US Micro Products

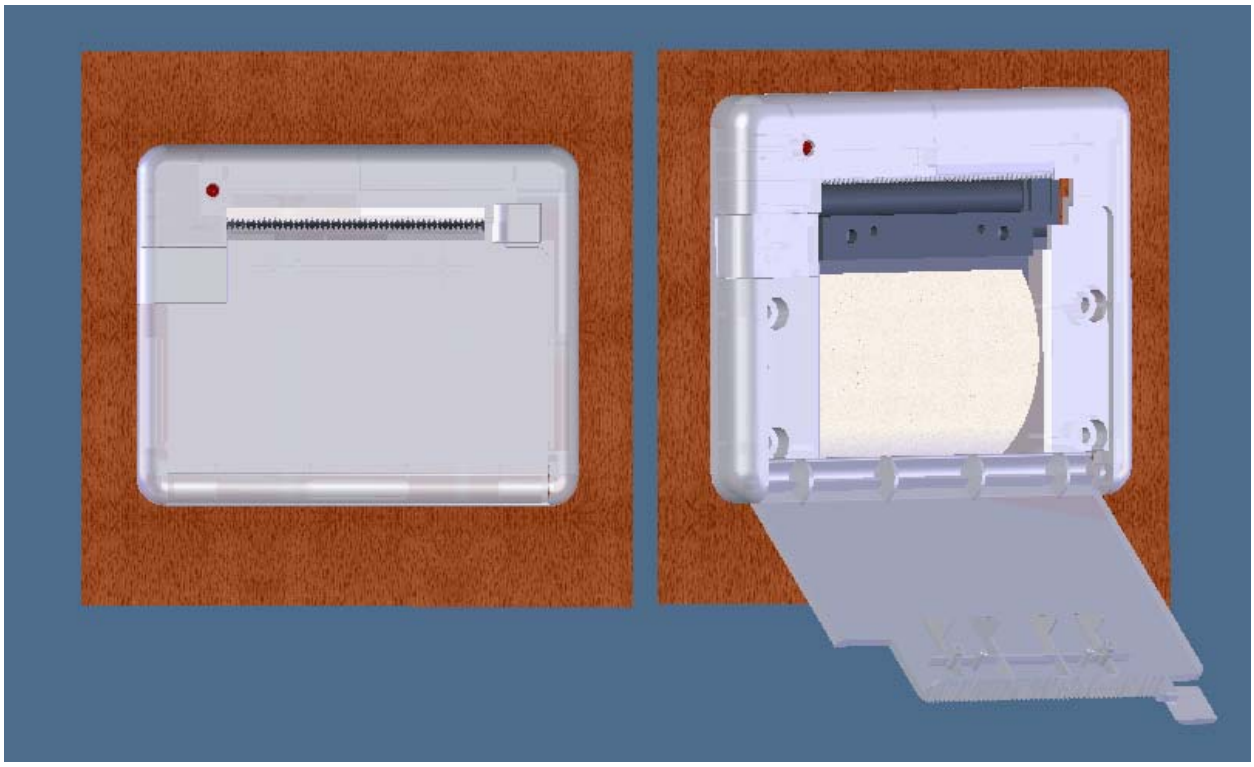
*Electronic Products for the OEM*

# USMP-EPC1200 THERMAL PRINTER

## And IF1200 INTERFACE

Operation manual

October 2007



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| 9 | Modification | 5VDC±10% | 5VDC+10%-5% |
| 18 | Errata | | Removed CENTRONIC connector |
| 50 | New Testing Software | | New Screen shoots |
| 52 | Added Appendix G | | |

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# IMPORTANT NOTES IN EPC1200 THERMAL PRINTER HANDLING

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

## SAFETY PRECAUTONS

- 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 EPC1200 printer.
- **NEVER** disassemble or modify the hardware of the EPC1200 printer.
- **NEVER** try to repair the EPC1200 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 your 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.**

## 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.

US MICRO 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

## 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 bellow limits causing malfunction of the printer, specially on the 5VDC version.

# 0 – INTRODUCTION

The EPC1200 is a high performance thermal panel printer. 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 main features of the EPC1200 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: **5VDC** or **24VDC**, depending on the interface.
- No-paper sensor.
- Up to 45 mm paper roll diameter.
- High speed printing up to **90mm/s**.
- Printing resolution: 8 dots/mm (203 dpi).
- Passive paper cut.
- 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 (*****).
- Hexadecimal mode for easy software debugging.
- Automatic paper load.
- Three maintenance counters (On/Off times, Half hours, Meters)
- Operating temperature range (**0ºC to +50ºC**).
- Storage temperature range (**-20ºC to +70ºC**).
- Self test, hexadecimal mode and configuration mode features.
- **Logo load capability**, through Windows driver.
- Windows 2000 and XP drivers and demo/configuration program.
- Linux Driver.

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

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

# 1 – GENERAL SPECIFICATIONS

## 1.1- Printing specifications

| | |
|---|---|
| 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 | High speed mode: up to 90mm/s (2) |
| Paper feed speed | 90 mm/s (continuous paper feed) |
| Characters per line (by default): | A font: 24<br>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.

## 1.2- 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.

## 1.3- 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 –5ºC to 50ºC → | **TF50KS-E2D** | (59μm paper) |
| | **TF77KS-E2** | (95μm paper) |
| | **TL69KS-HG76** | (label paper) |
| At –30ºC to 70ºC→ | **TL51KS-R2** | (High heat-resistant paper) |
| | **TL69KS-R2** | (High heat-resistant paper) |
| At 5ºC to 40ºC → | **TW80KK-S** | (2-ply thermal paper) |
| | From Nippon Paper Industries | |

## 1.4- Paper loading

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

## 1.5- 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 has an additional **512 Kbytes** memory buffer to fully enjoy the USB fast data sending features.

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.

## 1.6- Electrical specifications

- Power supply voltage: 5VDC+10%-5% or 24VDC±10% depending on the interface chosen.
- Peak current consumption (ambient temperature, 64dots activated): 12A (approx.) for the 5VDC version and 2,5A (approx.) for the 24VDC version

## 1.7- Environmental conditions

Temperature range: Working temperature: 0º to 50ºC
Storage temperature: -25º to 70ºC with no paper loaded, in a dry place.

# 2 – INSTALLATION

## 2.1- EPC1200 INSTALLATION CONSIDERATIONS

There are some general considerations to take into account when installing the EPC1200 printer.

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
- Smooth exit of the ticket. Prevent problems with static electricity due to the nature of the used materials. Be sure to make a good earth connection.

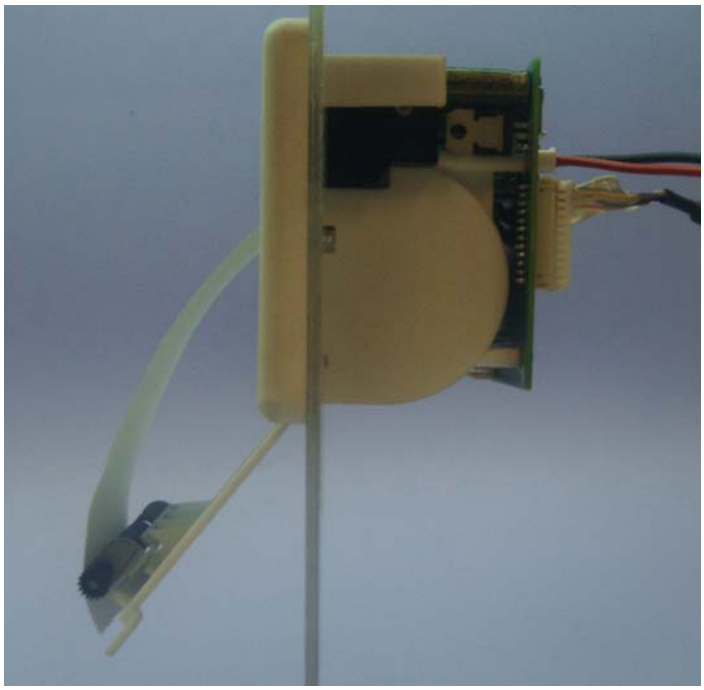


**Fig. 2.-** EPC1200 accessibility

This printer has been designed to ease the installation process and maintenance to the maximum. 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 has to be screwed from outside. To do so cut a window with the dimensions indicated on the figure and drill four holes.

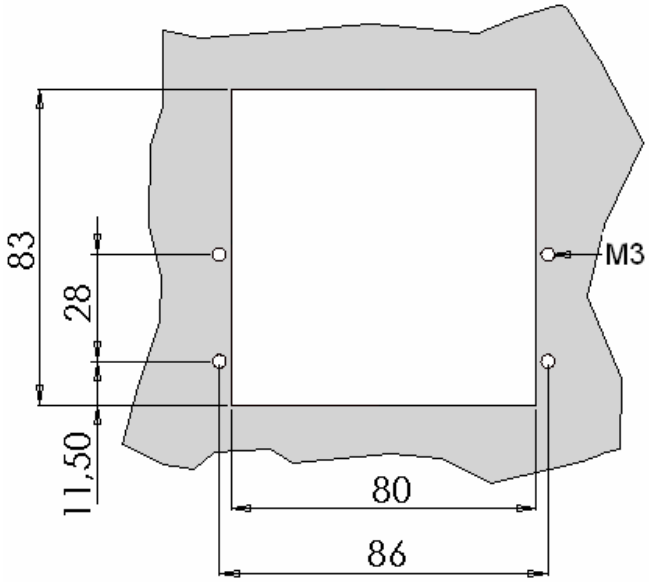



**Fig. 3.-** Fixing holes and window to be cut on the mounting wall

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 an EPC1200 embedded into a CPU

## 2.2- 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 24VDC) |

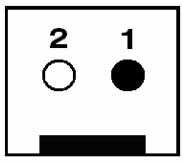



**Fig. 5.**- Power supply connector CON1.

The power supply male connector must be a:
JST Ref. **VH396-02** (housing)
**VH396T-010** (contact) or an equivalent model.

