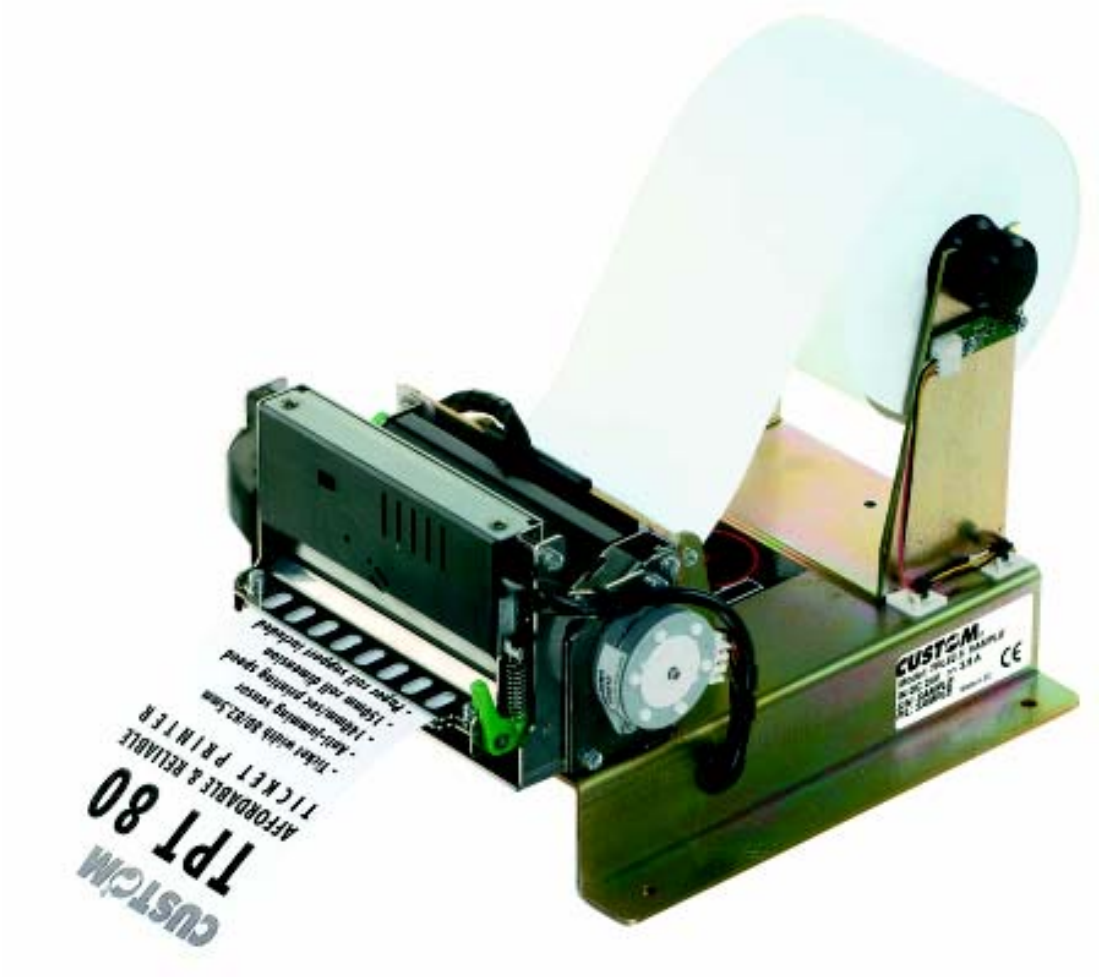
Thermal printer for information kiosks and ATMs

TPL 80/82.5 mm

User Manual



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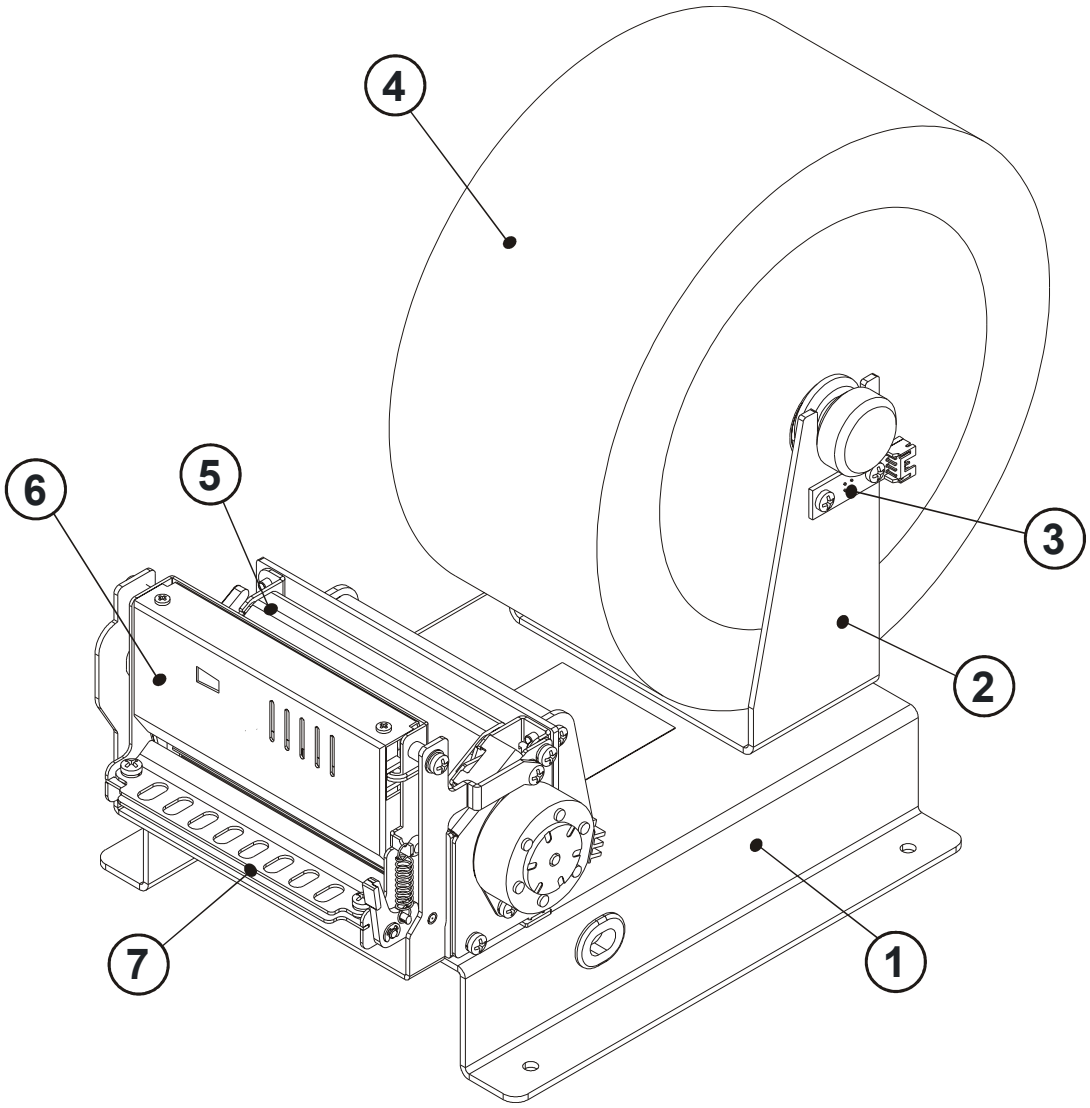
PRINTER COMPONENTS

A. TPL825-S Front external view

1- Printer frame
2- Paper roll support
3- Near paper end sensor
4- Paper roll
5- Printing mechanism
6- Cutter
7- Paper outfeed



B. Rear external view with RS232 serial interface

1- Power supply connector
2- RS232 serial connector
3- “Near paper end” led
4- Status led
5- “Power on” led
6- “Form Feed” Key
7- “Line Feed” Key
8- Paper input

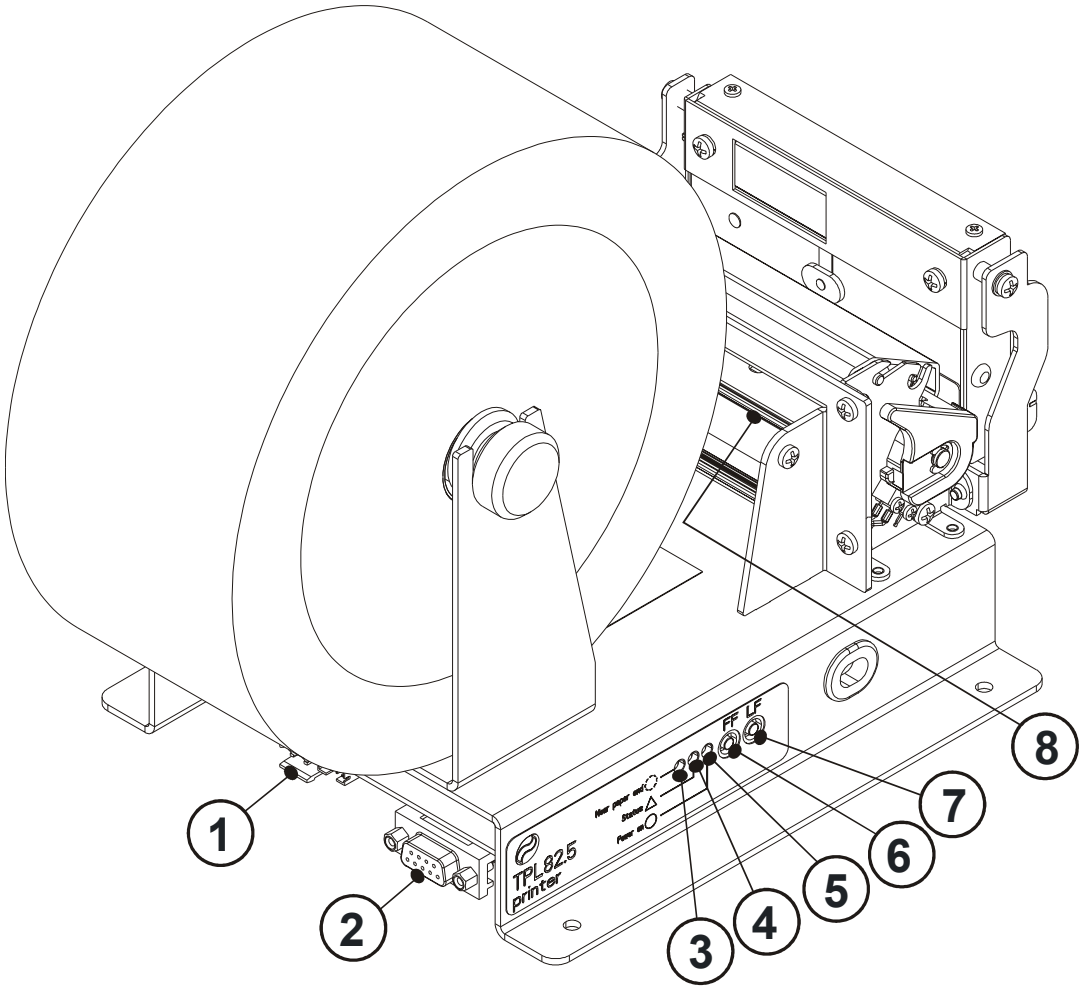


TABLE OF CONTENTS

MANUAL CONTENTS

In addition to the Introduction which includes a description of the explanatory notes used in the manual, general safety information, how to unpack the printer and a brief description of the printer including its basic features, this manual is organized as follows:

Chapter 1: Contains the information required for correct printer installation and its proper use

Chapter 2: Contains information on interface specifications

Chapter 3: Contains a description of the printer command set

Chapter 4: Contains Technical Specifications of the printer

Chapter 5: Contains the character sets (fonts) used by the printer

EXPLANATORY NOTES USED IN THIS MANUAL

N.B.
Gives important information or suggestions relative to the use of the printer.

WARNING
Information marked with this symbol must be carefully followed to guard against damaging the printer.

DANGER
Information marked with this symbol must be carefully followed to guard against operator injury or damage.

GENERAL SAFETY INFORMATION

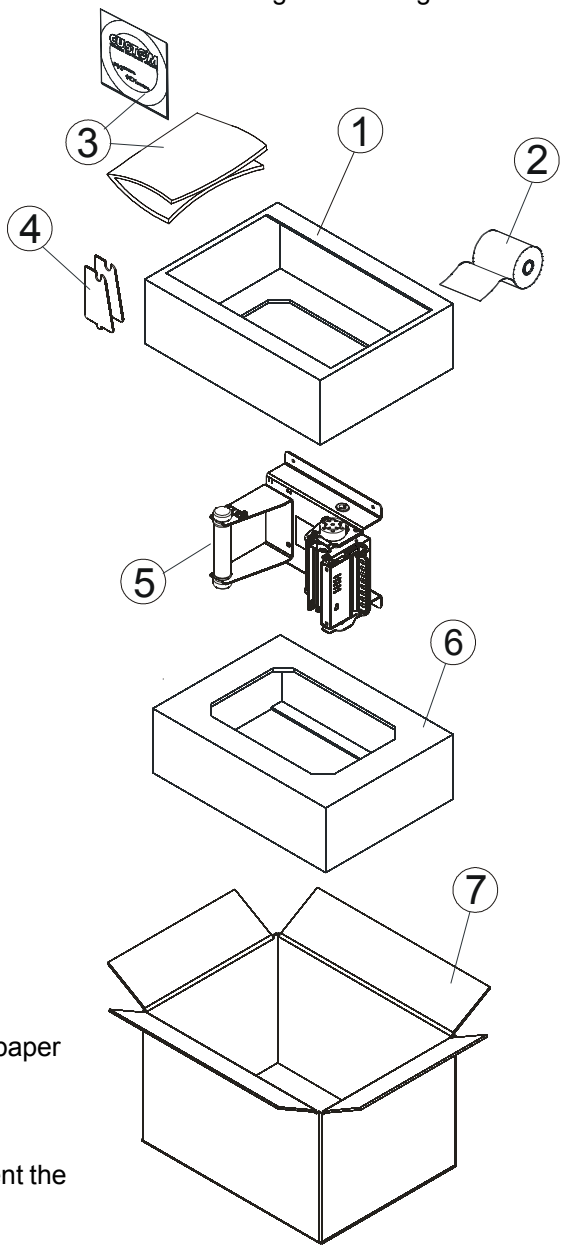
- Read and keep the instructions which follow.
- Follow all warnings and instructions indicated on the printer.
- Before cleaning the printer, disconnect the power supply.
- Clean the printer with a damp cloth. Do not use liquid or spray products.
- Do not operate the printer near water.
- Do not use the printer on unstable surfaces that might cause it to fall and be seriously damaged.
- Only use the printer on hard surfaces and in environments that guarantee proper ventilation.
- Make sure the printer is placed in such a way as to avoid damage to its wiring.
- Use the type of electrical power supply indicated on the printer label. If in doubt, contact your retailer.
- Do not block the ventilation openings.
- Do not introduce foreign objects of any kind into the printer as this could cause a short circuit or damage parts that could jeopardize printer functioning.
- Do not spill liquids onto the printer.
- Do not carry out technical operations on the printer, with the exception of the scheduled maintenance procedures specifically indicated in the user manual.
- Disconnect the printer from the electricity supply and have it repaired by a specialized technician when:

    A. The feed connector has been damaged.
    B. Liquid has seeped inside the printer.
    C. The printer has been exposed to rain or water.
    D. The printer is not functioning normally despite the fact that all instructions in the users manual have been followed.
    E. The printer has been dropped and its outer casing damaged.
    F. Printer performance is poor.
    G. The printer is not functioning.

UNPACKING THE PRINTER

Remove the printer from its carton being careful not to damage the packing material so that it may be re-used if the printer is to be transported in the future.
Make sure that all the components listed below are present and that there are no signs of damage. If there are, contact Customer Service.

1. Upper foam packing shell
2. Paper roll (80 / 82.5)
3. Manual (or CD-Rom)
4. Paper adaptation stirrup for 80mm.
5. Printer
6. Lower foam packing shell
7. Box



- Open the printer packaging
- Remove the paper roll, the manual (or CD-Rom) and paper adaptation stirrup.
- Take out the upper foam packing shell.
- Take out the printer.
- Keep the box, trays and packing materials in the event the printer must be transported/shipped in the future.

PRINTER FEATURES

The printer is comprised of printers designed to emit high-resolution thermal-printed tickets ideal for use in information and multimedia kiosks, self-service machines, no-queue systems, parking areas, gaming machines and toll receipt machines.

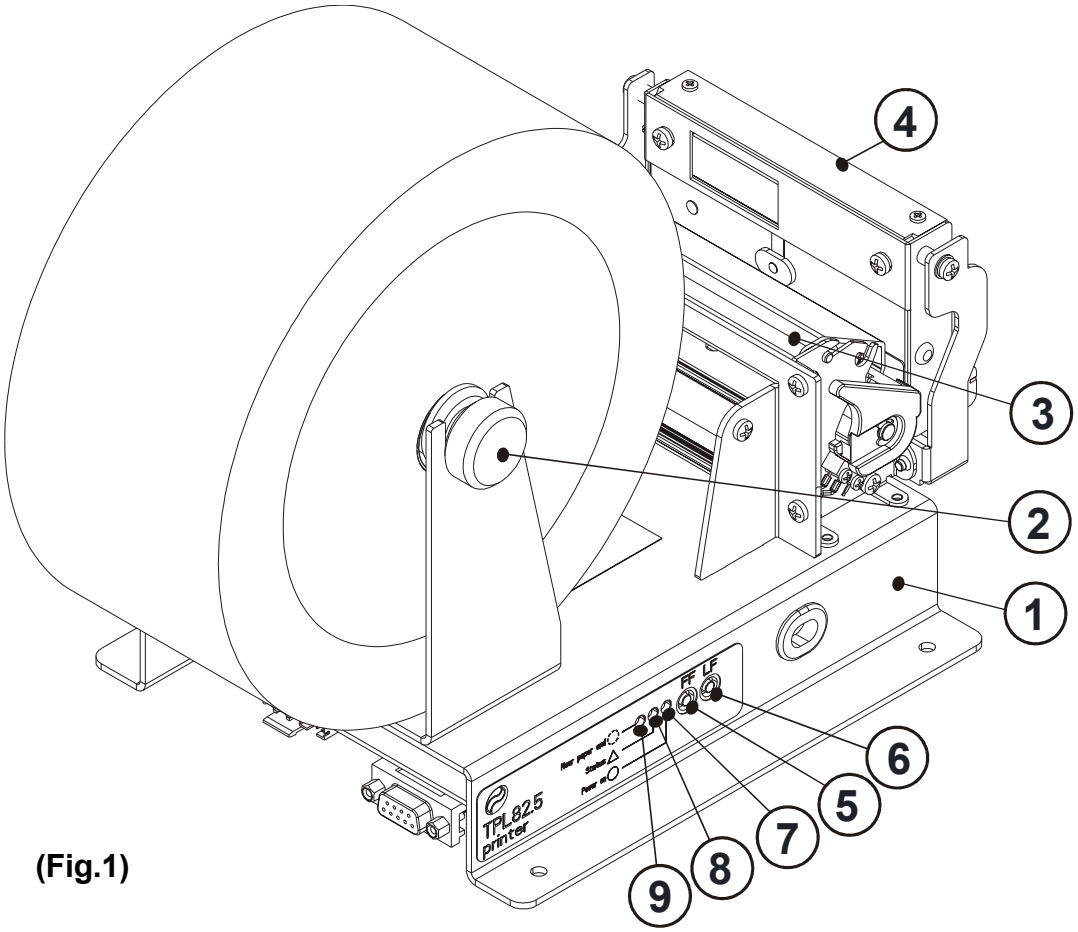
The printer offers a wide range of options in addition to normal print features:

- Ticket width : 80, 82.5 mm.
- High speed printing: 130mm/sec.
- Interfaces : RS232, USB optional, CENTRONICS parallel.
- ESC/POS™ and CUSTOM TPT emulation.
- Bar code UPC-A. UPC-E, EAN13, EAN8, CODE39, ITF, CODABAR, CODE93, CODE128 and CODE32.

- 6 standard and international character set fonts.
- Completely- or partially-programmable fonts.
- Double width/height, quadruple width/height, expanded, italic, rotated 90°, 180° and 270°.
- Receive buffer: 16Kbytes.
- Definition of function macros for automatic operation repetition.
- Internal programmable counter.
- Graphic print mode.
- Print density.
- ESC/POS™ Emulation :6 programmable logos 640 x 215 each dots
  CUSTOM TPT Emulation :3 programmable logos: 640 x 431 each dots
- Anti-jamming and near paper end sensors.
- Paper cutter.

PRINTER DESCRIPTION

The printer (fig.1) is comprised of a metal frame (1), paper roll holder (2), printing mechanism (3) and cutter (4). The following keys are located on the control panel: FORM FEED (5), LINE FEED (6), “Power On” LED (7), Paper Low LED (8) and “Status” LED (9).



(Fig.1)

- When the LINE FEED (6) key is pressed, the printer advances the paper so that it may be inserted manually in the printing mechanism. During power-up, if the LINE FEED key is held down, the printer will perform the FONT TEST routine.

- If the FORM FEED (5) key is enabled, when it is pressed the printer advances the paper the number of increments programmed in the Eeprom. If the FORM FEED key is not enabled and the printer is in Custom Emulation mode, when the key is pressed, the code 12 (HEX 0C) is transmitted on the RS232 serial line. This function may be modified by the ESC = software command (see section on software commands).

- During power-up, if both keys are held down, the printer enters the print setup routine. Following the print-out of the setup report, the printer remains in standby until a key is pressed or signals arrive from the serial port; each 10 characters it prints out hexadecimal and ASCII codes (if the characters are underlined, the receive buffer is full); see Receive buffer hexidecimal print-out.

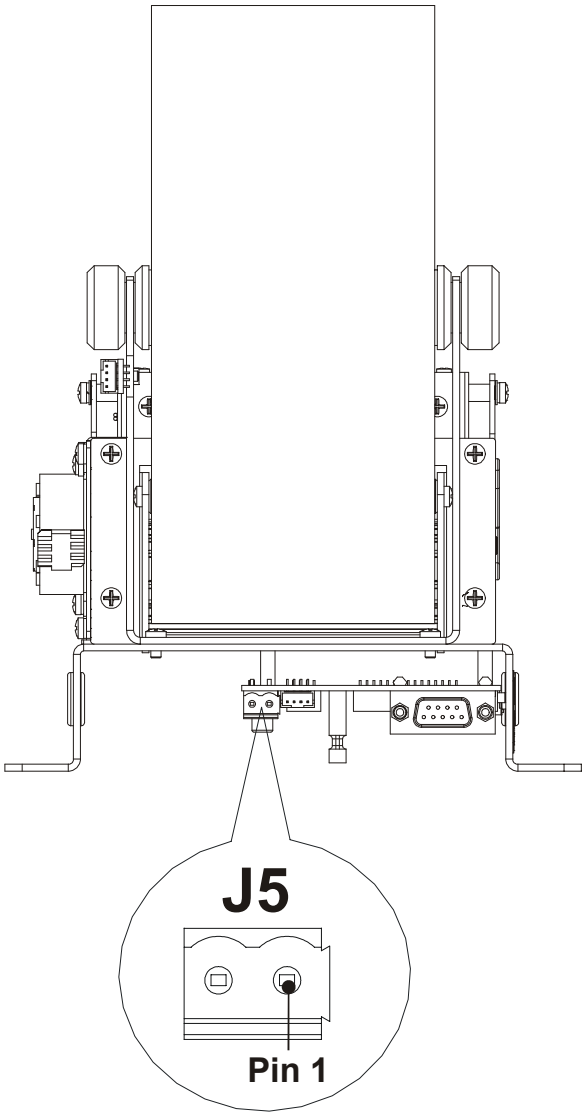
- The “Power On” LED (green) indicates that the printer is on.
- The Paper Low LED (red) indicates that the paper is about to run out.

- The “Status” LED (yellow) indicates printer status; the check is made on-line. Given in the table below are the various LED signals and the corresponding printer status.

(Tab.1)

LED status	Description
Steady	Printer ON - no malfunction
Rapid blinking	Overheating
Slow blinking (lit for extended period)	"No Paper" message
Slow blinking (lit for short period)	Head turned upwards
Remains off	Printer malfunction

1.1 CONNECTIONS



(Fig.1.1)

1.1.1 Power supply

For the power supply, every model of the printer is equipped with a male, 90° mobile screw (pitch 5.08mm) terminal (J5). The signals on the power suppy connector pins are as follows:

WARNING:
Respect power supply polarity.

