ESC/POS Command Specifications

V1.4

The command is applicable to AK912

◆ INTRUDCUTION

- ✧ ESC command is a standard instruction set made by EPSON for needle printer, which has become an effective industrial standard of the control language of needle printers.
- ✧ ESC/POS printing command is a simplified version of ESC printing control commands. ESC/POS instruction set is a major practice applied in voucher printing.
- ✧ The notable characteristic of this command is most of the instructions are a group of codes beginning with ESC control characters.
- ✧ AK912 are compatible with ESC/POS command.

◆ COMMAND FUNCTION LIST

CHAPTER	Commands	HEX	Name
Basic control command			
1.1.1	**ESC @**	**0x1B 0x40**	Initialize printer
1.1.2	**FF**	**0x0C**	Print and feed paper 1 lines
1.1.3	**SO**	**0x0E**	Print and paper feed to the right black bar
1.1.4	**LF**	**0x0A**	Line feed
1.1.5	**CR**	**0x0D**	Print and carriage return
1.1.6	**ESC J *n***	**0x1B 0x4A n**	Print and Paper Feed
1.1.7	**ESC d *n***	**0x1B 0x64 n**	Print and feed paper n lines
1.1.8	**HT**	**0x09**	Horizontal tab
1.1.9	**GS FF**	**0x1D 0x0C**	Print and paper feed to the label gap
1.1.10	**GS 0x99**	**0x1D 0x99**	Read the printer status
Character parameter set command			
1.2.1	**ESC ! *n***	**0x1B 0x21 *n***	Select character printing mode
1.2.2	**GS ! *n***	**0x1D 0x21 *n***	Select character size
1.2.3	**ESC M *n***	**0x1B 0x4D *n***	Select character font
1.2.4	**ESC – *n***	**0x1B 0x2D *n***	Specify/cancels underline mode
1.2.5	**ESC E *n***	**0x1B 0x45 *n***	Specify/cancel emphasized printing
1.2.6	**GS B *n***	**0x1D 0x42 *n***	Specify/cancel white/black inverted printing
1.2.7	**ESC V *n***	**0x1B 0x56 *n***	Specify/cancel char. 90 deg. clockwise rotation
Print layout parameters set command			
1.3.1	**ESC $ *nL Nh***	**0x1B 0x24 *nL nH***	Specify absolute position
1.3.2	**ESC D *n1 n2…nk* NULL**	**0x1B 0x44 *nL,nk* 00(FF)**	Set horizontal tab position
1.3.3	**ESC 2**	**0x1B 0x32**	Set default line spacing
1.3.4	**ESC 3 *n***	**0x1B 0x33 *n***	Set line feed amount
1.3.5	**ESC SP *n***	**0x1B 0x20 *n***	Set character right space amount
1.3.6	**ESC a *n***	**0x1B 0x61 *n***	Position alignment
1.3.7	**GS L *n***	**0x1D 0x4C *nL nH***	Set left margin
Graphics / image print command			
1.4.1	**ESC * *m nL nH d1…dk***	**0x1B 0x2A *m nL nH d1…dk***	Specify bit image mode

1.4.2	**GS * *x y d1…dk***	**0x1D 0x2A *x y d1…dk***	Define download bit images
1.4.3	**GS / *n***	**0x1D 0x2F *n***	Print download bit images
1.4.4	**FS P n**	**1C 50 n**	Print NV bit image
Bar code printing command			
1.5.1	**GS h *n***	**0x1D 0x68 *n***	Set bar code height
1.5.2	**GS w *n***	**0x1D 0x77 *n***	Set bar code horizontal size
1.5.3	**GS H *n***	**0x1D 0x48 *n***	Select HRI character print position
1.5.4	**GS f *n***	**0x1D 0x66 *n***	Select HRI character font
1.5.5	**GS k *m …***	**0x1D 0x6B *m***	Print bar code
1.5.6	**GS Z *n***	**0x1D 0x5A *n***	Select the 2D bar code
1.5.7	**ESC Z *m n k sL sH d1…dn***	**0x1B 0x5A *m n k sL sH d1…dn***	Print the 2D bar code
Curve the print command			
1.1.1	**GS ‘**	**0x1D 0x27 *n x1sL x1sH x1eL x1eH … xnsL xnsH xneL xneH***	Print curve
1.1.2	**GS “**	**0x1D 0x22 *n xL xH c1 c2* … 0x00**	Print character on the curve
Print Chinese characters command			
1.7.1	**FS &**	**0x1C 0x26**	Specify Chinese character mode
1.7.2	**FS .**	**0x1C 0x2E**	Cancel Chinese character mode
1.7.3	**FS U *nL nH***	**0x1C 0x55 *nL nH***	Print Unicode code character
1.7.4	ESC t n	0x1B 0x74 *n*	Select character code page
1.7.5	ESC R n	0x1B 0x52 *n*	Select international characters
1.7.6	**US f**	**1F 66 id nL nH crc16L crc16H d1…dn**	In frame mode data transmission
1.7.7	**US q**	**1F 71 id**	Frame status query
Especial command			
1.8.1	**US sBrP（1F 73 42 72 50）**	**0x1F 0x73 0x42 0x72 0x50**	Read the Bluetooth password
1.8.2	**US sBsP k n1…nk**	**0x1F 0x73 0x42 0x73 0x50 k n1…nk**	Setup the Bluetooth password

The illustration of the format in description：

【COMMAND】+【parameter】

【COMMAND】are commands consisting of ESC characters and command characters in bold. ESC characters are ESC(0x1B), FS(0x1C),GS(0x1D). Some single byte commands have no ESC characters.

【parameter】are parameters，which are not digital characters but the value of the characters in italic and bold.

For example, **ESC J *n***

ESC J is the command while *n* is the parameter.

- *n，nL，nH，n1，n2，nk，m，d1，dk，x，y，c1，c2* indicates a certain value. Please pay attention to the difference between decimal and hexadecimal digit while using.
- To indicate a hexadecimal digit, it is prefixed by 0x in this instruction. For example, 0x10 indicates 16 of decimal digit.

1.1 Basic control command

1.1.1 ESC @

[Name]	Initialize printer	
[CODE]	ASCII	**ESC @**
	Hex.	**0x1B 0x40**
	Decimal	**27 64**
[RANGE]		
[DESCRIPTION]	Clear data in printing buffer area. Set printing commands to defaults.	
[ATTENTION]	Not set to the original factory defaults, but to the default parameters of printing command setting.	
[DEFAULT VALUE]		
[REFERENCE]		

1.1.2 FF

[Name]	Print and feed paper 1 lines	
[CODE]	ASCII	**FF**
	Hex.	**0x0C**
	Decimal	**12**
[RANGE]		
[DESCRIPTION]	Print all data in printing buffer area and paper feed paper 1 lines	
[ATTENTION]	● All buffer data is deleted after printing ● Sets the print position to the beginning of the next line after execution.	
[DEFAULT VALUE]		
[REFERENCE]	**SO**	

1.1.3 SO

[Name]	Print and paper feed to the right black bar	
[CODE]	ASCII	**SO**
	Hex.	**0x0E**
	Decimal	**14**
[RANGE]		
[DESCRIPTION]	Print all data in printing buffer area and paper feed to the right black bar.	
[ATTENTION]	● This command is used to locate to the minor black bar when printing the vouchers to be printed. It can be used with FF command to print double-layered vouchers to be printed. ● Delete the data in buffer area after printing. ● This command is to set the starting point of printing lines. ● If there is a black bar in the paper, paper feeding will stop at the right black bar after all data in the buffer area are printed. If there is not a black bar in the paper, paper feeding will stop at a distance of 20cm.	
[DEFAULT VALUE]		
[REFERENCE]	**FF**	

1.1.4 LF

[Name]	Line feed	
[CODE]	ASCII	**LF**
	Hex.	**0x0A**
	Decimal	**10**
[RANGE]		
[DESCRIPTION]	Print all data in printing buffer area and paper feed one line forward with the line space set. **ESC 2，ESC 3** can set the line space.	
[ATTENTION]	● This command is to set the starting point of printing lines. ● If there is no data in line buffer area, paper feeds one line forward only. ● If this command is followed by CR command，paper feeds one line forward only.	
[DEFAULT VALUE]		
[REFERENCE]	**CR** **ESC 2** **ESC 3**	

1.1.5 CR

[Name]	Print and carriage return	
[CODE]	ASCII	**CR**
	Hex.	**0x0D**
	Decimal	**13**
[RANGE]		
[DESCRIPTION]	Print all data in printing buffer area and paper feed one line forward with the line space set. **ESC 2，ESC 3** can set the line space.	
[ATTENTION]	This command is to set the starting point of printing lines. ● If there is no data in line buffer area, paper feeds one line forward only. ● If this command is followed by LF command，paper feeds one line forward only.	
[DEFAULT VALUE]		
[REFERENCE]	**LF** **ESC 2** **ESC 3**	

1.1.6 ESC J *n*

[Name]	Print and Paper Feed	
[CODE]	ASCII	**ESC J *n***
	Hex.	**0x1B 0x4A *n***
	Decimal	**27 74 *n***
[RANGE]	$1 \leq n \leq 255$	
[DESCRIPTION]	Print all data in printing buffer area and paper feed to n vertical dot pitch plus line space set. Each dot pitch is 0.125mm.	

