RD-V32

Embedded thermal printers specification of Development

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目录

Chapter 1: Overview

1.1 characteristics

1.Equip with imported original printer core, high printing speed , and print clearly
2.Have the black label location, lack of paper detection, and overheating detection, etc
3.moderate weight and small appearance
4.Be suitable for mobile bill printing
5.Have multiple instructions, and can print one-dimensional bar code, two-dimensional bar code, graphics and curve
6.Complete character set library, GBK character library, can meet the print of all rarely used word and symbols
7.Standard serial interface (RS232), dealer options: USB and Bluetooth interface
8.Intelligent province electricity, print mode and standby mode can automatically switch

1.2 performance index

Printing performance	printing method	thermal line printing
	Printing speed	50mm/s（MAX）
	Working time	When the density of the print is 12.5%， it can print 30～100m
	Resolution ration	203dpi(8dots per millimeter),576dots per line
	Effective print width	48mm
	Paper feed step	0.125mm
	Foreign language characters	1.support standard ASCII characters (96): 5×7， 2.Support extended ASCII characters (352): 6×8， 3.support standard ASCII characters (224): 12×24， 4.support standard ASCII characters (224): 8×16
	Chinese characters	Equip with the GBK font of 24×24 and 16×16, which contains a total of more than 21000 Chinese characters， and supports the rare Chinese characters printing
	graphics	Support different density point figure and bitmap download
	bar code	Support one-dimensional bar code (such as: UPC-A、UPC-E、EAN-13、EAN-8、CODE39、ITF25、CODABAR、CODE93、CODE128 etc.) and two-dimensional bar code (such as: QRCODE etc.) printing
Detection function	Anomaly detection	1.lack of paper detection: yes 2.electricity shortage detection: yes 3.overheating detection: yes

		After detecting abnormal, the buzzer can alarm	
	Black label location	yes	
	Auto sleep function	yes	
Interface parameters	Wired Interface	RD-V32-SN	Standard serial interface (RS232)
		RD-V32-BL	Bluetooth interface
		RD-V32-USB	USB interface
	Wireless interface	Bluetooth interface	
control system	buffer	8K～20K	
	instruction system	print command: ESC/POS (Compatible with IBM/EPSON and ESC/P)	
	Print drivers	WIN2000/NT/XP/WIN7	
power supply	power supply mode	lithium battery: rechargeable, 700mAh 、7.4V, the number of charging (discharge)>500	
	Charge methods	Standby charge, charging time is approximately 3 hours	
reliability	print head life	50km	
Printing paper	Paper type	Ordinary thermal Paper (width: 80±0.5mm，ø≤33mm)	
	paper loading way	Clam shell 、easy paper loading	
	Cut type	tearing paper manually	
Physical characteristics	Operating environment	Temperature: 0～50℃ Humidity: 20～80%(RH)	
	Storage temperature / humidity	Temperature: -20～60℃ Humidity: 10～90%(RH)	
	bare machine weight	approximately 220g（Contain batteries, excluding printing paper）	

1.3 scope of application

◇The mobile police system
◇Tobacco distribution system
◇Utility meter reading system
◇Mobile office system / mobile logistics system
◇FOR a corollary equipment of the portable instrument/detection equipment

Chapter 2: Printer's status and operating instructions

2.1 Printer Status Description

1. When the printer is turned on, the buzzer will sound 3 beeps to alert the boot;
2. When the charging adapter is connected to the printer, the printer's buzzer will issue a short musical sound;
3. When the printer does not receive data, the printer automatically sleep, and wake up automatically after receiving the data.
4. In the boot state, if the printer does not print data within 10 minutes, the printer automatically shut down.

Specific state is as follows:

power-up / state	battery	
	Indicator	Buzzer
Stand by	The green (blue) indicator on the right flashes	--
Print status	The green (blue) indicator on the right brighten for long	--
Lack of paper status	The red indicator on the right flashes	2 beeps /2s
Lack of electricity	The red indicator on the right flashes	1 beep /2s
Charging	The red indicator on the left brighten for long	--
Charging complete	The green (blue) indicator on the left brighten for long	--

Note: a buzzer hint at most three times and after three times it no longer prompts.

2.2 Boot method

The P key is the power button. Hold down the key and after hearing the tone the printer switched on, and then press this button again, the printer shuts down. When the printer does not print data in the 10 minutes, the printer will automatically shut down (the time can be adjusted according to customer's requirements), when used, the printer must be re-boot to print.

2.3 Loading the roll paper

Step 1: Open the paper storehouse door

Step 2: Directly put the thermal roll paper into the paper store house in the proper direction and the smooth side down

Step 3: Place the paper to the extent that it can be exposed from the printer and close the paper storehouse

cover and press the paper's exposed end.
The F key is the FEED button. In the boot state, hold down the F key, printer starts feeding paper, and loosen the F key, the printer stops feeding paper.

2.4 Self-test

In the shutdown state, hold down the F key, then press the P key for about three seconds, and then loosen the button and the printer starts the self-test printing (print out the model of the printer, communication methods, manufacturers and other information).

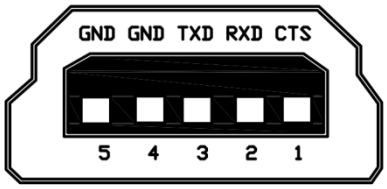
2.5 Charging

Whether the printer is in the boot or shutdown state, the printer automatically enters the charging mode as long as charging adapter is inserted.

Chapter 3: Interface

3.1 serial interface

Data transfer: Serial
Synchronization way: Asynchronous
Interface level: RS232 level
Baud Rate: 9600
Data Length: 8Bit
Parity: None
Handshake way: CTS
Interface: MINI_USB socket



Printer's data buffer is 8K bytes. When the data which is sent is less than 8K byte, don't use the 'flow control' way, the specific function of the pin is in the following table:

DB-9 hole socket **(Pin No.)**	**Signal name**	**signal source**	**direction**	**Illustration**
3	TXD	mainframe	Import(in)	The printer receives the data from the main computer. (TRANSMIT DATA)
2	RXD	printer	Export(out)	When using the 'X-ON/X-OFF' Handshake Protocol，the printer sends control code 'X-ON/X-OFF' to the computer. (RECEIVE DATA)

1	CTS	printer	Export(out)	When the signal is in a state of 'MARK', it means that the printer is busy and can't receive data. But when the signal is in a state of 'SPACE', it means that the printer is ready to receive data.
4	GND	——	——	Signal ground
5	GND	——	——	Signal ground

Programming operation of the printer with RS232 interface is as follows:

Connect the printer interface-- Printer is turned on—Initialize the PC serial port—Send the data

Specific steps:

1) Connect the printer's serial interface with the host's serial interface, pay attention to the serial port level, should RS232 level.

2) Determine the paper has been installed, press the P key, turn on the printer.

3) Open the PC serial port, communication speed and communication mode is set to the same printer. Normal for 9600,8, N, if they cannot determine the specific parameters of communication by self-detect the printer on self-test strips communication parameters are detailed instructions, click here parameter settings.

Chapter 3: Command system

3.1 Command list

RD-DH32 Series thermal printers use the ESC / POS compatible command, and add to some functions such as the Chinese characters printing, Character and Chinese characters rotation, and word spacing adjustment.

Command	Function
ESC c	To allow/ban reverse printing
HT	To execute horizontal tab
LF	To print and line feed
CR	To print and carriage return
ESC SP	To set the character spacing
ESC !	To select printing modes for characters
ESC $	To set printing absolute position
ESC ‘	To print curve
ESC i	To cut the paper (only for printers with cutter)

ESC v	Send the printer's status to the host
FS &	Select the Kanji mode
FS .	Cancel the Kanji mode
ESC +	To allow/ban the overline printing
ESC –	To allow/ban the underline printing (to set/clear the underline mode)
ESC 1	To set the line spacing
ESC 6	To select Character Set 1 （6X8）
ESC 7	To select Character Set 2 （6X8）
ESC a	Select alignment methods
GS v	Print raster bit image
ESC @	To initialize the printer
ESC D	To set the position of horizontal tab
GS k	To print the bar code
ESC J	To print and feed paper
ESC d	To print and feed paper n lines
ESC K	Printing graphics command ①
ESC *	Printing graphics command ②
ESC Q	To set the right margin width
ESC U	Horizontally magnify character
ESC V	Vertically magnify character
GS H	Select the printing position for bar code character
GS F	Select mode
GS Q	Set horizontal printing position for the bar code
GS k	Print the bar code(s)
ESC X	Magnify characters
GS h	Select bar code's height
GS w	Select bar code's width
GS B	To allow/ban white reverse printing mode
ESC l	To set the printing position
ESC r d n	To adjust the depth of thermal printing

FS 2	To set character rotation Printing
FS r	To select the superscript and subscript

This chapter describes the commands of controlling the printer to print. Format specification is as follows:

【COMMAND】+【*parameter*】

1) 【COMMAND】 is the command, and consists of the escape character and command characters. But a small number of single-byte commands don't have the escape character.
2) 【*parameter*】 is the parameter, which is in italics. And the parameters are not numeric characters, but the value of the character.

