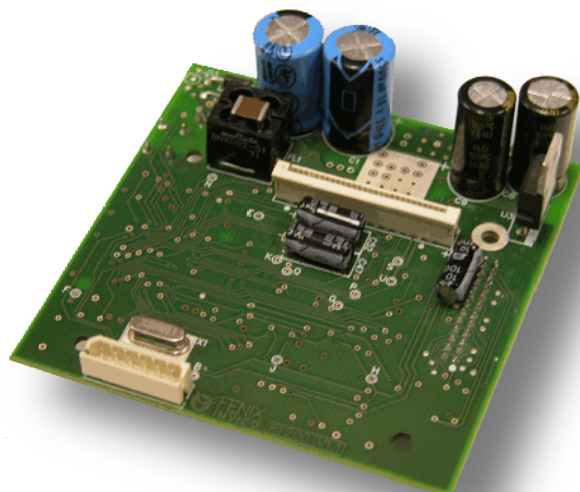

EPC1200 THERMAL PRINTER SERIES

IF1200 INTERFACE and PTR2 Stand-Alone Printer

Operation manual

Version 2.1



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1 – INTRODUCTION

The EPC1200 is a high performance thermal panel printer series. Its compact and functional design covers many professional uses (as in supermarkets, hotels, hospitals, restaurants, and so on.) It is capable of printing text, graphics, logo and barcodes. It can be used in laboratories, industrial and professional environments.

The PTR2 consist of a EPC1200-12 printer with serial interface enclosed into a metal chassis.

The main features of the EPC1200 Series are:

- Simple installation and easy maintenance.
- Low noise thermal printing.
- Paper width: 58 mm.
- High reliability: 100 million pulses. Abrasion resistance: 50 Km.
- Power supply, two options: **5VDC** or **12-24VDC**, depending on the interface.
- No-paper sensor.
- Near-to-end paper sensor (only on the 12-24VDC models)
- Up to 45 mm paper roll diameter.
- High speed printing up to **90mm/s** (EPC1250 prints up to 50mm/s).
- Printing resolution: 8 dots/mm (203 dpi).
- Passive paper cut.
- Interface: - Option 1: IEEE 1284 **parallel and serial** RS232C data input interface on-board (up to 115200bps).
- Option 2: Universal Serial Bus (**USB**) communications port on-board.
- Two internal character fonts (A font = 12x24 dots. B font = 8x16 dots).
- Scalable font (independent scale in X/Y-axis), up to 64 times.
- Programmable character and line space.
- Bold and reverse character capabilities
- Graphic bitmap printing capabilities.
- Several format **Bar Code** (EAN13, Code39, Code128 and ITF)
- Control code based on ESC/POS commands ⁽¹⁾.
- Hexadecimal mode for easy software debugging.
- Automatic paper load.
- Three maintenance counters (On/Off times, Half hours, Meters)
- Operating temperature range (**0°C to +50°C**).
- Storage temperature range (**-20°C to +70°C**).
- Self test, hexadecimal mode and configuration mode features.
- **Logo load capability**, through Windows driver.
- **Upgrading of firmware** version through communication port ⁽²⁾
- Windows 2000 and XP drivers and demo/configuration program.
- Linux Driver.

(1) ESC/POS are registered trademarks of Seiko Epson Corporation.

(2) Only in EPC1200-12-U and PTR2 printers

The EPC1200 Printer Series comprises the following models:

EPC1200-5	5VDC, 90mm/s printing speed, serial and parallel interface
EPC1200-12	12-24VDC, 90mm/s printing speed, serial and parallel interface
EPC1200-12-U	12-24VDC, 90mm/s printing speed, USB interface
EPC1250	5VDC, 50mm/s printing speed, serial and parallel interface
PTR2	12-24VDC, 90mm/s printing speed, serial interface

This manual is the printer operations' guide and is intended for the designer's application. The following sections contain a detailed description of both hardware and configuration software that allow obtaining the maximum benefit of the printer capabilities.

2 – IMPORTANT NOTES ON EPC1200 THERMAL PRINTER HANDLING

In order to preserve the life of the printer, it is necessary to keep in mind some precautions on the handling of the EPC1200 printer. Please read carefully the following points in order to make a good use of the printer.

2.1- SAFETY PRECAUTIONS

- Before using the printer, read carefully section 2-*INSTALLATION*.
- **NEVER** connect the external power supply with the wrong polarity. This could permanently damage the printer.
- Turn off the printer immediately if it produces smoke, a strange smell or an unusual noise. Keeping on using the printer could cause fire. Unplug the equipment immediately and contact your official distributor.
- **NEVER** connect cables with different connectors from the ones mentioned in this manual. Failing on doing so could permanently damage the printer.
- Use a power supply whose output voltage is within the specification range stated in this manual. Over voltage can permanently damage the printer. Under voltage can cause malfunctions.
- **NEVER** wet EPC1200 thermal printer with water or any other liquid. If any liquid is spilled inside the equipment, unplug the power cable immediately and contact the technical service.
- Make sure the printer is on a steady, securely fixed surface. If the printer falls down, it could break or damage.
- **NEVER** use the printer in high humidity or in locations with high risk of fire.
- **NEVER** place heavy objects on top of the printer and never lean on it.
- **NEVER** put any object inside of the printer, as it could cause hardware damage on it, such as short-circuit, print head breaking or general failure of the printer.
- **NEVER** shake the printer.
- **NEVER** disassemble or modify the hardware of the printer.
- **NEVER** try to repair the printer. Please contact your official distributor in case of failure.
- As the printer contains electromagnets (inside of the motor), it should not be used in excessively dirty environments or places with dust or metal particles.
- **NEVER** print without paper loaded or without the cover closed, as the thermal print head life can be highly shortened.
- Avoid touching accessible parts with metallic objects, such as screwdrivers or tweezers, the print head thermal elements as well as the electronic printed circuit. They are delicate parts.
- **NEVER** touch with bare hands the areas around the print head and the motor surface as they become very hot during and just after printing; wait 15 seconds after printing to let them cool down.
- **NEVER** touch the surfaces of the print head thermal elements or the electronic printed circuit, as dust and dirt can stick to their surface and cause damage by electrostatic discharge. Moreover, some electronic components can get very hot during operation.
- The thermal paper contains Na⁺, K⁺ and Cl⁻ ions that can cause harm to the print head elements. Therefore, use only the specified paper.
- If the printer has not been used for long period of time and the paper was loaded, the paper could become deformed by the drive roller pressure. It is recommended to make it advance at least 30 mm before printing again.
- For safety reasons, unplug the printer if it is not going to be used over a long period of time.
- **Do not print continuously (without stopping) for more than 6 minutes.**

2.2- ABSOLUTE MAXIMUM RATINGS

Supply voltage

EPC1200-12	.....	+30 V
EPC1200-5	.....	+10 V
EPC1250	.....	+5.6 V
PTR2	.....	+30 V

Storage temperature range -20°C to 70°C

2.3- CLEANING PROCEDURE AND PRECAUTIONS

In order to clean the thermal print head, proceed as indicated by the following steps:

- 1- Unplug the power supply cable and open the front door.
- 2- Remove the paper roll and the thermal print head will be accessible from downwards.
- 3- Soak a cotton sponge in alcohol (ethanol, methanol or IPA), and rub it gently along the thermal head in order to remove the possible accumulation of paper particles.
- 4- Wait for alcohol to evaporate before inserting the paper roll and closing the cover.

FENIX recommends cleaning the thermal print head periodically (every 2 or 3 months) in order to keep an optimal print quality.

NOTES:

- ✓ The print head could be hot after printing. Make sure it has thoroughly cooled down before proceeding to clean it.
- ✓ Never touch the thermal elements of the print head with your hands.
- ✓ Never use metallic or piercing elements to clean the print head, as they could scratch it.



Fig. 1. - Thermal print head cleaning

2.4- RECOMMENDATIONS

- **The plug has to be located near the printer and has to be easily obtainable.**
- Before connecting any communication data cable, check the printer is working properly by executing the self-test.
- Set the EPC1200 in a place where the connection cables do not suffer stretching or cross with each other.
- **IMPORTANT!!!** Since the printer demands high current peaks during operation it is advisable to make the power supply cables the shortest possible. Otherwise the supply voltage could fall below limits causing malfunction of the printer, especially on the 5VDC model.

3 – GENERAL SPECIFICATIONS

3.1- PRINTING SPECIFICATIONS

	EPC1200 / PTR2	EPC1250
Printing method	Thermal line printing	
Dot density	203 dpi x 203 dpi ⁽¹⁾	
Printing direction	Unidirectional with friction feed	
Printing width	48 mm (384 dots)	
Printing speed ⁽²⁾	High speed mode: up to 90mm/s	up to 50mm/s
Paper feed speed	90 mm/s (continuous paper feed)	50 mm/s (continuous paper feed)
Characters per line (by default):	A font: 24 B font: 32	
Space between characters (by default):	4 dots (0.5 mm)	
Line spacing (by default):	3.75mm	

⁽¹⁾ 'dpi': dots per inch. 1 inch = 25.4mm; 203 dpi = 8 dots per mm

⁽²⁾ Printing speed could vary depending on the print head temperature as well as the command processing and the data transmission speed. Low printing speed could cause intermittent printing. It is recommended to transmit data to the printer as quickly as possible.

3.2- CHARACTER SPECIFICATIONS

- 1) Number of characters: Alphanumeric characters: 95
 Extended graphics: 128 per page
- 2) Character structure: A font: 12 x 24 dots (1.5 x 3 mm). *(selected by default)*
 B font: 8 x 16 dots (1 x 2 mm).
- 3) Character size:

	Standard		Double height		Double width		Double width / Double height	
	Width x height	cpl	Width x height	cpl	Width x height	cpl	Width x height	cpl
A Font	1,5 x 3 mm	24	1,5 x 6 mm	24	3 x 3 mm	12	3 x 6 mm	12
B Font	1 x 2 mm	32	1 x 4 mm	32	2 x 2 mm	16	2 x 4 mm	16

The space between the characters is not included. Characters can be scaled up to 64 times bigger than their normal size.

cpl: characters per line.

3.3- PAPER SPECIFICATIONS

- 1) Paper type: thermal paper roll
- 2) Paper width: 58 +0/-1mm
- 3) Paper roll size: up to a maximum diameter of **45 mm**
- 4) Specified thermal paper: At -5°C to 50°C → **TF50KS-E2D** (59µm paper)
 TF77KS-E2 (95µm paper)
 TL69KS-HG76 (label paper)
 At -30°C to 70°C → **TL51KS-R2** (High heat-resistant paper)
 TL69KS-R2 (High heat-resistant paper)
 At 5°C to 40°C → **TW80KK-S** (2-ply thermal paper)
 From Nippon Paper Industries

3.4- PAPER LOADING

One of the main advantages of the EPC1200 printer series is its paper loading system. It can be carried out by any final user without having to disassemble the printer or loading the paper in a complex paper path.

3.5- INTERNAL BUFFER

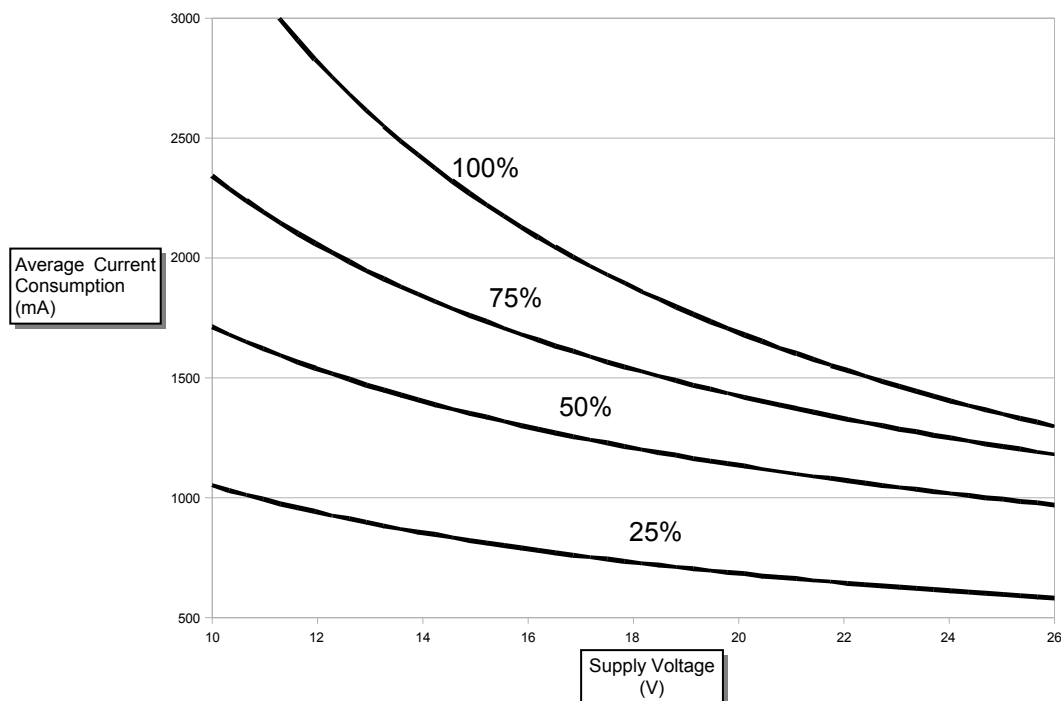
The standard EPC1200 printer has a **10 Kbytes** internal memory buffer, whose functionality is dynamically shared by the receiving buffer. The USB version and PTR2 have an additional **512 Kbytes** memory buffer.

This big receiving buffer allows the printer working in the following way: Firstly, all data is buffered, and afterwards the printing is performed at the maximum possible speed without being affected by the communications time processing.

3.6- ELECTRICAL SPECIFICATIONS

- Power supply voltage: 5VDC+10%-3% or 12-24VDC \pm 10% depending on the interface.
- Current consumption: The table and chart below show the current consumption for different supply voltages. Measurements have been done for the following cases:
 - Printer powered on (stand-by)
 - Printer feeding paper but no printing
 - Printer printing at rates of 25%, 50%, 75% and 100% of dots activated each line (chart)

Printer Model	Supply Voltage (V)	Stand-by current (mA)	Feeding paper current (mA)	25% Printing Ratio	50% Printing Ratio	75% Printing Ratio	100% Printing Ratio
EPC1250	5	210	500	1750	2780	4265	5390
EPC1200	5	395	850	2155	4250	5250	7150
EPC1200-X-12 / PTR2	12	135	335	SEE CHART BELOW			
EPC1200-X-12 / PTR2	15	110	280				
EPC1200-X-12 / PTR2	20	90	220				
EPC1200-X-12 / PTR2	24	75	190				



3.7- ENVIRONMENTAL CONDITIONS

Temperature range: Working temperature: 0° to 50°C.

Storage temperature: -20° to 70°C with no paper loaded, in a dry place.

4 – INSTALLATION

4.1- EPC1200 INSTALLATION CONSIDERATIONS

There are some general considerations to take into account when installing the EPC1200 printer. For PTR2 installation please refer to **APPENDIX H – PTR2**.

A wrong installation may cause many issues like paper jam, difficult maintenance of the printer, difficulty in changing the paper roll, etc. Moreover, a correct installation can prevent the printer from being damaged by external agents, such as weather or vandalism.

This printer is thought to be installed vertically in a bigger case or structure, or another kind of appropriate chassis.

The basic points that a correct installation must follow are:

- Allow enough space and accessibility to reach the maintenance procedure points in case it is needed. Take notice all user accessible parts in the printer.
- Consider if the printer is going to be attached first to the panel and then connected or the other way round. The EPC1200 allows both ways but cable length and some other variables should have been taken into consideration.
- Allow enough room in front of the printer in order to be able to open completely the door.

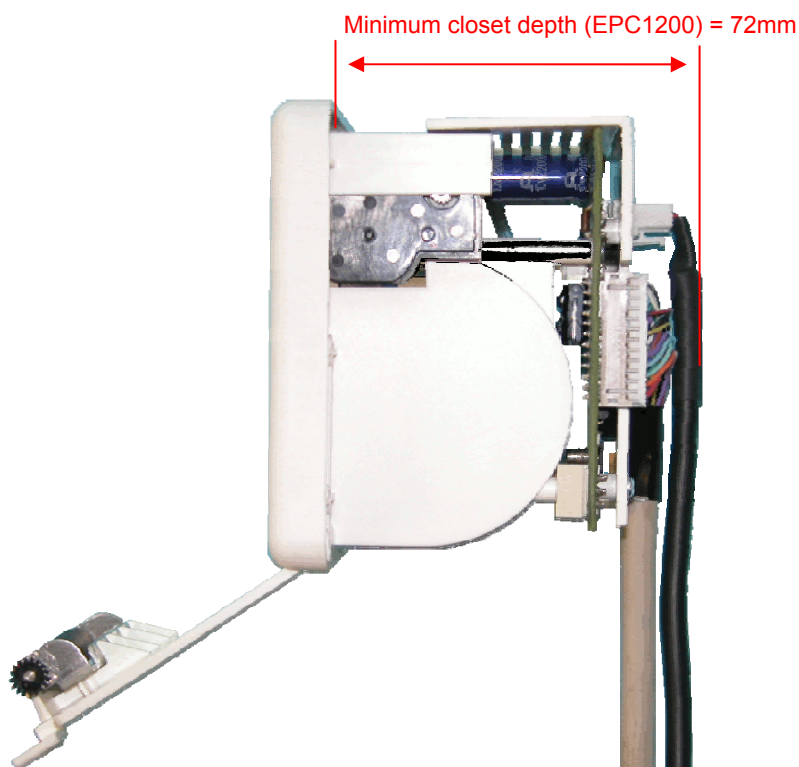


Fig. 2. - EPC1200 accessibility

This printer has been designed to ease the installation process and maintenance. Please follow the recommendations below so there should not be any issue related to it.

