

Programming Guide

HP Engage One Serial USB and Column Thermal Printers



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Chapter 1: About this Guide

How to use this guide

This is a supplemental guide providing programming information about 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 about setup or basic operation, see 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: Diagnostics and Configuration

The printer performs a number of diagnostics that provide useful information about the operating status of the printer. The following diagnostic tests are available.

- Start-up diagnostics
Performed during the printer's start-up cycle.
- Runtime diagnostics
Performed during normal printer operation.
- Remote diagnostics
Maintained during normal operation and reported in the print test.
- The printer can be configured with the following settings and functions through the configuration menu that is printed on the receipt. For more information about configuring the printer, see "Printer configuration" on page 15.
 - Communication interfaces
 - Diagnostic modes
 - Printer emulations/software options
 - Hardware options
 - Paper Type
 - Firmware features

Start-up Diagnostics

When the printer receives power or performs a hardware reset, it automatically performs the startup diagnostics (also known as level 0 diagnostics) during the start-up cycle. The following diagnostics are performed:

- Turn off motors
- Perform boot CRC check of the firmware ROM and test main program CRC
Failure causes Start-up Diagnostics to stop; the printer beeps and the LED flashes a set number of times, indicating the nature of the failure. The table in the "Indicators" section (page 14) describes the specific tone and LED sequences.
- Check if paper is present
- Return the knife to the home position
Failure causes a fault condition. The table in the "Indicators" section (page 14) describes the specific tone and LED sequences.
- Check if receipt cover is closed
Failure does not interrupt the start-up cycle.

At power up, if the LED blinks twice, every four seconds, the object storage areas are being initialized. This process could take up to two minutes. Once the object storage area initialization is complete the printer will continue with its normal startup procedure and operation. **DO NOT RESET THE PRINTER UNTIL THIS PROCESS IS COMPLETE.**

When the start-up diagnostics are complete, the printer makes a two-tone beep (low then high frequency), the paper feed button is enabled, and the printer is ready for normal operation.

If the printer has not been turned on before, or a new EEPROM has been installed, the default values for the printer functions will be loaded into the EEPROM during start-up diagnostics, and the printer will make a quick four-tone beep (high then low frequency, twice)

Runtime diagnostics

Runtime diagnostics (sometimes called level 2 diagnostics) run during normal printer operation. When the following conditions occur, the printer automatically turns off the appropriate motors and disables printing to prevent damage to the printer:

- Paper out
- Receipt cover open
- Knife unable to home
- Printhead too hot
- Voltages out of range

The LED on the operator panel will signal when these conditions occur as well as indicate what state or mode the printer is in.

Remote diagnostics

Remote diagnostics (sometimes called level 3 diagnostics) keeps track of the following tallies and prints them on the receipt during the print test. See the sample test printout on the next page. These tallies can be used to determine the printer's state of health.

- Model number
- Serial number
- CRC number
- Number of lines printed
- Number of knife cuts
- Number of hours the printer has been on
- Number of flash cycles
- Number of cutter jams
- Number of times the cover is opened
- Number of barcodes printed
- Number of receipt characters printed
- Number of printer faults
- Maximum temperature reached
- Number of dots printed
- Number of dots printed on current printhead
- Number of printhead changes
- Number of receipt mechanism changes
- Number of knife mechanism changes
- Number of thermistor errors
- Number of low voltage errors
- Number of high voltage errors
- Number of firmware starts
- Number of EEPROM updates

H300 Diagnostics Form

Column

*** H300 - Diagnostics Form ***	
Model number	: H300-E8CC-NNN0
Serial number	: 0000000000
Loader Firmware	
P/N	: PN#: 189-30CL116
Date	: Sep 16 2016
Flash Firmware	
Revision	: V1.54
CRC	: 0DCF
P/N	: 189-30CA154A
H/W parameters	
Flash Memory Size	: 8 Mbytes
Flash Logos/Fonts	: 1600 kbytes
Flash User Storage	: 576 kbytes
Flash Perm'nt Fonts	: 2240 kbytes
Flash Journal Size	: 640 kbytes
SRAM Size	: 512 kbytes
Head setting	: N
Motor ID	: 1
Paper Type Setting	: Type 0, Monochrome
Color Density Adj	: n/a
Print Density, Mono	: 100%
Max Speed	: 114 mm/sec
Paper Width	: 80 mm
Max Power	: 48w
Knife	: Enabled
Partial Cut	: 135 steps
Paper Low Sensor	: Disabled
No Paper Low Extension	
Comm. Interface	
Interface	: USB
RX Buffer Size	: 4096
USB Driver Type	: Printer Class
Interface	: RS232
RX Buffer Size	: 4096
Parameters	
Baud Rate	: 115200
Data Bits	: 8
Stop Bit	: 1
Parity	: NONE
Flow Control	: DTR/DSR
Reception Errors	: Ignore
Resident Code Pages	: 437, 720, 737, 775, 850 852, 857, 858, 860, 862...

To Enter Printer Config Menu
Press Feed Button Within the
Next Two Seconds

Standalone

*** H300 - Diagnostics Form ***	
Model number	: H300-E8SD-HPN0
Serial number	: 0000000000
Loader Firmware	
P/N	: PN#: 189-30SL116
Date	: Sep 16 2016
Flash Firmware	
Revision	: V1.54
CRC	: 0DCF
P/N	: 189-30SA154A
H/W parameters	
Flash Memory Size	: 8 Mbytes
Flash Logos/Fonts	: 1600 kbytes
Flash User Storage	: 576 kbytes
Flash Perm'nt Fonts	: 2240 kbytes
Flash Journal Size	: 640 kbytes
SRAM Size	: 512 kbytes
Head setting	: N
Motor ID	: 1
Paper Type Setting	: Type 0, Monochrome
Color Density Adj	: n/a
Print Density, Mono	: 100%
Max Speed	: 114 mm/sec
Paper Width	: 80 mm
Max Power	: 48w
Knife	: Enabled
Partial Cut	: 135 steps
Paper Low Sensor	: Disabled
No Paper Low Extension	
Comm. Interface	
Interface	: USB
RX Buffer Size	: 4096
USB Driver Type	: Printer Class
Interface	: RS232
RX Buffer Size	: 4096
Parameters	
Baud Rate	: 115200
Data Bits	: 8
Stop Bit	: 1
Parity	: NONE
Flow Control	: DTR/DSR
Reception Errors	: Ignore
Resident Code Pages	: 437, 720, 737, 775, 850 852, 857, 858, 860, 862...

To Enter Printer Config Menu
Press Feed Button Within the
Next Two Seconds

Print test will vary per model or printer configuration.

(Shown approximately 60% of size.)

For more information about

Accessing the remote diagnostic tallies

See this section

“Command descriptions” in Chapter 4: Programming commands
(Status commands: Transmit printer ID, remote diagnostics extension,
Hexadecimal 1D 49 40 n)

Indicators

The printer communicates various conditions both visually, with the green LED or audibly, with a series of tones or beeps. The following table lists these indicators.

Indicator	Sequence	Condition
LED	Continuous, flashing quickly	Paper out Cover open Knife unable to home
LED	Continuous, flashing slowly	Printhead too hot Voltages low/high
LED	Continuous, Double LED flash	Write to permanent memory in progress
Tone	Two-tone beep (low frequency, high frequency)	Start-up diagnostics completed successfully
LED and Tone	Two-Tone beep (high frequency, low frequency) Continuous, quick blinking of LED	When entering flash download mode*

*Note: The printer enters flash download mode when a download command is sent to the printer.

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 <i>Chapter 4: Using the Printer</i> , in the User Guide
Communication of printer status to the host application	"Command descriptions" in <i>Chapter 4: Programming commands</i> , 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 settings 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
 - Baud rate
 - Parity
 - Hardware (DTR/DSR) or software (XON/XOFF) flow control
 - Data reception errors
 - Alternate DTR/DSR
 - USB Driver
 - USB NAK
- Diagnostics Modes
 - Normal
 - Datascope (with or without graphics)
 - Receipt test
- Printer Emulations
 - Native mode
 - A794 emulation
 - A793 emulation
 - LEGACY emulation
- Emulation/Software options
 - Printer ID mode
 - Default lines per inch
 - Carriage return usage
 - Code 128 Check Digit
 - Default font
 - Font size
 - Journal Print
- Hardware options
 - Monochrome print density
 - Partial cut distance
 - Fine partial cut steps
 - Printhead setting (cannot change)
- Firmware features
 - Paper selection lockout
 - Beep after knife cut
 - Cash drawer open after knife cut

For more information about See this section

Using the configuration menu to configure the printer "Configuring the printer" on page 16.

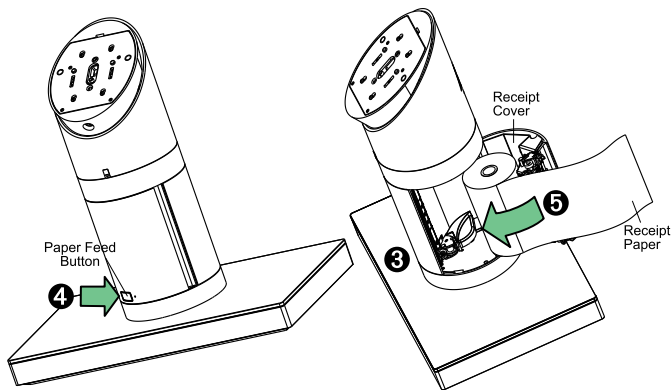
Configuring the printer

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.

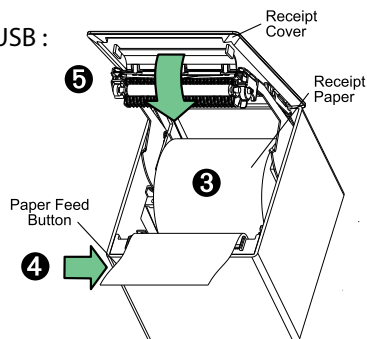
Caution: *Be extremely careful changing any of the printer settings to avoid changing other settings that might affect the performance of the printer.*

- 1 Turn power off to printer.
- 2 Make sure receipt paper is loaded in the printer before proceeding. Make sure cover is closed.

Column:



Serial USB :



- 3 Apply power to printer and immediately press and hold the paper feed button until the configuration printout begins.
 - The printer beeps, then prints Diagnostics Form I.
 - Press the paper feed button within two seconds after form finishes printing to enter the configuration main menu.
 - The printer prints Diagnostics Form II, followed by the Printer Configuration Menu, and waits for a main menu selection to be made (see sample printout on page 13; short clicks are used, except when answering “yes” or validating selection).

- 4 To communicate with the printer, you will press the paper feed button using either short or long clicks. Use a long click for “yes” (more than one second) and a short click for “no.” Follow the printed instructions to make selections.
 - 5 Continue through your menu selections until you are asked, “Save New Parameters?” Select “Yes.”
 - a Reset the Printer.
 - b Open the receipt cover.
 - Press and hold the paper feed button while closing the receipt cover.
- The diagnostic printout verifies your new settings.

Communication interface settings

To change the communication interface settings, enter the configuration menu, select “Set Communication Interface” from the main menu.

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

Press the paper feed button as instructed on the configuration menu to select the settings you want to change.

- | | |
|--|---|
| <ul style="list-style-type: none"> • Baud rate <ul style="list-style-type: none"> 115200 baud 57600 baud 38400 baud 19200 baud 9600 baud 4800 baud 2400 baud 1200 baud • Parity <ul style="list-style-type: none"> No Parity Even Parity Odd Parity • Flow control method <ul style="list-style-type: none"> Software (XON/XOFF) Hardware (DTR/DSR) | <ul style="list-style-type: none"> • Data reception errors <ul style="list-style-type: none"> Ignore errors Print “?” • Alternate DTR/DSR <ul style="list-style-type: none"> Enabled Disabled • USB Driver <ul style="list-style-type: none"> Printer Class Comm Class • USB NAK <ul style="list-style-type: none"> Reject Packets When Error Accept Packets When Error |
|--|---|

Note: *Press the paper feed button for at least one second to validate the selection.*

For more information about

Setting the RS-232C Serial interface settings

See this section

“Configuring the printer” on page 16

Diagnostics modes

To change the diagnostic modes enter the configuration menu, select “Set Diagnostics Modes” from the main menu and select one of the following modes:

- **Normal:** normal operating mode of the printer.
- **Datascopes:** the receipt printer prints incoming commands and data in hexadecimal format to help troubleshoot communication problems. There are DataScope modes for both with and without graphics.
- **Receipt test:** the receipt printer prints all code pages to verify proper printing of the receipt.

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

See “Configuring the printer,” page 16 for instructions on how to enter the configuration menu.

Enable or disable data scope mode

The data scope mode test prints a hexadecimal dump of all data sent to the printer: “1” prints as hexadecimal 31, “A” as hexadecimal 41 and so on. This helps troubleshoot communication problems and runs during a normal application (after being enabled through printer configuration).

Note: *Data scope mode is usually considered a level 1 diagnostic test.*

Data scope mode is enabled and disabled by selecting the “Diagnostics Modes” sub-menu of the configuration menu.

Press the paper feed button as instructed on the “Diagnostics Modes Menu” to enable or disable the data scope mode test.

- Off, normal mode (Data scope mode disabled)
- Data scope mode with or without graphics (enabled)

Note: *Press the paper feed button for at least one second to validate the selection.*

To run the data scope mode:

- 1 After you have enabled the data scope mode, exit the configuration menu.
- 2 Run a transaction from the host computer.

All commands and data sent from the host computer will be printed as hexadecimal characters as shown in the illustration.

```

20 54 68 65 72 6D 61 6C : Thermal
20 50 72 69 6E 74 20 54 : Print T
65 63 68 6E 6F 6C 6F 67 : echnolog
79 0D 0A 20 20 20 20 20 : y
20 20 20 20 20 20 20 20 :

```

To exit the data scope mode:

- 1 Enter the configuration menu again.
- 2 Disable the data scope mode.
- 3 Exit the configuration menu.

The printer is on-line and can communicate normally with the host computer.

For more information about

Enabling the data scope mode

See this section

“Configuring the printer” on page 16

Enable or disable receipt test mode

The receipt test mode verifies proper receipt printing. Receipt test is enabled and disabled by selecting the “Diagnostics Modes” sub-menu of the configuration menu. See “Configuring the printer”, page 16 for instructions on how to enter the configuration menu.

To run the receipt test mode:

- 1 Enable the receipt test mode in the configuration menu.
- 2 Exit the configuration menu.
- 3 Push the paper feed button. The receipt station prints all code pages and cuts the receipt.
- 4 To repeat this test, push the paper feed button again.

To exit the receipt test mode:

- 1 Enter the configuration menu again.
- 2 Disable the receipt test mode.
- 3 Exit the configuration menu.

The printer is on-line and can again communicate normally with the host computer.

Electronic Journal Datascope Diagnostic

1F 03 18 02 n=1, turn on electronic journal datascope, run time only

1F 03 18 02 n=0, n>1, turn off electronic journal datascope, run time only

1F 03 18 03 n=1, turn on electronic journal datascope, configuration saved over power cycle

1F 03 18 03 n=0, n>1, turn off electronic journal datascope, configuration saved over power cycle

When enabled, “Auto Journal : Datascope” prints on the second diagnostic page.

This diagnostic is for debugging purposes, and should be used only under the direction of customer support.

Printer emulations

To change the printer emulations settings, enter the configuration menu, select “Emulation/Software Options” from the main menu and answer “Yes” to “Set printer mode?” printed on the receipt. This will take you to the instructions for setting the printer emulation.

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

Press the paper feed button as instructed to select the printer emulation you want.

- Native mode
- A794 emulation
- A793 emulation
- LEGACY emulation

Note: *Press the paper feed button for at least one second to validate the selection.*

For more information about

Setting the printer emulation

See this section

“Configuring the Printer”, page 16

Printer settings and functions

To change the printer settings and functions, enter the configuration menu, select the sub-menu from the main menu and answer the questions printed on the receipt until you come to the instructions for selecting the printer settings.

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

Press the paper feed button as instructed to select the printer settings you want.

Select the emulation/software options sub-menu to set:

- Printer Mode

This function is used to set the printer emulation to Native, A794, A793 or Legacy emulation.

- Printer ID mode

This function is used to determine what printer ID value is returned in response to a Transmit printer ID command (1D 49 *n*) when the printer is in A794 emulation mode. The printer can be configured to send back the ID of the H300, A794, A793 or Application Compatible Escape Command systems.

- Default lines per inch

This function allows you to set the default for lines per inch to:

- 8.13 lines per inch
- 7.52 lines per inch
- 6.77 lines per inch
- 6.00 lines per inch

- Carriage return usage

This function allows the printer to ignore or use the *carriage return* (hexadecimal 0D) command depending on the application. Some applications expect the command to be ignored while others use the command as a print command.

- Code 128 Check Digit

Enables or disables the calculation of the check digit.

- Default font

Sets the default for monochrome and LEGACY emulations.

- Font size

Allows user to set font size for the emulation being used.

- Journal Print

Enables or disables operator action.

Select the hardware options sub-menu to set:

- Print density (monochrome papers only)

Adjusts printhead energy level to darken printout or adjust for paper variations. When printer prints high-density print lines (text or graphics), it automatically slows down. Factory setting for the H300 is 100%.

WARNING: Choose a print density setting no higher than necessary to achieve acceptable print density. Failure to observe this rule may result in a printer service call and may void the printer warranty. Running at a higher energy level will reduce the printhead life. Consult your HP technical support specialist if you have questions.

- Partial cut distance

Allows the user to set the distance that the knife will cut across a receipt in 5 step increments between 110-160.

- Fine partial cut steps

Allows the user to set the amount of extra steps the knife will cut across a receipt, between 0 and 4.

For more information about

Setting the printer functions and settings

See this section

“Configuring the printer”
(See page 16)

Select the firmware features sub-menu to set:

- Paper selection lockout
- Beep after knife cut
- Cash drawer open after knife cut

Allows the user to enable and set the time-out value to 15, 30, 60, 120, or 240 minutes, or to disable the feature.

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 groups. For this reason, “related” commands may not be listed adjacent to one another.

The operation of various printers may be emulated by the commands, including the following:

- A793/A794
- Native
- LEGACY

Any of the commands may be used in any combination to program a host computer to communicate with the printer (unless otherwise noted).

Some commands listed and described here may not be implemented and are identified as “not implemented.” If received, they are ignored and not sent to the print buffer as data.

Any nonlegal commands have their parameter sent to the print buffer as data.

Comparison to A793

The following table details the list of commands whose behavior differs between the A793, A794, and H300 because of the physical differences of a 6 dots/mm head (A793) versus an 8 dots/mm head (A794 and H300).

Command	Description	Difference between previous product and new product emulation mode.
15 n	Feed n dot rows	This command will move the paper on the receipt in n/203 inch steps instead of n/152 inch steps.
16 n	Add n extra dot rows	The dot rows will be measured in n/203 inches versus n/152 inches.
1B 20 n	Set right-side character spacing	This command sets the right side spacing to “n” horizontal motion units. By default, these units are in terms of 1/203 inches versus 1/152 inches.
1B 24 n1 n2	Set absolute starting position	For graphics commands, the position is scaled to best match A793. In text mode, the equivalent character position is calculated.
1B 26 s c1 c2 n1 d1...nn dn]	Define user-defined character set	Since the dots on the H300 printhead are smaller, user defined characters that were used on the previous printers will appear smaller on the H300 printer.
1B 2A m n1 n2 d1...dn	Select bit image mode	In A793 emulation mode, graphics are scaled to best match the size of the graphic in the A793 printer.
1B 33 n	Set line spacing	This command uses n in terms of n/360 inches. Since the A793 had a fundamental step of 1/152 inch and the H300 has a fundamental step of 1/203 inch, the actual line spacing will not exactly match the requested spacing.

Continued...

Command	Description	Difference between previous product and new product emulation mode.
1B 4A <i>n</i>	Print and feed paper	This command uses <i>n</i> in terms of $n/360$ inches. Since the A793 had a fundamental step of $1/152$ inch and the H300 has a fundamental step of $1/203$ inch, the actual line spacing will not exactly match the requested spacing.
1B 59 <i>n1 n2 d1...dn</i>	Select double-density graphics	In A793 emulation mode, the printer scales the graphics to provide the best match.
1B 5C <i>n1 n2</i>	Set relative print position	The parameter to this command is in units of dots. However, the command moves and aligns to character positions. In A793 emulation mode, this command calculates how many character positions to move based on the A793 character width in dots (10) versus the H300 (13).
1B 61 <i>n</i>	Select justification	This command does true dot resolution alignment for centering versus character-aligned centering.
1D 2A <i>n1 n2 d1...dn]</i>	Define downloaded bit image	In A793 emulation mode, this command scales the incoming data to provide a best match to the size of the image as it printed on A793.
1D 2F <i>m</i>	Print downloaded bit image	In A793 emulation mode, this command scales the incoming data to provide a best match to the size of the image as it printed on A793.

Character appearance

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

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

Width specifications

Standard

- Characters per inch: 15.6
- Characters per line: 44
- Cell size: 13 × 24 dots (default font)
 - 13 × 27 dots (Tall font)
 - 13 × 18 dots (paper-saving font)
 - 13 × 21 dots (paper-saving font 2)

Compressed

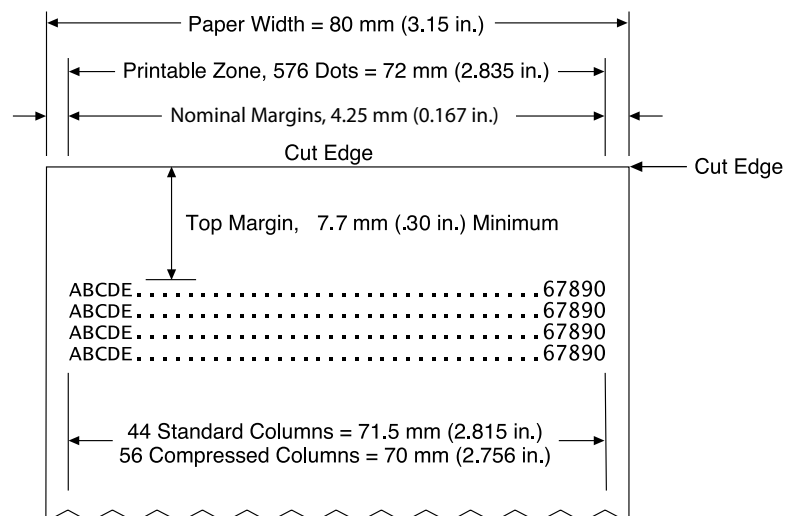
- Characters per inch: 20.3
- Characters per line: 56
- Cell size: 10 × 24 dots (default font)
 - 10 × 27 dots (Tall font)
 - 10 × 18 dots (paper-saving font)

Print zones

Print zones for 80mm paper

Specifications of print zone for 80mm paper:

- 576 dots (addressable) @ 8 dots/mm, centered on 80mm
- Standard mode: minimum margins: 2.0mm (.079 inches)
- Top margin to manual tear-off:
 - Column: 21.7mm (0.85 inches)
 - Serial USB : 31.7mm (1.25 inches)



- Top margin to knife cut: 7.7mm (0.30 inches)

Note: The application centers 44 standard character cells (13 × 24 dots), or 56 compressed character cells (10 × 24 dots), or 576 addressable bits of graphics across an 80mm wide receipt. Minimum print line height is 24 dots for text or graphics. Standard print line spacing is 27 dots (i.e., 3 extra row dots).

The H300 Series adds a 27 dot high font, so standard print spacing is 30 dots.

The H300 Series paper-saving feature adds a 18 dot high font and reduces extra dot rows to 2, so standard print spacing is 20 dots.

Rotated printing commands

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

Rotated clockwise and *rotated counterclockwise* print commands are mutually exclusive: the setting of the last received command is effective. Unintended consequences may result when *rotated clockwise* is mixed with other commands

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)	Rotated CCW (1B 12)	Resulting output
Canceled	Canceled	Cleared	A B C
Canceled	Set	X	A B C
Set	Canceled	X	C B A
Set	Set	X	C B A
X	X	Set	A B C

Note: The following print modes cannot be mixed on the same line:

- Right-side up and upside-down

Emulation modes

The HP printer may be operated in a number of different emulation modes. However, printing characteristics and defaults may differ, depending on the desired mode.

Print setup in emulation modes

Refer to the chart below for defaults and allowed printing options in each emulation mode.

