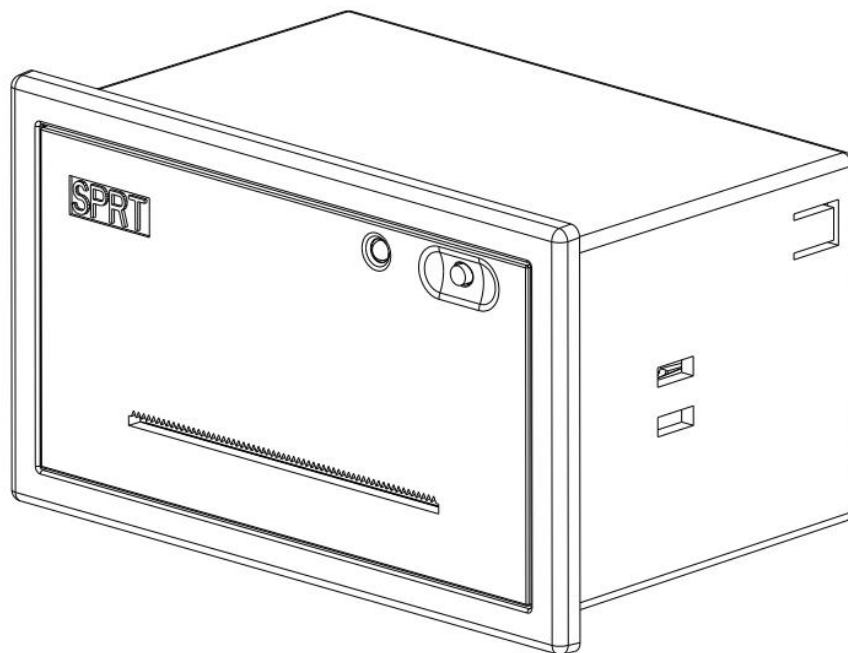# SPRT®

Micro Panel Dot Matrix Printer

User Manual

V1.02

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Content

Introduction

SP-DVII dot matrix printer is a intelligent printer which manufactured by SPRT in 21th century. The machine adopt new imported clock mechanism with computer single chip, with the advantages of small volume, light weight, fully functional, high speed, high-definition, beautiful appearance, simple operation, convenient connection and so on. SP-DVII dot matrix printer with full product line, standard installation size. It is the best replacement used in medical equipment, fire control station, industrial control and other instruments and apparatus.

SP-DVII dot matrix printer can print all ASCII characters as well as English, Greek, German, French, Russian, Japanese katakana. What's more it also can print 16x16 or 12x12 dots Chinese characters as well as a large number of mathematical symbols, graphics and curves. According to different commands, it can change the size and space of the printed word and characters, also can customize the code characters and has the self- test function. What's more, SP series mini printer can work with Windows driver. They can print characters, Chinese and graphics with PC equipment.

Chapter 1 Feature and Performance

1.1 Features

◇Adopt impact dot-matrix print method.

◇Special design for convenient installation on the vertical panel of the instrument or equipment.

◇Comes with single - chip processor, have standard parallel or serial, could online use with various microcomputers or smart instruments conveniently.

◇Real time commands to print Chinese, character, figure and others, also can print standard 6×7 ASCII character and 16×16, 12×12 Chinese. Command set could be compatible with traditional printer.

◇Speed can have 5 choices of 1.2 line/s, 0.7 line/s, 0.4 line/s, 2.5 line/s, 1.5 line/s by different models.

◇Self-test, print full codes, character has high definition and elegant fonts.

◇Power DC 5V±5%, 1.5A

◇Operation temp 0~50℃

1.2 Performance Index

◇Print Method: impact dot-matrix

◇Effective printing width: 33/48mm

◇Print paper: plain white paper, 44/57×φ40(MAX)

◇GB level I, II Chinese fonts library.

◇Enough buffer at 32K

◇Print font: total 448 characters, including 96 ASCII characters, Greek, German, French letters, Russian, Japanese katakana and partial Chinese characters, mathematics symbols, print symbols and graphic symbols

◇Character structure: ANK: 6×7 dots, Chinese: 8×16 or 6×12,

Chinese character: 16×16/12×12

◇Graphic symbols: 6×8 dots

◇Interface: Parallel interface (compatible with CENTRONICS) or serial interface (compatible with RS-232C or TTL).

◇Interface connector: Parallel port: IDC26 needle socket; Serial port: IDC10 needle socket or 5-pin single-row socket;

◇Control code: ESC, FS control codes

◇Reliability: MCBF (Mean cycles between failure) $(5\sim15) \times 10^{6}$

◇THP: 1,500,000 lines

◇Power: DC5V±5% , 1.5A

◇Operation temp/Humidity: $0\sim50℃$, $10\sim80\%$

◇Storage temp/Humidity: $-20\sim60℃$, $10\sim90\%$

◇Installation dimension: 103.5mm×57.5mm(W×H), depth: 64mm

◇Outline dimension: 111mm×65.5mm×68mm(W×H×D)

The Main Characteristics of SP-DVII Series Printers

Model	Character/line (5×7)	Character dimension(mm)	Dots/line	Speed (line/s)
16Series	16	1．8×2.5(W×H)	96	1.2
24Series	24	1．7×2.4(W×H)	144	0.7
40Series	40	1．1×2.4(W×H)	240	0.4

Chapter 2 System Installation

2.1 Installation Size

SP-DVII printer's outline dimension is as Fig. 2-1 shows:
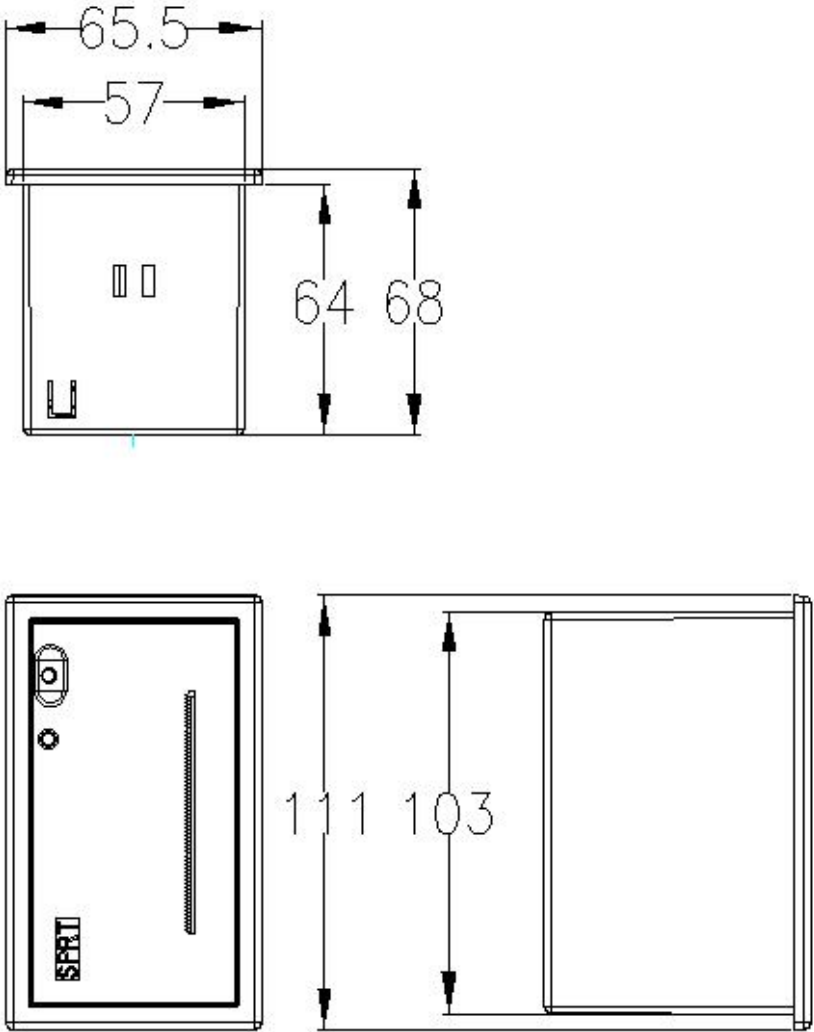
Figure 2－1