Pin no.	Signal
1	GND
2	24Vcc power supply

(Tab.1.1)

1.2 SELF-TEST

Printer operating status is indicated in the configuration print-out in which, next to the name of the components displayed (see fig. 1.2 and fig. 1.3), the following information is given:
• under *INTERFACE* is given the interface present (RS232, CENTRONICS or USB(1)).
• under *EEPROM TEST* and *CUTTER TEST,* the message OK appears if functioning and NOT OK if faulty.
• under *EJECTER TEST,* the message OK appears if functioning, NONE if not present and NOT OK if faulty.
• under *HEAD TEMPERATURE* is given the temperature of the head.
• under *PAPER PRINTED* is given the number of centimeters of paper printed.

• under *CUT COUNTER* is given the number of cuts made.
• under *POWER ON COUNTER* is given the number of power-ups made.

(1) **NOTE:** *If the printer has a USB interface and the cable is plugged into the printer connector, the message USB will appear next to the address assigned by the Host to the USB peripheral device in use (see fig. 1.3).*
(2) **NOTE:** *If the printer has an USB interface, the serial interface configuration parameters are not displayed.*
(3) **NOTE:** *This parameter is displayed if the printer has an USB interface; it's used to identify univocally the USB printer by a numerical address code, if on the PC are connected two printers with USB interface.*
(4) **NOTE:** *This parameter is displayed if the printer has an USB interface. The Status Monitor is an additional printing driver component that allows the printer status monitoring. It must be enabled only if it was installed the Status Monitor specific driver.*

Model with serial interface

* PRINTER SETUP *

INTERFACE.....: RS232
EEPROM TEST.....: OK
CUTTER TEST.....: OK
EJECTER TEST.....: OK
HEAD TEMPERATURE [°C].: 22.5
PAPER PRINTED [cm].....: 9860
CUT COUNTER.....: 604
POWER ON COUNTER.....:135

Printer emulation	**: CUSTOM TPT**
Baud Rate (2)	**: 9600 bps**
Data length (2)	**: 8 bits/chr**
Parity (2)	**: None**
Handshaking (2)	**: Xon/Xoff**
Autofeed	**: CR disabled**
Panel key	**: Enabled**
Print Mode	**: Normal**
Height Mode	**: x 1**
Width Mode	**: x 1**
Justification	**: Left**
Font Dimension	**: 16x24 28 col**
Speed / Quality	**: Normal**
Current	**: Normal**
Paper autoload	**: Enabled**
Reset buffer	**: At Paper End**
Print Density	**: Normal**

[FF] *Key to enter setup*
[LF] *Key to skip setup*

(Fig.1.2)

Model with USB interface

* PRINTER SETUP *

INTERFACE.....: USB : 2 (1)
EEPROM TEST.....: OK
CUTTER TEST.....: OK
EJECTER TEST.....: OK
HEAD TEMPERATURE [°C].: 22.5
PAPER PRINTED [cm].....: 9860
CUT COUNTER.....: 604
POWER ON COUNTER.....:135

Printer emulation	**: CUSTOM TPT**
USB Address N. (3)	**: 0**
USB Status Monitor (4)	**: Enabled**
Autofeed	**: CR disabled**
Panel key	**: Enabled**
Print Mode	**: Normal**
Height Mode	**: x 1**
Width Mode	**: x 1**
Justification	**: Left**
Character set	**: U.S.A.**
Font Dimension	**: 16x24 28 col**
Speed / Quality	**: Normal**
Current	**: Normal**
Paper autoload	**: Enabled**
Reset buffer	**: At Paper End**
Print Density	**: Normal**

[FF] *Key to enter setup*
[LF] *Key to skip setup*

(Fig.1.3)

1.3 CONFIGURATION

This printer permits the configuration of default parameters. The printer's configurable parameters are:

- **Printer emulation:** ESC/POS™, CUSTOM TPT *D*.

If serial interface is present:

- **Baud Rate:** 57600, 38400, 19200, 9600 *D*, 4800, 2400, 1200.
- **Data length:** 7, 8 bits/char *D*.
- **Parity:** None *D*, even or odd.
- **Handshaking:** XON/XOFF *D* or Hardware.

If parallel interface is present:

- **Select line:** Select *D*, Ticket Present, Paper Low.
- **Fault line:** Error *D*, Ticket Present, Paper Low.

- **USB address N. :** 0 *D*, 1, 2, 3, 4, 5, 6, 7, 8, 9.
- **USB Status Monitor :** Activated o deactivated *D*.
- **Autofeed:** CR deactivated *D* or CR activated.
- **Panel keys:** Activated *D* or deactivated.
- **Print mode:** Normal *D* or Reverse.
- **Height mode:** x1 *D* , x2 or x4.
- **Width mode:** x1 *D*, x2 or x4.
- **Justification:** Left *D*, Centered or Right.

With ESC/POS™ emulation:

- **Char/line:** Ⓐ A=43 / B=60 columns*D* or A=60 / B=76 columns
  Ⓑ A=45 / B=64 columns*D* or A=64 / B=80 columns

With CUSTOM TPT emulation:

- **Font Size:**

Ⓐ	25 col.	38 col.	76 col.
	24x32	16x24	8x16

Ⓑ	26 col.	40 col.	80 col.
	24x32	16x24	8x16

- **Speed/Quality:** Normal *D*, Draft or High Quality.
- **Paper Autoload:** Deactivated *D* or Activated.
- **Reset buffer:** Not implemented, At paper end *D*.
- **Print density:** Normal *D*, Light, Very light, Dark, Very dark, Double copy.

General notes:
- The parameters marked with the symbol *D* are the default values.
- The Ⓐ symbol indicates TPL 80 model.
- The Ⓑ symbol indicates TPL 82.5 model.
- Settings remain active even after the printer has been turned off.

The settings made are stored in EEPROM (nonvolative memory).
During power-up, if both the LINE FEED and FORM FEED keys are held down, the printer enters configuration mode and prints-out the setup report; it will remain in standby until a key is pressed or characters are received through the communication port (see Hexadecimal dump).
When the LINE FEED key is pressed, the printer skips the setup mode and terminates the Hexadecimal dump function.
When the FORM FEED key is pressed, the printer enters the parameter entry mode.

1.4 HEXADECIMAL DUMP

This function is used to diagnose the characters received through the communication port; the characters are printed out both as hexadecimal codes and ASCII codes.
Once the self-test routine has finished, the printer enters Hexadecimal Dump mode. The printer remains in

standby until a key is pressed or characters are received through the communication port.
For every 10 characters received, the hexadecimal and corresponding ASCII codes are printed out (if the characters are underlined, the receive buffer is full). Shown below is an example of a Hexadecimal Dump:

```
48  65  78  61  64  65  63  69  6D  61      Hexadecima
6C  20  64  75  6D  70  20  66  75  6E      l dump fun
63  74  69  6F  6E  20  30  31  32  33      ction 0123
34  35  36  37  38  39  61  62  63  64      456789abcd
65  66  67  68  69  6A  6B  6C  6D  6E      efghijklmn
6F  70  71  72  73  74  75  76  77  78      opqrstuvwx
79  7A                                      yz
```

1.5 MAINTENANCE

1.5.1 Changing the paper roll

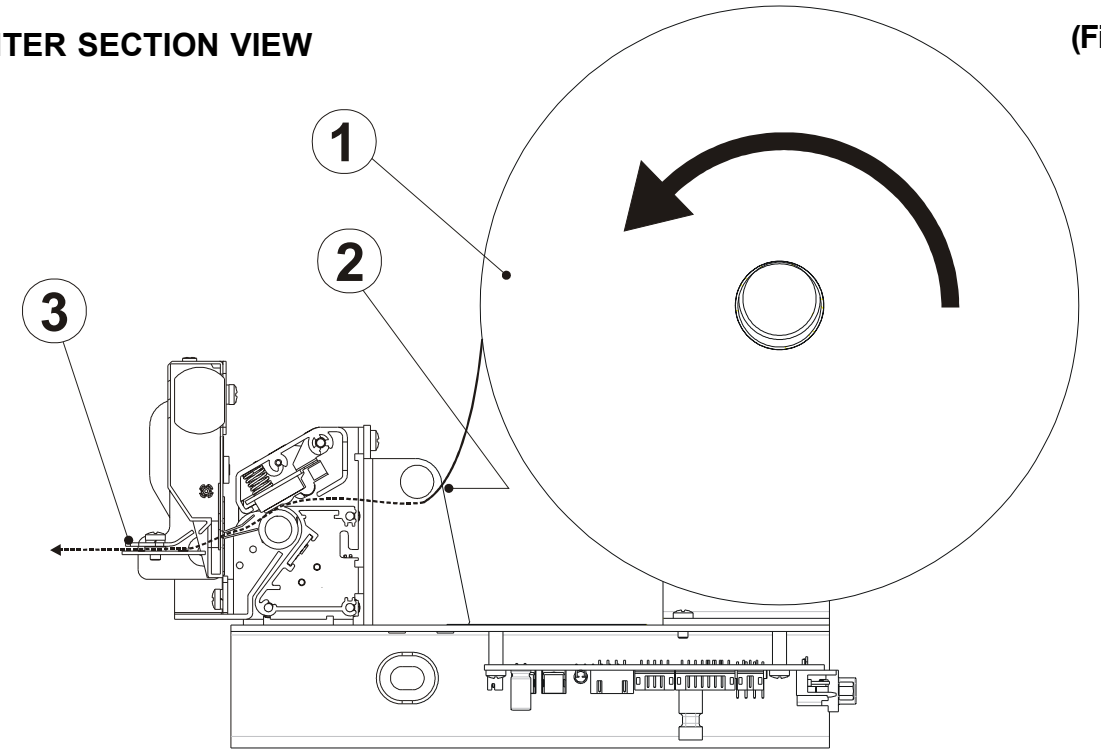
Depending on how the printer **"Paper Autoload"** parameter is set, one of two procedures must be followed:

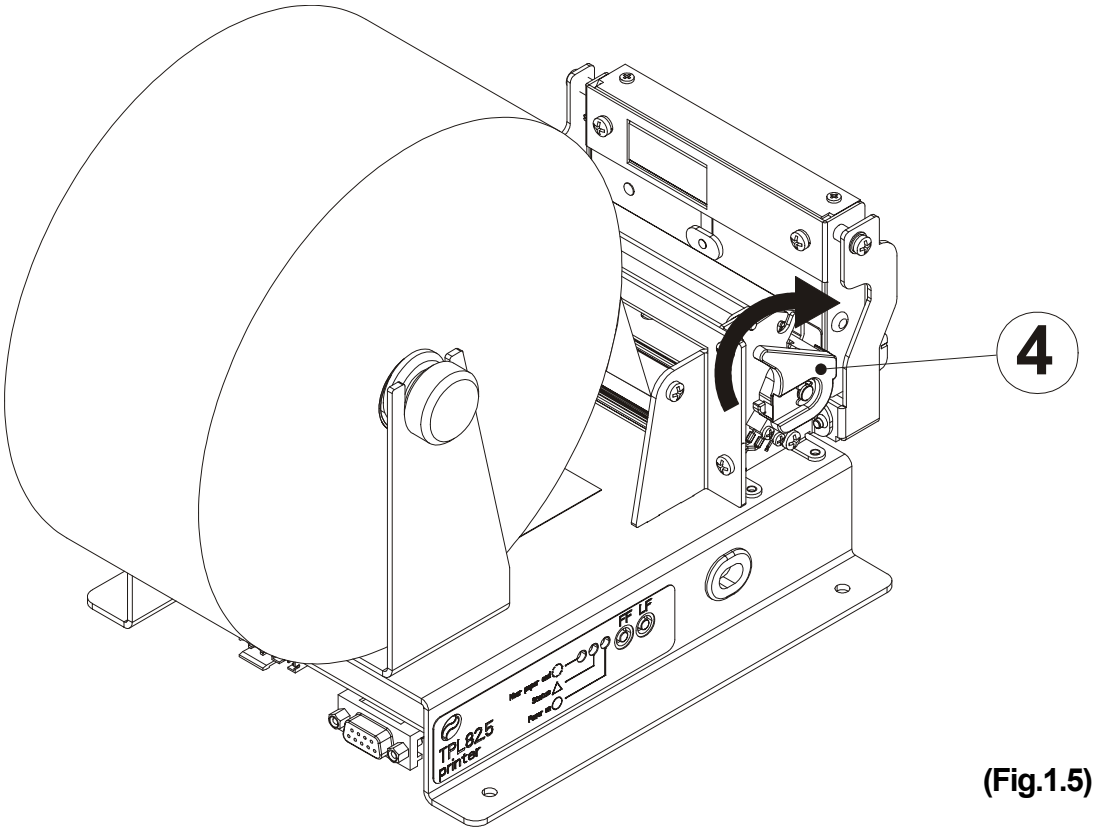
If enabled: Position the paper roll (1), so that it unrolls correctly as shown in fig. 1.4; insert the paper into the infeed slot (2) and wait for the roll to load automatically.

If not enabled, proceed as follows:

1) Position the paper roll (1), so that it unrolls correctly as shown in fig. 1.4;
2) Raise the print head by lifting the lever (4) in the direction indicated by the arrow as shown in fig. 1.5;
3) Insert the end of the paper roll into the infeed slot (2) and have it pass beyond the print head;
4) Lower the head lever and press the LINE FEED key, so that the paper will feed a few centimeters out of the printer (3).

PRINTER SECTION VIEW **(Fig.1.4)**





(Fig.1.5)

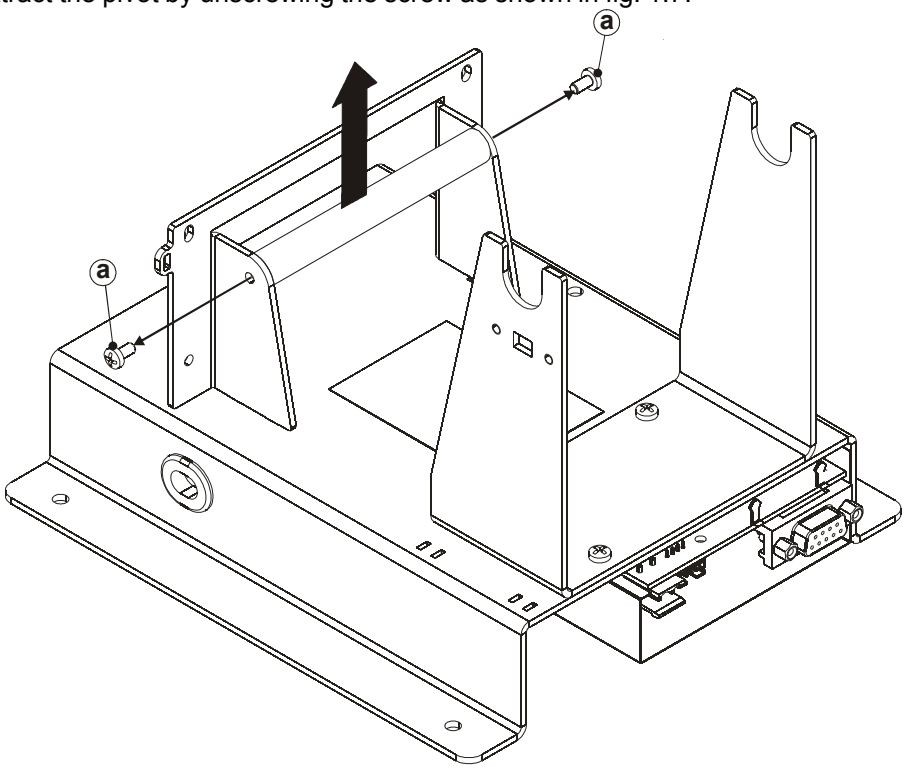
(Fig.1.6)

ATTENTION
Before inserting the paper, make sure it is cut cleanly.

NOTE: the changing paper procedure is the same for all the printer models avalaible.

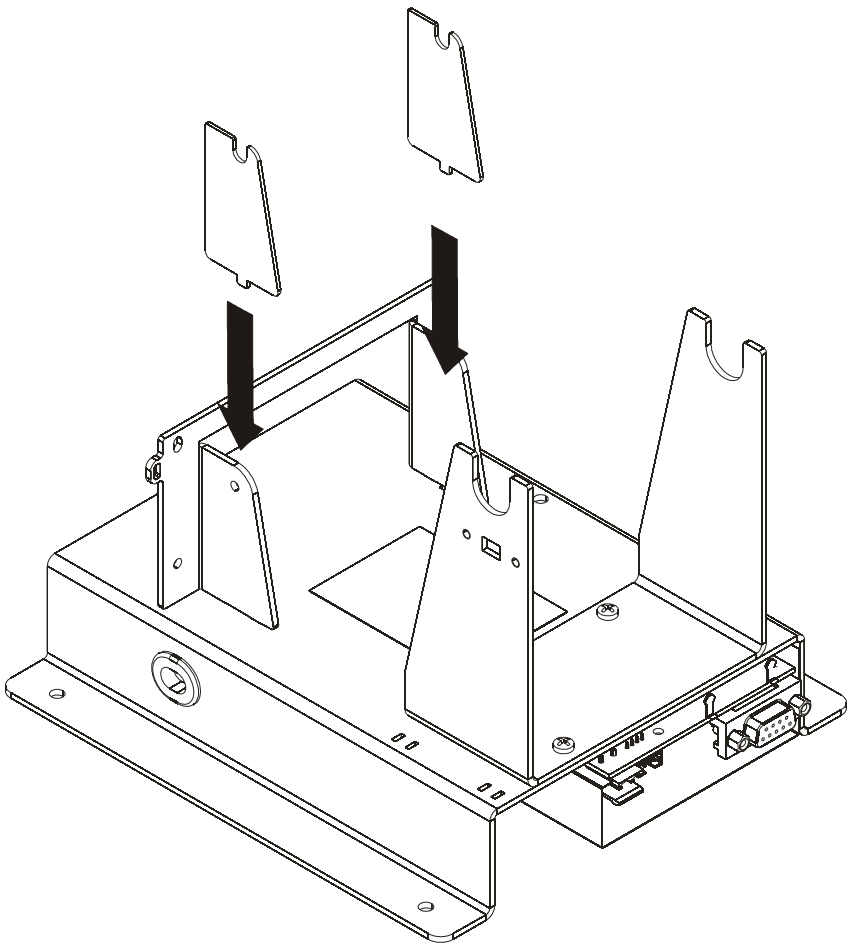
1.5.2 Using adaptation stirrup for 80 mm paper width

1) Extract the pivot by unscrewing the screw as shown in fig. 1.7.



(Fig.1.7)

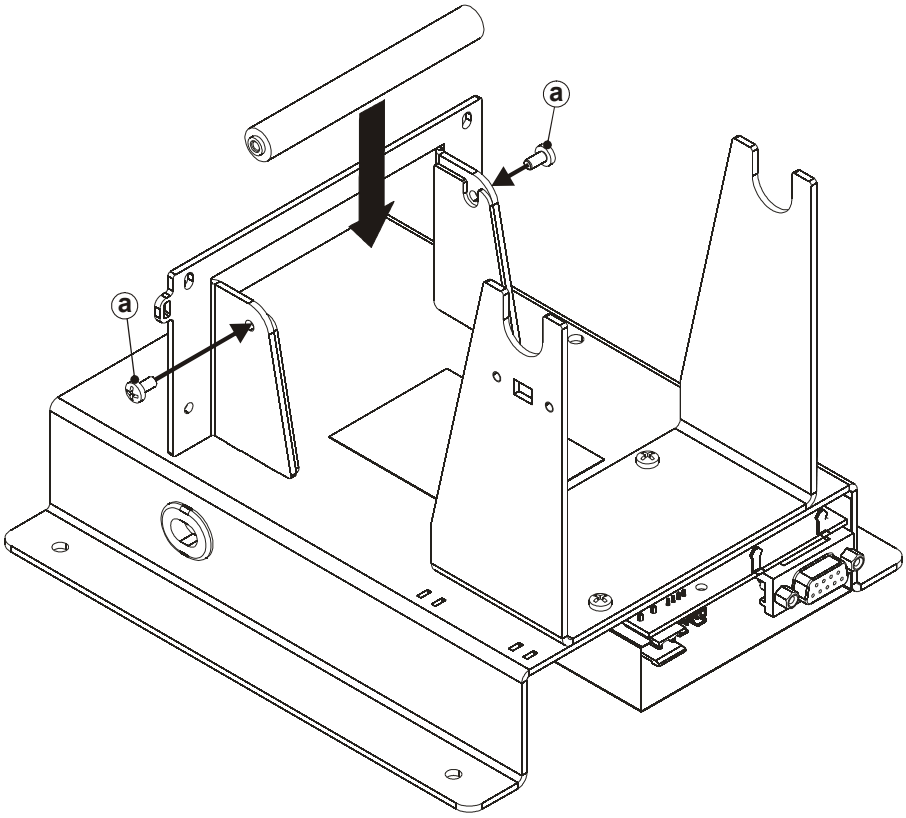
2) Insert the two stirrup for 80 mm paper adaptation as shown in fig. 1.8.



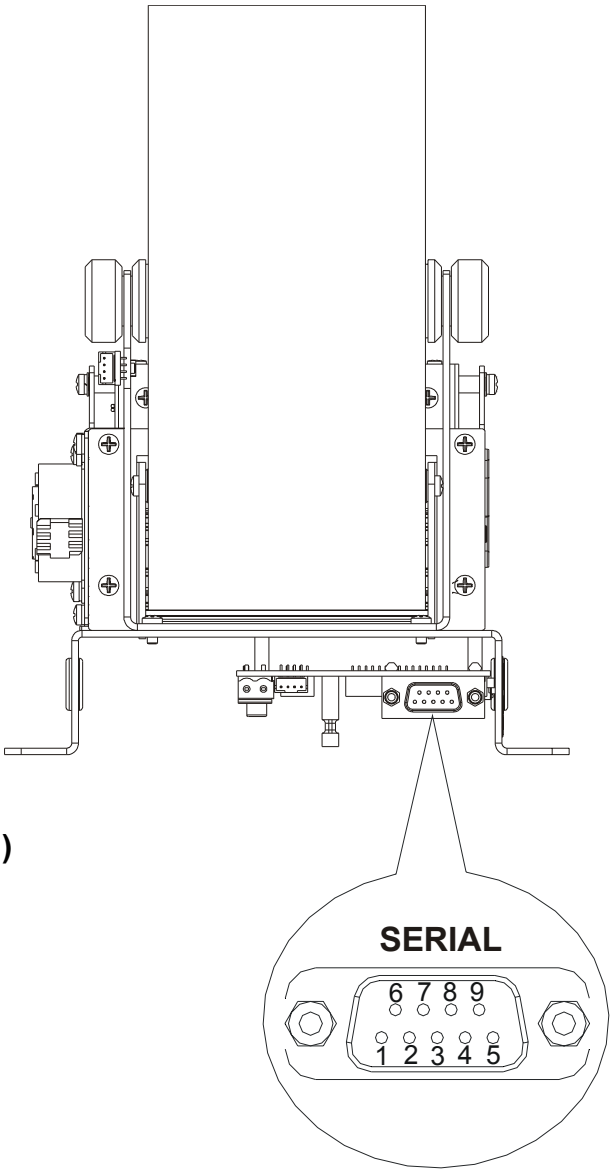
(Fig.1.8)

3) Re-assemble the pivot inside the two stirrup and fixing itself with the two screw as shown in fig. 1.9.

