current left margin.

[Default] nL = 0, nH = 0

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

## GS P x y

[Name] Setting horizontal and vertical motion units

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

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

$0 \leq y \leq 255$

[Description] · Setting horizontal motion units as near 25.4/xmm ( 1/x inch ) Setting vertical

Motion units as near 25.4/ymm ( 1/y inch )

· When x and y are all 0, x and y are setting as default value

[Notice] · Direction is perpendicular to the feeding is horizontal, the feeding direction is vertical.

No matter x or y is used for the below command, it will not be changed even though rotating characters, inversion or rotating 90° clockwise.

① ☐ Using x command: **ESC SP, ESC \$, ESC \, FS S, GS L, GS W**

② ☐ Using y command: **ESC 3, ESC J, GS V**

· This command doesn't affect the set position previously.

· The minimum motion distance is the result of combined action of this and other commands

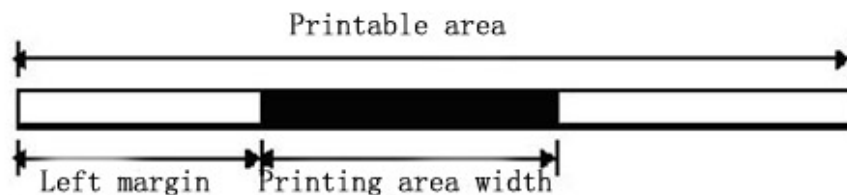
· a inch=25.4mm

[Default value] x=203, y=203, now a motion unit is a printing dot. Horizontal motion distance is 1/8mm, and vertical motion distance is 1/8mm.

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

## GS W nL nH

[Name]	Setting the width of printing area				
[Format]	ASCII	GS	W	nL	nH
	Hex	1D	57	nL	nH
	Decimal	29	87	nL	nH
[Range]	$0 \leq nL \leq 255$				
	$0 \leq nH \leq 255$				
[Description]	Setting the width of printing area by nL and nH				
	·Setting width of printing area to [( nL + nH × 256) × horizontal motion unit)] inches.				



[Notice]	·This command is just available at the zero position of the line and under standard mode.				
	·If [left margin+width of printing area]goes beyond the print able area,the width of				
	printing is it of[printable area width–left margin]				
	·Vertical and horizontal motion units are set by GSP.Changing them will not Influence the current left margin and area width				
	·Using horizontal motion units to count the width of printing area				
[Default]	$(nL + nH \times 256) = 576$ [ 80mm paper width, 72mm printing width ]				
	$(nL + nH \times 256) = 512$ [ 80mm paper width, 64mm printing width ]				
	$(nL + nH \times 256) = 384$ [ 58mm paper width ]				
[Reference]	<b>GS L, GS P</b>				

## GS a n

[Name]	Enable/disable Automatic Status Back (ASB)			
[Format]	ASCII	GS	a	n
	Hex	1D	61	n
	Decimal	29	97	n
[Range]	$0 \leq n \leq 255$			
[Description]	Enables or disables basic ASB (Automatic Status Back). The meaning of n			
	is as below,			

Bit	1/0	Hex	Decimal	ASB related status
0	0	00	0	Reserved
1	0	00	0	Forbid Online/offline status
	1	02	2	Permit Online/offline status

2	0	00	0	Forbid error status
	1	04	4	Permit error status
3	0	00	0	Forbid paper sensor status
	1	08	8	Permit paper sensor status
4~ 7	-	-	-	Reserved

[Notice]

- If any item in the above table is permitted, when this status is changed, the printer will return four bytes status automatically.
- If all items are forbidden, ASB is also forbidden.
- Whether the host is ready or not cannot be confirmed from whether the printer return the status bytes.
- This command is carried out in sequential execution with other commands together. So there is some period delay when receiving returned status after sending this command.
- Although printer is set to be invalid status by command ESC =, the printer will still return the status automatically as setting.
- Auto returned status is as below:

The first byte (Printer information)

Bit	1/0	Hex	Decimal	Printer status
0	0	00	0	Fix as 0
1	0	00	0	Fix as 0
2	0	00	0	Fix as 0
3	0	00	0	Printer online
	1	08	8	Printer offline
4	1	10	16	Fix as 1
5	0	00	0	Fix as 0
6	0	00	0	Not use feed button to feed paper
	1	40	64	Use feed button to feed paper
7	0	00	0	Fix as 0

The second byte (Printer information)

Bit	1/0	Hex	Decimal	Printer status
0	-	-	-	Reserved
1	-	-	-	Reserved
2	-	-	-	Reserved
3	0	00	0	Fix as 0
4	0	00	0	Fix as 0
5	0	00	0	No unrecovered error
	1	20	32	Unrecovered error
6	0	00	0	No auto-recovered error
	1	40	64	Auto-recovered error
7	0	00	0	Fix as 0

Bit 5: Such as paper jam, etc, which are recovered errors. These errors can be recovered by command DLE ENQ n ( $1 \leq n \leq 2$ ) after the error reasons



are found. Such as control board damage, etc, which are unrecovered errors.

Bit 6: Such as over-heat of printing head is auto-recovered error.