- 1) The printer must be set onto the user's chassis and screwing it from outside. To do so cut a window with the dimensions indicated on the figure and thread four holes as shown.

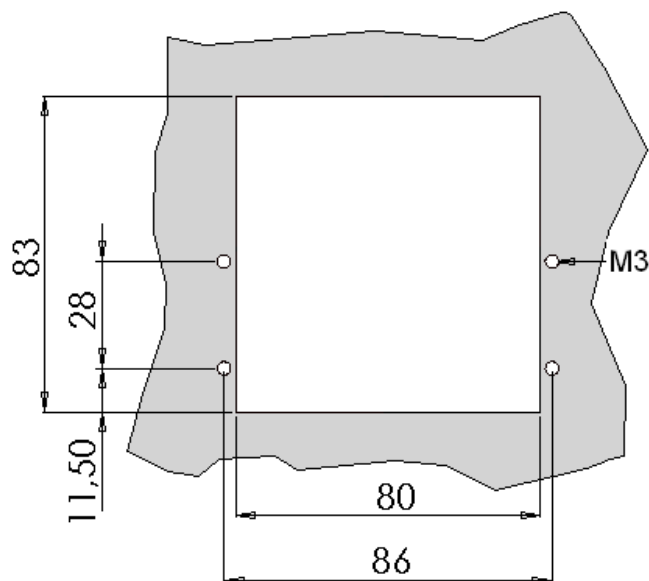


Fig. 3. - Fixing holes and window to be cut on the mounting wall

- 2) All the wiring has been designed to allow the user to firstly connect the cables and then screw the printer onto the panel although the other way is also possible. If it is difficult to access the rear side of the printer it is advisable to connect all the cables first and perform a self-test before fixing the printer to the mounting wall.



Fig. 4. - Application of a self-stand PTR2 with the EPC1200.

4.2- POWER SUPPLY

The EPC1200 is powered by an external power supply by means of a female 2-pin polarized connector that includes a security anchor. The power supply voltage must be verified before powering the printer.

Terminal nº	Voltage
1	GNDP
2	VCC (5VDC or 12-24VDC)

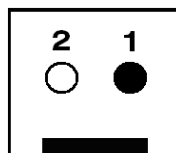


Fig. 5. - Power supply connector CON1.

The power supply male connector must be a:

Housing: **VHR-2N or VHR-2M** (JST Ref.)

Terminal: **SVH-21T-P1.1** or equivalent.

NOTES:

- (1) If the number of dots that are energized at the same time is increased, a higher current will flow; therefore, a power supply with an adequate current capability must be used.
- (2) When designing lines and bit images, take the printing ratio and print duty into consideration. Print quality may be poor if the printing ratio (energizing pulses/dot line) or print duty is high.
- (3) Average energizing pulse width is defined as 64 of 192 dots/dot line that are energized.



WARNING: Beware not to invert the polarity of power supply. This may irretrievably damage the printer. Ensure that the voltage is the correct one. Use the 2 terminals (2 wires) with 1 mm² minimum section each.

IMPORTANT NOTE ABOUT POWER SUPPLY:

The current demand depends on the density of the printout. A 60W power supply covers all adverse possibility (printing ratio of 100% black at any temperature). Anyway, power supply must meet the peaks current that mechanism requires. As an example, next figure shows the relationship between a sample ticket and the input current measured for 3 different voltage supplies. As it can be observed, the peak current required when printing a horizontal line of about 90% density can be as high as 10A when supplied at 5VDC.

A very important point to be aware of is the necessity of keeping the supply wiring the shortest possible. When the printer is supplied with 5VDC, if the input voltage drops a significant quantity the printer could stop working normally. The longest and thinnest the wire the higher the impedance and therefore the voltage drop at the input.

FENIX offers different power supplies as an accessory option (See APPENDIX C – HOW TO ORDER). These power supplies which have been exhaustively tested are available in OPEN FRAME or ENCLOSED version.

	Recommended power supply
EPC1200-5 / EPC1250	5VDC / 60W
EPC1200-12/PTR2 (12VDC supply)	12VDC / 60W
EPC1200-12/PTR2 (24VDC supply)	24VDC / 60W

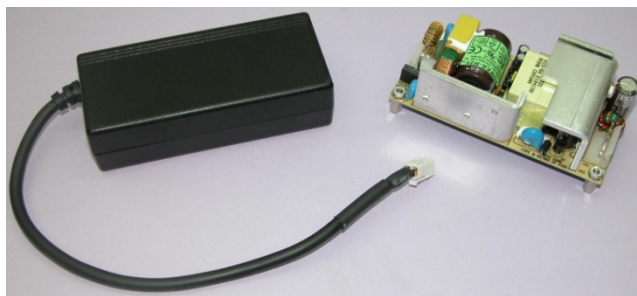


Fig. 6. - FENIX supplied 5VDC power modules.

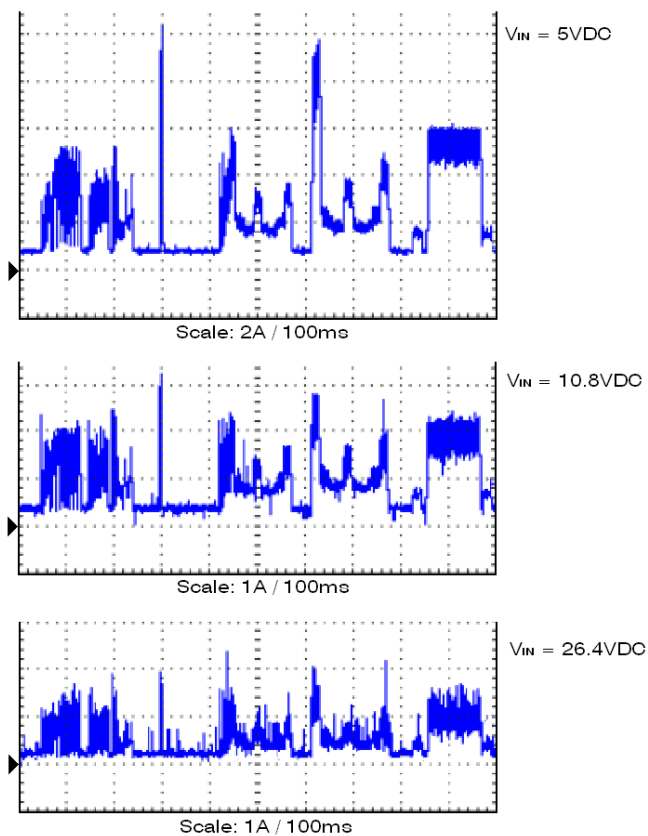
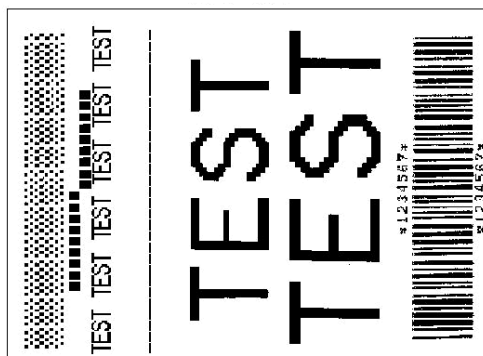


Fig. 7. - Current consumption example

4.3- RS-232 SERIAL INTERFACE

4.3.1- RS-232 Serial interface specifications

- Data transmission type: Serial
- Synchronization: Asynchronous
- Flow control: DTR/DSR control, **none** for PTR2
- Signal levels (RS232): MARK = -3 to -15 V Logic '1'/OFF
SPACE = +3 to +15 V Logic '0'/ON
- Speed: 9600, 19200, 38400, 115200 bps (bps: bits per second)
- Data length: 8 bits
- Parity: none, even, odd
- Stop bits: Fixed to 1
- Connector (user side): JST **PHDR-24VS** (housing)
JST **SPHD-001T-P0.5** (terminal) or similar.

NOTE: Speed and parity depend on the settings (refer to section 4.6.2).

4.3.2- Change between online and offline mode

The printer is in offline mode:

- 1) When powering up or resetting the printer, until the printer is ready to receive data.
- 2) When the platen is opened.
- 3) After pressing the button while the paper advances.
- 4) When 'out of paper' causes the printer to stop printing.
- 5) When the power supply has a temporal abnormal voltage change.
- 6) When an error has occurred.

4.3.3- Serial RS-232 interface pins assignment

The assignments of the terminals of the RS-232 connector and the functions of its signals are described in the following table:

Pin Number	Signal name	Signal direction (from the printer point of view)	Function
20	TXD	Output	Data transmission line.
21	RXD	Input	Data reception line.
22	RTS	Output	This signal indicates whether the printer is busy. SPACE indicates that the printer is ready to receive data, and MARK indicates that the printer is busy.
23 / 24	SG	-	Signal ground.
19	DTR	Output	This signal indicates whether an error occurs.
Other	nc	---	Not connected

Table 1. - Pins Assignments of RS-232 connector terminals

(*1) Definition of 'data receiving buffer full': the state of the printer becomes 'buffer full' when the receiving buffer increases to 10 Kbytes maximum.

Note: The printer ignores the received data when the free space in the receiving buffer is 0 bytes.

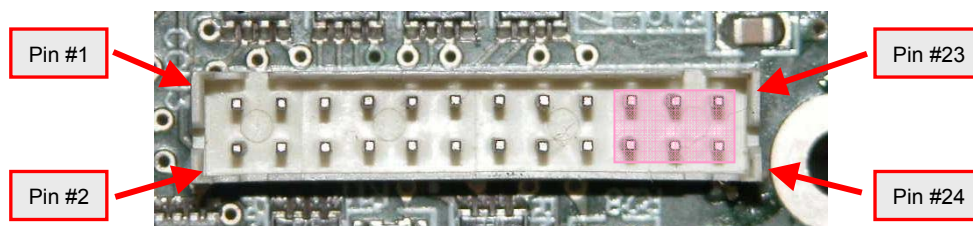


Fig. 8. - Serial RS-232 interface pins

4.3.4- PC serial interface connection

Communications cable Ref. RS-232-6

HOST

FEMALE DB9

EPC1200

Housing: PHDR-24VS (JST)

Contact: SPHD-001T-P0.5

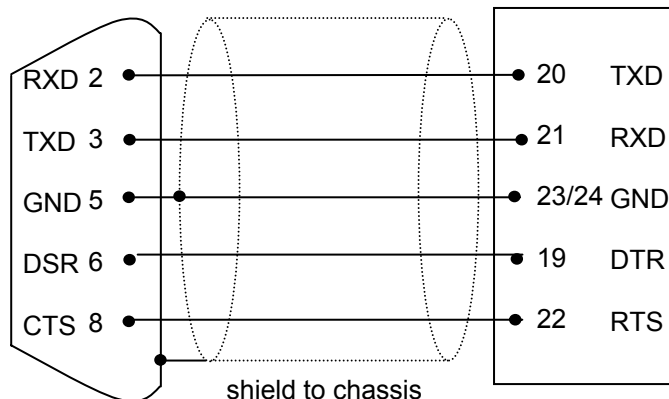


Fig. 9. - PC serial cable

NOTES:

- Same configuration in the printer and in the host system should be set.
- The communication protocol should be set properly so that the transmitted data can be received without errors.

4.4- CENTRONICS PARALLEL INTERFACE

The EPC1200 complies the IEEE1284 protocol (**NIBBLE MODE**).

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4.4.1- Compatibility mode (Data transmission from host to printer: Centronics compatible)

*Any system sending data to the printer (PC, PLC, custom board, etcetera) is considered to be a host system.

The compatibility mode supports compatibility with the Centronics parallel interface.

a) Specifications

- Data transmission: 8-bit parallel
- Synchronization: nSTB signal externally provided
- Protocol: nACK (acknowledge) and BUSY signals
- Signal levels: TTL compatible
- Connector (user side): JST **PHDR-24VS** (housing)
JST **SPHD-001T-P0.5** (terminal) or an equivalent model.

b) Switching between online and offline mode

The printer does not provide any switch for online/offline mode. The printer is in offline mode in the following cases:

- 1) When powering ON or until the printer becomes ready for data transmission after it is initialized by the reset signal from the interface.
- 2) During the self-test.
- 3) When the platen is opened.
- 4) During paper advance using the paper advance button (paper feed).
- 5) When the printer stops printing due to 'out of paper'.
- 6) When a temporal voltage abnormality happens to the power supply.
- 7) When an error occurs.

c) Timing diagram of data reception

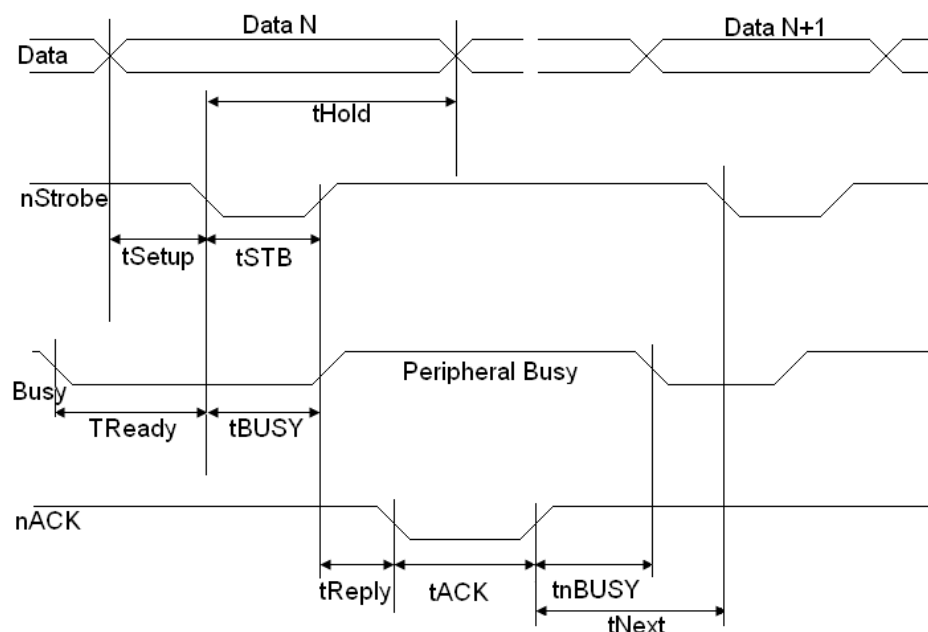


Fig. 10. - Timing diagram of data reception

Description	Symbol	Specification	
		Min(ns)	Max(ns)
Data hold time	tHold	750	--
Data setup time	tSetup	750	--
STROBE pulse width	tSTB	750	--
READY cycle idle time	tReady	0	--
BUSY output delay time	tBUSY	0	500
Data processing time	tReply	0	∞
ACKNLG pulse width	tACK	500	10 μ s
BUSY release time	tnBUSY	0	∞
ACK cycle idle time	tNext	0	--

Table 2. - Timing of parallel communication protocol

4.4.2- Reverse mode (Data transmission from the printer to the host system)

The transmission of the printer status to the host system is implemented according to the IEEE1284 standard (**NIBBLE MODE**).

4.4.3- Parallel interface pins assignment for each mode

Pin	Source	Compatibility mode	Nibble mode
1	Host Sys.	nStrobe	HostClk
2	Host Sys/printer	Data0 (LSB)	Data0 (LSB)
3	Host Sys/printer	Data1	Data1
4	Host Sys/printer	Data2	Data2
5	Host Sys/printer	Data3	Data3
6	Host Sys/printer	Data4	Data4
7	Host Sys/printer	Data5	Data5
8	Host Sys/printer	Data6	Data6
9	Printer	Data7 (MSB)	Data7 (MSB)
10	Printer	nAck	PrtClk
11	Printer	Busy	PrtBusy/Data3,7
12	Printer	PError	AckDataReq/Data2,6
13	Printer	Selected	Xflag/Data1,5
14	Host Sys.	Nautofeed	HostBusy
15	Printer	nFault	nDataAvail/Data0,4
16	Host Sys.	nInit	NInit
17	Host Sys.	nSelectIn	1284-Active
18-25		GND	GND

Table 3. - PC parallel connector (DB25)

NOTES:

- 1) The 'n' prefix used before a signal name means that they are active in '0' logic level. If the host system does not provide any of the signal lines mentioned above, both communication types could fail.
- 2) It is recommended to use twisted pair cables (signal/ground), with the return sides connected to the system signal ground level.
- 3) Do not ignore the nACK and BUSY signals during data transmissions. An attempt to transmit data without nACK or BUSY control signals might cause lost data.
- 4) The interface cables should have the minimum required possible length (maximum recommended length: 2 m).