**NOTES:**

(1) If the number of dots that are energized at the same time is increased, a higher current will flow; therefore, the user should use a power supply with an adequate current capability.
(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 irremediably 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. As it can be observed, the peak current required when printing a horizontal line of about 90% density is close to 12.5A.

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 less voltage will have in the input, especially during the high peak currents.

USMP offers four different power supplies as an accessory option (See APPENDIX C – HOW TO ORDER). These power supplies which have been exhaustively tested are rated at 40W (5VDC) or 60W (24VDC) and are available in OPEN FRAME or ENCLOSED version.

**Fig. 6.**- USMP supplied 5VDC power modules.

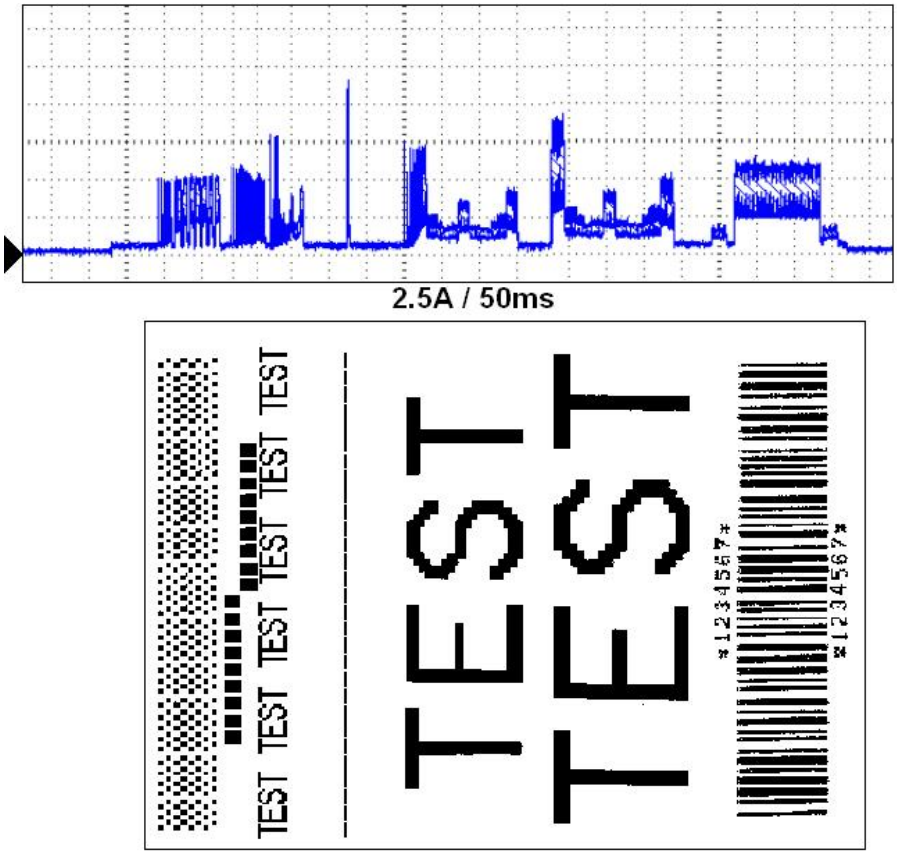



**Fig. 7.-** Current consumption example

## 2.3- RS-232 SERIAL INTERFACE

### 2.3.1- RS-232 Serial interface specifications

- Data transmission type: Serial
- Synchronization: Asynchronous
- Flow control: DTR/DSR control
- 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-18VS** (housing)
  **SPHD-001T-P0.5** (contact) or an equivalent model.

**NOTE:** Speed and parity depend on the settings (refer to section 3.6.2).

### 2.3.2- 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.

### 2.3.3- 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.

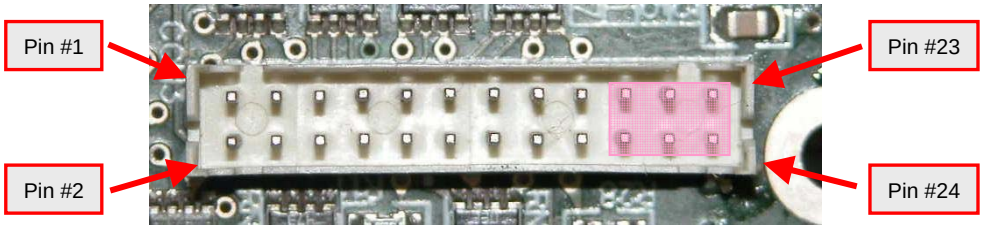



**Fig. 8.**- Serial RS-232 interface pins

### 2.3.4- PC serial interface connection

Communications cable Ref. RS-232-6

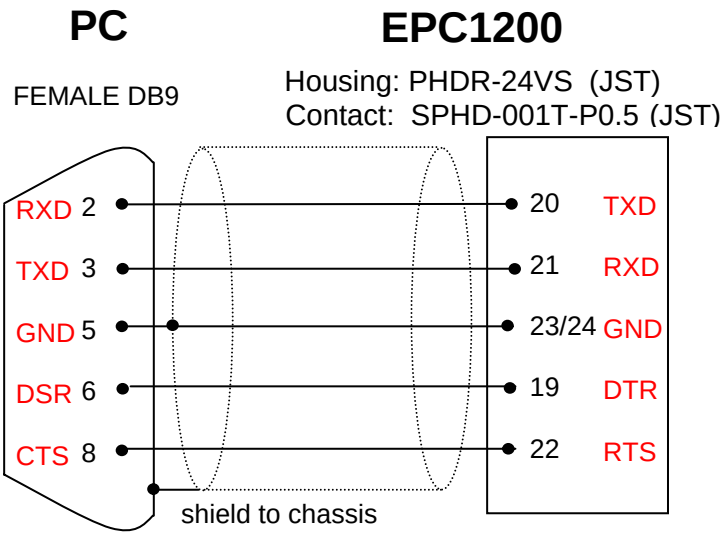



**Fig. 9.**- PC serial cable

**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.

## 2.4- CENTRONICS PARALLEL INTERFACE

The EPC1200 comply the IEE1284 protocol (**NIBBLE MODE**).


### 2.4.1- Compatibility mode (Data transmission from host system to the 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-18VS** (housing)
  **SPHD-001T-P0.5** (contact) 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

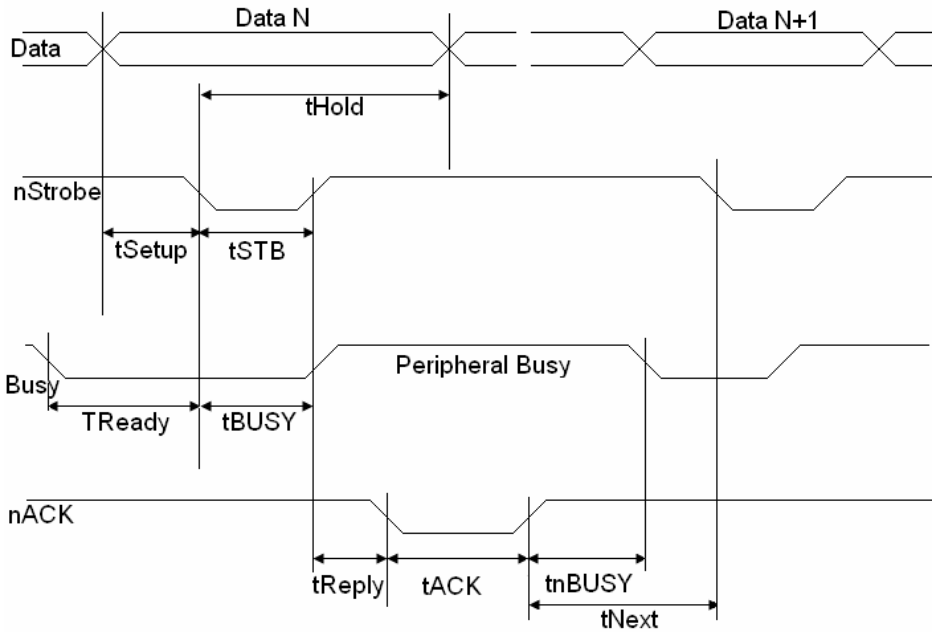



**Fig. 10.**- Timing diagram of data reception

| 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 | 10μs |
| BUSY release time | tnBUSY | 0 | ∞ |
| ACK cycle idle time | tNext | 0 | -- |