The third byte (Paper sensor information)

Bit	1/0	Hex	Decimal	Printer status
0, 1	0	00	0	Fix as 0
2, 3	0	00	0	Paper out sensor: paper exists
	1	0C	12	Paper out sensor: paper out
4	0	00	0	Fix as 0
5, 6	-	-	-	Reserved
7	0	00	0	Fix as 0

The forth byte (Paper sensor information)

Bit	1/0	Hex	Decimal	Printer status
0~ 3	-	-	-	Reserved
4	0	00	0	Fix as 0
5, 6	-	-	-	Reserved
7	0	00	0	Fix as 0

[Default] n = 0

## GS g 0 m nL nH

[Name] Initialize the maintenance counter

[Format] ASCII GS g 0 m nL nH

Hex 1D 67 30 m nL nH

Decimal 29 103 48 m nL nH

[Range] m =0

(nL + nH × 256) = 20, 21, 50, 70 (nL = 20, 21, 50, 70, nH = 0)

[Description] Set the maintain counter dominated by (nL+nH × 256) to"0" which can be cleared.

nL + nH × 256		Maintain counter [unit]
Hex	Decimal	
14	20	Feeding paper lines [line]
15	21	Heating times of printer head [times]
32	50	Cutter operation times [times]
46	70	Printer operation time [hours]

[Notice] · To write FLASH memory command in high frequency may destroy FLASH

memory, so recommend write it not exceed 10 times per day.

- When this command is carried out, to power off the printer or reset printer via interface may caused abnormal status of the printer, so never power off the printer or reset printer via interface when carrying out this order.
- When printer carried out this order and write data to FLASH memory, it will become “busy” status and stop receiving data, so when the printer is “busy”, do not send data to it.

Reference] **GS g 2**

## GS g 2 m nL nH

[Name] Transfer the maintenance counter

[Format] ASCII GS g 2 m nL nH

Hex 1D 67 32 m nL nH

Decimal 29 103 50 m nL nH

[Range] m =0

(nL + nH × 256) = 20, 21, 50, 70, 148, 149, 178, 98

(nL = 20, 21, 50, 70, 148, 149, 178, 198 , nH = 0)

[Description] To transmit value of maintain counter appointed by (nL+nH × 256).

nL + nH × 256		Maintain Counter [unit]	Counter Type
Hex	Decimal		
14	20	Feeding paper lines [line]	Re-settable(can be cleared)
15	21	Heating times of printer head [times]	
32	50	Cutter operation times [times]	
46	70	Printer operation time [hours]	
94	148	Feeding paper lines [line]	accumulated
95	149	Heating times of printer head [times]	
B2	178	Cutter operation times [times]	
C6	198	Printer operation time [hours]	

[Notice] ·Maintain counter is a measurement value, so this value will be influenced by timing error, how to power off printer, or when to power off printer.

- When this order is carried out, do not send other data before the host receive returned value.

[Reference] **GS g 0**

## Chinese Control Commands

### FS ! n

[Name] Setting Chinese characters mode

[Format]     ASCII        FS        !        n  
                  Hex        1C        21        n  
                  Decimal        28        33        n

[Range]         $0 \leq n \leq 255$

[Description]     Using value of n to set the printing mode of Chinese characters

Bit	0/1	Hex	Decimal	Function
0, 1				Undefined
2	0	00	0	Canceling double width
	1	04	4	Selecting double width
3	0	00	0	Canceling double height
	1	08	8	Selecting double height
4~ 6	-	-	-	Undefined
7	0	00	0	Canceling underline
	1	80	128	Selecting underline

- [Notice]    ·When double width and double height are set together,portrait and landscape will be enlarged two times together(including left and right space).  
                  ·Printer can add underline to all the characters,including left and right space.But can not add underline to the space caused by HT command (horizontal tab),either the 90 degree clockwise characters.  
                  ·The width of underline is set by FS,has no relation to the character boundary  
                  ·When the height of the character in one line is not the same,all the characters Align the base line  
                  ·Using FS W and GS! can make the characters bold,the setting of the last received command is effective.  
                  ·Also can use FS- to select or cancel the underline,the setting of the last received command is effective.

[Default value]     n = 0

[Reference]     **FS - , FS W, GS !**

## FS &

---

[Name]    Selecting Chinese character mode

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

[Description]    Selecting Chinese character mode

- [Notice]    ·When select Chinese character mode,printer will judge whether the character is Hanzi internal code,if it is,dealing with the first byte in advance.Then the second one.

