
TK14 THERMAL PRINTER
Operation manual - Version 1
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IMPORTANT NOTES IN TK14 THERMAL PRINTER MANAGEMENT

In order to preserve the life of the printer, it is necessary to keep in mind some precautions in the handling of the TK14 printer. Please read carefully the following points in order to make a good use of the printer.

SECURITY PRECAUTIONS

- Before using the printer, read carefully section 2-*INSTALLATION*.
- **NEVER** connect the external power supply with the wrong polarity. This could permanently damage the printer.
- Turn off the printer immediately if it produces smoke, a strange smell or an unusual noise. Keeping on using the printer could cause fire. Unplug the equipment immediately and contact your official distributor.
- **NEVER** connect cables with different connectors from the ones mentioned in this manual. Making different connections could permanently damage the printer.
- Use a power supply voltage 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 TK14 thermal printer with water or any other liquid. If any liquid is spilled inside of the equipment, unplug the power cable immediately and then contact your technical service.
- Make sure the printer is on a steady, horizontal, securely fixed surface. If the printer fell down, it could break or damage.
- **NEVER** use the printer in high humidity or dirty places.
- **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** shock the TK14 printer.
- **NEVER** disassemble or modify the TK14 printer.
- **NEVER** try to repair the TK14 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.
- **NEVER** pull the paper out when the cover is closed. Use the paper advance button instead.
- Avoid touching with metal 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 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.
- 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 security reasons, unplug the printer if it is not going to be used over a long period of time.
- **Don' t 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 remove the 4 screws (2 in each side) holding the thermal print mechanism. Open the printer cover. Wet a cotton sponge in alcohol (ethanol, methanol or IPA), and use it in order to clean the thermal elements of the print head and to remove the possible accumulation of paper particles found on the cover, roller and nearby surfaces.
2. Wait for alcohol to evaporate before inserting the paper roll and closing the cover.

FENIX recommends cleaning the thermal print head periodically (each 2 or 3 months) in order to keep the 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 for the cleaning of the print head, as they could scratch it.

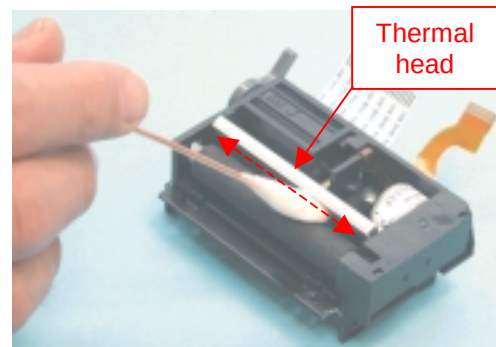


Fig. a. Thermal print head cleaning.

RECOMMENDATIONS

- **The plug has to be located near the printer and have to be easily obtainable.**
- Before connecting any communication data cable, check the printer is working properly by executing the self-test.
- Set the TK14 in a place where the connection cables do not suffer stretching or cross with each other.

0 – INTRODUCTION

The TK14 is a high performance thermal 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 TK14 are:

- Simple installation and easy maintenance.
- Low noise thermal printing.
- Full-logic ticket presentation through intelligent processor, controlling even printer status.
- Paper width: 58 mm.
- High reliability: 100 million pulses. Abrasion resistance: 50 Km.
- Power supply: 12V to 24V DC.
- No-paper, paper-near-end and paper jam sensors.
- Up to 80 mm paper roll diameter.
- High speed printing up to 62,5mm/s.
- Printing resolution: 8 dots/mm (203 dpi).
- Passive cut of paper.
- Nozzle ticket presenter.
- IEEE 1284 parallel and serial RS232C data input interface 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.
- Extended operating temperatures range (-30°C to +70°C).
- Self test, hexadecimal mode and configuration mode features.
- One logo load capability, through Windows driver.
- Windows 95, 98 & 2000 drivers and demo/configuration program.

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

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

1 – GENERAL SPECIFICATIONS

1.1- Printing specifications

- 1) Printing method: Thermal line printing
- 2) Dot density: 203 dpi x 203 dpi
(‘dpi’: dots per inch. 1 inch = 25.4mm)
(203 dpi = 8 dots per mm)
- 3) Printing direction: Unidirectional with friction feed.
- 4) Printing width: 48 mm (384 dots).
- 5) Printing speed: High speed mode: up to 62,5mm/s
(The printing speed could vary automatically depending on the print head temperature as well as the command processing and the data transmission speed).

NOTES:

- Printing speed depends on the data transmission interface, the combination of control commands and the print head temperature.
- Low printing speed could cause intermittent printing. It is recommended to transmit data to the printer as quickly as possible.

- 6) Paper feed speed: 62,5 mm/s (continuous paper feed)
- 7) Characters per line (by default):
A font: 24
B font: 32
- 8) Space between characters (by default): 4 dots (0.5 mm)
- 9) Line spacing (by default): 3.75mm

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).
B font: 8 x 16 dots (1 x 2 mm).
A font is selected by default.
- 3) Character size:

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

The TK14 has a passive cutter system. After present the ticket printed in the nozzle, user can take it and, himself, cuts the paper, without any TK14 automatic action.

1.4- Paper specifications

- | | |
|-----------------------------|--|
| 1) Paper type: | thermal paper roll |
| 2) Paper width: | 58 +0/-1mm |
| 3) Paper roll size: | up to a maximum of 80 mm of diameter (25 mm inner diameter) |
| 4) Specified thermal paper: | |
| At -5°C to 50°C → | TF50KS-E2D (59µm paper) |
| | TF77KS-E2 (95µm paper) |
| | TL69KS-HG76 (label paper) |
| At -30°C to 70°C → | TL51KS-R2 (High heat-resistant paper) |
| | TL69KS-R2 (High heat-resistant paper) |
| At 5°C to 40°C → | TW80KK-S (2-ply thermal paper) |
| | From Nippon Paper Industries |

1.5- Internal buffer

The **TK14** printer contains a **10 Kbytes** internal memory, whose functionality is dynamically shared by the receiving buffer.

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

1.6- Electrical specifications

- | | |
|-----------------------------|---|
| 1) Power supply voltage: | 12V to 24V DC $\pm$ 10% |
| 2) Peak current consumption | (ambient temperature, 64dots activated): 3A (approx.) |

1.7- Environmental conditions

- | | |
|-----------------------|---|
| 1) Temperature range: | Working temperature range: -30°C to 70°C |
| | Storage temperature range: -30 a 60°C (without paper loaded, in a dry place). |

2 – INSTALLATION

2.1- TK14 INSTALLATION CONSIDERATIONS

There are some general considerations to take into account when installing the TK14 printer.

A wrong installation can cause many serious problems 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 fixed 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 that all user accessible parts are in the left and rear side of the printer, like the next picture shows:

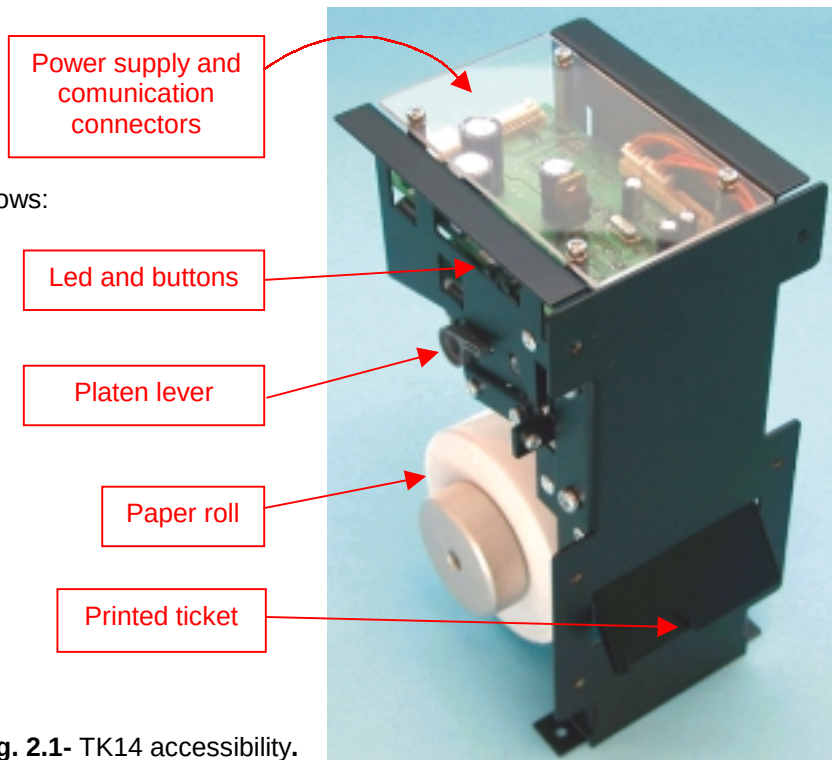


Fig. 2.1- TK14 accessibility.

- 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.

For these reasons, FENIX suggests the following systems as solutions to a correct installation:

The printer must be set quite near the front side of the user's chassis.

Special care in the design of the part which goes from the printer outlet to the paper guide (paper jams can occur due to an inappropriate design).

As the printer is placed very near the user's chassis, some system must be implemented in order to move the printer when accessing the printing head (i.e. giving the fixing holes of the chassis an oval shape to allow the printer moving forward and backward).

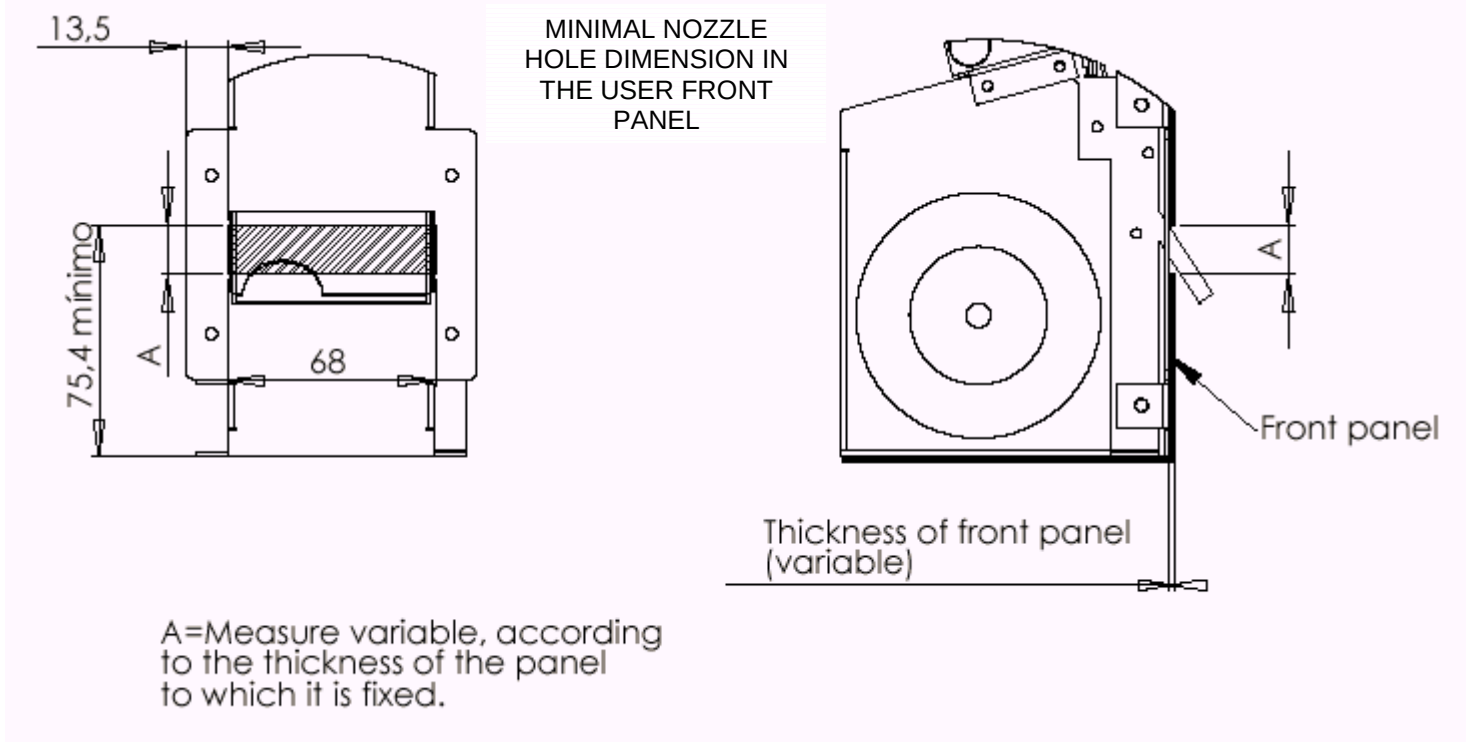
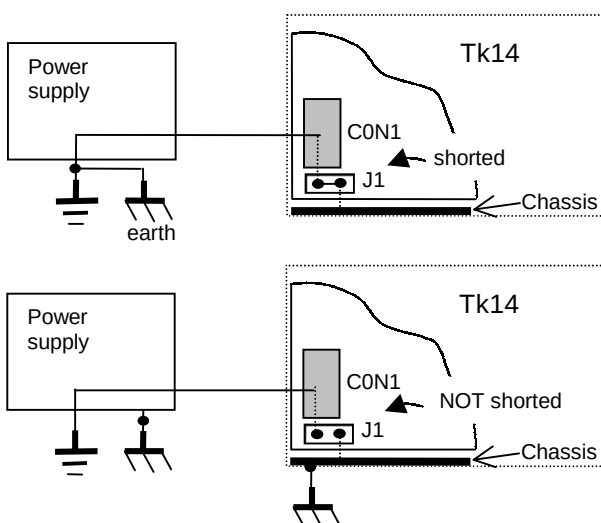


Fig. 2.2- Nozzle hole dimension.

