



HP Single Station Receipt Printer

Programming Guide



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HP Point of Sale (POS) Single Station Receipt Printer Programming Guide

Document Version A

April 2010

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Chapter 1: About this Guide

How to use this guide

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

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

Where to find the basics

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

Where to find advanced technical information

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

If you are having problems with the physical operation of the printer, the **HP POS Configuration Guide**, provides in-depth information on set-up, diagnostics and maintenance. The **HP POS Configuration Guide** can be found on the HP Point of Sale System Software and Documentation / Supplemental CD that was packaged with your printer.

Support

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

For on-line support, refer to the Web site at <http://www.hp.com/#Support>

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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,

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.

Two-color commands

The following table details the list of commands that are available for two-color functionality.

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
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

Continued...

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 X 24 dots

Compressed

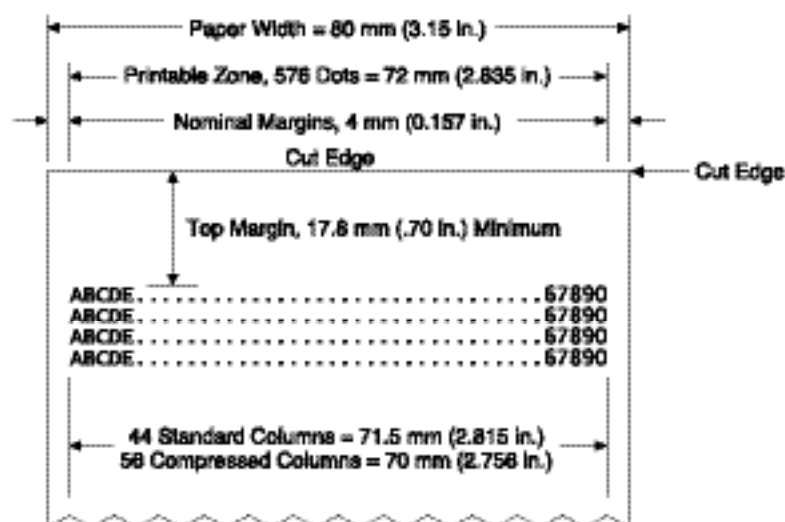
- Characters per inch: 20.3
 - Characters per line: 56
 - Cell size: 10 X 24 dots
-

Print zones

Print zones for 80mm paper

Specifications of print zone for 80mm paper:

- 576 dots (addressable) @ 8 dots/mm, centered on 80mm
- Standard mode: minimum margins: 2.0mm (.079 inches)
- Top margin to manual tear-off: 17.8mm (0.70 inches)
- Top margin to knife cut: 19.0mm (0.75 inches)



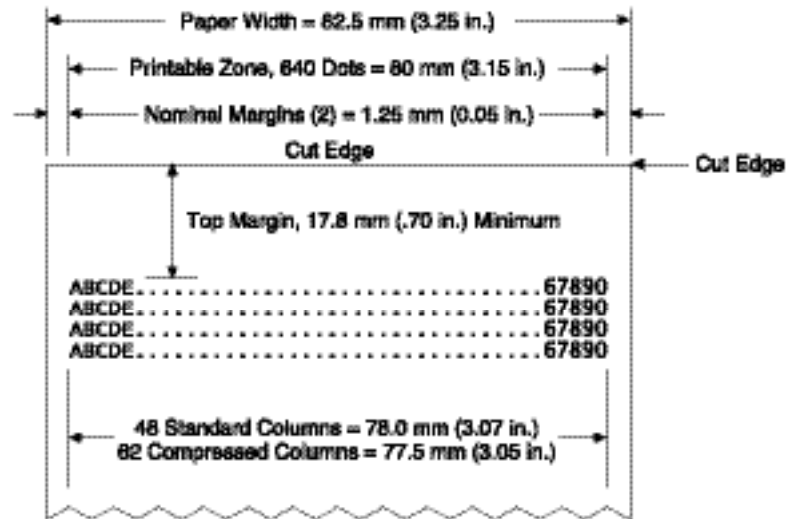
Note: The application centers 44 standard character cells (13 X 24 dots), or 56 compressed character cells (10 X 24 dots), or 576 addressable bits of graphics across an 80mm wide receipt. Minimum print line height is 24 dots for text or graphics. Standard print line spacing is 27 dots (i.e., 3 extra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

The A799 adds a 27 dot high font, so standard print spacing is 30 dots.

Print zones for 82.5mm paper

Specifications of print zone for 82.5 mm paper:

- 640 dots (addressable) @ 8 dots/mm, centered on 82.5mm
- Standard mode: minimum margins: 1.0mm (0.040 inches)
- Top margin to manual tear-off: 17.8mm (0.70 inches)
- Top margin to knife cut: 19.0mm (0.75 inches)



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	
Set	Canceled	X	
Set	Set	X	
X	X	Set	

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

- Right-side up and upside-down
- Single-high (normal) and double-high

Emulation modes

The A799 printer may be operated in a number of different emulation modes.

Print setup in emulation modes

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

Emulation mode	LPI options	Font(s) options	Font size	Default LPI	Default EDR	Comments
Native	6.00, 6.77, 7.52, 8.13	Standard	13X24	7.52	3	Default setup for monochrome paper
		Tall	13X27	6.77	3	
		Color	13X27	6.77	3	Default setup for two-color paper

The following list clarifies how the A799 printer will behave in each emulation mode:

Two-color paper commands and features are supported only in A799 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 table above.
- The LPI is set at 6.00.

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Chapter 3: Programming Commands

Commands listed by function

Printer actions

Code (hexadecimal)	Command	Page
10	Clear printer	22
19	Perform full knife cut (or code 1B 69)	22
1A	Perform partial knife cut (or code 1B 6D)	23
1B 07	Generate tone	23
1B 3D <i>n</i>	Select peripheral device (for multi-drop)	23
1B 40	Initialize printer	23
1B 63 33 <i>n</i>	Select paper sensors to output paper-end signals	24
1B 63 34 <i>n</i>	Select sensors to stop printing	25
1B 63 35 <i>n</i>	Enable or disable panel button	25
1B 69	Perform full knife cut (or code 19)	22
1B 6D	Perform partial knife cut (or code 1A)	23
1B 70 <i>n p1 p2</i>	Generate pulse to open cash drawer	26
1B 72 <i>m</i>	Set current color	26
1D 56 <i>m</i>	Select cut mode and cut paper (or code 1D 56 <i>m n</i>)	27
1D 56 <i>m n</i>	Select cut mode and cut paper (or code 1D 56 <i>m</i>)	27
1D 81 <i>m n</i>	Set paper type (for two-color printing)	27
1F 03 16 05 <i>n</i>	Set interpretation of "Set current color" command	28
1F 74	Print test form	28

Print and paper feed

Code (hexadecimal)	Command	Page
0A	Print and feed paper one line	28
0D	Print and carriage return	29
14 <i>n</i>	Feed <i>n</i> print lines	29
15 <i>n</i>	Feed <i>n</i> dot rows	29
16 <i>n</i>	Add <i>n</i> extra dot rows	29
17	Print	30
1B 4A <i>n</i>	Print and feed paper	30
1B 64 <i>n</i>	Print and feed <i>n</i> lines	31

Vertical and horizontal positioning

Code (hexadecimal)	Command	Page
09	Horizontal tab	31
1B 14 <i>n</i>	Set column	31
1B 24 <i>nL nH</i>	Set absolute starting position	32
1B 32	Set vertical line spacing to 1/6 inch	32
1B 33 <i>n</i>	Set vertical line spacing	32
1B 44 [<i>n</i>] <i>k</i> 00	Set horizontal tab positions	33
1B 5C <i>n1 n2</i>	Set relative print position	33
1B 61 <i>n</i>	Select justification	34
1D 4C <i>nL nH</i>	Set left margin	35
1D 50 <i>x y</i>	Set horizontal and vertical minimum motion units	31
1D 57 <i>nL nH</i>	Set printing area width	35

Text characteristics

Code (hexadecimal)	Command	Page
12	Select double-wide characters	36
13	Select single-wide characters	36
1B 12	Select 90 degree counter-clockwise rotated print	36
1B 16 <i>n</i>	Select pitch (column width)	37
1B 20 <i>n</i>	Set right-side character spacing	37
1B 21 <i>n</i>	Select print mode	38
1B 25 <i>n</i>	Select or cancel user-defined character set	38
1B 26 <i>s c1 c2</i>	Define user-defined character set	39
1B 2D <i>n</i>	Select or cancel underline mode	40
1B 3A 30 30 30	Copy character set from ROM to RAM	40
1B 3F <i>n</i>	Cancel user-defined character	40
1B 45 <i>n</i>	Select or cancel emphasized mode	41
1B 47 <i>n</i>	Select or cancel double-strike	42
1B 49 <i>n</i>	Select or cancel italic print	42
1B 52 <i>n</i>	Select international character code	43
1B 56 <i>n</i>	Select or cancel 90 degree clockwise rotated print	43
1B 74 <i>n</i>	Select international character set	44
1B 7B <i>n</i>	Select or cancel upside-down print mode	44
1D 21 <i>n</i>	Select character size	45
1D 42 <i>n</i>	Select or cancel white/black reverse print mode	46
1D 62 <i>n</i>	Set smoothing	46
1D 85 <i>m n</i>	Reverse color text mode (two-color)	47

1D 8D <i>n m</i>	Text strike-through mode	47
1D F0 01 <i>n</i>	Select font ID number	48
1D F0 02 <i>n</i>	Select font style number	48
1D F0 03	Save font ID number as default font at power up	48
1D F0 80	Download font	49
1D F0 C0 02	Download font list	49
1F 05 <i>n</i>	Select superscript or subscript modes	49
1F 26 <i>s c1 c2</i>	Define extended user-defined character set	39
1F 69 <i>n</i>	Select active user-defined character set	50

Graphics

Code (hexadecimal)	Command	Page
11 <i>n1 ... n72</i>	Print monochrome raster graphics	56
1B (+*.BMP file)	Download BMP logo	50
1B 2A <i>m n1 n2 d1 ... dn</i>	Select bit image mode	51
1B 2E <i>m n rL rH d1 ... dn</i>	Print advanced raster graphics	52
1B 4B <i>n1 n2 d1 ... dn</i>	Select single-density graphics	52
1B 59 <i>n1 n2 d1 ... dn</i>	Select double-density graphics	52
1C 70 <i>n m</i>	Print flash logo	57
1C 71 <i>n</i>	Define flash logos	58
1D 23 <i>n</i>	Select the current logo (downloaded bit image)	53
1D 2A <i>n1 n2 d1 ... dn</i>	Define downloaded bit image	54
1D 2F <i>m</i>	Print downloaded bit image	55
1D 82 <i>n1 ... n72</i> or ... <i>n80</i>	Print raster monochrome graphics	56
1D 83 <i>n1 ... n144</i> or ... <i>n160</i>	Print raster color graphics	56
1D 84 <i>m n1 n2 d1 ... dx</i>	Download logo image	57
1D 8B <i>n m o</i>	Apply shading to logo	58
1D 86 <i>m</i>	Monochrome shade mode	59
1D 87 <i>m</i>	Color shade mode	60
1D 89 <i>n m</i>	Logo print with color plane swap	60
1D 8C <i>n m</i>	Merge watermark mode	59
1D 90 <i>m x y o p q</i>	Form and merge real time surround graphic	60
1D 91 <i>n</i>	Save graphics buffer as logo	61
1D 92 <i>n</i>	Background logo print mode	61
1D 99 <i>l m n o</i>	Apply margin message mode	62
1D 9A <i>n m o</i>	Shade and store logo	62
1D 9B <i>m n</i>	Logo print with knife cut	63
1D A0 <i>n l nh</i>	Set temporary max target speed	63

