Programming Guide

Includes TPG LogoEZ® colorization information

COGNITIVETPG

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Information to the User

This equipment must be installed and used in strict accordance with the manufacturer's instructions. However, there is no guarantee that interference to radio communications will not occur in a particular commercial installation. If this equipment does cause interference, which can be determined by turning the equipment off and on, the user is encouraged to contact CognitiveTPG immediately.

CognitiveTPG is not responsible for any radio or television interference caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by CognitiveTPG. The correction of interferences caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

In order to ensure compliance with the Product Safety, FCC and CE marking requirements, you must use the power supply, power cord, and interface cable which are sold for use with this product or which meet the following parameters:

Power Supply

UL Listed (QQGQ), Class 2 power supply with SELV (Secondary Extra Low Voltage), non-energy hazard output, limited energy source, input rated 100-240 Vac, 1.5/0.8 A, 50/60 Hz, output rated 24 Vdc, 2.3 A for 55 watt unit; 100-240 Vac, 2.0A, 50/60 Hz, output rate 24 Vdc, 3.125 A for 75 watt unit.

Use of this product with a power supply other than the CognitiveTPG power supply will require you to test the power supply and CognitiveTPG printer for FCC and CE mark certification.

Communication Interface Cable

A shielded (360 degree) interface cable must be used with this product. The shield must be connected to the frame or earth ground connection or earth ground reference at EACH end of the cable.

Use of a cable other than described here will require that you test the cable with the CognitiveTPG printer and your system for FCC and CE mark certification.

Power Cord

A UL listed, detachable power cord must be used. For applications where the power supply module may be mounted on the floor, a power cord with Type SJT marking must be used. For applications outside the US, power cords which meet the particular country's certification and application requirements should be used.

Use of a power cord other than described here may result in a violation of safety certifications which are in force in the country of use.

Industry Canada (IC) Radio Frequency Interference Statement

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Voluntary Control Council for Interference (VCCI) Radio Frequency Interference Statement

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Disclaimer

Information in this document is subject to change without notice. Consult your CognitiveTPG sales representative for information that is applicable and current. CognitiveTPG reserves the right to improve products as new technology, components, software, and firmware become available.

No part of this document may be reproduced, transmitted, or translated in any form or by any means, electronic or mechanical, for any purpose without the express written permission of CognitiveTPG.

Copyright

Copyright © 2009 by TPG IPB, Inc., 950 Danby Road, Ithaca, New York 14850, USA. All rights reserved. Printed in USA. Confidential, Unpublished. Property of TPG IPB, Inc.

Trademarks

CogntiveTPG™ is a trademark of TPG IPB, Inc.

Microsoft, Windows NT are registered Trademarks of Microsoft Corporation in the U.S.A. and/or other countries.
Inside Out Networks, Inside Out, EPIC, and Edgeport are trademarks of Inside Out Networks.
All other trademarks and registered trademarks are the property of their respective holders.

Patents

Made under one or more of the following U.S. patents: 4886381, 5579043, 5613787, 5651624, 5713678, 5752779, 5789916, 5800080, 5879090, 5887999, 5975776, 6027266, 6085973, 6089450, 6129465, 6155483, 6404452, 6486902, 6504331, 5749277, 6722754, 6739773, 6784909.

Web Site

http://www.CognitiveTPG.com

Contents

Contents

Contents

Chapter 1: About this Guide

How to use this guide

This is a supplemental guide providing programming information on CognitiveTPG's A799 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 **A799 Two-Color Thermal Receipt Printer: User Guide**.

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

Where to find the basics

If you are looking for information on setup or basic operation, refer to the **A799 User Guide**. The programming guide assumes that you have the **A799 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 CognitiveTPG representative for assistance.

If you are having problems with the physical operation of the printer, the **A799 Service Guide**, provides in-depth information on diagnostics and service. The **A799 Service Guide** is available to qualified service technicians who have been certified by CognitiveTPG to perform advanced procedures.

Support

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

For on-line service, refer to the Web site at www.CognitiveTPG.com or e-mail to: support@cognitivetpg.com.

Chapter 2: Diagnostics and Configuration

The A799 printer performs a number of diagnostics that provide useful information about the operating status of the printer. The following diagnostic tests are available.

- Start-up diagnostics

    Performed during the printer's start-up cycle.

- Runtime diagnostics

    Performed during normal printer operation.

- Remote diagnostics

    Maintained during normal operation and reported in the print test.

- The printer can be configured with the following settings and functions through the configuration menu that is printed on the receipt. For more information on configuring the printer, see "Printer configuration" on page 16.

    Communication interfaces

    Diagnostic modes

    RS-232C settings

    Printer emulations/software options

    Hardware options

Start-up Diagnostics

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

- Turn off motors

- Perform boot CRC check of the firmware ROM, test external SRAM, test EEPROM, and test main program CRC

    Failure causes Start-up Diagnostics to stop; the printer beeps and the LED flashes a set number of times, indicating the nature of the failure. The table in the "Indicators" section (page 14) describes the specific tone and LED sequences.

- Check if paper is present

- Return the knife to the home position

    Failure causes a fault condition. The table in the "Indicators" section (page 14) describes the specific tone and LED sequences.

- Check if receipt cover is closed

    Failure does not interrupt the start-up cycle.

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

If the printer has not been turned on before, or a new EEPROM has been installed, the default values for the printer functions will be loaded into the EEPROM during start-up diagnostics.

Runtime diagnostics

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

- Paper out

- Receipt cover open

- Knife unable to home

- Printhead too hot

- Voltages out of range

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

Remote diagnostics

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

- Model number
- Serial number
- CRC number
- Number of lines printed
- Number of knife cuts

- Number of hours the printer has been on
- Number of flash cycles
- Number of cutter jams
- Number of times the cover is opened
- Maximum temperature reached

  (See tallies note on the following page.)

```
*** A799 - Diagnostics Form ***
        ReceiptWare Enabled

Model number          : A799-1234-5678
Serial number         : K010101010

Boot Firmware
   Revision           : V1.05
   CRC                : A396
   P/N                : 189-7940193A
Flash Firmware
   Revision           : V1.06
   CRC                : D4D6
   P/N                : 189-7940192B

H/W parameters
  Flash Memory Size   : 4 Mbytes
  Flash Logos/Fonts   : 1472 kbytes
  Flash User Storage  : 64 kbytes
  Flash Perm'nt Fonts : 1472 kbytes
  Flash Journal Size  : 64 kbytes
  SRAM Size           : 256 kbytes
  Head setting        : F
  Motor ID            : 1
  Paper Type setting  : Type  0, Monochrome
  Color Density Adj   : n/a
  Print Density,Mono  : 100 %
  Max Speed           : 250 mm/sec
  Paper Width         : 80 mm
  Max Power           : 55 W
  Knife               : Enabled
  Partial Cut         : 140 steps
  Paper Low Sensor    : Enabled
  No Paper Low Extension

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

Resident Code Pages  : 437, 850, 852, 858
                       860, 863, 865, 866
                       1252,862, 737, 857

Logo(s) defined       : NO
User Char(s) defined  : NO
Journal Unused        :   64 kbytes


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

Paper type can be changed in the configuration menu.
Paper types and grades available:

   Type 0 - Monochrome grades
             Kanzaki P-310
   Type 1 - Two-color grades
             Kanzaki P-310 RB (Red/Black)
   Type 4 - Two-color grades
             Kanzaki P-320 BB (Blue/Black)
   Type 5 - Two-color grades
             Kanzaki P-320 RB (Red/Black)
See "printer configuration" section for more information.

When the printer is configured for USB, this location will show either: "USB Driver Type: Native" ,"USB Driver Type: Printer Class", or "USB Driver: Comm Class".

Print test and configuration menu samples will vary per model or printer configuration. (Shown approximately 60% of size.)

For more information about	See this section
Accessing the remote diagnostic tallies	"Command descriptions" in Chapter 4: Programming commands (Status commands: Transmit printer ID, remote diagnostics extension, Hexadecimal 1D 49 40 n)

Indicators

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

Indicator	Sequence	Condition
LED	Continuous, flashing quickly	Paper out Cover off Knife unable to home
LED	Continuous, flashing slowly	Paper is low (if paper low sensor is installed) Printhead too hot Voltages out of range
Tone	Two-tone beep (low frequency, high frequency)	Start-up diagnostics completed successfully
LED and Tone	Single beep Single LED flash	Boot CRC test failure
LED and Tone	Double beep Double LED flash	SRAM test failure
LED and Tone	Triple beep Triple LED flash	EEPROM test failure
LED and Tone	Four beeps Four LED flash	Dynamic memory initialization failure
LED and Tone	Two-Tone beep (high frequency, low frequency) Continuous flashing of LED	Main program CRC test failure Or DIP switch is in on position indicating flash download mode

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

For more information about	See this section
Error conditions and correcting them	" Troubleshooting the printer" on page 30, *Chapter 4: Using the Printer*, in the **A799 User Guide**
Communication of printer status to the host application	"Command descriptions" in *Chapter 4: Programming commands*, Status sections.

Printer configuration

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

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

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

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

- Communication Interfaces
    - RS-232C serial interface (25-pin)
    - Universal serial bus (USB)/RS232 Serial (9-pin)
    - Ethernet
    - Powered USB
- RS-232C serial interface settings
    - Baud rate
    - Data bits (can not be changed)
    - Stop bits (can not be changed)
    - Parity (can not be changed)
    - Hardware (DTR/DSR) or software (XON/XOFF) flow control
    - Data reception errors
    - Alternate DTR/DSR
- Diagnostic Modes
    - Normal
    - Datascope
    - Receipt test
- Printer Emulations
    - Native mode
    - A794 emulation
    - A793 emulation
    - LEGACY emulation

- Printer settings and functions
    - Emulation/Software options submenu
        - Printer ID mode
        - Default lines per inch
        - Carriage return usage
        - Default font
        - Font size
    - Hardware options submenu
        - Color density
        - Monochrome print density
        - Power supply wattage (max power)
        - Knife option
        - Partial cut distance
        - Paper low sensor
        - Paper width
        - Printhead setting

For more information about	See this section
Using the configuration menu to configure the printer	"Configuring the printer" on page 16.

Configuring the printer

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

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

Switch 1 & 2 are shown in the normal OFF position

Off
On

1 2

DIP Switches

Connector Cover Open
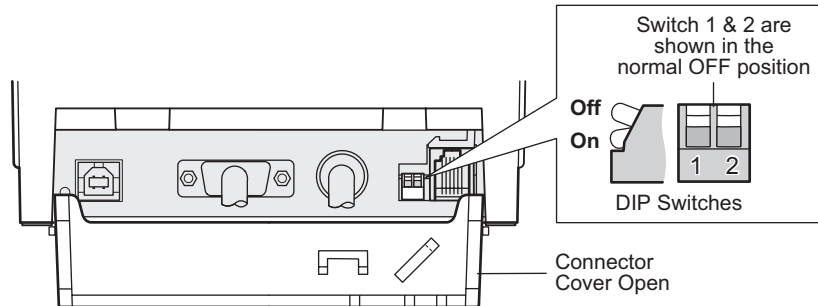
1 Turn power off to printer.

2 Open the connector cover.

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

Receipt Cover

Receipt Paper

⑤

③

④
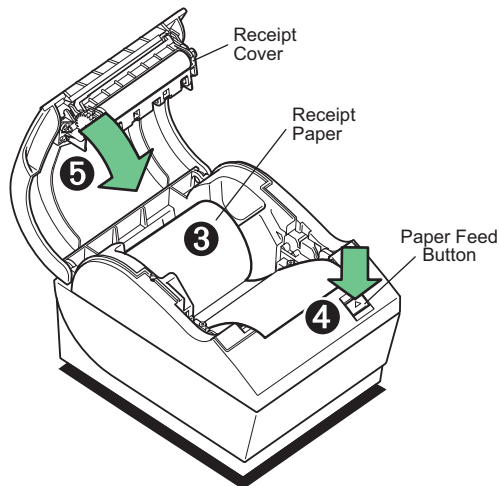
Paper Feed Button

4 Make sure receipt paper is loaded in the printer before proceeding. (For loading instructions, see the *A799 User Guide*) Make sure cover is closed.

5 Apply power to printer and immediately press and hold the paper feed button (4) until the configuration printout begins.

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

  • The printer pauses and waits for a main menu selection to be made; short clicks are used, except when answering "Yes" or validating selection (see sample printout).

```
*********  MAIN MENU  **********
*******************************

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

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

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

7 Continue through your menu selections until you are asked, "Save New Parameters?". Select "Yes" or "No."

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

  b. Open the receipt cover.

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

  • The diagnostic printout verifies your new settings.

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

Communication interface

To change the communication interface settings, enter the configuration menu, select "Set Communication Interface" from the main menu and answer "Yes" to "SET INTERFACE TYPE?" printed on the receipt.

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

Press the paper feed button as instructed to select the communication interface you want.

- Communication interface

    - RS-232C interface: 1 click

    - USB: Auto when no RS-232C activity

RS-232C serial interface settings

To change the RS-232C serial interface settings, enter the configuration menu, select "Set Communication Interface" from the main menu and answer "No" to "SET INTERFACE TYPE?" printed on the receipt. This will take you to the instructions for selecting the RS-232C settings.

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

Press the paper feed button as instructed on the configuration menu to select the RS-232C settings you want to change.

- Baud rate

    115200 baud

    57600 baud

    38400 baud

    19200 baud

    9600 baud

    4800 baud

    2400 baud

    1200 baud

- Number of data bits (can not be changed)

- Stop bits (can not be changed)

- Parity (can not be changed)

- Hardware flow control

    Software (XON/XOFF)

    Hardware (DTR/DSR)

- Data reception errors

    Ignore errors

    Print "?"

- Alternate DTR/DSR

    Enabled

    Disabled

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

For more information about	See this section
Setting the RS-232C Serial interface settings	"Configuring the printer" on page 16

Diagnostic modes

To change the diagnostic modes enter the configuration menu, select "Set Diagnostic Modes" from the main menu and select one of the following modes:

- **Normal:** normal operating mode of the printer.
- **Datascope:** the receipt printer prints incoming commands and data in hexadecimal format to help troubleshoot communication problems.
- **Receipt test:** the receipt printer prints two code pages to verify proper printing of the receipt.

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

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

Enable or disable data scope mode

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

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

Data scope mode is enabled and disabled by selecting the "Diagnostic Modes" sub-menu of the configuration menu.

Press the paper feed button as instructed on the "Diagnostic Modes Menu" to enable or disable the data scope mode test.

- Off, normal mode (Data scope mode disabled)
- Data scope mode (enabled)

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

To run the data scope mode:

1 After you have enabled the data scope mode, exit the configuration menu.

2 Run a transaction from the host computer.

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

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

To exit the data scope mode:

1 Enter the configuration menu again.

See "Configuring the printer," page 16.

2 Disable the data scope mode.

3 Exit the configuration menu.

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

For more information about	See this section
Enabling the data scope mode	"Configuring the printer" on page 16

Enable or disable receipt test mode

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

To run the receipt test mode:

1 Enable the receipt test mode in the configuration menu.

2 Exit the configuration menu.

3 Push the paper feed button. The receipt station prints two code pages and cuts the receipt.

4 To repeat this test, push the paper feed button again.

To exit the receipt test mode:

1 Enter the configuration menu again. (See "Configuring the printer", page 16.)

2 Disable the receipt test mode.

3 Exit the configuration menu.

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

Electronic Journal Datascope Diagnostic

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

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

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

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

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

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

Printer emulations

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

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

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

   •   Native mode

   •   A794 emulation

   •   A793 emulation

   •   LEGACY emulation

Note: *The A793, A794 and Legacy Command emulations do not recognize the ColorPOS ® commands.*

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

For more information about	See this section
Setting the printer emulation	"Configuring the Printer", page 16

Printer settings and functions

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

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

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

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

- Printer ID mode

  This function is used to determine what printer ID value is returned in response to a Transmit printer ID command (1D 49 *n*) when the printer is in A794 emulation mode. The printer can be configured to send back the ID of the A799, A794, A793 or Application Compatible Escape Command systems.

- Default lines per inch

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

    - 8.13 lines per inch

    - 7.52 lines per inch

    - 6.77 lines per inch

    - 6.00 lines per inch

- Carriage return usage

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

- Default font

  Sets the default for monochrome, two-color, and LEGACY emulations.

- Font size

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

Select the hardware options sub-menu to set:

- Printhead setting

  This setting is the printhead energy rating and must match the rating marked on the front right of the thermal mechanism in the printer. Whenever a new thermal mechanism is installed, this setting must match the indicated energy rating on the mechanism. (See A799 Service manual for replacing the thermal mechanism.)

