# User Manual

## Thermal printer controller
## PRN604-S
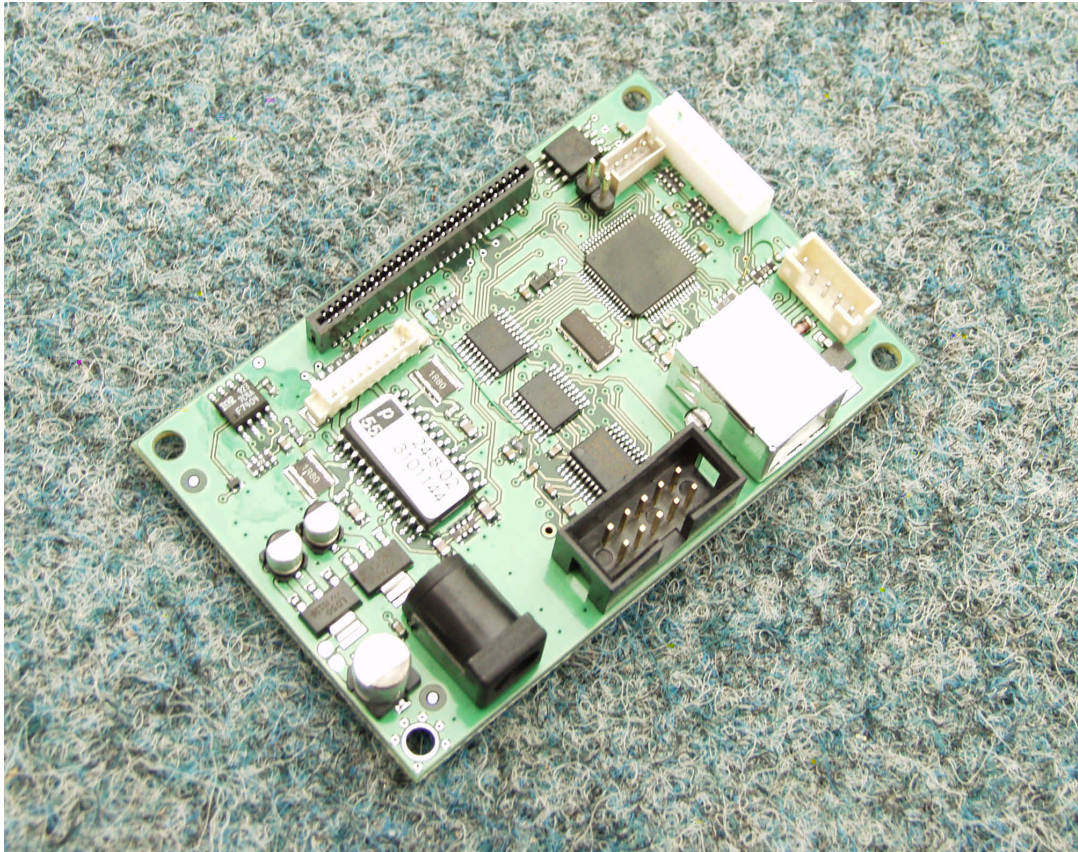
FOR FUJITSU THERMAL PRINTERS
FTP604 SERIES

**I/F-COM**

**VERSION HISTORY**

| Version | Date | Init | Status | Description |
|---------|--------|------|-------------|---------------------|
| 0.9 | 020712 | BB | Draft | First release |
| 0.91 | 021022 | BB | Pre-release | Second pre-release |
| 0.92 | 030111 | BB | Pre-release | Third pre-release |
| 0.93 | 030125 | BB | Pre-release | Connector updated |

**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 organisation.  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).

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# 1 SYSTEM DESCRIPTION

This reference manual describes the specifications, functions, and operating procedures for the PRN604-SInterface Board.
The PRN604-S is an interface board for the FTP604 series printer mechanisms.
This reference manual also describes the print operation of the FTP604. Read this reference manual thoroughly before using the PRN604-S. PRN604-S is designed for the following Fujitsu printers:

**FTP-624MCLxxx**
**FTP-634MCLxxx**
**FTP-644MCLxxx**

PRN604-S consists of an interface board.
The communication is RS232, USB or IRDA.
PRN604-S can print graphic data either compressed or non-compressed.
Burn time can be set to control the printing intensity
Windows 95/98, 2000, NT and CE 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

PRN604-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. PRN604-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

PRN604-Sis fastened in the product by 4 M3.3 screws. The cables (for the thermal head, the stepper-motor and detector) are placed in the thermal printer connector on the PCB. 1 Mounting hole is grounded. See drawing for more details.

(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.

## 2.4    Power supply

Single power supplies for the PRN604-Scontroller board. Voltage range is 6-8,5VDC. 4A minimum @ 7,2V. Make sure that voltages never exceed 8,5VDC.

(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:

## 2.5    Settings

Following below description can change default settings. Baud rate is default 115.200, however standard PC´s today cannot handle this Baud rate. Windows OS does not support speed higher than 115.200 Baud, even when setup menus can be set to higher speed. In order to obtain higher speed you need to install 3$^{rd}$ part utility program on PC. Please visit www.if-com.com for further information.

1. Turn off power
2. Press Key 1 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:
    a. Test printout
    b. Select Command set (optional)
        i. I/F-COM command set
        ii. Seiko compatible command set (Optional)
        iii. Fujitsu compatible command set (Optional)
        iv. APS compatible command set (Optional)
        v. ESC/POS compatible command set (Optional)
    c. Baud rate
        i. 9600
        ii. 19.200
        iii. 38.400
        iv. 57.600
        v. 115.200
        vi. 230.400
        vii. 460.800
    d. Parity
        i. 0
        ii. 1
    e. Data bit
        i. 7
        ii. 8
    f. Stop bit
        i. 1
        ii. 2
    g. Flow control
        i. None
        ii. Hardware
        iii. Xon/Xoff
    h. Dot size of printer
        i. 384 dots
        ii. 432 dots

iii.   448 dots
                    iv.   512 dots
                     v.   576 dots
                    vi.   640 dots
                   vii.   832 dots
                  viii.   1152 dots
          i.   Key 1 function
                     1.   Input key
                     2.   LED output
                     3.   Label detect
                     4.   Black mark detection
                     5.   Paper near end function
                     6.   Paper jam function
                            a.   Stop printer
                            b.   Send data to host

          j.   Key 2 function
                     1.   Input key
                     2.   LED output
                     3.   Label detect
                     4.   Black mark detection
                     5.   Paper near end function
                     6.   Paper jam function
                            a.   Stop printer
                            b.   Send data to host
          k.   Paper select
                     i.   Paper 1
                    ii.   Paper 2
                   iii.   Paper 3
                    iv.   Paper 4
          l.   IRDA
                     i.   Enabled
                    ii.   Disabled
          m.   Auto form feed
                     i.   0 sec.
                    ii.   1 sec.
                   iii.   2 sec.
                    iv.   3 sec.
                     v.   4 sec.
                    vi.   5 sec.
          n.   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

o. Grey scale printing
          i.   On
          ii.  Off

p. Acceleration
          i.   Slow
          ii.  Medium
          iii. Fast
          iv. Disable

q. Printing speed
          i.   25%
          ii.  50%
          iii. 75%
          iv. 100%
          v.   Disable

r. Burn strobe dark
          i.   1
          ii.  2
          iii. 3
          iv. 4
          v.   5
          vi.  6
          vii. 7
          viii. 8
          ix.  9

s. Burn strobe light
          i.   -1
          ii.  -2
          iii. -3
          iv. -4
          v.   -5
          vi.  -6
          vii. -7
          viii. -8
          ix.  -9

t. Output
          i.   Cash drawer output
                1.  Solenoid time 0,2 sec.
                2.  Solenoid time 0,5 sec.
                3.  Solenoid time 0,7 sec.
                4.  Solenoid time 1,0 sec.
                5.  Solenoid time 1,5 sec.

ii. Winding motor

Settings will be effective upon turn off and on.