2.2 Paper Roll Installation

SP-DVII dot matrix printer uses 44.5mm/57.5mm paper roll which has been equipment

with before leaving factory. In order to prevent damage of printer head while long-distance

transporting or long-time storing, the paper didn't inserted in the print head. So the paper roll needed to insert into the printer head firstly before using. The general steps of installing the paper are as follows:

(1) As figure 2-2: Push panel center inward, then inner shell will auto eject when released.
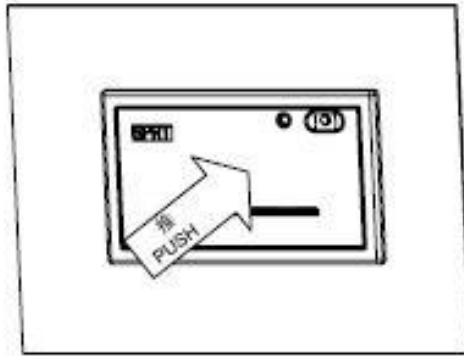
Figure 2－2

(2) After inner shell ejected, hold both sides and pull them outward until the end as direction of figure 2-3, rotate it upward and press the whole downward, until fastened.
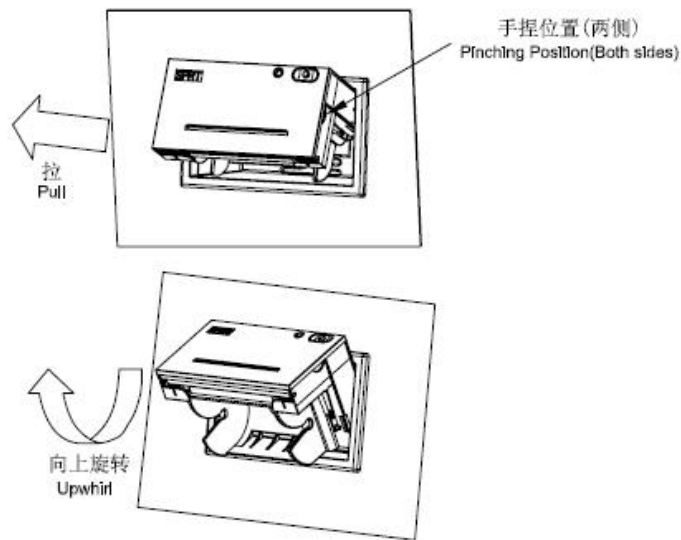
Figure 2-3

(3) Install paper roll to paper reel as figure 2-4, hold both sides of paper reel, put paper roll into paper case, then release paper reel and fastened it.

纸卷
Paper roll

纸轴
Paper reel
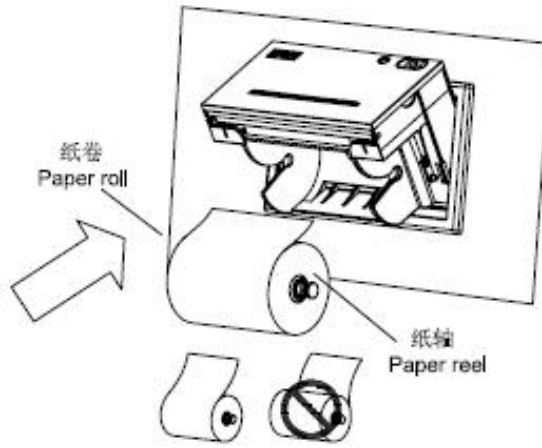
Figure 2-4

(4) Switch on, press feed button and insert paper from feeding paper slot, press feed button again to stop feeding after paper comes out. As figure 2-5:
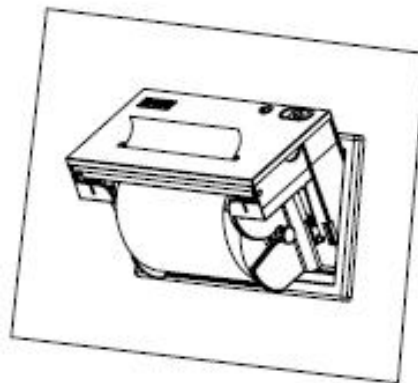
Figure 2－5

(5) Hold two sides of inner shell, rotate inner shell downward as figure2-6, and push it inward as the same time.

向下旋转
rotate direction
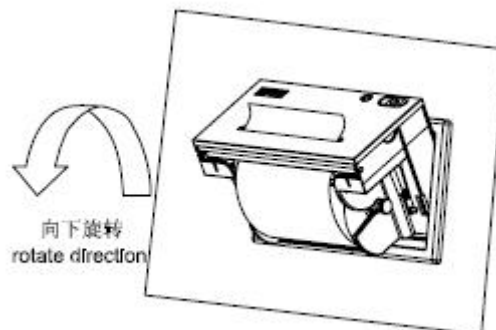
Figure 2－6

(6) Push inner shell fully, fastened with outer, paper installation is finished. As figure

2-7:
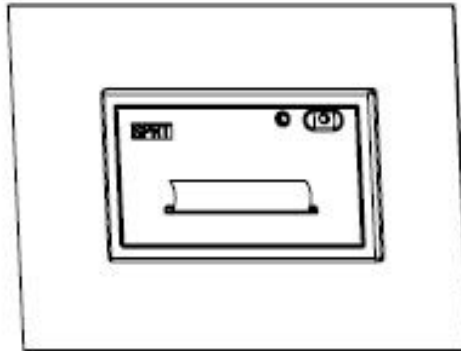
Figure 2－7

Notice:

1, The fluffy paper roll will not be pushed easily and happen paper jam, hold the paper tightly and push it inward as the direction of figure 2-8 until inner shell is inserted fully.
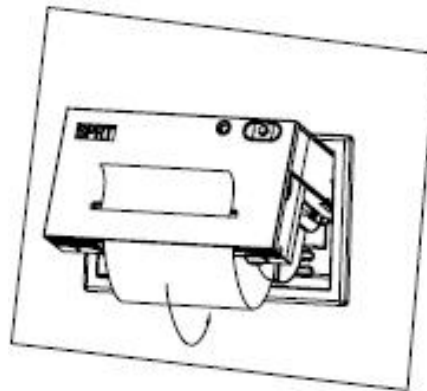
Figure 2－8

2, When fail to push inner shell inward, pls pull out then push again, not use too big strength, or the printer will be damaged.

2.3 Power Supply Connection

SP micro dot matrix printers adopt single DC+5V power supply.

A two-line power cable with plug has been offered. The plug has polarity protection

mechanisms, can be inserted directly in the socket which is on the control panel of SP micro dot matrix printers. The red line of the power cable should be connected to the positive pole (+) of power, the white line should be connected to the negative pole (–) of power. Please note that the polarity of the power shouldn't be connected incorrectly, the voltage of the power must be in the permitting range, otherwise will cause permanent damage to the printer.

Chapter 3 Printer Operation

3.1 Serial Interface Connection

The serial interface of SP-DVII micro dot matrix printers is compatible with RS-232C standard or TTL, support RTS/CTS and XON/XOFF protocols.

The interface sockets are IDC10 needle socket, DB25 hole socket, 5-pin single row socket.

The pin order of serial port is as Fig. 3-1 shows:

IDC10 needle socket No. as figure 3-1
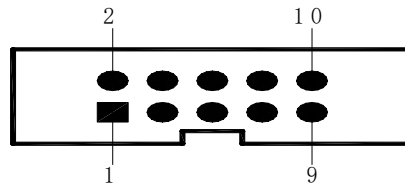
Figure 3－1　Pin order of IDC10 needle serial interface

DB25 hole serial interface socket No. as figure 3-2
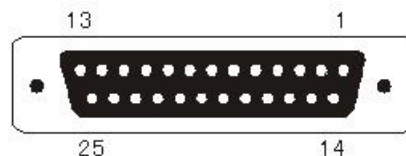
Figure 3－2　DB25 hole serial interface socket No.