(Fig.1.9)



2.1 RS232 SERIAL



(Fig.2.1)

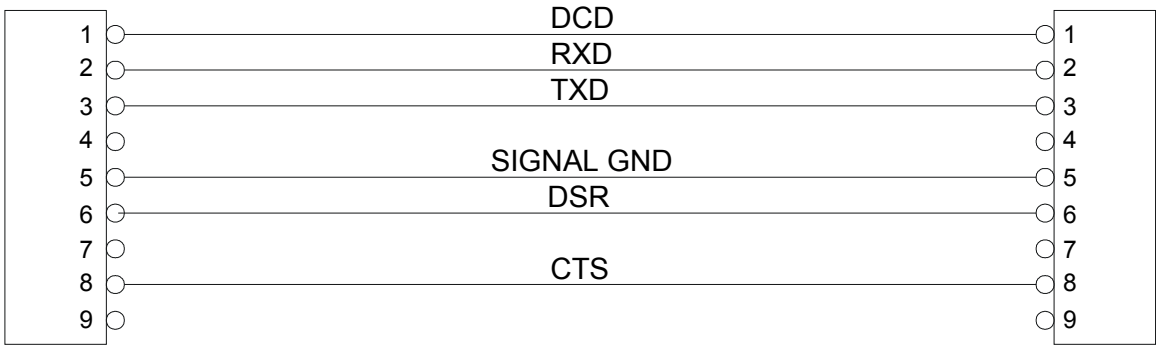
The printer has an RS232 serial interface and is connected by means of a 9 pin female connector (see fig. 2.1). In the following table, the signals present on the connector are listed:

(Tab.2.1)

PIN	SIGNAL	DIRECTION	TO	DESCRIPTION
1	DCD	Output	DCD	Data Carrier detect. Printer ON (active at level RS232 high)
2	TXD	Output	RXD	Receive data. Serial output (from Host)
3	RXD	Input	TXD	Transmit data. Serial data input (towards Host)
4	N.C.	-	N.C.	Not connected
5	GND	-	GND	Ground signal
6	DSR	Output	DSR	Data Set Ready. Printer on and operating (active at RS232 level high).
7	N.C.	-	N.C.	Not connected
8	RTS	OUT	CTS	Clear to send. Ready to receive data (active at RS232 high level)
9	N.C.	-	N.C.	Not connected

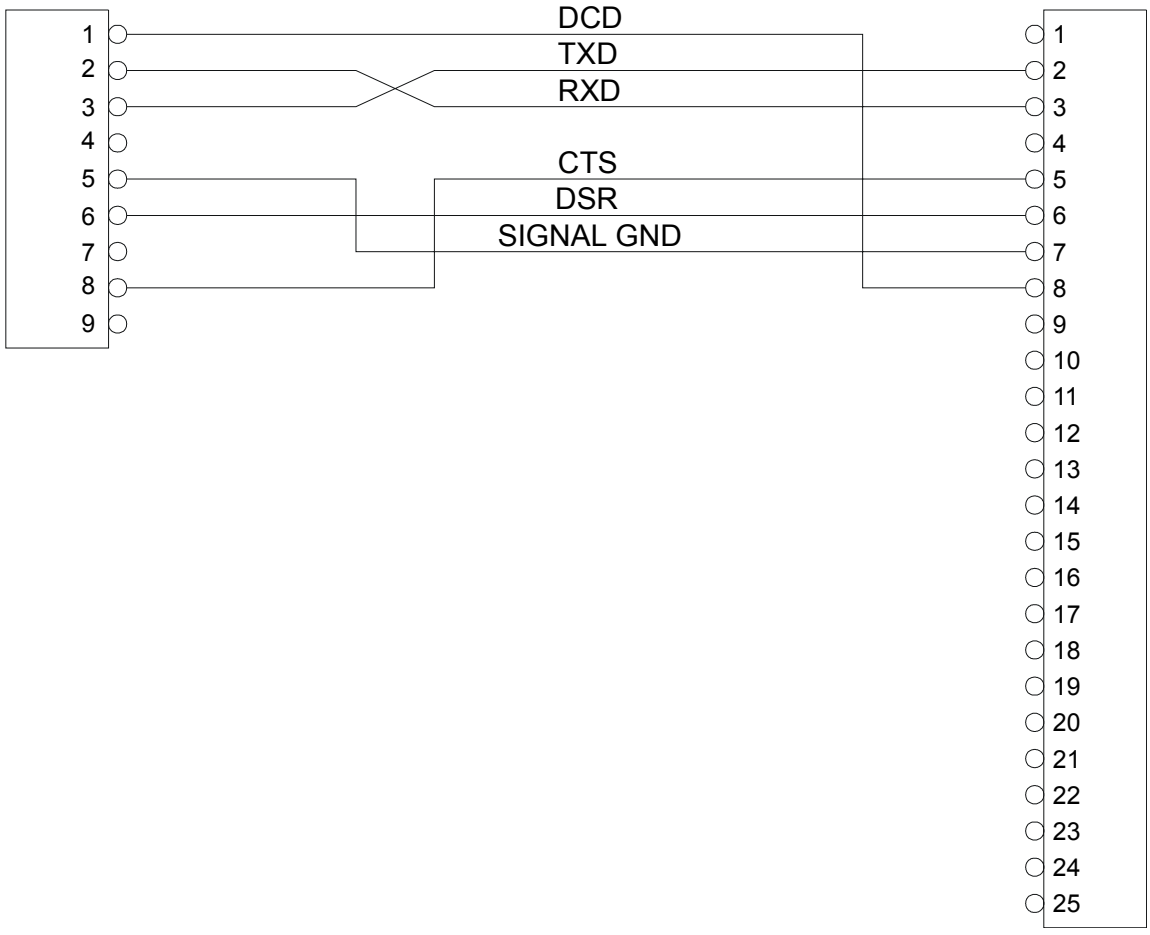
The following diagrams show examples of connections between the printer and the Personal Computer using 25 and 9 pin female connectors.

(Fig.2.2)



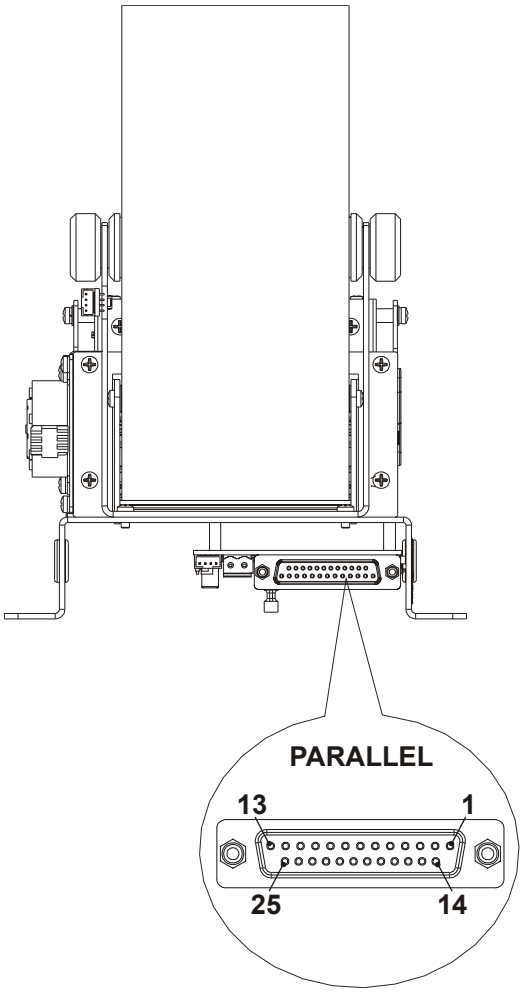
TPL 80 / 82.5-S **PC**

(Fig.2.3)



TPL 80 / 82.5-S **PC**

2.2 PARALLEL CENTRONICS



(Fig.2.4)

The printer has a Centronics parallel interface and is connected by means of a 25-pin female connector (see fig. 2.4). In the following table, the signals present on the connector are listed:

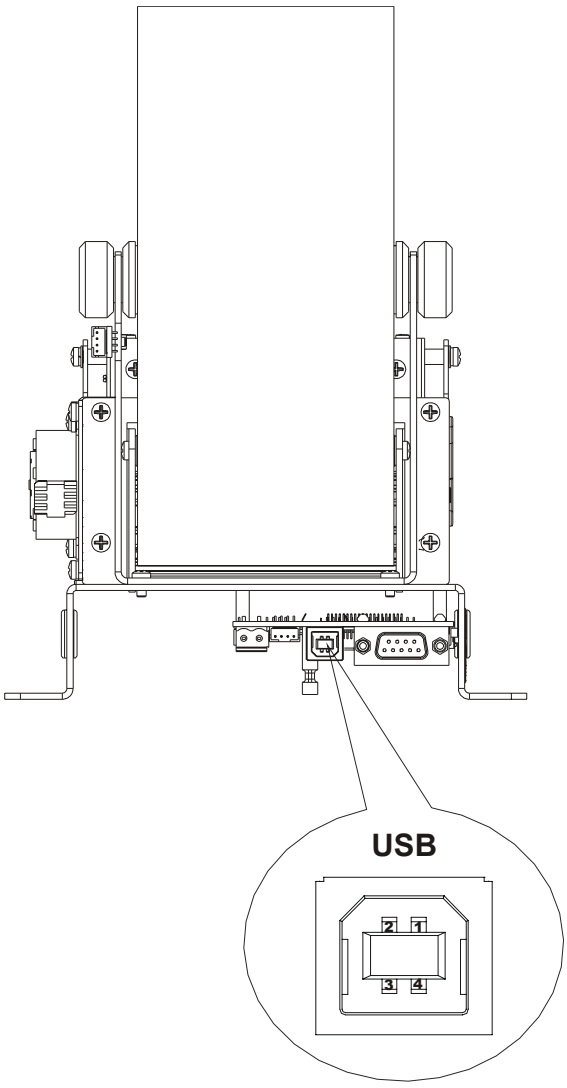
(Tab.2.2)

PIN	SIGNAL	FUNCTION
1	Strobe	Strobe input
2	D0	Data input bit 0
3	D1	Data input bit 1
4	D2	Data input bit 2
5	D3	Data input bit 3
6	D4	Data input bit 4
7	D5	Data input bit 5
8	D6	Data input bit 6
9	D7	Data input bit 7
10	ACK	Acknowledge
11	BUSY	Busy
12	PE	Paper end
13	SELECT	Select / Ticket presence / Near paper end (*)
14	N.C.	Not connected
15	FAULT	Fault / Ticket presence / Near paper end (*)
16	RESET	Printer reset
17	GND	GND
18	N.C.	Not connected
19-25	GND	GND

For the parallel connector, the connection between printer and Personal Computer, must be made with a 25-pin- to- pin connector.

(*) NOTE : Functions selecting through the parameter setting mode to the start. The signals Select and Fault respond to the logic of functioning of the Centronics parallel port. The signal "Ticket Presence " is high if the ticket is present on the mouth of exit; the signal "Near paper end" is high when the RED LED has turned on.

2.3 USB



(Fig.2.5)

Printers with USB serial interface conform to USB 1.0 standards and have the following specifications:

- Communication speed 12 Mbit/sec
- "Receptacle series B"-type connector.

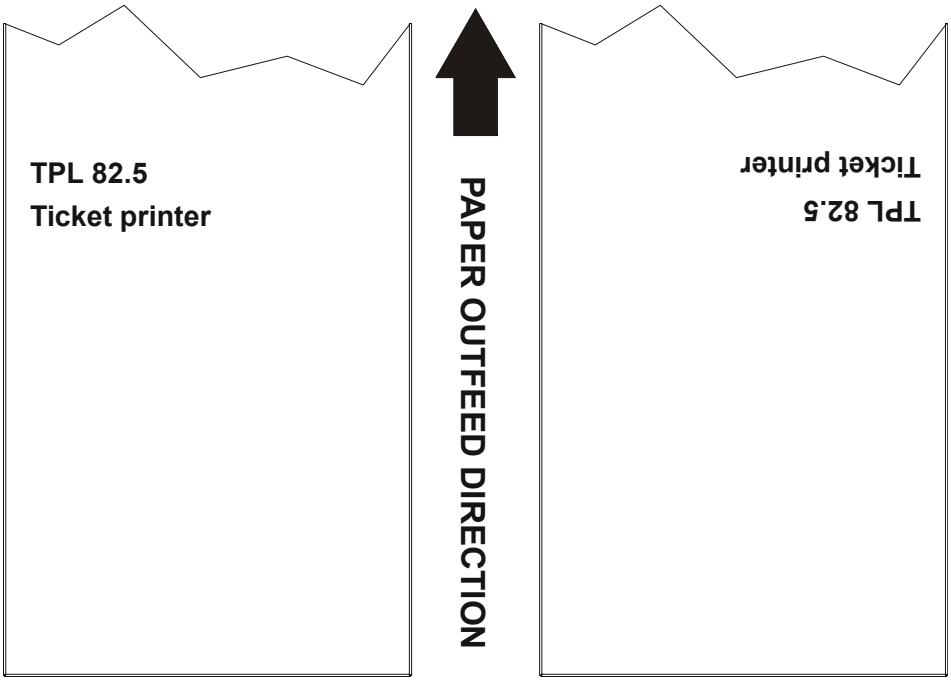
Refer to the table 2.3 for the connector pin signals and connection to a device:

PIN	SIGNAL	DESCRIPTION
1	VBUS	N.C.
2	D-	Data -
3	D+	Data +
4	GND	Ground signal
Shell	Shield	Cable shield

(Tab.2.3)

3.1 PRINT DIRECTION

The printer has two printing directions which can be selected by means of the control characters:normal and reverse.



(Fig.3.1)

3.2 COMMANDS DESCRIPTION

3.2.1 Custom TPT Emulation

The following table lists all the commands for function management in Custom TPT Emulation of the printer. The commands can be transmitted to the printer at any moment, but they will only be carried out when the commands ahead of them have been executed. The commands are carried out when the circular buffer is free to do so. The table 3.1 shows the commmands list, ordered by their hexadecimal value.

LEGEND :

Symbol	**Function**
$	indicates the representation of the command hexadecimal value (for example $40 means HEX 40).
{ }	indicates an ASCII character not performable.
n, **m**, **t**, **x**, **y**	are optional parameters that can have different values.

COMMAND DESCRIPTION TABLE **(Tab.3.1)**

HEX	ASCII	Description
$0A	LF	Print and line feed
$0B	VT	Vertical tab
$0C	FF	Form feed
$0D	CR	Print and carriage return
$18	CAN	Cancels line buffer
$1B $21 (n)	ESC ! n	Sets print mode
$1B $23 n1 n8	ESC #	Receives data in graphic page
$1B $24 n1 n2	ESC $ n1 n2	Sets bar code print position
$1B $25 n1 n2	ESC % n	Prints graphic page
$1B $2A m nL nH	ESC * m nL nH	Sets bit image mode
$1B $2B n1 n2	ESC+ n1 n2	Prints in semi-graphic mode

HEX	ASCII	Description
$1B $34 n	ESC 4 n	Sets/resets script mode
$1B $3D n	ESC = n	Enables/disables form feed key
$1B $3F n	ESC ? n	Requests printer setting
$1B $40	ESC @	Resets the printer
$1B $41 n1 n2	ESC A n1 n2	Moves stepping motor
$1B $44 n	ESC D n	Sets default paper sensitbility
$1B $46 n	ESC F n	Copies flash bank into ram bank (16Bytes)
$1B $47 n	ESC G n	Sets/resets double-strike mode
$1B $4E n	ESC N n	Sets negative mode
$1B $50	ESC P	Fills ram bank from port (16384 BYTES)
$1B $52 n	ESC R n	Sets font in use
$1B $53 n	ESC S n	Sets paper sensibility in use
$1B $55 n	ESC U n	Sets underline mode
$1B $ 56 n	ESC V n	Sets print mode rotated by 90°
$1B $57	ESC W	Prints a graphic dotline
$1B $5A n1 n2	ESC Z n1 n2	Sets form feed steps number
$1B $5C nL nH	ESC \ nL nH	Sets relative print position
$1B $61 n	ESC a n	Selects justification
$1B $63 $34 n	ESC c 4 n	Selects paper sensor to stop printing
$1B $63 $35 n	ESC c 5 n	Enables/disables panel buttons
$1B $64 n	ESC d n	Prints and feed paper n lines
$1B $66 n	ESC f n	Sets default font
$1B $69	ESC i	Cuts paper completely
$1B $6D	ESC m	Cuts paper partially
$1B $72 n	ESC r n	Copies RAM bank into flash bank (16kbytes)
$1B $73	ESC s	Sends RAM bank to port (16kbytes)
$1B $76	ESC v	Transmit printer status
$1B $7A	ESC z	Sets vertical tab value
$1B $7B n	ESC { n	Sets/cancels upside-down character printing
$1B $7C	ESC { }	Cancels graphic page
$1B $FA n xL xH yH yL	ESC · n xL xH yH yL	Prints graphic bank
$1B $FB nL nH	ESC { } nL nH	Transmits RAM bank to serial port
$1B $FC n	ESC { } n	Transfers flash bank into RAM bank
$1B $FD nL nH	ESC { } nL nH	Receives RAM bank from serial port
$1B $FE n	ESC { } n	Transfers RAM bank into flash bank
$1D $3A	GS :	Sets start/end of macro definition
$1D $43 $30 n m	GS C 0 n m	Selects counter print mode
$1D $43 $31 aL aH bL bH n r	GS C 1 aL aH bL bH n r	Selects counter mode (A)
$1D $43 $32 nL nH	GS C 2 nL nH	Sets counter
$1D $43 $3B sa $3B sb $3B sn $3B sr $3B sc $3B	GS c ; sa ; sb ; sn ; sr; sc ;	Selects counter mode (B)
$1D $48 n	GS H n	Selects HRI print position
$1D $49 n	GS I n	Transmit printer ID
$1D $5E r t m	GS ^ r t m	Executes macro
$1D $63	GS c	Print counter
$1D $65 n [m] [l]	GS e n [m] [l]	Ejector commands
$1D $68 n	GS h n	Selects bar code height
$1D $6B n <HRI>CR	GS k n <HRI>CR	Prints a bar code

Com. HEX	Com. ASCII	Descrizione
$1D $76	GS v	Extended status request ✹
$1D $77 n	GS w n	Selects bar code width
$1D $E0 n	GS { } n	Enable/disable automatic FULL STATUS back
$1D $E2 n	GS { } n	Reading number of cuts performed from teh printer
$1D $E3	GS { }	Reading of length (cm) of printed paper
$1D $E5	GS { }	Reading number of power up

✹ In the table listed above, the command marked with this symbol are defined only for the serial interface.

Given below are more detailed descriptions of each command.

$0A

[Name] **Print and line feed**

[Format] ASCII LF
Hex 0A
Decimal 10

[Description] Prints the data in the buffer and feeds one line based on the current line spacing.

[Notes] • Sets the print position to the beginning of the line.

[Default]

[Reference]

[Example]

$0B

[Name] **Vertical tab**

[Format] ASCII VT
Hex 0B
Decimale 11

[Description] When this character is received , the paper forward feeds by n lines (default value : 10). This value can be modified by using the command **$1B $7A**. When the printer is next initialized, the default value is reset.

[Notes]

[Default]

[Reference]

[Example]

$0C

[Name] **Form Feed**

[Format] ASCII FF
Hex 0C
Decimal 12

[Description] If the buffer contains any characters, these are printed and the paper forward feeds until the detection of a reference mark on the paper, signalled by the NICK photocell. Alternatively the paper forward feeds by the number of dotlines preset by the command **$1B $5A**.

[Notes]

[Default]

[Reference]

[Example]

$0D

[Name] **Carriage return**

[Format]

ASCII	CR	
Hex	0D	
Decimal	13	

[Description] When autofeed is “CR enabled”, this command functions in the same way as **$0A**, otherwise it is disregarded.

[Notes] The command sets the print position at the beginning of the line.

[Default]

[Reference] **$0A**

[Example]

$18

[Name] **Cancel print data buffer**

[Format]

ASCII	CAN
Hex	18
Decimal	24

[Description] Deletes all the print data in the current print buffer.

[Notes] The command set the print position to the beginning of the line

[Default]

[Reference]

[Example]

$1B $21 n

[Name] **Select print modes**

[Format]

ASCII	ESC	!	n
Hex	1B	21	n
Decimal	27	33	n

[Description] This command sets the print mode. Each bit of “n” is read as follows:

Bit	FUNCTION	0	1
0	n.u.		
1	n.u.		
2	Selects superscript or subscript (only for 8x16)	Superscript	Subscript
3	n.u.		
4	Double height	Cancel	Set
5	Double width	Cancel	Set
6	Quadruple height	Cancel	Set
7	Quadruple width	Cancel	Set

[Notes] Height and width commands set the mode for a whole line.

[Default] n=0

[Reference]

[Example]

$1B $23 n1...n8

[Name] **Receives data in graphic page**

[Format]

ASCII	ESC	#	n1	n8
Hex	1B	23	n1	n8
Decimal	27	35	n1	n8

[Description] This receives an array of data an arranges it in a graphic page at the given coordinates. The coordinates define the vertices of a window in which the data is stored.

x1=(n1 * 256) + n2

y1=(n3 * 256) + n4

x2=(n5 * 256) + n6

y2=(n7 * 256) + n8

The values of coordinates x1 and x2 are aligned with the byte.

[Notes]

[Default]

[Reference]

[Example]

$1B $24 n1 n2

[Name] **Sets bar code printing position.**

[Format]					
ASCII	ESC	$	n1	n2
Hex	1B	24	n1	n2
Decimal	27	36	n1	n2

[Description] The bar code is printed at position (n1*256) + n2. If the value exceeds 640 it is rejected.

[Notes]

[Default]

[Reference]

[Example]

$1B $25 n1 n2

[Name] **Prints grahic page.**

[Format]				
ASCII	ESC	$	n1	n2
Hex	1B	25	n1	n2
Decimal	27	37	n1	n2

[Description] Prints graphic page starting from the beginning for a number of lines eqaul to (n1*256) + n2; if the vaule is higher than the lines availables 209 it prints the entire page.

[Notes]

[Default]

[Example]

$1B $2A m nL nH d1...dk

[Name] **Select bit image mode**

[Format]						
ASCII	ESC	*	m	nL	nH	d1...dk
Hex	1B	2A	m	nL	nH	d1...dk
Decimal	27	42	m	nL	nH	d1...dk

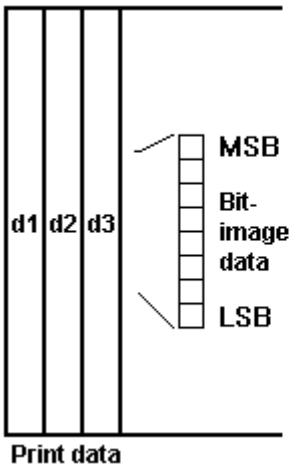
[Range] m = 0, 1, 32, 33
$0 \le nL \le 255$
$0 \le nH \le 7$
$0 \le d \le 255$

[Description] Selects a bit image mode using *m* for the number of dots specified by *nL* and *nH*, as follows:

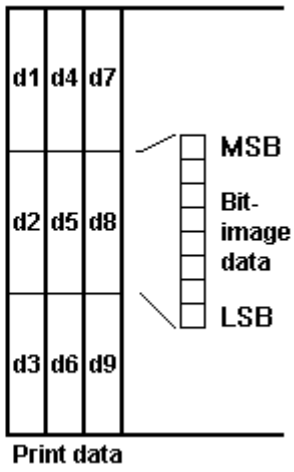
m	Mode	Vertical direction		Horizontal direction (*1)	
		N. dots	DPI	DPI	N. of Data (k)
0	8 dot single density	8	67	100	nL + nH x 256
1	8 dot double density	8	67	200	nL + nH x 256
32	24 dot single density	24	200	100	(nL + nH x 256) x 3
33	24 dot double density	24	200	200	(nL + nH x 256) x 3

[Notes]
- The *nL* and *nH* indicates the number of bytes.
- If the bit image data input exceeds the number of dots to be printed on a line, the excess data is ignored.
- *d* indicates the bit image data. Set a corresponding bit to 1 to print a dot, or to 0 to not print the dot.
- If the value of *m* is outside the specified range, *nL* and data following it are processed as normal data.
- To print the bit image use **$0A**, **$0D** or **$1D $64**.
- After printing a bit image, the printer returns to normal data processing mode.
- This command is not affected by the emphasized, double-strike, underline (etc.) print modes, except for the upside-down mode.
- The relationship between the image data and the dots to be printed is as follows:

8-dot bit image



24-dot bit image



[Default]
[Reference]
[Example]

$1B $2B n1 n2

[Name] **Semi-graphic printing mode**

[Format]

ASCII	ESC	+	n1	n2
Hex	1B	2B	n1	n2
Decimal	27	43	n1	n2

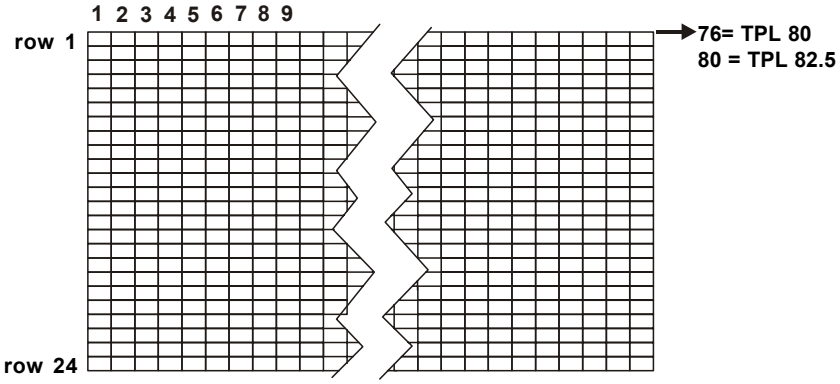
[Description] The bar code is printed at position (n1*256) + n2. If the value exceeds Ⓐ608 / Ⓑ 640, it is rejected. The number of characters to be received is (n1*256) + n2.

