User Manual
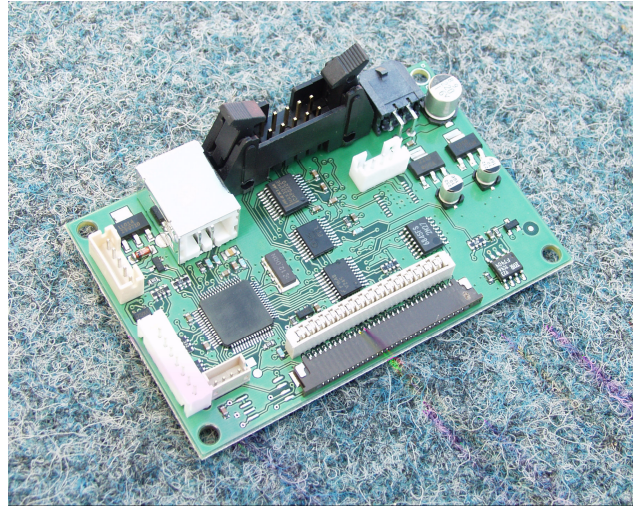
Thermal printer controller
PRN608-S

FOR FUJITSU THERMAL PRINTERS

FTP628MCL001/002/003/052/054/100/103
FTP638MCL100/103

11 February 2005

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VERSION HISTORY

Version	Date	Init	Status	Description
AA	020904	HBM	Closed	First release
AB	041220	TLP	Closed	Command set updated.
AC	050211	TLP	Released	Add "config-mode" description

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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 I/F-COM.

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1 SYSTEM DESCRIPTION

PRN608-S is designed for the following Fujitsu printers:

FTP628MCL001/002/003/052/054/100/103
FTP638MCL100/103

PRN608-S consists of an interface board.
The communication is RS232, USB
PRN608-S can print graphic data either compressed or non-compressed.
Burn time can be set to control the printing intensity
Windows 2000 and XP drivers are available at http://www.if-com.com, for easy operation by pc.
Linux drivers are available upon request.

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

PRN608-S 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. PRN608-S 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

PRN608-S 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.

(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 PRN608-S controller board. The nominal supply voltage is 6 - 8,5 VDC, with. Make sure that voltages never exceed 8,5 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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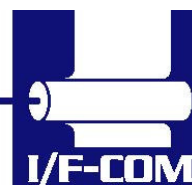
2.5 Configuration mode

The configuration mode is the where the parameter for serial communication and general printer behaviour is controlled. A keypad is need to entering configuration mode.

Following below description can change default settings.

1. Turn off power
2. Press Key 1 and 2 low while power up. Board is now in setting mode. Text will be printed on paper for further information
3. By activating key 1 and 2 you can change following parameters:
   Press key 1 to select next
   Press key 2 to modify settings

```
          Test printout

    b.  Select Command
        set
          i.  I/F-COM
              command set
              (Default)
        Baud rate
          i.  9600
         ii.  19.200
        iii.  38.400
         iv.  57.600
          v.  115.200
              (Default)
         vi.  230.400
        vii.  460.800
        Parity
          i.  0 (Default)
         ii.  1
        Data bit
          i.  7
         ii.  8 (Default)
        Stop bit
          i.  1
         ii.  2
    g.  Flow control
          i.  None
         ii.  Hardware
              (Default)
        iii.  Xon/Xoff
    h.  Printer Dot size
          i.  384 dots
              (Default)
         ii.  432 dots
        iii.  448 dots
         iv.  512 dots
          v.  576 dots
         vi.  640 dots
        vii.  832 dots
       viii.  1152 dots
```

```
    i.  IRDA
          i.  Enabled
              (Optional)
         ii.  Disabled
    j.  Auto form feed
          i.  0 sec.
         ii.  1 sec.
        iii.  2 sec.
              (Default)
         iv.  3 sec.
          v.  4 sec.
         vi.  5 sec.
    k.  Form feed length
          i.  0 mm
         ii.  1 mm
        iii.  2 mm
         iv.  5 mm
          v.  10 mm
         vi.  20 mm
        vii.  30 mm
       viii.  50 mm
              (Default)
    l.  Acceleration
          i.  Slow
         ii.  Medium
        iii.  Fast
         iv.  Disable
              (Default)
    m.  Printing speed
          i.  25%
         ii.  50%
        iii.  75%
         iv.  100%
              Default)
          v.  Disable
```

Settings will be effective upon turn off and on.

