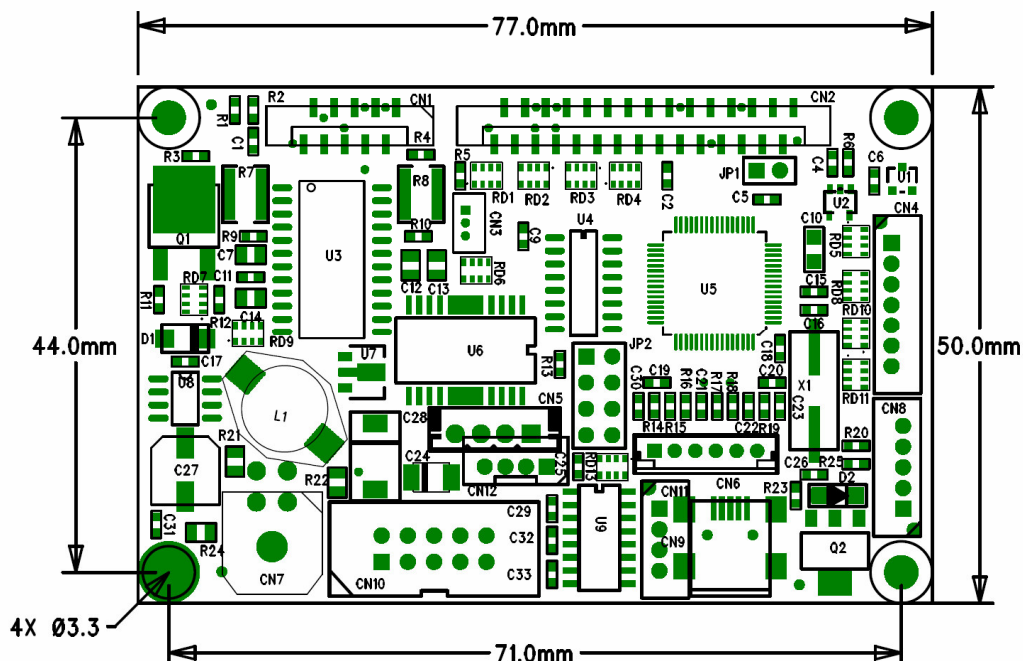


# Users Manual

## Thermal printer controller PRN609-012R



## FOR FUJITSU THERMAL PRINTERS

FTP-629MCL103  
 FTP-629MCL363  
 FTP-629MCL364  
 FTP-629MCL383

FTP-639MCL064  
 FTP-639MCL103  
 FTP-639MCL303  
 FTP-639MCL363  
 FTP-639MCL364  
 FTP-639MCL383  
 FTP-639MCL393

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## Version history

Version	Date	Init	Status	Description
1.0	060628	BB	Released	First release

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**PRN609-012R is RoHS compliant.**

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## Safety Precautions

- Please read and understand these specifications thoroughly before using the printer. Please keep the specifications carefully in a place where they may be easily consulted when the printer is used.
- Please do not modify or service this printer as this may cause unpredictable faults to occur.
- The product is not intended to be installed in devices such as those used in life-support medical equipment, undersea relays, and aerospace applications or for nuclear power control, in which extremely high reliability is required. If you are considering such applications, please consult our customer service department.
- There is a general possibility of component failure. Every effort has been made to improve product quality but such failures cannot be completely excluded. Please assume that such failure may occur before using this printer.

We would urge that these specifications should be thoroughly understood and the printer used safely in your company or associated organization. Please indicate or describe in your products and in the user manuals those items, which are related to the prevention or avoidance of danger and draw these to the attention of the eventual client (the user).

This manual may only be used as appendix to the product and may only be used, as a help to better understand the functionality of the product. Any approval of the product may only be done based upon sample of the product. Approval based upon the specification is not accepted by Trentino Systems ApS.

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## 1 SYSTEM DESCRIPTION

This reference manual describes the specifications, function, and operating procedures for the PRN609-012R interface boards.

PRN609-012R is designed for the following Fujitsu printers:

<b>FTP-629MCL103</b>	<b>FTP-639MCL064</b>
<b>FTP-629MCL363</b>	<b>FTP-639MCL103</b>
<b>FTP-629MCL364</b>	<b>FTP-639MCL303</b>
<b>FTP-629MCL383</b>	<b>FTP-639MCL363</b>
	<b>FTP-639MCL364</b>
	<b>FTP-639MCL383</b>
	<b>FTP-639MCL393</b>

PRN609-012R consists of an interface board.

The communication is RS232, USB

PRN609-012R can print graphic data either compressed or non-compressed.