## 2.6   Serial Input/Output

If BUSY control is selected:
When 236 bytes of data have been stored in the input buffer, the
SBUSY signal becomes high to request that the computer temporarily
stop sending data. When the amount of data stored in the input buffer
becomes 235 bytes or less, the SBUSY signal changes to low to
request that the host device continue data transfer. Up to 16 bytes of
input data are guaranteed after the SBUSY signal has become high.
When an error occurs, the SBUSY signal becomes high. Data input is
prohibited until the error is cancelled.
If Xon/Xoff control is selected:
When 188 bytes of data has been stored in the input buffer, Xoff ($13_{16}$)
is output through the TxD terminal to request that the host device
temporarily stops sending data. When the amount of data stored in the
input buffer becomes 124 bytes or less, Xon ($11_{16}$) is output to request
that the computer continues data transfer. Up to 64 bytes of the input
data are guaranteed after
Xoff has been output. When an error occurs, the Xoff signal is output to
prohibit the data input.
When the error is cancelled, Xon is output.

### 2.6.1   Serial data transfer

The PRN604-Stransfers various data other than the Xon and Xoff
codes which are output when controlling Xon and Xoff.
Regardless of whether the input mode is serial or parallel, the following
data is transferred through the TxD terminal.
(a) Error codes when a hardware error occurs at initialisation
(b) The data when executing the Vhead voltage response (DC2+'v')
(c) The data when the error status response is set (DC2+'e') and an
error occurs
(d) The data when executing the execution response request (DC2+'q')
(e) The data when executing the remaining RAM capacity response
(DC2+'r')
(f) The data when executing the environmental temperature response
(DC2+'t')
At the selection of serial input, data (b) through (f) is transferred
according to the transfer conditions, which are set using the function

switches. However, the hardware error code (a) has the same conditions as those for parallel input.

When transferring data, data control by SBUSY and Xon/Xoff is not executed and the data is transferred with no conditions.

All of the transmission conditions of serial data transfer for sending hardware error codes are fixed at the selection of parallel input as follows:

### 2.6.1.1  Serial input/output port

Serial data output (TxD)
>    When Xon/Xoff control is selected, the Xon/Xoff signal is output.
>    Data is output according to the transmission conditions, which are set by the function switches.
>    All response data is output.

Serial data input (RxD)
>    Data input port
>    Data is input from the host device according to the transmission conditions, which are set using the function switches.

Serial busy (SBUSY)
>    Indicates whether or not the PRN604-S is ready to receive data.
>    When the SBUSY signal is low, data can be input.
>    When Xon/Xoff control is selected, SBUSY is always low.

## 2.6.2  Setting functions

Error processing when receiving serial data
The PRN604-S receives and checks serial data according to the transmission conditions.
When the PRN604-S has received one byte of data without errors, the data is stored in the input buffer.
If there are any errors, the following data is stored in the input buffer according to the type of error.
Error type Error code
Parity error (!: 2116)
Framing error (?: 3F16)
If the input data cannot be printed correctly and instead "!" or "?" is printed, the transmission conditions between the host device and the PRN604-S most likely does not match. If this happens, adjust the conditions so that they match.

## 2.7 THERMAL HEAD CONTROL

Data Transfer to the Thermal Head
The PRN604-S transfers one dot line of data at 6 Mbps synchronized with the CLOCK signal.
The data is transferred in order to the shift register inside the thermal head from the left (when facing the paper feed direction).
The transferred data is then transferred by the head latch signal to the latch register inside the thermal head. Turning on the head strobe signal initiates printing of one dot line of data on the thermal paper.

### 2.7.1 Thermal Head Drive Operation

Generally, when the line thermal head is operating, the line is divided into several blocks, which are activated one after another in succession. For the line thermal head of the FTP604 printer mechanism, the line is divided into 7 blocks called physical blocks, 216, 288 or 416 dots with each. A strobe signal (/ST1 to /ST7) is allocated to each physical block to activate it. To drive the head, physical blocks are activated in groups. The group of physical blocks is called a logical block.
For the PRN604-S either dynamic division or fixed division can be selected as the method of division for logical blocks. This selection is made through a function. See settings for more information.

### 2.7.2 Peak power limitation

The PRN604-S counts the number of dots activated in each physical block and groups the physical blocks into logical blocks to print a single dot line so that the number does not exceed the specified maximum number of activated dots. The PRN604-S determines logical blocks each time it prints a single dot line.
In dynamic division, in order to avoid unclear printing, at the first step of the motor the thermal head is driven and at the second step the paper is fed.
Also, since the order of the printing blocks and printing speed are changed in each dot line according to the content of the print data, print quality may be lower than that in fixed division. If print quality is regarded as important, printing in fixed division is recommended.
The maximum number of activated dots in the initialisation status is specified using the function switches.
64 through 256 dots can, however, are set using the command for setting the number of dynamic division dots.

When the maximum number of activated dots is 128 dots, and all of the dots are driven, as shown in

### 2.7.3  Head Control Circuit

The PRN604-S has a function for measuring the resistance of the thermal head connected to the FTP604.
The PRN604-S measures the resistance of the thermal head and detects the errors at initialisation.
Based on the measurement, the PRN604-S determines how much energy to apply. No adjustment is needed for replacing the FTP604 to get the best printing.

### 2.7.4  Head temperature measurement circuit

The thermistor is mounted on the FTP604 to measure the temperature of the thermal head.
The PRN604-S determines the energy to be applied to the head and also checks for head temperature errors.
If the temperature of the thermal head is -10 °C or lower, or 80 °C or higher, the PRN604-S stops driving and puts the printer in head temperature error status. If the temperature of the thermal head is returned to from -5 °C to 75 °C, the printer goes to printable status.

### 2.7.5  Vhead interrupt circuit

This circuit interrupts Vhead to prevent electrolytic corrosion of the thermal head and to enable the detection of the resistance mentioned above.
Electrolytic corrosion may significantly shorten the life of the thermal head. Thermal paper ordinarily contains electrolytic material to prevent sheets from sticking to each other due to static electricity. If there is too much of this electrolytic material, high temperatures and humidity cause the material to ionise, resulting in electrolytic corrosion of the thermal head.