3.1.1　Pin assignment of SP-DVII series interface

SP-DVII micro printer has two serial socket of COM1 and COM2. Both of them are IDC-10,

have same function, but different orders of pin assignment. See details in figure 3-3 and 3-4. Notice: Do not use both sockets at the same time.

Signal	Pin No.	Source	Function
TXD	2	Printer	Printer sends data to host
RXD	3	Host	Printer receives data from host
CTS	8	Printer	Printer and host flow control signal(Busy)
DSR	6	Printer	Same to signal CTS
DCD	1	Printer	Same to signal CTS
GND	5	—	

Figure 3-3 Pin assignment of DⅦ series COM1 socket

Signal	Pin No.	Source	Function
TXD	3	Printer	Printer sends data to host
RXD	5	Host	Printer receives data from host
CTS	6	Printer	Printer and host flow control signal(Busy)
DSR	2	Printer	Same to signal CTS
DCD		Printer	Same to signal CTS
GND	9	—	

Figure 3-4 Pin assignment of DⅦ series COM2 socket

3.1.2 SP-DVII series serial setting

The baud rate in serial interface mode is selected in the range of 1200, 2400, 4800, 9600, 19200, 38400, 57600 and115200 bps, and it is set by setting tool. 9600bps has been set at ex-factory.

The default printing direction can be chosen, default is: inverse. So can Chinese printing way, default is: ANK. Integrate 16×16, 12×12 Chinese, and default could select from 16×16, 12×12 Chinese, default value: 16×16. Setting of serial parameters, printing direction, Chinese method and font matrix details see chapter4.3.

Signal	Printer interface pin No.	PC pin No.		Instruction
Name	IDC10	DB25	DB9	
RXD	3	2	3	Printer receives data from host
TXD	2	3	2	Printer send data to computer，when use X-ON/X-OFF handshaking protocol agreement, the printer will send control code X-ON/X-OFF to computer
RTS	8	5	8	When the signal show "MARK", it means the printer is busy and can not receive data, when the signal show " SPACE", it means the printer get ready to receive data.
DSR	6	6	6	Signal "SPACE" indicates that the printer is "ONLINE"
GND	5	7	5	Signal Ground
DCD	1	8	1	Same to signal CTS

3.2 Parallel interface connection

SP-DVII micro dot matrix printers adopt parallel interface, which is compatible with CENTRONICS standard, and the interface socket are IDC26-pin needle cable socket.

Pin Order of IDC26 Parallel Port is as figure 3-5:
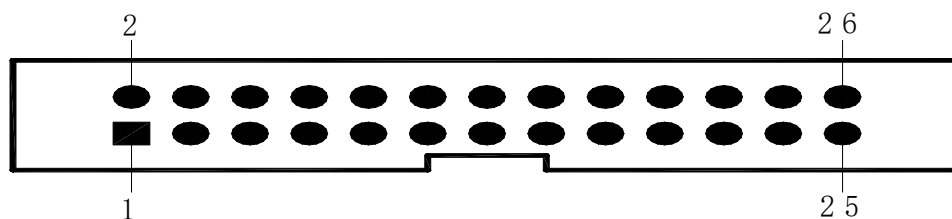
Fig.3-5 Pin Order of IDC26 Parallel Port

Pin assignments of parallel interface are as figure 3-6:

Pin No. of IDC26	Signal	Direction	Instruction
1	/STB	In	Strobe pulse to latch data, reading occurs at falling edge.
3	DATA1	In	These signals represent the 1st bit to 8th bit of the parallel data respectively, each signal is at HIGH level when data is logic 1, and LOW when data is logic 0.
5	DATA2	In	
7	DATA3	In	
9	DATA4	In	
11	DATA5	In	
13	DATA6	In	
15	DATA7	In	
17	DATA8	In	
19	/ACK	Out	Answering pulse, LOW level signal indicates that data have already been received and the printer gets ready to receive the next data.
21	BUSY	Out	HIGH level signal indicates that the printer is BUSY and can not receive data.
23	/PE	Out	High level signal indicates that paper is end. Low level indicates having paper.
25	SEL	---	Pulling up to HIGH level signal by a resistor indicates the printer is on line.
4	/ERR	Out	Pulling up to HIGH level signal by a resistor indicates that there is no error.
2, 6, 8, 26	NC	---	No connection

10, 12, 14, 16, 18, 20, 22, 24	GND	---	Grounding logical 0 level

Fig.3-6 Pin Assignment of Parallel Interface

Notice: (1) "In" denotes input to the printer, "Out" denotes output from the printer.

(2) Signal level is TTL standard.

3.3 Button and Indicator

SP-DVII micro printer has one button, which is feed button "LF"

SP-DVII micro printer has one indicator, which is online indicator SEL. When SEL indicator light on, it means printer online, otherwise, printer is outline or busy.

    (1)   Self-test mode:

        Press LF button and switch on, the printer will print self-test receipt.

    (2) Paper feeding mode:

        Press LF button, the printer will feed paper, then release it, the printer will stop feeding

3.4 Self-test

The self-test will check the condition of printer. If the printer prints out the self-test receipt correctly, it means the printer works normally. Otherwise it needs to repair.

Refer to 3.3 of how to print self-test.

3.5 Printer Initialization

There are three kinds of modes for printer initialization. The first one is that the host sends command to the printer with control code ESC@, realizing initialization through software. The second one is that realizing initialization through self-test. The third one is that power on initialization. The contents of initialization include: select default of each control code, namely the dot number of line spacing is 3, no binding length, vertical and horizontal tab value are both 0, left and right margin width are both 0, enlarging multiple is 2; cancel all

the user-defined characters or graphics characters; select character set 1 and select non reverse white print etc.

For watching the receipt bar conveniently, the default direction are different, for example, T series is forward, others are inverse.

Chapter 4 Print command

4.1 Summary

Dot matrix printer support printing commands all compatible with traditional ESC printing commands. Each command is described in following format:

Command name		Function

Format:	ASCII:	the standard ASCII character sequence
	Decimal:	the Decimal number sequence
	Hexadecimal:	the Hexadecimal number sequence

Explanation: what the command does and how to use it.

Example: some examples are listed to illustrate the command for better understanding.

The following is the description of each command according to the function of each command. The following examples all printed with A series, and inverse, the bottom of receipt bar is printed first.

4.2 Commands details

4.2.1 Paper Feeding Commands

LF		Feed Line

Format: ASCII:	LF
Decimal:	10
Hexadecimal:	0A

Explanation:

All the data in buffer will be printed and feeds paper forwards one line when send one LF. The effect is the same as CR, if using both LF and CR commands, only one command will work.

ESC J				n Dot Line Feed
Format: ASCII:	ESC	J	n	
Decimal:	27	74	n	
Hexadecimal:	1B	4A	n	

Explanation:

The printer feeds paper n dot lines. n=0~255.

This command sends carriage return and feed line. It won't influence the latter feed line command. If you need to feed paper immediately but no carriage return, can use ESC J command. Line spacing will be adjusted automatically when using commands ESC V, ESC W and FS W for enlarge characters.

ESC 1				Set n Dot-line Spacing
Format: ASCII:	ESC	1	n	
Decimal:	27	49	n	
Hexadecimal:	1B	31	n	

Explanation:

The line spacing is set to n dot-lines for future Line Feed command. n=0~255, default setting n=3 for text printing, n=0 for bit map printing when using ESC K command.

