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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 temperture 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 J1 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.

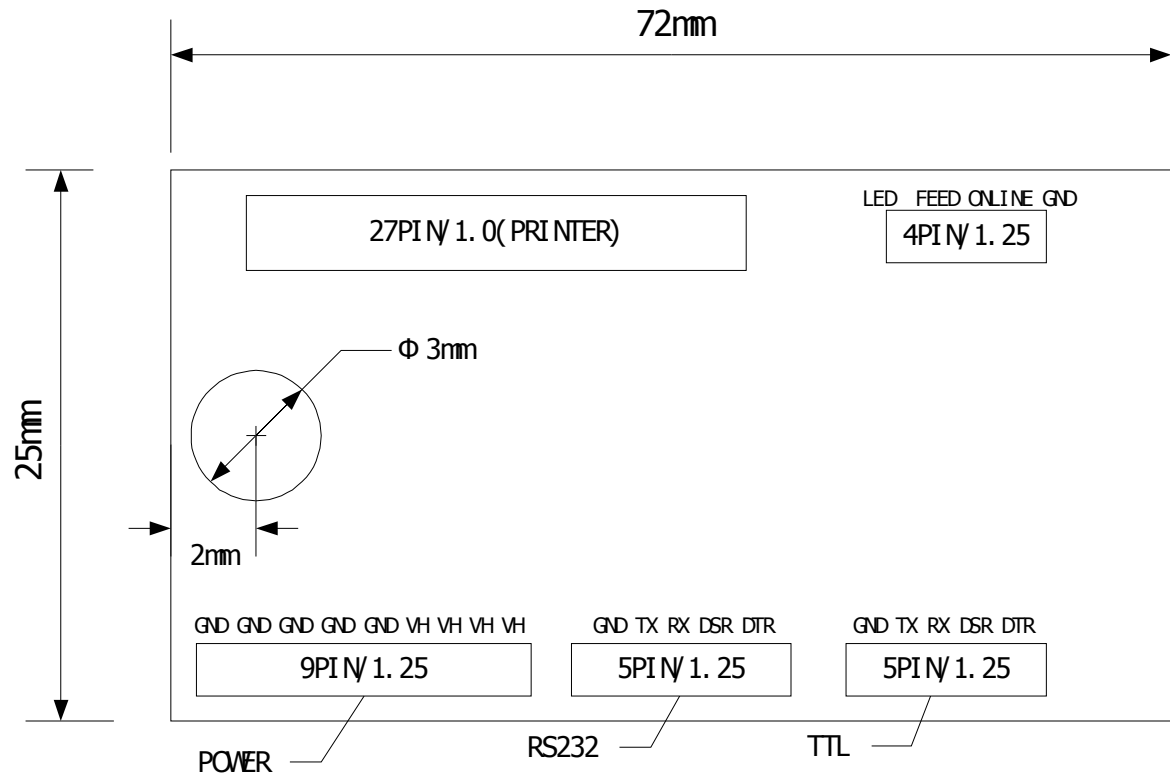
3 MECHANISM

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 S0	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 described 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 $0 \leq m \leq 2$ or $48 \leq m \leq 50$ Align left: n=0, 48 Align 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 $0 \leq m \leq 47$	

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 S0			Select Double Width mode
Format	ASCII	ESC S0	
	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 m 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 specified 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 defines a downloaded bit image by using $x \times 8$ dots in the horizontal direction and $y \times 8$ dots in the vertical direction. Once a downloaded bit image has been define, it is available until

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

$x=1 \sim 48$ (width), $y=1 \sim 255$ (height), $x \times y < 1200$, $k=x \times y \times 8$

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 effect.

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 definition:
 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 $0 \leq n \leq 3$

$48 \leq n \leq 51$

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 Position

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

$1 \leq n \leq 255$

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

al

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

al

Description m: barcode type

Format 1: $0 \leq m \leq 10$

Format 2: $65 \leq m \leq 75$

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	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
8	Ç	ı	é	â	ä	à	â	ç	ê	ë	è	ï	î	ì	Ä	Å
9	É	æ	Æ	ô	ö	ò	û	ù	ý	ÿ	ö	ü	ç	£	¥	₺
A	á	í	ó	ú	ñ	Ñ	ª	º	¿	¬	¬	¼	½	¾	ı	«
B	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı
C	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı
D	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı
E	α	β	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	ı	é	â	ä	à	â	ç	ê	ë	è	ï	î	ì	Ä	Å
9	É	æ	Æ	ô	ö	ò	û	ù	ý	ÿ	ø	ø	£	Ø	×	f
A	á	í	ó	ú	ñ	Ñ	ª	º	¿	©	¬	¼	½	¾	ı	«
B	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı
C	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı
D	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı
E	Ó	β	Ó	Ö	ö	Ö	μ	þ	þ	Ú	Ú	Ú	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	ü	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	\$	@	í	Ñ	¿	^	'	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	í	Ñ	¿	é	'	ì	ñ	ó	ú
12	Latin America	#	\$	á	í	Ñ	¿	é	ü	ì	ñ	ó	ú
13	Korea	#	\$	@	[₩]	^	'	{		}	~