Burn time can be set to control the printing intensity

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## 2 INSTALLATION

### 2.1 Unpacking

Remove the cover observing precautions for Electro Static Discharge (ESD). Make sure that board is handled with care with respect to Electrostatic environment.

### 2.2 Labels

PRN609-012R has 3 labels;

Label 1 on backside ex. Ifxxxxxx is a unique ID number. For service and question based upon 1 particular board please refer to this number. Label 2 on topside ex. PRN609-012R is part number. Please refer to this number upon reordering. Make sure that software revision is applied at same time.

Label 3 is an internal code. Please ignore

### 2.3 Installation

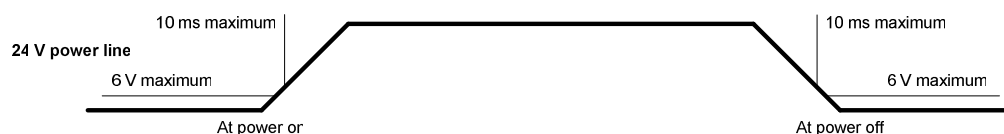
PRN609-012R is fastened in the product by 4 M3 screws. The cables (for the thermal head, the stepper-motor and detector) are placed in the thermal printer connector on the PCB. Mounting holes are grounded connected to electrical ground.

- (a) To connect or remove the connector, always turn off the power in advance. If the connector is connected or removed while the power to the printer is on, errors may occur.
- (b) The connector of each cable must be correctly locked and connected. The connector at the head side has no lock feature. Check that the connector at the head side is completely inserted.
- (c) To install the interface, carefully check each cable so that excessive force is not applied to each cable. Especially, carefully check the head connection cable because it affects the head pressure force. If the print head connector is not completely connected, overheating or burning may occur in the print head.
- (d) Be sure to add grounding cable from printer body to interface ground. Make sure that ground is present at any mechanical settings, like head up and paper out.

## 2.4 Power supply

Single power supplies for the PRN609-012R controller board. The nominal supply voltage is 24VDC, with  $\pm 10\%$  in tolerance. Make sure that voltages never exceed 26,5 VDC.

- (a) The power supply unit that satisfies the specified specifications must be used. If a power supply unit that does not satisfy the specified specifications is used, normal operation is not assured and errors may occur.
- (b) To turn on or off the power, a protective circuit must be mounted on the control board in advance. For safety, the following voltage change conditions must be satisfied.



### 3 SPECIFICATIONS

Interface	Serial RS232, USB
Data format	Max 460.800 baud, 8 data bit, none parity, 1 stop bit, (115.200 baud, default)
Handshake	Hardware
Command set	Trentino Systems
Transmission to host	Requested status etc.
Printer supply	24VDC $\pm$ 10% tolerance.
Power on self test	Feed
Voltage compensation	Burn time
Current consumption	Operating 130mA, Printing up to 10A @ 24V (TBD)
Printing speed	Up to 200mm/sec (7,87"/sec) Optional 240 mm/sec (9,45"/sec.)
Font set	Cyrillic + € symbol
Character size	8x16, 16x16, 8x32, 16x32, 16x64, 32x32, 32x64, 64x128
Character type	Normal, Underline, Reverse (white on black)
Default font	16x32
Paper detect	Digital
Graphics	Normal / Compressed
Auto load	50mm User settings
Form feed	50mm User settings
Line feed	LF
Maximum dimensions	Width 77mm, Depth 50mm, Connected height 15mm
Mounting holes	Width 71mm, Depth 44mm, Diameter 3.3mm
Connectors	CN1, Connector type: CF10101M0T0
	CN2, Connector type: CF10301M0T0
	CN3, Connector type: 53047-0410
	CN4, Connector type: 53324-0710
	CN5, Connector type: JS-1132-4
	CN6, Connector type: TBD
	CN7, Connector type: 43045-0400
	CN8, Connector type: 53324-0510
Weight	25g
Temperature	Storage -40°C to +85°C 0-90% RH Operating 0C to +70°C 10-90%RH
Shock	100G XYZ
EMC	Emission: E-Field EN50081-1-1, Conducted EN50081-1-2
	Immunity: E-field EN50082-1-1, Conducted EN50082-1-2, Over voltage EN50082-1-3
Approvals	CE, UL
Accessories	Serial Interface cable: CBL-002, 9pol Sub-D, female
	Power cable: CBL-025

## **4 FUNCTION**

### **4.1 Serial communication**

It is possible to receive and send data (8 bit) via the serial port. The default baud rate is 115.200, and there are no parity bit and one stop bit. Handshake signals are hardware. Other baud rates are available upon request.

### **4.2 USB communication**

The USB port is fully compatible with USB 2.0. PRN609-012R interface board is 100% compatible with the printer class specification.