All the examples in this chapter are compiled in C language. The 'SendDataToPrinter' function is virtual function. And require developers to write according to the actual situation of the mainframe.

This function is defined as follows:

SendDataToPrinter(unsigned char *buffer, unsigned int len)
Illustration: send the data to the printer

Unsigned char *buf // Print data command

Unsigned int len // Data length. Unit: byte.

3.2 Command Details

ESC @

[Name] To initialize the printer

[Type] ASCII: ESC @
Decimal: 27 64
Hex: 1B 40

[Explanation] Clear the data in the print buffer, and reset the printing parameters to the current printer default parameters.

[Note]

•The data in the receive buffer is not cleared.

[Example] unsigned char str[2];

```
str[0] = 0x1B;
str[1] = 0x40;
SendDataToPrinter(str,2);
```

LF

[Name] print and feed line

[Type] ASCII: LF
Decimal: 10

Hex: 0A

[Explanation] Print the data in the print buffer and feed one line

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

[Example] unsigned char str[2];
str[0] = 0x0A;//或str[0] = '\n'
SendDataToPrinter(str,1);

CR

[Name] print and carriage return

[Type] ASCII: CR
Decimal: 13
Hex: 0D

[Explanation] Print the data in the print buffer and carriage return

[Reference] LF

[Example] unsigned char str[2];
str[0] = 0x0D;//或str[0] = '\r'
SendDataToPrinter(str,1);

ESC J

[Name] print and feed paper

[Type]

ASCII:	ESC	J	n
Decimal:	27	74	n
Hex:	1B	4A	n

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

[Comment]

- After printing is finished, the command sets the print starting position to the beginning of the line.

[Scope] 0 ≤ *n* ≤ 255

[Example] unsigned char str[3];
str[0] = 0x1B;
str[1] = 0x4A;
str[2] = 0x4;
SendDataToPrinter(str,3);// feeds forward paper 0.5mm

ESC d n

[Name] print and feed paper n lines

[Type]

ASCII:	ESC	d	n
Decimal:	27	100	n
Hex:	1B	64	n

[Scope] 0 ≤n ≤ 255

[Explanation] Print the data in the print buffer and feed paper n lines

[Comment]

- After finishing the printing, this command sets the print starting position to the beginning of the line.
- One line distance is 24 vertical pitch (0.125mm)

[Example] unsigned char str[3];

str[0] = 0x1B;

str[1] = 0x64;

str[2] = 0x4;

SendDataToPrinter(str,3);// feed forward paper 4 lines

ESC c

[Name] To allow/ban reverse printing

[Type] ASCII: ESC C n

Decimal: 27 99 n

Hex: 1B 63 n

[Scope] 0 ≤ *n* ≤ 1

[Explanation]

When n=1, allow the reverse printing and the printing direction is from left to right.

When n=0, ban the reverse printing and the printing direction is from right to left.

[Comment]

When the printer is vertically installed, the printer uses the reverse printing way.

Reversely printing not only supports character mode, and also supports graphical mode. When reversely printing graphics, we should note the printing order of graphics unit. (See the ESC K command)

[Example] unsigned char str[3];

str[0] = 0x1B;

str[1] = 0x63;

str[2] = 0x1

SendDataToPrinter(str,3);// reverse printing

HT

[Name] horizontal tab

[Type] ASCII: HT

Decimal: 9

Hex: 09

[Explanation]Move the print position to the next horizontal tab position

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

• Horizontal tab positions are set with the 'ESC D'.

[Reference] ESC D

ESC ! n

[Name] To set printing mode(s) for characters

[Type] ASCII: ESC ! *n*

Decimal: 27 33 n

Hex: 1B 21 n

[Scope] 0 ≤ n ≤ 255

[Explanation]Set the printing mode(s) according to the value of n

bit	0/1	function

0	0	English characters (half-width) font A（12×24）
	1	English characters （half-width） font B (8×16)
1，2,3	——	--
4	0	Cancel the double-height mode
	1	Select the double-height mode
5	0	Cancel the double-width mode
	1	Select the double-width mode
6	——	--
7	0	Cancel the underline mode
	1	Select the underline mode

[Example] unsigned char str[3];

str[0] = 0x1B;

str[1] = 0x21;

str[2] = 0x31;

SendDataToPrinter(str,3);// print the character (8X16) under the double-width and double-height mode

ESC D n1 n2 … nk NULL

[Name] To set the position of horizontal tab

[Type] ASCII： ESC D *n1…nk NULL*

Decimal: 27 68 *n1…nk 0*

Hex: 1B 44 *n1…nk 00*

[Scope] $1 \leqslant n \leqslant 255$ $0 \leqslant k \leqslant 20$

[Explanation] Set the position of horizontal tab

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

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

[Note]

- The horizontal position is stored as a value of [character width × n]measured from the beginning of the line. The character width includes the default width of the characters' spacing.
- This command deletes the previously set level positioning location.
- When n = 8, the printing position is moved to the 9th column by sending HT.
- The command is not affected by the ESC X command.
- This command cancels the previous tabulator position settings.
- The character printing position ,which exceeds the positioning location, will be processed as normal data.
- Transmit [n] k in ascending order and place a NULL code 0 at the end.
- When nk 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 NULL cancels all horizontal tab position.
- Even if the character width changes, previously specified horizontal tab positions don't also change.

[Default]The default tab positions are Font A (12*24).

[Example] unsigned str[8];

```
unsigned char Order = 9;
str[0] = 0x1B;
str[1] = 0x44;
str[2] = 2;// one character spacing from the first column
str[3] = 9;// eight character spacing from the first column
str[4] = 14;// thirteen character spacing from the first column
str[5] = 0; // end
SendDataToPrinter (str,6)
SendDataToPrinter (&Order,1);
SendDataToPrinter ("HT1",3);
SendDataToPrinter (&Order,1);
SendDataToPrinter ("HT2",3);
SendDataToPrinter (&Order,1);
SendDataToPrinter ("HT3",3);
Order = 0x0D;
SendDataToPrinter (&Order,1);
SendDataToPrinter ("1234567890123456\r",17)
```

```
HT1     HT2  HT3
1234567890123456
```

ESC – n

[Name] To select/cancel the underline mode

[Type]

ASCII:	ESC	–	*n*
Decimal:	27	45	*n*
Hex:	1B	2D	*n*

[Explanation] *n* = 1, select the underline mode

n = 0, cancel the underline mode

[Note]

- Underline can't act in the rotation and reverse characters.
- This command only affects the English and Kanji characters.

[Default] *n* = 0.

[Example]

```
unsigned char str[3];

str[0] = 0x1B;

str[1] = 0x2D;

str[2] = 0x1;

SendDataToPrinter (str,3);// set the underline
```

ESC +

[Name] allow/ban the overline printing

[Type] ASCII: ESC + n

Decimal: 27 43 n

Hex: 1B 2B n

[Explanation]When n=1, allow the overline printing

When n=0, ban the overline printing

[Note]

- Overline can't act in the rotation and reverse characters.
- This command only affects the English and Kanji characters.

[Default] $n = 0$

[Example]

```
unsigned char str[3];
str[0] = 0x1B;
str[1] = 0x2B;
str[2] = 0x1;
SendDataToPrinter (str,3);//  set the overline
```

GS B n

[Name] select/cancel white reverse printing mode

[Type] ASCII: GS B n

Decimal: 29 66 n

Hex: 1D 42 n

[Scope] 0 ≤n ≤ 255

[Explanation] select/cancel white reverse printing mode

- When the LSB of n is 0, cancel white/black reverse printing mode.
- When the LSB of n is 1, select white/black reverse printing mode.

[Comment]

- Only the lowest bit of n is valid.
- The command is valid for the built-in and user-defined characters.
- This command only affects the English and Kanji characters.

