Programming Guide

HP A799II/A799I Thermal Receipt Printer

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Chapter 1: 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 on configuring the printer, see <u>Printer configuration</u>.
    - 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 cyclic redundancy check (CRC) 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 <u>Indicators</u> describes the specific tone and LED sequences.

- Verify whether paper is present.

- Return the knife to the home position.

    Failure causes a fault condition. The table in <u>Indicators</u> describes the specific tone and LED sequences.

- Verify whether the receipt cover is closed.

    Failure does not interrupt the start-up cycle.

When you turn on the printer, if the LED blinks twice, every 4 seconds, the object storage areas are being initialized. This process could take up to 2 minutes. After the object storage area initialization is complete, the printer continues with normal startup procedure and operation.

Important: Do not restart the computer 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 load into the EEPROM during start-up diagnostics, and the printer makes 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 the state or mode of the printer.

Remote diagnostics

Remote diagnostics (sometimes called level 3 diagnostics) keep track of the following tallies and print 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 black mark errors
- Number of thermistor errors
- Number of low voltage errors
- Number of high voltage errors
- Number of firmware starts
- Number of EEPROM updates

A799II Diagnostics Form

```
*** A799II - Diagnostics Form ***

Model number              : A799-780X-TD00
Serial number             : 0000000000

Loader Firmware
    P/N                   : PN#: 189-799L107A
    DATE                  : Feb 16 2015
Flash Firmware
    Revision              :  V1.31
    CRC                   :  8669
    P/N                   : 189-799A131A

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 settting         :  H
    Motor ID              :  1
    Paper Type Setting    : Type 0, Monochrome
    Color Density Adj     : n/a
    Print Density, Mono   : 100%
    Max Speed             : 350 mm/sec
    Paper Width           : 80 mm
    Max Power             : Auto
    Knife                 : Enabled
    Partial Cut           : 135 steps
    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
                          : 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 varies per model or printer configuration.

(Shown approximately 60% of size)

For more information about	See this section
Accessing the remote diagnostic tallies	See the following 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 Black dot sensor error (n/a A799) Knife unable to home
LED	Continuous, flashing slowly	Paper is low (if sensor is installed) Printhead too hot Voltages low/high
LED	Continuous, double LED flash	Write to permanent memory in progress (n/a A799)
LED	Continuous, quick blinking (on power up)	Invalid firmware (n/a A799)
Tone	Two-tone beep (low frequency, high frequency)	Start-up diagnostics completed successfully
LED and Tone	Single beep Single LED flash	Boot CRC test failure (n/a A799II)
LED and Tone	Double beep Double LED flash	SRAM test failure (n/a A799II)
LED and Tone	Triple beep Triple LED flash	EEPROM test failure (n/a A799II)
LED and Tone	Four beeps Four LED flash	Dynamic memory initialization failure (n/a A799II)
LED and Tone	Two-tone beep (high frequency, low frequency) Continuous flashing of LED	Main program CRC test failure (n/a A799II) – or – When entering flash download mode*

*Note: The printer enters flash download mode in one of two ways: either the DIP switch is in on position (n/a A799II) or a download command is sent to the printer (n/a A799).

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

For more information about	See this section
Communication of printer status to the host application	See the command descriptions in the Status sections.

Printer configuration

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

Important: 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
  - Color density
  - Monochrome print density
  - Max Power
  - Optional cut after feed
  - Partial cut distance
  - Fine partial cut steps
  - Paper low sensor
  - Paper low threshold extension
- Paper type
- Firmware features
  - Paper selection lockout
  - Beep after knife cut
  - Cash drawer open after knife cut
  - Energy-Savings Timeout
  - Print Quality Level
  - Paper-Savings Level / Top Logo ID

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.

Important: Be careful when you change any of the printer settings to avoid changing other settings that might affect the performance of the printer.

1 Turn the printer off.

2 Make sure receipt paper is loaded in the printer before proceeding. Make sure cover is closed.

Receipt Cover

Receipt
Paper
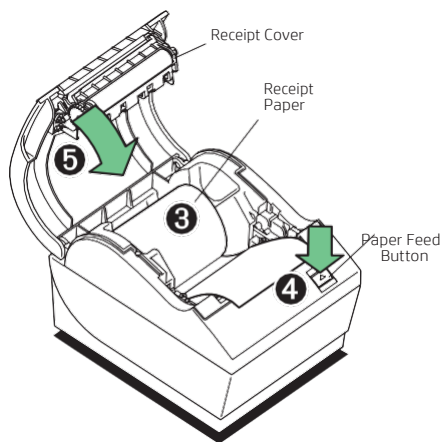
Paper Feed
Button

4 To communicate with the printer, 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 prompted to 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.

3 Turn the printer on and immediately press and hold the paper feed button until the configuration printout begins.

- The printer beeps, and then prints Diagnostics Form I.

- Press the paper feed button within 2 seconds 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. Use short clicks, except when **Yes** or a validating option was selected.

Communication interface settings

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

Important: Be careful when you change 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.

- Baud rate

    115200 baud

    57600 baud

    38400 baud

    19200 baud

    9600 baud

    4800 baud

    2400 baud

    1200 baud

- Parity
    No Parity
    Even Parity
    Odd Parity

- Flow control method
    Software (XON/XOFF)

    Hardware (DTR/DSR)

- Data reception errors
    Ignore errors

    Print "?"

- Alternate DTR/DSR
    Enabled

    Disabled

- USB Driver
    Printer Class

    Comm Class

- USB NAK
    Reject Packets When Error Accept Packets

    When Error

Note: Press the paper feed button for at least 1 second to validate the selection.

For more information about	See this section
Setting the RS-232C Serial interface settings	Configuring the printer

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.
- **Datascope:** 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.

Important: Be careful when you change any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

See Configuring the printer for instructions on how to enter the configuration menu.

Enabling or disabling datascope mode

The datascope 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: Datascope mode is usually considered a level 1 diagnostic test.

Datascope mode is enabled and disabled by selecting the **Diagnostics Modes** submenu of the configuration menu. Press the

paper feed button as instructed on the **Diagnostics Modes Menu** to enable or disable the datascope mode test.

- Off, normal mode (datascope mode disabled)
- Datascope mode with or without graphics (enabled)

Note: Press the paper feed button for at least 1 second to validate the selection.

Running datascope mode

1 After you have enabled the datascope 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.

Exiting datascope mode

1 Enter the configuration menu again.

2 Disable the datascope mode.

3 Exit the configuration menu.

The printer is online and can communicate normally with the host computer.

For more information about	See this section
Enabling the datascope mode	Configuring the printer

Enabling or disabling receipt test mode

The receipt test mode verifies proper receipt printing. Receipt test is enabled and disabled by selecting the **Diagnostics Modes** submenu of the configuration menu. See Configuring the printer for instructions on how to enter the configuration menu.

Running 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.

Exiting receipt test mode

1 Enter the configuration menu again.

2 Disable the receipt test mode.

3 Exit the configuration menu.

The printer is online 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.

Notice: Be careful when you change 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: The A793, A794, and Legacy Command emulations do not recognize the ColorPOS ® commands.

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

For more information about	See this section
Setting the printer emulation	Configuring the printer

Printer settings and functions

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

Notice: Be careful when you change 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.

Emulation/software options

- 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 A799II, 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, two-color, and LEGACY emulations.

- Font size

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

- Journal Print

  Enables or disables operator action.

Hardware options

- Color density

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

Important: Choose a color density setting no higher than necessary to achieve acceptable color 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.

- 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 A799II is 100%.

Important: 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.

Note: When printer is set to color paper, Print Density adjusts the overall darkness for both color and monochrome.

- Power supply level (Max power)

    You can choose from these power settings to match the power supply:

    0 = Auto

    1 = Level 1

    2 = Level 2

    3 = Level 3

- Optional Cut after Feed

    Allows you to set whether or not a cut follows a feed.

- Partial cut distance

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

- Fine partial cut steps

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

- Paper low sensor

    Senses when the paper roll is getting low on paper.

- Paper low threshold extension

    Allows you to set the amount of footage for the extension in five-foot increments between -10 and 20 feet.

For more information about	See this section
Setting the printer functions and setting	<u>Configuring the printer</u>

Paper type options

- Paper Type Name

    Sets the printer to optimum performance for paper being used. This can also be done through the command 1D 81 *m n*. See <u>Chapter 2: Programming the printer</u> for command usage.

    Available paper types may vary. Currently there are three types:

    0 = monochrome

    4 = two-color (blue/black)

    5 = two-color, (red/black or green/black)

Firmware features options

- Paper selection lockout

- Beep after knife cut

- Cash drawer open after knife cut

- Energy-savings timeout value

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

- Print quality level

    Allows you to set the print quality to speed (350mm/s), balanced (300mm/s), or quality (240mm/s)

- Paper-Savings level

    Allows you to set the paper-savings level to disabled (standard font, no reduction), light (standard font, white space removal), medium (standad font, white space removal, bar code reduction, top logo), or heavy (short font, white space removal, bar code reduction, top logo)

- Top logo id setting

Chapter 2: 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 A799II because of the physical differences of a 6 dots/mm head (A793) versus an 8 dots/mm head (A794 and A799II).

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 A799II printhead are smaller, user defined characters that were used on the previous printers will appear smaller on the A799II 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 A799II 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 *n*	Print and feed paper	This command uses *n* in terms of n/360 inches. Since the A793 had a fundamental step of 1/152 inch and the A799II has a fundamental step of 1/203 inch, the actual line spacing will not exactly match the requested spacing.
1B 59 *n1 n2 d1...dn*	Select double-density graphics	In A793 emulation mode, the printer scales the graphics to provide the best match.
1B 5C *n1 n2*	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 A799II (13).
1B 61 *n*	Select justification	This command does true dot resolution alignment for centering versus character-aligned centering.
1D 2A *n1 n2 d1...dn*]	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 *m*	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.

Two-color commands (comparison A794 to A799II)

The following table details the list of commands that have been added for two-color ColorPOS® functionality or existing commands that have been altered by the addition of two-color capacity.

ColorPOS® two-color and color-interpreted commands		
Hexadecimal	ASCII	Description
1B 72 m	ESC r m	Set current color
1D A0 nl nh	1D GS	Set temporary maximum target speed
1D 23 n	GS # n	Select current logo
1D 42 n	GS B n	Select or cancel white/black reverse print mode
1D 2A n1 n2 d1 – dm	GS × n1 n2 d1 – dm	Define downloaded bit image
1D 2F m	GS / m	Print downloaded bit image
1D 81 m n	GS 0x81 m n	Set paper type
1D 82 n1– n72/n80	GS 0x82 n1– n72/n80	Print raster monochrome graphics
1D 83 n1– n144/n160	GS 0x83 n1– n144/n160	Print raster color graphics
1D 84 n m n1 n2 d1 dx	GS 0x84 n m n1 n2 d1 dx	Download logo image
1D 85 m n	GS 0x85 m n	Reverse color text mode (two-color)
1D 86 m	GS 0x86 m	Monochrome shade mode
1D 87 m	GS 0x87 m	Color shade mode
1D 89 n m	GS 0x89 n m	Logo print with color plane swap
1D 8B n m o	GS 0x8B n m o	Apply shading to logo

ColorPOS® two-color and color interpreted commands (continued)

Hexadecimal	ASCII	Description
1D 8C n m	GS 0x8C n m	Merge watermark mode
1D 8D n m	GS 0x8D n m	Text strike through mode
1D 90 m x y o p q	GS 0x8A m x y o p q	Form and print real time surround graphic
1D 91 n	GS 0x91 n	Save graphics buffer as logo
1D 92 n	GS 0x92 n	Background logo print mode
1D 97 m n	GS 0x87 m n	User storage status
1D 99 l m n o	US	Apply margin message mode
1D 9A n m o	GS 0x9A n m o	Shade and store logo
1D 9B m n	GS	Logo print with knife cut
1F 03 16 05 n	US	Set interpretation of "Set current color" command

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 and ColorPOS fonts)

     13 × 18 dots (paper-saving font)

     13 × 21 dots (smaller font, n/a A799)

Compressed

- Characters per inch: 20.3
- Characters per line: 56
- Cell size: 10 × 24 dots (default font)

     10 × 27 dots (Tall and ColorPOS fonts)

     10 × 18 dots (paper-saving font)

     10 × 21 dots (smaller font, n/a A799)

Print zones

Print zones for 80 mm paper

Specifications of print zone for 80 mm paper:

- 576 dots (addressable) @ 8 dots/mm, centered on 80 mm

- Standard mode: minimum margins: 2.0 mm (0.079 inches)
- Top margin to manual tear-off: 17.8 mm (0.70 inches)

- Top margin to knife cut: 19.0 mm (0.75 inches)
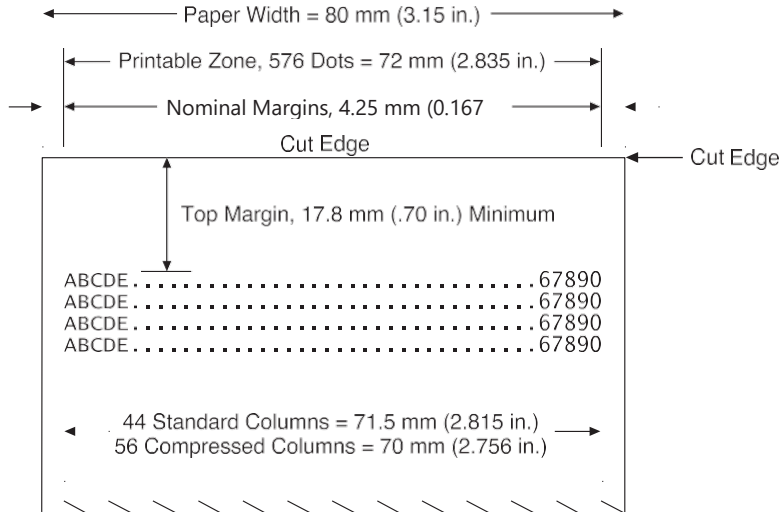
Note: *The application centers 44 standard character cells (13 × 24 dots), or 56 compressed character cells (10 × 24 dots), or 576 addressable bits of graphics across an 80 mm wide receipt. Minimum print line height is 24 dots for text or graphics. Standard print line spacing is 27 dots (that is, 3 extra row dots).*

Because the A799II series adds a 27 dot high font, standard print spacing is 30 dots.

The A799II series paper-saving feature adds an 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	ⱯＢＯ
Set	Canceled	X	∀ B Ɔ
Set	Set	X	Ɔ B Ɐ
X	X	Set	∀ B Ɔ

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

- Right-side up and upside-down

Emulation modes

The HP A799II Series printer may be operated in a number of different emulation modes. However, printing characteristics and defaults may differ, depending on the desired mode. For instance, two-color paper and ColorPOS® commands and features are available only in A799II native mode.

Print setup in emulation modes

For defaults and allowed printing options in each emulation mode, see the following chart.

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	
		ColorPOS®	13 × 27	6.77	3	Default setup for two-color paper
		Paper-saving	13 × 18	10.15	2	
		Smaller Font	13 × 21	9.67	0	n/a A799
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 A799II printer will behave in each emulation mode:

Two-color paper and ColorPOS® commands and features are supported only in native mode.

- If the paper type is changed using the 0x1D 0x81 command, the font and default lines per inch (LPI) will be setup as in the table above.

- If only the font is changed, the default LPI will automatically be changed as in the previous table.

- 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 previous table.

- If emulation is switched from any emulation to native the font and LPI remains 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 made. The LPI is set at 6.00.

Chapter 3: Programming commands

Commands listed by function

Printer actions

Code (hexadecimal)	Command
10	Clear printer
19	Perform full knife cut (or code 1B 69)
1A	Perform partial knife cut (or code 1B 6D)
1B 07	Generate tone
1B 3D *n*	Select peripheral device (for multi-drop)
1B 40	Initialize printer
1B 63 34 *n*	Select sensors to stop printing
1B 63 35 *n*	Enable or disable panel button
1B 69	Perform full knife cut (or code 19)
1B 6D	Perform partial knife cut (or code 1A)
1B 70 *n p*1 *p*2	Generate pulse to open cash drawer
1B 72 *m*	Set current color
1D 56 *m*	Select cut mode and cut paper (or code 1D 56 *m n*)
1D 56 *m n*	Select cut mode and cut paper (or code 1D 56 *m*)
1D 81 *m n*	Set paper type (for two-color printing)
1F 03 16 05 *n*	Set interpretation of "Set current color" command
1F 03 4E *n1 n2*	Port Idle Timeout (n/a A799)
1F 74	Print test form

Print and paper feed

Code (hexadecimal)	Command
0A	Print and feed paper one line
0D	Print and carriage return
14n	Feed *n* print lines
15 *n*	Feed *n* dot rows
16 *n*	Add *n* extra dot rows
17	Print
1B 4A *n*	Print and feed paper
1B 64 *n*	Print and feed *n* lines

Vertical and horizontal positioning

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

Text characteristics

Code (hexadecimal)	Command
12	Select double-wide characters
13	Select single-wide characters
1B 12	Select 90° counterclockwise rotated print
1B 16 n	Select pitch (column width)
1B 20 n	Set right-side character spacing
1B 21 n	Select print mode
1B 25 n	Select or cancel user-defined character set
1B 26 s c1 c2	Define user-defined character set
1B 2D n	Select or cancel underline mode
