Users Manual

Thermal printer controller
PRN609-SR
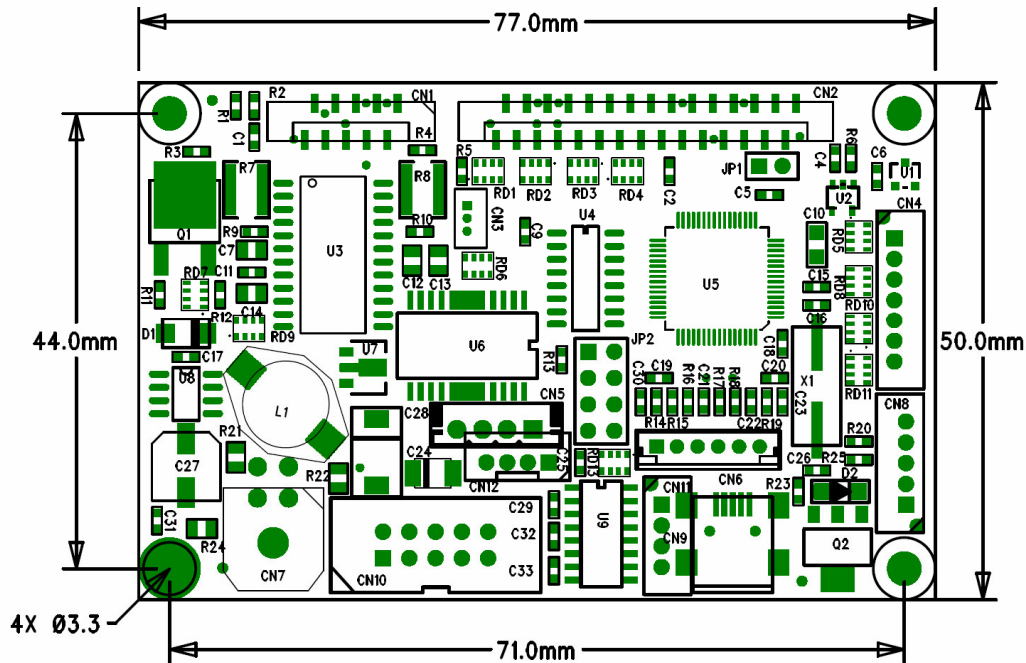
FOR FUJITSU THERMAL PRINTERS

FTP-629MCL103	FTP-639MCL064
FTP-629MCL363	FTP-639MCL103
FTP-629MCL364	FTP-639MCL303
FTP-629MCL383	FTP-639MCL363
	FTP-639MCL364
	FTP-639MCL383
	FTP-639MCL393

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Version history

Version	Date	Init	Status	Description
1.0	030328	BB	Released	First release
1.1	030902	BB	Released	Minor error removed
2.0		TLP	Open	New stencil
2.1	060126	BB	Open	New functions added
2.2	060130	BB	Open	Connectors updated

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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-SR interface boards.

PRN609-SR is designed for the following Fujitsu printers:

FTP-629MCL103	FTP-639MCL064
FTP-629MCL363	FTP-639MCL103
FTP-629MCL364	FTP-639MCL303
FTP-629MCL383	FTP-639MCL363
	FTP-639MCL364
	FTP-639MCL383
	FTP-639MCL393

PRN609-SR consists of an interface board.
The communication is RS232, USB
PRN609-SR can print graphic data either compressed or non-compressed.
Burn time can be set to control the printing intensity
Windows 2000 and XP are available at http://www.trentino.dk, for easy operation by pc. Linux drivers are available upon request.

Part numbers

	2MBit Flash	4Mbit Flash	Presenter interface	RoHS compliant
PRN609-SR				✓
PRN609F-SR	✓			✓
PRN609F1-SR		✓		✓
PRN609P-SR			✓	✓
PRN609FP-SR	✓		✓	✓
PRN609F1P-SR		✓	✓	✓

2 INSTALLATION

Unpacking

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

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Labels

PRN609P-SR 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. PRN609P-SR 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

Installation

PRN609P-SR 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.

Power supply

Single power supplies for the PRN609-SR controller board. The nominal supply voltage is 24VDC, with ±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.