[Default] n=0

[Example] unsigned char str[3];

```
str[0] = 0x1D;
str[1] = 0x42;
str[2] = 1;// set the white reverse printing mode
SendDataToPrinter(str, 3);
```

FS 2 n

[Name] set character rotation Printing

[Type] ASCII: FS 2 n

Decimal: 28 73 n

Hex: 1C 49 n

[Scope] 0 ≤n ≤3

[Explanation]The command can rotate the character. The value of **n** is as follows:

n (Decimal)	Counterclockwise rotation
0	Does not rotate
1	90 degrees (Counterclockwise rotation)
2	180 degrees (Counterclockwise rotation)
3	270 degrees (Counterclockwise rotation)

[Note] Under the 90 degrees or 270 degrees rotation mode, the character width and height magnification direction is opposite to the magnification direction of the general mode.

[Default] n=0

[Example] unsigned char str[3];

```
str[0] = 0x1C;
str[1] = 0x49;
str[2] = 1;//     set 90 degrees rotation
SendDataToPrinter(str, 3);
```

ESC $ nL nH

[Name] Set absolute print position

[Type] ASCII: ESC $ nL nH

Decimal: 27 36 nL nH

Hex: 1B 24 nL nH

[Scope] 0 ≤ *nL + (nH x 256)* < 384

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

The distance from the beginning of the line to the printing position is N horizontal dot pitch

The nL and nH are the low and high bit of double-byte unsigned integer N .N=nL + nH×256

[Comment]

- Settings outside the specified printable area are ignored.
- In mode 1, n <= 372; In mode 2, n <= 420

[Example] unsigned char str[4];

```
str[0] = 0x1B;
str[1] = 0x24;
str[2] = 32;//
SendDataToPrinter (str, 3); // Set the absolute position to 32 horizontal dot pitch from the left margin
```

ESC l n

[Name] set the left margin

[Type] ASCII: ESC 1 n
Decimal: 27 108 n
Hex: 1B 6C n

[Scope] $0 \leqslant n \leqslant 32$

[Explanation]

The left margin is the number of characters, which isn't printed on the left side of the printing paper. The distance from the beginning of the line to the printing position is the width of n English characters.

[Comment]

- If the printing position is outside the printable area, the command is ignored.
- The width of the character includes the default character width of the character spacing

[Example] unsigned char str[4];

```
str[0] = 0x1B;
str[1] = 0x6C;
str[2] = 3;//
SendDataToPrinter (str, 3); // the left position is set to the width of 3 English characters from the left margin
```

ESC Q n

[Name] set the right margin

[Type] ASCII: ESC Q n
Decimal: 27 81 n
Hex: 1B 51 n

[Scope] $0 \leqslant n \leqslant 32$

[Explanation]The right margin is the number of characters, which isn't printed on the right side of the printing paper.

[Comment]

- If the printing position is outside the printable area, the command is ignored.
- The width of the character includes the default character width of the character spacing

[Example] unsigned char str[4];

```
str[0] = 0x1B;
str[1] = 0x51;
str[2] = 3;//
SendDataToPrinter (str, 3); // set the area of three characters' width to the unprintable area on the right side
```

ESC 1 n

[Name] set the line spacing

[Type] ASCII: ESC 1 n
Decimal: 27 49 n
Hex: 1B 31 n

[Scope] 0 ≤ n ≤ 255 (The default value of '**n**' is 3)

[Default] n=3

[Explanation]Set the line spacing to n vertical dot pitch

[Example] unsigned char str[4];

str[0] = 0x1B;

str[1] = 0x31;

str[2] = 8;

SendDataToPrinter(str,3);// Set the line spacing to 8 vertical dot pitch

ESC SP n

[Name] set the character spacing

[Type] ASCII: ESC SP n

Decimal: 27 32 n

Hex: 1B 20 n

[Scope] 0 ≤ n ≤ 255 (The default value of '**n**' is 0)

[Explanation] Set the character spacing to n horizontal dot pitch

[Example] unsigned char str[4];

str[0] = 0x1B;

str[1] = 0x20;

str[2] = 8;

SendDataToPrinter(str,3);// Set the character spacing to 8 horizontal dot pitch

ESC a n

[Name]Select justification methods

[Type] ASCII: ESC a n

Decimal: 27 97 n

Hex: 1B 61 n

[Scope] 0 ≤ n ≤ 2

[Explanation] Aligns all the data in one line to the specified position.

n selects the justification as follows:

n	justification methods
0	Left justification
1	Centering
2	Right justification

[Comment]

• This command is only valid at the beginning of the line.

[Default] n=0

[Example]

unsigned char str[4];

str[0] = 0x1B;

str[1] = 0x61;

str[2] = 1;

SendDataToPrinter(str,3);// select the centering to print

FS r n

[Name] select the superscript and subscript

[Type] ASCII: FS r n

Decimal: 28 114 n

Hex: 1C 72 n

[Scope] 0 ≤ n ≤ 1

[Explanation]

The value of **n**	Result
n=o	superscript
n=1	subscript

[Comment]

The command is effective for all characters (including English characters and Kanji)

The command is ignored if n is outside the defined scope

[Example] unsigned char str[3];

```
str[0] = 0x1C;
str[1] = 0x72;
str[2] = 0;
SendDataToPrinter(str,3);//
```

ESC U

[Name] Horizontally magnify characters

[Type] ASCII: ESC U n

Decimal: 27 85 n

Hex: 1B 55 n

[Scope] 0 ≤ n ≤8

[Comment]

The command is effective for all characters (including English characters and Kanji)

The command is ignored if n is outside the defined scope

[Reference] ESC X

[Example] unsigned char str[4];

```
str[0] = 0x1B;
str[1] = 0x55;
str[2] = 2;
SendDataToPrinter(str,3);// Horizontally magnify 2 times
```

ESC V

[Name]Vertically magnify characters

[Type] ASCII: ESC V n

Decimal: 27 86 n

Hex: 1B 56 n

[Scope] 0 ≤ n ≤8

[Comment]

The command is effective for all characters (including English characters and Kanji)

The command is ignored if n is outside the defined scope

[Reference] ESC X

[Example] unsigned char str[4];

```
str[0] = 0x1B;
str[1] = 0x56;
str[2] = 2;
SendDataToPrinter(str,3);// Vertically magnify 2 times
```

ESC X

[Name] Magnify characters

[Type]

ASCII:	ESC	X	n1	n2
Decimal:	27	88	n1	n2
Hex:	1B	58	n1	n2

[Scope] $0 \leqslant n \leqslant 8$ (1 ≤ *n1* horizontal times ≤ 8,1 ≤ *n2* vertical times ≤ 8)

[Comment]

The command is effective for all characters (including English characters and Kanji), except barcode reading characters.

The command is ignored if n is outside the defined scope.

Vertical direction is the paper feeding direction, and horizontal direction is vertical with the paper feeding direction. When character clockwise rotate 90 °, the relationship between the vertical direction and horizontal direction is reversed, that is to say, this command's priority is lower than the FS 2. And when two commands is effective at the same time, the characters firstly rotate, then enlarge.

[Example]unsigned char str[4];

```
str[0] = 0x1B;
str[1] = 0x58;
str[2] = 2;
str[3] = 2;
SendDataToPrinter(str,4);// Vertically and horizontally magnify 2 times
```

ESC i

[Name] Full cutting

[Type]

ASCII:	ESC	i
Decimal:	27	105
Hex:	1B	69

[Explanation] cutter: full cutting

[Comment]

- This command does not cause feeding line.
- This command is only used in the printers with cutter.

[Example] unsigned char str[4];

```
str[0] = 0x1B;
str[1] = 0x69;
SendDataToPrinter(str,2);// Send the full-cutting command
```

ESC m

[Name] Half cutting

[Type] ASCII: ESC i
Decimal: 27 109
Hex: 1B 6D

[Explanation] cutter: half cutting

[Comment]

- This command does not cause feeding line.
- This command is only used in the printers with cutter.

[Example] unsigned char str[4];

```
str[0] = 0x1B;
str[1] = 0x6D;
SendDataToPrinter(str,2);// Send the half-cutting command
```

ESC K nL nH d1 d2 ……dk

[Name] Printing graphics command ①

[Type] ASCII ESC K nL nH d1…dk
Decimal: 27 75 nL nH d1…dk
Hex: 1B 4B nL nH d1…dk

[Scope] 0 ≤nL ≤255
0 ≤nH ≤1
0 ≤d ≤255

[Explanation]

This command can only print the black/white bit-image whose height is 8 dots and width does not exceed the printable area.

The nL and nH are the low and high bit of double-byte unsigned integer N. They express the number of the dots of the bit-image on the horizontal direction.

[Reference] ESC *

[Comment]

• The graphics command is influenced by the character enlargement command.

• When using reverse printing mode, successively print each graphics unit according to the order of the graphics from bottom to up.