**Table 2.**- Timing of parallel communication protocol

### 2.4.2- 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**).

### 2.4.3- 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).

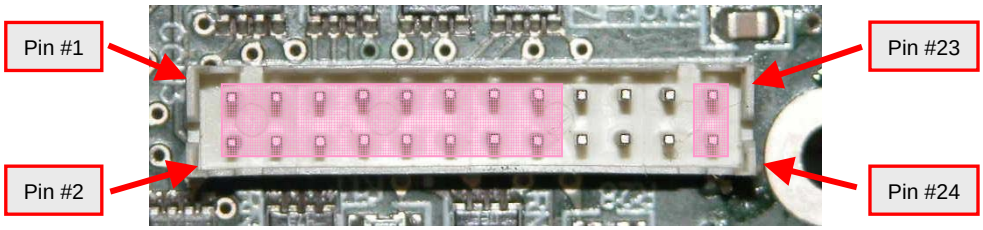



**Fig. 11.**- Parallel interface pins

### 2.4.4- PC parallel interface connection

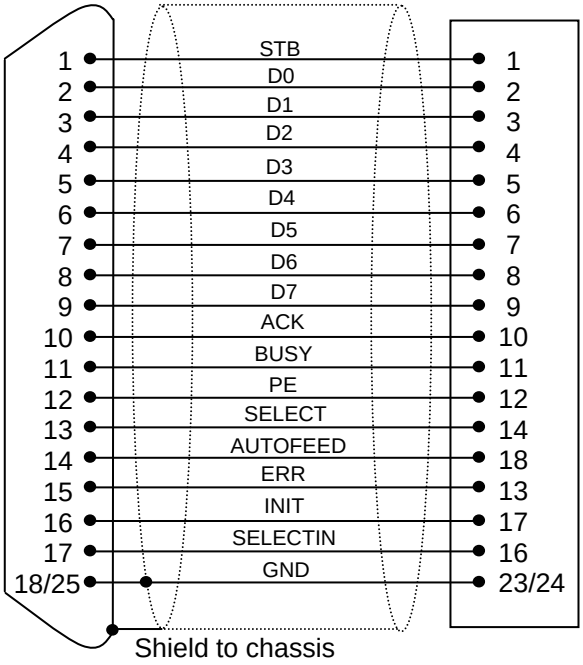
Communications cable Ref. CENTRONICS-7

PC EPC1200

Housing**:** PHDR-24VS (JST)

Contact: SPHD-001T-P0.5 (JST)

MALE DB25



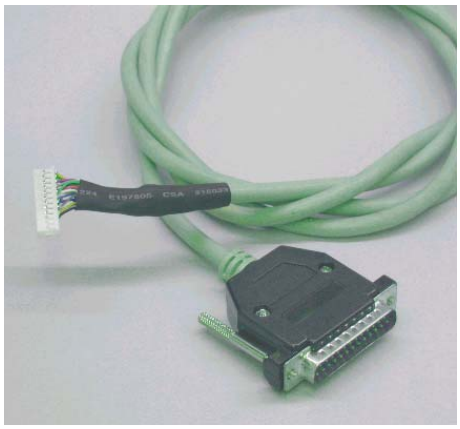



**Fig. 12.-** PC parallel cable

**NOTES:**

1) Same configuration in the printer and in the host system should be set.
2) The 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).

## 2.5- 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.

### 2.5.1- Assignments of USB connector terminals USB

| Pin | Signal name |
|---|---|
| 1 | Vbus |
| 2 | D – |
| 3 | D+ |
| 4 | GND |

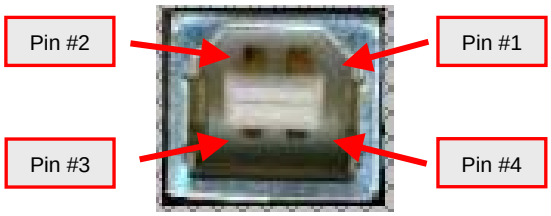



**Fig. 13.-** EPC1200 USB connector.

Standard "B" series USB connector has to be used.

# 3 – BASIC OPERATIONS

## 3.1- 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:

a) Open the printer's front lid by pressing the cover open button.
b) Insert the paper roll with the orientation shown in the picture, leaving some 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.**

c) Close the cover until feeling the roller is latched again.

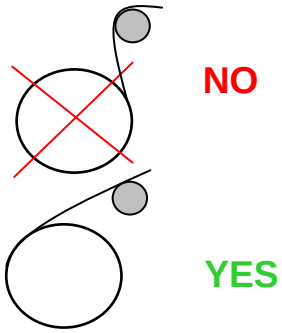



**Fig. 14**.- Paper orientation

## 3.2- 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 release for 5 sec. -> Means No

## 3.3- 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.

### 3.4- 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).**

### 3.5- 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***).

### 3.6- 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.

#### 3.6.1- 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.

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.


**Fig. 15.-** SELF-TEST mode example

### 3.6.2- 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 de 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: 4800, 9600, 19200 or 38400 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.

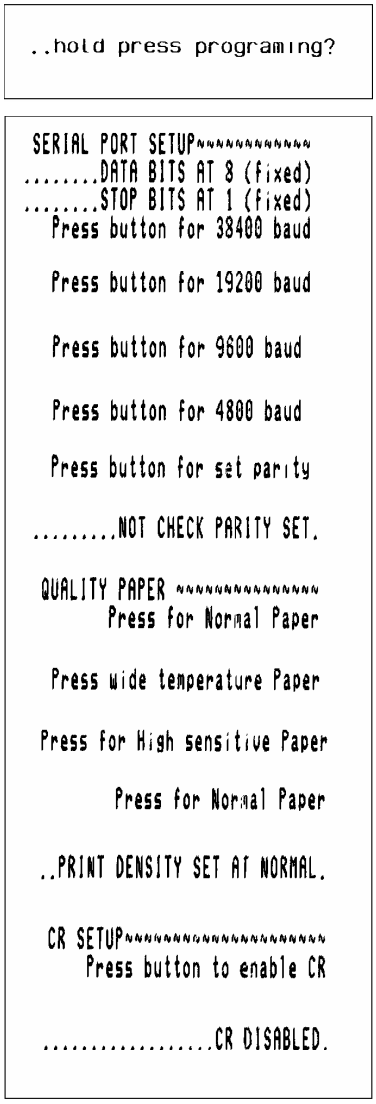
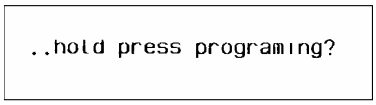


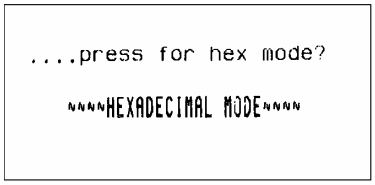

**Fig. 16.-** PROGRAMMING MODE example

### 3.6.3- 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.

**Fig. 17.-** HEXADECIMAL DUMP mode example

## 3.7- ERROR PROCESSING

### 3.7.1- Error types

When an error happens, the printer visually notifies the error type through the LED located next to the buttons. 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.

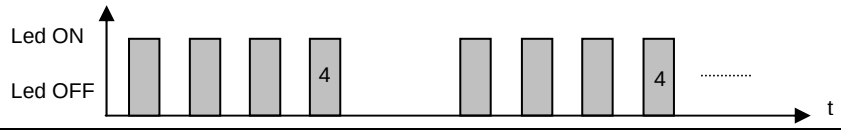
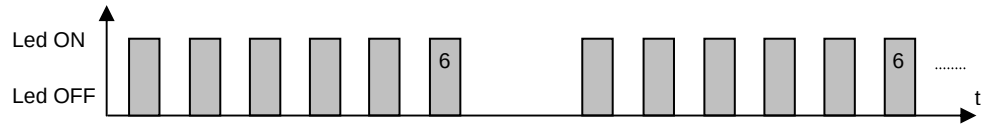
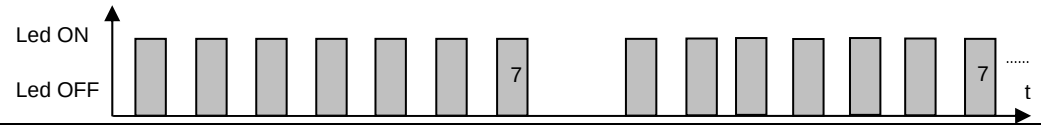
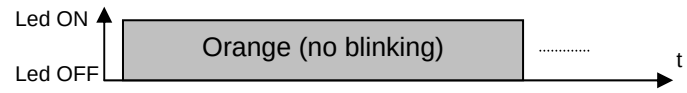
| ERROR | Sequence (RED BLINKING) (a = 0,5 seconds , b = 2 seconds.) |
|---|---|
| HARDWARE |   |
| VOLTAGE ERROR |   |
| TEMPERATURE |   |
| NO PAPER / DOOR OPEN |   |

**Fig. 18.-** LED Blinking sequence (RED)

More information on these errors can be found below:

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 80ºC), 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 60ºC 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 de 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. *Paper loading).*

[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***).

### 3.7.2- Printer operation when an error happens

When the printer detects an error, it executes the following operations:

- It stops all printing operations.
- The red led blinks or orange permanently lights.