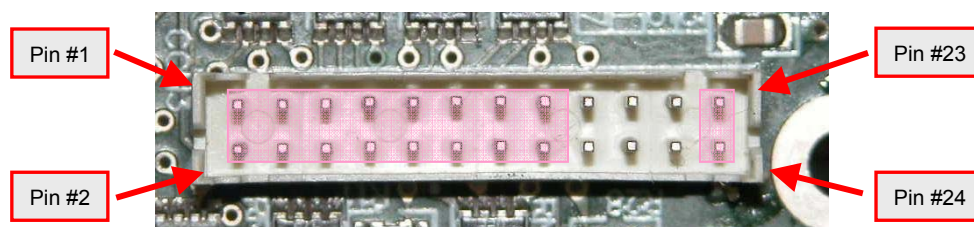


Fig. 11. - Parallel interface pins

4.4.4- PC parallel interface connection

Communications cable Ref. CENTRONICS-7

HOST

MALE DB25

EPC1200

Housing: PHDR-24VS (JST)

Contact: SPHD-001T-P0.5

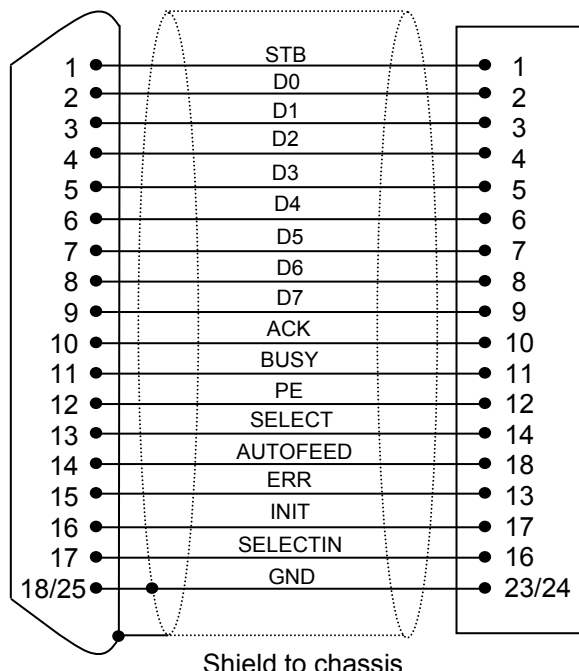


Fig. 12. - PC parallel cable

NOTES:

- 1) Same configuration in the printer and in the host system should be set.
- 2) Communication protocol should be set properly so that the transmitted data can be received without errors.
- 3) The 'n' prefix used before a signal name means that they are active in '0' logic level. If the host system does not provide any of the signal lines mentioned above, both communication types could fail.
- 4) It is recommended to use twisted pair cables (signal/ground), with the return sides connected to the system signal ground level.
- 5) Do not ignore the nACK and BUSY signals during data transmissions. An attempt to transmit data without nACK or BUSY control signals might cause lost data.
- 6) The interface cables should have the minimum required possible length (maximum recommended length: 2 m).

4.5- USB INTERFACE

The EPC1200 USB interface has the following general features:

- | | |
|--|----------------------------|
| • USB specification | USB 1.1 (12MHz full speed) |
| • Transfer type | Bulk |
| • Maximum receive/transmit endpoint size | 64 bytes |
| • Current consumption from USB bus | 2mA max. |

4.5.1- Assignments of USB connector terminals USB

Pin	Signal name
1	Vbus
2	D –
3	D+
4	ID
5	GND

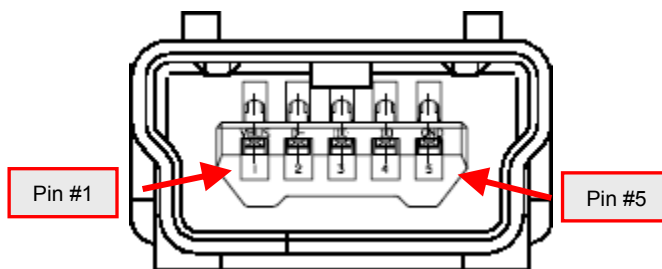


Fig. 13. - EPC1200 USB connector.

Mini -B series USB connector has to be used.

5 – BASIC OPERATIONS

5.1- PAPER LOADING

One of the most highlighted features of the EPC1200 printer is paper loading, which becomes very simple if the following steps are executed:

- Open the printer's front lid by pressing the cover open button.
- Insert the paper roll with the orientation shown in the picture, leaving about 5mm of paper outside the printer.

Place the paper roll in the right direction. The thermal paper has only one surface that can be printed (thermal side). In order to know which one it is, just scratch the paper: the thermal side will show up the track on.

- Close the cover feeling the roller is latched again.

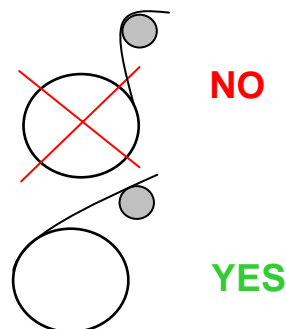


Fig. 14. - Paper orientation

5.2- BUTTON FUNCTIONS

Button functions.

- PAPER FEEDING:** when the printer is powered on pressing the button will feed the paper. The paper roller will not move under the following conditions:
 - The paper roll end sensor detects a paper end.
 - When the door is open.
 - When another non-recoverable error is present.
- SELF-TEST MODE:** If pressed on start-up with the door closed, it activates this mode.
- PROGRAMMING MODE:** In order to activate it, if the button is still pressed when the full Self-test has been printed, the printer will prompt the user to hold the button to enter this mode.
- HEXADECIMAL MODE:** If we are in the same situation as before, if we do not hold the button in the next 5 seconds (meaning NO), the printer will ask the user to press the button to enter this mode. If we do not press it we will exit selection.
- YES/NO:** as described above when the printer asks for user selection the procedure will always be:
 - Button press → Means YES
 - Button released for 5 sec. → Means NO

5.3- PAPER SENSORS

The EPC1200 has one photo sensor for 'out of paper' detection.

The out of paper sensor has the basic function of informing the printer controller about the existence of paper (on the printing line). Because there are some actions (for instance, printing without paper) that could seriously damage the mechanism, this error blocks all the printer activities.

The final user can detect these errors by the LED, and the application developer can test them through the **DEL EOT** command, being able to act accordingly.

NOTES:

- Use** paper rolls that meet the specifications indicated in this manual.
- DO NOT** open the printer cover during the printing operation.
- Close** the cover correctly, checking that the 'PAPER OUT' LED turns green.

5.4- OPEN PLATEN SENSOR

When this sensor detects the opening of the platen, it lights the orange LED, blocking all the activity related to printing.

NOTE: If EPC1200 detects no paper or platen open while is printing, the current and the following data will be lost. The control error must be done before sending any byte data. (See 3.7.4 and 3.7.5 points, flow diagrams of the error detection).

5.5- NEAR-END PAPER SENSOR

EPC1200-12 printers have an optional near-end paper sensor. The 'near-end paper' sensor detects when the paper roll is near its end of file. This error, by default, does not stop printing, but through the ESC c 4 command, it can be achieved that the 'near-end paper' detection stops the printing.

The final user can detect these errors through the LED INDICATOR, and the application developer can test them through the DEL EOT command, being able to act accordingly.

5.6- LED INDICATOR

EPC1200 has one indicator led to visually inform about the printer status.

The led lights GREEN whether the EPC1200 is powered on without errors.

The led lights ORANGE whether the EPC1200 does not have paper and/or the platen is opened.

The led blinks RED if there has been any error in the EPC1200 (See section: **3.7- ERROR PROCESSING**).

5.7- SPECIAL PRINTING MODES

Besides the normal printing mode, in which all the received data are printed according to the settings or conditions fixed by the commands, the EPC1200 printer allows two special working modes: the self-test mode, programming mode and the hexadecimal mode.

5.7.1- Self-test mode

The printer provides the self-test mode with two different functionality: showing information of the settings of that particular printer model and verifying the printing.

To enter the self-test mode, the printer must be powered on while keeping pressing the button.

The EPC1200 will start printing a report, which allows checking the features of this particular model, like the firmware current version, control functions of the communications protocol, and so on.

FENIX INVIKO S.A.
EPC1200 U.b
Set character EUROPE 43?

PARALLEL PORT SETTINGS
IEEE 1284 nibble mode

```
SERIAL PORT SETTINGS
Data bits : 8 (fixed)
Baud rate : 9600 bauds
Parity bit: Not parity
Stop bits : 1 (fixed)
```

TEXT SETTINGS
Normal Paper
Font A (12x24 dots)
Character Width: 1
Character Height: 1
Character space: 004
Line space: 015
Carry Return: Disabled

```

* RECORDS *
On/Off times: 00059
Half hours:   00007
Meters:       00083

```

[illegible][illegible]

Fig. 15. - SELF-TEST mode example

If, once this printing has been finished, the button is kept pressed; the printer will start printing continuously and repetitively a character map until it finally concludes the self-test by printing '* * completed * *'. This second option of the self-test mode has the goal of validating the printing speed and quality.

At the end of the autotest page there are few lines showing the three different maintenance counts:

- 1- Times that the printer has been switched on.
- 2- Time (in half hours) that the printer has been powered on.
- 3- Meters of paper printed.

5.7.2- Programming mode

The EPC1200 has a PROGRAMMING MODE in order to set up some parameters of the printer, without sending any command neither setting micro-switches.

In this mode, the printer makes some questions to the user. These questions must be answered by pressing the button present. Pressing and holding the the button means "YES" and releasing it for at least 5 seconds means "NO".

To enter the programming mode after the full self test page has been printed we must keep on pressing the button, then the printer will prompt us to hold the button to enter programming mode as shown. If we press the button for a couple of seconds we will enter this mode.

In programming mode the printer will ask the user to answer YES (pressing the button) or NO (leaving the button released) to different configurable parameters:

- Baud rate: 9600, 19200, 38400, 115200 baud.
- Parity for serial transmission: ODD, EVEN, NO parity.
- Paper quality:
 - a) Normal paper
 - TF50KS-E2D (Recommended)
 - TF77KS-E2 (or similar)
 - b) Wide temperature paper
 - TL51KS-R2
 - TL69KS-R2 (or similar)
 - c) High sensitive paper
 - TL69KS-HG76 (label paper)
- Carry Return: Enable / Disable CR command.

Figure on the right shows the way the printer asks for the different settings.

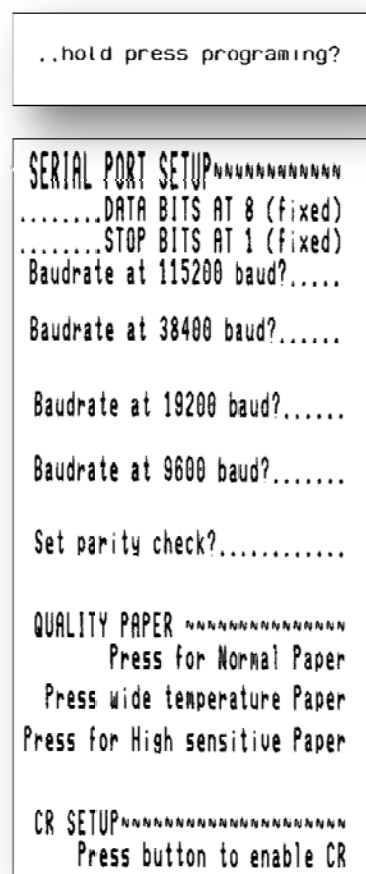


Fig. 16. - PROGRAMMING MODE example

5.7.3- Hexadecimal dump mode

To enter this mode we do as to enter in programming mode but to the question "...hold press programming?" we release the button and then we will be requested to press the button as shown in the figures.

Once entered this mode, which will be indicated by "****HEXADECIMAL MODE****" anything sent to the printer will be printed as hexadecimal characters.

This mode can be very helpful for the application developer during the setup test time, as it allows detecting and eliminating possible errors (like out of range parameters, non valid command sequences, errors in the communication channel, etc.), comparing what it has theoretically been sent to the printer to what it is really being received.

Turn off the printer to quit the hexadecimal mode.

NOTES:

- (1) For any received characters under 20h, the ASCII '.' will not be printed.
- (2) During the hexadecimal dump mode, the **DEL EOT** command does not work.
- (3) It must be taken into account that if the number of bytes is less than the minimum amount required to print one line (9 bytes), the printer will not print. It is recommended to complete the hexadecimal dump by sending at least 9 bytes (for example 00h).
- (4) It is also possible to enter the hexadecimal mode through the **GS (A)** command.

..hold press programming?

....press for hex mode?

****HEXADECIMAL MODE****

```

18 21 00 10 21 00 18 35 CA .f...f..3,
18 20 02 18 21 00 10 21 E0 . ...f...f,
18 33 01 18 20 01 18 4C 60 .3.. ..M,
10 4C 00 08 53 4D 32 3C 30 .L..SM200
38 20 73 61 6D 70 6C 65 20 C sample
74 88 03 88 05 74 0A 53 4D ticket,SM
32 38 30 38 28 73 61 6C 70 2000 samp
8C 65 20 74 68 63 88 65 74 1e ticket
0A 53 4D 32 38 30 30 28 73 ,SM200 s
61 8D 70 6C 65 20 74 68 63 ample tic
88 65 74 0A 53 4D 32 38 3C ket,SM200
30 28 73 61 6D 70 6C 65 20 C sample
74 88 03 88 05 74 0A 53 4D ticket,SM
32 38 30 38 28 73 61 6C 70 2000 samp
8C 65 20 74 68 63 88 65 74 1e ticket
0A 53 4D 32 38 30 30 28 73 ,SM200 s
61 8D 70 6C 65 20 74 68 63 ample tic
88 65 74 0A 10 68 43 0A 31 ket,,kC,l
32 33 33 34 35 36 37 38 31 233456781
10 58 42 64 18 21 0E 10 21 .Ud..f...f
.. .. .. .. .. .. .. .. ..

```

Fig. 17. - HEXADECIMAL DUMP mode example

5.8- ERROR PROCESSING

5.8.1- Error types

When an error occurs, the printer visually notifies its type through the LED. This fact allows the final user to have a direct and visual reference of the current printer status.

On the other hand, the printer status and all its possible errors can also be monitored via software through the **DEL EOT** command. In this way, the application developer can have more complete information on the printer status, therefore being able to act accordingly.

The errors detected by the interface are the following: 'near-end paper', hardware error, power supply voltage error and printing head temperature error.

When any of these errors happen, the led blinks with a different blinking timing sequence for each of them. If no error happens the led will light permanently green.

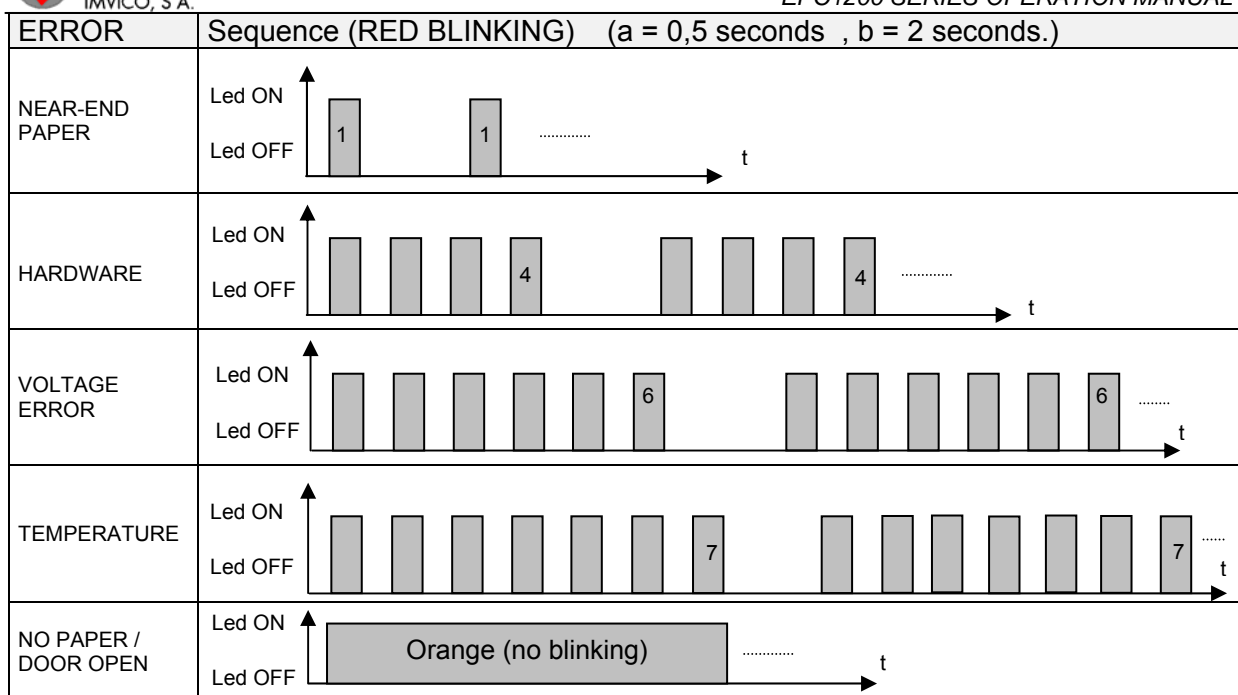


Fig. 18. - LED Blinking sequence (RED)

More information on these errors can be found below:

NEAR-END PAPER ERROR

[Description]	<p>This error happens when the 'near-end paper' sensor detects that the paper roll is close to the end. This means that using a paper roll with an external diameter of 100 mm and inner diameter of 25 mm, the sensor will trigger the error when there are still 1.5 meters of paper approx. This indication should be really taken as a warning, not as an error as such. The action depends on the application and the developer's criteria.</p>
---------------	--

[Recover action] Replace paper roll.