[Reference]    **FS . , FS C**

## FS - n

[Name] selecting/canceling Chinese underline mode

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

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

[Description]    selecting or canceling Chinese underline according to value of n

n	Function
0, 48	canceling Chinese underline
1, 49	selecting Chinese underline (1dot width)
2, 50	selecting Chinese underline (2dots width)

[Note]    ·Printer can add underline to all the characters,including left and right space.But  
            Can not add underline to the space caused by HT  
            command(horizontal tab),either the 90 degree clockwise characters.  
            ·It does not carry out the underline printing after canceling underline mode,  
            but the previous set does not change。 The default underline width is 1dot。  
            ·The underline width does not change even if changing the character  
            dimension。  
            ·Can use FS ! to select or cancel the underline,the setting of the last  
            received  
            command is effective

[Default value]    n = 0

[Reference]    **FS !**

## FS .

[Name]    canceling chinese mode

[Format]    ASCII        FS        .  
             Hex        1C        2E  
             Decimal        28        46

[Description]    canceling chinese mode

[Notice]    ·When the Chinese mode is canceled, all the characters are the same as  
            ASCII style, and deal with one byte once

[Reference]    **FS &, FS C**

## FS 2 c1 c2 d1...dk

[Name]    defining user self-defined Chinese

[Format]    ASCII        FS        2        c1    c2    d1...dk  
             Hex        1C        32        c1    c2    d1...dk  
             Decimal        28        50        c1    c2    d1...dk

[Range]    c1, c2 represent the code of defined characters.

c1 = FEH

A1H ≤ c2 ≤ FEH

0 ≤ d ≤ 255

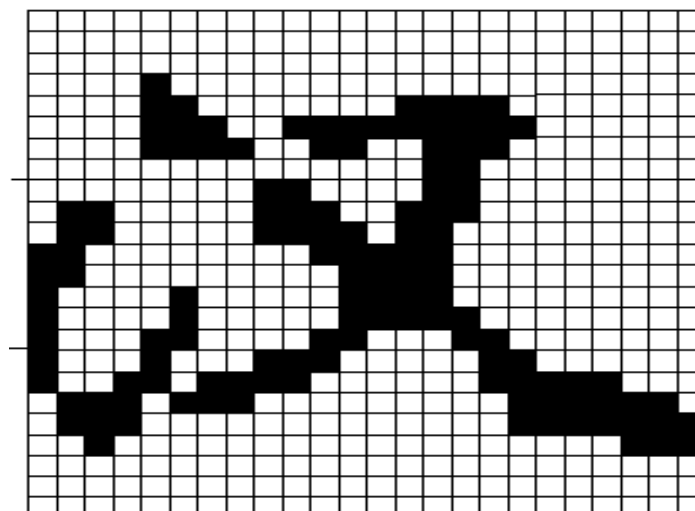
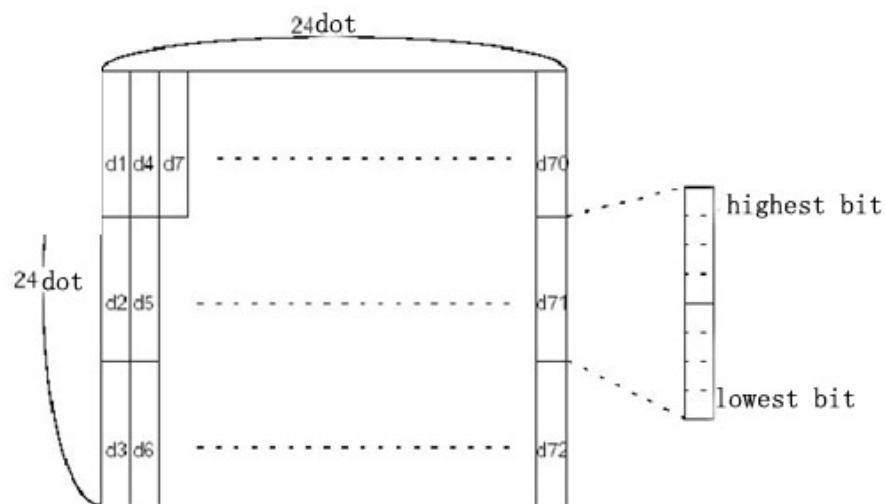
k = 72

[Description] Defining the Chinese specified by c1, c2.

- [Notice]
- C1, c2 represent user self-defined Chinese code, c1 specifies the first byte, c2 specifies the second byte.
  - d represent data. Every bit of byte is 1 represents to print the dot, 0 means does not print.
  - It can define 4 chinese the most

[Default value] no self-defined Chinese

The relation between self-defined Chinese font and data as follows:



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

## FS C n

[Name] selecting Chinese code system

[Format]    ASCII        FS        C        n1        n2  
             Hex        1C        43        n1        n2  
             Decimal        28        67        n1        n2

[Range]    n=0, 1, 48, 49

[Description]    selecting Chinese code system

n	selecting Chinese code system
0, 48	Simplified Chinese(GB18030)
1, 49	Traditional Chinese(BIG5)
2,50	Traditional Chinese(GB12345)
3,51	Japanese(ShiftJIS)

[Notice]    ·The command does not change the parameter set of flash  
             ·It returns to default after carried out ESC @ command、 power off or reset

[Default value]    n = 0 Simplified Chinese(GB18030)  
                     n = 1 Traditional Chinese(BIG5)  
                     n = 2 Traditional Chinese(GB12345)  
                     n = 3 Japanese(ShiftJIS)

## FS S n1 n2

[Name]        Setting the left and right space of Chinese character

[Format]    ASCII        FS        S        n1    n2  
             Hex        1C        53        n1    n2  
             Decimal        28        83        n1    n2

[Range]     $0 \leq n1 \leq 255$   
              $0 \leq n2 \leq 255$

[Description]    Setting the space of left and right are n1, n2.