### 3.7.3- 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.

### 3.7.4- Flow diagram of the error detection for the serial port

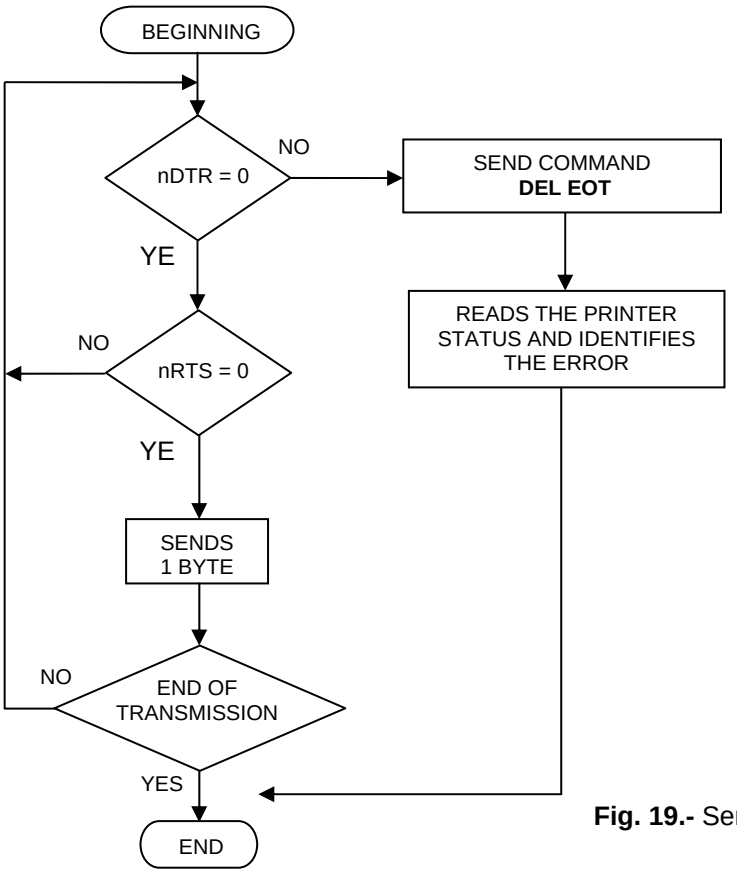



**Fig. 19.-** Serial port error flow diagram

### 3.7.5- Flow diagram of the error detection for the parallel port

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

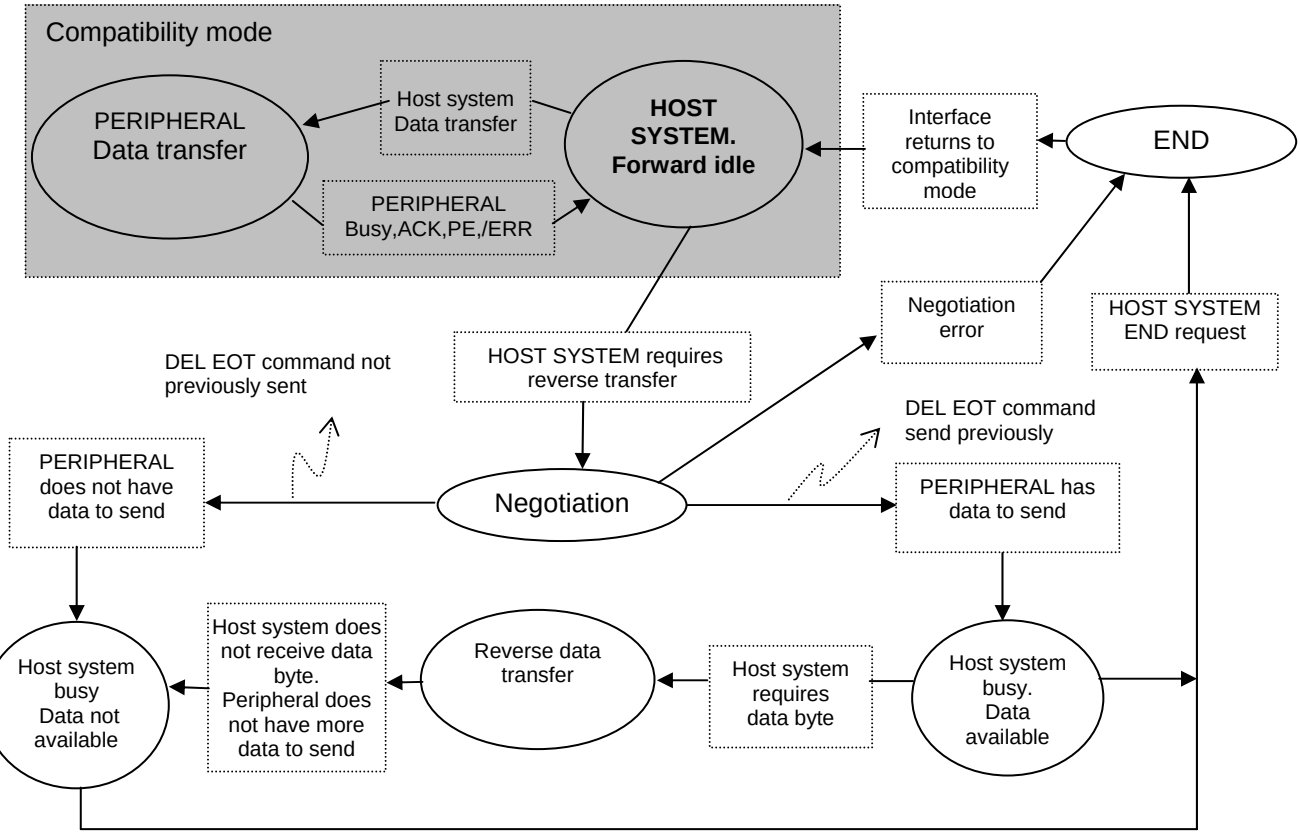



**Fig. 20.-** Nibble mode phase transitions

**NOTES:**

(1) The circles represent the IEEE1284 phases.
(2) This diagram can not 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.

# 4 – CONTROL COMMANDS

## 4.1- COMMAND NOTATION

| | |
|---|---|
| [Name] | The command name. |
| [Format] | The 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. |

## 4.2- 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.

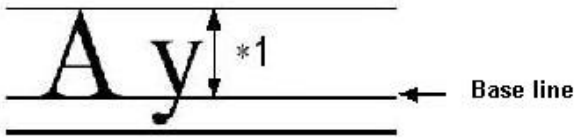
3) Printable area. It is the maximum range in which the printing is possible under the printer specifications. The printable area for this printer is 48mm in the horizontal direction by the total printable length.

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.

## 4.3- 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 | 30 |
| **ESC SP** | Set right-side character spacing | | X | 30 |
| **ESC – n** | Turn underline mode on/off | | X | 30 |
| **ESC !** | Select print mode(s) | | X | 31 |
| **ESC 2** | Select default line spacing | | X | 31 |
| **ESC 3** | Set line spacing | | X | 31 |
| **ESC @** | Initialize printer | X | X | 32 |
| **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 | | 33 |
| **ESC M** | Select character font | | X | 33 |
| **ESC a** | Select justification | X | | 33 |
| **ESC c 3** | Select paper sensor to output PE signal | | 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 L** | Set left margin | | X | 36 |
| **GS T** | Set print position to the beginning of print line | X | | 36 |
| **GS f** | Select font for HRI characters | | X | 36 |
| **GS H** | Select printing position of HRI characters | | X | 37 |
| **GS h** | Set bar code height | | X | 37 |
| **GS k** | Print bar code | X | | 37 |
| **GS w** | Set bar code width | | X | 39 |
| **GS v 0** | Print raster bit image | X | | 39 |
| **FS p** | Print NV bit image | X | | 40 |
| **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]

- 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 *n*
Hex 10 04 *n*
Decimal 16 04 *n*
[Range] <01>H ≤ *n* ≤<04>H
[Description] Transmits the selected printer status specified by *n* in real-time, according to the following parameters:
*n* = <01>H: Transmit printer status
*n* = <02>H: Transmit offline status
*n* = <03>H: Transmit error status
*n* = <04>H: Continuous paper sensor status
*n* = <05>H: Paper sensor status
[Notes]

- The status is transmitted whenever the data sequence <10>H<04>H<n> (<01>H ≤ *n* ≤<05>H) 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.
- If a not recovery error occurred, the bit 2 in the Printer Status (*n*=1) will be indeterminate.

*n* = <01>H: **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 | Does not wait for online error recovery |
| | ON | Waits for online error recovery |
| 6 | - | Undefined |
| 7 | OFF | Not used. Fixed to OFF |

*n* = <02>H: **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 | No paper-end stop |
| | ON | Printing is being stopped |
| 6 | OFF | No error |
| | ON | Error occurred |
| 7 | OFF | Not used. Fixed to OFF |

*n* = <03>H: **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 | x | Not used. |
| 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* = <04>H: **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 |
| | | Paper real-end sensor: Paper not present |
| 7 | OFF | Not used. Fixed to OFF |

n = <05>H: **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 | Ticket not pick up |
| | ON | Ticket pick up |
| 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* = <00>H, *n* = <11>H

[Description] Selects page *n* from the character code table.

| ***n*** | **Page** |
|---|---|
| 0 | PC437 (U.S.A., standard Europe) |
| 17 | PC866 (Cyrillic) |

[Default] *n* = 0

[Reference] **APPENDIX E**

**ESC SP *n***

[Name] Set right-side character spacing

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | SP | *n* |
| Hex | 1B | 20 | *n* |
| Decimal | 27 | 32 | *n* |

[Range] <00>H ≤*n*≤ <FF>H

[Description] Sets the character spacing for the right side of the character to [*n x* 0.125 mm (*n x* 0.0049")].

