PRINTER
DP24-42BA
External Charger Battery

User Manual

COD. DOME - DP24-42-BA REV. 1.10

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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.

INTRODUCTION

The DP24-42B is an extremely simple and functional desktop printer. It is the perfect solution for all industrial, professional and laboratory applications requiring immediate data printout in receipt form: POS, weighing systems, non-fiscal receipts, security, checking and diagnosis.

It is equipped with a rapid type 6 wire impact print mechanism which uses ordinary paper in 57.5mm wide rolls.

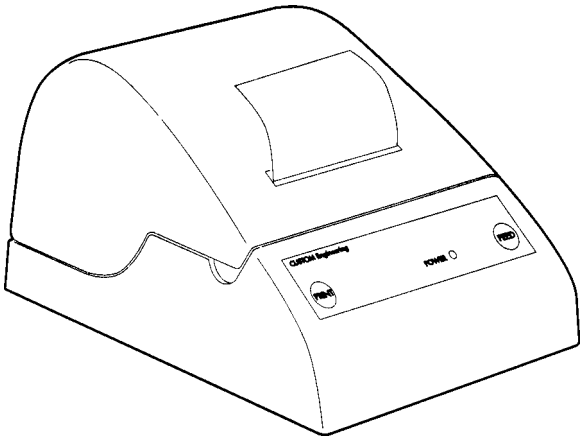
The DP24-42B printer is outstanding for its compactness and built-in battery pack which ensures independent power supply to the printer itself. It has a 150 byte print buffer. RS232 serial interface is standard. It can also be equipped with a Real Time Clock. It is available in three colours and two models, 24 and 42 columns (DP42).

Unpacking the printer

Open the pack and check:
- that no parts have been damaged during shipping;
- that the inked cartridge is on the print mechanism and that the paper roll is in its place.

Warning

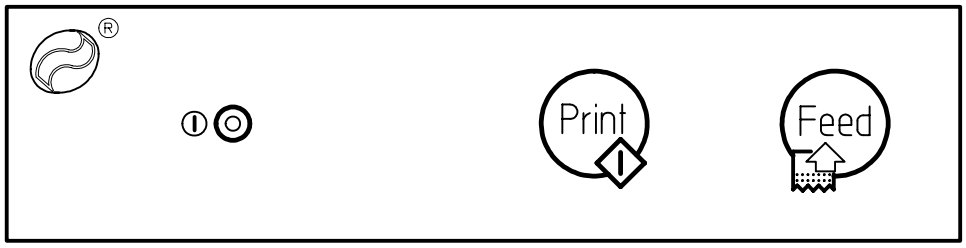
- do not print without paper and/or inked ribbon: this will cause rapid deterioration of the wires; avoid foreign bodies getting into the printer;
- do not move the carriage manually with the printer switched on;
- avoid knocks to all parts of the printer both during and after installation;
- if possible keep the printer out of direct light.



Product description

The DP24-42B printer consists of a body in ABS equipped with a cover by means of which access is gained to the paper roll and print head.

The front part of the printer houses a keyboard equipped with two keys, PRINT and FEED, and one led (POWER ON).



PRINT KEY

When pressed it activates transmission of the control character “$0D” only if switch 5 of the Dip Switches located on the back part of the printer is in the ON position.

FEED KEY

Activates manual paper feed. Pressed briefly, if the RTCK option is installed, it prints the time and date.

GREEN Led

Flashing led indicates correct printer functioning. In the phase of battery charging with the wall-socket adaptor the led remains permanently lit (in ON position).

The RS232 interface connector, the on-off switch and the battery charging connector are located at the back of the printer.

Technical Specifications.

The table below shows the main features of the two printer models: 24 columns and 42 columns.