Depending on the construction materials, care must be taken with static electricity; otherwise tickets may get stuck in the paper guide and never reach the receptacle.

Be sure to make a good earth connection, performing one of the following schemes:



a) The earth connection is at the power supply and shorted with the negative terminal. The chassis is connected to earth shorting the jumper J1.

b) The negative terminal is floating. The chassis is connected to earth by a cable from the main earth connection.

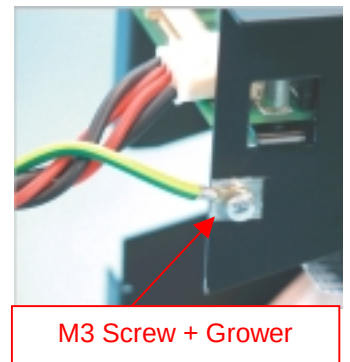


Fig. 2.3- TK14 earth connection.

2.2- POWER SUPPLY

The TK14 is powered by an external power supply by means of a female polarized connector of 4 pins that includes a security anchor. The power supply voltage must be verified before making the connection between the supply and the printer.

The power supply male connector must be a

JST **VH396-04-H** (housing)

VH396T-010 (contact), or an equivalent model.

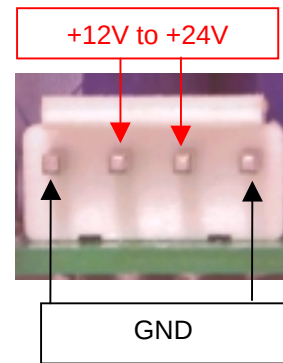


Fig. 2.4- TK14 power supply connector.

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 capacity.
- (2) When designing lines and bit images, take the printing ratio and print duty into consideration.
- (3) Print quality may be poor if the printing ratio (energizing pulses/dot line) or print duty is high.
- (3) Average energizing pulse width is defined as 64 of 192 dots/dot line that are energized.



WARNING: Beware not to invert the polarity of power supply. This may irretrievably damage the printer. Use the 4 terminals (4 wires) with 1 mm² minimum section everyone.

IMPORTANT NOTE ABOUT POWER SUPPLY:

The necessary supply of power depends on the content to print on the ticket. A 60W power supply covers all adverse possibility (printing ratio of 100% black at any temperature). However, if the print ratio is not over 60%, a 40W power supply can be used. Any way, power supply must meet the peaks current that mechanism requires, which are determined by the following formula:

$$I_{\text{peak}} = [(\text{number of printing dots}) \times 8,3] / 176 \text{ [A]}$$

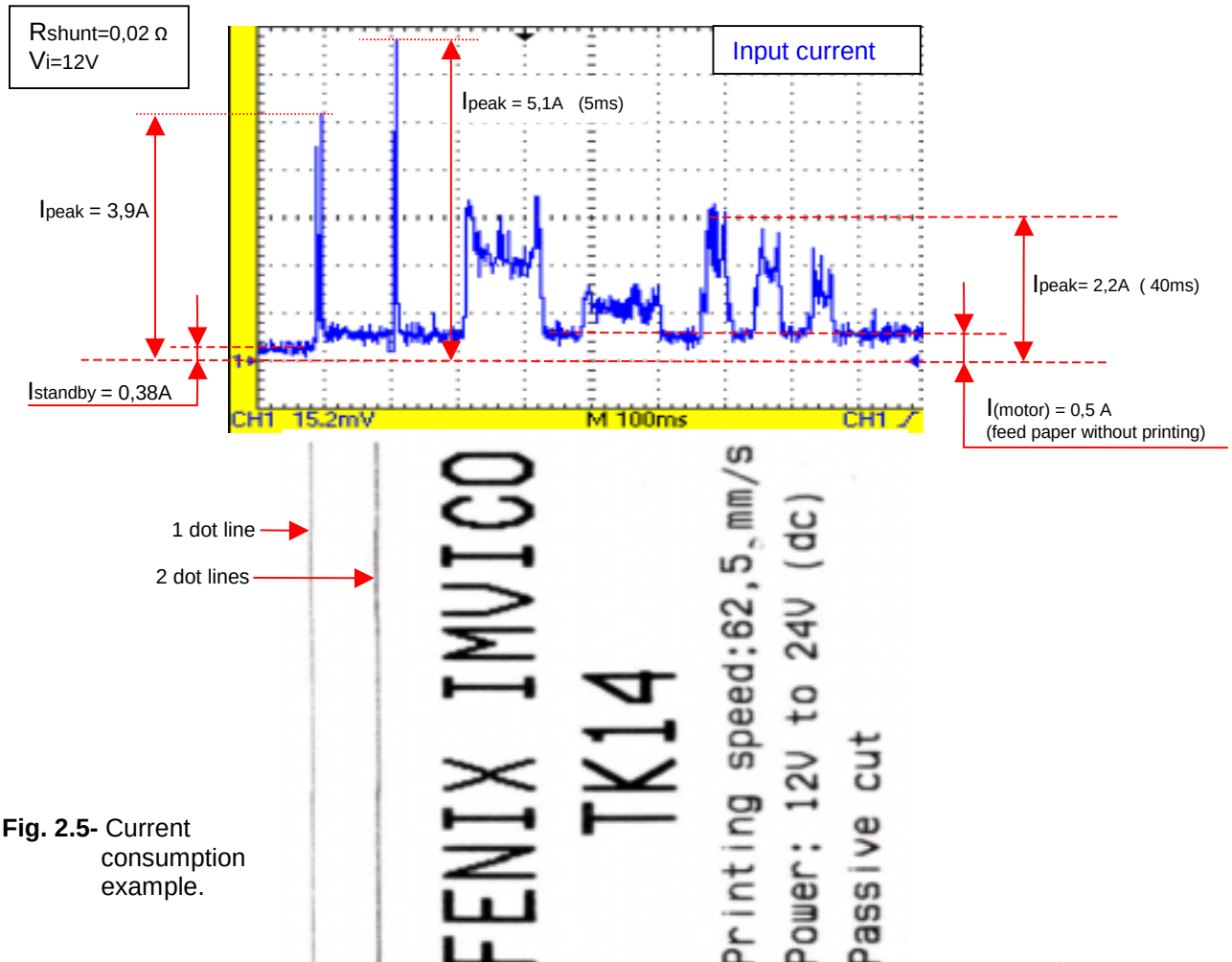


Fig. 2.5- Current consumption example.

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: 4800, 9600, 19200, 38400 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:

- (1) 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 Paper feed button (FEED) 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	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.
24	SG	-	Signal ground.
23	DTR	Output	This signal indicates whether an error occurs.
Other	nc	---	Not connected

Table 2.1- 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.

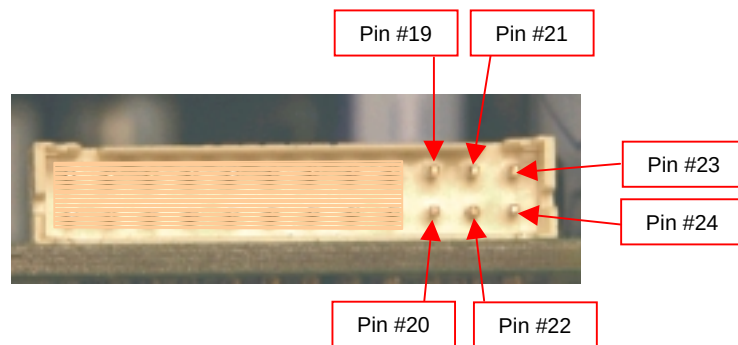


Fig. 2.6- Serial RS-232 interface pins.

2.3.5- PC serial interface connection

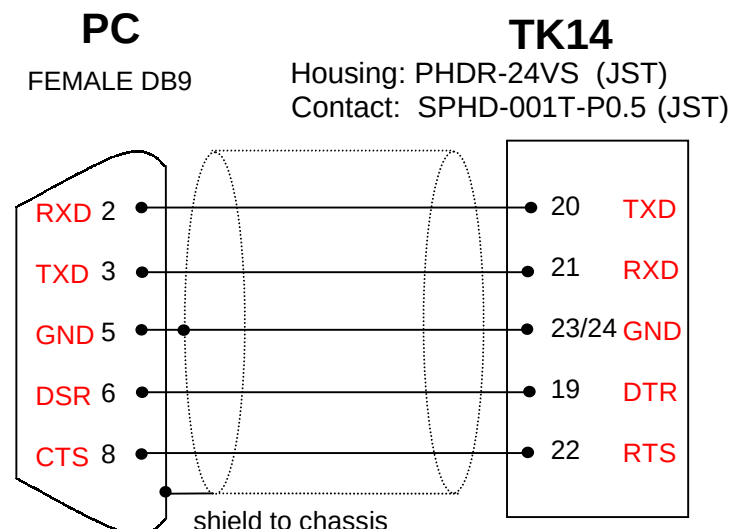


Fig. 2.7- PC serial cable.

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 TK14 comply the IEEE1284 protocol (**NIBBLE MODE**).

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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, et cetera) is considered to be a host system.

The compatibility mode supports compatibility with the Centronics parallel interface.

a) Specifications

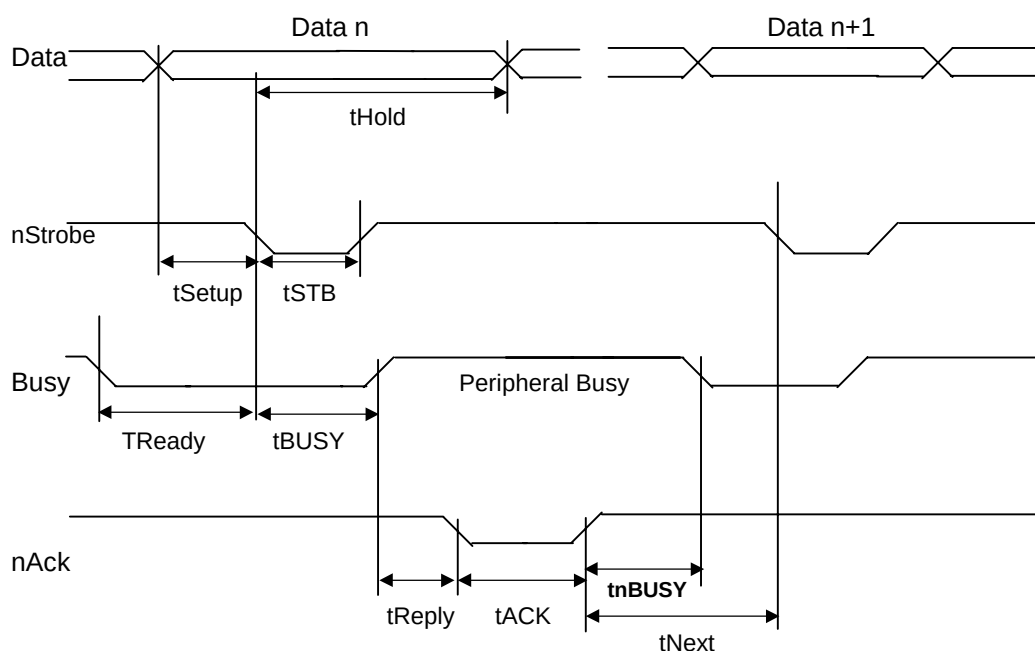
Data transmission:	8-bit parallel
Synchronization:	nSTB signal externally provided
Protocol:	nACK (acknowledge) and BUSY signals
Signal levels:	TTL compatible
Connector (user side):	JST PHDR-18VS (housing) SPHD-001T-P0.5 (contact) or an equivalent model.

