Programming Guide

HP Engage G2 Column Printer

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Product notice

This user guide describes features that are common to most models. Some features may not be available on your computer.

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Chapter 1: About this Guide

How to use this guide

This is a supplemental guide providing programming information on HP printers. This guide is written for tech-savvy users who are interested in customizing or adjusting printer functionality and is meant to be used in conjunction with the User Guide.

If you experience any difficulties during the programming process or feel unsure of adjustments you have made, contact your HP representative for further assistance.

Where to find the basics

If you are looking for information on setup or basic operation, refer to the User Guide. The programming guide assumes that you have the User Guide handy for reference or are already familiar with the printer.

Where to find advanced technical information

This guide contains the most complete information available on programming the printer. If you cannot find what you need here or would like further guidance on how to program the printer, contact a HP representative for assistance.

Support

For more advanced procedures and troubleshooting, you may need to refer to the printer's service guide or speak to a HP technical professional. Your representative is able to provide you with necessary information.

For on-line service, go to www.hp.com/support.

Chapter 2: Configuration

The printer can be configured with the following settings and functions through the configuration menu that is printed on the receipt.

Communication interfaces
Software options
Hardware options
Paper type

Indicators

The printer communicates various conditions with the status LED. The following table lists these indicators.

Indicator	Sequence	Condition
Green	ON	Device on: no error
Green Slow blink	x1	Receive data
	x2	Printhead overheated
	x3	Paper end
	x4	Voltage error
	x5	Cover open
Green Fast blink	x1	RAM error (*)
	x1	EEPROM error (*)
	x1	Auto cutter error (*)(**)
	x1	Command not recognized
	x1	Command reception time out

(*): A buzzer beep is also associated.

(**): When auto cutter error is present, before printing a recover error procedure is performed (only one time). When auto cutter error, holding the feed button a recover procedure is performed.

The printer is also able to communicate its status to the host application if the application has been programmed to receive this information.

For more information about	See this section
Error conditions and correcting them	“Troubleshooting the printer” in Appendix A, in the **User Guide**
Communication of printer status to the host application	“Command descriptions” in Chapter 4: Programming commands, Status sections.

Printer configuration

Printers are shipped with all the functions and parameters preset at the factory. Settings for various printer parameters can be changed. This menu is printed on the receipt and scrolls through instructions for selecting and changing any of the functions or parameters.

Caution: *Be extremely careful changing any of the printer settings to avoid inadvertently changing other setting that might affect the performance of the printer.*

The following functions and parameters can be changed in the scrolling configuration menu (except as noted):

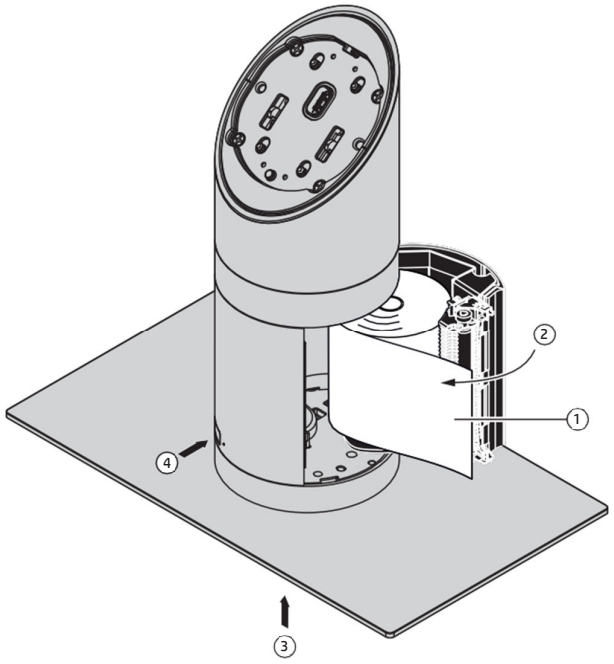
- Communication Interfaces
  - Busy Condition
  - USB control
- Emulation/Software options
  - Print mode
  - Carriage return usage
  - Default font
  - Font size
- Hardware options
  - Print width
  - Print density
  - Paper threshold

Configuring the printer by keys

The configuration menu allows you to select functions or change various settings for the printer. Instructions printed on the receipt guide you through the processes.

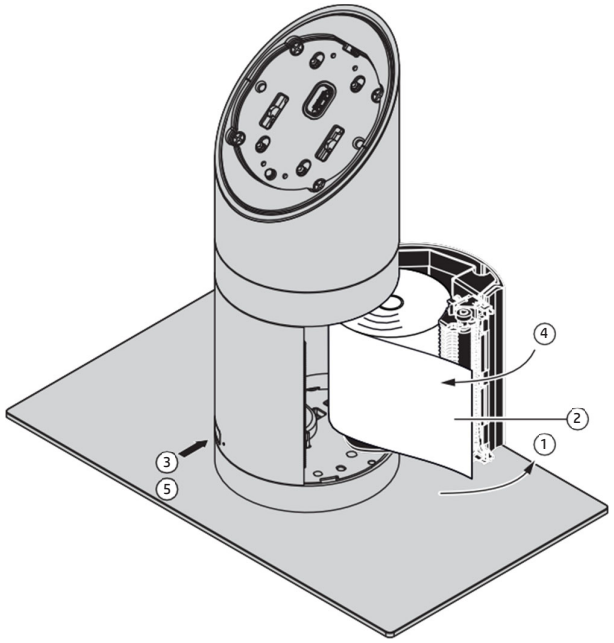
Caution: *Be extremely careful changing any of the printer settings to avoid inadvertently changing other setting that might affect the performance of the printer.*

1. Turn power off to printer.
2. Make sure receipt paper (1) is loaded in the printer before proceeding. Make sure cover is closed (2).
3. Connect the printer to power supply (3) and immediately press and hold the feed paper button (4) until the configuration printout begins.
4. To communicate with the printer, press the paper feed button. Use a short click of the feed button for modify parameters and keep hold the feed button to go to the next parameter. Follow the printed instructions to make selections.
5. Continue through your menu selections until the printer performs a total cut of the paper.



To print a setup report without turning off the printer, proceed as follows:

1. Open the cover (1).
2. Make sure receipt paper (2) is loaded in the printer before proceeding.
3. Press and hold the feed paper button (3).
4. Close the cover (4).
5. Press and hold the feed paper button (5) until the configuration printout begins.
6. To communicate with the printer, press the paper feed button. Use a short click of the feed button for modify parameters and keep hold the feed button to go to the next parameter. Follow the printed instructions to make selections.
7. Continue through your menu selections until the printer performs a total cut of the paper.



Configuring the printer by software

The setup parameters can be set by using the “Cu4HPTool” software tool.

Caution: *Be extremely careful changing any of the printer settings to avoid inadvertently changing other setting that might affect the performance of the printer.*

1. Connect the device to a PC directly without using HUB devices.
2. Start “Cu4HPTool” software tool.
3. Click on LOAD > From Device and select the device connected to the PC.
4. Click on SETUP to access the operating parameters of the device to be configured.
5. Make the desired changes to the device operating parameters.
6. Click on SAVE > To Device to make the changes made effective.

Communication interface settings

To change the communication interface settings enter the configuration menu and follow the instructions printed on the setup receipt or use the “Cu4HPTool” software tool.

Caution: *Be extremely careful changing any of the printer settings to avoid inadvertently changing other setting that might affect the performance of the printer.*

Component	Description
Busy Condition	Activation mode for the Busy signal: OffLine/ RxFull = Busy signal is activated when the device is both in OffLine status and the buffer is full RxFull [D] = Busy signal is activated when the buffer is full
USB Class	USB communication class definition. Printer [D] = setting the printer function Virtual COM = setting the USB port as a serial port
USB Address Number	Numerical address code for the univocal identification of the USB device (in case of more than a USB device connected with the same PC): 0 [D] 1 2 3 4 5 6 7 8 9

Printer settings and functions

To change the printer settings and functions enter the configuration menu and follow the instructions printed on the setup receipt or use the “Cu4HPTool” software tool.

Caution: *Be extremely careful changing any of the printer settings to avoid inadvertently changing other setting that might affect the performance of the printer.*

Component	Description
Print Mode	Printing mode: Normal [D] = enables printing in normal writing way Reverse = enables printing rotated 180 degrees
Autofeed	Setting of the Carriage Return character: CR disabled [D] = Carriage Return disabled CR enabled = Carriage Return enabled
Chars / Inch	Font selection: A = 11 cpi, B = 15 cpi A = 15 cpi, B = 20 cpi A = 20 cpi, B = 25 cpi [D]
Font Type	Setting of the font type: International [D] = enables the use of the 256 characters font tables Chinese GB18030 = enables the use of the Chinese extended font GB18030 Korean CP949 = enables the use of the Korean font CP949 Chinese BIG5 = enables the use of the Chinese BIG5 font
Code Table	Identifier number of the character code table to use. See Appendix B to learn about the character tables corresponding to the identification numbers set with this parameter.
Speed / Quality	Setting of printing speed and printing quality: High Quality Normal High Speed [D]
Paper Threshold	Threshold value (in percent) for the recognition of paper presence by the paper presence sensor: 30% 60% 90% 40% [D] 70% 50% 80%
PaperEnd Buffer Clear	Cleaning mode of data in receive buffer, if the printing is stopped due to lack of paper: Disabled [D] = Data remain in the receive buffer. When the paper runs out, the device keeps the remaining data in receive buffer and prints the remaining portion of ticket after that the new paper is loaded. Enabled = When the paper runs out, all data in the receive buffer are deleted. Enabling PaperEnd Buffer Clear also enables Paper Jam Buffer Clear.
PrintHead Test Power On	Setting of the performing of the print head test: Disabled [D] = the test is performed only during the printing of the setup report Enabled = the test is performed at each power on
Print Density	Adjusting the printing density: -25% -12% 0 [D] +12% +25% The print quality is strongly influenced by the type of chemical treatment and the type of storage to which the thermal paper has been subjected, as well as by the weight of the same. It may therefore be necessary to act on this parameter to obtain the desired print quality.

Drawer signal	Drawer signal management:	
	Normal [D] =	Drawer signal active with high signal
	Invert =	Drawer signal active with low signal
Thai Printing Mode	Thai font management:	
	1-pass [D]	
	3-pass	

Chapter 3: Programming the Printer

Overview of commands

Commands control all operations and functions of the printer. This includes selecting the size and placement of characters and graphics on the receipt to feeding and cutting the paper. The programming commands have been organized, in order of hexadecimal code within functional group. For this reason, “related” commands may not be listed adjacent to one another.

Character appearance

The appearance of text can be changed using the following print modes:

- Standard
- Double-high
- Double wide
- Upside-down
- Rotated
- Underlined
- Bold
- Reverse
- Italic
- Strike-through

Width specifications

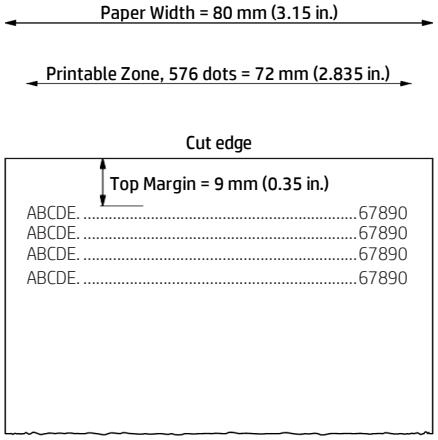
- Characters per inch: 15
- Characters per line: 44
- Cell size: 13 x 24 dots (default font)
  18 x 24 dots
  10 x 24 dots

Print zones

Print zones for 80 mm paper

Specifications of print zone for 80 mm paper:

- 576 dots (addressable) @ 8 dots/mm, centered on 80 mm
- Top margin to knife cut: 9 mm (0.35 inches)



Rotated printing commands

Two commands control the rotation of printing. The table shows the combinations of set/cancel upside down print and set/cancel rotated print (clockwise).

The samples of the print show only the normal-size characters. Double-wide and double-high characters are printed in the same orientation. They may also be mixed on the same line.

Upside down (1B 7B *n*)	Rotated CW (1B 56 *n*)	Resulting output
Canceled	Canceled	**A B C**
Canceled	Set	
Set	Canceled	
Set	Set	

Chapter 4: Programming Commands

Command listed by function

Printer actions

Code (hexadecimal)	Command	Page
1B 3D *n*	Select peripheral device	22
1B 40	Initialize device	23
1B 63 35 *n*	Enable or disable panel buttons	23
1B 69	Total cut	23
1B 6D	Partial cut	23
1B 70 *n p*1 *p*2	Generate pulse to open cash drawer	24
1D 56 *m or* 1D 56 *m n*	Select cut mode and cut paper (or code 1D 56 *m*)	24

Print and paper feed

Code (hexadecimal)	Command	Page
0A	Print and feed paper one line	25
0D	Print and carriage return	25
1B 4A *n*	Print and feed paper	25
1B 64 *n*	Print and feed *n* lines	25

Vertical and horizontal positioning

Code (hexadecimal)	Command	Page
08	Back space	26
09	Horizontal tab	26
1B 24 *n*L *n*H	Set absolute print position	26
1B 28 76 *n*L *n*H	Set relative vertical print position	27
1B 30	Set vertical line spacing to 1/8 inch	27
1B 32	Set vertical line spacing to 1/6 inch	27
1B 33 *n*	Set vertical line spacing	28
1B 44 *n1...nk* 00	Set horizontal tab positions	28
1B 5C *n1 n2*	Set relative print position	29
1B 61 *n*	Select justification	30
1D 4C *n*L *n*H	Set left margin	30
1D 50 *x y*	Set horizontal and vertical minimum motion units	31
1D 57 *n*L *n*H	Set printing area width	31

Text characteristics

Code (hexadecimal)	Command	Page
1B 20 *n*	Set right-side character spacing	33
1B 21 *n*	Select print mode	34
1B 25 *n*	Enable or disable user-defined characters	35
1B 26 *y c1 cn x1[d0...dk] ...xn[d0...dk]*	Define user-defined characters	35
1B 2D *n*	Select or cancel underline mode	36
1B 34 *n*	Select or cancel italic print	36
1B 3F *n*	Cancel user-defined characters	37
1B 45 *n*	Select or cancel emphasized mode	37
1B 47 *n*	Select or cancel double-strike	38
1B 4D *n*	Select character font	38
1B 52 *n*	Select an international character set font	39
1B 56 *n*	Select or cancel 90 degree clockwise rotated print	39
1B 74 *n*	Select character code table	40
1B 7B *n*	Select or cancel upside-down print mode	41
1B C1 *n*	Select character pitch	42
1C 25 *n*	Select the font type	42
1C 26	Enable Kanji characters	43
1C 2E	Disable Kanji characters	43
1C 74 *n*	Thai font management	43
1D 21 *n*	Select character size	44
1D 42 *n*	Select or cancel white/black reverse print mode	45

Graphics

Code (hexadecimal)	Command	Page
1B 2A *m n*L *n*H *d1...dk*	Select bit image mode	46
1C 50 41 00	Erase all logos	47
1C 50 44 *n*H *n*L *kc1 kc2 drv szHH szHL szLH szLL d[1]...d[sz]*	Load logo in .bmp format	47
1C 50 45 *n*H *n*L	Erase single logo	47
1C 50 46 *drv*	Read the memory free space	48
1C 50 47 *n*H *n*L	Read a stored logo	48
1C 50 49 *n*H *n*L	Read the information for a specific logo	49
1C 50 4C	Read the list of currently stored logos	50
1C 50 4E *n*H *n*L	Read the number of stored logos	50
1C 50 50 *n*H *n*L *m r*	Print a logo previously saved	50
1C 50 54 *drv*	Read the memory overall size	51

Status

Real time

Bar codes

1D 28 6B 03 00 51 43 n	Select dot size of the module for DataMatrix	74
1D 28 6B 03 00 51 44 n	Set size of the module for DataMatrix	75
1D 28 6B 03 00 51 50 33 d1...dk	Store symbol data for DataMatrix	75
1D 28 6B 03 00 51 51 33	Print symbol data for DataMatrix	76
1D 48 *n*	Select printing position of HRI characters	76
1D 66 *n*	Select font for HRI characters	76
1D 68 *n*	Select bar code height	77
1D 6B *m [d1...dk]* 00 or 1D 6B *m n [d1...dk]*	Print bar code	77
1D 77 *n*	Select bar code width	79

Page mode

Code (hexadecimal)	Command	Page
0C	Print and return to standard mode from page mode	80
18	Cancel print data in page mode	80
1B 0C	Print data in page mode	80
1B 4C	Select page mode	81
1B 53	Select standard mode	81
1B 54 *n*	Select print direction in page mode	82
1B 57 *n1, n2...n8*	Set print area in page mode	83
1D 24 *n*L *n*H	Set absolute vertical print position in page mode	84
1D 28 4C *p*L *p*H *30 70 30 bx by c xL xH yL yH d1...dk*	Store graphics data in the print buffer in raster format	85
1D 5C *n*L *n*H	Set relative vertical print position in page mode	86

Macros

Code (hexadecimal)	Command	Page
1D 3A	Select or cancel macro definition	87
1D 5E *r t m*	Execute macro	87

Miscellaneous configuration commands

Code (hexadecimal)	Command	Page
1C C0 18 10 14 1A or 1C C0 18 10 14 1B	Hardware reset	88
1D 7C *n*	Select printing density	88
1D E6 *n*H *n*L	Select virtual paper end limit	88
1D F0 *n*	Select print speed	88

Command conventions

The following information describes how each command is organized:

Name: Name of command.

ASCII: The ASCII control code.

Hexadecimal: The hexadecimal control code.

Decimal: The decimal control code.

Value: A description of the command operands.

Range: The upper and lower limits of the command operand.

Default: The command operand default after printer reset.

Description: Brief description and summary of the command.

Formulas: Any formulas used for this command.

Exceptions: Describes any exceptions to this command; for example, incompatible commands.

Related information: Describes related information for this command; for example, bit information.

Command descriptions

Printer actions

The printer function commands control the following basic printer functions and are described in order of their hexadecimal codes:

- Resetting the printer
- Cutting the paper
- Opening the cash drawers

Select peripheral device

ASCII ESC = *n*

Hexadecimal 1B 3D *n*

Decimal 27 61 *n*

Value of *n*: 1, 3 = Device enabled
2 = Device disabled

Default: 1 (Enabled)

Related information

When the device is disabled by this command, it ignores all transmitted data until the device is re-enabled by the same command.

Initialize device

ASCII	ESC @
Hexadecimal	1B 40
Decimal	27 64

Default:

Character pitch:	15 CPI
Column width:	44 characters
Character set:	Code Page 437
Printing position:	Column One

Clears the print line buffer and resets the device to the default settings for the start-up configuration (refer to Default settings above). Data in the receive buffer is not cleared, and printing position moves to the beginning of the line.
Single-wide, single-high, non-rotated and left-aligned characters are set, and user-defined characters or logo graphics are cleared. (Flash memory and macros are not affected.) Tabs reset to default. Barcode settings reset. Page mode settings are cleared, and printer is set to standard mode.