·When the printer have GSP command, the left space is[n1\*lateral or vertical motion unit]inch,the right space is[n2\*lateral or vertical motion unit]inch.

[Notice]    The left and right space will be doubled after setting the double width mode.  
             ·The shifting unit is setted by the command GS P.The former character space does not change even if the lateral and vertical units are changed.  
             ·Using the lateral shifting unit under the standard mode.  
             ·Selecting to use the lateral or vertical shifting unit according to the printing area under page mode.  
                 1.Using horizontal shifting when the beginning position is the top left or lower right corner of the printing area  
                 2.Using vertical shifting when the beginning position is the lower left or top right corner of the printing area  
                 3. The maximum distance of Chinese is36mm.If it is beyond this distance,taking the maximum distance.

[Default] n1 = 0, n2 = 0

[Reference] **GS P**

## FS W n

[Name] selecting/canceling Chinese double height or width

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

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

[Description] Selecting/canceling Chinese double width mode

- Cancel Chinese double width mode when the lowest bit is 0
- Select Chinese double width mode when the lowest bit is 1.

[Notice]

- only the lowest bit of n is effective.
- To print Chinese dimension under double width mode is the same as to select both double width and double height.
- The Chinese dimension is printed normally after canceling the Chinese double width mode.
- When the height of the character in one line is not the same, all the characters align the baseline
- Also using FS! or GS! can select or cancel Chinese double height and width mode, the setting of the last received command is effective.

[Default] n = 0

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

## Commands of printing 1-D barcode

### GS H n

[Name] Selecting the printing position of HRI character

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

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

[Description] When printing the barcode,selecting the printing position for HRI character  
N appoints the printing position of HRI

n	Printing position
0, 48	No printing
1, 49	Above the barcode
2, 50	Below the barcode
3, 51	Both above and below the barcode

·HRI is the character of content note of barcode

[Note] ·The style of HRI character is appointed by GS f.

[Default value] n = 0

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

## GS f n

[Name] Selecting font of HRI used

[Format] ASCII GS f n  
Hex 1D 66 n  
Decimal 29 102 n

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

[Description] When printing barcode,selecting a style for HRI character

Selecting style by n is as below:

n	Style
0, 48	Standard ASCII character(12×24)
1, 49	Compressed ASCII character(9 × 17)

[Notice] ·HRI character is the note of barcode content

·HRI character printing position is set by GS H command

[Default value] n = 0

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

## GS h n

[Name] Selecting height of barcode

[Format] ASCII GS h n  
Hex 1D 68 n  
Decimal 29 104 n

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

[Description] Selecting height of barcode

The height of barcode is n dots

[Default value] n = 60

[Reference] **GS k**

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

[Name] Printing barcode

[Format] ①ASCII GS k m d1...d k NUL  
Hex 1D 6B m d1...d k 00  
Decimal 29 107 m d1...d k 0  
②ASCII GS k m n d1... dn  
Hex 1D 6B m n d1... dn  
Decimal 29 107 m n d1... dn

[Range] ① $0 \leq m \leq 6$  (Value range of k and d is decided by its type)



②  $65 \leq m \leq 73$  (Value range of k and d is decided by its type)

[Description] Selecting a kind of barcode and printing

m is used to select type of barcode,as follows:

m		Barcode type	Number of character	d
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	JAN 8 (EAN8)	$7 \leq k \leq 8$	$48 \leq d \leq 57$
	4	CODE39	$1 \leq k \leq 255$	$45 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43$
	5	ITF	$1 \leq k \leq 255$	$48 \leq d \leq 57$
	6	CODABAR	$1 \leq k \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 68, 36, 43, 45, 46, 47, 58$
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	JAN 8 (EAN8)	$7 \leq n \leq 8$	$48 \leq d \leq 57$
	69	CODE39	$1 \leq n \leq 255$	$45 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43$ $d1 = dk = 42$
	70	ITF	$1 \leq n \leq 255$	$48 \leq d \leq 57$
	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	$2 \leq n \leq 255$	$0 \leq d \leq 127$

[Notice ①]

- This command is ended by NULL under this format
- When selecting code of UPC-A or UPC-E, after receiving 12 bytes data,printer will handle the rest as normal character
- When selecting type of JAN13(EAN13), after receiving 13 bytes data,printer will handle the rest as normal character
- When selecting type of JAN8(EAN8), after receiving 8 bytes data,printer will handle the rest as normal character
- Number of ITF code data must be a even number.If entering code data of odd number,the last data will be ignored

[Notice②]

- N is used to appoint the number of pointing barcode data.The printer will handle then byte data follow as barcode data
- If n goes beyond the specified range,the printer will not handle this command,and handle the data following as normal data

[Notice(Standard mode)]

- If the barcode d goes beyond the specified range,this command is invalid.
- If the cross wise of barcode goes beyond printing area,invalid
- No matter what is the height set by ESC 2 or ESC 3,the distance of feeding paper is the same as the height of barcode.
- This command only available when there is no data in printing buffer,if not,the command will be ignored.
- The printing position will be set at the beginning of the line after printing the barcode.
- Other mode setting(bold、 double printing、 underline、 character dimension、 inverse and character clockwise rotates 90 degree)can not influence this command except

