THERMAL PRINTER
PT 285

User's Manual

COD. DOME-PT285 Revision 1.10

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"CE" Declaration of Conformity

In accordance with standards ISO/IEC Guide 22 and EN 45014 N°: DC0140996

Manufacturer's name: Custom Engineering s.r.l.

Manufacturer's address: Strada Berettine 2
Fontevivo (Parma)
Italy

Declares that the product:

Product name: Panel printer with thermal print mechanism

Type name: PT285

Model: PT285

is in conformity with the following directives:

Electromagnetic compatibility directives EEC/89/336; EEC/92/31; EEC/93/68

In accordance with the following standards:

EN 55022 Class B	Limits and methods of measurement of radio disturbance characteristics of information technology equipment	1994
EN 50082-2	Electromagnetic compatibility - General immunity standard. Part 2: Industrial environments.	1995
EN 61000-4-2	Electrostatic discharge requirements 4KV contact discharge, 8KV air discharge	1995
EN 61000-4-4	Fast electrical transient/burst requirements. DC mains 0.5KV	1995
EN 61000-4-8	Power frequency magnetic field - Immunity test 30 A/m ; 50Hz	1994
ENV 50140	Radiated radio-frequency electromagnetic fields. Immunity tests. 3V/m, 80MHz-1000MHz, 80% 1KHz AM	1993

September 1996

GENERAL INFORMATION REGARDING SAFETY

- Read and keep the following instructions.
- Observe all warnings and follow all instructions attached to the printer.
- Before cleaning the printer, disconnect the feed cable.
- Clean the printer with a damp cloth. Do not use liquid or spray products.
- Do not operate the printer near to water.
- Do not place the printer on unsteady surfaces. It could fall and get seriously damaged.
- Use the type of electricity supply marked on the printer label. In the event of uncertainty, contact the seller.
- Position the printer in such a way as to ensure that the cables connected to it will not be damaged.
- Ensure that the maximum absorbed current of the printer does not exceed the maximum acceptable current for the type of feed cable used.
- Do not put objects of any kind inside the printer as they could cause a short circuit or damage parts which could affect its performance.
- Do not spill liquids on the printer.
- Do not carry out technical operations on the printer with the exception of the scheduled maintenance operations specifically indicated in the user's manual.
- Disconnect the printer from the electricity supply and have it repaired by a specialized technician should any of the following conditions occur:
    A. The feed connector has been damaged.
    B. Liquid has penetrated to the inside of the printer;
    C. The printer has been exposed to rain or water;
    D. The printer is not operating normally despite the instructions in the user's manual having been followed.
    E. The printer has been dropped and its case damaged.
    F. The performance of the printer is poor.
    G. The printer does not work.

GENERAL FEATURES

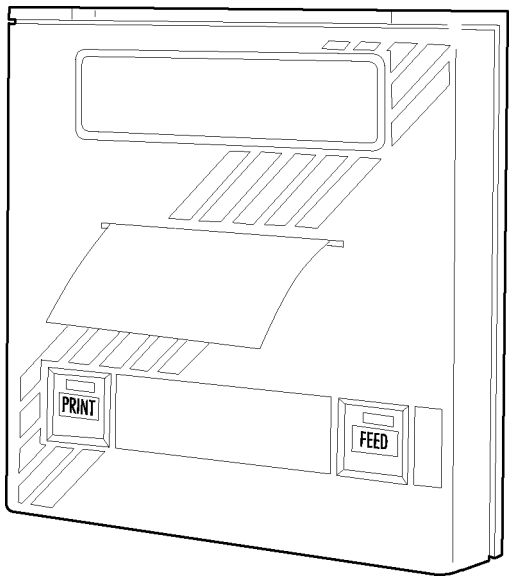
The PT285 (Fig.1) is a panel printer which is undoubtedly the best solution for all industrial applications: it is ideal for POS, weighing systems, receipts (not for tax purposes), security, controlling and diagnostics purposes.

IT IS equipped with a high resolution, rapid-type thermal print mechanism (200dpi), which uses 57.5mm wide rolls of thermal paper.

The PT285 printer is so compact and lightweight that it can be installed extremely easily on any type of equipment. It is able to satisfy every requirement, thanks to its personalized programming facility. It has a 4K print buffer. It is supplied with RS232 serial and CENTRONICS parallel interfaces as standard. It can also be equipped with a Real Time Clock.

The PT285 has 3 pages of programmable graphics in which logos and drawings can be stored.

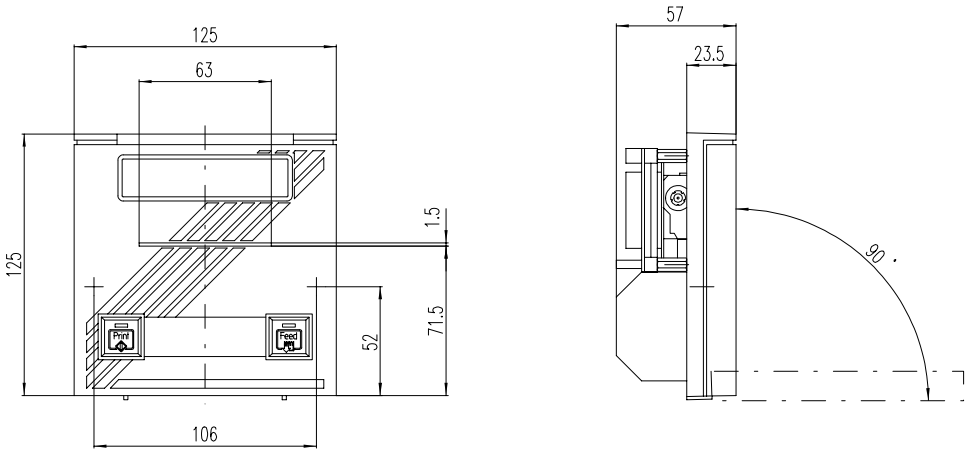
The driver for Microsoft® Windows™ and software for editing and programming logos and fonts, and for upgrading the printer's firmware, are available on request.



PRODUCT DESCRIPTION

The PT285 printer has an ABS casing with a cover which opens to allow access to the paper roll and print head. The printer's dimensions are shown in fig. 2.
The keyboard, consisting of the PRINT and FEED keys with illuminated LEDs, is housed in the front of the printer.

Figure 2



- PRINT key. When the print key is activated it brings about the transmission in serial of the control character "$0D". This only happens, however, if it has been enabled through DATA4 with logic "0" or, alternatively, if switch 5 of option RS232 is in the ON position. If during configuration from the keyboard, the option to set using the keys has been selected, transmission of the character "$0D" can either be enabled or disabled. When the PRINT key's LED lights up, this indicates that the printer is printing.

- FEED key. When this is pressed the paper feeds forward manually. If this key is pressed briefly, when the RTCK option is installed, the date and time of day is printed. When the LED of the FEED key lights up , this indicates that the logic card's power supply is correct, i.e. that it is over 3.7 V (minimum threshold, under which the printer is reset and the LED stays off). If there is no paper, the LED flashes.

TECHNICAL SPECIFICATIONS

Table 1 lists the main features of the two printer models: PT285 16, 24 and 40 columns.

TABLE 1

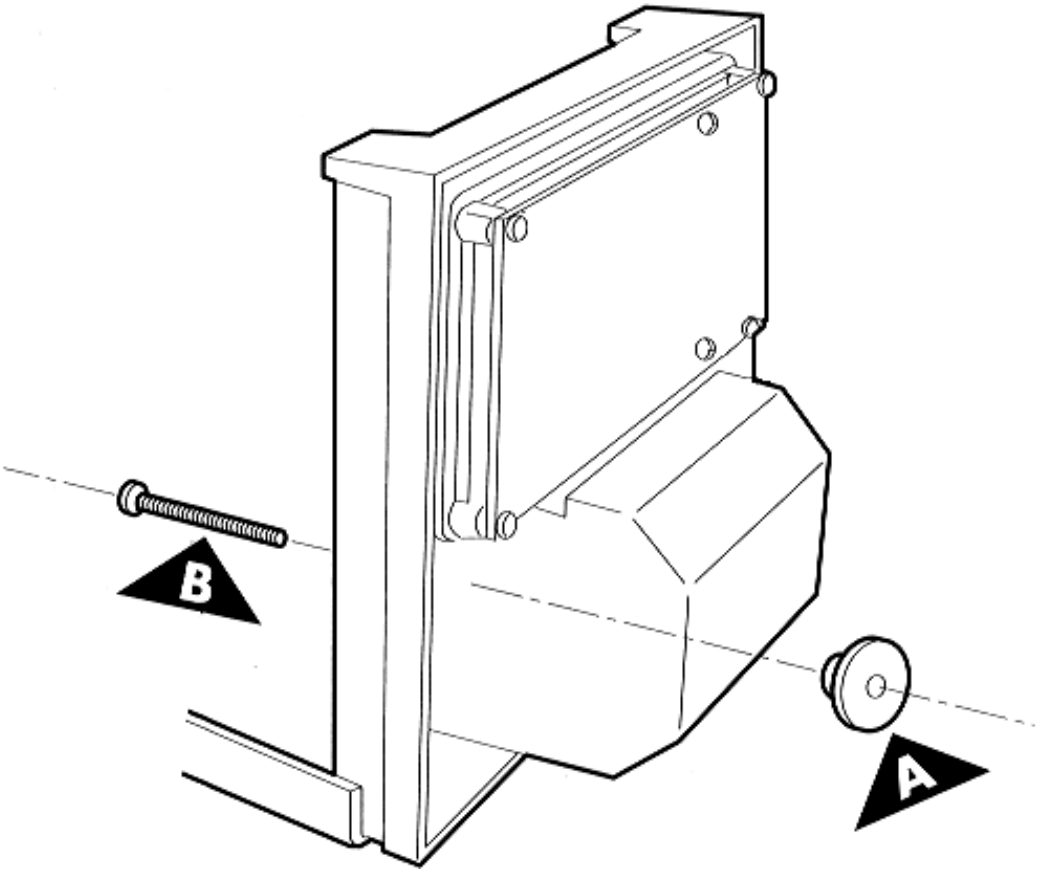
COLUMNS	**16**	**24**	**40**
Characters (L x H mm)	3x4	2x3	1,1x2
Character matrix	24x32	16x24	9x16
Graphic dot	8 dot/mm		
Dots per line	384		
Printing speed:	2,6		
Lines/sec.	6,5	9	13
Characters/sec.	100	216	520
Printing method	Fixed thermal head		
Writing method	Straight, reverse, 90°		
Print formats	Normal, double and quadruple height and width, enlarged, negative, underscored		
Character set	5 built-in fonts		
Paper width	57,5 .0,5 mm x ø50 mm max		
Print buffer	4 Kbytes		
Standard interfaces	TTL serial and parallel		
Optional interfaces	Current loop RS232 serial, RS485 and Centronics parallel		
Power supply	5 Vdc ± 10%		
Absorption			
Medium when printing	14 W		
Environmental conditions			
Operating temperature	0°C - +50°C		
Operating humidity	35% - 85%		
Storage temperature /humidity	-20°C - +65°C / 10%-90%		
Options	Real time Clock, power pack		