- Paper Type Name

  Sets the printer to optimum performance for paper being used. This can also be done through the command 1D81 *m n*. See the following chapter for command usage.

  Available paper types may vary. Currently there are 4 types:

  0 = monochrome, Kanzaki P310

  1 = two-color, Kanzaki P310RB

  4 = two-color, Kanzaki P320BB

  5 = two-color, Kanzaki P320RB

  (See page 30 in User Guide for available paper manufacturers.)

- Color density

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

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

- Print density (monochrome papers only)

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

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

- Power supply wattage (Max power)

  You can choose between a 55-watt or 75-watt power supply. This matches the wattage of the printer to the power supply.

  55-watt power supply (standard)

  75-watt power supply (Enables printer to optimize speed at higher dot coverage.)

- Knife option

  This should only be changed if the knife is removed or you do not want to cut the paper.

- Partial cut distance

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

- Paper low sensor

  Senses when the paper roll is getting low on paper.

  See troubleshooting section: "Receipt paper is low" in the A799 User Guide.

- Paper width

  Allows the user to set the printer for 58mm, 60mm, 80mm, or 82.5mm paper width.

For more information about	See this section
Setting the printer functions and settings	"Configuring the printer" (See page 16)

Chapter 3: Programming the Printer

Overview of commands

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

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

• A793

• A794

• LEGACY

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

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

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

Comparison to A793

The following table details the list of commands whose behavior differs between the A793, A794, and A799 because of the physical differences of a 6 dots/mm head (A793) versus an 8 dots/mm head (A794 and A799).

Command	Description	Difference between previous product and new product emulation mode.
15 n	Feed n dot rows	This command will move the paper on the receipt in n/203 inch steps instead of n/152 inch steps.
16 *n*	Add *n* extra dot rows	The dot rows will be measured in n/203 inches versus n/152 inches.
1B 20 *n*	Set right-side character spacing	This command sets the right side spacing to "n" horizontal motion units. By default, these units are in terms of 1/203 inches versus 1/152 inches.
1B 24 *n1 n2*	Set absolute starting position	For graphics commands, the position is scaled to best match A793. In text mode, the equivalent character position is calculated.
1B 26 *s c1 c2 n1 d1...nn dn*]	Define user-defined character set	Since the dots on the A799 printhead are smaller, user defined characters that were used on the previous printers will appear smaller on the A799 printer.
1B 2A *m n1 n2 d1...dn*	Select bit image mode	In A793 emulation mode, graphics are scaled to best match the size of the graphic in the A793 printer.
1B 33 *n*	Set line spacing	This command uses *n* in terms of n/360 inches. Since the A793 had a fundamental step of 1/152 inch and the A799 has a fundamental step of 1/203 inch, the actual line spacing will not exactly match the requested spacing.

Continued...

Command	Description	Difference between previous product and new product emulation mode.
1B 4A *n*	Print and feed paper	This command uses *n* in terms of n/360 inches. Since the A793 had a fundamental step of 1/152 inch and the A799 has a fundamental step of 1/203 inch, the actual line spacing will not exactly match the requested spacing.
1B 59 *n1 n2 d1...dn*	Select double-density graphics	In A793 emulation mode, the printer scales the graphics to provide the best match.
1B 5C *n1 n2*	Set relative print position	The parameter to this command is in units of dots. However, the command moves and aligns to character positions. In A793 emulation mode, this command calculates how many character positions to move based on the A793 character width in dots (10) versus the A799 (13).
1B 61 *n*	Select justification	This command does true dot resolution alignment for centering versus character-aligned centering.
1D 2A *n1 n2 d1...dn*]	Define downloaded bit image	In A793 emulation mode, this command scales the incoming data to provide a best match to the size of the image as it printed on A793.
1D 2F *m*	Print downloaded bit image	In A793 emulation mode, this command scales the incoming data to provide a best match to the size of the image as it printed on A793.

Two-color commands (comparison A794 to A799)

The following table details the list of commands that have been added for two-color ColorPOS® functionality (ColorPOS® commands, 1D 81 through 1D 97 are in bold) or existing commands that have been altered by the addition of two-color capacity.

TPG ColorPOS® two-color and color interpreted commands

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

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

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

TPG LogoEZ® colorization commands

Hexadecimal	ASCII	Description
1F 03 16 f m n o p q	US ETX SYN	Set LogoEZ® surround graphics
1F 03 16 f s p/r t	US ETX SYN f s p/r t	Set colorization
1F 03 17 a m s	US ETX ETB a m s	Set attribute mapping

Note: *The new TPG LogoEZ ® colorization utility provides you a fast and easy way to get basic two-color and logos onto your receipt without having to enter commands. Check out the CognitiveTPG Website at: www.CognitiveTPG.com.*

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)

```
         ←————— Paper Width = 80 mm (3.15 in.) —————→
         ←———— Printable Zone, 576 Dots = 72 mm (2.835 in.) ————→
      →  ←———— Nominal Margins, 4 mm (0.157 in.) ————→  ←→
                        Cut Edge                        ←— Cut Edge

                  Top Margin, 17.8 mm (.70 in.) Minimum

      ABCDE.................................67890
      ABCDE.................................67890
      ABCDE.................................67890
      ABCDE.................................67890

         ←— 44 Standard Columns = 71.5 mm (2.815 in.) —→
            56 Compressed Columns = 70 mm (2.756 in.)
```
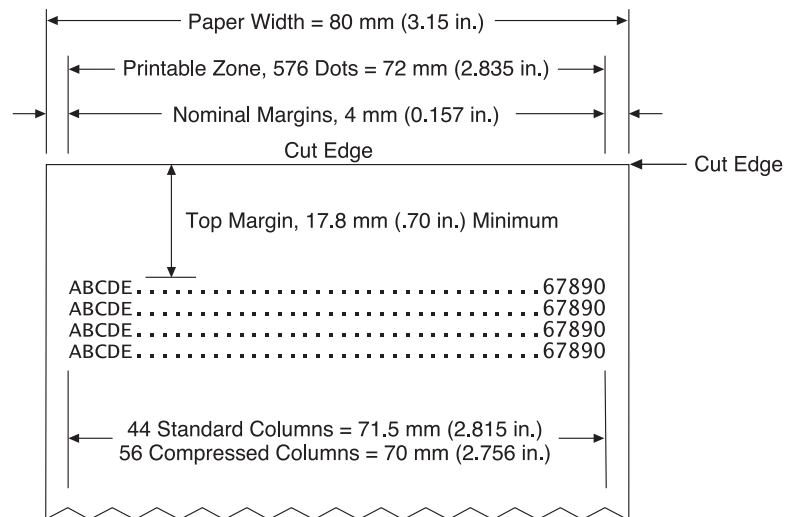
Note: The application centers 44 standard character cells (13 X 24 dots), or 56 compressed character cells (10 X 24 dots), or 576 addressable bits of graphics across an 80mm wide receipt. Minimum print line height is 24 dots for text or graphics. Standard print line spacing is 27 dots (i.e., 3 extra 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)

```
          Paper Width = 82.5 mm (3.25 in.)
        Printable Zone, 640 Dots = 80 mm (3.15 in.)
         Nominal Margins (2) = 1.25 mm (0.05 in.)
                       Cut Edge                          Cut Edge

               Top Margin, 17.8 mm (.70 in.) Minimum

   ABCDE................................67890
   ABCDE................................67890
   ABCDE................................67890
   ABCDE................................67890

           48 Standard Columns = 78.0 mm (3.07 in.)
           62 Compressed Columns = 77.5 mm (3.05 in.)
```
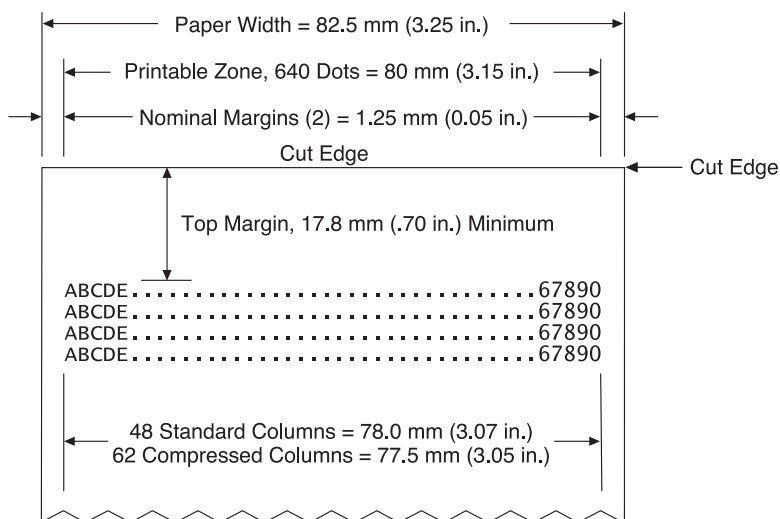
Rotated printing commands

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	ꓯ ꓭ ꓛ
Set	Canceled	X	A B C
Set	Set	X	ꓛ ꓭ ꓯ
X	X	Set	ꓯ ꓭ ꓛ

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 CognitiveTPG A799 printer may be operated in a number of different emulation modes. However, printing characteristics and defaults may differ, depending on the desired mode. For instance, two-color paper and ColorPOS® commands and features are available only in A799 native mode.

Print setup in emulation modes

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

Emulation mode	LPI options	Font(s) options	Font size	Default LPI	Default EDR	Comments
Native	6.00, 6.77, 7.52, 8.13	Standard	13X24	7.52	3	Default setup for monochrome paper
		Tall	13X27	6.77	3	
		ColorPOS®	13X27	6.77	3	Default setup for two-color paper
A794, A793 emulations	6.00, 7.52, 8.13	Standard	13X24	7.52	3	
LEGACY emulation	6.00	Tall	13X27	6.00	7	Default setup for LEGACY emulation
		Standard	13X24	6.00	10	

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

Two-color paper and ColorPOS® 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.

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

- If emulation is switched from any emulation to A799 native, the font and LPI will remain unchanged because the A799 native mode supports all font and LPI options offered in the emulation modes.

- The "Set Default LPI" option in the configuration menu is not offered in LEGACY emulation made. The LPI is set at 6.00.

Chapter 4: Programming Commands

Commands listed by function

Printer actions

Code (hexadecimal)	Command	Page
10	Clear printer	35
19	Perform full knife cut (or code 1B 69)	36
1A	Perform partial knife cut (or code 1B 6D)	36
1B 07	Generate tone	36
1B 3D *n*	Select peripheral device (for multi-drop)	36
1B 40	Initialize printer	37
1B 63 33 *n*	Select paper sensors to output paper end signals (parallel only)	37
1B 63 34 *n*	Select sensors to stop printing	38
1B 63 35 *n*	Enable or disable panel button	38
1B 69	Perform full knife cut (or code 19)	36
1B 6D	Perform partial knife cut (or code 1A)	36
1B 70 *n p*1 *p*2	Generate pulse to open cash drawer	38
1B 72 *m*	Set current color	39
1D 56 *m*	Select cut mode and cut paper (or code 1D 56 *m n*)	39
1D 56 *m n*	Select cut mode and cut paper (or code 1D 56 *m*)	39
1D 81 *m n*	Set paper type (for two-color printing)	40
1F 03 16 05 *n*	Set interpretation of "Set current color" command	41
1F 74	Print test form	41

Print and paper feed

Code (hexadecimal)	Command	Page
0A	Print and feed paper one line	42
0D	Print and carriage return	42
14n	Feed *n* print lines	42
15 *n*	Feed *n* dot rows	42
16 *n*	Add *n* extra dot rows	43
17	Print	43
1B 4A *n*	Print and feed paper	44
1B 64 *n*	Print and feed *n* lines	44

Vertical and horizontal positioning

Code (hexadecimal)	Command	Page
09	Horizontal tab	45
1B 14 n	Set column	45
1B 24 nL nH	Set absolute starting position	46
1B 32	Set vertical line spacing to 1/6 inch	46
1B 33 n	Set vertical line spacing	47
1B 44 [n] k 00	Set horizontal tab positions	47
1B 5C n1 n2	Set relative print position	48
1B 61 n	Select justification	49
1D 4C nL nH	Set left margin	49
1D 50 x y	Set horizontal and vertical minimum motion units	45
1D 57 nL nH	Set printing area width	50

Text characteristics

Code (hexadecimal)	Command	Page
12	Select double-wide characters	51
13	Select single-wide characters	51
1B 12	Select 90 degree counter-clockwise rotated print	51
1B 16 n	Select pitch (column width)	52
1B 20 n	Set right-side character spacing	52
1B 21 n	Select print mode	53
1B 25 n	Select or cancel user-defined character set	54
1B 26 s c1 c2	Define user-defined character set	54
1B 2D n	Select or cancel underline mode	55
1B 3A 30 30 30	Copy character set from ROM to RAM	56
1B 3F n	Cancel user-defined character	56
1B 45 n	Select or cancel emphasized mode	56
1B 47 n	Select or cancel double-strike	57
1B 49 n	Select or cancel italic print	57
1B 52 n	Select international character code	58
1B 56 n	Select or cancel 90 degree clockwise rotated print	58
1B 74 n	Select international character set	59
1B 7B n	Select or cancel upside-down print mode	59
1D 21 n	Select character size	60
1D 42 n	Select or cancel white/black reverse print mode	60
1D 62 n	Set smoothing	61
1D 85 m n	Reverse color text mode (two-color)	61

1D 8D *n m*	Text strike-through mode	62
1D F0 01 *n*	Select font ID number	62
1D F0 02 *n*	Select font style number	62
1D F0 03	Save font ID number as default font at power up	63
1D F0 80	Download font	63
1D F0 C0 02	Download font list	63
1F 05 *n*	Select supersctipt or subscript modes	63
1F 26 *s c1 c2*	Define extended user-defined character set	55
1F 69 *n*	Select active user-defined character set	64

Graphics

Code (hexadecimal)	Command	Page
11 *n*1 . . . *n*72	Print monochrome raster graphics	69
1B (+*.BMP file)	Download BMP logo	64
1B 2A *m n*1 *n*2 *d*1…*dn*	Select bit image mode	65
1B 2E *m n r*L *r*H *d*1 … *dn*	Print advanced raster graphics	66
1B 4B *n*1 *n*2 *d*1 … *dn*	Select single-density graphics	66
1B 59 *n*1 *n*2 *d*1 … *dn*	Select double-density graphics	66
1C 70 *n m*	Print flash logo	71
1C 71 *n*	Define flash logos	71
1D 23 *n*	Select the current logo (downloaded bit image)	67
1D 2A *n*1 *n*2 *d*1 … *dn*	Define downloaded bit image	68
1D 2F *m*	Print downloaded bit image	69
1D 82 *n*1…*n*72 or …*n*80	Print raster monochrome graphics	70
1D 83 *n*1…*n*144 or …*n*160	Print raster color graphics	70
1D 84 *m n*1 *n*2 *d*1 … *dx*	Download logo image	71
1D 8B *n m o*	Apply shading to logo	72
1D 86 *m*	Monochrome shade mode	72
1D 87 *m*	Color shade mode	73
1D 89 *n m*	Logo print with color plane swap	73
1D 8C *n m*	Merge watermark mode	72
1D 90 *m x y o p q*	Form and merge real time surround graphic	73
1D 91 *n*	Save graphics buffer as logo	74
1D 92 *n*	Background logo print mode	74
1D 99 l *m n o*	Apply margin message mode	75
1D 9A *n m o*	Shade and store logo	75
1D 9B *m n*	Logo print with knife cut	76
1D A0 *nl nh*	Set temporary max target speed	76

Page mode

Macros

User data storage

Flash download

Code (hexadecimal)	Command	Page
1B 5B 7D	Switch to flash download mode	116
1D 00	Return boot sector firmware part number	116
1D 01	Return segment number status of flash memory	117
1D 02 *nn*	Select flash memory sector to download	117
1D 06	Get firmware CRC	117
1D 07	Return microprocessor CRC	117
1D 0E	Erase all flash contents except boot sector	118
1D 0F	Return main program flash CRC	118
1D 10 *n*	Erase selected flash sector	118
1D 11 *a*L *a*H *c*L *c*H *d*1…*dn*	Download to active flash sector	118
1D FF	Reset firmware	119

Ethernet setup commands

Code (hexadecimal)	Command	Page
1B 5B 7D	Switch to flash download (boot mode)	116
1F 08 00	Restore default settings	119
1F 08 01 *n1 n2 n3 n4*	Set IP address	119
1F 08 02 *n1 n2 n3 n4*	Set net mask	119
1F 08 03 *n1 n2 n3 n4*	Set gateway	120
1F 08 04 *n1 n2 n3 n4*	Set raw TCPIP port	120
1F 08 05 *n1*	LP Daemon	120
1F 08 06 *n1*	Telnet Daemon	120
1F 08 07 *n1*	BootP	120
1F 08 08 *n1*	DHCP (auto-configuration)	121
1F 08 09 *n1*	Inactivity timeout	121
1F 08 0A *n1*	Keep-alive pings (arps)	121

Command conventions

The following information describes how each command is organized:

Name:	Name of command.
ASCII:	The ASCII control code.
Hexadecimal:	The hexadecimal control code.
Decimal:	The decimal control code.
Value:	A description of the command operands.
Range:	The upper and lower limits of the command operand.
Default:	The command operand default after printer reset.
Description:	Brief description and summary of the command.
Formulas:	Any formulas used for this command.
Exceptions:	Describes any exceptions to this command; for example, incompatible commands.
Related information:	Describes related information for this command; for example, bit information.