I/F-COM A/S (Trentino Systems) Vendor number: 5098

### **4.3 Auto detect printer**

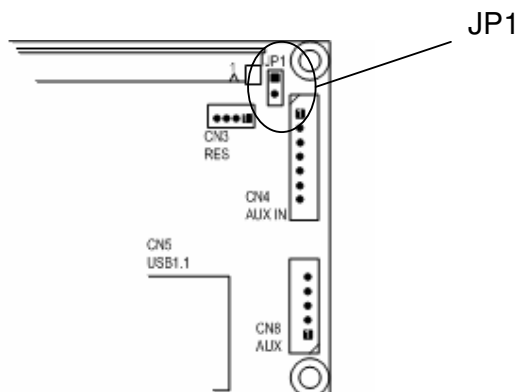
At power up the PRN609-012R, detects the printer size.

### **4.4 Auto form feed**

When paper is out, it is possible to form feed new paper automatic. While the thermal head is down, place the paper at the roller. After 2 seconds the paper will be pulled in automatically. Form feed length is factory set

## 4.5 Firmware upgrade

The firmware can be upgraded. In case firmware up grade is needed Trentino Systems ApS will provide windows utility and the firmware. In order to upload new firmware to the PRN609-012R Board, the jumper JP1 must be shorten.



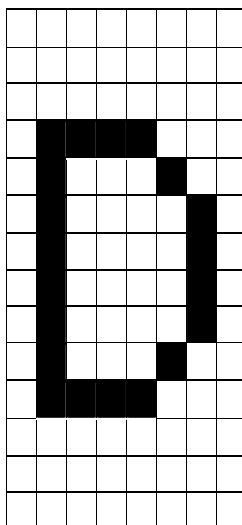
Further instruction concerning firmware upgrade comes along with utility and the firmware from Trentino Systems ApS.

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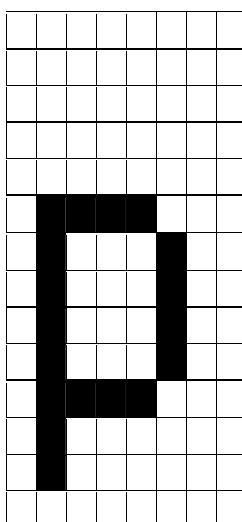
## 4.6 Character design

The following figures describe the design of different types of characters (small):

### 4.6.1 Normal character



### 4.6.2 Low character



### 4.6.3 Underline

When underline characters are printed the last line in the character matrix will be marked.

### 4.6.4 Reverse

When reverse characters are printed the character matrix will be negated.

### 4.6.5 Font size

Font	Width	Height
Small	Half	Half
Low	Normal	Half
Narrow	Half	Normal
Normal	Normal	Normal
Wide	Double	Normal
High	Normal	Double
Large	Double	Double
X-large	Quadruple	Quadruple

A build-in smooth function is implemented to obtain best character quality.

## 4.7 Font table

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	<u>NUL</u> 0000	<u>STX</u> 0001	<u>SOT</u> 0002	<u>ETX</u> 0003	<u>EOT</u> 0004	<u>ENQ</u> 0005	<u>ACK</u> 0006	<u>BEL</u> 0007	<u>BS</u> 0008	<u>HT</u> 0009	<u>LF</u> 000A	<u>VT</u> 000B	<u>FF</u> 000C	<u>CR</u> 000D	<u>SO</u> 000E	<u>SI</u> 000F
10	<u>DLE</u> 0010	<u>DC1</u> 0011	<u>DC2</u> 0012	<u>DC3</u> 0013	<u>DC4</u> 0014	<u>NAK</u> 0015	<u>SYN</u> 0016	<u>ETB</u> 0017	<u>CAN</u> 0018	<u>EM</u> 0019	<u>SUB</u> 001A	<u>ESC</u> 001B	<u>FS</u> 001C	<u>GS</u> 001D	<u>RS</u> 001E	<u>US</u> 001F
20	<u>SP</u> 0020	!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{		}	~	<u>DEL</u> 007F
80	Ç 00C7	ù 00FC	é 00E9	â 00E2	ä 00E4	à 00E0	å 00E5	ç 00E7	ë 00EA	è 00EB	è 00E8	ì 00EF	ï 00EE	ì 00EC	Ä 00C4	Å 00C5
90	É 00C9	æ 00E6	Æ 00C6	ø 00F4	ö 00F6	ò 00F2	û 00FB	ù 00F9	ÿ 00FF	Ö 00D6	Ü 00DC	ø 00F8	£ 00A3	Ø 00D8	×	f 0192
A0	á 00E1	í 00ED	ó 00F3	ú 00FA	ñ 00F1	Ñ 00D1	ª 00AA	º 00BA	¿ 00BF	® 00AE	¬ 00AC	¼ 00BD	¾ 00BC	¡ 00A1	« 00AB	» 00BB
B0	▒ 2591	▓ 2592	█ 2593	 2502	⊥ 2524	Á 00C1	Ã 00C2	À 00C0	⊙ 00A9	⌋ 2563	⌌ 2551	⌍ 2557	⌎ 255D	◊ 00A2	¥ 00A5	⌏ 2510
C0	ℒ 2514	ℓ 2534	ℓ 252C	ℓ 251C	— 2500	† 253C	ã 00E3	Ã 00C3	ℒ 255A	ℒ 2554	ℒ 2569	ℒ 2566	ℒ 2560	= 2550	ℒ 256C	※ 00A4
D0	ø 00F0	Ð 00D0	Ê 00CA	Ë 00CB	È 00C8	€ 20AC	Í 00CD	Î 00CE	Ï 00CF	⌋ 2518	ℒ 250C	■ 2588	■ 2584	¡ 00A6	ì 00CC	■ 2580
E0	Ó 00D3	ß 00DF	Ö 00D4	Ò 00D2	ø 00F5	Õ 00D5	μ 00B5	þ 00FE	ƒ 00DE	Ú 00DA	Û 00DB	Ü 00D9	Ý 00FD	Ý 00DD	— 00AF	´ 00B4
F0	- 00AD	± 00B1	= 2017	¾ 00BE	¶ 00B6	§ 00A7	÷ 00F7	¸ 00B8	° 00B0	· 00A8	· 00B7	± 00B9	§ 00B3	² 00B2	■ 25A0	<u>NBSP</u> 00A0