Enable or disable panel buttons

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

Value of *n*:
0 = Enable
1 = Disable
(When 0 and 1 are the least significant bit, LSB)

Range of *n*: 0-255

Default: 0 (Enable)

Related information

When the panel buttons is disabled, the buttons may only be used after the device has been reset.

Total cut

ASCII	ESC i
Hexadecimal	1B 69
Decimal	27 105

This command enables auto cutter operation and executes a total cut.

Related information

The device waits to complete all paper movement commands before it executes a total cut.

Partial cut

ASCII	ESC m
Hexadecimal	1B 6D
Decimal	27 109

This command enables auto cutter operation and executes a partial cut.

Related information

The device waits to complete all paper movement commands before it executes a partial cut.

Generate pulse to open cash drawer

ASCII	ESC p *n p*1 *p*2
Hexadecimal	1B 70 *n p*1 *p*2
Decimal	27 112 *n p*1 *p*2

Value of *n*: 00,48 = Cash drawer 1
01,49 = Cash drawer 2

Value of *p*1: 0-255

Value of *p*2: 0-255

Sends a pulse to open the cash drawer.

Formulas

The value for either *p*1 or *p*2 is the hexadecimal number multiplied by 2 msec to equal the total time.

- On-time = *p*1 (Hex) x 2 msec
- Off-time = *p*2 (Hex) x 2 msec

Related information

Off-time is the delay before the printer performs the next operation. Refer to cash drawer specifications for required on and off-time. If *p*2< *p*1, the off-time is equal to the on-time.

Select cut mode and cut paper

ASCII	GS V *m*	GS V *m n*
Hexadecimal	1D 56 *m*	1D 56 *m n*
Decimal	29 86 *m*	29 86 *m n*

Value of *m*: Selects the mode as shown in the table.

Value of *n*: Determines cutting position only if *m* is 65 or 66.

m	Feed and cut mode
0, 48	Total cut
1, 49	Partial cut
65	Feeds paper to cutting postion + (*n* times vertical motion unit), and cuts the paper completely
66	Feeds paper to cutting position + (*n* times vertical motion unit), and performs a partial cut

Range of *m*: 0, 48; 1, 49

Range of *n*: 0-255

Default of *m, n*: 0

Selects a mode for cutting paper and cuts the paper. There are two formats for this command, one requiring one parameter *m*, the other requiring two parameters *m* and *n*. The format is indicated by the parameter *m*.

Formulas

n times the vertical motion unit is used to determine the cutting position to which the paper is fed. Set *n* to 0 to cut below the last printed line.

Print and paper feed

The print and feed commands control printing on the receipt and paper feed by the printer.

Print and feed paper one line

ASCII	LF
Hexadecimal	0A
Decimal	10

Prints one line from the buffer and feeds paper one line.

Carriage return/line feed pair prints and feeds only one line.

Print and carriage return

ASCII	CR
Hexadecimal	0D
Decimal	13

Prints one line from the buffer and feeds paper one line. The printer can be set through the configuration menu to ignore or use this command. Some applications expect the command to be ignored while others use it as print command.

Related information

See ignoring/using the carriage return in *Diagnostics* for more information.

Carriage return/line feed pair prints and feeds only one line.

Print and feed paper

ASCII	ESC J *n*
Hexadecimal	1B 4A *n*
Decimal	27 74 *n*

Value of *n*: *n*/203 inch

Range of *n*: 0-255

Prints one line from the buffer and feeds the paper *n*/8 mm (*n*/203 inch). The line height equals the character height when n is too small.

If the set horizontal and vertical minimum motion units command (1D 50) is used to change the horizontal and vertical minimum motion units, the parameters of this command (print and feed paper) will be interpreted accordingly.

Related information

For more information, see the description of the set horizontal and vertical minimum motion units command in this document.

Print and feed *n* lines

ASCII	ESC d *n*
Hexadecimal	1B 64 *n*
Decimal	27 100 *n*

Range of *n*: 1-255 (0 is interpreted as 1)

Prints one line from the buffer and feeds paper *n* lines at the current line height.

Vertical and horizontal positioning

The horizontal positioning commands control the horizontal print positions of characters on the receipt.

The command describe operation for 80mm paper.

Back space

ASCII	BS
Hexadecimal	08
Decimal	8

Moves print position to previous character. This command can be used to put two characters at the same position.

Horizontal tab

ASCII	HT
Hexadecimal	09
Decimal	9

Moves the print position to the next tab position set by the set horizontal position (1B 44 *n*1 *n*2.... 00) command. The print position is reset to column one after each line.

Tab treats the left margin as column one, therefore changes to the left margin will move the tab positions.

When no tabs are defined to the right of the current position or if the next tab is past the right margin, line feed is executed. HT has no effect in page mode. If underline is set, tab spaces skipped by this command are not underlined.

Print initialization sets 32 tabs at column 8, 16, 24....

Set absolute print position

ASCII	ESC $ *n*L *n*H
Hexadecimal	1B 24 *n*L *n*H
Decimal	27 36 *n*L *n*H

Value of *n*: *n* = Number of dots to be moved from the beginning of the line.
*n*L = Remainder after dividing *n* by 256.
*n*H = Integer after dividing *n* by 256.

The values for *n*L and *n*H are two bytes in low byte, high byte word orientation.

Sets the print starting position to the specified number of dots (up to the right margin) from the beginning of the line. The print starting position is reset to the first column after each line.

Formulas

The example shows how to calculate 280 dots as the absolute starting position.

28 x 10 =	280 dots (beginning of column 29)
280/256 =	1, remainder of 24
*n*L = 24 *n*H =	1

Related information

If the set horizontal and vertical motion units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of the set relative print position command will be interpreted accordingly. For more information, see the description of the command set horizontal and vertical minimum motion units command (1D 50) in this document.

Set relative vertical print position

ASCII	ESC (v *n*L *n*H
Hexadecimal	1B 28 76 *n*L *n*H
Decimal	27 43 118 *n*L *n*H

Range of *nL*: 0 - 255

Range of *nH*: 0 - 255

Sets the print vertical position based on the current position by using the horizontal or vertical motion unit. This command sets the distance from the current position to [(*n*L + *n*H × 256) × horizontal or vertical motion unit].

Related information

When the starting position is specified by N motion unit to the bottom: *n*L + *n*H × 256 = N.
When the starting position is specified by N motion unit to the top (negative direction), use the complement of 65536: *n*L + *n*H × 256 = 65536 - N.
If the set horizontal and vertical motion units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of the set relative print position command will be interpreted accordingly. For more information, see the description of the command set horizontal and vertical minimum motion units command (1D 50) in this document.

Set vertical line spacing to 1/8 inch

ASCII	ESC 0
Hexadecimal	1B 30
Decimal	27 48

Default: 3.33 mm (0.13 inch)

Sets the default line spacing to 3.33 mm (1/8 of an inch).

This is set independently of the vertical motion unit (see 1D 50 x y).

Set vertical line spacing to 1/6 inch

ASCII	ESC 2
Hexadecimal	1B 32
Decimal	27 50

Default: 3.33 mm (0.13 inch)

Sets the default line spacing to 4.25 mm (1/6 of an inch).

This is set independently of the vertical motion unit (see 1D 50 x y).

Set vertical line spacing

ASCII	ESC 3 *n*
Hexadecimal	1B 33 *n*
Decimal	27 51 *n*

Range of *n*: 0-255

Default: 3.33 mm (0.13 inch)

Sets the line spacing to *n*/16 mm (*n*/406 inch). Note: sending 1B 32 will overwrite this setting.

The minimum line spacing is 8.5 lines per inch. The line spacing equals the character height when *n* is too small.

If the set horizontal and vertical minimum motion units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (set line spacing) will be interpreted accordingly.

Set horizontal tab positions

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

Value of *n*: 1 - number of columns in selected pitch

Range of *n*: 0-32 (decimal)

Default: n = 8, 16, 24, 32, ...(Every eight characters for the default font set)

Sets a horizontal tab to *n* columns from the beginning of the line, where k indicates the number of horizontal tab positions to be set.

The horizontal tab position is stored as a value of [character width x *n*], measured from the beginning of the line. The character width should be set before using this command. The setting of the horizontal tab positions will not be changed if the character width is changed after sending this command.

A maximum of 32 horizontal tab positions can be set. Data exceeding 32 horizontal tab positions are processed as normal data.

This command cancels any previous horizontal tab settings.

*n*1-*nk* should be listed in ascending order, followed by a 00. 1B 44 00 changes all horizontal tab positions back to their default positions.

Horizontal tab position settings are effective until the printer is reset, the power is turned off, or a 1B 40 command is sent.

Print position advances to the next tab position on receipt by a 09h.

The horizontal tab position is affected by changes to the left margin.

Set relative print position

ASCII	ESC \ *n1 n2*
Hexadecimal	1B 5C *n1 n2*
Decimal	27 92 *n1 n2*

Value of *n*:

To move the relative starting position right of the current position:

n = Number of dots to be moved right of the current position
n1 = Remainder after dividing *n* by 256
n2 = Integer after dividing *n* by 256

The values for *n1* and *n2* are two bytes in low byte, high byte word orientation.

To move the relative starting position left of the current position:

n = Number of dots to be moved left of the current position
n1 = Remainder after dividing (65536-*n*) by 256
n2 = Integer after dividing (65536-*n*) by 256

The values for *n1* and *n2* are two bytes in low byte, high byte word orientation.

Moves the print starting position the specified number of dots either right (up to the right margin) or left (up to the left margin) of the current position. The print starting position is reset to the first column after each line.

Related information

If the set horizontal and vertical minimum motion units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (set relative print position) will be interpreted accordingly. In page mode, upper left or lower right uses the horizontal motion unit, and upper right or lower left uses the vertical motion unit. For more information, see the description of the set horizontal and vertical minimum motion units command (1D 50) in this document.

If underline is set, spaces skipped by this command are not underlined.

Select justification

ASCII ESC a *n*
Hexadecimal 1B 61 *n*
Decimal 27 97 *n*

Value of *n*: 0,48 = Left aligned
1, 49 = Center aligned
2, 50 = Right aligned

Range of *n*: 0-2, 48-50

Default: 0 = Left aligned

Specifies the alignment of characters, graphics, logos, and bar codes on the receipt station in the print area specified by 1D 4C and 1D 57 according to the above table, until the printer is initialized, reset, or powered off. This justifies an entire line.

Set left margin

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

Range of *nL*: 0-255

Range of *nH*: 0-255

Default: 576 dots (the maximum printable area)

Formulas

Sets the left margin of the printing area until the printer is initialized, reset, or powered off. The left margin is set to ((*nH* x 256) + *nL*) times horizontal motion unit) inches. The horizontal motion units are set by the set horizontal and vertical minimum motion units command (1D 50), described in this manual. If the horizontal motion unit is changed after changing left margin, the left margin setting is not changed.

The width of the printing area is set by the set printing area width command (1D 57), which follows this command. See the set printing area width command in this document for a description of that command.

If the setting exceeds the printable area, the maximum value of the printable area is used. The maximum printable area is 576 dots. See the illustration.

To set the left margin to one inch at the default horizontal motion unit of 1/203 inches, send the four-byte string:

GS L 203 0

Or, to set the left margin to two inches at the default horizontal motion unit of 1/203 units per inch, send the four-byte string:

GS L 150 1

Where 2 inches = 406/203, and 406 = (1 x 256) + 150.

Exceptions

The command is effective only at the beginning of a line. This command is ignored if the line buffer is not empty.

If this command is processed in page mode, left margin is not changed until the printer is returned to standard mode.

Set horizontal and vertical minimum motion units

ASCII GS P *x y*
Hexadecimal 1D 50 *x y*
Decimal 29 80 *x y*

Value of *x*: Horizontal **Range of *x*:** 0-255 **Default of *x*:** 203
Value of *y*: Vertical **Range of *y*:** 0-255 **Default of *x*:** 203

Sets the horizontal and vertical motion units to 1/*x* inch and 1/*y* inch respectively, until the printer is initialized, reset, or powered off.

When *x* or *y* is set to 0, the default setting for that motion unit is used. When combined with other commands, the calculated result is truncated to the minimum value of the mechanical pitch.

Mode	Command using x	Command using Y
Standard	1B 20, 1B 24, 1B 5C, 1D 4C, 1D 57	1B 33, 1B 4A, 1D 56
Page (upper left or lower right)	1B 20, 1B 24, 1B 57, 1B 5C	1B 33, 1B 4A, 1D 24, 1D 56, 1D 5C
Page (upper right or lower left)	1B 33, 1B 4A, 1B 57, 1D 24, 1D 5C	1B 20, 1B 24, 1B 57, 1B 5C, 1D 56

Set printing area width

ASCII GS W *nL nH*
Hexadecimal 1D 57 *nL nH*
Decimal 29 87 *nL nH*

Range of *nL*: 0-255

Range of *nH*: 0-255

Default: 576 dots (the maximum printable area)

Sets the width of the printing area until the printer is initialized, reset, or powered off. If the setting exceeds the printable area, the maximum value of the printable area is used. If the left margin and printing area set the width to less than the width of a single character, the width is extended to accommodate the character for the line. The width of the printing area is set to ((*nH* X 256) + *nL*) times horizontal motion unit) inches. The horizontal motion units are set by the set horizontal and vertical minimum motion units command (1D 50). If the horizontal motion unit is changed after changing printing area width, the printing area width setting is not changed.

The width of the printing area follows the set left margin command (1D 4C). See the set left margin command (1D 4C ...) earlier in this document for a description.

Formulas

To set the width of the printing area to one inch at the default horizontal motion unit of 1/203 inches, send the four-byte string:

GS W 203 0

Or, to set the width of the printing area to two inches at the default horizontal motion unit of 1/203 units per inch, send the four-byte string:

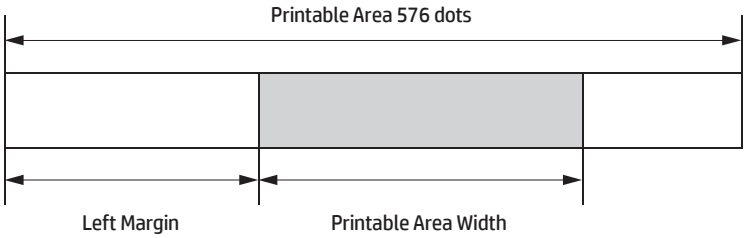
GS W 150 1

Where 2 inches = 406/203, and 406 = (1 x 256) + 150.

Exceptions

The command is effective only at the beginning of a line.

If the setting exceeds the printable area, the maximum value of the printable area is used. The maximum printable area is 576 dots. See the illustration.



If this command is processed in page mode, left margin is not changed until the printer is returned to standard mode.

Text characteristics

These commands control what the printed information looks like, selection of character sets, definition of custom-defined characters and settings of margins. The commands are described in order of their hexadecimal codes. The commands describe operation for 80 mm paper.

Set right-side character spacing

ASCII ESC SP *n*
Hexadecimal 1B 20 *n*
Decimal 27 32 *n*

Range of *n*: 0-32 (decimal)

Default: 0

The units of horizontal and vertical motion are specified by the set horizontal and vertical minimum motion units (1D 50 ...) command. Changes in the horizontal or vertical units do not affect the current right side character spacing. When the horizontal or vertical motion unit is changed by the set horizontal and vertical minimum motion units (1D 50 ...) command the value must be in even units and not less than the minimum amount of horizontal movement.

In standard mode the horizontal motion unit is used.

In page mode the horizontal or vertical motion unit differs and depends on the starting position of the printable area. When the starting printing position is the upper left or lower right of the printable area (set by select print direction in page mode, 1B 54 *n*) the horizontal motion unit (*x*) is used. When the starting printing position is the upper right or lower left of the printable area (set by select print direction in page mode, 1B 54 *n*) the vertical motion unit (*y*) is used.

This command can be set independently in standard mode and in page mode.

When characters are enlarged, the right-side character spacing is a multiple of its normal value (ex. spacing for double-width mode is twice the normal value).

Related information

This command does not affect HRI characters.

Select print mode

ASCII	ESC ! *n*
Hexadecimal	1B 21 *n*
Decimal	27 33 *n*

Value of *n*: Pitch selection (standard, double high or double wide)

Value of *n*:

Bit[1]	Function
Bit 0	Font selection
Bit 1	Strike-through mode
Bit 3	Emphasized mode
Bit 4	Double high
Bit 5	Double wide
Bit 6	Italic mode
Bit 7	Underlined mode

[1] Bits 1, 2 are not used

Default: 0 (for bits 0, 3, 4, 5, 6, 7)

Bit 0	Font selection	11/15 cpi	15/20 cpi	20/25 cpi
Off	Font A selected	18x24	13x24	10x24
On	Font B selected	14x24	10x24	8x24

Selects the print mode: standard, emphasized, underlined, italic, double-high, or double-wide until the printer is initialized, reset, or powered off.
When double-height mode is enabled for some characters on a line, all characters are aligned on the baseline. When double-width mode is enabled, characters are enlarged to the right, starting from the left side of the character.

Exceptions

This command does not affect HRI characters.

Related information

In standard mode, when double-height mode is selected, the character is enlarged in the paper feed direction, and when double-width mode is selected it is enlarged perpendicular to the paper feed direction. In 90° clockwise-rotated mode, the relationship between double-height and double-width is reversed. In page mode, double-height and double-width are on the character orientation.

The bits in this command perform the same function as the stand-alone functions:

1B C1 n	Select pitch
1B 45 n	Emphasized
1B 47 n	Double-strike
1B 2D n	Underline
1D 21 n	Double high/Double wide

Enable or disable user-defined characters

ASCII	ESC % *n*
Hexadecimal	1B 25 *n*
Decimal	27 37 *n*

Value of *n*: 0 (bit 0) not selected
1 (bit 1) selected
(When 0 and 1 are the least significant bit, LSB)

Range of *n*: 0-255

Default: 0 (Off)

Enables or disables the user-defined character set.

Related information

Only the Least Significant Bit (LSB) of n is applicable.
When the user-defined character set is disabled, the internal character set is automatically selected.

Define user-defined characters

ASCII	ESC & *y c1 cn x1[d0...dk] ... xn[d0. dk]*
Hexadecimal	1B 26 *y c1 cn x1[d0...dk] ... xn[d0. dk]*
Decimal	27 38 *y c1 cn x1[d0...dk] ... xn[d0. dk]*

Values and range:

y = 3, the number of bytes (vertically) in the character cell

c = c1 specifies the start character code and cn specifies the final character code of the characters map area

c1 = Hex 20 - 7E
cn = Hex 20 - 7E

To define only one character, use the same code for both *c1* and *cn.*

k = cn – c1 + 1 = the number of characters to be defined in this command string

x = the width of the character to be replaced
x = Hex 0 - 12 (font 18x24)
x = Hex 0 - 0E (font 14x24)
x = Hex 0 - 0A (font 10x24)
x = Hex 0 - 8 (font 8x24)

d0. dk = 0 - 255 = the dot data for the characters.
The dot pattern is in the horizontal direction starting from the left. Any remaining dots on the right remain blank.