Table 1

Columns	24	42
Character (W x H mm)		
Normal	1.7 x 2.6	1.1 x 2.6
Double height	1.7 x 5.2	1.1 x 5.2
Double width	3.4 x 2.6	2.2 x 2.6
Expanded	3.4 x 5.2	2.2 x 5.2
Graphic dot (W x H mm)	0.33 x 0.38	0.19 x 0.38
Dots per line	144	252
Printing speed		
Lines/sec.	1.8	1.0
Characters/sec.	42	42
Feed (lines/sec.)	4	2.3
Line Buffer	24 bytes	42 bytes
Print Buffer	150 bytes	
Printing method	Dot matrix impact	
Character matrix	6 x 10 points	
Writing mode	Normal and reverse	
Character set	Normal and extended	
Paper roll size	57.5 ± 0.5 mm x ø50 max	
Standard interfaces	RS232 Serial	
Optional interfaces	TTL Serial	
Power Supply	Double or single 5Vcc ± 10%	
Absorption		
Average on standby	38 mA	
Average printing	880 mA	
Impulse printing	3.0 A µ600 (Sec)	
Environmentals conditions		
Operating temperature	0°C - +50°C	
Operating humidity	35% - 85%	
Storage temperature /humidity	-20°C - +70°C / 10%-90%	
Option	Real Time Clock, power supply	

INSTALLATION AND USE

Installation procedure

- Place the printer on a flat, smooth surface, taking care that there is enough space for normal operations of replacing paper and inked ribbon.
- Fit the interface connector, fixing it in place with the screws provided on the printer connector body;

Connections

Logic
The DP24-42 is equipped with an RS232 serial interface (9 pin socket connector).
For the positioning of signals on the connector pins and for connection to a PC (cable) refer to the table below :

Serial 9 pole connector:

N.pin	Name	< IN / OUT >	Description
1			Connected to pin 4
2	TX	OUT	Transmit Data
3	RX	IN	Receive Data
4			Connected to pin 1
5	GND	POWER	Signal Ground
6	DSR	OUT	Data Set Ready
7	N.C.		
8	RTS	OUT	Request To Send
9	N.C.		

Power supply

The DP24-42B printer is equipped with an NI-CD 4-element battery pack of 1.2V each for a total of 4.8V with a current output equal to 750mAh. Battery charging should be done using the wall socket adaptor supplied by Custom Engineering. Maximum power is reached after 8 hours charging. Printing typical receipts (ASCII text, Line Feed, graphic lines etc.) the printer will run for 3 hours, after which defects will arise due to insufficient power.

Configuration

The Dip Switches on the back of the printer are used for configuring the serial communication protocol and some of the default parameters.

DIP1	DIP2	DIP3	BAUD Rate
ON	ON	OFF	300
OFF	ON	OFF	600
OFF	OFF	OFF	1200
ON	OFF	OFF	2400
ON	ON	ON	4800
OFF	ON	ON	9600

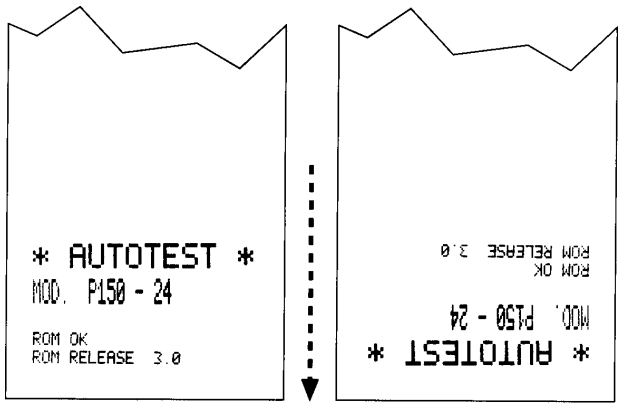
DIP4	Description
OFF	Transmission protocol RTS/CTS
ON	Transmission protocol XON/XOFF

DIP5	Description
OFF	Deactivates transmission of $0D pressing the PRINT key
ON	Activates transmission of $0D

DIP6	DIP7	DIP8	Transmission format
OFF	OFF	OFF	8 bits without parity, 1 Bit of Stop
OFF	OFF	ON	8 bits with Even parity, 1 Bit of Stop
ON	OFF	ON	8 bits with Odd parity, 1 Bit of Stop
ON	OFF	OFF	7 bits without parity, 2 Bits of Stop
OFF	ON	OFF	7 bits with Even parity, 1 Bit di Stop
ON	ON	OFF	7 bits with Odd parity, 1 Bit di Stop

Autotest

The autotest is carried out by keeping the FEED key depressed on switching the printer on. Execution of the autotest produces printout of the current printer setting data, memory check and printing of the complete ASCII character set.



