1 Outline

Printing Method:	Thermal
Paper Width:	57.5mm
Paper Diameter:	40mm
Resolution:	203DPI
Printing Speed:	Up to 90mm/s
Barcode Supported:	I25,UPC-A,UPC-E,EAN-8, EAN-13,Codebar,Code39, Code93,Code128,Code11,MSI
Font:	ASCII(12x24)
Graphic printing:	Direct bitmap printing
Paper Sensor:	Photo-sensor
Head tempeture detection:	Thermistor
Communication Interface:	RS232 or RS232 with TTL level
Power supply:	5V-9V
Head Life:	50km
Printing width:	48mm
Operation condition:	5~45℃，20~90%RH(40℃)
Storage condition:	-40~60℃，20~93%RH(40℃)

2 HOW TO USE

2.1 Printing test

After power up, connect JP4 and disconnect, one test page will be printed.

2.2 On board LED

There is one LED on board to indicate the status of the board. The indicator is as follows:

Blink one:	Work well
Blink two:	No printer is detected
Blink three:	No paper is detected
Blank five:	Printer mechanism is overheat.

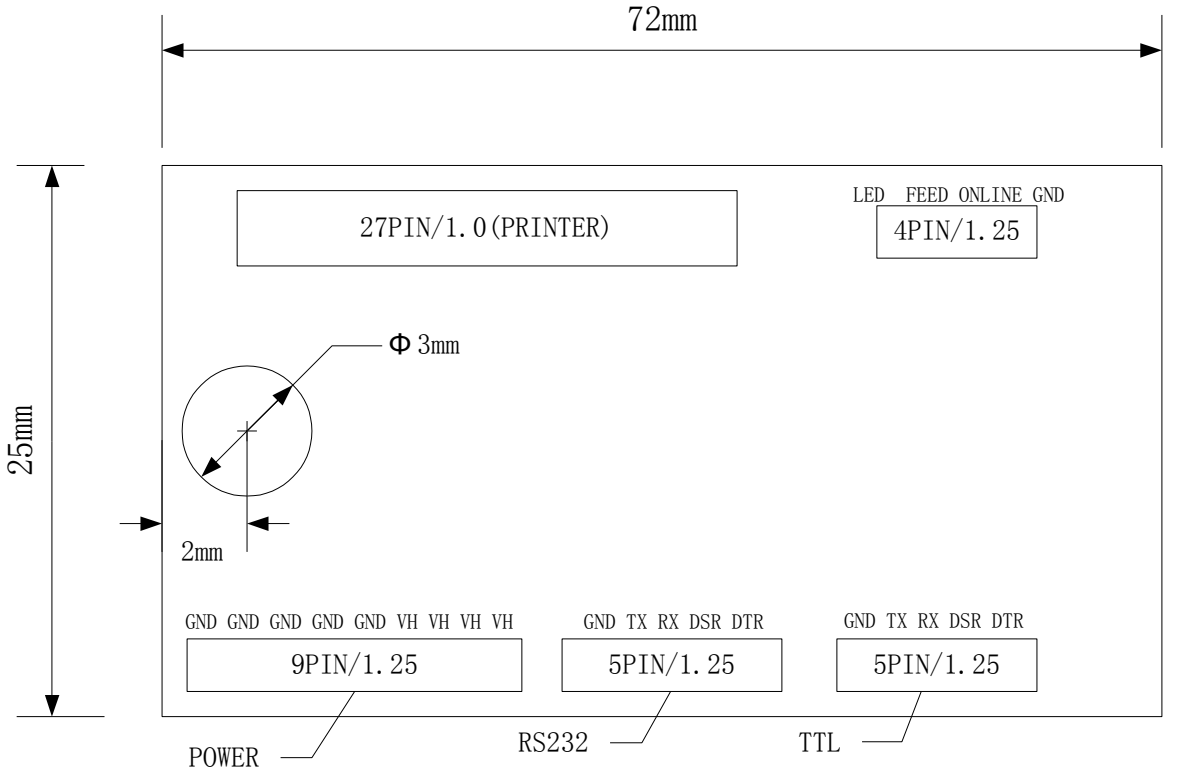
3 MECHANISM

4CONNECTOR

Serial communication connector

The EPM203-MRS printer integrates 2 serial communication connectors.
The RS232 connector is specially dedicated to the full RS232 protocol (+/-12V levels), when the TTL connector is designed to handle TTL levels (0/5V levels).