Related information

It is possible to define multiple characters for consecutive character codes
if cn < c1, the command is not executed.
The data to define a user-defined character is (x × y) bytes.
To print a dot, set the corresponding bit to 1; to not have it print, set to 0.
This command can define different user-defined character patterns for each font.

Formulas

To replace only the “A” character of the 11 cpi font table (font 18x24), the command sequence is:

0x1B 0x26 0x03 0x41 0x41 0x10 [48 bytes of the new character definition].

To replace “A” and “B” characters of the 11 cpi font table (font 18x24), the command sequence is:

0x1B 0x26 0x03 0x41 0x42 0x10 [48 bytes of the new character definition] 0x10 [48 bytes of the new character definition].

Select or cancel underline mode

ASCII	ESC - *n*
Hexadecimal	1B 2D *n*
Decimal	27 45 *n*

Value of *n*:	0,48 = Cancel underline mode 1, 49 = Select underline mode 2, 50 = Select double thickness underline mode
Default:	0 = Cancel underline mode

Turns underline mode on or off until the printer is initialized, reset, or powered off. Underlines cannot be printed for spaces set by the horizontal tab, set absolute start position, or set relative print position commands. Underline thickness grows as the vertical size of the character grows.

This command and the Select Print Mode(s) command (1B 21) turn underline on and off in the same way.

Exceptions

This command is ignored if *n* is out of the specified range.

This command does not affect HRI characters.

The device cannot underline 90°/270° rotated characters and white/black inverted characters.

Select or cancel italic print

ASCII	ESC 4 *n*
Hexadecimal	1B 34 *n*
Decimal	27 52 *n*

Value of *n*:	0,48 = Cancel italic print 1, 49 = Select italic print
Default:	0 = Cancel italic mode

Turns italic print on or off until the printer is initialized, reset, or powered off. Italics cannot be printed for spaces set by the horizontal tab, set absolute start position, or set relative print position commands.

This command and the Select Print Mode(s) command (1B 21) turn italic on and off in the same way.

Exceptions

This command is ignored if *n* is out of the specified range.

Cancel user-defined character

ASCII	ESC ? *n*
Hexadecimal	1B 3F *n*
Decimal	27 63 *n*

Value of *n*: Specified character code

Range of *n*: 32 - 126

Cancels the pattern defined for the character code specified by n. After the user-defined character is canceled, the corresponding pattern from current active ROM code page is printed.

User-defined characters can be cancelled for each pitch independently by selecting the pitch using the 1B 21 command.

Exceptions

This command is ignored if *n* is out of the specified range.

Select or cancel emphasized mode

ASCII	ESC E *n*
Hexadecimal	1B 45 *n*
Decimal	27 69 *n*

Value of *n*: 0 (bit 0) not selected
1 (bit 1) selected
(When 0 and 1 are the least significant bit, LSB)

Range of *n*: 0-255

Default: 0 (Off)

Starts or stops emphasized printing until the printer is initialized, reset, or powered off.

Exceptions

Only the lowest bit of *n* is effective. Emphasized printing cannot be used with bit-images or downloaded bit-images.

This command does not affect HRI characters.

Related information

This command and the select print mode(s) command (1B 21) function identically. They should have the same setting when used together.

Select or cancel double-strike

ASCII ESC G *n*
Hexadecimal 1B 47 *n*
Decimal 27 71 *n*

Value of *n*: 0 (bit 0) not selected
1 (bit 1) selected
(When 0 and 1 are the least significant bit, LSB)

Range of *n*: 0-255

Default: 0 (Off)

Turns double-strike mode on or off until the printer is initialized, reset, or powered off. Identical to emphasized mode.

Exceptions

Only the lowest bit of n is effective. The settings do not apply in page mode. However they can be set or cleared in page mode.

Double-strike printing cannot be used with bit-images or downloaded bit-images.

This command does not affect HRI characters.

Related information

This command and the select print mode(s) command (1B 21) function identically. They should have the same setting when used together.

Select character font

ASCII ESC M *n*
Hexadecimal 1B 4D *n*
Decimal 27 77 *n*

Value of *n*: 0, 1, 48, 49

Selects characters font depending on cpi value set (Char/Inch) as follows:

Char/Inch	n	Function
A = 11 cpi	0, 48	Font 11 cpi (18x24)
B = 15 cpi	1, 49	Font 15 cpi (14x24)
A = 15 cpi	0, 48	Font 15 cpi (14x24)
B = 20 cpi	1, 49	Font 20 cpi (10x24)
A = 20 cpi	0, 48	Font 20 cpi (10x24)
B = 25 cpi	1, 49	Font 25 cpi (8x24)

Select an international character set font

ASCII ESC R *n*
Hexadecimal 1B 52 *n*
Decimal 27 82 *n*

Range of *n*: 0 - 255

Default: 0

Selects the international character set n according to the table below:

	HEX	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
n (Hex)	**Character Set**												
0	U.S.A.	#	$	@	[	\	]	^	`	{	|	}	~
1	France	#	$	à	°	ç	§	^	`	é	ù	è	“
2	Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3	United Kingdom	£	$	@	[	\	]	^	`	{	|	}	~
4	Denmark I	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain I	Pt	$	@	i	Ñ	¿	^	`	“	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	`	{	|	}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
0A	Denmark II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü

Select or cancel 90 degree clockwise rotated print

ASCII ESC V *n*
Hexadecimal 1B 56 *n*
Decimal 27 86 *n*

Value of *n*: 0,48 = Cancel
1, 49 = Set

Default: 0 = Cancel

Rotates characters 90 degrees clockwise. The command remains in effect until the printer is initialized, reset, powered off.

This command does not affect HRI characters.

Select character code table

ASCII	ESC t *n*
Hexadecimal	1B 74 *n*
Decimal	27 116 *n*

Value of *n*:

n (Hex)	Page
0	PC437 - U.S.A., Standard Europe
1	Katakana
2	PC850 - Multilingual
3	PC860 - Portuguese
4	PC863 - Canadian/French
5	PC865 - Nordic
6	VISCII - Vietnamese Standard Code
0D	PC857 - Turkish
0E	PC737 - Greek
10	WPC1252 - Latin I
11	PC866 - Russian
12	PC852 - Latin II
13	PC858 for € symbol in position 0xD5
14	KU42 - Thai
20	PC720 - Arabic
22	PC855 - Cyrillic
24	PC862 - Hebrew
25	PC864 - Arabic
27	ISO8859-2 - Latin 2
2C	PC1125 - Ukrainian
2D	WPC1250 - Central Europe
2E	WPC1251 - Cyrillic
2F	WPC1253 - Greek
30	WPC1254 - Turkish
31	WPC1255 - Hebrew
32	WPC1256 - Arabic
33	WPC1257 - Baltic Rim
34	WPC1258 - Vietnamese
FF	Space page

Default: 0

Selects the character set to be used until the printer is initialized, reset, or powered off.

The tables are selectable only if the code pages are present on the machine. By selecting a code page not present on the machine, the code page remains the one currently in use.

Make sure to select the font type “International” with the command (1C 25) or with the “Font type” parameter during the setup procedure (see the **User Guide**).

Select or cancel upside-down print mode

ASCII	ESC { *n*
Hexadecimal	1B 7B *n*
Decimal	27 123 *n*
Value of *n*:	0 (bit 0) not selected 1 (bit 1) selected (When 0 and 1 are the least significant bit, LSB)
Range of *n*:	0-255
Default:	0 (Off)

Prints upside-down characters until the printer is initialized, reset, or powered off.
The command may be combined with clockwise rotated print (1B 56).

Exceptions

The command is valid only at the beginning of a line. It cannot be used with right side up characters on the same line.

Select character pitch

ASCII	ESC 0xC1 *n*
Hexadecimal	1B C1 *n*
Decimal	27 192 *n*

Value of *n*:

0, 48 = Font A = 11 cpi, Font B = 15 cpi
1, 49 = Font A = 15 cpi, Font B = 20 cpi
2, 50 = Font A = 20 cpi, Font B = 25 cpi

Default: 0

Select the font type

ASCII	FS % *n*
Hexadecimal	1C 25 *n*
Decimal	28 37 *n*

Value of *n*:

0 = International
1 = Chinese GB18030
2 = Korean PC949
3 = Chinese BIG5

Default: 0

Related information

The selection made by this command is stored in the RAM memory. Turning off the device reverts to the default value, which can be set with the “Font type” parameter during the setup procedure (see **User Guide**).

After selecting the font type “International” it must be selected the desired character code table using the command 1B 74.

Enable Kanji characters

ASCII FS &
Hexadecimal 1C 26
Decimal 28 38

Related information

This command can be used only for the Simplified Chinese (GB2312), Traditional Chinese (BIG5) or Extended Chinese (GB18030-2000).
This command enables Kanji fonts in RAM. Does not intervene on the parameter set-up.

Disable Kanji characters

ASCII FS .
Hexadecimal 1C 2E
Decimal 28 46

Related information

This command can be used only for the Simplified Chinese (GB2312), Traditional Chinese (BIG5) or Extended Chinese (GB18030-2000).
This command enables Kanji fonts in RAM. Does not intervene on the parameter set-up.
Disabling the use of Kanji fonts will restore the codepage previously used.

Thai font management

ASCII FS t *n*
Hexadecimal 1C 74 *n*
Decimal 28 116 *n*

Value of *n*:

0 = 1-pass
1 = 3-pass

Default: 0

Related information

This command allows the management of the KU42 single line.

Select character size

ASCII GS ! *n*
Hexadecimal 1D 21 *n*
Decimal 29 33 *n*

Value of *n*: 1 - 8 = vertical number of times active font
1 - 8 = horizontal number of times active font

Range of *n*: 00-07, 10-77, ..., 70-77

Bits 0 to 3: to select character height.
Bits 4 to 7: to select character width.

Hex	Width
00	1 (normal)
10	2 (width = 2x)
20	3 (width = 3x)
30	4 (width = 4x)
40	5 (width = 5x)
50	6 (width = 6x)
60	7 (width = 7x)
70	8 (width = 8x)

Hex	Height
00	1 (normal)
01	2 (height = 2x)
02	3 (height = 3x)
03	4 (height = 4x)
04	5 (height = 5x)
05	6 (height = 6x)
06	7 (height = 7x)
07	8 (height = 8x)

This command is effective for all characters (except for HRI characters) and is effecitve until the printer is initialized, reset, or powered off.

In standard mode, the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction. However, when character orientation changes in 90 degree clockwise-rotation mode, the relationship between vertical and horizontal directions is reversed.

In page mode, vertical and horizontal directions are based on the character orientation. When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline. When characters are enlarged width-wise, the characters are enlarged to the right, starting from the left side of the character.

The select print mode (1B 21 *n*) command can also select or cancel double-width and double-height modes. However, the setting of the last received command is effective.

Exceptions

If *n* is out of the defined range, this command is ignored.

Select or cancel white/black reverse print mode

ASCII	GS B *n*
Hexadecimal	1D 42 *n*
Decimal	29 66 *n*

Value of *n*: 0 (bit 0) not selected
1 (bit 1) selected
(When 0 and 1 are the least significant bit, LSB)

Range of *n*: 0-255

Default: 0 (Off)

Turns on white/black reverse print mode. In white/black reverse print mode, print dots and non-print dots are reversed, which means that white characters are printed on a black background. When the white/black reverse print mode is selected it is also applied to character spacing which is set by right-side character spacing (1B 20).

This command can be used with built-in characters and user-defined characters, but does not affect the space between lines.

White/black reverse print mode does not affect bit image, downloaded bit image, bar code, HRI characters, and spacing skipped by horizontal tab (09), set absolute starting position (1B 24 ...), and set relative print position (1B 5C).

White/black reverse print mode has a higher priority than underline mode. When underline mode is on and white/black reverse print mode is selected, underline mode is disabled, but not canceled.

Bar codes, logos, and bit images are not affected by this command.

Exceptions

Only the lowest bit of *n* is valid.

Graphics

These commands are used to enter and print graphics data and are described in order of their hexadecimal codes, unless otherwise noted.

These commands describe operation for 80mm paper.

Select bit image mode

ASCII	ESC * *m* *n*L *n*H *d1...dk*
Hexadecimal	1B 2A *m* *n*L *n*H *d1...dk*
Decimal	27 42 *m* *n*L *n*H *d1...dk*

Value of *m*:

m	Mode	Vertical direction		Horizontal direction	
		N. Dots	Dpi	Dpi	N. Data (K)
0	8 dots single density	8	67	100	nL + nH × 256
1	8 dots double density	8	67	200	nL + nH × 256
32	24 dots single density	24	200	100	(nL + nH × 256) × 3
33	24 dots double density	24	200	200	(nL + nH × 256) × 3

Value of *n*:

Value of n (8-dot single)	Value of n (24-dot single)	Value of d
*n*L + (256 x *n*H)	3 x [*n*L + (256 x *n*H)]	Number of bytes of data*

* Printed left to right (8-dot mode); printed down then across (24-dot mode), bit gets printed to 1 and not printed to 0

Formulas

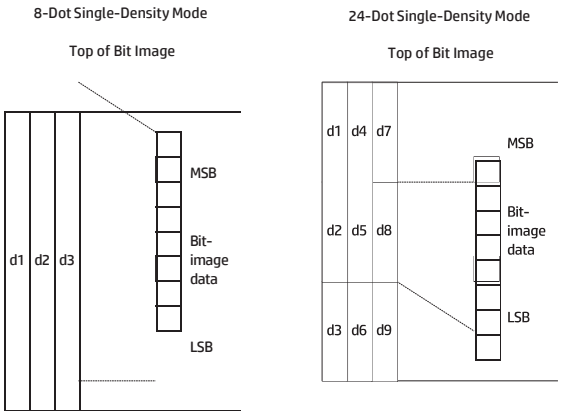
8-dot single-density = *n*L + (256 x *n*H)

24-dot single-density = 3 x [*n*L + (256 x *n*H)]

Sets the print resolution and enters one line of graphics data into the print buffer. Excess data is accepted but ignored. Any print command is required to print the data, after which the printer returns to normal processing mode. The bit image is not affected by emphasize, double-strike, underline, character size, reverse printing, or 90 rotation, but is affected by upside-down printing mode.

In page mode, a starting position of upper right or lower left results in rotated bit-image data printing.

See the illustration for graphic representations of the bit image below.



Erase all logos

ASCII	FS P A NUL
Hexadecimal	1C 50 41 00
Decimal	28 80 65 0

Erases all logos from the storage drive.

Related information

If command is successful the device transmits the ACK (0x06), otherwise returns NACK.

Load logo in .bmp format

ASCII	FS P D *n*H *n*L nL Kc1 Kc2 drv szHH szHL szLH szLL d[1]...d[sz]
Hexadecimal	1C 50 44 *n*H *n*L Kc1 Kc2 drv szHH szHL szLH szLL d[1]...d[sz]
Decimal	28 80 68 *n*H *n*L Kc1 Kc2 drv szHH szHL szLH szLL d[1]...d[sz]

Value of n*H*, n*L*: Identifies the 16-bit index of the logo.

Value of drv: Storage drive

Value of Kc1 Kc2: Kc1 and Kc2 2 bytes that indicate the Keycode.

Value of d[1] ...d[sz]: .bmp image data.

Default: drv = 0

Related information

Keycode is 2 byte optional data to identify loaded image; its content is free for the user to select as a progressive number, file CRC or else.

szHH, szHL, szLH and szLL 4 bytes that indicate the bmp dimension in bytes.
sz = (szHH × 16777216) + (szHL × 65536) + (szLH × 256) + szLL indicates the number of bytes in the logo (4 bytes expressed in hexadecimal notation).

The image size depends on the amount of available memory on the device that you get by using 1C 50 46 command.

If command is not successful the device transmits the NACK (0x15), otherwise returns ACK (0x06) followed by 13 bytes as shown in the command 1C 50 49.

Device does not perform any check on Keycode since it is just an identification number.

Erase single logo

ASCII	FS P E *n*H *n*L
Hexadecimal	1C 50 45 *n*H *n*L
Decimal	28 80 69 *n*H *n*L

Value of n*H*, n*L*: Identifies the 16-bit index of the logo.

Related information

If command is successful the device transmits the ACK (0x06), otherwise returns NACK.

Read the memory free space

ASCII FS P F *drv*
Hexadecimal 1C 50 46 *drv*
Decimal 28 80 70 *drv*

Value of *drv*: The storage drive. Its value must be 0x00.

Reads the free space size (amount of free memory of the storage drive).

Related information

If command is not successful the device transmits the NACK (0x15), otherwise returns ACK (0x06) followed by 4 bytes that indicate the amount of free memory in bytes as follows:

Byte	Function
1st	freeHH
2nd	freeHL
3rd	freeLH
4th	freeLL

Formulas

To calculate the free memory size in bytes (4 bytes expressed in hexadecimal notation) using this formula:
free size = (freeHH × 16777216) + (freeHL × 65536) + (freeLH × 256) + freeLL

Read a stored logo

ASCII FS P G *n*H *n*L
Hexadecimal 1C 50 47 *n*H *n*L
Decimal 28 80 71 *n*H *n*L

Reads a logo specified by (*n*H x 256) + *n*L number.

Related information

If the transmission has been received correctly and the command is valid, the device returns ACK (0x06) character, followed by image data, otherwise returns NACK (0x15) character if the logo is not present.

Read the information for a specific logo

ASCII	FS P I *n*H *n*L
Hexadecimal	1C 50 49 *n*H *n*L
Decimal	28 80 73 *n*H *n*L

Value of n: 16 bit index of the logo

Reads the information for a specific logo.

Related information

If command is not successful the device transmits the NACK (0x15), otherwise returns ACK (0x06) followed by the following bytes:

Byte	Function	Description
1st	ACK	
2nd	drv	
3rd	xDimH	Logo Horizontal dimension
4th	xDimL	
5th	yDimH	Logo Vertical dimension
6th	yDimL	
7th	sizeHH	RAW Bitmap dimension
8th	sizeHL	
9th	size LH	
10th	size LL	
11th	crcH	Cyclic Redundancy Check of Bitmap data
12th	crcL	
13th	Kc1	Keycode stored by command 1C 50
14th	Kc2	

where:

- drv is the storage drive. Its value must be 0x00
- xDimH and xDimL specifies the dimension X of logo = (xDimH × 256) + xDimL
- yDimH and yDimL specifies the dimension Y of logo = (yDimH × 256) + yDimL
- sizeHH, sizeHL, sizeLH and sizeLL specifies the 32 flag bit for RAW bitmap dimension
- crcH and crcL identifies the Cyclic Redundancy Check of bitmap data
- Kc1, Kc2 is the keycode

Read the list of currently stored logos

ASCII	FS P L
Hexadecimal	1C 50 4C
Decimal	28 80 76

Returns the indexes list of the stored logos.

