DPP-255

ESC/POS Thermal Printer

Programmer's Manual

Introduction

DATECS DPP-255 is a mobile ESC/POS and LABEL thermal printer. It can be used in dynamic working conditions and its abundant built-in features allow it to be widely used for different applications. Printer can quickly and easily print text and/or graphics, depending on customer's needs – barcodes, logo, etc.

DPP-255 Specification	
Printing Method	Direct line thermal printer
Total Dots	384 dots / line
Dot Density	8 dots / mm (203 dpi)
Print Speed	100 mm / sec
Print Width	48 mm
Characters per Line	Font A: 48 characters / line Font B: 64 characters / line Font C: 48 characters / line (loadable) Font D: 64 characters / line (loadable)
Roll Max Diameter	58
Interfaces	- RS-232C port (max 115200 bps) - mini USB 2.0 port(device) - Bluetooth 2.0 class 2 (Serial Port Profile) (optional) - Bluetooth 3.0 class 2(Serial Port Profile, iPod Accessory Protocol) (optional) - Wireless LAN 802.11b (optional)
Paper Feed system	Step
Logo Registration	1 Black & White 384 x 248 dots
Emulation	ESC/POS / Eltron ZPL
Resident Barcodes	1 D: EAN 13, EAN 8, UPC A, UPC E, Code 39, Code 93, Code 128, Codabar, 2 of 5 interleaved 2 D:PDF417, QR code
Power Supply	AC 100 to 240 V, 50 to 60 Hz, DC 9V/1A
Battery	Rechargeable Li-Ion battery 7.4V/2000 mA 20 000 lines per fully charged battery
LED indication	- Battery low - Battery charging - Paper end - Cover open - Overheating
Reliability	50 km (Thermal head) 15,000,000 lines(Mechanism MCBF)
Weight, kg	420 grams (with battery)
Dimension (W x D x H), mm	88 x 120 x 64
Environment	Operating: -10 to 50 ^{o}C, 30 to 50 % RH Storage: -20 to 60 ^{o}C, 10 to 90 % RH
OS Compatibility	iOS, Android OS, Black Berry OS, Windows OS, Win CE, Windows Mobile, Windows Phone 8.x
Accessories	Wearable built-in metal belt hook

Diagnostic information, dump mode and firmware updating

• Holding <LF> button while power on for ~ 0.5 sec (first sound signal) – short selftest.
• Holding <LF> button while power on for ~ 2.5 sec (second sound signal) – start dump mode. All input data are printed hexadecimal and as text.
• Holding <LF> button while power on for ~ 6.5 sec (forth sound signal) – enter firmware updating mode for the optional card reader.
• Holding <LF> button while power on for ~ 6.5 sec (forth sound signal) – enter firmware updating mode for the optional card reader.
• Holding <LF> button while power on for more than 8.5 sec (fifth 4-tone sound signal) – enter firmware updating mode.
• Holding <ON> button while power on for ~ 4 sec (first sound signal):
     - If serial cable is connected (RS232 communication) – temporary forcing 9600 bps serial speed.
     - If no serial cable connected (Bluetooth or USB communication) – starting a hardware menu for fast Bluetooth pairing info reset.
• Holding <ON> button while power on for more than 6 sec – enter hardware setup mode.

Page mode

New 13 commands are added in page mode, most of the old command work differently.
In standard mode the device prints the data after receiving new line command (LF or CR depending on memory switches) or when the line is wider than the defined print area.

In page mode the result of incoming commands is forwarded to a reserved memory area (page). The page place and size is defined using command ESC W. Command GS T selects the print direction in this page. At the end the collected information is printed using one of the commands, provided for this. Commands ESC FF and GS FF print only the currently defined page, but command ESC Z prints the area between the first and last line containing at least one black point.

All commands except GS L and GS W work in page mode. The centering and right alignment (command ESC a) is working in the currently defined page width.

Ruled lines

The printer has two line buffers with size the maximum printing width (paper width in standard mode or the selected page width in page mode). When ruled lines are active, then every horizontal line of the text line is combined with the selected ruled line buffer. Bit '1' in the ruled line buffer is a black dot in OR mode and inverts the color of the dot in XOR mode. Two commands allow the ruled line buffers to be printed without combining with a text line.

When pressing the FEED button, no ruled lines buffer is applied.
All ruled lines commands start with symbol DC3 (ASCII code 13h). Please see command DC2 = , too .

Warning!
The ruled lines print position depends not on GS L and GS W (left margin and line width) and is always at the beginning of the line (or at the beginning of the printable area in page mode). The printed text and graphic change their position according these commands.
When printing 180 degrees rotated lines (command ESC { 1) ruled lines buffers are not rotated!

DIP SWITCHES

Switch	ON	OFF
Sw 1	BT disable	BT enable
Sw 2	Peeler mode	Normal mode
Sw 3	XON/XOFF	No protocol
Sw 4	Protocol mode	Normal mode

List of commands

1	BEL	Sounds the buzzer
2	HT	Horizontal Tab command configuration flags 2, 3 and 4
3	LF	Printing a line and Paper Feeding command
4	FF	Printing and paper feeding to the black mark position
5	CR	The operation of the command depends on the state of the
6	DC2 =	Image LSB/MSB select
7	DC3	(DC3 (Ruled line) commands sequence start
8	DC3 +	Sets the ruled line ON
9	DC3 -	Sets the ruled line off
10	DC3 A	Selects ruled line A
11	DC3 B	Selects ruled line B
12	DC3 C	Clears selected ruled line buffer
13	DC3 D	Sets a single dot in selected ruled line buffer
14	DC3 F	Ruled line pattern set
15	DC3 L	Ruled line line set
16	DC3 M	Selects ruled line combine mode
17	DC3 P	Ruled line 1 dot line print
18	DC3 p	Ruled line n dots line print
19	DC3 v	Ruled line image write
20	CAN	Canceling print data in page mode
21	ESC FF	Printing data in page mode
22	ESC RS	Sounds the buzzer
23	ESC SP	Setting character spacing
24	ESC #	Setting EURO symbol position
25	ESC $	Specifying the absolute horizontal position of printing
26	ESC %	Selecting/Canceling the printing of downloaded user character sets
27	ESC &	Selecting user character set
28	ESC !	Specifying printing mode of text data
29	ESC *	Printing graphical data
30	ESC +	Switches OFF the printer
31	ESC -	Selecting/Canceling underlining
32	ESC .	Printing self test/diagnostic information
33	ESC 2	Specifying 1/6-inch line feed rate
34	ESC 3	Specifying line feed rate n/203 inches
35	ESC <	Changes print direction to opposite
36	ESC =	Data input control
37	ESC >	Selecting print direction
39	ESC @	Initializing the printer
40	ESC CAL	Black mark mode sensor calibration
41	ESC D	Setting horizontal tab position
42	ESC E	Specifying/Canceling highlighting
43	ESC F	Filling or inverting the page area in page mode
44	ESC G	Specifying/Canceling highlighting
45	ESC I	Specifying/Canceling Italic print
46	ESC J	Printing and Paper feed n/203 inches
47	ESC L	Selecting page mode
48	ESC N	Reading programmed serial number
49	ESC R	Selecting country

50	ESC S	Specifying speed (bps) of the serial port
51	ESC T	Printing short self test
52	ESC U	Selecting/Canceling underlined printing
53	ESC V	Selecting/Canceling printing 90°- right turned characters
54	ESC W	Defining the print area in page mode
55	ESC X	Specifying max printing speed
56	ESC Y	Selecting intensity level
57	ESC Z	Returning diagnostic information
58	ESC \	Specifying relative horizontal position
59	ESC]	Loading the default settings stored in Flash memory
60	ESC ^	Saving current settings in Flash memory
61	ESC _	Loading factory settings
62	ESC `	Reading the Battery Voltage and Thermal head temperature
63	ESC a	Aligning the characters
64	ESC b	Increasing text line height
65	ESC c5	Enabling/Disabling the functioning of the button LF
66	ESC d	Printing and feeding paper by n- lines
67	ESC i	Feeding paper backwards
68	ESC o	Temporarily feeding paper forward
69	ESC pair=	Enabling/Disabling PAIRING info saving in Bluetooth mode
70	ESC pwd=	Programming a new Bluetooth password (PIN)
71	ESC r	Full command for sounding buzzer
72	ESC s	Reading printer settings
73	ESC u	Selecting code table
74	ESC v	Transmitting the printer status
75	ESC x	Setting the time interval for automatically switching Off the printer
76	ESC y	Setting USB response strings
77	ESC {	Enabling/Canceling printing of 180° turned characters
78	GS FF	Printing in page mode and returning to standard mode
79	GS $	Specifying the absolute vertical position in page mode
80	GS)	Setting printer flags (memory switches)
81	GS *	Defining a Downloaded Bit Image (logo)
82	GS /	Printing a Downloaded Bit Image
83	GS :	Starting/ending macro definitions
84	GS B	Enabling/Disabling inverse printing (white on black)
85	GS C	Read the Real Time Clock
86	GS H	Selecting printing position of HRI Code
87	GS L	Setting the left margin
88	GS Q	Printing 2-D barcodes
89	GS R	Filling or inverting a rectangle in page mode
90	GS S	Selecting 2-D barcode cell size
91	GS T	Selecting the print direction in page mode
92	GS U	Selecting standard mode
93	GS W	Setting the print area width
94	GS X	Drawing a rectangular box with selected thickness in page mode
95	GS Z	Printing the non blank page area only in page mode
96	GS \	Specifying the relative vertical position in page mode
97	GS ^	Executing macro
98	GS c	Setting the Real Time Clock
99	GS f	Setting the font of HRI characters of the barcode
100	GS h	Setting the height of the barcode

101	GS k	Printing a barcode
102	GS p	Settings for 2D barcode PDF417
103	GS q	Selecting the height of the module of 2D barcode PDF417
104	GS w	Selecting the horizontal size (Scale factor) of the barcode
105	GS x	Direct text print in page mode
106	FS !	Specifying printing mode of two-byte text data
107	FS &	Selecting two-byte text mode (JIS or GB2312)
108	FS -	Selecting/Canceling underline mode for two-byte text mode
109	FS .	Canceling two-byte text mode
110	FS C	Selecting Shift-JIS mode (Japanese version only)
111	FS S	Specifying character spacing for two-byte text mode
112	FS W	Selecting double size characters for two-byte text mode
113	ESC y WAN	WAN

Command Details

1. Sounds the Buzzer (**BEL**)

Code: **[07h]**

By executing this command the buzzer will beep

2. Horizontal Tab command (**HT**)

Code: **[09h]**

Shifts the printing position to the next horizontal tab position. The horizontal tab position is set by ESC D.