In this mode, the bytes received are input in the line buffer at the current position of the cursor and in a different order from that of the previous command. Let's imagine that a print line consists of an array of 24 rows containing Ⓐ76 / Ⓑ 80 bytes each: the characters received after this command will be input starting from the top line and proceeding towards the bottom line. After 24 characters, the pointer increases and proceeds to the next position. At the Ⓐ76th / Ⓑ80th position the line is printed and filling continues on the next line. Thanks to this procedure, text and graphics can be combined. In fact, if, for example, there were any characters present in the print buffer, the bytes subsequent to this command would be input in the position immediately after. Figure 1 shows a line buffer: each box corresponds to 8 dots, which on paper correspond to 1 mm, both horizontally and vertically. To fill the memory completely, Ⓐ1824 / Ⓑ 1920 bytes are required. For example, to print a filled bar Ⓐ608 / Ⓑ640 dots long and 24 dots high, send the following command:

Ⓐ $1B + $2B + $07 + $20 + (1824*$FF)

Ⓑ $1B + $2B + $07 + $80 + (1920*$FF)

buffer position



[Notes] Ⓐindicates TPL 80, Ⓑindicates TPL 82.5.

[Default]

[Reference]

[Example]

$1B $34 n

[Name] **Set/reset italic mode**

[Format]

ASCII	ESC	4	n
Hex	1B	34	n
Decimal	27	52	n

[Range] $0 \le n \le 1, 48 \le n \le 49$

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

n	Function
0, 48	Turns off italic mode
1, 49	Turns on italic mode

[Notes] • The printer can print any character in italic mode.
• When italic mode is turned off by setting the value of *n* to 0 or 48, the data which follows is printed in normal mode.
• Italic mode can also be turned on or off using **$1B $21**. Note, however, that the last received command is the effective one.

[Default] n = 0

[Reference] **$1B $21**

[Example]

$1B $3D n

[Name] Enables / Disables Form Feed key

[Format]

ASCII	ESC	=	n
Hex	1B	3D	n
Decimal	27	61	n

[Description] This command is used to control the Form Feed key. Normally, when this key is pressed, the paper forward feeds until a reference mark is detected or until the steps set by the **$1B $5A** command have been completed. When the key is released, a character FF ($0C) is transmitted. In this way a controller can check the output of receipts with progressive number etc. directly.

n = 0 Disables transmission - Enables the Form Feed key

n > 0 Enables transmission when the Form Feed key is pressed.

[Notes]

[Default]

[Reference]

[Example]

$1B $3F n

[Name] **Printer setting request**

[Format]

ASCII	ESC	?	n
Hex	1B	3F	n
Decimal	27	63	n

[Range] $32 \leq n \leq 126$

[Description] This command transmits two bytes to serial port, when each bit indicates the printer setting. The meaning of these bytes depends on the n parameter:

with n = 0

Byte 1

Bit 1	Bit 0	Function	Description
0	0	Normal	H mode
0	1	Double	H mode
1	0	Quadruple	H mode
1	1	Not used	H mode

Bit 3	Bit 2	Function	Description
0	0	Normal	V mode
0	1	Double	V mode
1	0	Quadruple	V mode
1	1	Not used	V mode

Bit 4	Function	Description
-	Not used	-

Bit 5	Function	Description
0	Superscript	Superscript / Subscript
1	Subscript	

Bit 6	Function	Description
0	Reverse OFF	Reverse
1	Reverse ON	

Bit 7	Function	Description
0	Rotation OFF	Rotation
1	Rotation ON	

Byte2

Bit 0	Function
0	Cutter enabled
1	Cutter disabled

Bit 1	Function
0	Paper end enabled
1	Paper end disabled

Bit 2	Function
0	Form Feed enabled
1	Form Feed disabled

Bit 3	Function
0	Autofeed enabled
1	Autofeed disabled

Bit 4	Function
0	Font 24x32
1	Font 8x16 or Font 16x24

Bit 5	Bit 6	Bit 7	Function
-	-	-	Not used

with n =1

Byte 1	Indicates number of line feeds for VTAB (Vertical TAB)
Byte 2	Indicates printing head value

with n =2

Byte 1	Byte 2	Description
H	L	Indicates number of dot lines for FORM FEED

with n =3

Byte 1

Bit	Function
0	Indicates Bar Code size
1	
2	
3	Indicates HRI (1) printing position
4	
5	Not used
6	Not used
7	Not used

(1) These bits correspond to the coding assigned with the GS w and GS H commands.

Byte 2	Indicates Bar Code height

[Notes]
[Default]
[Reference]
[Example]

$1B $40

[Name] **Initialize printer**

[Format]

ASCII	ESC	@	
Hex	1B	40	
Decimal	27	64	

[Description] When this command is received, the printer resets, restoring the default programming and erasing the RAM.The machine requires approx. 3 seconds from reception of the command to regain its full operating capacity.

[Notes] • Same as hardware reset.
[Default]
[Reference]
[Example]

$1B $41 n1 n2

[Name] Moves stepping motor

[Format]

ASCII	ESC	A	n1	n2
Hex	1B	41	n1	n2
Decimal	27	65	n1	n2

[Description] This command moves the paper feeding step motor by a number of steps equal to (n1*256) + n2.

[Notes]
[Default]
[Reference]
[Example]

$1B $44 n

[Name] Sets the default paper sensibility.

[Format]

ASCII	ESC	D	n
Hex	1B	44	n
Decimal	27	68	n

[Range]

[Description] This command sets the default paper sensibility. The current paper sensibility in use is also changed.

[Notes]

[Default]

[Reference]

[Example]

$1B $46 n

[Name] Copy flash bank into ram bank (16kbytes)

[Format]

ASCII	ESC	F	n
Hex	1B	46	n
Decimal	27	70	n

[Range] $1 \le n \le 6$

[Description] The value of "n" determines flash bank:

n = 1	1st bank
n = 2	2nd bank
n = 3	3rd bank
n = 4	4th bank
n = 5	5th bank
n = 6	6th bank

if n = 0 or n > 6 the command is ignored.

[Notes]

[Default]

[Reference]

[Example]

$1B $47 n

[Name] Turn double-strike mode On/Off.

[Format]

ASCII	ESC	G	n
Hex	1B	47	n
Decimal	27	71	n

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

[Description] Turn 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 LSB of *n* is active.
- Printer output is the same in double-strike mode and emphasized mode.

[Default] n = 0

[Reference]

[Example]

$1B $4E n

[Name] **Sets negative mode.**

[Format]

ASCII	ESC	N	n
Hex	1B	4E	n
Decimal	27	78	n

[Description] Sets or cancel printing negative mode.

n = 0	Normal print
n <> 0	Negative print

[Notes]

[Default] n = 0

[Reference]

[Example]

$1B $50

[Name] **Fill ram bank from port.**

[Format]

ASCII	ESC	P	16384 bytes
Hex	1B	50	16384 bytes
Decimal	27	80	16384 bytes

[Description] This command can transfer graphic page into ram.

Ⓐ76, Ⓑ80 bytes is an horizontal dotline of Ⓐ608, Ⓑ640 dots; for Ⓐ215, Ⓑ204 dotlines.

The number of bytes that make graphic page is

ⒶⒷ76x215=16340 the others 44 bytes

ⒷⒷ80x204=16320 the others 64 bytes

must be sent, but are not important.

[Notes] Ⓐindicates TPL 80, Ⓑindicates TPL 82.5.

[Default] n = 0

[Reference]

[Example]

$1B $52 n

[Name] **Sets font.**

[Format]

ASCII	ESC	R	n
Hex	1B	52	n
Decimal	27	82	n

[Range] $0 \le n \le 12$

[Description] It sets the font currently being used. This setting is maintained until a new command given or the machine is reset.

n = $01	Font 8x16
n = $02	Font 16x24
n = $03	Font 24x32

[Notes]

[Default] n = 0

[Reference]

[Example]

$1B $53 n

[Name] **Sets paper sensibility.**

[Format]

ASCII	ESC	S	n
Hex	1B	53	n
Decimal	27	83	n

[Description] It sets the paper sensibility currently in used. This setting is maintained until a new command is given or the machine is reset.

n = $00	High
n = $01	Normal
n = $02	Medium
n = $03	Low
n = $04	Double copy

[Notes]

[Default]

[Reference]

[Example]

$1B $55 n

[Name] **Sets underlined mode.**

[Format]

ASCII	ESC	U	n
Hex	1B	55	n
Decimal	27	85	n

[Description] Sets or cancels the underline printing mode.

n = 0	Normal print
n <> 0	Underlined mode

[Notes]

[Default]

[Reference]

[Example]

$1B $56 n

[Name] **Sets the print mode rotated by 90°.**

[Format]

ASCII	ESC	V	n
Hex	1B	56	n
Decimal	27	86	n

[Description] Sets or cancels the 90° printing flag rotation in according to *n* :

n = 0	Normal print
n <> 0	Rotated print

The printing direction depends of the reverse bit.

[Notes]

[Default]

[Reference]

[Example]

$1B $57 80 bytes

[Name] **Prints a graphic dotline.**

[Format]

ASCII	ESC	W	❶76bytes	❷80 bytes
Hex	1B	57	❶76bytes	❷80 bytes
Decimal	27	87	❶76bytes	❷80 bytes

[Description] This command prints a dotline (❶608, ❷640 dots) after ❶76 ❷ 80 bytes and feeds the paper.

[Notes] ❶indicates TPL 80, ❷indicates TPL 82.5.

[Default]

[Reference]

[Example]

$1B $5A n1 n2

[Name] **Sets the number of steps for form feed.**

[Format]

ASCII	ESC	Z	n1	n2
Hex	1B	5A	n1	n2
Decimale	27	90	n1	n2

[Description] When the printer receives an FF ($0C) character, or when the FF key is pressed, the paper forward feeds until the photocell finds a reference point or up to the distance preset in the Eeprom. The default value, which is 240 (30 mm), can be modified by the user. The number of steps is given by (n1*256) +n2. The set value is stored in the Eeprom, and continues to be stored even when the printer is switched off.

[Notes]

[Default]

[Reference]

[Example]

$1B $5C nL nH

[Name] **Set relative print position**

[Format]

ASCII	ESC	\	nL	nH
Hex	1B	5C	nL	nH
Decimal	27	92	nL	nH

[Range] $0 \le nL \le 255$
$0 \le nH \le 255$

[Description] Sets the print starting position based on the current position by using the horizontal or vertical motion unit.
This command sets the distance from the current position to $[(nL + nH \times 256) \times$ (horizontal or vertical motion unit)].

[Notes] • Any setting that exceeds the printable area is ignored.
• When the starting position is specified by *n* motion units to the right:
$nL + nH \times 256 = n$
When the starting position is specified by *n* motion units to the left (negative direction), use the complement of 65536:
$nL + nH \times 256 = 65536 - n$
• If setting exceeds the printing area width, the left or right margin is set to the default value.

[Default]

[Reference]

[Example]

ESC a n

[Name] **Select justification**

[Format]

ASCII	ESC	a	n
Hex	1B	61	n
Decimal	27	97	n

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

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

n	Justification
0, 48	Flush left
1, 49	Centered
2, 50	Flush right

[Notes]
- This command is only enabled when inserted at the beginning of a line.
- Lines are justified within the specified printing area.
- Spaces set by **$1B $24** and **$1B $5C** will be justified according to the previously-entered mode.

[Default] n = 0

[Reference]

[Example]

Flush left

```
ABC
ABCD
ABCDE
```

Centered

```
 ABC
 ABCD
ABCDE
```

Flush right

```
  ABC
 ABCD
ABCDE
```

$1B $63 $34 n

[Name] **Select paper sensor to stop printing.**

[Format]

ASCII	ESC	c	4	n
Hex	1B	63	34	n
Decimale	27	99	52	n

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

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

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll end sensor enabled.
	On	01	1	Paper roll near-end sensor enabled.
1	-	-	-	RESERVED
2	-	-	-	RESERVED
3	-	-	-	RESERVED
4	-	-	-	RESERVED
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	-	-	-	RESERVED

[Notes]
- When a near paper-end is detected, printing stops after printing the current line and feeding the paper.
- The paper roll near-end sensor is enabled when either bit 0 is 1.
- This setting is not cleared by printer resetting, because it is stored in the Eeprom.

[Default] n = 0

[Reference]

[Example]

$1B $43 $35 n

[Name] **Enable/disable front panel buttons**

[Format]

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

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

[Description] Enables/disables the buttons on the front panel.
• When the LSB of *n* is 0, the panel buttons are enabled.
• When the LSB of *n* is 1, the panel buttons are disabled.

[Notes]
• Only the LSB of *n* is effective.
• On the printer, the panel buttons are LINE FEED and FORM FEED.
• When the panel buttons are disabled, the buttons may only be used after the printer has been reset.
• When the panel buttons are disabled, they're available only during the reset procedure.

[Default] n = 0

[Reference]

[Example]

$1B $64 n

[Name] **Print and feed paper *n* lines**

[Format]

ASCII	ESC	d	n
Hex	1B	64	n
Decimal	27	100	n

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

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

[Notes]
• Sets the print starting position at the beginning of the line.
• The maximum paper feed amount is 200 lines. Even if a paper feed amount of more than 200 lines is set, the printer feeds the paper only 200 lines.

[Default]

[Reference]

[Example]

$1B $66 n

[Name] **Sets the default font.**

[Format]

ASCII	ESC	f	n
Hex	1B	66	n
Decimal	27	102	n

[Description] This command sets the default font. The font currently in use is also changed.

n = $01	Font 8x16
n = $02	Font 16x24
n = $03	Font 24x32

[Notes]

[Default]

[Reference]

[Example]

$1B $69

[Name] **Total cut**

[Format]

ASCII	ESC	i
Hex	1B	69
Decimal	27	105

[Description] This command enables cutter operation. If there is no cutter, a disabling flag is set and any subsequent cut commands will be ignored.

[Notes] • The printer waits to complete all paper movement commands before it executes a total cut.

[Default]

[Reference]

[Example]

$1B $6D

[Name] **Partial cut**

[Format]

ASCII	ESC	m
Hex	1B	6D
Decimal	27	109

[Description] This command enables partial cutter operation. If there is no cutter, a disabling flag is set and any subsequent cut commands will be ignored.

[Notes] • The printer waits to complete all paper movement commands before it executes a partial cut.

[Default]

[Reference]

[Example]

$1B $72 n

[Name] **Copy ram bank into flash bank (16Kbytes)**

[Format]

ASCII	ESC	r	n
Hex	1B	72	n
Decimal	27	114	n

[Range] $1 \le n \le 6$

[Description] The value of *n* selects the flash bank :

n = 1	1st bank
n = 2	2nd bank
n = 3	3rd bank
n = 4	4th bank
n = 5	5th bank
n = 6	6th bank

If n = 0 or n > 6 the command is ignored.

For about 1 sec. the printer does not receive characters or commands. The serial version return :

$77 if flash memory is not programmed

$88 if flash memory is not erased

$AA if flash memory is programmed.

[Notes]

[Default]

[Reference]

[Example]

$1B $73

[Name] **Sends ram bank to port (16Kbytes)**

[Format]

ASCII	ESC	s
Hex	1B	73
Decimal	27	115

[Description] This commands sends 16384 RAM bytes to serial port.

[Notes]

[Default]

[Reference]

[Example]

$1B $76

[Name] **Transmit status request.**

[Format]

ASCII	ESC	v
Hex	1B	76
Decimal	27	118

[Description] This command transmits a byte, where each bit indicates the printer status, to serial port.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Near paper end
	On	01	1	Paper presence in abundance
1	-	-	-	RESERVED
2	Off	00	0	Paper out
	On	04	4	Paper presence
3	Off	00	0	Line Feed key released
	On	08	8	Line Feed key pressed
4	Off	00	0	Form Feed key released
	On	10	16	Form Feed key pressed
5	Off	00	0	Head temperature correct
	On	20	32	Head temperature error
6	Off	00	0	Motor off
	On	40	64	Motor on
7	Off	00	0	No error
	On	80	128	Error due to paper end, Head up, etc.

[Notes] • This command is executed immediately, even when the data buffer is full (Busy).

[Default]

[Reference]

[Example]

$1B $7A

[Name] **Sets the vertical tab value.**

[Format]

ASCII	ESC	z
Hex	1B	7A
Decimal	27	122

[Description] Sets the number of feeds lines when a vertical tab character is received. The default value on switching on the printer is 10. The set value is valid until the printer is next initialized.

[Notes]
[Default]
[Reference]
[Example]

$1B $7B n

[Name] **Turn upside-down printing mode on/off**

[Format]

ASCII	ESC	{	n
Hex	1B	7B	n
Decimal	27	123	n

[Range] 0 ≤ n ≤ 255

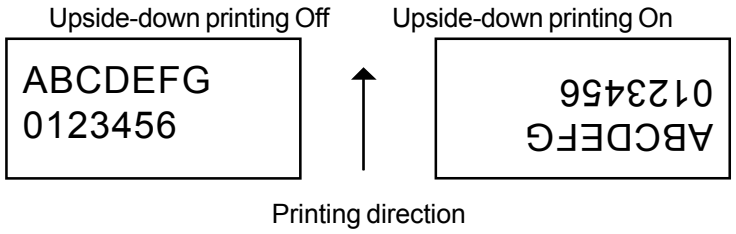
[Description] Turns upside-down printing mode on or off.
• When the LSB of *n* is 0, the upside-down printing mode is off.
• When the LSB of *n* is 1, the upside-down printing mode is on.

[Notes]
• Only the LSB of *n* is effective.
• This command is valid only if entered at the beginning of a line.
• In upside-down printing mode, the printer rotates the line to be printed 180° and then prints it.

[Default] n = 0

[Reference]

[Example]



$1B $7C

[Name] **Delete graphic page.**

[Format]

ASCII	ESC	{ }
Hex	1B	7C
Decimale	27	124

[Description] This command deletes graphic page.

[Notes]
[Default]
[Reference]
[Example]

$1B $FA n xH xL yH yL

[Name] **Print graphic bank(608 × 215 dots).**

[Format]

ASCII	ESC	{ }	nxH	xL	yH	yL	
Hex	1B	FA	n	xH	xL	yH	yL
Decimal	27	250	n	xH	xL	yH	yL

[Range] 0 ≤ *n* ≤ 6
0 ≤ *xH*, *xL*, *yH*, *yL* ≤ 255

[Description] Prints graphic bank from flash or ram. *n* selects the graphic source as follows:

n	Function
0	Print ram bank
1	Print flash bank logo 1
2	Print flash bank logo 2
3	Print flash bank logo 3
4	Print flash bank logo 4
5	Print flash bank logo 5
6	Print flash bank logo 6

xL + *xH* × 256 specifies the starting dotline (1 ÷ 215).
yL + y*H* × 256 specifies the number of lines to print.

[Notes] • If (*xL* + (*xH* × 256)) > 215the printer does not execute the command.
• If (*xL* + (*xH* × 256) + *yL* +(y*H* × 256))> 215 the printer prints only 215- *xL* + (*xH* × 256) +1 dotline.

[Default]

[Reference] **$1B $FC, $1B $FD, $1B 4FE**

[Example] To print from ram bank dotline 100 to dotline 299, send:
$1B $FA $00 $00 $64 $00 $C7

$1B $FB

[Name] **Transmit ram bank to serial port**

[Format]

ASCII	ESC	{ }	nL	nH
Hex	1B	FB	nL	nH
Decimal	27	251	nL	nH

[Description] Transmits (nH x 256) + nL bytes of ram bank to serial port.

[Notes] • The size of ram bank for graphic printing is 640 horizontal dots (80 bytes/dotline) x 409 vertical dots (32720 bytes = 16360 words).

[Default]

[Reference] **$1B $FC, $1B $FD, $1B $FE**

[Example]

$1B $FC n

[Name] **Transfer flash bank into ram bank**

[Format]

ASCII	ESC	{ }	n
Hex	1B	FC	n
Decimal	27	252	n

[Range] 1 ≤ n ≤ 6

[Description] Transfers flash bank into ram bank (32768 bytes). *n* selects the bank as follows:

n	Function
1	Transfers flash bank logo 1 into ram
2	Transfers flash bank logo 2 into ram
3	Transfers flash bank logo 3 into ram
4	Transfers flash bank logo 4 into ram
5	Transfers flash bank logo 5 into ram
6	Transfers flash bank logo 6 into ram

[Notes]

[Default]

[Reference] **$1B $FA, $1B $FD, $1B $FE**

[Example]

$1B $FD nL nH

[Name] **Receive ram bank from serial port**

[Format]

ASCII	ESC	{ }	nL	nH
Hex	1B	FD	nL	nH
Decimal	27	253	nL	nH

[Range] $0 \le nL, nH \le 255$

[Description] Receives [$nL + (nH \times 256)$] words from the port and puts them into the ram bank.

[Notes]
- The number of data bytes received is [$nL + (nH \times 256)$] $\times 2$.
- Each word is first received as MSByte and then as LSByte.
- If [$nL + (nH \times 256)$] is greater than 16384, the data which follows is processed as normal data.
- An horizontal dotline is represented to 40 words.

[Default]

[Reference] **$1B $FA, $1B $FC, $1B $FE**

[Example]

$1B $FE n

[Name] **Transfer ram bank into flash bank**

[Format]

ASCII	ESC	{ }	n
Hex	1B	FE	n
Decimal	27	254	n

[Range] $1 \le n \le 6$

[Description] Transfers the ram bank into the flash bank (32768 bytes). *n* selects the bank as follows:

n	Function
1	Transfers ram bank into flash bank logo 1
2	Transfers ram bank into flash bank logo 2
3	Transfers ram bank into flash bank logo 3
4	Transfers ram bank into flash bank logo 4
5	Transfers ram bank into flash bank logo 5
6	Transfers ram bank into flash bank logo 6

[Notes]

[Default]

[Reference] **$1B $FA, $1B $FC, $1B $FD**

Example

$1D $3A

[Name] **Start/end macro definition**

[Format]

ASCII	GS	:
Hex	1D	3A
Decimal	29	58

[Description] Starts or ends macro definition.

[Notes]
• Macro definition starts when this command is received during normal operation.
• When **$1D $5E** is received during macro definition, the printer ends macro definition and clears all definitions.
• Macros are not defined when power is turned on to the machine.
• Macro content is not cancelled by the **$1B $40** command. Therefore, **$1B $40** may be included in the content of macro definitions.
• If the printer receives **$1D $3A** a second time after previously receiving **$1D $3A**, the printer remains in macro undefined status.
• The contents of the macro can be defined up to 2048 bytes. If the macro definition exceeds 2048 bytes, excess data is not stored.

[Default]

[Reference] **$1D $5E**

[Example]

$1D $43 $30 n m

[Name] **Select counter print mode**

[Format]

ASCII	GS	C	0	n	m
Hex	1D	43	30	n	m
Decimal	29	67	48	n	m

[Range] $0 \le n \le 5$
m = 0, 1, 2, 48, 49, 50

[Description] Selects a print mode for the serial number counter.
• *n* specifies the number of digits to be printed as follows:
when *n* = 0, the printer prints the actual digits indicated by the numeric value.
when *n* = 1 to 5, the command sets the number of digits to be printed.
• m specifies the printing position within the entire range of printed digits as follows:

m	Printing position	Processing of digits less than those specified
0, 48	Flush right	Adds spaces to the left
1, 49	Flush right	Adds a '0' to the left
2, 50	Flush left	Adds spaces to the right

[Notes]
• If *n* or *m* is out of the defined range, the previously set print mode is not changed.
• If *n* = 0, *m* is not applicable.

[Default] *n* = 0, *m* = 0

[Reference] **$1D $43 $31, $1D $43 $32, $1D $43 $3B, $1D $63**

[Example]

n = 3,m = 0	n = 3, m = 1	n = 3, m=2
□□1	001	1□□

□ indicates a space

$1D $43 $31 aL aH bL bH n r

[Name] **Select count mode (A).**

[Format]

ASCII	GS	C	1	aL	aH	bL	bH	n	r
Hex	1D	43	31	aL	aH	bL	bH	n	r
Decimal	29	67	49	aL	aH	bL	bH	n	r

[Range] $0 \le aL, aH \le 255$
$0 \le bL, bH \le 255$
$0 \le n, r \le 255$

[Description] Selects a count mode for the serial number counter.

• *aL*, *aH* or *bL*, *bH* specify the counter range.
• *n* indicates the unit amount when counting up or down.
• *r* indicates the repetition number when the counter value is fixed.