[Notes]

- The right side character spacing for double-width mode is twice the normal value. When characters are enlarged, the right-side character spacing is *n* times normal value.
- **This command is effective only when sent at the beginning of a line.**

[Default] *n* = <04>H

[Reference] **APPENDIX A**

**ESC - n**

[Name] Turn underline mode on/off

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | - | *n* |
| Hex | 1B | 2D | *n* |
| Decimal | 27 | 45 | *n* |

[Range] $0 \le n \le 2, 48 \le n \le 50$

[Description] Turns underline mode on or off, based on the following values of *n*:

| ***n*** | **Function** |
|---|---|
| 0, 48 | Turns off underline mode |
| 1, 49 | Turns on underline mode (1-dot thick) |
| 2,50 | Turns on underline mode (2-dots thick) |

[Description] Turns underline mode on or off, based on the following values of *n*:

[Notes]

- The printer can underline all characters (including right-side character spacing), but cannot underline the space set by Horizontal tab.
- When underline mode is turned off by setting the value of n 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 ! *n*
Hex 1B 21 *n*
Decimal 27 33 *n*
[Range] <00>H ≤ *n* ≤ <FF>H, 0 ≤ *n* ≤255 decimal
[Description] Selects print mode(s) using *n* 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* = <00>H
[Reference] **ESC M, ESC - n, GS !, APPENDIX A**

**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] <00>H ≤ *n* ≤ <FF>H
[Description] Sets the line spacing to *[n* x 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 *n*
Hex 1B 45 *n*
Decimal 27 69 *n*
[Range] $0 \le n \le 255$
[Description] Turns emphasized mode on or off
When the LSB of *n* is 0, emphasized mode is turned off.
When the LSB of *n* is 1, emphasized mode is turned on.
[Notes] Only the least significant bit of *n* 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] *n* = 0
[Reference] **ESC !, ESC G**

**ESC G *n***

[Name] Turn on/off double-strike mode
[Format] ASCII ESC G *n*
Hex 1B 47 *n*
Decimal 27 71 *n*
[Range] $0 \le n \le 255$
[Description] Turns double-strike mode on or off.
When the LSB of *n* is 0, double-strike mode is turned off.
When the LSB of *n* is 1, double-strike mode is turned on.
[Notes] Only the lowest bit of *n* is enabled.
- Printer output is the same in double-strike mode and in emphasized mode.

[Default] *n* = 0
[Reference] **ESC E**

**GS B *n***

[Name] Turn white/black reverse printing mode
[Format] ASCII GS B *n*
Hex 1D 42 *n*
Decimal 29 66 *n*
[Range] $0 \le n \le 255$
[Description] Turns on or off white/black reverse printing mode.
When the LSB of *n i*s 0, white/black reverse mode is turned off.
When the LSB of *n* is 1, white/black reverse mode is turned on.
[Notes]
- Only the lowest bit of *n* is valid.
- When white/black reverse printing mode is on, it also applied to character spacing set by **ESC SP**.
- This command does not affect bit image, user-defined bit image, bar code and HRI characters.
- This command does not affect the space between lines.
- 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] *n* = 0

**ESC J *n***

[Name] Print and feed paper

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | J | *n* |
| Hex | 1B | 4A | *n* |
| Decimal | 27 | 74 | *n* |

[Range] <00>H ≤ *n* ≤ <FF>H

[Description] Prints the data in the print buffer and feeds the paper [*n* x 0.125 mm (0.0049")].

[Notes]

- After printing is completed, this command sets the print starting position to the beginning of the line.
- The paper feed amount set by this command does not affect the values set by **ESC 2** or **ESC 3**.
- The printer uses the vertical motion unit *(*y).

**ESC M *n***

[Name] Select character font

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | M | *n* |
| Hex | 1B | 4D | *n* |
| Decimal | 27 | 77 | *n* |

[Range] *n* = <00>H, <01>H

[Description] Selects the character font.

| ***n*** | **Function** |
|---|---|
| <00>H | Character Font A (12 x 24) selected |
| <01>H | 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**

**ESC a *n***

[Name] Select justification

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | a | *n* |
| Hex | 1B | 61 | *n* |
| Decimal | 27 | 97 | *n* |

[Range] <0>ASCII ≤ ***n*** ≤ <2> ASCII, <48>D ≤ ***n*** ≤ <50>D

[Description] Aligns all the data in one line to the specified position
*n* selects the justification as follows:

| ***n (ASCII)*** | ***n (Decimal)*** | **Justification** |
|---|---|---|
| 0 | 48 | Left justification |
| 1 | 49 | Centering |
| 2 | 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

```
ABC
ABCD
ABCDE
```