Emulation mode	LPI options	Font(s) options	Font size	Default LPI	Default EDR	Comments
Native	6.00, 6.77, 7.52, 8.13	Standard	13 × 24	7.52	3	Default setup for monochrome paper
		Tall	13 × 27	6.77	3	
		Paper-saving	13 × 18	10.15	2	
		Paper-saving 2	13 × 21	9.67	0	
A793/A794 emulation	6.00, 7.52, 8.13	Standard	13 × 24	7.52	3	
LEGACY emulation	6.00	Tall	13 × 27	6.00	7	Default setup for Escape Commands
		Standard	13 × 24	6.00	10	

The following list clarifies how the H300 printer will behave in each emulation mode:

- If only the font is changed, the default LPI will automatically be changed as in the table above.
- If emulation is switched to LEGACY, Native, A794 or A793 emulation(s), the paper type will automatically be changed to monochrome paper, and the font and LPI will be changed as in the table above.
- If emulation is switched from any emulation to native the font and LPI will remain unchanged because the Native mode supports all font and LPI options offered in the emulation modes.
- The “Set Default LPI” option in the configuration menu is not offered in LEGACY emulation mode. The LPI is set at 6.00.

Chapter 4: Programming Commands

Commands listed by function

Printer actions		
Code (hexadecimal)	Command	Page
10	Clear printer	34
19	Perform full knife cut (or code 1B 69)	34
1A	Perform partial knife cut (or code 1B 6D)	35
1B 07	Generate tone	35
1B 3D <i>n</i>	Select peripheral device (for multi-drop)	35
1B 40	Initialize printer	36
1B 63 34 <i>n</i>	Select sensors to stop printing	36
1B 63 35 <i>n</i>	Enable or disable panel button	36
1B 69	Perform full knife cut (or code 19)	34
1B 6D	Perform partial knife cut (or code 1A)	35
1B 70 <i>n p1 p2</i>	Generate pulse to open cash drawer	37
1D 56 <i>m</i>	Select cut mode and cut paper (or code 1D 56 <i>m n</i>)	37
1D 56 <i>m n</i>	Select cut mode and cut paper (or code 1D 56 <i>m</i>)	37
1F 03 4E <i>n1 n2</i>	Port Idle Timeout	38
1F 74	Print test form	38
Print and paper feed		
Code (hexadecimal)	Command	Page
0A	Print and feed paper one line	39
0D	Print and carriage return	39
14 <i>n</i>	Feed <i>n</i> print lines	39
15 <i>n</i>	Feed <i>n</i> dot rows	40
16 <i>n</i>	Add <i>n</i> extra dot rows	40
17	Print	41
1B 4A <i>n</i>	Print and feed paper	41
1B 64 <i>n</i>	Print and feed <i>n</i> lines	41

Vertical and horizontal positioning

Code (hexadecimal)	Command	Page
09	Horizontal tab	42
1B 14 <i>n</i>	Set column	42
1B 24 <i>nL nH</i>	Set absolute starting position	43
1B 32	Set vertical line spacing to 1/6 inch	43
1B 33 <i>n</i>	Set vertical line spacing	44
1B 44 <i>n1...nk 00</i>	Set horizontal tab positions	44
1B 5C <i>n1 n2</i>	Set relative print position	45
1B 61 <i>n</i>	Select justification	46
1D 4C <i>nL nH</i>	Set left margin	46
1D 50 <i>x y</i>	Set horizontal and vertical minimum motion units	42
1D 57 <i>nL nH</i>	Set printing area width	47

Text characteristics

Code (hexadecimal)	Command	Page
12	Select double-wide characters	48
13	Select single-wide characters	48
1B 12	Select 90 degree counter-clockwise rotated print	48
1B 16 <i>n</i>	Select pitch (column width)	49
1B 20 <i>n</i>	Set right-side character spacing	49
1B 21 <i>n</i>	Select print mode	50
1B 25 <i>n</i>	Select or cancel user-defined character set	51
1B 26 <i>s c1 c2</i>	Define user-defined character set	51
1B 2D <i>n</i>	Select or cancel underline mode	52
1B 3A 30 30 30	Copy character set from ROM to RAM	53
1B 3F <i>n</i>	Cancel user-defined character	53
1B 45 <i>n</i>	Select or cancel emphasized mode	53
1B 47 <i>n</i>	Select or cancel double-strike	54
1B 49 <i>n</i>	Select or cancel italic print	54
1B 52 <i>n</i>	Select international character code	55
1B 56 <i>n</i>	Select or cancel 90 degree clockwise rotated print	56
1B 74 <i>n</i>	Select international character set	56
1B 7B <i>n</i>	Select or cancel upside-down print mode	57
1D 21 <i>n</i>	Select character size	58
1D 42 <i>n</i>	Select or cancel white/black reverse print mode	59
1D 62 <i>n</i>	Set smoothing	59
1D F0 01 <i>n</i>	Select font ID number	63
1D F0 02 <i>n</i>	Select font style number	63

1D F0 03	Save font ID number as default font at power up	63
1D F0 80	Download font	64
1D F0 C0 02	Download font list	61
1F 03 45 FSID	Configure use of font set over power cycles	61
1F 03 46 <i>n</i>	Configure line spacing	61
1F 05 <i>n</i>	Select superscript or subscript modes	60
1F 26 <i>s c1 c2</i>	Define extended user-defined character set	52
1F 69 <i>n</i>	Select active user-defined character set	60
1D F0 20 <i>nn</i>	Get double-byte font CRC (font ID)	63
1D F0 21 <i>nn mm</i>	Get double-byte font CRC (font ID and font style)	63

Graphics

Code (hexadecimal)	Command	Page
11 <i>n1 ... n72</i>	Print raster graphics	69
1B (+*.BMP file)	Download BMP logo	64
1B 2A <i>m n1 n2 d1 ... dn</i>	Select bit image mode	65
1B 2A 62 6d <i>n</i>	Turn on/off TIFF compression	65
1B 2E <i>m n rL rH d1 ... dn</i>	Print advanced raster graphics	66
1B 4B <i>n1 n2 d1 ... dn</i>	Select single-density graphics	66
1B 59 <i>n1 n2 d1 ... dn</i>	Select double-density graphics	66
1C 70 <i>n m</i>	Print flash logo	70
1C 71 <i>n ...</i>	Define flash logos	70
1D 23 <i>n</i>	Select the current logo (downloaded bit image)	67
1D 2A <i>n1 n2 d1 ... dn</i>	Define downloaded bit image	68
1D 2F <i>m</i>	Print downloaded bit image	69
1D 9B <i>m n</i>	Logo print with knife cut	70
1D A0 <i>nl nh</i>	Set temporary max target speed	71
1F 04 <i>n</i>	Convert 6-dots/mm bitmap to 8 dots/mm bitmap	71
1F 7B <i>n</i>	Enable constant speed logos	71

Status

Batch mode

Code (hexadecimal)	Command	Page
1B 75 0	Transmit peripheral device status (RS-232C printers only)	72
1B 76	Transmit paper sensor status	73
1D 49 <i>n</i>	Transmit printer ID	73
1D 49 40 <i>n</i>	Transmit printer ID, remote diagnostics extension	75
1D 72 <i>n</i>	Transmit status	78
1F 56	Send printer software version	79

Real time

Code (hexadecimal)	Command	Page
10 04 <i>n</i>	Real time status transmission (DLE sequence)	81
10 05 <i>n</i>	Real time request to printer (DLE sequence)	83
1D 03 <i>n</i>	Real time request to printer (GS sequence)	83
1D 04 <i>n</i>	Real time status transmission (GS sequence)	81
1D 05	Real time printer status transmission	84
1F 7A	Real time commands disabled	84

Automatic status back / Unsolicited status mode

Code (hexadecimal)	Command	Page
1D 61 <i>n</i>	Enable/disable Automatic Status Back (ASB)	85
1D 61 <i>n</i>	Select or cancel unsolicited status mode	88

Bar codes

Code (hexadecimal)	Command	Page
1D 48 <i>n</i>	Select printing position for HRI characters	96
1D 66 <i>n</i>	Select pitch for HRI characters	96
1D 28 6B 04 00 00 31 41 <i>n</i> 1 <i>n</i> 2	Select model for QR Code	91
1D 28 6B 03 00 31 43 <i>n</i>	Set size of module for QR Code	91
1D 28 6B 03 00 31 44 <i>m</i>	Set data parsing mode for QR Code	92
1D 28 6B 03 00 31 45 <i>n</i>	Select error correction level for QR Code	92
1D 28 6B <i>qL qH</i> 31 50 30 <i>f</i> 1 ... <i>f</i> <i>k</i>	Store symbol data for QR Code	92
1D 28 6B 03 00 31 51 30	Print symbol data for QR Code	93
1D 28 6B 03 00 31 52 30	Transmit QR code print size	94
1D 68 <i>n</i>	Select bar code height	96
1D 6B <i>m d</i> 1... <i>dk</i> 00 or 1D 6B <i>m n d</i> 1... <i>dn</i>	Print bar code	96
1D 6B FF <i>n</i>	Print Multiple Barcodes	98
1D 6B <i>n d</i> 1... 00	Print GSI Databar (formerly RSS), null terminated	99
1D 6B <i>m n L n H d</i> 1... <i>dn</i>	Print GSI Databar (formerly RSS), data length specified	99
1D 70 <i>a b c d e f</i>	Select PDF 417 parameters	100
1D 71 <i>a b c d e f L f H</i>	Set GSI Databar (formerly RSS) parameters	100
1D 77 <i>n</i>	Select bar code width	101
1D 28 6B 05 00 36 42 <i>m d</i> 1 <i>d</i> 1	Set DataMatrix parameters	102
1D 28 6B 05 00 36 43 <i>n</i>	Set DataMatrix module size	103
1D 28 6B <i>pL pH</i> 36 50 30 <i>d</i> 1... <i>dk</i>	Store DataMatrix data in symbol storage area	104
1D 28 6B 03 00 36 51 30	Print DataMatrix symbol data in the symbol storage area	105

Page mode

Code (hexadecimal)	Command	Page
0C	Print and return to standard mode	106
18	Cancel print data in page mode	106
1B 0C	Print data in page mode	106
1B 4C	Select page mode	107
1B 53	Select standard mode	108
1B 54 <i>n</i>	Select print direction in page mode	108
1B 57 <i>n1, n2...n8</i>	Set print area in page mode	109
1D 24 <i>nL nH</i>	Set absolute vertical print position in page mode	110
1D 5C <i>nL nH</i>	Set relative vertical print position in page mode	110

Macros

Code (hexadecimal)	Command	Page
1D 3A	Select or cancel macro definition	111
1D 5E <i>r t m</i>	Execute macro	111

User data storage

Code (hexadecimal)	Command	Page
1B 27 <i>m a0 a1 a2 d1...dm</i>	Write to user data storage	112
1B 34 <i>m a0 a1 a2</i>	Read from user data storage	112
1D 22 <i>n</i>	Select memory type (SRAM/flash) where to save logos or user-defined fonts	112
1D 22 55 <i>n1 n2</i>	Flash memory user sectors allocation	113
1D 22 60 <i>n1</i>	Flash object area pack	113
1D 22 61 <i>n1 n2 (n3)</i>	Flash object delete	113
1D 22 80	Expanded flash memory allocation	114
1D 22 81 <i>n</i>	Select flash area for storing logos and user-defined characters	114
1D 22 90 <i>n</i>	Return flash area size	114
1D 40 <i>n</i>	Erase user flash sector	62, 115
1D F0 10 <i>n</i>	Lock permanent flash area	62, 115

Flash download

Code (hexadecimal)	Command	Page
1B 5B 7D	Switch to flash download mode	116
1D 0E	Erase all flash contents except boot sector	116
1D 0F	Return main program flash CRC	117
1D 11 00 00 00 00 <i>d1...dn</i>	Download Application	117
1D FF	Reset firmware	117

Settings commands

Code (hexadecimal)	Command	Page
1F 09 01 06	Save current settings as factory settings	118
1F 09 01 07	Clear active settings and restore factory settings	118
1F 09 01 08	Upload current settings	118
1F 09 01 09	Upload factory settings	118
1F 09 01 0A	Download settings	118

Miscellaneous configuration commands

Code (hexadecimal)	Command	Page
1F 03 00 <i>n</i>	Set diagnostics mode	119
1F 03 02 <i>n</i>	Enable or disable knife	119
1F 03 07 <i>n</i>	Set printer emulation	120
1F 03 09	Reset settings to default values	120
1F 03 0F <i>n</i>	Set default font	120
1F 03 10 <i>n</i>	Set font size	121
1F 03 1B <i>n</i>	Enable or disable Code 128 check digit calculation	121
1F 03 1D <i>n</i>	Enable or disable barcode ITF leading zero	121
1F 03 1E <i>n</i>	Enable or disable barcode string terminator	121
1F 03 28 <i>n</i>	Enable or disable USM canned status	122
1F 03 2C <i>n</i>	Send diagnostic page to comm port	122
1F 03 2E <i>n</i>	Enable or disable EJ action via operator control	122
1F 03 32 <i>n</i>	Set printer ID mode	123
1F 03 33 <i>n</i>	Set default code page at power on	123
1F 03 3D <i>n</i>	Set Asian ASCII characters to narrow	123
1F 03 47 <i>n</i>	Set vertical white space	124
1F 03 52 <i>n fL fH dL dH</i>	Set printer tone	124

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

Clear printer

ASCII	DLE
Hexadecimal	10
Decimal	16

Clears the print line buffer without printing and sets the printer to the following condition:

- Double-wide command (0x12) is canceled
- Line spacing, pitch, and user-defined character sets are maintained at current selections (RAM is not affected)
- Single-wide, single-high, non-rotated, and left-aligned characters are set
- Printing position is set to column one

Related Information

This command followed by a 04 or 05 is interpreted as a “Real Time Command”

This command is recognized in A793 emulation and Native mode, ignored in LEGACY emulation.

Perform full knife cut

ASCII	EM	ESC i
Hexadecimal	19	1B 69
Decimal	25	27 105

Cuts the receipt.

There are two codes (Hex 19 or 1B 69) for this command and both perform the same function.

Exceptions

The full cut is replaced by a partial cut in the A793 emulation. ASCII EM, (0x19) is ignored in LEGACY emulation. Line feed is executed first, if the buffer is not empty.

Perform partial knife cut

ASCII	SUB	ESC m
Hexadecimal	1A	1B 6D
Decimal	26	27 109

Partially cuts the receipt. The default setting leaves 5mm (0.20 inch) of paper on the left edge. (See setting partial cut distance in diagnostics.)

There are two codes (Hex 1A or 1B 6D) for this command and both codes perform the same function.

Formulas

The cut edge is 144 dot rows or 18 mm (0.71 inch) above the print station.

Exceptions

The command is valid only at the beginning of a line. ASCII SUB, (0x1A), is ignored in LEGACY emulation. Line feed is executed first, if the buffer is not empty.

Generate tone

ASCII	ESC BEL
Hexadecimal	1B 07
Decimal	27 7

Generates an audible tone. Performed by the printer to signal certain conditions.

Related information

This command is ignored in LEGACY emulation.

Select peripheral device (for multi-drop)

ASCII	ESC = <i>n</i>
Hexadecimal	1B 3D <i>n</i>
Decimal	27 61 <i>n</i>

Value of *n*: 0 (bit 0), device not selected
1 (bit 0), device selected

Default: 1 (bit 0), device selected

Selects the device to which the host computer sends data.

Related information

Other bits of *n* (1–7) are undefined and ignored.

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

Initialize printer

ASCII	ESC @	
Hexadecimal	1B 40	
Decimal	27 64	
Default:	Character pitch:	15.6 CPI
	Column width:	44 characters
	Extra dot rows:	3
	Character set:	Code Page 437
	Printing position:	Column One

Clears the print line buffer and resets the printer 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. Receipt selection state is selected. Barcode settings reset. Page mode settings are cleared and printer is set to standard mode. ASB is switched off.

Select sensors to stop printing

ASCII	ESC c 4 <i>n</i>
Hexadecimal	1B 63 34 <i>n</i>
Decimal	27 99 52 <i>n</i>
Value of <i>n</i>:	Sensor status

Bit	Sensor	Sensor Status	
		0	1
0	Receipt paper near-end	Disabled	Enabled
1	Receipt paper near-end	Disabled	Enabled
2–4	Undefined		
6	Undefined		

Bits 5 and 7 are not used.

Default: 0

Determines which sensor stops printing on the respective station when paper is low. The command does not affect the paper out status on the receipt station, which will automatically stop the printer when the paper is depleted.

Enable or disable panel button

ASCII	ESC c 5 <i>n</i>
Hexadecimal	1B 63 35 <i>n</i>
Decimal	27 99 53 <i>n</i>
Value of <i>n</i>:	0 = Enable 1 = Disable
Default:	0 (Enable)

Enables or disables the paper feed button. If the last bit is 0, the paper feed button is enabled. If the last bit is 1, the paper feed button is disabled.

Exceptions

Functions that require the paper feed button (except for the execute macro [1D 5E] command) cannot be used when it has been disabled with this command.

Generate pulse to open cash drawer

ASCII ESC p n p1 p2
Hexadecimal 1B 70 n p1 p2
Decimal 27 112 n p1 p2

Value of n: 00, 48 (Decimal) = Drawer 1;
 01, 49 (Decimal) = Drawer 2

Value of p1: 0–255

Value of p2: 0–255

Sends a pulse to open the cash drawer.

Formulas

The value for either *p1* or *p2* is the hexadecimal number multiplied by 2 msec to equal the total time.

- On-time = *p1* (Hex) x 2 msec
- Off-time = *p2* (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 $p2 < p1$, 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.

<i>m</i>	Feed and cut mode
0, 48	Full cut (no extra feed)
1, 49	Partial cut (no extra feed)
65	Feeds paper to cutting position + (<i>n</i> times vertical motion unit), and cuts the paper completely
66	Feeds paper to cutting position + (<i>n</i> times vertical motion unit), and performs a partial cut

Range of m: 0, 48; 1, 49
 65, 66 (when used with *n*)

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 test form

ASCII US t
Hexadecimal 1F 74
Decimal 31 116

Prints the current printer configuration settings on the receipt.

Disabled in page mode.

Port Idle Timeout

ASCII US ETX 0x4E *n1 n2*
Hexadecimal 1F 03 4E *n1 n2*
Decimal 31 03 78 *n1 n2*
Value of *n*: *n1*: low order byte of seconds
n2: high order byte of seconds
Default: disabled

Sets an idle time after which switching between communication ports can be done without a power cycle. Setting seconds to 0 disables port idle timeout.

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.

This command is ignored in LEGACY emulation.

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

Feed *n* print lines

ASCII	DC4 <i>n</i>
Hexadecimal	14 <i>n</i>
Decimal	20 <i>n</i>

Value of *n*: The number of lines to feed at current line height setting.

Range of *n*: 0–255 in Native mode
0–127 in A793 emulation

Feeds the paper *n* lines at the current line height without printing. Ignored on receipt if current line is not empty.

Related information

This is ignored in LEGACY emulation and the parameter byte goes into the print buffer.

Feed n dot rows**ASCII** NAK n **Hexadecimal** 15 n **Decimal** 21 n **Value of n :** $n/203$ inch**Range of n :** 0–255 in Native mode
0–127 in A793 emulation

Feeds the paper n dot rows ($n/8$ mm, $n/203$ inch), without printing. Receipt moves n rows if the print buffer is empty.

Related information

This is ignored in LEGACY emulation and the parameter byte goes into the print buffer.

Add n extra dot rows**ASCII** SYN n **Hexadecimal** 16 n **Decimal** 22 n **Value of n :** Number of extra dot rows**Range of n :** 0–16**Default:** 3 extra dot rows

Adds n extra dot rows ($n/8$ mm, $n/203$ inch) to the character height to increase space between print lines or decrease the number of lines per inch.

Formulas

The following table shows the relationship between the number of lines per inch and each extra dot row added:

Extra rows	Lines per inch	Dot rows
0	8.5	24
1	8.1	25
2	7.8	26
3	7.5	27
4	7.2	28
5	7.0	29
6	6.77	30
7	6.5	31
8	6.3	32
9	6.1	33
10	6.0	34
11	5.8	35
12	5.6	36
13	5.5	37
14	5.3	38
15	5.2	39
16	5.1	40

Related information

This is ignored in LEGACY emulation and the parameter byte goes into the print buffer.

Print

ASCII ETB
Hexadecimal 17
Decimal 23

Prints one line from the buffer and feeds paper one line. Executes LF on receipt.

Related information

This command is ignored in LEGACY emulation.

Print and feed paper

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

Value of *n*: *n*/203 inch in Native mode and Application Compatible Escape Commands emulation mode;
n/360 inch in A793 emulation mode

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 commands describe operation for 80mm paper.

Horizontal tab

ASCII HT
Hexadecimal 09
Decimal 9

Moves the print position to the next tab position set by the set horizontal tab positions (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 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 y :** 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	Commands using x	Commands using y
Standard	1B 20, 1B 24, 1B 5C, 1D 4C, 1D 57	1B 33, 1B 4A, 1B 4B, 1D 56
Page (upper left or lower right)	1B 20, 1B 24, 1B 57, 1B 5C, [1C 53]	1B 33, 1B 4A, 1B 4B, 1B 57, 1D 24, 1D 56, 1D 5C
Page (upper right or lower left)	1B 33, 1B 4A, 1B 4B, 1B 57, 1D 24, 1D 5C	1B 20, 1B 24, 1B 57, 1B 5C, [1C 53], 1D 56

Set column

ASCII ESC DC4 n
Hexadecimal 1B 14 n
Decimal 27 20 n

Value of n : 1 – 44 = Standard pitch
 1 – 56 = Compressed pitch

Default of n : 1

Prints the first character of the next print line in column n . It must be sent for each line not printed at column one. The value of n is set to one after each line.

Exceptions

This command cannot be used with single- or double-density graphics.

Related information

This is ignored in LEGACY emulation and the parameter byte goes into the print buffer.

Set absolute starting position

ASCII ESC \$ nL nH
Hexadecimal 1B 24 nL nH
Decimal 27 36 nL nH

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

The values for nL and nH 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.

$28 \times 10 =$ 280 dots (beginning of column 29)
 $280/256 =$ 1, remainder of 24
 $nL = 24$ $nH =$ 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.

Compatibility information (H300 receipt vs. A793 receipt)

There is a difference in the normal behavior of this command in A793 emulation mode as compared to the original A793. The difference exists when the command is used to move to the left. The A793 processes the whole print string prior to putting it in the buffer for the print head. This method of processing allows the A793 to backup in the print string and replace characters and their associated attributes when a "Set relative print position" command instructs the printer to move the print position to the left.

In order to improve the speed of printing, the H300 moves the data into a buffer for the printhead when it receives it. When the "Set relative print position" command contains a move to the left, this causes the new data to overstrike the previous data. This behavior can be used to an application's advantage to provide the ability to create compound characters on the receipt station.

This command also functions differently in the A793 emulation when used in graphics:

$n \times 2 =$ Number of dots to be moved from the beginning of the line when this command is followed by a graphics command.

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*

Value of *n*: *n*/406 inch in Native mode
n/360 inch in A793 emulation mode
n/203 inch in Application Compatible Escape Commands emulation mode

Range of *n*: 0-255

Default: 3.37 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.

Related information

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

In addition, see “Configure line spacing” (1F 03 46 *n*).

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 (typically 44 for standard, 56 for compressed, but this is affected by paper width, fonts and margins)

Value of *k*: 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.

n1-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 (65,536-*n*) by 256
n2 = Integer after dividing (65,536-*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.

Formulas*To move to the left:*

Determine the value of *n* by multiplying the number of columns to move left of the current position by 10 (standard) or 8 (compressed) pitch. The example shows how to set the relative position two columns in standard pitch (10 dots per column) to the left of the current position.

$2 \times 10 = 20$ dots (two columns to be moved left of the current position)
 $65,536 - 20 = 65,516$
 $65,516 / 256 = 255$, remainder of 236
n1 = 236, *n2* = 255

To move to the right:

Determine the value of *n* by multiplying the number of columns to move right of the current position by 10 (standard) or 8 (compressed) pitch. The example shows how to set the relative position two columns in standard pitch (10 dots per column) to the right of the current position.

$2 \times 10 = 20$ dots (two columns to be moved left of the current position)
 $20 / 256 = 0$, remainder of 20
n1 = 20, *n2* = 0

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.