By default the horizontal tab position is at each 8th character (in 9th, 17th, 25th column) from FONT A.

3. Printing a line and Paper Feeding command (**LF**)

Code: **[0Ah]**

Prints data stored in input buffer and feeds paper with one line (the height of a line that has been set).

4. Printing and Paper Feeding to the black mark position (**FF**)

Code: **[0Ch]**

This command prints the data in the printer buffer and searches for black mark. It is ignored if black mark mode is not specified.

Note for Black Mark Function

- **Error detection at black mark mode**

Paper end is not checked during printing and also black mark is not checked.

After receiving FF command, printer checks black mark and paper end. Once black is detected and white is detected again within 6 mm paper feed, it is determined as black mark. If the white is not detected within 6 mm paper feed, it is determined as paper end.

After receiving FF command, if printer cannot detect black mark by feeding paper for 360 mm, printer recognizes it as black mark detecting error. And the result is same as detecting paper end.

To release the error, it is necessary to put correct paper and press LF switch long.

- **LF switch operation in black mark mode**

Press short: Feed one line

Press longer than 1 sec.: Feed paper to find next black mark.
(Same as sending FF command)

- **Remarks for programming**
  As it is possible to print on black mark, if user does not want to print on the black mark, it have to be taken care by user side program

- **Remarks on handling**
  If the paper cover is open in black mark mode, there is a possibility to recognize it as detecting black mark.

5. The operation of the command depends on the state of the configuration flags 2, 3 and 4 (**CR**)
Code: **[0Dh]**
     This command is ignored or its action is the same as LF depending on the state of memory switches 2, 3 and 4, set using last command **GS)**.

6. Image LSB/MSB select (**DC2 =**)
Code: [12h] + [3Dh] + n
     The command selects whether the left edge of print image is the LSB or MSB for commands GS *, DC3
     F and DC3 v. n is from 0 to FFh, but only least significant bit checked:
          0: LSB is the left edge.
          1: MSB is the left edge.
          Default is 1.

7. DC3 (Ruled line) commands sequence start (**DC3 (**)
Code: **[13h] + [28h]**
     Following this command the printer receives DC3 commands without DC3 symbol at the beginning. The symbol '**)**' ends the sequence. All commands, which are not DC3 commands, are ignored.

8. Sets the ruled line ON (**DC3 +**)
Code: **[13h] + [2Bh]**
     After receiving this command every printed line is combined with the selected ruled line buffer. This happens when commands **LF**, **ESC J**, **ESC d**, **DC3 P**, **DC3 p** are executed. Depending on last command **DC3 M** executed the ruled line buffer is combined with the text using OR (if there is a bit '1' in ruled line buffer, a black dot is printed) or XOR (if there is a bit '1' in ruled line buffer, then the corresponding dot is inverted).
     All **DC3** command except **DC3 P** and **DC3 p** are executed when ruled line mode is off, too. Su the ruled line buffers can be cleared or set before this command.
     The command **DC3 –** sets ruled lines off.
     In page mode nothing is printed outside the selected using **ESC W** region.
     The command does not clear rule line buffers.
     By default ruled lines are disabled.

9. Sets the ruled line OFF (**DC3 -**)
Code: **[13h] + [2Dh]**
     The command disables ruled line mode.
     All **DC3** command except **DC3 P** and **DC3 p** are executed when ruled line mode is off, too. Su the ruled line buffers can be cleared or set after this command.
     The command **DC3 +** sets ruled lines on.
     The command does not clear rule line buffers.
     By default ruled lines are disabled.

10. Selects ruled line buffer **A** (**DC3 A**)
Code: **[13h] + [41h]**
Makes ruled line buffer **A** active.
All **DC3** commands for clearing or setting data use the active ruled line buffer. When ruled line is enabled, then printing a line and commands **DC3 P** and **DC3 p** use this buffer.
By default buffer **A** is selected.

11. Selects ruled line buffer **B** (**DC3 B**)
Code: **[13h] + [42h]**
Makes ruled line buffer **B** active.
All **DC3** commands for clearing or setting data use the active ruled line buffer. When ruled line is enabled, then printing a line and commands **DC3 P** and **DC3 p** use this buffer.
By default buffer **B** is selected.

12. Clears selected ruled line buffer (**DC3 C**)
Code: **[13h] + [43h]**
Clears selected ruled line buffer (Sets all bits to 0).
After power on or command **ESC @** both buffers are clear.
Entering or leaving ruled line mode (**DC3 +** and **DC3 -**) does not clear ruled line buffers.

13. Sets a single dot in selected ruled line buffer (**DC3 D**)
Code: **[13h] + [44h] + nL + nH**
Set to '**1**' one bit of the active ruled line buffer.
The dot coordinates are **nL+256*nH**. Coordinates outside the printable area are ignored.

14. Ruled line pattern set (**DC3 F**)
Code: **[13h] + [46h] + n1 + n2**
The command fills the selected ruled line buffer with the data sequence **n1**, **n2**. Permitted values: 0-FFh. Every byte sets 8 dots, last executed command **DC2 =** determines whether the MSB is the left or the right side.
The existing data in the buffer are replaced with the new data.
Dots outside the printable area are ignored.

15. Ruled line line set (**DC3 L**)
Code: **[13h] + [4Ch] + mL + mH + nL + nH**
The command sets to '**1**' the bits between to specified coordinates in the selected ruled line buffer.
The coordinates are **mL+256*mH** and **nL+256*nH**. The part of the line outside the printable area is ignored.

16. Selects ruled line combine mode (**DC3 M**)
Code: **[13h] + [4Dh] + n**
The command selects the logical operation between the selected ruled line buffer and the print buffer when ruled line is enabled. **n** is from 1 to FFh, but only the LSB is used:
0: OR operation – bit '1' in ruled line buffer sets a black dot on paper.
1: XOR operation – bit '1' in ruled line buffer inverts the dot.
For commands **DC3 P**, **DC3 p** and when printing an empty line the logical operation doesn't matter.
Logical operation XOR is useful to invert the whole height of a text line (white letters on black background).
By default OR mode is selected (value **0**).

17. Ruled line one dot line print (**DC3 P**)
Code: **[13h] + [50h]**
The active ruled line buffer is printed as a single line (0.125 mm high).

If ruled line is off, then the paper is moved one line (0.125 mm) without printing.
If there are graphic or text data in the line, they are ignored (erased).
The same effect will have command **ESC 3 [01h]** without text or graphic data in the line.

18. Ruled line **n** dot line print (**DC3 p**)
Code: [13h] + [70h] + nL + nH
The selected ruled line buffer is repeated on **nL+256*nH** lines.
If ruled line is off, then the paper is moved **nL+256*nH** dots without printing.
If there are graphic or text data in the line, they are ignored (erased).
The same effect will have command **ESC 3 n** without text or graphic data in the line (the difference is, that the possible line height is up to 255 dots).

19. Ruled line image write (**DC3 v**)
Code: [13h] + [76h] + nL + nH + D1 + …
The command fills the selected ruled line buffer with **nL+256*nH** data bytes.
Possible values of data bytes: 0-FFh. Every byte defines 8 dots, last executed **DC2 =** determines whether MSB is left or right side.
Selected ruled line buffer is erased and new data are written.
Dots outside the printable area are ignored.

20. Canceling print data in page mode (**CAN**)
Code: [18h]
The command clears the currently selected page area and sets current print position to coordinates (0, 0) in the current page (depending on the currently selected print direction with command **GS T**).
The command is not valid in standard mode.

21. Printing data in page mode (**ESC FF**)
Code: [1Bh] + [0Ch]
The command executes a batch printout of the data, mapped in the currently selected page. The printer continues to work in page mode and data is not destroyed, so the command may be executed many times.
The command is not valid in standard mode.

22. Sounds the buzzer (**ESC RS**)
Code: [1Bh] + [1Eh]
By executing this command the buzzer will beep.

23. Setting character spacing (**ESC SP**)
Code: [1Bh] + [20h] + n
[0 <= **n** < 40h]
The rightward space amount is set in dot unit (1/203 inch unit). The initial value is **n**=0. When the font size is doubled the space between characters is also doubled. Possible values are from 0 to 63 dots.

24. Setting EURO symbol position (ESC #)
Code: **[1Bh] + [23h] + n**
0 <= **n** <= FF The ASCII code of EURO symbol
This command forces the EURO symbol to appear at the selected ASCII code. So when a code table without EURO symbol is selected, the user can use this symbol at the desired place. The original character with this ASCII code becomes inaccessible until redefinition using the same command. ASCII codes from 00H to 1FH disable EURO substitution and the selected code table is printed unchanged.
Default value is 00H (EURO substitution disabled).

25. Specifying the absolute horizontal position of printing (**ESC $**)
Code: **[1Bh] + [24h] + n1 + n2**
0 <= **n1** <= FF Horizontal shifting in dots (least significant byte LSB)
0 <= **n2** <= 02 Horizontal shifting in dots (most significant byte MSB)
The shifting is **n1 + 256*n2** dots. Specifying beyond the line end is ignored.

26. Selecting/Canceling the printing of downloaded user character sets (ESC %)
Code: **[1Bh] + [25h] + n**
n can be from 0 to 255, but only the Least significant bit (LSB) is important:
0 canceling selection of user characters (default characters set is chosen)
1 loaded user character set is chosen
Character set is defined by the command ESC &. The chosen character set is kept even if printer is switched off.

