SPRT®

SP－POS88III

Line Thermal Printer

User's Manual

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Content

Introduction

SP-POS88III printer is a new type line thermal printer, it features in fast speed print, low print noise, high reliability, perfect print quality and ribbon needless, avoiding the vexation of regular maintenance.

SP-POS88III printer: small in outline dimension, simple operation, and extensive application, especially suitable for commercial cash register, PC-POS, bank POS and all kinds of receipts print.

Chapter 1 Feature and Performance

1.1 Print Performance

- Print method: direct thermal
- Print paper width: 79.5±0.5mm
- Print density: 8 dots/mm, 576 dots/line
- Print speed: approx.150mm / sec. or 40 lines/sec.
- Reliability
  Print head life: 100km
  Using condition:
  * Print 12 × 24 ASCII characters, print 50 lines each time, intermittent print repeatedly
  * Each dot-line printing at the same time should not exceed 25%, each character line and one dot vertical printing repeatedly should not exceed 11 times
  * Use specified thermal paper
  Cutter life: 500,000 cuts
  Using condition: less than 30 cuts/minute
- Valid print width: 72mm
- Feeding speed: approx.150mm / sec. or 40 lines / sec.

1.2 Print Paper

- Thermal paper roll model: TF50KS－E（Japan paper co.ltd）
  AF50KS-E (JUJO THERMAL)
- Thermal paper roll: Width－－－ 79.5±0.5mm
  Outer Diameter －－－ 80mm（max.）
  Inner Diameter－－－ 13mm（min.）
  Thickness －－－ 53～60g / m^2

1.3 Print Font

- IBM Character set II (ANK):
  12×24 dots，1.25（W）×3.00（H）mm;
- GB GB2312-80(Chinese):
  24×24 dots，3.00（W）×3.00（H）mm.

1.4 Interface

- Serial interface

DB-25 socket (female), supports XON/XOFF and RTS/CTS protocols.
Baud rate: 12000～115200bps adjustable.
Data structure: 1start bit + (7 or 8) data bits + 1 stop bit.
Parity checking: no parity or odd, even parity optional.

● Parallel interface

DB-25 socket (male) or 36-pin is optional, 8-bit parallel interface, BUSY/ACK handshaking protocol, TTL signal level.

● Cash drawer control

DC24V，1A，6-pin RJ-11 socket.

1.5 Print control commands

● Character print commands: support double-width, double height print of ANK characters, user-defined characters and Chinese characters, the character line spacing is adjustable.

● Graphics print commands: support the print of bit-map graphics and download bit-map graphics with different density

● GS bar code print commands: support EAN-13，EAN-8 bar code print.

1.6 Power Supply

● DC24V±10％，2A，A-1009-3P power socket.

1.7 Operation Environment

● Operation temperature: 5～50℃; Relative humidity: 10～80％

● Storage temperature: -20～60℃; Relative humidity: 10～90℃

1.8 Outline Dimension

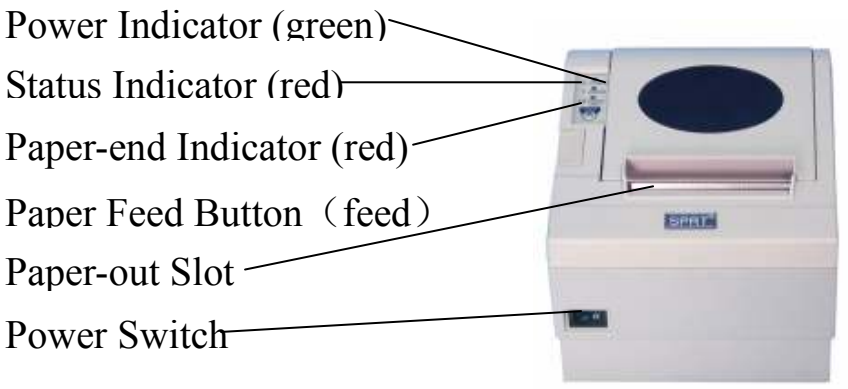
● 150（W）×192（L）×150（H）mm

1.9 Model classification

Model	Cutter	Interface
POS88Ⅲ-AS	Partial-cutting	Serial(DB25 female)
POS88Ⅲ-AP1	Partial -cutting	Parallel(36-pin standard print)
POS88Ⅲ-AP2	Partial -cutting	Parallel(DB25 male)
POS88Ⅲ-BS	Full-cutting	Serial(DB25 female)
POS88Ⅲ-BP1	Full-cutting	Parallel(36-pin standard print)
POS88Ⅲ-BP2	Full-cutting	Parallel(DB25 male)