[ATTENTION]	● Set the line space to the length of Command ESC2 & ESC 3 set. ● Set the beginning of the next line as the starting point when this command is executed. ● If there is no data in line buffer area, paper feeds n vertical dot pitch.
[DEFAULT VALUE]	
[REFERENCE]	**ESC d *n***

1.1.7 ESC d *n*

[Name]	Print and feed paper n lines	
[CODE]	ASCII	**ESC d *n***
	Hex.	**0x1B 0x64 *n***
	Decimal	**27 100 *n***
[RANGE]	1≤ ***n*** ≤255	
[DESCRIPTION]	Print all data in printing buffer area and paper feed n lines.	
[ATTENTION]	● This command sets the beginning of a line as the printing starting point. ● This command can be impacted by such line space setting commands as ESC 2 & ESC 3. ● This command can be impacted by font size setting commands.	
[DEFAULT VALUE]		
[REFERENCE]	**ESC J *n***	

1.1.8 HT

[Name]	Horizontal tab	
[CODE]	ASCII	**HT**
	Hex.	**0x09**
	Decimal	**9**
[RANGE]		
[DESCRIPTION]	Move to the next horizontal tab.	
[ATTENTION]	● Set the horizontal tab with Command ESC D. ● If the next horizontal tab is not set, this command is passed. ● If the next horizontal tab is occupied, move to the next tab but one. ● The default of horizontal tab is 8-character width of character A(12×24), i.e. Column 9, 17, 25 …	
[DEFAULT VALUE]		
[REFERENCE]	**ESC D**	

1.1.9 GS FF

[Name]	Print and paper feed to the label gap	
[CODE]	ASCII	**Gs FF**
	Hex.	**0x1D 0x0C**
	Decimal	**29 12**
[RANGE]		
[DESCRIPTION]	Print all data in printing buffer area and paper feed to the next segmentation line of the label.	
[ATTENTION]	● It locates to the segmentation line when this command is applied for labels. ● This command sets the beginning of a line as the printing starting point.	

	After all data printed in buffer area, for label printing, paper feeds to the next segmentation line of the label; for printing plain paper without right black bar, paper feeds to a distance of 20cm; for printing paper with right black bar, paper feeds to the right black bar. ● This command is only effective when the segmentation line space is 2mm~4mm.
[DEFAULT VALUE]	
[REFERENCE]	

1.1.10 GS 0x99 (0x1D 0x99)

[Name]	Read the printer status	
[CODE]	ASCII	**GS 0x99**
	Hex.	**0x1D 0x99**
	Decimal	**29 153**
[RANGE]		
[DESCRIPTION]	This command is to read the interrelated status of the equipment. The feedback characters shall be 1D 99 XX FF when the printer receives the command. Each character of the first five characters indicates:	

DIGIT	VALUE	IMPLICATION
0	0	PAPER LOADED
	1	PAPER OUT
1	0	COVER CLOSED
	1	COVER OPEN
2	0	TEMPERATURE OF PRINTER ENGINE NORMAL
	1	OVERHEAT OF PRINTER ENGINE
3	0	BATTERY LEVEL NORMAL
	1	LOW BATTERY LEVEL
4	0	STANDBY
	1	PRINTING

The last three digits indicate the paper bin no.

7	6	5	PAPER BIN NO.	REMARKS
0	0	0	0	/
0	0	1	1	VAT INVOICE
0	1	0	2	RECEIPT
0	1	1	3	WAY BILL
1	0	0	4	/
1	0	1	5	/
1	1	0	6	/
1	1	1	7	/

[ATTENTION]	● The feedback value indicates the printer status when it receives a command.
[DEFAULT VALUE]	
[REFERENCE]	

1.2 Character parameter set command

1.2.1 ESC ! *n*

<table>
<tr><td>[Name]</td><td colspan="2">Select character printing mode</td></tr>
<tr><td>[CODE]</td><td>ASCII</td><td>ESC ! n</td></tr>
<tr><td></td><td>Hex.</td><td>0x1B 0x21 n</td></tr>
<tr><td></td><td>Decimal</td><td>27 33 n</td></tr>
<tr><td>[RANGE]</td><td colspan="2">0≤ n ≤ 255</td></tr>
<tr><td>[DESCRIPTION]</td><td colspan="2">Select printing mode by setting the parameter n.
The implication of n is as follows:
<table>
<tr><th>DIGIT</th><th>VALUE</th><th>IMPLICATION</th></tr>
<tr><td>0</td><td>0</td><td>Western character Font A(12x24)
Chinese character Font A(24x24)</td></tr>
<tr><td>1</td><td>—</td><td>Undefined</td></tr>
<tr><td>2</td><td>—</td><td>Undefined</td></tr>
<tr><td>3</td><td>0</td><td>Unlock bold mode</td></tr>
<tr><td></td><td>1</td><td>Bold mode</td></tr>
<tr><td>4</td><td>0</td><td>Unlock double-height mode</td></tr>
<tr><td></td><td>1</td><td>Set double-height mode</td></tr>
<tr><td>5</td><td>0</td><td>Unlock double-width mode</td></tr>
<tr><td></td><td>1</td><td>Set double-width mode</td></tr>
<tr><td>6</td><td>—</td><td>Undefined</td></tr>
<tr><td>7</td><td>0</td><td>Unlock underline mode</td></tr>
<tr><td></td><td>1</td><td>Set underline mode</td></tr>
</table></td></tr>
<tr><td>[ATTENTION]</td><td colspan="2">● When both double-height and double-width mode are selected, the character size is quadrupled.
● This command can be used to set underline mode for all characters. The underline is two-dot width defaulted, unless is set one-dot width by ESC. It cannot be used to set underline mode for the space, rotated and reversed characters generated by HT.
● When there are double-height or even bigger height characters in a line, all characters align to the baseline.
● ESC M can be used to set font. The last setting command takes the effect.
● ESC E can be used to lock or unlock bold mode. The last setting command takes the effect.
● ESC – can be used to lock or unlock underline mode. The last setting command takes the effect.
● GS ! can be used to set character size. The last setting command takes the effect.
● This command is effective for English characters, numbers, symbols and Chinese characters.
● If n is not meant to be 0, set any digit of 1, 2 and 6 of n to 1.</td></tr>
<tr><td>[DEFAULT VALUE]</td><td colspan="2">n = 0</td></tr>
<tr><td>[REFERENCE]</td><td colspan="2">ESC –
ESC E
GS !
ESC M</td></tr>
</table>

1.2.2 GS ! *n*

<table>
<tr><td>[Name]</td><td colspan="2">Select character size</td></tr>
<tr><td>[CODE]</td><td>ASCII</td><td>GS ! n</td></tr>
<tr><td></td><td>Hex.</td><td>0x1D 0x21 n</td></tr>
<tr><td></td><td>Decimal</td><td>29 33 n</td></tr>
<tr><td>[RANGE]</td><td colspan="2">0≤ n ≤ 255 (1 ≤vertical exansion≤ 8, 1 ≤horizontal expansion≤ 8)</td></tr>
<tr><td>[DESCRIPTION]</td><td colspan="2">Set character height with any digit of 0~3. Set character width with any digit of 4~7.
<table>
<tr><td>WIDTH</td><td>7</td><td>6</td><td>5</td><td>4</td></tr>
<tr><td>ONE TIME</td><td>-</td><td>-</td><td>0</td><td>0</td></tr>
<tr><td>DOUBLE</td><td>-</td><td>-</td><td>0</td><td>1</td></tr>
<tr><td>TRIPLE</td><td>-</td><td>-</td><td>1</td><td>0</td></tr>
</table>
<table>
<tr><td>HEIGHT</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>ONE TIME</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>DOUBLE</td><td>0</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>TRIPLE</td><td>0</td><td>0</td><td>1</td><td>0</td></tr>
</table></td></tr>
<tr><td>[ATTENTION]</td><td colspan="2">● This command is effective for all characters, English characters, numbers, symbols and Chinese characters, but characters read by barcode.
● If n is defined out of range, unknown results may occur.
● Paper feed goes vertical, normal to the horizontal direction. However, if the character is rotated 90°clockwise, the vertical direction and horizontal direction become reversed, i.e. this command is subordinate to ESC V. When both commands are effective, the character rotates first and enlarges after that.
● When different sized characters are enlarged in a line, all characters align to the baseline.
● ESC ! can be used to set character size. The last setting command takes the effect.
● If n is not meant to be 0, set any digit of 6 and 7 of n to 1.</td></tr>
<tr><td>[DEFAULT VALUE]</td><td colspan="2">n = 0</td></tr>
<tr><td>[REGFERENCE]</td><td colspan="2">ESC !</td></tr>
</table>