Command descriptions

Printer actions

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

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

Clear printer

ASCII	DLE
Hexadecimal	10
Decimal	16

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

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

Related Information

This command is recognized in A793 emulation and A799 native mode, ignored in LEGACY emulation.

Perform full knife cut

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

Cuts the receipt.

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

Exceptions

The full cut is replaced by a partial cut in the A793 emulation. ASCII EM, (0x19) is ignored in LEGACY emulation.

Perform partial knife cut

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

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

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

Formulas

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

Exceptions

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

Generate tone

ASCII	ESC BEL
Hexadecimal	1B 07
Decimal	27 7

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

Related information

This command is ignored in LEGACY emulation.

Select peripheral device (for multi-drop)

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

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

Selects the device to which the host computer sends data.

Related information

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

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

Initialize printer

ASCII   ESC @
Hexadecimal   1B 40
Decimal   27 64

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

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

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.

Exceptions

The command is ignored, except in parallel communications.

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

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

Bits 5 and 7 are not used.

Default: 0

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

Enable or disable panel button

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

Value of *n*:   0 = Enable
                     1 = Disable

Default: 0 (Enable)

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

Exceptions

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

Generate pulse to open cash drawer

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

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

Value of *p1*:   0–255

Value of *p2*:   0–255

Sends a pulse to open the cash drawer.

Formulas

The value for either *p1* or *p2* is the hexadecimal number multiplied by 2 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 *m*   GS V *m n*
Hexadecimal   1D 56 *m*   1D 56 *m n*
Decimal   29 86 *m*   29 86 *m n*

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

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

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

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

Range of *n*:   0 – 255

Default of *m, n*: 0

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

Formulas

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

Set paper type (ColorPOS®)

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

Value of *m*:	0 = monochrome (black) paper	(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* = OxFF 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.

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 ColorPOS® 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.
- If emulation is switched to LEGACY, A794 or A793 emulation(s), the paper type will automatically be changed to monochrome paper, and the font and LPI will be changed as in the table on next page.
- If emulation is switched from any emulation to A799 native, the font and LPI will remain unchanged because the A799 native mode supports all font and LPI options offered in the emulation modes.
- The "Set Default LPI" option in the configuration menu is not offered in LEGACY emulation mode. The LPI is set at 6.00.

Continued...

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	
		ColorPOS˚	13x27	6.77	3	Default setup for two-color paper
A794, A793 emulation	6.00, 7.52, 8.13	Standard	13x24	7.52	3	
LEGACY emulation	6.00	Tall	13x27	6.00	7	Default setup for LEGACY emulation
	6.00	Standard	13x24	6.00	10	

Set interpretation of "Set current color" command

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

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

This command defines how to interpret the 1B 72 command for legacy environments. It provides a method to resolve any differences in the definition of command 1B72 between the A799 native mode and earlier implementations in other printers.

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

Related information

The 1F 03 16 00 command disables this and all other LogoEZ® features.

To disable one LogoEZ® feature when multiple LogoEZ® features are set, first disable all LogoEZ® features and then re-enable only those you desire.

Print test form

ASCII	US t
Hexadecimal	1F 74
Decimal	31 116

Prints the current printer configuration settings on the receipt.

Disabled in page mode.

Print and paper feed

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

Print and feed paper one line

ASCII   LF
Hexadecimal   0A
Decimal   10

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

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

Print and carriage return

ASCII   CR
Hexadecimal   0D
Decimal   13

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

Related information

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

This command is ignored in LEGACY emulation.

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

Feed *n* print lines

ASCII   DC4 *n*
Hexadecimal   14 *n*
Decimal   20 *n*

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

Range of *n*:   0–255 in A799 native mode
                    0–127 in A793 emulation

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

Related information

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

Feed *n* dot rows

ASCII   NAK *n*
Hexadecimal   15 *n*
Decimal   21 *n*

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

Range of *n*:   0–255 in A799 native mode
                    0–127 in A793 emulation

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

Related information

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

Add *n* extra dot rows

ASCII	SYN *n*
Hexadecimal	16 *n*
Decimal	22 *n*

Value of *n*:	Number of extra dot rows

Range of *n*:	0–16

Default:	3 extra dot rows

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

Formulas

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

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

Related information

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

Print

ASCII	ETB
Hexadecimal	17
Decimal	23

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

Related information

This command is ignored in LEGACY emulation.

Print and feed paper

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

Value of *n*:   *n*/203 inch in A799 native mode, A794 emulation and Application Compatible Escape Commands emulation mode; *n*/360 inch in A793 emulation mode

Range of *n*:   0–255

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

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

Related information

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

Print and feed *n* lines

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

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

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

Vertical and horizontal positioning

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

The commands describe operation for 80mm paper. 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.

When no tabs are defined to the right of the current position, or if the next tab is past the right margin, line feed is executed. HT has no effect in page mode.

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.

Related information

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

Set absolute starting position

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

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

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

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

Formulas

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

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

Related information

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

Compatibility information (A799 receipt vs. A793 receipt)

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

In order to improve the speed of printing, the 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.

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

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

Set vertical line spacing to 1/6 inch

ASCII   ESC 2
Hexadecimal 1B 32
Decimal   27 50

Default: 3.33 mm (0.13 inch)

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

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, A794 emulation
	n/360 inch in A793 emulation mode
	n/203 inch in Application Compatible Escape Commands emulation mode
Range of *n:*	0-255
Default:	3.37 mm (0.13 inch)

Sets the line spacing to *n*/16 mm (*n*/406 inch).

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.

2 x 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 x 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.

Compatibility information (A799 receipt vs. A793 receipt)

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

In order to improve the speed of printing, the 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

Continued...

previous data. This behavior can be used to an application's advantage to provide the ability to create compound characters on the receipt station.

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

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

Select justification

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

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

Range of *n*:	0–2, 48–50

Default:	0 (Left aligned)

Specifies the alignment of characters, graphics, logos, and bar codes on the receipt station according to the above table.

Related information

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

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

00	left aligned
01	center
10	right aligned
11	center

Set left margin

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

Range of *nL*:	0–255

Range of *nH*:	0–255

Default:	576 dots (the maximum printable area)

Formulas

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

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

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

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

    GS L 203 0

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

    GS L 150 1

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

Exceptions:

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

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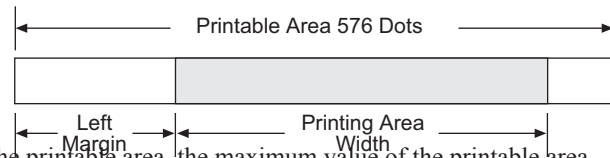
Sets the width of the printing area. If the setting exceeds the printable area, the maximum value of the printable area is used. The width of the printing area is set to ((*nH* X 256) + *nL*) times horizontal motion unit) inches. The horizontal motion units are set by the set horizontal and vertical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

The width of the printing area follows the set left margin command (1D 4C). See the set left margin command (10 4C …) earlier in this document for a description.

Formulas

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

       GS W 203 0

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

       GS W 150 1

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

Exceptions

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

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

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.

Related information

This command is ignored in LEGACY emulation.

Select single-wide characters

ASCII   DC3
Hexadecimal   13
Decimal   19

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

Exceptions

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

Related information

This command is ignored in LEGACY emulation.

Select 90 degree counter-clockwise rotated print

ASCII   ESC DC2
Hexadecimal   1B 12
Decimal   27 18

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

Exceptions

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

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

Related information

See "Summary of rotated printing" in this document.

This command is ignored in LEGACY emulation.

Select pitch (column width)

ASCII	ESC SYN *n*
Hexadecimal	1B 16 *n*
Decimal	27 22 *n*

Value of *n*:   0 = Standard pitch
                      1 = Compressed pitch

Default: 0 (Standard pitch)

Selects the character pitch for a print line.

Formulas

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

Pitch	Columns, 80mm Paper	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.

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

Set right-side character spacing

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

Range of *n*:   0 – 32 (decimal)

Default: 0

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

In standard mode the horizontal motion unit is used.

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

Related information

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

Select print mode

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

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

Value of *n*

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

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

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

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

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

Pitch	Columns, 80 mm paper	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 *n*	Select pitch
1B 45 *n*	Emphasized
1B 47 *n*	Double-strike
12	Double-wide
13	Single-wide
1B 2D *n*	Underline

Select or cancel user-defined character set

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

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

Range of *n*:	0–2

Default:	0 (Code Page 437)

Selects the character set. When an undefined RAM character is selected, the current active ROM code page character is used. Look in Chapter 3: Programming the Printer, "Character appearance" for the character sets.

Exception:

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

Related information

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

Define user-defined character set

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

Values and ranges:

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

c = the ASCII codes of the first (*c*1) and last (*c*2) characters respectively

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

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

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

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

d = the dot data for the characters

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

The bytes are printed down and across each cell.

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

Any invalid byte (*s*, *c*1, *c*2, *n*1) aborts the command.

Related information

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

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 (*c*1) and last (*c*2) characters respectively

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

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

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

k = *c2* − *c1* + *1* = the number of characters to be defined in this command string
[character i data] = *[ni d1 ... d(j x ni)]* for *1 ≤ i ≤ k*

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

d = the dot data for the characters

The number of bytes for the ith character cell is *j x ni.*

The bytes are printed down and across each cell.

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

Any invalid byte (*s*, *c*1, *c*2, *n*1, *n*2) aborts the command.

Related information

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

Select or cancel underline mode

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

Value of *n*:

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

Default: 0 (Cancel underline mode)

Turns underline mode on or off. 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.

Related information

In A793 emulation, this command is unrecognized and the parameter *n* is put into the print buffer.
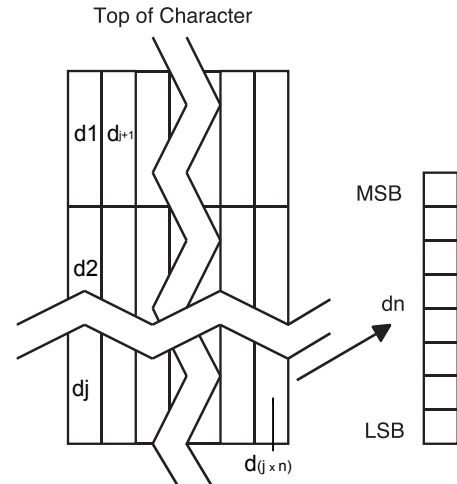
Copy character set from ROM to RAM

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

Default: Current active ROM code page

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

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

Related information

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

Cancel user-defined character

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

Value of *n*:   Specified character code.

Range of *n*:   32–255

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

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.

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

Select or cancel double-strike

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

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

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

Default: 0 (Off)

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

Exceptions

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

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

Related information

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

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

Select or cancel italic print

ASCII   ESC I *n*
Hexadecimal   1B 49 *n*
Decimal   27 73 *n*

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

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

Default: 0 (Off)

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

Exceptions

Only the lowest bit of *n* is valid.

Related information

This command is recognized in A799 native mode and A794 emulation.

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

Select international character code

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

Value of *n*:

A799 native mode	A793 emulation	Application Compatible Escape Command emulation (1B 52 n only)
0 = Code Page 437	0 = Code Page 437	0 = U.S.A.
1 = Code Page 850	Not 0 = Code Page 850	1 = France
2 = Code Page 852		2 = Germany
3 = Code Page 860		3 =-U.K.
4 = Code Page 863		4 = Denmark I
5 = Code Page 865		5 = Sweden
6 = Code Page 858		6 = Italy
7 = Code Page 866		7 = Spain
8 = Code Page 1252		8 = Japan
9 = Code Page 862		9 = Norway
10 = Code Page 737, Greek (only in A799 native mode)		
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.

Related information

The LEGACY emulation selection applies only to the command "Select international character code" (1B 52 *n*). The LEGACY emulation generates the same as A799 native mode for the command "Select international character set table" (1B 74 *n*).

Select or cancel 90 degree clockwise rotated print

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

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

Default: 0 (Cancel)

Rotates characters 90 degrees clockwise. The command remains in effect until the printer is 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	A793 emulation
0 = Code Page 437	0 = Code Page 437.
1 = Code Page 850	Not 0 = Code Page 850
2 = Code Page 852	
3 = Code Page 860	
4 = Code Page 863	
5 = Code Page 865	
6 = Code Page 858	
7 = Code Page 866	
8 = Code Page 1252	
9 = Code Page 862	
10 = Code Page 737, Greek (in A799 native mode and A794 emulation)	
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.

Related information

The LEGACY emulation selection applies only to the command "Select international character code" (1B 52 *n*).
The LEGACY emulation generates the same as A799 native mode for the command "Select international character set" (1B 74 *n*).

Select or cancel upside-down print mode

ASCII   ESC { *n*
Hexadecimal   1B 7B *n*
Decimal   27 123 *n*

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

Default: 0 (Cancel)

Prints upside-down characters. 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.

In page mode, vertical and horizontal directions are based on the character orientation. When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.

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

Exceptions

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

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

Related information

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

Select or cancel white/black reverse print mode

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

Value of n: 0 = Off
1 = On

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

Range of n: 0–255

Default: 0 (Off)

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

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

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

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

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

Exceptions

Only the lowest bit of n is valid.

Related information

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

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

Set smoothing

ASCII	GS b n
Hexadecimal	1D 62 n
Decimal	29 98 n
Value of n:	0 = smoothing off,
	1 = smooting on,
	default = off

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

Reverse color text mode (ColorPOS®)

ASCII	GS 0x85 m n
Hexadecimal	1D 85 m n
Decimal	29 133 m n
Value of m:	0 = white
	1 = black
	2 = paper color
Value of n:	0 = white
	1 = black
	2 = paper color
Default:	m = 0 (off)

Sets a mode for reverse printing effects on text. The background color is specified by m, while the text color is specified by n. Setting m = 0 turns off the mode.

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

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

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

Text strike-through mode (ColorPOS®)

ASCII	GS 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.

Three Asian Fonts are available for use on the A799 printer: 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 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.

Related information

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

Select active user-defined character set

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

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

n = 0 - 127

Set high order bit of *n* to configure user-defined character set number as the default. To configure the printer to print from the user-defined character set at power, send 1F 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 downloaded BMP file to save it as a logo, send the hexadecimal code 1B followed by the whole BMP file.

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

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

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

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

Exceptions

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

Related information

Microsoft BMP bitmap file format.

This command is recognized in A799 native mode and in A794 emulation.

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

Select bit image mode

ASCII   ESC * *m n*1 *n*2 *d*1 ... *d*n
Hexadecimal   1B 2A *m n*1 *n*2 *d*1 ... *d*n
Decimal   27 42 *m n*1 *n*2 *d*1 ... *d*n

Value of *m*:

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

Value of *n:*

Value of *n* (8-dot single-density mode)	Value of *n* (24-dot single-density mode)	Value of *d*
n1 + (256 x n2)	3 x [n1 + (256 x n2)]	Number of bytes of data*

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

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.
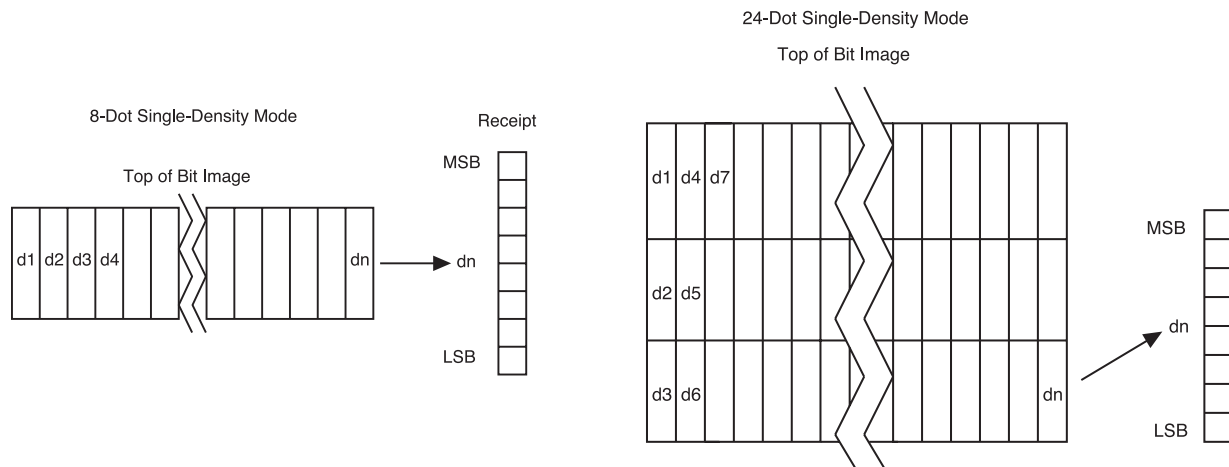
Print advanced raster graphics

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 x *m* dots

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

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

d1 … dn: data bytes

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

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

Exceptions

Advanced raster graphics is not available in page mode.