Windows OS does not support baud rate higher than 115.200 Baud, even though the setup menus can be set to higher speed. In order to obtain higher baud rate is a 3rd part utility needed on the host. Please visit www.if-com.com for further information

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3 SPECIFICATION

Interface	Serial RS232, USB1.1
Data format	Max 460.800 baud, 8 data bit, none parity, 1 stop bit, (115.200 baud, default)
Handshake	Hardware
Command set	I/F-com
Transmission to host	Requested status etc.
Printer supply	6V to 8.5V DC
Power on self test	Feed
Voltage compensation	Burn time
Current consumption	Operating 130mA, Printing up to XA @ 8.5V (TBD)
Printing speed	Up to 80mm/sec
Fontset	Western (Code 850, char 32-159)
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
Form feed	50mm
Line feed	LF
Maximum dimensions	Width 77mm, Depth 50mm, Connected height 15mm
Mounting holes	Width 71mm, Depth 44mm, Diameter 3.3mm
Connectors	TBD
Weight	25g
Temperature	Storage -40ºC to +85ºC 0-90 Operating 0C to +85ºC 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
	ESD Contact discharge 4kV, air discharge 8kV
Drivers	Linux, Windows2000 and Windows XP
Approvals	CE, UL
Accessories	Serial Interface cable: CBL-002, 9pol Sub-D, female
	Power cable: CBL-022

4 FUNCTION

4.1 General

Notice, when data is sent from the external equipment to the printer controller, all data has to be sent as binary file. If data is being sent as a character file, and some data in the file is equal to EOF, the rest will not be received.

4.2 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.

4.3 USB communication

The USB port is fully compatible with USB 1.1 .The PRN609-S interface board is 100% compatible with the printer class specification. I/F-COM A/S Vendor number: 5098

4.4 IRDA communication

IRDA is available upon request.

4.5 Auto detect printer.

At power up the PRN608-S, detects the printer size.

4.6 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.

4.7 Firmware upgrade

Firmware can be upgraded. In case firmware upgrade is needed I/F-Com will provide Windows utility and the firmware.
In order to upload new firmware to PRN609-S board, the jumper JP1 must be shorten.
Further instruction concerning firmware upgrade comes along with the utility and the firmware

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

4.8.1 Normal character

4.8.2 Low Character

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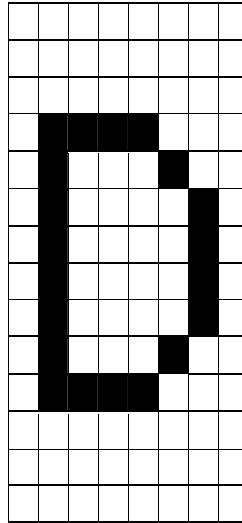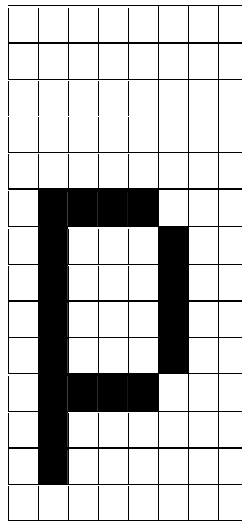
4.8.3   Underline

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

4.8.4   Reverse

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

4.8.5   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

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4.9 Printer commands

The control of the PRN608-S printer interface is performed by a command set of escape sequences. The following commands are use when controlling the printer interface. All other commands are ignored

4.9.1 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	Xlarge font
BS	Partial cut
HT	Full cut
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 and dot size
CAN	Request status
EM	Request analogue voltage
SUB	Request temperature
GS+n	Feed paper
RS+n	Burn compensate
US+d1..dLast	Graphic data non compressed
X+d1,d2,..,d(-X)	Graphic data compressed
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+1+b+n	Black mark enable
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

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4.9.2   Small font

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

4.9.3   Low font

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

4.9.4   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.	