The PRN604-S turns the FET off and breaks the Vhead applied to the thermal head during waiting status to prevent electrolysis corrosion of the thermal head.

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# Specifications

## Default settings

| Interface | Serial RS232C, USB or IRDA |
|---|---|
| Data format serial | 115.200 baud, 8 data bit, none parity, 1 stop bit, hardware handshake.Baud rate can be changed by software. |
| Data format USB | USB Printer class specification. http://www.usb.org/developers/data/devclass/usbprint11.pdf |
| Data format IRDA | IRDA (Ircomm specifications) http://www.irda.org/standards/pubs/ircomm10.pdf |
| Command set | I/F-com |
| Transmission to host | Requested status etc. |
| Printer supply | 18V to 24V DC |
| Power on self test | Feed |
| Voltage compensation | Burn time |
| Current consumption | Operating 130mA, Printing up to XA @ 24V (TBD) |
| Printing speed | 50mm/sec FTP624MCLxxx, 40mm/sec FTP634MCLxxx |
| Fontset | Western (Code 850, char 32-159) |
| Character size | 8x14, 8x28, 16x14, 16x28, 16x56, 32x28, 32x56, 64x112 |
| Character type | Normal, Bold, Underline, Italic, Reverse (white on black) |
| Default font | 16x28 |
| Paper detect | Digital |
| Graphics | Normal / Compressed |
| Auto load | 80mm |
| 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 | Windows 9x, Windows CE, Windows NT, Linux, Windows2000 and Windows XP |
| Approvals | CE, UL |
| Accessories | Serial Interface cable: CBL-002, 9pol SubD, female |
| | Power cable: CBL-022 |

# 3   Function

## 3.1   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.

## 3.2   Serial communication.

Standard communication is;
Baud rate; 115.200 Baud
Data bits = 8
Stop bits = 1.
Parity = None
Flow control = Hardware handshake

Baud rate can be changed by changed by a software command.

## 3.3   USB communication.

Build in USB interface is 100% compliant to USB 1.1 and fully approved by the USB organisation. For more details please contact I/F-COM.
By plug USB cable - Host system will recognise I/F-COM interface board.
Before connecting USB cable please set USB port as offline. Interface board will automatically online USB port. Data cannot be send from interface board to host. USB is not a bi-directional communication.

## 3.4   IRDA communication.

PRN604-S is prepared for IRDA via connector for IRDA transmission. Please contact I/F-COM for more information.

### 3.5 Firmware upgrade.

If firmware needs to be changed, alternative firmware can be downloaded.
Please contact I/F-COM for firmware upgrade or changes.
The steps to download an alternative firmware in DOS are the following. These steps only work for a serial connection, look further down how to do it with USB.

1. Power the system off.
2. Disconnect printer.
3. Short circuit the pins "upgrade firmware"
4. Turn on printer
5. Write the following command "mode com1:9600,n,8,1", this command ensure that the serial port is at a known state.
6. Write the following command "xmode 1 +", this command sets the baud rate to 115.200, the xmode program can be downloaded from the I/F-COM web site
http://www.if-com.com/data/drivers/xmode.zip
7. Run the following command, "copy "filename" /b com1". The filename represents the path and the filename of the new firmware file. This file can be downloaded from website, or can be emailed by I/F-COM.

I/F-COM also offers a Windows utility program in order to download firmware through serial port. Visit www.if-com.com for more information.

For further information about downloading with the driver, can be found in the driver installation guide.

### 3.6 Auto form feed

When paper no paper is present, it is possible to form feed new paper automatic. While thermal head is down, place the paper at the roller. After 2 seconds (default) the paper will be pulled in automatically. Form feed wait time is 2 sec (default), but can be changed by a command.

### 3.7 Character design

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

### 3.7.1 Normal Character.
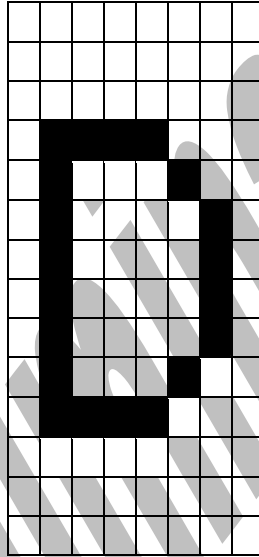


### 3.7.2 Low Character
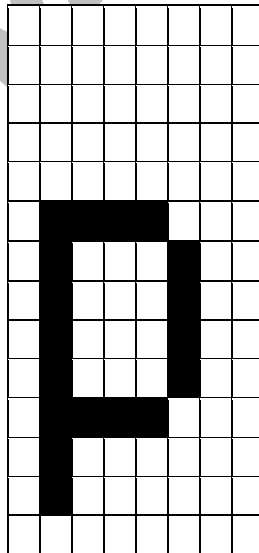
### 3.7.3 Underline

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

### 3.7.4 Bold

When bold characters are printed the character is or with itself shifted right.

### 3.7.5 Reverse

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

### 3.7.6 Italic.

When Italic characters are printed every line will be shifted the following number of dots to the right:
(Line number from bottom)/4

### 3.7.7 Font sizes.

| Font | Width | Height |
|---|---|---|
| Small | Normal | Normal |
| Low | Double | Normal |
| Narrow | Normal | Double |
| Normal | Double | Double |
| Wide | Double | Quadruple |
| High | Quadruple | Double |
| Large | Quadruple | Quadruple |
| Xlarge | Octuple | Octuple |

When the size is normal or greater a build in smooth function will smooth the characters.

### 3.8 I/F-COM simple command set.

The following commands are use when communicating with the printer controller. All other commands is ignored

### 3.8.1 Small Font

| | | |
|---|---|---|
| [Name] | Small Font (8x12) | |
| [Format] | ASCII | NUL |
| | Hex | 00 |
| | Decimal | 0 |
| [Description] | Chooses small font from the current print position. | |

### 3.8.2 Low Font

| | | |
|---|---|---|
| [Name] | Low Font (16x12) | |
| [Format] | ASCII | SOH |
| | Hex | 01 |
| | Decimal | 1 |
| [Description] | Chooses low font from the current print position. | |

### 3.8.3 Narrow Font

| | | |
|---|---|---|
| [Name] | Narrow Font (8x28) | |
| [Format] | ASCII | STX |
| | Hex | 02 |
| | Decimal | 2 |
| [Description] | Chooses narrow font from the current print position. | |

### 3.8.4 Normal Font

| | | |
|---|---|---|
| [Name] | Normal Font (16x28) | |
| [Format] | ASCII | ETX |
| | Hex | 03 |
| | Decimal | 3 |
| [Description] | Chooses normal font from the current print position. This is the default font after power up or reset. | |

### 3.8.5 Wide Font

| | | |
|---|---|---|
| [Name] | Wide Font (32x28) | |
| [Format] | ASCII | EOT |

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|  | Hex | 04 |
|---|---|---|
|  | Decimal | 4 |
| [Description] | Chooses wide font from the current print position. | |