Select single-density graphics

ASCII	ESC K *n1 n2 d*1 ... *d*n
Hexadecimal	1B 4B *n1 n2 d*1 ... *d*n
Decimal	27 75 *n1 n2 d*1 ... *d*n

Value of *n:*

Value of *n* (8-dot single-density mode)	Value of *d*
n1 + (256 x n2)	Number of bytes of data (printed down, then across)

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

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

Related information

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

Select double-density graphics

ASCII	ESC Y *n1 n2 d*1 ... *d*n
Hexadecimal	1B 59 *n1 n2 d*1 ... *d*n
Decimal	27 89 *n1 n2 d*1 ... *d*n

Value of *n:*

Value of *n* (8-dot single-density mode)	Value of *d*
n1 + (256 x n2)	Number of bytes of data (printed down, then across)

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

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

Related information

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

Select the current logo

ASCII	GS # *n*
Hexadecimal	1D 23 *n*
Decimal	29 35 *n*

Range of *n*:   0 – 255

Default: 0

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

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

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

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

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

Related information

This command is recognized in A799 native mode and A794 emulation.

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

Define downloaded bit image

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

Value of *n*:

Value of *n*1	Value of *n*2	Value of *d*
1–72 (8 x n1 = number of horizontal dot columns)	1–64 (number of vertical bytes)	Bytes of data (printed down, then across)

[1]The number of bytes sent is represented by the following formula:
$n = 8$ x $n1$ x $n2$ ($n1$ x $n2$ 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.
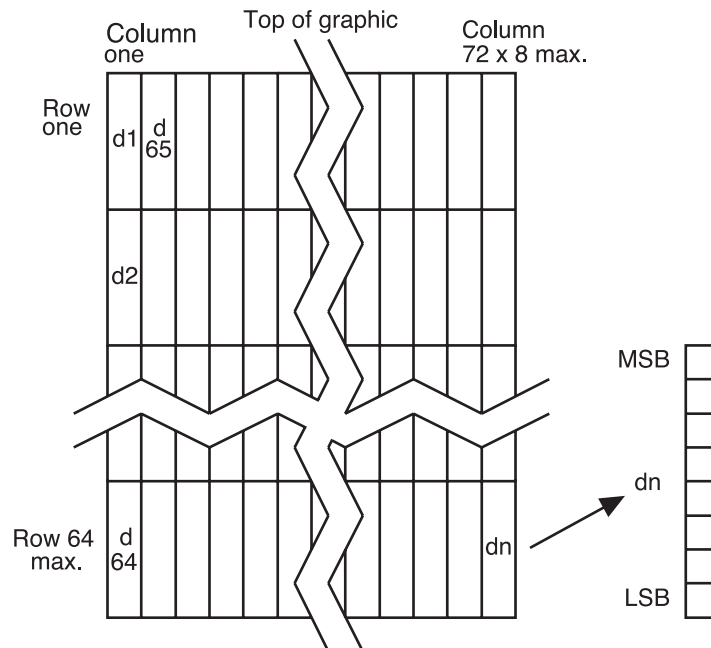
Print downloaded bit image

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 *m*	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 <u>not</u> apply and are overridden by this command. A complete rendering of the intended final image should have been done by the application before sending the dot rows. If two-color paper is indicated by the set paper type command, then the raster will be printed in the color that is defined by the set current color command.

Print raster monochrome graphics (ColorPOS®)

ASCII   GS 0x82 *n1…..n72* (576 dots) for 80 mm paper, or *n80* (640 dots) for 82.5 mm paper
Hexadecimal   1D 82 *n1…..n72* (576 dots) for 80 mm paper, or *n80* (640 dots) for 82.5 mm paper
Decimal   29 130 *n1…..n72* (576 dots) for 80 mm paper, or *n80* (640 dots) for 82.5 mm paper

ASCII   DC1 *n1…..n72* (576 dots) for 80 mm paper, or n80 (640 dots) for 82.5 mm paper
Hexadecimal   11 *n1…..n72* (576 dots) for 80 mm paper, or n80 (640 dots) for 82.5 mm paper
Decimal   17 *n1…..n72* (576 dots) for 80 mm paper, or n80 (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 <u>not</u> apply and are overridden by this command. A complete rendering of the intended final image should have been done by the application before sending the dot rows. If two-color paper is indicated by the set paper type command, then the raster will be printed in the color that is defined by the set current color command.

Print raster color graphics (ColorPOS®)

ASCII   GS 0x83 *n1…..n144* (576 dots 80mm paper) / *n160* (640 dots, 82.5mm paper)
Hexadecimal   1D 83 *n1…..n144* (576 dots 80mm paper) / *n160* (640 dots, 82.5mm paper)
Decimal   29 13 *n1…..n144* (576 dots 80mm paper) / *n160* (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 (ColorPOS®)

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 <u>color</u> 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 <u>monochrome</u> 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 (ColorPOS®)

ASCII   GS Ox8B *n m o*
Hexadecimal   1D 8B *n m o*
Decimal   29 139 *n m o*

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

n must be the index value of an existing logo

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

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

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

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

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

Merge watermark mode (ColorPOS®)

ASCII   GS Ox8C *n m*
Hexadecimal   1D 8C *n m*
Decimal   29 140 *n m*

Default   0 (off)

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

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

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

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

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

Monochrome shade mode (ColorPOS®)

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

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

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

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

Note: Only a few gradations 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 <u>background only</u>.

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

Both text and monochrome graphics are affected by this command.

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

Color shade mode (ColorPOS®)

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

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

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

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

Note: Only a few gradations 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 <u>background only</u>.

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

Both text and monochrome graphics are affected by this command.

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

Logo print with color plane swap (ColorPOS®)

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

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

Form and merge real time surround graphic (ColorPOS®)

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

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

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

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. This command may be used in page mode.

Save graphics buffer as logo (ColorPOS®)

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

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

There is one working graphics buffer in the printer; its size (and that of the saved logo) is of maximum print width size, and of sufficient length to store the largest of the surround graphic styles defined since the last buffer "freeze" event. This command is ignored if the graphics buffer is not in a "merge pending" state. The graphics buffer state will be set to "frozen" by this command.

Related information

This command is ignored in page mode.

Background logo print mode (ColorPOS®)

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

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

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

Related information

This command is ignored in page mode.

Apply margin message mode (ColorPOS®)

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

Value of *l*:   *l* is a binary switch:

> *l* = 0   disables margin message merging
> *l* = 1   enable left margin message merging
> *l* = 2   enable right margin message merging
> *l* > 2   ignore command

Value of *m*:   *m* is the ID (index) of the logo to be used in the merging. If a logo with index *m* does not exist or is wider than the print raster width then this command is ignored.

Value of *n*:   *n* is the number of raster rows to be empty (skipped) before repeating the designated margin message merge

Value of *o*:   *o* is a right – left toggle switch:

> *o* = 0   no toggling of the margin message merge
> *o* = 1   enable toggling, starting with a left margin message first
> *o* = 2   enable toggling, starting with a right margin message first
> *o* > 2   ignore entire command

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

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

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

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

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

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

Logo print with knife cut

ASCII	GS 0x9B *m n*
Hexadecimal	1D 9B *m n*
Decimal	29 155 *m n*

Values of *m*: 0 = Standard size
1 = Double wide
2 = Double high
3 = Double high/wide

Value of *n*: 01 - FF (Hex)
# dot rows = n x 24
n = 5 is the recommended setting

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

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

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

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

The command is available only in A799 native mode.

Related information

See "Print downloaded bit image" command.

Set temporary max target speed

ASCII	GS 0xA0 *nl nh*
Hexadecimal	1D A0 *nl nh*
Decimal	29

Values: 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.

Set LogoEZ® colorization

ASCII	US ETX SYN *f s p/t t*
Hexadecimal	1F 03 16 *f s p/t t*
Decimal	31 03 22 *f s p/t t*

Value of *f*:	0 =	turn off all LogoEZ® colorization features
	1 =	link print logo after knife cut
	2 =	link watermark printing
	3 =	link margin message printing
	4 =	link logo print before cut

Default: 0   (Off)

This command configures into EEPROM (permanent configuration switch setting) a set of features that allows placement of a color logo in the header, full-time margin message printing, watermarking in the middle of the receipt and printing of a trailer color logo. These commands are triggered by any knife cut command (partial or full: 19, 1A, 1B 69, 1B 6D, 1D 56 *m n*). The printer when powered-up will (if set) activate the header, watermark, and margin message features and will be ready to print the body of a receipt. For selected features to print however, logos with defined index values of F0, F1, F2, F3 respectively must be saved in the flash memory.

The command is available only in A760 native mode. Once logos have been loaded and enabled they can be used in any emulation mode. Skip distances remain constant. A760 native mode must be used to turn the feature off.

Value descriptions:

f =   function selector and defines which parameters are used :

   s = dot row space before object distance
   p = dot row past an object
   r = repetition space distance in mm
   t = margin message toggle mode

f = 0   turn off all LogoEZ® colorization functions (default). No other parameters are required.

f = 1   link print logo after knife cut – equivalent to printing a transaction header graphic.

   Example:
   Print logo (#F0) after a knife-cut with "*s*" dot row spacing before the logo and "*a*" dot row spacing after the logo (1F 03 16 01 *s p*).

   After executing a knife-cut command, if *s* > 0, execute the following:

   - stop background merging (1D 9B 1 command)

   - skip *s* (feed paper) dot rows (15 *s* command) – adds spacing in addition to any set by the application around a knife cut command

   - set centered justification (1B 61 1 command), saving the previous justification

   - if the logo at F0h is currently defined, print logo by sending print downloaded bit image, normal size (1D 2F 0 command) without changing the value of current logo

   - reset justification to previous value (1B 61 [previous value])

   - skip (feed paper) "*p*" dot rows after logo (15 *p* command)

Since the normal space on the receipt paper after a knife cut is 18 mm (144 rows), no extra space is usually needed above the logo. The default value is *s* = 0 and turns off the *f* = 1 logo after knife-cut link.

f = 2 link watermark printing

Example:

Activate watermark printing using logo #F1 (1F 03 16 02 *s r*) with "*s*" being the skip distance in dot rows before activation and *"r"* is the distance in mm between watermark repetitions.

After executing a knife-cut command and the *f* = 1 steps, if *s* > 0, execute the following:

- skip "*s*" (feed paper) dot rows (15 *s* command)

- set watermark printing to "on" using logo F1 (execute merge watermark mode -1D 8C *r* F1 command). Logo must be defined for F1 and comply with watermark mode requirements in order for this happen.

- stop background merging mode (1D 9B 1 command). Clears background for logos, barcodes, and captured images.

The watermarks feature is now activated (following an optional F0 logo) to start after each knife cut. Note that when printing graphic objects, merging is turned off by each knife cut. The default value is *s* = 0 and turns off the *f* = 2 watermark link.

No correlation exists (when both are set) between watermark and logo skip distances.

If the *f* = 4 logo link is undefined, you should set a null trailer logo with *s* = 1 and *p* = 144 (1F 03 16 04 1 90, no logo at index F3). This will turn off watermarks at the position of a knife cut and leave a clear space at the top of the next receipt.

f = 3 link margin message printing

Example:

Activate margin message printing using logo #F2 (1F 03 16 03 *s r t*) with "*s*" being the skip distance, "*r*" the distance between repetitions and "*t*" the toggle mode.

Toggle mode values for *t*:
    0 = both left and right side
    1 = toggle sides, starting with left side
    2 = right side margin message only
    3 = left side margin message only

After executing a knife cut command and the *f*=1 steps, if *s* > 0, execute the following:

- skip "*s*" dot rows (=15 *s* command). When both watermark and margin message merging are defined, the respective "*s*" values are treated independently. The same value should be used to start watermark and margin message at the same place.

- Use the toggle mode values listed above to apply margin message for the left and/or right side. For margin messages on both sides, enter the 1D 99 1 F2 *p* 0 command followed by the 1D 99 *t'* F2 *r t'* (apply margin message) command with the message at index F2 defined.

- suspend background merging mode (=1D 9B 1 command), so any logos, barcodes, and captured images will print in the clear.

The margin message printing feature is activated after the header logo after a restart at each knife-cut. Note that when printing graphic objects, merging is turned off by each knife cut. No correlation exists (when both are set) between watermark and logo skip distances.

If the *f* = 4 logo link is undefined, you should set a null trailer logo with *s* = 1 and *p* = 144 (1F 03 16 04 1 90, no logo at index F3). This will turn off margin message at the position of a knife cut and leave a clear space at the top of the next receipt.

f = 4 link logo print before cut

Prints a logo after the skip distance of "*s*" before a logo and "*p*" past a logo and performs a knife cut (1F 03 16 04 *s p*).

Immediately <u>before</u> executing a knife-cut command, if *s* > 0, execute the following:

- skip (feed paper) "*s*" dot rows (15 *s* command)

- stop background merging (1D 9B 1 command). Save previous background merging value, so logo prints in the clear

- set centered justification (1B 61 1 command), saving the previous justification

- if a logo at index F3h is currently defined, print the logo by sending print downloaded bit image, normal size (1D 2F 0 command), without changing the value of current logo.

- reset justification to previous value (1B 61 [previous value])

- skip (feed paper) "*p*" dot rows (15 *p* command) a minimum value of 90h, to ensure knife cut occurs after the logo

- restore background merge suspension (1D 9B [previous value])

Related information

This command is utilized in the TPG LogoEZ® utility. The utility can be used to pre-configure new printers with a default colorization setup without requiring any application changes. The default setup was designed to provide a general level of colorization features that would not affect the printer operation. You can expand beyond the default features of the utility by modifying the application at the host. However, do not attempt to modify the settings within the utility.

LogoEZ® utility default settings:

    f = 1: *s* = 1H
           a = 30H

    f = 2: *s* = 32H
           r = 19H

    f = 3: *s* = 1H
           r = 7H
           t = 1H

    f = 4: *s* = 30H
           a = A0H

Set LogoEZ® attribute mapping

ASCII	US ETX ETB *a m s*
Hexadecimal	1F 03 17 *a m s*
Decimal	31 03 23 *a m s*

Values:		
	a =	attribute map selector
	a , m, s = 0, 0, 0	turn off attribute mapping (all 3 bytes required)
	a = 1	selects first attribute mapping definition (of two available)
	a = 2	selects second attribute mapping definition
	a = 1 or 2, if *m* = 0	mapping 1 or 2, respectively, is turned off

A word (2 bytes) is used to identify the attribute mapping, with "*m*" bits 0 – 6 identifying which original attributes should be mapped:

Original attribute mapped table

m bit on	attribute mapped
0	Bold
1	Italic
2	Reverse
3	Underline
4	Double high
5	Double wide
6	Compressed print

The following *"s"* bits and "*m*" bit 7 set the attributes that substitute for the mapped set:

Attributes substituted table

m bit on	attributes substituted
7	**Bold substituted**

s bit on	attributes substituted
0	Italic
1	Reverse
2	Underline
3	Double high
4	Double wide
5	Compressed print
6	Alternate color
7	Color reverse

This command configures into EEPROM (permanent configuration switch setting) one or two combinations of character attribute mappings, including substitute attribute settings for color effects. The attributes of the character code are used to form the desired pixel character when the code is placed into the raster print buffer. An "*m*" bit value set to on in the "original attribute mapped table" above will have its attributes set to the corresponding bit value of "*s*" in the "attributes substituted table". If $m = 0$ then no substitution takes place.