The BASIC programs for observing the effect of this command are as below:

FOR I=1 TO 11 STEP 2

LPRINT CHR$(27);CHR$(49);CHR$(I);   'ESC 1 set line spacing

LPRINT "RMWD TEST"   'print character string and feed line

NEXT I

The print result of the said programs is as following:
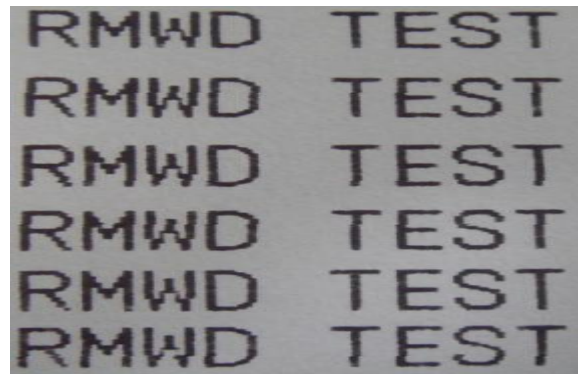
4.2.2 Format Setting Commands

FF				Feed Page
Format:: ASCII:	FF			
Decimal:	12			
Hexadecimal:	0C			

Explanation:

Feed paper to the beginning of the next page.

ESC C				Set Page Length
Format: ASCII:	ESC	C	n	
Decimal:	27	67	n	
Hexadecimal:	1B	43	n	

Explanation:

The page length is set to n character lines. n=0~255, when n=0, the page

length is 256 lines. Default n=40.

ESC N				Set Binding Length
Format: ASCII:	ESC	N	n	
Decimal:	27	78	n	
Hexadecimal:	1B	4E	n	

Explanation:

The binding length is set to n lines. n=0~255, default n= 0. In SP-T,

binding length denotes the number of blank line between one page and the next page.

Example: set binding length to 3 lines, send the following sequence to the printer:

ASCII: ESC N ETX

Decimal: 27 78 3

Hexadecimal: 1B 4E 03

LPRINT CHR$(27); "N"; CHR$(3);

The BASIC programs for sending the said sequence are as below:

LPRINT CHR$ (27) ; "N"; CHR$ (3)

ESC O   Cancel Binding Length

Format: ASCII: ESC O

Decimal: 27 79

Hexadecimal: 1B 4F

Explanation:

The binding length is set to 0 line, it means the printer will print line-by-line, won't vacate

blank lines between each page.

ESC B   Set Vertical Tab Value

Format: ASCII: ESC B n1 n2 n3…NUL

Decimal: 27 66 n1 n2 n3…0

Hexadecimal: 1B 42 n1 n2 n3…00

Explanation:

The vertical tab positions are entered as n1, n2 and so on, all of

these should be within the page length set by ESC C command.

Command NUL added at the end indicates the command is over.

All vertical tab positions that input can be deleted by using this command

in ESC B NUL format. VT command is to carry out vertical tab, the paper fed to the next

vertical position.

Example: set three vertical tab values at 2nd line, 5th line, 8th line in

one page, you can send the following commands:

ASCII:	ESC	B	STX	ENQ	BS	NUL
Decimal:	27	66	2	5	8	0
Hexadecimal:	1B	42	02	05	08	

00

The BASIC programs for this example are as below:

LPRINT CHR$(27); CHR$(66);CHR$(2);CHR$(5);CHR$(8);CHr$(0); 'ESC   B

command

LPRINT CHR$(11);   VT command

LPRINT "SPRM1"   Print character string

LPRINT CHR$(11);   VT command

LPRINT "SPRM2"   Print character string

LPRINT CHR$(11);   VT command

LPRINT "SPRM3"   Print character string

The print result in dot matrix is as following:
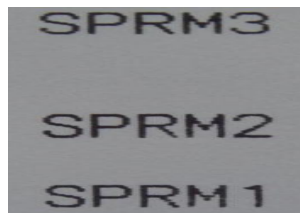
VT	Carry out Vertical Tab Value

Format: ASCII:	VT
Decimal:	11
Hexadecimal:	0B

Explanation:

Feed paper to the next vertical tab position which is set by ESC B command.

Notice: if there is no vertical tab value setting, or the current position equals or is beyond the last vertical tab position, VT command is to feed

paper one line only (same to LF command).

Format: ASCII:	ESC	D	n1	n2	n3………NUL
Decimal:	27	68	n1	n2	n3………0
Hexadecimal:	1B	44	n1	n2	n3………00

Explanation:

The tab positions are entered as n1, n2 and so on, all of these should be within the line width of this model printer. Command NUL added at the end indicates the command is over.

All horizontal tab positions that set can be deleted by using this command in ESC D NUL format.

HT command is to carry out horizontal tab.

Example : set three horizontal tab values at 2nd, 9th line, 14th character position in one line, you can send the following commands:

        ASCII: ESC   D   STX   HT   SO   NUL

        Decimal: 27   68   2   9   14   0

        Hexadecimal: 1B   44   02   09   0E   00

The BASIC programs for this example are as below:

        LPRINT "12345678901234567889"   Ruler

        LPRINT CHR$(27); CHR$(68);CHR$(2);CHR$(9);CHR$(14); CHR$(0);'ESC

            Command

        LPRINT CHR$(9);   HT command

        LPRIN "HT1";   Print character string

        LPRINT CHR$(9);   HT command

        LPRINT "HT2";   Print character string

        LPRINT CHR$(9);   HT command

        LPRINT "HT3";   Print character string

        LPRINT CHR$(13);

The print result in dot matrix is as following:

```
HT1      HT2    HT3
1234567890123456789
```

HT		Carry out Horizontal Tab Value
Format: ASCII:	HT	
Decimal:	9	
Hexadecimal:	09	

Explanation:

The print position is advanced to the next horizontal tab position which is set by ESC D command.

Note : If there is no horizontal tab value setting, or the current position equals or is beyond the last horizontal tab position, HT command won't be carried out.

ESC f				Print Blank Characters or Lines
Format: ASCII:	ESC	f	m	n
Decimal:	27	102	m	n
Hexadecimal:	1B	66	m	n

Explanation:

When m=0, ESC f NUL n will command to print n blank characters, the

value of n should be within the line width of this model printer.

When m=1, ESC f SOH n will command to print n blank lines. n=0~255.

Example: print 6 blank characters in one line, you can send the following commands:

ASCII: ESC   f   NUL   ACK

Decimal: 27   102   0   6

Hexadecimal: 1B   66   00   06

Another example: print 6 blank lines, you can send the following commands:

Format: ASCII: ESC   f   SOH   ACK

Decimal: 27   102   1   6

Hexadecimal: 1B   66   01   06

ESC I				Set Left Margin

Format: ASCII:	ESC	l	n	
Decimal:	27	108	n	
Hexadecimal:	1B	6C	n	

Explanation:

The value of n should be in the range from 0 to the line width of this model printer. Default n=0, that means no left margin.

This command sets absolute position, and won't be influenced by character enlarging commands ESC U and ESC W.

Example: set left margin value to 12, you can send the following commands:

ASCII:	ESC	1	FF
Decimal:	27	108	12
Hexadecimal:	1B	6C	0C

The BASIC programs for this example are as below:

LPRINT "1234567890123456"   Ruler

LPRINT   CHR$(27); CHR$(108);CHR$(12);   ESC 1 command

LPRINT "123456789012345678901234567890"

The print result in dot matrix is as following:
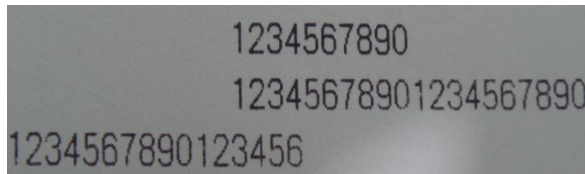
ESC Q			Set Right Margin

Format: ASCII:	ESC	Q	n	
Decimal:	27	81	n	
Hexadecimal:	1B	51	n	

Explanation:

The value of n should be in the range from 0 to the line width of this model printer. Default n=0, that means no right margin.

This command sets absolute position, and won't be influenced by character enlarging

commands ESC U and ESC W.

After setting this command, the printer will auto add feed line as long as the right margin position is reached.