27. Selecting user character set (ESC &)
Code: **[1Bh] + [26h] + a + n + m + D11 + … + D(m-n+1)k**
20h <= **n** <= **m** FFh
a is the number of the sub-command and can be:
0 or '**0**': Copies internal character set A over user character set A. All parameters after the number of the command are omitted.
1 or '**1**': Copies internal character set B over user character set B. All parameters after the number of the command are omitted.
2 or '**2**': Defines a sequence of characters for Font A (12x24)
3 or '**3**': Defines a sequence of characters for Font B (9x16)
4 or '**4**': Defines a sequence of characters for Font B (9x16)
n is the ASCII code of the first, **m** ASCII code of the last of the (**m-n+1**) consecutive characters. When only one symbol is defined **m**=**n**.
With **Dij** are described the data for the characters. Each character from Font A is defined with 48 bytes. Each character from Font B is defined with 16 bytes for subcommand 3 (the 9-th horizontal bit is always white) and with 32 bytes for subcommand 4 (2 bytes for each horizontal row, only the most significant bit of the second byte is used).
The data for character set (font) A is composed from left to right and from top to bottom with two bytes for each horizontal line. From the second byte only the first nibble (the most significant 4 bits) is valid.
Each bit defines one dot, 1 is for black, starting from the most significant bit.
Downloaded characters are valid even after switching off the printer.

28. Specifying printing mode of text data (**ESC !**)
Code: **[1Bh] + [21h] + n**
Data is given in binary code.
Each bit of **n** indicates the following:

Bit	Function	Value 0	Value 1

0	Character Font	A (12x24)	B (9x16)
1	Undefined		
2	Undefined		
3	Highlighting	Canceled	Specified
4	Double Height	Canceled	Specified
5	Double Width	Canceled	Specified
6	Undefined		
7	Underline	Canceled	Specified

An underline is attached to the full character width, which, however, is not attached to the part having been skipped by the horizontal tab. Neither is it attached to 90°-right-turned characters.
The underline width is as having been specified by (ESC -). (The default setting is 1 dot width.)
Highlighting is valid for character font A (12x24) and font B (9x16). It is not recommended to be used for font B because text is not readable. If at same time are given double height and/or double width and to 90°-right-turning of character, then the sequense of execution is as follows:
- *characters is doubled in the direction indicated*,
- *character is turned at 90°-right-angle*.

29. Printing graphical data (**ESC ***)
Code: **[1Bh] + [2Ah] + m + n1 + n2 + D1+ … + Dk**

   m (0 ,1 ,20h или 21h) Graphics mode (see table below).
   0 <= **n1** <= FFh specifies the number of dots in horizontal line (LSB).
   0 <= **n2** <= 09h specifies the number of dots in horizontal line (MSB).
   Di (**i** from **1** to **k**) bit image data.
   The number of dots in horizontal direction is **n1+n2*256**.
   Number of data bytes **k** is **n1 + 256*n2** for modes 0 and 1, and **(n1+256*n2)*3** for 20h and 21h.
   The bits subject to printing are taken as "1" and those not as "0".
   Bit image data is sent starting from the top to bottom and from the left to right (vertical columns scanning). In modes m=0 and 1 only one byte per column is sent and in mode m=20h, 21h - 3 bytes for each column are sent.

m	Mode	Vertical Direction		Horizontal Direction	
		Dots	Dot density	Dot density	Max. dots 104 mm
0	8-dot single density	8	67 DPI	101 DPI	
1	8-dot double density	8	67 DPI	203 DPI	
20h	24-dot single density	24	203 DPI	101 DPI	
21h	24-dot double density	24	203 DPI	203 DPI	

When the values set in **m** or **n2** are out of the above range, the data is processed as normal printing data. If some part of the graphic or the entire graphic is outside the printable area, then graphics data are accepted, but only the needed part of them are printed.
In page mode and rotated by 90 degrees page the max. dot count is larger than the numbers in the table above.

This command has one more version with 3 new modes:

Code: **[1Bh] + [2Ah] + m + n + { a + [00h] } +D1 + … +Dk**
   Designates a bit image of **n*8** dots horizontal and by **24** or **a** dots vertical. Depending on **m** there is compression of data. All 3 modes are with high dot density (203x203 dpi).

m can be:

10h Not compressed data with height 24 lines. Byte **a** and byte **00h** are not sent.

11h Compressed data with height 24 lines. Byte **a** and byte **00h** are not sent.

12h Compressed data with height **a** lines (**a**<=24).

0 <= **n** <= FFh defines horizontal size.

Di are the bit image data. Their number is **n*24** bytes for mode 10h. The compressed data in mode 11h must give same number of bytes, but after the decompression. The number of data bytes for mode 12h must be **a*n** (after decompression).

Decompression in modes 11h and 12h is similar to the one used in PCX monochrome graphic mode. If the 2 most significant bits of the consecutive byte are 1, so the next define a counter of iterations from 0 to 63, and the next byte contains the data that has to be repeated. If at least one of the most significant bytes is 0, the byte contains data which is directly used. If the data for the printer contains a byte with two most significant bits 1, it has to be sent as 2 bytes with counter 1. Data for both modes is sent horizontally, from right to left and from top to bottom. Each byte contains 8 points, the "1"-s are black starting from the most significant bit.

A new mode for printing vertical lines added in version **1.39**.

Code: **[1Bh] + [2Ah] + [18h] + L + n + R**

L Offset (white dots) before the vertical line. From 0 to 255.

n Vertical line thickness in dots. From 0 to 255.

R Offset (white dots) after the vertical line. From 0 to 255.

The command prints a vertical black line with thickness **n** and height – the whole height of the line (including the space between the lines set with commands **ESC 2**, **ESC 3** or **ESC J**). The printer adds **L** dots to the current X coordinate, draws the line and adds **R** dots to the X coordinate after the line. The purpose of the command is to draw tables independent of the type or of the font of the printed symbols

between the vertical lines.

Starting from version **1.40** *two new modes for printing graphics are added.*

Code: **[1Bh] + [2Ah] + [13h] + n1 + n2 + a +D1 + … +Dk**

or **[1Bh] + [2Ah] + [14h] + n1 + n2 + a +D1 + … +Dk**

n1 Lower part of bytes count in horizontal direction. From 0 to 255.

n2 Higher part of bytes count in horizontal direction. From 0 to 1.

a Vertical size of the image in dots. From 1 to 24.

For command **ESC * [13h]** data for a bit image with size (**n1+256*n2)*8** dots horizontally and **a** dots vertically are sent, with data compression (exactly as in command **ECS * [12h]**). The graphics mode is single density (203x203 dots/inch).

Data bytes count is **a*(n1+256*n2)** after decompression.

For command **ESC * [14h]** data are without compression like **ESC * [10h]** command.

The commands are added to make printing of graphics in page mode easier – in page mode with page height more than 2040 dots and print direction 90 or 270 degrees it is not possible to fill the whole page height using only one of the older commands for compressed graphics (**ESC * [11h]** and **ESC * [12h]**).

30. Switch's OFF the printer (**ESC +**)

Code: **[1Bh] + [2Bh]**

This command switches OFF the printer as by setting the power switch to OFF.

31. Selecting/Cancelling Underline (**ESC -**)

Code: **[1Bh] + [2Dh] + n**

An underline is attached to the full character width. It is, however, not attached to the part having been kipped by horizontal tab command.

An underline is not attached to a 90°- right-turned characters.
The following values of **n** are possible:
0 or **30h** Canceling an underline.
1 or **31h** Specifying an underline for 1-dot width.
2 or 32h Specifying an underline for 2-dots width.

Note:
This command only selects the underline thickness. For specifying/canceling the Underline mode command ESC ! ([1Bh] + [21h]) must be used.

32. Printing Self Test/diagnostic information (**ESC .**)
Code: **[1Bh] + [2Eh]**
Prints test page and self-diagnostic information. The self-diagnostic information includes print density, print head temperature, battery voltage, baud rate in case of work via RS232 and others.

33. Specifying 1/6-inch line feed rate (**ESC 2**)
Code: **[1B] + [32h]**
If in the line there are symbols that will not fit in the defined size, the line automatically is set to be of the necessary height so they fit.

34. Specifying line feed rate n/203 inches (**ESC 3**)
Code: **[1Bh] + [33h] + n**
n is from 0 to 255.
Default value is **n**=22h (1/6 inches).

35. Changes print direction to opposite (**ESC <**)
Code: **[1Bh] + [3Ch]**
The command changes current print direction. It is needed when using Hebrew and Arabic code tables, but is working for all code tables.
Default print direction is from right to left for code tables 19, 21, 22, 23, 24 and from left to right for all others.

The command is supported starting from version 1.42.

36. Data input control (**ESC =**)
Code: **[1Bh] + [3Dh] + n**
n can be from 0 to 255, but only the LSB is of significance.
Value **0**: Printer is not selected.
Value **1**: Printer is selected.
When the printer is not selected, it does not accept data (abandons all the received data) and the only command that it executes is ESC = n with least significant bit 1.
By default the printer is selected.

37. Select print direction (**ESC >**)
Code: **[1Bh] + [3Eh] + n**
Possible values for **n**:
0 or '**0**': Default direction for the selected code table.
1 or '**1**': Left to right direction forced.
2 or '**2**': Right to left direction forced.
The command sets the print direction. It is needed when using Hebrew and Arabic code tables, but is working for all code tables.
Default print direction is from right to left for code tables 19, 21, 22, 23, 24 and from left to right for all others.

Commands **ESC <** and **ESC >** work together. The sequence, which selects the direction, is as follows:
• The print direction is set according to the currently selected code table.

• If command **ESC >** with argument > 0 was executed since last **ESC u** command, then this is the print direction.

• If command **ESC <** was executed after this, the print direction is changed to the opposite.

39. Initializing the printer (**ESC @**)
Code: **[1Bh] + [40h]**

Clears data stored in the print buffer and brings various settings to the initial state (Default state). Data (items) in serial buffer are not cleared.