Formulas

If command is not successful the device transmits the NACK (0x15), otherwise returns ACK (0x06) followed by 2 bytes nH and nL that indicates the number of stored logos (2 bytes expressed in hexadecimal notation) and a list of indexes structured as follows:

Index 1		...	Index n	
Index H[1]	Index L[1]		Index H[n]	Index L[n]

Read the number of stored logos

ASCII	FS P N *n*H *n*L
Hexadecimal	1C 50 4E *n*H *n*L
Decimal	28 80 78 *n*H *n*L

Reads how many logos are loaded.

Related information

It returns ACK (0x06) character, followed by a 2 bytes nH and nL that indicate the number of stored logos. This value is expressed as [(*n*H x 256) + *n*L].

Print a logo previously saved

ASCII	FS P P *n*H *n*L *m r*
Hexadecimal	1C 50 50 *n*H *n*L *m r*
Decimal	28 80 80 *n*H *n*L *m r*

Value of n*H*, n*L*: Identifies the 16-bit index of the logo.

Value of *m*: The value of m selects the mode as follows:
0, 48 = Normal
1, 49 = Double width
2, 50 = Double height
3, 51 = Quadruple

Value of *r*: Specifies the rotation as follows:
0 = 0°
1 = 90°
2 = 180°
3 = 270°

Read the memory overall size

ASCII FS P T *drv*
Hexadecimal 1C 50 54 *drv*
Decimal 28 80 84 *drv*

Value of *drv*: The storage drive. Its value must be 0x00.

Reads the total size of memory of the storage drive (area where it is possible store logos).

Default: Total memory 3 MB

Related information

If command is not successful the device transmits the NACK (0x15), otherwise returns ACK (0x06) followed by 4 bytes that indicate the amount of free memory in bytes as follows:

Byte	Function
1st	freeHH
2nd	freeHL
3rd	freeLH
4th	freeLL

Formulas

To calculate the total memory size in bytes (4 bytes expressed in hexadecimal notation) using this formula:
total size = (totHH × 16777216) + (totHL × 65536) + (totLH × 256) + totLL

Print NV bit image

ASCII FS p *n m*
Hexadecimal 1C 70 *n m*
Decimal 28 112 *n m*

Value of *n*: Number of the NV bit image

Value and range of *m*:

Prints a NV bit image *n* using the mode specified by *m*. NV bit image means a bit image which is defined in a non-volatile memory by 1C 71 and printed by 1C 70.

m	Print mode
0, 48	Normal
1, 49	Double width
2, 50	Double height
3, 51	Quadruple

Related information

This command is not effective when the specified NV bit image has not been defined.

In standard mode, this command is effective only when there is no data in the print buffer.

This command is not affected by print modes (bold, underline, character size, white/black reverse printing, etc.), except upside-down printing mode.

If the printing area width set by 1D 4C and 1D 57 for the NV bit image is less than one vertical line, the following processing is executed only on the line in question. However, in NV bit image mode, one vertical line means 1 dot (one half dot for slip paper) in normal mode (m = 0x00, 0x30) and in double-height mode (m = 0x02, 0x32), and it means 2 dots (two half dots for slip paper) in double-width mode (m = 0x01, 0x31) and in quadruple mode (m = 0x03, 0x33).

The printing area width is extended to the right in NV bit image mode up to one line vertically. In this case, printing does not exceed the printable area.

If the printing area width cannot be extended by one line vertically, the left margin is reduced to accommodate one line vertically.

If the downloaded bit image to be printed exceeds one line, the excess data is not printed.

This command feeds dots (for the height n of the NV bit image) in normal and double-width modes, and (for the height n x 2 of the VN bit image) in double-height and quadruple modes, regardless of the line spacing specified by 1B 32 or 1B 33.

After printing the bit image, this command sets the print position to the beginning of the line and processes the data that follows as normal data.

In page mode, this command is effective only if m = 0x00 or 0x30.

Define NV bit image

ASCII	FS q *n (x*L *x*H *y*L *y*H *d1...dk) 1...(x*L *x*H *y*L *y*H *d1...dk)*
Hexadecimal	1C 71 *n (x*L *x*H *y*L *y*H *d1...dk) 1...(x*L *x*H *y*L *y*H *d1...dk)*
Decimal	28 113 *n (x*L *x*H *y*L *y*H *d1...dk) 1...(x*L *x*H *y*L *y*H *d1...dk)*

Value of *n*: Number of the NV bit image

Value and range of *x*: Hex 0 - FF = (*x*L + *x*H × 256) × 8 dots in the horizontal direction
Hex 0 - 3 (when 1 ≤ (*x*L + *x*H × 256) ≤ 1023

Value and range of *y*: Hex 0 - 1 (when 1 ≤ (*y*L + *y*H × 256) ≤ 288 = (*y*L + *y*H × 256) × 8 dots in the vertical direction

Value of *d*: Bytes of data. Bit gets printed to 1 and not printed to 0

Value of *k*: *k* = (*x*L + *x*H × 256) × (*y*L + *y*H × 256) × 8

Define the NV bit image specified by *n*. NV bit image means a bit image which is defined in a non-volatile memory by 1C 71 and printed by 1C 70.

Related information

Frequent write command execution may cause damage the NV memory. Therefore, it is recommended to write the least possible in the memory and no more than 10 times per day.

This command cancels all NV bit images that have already been defined by this command. The device cannot redefine only one of several data definitions previously defined. In this case, all data needs to be sent again.

In page mode, this command is not effective.

When the amount of data exceeds the capacity left in the range defined by *x*L, *x*H, *y*L, *y*H, the device processes *x*L, *x*H, *y*L, *y*H out of the defined range.

In the first group of NV bit images, when any of the parameter's *x*L, *x*H, *y*L, *y*H is out of the definition range, this command is disabled.

In groups of NV bit images other than the first one, when the device processes *x*L, *x*H, *y*L, *y*H out of the defined range, it stops processing this command and starts writing into the non-volatile images. At this time, NV bit images that have not been defined are disabled (undefined), but any NV bit images before that are enabled.

This command defines n as the number of a NV bit image. Numbers rise in order from NV bit image 01H. Therefore, the first data group [*x*L *x*H *y*L *y*H *d1...dk*] is NV bit image 01H, and the last data group [*x*L *x*H *y*L *y*H *d1...dk*] is NV bit image n. The total agrees with the number of NV bit images specified by command 1C 70.

A definition data of a NV bit image consists of [*x*L *x*H *y*L *y*H *d1...dk*]. Thefore, when only one NV bit image is defined, n = 0x01.

The device processes a data group [*x*L *x*H *y*L *y*H *d1...dk*] once.

The device uses ([data: (*x*L + *x*H × 256) × (*y*L + *y*H × 256) × 8] + [header :4]) bytes of non-volatile memory.

The definition area in this device is a maximum of 3 MB. This command can define several NV bit images but cannot define a bit image data whose total capacity [bit image data + header] exceeds 3 MB.

When this command is received during macro definition, the device ends macro definition, and begins executing this command.

Once a NV bit image is defined, it is not erased by executing 1B 40, reset, and power off.

Define downloaded bit image

ASCII GS * *x y d1...d(x × y × 8)*
Hexadecimal 1D 2A *x y d1...d(x × y × 8)*
Decimal 29 42 *x y d1...d(x × y × 8)*

Value and range of *x*: Hex 1 - FF = Number of bytes in the horizontal direction

Value and range of *y*: Hex 1 - 30 = Number of bytes in the vertical direction

Value of *d*: Bytes of data. Bit gets printed to 1 and not printed to 0

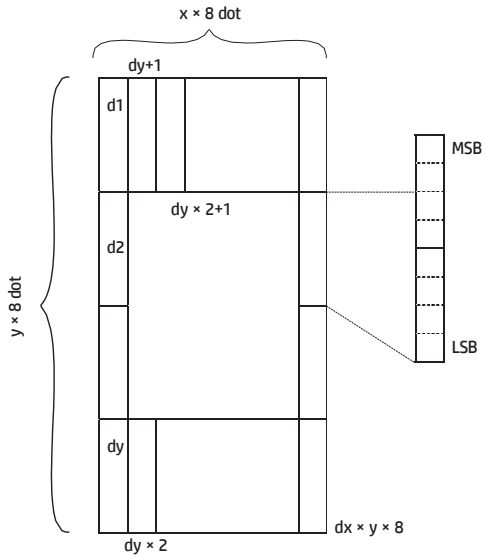
x × y ≤ 1536

Enters a downloaded bit image into graphic memory of the device with the number of dots specified by *x* and *y*.

The number of bytes in horizontal and vertical directions (*x* and *y*) are the horizontal and vertical size of the starting image divided by 8.

The downloaded bit image is available until power is turned off or reset, another bit image is defined, or initialize printer (1B 40) command is received.

See the illustration below for a graphic representation of the downloaded bit image.



Print downloaded bit image

ASCII	GS / *m*
Hexadecimal	1D 2F *m*
Decimal	29 47 *m*

Value and range of *m*:

This command is used to print a previously stored monochrome logo (defined by 1D 2A) from printer memory on the receipt station. The logo is identified as the one indicated by the most recent select current logo command or 0 if a select current logo command has not yet been given. Parameter m is interpreted as follows:

m	Print mode
0	Normal
1	Double width
2	Double height
3	Quadruple

Related information

The indexed downloaded bit image from RAM or flash will be printed on the receipt station at a size specified by m.

If doubling or quadrupling exceeds the print paper width maximums (576) the left side of the image is printed and the bits to the right of the maximum column are discarded.

If the available width is greater than the bit image, its printing will adhere to any currently set right, left, or center justification.

This command is ignored if the index refers to an undefined logo/ bit image.

In standard mode, this command is effective only when there is no data in the print buffer.

This command has no effect in the print modes bold, underline, character size, or white/black reverse printing), except for upside-down printing mode (180° rotation).

If the printing area width set by 1D 4C and 1D 57 is less than one line in vertical, the following processing is performed only on the line in question:
1) The printing area width is extended to the right up to one line in vertical. In this case, printing does not exceed the printable area.
2) If the printing area width cannot be extended by one line in vertical, the left margin is reduced to accommodate one line in vertical.

Print raster bit image

ASCII	GS v 0 *m* x*L* x*H* y*L* y*H* *d1...dk*
Hexadecimal	1D 76 30 *m* x*L* x*H* y*L* y*H* *d1...dk*
Decimal	29 118 48 *m* x*L* x*H* y*L* y*H* *d1...dk*

Value and range of *m*:

Selects raster bit image mode. Parameter m is interpreted as follows:

m	Print mode
0, 48	Normal
1, 49	Double width
2, 50	Double height
3, 51	Quadruple

Value and range of *x*L, *x*H: 0x00 ≤ *x*L ≤ 0xFF
0x00 ≤ *x*H ≤ 0xFF (1 ≤ *x*L + *x*H × 256 ≤ 65535)

*x*L, *x*H selects the number of data bytes (*x*L + *x*H × 256) in the horizontal direction for the bit image.

Value and range of *y*L, *y*H: 0x00 ≤ *y*L ≤ 0xFF
0x00 ≤ *y*H ≤ 0x08 (1 ≤ *y*L + *y*H × 256 ≤ 2047)

*y*L, *y*H selects the number of data bytes (*y*L + *y*H × 256) in the vertical direction for the bit image.

Value and range of *k*: k = (xL + xH × 256) + (yL + yH × 256) (except for k = 0)
k shows the number of data of the image. It is an explanation parameter, so it is not necessary to transmit it.

Value and range of *d*: 0-255 = data of the image.

Related information

In standard mode for receipt paper, this command is effective only when there is no data in the print buffer.

The data (d) identify as 1 a printed bit and as 0 a non-printed bit.

If a raster bit image is longer than one line, the surplus data are not printed.

This command has no effect in all print modes (character size, bold, upside-down, underline, white/black reverse printing, etc.) for raster bit image, except the reverse mode (90° anticlockwise rotation).

This command feed the paper as much as is necessary to print the raster bit image.

Do not use this command during a macro execution because it cannot be included in a

macro. After the printing, the printing position moves to the beginning of the line.
The following table shows the relationship between the downloaded bit image and the printed data:

d1	d2	...	dx
dX+1	dX+2	...	dX x 2
:	:	...	:
...	dk-2	dk-1	d

Status

These commands providing the status of the printer.

Transmit printer serial number

ASCII FS 0xEA *n*
Hexadecimal 1C EA *n*
Decimal 28 234 *n*

Value of *n*: 82, 114 = Transmit printer serial number

Related information

The serial number is a string of 16 alphanumeric characters.

If the printer serial number is not defined, the device returns a string of 16 characters with a value of 0x00.

Transmit printer ID

ASCII GS I *n*
Hexadecimal 1D 49 *n*
Decimal 29 73 *n*

Value of *n*: 1, 49 = Printer model ID (1 byte)
2, 50 = Type ID
3, 51 = ROM version ID
255 =Printer model ID (2 bytes)

Transmits the device ID specified by *n* follows:

n	Printer ID	Specification
1, 49	Device model ID (1 byte)	0xFF (resend the command with *n* = 255)
2, 50	Type ID	See table below
3, 51	ROM version ID (4 bytes)	Depends on ROM version (4 character)
255	Device model ID (2 bytes)	0x0C 0x83

***n* = 2 or 50: Type ID**

BIT	OFF/ON	HEX	FUNCTION
0	Off	00	2 bytes characters codes not supported
1	Off	00	Auto cutter not supplied
	On	02	Auto cutter supplied
2	Off	00	Thermal paper w/o label
	On	04	Thermal paper label
3	-	-	Undefined
4	Off	00	Fixed to off
5	-	-	Undefined
6	-	-	Undefined
7	Off	00	Fixed to off

Enable or disable automatic full status back

ASCII GS 0xE0 *n*
Hexadecimal 1D E0 *n*
Decimal 29 224 *n*

Value and range of *n*: 0-255 = Enable or disable automatic full status back

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Disable paper status
	On	01	1	Enable paper status
1	Off	00	0	Disable user status
	On	02	2	Enable user status
2	Off	00	0	Disable recoverable error status
	On	04	4	Enable recoverable error status
3	Off	00	0	Disable unrecoverable error status
	On	08	8	Enable unrecoverable error status
4	-	-	-	Undefined
5	-	-	-	Undefined
6	-	-	-	Undefined
7	-	-	-	Undefined

Related information

Once enable at least one byte of the full status, for each change of at least one of the bits which compose the required status, the status sent in automatic from the device will be so composed as follows:
1st Byte = 0x10 (DLE)
2nd Byte = n

Real time

The real time commands provide an application interface to the printer even when the printer is not handling other commands.
Three situations must be understood when using real time commands.

First, the printer executes the real time command within a few msec of detecting it in the input buffer and will transmit status regardless of the condition of the DSR signal.

Second, the printer transmits status whenever it recognizes a real time status transmission command sequence, even if that sequence happens to occur naturally within the data of another command, such as graphics data. In this case the sequence will also be handled correctly as the graphics data it is intended to be when the graphics command is executed from the buffer.

Third, care must be taken not to insert a real time command into the data sequence of another command that consists of two or more bytes.

In this case the printer will use the real time command sequence bytes instead of the other command's parameter bytes when finally executing that other command from the buffer; the other command will NOT be executed correctly.

Real time status transmission

ASCII	DLE EOT *n*
Hexadecimal	10 04 *n*
Decimal	16 4 *n*

Value of *n*:
1 = Transmit printer status
2 = Transmit off-line status
3 = Transmit error status
4 = Transmit paper roll sensor status
17 = Transmit print status
20 = Transmit full status
21 = Transmit printer ID

Transmits the selected one byte printer status specified by n in real time according to the following parameters.

Exceptions

The command is ignored if *n* is out of range.

Related information

1 = Transmit printer status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to off
1	On	02	2	Fixed to on
2	Off	00	0	Drawer kick-out signal level Low (pin 3)
	On	04	4	Drawer kick-out signal level High (pin 3)

3	Off	00	0	On-line
	On	08	8	Off-line
4	On	10	16	Fixed to on
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	Off	00	0	LF key released
	On	80	128	LF key pressed

2 = Transmit off-line status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to off
1	On	02	2	Fixed to on
2	Off	00	0	Cover closed
	On	04	4	Cover opened
3	Off	00	0	Paper is not fed by FEED key
	On	08	8	Paper is fed by FEED key
4	On	10	16	Fixed to on
5	Off	00	0	Paper present
	On	20	32	Printing stop due to paper end
6	Off	00	0	No error
	On	40	64	Error
7	Off	00	0	Fixed to off

3 = Transmit error status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to off
1	On	02	2	Fixed to on
2	-	-	-	RESERVED
3	Off	00	0	Auto cutter ok
	On	08	8	Auto cutter error
4	On	10	16	Fixed to on
5	Off	00	0	No unrecoverable error
	On	20	32	Unrecoverable error
6	Off	00	0	No auto-recoverable error
	On	40	64	Auto-recoverable error
7	Off	00	0	Fixed to off

4 = Transmit paper roll sensor status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to off
1	On	02	2	Fixed to on
2, 3	Off	00	0	Paper present
	On	0C	12	Low paper
4	On	10	16	Fixed to on
5,6	Off	00	0	Paper present
	On	60	96	Paper not present
7	Off	00	0	Fixed to off

17 = Transmit print status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to off
1	On	02	2	Fixed to on
2	Off	00	0	Paper drag motor off
	On	04	4	Paper drag motor on
3	-	-	-	RESERVED
4	On	10	16	Fixed to on
5	Off	00	0	Paper present
	On	20	32	Printing stopped out for paper end
6	-	-	-	RESERVED
7	Off	00	0	Fixed to off

20 = Transmit full status (6 bytes)

1st byte = 0x10 (DLE)

2nd byte = 0x0F

3rd byte = Paper status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Paper present
	On	01	1	Paper not present
1	-	-	-	RESERVED
2	Off	00	0	Paper present
	On	04	4	Low paper
3	-	-	-	RESERVED
4	-	-	-	RESERVED
5	-	-	-	RESERVED

6	Off	00	0	Paper virtually present *
	On	40	64	Virtual paper end *
7	-	-	-	RESERVED

(*) Paper virtually present is set when the paper length available, read by 1D E1, is 0.

4th byte = User status

Bit	Status	Hex	Decimal	Function
0,1	Off	00	0	Cover closed
	On	01	3	Cover opened
2	Off	00	0	No spooling
	On	04	4	Spooling
3	Off	00	0	Drag paper motor off
	On	08	8	Drag paper motor on
4	-	-	-	RESERVED
5	Off	00	0	LF key released
	On	20	32	LF key pressed
6	-	-	-	RESERVED
7	-	-	-	RESERVED

5th byte = Recoverable status error

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Head temperature ok
	On	01	1	Head temperature error
1	Off	00	0	No RS232 COM error
	On	02	2	RS232 COM error
2	-	-	-	RESERVED
3	Off	00	0	Power supply voltage ok
	On	08	8	Power supply voltage error
4	-	-	-	RESERVED
5	Off	00	0	Acknowledge command
	On	20	32	Not acknowledge command error
6	Off	00	0	Free paper path
	On	40	64	Paper jam
7	-	-	-	RESERVED

6th byte = Unrecoverable status error

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Auto cutter ok
	On	01	1	Auto cutter error

1	Off	00	0	Auto cutter cover ok
	On	02	2	Auto cutter cover open
2	Off	00	0	RAM ok
	On	04	4	RAM error
3	Off	00	0	EEPROM ok
	On	08	8	EEPROM error
4	-	-	-	RESERVED
5	-	-	-	RESERVED
6	-	-	-	RESERVED
7	-	-	-	RESERVED

21 = Transmit printer ID

Refer to command 1D 49

Reading length of paper available before virtual paper-end

ASCII GS 0xE1
Hexadecimal 1D E1
Decimal 29 225

The command returns a string indicating how much paper is available.