[Notes]
• Count-up mode is specified when:
[a*L* + (a*H* × 256)] < [b*L* + (b*H* × 256)] and $n \neq 0$ and $r \neq 0$
• Count-down mode is specified when:
[a*L* + (a*H* × 256)] > [b*L* + (b*H* × 256)] and $n \neq 0$ and $r \neq 0$
• Counting stops when:
[a*L* + (a*H* × 256)] = [b*L* + (b*H* × 256)] or $n = 0$ or $r = 0$
• Setting the count-up mode, the minimum counter value is [a*L* + (a*H* × 256)] and the maximum value is [b*L* + (b*H* × 256)]. If the counting up reaches a value that exceeds the maximum, it resets to the minimum value.
• Setting the count-down mode, the maximum counter value is [a*L* + (a*H* × 256)] and the minimum value is [b*L* + (b*H* × 256)]. If the counting down reaches a value less than the minimum, it resets to the maximum value.
• When this command is executed, the internal count that indicates the repetition number specified by *r* is cleared.

[Default] aL = 1, aH = 0, bL = 255, bH = 255, n = 1, r = 1

[Reference] **$1D $43 $30, $1D $43 $32, $1D $43 $3B, $1D $63**

[Example]

GS C 2 nL nH

[Name] **Set counter**

[Format]

ASCII	GS	C	2	nL	nH
Hex	1D	43	32	nL	nH
Decimal	29	67	50	nL	nH

[Range] $0 \leq nL, nH \leq 255$

[Description] Sets the serial number counter value.
• *nL* and *nH* determine the value of the serial number counter set by [*nL* + (*nH* × 256)].

[Notes]
• In count-up mode, if the counter value specified by this command goes out of the counter operation range specified by **$1D $43 $31** or **$1D $43 $3B** it is forced to convert to the minimum value through **$1D $63**.
• In count-down mode, if the counter value specified by this command goes out of the counter operation range specified by **$1D $43 $31** or **$1D $43 $3B** it is forced to convert to the maximum value through **$1D $63**.

[Default] nL = 1, nH = 0

[Reference] **$1D $43 $30, $1D $43 $31, $1D $43 $3B, $1D $63**

[Example]

$1D $43 $3B sa $3B sb $3B sn $3B sr $3B sc $3B

[Name] **Select count mode**

[Format]

ASCII	GS	C	;	sa	;	sb	;	sn	;	sr	;	sc	;
Hex	1D	43	3B	sa	3B	sb	3B	sn	3B	sr	3B	sc	3B
Decimal	29	67	59	sa	59	sb	59	sn	59	sr	59	sc	59

[Range] $0 \leq sa, sb, sc \leq 65535$
$0 \leq sn, sr \leq 255$
These values are all character strings.

[Description] Selects a count mode for the serial number counter and specifies the value of the counter.
• *sa*, *sb*, *sn*, *sr* and *sc* are all displayed as ASCII characters using codes from '0' to '9'.

• *sa* and *sb* specify the counter range.
• *sn* indicates the unit amount for counting up or down.
• *sr* indicates the repetition number when the counter value is fixed.
• *sc* indicates the counter value.

[Notes]
• Count-up mode is specified when:
sa < *sb* and *sn* ≠ 0 and *sr* ≠ 0
• Count-down mode is specified when:
sa > *sb* and *sn* ≠ 0 and *sr* ≠ 0
• Counting stops when:
sa = *sb* or *sn* = 0 or *sr* = 0
• In setting count-up mode, the minimum value of the counter is *sa* and the maximum value is *sb*. If counting up reaches a value exceeding the maximum, it resets to the minimum value. If the counter value set by *sc* is outside the counter operation range, the counter value is forced to convert to the minimum value by executing **$1D $63**.
• In setting count-down mode, the maximum value of the counter is *sa* and the minimum value is *sb*. If counting down reaches a value less than the minimum, it resets to the maximum value. If the counter value set by *sc* is outside the counter operation range, the counter value is forced to convert to the maximum value by executing **$1D $63**.
• Parameters *sa* to *sc* can be omitted. If omitted, they remain unchanged.
• Parameters *sa* to *sc* cannot contain characters other than '0' to '9'.

[Default] sa = 1, sb = 65535, sn = 1, sr = 1, sc = 1

[Reference] **$1D $43 $30, $1D $43 $32, $1D $43 $31, $1D $63**

[Example]

$1D $48 n

[Name] **Select printing position of Human Readable Interpretation (HRI) characters**

[Format]

ASCII	GS	H	n
Hex	1D	48	n
Decimal	29	72	n

[Range] 0 ≤ n ≤ 3, 48 ≤ n ≤ 51

[Description] Selects the printing position of HRI characters when printing bar codes.
n selects the printing positions as follows:

n	Function
0, 48	Not printed
1, 49	Above the bar code
2, 50	Below the bar code
3, 51	Both above the below the bar code

[Notes]

[Default] n = 0

[Reference] **$1D $6B**

[Example]

$1D $49 n

[Name] **Transmit printer ID**

[Format]

ASCII	GS	I	n
Hex	1D	49	n
Decimal	29	73	n

[Range] 1 ≤ n ≤ 3, 49 ≤ n ≤ 51

[Description] Transmits the printer ID specified by *n* follows:

n	Printer ID	Specification
1, 49	Printer model ID	$72
2, 50	Type ID	See table below
3, 51	ROM version ID	Depends on ROM version (4 character)

n = 2, Type ID

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	2-byte character codes not supported
1	Off	00	0	Autocutter not supplied
	On	02	2	Autocutter supplied
2	Off	00	0	Thermal paper w/o label
	On	04	4	Thermal paper with label
3	-	-	-	RESERVED
4	-	-	-	RESERVED
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	Off	00	0	Custom TPT emulation.
	On	80	128	ESC/POS™ emulation.

[Notes] • Tthe printer only transmits 1 byte (printer ID) without confirmation that the host is ready to receive data.
• This command is executed when the data is processed in the data buffer. Therefore, there could be a time lag between command reception and data transmission, depending on data buffer status.

[Default]

[Reference]

[Example]

$1D $5E r t m

[Name] **Execute macro**

[Format]

ASCII	GS	^	r	t	m
Hex	1D	5E	r	t	m
Decimal	29	94	r	t	m

[Range] $0 \le r, t \le 255$

$0 \le m \le 1$

[Description] Executes a macro.
• *r* specifies the number of times to execute the macro.
• *t* specifies the waiting time for executing the macro.
The waiting time is $t \times 100$ msec. for each macro execution.
• *m* specifies macro executing mode:
When the LSB of *m* = 0, the macro is executed *r* times continuously at the interval specified by *t*.
When the LSB of *m* = 1, after waiting for the period specified by *t*, the LED indicator blinks and the printer waits for the FORM FEED button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats the operation *r* times.

[Notes] • This command has an interval of ($t \times 100$ msec.) after a macro is executed by *t*.
• If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.
• If the macro is not defined or if *r* is 0, nothing is executed.

• When the macro is executed by pressing the FORM FEED button (*m*=1), the paper cannot be fed using the FORM FEED button.

[Default]

[Reference] **$1D $3A**

[Example]

$1D $63

[Name] **Print counter**

[Format]

ASCII	GS	c
Hex	1D	63
Decimal	29	99

[Description] Sets the serial counter value in the print buffer and increments or decrements the counter value.

[Notes]
• After setting the current counter value in the print buffer as print data (a character string), the printer counts up or down based on the count mode set. The counter value in the print buffer is printed when the printer receives a print command or the buffer is full.
• The counter print mode is set using **$1D $43 $30**.
• The counter mode is set using **$1D $43 $31** or **$1D $43 $3B**.
• In count-up mode, if the counter value set by this command goes out of the counter operation range set by **$1D $43 $31** or **$1D $43 $3B** it is forced to revert to the minimum value.
• In count-down mode, if the counter value set by this command goes out of the counter operation range set by **$1D $43 $31** or **$1D $43 $3B** it is forced to revert to the maximum value.

[Default]

[Reference] **$1D $43 $30, $1D $43 $31, $1D $43 $32, $1D $43 $3B**

[Example]

$1D $65 n [m] [l]

[Name] **Ejector commands**

[Format]

ASCII	GS	e	n	[m]	[l]
Hex	1D	65	n	[m]	[l]
Decimal	29	101	n	[m]	[l]

[Range] $0 \le n \le 3$, $5 \le n \le 8$

[Description] This command checks tickets ejector :
n = 0 Ticket produced with defined number of steps (see command notes)
n = 1 Ejector motor off
n = 2 Ejector motor on
n = 3 ticket presenting with (3 x m) steps (1 step = 36 mm = 3 x 12 mm)
n = 5 ticket espulsion
n = 6 transmits ejector byte status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not near paper end
	On	01	1	Near paper end
1	Off	00	0	Fixed to 0
2	Off	00	0	Paper end sensor
	On	04	4	Paper is present.
3	Off	00	0	Tickets out
	On	08	8	Ticket present on ejector mouth
4	Off	00	0	Printer stepping motor off
	On	10	16	Printer stepping motor on
5	Off	00	0	Ejector motor off
	On	20	32	Ejector motor on
6	Off	00	0	No error
	On	40	64	Error occurs
7	Off	00	0	Fixed to 0

n = 7 sets maximum ticket length :

The maximum ticket length is [(*m**256+l) * (vertical motion unit)] inches. Max ticket length *recommended is 20*cm.

n = 8 ticket presenting with m steps (1 step = 12 mm)

[Notes]

• *m* must be sent with *n* = 3, 7;

• *l* must be sent with *n* = 7;

• if *n*=3 and ticket is not cut yet, before execute the command a total cutting will be make.

• if *n*=0 the fixed value of ticket presenting is :

- on power on and after a reset command (both hardware and software) 47mm

- the last distance saved to a **$1D $65 3** or **$1D $65 8** commands.

- Ticket presenting lenght can change of +/- 12 mm.

• The minimum ticket presenting lenght is 89 mm (below tihs value the ticket espulsion could have some problems).

[Default]

[Reference] **$1D $6B**

[Example]

$1D $68 n

[Name] **Set bar code height**

[Format]

ASCII	GS	h	n
Hex	1D	68	n
Decimal	29	104	n

[Range] 1 ≤ n ≤ 255

[Description] Sets the height of the bar code.
n specifies the number of vertical dots.

[Notes]

[Default] n = 96 (12 mm)

[Reference] **$1D $6B**

[Example]

$1D $6B n <*HRI*> CR

[Name] **Prints bar code.**

[Formato]

ASCII	GS	k	n	<HRI>	CR
Hex	1D	6B	n	<HRI>	0D
Decimale	29	107	n	<HRI>	13

[Range] $1 \le n \le 7$

[Description] Prints a bar code. The value of *n* selects the bar code type to print :

n = 1 UPC-E

n = 2 EAN 13

n = 3 EAN 8

n = 4 CODE 39 (max 12 characters)

n = 5 ITF (Interleaved 2 of 5) (max 22 characters)

n = 6 CODEBAR (max 16 characters)

n = 7 UPC-A (max 16 characters)

[Notes] • The rotation command does not affect on bar code printing.

[Default]

[Reference] **$1D $68**

[Example]

$1D $76

[Name] **Request expanded status**

Format]

ASCII	GS	v
Hex	1D	76
Decimal	29	118

[Description] This command transmits two bytes, each bit indicates the printer status to serial port.

First byte :

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Near paper end
	On	01	1	Paper presence in abundance
1	-	-	-	RESERVED
2	Off	00	0	Paper out
	On	04	4	Paper presence
3	Off	00	0	Line Feed key released
	On	08	8	Line Feed key pressed
4	Off	00	0	Form Feed key released
	On	10	16	Form Feed key pressed
5	Off	00	0	Head temperature correct
	On	20	32	Head temperature error
6	Off	00	0	Motor off
	On	40	64	Motor on
7	Off	00	0	No error
	On	80	128	Error due to paper end, Head up, etc.

Second byte :

Bit	Off/On	Hex	Decimal	Function
0	On	01	1	Printing
1	On	02	2	Head up
2	-	-	-	RESERVED
3	On	08	8	Ticket on the exit mouth
4	-	-	-	RESERVED
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	-	-	-	RESERVED

[Notes] • This command is executed immediately, even when the data buffer is full (Busy).
[Default]
[Reference]
[Example]

$1D $77 n

[Name] **Set bar code width**

[Format]

ASCII	GS	w	n
Hex	1D	77	n
Decimal	29	119	n

[Range] $2 \le n \le 6$

[Description] Sets the horizontal size of the bar code. *n* specifies the bar code width as follows:

n	Module width (mm)
2	0.25
3	0.375
4	0.5
5	0.625
6	0.75

[Notes]
[Default] n = 3
[Reference] **$1D $6B**
[Example]

$1D $E0 n

[Name] **Enable / disable automatic FULL STATUS back**

[Format]

ASCII	GS	{}	n
Hex	1D	E0	n
Decimal	29	224	n

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

[Description] Enable / disable automatic full status back.
n specifies the composition of FULL STATUS as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable Paper status.
	On	01	1	Enable Paper status.
1	Off	00	0	Disable User status.
	On	02	2	Enable User status.
2	Off	00	0	Disable Recoverable Error Status.
	On	04	4	Enable Recoverable Error Status.
3	Off	00	0	Disable Unrecoverable Error Status.
	On	08	8	Enable Unrecoverable Error Status.
4	-	-	-	RESERVED.
5	-	-	-	RESERVED.
6	-	-	-	RESERVED.
7	-	-	-	RESERVED.

[Notes] • Once enable at least one byte of the FULL STATUS, for each change of at least one of the bits which compose the required status, the status sent in automatic from the printer will be so composed as follows:
1° Byte = $10 (DLE)
2° Byte = n
Next byte (depends how many bits are active in n)

[Reference]

[Example]

$1D $E2

[Name] **Reading number of cuts performed from the printer**

[Format]

ASCII	GS	{}
Hex	1D	E2
Decimal	29	226

[Description] Reading the number of cuts performed from the printer.
The command return a string that points out how many cuts are performed by the printer, for example if there are performed 2376 cuts, it will be:
'2376 cuts'

[Notes]

[Default]

[Reference]

[Example]

$1D $E3

[Name] **Reading of length (cm) of printed paper**

[Format]

ASCII	GS	{}
Hex	1D	E3
Decimal	29	227

[Description] Reading of length (cm) of printed paper.
The command return a string pointing out how much paper is printed, for example if the printer has print about 2515,5 m, it will be:
'251550cm'

[Notes]

[Default]

[Reference]

[Example]

$1D $E5

[Name]	**Reading number of power up**		
[Format]	ASCII	GS	{ }
	Hex	1D	E5
	Decimal	29	229
[Description]	Reading number of power up of the printer.		
[Notes]	• The command return a string pointing out the number of turning on of the printer, for example if the printer is turned on 512 times, it will be: '512on'		
[Default]			
[Reference]			
[Example]			

3.2.2 ESC/POS™ emulation

The following table lists all the commands for function management in ESC/POS™ emulation of the printer. The commands can be transmitted to the printer at any moment, but they will only be carried out when the commands ahead of them have been executed. The commands are carried out when the circular buffer is free to do so. The table 3.2 shows the commmands list, ordered by their hexadecimal value.

LEGEND :

Symbol	**Function**
$	indicates the representation of the command hexadecimal value (for example $40 means HEX 40).
{ }	indicates an ASCII character not performable.
n, **m**, **t**, **x**, **y**	are optional parameters that can have different values.

COMMAND DESCRIPTION TABLE **(Tab.3.2)**

HEX	ASCII	Description
$08	BS	Back space
$09	HT	Horizontal tab
$0A	LF	Print and line feed
$0D	CR	Print and carriage return
$10 $04 (n)	DLE EOT n	Real-time status transmission
$18	CAN	Cancel current line transmitted
$1B $20 (n)	ESC SP n	Set character right-side spacing
$1B $21 (n)	ESC ! n	Set print mode
$1B $24 nL nH	ESC $ nL nH	Set absolute position
$1B $25 (n)	ESC % n	Select/cancel user-defined character set
$1B $26 y c1 c2	ESC & y c1 c2	Define user-defined characters
$1B $2A m nL nH d1...dk	ESC * m nL nH d1...dk	Select image print mode
$1B $2D (n)	ESC - n	Turn underline mode on/off
$1B $30	ESC 0	Select 1/8-inch line spacing
$1B $32	ESC 2	Select 1/6-inch line spacing
$1B $33 (n)	ESC 3 n	Set line spacing using minimum units
$1B $34 (n)	ESC 4 n	Set/reset script mode
$1B $3D (n)	ESC = n	Select device
$1B $3F (n)	ESC ? n	Cancel user-defined characters
$1B $40	ESC @	Initialize printer
$1B $44 n1...nk 00	ESC D n1...nk NUL	Set horizontal tab positions

HEX	ASCII	Description
$1B $45 (n)	ESC E n	Select emphasized mode
$1B $47 (n)	ESC G n	Select double-strike mode
$1B $4A (n)	ESC J n	Print and feed paper
$1B $52 (n)	ESC R n	Select international character set
$1B $56 (n)	ESC V n	Select print mode 90° turned
$1B $5C nL nH	ESC \ nL nH	Set relative print position
$1B $61 (n)	ESC a n	Select justification
$1B $63 $34 n	ESC c 4 n	Select paper sensor for printing interruption
$1B $63 $35 (n)	ESC c 5 n	Enable/disable front panel buttons
$1B $64 (n)	ESC d n	Print and feed paper n lines
$1B $69	ESC i	Total cut
$1B $6D	ESC m	Partial cut
$1B $74 (n)	ESC t n	Select character code table
$1B $76	ESC v	Transmit printer status
$1B $78 n	ESC x n	Select speed/quality mode
$1B $7B (n)	ESC { n	Set/cancel upside-down character printing
$1B $FA n xL xH yH yL	ESC { } n xL xH yH yL	Print graphic
$1B $FB nL nH	ESC { } nL nH	Transmit graphic page to communication port
$1B $FC (n)	ESC { } n	Transfer flash bank into graphic page
$1B $FD nL nH	ESC { } nL nH	Receive graphic page from communication port
$1B $FE (n)	ESC ¦ n	Transfer graphic page into flash bank
$1D $21 (n)	GS ! n	Select character size
$1D $3A	GS :	Set start/end of macro definition
$1D $42 (n)	GS B n	Turn white/black reverse printing mode on/off
$1D $43 $30 n m	GS C 0 n m	Select counter print mode
$1D $43 $31 aL aH bL bH n r	GS C 1 aL aH bL bH n r	Select count mode (A)
$1D $43 $32 nL nH	GS C 2 nL nH	Sets counter
$1D $43 $3B sa $3B sb $3B sn $3B sr $3B sc $3B	GS c ; sa ; sb ; sn ; sr; sc ;	Selects counter mode (B)
$1D $48 n	GS H n	Selects HRI print position
$1D $49 n	GS I n	Transmit printer ID
$1D $4C nL nH	GS L nL nH	Set left margin
$1D $50 x y	GS P x y	Set horizontal and vertical motion units (mode 1)
$1D $57 nL nH	GS W nL nH	Set printing area width
$1D $5E r t m	GS ^ r t m	Executes macro
$1D $63	GS c	Print counter
$1D $66 n	GS f n	Selects font for HRI characters
$1D $68 n	GS h n	Selects bar code height
$1D $6B n <HRI>CR	GS k n <HRI>CR	Prints a bar code
$1D $72	GS r n	Transmit status
$1D $76	GS v	Request extended status
$1D $77 n	GS w n	Selects horizontal dimension (enlargement) of bar code
$1D $7E n	GS { } n	Set superscript / subscript
$1D $7C n	GS { } n	Sets print density
$1D $E0 n	GS { } n	Enable/disable automatic FULL STATUS back
$1D $E2	GS { }	Reading number of cuts performed from the printer
$1D $E3	GS { }	Reading of length (cm) of printed paper
$1D $E5	GS { }	Reading number of power up

In the table listed above, the command marked with this symbol are defined only for the serial interface.

Given below are more detailed descriptions of each command.

$08

[Name]	**Back space**	
[Format]	ASCII	BS
	Hex	08
	Decimal	8
[Description]	Moves print position to previous character.	
[Notes]	Can be used to put two characters at the same position.	
[Default]		
[Reference]		
[Example]		

$09

[Name]	**Horizontal tab**	
[Format]	ASCII	HT
	Hex	09
	Decimal	9
[Description]	Moves the print position to the next horizontal tab position.	
[Notes]	• Ignored unless the next horizontal tab position has been set.	
	• If the command is received when the printing position is at the right margin, the printer executes print buffer full printing and horizontal tab processing from the beginning of the next line.	
	• Horizontal tab positions are set using $1B $44**.**	
[Default]		
[Reference]	**$1B $44**	
[Example]		

$0A

[Name]	**Print and line feed**	
[Format]	ASCII	LF
	Hex	0A
	Decimal	10
[Description]	Prints the data in the buffer and feeds one line based on the current line spacing.	
[Notes]	• Sets the print position to the beginning of the line.	
[Default]		
[Reference]	**$1B $32, $1B $33**	
[Example]		

$0D

[Name]	**Print and carriage return**	
[Format]	ASCII	CR
	Hex	0D
	Decimal	13
[Description]	When autofeed is “CR enabled”, this command functions in the same way as **$0A**,	

otherwise it is disregarded.

[Notes] • This command sets the print position to the beginning of the line.

[Default]

[Reference] **$0A**

[Example]

$10 $04 n

[Name] **Real-time status transmission**

[Format]

ASCII	DLE	EOT	n
Hex	10	04	n
Decimal	16	4	n

[Range] $1 \le n \le 4$, n=20

[Description] Transmits the selected printer status specified by *n* in real time according to the following parameters:

n = 1 transmit printer status
n = 2 transmit off-line status
n = 3 transmit error status
n = 4 transmit paper roll sensor status

n = 20 transmit FULL STATUS

[Notes] • This command is executed when the data buffer is full.
• This status is transmitted whenever data sequence $10 $04 n is received ($1 \le n \le 4$).

[Default]

[Reference] See tables below.

[Example]

n=1: Printer status

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	RESERVED.
1	-	-	-	RESERVED.
2	-	-	-	RESERVED.
3	Off	00	0	On-line.
	On	08	8	Off-line.
4	-	-	-	RESERVED.
5	-	-	-	RESERVED.
6	-	-	-	RESERVED.
7	-	-	-	RESERVED.

n=2: Off-line status

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	RESERVED.
1	-	-	-	RESERVED.
2	Off	00	0	Cover closed.
	On	04	4	Cover opened.
3	Off	00	0	Paper isn't feeded by FEED button.
	On	08	8	Paper is feeded by FEED button.
4	-	-	-	RESERVED.
5	Off	00	0	Paper presence.
	On	20	32	Printing stop due to paper end.
6	Off	00	0	No error.
	On	40	64	Error.
7	-	-	-	RESERVED.

n=3: Error status

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	RESERVED.
1	-	-	-	RESERVED.
2	-	-	-	RESERVED.
3	-	-	-	RESERVED.
4	-	-	-	RESERVED.
5	-	-	-	RESERVED.
6	Off	00	0	No auto-recoverable error.
	On	40	64	Auto-recoverable error.
7	-	-	-	RESERVED.

n=4: Paper roll sensor status

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	RESERVED.
1	-	-	-	RESERVED.
2,3	Off	00	0	Paper present in abundance.
	On	0C	12	Near paper end.
4	-	-	-	RESERVED.
5, 6	Off	00	0	Paper present.
	On	60	96	Paper not present.
7	-	-	-	RESERVED.

n=20: FULL status (6 bytes)
1° Byte = $10 (DLE)
2° byte = $0F
3° byte = Paper status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper present.
	On	01	1	Paper not present.
1	-	--	-	RESERVED.
2	Off	00	0	Paper present in abundance.
	On	04	4	Near paper end.
3	-	--	-	RESERVED.
4	-	--	-	RESERVED.
5	-	--	-	RESERVED.
6	Off	00	0	Not virtual paper end ***(*)***.
	On	40	64	Virtual paper end ***(*)***.
7	-	--	-	RESERVED.

(*) Virtual paper end is set when the paper length available, readed by GS ß, is 0.

4° byte = USER STATUS

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Thermal head down.
	On	01	1	Thermal head up.
1	-	-	-	RESERVED.
2	-	-	-	RESERVED.
3	Off	00	0	Drag paper motor off.
	On	08	8	Drag paper motor on.
4	-	-	-	RESERVED.
5	Off	00	0	LF key released.
	On	20	32	LF key pressed.
6	Off	00	0	FF key released.
	On	40	64	FF key pressed.
7	-	-	-	RESERVED.