[Example] unsigned char str[30];

```
unsigned char i=0;
str[i++] = 0x1B; str[i++] = 0x4B;
str[i++] = 15; //print the graphics whose width is 15 dots
str[i++] = 0x7C; str[i++] = 0x44; str[i++] = 0x44; str[i++] = 0xFF;
str[i++] = 0x44; str[i++] = 0x44; str[i++] = 0x7C; str[i++] = 0x00;
str[i++] = 0x41; str[i++] = 0x62; str[i++] = 0x54; str[i++] = 0xC8;
str[i++] = 0x54; str[i++] = 0x62; str[i++] = 0x41; str[i++] = 0x0D;
SendDataToPrinter(str,i);//send the printing graphics command.
```

ESC * m nL nH d1…dk

[Name] Printing graphics command ②

[Type] ASCII ESC * m nL nH d1…dk
Decimal: 27 42 m nL nH d1…dk

Hex: 1B 2A m nL nH d1…dk

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

0 ≤nL ≤255

0 ≤nH ≤1

0 ≤d ≤255

[Explanation]

This command can only print the black/white bit-image whose height is 8 dots or 24 dots and width does not exceed the printable area.

The parameter meaning is as follows:

Using the m to select the bit image modes, and the dots of the bit image in the horizontal direction are specified by the nL and Nh.

m	The number of vertical dots (height)	Double-width mode
0	8	Twice as width
1	8	single-width
32	24	Twice as width
33	24	single-width

The nL and nH are the low and high bit of double-byte unsigned integer N. They express the number of the dots of the bit-image on the horizontal direction.

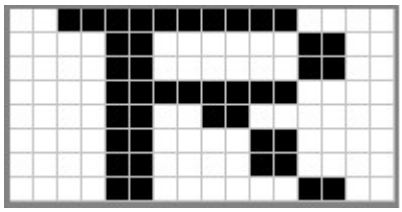
Mode 1: When the double-width mode is single-width, its maximum is 384. When the double-width mode is twice as width, its maximum is 192.

Mode 2: When the double-width mode is single-width, its maximum is 432. When the double-width mode is twice as width, its maximum is 216.

d1……dk express the bit-image data. And the specific format is as follows:

[Example 1] m =0 (8 dots, twice as width), d1 represents the data to be printed in the first and second column. And dk represents the data to be printed in the $2k^{th}$ and $(2k-1)^{th}$ column. The bn represents the n^{th} bit of the byte.

d1	d2	d3	d4	d5	d6	d7	d8	
0	1	1	1	1	1	0	0	b7
0	0	1	0	0	0	1	0	b6
0	0	1	0	0	0	1	0	b5
0	0	1	1	1	1	0	0	b4
0	0	1	0	1	0	0	0	b3
0	0	1	0	0	1	0	0	b2
0	0	1	0	0	1	0	0	b1
0	0	1	0	0	0	1	0	b0



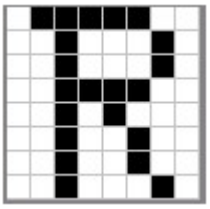
Program code is as follows:

```
unsigned char str[100];
j=0;
str [j++] = 0x1B;    str r[j++] = 0x2A;
str [j++] = 0; //m=0 (height is 8 dots, twice as width)
str [j++] = 8; //the width of the graphic is 8dots
str [j++] = 0;//the bit image data
str [j++] = 0x00;str [j++] = 0x80;str [j++] = 0xFF;str [j++] = 0x90;str [j++] = 0x98;
```

str [j++] = 0x96;str [j++] = 0x61;str [j++] = 0x00;str [j++] = 0x0D;//print the graphic
SendDataToPrinter(str,j);

[Example 2] m =1 (8 dots, single-width), d1 represents the data to be printed in the first column. And dk represents the data to be printed in the kth column. The bn represents the nth bit of the byte.

d1	d2	d3	d4	d5	d6	d7	d8	
0	1	1	1	1	1	0	0	b7
0	0	1	0	0	0	1	0	b6
0	0	1	0	0	0	1	0	b5
0	0	1	1	1	1	0	0	b4
0	0	1	0	1	0	0	0	b3
0	0	1	0	0	1	0	0	b2
0	0	1	0	0	1	0	0	b1
0	0	1	0	0	0	1	0	b0

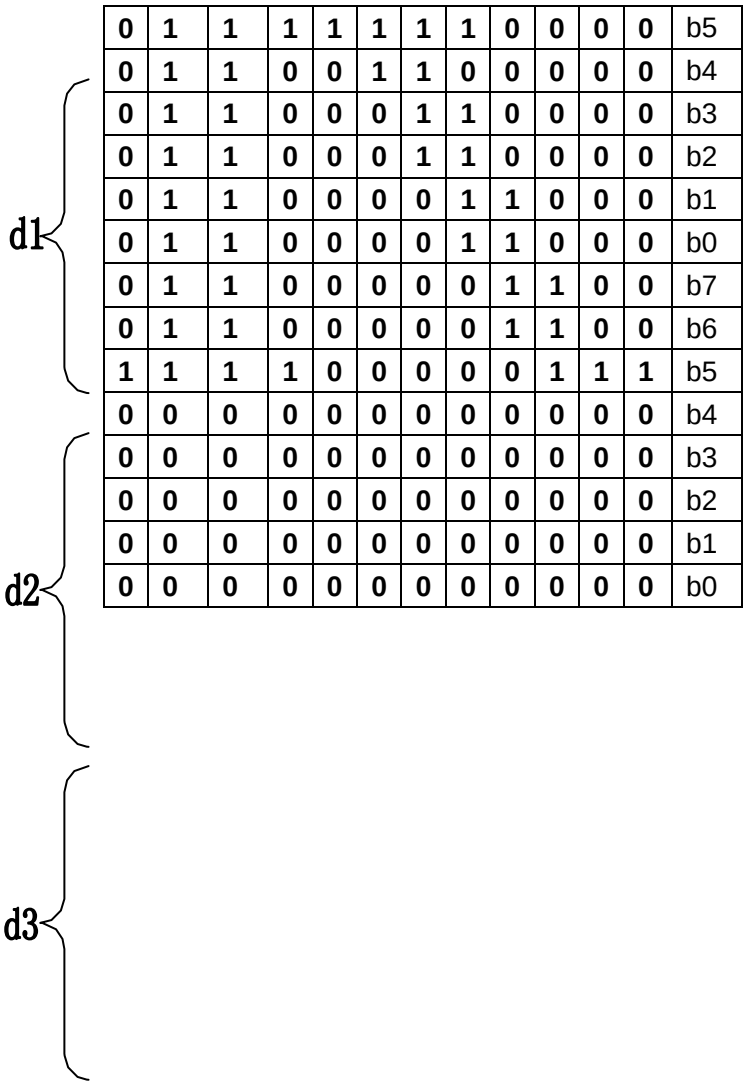


Program code is as follows:

unsigned char str[100];
j=0;
str[j++] = 0x1B;
str[j++] = 0x2A;
str[j++] = 1; //m=1(height is 8 dots, don't enlarge)
str [j++] = 8; //the graphic width is 8dots
str [j++] = 0;//bit image data
str[j++] = 0x00;str[j++] = 0x80;str [j++] = 0xFF;str[j++] = 0x90;str[j++] = 0x98;
strr[j++] = 0x96;str[j++] = 0x61;str[j++] = 0x00;str[j++] = 0x0D; ;//print the graphic
SendDataToPrinter(str,j);

[Example 3] m =32 (24 dots, twice as width), d1,d2 and d3 represent the data to be printed in the first, second and third column. And dk represents the data to be printed in the kth column. The bn represents the nth bit of the byte.

	d4	**d7**									D	**d49**
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	b7
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	b6
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	b5
1	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	b4
0	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	b3
0	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	b2
0	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	b1
0	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	b0
0	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	b7
0	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	b6



0	1	1	1	1	1	1	1	0	0	0	0	b5
0	1	1	0	0	1	1	0	0	0	0	0	b4
0	1	1	0	0	0	1	1	0	0	0	0	b3
0	1	1	0	0	0	1	1	0	0	0	0	b2
0	1	1	0	0	0	0	1	1	0	0	0	b1
0	1	1	0	0	0	0	1	1	0	0	0	b0
0	1	1	0	0	0	0	0	1	1	0	0	b7
0	1	1	0	0	0	0	0	1	1	0	0	b6
1	1	1	1	0	0	0	0	0	1	1	1	b5
0	0	0	0	0	0	0	0	0	0	0	0	b4
0	0	0	0	0	0	0	0	0	0	0	0	b3
0	0	0	0	0	0	0	0	0	0	0	0	b2
0	0	0	0	0	0	0	0	0	0	0	0	b1
0	0	0	0	0	0	0	0	0	0	0	0	b0