4.9.5   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.	

4.9.6   Wide font

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

4.9.7   High font

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

4.9.8 Large font

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

4.9.9 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.

4.9.10 Cut

[Name]   Cut
[Format]   ASCII   BS
                Hex   08
                Decimal   8
[Description]   If cutter present paper cut will be executed.

4.9.11 Cut

[Name]   Cut
[Format]   ASCII   HT
                Hex   09
                Decimal   9
[Description]   If cutter present paper cut will be executed.

4.9.12 Line feed

[Name]   Line feed
[Format]   ASCII   LF
                Hex   0A
                Decimal   10
[Description]   When the printer controller receives this byte the text data in the
                buffer will be printed

4.9.13 Feed forward

[Name]   Feed forward
[Format]   ASCII   FF
                Hex   0C
                Decimal   12
[Description]   When this command is received the printer will print whatever data it
                has in the buffer and feed forward 50mm

4.9.14 Reverse off

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

4.9.15 Reverse on

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

4.9.16 Underline off

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

4.9.17 Underline on

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

4.9.18 Initialize printer

[Name]   Initialize
[Format]   ASCII   SYN
                Hex   16
                Decimal   22
[Description]   When the printer controller receives this byte a reset of the printer
                will be initialized. This command can be treated even if buffer is full.

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4.9.19 Request software version and dot size

[Name]	Request software version and dot size	
[Format]	ASCII	ETB
	Hex	17
	Decimal	23
[Description]	When the printer controller receives this byte the software version will be transmitted. This command can be treated even if buffer is full.	

4.9.20 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 (> 16 bytes left)
7	Always 1.		

4.9.21 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	

4.9.22 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.	

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4.9.23 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.

4.9.24 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.

4.9.25 Graphic data – non compressed

[Name]   Graphic data – non-compressed
[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.

4.9.26 Graphic data – compressed

[Name]	Graphic data – compressed			
[Format]	ASCII	X	d1,d2,..,d(-X)	
	Hex	X	d1,d2,..,d(-X)	
	Decimal	X	d1,d2,..,d(-X)	

[Range]   Y: [-Last;-2]
n: [0;255]
Last: Depend on printer size

[Description]   The following example descripes a printer with a size of 576 dots.
This gives Last=72
When the printer controller receives a byte that is –72 to –2
(Decimal 256-72 to 254) the following data is compressed data. The
number of compressed graphic bytes is the negative value.

This means:
If X = -10 (Decimal 246) the next 10 bytes is compressed data.
The compressed data is as follows.
When a data byte is 0 (no dots activated) the next byte received is
the number of bytes that are 0. All other data is send as non
compressed.
A very few lines cannot be compressed. These will if you try to
compress them be longer than the non-compressed line. These
must therefore be send as non-compressed data

4.9.27 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]   Sets the dot size of the printer to n bytes. If the dot size is changed
printer outs can be strange.

4.9.28 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.

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4.9.29 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			

4.9.30 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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4.9.31 Black mark enable

[Name]	Black mark enable				
[Format]	ASCII	ESC 205	1	b	n
	Hex	1B CD	1	62	n
	Decimal	27 205	1	98	n

[Range]   n: bit 0: If bit 0 is set the board will transmit 'B' every time paper is not detected at paper sensor bit 1:
If bit 1 is set the black mark function is enabled.

[Default]   n = 0

[Description]   This command enables the black mark function.
Paper detects. If the printer stops on a black mark the paper will be forwarded the length of the black mark. If the paper have been forwarded BLACMARK LENGTH the paper is detected out.

If the paper is removed when the printer is not printing then the roller will feed BLACKMARK LENGTH and then the paper is detected out. When the board received the command Feed Forward (FF=0xC) the paper is either feed until the next black mark or the rest of the page, whatever comes first.
The board can be set to transmit a 'B' whenever the paper is not detected at the paper detector. This is typical when the sensor encounters a Black Mark.

4.9.32 Black mark parameters

[Name]   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 feeded 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
                lengthPAPER 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.

                Default:
                PAGELENGHT=150mm
                PAPEROFFSET=2mm
                BLACKMARK=120 (120/8=15mm)

4.9.33 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 feeded until the next black mark or the rest of the
                page, whatever comes first.

