ULTRACOMPACT PRINTER
S 16S

User's Manual

COD. DOME - S16S   REV. 1.10

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.
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GENERAL FEATURES

The **S16S** (Fig. 1) is an extremely practical, easy-to-use desk or panel printer. It is the ideal solution for all those applications, whether they be industrial, professional or laboratory-related, in which data has to be immediately printed out in ticket form: measuring systems, receipts (not for tax purposes), security, controlling and diagnostics purposes, vehicles (taxis, trucks), portable version for measuring and reports of all kinds, and any other circumstances in which high performance printing is required in tight spaces.

The printer is equipped with a 4-needle impact mechanism which uses ordinary 44.5 mm paper rolls with a maximum of 16 columns per line.

The S16S printer is so compact, lightweight and economical that it can be installed extremely easily on any type of equipment. It has an RS232 standard serial interface.

Figure 1
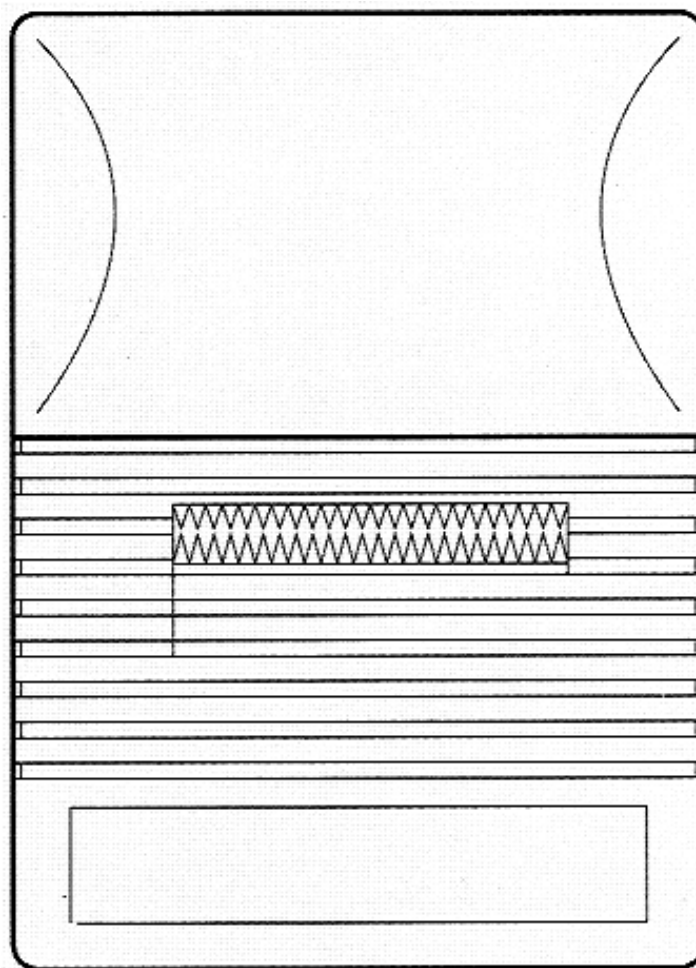
PRODUCT DESCRIPTION

The printer has an ABS casing with a cover which opens to allow access to the paper roll and print head.
On the front of the panel there is a FEED key and an illuminated LED.