Compatibility information (H300 receipt vs. A793 receipt)

There is a difference in the normal behavior of this command in A793 emulation mode as compared to the original A793. The difference exists when the command is used to move to the left. The A793 processes the whole print string prior to putting it in the buffer for the print head. This method of processing allows the A793 to backup in the print string and replace characters and their associated attributes when a "Set relative print position" command instructs the printer to move the print position to the left.

Continued...

In order to improve the speed of printing, the H300 moves the data into a buffer for the printhead when it receives it. When the “Set relative print position” command contains a move to the left, this causes the new data to overstrike the previous data. This behavior can be used to an application’s advantage to provide the ability to create compound characters on the receipt station.

This command also functions differently in the A793 emulation when used in graphics:

$n \times 2$ = Number of dots to be moved from the beginning of the line when this command is followed by a graphic command.

Select justification

ASCII	ESC a <i>n</i>
Hexadecimal	1B 61 <i>n</i>
Decimal	27 97 <i>n</i>
Value of <i>n</i>:	0, 48 = Left aligned 1, 49 = Center aligned 2, 50 = Right aligned
Range of <i>n</i>:	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.

Related information

On the LEGACY emulation printer, this command is valid only at the beginning of a line.

Range of *n* on A793 is 0–255 using low 2 bits only:

00	left aligned
01	center
10	right aligned
11	center

Set left margin

ASCII	GS L <i>nL nH</i>
Hexadecimal	1D 4C <i>nL nH</i>
Decimal	29 76 <i>nL nH</i>
Range of <i>nL</i>:	0–255
Range of <i>nH</i>:	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 $((nH \times 256) + nL)$ 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 = $(1 \times 256) + 150$.

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 printing area width

ASCII GS W *nL nH*

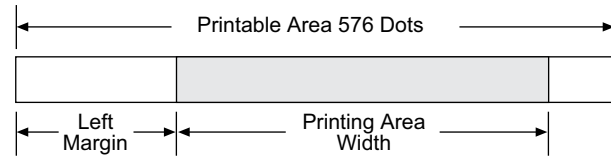
Hexadecimal 1D 57 *nL nH*

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 $((nH \times 256) + nL)$ 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

This 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, printing area width is not changed until the printer is returned to standard mode.

Text characteristics commands

These commands control what the printed information looks like, selection of character sets, definition of custom-defined characters, and setting of margins. The commands are described in order of their hexadecimal codes.

The commands describe operation for 80mm paper.

Select double-wide characters

ASCII	DC2
Hexadecimal	12
Decimal	18

Prints double-wide characters. The printer is reset to single-wide mode after a line has been printed or the clear printer (0x10) command is received. Double-wide characters may be used in the same line with single-wide characters.

Exceptions

Double-wide characters may not be used in the same line with single or double-density graphics.

Related information

This command is ignored in LEGACY emulation.

Select single-wide characters

ASCII	DC3
Hexadecimal	13
Decimal	19

Prints single-wide characters. Single-wide characters may be used in the same line with double-wide characters.

Exceptions

Single-wide characters may not be used in the same line with single or double-density graphics.

Related information

This command is ignored in LEGACY emulation.

Select 90 degree counter-clockwise rotated print

ASCII	ESC DC2
Hexadecimal	1B 12
Decimal	27 18

Rotates characters 90 degrees counter-clockwise. The command remains in effect until the printer is reset or until a clear printer (0x10), select or cancel upside down print (1b 7b) or cancel rotated print (1b 56) command is received.

Exceptions

This command is valid only at the beginning of a line.

Rotated print and non-rotated print characters cannot be used together in the same line.

Related information

See “Summary of rotated printing” in this document.

This command is ignored in LEGACY emulation.

Select pitch (column width)**ASCII** ESC SYN *n***Hexadecimal** 1B 16 *n***Decimal** 27 22 *n***Value of *n*:** 0 = Standard pitch
1 = Compressed pitch**Default:** 0 (Standard pitch)

Selects the character pitch for a print line.

Formulas

The following table provides the print characteristics for both pitches on the receipt station.

Pitch	Columns, 80mm Paper	CPI
Standard	44	15.6
Compressed	56	20.3

Related information

Look in Chapter 3: Programming the Printer, “Character appearance” for a description of both pitches.

This command and the select print modes command (1B 21 *n*) affect pitch selection.

This is ignored in LEGACY emulation and the parameter byte goes into the print buffer.

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.

This is ignored in LEGACY emulation and the parameter byte goes into the print buffer. In the A793 emulation, the command and parameter byte are ignored.

Select print mode

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

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

Value of *n*

Bit ¹	Function	0	1
Bit 0	Pitch ² (See chart below)	Standard pitch	Compressed pitch
Bit 3	Emphasized mode	Canceled	Set
Bit 4	Double-high	Canceled	Set
Bit 5	Double-wide	Canceled	Set
Bit 7	Underlined mode	Canceled	Set

¹Bits 1, 2 and 6 are not used.

²Standard and compressed pitch cannot be used together in the same line.

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

This command and select pitch (column width) command (1B 16 *n*) affect pitch selection.

Pitch	Columns, 80 mm paper	CPI
Standard	44	15.6
Compressed	56	20.3

Selects the print mode: standard, compressed, emphasized, underlined, 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

Refer to the table in other column for 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.

Look in Chapter 3: Programming the Printer, “Character appearance” for a description of standard and compressed character pitches.

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

1B 16 <i>n</i>	Select pitch
1B 45 <i>n</i>	Emphasized
1B 47 <i>n</i>	Double-strike
12	Double-wide
13	Single-wide
1B 2D <i>n</i>	Underline

Select or cancel user-defined character set

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

- Value of *n*:** 0 = Code Page 437
 1 = User Defined (RAM)
 2 = Code Page 850

- Range of *n*:** 0–2

- Default:** 0 (Code Page 437)

Selects the character set until the printer is initialized, reset, or powered off. When an undefined RAM character is selected, the current active ROM code page character is used. Look in Chapter 3: Programming the Printer, “Character appearance” for the character sets.

Exception:

The character sets cannot be used together on the same line.

Related information

In LEGACY emulation, the low order bit of *n* is used to select the user-defined character set and the current active ROM code page is not affected.

Define user-defined character set

- ASCII** ESC & *s c1 c2 [character 1 data] ... [character *k* data]*
- Hexadecimal** 1B 26 *s c1 c2 [character 1 data] ... [character *k* data]*
- Decimal** 27 38 *s c1 c2 [character 1 data] ... [character *k* data]*

Values and ranges:

- s* = 3, the number of bytes (vertically) in the character cell
- c* = the ASCII codes of the first (*c1*) and last (*c2*) characters respectively
- c1* = Hex 20–FF (20 is always printed as a space)
- c2* = Hex 20–FF (20 is always printed as a space)
- To define only one character, use the same code for both *c1* and *c2*
- k* = *c2* – *c1* + 1 = the number of characters to be defined in this command string
*[character *i* data] = [ni d1 ... d(3 x ni)]* for 1 ≤ *i* ≤ *k*
- ni* = the number of dot columns for the *i*th character, 1 ≤ *ni* ≤ 16
- d* = the dot data for the characters

The number of bytes for the *i*th character cell is 3 x *ni*.

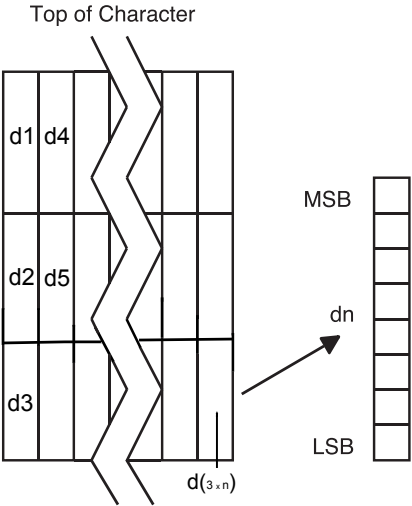
The bytes are printed down and across each cell.

Defines and enters downloaded characters into RAM. The command may be used to overwrite single characters. User-defined characters are available until power is turned off or the initialize printer command (1B 40) is received.

Any invalid byte (*s*, *c1*, *c2*, *n1*) aborts the command.

Related information

See 1D 22 *n* (select memory type) to save user-defined characters.



Define extended user-defined character set

ASCII US & $s\ c1\ c2$ [character 1 data] ... [character k data]
Hexadecimal 1F 26 $s\ c1\ c2$ [character 1 data] ... [character k data]
Decimal 31 38 $s\ c1\ c2$ [character 1 data] ... [character k data]

Values and ranges:

s = the number of dot rows in the character cell (maximum 64)

c = the ASCII codes of the first ($c1$) and last ($c2$) characters respectively

$c1$ = Hex 20–FF (20 is always printed as a space)

$c2$ = Hex 20–FF (20 is always printed as a space)

To define only one character, use the same code for both $c1$ and $c2$

$j = s/8$ = the number of bytes (vertically) in the character cell

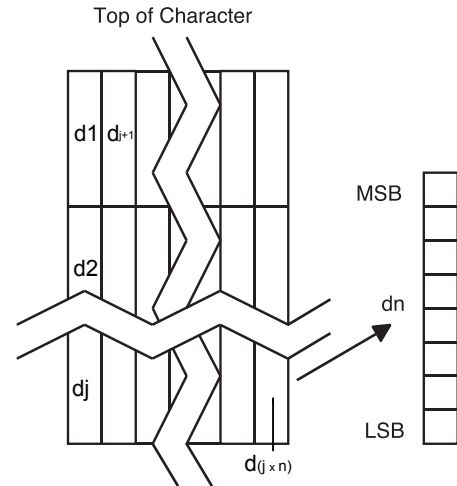
$k = c2 - c1 + 1$ = the number of characters to be defined in this command string
 [character i data] = [$n_i\ d1 \dots d(j \times n_i)$] for $1 \leq i \leq k$

n_i = the number of dot columns for the i th character, $1 \leq n_i \leq 16$

d = the dot data for the characters (bit gets printed to 1 and not printed to 0)

The number of bytes for the i th character cell is $j \times n_i$.

The bytes are printed down and across each cell starting from the left side.



Defines and enters downloaded characters into RAM. The command may be used to overwrite single characters. User-defined characters are available until power is turned off or the Initialize Printer command (1B 40) is received.

Any invalid byte (s , $c1$, $c2$, $n1$, $n2$) aborts the command.

Related information

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

See ID 22 n (select memory type) to save user-defined characters.

Select or cancel underline mode

ASCII ESC - n

Hexadecimal 1B 2D n

Decimal 27 45 n

Value of n : Decimal Hex

0, 48 30 = Cancel underline mode

1, 49 31 = Select underline mode

2, 50 32 = 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.

Related information

In A793 emulation, this command is unrecognized and the parameter n is put into the print buffer.

Copy character set from ROM to RAM

ASCII ESC : 0 0 0
Hexadecimal 1B 3A 30 30 30
Decimal 27 58 0 0 0

Default: Current active ROM code page

Copies characters in the active ROM set to RAM. Use this command to re-initialize the user-defined character set. Code page 437 is copied by default at initialization.

This command is ignored if current font is the user font.

Related information

To modify characters in one of the character set variations, such as rotated print, select one of the rotated print commands, copy to RAM, then use the define user-defined character set command (1B 26).

Cancel user-defined character

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

Value of *n*: Specified character code.

Range of *n*: 32–255

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 range or if the user-defined character is not defined.

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 0) 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. The printer is reset to the standard print mode after a clear printer (0x10) command is received.

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.

In A793 emulation, this command is unrecognized and the parameter byte is put into the print buffer.

Select or cancel double-strike**ASCII** ESC G *n***Hexadecimal** 1B 47 *n***Decimal** 27 71 *n***Value of *n*:** 0 = Off

1 = On

(When 0 and 1 are the least significant bit, LSB)

Default: 0 (Off)

Turns double-strike mode on or off until the printer is initialized, reset, or powered off. Identical to emphasized mode. The printer is reset to the standard print mode after a clear printer (0x10) command is received.

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.

In A793 emulation, this command is unrecognized and the parameter byte is put into the print buffer.

Select or cancel italic print**ASCII** ESC I *n***Hexadecimal** 1B 49 *n***Decimal** 27 73 *n***Value of *n*:** 0 = Off

1 = On

(When 0 and 1 are the least significant bit, LSB)

Default: 0 (Off)

Turns italic print mode on or off. The printer is reset to the standard print mode after a clear printer (0x10) command is received.

Exceptions

Only the lowest bit of *n* is valid.

Related information

This command is recognized in Native mode.

In A793 and LEGACY emulations, the parameter byte is put into the buffer.

Select international character code

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

Value of *n*:

Native mode	A793 emulation	Application Compatible Escape Command emulation (1B 52 <i>n</i> only)
0 = Code Page 437	0 = Code Page 437	0 = U.S.A.
1 = Code Page 850	Not 0 = Code Page 850	1 = France
2 = Code Page 852		2 = Germany
3 = Code Page 860		3 = U.K.
4 = Code Page 863		4 = Denmark I
5 = Code Page 865		5 = Sweden
6 = Code Page 858		6 = Italy
7 = Code Page 866		7 = Spain
8 = Code Page 1252		8 = Japan
9 = Code Page 862		9 = Norway
0A = Code Page 737		
0B = Code Page 874		
0C = Code Page 857		
0D = Code Page 1251		
0E = Code Page 1255		
0F = Code Page KZ_1048		
10 = Code Page 1256		
11 = Code Page 1250		
12 = Code Page 28591		
13 = Code Page 28592		
14 = Code Page 28599		
15 = Code Page 28605		
16 = Code Page 864		
17 = Code Page 720		
18 = Code Page 1254		
19 = Code Page 28596		
1A = KATAKANA		
1B = Code Page 775		
1C = Code Page 1257		
1D = Code Page 28594		
1E = Code Page 1253		
FD = UTF-8 with bidirectional support *takes longer to process, use as needed		
FE = UTF-8 left-to-right only		
Default: 0 (Code Page 437)		

Selects the character set to be used until the printer is initialized, reset, or powered off. Look in “Appendix B: Resident Character Sets” in this programming guide for the character sets. The alphanumeric characters (0x20-0x7F) are the same for each set.

There are two codes for this command (see select international character set, 1B 74 *n*). Both codes perform the same function.

Related information

The LEGACY emulation selection applies only to the command “Select international character code” (1B 52 *n*). The LEGACY emulation generates the same as Native mode for the command “Select international character set” (1B 74 *n*).

Select or cancel 90 degree clockwise rotated print

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

Value of *n*: 0 = Cancel
 1 = Set

Default: 0 (Cancel)

Rotates characters 90 degrees clockwise. The command remains in effect until the printer is initialized, reset, powered off, or until a clear printer (0x10) or rotated print (1B 12) command is received. See summary of rotated printing in this document.

This command does not affect HRI characters.

Select international character set

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

Value of *n*:

Native mode	A793 emulation
0 = Code Page 437	0 = Code Page 437
1 = Code Page 850	Not 0 = Code Page 850
2 = Code Page 852	
3 = Code Page 860	
4 = Code Page 863	
5 = Code Page 865	
6 = Code Page 858	
7 = Code Page 866	
8 = Code Page 1252	
9 = Code Page 862	
0A = Code Page 737	
0B = Code Page 874	
0C = Code Page 857	
0D = Code Page 1251	

0E = Code Page 1255

0F = Code Page KZ_1048

10 = Code Page 1256

11 = Code Page 1250

12 = Code Page 28591

13 = Code Page 28592

14 = Code Page 28599

15 = Code Page 28605

16 = Code Page 864

17 = Code Page 720

18 = Code Page 1254

19 = Code Page 28596

1A = KATAKANA

1B = Code Page 775

1C = Code Page 1257

1D = Code Page 28594

1E = Code Page 1253

FD = UTF-8 with bidirectional support *takes longer to process, use as needed

FE = UTF-8 left-to-right only

Default: 0 (Code Page 437)

Selects the character set to be used until the printer is initialized, reset, or powered off. Look in “Appendix B: Resident Character Sets” in this programming guide for the character sets. The alphanumeric characters (0x20-0x7F) are the same for each set.

There are two codes for this command (See “Select international character code”, 1B 52 *n*.) Both codes perform the same function.

Related information

The LEGACY emulation selection applies only to the command “Select international character code” (1B 52 *n*).

The LEGACY emulation generates the same as Native mode for the command “Select international character set” (1B 74 *n*).

Select or cancel upside-down print mode

ASCII ESC { *n*

Hexadecimal 1B 7B *n*

Decimal 27 123 *n*

Value of *n*: 0 = Cancel
1 = Set

Default: 0 (Cancel)

Prints upside-down characters until the printer is initialized, reset, or powered off. The command may be combined with clockwise rotated print (1B 56) or counter-clockwise rotated print (1B 12). The character order is inverted in the buffer so text is readable. Only bit 0 is used. Bits 1-7 are not used. See summary of rotated printing in this document for more information.

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 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, 10–17, ...70–77**Default of *n*:** 11 hexadecimal

Selects the character height using bits 0 to 2 and selects the character width using bits 4 to 6, as follows:
With smoothing enabled, maximum value of $0 + n$ is 66.

Character width selection		
Hex	Decimal	Width
00	0	1 (normal)
10	16	2 (two times width)
20	32	3 (three times width)
30	48	4 (four times width)
40	64	5 (five times width)
50	80	6 (six times width)
60	96	7 (seven times width)
70	112	8 (eight times width)

Character height selection		
Hex	Decimal	Height
00	0	1 (normal)
01	1	2 (two times height)
02	2	3 (three times height)
03	3	4 (four times height)
04	4	5 (five times height)
05	5	6 (six times height)
06	6	7 (seven times height)
07	7	8 (eight times height)

This command is effective for all characters (except for HRI characters) and is effective 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.

In native mode, the vertical direction is limited to 7 (seven times height) when Tall font is selected. If 8 (eight times height) is selected, the results are unspecified.

Related information

In A793 emulation, this command is discarded and not put into print buffer.

Select or cancel white/black reverse print mode

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

Value of *n*: 0 = Off
 1 = On

(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.

Related information

In A793 emulation, the command is unrecognized and the parameter byte is put into the print buffer.

Set smoothing

ASCII GS b *n*
Hexadecimal 1D 62 *n*
Decimal 29 98 *n*

Value of *n*: 0 = smoothing off
 1 = smoothing on

Default: 0 (Off)

Turns smoothing mode on or off for the quadruple or larger sizes of characters.

Select superscript or subscript modes**ASCII** US ENQ *n***Hexadecimal** 1F 05 *n***Decimal** 31 05 *n***Value of *n*:** 0 = Normal character size
1 = Select subscript size
2 = Select superscript size**Default:** 0 (normal size)

Turns superscript or subscript modes on or off. This attribute may be combined with other characters size settings commands (12, 13, 1B 21 *n*, 1D 21 *n*,...)

Exceptions

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

Related information

In A793 emulation, this command is unrecognized and the parameter byte is put into the print buffer.

Select active user-defined character set

Selects user-defined character set number for download or printing. The default at power on is 0.

ASCII US *i n***Hexadecimal** 1F 69 *n***Decimal** 31 105 *n*

n = 0 - 127

Set high order bit of *n* to configure user-defined character set number as the default. To configure the printer to print from the user-defined character set at power, send 1F 03 0F 01 and reset the printer. Information will print on the first diagnostic page.

Download font list

ASCII GS 0xF0 0xC0
Hexadecimal 1D F0 C0
Decimal 29 240 192

Print downloaded font information.

Configure use of font set

ASCII US ETX 0x45 FSID
Hexadecimal 1F 03 45 FSID
Decimal 31 03 69 FSID

Value of FSID: font ID

00 = 24 high
01 = Tall font
03 = paper-saving font (18 high)
04 = paper-saving font (21 high)
06 - 0xFF = user configurable

This command configures a font set to be used all of the time (over power cycles).

Configure line spacing

ASCII US ETX 0x46 *n*
Hexadecimal 1F 03 46 *n*
Decimal 31 03 70 *n*

Value of *n*: 1-byte #dot rows per print line

1 = 6 dpi
2 = 6.77 dpi
3 = 7.52 dpi
4 = 8.13 dpi
5 - FF = reserved

This command configures the line spacing for resident and downloaded font sets.

Double-byte fonts

Five double-byte fonts are available for use on the H300 Series printer: Simplified Chinese, Traditional Chinese, Kanji, Korean and Thai.

The Thai font (Code Page 874) is already available as a resident code page.

The commands needed for downloading the fonts are described below in the order of use. Before downloading Simplified Chinese, Traditional Chinese, Kanji, or Korean, the expanded flash memory allocation must be set up to expand the size of the permanent font space. For Simplified Chinese, 2.2 Meg of space is required. Traditional Chinese requires 1.3 Meg. Kanji requires 1 Meg, and Korean requires of 1 Meg of space in the permanent font area.

If the H300 is set to Unicode, the Vietnamese character set is available.

Lock permanent font flash area

ASCII GS 0xF0 0x10 *n*

Hexadecimal 1D F0 10 *n*

Decimal 29 240 16 *n*

Value of *n*: *n* = 0x00 lock permanent font flash (default)
n = 0x01 unlock permanent font flash to erase or delete

This command allows or prevents the permanent font area to be erased.

Note: This only affects the 1D 40 33 commands and downloading a font to permanent font area when a font already exists with the same ID.

Erase user flash sector

ASCII GS @ *n*

Hexadecimal 1D 40 *n*

Decimal 29 64 *n*

Value of *n*: 51

***n* = 49 (ASCII *n* = 1) HEX 31**

This command erases all 64K Flash Memory sectors allocated to user-defined character and logos storage in Flash. Those sectors should be erased only in one situation: when the logo definition area is full and an application is attempting to define new logos. In both cases, all logos and character set definitions are erased and must be redefined.

***n* = 50 (ASCII *n* = 2) HEX 32**

This command erases all sectors available for user data storage.

***n* = 51 (ASCII *n* = 3) HEX 33**

This command erases all sectors available for permanent fonts. The area must be unlocked first using the 1D F0 10 01 command above.

Erases a page of flash memory and sends a carriage return when the operation is complete, or a NAK if erase fails.

Related information

See command “Flash memory user sectors allocation” (1D 22 55 *n*1 *n*2).

See also command “Expanded flash memory allocation” (1D 22 80...) and “Select flash area” (1D 22 81 *n*).

Important: While erasing flash memory, the printer disables all interrupts, including communications. To provide feedback to the application, the printer responds to the application when the erase is complete with a 0D (Hex). After sending the erase user flash sector (1D 40 *n*) command, an application should wait for the response from the printer before sending data. Otherwise, data will be lost. If an application is unable to receive data, it should wait a minimum of ten seconds after sending the erase user flash sector (1D 40 *n*) command before sending data.

Select font ID number

ASCII GS 0xF0 0x01 *n*
Hexadecimal 1D F0 01 *n*
Decimal 29 240 1 *n*
Value of n: 128 - 255

Select font ID number for downloaded font.

This command is sent before downloading the map file for a specific font. Each font ID has one map file to download.

This command is also sent to select a downloaded font at run time.

Font ID	Font
C3 (hex)	Traditional Chinese
D3 (hex)	Simplified Chinese
CB (hex)	Kanji
CE (hex)	Korean
00 (hex)	Cancel double byte (when sent with 1F F0 02 00)

Select font style number

ASCII GS 0xF0 0x02 *n*
Hexadecimal 1D F0 02 *n*
Decimal 29 240 2 *n*
Value of n: 0 - 255

Select font style number for downloaded font. After selecting font style number, set the horizontal and vertical character spacing for the characters.

This command is sent before downloading the map file for a specific font. Each font ID can have multiple styles. For example, two different styles could be 16 × 16 Gothic and 24 × 24 Gothic, or three different styles could be 16 × 16 Gothic, 16 × 16 Arial, and 16 × 16 Courier. Each style number within a font has one character definition file.

This command is also sent to select a downloaded font style at run time, and sent with cancel double byte with $n = 0$.

Save font ID number as default font at power up

ASCII GS 0xF0 0x03
Hexadecimal 1D F0 03
Decimal 29 240 3

Save current font ID number as default font at power up. All characters will be printed from the downloaded font. Sending this command after canceling double byte restores the standard default font at startup.

Get double-byte font CRC (font ID)

ASCII GS 0xF0 0x20 *nn*
Hexadecimal 1D F0 20 *nn*
Decimal 29 240 32 *nn*

This command queries the double-byte font CRC where *nn* is the fontset ID. The printer transmits ACK (0x06) followed by the two-byte CRC; otherwise, returns a NAK (0x15) followed by two bytes of zero (0x00).