### 3.8.6 High Font

| [Name] | High Font (16x56) | |
|---|---|---|
| [Format] | ASCII | ENQ |
|  | Hex | 05 |
|  | Decimal | 5 |
| [Description] | Chooses high font from the current print position. | |

### 3.8.7 Large Font

| [Name] | Large Font (32x56) | |
|---|---|---|
| [Format] | ASCII | ACK |
|  | Hex | 06 |
|  | Decimal | 6 |
| [Description] | Chooses large font from the current print position. | |

### 3.8.8 Xlarge Font

| [Name] | Xlarge Font (64x112) | |
|---|---|---|
| [Format] | ASCII | BEL |
|  | Hex | 07 |
|  | Decimal | 7 |
| [Description] | Chooses Xlarge font from the current print position. | |

### 3.8.9 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 | |

### 3.8.10 Barcode on

| [Name] | Barcode on | |
|---|---|---|
| [Format] | ASCII | VT |
|  | Hex | 0B |
|  | Decimal | 11 |
| [Type] | Barcode 39 | |

[Description]     Turns the barcode on until non-barcode character
received.
[Barcode char.] Space , $ , % , * , + , - , . , / , 0-9 , A-Z
[Notes]          The barcode 39 must start and end with the character
'*'. This character is the start and stop character in
barcode 39, and the '*' can only be used as start and
end character.

If the barcode length exceeds the paper size the last
barcode character will not be written as barcode. In that
case the barcode cannot be read because the last
character will not be '*'

## 3.8.11 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

## 3.8.12 Reverse off

## 3.8.13 [Name]           Reverse off

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

## 3.8.14 Reverse on

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

## 3.8.15 Underline off

[Name]           Underline off
[Format]         ASCII           DLE

|          | Hex       | 10 |
|----------|-----------|----|
|          | Decimal   | 16 |

[Description]    This command will switch off underline printing

## 3.8.16 Underline on

[Name]    Underline on

[Format]    ASCII    DC1

    Hex    11

    Decimal    17

[Description]    This command will switch on underline printing

## 3.8.17 Bold off

[Name]    Bold off

[Format]    ASCII    DC2

    Hex    12

    Decimal    18

[Description]    This command will switch off bold printing

## 3.8.18 Bold on

[Name]    Bold on

[Format]    ASCII    DC3

    Hex    13

    Decimal    19

[Description]    This command will switch on bold printing

### 3.8.19    Italic off

[Name]    Italic off

[Format]    ASCII    DC4

    Hex    14

    Decimal    20

[Description]    This command will switch off italic printing

## 3.8.20 Italic on

[Name]    Italic on

[Format]    ASCII    NAK

    Hex    15

    Decimal    21

[Description]    This command will switch on italic printing

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### 3.8.21    Initialise Printer

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


### 3.8.22 Request Software version

[Name]        Request software version
[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.


### 3.8.23 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 | Paper Jam | No error | Error |
| 5 | Rxerror | No error | Rx error |
| 6 | Buffer | Not full. | Full (less than 16 bytes left) |
| 7 | Always 1. | | |


### 3.8.24 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


### 3.8.25 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


### 3.8.26 Sub command set

[Name]           Sub command set
[Format]         ASCII          ESC n
                 Hex            1B    n
                 Decimal        27    n
[Range]          n: [-128;127]
[Description]    The n is the commands in the sub-set.


### 3.8.27 Upgrade command

[Name]           Upgrade command
[Format]         ASCII    ESC Z
                 Hex      1B    5A
                 Decimal  27    90
[Description]    Only used by the I/F-COM A/S upgrade programs.


### 3.8.28 Set auxiliary output

[Name]               Set auxiliary output
[Format]             ASCII    ESC p    n
                     Hex      1B    70    n
                     Decimal  27    112   n
[Description]        When this command is received then
                     the auxiliary output can be set.
                     If n = 0, then the output will be set to off

If n > 1 and < 254 then the output will be turned on in n/4.096msec, and then turned off again.
If n = 255, then the output will be turned on.

### 3.8.29 Automatic sending status

| | |
|---|---|
| [Name] | Automatic sending status |
| [Format] | ASCII    ESC a |
| | Hex      1B   61 |
| | Decimal  27   97 |
| [Description] | When this command is sent once, then the board will transmit the status every time that it change state. |

### 3.8.30 Stop sending automatic status

| | |
|---|---|
| [Name] | Stop sending automatic status |
| [Format] | ASCII    ESC b |
| | Hex      1B   62 |
| | Decimal  27   98 |
| [Description] | When this command is sent then it will turn off transmitting status. |

### 3.8.31 Color/Grey scale graphic

| | |
|---|---|
| [Name] | Colour / Grey scale graphic |
| [Format] | ASCII    ESC c    n |
| | Hex      1B   63   n |
| | Decimal  27   99   n |
| [Description] | When this command is sent then will the board not feed. After the next graphic data (both compression and not). The n is a percent of the burn ratio, n can be from 0 to 15, and the burn ratio is 100/15*n. This command is used by the driver to make colour and grey scales printout. |

### 3.8.32 Enable saving data

| | |
|---|---|
| [Name] | Enable saving data |
| [Format] | ASCII    ESC d |
| | Hex      1B   64 |

|  |  |
|---|---|
| | Decimal    27    100 |
| [Description] | This command will enable that the boards save values to the flash, this is made to ensure that a wrong transmission not will change settings in the board, remember to send the command "Saving data to board", to actual save the data. |

### 3.8.33 Save data to board

| | |
|---|---|
| [Name] | Save data to board |
| [Format] | ASCII      ESC e |
| | Hex         1B    65 |
| | Decimal    27    101 |
| [Description] | This command saves all settings to flash. |

### 3.8.34 Change dot size

| | |
|---|---|
| [Name] | Change dot size |
| [Format] | ASCII      ESC f       n |
| | Hex         1B    66    n |
| | Decimal    27    102   n |
| [Description] | If n = 0x01, then the board is set to FTP624MCLxxx. If n = 0x02 then is it set to FTP634MCLxxx. The value is saved to flash, |

### 3.8.35 Change form feed length

| | |
|---|---|
| [Name] | Change form feed length |
| [Format] | ASCII      ESC g      n |
| | Hex         1B    67    n |
| | Decimal    27    103   n |
| [Description] | N represents the value in mm that is form feeded after the feed command is sent. The value is saved to flash. |

### 3.8.36 Change baud rate

| | |
|---|---|
| [Name] | Change baud rate |
| [Format] | ASCII      ESC h      n |
| | Hex         1B    68    n |

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Decimal    27    104    n

[Description]    N represents the new baud rate, legal values
for n = 1 to 255. The baud rate is calculated
as 921600/n = new baud rate.
For instance 921600/8 = 115200baud.
The value is saved to the flash

## 3.8.37 Change form feed time

[Name]    Change form feed time
[Format]    ASCII    ESC i    n
Hex    1B    69    n
Decimal    27    105    n
[Description]    N represents the time between that the
board registry incoming paper, and to it
starts feed the auto form feed length. The
time is calculated as n * 50msec. The default
setting is 2 seconds. The value is saved to
flash. Legal values for n are between 1 and
255.