Replacing the paper roll

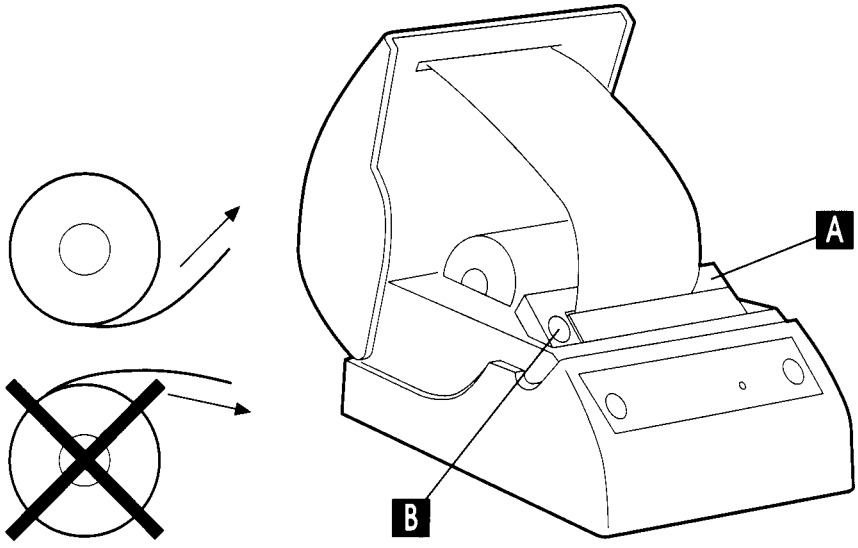
To change the paper roll proceed as follows:

1) open the upper cover and place the paper roll in the correct rotation position;
2) insert the end into the print mechanism opening;
3) press the FEED key until a few centimetres of paper comes out of the printer;
4) insert the end into the slot on the printer cover and close the cover.

Replacing the inked ribbon

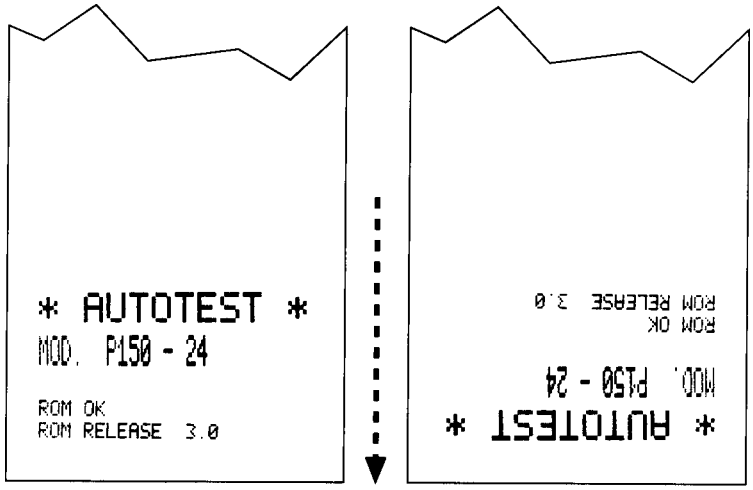
To replace the inked ribbon proceed as follows:

1) open the upper cover and remove the used cartridge, applying pressure at point “A” of the illustration;
2) insert the new ribbon, making sure it is positioned correctly;
3) tension the ribbon by rotating knurled knob “B” and close the cover.



Writing modes

The DP24-42B printer has two writing modes, selected by the control characters: NORMAL and REVERSE.
The base matrix of the characters is 6 x 10 dots. Characters can be printed in various formats.