5° byte = Recoverable error Status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Head temperature ok.
	On	01	1	Head temperature error.
1	-	-	-	RESERVED
2	-	-	-	RESERVED
3	Off	00	0	Power supply voltage ok.
	Off	00	0	Power supply voltage error.
4	-	-	-	RESERVED
5	Off	00	0	Acknowledge command.
	On	20	32	Not acknowledge command error.
6	Off	00	0	Free paper route.
	On	40	64	Paper jam.
7	-	-	-	RESERVED

6° byte = Unrecoverable error Status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Cutter ok.
	On	01	1	Cutter error.
1	-	-	-	RESERVED
2	-	-	-	RESERVED
3	Off	00	0	EEPROM ok.
	On	08	8	EEPROM error.
4	-	-	-	RESERVED
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	-	-	-	RESERVED

$18

[Name] **Cancel current line transmitted**

[Format] ASCII CAN

Hex 18

Decimal 24

[Description] Deletes current line transmitted.

[Notes] • Sets the print position to the beginning of the line.
[Default]
[Reference]
[Example]

$1B $20 n

[Name] **Set right-side character spacing**

[Format]

ASCII	ESC	SP	n
Hex	1B	20	n
Decimal	27	32	n

[Range] 0 ≤ n ≤ 255

[Description] Sets the character spacing for the right side of the character to [n x horizontal or vertical motion units].

[Notes] • The right character spacing for double-width mode is twice the normal value. When the characters are enlarged, the right side character spacing is m (2 or 4) times the normal value.
• The horizontal and vertical motion units are specified by **$1D $50**. Changing the horizontal or vertical motion units does not affect the current right side spacing.
• The **$1D $50** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount.
• In standard mode, the horizontal motion unit is used.
• The maximum right side spacing is 255/200 inches.

[Default] n = 0

[Reference] **$1D $50**

[Example]

$1B $21 n

[Name] **Select print modes**

[Format]

ASCII	ESC	!	n
Hex	1B	21	n
Decimal	27	33	n

[Range] 0 ≤ n ≤ 255

[Description] Selects print modes using *n* (see table below):

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A selected.
	On	01	1	Character font B selected.
1	-	-	-	RESERVED
2	-	-	-	RESERVED
3	Off	00	0	Expanded mode not selected.
	On	08	8	Expanded 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	Off	00	0	Italic mode not selected.
	On	40	64	Italic mode selected.
7	Off	00	0	Underline mode not selected.
	On	80	128	Underline mode selected.

[Notes] • The printer can underline all characters, but cannot underline the spaces set by **$09**,

$1B $24, **$1B $5C** and 90° rotated characters.
• When characters are enlarged to different heights on one line, the characters are aligned at the baseline or topline (see **$1D $7E**).
• This command resets the left and right margin at default value (see **$1D $4C**, **$1D $57**).
• **$1B $45** can also be used to turn the emphasized mode on/off. However, the last-received setting command is the effective one.
• **$1B $2D** can also be used to turn the underlining mode on/off. However, the last-received setting command is the effective one.
• **$1B $34** can also be used to turn the italic mode on/off. However, the last-received setting command is the effective one.
• **$1D $21** can also be used to select character height/width. However, the last-received setting command is the effective one.

[Default] n = 0

[Reference] **$1B $2D, $1B $45, $1B $34, $1D $21**

[Example]

$1B $24 nL nH

[Name] **Set absolute print position**

[Format]

ASCII	ESC	$	nL	nH
Hex	1B	24	nL	nH
Decimal	27	36	nL	nH

[Range] $0 \le nL \le 255$
$0 \le nH \le 255$

[Description] Sets the distance from the beginning of the line to the position at which subsequent characters are to be printed.

The distance from the beginning of the line to the print position is $[(nL + nH \times 256) \times$ (vertical or horizontal motion unit)] inches.

[Notes] • Settings outside the specified printable area are ignored.
• The horizontal and vertical motion unit are specified by **$1D $50**.
• **$1D $50** can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount.
• In standard mode, the horizontal motion unit (x) is used.
• If the setting is outside the printing area width, it sets the absolute print position, but the left or right margin is set at default value.

[Default]

[Reference] **$1B $5C, $1D $50**

[Example]

$1B $25 n

[Name] **Select/cancel user-defined characters**

[Format]

ASCII	ESC	%	n
Hex	1B	25	n
Decimal	27	37	n

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

[Description] Selects or cancels the user-defined character set.
When the Least Significant Bit (LSB) of n is 0, the user-defined character set is canceled.
When the LSB of n is 1, the user-defined character set is selected.

[Notes] • Only the LSB of n is applicable.
• When the user-defined character set is canceled, the internal character set is automatically selected.

[Default] n=0

[Reference] **$1B $26, $1B $3F**

[Example]

$1B $26 y c1 c2 [x1 d1...d(y x x1)]...[xkd1...d(y x xk)]

[Name] **Defines user-defined characters**

[Format]

ASCII	ESC	&	y	c1	c2	
Hex	1B	26	y	c1	c2	
Decimal	27	37	y	c1	c2	

[Range]
y = 3
$32 \le c1 \le c2 \le 126$
$0 \le x \le 14$ (Font (14×24))
$0 \le x \le 10$ (Font 10×24)
$0 \le x \le 8$ (Font 8×24)
$0 \le d1 \ldots d (y \times xk) \le 255$
$k = c2 - c1 + 1$

[Description] Defines user-defined characters.
Y specifies the number of bytes in the vertical direction.
C1 specifies the beginning character code for the definition, and C2 specifies the final code.
X specifies the number of dots in the horizontal direction.

[Notes]
• The allowable character code range is from ASCII $20 (32) to $7E (126) (95 characters).
• It is possible to define multiple characters for consecutive character codes. If only one character is desired, use c1 = c2.
• If c2 < c1, the command is not executed.
• d is the dot data for the characters. The dot pattern is in the horizontal direction starting from the left. Any remaining dots on the right remain blank.
• The data to define a user-defined character is (x x y) bytes.
• To print a dot, set the corresponding bit to 1; to not have it print, set to 0.
• This command can define different user-defined character patterns for each font. To select the font, use **$1B $21**.
• The user-defined character definitions are cleared when:
$1B $40 or **$1B $3F** are executed or the printer is reset or the power shut off.

[Default] Internal character set.

[Reference] **$1B $25, $1B $3F**

[Example]

$1B $2A m nL nH d1...dk

[Name] **Select bit image mode**

[Format]

ASCII	ESC	*	m	nL	nH	d1...dk
Hex	1B	2A	m	nL	nH	d1...dk
Decimal	27	42	m	nL	nH	d1...dk

[Range]
m = 0, 1, 32, 33
$0 \le nL \le 255$
$0 \le nH \le 2$
$0 \le d \le 255$

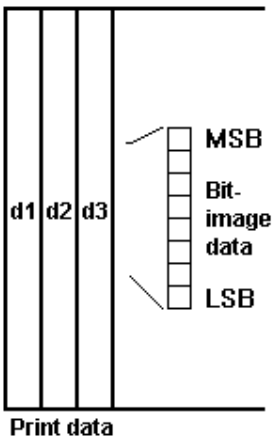
[Description] Selects a bit image mode using *m* for the number of dots specified by *nL* and *nH*, as follows:

m	Mode	Vertical direction		Horizontal direction (*1)	
		N. dots	DPI	DPI	N. of Data (k)
0	8 dot single density	8	67	100	nL + nH x 256
1	8 dot double density	8	67	200	nL + nH x 256
32	24 dot single density	24	200	100	(nL + nH x 256) x 3
33	24 dot double density	24	200	200	(nL + nH x 256) x 3

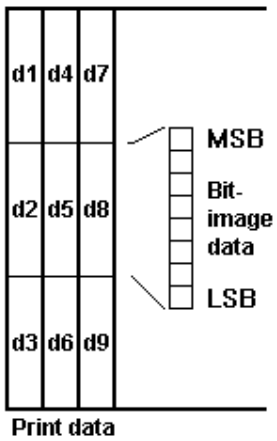
[Notes]

• The *nL* and *nH* commands indicate the number of dots of the bit image in the horizontal direction. The number of dots is calculated using: nL + nH × 256.
• If the bit image data input exceeds the number of dots to be printed on a line, the excess data is ignored.
• *d* indicates the bit image data. Set a corresponding bit to 1 to print a dot, or to 0 to not print the dot.
• If the value of *m* is outside the specified range, *nL* and data following it are processed as normal data.
• If the width of the printing area set by **$1D $4C** and **$1D $57** is less than the width required by the data set using **$1B $2A** , the excess data are ignored.
• To print the bit image use **$0A**, **$0D**, **$1B $4A** or **$1B $64**.
• After printing a bit image, the printer returns to normal data processing mode.
• This command is not affected by the emphasized, double-strike, underline (etc.) print modes, except for the upside-down mode.
• The relationship between the image data and the dots to be printed is as follows:

8-dot bit image



24-dot bit image



[Default]

[Reference]

[Example]

$1B $2D n

[Name] **Turn underline mode on/off**

[Format]

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

[Range] 0 ≤ n ≤ 2, 48 ≤ n ≤ 50

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

n = 0, 48 Turns off underline mode
n = 1, 49 Turns on underline mode (1-dot thick)
n = 2, 50 Turns on underline mode (2-dot thick)

[Notes] • The printer can underline all characters, but cannot underline the space set by **$09** and

right-side character spacing.
• The printer cannot underline 90° rotated characters and white/black inverted characters.
• When underline mode is turned off by setting the value of *n* to 0 or 48, the data which follows is not underlined.
• Underline mode can also be turned on or off by using **$1B $21**. Note, however, that the last received command is the effective one.

[Default] n=0

[Reference] **$1B $21**

[Example]

$1B $30

[Name] **Select 1/8-inch line spacing**

[Format]

ASCII	ESC	0
Hex	1B	30
Decimal	27	48

[Description] Selects 1/8-inch line spacing

[Notes]

[Default]

[Reference] **$1B $32, $1B $33**

[Example]

$1B $32

[Name] **Select 1/6-inch line spacing**

[Format]

ASCII	ESC	2
Hex	1B	32
Decimal	27	50

[Description] Selects 1/6-inch line spacing.

[Notes]

[Default]

[Reference] **$1B $30, $1B $33**

[Example]

$1B $33 n

[Name] **Set line spacing**

[Format]

ASCII	ESC	3	n
Hex	1B	33	n
Decimal	27	51	n

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

[Description] Sets line spacing to [$n \times$ (vertical or horizontal motion unit)] inches.

[Notes]
• The horizontal and vertical motion unit are specified by **$1D $50**. Changing the horizontal or vertical motion unit does not affect the current line spacing.
• The **$1D $50** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum vertical movement amount.
• In standard mode, the vertical motion unit is used.
• The maximum line spacing is *n* = 255 (≅ 32 mm).

[Default] n = 32 (1/6 inch)

[Reference] **$1B $30, $1B $32, $1D $50**

[Example]

$1B $34 n

[Name] **Set/reset italic mode**

[Format]

ASCII	ESC	4	n
Hex	1B	34	n
Decimal	27	52	n

[Range] $0 \le n \le 1, 48 \le n \le 49$

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

n	Function
0, 48	Turns off italic mode
1, 49	Turns on italic mode

[Notes]
- The printer can print any character in italic mode.
- When italic mode is turned off by setting the value of *n* to 0 or 48, the data which follows is printed in normal mode.
- Italic mode can also be turned on or off using **$1B $21**. Note, however, that the last received command is the effective one.

[Default] n = 0

[Reference] **$1B $21**

[Example]

$1B $3D n

[Name] **Select peripheral device**

[Format]

ASCII	ESC	=	n
Hex	1B	3D	n
Decimal	27	61	n

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

[Description] Select the device to which the host computer sends data, using *n* as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Printer disabled
	On	01	1	Printer enabled
1	-	-	-	RESERVED
2	-	-	-	RESERVED
3	-	-	-	RESERVED
4	-	-	-	RESERVED
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	-	-	-	RESERVED

[Notes]
- When the printer is disabled, it ignores all transmitted data until the printer is enabled through this command.

[Default] n = 1

[Reference]

[Example]

$1B $3F n

[Name] **Cancel user-defined characters**

[Format]

ASCII	ESC	?	n
Hex	1B	3F	n
Decimal	27	63	n

[Range] $32 \le n \le 126$

[Description] Cancels user-defined characters.

[Notes]
- This command cancels the pattern defined for the character code specified by *n*. After the user-defined character is cancelled, the corresponding pattern for the internal character is printed.
- This command deletes the pattern defined for the specified character code in the font selected by **$1B $21**.
- If the user-defined character has not been defined for the specified character code, the printer ignores this command.

[Default]

[Reference] **$1B $26**, **$1B $25**

[Example]

$1B $40

[Name] **Initialize printer**

[Format]

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

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

[Notes]
- The data in the receiver buffer is not cleared.
- The macro definitions are not cleared.

[Default]

[Reference]

[Example]

$1B $44 [n1...nk] 00

[Name] **Set horizontal tab positions**

[Format]

ASCII	ESC	D	n1...nk	NUL
Hex	1B	44	n1...nk	00
Decimal	27	68	n1...nk	0

[Range] $1 \le n \le 255$

$0 \le k \le 32$

[Description] Sets horizontal tab positions
- *n* specifies the column number for setting a horizontal tab position calculated from the beginning of the line.
- *k* indicates the total number of horizontal tab positions to be set.

[Notes]
- The horizontal tab position is stored as a value of [character width x *n*] measured from the beginning of the line. The character width includes the right-side character spacing and double-width characters are set with twice the width of normal characters.
- This command cancels previous tab settings.
- When setting n = 8, the print position is moved to column 9, by sending **$09**.
- Up to 32 tab positions (*k* = 32) can be set. Data exceeding 32 tab positions is processed as normal data.

• Send [*n*] *k* in ascending order and place a 0 NUL code at the end. When [*n*] *k* is less than or equal to the preceding value [*n*] *k*-1, the setting is complete and the data which follows is processed as normal data.
• **$1D $44 00** cancels all horizontal tab positions.
• The previously specified horizontal tab position does not change, even if the character width is modified.

[Default] Default tab positions are set at intervals of 8 characters (columns 9, 17, 25, …) for Font A when the right-side character spacing is 0.

[Reference] **$09**

[Example]

$1B $45 n

[Name] **Turn emphasized mode on/off**

[Format]

ASCII	ESC	E	n
Hex	1B	45	n
Decimal	27	69	n

[Range] 0 ≤ n ≤ 255

[Description] Turns emphasized mode on/off.
• When the LSB of *n* is 0, the emphasized mode is off.
• When the LSB of *n* is 1, the emphasized mode is on.

[Notes] • Only the LSB of *n* is effective.
• **$1B $21** also turns on and off the emphasized mode. However, the last received command is the effective one.

[Default] n = 0

[Reference] **1B $21**

[Example]

$1B $47 n

[Name] **Turn double-strike mode on/off**

[Format]

ASCII	ESC	G	n
Hex	1B	47	n
Decimal	27	71	n

[Range] 0 ≤ n ≤ 255

[Description] Turns double-strike mode on or off.
• When the LSB of *n* is 0, the double-strike mode is off.
• When the LSB of *n* is 1, the double-strike mode is on.

[Notes] • Only the LSB of *n* is effective.
• Printer output is the same in double-strike and emphasized mode.

[Default] n = 0

[Reference] **$1B $45**

[Example]

$1B $4A n

[Name] **Print and paper feed**

[Format]

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

[Range] 0 ≤ n ≤ 255

[Description] Prints the data in the print buffer and feeds the paper [n × (vertical or horizontal motion

unit)] inches.

[Notes]
- After printing has been 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 **$1B $32** or **$1B $33**.
- The horizontal and vertical motion units are specified by **$1D $50**.
- **$1D $50** can change the vertical (and horizontal) motion unit. However, the value cannot be less than the minimum vertical movement amount.
- In standard mode, the vertical motion unit is used.
- The maximum paper feed amount is 31.8 mm.

[Default]

[Reference] **$1D $50**

[Example]

$1B $52 n

[Name] **Select an international character set**

[Format]

ASCII	ESC	R	n
Hex	1B	52	n
Decimal	27	82	n

[Range] $0 \le n \le 12$

[Description] Selects the international character set *n* according to the table below:

	Hex	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
n	Character set												
0	U.S.A.	#	$	@	[	\	]	^	`	{	|	}	~
1	France	#	$	à	°	ç	§	^	`	è	ù	è	"
2	Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	β
3	United Kingdom	£	$	@	[	\	]	^	`	{	|	}	~
4	Denmark I	#	$	@	Æ	∅	Å	^	`	æ	ϕ	å	~
5	Sweden	#	¤	È	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	$	@	°	\	è	^	ù	à	ò	è	ì
7	Spain 1	Pt	$	@	i	Ñ	¿	^	`	"	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	`	{	|	}	~
9	Norway	#	¤	É	Æ	∅	Å	Ü	é	æ	ϕ	å	ü
10	Denmark II	#	$	É	Æ	∅	Å	Ü	é	æ	ϕ	å	ü
11	Spain 2	#	$	à	i	Ñ	¿	è	`	í	ñ	ö	ü
12	South America	#	$	à	i	Ñ	¿	è	ù	í	ñ	ö	ü

[Default] n = 0

[Reference]

[Example]

$1B $56 n

[Name] **Set 90° rotated print mode.**

[Format]

ASCII	ESC	V	n
Hex	1B	56	n
Decimal	27	86	n

[Range] $0 \le n \le 1, 48 \le n \le 49$

[Description] Turns 90° rotation mode on/off. n is used as follows :

n	Function
0, 48	Turns off 90° rotation mode
1,49	Turns on 90° rotation mode

[Notes]
• When underlined mode is turned on, the printer does not underline 90° rotated characters. All the same it's possible select the underline mode.
• Double-width and double-height commands in 90° rotation mode enlarge characters in the opposite directions from double-height *and* double-width commands in normal mode.
• This command is not available in Page mode.
• If this command is entered in Page mode, the printer all the same save the setting.

Default] n = 0

[Reference] **$1B $21, $1B $2D**

$1B $5C nL nH

[Name] **Set relative print position**

[Format]

ASCII	ESC	\	nL	nH
Hex	1B	5C	nL	nH
Decimal	27	92	nL	nH

[Range]
$0 \le nL \le 255$
$0 \le nH \le 255$

[Description] Sets the print starting position based on the current position by using the horizontal or vertical motion unit.
This command sets the distance from the current position to $[(nL + nH \times 256) \times$ (horizontal or vertical motion unit)].

[Notes]
• Any setting that exceeds the printable area is ignored.
• When the starting position is specified by *n* motion units to the right:
$nL + nH \times 256 = n$
When the starting position is specified by *n* motion units to the left (negative direction), use the complement of 65536:
$nL + nH \times 256 = 65536 - n$
• If setting exceeds the printing area width, the left or right margin is set to the default value.
• The horizontal and vertical motion unit are specified by **$1D $50**.
• **$1D $50** can change the horizontal (and vertical) motion units. However, the value cannot be less than the minimum horizontal movement amount.
• In standard mode, the horizontal motion unit is used.

[Default]

[Reference] **$1B $24**, **$1D $50**

[Example]

$1B $61 n

[Name] **Select justification**

[Format]

ASCII	ESC	a	n
Hex	1B	61	n
Decimal	27	97	n

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

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

n	Justification
0, 48	Flush left
1, 49	Centered
2, 50	Flush right

[Notes]
- This command is only enabled when inserted at the beginning of a line.
- Lines are justified within the specified printing area.
- Spaces set by **$09**, **$1B $24** and **$1B $5C** will be justified according to the previously-entered mode.

[Default] n = 0

[Reference]

[Example]

Flush left

```
ABC
ABCD
ABCDE
```

Centered

```
 ABC
 ABCD
ABCDE
```

Flush right

```
  ABC
 ABCD
ABCDE
```

$1B $63 $34 n

[Name] **Select paper sensor to stop printing.**

[Format]

ASCII	ESC	c	4	n
Hex	1B	63	34	n
Decimale	27	99	52	n

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

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

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll end sensor enabled.
	On	01	1	Paper roll near-end sensor enabled.
1	-	-	-	RESERVED
2	-	-	-	RESERVED
3	-	-	-	RESERVED
4	-	-	-	RESERVED
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	-	-	-	RESERVED

[Notes]
- When a near paper-end is detected, printing stops after printing the current line and feeding the paper.
- The paper roll near-end sensor is enabled when either bit 0 is 1.
- This setting is not cleared by printer resetting, because it is stored in the Eeprom.

[Default] n = 0

[Reference]

[Example]

$1B $63 $35 n

[Name] **Enable/disable front panel buttons**

[Format]

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

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

[Description] Enables/disables the buttons on the front panel.
• When the LSB of *n* is 0, the panel buttons are enabled.
• When the LSB of *n* is 1, the panel buttons are disabled.

[Notes]
• Only the LSB of *n* is effective.
• On the printer, the panel buttons are LINE FEED and FORM FEED.
• When the panel buttons are disabled, the buttons may only be used after the printer has been reset.
• When the panel buttons are disabled, is possible to know the status through the **$10 $04** command.

[Default] n = 0

[Reference] **$10 $04**

[Example]

ESC d n

[Name] **Print and feed paper *n* lines**

[Format]

ASCII	ESC	d	n
Hex	1B	64	n
Decimal	27	100	n

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

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

[Notes]
• Sets the print starting position at the beginning of the line.
• This command does not affect the line spacing set by **$1B $32** or **$1B $33**.
• The maximum paper feed amount is 200 lines. Even if a paper feed amount of more than 200 lines is set, the printer feeds the paper only 200 lines.

[Default]

[Reference] **$1B $32**, **$1B $33**

[Example]

$1B $69

[Name] **Total cut**

[Format]

ASCII	ESC	i
Hex	1B	69
Decimal	27	105

[Description] This command enables cutter operation. If there is no cutter, a disabling flag is set and any subsequent cut commands will be ignored.

[Notes]
• The printer waits to complete all paper movement commands before it executes a total cut.

[Default]

[Reference]

[Example]

$1B $6D

[Name] **Partial cut**

[Format]

ASCII	ESC	m
Hex	1B	6D
Decimal	27	109

[Description] This command enables partial cutter operation. If there is no cutter, a disabling flag is set and any subsequent cut commands will be ignored.

[Notes] • The printer waits to complete all paper movement commands before it executes a partial cut.

[Default]

[Reference]

[Example]

$1B $74 n

[Name] **Select character code table**

[Format]

ASCII	ESC	t	n
Hex	1B	74	n
Decimal	27	116	n

[Range] n = 0, 19, 255

[Description] Selects a page *n* from the character code table, as follows:

n	Page
0	0 (PC437 [U.S.A., Standard Europe])
19	19 (PC858 for Euro symbol at position 213)
255	Space page

[Notes]

[Default] n = 0

[Reference] See character code tables

[Example] For printing Euro symbol (•), the command sequence is :
$1B, $74, $13, $D5

$1B $76

[Name] **Transmit paper sensor status**

[Format]

ASCII	ESC	v
Hex	1B	76
Decimal	27	118

[Description] When this command is received, transmit the current status of the paper sensor. The status to be transmitted is shown in the table below:

Bit	Off/On	Hex	Decimal	Function
0,1	Off	00	0	Paper is present
	On	03	3	Near paper end
2,3	Off	00	0	Paper-end sensor: Paper is present
	On	(0C)	(12)	Paper-end sensor: Paper is not present
4	-	-	-	RESERVED
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	-	-	-	RESERVED

[Notes] • This command is executed immediately, even when the data buffer is full (Busy).
[Default]
[Reference] **$10 $04**
[Example]

$1B $78 n

[Name] **Select speed/quality mode.**
[Format]

ASCII	ESC	x	n
Hex	1B	78	n
Decimal	27	120	n

[Range] 0 ≤ n ≤ 2
[Description] Selects printing speed/quality mode.

n	Function
0	Draft mode (high speed)
1	Normal mode
2	High quality (low speed)

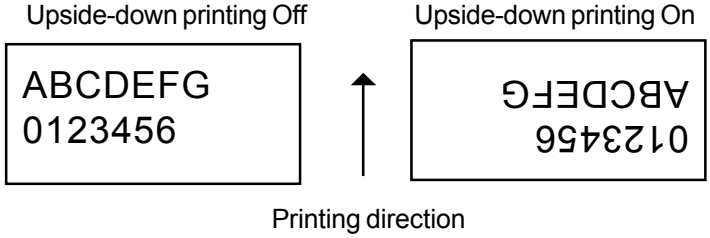
[Notes] • In high quality mode (n=2), the printer may be noisy.
[Default] *n* = 1
[Reference]
[Example]

$1B $7B n

[Name] **Turn upside-down printing mode on/off**
[Format]

ASCII	ESC	{	n
Hex	1B	7B	n
Decimal	27	123	n

[Range] 0 ≤ n ≤ 255
[Description] Turns upside-down printing mode on or off.
• When the LSB of *n* is 0, the upside-down printing mode is off.
• When the LSB of *n* is 1, the upside-down printing mode is on.
[Notes] • Only the LSB of *n* is effective.
• This command is valid only if entered at the beginning of a line.
• In upside-down printing mode, the printer rotates the line to be printed 180° and then prints it.
[Default] n = 0
[Reference]
[Example]



$1B $FA n xH xL yH yL

[Name] **Print graphic bank (608 × 431 dots).**

[Format]

ASCII	ESC	{ }	nxH	xL	yH	yL	
Hex	1B	FA	n	xH	xL	yH	yL
Decimal	27	250	n	xH	xL	yH	yL

[Range] $0 \le n \le 3$

$0 \le xH, xL, yH, yL \le 255$

[Description] Prints graphic bank from flash or ram. *n* selects the graphic source as follows:

n	Function
0	Print ram bank
1	Print flash bank logo 1
2	Print flash bank logo 2
3	Print flash bank logo 3

xL + *xH* × 256 specifies the starting dotline (1 ÷ 431).
yL + y*H* × 256 specifies the number of lines to print.