Chapter 2 Operation Specification

2.1 Printer Appearance



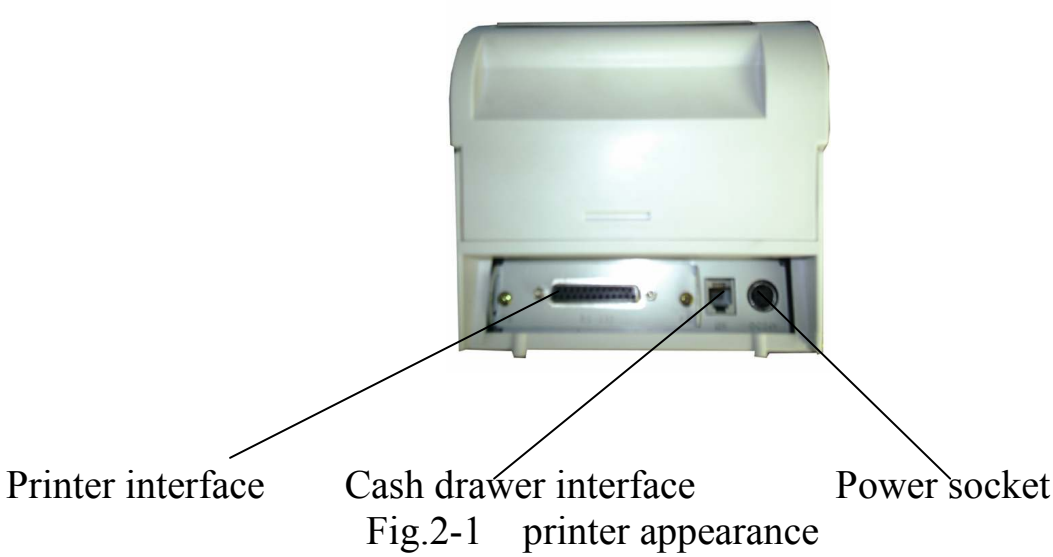


Fig.2-1 printer appearance

2.2 Paper Installation

2.2.1 Paper Loading

SP-POS88III adopts 80mm width thermal paper roll.

If you prepare to load the paper, you can do as the following steps.

Hold down the upper cover button, open the movable upper cover, move away the old paper roll, and put the new thermal paper in the paper holder of printer, draw a certain length of the paper roll, put the paper end on the print head, close the upper cover and press it downwards lightly until it restore to original position, and the paper end appears from the paper-out slot which is on the upper cover, then print paper installation is finished.

Caution!

1. When there is no paper in the print head, don't press 【FEED】 button, avoiding to shorten the print head life;
2. Please don't feed or draw the paper forwards or backwards with hands. When returning paper, please cut the extra paper, and press 【LF】button, paper will go forwards.

2.2.2 Solution to Paper Jam

Turn power off, open the upper cover, hold down the black rubber cutter lever, at the same time move the cutter forwards slowly, can separate the cutter from the print head. Then lift the print head lever forwards to maximum position, draw out the paper slowly with hand.

2.3 Interface

2.3.1 Serial Interface

The serial interface of SP-POS88Ⅲ printer is compatible with RS-232C, supports RTS/CTS and XON/XOFF handshaking protocols, uses DB25 socket (female). The pin order of the serial port is as Fig.2-2 shows:

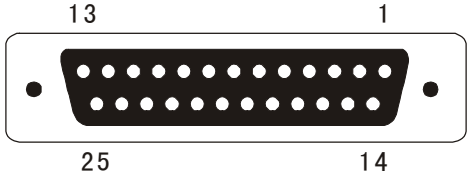


Fig.2-2 Pin Order of Serial Port

The pin assignment of serial interface is shown in Fig. 2-3:

Pin No.	Signal Name	Source	Description
2	RXD	Host	Printer receives data from host
3	TXD	Printer	Printer transmits control code X-ON/X-OFF and data to host
5	CTS	Printer	Signal "MARK" indicates that the printer is "BUSY" and unable to receive data; "SPACE" indicates that the printer is "READY" for receiving data.