[Notes] When this error happens the printing is not interrupted, although using the ESC c 4 command could stop it. This error is different from the 'out of paper'.

HARDWARE ERROR

[Description]	At initialization, the printer internally checks its hardware devices. If they do not function properly, an error occurs.
---------------	---

[Recover action] This error cannot be recovered. One of the control board components might be damaged and should be replaced or repaired.

POWER SUPPLY VOLTAGE ERROR

[Description] The power supply voltage is out of range (5VDC + 10%).

[Recover action] This is a recoverable error. Unplug the power supply from the printer and check if the output voltage of the power supply is within the specified range. Replace it in case it is not working properly.

[Note] When this error occurs, some parts of the printer may be damaged. If this happens, the printer will be unable to recover itself and some of its components are likely to be replaced.

THERMAL HEAD TEMPERATURE ERROR

[Description]	Due to very continuous use of the printer or due to environmental conditions, the temperature in the thermal head may reach levels (above 80°C), which can damage the printer itself. When this situation occurs, an error must be indicated in order to protect the printer from abrasion.
---------------	---

[Recover action]	The printing recovers automatically from this error when the thermal print head temperature drops below 60°C again.
[Note]	This error can happen if the ambient temperature is very high and the printer is working continuously with high-density printing.

NO PAPER ERROR / DOOR OPEN

[Description]	The out of paper sensor detects there is not paper on the printing line. When the door is open the printer will also detect it the same way.
[Recover action]	This error disappears loading a new paper roll in the printer and closing the paper door (see section 3.1. <i>Paper loading</i>).
[Note]	This error stops the printing and it cannot be restarted until it is not recovered. This error is indicated in the parallel port depending on the conditions set by the "ESC c 3" command (See point 4. CONTROL COMMANDS).

5.8.2- Printer operation when an error happens

When the printer detects an error, It stops all printing operations and the red led blinks or orange permanently lights.

5.8.3- Data reception error (serial interface only)

If one of the following errors happens during the serial interface data communication, the printer prints '?' or ignores the data.

- Parity error.
- Synchronization error.
- Overlap error.

5.8.4- Flow diagram of the error detection for the serial port

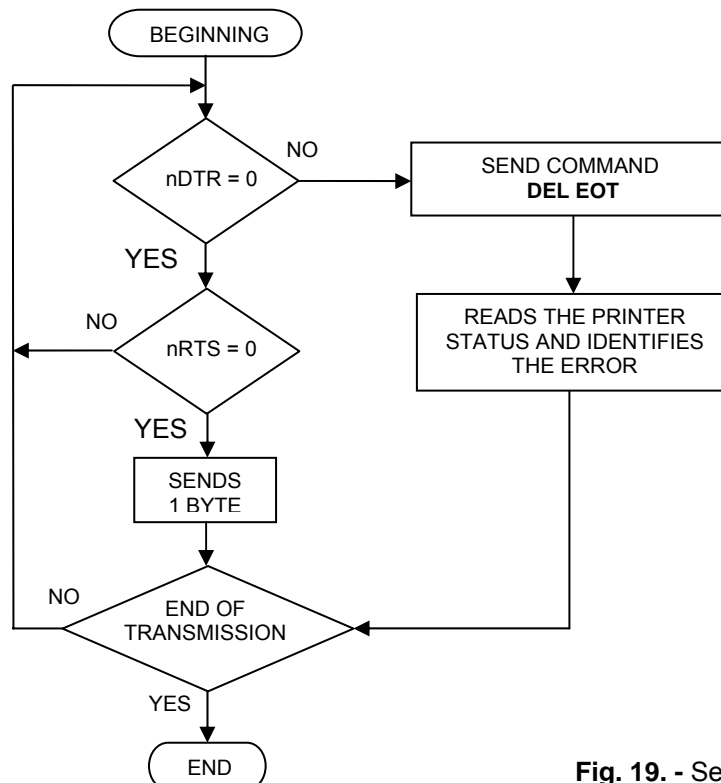


Fig. 19. - Serial port error flow diagram

5.8.5- Flow diagram of the error detection for the parallel port

The EPC1200 meets the IEEE-1284 standard, in the nibble mode variant.

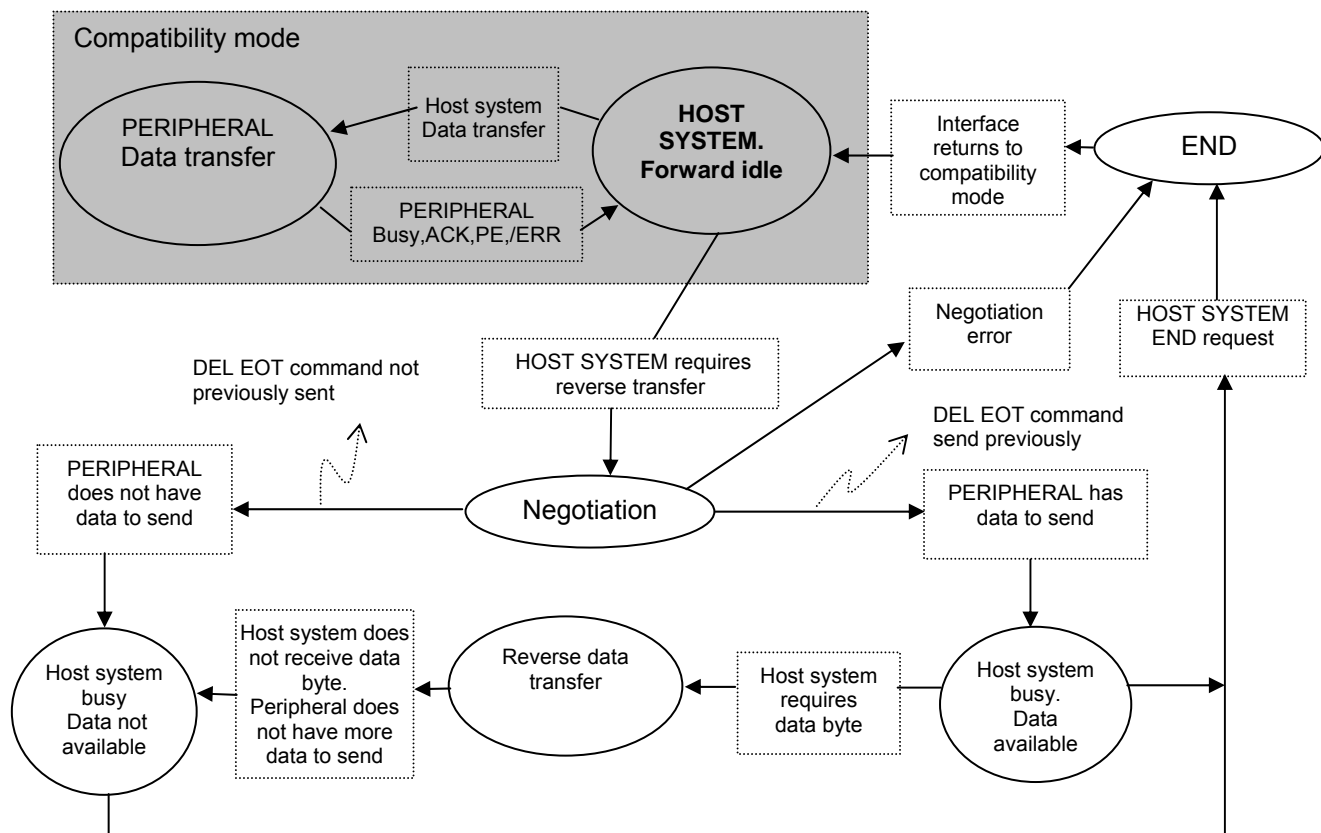


Fig. 20. - Nibble mode phase transitions

NOTES:

- (1) The circles represent the IEEE1284 phases.
- (2) This diagram cannot be considered as a true state diagram.
- (3) **The host system can request the negotiation phase at any time, but the printer will only return a status byte if the host system has send the DEL EOT command previously.**
- (4) If the printer control of the host system does not have enabled or implemented the nibble mode according to the IEEE-1284 interface, only the compatibility mode will make communication possible. In this case, the error signaling is reduced to the information provided by the PError and nFault pins.

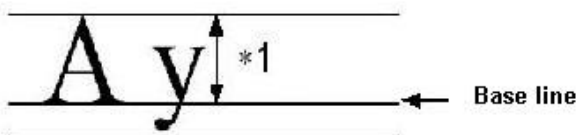
6 – CONTROL COMMANDS

6.1- COMMAND NOTATION

[Name]	Command name.
[Format]	Coding sequence.
[Range]	It provides the allowed range for the arguments.
[Description]	It describes the command functionality.
[Notes]	It provides important information in command usage and warnings, if needed.
[Defect]	It provides the default values, if any, for the command parameters.
[Reference]	It lists related commands.
[Examples]	It shows examples on how to use the command.

6.2- TERM DEFINITIONS

- 1) Receiving buffer: It is the buffer that stores the received data (commands and data). They are stored temporally in the buffer and are sequentially processed later.
- 2) Printing buffer. The printing buffer is a buffer that holds the data of the image to be printed.
- 3) Printable area. It is the maximum range in which the printing is possible under the printer specifications. The printable area for this printer is 48mm in the horizontal direction by the total printable length.
- 4) Inch Length unit. One inch is 25.4 millimeters.
- 5) MSB Most significant bit.
- 6) LSB Least significant bit.
- 7) Base line. Standard position where the characters are printed. The following drawing shows the position of normal characters in standard mode:



- *1. When the font selected is A type (12x24 dots), this height is 18 dots.
When the font selected is B type (8x16 dots), this height is 14 dots.

6.3- DESCRIPTION OF THE CONTROL COMMANDS

Command	Name	Command classification		Page
		Executing	Setting	
LF	Print and line feed	X		28
CR	Print and carriage return	X		28
DLE EOT	Real-time status transmission	X		28
ESC t	Select character code table		X	29
ESC SP	Set right-side character spacing		X	30
ESC –	Turn underline mode on/off		X	30
ESC !	Select print mode(s)		X	30
ESC 2	Select default line spacing		X	31
ESC 3	Set line spacing		X	31
ESC @	Initialize printer	X	X	31
ESC E	Turn emphasized mode on/off		X	32
ESC G	Turn double-strike mode on/off		X	32
GS B	Turn white/black reverse printing mode on/off		X	32
ESC J	Print and feed paper	X		32
ESC M	Select character font		X	33
ESC a	Select justification	X		33
ESC c 3	Select paper sensor to output PE signal		X	33
ESC c 4	Select paper-near-end sensor to stop printing		X	34
ESC c 5	Enable/disable panel buttons		X	34
ESC d	Print and feed n lines	X		34
GS !	Select character size		X	35
GS (A	Execute test print	X		35
GS a n	Automatic status report	X		36
GS I n	Firmware version query	X		36
FS DC2 ESC	Serial number query	X		36
GS L	Set left margin		X	37
GS T	Set print position to the beginning of print line	X		37
GS f	Select font for HRI characters		X	37
GS H	Select printing position of HRI characters		X	38
GS h	Set bar code height		X	38
GS k	Print bar code	X		38
GS w	Set bar code width		X	40
GS v 0	Print raster bit image	X		40
FS p	Print NV bit image	X		41
FS q	Define NV bit image		X	41

Table 4. - Command List

LF

[Name]	Print and line feed
[Format]	ASCII LF Hex 0A Decimal 10
[Description]	Prints the data in the print buffer and feeds one line, based on the current line spacing.
[Note]	This command sets the print position to the beginning of the line.
[Reference]	ESC 2, ESC 3.

CR

[Name]	Print and carriage return
[Format]	ASCII CR Hex 0D Decimal 13
[Description]	When automatic line feed is enabled, this command operates the same as LF ; when automatic line feed is disabled, this command is ignored.
[Notes]	<ul style="list-style-type: none"> This command is set at the start-up, via the PROGRAMMING MODE (See point 3.6.2- PROGRAMMING MODE). Sets the print starting position to the beginning of the line.
[Reference]	LF

DLE EOT *n*

[Name]	Real-time status transmission
[Format]	ASCII DLE EOT <i>n</i> Hex 10 04 <i>n</i> Decimal 16 04 <i>n</i>
[Range]	$1 \leq n \leq 4$
[Description]	Transmits the selected printer status specified by <i>n</i> in real-time, according to the following parameters: <i>n</i> = 1: Transmit printer status <i>n</i> = 2: Transmit offline status <i>n</i> = 3: Transmit error status <i>n</i> = 4: Continuous paper sensor status <i>n</i> = 5: Paper sensor status <i>n</i> = 100: Low byte (BL) of thermal head temperature <i>n</i> = 101: High byte (BH) of thermal head temperature
[Notes]	<ul style="list-style-type: none"> The status is transmitted whenever the data sequence 16, 04, <i>n</i> ($1 \leq n \leq 5$) is received. The printer transmits the current status. Each status item is represented by one byte. The printer transmits the status without confirming whether the host computer can receive data (in serial interface). The printer executes this command upon receiving it. This command is executed even when the printer is offline, the receiver buffer is full, or there is an error status with a serial interface model. Thermal head temperature (°C) is transmitted in two bytes and multiplied x 10. For instance, if BL = 35H and BH = 02H, head temperature is (235H): $565/10 = 56.5^{\circ}\text{C}$

n = 1: **Printer status**

Bit	OFF/ON	Function
0	OFF	Not used. Fixed to OFF
1	ON	Not used. Fixed to ON
2	OFF	Not used. Fixed to OFF
3	OFF	Online
	ON	Offline
4	ON	Not used. Fixed to ON
5	OFF	Not used. Fixed to OFF
6	-	Undefined
7	OFF	Not used. Fixed to OFF

n = 2: Offline status

Bit	OFF/ON	Function
0	OFF	Not used. Fixed to OFF
1	ON	Not used. Fixed to ON
2	OFF	Platen is closed (Thermal head is closed)
	ON	Platen is open (Thermal head is open)
3	-	Undefined
4	ON	Not used. Fixed to ON
5	OFF	Not used. Fixed to OFF
6	OFF	No error
	ON	Error occurred
7	OFF	Not used. Fixed to OFF

n = 3: Error status

Bit	OFF/ON	Function
0	OFF	Not used. Fixed to OFF
1	ON	Not used. Fixed to ON
2	OFF	Not used. Fixed to OFF
3	-	Undefined
4	ON	Not used. Fixed to ON
5	OFF	No unrecoverable error
	ON	Unrecoverable error occurred
6	OFF	No auto-recoverable error
	ON	Auto-recoverable error occurred
7	OFF	Not used. Fixed to OFF

Bit 6 is ON when printing is stopped due to high print head temperature until the print head temperature drops sufficiently.

n = 4: Continuous paper sensor status

Bit	OFF/ON	Function
0	OFF	Not used. Fixed to OFF
1	ON	Not used. Fixed to ON
2	-	Undefined
3	OFF	Paper near-end sensor: Paper present
	ON	Paper near-end sensor: Paper not present
4	ON	Not used. Fixed to ON
5	-	Undefined
6	OFF	Paper real-end sensor: Paper present
	ON	Paper real-end sensor: Paper not present
7	OFF	Not used. Fixed to OFF

n = 5: Paper sensor status

Bit	OFF/ON	Function
0	OFF	Not used. Fixed to OFF
1	ON	Not used. Fixed to ON
2	-	Undefined
3	ON	Not used. Fixed to ON
4	ON	Not used. Fixed to ON
5	-	Undefined
6	-	Undefined
7	OFF	Not used. Fixed to OFF

ESC t n

[Name]	Select character code table			
[Format]	ASCII	ESC	t	n
	Hex	1B	74	n
	Decimal	27	116	n
[Range]	n = 0, 17			
[Description]	Selects page n from the character code table.			

<i>n</i> (Hex)	<i>n</i> (Dec)	Page
0	0	PC437 (U.S.A., standard Europe)
11	17	PC866 (Cyrillic)

[Default] $n = 0$

[Reference] **APPENDIX E - INTERNAL CHARACTER TABLES**

ESC SP *n*

[Name]	Set right-side character spacing			
[Format]	ASCII	ESC	SP	<i>n</i>
	Hex	1B	20	<i>n</i>
	Decimal	27	32	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Description]	Sets the character spacing for the right side of the character to [<i>n</i> x 0.125 mm].			
[Notes]	<ul style="list-style-type: none"> The right side character spacing for double-width mode is twice the normal value. When characters are enlarged, the right-side character spacing is <i>n</i> times normal value. 			
	<ul style="list-style-type: none"> This command is effective only when sent at the beginning of a line. 			
[Default]	$n = 4$			
[Reference]	APPENDIX A - SPECIFICATIONS			

ESC - *n*

[Name]	Turn underline mode on/off			
[Format]	ASCII	ESC	-	<i>n</i>
	Hex	1B	2D	<i>n</i>
	Decimal	27	45	<i>n</i>
[Range]	$0 \leq n \leq 2, 48 \leq n \leq 50$			
[Description]	Turns underline mode on or off, based on the following values of <i>n</i> :			

<i>n</i> (Hex)	<i>n</i> (Dec)	Function
0, 30	0, 48	Turns off underline mode
1, 31	1, 49	Turns on underline mode (1-dot thick)
2, 32	2, 50	Turns on underline mode (2-dots thick)

[Description]	Turns underline mode on or off, based on the following values of <i>n</i> :			
[Notes]	<ul style="list-style-type: none"> The printer can underline all characters (including right-side character spacing), but cannot underline the space set by Horizontal tab. 			
	<ul style="list-style-type: none"> When underline mode is turned off by setting the value of <i>n</i> to 0 or 48, the following data is not underlined, and the underline thickness set before the mode is turned off does not change. The default underline thickness is 1 dot. Changing the character size does not affect the current underline thickness. Underline mode can also be turned on or off by using ESC !. Note, however, that the last received command is effective. 			
[Default]	$n = 0$			
[Reference]	ESC !			