Figure 2
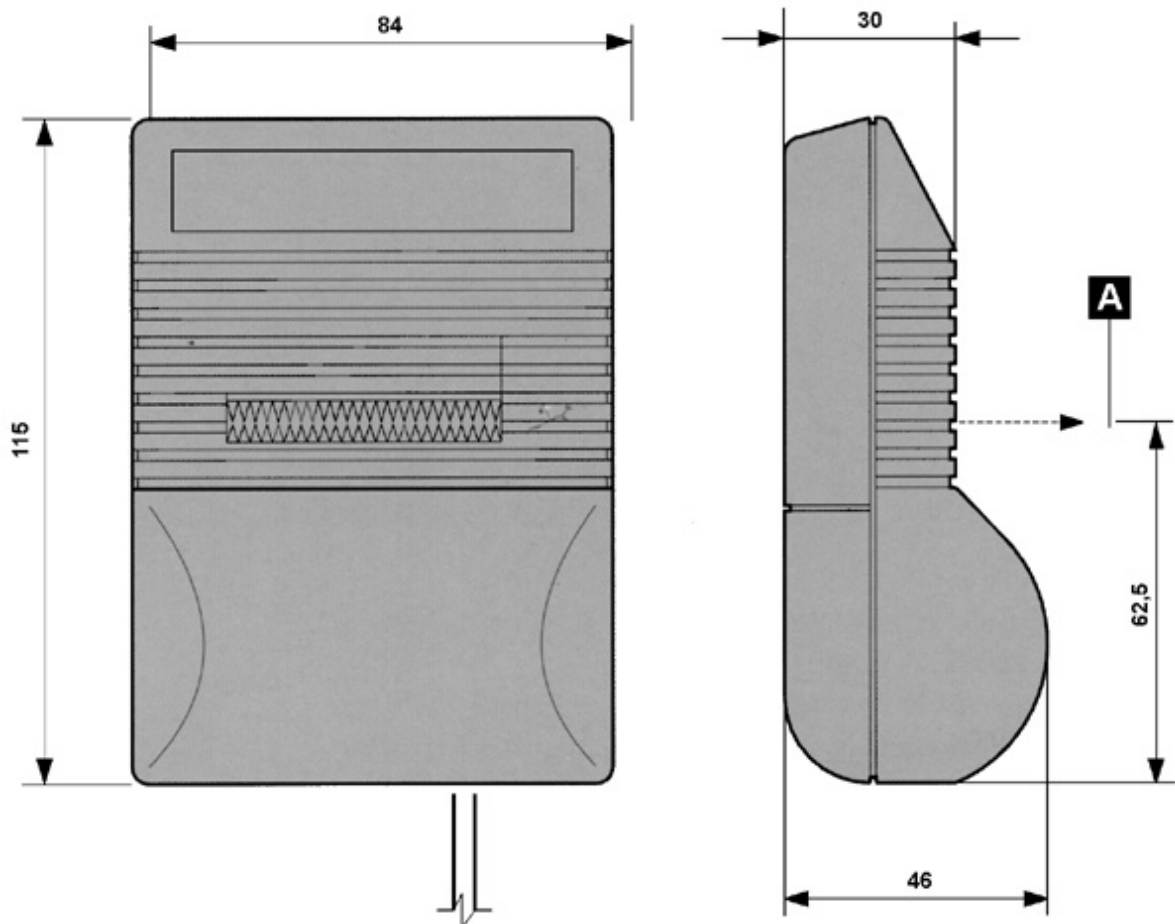
- FEED key. If this key is pressed down, the paper feeds forward manually. If it is held down when the printer is switched on, it automatically runs a self-test to check that both software and hardware are in perfect working order. This procedure involves the printing of the character font contained in the system ROM.

- GREEN LED. The lighting of this LED indicates that the S16S is in perfect working order. After the printer has been inactive for approximately 5 minutes, the LED begins to blink in order to reduce the electronics' total consumption.
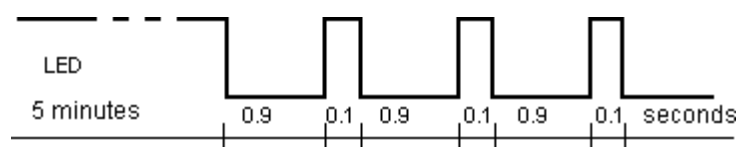
TECHNICAL SPECIFICATIONS

The main technical features of the S16 Serial 16-column printer are listed in the table below.

Model	S16
Columns	16
Character (L x H mm)	
Normal	1,8 x 2,5
Double height	1,8 x 5,0
Double width	3,6 x 2,5
Expanded	3,6 x 5,0
Graphic dot (L x H mm)	0,35 x 0,35
Dots per line	96
Print speed	
Lines/sec.	1
Characters/sec.	16
Line buffer	16 bytes
Print method	Impact dot matrix
Print direction	Normal and reverse
Characters set	HALF ASCII STANDARD
Absorptions	
Stand-by	1mA
Medium when printing	0.8A
Stand-by when printing	2A
Environmentals conditions	
Operating temperature	0°C - +50°C
Operating humidity	10% - 50%
Storage temperature / humidity	-20°C - +70°C