1B 3A 30 30 30	Copy character set from ROM to RAM
1B 3F n	Cancel user-defined character
1B 45 n	Select or cancel emphasized mode
1B 47 n	Select or cancel double-strike
1B 49 n	Select or cancel italic print
1B 52 n	Select international character code
1B 56 n	Select or cancel 90° clockwise rotated print
1B 74 n	Select international character set
1B 7B n	Select or cancel upside-down print mode
1D 21 n	Select character size
1D 42 n	Select or cancel white/black reverse print mode
1D 62 n	Set smoothing
1D 85 m n	Reverse color text mode (two-color)
1D 8D n m	Text strike-through mode
1D F0 01 n	Select font ID number

1D F0 02 *n*	Select font style number
1D F0 03	Save font ID number as default font at power up
1D F0 80	Download font
1D F0 C0 02	Download font list
1F 03 45 FSID	Configure use of font set over power cycles
1F 03 46 *n*	Configure line spacing
1F 05 *n*	Select superscript or subscript modes
1F 26 *s c1 c2*	Define extended user-defined character set
1F 69 *n*	Select active user-defined character set
1D F0 20 nn	Get double-byte font CRC (font ID) (n/a A799)
1D F0 21 nn mm	Get double-byte font CRC (font ID and font style) (n/a A799)

Graphics

Code (hexadecimal)	Command
11 *n*1 . . . *n*72	Print raster graphics
1B (+*.BMP file)	Download BMP logo
1B 2A *m n*1 *n*2 *d*1...*dn*	Select bit image mode
1B 2A 62 6d *n*	Turn on/off TIFF compression (n/a A799)
1B 2E *m n r*L *r*H *d*1 ... *dn*	Print advanced raster graphics
1B 4B *n*1 *n*2 *d*1 ... *dn*	Select single-density graphics
1B 59 *n*1 *n*2 *d*1 ... *dn*	Select double-density graphics
1C 70 *n m*	Print flash logo
1C 71 *n*	Define flash logos
1D 23 *n*	Select the current logo (downloaded bit image)
1D 2A *n*1 *n*2 *d*1 ... *dn*	Define downloaded bit image
1D 2F *m*	Print downloaded bit image
1D 82 *n*1...*n*72/*n*80	Print raster monochrome graphics
1D 83 *n*1...*n*144/*n*160	Print raster color graphics
1D 84 *m n*1 *n*2 *d*1 ... *dx*	Download logo image
1D 8B *n m o*	Apply shading to logo
1D 86 *m*	Monochrome shade mode
1D 87 *m*	Color shade mode
1D 89 *n m*	Logo print with color plane swap
1D 8C *n m*	Merge watermark mode
1D 90 *m x y o p q*	Form and merge real time surround graphic
1D 91 *n*	Save graphics buffer as logo
1D 92 *n*	Background logo print mode
1D 99 l *m n o*	Apply margin message mode
1D 9A *n m o*	Shade and store logo
1D 9B *m n*	Logo print with knife cut
1D A0 *nl nh*	Set temporary max target speed

1F 04 *n*	Convert 6-dots/mm bitmap to 8 dots/mm bitmap
1F 7B *n*	Enable constant speed logos

Status

Batch mode

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

Real time

Code (hexadecimal)	Command
10 04 *n*	Real-time status transmission (DLE sequence)
10 05 *n*	Real-time request to printer (DLE sequence)
1D 03 *n*	Real-time request to printer (GS sequence)
1D 04 *n*	Real-time status transmission (GS sequence)
1D 05	Real-time printer status transmission
1F 7A	Real-time commands disabled

Automatic status back/Unsolicited status mode

Code (hexadecimal)	Command
1D 61 *n*	Enable/disable Automatic Status Back (ASB) (n/a A799)
1D 61 *n*	Select or cancel unsolicited status mode

Bar codes

Code (hexadecimal)	Command
1D 48 *n*	Select printing position for HRI characters
1D 66 *n*	Select pitch for HRI characters
1D 28 6B 04 00 00 31 41 n1 n2	Select model for QR Code
1D 28 6B 03 00 31 43 n	Set size of module for QR Code
1D 28 6B 03 00 31 44 m	Set data parsing mode for QR Code
1D 28 6B 03 00 31 45 n	Select error correction level for QR Code
1D 28 6B qL qH 31 50 30 f1 ... fk	Store symbol data for QR Code
1D 28 6B 03 00 31 51 30	Print symbol data for QR Code
1D 28 6B 03 00 31 52 30	Transmit QR code print size (n/a A799)
1D 68 *n*	Select bar code height
1D 6B *m d1...dk* 00 or 1D 6B *m n d1...dn*	Print bar code
1D 6B FF *n*	Print Multiple Barcodes

1D 6B *n* d1... 00	Print GSI Databar (formerly RSS), null terminated
1D 6B *m n* L *n* H d1... dn	Print GSI Databar (formerly RSS), data length specified
1D 70 *a b c d e f*	Select PDF 417 parameters
1D 71 *a b c d e f* L *f* H	Set GSI Databar (formerly RSS) parameters
1D 77 *n*	Select bar code width
1D 28 6B 05 00 36 42 *m d1 d1*	Set DataMatrix parameters (n/a A799)
1D 28 6B 05 00 36 43 *n*	Set DataMatrix module size (n/a A799)
1D 28 6B *pL pH* 36 50 30 *d1...dk*	Store DataMatrix data in symbol storage area (n/a A799)
1D 28 6B 03 00 36 51 30	Print DataMatrix symbol data in the symbol storage area (n/a A799)

Page mode

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

Macros

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

User data storage

Code (hexadecimal)	Command
1B 27 *m a0 a1 a2 d1...dm*	Write to user data storage
1B 34 *m a0 a1 a2*	Read from user data storage
1D 22 *n*	Select memory type (SRAM/flash) where to save logos or user-defined fonts
1D 22 55 *n1 n2*	Flash memory user sectors allocation
1D 22 60 n1	Flash object area pack (n/a A799)
1D 22 61 n1 n2 (n3)	Flash object delete (n/a A799)
1D 22 80	Expanded flash memory allocation
1D 22 81 *n*	Select flash area for storing logos and user-defined characters
1D 22 90 *n*	Return flash area size (n/a A799)
1D 40 *n*	Erase user flash sector
1D 97 *m n*	User storage status
1D F0 10 *n*	Lock permanent flash area

Flash download

Code (hexadecimal)	Command
1B 5B 7D	Switch to flash download mode
1D 0E	Erase all flash contents except boot sector
1D 0F	Return main program flash CRC
1D 11 00 00 00 00 *d1…dn*	Download Application (n/a A799)
1D FF	Reset firmware

Code (hexadecimal)	Command
1B 5B 7D	Switch to flash download (boot mode)
1F 08 00	Restore default settings
1F 08 01 *n1 n2 n3 n4*	Set IP address
1F 08 02 *n1 n2 n3 n4*	Set net mask
1F 08 03 *n1 n2 n3 n4*	Set gateway
1F 08 04 *n1 n2*	Set raw TCPIP port
1F 08 08 *n1*	DHCP
1F 08 09 *n1*	Inactivity timeout
1F 08 0A *n1*	Keep-alive pings (arps)
1F 08 0E*n1 n2*	Set HTTP port (n/a A799)
1F 0B *nn*	Get network configuration (n/a A799)

Settings commands

Code (hexadecimal)	Command
1F 09 01 06	Save current settings as factory settings (n/a A799)
1F 09 01 07	Clear active settings and restore factory settings (n/a A799)
1F 09 01 08	Upload current settings (n/a A799)
1F 09 01 09	Upload factory settings (n/a A799)
1F 09 01 0A	Download settings (n/a A799)

Code (hexadecimal)	Command
1F 03 4B *m n*	Define Arabic settings (n/a A799)
1F 03 4B *m* 08	Use Arabic Ligatures (n/a A799)

Code (hexadecimal)	Command
1F 03 4B *m* 30	Set Arabic Text Direction (n/a A799)
1F 03 4B *m* 40	Set Arabic Spacing Group Rules (n/a A799)
1F 03 60 *m* 03	Select Arabic Glyph Set (n/a A799)

Code (hexadecimal)	Command
1F 03 51 00 *nn*	Set black bar flags (n/a A799)
1F 03 51 01	Enable feed to mark on form feed (n/a A799)
1F 03 51 02	Enable feed to mark on cut (n/a A799)
1F 03 51 03	Enable black bar paper low detection (n/a A799)
1F 03 51 04 *nn*	Set black bar max feed (n/a A799)
1F 03 51 05 FF	Set black bar threshold (n/a A799)
1F 03 51 06 *ll hh*	Set black bar offset (n/a A799)

Code (hexadecimal)	Command
1F 03 00 *n*	Set diagnostics mode
1F 03 02 *n*	Enable or disable knife
1F 03 03 *n*	Enable or disable paper low sensor
1F 03 04 *n*	Set max power
1F 03 07 *n*	Set printer emulation
1F 03 09	Reset settings to default values
1F 03 0A *n*	Set partial cut distance
1F 03 0F *n*	Set default font
1F 03 10 *n*	Set font size
1F 03 19 *n*	Set color density
1F 03 1B *n*	Enable or disable Code 128 check digit calculation
1F 03 1D *n*	Enable or disable barcode ITF leading zero
1F 03 1E *n*	Enable or disable barcode string terminator
1F 03 1F *n*	Set paper low threshold extension
1F 03 28 *n*	Enable or disable USM canned status
1F 03 2C *n*	Send diagnostic page to comm port
1F 03 2E *n*	Enable or disable EJ action via operator control
1F 03 31 *n*	Set fine adjustment of partial cut steps
1F 03 32 *n*	Set printer ID mode
1F 03 33 *n*	Set default code page at power on
1F 03 3D *n*	Set Asian ASCII characters to narrow
1F 03 47 *n*	Set vertical white space
1F 03 52 *n fL fH dL dH*	Set printer tone (n/a A799)
1F 03 56 *nn*	Set hard sync (n/a A799)
1B 5B 21 74 *ll hh*	Set control point (n/a A799)

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 = n
Hexadecimal	1B 3D n
Decimal	27 61 n

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 *n*
Hexadecimal	1B 63 34 *n*
Decimal	27 99 52 *n*

Value of n:	Sensor status

Sensor Status

Bit	Sensor	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 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 *n*
Hexadecimal	1B 63 35 *n*
Decimal	27 99 53 *n*

Value of n:	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 p*1 *p*2
Hexadecimal	1B 70 *n p*1 *p*2
Decimal	27 112 *n p*1 *p*2

Value of n:	00, 48 (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 ms to equal the total time.

- On-time = *p1* (Hex) × 2 ms

- Off-time = *p2* (Hex) × 2 ms

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.

Set current color

ASCII	ESC r *m*
Hexadecimal	1B 72 *m*
Decimal	27 114 *m*

Default of m:	0 (monochrome)

This command will set the current color to the *color m* for all character data that may follow this command and all graphic objects (bit images) that have not been explicitly loaded as two-color.

m = 0 (monochrome) is the initial value
m = 1 (two-color paper "primary color", usually black)
m = 2 (second color available from two-color paper)

The *m* values 0 and 1 will not have a distinguishable effect; 0 is the initial value and provides parameter value consistency with other commands.

Description

When the monochrome paper type command (0 0) is set, this command is recognized and retained, but has no effect. The monochrome paper selection (usually black) controls the output.

When two-color paper is loaded and the two-colors paper type command set, this command will designate which of the two colors will be used for everything not specified as having an explicit color parameter(s), such as color logos, side bars, surround graphics, background watermarks or color raster graphics. The effect mimics shifting a two-color ribbon in a printer or typewriter to type the color of the lower half of the ribbon.

Exceptions

After a power loss or reset the default value *m* = 0 is reset.

Select cut mode and cut paper

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

Value of m:	Selects the mode as shown in the table.
Value of n:	Determines cutting position only if *m* is 65 or 66.

m	**Feed and cut mode**
0, 48	Full cut (no extra feed)
1, 49	Partial cut (no extra feed)

65	Feeds paper to cutting position + (*n* times vertical motion unit), and cuts the paper completely
66	Feeds paper to cutting position + (*n* times vertical motion unit), and performs a partial cut

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

Set paper type (ColorPOS®)

ASCII	GS 0x81 *m n*
Hexadecimal	1D 81 *m n*
Decimal	29 129 *m n*

Value of m: 0 = monochrome (black) paper
                      2 = monochrome (black) paper (Koehler KT55F20)
                      4 = two-color (blue/black) papers
                      5 = two-color (red/black or green/black) papers

Default: 0 (monochrome paper)

This command will set the optimum parameter values in the thermal print engine control hardware for defined monochrome or two-color paper chemistry. The *m n* parameters select paper category and formulation version, respectively.

(*m n* = 0 0) defines the default monochrome (black category, initial version) paper, out-of-box printers will also have factory preset descriptions for customer selected color types; initial release consists of three defined color types: (*m n* = 4

0) blue/black paper, or (*m n* = 5 0) red/black paper or green/black paper. Other valid values of *m n* may be present if the download paper type description command has been executed defining additional types.

When issuing this command a value of *n* = 0xFF can always be used; that is interpreted as requesting the setting of the highest version defined in the printer of that category. This is a safe way for an application to always select the latest of a manufacturer's paper category, thus choosing "latest standard red/black".

An incorrect setting of m n for a two-color paper or non-standard monochrome paper, or failure to set m n when a color paper is inserted will result in poor print quality. n should always either be 0 or 0xFF.

The last set paper type choice is stored in non-volatile memory and is retained after a power loss and across reset commands.

Related information

An incorrect setting of *n* for a two-color paper or failure to set *n* when a two-color paper is loaded will result in poor output quality.

The following list clarifies how the A799II printer will behave in each emulation mode:

Two-color paper and ColorPOS® commands and features are supported only in Native mode.

- If the paper type is changed using the 0x1D 0x81 command, the font and default lines per inch (LPI) will be setup as in the table below.

- If only the font is changed, the default LPI will automatically be changed as in the table below.

- If emulation is switched to LEGACY, Native or A793/A794 emulation(s), the paper type will automatically be changed to monochrome paper, and the font and LPI will be changed as in the table below.

- If emulation is switched from any emulation to Native, the font and LPI will remain unchanged because 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.

Font and lines per inch (LPI) setup for different emulations

Emulation Mode	LPI Options	Font(s) Options	Font Size	Default LPI	Default EDR	Comments
Native	6.00, 6.77, 7.52, 8.13	Standard	13x24	7.52	3	Default setup for monochrome paper
		Tall	13x27	6.77	3	
		ColorPOS®	13x27	6.77	3	Default setup for two-color paper
		Paper-saving	13x18	10.15	2	
		Smaller Font	13x21	9.67	0	n/a A799
A793/A794 emulation	6.00, 7.52, 8.13	Standard	13x24	7.52	3	
LEGACY emulation	6.00	Tall	13x27	6.00	7	Default setup for Escape Commands
		Standard	13x24	6.00	10	

Set interpretation of "Set current color" command

ASCII	US ETX SYN ENQ *n*
Hexadecimal	1F 03 16 05 *n*
Decimal	31 03 22 05 *n*

Value of n: 0-FF (Hex)
n = 01 will cause 1B 72 01 to print red. Any other value for 1B 72 will print black. n = 00 will cause 1B 72 00 to print red and all other values to print black.

This command defines how to interpret the 1B 72 command for legacy environments. It provides a method to resolve any differences in the definition of command 1B 72 between the Native mode and earlier implementations in other printers.

In Native mode, the standard "Set current color" command should be used.

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 (n/a A799)

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 *n*
Hexadecimal	14 *n*
Decimal	20 *n*

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 80 mm paper. There are 576 printable dots on the 80 mm 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 $ *n*L *n*H
Hexadecimal	1B 24 *n*L *n*H
Decimal	27 36 *n*L *n*H

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

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

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

Formulas

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

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

Related information

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

Compatibility information (A799II 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 A799II 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 x 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 × 10 = 20 dots (two columns to be moved left of the current position)
65,536–20 = 65516
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 × 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 (A799II 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 A799II 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 x 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 *n*
Hexadecimal	1B 61 *n*
Decimal	27 97 *n*

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

Range of n:	0–2, 48–50

Default:	0 (Left aligned)

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

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 *nL nH*
Hexadecimal	1D 4C *nL nH*
Decimal	29 76 *nL nH*

Range of nL:	0–255

Range of nH:	0–255

Default:	576 dots (the maximum printable area)

Formulas

Sets the left margin of the printing area until the printer is initialized, reset, or powered off. The left margin is set to ((*nH* X 256) + *nL*) times horizontal motion unit) inches. The horizontal motion units are set by the set horizontal and

vertical minimum motion units command (1D 50), described in this manual. If the horizontal motion unit is changed after changing left margin, the left margin setting is not changed.

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

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

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

> GS L 203 0

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

> GS L 150 1

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

Exceptions:

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

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

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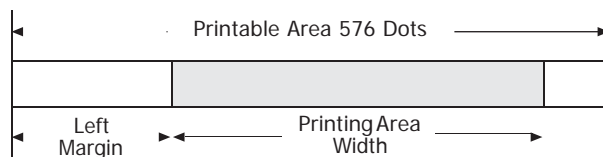
Sets the width of the printing area until the printer is initialized, reset, or powered off. If the setting exceeds the printable area, the maximum value of the printable area is used. If the left margin and printing area set the width to less than the width of a single character, the width is extended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

The width of the printing area follows the set left margin command (1D 4C). See the set left margin command (10 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 80 mm paper. There are 576 printable dots on 80 mm 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° counterclockwise rotated print

ASCII	ESC DC2
Hexadecimal	1B 12
Decimal	27 18

Rotates characters 90° counterclockwise. 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." 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, 80 mm Paper	CPI
Standard	44	15.6
Compressed	56	20.3

Related information

See Chapter 2: 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.

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

[1]Bits 1, 2 and 6 are not used.

[2]Standard 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 charactes 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 *n*	Select pitch
1B 45 *n*	Emphasized
1B 47 *n*	Double-strike
12	Double-wide
13	Single-wide
1B 2D *n*	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

*c*1 = Hex 20–FF (20 is always printed as a space)
*c*2 = Hex 20–FF (20 is always printed as a space)