ESC ! *n*

[Name]	Select print mode(s)			
[Format]	ASCII	ESC	!	<i>n</i>
	Hex	1B	21	<i>n</i>
	Decimal	27	33	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Description]	Selects print mode(s) using <i>n</i> as follows:			

Bit	OFF/ON	Hex	Decimal	Function
0	OFF	00	0	Character font A (12 x 24).
	ON	01	1	Character font B (8 x 16).
1	--	--	-	Undefined.
2	--	--	-	Undefined.
3	OFF	00	0	Emphasized mode not selected.
	ON	08	8	Emphasized mode selected.
4	OFF	00	0	Double-height mode not selected.
	ON	10	16	Double-height mode selected.
5	OFF	00	0	Double-width mode not selected.
	ON	20	32	Double-width mode selected.
6	--	--	-	Undefined.
7	OFF	00	0	Underline mode not selected
	ON	80	128	Underline mode selected

[Notes]

- When both double-height and double-width modes are selected, quadruple-size characters are printed.
- When some characters in a line are double or more height, all the characters in the line are aligned at the baseline.
- ESC M can also select character font type. However, the setting of the last received command is effective.
- ESC - n can also turn on or off underline mode. However, the setting of the last received command is effective.
- GS ! can also select character size. However, the setting of the last received command is effective.
- If this command is not received at the beginning of a line, and the character font is to be changed, all previous data in the print buffer is printed and the ticket is placed at the beginning of the next line.

[Default]

$n = 0$

[Reference]

ESC M, ESC - n, GS !, APPENDIX A - SPECIFICATIONS

ESC 2

[Name]	Select default line spacing
[Format]	ASCII ESC 2
	Hex 1B 32
	Decimal 27 50
[Description]	Selects 0.93 mm (15 x 0.0625 mm) line spacing
[Reference]	ESC 3

ESC 3 n

[Name]	Set line spacing
[Format]	ASCII ESC 3 n
	Hex 1B 33 n
	Decimal 27 51 n
[Range]	$0 \leq n \leq 255$
[Description]	Sets the line spacing to [$n \times 0.0625$ mm]
[Default]	$n = 15$
[Reference]	ESC 2

ESC @

[Name]	Initialize printer
[Format]	ASCII ESC @
	Hex 1B 40
	Decimal 27 64
[Description]	Clears the data in the print buffer and resets the printer settings to the settings that were in effect when the power was turned on.
[Notes]	The data in the receiver buffer is not cleared.

ESC E *n*

[Name]	Turn emphasized mode on/off			
[Format]	ASCII	ESC	E	<i>n</i>
	Hex	1B	45	<i>n</i>
	Decimal	27	69	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Description]	Turns emphasized mode on or off.			
	When the LSB of <i>n</i> is 0, emphasized mode is turned off. When the LSB of <i>n</i> is 1, emphasized mode is turned on.			
[Notes]	<ul style="list-style-type: none"> Only the least significant bit of <i>n</i> is enabled. This command and ESC ! turns on and off emphasized mode in the same way. Be careful when this command is used with ESC !. 			
[Default]	<i>n</i> = 0			
[Reference]	ESC ! , ESC G			

ESC G *n*

[Name]	Turn on/off double-strike mode			
[Format]	ASCII	ESC	G	<i>n</i>
	Hex	1B	47	<i>n</i>
	Decimal	27	71	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Description]	Turns double-strike mode on or off.			
	When the LSB of <i>n</i> is 0, double-strike mode is turned off. When the LSB of <i>n</i> is 1, double-strike mode is turned on.			
[Notes]	<ul style="list-style-type: none"> Only the lowest bit of <i>n</i> is enabled. Printer output is the same in double-strike mode and in emphasized mode. 			
[Default]	<i>n</i> = 0			
[Reference]	ESC E			

GS B *n*

[Name]	Turn white/black reverse printing mode			
[Format]	ASCII	GS	B	<i>n</i>
	Hex	1D	42	<i>n</i>
	Decimal	29	66	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Description]	Turns on or off white/black reverse printing mode.			
	When the LSB of <i>n</i> is 0, white/black reverse mode is turned off. When the LSB of <i>n</i> is 1, white/black reverse mode is turned on.			
[Notes]	<ul style="list-style-type: none"> Only the lowest bit of <i>n</i> is valid. 			
	<ul style="list-style-type: none"> When white/black reverse printing mode is on, it also applied to character spacing set by ESC SP. 			
	<ul style="list-style-type: none"> This command does not affect bit image, user-defined bit image, bar code and HRI characters. 			
	<ul style="list-style-type: none"> This command does not affect the space between lines. 			
	<ul style="list-style-type: none"> White/black reverse mode has a higher priority than underline mode. Even if underline mode is on, it is disabled (but not cancelled) when white/black reverse mode is selected. 			
[Default]	<i>n</i> = 0			

ESC J *n*

[Name]	Print and feed paper			
[Format]	ASCII	ESC	J	<i>n</i>
	Hex	1B	4A	<i>n</i>
	Decimal	27	74	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Description]	Prints the data in the print buffer and feeds the paper [<i>n</i> x 0.125 mm (0.0049")].			
[Notes]	<ul style="list-style-type: none"> After printing is completed, this command sets the print starting position to the beginning of the line. 			
	<ul style="list-style-type: none"> The paper feed amount set by this command does not affect the values set by ESC 2 or ESC 3. 			
	<ul style="list-style-type: none"> The printer uses the vertical motion unit (<i>y</i>). 			

ESC M *n*

[Name]	Select character font
[Format]	ASCII ESC M <i>n</i>
	Hex 1B 4D <i>n</i>
	Decimal 27 77 <i>n</i>
[Range]	<i>n</i> = 0, 1
[Description]	Selects the character font.

<i>n</i>	Function
0	Character Font A (12 x 24) selected
1	Character Font B (8 x 16) selected

- [Notes]
- **ESC !** can also select character font types. However the setting of the last received command is effective.
 - This command must be sent at the beginning of a line. If it is sent in the middle of a line, all previous data in the print buffer is printed and the ticket is placed at the beginning of the next line.

[Reference] **ESC !, APPENDIX A - SPECIFICATIONS**

ESC a *n*

[Name]	Select justification
[Format]	ASCII ESC a <i>n</i>
	Hex 1B 61 <i>n</i>
	Decimal 27 97 <i>n</i>
[Range]	$0 \leq n \leq 2, 48 \leq n \leq 50$
[Description]	Aligns all the data in one line to the specified position <i>n</i> selects the justification as follows:

<i>n</i> (Hex)	<i>n</i> (Dec)	Justification
0, 30	0, 48	Left justification
0, 31	0, 49	Centering
0, 32	0, 50	Right justification

- [Notes]
- The command is enabled only when processed at the beginning of the line.
 - This command executes justification in the printing area.

[Reference] **ESC !**

[Example]

Left justification	Centering	Right justification
ABC ABCD ABCDE	ABC ABCD ABCDE	ABC ABCD ABCDE

ESC c 3 *n*

[Name]	Select paper sensor(s) to output paper-end signals (PE in parallel interface)
[Format]	ASCII ESC c 3 <i>n</i>
	Hex 1B 63 33 <i>n</i>
	Decimal 27 99 51 <i>n</i>
[Range]	$0 \leq n \leq 255$
[Description]	Selects the paper sensor(s) to output paper end signals. Each bit of <i>n</i> is used as follows:

Bit	OFF / ON	Hex	Function
0	-	-	Undefined
1	OFF	00	Paper roll near-end sensor disabled
	ON	02	Paper roll near-end sensor enabled
2	OFF	00	Paper roll end sensor disabled
	ON	04	Paper roll end sensor enabled

3	OFF	00	Paper roll end sensor disabled
	ON	08	Paper roll end sensor enabled
4-7	-	-	Undefined

- [Notes]
- The command is available only with a parallel interface and is ignored with a serial interface.
 - It is possible to select multiple sensors to output signals. Then, if any of the sensors detects a paper end, the paper end signal is output.
 - Sensor is switched when executing this command. The paper end signal switching be delayed depending on the receive buffer state.
 - If either bit 0 or bit 1 is on, the paper roll near-end sensor is selected as the paper sensor outputting paper-end signals
 - If either bit 2 or bit 3 is on, the paper roll end sensor is selected as the paper sensor outputting paper-end signals.
 - When all the sensors are disabled, the paper end signal always outputs a paper present status.

[Default] $n = 12$

ESC c 4 n

[Name] Select paper-near-end sensor to stop printing

[Format] ASCII ESC c 4 n
Hex 1B 63 34 n
Decimal 27 99 52 n

[Range] $0 \leq n \leq 255$

[Description] Selects the paper-near-end sensor to stop printing when a paper-near-end is detected, using n as follows:

Bit	OFF / ON	Hex	Decimal	Function
0	OFF	00	0	Undefined.
1	OFF	00	0	Paper roll near-end sensor disabled.
	ON	02	2	Paper roll near-end sensor enabled.
2-7	-	-	-	Undefined.

[Notes] When a paper sensor is enabled with this command ($n = 2$), printing is stopped.

[Default] $n = 0$

ESC c 5 n

[Name] Enable/disable the on-board button

[Format] ASCII ESC c 5 n
Hex 1B 63 35 n
Decimal 27 99 53 n

[Range] $0 \leq n \leq 255$

[Description] Enables or disables the on-board button.

When the LSB of n is 0, the on-board button is enabled.

When the LSB of n is 1, the on-board button is disabled.

[Notes] Only the lowest bit of n is valid.

[Default] $n = 0$

ESC d n

[Name] Print and feed n lines

[Format] ASCII ESC d n
Hex 1B 64 n
Decimal 27 100 n

[Range] $0 \leq n \leq 255$

[Description] Prints the data in the print buffer and feeds n character lines.

- [Notes]
- This command sets the print starting position to the beginning of the line.
 - This command does not affect the line spacing set by **ESC 2** or **ESC 3**.
 - The maximum paper feed amount is 1016 mm {40"}. If the paper feed amount ($n \times$ line spacing) of more than 1016 mm {40"} is specified, the printer feeds the paper only 1016 mm {40"}.
 - Every line feed corresponds to the current selected font height (24 dots for Font A and 16 dots for Font B).

[Reference] **ESC 2, ESC 3.**

GS ! n

[Name]	Select character size			
[Format]	ASCII	GS	!	<i>n</i>
	Hex	1D	21	<i>n</i>
	Decimal	29	33	<i>n</i>
[Range]	$0 \leq n \leq 255$ ($1 \leq \text{vertical number of times} \leq 8$, $1 \leq \text{horizontal number of times} \leq 8$)			
[Description]	Selects the character height using bits 0 to 3 and selects the character width using bits 4 to 7, as follows:			

Bit	OFF / ON	Hex	Function
0	Character height selection. See Table 2.		
1			
2			
3			
4	Character width selection. See Table 1.		
5			
6			
7			

Table 1
Character Width Selection

Hex	Width
00	1 (normal)
10	2 (double-width)
20	3
30	4
40	5
50	6
60	7
70	8

Table 2
Character Height Selection

Hex	Height
00	1 (normal)
01	2 (double-height)
02	3
03	4
04	5
05	6
06	7
07	8

- [Notes]
- This command is effective for all characters, except for HRI characters.
 - The vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction.
 - When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.
 - The **ESC !** command can also turn double-width and double-height modes on or off. However, the setting of the last received command is effective.

[Default] *n* = 0

[Reference] **ESC !, APPENDIX A - SPECIFICATIONS**

GS (A pL pH n m

[Name]	Execute test print							
[Format]	ASCII	GS	(	A	<i>pL</i>	<i>pH</i>	<i>n</i>	<i>m</i>
	Hex	1D	28	41	<i>pL</i>	<i>pH</i>	<i>n</i>	<i>m</i>
	Decimal	29	40	65	<i>pL</i>	<i>pH</i>	<i>n</i>	<i>m</i>
[Range]	$(pL + (pH \times 256)) = 2$ (where $pL = 2$, $pH = 0$)							
	$48 \leq n \leq 50$							
	$49 \leq m \leq 51$							
[Description]	Executes a test print with a specified test pattern on a specified paper.							
	<ul style="list-style-type: none"> • <i>pL</i>, <i>ph</i> specifies ($pL + (ph \times 256)$) for the number of the bytes after <i>ph</i> (<i>n</i> and <i>m</i>). • <i>n</i> specifies the paper to be tested. • <i>m</i> specifies a test pattern. 							

<i>n</i>	Paper
48	Paper roll
49	
50	

m	Test pattern
49	Hexadecimal dump
50	Printer status print
51	Rolling pattern print

- [Notes]
- This command has enabled only when processed at the beginning of a line.
 - After the test print is finished, the printer resets itself automatically. Therefore, data already defined before this command is executed, such as user-defined buffer and print buffer are cleared; and each setting returns to the default value.

GS a n

[Name]	Automatic status report
[Format]	ASCII GS a n Hex 1D 61 n Decimal 29 97 n
[Range]	n=48, n=49
[Description]	Enables/disables automatic status report.

n (dec)	Function
48	Disables automatic status report
49	Enables automatic status report

- [Notes]
- When enabling the automatic status report, the printer remains in this state indefinitely, until it becomes disabling, or until the power is switched off.
 - After enabling the automatic status report, the printer returns the 5 states mentioned in the command DLE EOT n, every 0.5 seconds in the following order:

First status sent Last status sent
(status1) (status5)

status1 = Transmit printer status
status2 = Transmit offline status
status3 = Transmit error status
status4 = Continuous paper sensor status
status5 = Paper sensor status

[Default]	n=48
[Reference]	DEL EOT

GS I n

[Name]	Firmware version query
[Format]	ASCII GS I 3 Hex 1D 49 33 Decimal 29 73 51
[Description]	Obtains de printer's firmware version number. Returns one byte indicating numerically the current firmware version.
[Example]	If returning byte 33(hex) will correspond to firmware version 3.3.

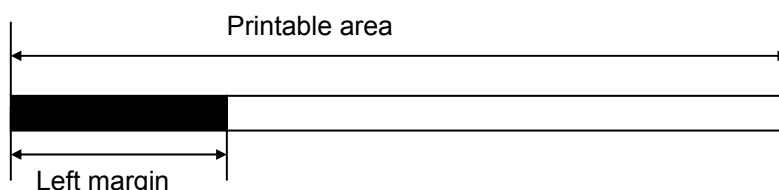
FS DC2 ESC

[Name]	Serial number query
[Format]	ASCII FS DC2 ESC Hex 1C 12 1B Decimal 28 18 27
[Description]	Printer sends the interface exclusive serial number. This number consists of 12 hexadecimal digits (6 bytes). Transmission order is from least to most significant byte.
[Example]	Serial number = 12D4AC78F38E <u>First byte sent</u> <u>Last byte sent</u> (Hex) 8E F3 78 AC D4 12
[Notes]	The interface exclusive serial number can be used to assure absolute traceability because no two parts are alike. The serial number can also be verified by printing the self-test:

```
* RECORDS *
Serial num. 00000026AFE
On/Off times: 00132
Meters: 00098
Cuts: 00507
Time ON(H:M): 00009:02
```

GS L nL nH

[Name]	Set left margin				
[Format]	ASCII	GS	L	nL	nH
	Hex	1D	4C	nL	nH
	Decimal	29	76	nL	nH
[Range]	$0 \leq n \leq 255$				
	$0 \leq n \leq 255$				
[Description]	Sets the left margin using nL and nH.				
	<ul style="list-style-type: none"> The left margin is set to $[(nL + nH \times 256) \times 0.125 \text{ mm}]$. 				



[Notes]	<ul style="list-style-type: none"> This command is effective only when processed at the beginning of the line. This command affects text, graphic and bar code printing. 				
	nL = 0, nH = 0				
[Default]	nL = 0, nH = 0				
[Reference]	APPENDIX A - SPECIFICATIONS				

GS T n

[Name]	Set print position to the beginning of print line				
[Format]	ASCII	GS	T	n	
	Hex	1D	54	n	
	Decimal	29	84	n	
[Range]	n = 0, 1				
[Description]	Sets the print position to the beginning of print line.				
	<ul style="list-style-type: none"> n specifies the data processing in the print buffer. 				

n	Printing position
0	Sets the print position to the beginning of print line after deleting all data in the print buffer.
1	Sets the print position to the beginning of print line after printing all data in the print buffer.