Logic Signal	Voltage Level on RS232 Connector	Voltage Level on TTL Connector
0	From +3V to +12V	From 0V to 0.2V
1	From -3V to –12V	From 2 to 5V



The definition is as following:

Power connector

EPM device connector J5	User side matching connector
Molex 53047 Series 9 contacts(maile)	Molex 51021 Series (female)

Pin number	Signal name
1	GND
2	
3	
4	
5	

6	POWER
7	
8	
9	

RS232 connector

EPM device connector J4	User side matching connector
Molex, 53047 Series 5 contacts (male)	Molex 51021 Series (female) Contacts: 50079/50058.

Pin number	Signal name
1	Gnd
2	Transmit data (Txd, printer output)
3	Receive data (Rxd, printer input)
4	CTS/DSR (printer input)
5	RTS/DTR (printer output)

TTL connector

EPM device connector J3	User side matching connector
Molex, 53047 Series 5 contacts (male)	Molex 51021 Series (female) Contacts: 50079/50058.

Pin number	Signal name
1	Gnd
2	Transmit data (Txd, printer output)
3	Receive data (Rxd, printer input)
4	CTS/DSR (printer input)
5	RTS/DTR (printer output)

5 ESC/POS PRINTING COMMAND SET

5.1 Set of Command

Type	Command	Name
Print Command	LF	Print and line feed
	ESC J	Print and Feed n dots paper
Line spacing Command	ESC 2	Select default line spacing
	ESC 3 n	Set line spacing
	ESC a n	Select justification
	ESC B n	Set the left blank char number
Character Command	ESC ! n	Select print mode(s)
	ESC SO	Turn double width on
	ESC DC4	Turn double width off
	ESC { n	Turn upside-down printing mode on/off
	GS B n	Turn inverting printing mode on/off
	ESC % n	Select/Cancel user-defined characters
	ESC &	Define user-defined characters
	ESC ?	Cancle user-defined characters
	ESC R n	Select and internation character set
	ESC t n	Select character code table
Bit Image Command	ESC *	Select bit-image mode
	GS *	Define downloaded bit image
	GS /	Print downloaded bit image
Cash drawer command	ESC p	Generate cash drawer control pulse
Key Control Command	ESC c 5	Enable/disable panel buttons
Init Command	ESC @	Initialize printer
Status Command	ESC v n	Transmit paper sensor status
	ESC u n	Transmit peripheral device status
	GS a n	Enable/Disable AutomaticStatus Back(ASB)
Bar Code Command	GS H	Select printing position of human readable characters
	GS h	Set bar code height
	GS w	Set bar code width
	GS k	Print bar code

5.2 Command detail

TCB thermal printer control board use ESC/POS command set.
The printing command is descripted as followed format:

CMD		Function
Format	ASCII	List by ASCII characters
	Decimal	List by decimal characters
	Hexadecimal	List by hexadecimal characters
Description	Command function description	
Example	Command use example	

5.2.1 Print Commands

LF		Print and line feed
Format	ASCII	LF
	Decimal	10
	Hexadecimal	0A
Description	LF prints the data in the print buffer and feeds one line. When the print buffer is empty, LF feeds one line.	

ESC J n		Print and feed paper
Format	ASCII	ESC J n
	Decimal	27 74 n
	Hexadecimal	1B 4A n
Description	n = 0-255。 ESC J prints the data in the print buffer and feeds n dots. The command will not change the setting set by command ESC 2, ESC 3.	