## 3.8.38 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.

## 3.8.39 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.

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### 3.8.40 Graphic data – non compressed

| | | | |
|---|---|---|---|
| [Name] | Graphic data – non-compressed | | |
| [Format] | ASCII | US | d1,d2,..,dX |
| | Hex | 1F | d1,d2,..,dX |
| | Decimal | 31 | d1,d2,..,dX |
| [Range] | n: [0;255] | | |
| | X=54 for FTP624MCLxxx, X=72 for FTP634MCLxxx, | | |
| [Description] | When the printer controller receives this command the X graphic bytes (d1-dX) will be printed in one dot line. The MSB in d1 is the left most dot and the LSB in dX is the right most dot. | | |

### 3.8.41 Graphic data – compressed

| | | | |
|---|---|---|---|
| [Name] | Graphic data – compressed | | |
| [Format] | ASCII | Y | d1,d2,..,d(-Y) |
| | Hex | Y | d1,d2,..,d(-Y) |
| | Decimal | Y | d1,d2,..,d(-Y) |
| [Range] | Y: [-X;-2] | | |
| | n: [0;255] | | |
| | X=54 for FTP624MCLxxx, X=72 for FTP634MCLxxx, | | |
| [Description] | When the printer controller receives a byte that is –Y to –2 (Decimal 256-Y to 254) the following data is compressed data. The number of compressed graphic bytes is the negative value. | | |

This means:
If Y = -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.

### 3.8.42 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 |
| LF | Line Feed |
| VT | Print barcode |
| FF | Forward feed |
| SO | Reverse off |
| SI | Reverse on |
| DLE | Underline off |
| DC1 | Underline on |
| DC2 | Bold off |
| DC3 | Bold on |
| DC4 | Italic off |
| NAK | Italic 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..dX | Print graphic line |

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# 4 Maintenance

## 4.1 Daily use

Printer and interface board must be switch off while in idle mode.

## 4.2 Store/Transport

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

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# 5 Specifications

## 5.1 Electrical Data

Voltage: 6-8,5VDC

Current: Maximum head current:$\underline{\text{Numbers of active dots * Vhead}}$
                                                              150+/-15%

Maximum motor current:                    1000mA

Power up sequence:        max. 10 msec. 10 – 90% Voltage applied
Power down sequence:    max. 10 msec. 90 – 10% Voltage applied

## 5.2 Mechanical Data

Dimensions: Length, width, height:  77 mm* 50 mm * max. 15 mm
                    Including connectors.
Vibration:    100G XYZ
Shock:        100G XYZ

## 5.3 Environmental Data

Operation:   Temperature:           -20°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

## 5.4 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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ESD: 4 kV contact discharge against parts exposed to contact at normal use. 8 kV air discharge.

## 5.5 Temperature Test

Temperature shock: (no voltage applied) -28°C to +100°C at 1 sec. 100 times: no damage.

# 6   Connector Pin Assignment

## 6.1.1   Motor connector

Connector CN1: 5501-4S
Mating connector part number:
TBA

| Pin | Function |
|-----|----------|
| 1 | /MB |
| 2 | MB |
| 3 | /MA |
| 4 | MA |

## 6.1.2   Thermal Head connector

FTP624MCLxxx
Connector CN2:  JS-1125-16
Mating connector part number:
TBA

| Pin | Function | Pin | Function |
|-----|----------|-----|----------|
| 1 | VH | 9 | /ST5 |
| 2 | GND | 10 | /LAT |
| 3 | GND | 11 | /ST6 |
| 4 | /ST1 | 12 | +5V |
| 5 | /ST2 | 13 | CLK |
| 6 | /ST3 | 14 | DI |
| 7 | /ST4 | 15 | GND |
| 8 | TI | 16 | VH |

### 6.1.3 Thermal Head connector

FTP634MCLxxx and FTP644MCLxxx
Mating connector: TBA

Connector CN4: JS1125-11

| Pin | Function | Pin | Function |
|-----|----------|-----|----------|
| 1 | /ST5 | 7 | DI |
| 2 | /ST6 | 8 | GND |
| 3 | /ST7 | 9 | GND |
| 4 | /ST7 | 10 | VH |
| 5 | /CLK | 11 | VH |
| 6 | /LAT | | |

### 6.1.4 Thermal Head connector

FTP634MCLxxx and FTP644MCLxxx
Mating connector: TBA

Connector CN3: JS1125-10

| Pin | Function | Pin | Function |
|-----|----------|-----|----------|
| 1 | VH | 6 | /ST1 |
| 2 | VH | 7 | /ST2 |
| 3 | GND | 8 | /ST3 |
| 4 | GND | 9 | /ST4 |
| 5 | TI1 | 10 | +5V |

## 6.1.5 IRDA connector

IRDA connector CN7: B4B-ZR
Mating connector part number:
TBA

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

## 6.1.6 AUX INPUT connector

Connector type CN6: 53324-0710
Mating connector part number:
Housing:   TBA
Contact:   TBA

CN4:

| Pin | Function | Pin | Function |
|---|---|---|---|
| 1 | LED1+ | 4 | LED2+ |
| 2 | INPUT1 | 5 | INPUT2 |
| 3 | GND | 6 | GND |
| 7 | GND | | |

The paper near end status, can be seen on the LED on the aux connector, it can be reading through the status command, and if a driver is used, then it can be reading in the port monitor: If paper jam is used, then will the printer stop printing if this signal is going low, the value of this bit can be seen on the LED on the aux output connector, it can be reading by a status request, or if a driver is used, then it can be reading by the port monitor

The paper near end and paper jam is indicated on LED at the AUX connector CN4. The status of these bits can also be read with a response on a status request. If a driver is used, then the status can also be read in the print monitor. If paper jam sensor is activated printing will stop until paper jam sensor is deactivated. The LED will show these conditions.

The LED will show these conditions

| LED | Error |
|---|---|
| Off | No Error |
| Flash 1Hz | Paper near end |
| Flash 2Hz | Paper jam |
| On | Both paper jam and near end |

## 6.1.7 Power connector

Power connector CN10: KLD-0202-B
Mating connector
TBA

| Pin | Function | Pin | Function |
|---|---|---|---|
| 1 | GND | 3 | GND |
| 2 | +8.5V | 4 | +8.5V |

## 6.1.8 USB connector

USB connector CN8: UBBR-04SW11
Mating connector:
TBA

| Pin | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| **Function** | N.C. | USB- | USB+ | GND |