GS f n

[Name]	Select font for Human Readable Interpretation (HRI) characters				
[Format]	ASCII	GS	f	n	
	Hex	1D	66	n	
	Decimal	29	102	n	
[Range]	n = 0, 1				
[Description]	Selects a font for the HRI characters used when printing a bar code.				
	n selects a font from the following table:				

n	Font
0	Font A (12x24)
1	Font B (8x16)

[Notes]	<ul style="list-style-type: none"> HRI indicates Human Readable Interpretation HRI characters are printed at the position specified by GS H. HRI characters are always printed at X-Scale = 1 and Y-Scale = 1 				
	n = 1				
	GS H, GS k				

GS H n

[Name] Select print position for HRI characters.

[Format] ASCII GS H n
Hex 1D 48 n
Decimal 29 72 n

[Range] $n = 0, 3$

[Description] Selects the print position of HRI characters when printing a bar code.
 n selects the print position as follows:

n	Printing position
0	Not printed
1	Above the bar code
2	Below the bar code
3	Both above and below the code bar

[Notes] • HRI indicates Human Readable Interpretation.
• HRI characters are printed using X-scale=1, Y-scale=1 and the font specified by **GS f**

[Default] $n = <02>H$

[Reference] **GS f, GS k**

GS h n

[Name] Select bar code height

[Format] ASCII GS h n
Hex 1D 68 n
Decimal 29 104 n

[Range] $0 \leq n \leq 255$

[Description] Selects the height of the bar code.
 n specifies the bar code height in the vertical direction [$n \times 0.0625$ mm (0.0049")].

[Default] $n = 160$ (10mm)

[Reference] **GS k**

GS k m n d1...dn

[Name] Print bar code

[Format] ASCII GS k m n d1...dn
Hex 1D 6B m n d1...dn
Decimal 29 107 m n d1...dn

[Range] $m = 67, m = 69, m = 70$ or $m = 73$
(n and d depend on the bar code system used).

[Description] Selects a bar code system and prints the bar code.
 m selects a bar code system as follows:

m	Bar Code System	Number of Characters	Remarks
67	EAN13	$n = 12$	$48 \leq d \leq 57$
69	CODE39	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43, 45, 46, 47$
70	ITF	$1 \leq n \leq 255$ (even number)	$48 \leq d \leq 57$
73	CODE128	$2 \leq n \leq 255$	$0 \leq d \leq 127$

[Notes] • n indicates the number of bar code data bytes, and the printer processes n bytes from the next character data as bar code data.
• If n is outside the specified range, the printer stops command processing and processes the following data as normal data.
• If d is outside the specified range, the printer only feeds paper and processes the following data as normal data.
• If the horizontal size exceeds printing area, the printer only feeds the paper.
• This command feeds as much paper as is required to print the bar code, regardless of the line spacing specified by **ESC 2** or **ESC 3**.
• This command is enabled only when no data exists in the print buffer. When data exists in the print buffer, the printer processes the data following m as normal data.
• After printing the bar code, this command sets the print position to the beginning of the line.

- This command is not affected by print modes.
- The number of data for the ITF bar code must be even numbers. When an odd number of bytes of data is input, the printer ignores the last received data.
- When Code128 (m=49h) is used:
 1. Refer to **APPENDIX D – CODE 128 BAR CODE** for the information for the Code128 bar code and its code table.
 2. When using Code128 in this printer, take the following points into account for data transmission:
 - The top of the bar code data string must be the code set selection character (CODE A, CODE B or CODE C), which selects the first code set.
 - Special characters are defined by combining two characters “{” and one character. The ASCII character “{” is defined by transmitting “{” twice consecutively.

Specific character	Transmit data		
	ASCII	Hex	Decimal
SHIFT	{S	7B, 53	123, 83
CODE A	{A	7B, 41	123, 65
CODE B	{B	7B, 42	123, 66
CODE C	{C	7B, 43	123, 67
FNC1	{1	7B, 31	123, 49
FNC2	{2	7B, 32	123, 50
FNC3	{3	7B, 33	123, 51
FNC4	{4	7B, 34	123, 52
“{”	{{	7B, 7B	123, 123

[Example] Example data for printing “Ref. 258710”

In this example, the printer first prints “No.” Using CODE B, then prints the following numbers using CODE C.

GS k 73 11 123 66 82 101 102 46 123 67 25 87 10



Fig. 21. - Code128 bar code

3. If the top of the bar code data is not the code set selection character, the printer stops command processing and processes the following data as normal data.
 4. If the combination of “{” and the following character does not apply any special character, the printer stops command processing and processes the following data as normal data.
 5. If the printer receives characters that cannot be used in the special code set, the printer stops command processing and processes the following data as normal data.
 6. The printer does not print HRI characters that correspond to the shift characters or code set selection characters.
 7. HRI character for the function character is space.
 8. HRI characters for the control character (<00>H to <1F>H and <7F>H) are space.
- <Others> Be sure to keep spaces on both right and left sides of a bar code. (Spaces are different depending on the types of the bar code.)

[Reference] **GS h, GS w**

GS w n

[Name] Set bar code width
 [Format] ASCII GS w n
 Hex 1D 77 n
 Decimal 29 119 n
 [Range] $2 \leq n \leq 6$
 [Description] Sets the horizontal size of the bar code.
 n specifies the bar code width as follows:

n	Module Width (mm) for Multi-level Bar Code
2	0.250
3	0.375
4	0.500
5	0.625
6	0.750

Multi-level bar codes are as follows: EAN13, CODE39, CODE128, ITF.

[Default] $n = 3$
 [Reference] **GS k**

GS v 0 m xL xH yL yH d1 ... dk

[Name] Print raster bit image
 [Format] ASCII GS v 0 m xL xH yL yH d1...dk
 Hex 1D 76 30 m xL xH yL yH d1...dk
 Decimal 29 118 48 m xL xH yL yH d1...dk
 [Range] $0 \leq m \leq 3$
 $0 \leq xL \leq 255$
 $0 \leq xH \leq 255$ where $1 \leq (xL + xH \times 256) \leq 128$
 $0 \leq yL \leq 255$
 $0 \leq yH \leq 8$ where $1 \leq (yL + yH \times 256) \leq 4095$
 $0 \leq d \leq 255$
 $k = (xL + xH \times 256) \times (yL + yH \times 256)$ ($k \neq 0$)
 [Description] Selects raster bit-image mode. The value of m selects the mode, as follows:

M	Mode	Vertical Dot Density	Horizontal Dot Density
0	Normal	203.2 dpi	203.2 dpi
1	Double-width	203.2 dpi	101.6 dpi
2	Double-height	101.6 dpi	203.2 dpi
3	Quadruple	101.6 dpi	101.6 dpi

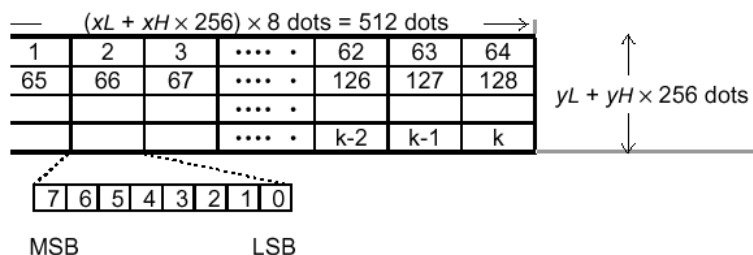
(dpi: dots per 25.4 mm {1"})

xL, xH, select the number of data bytes ($xL + xH \times 256$) in the horizontal direction for the bit image.

yL, yH, select the number of data bits ($yL + yH \times 256$) in the vertical direction for the bit image.

- [Notes]
- This command is effective only when there is no data in the print buffer.
 - Data outside the printing area is read in and discarded on a byte-by-byte basis.
 - The position at which subsequent characters are to be printed for raster bit image is specified by **GS L** (Set left margin).
 - d indicates the bit-image data. Setting a bit to 1 prints a dot and setting it to 0 does not print a dot.

[Example] When $xL + xH \times 256 = 64$



FS p n m

[Name]	Print NV bit image				
[Format]	ASCII	FS	p	n	m
	Hex	1C	70	n	m
	Decimal	28	112	n	m
[Range]	n = 1 48 ≤ m ≤ 51				
[Description]	Prints a NV bit image n using the mode specified by m.				

m (Dec)	Mode	Vertical Dot Density	Horizontal Dot Density
48	Normal	203.2 dpi	203.2 dpi
49	Double-width	203.2 dpi	101.6 dpi
50	Double-height	101.6 dpi	203.2 dpi
51	Quadruple	101.6 dpi	101.6 dpi

[dpi: dots per 25.4 mm]

n is the number of the NV bit image (always 1).
m specifies the bit image mode.

- [Notes]
- NV bit image means a bit image which is defined in a non-volatile memory by **FS q** and printed by **FS p**.
 - This command is not effective when the specified NV bit image has not been defined.
 - This command is effective only when there is no data in the print buffer.
 - This command is not affected by print modes (emphasized, double-strike, underline, character size, white/black reverse printing, etc.).
 - If the printing area width set by **GS L** for the NV bit image is less than one vertical line, the following processing is performed only on the line in question. However, in NV bit image mode, one vertical line means 1 dot in normal mode (m=48) and in double-height mode (m=50), and it means 2 dots in double-width mode (m=49) and in quadruple mode (m=51).
- The printing area width is extended to the right in NV bit image mode up to one line vertically. In this case, printing does not exceed the printable area.
 - If the printing area width cannot be extended by one line vertically, the left margin is reduced to accommodate one line vertically.
- If the downloaded image to be printed exceeds one line, the excess data is not printed.
 - This command feeds dots (for the height n of the NV bit-image) in normal and double width modes, and (for the height n × 2 of the NV bit-image) in double-height and quadruple modes, regardless of the line spacing specified by **ESC 2** or **ESC 3**.
 - After printing the bit image, this command sets the print position to the beginning of the line and processes the data that follows as normal data.

[Reference] **FS q, GS v 0**

FS q n [xL xH yL yH d1...dk]

[Name]	Define NV bit image				
[Format]	ASCII	FS	q	n	[xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]
	Hex	1C	71	n	[xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]
	Decimal	28	113	n	[xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]
[Range]	n = 1				
	xL ≤ 48 xH = 0 (when 1 ≤ (xL + xH × 256) ≤ 48)				
	0 ≤ yL ≤ 255 0 ≤ yH ≤ 1 (when 1 ≤ (yL + yH × 256) ≤ 288)				
	0 ≤ d ≤ 255 k = (xL + xH × 256) × (yL + yH × 256) × 8				
	Total available data area = 16380 bytes (16KB-4Bytes)				
[Description]	Define the NV bit image specified by n.				

- n specifies the NV bit image number (always 1).
- xL, xH specifies (xL + xH × 256) × 8 dots in the horizontal direction for the NV bits image you are defining.

[Notes]

- yL, yH specifies $(yL + yH \times 256) \times 8$ dots in the vertical direction for the NV bit image you are defining.
- From the beginning of the processing of this command till the finish, mechanical operations (including initializing the position of the printer head when the cover is open, paper feeding by using the FEED button, etc.) cannot be performed.
- NV bit image means a bit image which is defined in a non-volatile memory by FS q and printed by FS p.
- This command is effective only when processed at the beginning of the line.
- This command is effective when 7 bytes <FS~yH> is processed as a normal value.
- When the amount of data exceeds the capacity left in the range defined by xL, xH, yL, yH, the printer processes xL, xH, yL, yH out of the defined range.
- The d indicates the definition data. In data (d) a 1 bit specifies a dot to be printed and a 0 bit specifies a dot not to be printed.
- The definition area in this printer is a maximum of 16KBytes-4Bytes.
- Once a NV bit image is defined, it is not erased by ESC @, reset or power off.
- This command performs only definition of a NV bit image and does not perform printing. Printing of the NV bit image is performed by the FS p command.

[Reference] FS p

IMPORTANT NOTE. - FENIX provides a powerful utility to his Windows driver, that makes logo load extremely easy and useful. Taking advantage of high features in drawing and image handle software like Word, Paint, Photoshop, etc. the user can load a logo, selecting in “Device operation” (EPC1200 Windows driver) the correct option.

We suggest adjusting the logo selecting “Driver mode” option until get the size, the layout and the arrangement desired. Afterwards, the user just have to reprint with the option “Load Logo 1” selected, and the logo will be stored same way that last printing.

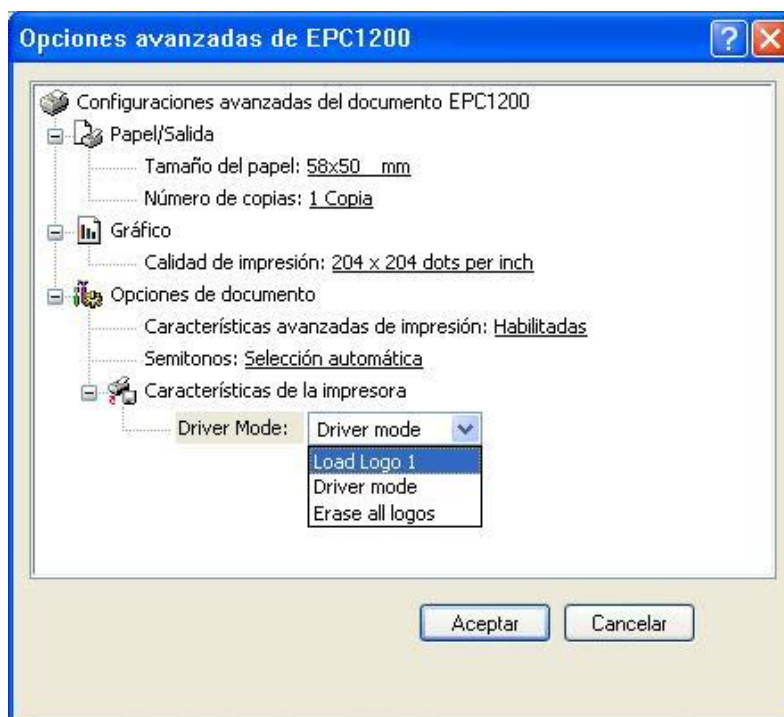
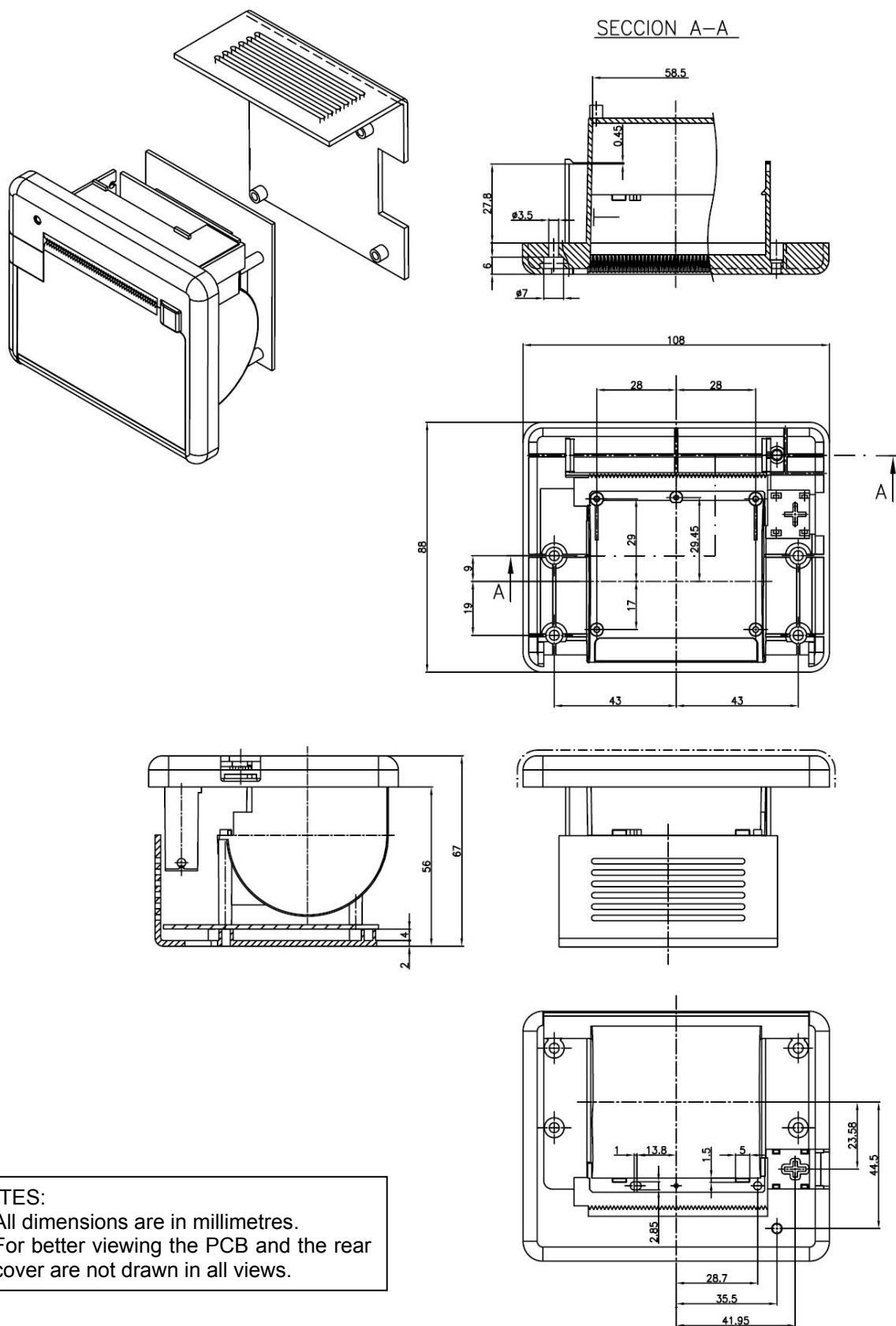