1.2.3 ESC M *n*

<table>
<tr><td>[Name]</td><td colspan="2">Select character font</td></tr>
<tr><td>[CODE]</td><td>ASCII</td><td>ESC M n</td></tr>
<tr><td></td><td>Hex.</td><td>0x1B 0x4D n</td></tr>
<tr><td></td><td>Decimal</td><td>27 77 n</td></tr>
<tr><td>[RANGE]</td><td colspan="2">n = 0, 1,2，'0'，'1'，'2'</td></tr>
<tr><td>[DESCRIPTION]</td><td colspan="2">Select character font.
<table>
<tr><th colspan="2">N</th><th rowspan="2">IMPLICATION</th></tr>
<tr><th>CHARACTER</th><th>HEXADECIMAL</th></tr>
<tr><td>0</td><td>0x00</td><td>Western character Font A(12x24)
Chinese character Font A(24x24)</td></tr>
<tr><td>'0'</td><td>x30</td><td>Western character Font A(12x24)
Chinese character Font A(24x24)`</td></tr>
</table></td></tr>
<tr><td>[ATTENTION]</td><td colspan="2">● Can be used with the codepage selecting ‘FS c’</td></tr>
<tr><td>[DEFAULT VALUE]</td><td colspan="2">n = 0</td></tr>
<tr><td>[REFERENCE]</td><td colspan="2">FS c</td></tr>
</table>

1.2.4 ESC – *n*

<table>
<tr><td>[Name]</td><td colspan="2">Specify/cancels underline mode</td></tr>
<tr><td>[CODE]</td><td>ASCII</td><td>ESC – n</td></tr>
<tr><td></td><td>Hex.</td><td>0x1B 0x2D n</td></tr>
<tr><td></td><td>Decimal</td><td>27 45 n</td></tr>
<tr><td>[RANGE]</td><td colspan="2">0≤ n ≤ 2</td></tr>
<tr><td>[DESCRIPTION]</td><td colspan="2">Set/unlock the underline mode based on the n value as follows：
<table>
<tr><th colspan="2">n</th><th rowspan="2">IMPLICATION</th></tr>
<tr><th>CHARACTER</th><th>HEXADECIMAL</th></tr>
<tr><td>0</td><td>0x00</td><td>Unlock underline</td></tr>
<tr><td>1</td><td>0x01</td><td>Set underline(1 dot width)</td></tr>
<tr><td>2</td><td>0x02</td><td>Set underline(2 dots width)</td></tr>
<tr><td>'0'</td><td>0x30</td><td>Unlock underline</td></tr>
<tr><td>'1'</td><td>0x31</td><td>Set underline(1 dot width)</td></tr>
<tr><td>'2'</td><td>0x32</td><td>Set underline(2 dots width)</td></tr>
</table></td></tr>
<tr><td>[ATTENTION]</td><td colspan="2">● Space, rotated and reversed characters generated by HT can’t be underlined.
● The weight of underline can be impacted by changing of character size.
● ESC ! can be used to set or unlock the underline mode. The last setting command takes the effect.
● This command is effective for both English and Chinese characters.</td></tr>
<tr><td>[DEFAULT VALUE]</td><td colspan="2">n = 0</td></tr>
<tr><td>[REFERENCE]</td><td colspan="2">ESC !</td></tr>
</table>

1.2.5 ESC E *n*

<table>
<tr><td>[Name]</td><td colspan="2">Specify/cancel emphasized printing</td></tr>
<tr><td>[CODE]</td><td>ASCII</td><td>ESC E n</td></tr>
<tr><td></td><td>Hex.</td><td>0x1B 0x45 n</td></tr>
<tr><td></td><td>Decimal</td><td>27 69 n</td></tr>
<tr><td>[RANGE]</td><td colspan="2">0 ≤ n ≤ 255</td></tr>
<tr><td>[DESCRIPTION]</td><td colspan="2">Lock/unlock bold mode.
<table>
<tr><th colspan="2">N</th><th rowspan="2">IMPLICATION</th></tr>
<tr><th>CHARACTER</th><th>HEXADECIMAL</th></tr>
<tr><td>0</td><td>0x00</td><td>Unlock bold mode</td></tr>
<tr><td>1</td><td>0x01</td><td>Lock bold mode</td></tr>
<tr><td>'0'</td><td>0x30</td><td>Unlock bold mode</td></tr>
<tr><td>'1'</td><td>0x31</td><td>Lock bold mode</td></tr>
</table></td></tr>
<tr><td>[ATTENTION]</td><td colspan="2">● ESC !can be used to lock or unlock bold mode. The last setting command takes the effect.</td></tr>
<tr><td>[DEFAULT VALUE]</td><td colspan="2">n = 0</td></tr>
<tr><td>[REFERENCE]</td><td colspan="2">ESC !
ESC G</td></tr>
</table>

1.2.6 GS B *n*

<table>
<tr><td>[Name]</td><td colspan="2">Specify/cancel white/black inverted printing</td></tr>
<tr><td>[CODE]</td><td>ASCII</td><td>GS B n</td></tr>
<tr><td></td><td>Hex.</td><td>0x1D 0x42 n</td></tr>
<tr><td></td><td>Decimal</td><td>29 66 n</td></tr>
<tr><td>[RANGE]</td><td colspan="2">0 （0x30）≤ n ≤ 255</td></tr>
<tr><td>[DESCRIPTION]</td><td colspan="2">Lock/unlock reversed printing.
<table>
<tr><th colspan="2">N</th><th rowspan="2">IMPLICATION</th></tr>
<tr><th>CHARACTER</th><th>HEXADECIMAL</th></tr>
<tr><td>0</td><td>0x00</td><td>Unlock reversed printing</td></tr>
<tr><td>1</td><td>0x01</td><td>Lock reversed printing</td></tr>
<tr><td>'0'</td><td>0x30</td><td>Unlock reversed printing</td></tr>
<tr><td>' '</td><td>0 31</td><td>Lock reversed printing</td></tr>
</table></td></tr>
<tr><td>[ATTENTION]</td><td colspan="2">● This command is effective for all built-in characters.
● This command does not impact bitmaps, barcodes, characters read by barcode and space generated by HT, ESC $.
● Reverse mode is prior to underline mode. When reverse mode is locked, underline mode is not effective, not unlocked.</td></tr>
<tr><td>[DEFAULT VALUE]</td><td colspan="2"></td></tr>
<tr><td>[REFERENCE]</td><td colspan="2">n = 0</td></tr>
</table>

1.2.7 ESC V *n*

<table>
<tr><td>[Name]</td><td colspan="2">Specify/cancel char. 90 deg. clockwise rotation</td></tr>
<tr><td>[CODE]</td><td>ASCII</td><td>ESC V n</td></tr>
<tr><td></td><td>Hex.</td><td>0x1B 0x56 n</td></tr>
<tr><td></td><td>Decimal</td><td>27 86 n</td></tr>
<tr><td>[RANGE]</td><td colspan="2">0≤ n ≤ 3</td></tr>
<tr><td>[DESCRIPTION]</td><td colspan="2">Set/unlock character rotation mode.
<table>
<tr><th colspan="2">N</th><th rowspan="2">IMPLICATION</th></tr>
<tr><th>CHARACTRER</th><th>HEXADECIMAL CODE</th></tr>
<tr><td>0</td><td>0x00</td><td>Unlock rotation mode</td></tr>
<tr><td>1</td><td>0x01</td><td>Rotate 90°clockwise</td></tr>
<tr><td>2</td><td>0x02</td><td>Rotate 180°clockwise</td></tr>
<tr><td>3</td><td>0x03</td><td>Rotate 270°clockwise</td></tr>
<tr><td>'0'</td><td>0x30</td><td>Unlock rotation mode</td></tr>
<tr><td>'1'</td><td>0x31</td><td>Rotate 90°clockwise</td></tr>
<tr><td>'2'</td><td>0x32</td><td>Rotate 180°clockwise</td></tr>
<tr><td>'3'</td><td>0x33</td><td>Rotate 270°clockwise</td></tr>
</table></td></tr>
<tr><td>[ATTENTION]</td><td colspan="2">● Rotated characters are not underlined even underline mode is locked.
● In rotation mode, double-width and double-height characters’ direction is reverse to double-width and double-height characters in normal mode.</td></tr>
<tr><td>[DEFAULT VALUE]</td><td colspan="2">n = 0x00 （0x30）</td></tr>
</table>

[REFERENCE]	**ESC !** **ESC –**

1.3 Print layout parameters set command

1.3.1 ESC $ *nL nH*

[Name]	Specify absolute position	
[CODE]	ASCII	**ESC $ *nL nH***
	Hex.	**0x1B 0x24 *nL nH***
	Decimal	**27 36 *nL nH***
[RANGE]	0≤ ***nL*** ≤ 255；0≤ ***nH*** ≤ 2	
[DESCRIPTION]	Set the distance from the starting point of one line to position where the character to be printed. ***nL nH*** are the low-order byte and upper byte of the double byte unsigned whole number n. ***n*** =***nL*** + ***nH*** *256 It is n horizontal dot pitch from the starting point of one line to the position to be printed. Each horizontal dot pitch is 0.125mm.	
[ATTENTION]	● This command is only effective in its present line. ● If the printing position is beyond the set printable area, it will be printed at the starting point of the next line. ● If there is data at the set printing position, the data will be replaced. ● If nH is not meant to be 0x00, it can be set as 0x80. The result is the same with nH=0x00.	
[DEFAULT VALUE]		
[REFERENCE]		