Get double-byte font CRC (font ID and font style)

ASCII GS 0xF0 0x20 *nn mm*
Hexadecimal 1D F0 21 *nn mm*
Decimal 29 240 33 *nn mm*

This command queries the double-byte font CRC where *nn* is the font ID and *mm* is the font style. The printer transmits ACK (0x06) followed by the two-byte CRC; otherwise, returns a NAK (0x15) followed by two bytes of zero (0x00).

Download font

ASCII G5 0xF0 0x80 followed by file
Hexadecimal 1D F0 80
Decimal 29 240 128

This command is the sequence introducer for downloading existing files.

The downloaded font is always stored in the permanent font area of flash. If there is not enough memory in the permanent font area to store the file the printer returns NACK.

When the file is downloaded the printer returns ACK.

If the file contents are incorrect the printer returns NACK. File format to be described in appendix.

So the full sequence for downloading files as font ID CB would be:

```
1D F0 01 CB
1D F0 80        followed by map file shftjis.chr
1D F0 02 01
1B 20 n        for horizontal character spacing
1B 33 n        for vertical character spacing
1D F0 80        followed by character definition file shftj16.chr
1D F0 02 02
1B 20 n        for horizontal character spacing
1B 33 n        for vertical character spacing
1D F0 80        followed by character definition file shftj24.chr
```

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.

Download BMP logo

ASCII: ESC (+*.BMP file)
Hexadecimal: 1B (+*.BMP file)
Decimal: 27 66 77(+*.BMP file)

Value: Maximum width = 576
 Maximum height = 512

Enters a downloaded BMP logo into RAM or flash.

The downloaded BMP logo can be printed by using the print downloaded bit image (1D 2F *m*) command.

To download a BMP file to save it as a logo, send the hexadecimal code 1B followed by the whole BMP file.

The printer decodes the BMP file header and will save the image data after checking important parameters, such as:

- Width
- Height
- Number of colors (only monochrome images are accepted)

BMPs and bit images continue to be definable only for the receipt station. However, there is no longer an automatic erasure whenever the user downloads a character set (as happened previously) as well as in the case where the current logo was never set > 0, (the automatic erasure if user flash memory had filled up with inactive logo 0 definitions upon next power cycle). Warnings about the effect of running out of defined logo space during a download apply (i.e. the command is ignored). The application is required to manage user data space, downloaded font space, and logo space.

After downloading a logo to the printer, wait 100ms to allow the printer time to write the logo to flash.

Exceptions

BMP file images that are not monochrome are put into the print buffer.

Related information

Microsoft BMP bitmap file format.

This command is recognized in Native mode.

In A793 and LEGACY emulations, the BMP file bytes are put into the print buffer.

Select bit image mode

- ASCII** ESC * m n1 n2 d1 ... dn
- Hexadecimal** 1B 2A m n1 n2 d1 ... dn
- Decimal** 27 42 m n1 n2 d1 ... dn

Value of m:

Value of m	Mode	No. of dots (vertical)	No. of dots (horizontal)	No. of dots/line
0	8-dot single-density	8 (68 DPI)	0-288 (101 DPI)	8 × 288
1	8-dot double-density	8 (68 DPI)	0-576 (203 DPI)	8 × 576
32	24-dot single-density	24 (203 DPI)	0-288 (101 DPI)	24 × 288
33	24-dot double-density	24 (203 DPI)	0-576 (203 DPI)	24 × 576
49	Line Graphics			

Value of n:

Value of n (8-dot single/Line Graphics)	Value of n (24-dot single)	Value of d
n1 + (256 x n2)	3 x [n1 + (256 x n2)]	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

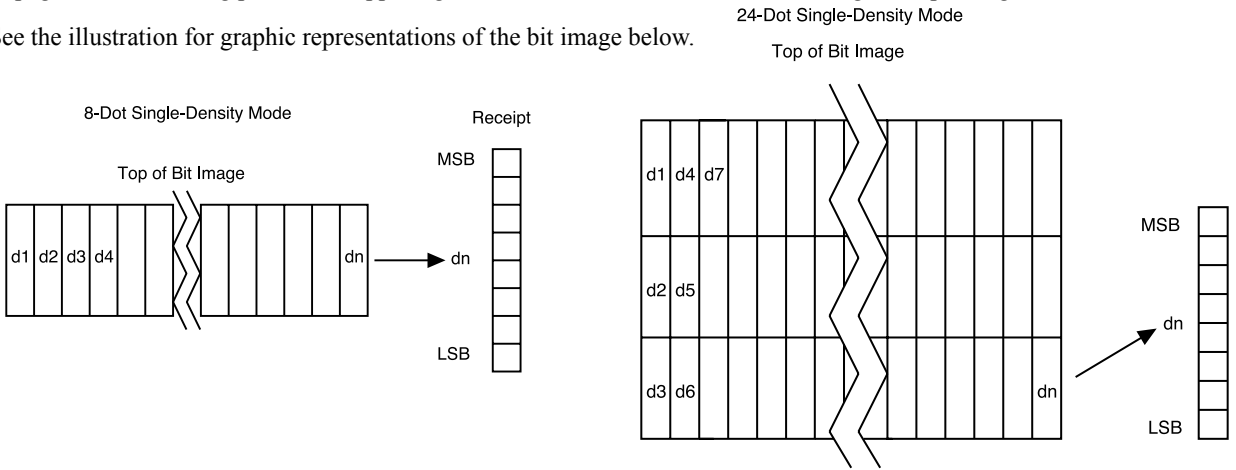
- 8-dot single-density**= n1 + (256 X n2)
- 24-dot single-density**= 3 X [n1+ (256 X n2)]
- Line Graphics**= n1 + (256 X n2)

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.



Turn on/off TIFF compression

- ASCII** ESC * b m n
- Hexadecimal** 1B 2A 62 6D n
- Decimal** 27 42 98 109 n

Range of n: 0, 2, 48, 50

Turns the TIFF compression on ($n = 2, 50$), or off ($n = 0, 48$). Default off ($n = 0$).

Print advanced raster graphics

ASCII ESC . $m n rL rH d1 \dots dn$

Hexadecimal 1B 2E $m n rL rH d1 \dots dn$

Decimal 27 46 $m n rL rH d1 \dots dn$

Value of m : horizontal offset from left margin = $8 \times m$ dots

Value of n : number of data bytes that compose the raster

Value of r : number of times the raster has to be printed = $256 \times rH + rL$

$d1 \dots dn$: data bytes

Range:
 $0 \leq m \leq 72$
 $0 \leq n \leq 72$
 $0 \leq r \leq 65535$
 $0 \leq d1 \dots dn \leq 255$

Prints a horizontal raster of graphics data one or multiple times. Horizontal offset and number of data bytes are variable and specified by parameters.

Exceptions

Advanced raster graphics is not available in page mode.

Select single-density graphics

ASCII ESC K $n1 n2 d1 \dots dn$

Hexadecimal 1B 4B $n1 n2 d1 \dots dn$

Decimal 27 75 $n1 n2 d1 \dots dn$

Value of n :

Value of n (8-dot single-density mode)

Value of d

$n1 + (256 \times n2)$

Number of bytes of data (printed down, then across)

Enters one line of 8-dot single-density graphics into the print buffer. Any print command is required to print the line, after which the printer returns to normal processing mode. Single-density mode allows 0–288 dot columns. The number of bytes sent is represented by the formulas in the table.

Each bit corresponds to two horizontal dots. Compare to set bit image mode (1B 2A, $m = 0$) earlier in this document.

Related information

In LEGACY emulation, this command is unrecognized and the parameters are put into the print buffer.

Select double-density graphics

ASCII ESC Y $n1 n2 d1 \dots dn$

Hexadecimal 1B 59 $n1 n2 d1 \dots dn$

Decimal 27 89 $n1 n2 d1 \dots dn$

Value of n :

Value of n (8-dot single-density mode)

Value of d

$n1 + (256 \times n2)$

Number of bytes of data (printed down, then across)

Enters one line of 8-dot double-density graphics into the print buffer. Any print command is required to print the line, after which the printer returns to normal processing mode. Double-density mode allows 0–576 dot columns. The number of bytes sent is represented by the formulas in the table.

Each bit corresponds to one horizontal dot. Compare to set bit image mode (1B 2A, $m=1$) earlier in this document.

Related information

In LEGACY emulation, this command is unrecognized and the parameters are put into the print buffer.

Select the current logo

ASCII GS # *n*

Hexadecimal 1D 23 *n*

Decimal 29 35 *n*

Range of *n*: 0 – 255

Default: 0

Selects a monochrome logo to be defined or printed. The active logo *n* remains in use until this command is sent again with a different logo *n*.

When this command precedes a logo definition, that definition is stored in flash or RAM memory as logo *n*. If there is already a different definition in flash memory for logo *n*, the first is inactivated and the new definition is used. The inactive definition is not erased from flash and continues to take up space in flash memory.

When this command precedes a logo print command and *n* is different from the previously active logo selected, the printer retrieves the logo definition for *n* from flash or RAM memory and prints it. If there is no definition for logo *n*, then no logo is printed.

In the case of a previously existing application that expects only one possible logo, the printer will not receive the select current logo (1D 23 *n*) command. In this case, the printer assigns 0 as the active logo identifier. It automatically stores any new logo definition in flash memory as logo 0, inactivating any previous logo 0 definition. If the flash memory space available for logos fills up with inactive logo 0 definitions, the firmware erases the old definitions at the next power cycle. This is the only case in which the printer erases flash memory without an application command.

In the case of a new application using multiple logos, the select current logo (1D 23 *n*) command is used. After that, the printer no longer automatically erases the logo definition flash memory page when it fills with multiple definitions. A new application using multiple logos, writing a user-defined character set into flash memory, or both, is responsible for erasing the logo and user-defined character set flash memory page when the logo area is full or before a new character set is defined.

Related information

This command is recognized in Native mode.

In A793 and LEGACY emulations, the parameters are put into the print buffer.

Define downloaded bit image

ASCII GS * n1 n2 d1 ... dn]
Hexadecimal 1D 2A n1 n2 d1 ... dn]
Decimal 29 42 n1 n2 d1 ... dn]

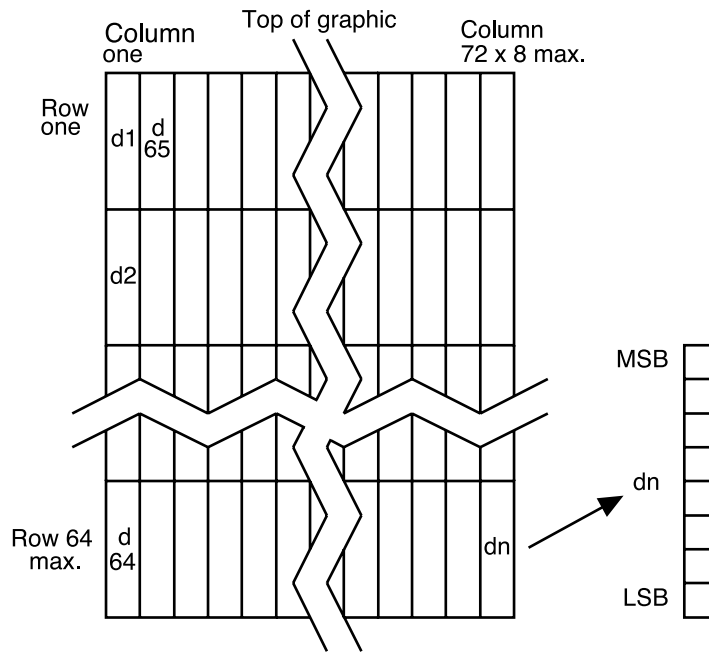
Value of n:

Value of n1	Value of n2	Value of d
1–72 (8 x n1 = number of horizontal dot columns)	1–64 (number of vertical bytes)	Bytes of data (printed down, then across) bit gets printed to 1 and not printed to 0

¹The number of bytes sent is represented by the following formula:
 $n = 8 \times n1 \times n2$ ($n1 \times n2$ must be less than or equal to 4608).

Enters a downloaded bit image (such as a logo) into RAM or flash with the number of dots specified by n1 and n2. If in RAM, 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. This bit image will be saved as a monochrome logo indexed by current value that was last set by the select current logo command or 0 is a select current logo command had not yet been given.

The downloaded bit image can be printed using the 1D 2F command.



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:

Value of <i>m</i>	Print mode	Vertical DPI	Horizontal DPI
0	Normal	203	203
1	Double wide	203	101
2	Double high	101	203
3	Double wide/ Double high	101	101

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.

Print raster graphics

This command is used to enter and print graphics data.

This command describes operation for 80 mm paper.

ASCII *DC1 n1 ... n1*
Hexadecimal *11 n1 ... n72*
Decimal *17 n1 ... n1r*

Value and range of *n*: *n1* to *n72/n80* corresponds to one dot row data for a thermal receipt printer.

Each bit defines whether or not a dot will be printed. This command is used for printing a monochrome graphic in real-time. Offsets, page and any other modes or overlays, including watermark do not apply and are overridden by this command. A complete rendering of the intended final image should have been done by the application before sending the dot rows.

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

Print flash logo ID *n* using mode *m*. See command 1D 2F *m* for description of mode *m*. See command 1C 71 for description of *n*.

Define Flash Logos**ASCII** FS *q n* [*xL xH yL yH d1 ...dk*]*1...[xL xH yL yH d1 ...dk]**n***Hexadecimal** 1C 71 *n* [*xL xH yL yH d1 ...dk*]*1...[xL xH yL yH d1 ...dk]**n***Decimal** 28 113 *n* [*xL xH yL yH d1 ...dk*]*1...[xL xH yL yH d1 ...dk]**n*

Define *n* flash logos specified by IDs 1 through *n*. Maximum size of logos is determined by amount of flash allocated to logos. See command 1D 22 80... for flash allocation.

$$0 < xH:xL < 1024 \text{ max printable } xH:xL = 72 = 576 \text{ dots wide}$$

$$0 < yH:yL < 256$$

For each logo definition: *xH:xL* times 8 dots in the horizontal direction, *yH:yL* times 8 dots in the vertical direction. Total data definition bytes $k = xH:xL \text{ times } yH:yL \text{ times } 8 \text{ bytes}$. See command 1D 2A *x y ...* for description of data definition bytes arrangement.

During execution of this command printer turns off USM and Real Time status processing. The printer goes busy when writing to flash. At the end of this command the printer resets.

Logo print with knife cut**ASCII** GS 0x9B *m n***Hexadecimal** 1D 9B *m n***Decimal** 29 155 *m n*

Values of *m*:

- 0 = Standard size
- 1 = Double wide
- 2 = Double high
- 3 = Double high/wide

Value of *n*:

- 01 - FF (Hex)
- # dot rows = $n \times 24$
- n* = 5 is the recommended setting

Because the printhead and cutting knife are physically separated, it is necessary to advance the printed area of a receipt past the knife to avoid the last of the printing from being cut off. This advance of paper however, causes a blank space at the start of the next receipt that could be used. To utilize this space and reduce paper usage, this command starts to print a logo for the next receipt before initiating the cut at the end of the current receipt. At a set location during the printing of the logo, the corresponding paper advance is stopped and a paper cut performed.

The formula " $n \times 24$ " is used to determine the number of dot rows to move the paper from the start of the logo to the position of the cut.

If $n \times 24$ is greater than the height of the logo, the logo height is used to determine the cut position. If $n = 0$ the cut is eliminated.

In order for this command to function properly, all commands used by legacy applications to move the end of the current receipt past the knife should be removed.

The command is available only in Native mode.

Related information

See “Print downloaded bit image” command.

Set temporary max target speed

ASCII GS 0xA0 nl nh

Hexadecimal 1D A0 nl nh

Decimal 29

Values: 15 00 - 5E 01 monochrome
Max value is limited by the max speed setting of the printer

Default: 0 - normal speed

This command sets a specific speed for an operation, allowing the user more control of the print environment. The speed is maintained as long as it is less than the speed automatically set by power management. A parameter of zero (0) restores the normal max speed.

Convert 6-dots/mm bitmap to 8-dots/mm bitmap

ASCII US EOT n

Hexadecimal 1F 04 n

Decimal 31 04 n

Value: 0 = Off
1 = On

(When 0 and 1 are the LSB)

Default: 0 (Off)

Selects or cancels 6-dot/mm emulation mode.

When the 6-dot/mm emulation is selected, logos and graphics are expanded horizontally and vertically during download to emulate their size on a 6-dot/mm printer. The horizontal positioning commands also emulate positioning on a 6-dot/mm printer.

Enable constant speed logos

ASCII US { n

Hexadecimal 1F 7B n

Decimal 31 123 n

Value: 0 = disable
1 = enable

This command allows the firmware to determine the optimal speed to print a logo. It is set prior to downloading the logo and reset after the logo has been downloaded.

In general, “Set max target speed (1D A0 nl nh)” is the preferred command.

Status

Status command introduction

The H300 has three methods of providing status to the application. These methods are through batch status commands, real time status commands and unsolicited status mode. An application may use one or more of these methods to understand the current status of the printer. A brief description of each of these methods follows.

Batch status commands – These commands are sent to the printer and stored in the printer’s buffer. Once the printer has processed all the previous commands these commands are processed and the proper status is returned to the application. In the event a condition causes the printer to go BUSY, it stops processing commands from the printer buffer. If a batch status command remained in the buffer during this busy condition, it would not be processed. In fact, no batch commands are processed while the printer is in this state.

Real-time commands – These commands are sent to the printer buffer. Periodically, when the printer has time, it scans the input buffer looking for these commands. When found by the printer, these commands are processed immediately. This gives the application the ability to query the printer when it is in a busy state in order to correct whatever fault has occurred.

Automatic status back or Unsolicited status mode– This mechanism allows the application developer to program the printer to automatically respond with a four byte status when certain conditions in the printer change.

Please see the subsequent sections for a more detailed description of these status commands. At the end of this status commands section is a page entitled “Recognizing data from the printer”. This describes how to interpret what command or setting (in the case of unsolicited status mode) triggered a response from the printer.

Batch mode

For RS-232C printers, these commands enable the printer to communicate with the host computer following the selected handshaking protocol, either DTR/DSR or XON/XOFF. They are stored in the printer’s data buffer as they are received, and are handled by the firmware in the order in which they are received.

When a fault occurs, the printer will go busy at the RS-232C interface and not respond to any of the batch mode printer status commands. If the fault causing the busy condition can be cleared, such as by loading paper, or letting the thermal printhead cool down, the printer will resume processing the data in its receive buffer.

Transmit peripheral device status (RS-232C printers only)

ASCII ESC u 0
Hexadecimal 1B 75 0
Decimal 27 117 0

Value of returned byte:

Bit 0	Bit 1
1 = Drawer 1 Closed	1 = Drawer 2 Closed
0 = Drawer 1 Open	0 = Drawer 2 Open

Bits 2–7 are not used.

Transmits current status of the cash drawers. One byte is sent to the host computer. In DTR/DSR protocol, the printer waits for DSR = SPACE. If a drawer is not connected, the status will indicate it is closed.

Exceptions

Unlike the A793, that had a dedicated connector and resultant dedicated status reporting for each cash drawer, the H300 has a single connector that shares data reporting from either cash drawer. When either cash drawer is open, an open status is reported by the printer.

Related information

In LEGACY emulation, this command is ignored.

Transmit paper sensor status

ASCII ESC v
Hexadecimal 1B 76
Decimal 27 118

Values:**Status Byte (RS-232C)**

Bit	Function	0 Signifies	1 Signifies
0	Not used	Fixed to zero	Fixed to zero
1	Receipt cover	Closed	Open
2	Receipt paper	Present	Out
3	Knife position	Home position	Not home position
4	Not used	Fixed to zero	Fixed to zero
5	Temperature	In valid range	Too hot or too cold
6	Voltage	In valid range	Too high or too low
7	Not used	Fixed to zero	Fixed to zero

Sends status data to the host computer. The printer sends one byte to the host computer when it is not busy or in a fault condition. In DTS/DSR protocol, the printer waits for DSR = SPACE.

Related information

See busy line and fault conditions in the real time commands section of this document for details about fault condition reporting.

In LEGACY emulation, this command is ignored.

Transmit printer ID

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

Value of n: 1, 49 = Printer model ID
 2, 50 = Type ID
 3, 51 = ROM version ID
 4, 52 = Logo Definition

Transmits the printer ID specified by *n* as follows:

n	Printer ID	Specification	ID (Hexadecimal)
1, 49	Printer model ID	H300	0x24
2, 50	Type ID	Installed options	Refer to below
3, 51	ROM version ID	ROM version	0x00
4, 52	Logo definition	Logo definition	Refer to next page

n = 2 or 50: Type ID

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	No two-byte character code installed.
	On	01	1	Two-byte character code installed.
1	Off	00	0	No knife installed.

	On	02	2	Knife installed.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	Off	00	0	Not used. Fixed to Off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to Off.

***n* = 4 or 52: Logo Definition**

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	No logo downloaded (SRAM or Flash)
	On	01	1	Logo downloaded (SRAM or Flash)
1-7	Off	00	0	Not Used. Fixed to Off.

Transmits the printer ID specified by *n*. This command is a batch mode command; that is, the response is transmitted after all prior data in the receive buffer has been processed. There may be a time lag between the printer receiving this command and transmitting the response, depending on the receive buffer status.

Transmit printer ID, remote diagnostics extension

ASCII GS I @ *n*
Hexadecimal 1D 49 40 *n*
Decimal 29 73 64 *n*

Values of *n*: Refer to table

Range of *n*: 32–255 (not all defined, but reserved)

Twenty-five remote diagnostic items are defined in the following table: five printer ID items and twenty printer tally items. A group of four remote diagnostic functions is assigned to each diagnostic item. Most of the diagnostic items are maintained in non-volatile memory (NVRAM), but some are maintained in read-only memory (ROM).

The first item group in the table includes an example of data to send and to receive. Data sent from the host to write to NVRAM must contain all digits required by the remote diagnostic item. All data must be ASCII. The printer returns all ASCII data. It is preceded by the parameter *n* to identify the diagnostic item and is followed by a carriage return (0D) to signify the end of the data.

Each returned message is defined as: *n* + data + <CR>

The command performs the remote diagnostic function specified by *n* as described in the following table.