1F 04 <i>n</i>	Convert 6-dots/mm bitmap to 8 dots/mm bitmap	63
1F 7B <i>n</i>	Enable constant speed logos	64

Status

Batch mode

Code (hexadecimal)	Command	Page
1B 75 0	Transmit peripheral device status (RS-232C printers only)	65
1B 76	Transmit paper sensor status	65
1D 49 <i>n</i>	Transmit printer ID	66
1D 49 40 <i>n</i>	Transmit printer ID, remote diagnostics extension	66
1D 72 <i>n</i>	Transmit status	69
1F 56	Send printer software version	70

Real time

Code (hexadecimal)	Command	Page
10 04 <i>n</i>	Real time status transmission (DLE sequence)	70
10 05 <i>n</i>	Real time request to printer (DLE sequence)	74
1D 03 <i>n</i>	Real time request to printer (GS sequence)	74
1D 04 <i>n</i>	Real time status transmission (GS sequence)	70
1D 05	Real time printer status transmission	75
1F 7A	Real time commands disabled	75

Unsolicited status mode

Code (hexadecimal)	Command	Page
1D 61 <i>n</i>	Select or cancel unsolicited status mode	76

Bar codes

Code (hexadecimal)	Command	Page
1D 48 <i>n</i>	Select printing position for HRI characters	79
1D 66 <i>n</i>	Select pitch for HRI characters	79
1D 68 <i>n</i>	Select bar code height	80
1D 6B <i>m d1...dk</i> 00 or 1D 6B <i>m n d1...dn</i>	Print bar code	80
1D 6B FF <i>n</i>	Print Multiple Barcodes	82
1D 6B <i>n d1... 00</i>	Print GSI Databar (formerly RSS), null terminated	83
1D 6B <i>m n L n H d1... dn</i>	Print GSI Databar (formerly RSS), data length specified	83
1D 70 <i>a b c d e f</i>	Select PDF 417 parameters	84
1D 71 <i>a b c d e f L f H</i>	Set GSI Databar (formerly RSS) parameters	84
1D 77 <i>n</i>	Select bar code width	86

Macros

Code (hexadecimal)	Command	Page
1D 3A	Select or cancel macro definition	86
1D 5E <i>r t m</i>	Execute macro	87

User data storage

Code (hexadecimal)	Command	Page
1B 27 <i>m a0 a1 a2 d1...dm</i>	Write to user data storage	87
1B 34 <i>m a0 a1 a2</i>	Read from user data storage	87
1B 6A <i>k</i>	Read from non-volatile memory (NVRAM)	88
1B 73 <i>n1 n2 k</i>	Write to non-volatile memory (NVRAM)	88
1D 22 <i>n</i>	Select memory type (SRAM/flash) where to save logos or user-defined fonts	88
1D 22 55 <i>n1 n2</i>	Flash memory user sectors allocation	89
1D 22 80	Expanded flash memory allocation	89
1D 22 81 <i>n</i>	Select flash area	89
1D 40 <i>n</i>	Erase user flash sector	91
1D 97 <i>m n</i>	User storage status	92

Flash download

Code (hexadecimal)	Command	Page
1B 5B 7D	Switch to flash download mode	93
1D 00	Return boot sector firmware part number	94
1D 01	Return segment number status of flash memory	94
1D 02 <i>nn</i>	Select flash memory sector to download	94
1D 06	Get firmware CRC	94
1D 07	Return microprocessor CRC	95
1D 0E	Erase all flash contents except boot sector	95
1D 0F	Return main program flash CRC	95
1D 10 <i>n</i>	Erase selected flash sector	95
1D 11 <i>aL aH cL cH d1...dn</i>	Download to active flash sector	96
1D FF	Reset firmware	96

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

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.

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. 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.

Select peripheral device (for multi-drop)

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

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

Default: 1 (bit 0), device selected

Selects the device to which the host computer sends data.

Related information

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

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

Initialize printer

ASCII	ESC @
Hexadecimal	1B 40
Decimal	27 64

Default: Character pitch: 15.6 CPI
Column width: 44 characters
Extra dot rows: 3
Character set: Code Page 437
Printing position: Column One

Clears the print line buffer and resets the printer to the default settings for the start-up configuration (refer to Default settings above).

Single-wide, single-high, non-rotated, and left-aligned characters are set, and user-defined characters or logo graphics are cleared. (Flash memory is not affected.) Tabs reset to default. Receipt selection state is selected.

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-end sensor disabled
	On	04	4	Paper roll-end sensor enabled
3	Off	00	0	Paper roll-end sensor disabled
	On	08	8	Paper roll-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.

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. 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 p1 p2*
Hexadecimal 1B 70 *n p1 p2*
Decimal 27 112 *n p1 p2*

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

Value of *p1*: 0–255

Value of *p2*: 0–255

Sends a pulse to open the cash drawer.

Formulas

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

- On-time = *p1* (Hex) x 2 msec
- Off-time = *p2* (Hex) x 2 msec

Related information

Off-time is the delay before the printer performs the next operation. Refer to cash drawer specifications for required on and off-time.

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 <i>m</i>	GS V <i>m n</i>
Hexadecimal	1D 56 <i>m</i>	1D 56 <i>m n</i>
Decimal	29 86 <i>m</i>	29 86 <i>m n</i>

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 + (<i>n</i> times vertical motion unit), and cuts the paper completely
66	Feeds paper to cutting position + (<i>n</i> times vertical motion unit), and performs a partial cut

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

Range of *n*: 0 – 255

Default of *m, n*: 0

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

Formulas

n times the vertical motion unit is used to determine the cutting position to which the paper is fed.

Set paper type

ASCII	GS 0x81 <i>m n</i>
Hexadecimal	1D 81 <i>m n</i>
Decimal	29 129 <i>m n</i>

Value of <i>m</i>:	0 = monochrome (black) paper	(Kanzaki P310)
	1 = two-color (red/black) papers	(Kanzaki P310RB)
	4 = two-color (blue/black) papers	(Kanzaki P320BB)
	5 = two-color (red/black) papers	(Kanzaki P320RB)

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 two defined color types: (*m n* = 1 0) Kanzaki P-310RB red/black paper and (*m n* = 5 0) Kanzaki P-320RB red/black paper, or (*m n* = 4 0) Kanzaki P-320BB blue/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.

The last set paper type choice is stored in non-volatile memory and is retained after a power loss and across reset commands. The initial value at first boot after firmware load (or reload) is *m n* = 0 0.

Continued...

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 A799 printer will behave in each emulation mode:

Two-color paper and Color commands and features are supported only in A799 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..
- 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
A799 native	6.00, 6.77, 7.52, 8.13	Standard	13x24	7.52	3	Default setup for monochrome paper
		Tall	13x27	6.77	3	
		Color*	13x27	6.77	3	Default setup for two-color paper

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.

In A799 native mode, the standard “Set current color” command should be used.

Related information

The 1F 03 16 00 command disables this feature.

Print test form

ASCII US t

Hexadecimal 1F 74

Decimal 31 116

Prints the current printer configuration settings on the receipt.

Print and paper feed

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

Print and feed paper one line

ASCII	LF
Hexadecimal	0A
Decimal	10

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

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

Print and carriage return

ASCII	CR
Hexadecimal	0D
Decimal	13

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

Related information

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

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

Feed *n* print lines

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

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

Range of *n*: 0–255 in A799 native mode

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

Feed *n* dot rows

ASCII	NAK <i>n</i>
Hexadecimal	15 <i>n</i>
Decimal	21 <i>n</i>

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

Range of *n*: 0–255 in A799 native mode

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

Add *n* extra dot rows

ASCII	SYN <i>n</i>
Hexadecimal	16 <i>n</i>
Decimal	22 <i>n</i>

Value of *n*: Number of extra dot rows

Range of *n*: 0–16

Continued....

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

Print

ASCII ETB
Hexadecimal 17
Decimal 23

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

Print and feed paper

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

Value of n : $n/203$ inch in A799 native mode.

Range of n : 0–255

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

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

Related information

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

Print and feed n lines

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

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

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

Vertical and horizontal positioning

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

The commands describe operation for 80mm paper. If the printer supports 82.5mm paper, the dot spacing is the same but there are 640 printable dots rather than 576 printable dots on the 80mm paper.

Horizontal tab

ASCII HT
Hexadecimal 09
Decimal 9

Moves the print position to the next tab position set by the set horizontal tab positions (1B 44 $n1$ $n2$... 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.

Print initialization sets 32 tabs at column 9, 17, 25...

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

Value of y : Vertical

Range of x : 0 – 255

Range of y : 0 – 255

Default of x : 203

Default of y : 203

Sets the horizontal and vertical motion units to 1/ x inch and 1/ y inch respectively. When x or y is set to 0, the default setting for that motion unit is used.

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.

Set absolute starting position

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

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

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

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

Formulas

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

28 x 10 = 280 dots (beginning of column 29)
 280/256 = 1, remainder of 24
nL = 24 *nH* = 1

Related information

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

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).

Set vertical line spacing

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

Value of *n*: *n*/406 inch in A799 native 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).

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.

Set horizontal tab positions

ASCII ESC D [n]...k NUL
Hexadecimal 1B 44 [n]...k 00
Decimal 27 68 [n]...k 0

Value of n: Column number for tab minus one (*n* is always less than or equal to the current selected column width)

Value of k: 0-32 (decimal)

Default: Every 8 characters from column 1 (9, 17, 25, etc.) for normal print.

Sets up to 32 horizontal tab positions *n* columns from column one, but does not move the print position. See the horizontal tab command (09).

The tab positions remain unchanged if the character widths are changed after the tabs are set. The command ends with hexadecimal 00; hexadecimal 1B 44 00 clears all tabs.

Tabs assumed to be in strictly ascending order. A tab out of order terminates the command string as if it were 00, and remaining tab values are taken as normal data.

Formulas

Set the tab positions in ascending order and put Hex 00 at the end. Hex 1B 44 00 (number of tabs not specified) clears all tab positions.

Exceptions

The tabs cannot be set higher than the column width of the current pitch:

Standard pitch = 44 columns

Compressed pitch = 56 columns

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.

Continued...

$2 \times 10 = 20$ 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.

$2 \times 10 = 20$ dots (two columns to be moved left of the current position)

$20 / 256 = 0$, remainder of 20

$n1 = 20, n2 = 0$

Related information

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

In order to improve the speed of printing, the A799 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.:

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

Select justification

ASCII ESC a 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 according to the above table.

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. The left margin is set to $((nH \times 256) + nL)$ times horizontal motion unit) inches. The horizontal motion units are set by the set horizontal and vertical minimum motion units command (1D 50), described in this manual.

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

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

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

GS L 203 0

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

GS L 150 1

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

Exceptions:

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

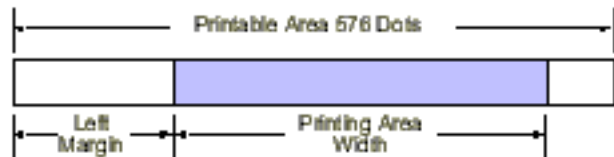
Set printing area width

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. If the setting exceeds the printable area, the maximum value of the printable area is used. The width of the printing area is set to $((nH \times 256) + nL)$ times horizontal motion unit) inches. The horizontal motion units are set by the set horizontal and vertical minimum motion units command (1D 50).

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

Continued...

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.

Text characteristics commands

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

The commands describe operation for 80mm paper. If the printer supports 82.5mm paper, the dot spacing is the same but there are 640 printable dots rather than 576 printable dots on 80mm paper.

Select double-wide characters

ASCII	DC2
Hexadecimal	12
Decimal	18

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

Exceptions

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

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

Select 90 degree counter-clockwise rotated print

ASCII	ESC DC2
Hexadecimal	1B 12
Decimal	27 18

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

Exceptions

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

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

Related information

See “Summary of rotated printing” in this document.