CONNECTIONS

J1 SUPPLY

The printer is equipped with a 1.3 mm D.C. power plug connector, to which the supply voltage (5 VDC) is then applied. This voltage supplies both the digital part of the electronics and the print mechanism. The electronics include a protection against accidental polarity inversion.

pin NO.	Name	< IN / OUT >	DESCRIPTION
1	VCC 5 V	IN VCC	
2-3	GND	POWER	Signal Ground

The electrical characteristics are listed in the table below:

Single supply	5V ± 10%
Average current absorbed during printing	510 mA
Peak current during printing	2 A
Average current absorbed on stand-by	20 mA
Temperature	0° ± 50°

JP3 SELECTION OF CHARACTER BIT

This selection enables data to be sent to the printer (8 bits per piece of data,1 stop bit, parity none).

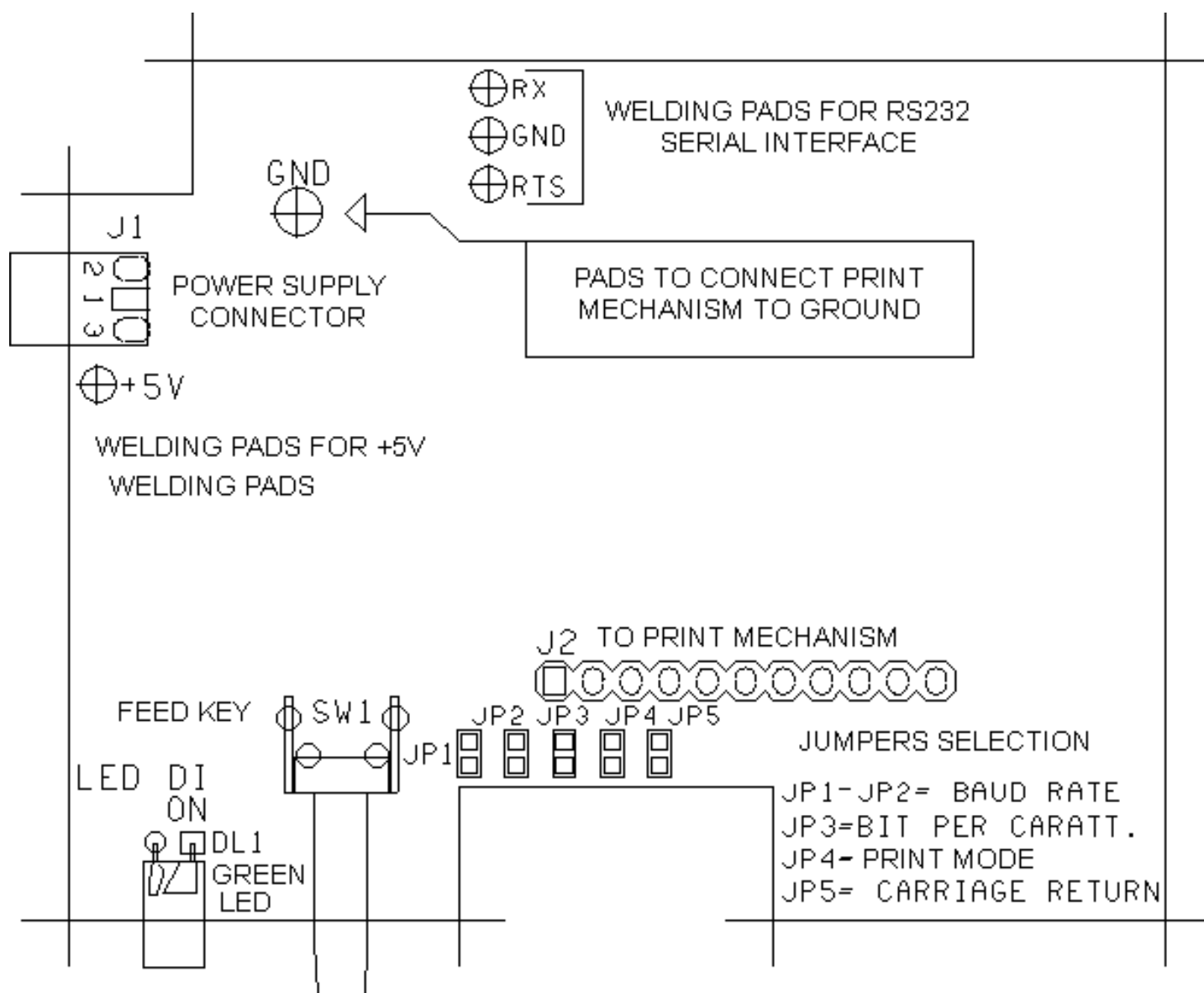| JP3	BITS PER CHARACTER
CLOSED	7 BITS PER CHARACTER
OPEN	8 BITS PER CHARACTER

JP5 CARRIAGE RETURN SELECTION

If the JP5 jumper is closed, the printer management software ignores the command code $0D (carriage return). This procedure is also run by the command $0F (CRLF).

JP5	CARRIAGE RETURN
CLOSED	DISABLE
OPEN	ENABLE

JP4 SELECTION OF PRINT DIRECTION

By means of the jumper JP4, Normal or Reverse print directions may be selected. In normal printing mode, the characters are printed from left to right, while in reverse mode the characters are printed upside down and from right to left. It is always possible to vary this configuration using the software commands ESC R and ESC N.