Value of <i>n</i>			
Hex	Dec	Remote diagnostic item	Function
20	32	Serial #, 10 digit ASCII	Write to NVRAM Example, send 14 bytes to printer: GS I @ 0x20 1234567890
21	33	Serial #	Write to NVRAM, and print on receipt to verify Example, send 14 bytes to printer: GS I @ ! 1234567890 This will print on receipt: Serial # written: 1234567890
23	35	Serial #	Return Serial #, preceded by <i>n</i> to identify Printer returns 12 bytes in above example: #1234567890<CR>
24	36	Class/model #, 15 digit ASCII	Write to NVRAM
25	37	Class/model #	Write to NVRAM, and print on receipt to verify
27	39	Class/model #	Return Class/model #, returns 17 bytes
33	51	Flash firmware part #, 12 digit ASCII	Return Flash firmware part #, returns 14 bytes
37	55	Flash firmware CRC, 4 digit ASCII	Return Flash firmware CRC, returns 6 bytes
80	128	Receipt lines tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM Example, send 12 bytes to printer: GS I @ Ç00010000 To set receipt lines tally to 10,000
81	129	Receipt lines tally	Write to NVRAM, and print on receipt to verify Example, send 12 bytes to printer: GS I @ ü00010000 This will print on receipt: Receipt tally written: 10,000
82	130	Receipt lines tally	Clear receipt lines tally to 0
83	131	Receipt lines tally	Return receipt lines tally, preceded by <i>n</i> to identify Printer returns 10 bytes in above example: â00010000<CR>
84	132	Knife cut tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
85	133	Knife cut tally	Write to NVRAM, and print on receipt to verify
86	134	Knife cut tally	Clear knife cut tally to 0
87	135	Knife cut tally	Return knife cut tally, returns 10 bytes

90	144	Hours on tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
91	145	Hours on tally	Write to NVRAM, and print on receipt to verify
92	146	Hours on tally	Clear Hours on tally to 0
93	147	Hours on tally	Return hours on tally, returns 10 bytes
A3	163	Flash firmware version	Return flash firmware version, returns 6 bytes
A4	164	Flash cycles tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
A5	165	Flash cycles tally	Write to NVRAM, and print on receipt to verify
A6	166	Flash cycles tally	Clear flash cycles cut tally to 0
A7	167	Flash cycles tally	Return flash cycles cut tally, returns 10 bytes
A8	168	Knife jams tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
A9	169	Knife jams tally	Write to NVRAM, and print on receipt to verify
AA	170	Knife jams tally	Clear knife jams tally to 0
AB	171	Knife jams tally	Return knife jams tally, returns 10 bytes
AC	172	Cover openings tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
AD	173	Cover openings tally	Write to NVRAM, and print on receipt to verify
AE	174	Cover openings tally	Clear cover openings tally to 0
AF	175	Cover openings tally	Return cover openings tally, returns 10 bytes
B2	178	Max temperature tally	Reset max temperature reached value
B3	179	Max temperature tally	Return max temperature reached since it was reset, returns 10 bytes
B8	184	Barcodes Printed	Write to NVRAM
B9	185	Barcodes Printed	Write to NVRAM, and print on receipt to verify
BA	186	Barcodes Printed	Clear Barcodes Printed tally to 0
BB	187	Barcodes Printed	Return Barcodes Printed tally, returns 10 bytes
BC	188	Receipt Characters Printed	Write to NVRAM
BD	189	Receipt Characters Printed	Write to NVRAM, and print on receipt to verify
BE	190	Receipt Characters Printed	Clear Receipt Characters Printed tally to 0
BF	191	Receipt Characters Printed	Return Receipt Characters Printed tally, returns 10 bytes
C0	192	Printer Faults	Write to NVRAM
C1	193	Printer Faults	Write to NVRAM, and print on receipt to verify
C2	194	Printer Faults	Clear Printer Faults tally to 0
C3	195	Printer Faults	Return Printer Faults tally, returns 10 bytes
C4	196	Dots Printed*	Write to NVRAM
C5	197	Dots Printed*	Write to NVRAM, and print on receipt to verify
C6	198	Dots Printed*	Clear Dots Printed tally to 0
C7	199	Dots Printed*	Return Dots Printed tally, returns 10 bytes
C8	200	Dots Printed on Current Printhead*	Write to NVRAM
C9	201	Dots Printed on Current Printhead*	Write to NVRAM, and print on receipt to verify
CA	202	Dots Printed on Current Printhead*	Clear Dots Printed on Current Printhead tally to 0
CB	203	Dots Printed on Current Printhead*	Return Dots Printed on Current Printhead tally, returns 10 bytes

CC	204	Printhead Changes	Write to NVRAM
CD	205	Printhead Changes	Write to NVRAM, and print on receipt to verify
CE	206	Printhead Changes	Clear Printhead Changes tally to 0
CF	207	Printhead Changes	Return Printhead Changes tally, returns 10 bytes
D0	208	Receipt Mechanism Changes	Write to NVRAM
D1	209	Receipt Mechanism Changes	Write to NVRAM, and print on receipt to verify
D2	210	Receipt Mechanism Changes	Clear Receipt Mechanism Changes tally to 0
D3	211	Receipt Mechanism Changes	Return Receipt Mechanism Changes, returns 10 bytes
D4	212	Knife Mechanism Changes	Write to NVRAM
D5	213	Knife Mechanism Changes	Write to NVRAM, and print on receipt to verify
D6	214	Knife Mechanism Changes	Clear Knife Mechanism Changes tally to 0
D7	215	Knife Mechanism Changes	Return Knife Mechanism Changes, returns 10 bytes
DC	220	Thermistor Error	Write to NVRAM
DD	221	Thermistor Error	Write to NVRAM, and print on receipt to verify
DE	222	Thermistor Error	Clear Thermistor Error tally to 0
DF	223	Thermistor Error	Return Thermistor Error tally, returns 10 bytes
E0	224	Low Voltage Error	Write to NVRAM
E1	225	Low Voltage Error	Write to NVRAM, and print on receipt to verify
E2	226	Low Voltage Error	Clear Low Voltage Error tally to 0
E3	227	Low Voltage Error	Return Low Voltage Error tally, returns 10 bytes
E4	228	High Voltage Error	Write to NVRAM
E5	229	High Voltage Error	Write to NVRAM, and print on receipt to verify
E6	230	High Voltage Error	Clear High Voltage Error tally to 0
E7	231	High Voltage Error	Return High Voltage Error tally, returns 10 bytes
E8	232	Power Cycles	Write to NVRAM
E9	233	Power Cycles	Write to NVRAM, and print on receipt to verify
EA	234	Power Cycles	Clear Power Cycles tally to 0
EB	235	Power Cycles	Return Power Cycles tally, returns 10 bytes
EC	236	EEPROM Updates	Write to NVRAM
ED	237	EEPROM Updates	Write to NVRAM, and print on receipt to verify
EE	238	EEPROM Updates	Clear EEPROM Updates tally to 0
EF	239	EEPROM Updates	Return EEPROM Updates tally, returns 10 bytes

* Tallies involving dots are the actual tallies divided by 1000.

Transmit status

ASCII	GS r n
Hexadecimal	1D 72 n
Decimal	29 114 n

Value of n: 1, 49 = printer status
2, 50 = cash drawer status
4, 52 = Flash memory user sector status

Transmits the status specified by *n*. This is a batch mode command which transmits the response after all prior data in the receive buffer has been processed. There may be a time lag between the printer receiving this command and transmitting the response, depending on the receive buffer status.

When DTR/DSR RS-232C communications handshaking control is selected, the printer transmits the one byte response only when the host signal DSR indicates it is ready to receive data.

When XON/XOFF RS232C communications handshaking control is selected, the printer transmits the one byte response regardless of the host signal DSR.

The status bytes to be transmitted are described in the three tables below and on the next page.

Exceptions

Unlike the A793, that had a dedicated connector and resultant dedicated status reporting for each cash drawer, the H300 has a single connector that shares data reporting from either cash drawer. When either cash drawer is open, an open status is reported by the printer.

Printer status (n = 1 or n = 49)

Bit	Off/On	Hex	Decimal	Status for transmit status
0	Off	00	0	Paper present.
	On	01	1	Paper exhausted.
1	Off	00	0	Cover closed.
	On	02	2	Cover open.
2	Off	00	0	Paper present.
	On	04	4	Paper exhausted.
3	–	–	–	Undefined.
4	Off	00	0	Not used. Fixed to off.
5	–	–	–	Undefined.
6	–	–	–	Undefined.
7	Off	00	0	Not used. Fixed to off.

Cash drawer status (n = 2 or n = 50)

Bit	Off/On	Hex	Decimal	Status for transmit status
0	Off	00	0	One or both cash drawers open.
	On	01	1	Both cash drawers closed.
1	Off	00	0	One or both cash drawers open.
	On	02	2	Both cash drawers closed.
2	–	–	–	Undefined
3	–	–	–	Undefined
4	Off	00	0	Not used. Fixed to off.
5	–	–	–	Undefined.
6	–	–	–	Undefined.
7	Off	00	0	Not used. Fixed to off.

Flash memory user sector status ($n = 4$ or $n = 52$)

Bit	Off/On	Hex	Decimal	Status for transmit status
0	-	-	-	Undefined. Fixed to off.
1	-	-	-	Undefined. Fixed to off.
2	Off	00	0	User data storage write successful
	On	04	4	User data storage write failed, specified area not erased.
3	Off	00	0	Flash logo area adequate, definition stored
	On	08	8	Flash logo area not adequate
4	Off	00	0	Not used. Fixed to off.
5	Off	00	00	No thermal user-defined characters written to flash.
	On	20	32	Thermal user-defined characters written to flash.
6	Off	00	0	Not used. Fixed to off.
7	-	-	-	Undefined.

Notes

If the data transmitted from the printer after outputting this command to the printer is “0xx1xx10”(x = 0 or 1), process the data as a normal status.

Exceptions

When n is out of the specified range, the command is ignored.

Send printer software version

ASCII	US V
Hexadecimal	1F 56
Decimal	31 86

The printer returns 8 bytes containing the loader and flash software version. The first 4 bytes returned are an ASCII string for the loader version.

The second 4 bytes are an ASCII string for the flash version. Example: For 1.234.56 (8 bytes), the loader version is 1.23 and the flash version is 4.56.

Real time commands

The real time commands provide an application interface to the printer even when the printer is not handling other commands (RS-232C communication interface only):

- Real time status transmission: GS (Hex 1D) sequence and DLE (Hex 10) sequence
- Real time request to printer: GS (Hex 1D) sequence and DLE (Hex 10) sequence
- Real time printer status transmission

The batch mode printer status commands are placed in the printer’s data buffer as they are received and handled by the firmware in the order in which they were received. If the paper exhausts while printing data that was in the buffer ahead of the status command, the printer goes busy at the RS-232C interface and suspends processing the data in the buffer until paper is reloaded. This is true for all error conditions: knife home error, thermal printhead overheat, etc. In addition, there is no way to restart the printer after a paper jam or other error, when using batch mode status commands.

The real time commands are implemented in two ways in order to overcome the limitations of batch mode status commands. Both implementations offer the same functionality; which one you choose depends on the current usage of your application.

Preferred implementation

For a new application the GS (1D) sequences are recommended to avoid possible misinterpretation of a DLE (0x10) sequence as a clear printer (0x10 0, ASCII DLE NUL) command.

An application using these GS (1D) sequences, does not need to distinguish for the printer between the new real time commands and the clear printer command. This implementation is ideal for an existing application that already uses the clear printer command or for a new application being developed.

Alternate implementation

The alternate implementation uses the DLE (0x10) sequences as implemented on other printers. An application using these DLE (0x10) sequences and the original clear printer command (0x10) must distinguish for the printer between the new real time commands and the clear printer command by adding a NUL (0x00) to the clear printer command.

An application using these DLE (0x10) sequences must also send the second byte of the sequence within 100 milliseconds of the first, to prevent the first byte being mistaken for a clear printer command.

Rules for using real time 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.

These three situations generally preclude use of standard DOS drivers for the serial communication ports when using real time commands.

Moving data through the buffer

Applications should not let the buffer fill up with real time commands when the printer is busy at the RS-232C interface. A busy condition at the RS-232C interface can be determined by bit 3 of the response to 1D 05, or 1D 04 1, or 10 04 1. The reason for a particular busy condition can be determined by other responses to 1D 04 *n* or 10 04 *n*.

Although the printer responds to real time commands when it is busy, it will place them into the buffer behind any other data there, and flush them out in the order in which they were received. When the printer is busy due simply to buffer full (that is, it can't print data as fast as it can receive it), then data continues to be processed out of the buffer at approximately print speed and the real time commands will eventually get flushed out.

When the printer is busy due to an error condition, then data stops being processed to the buffer until the condition clears one way or another. In either case, but more quickly in the case of an error condition, the buffer can fill with real time commands.

When the DLE (0x10) sequences are being used, the last byte stored when the buffer fills up could be the DLE (0x10) code, with no room for the subsequent EOT or ENQ. When this lone DLE (0x10) byte is finally processed out of the buffer it will be interpreted as a clear printer command.

Similarly, when the GS (1D) sequences are being used, the last byte stored when the buffer fills up could be the GS (1D) code, with no room for the subsequent EOT or ETX or ENQ. When this lone GS (1D) byte is finally processed out of the buffer it will use the next byte, whatever it is, as the second byte in its GS (1D) sequence.

To guard against this situation, the application must determine the cause of a busy condition and take appropriate action or pace the real time commands to avoid filling the buffer. There is a minimum of 256 bytes available in the printer's buffer when it goes busy.

Busy line and fault conditions

If the printer is in error condition (cover is open, paper is exhausted...), the printer will still accept data, respond to the batch mode status commands (1B 76 and 1B 75 0), handle the cash drawer commands, and not go busy until it actually tries to execute a print command. Then it will stay busy and stop processing data out of the receive buffer until the condition clears. It will respond to the real time commands as described below.

Real time status transmission

	<u>GS sequence</u>	<u>DLE sequence</u>
ASCII	GS EOT <i>n</i>	DLE EOT <i>n</i>
Hexadecimal	1D 04 <i>n</i>	10 04 <i>n</i>
Decimal	29 4 <i>n</i>	16 4 <i>n</i>

Value of *n*: GS/DLE sequence

- 1 = Transmit printer status
- 2 = Transmit RS-232C busy status
- 3 = Transmit error status
- 4 = Transmit receipt paper status

Transmits the selected one byte printer status specified by *n* in real time according to the following parameters. This command includes two sequences: GS (1D) and DLE (0x10). This command can be disabled using 1F 7A.

Exceptions

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

An application using DLE (0x10) sequence must send EOT within 100 milliseconds of DLE or the printer will misinterpret the DLE and execute a clear printer command. Avoid this possibility by using the 1D 04 *n* sequence, which is handled exactly the same as 10 04 *n*.

Unlike the A793, that had a dedicated connector and resultant dedicated status reporting for each cash drawer, the H300 has a single connector that shares data reporting from either cash drawer. When either cash drawer is open, an open status is reported by the printer.

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	One or both cash drawers open.
	On	04	4	Both cash drawers closed.
3	Off	00	0	Not busy at the RS-232C interface.
	On	08	8	Printer is busy at the RS-232C interface.
4	On	10	16	Fixed to on.
5				Undefined.
6				Undefined.
7	Off	00	0	Fixed to off.

2 = Transmit RS-232C Busy 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 open.
3	Off	00	0	Paper feed button is not pressed.
	On	08	8	Paper feed button is pressed.
4	On	10	16	Fixed to on.
5	Off	00	0	Printing not stopped due to paper condition.
	On	20	32	Printing stopped due to paper condition.
6	Off	00	0	No error condition.
	On	40	64	Error condition exists in the printer.
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	Off	00	0	Fixed to off.
3	Off	00	0	No knife error.
	On	08	8	Knife error occurred.
4	On	10	16	Fixed to on.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurred.
6	Off	00	0	Thermal printhead temp. and power supply voltage are in range.
	On	40	64	Thermal print head temp. or power supply voltage are out of range.
7	Off	00	0	Fixed to off

4 = Transmit receipt paper status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to off
1	On	02	2	Fixed to on
2	Off	00	0	Fixed to off
3	Off	00	0	Fixed to off
4	On	10	16	Fixed to on
5	Off	00	0	Paper present
	On	20	32	Paper exhausted
6	Off	00	0	Paper present
	On	40	64	Paper exhausted
7	Off	00	0	Fixed to off

Real time request to printer

	<u>GS sequence</u>	<u>DLE sequence</u>
ASCII	GS ETX <i>n</i>	DLE ENQ <i>n</i>
Hexadecimal	1D 03 <i>n</i>	10 05 <i>n</i>
	29 3 <i>n</i>	16 5 <i>n</i>
Value of <i>n</i>:	1 = recover and restart	
	2 = recover and clear buffers	

The printer responds to a request from the host specified by *n*. This command includes two sequences: GS and DLE. This command can be disabled using 1F 7A. If in page mode, the printer is set back to standard mode, causing values set by 1B 57 to be changed back to default. The operations performed depend on the value of *n*, according to the following parameters.

***n* = 1**

Restarts printing from the beginning of the line where an error occurred, after recovering from the error. Print settings that are normally preserved from line to line, such as character height and width, are still preserved with this command. This sequence is ignored except when the printer is busy due to an error condition.

This command will attempt recovery from a knife error. Other errors associated with the receipt, such as paper out or printhead overheating, can be recovered from only by clearing the specific condition, such as loading paper or letting the printhead cool down.

***n* = 2**

Recovers from an error after clearing the receive and print buffers. Print settings that are normally preserved from line to line, such as character height and width, are still preserved with this command. This sequence is ignored except when the printer is busy due to an error condition.

The same error recovery possibilities exist as for *n* = 1.

Exceptions

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

An application using DLE (0x10) sequence must send ENQ within 100 milliseconds of DLE or the printer will misinterpret the DLE and execute a clear printer command. Avoid this possibility by using the 1D 03 *n* sequence, that is handled exactly the same as 10 05 *n*.

Real time printer status transmission

ASCII GS ENQ
Hexadecimal 1D 05
Decimal 29 5

Transmits one byte status of the printer in real time.

Value of byte:

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to off
1	Off	00	0	Fixed to off
2	Off	00	0	Cover closed.
	On	04	4	Cover open.
3	Off	00	0	Not busy at the RS-232C interface.
	On	08	8	Printer is busy at the RS-232C interface.
4	Off	00	0	One or both cash drawers open.
	On	10	16	Both cash drawers closed.
5	Off	00	0	Fixed to off.
6	Off	00	0	No error condition.
	On	40	64	Error condition exists in the printer.*
7	On	80	128	Fixed to on.

* Errors include cover open, paper out, cutter error, thermistor error, high or low voltage error, where a thermistor error is unrecoverable, and a high or low voltage error automatically recover

Exceptions

Unlike the A793, that had a dedicated connector and resultant dedicated status reporting for each cash drawer, the H300 has a single connector that shares data reporting from either cash drawer. When either cash drawer is open, an open status is reported by the printer.

Real time commands disabled

ASCII US z n
Hexadecimal 1F 7A n
Decimal 31 122 n

Value of n: 0 = enable
 1 = disable

This command is used to disable real time commands. They are disabled prior to sending graphic or other data to the printer that may contain embedded real time commands.

The command is a batch command and processed in the order received.

Automatic Status Back

Enable/disable Automatic Status Back (ASB)

ASCII: GS a n

Hexadecimal: 1D 61 n

Decimal: 29 97 n

Range of n: 0 - 255

Default: 0 (ASB disabled)

Enables or disables automatic status back (ASB) and specifies the status items. This command is a batch mode command; that is, it is processed after all prior data in the input buffer has been processed. There may be a time lag between the printer receiving this command and changing the ASB response, depending on the receive buffer contents.

If any of the status items listed are selected, ASB is enabled and the printer automatically transmits 4 status bytes whenever the selected status changes. If no status is selected, ASB is disabled. All four status bytes are transmitted without checking DSR

If the error status is enabled, a change in the following conditions will trigger the ASB:

- Cash Drawer
- Receipt Cover
- Knife Error
- Out-of-Range Printhead Temperature
- Out-of-Range Voltage
- Paper Exhaust Status

The bits of n are defined in the table.

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Cash drawer status disabled.
	On	01	1	Cash drawer status enabled.
1	Off	00	0	RS-232C Busy status disabled.
	On	02	2	RS-232C Busy status enabled.
2	Off	00	0	Error status disabled.
	On	04	4	Error status enabled.
3	Off	00	0	Receipt paper roll status disabled.
	On	08	8	Receipt paper roll status enabled.
4	Off	00	0	Undefined
5	Off	00	0	Undefined
6	Off	00	0	Undefined
7	Off	00	0	Undefined

Exceptions

If n = 0, ASB is disabled

Related information

When Automatic Status Back (ASB) is enabled using this command, the status transmitted by other commands and the ASB status are differentiated according to the information found in Recognizing Data from the printer, (in the Real Time Commands section in this chapter). The status bytes to be transmitted are described in the following four tables.

Byte 1 = printer information
 Byte 2 = error information
 Byte 3 = paper sensor information
 Byte 4 = paper sensor information

First Byte (Printer Information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Not used. Fixed to off.
1	Off	00	0	Not used. Fixed to off.
2	Off On	00 04	0 4	One or both cash drawers open. Both cash drawers closed.
3	Off On	00 08	0 8	Not busy at the RS232C interface. Printer is busy at the RS232C interface.
4	On	10	16	Not used. Fixed to on.
5	Off On	00 20	0 32	Receipt cover closed. Receipt cover open.
6	Off On	00 40	0 64	Paper feed button is not pressed. Paper feed button is pressed.
7	Off	00	0	Not used. Fixed to off.

Second byte (error information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	-	-	-	Undefined
1	-	-	-	Undefined
2	Off On	00 04	0 4	No mechanical error Mechanical error occurred
3	Off On	00 08	0 8	No knife error. Knife error occurred.
4	Off	00	0	Not used. Fixed to off.
5	Off On	00 20	0 32	No unrecoverable error. Unrecoverable error occurred.
6	Off On	00 40	0 64	No recoverable error. Recoverable error: Cover open, paper out, temperature or voltage error is out of range.
7	Off	00	0	Not used. Fixed to off.

Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Fixed to off
1	Off	00	0	Fixed to off
2	Off On	00 04	0 4	Receipt paper present. Receipt paper exhausted.

3	Off On	00 08	0 8	Receipt paper present. Receipt paper exhausted.
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

Fourth byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	-	-	-	Undefined
1	-	-	-	Undefined
2	-	-	-	Undefined
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

Unsolicited status mode

Select or cancel unsolicited status mode (USM)

ASCII: GS a n

Hexadecimal: 1D 61 n

Decimal: 29 97 n

Value of n: 0 turns mode off; any non-zero value turns mode on

Default: 0 (USM disabled)

Enables or disables automatic return of 4 status bytes whenever one or more of the listed changes occurs. This command is a batch mode command; that is, it is processed after all prior data in the input buffer has been processed. There may be a time lag between the printer receiving this command and enabling unsolicited status mode (USM), depending on the pending input buffer contents.

If an immediate return of printer status is desired, then any of the other status commands should be issued following this command. Once this mode is activated, the printer automatically transmits 4 status bytes whenever any of the conditions change. If an RS-232C connection with hardware flow control is used, all four status bytes will be transmitted without checking DSR.

This command is a POS version of general printer unsolicited status functions; it uses the same command code as older versions of the POS command, “automatic status back (ASB)” but has the following differences:

- The parameter *n* is an on/off switch; it does not select trigger subset
- There is no immediate return when this mode is turned on
- All 4 status bytes are always returned

A change in any of the following conditions will trigger the USM response:

- Cash Drawer
- Receipt Cover
- Knife Error
- Out-of-Range Printhead Temperature
- Out-of-Range Voltage
- Paper Exhaust Status

Related information

When Unsolicited Status Mode is enabled using this command, the status transmitted by other commands and the USM status are differentiated according to the information found in Recognizing Data from the printer, which follows the USM return description.

The status bytes to be transmitted are described in the following four tables.

Byte 1 = printer information

Byte 2 = error information

Byte 3 = paper sensor information

Byte 4 = paper sensor information

First Byte (Printer Information)

Bit	Off/On	Hex	Decimal	Status for USM
0	Off	00	0	Not used. Fixed to off.
1	Off	00	0	Not used. Fixed to off.
2	Off On	00 04	0 4	One or both cash drawers open. Both cash drawers closed.
3	Off On	00 08	0 8	Not busy at the RS232C interface. Printer is busy at the RS232C interface.
4	On	10	16	Not used. Fixed to on.
5	Off On	00 20	0 32	Receipt cover closed. Receipt cover open.
6	Off On	00 40	0 64	Paper feed button is not pressed. Paper feed button is pressed.
7	Off	00	0	Not used. Fixed to off.

Second byte (error information)

Bit	Off/On	Hex	Decimal	Status for USM
0	-	-	-	Undefined
1	-	-	-	Undefined
2	Off On	00 04	0 4	No mechanical error Mechanical error occurred
3	Off On	00 08	0 8	No knife error. Knife error occurred.
4	Off	00	0	Not used. Fixed to off.
5	Off On	00 20	0 32	No unrecoverable error. Unrecoverable error occurred.
6	Off On	00 40	0 64	No recoverable error. Recoverable error: Cover open, paper out, temperature or voltage error is out of range.
7	Off	00	0	Not used. Fixed to off.

Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status for USM
0	Off	00	0	Fixed to off
1	Off	00	0	Fixed to off
2	Off On	00 04	0 4	Receipt paper present. Receipt paper exhausted.
3	Off On	00 08	0 8	Receipt paper present. Receipt paper exhausted.
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

Fourth byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status for USM
0	-	-	-	Undefined
1	-	-	-	Undefined
2	-	-	-	Undefined
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

Recognizing data from the printer

An application sending various real time and non-real time commands to which the printer responds can determine which command a response belongs to by the table below.

Responses to transmit peripheral device status (1B 75) and transmit paper sensor status (1B 76) are non-real time responses and will arrive in the order in which they were solicited.