Inversion mode

[Notice(page mode)]

- This command just produces the barcode figure in printing buffer,but not print.Moving the printing position to the right of the barcode after handling the barcode data.
- If the d goes beyond the specified range,this command will be ignored.
- If the width of the barcode goes beyond the printing area,this command will be ignored

When selecting CODE128(m=73):

- Referring appendix A, related information of CODE128 and character set
- When using CODE128,encoding according to the description following
  - ① Selecting character set before barcode data (CODE A、 CODE B or CODE C)
  - ② Selecting character set according to sending character "{" and combine with another character;ASCII character "{" is finished by sending character "{" for twice.

Appointing Character	Sending data		
	ASCII	Hex	Decimal
SHIFT	{S	7B, 53	123,83
CODE A	{A	7B, 41	123, 65
CODE B	{B	7B, 42	123, 66
CODE C	{C	7B, 43	123, 67
FNC1	{1	7B, 31	123, 49
FNC2	{2	7B, 32	123, 50
FNC3	{3	7B, 33	123, 51
FNC4	{4	7B, 34	123, 52
"{"	{{	7B, 7B	123, 123

[Example] Printing"No.123456"

Using CODE B to print"No.", and then using CODE C to print the digital rest

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



- If it is not character set selection at the beginning of barcode data, the printer will stop handling this command, and handling the rest data as normal data.
- If “{” and the character close behind is not the combination as above, the printer will stop handling this command, and handling the rest data as normal data.
- If the character is not the data of barcode character set, the printer will stop handling this command, and handling the rest data as normal data.
- When printing HRI character, not printing shift character and character set selection data
- HRI character of function character is not printed
- HRI character of control character (<00>H to <1F>H and <7F>H) is not printed
- <Others> Ensure the left and right space of barcode. Space is different because of different barcode style.

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

## GS w n

[名称] 设置条码宽度

[格式]

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

[范围]  $2 \leq n \leq 6$

[描述] 设置条码横向模块宽度

用 n 来指定条码的横向模块宽度：

n	单基本模块宽度 (mm)	双基本模块宽度	
		窄基本模块 (mm)	宽基本模块 (mm)
2	0.25	0.25	0.625
3	0.375	0.375	1.0
4	0.5	0.5	1.25
5	0.625	0.625	1.625
6	0.75	0.75	1.875

· 单基本模块条码如下：

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

· 双基本模块条码如下：

CODE39, ITF, CODABAR

[默认值]  $n = 2$

[参考] **GS k**

[Name]	Print 2D code									
[Format]	ASCII	ESC	Z	v	r	k	nL	nH	d1	...dn
	Hex	1B	5A	v	r	k	nL	nH	d1	...dn
	Decimal	27	90	v	r	k	nL	nH	d1	...dn
[Range]	<p>Meaning and range of of the parameters is different based on different 2D barcode type chosen by GSZ.</p> <p>The meaning is different when the barcode with different parameter v, r.</p> <p>① PDF417 code</p> <p><math>1 \leq v \leq 30</math> means characters number per line. The max value of v should be within the range of the allowable max value for the model due to the different model with different paper width.</p> <p><math>0 \leq r \leq 8</math> means the level of error correction.</p> <p>② DATA MATRIX code</p> <p><math>0 \leq v \leq 144</math> means the height of graph.(0: auto select).</p> <p><math>8 \leq r \leq 144</math> means the width of graph (when v=0, void).</p> <p>③ QR CODE code</p> <p><math>0 \leq v \leq 40</math> means graph version (0: auto select).</p> <p>r=76,77,81,72 means the level of error correction.(L:7%, M:15%,Q:25%,H:30%).</p> <p>· The Parameter meaning of Parameter n(nL, nH), d.</p> <p><math>1 \leq k \leq 6</math> Means vertical magnification times.</p> <p><math>1 \leq n \leq 65535</math> means the data length of printing code is parameter n, nL and nH is the low level and high level of value n (n= dL + dH × 256).</p> <p><math>0 \leq dn \leq 255</math> means data of barcode.</p>									
[Description]	Print 2D barcode according to code type chosen by GSZ .									

[Reference] **GS Z**

**①GS k m v r d1...dn NUL ②GS k m v r nL nH d1...dn**

[Name]	To scan 2D bar code							
[Format]	①ASCII	GS	k	m	v	r	d1...dn	NUL
	Hex	1D	6B	m	v	r	d1...dn	00
	Decimal	29	107	m	v	r	d1...dn	0
	Hex	1D	6B	m	v	r	nL nH	d1... dn
	Decimal	29	107	m	v	r	nL nH	d1... dn
[Range]	① $32 \leq m \leq 34$							
	② $97 \leq m \leq 99$							
	· Different meaning due to different v. r parameter of the code.							
	① PDF417 2D bar code							
	$1 \leq v \leq 30$		means characters number per line, The max value of v should be within the range of the allowable max value for the model due to the different model with different paper width.					
	$0 \leq r \leq 8$		means the level of error correction.					
	② DATA MATRIX code							
	$0 \leq v \leq 144$		means the height of graph.(0: auto select)					
	$8 \leq r \leq 144$		means the width of graph (when v=0, void).					
	③ QR CODE code							
	$0 \leq v \leq 40$		means graph version (0: auto select).					
	$1 \leq r \leq 4$		means the level of error correction. (L:7%, M:15%,Q:25%,H:30%)。					
	· The Parameter meaning of Parameter n(nL, nH), d							
	$1 \leq n \leq 65535$		means the data length of printing code is parameter n, nL and nH is the low level and high level of value n (n= dL + dH × 256).					
$0 \leq dn \leq 255$		means data of barcode.						