Select pitch (column width)

ASCII	ESC SYN <i>n</i>
Hexadecimal	1B 16 <i>n</i>
Decimal	27 22 <i>n</i>
Value of <i>n</i>:	0 = Standard pitch 1 = Compressed pitch
Default:	0 (Standard pitch)

Selects the character pitch for a print line.

Formulas

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

Pitch	Columns, 80mm Paper	Columns, 82.5mm Paper	CPI
Standard	44	49	15.6
Compressed	56	64	20.3

Related information

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

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

Set right-side character spacing

ASCII	ESC SP <i>n</i>
Hexadecimal	1B 20 <i>n</i>
Decimal	27 32 <i>n</i>
Range of <i>n</i>:	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.

Select print mode**ASCII** ESC ! *n***Hexadecimal** 1B 21 *n***Decimal** 27 33 *n***Value of *n*:** Pitch selection (standard, compressed, double high, or double wide.)**Value of *n***

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

¹Bits 1, 2 and 6 are not used.²Standard and compressed pitch cannot be used together in the same line.**Default:** 0 (for bits 0, 3, 4, 5, 7)This command and select pitch (column width) command (1B 16 *n*) affect pitch selection.**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. 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.

Define user-defined character set

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

Values and ranges:

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

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

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

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

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

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

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

d = the dot data for the characters

The number of bytes for the *i*th character cell is $3 \times ni$.

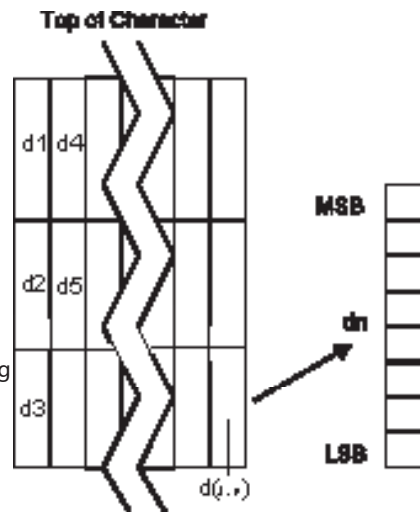
The bytes are printed down and across each cell.

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

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

Related information

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



Define extended user-defined character set

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

Values and ranges:

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

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

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

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

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

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

k = *c2* – *c1* + 1 = the number of characters to be defined in this command string
 [*character i data*] = [*ni d1 ... d(j × ni)*] for $1 \leq i \leq k$

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

d = the dot data for the characters

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

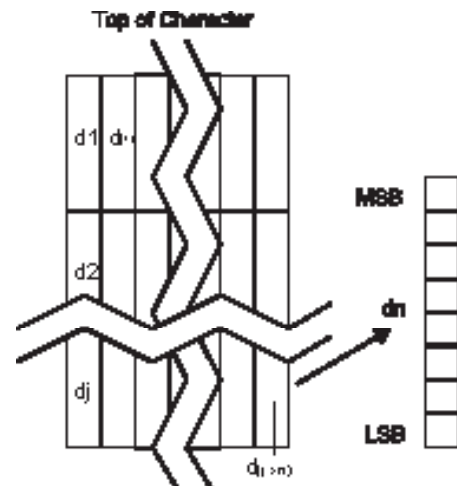
The bytes are printed down and across each cell.

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

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

Related information

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



Select or cancel underline mode**ASCII** ESC - *n***Hexadecimal** 1B 2D *n***Decimal** 27 45 *n***Value of *n*:** Decimal Hex

0, 48	30	=	Cancel underline mode
1, 49	31	=	Select underline mode
2, 50	32	=	Select double thickness underline mode

Default: 0 (Cancel underline mode)

Turns underline mode on or off. Underlines cannot be printed for spaces set by the horizontal tab, set absolute start position, or set relative print position commands.

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

Exceptions

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

Copy character set from ROM to RAM**ASCII** ESC : 0 0 0**Hexadecimal** 1B 3A 30 30 30**Decimal** 27 58 0 0 0**Default:** Current active ROM code page

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

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

Related information

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

Cancel user-defined character**ASCII** ESC ? *n***Hexadecimal** 1B 3F *n***Decimal** 27 63 *n***Value of *n*:** Specified character code.**Range of *n*:** 32–255

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

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. 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.

Related information

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

Pitch	Columns, 80 mm paper	Columns, 82.5 mm paper	CPI
Standard	44	49	15.6
Compressed	56	64	20.3

Selects the print mode: standard, compressed, emphasized, underlined, double-high, or double-wide.

Exceptions

Refer to the table in other column for exceptions.

Related information

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

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

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

Select or cancel 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. 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.

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

Related information

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

Select or cancel 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 A799 native mode.

Select international character code

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

Value of *n*:

A799 native mode	Application Compatible Escape Command emulation (1B 52 <i>n</i> only)
0 = Code Page 437	0 = U.S.A.
1 = 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
10 = Code Page 737, Greek	
12 = Code Page 857	

Default: 0 (Code Page 437)

Selects the character set to be used. Look in “Appendix B: Resident Character Sets” in the *A799 User Guide* for the character sets.

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

Select or cancel 90 degree clockwise rotated print

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

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

Default: 0 (Cancel)

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

Select international character set

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

Value of *n*:**A799 native mode emulation**

0 = Code Page 437 .
 1 = 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
 10 = Code Page 737, Greek
 12 = Code 857

Default: 0 (Code Page 437)

Selects the character set to be used. Look in “Appendix B: Resident Character Sets” in the *A799 User Guide Programming Supplement* for the character sets.

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

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

Exceptions

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

It cannot be used with right side up characters on the same line.

Select character size**ASCII** GS ! *n***Hexadecimal** 1D 21 *n***Decimal** 29 33 *n***Value of *n*:** 1–8 = vertical number of times active font
1–8 = horizontal number of times active font**Range of *n*:** 00–07, 10–17, ...70–77**Default of *n*:** 11 hexadecimal

Selects the character height using bits 0 to 2 and selects the character width using bits 4 to 6, as follows:

With smoothing enabled, maximum value of $0 + n$ is 66.

Character width selection

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

Character height selection

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

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

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

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

Exceptions

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

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

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..

Set smoothing

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

Value of *n*: 0 = smoothing off,
 1 = smooting on,
 default = off

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

Reverse color text mode**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**ASCII** GS 0x85 *m n***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*:** standard cell height**Default:** *n* = 0 (off)

Prints a strike-through over characters. If the strike-through is as wide 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 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.

Four Asian Fonts are available for use on the A799 printer: Simplified Chinese, Traditional Chinese, Kanji, and Korean. Only one of these character sets can be downloaded to the printer at one time.

Font ID	Font
C3 (hex)	Traditional Chinese
CB (hex)	Kanji
CE (hex)	Korean

Note: Before downloading one of the Asian Fonts, the expanded flash memory allocation must be set up to expand the size of the permanent font space. (See Expanded Flash Memory Allocation below). For Simplified Chinese, 2.3 Meg of space is required. Traditional Chinese, 1.3 Meg of space is required. Kanji requires 1 Meg, and Korean requires of 1 Meg of space in the permanent font area.

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 x 16 Gothic and 24 x 24 Gothic, or three different styles could be 16 x 16 Gothic, 16 x 16 Ariel, and 16 x 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.

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.

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 90 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

Download font list

ASCII GS 0xF0 0xC0 0x02
Hexadecimal 1D F0 C0 02
Decimal 29 240 192 2

Print downloaded font information.

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.

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 3 0F 01 and reset the printer. Information will print on the first diagnostic page.

Graphics

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

These commands describe operation for 80mm paper. If the printer supports 82.5mm paper, the dot spacing is the same but there are 640 printable dots rather than 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 (640 for 82.5mm paper)
Maximum height = 512

Enters a downloaded BMP logo into RAM or flash.

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

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

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

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

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

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

Exceptions

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

Related information

Microsoft BMP bitmap file format.

This command is recognized in A799 native mode.

Select bit image mode

ASCII	ESC * <i>m</i> <i>n1</i> <i>n2</i> <i>d1</i> ... <i>dn</i>
Hexadecimal	1B 2A <i>m</i> <i>n1</i> <i>n2</i> <i>d1</i> ... <i>dn</i>
Decimal	27 42 <i>m</i> <i>n1</i> <i>n2</i> <i>d1</i> ... <i>dn</i>

Value of *m*:

Value of <i>m</i>	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

Value of *n*:

Value of <i>n</i> (8-dot single-density mode)	Value of <i>n</i> (24-dot single-density mode)	Value of <i>d</i>
$n1 + (256 \times n2)$	$3 \times [n1 + (256 \times n2)]$	Number of bytes of data*

*Printed left to right (8-dot mode); printed down then across (24-dot mode)

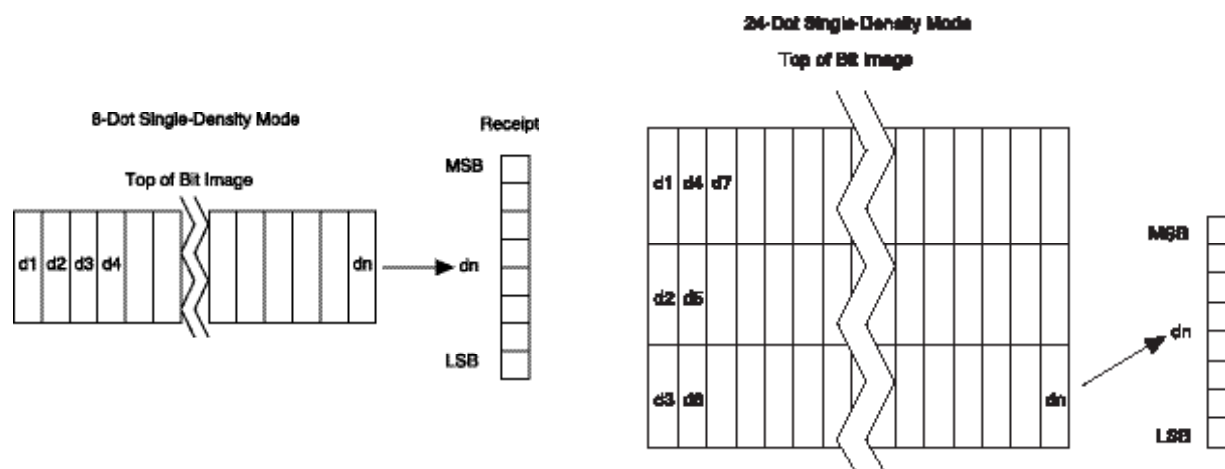
Formulas

8-dot single-density= $n1 + (256 \times n2)$

24-dot single-density= $3 \times [n1 + (256 \times n2)]$

Sets the print resolution and enters one line of graphics data into the print buffer. Excess data is accepted but ignored. Any print command is required to print the data, after which the printer returns to normal processing mode.

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



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 = $8 \times m$ dots
Value of *n*: number of data bytes that compose the raster
Value of *r*: number of times the raster has to be printed = $256 \times rH + rL$
d1 ... dn: data bytes
Range: $0 \leq m \leq 72$
 $0 \leq n \leq 72$
 $0 \leq r \leq 65535$
 $0 \leq d1 \dots dn \leq 255$

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

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*

$n1 + (256 \times n2)$

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

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

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

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*

$n1 + (256 \times n2)$

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

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

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

Select the current logo

ASCII	GS # <i>n</i>
Hexadecimal	1D 23 <i>n</i>
Decimal	29 35 <i>n</i>
Range of <i>n</i>:	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 A799 native mode.