To define only one character, use the same code for both *c*1 and *c*2

$k = c2 - c1 + 1$ = the number of characters to be defined in this command string
[character i data] = [ni d1 …..d(3 x ni)] for $1 \le i \le k$

ni = the number of dot columns for the ith character, $1 \le ni \le 16\ d$

= the dot data for the characters

The number of bytes for the ith 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*, *c*1, *c*2, *n*1) aborts the command.

Related information

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

Top of Character
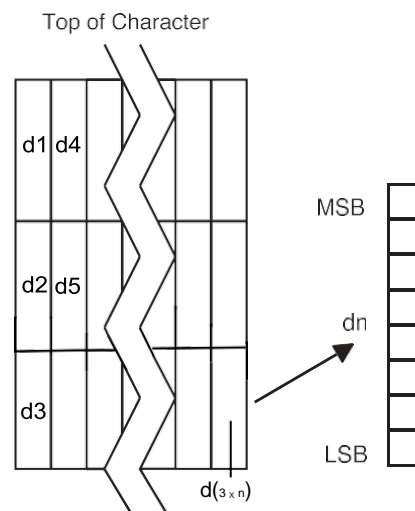
Define extended user-defined character set

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] = *[ni d1 ... d(j x ni)]* for *1 ≤ i ≤ k*

ni = the number of dot columns for the ith character, *1 ≤ ni ≤ 16*

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

The number of bytes for the ith character cell is *j x ni.*
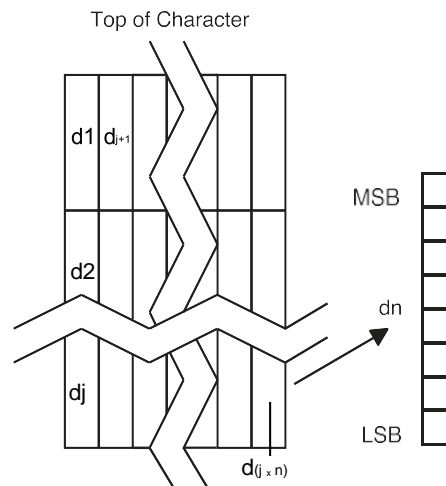
The bytes are printed down and across each cell starting from the left side.

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: <u>Decimal</u> <u>Hex</u>

	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-defined 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 n 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 (download for A799)		
0C = Code Page 857		
0D = Code Page 1251		
0E = Code Page 1255		
0F = Code Page KZ_1048		
10 = Code Page 1256 (n/a A799)		
11 = Code Page 1250 (n/a A799)		
12 = Code Page 28591 (n/a A799)		
13 = Code Page 28592 (n/a A799)		
14 = Code Page 28599 (n/a A799)		
15 = Code Page 28605 (n/a A799)		
16= Code Page 864 (n/a A799)		
17 = Code Page 720 (n/a A799)		
18 = Code Page 1254 (n/a A799)		
19 = Code Page 28596 (n/a A799)		
1A = KATAKANA (n/a A799)		
1B = Code Page 775 (n/a A799)		
1C = Code Page 1257 (n/a A799)		
1D = Code Page 28594 (n/a A799)		
1E = Code Page 1253 (n/a A799)		
FD = UTF-8 with bidrectional 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° 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° 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."

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 (download for A799)	
0C = Code Page 857	
0D = Code Page 1251	

0E = Code Page 1255

0F = Code Page KZ_1048

10 = Code Page 1256 (n/a A799)

11 = Code Page 1250 (n/a A799)

12 = Code Page 28591 (n/a A799)

13 = Code Page 28592 (n/a A799)

14 = Code Page 28599 (n/a A799)

15 = Code Page 28605 (n/a A799)

16= Code Page 864 (n/a A799)

17 = Code Page 720 (n/a A799)

18 = Code Page 1254 (n/a A799)

19 = Code Page 28596 (n/a A799)

1A = KATAKANA (n/a A799)

1B = Code Page 775 (n/a A799)

1C = Code Page 1257 (n/a A799)

1D = Code Page 28594 (n/a A799)

1E = Code Page 1253 (n/a A799)

FD = UTF-8 with bidrectional 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.

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 effecitve until the printer is initialized, reset, or powered off.

In standard mode, the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction. However, when character orientation changes in 90° 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 englarged 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 or ColorPOS® 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

If the current color is not black and two-color paper is loaded, no visible effect takes place.

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.

Reverse color text mode (ColorPOS®)

ASCII	GS 0x85 *m n*
Hexadecimal	1D 85 *m n*
Decimal	29 133 *m n*

Value of m:	0 = white
	1 = black
	2 = paper color
Value of n:	0 = white
	1 = black
	2 = paper color
Default:	*m* = 0 (off)

Sets a mode for reverse printing effects on text. The background color is specified by m, while the text color is specified by

n. Setting m = 0 turns off the mode.

If *m* = *n* but not zero, the printer produces solid printing in the given color. This tactic can be used to minimize the firmware busy work.

The value of current color and white/black reserve print mode is superceded by the value of *n* whenever this mode is on (*m*>0).

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

Text strike-through mode (ColorPOS®)

ASCII	GS 0x8D *n m*
Hexadecimal	1D 8D *n m*
Decimal	29 141 *n m*

Value of m:	0 = retain same color as the character itself
	1 = black
	2 = paper color
Value of n:	thickness of strike through in dots
Default:	*n* = 0 (off)

Prints a strike-through over characters. If the strike-through is as thick as the cell height, this will produce a cell that will be printed as a solid current color.

When characters are greater than normal size, such as double-high, the number of character rows claimed by *n* also increases proportionally, such as doubling for double-high cells. Location of the strike-through on a cell is on a cell-by-cell basis, so mixing cell sizes on the same print row will give uneven results.

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
	02 = Color POS font
	03 = paper-saving font (18 high)
	04 = smaller font (21 high, n/a A799)
	04 - 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 A799II Series printer: Simplified Chinese, Traditional Chinese, Kanji, Korean and Thai.

The Thai font (Code Page 874) is already available as a resident code page on A799II (see page 60), but needs to be downloaded for the A799.

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 MB of space is required. Traditional Chinese requires 1.3 MB. Kanji requires 1 MB, and Korean requires of 1 MB of space in the permanent font area.

If the A799II 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 memory. 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 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.*

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 will restore standard default font at power up.

Get double-byte font CRC (font ID) (n/a A799)

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) (n/a A799)

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

This command quires 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	GS 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 80 mm paper. There are 576 printable dots on 80 mm 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 downloaded 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 you download 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 100 ms 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 n*1 *n*2 *d*1 ...
Hexadecimal: *d*n 1B 2A *m n*1 *n*2 *d*1
Decimal: ... *d*n 27 42 *m n*1 *n*2 *d*1 ... *d*n

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 x 288
1	8-dot double-density	8 (68 DPI)	0–576 (203 DPI)	8 x 576
32	24-dot single-density	24 (203 DPI)	0–288 (101 DPI)	24 x 288
33	24-dot double-density	24 (203 DPI)	0–576 (203 DPI)	24 x 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= *n*1 + (256 X *n*2)
24-dot single-density= 3 X [*n*1+ (256 X *n*2)]
Line Graphics= *n*1 + (256 X *n*2)

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.
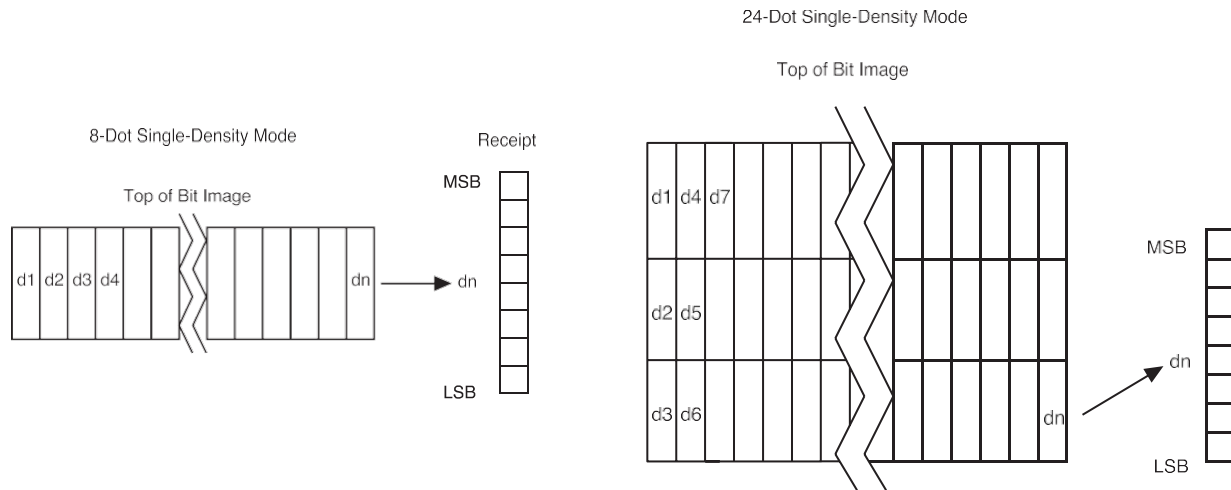
Turn on/off TIFF compression (n/a A799)

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 ... dn*
Hexadecimal	1B 2E *m n rL rH d1 ... dn*
Decimal	27 46 *m n rL rH d1 ... dn*

Value of m: horizontal offset from left margin = 8 x *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 x *rH* + *rL*

d1 ... dn: data bytes

Range: $0 <= m <= 72$
                     $0 <= n <= 72$
                     $0 <= r <= 65535$
                     $0 <= d1 ... dn <= 255$

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 ... dn*
Hexadecimal	1B 4B *n1 n2 d1 ... dn*
Decimal	27 75 *n1 n2 d1 ... dn*

Value of n:

Value of *n* (8-dot single-density mode)	Value of *d*
n1 + (256 x 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 ... dn*
Hexadecimal	1B 59 *n1 n2 d1 ... dn*
Decimal	27 89 *n1 n2 d1 ... dn*

Value of n:

Value of *n* (8-dot single-density mode)	Value of *d*
n1 + (256 x 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 color or 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 * *n*1 *n*2 *d*1 ... *dn*]
Hexadecimal	1D 2A *n*1 *n*2 *d*1 ... *dn*]
Decimal	29 42 *n*1 *n*2 *d*1 ... *dn*]

Value of n:

Value of *n*1	Value of *n*2	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

[1]The 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 *n*1 and *n*2. 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 dowloaded bit image can be printed using the 1D 2F command.

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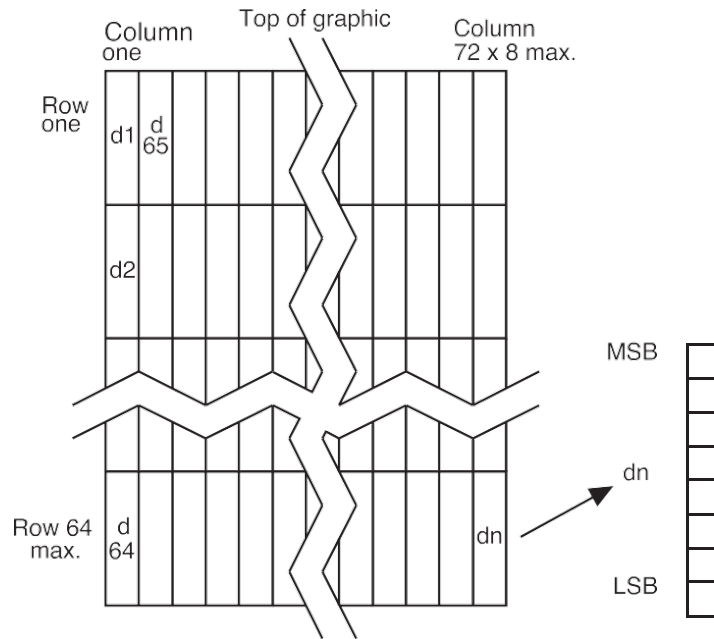
Print downloaded bit image

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 or color 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 *m*	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 the bit image is a monochrome one, it is printed in the current color; otherwise it is printed as a two-color image. 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. There are 576 printable dots on 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 of the current color 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. If two-color paper is indicated by the set paper type command, then the raster will be printed in the color that is defined by the set current color command.

Print raster monochrome graphics (ColorPOS®)

ASCII	GS 0x82 *n1.....n72* (576 dots) for 80 mm paper
Hexadecimal	1D 82 *n1.....n72* (576 dots) for 80 mm paper
Decimal	29 130 *n1.....n72* (576 dots) for 80 mm paper
ASCII	DC1 *n1.....n72* (576 dots) for 80 mm paper
Hexadecimal	11 *n1.....n72* (576 dots) for 80 mm paper
Decimal	17 *n1.....n72* (576 dots) for 80 mm paper

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 of the current color 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. If two-color paper is indicated by the set paper type command, then the raster will be printed in the color that is defined by the set current color command.
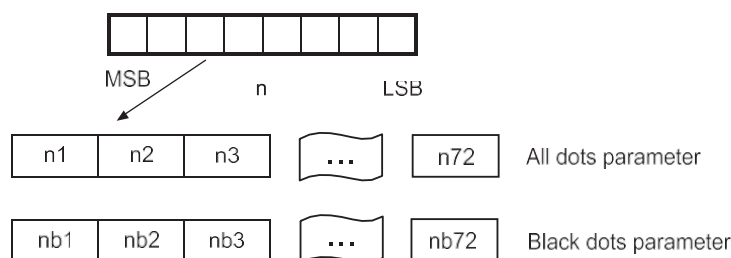
Print raster color graphics (ColorPOS®)

ASCII	GS 0x83 *n1.....n144* (576 dots 80 mm paper)
Hexadecimal	1D 83 *n1.....n144* (576 dots 80 mm paper)
Decimal	29 13 *n1.....n144* (576 dots 80 mm paper)

Value and range of n: *n1* to *n144/n160* corresponds to one dot row data.

For each printed dot row starting at the top left, two-part bit strings are used to define (in the first half), all dots that are of either color (i.e. not white). The second half string defines only the dots where the color = black. Thus all dots which are on in the first half string but not on in the second half string, select the secondary color. The parameter of this command is thus a string of bytes for one dot row with the same structure as defined for the thermal color format file given in the download color logo command.

This command is used for printing a single raster of color graphics in real-time. Offsets, page and any other modes or overlays, including watermark, and current color do not apply to this command. A complete rendering of the intended final image has to be done by the application before sending the dot rows.

ASCII	GS 0x84 *m n1 n2 d1…..dx* , *x* = (n1 × n2×8) × m
Hexadecimal	1D 84 *m n1 n2 d1…..dx* , *x* = (n1 × n2×8) × m
Decimal	29 132 *m n1 n2 d1…..dx* , *x* = (n1 × n2×8) × m
Value of m:	1 = monochrome 2 = two-color
Max n1 =	576/8 for 80 mm paper

The latest value from the set current logo command will be the logo index to be used to store the downloaded graphic.

m identifies whether the image is monochrome (which requires one parameter bit row description) or two-color, which requires a pairing of bit descriptions for each row.

n1 × *n2* define a rectangular image *n1 bytes* wide and *n2 bytes* long. *n1×8* specifies the number of dot columns, and *n2×8* the number of dot rows. That is, each row is defined by an integral number of bytes and the number of rows is also an integral number of bytes. Note that *n2* can be any length, subject to memory space availability.

For each two-color dot row starting at the top-left corner, a two-part parameter byte string is used to define first, all dots that are not white, and the second half defines all dots where the color is black. Thus all dots that are on (=1) in the first half but not on in the second half select the paper-color. A sequence of these raster row strings is used to specify the complete logo. In the monochrome case, only one bit is needed per row. This is the same structure as used for the definitions of print raster monochrome graphics and print raster color graphics.

This command is used for storing a logo of *n1* by *n2* size indexed by the current logo value.

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

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 max printable xH:xL = 72 = 576 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 times yH:yL times 8 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.

Apply shading to logo (ColorPOS®)

ASCII	GS 0x8B *n m o*
Hexadecimal	1D 8B *n m o*
Decimal	29 139 *n m o*

This command will apply shading effect *m* to logo *n* and store it at index *o*, also extending width to full horizontal size if logo n is not at full paper width.

n must be the index value of an existing logo

0 <= *m* <= 100, possibly resulting in a logo suitable for background watermark mode use

o can be any value, and the logo will be placed according to the current setting of user storage into RAM or flash memory.

An application might use a high value of *m* to shade out the logo if the original image has a significant number of "on" dots to allow for future foreground print readability.

Note: *The old logo size and current justification mode are used to create a new logo image at full paper width size by filling in white space at either or both sides if needed. This new logo will provide for minimal performance impacts when it is selected for use in watermark mode.*

After sending the shading command, wait 5 seconds to allow the printer to apply the shading and write the results to flash.

Merge watermark mode (ColorPOS®)

ASCII	GS 0x8C *n m*
Hexadecimal	1D 8C *n m*
Decimal	29 140 *n m*
Default	0 (off)

This command will insert the logo *m* as a repeated background image, similar to printing a visible watermark, into the print stream. The space between repetitions of this usually shaded logo will be every *n×8* dot rows.

n >0 = number of dot rows x8 to skip before repeating the merge action

m specifies the index value of the logo. If no logo has been defined with this index then the command is ignored.

Note: *Horizontal placement of a watermark logo was fixed at the time the logo was Shaded or when it was downloaded as a full width logo for watermark use. This command will be ignored if the current logo is not at full paper width size (see the apply shading to logo command for preparing logos for watermark use).*

The merge process is performed after all other image formation and takes whatever print raster data is ready to be put on paper. It "adds" (computer logic OR) the mono or color bits to the print row. Generally, if the print dot was to be white or same color as the watermark dot, the print dot will be the color of the watermark; otherwise it will be black.

Monochrome shade mode (ColorPOS®)

ASCII	GS 0x86 *m*
Hexadecimal	1D 86 *m*
Decimal	29 134 *m*

This applies a selected shade density to all monochrome objects such as text and monochrome logos. The parameter m specifies the shading effect and has an initial value of 0 which signifies no effect.

m specifies the percentage of shading, 0 <= *m* <= 100.

m = 0 is the initial value and turns this mode off.

Note: *Only a few gradations are perceptible, so large increments of m, such as 20, should be used. If a reverse print mode is on, the shade effect is applied to the background only.*

When the current color mode is set to black, increasing values of *m* relate to the relative amount of (white) paper that replaces black dots. Analogously, when the paper-color is the current color, *m* defines the relative amount of color dots being "erased" by white originals of the paper.

Both text and monochrome graphics are affected by this command.

Turning monochrome shade mode on, turns color shade mode off.

Color shade mode (ColorPOS®)

ASCII	GS 0x87 *m*
Hexadecimal	1D 87 *m*
Decimal	29 135 *m*

This applies a mixing of color into any monochrome objects such as text and monochrome logos. Rather than fading away, this mode transitions a character or logo from the current color in which it would normally be printed to the other color. The parameter *m* specifies the shading effect and has an initial value of 0 which signifies no effect. *m* specifies the percentage of shading, 0 <= *m* <= 100.

m specifies the percentage of shading, 0 <= *m* <= 100.

m = 0 is the initial value and turns this mode off.

Note: *Only a few gradations are perceptible, so large increments of m, such as 20, should be used. If a reverse print mode is on, the shade effect is applied to the background only.*

When the current color mode is set to black, increasing values of *m* relate to the relative amount of paper-color that replaces black dots. Analogously, when the paper-color is the current color, *m* defines the relative amount of black color dots replacing the paper-color ones.

Both text and monochrome graphics are affected by this command.

Turning color shade mode on, turns monochrome shade mode off.

Logo print with color plane swap (ColorPOS®)

ASCII	GS 0x89 *n m*
Hexadecimal	1D 89 *n m*
Decimal	29 137 *n m*

This command will print logo *n*. The command is ignored if a logo with index *n* has not been defined. If *m* = 0 the color(s) as defined in the logo are used; if *m* = 1 and if the logo is a color one, then the two-color planes (black and paper-color) in the logo are swapped.

Form and merge real time surround graphic (ColorPOS®)

ASCII	GS 0x90 *m x y o p q*
Hexadecimal	1D 90 *m x y o p q*
Decimal	29 144 *m x y o p q*

This command will print a real-time graphic style designated by *m*. *m* = 0 rectangle, *m* =1 oval, *m* =2 ellipse (if printed in a square area the ellipse becomes a circle), *m* = 3 is a 5 point star, *m* = 4 is a free hand underline, *m* = 5 is a free hand ellipse and other values of *m* reserved for future styles. This graphic is formed into a RAM based graphics buffer, and the buffer state is set to "graphic merge pending".