Batch mode response		Response recognized by:								
ASCII	HEX									
ECS <i>u</i> 0	1B 75 0	0	0	0	0	0	0	x	x	Binary
ESC <i>v</i>	1B 76	0	x	x	0	0	x	x	x	Binary
GS <i>l n</i>	1D 49 <i>n</i>	0	x	x	0	x	x	x	x	Binary
GS <i>r n</i>	1D 72 <i>n</i>	0	x	x	0	x	x	x	x	Binary
Real time response		Response recognized by:								
ASCII	HEX									
GS EOT <i>n</i>	1D 04 <i>n</i>	0	x	x	1	x	x	1	0	Binary
DLE EOT <i>n</i>	10 04 <i>n</i>	0	x	x	1	x	x	1	0	Binary
GS ENQ	1D 05	1	x	x	x	x	x	x	x	Binary
XON		0	0	0	1	0	0	0	1	Binary
XOFF		0	0	0	1	0	0	1	1	Binary
Unsolicited status mode (USM)		Response recognized by:								
USM Byte 1		0	x	x	1	x	x	0	0	Binary
USM Byte 2-4		0	x	x	0	x	x	x	x	Binary

Bar codes

These commands format and print bar codes and are described in order of their hexadecimal codes, with the exception of the QR code overview, which is described in the order of use in creating two-dimensional QR codes.

These commands describe operation for 80mm paper.

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. Set the size for QR module	1D 28 6B 03 00 31 43 n
3. Set data parsing mode	1D 28 6B 03 00 31 44 m
4. Select error correction level	1D 28 6B 03 00 31 45 n
5. Store symbol data	1D 28 6B qL qH 31 50 30 f1...fk
6. Print symbol data	1D 28 6B 03 00 31 51 30
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:	31h = Selects model 1 32h = Selects model 2 (default)
Value of n2:	00h (default)

This command specifies the original version ($m = 1$), or the enhanced form of the symbology ($m = 2$). Model 2 is the recommended model.

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 49 67 n
Value of n:	01h $\leq n \leq$ 10h
Default:	03h

This command sets the size of the QR module to n dots.

Set data parsing mode for QR Code

ASCII GS (k ETX NUL 1 D m
Hexadecimal 1D 28 6B 03 00 31 44 m
Decimal 29 40 107 3 49 68 m
Value of m: 30h = Manual Mode
 31h = Auto Mode (default)

This command specifies which method of data parsing to use. Auto mode will try to determine the best encoding scheme to use to encode the data based off of the values in the buffer. This mode may not encode the data as desired (data intended to be encoded as one type may be encoded as another due to overlap between the two).

Manual mode allows for more control, as the data can be broken into blocks (up to 200) that are each assigned a type using a leading byte, with each block separated by a comma (0x2C). See store symbol data for QR Code for more details.

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 03 00 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 code words.

Store symbol data for QR Code

ASCII GS (k qL qH 1 P 0 f1 ... fk
Hexadecimal 1D 28 6B qL qH 31 50 30 f1 ...fk
Decimal 29 40 107 qL qH 49 80 48 f1 ... fk

This command stores the QR code symbol data (f1... fk) in the symbol storage area, which is located in RAM in font memory (command is ignored if no memory is free).

qL and qH: 04h < (qL+ qH x 100h) < 1BB4; 0h < qL < FF; 0h < qH < 1B

f: 0h < f < FF

k = (qL + qH x 100h) – 03h

Note:

- k bytes of f1...fk are processed as symbol data.
- when using manual mode, data size must also account for the leading type byte, the delimiters (0x2C), and any headers (if using binary blocks)
- It is possible to encode to a QR code as follows. Be sure not to include anything except the following in the f1...fk data:

Category of data	Characters it is possible to specify	Type byte (Manual mode)
Numerical Mode data	“0” ~ “9”	‘N’ (0x4E)
Alphanumeric Mode data	“0”~“9”, “A”~“Z”, SP, \$, %, *, +, -, ., /, :	‘A’ (0x41)
Kanji Mode data	Shift JIS value (Shift value from JISX0208)	‘K’ (0x4B)
8-bit Byte Mode data	00h ~ FFh	‘B’ (0x42)*

*Binary data require a 4-byte field following the type byte to specify length of data block

Continued ...

Sample Auto Mode Data:

1D 28 6B 03 00 31 44 31	‘ Set auto parsing
1D 28 6B 0D 00 31 50 30	‘ Set data size
53 54 31 2D 35 36 37 38 39 30	‘ Data (letters, symbols, numbers)

Sample Manual Mode Data:

1D 28 6B 03 00 31 44 30	‘ Set manual parsing
1D 28 6B 31 00 31 50 30	‘ Set data size
41	‘ Set alpha-numeric type
54 45 53 54 31 2D 2E 2F 3A	‘ Alpha-Numeric Data
2C	‘ Delimiter
4E	‘ Set numeric type
31 32 33 34 35 36 37 38 39 30	‘ Numeric Data
2C	‘ Delimiter
4B	‘ Set Kanji
9B 97 82 71 9B 95 82 92	‘ Kanji Data
2C	‘ Delimiter
42 30 30 30 38	‘ Set binary and block length (0 0 0 8 = 0x00 0x08 = 8 bytes)
54 2C 45 2C 53 2C 54 2C	‘ Binary Data (0x2Cs are valid data, not delimiters)

Print symbol data for QR code

ASCII	GS (k ETX NUL 1 Q 0
Hexadecimal	1D 28 6B 03 00 31 51 30
Decimal	29 40 107 03 00 49 81 48

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

The following data are added automatically by the encode processing.

- Position Detection Patterns
- Separators for Position Detection Patterns
- Timing Patterns
- Format Information
- Version Information
- Error Correction code words (employs the Reed-Solomon Error Detection and Correction algorithm)
- Pad codeword
- Number of bits in Character Count Indicator
- Mode Indicator
- Terminator
- Alignment Patterns (when model 2 is selected)
- Extension Patterns (when model 1 is selected)

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 03 00 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	Decimal	Number of bytes
Header	37H	55	1 byte
Identifier	59H	89	1 byte
Horizontal size (1)	30H – 39H	48 – 57	3 byte
Separator	1FH	31	1 byte
Vertical size (1)	30H – 39H	48 – 57	3 byte
Separator	1FH	31	1 byte
Fixed value	31H	49	1 byte
Separator	1FH	31	1 byte
Other information (2)	30H or 31H	48 or 49	1 byte
Error information (3)	30H – 39H	48 – 57	4 byte
NUL	00H	0	1 byte

1. Barcode Size

“Horizontal size” and “vertical size” indicate the number of dots of the symbol. The decimal value of the vertical size and horizontal size is converted to text data and sent starting from the high order end.

(ex: When horizontal size is 120 dots, horizontal size is “120” (in hexadecimal: 31H, 32H, and 30H / in decimal: 49, 50, and 48), which is 3 bytes of data.)

2. Other Information

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

Hex	Decimal	Condition
30H	48	Printing is possible
31H	49	Printing is impossible

3. Error Information

“Error information” indicates mainly detailed information when “Other information” is Unprintable.

Error information	Error content	Solution
"0000". (0x30 30 30 30)	No error (printing is possible)	
"1001". (0x31 30 30 31)	Encoded data cannot be within one symbol.	Check the amount of encoded data.
"1002". (0x31 30 30 32)	Encode processing failed.	Check the encoded data.
"2001". (0x32 30 30 31)	No barcode data in the symbol storage area.	Put data in the print buffer.
"2002". (0x32 30 30 32)	The symbol size is bigger than the current printing area.	
"3001". (0x33 30 30 31)	Too much data.	The data being sent is larger than the print buffer.
"3002". (0x33 30 30 32)	Invalid Data Packet.	Error receiving QR Code data.
"3003". (0x33 30 30 33)	Memory Allocation Error	Failed to allocate memory for plotting.
"9999" (0x39 39 39 39)	Internal Error	Power Cycle Printer.

Notes

The symbol is bigger than the printing area:

- Make the module size smaller.

- Change the printing layout (printing area, printing position, etc.)

- Size information indicates size of symbol that is printed with Encode Command.

- The quiet zone is included in the calculation for the maximum size allowed.

This function does not print.

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 pitch of HRI characters

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

Value of *n*: 0, 48 = Standard Pitch at 15 CPI
 1, 49 = Compressed Pitch at 20 CPI

Default: 0 (Standard Pitch at 15 CPI)

Selects standard and compressed font for printing bar code characters using 1D 48 *n* (see above).

Select bar code 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: 216

Sets the bar code height to (*n*/154 inch).

Print bar code

	<u>First Variation</u>	<u>Second Variation</u>
ASCII	GS k <i>m d1...dk</i> NUL	GS k <i>m n d1...dn</i>
Hexadecimal	1D 6B <i>m d1...dk</i> 00	1D 6B <i>m n d1...dn</i>
Decimal	29 107 <i>m d1 dk</i> 0	29 107 <i>m n d1...dn</i>

(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.

Bar codes can be aligned left, center, or right using the align positions command (1B 61).

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.

Continued ...

Rotated barcodes set with small modules (select bar code width command 1D 77 n , with n=1 or 2) and PDF 417 barcodes in any orientation are printed at low speed, for better readability.

Exceptions

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

Illegal data cancels the command.

Values:

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

<i>m</i>	Bar code	<i>d1...dk</i>	length
0	UPC-A	48–57 (ASCII numerals)	Fixed length: 11, 12
1	UPC-E	48–57	Fixed length: 11, 12
2	JAN13 (EAN)	48–57	Fixed length: 12, 13
3	JAN8 (EAN)	48–57	Fixed length: 7, 8
4	Code 39	48- 57, 65- 90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) $d1 = dk = 42$ (start/stop code is supplied by printer if necessary)	Variable length
5	Interleaved 2 of 5	48–57	Variable length (even number)
6	Codabar	65–68, start code 48–57, 36, 43, 45, 46, 47, 58	Variable length
10	PDF 417	32–255	Variable length, maximum 1000 characters

Second variation: Length n specified at beginning of string. Except as noted, $0 < n < 256$.

<i>m</i>	Bar code	<i>d1...dn</i>	length
65	UPC-A	48–57 (ASCII numerals)	Fixed length: 11, 12
66	UPC-E	48–57	Fixed length: 11, 12
67	JAN13 (EAN)	48–57	Fixed length: 12, 13
68	JAN8 (EAN)	48–57	Fixed length: 7, 8
69	CODE39	48–57, 65–90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) $d1 = dk = 42$ (start/stop code is supplied by printer if necessary)	Variable length
70	Interleaved 2 of 5 (ITF)	48–57	Variable length (even number)
71	CODABAR (NW-7)	65–68, start code 48- 57, 36, 43, 45, 46, 47, 58	Variable length
72	Code 93	00–127	Variable length
73	Code 128	0–105 $d1 = 103-105$ (must be a start code) $d2 = 0-102$ (data bytes) (Stop code is provided by the printer)	Variable length
74	Code 128 auto compress	00–255 00–FF	Variable length
75	PDF 417	0–255 00–FF	Variable length
78	Code EAN 128 auto compress	0–255 00–FF	Variable length

79	PDF 417	0–255 00–FF data length specified via integer $n = nH:nL\ 1D\ 6B\ m\ nL\ nH\ d1\ \dots\ dn$	Variable length $0 < n < 2800$
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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

Code 93 and PDF 417 are only available in Native mode.

Print multiple barcodes

ASCII	GS k
Hexadecimal	1D 6B FF n
Decimal	29 108 255

All the individual barcode strings start with 1D 6B m , where m is the type of barcode. Use the same command to do multiple barcodes on one line.

1D 6B FF 01	begin multiple barcodes one line
1D 6B FF 00	end multiple barcodes one line, print the barcodes

- Multiple barcodes can be aligned right, left, center same as single line barcodes
- All barcodes on one line printed at same alignment, height, width, and HRI as the first one
- Parameters for alignment, height, width, and HRI can be set before or after 1D 6B FF 01 command
- No height restriction change from single line barcodes
- Quiet zone between barcodes = 10 * module width
- No text in between barcodes (results undefined)
- Upright, picket fence barcodes only, no upside down or ladder. Extended barcode printing for upside down and ladder barcodes can be done in page mode if required.
- Slip/validation selection disabled in multiple barcodes command string
- Multiple barcodes command string disabled when slip/validation selected
- Page mode disabled in multiple barcodes command string
- Multiple barcodes command string disabled in page mode
- Page mode parameters initialized at end of multiple barcodes command string

Sample multiple barcodes command string:

1B 40	Initialize
1D 6B FF 01	Begin multiple barcodes one line
1B 61 01	Center align
1D 68 40	Barcode height
1D 77 02	Barcode width
1D 48 02	Print HRI below

1D 6B 49 06 67 27 2d 2e 2d 2e Barcode 1, code 128
 1D 6B 49 07 67 04 05 06 07 08 09 Barcode 2, code 128
 1D 6B 49 04 67 01 02 03 Barcode 3, code 128
 1D 6B FF 00 End multiple barcodes, print

Print GS1 DataBar, null terminated

ASCII GS k n d1... 00
Hexadecimal 1D 6B n d1... 00
Decimal 29 107 n d1... 00

<i>n</i>	Type
51	GS1 DataBar
52	GS1 DataBar truncated
53	GS1 DataBar stacked
54	GS1 DataBar stacked omni-directional
55	GS1 DataBar limited
56	GS1 DataBar expanded and expanded stacked
57	UPC-A
58	UPC-E
59	EAN-13
5A	EAN-8
5B	UCC/EAN-128 with CC-A or CC-B
5C	UCC/EAN-128 with CC-C

Note: Null terminated, data length 1 to 2436

Print GS1 DataBar, data length specified

ASCII GS k m nL nH d1... dn
Hexadecimal 1D 6B m nL nH d1... dn
Decimal 29 107 m nL nH d1... dn

<i>m</i>	Type
61	GS1 DataBar
62	GS1 DataBar truncated
63	GS1 DataBar stacked
64	GS1 DataBar stacked omni-directional
65	GS1 DataBar limited
66	GS1 DataBar expanded and expanded stacked
67	UPC-A
68	UPC-E
69	EAN-13
6A	EAN-8
6B	UCC/EAN-128 with CC-A or CC-B
6C	UCC/EAN-128 with CC-C

Note: Data length specified 1 to 2436 via integer nH : nL.

Set GS1 DataBar parameters

Setting of parameters for GS1 DataBar

ASCII GS q a b c d e f L fH
Hexadecimal 1D 71 a b c d e f L fH
Decimal 29 113 a b c d e f L fH

a	byte	pixels per minimum unit, default 3, minimum 2, maximum 6 (value a applies to parameters b, c, d)
b	byte	X undercut, default 0, can be set 0 to a-1
c	byte	Y undercut, default 0, can be set 0 to a-1
d	byte	separator height, default a, can be set a to a*2
e	byte	segment width, used only by GS1 DataBar Expanded, default 22, must be even number 2 to 22
f	word	line height, used only by UCC128, default 25, can be set 1 to 500

Note: For GS1 DataBar commands, consult ISO/IEC 24721. For further information, visit www.gs1.org.

Select PDF 417 parameters

ASCII GS p a b c d e f
Hexadecimal 1D 70 a b c d e f
Decimal 29 112 a b c d e f

Value and Ranges:

Value:	Ranges:	Description:
a, b =		The ratio of bar height to symbol length.
a = height	limit 1 to 10	
b = width	limit 1 to 100	
c = rows	limit 3 to 90	Number of rows in the matrix of code words.
d = columns	limit 7 to 30	Number of columns in the matrix of code words.
e = x dimension	limit 1 to 7	Width of a single module in dots.
f = y dimension	limit 2 to 25	Height of the code word in dots.

Defaults:
a = 1
b = 2
c = 58
d = 7
e = 3
f = 10

PDF 417 is a multi-row, continuous, variable length symbology which has high data capacity. Each symbol has between 3 and 90 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.

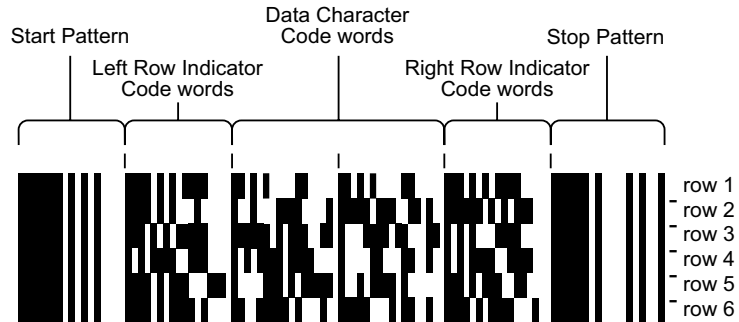
Each character has four bars and four spaces within 17 modules, and is assigned a value between 0 and 928. For this symbology, it is common to refer to these character values as “code words.”

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 90 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.

Related Information:

The "Set bar code width" command (1D 77 n) affects the x dimension and row height for PDF 417. See chart below.

n value	x dimension	row height
2	2	7
3	3	10
4	4	13
5	5	17
6	6	20

Select bar code width

ASCII GS w n
Hexadecimal 1D 77 n
Decimal 29 119 n
Value of n: 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

$n/8\text{mm}$ ($n/203$ inch)

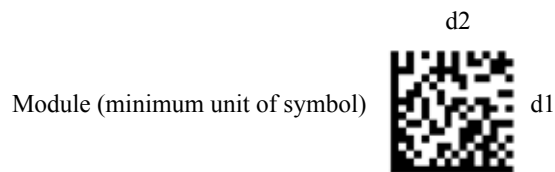
Set DataMatrix Parameters

ASCII GS (k pL pH cn fn m d1 d2
Hexadecimal 1D 28 6B 05 00 36 42 m d1 d2
Decimal 29 40 107 5 0 54 66 m d1 d2

Value and Ranges:

Value:	Ranges:
(pL + pH x 256)	5
cn	54
fn	66
m	0, 1, 48, 49
d1, d2 (when m = 0, 48)	(0, 0), (10, 10), (12, 12), (14, 14), (16, 16), (18, 18), (20,20), (22, 22), (24, 24), (26, 26), (32, 32), (36, 36), (40, 40), (44, 44), (48, 48), (52, 52), (64, 64), (72, 72), (80, 80), (88, 88), (96, 96), (104, 104), (120, 120), (132, 132), (144, 144)
d1, d2 (when m = 1, 49)	(8, 0), (8, 18), (8, 32), (12, 0), (12, 26), (12, 36), (16, 0), (16, 36), (16, 48)
Defaults:	m = 0 d1, d2 = (0, 0)

This command sets the symbol type, number of rows (d1), and number of columns (d2)



m	d1, d2	symbol type	number of rows, columns
0, 48	(0, 0)	Square (ECC200)	Sets automatic processing for the number of rows and columns of the symbol.
0, 48	Other than (0, 0)	Square (ECC200)	Sets the number of rows of the symbol to d1, the number of columns to d2.
1, 49	(8, 0), (12, 0), (16, 0)	Rectangle (ECC200)	Sets the rows of the symbol to d1, the number of columns to automatic processing.
1, 49	Other than (8, 0), (12, 0), (16, 0)	Rectangle (ECC200)	Sets the number of rows of the symbol to d1, the number of columns to d2.

Notes

This command is ignored if any of m, d1, or d2 is outside its range.

Settings of this command are in effect until 1b 40 is executed, the printer is reset, or the power is turned off.

Settings of this command affect the encode processing for DataMatrix. Changing the symbol type affects the horizontal and vertical sizes of the symbol.

Set DataMatrix module size

ASCII GS (k pL pH cn fn n
Hexadecimal 1D 28 6B 03 00 36 43 n
Decimal 29 40 107 3 0 54 67 n

Value and Ranges:

Value:	Ranges:
(pL + pH x 256)	3
cn	54
fn	67
n	2-16

Defaults: n = 3

This command sets the width of one module of DataMatrix to n dots.

Notes

n = width of a module = height of a module (because the DataMatrix modules are square).

If n is outside its range, this command is ignored.

Settings of this command are in effect until 1b 40 is executed, the printer is reset, or the power is turned off.

Settings of this command affect the encode processing for DataMatrix. Changing the symbol type affects the horizontal and vertical sizes of the symbol.

Store DataMatrix data in symbol storage area

ASCII GS (k pL pH cn fn m d1...dk
Hexadecimal 1D 28 6B pL pH 36 50 30 d1...dk
Decimal 29 40 107 pL pH 54 80 48 d1...dk

Value and Ranges:

Value:	Ranges:
(pL + pH x 256)	4-3119
cn	54
fn	80
m	48
d	0-255
k	(pL + pH x 256) - 3

This command stores the DataMatrix symbol data (d1...dk) in the symbol storage area. k bytes of d1...dk are processed as the symbol data.

Notes

The symbol data saved in the symbol storage area by this command is encoded by printing and transmission of this command. After printing and transmission are executed, the symbol data in the symbol storage area is kept.

FNC1 character must be specified as ESC (Hex = 1BH / Decimal = 27) + "1" (Hex = 31H / Decimal = 49).

ESC itself must be specified as ESC + ESC.

The symbol data saved in the symbol storage area by this command is kept until the following processing is performed:

- This function is executed

- 1b 40 is executed

- The printer is reset or the power is turned off

Print DataMatrix symbol data in the symbol storage area

ASCII GS (k pL pH cn fn m
Hexadecimal 1D 28 6B 03 00 36 51 30
Decimal 29 40 107 3 0 54 81 48

Value and Ranges:

Value:	Ranges:
(pL + pH x 256)	3
cn	54
fn	81
m	48

This command encodes and prints the DataMatrix symbol data stored in the symbol storage area.

Notes

Use this command when the printer is at the beginning of a line, or there is no data in the print buffer.

If the symbol size exceeds the print area, the printer feeds the paper as much as the symbol's height, without printing the symbol.

The quiet zone (the space at the top, bottom, right, and left of the symbols, which is specified by the DataMatrix standard) is not included in the printing data. Be sure to include the quiet zone when using this function.

If there is any of the errors described below in the data of the symbol storage area, the barcode will not be printed.

- There is no data.
- When there is a problem with the amount of data saved in the symbol storage area.
- When the data saved in the symbol storage area includes data outside the domain.

Printing of symbol is not affected by print mode (emphasized, double-strike, underline, or font size), except for upside-down print mode.

The following functions are not supported:

- Structured Append Symbols
- Macro Character
- Reader Programming Character
- ECI: Extended Channel Interpretation

Error correction version is ECC 200. Versions ECC 000 – 140 cannot be used.

For ECC 200, the Reed-Solomon Error Detection and Correction algorithm is used for the error correction codewords.

In the Reed-Solomon Error Detection and Correction algorithm, the error correction level (%) is automatically determined based on the symbol size.

The data sequence: ESC (Hex = 1BH / Decimal = 27) + "1" (Hex = 31H / Decimal = 49) is encoded to FNC1 character.

The data sequence: ESC + ESC is encoded to ESC.

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. After the symbol printing, the print position is moved to left side of the printable area. Also, the printer is in the status "beginning of the line".

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.

Page mode

Page mode is one of two modes that the H300 printer uses to operate. 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. Note: the A793 Emulation does not support Page Mode.

Print and return to standard 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 current data to be printed is deleted.

Exceptions

This command is only used in page mode.

Print data in page mode

ASCII	ESC FF
Hexadecimal	1B 0C
Decimal	27 12

Collectively prints all buffered data in the printing area.

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

Printer returns to standard mode through use of 0C, 1B 53, or initialization (which cancels all settings).

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. For more information see page mode in this document.

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)
- Set counter-clockwise rotation (1B 12)
- Select justification (1B 61)
- Select or cancel upside-down printing (1B 7B)
- Set left margin (1D 4C)
- Set print area width (1D 57)

The table below shows the memory allocation in page mode when using monochrome.

Paper type	Total memory allocated (kBytes)	Area of construction (mm)
Monochrome paper	40.5	72 wide x 72 high

Printer returns to standard mode through use of 0C, 1B 53, or initialization (which cancels all settings).

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 mode (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 (the values for these commands 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.

18, 1B 0C, 1D 24, and 1D 5C commands are ignored in standard mode.

Exceptions

This command is effective only in page mode.

Select print direction in page mode

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

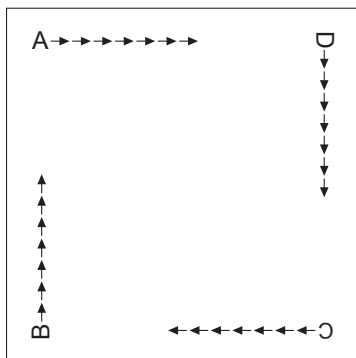
Value of *n*: Start position

- 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).



Starting 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

The command is valid only in page mode.

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

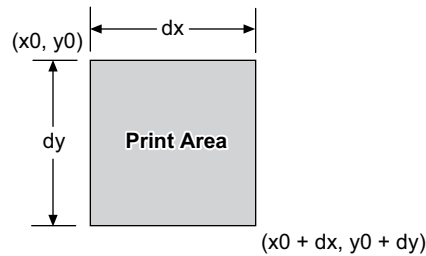
If this command is processed in standard mode, print direction is not changed until the printer is set to page mode.