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



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

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**).

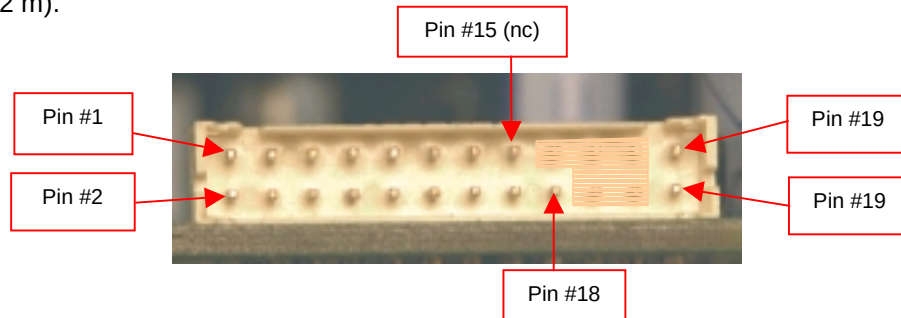
2.4.3- Parallel interface pins assignment for each mode

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

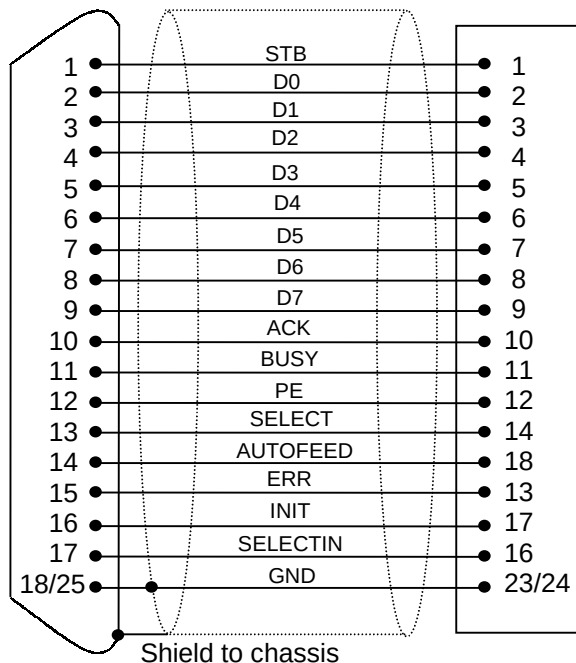
Table 2.3- PC parallel connector (DB25).

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. 2.8-** Parallel interface pins.**2.4.4- PC parallel interface connection**

PC	TK14
	Housing: PHDR-24VS (JST)
MALE DB25	Contact: SPHD-001T-P0.5 (JST)

**Fig. 2.9-** PC parallel 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.

3 – BASIC OPERATIONS

3.1- PAPER LOADING

When the printer runs out of paper, there are two ways of loading paper: automatic and manual. Before starting the paper load sequence, please make sure the paper roll has been placed in the right way.

Place the paper roll in the right direction. The thermal paper has only a side, which can be printed (thermal side). If the user don't know which one it is, just scratch the paper: the thermal side will show up the track on.

3.1.1- AUTOMATIC PAPER LOAD

- 1) Make sure the TK14 is power supplied.
- 2) Open the printing head and remove paper from inside the mechanism (if there is any).
- 3) Make sure that the platen is closed.
- 4) Make sure the paper end is cut in a straight way as shown in the next figure:



- 5) Put the paper end in the mechanism inlet.
- 6) Push the paper in until the TK14 detects it and starts the auto-load sequence.
- 7) Wait until the auto-load sequence extracts the paper from the printer outlet.



Fig.3.1- Automatic paper load.

NOTE:

In the automatic paper load, the printer motor runs at low speed, because the printer needs the maximum motor torque. Running at low speed, the motor is noisier, but it is not a wrong performing.

3.1.2- MANUAL PAPER LOAD

- 1) Open the platen and remove the paper (if there is any).
- 2) Keep the platen opened.
- 3) Make sure the paper end is cut in a sharp way as shown in the next figure:

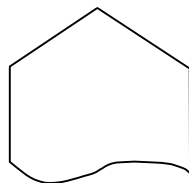


Fig.3.2- Platen opened.

- 4) Put the paper end in the mechanism inlet.
- 5) Push the paper in until it reaches the mechanism outlet (about 3 cm).
- 6) Close the platen.

NOTE: After the paper has been loading, push the PFEED button and pick up the ticket, leaving the next ticket ready to be printed on the top.

3.2- BUTTONS FUNCTIONS

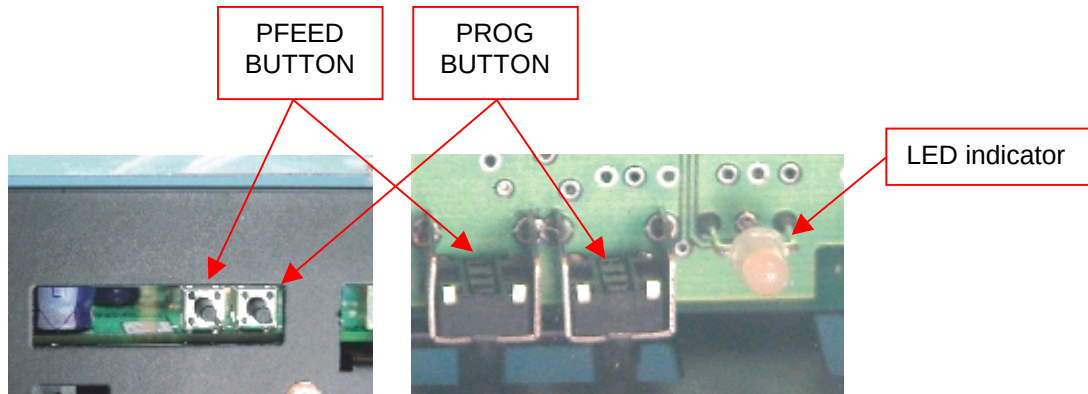


Fig. 3.3- TK14 led and buttons.

1) PFEED Button.

Functions:

- If pressed on start-up, it activates the *SELF-TEST MODE*.
- If pressed together with PROG button on start-up, they activate the *HEXADECIMAL MODE*.
- During *PROGRAMMING MODE* this is the **“YES”** button.
- Paper feeding using the paper FEED button cannot be performed under the following conditions:
 - The paper roll end sensor detects a paper end.
 - When the printer thermal head is opened.

2) PROG Button.

Functions:

- If pressed on start-up, it activates the *PROGRAMMING MODE*.
- If pressed together with PFEED button on start-up, they activate the *HEXADECIMAL DUMP MODE*.
- During *PROGRAMMING MODE* this is the **“NO”** button.

3.3- PAPER SENSORS

The TK14 has two specific photo sensors for paper: 'out of paper' and 'near-end paper'.

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 (as an example, printing without paper) that could seriously damage the mechanism, this error blocks all the printer activities.

The 'near-end paper' sensor detects when the paper roll is near its end of file. This error, by default, does not stop printing, but through the **ESC c 4** command, it can be achieved that the 'near-end paper' detection stops the printing. If a **25 mm** inner diameter paper roll is used, the sensor will trigger when **10 meters** of paper remain (approximately).

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.

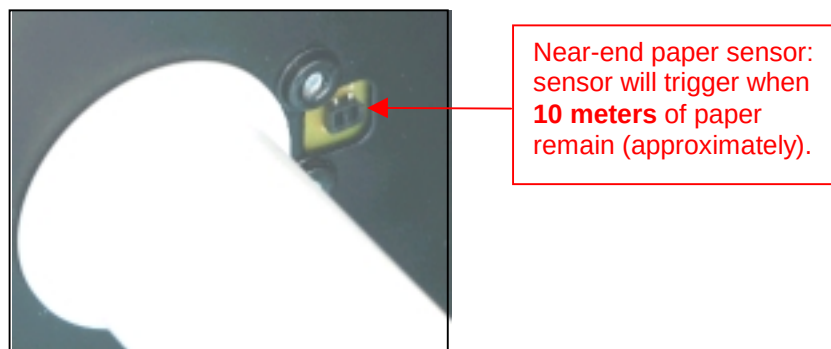


Fig.3.4- Near-end paper sensor localization.

3.6.2- Programming mode

The TK14 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 one of the two push buttons.

PFEED button means “YES” and “**PROG**” button means “NO”.

To start the programming mode, turn off the printer and, holding the PROG button pressing, turn on the printer. Then the printer asks for the configurable parameters.

These are the configurable parameters during PROGRAMMING MODE:

- Baudrate: 4800, 9600, 19200 or 38400 baud.
- Parity for serial transmission: ODD, EVEN, NO parity.
- Cutter mode: total cut, partial cut or passive cut (no cutter).



Always select “passive cut” for TK14.

- Wait until ticket pickup:



Enabling this option, user can not print a new ticket if the actual printed ticket has not been picked up; therefore, it can avoid a possible paper jam. User has to send the GS V command at the ticket end. While TK14 is waiting the ticket pick up, BUSY signal will remain active (BUSY=1). This option is enabled by default.

Alternately, user can make this control himself, by the DEL EOT command, testing the ticket pick up flag.

Any way, application programmer has to estimate the property application consequences and choose the correct option.

- Paper quality:
 - Normal paper
TF50KS-E2D
TF77KS-E2 (or similar)
 - Wide temperature paper
TL51KS-R2
TL69KS-R2 (or similar)
 - High sensitive paper
TL69KS-HG76 (label paper)

- Carry Return: Enable / Disable CR command.

Next figure shows how the printer asks for the configurable parameters:

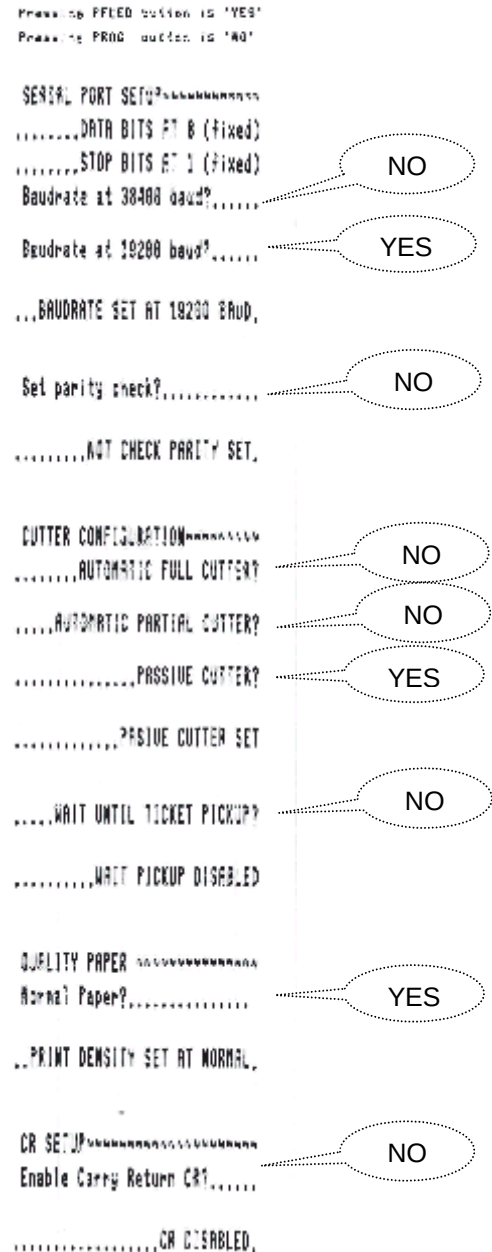


Fig. 3.6- PROGRAMMING MODE example.