[Notes]
• If (*xL* + (*xH* × 256)) > 608 the printer does not execute the command.
• If (*xL* + (*xH* × 256) + *yL* +(y*H* × 256))> 431the printer prints only 431- *xL* + (*xH* × 256) +1 dotline.

[Default]

[Reference] **$1B $FC, $1B $FD, $1B $FE**

[Example] To print from ram bank dotline 100 to dotline 299, send:

$1B $FA $00 $00 $64 $00 $C7

$1B $FB

[Name] **Transmit ram bank to serial port**

[Format]

ASCII	ESC	{ }	nL	nH
Hex	1B	FB	nL	nH
Decimal	27	251	nL	nH

[Description] Transmits (nH x 256) + nL bytes of ram bank to serial port.

[Notes]
• The size of ram bank for graphic printing is :
640 horizontal dots (80 bytes/dotline) x 409 vertical dots (32720 bytes = 16360 words).

[Default]

[Reference] **$1B $FC, $1B $FD, $1B $FE**

[Example]

$1B $FC n

[Name] **Transfer flash bank into ram bank**

[Format]

ASCII	ESC	{ }	n
Hex	1B	FC	n
Decimal	27	252	n

[Range] $1 \le n \le 3$

[Description] Transfers flash bank into ram bank (32768 bytes). *n* selects the bank as follows:

n	Function
1	Transfers flash bank logo 1 into ram
2	Transfers flash bank logo 2 into ram
3	Transfers flash bank logo 3 into ram

[Notes]
[Default]
[Reference] **$1B $FA, $1B $FD, $1B $FE**
[Example]

$1B $FD nL nH

[Name] **Receive ram bank from serial port**

[Format]

ASCII	ESC	{ }	nL	nH
Hex	1B	FD	nL	nH
Decimal	27	253	nL	nH

[Range] $0 \le nL, nH \le 255$

[Description] Receives [$nL + (nH \times 256)$] words from the port and puts them into the ram bank.

[Notes]
- The number of data bytes received is [$nL + (nH \times 256)$] $\times 2$.
- Each word is first received as MSByte and then as LSByte.
- If [$nL + (nH \times 256)$] is greater than 16384, the data which follows is processed as normal data.
- An horizontal dotline is represented to 40 words.

[Default]
[Reference] **$1B $FA, $1B $FC, $1B $FE**
[Example]

$1B $FE n

[Name] **Transfer ram bank into flash bank**

[Format]

ASCII	ESC	¦	n
Hex	1B	FE	n
Decimal	27	254	n

[Range] $1 \le n \le 3$

[Description] Transfers the ram bank into the flash bank (32768 bytes). *n* selects the bank as follows:

n	Function
1	Transfers ram bank into flash bank logo 1
2	Transfers ram bank into flash bank logo 2
3	Transfers ram bank into flash bank logo 3

[Notes]
[Default]
[Reference] **$1B $FA, $1B $FC, $1B $FD**
[Example]

$1D $21 n

[Name] **Select character size**

[Format]

ASCII	GS	!	n
Hex	1D	21	n
Decimal	29	33	n

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

[Description] Selects character height and width, as follows:

• Bits 0 to 3: to select character height (see table 2).
• Bits 4 to 7: to select character width (see table 1).

Table 1 Character Width selection

Hex	Decimal	Width
00	0	1 (normal)
10	16	2 (double width)
20	32	3 (quadruple width)
30	48	
40	64	
50	80	
60	96	
70	112	

Table 2 Character Height selection

Hex	Decimal	Height
00	0	1 (normal)
01	1	2 (double height)
02	2	3 (quadruple height)
03	3	
04	4	
05	5	
06	6	
07	7	

[Notes] • This command is effective for all characters (except HRI characters).
• If *n* falls outside the defined range, this command is ignored.
• Characters enlarged to different heights on the same line are aligned at the baseline or topline (see **$1D $7E**).
• **$1B $21** can also be used to select character size. However, the setting of the last received command is the effective one.

[Default] n = 0

[Reference] **$1B $21**

[Example]

$1D $3A

[Name] **Start/end macro definition**

[Format]

ASCII	GS	:	
Hex	1D	3A	
Decimal	29	58	

[Description] Starts or ends macro definition.

[Notes] • Macro definition starts when this command is received during normal operation.
• When **$1D $5E** is received during macro definition, the printer ends macro definition and clears all definitions.
• Macros are not defined when power is turned on to the machine.
• Macro content is not cancelled by the **$1B $40** command. Therefore, **$1B $40** may be included in the content of macro definitions.
• If the printer receives **$1D $3A** a second time after previously receiving **$1D $3A**, the printer remains in macro undefined status.
• The contents of the macro can be defined up to 2048 bytes. If the macro definition exceeds 2048 bytes, excess data is not stored.

[Default]

[Reference] **$1D $5E**

[Example]

$1D $42 n

[Name] **Turn white/black reverse printing mode on/off**

[Format]

ASCII	GS	B	n	
Hex	1D	42	n	
Decimal	29	66	n	

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

[Description] Turns white/black reverse printing mode on or off.
• When the LSB of *n* is 0, white/black reverse printing is turned off.
• When the LSB of *n* is 1, white/black reverse printing is turned on.

[Notes] • Only the LSB of *n* is effective.
• This command is available for both built-in and user-defined characters.
• This command does not affect bit image, downloaded bit image, bar code, HRI characters and spacing skipped by **$09, $1B $24** and **$1B $5C.**
• This command does not affect white space between lines.
• White/black reverse mode has a higher priority than underline mode. Even if underline mode is on, it will be disabled (but not cancelled) when white/black reverse mode is selected.

[Default] n = 0

[Reference]

[Example]

$1D $43 $30 n m

[Name] **Select counter print mode**

[Format]

ASCII	GS	C	0	n	m
Hex	1D	43	30	n	m
Decimal	29	67	48	n	m

[Range] $0 \le n \le 5$
m = 0, 1, 2, 48, 49, 50

[Description] Selects a print mode for the serial number counter.
• *n* specifies the number of digits to be printed as follows:
when *n* = 0, the printer prints the actual digits indicated by the numeric value.
when *n* = 1 to 5, the command sets the number of digits to be printed.
• m specifies the printing position within the entire range of printed digits as follows:

m	Printing position	Processing of digits less than those specified
0, 48	Align right	Adds spaces to the left
1, 49	Align right	Adds a '0' to the left
2, 50	Align left	Adds spaces to the right

[Notes] • If *n* or *m* is out of the defined range, the previously set print mode is not changed.
• If *n* = 0, *m* is not applicable.

[Default] *n* = 0, *m* = 0

[Reference] **$1D $43 $31, $1D $43 $32, $1D $43 $3B, $1D $63**

[Example]

n = 3,m = 0	n = 3, m = 1	n = 3, m=2
□□1	001	1□□

□ indicates a space

$1D $43 $31 aL aH bL bH n r

[Name] **Select count mode (A).**

[Format]

ASCII	GS	C	1	aL	aH	bL	bH	n	r
Hex	1D	43	31	aL	aH	bL	bH	n	r
Decimal	29	67	49	aL	aH	bL	bH	n	r

[Range] $0 \le aL, aH \le 255$
$0 \le bL, bH \le 255$
$0 \le n, r \le 255$

[Description] Selects a count mode for the serial number counter.
• *aL*, *aH* or *bL*, *bH* specify the counter range.
• *n* indicates the stepping amount when counting up or down.
• *r* indicates the repetition number when the counter value is fixed.

[Notes] • Count-up mode is specified when:
[a*L* + (a*H* × 256)] < [b*L* + (b*H* × 256)] and $n \neq 0$ and $r \neq 0$
• Count-down mode is specified when:
[a*L* + (a*H* × 256)] > [b*L* + (b*H* × 256)] and $n \neq 0$ and $r \neq 0$
• Counting stops when:
[a*L* + (a*H* × 256)] = [b*L* + (b*H* × 256)] or $n = 0$ or $r = 0$
• Setting the count-up mode, the minimum counter value is [a*L* + (a*H* × 256)] and the maximum value is [b*L* + (b*H* × 256)]. If the counting up reaches a value that exceeds the maximum, it resets to the minimum value.
• Setting the count-down mode, the maximum counter value is [a*L* + (a*H* × 256)] and the minimum value is [b*L* + (b*H* × 256)]. If the counting down reaches a value less than the minimum, it resets to the maximum value.
• When this command is executed, the internal count that indicates the repetition number specified by *r* is cleared.

[Default] aL = 1, aH = 0, bL = 255, bH = 255, n = 1, r = 1

[Reference] **$1D $43 $30, $1D $43 $32, $1D $43 $3B, $1D $63**

[Example]

$1D $43 $32 nL nH

[Name] **Set counter**

[Format]

ASCII	GS	C	2	nL	nH
Hex	1D	43	32	nL	nH
Decimal	29	67	50	nL	nH

[Range] $0 \leq nL, nH \leq 255$

[Description] Sets the serial number counter value.
• *nL* and *nH* determine the value of the serial number counter set by [*nL* + (*nH* × 256)].

[Notes] • In count-up mode, if the counter value specified by this command goes out of the counter operation range specified by **$1D $43 $31** or **$1D $43 $3B** it is forced to convert to the minimum value through **$1D $63**.
• In count-down mode, if the counter value specified by this command goes out of the counter operation range specified by **$1D $43 $31** or **$1D $43 $3B** it is forced to convert to the maximum value through **$1D $63**.

[Default] nL = 1, nH = 0

[Reference] **$1D $43 $30, $1D $43 $31, $1D $43 $3B, $1D $63**

[Example]

$1D $43 $3B sa $3B sb $3B sn $3B sr $3B sc $3B

[Name] **Select count mode**

[Format]

ASCII	GS	C	;	sa	;	sb	;	sn	;	sr	;	sc	;
Hex	1D	43	3B	sa	3B	sb	3B	sn	3B	sr	3B	sc	3B
Decimal	29	67	59	sa	59	sb	59	sn	59	sr	59	sc	59

[Range] $0 \leq sa, sb, sc \leq 65535$
$0 \leq sn, sr \leq 255$
These values are all character strings.

[Description] Selects a count mode for the serial number counter and specifies the value of the counter.
• *sa*, *sb*, *sn*, *sr* and *sc* are all displayed as ASCII characters using codes from '0' to '9'.

• *sa* and *sb* specify the counter range.
• *sn* indicates the unit amount for counting up or down.
• *sr* indicates the repetition number when the counter value is fixed.
• *sc* indicates the counter value.

[Notes]
• Count-up mode is specified when:
$sa < sb$ and $sn \neq 0$ and $sr \neq 0$
• Count-down mode is specified when:
$sa > sb$ and $sn \neq 0$ and $sr \neq 0$
• Counting stops when:
$sa = sb$ or $sn = 0$ or $sr = 0$
• In setting count-up mode, the minimum value of the counter is *sa* and the maximum value is *sb*. If counting up reaches a value exceeding the maximum, it resets to the minimum value. If the counter value set by *sc* is outside the counter operation range, the counter value is forced to convert to the minimum value by executing **$1D $63**.
• In setting count-down mode, the maximum value of the counter is *sa* and the minimum value is *sb*. If counting down reaches a value less than the minimum, it resets to the maximum value. If the counter value set by *sc* is outside the counter operation range, the counter value is forced to convert to the maximum value by executing **$1D $63**.
• Parameters *sa* to *sc* can be omitted. If omitted, they remain unchanged.
• Parameters *sa* to *sc* cannot contain characters other than '0' to '9'.

[Default] sa = 1, sb = 65535, sn = 1, sr = 1, sc = 1

[Reference] **$1D $43 $30, $1D $43 $31, $1D $43 $32, $1D $63**

[Example]

$1D $48 n

[Name] **Select printing position of Human Readable Interpretation (HRI) characters**

[Format]

ASCII	GS	H	n
Hex	1D	48	n
Decimal	29	72	n

[Range] $0 \le n \le 3, 48 \le n \le 51$

[Description] Selects the printing position of HRI characters when printing bar codes. *n* selects the printing positions as follows :

n	Function
0, 48	Not printed
1, 49	Above the bar code
2, 50	Below the bar code
3, 51	Both above and below the bar code

[Notes] • HRI characters are printed using the font specified by **$1D $66**.

[Default] n = 0

[Reference] **$1D $66, $1D $6B**

[Example]

GS I n

[Name] **Transmit printer ID**

[Format]

ASCII	GS	I	n
Hex	1D	49	n
Decimal	29	73	n

[Range] $1 \le n \le 3, 49 \le n \le 51$

[Description] Transmits the printer ID specified by *n* follows:

n	Printer ID	Specification
1, 49	Printer model ID	$72
2, 50	Type ID	See table below
3, 51	ROM version ID	Depends on ROM version (4 character)

n = 2, Type ID

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	2-byte character codes not supported
1	Off	00	0	Autocutter not equipped
				Autocutter equipped
2	Off	00	0	Non-label thermal paper
	On	04	4	Label thermal paper
3	-	-	-	Undefined
4	-	-	-	RESERVED
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	-	-	-	RESERVED

[Notes]
- When the DTR/DSR control is selected, the printer only transmits 1 byte (printer ID) without confirmation that the host is ready to receive data. If host is not ready, the printer waits until is ready.
- When the XON/XOFF control is selected, the printer only transmits 1 byte (printer ID) without confirmation that the host is ready to receive data.
- This command is executed when the data is processed in the data buffer. Therefore, there could be a time lag between command reception and data transmission, depending on data buffer status.

[Default]

[Reference]

[Example]

$1D $4C nL nH

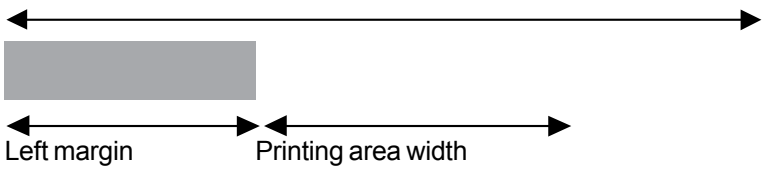
[Name] **Set left margin**

[Format]

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

[Range] $0 \le nL, nH \le 255$

[Description] Sets the left margin.
- The left margin is set to $[(nL + nH \times 256) \times$ (horizontal motion unit)] inches.



[Notes]
- This command is enabled only if set at the beginning of the line.
- If the setting exceeds the printable area, the maximum value of the printable area is used.
- If the left margin + printing area width is greater than the printable area, the printing area width is set at maximum value.

• The horizontal and vertical motion unit are specified by **$1D $50**. Changing the horizontal or vertical motion unit does not affect the current left margin.
• The **$1D $50** command can change the horizontal (and vertical) motion unit.
• However, the value cannot be less than the minimum horizontal movement amount and it must be in even units of the minimum horizontal movement amount.

[Default]

If 40 and 56 col.:	nL = nH = 0
If 72 col. :	nL = 14 nH = 0

[Reference]

[Example]

$1D $50 x y

[Name] **Set horizontal and vertical motion units**

[Format]

ASCII	GS	P	x	y
Hex	1D	50	x	y
Decimal	29	80	x	y

[Range] x = 100, 200
y = 100, 200

[Description] Sets the horizontal and vertical motion units to 1/x inch and 1/y inch respectively.
When *x* is set to 0, the default setting value is used.
When *y* is set to 0, the default setting value is used.

[Notes]
• The horizontal direction is perpendicular to the paper feed direction.
• In standard mode, the following commands use *x* or *y*, regardless of character rotation (upside-down or 90° clockwise rotation):
① Commands using x : **$1B $24, $1B $5C, $1D $4C, $1D $57.**
② Commands using y : **$1B $33, $1B $4A.**
• This command does not affect the previously specified values.
• The calculated result from combining this command with others is truncated to the minimum value of the mechanical pitch or an exact multiple of that value.

[Default] x = 200, y = 200

[Reference] **$1B $24, $1B $5C, $1B $33, $1B $4A, $1D $4C, $1D $57**

[Example]

$1D $57 nL nH

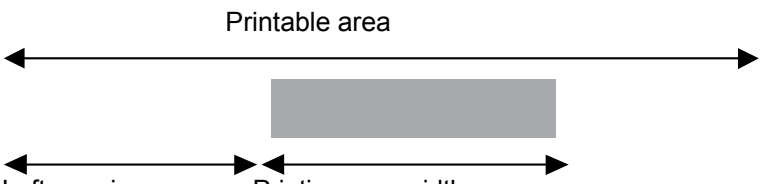
[Name] **Set printing area width**

[Format]

ASCII	GS	W	nL	nH
Hex	1D	57	nL	nH
Decimal	29	87	nL	nH

[Range] $0 \le nL, nH \le 255$
$0 \le (nL + nH \times 256) \le 832$

[Description] Sets the printing area width to the area specified by *nL* and *nH*.
• The printing area width is set to $[(nL + nH \times 256) \times (\text{horizontal motion unit})]$ inches.



[Notes]
• This command is only enabled if set at the beginning of the line.

• If the right margin is greater than the printable area, the printing area width is set at maximum value.
• If the printing area width = 0, it is set at the maximum value.
• The horizontal and vertical motion units are specified by **$1D $50**. Changing the horizontal or vertical motion unit does not affect the current left margin.
• The **$1D $50** command can change the horizontal (and vertical) motion unit.
• However, the value cannot be less than the minimum horizontal movement amount and it must be in even units of the minimum horizontal movement amount.

[Default]

If 40 and 56 col.:	nL = nH = 0
If 72 col. :	nL = 14 nH = 0

[Reference]

[Example]

$1D $5E r t m

[Name] **Execute macro**

[Format]

ASCII	GS	^	r	t	m
Hex	1D	5E	r	t	m
Decimal	29	94	r	t	m

[Range] $0 \le r, t \le 255$

$0 \le m \le 1$

[Description] Executes a macro.
• *r* specifies the number of times to execute the macro.
• *t* specifies the waiting time for executing the macro.
The waiting time is $t \times 100$ msec. for each macro execution.
• *m* specifies macro executing mode:
When the LSB of *m* = 0, the macro is executed *r* times continuously at the interval specified by *t*.
When the LSB of *m* = 1, after waiting for the period specified by *t*, the LED indicator blinks and the printer waits for the FEED button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats the operation *r* times.

[Notes] • This command has an interval of ($t \times 100$ msec.) after a macro is executed by *t*.
• If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.
• If the macro is not defined or if *r* is 0, nothing is executed.
• When the macro is executed by pressing the FORM FEED button (*m*=1), the paper cannot be fed using the FORM FEED button.

[Default]

[Reference] **$1D $3A**

[Example]

$1D $63

[Name] **Print counter**

[Format]

ASCII	GS	c
Hex	1D	63
Decimal	29	99

[Description] Sets the serial counter value in the print buffer and increments or decrements the counter value.

[Notes] • After setting the current counter value in the print buffer as print data (a character string), the printer counts up or down based on the count mode set. The counter value in

the print buffer is printed when the printer receives a print command or the buffer is full.
• The counter print mode is set using **$1D $43 $30**.
• The counter mode is set using **$1D $43 $31** or **$1D $43 $3B**.
• In count-up mode, if the counter value set by this command goes out of the counter operation range set by **$1D $43 $31** or **$1D $43 $3B** it is forced to revert to the minimum value.
• In count-down mode, if the counter value set by this command goes out of the counter operation range set by **$1D $43 $31** or **$1D $43 $3B** it is forced to revert to the maximum value.

[Default]

[Reference] **$1D $43 $30, $1D $43 $31, $1D $43 $32, $1D $43 $3B**

[Example]

$1D $65 n [m] [l]

[Name] **Ejector commands**

[Format]

ASCII	GS	e	n	[m]	[l]
Hex	1D	65	n	[m]	[l]
Decimal	29	101	n	[m]	[l]

[Range] $0 \le n \le 3$, $5 \le n \le 8$

[Description] This command checks tickets ejector :
n = 0 Ticket produced with defined number of steps (see command notes)
n = 1 Ejector motor off
n = 2 Ejector motor on
n = 3 ticket presenting with (3 x m) steps (1 step = 36 mm = 3 x 12 mm)
n = 5 ticket espulsion
n = 6 transmits ejector byte status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not near paper end
	On	01	1	Near paper end
1	Off	00	0	Fixed to 0
2	Off	00	0	Paper end sensor
	On	04	4	Paper is present.
3	Off	00	0	Tickets out
	On	08	8	Ticket present on ejector mouth
4	Off	00	0	Printer stepping motor off
	On	10	16	Printer stepping motor on
5	Off	00	0	Ejector motor off
	On	20	32	Ejector motor on
6	Off	00	0	No error
	On	40	64	Error occurs
7	Off	00	0	Fixed to 0

n = 7 sets maximum ticket length :
The maximum ticket length is [(*m**256+l) * (vertical motion unit)] inches. Max ticket length *recommended is 20*cm.
n = 8 ticket presenting with m steps (1 step = 12 mm)

[Notes] • *m* must be sent with *n* = 3, 7;
• *l* must be sent with *n* = 7;
• if *n*=3 and ticket is not cut yet, before execute the command a total cutting will be make.

• if *n*=0 the fixed value of ticket presenting is :

- on power on and after a reset command (both hardware and software) 47mm
- the last distance saved to a **$1D $65 3** or **$1D $65 8** commands.
- Ticket presenting lenght can change of +/- 12 mm.

• The minimum ticket presenting lenght is 89 mm (below tihs value the ticket espulsion could have some problems).

[Default]

[Reference] **$1D $6B**

[Example]

$1D $66 n

[Name] **Select font for HRI characters**

[Format]

ASCII	GS	f	n
Hex	1D	66	n
Decimal	29	102	n

[Range] n = 0, 1, 48, 49

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

n	Font
0, 48	Font A (14x24)
1, 49	Font B (10x24)

[Notes] HRI characters are printed at the position specified by **$1D $48**.

[Default] n = 0

[Reference] **$1D $48, $1D $6B**

[Example]

$1D $68 n

[Name] **Set bar code height**

[Format]

ASCII	GS	h	n
Hex	1D	68	n
Decimal	29	104	n

[Range] $1 \le n \le 255$

[Description] Sets the height of the bar code.
n specifies the number of vertical dots.

[Notes]

[Default] n = 96 (12 mm)

[Reference] **$1D $6B**

[Example]

❶ $1D $6B m [d1...dk] NUL ❷ $1D $6B m n [d1...dn]

[Name] **Print bar code**

[Format]

①	ASCII	GS	k	m	NUL
	Hex	1D	6B	m	00
	Decimal	29	107	m	0

	②	ASCII	GS	k	m	n
		Hex	1D	6B	m	n
		Decimal	29	107	m	n

[Range] ① $0 \le m \le 6$
② $65 \le m \le 73$

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

	m	Bar code system	No. of characters	Remarks
❶	0	UPC-A	$11 \le k \le 12$	$48 \le d \le 57$
	1	UPC-E	$11 \le k \le 12$	$48 \le d \le 57$
	2	EAN13 (JAN)	$12 \le k \le 13$	$48 \le d \le 57$
	3	EAN8 (JAN)	$7 \le k \le 8$	$48 \le d \le 57$
	4	CODE39	$1 \le k$	$48 \le d \le 57$, $65 \le d \le 90$, 32, 36, 37, 43, 45, 46, 47
	5	ITF	$1 \le k$ (even number)	$48 \le d$ £ 57
	6	CODABAR	$1 \le k$	$48 \le d \le 57$, $65 \le d1 \le 68$, 36, 43, 45, 46, 47, 58
	7	CODE93	$1 \le k \le 255$	$1 \le d \le 127$
	8	CODE128	$2 \le k \le 255$	$1 \le d \le 127$
	20	CODE32	$8 \le k \le 9$	$48 \le d \le 57$

②	65	UPC-A	$11 \le n \le 12$	$48 \le d \le 57$
	66	UPC-E	$11 \le n \le 12$	$48 \le d \le 57$
	67	EAN13 (JAN)	$12 \le n \le 13$	$48 \le d \le 57$
	68	EAN8 (JAN)	$7 \le n \le 8$	$48 \le d \le 57$
	69	CODE39	$1 \le n \le 255$	$48 \le d \le 57$, $65 \le d \le 90$, 32, 36, 37, 43, 45, 46, 47
	70	ITF	$1 \le n \le 255$	$48 \le d \le 57$
	71	CODABAR	$1 \le n \le 255$	$48 \le d \le 57$, $65 \le d1 \le 68$, 36, 43, 45, 46, 47, 58
	72	CODE93	$1 \le n \le 255$	$0 \le d \le 127$
	73	CODE128	$2 \le n \le 255$	$0 \le d \le 127$
	90	CODE32	$8 \le n \le 9$	$48 \le d \le 57$

[Notes]
- If *d* is outside of the specified range, the printer prints the following message: “BAR CODE GENERATOR IS NOT OK!” and processes the data which follows as normal data.
- If the horizontal size exceeds the 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 **$1B $32** or **$1B $33**.
- 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 (emphasized, double-strike, underline

or character size), except for upside-down and justification mode.