Whenever the buffer is in the pending merge state and print output is started, the state will be changed to frozen and a merge process started (logically OR-ed graphic data) into the print lines that follow. The application determines how close the graphic is to any printed character data by subsequent printing of blank lines or blank dot rows. The merge process stops when the buffer is exhausted or its state changed (by a save graphics buffer as logo or new form and merge real time surround graphics command). The form and merge real time surround graphics command can be given multiple consecutive times, allowing the application to set up a multi-polygon background before starting its printout with placed text or logo.

The geometric location points for this graphic are defined by a rectangular area start position of *x* bytes from the left edge and *y* bytes from the top of the new line and times *o* bytes wide times *p* bytes in length. For the case of *m* =3 (star), the value passed for *o* is also used as the implicit *p* value (passed *value* is ignored), i.e. a square area. The thickness of the graphic is defined by *q* dots. This will form a bit image in a RAM graphics buffer. Subsequent surround graphic commands can be added into (logical OR process) with expanded size if needed) the graphics buffer until an output action is issued. It is expected that area left white will then be (usually) filled in with text or other data that is to be printed. Printing starts as soon as the first line of data or other printout arrives. After this printing is started, any new surround graphics commands will set the graphics buffer to a merge pending state. Example: *Create different size stars and an ellipse around a block of text.*

The graphics buffer is at a frozen state at printer initialization or reset, with blank data in it.

Each the time this command is given, the current color and shade mode values (if any) are used for the surround graphic, and may be changed before any subsequent surround graphics and/or printing output. This command may be used in page mode.

Save graphics buffer as logo (ColorPOS®)

ASCII	GS 0x91 *n*
Hexadecimal	1D 91 *n*
Decimal	29 145 *n*

This command will save all the raster data that is in the working graphics buffer (where surround graphics are formed) as a logo with index value *n*. This logo can then be used repeatedly for inserting different text. See the background logo print command.

There is one working graphics buffer in the printer; its size (and that of the saved logo) is of maximum print width size, and of sufficient length to store the largest of the surround graphic styles defined since the last buffer "freeze" event.

This command is ignored if the graphics buffer is not in a "merge pending" state. The graphics buffer state will be set to "frozen" by this command.

Related information

This command is ignored in page mode.

Background logo print mode (ColorPOS®)

ASCII   GS 0x92 *n*
Hexadecimal 1D 92 *n*
Decimal 29 146 *n*

This command will place into the graphics buffer the logo designated by *n*. As soon as there is a print action command (such as text output) the graphics buffer will be merged (logical OR process) with print output.

This command sets the graphics buffer state to "merge pending", functioning and performing the save as in the form and merge real time surround graphics command.

Related information

This command is ignored in page mode.

Apply margin message mode (ColorPOS®)

ASCII   GS 0x99 *l m n o*
Hexadecimal: 1D 99 *l m n o*
Decimal: 29 155 *l m n o*

Value of l:	*l* is a binary switch:
	l = 0 disables margin message merging *l* = 1 enable left margin message merging *l* = 2 enable right margin message merging *l* > 2 ignore command
Value of m:	*m* is the ID (index) of the logo to be used in the merging. If a logo with index *m* does not exist or is wider than the print raster width then this command is ignored.
Value of n:	*n* is the number of raster rows to be empty (skipped) before repeating the designated margin message merge
Value of o:	*o* is a right – left toggle switch:
	o = 0 no toggling of the margin message merge *o* = 1 enable toggling, starting with a left margin message first *o* = 2 enable toggling, starting with a right margin message first *o* > 2 ignore entire command

This command performs a dynamic merge of a designated logo/margin message (or logo/margin message pair, which can be the same) into each raster line to be printed after the character data has been placed and in conjunction with any other active merge modes. The parameter *l* specifies whether merging should take place from the left side or the right side. A left side merge followed by a right side merge (or vice-versa) must be issued, with the latter side merge command setting the toggle switch = 1 or 2 will create the desired left – right printing effect. Each merge side retains its *n* value of raster rows to be skipped. If toggling is not selected when both sides are defined, then if the *n* skip row values are different, or the logo height sizes are different, the side logos will not line up as printing progresses. If toggling is selected, both the left and right sides merge message (graphic) must be defined; otherwise, toggling is ignored.

Each side logo can be > ½ of the raster print line. In that case the printing process is additive in the overlap region. This command with the first parameter *l = 0* turns all margin message merging to off.

Shade and store logo (ColorPOS®)

ASCII	GS 0x9A *n m o*
Hexadecimal	1D 9A *n m o*
Decimal	29 154 *n m o*

Value of n: *n* is ID (logo index value) of an existing logo in either flash or RAM memory

Value of m: *m* is the % of shading to be applied to the logo, $0 <= m <= 100$.

Value of o: *o* is the new ID (logo index value) to be used to store the shaded result, according to the current setting of user storage into flash or RAM.

This command applies shading to an existing logo of any size, storing the result in a new logo at index *o*. The new logo is thus better suited for use in a merging mode. The % of shading will have only a few perceptible gradations, so large increments (20 is suggested) should be used to achieve visibly distinct effects.

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 x 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 x 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 x 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
	15 00 - 96 00 color
	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 you more control of the print environment. The speed is maintained if 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 A799II 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.

See the following 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 A799II has a single connector that shares data reporting from either cash drawer. When either cash drawer is open, an openstatus 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	Paper low	Not low	Low (only if paper low sensor is enabled)
1	Receipt cover	Closed	Open
2	Receipt paper	Present	Out
3	Knife position	Home position	Not home position
4	Not used	Set to zero	Set 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	Set to zero	Set 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.

See 1F 03 56 n command for requiring 1B 76 to finish the print job before returning status.

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	A799II A799	0x25 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. Set 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. Set 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-six remote diagnostic items are defined in the following table: five printer ID items and twenty-one 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 n			
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 *n* 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
2B	43	Boot firmware part #, 12 digit ASCII	Return Boot firmware part #, returns 14 bytes (A799 only)
2F	47	Boot firmware CRC, 4 digit ASCII	Return Boot firmware CRC, returns 6 bytes (A799 only)
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 n 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
97	151	Boot firmware version	Return boot firmware version, returns 6 bytes (A799 only)
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
D8	216	Black Mark Error	Write to NVRAM
D9	217	Black Mark Error	Write to NVRAM, and print on receipt to verify
DA	218	Black Mark Error	Clear Black Mark Error tally to 0
DB	219	Black Mark Error	Return Black Mark Error tally, 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.

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 RS-232C 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 A799II has a single connector that shares data reporting from either cash drawer. When either cash drawer is open, an openstatus 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. Set to off.
5	–	–	–	Undefined.
6	–	–	–	Undefined.
7	Off	00	0	Not used. Set 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. Both cash drawers closed.
	On	01	1	
1	Off	00	0	One or both cash drawers open. Both cash drawers closed.
	On	02	2	
2	–	–	–	Undefined
3	–	–	–	Undefined
4	Off	00	0	Not used. Set to off.
5	–	–	–	Undefined.
6	–	–	–	Undefined.
7	Off	00	0	Not used. Set to off.

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

Bit	Off/On	Hex	Decimal	Status for transmit status
0	–	–	–	Undefined. Set to off.
1	–	–	–	Undefined. Set 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. Set 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. Set 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 milliseconds 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.

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.

	GS sequence	DLE sequence
ASCII	GS EOT *n*	DLE EOT *n*
Hexadecimal	1D 04 *n*	10 04 *n*
Decimal	29 4 *n*	16 4 *n*

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 ID 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 A799II has a single connector that shares data reporting from either cash drawer. When either cash drawer is open, an openstatus is reported by the printer.

Related information

1 = Transmit printer status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Set to Off.
1	On	02	2	Set 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	Set to on.
5				Undefined.
6				Undefined.
7	Off	00	0	Set to off.

2 = Transmit RS-232C Busy Status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Set to off.
1	On	02	2	Set 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	Set 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	Set to off.

3 = Transmit error status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Set to off.
1	On	02	2	Set to on.
2	Off	00	0	Set to off.
3	Off	00	0	No knife error.
	On	08	8	Knife error occurred.
4	On	10	16	Set 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	Set to off

4 = Transmit receipt paper status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Set to off
1	On	02	2	Set to on
2	Off	00	0	Paper adequate
	On	04	4	Paper low (if paper low sensor enabled)
3	Off	00	0	Paper adequate
	On	08	8	Paper low (if paper low sensor enabled)
4	On	10	16	Set 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	Set to off

Real time request to printer

	GS sequence	DLE sequence
ASCII	GS ETX *n*	DLE ENQ *n*
Hexadecimal	1D 03 *n*	10 05 *n*
	29 3 *n*	16 5 *n*

Value of n: 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 ID 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	Paper adequate.
	On	01	1	Paper low (if paper low sensor enabled).
1	Off	00	0	Paper adequate.
	On	02	2	Paper low (if paper low sensor enabled).
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	Set to off.
6	Off	00	0	No error condition.
	On	40	64	Error condition exists in the printer.*
7	On	80	128	Set to on.

* Errors include cover open, paper out, black mark error, cutter error, thermistor error, high or low voltage error, where at hermistor 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 A799II has a single connector that shares data reporting from either cash drawer. When either cash drawer is open, an openstatus 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.

Enable/disable Automatic Status Back (ASB) (n/a A799)

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. Set to off.
1	Off	00	0	Not used. Set to off.
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	Not used. Set to on.
5	Off	00	0	Receipt cover closed.
	On	20	32	Receipt cover open.
6	Off	00	0	Paper feed button is not pressed.
	On	40	64	Paper feed button is pressed.
7	Off	00	0	Not used. Set to off.

Second byte (error information)

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

Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Receipt paper adequate
	On	01	1	Receipt paper low (if paper low sensor enabled)
1	Off	00	0	Receipt paper present
	On	02	2	Receipt paper low (if paper low sensor enabled)
2	Off	00	0	Receipt paper present.
	On	04	4	Receipt paper exhausted.

Bit	Off/On	Hex	Decimal	Status for ASB
3	Off	00	0	Receipt paper present.
	On	08	8	Receipt paper exhausted.
4	Off	00	0	Not used. Set to off.
5	–	–	–	Undefined
6	–	–	–	Undefined
7	Off	00	0	Not used. Set 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. Set to off.
5	–	–	–	Undefined
6	–	–	–	Undefined
7	Off	00	0	Not used. Set to off.

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. Set to off.
1	Off	00	0	Not used. Set to off.

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	Not used. Set to on.
5	Off	00	0	Receipt cover closed.
	On	20	32	Receipt cover open.
6	Off	00	0	Paper feed button is not pressed.
	On	40	64	Paper feed button is pressed.
7	Off	00	0	Not used. Set to off.

Second byte (error information)

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

Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status for USM
0	Off	00	0	Receipt paper adequate
	On	01	1	Receipt paper low (if paper low sensor enabled)
1	Off	00	0	Receipt paper present
	On	02	2	Receipt paper low (if paper low sensor enabled)
2	Off	00	0	Receipt paper present.
	On	04	4	Receipt paper exhausted.
3	Off	00	0	Receipt paper present.
	On	08	8	Receipt paper exhausted.
4	Off	00	0	Not used. Set to off.
5	–	–	–	Undefined
6	–	–	–	Undefined
7	Off	00	0	Not used. Set 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. Set to off.
5	–	–	–	Undefined
6	–	–	–	Undefined
7	Off	00	0	Not used. Set 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 u 0	1B 75 0	0	0	0	0	0	0	x	x	Binary
ESC v	1B 76	0	x	x	0	0	x	x	x	Binary
GS I *n*	1D 49 *n*	0	x	x	0	x	x	x	x	Binary
GS r *n*	1D 72 *n*	0	x	x	0	x	x	x	x	Binary
Real time response	**Response recognized by:**									
ASCII	HEX									
GS EOT *n*	1D 04 *n*	0	x	x	1	x	x	1	0	Binary
DLE EOT *n*	10 04 *n*	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 80 mm paper. There are 576 printable dots on 80 mm 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 ≤ n ≤ 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

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 2C	' Alpha-Numeric Data ' 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 2C 45 2C 53 2C 54 2C	' Set binary and block length (0 0 0 8 = 0x00 0x08 = 8 bytes) 54 ' 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 (n/a A799)

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

• 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.)

• 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

• 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

	First Variation	Second Variation
ASCII	GS k *m d1…dk* NUL	GS k *m n d1…dn*
Hexadecimal	1D 6B *m d1…dk* 00	1D 6B *m n d1…dn*
Decimal	29 107 *m d1 dk* 0	29 107 *m n d1…dn*

(0 = End of command)

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

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

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.

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.

m	Bar code	d1…dk	length
0	UPC-A	48–57 (ASCII numerals)	Fixed length: 11, 12
1	UPC-E	48–57	Fixed length: 11, 12
2	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.

m	Bar code	d1…dn	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 $n = n$H:nL $1D\ 6B\ m\ n$L nH $d1 \ldots dn$	Variable length $0 < n < 2800$

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

n	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. For composite barcodes, use 0x7C to separate 1D and 2D data.

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

m	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. For composite barcodes, use 0x7C to separate 1D and 2D data.

Set GS1 DataBar parameters

Setting of parameters for GS! DataBar

ASCII	GS q a b c d e fL fH
Hexadecimal	1D 71 a b c d e fL fH
Decimal	29 113 a b c d e fL 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 from 0 to a-1
c	byte	Y undercut, default 0, can be set from 0 to a-1
d	byte	Separator height, default a, can be set from 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 from 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
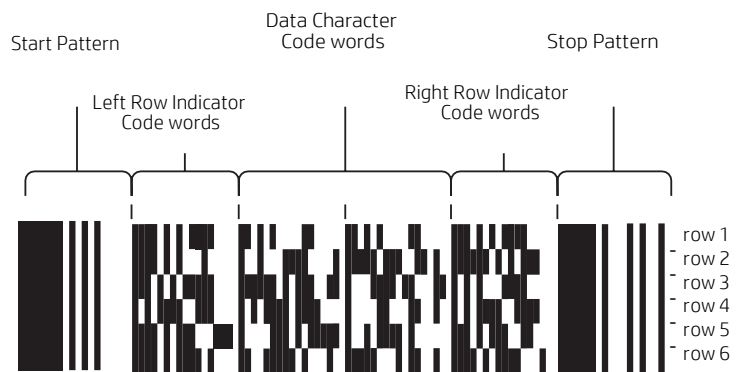
The number of characters in a row and number of rows can be adjusted to vary the symbol's overall aspect ratio to best fit an available space.

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

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/8mm (*n*/203 inch)

Set DataMatrix Parameters (n/a A799)

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)

d2

Module (minimum unit of symbol)   d1
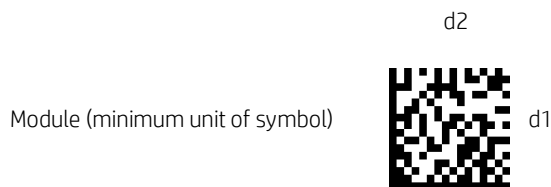
m	d1, d2	symbol type	number of rows, columns
0, 48	(0, 0)	Square (ECC200)	Sets automatic processing for the number of rows and columns of the symbol.
0, 48	Other than (0, 0)	Square (ECC200)	Sets the number of rows of the symbol to d1, the number of columns to d2.
1, 49	(8, 0), (12, 0), (16, 0)	Rectangle (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 (n/a A799)

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 (n/a A799)

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 (n/a A799)

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 postion 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 A799II 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 80 mm paper. There are 576 printable dots on 80 mm 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 54n) and set print area in page mode (1B 57 n1, n2, …n8) 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.

This command also prints and feeds marked paper when the black mark sensor is enabled.

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° 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 difference in memory allocation in page mode when using monochrome and two-color paper. Two-color paper mode requires extra memory in order to differentiate between non-black and black.

Paper type	Total memory allocated (kBytes)	Area of construction (mm)
Monochrome paper	40.5	72 wide x 72 high
Two-color (dots) paper	81.0	72 wide x 72 high 72 wide x 72 high (energy)