Related information

The length of residual paper reported is just as an indication because tolerances and other factors are not taken into consideration (paper thickness, roll core diameter, roll core thickness).

The virtual paper-end limit is set by the command 1D E6.

To set virtual paper-end limit, measure the length of the paper from low paper to the end of the roll, using several of them.

Reading number of cuts performed by the auto cutter

ASCII GS 0xE2
Hexadecimal 1D E2
Decimal 29 226

The command returns a string indicating how many cuts are performed by the auto cutter.

Reading length of printed paper

ASCII GS 0xE3
Hexadecimal 1D E3
Decimal 29 227

The command returns a string indicating how much paper is printed.

Reading number of power up

ASCII GS 0xE5
Hexadecimal 1D E5
Decimal 29 229

The command returns a string indicating the number of device power ups.

Bar codes

These commands format and print bar codes and are described in order of their hexadecimal codes.

These commands describe operation for 80mm paper.

PDF 417 Overview

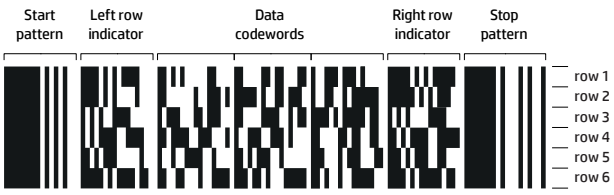
PDF 417 is a multi-row, continuous, variable length symbology which has high data capacity. Each symbol has between 3 and 20 rows, with each row containing a start pattern, a left row indicator, 1 to 30 data characters, a right row indicator and a stop pattern. The number and length of the rows are selectable, which allows the aspect ratio to be adjusted to particular labeling applications. There are no separator bars between rows.

Each character has four bars and four spaces within 8 modules and is assigned a value between 0 and 928. For this symbology, it is common to refer to these character values as “code words.”

There are three mutually exclusive sets of symbol patterns, or clusters, each having 929 distinct patterns. Because different clusters are used for adjacent rows, it is possible for the decoder to tell if the scanning path is crossing row boundaries without the use of separator bars.

Sample symbol description:
Each PDF 417 symbol consists of 3 to 20 stacked rows surrounded on all four sides by a quiet zone. Each row contains:

1 Leading quiet zone
2 Start pattern
3 Left row indicator characters (code words)
4 One to thirty data characters (code words)
5 Right row indicator character (code words)
6 Stop pattern
7 Trailing quiet zone



The number of characters in a row and number of rows can be adjusted to vary the symbol’s overall aspect ratio to best fit an available space.

Each row has a left and right row indicator with a data region between. The left-most character in the top row of the data region is the total number of characters in the data region, excluding error correction characters. Characters within the data region are designed to be read from left to right, starting on the top row, immediately after the length-defining character. The maximum characters in the data region are 928.

A series of seven commands are required to create and print QR codes.

1. Select number of columns	1D 28 6B 03 00 30 41 n
2. Select number of rows	1D 28 6B 03 00 30 42 n
3. Select width of module	1D 28 6B 03 00 30 43 n
4. Select height of module	1D 28 6B 03 00 30 44 n
5. Select error correction level	1D 28 6B 04 00 30 45 m n
6. Store symbol data	1D 28 6B 03 00 30 50 30 d1...dk
7. Print symbol data	1D 28 6B 03 00 30 51 30

Select number of columns for PDF 417

ASCII GS (k ETX NUL 0 A n
Hexadecimal 1D 28 6B 03 00 30 41 n
Decimal 29 40 107 3 0 48 65 n

Value of n: 7-30 = Specifies the number of columns for PDF 417 bar code.

Default: 0

Related information

n = 0x00 specifies auto processing. When auto processing is specified, the maximum number of columns in the data area is 30 columns.

When n is not 0x00, specifies the number of columns of the data area as n code word.
The following data is not included in the number of columns:
- start pattern and stop pattern
- indicator code word of left and right

Select number of rows for PDF 417

ASCII GS (k ETX NUL 0 B n
Hexadecimal 1D 28 6B 03 00 30 42 n
Decimal 29 40 107 3 0 48 66 n

Value of n: 3-20 = Specifies the number of rows for PDF 417 bar code.

Default: 0

Related information

n = 0x00 specifies auto processing. When auto processing is specified, the maximum number of rows is 20.

When n is not 0x00, specifies the number of rows of the data area as n rows.

Select width of a module of PDF 417

ASCII GS (k ETX NUL 0 C n
Hexadecimal 1D 28 6B 03 00 30 43 n
Decimal 29 40 107 3 0 48 67 n

Value of n: 2-8 = Specifies the width of a module of PDF 417 barcode.

Default: 3

Select height of a module of PDF 417

ASCII GS (k ETX NUL 0 D n
Hexadecimal 1D 28 6B 03 00 30 44 n
Decimal 29 40 107 3 0 48 68 n

Value of n: 2-8 = Specifies the height of a module of PDF 417 barcode.

Default: 3

Select error correction level for PDF 417

ASCII	GS (k EOT NUL 0 E m n
Hexadecimal	1D 28 6B 04 00 30 45 m n
Decimal	29 40 107 4 0 48 69 m n

Values of m: 48 = Error correction level specified by level

Value of n:	Function	No. of error correction code word
30h	Selects Error correction level 0	2
31h	Selects Error correction level 1	4
32h	Selects Error correction level 2	8
33h	Selects Error correction level 3	16
34h	Selects Error correction level 4	32
35h	Selects Error correction level 5	64
36h	Selects Error correction level 6	128
37h	Selects Error correction level 7	256
38h	Selects Error correction level 8	512

Values of m: 49 = Error correction level specified by ratio

The error correction level is defined by the calculated value [number of data code word × n × 0.1 = (A)]. The number of the error correction code word is changeable in proportion to the number of the code words on the data area.

Calculated value (A):	Function	No. of error correction code word
0-3	Selects Error correction level 1	4
4-10	Selects Error correction level 2	8
11-20	Selects Error correction level 3	16
21-45	Selects Error correction level 4	32
46-100	Selects Error correction level 5	64
101-200	Selects Error correction level 6	128
201-400	Selects Error correction level 7	256
>400	Selects Error correction level 8	512

Related information

This error correction allows the barcode to endure some damage without causing loss of data. The error correction level depends on the amount of data that needs to be encoded, the size and the amount of symbol damage that could occur.

Store symbol data for PDF 417

ASCII	GS (k ETX NUL 0 P 0 d1...dk
Hexadecimal	1D 28 6B 03 00 30 50 30 d1...dk
Decimal	29 40 107 3 0 48 80 48 d1...dk

This command stores the PDF-417 symbol data (d1... dk) in the symbol storage area.

PDF417 barcode only with ASCII characters:
4 ≤ (pL + pH × 256) ≤ 1112 (0x00 ≤ pL ≤ 0xFF, 0x00 ≤ pH ≤ 0x04)
PDF417 barcode only with alphanumeric characters:
4 ≤ (pL + pH × 256) ≤ 1854 (0x00 ≤ pL ≤ 0xFF, 0x00 ≤ pH ≤ 0x07)
PDF417 barcode only with numeric characters:
4 ≤ (pL + pH × 256) ≤ 2729 (0x00 ≤ pL ≤ 0xFF, 0x00 ≤ pH ≤ 0x0A)

Related information

k bytes of d1...dk are processed as barcode data.
Specify only the data code word of the barcode with this function. Be sure not to include the control data in the data d1...dk because they are added automatically by the device.

Print symbol data for PDF 417

ASCII	GS (k ETX NUL 0 Q 0
Hexadecimal	1D 28 6B 03 00 30 51 30
Decimal	29 40 107 3 0 48 81 48

This command encodes and prints the PDF 417 symbol data in the symbol storage area, based on the settings in the previous commands.

In standard mode, use this function when printer is “at the beginning of a line,” or “there is no data in the print buffer.” The symbol size that exceeds the print area cannot be printed.

If there is any error described below in the data of the barcode save area, it cannot be printed.
- There is no data.
- If [(number of columns × number of rows) < number of code word] when auto processing is specified for number of columns and number of rows.
- Number of code word exceeds 928 in the data area.

Printing of symbol is not affected by print mode (emphasized, double-strike, underline, white/black reverse printing, or 90° clockwise-rotated), except for character size and upside-down print mode.

When auto processing is specified, the number of columns is calculated by the current printing area, module width and the code word in the data area. Maximum number of the columns is 30.

QR Code Overview

QR code is a 2-dimensional matrix symbology consisting of an array of nominally square modules arranged in an overall square pattern using the QR symbology. A unique pattern at three of the symbol's four corners assists in determining the bar code size, position, and rotation.

A series of seven commands are required to create and print QR codes.

1. Select model for QR code	1D 28 6B 04 00 31 41 n1 n2
2. Select QR Code barcode version	1D 28 6B 03 00 31 42 n
3. Set size for QR module	1D 28 6B 03 00 31 43 n
4. Select error correction level	1D 28 6B 03 00 31 45 n
5. Store symbol data	1D 28 6B 03 00 31 50 31 d1...dk
6. Print symbol data	1D 28 6B 03 00 31 51 31
7. Transmit QR code print size	1D 28 6B 03 00 31 52 30

The details of each command are described below.

Note: The settings for model, size of module, and error correction level are effective until the printer is reset, or the power is turned off.

Select model for QR Code

ASCII GS (k EOT NUL 1 A n1 n2
Hexadecimal 1D 28 6B 04 00 31 41 n1 n2
Decimal 29 40 107 4 0 49 65 n1 n2

Value of n1: 32h = Selects model 2 (default)
33h = Selects Micro Qr code

Value of n2: 00h (default)

Related information

QRcode: Encode all extended ASCII characters data up to a maximum length of 7089 numeric digits, 4296 alphabetic characters or 2953 bytes of data.
MicroQR (a miniature version of the QRcode barcode for short message): Encode all numbers from 0 to 9 up to a maximum length of 35 characters.

Select QR Code barcode version

ASCII GS (k ETX NUL 1 B n
Hexadecimal 1D 28 6B 03 00 31 42 n
Decimal 29 40 107 3 0 49 66 n

Range of n: 0-40

Value of n:

n (Hex)	Version	Modules	Ecc Level	Numeric	Alphanumeric	Binary
0x00	AUTO	-	-	-	-	-
0x01	1	21 x 21	L	40	24	16
			M	33	19	13
			Q	26	15	10
			H	16	9	6

n (Hex)	Version	Modules	Ecc Level	Numeric	Alphanumeric	Binary
0x02	2	25 x 25	L	76	46	31
			M	62	37	25
			Q	47	28	19
			H	33	19	13
0x03	3	29 x 29	L	126	76	52
			M	100	60	41
			Q	76	46	31
			H	57	34	23
0x04	4	33 x 33	L	186	113	77
			M	148	89	61
			Q	110	66	45
			H	81	49	33
0x05	5	37 x 37	L	254	153	105
			M	201	121	83
			Q	143	86	59
			H	105	63	43
0x06	6	41 x 41	L	321	194	133
			M	254	153	105
			Q	177	107	73
			H	138	83	57
0x07	7	45 x 45	L	369	223	153
			M	292	177	121
			Q	206	124	85
			H	153	92	63
0x08	8	49 x 49	L	460	278	191
			M	364	220	151
			Q	258	156	107
			H	201	121	83
0x09	9	53 x 53	L	551	334	229
			M	431	261	179
			Q	311	188	129
			H	234	142	97
0x0A	10	57 x 57	L	651	394	270
			M	512	310	212
			Q	363	220	150
			H	287	173	118
0x0B	11	61 x 61	L	771	467	320
			M	603	365	250
			Q	426	258	176
			H	330	199	136
0x0C	12	65 x 65	L	882	534	366
			M	690	418	286
			Q	488	295	202
			H	373	226	154
0x0D	13	69 x 69	L	1021	618	424
			M	795	482	330
			Q	579	351	240
			H	426	258	176

n (Hex)	Version	Modules	Ecc Level	Numeric	Alphanumeric	Binary
0x0E	14	73 x 73	L	1100	666	457
			M	870	527	361
			Q	620	375	257
			H	467	282	193
0x0F	15	77 x 77	L	1249	757	519
			M	990	599	411
			Q	702	425	291
			H	529	320	219
0x10	16	81 x 81	L	1407	853	585
			M	1081	655	449
			Q	774	469	321
			H	601	364	249
0x11	17	85 x 85	L	1547	937	643
			M	1211	733	503
			Q	875	530	363
			H	673	407	279
0x12	18	89 x 89	L	1724	1045	717
			M	1345	815	559
			Q	947	573	393
			H	745	451	309
0x13	19	93 x 93	L	1902	1152	791
			M	1499	908	623
			Q	1062	643	441
			H	812	492	337
0x14	20	97 x 97	L	2060	1248	857
			M	1599	969	665
			Q	1158	701	481
			H	918	556	381
0x15	21	101 x 101	L	2231	1351	928
			M	1707	1034	710
			Q	1223	741	508
			H	968	586	402
0x16	22	105 x 105	L	2408	1459	1002
			M	1871	1133	778
			Q	1357	822	564
			H	1055	639	438
0x17	23	109 x 109	L	2619	1587	1090
			M	2058	1247	856
			Q	1467	889	610
			H	1107	671	460
0x18	24	113 x 113	L	2811	1703	1170
			M	2187	1325	90
			Q	1587	92	60
			H	1227	73	50
0x19	25	117 x 117	L	3056	1852	1272
			M	2394	1450	96
			Q	1717	1040	74
			H	1285	78	54
0x1A	26	121 x 121	L	3282	198	1366
			M	2543	1541	1058
			Q	1803	1093	70
			H	1424	83	52

n (Hex)	Version	Modules	Ecc Level	Numeric	Alphanumeric	Binary
0x1B	27	125 x 125	L	3516	2131	1464
			M	2700	1636	1124
			Q	1932	1171	84
			H	1500	89	64
0x1C	28	129 x 129	L	3668	2222	1527
			M	2856	1731	118
			Q	2084	1262	87
			H	1580	97	67
0x1D	29	133 x 133	L	3908	2368	1627
			M	3034	1838	1263
			Q	2180	1321	97
			H	1676	1015	67
0x1E	30	137 x 137	L	4157	251	1731
			M	3288	1993	136
			Q	2357	1428	91
			H	1781	107	71
0x1F	31	141 x 141	L	4416	2676	183
			M	3485	2112	1451
			Q	2472	1498	102
			H	1896	114	69
0x20	32	145 x 145	L	4685	283	1951
			M	3692	2237	1537
			Q	266	1617	1111
			H	2021	1225	81
0x21	33	149 x 149	L	4964	3008	2067
			M	3908	2368	1627
			Q	2804	16	1167
			H	2156	1306	87
0x22	34	153 x 153	L	5252	3182	2187
			M	4133	2505	1721
			Q	2948	1786	1227
			H	2300	1393	97
0x23	35	157 x 157	L	5528	3350	2302
			M	4342	2631	1808
			Q	3080	1866	1282
			H	2360	1430	92
0x24	36	161 x 161	L	5835	3536	2430
			M	4587	277	1910
			Q	3243	1965	1350
			H	2523	152	1050
0x25	37	165 x 165	L	6152	3728	2562
			M	4774	2893	1988
			Q	3416	2070	1422
			H	2624	1590	1092
0x26	38	169 x 169	L	6478	3926	2698
			M	5038	3053	2098
			Q	3598	2180	1498
			H	2734	1657	1138
0x27	39	173 x 173	L	6742	4086	2808
			M	5312	321	2212
			Q	3790	2297	1578
			H	2926	1773	1218

n (Hex)	Version	Modules	Ecc Level	Numeric	Alphanumeric	Binary
0x28	40	177 x 177	L	7088	4295	2952
			M	5595	3390	2330
			Q	3992	241	1662
			H	3056	1851	1272

Related information

f selected version has not enough capacity to store the saved amount of data, next smallest version capable of that capacity will be printed.
For QRcode version capacity according to ECC (Error Correction Capability) and data type refer to following table.
With n = 0x00 the selection of the version occurs automatically according to the one that allows the printing of the requested data.

Set size for QR Code module

ASCII GS (k ETX NUL 1 C n
Hexadecimal 1D 28 6B 03 00 31 43 n
Decimal 29 40 107 3 0 49 67 n

Value of n: 02h ≤ n ≤ 18h

Default: 06h

Sets numbers of dots for each pixel of QRcode barcode.

Select error correction level for QR Code

ASCII GS (k ETX NUL 1 E n
Hexadecimal 1D 28 6B 03 00 31 45 n
Decimal 29 40 107 3 0 49 69 n

Value of n:	Function	Recovery Capacity %
30h	Selects Error correction level L	7
31h	Selects Error correction level M	15
32h	Selects Error correction level Q	25
33h	Selects Error correction level H	30

Note: QR Code employs Reed-Solomon error correction to generate a series of error correction words.

Store symbol data for QR Code

ASCII GS (k ETX NUL 1 P 1 d1...dk
Hexadecimal 1D 28 6B 03 00 31 50 31 d1...dk
Decimal 29 40 107 3 0 49 80 49 d1...dk

This command stores the QR code symbol data (d1... dk) in the symbol storage area.

QRcode barcode only with binary characters (8 bit):
4 ≤ (pL + pH × 256) ≤ 2957 (0x00 ≤ pL ≤ 0xFF, 0x00 ≤ pH ≤ 0x0B)
QRcode barcode only with alphanumeric characters:
4 ≤ (pL + pH × 256) ≤ 4300 (0x00 ≤ pL ≤ 0xFF, 0x00 ≤ pH ≤ 0x10)
QRcode barcode only with numeric characters:
4 ≤ (pL + pH × 256) ≤ 7093 (0x00 ≤ pL ≤ 0xFF, 0x00 ≤ pH ≤ 0x1B)

Related information

k bytes of d1...dk are processed as barcode data.
Specify only the data code word of the barcode with this function.

Print symbol data for QR Code

ASCII	GS (k ETX NUL 1 Q 1
Hexadecimal	1D 28 6B 03 00 31 51 31
Decimal	29 40 107 3 0 49 81 49

This command encodes and prints the QR code symbol data in the symbol storage area, based on the settings in the previous commands.

In standard mode, use this function when printer is “at the beginning of a line,” or “there is no data in the print buffer.” The symbol size that exceeds the print area cannot be printed.