3.6.3- Hexadecimal dump mode

In this mode, all the data received from the host system is printed, without processing any command, in hexadecimal and its corresponding ASCII.

This mode can be very helpful for the application developer during the setup test time, as it allows to detect and eliminate possible errors (as 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.

To enter hexadecimal mode, proceed with the following steps:

- Keeping the paper advance button (FEED) and program button (PROG) pressed, switch the power on.
- The TK14 will print the text '~~~~HEXADECIMAL MODE~~~~', and it will remain waiting for receiving data. As soon as the received bytes received complete one line (9 bytes), they will be printed automatically.

Turn off the printer to quit the hexadecimal mode.

```

~~~~HEXADECIMAL MODE~~~~

18 21 00 10 21 00 18 33 EA .1..f..3.
18 20 02 18 21 00 10 21 E0 . .f..f.
18 33 01 18 20 01 18 4C E0 .3..M.
10 4C 00 08 53 4D 32 3E 30 .L..SM200
38 20 73 61 6D P0 6C 65 20 C sample
74 68 63 68 65 P4 0A 53 4D ticket,SM
32 30 30 30 28 P8 61 6C P0 2000 samp
6C 65 20 74 68 63 68 65 74 1e ticket
0A 53 4D 32 38 30 30 28 P3 ,SM2000 s
61 6D P0 6C 65 20 74 68 63 ample tic
68 65 P4 0A 53 4D 32 38 30 ket,SM200
30 28 P3 61 6D P0 6C 65 20 C sample
74 68 63 68 65 74 6A 53 4C ticket,SM
32 38 30 30 28 P3 61 6D P0 2000 samp
6C 65 20 74 68 63 68 65 74 1e ticket
0A 53 4D 32 38 30 30 28 P3 ,SM2000 s
61 6D P0 6C 65 20 74 68 63 ample tic
68 65 P4 0A 10 68 43 0A 31 ket..kC,1
32 33 33 34 35 36 37 38 31 233456789
1D 58 42 64 18 21 0E 1D 21 .UBd.1..f

```

Fig. 3.6- HEXADECIMAL DUMP mode example.

NOTES:

- (1) For any received characters that are under 20h, the ASCII '.' will 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 not bigger than the minimum amount required to print one line (9 bytes), the TK14 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.

3.7- ERROR PROCESSING

3.7.1- Error types

When an error happens, the TK14 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 on the current printer status. On the other hand, the printer status and all its possible errors can also be obtained via software through the **DEL EOT** command. In this way, the application developer can have more complete information on the printer status, therefore being able to act accordingly.

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

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

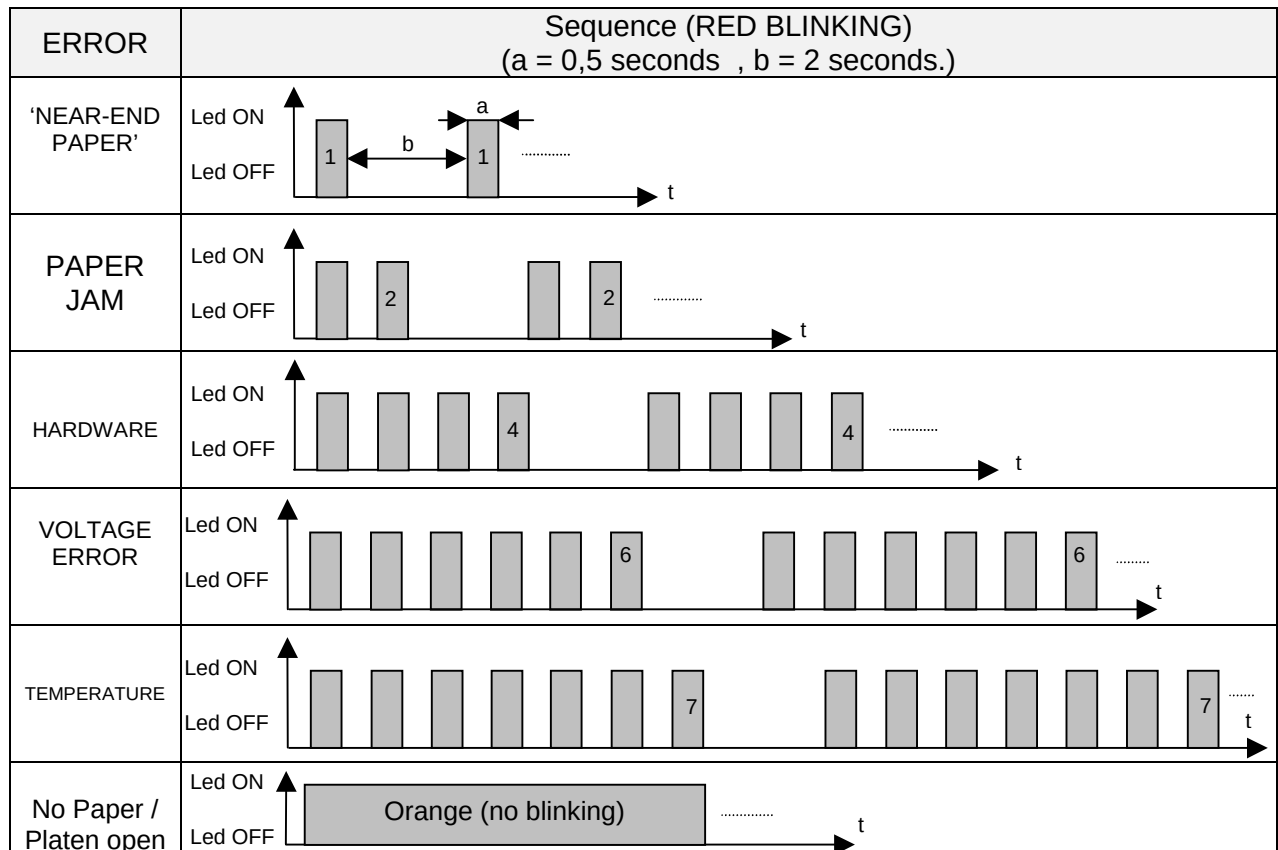


Fig. 3.8- LED Blinking sequence (RED).

More information on these errors can be found below:

NEAR-END PAPER ERROR

[Description] This error happens when the 'near-end paper' sensor detects that the paper roll is close to be finished. This means that using a paper roll with an external diameter of **80 mm** and inner diameter of **25 mm**, the sensor will trigger the error when there are still **10 meters** of paper approximately.

[Recover action] This indication should be really taken as a **warning**, not as an error as such. The action depends on the application and the developer's criteria. To recover from this error, user must change the paper roll.

[Notes] Depending on the settings of command "ESC c 4" this error stops the printing or not (see point **4. CONTROL COMMANDS**). If this error is set to stop the printing, it will be detected as any other error. If this error is not set to stop the printing, user must detect it by polling the status bytes. This error is indicated in the parallel port depending on the conditions set by the "ESC c 3" command (See point **4. CONTROL COMMANDS**).

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 (12V to 24V DC $\pm$ 10%).

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

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

THERMAL HEAD TEMPERATURE ERROR

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

[Recover action] The printing recovers automatically from this error when the thermal print head temperature drops below 60°C again.

[Note] This error can happen if the ambient temperature is very high and the printer is working continuously with high-density printing.

NO PAPER ERROR

[Description] The out of paper sensor detects there is not paper on the printing line.

[Recover action] This error disappears loading a new paper roll in the printer (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**).

PLATEN OPENED ERROR

[Description] The platen unit is open.

[Recover action] This error disappears when closing the platen.

[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**).

PAPER JAM ERROR

[Description] When printing a ticket, the paper must run across the printer mechanism and the presenter unit without any obstacle. Moreover, the ticket has to be the minimum length in order to the user may catch it.



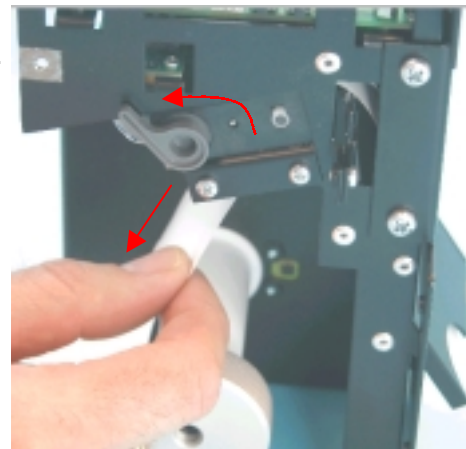
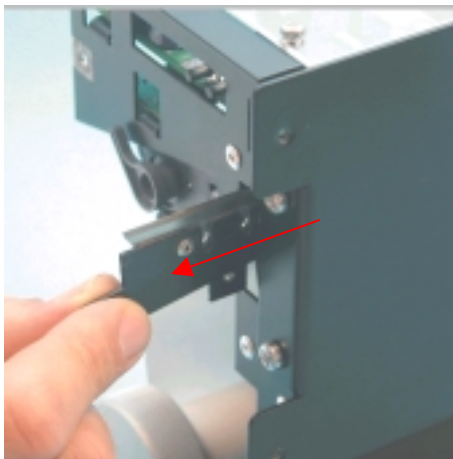
- **IMPORTANT NOTES:**
THE MINIMUM TICKET LENGTH IS 120 mm.
ANY TICKET WITH LENGTH MINOR THAN 120 mm WILL CAUSE PAPER JAM.



- **FENIX SUGGEST A 160 mm MAXIMUM TICKET LENGTH TO AVOID VANDALIC ACTIONS.**

[Recover action] This is a Non-recoverable error.