Set print area in page mode

ASCII ESC W $n1, n2 \dots n8$
Hexadecimal 1B 57 $n1, n2 \dots n8$
Decimal 27 87 $n1, n2 \dots n8$

Range of n : 0-255

Default: $n1-4 = 0$
 $n5 = 64$
 $n6 = 2$
 $n7 = 64$
 $n8 = 2$
 (576x576 for 80mm 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 B 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 .

- $x0 = [(n1 + n2 \times 256) \times (\text{horizontal direction of the fundamental calculation pitch})]$
- $y0 = [(n3 + n4 \times 256) \times (\text{vertical direction of the fundamental calculation pitch})]$
- $dx = [(n5 + n6 \times 256) \times (\text{horizontal direction of the fundamental calculation pitch})]$
- $dy = [(n7 + n8 \times 256) \times (\text{vertical direction of the fundamental calculation pitch})]$

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.

See the illustration for a graphic representation of the printing area. For more information about the fundamental calculation pitch, see the set horizontal and vertical motion units command (1D 50).

Maximum area specification in page mode

Maximizing the possible area in page mode consumes almost all of the free RAM. Without any free RAM, bitmap rotations and enlargements cannot be performed. Use the User Storage Status command (1D 97 $m n$) to determine the amount of free memory.

Exceptions

The command is effective only in page mode.

If $[x0 + dx]$ is greater than the printable area, the printing area width is set to $[\text{horizontal printable area} - x0]$. If $[y0 + yx]$ is greater than the printable area, the printing area height is set to $[\text{vertical printable area} - y0]$.

Set absolute vertical print position in page mode

ASCII *GS \$ nL nH*
Hexadecimal *1D 24 nL nH*
Decimal *29 36 nL nH*

Sets the absolute vertical print starting position for buffer character data in page mode. The absolute print position is set to $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$ 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

$[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$ inches.

Exceptions

This command is effective only in page mode.

If the $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$ exceeds the specified printing area, this command is ignored.

Set relative vertical print position in page mode

ASCII *GS \ nL nH*
Hexadecimal *1D 5C nL nH*
Decimal *29 92 nL nH*

Value

The value for the horizontal and vertical movement cannot be less than the minimum horizontal movement amount, 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 $[(nL + nH \times 256) \times \text{vertical or horizontal motion unit}]$ inches. The amount of movement is calculated only for the paper roll.

When pitch n is specified to the movement downward: $nL + nH \times 256 = n$

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: $nL + nH \times 256 - 65536 - N$

Exceptions

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

Any setting that exceeds 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 2048 bytes.

Exceptions

If the macro definition exceeds 2048 bytes, excess data is not stored.

Execute macro

ASCII GS ^ *rtm*
Hexadecimal 1D 5E *rtm*
Decimal 29 94 *rtm*

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 $t \times 100$ ms for every macro execution.

m specifies macro executing mode when the LSB (least significant bit) $m = 0$

The macro executes r times continuously at the interval specified by t when the LSB (least significant bit) of $m = 1$.

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.

User data storage

Write to user data storage

ASCII ESC ' *m a0 a1 a2 d1 ... dm*
Hexadecimal 1B 27 *m a0 a1 a2 d1 ... dm*
Decimal 27 39 *m a0 a1 a2 d1 ... dm*

Value of *m*: 0 – 255

Writes *m* bytes of data to the user data storage flash page at the address specified. The printer waits for *m* bytes of data following the 3-byte address, *addr*.

If any of the memory locations addressed by this command are not currently erased, the command is not executed.

Related information

Result of this write is returned in bit 2 of response to transmit status command 1D 72, *n* = 4.

Read from user data storage

ASCII ESC 4 *m a0 a1 a2*
Hexadecimal 1B 34 *m a0 a1 a2*
Decimal 27 52 *m a0 a1 a2*

Value of *m*: 0 – 255

Reads *m* bytes of data from the user data storage flash page at the address specified. Returns *m* bytes to the application, followed by a carriage return (0x0D). If the range of requested data exceeds the sector boundary, the printer will only send the data up to the sector boundary.

Select memory type (SRAM/flash) where to save logos or user-defined fonts

ASCII GS " *n*
Hexadecimal 1D 22 *n*
Decimal 29 34 *n*

Value of *n*: 48 – 53

***n* = 48 (ASCII *n* = 0) HEX 30**

Loads active logo to RAM only. This is used to print a special logo but not have it take up flash memory. A logo defined following this command is not preserved over a power cycle. The printer disables interrupts while writing to flash. Any command that cause data to be written to flash should be followed by a 50 Msec delay to allow significant time for the write operation.

***n* = 49 (ASCII *n* = 1) HEX 31**

Loads active logo to flash memory. This is the default condition for logo flash storage. A logo defined following this command is stored in flash memory.

***n* = 50 (ASCII *n* = 2) HEX 32**

Loads user-defined characters to RAM only. This is the default condition for user-defined character storage. Any user-defined characters defined following this command are not preserved over a power cycle.

***n* = 51 (ASCII *n* = 3) HEX 33**

Loads user-defined characters to flash memory. An application must use this command to store user-defined characters in flash memory. Any user-defined characters defined following this command are stored in flash memory. A user-defined character cannot be redefined in flash memory. The flash memory page must be erased by an application before redefining user-defined characters. For more information, see the erase user flash sector (1D 40 *n*) command.

Specifies whether to load the logos or user-defined characters to logo/font flash memory or to RAM (volatile memory). The selection remains in effect until it is changed via this command or until the power cycles. To specify permanent font flash, also send 1D 22 81 01.

Related information

This command is recognized in Native mode. In A793 and LEGACY emulations, parameter bytes go into the print buffer.

Flash memory user sectors allocation

ASCII GS" U n1 n
Hexadecimal 1D 22 55 n1 n2
Decimal 29 34 85 n1 n2

Default Value of n1: 1 (see below)

Default Value of n2: 1 (see below)

n1 is the number of 64k sectors used for logos and user-defined characters.

n2 is the number of 64k sectors used for user data storage.

n1 + n2 <= 6 (dec) (1M)

n1 + n2 <= 22 (dec) 16 (hex) (2M)

If n1 + n2 is greater than the maximum number of sectors available, the command is ignored. The printer returns NACK.

Issuing this command with parameters different from current parameters will erase all sectors. The printer returns ACK.

Issuing this command with parameters the same as current parameters will do nothing. The printer returns ACK.

Note: Flash memory is made up of user and program code. Therefore, the available flash memory space will vary with the amount of program code utilized.

Flash object area pack

ASCII GS" ` n1
Hexadecimal 1D 22 60 n1
Decimal 29 34 96 n1

Value of n1: n1 specifies

n1 = 0 pack the permanent font area

n1 = 1 pack the logo and user-defined character area

Issuing this command will pack the objects currently stored in flash memory. Objects that are no longer valid will be removed. This will provide the user the maximum amount of storage in this area for new objects.

Note: Flash memory is made up of user and program code. Therefore, the available flash memory space will vary with the amount of program code utilized.

Flash object delete

ASCII GS" ` n1 n2 (n3)
Hexadecimal 1D 22 61 n1 n2 (n3)
Decimal 29 34 97 n1 n2 (n3)

Value of n1: n1 specifies

n1 = 01 user-defined character set where n2 is the ID of the user-defined character set to delete. This will delete all characters found that are part of the specified set.

n1 = 02 logo where n2 is the ID of the logo to delete

n1 = 0C double-byte font where n2 is the font ID and n3 is the font style of the font to delete. This will delete the double-byte font of the specified ID and style. If no other fonts of the same ID are found, the double-byte table that corresponds to this ID will be deleted as well.

n1 = 0D POS fontset where n2 is the ID of the fontset to delete. This will delete both fonts specified by the fontset, if they are not used in any other fontset.

n1 = 0F demo script, which takes no following n parameters. Erases all scripts found, not individual scripts.

Issuing this command will delete an individual object or group of objects from flash memory. The parameter n3 is not used for all types. To reuse the space that these objects occupied in flash memory, a flash area pack must be performed after deleting the object(s).

Note: Flash memory is made up of user and program code. Therefore, the available flash memory space will vary with the amount of program code utilized.

Expanded flash memory allocation

ASCII GS" 0x80
Hexadecimal 1D 22 80
Decimal 29 34 128

This sequence of commands is used to specify the number of flash sectors to be used for different applications. The begin and end sequence commands must be sent. All areas do not need to have flash sectors specified.

The command to request the number of user sectors is optional.

If more sectors are specified than are available the command sequence is ignored and the printer returns NACK.

If the sectors are available, and different from current parameters, all sectors are erased and the printer returns ACK.

If the sectors specified are the same as current parameters, nothing is erased and the printer returns ACK.

1D 22 80 00	request number of user sectors available, printer returns nL nH
1D 22 80 30	begin expanded flash memory allocation sequence
1D 22 80 31 nL nH	n sectors to logo/font area
1D 22 80 32 nL nH	n sectors to user data storage area
1D 22 80 33 nL nH	n sectors to permanent font area
1D 22 80 34 nL nH	n sectors to electronic journal area
1D 22 80 40	end expanded flash memory allocation sequence

n = 0xFFFF means allocate all remaining sectors to this area; only one area can specify this parameter value.

Select flash area for storing logos and user-defined characters

ASCII GS" 0x81
Hexadecimal 1D 22 81 *n*
Decimal 29 34 129 *n*

Value of *n*: *n* specifies

n = 0 select logo/font flash

n = 1 select permanent font flash

n > 1 reserved

Logos and user-defined characters can be stored in either flash area.

Return flash area size

ASCII GS" 0x90
Hexadecimal 1D 22 90 *n*
Decimal 29 34 144 *n*

Value of *n*: *n* specifies

n = 0 select logo/font flash

n = 1 select permanent font flash

n > 1 reserved

Returns the size for the selected flash area.

Erase user flash sector

ASCII GS @ n
Hexadecimal 1D 40 n
Decimal 29 64 n

Value of n: 49 – 51

n = 49 (ASCII n = 1) HEX 31

This command erases all 64K flash memory sectors allocated to user-defined character and logos storage. Those sectors should be erased in two situations: when the logo definition area is full and an application is attempting to define new logos, and when an application wants to replace one user-defined character set with another. In both cases, all logos and character set definitions are erased and must be redefined.

n = 50 (ASCII n = 2) HEX 32

This command erases all sectors available for user data storage.

n = 51 (ASCII n = 3) HEX 33

This command erases all sectors available for permanent fonts.

Erases a page of flash memory and sends a carriage return when the operation is complete.

Related information

See command “Flash memory user sectors allocation” (1D 22 55 n1 n2).

See also command “Expanded flash memory allocation” (1D 22 80) and “Select flash area” (1D 22 81 n).

***Important:** While erasing flash memory, the printer disables all interrupts, including communications. To provide feedback to the application, the printer responds to the application when the erase is complete with a 0D (Hex). After sending the erase user flash sector (1D 40 n) command, an application should wait for the response from the printer before sending data. Otherwise, data will be lost. If an application is unable to receive data, it should wait a minimum of ten seconds after sending the erase user flash sector (1D 40 n) command before sending data.*

Lock permanent font flash area

ASCII GS 0xF0 0x10 n
Hexadecimal 1D F0 10 n
Decimal 29 240 16 n

Value of n: n = 0x00 lock permanent font flash (default)
n = 0x01 unlock permanent font flash to erase or delete

This command allows or prevents the permanent font area to be erased.

***Note:** This only affects the 1D 40 33 commands and downloading a font to permanent font area when a font already exists with the same ID.*

Flash download

These commands are used to load firmware into the printer.

The commands are listed in numerical order according to their hexadecimal codes. Each command is described and the hexadecimal, decimal, and ASCII codes are listed.

There are two ways to enter the download mode.

1. While the printer is running normally, send the command, “Switch to flash download mode” (1B 5B 7D) to leave normal operation and enter the download mode.
2. If the flash is found corrupted during level 0 diagnostics the download mode is automatically entered after the printer has reset.

The printer never goes directly from the download mode to normal printer operation. To return to normal printer operation either the operator must turn the power off and then on to reboot or the application must send a command to cancel download mode and reboot.

When each flash download command is received, the printer returns either ACK or NAK to the host computer when each command is received:

- ACK (hexadecimal 06)
Sent when the printer has received a host transmission and has completed the request successfully.
- NAK (hexadecimal 15)
Sent when a request is unsuccessful.

Communicates to the printer information downloaded from applications. Data is downloaded to flash memory to query the state of the firmware, calculate the firmware CRC and other functions.

Switch to flash download mode

ASCII	ESC [}
Hexadecimal	1B 5B 7D
Decimal	27 91 125

Puts the printer in flash download mode in preparation to receive commands controlling the downloading of objects into flash memory. When this command is received, the printer leaves normal operation and can no longer print transactions until the reboot the printer command (1D FF) is received or the printer is rebooted.

This command does not affect the current communication parameters. Once the printer is in flash download mode, this command is no longer available.

Related information

See entering flash download mode elsewhere in this book to put the printer in flash download mode using the configuration menu.

Erase all flash contents except boot sector

ASCII	GS SO
Hexadecimal	1D 0E
Decimal	29 14

Causes the entire flash memory to be erased.

The printer returns ACK if the command is successful; NAK if it is unsuccessful.

Exceptions

Available only in download mode.

Return main program flash CRC

ASCII GS SI
Hexadecimal 1D 0F
Decimal 29 15

Returns the CRC calculated over the flash firmware code space.

The format of the response is ACK <low byte> <high byte>.

Download application

ASCII GS DC1 NUL NUL NUL NUL *d1... dn*
Hexadecimal 1D 11 00 00 00 00 *d1... dn*
Decimal 29 17 0 0 0 0 *d1... dn*

Value of *d*: data bytes, 0–255

Sending this command followed by an application will download the application to the printer. This will reprogram the flash.

Related information

Available only in download mode.

For more information, contact your service representative.

Reset firmware

ASCII GS (SPACE)
Hexadecimal 1D FF
Decimal 29 255

Ends the load process and reboots the printer. Before executing this command, the printer should have firmware loaded and external switches set to the runtime settings. Application software for downloading should prompt the user to set the external switches and confirm before sending this command. If the downloading was started from a diagnostic, the reboot will cause the printer to re-enter download state unless the external switches are changed.

Settings commands

The following commands enable the user to save and restore printer settings.

Save current settings

ASCII US HT SOH ACK
Hexadecimal 1F 09 01 06
Decimal 31 09 01 06

Saves all current settings as factory settings.

Restore factory settings

ASCII US HT SOH BEL
Hexadecimal 1F 09 01 07
Decimal 31 09 01 07

Clears active settings and restores factory settings.

Upload current settings

ASCII US HT SOH BS
Hexadecimal 1F 09 01 08
Decimal 31 09 01 08

Uploads current settings to the current communications port.

Upload factory settings

ASCII US HT SOH TAB
Hexadecimal 1F 09 01 09
Decimal 31 09 01 09

Uploads factory settings to the current communications port.

Download settings

ASCII US HT SOH LF
Hexadecimal 1F 09 01 0A
Decimal 31 09 01 10

Downloads and merges settings into factory settings and makes these the new settings.

Miscellaneous configuration commands

Set diagnostics mode

ASCII US EXT NUL *n*

Hexadecimal 1F 03 00 *n*

Decimal 31 03 00 *n*

Value of n: 0 = Normal operation/diagnostics mode off
1 = DataScope mode (without graphics)
2 = Receipt test mode
6 = DataScope mode (with graphics)

Default: 0 (Normal operation)

Sets the diagnostics mode to DataScope mode (with or without graphics) or receipt test mode, or sets the printer back to normal operation. See “Diagnostics modes” in chapter two for more information.

Enable or disable knife

ASCII US EXT STX *n*

Hexadecimal 1F 03 02 *n*

Decimal 31 03 02 *n*

Value of n: 0 = Disable
1 = Enable

Default: 1 (Enable)

Enables or disables the knife.

Set printer emulation**ASCII** US EXT BEL *n***Hexadecimal** 1F 03 07 *n***Decimal** 31 03 07 *n***Value of n:** 0 = Native mode
1 = A794 emulation
2 = A793 emulation
3 = LEGACY emulation**Default:** 0 (Native mode)

Sets the printer emulation. See “Printer emulations” in chapter two for more information.

Reset settings to default values**ASCII** US EXT TAB**Hexadecimal** 1F 03 09**Decimal** 31 03 09

This command is obsolete. Instead, use Restore factory settings (1F 09 01 07).

Set default font**ASCII** US EXT S1 *n***Hexadecimal** 1F 03 0F *n***Decimal** 31 03 15 *n***Value of n:** 0 = Standard 13x24
1 = User defined
2 = Compressed 10x24

Sets the default font for monochrome and LEGACY emulations.

Set font size

ASCII US EXT DLE *n*
Hexadecimal 1F 03 10 *n*
Decimal 31 03 16 *n*

Value of n: 0 = Standard 24 high
1 = Tall font
3 = Paper-Savings font

Sets font size for the emulation being used.

Enable or disable Code 128 check digit calculation

ASCII US EXT ESC *n*
Hexadecimal 1F 03 1B *n*
Decimal 31 03 27 *n*

Value of n: 0 = Disable
1 = Enable

Default: 1 (Enable)

Enables or disables the calculation of the Code 128 check digit.

Enable or disable barcode ITF leading zero

ASCII US EXT GS *n*
Hexadecimal 1F 03 1D *n*
Decimal 31 03 29 *n*

Value of n: 0 = Disable
1 = Enable

Default: 1 (Enable)

Enables or disables the leading zero for barcode ITF. If enabled, a zero is provided to even out an odd number of input characters.

Enable or disable barcode string terminator

ASCII US EXT RS *n*
Hexadecimal 1F 03 1E *n*
Decimal 31 03 30 *n*

Value of n: 0 = Disable
1 = Enable

Default: 0 (Disable)

Enables or disables the barcode string terminator. If disabled, the string terminator will not be looked for when the length is specified.

Enable or disable USM canned status**ASCII** US EXT 0x28 *n***Hexadecimal** 1F 03 28 *n***Decimal** 31 03 40 *n***Value of n:** 0 = Disable

1 = Enable

Default: 0 (Disable)

Enables or disables the USM canned status feature.

Send diagnostic pages to comm port**ASCII** US EXT 0x2C *n***Hexadecimal** 1F 03 2C *n***Decimal** 31 03 44 *n***Value of n:** 0 = Disabled

1 = Enabled

Sends the diagnostic pages to the comm port if enabled.

Enable or disable EJ action via operator control**ASCII** US EXT 0x2E *n***Hexadecimal** 1F 03 2E *n***Decimal** 31 03 46 *n***Value of n:** 0 = Disable

1 = Enable

Enables or disables the need for operator control for electronic journaling.

Set printer ID mode**ASCII** US EXT 0x32 *n***Hexadecimal** 1F 03 32 *n***Decimal** 31 03 50 *n***Value of n:** 0 = Native or Emulated printer ID
0x01-0xFE = User-defined printer ID

This function is used to determine what printer ID value is returned in response to a Transmit printer ID command (1D 49 *n*). If *n* > 0, the printer ID will transmit whatever value of *n* is selected. If *n* = 0, the printer can be configured to send back the ID of the H300, A794, A793 or Application Compatible Escape Command systems using the configuration menu.

Set default code page at power on**ASCII** US EXT 0x33 *n***Hexadecimal** 1F 03 33 *n***Decimal** 31 03 51 *n***Value of n:** code page value**Default:** 00 (Code page 437)

Changes the default code page used at power up. See “Select international character set” command for more information about code page values.

Set Asian ASCII characters to narrow**ASCII** US EXT 0x3D *n***Hexadecimal** 1F 03 3D *n***Decimal** 31 03 61 *n***Value of n:** 0 = Normal
1 = Narrow

Changes the width of the ASCII characters of the Asian fonts.

Set vertical white space**ASCII** US EXT 0x47 *n***Hexadecimal** 1F 03 47 *n***Decimal** 31 03 71 *n***Value of n:** number of dot rows
0 = Reduced white space on
FF = Normal spacing

When this command is sent, the amount of white space on the printed receipt is *n* dot rows.

Set printer tone**ASCII** US EXT 0x52 *n fL fH dL dH***Hexadecimal** 1F 03 52 *n fL fH dL dH***Decimal** 31 03 82 *n fL fH dL dH***Value of n:** 1 = runtime configuration
2 = write to EEPROM (requires a reset)**Value of fL:** low byte of frequency**Value of fH:** high byte of frequency**Value of dL:** low byte of duration**Value of dH:** high byte of duration

Sets the duration and frequency of the printer tone. Setting *f* or *d* to 0 will set the original tone.

Appendix A: Commands listed by hexadecimal code

Code (hexadecimal)	Command	Page
09	Horizontal tab	42
0A	Print and feed paper one line	39
0C	Print and return to standard mode	106
0D	Print and carriage return	39
10	Clear printer	34
10 04 <i>n</i>	Real time status transmission (DLE sequence)	81
10 05 <i>n</i>	Real time request to printer (DLE sequence)	83
11 <i>n1</i> ... <i>n72</i>	Print raster graphics	69
12	Select double-wide characters	48
13	Select single-wide characters	48
14 <i>n</i>	Feed <i>n</i> print lines	39
15 <i>n</i>	Feed <i>n</i> dot rows	40
16 <i>n</i>	Add <i>n</i> extra dot rows	40
17	Print	41
18	Cancel print data in page mode	106
19	Perform full knife cut (or code 1B 69)	34
1A	Perform partial knife cut (or code 1B 6D)	35
1B (+*.BMP)	Download BMP logo (where +*.BMP is the data from the file, not the filename.)	64
1B 07	Generate tone	35
1B 0C	Print data in page mode	106
1B 12	Select 90 degree counter-clockwise rotated print	48
1B 14 <i>n</i>	Set column	42
1B 16 <i>n</i>	Select pitch (column width)	49
1B 20 <i>n</i>	Set right-side character spacing	49
1B 21 <i>n</i>	Select print mode	50
1B 24 <i>nL nH</i>	Set absolute starting position	43
1B 25 <i>n</i>	Select or cancel user-defined character set	51
1B 26 <i>s c1 c2</i>	Define user-defined character set	51
1B 27 <i>m a0 a1 a2 d1 ... dm</i>	Write to user data storage	112
1B 2A <i>m n1 n2 d1...dn</i>	Select bit image mode	65
1B 2A 62 6d <i>n</i>	Turn on/off TIFF compression	65
1B 2D <i>n</i>	Select or cancel underline mode	52
1B 2E <i>m n rL rH d1 ... dn</i>	Print advanced raster graphics	66
1B 32	Set vertical line spacing to 1/6 inch	43

Code (hexadecimal)	Command	Page
1B 33 <i>n</i>	Set vertical line spacing	44
1B 34 <i>m a0 a1 a2</i>	Read from user data storage	112
1B 3A 30 30 30	Copy character set from ROM to RAM	53
1B 3D <i>n</i>	Select peripheral device (for multi-drop)	35
1B 3F <i>n</i>	Cancel user-defined character	53
1B 40	Initialize printer	36
1B 44 <i>n1...nk 00</i>	Set horizontal tab positions	44
1B 45 <i>n</i>	Select or cancel emphasized mode	53
1B 47 <i>n</i>	Select or cancel double-strike	54
1B 49 <i>n</i>	Select or cancel italic print	54
1B 4A <i>n</i>	Print and feed paper	41
1B 4B <i>n1 n2 d1...dn</i>	Select single-density graphics	66
1B 4C	Select page mode	107
1B 52 <i>n</i>	Select international character code	55
1B 53	Select standard mode	108
1B 54 <i>n</i>	Select print direction in page mode	108
1B 56 <i>n</i>	Select or cancel 90 degree clockwise rotated print	56
1B 57 <i>n1, n2...n8</i>	Set print area in page mode	109
1B 59 <i>n1 n2 d1...dn</i>	Select double-density graphics	66
1B 5B 7D	Switch to flash download mode	116
1B 5C <i>n1 n2</i>	Set relative print position	45
1B 61 <i>n</i>	Select justification	46
1B 63 34 <i>n</i>	Select sensors to stop printing	36
1B 63 35 <i>n</i>	Enable or disable panel button	36
1B 64 <i>n</i>	Print and feed <i>n</i> lines	41
1B 69	Perform full knife cut (or code 19)	34
1B 6D	Perform partial knife cut (or code 1A)	35
1B 70 <i>n p1 p2</i>	Generate pulse to open cash drawer	37
1B 74 <i>n</i>	Select international character set	56
1B 75 0	Transmit peripheral device status (RS-232C printers only)	72
1B 76	Transmit paper sensor status	73
1B 7B <i>n</i>	Select or cancel upside-down print mode	57
1C 70 <i>m n</i>	Print flash logo	70
1C 71 <i>n ...</i>	Define flash logos	70
1D 03 <i>n</i>	Real time request to printer (GS sequence)	83
1D 04 <i>n</i>	Real time status transmission (GS sequence)	81
1D 05	Real time printer status transmission	84