## 6.1.9 AUX connector

Connector type CN11: 5501-5TS
Mating connector
TBA
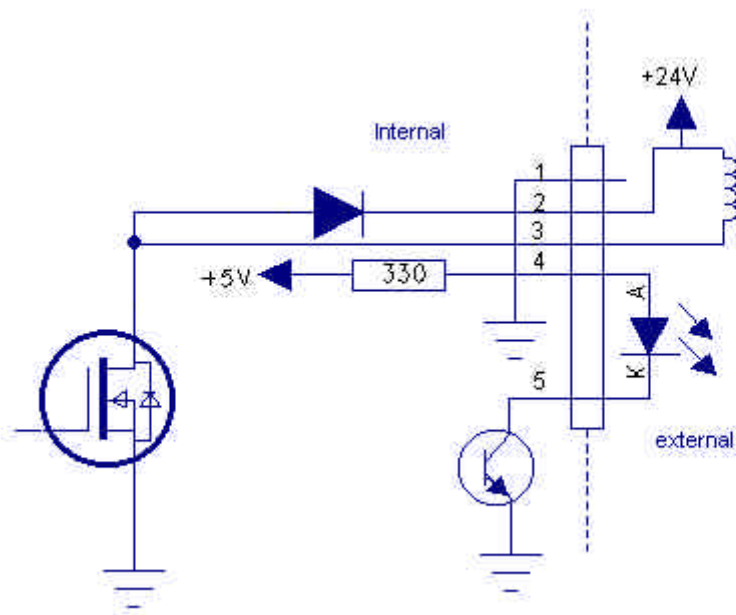
| Pin | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Function** | GND | Vcoil, Max 24V | Coil, max 1A | Anode | Cathode |

Using output as cash drawer solenoid time must be set. By default solenoid time is 0,5 sec.

Using output for winding motor, connector must be applied.
Upon feeding with motor the winding motor also turns. Please see manual for winding motor for more information
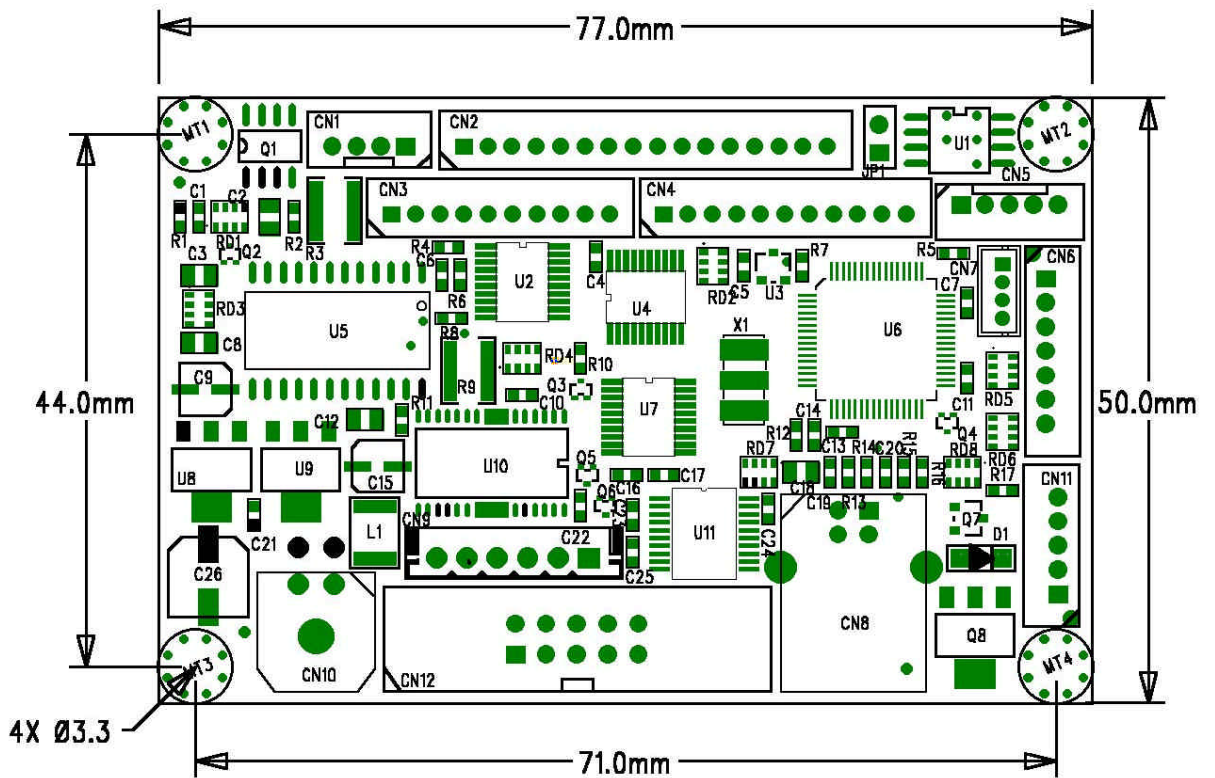
6.1.10 Serial connector

Connector type CN12; IDH10S1GN  (Taitek)
Mating connector part number: FC10AGN (Taitek)

| Pin | Function | Pin | Function |
|---|---|---|---|
| 1 | NC | 2 | DSR |
| 3 | TX | 4 | CTS |
| 5 | RX | 6 | RTS |
| 7 | DTR | 8 | NC |
| 9 | GND | 10 | NC |

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## 6.2       Mechanical Drawings

# 7 Appendix

## 7.1 Seiko compatible command set (optional)

### 7.1.1 Escape sequences, overview.

| CR | CR Carriage Return |
|---|---|
| ESC+ ' J ' +n | Print and Feed Forward |
| ESC+ ' j ' +n | Print and Feed Backward |
| ESC+ ' 2 ' | 16-dot Line Spacing |
| ESC+ ' 0 ' | 4-dot Line Spacing |
| ESC+ 'A'+n or ESC+ '3'+n n-dot | Line Spacing |
| ESC+ SP+n | Character Spacing |
| ESC+ ' s '+nl+nr | Left/Right Character Spacing |
| ESC+ ' U '+n | Inverse Print |
| DC2+ ' Y' +n | Character Rotation |
| ESC+ ' - ' +n | Underline |
| SO | Double-Width (with automatic reset ) ON |
| DC4 | Double-Width (with automatic reset) OFF |
| ESC+ ' W '+n | Double-Width |
| ESC+ ' w '+n | Double-Height |
| ESC+ ' l '+n | Reverse |
| DC2+ ' F '+n | Font Size Selection |
| ESC+ ' t '+n | Character Set Select |
| ESC+ ' & ' + s + e+ | Font Data Downloaded Character Define |
| ESC+ ' % ' + n | Downloaded Character Select |
| DC2+ ' D '+n | Downloaded Character Area Operation |
| ESC+ '+' + k1 + k2+ | ESC+ '+' + k1 + k2+ Font Data |
| FS+ ' 2 ' + k1 + k2+ | Font Data User-Defined Character Define |
| ESC+ ' K ' or FS+ ' & ' | Kanji Mode Specify |
| ESC+ ' H' or FS+ '. ' | Kanji Mode Clear |
| DC2+ ' G '+n | User Defined Character Area Operation |

| | |
|---|---|
| DC2+ ' P ' + s + e+ x + y + | Font Data Option Font Define |
| DC2+ ' O '+n | Option Font Select/Deselect |
| DC2+ ' Q ' | Option Font Clear |
| DC3+ ' A ' | Ruler Line Buffer A |
| DC3+ ' B ' | Ruler Line Buffer B |
| DC3+ ' V ' + | Image Data Ruler Line Image |
| DC3+ ' D '+nl+nh | Define Ruler Line by Dot |
| DC3+ ' L '+ml+mh+nl+nh | Define Ruler Line by Line |
| DC3+ ' F '+n1+n2 | Define Ruler Line with Repeating Pattern |
| DC3+ ' + ' | Ruler Line ON |
| DC3+ ' - ' | Ruler Line OFF |
| DC3+ ' P ' | Print One Dot Line after Printing Line Buffer Data |
| DC3+ ' C ' | Ruler Line Buffer Clear |
| DC3+ ' (' | Continuous Ruler Line Control Code Input |