5.2.2 Line spacing setting command

ESC 2		Select default line spacing
Format	ASCII	ESC 2
	Decimal	27 50
	Hexadecimal	1B 32
Description	ESC 2 sets the line space to default value (30dots)	

ESC 3 n		Set line spacing
Format	ASCII	ESC 3 n
	Decimal	27 51 n
	Hexadecimal	1B 33 n

Description	n = 0-255 ESC 3 n sets the line spacing to n dots. The default value is 30

ESC a n — Select align mode

Format	ASCII	ESC a n
	Decimal	27 97 n
	Hexadecimal	1B 61 n
Description	Default is 0 0 ≤ m ≤ 2 or 48 ≤ m ≤ 50 Align left: n=0,48 Aligh middle: n=1,49 Align right: n=2,50	

ESC B n — Set left blank char nums

Format	ASCII	ESC B n
	Decimal	27 66 n
	Hexadecimal	1B 42 n
Description	Default is 0 0 ≤ m ≤ 47	

5.2.3 Character command

ESC ! n — Select print mode

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

Description

The default value is 0. This command is effective for all characters.

BIT0:

BIT1:

BIT2:

BIT3: 1:Emphasized mode selected
0:Emphasized mode not selected

BIT4: 1:Double Height mode selected
0:Double Height mode not selected

BIT5: 1:Double Width mode selected
0:Double Width mode not selected

BIT6: 1:Deleteline mode selected
0:Deleteline mode not selected

BIT7: 1:Underline mode selected
0:Underline mode not selected

ESC SO		Select Double Width mode
Format	ASCII	ESC SO
	Decimal	27 14
	Hexadecimal	1B 0E
Description	Select Double Width mode To turn double width off, use LF or DC4 command.	

ESC DC4		Disable Double Width mode
Format	ASCII	ESC DC4
	Decimal	27 20
	Hexadecimal	1B 14
Description	Disable Double Width mode	

ESC { n		Set/Cancel Character Updown mode
Format	ASCII	ESC { n
	Decimal	27 123 n
	Hexadecimal	1B 7B n
Description	n=1:Enable Updown mode n=0:Disable Updown Mode Default value is 0	

GS B n		Turn white/black reverse printing mode on/off
Format	ASCII	ESC B n
	Decimal	29 66 n
	Hexadecimal	1D 42 n
Description	n=1:Enable white/black reverse mode n=0:Disable white/black reverse mode Default value is 0	

ESC % n		Enable/Disable User-defined Characters
Format	ASCII	ESC % n
	Decimal	27 37 n
	Hexadecimal	1B 25 n
Description	n=1:Enable User-defined character n=0:Disable User-defined character	

ESC & s n m w		Define User-defined characters
Format	ASCII	ESC & s n m w d1 d2 … dx
	Decimal	27 38 s n w m d1 d2 … dx
	Hexadecimal	1B 26 s n w m d1 d2 … dx

Description

The command is used to define user-defined character.Max 64 user chars can be defined.

For 3" printer control board, such as 721, Max 32 user chars can be defined.

s= 3, 32≤ n ≤ m < 127
s: Character height bytes, =3(24dots)
w: Character width 0～12(s=3)
n: User-defined character starting code
m: User-defined characters ending code
dx:data, x=s*w

s=3

d1	d4	d7							
d2	d5	d8							
d3	d6	d9							d36

dx format:

dx	BIT 7
	BIT 6
	BIT 5
	BIT 4
	BIT 3
	BIT 2
	BIT 1
	BIT 0

ESC ? n — Disable user-defined character

Format

ASCII	ESC ? n
Decimal	27 37 n
Hexadecimal	1B 25 n

Description

ESC ? n disable user-defined characters, printer will use the interal character.