Modo NORMAL Modo REVERSE

Graphics

Sizes of the graphics dot and of the number of dots per line vary in accordance with the number of columns and are shown in Table 1.
To print in graphics mode you must give the command $11 at the beginning of each line.
The format of the lines in graphics configuration is as follows:

X	**R**	**P6**	**P5**	**P4**	**P3**	**P2P1**		
D7	D6	D5	D4	D3	D2	D1	D0	

where:
X is not used;
R must be fixed at level 1;
P1,..., P6 are the graphic dots data (1 printing, 0 non printing).
The bit P6 of the dots string transmitted is printed on the left and the others that follow (P5, P4, P3, P2, P1) towards the right as shown:

1st 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 you must transmit:
$11, N x $7F (where N is the number of characters per line), $0D.
To print an empty line you must transmit:
$11, $40, $0D.

Control characters

All the commands for management of the DP24-42B printer functions are listed in the table below (Table 2).
Commands may be transmitted to the printer at any time, but they will be carried out only when the characters previously transmitted have been printed or previous commands have been carried out. So there are no priority commands, all commands being carried out at the moment when the circular buffer makes them available. Commands can be of one, two or three bytes.
Following the table there is a more detailed description of the individual control characters.

ASCII comm.	HEX comm.	Description
-	$00	Small char. writing
-	$01	Double width writing
-	$02	Double height writing
-	$03	Expanded type writing
-	$04	Restore small char. writing
-	$0A	Execute a line feed
-	(n) $0B	Execute a (N°) line feeds
-	$0D	Execute buffer line print
-	$0F	Set CRLF mode
-	$11	Graphics mode
-	$12	Print time and date
-	$13	Set time and date serial
-	$14	Transmit time and date serial
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	Insert date in print buffer
ESC T	$1B $54	Insert time in print buffer
ESC U	$1B $55	Insert date (mm-dd-yy) in print buffer

List of Commands

ASCII: - / Hex: $00
Small character writing
The command $00 is used for setting the print to small characters. If for example double height or double width characters have been set and the user wants to return to small characters, key the code. This command clears the print buffer so it must not be sent immediately after an ASCII string otherwise the string will be cancelled. So it is preferable to transmit the $00 command after a (CR) $0D so that the string is printed and the buffer cleared subsequently, bringing back the small characters mode. In many cases the character $00 is not transmitted because it is considered as “NULL”. This is why you can use the command $04. In small mode a character is 6 dots wide and 10 dots high.

ASCII: - / Hex: $01
Double width writing
The command $01 is used for setting the print to double width characters. This command clears the print buffer so it must not be sent immediately after an ASCII string otherwise the string will be cancelled. So it is preferable to transmit the $01 command after a (CR) $0D so that the string is printed and the buffer cleared subsequently, activating double width writing mode. When this printing mode is set the number of characters per line becomes exactly half of a line in small characters. So in a 24 column printer the print line is 12 characters, and 24 characters in a 42. A double width character is 12 dots wide and 10 dots high.

ASCII: - / Hex: $02
Double height writing
The command $02 is used for setting the print to double height characters. This command clears the print buffer so it must not be sent immediately after an ASCII string otherwise the string will be cancelled. So it is preferable to transmit the $02 command after a (CR) $0D so that the string is printed and the buffer cleared subsequently, activating double height writing mode. When this printing mode is set the number of characters per line remains 24 for a 24 column printer and 42 characters for a 42 column printer. A double height character is 6 dots wide and 20 dots high.

ASCII: - / Hex: $03
Expanded type writing
The command $03 is used for setting the print to expanded mode characters. This command clears the print buffer so it must not be sent immediately after an ASCII string otherwise the string will be cancelled. So it is preferable to transmit the $03 command after a (CR) $0D so that the string is printed and the buffer cleared subsequently, activating the double width writing mode. When this printing mode is set the number of characters per line becomes exactly half of a line in small characters. So in a 24 column printer the print line is 12 characters, and 24 characters in a 42. A double width character is 12 dots wide and 20 dots high.