The command is available only in A760 native mode. Once attributes have been defined and enabled they can be used in any emulation mode. A760 native mode must be used to turn the feature off.

The operational theory of this command is that if (input character attributes) AND (original) = (original); then (output character attributes) = ([original] XOR [input character attributes]) OR (substituted). The input character's original attributes are mapped to the substituted attributes, but any attributes not specified for mapping are unchanged.

In the tables you will see that there are 7 input attributes and 9 outputs. It is expected that the alternate color attribute will be used most. For example, when the alternate color attribute is combined with the reverse substitution attribute, the result is white characters on a color background. The color reverse attribute without alternate color will print black text on a color background.

Any mappings utilizing compressed and/or double-wide attributes will effect the length of a line and could cause unintended line wraps. Mappings containing double-high attributes could cause unintended receipt lengths.

When both attribute mappings are set, processing is perform in order sequence. When two text attribute substitutions contain conflicting dependent remappings, the result is undefined.

Related information

This command is utilized in the TPG LogoEZ® utility. The utility can be used to pre-configure new printers with a default colorization setup without requiring any application changes. The default setup was designed to provide a general level of colorization features that would not affect the printer operation. You can expand beyond the default features of the utility by modifying the application at the host. However, do not attempt to modify the settings within the utility.

$f = 1$: $s = 1H$
         $a = 30H$

$f = 2$: $s = 32H$
         $r = 19H$

$f = 3$: $s = 1H$
         $r = 7H$
         $t = 1H$

$f = 4$: $s = 30H$
         $a = A0H$

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

ASCII	US EOT n
Hexadecimal	1F 04 n
Decimal	31 04 n

Value:	0 = Off
	1 = On
	(When 0 and 1 are the LSB)
Default:	0 (Off)

Selects or cancels 6-dot/mm emulation mode.

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

Enable constant speed logos

ASCII	US { n
Hexadecimal	1F 7B n
Decimal	31 123 n

Value:	0 = disable
	1 = enable

This command allows the firmware to determine the optimal speed to print a logo. It is set prior to

downloading the logo and reset after the logo has been downloaded.

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

Status

Status command introduction

The 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

Unlike the A793, that had a dedicated connector and resultant dedicated status reporting for each cash drawer, 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

In LEGACY emulation, this command is ignored.

Request alternate status (A793 emulation only)

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

Value and Range of *n*:

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

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

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

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

Exceptions

Parallel communications only.

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.

In LEGACY emulation, this command is ignored.

Transmit printer ID

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

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

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

n	Printer ID	Specification	ID (Hexadecimal)
1, 49	Printer model ID	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 *n*

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 *n* to identify Printer returns 12 bytes in above example: #1234567890<CR>
$	24	36	Class/model #, 15 digit ASCII	Write to NVRAM
%	25	37	Class/model #	Write to NVRAM, and print on receipt to verify
'	27	39	Class/model #	Return Class/model #, returns 17 bytes
+	2B	43	Boot firmware part #, 12 digit ASCII	Return Boot firmware part #, returns 14 bytes
/	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 *n* 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 *n* (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
a	A6	166	Flash cycles tally	Clear flash cycles cut tally to 0
o	A7	167	Flash cycles tally	Return flash cycles cut tally, returns 10 bytes
¿	A8	168	Knife jams tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
+	A9	169	Knife jams tally	Write to NVRAM, and print on receipt to verify
+	AA	170	Knife jams tally	Clear knife jams tally to 0
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
¡	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 *n*
Hexadecimal	1D 72 *n*
Decimal	29 114 *n*

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

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

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

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

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

Exceptions

Unlike the A793, that had a dedicated connector and resultant dedicated status reporting for each cash drawer, 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.

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

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

Value of *n*:	GS/DLE sequence
	1 = Transmit printer status
	2 = Transmit RS-232C busy status
	3 = Transmit error status
	4 = Transmit receipt paper status

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

Exceptions

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

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

Unlike the A793, that had a dedicated connector and resultant dedicated status reporting for each cash drawer, the 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.

Continued...

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

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

Value of *n*:   1 = recover and restart
                      2 = recover and clear buffers

The printer responds to a request from the host specified by *n*. This command includes two sequences: GS and DLE. 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

Unlike the A793, that had a dedicated connector and resultant dedicated status reporting for each cash drawer, 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	00	0	One or both cash drawers open.
	On	04	4	Both cash drawers closed.
3	Off	00	0	Not busy at the RS232C interface.
	On	08	8	Printer is busy at the RS232C interface.
4	On	10	16	Not used. Fixed to on.
5	Off	00	0	Receipt cover closed.
	On	20	32	Receipt cover open.
6	Off	00	0	Paper feed button is not pressed.
	On	40	64	Paper feed button is pressed.
7	Off	00	0	Not used. Fixed to off.

Second byte (error information)

Bit	Off/On	Hex	Decimal	Status for USM
0	–	–	–	Undefined
1	–	–	–	Undefined
2	Off	00	0	No mechanical error
	On	04	4	Mechnical error occurred
3	Off	00	0	No knife error.
	On	08	8	Knife error occurred.
4	Off	00	0	Not used. Fixed to off.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurred.
6	Off	00	0	No recoverable error.
	On	40	64	Recoverable error: Cover open, paper out, temperature or voltage error is out of range.
7	Off	00	0	Not used. 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 I n	1D 49 n	0	x	x	0	x	x	x	x		Binary
GS r n	1D 72 n	0	x	x	0	x	x	x	x		Binary
Real time response		**Response recognized by:**									
ASCII	**HEX**										
GS EOT n	1D 04 n	0	x	x	1	x	x	1	0		Binary
DLE EOT n	10 04 n	0	x	x	1	x	x	1	0		Binary
GS ENQ	1D 05	1	x	x	x	x	x	x	x		Binary
XON		0	0	0	1	0	0	0	1		Binary
XOFF		0	0	0	1	0	0	1	1		Binary
Unsolicited status mode (USM)		**Response recognized by:**									
USM Byte 1		0	x	x	1	x	x	0	0		Binary
USM Byte 2-4		0	x	x	0	x	x	x	x		Binary

Bar codes

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

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

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

(0 = End of command)

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

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

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

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

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

Exceptions

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

Illegal data cancels the command.

Values:

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

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

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

m	Bar code	*d1...dn*	length
65	UPC-A	48–57 (ASCII numerals)	Fixed length: 11, 12
66	UPC-E	48–57	Fixed length: 11, 12
67	JAN13 (EAN)	48–57	Fixed length: 12, 13
68	JAN8 (EAN)	48–57	Fixed length: 7, 8
69	CODE39	48–57, 65–90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) $d1 = dk = 42$ (start/stop code is supplied by printer if necessary)	Variable length
70	Interleaved 2 of 5 (ITF)	48–57	Variable length (even number)
71	CODABAR (NW-7)	65–68, start code 48- 57, 36, 43, 45, 46, 47, 58	Variable length
72	Code 93	00–127	Variable length
73	Code 128	0–105 $d1 = 103$-105 (must be a start code) $d2 = 0$–102 (data bytes) (Stop code is provided by the printer)	Variable length
74	Code 128 auto compress	00–255 00–FF	Variable length
75	PDF 417	0–255 00–FF	Variable length
78	Code EAN 128 auto compress	0–255 00–FF	Variable length
79	PDF 417	0–255 00–FF data length specified via integer $n = n$H:nL *1D 6B m n*L *n*H *d1 . . . 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. Extended barcode printing for upside down and ladder barcodes can be done in page mode if required.

·   Slip/validation selection disabled in multiple barcodes command string

·   Multiple barcodes command string disabled when slip/validation selected

·   Page mode disabled in multiple barcodes command string

·   Multiple barcodes command string disabled in page mode

·   Page mode parameters initialized at end of multiple barcodes command string

Sample multiple barcodes command string:

1b 40	Initialize
1d 6b ff 01	Begin multiple barcodes one line
1b 61 01	Center align
1d 68 40	Barcode height
1d 77 02	Barcode width
1d 48 02	Print HRI below
1d 6b 49 06 67 27 2d 2e 2d 2e	Barcode 1, code 128
1d 6b 49 07 67 04 05 06 07 08 09	Barcode 2, code 128
1d 6b 49 04 67 01 02 03	Barcode 3, code 128
1d 6b ff 00	End multiple barcodes, print

Print GS1 DataBar (formerly RSS), null terminated

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

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

Note: Null terminated, data length 1 to 2436

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

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

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

Set GS1 DataBar (formerly RSS) parameters

Setting of parameters for GS! DataBar

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

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

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

Select PDF 417 parameters

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

Value and Ranges:

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

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

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

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

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

Sample symbol description:

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

1 Leading quiet zone

2 Start pattern

3 Left row indicator characters (code words)

4 One to thirty data characters (code words)

5 Right row indicator character (code words)

6 Stop pattern

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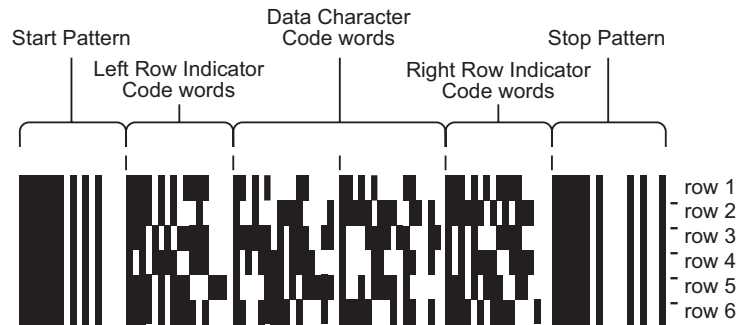
The number of characters in a row and number of rows can be adjusted to vary the symbol's overall aspect ratio to best fit an available space.

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

Related Information:

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

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

Select bar code width

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

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

Default: n=3

Sets the bar code width to *n* dots.

Formulas

n/8mm (n/203 inch)

Page mode

Page mode is one of two modes that the A799 printer uses to operate. Standard mode is typical of how most printers operate by printing data as it is received and feeding paper as the various paper feed commands are received. Page mode is different in that it processes or prepares the data as a "page" in memory before it prints it. Think of this as a virtual page. The page can be any area within certain parameters that you define. The page is printed using either the FF (0C) or the ESC FF (1B 0C) command.

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

These commands describe the operation for 80mm paper. 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.

Print and return to standard mode

ASCII   FF
Hexadecimal 0C
Decimal   12

When printing is completed, values for select print direction in page mode (1B 54n) and set print area in page mode (1B 57 $n1$, $n2$, …$n8$) and the position for buffering character data are set. Buffered data is not deleted from the printer.

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

Exceptions

This command is enabled only in page mode.

Cancel print data in page mode

ASCII   CAN
Hexadecimal 18
Decimal   24

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

Exceptions

This command is only used in page mode.

Print data in page mode

ASCII   ESC FF
Hexadecimal 1B 0C
Decimal   27 12

Collectively prints all buffered data in the printing area.

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

Exceptions

This command is enabled only in page mode.

Select page mode

ASCII   ESC L
Hexadecimal   1B 4C
Decimal   27 76

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

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

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

• Set right-side character spacing (1B 20)

• Select 1/6-inch line spacing (1B 32)

• Set line spacing (1B 33)

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

• Select or cancel 90 degree clockwise rotation (1B 56)

• Set counter-clockwise rotation (1B 12)

• Select justification (1B 61)

• Select or cancel upside-down printing (1B 7B)

• Set left margin (1D 4C)

• Set print area width (1D 57)

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

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

Exceptions

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

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

Select standard mode

ASCII   ESC S
Hexadecimal   1B 53
Decimal   27 83

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

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

* Set right-side character spacing (1B 20)

* Select 1/6 inch line spacing (1B 32)

* Set line spacing (1B 33)

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

Exceptions

This command is effective only in page mode.

Select print direction in page mode

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

Value of *n*:   Start position

                    0 = Upper left corner proceeding across page to the right
                    1 = Lower left corner proceeding up the page
                    2 = Lower right corner proceeding across page to the left (upside down)
                    3 = Upper right corner proceeding down page

Default: 0

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

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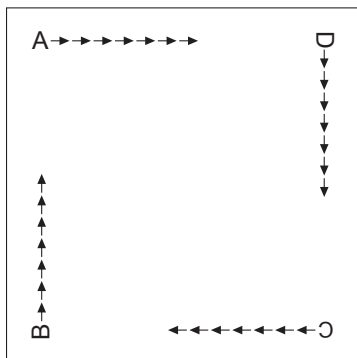
Exceptions

The command is valid only in page mode.

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

Set print area in page mode

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

Range of *n*:   0-255

Default: *n1-4 =*   0
                 n5 =   64
                 n6 =   2
                 n7 =   64
                 n8 =   2
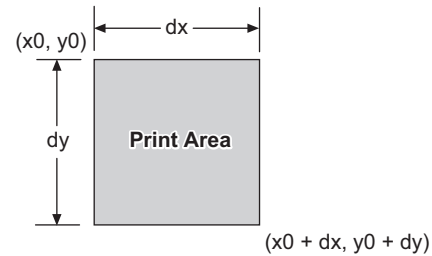
Sets the position and size of the printing area in page mode.

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

Formulas

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

- x0 = [($n1 + n2$ x 256) x (horizontal direction of the fundamental calculation pitch)]

- y0 = [($n3 + n4$ x 256) x (vertical direction of the fundamental calculation pitch)]

- dx = [($n5 + n6$ x 256) x (horizontal direction of the fundamental calculation pitch)]

- dy = [($n7 + n8$ x 256) x (vertical direction of the fundamental calculation pitch)]

Keep the following notes in mind for this command.

- The fundamental calculation pitch depends on the vertical or horizontal direction.

- The maximum printable area in the x direction is 576/203 inches.

- The maximum printable area in the y direction is 576/203 inches.

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

Maximum area specification in page mode

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

Exceptions

The command is effective only in page mode.

Set absolute vertical print position in page mode

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

Sets the absolute vertical print starting position for buffer character data in page mode. The absolute print position is set to [(*nL* + *nH* X 256) x (vertical or horizontal motion unit)] inches.

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

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

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

Formulas

[(*nL* + *nH* X 256) x (vertical or horizontal motion unit)] inches.

Exceptions

This command is effective only in page mode.

If the [(*nL* + *nH* X 256) x (vertical or horizontal motion unit)] exceeds the specified printing area, this command is ignored.

Set relative vertical print position in page mode

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

Value

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

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

This command functions as follows, depending on the print starting position set by select print direction in page mode (1B 54):

When the starting position is set to the upper right or lower left of the printing area, the vertical motion unit (*y*) is used. When the starting position is set to the upper left or lower right of the printing area, the horizontal motion unit (*x*) is used.

Formulas

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

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

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

When pitch *n* is specified to the movement upward: $nL + nH \times 256 - 65536 - N$

Exceptions

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

Any setting that exceeds the specified printing area is ignored.

Macros

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

Select or cancel macro definition

ASCII   GS :
Hexadecimal   1D 3A
Decimal   29 58

Starts or ends macro definition. Macro definition begins when this command is received during normal operation and ends when this command is received during macro definition. The macro definition is cleared, during definition of the macro when the execute macro (1D 5E) command is received.

Normal printing occurs while the macro is defined. When the power is turned on the macro is not defined.

The defined contents of the macro are not cleared by the initialize printer (1B 40), thus, the initialize printer (1B 40) command may be used as part of the macro definition.

If the printer receives a second select or cancel macro definition (1D 3A) command immediately after previously receiving a select or cancel macro definition (1D 3A) the printer remains in the macro undefined state.

Formulas

The contents of the macro can be defined up to 2048 bytes.

Exceptions

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

Execute macro

ASCII   GS ^ $r\,t\,m$
Hexadecimal   1D 5E $r\,t\,m$
Decimal   29 94 $r\,t\,m$

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

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

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

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

Formulas

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

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

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

Exceptions

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

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

User data storage

Write to user data storage

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

Value of m: 0 – 255

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

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

Related information

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

Read from user data storage

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

Value of m: 0 – 255

Reads m bytes of data from the user data storage flash page at the address specified.

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.

Related information:

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

Write to non-volatile memory (NVRAM)

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

Value of $n1$:   1st Byte

Value of $n2$:   2nd Byte

Range of k: 20 – 63 (decimal locations)

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

Related information:

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

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. In A793 and LEGACY emulations, parameter bytes go into the print buffer.

Flash memory user sectors allocation

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

Default Value of *n1*:   1 (see below)

Default Value of *n2*:   1 (see below)

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

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

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

If *n*1 + *n*2 is greater than the maximum number of sectors available, the command is ignored. The printer returns NACK.