## 7.2 Fujitsu compatible command set (optional)

7.2.1 Escape sequences, overview.

| | |
|---|---|
| HT | Horizontal tab |
| LF | Line feed with printing |
| FF | Forms feed |
| ESC RS: | Black-white reversed printing specification |
| ESC US: | Black-white reversed printing cancellation |
| ESC !+n: | Printing mode specification |
| ESC %+n: | Download character set specification/cancellation (valid only when optional memory is installed) |
| ESC &+y+c1+c2+x+[d]k : | Download character definition (valid only when optional memory is installed) |
| ESC *+m+n1+n2+[d]k : | Bit image mode specification |
| ESC ?+n | External registration character deletion (valid only when optional memory is |
| ESC 2 | 1/6-inch line pitch setting |
| ESC 3+n | Minimum-pitch-unit line pitch setting |

| ESC @ | Printer initialisation |
|---|---|
| ESC A+n | Line spacing setting |
| ESC C+n | Page length (number of lines) setting |
| ESC D+[n]k+NUL | Horizontal tab position setting |
| ESC J+n | Printing and minimum-pitch-unit paper feed |
| ESC K+n | Backward paper feed |
| ESC R+n | International character specification |
| ESC c+1+n | Internal processing setting |
| ESC d+n | Printing and n-line feed |
| ESC e+n | Printing and backward n-line feed |
| ESC s+n | Printing speed setting |
| ESC t+n | Character code table selection |
| ESC {+n | Upside-down printing setting/cancellation |
| FS 9+n | Detection function enable/disable setting |
| GS < | Mark detection execution |
| GS A+m+n | After-mark-detection head detection distance setting |
| GS E+n | Print quality setting |
| GS V+n+m | Paper cutting |
| GS e+n+m | Bar code width setting |
| GS h+n | Bar code height setting |
| GS k+m+n+[d]k | Bar code printing |
| GS w+n | Bar code width magnification setting |
| FS *+n1+n2+[n]k | High speed collective image printing specified |
| GS &+m+x+y1+y2+[n]k | Registration of image data |
| GS '+m+n | Print registered image data |
| FS E+n | Correction of impressed energy |
| ESC V+n | Right rotation 90º |
| GS a+n | Setting and cancellation of status transmission. |
| FS r+n | Parameter transmission |
| ESC EM+n | Setting the amount of the feeding at automatic paper feed |
| ESC X+n+m | Setting the turning time of the motor excitation |

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

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

## 7.3 APS compatible command set (optional)

### 7.3.1 Escape sequences, overview.

| | |
|---|---|
| GS / n | Set printing speed / Maximum peak current |
| GS D n | Set print Intensity |
| ESC v | Send printer status |
| ESC I | Send printer identity |
| ESC @ | Resets printer |
| ESC S | Puts the printer in sleep mode |
| GS B n | Serial Communication setting |
| GS b n | Set parallel port Busy line hold time |
| ESC % n | Select internal Character Set |
| ESC R n | Select international character Set |
| ESC 3 n | Set line spacing |
| ESC SP n | Set character spacing |
| ESC ! n | Set print mode |
| ESC { n | Set/reset Rotated character |
| LF | Line feed |
| CR | Carriage return |
| ESC J n | Feed paper (n dot lines) forward |
| ESC j n | Feed paper (n dot lines) backward |
| CAN | Cancel print data buffer (text mode) |
| ESC * n1 n2 n3 n4 n5 n6, data | Print graphics |
| ESC $ n1,n2 | Horizontal dot positioning |
| ESC V n1,n2,n3 data | Horizontal bit image |
| ESC m | Partial cut |
| ESC i | Full cut |
| GS k n [Start] <data> NUL | Print bar code |
| GS h n | Barcode Height |
| GS w n | Barcode magnification |
| GS H n | Text position in Barcode |
| GS L n | Set Mark length |
| GS T n Se | Set TOF position |
| GS E | TOF feed paper |
| GS X n1 n2 | Set Mark to Cut Position |
| GS x n1 n2 | Set Cut Line to Head Dot line Length |

GS / n

| Description: | Set printing speed / Maximum peak current/ Dynamic division |
|---|---|
| Format: | <1Dh> <2Fh> <n> |
| Comments: | n=1 to 32: (Default n=5) Software programmable consumption (Dynamic division). The maximum number of black dots which are simultaneously heated is (n+1) x 8. In Default Mode, n = 5. |
| Example: | n=5 Maximum black dots heated: (5+1)*8=48. Printer Peak consumption @5V: (0.3A (Stepper Motor) + 5*48/160) = 1.8A 160 Ohms is the dot resistance. |

GS D n

| Description: | Set print Intensity |
|---|---|
| Format: | <1Dh> <44h> <n> |
| Comments: | n=8Fh (127d) : (Default). Nominal print intensity n>8Fh (127d) : Printout becomes darker n<8Fh (127d) : Printout becomes lighter (n from 0 to 255 (FFh)). |

ESC v

| Description: | Send printer status |
|---|---|
| Format: | <1Bh> <76h> |
| Comments: | The printer returns a single byte that reflects the status of the printer in accordance with the following table: |

| BIT | FUNCTION | BIT = 0 | BIT = 1 |
|---|---|---|---|
| 0 | Head temperature | OK | Too high or too low |
| 1 | Head-up | No | Yes |
| 2 | Paper out | No | Yes |
| 3 | Power supply | OK | Too high or too low |
| 4 | Printer in use | Ready | Action in progress |
| 5 | On/Off line | Off | On |
| 6 | Hole/Mark detection Error | No | Too short, too long or not found |
| 7 | Cutter failure | Yes | No |

This command is executed immediately after being received, even in case of a full buffer
(DTR/RTS, Xoff or Busy active). Host must disable the handshaking controls to send the ESC v
command.
When using the parallel port, the software continuously updates PE signal. To read the
status byte, use the Byte Mode (Parallel communication) as described in section 3.4.2, after
having sent the ESC v command.