Centering

```
  ABC
 ABCD
ABCDE
```

Right justification

```
  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 | *n* |
| Hex | 1B | 63 | 33 | *n* |
| Decimal | 27 | 99 | 51 | *n* |

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

[Description] Selects the paper sensor(s) to output paper end signals.
Each bit of *n* is used as follows:

| Bit | OFF / ON | Hex | Function |
|---|---|---|---|
| 0-1 | - | - | Undefined |
| 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 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] $0 \le n \le 255$

[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] <00>H ≤ *n* ≤ <FF>H

[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 x* 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 | ! | *n* |
| Hex | 1D | 21 | *n* |
| Decimal | 29 | 33 | *n* |

[Range] <00> ≤ *n* ≤ <FF>H (1 ≤ vertical number of times ≤ 8, 1 ≤ horizontal number of times ≤ 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* = <00>H

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

**GS ( A pL pH n m**

[Name] Execute test print

[Format]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ASCII | GS | ( | A | *pL* | *pH* | *n* | *m* |
| Hex | 1D | 28 | 41 | *pL* | *pH* | *n* | *m* |
| Decimal | 29 | 40 | 65 | *pL* | *pH* | *n* | *m* |

[Range] (*pL* + (*pH* x 256)) = 2 (where *pL* = <02>H, *pH* = <00>H)
<30>H ≤ *n* ≤ <32>H
<31>H ≤ *m* ≤ <33>H

[Description] Executes a test print with a specified test pattern on a specified paper.

- *pL*, *ph* specifies (*pL*+(*ph*x256)) for the number of the bytes after *ph* (*n* and *m*).
- *n* specifies the paper to be tested.
- *m* specifies a test pattern.

| *n* | **Paper** |
|---|---|
| <30>H<br><31>H<br><32>H | Paper roll |

| *m* | **Test pattern** |
|---|---|
| <31>H | Hexadecimal dump |
| <32>H | Printer status print |
| <33>H | Rolling pattern print |

[Details] 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 L *nL nH***

[Name] Set left margin

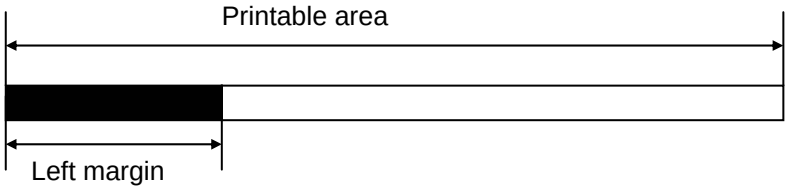
[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | GS | L | *nL* | *nH* |
| Hex | 1D | 4C | *nL* | *nH* |
| Decimal | 29 | 76 | *nL* | *nH* |

[Range] <00>H ≤ *nL* ≤ <FF>H
<00>H ≤ *nH* ≤ <FF>H

[Description] Sets the left margin using *nL* and *n*H.

- The left margin is set to [(*nL* + *nH* x 256) x 0.125 mm].




[Notes]

- This command is effective only when processed at the beginning of the line.
- This command affects text, graphic and bar code printing.

[Default] *nL* = <00>H, *nH* = <00>H

[Reference] **APPENDIX A**

**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* = <00>H or *n* = <01>H

[Description] Sets the print position to the beginning of print line.

- *n* specifies the data processing in the print buffer.

| *N* | **Printing position** |
|---|---|
| <00>H | Sets the print position to the beginning of print line after deleting all data in the print buffer. |
| <01>H | 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* = <00>H or <01>H

[Description] Selects a font for the HRI characters used when printing a bar code.
*n* selects a font from the following table:

| *n* | **Font** |
|---|---|
| <00>H | Font A (12x24) |
| <01>H | Font B (8x16) |

[Notes]

- 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

[Default] *n* = <01>H
[Reference] **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>D
[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] <01>H ≤ *n* ≤ <FF>H
[Description] Selects the height of the bar code.
*n* specifies the bar code height in the vertical direction [*n* x 0.0625 mm (0.0049")].
[Default] *n* = <A0>H (10mm)
[Reference] **GS k**

**GS k *m n d1...dn***

[Name] Print bar code
[Format]

| | | | | | | |
|---|---|---|---|---|---|---|
| ASCII | GS | k | *m* | *n* | *d*1...*dn* |
| Hex | 1D | 6B | *m* | *n* | *d*1...*dn* |
| Decimal | 29 | 107 | m | *n* | *d1...dn* |

[Range] m= <43>H, m = <45>H, m= <46>H or m= <49>H
*(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** |
|---|---|---|---|
| <43>H | EAN13 | *n* = <0C>H | <30>H ≤ *d* ≤ <39>H |
| <45>H | CODE39 | <01>H ≤ *n* ≤ <FF>H | <30>H ≤ *d* ≤ <39>H, <41>H ≤ *d* ≤ <5A>H, <20>H, <24>H, <25>H, <2B>H, <2D>H, <2E>H, <2F>H |
| <46>H | ITF | <01>H ≤ *n* ≤ <FF>H (even number) | <30>H ≤ *d* ≤ <39>H |
| <49>H | CODE128 | <02>H ≤ *n* ≤ <FF>H | <00>H ≤ *d* ≤ <7F>H |

[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 E – 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] <02>H ≤ *n* ≤ <06>H

[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 |
|---|---|
| <02>H | 0.250 |
| <03>H | 0.375 |
| <04>H | 0.500 |
| <05>H | 0.625 |
| <06>H | 0.750 |

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

[Default] *n* = <03>H

[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] <00>H ≤ *m* ≤ <03>H
<00>H ≤ *xL* ≤ <FF>H
<00>H ≤ *xH* ≤ <FF>H where 1 ≤ *(xL* + *xH* x 256) ≤ 128
<00>H ≤ *yL* ≤ <FF>H
<00>H ≤ *yH* ≤ <08>H where 1 ≤ *(yL* + *yH* x 256) ≤ 4095
<00>H ≤ *d* ≤ <FF>H
*k* = *(xL* + *xH* x 256) x *(yL* + *yH* x 256) *(k* ≠ 0)