JP4	PRINT
CLOSED	NORMAL
OPEN	REVERSE

RX
GND
RTS
WELDING PADS FOR RS232 SERIAL INTERFACE

GND

J1

POWER SUPPLY CONNECTOR

PADS TO CONNECT PRINT MECHANISM TO GROUND

+5V

WELDING PADS FOR +5V WELDING PADS

J2 TO PRINT MECHANISM

FEED KEY SW1

LED DI ON

DL1 GREEN LED

JP1 JP2 JP3 JP4 JP5

JUMPERS SELECTION

JP1-JP2= BAUD RATE
JP3=BIT PER CARATT.
JP4= PRINT MODE
JP5= CARRIAGE RETURN

RS232 SERIAL

In the serial protocol, the signals relating to communication are RX and RTS. The reception format is fixed at 8 data bits, 1 stop bit, parity none. It is, however, possible to vary reception speed by using jumpers JP1 and JP2. The table below describes the pins of the 9-pole external rectangular connector, or the points to which the user must connect, if not using the connector.

| N. pin/pad ON P.C.B.	Name	< IN / OUT >	Description
3 / (pad4)	RX	IN	Receive Data
5 / (pad6)	GND		Signal Ground
8 / (pad5)	RTS	OUT	Request To Send

The jumpers JP1 e JP2 select the speed at which the RS232 receives the data. This setting is read by the printer software immediately after a reset (hardware or software). Any changes made in the configuration while the printer is operating will not, therefore, produce any effect.