Define downloaded bit image

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

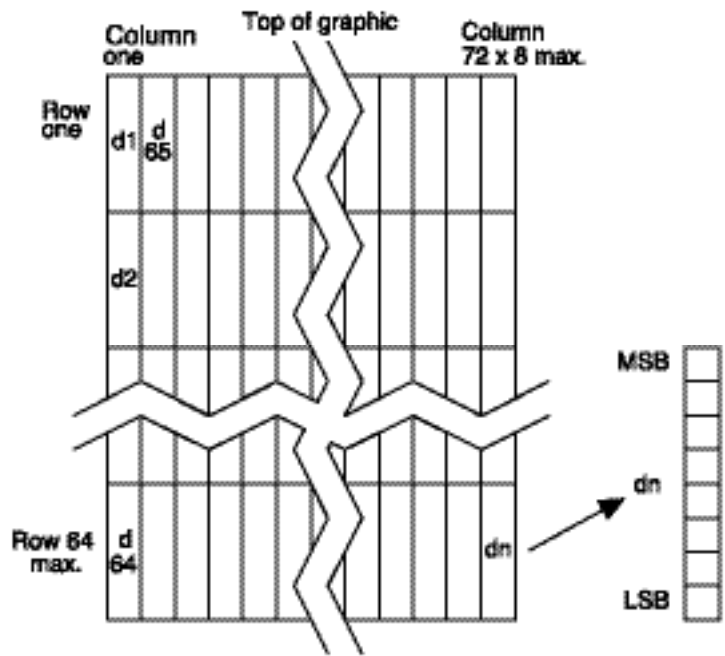
Value of *n*:

Value of <i>n1</i>	Value of <i>n2</i>	Value of <i>d</i>
1–72 (8 x <i>n1</i> = number of horizontal dot columns)	1–64 (number of vertical bytes)	Bytes of data (printed down, then across)

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

Enters a downloaded bit image (such as a logo) into RAM or flash with the number of dots specified by *n1* and *n2*. If in RAM, the downloaded bit image is available until power is turned off, 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.

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 from printer memory on the receipt station. The logo is identified as the one indicated by the most recent select current logo command or 0 if a select current logo command has not yet been given. Parameter *m* is interpreted as follows:

Value of <i>m</i>	Print mode	Vertical DPI	Horizontal DPI
0	Normal	203	203
1	Double wide	203	101
2	Double high	101	203
3	Quadruple	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 or 640 with 82.5mm paper) 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. If the printer supports 82.5 mm paper, the dot spacing is the same but there are 640 printable dots rather than 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.

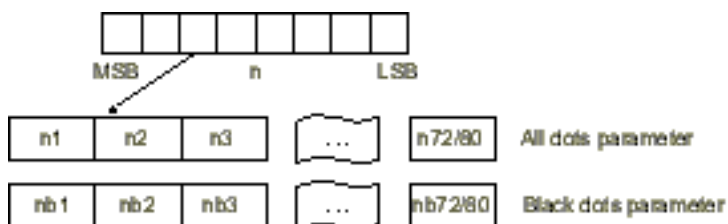
Each bit defines whether or not a dot of the current color will be printed. This command is used for printing a monochrome graphic in real-time. Offsets, page and any other modes or overlays, including watermark do not apply and are overridden by this command. A complete rendering of the intended final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

ASCII	GS 0x82 <i>n1</i> <i>n72</i> (576 dots) for 80 mm paper, or <i>n80</i> (640 dots) for 82.5 mm paper
Hexadecimal	1D 82 <i>n1</i> <i>n72</i> (576 dots) for 80 mm paper, or <i>n80</i> (640 dots) for 82.5 mm paper
Decimal	29 130 <i>n1</i> <i>n72</i> (576 dots) for 80 mm paper, or <i>n80</i> (640 dots) for 82.5 mm paper
ASCII	DC1 <i>n1</i> <i>n72</i> (576 dots) for 80 mm paper, or <i>n80</i> (640 dots) for 82.5 mm paper
Hexadecimal	11 <i>n1</i> <i>n72</i> (576 dots) for 80 mm paper, or <i>n80</i> (640 dots) for 82.5 mm paper
Decimal	17 <i>n1</i> <i>n72</i> (576 dots) for 80 mm paper, or <i>n80</i> (640 dots) for 82.5 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

ASCII	GS 0x83 <i>n1</i> <i>n144</i> (576 dots 80mm paper) / <i>n160</i> (640 dots, 82.5mm paper)
Hexadecimal	1D 83 <i>n1</i> <i>n144</i> (576 dots 80mm paper) / <i>n160</i> (640 dots, 82.5mm paper)
Decimal	29 13 <i>n1</i> <i>n144</i> (576 dots 80mm paper) / <i>n160</i> (640 dots, 82.5mm 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.

Download logo image**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 80mm paper

640/8 for 82.5mm 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 color dot row starting at the top left, 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 = 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 100ms 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

ASCII GS O $x8B\ n\ m\ o$
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

$0 \leq m \leq 100$, 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

ASCII	G5 0x8C <i>n m</i>
Hexadecimal	1D 8C <i>n m</i>
Decimal	29 140 <i>n m</i>
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

ASCII	G5 0x86 <i>m</i>
Hexadecimal	1D 86 <i>m</i>
Decimal	29 134 <i>m</i>

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, $0 \leq m \leq 100$.

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

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

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, $0 \leq m \leq 100$.

m specifies the percentage of shading, $0 \leq m \leq 100$.

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

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

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

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.

Continued...

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.

Save graphics buffer as logo

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.

Background logo print mode

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.

Apply margin message mode**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 then both 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**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 <i>m n</i>
Hexadecimal	1D 9B <i>m n</i>
Decimal	29 155 <i>m n</i>
Values of <i>m</i>:	0 = Standard size 1 = Double wide 2 = Double high 3 = Double high/wide
Value of <i>n</i>:	01 - FF (Hex) # dot rows = $n \times 24$ $n = 5$ is the recommended setting

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

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

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

The command is available only in A799 native mode.

Related information

See "Print downloaded bit image" command.

Set temporary max target speed

ASCII	GS 0xA0 <i>nl nh</i>
Hexadecimal	1D A0 <i>nl nh</i>
Decimal	29
Values:	15H - B4H monochrome 15H - 64H color
Default:	0 - normal speed

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

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

ASCII	US EOT <i>n</i>
Hexadecimal	1F 04 <i>n</i>
Decimal	31 04 <i>n</i>
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 { <i>n</i>
Hexadecimal	1F 7B <i>n</i>
Decimal	31 123 <i>n</i>
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 A799 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.

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

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

Batch mode

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

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

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

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

Value of returned byte:

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

Bits 2–7 are not used.

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

Exceptions

The A799 has a single connector that shares data reporting from either cash drawer. When either cash drawer is open, an open status is reported by the printer..

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	Receipt paper	Present	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	Fixed to zero	Fixed to zero
5	Temperature	In valid range	Too hot or too cold
6	Voltage	In valid range	Too high or too low
7	Not used	Fixed to zero	Fixed to zero

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

Related information

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

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	A799	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 column

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

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	No two-byte character code installed.
	On	01	1	Two-byte character code installed.
1	Off	00	0	No knife installed.
	On	02	2	Knife installed.
2	–	–	–	Undefined.
3	–	–	–	Undefined.
4	Off	00	0	Not used. Fixed to Off.
5	–	–	–	Undefined
6	–	–	–	Undefined
7	Off	00	0	Not used. Fixed to Off.

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

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

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

Transmit printer ID, remote diagnostics extension

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

Values of *n*: Refer to table

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

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

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

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

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

Value of <i>n</i>				
ASCII	Hex	Dec	Remote diagnostic item	Function
Space	20	32	Serial #, 10 digit ASCII	Write to NVRAM Example, send 14 bytes to printer: GS I @ 0x20 1234567890
!	21	33	Serial #	Write to NVRAM, and print on receipt to verify Example, send 14 bytes to printer: GS I @ ! 1234567890 This will print on receipt: Serial # written: 1234567890
#	23	35	Serial #	Return Serial #, preceded by <i>n</i> to identify Printer returns 12 bytes in above example: #1234567890<CR>
\$	24	36	Class/model #, 15 digit ASCII	Write to NVRAM
%	25	37	Class/model #	Write to NVRAM, and print on receipt to verify
'	27	39	Class/model #	Return Class/model #, returns 17 bytes
+	2B	43	Boot firmware part #, 12 digit ASCII	Return Boot firmware part #, returns 14 bytes
/	2F	47	Boot firmware CRC, 4 digit ASCII	Return Boot firmware CRC, returns 6 bytes
3	33	51	Flash firmware part #, 12 digit ASCII	Return Flash firmware part #, returns 14 bytes
7	37	55	Flash firmware CRC, 4 digit ASCII	Return Flash firmware CRC, returns 6 bytes
Ç	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
ü	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
é	82	130	Receipt lines tally	Clear receipt lines tally to 0
â	83	131	Receipt lines tally	Return receipt lines tally, preceded by <i>n</i> to identify Printer returns 10 bytes in above example: â00010000<CR>
ä	84	132	Knife cut tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
à	85	133	Knife cut tally	Write to NVRAM, and print on receipt to verify

Value of <i>n</i> (continued)				
ASCII	Hex	Dec	Remote diagnostic item	Function
å	86	134	Knife cut tally	Clear knife cut tally to 0
ç	87	135	Knife cut tally	Return knife cut tally, returns 10 bytes
É	90	144	Hours on tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
æ	91	145	Hours on tally	Write to NVRAM, and print on receipt to verify
Æ	92	146	Hours on tally	Clear Hours on tally to 0
ô	93	147	Hours on tally	Return hours on tally, returns 10 bytes
ù	97	151	Boot firmware version	Return boot firmware version, returns 6 bytes
ú	A3	163	Flash firmware version	Return flash firmware version, returns 6 bytes
ñ	A4	164	Flash cycles tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
Ñ	A5	165	Flash cycles tally	Write to NVRAM, and print on receipt to verify
ä	A6	166	Flash cycles tally	Clear flash cycles cut tally to 0
ö	A7	167	Flash cycles tally	Return flash cycles cut tally, returns 10 bytes
ì	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
½	AB	171	Knife jams tally	Return knife jams tally, returns 10 bytes
¼	AC	172	Cover openings tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
ì	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

Transmit status

ASCII	GS r <i>n</i>
Hexadecimal	1D 72 <i>n</i>
Decimal	29 114 <i>n</i>

Value of *n*:

- 1, 49 = printer status
- 2, 50 = cash drawer status
- 4, 52 = Flash memory user sector status

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

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

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

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

Exceptions

The A799 has a single connector that shares data reporting from either cash drawer. When either cash drawer is open, an open status is reported by the printer.

Printer status (*n* = 1 or *n* = 49)

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

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

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

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

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

Exceptions

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

Send printer software version

ASCII	AX V
Hexadecimal	1F 56
Decimal	31 86

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

The second 4 bytes are an ASCII string for the flash version. Example: For 1.234.56 (8 bytes), the boot 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 A756 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 A756 clear printer command (0x10) must distinguish for the printer between the new real time commands and the clear printer command by adding a NUL (0x00) to the clear printer command.

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

Rules for using real time commands

Three situations must be understood when using real time commands.

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

Second, the printer transmits status whenever it recognizes a real time status transmission command sequence, even if that sequence happens to occur naturally within the data of another command, such as graphics data.

In this case the sequence will also be handled correctly as the graphics data it is intended to be when the graphics command is executed from the buffer.

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

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

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

Moving data through the buffer

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

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

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

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

Continued...

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

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

Busy line and fault conditions

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

Real time status transmission

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

Value of *n*: GS/DLE sequence

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

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

Exceptions

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

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

The A799 has a single connector that shares data reporting from either cash drawer. When either cash drawer is open, an open status is reported by the printer.

Related information

1 = Transmit printer status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off.
1	On	02	2	Fixed to On.
2	Off	00	0	One or both cash drawers open.
	On	04	4	Both cash drawers closed.
3	Off	00	0	Not busy at the RS-232C interface.
	On	08	8	Printer is busy at the RS-232C interface.
4	On	10	16	Fixed to on.
5				Undefined.
6				Undefined.
7	Off	00	0	Fixed to off.