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

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

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

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

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

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

d = the dot data for the characters

The number of bytes for the ith character cell is $j x ni$.

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 (ColorPOS®)

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

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

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

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

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

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

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 if found corrupted during level 0 diagnostics the download mode is automatically entered after the printer has reset.

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

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 an NAK if the sector number is not acceptable. Sector numbers start at 0.

Exceptions

Available only in download mode.

Get firmware CRC

ASCII   GS ACK
Hexadecimal   1D 06
Decimal   29 6

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

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

Return microprocessor CRC

ASCII   GS BEL
Hexadecimal   1D 07
Decimal   29 7

Returns the CRC calculated over the boot sector code space.

Formulas

ACK <low byte> <high byte>

Erase all flash contents except boot sector

ASCII   GS SO
Hexadecimal 1D 0E
Decimal   29 14

Causes the entire flash memory to be erased.

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

Exceptions

Available only in download mode.

Return main program flash CRC

ASCII   GS SI
Hexadecimal 1D 0F
Decimal   29 15

Returns the CRC calculated over the flash firmware code space.

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

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 *n* (for number of data bytes)	Range of address (*aL aH*)	Range of count (*cL cH*)
((cH * 256) + cL)	0000–FFFF (hexadecimal)	0001–FFFF (hexadecimal)
Range: Addresses run from 0 to 64K.		

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

The count must always be 256.

The printer may return one of several responses. ACK means that the data was written correctly and the host should transmit the next block. NAK means that, for some reason, the data was not written correctly. This could mean that

communications failed or that the write to flash failed. The alternatives seem to be to retry the block or halt loading and assume a hardware failure.

Related information

Available only in download mode.

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.

Ethernet setup commands

The following commands are designed to set the required printer internal parameters for Ethernet operation. The commands can be used only in the Flash download (boot) mode. See Chapter 3 for default setup.

Restore default settings

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

Restores the Ethernet settings to the preset values.

Default settings are:

IP address:	192.0.0.192	(in use after boot timeout of two minutes)
Net mask:	0.0.0.0	(default mask of selected IP is used)
Gateway:	none	
Raw TCPIP port 9001:	active	
Telnet Daemon:	enabled	
LP Daemon:	disabled	
Bootp:	disabled	
DHCP:	enabled	
Inactivity timeout:	enabled	
Keep alive pings:	disabled	

Setting IP address

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

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

Setting Net Mask

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

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

Setting the Gateway

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

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

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

Setting raw TCPIP port 9001

ASCII	US	BS	EOT	*n1*	*n2 n3*	*n4*
Hexadecimal	1F	08	04	*n1*	*n2 n3*	*n4*
Decimal	31	8	4	*n1*	*n2 n3*	*n4*

n1 = 0:	disabled
n1 = 1:	enabled
Default:	enabled

Sets the port where the printer will look for raw tcpip communications.

LP Daemon

ASCII	US	BS	ENQ	*n1*
Hexadecimal	1F	08	05	*n1*
Decimal	31	8	5	*n1*

n1 = 0:	disabled
n1 = 1:	enabled
Default:	disabled

Enables or disables the printer LP Daemon.   The LP listens on port 515.

Telnet Daemon

ASCII	US	BS	ACK	*n1*
Hexadecimal	1F	08	06	*n1*
Decimal	31	8	6	*n1*

n1 = 0:	disabled
n1 = 1:	enabled
Default:	enabled

Enables or disables the printer Telnet server.   The Telnet server listens on port 23.

BootP

ASCII	US	BS	BELL	*n1*
Hexadecimal	1F	08	07	*n1*
Decimal	31	8	7	*n1*

n1 = 0:	disabled
n1 = 1:	enabled
Default:	disabled

Enables or disables the use of BootP at power-up to obtain an IP address. BootP is a subset of DHCP.

DHCP (auto-configuration)

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

n1 = 0:   disabled
n1 = 1:   enabled

Default: enabled

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

Inactivity timeout

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

n1 = 0:   disabled
n1 = 1:   enabled

Default: enabled

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

Keep-alive pings

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

n1 = 0:   disabled
n1= 1:   enabled

Default: enabled

Appendix A:
Commands listed by hexadecimal code

By command code

Code (hexadecimal)	Command	Page
09	Horizontal tab	45
0A	Print and feed paper one line	42
0C	Print and return to standard mode	105
0D	Print and carriage return	42
10	Clear printer	35
10 04 *n*	Real time status transmission (DLE sequence)	90
10 05 *n*	Real time request to printer (DLE sequence)	93
11 *n1 . . . n72*	Print monochrome raster raphics	69
12	Select double-wide characters	51
13	Select single-wide characters	51
14 *n*	Feed *n* print lines	42
15 *n*	Feed *n* dot rows	42
16 *n*	Add *n* extra dot rows	43
17	Print	43
18	Cancel print data in page mode	105
19	Perform full knife cut (or code 1B 69)	36
1A	Perform partial knife cut (or code 1B 6D)	36
1B (+*.BMP)	Download BMP logo (where +*.BMP is the data from the file, not the filename.)	64
1B 07	Generate tone	36
1B 0C	Print data in page mode	105
1B 12	Select 90 degree counter-clockwise rotated print	51
1B 14 *n*	Set column	45
1B 16 *n*	Select pitch (column width)	52
1B 20 *n*	Set right-side character spacing	52
1B 21 *n*	Select print mode	53
1B 24 *n*L *n*H	Set absolute starting position	46
1B 25 *n*	Select or cancel user-defined character set	54
1B 26 *s c1 c2*	Define user-defined character set	54
1B 27 *m a0 a1 a2 d1 … dm*	Write to user data storage	111
1B 2A *m n1 n2 d1…dn*	Select bit image mode	65
1B 2D *n*	Select or cancel underline mode	55
1B 2E *m n rL rH d1 … dn*	Print advanced raster graphics	66
1B 32	Set vertical line spacing to 1/6 inch	46

Code (hexadecimal)	Command	Page
1B 33 *n*	Set vertical line spacing	47
1B 34 *m a0 a1 a2*	Read from user data storage	111
1B 3A 30 30 30	Copy character set from ROM to RAM	56
1B 3D *n*	Select peripheral device (for multi-drop)	36
1B 3F *n*	Cancel user-defined character	56
1B 40	Initialize printer	37
1B 44 [*n*] *k* 00	Set horizontal tab positions	47
1B 45 *n*	Select or cancel emphasized mode	56
1B 47 *n*	Select or cancel double-strike	57
1B 49 *n*	Select or cancel italic print	57
1B 4A *n*	Print and feed paper	44
1B 4B *n1 n2 d1...dn*	Select single-density graphics	66
1B 4C	Select page mode	106
1B 52 *n*	Select international character code	58
1B 53	Select standard mode	107
1B 54 n	Select print direction in page mode	107
1B 56 *n*	Select or cancel 90 degree clockwise rotated print	58
1B 57 *n1, n2...n8*	Set print area in page mode	108
1B 59 *n1 n2 d1...dn*	Select double-density graphics	66
1B 5B 7D	Switch to flash download mode	116
1B 5C *n1 n2*	Set relative print position	48
1B 61 *n*	Select justification	49
1B 63 33 *n*	Select paper sensors to output paper end signals (parallel only)	37
1B 63 34 *n*	Select sensors to stop printing	38
1B 63 35 *n*	Enable or disable panel button	38
1B 64 *n*	Print and feed *n* lines	44
1B 69	Perform full knife cut (or code 19)	36
1B 6A *k*	Read from non-volatile memory (NVRAM)	111
1B 6D	Perform partial knife cut (or code 1A)	36
1B 70 *n p1 p2*	Generate pulse to open cash drawer	38
1B 72 m	Set current color	39
1B 73 *n1 n2 k*	Write to non-volatile memory (NVRAM)	111
1B 74 *n*	Select international character set	59
1B 75 0	Transmit peripheral device status (RS-232C printers only)	82
1B 75 *n*	Request alternate status (A793 emulation only)	83
1B 76	Transmit paper sensor status	83
1B 7B *n*	Select or cancel upside-down print mode	59

Code (hexadecimal)	Command	Page
1C 70 *m n*	Print flash logo	71
1C 71 *n* ...	Define flash logos	71
1D 00	Return boot sector firmware part number	116
1D 01	Return segment number status of flash memory	117
1D 02 *nn*	Select flash memory sector to download	117
1D 03 n	Real time request to printer (GS sequence)	93
1D 04 *n*	Real time status transmission (GS sequence)	90
1D 05	Real time printer status transmission	94
1D 06	Get firmware CRC	117
1D 07	Return microprocessor CRC	117
1D 0E	Erase all flash contents except boot sector	118
1D 0F	Return main program flash CRC	118
1D 10 *n*	Erase selected flash sector	118
1D 11 *aL aH cL cH d1...dn*	Download to active flash sector	118
1D 21 *n*	Select character size	60
1D 22 *n*	Select memory type (SRAM/Flash) where to save logos or user-defined fonts	112
1D 22 55 *n1 n2*	Flash memory user sectors allocation	112
1D 22 80	Expanded flash memory allocation	113
1D 22 81 *n*	Select flash area for storing logos and user-defined characters	113
1D 23 *n*	Select the current logo (downloaded bit image)	67
1D 24 *nL nH*	Set absolute vertical print position in page mode	109
1D 2A *n1 n2 d1...dn*]	Define downloaded bit image	68
1D 2F *m*	Print downloaded bit image	69
1D 3A	Select or cancel macro definition	110
1D 40 *n*	Erase user flash sector	114
1D 42 *n*	Select or cancel white/black reverse print mode	60
1D 48 *n*	Select printing position of HRI characters	98
1D 49 *n*	Transmit printer ID	84
1D 49 40 *n*	Transmit printer ID, remote diagnostics extension	85
1D 4C *nL nH*	Set left margin	49
1D 50 *x y*	Set horizontal and vertical minimum motion units	45
1D 56 *m*	Select cut mode and cut paper (or code 1D 56 *m n*)	39
1D 56 *m n*	Select cut mode and cut paper (or code 1D 56 m)	39
1D 57 *nL nH*	Set printing area width	50
1D 5C *nL nH*	Set relative vertical print position in page mode	109
1D 5E *r t m*	Execute macro	110
1D 61 *n*	Select or cancel unsolicited status mode	95
1D 62 *n*	Set smoothing	61
1D 66 *n*	Select pitch of HRI characters	99

Code (hexadecimal)	Command	Page
1D 68 *n*	Select bar code height	99
1D 6B *m d1…dk* 00 or	Print bar code	99
1D 6B *m n d1…dn*	Print bar code	99
1D 6B *n d1…* 00	Print GS1 Databar (RSS barcode), null terminated	102
1D 6B *m n*L *n*H *d1… dn*	Print GS1 DataBar (RSS barcode), data length specified	102
1D 6B FF *n*	Print Multiple Barcodes	101
1D 70 *a b c d e f*	Select PDF 417 parameters	103
1D 71 *a b c d e f*L *f*H	Set GS1 Databar (RSS) parameters	103
1D 72 *n*	Transmit status	87
1D 77 *n*	Select bar code width	104
1D 81 *m n*	Set paper type (for two-color printing)	40
1D 82 *n*1…*n*72 or … *n*80	Print raster monochrome graphics	70
1D 83 *n*1…*n*144 or … *n*160	Print raster color graphics	70
1D 84 *m n*1 *n*2 *d1…dx*	Download logo image	71
1D 85 *m n*	Reverse color text mode (two-color)	61
1D 86 *m*	Monochrome shade mode	72
1D 87 *m*	Color shade mode	73
1D 89 *n m*	Logo print with color plane swap	73
1D 8B *n m o*	Apply shading to logo	72
1D 8C *n m*	Merge watermark mode	72
1D 8D *n m*	Text strike-through mode	62
1D 90 *m x y o p q*	Form and merge real time surround graphic	73
1D 91 *n*	Save graphics buffer as logo	74
1D 92 *n*	Background logo print mode	74
1D 97 *m n*	User storage status	114
1D 99 *l m n o*	Apply margin message mode	75
1D 9A *n m o*	Shade and store logo	75
1D 9B *m n*	Logo print with knife cut	76
1D A0 *nl nh*	Set temporary maximum target speed	76
1D F0 01 *n*	Select font ID number	62
1D F0 02 *n*	Select font style number	62
1D F0 03	Save font ID number as default font at power up	63
1D F0 80	Download font	63
1D F0 C0 02	Download font list	63
1D FF	Reset firmware	119
1F 03 16 *f s p/t t*	LogoEZ® colorization	77
1F 03 16 05 *n*	Set interpretation of "Set current color" command	41

Code (hexadecimal)	Command	Page
1F 03 17 *a m s*	LogoEZ® attribute mapping	79
1F 04 *n*	Convert 6-dots/mm bitmap to 8-dots/mm bitmap	81
1F 05 *n*	Select superscript or subscript modes	63
1F 08 00	Restore default settings	119
1F 08 01 *n1 n2 n3 n4*	Set IP address	119
1F 08 02 *n1 n2 n3 n4*	Set net mask	119
1F 08 03 *n1 n2 n3 n4*	Set gateway	120
1F 08 04 *n1 n2 n3 n4*	Set raw TCPIP port	120
1F 08 05 *n1*	LP Daemon	120
1F 08 06 *n1*	Telnet Daemon	120
1F 08 07 *n1*	BootP	120
1F 08 08 *n1*	DHCP (auto-configuration)	121
1F 08 09 *n1*	Inactivity timeout	121
1F 08 0A *n1*	Keep-alive pings (arps)	121
1F 26 *s c1 c2*	Define extended user-defined character set	55
1F 56	Send printer software version	88
1F 69 *n*	Select active user-defined character set	64
1F 74	Print test form	41
1F 7A	Real time commands disable	94
1F 7B n	Enable constant speed logos	81

Appendix B:
Resident Character Sets

Character sets

Code page 437 (US)

	0x	1x	2x	3x	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0			SP	0	@	P	`	p	Ç	É	á	░	└	╨	∝	≡
x1			!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	β	±
x2			"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
x3			#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
x4			$	4	D	T	d	t	ä	ö	ñ	┤	─	╘	Σ	⌠
x5			%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
x6			&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
x7			'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
x8			(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
x9			)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	•
xA			*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
xB			+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
xC			,	<	L	\	l	|	î	£	¼	╝	╠	▄	∞	ⁿ
xD			-	=	M	]	m	}	ì	¥	¡	╜	═	▌	∅	²
xE			.	>	N	^	n	~	Ä	₧	«	╛	╬	▐	ε	■
xF			/	?	O	_	o	⌂	Å	ƒ	»	┐	╧	▀	∩	BLANK

A799-PG00001D

Code page 737 (Greek)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
x0	(0)	(16)	SP (32)	0 (48)	@ (64)	P (80)	` (96)	p (112)	A (128)	P (144)	ι (160)	░ (176)	└ (192)	╨ (208)	ω (224)	Ώ (240)
x1	(1)	(17)	! (33)	1 (49)	A (65)	Q (81)	a (97)	q (113)	Β (129)	Σ (145)	κ (161)	▒ (177)	┴ (193)	╤ (209)	ά (225)	± (241)
x2	(2)	(18)	" (34)	2 (50)	B (66)	R (82)	b (98)	r (114)	Γ (130)	T (146)	λ (162)	▓ (178)	┬ (194)	╥ (210)	έ (226)	≥ (242)
x3	(3)	(19)	# (35)	3 (51)	C (67)	S (83)	c (99)	s (115)	Δ (131)	Y (147)	μ (163)	│ (179)	├ (195)	╙ (211)	ή (227)	≤ (243)
x4	(4)	(20)	$ (36)	4 (52)	D (68)	T (84)	d (100)	t (116)	E (132)	φ (148)	ν (164)	┤ (180)	─ (196)	╘ (212)	ï (228)	Ϊ (244)
x5	(5)	(21)	% (37)	5 (53)	E (69)	U (85)	e (101)	u (117)	Z (133)	X (149)	ξ (165)	╡ (181)	┼ (197)	╒ (213)	ί (229)	Ϋ (245)
x6	(6)	(22)	& (38)	6 (54)	F (70)	V (86)	f (102)	v (118)	H (134)	Ψ (150)	ο (166)	╢ (182)	╞ (198)	╓ (214)	ό (230)	÷ (246)
x7	(7)	(23)	' (39)	7 (55)	G (71)	W (87)	g (103)	w (119)	Θ (135)	Ω (151)	π (167)	╖ (183)	╟ (199)	╫ (215)	ύ (231)	≈ (247)
x8	(8)	(24)	((40)	8 (56)	H (72)	X (88)	h (104)	x (120)	I (136)	α (152)	ρ (168)	╕ (184)	╚ (200)	╪ (216)	ϋ (232)	° (248)
x9	(9)	(25)	) (41)	9 (57)	I (73)	Y (89)	i (105)	y (121)	K (137)	β (153)	σ (169)	╣ (185)	╔ (201)	┘ (217)	ώ (233)	∙ (249)
xA	(10)	(26)	* (42)	: (58)	J (74)	Z (90)	j (106)	z (122)	Λ (138)	γ (154)	ς (170)	║ (186)	╩ (202)	┌ (218)	Ά (234)	· (250)
xB	(11)	(27)	+ (43)	; (59)	K (75)	[(91)	k (107)	{ (123)	M (139)	δ (155)	τ (171)	╗ (187)	╦ (203)	█ (219)	Έ (235)	√ (251)
xC	(12)	(28)	, (44)	< (60)	L (76)	\ (92)	l (108)	| (124)	N (140)	ε (156)	υ (172)	╝ (188)	╠ (204)	▄ (220)	Ή (236)	ⁿ (252)
xD	(13)	(29)	- (45)	= (61)	M (77)	] (93)	m (109)	} (125)	Ξ (141)	ζ (157)	φ (173)	╜ (189)	═ (205)	▌ (221)	Ί (237)	² (253)
xE	(14)	(30)	. (46)	> (62)	N (78)	^ (94)	n (110)	~ (126)	O (142)	η (158)	χ (174)	╛ (190)	╬ (206)	▐ (222)	Ό (238)	■ (254)
xF	(15)	(31)	/ (47)	? (63)	O (79)	_ (95)	o (111)	DEL △ (127)	Π (143)	θ (159)	ψ (175)	┐ (191)	╧ (207)	▀ (223)	Ύ (239)	BLANK (255)