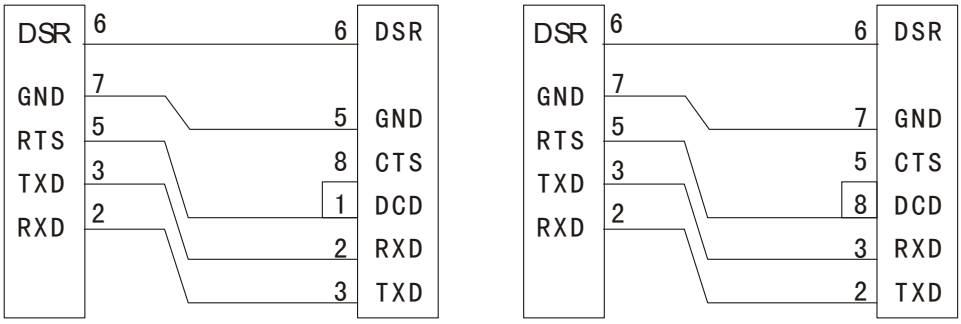
6	DSR	Printer	Signal “SPACE” indicates that the printer is “ONLINE”
7	GND	—	Signal Ground
8	DCD	Printer	Same to signal CTS

Note: ①“Source” denotes the source that signal come from;
② Logical signal level is EIA.

Fig.2-3 Pin Assignment of Serial Interface

The baud rate and data structure in serial interface mode is 9600bps, 8-bit data bits, no parity bit and 1 stop bit.

The serial interface of SP-POS88 Ⅲ can be connected to standard RS-232CRS-232C interface. When it is connected to IBM PC or its compatible machine, connection can accord to Fig.2-4.



Printer 25PIN Socket — IBM PC Serial Interface DB-9

Printer 25PIN Socket — IBM PC Serial Interface DB-25

Fig.2-4 Connection between SP-POS88Ⅲ and IBM PC Serial Interface Sketch Map

2.3.2 Parallel Interface

The parallel interface of SP-POS88Ⅲ printer is compatible with CENTRONICS, supports BUSY or ACK handshaking protocol, uses DB25 socket (male) or 36pin CENIRONICS socket (female) optional.
The pin order of parallel port is as Fig. 2-5 shows:

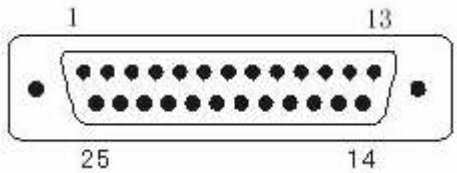


Fig.2-5 Pin Order of Parallel Port

The pin assignment of DB25 parallel interface is shown in Fig. 2-6 shows:

Pin No.	Signal	Direction	Description
1	/STB	In	Strobe pulse to latch data, Reading occurs at falling edge.
2 3 4 5 6 7 8 9	DATA1 DATA2 DATA3 DATA4 DATA5 DATA6 DATA7 DATA8	In In In In In In In In	These signals represent the 1st bit to 8th bit of the parallel data representatively, each signal is at HIGH level when data is logic 1, and LOW when data is logic 0.
10	/ACK	Out	Answer pulse, LOW level signal indicates that data have already been received and the printer gets ready to receive the next data.
11	BUSY	Out	HIGH level signal indicates that the printer is BUSY and can not receive data.
12	PE	Out	HIGH level signal indicates that paper is end.
13	SEL	Out	Pulling up to HIGH level signal by a resistor
15	/ERR	Out	LOW level signal indicates that there has error.
14,16,17	NC	---	No connection
18-25	GND	---	Grounding logical 0 level

Note: （1）“In” denotes input to the printer，“Out” denotes output from the printer.

（2）Signal level is TTL standard.

Fig.2-6 Pin assignment of DB-25 parallel interface

The pin assignment of 36pin parallel interface is as Fig.2-7 shows:

pin No.	Signal	Direction	Description
1	/STB	In	Strobe pulse to latch data, Reading occurs at falling edge.
2 3 4 5 6 7 8 9	DATA1 DATA2 DATA3 DATA4 DATA5 DATA6 DATA7 DATA8	In In In In In In In In	These signals represent the 1st bit to 8th bit of the parallel data representatively, each signal is at HIGH level when data is logic 1, and LOW when data is logic 0.
10	/ACK	Out	Answer pulse, LOW level signal indicates that data have already been received and the printer gets ready to receive the next data.
11	BUSY	Out	HIGH level signal indicates that the printer is BUSY and can not receive data.
12	PE	Out	HIGH level signal indicates that paper running out.
13	SEL	Out	Pulling up to HIGH level signal by a resistor
32	/ERR	Out	LOW level signal indicates that there has error.
14, 15, 17, 18, 34, 36	NC	---	No connection
16, 19～30, 33	GND	---	Grounding logical 0 level

Note: （1）“In” denotes input to the printer，“Out” denotes output from the printer.