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24 V power line

10 ms maximum

6 V maximum

At power or

10 ms maximum

6 V maximum

At power off

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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 /User defined
Memory size Flash	2048KB or 4096KB for download of logo etc. User selectable
Transmission to host	Requested status etc.
Printer supply	24VDC ± 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	Western Code 858 + € symbol
Character size	7x12, 12x12, 7x24, 14x24, 14x48, 24x24, 24x48, 48x96
Character type	Normal, Underline, Reverse (white on black)
Default font	14x24
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: 53047-0310
	CN4, Connector type: 53324-0710
	CN5, Connector type: JS-1132-4
	CN6, Connector type: 53253-0670
	CN7, Connector type: 43045-0400
	CN8, Connector type: 53324-0510
	CN9, Connector type: MUBS1-05SN2-MY
	CN10, Connector type: IDH10S1GN
	CN11, Connector type: 53324-0410
	CN12, connector type: B4B-KH-A
Weight	27g
Temperature	Storage -40ºC to +85ºC 0-90 Operating 0C to +70ºC 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
Drivers	Windows2000 and Windows XP + embedded, Linux,
Approvals	CE, UL
Accessories	Serial Interface cable: CBL-002, 9pol Sub-D, female, option
	Power cable: CBL-025

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4 FUNCTION

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.

USB communication

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

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

Auto detect printer

At power up the PRN609-SR, detects the printer size.

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

Memory size

Optional memory size for download of logo, fonts and labels can be added to PRN609-SR.

2.048 KB   Optional: PRN609F-SR
4.096 KB   Optional: PRN609F1-SR

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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-SR Board, the jumper JP1 must be shorten.
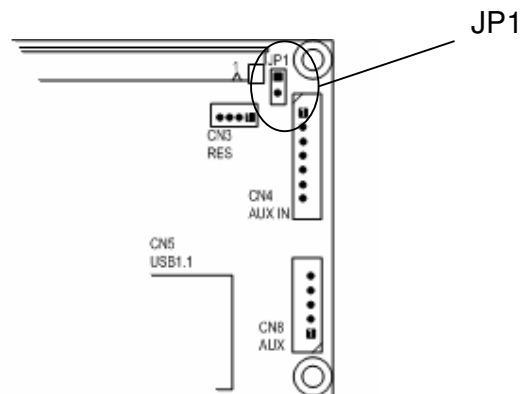
Further instruction concerning firmware upgrade comes along with utility and the firmware from Trentino Systems ApS.

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Character design

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

4.1.1 Normal character
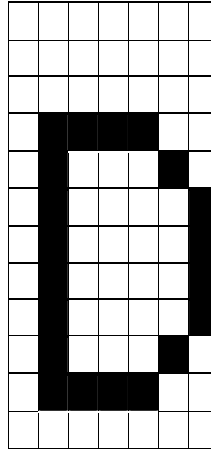
4.1.2 Low character
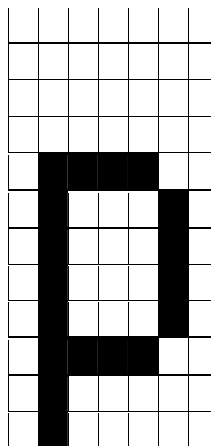
4.1.3 Underline

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

4.1.4 Reverse

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

4.1.5 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.

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Control and Escape sequences

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

4.1.6 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

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ESC+k+m n+d1 to dn	Bar code printing
ESC q	Presenter motor drive 1 sec.

4.1.7 Small font

[Name]   Small font (7x12)
[Format]   ASCII   NUL
              Hex   00
              Decimal   0
[Description] Select small font from the current print position.

4.1.8 Low font

[Name]   Low font (12x12)
[Format]   ASCII   SOH
              Hex   01
              Decimal   1
[Description] Select low font from the current print position.

4.1.9 Narrow font

[Name]   Narrow font (7x24)
[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.

4.1.10 Normal font

[Name]   Normal font (14x24)
[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.

4.1.11 Wide font

[Name]   Wide font (24x24)
[Format]   ASCII   EOT
              Hex   04
              Decimal   4
[Description] Select wide font from the current print position.

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4.1.12 High font

[Name]   High font (14x48)
[Format]   ASCII   ENQ
                Hex   05
                Decimal   5
[Description]   Select high font from the current print position.

4.1.13 Large font

[Name]   Large font (28x48)
[Format]   ASCII   ACK
                Hex   06
                Decimal   6
[Description]   Select large font from the current print position.

4.1.14 X-large font

[Name]   X-large font (56x96)
[Format]   ASCII   BEL
                Hex   07
                Decimal   7
[Description]   Select X-large font from the current print position.