If there is no data in storage, or if the data in the storage area is more than the data allowed by specified model and data compaction mode, the QR code cannot be printed.

Printing of symbol is not affected by print mode (emphasized, double-strike, underline, white/black reverse printing, or 90° clockwise-rotated), except for character size and upside-down print mode.

In standard mode, this command executes paper feeding for the amount needed for printing the symbol, regardless of the paper feed amount set by the paper feed setting command, The print position returns to the left side of the printable area after printing the symbol, and printer is in the status “beginning of the line,” or “there is no data in the print buffer.”

In page mode, the printer stores the symbol data in the print buffer without executing actual printing. The printer moves print position to the next dot of the last data of the symbol.

A quiet zone of four times the size of one module is required on all sides of the QR code symbol, but it is not included in the printing data. Be sure to add a quiet zone when using this function.

Transmit QR Code print size

ASCII	GS (k ETX NUL 1 R 0
Hexadecimal	1D 28 6B 03 00 31 52 30
Decimal	29 40 107 3 0 49 82 48

Transmits the size information for printing the QR symbol data stored by the store data command in the symbol storage area.

The size information for each data is as follows:

Send Data	Hex	Data
Header	37	1 byte
Identifier	36	1 byte
Horizontal size [1]	30-39	1 - 5 byte
Separator	1F	1 byte
Vertical size [1]	30-39	1 - 5 byte
Separator	1F	1 byte
Fixed value	31	1 byte
Separator	1F	1 byte
Other information [2]	30 or 31	1 byte
NUL	00	1 byte

(1) “Horizontal size” and “vertical size” indicate the number of dots of the symbol.
The values of the vertical size and horizontal size are converted to characters and sent starting from the high order end (ex: When horizontal size is 120 dots, horizontal size is 0x31 0x32 0x30, which is 3 bytes of data).

(2) ”Other information” indicates whether printing of the data in the symbol storage area is possible or impossible. The “Other information“ is the following:

Hex	Condition
30	Printing is possible
31	Printing is impossible

The quiet zone is not included in the size information.
If “other information” is “Printing is impossible“(0x31), use one of the solutions shown below:

Cause	Solution
There are data in the print buffer in the standard mode	Clear the data in the print buffer.
Symbol is bigger than the current print area.	Expand the print area. Reduce the module size. Lower the error correction level.
The data in the symbol storage area is too large.	Send correct data. Lower the error correction level.
There is no data in the symbol storage area.	Send data to the symbol storage area.

Select encoding scheme of DataMatrix

ASCII GS (k ETX NUL Q A n
Hexadecimal 1D 28 6B 03 00 51 41 n
Decimal 29 40 107 3 0 81 65 n

Value of n:	**Encoding**
0h	ASCII
1h	C40
2h	Text
3h	X12
4h	Edifact
5h	Base256
6h	AutoBest

Select rotation of DataMatrix

ASCII GS (k ETX NUL Q B n
Hexadecimal 1D 28 6B 03 00 51 42 n
Decimal 29 40 107 3 0 81 66 n

Value of n: 0 = No rotation
1 = Rotation

Select dot size of the module for DataMatrix

ASCII GS (k ETX NUL Q C n
Hexadecimal 1D 28 6B 03 00 51 43 n
Decimal 29 40 107 3 0 81 67 n

Value and range of n: 2 - 24 = Dot dimension of module for DataMatrix

Default: 6

Set size of the module for DataMatrix

ASCII GS (k ETX NUL Q D n
Hexadecimal 1D 28 6B 03 00 51 44 n
Decimal 29 40 107 3 0 81 68 n

Range of n: 00h - 1Dh

Values of n:

n (Hex)	Barcode size	n (Hex)	Barcode size
00	AUTO	0F	52 x 52
01	10 x 10	10	64 x 64
02	12 x 12	11	72 x 72
03	14 x 14	12	80 x 80
04	16 x 16	13	88 x 88
05	18 x 18	14	96 x 96
06	20 x 20	15	104 x 104
07	22 x 22	16	120 x 120
08	24 x 24	17	132 x 132
09	26 x 26	18	144 x 144
0A	32 x 32	19	8 x 18
0B	36 x 36	1A	8 x 32
0C	40 x 40	1B	12 x 26
0D	44 x 44	1C	12 x 36
0E	48 x 48	1D	16 x 36

Store symbol data for DataMatrix

ASCII GS (k ETX NUL Q P 3 d1...dk
Hexadecimal 1D 28 6B 03 00 51 50 33 d1...dk
Decimal 29 40 107 3 0 81 80 51 d1...dk

This command stores the DataMatrix symbol data (d1... dk) in the symbol storage area.

DataMatrix barcode only with ASCII characters (8 bit) :
4 ≤ (pL + pH × 256) ≤ 1560 (0x00 ≤ pL ≤ 0xFF, 0x00 ≤ pH ≤ 0x06)
DataMatrix barcode only with alphanumeric characters:
4 ≤ (pL + pH × 256) ≤ 2339 (0x00 ≤ pL ≤ 0xFF, 0x00 ≤ pH ≤ 0x09)
DataMatrix barcode only with numeric characters:
4 ≤ (pL + pH × 256) ≤ 3120 (0x00 ≤ pL ≤ 0xFF, 0x00 ≤ pH ≤ 0x0C)

Related information

k bytes of d1...dk are processed as barcode data.
Specify only the data code word of the barcode with this function. Be sure not to include the control data in the data d1...dk because they are added automatically by the device.

Print symbol data for DataMatrix

ASCII GS (k ETX NUL Q Q 3
Hexadecimal 1D 28 6B 03 00 51 51 33
Decimal 29 40 107 3 0 81 81 51

This command encodes and prints the DataMatrix symbol data in the symbol storage area, based on the settings in the previous commands.

In standard mode, use this function when printer is “at the beginning of a line,” or “there is no data in the print buffer.” The symbol size that exceeds the print area cannot be printed.

If there is any error described below in the data of the barcode save area, it cannot be printed.
- There is no data.
- If [(number of columns × number of rows) < number of code word] when auto processing is specified for number of columns and number of rows.
- Number of code word exceeds 928 in the data area.

Printing of symbol is not affected by print mode (emphasized, double-strike, underline, white/black reverse printing, or 90° clockwise-rotated), except for character size and upside-down print mode.

When auto processing is specified, the number of columns is calculated by the current printing area, module width and the code word in the data area. Maximum number of the columns is 30.

Select printing position of HRI characters

ASCII GS H *n*
Hexadecimal 1D 48 *n*
Decimal 29 72 *n*

Value of *n*: Printing position

0 = Not printed
1 = Above the bar code
2 = Below the bar code
3 = Both above and below the bar code

Default: 0 (Not printed)

Prints HRI (human readable interface) characters above or below the bar code using the pitch specified by 1D 66. Setting is effective until the printer is initialized, reset, or powered off.

Select font for HRI characters

ASCII GS f *n*
Hexadecimal 1D 66 *n*
Decimal 29 102 *n*

Value of *n*: 0, 48 = Font A
1, 49 = Font B

Default: 0 (Not printed)

Selects font for printing bar code characters using 1D 48 *n*.

Select barcode height

ASCII	GS h *n*
Hexadecimal	1D 68 *n*
Decimal	29 104 *n*

Value of *n*: Number of dots

Range of *n*: 1-255

Default: 162

Sets the bar code height.

Print bar code

	First variation	Second variation
ASCII	GS k *m [d1..dk]* NUL	GS k *m n [d1..dn]*
Hexadecimal	1D 6B *m [d1..dk]* 00	1D 6B *m n [d1..dn]*
Decimal	29 107 *m [d1..dk]* 0	29 107 *m n [d1..dn]*

(0 = End of command)

Selects the bar code type and prints a bar code for the ASCII characters entered. If the width of the bar code exceeds one line, the bar code is not printed.

There are two variations to this command. The first variation uses a NUL character to terminate the string; the second uses a length byte at the beginning of the string to compensate for the code 128 bar code, which can accept a NUL character as part of the data. With the second variation, the length of byte is specified at the beginning of the string.

This command is not affected by print modes (bold, double-strike, underline, or character size), except for upside-down and justification mode.

The check digit is calculated for UPC and JAN (EAN) codes if it is not sent from the host computer. Six-character zero-suppressed UPC-E tags are generated from full 11 or 12 characters sent from the host computer according to standard UPC-E rules. Start/stop characters are added for code 39 if they are not included.

Related information

The command is only valid at the beginning of a line.
If d is outside of the specified range, the device prints the following message: “BARCODE GENERATOR IS NOT OK!” and processes the data which follows as normal data.
If the horizontal size exceeds the printing area, the device only feeds the paper.

Values

First variation: String terminated with NUL character. Length *k* is not specified in command string; it depends on the bar code being printed.

m	Bar code	*d1...dk*	Length
0	UPC-A	48-57 (ASCII numerals)	Fixed length: 11, 12
1	UPC-E	48-57	Fixed length: 11, 12
2	EAN13 (JAN)	48-57	Fixed length: 12, 13
3	EAN8 (JAN)	48-57	Fixed length: 7, 8

4	CODE39	48-57, 65-90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47	Variable length
5	ITF	48-57	Variable length (even number)
6	CODABAR	48-57, 65-68, 36, 43, 45, 46, 47, 58	Variable length
7	CODE93	1-127	Variable length
8	CODE128	1-127	Variable length
20	CODE32	48-57	Fixed length: 8, 9

Second variation: Length *n* specified at beginning of string. Except as noted, 0 < *n* < 25.

m	**Bar code**	***d1...dk***	**Length**
65	UPC-A	48-57 (ASCII numerals)	Fixed length: 11, 12
66	UPC-E	48-57	Fixed length: 11, 12
67	EAN13 (JAN)	48-57	Fixed length: 12, 13
68	EAN8 (JAN)	48-57	Fixed length: 7, 8
69	CODE39	48-57, 65-90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47	Variable length
70	ITF	48-57	Variable length (even number)
71	CODABAR	48-57, 65-68, 36, 43, 45, 46, 47, 58	Variable length
72	CODE93	1-127	Variable length
73	CODE128	1-127	Variable length
75	GS1 Databar	48-57	13
76	GS1 Databar Truncated	48-57	13
77	GS1 Databar Limited	48-57 (however d1 = 48,49)	13
78	GS1 Databar Expanded	48-57, 65-90, 97-122, 32-34, 37-47, 58-63, 95, 123, (however d1 = 40, 48 ≤ d2 ≤ 57, 48 ≤ d3 ≤ 57 when 48 ≤ d1 ≤ 57, 48 ≤ d2 ≤ 57)	Variable length
90	CODE32	48-57	Fixed length: 8, 9

The value of m selects the bar code system as described in the table.

The variable d indicates the character code to be encoded into the specified bar code system. If character code d cannot be encoded, the printer prints the bar code data processed so far, and the following data is treated as normal data.

Exceptions

When CODE93 is used:
The device prints an HRI character (o) as a start character at the beginning of the HRI character string.
The device prints an HRI character (o) as a stop character at the end of the HRI character string.
The device prints an HRI character (n) as a control character (0 to 31 and 127).

When CODE128 is used, please note the following regarding data transmission:
The top part of the barcode data string must be a code set selection character (CODE A, CODE B or CODE C) which selects the first code set.
Special characters are defined by combining two characters "{" and one character. ASCII character "{" is defined by transmitting "{" twice, consecutively.

Specific character	Data Transmission	
	ASCII	Hex
SHIFT	{S	7B, 53
CODE A	{A	7B, 41
CODE B	{B	7B, 42
CODE C	{C	7B, 43
FNC1	{1	7B, 31
FNC2	{2	7B, 32
FNC3	{3	7B, 33
FNC4	{4	7B, 34
'{'	{{	7B, 7B

When UPC-E is used, introducing the barcode characters, the device prints:

Transmitted data											Printed Data					
d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11						
0	0-9	0-9	0	0	0	0	0	0-9	0-9	0-9	d2	d3	d9	d10	d11	0
0	0-9	0-9	1	0	0	0	0	0-9	0-9	0-9	d2	d3	d9	d10	d11	1
0	0-9	0-9	2	0	0	0	0	0-9	0-9	0-9	d2	d3	d9	d10	d11	2
0	0-9	0-9	3-9	0	0	0	0	0	0-9	0-9	d2	d3	d4	d10	d11	3
0	0-9	0-9	0-9	1-9	0	0	0	0	0	0-9	d2	d3	d4	d5	d11	4
0	0-9	0-9	0-9	0-9	1-9	0	0	0	0	5-9	d2	d3	d4	d5	d6	d11

Select barcode width

ASCII GS w *n*
Hexadecimal 1D 77 *n*
Decimal 29 119 *n*

Value of *n*: 1,2,3,4,5,6

Default: *n* = 3

Sets the bar code width to n dots until the printer is initialized, reset, or powered off. If the barcode is too wide for the printing area, the barcode will not print.

Formulas

n/8mm (*n*/203 inch)

Page mode

Standard mode is typical of how most printers operate by printing data as it is received and feeding paper as the various paper feed commands are received. Page mode is different in that it processes or prepares the data as a “page” in memory before it prints it. Think of this as a virtual page. The page can be any area within certain parameters that you define. The page is printed using either the FF (0C) or the ESC FF (1B 0C) command.

The select page mode command (1B 4C) puts the printer into page mode. Any commands that are received are interpreted as page mode commands. Several commands react differently when in standard mode and page mode. The descriptions of these individual commands in this chapter indicate the differences in how they operate in the two modes.

These commands describe the operation for 80mm paper.

Print and return to standard mode from page mode

ASCII	FF
Hexadecimal	0C
Decimal	12

When printing is completed, values for select print direction in page mode (1B 54 *n*) and set print area in page mode (1B 57 *n*1, *n*2, ..., *n*8) and the position for buffering character data are set. Buffered data is not deleted from the printer.

The processed data is printed, and the printer returns to standard mode. The developed data is deleted after being printed. For more information see page mode in this document.

Exceptions

This command is enabled only in page mode.

Cancel print data in page mode

ASCII	CAN
Hexadecimal	18
Decimal	24

Deletes all the data to be printed in the "page" area. Any data from the previously selected "page" area that is also part of the data to be printed is deleted.

Exceptions

This command is enabled only in page mode.

Print data in page mode

ASCII	ESC FF
Hexadecimal	1B 0C
Decimal	27 12

Prints all buffered data in the printing area collectively.

After printing, the printer does not clear the buffered data and sets values for select print direction in page mode (1B 54 *n*), print area in page mode (1B 57) and the position for buffering character data.

Exceptions

This command is enabled only in page mode.

Select page mode

ASCII	ESC L
Hexadecimal	1B 4C
Decimal	27 76

Switches from standard mode to page mode. After printing has been completed either by the print and return to standard mode (FF) command or select standard mode (1B 53) the printer returns to standard mode. The developed data is deleted after being printed.

This command sets the position where data is buffered to the position specified by select print direction in page mode (1B 54) within the printing area defined by set print area in page mode (1B 57).

This command switches the settings for the following commands (which values can be set independently in standard mode and page mode) to those for page mode:

- Set right-side character spacing (1B 20)
- Select 1/6-inch line spacing (1B 32)
- Set line spacing (1B 33)

It is possible only to set values for the following commands in page mode. These commands are not executed.

- Select or cancel 90 degree clockwise rotation (1B 56)
- Select justification (1B 61)
- Select or cancel upside-down printing (1B 7B)
- Set left margin (1D 4C)
- Set print area width (1D 57)

Printer returns to standard mode through use of 1B 40 or initialization.

Exceptions

The command is enabled only when input at the beginning of a line.

The command has no effect if page mode has previously been selected.

Select standard mode

ASCII	ESC S
Hexadecimal	1B 53
Decimal	27 83

Switches from page mode to standard mode. In switching from page mode to standard mode, data buffered in page mode are cleared, the printing area set by set print area in page (1B 57) is initialized and the print position is set to the beginning of the line.

This command switches the settings for the following commands (which values can be set independently in standard mode and page mode) to those for standard mode:

- Set right-side character spacing (1B 20)
- Select 1/6-inch line spacing (1B 32)
- Set line spacing (1B 33)

Standard mode is automatically selected when power is turned on, the printer is reset or the initialize printer command (1B 40) is used.

1D 24 and 1D 5C commands are ignored in standard mode.

Exceptions

This command is enabled only in page mode.

Select print direction in page mode

ASCII ESC T *n*
Hexadecimal 1B 54 *n*
Decimal 27 84 *n*

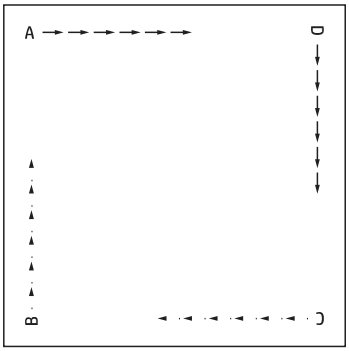
Value of *n*: Start position

0 = Upper left corner proceeding across page to the right [A]
1 = Lower left corner proceeding up the page [B]
2 = Lower right corner proceeding across page to the left (upside down) [C]
3 = Upper right corner proceeding down page [D]

Default: 0

Selects the printing direction and start position in page mode. See the illustration below.

The command can be sent multiple times so that several different print areas, aligned in different print directions, can be developed in the printer's page buffer before being printed using the print page mode commands (0C or 1B 0C).



Standard Position	Commands Using Motion Unit
Upper Left/Lower Right	1B 20, 1B 24, 1B 5C (horizontal motion unit) 1B 33, 1B 4A, 1D 24, 1D 5C (vertical motion unit)
Upper Right/Lower Left	1B 33, 1B 4A, 1D 24, 1D 5C (horizontal motion unit) 1B 20, 1B 24, 1B 5C (vertical motion unit)

Exceptions

This command is valid only in page mode.

The command is ignored if the value of *n* is out of the specified range.

If this command is processed in standard mode, print direction is not changed until the printer is set to page mode.

Set print area in page mode

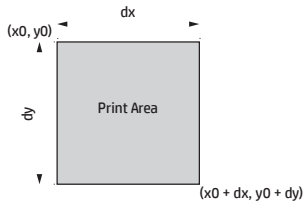
ASCII	ESC W *n1, n2...n8*
Hexadecimal	1B 57 *n1, n2...n8*
Decimal	27 87 *n1, n2...n8*

Range of *n*: 0-255

Default:

n1-4 =	0
n5 =	64
n6 =	2
n7 =	64
n8 =	2

(576x576 for 80 mm paper)



Sets the position and size of the printing area in page mode until the printer is initialized, reset, or powered off, or a 0C command is sent.

The command can be sent multiple times so that several different print areas, aligned in different print directions, can be developed in the printer's page buffer before being printed using the print page mode commands (0C or 1B 0C).

Formulas

The starting position of the print area is the upper left of the area to be printed (x0, y0). The length of the area to be printed in the y direction is set to dy inches. The length of the area to be printed in the x direction is set to dx inches. Use the equations to determine the Value of x0, y0, dx and dy.