JP1	JP2	BAUD RATE
CLOSED	CLOSED	1200
OPEN	CLOSED	2400
CLOSED	OPEN	4800
OPEN	OPEN	9600

During data transmission it is extremely important to test the RTS line in order to check whether the printer can receive data. When the RTS line is ready to receive, it is in a "high" logic state. (Standard RS232 +12V (4V) ; when the printer is busy, the RTS line is in a "low" logic state (Standard RS232 -12V (4V). Before sending any data, the device which transmits data to the printer must ensure that the RTS line is in a "high" logic state. If this structure is not applied, some of the data could get lost.
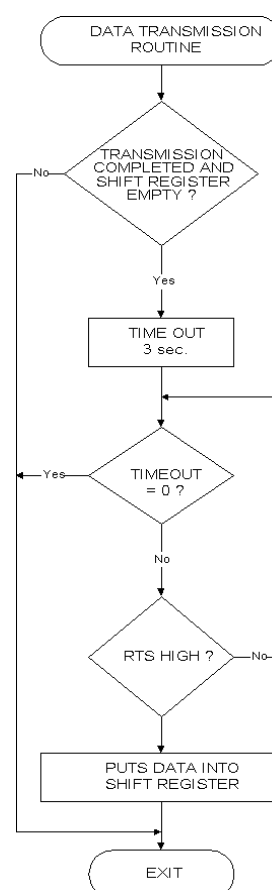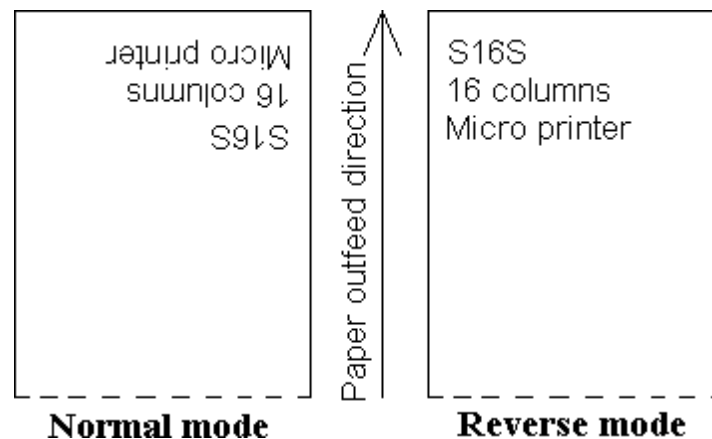
The diagram below shows the status of the RX and RTS lines required in order to ensure good communication:
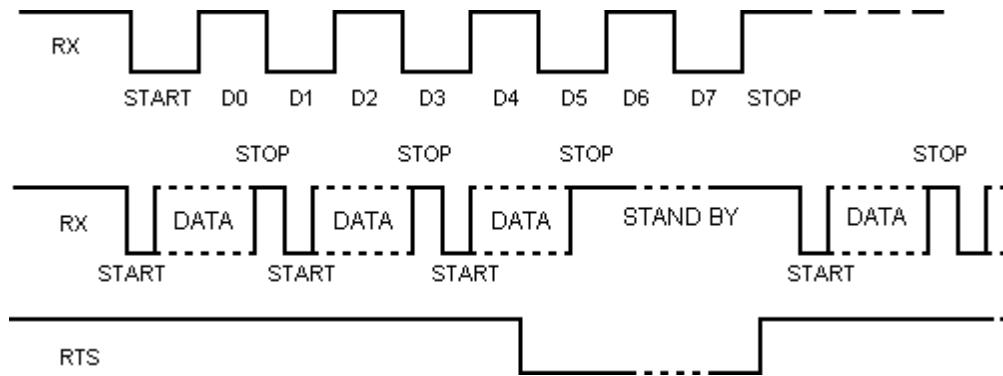
PRINTING MODES

The S16S printer features two printing modes selectable through the normal and reverse control characters.

GRAPHICS

To enter graphic mode, simply send the command 11H 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 point 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 :

To print a line of dots, transmit:

   11H   Nx7FH (where N is the number of columns per line) *0DH.*

To print an empty line, transmit:

   11H   40H   0DH.

CONTROL CHARACTERS

The table below lists all the commands used to run the S16S printer funcions. These commands can be transmitted to the printer through the RS232 serial interface.

S16S TABLE OF COMMANDS

	HEX Comm.	Description
	<00>H	Small character print
	<01>H	Double width print
	<02>H	Double height print
	<03>H	Expanded print
	<04>H	Reset small character print
LF	<0A>H	Forward feed one line
VT	<n>A <0B>H	Forward feed <n> lines
CR	<0D>H	Print the line buffer (if enabled) and forward feed one line
CRLF	<0F>H	Set the CRLF mode
	<11>H [<d>]k <0D>H	Print a graphic line
ESC @	[<1B>H <40>H]	Reset Software
ESC N	[<1B>H <4E>H]	Set printing in normal mode
ESC R	[<1B>H <52>H]	Set printing in reverse mode

The following pages provide a more detailed description of each command.
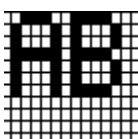
DESCRIPTION OF THE COMMANDS

Syntax description:

XXX	Command.
[Name]	Name of the command.
[Format]	Code sequence.
	In this description, < >H means a hexadecimal number, , < >A an ascii character, < > a decimal number and < >B binary number.
	[ ]k means the content of [ ] which can be repeated k times.
[Range]	Describes the range of the subject.
[Description]	Describes the function of the command.
[Notes]	(Included only when required).
[Default]	Default value of the commands.
[Reference]	References to linked commands.
[Example]	Example for the use of the command.