User must turn OFF the printer and remove the paper jam.

- 1st)** Open the platen and try to remove the jam pulling the paper backwards.

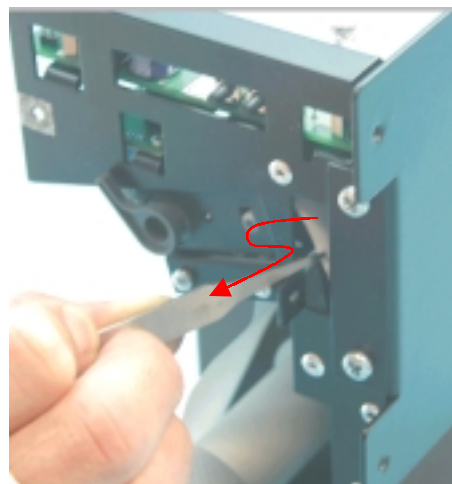


- 2nd)** If step 1st) has not effect: remove the 2 screws holding the cutter and take out it from the printer.



BE CAREFUL! THE SHAPPENING BLADE MEY CAUSE DAMAGE

- 3rd)** Try to remove the paper jam using forceps or similar tool.



- 4rd)** If step 3rd) has not effect: remove the 4 screws holding the head mechanism and take out from the printer.

Fig. 3.9- Paper jam recovery.

3.7.2- Printer operation when an error happens

When the TK14 detects an error (except the near-end paper), 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

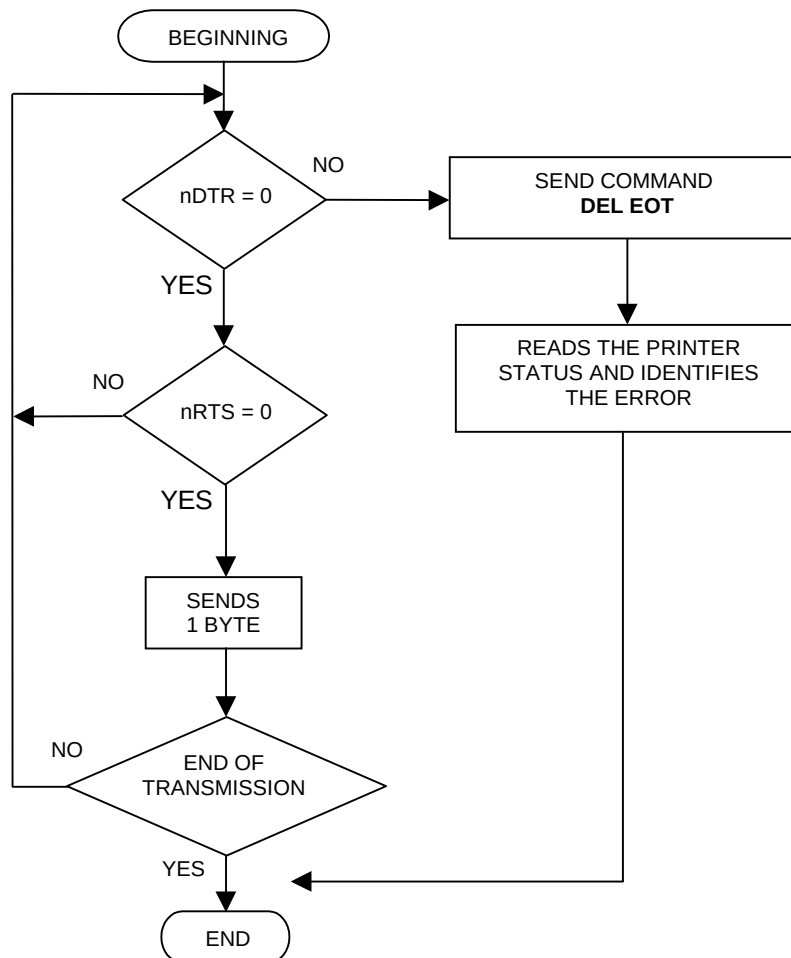


Fig.3.10- Serial port error flow diagram.

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

The TK14 meets the IEEE-1284 standard, in the nibble mode variant.

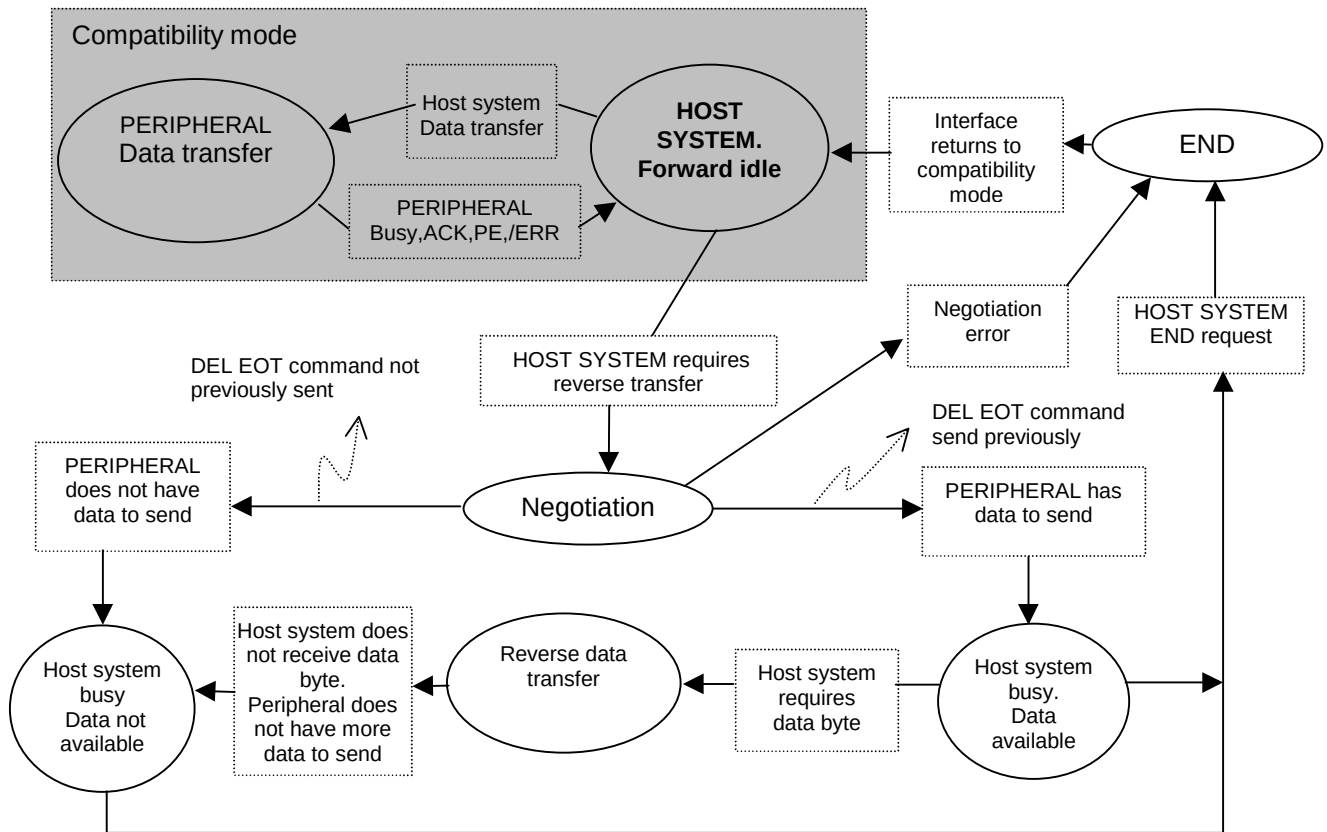


Fig.3.11- Nibble mode phase transitions.

NOTES:

- (1) The circles represent the IEEE1284 phases.
- (2) This diagram can not be considered as the true state diagram.
- (3) **The host system can request the negotiation phase at any time, but the TK14 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.

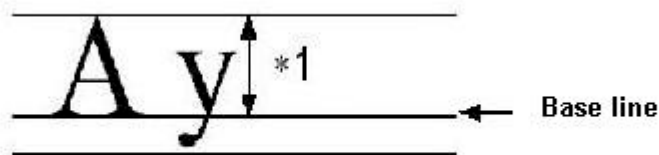
4 – CONTROL COMANDS

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 the following:
 - The horizontal direction length is 48 mm.
- 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 List**

Command	Name	Command classification		Page
		Executing	Setting	
LF	Print and line feed	X		31
CR	Print and carriage return	X		31
DLE EOT	Real-time status transmission	X		31
ESC t	Select character code table		X	33
ESC SP	Set right-side character spacing		X	33
ESC !	Select print mode(s)		X	33
ESC 2	Select default line spacing		X	34
ESC 3	Set line spacing		X	34
ESC @	Initialize printer	X	X	34
ESC E	Turn emphasized mode on/off		X	34
ESC G	Turn double-strike mode on/off		X	34
GS B	Turn white/black reverse printing mode on/off		X	35
ESC J	Print and feed paper	X		35
ESC M	Select character font		X	35
ESC a n	Select justification	x		36
ESC c 3	Select paper sensor to output PE signal		X	36
ESC c 5	Enable/disable panel buttons		X	37
ESC d	Print and feed n lines	X		37
GS !	Select character size		X	37
GS (A	Execute test print	X		38
GS L	Set left margin		X	38
GS T	Set print position to the beginning of print line	X		39
GS V	Feed paper to cut paper line		X	39
GS f	Select font for HRI characters		X	39
GS H	Select printing position of HRI characters		X	40
GS h	Set bar code height		X	40
GS k	Print bar code	X		40
GS w	Set bar code width		X	42
GS v 0	Print raster bit image	X		42
FS p	Print NV bit image	X		43
FS q	Define NV bit image		X	44

Table 4.1- 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 <i>n</i>
	Hex	10	04 <i>n</i>
	Decimal	16	04 <i>n</i>
[Range]	<01>H ≤ <i>n</i> ≤ <04>H		
[Description]	Transmits the selected printer status specified by <i>n</i> in real-time, according to the following parameters:		
	<i>n</i> = <01>H: Transmit printer status <i>n</i> = <02>H: Transmit offline status <i>n</i> = <03>H: Transmit error status <i>n</i> = <04>H: Continuous paper sensor status <i>n</i> = <05>H: Paper sensor status		
[Notes]	- The status is transmitted whenever the data sequence <10>H<04>H<<i>n</i>> (<01>H ≤ <i>n</i> ≤ <05>H) is received. - The printer transmits the current status. Each status item is represented by one-byte of data. - 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 (<i>n</i>=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: 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
	ON	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 F****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]	Select print mode(s)			
[Format]	ASCII	ESC	!	n
	Hex	1B	21	n
	Decimal	27	33	n
[Range]	<00>H ≤ n ≤ <FF>H			
[Description]	Selects print mode(s) using n as follows:			

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

[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.
- 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, 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] $<00>H \leq n \leq <FF>H$

[Description] Sets the line spacing to [$n \times 0.0625$ mm].

[Default] $n = 15$

[Reference] **ESC 2**

ESC @

[Name] Initialize printer

[Format] ASCII ESC @
Hex 1B 40
Decimal 27 64

[Description] Clears the data in the print buffer and resets the printer settings to the settings that were in effect when the power was turned on.

[Notes] The data in the receiver buffer is not cleared.

ESC E n

[Name] Turn emphasized mode on/off

[Format] ASCII ESC E n
Hex 1B 45 n
Decimal 27 69 n

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

[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 !** turn 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] $0 \leq n \leq 255$

[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**

ESC a n

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

n	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]	$0 \leq n \leq 255$				
[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	OFF	00	Paper roll near-end sensor disabled