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.

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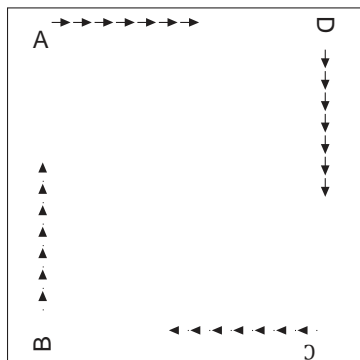
Starting Position	Commands Using Motion Unit
Upper Left/Lower Right	1B 20, 1B 24, 1B 5C (horizontal motion unit) 1B 33, 1B 4A, 1D 24, 1D 5C (vertical motion unit)
Upper Right/Lower Left	1B 33, 1B 4A, 1D 24, 1D 5C (horizontal motion unit) 1B 20, 1B 24, 1B 5C (vertical motion unit)

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

Range of n: 0-255

Default:

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

(576x576 for 80 mm paper)
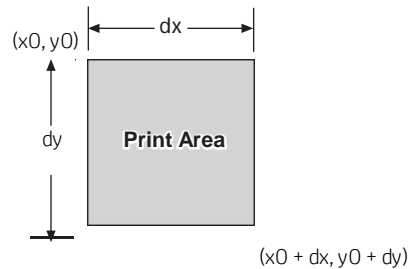
Sets the position and size of the printing area in page mode until the printer is initialized, reset, or powered off, or a 0C command is sent.

The command can be sent multiple times so that several different print areas, aligned in different print directions, can be developed in the printer's page buffer before being printed using the print page mode commands (0C or 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 = [(*n*1 + *n*2 x 256) x (horizontal direction of the fundamental calculation pitch)]

- y0 = [(*n*3 + *n*4 x 256) x (vertical direction of the fundamental calculation pitch)]

- dx = [(*n*5 + *n*6 x 256) x (horizontal direction of the fundamental calculation pitch)]

- dy = [(*n*7 + *n*8 x 256) x (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 [horizontal printable area – x0]. If [y0 + yx] is greater than the printable area, the printing area height is set to [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* X 256) x (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* X 256) x (vertical or horizontal motion unit)] inches.

Exceptions

This command is effective only in page mode.

If the [(*nL* + *nH* X 256) x (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* x 256) x 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* x 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* x 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 ^ *r t m*
Hexadecimal	1D 5E *r t m*
Decimal	29 94 *r t m*

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

Value of t: The waiting time for executing the macro.

Executes a macro. After waiting for a specified period the printer waits for the paper feed button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats this operation the number of specified times.

When the macro is executed by pressing the paper feed button ($m = 1$), paper cannot be fed by using the paper feed button.

Formulas

The waiting time is t x 100 ms for every macro execution.

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 ms 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)

*n*1 is the number of 64k sectors used for logos and user-defined characters.

*n*2 is the number of 64k sectors used for user data storage.

*n*1 + *n*2 <= 6 (dec) (1M)
*n*1 + *n*2 <= 22 (dec) 16 (hex) (2M)

If *n*1 + *n*2 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 (n/a A799)

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 provides you with 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 (n/a A799)

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 (n/a A799)

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.

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.*

User storage status (ColorPOS®)

ASCII	GS 0x97 *m n*
Hexadecimal	1D 97 *m n*
Decimal	29 151 *m n*

Value of m: *m* specifies the type of stored object to be reported:

m = 0   return the kilobytes (1024) of free user RAM,
     n = 0 gets largest free block size
     n = 1 gets the total size free

m = 1   return the kilobytes of free character & logo flash memory, *n* = 0

m = 3   return the CRC of a logo indexed by *n*

m = 5   return the CRC of a macro that has been stored, *n* = 0

m = 6   return the number of LEGACY trigger slots open

m = 7   return the kilobytes of free permanent flash, *n* = 0

For *m* = 0 the value of n selects a return of either the largest free block or total free size, since contiguous allocation cannot be assumed as this area is completely under user control through address parameters.

n = 0   if only one instance of an object type is allowed (macro, user data, user defined characters).

n   is the item index when more than one object of type *m* is possible

n <= FE, see the comments about logo indexes

n = FF :   return a list describing all the existing items of type *m*

Note: *When a specific item request is made, a returned CRC value of 0 0 indicates that no item is stored at that index. There is a practically negligible possibility that a valid object will have a 0 0 CRC; if this is of concern, applications should check the object downloaded byte sequence to verify that this is not the case (as well as store the CRC as an "ID" for the object if needed later for return value comparisons).*

This command returns the state of occupancy of available flash storage and user RAM. The printer response for each item is a 4 byte header, 0x1D 0x97 nL nH (number of bytes that follow in the response) and for each item a 4 byte structure: 1st m (type) byte, 2nd n index byte followed by a 2 byte CRC in Lo Hi order of the data string in that storage space.

The return for $m = 0–2$ is the header and one 4-byte item giving remaining storage space in the CRC position in

Lo Hi order: 1D 97 4 0 m 0 fL fH, where f is the kBytes of storage remaining. Note that RAM storage space is not content typed, while available flash is statically divided into logo, character set, and user data types. Change of the divisions is possible via flash erasure and flash allocation commands.

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 permanet 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 three ways to enter the download mode.

- Powering the printer up with DIP Switch 1 down. **(n/a A799II)**
- While the A799II printer is running normally, send the command Switch to flash download mode (1B 5B 7D) to leave normal operation and enter the download mode.
- If the flash if 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.

DIP switch 1 must in UP position during reboot to return to normal printer operation. (n/a A799II)

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 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 (n/a A799)

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 prompts you 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.

Network setup commands

The following commands are designed to set the required printer internal parameters for network operation. The commands can be used only in flash download mode.

Restore default settings

ASCII	US BS NUL
Hexadecimal	1F 08 00
Decimal	31 8 0

Restores the network settings to the preset values.

Default settings are:

IP address:	192.0.0.192	(in use after bootup timeout of 2 minutes)
Net mask:	0.0.0.0	(default mask of selected IP is used)
Gateway:	none	
Raw TCPIP port 9001:	active	
HTTP port 80:	active	
DHCP:	enabled	
Inactivity timeout:	disabled	
Keep alive pings:	disabled	

Set IP address

ASCII	US BS SOH *n1 n2 n3 n4*
Hexadecimal	1F 08 01 *n1 n2 n3 n4*
Decimal	31 8 1 *n1 n2 n3 n4*
Default:	192.0.0.192

Sets the IP address value specified by the values of *n1* to *n4*.

Set Net Mask

ASCII	US BS STX *n1 n2 n3 n4*
Hexadecimal	1F 08 02 *n1 n2 n3 n4*
Decimal	31 8 2 *n1 n2 n3 n4*
Default:	0.0.0.0

Sets the Net Mask value specified by the values *n1* to *n4*.

Set gateway

ASCII	US BS ETX *n1 n2 n3 n4*
Hexadecimal	1F 08 03 *n1 n2 n3 n4*
Decimal	31 8 3 *n1 n2 n3 n4*
Default:	none

Sets the printer to the gateway having the IP address value specified by the values *n1* to *n4*. A gateway, even when the printer is on another subnet, is not always needed.

The printer initiates no connection and obtains the gateway address from the host packets.

Set raw TCP/IP port

ASCII	US BS EOT *n1 n2*
Hexadecimal	1F 08 04 *n1 n2*
Decimal	31 8 4 *n1 n2*
n1:	Low order byte of port #
n2:	High order byte of port #
Default:	Port = 9001

Sets the port where the printer will look for raw TCP/IP communications. Setting port number to 0 disables raw TCP/IP communications.

DHCP (auto-configuration)

ASCII	US BS BS *n1*	
Hexadecimal	1F 08 08 *n1*	
Decimal	31 8 8 *n1*	

n1 = 0:   disabled
n1 = 1:   enabled

Default: enabled

Enables or disables the use of DHCP at power-up to obtain an IP address. If no address is found within 2 minutes, DHCP obtains the default IP address.

Inactivity timeout

ASCII	US BS HT *n1*	
Hexadecimal	1F 08 09 *n1*	
Decimal	31 8 9 *n1*	

n1 = 0:   disabled
n1 = 1:   enabled

Default: disabled

Enables or disables resetting of open TCP ports after 5 minutes of inactivity.

Keep-alive pings

ASCII	US BS LF *n1*	
Hexadecimal	1F 08 0A *n1*	
Decimal	31 8 10 *n1*	

n1 = 0:   disabled
n1= 1:   enabled

Default: disabled

Enables or disables sending of the keep alive pings (self arps). Keep alive pings may be required for use with such things as smart hubs to remind the smart hub to which port a printer is connected.

If enabled, self arps are sent every 10 minutes.

Set HTTP port (n/a A799)

ASCII	US BS SO *n1 n2*	
Hexadecimal	1F 08 0E *n1 n2*	
Decimal	31 8 14 *n1 n2*	

n1:   Low order byte of port #
n2:   High order byte of port #

Default: Port = 80

Sets the port where the HTTP server will listen. Setting port number to 0 disables HTTP communications.

Get network configuration (n/a A799)

ASCII	US	VT	*nn*
Hexadecimal	1F	0B	*nn*
Decimal	31	11	*nn*

nn	value
00	Return all
01	Return IP address
02	Return net mask
03	Return gateway
04	Return TCP/IP port
08	Return DHCP status
09	Return inactivity timeout status
0A	Return keep alive pings status
0E	Return HTTP port

Returns *rr record1...recordr* for the selected value of *nn*, where *rr* is the number of records being returned (always 1 except when *nn* = 00). Each returned *record* is in the format of *id s0 s1 d0...ds*.

id:	Identifying value of configuration setting type reflecting *nn* values (01-0E)
s0:	Low byte of data size
s1:	High byte of data size
d0...ds:	Data bytes representing value

Example:

Sending 1F 0B 08 (*nn* = 08, return DHCP status) returns 01 08 01 00 01. The first 01 is the *rr* (1 record) and the rest is the *record* (08 01 00 01), where 08 is the *id* (DHCP), 01 00 is the size as *s0 s1* (1 byte), and the final 01 is the data as *d0...ds* (enabled).

Settings commands

The following commands enable you to save and restore printer settings.

Save current settings (n/a A799)

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 (n/a A799)

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 (n/a A799)

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 (n/a A799)

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 (n/a A799)

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.

Arabic font commands

Define Arabic settings (n/a A799)

ASCII	US ETX K *m n*
Hexadecimal	1F 03 4B *m n*
Decimal	31 3 75 *m n*

Value of m n: binary bytes of wanted settings (in hex)

00 08: enable Arabic Glyph ligatures
08 08: disable Arabic Glyph ligatures

00 30: print engine determines print direction
10 30: print left-to-right
20 30: print right-to-left

00 40: no special handling for groups over two spaces
08 40: use left-to-right for groups over two spaces

Defines Arabic settings using two binary bytes. To set multiple settings at once, add the hex together. For example, to disable Arabic Glyph ligatures and print right to left, send 1F 03 4B 28 38. Each setting can be individually adjusted using the next three commands as well.

Use Arabic glyph ligatures (n/a A799)

ASCII	US ETX K *m* BS
Hexadecimal	1F 03 4B *m* 08
Decimal	31 3 75 *m* 8

Value of m: 00: enabled
08: disabled

Sets whether or not to use the Arabic glyph characters that have been automatically combined.

Set Arabic text direction (n/a A799)

ASCII	US ETX K *m* 0
Hexadecimal	1F 03 4B *m* 30
Decimal	31 3 75 *m* 48

Value of m: 00: print engine determines direction
10: left-to-right
20: right-to-left

Sets the direction the Arabic text prints. (Note: Arabic is usually written right-to-left.)

Set Arabic spacing group rules (n/a A799)

ASCII	US ETX K *m* @
Hexadecimal	1F 03 4B *m* 40
Decimal	31 3 75 *m* 64

Value of m: 00: no special handling
08: use left-to-right

Sets the rules regarding groups of spaces in Arabic characters. Groups of over two spaces may be used for alignment if this is set to use left-to-right.

Select Arabic glyph set (n/a A799)

ASCII	US ETX ` *m* ETX
Hexadecimal	1F 03 60 *m* 03
Decimal	31 3 96 *m* 3

Value of m: 00: small and proportional width
10: large and proportional width
30: large and fixed width

Selects which version of the Arabic glyph set to use. It is recommended when using fixed width to disable Arabic Glyph Ligatures using 1F 03 4B 08 08.

Black bar commands

Set black bar flags (n/a A799)

ASCII	US EXT 0x51 NUL *nn*
Hexadecimal	1F 03 51 00 *nn*
Decimal	31 03 81 00 *nn*

Value of nn: binary byte of wanted flags (in hex)

01 = Sensor available
02 = Paper low active
04 = Feed to bar on form feed
08 = Cut on black bar

Sets the black bar flags as a single binary byte. If only one flag is needed, use the above as hex. If multiple flags are needed, the above act as the last four bits of the byte. For example, setting sensor available and cut on black bar would result in 1001, which is a hex 9, and therefore nn would be 09. Setting all the flags would be 1111, which is F, or 0F for nn.

Enable feed to mark on form feed (n/a A799)

ASCII	US EXT 0x51 SOH
Hexadecimal	1F 03 51 01
Decimal	31 03 81 01

Sets the printer to feed to the black mark when paper is fed.

Enable feed to mark on cut (n/a A799)

ASCII	US EXT 0x51 STX
Hexadecimal	1F 03 51 02
Decimal	31 03 81 02

Sets the printer to feed to the black mark when paper is cut. Note: this works with 1D 56 41 00 and 1D 56 42 00 commands only.

Enable black bar paper low detection (n/a A799)

ASCII	US EXT 0x51 ETX
Hexadecimal	1F 03 51 03
Decimal	31 03 81 03

Sets the printer to detect if the black bar paper is low.

Set black bar max feed (n/a A799)

ASCII	US EXT 0x51 EOT *nn*
Hexadecimal	1F 03 51 04 *nn*
Decimal	31 03 81 04 *nn*

Value of nn: number of inches

Sets the max feed to *nn* inches.

Set black bar threshold (n/a A799)

ASCII	US EXT 0x51 ENQ 0xFF
Hexadecimal	1F 03 51 05 FF
Decimal	31 03 81 05 255

This command will make a black bar reading and calibrate the sensor. To calibrate, make sure white paper is over the sensor. This command will return three bytes, and if the first is an 'E', then there was an error calibrating.

Set black bar offset (n/a A799)

ASCII	US EXT 0x51 ACK *ll hh*
Hexadecimal	1F 03 51 06 *ll hh*
Decimal	31 03 81 06 *ll hh*

Value of ll:	low byte of offset
Value of hh:	high byte of offset

Sets the distance from the black bar to the printhead.

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 data scape 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.

Enable or disable paper low sensor

ASCII	US EXT EXT *n*
Hexadecimal	1F 03 03 *n*
Decimal	31 03 03 *n*

Value of n:	0 = Disable
	1 = Enable
Default:	1 (Enable)

Enables or disables the paper low sensor. The printer will not be able to sense when the paper roll is low if this is set to disabled.

Set max power

ASCII	US EXT EOT *n*
Hexadecimal	1F 03 04 *n*
Decimal	31 03 04 *n*

Value of n:	0 = Auto
	1 = Level 1
	2 = Level 2
	3 = Level 3
Default:	1 (Level 1)

Sets the max power to match the power supply of the printer.

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. Use Restore factory settings (1F 09 01 07).

Set partial cut distance

ASCII	US EXT LF *n*
Hexadecimal	1F 03 0A *n*
Decimal	31 03 10 *n*

Value of n: 00h = 125 steps 05h = 110 steps
01h = 130 steps 06h = 115 steps
02h = 135 steps 07h = 120 steps
03h = 140 steps 08h = 150 steps
04h = 145 steps 09h = 155 steps
0Ah = 160 steps

Sets the distance that the knife will cut across a receipt in five-step increments between 110 and 160.

Set default font

ASCII	US EXT SI *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, two-color, 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
	2 = ColorPOS font
	3 = Paper-Savings font
	4 = Smaller font (n/a A799)

Sets font size for the emulation being used.

Set color density

ASCII	US EXT EM *n*
Hexadecimal	1F 03 19 *n*
Decimal	31 03 25 *n*

Value of n:	Percentage (between 70% and 120%)

Default:	64h (100%)

Adjusts printhead energy level to darken color printing or adjust for paper variations. When printer prints high-density color print lines (text or graphics), it automatically slows down.

IMPORTANT: Choose a color density setting no higher than necessary to achieve acceptable color 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.

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.

Set paper low threshold extension

ASCII	US EXT US *n*
Hexadecimal	1F 03 1F *n*
Decimal	31 03 31 *n*

Value of n:	0 = Zero
	1 = 5 feet
	2 = 10 feet
	3 = 15 feet
	4 = 20 feet
	5 = -5 feet
	6 = -10 feet

Default:	0 (Zero)

Sets the amount of footage for the extension in 5-foot increments between 0 and 20 feet.

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 fine adjustment of partial cut steps

ASCII	US EXT 0x31 *n*
Hexadecimal	1F 03 31 *n*
Decimal	31 03 49 *n*

| **Value of n:** | number of extra steps |

Sets the amount of extra steps the knife will cut across a receipt.

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 whaver value of n is selected. If n = 0, the printer can be configured to send back the ID of the A799II, A794, A793 or Application Compatible Escape Command systems using the confiuration 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 on 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
　　　　　　　　　FF = Normal spacing

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

Set printer tone (n/a A799)

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.

Set hard sync (n/a A799)

ASCII　　　　　US EXT 0x56 *nn*
Hexadecimal　　1F 03 56 *nn*
Decimal　　　　31 03 86 *nn*

Value of nn:　　00 = return status when command is reached
　　　　　　　　　01 = wait end of print job (dots are on paper) to return status

Default:　　　　00

Sets whether or not the 1B 76 command is forced to wait for the printing job to finish before returning status.

Set control point (n/a A799)

ASCII　　　　　ESC [! t *ll hh*
Hexadecimal　　1B 5B 21 74 *ll hh*
Decimal　　　　27 91 33 116 *ll hh*

Value of (ll hh × 256): definied by application or driver

Range:　　　　0 - 0xFFFF

Printer sends its response to a control point after all the mechanical activities are finished, so long as command is sent after a line feed.

Appendix A: A799 legacy information

A799 diagnostics form