4.1.15 Line feed

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

4.1.16 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

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4.1.17 Reverse off

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

4.1.18 Reverse on

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

4.1.19 Underline off

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

4.1.20 Underline on

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

4.1.21 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.

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4.1.22 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.

4.1.23 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	Paper jam	No error	Error
6	Buffer	Not full.	Full (less than 16 bytes)
7	Always 1.		

4.1.24 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

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4.1.25 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

4.1.26 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.

4.1.27 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.

4.1.28 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] When the printer controller receives this command a number 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.

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4.1.29 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.

4.1.30 Change auto feed settings

[Name]	Change auto feed settings					
[Format]	ASCII	ESC 205	2	d	m	n
	Hex	1B CD	2	64	m	n
	Decimal	27 205	2	100	m	n

[Range]   m: Auto feed delay in ½seconds
               n: Auto feed length in mm.

[Description]   The auto feed delay is the delay between the sensor detects paper to the time the paper is auto feed.
               The auto feed length is the paper length which will be fed when auto feeding.

4.1.31 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

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4.1.32 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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4.1.33 Black mark

[Name]	Set black mark parameters	
[Format]	ASCII	RS n
	Hex	1E n
	Decimal	30 n
[Range]	n: [-15;15]	
[Description]	When Black mark is enabled:	
[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:
PAGELENGHT=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.

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4.1.34 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.

4.1.35 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.

4.1.36 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).

4.1.37 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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4.1.38 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.l
                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.

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4.1.39 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 ADDITIONAL COMMANDS - USER DEFINED -OPTONAL

Command	Contents		
1B 16 n	Select Pitch (Column Width) n = pitch, dimension to be agreed		
1B 7B n	Select/Cancel upside down printing		
	n = 0	Cancel	
	n = 1	Set	
1B 21 n	Select Character Size		
	Bit number	**0**	**1**
	Bit 0 = pitch	Standard	Compressed
	Bit 3 = emphasise	Off	on
	Bit 4 = double	Off	on
	Bit 5 = double	Off	on
	Bit 7 = underline	Off	on
1B 33 n	Set line spacing n = line space, dimensions to be agreed		
1B (+*.bmp)	Download BMP Logo Expects a monochrome Windows BMP file		
1D 2F m	Print downloaded bit image		
	m = 0	Normal	
	m = 1	Double width	
	m = 2	Double height	
	m = 3	Double width/Double height	
1B 76	Transmit printer status		
	Response Bit number	**0**	**1**
	Bit 0 = Receipt Paper	OK	Low
	Bit 1 = Cover Open	Closed	Open
	Bit 2 = Receipt Paper	OK	Out
1D 48 n	Select position for human readable chars		
	n = 0	Not printed	
	n = 1	Above	
	n = 2	Below	

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ID 68 n	Select Bar Code Height n = no of pixels
ID 77 n	Select Bar Code Width n = no of pixels per bar

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6 MAINTENANCE

Normal operation

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

Store/Transport

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

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7 SPECIFICATIONS

Electrical data

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

Mechanical data

Dimensions:	L * W * H:	77 mm* 50 mm * max. 17 mm including connectors.
Vibration:	XYZ	100G
Shock:	XYZ	100G

Environmental data

Operation:	Temperature:	0°C- +70°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

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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Connector pin assignment

7.1.1 Motor/Sensor connector CN1

Connector type: CF10101M0T0, Molex
Mating part: Flat Flex Cable

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

7.1.2 Thermal head connector CN2

Connector type: CF30101M0T0, 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

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7.1.3   Reserved connector CN3

Connector type: 53047-0310, Molex
Mating part: Molex
Housing: 51021-0300
Contact: 50079 or 50058

Pin	Function
1	LED out
2	+5V
3	LED out

7.1.4   Aux input CN4

Connector type: 53324-0710, Molex
Mating part: Molex
Housing: 51065-0700
Contact: 50212-8100 (female)

Pin	Function
1	Anode
2	Paper Jam
3	150 E GND
4	Anode
5	Paper near end
6	150 E 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.
In case paper jam function is not used, make sure pin 1 and 2 are shorted, otherwise paper jam will be set and no printing will happen.

7.1.5   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

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7.1.6   USB connector CN9

Connector type: MUBS1-05SN2-MY

Pin	Function
1	USB -
2	US-
3	US+
4	USB +
5	GND

7.1.7   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

7.1.8   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

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7.1.9   Serial connector CN10

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

7.1.10 USB connector CN11

Connector type: 53324-0410

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

Optional connector. Can only be applied in case CN9 is removed.