（2）Signal level is TTL standard.

Fig. 2-7 Pin assignment of 36pin parallel interface

The timing chart for interface signal of parallel interface is as Fig.2-8 shows:

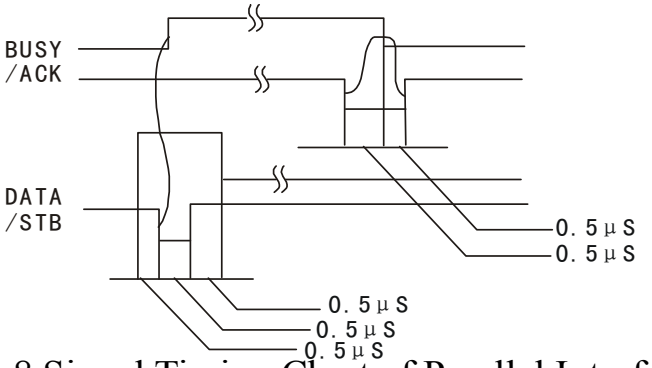


Fig.2-8 Signal Timing Chart of Parallel Interface

2.3.3 Cash Drawer Interface

Fig. 2-9
Cash drawer interface

The cash drawer interface of POS-POS88 Ⅲ adopts RJ-11 6-pin socket, as Fig.2-9 shows:

The pin assignment of the cash drawer interface is defined as follows:

Pin No.	Signal	Direction
1	Chassis Ground	---
2	Cash drawer driver signal	Out
3	Cash drawer on/off status signal	In
4	+24VDC	Out
5	N.C	---
6	Cash drawer on/off status signal ground	---

2.3.4 Power Connection

Fig.2-10
Power Socket

SP-POS88III uses the external power supply adopter as 24V±10％、2A, power socket is A-1009-3P model, as Fig. 2-10 shows:

2.4 Buttons and Indicators

There is one button and three indicators on SP-POS88 Ⅲ printer.【FEED】is paper feeding button, the function of its enabling or disabling the button on/off can be set by print command, when the button is enabled, press 【FEED】 button, then the paper presenting driver starts up and paper fed

into the printer; release【FEED】 button, paper feeding stops. The green POWER light is the power indicator, red ERROR light is status indicator, it is dark when the printer works normally, while it flashes when reporting an abnormal emergency, as the following form shows:

Error	Indicator status	Description	ERROR Code (Hex)
Paper running out	Flash continuously	Paper is about to out	88H
Print head uplifted	Flash once and put out 1.2 seconds	Put down the print head	82H
Print head overheat	Flash twice and put out 1.2 seconds	Printer will restore to normal status automatically when the temperature of the print head drops	81H
Cutter position error	Flash thrice and put out 1.2 seconds	Printer can't restore, wait for testing whether the cutter blocked paper	A0H

When the assemblies of printer appear the foresaid errors, parallel interface / ERR pin became "0"signal level, and automatically send one byte ERROR code through TXD parallel interface, the status of printer can be transmitted by ESC v command.
Red PAPEROUT light is paper end indicator. When there is no paper in the print head, the indicator flashes, and sends one byte 84H code through TXD serial interface, while it goes dark in normal status.

2.5 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.
The self-test will print out the firmware version, interface setting and 128

ANK characters.
Hold down【FEED】button and turn on the power, then release the button, self-test begins automatically at this moment.

2.6 DIP Switch Setting

DIP Switch1 is used to set the baud rate and data structure of serial interface, setting is as Fig. 2-11 shows.