HOW TO REMOVE THE PRINTER FROM ITS PACKAGING

Open the packaging and check :

a) that none of the parts have been damaged during transportation ;
b) that the paper roll is in place.
c) that the printer is equipped with two screws and two brass washers, for installation purposes.

Figure 3



INSTALLATION PROCEDURE

On the panel on which the printer is to be mounted, make a square hole of dimensions 112 X 112 mm (see fig. 3). Unscrew the two brass washers +A+, while leaving the screws “B” in place. Insert the printer into the hole on the panel, open the front cover and, working from the back, manually screw down the two brass washers until the printer is firmly in place.
Plug in the interfacing and feed connectors located on the logic card..
If possible, do not expose the equipment to direct light sources.

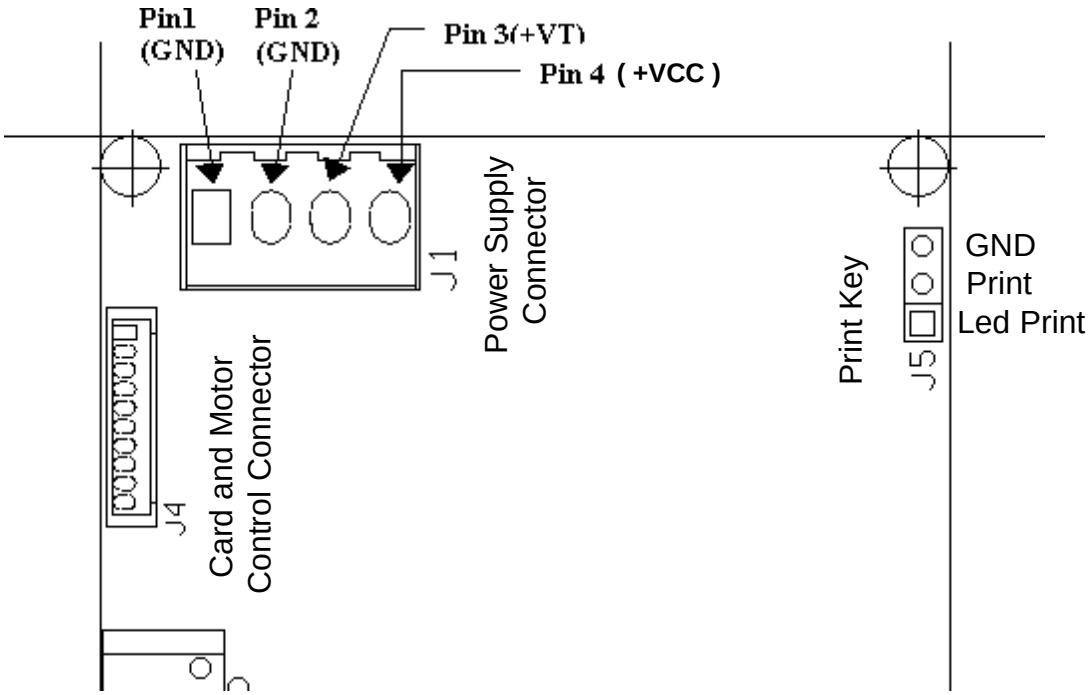
CONNECTIONS

Power supply

The PT285 printer is equipped with a standard 4-pin male AMPMODU1-type connector (J1).
The signals on the power supply connector pins are as follows :

1 GND
2 GND
3 +VT :5 Vdc ±15% (print head power supply)
4 +VDC : 5 Vdc± 7% (logic card power supply)

In the following figure (serigraph of card connectors) the connections to be made on the pins of power supply connector J1 are shown:



It is advisable to install a common mode ferrite with an impedance of approx.200 W to 100 MHz on the feeding line, for the express purpose of improving immunity to disturbance on the line.

Connection with the power supply connector (J1) can be avoided by using the logic circuitry's flat 20-pin connector (J4), thus connecting the printer's power supply and signals with a single cable. The flat cable must not exceed 20 cm in length for the 20-pin connector because, when electrical current run inside small diameter wires, voltage failures can occur, thus interfering with the correct operation of the printer. Additionally, with this type of connection, conformity to the electromagnetic compatibility standards can no longer be guaranteed.
If the RS232 or CENTRONICS options are installed in the printer, it must, of necessity, be supplied through the connector J1.
For the pin pattern relative to feeding through the logic's flat connector, please refer to the following paragraph :

Logic

In the 20-pin connector J4, the signals are arranged as follows :

1	+VT	**2**	+VT
3	+VDC	**4**	+VDC
5	GND	**6**	GND
7	TD	**8**	D6
9	D5	**10**	D4
11	D3	**12**	D2
13	D1	**14**	D0
15	D7 *	**16**	RESET
17	PSE	**18**	READY/RTS
19	FEED	**20**	STB/RD

*The D7 signal is not taken into consideration in the event of 7-bit programming of the parallel port. In order to configure the PT285 with the extended character set, the parallel interface must be 8-bit programmed.

The signals indicated have the following functions :

GND : signal ground and feed ;

+VT : print head feed ;

+VCC logic card feed ;

PSE (input) : serial/parallel interface selection. If shortcircuited to ground (0) serial communication is enabled ; if free (1) parallel communication is enabled ;

D0,...,D7 (inputs) :data buses. In the parallel configuration, these correspond to the printer input data bus (the high level indicates binary digit 1). In serial communication these are used to determine the communication speed and transmission protocol: normally the data bus is on logic level 1: in order to obtain logic level 0, shortcircuit to ground (GND).

The serial baud rate is settable as shown in the table below :

D0	**D1**	**D2**	**BAUD**
0	0	1	300
1	0	1	600
1	1	1	1200
0	1	1	2400
0	0	0	4800
1	0	0	9600
1	1	0	19200

All other combinations select the speed at 1200 baud.

D3=1 : flag type transmission protocol. When the print buffer is full, the printer sends a low level on the RTS signal, which interrupts transmission; when the buffer is able to receive more data, the level of the RTS signal changes to 1 .

D3=0 : XON/XOFF type transmission protocol. When the print buffer is full, the printer sends XON$13 (DC3), which interrupts transmission; when the buffer is able to receive more data, the command XON$11 (DC1) is transmitted .

D4=1 : nothing happens when the PRINT key is pressed.

D4=0 : if the PRINT key is pressed when the serial interface has been configured, the signal $0D (CR) is transmitted on the pin TD.

D5, D6, D7 : the selection of these bits sets configuration in serial with the transmission format listed in the table below :

D7	D6	D5	Format
1	1	1	8 parity none bits and 1 stop bit
0	1	1	8 parity EVEN bits and 1 stop bit
0	1	0	8 parity ODD bits and 1 stop bit
1	1	0	7 parity none bits and 1 stop bit
1	0	1	7 parity EVEN bits and 1 stop bit
1	0	0	7 parity ODD bits and 1 stop bit

Remember that in order to configure the printer in serial mode, the signal PSE must be shortcircuited to ground on connector J2.

RESET (input) :reset card controller, active at low level. The reset initializes the printer parameters, with the following effects: :
the line buffer and print buffer are erased ;
the print format is selected according to programming ;
the PSE pin of J2 is read for serial or parallel configuration ;
The autotest is printed, on pressing the PRINT key ;
The printer setup is run, on pressing the FEED key.