2 = Transmit RS-232C Busy Status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to off.
1	On	02	2	Fixed to on.
2	Off	00	0	Cover closed.
	On	04	4	Cover open.
3	Off	00	0	Paper feed button is not pressed.
	On	08	8	Paper feed button is pressed.
4	On	10	16	Fixed to on.
5	Off	00	0	Printing not stopped due to paper condition.
	On	20	32	Printing stopped due to paper condition.
6	Off	00	0	No error condition.
	On	40	64	Error condition exists in the printer.
7	Off	00	0	Fixed to off.

3 = Transmit error status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to off.
1	On	02	2	Fixed to on.
2	Off	00	0	Fixed to off.
3	Off	00	0	No knife error.
	On	08	8	Knife error occurred.
4	On	10	16	Fixed to on.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurred.
6	Off	00	0	Thermal printhead temp. and power supply voltage are in range.
	On	40	64	Thermal print head temp. or power supply voltage are out of range.
7	Off	00	0	Fixed to off

4 = Transmit receipt paper status

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

Real time request to printer

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

The printer responds to a request from the host specified by *n*. This command includes two sequences: GS and DLE. 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	Fixed to off.
6	Off	00	0	No error condition.
	On	40	64	Error condition exists in the printer.
7	On	80	128	Fixed to on.

Exceptions

The A799 has a single connector that shares data reporting from either cash drawer. When either cash drawer is open, an open status is reported by the printer.

Real time commands disabled

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

Value of *n*: 0 = enable
 1 = disable

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

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

Unsolicited status mode

Select or cancel unsolicited status mode (USM)

ASCII: GS a *n*

Hexadecimal: 1D 61 *n*

Decimal: 29 97 *n*

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

Default: 0 (USM disabled)

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

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

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

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

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

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

Related information

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

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

Byte 1 = printer information

Byte 2 = error information

Byte 3 = paper sensor information

Byte 4 = paper sensor information

First Byte (Printer Information)

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

Second byte (error information)

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

Continued...

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. Fixed to off.
5	–	–	–	Undefined
6	–	–	–	Undefined
7	Off	00	0	Not used. Fixed to off.

Fourth byte (paper sensor information)

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

Recognizing data from the printer

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

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

Batch mode response		Response recognized by:									
ASCII	HEX										
ECS 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 l 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 <i>n</i>	1D 04 <i>n</i>	0	x	x	1	x	x	1	0	Binary	
DLE EOT <i>n</i>	10 04 <i>n</i>	0	x	x	1	x	x	1	0	Binary	
GS ENQ	1D 05	1	x	x	x	x	x	x	x	Binary	
XON		0	0	0	1	0	0	0	1	Binary	
XOFF		0	0	0	1	0	0	1	1	Binary	
Unsolicited status mode (USM)		Response recognized by:									
USM Byte 1		0	x	x	1	x	x	0	0	Binary	
USM Byte 2-4		0	x	x	0	x	x	x	x	Binary	

Bar codes

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

These commands describe operation for 80mm paper. If the printer supports 82.5mm paper, the dot spacing is the same but there are 640 printable dots rather than the 576 printable dots on 80mm paper.

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.

Select pitch of HRI characters

ASCII GS f *n*

Hexadecimal 1D 66 *n*

Decimal 29 102 *n*

Value of *n*: 0 = Standard Pitch at 15 CPI

1 = Compressed Pitch at 20 CPI

Default: 0 (Standard Pitch at 15 CPI)

Selects standard and compressed font for printing bar code characters.

Select bar code height

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

Value of *n*: Number of dots

Range of *n*: 1–255

Default: 216

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

Print bar code

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

(0 = End of command)

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

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

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

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

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

Exceptions

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

Illegal data cancels the command.

Values:

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

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

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

<i>m</i>	Bar code	<i>d1...dn</i>	length
65	UPC-A	48–57 (ASCII numerals)	Fixed length: 11, 12
66	UPC-E	48–57	Fixed length: 11, 12
67	JAN13 (EAN)	48–57	Fixed length: 12, 13
68	JAN8 (EAN)	48–57	Fixed length: 7, 8
69	CODE39	48–57, 65–90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) <i>d1 = dk = 42</i> (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 <i>d1 = 103-105</i> (must be a start code) <i>d2 = 0–102</i> (data bytes) (Stop code is provided by the printer)	Variable length
74	Code 128 auto compress	00–255 00–FF	Variable length
75	PDF 417	0–255 00–FF	Variable length
78	Code EAN 128 auto compress	0–255 00–FF	Variable length
79	PDF 417	0–255 00–FF data length specified via integer $n = nH:nL\ 1D\ 6B\ m\ nL\ nH\ d1 \dots dn$	Variable length $0 < n < 2800$

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 A799 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.
- Slip/validation selection disabled in multiple barcodes command string
- Multiple barcodes command string disabled when slip/validation selected

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 (formerly RSS), null terminated

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

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

Note: Null terminated, data length 1 to 2436

Print GS1 DataBar (formerly RSS), data length specified

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

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

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

Set GS1 DataBar (formerly RSS) parameters

Setting of parameters for GS1 DataBar

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

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

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

Select PDF 417 parameters

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

Value and Ranges:

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

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

PDF 417 is a multi-row, continuous, variable length symbology which has high data capacity. Each symbol has between 3 and 90 rows, with each row containing a start pattern, a left row indicator, 1 to 30 data characters, a right row indicator and a stop pattern. The number and length of the rows are selectable, which allows the aspect ratio to be adjusted to particular labeling applications. There are no separator bars between rows.

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

Continued...

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

Sample symbol description:

Each PDF 417 symbol consists of 3 to 90 stacked rows surrounded on all four sides by a quiet zone. Each row contains:

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

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

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

Related Information:

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

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

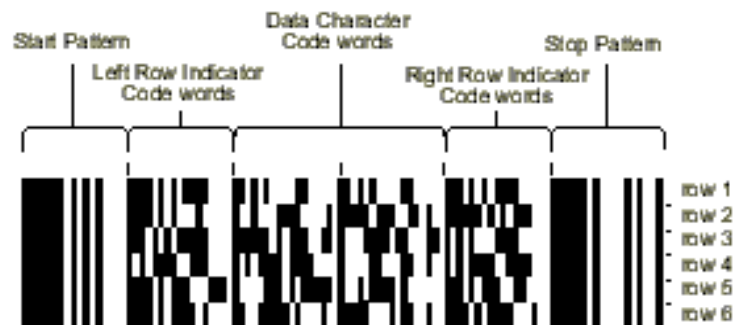
Select bar code width

ASCII GS w *n*
Hexadecimal 1D 77 *n*
Decimal 29 119 *n*
Value of *n*: 2, 3, 4, 5, 6
Default: *n*=3

Sets the bar code width to *n* dots.

Formulas

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

**Print and return to standard mode**

ASCII FF
Hexadecimal 0C
Decimal 12

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

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

Exceptions

This command is enabled only in page mode.

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 $GS \wedge r t m$
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 $t \times 100$ ms for every macro execution.

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

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

Exceptions

If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.

If the macro is not defined or if r is 0, nothing is executed.

User data storage

Write to user data storage

ASCII $ESC' m\ a0\ a1\ a2\ d1 \dots dm$
Hexadecimal $1B\ 27\ m\ a0\ a1\ a2\ d1 \dots dm$
Decimal $27\ 39\ m\ a0\ a1\ a2\ d1 \dots dm$

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.

Read from non-volatile memory

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.

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.

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

ASCII GS " *n*
Hexadecimal 1D 22 *n*
Decimal 29 34 *n*
Value of *n*: 48 – 53

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

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

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

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

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

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

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

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

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

Related information

This command is recognized in A799 native mode.

Flash memory user sectors allocation

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

Default Value of n1: 1 (see below)

Default Value of n2: 1 (see below)

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

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

$n1 + n2 \leq 6$ (dec) (1M)

$n1 + n2 \leq 22$ (dec) 16 (hex) (2M)

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

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

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

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

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 us

Define extended user-defined character set

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

Values and ranges:

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

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

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

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

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

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

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

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

d = the dot data for the characters

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

The bytes are printed down and across each cell.

See the illustration.

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.

er 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.

Erase user flash sector

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

Value of *n*: 49 – 51

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

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

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

This command erases all sectors available for user data storage.

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

This command erases all sectors available for permanent fonts.

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

Related information

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

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

Important: While erasing flash memory, the printer disables all interrupts, including communications. To provide feedback to the application, the printer responds to the application when the erase is complete. 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

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

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 and character set 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).

Downloaded character sets are identified by integer extending the existing code page selection as enumerated in the select international character set (= select character code table) command. The firmware standard list is incrementally extended each time a new single or double byte set is downloaded.

Single byte downloaded fonts are selected by *m* = 3 and 0x40 <= *n* < 0x80.

Since there are only three double-byte character sets supported, the value 0x80 / 0xA0 / 0xC0 selects the first, second, third downloaded double byte font respectively. In return, each downloaded double byte character band is reported individually as 0xC0, 0xC1, 0xC2 ... for as many bands as have been defined.

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.

If the communication protocol is RS-232C – Xon/Xoff, then “X symbol substitution response” should be configured with the setting communications parameters command (US STX , 1F 02).

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.

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

The printer never goes directly from the download mode to normal printer operation. To return to normal printer operation either the operator must turn the power off and then on to reboot or the application must send a command to cancel download mode and reboot. **DIP switch 1 must be in UP position during reboot to return to normal printer operation.**

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

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

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

Switch to flash download mode

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

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

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

Related information

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

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 Meg) or 32 (2 Meg) 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

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 a 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 all flash contents except boot sector

ASCII GS SO
Hexadecimal 1D 0E
Decimal 29 14

This Page Intentionally Left Blank

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>.

Erase selected flash sector

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 <i>n</i> (for number of data bytes)	Range of address (<i>aL aH</i>)	Range of count (<i>cL cH</i>)
$((cH * 256) + cL)$	0000–FFFF (hexadecimal)	0001–FFFF (hexadecimal)

Range: Addresses run from 0 to 64K.

Contains a start address ($aH \times 256 + aL$) and count ($cH \times 256 + cL$) 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.