DIP	Function	ON	OFF
1	Baud rate selection	See Fig.2-12	
2			
3			
4	Handshaking protocol	XON/XOFF	RTS/CTS
5	Length of character	7 bits	8 bits
6	Parity	Yes	No
7	Parity checking mode selection	Even parity	Odd parity
8	Wrong solution to data receiving	Ignore	Print“？”

Fig. 2-11 DIP Switch1 Setting

Baud rate（BPS）	DIP 1-1	DIP 1-2	DIP 1-3
1200	ON	ON	ON
2400	OFF	ON	ON
4800	ON	OFF	ON
9600	OFF	OFF	ON
19200	ON	ON	OFF
38400	OFF	ON	OFF
57600	ON	OFF	OFF
115200	OFF	OFF	OFF

Fig. 2-12 Baud Rate Setting

DIP Switch 2 each bit is reserved bit.
When set DIP switch, it needs to open the small iron plate at the bottom of the printer.

Chapter 3 Print Control Commands

3.1 Summary

SP-POS88Ⅲ offers ESC/POS print command set.

Each command is described in following format:

Print command		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.

3.2 Command Descriptions

3.2.1 Print Commands

LF		Print and Feed Line
Format:	ASCII:	LF
	Decimal:	10
	Hexadecimal:	0A

Explanation:

Print the content in the buffer and feed paper one line. Only feed paper one line if buffer is empty.

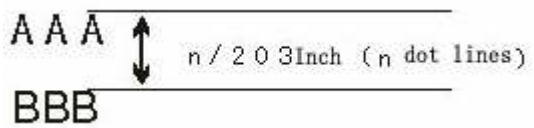
ESC J				Print and Feed n Dot Lines
Format:	ASCII:	ESC	J	n
	Decimal:	27	74	n
	Hexadecimal:	1B	4A	n

Explanation:

Print the content in the buffer and feed paper n dot lines. (n/203 inch), n=0~255.

This command is only valid for current line and will not change the spacing settings set by ESC 2，ESC 3 commands.

Example:



3.2.2 Line Space Setting Commands

ESC 2				Set Line Spacing to 1/6 Inch
Format:	ASCII:	ESC	2	
	Decimal:	27	50	
	Hexadecimal:	1B	32	

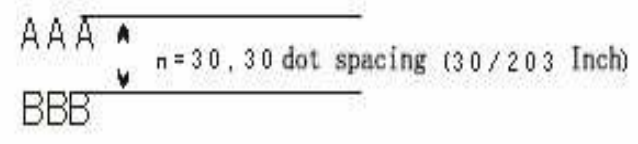
Explanation:

Set line spacing to 1/6 inch.

ESC 3			Set Line Spacing to n Dot Lines (n/203 inch)
Format:	ASCII：	ESC	3
	Decimal:	27	51
	Hexadecimal:	1B	33

Explanation:
Set line spacing to n dot lines. n=0~255.
One dot-line is 1/203 inch for SP-POS88III, that means this command set the dot-line spacing to n/203 inch. Default n=30.

Example:



3.2.3 Character Print Commands

ESC !				Set Character Print Mode
Format:	ASCII:	ESC	!	n
	Decimal:	27	33	n
	Hexadecimal:	1B	21	n

Explanation:
ESC ! n is a comprehensive command to set character print mode, is used for selecting print character size. Each bit of print parameter n is defined:

× × D5 D4 × × × ×
1: Double Height Print
1: Double Width Print

Default n=0, that means no character enlargement.

ESC SO			Set Double Width Character Print
Format:	ASCII:	ESC	SO
	Decimal:	27	14
	Hexadecimal:	1B	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.

ESC DC4			Cancel Double Width Character Print
Format:	ASCII:	ESC	DC4
	Decimal:	27	20
	Hexadecimal:	1B	14

Explanation:

After carrying out this command, the characters will be printed with normal width.

ESC %				Select/Cancel User-defined Characters
Format:	ASCII:	ESC	%	n
	Decimal:	27	37	n
	Hexadecimal:	1B	25	n

Explanation:

When n=1, select user-defined character set; When n=0, select internal character set.

Default n=0

ESC &							Define Use-defined Characters
Format:	ASCII：	ESC	&	s	n	m	[a [p]s×a]m-n+1
	Decimal:	27	38	s	n	m	[a [p]s×a]m-n+1
	Hexadecimal:	1B	26	s	n	m	[a [p]s×a]m-n+1

Explanation:

ESC & is used to define user-defined characters. s=3，32≤n≤m≤127, 0≤a≤12, 0≤p≤255,

◆ s is the number of bytes in vertical direction, s=3 here.

◆ n is the starting ASCII code of user-defined character.