	ON	01	Paper roll near-end sensor enabled
1	OFF	00	Paper roll near-end sensor disabled
	ON	02	Paper roll near-end sensor enabled
2	OFF	00	Paper roll end sensor disabled
	ON	04	Paper roll end sensor enabled
3	OFF	00	Paper roll end sensor disabled
	ON	08	Paper roll end sensor enabled
4-7	-	-	Undefined

[Notes]

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

[Default] $n = 12$

ESC c 5 n

[Name]	Enable/disable panel buttons				
[Format]	ASCII	ESC	c	5	<i>n</i>
	Hex	1B	63	35	<i>n</i>
	Decimal	27	99	53	<i>n</i>
[Range]	$0 \leq n \leq 255$				
[Description]	Enables or disables the panel buttons. - When the LSB of <i>n</i> is 0, the panel buttons are enabled. - When the LSB of <i>n</i> is 1, the panel buttons are disabled.				
[Notes]	Only the lowest bit of <i>n</i> is valid. In this printer, only the FEED button can be disabled.				
[Default]	<i>n</i> = 0				

ESC d n

[Name]	Print and feed <i>n</i> lines			
[Format]	ASCII	ESC	d	<i>n</i>
	Hex	1B	64	<i>n</i>
	Decimal	27	100	<i>n</i>
[Range]	$\langle 00 \rangle H \leq n \leq \langle FF \rangle H$			
[Description]	Prints the data in the print buffer and feeds <i>n</i> 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 (<i>n</i> 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	!	<i>n</i>
	Hex	1D	21	<i>n</i>
	Decimal	29	33	<i>n</i>
[Range]	$\langle 00 \rangle \leq n \leq \langle FF \rangle H$ ($1 \leq$ vertical number of times ≤ 8 , $1 \leq$ 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] $(pL + (pH \times 256)) = 2$ (where $pL = <02>H$, $pH = <00>H$)
 $<30>H \leq n \leq <32>H$
 $<31>H \leq m \leq <33>H$

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

- pL, pH specifies $(pL + (pH \times 256))$ for the number of the bytes after ph (n and m).
- n specifies the paper to be tested.

n	Paper
$<30>H$	Paper roll
$<31>H$	
$<32>H$	

- m specifies a test pattern.

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

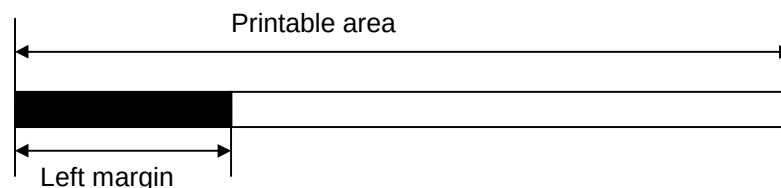
[Name] Set left margin

[Format] ASCII GS L nL nH
 Hex 1D 4C nL nH
 Decimal 27 76 nL nH

[Range] $<00>H \leq nL \leq <FF>H$
 $<00>H \leq nH \leq <FF>H$

[Description] Sets the left margin using nL and nH .

- The left margin is set to $[(nL + nH \times 256) \times 0.125 \text{ mm}]$.



[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	<i>n</i>
	Hex	1D	54	<i>n</i>
	Decimal	27	84	<i>n</i>
[Range]	<i>n</i> = <00>H or <i>n</i> = <01>H			
[Description]	Sets the print position to the beginning of print line.			

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

<i>n</i>	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 V *m*

[Name]	Feeds paper to the passive cutter line.			
[Format]	ASCII	GS	V	<i>m</i>
	Hex	1D	56	<i>m</i>
	Decimal	27	86	<i>m</i>
[Range]	<i>m</i> = <01>H			
[Notes]				

- **There are 26 mm of distance between the thermal head line and the passive cutter line. This command arranges the ticket to be cut, feeding paper automatically.**
- This command is effective only when processed at the beginning of a line. Afterwards the ticket is cutting by the user, the printer feeds the paper back to the printing position.
- **Sending this command, user informs to TK14 that actual ticket is completely finished; so TK14 can make internal controls to right performance.**

GS f *n*

[Name]	Select font for Human Readable Interpretation (HRI) characters			
[Format]	ASCII	GS	f	<i>n</i>
	Hex	1D	66	<i>n</i>
	Decimal	27	102	<i>n</i>
[Range]	<i>n</i> = <00>H or <01>H			
[Description]	Selects a font for the HRI characters used when printing a bar code. <i>n</i> selects a font from the following table:			

<i>n</i>	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]	<i>n</i> = <01>H
[Reference]	GS H, GS k

GS H *n*

[Name]	Select print position for HRI characters.			
[Format]	ASCII	GS	H	<i>n</i>
	Hex	1D	48	<i>n</i>
	Decimal	29	72	<i>n</i>
[Range]	<i>n</i> = 0/3			
[Description]	Selects the print position of HRI characters when printing a bar code. <i>n</i> selects the print position as follows:			

<i>n</i>	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]	<i>n</i> = <02>H
[Reference]	GS f , GS k

GS h *n*

[Name]	Select bar code height			
[Format]	ASCII	GS	h	<i>n</i>
	Hex	1D	68	<i>n</i>
	Decimal	27	104	<i>n</i>
[Range]	<01>H ≤ <i>n</i> ≤ <FF>H			
[Description]	Selects the height of the bar code. <i>n</i> specifies the bar code height in the vertical direction [<i>n</i> × 0.0625 mm (0.0049")].			
[Default]	<i>n</i> = <A0>H (10mm)			
[Reference]	GS k			

GS k *m n d1...dn*

[Name]	Print bar code				
[Format]	ASCII	GS	k	<i>m</i>	<i>n d1...dn</i>
	Hex	1D	6B	<i>m</i>	<i>n d1...dn</i>
	Decimal	27	107	<i>m</i>	<i>n d1...dn</i>
[Range]	<i>m</i> = <43>H, <i>m</i> = <45>H, <i>m</i> = <46>H or <i>m</i> = <49>H (<i>n</i> and <i>d</i> depend on the bar code system used).				
[Description]	Selects a bar code system and prints the bar code. <i>m</i> selects a bar code system as follows:				

<i>m</i>	Bar Code System	Number of Characters	Remarks
<43>H	EAN13	<i>n</i> = <0C>H	<30>H ≤ <i>d</i> ≤ <39>H
<45>H	CODE39	<01>H ≤ <i>n</i> ≤ <FF>H	<30>H ≤ <i>d</i> ≤ <39>H, <41>H ≤ <i>d</i> ≤ <5A>H, <20>H, <24>H, <25>H, <2B>H, <2D>H, <2E>H, <2F>H