40. Black mark mode sensor calibration (ESC CAL)
Code: [1Bh] + [43h] + [41h] + [4Ch] + n

Selects the ADC value, which the printer uses to distinguish the black marks on paper or labels. The command is used in black mark mode only.

Possible values for n:

- **01h**   Returns one byte, which is the current ADC threshold value.

- **02h**   After receiving this command the printer moves approximately 20 cm of paper and searches minimum and maximum of paper sensor values. Two bytes data are returned – minimum value and maximum value.

- **03h**   After receiving this command the printer moves approximately 20 cm of paper and searches minimum and maximum of paper sensor values. Then a reasonable value of the ADC threshold is calculated and stored in flash memory. One byte data is returned, which is the new ADC threshold value.

- **0Ch** Set / Get number of steps (1/8mm) between detection of black marker and printer stop. After receiving this command, the printer expect one more byte:

   - **01h** Returns one byte, which is the current number of steps (1/8mm).

   - **10h** to FFh The byte is used as number of steps (1/8mm) between detection of black marker and printer stop and is stored in flash memory. One byte data is returned, which is the new value.

   The factory setting of steps is 75h.

- **0Ch**   Peeler sensor calibration. After receiving this command, the printer expect one more byte:

      - *01h*   Returns one byte, which is the current ADC threshold value.

      - *10h to FFh*   The byte is used as ADC threshold value and is stored in flash memory. One byte data is returned, which is the new ADC threshold value.

         The factory setting of ADC threshold value is B0h.

- **05h** Set / Get number of steps (1/8mm) after label was got. After receiving this command, the printer expect one more byte:

   - **01h** Returns one byte, which is the current number of steps (1/8mm).

   - **10h** to FFh The byte is used as number of steps (1/8mm)

    (with offset 10h, i.e. if 1 step is wanted it must be send like (1 + 10h)).

    One byte data is returned, which is the new value (real value, without 10h).

   The factory setting of steps is 24h.

- **0Eh**   After receiving this command, the printer need one more byte, which is the new value of DAC of the GAP sensor. If DAC value is 0, the printer uses Black Mark sensor. Return one byte, new value of DAC.

- **0Fh**   Return one byte, which is current value of DAC of the GAP sensor. 0 mean printer uses Black Mark sensor.

- **10h to FFh**   The byte is used as ADC threshold value and is stored in flash memory. One byte data is returned, which is the new ADC threshold value.

The factory setting of ADC threshold value is 68h.

Use this command carefully and only if the printer has problems in black mark / label recognition.

Note:

Use this command carefully and only if the printer has problems in black mark / label recognition.

41. Setting horizontal tab position (**ESC D**)

Code: **[1Bh] + [44h] + n1 + … + nk + [00h]**

ni is from 0 to 255.

ni indicates the number of the column from the beginning to the horizontal tab position, minus 1. For example, to set the position at 9th column, n=8 is to be specified.

The tab position is set at position where it is "character width multiplied by **ni**" from the line beginning. The character width, at this time, includes the rightward space amount. In double wide characters, it is made double of the ordinary case.

Tab positions can be specified are maximum 32.

ESC D [00h] clears all the set tab positions. Following clearing, horizontal tab command is ignored.

42. Specifying / Canceling highlighting (**ESC E**)

Code: **[1Bh] + [45h] + n**

n can be from 0 to 255, but only the least significant bit is of significance.

Value 0: Canceling highlighting

Value 1: Highlighting is specified

This is effective for character font A (12x24) and font B (9x16).

Note:

*It is not recommended to be used for font **B** because text is not readable.*

43. Filling or inverting the page area in page mode (**ESC F**)

Code: **1Bh] + [46h] + n**

Allowed values for **n**:

0 or '**0**': The area is cleared (white)

1 or '**1**': The area is filled (black)

2 or '**2**': The area is inverted.

The command fills the selected with **ESC W** page with the desired color or inverts it. The command is not valid in standard mode.

44. Specifying / Canceling highlighting (**ESC G**)

Code: **[1Bh] + [47h] + n**

Same as command **ESC E**.

45. Specifying / Canceling Italic Print (**ESC I**)

Code: **[1Bh] + [49h] + n**

n can be from 0 to 255, but only the least significant bit is of significance.

Value 0: Normal Print

Value 1: Italic Print

46. Printing and Paper Feed **n**/203 inches (**ESC J**)

Code: **[1Bh] + [4Ah] + n**

n can be from 0 to 255.

Prints data in the print buffer and feeds paper by n/203 inch.

• This function is temporary and does not affect the feed operation thereafter.

• The beginning of the line is to be considered as the next printing start position.

47. Selecting page mode (**ESC L**)
Code: **[1Bh] + [4Ch]**
The command switches from standard mode to page mode. In this mode the printing is not immediately, but is accumulated in a reserved for this purpose memory area. The resulting image is printed using one of the commands **ESC FF**, **GS FF** or **GS Z**.
The page area is the maximum 832x1732 dots or the result of the last executed command **ESC W**.
The print direction is the default (left to right) or the result of the last executed command **GS T**.
The current print position is (0, 0) depending on the selected print direction.
The command is not valid in page mode.
The command is supported in firmware version 1.42 or higher.

48. Reading programmed serial number (**ESC N**)
Code: **[Bh] + [4Eh]**
The command returns the programmed serial number of the printer as an ASCIIZ string. Number length is 13 characters. If no serial number is programmed, then only one symbol is returned - **00h**.

49. Selecting Country (**ESC R**)
Code: **[1Bh] + [52h] + n**
n can be from 0 o 13 and has the following meaning:

N	Character Set	Changed characters											
		23h	24h	40h	5Bh	5Ch	5Dh	5Eh	60h	7Bh	7Ch	7Dh	7Eh
0	U.S.A.	#	$	@	[	\	]	^	`	{	|	}	~
1	France	#	$	à	º	ç	§	^	`	é	ù	è	¨
2	Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3	U.K.	£	$	@	[	\	]	^	`	{	|	}	~
4	Denmark I	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	Sweden	#	$	É	Ä	Ö	Å	Ü	É	ä	ö	å	ü
6	Italy	#	$	@	º	\	é	^	Ù	à	ò	è	ì
7	Spain I	Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	`	{	|	}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	É	æ	ø	å	ü
10	Denmark II	#	$	É	Æ	Ø	Å	Ü	É	æ	ø	å	ü
11	Spain II	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
12	Latin America	#	$	á	¡	Ñ	¿	é	Ü	í	ñ	ó	ú
13	Korea	#	$	@	[	₩	]	^	`	{	|	}	~

50. Specifying speed (bps) of the serial port (**ESC S**)

Code: **[1Bh] + [53h] + n**

Sets new communication speed for the serial interface.

The command is valid only when the printer is connected through a serial cable. Possible values of parameter **n**:

> **0** or '**0**': 1200 bps
> **1** or '**1**': 2400 bps
> **2** or '**2**': 4800 bps
> **3** or '**3**': 9600 bps
> **4** or '**4**': 19200 bps
> **5** or '**5**': 57600 bps
>   115200
> **6** or '**6**': bps
> **7** or '**7**': 38400 bps
>
> The last setting is valid after switching OFF and ON the printer.
>
> Default value is 6 (115200 bps).

51. Printing short self test (**ESC T**)

Code: **[1Bh] + [54h]**

> Prints current printer parameters, including intensity, temperature of the print head, battery voltage, speed in case of serial connection, etc.

52. Selecting / Canceling underlined printing (**ESC U**).

Code: **[1Bh] + [55h] + n**

> Possible values for **n**:
>
> **0** or '**0**' Canceling underlined characters
>
> **1** or '**1**' Specifying underlined characters

Note:
No underlines are attached to 90°-right- turned characters.

53. Selecting / Canceling printing 90° - right turned characters (**ESC V**)

Code: **[1Bh] + [56h] + n**

> **n** can be from 0 to 255, but only the least significant bit is of
>
> significance: **0** Canceling 90°-right- turned Characters
>
> **1** Specifying 90°-right- turned Characters

Note:
No underlines are attached to 90°-right- turned characters.

54. Defining the print area in page mode (**ESC W**)

Code: **[1Bh] + [57h] + xL + xH + yL + yH + dxL + dxH + dyL + dyH**

> **xL** and **xH**   Low and high byte of the horizontal offset of the relative top left corner of the page.
>
> **yL** and **yH**   Low and high byte of the vertical offset of the relative top left corner of the page.
>
> **dxL** and **dxH**   Low and high byte of the width of the page.

dyL and **dyH**   Low and high byte of the height of the page.

The command defines the relative position and size of the page. In page mode the new values are active immediately, in standard mode they are memorized and used after entering page mode. The print position has coordinates (**0**, **0**) depending on the currently selected print direction (command **GS T**). If the relative position is invalid, the command is not accepted. If only a part of the selected page is in the printable area (current paper width and maximal height of 2432 dots), this area is used as page area.
Default page size is 832x1732 dots.

The command is supported in firmware version 1.42 or higher.

55. Specifying max printing speed (**ESC X**)
Code: **[1Bh] + [58h] + n**

n is between 0 and 3 or between '0' and '3':
0 or **'0'**   60 mm/s (2.4 inch/s)
1 or **'1'**   50 mm/s (2.0 inch/s)
2 or **'2'**   37 mm/s (1.5 inch/s)
3 or **'3'**   25 mm/s (1.0 inch/s)
Default value is 0 (60 mm/s).

Note:
The defined speed is recommended and can be achieved with not very cold printing head and comparatively little data to print in the line (less black).

56. Specifying intensity level (ESC Y)
Code: **[1Bh] + [59h] + n**

n is between 0 and 6 or between '0' and '6':
0 or **'0'**   Intensity 60 %
1 or **'1'**   Intensity 75 %
2 or **'2'**   Intensity 90 %
3 or **'3'**   Intensity 100 %
4 or **'4'**   Intensity 120 %
5 or **'5'**   Intensity 140 %
6 or **'6'**   Intensity 160 %
Default value is **3** (100%).

Note:
Higher intensity can cause decrease in printing speed.