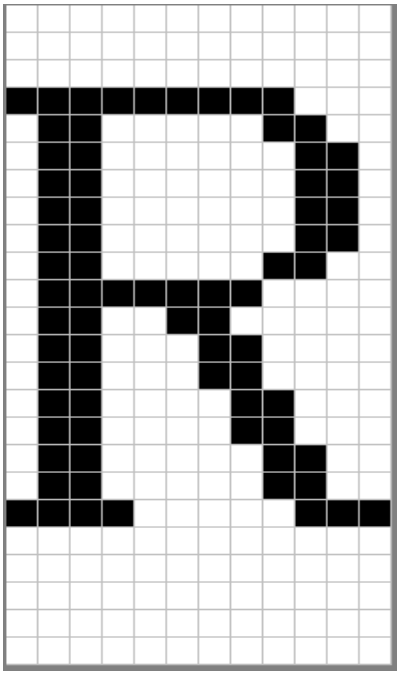
Program code is as follows:

```
unsigned char str[200];
j=0;
str[j++] = 0x1B;
str[j++] = 0x2A;
str[j++] = 32; //m=32(height is 24 dots, double-width)
str[j++] = 12; //graphic width is 12dots
str[j++] = 0;//bit image data
str[j++] = 0x10;str[j++] = 0x00;str[j++] = 0x20;str[j++] = 0x1F;str[j++] = 0xFF;str[j++] = 0xE0;
str[j++] = 0x1F;str[j++] = 0xFF;str[j++] = 0xE0;str[j++] = 0x10;str[j++] = 0x20;str[j++] = 0x20;
str[j++] = 0x10;str[j++] = 0x20;str[j++] = 0x00;str[j++] = 0x10;str[j++] = 0x30;str[j++] = 0x00;
str[j++] = 0x10;str[j++] = 0x3C;str[j++] = 0x00;str[j++] = 0x10;str[j++] = 0x2f;str[j++] = 0x00;
str[j++] = 0x18;str[j++] = 0x43;str[j++] = 0xC0;str[j++] = 0x0F;str[j++] = 0xC0;str[j++] = 0xE0;
str[j++] = 0x07;str[j++] = 0x80;str[j++] = 0x20;str[j++] = 0x00;str[j++] = 0x00;str[j++] = 0x20;
str[j++] = 0x0D;// Print out the current graphics
```

SendDataToPrinter(str,j);

[Example 4] m =33 (24 dots, don't enlarge), d1,d2 and d3 represent the data to be printed in the first, second and third column. And dk represents the data to be printed in the k^{th} column. The bn represents the n^{th} bit of the byte.

		d4	d7								D	d49
d1	0	0	0	0	0	0	0	0	0	0	0	b7
	0	0	0	0	0	0	0	0	0	0	0	b6
	0	0	0	0	0	0	0	0	0	0	0	b5
	1	1	1	1	1	1	1	1	1	0	0	b4
	0	1	1	0	0	0	0	0	1	1	0	b3
	0	1	1	0	0	0	0	0	0	1	1	b2
	0	1	1	0	0	0	0	0	0	1	1	b1
	0	1	1	0	0	0	0	0	0	1	1	b0
d2	0	1	1	0	0	0	0	0	0	1	1	b7
	0	1	1	0	0	0	0	0	1	1	0	b6
	0	1	1	1	1	1	1	1	0	0	0	b5
	0	1	1	0	0	1	1	0	0	0	0	b4
	0	1	1	0	0	0	1	1	0	0	0	b3
	0	1	1	0	0	0	1	1	0	0	0	b2
	0	1	1	0	0	0	0	1	1	0	0	b1
	0	1	1	0	0	0	0	1	1	0	0	b0
d3	0	1	1	0	0	0	0	0	1	1	0	b7
	0	1	1	0	0	0	0	0	1	1	0	b6
	1	1	1	1	0	0	0	0	0	1	1	b5
	0	0	0	0	0	0	0	0	0	0	0	b4
	0	0	0	0	0	0	0	0	0	0	0	b3
	0	0	0	0	0	0	0	0	0	0	0	b2
	0	0	0	0	0	0	0	0	0	0	0	b1
	0	0	0	0	0	0	0	0	0	0	0	b0



Program code is as follows:

```
unsigned char str[200];
j=0;
str[j++] = 0x1B;
str[j++] = 0x2A;
str[j++] = 32; //m=33 (height is 24 dots, don't enlarge)
str[j++] = 12; // graphic width is 12dots
str[j++] = 0;
// bit image data
str[j++] = 0x10;str[j++] = 0x00;str[j++] = 0x20;str[j++] = 0x1F;str[j++] = 0xFF;str[j++] = 0xE0;
str[j++] = 0x1F;str[j++] = 0xFF;str[j++] = 0xE0;str[j++] = 0x10;str[j++] = 0x20;str[j++] = 0x20;
str[j++] = 0x10;str[j++] = 0x20;str[j++] = 0x00;str[j++] = 0x10;str[j++] = 0x30;str[j++] = 0x00;
```

```
str[j++] = 0x10;str[j++] = 0x3C;str[j++] = 0x00;str[j++] = 0x10;str[j++] = 0x2f;str[j++] = 0x00;
str[j++] = 0x18;str[j++] = 0x43;str[j++] = 0xC0;str[j++] = 0x0F;str[j++] = 0xC0;str[j++] = 0xE0;
str[j++] = 0x07;str[j++] = 0x80;str[j++] = 0x20;str[j++] = 0x00;str[j++] = 0x00;str[j++] = 0x20;
str[j++] = 0x0D;// Print out the current graphics
SendDataToPrinter(str,j);
```

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

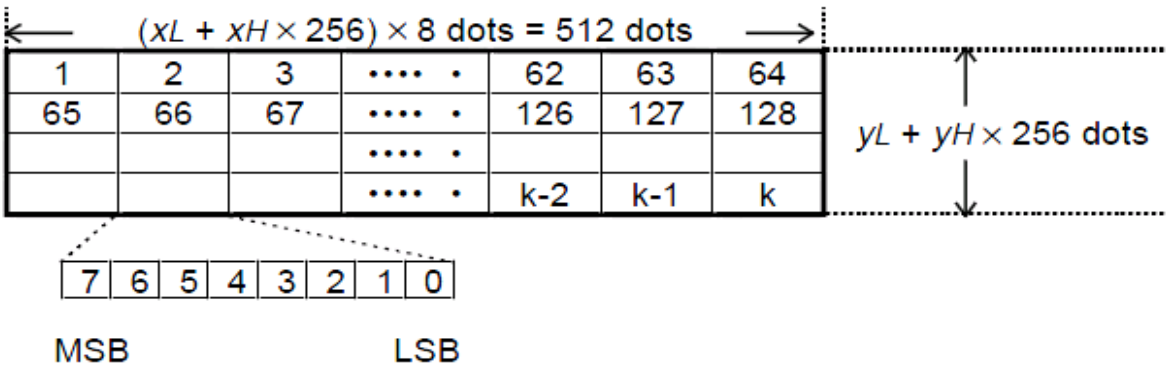
[Name] Print raster bit image

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

[Scope] 0 ≤m ≤ 3, 48 ≤m ≤ 51
0 ≤xL ≤255
0 ≤ xH ≤255 where 1 ≤ (xL + xH × 256) ≤128
0 ≤yL ≤255
0 ≤yH ≤8 where 1 ≤ (yL + yH × 256) ≤ 4095
0 ≤d ≤255
k = (xL + xH × 256)×(yL + yH × 256) (k≠0)

m	mode	Vertical resolution (DPI)	Lateral resolution (DPI)
0, 48	Normal	203.2dpi	203.2dpi
1, 49	Double-width	203.2dpi	101.6dpi
2, 50	Double-height	101.6dpi	203.2dpi
3, 51	Double-width、Double-height	101.6dpi	101.6dpi

- The xL and xH indicates the number of bytes in the horizontal direction of the bit-image
- The yL and yH indicates the number of bytes in the vertical direction of the bit-image



GS h n

[Name] Select bar code height

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

[Scope] 1 ≤ n ≤ 255

[Explanation] Select bar code height. And N is the number of dots on the vertical direction.

[Default] n=48

[Example] unsigned char str[4];

str[0] = 0x1D;

str[1] = 0x68;

str[2] = 30;

SendDataToPrinter(str,3);//Set the bar code height to 30 vertical dot pitch

GS w n

[Name] Select bar code width

[Type] ASCII: GS w n

Decimal: 29 119 n

Hex: 1D 77 n

[Scope] 1≤ n ≤ 4

[Explanation] Set the horizontal width of the bar code.