<46>H	ITF	<01>H ≤ <i>n</i> ≤ <FF>H (even number)	<30>H ≤ <i>d</i> ≤ <39>H
<49>H	Code128	<02>H ≤ <i>n</i> ≤ <FF>H	<00>H ≤ <i>d</i> ≤ <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. 4.1- Code128 code example.

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	27	119	n
[Range]	$\langle 02 \rangle H \leq n \leq \langle 06 \rangle H$			
[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
$\langle 02 \rangle H$	0.250
$\langle 03 \rangle H$	0.375
$\langle 04 \rangle H$	0.500
$\langle 05 \rangle H$	0.625
$\langle 06 \rangle H$	0.750

- Multi-level bar codes are as follows: EAN13, CODE93, ITF.

[Default] $n = \langle 03 \rangle H$

[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	27	118	48	m	xL	xH	yL	yH	d1...dk
[Range]	$\langle 00 \rangle H \leq m \leq \langle 03 \rangle H$									
	$\langle 00 \rangle H \leq xL \leq \langle FF \rangle H$									
	$\langle 00 \rangle H \leq xH \leq \langle FF \rangle H$ where $1 \leq (xL + xH \times 256) \leq 128$									
	$\langle 00 \rangle H \leq yL \leq \langle FF \rangle H$									
	$\langle 00 \rangle H \leq yH \leq \langle 08 \rangle H$ where $1 \leq (yL + yH \times 256) \leq 4095$									
	$\langle 00 \rangle H \leq d \leq \langle FF \rangle H$									
[Description]	$k = (xL + xH \times 256) \times (yL + yH \times 256) (k \neq 0)$									
	Selects raster bit-image mode. The value of m selects the mode, as follows:									

m	Mode	Vertical Dot Density	Horizontal Dot Density
$\langle 00 \rangle H$	Normal	203.2 dpi	203.2 dpi
$\langle 01 \rangle H$	Double-width	203.2 dpi	101.6 dpi
$\langle 02 \rangle H$	Double-height	101.6 dpi	203.2 dpi
$\langle 03 \rangle H$	Quadruple	101.6 dpi	101.6 dpi

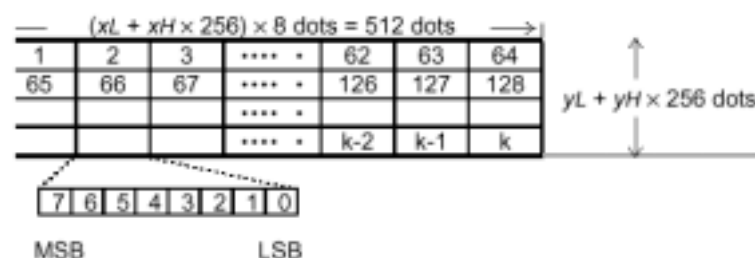
(dpi: dots per 25.4 mm {1"})

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

[Notes] This command is effective only when there is no data in the print buffer.

- Data outside the printing area is read in and discarded on a byte-by-byte basis.
- The position at which subsequent characters are to be printed for raster bit image is specified by **GS L** (Set left margin).
- d indicates the bit-image data. Setting a bit to 1 prints a dot and setting it to 0 does not print a dot.

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



FS p n m

[Name] Print NV bit image

[Format]	ASCII	FS	p	n	m
	Hex	1C	70	n	m
	Decimal	28	112	n	m

[Range] $n = 1$
 $0 \leq m \leq 3, <48>H \leq m \leq <51>H$

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

m	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]

- [Notes]
- n is the number of the NV bit image (always 1).
 - m specifies the bit image mode.
- 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 bit-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 $n \times 2$ 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 $(xL + xH \times 256) \times 8$ dots in the horizontal direction for the NV bits image you are defining. - yL, yH specifies $(yL + yH \times 256) \times 8$ 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 performing ESC @, reset or power off.				
	This command performs only definition of a NV bit image and does not perform printing. Printing of the NV bit image is performed by the FS p command.				
[Reference]	FS p				

IMPORTANT NOTE.- FENIX 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" (TK14 Windows driver) the correct option.

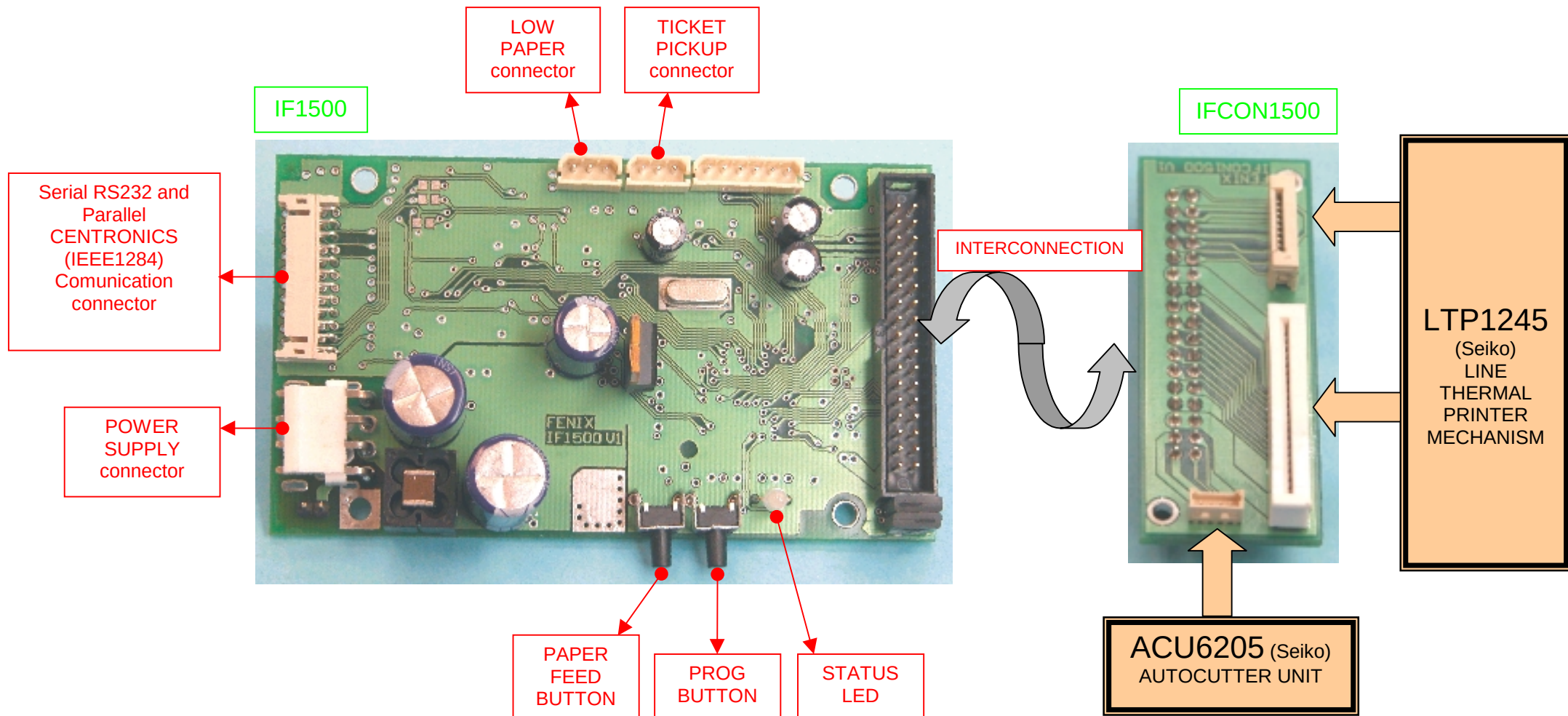
We suggest to adjust the logo selecting "Driver mode" option until get the size, the layout and the arrangement desired. After, the user only must reprint with the option "Load Logo 1" selected, and the logo will be stored at the same way that last printing.



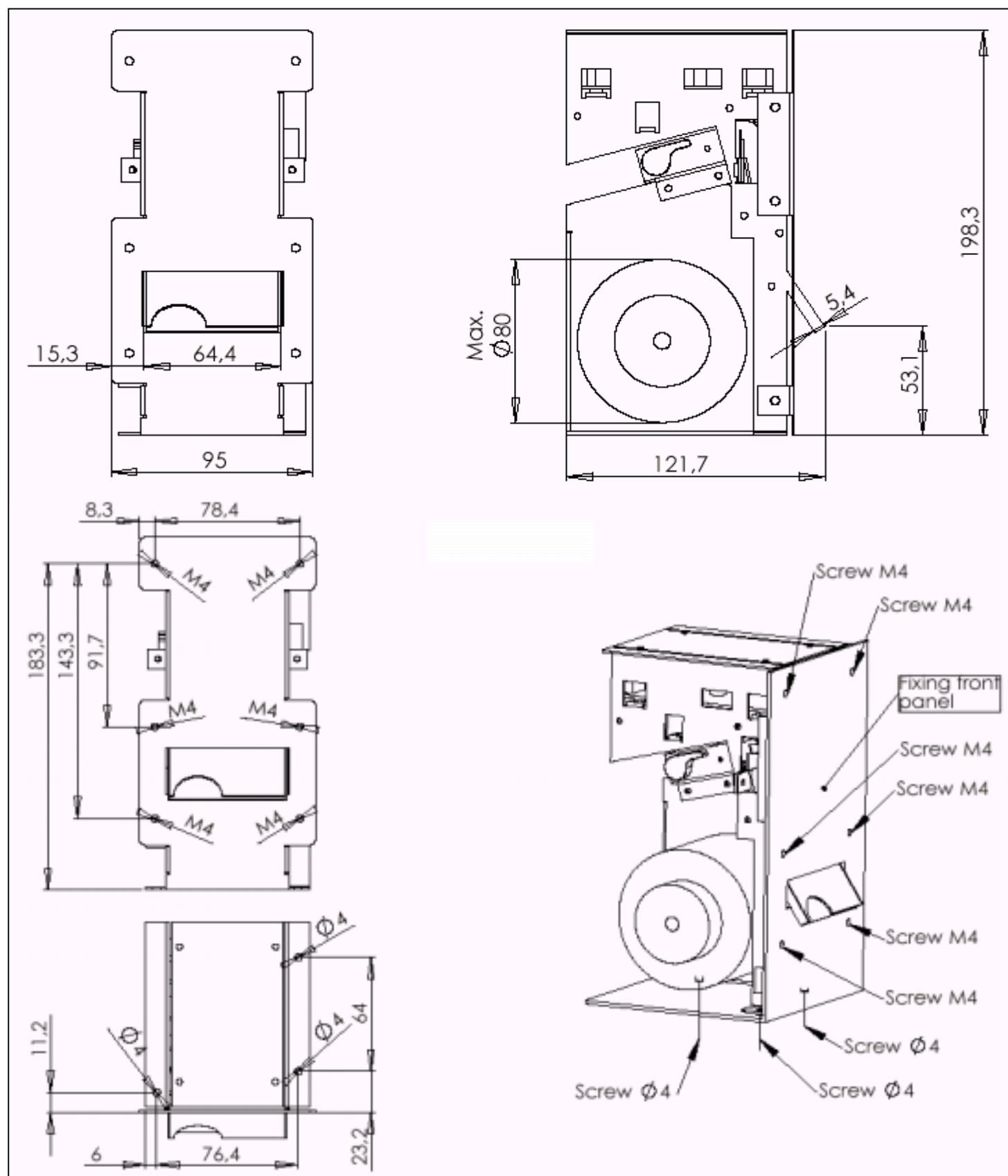
APPENDIX A – SPECIFICATIONS

Printing method	Thermal line printing	
Dot density	203 dpi x 203 dpi (dpi = dots per inch. 1 inch=25.4mm) 8 dots x mm	
Printing direction	Unidirectional with friction feed	
Printing width	48 mm (384 dots)	
Character per line (default)	Font A: 42 Font B: 56	
Character spacing (default)	0.5 mm (4 dots)	
Character structure	Font A: 12 x 24 dots (1.5 x 3 mm). Font B: 8 x 16 dots (1 x 2 mm). Font A is the default.	
Character size (mm)	Font A	
	Standard:	1.5 x 3
	Double-width:	3 x 3
	Double-height:	1.5 x 6
	Double width/height:	3 x 6
	Font B	
	Standard:	1 x 2
	Double-width:	2 x 2
	Double-height:	1 x 4
	Double width/height:	2 x 4
Character number	Alphanumeric characters: 95 Extended Graphics: 128 per page	
Print speed	High speed mode: up to 62,5 mm/s (The printing speed could vary automatically depending on the print head temperature as well as the command processing and the data transmission speed).	
Paper feed speed	62,5 mm/s (continuous paper feed)	
Line spacing (default)	0.99 mm	
Paper roll	Width: 58 +/-1mm Maximum outside diameter: 80 mm } (50 m approx.) Minimum inner diameter: 25 mm }	
Minimum ticket length	120 mm	
Maximum ticket length suggested	160 mm	
Thermal paper type	At -5°C to 50°C → TF50KS-E2D (59µm paper) TF77KS-E2 (95µm paper) TL69KS-HG76 (label paper) At -30°C to 70°C → TL51KS-R2 (High heat-resistant paper) TL69KS-R2 (High heat-resistant paper) At 5°C to 40°C → TW80KK-S (2-ply thermal paper) From Nippon Paper Industries	