[Notes per ①]

• This command ends with a NUL code.
• When the bar code system used is UPC-A or UPC-E, the printer prints the bar code data after receiving 11 (without check digit) or 12 (with check digit) bytes bar code data.
• When the bar code system used is EAN13, the printer prints the bar code data after receiving 12 (without check digit) or 13 (with check digit) bytes bar code data.
• When the bar code system used is EAN8, the printer prints the bar code data after receiving 7 (without check digit) or 8 (with check digit) bytes bar code data.
• The number of data for ITF bar code must be even numbers. When an odd number of data is input, the printer ignores the last received data.

[Notes per ②]

• If *n* is outside of the specified range, the printer stops command processing and processes the following data as normal data.

When CODE93 is used:

• The printer prints an HRI character (o) as a start character at the beginning of the HRI character string.
• The printer prints an HRI character (o) as a stop character at the end of the HRI character string.
• The printer prints an HRI character (n) as a control character ($00 to $1F and $7F).

When CODE128 is used:

• When using CODE128 in this printer, please note the following regarding data transmission:
• The top part of the bar code data string must be a 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. ASCII character “{” is defined by transmitting “{“ twice, consecutively.

Specific character	Data transmission		
	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

[Default]

[Reference] **$1D $48, $1D $66, $1D $68**

[Example]

$1D $72 n

[Name] **Transmit status**

[Format]

ASCII	GS	r	n
Hex	1D	72	n
Decimal	29	114	n

[Range] n = 1, 49

[Description] Transmits the status specified by *n* as follows:

n	Function
1, 49	Transmits paper sensor status (same as **$1B $76**).

Paper sensor status (n = 1, 49)

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	RESERVED
1	-	-	-	RESERVED
2,3	Off	00	0	Paper end sensor: paper present
	On	0C	12	Paper end sensor: paper not present
4	Off	00	0	Not used. Fixed to Off.
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	-	-	-	RESERVED

[Notes] • This command is executed when the data is processed in the data buffer. Therefore, there may be a time lag between receiving the command and transmitting the status, depending on data buffer status.

[Default]

[Reference] **$10 $04, $1B $76**

[Example]

$1D $76

[Name] **Request expanded status**

[Format]

ASCII	GS	v
Hex	1D	76
Decimal	29	118

[Description] This command transmits two bytes, each bit indicates the printer status to serial port.

First byte :

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper presence in abundance
	On	01	1	Near paper end
1	-	-	-	RESERVED
2	Off	00	0	Paper out
	On	04	4	Paper presence
3	Off	00	0	Line Feed key released
	On	08	8	Line Feed key pressed
4	Off	00	0	Form Feed key released
	On	10	16	Form Feed key pressed
5	Off	00	0	Head temperature correct
	On	20	32	Head temperature error
6	Off	00	0	Motor off
	On	40	64	Motor on
7	Off	00	0	No error
	On	80	128	Error due to paper end, Head up, etc.

Second byte :

Bit	Off/On	Hex	Decimal	Function
0	On	01	1	Printing
1	On	02	2	Head up
2	-	-	-	RESERVED
3	On	08	8	Ticket on the exit mouth
4	-	-	-	RESERVED
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	-	-	-	RESERVED

[Notes] • This command is executed immediately, even when the data buffer is full (Busy).
[Default]
[Reference] **$10 $04**
[Example]

$1D $77 n

[Name] **Set bar code width**
[Format]

ASCII	GS	w	n
Hex	1D	77	n
Decimal	29	119	n

[Range] 1 ≤ n ≤ 6
[Description] Sets the horizontal size of the bar code. *n* specifies the bar code width as follows:

n	Module width (mm)
1	0.125
2	0.25
3	0.375
4	0.5
5	0.625
6	0.75

[Notes]
[Default] n = 3
[Reference] **$1D $6B**
[Example]

$1D $7C n

[Name] **Set printing density**
[Format]

ASCII	GS	{ }	n
Hex	1D	7C	n
Decimal	29	124	n

[Range] 0 ≤ n ≤ 4, 48 ≤ n ≤ 52
[Description] Sets printing density. *n* specifies printing density as follows:

n	Printing density
0, 48	Very light
1, 49	Light
2, 50	Normal
3, 51	Dark
4, 52	Very dark

[Notes] • Printing density reverts to the default value when the printer is reset or turned off.
[Default] n = 2
[Reference]
[Example]

$1D $7E n

[Name] **Set superscript/subscript**
[Format]

ASCII	GS	{ }	n
Hex	1D	7E	n
Decimal	29	126	n

[Range] n = 0, 1, 48, 49
[Description] Sets superscript or subscript character position. *n* specifies the position as follows:

n	Function
0, 48	Subscript character position
1, 49	Superscript character position

[Notes] • This command is executed if there are characters of different height on the same line.
[Default] n = 0
[Reference] **$1B $21, $1D $21**
[Example]

$1D $E0 n

[Name] **Enable / disable automatic FULL STATUS back**
[Format]

ASCII	GS	{ }	n
Hex	1D	E0	n
Decimal	29	224	n

[Range] $0 \le n \le 255$
[Description] Enable / disable automatic full status back. *n* specifies the composition of FULL STATUS as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable Paper status.
	On	01	1	Enable Paper status.
1	Off	00	0	Disable User status.
	On	02	2	Enable User status.
2	Off	00	0	Disable Recoverable Error Status.
	On	04	4	Enable Recoverable Error Status.
3	Off	00	0	Disable Unrecoverable Error Status.
	On	08	8	Enable Unrecoverable Error Status.
4	-	-	-	RESERVED
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	-	-	-	RESERVED

[Notes] • Once enable at least one byte of the FULL STATUS, for each change of at least one of the bits which compose the required status, the status sent in automatic from the printer will be so composed as follows:
1° Byte = $10 (DLE)
2° Byte = n
Next byte (depends how many bits are active in n)

[Reference] **$10 $04 n**

[Example]

$1D $E2 n

[Name] **Reading number of cuts performed from the printer**

[Format]

ASCII	GS	{}
Hex	1D	E2
Decimal	29	226

[Description] Reading the number of cuts performed from the printer.
The command return a string that points out how many cuts are performed by the printer, for example if there are performed 2376 cuts, it will be:
'2376 cuts'

[Notes]

[Default]

[Reference]

[Example]

$1D $E3 n

[Name] **Reading of length (cm) of printed paper**

[Format]

ASCII	GS	{}
Hex	1D	E3
Decimal	29	227

[Description] Reading of length (cm) of printed paper.
The command return a string pointing out how much paper is printed, for example if the printer has print about 2515,5 m, it will be:
'251550cm'

[Notes]

[Default]

[Reference]

[Example]

$1D $E5

[Name] **Reading number of power up**

[Format]

ASCII	GS	{}
Hex	1D	E5
Decimal	29	229

[Description] Reading number of power up of the printer.

[Notes] • The command return a string pointing out the number of turning on of the printer, for example if the printer is turned on 512 times, it will be:
'512on'

[Default]

[Reference]

[Example]

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4.1 TECHNICAL SPECIFICATIONS

Table 4.1 gives the main technical specifications for the printer models.

(Tab.4.1)

Model	**TPL 80**	**TPL 82.5**
Resolution	203 DPI (8 dot/mm)	
Paper specifications		
Type of paper	Thermal rolls Heat-sensitive side on outside of roll	
Recommended types of paper (1)	from 58 g/m^2 to 80 g/m^2 (KANZAN)	
Paper thickness	from 0,063 mm to 0,080 mm	
Paper roll size	80 mm	82.5 mm
External roll diameter	max 180 mm	
Paper end	Not attached to roll core	
Internal roll core diameter	25 mm (+1 mm)	
Core thickness	2 mm (+1 mm)	
Core type	Cardboard or plastic	
Sensors	Paper end, head open, near paper end, Paper anti-jamming, head temperature	
Printing method	Thermal, fixed head (8 dot/mm)	
Printing mode	Straight, 90°, 180°, 360°	
Printing format	Height / width from 1 to 8, bold, reverse, underlined, italic	
Characters font	ASCII Standard, EPSON, International	
Standard interfaces	Serial RS232, CENTRONICS and USB (optional)	
Baud rate	From 1200 to 57600 bps	
Receive buffer	16 Kbyte	
Flash memory	256 Kbyte	
Graphic memory	Custom TPT emulation : 6 logos 608 x 215 each ESC/POS™ emulation : 3 logos 608 x 431 each	
Printing speed		
Low speed	60 mm/sec	
Normal	110 mm/sec	
High speed	130 mm/sec	
Power supply	24Vdc	
Consumption		
Medium	5 A	
Peak	6.2 A	
Standby	0.06 A	
Weight (2)	1800 gr.	

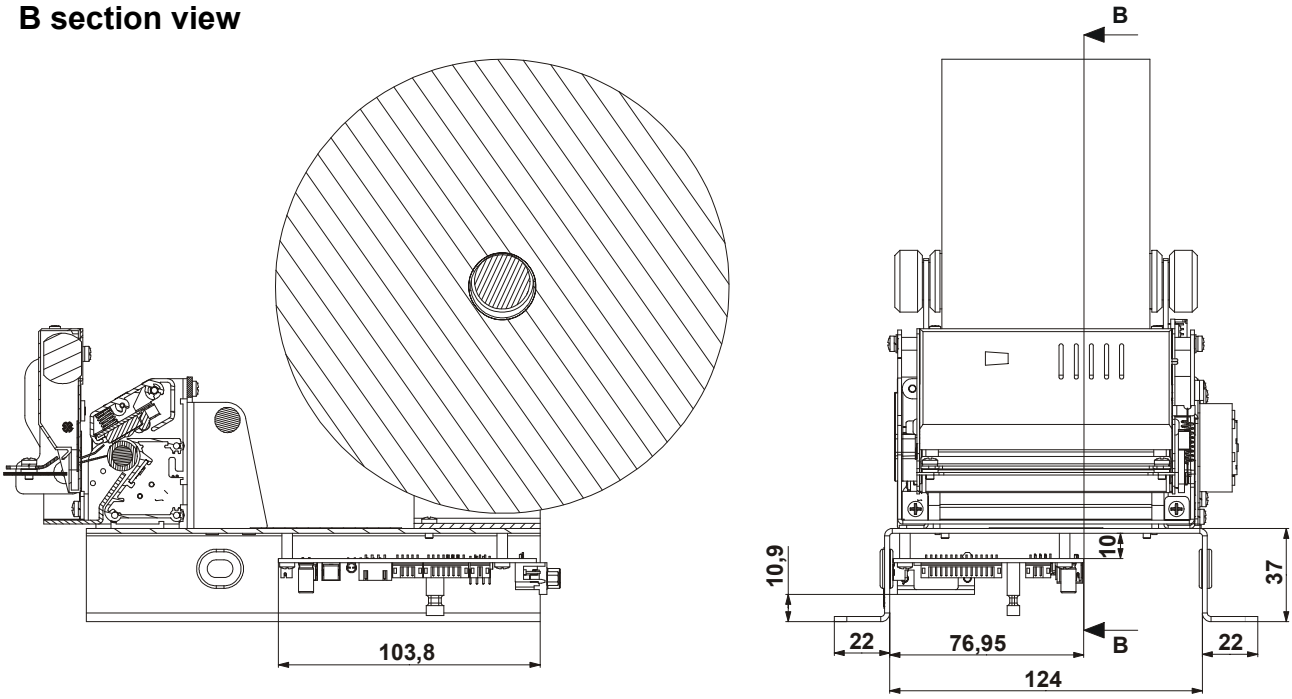
Note : (1) The recommended minimum basis weight is 58 g/m².
(2) Printer weight is given without paper roll.

Environmental conditions			
Operating temperature	0 °C - 50 °C		
Relative humidity	10% - 80% w/o condensation		
Storage temperature / humidity	-20°C - +70°C / 10% - 90%		
ESC/POS™ EMULATION			
Number of columns			
TPL 80 model	43	60	76
TPL 82.5 model	45	64	80
Characters (L x H mm)			
Normal	1.7x 3	1.2 x 3	1 x 3
CUSTOM TPT EMULATION			
Number of columns			
TPL 80 model	25	38	76
TPL 82.5 model	26	40	80
Characters (L x H mm)			
Normal	3 x 4	2 x 3	1 x 2

4.2 DIMENSIONS

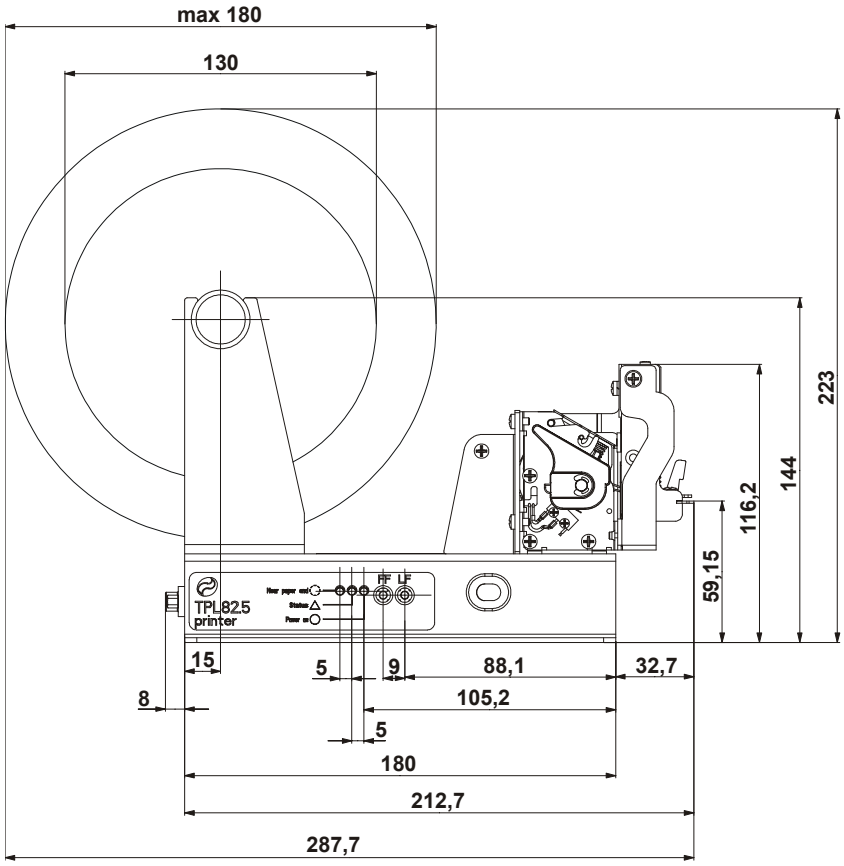
Front view

B section view



(Fig.4.1)

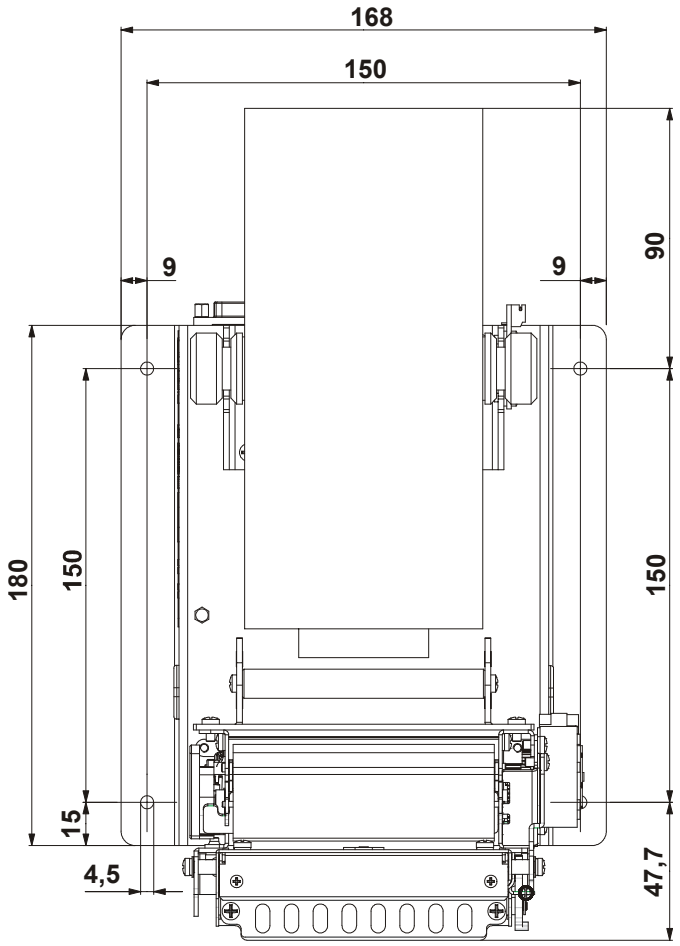
Side view



(Fig.4.2)

Top view

(Fig.4.3)

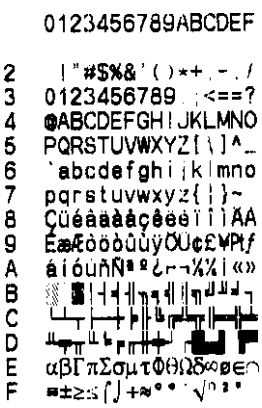


5.1 CHARACTER SETS

The printer has six fonts each with 224 characters (two font for every emulation).

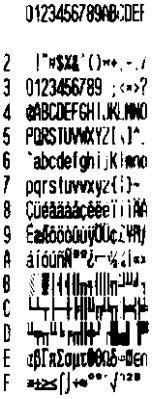
ESC/POS™ Emulation (PC437 USA, Standard Europe)

FONT 14X24



FONT 10X24

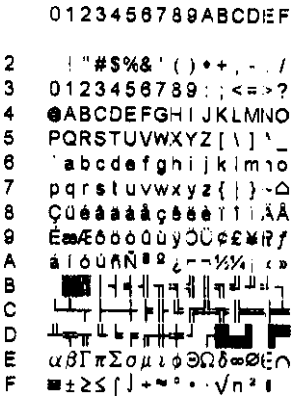
FONT 8X24



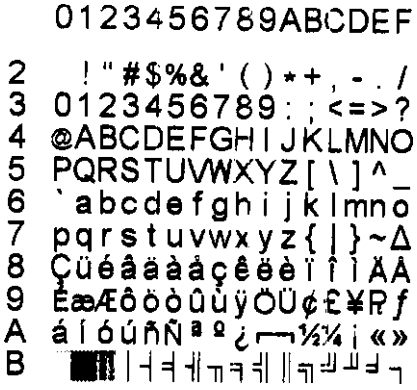
(Fig.5.1)

Custom TPT Emulation

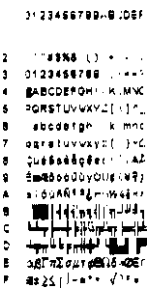
FONT 16X24



FONT 24X32



FONT 8X16



(Fig.5.2)

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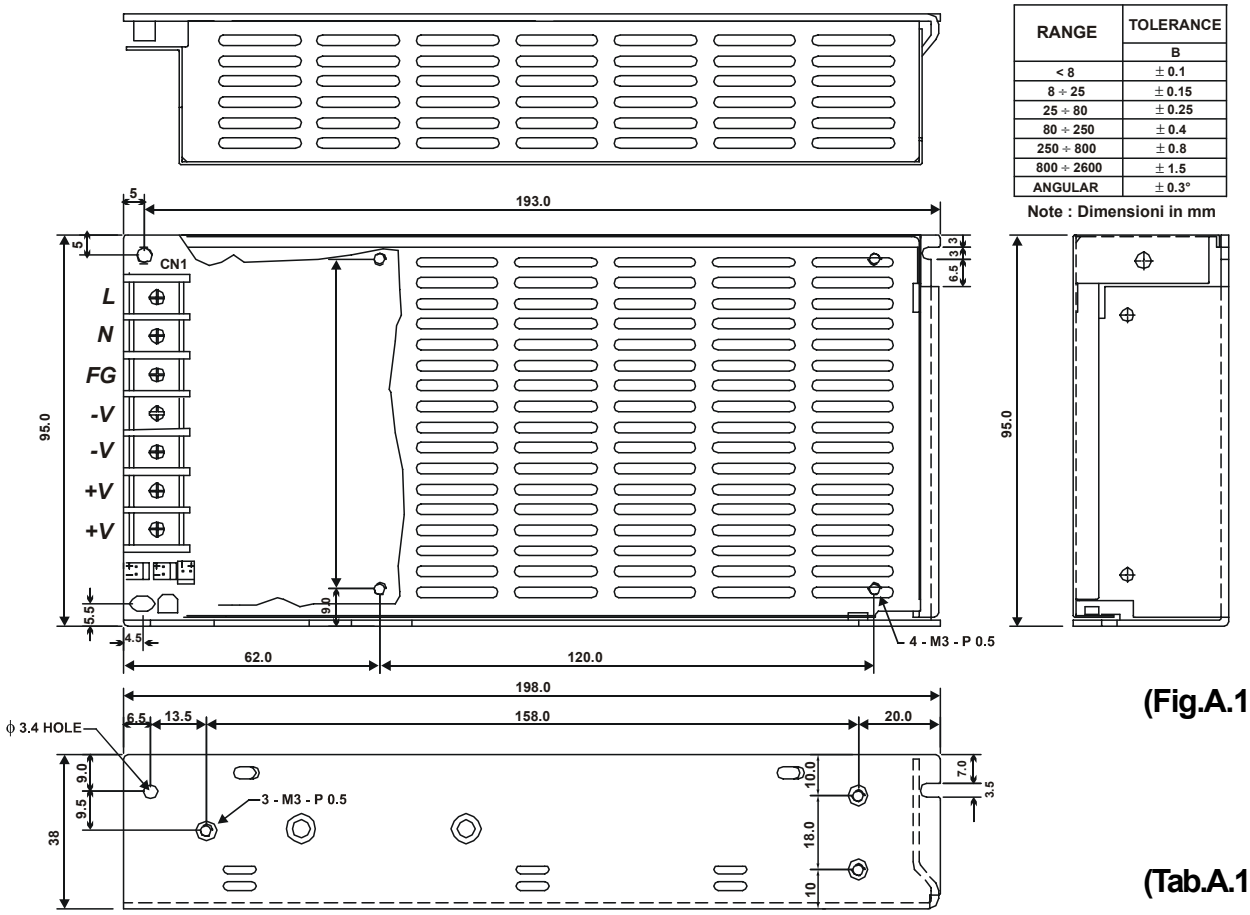
A.1 ACCESSORIES

A.1.1 Power supply

The figure below illustrates the power supply provided by Custom to be utilized for operating printers.



RANGE	TOLERANCE
	B
< 8	± 0.1
8 ÷ 25	± 0.15
25 ÷ 80	± 0.25
80 ÷ 250	± 0.4
250 ÷ 800	± 0.8
800 ÷ 2600	± 1.5
ANGULAR	± 0.3°

(Fig.A.1)

(Tab.A.1)

PPSPS-100-24V		**Switching power supply 24V 100W**
Input specifications		
Input voltage	85V - 264V	
Current	0A - 4.5A	
Input frequency	47 Hz - 63 Hz	
Output specifications		
Output voltage		24 V
Output current	Min. - Max.	0A - 4.5A
Efficiency	Min.	80%
Environmental conditions		
Operating temperature	0°C - 70°C	
Humidity	20% - 85% Rh (w/o condensation)	
Storage temperature / humidity	-10°C - 75°C / 10% - 95% (w/o condensation)	

Protection devices: Shortcircuit, overload.

A.2 SPARE PARTS

Paper roll **(Tab.A.2)**

RCT80X48-25MM	Thermal paper roll - 80 mm
RCT82.5X48-25MM	Thermal paper roll - 82.5 mm