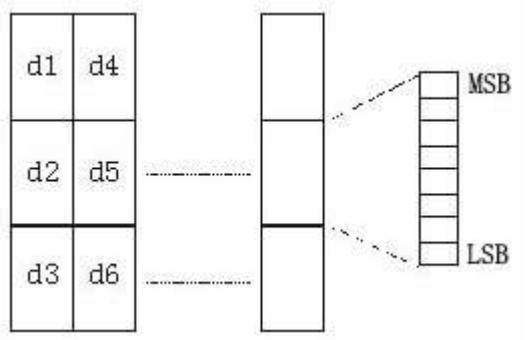
◆ m is the stopping ASCII code of user-defined character.

When define only one character, n=m, the maximum number of user-defined characters is 96.

◆ a is the number of dots in horizontal direction.

◆ p is the data of self-defined characters, there are s×a bytes in each character, the total number of user-defined characters is m-n+1.

◆ User-defined characters are valid until re-defined, reset or power off, format of the user-defined characters is shown as follows:



3.2.4 Special Control Commands

ESC c 5					On/Off Switch Button Function
Format:	ASCII：	ESC	c	5	n
	Decimal:	27	99	53	n
	Hexadecimal:	1B	63	35	n

Explanation:

When n=1, button【FEED】is enabled;

When n=0, button【FEED】is disabled;

Default n=0.

3.2.5 Graphics Print Commands

ESC *						Set Bit-map Graphics Command
Format:	ASCII：	ESC	*	m	n1 n2	[d]k
	Decimal:	27	42	m	n1 n2	[d]k
	Hexadecimal:	1B	2A	m	n1 n2	[d]k

Explanation:

Select bit-map command, m for setting bit-map mode; n1, n2 for setting number of dots; [d]k for setting contents of bit-map.

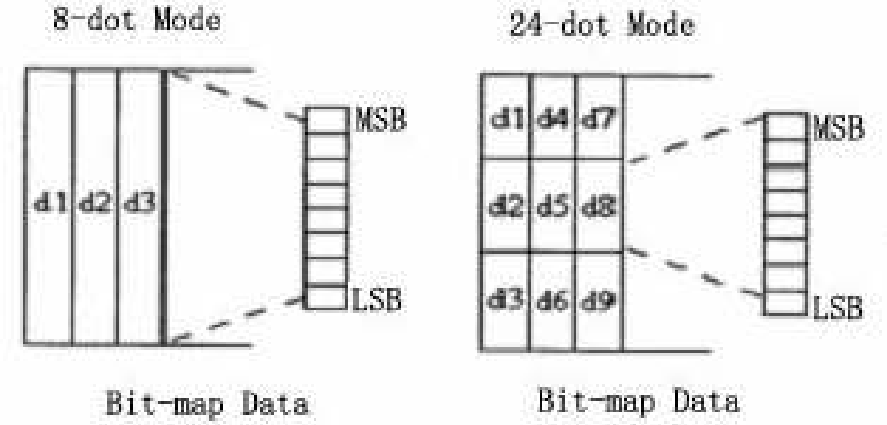
M=0,1,32,33, n1=0~255. n2=0~2. d=0～255.

k=n1+256×n2 (m=0，1)

k= (n1+256×n2) ×3 (m=32, 33)

- ◆ The number of horizontal dots of the graphics is n1+256×n2
- ◆ If the number of dot is more than one line, the extra portion will be ignored (referring the following table)
- ◆ d is the bit map data, for 1 of bit means the related dot will be printed and for 0 of bit means the related dot will not be printed. (k is the total number of dot)
- ◆ m is the selected bit map mode.

M	Mode	Vertical		Horizontal	
		Dot	Density	Density	Max. Dots
0	8-dot single density	8	68DPI	101DPI	288
1	8-dot double density	8	68DPI	203DPI	576
32	24-dot single density	24	203DPI	101DPI	288
33	24-dot double density	24	203DPI	203DPI	576



GS / Print download bit map graphics

Format: ASCII: GS / n
Decimal: 29 47 n
Hexadecimal: 1D 2F n

Explanation:

This command is used to print download bit-map graph. n=0～3

◆ n is the print mode of bit-map graph selection.