ASCII: - / Hex: $04
Restore normal mode
The command $04 is equivalent to command $00.

ASCII: - / Hex: $0A
Execute a line feed
The command $0A carries out a printer line feed. If there are any characters in the line buffer this command executes printing of the buffer itself. The space of a line feed is equal to 10 dots of normal print but is carried out more rapidly due to the automatic activation of a magneto which accelerates paper feed.

ASCII: - / Hex: (n)$0B
Execute (N°) line feeds
The command $0B carries out as many line feeds as are defined by the number previously received. This number must be ASCII between 0 and 9; obviously if the number is 0 the command will be null. It should be remembered that the code $0B cancels the line buffer, so if there is any character in the buffer it will be cancelled. For example if you want a fast 5 line feed, simply transmit:
$35 $0B (or, 5 and the command $0B).

ASCII: - / Hex: $0D
Print line buffer
The command $0D (carriage return) prints the line buffer. If the buffer is empty the command is null. Where the CRLF option is set the code $0D is ignored and printing is carried out only with the $0A command.

ASCII: - / Hex: $0F
Set CRLF mode
The command $0F activates the CRLF option. It inhibits action of the $0D command, keeping only the command $0A active for printing. This function may be useful in cases where the $0D and $0A commands are linked with the RETURN key, thus producing double spacing between the lines during the phase of printing from the DP. To deactivate this option it is necessary to reset the printer by unplugging it or transmitting the software reset command “ESC@”.

ASCII: - / Hex: $11
Graphics mode
The command $11 activates the DP24-42B printer’s graphics mode: to obtain graphic mode printout you must give the command $11 at the beginning of every line. One line for the DP24 printer (24 colonne) corresponds to 144 horizontal dots divided into 24 blocks of 6 dots. For the byte format in graphics configuration see the paragraph “Graphics”.

ASCII: - / Hex: $12
Print time and date
This command gives printout of the time and date in the following format:
hh : mm dd - mm - yy.
Should expanded or double width print be selected (i.e. less than 15 characters per line) only the time will be printed. If printing of seconds is activated the format will be:
hh:mm:ss dd-mm-yy.

In any case this command causes reset of the line.

ASCII: - / Hex: $13
Serial time and date set
The command $13 sets the time and date of the clock that is built into the DP24-42B printer. There are two setting modes: the first sets the time to a 24 hour system, the second to 12 hours a.m. and p.m.. In the first mode you must transmit the 10 ASCII characters corresponding to time and date, followed by the command $13.
For example, to set 12:45 on 19-01-93 you must give the 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 second mode, 10 ASCII characters corresponding to the time and date, and preceded by “A” for a.m. and “P” for p.m., are fed into the printer, followed by the $13 command.
For example, to set 12:45 on 19-01-93 you must give the 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 first give a $00 command (normal writing format) to cancel the print buffer and to be sure there are no residual characters.

ASCII: - / Hex: $14
Serial transmission of time and date
The command $14 transmits, on the printer serial port, the contents of the real time clock in the format of 11 ASCII characters:
hour/minutes/day/month/year + (CR) $0D.
If the seconds option is active, the seconds are transmitted after the minutes.

ASCII: ESC R / Hex: $1B $52
Set printing in REVERSE mode
The command “ESC” R selects reverse mode printing. In this mode the receipt comes out of the printer written straight and from left to right. On switching on the default value is selected by switch 9 located at the back of the printer.

ASCII: ESC N / Hex: $1B $4E
Set printing in NORMAL mode
The command “ESC” N selects normal mode printing. In this mode the receipt comes out of the printer written upside down and from right to left. On switching on the default value is selected with switch 9 located at the back of the printer.

ASCII: ESC @ / Hex: $1B $40
Reset printer
The command “ESC” @ carries out a printer software reset. This command is the same as hardware reset and can be used to re-initialize the printer parameters. Obviously after this command the reception buffer is zeroed so all data transmitted to the printer are lost. One the command has been given you must wait about 1.5 seconds before reactivating the printer. The reset command is useful on switching the system on, avoiding false characters being sent, which would dirty the printer reception buffer, during the master apparatus initializing phases.