Example: set right margin value to 12, you can send the following commands:

ASCII: ESC   Q   ACK

Decimal: 27   81   12

Hexadecimal: 1B   51   0C

The BASIC programs for this example are as below:

LPRINT "12345678901234567890123456789012"   Ruler

LPRINT   CHR$(27); CHR$(81);CHR$(12);   ESC Q command

LPRINT "123456789012345678901234567890";

LPRINT   "12345678901234567890"

The print result in dot matrix is as following:
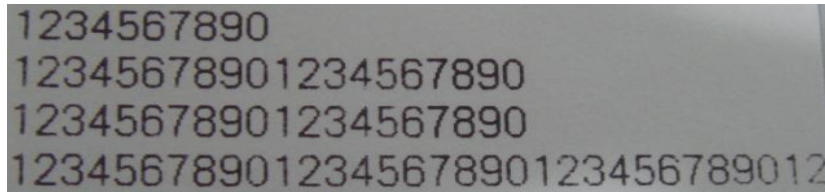
4.2.3 Character Setting Commands

ESC U				Enlarge Width
Format: ASCII:	ESC	U	n	
Decimal:	27	85	n	
Hexadecimal:	1B	55	n	

Explanation:

The characters and graphics following this command are printed at n times of normal width, n=1~4, default n=1, that means normal width, no width enlarging.

The BASIC programs for observing the enlarging effect of this command are as below:

FOR I=1 TO 3

```
LPRINT CHR$(27); CHR$(85); CHR$(I);          ESC U command

LPRINT   "SPRM"                               Print character string

NEXT I
```

The print result in dot matrix is as following:
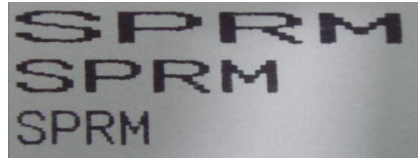
ESC V			Enlarge Height
Format: ASCII:	ESC	V	n
Decimal:	27	86	n
Hexadecimal:	1B	56	n

Explanation:

The characters and graphics following this command are printed at n times of normal height, n=1～4, default n=1.This command should be sent at the beginning of one line.

The BASIC programs for observing the enlarging effect of this command are as below:

```
FOR I=1 TO 3                                  from 1 to 3 times

LPRINT CHR$(27); CHR$(86); CHR$(I)           ESC V command

LPRIN   "SPRM"                                Print character string

NEXT I
```

The print result in dot matrix is as following:
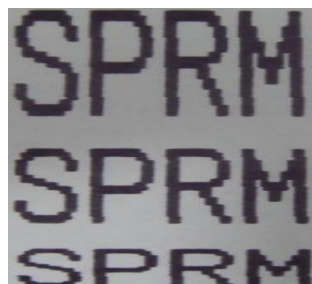
ESC W			Enlarge Width and Height
Format: ASCII:	ESC	W	n

	Decimal:	27	87	n
	Hexadecimal:	1B	57	n

Explanation:

The characters and graphics following this command are printed at n times

of normal width and height, n=1～4, default n=1.

FOR I=1 TO 3	from 1 to 3 times
LPRINT CHR$(27); CHR$(87); CHR$(I);	ESC W command
LPRINT "SPRM"	Print character string
NEXT I	

The print result in dot matrix series is as following:
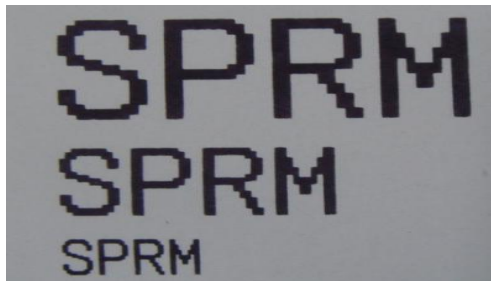
ESC -   Select/cancel Underline Print

Format: ASCII:	ESC	-	n
Decimal:	27	45	n
Hexadecimal:	1B	2D	n

Explanation:

When n=1, select underline print; when n=0, cancel underline print.

All characters including spaces will be printed out with underline after selecting underline

print command, unless cancel the underline print command.

The BASIC programs for observing the effect of this command are as below:

LPRINT CHR$(27); CHR$(57); CHR$(2);   Enlarge the width and height twice

LPRINT "SPRM"

LPRINT CHR$(27); CHR$(45); CHR$(1);   Select underline print

LPRINT "SPRM"   Dot matrix print with underline

LPRINT CHR$(27); CHR$(45); CHR$(0);   Cancel underline print

LPRINT "SPRM"

The print result in dot matrix is as following:
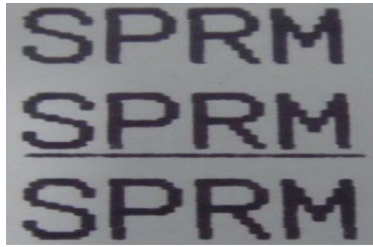
ESC +   Select/cancel Up-line Print

Format: ASCII:	ESC	+	n
Decimal:	27	43	n
Hexadecimal:	1B	2B	n

Explanation:

When n=1, select up-line print; when n=0, cancel up-line print.

All characters including spaces will be printed out with up-line after selecting up-line print command, unless cancel the up-line print command.

The BASIC programs for observing the effect of this command are as below:

LPRINT CHR$(27); CHR$(57); CHR$(2);   Enlarge   the   width and height twice

LPRINT "SPRM"

LPRINT CHR$(27); CHR$(43); CHR$(1);   Select up-line print

LPRINT "SPRM"   dot matrix print with up-line

LPRINT CHR$(27); CHR$(45); CHR$(0);   Cancel up-line print

LPRINT "SPRM"

The print result in dot matrix series is as following:
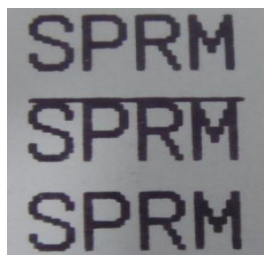
ESC   6   Select Character Set I

Format: ASCII:	ESC	6
Decimal:	27	54
Hexadecimal:	1B	36

Explanation:

All characters following this command are printed using the character set I.

There are two character sets are available for SP micro dot matrix printers,

character set I is selected at power on or on ESC @ command.

ESC   7   Select Character Set II

Format: ASCII:	ESC	7
Decimal:	27	55
Hexadecimal:	1B	37

Explanation:

All characters following this command are printed using the character set II, please refer

to ESC 6.

SO   Set double width character print

Format: ASCII:	SO
Decimal:	14
Hexadecimal:	0E

Explanation:

All characters following this command on the same line are printed at twice their normal

width, this command can be deleted by a carriage return or DC4 command. Normal

characters and width-enlarged characters can be printed on the same line.

DC4   Cancel double width character print

Format: ASCII:	DC4
Decimal:	20
Hexadecimal:	14

Explanation:

Double width printing mode which is set by SO command can be canceled by DC4 command. This command doesn't cancel width enlarging print which set by ESC U and ESC W.

ESC i				Select/cancel Reverse White Print
Format: ASCII:	ESC	i	n	
Decimal:	27	105	n	
Hexadecimal:	1B	69	n	

Explanation:

When n=1, select reverse white print; when n=0, cancel reverse white print.

Reverse white print is printing in the black background, just like the film of photography. It is normal print that printing black characters in white background, the default is canceling reverse white print.

The BASIC programs for reverse white print are as below:

LPRINT CHR$(27); CHR$(105); CHR$(1),   Select reverse white print

LPRINT "SPRD"

The print result in dot matrix series is as following:

ESC c				Select/cancel Reverse Print
Format: ASCII:	ESC	c	n	
Decimal:	27	99	n	
Hexadecimal:	1B	63	n	

Explanation:

When n=1, select reverse print; when n=0, cancel reverse print.

SP-T printers default n=0, others n=1.

Notice:

Reverse print not only supports character mode but also supports graphics and Chinese mode. When print the graphics in reverse direction, pay attention to the print order of graphic units, please see ESC K command.