1.3.2 ESC D *n1 n2…nk* NULL

[Name]	Set horizontal tab position	
[CODE]	ASCII	**ESC D *n1…nk* NULL**
	Hex.	**0x1B 0x44 *n1…nk* 00(FF)**
	Decimal	**27 68 *n1…nk* 0(255)**
[RANGE]	1≤ ***n1，..，nk*** ≤ 72 ； 0 ≤ ***k*** ≤ 8；	
[DESCRIPTION]	Set the horizontal position. ***n1,…,nk***: Appoint the column no. of one line as the horizontal tab position. ***k*** indicates the total number of the horizontal tab to be set.	
[ATTENTION]	● Horizontal tab is saved as a value, which is n Western characters' width, measured from the starting point of one line. The width includes the default space between characters. ● This command is not impacted by character enlarging command **ESC !, GS !**. ● This command deletes the previously set horizontal position. ● 8 positions can be set(***k*** = 8).Data exceeding 8 positions is treated as normal data. ● ***nk*** is transmitted in ascending sequence， ended with a **NULL** code(0x00 or 0xFF). ● ***nk*** >***n(k-1)*** in this command. If ***nk*** is smaller or equals to the frontal value ***n(k-1)***， ***nk*** position is ignored。 ● **ESC D NULL** cancels all horizontal position setting.	
[DEFAULT VALUE]	The space between horizontal position is default to be 8 characters (12*24)，i.e. column 9，17，25， …	

[REFERENCE]	**HT**

1.3.3 ESC 2

[Name]	Set default line spacing	
[CODE]	ASCII	**ESC 2**
	Hex.	**0x1B 0x32**
	Decimal	**27 50**
[RANGE]		
[DESCRIPTION]	Set current line space to the default value 1mm（8 vertical dot pitch）。	
[ATTENTION]	● This command can impact the line space between the image and the character.	
[DEFAULT VALUE]		
[REFERENCE]	**ESC 3**	

1.3.4 ESC 3 *n*

[Name]	Set line feed amount	
[CODE]	ASCII	**ESC 3 *n***
	Hex.	**0x1B 0x33 *n***
	Decimal	**27 51 *n***
[RANGE]	0≤ ***n*** ≤ 127	
[DESCRIPTION]	Set line space as n vertical dot pitch. Each vertical dot pitch is 0.125mm.	
[ATTENTION]	● This command can impact the line space between the image and the character. ● If n is not meant to be 0x00，it can be set as 0x80. The result is the same with n=0x00.	
[DEFAULT VALUE]	***n*** = 8	
[REFERENCE]	**ESC 2**	

1.3.5 ESC SP *n*

[Name]	Set character right space amount	
[CODE]	ASCII	**ESC SP *n***
	Hex.	**0x1B 0x20 *n***
	Decimal	**27 32 *n***
[RANGE]	0≤ ***n*** ≤ 48	
[DESCRIPTION]	Set each space on the right of a character as ***n*** horizontal dot pitch. Each horizontal dot pitch is 0.125mm.	
[ATTENTION]	● Under double-width mode, the space on the right of a character is twice as normal. When the character is enlarged, the space will be enlarged at the same times. ● This commands can impact the setting of both English and Chinese characters. ● If n is not meant to be 0x00，it can be set as 0x80. The result is the same with n=0x00.	
[DEFAULT VALUE]	***n*** = 0 (0x80)	
[REFERENCE]		

1.3.6 ESC a *n*

[Name]	Position alignment	
[CODE]	ASCII	**ESC a *n***
	Hex.	**0x1B 0x61 *n***
	Decimal	**27 97 *n***
[RANGE]	0≤ ***n*** ≤ 2	
[DESCRIPTION]	Set the line alignment with n value. The alternatives and implications of ***n*:**	

n		**IMPLICATION**
CHARACTER	**HEXADECIMAL**	
0	0x00	Left aligned
1	0x01	Centered
2	0x02	Right aligned
0'	0x30	Left aligned
'1'	0x31	Centered || ' '	0x32	Right aligned

[ATTENTION]	● This command is only effective when start processing at the beginning of a line. ● This command controls alignment within printing area. ● This command can make space area aligned by the instruction of **ESC $**. ● This command can be impacted by the left margin position generated by GS L
[DEFAULT VALUE]	***n*** = 0
[REFERENCE]	

1.3.7 GS L *nL nH*

[Name]	Set left margin	
[CODE]	ASCII	**GS L *nL nH***
	Hex.	**0x1D 0x4C *nL nH***
	Decimal	**29 76 *nL nH***
[RANGE]	0 ≤ ***nL*** ≤255； 0≤ ***nH*** ≤2	
[DESCRIPTION]	Left margin is the width from the left end to the left beginning of printable area. ***nL & nH*** are the low-order byte and upper byte of the unsigned double-byte whole number. Left margin is set to be ***n*** horizontal dot pitch.***n*** = ***nL*** + ***nH*** * 256. Each horizontal dot pitch is 0.125mm.	
[ATTENTION]	● This command is only effective when start processing at the beginning of a line. ● The maximum margin is 576. No contents can be printed when it goes beyond 576. ● If nH is not meant to be 0x00，it can be set as 0x80. The result is the same with nH=0x00.	
[DEFAULT VALUE]	***nL*** = 0, ***nH*** = 0	
[REFERENCE]		

1.4 Graphics / image print command

1.4.1 ESC * *m nL nH d1…dk*

[Name]	Specify bit image mode

[CODE]	ASCII	**ESC * *m nL nH d1…dk***
	Hex.	**0x1B 0x2A *m nL nH d1…dk***
	Decimal	**27 42 *m nL nH d1…dk***
[RANGE]	***m*** = 0, 1, 32, 33 0 ≤ ***nL*** ≤ 255 0 ≤ ***nH*** ≤ 2 0 ≤ ***d*** ≤ 255	
[DESCRIPTION]	This command is only effective for black and white bitmaps of 8-dot or 24-dot height and not exceeding printable area. The direction of image scanning is from top to bottom, left to right. When data bit is 1, black dots are printed. When data bit is 0, no printing. The implications of the parameters are as follows: Use ***m*** to set the bitmap mode. The dot number of horizontal direction of bitmaps is determined by ***nL*** & ***nH***.	

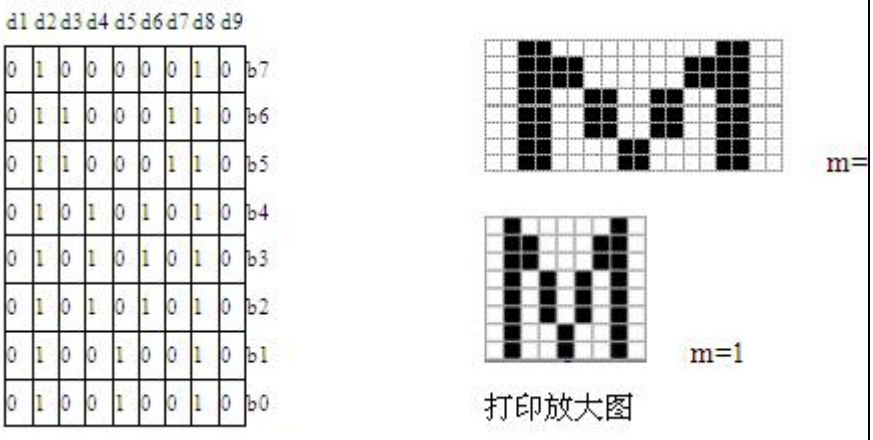
***m*（*DECIMAL*）**	**VERTICAL DOTS（HEIGHT）**	**IMPLICATION**
0	8	Double-width
1	8	Single-time-width
32	2	Double-width
33	2	Single-time-width

nL, nH are the low-order byte and upper byte of the double byte unsigned whole number n, which indicate the dot number in horizontal bitmaps. The maximum value of single-time width ***n*** is 576， the maximum of double-width is 288.

d1…dk indicate bitmap data, the format of which are described as follows:

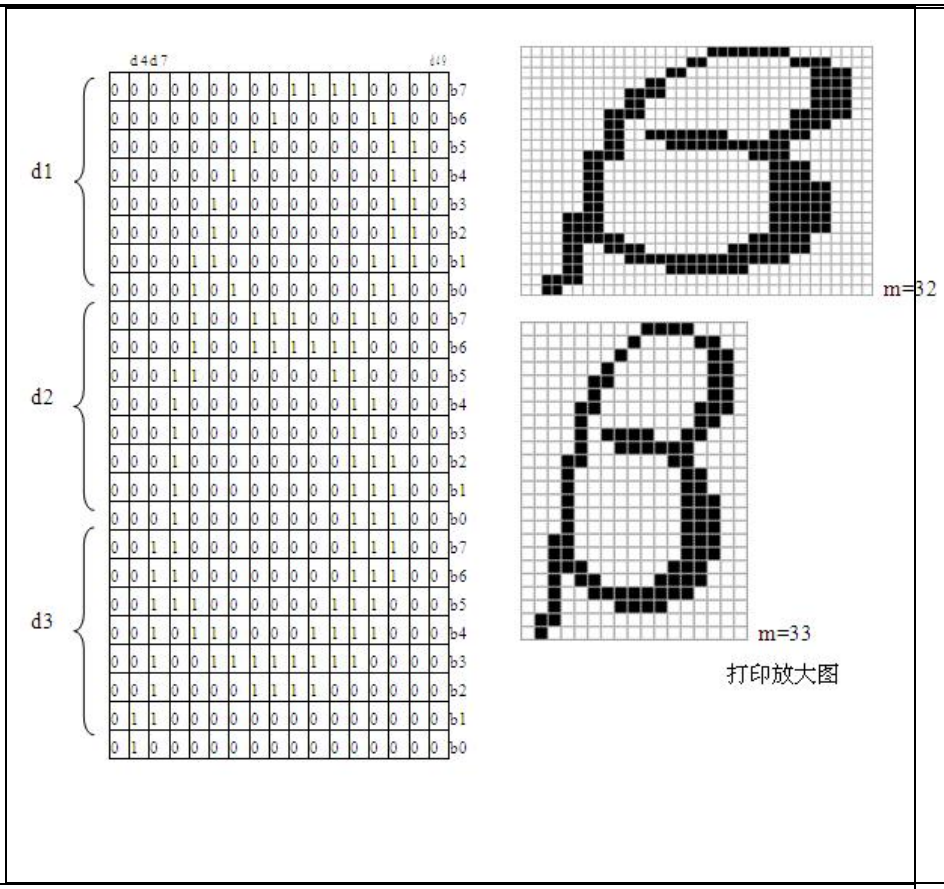
m = 0 ： ***d1*** indicates the data of column dot of 1 and 2. ***dk*** indicates the data of column dot of 2k-1 and 2k. bn indicates the n digit of byte.

m = 1 ： ***d1*** indicates the data of column dot of 1. ***dk*** indicates the data of column dot of k. bn indicates the n digit of byte.



m = 32： d1、d2、d3 indicate the data of column dot of 1 and 2, and the like. Bn indicates the n digit of byte.

m = 33： d1、d2、d3 indicate the data of column dot of 1, and the like. Bn indicates the n digit of byte.

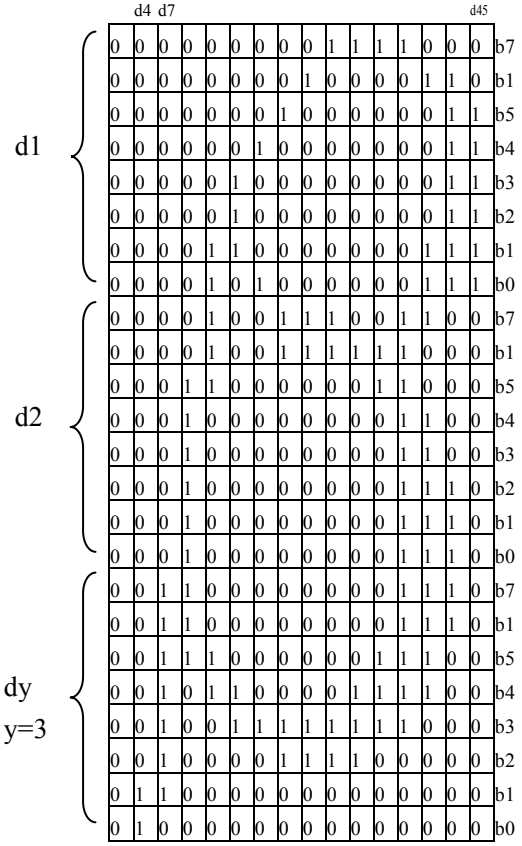
	
[ATTENTION]	● If ***m*** exceeds the range，unpredictable results may occur。 ● If the key-in bitmap data exceeds the number of the printable dots of the line, the data exceeded shall be ignored. ● The printer returns to the normal data processing mode after printing a bitmap.。 ● This command is not impacted by printing mode(bold, overstriking, underline, font size and reverse printing).
[DEFAULT VALUE]	
[REFERENCE]	**GS * *x y d1…dk***

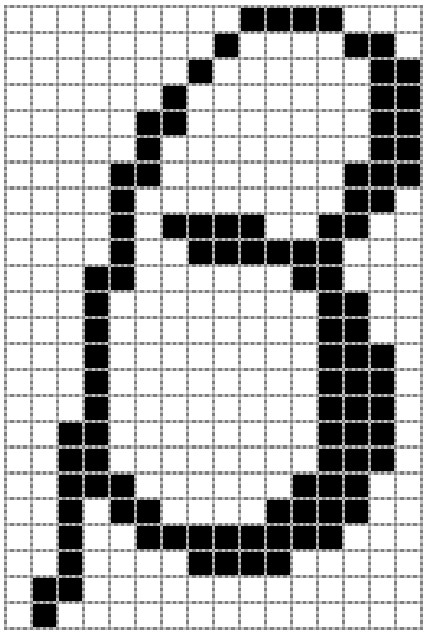
1.4.2 GS * *x y d1…dk*

[Name]	Define download bit images	
[CODE]	ASCII	**GS * *x y d1…dk***
	Hex.	**0x1D 0x2A *x y d1…dk***
	Decimal	**29 42 *x y d1…dk***
[RANGE]	1≤ ***x*** ≤72 (576/8)；1≤ ***y*** ≤ 20；***x*** * ***y*** ≤ 400 0≤ ***d*** ≤ 255；k=***x*** * ***y*** * 8	
[DESCRIPTION]	Downloading bitmaps are defined by dot number of ***x*** & ***y.*** The direction of image scanning is from top to bottom, left to right. ***x*** * 8 indicates the horizontal dots. ***y*** * 8 indicates the vertical dots.	
[ATTENTION]	● Limited by the buffer area, if ***x*** * ***y*** value exceeds the range， this command becomes ineffective. ● ***d*** indicates the bitmap data. The printing digit for ***d*** is 1, the non printing digit is 0. ● The downloading bitmaps defined by this command is printed by command **GS / *n.***	

	● Downloading bitmap definitions are cleared under below circumstances： 1. **ESC @** is executed. 2. The printer is reset or power off.
[DEFAULT VALUE]	
[REFERENCE]	**GS / *n***

[EXAMPLE]	The picture below is a bitmap of 16-dot width and 24-dot height.
	x =2,***y*** =3,***d1…dk*** values are as follows.
	d1 = 0x00; d2 = 0x00; d3 = 0x00;//第1列 d4 = 0x00; d5 = 0x00; d6 = 0x03;//2
	d7 = 0x00; d8 = 0x00; d9 = 0xFE;//3 d10 = 0x00; d11 = 0x3F; d12 = 0xE0;//4
	d13 = 0x03; d14 = 0xE0; d15 = 0x30;//5 d16 = 0x0E; d17 = 0x00; d18 = 0x18;//6
	d19 = 0x11; d20 = 0x00; d21 = 0x08;//7 d22 = 0x20; d23 = 0xC0; d22 = 0x0C;//8
	d25 = 0x40; d26 = 0xC0; d23 = 0x0C;//9 d28 = 0x80; d29 = 0xC0; d30 = 0x0C;//10
	d31 = 0x80; d32 = 0x40; d33 = 0x1C;//11 d34 = 0x80; d35 = 0x60; d36 = 0x1C;//12
	d37 = 0x80; d38 = 0xFF; d39 = 0xF8;//13 d40 = 0x43; d41 = 0x9F; d42 = 0xF0;//14
	d43 = 0x7F; d44 = 0x07; d45 = 0xC0;//15 d46 = 0x3E; d47 = 0x00; d48 = 0x00;//16





● 打印放大图

1.4.3 GS / *n*

[Name]	Print download bit images	
[CODE]	ASCII	**GS / *n***
	Hex.	**0x1D 0x2F *n***
	Decimal	**29 47 *n***
[RANGE]	0≤ ***n*** ≤ 3	
[DESCRIPTION]	Downloading bitmaps defined by command **GS *** are printed in the mode set by ***n*.**	

	n sets the mode as follows： ***n*** | **IMPLICATION** 0 | Normal 1 | Double-width 2 | Double-height 3 | Double-width & double-height
[ATTENTION]	● This command is ineffective if the bitmap data is undefined. ● This command is not impacted by printing mode(bold, overstriking, underline, font size and reverse printing). ● If the downloading bitmap goes beyond the printable area, the data exceeded will not be printed. ● If the height of bitmap exceeds 160 dots, only the height not exceeded can be printed. The height should not exceed 80 dots if the double-height mode is in use.
[DEFAULT VALUE]	
[REFERENCE]	**GS ***

1.4.4 FS P n

[Name]	Print NV bit image	
[CODE]	ASCII	**FS P n**
	Hex.	**1C 50 n**
	Decimal	**28 80 n**

[RANGE]

n				**IMPLICATION**
CHARACTER		**HEXADECIMAL**		
0	8	0x00	0x08	No.00 bitmap is selected to print
1	9	0x01	0x08	No.01 bitmap is selected to print
2	A	0x02	0x0A	No.02 bitmap is selected to print
3	B	0x03	0x0B	No.03 bitmap is selected to print
4	C	0x04	0x0C	No.04 bitmap is selected to print
5	D	0x05	0x0D	No.05 bitmap is selected to print
6	E	0x06	0x0E	No.06 bitmap is selected to print
7	F	0x07	0x0F	No.07 bitmap is selected to print