[Description] Selects raster bit-image mode. The value of *m* selects the mode, as follows:

| *m* | Mode | Vertical Dot Density | Horizontal Dot Density |
|---|---|---|---|
| <00>H | Normal | 203.2 dpi | 203.2 dpi |
| <01>H | Double-width | 203.2 dpi | 101.6 dpi |
| <02>H | Double-height | 101.6 dpi | 203.2 dpi |
| <03>H | Quadruple | 101.6 dpi | 101.6 dpi |

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

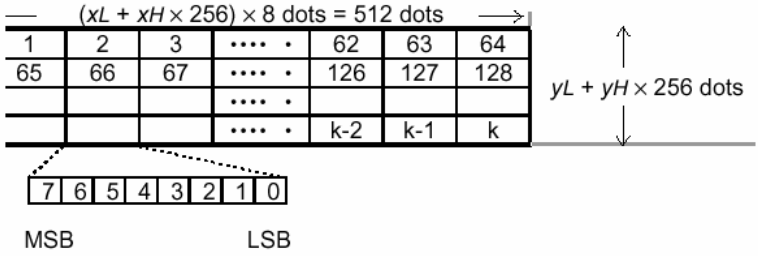
- *x*L, *x*H, select the number of data bytes *(x*L+*xH x* 256) in the horizontal direction for the bit image.

- *y*L, *y*H, select the number of data bits *(y*L+*yH x* 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* x 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

<0>ASCII ≤ ***m*** ≤ <*3*> ASCII, <48>D ≤ ***m*** ≤ <51>D

[Description] Prints a NV bit image *n* using the mode specified by *m*.

| ***m* (ASCII)** | ***m* (Decimal)** | **Mode** | **Vertical Dot Density** | **Horizontal Dot Density** |
|---|---|---|---|---|
| 0 | 48 | Normal | 203.2 dpi | 203.2 dpi |
| 1 | 49 | Double-width | 203.2 dpi | 101.6 dpi |
| 2 | 50 | Double-height | 101.6 dpi | 203.2 dpi |
| 3 | 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* =0, 48H) and in double-height mode (*m* =2, 50H), and it means 2 dots in double-width mode (*m* =1, 49H) and in quadruple mode (*m*=3, 51H).

  1- 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.
  2- 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]1…[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]

$n = 1$

$xL \leq 48$ $xH = 0$ (when $1 \leq (xL + xH \times 256) \leq 48$)

$0 \leq yL \leq 255$ $0 \leq yH \leq 1$ (when $1 \leq (yL + yH \times 256) \leq 288$)

$0 \leq d \leq 255$ $k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$

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.
- yL, yH specifies (yL+ yH × 256) × 8 dots dots in the vertical direction for the NV bit image you are defining.

[Notes] 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.- US MICRO has provided 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 1 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.**

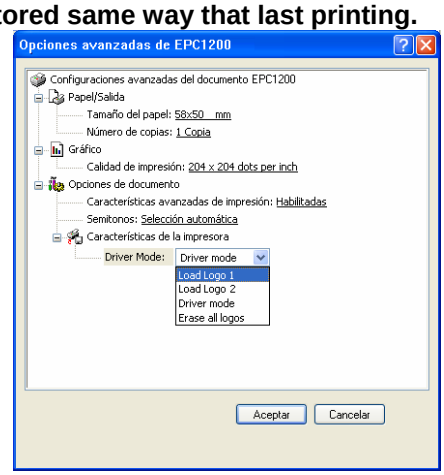
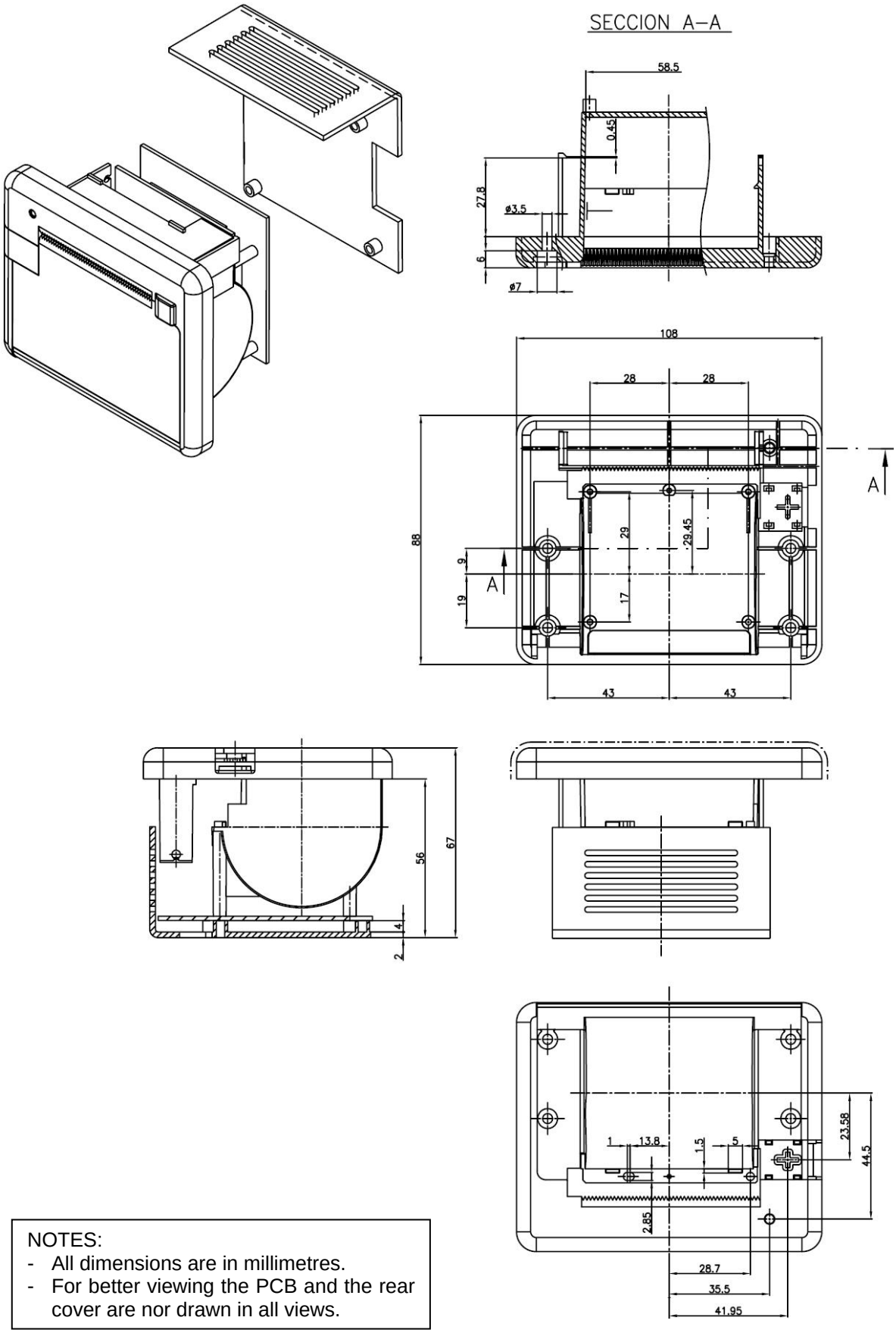



**Fig. 22**.- Logo loading

# APPENDIX A – SPECIFICATIONS

| | | | |
|---|---|---|---|
| ***Printing*** | ***Printing method*** | Thermal line printing | |
| | ***Dot density*** | 203 dpi x 203 dpi; 8 dots x mm<br>(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<br>(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 (continuous paper feed) | |
| ***Character*** | ***Character per line (default)*** | Font A: 42<br>Font B: 56 | |
| | ***Character spacing (default)*** | 0.5 mm (4 dots) | |
| | ***Character structure*** | Font A: 12 x 24 dots (1.5 x 3 mm).<br>Font B: 8 x 16 dots (1 x 2 mm).<br>Font A is the default. | |
| | ***Character size (mm)*** | Font A | Font B |
| | | Standard: 1.5 x 3<br>Double-width: 3 x 3<br>Double-height: 1.5 x 6<br>Double width/height: 3 x 6 | Standard: 1 x 2<br>Double-width: 2 x 2<br>Double-height: 1 x 4<br>Double width/height: 2 x 4 |
| | ***Character number*** | Alphanumeric characters: 95<br>Extended Graphics: 128 per page | |
| | ***Line spacing (default)*** | 0.99 mm | |
| ***Paper*** | ***Paper roll*** | Width: 58 +0/-1mm, (50 m approx.)<br>Maximum outside diameter: 45 mm | |
| | ***Thermal paper type*** | At –5ºC to 50ºC → TF50KS-E2D (59μm paper )<br>TF77KS-E2 (95μm paper)<br>TL69KS-HG76 (label paper)<br>TL51KS-R2 and TL69KS-R2 (high heat-resistant paper)<br>At 5ºC to 40ºC → TW80KK-S (2-ply thermal paper)<br>From Nippon Paper Industries | |
| ***Communications*** | ***Interface (compatible)*** | Serial RS-232C / TTL<br>Parallel IEEE 1284 (Nibble mode) | USB V2.0 Full Speed |
| ***Buffer*** | ***Receive buffer*** | 10 Kbytes | |
| ***Barcode*** | ***Barcode Specs*** | EAN-13, CODE39, ITF, CODE128 | |
| ***Power*** | ***Power supply*** | 5VDC+10%-5% or 24VDC ± 10% | |
| | ***Peak current consumption (64 dots activated)*** | 12A (5VDC) or 2,5A (24VDC) | |
| ***Operating*** | ***Life span (at 25ºC )***<br>***Activation pulse resistance***<br>***Abrasion resistance*** | 100 millions pulses or more (print ratio=12’5%).<br>50 Km or more. | |
| | ***Temperature*** | Operating: 0 to 50ºC<br>Storage: -20 to 70ºC, except for paper. | |
| ***Physical*** | ***Overall dimensions (mm)*** | 108 x 90 x 68 (W x D x H) | |
| | ***Weight (without paper)*** | 250g (approx.) | |

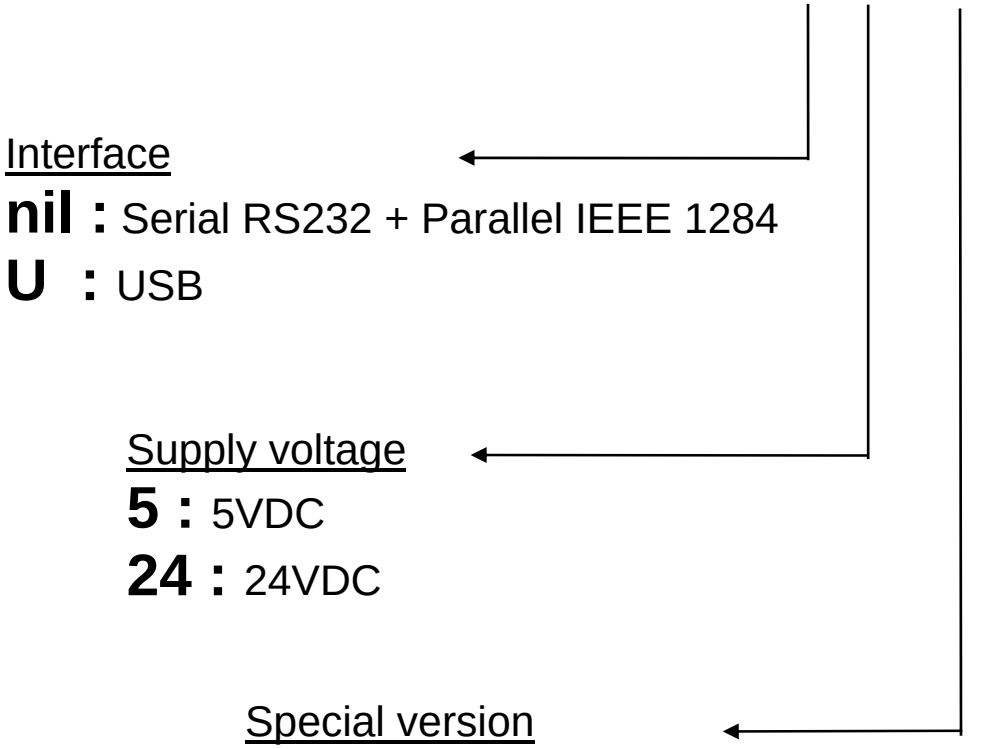
# APPENDIX B – MECHANICAL DIMENSIONS




NOTES:
- All dimensions are in millimetres.
- For better viewing the PCB and the rear cover are nor drawn in all views.

## APPENDIX C – HOW TO ORDER

# USMP-EPC1200-X-X-XX



Interface

**nil :** Serial RS232 + Parallel IEEE 1284

**U :** USB

Supply voltage

**5 :** 5VDC

**24 :** 24VDC

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)** **<u>Page 0</u>**. **PC437:** USA, Standard Europe (International Character Set: USA).