Code page 850 (Multilingual)

00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0	16	0 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	▒ 176	└ 192	ð 208	Ó 224	─ 240
1	17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▒ 177	┴ 193	Ð 209	ß 225	± 241
2	18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	▓ 178	┬ 194	Ê 210	Ô 226	= 242
3	19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ò 227	¾ 243
4	20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	È 212	õ 228	¶ 244
5	21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	Á 181	┼ 197	ı 213	Õ 229	§ 245
6	22	& 38	6 54	F 70	V 86	f 103	v 118	å 134	û 150	ª 166	Â 182	ã 198	Í 214	µ 230	÷ 246
7	23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	º 167	À 183	Ã 199	Î 215	þ 231	¸ 247
8	24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	© 184	╚ 200	Ï 216	Þ 232	° 248
9	25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	® 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249
10	26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250
11	27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	ø 155	½ 171	╗ 187	╦ 203	█ 219	Ù 235	¹ 251
12	28	, 44	< 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	ý 236	³ 252
13	29	- 45	= 61	M 77	] 93	m 109	} 125	ì 141	Ø 157	¡ 173	¢ 189	= 205	¦ 221	Ý 237	² 253
14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	× 158	« 174	¥ 190	╬ 206	Ì 222	¯ 238	■ 254
15	31	/ 47	? 63	O 79	_ 95	o 111	△ 127	Å 143	ƒ 159	» 175	┐ 191	¤ 207	▄ 223	´ 239	255

Code page 852 (Slavic)

Low \ High	0_	1_	2_	3_	4_	5_	6_	7_	8_	9_	A_	B_	C_	D_	E_	F_
_0				0	@	P	`	p	Ç	É	á	░	└	đ	Ó	
_1			!	1	A	Q	a	q	ü	Ĺ	í	▒	┴	Đ	ß	˝
_2			"	2	B	R	b	r	é	ĺ	ó	▓	┬	Ď	Ô	˛
_3			#	3	C	S	c	s	â	ô	ú	│	├	Ë	Ń	ˇ
_4			$	4	D	T	d	t	ä	ö	Ą	┤	─	ď	ń	˘
_5			%	5	E	U	e	u	ů	Ľ	ą	Á	┼	Ň	ň	§
_6			&	6	F	V	f	v	ć	ľ	Ž	Â	Ă	Í	Š	÷
_7			'	7	G	W	g	w	ç	Ś	ž	Ě	ă	Î	š	¸
_8			(	8	H	X	h	x	ł	ś	Ę	Ş	╚	ě	Ŕ	°
_9			)	9	I	Y	i	y	ë	Ö	ę	╣	╔	┘	Ú	¨
_A			*	:	J	Z	j	z	Ő	Ü	¬	║	╩	┌	ŕ	˙
_B			+	;	K	[	k	{	ő	Ť	ź	╗	╦	█	Ű	ű
_C			,	<	L	\	l	|	î	ť	Č	╝	╠	▄	ý	Ř
_D			-	=	M	]	m	}	Ź	Ł	ş	Ż	═	Ţ	Ý	ř
_E			.	>	N	^	n	~	Ä	×	«	ż	╬	Ů	ţ	■
_F			/	?	O	_	o	△	Ć	č	»	┐	¤	▀	´	

Code page 857 (Turkish)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
x0	(0)	(16)	SP (32)	0 (48)	@ (64)	P (80)	` (96)	p (112)	Ç (128)	É (144)	á (160)	░ (176)	└ (192)	o (208)	Ó (224)	(240)
x1	(1)	(17)	! (33)	1 (49)	A (65)	Q (81)	a (97)	q (113)	ü (129)	æ (145)	í (161)	▒ (177)	⊥ (193)	ª (209)	ß (225)	± (241)
x2	(2)	(18)	" (34)	2 (50)	B (66)	R (82)	b (98)	r (114)	é (130)	Æ (146)	ó (162)	▓ (178)	┬ (194)	Ê (210)	Ô (226)	¾ (242)
x3	(3)	(19)	# (35)	3 (51)	C (67)	S (83)	c (99)	s (115)	â (131)	ô (147)	ú (163)	│ (179)	├ (195)	Ë (211)	Ò (227)	¶ (243)
x4	(4)	(20)	$ (36)	4 (52)	D (68)	T (84)	d (100)	t (116)	ä (132)	ö (148)	ñ (164)	┤ (180)	─ (196)	È (212)	õ (228)	§ (244)
x5	(5)	(21)	% (37)	5 (53)	E (69)	U (85)	e (101)	u (117)	à (133)	ò (149)	Ñ (165)	Á (181)	┼ (197)	(213)	Õ (229)	÷ (245)
x6	(6)	(22)	& (38)	6 (54)	F (70)	V (86)	f (102)	v (118)	å (134)	û (150)	Ğ (166)	Â (182)	ã (198)	Í (214)	µ (230)	¸ (246)
x7	(7)	(23)	' (39)	7 (55)	G (71)	W (87)	g (103)	w (119)	ç (135)	ù (151)	ğ (167)	À (183)	Ã (199)	Î (215)	(231)	° (247)
x8	(8)	(24)	((40)	8 (56)	H (72)	X (88)	h (104)	x (120)	ê (136)	İ (152)	¿ (168)	© (184)	╚ (200)	ï (216)	× (232)	° (248)
x9	(9)	(25)	) (41)	9 (57)	I (73)	Y (89)	i (105)	y (121)	ë (137)	Ö (153)	® (169)	╣ (185)	╔ (201)	┘ (217)	Ú (233)	¨ (249)
xA	(10)	(26)	* (42)	: (58)	J (74)	Z (90)	j (106)	z (122)	è (138)	Ü (154)	¬ (170)	║ (186)	╩ (202)	┌ (218)	Û (234)	· (250)
xB	(11)	(27)	+ (43)	; (59)	K (75)	[(91)	k (107)	{ (123)	ï (139)	ø (155)	½ (171)	╗ (187)	╦ (203)	█ (219)	Ù (235)	¹ (251)
xC	(12)	(28)	, (44)	< (60)	L (76)	\ (92)	l (108)		(124)	î (140)	£ (156)	¼ (172)	╝ (188)	╠ (204)	▄ (220)	ì (236)	³ (252)
xD	(13)	(29)	- (45)	= (61)	M (77)	] (93)	m (109)	} (125)	ı (141)	Ø (157)	¡ (173)	¢ (189)	= (205)	¦ (221)	ÿ (237)	² (253)
xE	(14)	(30)	. (46)	> (62)	N (78)	^ (94)	n (110)	~ (126)	Ä (142)	Ş (158)	« (174)	¥ (190)	╬ (206)	Ì (222)	¯ (238)	■ (254)
xF	(15)	(31)	/ (47)	? (63)	O (79)	_ (95)	o (111)	DEL △ (127)	Å (143)	ş (159)	» (175)	┐ (191)	¤ (207)	▄ (223)	´ (239)	(255)

Code page 858 (with Eurosymbol)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0	0	16	32	0 (48)	@ (64)	P (80)	` (96)	p (112)	Ç (128)	É (144)	á (160)	░ (176)	└ (192)	ð (208)	Ó (224)	(240)
1	1	17	! (33)	1 (49)	A (65)	Q (81)	a (97)	q (113)	ü (129)	æ (145)	í (161)	▒ (177)	┴ (193)	Ð (209)	ß (225)	± (241)
2	2	18	" (34)	2 (50)	B (66)	R (82)	b (98)	r (114)	é (130)	Æ (146)	ó (162)	▓ (178)	┬ (194)	Ê (210)	Ô (226)	= (242)
3	3	19	# (35)	3 (51)	C (67)	S (83)	c (99)	s (115)	â (131)	ô (147)	ú (163)	│ (179)	├ (195)	Ë (211)	Ò (227)	¾ (243)
4	4	20	$ (36)	4 (52)	D (68)	T (84)	d (100)	t (116)	ä (132)	ö (148)	ñ (164)	┤ (180)	─ (196)	È (212)	õ (228)	¶ (244)
5	5	21	% (37)	5 (53)	E (69)	U (85)	e (101)	u (117)	à (133)	ò (149)	Ñ (165)	Á (181)	┼ (197)	€ (213)	Õ (229)	§ (245)
6	6	22	& (38)	6 (54)	F (70)	V (86)	f (103)	v (118)	å (134)	û (150)	ª (166)	Â (182)	ã (198)	Í (214)	µ (230)	÷ (246)
7	7	23	' (39)	7 (55)	G (71)	W (87)	g (103)	w (119)	ç (135)	ù (151)	º (167)	À (183)	Ã (199)	Î (215)	þ (231)	¸ (247)
8	8	24	((40)	8 (56)	H (72)	X (88)	h (104)	x (120)	ê (136)	ÿ (152)	¿ (168)	© (184)	╚ (200)	Ï (216)	Þ (232)	° (248)
9	9	25	) (41)	9 (57)	I (73)	Y (89)	i (105)	y (121)	ë (137)	Ö (153)	® (169)	╣ (185)	╔ (201)	┘ (217)	Ú (233)	¨ (249)
A	10	26	* (42)	: (58)	J (74)	Z (90)	j (106)	z (122)	è (138)	Ü (154)	¬ (170)	║ (186)	╩ (202)	┌ (218)	Û (234)	· (250)
B	11	27	+ (43)	; (59)	K (75)	[(91)	k (107)	{ (123)	ï (139)	ø (155)	½ (171)	╗ (187)	╦ (203)	█ (219)	Ù (235)	¹ (251)
C	12	28	, (44)	< (60)	L (76)	\ (92)	l (108)	| (124)	î (140)	£ (156)	¼ (172)	╝ (188)	╠ (204)	▄ (220)	ý (236)	³ (252)
D	13	29	- (45)	= (61)	M (77)	] (93)	m (109)	} (125)	ì (141)	Ø (157)	¡ (173)	¢ (189)	═ (205)	▌ (221)	Ý (237)	² (253)
E	14	30	. (46)	> (62)	N (78)	^ (94)	n (110)	~ (126)	Ä (142)	× (158)	« (174)	¥ (190)	╬ (206)	▐ (222)	¯ (238)	■ (254)
F	15	31	/ (47)	? (63)	O (79)	_ (95)	o (111)	△ (127)	Å (143)	ƒ (159)	» (175)	┐ (191)	¤ (207)	▀ (223)	´ (239)	(255)

Code page 860 (Portuguese)

00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
NUL (0)	(16)	SP (32)	0 (48)	@ (64)	P (80)	` (96)	p (112)	Ç (128)	É (144)	á (160)	░ (176)	└ (192)	╨ (208)	α (224)	≡ (240)
(1)	XON (17)	! (33)	1 (49)	A (65)	Q (81)	a (97)	q (113)	ü (129)	À (145)	í (161)	▒ (177)	┴ (193)	╤ (209)	β (225)	± (241)
(2)	(18)	" (34)	2 (50)	B (66)	R (82)	b (98)	r (114)	é (130)	È (146)	ó (162)	▓ (178)	┬ (194)	╥ (210)	Γ (226)	≥ (242)
(3)	XOFF (19)	# (35)	3 (51)	C (67)	S (83)	c (99)	s (115)	â (131)	ô (147)	ú (163)	│ (179)	├ (195)	╙ (211)	π (227)	≤ (243)
(4)	(20)	$ (36)	4 (52)	D (68)	T (84)	d (100)	t (116)	ã (132)	õ (148)	ñ (164)	┤ (180)	─ (196)	╘ (212)	Σ (228)	⌠ (244)
(5)	(21)	% (37)	5 (53)	E (69)	U (85)	e (101)	u (117)	à (133)	ò (149)	Ñ (165)	╡ (181)	┼ (197)	╒ (213)	σ (229)	⌡ (245)
(6)	(22)	& (38)	6 (54)	F (70)	V (86)	f (102)	v (118)	Á (134)	Ú (150)	ª (166)	╢ (182)	╞ (198)	╓ (214)	µ (230)	÷ (246)
(7)	(23)	' (39)	7 (55)	G (71)	W (87)	g (103)	w (119)	ç (135)	ù (151)	º (167)	╖ (183)	╟ (199)	╫ (215)	τ (231)	≈ (247)
(8)	(24)	((40)	8 (56)	H (72)	X (88)	h (104)	x (120)	ê (136)	Ì (152)	¿ (168)	╕ (184)	╚ (200)	╪ (216)	Φ (232)	° (248)
(9)	(25)	) (41)	9 (57)	I (73)	Y (89)	i (105)	y (121)	Ê (137)	Õ (153)	Ò (169)	╣ (185)	╔ (201)	┘ (217)	Θ (233)	• (249)
LF (10)	(26)	* (42)	: (58)	J (74)	Z (90)	j (106)	z (122)	è (138)	Ü (154)	¬ (170)	║ (186)	╩ (202)	┌ (218)	Ω (234)	· (250)
(11)	ESC (27)	+ (43)	; (59)	K (75)	[(91)	k (107)	{ (123)	Í (139)	¢ (155)	½ (171)	╗ (187)	╦ (203)	█ (219)	δ (235)	√ (251)
(12)	(28)	, (44)	< (60)	L (76)	\ (92)	l (108)	| (124)	Ô (140)	£ (156)	¼ (172)	╝ (188)	╠ (204)	▄ (220)	∞ (236)	ⁿ (252)
CR (13)	GS (29)	- (45)	= (61)	M (77)	] (93)	m (109)	} (125)	ì (141)	Ú (157)	¡ (173)	╜ (189)	═ (205)	▌ (221)	∅ (237)	² (253)
(14)	(30)	. (46)	> (62)	N (78)	^ (94)	n (110)	~ (126)	Ã (142)	Pt (158)	« (174)	╛ (190)	╬ (206)	▐ (222)	ε (238)	■ (254)
(15)	(31)	/ (47)	? (63)	O (79)	_ (95)	o (111)	SP (127)	Â (143)	Ó (159)	» (175)	┐ (191)	╧ (207)	▀ (223)	∩ (239)	(255)

Code page 862 (Hebrew)