[DESCRIPTION]	This command is used to print the binary bitmaps pre-saved in the nonvolatile memory of the printer. The binary bitmaps in the nonvolatile memory can be generated and read by professional software from PC. The maximum height of the bitmap should be no more than 200 dots and the product of height times width cannot exceed 4000. n is the bitmap no. 8 binary bitmaps can be uploaded in all.
[ATTENTION]	● This command is ineffective when a certain number of bitmap is not defined. ● Binary bitmaps only. ● Unknown results may occur if ***n*** exceeds the range. ● This command is not impacted by printing mode(bold, overstriking, underline, font size and reverse printing). ● Please reset the printer after uploading pre-saved image to prevent unknown error.
[DEFAULT VALUE]	
[REFERENCE]	GS / *n*

1.5 Bar code printing command

1.5.1 GS h *n*

[Name]	Set bar code height	
[CODE]	ASCII	**GS h *n***
	Hex.	**0x1D 0x68 *n***
	Decimal	**29 104 *n***
[RANGE]	12≤ ***n*** ≤160	
[DESCRIPTION]	Set the height of barcode. Set the vertical dots with ***n.*** Each dot pitch is 0.125mm.	
[ATTENTION]	● If ***n*** <12, the height of barcode is set as ***n*** =12。 ● If ***n*** >160, the height of barcode is set as ***n*** =160。	
[DEFAULT VALUE]	***n*** = 36	
[REFERENCE]	**GS k**	

1.5.2 GS w *n*

[Name]	Set bar code horizontal size			
[CODE]	ASCII	**GS w *n***		
	Hex.	**0x1D 0x77 *n***		
	Decimal	**29 119 *n***		
[RANGE]	1≤ ***n*** ≤ 4			
[DESCRIPTION]	Set the horizontal size of barcode. ***n*** indicates as follows：			

n	**UNIT WIDTH OF MULTILEVEL BARCODE（mm）**	**WIDTH OF BINARY BARCODE**	
		NARROW LINE WIDTH	**WIDE LINE WIDTH**
1	0.125	0.125	0.25
2	0.25	0.25	0.50
3	0.375	0.375	0.75
4	0.50	0.50	1.0

These are multilevel barcodes：

UPC-A, UPC-E, EAN13, EAN8, CODE93

These are binary barcodes：

CODE39,CODABAR,ITF

[ATTENTION]	
[DEFAULT VALUE]	***n*** = 2
[REFERENCE]	**GS k**

1.5.3 GS H *n*

[Name]	Select HRI character print position	
[CODE]	ASCII	**GS H *n***
	Hex.	**0x1D 0x48 *n***
	Decimal	**29 72 *n***
[RANGE]	0≤ ***n*** ≤ 2	

[DESCRIPTION]	Select the printing position of the readable character when printing the barcode. The printing position selected by setting ***n***:

n		**POSITION OF READABLE CHARACTERS**
CHARACTER	**HEXADECIMAL**	
0	0x00	Non print
1	0x01	Above barcode
2	0x02	Beneath barcode
'0'	0x30	Non print
'1'	0x31	Above barcode
'2'	0x32	Beneath barcode

[ATTENTION]	● Print the readable characters in the font **GS f** has designated. ● The readable characters of barcode are not impacted by printing mode (overstriking, underline, font size and reverse printing).
[DEFAULT VALUE]	***n*** = 0
[REFERENCE]	**GS f**, **GS k**

1.5.4 GS f *n*

[Name]	Select HRI character font	
[CODE]	ASCII	**GS f *n***
	Hex.	**0x1D 0x66 *n***
	Decimal	**29 102 *n***
[RANGE]	0≤ ***n*** ≤ 1	
[DESCRIPTION]	Select font of the readable characters when printing barcode. Alternatives and implications of ***n***:	

n		**POSITION OF READABLE CHARACTERS**
CHARACTER	**HEXADECIMAL**	
0	0x00	Font A (12×24)
1	0x01	Font B (8×16)
'0'	0x30	Font A (12×24)
'1'	0x31	Font B (8×16)

[ATTENTION]	● Print the readable characters of barcode at the position **GS H** has set. ● The readable characters of barcode are not impacted by printing mode (overstriking, underline, font size and reverse printing).
[DEFAULT VALUE]	***n*** = 0x00 （0x30）
[REFERENCE]	**GS H** **GS k**

1.5.5 GS k *m* …

[Name]	Print bar code	
[CODE]	ASCII	**GS k *m d1*…d*k* NULL**
	Hex.	**0x1D 0x6B *m d1*…d*k* 00(FF)**
	Decimal	**29 107 *m d1*…d*k* 0(255)**
[CODE 2]	65 ≤ ***m*** ≤ 73	

<table>
<tr><td>[CODE]</td><td>ASCII</td><td colspan="4">GS k m nL d1…dn</td></tr>
<tr><td></td><td>Hex.</td><td colspan="4">0x1D 0x6B m nL d1…dn</td></tr>
<tr><td></td><td>Decimal</td><td colspan="4">29 107 m nL d1…dn</td></tr>
<tr><td>[RANGE]</td><td colspan="5">0 （0x80）≤ m ≤ 8 (Data length(k) and data contents(d) are determined by the barcode system being used.)
65 ≤ m ≤ 73 (Data length(nL) and data contents(d) are determined by the barcode system being used.)
1≤ nL ≤255 nL is the data length of the printing barcode.</td></tr>
<tr><td>[DESCRIPTION]</td><td colspan="5">Select a barcode system and print. Parity-check code calculates automatically.
M defines the barcode system as follows：
<table>
<tr><th>m</th><th>BARCODE TYPE</th><th>BARCODE LENGTH(k)</th><th>CHARACTER SET RANGE（d） DECIMAL</th></tr>
<tr><td>0</td><td>UPCA</td><td>11≤k≤12</td><td>48≤d≤57</td></tr>
<tr><td>1</td><td>UPC-E</td><td>7≤k≤8</td><td>48≤d≤57</td></tr>
<tr><td>2</td><td>EAN8</td><td>7≤k≤8</td><td>48≤d≤57</td></tr>
<tr><td>3</td><td>EAN13</td><td>12≤k≤13</td><td>48≤d≤57</td></tr>
<tr><td>4</td><td>CODE39</td><td>1≤k</td><td>48≤d≤57,65≤d≤90,
d= 32，36，37，43，45，46，47</td></tr>
<tr><td>5</td><td>INTERLEAVED 25(ITF)</td><td>1≤k(odd number)</td><td>48≤d≤57</td></tr>
<tr><td>6</td><td>CODABAR</td><td>1≤k</td><td>48≤d≤57，65≤d≤68,
d= 36， 43，45，46，47，58</td></tr>
<tr><td>7</td><td>CODE93</td><td>1≤k</td><td>48≤d≤57，65≤d≤90,
d= 32，36，37， 43，45，46，47</td></tr>
<tr><td>8</td><td>CODE128</td><td>2≤k≤232</td><td>0≤d≤127</td></tr>
</table>
<table>
<tr><th>m</th><th>BARCODE TYPE</th><th>BARCODE DATA LENGTH(k)</th><th>CHARACTER SET RANGE（d） DECIMAL</th></tr>
<tr><td>65</td><td>UPC-A</td><td>11≤k≤12</td><td>48≤d≤57</td></tr>
<tr><td>66</td><td>UPC-E</td><td>7≤k≤8</td><td>48≤d≤57</td></tr>
<tr><td>67</td><td>EAN8</td><td>7≤k≤8</td><td>48≤d≤57</td></tr>
<tr><td>68</td><td>EAN13</td><td>12≤k≤13</td><td>48≤d≤57</td></tr>
<tr><td>69</td><td>CODE39</td><td>1≤k≤255</td><td>48≤d≤57,65≤d≤90,
d= 32，36，37，43，45，46，47</td></tr>
<tr><td>70</td><td>INTERLEAVED 25(ITF)</td><td>1≤k≤255 (odd number)</td><td>48≤d≤57</td></tr>
<tr><td>71</td><td>CODABAR</td><td>1≤k≤255</td><td>48≤d≤57，65≤d≤68,
d= 36， 43，45，46，47，58</td></tr>
<tr><td>72</td><td>CODE93</td><td>1≤k≤255</td><td>0≤d≤127</td></tr>
<tr><td>73</td><td>CODE128</td><td>2≤k≤232</td><td>0≤d≤127</td></tr>
</table>
</td></tr>
<tr><td>[ATTENTION]</td><td colspan="5">● When format 1 command is in use, if the data length is specified by barcode type, the subscript of dk, k（the data length of barcode the printer has received）should be the specified data length. If it does not equal to the specified data length, this command becomes ineffective. Please refer to barcode standards for specified data bit length of different types of barcode.</td></tr>
</table>