SOFTWARE COMMANDS

Small print

Name	
Format	<00>H
Range	
Description	Sets the small print mode.
Default	<00>H.
Notes	This command clears the print buffer, so that previously received data (if not already printed) is lost. You are, therefore, advised to transmit the <0D>H code first.
References	<01>H, <02>H, <03>H, <04>H.
Example	

Double width print

Name	
Format	<01>H
Range	
Description	Sets double width print mode.
Default	<00>H.
Notes	This command clears the print buffer, so that previously received data (if not already printed) is lost. You are, therefore, advised to transmit the <0D>H code first.
References	<00>H, <02>H, <03>H, <04>H.
Example	

Double height print

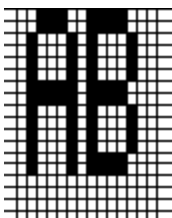|	
Name	
Format	<02>H
Range	
Description	Sets double height print mode.
Default	<00>H.
Notes	This command clears the print buffer, so that previously received data (if not already printed) is lost. You are, therefore, advised to transmit the <0D>H code first.
References	<00>H, <01>H, <03>H, <04>H.

Example

Expanded print

Name	
Format	<03>H
Range	
Description	Sets expanded print mode.
Default	<00>H.
Notes	This command clears the print buffer, so that previously received data (if not already printed) is lost. You are, therefore, advised to transmit the <0D>H code first.
References	<00>H, <01>H, <02>H, <04>H.
Example	

Resets small print

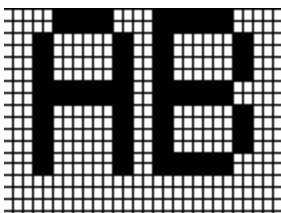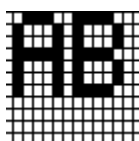|	
Name	
Format	<04>H
Range	
Description	Sets small print mode.
Default	<00>H.
Notes	This command clears the print buffer, so that previously received data (if not already printed) is lost. You are, therefore, advised to transmit the <0D>H code first.
References	<00>H, <01>H, <02>H, <03>H.
Example	

LF

Name	Print and forward feed one line
Format	<0A>H
Range	
Description	Prints the data contained in the buffer and forward feeds one line
Default	
Notes	If the buffer is empty, it simply forward feeds one line.
Referenza	CR
Example	

VT

Name	Vertical Tabs
Format	<n>A <0B>H
Range	0<n<9 ASCII
Description	Forward feeds by <n> lines.
Default	
Notes	
References	
Example	

CR

Name	Print and forward feed one line
Format	<0D>H
Range	
Description	Prints the data contained in the buffer and forward feeds one line.
Default	If the jumper JP5 is open, the command $0D is enabled; if it is closed, the command is disabled.
Notes	If the buffer is empty, nothing happens. To disable the $0D command, use the code $0F (CRLF).
References	LF, CRLF
Example	

CRLF

Name	
Format	<0F>H
Range	
Description	Disables the command $0D.
Default	With jumper JP5 closed, the CRLF function is enabled.
Notes	This command can only be zero-set either by physically resetting the printer or by using the command ESC @.
References	CR
Example	

Graphic Mode

Name	Graphic mode.
Format	<11>H [<d>]k <0D>H
Range	40H<d<7FH 1<k<16
Description	Prints a graphic line.
Default	
Notes	This command clears the print buffer, so that previously received data (if not already printed) is lost. You are, therefore, advised to transmit the <0D>H code first. It also automatically sets the printer in small print mode.
References	See the paragraph on GRAPHICS.
Example	

Reset Software

Name	Reset Software.
Format	ESC @ [<1B>H <40>H]
Range	
Description	Generates a software reset identical to 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.
Default	
Notes	
References	
Example	

Sets the printer to Normal print direction

Name	Normal print.
Format	ESC N [<1B>H <4E>H]
Range	
Description	Selects the normal print direction.
Default	Jumper JP4 (See paragraph on Selection of print direction)
Notes	
References	ESC R
Example	

Sets the printer to Reverse print direction

Name	Reverse print.
Format	ESC R [<1B>H <52>H]
Range	
Description	Selects the reverse print direction
Default	Jumper JP4 (See paragraph on Selection of print direction)
Notes	
References	ESC N
Example	

CHARACTER SET

The S16S printer has only one set of 96 characters (HALF ASCII STANDARD).

FONT 1

```
REL. 1.0

BAUD RATE 9600

 !"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmno
pqrstuvwxyz°±µΩ≠
```