ESC R n — Select an internal character set

Format

ASCII	ESC R n
Decimal	27 82 n
Hexadecimal	1B 52 n

Description

Select an internal character set n as follows:

0:USA	5:Sweden	10:Denmark II
1:France	6:Italy	11:Spain II
2:Germany	7:Spain1	12:Latin America
3:U.K.	8:Japan	13:Korea
4:Denmark 1	9:Norway	

ESC t n — Select character code table

Format

ASCII	ESC t n
Decimal	27 116 n
Hexadecimal	1B 74 n

Description

Select a page n from the character code table as follows::

0:437	1:850

5.2.4 Bit Image Command

ESC * m nL nH d1 d2...dk — Select bit-image mode

Format		
	ASCII	ESC * m nL nH d1 d2 … dk
	Decimal	27 42 m nL nH d1 d2 … dk
	Hexadecimal	1B 2A m nL nH d1 d2 … dk

Description

Attention: The command may clear the user defined char.

For 3" control board, such 721, this command don't be supported.

This command selects a bit image mode using m for the number of dots specifed by (nL+nH*256)

m =0,1,32,33。

nL=0-255

nH=0-3

dx=0-255

k = nL+256*nH (m=0,1)

k = (nL+256*nH)*3 (m=32,33)

The modes selected by m are as follows:

0：8dots single density，102dpi

1: 8dots double density，203dpi

31:24 dots single density,102dpi

32:24 dots double density,203dpi

The bit image format is the same as user-defined character.

GS / n — Print downloaded bit image

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

Description

This command prints a downloaded bit image using the mode specified by n as specified in the chart.In standard mode, this command is effective only when there is data in the print buffer. This command is ignored if a downloaded bit image has not been defined.

n=0-3、48-51: Specify bit image mode

n	Pattern Mode	Vertical DPI	Horizontal DPI
0,48	Normal	203DPI	203DPI
1,49	Double width	203DPI	101DPI
2,50	Double height	101DPI	203DPI
3,51	Quadruple	101DPI	101DPI

GS * x y d1...dk — Define downloaded bit image

Format		
	ASCII	GS * x y d1 … dk
	Decimal	29 42 x y d1 … dk
	Hexadecimal	1D 2A x y d1 … dk

Description This command defineds a downloaded bit image by using x*8 dots in the horizontal direction and y*8 dots in the vertical direction. Once a downloaded bit image has been define, it is avaiable until

- Another definition is made
- ESC & or ESC @ is executed
- The power is turned off
- The printer is reset

x=1～48(width), y＝1～255(height), x×y ＜ 1200, k=x×y×8

5.2.5 Key control command

ESC c 5 n — Enable/Disable the panel key

Format	ASCII	ESC c 5 n
	Decimal	27 99 53 n
	Hexadecimal	1B 63 35 n

Description This command has no effection.
n=1, Disable the panel key
n=0, Enable the panel key(Default)

5.2.6 Init command

ESC @ — Initialize the printer

Format	ASCII	ESC @
	Decimal	27 64
	Hexadecimal	1B 40

Description Initializes the printer.

- The print buffer is cleared.
- Reset the param to default value.
- return to standard mode
- Delete user-defined characters

5.2.7 Status Command

ESC v — Transmit paper sensor status

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

Description Transmits the status of the paper sensor as 1 byte of data.
The status byte definition:

Bit	Function	Value
0	NO PRINTER	
1		
2	NO PAPER	1

3	POWER ERROR	1
4	0	0
5		
6	PRINTER TEMPERAUTRE OVER	1
7		

GS a n — Enable/Disable Automatic Status Back(ASB)

Format
ASCII GS a n
Decimal 29 97 n
Hexadecimal 1D 61 n

Description n definition as follows:

Bit	Function	Value	
		0	1
0	0		
1			
2	Disable/Enable ASB	Disable	Enable
3-4			
5	Disable/Enable RTS as flow control	Disable	Enable
6-7			

When ASB is enabled, the printer will send the changed status to PC automatically.

ESC u n — Transmit peripheral devices status

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

Description This command is not supported.
Return status bytes definetion:
bit0: Drawer status.
bit4: 0
Always return 0 back.