### 4.8 Cyrillic font table

	*0	*1	*2	*3	*4	*5	*6	*7	*8	*9	*A	*B	*C	*D	*E	*F
80																
90																
A0									Ё	Э						
B0									ё	э						
C0	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
D0	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
E0	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
F0	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я

## CONTROL AND ESCAPE SEQUENCES

The control of the PRN609-012R printer interface is performed by a command set of escape sequences. The following commands are used. All other commands are ignored.

### 4.8.1 Escape sequences, overview.

ESCAPE SEQUENCES,ASCII	FUNCTION
NUL	Small font
SOH	Low font
STX	Narrow font
ETX	Normal font
EOT	Wide font
ENQ	High font
ACK	Large font
BEL	X-large font
LF	Line feed
FF	Forward feed
SO	Reverse off
SI	Reverse on
DLE	Underline off
DC1	Underline on
SYN	Initialize printer
ETB	Request software version
CAN	Request status
EM	Request analogue voltage
SUB	Request temperature
GS+n	Feed paper
RS+n	Burn compensate
US+d1..dLast	Print graphic line
ESC+205+1+C+n	Set printer size
ESC+205+2+d+m+n	Change auto feed settings
ESC+n+m	Set max speed
ESC+205+1+j+n	Auto request
ESC+205+3+97+m+n+o	Black mark parameters
ESC+205+0+c	Feed to next black mark.
ESC+205+1+i+n	Delimiter
ESC+e+m	Bar code width setting
ESC+h+n	Bar code height setting
ESC+k+m n+d1 to dn	Bar code printing
ESC+i	Cut paper

#### 4.8.2 Small font

[Name] Small font (8x16)  
 [Format] ASCII NUL  
 Hex 00  
 Decimal 0  
 [Description] Select small font from the current print position.

#### 4.8.3 Low font

[Name] Low font (16x16)  
 [Format] ASCII SOH  
 Hex 01  
 Decimal 1  
 [Description] Select low font from the current print position.

#### 4.8.4 Narrow font

[Name] Narrow font (8x32)  
 [Format] ASCII STX  
 Hex 02  
 Decimal 2  
 [Description] Select normal font from the current print position. This is the default font after power up or reset.

#### 4.8.5 Normal font

[Name] Normal font (16x32)  
 [Format] ASCII ETX  
 Hex 03  
 Decimal 3  
 [Description] Select normal font from the current print position. This is the default font after power up or reset.

#### 4.8.6 Wide font

[Name] Wide font (32x32)  
 [Format] ASCII EOT  
 Hex 04  
 Decimal 4  
 [Description] Select wide font from the current print position.

#### 4.8.7 High font

[Name] High font (16x64)  
 [Format] ASCII ENQ  
 Hex 05  
 Decimal 5  
 [Description] Select high font from the current print position.

#### 4.8.8 Large font

[Name] Large font (32x64)  
 [Format] ASCII ACK  
 Hex 06  
 Decimal 6  
 [Description] Select large font from the current print position.