- x0 = [(*n1* + *n2* × 256) × (horizontal direction of the fundamental calculation pitch)]
- y0 = [(*n3* + *n4* × 256) × (vertical direction of the fundamental calculation pitch)]
- dx = [(*n5* + *n6* × 256) × (horizontal direction of the fundamental calculation pitch)]
- dy = [(*n7* + *n8* × 256) × (vertical direction of the fundamental calculation pitch)]

Keep the following notes in mind for this command.

- The fundamental calculation pitch depends on the vertical or horizontal direction.
- The maximum printable area in the x direction is 576/203 inches.
- The maximum printable area in the y direction is 576/203 inches.

The horizontal and vertical motion unit are specified by 1D 50. Changing the horizontal or vertical motion unit does not affect the current printing area.

Exceptions

This command is valid only in page mode.

If [x0 + dx] is greater than the printable area, the printing area width is set to [horizontal printable area - x0].

If [y0 + yx] is greater than the printable area, the printing area height is set to [vertical printable area - y0].

If the horizontal or vertical starting position is set outside the printable area, the device stops command processing and processes the following data as normal data.

If the printing area width or height is set to 0, the device stops command processing and processes the following data as normal data.

Set absolute vertical print position in page mode

ASCII	GS $ *n*L *n*H
Hexadecimal	1D 24 *n*L *n*H
Decimal	29 36 *n*L *n*H

Sets the absolute vertical print starting position for buffer character data in page mode. The absolute print position is set to [(*n*L + *n*H × 256) × (vertical or horizontal motion unit)] inches.

The vertical or horizontal motion unit for the paper roll is used and the horizontal starting buffer position does not move.

The reference starting position is set by select print direction in page mode (1B 54). This sets the absolute position in the vertical direction when the starting position is set to the upper left or lower right and sets the absolute position in the horizontal when the starting position is set to the upper right or lower left. The horizontal and vertical motion unit are specified by the set horizontal and vertical minimum motion units (1D 50) command.

The set horizontal and vertical minimum motion units (1D 50) command can be used to change the horizontal and vertical motion unit. However, the value cannot be less than the minimum horizontal movement amount and it must be in even units of the minimum horizontal movement amount.

Formulas

[(*n*L + *n*H × 256) × (vertical or horizontal motion unit)] inches.

Exceptions

This command is valid only in page mode.

If the [(*n*L + *n*H × 256) × (vertical or horizontal motion unit)] exceeds the specified printing area, this command is ignored.

Store graphics data in the print buffer in raster format

First variation

ASCII GS (L *pL pH m fn a bx by c xL xH yL yH d1...dk*
Hexadecimal 1D 28 4C *pL pH 30 70 30 bx by c xL xH yL yH d1...dk*
Decimal 29 40 76 *pL pH 48 112 48 bx by c xL xH yL yH d1...dk*

Second variation

ASCII GS 8 L *p1 p2 p3 p4 m fn a bx by c xL xH yL yH d1...dk*
Hexadecimal 1D 38 4C *p1 p2 p3 p4 30 70 30 bx by c xL xH yL yH d1...dk*
Decimal 29 56 76 *p1 p2 p3 p4 48 112 48 bx by c xL xH yL yH d1...dk*

Range When using GS (L: 11 ≤ (*pL* + *pH* x 256) ≤ 32778 (0 ≤ *pL* ≤ 255, 0 ≤ *pH* ≤ 128)
When using GS 8 L: 11 ≤ (*p1* + *p2* x 256 + *p3* x 65536 + *p4* x 16777216) ≤ 32778
0 ≤ *d* ≤ 255

Values *m* = 48
fn = 112
a = 48
c = 49
k = (int ((*xL* + *xH* x 256) +7)/8) x (*yL* + *yH* x 256)

Defines selected items of NV graphics data (*d1...dk*) to the print buffer.
Users have the option of specifying horizontal (times *bx*) x vertical (times *by*) size settings for the selected data.
xL and *xH* specify the horizontal size of NV graphics in units of dots (*xL* + *xH* x 256).
yL and *yH* specify the vertical size of NV graphics in units of dots (*yL* + *yH* x 256).
Switch *d* is used to specify the defined data for NV graphics. This data is processed as raster format.
Switch *k* is used to indicate the defined data value. It is not necessary to send parameter *k* because it is a descriptive parameter.

Related information

Use this function when the printer enters the "beginning of the line" or "except for graphic data, no data in print buffer" state during the standard mode,
This function is incompatible with macros so make sure to avoid including it when defining macros.
NV graphics data that exceeds the print area for one line will not be printed.
The scales for width and height of graphics are specified by (*x, y*). Therefore, in page mode with 90° or 270° clockwise-rotated graphics, the printer applies printing area and dot density from [*x*: direction of paper feed, *y*: perpendicular to direction of paper feed].
Settings for text effect (bold, underline, orientation) and font size do not affect the printing of the NV graphics data.
Print position does not change before and after this function is used.
The data for byte k of *d1 ... dk* is processed as a single item of defined NV graphics data. The defined data (d) specifies “1” for bits corresponding to dots that will be printed and “0” for bits corresponding to dots that will not be printed.
During processing of this function, real time commands are not available.
The relationship between NV graphics data (raster format) and print result is shown in the table below

d1	***d2***	***...***	***dX***
dx+1	***dx***+2	...	***dx***x2
:	:	...	:
...	***dk***-2	***dk***-1	***dk***

X = (***xL*** + ***xH*** x 256)

Set relative vertical print position in page mode

ASCII	GS \ *n*L *n*H
Hexadecimal	1D 5C *n*L *n*H
Decimal	29 92 *n*L *n*H

The value for the horizontal and vertical movement cannot be less than the minimum horizontal movement around and must be in even units of the minimum horizontal movement amount.

Sets the relative vertical print starting position from the current position. This command can also change the horizontal and vertical motion unit. The unit of horizontal and vertical motion is specified by this command.

This command functions as follows, depending on the print starting position set by select print direction in page mode (1B 54):
When the starting position is set to the upper right or lower left of the printing area, the vertical motion unit (y) is used.
When the starting position is set to the upper left or lower right of the printing area, the horizontal motion unit (x) is used.

Formulas

The distance from the current position is set to [(*n*L + *n*H × 256) × (vertical or horizontal motion unit)] inches. The amount of movement is calculated only for the paper roll.

When pitch *n* is specified to the movement downward: *n*L + *n*H × 256 = *n*

When pitch *n* is specified to the movement upward (the negative direction), use the complement of 65536.

When pitch *n* is specified to the movement upward: *n*L + *n*H × 256 - 65536 - N

Exceptions

This command is used only in page mode, otherwise it is ignored.

Any setting that exceed the specified printing area is ignored.

Macros

These commands are used to select and perform a user-defined sequence of printer operations.

Select or cancel macro definition

ASCII GS :
Hexadecimal 1D 3A
Decimal 29 58

Starts or ends macro definition. Macro definition begins when this command is received during normal operation and ends when this command is received during macro definition. The macro definition is cleared, during definition of the macro when the execute macro (1D 5E) command is received.
Normal printing occurs while the macro is defined. When the power is turned on the macro is not defined.
The defined contents of the macro are not cleared by the initialize printer (1B 40), thus, the initialize printer (1B 40) command may be used as part of the macro definition.
If the printer receives a second select or cancel macro definition (1D 3A) command immediately after previously receiving a select or cancel macro definition (1D 3A) the printer remains in the macro undefined state.

Formulas

The contents of the macro can be defined up to 1024 bytes.

Exceptions

If the macro definition exceeds 1024 bytes, excess data is not stored.

Execute macro

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

Value of r: The number of times to execute the macro

Value of t: The waiting time for executing the macro

Executes a macro. After waiting for a specified period the printer waits for the paper feed button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats this operation the number of specified times.
When the macro is executed by pressing the paper feed button (*m* = 1), paper cannot be fed by using the paper feed button.

Formulas

The waiting time is *t* x 100 ms for every macro execution.
When the Least Significant Bit (LSB) of *m* = 0, the macro is executed r times continuously at the interval specified by t.
When the Least Significant Bit (LSB) of *m* = 1, after waiting for the period specified by t, the LED indicator blinks, and the device waits for the FEED button to be pressed. After the button is pressed, the device executes the macro once. The device repeats the operation *r* times.

Exceptions

If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.
If the macro is not defined or if *r* is 0, nothing is executed.
When the macro is executed by pressing the FEED button (*m* = 1), the paper cannot be fed using the FEED button.

Miscellaneous configuration commands

Hardware reset

	First variation	Second variation
ASCII	FS 0xC0 CAN DLE DC4 SUB	FS 0xC0 CAN DLE DC4 ESC
Hexadecimal	1C C0 18 10 14 1A	1C C0 18 10 14 1B
Decimal	28 192 24 16 20 26	28 192 24 16 20 27

When this command is received, the device perform a hardware reset.
This command is executed immediately, even when the data buffer is full (Busy).

Related information

First variation: The command execution stop the communication with host.

Second variation: The command execution keep the communication with host active.

Select printing density

ASCII GS | *n*
Hexadecimal 1D 7C *n*
Decimal 29 124 *n*

Value of *n*:
2, 50 = -25%
3, 51 = -12.5%
4, 52 = 0%
5, 53 = +12.5%
6, 54 = +25%

Default: 4

Related information

Printing density reverts to the default value when the device is reset or turned off.

Select virtual paper end limit

ASCII GS 0xE6 *n*H *n*L
Hexadecimal 1D E6 *n*H *n*L
Decimal 29 230 *n*H *n*L

Range of n*H*, n*L*: 0-255

Default:
*n*H = 0
*n*L = 240

This command sets the limit, expressed in cm as [(*n*H × 256) + *n*L], after which is pointed out the virtual paper-end.

Select print speed

ASCII GS 0xF0 *n*
Hexadecimal 1D F0 *n*
Decimal 29 240 *n*

Value of *n*:
0 = High quality
1 = Normal
2 = High speed

Default: 2

Related information

Print speed reverts to the default value when the device is reset or turned off.

Appendix A: Commands listed by hexadecimal code

Code (hexadecimal)	Command	Page
08	Back space	26
09	Horizontal tab	26
0A	Print and feed paper one line	25
0C	Print and return to standard mode from page mode	80
0D	Print and carriage return	25
10 04 *n*	Real time status transmission	59
18	Cancel current line transmitted	80
1B 0C	Print data in page mode	80
1B 20 *n*	Set right-side character spacing	33
1B 21 *n*	Select print mode	34
1B 24 *n*L *n*H	Set absolute print position	26
1B 25 *n*	Enable or disable user-defined characters	35
1B 26 *y c1 cn x1[d0...dk] ...xn[d0...dk]*	Define user-defined characters	35
1B 28 76 *n*L *n*H	Set relative vertical print position	27
1B 2A *m n*L *n*H *d1...dk*	Select bit image mode	46
1B 2D *n*	Select or cancel underline mode	36
1B 30	Set vertical line spacing to 1/8 inch	27
1B 32	Set vertical line spacing to 1/6 inch	27
1B 33 *n*	Set vertical line spacing	28
1B 34 *n*	Select or cancel italic print	36
1B 3D *n*	Select peripheral device	22
1B 3F *n*	Cancel user-defined characters	37
1B 40	Initialize device	23
1B 44 *n1...nk* 00	Set horizontal tab positions	28
1B 45 *n*	Select or cancel emphasized mode	37
1B 47 *n*	Select or cancel double-strike	38
1B 4A *n*	Print and feed paper	25
1B 4C	Select page mode	81
1B 4D *n*	Select character font	38
1B 52 *n*	Select an international character set font	39
1B 53	Select standard mode	81
1B 54 *n*	Select print direction in page mode	82
1B 56 *n*	Select or cancel 90 degree clockwise rotated print	39
1B 57 *n1, n2...n8*	Set print area in page mode	83
1B 5C *n1 n2*	Set relative print position	29
1B 61 *n*	Select justification	30
1B 63 35 *n*	Enable or disable panel buttons	23
1B 64 *n*	Print and feed *n* lines	25
1B 69	Total cut	23
1B 63 35 *n*	Enable or disable panel buttons	23
1B 6D	Partial cut	23

Code (hexadecimal)	Command	Page
1B 70 *n p1 p2*	Generate pulse to open cash drawer	24
1B 74 *n*	Select character code table	40
1B 7B *n*	Select or cancel upside-down print mode	41
1B C1 *n*	Select character pitch	42
1C 25 *n*	Select the font type	42
1C 26	Enable Kanji characters	43
1C 2E	Disable Kanji characters	43
1C 50 41 00	Erase all logos	47
1C 50 44 *n*H *n*L *kc1 kc2 drv szHH szHL szLH szLL d[1]...d[sz]*	Load logo in .bmp format	47
1C 50 45 *n*H *n*L	Erase single logo	47
1C 50 46 *drv*	Read the memory free space	48
1C 50 47 *n*H *n*L	Read a stored logo	48
1C 50 49 *n*H *n*L	Read the information for a specific logo	49
1C 50 4C	Read the list of currently stored logos	50
1C 50 4E *n*H *n*L	Read the number of stored logos	50
1C 50 50 *n*H *n*L *m r*	Print a logo previously saved	50
1C 50 54 *drv*	Read the memory overall size	51
1C 70 *n m*	Print NV bit image	52
1C 71 *n*	Define NV bit image	53
1C 74 *n*	Thai font management	43
1C C0 18 10 14 1A or 1C C0 18 10 14 1B	Hardware reset	88
1C EA *n*	Transmit printer serial number	57
1D 21 *n*	Select character size	44
1D 24 *n*L *n*H	Set absolute vertical print position in page mode	84
1D 28 4C *p*L *p*H *30 70 30 bx by c xL xH yL yH d1...dk*	Store graphics data in the print buffer in raster format	85
1D 28 6B 03 00 30 41 n	Select number of columns for PDF 417	65
1D 28 6B 03 00 30 42 n	Select number of rows for PDF 417	65
1D 28 6B 03 00 30 43 n	Select width of a module of PDF 417	65
1D 28 6B 03 00 30 44 n	Select height of a module of PDF 417	65
1D 28 6B 03 00 30 50 30 d1...dk	Store symbol data for PDF 417	67
1D 28 6B 03 00 30 51 30	Print symbol data for PDF 417	67
1D 28 6B 03 00 31 42 n	Select QR Code bar code version	68
1D 28 6B 03 00 31 43 n	Set size for QR Code module	72
1D 28 6B 03 00 31 45 n	Select error correction level for QR Code	72
1D 28 6B 03 00 31 50 31 d1...dk	Store symbol data for QR Code	72
1D 28 6B 03 00 31 51 31	Print symbol data for QR Code	73
1D 28 6B 03 00 31 52 30	Transmit QR Code print size	73
1D 28 6B 03 00 51 41 n	Select encoding scheme of DataMatrix	74
1D 28 6B 03 00 51 42 n	Select rotation of DataMatrix	74
1D 28 6B 03 00 51 43 n	Select dot size of the module for DataMatrix	74
1D 28 6B 03 00 51 44 n	Set size of the module for DataMatrix	75
1D 28 6B 03 00 51 50 33 d1...dk	Store symbol data for DataMatrix	75

Code (hexadecimal)	Command	Page
1D 28 6B 03 00 51 51 33	Print symbol data for DataMatrix	76
1D 28 6B 04 00 30 45 m n	Select error correction level for PDF 417	66
1D 28 6B 04 00 31 41 n1 n2	Select model for QR Code	68
1D 2A *x y d1...d(x × y × 8)*	Define downloaded bit image	54
1D 2F *m*	Print downloaded bit image	55
1D 3A	Select or cancel macro definition	87
1D 42 *n*	Select or cancel white/black reverse print mode	45
1D 48 *n*	Select printing position of HRI characters	76
1D 49 *n*	Transmit printer ID	57
1D 4C *n*L *n*H	Set left margin	30
1D 50 *x y*	Set horizontal and vertical minimum motion units	31
1D 56 *m or* 1D 56 *m n*	Select cut mode and cut paper (or code 1D 56 *m*)	24
1D 57 *n*L *n*H	Set printing area width	31
1D 5E *r t m*	Execute macro	87
1D 66 *n*	Select font for HRI characters	76
1D 68 *n*	Select bar code height	77
1D 6B *m [d1...dk]* 00 or 1D 6B *m n [d1...dk]*	Print bar code	77
1D 76 30 *m x*L *x*H *y*L *y*H *d1...dk*	Print raster bit image	56
1D 77 *n*	Select bar code width	79
1D 7C *n*	Select printing density	88
1D E0 *n*	Enable or disable automatic full status back	58
1D E1	Reading length of paper available before virtual paper-end	63
1D E2	Reading number of cuts performed by the auto cutter	63
1D E3	Reading length of printed paper	63
1D E5	Reading number of power up	63
1D E6 *n*H *n*L	Select virtual paper end limit	88
1D F0 *n*	Select print speed	88

Appendix B: Resident Character Sets

Character sets

Character code table Page 0 (PC437: USA, Standard Europe)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	¢	£	¥	₧	ƒ
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	⌐	¬	½	¼	¡	«	»
B0	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	□
E0	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0	≡	±	≥	≤	⌠	⌡	÷	≈	°	∙	·	√	ⁿ	²	■	NBSP

Character code table Page 1 (KATAKANA: Asia)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	_	▬	▬	▬	■	▮	▮	▮	|	|	▌	▌	▌	▌	▮	┼
90	┴	┬	┤	├	¯	─	|		┌	┐	└	┘	╭	╮	╰	╯
A0		。	「	」	、	・	ヲ	ァ	ィ	ゥ	ェ	ォ	ャ	ュ	ョ	ッ
B0	ー	ア	イ	ウ	エ	オ	カ	キ	ク	ケ	コ	サ	シ	ス	セ	ソ
C0	タ	チ	ツ	テ	ト	ナ	ニ	ヌ	ネ	ノ	ハ	ヒ	フ	ヘ	ホ	マ
D0	ミ	ム	メ	モ	ヤ	ユ	ヨ	ラ	リ	ル	レ	ロ	ワ	ン	゛	゜
E0	=	├	≠	┤	◢	◣	◤	◥	♠	♥	♦	♣	●	○	/	\
F0	X	円	年	月	日	時	分	秒	干	市	区	町	村	人	▒	

Character code table Page 2 (PC850: Multilingual Latin I)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	Ø	×	ƒ
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	®	¬	½	¼	¡	«	»
B0	░	▒	▓	│	┤	Á	Â	À	©	╣	║	╗	╝	¢	¥	┐
C0	└	┴	┬	├	─	┼	ã	Ã	╚	╔	╩	╦	╠	═	╬	¤
D0	ð	Ð	Ê	Ë	È	ı	Í	Î	Ï	┘	┌	█	▄	¦	Ì	□
E0	Ó	ß	Ô	Ò	õ	Õ	µ	þ	Þ	Ú	Û	Ù	ý	Ý	¯	´
F0	SHY	±	‗	¾	¶	§	÷	¸	°	¨	·	¹	³	²	■	NBSP