Reset firmware

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

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

Appendix A: Commands listed by hexadecimal code

By command code

Code (hexadecimal)	Command	Page
09	Horizontal tab	31
0A	Print and feed paper one line	28
0C	Print and return to standard mode	86
0D	Print and carriage return	29
10	Clear printer	22
10 04 <i>n</i>	Real time status transmission (DLE sequence)	70
10 05 <i>n</i>	Real time request to printer (DLE sequence)	74
11 <i>n1</i> ... <i>n72</i>	Print monochrome raster raphics	56
12	Select double-wide characters	36
13	Select single-wide characters	36
14 <i>n</i>	Feed <i>n</i> print lines	29
15 <i>n</i>	Feed <i>n</i> dot rows	29
16 <i>n</i>	Add <i>n</i> extra dot rows	29
17	Print	30
19	Perform full knife cut (or code 1B 69)	22
1A	Perform partial knife cut (or code 1B 6D)	23
1B (+*.BMP)	Download BMP logo (where +*.BMP is the data from the file, not the filename.)	50
1B 07	Generate tone	23
1B 12	Select 90 degree counter-clockwise rotated print	36
1B 14 <i>n</i>	Set column	31
1B 16 <i>n</i>	Select pitch (column width)	37
1B 20 <i>n</i>	Set right-side character spacing	37
1B 21 <i>n</i>	Select print mode	38
1B 24 <i>nL nH</i>	Set absolute starting position	32
1B 25 <i>n</i>	Select or cancel user-defined character set	38
1B 26 <i>s c1 c2</i>	Define user-defined character set	39
1B 27 <i>m a0 a1 a2 d1</i> ... <i>dm</i>	Write to user data storage	87
1B 2A <i>m n1 n2 d1</i> ... <i>dn</i>	Select bit image mode	51
1B 2D <i>n</i>	Select or cancel underline mode	40
1B 2E <i>m n rL rH d1</i> ... <i>dn</i>	Print advanced raster graphics	52
1B 32	Set vertical line spacing to 1/6 inch	32

Code (hexadecimal)	Command	Page
1B 33 <i>n</i>	Set vertical line spacing	32
1B 34 <i>m a0 a1 a2</i>	Read from user data storage	87
1B 3A 30 30 30	Copy character set from ROM to RAM	40
1B 3D <i>n</i>	Select peripheral device (for multi-drop)	23
1B 3F <i>n</i>	Cancel user-defined character	40
1B 40	Initialize printer	23
1B 44 [<i>n</i>] <i>k 00</i>	Set horizontal tab positions	33
1B 45 <i>n</i>	Select or cancel emphasized mode	41
1B 47 <i>n</i>	Select or cancel double-strike	42
1B 49 <i>n</i>	Select or cancel italic print	42
1B 4A <i>n</i>	Print and feed paper	30
1B 4B <i>n1 n2 d1...dn</i>	Select single-density graphics	52
1B 52 <i>n</i>	Select international character code	43
1B 56 <i>n</i>	Select or cancel 90 degree clockwise rotated print	43
1B 59 <i>n1 n2 d1...dn</i>	Select double-density graphics	52
1B 5B 7D	Switch to flash download mode	93
1B 5C <i>n1 n2</i>	Set relative print position	33
1B 61 <i>n</i>	Select justification	34
1B 63 34 <i>n</i>	Select sensors to stop printing	25
1B 63 35 <i>n</i>	Enable or disable panel button	25
1B 64 <i>n</i>	Print and feed <i>n</i> lines	31
1B 69	Perform full knife cut (or code 19)	22
1B 6A <i>k</i>	Read from non-volatile memory (NVRAM)	88
1B 6D	Perform partial knife cut (or code 1A)	23
1B 70 <i>n p1 p2</i>	Generate pulse to open cash drawer	26
1B 72 <i>m</i>	Set current color	26
1B 73 <i>n1 n2 k</i>	Write to non-volatile memory (NVRAM)	88
1B 74 <i>n</i>	Select international character set	44
1B 75 0	Transmit peripheral device status (RS-232C printers only)	65
1B 76	Transmit paper sensor status	65
1B 7B <i>n</i>	Select or cancel upside-down print mode	44
1C 70 <i>m n</i>	Print flash logo	57
1C 71 <i>n ...</i>	Define flash logos	58
1D 00	Return boot sector firmware part number	94
1D 01	Return segment number status of flash memory	94
1D 02 <i>nn</i>	Select flash memory sector to download	94
1D 03 <i>n</i>	Real time request to printer (GS sequence)	74

Code (hexadecimal)	Command	Page
1D 03 <i>n</i>	Real time request to printer (GS sequence)	74
1D 04 <i>n</i>	Real time status transmission (GS sequence)	72
1D 05	Real time printer status transmission	75
1D 06	Get firmware CRC	94
1D 07	Return microprocessor CRC	95
1D 0E	Erase all flash contents except boot sector	95
1D 0F	Return main program flash CRC	95
1D 10 <i>n</i>	Erase selected flash sector	95
1D 11 <i>aL aH cL cH d1...dn</i>	Download to active flash sector	96
1D 21 <i>n</i>	Select character size	45
1D 22 <i>n</i>	Select memory type (SRAM/Flash) where to save logos or user-defined fonts	88
1D 22 55 <i>n1 n2</i>	Flash memory user sectors allocation	89
1D 22 80	Expanded flash memory allocation	89
1D 22 81 <i>n</i>	Select flash area for storing logos and user-defined characters	90
1D 23 <i>n</i>	Select the current logo (downloaded bit image)	53
1D 2A <i>n1 n2 d1...dn]</i>	Define downloaded bit image	54
1D 2F <i>m</i>	Print downloaded bit image	55
1D 3A	Select or cancel macro definition	86
1D 40 <i>n</i>	Erase user flash sector	91
1D 42 <i>n</i>	Select or cancel white/black reverse print mode	46
1D 48 <i>n</i>	Select printing position of HRI characters	79
1D 49 <i>n</i>	Transmit printer ID	66
1D 49 40 <i>n</i>	Transmit printer ID, remote diagnostics extension	67
1D 4C <i>nL nH</i>	Set left margin	35
1D 50 <i>x y</i>	Set horizontal and vertical minimum motion units	31
1D 56 <i>m</i>	Select cut mode and cut paper (or code 1D 56 <i>m n</i>)	27
1D 56 <i>m n</i>	Select cut mode and cut paper (or code 1D 56 <i>m</i>)	27
1D 57 <i>nL nH</i>	Set printing area width	35
1D 5E <i>r t m</i>	Execute macro	87
1D 61 <i>n</i>	Select or cancel unsolicited status mode	76
1D 62 <i>n</i>	Set smoothing	46
1D 66 <i>n</i>	Select pitch of HRI characters	79
1D 68 <i>n</i>	Select bar code height	80
1D 6B <i>m d1...dk 00</i> or 1D 6B <i>m n d1...dn</i>	Print bar code	80
1D 6B <i>n d1... 00</i>	Print GS1 Databar (RSS barcode), null terminated	83
1D 6B <i>m nL nH d1... dn</i>	Print GS1 DataBar (RSS barcode), data length specified	83
1D 6B FF <i>n</i>	Print Multiple Barcodes	82
1D 70 <i>a b c d e f</i>	Select PDF 417 parameters	84

Code (hexadecimal)	Command	Page
1D 71 <i>a b c d e f L fH</i>	Set GS1 Databar (RSS) parameters	84
1D 72 <i>n</i>	Transmit status	69
1D 77 <i>n</i>	Select bar code width	86
1D 81 <i>m n</i>	Set paper type (for two-color printing)	27
1D 82 <i>n1...n72</i> or ... <i>n80</i>	Print raster monochrome graphics	56
1D 83 <i>n1...n144</i> or ... <i>n160</i>	Print raster color graphics	56
1D 84 <i>m n1 n2 d1...dx</i>	Download logo image	57
1D 85 <i>m n</i>	Reverse color text mode (two-color)	47
1D 86 <i>m</i>	Monochrome shade mode	59
1D 87 <i>m</i>	Color shade mode	60
1D 89 <i>n m</i>	Logo print with color plane swap	60
1D 8B <i>n m o</i>	Apply shading to logo	58
1D 8C <i>n m</i>	Merge watermark mode	59
1D 8D <i>n m</i>	Text strike-through mode	47
1D 90 <i>m x y o p q</i>	Form and merge real time surround graphic	60
1D 91 <i>n</i>	Save graphics buffer as logo	61
1D 92 <i>n</i>	Background logo print mode	61
1D 97 <i>m n</i>	User storage status	92
1D 99 <i>l m n o</i>	Apply margin message mode	62
1D 9A <i>n m o</i>	Shade and store logo	62
1D 9B <i>m n</i>	Logo print with knife cut	63
1D A0 <i>n l n h</i>	Set temporary maximum target speed	63
1D F0 01 <i>n</i>	Select font ID number	48
1D F0 02 <i>n</i>	Select font style number	48
1D F0 03	Save font ID number as default font at power up	48
1D F0 80	Download font	49
1D F0 C0 02	Download font list	49
1D FF	Reset firmware	96
1F 03 16 05 <i>n</i>	Set interpretation of "Set current color" command	28
1F 04 <i>n</i>	Convert 6-dots/mm bitmap to 8-dots/mm bitmap	63
1F 05 <i>n</i>	Select superscript or subscript modes	49
1F 04 <i>n</i>	Convert 6-dots/mm bitmap to 8-dots/mm bitmap	63
1F 05 <i>n</i>	Select superscript or subscript modes	49
1F 26 <i>s c1 c2</i>	Define extended user-defined character set	39

Code (hexadecimal)	Command	Page
1F 56	Send printer software version	70
1F 69 <i>n</i>	Select active user-defined character set	50
1F 74	Print test form	28
1F 7A	Real time commands disable	75
1F 7B <i>n</i>	Enable constant speed logos	64

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Appendix B: Resident Character Sets

Character sets

Code page 437 (US)

00	10	20	30	40	50	60	70	80	90	00	10	20	30	40	50	60	70	80	90	00	10	20	30	40	50	60	70	80	90
			SP	0	@	P				p	Ç	É	á																
01	11	21	31	41	51	61	71	81	91	01	11	21	31	41	51	61	71	81	91	01	11	21	31	41	51	61	71	81	91
			!	1	A	Q	a	q	ü	æ	í																		
02	12	22	32	42	52	62	72	82	92	02	12	22	32	42	52	62	72	82	92	02	12	22	32	42	52	62	72	82	92
			"	2	B	R	b	r	é	Æ	ó																		
03	13	23	33	43	53	63	73	83	93	03	13	23	33	43	53	63	73	83	93	03	13	23	33	43	53	63	73	83	93
			#	3	C	S	c	s	â	ô	ú																		
04	14	24	34	44	54	64	74	84	94	04	14	24	34	44	54	64	74	84	94	04	14	24	34	44	54	64	74	84	94
			\$	4	D	T	d	t	ã	ö	ñ																		
05	15	25	35	45	55	65	75	85	95	05	15	25	35	45	55	65	75	85	95	05	15	25	35	45	55	65	75	85	95
			%	5	E	U	e	u	à	ò	Ñ																		
06	16	26	36	46	56	66	76	86	96	06	16	26	36	46	56	66	76	86	96	06	16	26	36	46	56	66	76	86	96
			&	6	F	V	f	v	â	û	ä																		
07	17	27	37	47	57	67	77	87	97	07	17	27	37	47	57	67	77	87	97	07	17	27	37	47	57	67	77	87	97
			'	7	G	W	g	w	ç	ù	ö																		
08	18	28	38	48	58	68	78	88	98	08	18	28	38	48	58	68	78	88	98	08	18	28	38	48	58	68	78	88	98
			(8	H	X	h	x	ê	ÿ	¿																		
09	19	29	39	49	59	69	79	89	99	09	19	29	39	49	59	69	79	89	99	09	19	29	39	49	59	69	79	89	99
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0A	1A	2A	3A	4A	5A	6A	7A	8A	9A	0A	1A	2A	3A	4A	5A	6A	7A	8A	9A	0A	1A	2A	3A	4A	5A	6A	7A	8A	9A
			*	:	J	Z	j	z	è	Ü																			
0B	1B	2B	3B	4B	5B	6B	7B	8B	9B	0B	1B	2B	3B	4B	5B	6B	7B	8B	9B	0B	1B	2B	3B	4B	5B	6B	7B	8B	9B
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0C	1C	2C	3C	4C	5C	6C	7C	8C	9C	0C	1C	2C	3C	4C	5C	6C	7C	8C	9C	0C	1C	2C	3C	4C	5C	6C	7C	8C	9C
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0F	1F	2F	3F	4F	5F	6F	7F	8F	9F	0F	1F	2F	3F	4F	5F	6F	7F	8F	9F	0F	1F	2F	3F	4F	5F	6F	7F	8F	9F
			/	?	O	_	o	^	Å	f	»																		

Code page 737 (Greek)