57. Returning diagnostic information (ESC Z)
Code: **1Bh] + [5Ah]**

The printer will return **32** bytes of information with the following structure:
1-22: Printer name up to **22** charachters.
23-25: Firmware version – **3** digits.
26-27: Language version, described by two characters.
28-32: 5 bytes with flags. When the corresponding bit is **1**, the function is supported and when **0**, the function is not supported. Bits are listed below:

Bit	Meaning
28.0	Supports IrDA mode
28.1	Mag-stripe reader support
28.2	Supports reading of all 3 tracks on magnetic card
28.3	Katakana support, ASCII codes above 127 contain Katakana characters
28.4	JIS and Shift-JIS support
28.5	Prints in commands ESC . and ESC T and in command ESC ` returns temperature in º Fahrenheit
28.6	Bluetooth support
28.7	Reserved – always is 1
29.0	Update via firmware interface
29.1	Korean characters support
29.2	BLACK MARK mode support
29.3	Barcode reader support
29.4	USB support
29.5	Not in use
29.6	Page mode support
29.7	Reserved – always is 1
30.0	GB2312 (Simplified Chinese) support
30.1	BIG5 (Traditional Chinese) support
30.2	Not in use
30.3	Not in use
30.4	Not in use
30.5	Not in use
30.6	Not in use
30.7	Reserved – always is 1
31.0	State of flag 3 – determined in command GS)
31.1	State of flag 2 – determined in command GS)
31.2	State of flag 1 – determined in command GS)
31.3	State of DIP switch 4
31.4	State of DIP switch 3
31.5	State of DIP switch 2
31.6	State of DIP switch 1
31.7	Reserved – always is 1
32.0	State of flag 10 – determined in command GS)
32.1	State of flag 9 – determined in command GS)
32.2	State of flag 8 – determined in command GS)
32.3	State of flag 7 – determined in command GS)
32.4	State of flag 6 – determined in command GS)
32.5	State of flag 5 – determined in command GS
32.6	State of flag 4 – determined in command GS)
32.7	Reserved – always is 1

58. Specifying relative horizontal position (**ESC **)
Code: **[1Bh] + [5Ch] + n1 + n2**

        0 <= **n1** <= FFh Specifying number of dots from current position in
        horizontal (LSB) . 0 <= **n2** <= FFh Specifying number of dots from current
        position in horizontal (MSB).
        The printing start position is specified with **n1 + 256*n2** dots. Specifying exceeding the top of

line or the end of line is ignored.
 Specifying dots in minus (left) direction from the current one, is the complement of
N with 65536 (N.=65536 - N).

59. Loading the default settings stored in Flash memory (**ESC]**)
Code: **[1Bh] + [5Dh]**
   - The following parameters are read from flash memory and become active:
   - Speed of communication in serial port
   - Time for automatic turn off
   - Configuration "switches"
   - Max printing speed
   - Print density
   - Height of printing line
   - Country
   - Code table
   - Height of barcode
   - Width of barcode single line
   - Font of the text (HRI characters) corresponding to the barcode
   - Position of the HRI characters

60. Saving current settings in Flash memory (**ESC ^**)
Code: **[1Bh] + [5Eh]**
   - The values of the following settings are stored in flash memory:
   - Speed of communication in serial port
   - Time for automatic turn off
   - Configuration "switches"
     Max printing speed
   - Print density
   - Height of printing line
   - Country
   - Code table
   - Height of barcode
   - Width of barcode single line
   - Font of the text (HRI characters) corresponding to the barcode
   - Position of the HRI characters
     These setting become default settings.

61. Loading factory settings (**ESC _**)
Code: **1Bh] + [5Fh]**
   - This command sets the printer in default state with the following settings:
   - All printing attributes like underline, rotating etc. are cleared.
   - Internal font A (12 x 24) is selected.
   - Pitch between lines is 1/6 inch.
   - Barcode height is 80 dots, and barcode width is 3.
   - All downloaded fonts and bit images are cleared.
   - Printing speed is set to 60 mm/s.
   - Print density is 100%.
   - Communication speed is set to 115200 bps.
   - Code table becomes 437 (US), and country 0 (US).
     For Japanese version default values are: Code table Katakana and country Japan.

62. Returning the battery voltage and printer head temperature (**ESC `**)

Code: **[1Bh] + [60h]**

Returns 2 bytes of information - the first one is battery voltage returned in the format: battery voltage x 10 + 20H and second is head temperature returned in the format: head temperature + 20H.

63. Aligning the characters (**ESC a**)

Code: **[1Bh] + [61h] + n**

n is between 0 and 2 or between
'0' and '2': **0** or **'0'** Left end
alignment
1 or **'1'** Centering
2 or **'2'** Right end
alignment Default
value is 0.
After printing of the line the alignment becomes automatically left-justified.

64. Increase text line height (**ESC b**)

Code: **[1Bh] + [62h] + n**

The command adds **n** dots to current text
line height. **n** is from 0 to 255.
After receiving the every symbol for printing, the printer checks its size (depending on double height attributes, rotation e.c.t.) and sets current line height so, that the whole letter is printed. The command adds additional dots to so calculated line height.
The maximum line height is 48 dots above base line (the line, at which the bottom of most latin letters is, for example the letter 'A'). If adding **n** to the current height is larger than maximum height (48), then 48 is set as height.
If no text or graphic data in line, the command is not executed.
The difference between line height in commands **LF**, **ESC 2**, **ESC 3** and **ESC J** is that the height is increased above the letters. The command is useful when inverting a text line in XOR ruled lines mode.

65. Enabling/Disabling the functioning of the button **LF** (**ESC c5**)

Code: **[1Bh] + [63h] + [35h] + n**

n can be from 0 too 255, but only the least significant bit is of
significance. Value **0**: Button LF is valid.
Value **1** : Button LF
is invalid. Default
value is 0.

66. Printing and feeding paper by **n**-lines (**ESC d**)

Code: **[1Bh] + [64h] + n**

n can be from 0 to 255.
Prints data inside the buffer and feeds paper by **n** lines.
The beginning of the line is to be considered as the next printing
start position. When **n=0** paper is fed with 1 line.

67. Feeding paper backwards (**ESC i**)

Code: **[1Bh] + [69h]**

> If paper has been fed forward with command **ESC o**, then it returns backwards. The feed is exactly the same as it was defined in command **ESC o**, but in reverse direction.
> If paper has not been fed forward then this command is ignored.

68. Temporarily feeding paper forward (**ESC o**)

Code: **[1Bh] + [6Fh] + n**

> **n** can be from 0 to 255.
> This command temporarily feeds paper forward with the defined number of steps **n** (1/8 mm). At command **ESC i** or at first command for printing the paper feeds backwards.

69. Disabling/enabling PAIRING info saving in Bluetooth mode (**ESC pair=**)

Code: **[1Bh] + [70h] + [61h] + [69h] + [72h] + [3Dh] + n**

> Possible values of **n**:
> '**0**':Disables PAIRING info
> saving. '**1**':Enables
> PAIRING info saving.
> After PAIRING info saving no password is required when making new **Bluetooth** connection, but only paired devices can communicate. If an old connection (pairing) was saved, it will be destroyed and first new connection will be saved in it's place.
> After executing this command with argument '**0**' the current saved information will be destroyed, but no new connection will be saved. Every time a password will be required. The printer will work with all
> **Bluetooth** devices.
> After the command the printer must be switched off (using **ON/OFF** button or **ESC x** command). The **Bluetooth** connection will be reinitialized the next time the printer is switched on in **Bluetooth** mode.

70. Programming a new Bluetooth password (PIN) (**ESC pwd=**)

Code: **[1Bh] + [70h] + [77h] + [64h] + [3Dh] + d + [00h]**

> This command changes the Bluetooth module PIN.
> **d** contains the new PIN. PIN length is from 0 to 16 characters, allowed are digits and capital latin letters. The string ends with 00h (ASCIIZ). If the length is 0, Bluetooth module uses no password (PIN).
> New password is active after switching the printer on next time in Bluetooth mode (without serial or USB cable). The change is unconditionally and does not require the knowledge of the old PIN.

Warning:

The command destroys saved PAIRING info (like after command ESC pair=0).

71. Full command for sounding buzzer (**ESC r**)

Code: **[1Bh] + [72h] + Data**

> This command is used for making (beeping) a sequence of sounds with a certain frequency and duration. The data is in format, similar to the one used for writing notes and can be of any length. The first invalid character cancels the command.
> Data format: Notes of the scale: a latin letter of value

from 'A' to'G'. 'C' - Do

'D' - Re

'E' - Mi

'F' - Fa

'G' - Sol

'A' - La

'B' – Si

If immediately after the note comes character '**#**', then the note is higher in pitch by a semitone (*sharp*). If immediately after the note comes character '**&**', then the note is lower in pitch by a semitone (*flat*).

-       Pause: Character space (ASCII 20h).

After a note or pause there can be one or a few bytes, which specify the duration. Valid are characters from '0' to '5', they have the following meaning:

'**0**' basic duration of a

note/pause

'**1**' basic duration * 2

'**2**' basic duration

* 4

'**3**' basic duration

* 8

'**4**' basic duration

* 16

'**5**' basic duration

* 32

If there are a few durations one after another they are summed up.

• Going to higher scale: character '**+**'.

• Going to lower scale: character '**-**'.

• Specifying tempo: character '**^**', followed by a number. The number specifies the percentage: duration of notes and intervals to basic duration. Values:

'**1**'	200 %
'**2**'	175 %
'**3**'	140 %
'**4**'	120 %
'**5**'	100 %
'**6**'	80 %
'**7**'	60 %
'**8**'	50 %
'**9**'	40 %

-       Return to scale 1 (it is default). Character '**@**'. Tone 'La' in it is 440 Hz.

It is recommended that the data ends with ASCII code **03h**, although any other non-printing character will also stop the command.