READY/RTS (output) : in the parallel configuration, the high level indicates that the printer is ready to receive data. A low level indicates that the printer is busy. In serial communication if the CTS/RTS protocol is enabled, the high logic state (1) indicates that the printer is ready to receive data ; the low logic state (0) indicates that the print buffer is full and cannot accept data. If the XON/XOFF serial protocol is activated, the signal is enabled in any case.

FEED (input and output) : paper feed key, active at low level. This signal is in parallel with respect to the contacts of the FEED key on the front of the printer.

STR/RD (input) : in the parallel configuration, a low level indicates to the printer there there is valid data on the data buses (D0,..D7). In the serial configuration, it corresponds to the data reception pin.

CONFIGURATION

In the thermal version of the PT285, printer default parameters can be configured. The parameters affected during configuration are :

- enabling of the RTCK setting through the keys ;
- enabling of serial setting through the keys ;
- serial setting (if enabled) (300-19200baud, 7-8bits, no parity-even-odd, 1-2stop bit) ;
- print direction (normal or reverse) ;
- setting on line of number of columns (24 or 40) ;
- bits in parallel configuration (7 or 8);
- enabling of seconds display ;
- CRLF mode ;
- enabling of printing of bank 1 at init.;
- setting of default font (font1 or font2) ;
- setting of maximum absorbed peak current (2.5A or 4.5A) ;

The PT285 has three 16K-byte flash banks for the printing of graphic pages of 384x341dots (48x42,6mm), in which logos and drawings may be stored.

Configuration through PC

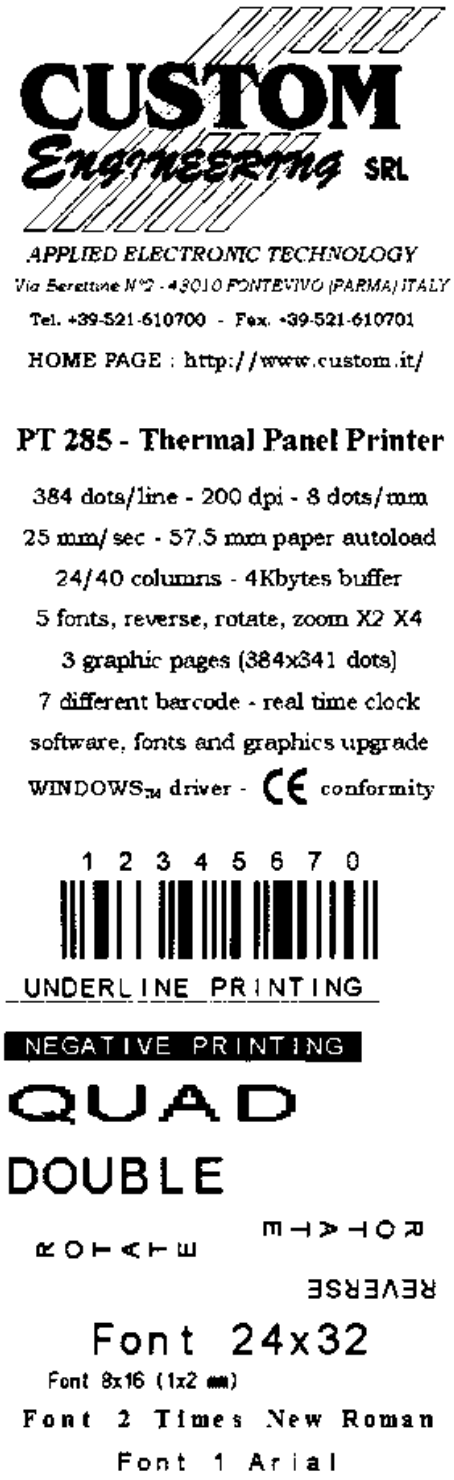
It is possible to set the printer using an IBM or IBM-compatible personal computer with serial output, and this can be done using a program which is available on request. This user-friendly program contains the instructions for its own use in pull-down menus.

Configuration using the PRINT and FEED keys

If when the printer is switched on, the FEED and PRINT keys are held down, a report on the current printer setting is printed ; the PRINT key puts the printer into configuration mode and the first modifiable parameter is printed. After this, each time the FEED key is pressed, the parameter is modified and its current value is printed. Once the required value has been obtained, press the PRINT key to proceed to the next parameter, and so on. Once all the parameters have been run through, the setting procedure is terminated by the printing of the report.

AUTOTEST

To run the autotest, hold the PRINT key down, on switching on the printer. When the autotest is run, some fonts of a bar code and two graphic pages are automatically printed as an example.



FONT-TEST

To run the font-test, hold down the FEED key, on switching on the printer. When the font-test is run, all the available fonts are automatically printed (see CHARACTER SET).

PRECAUTIONS

- Do not print without paper; this leads to the rapid deterioration of the print head.
- Do not put objects inside the printer.
- Do not pull the printer carriage manually when it is switched on.
- Before connecting the printer to the mains, ensure that the power supply or system ON/OFF switch is in the OFF position.
- Avoid blows to any part of the printer, both during and after installation.

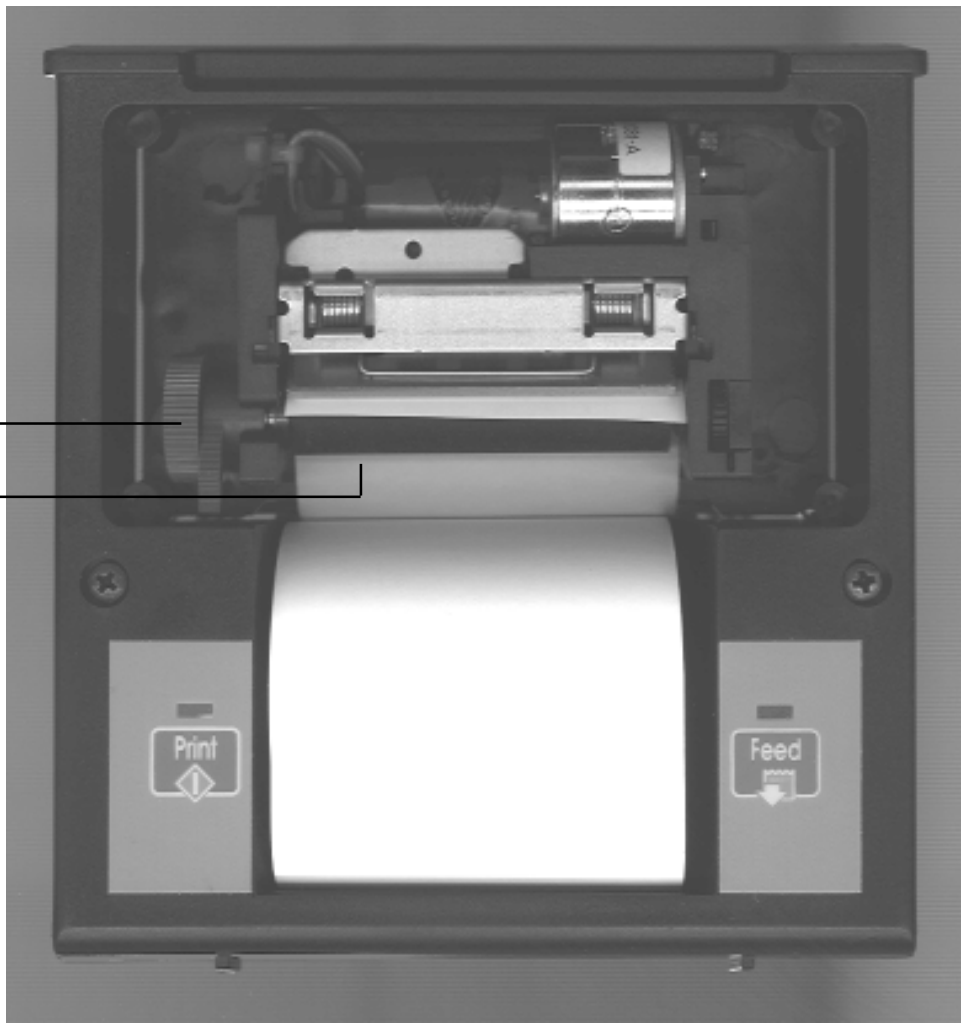
CHANGING THE PAPER ROLL (Autoload)

To change the paper roll, proceed as follows :

1) open the printer cover and position the paper roll so that it rotates in the right direction, as shown in figure 5. ;
2) use the blue lever to lift the print head ;
3) insert the end of the roll in the print mechanism opening ;
4) wait until the roll autoloads ;
5) using the blue lever, lower the print head ;
6) press the FEED key so that a few centimetres of paper feeds out of the printer ;
7) feed the end of the paper roll through the slit in the printer cover and close the cover.

N.B. : Before carrying out any kind of operation with the printer cover open, be sure to switch the printer off. If this is not possible, be sure to adopt the standard safety measures against stray currents.

Figure 5

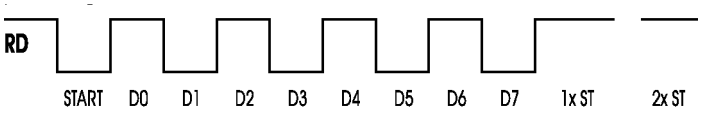


The selection of the standard interface, TTL serial and parallel, is given by the status of pin 17 (signal PSE) of the 20-pin connector J2.