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## 7.4 ESC/POS compatible command set (optional)

### 7.4.1 Escape sequences, overview.

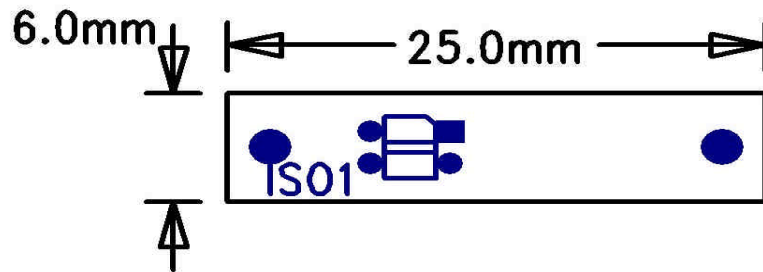| | |
|---|---|
| ESC c 4 | Select Paper Near End Sensors to stop printing |
| HT | Horizontal Tab |
| LF | Print and Line feed |
| FF | Print and return to standard Mode |
| CR | Print and carriage return |
| DLE EOT n | Real Time status transmission |
| DLE ENQ n | Real time request to printer |
| CAN | Cancel print data in page mode |
| ESC FF | Print data in page mode |
| ESC SP n | Set right side character spacing |
| ESC ! n | Select print mode(s) |
| ESC$ nL nH | Set absolute print position |
| ESC * m nL n H [d]k | Select bit image mode |
| ESC - n | Turn underline mode on/off |
| ESC 2 | Select 1/6-inch spacing |
| ESC 3 n | Set line spacing |
| ESC = n | Set peripheral device |
| ESC ? n | Cancel user defined characters |
| ESC @ | Initialize printer |
| ESC [n] k NUL | Set horizontal tab position |
| ESC E n | Turn emphasized mode on/off |
| ESC G n | Turn on/off double strike mode |
| ESC J n | Print and feed paper |
| ESC L | Select page mode |
| ESC R n | Select an international character set |
| ESC S | Select standard mode |
| ESC T n | Select print direction in page mode |
| ESV V n | Turn 90°clockwise rotation mode on/off |
| ESC W xL xH yL yH dxH dyL dyH | Set printing in page mode |
| ESC c 5 n | Enable/Disable panel buttons |
| ESC c 3 n | Select paper near end sensors to output end signals |
| ESC a n | Select justification |
| ESC \ nL nH | Set relative print position |

| ESC d n | Print and feed n lines |
|---|---|
| ESC i | Partial cut |
| ESC p m t1 t2 | Cash drawer Output |
| ESC t n | Select character Code table |
| ESC u n | Transmit peripheral device status |
| ESC v | Transmit paper sensor status |
| ESC { n | Turns on/off upside-down printing mode |
| GS ! n | Select character size |
| G S $ nL nH | Set absolute vertical print position in page mode |
| GS * x y  [d] x*y *8 | Define download bit image |
| GS / m | Print downloaded bit image |
| GS : | Start / end macro definition |
| GS B n | Turn white/black reverse printing mode |
| GS H n | Select printing position for HRI characters |
| GS I n | Transmit printer ID |
| GS L nL nH | Set left margin |
| GS P x y | Set horizontal and vertical motion units |
| GS V m n | Select cut mode and cut paper |
| GS W nL nH | Set printing area width |
| GS \ nL nH | Set relative vertical print position page mode |
| GS ^ r t m | Execute macro |
| GS a n | Enable /Disable Automatic Status back |
| GS b n | Turns smoothing mode on/off |
| GS f n | Select font for Human Readable Interpretation (HRI) characters |
| GS h n | Select bar code height |
| GS k m d1…dk NUL | Print bar code |
| GS k m n d1…dn | Print bar code |
| GS r n | Transmit status |
| GS w n | Set bar code width |

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## 7.5 Optional sensor description



ISO1
KTIR0811S

RED
WHITE
BLACK
CN1

PAPER NEAR SENSOR
OR
BLACK MARK SENSOR



6.0mm    25.0mm

ISO1

**Top view**



25.0mm    6.0mm

CN1

PIN1    PIN2    PIN3

**Bottom view**



1mm

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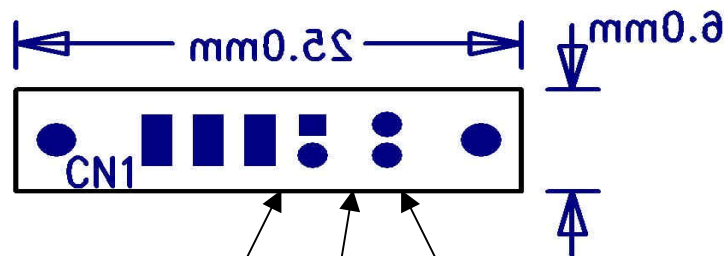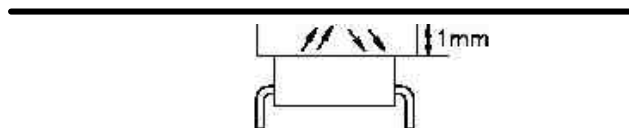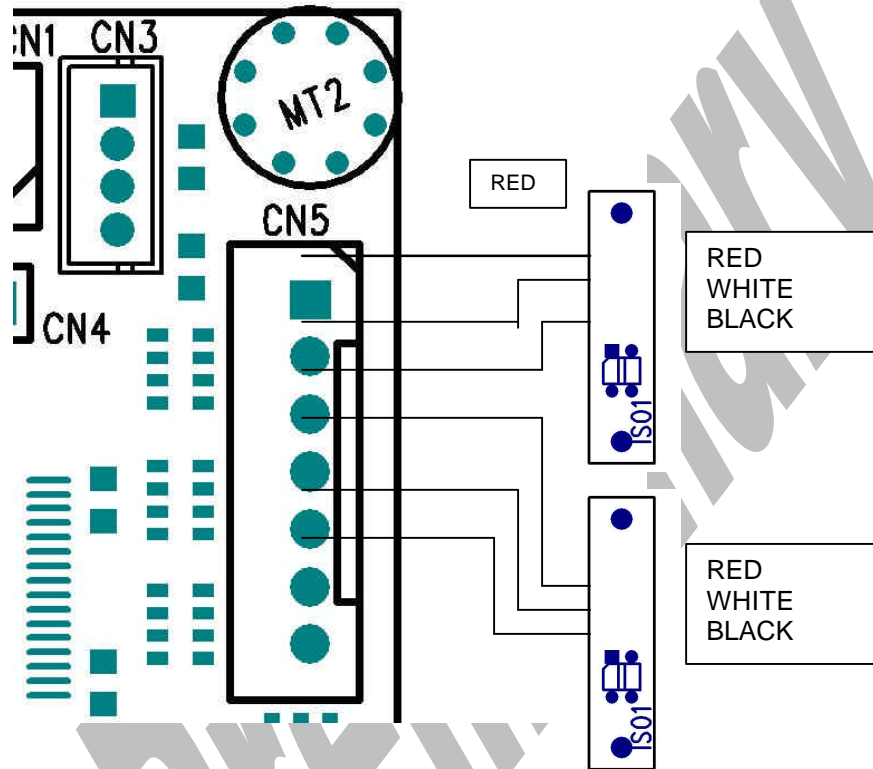
Please note that distance from top of sensor to paper must be Min
0,5mm and Max 1,00mm

Example showing how to connect PRS600 to AUX Input connector CN4 on PRN604-S standard board.

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