Code (hexadecimal)	Command	Page
1D 0E	Erase all flash contents except boot sector	116
1D 0F	Return main program flash CRC	117
1D 11 00 00 00 00 <i>d1...dn</i>	Download Application	117
1D 21 <i>n</i>	Select character size	58
1D 22 <i>n</i>	Select memory type (SRAM/Flash) where to save logos or user-defined fonts	112
1D 22 55 <i>n1 n2</i>	Flash memory user sectors allocation	113
1D 22 60 <i>n1</i>	Flash object area pack	113
1D 22 61 <i>n1 n2 (n3)</i>	Flash object delete	113
1D 22 80	Expanded flash memory allocation	114
1D 22 81 <i>n</i>	Select flash area for storing logos and user-defined characters	114
1D 22 90 <i>n</i>	Return flash area size	114
1D 23 <i>n</i>	Select the current logo (downloaded bit image)	67
1D 24 <i>nL nH</i>	Set absolute vertical print position in page mode	110
1D 28 6B 03 00 31 43 <i>n</i>	Set size of module for QR Code	91
1D 28 6B 03 00 31 44 <i>m</i>	Set data parsing mode for QR Code	92
1D 28 6B 03 00 31 45 <i>n</i>	Select error correction level for QR Code	92
1D 28 6B 03 00 31 51 30	Print symbol data for QR Code	93
1D 28 6B 03 00 31 52 30	Transmit QR code print size	94
1D 28 6B 03 00 36 51 30	Print DataMatrix symbol data in the symbol storage area	105
1D 28 6B 04 00 00 31 41 <i>n1 n2</i>	Select model for QR Code	91
1D 28 6B 05 00 36 42 <i>m d1 d1</i>	Set DataMatrix parameters	102
1D 28 6B 05 00 36 43 <i>n</i>	Set DataMatrix module size	103
1D 28 6B <i>pL pH 36 50 30</i> <i>d1...dk</i>	Store DataMatrix data in symbol storage area	104
1D 28 6B <i>qL qH</i> 31 50 30 <i>f1 ... fk</i>	Store symbol data for QR Code	92
1D 2A <i>n1 n2 d1...dn]</i>	Define downloaded bit image	68
1D 2F <i>m</i>	Print downloaded bit image	69
1D 3A	Select or cancel macro definition	111
1D 40 <i>n</i>	Erase user flash sector	62, 115
1D 42 <i>n</i>	Select or cancel white/black reverse print mode	59
1D 48 <i>n</i>	Select printing position of HRI characters	96
1D 49 <i>n</i>	Transmit printer ID	73
1D 49 40 <i>n</i>	Transmit printer ID, remote diagnostics extension	75
1D 4C <i>nL nH</i>	Set left margin	46
1D 50 <i>x y</i>	Set horizontal and vertical minimum motion units	42
1D 56 <i>m</i>	Select cut mode and cut paper (or code 1D 56 <i>m n</i>)	37
1D 56 <i>m n</i>	Select cut mode and cut paper (or code 1D 56 <i>m</i>)	37

Code (hexadecimal)	Command	Page
1D 57 <i>nL nH</i>	Set printing area width	47
1D 5C <i>nL nH</i>	Set relative vertical print position in page mode	110
1D 5E <i>r t m</i>	Execute macro	111
1D 61 <i>n</i>	Enable/disable Automatic Status Back (ASB)	85
1D 61 <i>n</i>	Select or cancel unsolicited status mode	88
1D 62 <i>n</i>	Set smoothing	59
1D 66 <i>n</i>	Select pitch of HRI characters	96
1D 68 <i>n</i>	Select bar code height	96
1D 6B <i>m d1...dk 00</i> or 1D 6B <i>m n d1...dn</i>	Print bar code	96
1D 6B <i>n d1... 00</i>	Print GS1 Databar (RSS barcode), null terminated	99
1D 6B <i>m nL nH d1... dn</i>	Print GS1 DataBar (RSS barcode), data length specified	99
1D 6B FF <i>n</i>	Print Multiple Barcodes	98
1D 70 <i>a b c d e f</i>	Select PDF 417 parameters	100
1D 71 <i>a b c d e fL fH</i>	Set GS1 Databar (RSS) parameters	100
1D 72 <i>n</i>	Transmit status	78
1D 77 <i>n</i>	Select bar code width	101
1D 9B <i>m n</i>	Logo print with knife cut	70
1D A0 <i>nl nh</i>	Set temporary maximum target speed	71
1D F0 01 <i>n</i>	Select font ID number	63
1D F0 02 <i>n</i>	Select font style number	63
1D F0 03	Save font ID number as default font at power up	63
1D F0 10 <i>n</i>	Lock permanent font flash area	62, 115
1D F0 20 <i>nn</i>	Get double-byte font CRC (font ID)	63
1D F0 21 <i>nn mm</i>	Get double-byte font CRC (font ID and font style)	63
1D F0 80	Download font	64
1D F0 C0 02	Download font list	61
1D FF	Reset firmware	117
1F 03 00 <i>n</i>	Set diagnostics mode	119
1F 03 02 <i>n</i>	Enable or disable knife	119
1F 03 07 <i>n</i>	Set printer emulation	120
1F 03 09	Reset settings to default values	120
1F 03 0F <i>n</i>	Set default font	120
1F 03 10 <i>n</i>	Set font size	121
1F 03 1B <i>n</i>	Enable or disable Code 128 check digit calculation	121

Code (hexadecimal)	Command	Page
1F 03 1D <i>n</i>	Enable or disable barcode ITF leading zero	121
1F 03 1E <i>n</i>	Enable or disable barcode string terminator	121
1F 03 28 <i>n</i>	Enable or disable USM canned status	122
1F 03 2C <i>n</i>	Send diagnostic page to comm port	122
1F 03 2E <i>n</i>	Enable or disable EJ action via operator control	122
1F 03 32 <i>n</i>	Set printer ID mode	123
1F 03 33 <i>n</i>	Set default code page at power on	123
1F 03 3D <i>n</i>	Set Asian ASCII characters to narrow	123
1F 03 45 FSID	Configure use of font set over power cycles	61
1F 03 46 <i>n</i>	Configure line spacing	61
1F 03 47 <i>n</i>	Set vertical white space	124
1F 03 4E <i>n1 n2</i>	Port idle timeout	38
1F 03 52 <i>n fL fH dL dH</i>	Set printer tone	124
1F 04 <i>n</i>	Convert 6-dots/mm bitmap to 8-dots/mm bitmap	71
1F 05 <i>n</i>	Select superscript or subscript modes	60
1F 09 01 06	Save current settings as factory settings	118
1F 09 01 07	Restore factory settings	118
1F 09 01 08	Upload current settings	118
1F 09 01 09	Upload factory settings	118
1F 09 01 0A	Download settings	118
1F 26 <i>s c1 c2</i>	Define extended user-defined character set	51
1F 56	Send printer software version	79
1F 69 <i>n</i>	Select active user-defined character set	60
1F 74	Print test form	38
1F 7A	Real time commands disabled	84
1F 7B <i>n</i>	Enable constant speed logos	71

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	¢	£	¥	Pt	f
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	¬	½	¼	;	«	»	
B0	␣	␣	␣		†	‡	‡	π	¶	‡		¶	¶	¶	¶	¶
C0	L	⊥	⊥	†	-	†	‡	‡	⊥	¶	⊥	¶	¶	=	¶	⊥
D0	⊥	¶	π	⊥	⊥	¶	π	‡	‡	⊥	¶	■	■	■	■	■
E0	α	β	Γ	π	Σ	σ	μ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0	≡	±	≥	≤	∫	∫	÷	≈	°	·	·	√	n	²	■	NBSP

Character code table Page 1 (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	×	f
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	®	¬	½	¼	¡	«	»
B0	␣	␣	␣		†	Á	Â	À	©	¶		¶	¶	¢	¥	¶
C0	L	⊥	⊥	†	-	†	ã	Ã	ℓ	ℓ	⊥	⊥	¶	=	¶	α
D0	ø	Ð	Ê	Ë	È	ı	Í	Î	Ï	⌋	⌈	■	■	ı	ì	■
E0	Ó	ß	Ô	Ò	õ	Õ	µ	þ	ƒ	Ú	Û	Ù	Ý	Ý	—	´
F0	-	±	=	¾	¶	§	÷	,	°	¨	.	1	3	2	■	NBSP

Character code table Page 2 (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	û	ć	ç	ł	ë	ő	ó	î	ź	Ä	Ć
90	É	Í	Í	ô	ö	Ł	ł	Ś	ś	Ö	Ü	Ť	ť	Ł	×	č
A0	á	í	ó	ú	Ą	a	Ż	ż	Ę	ę	¬	ź	Č	š	«	»
B0	␣	␣	␣		†	Á	Â	Ě	Ş	‡	‡	¶	¶	Ž	ž	ŕ
C0	Ł	Ł	Ť	†	-	†	Ǽ	ǻ	Ł	ŕ	Ł	Ť	¶	=	¶	α
D0	đ	Đ	Ď	Ě	ď	Ň	í	î	ě	ł	ŕ	■	■	Ť	Ů	■
E0	Ó	ß	Ô	Ń	ń	ň	Š	š	Ř	Ú	ř	Ů	Ý	Ý	ţ	´
F0	-	“	•	˘	˘	Š	÷	˘	°	˘	˘	ů	Ř	ř	■	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	õ	ò	Ú	ù	Ì	Õ	Ü	ç	£	Û	Þ	Ó
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	Ò	¬	½	¼	¡	«	»
B0	␣	␣	␣		†	‡	§	¶	¶	¶	¶	¶	¶	¶	¶	¶
C0	L	⊥	⊥	⊥	-	+	‡	‡	⊥	⊥	⊥	⊥	⊥	=	‡	⊥
D0	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	■	■	■	■	■
E0	α	β	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	Œ	ç	ê	ë	è	ï	î	=	À	§
90	É	È	Ê	ô	Ë	Ï	û	ù	œ	Ô	Ü	ç	£	Ù	Û	f
A0	¡	´	ó	ú	¨	¸	³	—	î	ƒ	¬	½	¼	¾	«	»
B0	␣	␣	␣		†	‡	§	¶	¶	¶	¶	¶	¶	¶	¶	¶
C0	L	⊥	⊥	†	—	†	‡	¶	¶	¶	¶	¶	¶	=	¶	⊥
D0	⊥	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	■	■	■	■	■
E0	α	β	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	Pt	f
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	¬	½	¼	¡	«	¤	
B0	␣	␣	␣		†	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡	‡
C0	L	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥
D0	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	■	■	■	■	■
E0	α	β	Γ	Π	Σ	σ	μ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0	≡	±	≥	≤	∫	∫	÷	≈	°	·	·	√	n	²	■	NBSP

Character code table Page 6 (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	×	f
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	®	¬	½	¼	¡	«	»
B0	␣	␣	␣		†	Á	Â	À	©	¶		¶	¶	¢	¥	¶
C0	L	⊥	⊥	†	-	†	ã	Ã	ℓ	ℓ	⊥	⊥	¶	=	¶	α
D0	ø	Ð	Ê	Ë	È	€	Í	Î	Ï	⌋	⌈	■	■	!	ì	■
E0	Ó	ß	Ô	Ò	õ	Õ	µ	þ	ƒ	Ú	Û	Ù	Ý	Ý	—	´
F0	-	±	=	¼	¶	§	÷	,	°	¨	.	1	3	2	■	NBSP

Character code table Page 7 (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	е	ї	і	Ў	ў	°	·	·	√	№	¤	■	NBSP

Character code table Page 8 (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	€	₹	,	f	„	…	†	‡	^	‰	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 9 (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	כ	ל	מ	נ	ס	ע
90	פ	צ	ק	ר	ש	ת	ך	ץ	גּ	דּ	טּ	פּ	צּ	קּ	רּ	שּׁ
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	¬	½	¼	;	«	»	
B0	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣
C0	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣
D0	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣
E0	α	β	Γ	Π	Σ	σ	μ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0	≡	±	≥	≤	∫	∫	÷	≈	°	·	·	√	n	²	■	NBSP

Character code table Page 10 (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	Α	Ε	Η	Ι	Ο	Υ
F0	Ω	±	≥	≤	İ	ÿ	÷	≈	°	·	·	√	n	²	■	NBSP

Character code table Page 11 (PC874: 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		`	'	“	”	•	-	—								
A0	NBSP	ก	ข	ฃ	ค	ศ	สม	ง	จ	ฉ	ช	ฅ	ญ	ฎ	ฏ	
B0	ฐ	ท	ฒ	ณ	ด	ต	ถ	ท	ธ	น	บ	ป	ผ	ฝ	พ	ฟ
C0	ภ	ม	ย	ร	ฤ	ล	ภ	ว	ศ	ษ	ส	ห	ฬ	อ	ฮ	ฯ
D0	ะ	ั	า	ำ	ิ	ี	ึ	ื	ุ	ู	ุ					฿
E0	เ	แ	โ	ใ	ไ	า	า	็	๋	ั	็	็	็	็	็	็
F0	อ	๑	๒	๓	๔	๕	๖	๗	๘	๙	๐	๑				

Character code table Page 12 (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	í	Ö	Ü	ø	£	Ø	Ş	ş
A0	á	í	ó	ú	ñ	Ñ	Ď	ď	¿	®	¬	½	¼	ı	«	»
B0	␣	␣	␣		†	Á	Â	À	©	¶		¶	¶	¢	¥	¶
C0	L	⊥	⊥	†	-	†	ã	Ã	ℒ	℞	⊥	⊥	¶	=	¶	α
D0	°	ª	Ê	Ë	È		Í	Î	Ï	⌋	⌈	■	■	ı	ì	■
E0	Ó	ß	Ô	Ò	õ	Õ	µ		×	Ú	Û	Ù	ì	ÿ	—	´
F0	-	±		¾	¶	§	÷	,	°	¨	.	¹	³	²	■	NBSP

Character code table Page 13 (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	Ѡ	Ѐ	,	ѓ	„	…	†	‡	€	‰	Љ	<	Њ	Ќ	Ѝ	Ў
90	ђ	ѡ	’	“	”	•	-	—	™	љ	>	њ	ќ	ћ	џ	ѡ
A0	␣	ѣ	ѝ	Ј	џ	Г	Ґ	§	Ё	©	Є	«	¬	-	®	ї
B0	°	±	І	і	Г	μ	¶	·	ё	№	є	»	ј	ѕ	ѕ	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 14 (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	€		,	f	„	…	†	‡	^	%		<				
90		\	'	“	”	•	–	—	~	™		>				
A0	NBSP	¡	¢	£	¤	¥	¦	§	¨	©	×	«	¬	–	®	—
B0	°	±	²	³	´	µ	¶	·	¸	¹	÷	»	¼	½	¾	¿
C0	◌̇	◌̈	◌̉	◌̊	◌̋	◌̌	◌̍	◌̎	◌̏	◌̐		◌̑	◌̒	◌̓	◌̔	◌̕
D0	◌̖	◌̗	◌̘	◌̙	◌̚	◌̛	◌̜	◌̝	◌̞							
E0	◌̠	◌̡	◌̢	◌̣	◌̤	◌̥	◌̦	◌̧	◌̨	◌̩	◌̪	◌̫	◌̬	◌̭	◌̮	◌̯
F0	◌̰	◌̱	◌̲	◌̳	◌̴	◌̵	◌̶	◌̷	◌̸	◌̹	◌̺			LRM	RLM	

Character code table Page 15 (KZ_1048: Kazakh):

	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	Ӓ	Ғ	,	ғ	„	…	†	‡	€	‰	Ӛ	<	Ӣ	Қ	Һ	Ц
90	ӕ	Ҙ	’	“	”	•	-	—	™	Ӛ	>	Ӣ	қ	Һ	ц	
A0		Ү	ұ	Ә	Ұ	Ө	!	§	Ё	©	Ғ	«	¬	-	®	Ү
B0	°	±	І	і	е	μ	¶	·	ё	№	Ғ	»	Ә	Ң	ң	Ү
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 16 (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	,	f	„	…	†	‡	^	%	ث	<	Ⓔ	چ	ژ	ڈ
90	گ	،	،	“	”	•	—	—	ک	™	ژ	>	œ	ZWNJ	ZWJ	و
A0	NBSP	،	¢	£	¤	¥	¦	§	¨	©	ھ	«	¬	—	®	—
B0	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0	ˆ	ء	آ	أ	ؤ	!	ئ	ا	ب	ة	ت	ث	ج	ح	خ	د
D0	ذ	ر	ز	س	ش	ص	ض	×	ط	ظ	ع	غ	—	ف	ق	ك
E0	à	ل	â	م	ن	هـ	و	ç	è	é	ê	ë	ى	ي	î	ï
F0	ó	ؤ	ِ	ó	ô	ؤ	ِ	÷	ó	ù	ó	û	ü	LRM	RLM	ع

Character code table Page 17 (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	Ž
90		`	'	“	”	•	-	-		™	š	>	ś	ť	ž	ž
A0	NBSP	˘	˘	Ł	ł	À	!	Š	“	©	Ş	«	¬	-	®	Ž
B0	°	±	.	ł	´	µ	¶	·	,	ą	ş	»	Ł	“	ı	ž
C0	Ř	Á	Â	Ă	Ä	Í	Ć	Ç	Č	É	Ę	Ë	Ě	Í	Î	Ď
D0	Đ	Ń	Ň	Ó	Ô	Õ	Ö	×	Ř	Ů	Ú	Ů	Ü	Ý	Ť	ß
E0	ř	á	â	ă	ä	í	ć	ç	č	é	ę	ë	ě	í	î	ď
F0	đ	ń	ň	ó	ô	õ	ö	÷	ř	ů	ú	ű	ü	ý	ț	·

Character code table Page 18 (WPC28591: Latin 1):

	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	¡	¢	£	¤	¥	¦	§	¨	©	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 19 (WPC28592: 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	ł	Ĺ	Ś	ś	˙	Š	š	Ť	Ž	-	Ž	ž
B0	°	ą	˙	ł	´	Ĺ	ś	˘	˙	š	ş	ť	ž	˘	ž	ž
C0	Ř	Á	Â	Ă	Ä	Í	Ć	Ç	Č	É	Ě	Ë	Ě	Í	Î	Ď
D0	Đ	Ń	Ň	Ó	Ô	Õ	Ö	×	Ř	Ů	Ú	Ů	Ü	Ý	Ť	ß
E0	ř	á	â	ă	ä	í	ć	ç	č	é	ě	ë	ě	í	î	ď
F0	đ	ń	ň	ó	ô	õ	ö	÷	ř	ů	ú	ů	ü	ý	ť	·

Character code table Page 20 (WPC28599: 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																
90																
A0	NBSP	ı	ç	£	¤	¥	¦	§	¨	©	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 21 (WPC28605: Latin 9):

	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	ı	ç	£	€	¥	Š	Š	š	©	ª	«	¬	-	®	—
B0	°	±	²	³	Ž	µ	¶	·	ž	¹	º	»	Œ	œ	ÿ	¿
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 22 (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	-	ل	£	¤	أ		€	ل	ب	ت	ث	،	ج	ح	خ
B0	·	١	٢	٣	٤	٥	٦	٧	٨	٩	ف	؛	س	ش	ص	؟
C0	٤	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	ا	ب	÷	×	ع
E0	ـ	ف	ق	ك	ل	م	ن	ه	و	ى	ي	ض	ع	غ	غ	م
F0	ـ	ـ	ن	ه	ه	ى	ى	غ	ق	لأ	لأ	ل	ك	ي	■	

Character code table Page 23 (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	❈	—	û	ù	ء	آ	أ	ؤ	£	!	ئ	ا
A0	ب	ة	ت	ث	ج	ح	خ	د	ذ	ر	ز	س	ش	ص	«	»
B0	⦿	⦿	⦿		⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿
C0	L	⦿	⦿	⦿	—	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	=	⦿	⦿
D0	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	■	■	■	■	■
E0	ض	ط	ظ	ع	غ	ف	ق	ك	ل	م	ن	هـ	و	ى	ي	
F0	≡	—´	—°	—´	—´	—´	—´	≈	°	•	•	√	n	2	■	NBSP

Character code table Page 24 (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	€		,	f	„	…	†	‡	^	%	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 26 (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	ア	イ	ウ	エ	オ	ヤ	ユ	ヨ	ツ
B0	—	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	¥	円	年	月	日	時	分	秒	〒	市	区	町	村	人	⋮	

Character code table Page 27 (PC775: 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	Ć	ü	é	ā	ä	ģ	ā	ć	ł	ē	ŕ	ŗ	ī	ž	Ä	Å
90	É	æ	Æ	ō	ö	Ģ	ċ	Ś	ś	Ö	Ü	ø	£	Ø	×	α
A0	Ā	Ī	ó	ž	ž	ž	"	!	©	®	¬	½	¼	Ł	«	»
B0	☐	☐	☐		†	Ą	Č	Ę	È	‡	‖	¶	‡	‡	Š	‡
C0	L	⊥	⊥	†	-	†	Ū	Ū	Ł	ŕ	⊥	⊥	‡	=	‡	Ž
D0	ą	č	ę	è	ì	ś	ų	ū	ž	⌋	⌈	■	■	■	■	■
E0	ó	ß	ō	ń	õ	õ	μ	ń	ķ	ķ	ł	ł	ŋ	Ē	Ņ	'
F0	-	±	"	¼	¶	§	÷	"	°	.	.	1	3	2	■	NBSP

Character code table Page 28 (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	€		,		„	…	†	‡		‰		<		..	˘	,
90		\	'	“	”	•	-	-		™		>		—	˙	
A0	NBSP		¢	£	¤		¦	§	Ø	©	Ð	«	¬	-	®	Æ
B0	°	±	²	³	´	µ	¶	·	ø	¹	ŗ	»	¼	½	¾	æ
C0	À	Ā	Ã	Ć	Ä	Å	Ė	Ē	Č	É	Ž	È	Ģ	Ķ	Ī	Ļ
D0	Š	Ņ	Ņ	Ó	Ō	Õ	Ö	×	Ū	Ł	Ś	Ū	Ü	Ž	Ž	ß
E0	ą	į	ā	ć	ä	å	ė	ē	č	é	ž	è	ģ	ķ	ī	ļ
F0	š	ń	ņ	ó	ō	õ	ö	÷	ū	ł	ś	ū	ü	ž	ž	·

Character code table Page 29 (WPC28594: 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																	
90																	
A0	NBSP	Ą	ą	Ą	Ą	Ī	ī	Ķ	ķ	Š	š	Ē	ē	Ģ	ģ	Ž	ž
B0	°	ą	ą	ą	ą	į	į	ķ	ķ	š	š	ē	ē	ģ	ģ	ž	ž
C0	Ā	Ā	Ā	Ā	Ā	Ā	Æ	Į	Č	É	Ē	Ē	Ē	Í	Î	Ī	
D0	Đ	Ņ	Ō	Ų	Ô	Õ	Ö	×	Ø	Ū	Ú	Û	Ü	Û	Ū	ß	
E0	ā	á	â	ã	ä	å	æ	į	č	é	ē	ē	ē	í	î	ī	
F0	đ	ņ	ō	ų	ô	õ	ö	÷	ø	ū	ú	û	ü	Û	Ū	·	

Character code table Page 30 (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	{		}	~	␣
80	€		,	f	„	…	†	‡		‰		<				
90		`	'	“	”	•	-	—		™		>				
A0	NBSP	ˆ	À	£	¤	¥	¦	§	¨	©	ª	«	¬	SHY	®	¯
B0	°	±	²	³	´	µ	¶	·	È	É	Ê	»	Ë	½	Υ	Ω
C0	Ï	À	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M	N	Ξ	O
D0	Π	P		Σ	T	Υ	Φ	X	Ψ	Ω	Ï	ÿ	ά	έ	ή	ί
E0	Û	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	