And n specifies the bar code width as follows:

n	Module width for multi-level bar code （mm）	Binary-level bar code	
		Thin element width （mm）	Thick element width （mm）
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

[Example] unsigned char str[4];

str[0] = 0x1D;

str[1] = 0x77;

str[2] = 3;

SendDataToPrinter(str,3);//Set the bar code width

GS H n

[Name] Select the printing position for bar code character

[Type] ASCII: GS H n

Decimal: 29 72 n

Hex: 1D 48 n

[Scope] 0 ≤ n ≤ 2

[Explanation]Selects a font for the HRI characters used when printing a bar code.

Use n to specify the printing position of HRI:

n	printing position
0	Do not print
1	Above the bar code
2	Below the bar code

[Default] n=0

[Example] unsigned char str[4];

```
str[0] = 0x1D;
str[1] = 0x48;
str[2] = 2;
SendDataToPrinter(str,3);// The HRI is printed below the bar code
```

GS Q n

[Name] Set the printing position of the bar code on the horizontal direction

[Type] ASCII: GS Q *n*
Decimal: 29 81 *n*
Hex: 1D 51 *n*

[Scope] 0≤ n ≤ 255

[Explanation]Set the distance from the beginning of one line to the position of printing bar code to N horizontal dot pitch.

[Default] n=0

[Example] unsigned char str[4];

```
str[0] = 0x1D;
str[1] = 0x51;
str[2] = 32;
SendDataToPrinter(str,3);//
```

GS k

[Name] Print bar code

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

[Scope] ① 0 ≤ m ≤ 6 ② 65 ≤ m ≤ 73
The range of k and d are determined by the type of bar code used.
The range of n and d are determined by the type of bar code used.
The n is the data length of the bar code to be printed.

[Explanation] Select a bar code system and print the bar code.

Use m to select a bar code system as follows:

m		Bar code system	length	scope
Format 1	0	UPC-A	11 k 12	48 d 57
	1	UPC-E	K	48 d 57
	2	JAN13 (EAN13)	12 k 13	48 d 57
	3	JAN 8 (EAN8)	7 k 8	48 d 57
	4	CODE39	1 k	48 d 57, 65 d 90, 32, 36, 37, 43, 45, 46, 47
	5	ITF	1 k (even number)	48 d 57
	6	CODABAR	1 k	48 d 57, 65 d 68 , 36, 43, 45, 46, 47, 58
Format	65	UPC-A	11 n 12	48 d 57

2	66	UPC-E	n=8	48 d 57
	67	JAN13 (EAN13)	12 n 13	48 d 57
	68	JAN 8 (EAN8)	7 n 8	48 d 57
	69	CODE39	1 n 255	48 d 57, 65 d 90, 32, 36, 37, 43, 45, 46, 47
	70	ITF	1 n 255 (even number)	48 d 57
	71	CODABAR	1 n 255	48 d 57, 65 d 68, 36, 43, 45, 46, 47, 58
	72	CODE93	1 n 255	0 d 127
	73	CODE128	2 n 255	0 d 127

[Note]

• When using the format 1 command, if the bar code type specifies the data length of the bar code, k (the barcode data length received by the printer) should be equal to the specified data length, and if not equal to the specified data length, the instruction is invalid . See the related barcode data bit length [Appendix B].

• The barcode data received by the printer should be included in the character set specified by the bar code, if some characters of the bar code data characters are outside the character set, the command is invalid. See the related barcode character set [Appendix B].

• When using the format 2 command, the value of n should be equal to the specified data length (if the kind of bar code specifies the data bit length). And if the value of n is not equal to the specified data bit length, the command is invalid. See the related barcode data bit length [Appendix B].

•The number of ITF code data length must be even numbers. If using the format 1 to print ITF bar code, the value of k should be even numbers, but if it is odd number, the last one bit data will be ignored. If using the format 2 to print ITF bar code, the value of n should be even numbers, but if it is odd number, the last one bit data will be ignored.

•If the bar code on the horizontal direction exceeds the printable area, it is invalid.

•The command is not affected by the print modes (Eg: emphasized, double-strike print, underline, character size, or white/black reverse printing, etc.)

•Printing barcode need obey the barcode specifications, or will cause that the bar code cannot be scanned.

•The printer does not calculate the checksum, but if barcode needs the checksum, the checksum should be included in the bar code data, and the printer is not responsible for checking whether the checksum is wrong or right. The user calculates the checksum, and if it is wrong, it will cause that the bar code cannot be scanned.

•CODE39 code does not include the extended CODE39 code (EXTERN CODE 93).

•CODE93 code does not include the extended CODE93 code (EXTERN CODE 93).

•When using the CODE128, must first select the character set (CODE A, CODE B or CODE C) before the barcode data. Select the character set through sending the character "{" and another character; the ASCII code characters " {" is defined by sending " {" twice consecutively.

ASCII	HEX	Function
{A	7B, 41	Select the code set A
{B	7B, 42	Select the code set B
{C	7B, 43	Select the code set C
{S	7B, 53	SHIFT
{1	7B, 31	FNC1
{2	7B, 32	FNC2
{3	7B, 33	FNC3
{4	7B, 34	FNC4

ESC ‘

[Name] Print curve

[Type]

ASCII:	ESC	‘	nL	nH	x1L	x1H	x21L	x21H	…….	xkL xkH CR
Decimal:	29	39	nL	nH	x1L	x1H	x21L	x21H	…….	xkL xkH 13
Hex:	1B	27	nL	nH	x1L	x1H	x21L	x21H	…….	xkL xkH 0D

[Scope] 0 ≤ nL ≤255

0 ≤ nHL ≤1

N is the number of the curve’s dots and N = nH x 256 + nL

The position of the curve’s dots in one horizontal line: X = xkH x 256 + xkL

[Explanation] Each curve consists of many dots. The command indicates that the printer prints n dots in one horizontal line, and continuously using the command can print out the curve which the user needs.

[Note] This command is only applicable to impact dot matrix printer and some thermal models.

[Example]

Print curve graphic of below five equations:

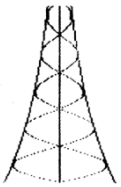
Y1=50+40*abs（-0.01*X）*sin（X/10）
Y2=50-40*abs（-0.01*X）*sin（X/10）
Y3=50
Y4=50+40*abs(-0.1*X)
Y5=50-40*abs(-0.01*X)

C program is as follows:

```
unsigned char str[50];
float X;
unsigned int   m_cur1,m_cur2,i;
for(X=0;X<150;X++)                          //print one line of 150 dots
{
    m_cur1= 40*exp(-0.01*X);
    YY= Y*sin(X/10);
    str[i++] = 0x1b;
    str[i++] = 0x27;
```

```
str[i++] = 0x5;//打印5条曲线
str[i++] = 0x0;
str[i++] = 50+m_cur2;
str[i++] = 0;
str[i++] = 50-m_cur2;
str[i++] = 0;
str[i++] = 50;
str[i++] = 0;
str[i++] = 50+m_cur1;
str[i++] = 0;
str[i++] = 50-m_cur1;
str[i++] = 0;
str[i++] = 0x0D;
SendDataToPrinter(str,i);//
}
```

[Print results]



ESC v

[Name] Send the printer's status to the host

[Type] ASCII: ESC v
Decimal: 27 118
Hex: 1B 76

[Explanation] Send the printer's status to the host

[Note] It is only effective for the printer with serial interface

Bit	Function	Value	
		0	1
0	Paper detector	No paper	Have paper
1	Work status	Idle	Printing
2	Receiving buffer	No full	Full
3	printer's status	Normal	Error
4	Undefined	——	——
5	Undefined	——	——
6	Undefined	——	——
7	Undefined	——	——

[Example]

```
unsigned char str[4];
str[0] = 0x1B;
```

```
str[1] = 0x76;
SendDataToPrinter(str,2);//Send status query command to the print
```

FS &

[Name] Select the Kanji mode

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

[Explanation] The printer enters Kanji printing mode

[Note] After powering on the printer, the printer defaults the Kanji printing mode

[Example]

```
unsigned char str[4];
str[0] = 0x1C;
str[1] = 0x26;
SendDataToPrinter(str,2);// Enter Kanji printing mode
```

FS.

[Name] Cancel the Kanji mode

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

[Explanation] Cancel the Kanji characters mode

[Example] unsigned char str[4];

```
str[0] = 0x1C;
str[1] = 0x2E;
SendDataToPrinter(str,2);//Enter ASCII characters printing mode
```

ESC 6

[Name] To select Character Set 1 （6X8）

[Type] ASCII: ESC 6
Decimal: 27 54
Hex: 1B 36

[Explanation] After inputting the command, all of printing characters use the characters in the character set 1 (see appendix D). The character set 1 has 224 '6 x 8 dot matrix' characters, including ASCII characters and all kinds of graphic marks, etc. The range of code is 20H~FFH(32~255).