Interface (compatible)	RS-232C and IEEE 1284 (Nibble mode)	
Receive buffer	10 Kbytes	
Power supply	12V to 24V DC ± 10%	
Peak current consumption (64 dots activated)	3A (approx.)	
Life span (at 25°C) Activation pulse resistance Abrasion resistance	100 millions pulses or more (print ratio=12,5%). 50 Km or more.	
Temperature	Operating: -30 to 70°C Storage: -35 to 75°C, except for paper.	
Overall dimensions (mm)	198,3 x 95 x 121,7 (H x W x D)	
Weight (without paper)	1 Kg (approx.)	

APPENDIX B – IF1500 CONNECTORS AND BUTTONS



APPENDIX C – EXTERNAL APPEARANCE



APPENDIX D – HOW TO ORDER

TK14-58-XX

Special version

└─► **nil** : Standard type

XX : custom-made type (under agreement only)

AVAILABLE ACCESORIES

PARTNUMBER	Description
FAPOS-1	Power supply close frame
FA-40TK	Power supply open frame
RS232-6	Serial cable 1,5m
CENTRONIC-7	Centronic cable 1,5m
T58X80X25,4	Standard 80 mm diameter paper roll for 58

APPENDIX E – 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:

E.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.

E.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			

E.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			

E.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 F – INTERNAL CHARACTER TABLES

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

	HEX	0	1	2	3	4	5	6	7
HEX	BIN	0000	0001	0010	0011	0100	0101	0110	0111
0	0000	NUL	DLE	SP	0	@	P		p
		00	16	32	48	64	80	96	112
1	0001		XON	!	1	A	Q	a	q
		01	17	33	49	65	81	97	113
2	0010			"	2	B	R	b	r
		02	18	34	50	66	82	98	114
3	0011		XOFF	#	3	C	S	c	s
		03	19	35	51	67	83	99	115
4	0100	EOT		\$	4	D	T	d	t
		04	20	36	52	68	84	100	116
5	0101	ENQ		%	5	E	U	e	u
		05	21	37	53	69	85	101	117
6	0110			&	6	F	V	f	v
		06	22	38	54	70	86	102	118
7	0111			'	7	G	W	g	w
		07	23	39	55	71	87	103	119
8	1000		CAN	(	8	H	X	h	x
		08	24	40	56	72	88	104	120
9	1001	HT		)	9	I	Y	i	y
		09	25	41	57	73	89	105	121
A	1010	LF		*	:	J	Z	j	z
		10	26	42	58	74	90	106	122
B	1011		ESC	+	;	K	[	k	{
		11	27	43	59	75	91	107	123
C	1100	FF	FS	,	<	L	\	l	!
		12	28	44	60	76	92	108	124
D	1101	CR	GS	-	=	M	]	m	}
		13	29	45	61	77	93	109	125
E	1110			.	>	N	^	n	~
		14	30	46	62	78	94	110	126
F	1111			/	?	O	_	o	SP
		15	31	47	63	79	95	111	127

Page 0 (Continued): 80H to FFH

HEX	BIN	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç	É	á	⌘	⌘	⌘	α	≡
		128	144	160	176	192	208	224	240
1	0001	ü	æ	í	⌘	⌘	⌘	β	±
		129	145	161	177	193	209	225	241
2	0010	é	Æ	ó	⌘	⌘	⌘	Γ	≥
		130	146	162	178	194	210	226	242
3	0011	ā	ō	ú	⌘	⌘	⌘	π	≤
		131	147	163	179	195	211	227	243
4	0100	ä	ö	ñ	⌘	⌘	⌘	Σ	ƒ
		132	148	164	180	196	212	228	244
5	0101	à	ò	Ñ	⌘	⌘	⌘	σ	Ƶ
		133	149	165	181	197	213	229	245
6	0110	á	û	â	⌘	⌘	⌘	μ	÷
		134	150	166	182	198	214	230	246
7	0111	ç	ù	ó	⌘	⌘	⌘	τ	≈
		135	151	167	183	199	215	231	247
8	1000	ê	ÿ	ô	⌘	⌘	⌘	Φ	°
		136	152	168	184	200	216	232	248
9	1001	ë	ÿ	⌘	⌘	⌘	⌘	θ	•
		137	153	169	185	201	217	233	249
A	1010	è	Ü	⌘	⌘	⌘	⌘	Ω	•
		138	154	170	186	202	218	234	250
B	1011	ï	ϕ	½	⌘	⌘	⌘	δ	√
		139	155	171	187	203	219	235	251
C	1100	î	£	¼	⌘	⌘	⌘	∞	π
		140	156	172	188	204	220	236	252
D	1101	ï	¥	ı	⌘	⌘	⌘	ø	²
		141	157	173	189	205	221	237	253
E	1110	Ä	Pl	«	⌘	⌘	⌘	€	■
		142	158	174	190	206	222	238	254
F	1111	Å	f	»	⌘	⌘	⌘	∩	SP
		143	159	175	191	207	223	239	255

b) Page 17. PC866: Cyrillic.

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	А	Р	а	Ѡ	Љ	Ў	р	Ѣ
		128	144	160	176	192	208	224	240
1	0001	Б	С	б	ѡ	Њ	Ѧ	с	ѣ
		129	145	161	177	193	209	225	241
2	0010	В	Т	в	Ѣ	Ћ	ѧ	т	Ѥ
		130	146	162	178	194	210	226	242
3	0011	Г	У	г	ѣ	Ќ	Ѩ	у	ѥ
		131	147	163	179	195	211	227	243
4	0100	Д	Ф	д	Ѥ	Ў	ѩ	ф	Ѧ
		132	148	164	180	196	212	228	244
5	0101	Е	Х	е	Ѧ	Ѐ	Ѫ	х	ѧ
		133	149	165	181	197	213	229	245
6	0110	Ж	Ц	ж	ѧ	Ё	ѫ	ц	Ѩ
		134	150	166	182	198	214	230	246
7	0111	З	Ч	з	Ѩ	Ђ	Ѭ	ч	ѯ
		135	151	167	183	199	215	231	247
8	1000	И	Ш	и	ѯ	Ѓ	ѭ	ш	Ѱ
		136	152	168	184	200	216	232	248
9	1001	Й	Щ	й	Ѱ	Є	Ѯ	щ	ѱ
		137	153	169	185	201	217	233	249
A	1010	К	Ъ	к	ѱ	Ѕ	ѯ	ъ	Ѳ
		138	154	170	186	202	218	234	250
B	1011	Л	Ы	л	Ѳ	Ї	Ѱ	ы	ѳ
		139	155	171	187	203	219	235	251
C	1100	М	Ь	м	ѳ	Љ	Ѳ	ь	Ѵ
		140	156	172	188	204	220	236	252
D	1101	Н	Э	н	Ѵ	Њ	ѳ	э	ѵ
		141	157	173	189	205	221	237	253
E	1110	О	Ю	о	ѵ	Ѓ	Ѵ	ю	Ѷ
		142	158	174	190	206	222	238	254
F	1111	П	Я	п	Ѷ	Є	ѵ	я	ѷ
		143	159	175	191	207	223	239	255

APPENDIX G – TESTING SOFTWARE

The TK14 printer is delivered together with a Windows-based, testing program. This program is an easy way to explore the TK14's main features.

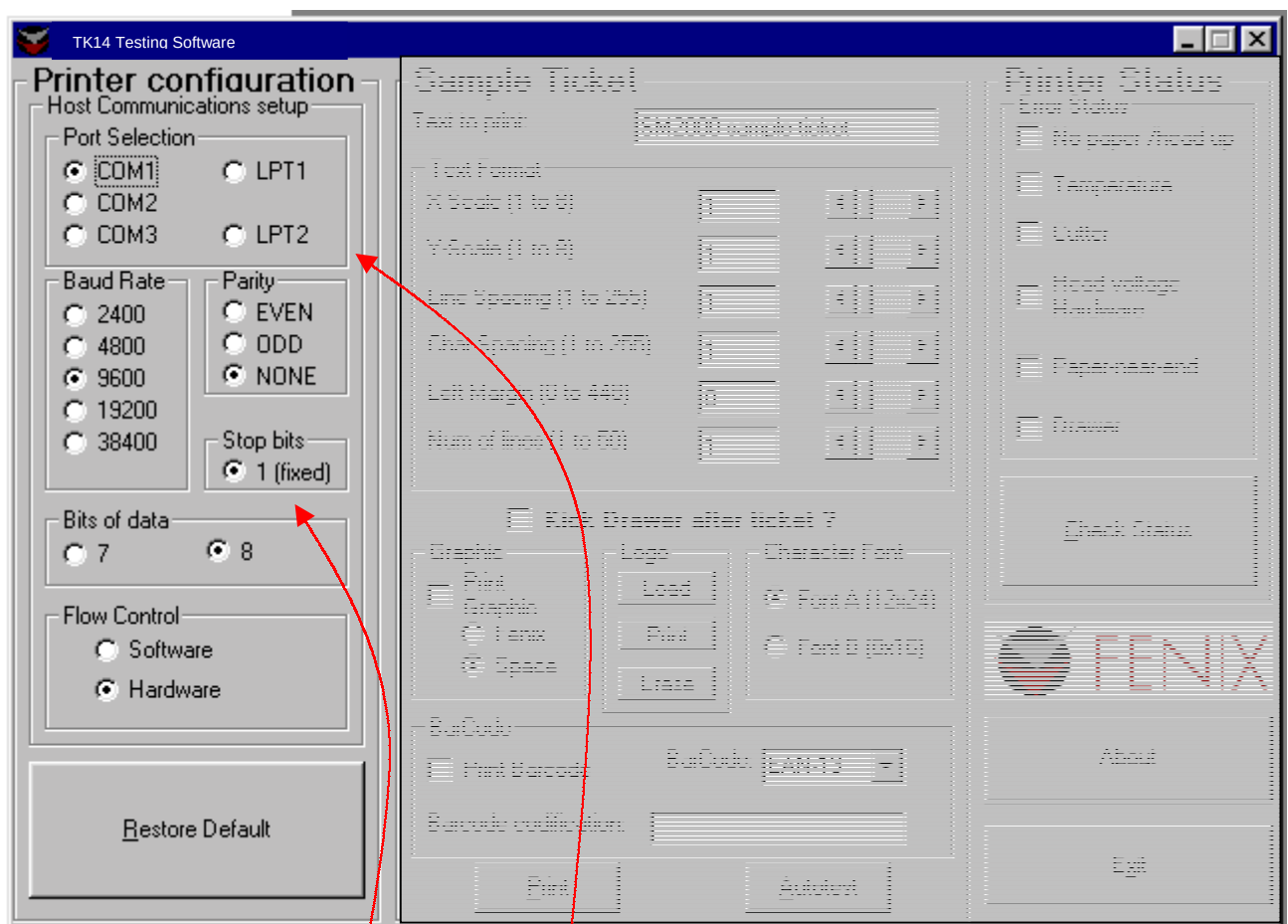
To install the program, run the **"SETUP.EXE"** file and follow the instructions on the screen.

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



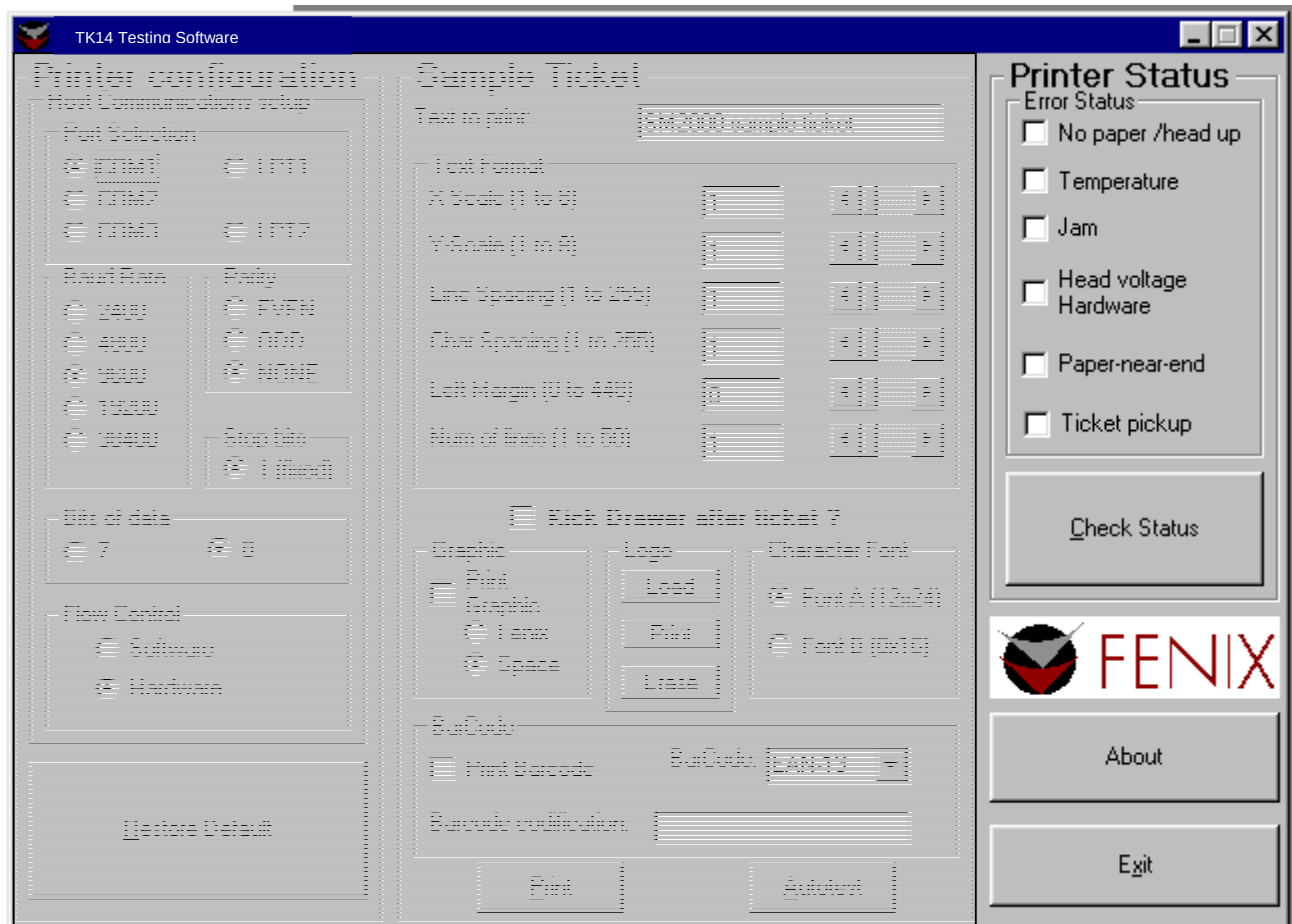
Serial port
configuration

Serial or parallel
port selection

PRINTER STATUS

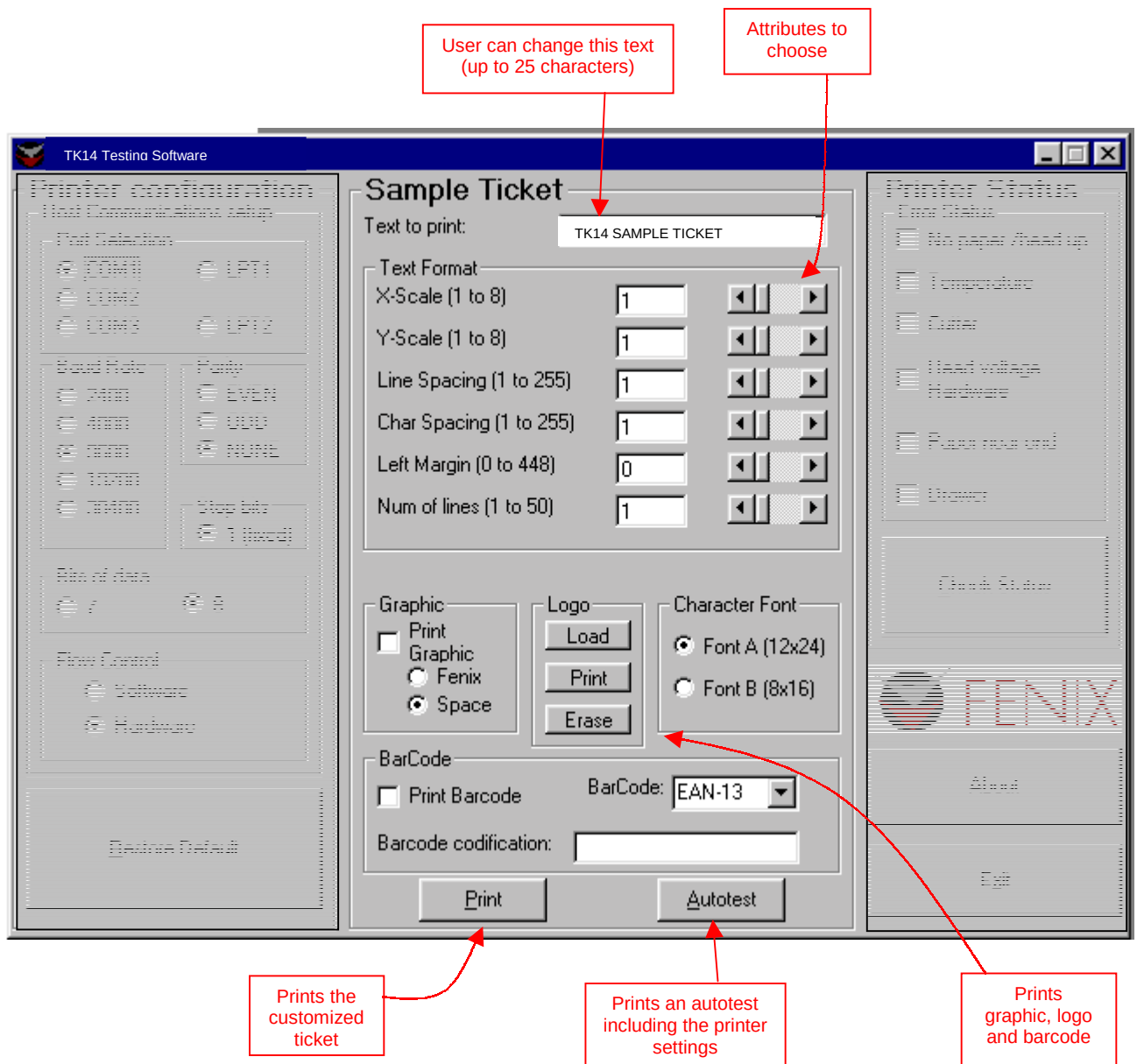
When enabling the printer status window, the program tests the printer's sensors and notifies every significant error or printing status.

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.



SAMPLE TICKET

With this feature, user can appreciate different formats of text by choosing the attributes of the desired text.





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