#### 4.8.9 X-large font

[Name] X-large font (64x128)  
 [Format] ASCII BEL  
 Hex 07  
 Decimal 7  
 [Description] Select X-large font from the current print position.

#### 4.8.10 Line feed

[Name] Line feed  
 [Format] ASCII LF  
 Hex 0A  
 Decimal 10  
 [Description] The text data in the buffer will be printed

#### 4.8.11 Feed forward

[Name] Feed forward  
 [Format] ASCII FF  
 Hex 0C  
 Decimal 12  
 [Description] The printer will print content of the buffer and feed forward 50mm

**4.8.12 Reverse off**

[Name] Reverse off  
 [Format] ASCII SO  
 Hex 0E  
 Decimal 14  
 [Description] This command will switch off reverse printing

**4.8.13 Reverse on**

[Name] Reverse on  
 [Format] ASCII SI  
 Hex 0F  
 Decimal 15  
 [Description] This command will switch on reverse printing

**4.8.14 Underline off**

[Name] Underline off  
 [Format] ASCII DLE  
 Hex 10  
 Decimal 16  
 [Description] This command will switch off underline printing

**4.8.15 Underline on**

[Name] Underline on  
 [Format] ASCII DC1  
 Hex 11  
 Decimal 17  
 [Description] This command will switch on underline printing

**4.8.16 Initialize printer**

[Name] Initialize  
 [Format] ASCII SYN  
 Hex 16  
 Decimal 22  
 [Description] Reset of the printer will be initialized. This command can be treated even though buffer is full.

#### 4.8.17 Request software version and dot size

[Name]	Request software version and dot size	
[Format]	ASCII	ETB
	Hex	17
	Decimal	23
[Description]	The software version will be transmitted. This command is treated even though buffer is full.	

#### 4.8.18 Request status

[Name]	Request status	
[Format]	ASCII	CAN
	Hex	18
	Decimal	24
[Description]	When the printer controller receives this byte a status byte will be transmitted. This command can be treated even if buffer is full. The bit definitions is as follows	

Bit	Status	0	1
0	Near end	Logic level is low	Logic level is high
1	Paper	Present	Absent
2	Temperature	Not too hot	Head too hot to print
3	Head	Closed	Open
4	Cutter	No error	Error
5	Rx error	No error	Rx error
6	Buffer	Not full.	Full (less than 16 bytes)
7	Always 1.		

#### 4.8.19 Request analog voltage

[Name]	Analog voltage	
[Format]	ASCII	EM
	Hex	19
	Decimal	25
[Description]	When the printer controller receives this byte the digital value of the head voltage will be transmitted. This command can be treated even if buffer is full	

#### 4.8.20 Request temperature

[Name]	Request temperature
[Format]	ASCII           SUB Hex               1A Decimal           26
[Description]	When the printer controller receives this byte the digital value of the head temperature will be transmitted. This command can be treated even if buffer is full

#### 4.8.21 Feed paper

[Name]	Feed paper
[Format]	ASCII           GS   n Hex             1D   n Decimal         29   n
[Range]	n: [-128;127]
[Description]	When the printer controller receives this command the paper will be fed n-dot lines. If the value is negative a reverse form feed will be made.

#### 4.8.22 Compensate burn time

[Name]	Compensate burn time
[Format]	ASCII           RS   n Hex             1E   n Decimal         30   n
[Range]	n: [-15;15]
[Description]	When the printer controller receives this command the burn time will be compensated. If a negative value is send the printout intensity will be lighter and if a positive value is send the printout intensity will be darker.

#### 4.8.23 Graphic line

[Name]	Graphic line
[Format]	ASCII           US   d1,d2,...,dLast Hex             1F   d1,d2,...,dLast Decimal         31   d1,d2,...,dLast
[Range]	d: [0;255] Last: Depend on printer size
[Description]	Graphic bytes equal to the printer size will be printed in one dot line. The MSB in d1 is the left most dot and the LSB in dLast is the right most dot.

#### 4.8.24 Set printer size

[Name]	Set printer size				
[Format]	ASCII	ESC	205	1	C n
	Hex	1B	CD	1	43 n
	Decimal	27	205	1	67 n
[Description]	Set the dot size of the printer to n bytes. If the dot size is changed printer outs can be strange.				

#### 4.8.25 Max speed

Name]	Set max speed				
[Format]	ASCII	ESC	n+m		
	Hex	27	110	+ m	
	Decimal	1B	6E	+ m	
[Range]	m: [50; 75, 100]				
[Description]	Sets the maximum speed to 50%, 75% or 100% of the normal maximum speed				

#### 4.8.26 Auto request

[Name]	Auto request				
[Format]	ASCII	ESC	205	1	j n
	Hex	1B	CD	1	6A n
	Decimal	27	205	1	106 n
[Range]	n: [0;255]				
[Default]	n= 0;				
[Return value]	[Status][Temperature/2][Voltage/2][0]				
[Description]	This command starts the auto request. The interval between status transmission is set with n. if n=0 the auto request has been disabled.				