Fig. 22. - Logo loading

APPENDIX A – SPECIFICATIONS

Printing	Printing method	Thermal line printing	
	Dot density	203 dpi x 203 dpi; 8 dots x mm (dpi = dots per inch. Inch = 25.4mm)	
	Printing direction	Unidirectional with friction feed	
	Printing width	48 mm (384 dots)	
	Print speed	High speed mode: up to 90 mm/s (50mm/s on the EPC1250) Printing speed could change depending on the print head temperature as well as the command processing and the data transmission speed.	
	Paper feed speed	90 mm/s (EPC1250 → 50mm/s)	
Character	Character per line (default)	Font A: 24 Font B: 32	
	Character spacing (default)	0.5 mm (4 dots)	
	Character structure	Font A: 12 x 24 dots (1.5 x 3 mm). Font B: 8 x 16 dots (1 x 2 mm). Font A is the default.	
	Character size (mm)	Font A	Font B
		Standard: 1.5 x 3	Standard: 1 x 2
		Double-width: 3 x 3	Double-width: 2 x 2
		Double-height: 1.5 x 6	Double-height: 1 x 4
		Double width/height: 3 x 6	Double width/height: 2 x 4
	Character number	Alphanumeric characters: 95 Extended Graphics: 128 per page	
	Line spacing (default)	0.99 mm	
Paper	Paper roll	Width: 58 +0/-1mm, (25 m approx.) Maximum outside diameter: 45 mm	
	Thermal paper type	At -5°C to 50°C → TF50KS-E2D (59µm paper) TF77KS-E2 (95µm paper) TL69KS-HG76 (label paper) TL51KS-R2 and TL69KS-R2 (high heat-resistant paper) At 5°C to 40°C → TW80KK-S (2-ply thermal paper) From Nippon Paper Industries	
Communications	Interface (compatible)	Serial RS-232C / TTL Parallel IEEE 1284 (Nibble mode)	USB V2.0 Full Speed
Buffer	Receive buffer	10 Kbytes	512K on the USB model and PTR2
Barcode	Barcode Specs	EAN-13, CODE39, ITF, CODE128	
Power	Power supply	5VDC+10%-5% or 12-24VDC ± 10%	
	Peak current consumption (64 dots activated)	5.5A (5VDC), 1.8A (24VDC) or 1.1A (12VDC)	
Operating	Life span (at 25°C)	100 millions pulses or more (print ratio=12'5%).	
	Activation pulse resistance	50 Km or more.	
	Abrasion resistance		
Physical	Temperature	Operating: 0 to 50°C Storage: -20 to 70°C, without paper.	
	Overall dimensions (mm)	EPC1200 → 108 x 68 x 90 (W x D x H)	
	Weight (without paper)	EPC1200 → 170g PTR2 → 670g (approx.)	

APPENDIX B – MECHANICAL DIMENSIONS



NOTES:

- All dimensions are in millimetres.
- For better viewing the PCB and the rear cover are not drawn in all views.

Fig. 23. - Mechanical dimensions

APPENDIX C – HOW TO ORDER

EPC1200-X-X-XX

Supply voltage

5: 5VDC

12: 12-24VDC

Interface

nil: Serial RS232 + Parallel IEEE 1284

U: USB

Special version

nil: Standard type

XX: Custom-made type (under agreement only)

EPC1250-XX

Special version

nil: Standard type

XX: Custom-made type (under agreement only)

PTR2-XX

Special version

nil: Standard type

XX: Custom-made type (under agreement only)

AVAILABLE ACCESORIES

PART NUMBER	Description
FAPOS-2	5VDC Power supply enclosed
FA-05EPC	5VDC Power supply open frame
FAPOS-3	24VDC Power supply enclosed
RS-232-6	Serial cable 1,5m
CENTRONICS-7	Parallel cable 1,5m
T58X40X12	Termal paper 58mm

APPENDIX D – CODE128 BAR CODE

In Code128 bar code system, it is possible to represent 128 ASCII characters and 2-digit numerals using one bar code character that is defined by combining one the 103 bar code characters and 3 code sets. Each code set is used for representing the following characters:

D.1 Description of the CODE128 Bar Code

- Code set A: ASCII characters 00H to 5FH
- Code set B: ASCII characters 20H to 7FH
- Code set C: 2-digit numeral characters using one character (100 numerals from 00 to 99)

The following special characters are also available in Code128:

- **SHIFT** characters

In code set A, the character just after SHIFT is processed as a character for code set B. In code set B, the character just after SHIFT is processed as the character for code set A.

SHIFT character cannot be used in code set C.

- Code set selection character (**CODE A**, **CODE B** or **CODE C**)

This character switches the following code set to code set A, B or C.

- Function character (**FNC1**, **FNC2**, **FNC3** or **FNC4**)

The usage of function characters depends on the application software. In code set C, only FNC1 is available.

D.2 Printable characters in CODE SET A

Character	Transmit Data		Character	Transmit Data		Character	Transmit Data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
NUL	00	0	(	28	40	P	50	80
SOH	01	1	)	29	41	Q	51	81
STX	02	2	*	2A	42	R	52	82
ETX	03	3	+	2B	43	S	53	83
EOT	04	4	,	2C	44	T	54	84
ENQ	05	5	-	2D	45	U	55	85
ACK	06	6	.	2E	46	V	56	86
BEL	07	7	/	2F	47	W	57	87
BS	08	8	0	30	48	X	58	88
HT	09	9	1	31	49	Y	59	89
LF	0A	10	2	32	50	Z	5A	90
VT	0B	11	3	33	51	[	5B	91
FF	0C	12	4	34	52	\	5C	92
CR	0D	13	5	35	53	]	5D	93
SO	0E	14	6	36	54	^	5E	94
SI	0F	15	7	37	55	-	5F	95
DLE	10	16	8	38	56	FNC1	7B,31	123,49
DC1	11	17	9	39	57	FNC2	7B,32	123,50
DC2	12	18	:	3A	58	FNC3	7B,33	123,51
DC3	13	19	;	3B	59	FNC4	7B,34	123,52
DC4	14	20	<	3C	60	SHIFT	7B,53	123,83
NAK	15	21	=	3D	61	CODEB	7B,42	123,66
SYN	16	22	>	3E	62	CODEC	7B,43	123,67
ETB	17	23	?	3F	63			
CAN	18	24	@	40	64			
EM	19	25	A	41	65			
SUB	1A	26	B	42	66			
ESC	1B	27	C	43	67			
FS	1C	28	D	44	68			
GS	1D	29	E	45	69			
RS	1E	30	F	46	70			
US	1F	31	G	47	71			
SP	20	32	H	48	72			
!	21	33	I	49	73			
"	22	34	J	4A	74			
#	23	35	K	4B	75			
\$	24	36	L	4C	76			
%	25	37	M	4D	77			
&	26	38	N	4E	78			
`	27	39	O	4F	79			

D.3 Printable characters in CODE SET B

Character	Transmit Data		Character	Transmit Data		Character	Transmit Data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
SP	20	32	H	48	72	P	70	112
!	21	33	I	49	73	Q	71	113
"	22	34	J	4A	74	R	72	114
#	23	35	K	4B	75	S	73	115
\$	24	36	L	4C	76	T	74	116
%	25	37	M	4D	77	U	75	117
&	26	38	N	4E	78	V	76	118
'	27	39	O	4F	79	W	77	119
(	28	40	P	50	80	X	78	120
)	29	41	Q	51	81	Y	79	121
*	2A	42	R	52	82	Z	7A	122
+	2B	43	S	53	83	{	7B,7B	123,123
,	2C	44	T	54	84	|	7C	124
-	2D	45	U	55	85	}	7D	125
.	2E	46	V	56	86	-	7E	126
/	2F	47	W	57	87	DEL	7F	127
0	30	48	X	58	88	FNC1	7B,31	123,49
1	31	49	Y	59	89	FNC2	7B,32	123,50
2	32	50	Z	5A	90	FNC3	7B,33	123,51
3	33	51	[	5B	91	FNC4	7B,34	123,52
4	34	52	\	5C	92	SHIFT	7B,53	123,83
5	35	53	]	5D	93	CODEA	7B,41	123,65
6	36	54	^	5E	94	CODEC	7B,43	123,67
7	37	55	-	5F	95			
8	38	56	`	60	96			
9	39	57	a	61	97			
:	3A	58	b	62	98			
;	3B	59	c	63	99			
<	3C	60	d	64	100			
=	3D	61	e	65	101			
>	3E	62	f	66	102			
?	3F	63	g	67	103			
@	40	64	h	68	104			
A	41	65	i	69	105			
B	42	66	j	6A	106			
C	43	67	k	6B	107			
D	44	68	l	6C	108			
E	45	69	m	6D	109			
F	46	70	n	6E	110			
G	47	71	o	6F	111			

D.4 Printable characters in CODE SET C

Character	Transmit Data		Character	Transmit Data		Character	Transmit Data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
00	00	0	40	28	40	80	50	80
01	01	1	41	29	41	81	51	81
02	02	2	42	2A	42	82	52	82
03	03	3	43	2B	43	83	53	83
04	04	4	44	2C	44	84	54	84
05	05	5	45	2D	45	85	55	85
06	06	6	46	2E	46	86	56	86
07	07	7	47	2F	47	87	57	87
08	08	8	48	30	48	88	58	88
09	09	9	49	31	49	89	59	89
10	0A	10	50	32	50	90	5A	90
11	0B	11	51	33	51	91	5B	91
12	0C	12	52	34	52	92	5C	92
13	0D	13	53	35	53	93	5D	93
14	0E	14	54	36	54	94	5E	94
15	0F	15	55	37	55	95	5F	95
16	10	16	56	38	56	96	60	96
17	11	17	57	39	57	97	61	97
18	12	18	58	3A	58	98	62	98
19	13	19	59	3B	59	99	63	99
20	14	20	60	3C	60	FNC1	7B,31	123,49
21	15	21	61	3D	61	CODEA	7B,41	123,65
22	16	22	62	3E	62	CODEB	7B,42	123,66
23	17	23	63	3F	63			
24	18	24	64	40	64			
25	19	25	65	41	65			
26	1A	26	66	42	66			
27	1B	27	67	43	67			
28	1C	28	68	44	68			
29	1D	29	69	45	69			
30	1E	30	70	46	70			
31	1F	31	71	47	71			
32	20	32	72	48	72			
33	21	33	73	49	73			
34	22	34	74	4A	74			
35	23	35	75	4B	75			
36	24	36	76	4C	76			
37	25	37	77	4D	77			
38	26	38	78	4E	78			
39	27	39	79	4F	79			

APPENDIX E – INTERNAL CHARACTER TABLES

a) Page 0. PC437: USA, Standard Europe (International Character Set: USA).

HEX	HEX	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
HEX	BIN	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	NUL	DLE	SP	0	@	P	`	p	Ç	É	á	À				
1	0001		XON	!	1	A	Q	a	q								
2	0010			"	2	B	R	b	r								
3	0011		XOFF	#	3	C	S	c	s								
4	0100	ROT		\$	4	D	T	d	t								
5	0101	ENQ		%	5	E	U	e	u								
6	0110			&	6	F	V	f	v								
7	0111			'	7	G	W	g	w								
8	1000	CAN		(	8	H	X	h	x								
9	1001	HT		)	9	I	Y	i	y								
A	1010	LF		*	:	J	Z	j	z								
B	1011		ESC	+	:	K	[	k	{								
C	1100	FF	FS	,	<	L	\	l									
D	1101	CR	GS	-	=	M	]	m									
E	1110			.	>	N	^	n									
F	1111			/	?	O	_	o									

b) Page 17. PC866: Cyrillic.

HEX	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	А	Р	а					
1	0001	Б	С	б					
2	0010	В	Т	в					
3	0011	Г	У	г					
4	0100	Д	Ф	д					
5	0101	Е	Х	е					
6	0110	Ж	Ц	ж					
7	0111	З	Ч	з					
8	1000	И	Ш	и					
9	1001	Й	Щ	й					
A	1010	К	Ъ	к					
B	1011	Л	Ы	л					
C	1100	М	Ь	м					
D	1101	Н	Э	н					
E	1110	О	Ю	о					
F	1111	П	Я	п					

APPENDIX F – TESTING SOFTWARE

The EPC1200 printer is delivered together with a Windows-based, testing program. This program is an easy way to explore the EPC1200's main features.

To install the program, run the **"SETUP.EXE"** file and follow the instructions on the screen.

The program is intended for three purposes:

- PC communication port configuration.
- Printer Status.
- Sample ticket.

These three parts are distinguished in the program main window. And they are explained next.

PC COMMUNICATION PORT CONFIGURATION

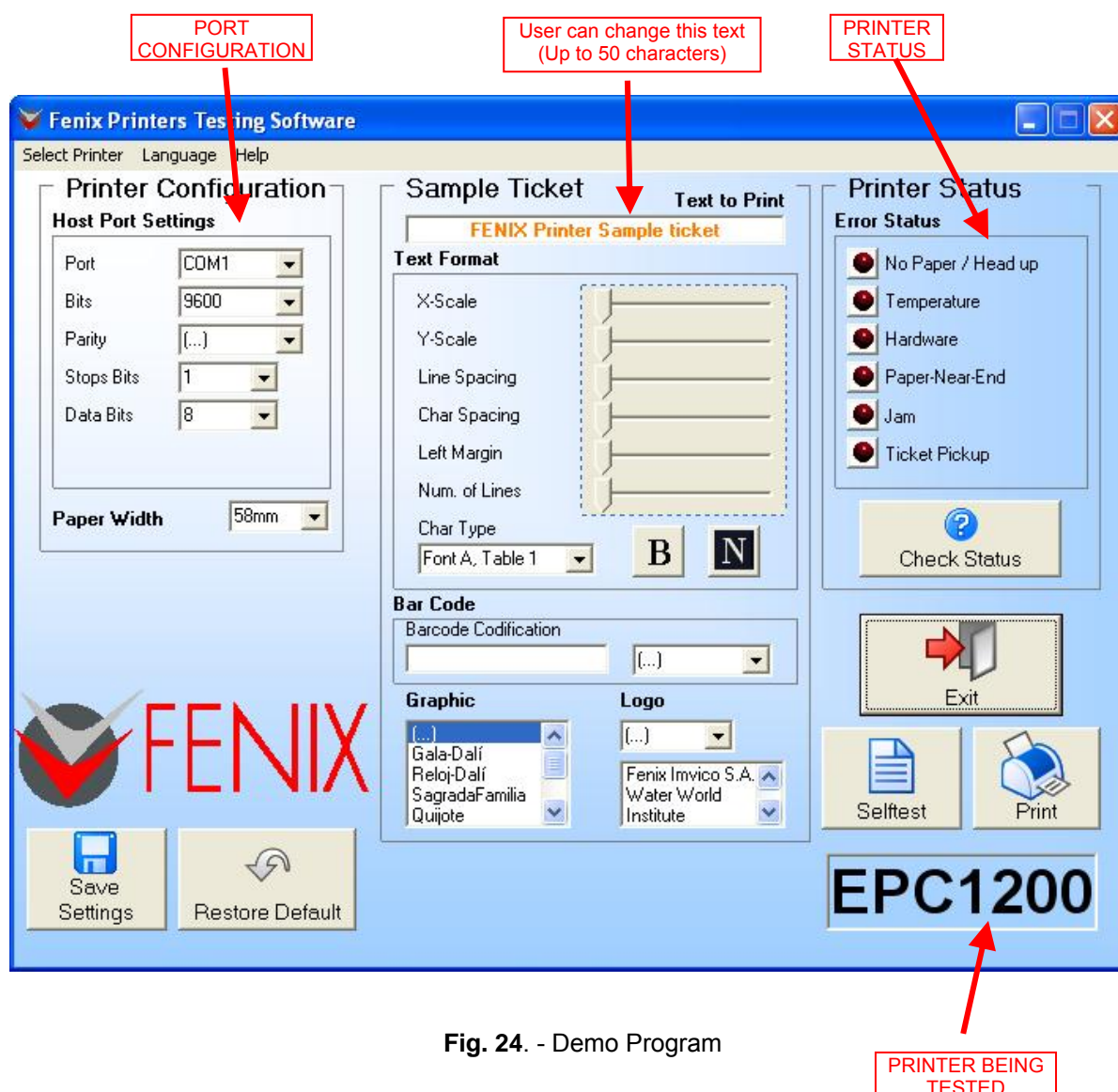


Fig. 24. - Demo Program

There are three main sections which are Printer Configuration, Sample Ticket and Printer Status.

PRINTER CONFIGURATION

In this section we can set all the configuration parameters related to the printer settings as communication setup and paper width.