00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
		SP	0	@	P											p	A	P	ι	...	ι	ι	ι	ι	ι	ι	ι	ι	ι	Ω	
10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F
		!	1	A	Q											a	q	B	Σ	κ	...	⊥	ι	
20	21	22	23	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F	20	21	22	23	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F
		"	2	B	R											b	r	Γ	T	λ
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	3E	3F	30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	3E	3F
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50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F	50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
		%	5	E	U											e	u	Z	X	ξ	ι	ι	ι	ι	ι	ι	ι	ι	ι	ι	ι
60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F	60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F
		&	6	F	V											f	v	H	Ψ	ο											
70	71	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F	70	71	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F
		'	7	G	W											g	w	Θ	Ω	π		-	-	-	-	-	-	-	-	-	-
80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F
		(8	H	X											h	x	ι	α	ρ	=	=	=	=	=	=	=	=	=	=	=
90	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	90	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F
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0A	0B	0C	0D	0E	0F	07	08	09	0A	0B	0C	0D	0E	0F	07	0A	0B	0C	0D	0E	0F	07	08	09	0A	0B	0C	0D	0E	0F	07
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10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F
		+	:	K	ι											k	{	M	δ	τ	ι	ι	ι	ι	ι	ι	ι	ι	ι	ι	ι
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60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F	60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F

Code page 852 (Slavic)

00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
	0	1	2	3	4	5	6	7	8	9	:	:	:	:	:
01	11	21	31	41	51	61	71	81	91	A1	B1	C1	D1	E1	F1
	!	!	!	!	!	!	!	!	!	!	!	!	!	!	!
02	12	22	32	42	52	62	72	82	92	A2	B2	C2	D2	E2	F2
	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
03	13	23	33	43	53	63	73	83	93	A3	B3	C3	D3	E3	F3
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
04	14	24	34	44	54	64	74	84	94	A4	B4	C4	D4	E4	F4
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
05	15	25	35	45	55	65	75	85	95	A5	B5	C5	D5	E5	F5
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06	16	26	36	46	56	66	76	86	96	A6	B6	C6	D6	E6	F6
	&	&	&	&	&	&	&	&	&	&	&	&	&	&	&
07	17	27	37	47	57	67	77	87	97	A7	B7	C7	D7	E7	F7
	'	'	'	'	'	'	'	'	'	'	'	'	'	'	'
08	18	28	38	48	58	68	78	88	98	A8	B8	C8	D8	E8	F8
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09	19	29	39	49	59	69	79	89	99	A9	B9	C9	D9	E9	F9
)))))))))))))))
0A	1A	2A	3A	4A	5A	6A	7A	8A	9A	AA	BA	CA	DA	EA	FA
	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
0B	1B	2B	3B	4B	5B	6B	7B	8B	9B	AB	BB	CB	DB	EB	FB
	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
0C	1C	2C	3C	4C	5C	6C	7C	8C	9C	AC	BC	CC	DC	EC	FC
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0D	1D	2D	3D	4D	5D	6D	7D	8D	9D	AD	BD	CD	DD	ED	FD
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0E	1E	2E	3E	4E	5E	6E	7E	8E	9E	AE	BE	CE	DE	EE	FE
	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
0F	1F	2F	3F	4F	5F	6F	7F	8F	9F	AF	BF	CF	DF	EF	FF
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0	
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11	21	31	41	51	61	71	81	91	A1	B1	C1	D1	E1	F1	
	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
12	22	32	42	52	62	72	82	92	A2	B2	C2	D2	E2	F2	
	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
13	23	33	43	53	63	73	83	93	A3	B3	C3	D3	E3	F3	
	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
14	24	34	44	54	64	74	84	94	A4	B4	C4	D4	E4	F4	
	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
15	25	35	45	55	65	75	85	95	A5	B5	C5	D5	E5	F5	
	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
16	26	36	46	56	66	76	86	96	A6	B6	C6	D6	E6	F6	
	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
17	27	37	47	57	67	77	87	97	A7	B7	C7	D7	E7	F7	
	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
18	28	38	48	58	68	78	88	98	A8	B8	C8	D8	E8	F8	
	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
19	29	39	49	59	69	79	89	99	A9	B9	C9	D9	E9	F9	
	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
1A	2A	3A	4A	5A	6A	7A	8A	9A	AA	BA	CA	DA	EA	FA	
	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
1B	2B	3B	4B	5B	6B	7B	8B	9B	AB	BB	CB	DB	EB	FB	
	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
1C	2C	3C	4C	5C	6C	7C	8C	9C	AC	BC	CC	DC	EC	FC	
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1D	2D	3D	4D	5D	6D	7D	8D	9D	AD	BD	CD	DD	ED	FD	
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1E	2E	3E	4E	5E	6E	7E	8E	9E	AE	BE	CE	DE	EE	FE	
	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
1F	2F	3F	4F	5F	6F	7F	8F	9F	AF	BF	CF	DF	EF	FF	
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Code page 857 (Turkish)

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Code page 858 (with Eurosymbol)

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Code page 860 (Portuguese)

A- 10 N- 0 16	20 30 40 S- 0 @ 04	50 60 70 P- 00 00 p 02	80 90 00 00 Ç É á 125 124 125 128	00 10 I 127 203	00 10 L 204	10 20 ≡ 200
Y- 1 17 XCV 12	21 31 41 ! 1 A 05	51 61 71 Q a q 07 07 07 02	81 91 01 01 Ü Ä í 126 125 126 127	01 11 = 128 209	11 21 β 204	21 31 ± 201
0- 12 18	22 32 42 " 2 B 06	52 62 72 R b r 08 08 08 01	82 92 02 02 é È ó 129 128 129 128	02 12 I 129 210	12 22 I' 205	22 32 ≥ 202
05 13 19	23 33 43 # 3 C 07	53 63 73 S c s 09 09 09 05	83 93 03 03 â ô ú 131 127 130 129	03 13 I 130 211	13 23 π 206	23 33 ≤ 203
01 14 20	24 34 44 \$ 4 D 08	54 64 74 T d t 10 10 10 06	84 94 04 04 ã õ ñ 132 128 134 129	04 14 I 131 212	14 24 Σ 207	24 34 ∫ 204
06 15 21	25 35 45 % 5 E 09	55 65 75 U e u 11 11 11 07	85 95 05 05 à ò Ñ 133 129 135 130	05 15 I 132 213	15 25 σ 208	25 35 J 205
00 16 22	26 36 46 & 6 F 10	56 66 76 V f v 12 12 12 08	86 96 06 06 Á Ú ã 134 130 136 129	06 16 I 133 214	16 26 μ 209	26 36 : 206
07 17 23	27 37 47 ' 7 G 11	57 67 77 W g w 13 13 13 09	87 97 07 07 ç ù ø 135 131 137 130	07 17 I 134 215	17 27 τ 210	27 37 = 207
08 18 24	28 38 48 (8 H 12	58 68 78 X h x 14 14 14 10	88 98 08 08 ê ì ¿ 136 132 138 134	08 18 I 135 216	18 28 L 211	28 38 q 208
04 19 25	29 39 49) 9 I 13	59 69 79 Y i y 15 15 15 11	89 99 09 09 Ê Ñ Ò 137 133 139 135	09 19 I 136 217	19 29 Θ 212	29 39 • 209
0A 1A 26	3A 4A 5A * : J 14	6A 7A 8A Z j z 16 16 16 12	9A 0A 1A 2A è Ü 138 134 140 136	0A 1A I 137 218	1A 2A Ω 213	2A 3A • 210
00 1B 27	3B 4B 5B + ; K 15	6B 7B 8B [k { 17 17 17 13	9B 0B 1B 2B í c ½ 139 135 141 137	0B 1B I 138 219	1B 2B L 214	2B 3B √ 211
0C 1C 28	3C 4C 5C , < L 16	6C 7C 8C \ 18 18 18 14	9C 0C 1C 2C ô £ ¼ 140 136 142 138	0C 1C I 139 220	1C 2C L 215	2C 3C π 212
0D 1D 29	3D 4D 5D - = M 17	6D 7D 8D] m } 19 19 19 15	9D 0D 1D 2D ì Ó 141 137 143 139	0D 1D I 140 221	1D 2D L 216	2D 3D 2 213
0E 1E 30	3E 4E 5E . > N 18	6E 7E 8E ^ n ~ 20 20 20 16	9E 0E 1E 2E Â P t 142 138 144 140	0E 1E I 141 222	1E 2E L 217	2E 3E ■ 214
0F 1F 31	3F 4F 5F / ? O 19	6F 7F 8F _ o 21 21 21 17	9F 0F 1F 2F Ã Ó 143 139 145 141	0F 1F I 142 223	1F 2F L 218	2F 3F 2 215

Code page 862 (Hebrew)

0C	0	20	00	40	50	60	70	80	90	9C	BC	CC	DC	EC	FC
			0	@	P		p	ן	י	á			ı	ı	≡
0D	1	21	01	41	51	61	71	81	91	A1	BD	CD	DD	ED	FD
			1	ı	ı	A	Q	a	q	ı	ı	ı	ı	ı	ı
0E	2	22	02	42	52	62	72	82	92	A2	BE	CE	DE	EE	FE
			2	ı	ı	B	R	b	r	ı	ı	ı	ı	ı	ı
0F	3	23	03	43	53	63	73	83	93	A3	BF	CF	DF	EF	FF
			3	#	ı	C	S	c	s	ı	ı	ı	ı	ı	ı
10	4	24	04	44	54	64	74	84	94	A4	00	04	08	0C	10
			4	S	ı	D	T	d	t	ı	ı	ı	ı	ı	ı
11	5	25	05	45	55	65	75	85	95	A5	01	05	09	0D	11
			5	%	ı	E	U	e	u	ı	ı	ı	ı	ı	ı
12	6	26	06	46	56	66	76	86	96	A6	02	06	0A	0E	12
			6	&	ı	F	V	v	ı	ı	ı	ı	ı	ı	ı
13	7	27	07	47	57	67	77	87	97	A7	03	07	0B	0F	13
			7	'	ı	G	W	g	w	ı	ı	ı	ı	ı	ı
14	8	28	08	48	58	68	78	88	98	A8	04	08	0C	10	14
			8	(ı	H	X	h	x	ı	ı	ı	ı	ı	ı
15	9	29	09	49	59	69	79	89	99	A9	05	09	0D	11	15
			9)	ı	I	Y	i	y	ı	ı	ı	ı	ı	ı
16	A	2A	0A	4A	5A	6A	7A	8A	9A	AA	06	0A	0E	12	16
			A	*	ı	J	Z	j	z	ı	ı	ı	ı	ı	ı
17	B	2B	0B	4B	5B	6B	7B	8B	9B	AB	07	0B	0F	13	17
			B	ı	ı	K	[k	{	ı	ı	ı	ı	ı	ı
18	C	2C	0C	4C	5C	6C	7C	8C	9C	AC	08	0C	10	14	18
			C	'	ı	L	\	ı	ı	ı	ı	ı	ı	ı	ı
19	D	2D	0D	4D	5D	6D	7D	8D	9D	AD	09	0D	11	15	19
			D	-	ı	M]	m	}	ı	ı	ı	ı	ı	ı
1A	E	2E	0E	4E	5E	6E	7E	8E	9E	AE	0A	0E	12	16	1A
			E	>	ı	N	^	n	~	ı	ı	ı	ı	ı	ı
1B	F	2F	0F	4F	5F	6F	7F	8F	9F	AF	0B	0F	13	17	1B
			F	/	ı	O	-	ı	ı	ı	ı	ı	ı	ı	ı

Code page 863 (French Canadian)