◆ To define download bit-map graph using GS * command:

N	Bit map	Vertical density	Horizontal density
0	Normal	203DPI	203DPI
1	Double width	203DPI	101DPI
2	Double height	101DPI	203DPI
3	Double height and double width	101DPI	101DPI

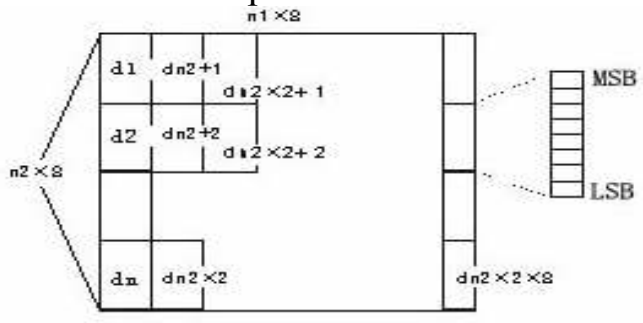
GS *					Define Download Bit-map Graphics
Format:	ASCII：	GS	*	n1	n2	[d]k
	Decimal:	29	42	n1	n2	[d]k
	Hexadecimal:	1D	2A	n1	n2	[d]k

Explanation:

This command is used to define download bit-map graphics.

n1=1～48，n2=1～255，n1×n2<1200, k=n1×n2×8。

- ◆ d is the bit-map data.
- ◆ The horizontal size of this graphics is n1×8 dots, and vertical size is n2×8 dots.
- ◆ The definition is valid until re-define, power off or system reset. Format of the download bit-map data is shown as follows:



3.2.6 Bar Code Print Commands

GS W					Set Bar Code Width
Format:	ASCII：	GS	W	n1	n2
	Decimal:	29	87	n1	n2
	Hexadecimal:	1D	57	n1	n2

Explanation:

n1: bar code narrow bar width, unit: dot. Each dot for SP-POS88III is 1/203 inch or 0.125mm.

Default n1=3.

n2: bar code broad bar width

GS k						Print Bar Code
Format:	ASCII：	GS	k	n	[d]	NUL
	Decimal:	29	107	n	[d]	0
	Hexadecimal:	D	6B	n	[d]	00

Explanation:

n--- Select the printing bar code system:

n	Bar code
2	EAN-13
3	EAN-8

Pay attention to the specified character number of each bar code. EAN-13 and EAN-8 can generate parity characters automatically.

［d］is the printing bar code data.

NUL denotes GS K command is over，and carry out bar code print.

GS H　　Select/cancel Printing HRI Characters

Format:	ASCII：	GS	H	n
	Decimal:	29	72	n
	Hexadecimal:	1D	48	n

Explanation:

n=0，don't print HRI characters. Default n=0.

n=1，print HRI characters under bar code print.

GS　h　　Set Bar Code Height

Format:	ASCII：	GS	h	n
	Decimal:	29	104	n
	Hexadecimal:	1D	68	n

Explanation:

Set height of bar code to be printed.

n=0～255, its unit is dot. When n=0, it is 256 dots.

Each dot for POS88Ⅲ printer is 1/203 inch or 0.125mm.

Default n=60.

GS w　　Set Bar Code Width

Format:	ASCII：	GS	w	n
	Decimal:	29	119	n
	Hexadecimal:	1D	77	n

Explanation:

Set the width of printing bar code.

n＝1～4. When n is different, the width of bar code will be different, as shows in the following tab:

n	Narrow size	Broad size
1	1	3
2	2	5
3	3	7
4	4	9

Its unit is dot. Each dot for SP-POS88III is 1/203 inch or 0.125mm.
Default n=3.

3.2.7 Other Commands

ESC @ Initialize Printer

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

Explanation:
ESC @ command is to initialize the following contents of the printer:
·Clear the data in the print buffer;
·Restore the default of each print command
·Select character print mode;
·Delete user-defined characters.

ESC p Cash Drawer Control

Format:	ASCII：	ESC	p	m	nl	n2
	Decimal:	27	112	m	nl	n2
	Hexadecimal:	1B	70	m	nl	n2

Explanation:
This command is to generate a pulse to trigger the opening and closing of the cash drawer, n1, n2 define the duration of the trigger pulse.
m=0,0＜nl≤n2≤255.
Opening time is nl× 2ms, Closing time is n2× 2ms.