4.9.34 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.

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4.9.35 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).

4.9.36 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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4.9.37 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.

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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4.9.38 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 PRN608-S board 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: Tolerance	24VDC ±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: Humidity :	0℃- +70℃ 10%-99% RH, without condensing
Storage:	Temperature: Humidity:	-40℃ - +85℃ 0%-99% RH, without condensing
Transport:	Temperature: Humidity:	-40℃ - +85℃ 0%-99% RH, without condensing

6.4 EMC & ESC

The printer controller is tested according to:

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

6.5 Connector Pin Assignment

6.5.1   Thermal head connector CN1

Connector type: 3800-30P-T-S

Pin	Function	Pin	Function
1	GND	2	+5V
3	P1	4	GND
5	SW	6	VH
7	VH	8	DI
9	CLK	10	GND
11	GND	12	/ST3
13	/ST3	14	/ST1
15	+5V	16	TI
17	ST2/GND	18	/ST1
19	AOE	20	AOE
21	GND	22	GND
23	/LAT	24	DOP
27	/MB	28	MB
29	/MA	30	MA

6.5.2   Thermal head connector CN2

Part number: 3700-30P-T-T

Pin	Function	Pin	Function
1	GND	2	+5V
3	P1	4	GND
5	SW	6	VH
7	VH	8	DI
9	CLK	10	GND
11	GND	12	/ST3
13	/ST3	14	/ST1
15	+5V	16	TI
17	ST2/GND	18	/ST1
19	AOE	20	AOE
21	GND	22	GND
23	/LAT	24	DOP
27	/MB	28	MB
29	/MA	30	MA

6.5.3   Reserved connector CN3

Connector type: 53047-0410

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

6.5.4   Motor/Sensor connector CN4

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

Pin	Function
1	+5V
2	P2
3	GND
4	+5V
5	+5V
6	GND
7	DNG

6.5.5   Cutter connector CN5

Connector type: 5501-04TS

Pin	Function
1	/SENSE
2	GND
3	CUT
4	/CUT

6.5.6   USB connector CN6

Connector type: UBBR-04SW11, Taitek
Mating cable: CBL-030

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

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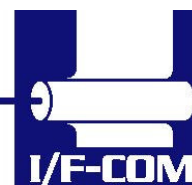
6.5.7 Power connector CN7

Connector Type: 3045-0400, Molex
Mating part
Housing: 39-01-3042, Molex
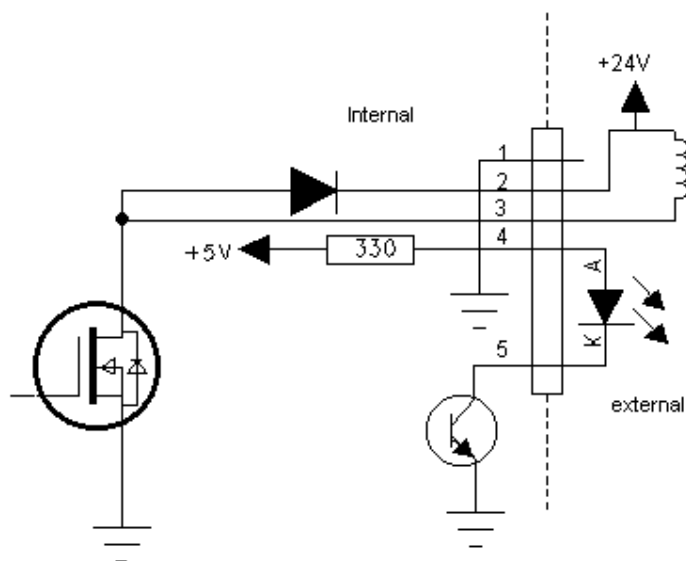Contact: 39-00-0038, Molex
Mating cable CBL-025
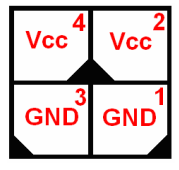
Pin	Function
1	GND
2	+Vcc
3	GND
4	+Vcc

6.5.8 AUX connector CN8

Connector type: 53324-0510

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

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

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6.6 Mechanical Drawings

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