The response consists of 4 bytes. The first will always have the most significant bit set while the other three will always have the most significant bit cleared.

The status byte is the same as the byte returned with the "Request status" command.

The unit for n is 2.73msec.

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#### 4.8.27 Black mark

[Name]	Set black mark parameters
[Format]	ASCII        ESC+205+3+97+m+n+o Hex         1B   CD 03 61 m n o Decimal     27 205 3 97 m n o
[Range]	m = Page length     1...255 n = Paper offset     1...255 o = Black mark length 1...255
[Description]	At printer stop on black mark the paper will be forwarded the full length of the black mark. Paper out is detected if full length of the Black Mark is feed and sensor does not detect paper.

At no paper in printer and printing is requested, form feed of black Mark Length will be executed. At no paper detected the printer will stop.

FF=0xC Feed paper forward until next Black Mark or rest of page whatever comes first.

The following values can be set:

PAGE LENGTH (default 150mm) This value is the paper length  
PAPER OFFSET (default 2mm) This value is the length between Black Mark and start of printing. Value must be between 2 mm. and Page length – 2mm.

BLACKMARK LENGTH (default 15mm). This is the length of the Black Marks.

The board can be set to transmit a 'B' whenever the paper is not detected at paper detect. This is typical when the sensor encounters a Black Mark.

The following commands is used for enabling Black Mark

Default:

PAGELENGTH=150mm

PAPEROFFSET=2mm

BLACKMARK=120 (120/8=15mm)

ESC+205+1+98+n

n: Bit 0: if set the board will transmit 'B' every time paper is not detected at the paper detector.

Bit 1: if set the Black Mark function is enable.

Default n = 0.

**4.8.28 Feed to next black mark**

[Name]	Feed to next black mark				
[Format]	ASCII	ESC	205	0	c
	Hex	1B	CD	0	63
	Decimal	27	205	0	99
[Description]	The paper is either feed until the next black mark or the rest of the page, whatever comes first.				

**4.8.29 Delimiter**

[Name]	Delimiter				
[Format]	ASCII	ESC	205	1	i n
	Hex	1B	CD	1	69 n
	Decimal	27	205	1	105 n
[Range]	n: [0;255]				
[Description]	When the printer handles this command it will transmit n.				

**4.8.30 Bar code width setting**

[Name]	Bar code width setting				
[Format]	ASCII	ESC	e	m	
	Hex	1B	65	m	
	Decimal	27	101	m	
[Range]	2<=m				
[Default]	m=6				
[Description]	Parameter n is ignored. Parameter m is used to determine the dot width of the narrow and wide bar lines. The wide bar lines is equal to m dots and the narrow is equal to m/2 dots (rounded down).				

**4.8.31 Bar code height setting**

[Name]	Bar code height setting				
[Format]	ASCII	ESC	h	n	
	Hex	1B	68	n	
	Decimal	27	104	n	
[Range]	1<=n<=255				
[Default]	n=60				
[Description]	Parameter n specifies the height of a bar code in dots.				

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### 4.8.32 Bar code printing

[Name]	Bar code printing					
[Format]	ASCII	ESC	k	m	n	d1 to dn
	Hex	1B	6B	m	n	d1 to dn
	Decimal	27	107	m	n	d1 to dn
[Description]	Parameter m specifies the type of bar codes to be printed. Parameter n specifies no of barcode characters.					

m(dec)	Type of Barcode	Number of barcode characters	Value of d
65	UPCA	11<=n<=12	48<=d<=57
67	EAN13	12<=n<=13	48<=d<=57
68	EAN8	7<=n<=8	48<=d<=57
69	Code39	Variable	Space, \$, %, *, +, -, ., /, 0-9, A-Z
72	Code128	Variable	0 to 105

UPCA: if n is 11 then the board calculate the checksum

EAN8: if n is 7 then the board calculate the checksum.

EAN13: if n is 12 then the board calculate the checksum

Code 39: The first and last character must be '\*'. This is the syntax for Code 39.

Code128. There is three subset of Code128 (Code128A, Code128B and Code128C). The start character specifies which character set to be used. The start character must be either 103 (subset A), 104 (subset B), 105 (subset C).

The following table shows the value between data (d) and barcode.