| HEX | BIN | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | NUL 00 | DLE 16 | SP 32 | 0 48 | @ 64 | P 80 | ` 96 | p 112 | Ç 128 | É 144 | á 160 | ▒ 176 | └ 192 | ╨ 208 | α 224 | ≡ 240 |
| 1 | 0001 | 01 | XON 17 | ! 33 | 1 49 | A 65 | Q 81 | a 97 | q 113 | ü 129 | æ 145 | í 161 | ▒ 177 | ┴ 193 | ╤ 209 | ß 225 | ± 241 |
| 2 | 0010 | 02 | 18 | " 34 | 2 50 | B 66 | R 82 | b 98 | r 114 | é 130 | Æ 146 | ó 162 | ▓ 178 | ┬ 194 | ╥ 210 | Γ 226 | ≥ 242 |
| 3 | 0011 | 03 | XOFF 19 | # 35 | 3 51 | C 67 | S 83 | c 99 | s 115 | â 131 | ô 147 | ú 163 | │ 179 | ├ 195 | ╙ 211 | π 227 | ≤ 243 |
| 4 | 0100 | EOT 04 | 20 | $ 36 | 4 52 | D 68 | T 84 | d 100 | t 116 | ä 132 | ö 148 | ñ 164 | ┤ 180 | ─ 196 | ╘ 212 | Σ 228 | ⌠ 244 |
| 5 | 0101 | ENQ 05 | 21 | % 37 | 5 53 | E 69 | U 85 | e 101 | u 117 | à 133 | ò 149 | Ñ 165 | ╡ 181 | ┼ 197 | ╒ 213 | σ 229 | ⌡ 245 |
| 6 | 0110 | 06 | 22 | & 38 | 6 54 | F 70 | V 86 | f 102 | v 118 | å 134 | û 150 | ª 166 | ╢ 182 | ╞ 198 | ╓ 214 | µ 230 | ÷ 246 |
| 7 | 0111 | 07 | 23 | ' 39 | 7 55 | G 71 | W 87 | g 103 | w 119 | ç 135 | ù 151 | º 167 | ╖ 183 | ╟ 199 | ╫ 215 | τ 231 | ≈ 247 |
| 8 | 1000 | 08 | CAN 24 | ( 40 | 8 56 | H 72 | X 88 | h 104 | x 120 | ê 136 | ÿ 152 | ¿ 168 | ╕ 184 | ╚ 200 | ╪ 216 | Φ 232 | ° 248 |
| 9 | 1001 | HT 09 | 25 | ) 41 | 9 57 | I 73 | Y 89 | i 105 | y 121 | ë 137 | Ö 153 | ⌐ 169 | ╣ 185 | ╔ 201 | ┘ 217 | θ 233 | ∙ 249 |
| A | 1010 | LF 10 | 26 | * 42 | : 58 | J 74 | Z 90 | j 106 | z 122 | è 138 | Ü 154 | ¬ 170 | ║ 186 | ╩ 202 | ┌ 218 | Ω 234 | · 250 |
| B | 1011 | 11 | ESC 27 | + 43 | ; 59 | K 75 | [ 91 | k 107 | { 123 | ï 139 | ¢ 155 | ½ 171 | ╗ 187 | ╦ 203 | █ 219 | δ 235 | √ 251 |
| C | 1100 | FF 12 | FS 28 | , 44 | < 60 | L 76 | \ 92 | l 108 | ¦ 124 | î 140 | £ 156 | ¼ 172 | ╝ 188 | ╠ 204 | ▄ 220 | ∞ 236 | n 252 |
| D | 1101 | CR 13 | GS 29 | — 45 | = 61 | M 77 | ] 93 | m 109 | } 125 | ì 141 | ¥ 157 | ¡ 173 | ╜ 189 | ═ 205 | ▌ 221 | ø 237 | ² 253 |
| E | 1110 | 14 | 30 | . 46 | > 62 | N 78 | ^ 94 | n 110 | ~ 126 | Ä 142 | ₧ 158 | « 174 | ╛ 190 | ╬ 206 | ▐ 222 | ∈ 238 | ■ 254 |
| F | 1111 | 15 | 31 | / 47 | ? 63 | O 79 | _ 95 | o 111 | SP 127 | Å 143 | ƒ 159 | » 175 | ┐ 191 | ╧ 207 | ▀ 223 | ∩ 239 | SP 255 |

**b)** **<u>Page 17</u>**. **PC866:** Cyrillic.

| HEX | BIN | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|
| | | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | А 128 | Р 144 | а 160 | ▒ 176 | └ 192 | ╨ 208 | р 224 | Ё 240 |
| 1 | 0001 | Б 129 | С 145 | б 161 | ▓ 177 | ┴ 193 | ╤ 209 | с 225 | ё 241 |
| 2 | 0010 | В 130 | Т 146 | в 162 | █ 178 | ┬ 194 | ╥ 210 | т 226 | Є 242 |
| 3 | 0011 | Г 131 | У 147 | г 163 | │ 179 | ├ 195 | ╙ 211 | у 227 | є 243 |
| 4 | 0100 | Д 132 | Ф 148 | д 164 | ┤ 180 | ─ 196 | ╘ 212 | ф 228 | Ї 244 |
| 5 | 0101 | Е 133 | Х 149 | е 165 | ╡ 181 | ┼ 197 | ╒ 213 | х 229 | ї 245 |
| 6 | 0110 | Ж 134 | Ц 150 | ж 166 | ╢ 182 | ╞ 198 | ╓ 214 | ц 230 | Ў 246 |
| 7 | 0111 | З 135 | Ч 151 | з 167 | ╖ 183 | ╟ 199 | ╫ 215 | ч 231 | ў 247 |
| 8 | 1000 | И 136 | Ш 152 | и 168 | ╕ 184 | ╚ 200 | ╪ 216 | ш 232 | ° 248 |
| 9 | 1001 | Й 137 | Щ 153 | й 169 | ╣ 185 | ╔ 201 | ┘ 217 | щ 233 | ∙ 249 |
| A | 1010 | К 138 | Ъ 154 | к 170 | ║ 186 | ╩ 202 | ┌ 218 | ъ 234 | · 250 |
| B | 1011 | Л 139 | Ы 155 | л 171 | ╗ 187 | ╦ 203 | █ 219 | ы 235 | √ 251 |
| C | 1100 | М 140 | Ь 156 | м 172 | ╝ 188 | ╠ 204 | ▄ 220 | ь 236 | № 252 |
| D | 1101 | Н 141 | Э 157 | н 173 | ╜ 189 | ═ 205 | ▌ 221 | э 237 | ¤ 253 |
| E | 1110 | О 142 | Ю 158 | о 174 | ╛ 190 | ╬ 206 | ▐ 222 | ю 238 | ■ 254 |
| F | 1111 | П 143 | Я 159 | п 175 | ┐ 191 | ╧ 207 | ▀ 223 | я 239 | SP 255 |

# 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.

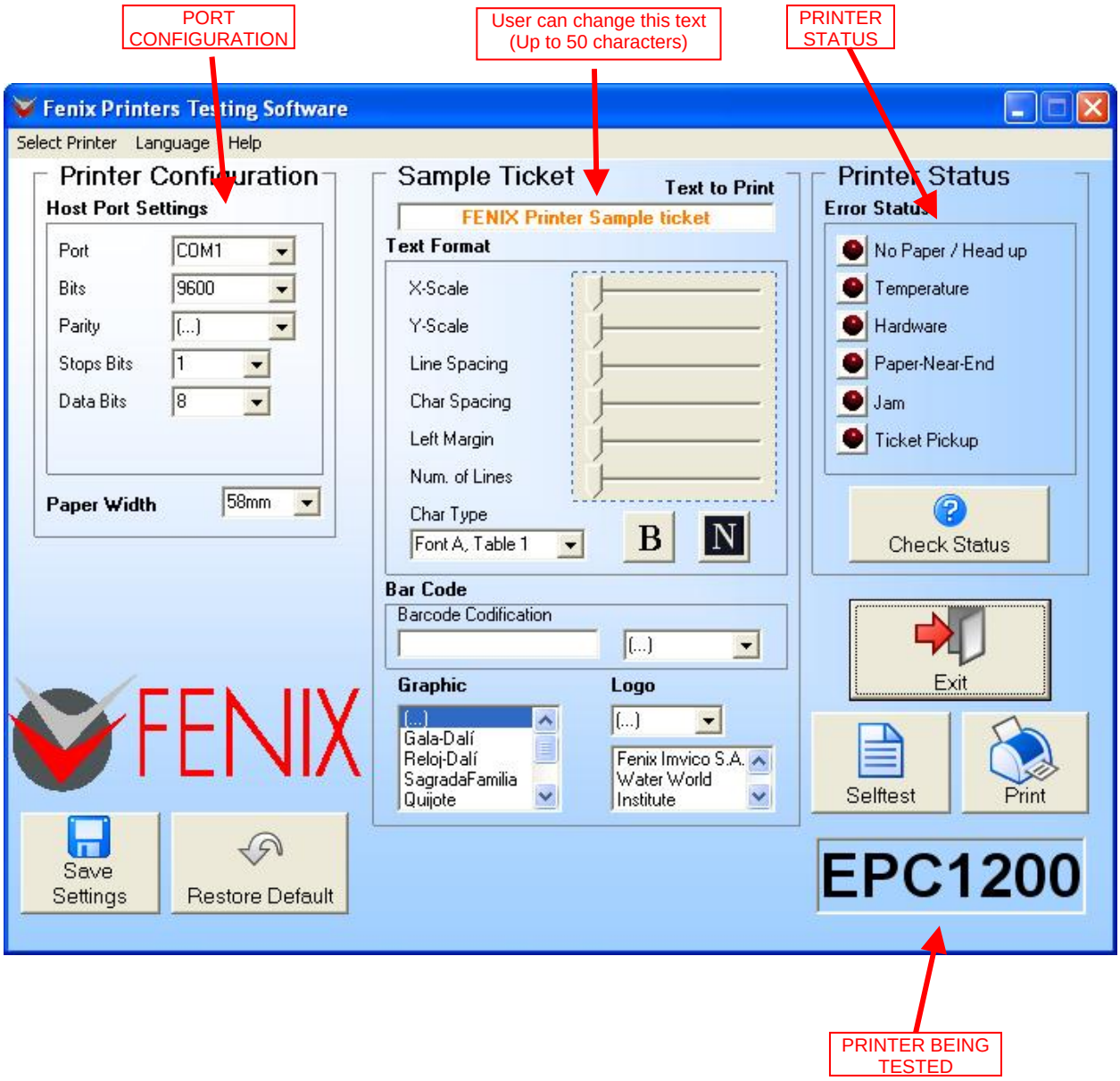
To install the program, run the ***"SETUP.EXE"*** file and follow the instructions on the screen.

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



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.

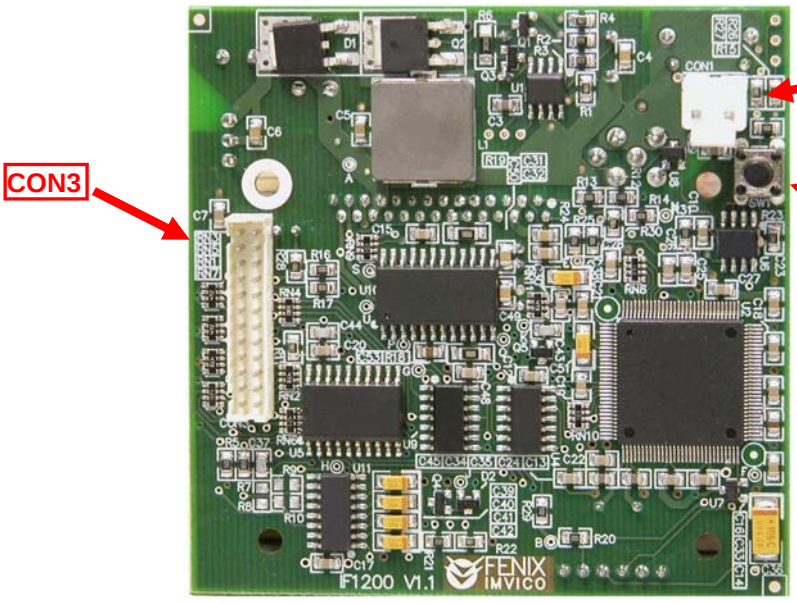
**BUTTONS**

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

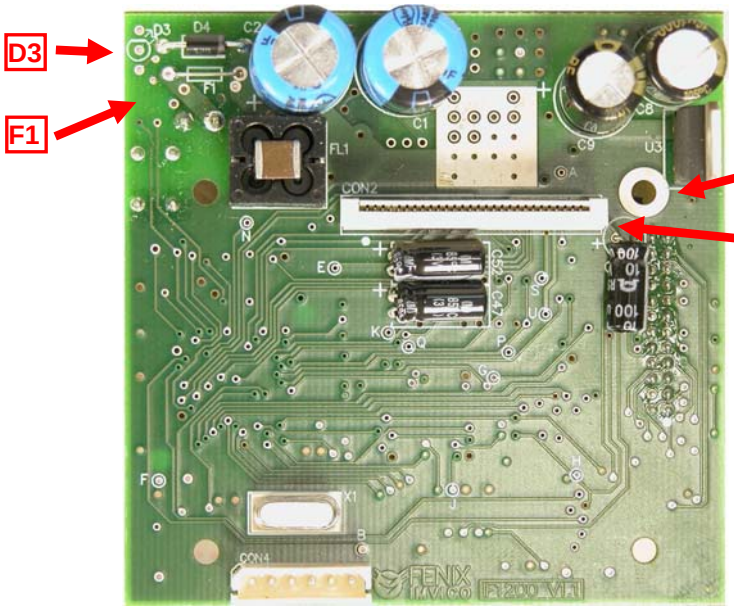
- **Save settings Button:** By clicking this button the configuration parameters set will be load into printer memory.
- **Restore Default Button:** This button will restore the default configuration parameters (Port: COM1, Baud Rate: 9600, etc.)
- **Print Button:** Prints a customized ticket according 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.

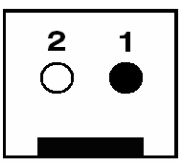



**SMD Components Side**




**Through Hole Components Side**

**CON 1:** 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 24VDC±10%) |

The power supply male connector must be a: JST Ref. **VH396-02** (housing)
**VH396T-010** (contact) or an equivalent model.

**CON 2:** Printer mechanism connector. This is to connect the flat cable of the LTPA245B-384 Seiko Printer mechanism.

**CON 3:** 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 an 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.