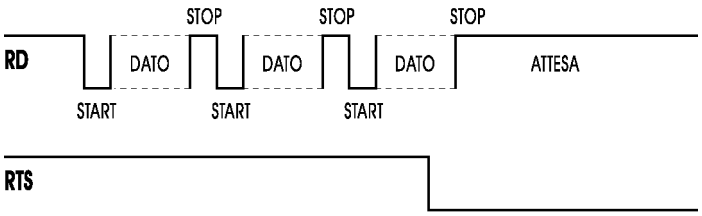
TTL SERIAL

In the serial protocol, the signals which distinguish the communication are TD, RD, and RTS if the RTS/CTS protocol has been selected. If, on the other hand, the XON/XOFF protocol has been selected, the signals are TD and RD.

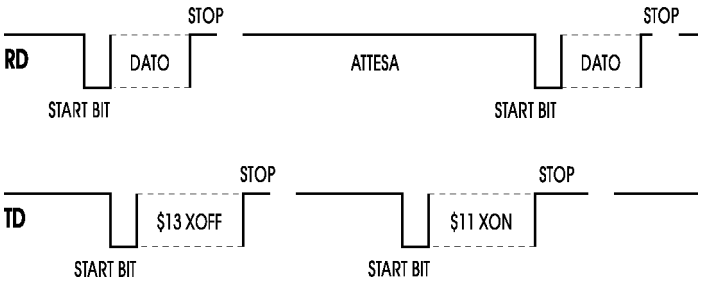
Transmission format



Protocol RTS/CTS



Protocol XON/XOFF



Notes:
Dato=DATA
Attesa=Stand by

TTL PARALLEL

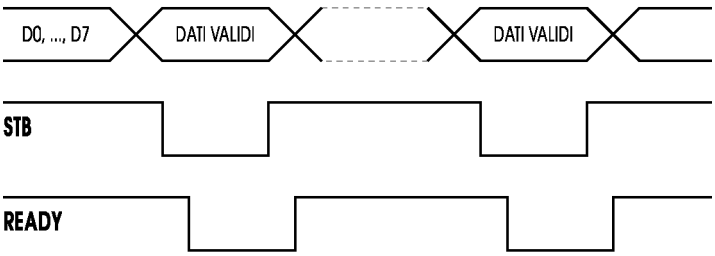
In the parallel communication the signals which can be used are :

1) 7 or 8 bit data buses ;

2) STROBE signal indicating the validity of the data ;

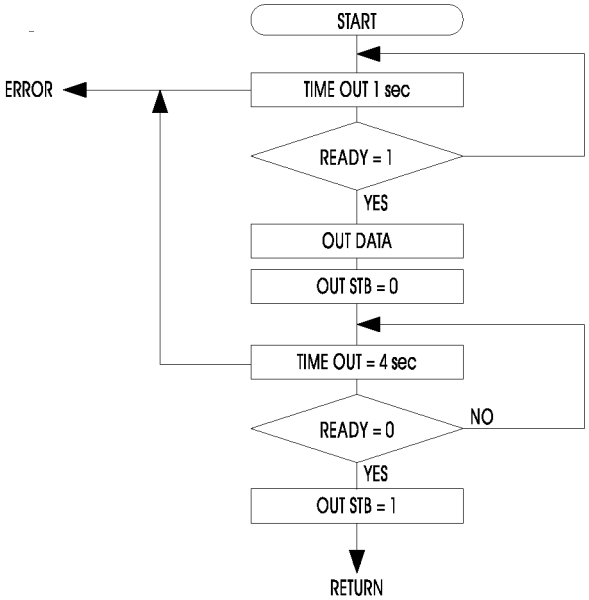
3) READY signal indicating that the printer is ready to receive data.

Transimision format



Notes: *DATI VALIDI=VALID DATA*

Flow Diagram



RS232 SERIAL

The printer is equipped with an RS232 serial interface and current loop to be installed on the PT285's controller. It is connected by means of a 25-pin rectangular female connector. The signals on the pins are shown in the following table ; the pins which are not indicated are not connected. Figure 6 describes how to select the operational modes.

Pin Connector Table

Pin	Signal	Direction	To be connected to	Description
1, 7	GND	OUT	GND	Signal ground
2	TXD	OUT	RXD	Receive Data. Output in serial (from Host)
3	RDX	IN	TXD	Transmit Data.Data input in serial (to Host)
4	DTR	OUT	DSR DCD	Data set ready. Printer on and operating (active at RS232 level high)
9	LOOP RD+	IN		Receive data in current loop
10	LOOP RD-			Return LOOP RD
11	LOOP RTS+	OUT		Current loop : ready to receive data
12	LOOP RTS-			Return LOOP RTS
13	LOOP DTR+	OUT		Current loop : indicates printer on
14	LOOP DTR-			Return LOOP DTR
15	LOOP TD+	OUT		Current loop : positive level data transmission
16	LOOP TD-			Return LOOP TD
20	RTS	OUT	CTS	Clear To Send. Ready to receive data (active at RS232 level high)

There is a dip-switch on the RS232 card by means of which the following personalizations, relative to the transmission format and to the PRINT key on the front of the PT285, may be obtained. :

DIP 1	DIP 2	DIP 3	BAUD speed
ON	ON	OFF	300
OFF	ON	OFF	600
OFF	OFF	OFF	1200
ON	OFF	OFF	2400
ON	ON	ON	4800
OFF	ON	ON	9600
OFF	OFF	ON	19200

DIP 4	Description
OFF	Transmission protocol RTS/CTS
ON	Transmission protocol XON/XOFF

DIP 5	Description
OFF	Disables the transmission of $0D when the PRINT key is pressed
ON	Enables the transmission of $0D

DIP 6	DIP 7	DIP 8	Transmission format
OFF	OFF	OFF	8 parity none bits and 1 stop bit
OFF	OFF	ON	8 parity EVEN bits and 1 stop bit
ON	OFF	ON	8 parity ODD bits and 1 stop bit
ON	OFF	OFF	7 parity none bits and 1 stop bit
OFF	ON	OFF	7 parity EVEN bits and 1 stop bit
ON	ON	OFF	7 parity ODD bits and 1 stop bit

CENTRONICS PARALLEL (option)

The printer can be equipped with a CENTRONICS parallel interface to be installed in the PT285's controller. It is connected by means of a 25-pin rectangular female connector. The signal pattern is the same as that adopted by personal computers using the same connector, as shown in the following table :

Pin	Signal	Direction	Description
1	STROBE	IN	A low level pulse on this line indicates that there is data ready to be read by the printer.
2	DATA1	IN	Data transmitted to the printer. :the low level indicates binary digit 1.
3	DATA2	IN	
4	DATA3	IN	
5	DATA4	IN	
6	DATA5	IN	
7	DATA6	IN	
8	DATA7	IN	
9	DATA8	IN	
10	ACK	OUT	A low level pulse indicates that the printer is ready to receive further data.
11	BUSY	OUT	High level active signal: indicates that the printer cannot receive data
12	PE	OUT	Paper out (Always to GND)
13	SELECT	OUT	Connection to Vdc with 4.7 Ohm resistance
18	GND		Pins connected to GND
19	GND		
20	GND		
21	GND		
22	GND		
23	GND		
24	GND		
25	GND		

REAL TIME CLOCK (option)

The Real Time Clock is available as an option. Printing and adjustment of the clock are managed by a series of control characters, described as follows:

$12	Print clock
$13	Set clock
$14	Tranmission of RTCK in serial
ESC T	Stores the time in the print buffer
ESC D	Stores the date in the print buffer
ESC U	Stores the date (American style) in the print buffer

Adjustment of the clock through the keyboard

The time and date can be adjusted using the PRINT and FEED keys on the printer's front panel.