```
        *** A799 - Diagnostics Form ***

Model number              : A799-120D-TD00
Serial number             : 0000000000

Boot Firmware
    Revision              :  V3.04
    CRC                   :  A5D3
    P/N                   : 189-799B304A
Flash Firmware
    Revision              :  V3.03
    CRC                   :  E28B
    P/N                   : 189-799F303A

H/W parameters
    Flash Memory Size     : 4 Mbytes
    Flash Logos/Fonts     :   256 kbytes
    Flash User Storage    :   192 kbytes
    Flash Perm'nt Fonts   : 2560 kbytes
    Flash Journal Size    : 64 kbytes
    SRAM Size             : 512 kbytes
    Head settting         :  D
    Motor ID              :  1
    Paper Type Setting    : Type 0, Monochrome
    Color Density Adj     : n/a
    Print Density, Mono   : 100%
    Max Speed             : 250 mm/sec
    Paper Width           : 80 mm
    Max Power             : 55 W
    Knife                 : Enabled
    Paper Low Sensor      : 125 steps
    No Paper Low Extension : Enabled

Comm. Interface
    RX Buffer Size        : 4096
    Interface Type        : RS232/USB
    Parameters
       Baud Rate          : 115200
       Data Bits          :  8
       Stop Bit           :  1
       Parity             : NONE
       Flow Control       : DTR/DSR
       Reception Errors   : Ignore
    USB Driver Type       : Printer Class
                          : Reject


To enter Printer Config Menu  :
   1) Flip DIP switch #1 down
   2) Reset the printer, while holding
      the Paper Feed button down
```

Print test will vary per model or printer configuration. (Shown

approximately 60% of size.)

A799 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.

Important: Be careful when you change any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

Note: When changing the paper type you either need to send the **Set paper type (1D 81 mn)** command or make a selection in the configuration menu.

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

- Communication Interfaces

    Universal serial bus (USB)/RS232 Serial (9-pin)

    RJ-45 netwrok/USB *(A799II only)*

    Powered USB

- RS-232C serial interface settings

    Baud rate

    Data bits (can not be changed)

    Stop bits (can not be changed)

    Parity (can not be changed)

    Hardware (DTR/DSR) or software (XON/XOFF) flow control

    Data reception errors

    Alternate DTR/DSR

- Diagnostic Modes

    Normal

    Datascope

    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

    Default font

    Font size

- Hardware options

    Color density Monochrome

    print density

    Power supply wattage (max power) *(n/a A799II)*

    Power supply level (Level I, II or III) *(A799II only)*

    Knife option

    Partial cut distance

    Paper low sensor

    Paper width

    Printhead setting

- Paper type

- Firmware features

    Paper selection lockout

    Beep after knife cut

    Cash drawer open after knife cut

For more information, see this section:

Configuring the printer

Enter configuration (A799)

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.

Important: Be careful when you change any of the printer settings to avoid changing other settings that might affect the performance of the printer.

Switch 1 & 2 are shown in the normal OFF position

Off
On

1 2

DIP Switches

Connector
Cover Open
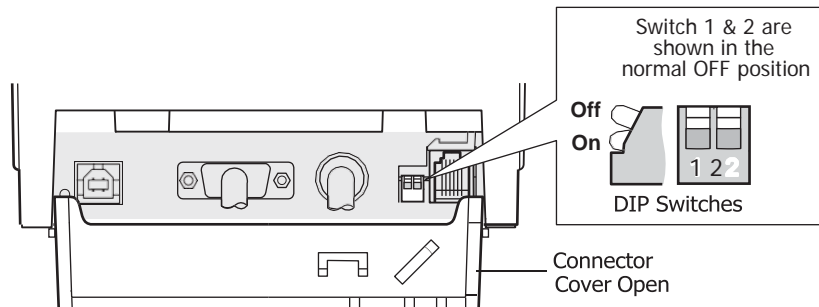
1 Turn off the printer.

2 Open the connector cover.

3 Set DIP Switch 1 to ON position (down). DIP Switch 2 should be in the OFF position (up).

Receipt
Cover

Receipt
Paper

Paper Feed
Button

⑤ ③ ④
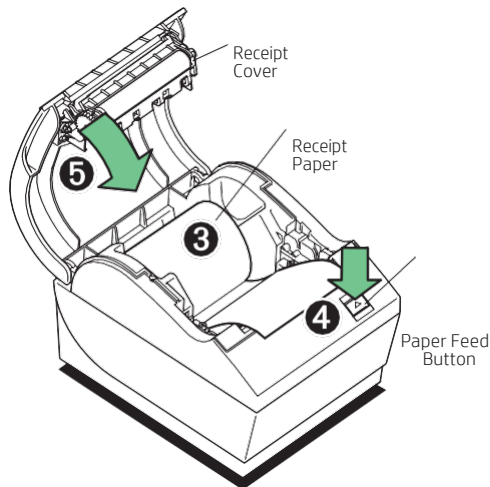
```
********* MAIN MENU **********
*******************************
Select a sub-menu :
  – EXIT                          –> 1 click
  – Print Current Configuration   –> 2 clicks
  – Set Communication Interface   –> 3 clicks
  – Set Diagnostics Modes         –> 4 clicks
  – Set Emulation/Software Options –> 5 clicks
  – Set Hardware Options          –> 6 clicks
  – Set Paper Type                –> 7 clicks
  – Set Firmware Features         – > 8 clicks