	● The barcode characters the printer receives should be contained in the character set the barcode type has specified. If any character cannot be found in the character set, this command becomes ineffective. Please refer to barcode standards for specified barcode character set of different types of barcode. ● When format 2 command is in use，***n***L的value should be equal to the data length of the barcode, if the data bit length is specified by this type of barcode. If ***n*** does not equal to the specified data length, this command becomes ineffective. Please refer to barcode standards for specified data bit length of different types of barcode. ● When the data length of INTERLEAVED 25(ITF) barcode is odd number，the printer calculates the parity-check code automatically and complement it to even number. If format 1 is in use to print ITF barcode，***k***（the barcode data length the printer has received）value should be odd number. If format 2 is in use to print ITF barcode, ***n*** value should be odd number. ● If the horizontal size exceeds the printing area, the part exceeded shall be ignored. ● This command is not impacted by printing mode(bold, overstriking, underline, font size and reverse printing). ● Barcode coding rule should be followed when printing barcodes, otherwise barcode scanning is unable. ● When printing the readable characters, the invisible characters of CODE93 & CODE128 cannot be printed. They are substituted by'□'. ● CODE39 does not contain extended CODE39 （EXTERN CODE 39）. Please remember to add '*' at both the beginning and the end of the printed content. ● CODE93 does not contain extended CODE93 （EXTERN CODE 93）. ● CODE128 barcode selects characters automatically (CODE A, CODE B, 或CODE C) and print the type of barcode according to the requirement, usually CODE A. ● If m is not meant to be 0x00，it can be set as 0x80. The result is the same with m=0x00.
[DEFAULT VALUE]	
[REFERENCE]	

1.5.6 GS Z *n*

[Name]	Select the 2D bar code	
[CODE]	ASCII	**GS Z *n***
	Hex.	**0x1D 0x5A *n***
	Decimal	**29 90 *n***
[RANGE]	***n***=0: Select PDF417(default) binary barcode. ***n***=1: Select DataMatrix binary barcode. ***n***=2: Select QR-CODE binary barcode.	
[DEFAULT VALUE]	***n***=0 (PDF417)	
[REFERENCE]	**GS Z *m n k sl sh d1…dn***	

1.5.7 ESC Z *m n k sL sH d1…dn*

[Name]	Print the 2D bar code

[CODE]	ASCII	**ESC Z *m n k sL sH d1…dn***
	Hex.	**0x1B 0x5A *m n k sL sH d1…dn***
	Decimal	**27 90 *m n k sL sH d1…dn***

[DESCRIPTION]

PDF417 CODE：

1．***m*** is the column number，manifesting how many code bits in each line. One code word i

17*w dots.

w is the value the barcode width command **GS w *n*** sets.

The line number is generated by the printer automatically, ranging from 3 ~ 90.

1≤ ***m*** ≤30

2．***n*** is the level of error correction(ECC).

n	**CORRECTED CODE NUMBER**	**STORABLE DATA VOLUMN(BYTES)**
0	2	1108
1	4	1106
2	8	1101
3	16	1092
4	32	1072
5	64	1024
6	128	957
7	256	804
8	512	496

SUGGESTED ERROR CORRECTION LEVEL

BYTES	**CORRECTION LEVEL(*k*)**
1 ~ 40	2
41 ~ 160	3
161 ~ 320	4
321 ~ 863	5

0≤ ***n*** ≤8

3． ***K*** is length-width ratio.

3≤ ***n*** ≤4

4． ***sL***，***sH*** is the specified data length. ***sL*** is low-order byte，***sH*** is upper byte.

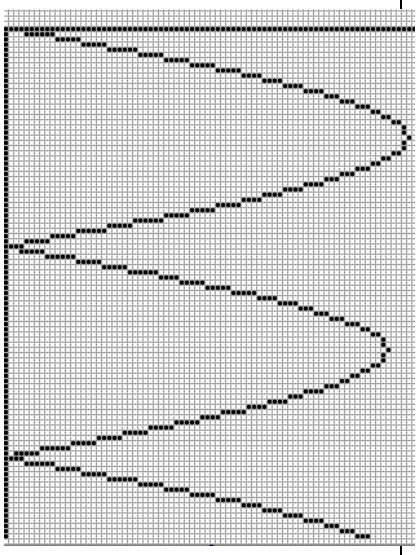
The data length is ***sL***+***sH****256.

<table>
<tr><td></td><td></td></tr>
<tr><td></td><td>QRCode TYPE：</td></tr>
<tr><td></td><td>1．m specifies the character version.
0≤m≤40
Attention：1.If m = 0,the character version will be calculated automatically according to the data length.
2.The maximum character version number is 20 due to limitation of the width of printing paper.
2．n specifies the ECC error correction level.
<table>
<tr><th>n</th><th>CORRECTION LEVEL</th></tr>
<tr><td>1</td><td>L：7%，low level, large amount of data</td></tr>
<tr><td>2</td><td>M：15%，middle level</td></tr>
<tr><td>3</td><td>Q：25%，optimized correction</td></tr>
<tr><td>4</td><td>H：30%，top level，small amount of data</td></tr>
</table>
3．k undefined.
4． sL，sH is the specified data length. sL is low-order byte. sH is upper byte.
The data length is sL+sH*256.</td></tr>
<tr><td></td><td>DataMatrix type：</td></tr>
<tr><td></td><td>1．m undefined.
2．n undefined.
3．k undefined.
4．sL，sH is the specified data length. sL is low-order byte. sH is upper byte.
The data length is sL+sH*256.</td></tr>
<tr><td>[ATTENTION]</td><td>●Please set the printable character according to the printable area of the printer due to limitation of the width of printing paper.
●The maximum height of the printable barcode is 270 dots*0.125(33.75mm).
●Please refer to the relevant standards for details of binary barcode coding standards.
●GS w n can set the width of barcode.</td></tr>
<tr><td>[REFERENCE]</td><td>GS w n
GS Z n</td></tr>
</table>

1.6 Curve the print command

1.6.1 GS ‘ *n x1sL x1sH x1eL x1eH… xnsL xnsH xneL xneH*

[Name]	Print curve	
[CODE]	ASCII	**GS ‘ *n x1sL x1sH x1eL x1eH … xnsL xnsH xneL xneH***
	Hex.	**0x1D 0x27 *n x1sL x1sH x1eL x1eH … xnsL xnsH xneL xneH***
	Decimal	**29 39 *n x1sL x1sH x1eL x1eH … xnsL xnsH xneL xneH***
[RANGE]	0 ≤ ***n*** ≤ 8	
[DESCRIPTION]	As is shown in the enlarged drawing below, each curve consists of several horizontal segments(a dot can be regarded as a segment with the length of 1).This command is used to print n segments of a horizontal line. The curve segment needed by the user can be produced	

	by continuous use of this command. ***n*** number of segments； ***xksL*** The lower position of the horizontal axis of the starting point of Segment k； ***xksH*** The higher position of the horizontal axis of the starting point of Segment k； ***xkeL*** The lower position of the horizontal axis of the ending point of Segment k； ***xkeH*** The higher position of the horizontal axis of the ending point of Segment k； The coordinate position counts from the left end of the printing area. The minimum value is 0. The maximum value is 383，i.e. the maximum of ***xkeL***+***xkeH****256 is 383. It is not necessary to put segment data in sequence. 
[ATTENTION]	● When printing a dot，***xkeL*** = ***xksL***, ***xkeH*** = ***xksH***.
[REFERENCE]	**G S “**

1.6.2 GS “

[Name]	Print character on the curve	
[CODE]	ASCII	**GS “ *n xL xH c1 c2* … NULL**
	Hex.	**0x1D 0x22 *n xL xH c1 c2* … 0x00**
	Decimal	**29 34 *n xL xH c1 c2* … 0**
[RANGE]	$0 \le n \le 1$	
[DESCRIPTION]	This command is used to print the characters on the curve in current font. Characters are automatically 90°rotated by this command when printing(character string rotates clockwise).	
	n is character number.	
	xL xH is the higher and lower position of the horizontal axis of the character.	
	***c1 c2* … NULL** is the character string that ends with 0.	
[ATTENTION]	● This command is only effective between two **ESC ‘** commands.	
	● The printer start printing 90°rotated characters in current line right after it receives this command.	
	● When there have been characters in current horizontal dotted line，it needs to set other values as character numbers to print other characters, but only limit to 0 and 1.	
	● There can be at most 2 characters in one horizontal dotted line. ● It needs enough number of horizontal dots or segments beneath the horizontal line to print complete characters.	
[REFERENCE]	**GS ‘**	

1.7 Language Control Commands

1.7.1 FS &

[Name]	Specify Chinese character mode	
[CODE]	ASCII	**FS &**
	Hex.	**0x1C 0x26**
	Decimal	**28 38**
[DESCRIPTION]	Select Chinese character mode.	
[ATTENTION]	Chinese character mode is selected when the power switch of printer is on.	
[REFERENCE]	**FS .**	

1.7.2 FS .

[Name]	Cancel Chinese character mode	
[CODE]	ASCII	**FS .**
	Hex.	**0x1C 0x2E**
	Decimal	**28 46**
[RANGE]		
[DESCRIPTION]	Unlock Chinese character mode. When Chinese character mode is unlocked, the code exceeding 0x80 is still processed as ASCII characters. No Chinese characters will be printed, unless select Chinese character mode again with command **FS &.**	
[ATTENTION]	● Command ESC @ will make the printer select Chinese character mode after the equipment is rest.	
[DEFAULT VALUE]		
[REFERENCE]	**FS &**	