To set proceed as follows :

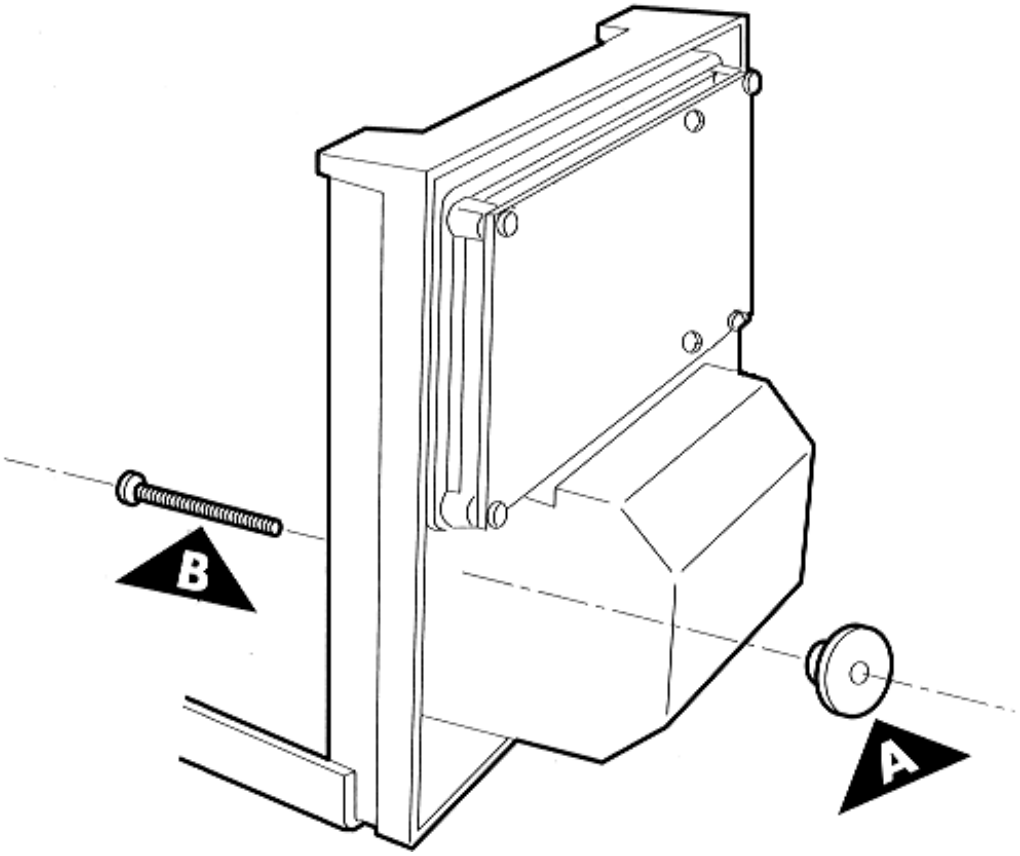
- while holding down the FEED key, press the PRINT key.
  The printer will print the time and date with an arrow indicating the digit to be modified ;
- each time the PRINT key is pressed, the digit marked by the arrow will increase ;
- to proceed to modify another digit, press the FEED key again;
- if no more keys are pressed for more than 3 seconds, the update will be printed ;
- to terminate setting procedure, scroll through all the parameters using the FEED key.

INSTALLATION OF OPTIONS

In order to install the CENTRONICS parallel and RS232 serial options :

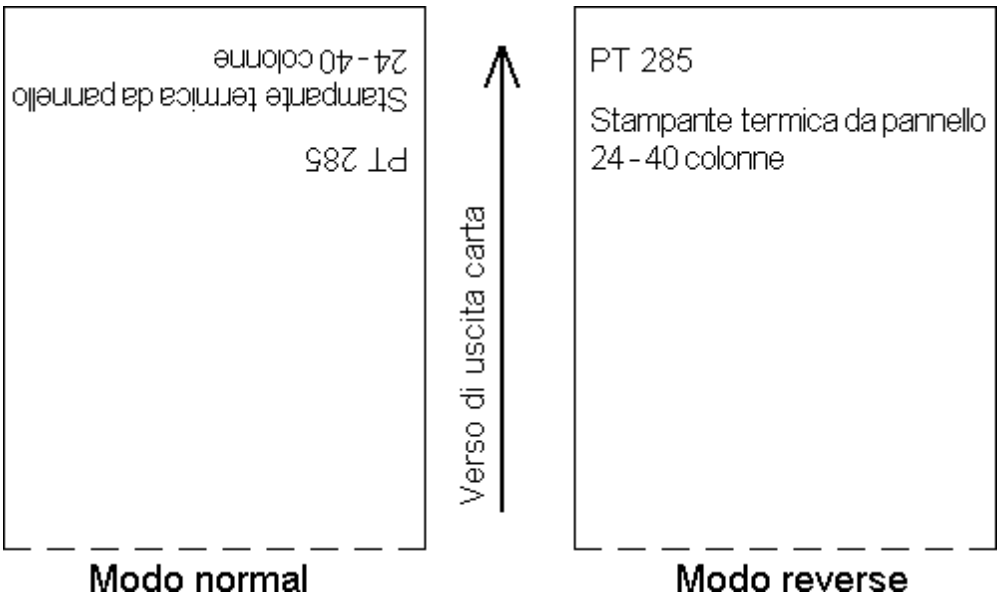
1) insert the plastic spacers provided with the option into the holes in the interface card ;

2) insert the option on the connector and on the spacers, taking good care to centre the pins correctly.



PRINT DIRECTION

The PT285 printer has two printing directions which can be selected by means of control characters: normal and reverse.



GRAPHICS

To print in PT285 graphic mode, send the command **$11** at the beginning of each line.
The byte format in the graphic configuration is:

X	**R**	**P6**	**P5**	**P4**	**P3**	**P2**	**P1**
D7	D6	D5	D4	D3	D2	D1	D0

where :
- X is not used
- R must be fixed at level 1
- P1...P6 represent the graphic dot data (1 print, 0 no print).

The P6 bit of the string transmitted is printed on the left and the others (P5,P4,P3,P2,P1) follow from left to right as illustrated :

1 st byte						2nd byte						3rd byte					
P6	P5	P4	P3	P2	P1	P6	P5	P4	P3	P2	P1	P6	P5	P4	P3	P2	P1

To print a line of dots, transmit:
$11, N x $7F (where N is the number of characters per line), $0D.

To print an empty line, transmit :
$11, $40, $0D.

For better resolution use the command **ESC !** followed by 48 bytes (384bits) which represent a horizontal dotline ; the printer will automatically print and forward feed.
A sequence of these commands can create a drawining with a resolution of over 200 dpi.

CONTROL CHARACTERS

The following table lists all the commands for function management of the PT285 printer. These commands can be transmitted to the printer with both the serial and parallel interfaces ; if, however, the parallel interface is being used, the user will not be able to receive the data requested, as this interface is mono-directional.
The commands can be transmitted to the printer at any moment, but they will only be carried out when the characters previously transmitted have been printed or the commands previously transmitted have been carried out. There are no commands with priority status; all the commands are carried out when the circular buffer is free to do so.

PT285 COMMAND TABLE

Com. ASCII	Com. HEX	Description
	$00	Small character print
	$01	Double width print
	$02	Double height print
	$03	Double height and width print
	$04	Reset small character print
	$05	Quadruple width print
	$06	Quadruple height print
	$07	Quadruple width and double height print
	$08	Quadruple height and double width print
	$09	Quadruple width and height print
	$0A	Forward feed one line
	(n) $0B	Forward feed (n) lines
	$0D	Print the line buffer (if enabled)
	$0F	Set CRLF mode
	$11	Graphic mode
	$12	Print the time and date
	$13	Set the time and date in serial
	$14	Transmit the time and date in serial
CAN	$18	Cancels line Buffer
ESC ”*” m n1 n2	$1B $2A m n1 n2	Sets bit image mode
ESC “+”n1 n2	$1B $2B n1 n2	Prints in semi-graphic mode
ESC ”>“ n1..n5 text	$1B $3E n1..n5 text	Prints a string in graphic page
ESC X	$1B $58	Print in negative
ESC x	$1B $78	Remove printing in negative
ESC Q	$1B $51	Underlined character print
ESC q	$1B $71	Remove underlined character print
ESC H	$1B $48	Set 24 columns in use
ESC h	$1B $68	Set 40 columns in use
ESC I	$1B $49	Set 24 columns by default
ESC i	$1B $69	Set 40 columns by default

ESC R	$1B $52	Set reverse mode printing
ESC N	$1B $4E	Set normal mode printing
ESC @	$1B $40	Reset printer
ESC D	$1B $44	Store date in print buffer
ESC T	$1B $54	Store time of day in print buffer
ESC U	$1B $55	Store date (mm :dd :yy) in print buffer
ESC S	$1B $53	Enable printing of seconds
ESC B	$1B $42	Set font 1 in use
ESC b	$1B $62	Set font 2 in use
ESC L	$1B $4C	Set font 1 by default
ESC l	$1B $6C	Set font 2 by default
ESC f(n)	$1B $66 (n)	Enable/Disable font 24x32
ESC 9 (n)	$1B $39 (n)	Enable/Disable printing rotated by 90°
(dd) ESC G	(dd) $1B $47	Write the value (dd) in the option register
(dd) ESC M	(dd) $1B $4D	Write the value (dd) in the print mode
ESC p	$1B $70	Transmit the option register in serial
ESC m	$1B $6D	Transmit the print mode in serial
ESC s	$1B $73	Transmit the next character in serial
ESC ! *<48bytes>*	$1B $21	Print a horizontal graphic dotline
ESC P *<16Kbytes>*	$1B $50	Receive 16384 bytes to put in the graphic ram bank
ESC j	$1B $6A	Transmit in serial the 16384 bytes of the ram bank
ESC %	$1B $25	Print ram bank
ESC F	$1B $46	Copy flash bank in ram bank
ESC C	$1B $43	Copy ram bank in flash
ESC ¦	$1B $B3	Cancel graphic page in ram
ESC c	$1B $63	Print barcode (see command note)
ESC v	$1B $66 n	Status request
ESC d (n)	$1B $64 (n)	Size barcode width
GS I n	$1D $49 n T	ransmit printer ID

The following pages provide a more detailed description of each command.

ASCII : -
HEX : **$00**

Small character print

The command $00 is used to restore small character printing. If, for example, double height or double width printing was set and the user wishes to return to small character print, he/she simply sends the command $00. See note at foot of page.