5.2.8 Bar Code Command

GS H n — Select printing position of human readable characters

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

Description 0 ≤ n ≤3
48 ≤ n ≤51
This command selects the printing position for human readable characters when printing a barcode. The default is n=0. Human readable characters are printed using the font specified by GS fn. Select the printing position as follows:
n Printing Positioin
0,48: Not printed
1,49: Above the barcode
2,50: Below the barcode
3,51: Both above and below the barcode

GS h n — Set bar code height

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

Description This command selects the height of a barcode. n specifies the number of dots in the vertical direction. The default value is 50
1 ≤ n ≤ 255

GS w n — Set bar code width

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

Description This command selects the horizontal size of a barcode.
n = 2,3
The default value is 3

GS k m d1 d2 ... dk NUL — Print barcode symbology
GS k m n d1 d2 ... dn

Format 1	ASCII	GS	k	m	d1 d2 ... dk	NUL
	Decimal	29	107	m	d1 d2 ... dk	0
	Hexadecimal	1D	6B	m	d1 d2 ... dk	00
Format 2	ASCII	GS	k	m n	d1 d2 ... dn	
	Decimal	29	107	m n	d1 d2 ... dn	
	Hexadecimal	1D	6B	m n	d1 d2 ... dn	

Description m: barcode type
Format 1: 0 ≤ m ≤ 10
Format 2: 65 ≤ m ≤ 75
n: barcode length

m	Bar code system	Number of characters	Remarks

0, 65	UPC-A	11, 12	48-57
1, 66	UPC-E	11, 12	48-57
2, 67	EAN13	12, 13	48-57
3, 68	EAN8	7, 8	48-57
4, 69	CODE39	>1	32, 36, 37, 43, 45-57, 65-90
5, 70	I25	>1 even number	48-57
6, 71	CODEBAR	>1	36, 43, 45-58, 65-68
7, 72	CODE93	>1	0-127
8, 73	CODE128	>1	0-127
9, 74	CODE11	>1	48-57
10, 75	MSI	>1	48-57

APPENDIXA: CODE PAGE

PC437

	0	0	2	3	4	5	6	7	8	9	A	B	C	D	E	F
8	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
9	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	¢	£	¥	₧	ƒ
A	á	í	ó	ú	ñ	Ñ	ª	º	¿	⌐	¬	½	¼	¡	«	»
B	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	▀	▄	▌	▐	■
E	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F	≡	±	≥	≤	⌠	⌡	÷	≈	°	∙	·	√	ⁿ	²	■	

PC850

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
8	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
9	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	Ø	×	ƒ
A	á	í	ó	ú	ñ	Ñ	ª	º	¿	®	¬	½	¼	¡	«	»
B	░	▒	▓	│	┤	Á	Â	À	©	╣	║	╗	╝	¢	¥	┐
C	└	┴	┬	├	─	┼	ã	Ã	╚	╔	╩	╦	╠	═	╬	¤
D	ð	Ð	Ê	Ë	È	ı	Í	Î	Ï	┘	┌	▀	▄	¦	Ì	■
E	Ó	ß	Ô	Ò	õ	Õ	µ	þ	Þ	Ú	Û	Ù	ý	Ý	¯	´
F	-	±	‗	¾	¶	§	÷	¸	°	¨	·	¹	³	²	■	

APPENDIXB: International characters

	Country	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	U.S.A	#	$	@	[	\	]	^	'	{	|	}	~
1	France	#	$	à	°	ç	§	^	'	é	ù	è	¨
2	Germany	#	$	§	Ä	Ö	Ü	^	'	ä	ö	ö	β
3	U.K.	£	$	@	[	\	]	^	'	{	|	}	~
4	Denmark I	#	$	@	Æ	Ø	Å	^	'	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain I	Pt	$	@	¡	Ñ	¿	^	'	¨	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	'	{	|	}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Denmark II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
11	Spain II	#	$	á	¡	Ñ	¿	é	'	ì	ñ	ó	ú
12	Latin America	#	$	á	¡	Ñ	¿	é	ü	ì	ñ	ó	ú
13	Korea	#	$	@	[	₩	]	^	'	{	|	}	~