[Description] Select a type of 2D code and print code.

- When use the first format, command is end by 00, d1...dn are barcode data. When use the second format, all the n of d1...dn after nH are code data.

Parameter “m” is to select the code type, please refer to below graphic:

m		Code Type	Data Length	v	r	d
①	3	QR Code	$1 \leq n \leq$	$0 \leq v \leq 40$	$1 \leq r \leq 4$	$0 \leq dn \leq 255$
	2		65535			
	3	Data Matrix	$1 \leq n \leq$	$0 \leq v \leq 144$	$8 \leq r \leq 144$	$0 \leq dn \leq 255$
	3		65535			
	3	PDF417	$1 \leq n \leq$	$1 \leq v \leq 30$	$0 \leq r \leq 8$	$0 \leq dn \leq 255$
	4		65535			

②	9 7	QR Code	$1 \leq n \leq 65535$	$0 \leq v \leq 40$	$1 \leq r \leq 4$	$0 \leq dn \leq 255$
	9 8	Data Matrix	$1 \leq n \leq 65535$	$0 \leq v \leq 144$	$8 \leq r \leq 144$	$0 \leq dn \leq 255$
	9 9	PDF417	$1 \leq n \leq 65535$	$1 \leq v \leq 30$	$0 \leq r \leq 8$	$0 \leq dn \leq 255$

[Notice]     · When use the command to print 2D code, the magnification times of barcode depends on the “n” of **GS w** set.

[Reference] **ESC Z, GS w**

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

[Name] Print raster bit image

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

[Range]  $0 \leq m \leq 3, 48 \leq m \leq 51$   
 $1 \leq (xL + xH \times 256) \leq 256$  ( $0 \leq xL \leq 255, xH = 0, 1$ )  
 $1 \leq (yL + yH \times 256) \leq 2303$  ( $0 \leq yL \leq 255, 0 \leq yH \leq 8$ )  
 $0 \leq d \leq 255$   
 $k = (xL + xH \times 256) \times (yL + yH \times 256)$  ( $k \neq 0$ )

[Description] Prints a raster bit image using the mode specified by m.

m	Mode	Vertical direction (DPI)	Horizontal direction (DPI)
0, 48	Normal	203	203
1, 49	Double width	203	101
2, 50	Double height	101	203
3, 51	Double width&height	101	101

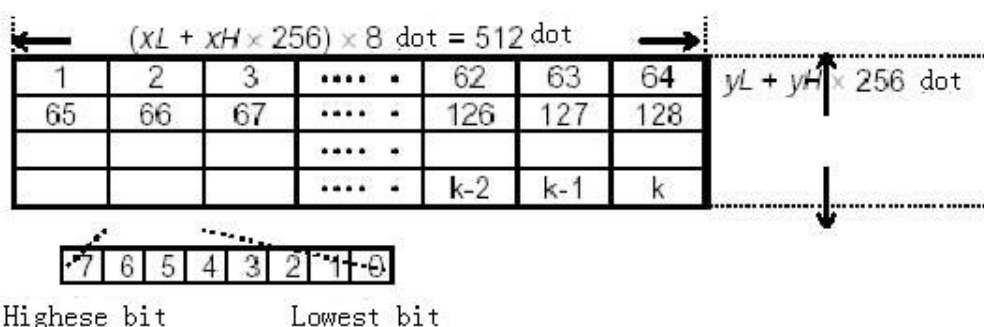
· xL, xH specify the number of bytes in the horizontal direction as  $(xL + xH \times 256)$ .

· yL, yH specify the number of dots in the vertical direction as  $(yL + yH \times 256)$ .

· d specifies the defined data (raster format).

- [Notice]
- This command is valid only when the buffer of printer is null.
  - Printing mode including enlarging characters, bold, double printing, etc, is invalid for this command.
  - The extra part of bitmap will not be printed.
  - ESC a is valid for this command.
  - d is bitmap data. 1 to print; while 0 not print.

[Example] When  $xL + xH \times 256 = 64$



## **Appendix A: 128 code**

### **A.1 128 code summary**

128code can code 128ASCII characters and 100 numbers from 00~99 and some special character by crossing using of character set A, B and C. Character of every character set code is as below:

Character set A: ASCII character from 00H to 5FH

Character set B: ASCII character from 20H to 7FH

Character set C: 100 numbers from 00~99

128 code can also code to the special character below:

SHIFT character

“SHIFT” can make bar code character the first character after SHIFT character transfer from character set A to B, or B to A, back to the character set used before SHIFT. “SHIFT” Character can only be used to transform between character set A and B, it can not make the current code character enter or quit state of character set C.