Enter code, then hold Button DOWN
at least 1 second to validate
```

4 Make sure receipt paper is loaded in the printer before proceeding. Make sure cover is closed.

5 Turn on the printer and immediately press and hold the paper feed button (4) until the configuration printout begins.

- The printer beeps, and then prints the diagnostics form and the configuration main menu.

- The printer pauses and waits for a main menu selection to be made. Use short clicks, except when answering **Yes** or validating selection (see sample printout).

6 To communicate with the printer, you press the paper feed button using either short or long clicks. Use a long click (more than one second) for "yes" and a short click for a "no." Follow the printed instructions to make selections.

7 Continue through your menu selections until you are prompted to save new parameters. Select **Yes** or **No**.

a If you wish to save, select **Yes**, and then return DIP switch 1 to the OFF Postion (up).

b. Open the receipt cover.

Press and hold the paper feed button while closing the receipt cover.

The diagnostic printout verifies your new settings.

8 If you would like to continue configuring the printer, select **No**. The printer then returns to the configuration menu, where you can set parameters again.

A799-only Commands

Select paper sensors to output paper-end signals

ASCII	ESC c 3 *n*
Hexadecimal	1B 63 33 *n*
Decimal	27 99 51 *n*

Value of n:

If either bit 0 or bit 1 is on, the paper roll near-end sensor is selected as the paper sensor outputting paper-end signals. If

either bit 2 or bit 3 is on, the paper roll-end sensor is selected as the paper sensor outputting paper-end signals.

Bit	Position	Hex	Decimal	Function
0	Off	00	0	Paper roll near-end sensor disabled
	On	01	1	Paper roll near-end sensor enabled
1	Off	00	0	Paper roll near-end sensor disabled
	On	02	2	Paper roll near-end sensor enabled
2	Off	00	0	Paper roll near-end sensor disabled
	On	04	4	Paper roll near-end sensor enabled
3	Off	00	0	Paper roll near-end sensor disabled
	On	08	8	Paper roll near-end sensor enabled
4, 5, 6, 7	—	—	—	Undefined

Range of n:	1–255
Default of n*:*	12

Specifies the paper sensor to output a paper-end signal. Multiple sensors may be selected to signal when paper has run out. When multiple sensors have been selected, anytime one of the sensors detects a paper-end, the paper end signal is output.

When this command is executed a sensor is switched. The paper-end signal switching is delayed depending on the receive buffer state.

Exceptions

The command is ignored, except in parallel communications.

Dynamically select the font set

ASCII	GS 0xF1 SOH FSID
Hexadecimal	1D F1 01 FSID
Decimal	29 241 1 FSID

Value of FSID: font ID

00 = 24 high

01 = Tall font

02 = Color POS font

03 - 0xFF (user configurable) = paper-saving font (18 high)

This command dynamically selects the font set.

Note*: Sending the 1D F1 01 FSID command cancels both compressed and user defined character selections. 1D F1 01 FSID does not store the font selection over power cycles.*

Related information

To configure a font set to be used over power cycles, see "Configure use of font set" (1F 03 45 FSID).

Request alternate status (A793 emulation only)

ASCII	ESC u *n*
Hexadecimal	1B 75 *n*
Decimal	27 117 *n*

Value and Range of n:

Value of *n*	Function	Description
00	Drawer 1	High = Open Low = Closed or Not Present
01	Drawer 2	High = Open Low = Closed or Not Present
02	Paper Low (Not Implemented. Interpreted as Paper Out.)	High = Paper Out Low = Paper Present
03	Paper Out (Default)	High = Paper Out Low = Paper Present
>03	Ignored, No Change	Printer Does Not Stay BUSY[1]

[dia1]PAPER EXHAUST LINE is valid to indicate previously requested status.

This command allows the printer to inform the host when the data in the buffer has been processed. The PAPER EXHAUST line shows the status for the cash drawer or receipt paper as shown in the table.

Status information is limited to what can be sent by the dedicated lines: BUSY, ACK, PAPER EXHAUST, and FAULT.

Exceptions

Parallel communications only.

Read from non-volatile memory (NVRAM)

ASCII	ESC j *k*
Hexadecimal	1B 6A *k*
Decimal	27 106 *k*

Range of *k*:   20 – 63 (decimal)

Reads a two-byte word from location *k* in the history EEROM. The printer returns the word at the next available opportunity.

Related information:

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

Write to non-volatile memory (NVRAM)

ASCII	ESC s *n1 n2 k*
Hexadecimal	1B 73 *n1 n2 k*
Decimal	27 115 *n1 n2 k*

Value of n1: 1st Byte

Value of n2: 2nd Byte

Range of k: 20 – 63 (decimal locations)

Writes the two-byte word, *n1 n2*, to location *k* in history EEROM.

Related information:

This is ignored in LEGACY emulation and the parameter bytes go into the print buffer.

Return boot sector firmware part number

ASCII	GS NULL
Hexadecimal	1D 00
Decimal	29 0

Returns ACK (Hex 06) + 12 bytes ASCII string describing the flash memory boot sector firmware part number. Ex : 189-1234567A

Exceptions

Available only in download mode.

Return segment number status of flash memory

ASCII	GS SOH
Hexadecimal	1D 01
Decimal	29 1

Returns the size of the flash used. There may be 16 (1 MB) or 32 (2 MB) sectors in flash memory. This command assures that the firmware to be downloaded is the appropriate size for flash memory. The value returned is the maximum sector number that can be accepted by the select sector to download (1D 02 *nn*) command.

Exceptions

Available only in download mode.

Select flash memory sector to download

ASCII	GS STX *nn*
Hexadecimal	1D 02 *nn*
Decimal	29 2 *nn*

Value of n: The flash sector to which the next download operation applies

Range of n: 0; n= 255 for A799II

Selects the flash sector (*nn*) for which the next download operation applies. The values of the possible sector are restricted, depending upon the flash part type. The printer transmits an ACK if the sector number is acceptable or an NAK if the sector number is not acceptable. Sector numbers start at 0.

Exceptions

Available only in download mode.

Get firmware CRC

ASCII	GS ACK
Hexadecimal	1D 06
Decimal	29 6

Causes the printer to calculate the CRC for the currently selected sector and transmits the result. This is performed normally after downloading a sector to verify that the downloaded firmware is correct. The printer also calculates the CRC for each sector during power up and halts the program if any sector is erroneous.

The printer transmits ACK if the calculated CRC is correct for the selected sector; NAK if the CRC is incorrect or if no sector is selected.

Return microprocessor CRC

ASCII	GS BEL
Hexadecimal	1D 07
Decimal	29 7

Returns the CRC calculated over the boot sector code space.

Formulas

ACK <low byte> <high byte>

Erase selected flash sector (n/a A799II)

ASCII	GS DLE *n*
Hexadecimal	1D 10 *n*
Decimal	29 16 *n*

Value and range of n: 0–7 =   512k bytes flash
                               0–15 = 1M bytes flash
                               0–31 = 2M bytes flash

Erases the previously selected sector. The printer transmits ACK when the sector has been erased. If the previous sector is not successfully erased, or if no sector was selected, the printer transmits NAK.

Exceptions

Available only in download mode.

Download to active flash sector

ASCII	GS DC1 *aL aH cL cH d1... dn*
Hexadecimal	1D 11 *aL aH cL cH d1... dn*
Decimal	29 17 *aL aH cL cH d1... dn*

Value of aL.:	low byte of the address
Value of aH:	high byte of the address
Value of cL.:	low byte of the count
Value of cH:	high byte of the count
Value of d:	data bytes, 0–255

Value of *n* (for number of data bytes)	Range of address (*aL aH*)	Range of count
(*cL cH*) ((*cH* × 256) + *cL*)	0000–FFFF (hexadecimal)	Addresses run from 0 to 64K.

Contains a start address (aH x 256 + aL) and count (cH x 256 + cL) of binary bytes to load into the selected sector, followed by that many bytes. The start address is relative to the start of the sector. Addresses run from 0 to 64K.

The count must always be 256.

The printer may return one of several responses. ACK means that the data was written correctly and the host should transmit the next block. NAK means that, for some reason, the data was not written correctly. This could mean that communications failed or that the write to flash failed. The alternatives seem to be to retry the block or halt loading and assume a hardware failure.

Related information

Available only in download mode.

Appendix B: Commands listed by hexadecimal code

Code (hexadecimal)	Command
09	Horizontal tab
0A	Print and feed paper one line
0C	Print and return to standard mode
0D	Print and carriage return
10	Clear printer
10 04 *n*	Real time status transmission (DLE sequence)
10 05 *n*	Real time request to printer (DLE sequence)
11 *n*1 . . . *n*72	Print raster graphics
12	Select double-wide characters
13	Select single-wide characters
14 *n*	Feed *n* print lines
15 *n*	Feed *n* dot rows
16 *n*	Add *n* extra dot rows
17	Print
18	Cancel print data in page mode
19	Perform full knife cut (or code 1B 69)
1A	Perform partial knife cut (or code 1B 6D)
1B (+*.BMP)	Download BMP logo (where +*.BMP is the data from the file, not the file name.)
1B 07	Generate tone
1B 0C	Print data in page mode
1B 12	Select 90° counterclockwise rotated print
1B 14 *n*	Set column
1B 16 *n*	Select pitch (column width)
1B 20 *n*	Set right-side character spacing
1B 21 *n*	Select print mode
1B 24 *n*L *n*H	Set absolute starting position
1B 25 *n*	Select or cancel user-defined character set
1B 26 *s c1 c2*	Define user-defined character set
1B 27 *m a0 a1 a2 d1 … dm*	Write to user data storage
1B 2A *m n1 n2 d1…dn*	Select bit image mode
1B 2A 62 6d *n*	Turn on/off TIFF compression (n/a A799)
1B 2D *n*	Select or cancel underline mode
1B 2E *m n rL rH d1 … dn*	Print advanced raster graphics
1B 32	Set vertical line spacing to 1/6 inch
1B 33 *n*	Set vertical line spacing

Code (hexadecimal)	Command
1B 34 *m a0 a1 a2*	Read from user data storage
1B 3A 30 30 30	Copy character set from ROM to RAM
1B 3D *n*	Select peripheral device (for multi-drop)
1B 3F *n*	Cancel user-defined character
1B 40	Initialize printer
1B 44 *n1...nk* 00	Set horizontal tab positions
1B 45 *n*	Select or cancel emphasized mode
1B 47 *n*	Select or cancel double-strike
1B 49 *n*	Select or cancel italic print
1B 4A *n*	Print and feed paper
1B 4B *n1 n2 d1...dn*	Select single-density graphics
1B 4C	Select page mode
1B 52 *n*	Select international character code
1B 53	Select standard mode
1B 54 n	Select print direction in page mode
1B 56 *n*	Select or cancel 90° clockwise rotated print
1B 57 *n1, n2...n8*	Set print area in page mode
1B 59 *n1 n2 d1...dn*	Select double-density graphics
1B 5B 21 74 *ll hh*	Set control point (n/a A799)
1B 5B 7D	Switch to flash download mode
1B 5C *n1 n2*	Set relative print position
1B 61 *n*	Select justification
1B 63 34 *n*	Select sensors to stop printing
1B 63 35 *n*	Enable or disable panel button
1B 64 *n*	Print and feed *n* lines
1B 69	Perform full knife cut (or code 19)
1B 6D	Perform partial knife cut (or code 1A)
1B 70 *n p1 p2*	Generate pulse to open cash drawer
1B 72 m	Set current color
1B 74 *n*	Select international character set
1B 75 0	Transmit peripheral device status (RS-232C printers only)
1B 76	Transmit paper sensor status
1B 7B *n*	Select or cancel upside-down print mode
1C 70 *m n*	Print flash logo
1C 71 *n ...*	Define flash logos
1D 03 n	Real time request to printer (GS sequence)
1D 04 *n*	Real time status transmission (GS sequence)
1D 05	Real time printer status transmission
1D 0E	Erase all flash contents except boot sector

Code (hexadecimal)	Command
1D 0F	Return main program flash CRC
1D 11 00 00 00 00 *d1…dn*	Download Application (n/a A799)
1D 21 *n*	Select character size
1D 22 *n*	Select memory type (SRAM/Flash) where to save logos or user-defined fonts
1D 22 55 *n1 n2*	Flash memory user sectors allocation
1D 22 60 n1	Flash object area pack (n/a A799)
1D 22 61 n1 n2 (n3)	Flash object delete (n/a A799)
1D 22 80	Expanded flash memory allocation
1D 22 81 *n*	Select flash area for storing logos and user-defined characters
1D 22 90 *n*	Return flash area size (n/a A799)
1D 23 *n*	Select the current logo (downloaded bit image)
1D 24 *nL nH*	Set absolute vertical print position in page mode
1D 28 6B 03 00 31 43 n	Set size of module for QR Code
1D 28 6B 03 00 31 44 m	Set data parsing mode for QR Code
1D 28 6B 03 00 31 45 n	Select error correction level for QR Code
1D 28 6B 03 00 31 51 30	Print symbol data for QR Code
1D 28 6B 03 00 31 52 30	Transmit QR code print size (n/a A799)
1D 28 6B 03 00 36 51 30	Print DataMatrix symbol data in the symbol storage area (n/a A799)
1D 28 6B 04 00 00 31 41 n1 n2	Select model for QR Code