## 4.8.33 Code128 barcode table

'd'	A	B	C	'd'	A	B	C
0	Space	Space	0	52	T	T	52
1	!	!	1	53	U	U	53
2	"	"	2	54	V	V	54
3	#	#	3	55	W	W	55
4	\$	\$	4	56	X	X	56
5	%	%	5	57	Y	Y	57
6	&	&	6	58	Z	Z	58
7	'	'	7	59	[	[	59
8	(	(	8	60	\	\	60
9	)	)	9	61	]	]	61
10	*	*	10	62	^	^	62
11	+	+	11	63			63
12	,	,	12	64	NUL	`	64
13	-	-	13	65	SOH	a	65
14	.	.	14	66	STX	b	66
15	/	/	15	67	ETX	c	67
16	0	0	16	68	EOT	d	68
17	1	1	17	69	ENQ	e	69
18	2	2	18	70	ACK	f	70
19	3	3	19	71	BEL	g	71
20	4	4	20	72	BS	h	72
21	5	5	21	73	HT	i	73
22	6	6	22	74	LF	j	74
23	7	7	23	75	VT	k	75
24	8	8	24	76	FF	l	76
25	9	9	25	77	CR	m	77
26	:	:	26	78	SO	n	78
27	;	;	27	79	SI	o	79
28	<	<	28	80	DLE	p	80
29	=	=	29	81	DC1	q	81
30	>	>	30	82	DC2	r	82
31	?	?	31	83	DC3	s	83
32	@	@	32	84	DC4	t	84
33	A	A	33	85	NAK	u	85
34	B	B	34	86	SYN	v	86
35	C	C	35	87	ETB	w	87
36	D	D	36	88	CAN	x	88
37	E	E	37	89	EM	y	89
38	F	F	38	90	SUB	z	90
39	G	G	39	91	ESC	{	91
40	H	H	40	92	FS		92
41	I	I	41	93	GS	}	93
42	J	J	42	94	RS	~	94
43	K	K	43	95	US	DEL	95
44	L	L	44	96	FNC3	FNC3	96
45	M	M	45	97	FNC2	FNC2	97
46	N	N	46	98	SHIFT	SHIFT	98
47	O	O	47	99	Code C	Code C	99
48	P	P	48	100	Code B	FNC 4	Code B
49	Q	Q	49	101	FNC 4	Code A	Code A
50	R	R	50	102	FNC 1	FNC 1	FNC1
51	S	S	51				

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## **5 MAINTENANCE**

### **5.1 Normal operation**

The PRN609-012R boards must be turned off in idle mode.

### **5.2 Store/Transport**

The product has to be stored under ESD safe conditions, and to be packed safely during transportation.

## 6 SPECIFICATIONS

### 6.1 Electrical data

Voltage:	Nominal:	24VDC
	Tolerance:	±10%
Current:	Max. head current:	Numbers of active dots * VHead TBD+/-15%
	Max. motor current:	1000mA

### 6.2 Mechanical data

Dimensions:	L * W * H:	77 mm* 50 mm * max. 15 mm including connectors.
Vibration:	XYZ	100G
Shock:	XYZ	100G

### 6.3 Environmental data

Operation:	Temperature:	0°C - +85°C
Humidity :		10%-99% RH, without condensing
Storage:	Temperature:	-40°C - +85°C
	Humidity:	0%-99% RH, without condensing
Transport:	Temperature:	-40°C - +85°C
	Humidity:	0%-99% RH, without condensing

### 6.4 EMC & ESC

The printer controller is tested according to:

Emission:	E-Field:	EN50081-1-1
	Conducted:	EN50081-1-2
Immunity:	E-field:	EN50082-1-1
	Conducted transients:	EN50082-1-2
	Over voltage:	EN50082-1-3
Medical equipment:		IEC601-1-2

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## 6.5 Connector pin assignment

### 6.5.1 Motor/Sensor connector CN1

Connector type: CF10101M0T0

Pin	Function	Pin	Function
1	NC	2	GND
3	Thermistor	4	MA
5	/MA	6	MB
7	/MB	8	Cathode
9	Common anode/collector	10	Emitter

### 6.5.2 Thermal head connector CN2

Connector type: CF10301M0T0, Molex  
Mating part: Flat Flex Cable

Pin	Function	Pin	Function
1	GND	2	SW
3	VH	4	VH
5	VH	6	VH
7	DI	8	/ST1
9	/ST1	10	VCC
11	Thermistor	12	GND
13	GND	14	GND
15	GND	16	GND
17	GND	18	GND
19	GND	20	GND
21	GND	22	/ST2
23	/ST2	24	LAT
25	CLK	26	DOP
27	VH	28	VH
29	VH	30	VH

### 6.5.3 Reserved connector CN3

Connector type: 53047-0410, Molex

Mating part: Molex

Housing: 51021-0400

Contact: 50079 or 50058

Pin	Function
1	+5V
2	TX
3	RX
4	GND

### 6.5.4 Aux input CN4

Connector type: 53324-0710, Molex

Mating part: Molex

Housing: 51065-0700

Contact: 50212-8100 (female)

Pin	Function
1	Anode
2	Feed
3	GND
4	Anode
5	Paper near end
6	GND
7	GND

The paper near end status can be seen on the LED on the aux connector. The status can be read through the status command. When feed is low paper will be forward feed.