[Example] unsigned char str[4];

```
str[0] = 0x1B;
str[1] = 0x36;
SendDataToPrinter(str,2);//Print '6X8' characters in the Character Set 1
```

ESC 7

[Name] To select Character Set 2（6X8）

[Type] ASCII: ESC 7
Decimal: 27 55
Hex: 1B 37

[Explanation] After inputting the command, all of printing characters use the characters in the character set 2

(see appendix D). The character set 2 has 224 '6 x 8 dot matrix' characters, Including German, French, Russian, Japanese Katakana, etc. The range of code is 20H~FFH(32~255).

[Example] unsigned char str[4];

```
str[0] = 0x1B;
str[1] = 0x37;
SendDataToPrinter(str,2);// Print '6X8' characters in the Character Set 2
```

GS F n

[Name] Select mode

[Type] ASCII: GS F *n*

Decimal: 29 70 *n*

Hex: 1D 46 *n*

[Scope] 0 ≤ *n* ≤ 1

[Explanation]

When n=0, the number of the dots printed in each line is 384.

When n=1, the number of the dots printed in each line is 432.

[Default] n＝0

[Example]unsigned char str[4];

```
str[0] = 0x1D;
str[1] = 0x46;
str[2] = 0;
SendDataToPrinter(str,3);//
```

ESC r d n

[Name] To adjust the depth of thermal printing

[Type] ASCII: ESC r d *n*

Decimal: 27 114 d *n*

Hex: 1B 72 d *n*

[Scope] d=2B or 2D, 0 ≤ *n* ≤ 255

[Explanation]

When d=2B, indicates the printing depth is adjusted deeper on the basis of the current printing depth.

When d=2D, indicates the printing depth is adjusted more shallowly on the basis of the current printing depth.

The n represents the value of the depth adjusting degree. And the larger the value, deeper the adjustment depth, and the maximum value does not exceed 255.

When n=0, using 'B 72 2B 00' or '1B 72 2D 00' will lead to revert to the default value

[Default] n＝0

[Note] When using the deepening adjustment, the value of n is adjusted to the maximum value, or it not only affects the results but also reduces the printing life.

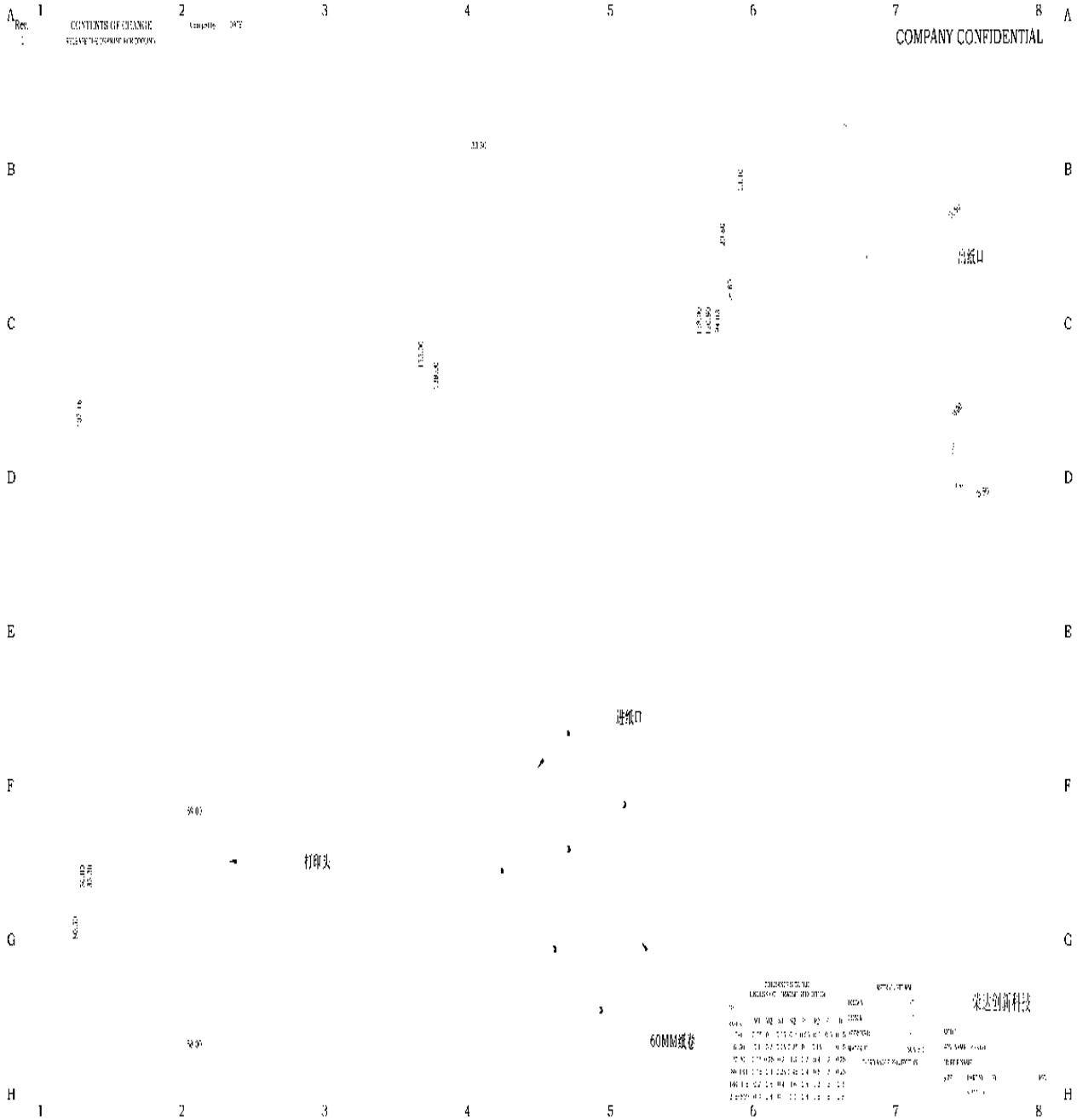
With increasing depth, the printer will increase power consumption.

[Example] unsigned char str[4];

```
str[0] = 0x1B;
str[1] = 0x72;
str[2] = 0x2B;
```

```
str[3]= 0x30;
SendDataToPrinter(str,4);// deepen ‘0X30’
```

Chapter 4: Installation



Chapter 5: Maintenance and Troubleshooting

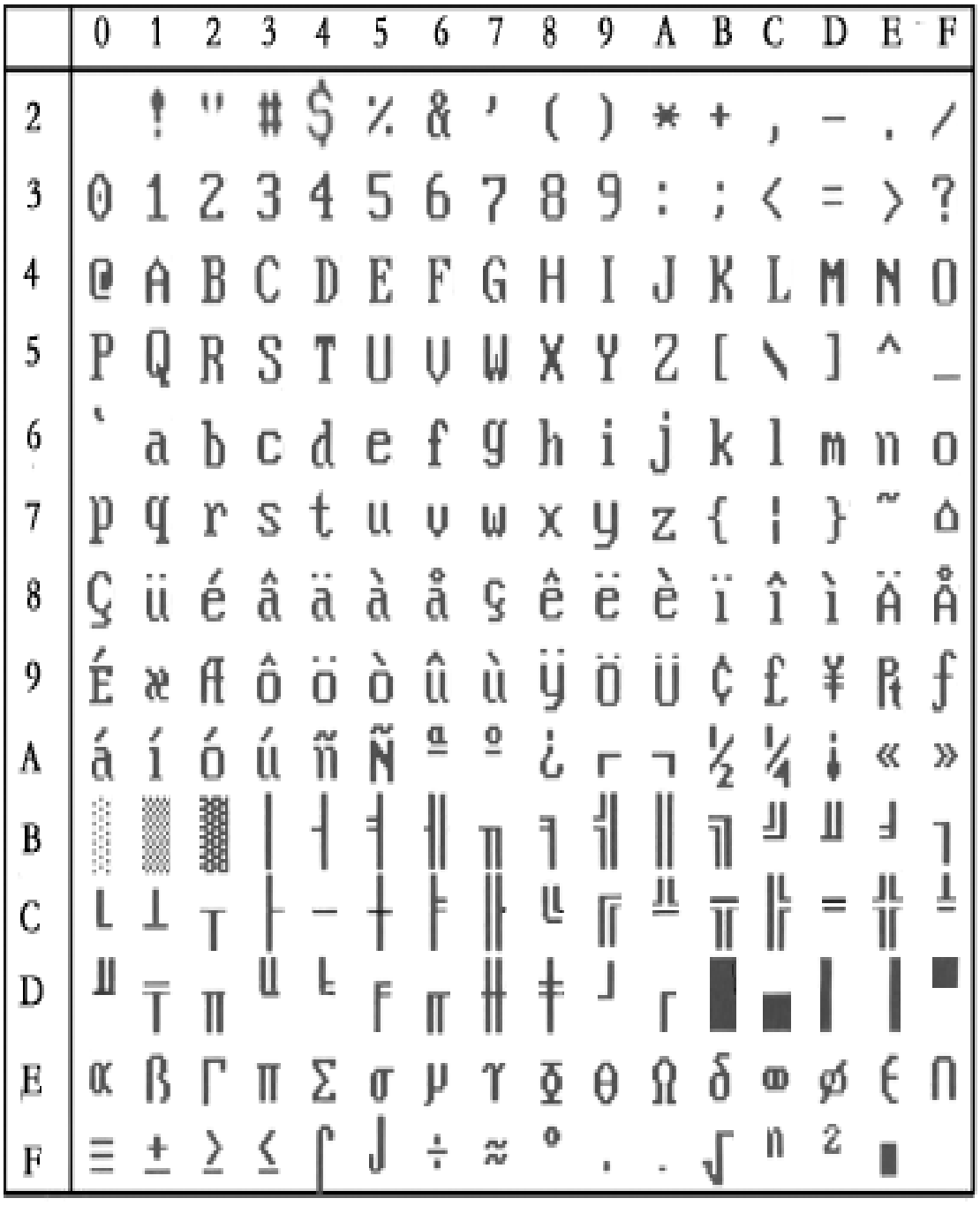
To ensure the printer to work normally, particularly note that we don't optionally remove the print head and do not make changes to the printer through ourself. For users not using the printer shell, more particularly note protecting the printing head.