Selecting character of character set (CODEA, CODEB, CODEC)

These characters can transform the coding character followed to character set A, B or C.

Function character (FNC1, FNC2, FNC3, FNC4)

Usage of these function character is determined by application software. Only FNC1 can be used in character set C.



## A.2 Character sets

Character in set A

Charac t-er	Sending data		Charact -er	Sending data		Charact -er	Sending data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
NULL	00	0	&	26	38	L	4C	76
SOH	01	1	'	27	39	M	4D	77
STX	02	2	(	28	40	N	4E	78
ETX	03	3	)	29	41	O	4F	49
EOT	04	4	*	2A	42	P	50	80
ENQ	05	5	+	2B	43	Q	51	81
ACK	06	6	,	2C	44	R	52	82
BEL	07	7	-	2D	45	S	53	83
BS	08	8	.	2E	46	T	54	84
HT	09	9	/	2F	47	U	55	85
LF	0A	10	0	30	48	V	56	86
VT	0B	11	1	31	49	W	57	87
FF	0C	12	2	32	50	X	58	88
CR	0D	13	3	33	51	Y	59	89
SO	0E	14	4	34	52	Z	5A	90
SI	0F	15	5	35	53	[	5B	91
DLE	10	16	6	36	54	\	5C	92
DC1	11	17	7	37	55	]	5D	93
DC2	12	18	8	38	56	^	5E	94
DC3	13	19	9	39	57	_	5F	95
DC4	14	20	:	3A	58	FNC1	7B,31	123,49
NAK	15	21	;	3B	59	FNC2	7B,32	123,50
SYN	16	22	<	3C	60	FNC3	7B,33	123,51
ETB	17	23	=	3D	61	FNC4	7B,34	123,52
CAN	18	24	>	3E	62	SHIFT	7B,53	123,83
EM	19	25	?	3F	63	CODEB	7B,42	123,66
SUB	1A	26	@	40	64	CODEC	7B,43	123,67
ESC	1B	27	A	41	65			
FS	1C	28	B	42	66			
GS	1D	29	C	43	67			
RS	1E	30	D	44	68			
US	1F	31	E	45	69			
SP	20	32	F	46	70			
!	21	33	G	47	71			
"	22	34	H	48	72			
#	23	35	I	49	73			
\$	24	36	J	4A	74			
%	25	37	K	4B	75			

Character in set B

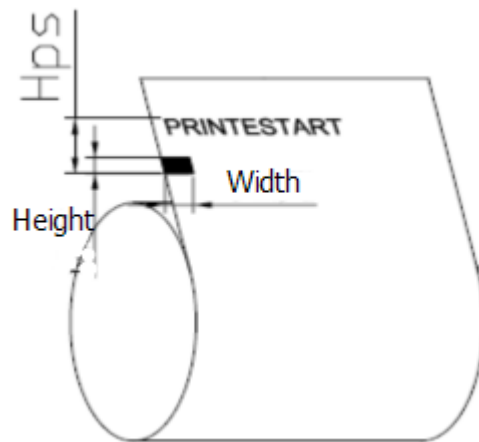
Character	Sending data		Character	Sending data		Character	Sending data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
SP	20	32	F	46	70	l	6C	108
!	21	33	G	47	71	m	6D	109
"	22	34	H	48	72	n	6E	110
#	23	35	I	49	73	o	6F	111
\$	24	36	J	4A	74	p	70	112
%	25	37	K	4B	75	q	71	113
&	26	38	L	4C	76	r	72	114
'	27	39	M	4D	77	s	73	115
(	28	40	N	4E	78	t	74	116
)	29	41	O	4F	79	u	75	117
*	2A	42	P	50	80	v	76	118
+	2B	43	Q	51	81	w	77	119
,	2C	44	R	52	82	x	78	120
-	2D	45	S	53	83	y	79	121
.	2E	46	T	54	84	z	7A	122
/	2F	47	U	55	85	{	7B,7B	123,123
0	30	48	V	56	86		7C	124
1	31	49	W	57	87	}	7D	125
2	32	50	X	58	88	—	7E	126
3	33	51	Y	59	89	DEL	7F	127
4	34	52	Z	5A	90	FNC1	7B,31	123,49
5	35	53	[	5B	91	FNC2	7B,32	123,50
6	36	54	\	5C	92	FNC3	7B,33	123,51
7	37	55	]	5D	93	FNC4	7B,34	123,52
8	38	56	^	5E	94	SHIFT	7B,53	123,83
9	39	57	_	5F	95	CODEA	7B,41	123,65
:	3A	58	`	60	96	CODEC	7B,43	123,67
;	3B	59	a	61	97			
<	3C	60	b	62	98			
=	3D	61	c	63	99			
>	3E	62	d	64	100			
?	3F	63	e	65	101			
@	40	64	f	66	102			
A	41	65	g	67	103			
B	42	66	h	68	104			
C	43	67	i	69	105			
D	44	68	j	6A	106			
E	45	69	k	6B	107			