### 6.5.5 Cutter connector CN5

Connector type: JS-1132-4, JST

Mating part: JST

Housing: HER-4

Contact: SEH-001T-P0.6

Pin	Function
1	Sense
2	GND
3	/Cut
4	Cut

### 6.5.6 USB connector CN6

Connector type: TBD  
Mating cable, TBD

Pin	Function
1	NC
2	USB -
3	USB +
4	GND

### 6.5.7 Power connector CN7

Connector Type: 43045-0400, Molex  
Mating part: Molex  
Housing: 39-01-3042, Molex  
Contact: 39-00-0038, Molex  
Mating cable: CBL-025

Pin	Function
1	GND
2	+VCC
3	GND
4	+Vcc

### 6.5.8 AUX connector CN8

Connector type: 53324-0510  
Mating part, Molex  
Housing 51090-0500 or 52484-0510  
Contact 50212 or 51094

Pin	Function
1	GND
2	Vcoil Max 24V
3	Coil Max 1A
4	Anode
5	Cathode

The AUX connector leaves several possibilities to connect external equipment  
Solenoid

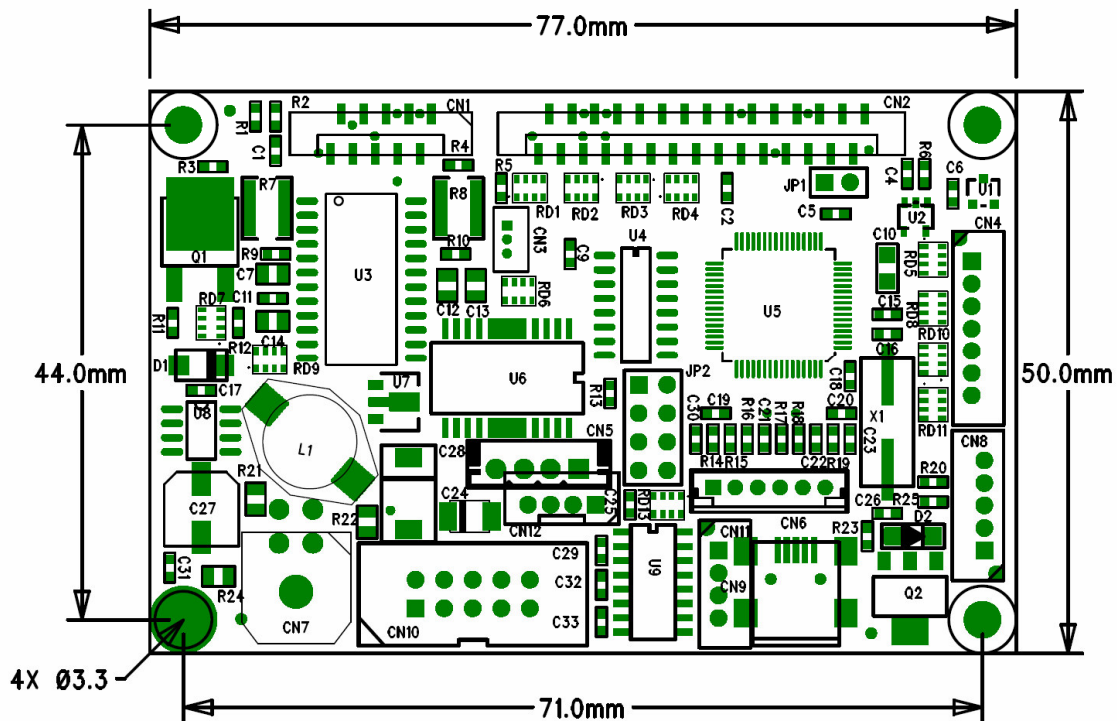
### 6.5.9 Serial connector CN9

Connector type: IDH10S1GN (Taitek)

Mating connector part number: FC10AGN (Taitek)

Pin	I/O	Function	Pin	I/O	Function
1	-	GND	2	OUT	DSR
3	OUT	TxD	4	IN	CTS
5	IN	RxD	6	OUT	RTS
7	IN	DTR	8	-	NC
9	-	GND	10	-	NC

## 6.6 Mechanical drawings



## 7 APPENDIX

### 7.1 Application notes

#### High current output