4.2.4 User-defined Character Setting Commands

ESC   &   User-defined Characters

Format: ASCII:	ESC	&	m	n1	n2……n6
Decimal:	27	38	m	n1	n2……n6
Hexadecimal:	1B	26	m	n1	n2……n6

Explanation:

This command allows a character to be defined, parameter m is the code of user-defined character, m=32～255.Parameter n1, n2, …n6 are the structure codes of user-defined character.

The character size is 6 × 8 dots. Each row is denoted by one byte data, the MSB is on the top, as the below figure shows:

The user-defined characters are stored in printer RAM until power off.

If many ESC & commands use same m value, only the last one is valid.

User can define at most 32 characters. Please refer to ESC % and ESC : commands.

ESC   %   Replace with User-defined Characters

Format: ASCII:	ESC	%	m1	n1	m2	n2……mk	nk	NUL
Decimal:	27	37	m1	n1	m2	n2……mk	nk	0

Hexadecimal:　　　1B　25　m1　n1　m2　n2……mk　nk　00

Explanation:

This command is used to replace the character n with the user-defined character m, and the user-defined character m will be printed out as the replacement of character n.

m1, m2……mk are the codes of user-defined characters.

n1, n2……nk are codes of characters in the current character set the replaced characters.

The values of m and n both should be in the range 32 to 255. The subscript

K=1～32, the maximum number of replaced characters is 32.

Character NUL added to the end means the command is over.

Please refer to ESC & and ESC : commands.

ESC ：　　　　　　　　　　　　　　　Restore Characters that in Character Set

Format: ASCII:　　　ESC　　　:

　　　　Decimal:　　27　　58

　　　　Hexadecimal:　1B　　3A

Explanation:

This command is used to restore the original characters in the character set replaced by user-defined characters using ESC % command. However, user-defined characters won't be deleted from the RAM in printer and may brought back again with ESC % command.

The BASIC programs for observing the effect of ESC &, ESC % and ESC : are as below:

10　LPRINT CHR$(27); "W"; CHR$(8);　　　　　　　' Enlarge width eighteen times

20　LPRINT CHR$(27); "&"; CHR$(65);　　　　　　　'ESC & command

30　LPRINT CHR$(＆H02); CHR$(＆H7C); CHR$(＆H40);

40　LPRINT CHR$(＆HC0); CHR$(＆H40); CHR$(＆H00);

50　LPRINT CHR$(27); "%"; CHR$(65); CHR$(65); CHR$(0); 'ESC %command

60　LPRINT CHR$(65); CHR$(13);　　　　　　　'Print user-defined characters

70　LPRINT CHR$(27); CHR$(58);　　　　　　　' ESC : command

80 LPRINT CHR$(65);   'Restore characters in the character set

The print result in dot matrix series is as following:

4.2.5 Graphics Print Commands

ESC	K				Print bit-map graphics

Format: ASCII:	ESC	K	n1	n2......data......
Decimal:	27	75	n1	n2......data......
Hexadecimal:	1B	4B	n1	n2......data......

Explanation:

This command is used to print (n2×256+n1) ×8bit map. The width of this graphics is n2×256+n1 dots. Each column has 8 dots and can be presented by a 8-bit byte, the MSB is on the top. The values of n1, n2 denote a 16-bit binary data, n1 is LSB, n2 is MSB, n2×256 + n1 denotes the width of this printing graphics, in dot matrix series, n2 =0, n1 should be in the range from 1 to the max. dots number of each line of this model printer. Data are the bytes of relative columns in the graphics sequential from left to right, the number of bytes should equal n1, when the height of the graphics is larger than 8 dots, it can be marked off several units according to 8 dot lines for each graphic unit, when the dots are fewer than 8, use blank dots to make up it, then print out every graphic unit with ESC K command orderly, at last compose an intact graphics. Notice: when adopting reverse print mode, you should print every graphic unit sequentially according to the order from top to bottom of the graphics.

For example: If you want to print two Chinese characters "中文" with ESC K command, the bit- map for the two Chinese is as the below figure shows.

Each character is composed by 7 × 8 dots to 7 columns, there is a space between the two characters, so totally there are 15 columns, then n1=15, n2=0, the 15-byte data showed in hexadecimal are as follows:

7C, 44, 44, FF, 44, 44, 7C, 00, 41, 62, 54, C8, 54, 62, 41

7C,44,44,FF,44,44,7C,00,41,62,54,C8,54,62,41
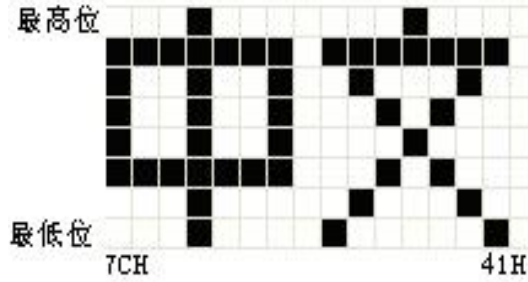
The BASIC programs for this example are as below:

LPRINT CHR$(27); "W"; CHR$(4);   'Enlarge the width and height 4 times

LPRINT CHR$(27); "K"; CHR$(15); CHR$(0);   'ESC K command

LPRINT CHR$(＆H7C); CHR$(＆H44);   CHR$(＆H44); CHR$(＆HFF);

LPRINT CHR$(＆H44); CHR$(＆H44);   CHR$(＆H7C); CHR$(＆H00)

LPRINT CHR$(＆H41); CHR$(＆H62);   CHR$(＆H54); CHR$(＆HC8)

LPRINT CHR$(＆H54); CHR$(＆H62);   CHR$(＆H41);

LPRINT CHR$(10); CHR$(13);   CR to print this line

The print result in dot matrix series is as following:
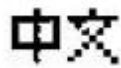
ESC '							Print Curve
Format: ASCII:	ESC	'	m	n1	n2……nm	CR	
Decimal:	27	39	m	n1	n2……nm	13	
Hexadecimal:	1B	27	m	n1	n2……nm	0D	

Explanation:

This command is designed to print curving graphics along with the paper feeding direction.

The value of m is the line number of the printing curve, it should be within the range of the

max. dots number of each line of this model printer.

There are m curving dots in one horizontal line. n1, n2…. nm denote the position of m

curves. The value of nm should equal m and each nm should be within the range of the

max. dots number of each line of this model printer. The last CR (Carriage Return) lets the

printer print out the current dot   line, so a set of dot lines will be printed   out form m-line

curving graphics based on the data of n1, n2…. Nm.

4.2.6 Initialization Commands

ESC @			Initialize Printer
Format: ASCII:	ESC	@	
Decimal:	27	64	
Hexadecimal:	1B	40	

Explanation:

This command is to initialize the following contents of the printer:

·Clear the data in the print buffer;

·Restore the default;

·Select character set 1;

·Delete user-defined characters.

4.2.7 Data Control Commands

CR		Carriage Return
Format: ASCII:	CR	
Decimal:	13	
Hexadecimal:	0D	

Explanation:

If a "CR" command is sent to printer the total data in the print buffer will be printed out and paper will be fed for one line forwards. The result is same as LF,if use both LF and CR commands at the same time, only one command will be effective.

CAN		Cancel One Line
Format: ASCII:	CAN	
Decimal:	24	
Hexadecimal:	18	

Explanation:

This command is to cancel all the characters in the print buffer before this command code, and return to the last carriage return code. It doesn't cancel any control code sequences in the current line.

DEL		Delete One Character
Format: ASCII:	DEL	
Decimal:	127	
Hexadecimal:	7F	

Explanation:

This command is to delete one character in the print buffer, it doesn't delete the control code unless this character has been printed.

NUL		NUL
Format: ASCII:	NUL	
Decimal:	0	
Hexadecimal:	00	

Explanation:

NUL command is used as the final code in some commands such as ESC B, ESC D, ESC % and ECS ', denotes these commands are over. NUL command is ignored when used alone.