ASCII: ESC D / Hex: $1B $44
Insert date in buffer
The command “ESC” D is used for inserting the printer’s built-in real time clock date in the line buffer. The date format is dd-mm-yy. This command can be used for inserting the date into a sentence without zeroing the line buffer.
For example, if you want to write:
DATE : 11-09-93 TEST OK
you must send:
DATE : $1B$44 TEST OK $0D
If you want to print only the date, simply transmit $1B $44 $0D. The date is printed in 8 characters, and if there is insufficient space in the line buffer the date is not printed.

ASCII: ESC T / Hex: $1B $54
Insert time in buffer
The command “ESC” T is used for inserting the printer’s built-in real time clock time in the line buffer. The time format is hh-mm. This command can be used for inserting the time into a sentence without zeroing the line buffer.

For example, if you want to write:
TIME : 16.45 TEST OK
you must send:
TIME : $1B$54 TEST OK $0D

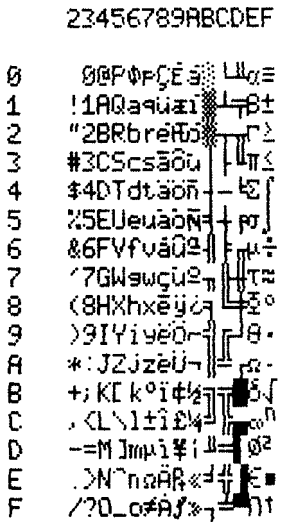
If you want to print only the time, simply transmit $1B $54 $0D. The time is printed in 5 characters, and if there is insufficient space in the line buffer the time is not printed.

ASCII: ESC U / Hex: $1B $55
Insert date (mm-dd-yy) in buffer
The command “ESC” U is used for inserting the printer’s built-in real time clock date into the line buffer in American format mm-dd-yy. This command can be used for inserting the date into a sentence without zeroing the line buffer.
For example, if you want to write:
DATE : 09-11-93 TEST OK
you must send:
DATE : $1B$55 TEST OK $0D
If you want to print only the date, simply transmit $1B $55 $0D. The date is printed in 8 characters, and if there is insufficient space in the line buffer the date is not printed.

ASCII: ESC S / Hex: $1B $53
Activate printing of seconds
The command “ESC” S activates printing of seconds when you call up the time with the command “ESC” T.

Character set

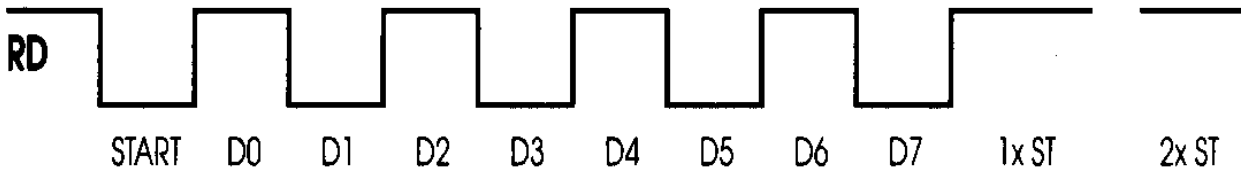
The printer has one font of 224 characters.