1.7.3 FS U *nL nH*

[Name]	Print Unicode code character	
[CODE]	ASCII	**FS U *nL nH***
	Hex.	**0x1C 0x55 *nL nH***
	Decimal	**28 85 *nL nH***
[RANGE]		
[DESCRIPTION]	Print ***n*** (***n*** =***nL*** + ***nH****256) Unicode characters.	
[ATTENTION]	● Unicode is double-byte code. The 2***n** (***n*** = ***nL*** + ***nH****256) bytes after this command is processed as Unicode characters. ● This command only supports the Chinese characters contained in GBK font, not all Chinese characters contained in Unicode. ● This command is not impacted by Chinese commands. ● This command can be embedded with other commands like **ESC** / **GS** / **FS**，but in Unicode. ● Please refer to 'Chinese ISN Extension Standard' made by the Technical Committee of Information Technology Standardization for details of GBK. ● Please check the official website of Unicode http://www.unicode.org for the details of Unicode.	
[DEFAULT VALUE]		

1.7.4 ESC t n

[Name]	Select character code page	
[CODE]	ASCII	**ESC t n**
	Hex.	0x1B 0x74 *n*
	Decimal	27 116 *n*
[RANGE]	0 ≤ n ≤ 50 , n = 252，253，254，255	

[DESCRIPTION] Selects a code page n from the character code table as follows.

n	Character Type	Remark (size)
0	Page 0 USA, Standard Europe [CP437]	
1	Page 1 Katakana	
2	Page 2 Multilingual(Latin-1) [CP850]	
3	Page 3Portuguese [CP860]	
4	Page 4 Canadian-French [CP863]	
5	Page 5 Nordic [CP865]	
6	Page 6 Slavic(Latin-2) [CP852]	
7	Page 7 Turkish [CP857]	
8	Page 8 Greek [CP737]	
9	Page 9 Russian(Cyrillic) [CP866]	
10	Page 10 Hebrew [CP862]	
11	Page 11 Baltic [CP775]	
12	Page 12 Polish	
13	Page 13 Latin-9 [ISO8859-15]	
14	Page 14 Latin1[Win1252]	
15	Page 15 Multilingual Latin I + Euro[CP858]	
16	Page 16 Russian(Cyrillic)[CP855]	
17	Page 17 Russian(Cyrillic)[Win1251]	
18	Page 18 Central Europe[Win1250]	
19	Page 19 Greek[Win1253]	
20	Page 20 Turkish[Win1254]	
21	Page 21 Hebrew[Win1255]	
22	Page 22 Vietnam[Win1258]	
23	Page 23 Baltic[Win1257]	
24	Page 24 Azerbaijani	
25-29	Reserved	
30	Thai[CP874]	
31-39	Reserved	
40	Page 25 Arabic [CP720]	
41	Page 26 Arabic [Win 1256]	
42	Page 27 Arabic (Farsi)	
43	Page 28 Arabic presentation forms B	
44-49	Reserved	
50	Page 29 Hindi_Devanagari	
252	Page 30 Japanese [CP932]	
253	Page 31 Korean [CP949]	
254	Page 32 Traditional Chinese [CP950]	
255	Page 33 Simplified Chinese [CP936]	

[ATTENTION]	1) Character code table can be different by printer version.

	2) Reference : http://msdn.microsoft.com/en-us/goglobal/bb964653.aspx http://en.wikipedia.org/wiki/Code_page
[DEFAULT VALUE]	n=255 Simplified Chinese

1.7.5 ESC R n

[Name]	Select an international character set.	
[CODE]	ASCII	ESC R n
	Hex.	**0x1B 0x52 *n***
	Decimal	**27 82 *n***
[RANGE]	0 ≤ n ≤ 13	
[DESCRIPTION]	Selects an international character set n from the following table.	

n	Country	0x2	0x2	0x4	0x5	0x5	0x5	0x5	0x6	0x7	0x7	0x7	0x7E
0	America	#	$	@	[	\	]	^	`	{	|	}	~
1	France	#	$	à	°	ç	§	^	`	é	ù	è	¨
2	Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3	UK	£	$	@	[	\	]	^	`	{	|	}	~
4	Denmark I	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain I	₧	$	@	¡	Ñ	¿	^	´	¨	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	`	{	|	}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Denmark II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
11	Spain II	#	$	á	¡	Ñ	¿	é	´	í	ñ	ó	ú
12	Latin Amer	#	$	@	¡	Ñ	¿	é	ü	í	ñ	ó	ú
13	Korea	#	$	@	[	₩	]	^	`	{	|	}	~

[[ATTENTION]]	
[DEFAULT VALUE]	**n=0**

1.7.6 US f

[Name]	In frame mode data transmission	
[CODE]	ASCII	**US f id nL nH crc16L crc16H d1…dn**
	Hex.	**1F 66 id nL nH crc16L crc16H d1…dn**
	Decimal	**31 102 id nL nH crc16L crc16H d1…dn**
[RANGE]	0≤ id ≤255 ； 0≤ nL ≤ 255 ； 0 ≤ nH ≤ 255	
[DESCRIPTION]	Transmit data in frames. id: ID of frame, 1 byte nL：Low-order byte of data length，1 byte. nH：Upper byte of data length, 1 byte. Data length equals to nL+nH*251. crc16L: Low-order byte checked by CRC16，1 byte. crc16H: Upper byte checked by CRC16，1 byte.	

	d1…dn：Frame data，n bytes. n=nL+nH*256
[ATTENTION]	● A frame data supports at most 4096 bytes. ● If nL+nH*256 in this command is bigger than 4096，this frame command is regarded as invalid frame. The data will be processed as normal ESC data afterwards. ● This frame is invalid if CRC16 error occurs. ● Frame data can contain other ESC commands，but US f.
[DEFAULT VALUE]	
[REFERENCE]	US q

1.7.7 US q

[Name]	Frame status query	
[CODE]	ASCII	US q id
	Hex.	**1F 71 id**
	Decimal	**1F 71 id**
[RANGE]		
[DESCRIPTION]	This command turns back to the id status of last specified frame by US f, in the format: 1F 71 id 03 fs ps0 ps1. Fixing data 03 indicates the parameter of 3-byte return, 1 byte. fs：frame status,1 byte, shown as below：	

Fs value	IMPLICATION
00	FRAME_RESET
01	FRAME_DATA_OK
02	FRAME_DATA_ERROR
03	FRAME_PRINT_ERROR
04	FRAME_PRINTING
05	FRAME_PRINT_OK

ps0：Low-position of the printer，1 byte，upper-position is in the front.

ps1：Upper-position of the printer, 1 byte，upper-position is in the front.

BYTE	Bit	IMPLICATION	VALUE	REMARKS
ps0	0	Paper bin status	1:Paper out;0:Paper loaded	
	1	Temperature of print head	1:Overheated;0:Normal	Temperature higher than 90℃
	2	Battery voltage	1:Low battery;0:Normal	
	3	Printing status	1:Busy;0:Idle	
	4	Cover status	1:Open;0:Closed	
	5	-	1	
	6-7	Hold		
ps1	0-7	Hold		

[ATTENTION]	● This command is non-real-time command. Correlated status is regained only after it processes the frame data. ● It needs delayed time waiting for the processing command to check frame status after

	US f is given. The processing time depends on the content and length of the frame data.
[DEFAULT VALUE]	
[REFERENCE]	US f

1.8 Especial command

1.8.1 US sBrP

[Name]	Read the Bluetooth password	
[CODE]	ASCII	**US sBrP**
	Hex.	**0x1F 0x73 0x42 0x72 0x50**
	Decimal	**31 115 66 114 80**
[RANGE]		
[DESCRIPTION]	This command is used to read the pin code set by the equipment with Bluetooth. The feedback characters are 1F 73 42 72 50 k after the printer receives the command. N1…Nk,k is the digit of the password，N1…NK is the password data The implication of each digit is：	
[ATTENTION]	● The printer beeps when successfully reads the password of Bluetooth.	
[DEFAULT VALUE]		
[REFERENCE]	**US sBsP**	

1.8.2 US sBsP k n1…nk

[Name]	Set the Bluetooth password	
[CODE]	ASCII	**US sBsP k n1…nk**
	Hex.	**0x1F 0x73 0x42 0x73 0x50 k n1…nk**
	Decimal	**31 115 66 114 80 k n1…nk**
[RANGE]	1≤k≤7	
[DESCRIPTION]	To set the Bluetooth password, the password cannot be null. The maximum password is 7 digits. n1...nk can consist of number of 0-9, both capital letters and lower case letters and "!" "@" "#" "$" "%" "^" "&" "*". The printer beeps and the bluetooth restarts (so it can be used as the command for unlocking the bluetooth) after the password is successfully set.	
[ATTENTION]	● Re-connection of matching is needed after the password is successfully set.	
[DEFAULT VALUE]		
[REFERENCE]	**US sBrP**	