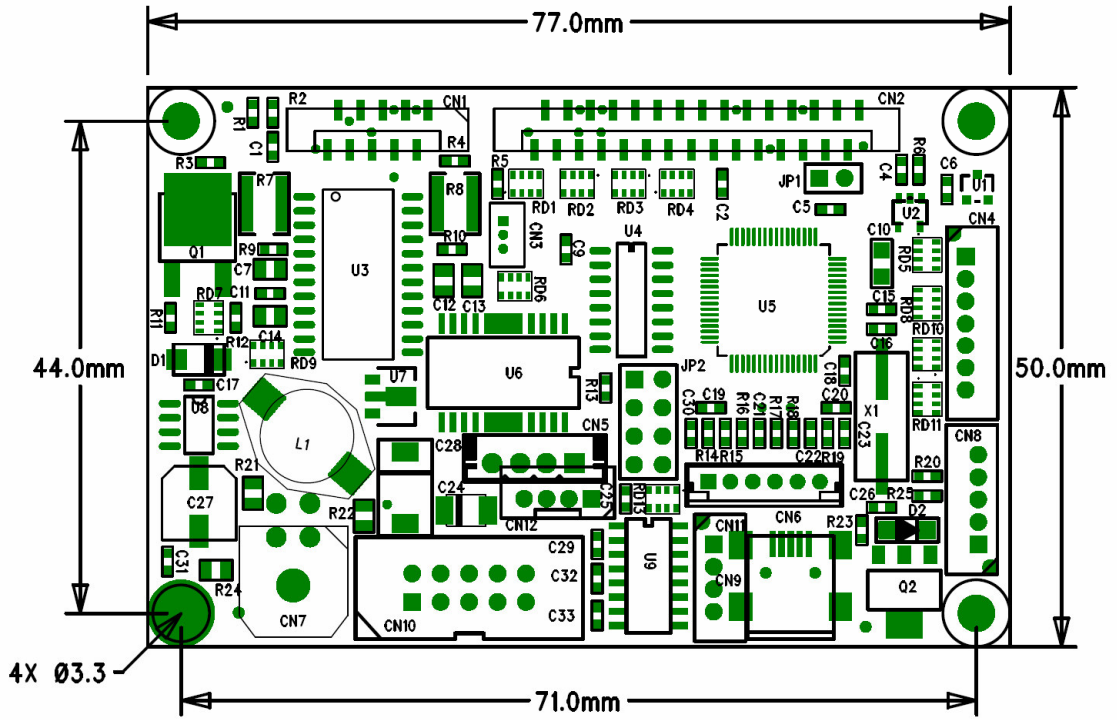### 7.1.11 Cutter connector CN12

Connector type: B4B-KH-A, JST

Pin	Function
1	/Sense
2	GND
3	/Cut
4	Cut

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7.1.12 Presenter connector CN6

Connector type: 53253-0670, Molex

Pin	Function
1	PM+
2	PM-
3	GND
4	220 E +5V
5	GND
6	PRSENSE

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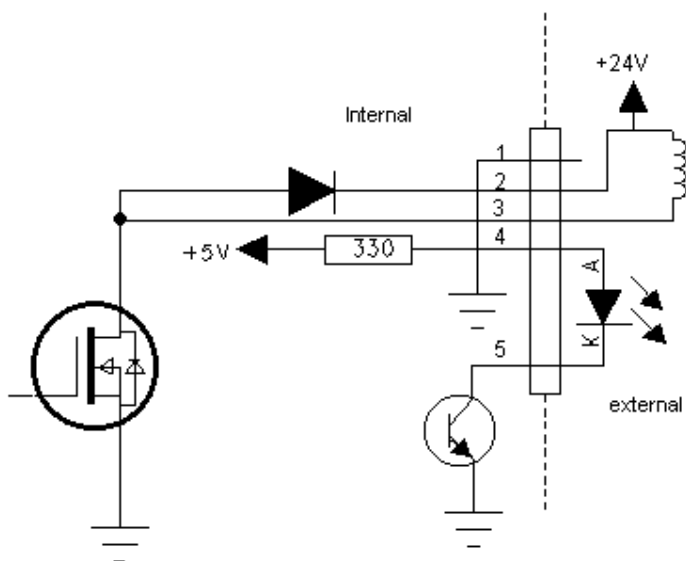*Systems*

Mechanical drawings

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8 APPENDIX

7.1 Application notes

High current output

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