SAMPLE TICKET

In this section we will define the ticket to be printed.

- **Text to print:** Write here any character string (up to 50 characters) to be printed on the ticket.
- **Character size:** By X-Scale and Y-Scale it is possible to change the width and height of the character (from 1 to 8, 1-Normal, 2-Double, etc.)
- **Line and Char Spacing:** Each unit means an increment of 0.0625 mm of either character or line space.
- **Left Margin:** Each unit means an increment of 0.125 mm of margin of the left hand side.
- **Number of lines:** By setting this the program will repeat the text sample line as many times as specified.
- **Char Type:** Allows you to swap between font sizes A and B and also between the two different character tables.
- **“B” and “N”:** Standing for Bold and Negative.
- **Barcode:** It will print the code written as a barcode of any of the four types supported.
- **Graphic:** It prints the graphic selected.
- **Logo:** It allows loading or erasing a logo into printer memory as well as printing it. When a logo is being load, the graphic options will be disabled.

PRINTER STATUS

When enabling the printer status window, the program tests the printer's sensors and notifies every significant error or printing status. The program tests the printer's status once. In some errors, there may be a little time delay from the moment when the error is produced until the printer notifies it.

BUTTONS

Below is a brief explanation of the buttons supported by the demo program:

- **Save settings Button:** By clicking this button the configuration parameters set will be load into printer memory.
- **Restore Default Button:** This button will restore the default configuration parameters (Port: COM1, Baud Rate: 9600, etc.)
- **Print Button:** Prints a customized ticket according to the properties set.
- **Selftest Button:** Prints a Selftest ticket.
- **Check Status:** Launches the status checking. After a while the status LEDs will light up to show if any problem has been detected.

APPENDIX G – INTERFACE IF1200

In case the Interface IF1200 is sold alone, this appendix shows how it must be installed and connected as well as how buttons LED indicators will work.

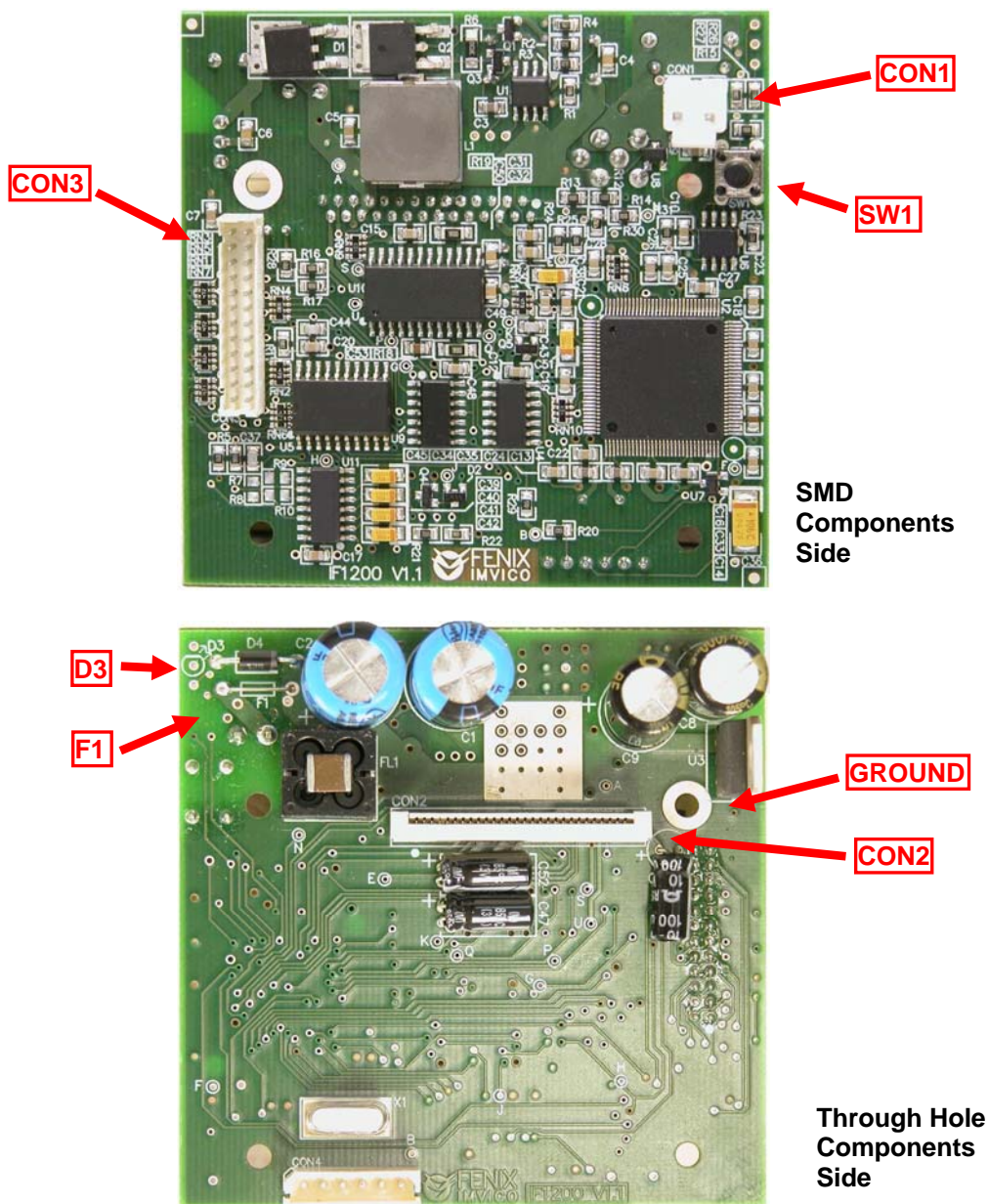
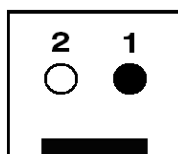


Fig. 25. - IF1200

CON1: Power supply connector. This connector is polarized to protect the interface against inverse voltage. Please read “Notes about power supply” in the 2.2 Power Supply Section before powering the interface.



Terminal nº	Voltage
1	GNDP
2	VCC (5VDC-5%+10% or 12-24VDC±10%)

The power supply male connector must be a:

JST Ref. **VH396-02** (housing)
JST Ref. **VH396T-010** (terminal) or similar.

CON2: Printer mechanism connector. This is to connect the flat cable of the LTPA245B-384 Seiko Printer mechanism.

CON3: Communications connector. Read sections 2.3-*RS232 Serial Interface* and 2.4- *Centronics Parallel Interface* for pin out and specifications. USB versions have the USB connector located in the same position.

GROUND ANCHOR POINT: This point is electrically connected to the main ground of the circuit (and through a filter to GNDP). It can be used to connect to the mechanism ground point to prevent paper from being charged with electrostatic electricity.

F1: Fuse wire, 10A. Apart from the supply connector polarity, the interface has a 10A, 29SWG FUSE WIRE that protects it from inverse voltage as well as from current overload. In case of needing a replacement, same fuse wire should be used, otherwise the interface could get permanently damaged.

SW1: Main switch. This switch is used for feeding paper, interface settings and printing Self-Test. Please read section 3.2- Button Functions for more detailed information.

D3: LED indicator. This is the position where the Tri-color LED indicator should be connected. The polarity is as indicated on the silkscreen.



The output current capability (of each color) is about 10mA.

MECHANICAL DIMENSIONS

The following picture shows the total dimension of the PCB as well as the anchor point locations and the CON1 and SW1 positions from the through hole components side.

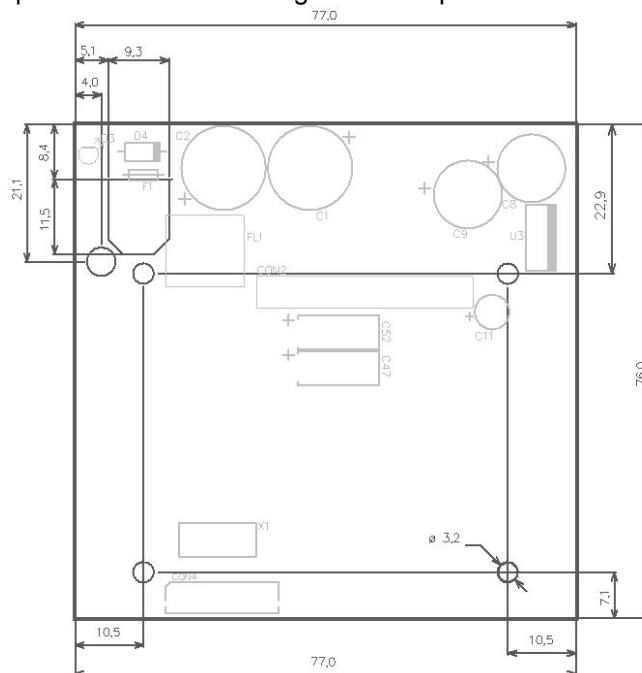


Fig. 26. - IF1200 Mechanical Dimensions

APPENDIX H – PTR2

GENERAL FEATURES

The PTR2 Stand-Alone Printer consists of an enclosed EPC1200 with an arm that allows attaching the device to any vertical or horizontal surface. The enclosure and the arm are made of paint-coated steel that gives the PTR2 toughness and prevents it from corrosion making the printer suitable for a wide range of environments.

Most of the PTR2 printer features have been mentioned in the preceding sections as they are common to the EPC1200 printer family. This appendix just describes the particularities of this printer.

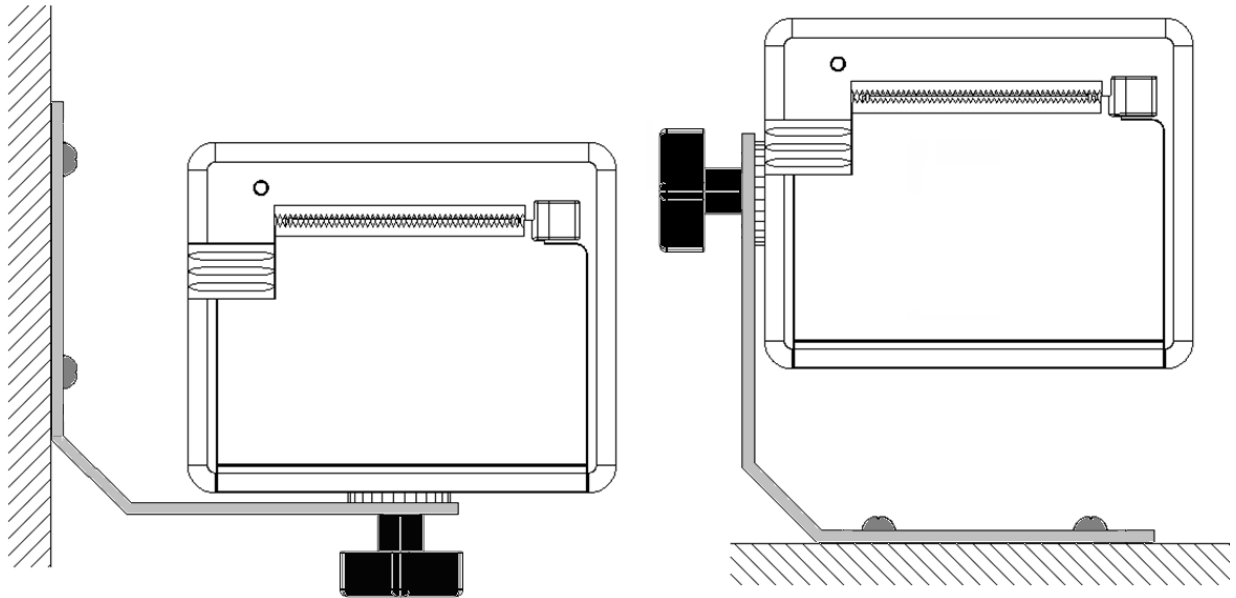


Fig. 27. - PTR2 Fixing Options

The PTR2 incorporates a detaching system that allows the printer to rotate around its fixing point in up to 20 positions and be secured again with no additional tools.

SERIAL PORT CONFIGURATION

Since PTR2 serial connector does not have DTR/DSR line Flow control = NONE must be set when connecting to the printer. The serial communications specs of the PTR2 are:

- | | |
|---------------------------|--|
| • Data transmission type: | Serial |
| • Synchronization: | Asynchronous |
| • Flow control: | None |
| • Signal levels (RS232): | MARK = -3 to -15 V Logic '1'/OFF
SPACE = +3 to +15 V Logic '0'/ON |
| • Speed: | 9600, 19200, 38400, 115200 bps |
| • Data length: | 8 bits |
| • Parity: | none, even, odd |
| • Stop bits: | Fixed to 1 |
| • Connector (user side): | MICRO-CONNECTOR 5 WAY FEMALE |

POWER AND SERIAL CABLE

Attach power supply and serial port cable to connector CON1. Verify power supply voltage before making the connection.

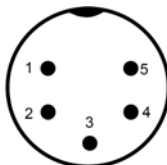


Fig. 28. - Back connector as seen from outside the printer.

Terminal nº	Name	Function
1	VCC	Power: 12-24VDC \pm 10%)
2	TXD	Out → Transmit data
3	SGND	Signal Ground
4	RXD	In ← Receive data
5	PGND	Power ground

MECHANICAL DIMENSIONS

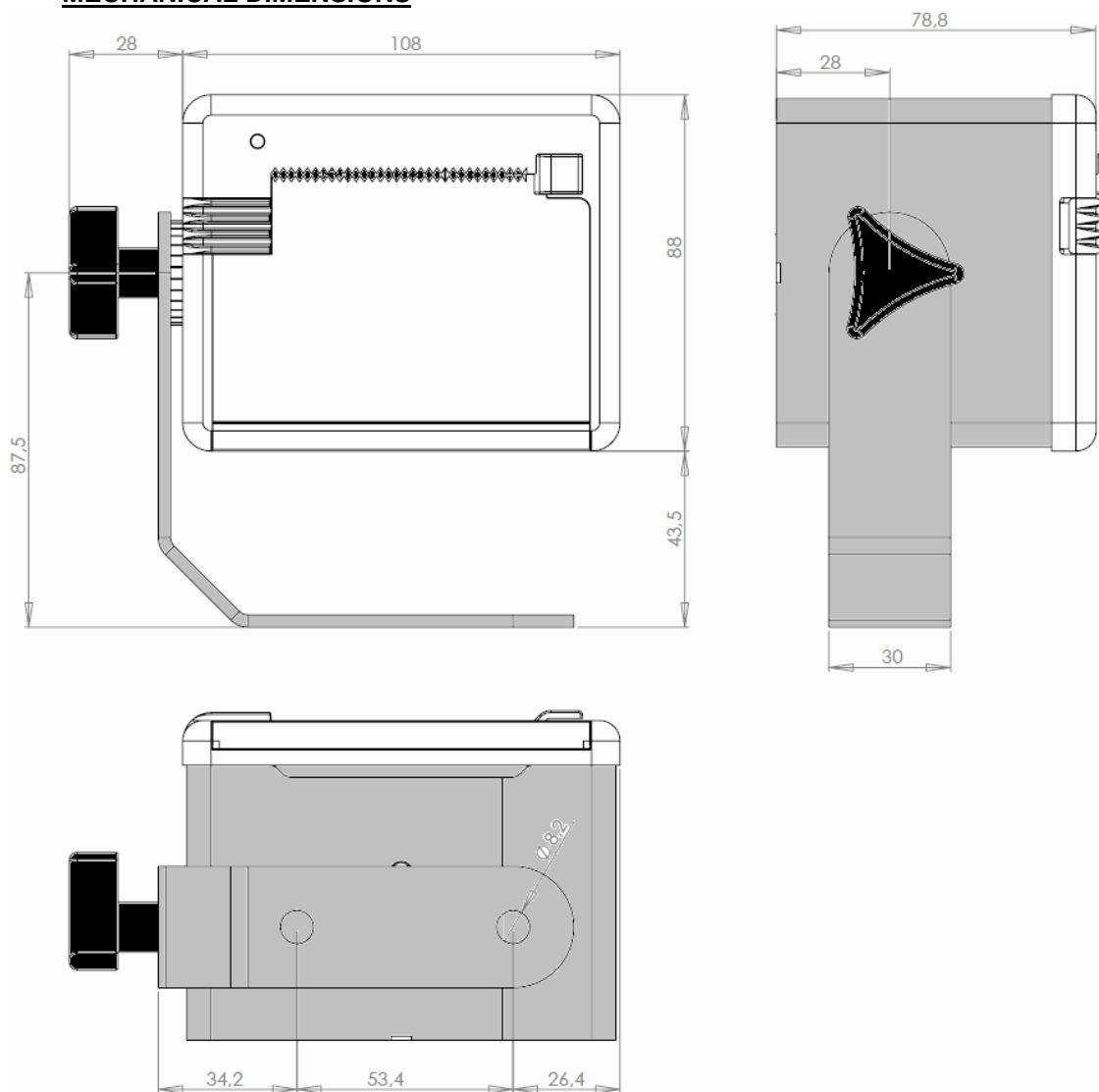


Fig. 29. - PTR2 Mechanical dimensions



c/ Pacífico, 53-55 – 08027 BARCELONA, SPAIN
Phone Num: +34 – 93 353 92 22
Fax Num: +34 – 93 353 97 21
E-mail: bcn@feniximvico.com
<http://www.feniximvico.com>