Character in set C

Charac- -ter	Sending data		Charact -er	Sending data		Charac- ter	Sending data	
	Hex	Decima l		Hex	Decimal		Hex	Decimal
0	00	0	38	26	38	76	4C	76
1	01	1	39	27	39	77	4D	77
2	02	2	40	28	40	78	4E	78
3	03	3	41	29	41	79	4F	79
4	04	4	42	2A	42	80	50	80
5	05	5	43	2B	43	81	51	81
6	06	6	44	2C	44	82	52	82
7	07	7	45	2D	45	83	53	83
8	08	8	46	2E	46	84	54	84
9	09	9	47	2F	47	85	55	85
10	0A	10	48	30	48	86	56	86
11	0B	11	49	31	49	87	57	87
12	0C	12	50	32	50	88	58	88
13	0D	13	51	33	51	89	59	89
14	0E	14	52	34	52	90	5A	90
15	0F	15	53	35	53	91	5B	91
16	10	16	54	36	54	92	5C	92
17	11	17	55	37	55	93	5D	93
18	12	18	56	38	56	94	5E	94
19	13	19	57	39	57	95	5F	95
20	14	20	58	3A	58	96	60	96
21	15	21	59	3B	59	97	61	97
22	16	22	60	3C	60	98	62	98
23	17	23	61	3D	61	99	63	99
24	18	24	62	3E	62	FNC1	7B,31	123,49
25	19	25	63	3F	63	CODEA	7B,41	123,65
26	1A	26	64	40	64	CODEB	7B,42	123,66
27	1B	27	65	41	65			
28	1C	28	66	42	66			
29	1D	29	67	43	67			
30	1E	30	68	44	68			
31	1F	31	69	45	69			
32	20	32	70	46	70			
33	21	33	71	47	71			
34	22	34	72	48	72			
35	23	35	73	49	73			
36	24	36	74	4A	74			
37	25	37	75	4B	75			

## Appendix B: the pre-print black mark description

User must obey the specification as follows when printing the black mark if wants to use pre-print black mark to progress note clamping, otherwise may cause printer cannot identify a black mark. The black mark pre-print specification:



**Printed location:** is shown as chart above, the black mark should be printed to character surface of right or left side rim.

**Width range:**  $\text{width} \geq 7\text{mm}$

**Height range:**  $4\text{mm} \leq \text{Height} \leq 6\text{mm}$

**Vs the reflectivity of infrared:**

$<10\%$  (the paper black mark width other fractions for the reflectivity of infrared  $>65\%$ )

**HPS:** HPS marks the last rim to be apart from the distance of printing the origin top rim for printer black.  $10\text{mm} \leq \text{HPS} \leq 12\text{mm}$

## Appendix C: Thai Character Rules

According to the Thai Character Rules, we classify the Thai characters to the below kinds visually:

1. "Shoes" characters. They can be put under the body characters, like taking shoes for body.
2. "Body" characters. "Cap" characters can be put above "Body" characters, while "Shoes" characters can be put under "Body" characters, like taking caps and shoes for body.
3. "Caps" characters. They can be put above the body characters, like taking caps for body.
4. Tone characters. It marks the tone of one word and must be put above the body characters or cap characters.
5. Independent characters. For this kind of characters, no matter shoes, caps or tones characters can't be put with them together.
6. Punctuation. They are used to make pauses during sentences, same with punctuations in other languages.

Below is the Contrast Table for Characters Type, Code and Characters. (Code is Unicode.

The related Codepage code can be converted according to the current chose codepage.)

Characte rs Type	Code (Hex)	Character
Shoes	0E38-0E39	๑    ๒
Body	0E01-0E10, 0E11-0E1F, 0E20-0E2E, 0E32,	กขฃคฅฉงจฉชซฌญฎฏฐฑฒณดตถทธนบปผฝพฟภม  ยรฤลฦวศษสหฬอฮ ฯ
Cap	0E31, 0E47, 0E33-0E37, 0E4C-0E4E	๐ ๘    ๐ ๙ ๔ ๕ ๖ ๗ ๘ ๙    ๐ ๘ ๙
Tones	0E48-0E4B	ฯ ๓ ๔ +
Independ ent	0E2F,0E30 , 0E3A 0E40-0E46 0E5A-0E5B,	๑๒ . แ โ ใ ไ ำ ๓  ๑   C w
Punctuati on	0E00 , 0E3F, 0E4F-0E59,	฿ ๐ ๑ ๒ ๓ ๔ ๕ ๖ ๗ ๘ ๙
Others	0E3B-0E3E, 0E5B-0E7F	

1. "Shoes" characters will be under the other characters.

2. "Caps" characters will be above the other characters.
3. Tones will be above the whole complete Thai characters. If there is only body character, the tone will be above the body character; if there is caps characters, the tone will be above the cap characters. No matter cap characters, shoes characters or tones won't be one characters independently. The example is as below,



1. Sending rules is: sending the body character firstly, then caps or shoes characters (generally cap and shoe will not in one character at the same time.); the last to send tones.