ASCII : -
HEX : **$01**

Double width print

The command $01 is used to enable double width printing.When this print mode is set, the number of characters per line is halved compared with the number of characters per line in small character print ; on a 24 column printer, therefore, the print line will contain 12 characters and on a 40 column printer it will contain 20.
See note at foot of page.

ASCII : -
HEX : **$02**

Double height print

The command $02 is used to enable double height printing. When this print mode is set, the number of characters per line remains 24 for a 24-column printer and 40 for a 40-column printer. See note at foot of page.

ASCII : -
HEX : **$03**

Double height and width print

The command $03 is used to enable expanded printing. When this print mode is set, the number of characters per line is halved compared with the number of characters per line in small character print ; on a 24 column printer, therefore, the print line will contain 12 characters and on a 40 column printer it will contain 20.
See note at foot of page.

N.B. : The commands from $00 to $09 do not cancel the print buffer.
The commands which modify the height of the characters are only activated at the beginning of the line; on the same line of print, therefore, it is only possible to print characters of different widths.

ASCII : -
HEX : **$04**

Restore normal mode

The command $04 is used to restore small character printing (it is the same as $00 and is used when it is impossible to use $00). If, for example, double height or double width printing was set and the user wishes to return to small character print, he/she simply sends the command $04. See note on previous page.

ASCII :
-
HEX :
$05

Quadruple width print

The command $05 is used to enable quadruple width printing. When this print mode is set, the number of characters per line is quartered compared with the number of characters per line in small character print ; on a 24 column printer, therefore, the print line will contain 6 characters and on a 40 column printer it will contain 10.
See note on previous page.

ASCII :
-
HEX :
$06

Quadruple height print

The command $06 is used to enable quadruple height printing. When this print mode is set, the number of characters per line remains 24 for a 24-column printer and 40 for a 40-column printer. See note on previous page.

ASCII :
-
HEX :
$07

Quadruple width and double height print

The command $07 is used to enable quadruple width and double height printing. When this print mode is set, the number of characters per line is quartered compared with the number of characters per line in small character print ; on a 24 column printer, therefore, the print line will contain 6 characters and on a 40 column printer it will contain 10.
See note on previous page.

ASCII :
-
HEX :
$08

Quadruple height and double width print

The command $08 is used to enable quadruple height and double width printing. When this print mode is set, the number of characters per line is halved compared with the number of characters per line in small character print ; on a 24 column printer, therefore, the print line will contain 12 characters and on a 40 column printer it will contain 20.
See note on previous page.

ASCII :
-
HEX :
$09

Quadruple width and quadruple height print

The command $09 is used to enable quadruple width and height printing.
When this print mode is set, the number of characters per line is quartered compared with the number of characters per line in small character print ; on a 24 column printer, therefore, the print line will contain 6 characters and on a 40 column printer it will contain 10. See note on previous page.

ASCII :
-
HEX :
$0A

Forward feed one line

The command $0A makes the printer forward feed one line. If there are any characters in the line buffer, these are automatically printed. A line feed occupies exactly the same space as a line of print.

ASCII : -
HEX : **$0B**

Forward feed (n) lines

The command $OB makes the printer forward feeds by the number of lines defined by the digit previously received. This must be an ASCII number between 0 and 9 ; of course if the number selected is 0, the command will have no effect. It is important to remember that the code $0B erases the line buffer, so if there are any characters in the line buffer, they will be erased. For example, if you wish to forward feed rapidly by 5 lines, simply transmit:

$35 $0B (or 5 and the command $0B).

ASCII : -
HEX : **$0D**

Print the line buffer

The command $0D (carriage return) prints the line buffer. If the buffer is empty, the command will have no effect. If the CRLF option is set, the code $0D will be ignored and the command $0A must be transmitted in order to print. When the printer is switched on, the default value of the CRLF option is contained in a flag of the byte called “option register” which can be manipulated during configuration by using either the two keys on the front of the printer the program installed in the PC.

ASCII : -
HEX : **$0F**

Set CRLF mode

The command $0F enables the CRLF option. It inhibits the action of the command $0D, so that only the command $0A is an active print command. This function can be very useful in cases in which the RETURN key is associated with the commands $0D and $0A, thus causing double spacing between one line and another during printing with the PT285. In order to disable this option, reset the printer by either switching off the power or by transmitting the reset command. When the printer is switched on, the default value of the CRLF option is contained in a flag of the byte called “option register” which can be manipulated through programming, using the two keys on the front of the printer.

ASCII : -
HEX : **$11**

Graphic mode (PT285 emulation)

The command $11 enables the PT285 graphic mode printing, i.e. to obtain graphic mode printing, transmit the command $11 at the beginning of each line. For the PT285 (24 column) printer, one line is equivalent to 144 horizontal dots, divided in 24 blocks of 6 dots. For the PT285 (40 column) printer, one line is equivalent to 240 horizontal dots, divided in 40 blocks of 6 dots. For the byte format in the graphic configuration, consult the section “*Printer functions*” at the paragraph “*Graphics*”.
For further details see the command ESC ! .

ASCII :
-

Print time and date

This command prints the time and date in the following format :

hh : mm dd - mm - yy.

HEX :
$12

If expanded or double width printing have been selected (i.e. with less than 15 characters per line) then only the time will be printed. If the seconds option is enabled, the format will be:

hh : mm : ss dd-mm-yy

N.B. In either case, the command resets the line buffer.

ASCII :
-

Set the time and date in serial

The command $13 sets the time and date on the Real Time Clock installed inside the PT285 printer.There are two ways of setting this : the first uses the 24 hour clock and

HEX :
$13

the second the 12 hour antemeridian and postmeridian clock. In the former case, the 10 ASCII characters corresponding to the time and date must be transmitted, followed by the command $13. For example, to set the time at 12 :45 on 19-01-93, send the following in sequence :

	1	2	4	5	1	9	0	1	9	3	$13
or	$31	$32	$34	$35	$31	$39	$30	$31	$39	$33	$13

In the latter case, transmit to the printer the letter “A” or “P” to indicate antemeridian or postmeridian, followed by the 10 ASCII characters and, lastly, the command $13. For example, to set the time A12 :45 on 19-01-93, send the following in sequence. :

	A	1	2	4	5	1	9	0	1	9	3	$13
or	$41	$31	$32	$34	$35	$31	$39	$30	$31	$39	$33	$13

It is advisable to send the command $00 (normal print mode) first of all, in order to erase the print buffer so as to ensure that no characters have been left in it.

ASCII :
-

Set the time and date in serial

The command $14 transmits the contents of the Real Time Clock, in the format of 11 ASCII characters, to the serial port of the printer :

HEX :

hour/minutes/day/month/year+(CR)$0D

$14

If the seconds option is enabled, the seconds will be transmitted immediately after the minutes. This command can only be used with the serial port ; if the parallel port is used, the printer will not be able to transmit.

ASCII :
CAN

Cancel

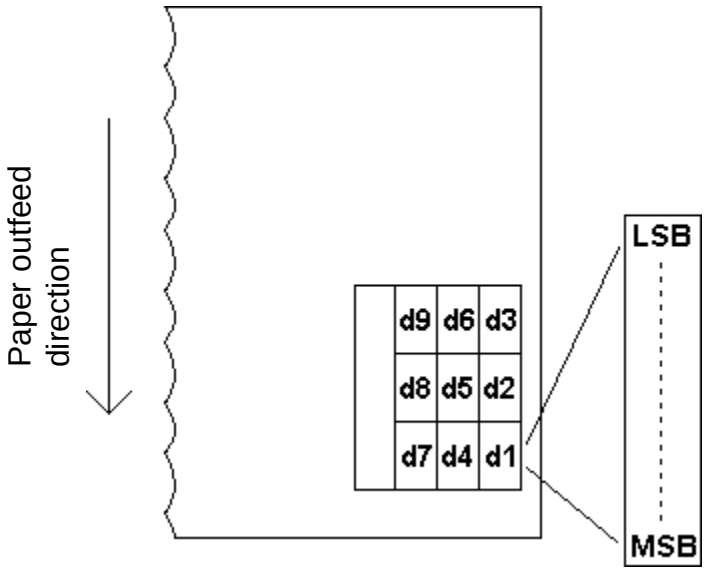
This character cancels the line buffer.

HEX :
$18

ASCII :
ESC*
m n1 n2

Set bit image mode
With **m = $21 = 33**
puts (n2*256)+n1 bytes in printer buffer; the bits are placed in the follow mode :

HEX :
$1B $2A
m n1 n2



The normal / reverse is ignored

ASCII :
ESC + n1 n2

Hex :
$1B $2B
n1 n2

Semi-graphic mode print
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 differently with respect to the previous command. Let's imagine that a print line consists of an array of 24 rows containing 48 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 48th 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, 1152 bytes are required.

For example, to print a filled bar 384 dot long and 24 dot high, send the following command:

$1B $2B $04 $80 (1152* $FF)

N.B.: This command only operates in reverse mode.

ASCII :
ESC X

Print in negative
The command “ESC” X is used to enable printing in the negative.

HEX :
$1B $58

ASCII :
ESC>
n1 n6 text

Prints a string in graphic page
It receives a string and arranges it in graphic page at the coordinates and in the direction given. The string must be completed by a NULL. If the string is too long, it is cut. The font is Font A (16x24).