1D 28 6B 05 00 36 42 *m d1 d1*	Set DataMatrix parameters (n/a A799)
1D 28 6B 05 00 36 43 *n*	Set DataMatrix module size (n/a A799)
1D 28 6B *pL pH* 36 50 30 *d1…dk*	Store DataMatrix data in symbol storage area (n/a A799)
1D 28 6B qL qH 31 50 30 f1 … fk	Store symbol data for QR Code
1D 2A *n1 n2 d1…dn*]	Define downloaded bit image
1D 2F *m*	Print downloaded bit image
1D 3A	Select or cancel macro definition
1D 40 *n*	Erase user flash sector
1D 42 *n*	Select or cancel white/black reverse print mode
1D 48 *n*	Select printing position of HRI characters
1D 49 *n*	Transmit printer ID
1D 49 40 *n*	Transmit printer ID, remote diagnostics extension
1D 4C *nL nH*	Set left margin
1D 50 *x y*	Set horizontal and vertical minimum motion units
1D 56 *m*	Select cut mode and cut paper (or code 1D 56 *m n*)
1D 56 *m n*	Select cut mode and cut paper (or code 1D 56 m)
1D 57 *nL nH*	Set printing area width
1D 5C *nL nH*	Set relative vertical print position in page mode

Code (hexadecimal)	Command
1D 5E *r t m*	Execute macro
1D 61 *n*	Enable/disable Automatic Status Back (ASB) (n/a A799)
1D 61 *n*	Select or cancel unsolicited status mode
1D 62 *n*	Set smoothing
1D 66 *n*	Select pitch of HRI characters
1D 68 *n*	Select bar code height
1D 6B *m d1...dk* 00 or 1D 6B *m n d1...dn*	Print bar code
1D 6B *n d*1... 00	Print GS1 Databar (RSS barcode), null terminated
1D 6B *m n*L *n*H *d*1... *dn*	Print GS1 DataBar (RSS barcode), data length specified
1D 6B FF *n*	Print Multiple Barcodes
1D 70 *a b c d e f*	Select PDF 417 parameters
1D 71 *a b c d e f*L *f*H	Set GS1 Databar (RSS) parameters
1D 72 *n*	Transmit status
1D 77 *n*	Select bar code width
1D 81 *m n*	Set paper type (for two-color printing)
1D 82 *n*1...*n*72/*n*80	Print raster monochrome graphics
1D 83 *n*1...*n*144/*n*160	Print raster color graphics
1D 84 *m n*1 *n*2 *d*1...*dx*	Download logo image
1D 85 *m n*	Reverse color text mode (two-color)
1D 86 *m*	Monochrome shade mode
1D 87 *m*	Color shade mode
1D 89 *n m*	Logo print with color plane swap
1D 8B *n m o*	Apply shading to logo
1D 8C *n m*	Merge watermark mode
1D 8D *n m*	Text strike-through mode
1D 90 *m x y o p q*	Form and merge real time surround graphic
1D 91 *n*	Save graphics buffer as logo
1D 92 *n*	Background logo print mode
1D 97 *m n*	User storage status
1D 99 *l m n o*	Apply margin message mode
1D 9A *n m o*	Shade and store logo
1D 9B *m n*	Logo print with knife cut
1D A0 *nl nh*	Set temporary maximum target speed
1D F0 01 *n*	Select font ID number
1D F0 02 *n*	Select font style number
1D F0 03	Save font ID number as default font at power up
1D F0 10 *n*	Lock permanent font flash area

Code (hexadecimal)	Command
1D F0 20 nn	Get double-byte font CRC (font ID) (n/a A799)
1D F0 21 nn mm	Get double-byte font CRC (font ID and font style) (n/a A799)
1D F0 80	Download font
1D F0 C0 02	Download font list
1D FF	Reset firmware
1F 03 00 *n*	Set diagnostics mode
1F 03 02 *n*	Enable or disable knife
1F 03 03 *n*	Enable or disable paper low sensor
1F 03 04 *n*	Set max power
1F 03 07 *n*	Set printer emulation
1F 03 09	Reset settings to default values
1F 03 0A *n*	Set partial cut distance
1F 03 0F *n*	Set default font
1F 03 10 *n*	Set font size
1F 03 16 05 *n*	Set interpretation of "Set current color" command
1F 03 19 *n*	Set color density
1F 03 1B *n*	Enable or disable Code 128 check digit calculation
1F 03 1D *n*	Enable or disable barcode ITF leading zero
1F 03 1E *n*	Enable or disable barcode string terminator
1F 03 1F *n*	Set paper low threshold extension
1F 03 28 *n*	Enable or disable USM canned status
1F 03 2C *n*	Send diagnostic page to comm port
1F 03 2E *n*	Enable or disable EJ action via operator control
1F 03 31 *n*	Set fine adjustment of partial cut steps
1F 03 32 *n*	Set printer ID mode
1F 03 33 *n*	Set default code page at power on
1F 03 3D *n*	Set Asian ASCII characters to narrow
1F 03 45 FSID	Configure use of font set over power cycles
1F 03 46 *n*	Configure line spacing
1F 03 47 *n*	Set vertical white space
1F 03 4B *m n*	Define Arabic settings (n/a A799)
1F 03 4B *m* 08	Use Arabic Ligatures (n/a A799)
1F 03 4B *m* 30	Set Arabic Text Direction (n/a A799)
1F 03 4B *m* 40	Set Arabic Spacing Group Rules (n/a A799)
1F 03 4E *n1 n2*	Port idle timeout (n/a A799)
1F 03 51 00 *nn*	Set black bar flags (n/a A799)

1F 03 51 01	Enable feed to mark on form feed (n/a A799)
1F 03 51 02	Enable feed to mark on cut (n/a A799)
1F 03 51 03	Enable black bar paper low detection (n/a A799)
1F 03 51 04 *nn*	Set black bar max feed (n/a A799)
1F 03 51 05 FF	Set black bar threshold (n/a A799)
1F 03 51 06 *ll hh*	Set black bar offset (n/a A799)
1F 03 52 *n fL fH dL dH*	Set printer tone (n/a A799)
1F 03 56 *nn*	Set hard sync (n/a A799)
1F 03 60 *m* 03	Select Arabic Glyph Set (n/a A799)
1F 04 *n*	Convert 6-dots/mm bitmap to 8-dots/mm bitmap
1F 05 *n*	Select superscript or subscript modes
1F 08 00	Restore default settings
1F 08 01 *n1 n2 n3 n4*	Set IP address
1F 08 02 *n1 n2 n3 n4*	Set net mask
1F 08 03 *n1 n2 n3 n4*	Set gateway
1F 08 04 *n1 n2*	Set raw TCPIP port
1F 08 08 *n1*	DHCP (auto-configuration)
1F 08 09 *n1*	Inactivity timeout
1F 08 0A *n1*	Keep-alive pings (arps)
1F 08 0E *n1 n2*	Set HTTP port (n/a A799)
1F 09 01 06	Save current settings as factory settings (n/a A799)
1F 09 01 07	Restore factory settings (n/a A799)
1F 09 01 08	Upload current settings (n/a A799)
1F 09 01 09	Upload factory settings (n/a A799)
1F 09 01 0A	Download settings (n/a A799)
1F 0B *nn*	Get network configuration (n/a A799)
1F 26 *s c1 c2*	Define extended user-defined character set
1F 56	Send printer software version
1F 69 *n*	Select active user-defined character set
1F 74	Print test form
1F 7A	Real time commands disable
1F 7B n	Enable constant speed logos

Appendix C: Resident 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	ƒ
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	⌐	¬	½	¼	¡	«	»
B0	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	▀
E0	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0	≡	±	≥	≤	⌠	⌡	÷	≈	°	·	·	√	ⁿ	²	■	NBSP

Character code table Page 1 (PC850: Multilingual Latin I):

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

	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	¢	£	Ù	Pt	Ó
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	Ò	¬	½	¼	¡	«	»
B0	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	▀
E0	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0	≡	±	≥	≤	⌠	⌡	÷	≈	°	∙	·	√	ⁿ	²	■	NBSP

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

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

Character code table Page 5 (PC865: Nordic):

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

Character code table Page 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	×	ƒ
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	®	¬	½	¼	¡	«	»
B0	░	▒	▓	│	┤	Á	Â	À	©	╣	║	╗	╝	¢	¥	┐
C0	└	┴	┬	├	─	┼	ã	Ã	╚	╔	╩	╦	╠	═	╬	¤
D0	ð	Ð	Ê	Ë	È	€	Í	Î	Ï	┘	┌	█	▄	¦	Ì	▀
E0	Ó	ß	Ô	Ò	õ	Õ	µ	þ	Þ	Ú	Û	Ù	ý	Ý	¯	´
F0	–	±	=	¾	¶	§	÷	¸	°	¨	·	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	є	Ї	ї	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	€	₹	‚	ƒ	„	…	†	‡	^	‰	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	ך	כ	ל	ם	מ	ן
90	נ	ס	ע	ף	פ	ץ	צ	ק	ר	ש	ת	¢	£	¥	Pt	ƒ
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	⌐	¬	½	¼	¡	«	»
B0	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	▀
E0	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
F0	≡	±	≥	≤	⌠	⌡	÷	≈	°	∙	·	√	ⁿ	²	■	NBSP

Character code table Page 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	Ά	Έ	Ή	Ί	Ό	Ύ
F0	Ώ	±	≥	≤	Ϊ	Ϋ	÷	≈	°	∙	·	√	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	¢	£	§	•	¶	ß	®	©	TM	´	¨	≠	Æ	Ø	∞
B0	±	≤	≥	¥	µ	∂	∑	∏	π	∫	ª	º	Ω	æ	ø	¿
C0	¡	¬	√	ƒ	≈	Δ	«	»	…	À	Ã	Õ	Œ	œ	–	—
D0	"	◌”	'	◌Ì	◌·	◌◊	◌ÿ	◌Ÿ	◌'	◌€	◌					฿
E0	‡	·	,	„	‰	Â	Ê	◌Á	◌å	◌ç	◌é	◌è	◌ê	◌Ì	◌Ó	Ô
F0	Ò	Ú	Û	Ù	ı	^	~	¯	˘	˙	˚	¸				

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	İ	Ö	Ü	ø	£	Ø	Ş	ş
A0	á	í	ó	ú	ñ	Ñ	Ğ	ğ	¿	®	¬	½	¼	¡	«	»
B0	░	▒	▓	│	┤	Á	Â	À	©	╣	║	╗	╝	¢	¥	┐
C0	└	┴	┬	├	─	┼	ã	Ã	╚	╔	╩	╦	╠	═	╬	¤
D0	º	ª	Ê	Ë	È		Í	Î	Ï	┘	┌	█	▄	¦	Ì	▀
E0	Ó	ß	Ô	Ò	õ	Õ	µ		×	Ú	Û	Ù	ì	ÿ	¯	´
F0		±		¾	¶	§	÷	¸	°	¨	·	¹	³	²	■	NBSP

Character code table Page 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	Ђ	Ѓ	‚	ѓ	„	…	†	‡	€	‰	Љ	‹	Њ	Ќ	Ћ	Џ
90	ђ	'	'	"	"	•	–	—		™	љ	›	њ	ќ	ћ	џ
A0	NBSP	Ў	ў	Ј	¤	Ґ	¦	§	Ё	©	Є	«	¬	-	®	Ї
B0	°	±	І	і	ґ	µ	¶	·	ё	№	є	»	ј	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	€		‚	ƒ	„	…	†	‡	^	‰		‹				
90		`	'	"	"	•	–	—	~	™		›				
A0	NBSP	¡	¢	£	₪	¥	¦	§	¨	©	×	«	¬	–	®	‾
B0	°	±	²	³	´	µ	¶	·	¸	¹	÷	»	¼	½	¾	¿
C0	◌	◌	◌	◌	◌	◌	◌	◌	◌	·		◌	◌	◌	–	◌
D0	׀	◌	◌	׃	װ	ױ	ײ	׳	״							
E0	א	ב	ג	ד	ה	ו	ז	ח	ט	י	ך	כ	ל	ם	מ	ן
F0	נ	ס	ע	ף	פ	ץ	צ	ק	ר	ש	ת			LRM	RLM	

Character code table Page 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	Ђ	Ѓ	‚	ѓ	„	…	†	‡	€	‰	Љ	‹	Њ	Қ	ħ	Џ
90	ђ	`	'	"	"	•	–	—		™	љ	›	њ	қ	h	џ
A0		¥	ұ	Ә	¤	Ө	¦	§	Ё	©	Ғ	«	¬	–	®	Ү
B0	°	±	І	і	ө	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	‚	ƒ	„	…	†	‡	ˆ	‰	ٹ	‹	Œ	چ	ژ	ڈ
90	گ	`	'	"	"	•	–	—	ک	™	ڑ	›	œ	ZWNJ	ZWJ	ں
A0	NBSP	،	¢	£	¤	¥	¦	§	¨	©	ه	«	¬	–	®	¯
B0	°	±	²	³	´	µ	¶	·	¸	¹	؛	»	¼	½	¾	؟
C0	ہ	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	ـ	و	ç	è	é	ê	ë	ى	ي	î	ï
F0	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	LRM	RLM	ے

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	Ź
90		`	'	"	„	•	–	—		™	š	›	ś	ť	ž	ź
A0	NBSP	˘	˜	Ł	¤	Ą	¦	§	¨	©	Ş	«	¬	–	®	Ż
B0	°	±	˛	ł	´	µ	¶	·	¸	ą	ş	»	Ľ	˝	ľ	ż
C0	Ŕ	Á	Â	Ă	Ä	Ĺ	Ć	Ç	Č	É	Ę	Ë	Ě	Í	Î	Ď
D0	Đ	Ń	Ň	Ó	Ô	Ő	Ö	×	Ř	Ů	Ú	Ű	Ü	Ý	Ţ	ß
E0	ŕ	á	â	ă	ä	ĺ	ć	ç	č	é	ę	ë	ě	í	î	ď
F0	đ	ń	ň	ó	ô	ő	ö	÷	ř	ů	ú	ű	ü	ý	ţ	˙

Character code table Page 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	¤	Ľ	Ś	§	¨	Š	Ş	Ť	Ź	-	Ž	Ż
B0	°	ą	˛	ł	´	ľ	ś	ˇ	¸	š	ş	ť	ź	˝	ž	ż
C0	Ŕ	Á	Â	Ă	Ä	Ĺ	Ć	Ç	Č	É	Ę	Ë	Ě	Í	Î	Ď
D0	Đ	Ń	Ň	Ó	Ô	Ő	Ö	×	Ř	Ů	Ú	Ű	Ü	Ý	Ţ	ß
E0	ŕ	á	â	ă	ä	ĺ	ć	ç	č	é	ę	ë	ě	í	î	ď
F0	đ	ń	ň	ó	ô	ő	ö	÷	ř	ů	ú	ű	ü	ý	ţ	˙

Character code table Page 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	¡	¢	£	¤	¥	¦	§	¨	©	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	¡	¢	£	€	¥	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	ﻵ			ﻻ	ﻹ	
A0	NBSP		آ	£	¤	أ		€	ا	ب	ت	ث	،	ج	ح	خ
B0	•	١	٢	٣	٤	٥	٦	٧	٨	٩	ف	؛	س	ش	ص	؟
C0	¢	ء	آ	أ	ؤ	ع	ئ	ا	ب	ة	ت	ث	ج	ح	خ	د
D0	ذ	ر	ز	س	ش	ص	ض	ط	ظ	ع	غ	ا	¬	÷	×	ع
E0	ـ	ف	ق	آ	ل	م	ن	ه	و	ى	ي	ض	ع	غ	غ	م
F0	ّ	ُ	ن	ه	ﻩ	ﻰ	ي	غ	ق	ﻵ	ﻻ	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	£	إ	ئ	ا
A0	ب	ة	ت	ث	ج	ح	خ	د	ذ	ر	ز	س	ش	ص	«	»
B0	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C0	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D0	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	▀
E0	ض	ط	ظ	ع	غ	ف	µ	ق	ك	ل	م	ن	ـه	و	ى	ي
F0	≡	_̀	_̂	_̣	_́	_̊	_̨	≈	°	∙	·	√	ⁿ	²	■	NBSP

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	€		‚	ƒ	„	…	†	‡	ˆ	‰	Š	‹	Œ			
90		'	'	"	"	•	–	—	˜	™	š	›	œ			Ÿ
A0	NBSP	¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	–	®	¯
B0	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0	Ğ	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	İ	Ş	ß
E0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0	ğ	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ı	ş	ÿ

Character code table Page 25 (WPC28596: 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																
A0	NBSP				¤									،	–	
B0												؛				؟
C0		ء	آ	أ	ؤ	إ	ئ	ا	ب	ة	ت	ث	ج	ح	خ	د
D0	ذ	ر	ز	س	ش	ص	ض	ط	ظ	ع	غ					
E0	ـ	ف	ق	ك	ل	م	ن	ـه	و	ى	ي	◌ً	◌ُ	◌ٍ	◌ّ	◌ُ
F0	◌ٍ	◌ً	◌ُ													

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	ァ	ィ	ゥ	ェ	ォ	ャ	ュ	ョ	ッ
B0	ー	ア	イ	ウ	エ	オ	カ	キ	ク	ケ	コ	サ	シ	ス	セ	ソ
C0	タ	チ	ツ	テ	ト	ナ	ニ	ヌ	ネ	ノ	ハ	ヒ	フ	ヘ	ホ	マ
D0	ミ	ム	メ	モ	ヤ	ユ	ヨ	ラ	リ	ル	レ	ロ	ワ	ン	゛	゜
E0	=	┝	┿	┥	□	□	□	□	♠	♥	♦	♣	●	○	□	□
F0	□	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	[	\	]	ˆ	_
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	ġ	å	ć	Ł	ē	Ŗ	ŗ	ī	Ź	Ä	Å
90	É	æ	Æ	ō	ö	Ģ	¢	Ś	ś	Ö	Ü	ø	£	Ø	×	¤
A0	Ā	Ī	ó	Ż	ż	ź	"	¦	©	®	¬	½	¼	Ł	«	»
B0	░	▒	▓	│	┤	Ą	Č	Ę	Ė	╣	║	╗	╝	Į	Š	┐
C0	└	┴	┬	├	─	┼	Ų	Ū	╚	╔	╩	╦	╠	═	╬	Ž
D0	ą	č	ę	ė	į	š	ų	ū	ž	┘	┌	█	▄	▌	▐	▀
E0	Ó	ß	Ō	Ń	õ	Õ	µ	ń	Ķ	ķ	Ļ	ļ	ņ	Ē	Ņ	'
F0	–	±	"	¾	¶	§	÷	„	°	·	·	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	€		‚		„	…	†	‡		‰		‹		¨	ˇ	¸
90		'	'	"	"	•	–	—		™		›		¯	˛	
A0	NBSP		¢	£	¤		¦	§	Ø	©	Ŗ	«	¬	–	®	Æ
B0	°	±	²	³	´	µ	¶	·	ø	¹	ŗ	»	¼	½	¾	æ
C0	Ą	Į	Ā	Ć	Ä	Å	Ę	Ē	Č	É	Ź	Ė	Ģ	Ķ	Ī	Ļ
D0	Š	Ń	Ņ	Ó	Ō	Õ	Ö	×	Ų	Ł	Ś	Ū	Ü	Ż	Ž	ß
E0	ą	į	ā	ć	ä	å	ę	ē	č	é	ź	ė	ģ	ķ	ī	ļ
F0	š	ń	ņ	ó	ō	õ	ö	÷	ų	ł	ś	ū	ü	ż	ž	˙

Character code table Page 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	ĸ	Ŗ	¤	Ĩ	Ļ	§	¨	Š	Ē	Ģ	Ŧ	–	Ž	¯
B0	°	ą	˛	ŗ	´	ĩ	ļ	ˇ	¸	š	ē	ģ	ŧ	ŋ	ž	ŋ
C0	Ā	Á	Â	Ã	Ä	Å	Æ	Į	Č	É	Ę	Ë	Ė	Í	Î	Ī
D0	Đ	Ņ	Ō	Ķ	Ô	Õ	Ö	×	Ø	Ų	Ú	Û	Ü	Ũ	Ū	ß
E0	ā	á	â	ã	ä	å	æ	į	č	é	ę	ë	ė	í	î	ī
F0	đ	ņ	ō	ķ	ô	õ	ö	÷	ø	ų	ú	û	ü	ũ	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	€		‚	ƒ	„	…	†	‡		‰		‹				
90		`	´	"	"	•	–	—		™		›				
A0	NBSP	˝	Ά	£	¤	¥	¦	§	¨	©	ª	«	¬	SHY	®	―
B0	°	±	²	³	΄	µ	¶	·	Έ	Ή	Ί	»	Ό	½	Ύ	Ώ
C0	ΐ	Α	Β	Γ	Δ	Ε	Ζ	Η	Θ	Ι	Κ	Λ	Μ	Ν	Ξ	Ο
D0	Π	Ρ		Σ	Τ	Υ	Φ	Χ	Ψ	Ω	Ϊ	Ϋ	ά	έ	ή	ί
E0	ΰ	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ	ο
F0	π	ρ	ς	σ	τ	υ	φ	χ	ψ	ω	ϊ	ϋ	ό	ύ	ώ	

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