00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0	16	32	0 48	@ 64	P 80	` 96	p 112	א 128	נ 144	á 160	▓ 176	└ 192	╨ 208	∝ 224	≡ 240
01 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 ב 129	91 ס 145	A1 í 161	B1 ▒ 177	C1 ┴ 193	D1 ╤ 209	E1 β 225	F1 ± 241
02 2	12 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 ג 130	92 ע 146	A2 ó 162	B2 ▓ 178	C2 ┬ 194	D2 ╥ 210	E2 Γ 226	F2 ≥ 242
03 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 ד 131	93 ף 147	A3 ú 163	B3 │ 179	C3 ├ 195	D3 ╙ 211	E3 π 227	F3 ≤ 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 ה 132	94 פ 148	A4 ñ 164	B4 ┤ 180	C4 ─ 196	D4 ╘ 212	E4 Σ 228	F4 ⌠ 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 ו 133	95 ץ 149	A5 Ñ 165	B5 ╡ 181	C5 ┼ 197	D5 ╒ 213	E5 σ 229	F5 ⌡ 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 ז 134	96 צ 150	A6 ª 166	B6 ╢ 182	C6 ╞ 198	D6 ╓ 214	E6 μ 230	F6 ÷ 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 ח 135	97 ק 151	A7 º 167	B7 ╖ 183	C7 ╟ 199	D7 ╫ 215	E7 τ 231	F7 ≈ 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 ט 136	98 ר 152	A8 ¿ 168	B8 ╕ 184	C8 ╚ 200	D8 ╪ 216	E8 Φ 232	F8 ° 248
09 9	19 25	29) 41	39 9 57	49 I 73	59 Y 89	69 i 105	79 y 121	89 י 137	99 ש 153	A9 ⌐ 169	B9 ╣ 185	C9 ╔ 201	D9 ┘ 217	E9 Θ 233	F9 • 249
0A 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A ך 138	9A ת 154	AA ¬ 170	BA ║ 186	CA ╩ 202	DA ┌ 218	EA Ω 234	FA · 250
0B 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B כ 139	9B ¢ 155	AB ½ 171	BB ╗ 187	CB ╦ 203	DB █ 219	EB δ 235	FB √ 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C	124	8C ל 140	9C £ 156	AC ¼ 172	BC ╝ 188	CC ╠ 204	DC ▄ 220	EC ∞ 236	FC ⁿ 252
0D 13	1D 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D ם 141	9D ¥ 157	AD ¡ 173	BD ╜ 189	CD ═ 205	DD ▌ 221	ED ∅ 237	FD ² 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E מ 142	9E Pt 158	AE « 174	BE ╛ 190	CE ╬ 206	DE ▐ 222	EE ε 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F △ 127	8F ן 143	9F ƒ 159	AF ¤ 175	BF ┐ 191	CF ╧ 207	DF ▀ 223	EF ∩ 239	FF 255

Code page 863 (French Canadian)

00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
NUL (0)	(16)	SP (32)	0 (48)	@ (64)	P (80)	` (96)	p (112)	Ç (128)	É (144)	¦ (160)	▒ (176)	└ (192)	╨ (208)	α (224)	≡ (240)
01 (1)	XON (17)	! (33)	1 (49)	A (65)	Q (81)	a (97)	q (113)	ü (129)	È (145)	´ (161)	▓ (177)	┴ (193)	╤ (209)	β (225)	± (241)
02 (2)	12 (18)	" (34)	2 (50)	B (66)	R (82)	b (98)	r (114)	é (130)	Ê (146)	ó (162)	▓ (178)	┬ (194)	╥ (210)	Γ (226)	≥ (242)
03 (3)	XOFF (19)	# (35)	3 (51)	C (67)	S (83)	c (99)	s (115)	â (131)	ô (147)	ú (163)	│ (179)	├ (195)	╙ (211)	π (227)	≤ (243)
04 (4)	14 (20)	$ (36)	4 (52)	D (68)	T (84)	d (100)	t (116)	Â (132)	Ë (148)	¨ (164)	┤ (180)	─ (196)	╘ (212)	Σ (228)	⌠ (244)
05 (5)	15 (21)	% (37)	5 (53)	E (69)	U (85)	e (101)	u (117)	à (133)	Ï (149)	¸ (165)	╡ (181)	┼ (197)	╒ (213)	σ (229)	⌡ (245)
06 (6)	16 (22)	& (38)	6 (54)	F (70)	V (86)	f (103)	v (118)	¶ (134)	û (150)	³ (166)	╢ (182)	╞ (198)	╓ (214)	μ (230)	÷ (246)
07 (7)	17 (23)	' (39)	7 (55)	G (71)	W (87)	g (103)	w (119)	ç (135)	ù (151)	‾ (167)	╖ (183)	╟ (199)	╫ (215)	τ (231)	≈ (247)
08 (8)	18 (24)	((40)	8 (56)	H (72)	X (88)	h (104)	x (120)	ê (136)	¤ (152)	Î (168)	╕ (184)	╚ (200)	╪ (216)	Φ (232)	° (248)
09 (9)	19 (25)	) (41)	9 (57)	I (73)	Y (89)	i (105)	y (121)	ë (137)	Ô (153)	⌐ (169)	╣ (185)	╔ (201)	┘ (217)	Θ (233)	● (249)
0A LF (10)	1A (26)	* (42)	: (58)	J (74)	Z (90)	j (106)	z (122)	è (138)	Ü (154)	¬ (170)	║ (186)	╩ (202)	┌ (218)	Ω (234)	• (250)
0B (11)	1B ESC (27)	+ (43)	; (59)	K (75)	[(91)	k (107)	{ (123)	ï (139)	¢ (155)	½ (171)	╗ (187)	╦ (203)	█ (219)	δ (235)	√ (251)
0C (12)	1C (28)	, (44)	< (60)	L (76)	\ (92)	l (108)		(124)	î (140)	£ (156)	¼ (172)	╝ (188)	╠ (204)	▄ (220)	∞ (236)	ⁿ (252)
0D CR (13)	1D GS (29)	- (45)	= (61)	M (77)	] (93)	m (109)	} (125)	= (141)	ù (157)	¾ (173)	╜ (189)	═ (205)	█ (221)	∅ (237)	² (253)
0E (14)	1E (30)	. (46)	> (62)	N (78)	^ (94)	n (110)	~ (126)	À (142)	Û (158)	« (174)	╛ (190)	╬ (206)	▀ (222)	ε (238)	▪ (254)
0F (15)	1F (31)	/ (47)	? (63)	O (79)	_ (95)	o (111)	SP (127)	§ (143)	ƒ (159)	» (175)	┐ (191)	╧ (207)	▀ (223)	∩ (239)	(255)

Code page 865 (Nordic)

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0	(0)	(16)	(32)	0 (48)	@ (64)	P (80)	` (96)	p (112)	Ç (128)	É (144)	á (160)	░ (176)	└ (192)	╨ (208)	∝ (224)	≡ (240)
1	(1)	(17)	! (33)	1 (49)	A (65)	Q (81)	a (97)	q (113)	ü (129)	æ (145)	í (161)	▒ (177)	┴ (193)	╤ (209)	β (225)	± (241)
2	(2)	(18)	" (34)	2 (50)	B (66)	R (82)	b (98)	r (114)	é (130)	Æ (146)	ó (162)	▓ (178)	┬ (194)	╥ (210)	Γ (226)	≥ (242)
3	(3)	(19)	# (35)	3 (51)	C (67)	S (83)	c (99)	s (115)	â (131)	ô (147)	ú (163)	│ (179)	├ (195)	╙ (211)	π (227)	≤ (243)
4	(4)	(20)	$ (36)	4 (52)	D (68)	T (84)	d (100)	t (116)	ä (132)	ö (148)	ñ (164)	┤ (180)	─ (196)	╘ (212)	Σ (228)	⌠ (244)
5	(5)	(21)	% (37)	5 (53)	E (69)	U (85)	e (101)	u (117)	à (133)	ò (149)	Ñ (165)	╡ (181)	┼ (197)	╒ (213)	σ (229)	⌡ (245)
6	(6)	(22)	& (38)	6 (54)	F (70)	V (86)	f (102)	v (118)	å (134)	û (150)	ª (166)	╢ (182)	╞ (198)	╓ (214)	µ (230)	÷ (246)
7	(7)	(23)	' (39)	7 (55)	G (71)	W (87)	g (103)	w (119)	ç (135)	ù (151)	º (167)	╖ (183)	╟ (199)	╫ (215)	τ (231)	≈ (247)
8	(8)	(24)	((40)	8 (56)	H (72)	X (88)	h (104)	x (120)	ê (136)	ÿ (152)	¿ (168)	╕ (184)	╚ (200)	╪ (216)	Φ (232)	° (248)
9	(9)	(25)	) (41)	9 (57)	I (73)	Y (89)	i (105)	y (121)	ë (137)	Ö (153)	⌐ (169)	╣ (185)	╔ (201)	┘ (217)	Θ (233)	∙ (249)
A	(10)	(26)	* (42)	: (58)	J (74)	Z (90)	j (106)	z (122)	è (138)	Ü (154)	¬ (170)	║ (186)	╩ (202)	┌ (218)	Ω (234)	· (250)
B	(11)	(27)	+ (43)	; (59)	K (75)	[(91)	k (107)	{ (123)	ï (139)	ø (155)	½ (171)	╗ (187)	╦ (203)	█ (219)	δ (235)	√ (251)
C	(12)	(28)	, (44)	< (60)	L (76)	\ (92)	l (108)	| (124)	î (140)	£ (156)	¼ (172)	╝ (188)	╠ (204)	▄ (220)	∞ (236)	ⁿ (252)
D	(13)	(29)	- (45)	= (61)	M (77)	] (93)	m (109)	} (125)	ì (141)	Ø (157)	¡ (173)	╜ (189)	═ (205)	▌ (221)	∅ (237)	² (253)
E	(14)	(30)	. (46)	> (62)	N (78)	^ (94)	n (110)	~ (126)	Ä (142)	Pt (158)	« (174)	╛ (190)	╬ (206)	▐ (222)	ε (238)	■ (254)
F	(15)	(31)	/ (47)	? (63)	O (79)	_ (95)	o (111)	⌂ (127)	Å (143)	ƒ (159)	¤ (175)	┐ (191)	╧ (207)	▀ (223)	∩ (239)	(255)

Code page 866 (Cyrillic)

00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0	16	32	0 / 48	@ / 64	P / 80	` / 96	p / 112	А / 128	Р / 144	а / 160	▓ / 176	└ / 192	╨ / 208	р / 224	Ё / 240
01 / 1	11 / 17	21 / 33	1 / 49	A / 65	Q / 81	a / 97	q / 113	Б / 129	С / 145	б / 161	▒ / 177	┴ / 193	╤ / 209	с / 225	ё / 241
02 / 2	12 / 18	" / 34	2 / 50	B / 66	R / 82	b / 98	r / 114	В / 130	Т / 146	в / 162	▓ / 178	┬ / 194	╥ / 210	т / 226	Є / 242
03 / 3	13 / 19	# / 35	3 / 51	C / 67	S / 83	c / 99	s / 115	Г / 131	У / 147	г / 163	│ / 179	├ / 195	╙ / 211	у / 227	є / 243
04 / 4	14 / 20	$ / 36	4 / 52	D / 68	T / 84	d / 100	t / 116	Д / 132	Ф / 148	д / 164	┤ / 180	─ / 196	╘ / 212	ф / 228	Ї / 244
05 / 5	15 / 21	% / 37	5 / 53	E / 69	U / 85	e / 101	u / 117	Е / 133	Х / 149	е / 165	╡ / 181	┼ / 197	╒ / 213	х / 229	ї / 245
06 / 6	16 / 22	& / 38	6 / 54	F / 70	V / 86	f / 103	v / 118	Ж / 134	Ц / 150	ж / 166	╢ / 182	╞ / 198	╓ / 214	ц / 230	ў / 246
07 / 7	17 / 23	' / 39	7 / 55	G / 71	W / 87	g / 103	w / 119	З / 135	Ч / 151	з / 167	╖ / 183	╟ / 199	╫ / 215	ч / 231	ў / 247
08 / 8	18 / 24	(/ 40	8 / 56	H / 72	X / 88	h / 104	x / 120	И / 136	Ш / 152	и / 168	╕ / 184	╚ / 200	╪ / 216	ш / 232	° / 248
09 / 9	19 / 25	) / 41	9 / 57	I / 73	Y / 89	i / 105	y / 121	Й / 137	Щ / 153	й / 169	╣ / 185	╔ / 201	╜ / 217	щ / 233	• / 249
0A / 10	1A / 26	* / 42	: / 58	J / 74	Z / 90	j / 106	z / 122	К / 138	Ъ / 154	к / 170	║ / 186	╩ / 202	╟ / 218	ъ / 234	· / 250
0B / 11	1B / 27	+ / 43	; / 59	K / 75	[/ 91	k / 107	{ / 123	Л / 139	Ы / 155	л / 171	╗ / 187	╦ / 203	■ / 219	ы / 235	√ / 251
0C / 12	1C / 28	, / 44	< / 60	L / 76	\ / 92	l / 108	| / 124	М / 140	Ь / 156	м / 172	╝ / 188	╠ / 204	▄ / 220	ь / 236	№ / 252
0D / 13	1D / 29	- / 45	= / 61	M / 77	] / 93	m / 109	} / 125	Н / 141	Э / 157	н / 173	╜ / 189	= / 205	▄ / 221	э / 237	¤ / 253
0E / 14	1E / 30	. / 46	> / 62	N / 78	^ / 94	n / 110	~ / 126	О / 142	Ю / 158	о / 174	╛ / 190	╬ / 206	▄ / 222	ю / 238	■ / 254
0F / 15	1F / 31	/ / 47	? / 63	O / 79	_ / 95	o / 111	△ / 127	П / 143	Я / 159	п / 175	┐ / 191	╧ / 207	▄ / 223	я / 239	255

Code page 1252 (Windows Latin 1)

00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
(0)	(16)	(32)	0 (48)	@ (64)	P (80)	` (96)	p (112)	€ (128)	Not Used (144)	NBSP (160)	° (176)	À (192)	Ð (208)	à (224)	ð (240)
(1)	(17)	(33)	1 (49)	A (65)	Q (81)	a (97)	q (113)	Not Used (129)	' (145)	¡ (161)	± (177)	Á (193)	Ñ (209)	á (225)	ñ (241)
(2)	(18)	" (34)	2 (50)	B (66)	R (82)	b (98)	r (114)	‚ (130)	' (146)	¢ (162)	² (178)	Â (194)	Ò (210)	â (226)	ò (242)
(3)	(19)	# (35)	3 (51)	C (67)	S (83)	c (99)	s (115)	ƒ (131)	" (147)	£ (163)	³ (179)	Ã (195)	Ó (211)	ã (227)	ó (243)
(4)	(20)	$ (36)	4 (52)	D (68)	T (84)	d (100)	t (116)	„ (132)	" (148)	¤ (164)	´ (180)	Ä (196)	Ô (212)	ä (228)	ô (244)
(5)	(21)	% (37)	5 (53)	E (69)	U (85)	e (101)	u (117)	… (133)	• (149)	¥ (165)	µ (181)	Å (197)	Õ (213)	å (229)	õ (245)
(6)	(22)	& (38)	6 (54)	F (70)	V (86)	f (102)	v (118)	† (134)	– (150)	¦ (166)	¶ (182)	Æ (198)	Ö (214)	æ (230)	ö (246)
(7)	(23)	' (39)	7 (55)	G (71)	W (87)	g (103)	w (119)	‡ (135)	— (151)	§ (167)	· (183)	Ç (199)	× (215)	ç (231)	÷ (247)
(8)	(24)	((40)	8 (56)	H (72)	X (88)	h (104)	x (120)	ˆ (136)	˜ (152)	¨ (168)	¸ (184)	È (200)	Ø (216)	è (232)	ø (248)
(9)	(25)	) (41)	9 (57)	I (73)	Y (89)	i (105)	y (121)	‰ (137)	™ (153)	© (169)	¹ (185)	É (201)	Ù (217)	é (233)	ù (249)
0A (10)	1A (26)	* (42)	: (58)	J (74)	Z (90)	j (106)	z (122)	Š (138)	š (154)	ª (170)	º (186)	Ê (202)	Ú (218)	ê (234)	ú (250)
0B (11)	1B (27)	+ (43)	; (59)	K (75)	[(91)	k (107)	{ (123)	‹ (139)	› (155)	« (171)	» (187)	Ë (203)	Û (219)	ë (235)	û (251)
0C (12)	1C (28)	, (44)	< (60)	L (76)	\ (92)	l (108)	| (124)	Œ (140)	œ (156)	¬ (172)	¼ (188)	Ì (204)	Ü (220)	ì (236)	ü (252)
0D (13)	1D (29)	- (45)	= (61)	M (77)	] (93)	m (109)	} (125)	Not Used (141)	Not Used (157)	SHY (173)	½ (189)	Í (205)	Ý (221)	í (237)	ý (253)
0E (14)	1E (30)	. (46)	> (62)	N (78)	^ (94)	n (110)	~ (126)	Ž (142)	ž (158)	® (174)	¾ (190)	Î (206)	Þ (222)	î (238)	þ (254)
0F (15)	1F (31)	/ (47)	? (63)	O (79)	_ (95)	o (111)	△ (127)	Not Used (143)	Ÿ (159)	¯ (175)	¿ (191)	Ï (207)	ß (223)	ï (239)	ÿ (255)