72. Reading current printer settings (**ESC s**)

Code: **[1Bh] + [73h] + n**

This command returns current settings or loaded data in printer. Possible

values for **n**: **0** or '**0**': Current settings from flash memory are returned in
following order:
• Hardware switches - 4 digits **0** or **1**.
• Memory switches -10 digits **0** or **1**.
• Serial port speed (bauds) – an integer.
• Country number (from command ESC R) – an integer.
• Current character table (from command ESC u) – an integer.
• Print density (from command ESC Y) – an integer.
• Print speed (from command ESC X) – an integer.
• Power off time (from command ESC x) – an integer (in minutes).
• EURO symbol position (from command ESC #) – an integer from 0 to 255.

Field separator is ','.
1 or '1': Current settings from printer RAM are returned. The format of data is the same as
for
Subcommand 0.
2 or '2': The currently loaded graphic logo is returned in format:
w h Di , where:
w   Graphics width in bytes (pixels*8).
H   Graphics height in pixels.
Di   Graphics data – 2*w*h bytes in the sequence as in command GS *. Data are in
              hexadecimal format (each byte sent as two hexadecimal symbols).
3 or '3': Current USB strings from ESC y are returned. Format is as in command ESC y Usb,
          All fields present in increasing order.
6 or '6': Current WAN settings from ESC y are returned. Format is as in command ESC y WAN,
All fields present in increasing order.

73. Selecting Code table (**ESC u**).
Code: **[1Bh] + [75h] + n**
Values for **n**:
  0   ENGLISH (437)
  1   LATIN 1 (850)
  2   PORTUGUESE (860)
  3   LITHUANIAN
  4   LATIN 2 (852)
  5   POLISH
  6   TURKISH (857)
  7   BALTIC (775)
  8   BULGARIAN (856)
  9   RUSSIAN (866)
  10   LATVIAN
  11   GREEK (737)
  12   HEBREW (862)
  13   WESTERN (1252)
  14   CE (1250)
  15   TURKISH (1254)
  16   BALTIC (1257)
  17   CYRILLIC (1251)

18	GREEK (1253)
19	HEBREW (1255)
20	KATAKANA
21	ARABIC
22	ARABIC (1256)
23	ARABIC (1256 with Arabic digits and punctuation)
24	ARABIC (1256 with Farsi Arabic digits and punctuation)

When the printer is switched ON it is loaded the default code table which is stored in flash-memory.

Addition information about Arabic code tables:

Arabic code tables are included in firmware version 1.42. When selected, the default print direction is from right to left (the same for code table 19 – Hebrew). The print direction can be changed using commands **ESC >** and
ESC <.
Arabic symbols are larger than the symbols in from the other code tables (16 dots for font A and 12 dots for font B). Depending on the position of the letter in a word, Arabic letters may have up to 4 different forms – single letter, right form, middle form and left form. Code table 21 includes all forms of every letter, so the application program has to select the correct ASCII code. When using code tables 22, 23 and 24, the printer automatically selects the correct letter form dependant on its neighbours. If it is needed to print directly a form of the letter when one of the pages 22, 23 or 24 is selected, the ASCII code 7Fh is sent to the printer – the first symbol after it is taken directly from code table 21.
Code table 23 differs from 22 by that the digits and some of the punctuation marks are changed with Arabic. Table 24 differs from 23 by that the Arabic digits are Farsi variant (3 of them are different).
For Japanese and Chinese versions of the printer only: When one of the Arabic code tables is selected, then two-byte Asian letters are not accessible – a non-Arabic code page must be selected to print them.

74. Transmitting the printer status (ESC v)
Code: **[1Bh] + [76h]**
The printer returns one byte whose bits have the following meaning:

Bit	Value 0	Value 1
0	Not in use	
1	Not in use	
2	There is paper and paper cover is closed	No paper or paper cover is open
3	Printing head is with normal temperature	Printing head is overheated
4	Not in use	
5	Not in use	
6	Battery Voltage is normal	Low battery voltage
7	Not in use	

75. Setting the time interval for automatically switching Off the printer. (**ESC x**)
Code: **[1Bh] + [78h] + n**
Sets the time interval after which the printer will be switched Off automatically if there is no

incoming data and LF button is not pressed.

n is one byte with value between 1 and 60, it sets time in minutes. This time is remembered after printer is switched off.

If value 0 is programmed, then the printer will not be switched off automatically. Default value is 10 minutes.

76. Setting USB response strings. (**ESC y**)

Code: **[1Bh] + [79h] + [55h] + [53h] + [42h] + [3Ah] + Data**

The command changes the USB response ID numbers and strings, used when connecting to a PC in USB slave mode.

Data format: **VendorID + [03h] + ProductID + [03h] + ManufacturerName + [03h] + ModelName+ [03h] +**

DeviceStr +[03h]

VendorID: 4 hexadecimal symbols.

ProductID: 4 hexadecimal symbols.

ManufacturerName: Up to 48 symbols (ASCII codes 20h-7Eh).

ModelName: Up to 48 symbols (ASCII codes 20h-7Eh).

DeviceStr: Up to 152 symbols (ASCII codes 20h-7Eh).

[03h]   is one byte (ASCII code 03h) - field separator.

All fields of the commands are obligatory. The settings will be active after next power on.

Starting with version 1.41, a new form of the command with USB class support added (ESC y Usb:).

Format: **[1Bh] + [79h] + [75h] + [73h] + [62h] + [3Ah] + Data**

Format for **Data**: **T₁ + D₁ + T₂ + D₂ + … + [00h]**

is one byte, selecting the data type, which follows. Possible

Ti   values:

01h USBclass : one byte - '**P**': принтер; '**S**': сериен.

02h VendorID: 4 hexadecimal symbols.

03h ProductID (for USB printer class): 4 hexadecimal symbols.

04h ProductID1 (for USB serial class): 4 hexadecimal symbols.

05h ManufacturerName: Up to 48 symbols (ASCII codes 20h-7Eh)

06h ModelName: Up to 48 symbols (ASCII codes 20h-7Eh)

07h DeviceStr: Up to 150 symbols (ASCII codes 20h-7Eh)

Not all fields are obligatory. Missing fields don't change values.

Note:

Downloading new firmware will destroy the last USB response string (the place they are stored is part of the firmware).

77. Enabling/Canceling printing of 180° turned characters (**ESC {**)

Code**: [1Bh] + [7Bh] + n**

n can be from 0 to 255, but only the least significant bit is of

significance: **0** Cancel printing of 180° turned characters

1 Enable printing of 180° turned

characters Default value is 0.

The whole line is turned.

78. Printing in page mode and returning to standard mode (**GS FF**)

Code: **[1Dh] + [0Ch]**

The command prints the image in the currently defined page and leaves page mode. All the page memory is erased.

79. Specifying the absolute vertical position in page mode (**GS $**)

Code: **[1Dh] + [24h] + nL + nH**

nL Lower byte of the new vertical

position **nH** Higher byte of the

new vertical position

The command sets new vertical print position. If the position is outside the currently active page, the command is not accepted. The real new coordinates depend on the print direction (selected using **GS T**). The command is invalid in standard mode.

The horizontal position is changed with commands **ESC $** and **ESC ** - they work both in page and standard mode.

80. Setting printer flags (memory switches) **(GS))**

Code: **[1Dh] + [29h] + f1 + f2 + … + f10**

This model has 10 memory switches and selecting, releasing, and changing a function is available with this command. With this command can be set 10 flags (memory switches), they are switched ON or OFF. Memory switch setting is retained even after printer power off. These flags are like virtual switches defining the state of the printer.

f_i is the flag that we want to switch ON or OFF. All flags must be set. Possible

values are: **'0'**: Flag is OFF.

'1':   Flag is ON.

'.': Flag stays

unchanged. Meaning

of different flags:

Flag	OFF/ON
1	"ENABLE SOUND"
2	"EXECUTE <CR> AS <LF>"
3	"DISABLE <LF> COMMAND"
4	"DISABLE <LF> AFTER <CR>"
5	"DEFAULT SMALL FONT"
6	"USE GAP SENSOR"
7	"BLACK MARK MODE"
8	"DISABLE DISCOVERABILITY"
9	"ENABLE USB INTERFACE"
10	USB IN DEVICE MODE

81. Defining a Downloaded Bit Image

(logo) (GS *) Code: **[1Dh] + [2Ah] + n1 +**

n2 + D$_1$ + … + D$_n$

n1 is between 1 and 127 and defines the horizontal size of the

downloaded image. **n2** is between 1 and 248 and defines the vertical

size of the downloaded image.

D_i are the data for the bit image. This data consists of **n1*n2** bytes, from left to right and from top to bottom, but **n1** bytes in each horizontal line (**n1*8** dots) and **n2** lines. Each bit defines a dot, 1 corresponds to black. Total number of bytes cannot be bigger than 16 kB.

The command defines a bit image that contains number of dots, defined by **n1** and **n2**. Image is stored and after the printers is switched off.

The so defined bit image is printed with command **GS /**

82. Printing a Downloaded Bit Image (logo) (**GS /**)

Code: **[1Dh] + [2Fh] + m**

m defines the printing mode and can be:

m	Mode	Vertical dots	Horizontal dots
0	Normal	203 DPI	203 DPI
1	Double width	203 DPI	101 DPI
2	Double height	101 DPI	203 DPI
3	Double height and double width	101 DPI	101 DPI

When a download bit image has not been defined, this command is ignored.

A portion of a download bit image exceeding one line length is not printed.

Command ESC @ (initialization of the printer) does not clear downloaded bit image.

83. Starting/Ending macro definitions (**GS :**)

Code: **[1Dh] + [3Ah]**

Specifies starting/ending macro definition. Maximum content available for macro definition is 4094 bytes. After the last byte of data, the command is sent once again to define the end. Even with ESC @ (initialization of the printer) having been executed, defined content is not cleared. Therefore, it is possible to include ESC @ into the content of macro definition. Normal printing operation is carried out even while in macro definition.

84. Enable / Disable inverse printing (white on black) (**GS B**) Code: **[1Dh] + [42h] + n**

n is from 0 to 255, but only LSB is checked: **0** Disable inverse printing

1 Enable inverse printing Default value: **0**.

85. Read the Real Time Clock (**GS C**)

Code: **[1Dh] + [43h]**

The command returns the current value of the RTC as string.