ESC v Transmit Status of Printer

Format:	ASCII ：	ESC	v
	Decimal:	27	118
	Hexadecimal:	1B	76

Explanation:
Send printer status to the host.
When printer received the command, it transfers one byte through TXD serial interface. Definition of said byte is shown as below:

Bit	Function	Value 0	Value 1
0	Print head temperature	Normal	Print head overheat
1	Print head position	Press down	Put up
2	Paper tester	With paper	Without paper

3	Paper running out	With paper	Paper running out
4	Not in use	0	0
5	Cutter position	On original position	False position
6	Undefined	———	———
7	Undefined	———	———

ESC u Transmit Status of Equipment

Format: ASCII： ESC u n
Decimal: 27 117 n
Hexadecimal: 1B 75 n

Explanation:
Send the peripheral equipment status to the host:
Default n=0
When printer received this command, it transmits one byte through TXD line of the serial interface to the host.

Bit	Function	Value 0	Value 1
0	Cash drawer on/off signal level	Low	High
1	Undefined	———	———
2	Undefined	———	———r
3	Undefined	———	———
4	Not in use	0	0
5	Cutter position	———	———
6	Undefined	———	———
7	Undefined	———	———

GS V Paper cutting

Format: ASCII： G S u m
Decimal: 29 86 n m
Hexadecimal: 1D 56 n m

Explanation:
Printer carries out cutting paper operation once. n=0, n=1 or 49 is for cutting paper immediately, the said ways needn't to specify m. When n=66, should feed paper the number of dot lines set by m, then cut paper, 0≤m≤255. Each dot for SP-POS88III printer is 1/203 inch or 0.125mm. It

can realize whole cutting or half cutting through changing the cutter.

Appendix 1 Performance Index

·Print method: Direct thermal
·Print width: 79.5 ± 0.5mm
·Valid print width: 72mm
·Print density: 8 dots/mm, 576 dots/line
·Print speed: Approx.150mm/sec.or 40 lines/sec.
·Reliability:
Print head life: 100km
Using condition:
＊ Print 12 × 24 ASCII characters, print 50 lines each time, intermittent print repeatedly
＊ Each dot-line printing at the same time should not exceed 25%, each character line and one dot vertical printing repeatedly should not exceed 11 times
＊Use specified thermal paper
Cutter life: 500,000 times
Using condition: less than 30 times/minute
·Thermal paper roll model: TF50KS－E（Japan paper co.ltd）
AF50KS-E (JUJO THERMAL)
·Thermal paper roll
Width－－－ 79.5±0.5mm
Outer Diameter －－－ 80mm（max.）
Inner Diameter－－－ 13mm（min.）
Thickness－－－ 53～60g／m^2
· Print Font
IBM Character set II (ANK):
12×24 dots，1.25（W）×3.00（H）mm;
GB GB2312-80(Chinese):
24×24 dots，3.00（W）×3.00（H）mm.
·Serial interface
DB-25 socket (female), supports XON/XOFF and RTS/CTS protocols.
Baud rate: 12000～115200bps adjustable.
Data structure: 1start bit + (7 or 8) data bits + 1stop bit. Parity is optional.
·Parallel interface
DB-25 socket (male) or 36-pin is optional, 8-bit parallel interface, BUSY/ACK handshaking protocol, TTL signal level.
·Cash drawer control

DC24V，1A，6-pin RJ-11 socket.

·Power Supply

DC24V±10％，2A，A-1009-3P power socket.

·Operation Environment

Operation temperature: 5～50℃; relative humidity: 10～80％
Storage temperature: -20～60℃; relative humidity: 10～90℃

Appendix 2 Index of Print Commands

Command name	Command	Description
Print commands	LF	Print and feed line
	ESCJ	Print and feed n dot lines
Line spacing setting commands	ESC2	Set character line spacing to 1/6 inch
	ESC3	Set line spacing to n dot lines (n/203 inch)
Character print commands	ESC !	Set character print mode
	ESC SO	Set double width character print
	ESC DC4	Cancel double width character print
	ESC％	Select/Cancel User-defined Characters
	ESC&	Define user-defined characters
Special control commands	ESC c 5	On/Off switch Button function
Graphics print commands	ESC*	Print bit-map graphics
	GS /	Print download bit-map graphics
	GS *	Define download bit-map graphics
Bar code print commands	GS W	Set bar code width
	GS H	Select/cancel printing HRI characters
	GS h	Set bar code height
	GS k	Print bar code

	GS w	Set bar code horizontal size
Other commands	ESC @	Initialize printer
	ESCp	Cash drawer control
	ESCv	Transmit status of printer
	ESC u	Transmit status of equipment
	GS V	Paper cutting

Appendix 3 Index of Print Characters