Character code table Page 3 (PC860: Portuguese)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	Ç	ü	é	â	ã	à	Á	ç	ê	Ê	è	Í	Ô	ì	Ã	Â
90	É	À	È	ô	ö	ò	Ú	ù	Ì	Õ	Ü	¢	£	Ù	₧	Ó
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	Ò	¬	½	¼	¡	«	»
B0	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	□
E0	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0	≡	±	≥	≤	⌠	⌡	÷	≈	°	∙	·	√	ⁿ	²	■	NBSP

Character code table Page 4 (PC863: Canadian/French)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	Ç	ü	é	â	Â	à	¶	ç	ê	ë	è	ï	î	‗	À	§
90	É	È	Ê	ô	Ë	Ï	û	ù	¤	Ô	Ü	¢	£	Ù	Û	ƒ
A0	¦	´	ó	ú	¨	¸	³	¯	Î	⌐	¬	½	¼	¾	«	»
B0	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	□
E0	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0	≡	±	≥	≤	⌠	⌡	÷	≈	°	∙	·	√	ⁿ	²	■	NBSP

Character code table Page 5 (PC865: Nordic)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	Ø	₧	ƒ
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	⌐	¬	½	¼	¡	«	¤
B0	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	□
E0	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0	≡	±	≥	≤	⌠	⌡	÷	≈	°	∙	·	√	ⁿ	²	■	NBSP

Character code table Page 6 (VISCII: Vietnamese Standard Code)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	Ắ	ETX	EOT	Ẵ	Ẫ	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	Ỷ	NAK	SYN	ETB	CAN	Ỹ	SUB	ESC	FS	GS	Ợ	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	Ạ	Ấ	Ầ	Ặ	Ẩ	Ằ	Ẳ	Ậ	Ẽ	Ẹ	Ế	Ề	Ể	Ễ	Ệ	Ố
90	Ồ	Ổ	Ỗ	Ộ	Ợ	Ớ	Ờ	Ở	Ị	Ỏ	Ọ	Ỉ	Ủ	Ũ	Ụ	Ỳ
A0	Õ	ắ	ằ	ặ	ấ	ầ	ẩ	ậ	ẽ	ẹ	ế	ề	ể	ễ	ệ	ố
B0	ồ	ổ	ỗ	Ỡ	ơ	ộ	ờ	ở	ị	ự	Ứ	Ừ	Ử	ơ	ó	ư
C0	À	Á	Â	Ã	Ả	Ă	ẳ	ẵ	È	É	Ê	Ẻ	Ì	Í	Ĩ	ỳ
D0	Đ	ứ	Ò	Ó	Ô	ạ	ỷ	ừ	ử	Ù	Ú	ỹ	ỵ	Ý	ỡ	ư
E0	à	á	â	ã	ả	ă	ữ	ẫ	è	é	ê	ẻ	ì	í	ĩ	ỉ
F0	đ	ự	ò	ó	ô	õ	ỏ	ọ	ụ	ù	ú	ũ	ủ	ý	ợ	Ữ

Character code table Page 13 (PC857: Turkish)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ı	Ä	Å
90	É	æ	Æ	ô	ö	ò	û	ù	İ	Ö	Ü	ø	£	Ø	Ş	ş
A0	á	í	ó	ú	ñ	Ñ	Ğ	ğ	¿	®	¬	½	¼	¡	«	»
B0	░	▒	▓	│	┤	Á	Â	À	©	╣	║	╗	╝	¢	¥	┐
C0	└	┴	┬	├	─	┼	ã	Ã	╚	╔	╩	╦	╠	═	╬	¤
D0	º	ª	Ê	Ë	È		Í	Î	Ï	┘	┌	█	▄	¦	Ì	□
E0	Ó	ß	Ô	Ò	õ	Õ	µ		×	Ú	Û	Ù	ì	ÿ	¯	´
F0	-	±		¾	¶	§	÷	¸	°	¨	·	¹	³	²	■	NBSP

Character code table Page 14 (PC737: Greek)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	Α	Β	Γ	Δ	Ε	Ζ	Η	Θ	Ι	Κ	Λ	Μ	Ν	Ξ	Ο	Π
90	Ρ	Σ	Τ	Υ	Φ	Χ	Ψ	Ω	α	β	γ	δ	ε	ζ	η	θ
A0	ι	κ	λ	μ	ν	ξ	ο	π	ρ	ς	σ	τ	υ	φ	χ	ψ
B0	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	□
E0	ω	ά	έ	ή	ϊ	ί	ό	ύ	ϋ	ώ	Ά	Έ	Ή	Ί	ε	Ό
F0	Ώ	±	≥	≤	Ϊ	Ϋ	÷	≈	°	∙	·	√	ⁿ	²	■	NBSP

Character code table Page 16 (WPC1252: Latin I)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	€	₹	‚	ƒ	„	…	†	‡	ˆ	‰	Š	‹	Œ		Ž	
90		‘	’	“	”	•	–	—	˜	™	š	›	œ		ž	Ÿ
A0	NBSP	¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
B0	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
E0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

Character code table Page 17 (PC866: Russian)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
90	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
A0	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
B0	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	□
E0	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я
F0	Ё	ё	Є	є	Ї	ї	Ў	ў	°	∙	·	√	№	¤	■	NBSP

Character code table Page 18 (PC852: Latin II)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	Ç	ü	é	â	ä	ů	ć	ç	ł	ë	Ő	ő	î	Ź	Ä	Ć
90	É	Ĺ	Í	ô	ö	Ľ	ľ	Ś	ś	Ö	Ü	Ť	ť	Ł	×	č
A0	á	í	ó	ú	Ą	ą	Ž	ž	Ę	ę	¬	ź	Č	ş	«	»
B0	░	▒	▓	│	┤	Á	Â	Ě	Ş	╣	║	╗	╝	Ż	ż	┐
C0	└	┴	┬	├	─	┼	Ă	ă	╚	╔	╩	╦	╠	═	╬	¤
D0	đ	Đ	Ď	Ë	ď	Ň	Í	Î	ě	┘	┌	█	▄	Ţ	Ů	□
E0	Ó	ß	Ô	Ń	ń	ň	Š	š	Ŕ	Ú	ŕ	Ű	ý	Ý	ţ	´
F0	-	˝	˛	ˇ	˘	§	÷	¸	°	¨	˙	ű	Ř	ř	■	NBSP

Character code table Page 19 (PC858: Multilingual I + Euro)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	Ø	×	ƒ
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	®	¬	½	¼	¡	«	»
B0	░	▒	▓	|	┤	Á	Â	À	©	╣	║	╗	╝	¢	¥	┐
C0	└	┴	┬	├	─	┼	ã	Ã	╚	╔	╩	╦	╠	═	╬	¤
D0	ð	Ð	Ê	Ë	È	€	Í	Î	Ï	┘	┌	█	▄	¦	Ì	□
E0	Ó	ß	Ô	Ò	õ	Õ	µ	þ	Þ	Ú	Û	Ù	ý	Ý	¯	´
F0	SHY	±	‗	¾	¶	§	÷	¸	°	¨	·	¹	³	²	■	NBSP

Character code table Page 20 (KU42: Thai)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	┌	┐	└	┘	│	─	├	┤	┴	┬	┼	▉	←	↑	→	↓
90	๐	๑	๒	๓	๔	๕	๖	๗	๘	๙	ข	ฃ	โ	ใ	ไ	ๆ
A0	NBSP	ก	ข	ค	ฆ	ง	จ	ฉ	ช	ซ	ฌ	ญ	ฎ	ฏ	ฐ	ฑ
B0	ฒ	ณ	ด	ต	ถ	ท	ธ	น	บ	ป	ผ	ฝ	พ	ฟ	ภ	ม
C0	ย	ร	ฤ	ล	ว	ศ	ษ	ส	ห	ฬ	อ	ฮ	ะ	ฦ	า	ำา
D0	เ	แ	โ	ใ	ไ	ๆ	ฯ	ุ	ู	ิ	ี	ึ	ื	ั	็	็
E0	่	้	๊	๋	์	็	็	ั	็	็						
F0																NBSP

Character code table Page 32 (PC720: Arabic)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80			é	â		à		ç	ê	ë	è	ï	î			
90		◌ً	◌ْ	ô	¤	ـ	û	ù	ء	آ	أ	ؤ	£	إ	ئ	ا
A0	ب	ة	ت	ث	ج	ح	خ	د	ذ	ر	ز	س	ش	ص	«	»
B0	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	▉	▄	▌	▐	□
E0	ض	ط	ظ	ع	غ	ف	µ	ق	ك	ل	م	ن	ـه	و	ى	ي
F0	≡	◌ً	◌ٌ	◌ٍ	◌َ	≈	°	∙	·	√	ⁿ	²	■	NBSP	▪	NBSP

Character code table Page 34 (PC855: Cyrillic)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	ђ	Ђ	ѓ	Ѓ	ё	Ё	є	Є	s	S	i	I	ї	Ї	j	J
90	љ	Љ	њ	Њ	ћ	Ћ	ќ	Ќ	ў	Ў	џ	Џ	ю	Ю	ъ	Ъ
A0	а	А	б	Б	ц	Ц	д	Д	е	Е	ф	Ф	г	Г	«	»
B0	░	▒	▓	│	┤	х	Х	и	И	╣	║	╗	╝	й	Й	┐
C0	└	┴	┬	├	─	┼	к	К	╚	╔	╩	╦	╠	═	╬	¤
D0	л	Л	м	М	н	Н	о	О	п	┘	┌	█	▄	П	я	□
E0	Я	р	Р	с	С	т	Т	у	У	ж	Ж	в	В	ь	Ь	№
F0	SHY	ы	Ы	з	З	ш	Ш	э	Э	щ	Щ	ч	Ч	§	■	NBSP

Character code table Page 36 (PC862: Hebrew)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	א	ב	ג	ד	ה	ו	ז	ח	ט	י	ך	כ	ל	ם	מ	ן
90	נ	ס	ע	ף	פ	ץ	צ	ק	ר	ש	ת	¢	£	¥	Pt	ƒ
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	®	¬	½	¼	¡	«	»
B0	░	▒	▓	|	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	▉	▄	▌	▐	□
E0	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0	≡	±	≥	≤	⌠	⌡	÷	≈	°	∙	·	√	ⁿ	²	■	NBSP

Character code table Page 37 (PC864: Arabic)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	°	∙	·	√	▒	─	│	┼	┤	┬	├	┴	┐	┌	└	┘
90	β	∞	φ	±	½	¼	≈	«	»	لأ	لأ			لا	لا	
A0	NBSP	-	آ	£	¤	أ			ا	ب	ت	ث	،	ج	ح	خ
B0	٠	١	٢	٣	٤	٥	٦	٧	٨	٩	ف	؛	س	ش	ص	؟
C0	¢	ء	آ	أ	ؤ	ع	ئ	ا	ب	ة	ت	ث	ج	ح	خ	د
D0	ذ	ر	ز	س	ش	ص	ض	ط	ظ	ع	غ	¦	¬	÷	×	ع
E0	ـ	ف	ق	ك	ل	م	ن	ه	و	ى	ي	ض	ع	غ	غ	م
F0	ّ	ً	ن	ه	ﻫ	ى	ي	غ	ق	لآ	لآ	ل	ك	ي	■	

Character code table Page 39 (ISO8859-2: Latin 2)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80																
90																
A0	NBSP	Ą	˘	Ł	¤	Ľ	Ś	§	¨	Š	Ş	Ť	Ź	-	Ž	Ż
B0	°	ą	˛	ł	´	ľ	ś	ˇ	¸	š	ş	ť	ź	˝	ž	ż
C0	Ŕ	Á	Â	Ă	Ä	Ĺ	Ć	Ç	Č	É	Ę	Ë	Ě	Í	Î	Ď
D0	Đ	Ń	Ň	Ó	Ô	Ő	Ö	×	Ř	Ů	Ű	Ű	Ü	Ý	Ţ	ß
E0	ŕ	á	â	ă	ä	ĺ	ć	ç	č	é	ę	ë	ě	í	î	ď
F0	đ	ń	ň	ó	ô	ő	ö	÷	ř	ů	ú	ű	ü	ý	ţ	˙

Character code table Page 44 (PC1125: Ukrainian)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
90	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
A0	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
B0	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	□
E0	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я
F0	Ё	ё	Ґ	ґ	Є	є	І	і	Ї	ї	÷	±	№	¤	■	NBSP

Character code table Page 45 (WPC1250: Central Europe)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	€		‚		„	…	†	‡		‰	Š	‹	Ś	Ť	Ž	Ź
90		‘	’	“	”	•	–	—		™	š	›	ś	ť	ž	ź
A0	NBSP	ˇ	˘	Ł	¤	Ą	¦	§	¨	©	Ş	«	¬	-	®	Ż
B0	°	±	˛	ł	´	µ	¶	·	¸	ą	ş	»	Ľ	˝	ľ	ż
C0	Ŕ	Á	Â	Ă	Ä	Ĺ	Ć	Ç	Č	É	Ę	Ë	Ě	Í	Î	Ď
D0	Đ	Ń	Ň	Ó	Ô	Ő	Ö	×	Ř	Ů	Ú	Ű	Ü	Ý	Ţ	ß
E0	ŕ	á	â	ă	ä	ĺ	ć	ç	č	é	ę	ë	ě	í	î	ď
F0	đ	ń	ň	ó	ô	ő	ö	÷	ř	ů	ú	ű	ü	ý	ţ	˙

Character code table Page 46 (WPC1251: Cyrillic)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	Ђ	Ѓ	‚	ѓ	„	…	†	‡	€	‰	Љ	‹	Њ	Ќ	Ћ	Џ
90	ђ	‘	’	“	”	•	–	—		™	љ	›	њ	ќ	ћ	џ
A0	NBSP	Ў	ў	Ј	¤	Ґ	¦	§	Ё	©	Є	«	¬	-	®	Ї
B0	°	±	І	і	ґ	µ	¶	·	ё	№	є	»	ј	S	s	ї
C0	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
D0	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
E0	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
F0	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я

Character code table Page 47 (WPC1253: Greek)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	ΔΔ
80	€		‚	ƒ	„	…	†	‡		‰		‹				
90		‘	’	“	”	•	–	—		™		›				
A0	NBSP	΅	Ά	£	¤	¥	¦	§	¨	©		«	¬	SHY	®	―
B0	°	±	²	³	΄	µ	¶	·	Έ	Ή	Ί	»	Ό	½	Ύ	Ώ
C0	ΐ	Α	Β	Γ	Δ	Ε	Ζ	Η	Θ	Ι	Κ	Λ	Μ	Ν	Ξ	Ο
D0	Π	Ρ		Σ	Τ	Υ	Φ	Χ	Ψ	Ω	Ϊ	Ϋ	ά	έ	ή	ί
E0	ΰ	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ	ο
F0	π	ρ	ς	σ	τ	υ	φ	χ	ψ	ω	ϊ	ϋ	ό	ύ	ώ	

Character code table Page 48 (WPC1254: Turkish)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	€		‚	ƒ	„	…	†	‡	ˆ	‰	Š	‹	Œ			
90		‘	’	“	”	•	–	—	˜	™	š	›	œ			Ÿ
A0	NBSP	¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
B0	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0	Ğ	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	İ	Ş	ß
E0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0	ğ	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ı	ş	ÿ

Character code table Page 49 (WPC1255: Hebrew)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	€		‚	ƒ	„	…	†	‡	ˆ	‰		‹				
90		‘	’	“	”	•	–	—	˜	™		›				
A0	NBSP	¡	¢	£	₪	¥	¦	§	¨	©	×	«	¬	-	®	¯
B0	°	±	²	³	´	µ	¶	·	¸	¹	÷	»	¼	½	¾	¿
C0	ִ	ֱ	ֲ	ֳ	ִ	ֵ	ֶ	ַ	ָ	ֹ	ֺ	ֻ	ּ	ֽ	-	-
D0	׀	ׁ	ׂ	׃	ׄ	ׅ	׆	ׇ								
E0	א	ב	ג	ד	ה	ו	ז	ח	ט	י	ך	כ	ל	ם	מ	ן
F0	נ	ס	ע	ף	פ	ץ	צ	ק	ר	ש	ת			LRM	RLM	

Character code table Page 50 (WPC1256: Arabic)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	€	پ	‚	ƒ	„	…	†	‡	ˆ	‰	ٹ	‹	Œ	چ	ژ	ڈ
90	گ	'	'	"	"	•	–	—	ک	™	ڑ	›	œ	ZWNJ	ZWJ	ں
A0	NBSP	،	¢	£	¤	¥	¦	§	¨	©	ھ	«	¬	-	®	¯
B0	°	±	²	³	´	µ	¶	·	¸	¹	؛	»	¼	½	¾	؟
C0	ہ	ء	آ	أ	ؤ	إ	ئ	ا	ب	ة	ت	ث	ج	ح	خ	د
D0	ذ	ر	ز	س	ش	ص	ض	×	ط	ظ	ع	غ	ـ	ف	ق	ك
E0	à	ل	â	م	ن	ه	و	ç	è	é	ê	ë	ى	ي	î	ï
F0	ً	ٌ	ٍ	َ	ô	ُ	ِ	÷	ّ	ù	ْ	û	ü	LRM	RLM	ے

Character code table Page 51 (WPC1257: Baltic)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	€		‚		„	…	†	‡		‰		‹		¨	ˇ	¸
90		‘	’	“	”	•	–	—		™		›		¯	˛	
A0	NBSP		¢	£	¤		¦	§	Ø	©	Ŗ	«	¬	-	®	Æ
B0	°	±	²	³	´	µ	¶	·	ø	¹	ŗ	»	¼	½	¾	æ
C0	Ą	Į	Ā	Ć	Ä	Å	Ę	Ē	Č	É	Ź	Ė	Ģ	Ķ	Ī	Ļ
D0	Š	Ń	Ņ	Ó	Ō	Õ	Ö	×	Ų	Ł	Ś	Ū	Ü	Ż	Ž	ß
E0	ą	į	ā	ć	ä	å	ę	ē	č	é	ź	ė	ģ	ķ	ī	ļ
F0	š	ń	ņ	ó	ō	õ	ö	÷	ų	ł	ś	ū	ü	ż	ž	˙

Character code table Page 52 (WPC1258: Vietnamese)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL	STX	SOT	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
10	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
20	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌂
80	€		‚	ƒ	„	…	†	‡	ˆ	‰		‹	Œ			
90		‘	’	“	”	•	–	—	˜	™		›	œ			Ÿ
A0	NBSP	¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	SHY	®	¯
B0	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0	À	Á	Â	Ă	Ä	Å	Æ	Ç	È	É	Ê	Ë	̀	Í	Î	Ï
D0	Đ	Ñ	̃	Ó	Ô	Ơ	Ö	×	Ø	Ù	Ú	Û	Ü	Ư	̃	ß
E0	à	á	â	ă	ä	å	æ	ç	è	é	ê	ë	́	í	î	ï
F0	đ	ñ	̣	ó	ô	ơ	ö	÷	ø	ù	ú	û	ü	ư	₫	ÿ