Returned data format (21 bytes):

YY MM DD WW hh mm ss[00h]

YY   Year without the century (00-99)

MM   Month (01-12)

DD   Day (01-31)

WW Day of the week (01-07)
hh Hour (00-23)
mm Minutes (00-59)
ss Seconds (00-59)

Field separator is space symbol (ASCII 32h).
Data are terminated with ASCII **00h**.
The command exists in printer versions 1.12 or newer.

86. Selecting printing position of HRI Code (GS H)
Code: **[1Dh] + [48h] + n**

Selecting printing position of HRI code when printing
barcodes. **n** is between 0 and 3 or between '0' and
'3':

Value:	Printing position:
0	No printing
1	Above the barcode
2	Below the barcode
3	Both above and below the barcode

87. Setting the left margin (**GS L**)
Code: **[1Dh] + [4Ch] + n1 + n2**

This command sets the position in dots (1/203 inches), from which begins printing of each
line.
This command only works when it is entered at the beginning of a line. The value of the left
margin is **n1+256*n2** dots. Default value is 0.
The command is valid in standard mode only.

88. Printing 2-D (two dimensional) barcodes
(**GS Q**) Code: **[1Dh] + [51h] + n + …**

n selects the type of barcode:

2 or '**2**': PDF417
Code: **[1Dh] + [51h] + n + Type + EncMode + ECCL+Size +nl + nh +Data$_i$**

Type PDF417 type
    0: Standard
    1: Truncate
EncMode Encoding mode
    0: Automatic most suitable encoding
    1: Binary encoding
    Error correction control level. Possible values 0 to 9. **ECCL**=9
ECCL automatically
    selects correction level dependent on data length.
Size Specify one from the bellow table (X: bar width, Y: row height).

0	X=2, Y=4	8	X=12, Y=4
1	X=2, Y=9	9	X=12, Y=9

2	X=2, Y=15	10	X=12, Y=15
3	X=2, Y=20	11	X=12, Y=20
4	X=7, Y=4	12	X=20, Y=4
5	X=7, Y=9	13	X=20, Y=9
6	X=7, Y=15	14	X=20, Y=15
7	X=7, Y=20	15	X=20, Y=20

nl, nh Specify lower byte and upper byte of data size (1 to 384).

Data$_i$ Data bytes

2 or '**2**':   QR Code

Code: **[1Dh] + [51h] + n + Size + ECCL + nl + nh + Data**$_i$

Size   Size of symbol. Possible values: 1, 4, 6, 8, 10, 12, 14

ECCL   Error correction control level:

1:   L (7%)

2:   M (15%)

3:   Q (25%)

4:   H (30%)

nl, nh   Specify lower byte and upper byte of data size (1 to 448).

Data$_i$ Data bytes

89. Filling or inverting a rectangle in page mode (GS R).

Code: **[1Dh] + [52h] + xL + xH + yL + yH + dxL + dxH + dyL + dyH + n**

xL and **xH**   Low and high byte of the horizontal position of the top left corner of the rectangle in the
active page.

yL and **yH**   Low and high byte of the vertical position of the top left corner of the rectangle in the
active page.

dxL and **dxH**   Low and high byte of the width of the rectangle.

dyL and **dyH**   Low and high byte of the height of the rectangle.

N   Filling mode:

0 or '**0**'   Rectangle area is cleared (white).

1 or '**1**'   Rectangle area is filled (black).

2 or '**2**'   Rectangle area is inverted.

The coordinates are relative to the left corner of the page, defined using **ESC W** (The print
direction doesn't matter).

If some part of the rectangle is outside the page, only the part inside the
page is filled. The command is invalid in standard mode.

90. Selecting 2-D barcode cell size (**GS S**)

Code: **[1Dh] + [53h] + n**

This command sets the cell size for two dimensional barcode

QR Code. Possible values:

n=**0** or '**0**': Cell

size 3. n=**1** or

'**1**': Cell size 4.

91. Selecting the print direction in page mode (GS T)

Code: **[1Dh] + [54h] + n**

The command selects the current print direction and set starting point to (0, 0) according to
this direction. Accepted values of **n**:

0 or '**0**'   Printing from left to right, feed to bottom. Starting point in left top corner of the
page.

1 or '**1**' Printing from bottom to top, feed to right. Starting point in left bottom corner
of the page. **2** or '**2**' Printing from right to left, feed to top. Starting point in right
bottom corner of the page. **3** or '**3**' Printing from top to bottom, feed to left. Starting
point in right top corner of the page.

In page mode this command changes immediately the print direction. In standard mode the new
value is memorized and used after entering page mode.

The command is supported in firmware version 1.42 or higher.

92. Selecting standard mode (GS U)

Code: **[1Dh] + [55h]**

The command switches from page mode to
standard mode. The whole memory area of page
mode is cleared.

The command is invalid in standard mode.

The command is supported in firmware version 1.42 or higher.

93. Setting the print area width (**GS W**)

Code: **[1Dh] + [57h] + n1 + n2**

This command sets the print area width in dots (1/203 inches). This command only works when it is
entered at the beginning of a line. The defined value of print area width is **n1+256*n2** dots. The
default value depends on the mode 104mm paper roll and 832dots.

The command is valid in standard mode only.

94. Drawing a rectangular box with selected thickness in page mode

(GS X) Code: **[1Dh] + [58h] + xL + xH + yL + yH + dxL + dxH + dyL +**

dyH + n + d

xL and **xH**	Low and high byte of the horizontal position of the top left corner of the box in the active page.
yL and **yH**	Low and high byte of the vertical position of the top left corner of the box in the active page.
dxL and **dxH**	Low and high byte of the width of the box.
dyL and **dyH**	Low and high byte of the height of the box.
n	Filling mode:

0 or '**0**'   Area under the box is cleared (white).

1 or '**1**'   Area under the box is filled (black).

2 or '**2**'   Area under the box is inverted.

d   Box thickness (from 1 to 64).

The coordinates are relative to the left corner of the page, defined using **ESC W** (The print

direction doesn't matter).
If some part of the rectangle is outside the page, only the part inside the
page is filled. The box thickness is always to the inner side of the rectangle.
The command is invalid in standard mode.

The command is supported in firmware version 1.42 or higher.

95. Printing the non blank page area only in page mode (**GS Z**)
Code: **[1Dh] + [5Ah]**
The command checks the whole memory of the page mode. The area from the first horizontal line
wit at least 1 black dot to the last such line is printed. The printer does not leave page mode, current
page start position and sizes are not changed. The printed width is 576 or 408 dots depending on the
selected paper width.
The command is invalid in standard mode.

The command is supported in firmware version 1.42 or higher.

96. Specifying the relative vertical position in page mode (**GS **)
Code: **[1Dh] + [5Ch] + nL + nH**

>   **nL** Lower byte of the new vertical
>
>   position **nH** Higher byte of the
>
>   new vertical position

The command sets new vertical print position relative to the current one. If the position is outside
the currently active page, the command is not accepted. The real new coordinates depend on the
print direction (selected using **GS T**). The command is invalid in standard mode.
The horizontal position is changed with commands **ESC $** and **ESC ** - they work both in page and
standard mode.

The relative vertical offset is **nL + 256*nH** dots. Offsets in negative direction are given as complement
of 65536 (**n̲=65536 - n**).
The command is supported in firmware version 1.42 or higher.

97. Executing macro (GS ^)
Code: **[1Dh] + [5Eh] + n1 + n2 + n3**

>   **n1** is between 1 and 255: The number of times of macro execution.
>   **n2** is between 1 and 255: Waiting time on macro execution. Waiting time of n2 x 100 msec is
>   given for every execution.
>   **n3** Macro execution mode. Possible values are:
>>   0   Continuous execution: The Macro is executed n1 times continuously at the
>>   time intervals specified by n2.
>>   1   Execution by LF switch: When LF switch is pressed, the macro is executed once.1

99. Setting the Real Time Clock (**GS c**)
Code: **[1Dh] + [63h] + YY MM DD WW hh mm[00h]**

>   where:
>   **YY**   Year without the century (00-99)
>   **MM**   Month (01-12)
>   **DD**   Day (01-31)

WW   Day of the week (01-07)
hh   Hour (00-23)
mm   Minutes (00-59)

Field separator is space symbol (ASCII 32h).
Data are terminated with ASCII **00h**.

The command exists in printer versions 1.12 or newer.

> *Note:*
> *The command clears the seconds!*

99. Setting the font of HRI characters of the barcode (**GS f**)
Code: **[1Dh] + [66h] + n**

   n can be the
       following values:
       0 Font A
       1   Font B

101. Setting the height of the barcode (**GS h**)
Code: **[1Dh] + [68h] + n**

   n is between 1 and FFh and it defines the heights of barcode in dots (1/203 inches). Default
   value: n=162.

101. Printing a barcode (**GS k**)
Code: **(1)   [1Dh] + [6Bh] + m + D$_i$ + [00h]** or
       (2)   [1Dh] + [6Bh] + m + n + D$_i$
       (3)   [1Dh] + [6Bh] + m + c + n1 + n2 + D$_i$
       D$_i$ are the data for the barcode. The number and possible characters depend on the type of
       barcode and are defined underneath.
       n defines the length of the data when 65 <= m <= 73.