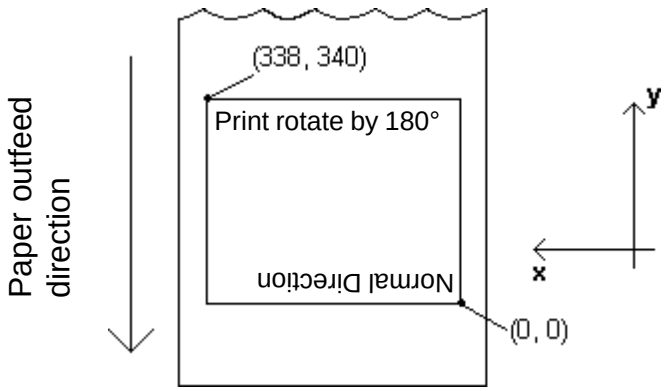
HEX :
$ 1B $3E
$n1 n6 text

(n1 * 256) + n2 = Horizontal position
(n3 * 256) + n4 = Vertical position

n5 Printing direction
00h = Normal direction
01h = Print rotated by 90°
02h = Print rotated by 180°
03h = Print rotated by 270°

n6 Font dimension
00h = Normal dimension
01h = Double height
02h = Double width
03h = Double height + Double width

The graphic page is setting in the follow mode :



ASCII : **Remove printing in negative**
ESC x The command “ESC” x is used to remove printing in the negative.

HEX :
$1B $78

ASCII : **Underlined character print**
ESC Q The command “ESC” Q is used to enable printing with underlined characters.

HEX :
$1B $51

ASCII : **Remove underlined character print**
ESC q The command “ESC” q is used to remove printing with underlined characters.

HEX :
$1B $71

ASCII : **Set number of colums at 24 in use**
ESC H The command “ESC” H sets the number of columns in the printer at 24. The number of columns return at old value after reset.

HEX :
$1B $48

ASCII : **Set number of colums at 40 in use**
ESC h The command “ESC” h sets the number of columns in the printer at 40. The number of columns return at old value after reset.

HEX :
$1B $68

ASCII : **Set number of colums at 24 (default)**
ESC I The command “ESC” I sets the number of columns in the printer at 24. Thanks to the on-line setting feature of the number of columns, this parameter can be easily modified

HEX : during normal printer operation, without the printer having to be switched off and/or
$1B $49 reset.

ASCII : **Set number of colums at 40 (default)**
ESC i The command “ESC” i sets the number of columns in the printer at 40. Thanks to the on-line setting feature of the number of columns, this parameter can be easily modified

HEX : during normal printer operation, without the printer having to be switched off and/or
$1B $69 reset.

ASCII :
ESC R
HEX :
$1B $52

Set reverse mode printing

The command “ESC” R selects printing in reverse mode. In reverse mode printing, the ticket feeds out of the printer with the printing upside down, running from right to left. When the printer is switched on, the default value is selected by the flag in a location called the “option register” ; this flag can be manipulated by programming using the two keys on the front of the printer, by means of which you may change the default value and determine, on switching on the printer, whether it should function in reverse or normal mode.

ASCII :
ESC N
HEX :
$1B $4E

Set normal mode printing

The command “ESC” N selects printing in normal mode. In normal mode printing, the ticket feeds out of the printer with the printing the right way up, running from left to right. When the printer is switched on, the default value is selected by the flag in a location called the “option register” ; this flag can be manipulated by programming using the two keys on the front of the printer, by means of which you may change the default value and determine, on switching on the printer, whether it should function in reverse or normal mode.

ASCII :
ESC @
HEX :
$1B $40

Reset printer

The command “ESC” @ resets the printer software.This command is the same as the hardware reset and can be used for re-initializing the printer parameters. Obviously, after this command has been sent the reception buffer is zero-set with consequent loss of all the data transmitted to the printer. Once the command has been transmitted, the printer takes approx, 1.5 seconds to become active again. The reset command can be useful, on switching on the system, in order to ensure that no false characters, which could corrupt the printer’s reception buffer, are sent during the initialization phases of the master device.

ASCII :
ESC D
HEX :
$1B $44

Store date in print buffer

The command +ESC+ D is used for entering in the line buffer the date set on the clock installed inside the printer. The format of the date is dd-mm-yy. This command can be used for entering the date in a context of a sentence without zero-setting the line buffer. If, for example, you wish to write :

	DATE : 11-09-93 TEST OK
transmit :	DATE : $1B$44TEST OK $OD

If you simply wish to print the date, transmit $1B$44$OD. The date is printed in 8 characters; if, therefore, there is not enough space in the line buffer, it will not be printed. If rotated printing is enabled, the command will have no effect.

ASCII :
ESC T
HEX :
$1 $54

Store time of day in print buffer

The command +ESC+ T is used for entering in the line buffer the time set on the clock installed inside the printer. This command can be used for entering the time in a context of a sentence without zero-setting the line buffer. If, for example, you wish to write :

	TIME : 16 :45 TEST OK
transmit :	ORA : $1B$54 TEST OK $OD

If you simply wish to print the time, transmit $ 1B $54 $OD. The time is printed in 5 characters; if, therefore, there is not enough space in the line buffer, it will not be printed. If rotated printing is enabled, the command will have no effect.

ASCII :
ESC U
HEX :
$1B $55

Store the date (mm-dd-yy) in the buffer

The command +ESC+ U is used for entering in the line buffer the date, American-style (mm-dd-yy), set on the clock installed inside the printer. This command can be used for entering the date in a context of a sentence without zero-setting the line buffer. If, for example, you wish to write :

	DATE : 09-11-93 TEST OK
transmit :	DATE : $1B$55TEST OK $OD

If you simply wish to print the date, transmit $1B$55$0D. The date is printed in 8 characters; if, therefore, there is not enough space in the line buffer, it will not be printed. If rotated printing is enabled, the command will have no effect.

ASCII :
ESC S
HEX :
$1B $53

Enable printing of seconds

The command “ESC” S enables the printing of seconds when the time is requested by means of the command “ESC”T. When the printer is switched on, the default value which defines whether or not the seconds are to be printed, is contained in a flag of the byte called “option register”, which can be manipulated by programming using the front keys on the printer.

ASCII :
ESC B
HEX :
$1B $42

Set font 1 in use

The command “ESC” B enables the use of font 1 (Arial). When the printer is switched on, the default font can be determined either by programming using the keys on the front of the printer, or by means of the commands ESC L or ESC l.

ASCII :
ESC b
HEX :
$1B $62

Set font 2 in use

The command “ESC” B enables the use of font 2 (Times New Roman). When the printer is switched on, the default font can be determined either by programming using the keys on the front of the printer, or by means of the commands ESC L or ESC l.

ASCII : **Set font 1 by default**
ESC L The command “ESC” L sets font 1 (Arial) by default.

HEX :
$1B $4C

ASCII : **Set font 2 by default**
ESC I The command “ESC” l sets font 2 (Times New Roman) by default.

HEX :
$1B $6C

ASCII : **Enables/Disables font 24x32**
ESC f (n) The command “ESC” f enables or disables font 24x32, depending on the value of n :
n = ‘0’ ($30) disable font 24x32 and revert to default setting
HEX : n = ‘1’ ($31) enable font 24x32
$1B $66 (n)

ASCII : **Enable/Disable rotated printing**
ESC 9 (n) The command “ESC” 9 enables or disables rotated printing:
n = ‘0’ ($30) disables rotated printing
HEX : n = ‘1’ ($31) enables printing rotated by 90° or 270° (depending on whether
$1B $39 (n) printing is set at Normal or Reverse)

N.B. : In Rotate Mode, the time is printed through the keys, ignoring the command, while the command to print time/date from an external port does not work.

ASCII : **Write the value (dd) in the option register**
(dd) By means of the command “ESC” G, the printer configuration can be manipulated. In
ESC G order to do this, transmit to the printer a byte in ASCII containing the configuration, followed by the command “ESC”G. The setting byte contains the following bits :

HEX :

d7	d6	d5	d4	d3	d2	d1	d0

(dd) where :

$1B $47

- **d0** is used to enable setting of the Real Time Clock through the keys on the front of the printer. If this bit is 0 it disables the setting, while if it is 1 it enables it. By disabling this function, the user can render the Real Time Clock immune to variations made either accidentally or deliberately by persons not qualified to modify it.
- **d1 :** is used to set the print direction.Normal or reverse. If this bit is 0 the print direction is normal; if it is 1 reverse print mode is enabled.

• **d2 :**is used in parallel communication and enables the 7 or 8 data bit protocol. If this bit is 0, the parallel port accepts 8 bit data; if it is at 1 the port accepts 7 bit data. If the 7 bit data protocol is enabled, the printer will only be able to print non-extended characters, i.e. those running from code $20 to code $7F.
• **d3 :**is used to enable the printing of seconds in the Real Time Clock commands. If the bit is 0 the seconds are not printed; if it is at 1, the seconds are printed when the time is printed.
• **d4 :**if the bit is 0 the command $0D is carried out; if it is at 1 the printer ignores the carriage return command.
• **d5 :**this bit enables the printing of the first graphic page (heading), on switching on the printer. If the bit is 0 this function is disabled; of it is at 1, then the function is enabled.
• **d6 :** if the bit is 0 it sets the number of columns at 24; if it is at 1 it sets the number of columns at 40.
• **d7 :** not implemented.