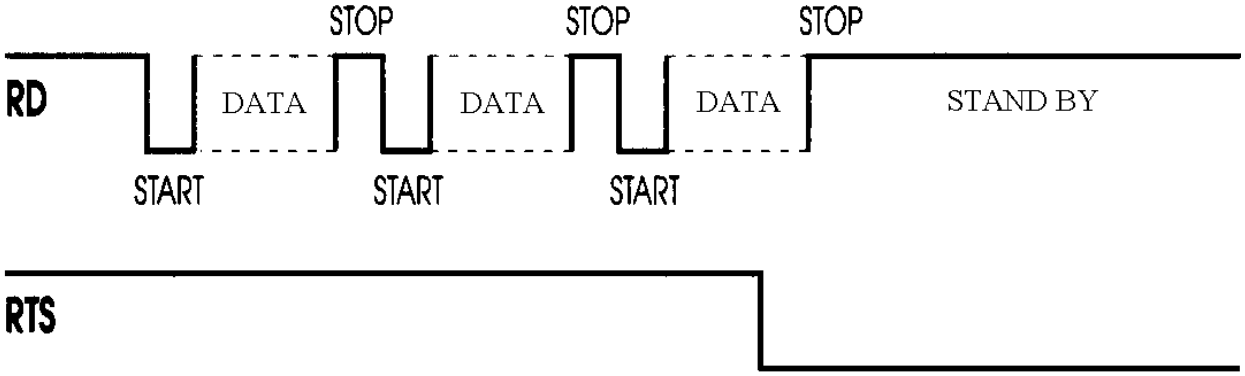
SERIAL INTERFACE RS232.

The signals characterizing communication in the serial protocol are RX, TX and RTS if protocol RTS/ CTS has been selected; if protocol XON/XOFF has been selected the signals are TX and RX.

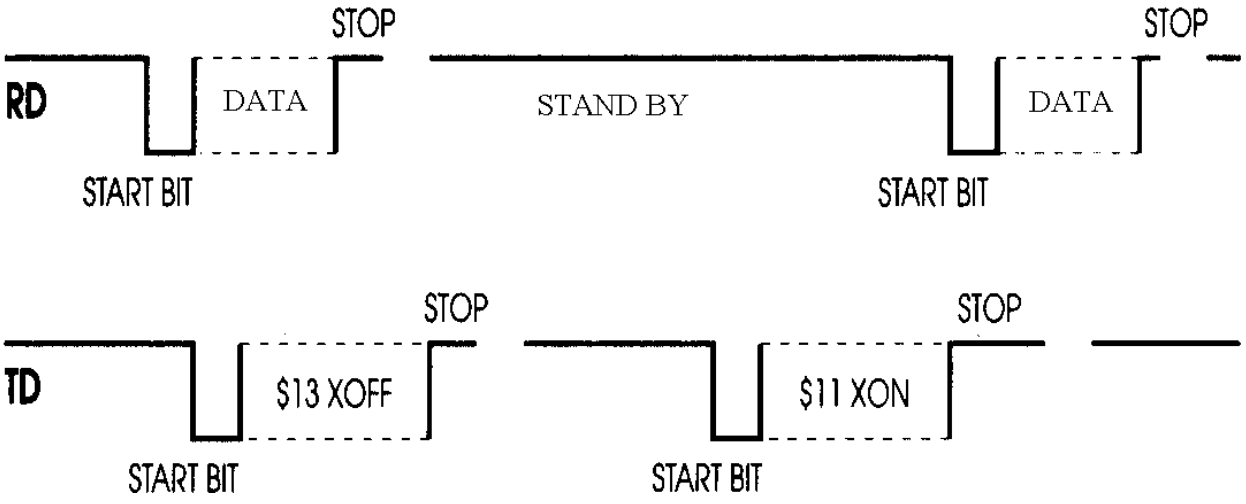
Transmission Format



RTS/CTS Protocol



XON/XOFF Protocol



Real Time Clock RTCK (optional)

The Real Time Clock is available as an optional. Printing and clock setting are managed by means of a series of control characters:

$12 Print clock
$13 Set clock
$14 RTCK serial transmission
ESC T Insert time in print buffer
ESC D Insert date in print buffer
ESC U Insert date (American format) in print buffer.

Setting clock from keyboard

The date and time can be set using the PRINT and FEED keys on the printer front panel.
The procedure is as follows:

1) Holding down the FEED key, press the PRINT key. The time and date will be printed with an arrow indicating a figure to be changed;
2) at each touch of the PRINT key the figure indicated by the arrow will be increased and the printing updated;
3) to select another figure to alter, press the FEED key again. At each operation the printer prints the updated time and date, highlighting the figure under selection with the arrow;
4) to terminate setting, press PRINT and FEED simultaneously or scroll all the parameters.