       For 2-D barcode PDF417:

       n1 and **n2** define the length of the data: N=n1+256*n2. Max value 1000.
               defines whether the barcode data is compressed. Possible values are 0 or
       c   1.
       m   defines the type of barcode and can be of the following values:

m (1)	Type of barcode	Length	Possible characters
0	UPC-A	11	48 <= D$_i$ <= 57
1	UPC-E	11	48 <= D$_i$ <= 57
2	EAN13 (JAN13)	12	48 <= D$_i$ <= 57
3	EAN 8 (JAN8)	7	48 <= D$_i$ <= 57
4	CODE 39	-	48 <= D$_i$ <= 57, 65 <= D$_i$ <= 90, 32, 36, 37, 43, 45, 46, 47
5	ITF	-	48 <= D$_i$ <= 57
6	CODABAR (NW-	-	48 <= D$_i$ <= 57, 65 <= D$_i$ <= 68, 36, 43, 45, 46, 47,

7)		58	

m (2)	Type of barcode	Length	Possible characters
65	UPC-A	11	$48 <= D_i <= 57$
66	UPC-E	11	$48 <= D_i <= 57$
67	EAN13 (JAN13)	12	$48 <= D_i <= 57$
68	EAN 8 (JAN8)	7	$48 <= D_i <= 57$
69	CODE 39	-	$48 <= D_i <= 57$, $65 <= D_i <= 90$, 32, 36, 37, 43, 45, 46, 47
70	ITF	-	$48 <= Di <= 57$
71	CODABAR (NW-7)	-	$48 <= Di <= 57$, $65 <= Di <= 68$, 36, 43, 45, 46, 47, 58
72	CODE 93	-	$0 <= Di <= 127$
73	CODE 128	-	$0 <= Di <= 127$
75	CODE 128 Auto	-	$0 <= Di <= 127$
76	EAN 128	-	$0 <= Di <= 127$

m (3)	Type of barcode	Length	Possible characters
74	PDF417	-	$0 <= Di <= 255$

Additional information for Code 128:

Code 128 covers the range of ASCII codes from 0 to 127 with the help of 3 code sets A, B and C, which can be used in one and the same barcode.

Code set A: consists of characters with ASCII codes from 0 to 95 and function characters FNC1, FNC2, FNC3, FNC4, SHIFT, CODEB, CODEC.

Code set B: consists of characters with ASCII codes from 32 to 127 and function characters FNC1, FNC2, FNC3, FNC4, SHIFT, CODEA, CODEC.

Code set C: is used for coding sections of the barcode which consist only of digits. Each character defines 2 digits, that are coded with ASCII code from 0 to 99. Also possible are function characters FNC1, CODEA, CODEB.

The barcode always begins with one of the characters CODEA, CODEB or CODEC, which defines the code set that will be used. If necessary the code set can be changed by inserting one of these characters in the barcode. The character following SHIFT is treated as a character of code set B if the current code set is A, and as a character of code set A if the current code set is B. If a character unacceptable for the current code set is given then barcode is not printed.

Function characters are defined with 2 bytes as follows:

Character	Coding		
	Decimal	Hexadecimal	Text
FNC1	123, 49	7B, 31	{1
FNC2	123, 50	7B, 32	{2
FNC3	123, 51	7B, 33	{3
FNC4	123, 52	7B, 34	{4

CODEA	123, 65	7B, 41	{A
CODEB	123, 66	7B, 42	{B
CODEC	123, 67	7B, 43	{C
SHIFT	123, 83	7B, 53	{S
{	123, 123	7B, 7B	{{

Code 128 Auto uses the same code sets, but the printer test the data and automatically switches between the code sets, trying to print a minimum width barcode. **D$_i$** contains only the real data to be printed.

EAN 128 uses Code 128 code sets, but puts an FNC1 code in the beginning, and if human readable text is enabled, the text is separated in fields (Application identifiers). If any of the fields contains invalid data, the barcode is not printed. Code sets are switched automatically like **Code 128 Auto**.

102. Settings for 2D barcode PDF417 (**GS p**)
Code: **[1Dh] + [70h] + e + c + r**

> **e** is error correction level for barcode PDF417. At value bigger than 8 the printer chooses automatically the appropriate level depending on the quantity of the coded data, else the defined value is being used.

> **c** is the max number of columns, which the printer uses for printing the barcode. **r** is max number of rows, which the printer uses for printing the barcode.

103. Selecting the height of the module of 2D barcode PDF417 (**GS q**)
Code: **[1Dh] + [71h] + n**

> **n** is between 4 and 32 including and is the height of one line from the barcode. By default **n**=18.

104. Selecting the horizontal size (Scale factor) of the barcode (**GS w**)
Code: **[1Dh] + [77h] + n**

> **n** is between 2 and 4 including and is the number of dots in barcode's fine element width. By default **n**=3.

105. Direct text print (text string print) in page mode (**GS x**)
Code: **[1Dh] + [78h] + xL + xH + yL + yH + sX + sY + Attr + D$_i$ + [00h]**
The command prints a text string in page mode. It allows larger multiplication of the symbols in comparison with
the normal text printing (more than 2).

> **xL** and **xH**   X coordinate of upper left corner of first letter.
> **yL** and **yH**   Y coordinate of upper left corner of first letter.
> **sX**   Size (multiplication) in horizontal direction. 1

to 16.

	Size (multiplication) in vertical direction. 1 to
sY	16.

Attr   Print attributes. One byte from 0 to 255. Each bit of **Attr** indicates the following:

Bit	Function	Value 0	Value 1
0	Font size	A (12x24 or 24x24)	B (9x16 or 16x16)
1	Not used		
2	Not used		
3	Bold	Enabled	Disabled
4	Not used		
5	Not used		
6	Not used		
7	Not used		

Di   Data. Bytes with ASCII codes below **20h** are ignored.

X and **Y** coordinates are **xL+256*xH** and **yL+256*yH**.

The currently active page direction, country and code table are used. From all print attributes only BOLD is used.

After every printed symbol **X** coordinate is automatically increased by symbol width + character space, multiplied by **sX**. If some part of the symbol is not in the selected page area, the symbol is not printed.

The command is executed in page mode only.

The command is supported in firmware version 1.48 or higher.

106. Specifying printing mode of two-byte text data (**FS !**)

Code   **[1Ch] + [21h] + n**

Data is given in binary code. Each **n** bit indicates the following:

Bit	Function	Value 0	Value 1
0	Font size	24x24	16x16
1	Undefined		
2	Undefined		
3	Double Height	Canceled	Specified
4	Double Width	Canceled	Specified
5	Undefined		
6	Undefined		
7	Underline	Canceled	Specified

An underline is attached to the full character width, which, however, is not attached to the part

been skipped by the horizontal tab. Neither is it attached to 90°-right-turned characters.
The underline width is as having been specified by (FS -). (The default setting is 1 dot width.)
If at the same time are given double height and/or double width and 90°-right-turning of character, then
the sequence of execution is as follows:
- character is doubled in the direction indicated
- character is turned at 90°-right-angle

107. Selecting the two-byte text mode - JIS or GB2312 (**FS &**)
Code: **[1Ch] + [26h]**
 The command selects two-byte characters mode. Depending on the version of the printer, this may be:
- Japanese version: JIS character table. First byte is between 20h and 7Fh, second byte between 00h and 7Fh. If outside this range, one-byte ASCII characters are printed.
- Chinese version: GB2312 (Simplified Chinese). First and second bytes are between A0h and FFh. If outside this range, one-byte ASCII characters are printed.

108. Selecting/Cancelling underline for two-byte text mode (**FS -**)
Code: **[1Ch] + [2Dh] + n**
        An underline is attached to the full character width. It is, however, not attached to the part
        having been skipped by horizontal tab command.
        An underline is not attached to 90°- right-turned
        characters. The following values of **n** are possible:
        0 or **30h**   Canceling an underline.
        1 or **31h** Specifying an underline of 1-dot
        width. **2** or **32h** Specifying an underline of
        2-dots width.

109. Cancelling the two-byte text mode (**FS .**)
Code: **[1Ch] + [2Eh]**
The command cancels two-byte characters mode (JIS or GB2312 depending on the version).
For Japanese version only: If Shift-JIS character mode was selected before using **FS C** command, then
the printer returns to Shift-JIS mode instead to one byte ASCII text mode.

110. Selecting Shift-JIS mode (Japanese version only) (**FS C**)
Code: **[1Ch] + [43h] + n**
        The following values of **n** are possible:
        0 or **30h** Canceling two-byte Shift-
        JIS mode. **1** or **31h** Specifying two-
        byte Shift-JIS mode.
The command selects/cancels two-byte characters mode Shift-JIS. It is supported only in Japanese
version of the printer. First byte is between 80h and 9Fh or between E0h and FFh, second byte
between 40h and FFh. If outside this range, one-byte ASCII characters are printed.
If both JIS and Shift-JIS modes are selected, the Shift-JIS mode is active.

111. Specifying character spacing for two-byte text mode (**FS S**)

Code: **[1Ch] + [53h] + n1 +n2**
The command sets the leftward and rightward space amount for two-byte character mode.
> **n1** specifies leftward space, **n2** rightward space. The space amount is set in dot unit (1/203 inch unit). The initial values are **n1**=0 and **n2**=0. When the font size is doubled the space between characters is also doubled. Possible values are from 0 to 63 dots.

112. Selecting double size characters for two-byte text mode (**FS W**)
Code: **[1Ch] + [57h] + n**
> The following values of **n** are possible:
> **0** or **30h** Canceling double size characters.
> **1** or **31h** Specifying double size characters.
> Double size characters may be selected using command FS !.

113. ESC y WAN. Format:
[1Bh] + [79h] + [4Ch] + [41h] + [4Eh] + [3Ah] + Data
Data Format: T1 + D1 + T2 + D2 + … + [00h]
Ti is one byte, which select which field will be set, and can be following values:
01h IP Address: 8 ASCII hex symbols.
02h Subnet Mask: 8 ASCII hex symbols.
03h DHCP Enable: 1 symbol 'D' (Enable) or 'F' (Disable).
04h Port: 4 ASCII hex symbols.
05h Network Mode IBSS: 1 byte '0' (BSS) or '1' (IBSS).
06h IBSS Channel: 1 ASCII hex symbol from '1' till 'B'.
07h SSID: up to 32 symbols.
08h Security Enable: 1 byte '0' (Disable) or '1' (Enable).
09h Security Mode: 1 byte:
> '0': No security
> '1': WEP 64
> '2': WEP 128
> '3': WPA PSK
> '4': WPA2 PSK
> '5': WPA Mixed Mode

0Ah Key Index: 1 byte from '1' till '4'.
0Bh Password: up to 63 symbols.
Not all fields must be setted. If any field missing, it keep its old valu