Once the printer configuration has been determined, transmit the above described byte in ASCII ; for example, byte = 00001001 corresponds to $09, the complete string will therefore be :

09”ESC” G or in Hex $30 $39 $1B $47

All of these bits, with the exception of bit 7, can be manipulated by programming using the front keys of the printer.

ASCII :
(dd) ESC M

HEX :
(dd) $1B $S4D

Write the value (dd) in the print mode

By means of the command “ESC” M the type of printing set by default can be manipulated. In order to do this, transmit to the printer a byte in ASCII containing the print mode, followed by the command “ESC”M. The types of printing settable are listed in the table below :

$00	Small character print
$01	Double width print
$02	Double height print
$03	Double width and height print
$05	Quadruple width print
$06	Quadruple height print
$07	Quadruple width and double height print
$08	Quadruple height and double width print
$09	Quadruple width and height print

If, for example, you require double height print, simply transmit :

02 “ESC” M (or $30 $32 $1B $4D)

The print mode will automatically assume the configuration required and be stored in the non volatile memory. The command clears the print buffer.

ASCII :
ESC p

HEX :
$1B $70

Transmit the option register in serial

The command “ESC” p, makes the printer transmit the “option register” byte in serial. If, of course, the parallel protocol is in use, nothing will be transmitted. The response to this question is given in two ASCII bytes which contain the *option register value. If, for example, we receive :

09 (or $30 $39)

this means that the configuration will be 00001001.

ASCII :
ESC m

HEX :
$1B $6D

Transmit the print mode in serial

The command “ESC” m, makes the printer transmit, in serial, the byte of the type of printing set by default. If, of course, the parallel protocol is in use, nothing will be transmitted. The response to this question is given in two ASCII bytes which contain the print type value. If, for example, we receive :

02 (or $30 $32)

this means that double height print is enabled.

ASCII :
ESC s

HEX :
$1B $73

Transmit the next character in serial

The command “ESC“ s ($1B$73) pre-sets the printer for transmitting the next character which it will receive. If, for example we transmit “ESC” s A, the last character, A, will not be printed but immediately transmitted on the serial line. i.e. if we use this function in text memorization blocks, we can simulate a password transmitted, for example, when the printer is switched on, or command codes when the PRINT key is pressed, or tests of connected printers.

ASCII :
ESC !

HEX :
$1B $21
<48bytes>

Print a horizontal graphic dotline

The command +ESC“ ! ($1B$21) pre-sets the printer to receive 48 bytes which represent the 384 dots making a line ; on receiving the 48th byte, the printer automatically prints and forward feeds by 1/8 of a mm.

ASCII :
ESC P

HEX :
$1B $50
<16bytes>

Receive 16384 bytes to put in the Ram bank

The command “ESC“ P ($1B$50) pre-sets the printer to receive 16384 bytes to fill the Ram bank. This command can be used for the following purposes:
- to unload a graphic page to be printed into the Ram
- to unload a graphic page to be programmed in Flash into the Ram

N.B. : the graphic page of 384x341 dots occupies 16368 bytes; the remaining 16 bytes are not printed but must, in any case, be transmitted.

ASCII :
ESC j

HEX :
$1B $6A

Transmit in serial the 16384 bytes of the Ram bank

The command “ESC“ j ($1B$6A) pre-sets the printer to transmit in serial the 16384 bytes of the Ram bank. It is, therefore possible to read 3 graphic pages memorized in Flash, by first sending the command ESC F.

ASCII :
ESC %
(n1) (n2)

HEX :
$1B $25
(n1) (n2)

Print the Ram graphic page

The command “ESC“ % ($1B$25) prints the Ram bank starting from the first line and for a number of lines equivalent to (n1*256)+n2 ; if the number exceeds the 341 lines available, it prints the entire page.

ASCII :
ESC F (n)

HEX :
$1B $46 (n)

Copy Flash bank in Ram bank

The command “ESC“ F ($1B$46) copies the 16K Flash bank indicated by n in the Ram :

n = 1 → bank n°1 (address : $0C000 - $0FFFF)
n = 2 → bank n°2 (address : $10000 - $13FFF)
n = 3 → bank n°3 (address : $14000 - $17FFF)

The command can be used to print the Flash bank or transmit it in serial.

ASCII :
ESC C (n)

HEX :
$1B $43 (n)

Copy Ram bank in Flash

The command “ESC“ C ($1B$43) copies the 16K Ram bank in the Flash bank indicated by n :

n = 1 → bank n°1 (address : $0C000 - $0FFFF)
n = 2 → bank n°2 (address : $10000 - $13FFF)
n = 3 → bank n°3 (address : $14000 - $17FFF)

The command is used to store graphic pages in Flash.
Within a maximum of 10 seconds, the printer responds in serial with:

$77 if the Flash does not programme
$88 if the Flash does not erase
$AA if programming has been carried out successfully
$BB if the communication port is set at 7bits/char (it does not programme)

ASCII :
ESC ¦

HEX :
$1B $B3

Erase the Ram graphic page

The command “ESC“ ¦ ($1B$B3) erases the Ram bank.

ASCII :
ESC v

Status request

This transmits a byte, the bits of which indicate the status of the machine, to the serial port. When the buffer is full this command already answer.

HEX :
$1B $76

Bit	FUNCTION
0	None
1	None
2	Paper Presence
3	Line Feed key
4	Form Feed key
5	Over-Heat flag
6	Motor ON
7	Error due to Paper End, Head Up etc.

BARCODE COMMANDS

The printer can print 7 types of barcode, which are:

- 39 STANDARD code
- CODABAR code
- EAN 8 and EAN 13 codes
- UPC A and UPC E codes

The syntax of the string to be sent to the printer must be as follows:

ESC c (code) (ndot) (posbar) (option) (len) (bufbar)

where :

ESC corresponds to the hexademical character $1B and the decimal character 27

c corresponds to the hexadecimal character $63 and the decimal character 99

(code) defines the type of barcode, i.e.:

	CODE	HEXADECIMAL	DECIMAL
I	2/5 INTERLEAVED	$49	73
C	39 STANDARD	$43	67
B	CODABAR	$42	66
e	EAN 8	$65	101
E	EAN 13	$45	69
U	UPC-A	$55	85
u	UPC-E	$75	117

(ndot) defines the number of repetitions of the seed, maximum 15. (Note that 1 seed corresponds to a 16-dot line - 2mm) the number must be expressed as a decimal.

(posbar) defines the barcode printing starting position, running from the right. The number must be expressed as a decimal and corresponds to the number of shift dots.

(option) bar code options:

BIT	VALUE	
0	0	does not implement the control code (automatic in
	1	EAN and UPC) implements the control code
1	0	not used
	1	
2	0	does not print the code's ASCII value under the barcode
	1	prints the code's ASCII value under the barcode
3	0	does not print the code's ASCII value above the barcode
	1	prints the code's ASCII value above the barcode

(len) defines the number of ASCII characters to be coded; the number must be expressed as a decimal

(bufbar) this must contain the ASCII characters of the code to be printed; the number of characters is expressed by(len).

HEX : **$1B $64 (n)**

Size barcode width

The command "ESC" d ($1B$62) sizes the width of the barcode

n = 0 minimum barcode width (default)
n = 1 medium barcode width
n = 2 maximum barcode width

GS COMMANDS ($1D)

ASCII : **GS I n**

Transmits printer ID

Transmits the printer ID specified by n as follow :

HEX : **$1D $49 n**

[Range] $1 \leq n \geq 3$, $49 \leq n \geq 51$.

n	Printer ID	Specification	ID (hexadecimal)
1, 49	Printer model ID		02
2, 50	Type ID	Refer to table below	
3, 51	ROM version ID	Depends on ROM version (4 char)	

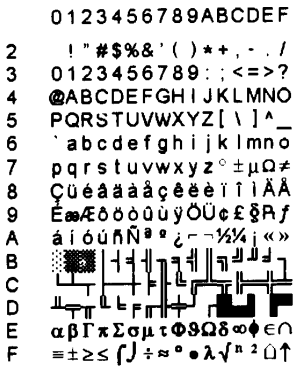
n = 1	Return printer Model ID = 02 (hexadecimal).			
n = 2	Return Type ID as follow :			
Bit	**Off/On**	**Hex**	**Decimal**	**Function**
0	Off	00	0	Not used.
1	Off	00	0	Auto-cutter not equipped.
2	Off	00	0	Non-label thermal paper.
3	-	-	-	Not used.
4	Off	00	0	Not used- Fixed to Off.
5	Off	00	0	Not used- Fixed to Off.
6	Off	00	0	Not used- Fixed to Off.
7	Off	00	0	Not used. Fixed to Off.
n = 3	Return ROM release (4 byte) Example :'1''.''0''1'.			

CHARACTER SET

The printer has four fonts of 224 characters and one font (24x32) of 160 characters.

Font 1
Arial

24 columns



40 columns

Font 2
Times New Roman

24 columns

40 columns

Font 24x32