1. If the printer is not used for a long time, we do not turn on the printer power.
2. If the printer is not working properly, please turn off the printer's power.
3. Power supply must meet the requirements, or it is unfavorable for the printing head, and even damages the printing head.
4. When replacing the paper roll, please note whether there are the paper scraps and dust on the printing head. If having paper scraps and dust, please gently remove. Note the thermal paper's obverse and reverse side, and if the reverse side is uncoated, the printer can‘t print out the handwriting.
5. When the printer is printing or paper feeding, we can't tear the paper, and can't more reversely drag the paper
6. Keep the printer control panel clean
7. When thermal printer prints unclearly, we can use the clean cotton ball soaked some alcohol to gently wipe the surface dirt on the print head chip heating element.
8. When we connect the printer to the host, we should connect the printer data cable, and then power on the printer.
9. To choose a good quality paper when we select the paper for the thermal printer can not only improve the printing quality, but also reduce the abrasion for thermal film.

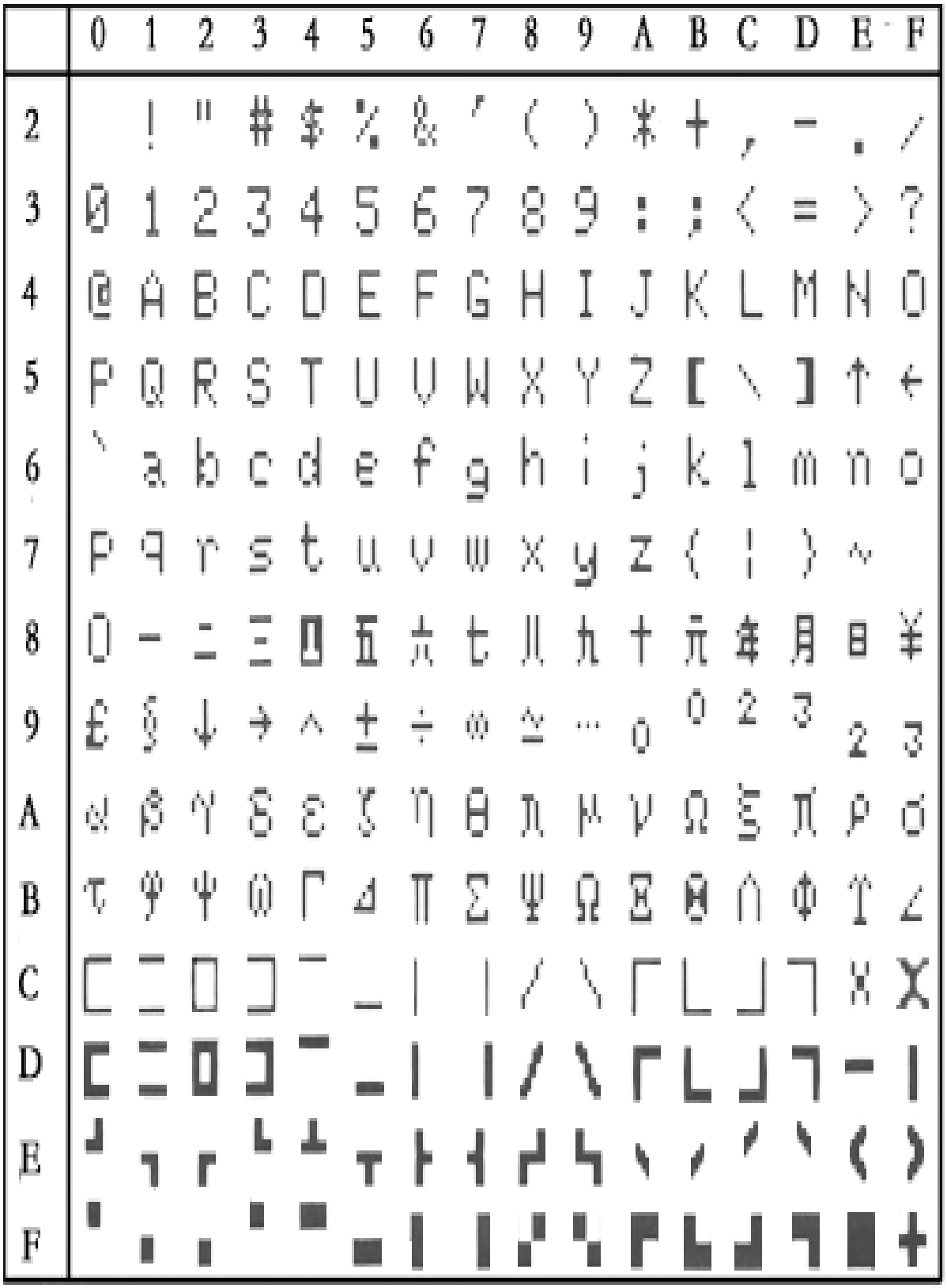
APPENDIX

A : printing character set

A.1 ASCII character set



A.2 character set 1



A.3 character set 2

B: bar code

B.1 bar code coding rules

1. UPC-A: UPC-A coding should comply with the UCC Organization (http://www.uccnet.org) specification.
2. UPC-E: UPC-E coding should comply with the UCC Organization (http://www.uccnet.org) specification.
3. ENA8: ENA8 coding should comply with the ENA Organization (http://www.uccnet.org) specification.
4. ENA13: ENA13 coding should comply with the ENA Organization (http://www.uccnet.org) specification
5. CODE39: Also known as 39 codes, CODE39's starting bit and stopping bit characters must be the '*'character, and it cannot contain the characters '*' between the starting and stopping bits. And the printer's '*' is automatically given by the printer, and when programming the data need not be given, and the data can contain or cannot contain check code, and the check code have fixed algorithm.
6. ITF: Also known as INTERLEAVED 25, intersect 25 code, INTERLEAVED 2 of 5. The length for the data bit must be even number, and the data can contain or cannot contain check code, and the check code have fixed algorithm.
7. CODABAR: The starting bit and stopping bit must be anyone of A、B、C and D, and The starting bit character and stopping bit character can be different. The data can contain or cannot contain check code. The check code can be defined by the code man.
8. CODE93: CODE93's starting bit and stopping bit characters must be the '*'character, and it cannot contain the characters '*' between the starting and stopping bits. And the printer's '*' is automatically given by the printer, and when programming the data need not be given, and the CODE93 data must contain two characters' check code, and the check code have fixed algorithm.

B.2 barcode length character set

Barcode Type	Length	character set (ASCII)
UPC-A	12	0~9
UPC-E	8	0~9
EAN8	8	0~9
EAN13	13	0~9
CODE39	27	0~9 A~Z - . SP $ / + % *
INTERLEAVED 25	even number 52	0~9
CODABAR	32	0~9 - : / % . A~D
CODE93	Unlimited	0~9 A~Z - . SP $ / + % *
CODE128	33	