ESC "				Select/cancel Hexadecimal print
Format: ASCII:	ESC	"	n	
Decimal:	27	34	n	
Hexadecimal:	1B	22	n	

Explanation:

Hexadecimal dump print mode is turned on if n=1, and turned off if n=0, when Hexadecimal dump print mode is turned on, all data sent from the host computer will be printed out in hexadecimal.

For example: when send the following data from the host computer to the printer

LPRINT CHR$ (0); CHR$ (27); "A"; CHR$ (24);

These data will be printed out in hexadecimal:

    00   1B   41   18

Hexadecimal print mode carries out print only when the print buffer is full.

4.2.8 Chinese Character Print Control Commands

Chinese character print commands adopt FS standard commands. The Chinese character library is the level I, II Chinese characters, graphics and symbols which all meet the specifications of GB2312-80. Each Chinese character or character is presented by 2-byte GB code. This series adopt internal code which is corresponding GB code to denote the Chinese characters. Notice: only the commands with * are effective in series CF and TF, and only receive Chinese command and CR, LF.

The following is the description for these commands.

FS &			* Select Chinese Print Mode*
Format: ASCII:	FS	&	
Decimal:	28	38	
Hexadecimal:	1C	26	

Explanation:

After printer received this command, it will switch from ASCII character print mode to Chinese character print mode. Using GB Chinese character library level I, II.

FS ·			* Cancel Chinese Print Mode*
Format: ASCII:	FS	·	
Decimal:	28	46	
Hexadecimal:	1C	2E	

Explanation:

After printer received this command, it will switch from Chinese character print mode to character print mode.

FS   SO   *_Set Chinese Double Width Print*

Format: ASCII:	FS	SO
Decimal:	28	14
Hexadecimal:	1C	0E

Explanation:

Characters following this command are printed at twice their normal width, does not enlarge the height. Notice: the command only be effective in one line.

FS   DC4   Cancel Chinese Double Width Print*

Format: ASCII:	FS	DC4
Decimal:	28	20
Hexadecimal:	1C	14

Explanation: This command is to cancel FS SO command.

FS   W   Set the Enlarging Multiple of Chinese Character

Format: ASCII:	FS	W	n
Decimal:	28	87	n
Hexadecimal:	1C	57	n

Explanation:

Characters following this command are printed at twice their normal width and height. When n=1, this command is selected, when n=0, it is canceled.

FS   J   Set Vertical Print

Format: ASCII:	FS	J
Decimal:	28	74
Hexadecimal:	1C	4A

Explanation:

This command is to print Chinese characters vertically, namely printing by rotating wider

shins for 90°

FS   K   Set Horizontal Print

Format: ASCII:	FS	K
Decimal:	28	75
Hexadecimal:	1C	4B

Explanation:

This command is to print Chinese characters horizontally, if have not set rotation, the

Chinese characters will be printed horizontally, that is normal print status.

FS   I   Set Chinese Character Rotational Print

Format: ASCII:	FS	I	n
Decimal:	28	73	n
Hexadecimal:	1C	49	n

Explanation:

This command is to rotate Chinese characters, the values of n are as following:

n	Chinese characters rotated wider shins
0	0°
1	90°
2	180°
3	270°

FS   -   Chinese Character with Underline Print

Format: ASCII:	FS	-	n
Decimal:	28	45	n
Hexadecimal:	1C	2D	n

Explanation:

The specified Chinese characters after this command are printed with underline. When n=1, underline selected; when n=0, it canceled.

FS   r   Select Superscript and Subscript Print

Format: ASCII:	FS	r	n
Decimal:	28	114	n
Hexadecimal:	1C	72	n

Explanation:

This command is to select the position for superscript and subscript, n=0 is superscript and n=1 is subscript. Notice: this command is only valid for 16×8, 8 ×8 Chinese characters and 5×7 or 6×8 ASCII characters, so before using this command, the Chinese characters or ASCII characters which are regarded as superscript and subscript for print, should be set firstly using FS i or FS ·command.

FS   SI   Select Vertical DBC Case Chinese Character Print

Format: ASCII:	FS	SI
Decimal:	28	15
Hexadecimal:	1C	0F

Explanation:

After the printer received this command, it will print Chinese characters with 8×16 dots. (the command only be effective for16×16 dots)

FS   DC2   Cancel Vertical DBC Case Chinese Character Print

Format: ASCII:	FS	DC2
Decimal:	28	18
Hexadecimal:	1C	12

Explanation:

This command cancels FS   SI, restore to print Chinese characters with 16×16dots. (the command only be effective for16×16 dots)

FS   i   Select Chinese Character Bit Map

Format:	ASCII:	FS	i	n
	Decimal:	28	105	n
	Hexadecimal:	1C	69	n

Explanation:

This command is to select Chinese characters with different bit map, as the following tab shows:

n	Chinese Character Bit Map
0	16*16
1	8*16
2	16*8
3	8*8

Characters with different bit map can be printed in one line, but before the Chinese character code, should set the bit map with FS i or FS SI command firstly. (the command only be effective for16×16 dots)

FS   G   Select Chinese Character Misplace Print

Format:	ASCII:	FS	G
	Decimal:	28	71
	Hexadecimal:	1C	47

Explanation:

This command is to set Chinese character misplace print. The characters that put in the printer after this command will be printed out in misplace mode, namely Chinese characters will become thicker and heavier than normal single-line ones, can be used for printing titles or printing heavily.

FS   H   Cancel Chinese Character Misplace Print

Format: ASCII:	FS	H

	Decimal:	28	72
	Hexadecimal:	1C	48

Explanation:

This command is to cancel Chinese character misplace print, and restore to normal single-line Chinese character print mode.

4.3 Printer default parameter setting commands

The setting command is used to set printer default parameters, only set once before using, the parameter will be stored into inner FLASH, it doesn't change after power off. Notice, some commands could change parameter in normal mode, but the content cannot be stored into FLASH, the setting still be the former default after power off or initialization.

4.3.1 Enter, exit setting mode

ESC HT				Enter setting mode
Format:	ASCII:	ESC	HT	
	Decimal:	27	09	
	Hexadecimal:	1B	09	

Explanation:

Enter setting mode.Only enter into setting mode,you can change parameter setting value.

ESC NAK				Exit setting mode
Format: ASCII:		ESC	NAK	
	Decimal:	27	21	
	Hexadecimal:	1B	15	

Explanation:

Exit setting mode.The setting parameter can be stored only after carry out exit setting mode command rightly.

4.3.2 Printer basic parameter setting

ESC #   Serial parameter setting

Format:	ASCII:	ESC	#	n
	Decimal:	27	35	n
	Hexadecimal:	1B	23	n

Explanation:

The command set serial parameter, n means serial baud rate and data format,as following figure:

Bit	Function	0	1
D0	Baud rate	000~111 are	
D1		1200,2400,4800,9600,19200,38400,57600,115200	
D2			
D3	handshaking protocol	XON/XOFF	RTS/CTS
D4	Character length	7bits	8bits
D5	Parity	Have	None
D6	Parity method option	Even parity	Odd parity
D7	Data receive error handling	Ignore	Print"？"

In default condition, n=FBH: 9600,no parity,8bits data, RTS/CTS handshaking protocol, print"？", printer will return value of n after received commands.

ESC   !   Font dots setting

Format: ASCII:	ESC	!	n
Decimal:	27	33	n
Hexadecimal:	1B	21	n

Explanation:

Set Chinese, character dots in Chinese mode.

n=00H : 16×16 dots Chinese ,8×16dots character; n=01H: 12×12dots Chinese ,6×12dots character; default n=00H, printer will return value of n after received commands.

FS &			Default Chinese mode set when power on
Format: ASCII:	FS	&	
Decimal:	28	38	
Hexadecimal:	1C	26	

Explanation:

Set default is Chinese mode when switched on, printer will return to 01H after received command.