01 1 16 XCN	21 31 41 ! 1 A	31 41 51 Q a q	41 51 61 Û È ' R1	51 61 71 — — F1	61 71 81 β ±
02 1 17 " 2 B	22 32 42 # 3 C	32 42 52 S c s	42 52 62 â ô ú	52 62 72 † † π	62 72 82 ≤
03 1 18 XOFF	23 33 43 \$ 4 D	33 43 53 T d t	43 53 63 Ê Ë Ì	53 63 73 Σ	63 73 83 ∫
04 1 19 % 5 E	24 34 44 & 6 F	34 44 54 V Γ v	44 54 64 Û Ü	54 64 74 † † μ	64 74 84 ÷
05 1 20 / 7 G	25 35 45 ' 8 H	35 45 55 W g w	45 55 65 ç ù	55 65 75 † † τ	65 75 85 ÷
06 1 21 8 9 I	26 36 46 (8 H	36 46 56 X h x	46 56 66 ê ì	56 66 76 =	66 76 86 φ
07 1 22 9 10 J	27 37 47) 9 I	37 47 57 Y i y	47 57 67 ë ò	57 67 77 =	67 77 87 θ
08 1 23 LF	28 38 48 * : J	38 48 58 Z j z	48 58 68 è ù	58 68 78 =	68 78 88 Ω
09 1 24 XRC	29 39 49 + ; K	39 49 59 [k {	49 59 69 ï ò	59 69 79 =	69 79 89 δ
10 1 25 CR CS	30 40 50 , < L	40 50 60 \	50 60 70 ↑	60 70 80 =	70 80 90 n
11 1 26 / ? O	31 41 51 - = M	41 51 61] m }	51 61 71 =	61 71 81 =	71 81 91 2
12 1 27 ^ ~	32 42 52 > N	42 52 62 ^ n ~	52 62 72 À	62 72 82 =	72 82 92 ■
13 1 28 _ o	33 43 53 / ? O	43 53 63 _ o	53 63 73 ß	63 73 83 =	73 83 93 ■

Code page 865 (Nordic)

0C	0	2B	00	40	53	6C	70	8D	9B	AC	BC	CC	CC	EC	FF
			0	@	P	p	Ç	É	á						
0D	1	2C	01	41	54	6D	71	8E	9C	AD	BD	CD	CE	ED	FE
			1	A	Q	a	q	Û	æ	í					
0E	2	2D	02	42	55	6E	72	8F	9D	AE	E2	C2	C3	E3	FD
			2	B	R	b	r	é	Æ	ó					
0F	3	2E	03	43	56	6F	73	90	9E	AF	7C	UD	UE	UF	FF
			3	C	S	c	s	â	ô	ú					
10	4	2F	04	44	57	70	74	91	9F	100	7D	CE	CF	EF	FE
			4	D	T	d	t	ä	ö	ñ					
11	5	30	05	45	58	71	75	92	90	101	7E	CF	CG	EF	FE
			5	E	U	e	u	à	ò	Ñ					
12	6	31	06	46	59	72	76	93	91	102	7F	CF	CH	EF	FE
			6	F	V	v	á	û	ä						
13	7	32	07	47	5A	73	77	94	92	103	80	CF	CI	EF	FE
			7	G	W	w	ç	ù	é						
14	8	33	08	48	5B	74	78	95	93	104	81	CF	CC	EF	FE
			8	H	X	x	ê	ÿ	í						
15	9	34	09	49	5C	75	79	96	94	105	82	CF	CD	EF	FE
			9	I	Y	y	ë	Ö	—						
16	A	35	0A	4A	5D	76	7A	97	95	106	83	CF	CE	EF	FE
			A	J	Z	j	z	è	Ü						
17	B	36	0B	4B	5E	77	7B	98	96	107	84	CF	CF	EF	FE
			B	K	[k	{	ï	ø	½					
18	C	37	0C	4C	5F	78	7C	99	97	108	85	CF	CF	EF	FE
			C	L	\	l	î	£	¼						
19	D	38	0D	4D	60	79	7D	9A	98	109	86	CF	CF	EF	FE
			D	M]	m	}	ì	Ø						
1A	E	39	0E	4E	61	7A	7E	9B	99	110	87	CF	CF	EF	FE
			E	N	^	n	~	Å	Pt	«					
1B	F	3A	0F	4F	62	7B	7F	9C	9A	111	88	CF	CF	EF	FE
			F	O	_	o	△	À	f	»					

Code page 866 (Cyrillic)

00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
			0	@	P		р	А	Р	а	...	І	ІІ	р	Ё
01	11	21	31	41	51	61	71	81	91	A1	B1	C1	D1	E1	F1
		!	1	А	Q	а	q	Б	С	б	...	—	с	е	
02	12	22	32	42	52	62	72	82	92	A2	B2	C2	D2	E2	F2
		"	2	В	Р	в	г	В	Т	в	...	т	т	€	
03	13	23	33	43	53	63	73	83	93	A3	B3	C3	D3	E3	F3
		#	3	С	Ѕ	с	ѕ	Г	У	г	...	т	т	у	є
04	14	24	34	44	54	64	74	84	94	A4	B4	C4	D4	E4	F4
		Ѕ	4	Д	Т	д	т	Д	Ф	д	...	—	і	ф	ї
05	15	25	35	45	55	65	75	85	95	A5	B5	C5	D5	E5	F5
		%	5	Е	U	е	и	Е	Х	е	...	І	І	х	ї
06	16	26	36	46	56	66	76	86	96	A6	B6	C6	D6	E6	F6
		&	6	Ғ	Ғ	ғ	ғ	Ж	Ц	ж	...	—	г	ц	ў
07	17	27	37	47	57	67	77	87	97	A7	B7	C7	D7	E7	F7
		'	7	С	W	с	у	З	Ч	з	...	г	ч	ч	ў
08	18	28	38	48	58	68	78	88	98	A8	B8	C8	D8	E8	F8
		(8	Н	Х	н	х	И	Ш	и	...	—	ш	ш	ў
09	19	29	39	49	59	69	79	89	99	A9	B9	C9	D9	E9	F9
)	9	І	У	і	у	Й	Щ	й	...	І	І	щ	ї
0A	1A	2A	3A	4A	5A	6A	7A	8A	9A	AA	BA	CA	DA	EA	FA
		*	:	Ј	Ѕ	ј	ѕ	К	Ъ	к	...	Љ	Г	ъ	...
0B	1B	2B	3B	4B	5B	6B	7B	8B	9B	AB	BB	CB	DB	EB	FB
		+	:	К	І	к	{	Л	Ы	л	...	І	Ы	у	...
0C	1C	2C	3C	4C	5C	6C	7C	8C	9C	AC	BC	CC	DC	EC	FC
		,	<	Л	\	і	і	М	Ь	м	...	І	Ь	№	...
0D	1D	2D	3D	4D	5D	6D	7D	8D	9D	AD	BD	CD	DD	ED	FD
		-	=	М]	т	}	Н	Э	н	...	—	Э	Ѡ	...
0E	1E	2E	3E	4E	5E	6E	7E	8E	9E	AE	BE	CE	DE	EE	FE
		.	>	Н	Λ	п	~	О	Ю	о	...	І	Ю	Ю	...
0F	1F	2F	3F	4F	5F	6F	7F	8F	9F	AF	BF	CF	DF	EF	FF
		/	?	О	-	о	^	П	Я	п	...	—	Я	Я	...
10	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0

Code page 1252 (Windows Latin 1)

00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	00
				0	1	2	3	4	5	6	7	8	9	A	B	C
10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F	10
				!	"	#	\$	%	&	'	()	*	+	,	.
20	21	22	23	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F	20
				2	3	4	5	6	7	8	9	A	B	C	D	E
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	3E	3F	30
				2	3	4	5	6	7	8	9	A	B	C	D	E
40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F	40
				2	3	4	5	6	7	8	9	A	B	C	D	E
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F	50
				2	3	4	5	6	7	8	9	A	B	C	D	E
60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F	60
				2	3	4	5	6	7	8	9	A	B	C	D	E
70	71	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F	70
				2	3	4	5	6	7	8	9	A	B	C	D	E
80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	80
				2	3	4	5	6	7	8	9	A	B	C	D	E
90	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	90
				2	3	4	5	6	7	8	9	A	B	C	D	E
AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AA
				2	3	4	5	6	7	8	9	A	B	C	D	E
BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BA
				2	3	4	5	6	7	8	9	A	B	C	D	E
CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CA
				2	3	4	5	6	7	8	9	A	B	C	D	E
DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DA
				2	3	4	5	6	7	8	9	A	B	C	D	E
EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EA
				2	3	4	5	6	7	8	9	A	B	C	D	E
FA	FB	FC	FD	FE	FF											FA
				2	3	4	5	6	7	8	9	A	B	C	D	E
GA	GB	GC	GD	GE	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP	GA
				2	3	4	5	6	7	8	9	A	B	C	D	E
HA	HB	HC	HD	HE	HF	HG	HH	HI	HJ	HK	HL	HM	HN	HO	HP	HA
				2	3	4	5	6	7	8	9	A	B	C	D	E
IA	IB	IC	ID	IE	IF	IG	IH	II	IJ	IK	IL	IM	IN	IO	IP	IA
				2	3	4	5	6	7	8	9	A	B	C	D	E
JA	JB	JC	JD	JE	JF	JG	JH	JI	IJ	JK	KL	LM	LN	LO	LP	JA
				2	3	4	5	6	7	8	9	A	B	C	D	E
KA	KB	KC	KD	KE	KF	KG	KH	KI	KJ	KK	KL	KM	KN	KO	KP	KA
				2	3	4	5	6	7	8	9	A	B	C	D	E
LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ	LK	LL	LM	LN	LO	LP	LA
				2	3	4	5	6	7	8	9	A	B	C	D	E
MA	MB	MC	MD	ME	MF	MG	MH	MI	MJ	MK	ML	MM	MN	MO	MP	MA
				2	3	4	5	6	7	8	9	A	B	C	D	E
NA	NB	NC	ND	NE	NF	NG	NH	NI	NJ	NK	NL	NM	NN	NO	NP	NA
				2	3	4	5	6	7	8	9	A	B	C	D	E
OA	OB	OC	OD	OE	OF	OG	OH	OI	OJ	OK	OL	OM	ON	OO	OP	OA
				2	3	4	5	6	7	8	9	A	B	C	D	E
PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK	PL	PM	PN	PO	PP	PA
				2	3	4	5	6	7	8	9	A	B	C	D	E
QA	QB	QC	QD	QE	QF	QG	QH	QI	QJ	QK	QL	QM	QN	QO	QP	QA
				2	3	4	5	6	7	8	9	A	B	C	D	E
RA	RB	RC	RD	RE	RF	RG	RH	RI	RJ	RK	RL	RM	RN	RO	RP	RA
				2	3	4	5	6	7	8	9	A	B	C	D	E
SA	SB	SC	SD	SE	SF	SG	SH	SI	SJ	SK	SL	SM	SN	SO	SP	SA
				2	3	4	5	6	7	8	9	A	B	C	D	E
TA	TB	TC	TD	TE	TF	TG	TH	TI	TJ	TK	TL	TM	TN	TO	TP	TA
				2	3	4	5	6	7	8	9	A	B	C	D	E
UA	UB	UC	UD	UE	UF	UG	UH	UI	UJ	UK	UL	UM	UN	UO	UP	UA
				2	3	4	5	6	7	8	9	A	B	C	D	E
VA	VB	VC	VD	VE	VF	VG	VH	VI	VJ	VK	VL	VM	VN	VO	VP	VA
				2	3	4	5	6	7	8	9	A	B	C	D	E
WA	WB	WC	WD	WE	WF	WG	WH	WI	WJ	WK	WL	WM	WN	WO	WP	WA
				2	3	4	5	6	7	8	9	A	B	C	D	E
XA	XB	XC	XD	XE	XF	XG	XH	XI	XJ	XK	XL	XM	XN	XO	XP	XA
				2	3	4	5	6	7	8	9	A	B	C	D	E
YA	YB	YC	YD	YE	YF	YG	YH	YI	YJ	YK	YL	YM	YN	YO	YP	YA
				2	3	4	5	6	7	8	9	A	B	C	D	E
ZA	ZB	ZC	ZD	ZE	ZF	ZG	ZH	ZI	ZJ	ZK	ZL	ZM	ZN	ZO	ZP	ZA
				2	3	4	5	6	7	8	9	A	B	C	D	E

Notes:

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