FS .			Default ANK mode set when power on
Format: ASCII:	FS	.	
Decimal:	28	46	
Hexadecimal:	1C	2E	

Explanation:

Set default is Chinese mode when switched on, printer will return to 01H after received command. Default is ANK mode when exit factory.

ESC c				Print direction setting
Format: ASCII:	ESC	c	n	
Decimal:	27	99	n	
Hexadecimal:	1B	63	n	

Explanation:

Set character printing direction, n=00H: forward printing, n=01H : inverse printing, default desktop type n=00H, panel type n=01H. Printer will return to value n when received command.

Chapter 5 Operation and maintenance

5.1 Print head protection

In order to guarantee the printer works normally, please especially pay attention not to dismantle the print head at random. As to the users who don't use the outer cover of the printer should give their attention to protect the print head even more.

1. If you do not use the printer for a long time, please don't put through the printer on the power.

2. If the printer works abnormally, please turn off the printer power.

3. The used power adapter must meet the requirement, otherwise it will be disadvantageous to the print head.

4. Don't lubricate the print head.

5. While changing the paper roll, please notice whether there is paper scrap on the print head, if there is, please blow it away gently.

6. While changing the ribbon cassette, don't press the ribbon cassette heavily, otherwise may damage the plastic roller on the printer.

7. Keep the circuit board of the printer clean and dustless.

5.2 Other

Please notice the following aspects too:

1. Don't insert and pull out the chip, if there is abnormality, please hand over to the producer for repairing.

2. Don't lubricate the ribbon cassette, otherwise damage the print head.

3. When you suppress to join the electric wire by yourself, should pay attention to whether your printer port is parallel interface or serial interface, don't connect to the host computer incorrectly.

Chapter 6 Printer Using under Windows

SP micro dot matrix printers can be used under Windows of PC. Installation method is same to the large-scale EPSON printer.

1. start-----set-----printer-----add the printer------default

2. Key in the contents.

3. Set the paper width to 44mm or 57mm, spacing and the length of page are optional.

4. Select serial or parallel interface.

5. Carry out printing (at this time the printer can print out the contents that you have selected or input).

Appendix 1 Valid Codes Tab

The serial number of valid codes is from 00H to 0FFH, among them 00H-1FH are control codes, 20H-0FFH are character codes. Character codes composed by two character sets, the character codes of each character set are all 20H-0FFH permutation.

Character Set I

Character Set II

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
2	百	千	万	II	℃	℉	⁻¹	⁴	₄	½	⅓	¼	⊤	×	√	⊥
3	∥	‖	∪	∩	⊕	⊂	⊃	∈	∋	▽	∇	∂	∫	∮	°	∵
4	∴	=	≘	∽	≠	∝	≤	≥	≮	≯	♂	♀	‡	†	‰	∷
5	※	□	(	)	⟨	⟩	⟦	⟧	⟬	⟭	˘	¨	○	♥	♦	♣
6	♠	ア	イ	ウ	エ	オ	カ	キ	ク	ケ	コ	サ	シ	ス	セ	ソ
7	タ	チ	ツ	テ	ト	ナ	ニ	ヌ	ネ	ノ	ハ	ヒ	フ	ヘ	ホ	マ
8	ミ	ム	メ	モ	ヤ	⊥	ヨ	ラ	リ	ル	レ	ロ	ワ	キ	エ	ヲ
9	ン	ァ	ゥ	ェ	ォ	ヵ	ュ	≠	ッ	\\	○	Б	Д	Ё	Ж	З
A	И	Й	Л	Ц	Ч	Ш	Щ	Ъ	Ы	Э	Ю	Я	ъ	§	è	Ø
B	ø	ɡ	ü	ė	å	ä	å	ã	S	ê	ë	ė	ī	î	ı	Ā
C	Â	É	æ	Æ	Ô	Ö	Ô	Û	Ù	ÿ	Ö	Ü	≮	₧	ƒ	á
D	í	ó	ú	ñ	Ñ	ª	º	¿	ß	ü	ê	â	ä	å	ã	S
E	ê	ë	è	ï	î	ı	Ă	Â	É	æ	Æ	Ô	Ô	Ò	Û	Ù
F	ÿ	Ö	Ü	≮	₧	ƒ	á	í	ó	ú	ñ	Ñ	ª	º	¿	∩

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Appendix 2 Print Commands

Decimal	Hexadecimal	Command Name	Function	Page
0	0	NUL	Ending symbol	33
9	9	HT	Carry out horizontal tab	22
10	0A	LF	Feed line	18
11	0B	VT	Carry out vertical tab	21
12	0C	FF	Feed page	19
13	0D	CR	Carriage return	33
14	0E	SO	Set double width character print	28
20	14	DC4	Cancel SO Command	28
24	18	CAN	Cancel the characters in current line	33
127	7F	DEL	Delete the last character	33
27 34 n	1B 22	ESC "n	Select/cancel hexadecimal print	33
27 37	1B 25	ESC % m1 n1…mk nk NUL	Replacing code nk is defining code mk	30
27 38	1B 26	ESC & m n n n2…n6	User-defined characters	29
27 39	1B 27	ESC ,m n1 n2…nk	Print m curving dots	32
27 43 n	1B 2B n	ESC +n	Select/cancel up-line print	27
27 45 n	1B 2D n	ESC –n	Select/cancel underline print	26
27 49 n	1B 31 n	ESC 1 n	Set line spacing to n dot lines	19
27 54	1B 36	ESC 6	Select character set I	28
27 55	1B 37	ESC 7	Select character set II	28
27 58	1B 3A	ESC :	Restore original codes (restore character set)	30

27 64	1B 40	ESC @	Initialize printer	32
27 66	1B 42	ESC B n1…nkNUL	Set vertical tab value	20
27 67	1B 43	ESC C n	Set page length to n lines	20
27 68	1B 44	ESC D n1…nk NUL	Set horizontal tab value	21
27 74 n	1B 4A n	ESC J N	Feed line n dot lines	18
27 75	1B 4B	ESC K n1…n2…data	Print n×18 bit-map graphics	31
27 78 n	1B 4E	ESC N n	Set binding length to n lines	20
27 79 n	1B 4F	ESC O n	Cancel binding length	20
27 81 n	1B 51 n	ESC Q n	Set right margin width	24
27 85 n	1B 55 n	ESC U n	Enlarge width n times	25
27 86 n	1B 56 n	ESC V n	Enlarge height n times	25
27 87 n	1B 57 n	ESC W n	Enlarge width and height n times	26
27 99 n	1B 63 n	ESC C n	Select/cancel reverse print	29
27 102 m n	1B 66	ESC f m n	Print blank or feed line	23
27 105 n	1B 69 n	ESC i n	Select/cancel reverse white print	28
27 108 n	1B 6C n	ESC I n	Set left margin width	23
28 14	1C 0E	FS SO *	Set double width print of Chinese character	34
28 20	1C 14	FS DC4 *	Cancel FS SO	35
28 15	1C 0F	FS SI	Select vertical DBC case Chinese character print	36
28 18	1C 12	FS DC2	Cancel vertical DBC case Chinese character print	36
28 38	1C 26	FS & *	Select GB level I, II Chinese fonts library	34
28 45 n	1C 2D n	SF – n	Print Chinese characters with underline	36

28 46	1C 2E	FS · *	Cancel Chinese print mode	34
28 71	1C 47	FS G	Select Chinese character misplace print	37
28 72	1C 48	FS H	Cancel Chinese character misplace print	37
28 73 n	1C 49 n	FS I n	Set Chinese character rotational print	35
28 74	1C 4A	FS J	Set vertical print	35
28 75	1C 4B	FS K	Set horizontal print	35
28 87 n	1C 57 n	FC W n	Set the enlarging multiple of Chinese character	35
28 105 n	1C 69 n	FS I n	Select Chinese character bit-map	37
28 114	1C 72 n	FS r n	Select superscript and subscript	36

Explanation:

only the Chinese commands with * are effective in series CF and TF, and only receive

Chinese commands and CR, LF.