A794 Thermal Receipt Printer

Owner's Guide

TPG Inc.

A794-D100

Federal Communications Commission (FCC) Radio Frequency Interference Statement Warning

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 TPG, Inc. immediately.

TPG, Inc. 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 TPG, Inc. 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 TPG, Inc. power supply will require you to test the power supply and TPG, Inc. 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 TPG, Inc. 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.

この装置は，情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Disclaimer

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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.TPGprinters.com

Contents

Chapter 1: About this Guide

Description of printer

The A794 thermal receipt printer is extremely fast, quiet, and very reliable. With thermal printing technology, there is no ribbon cassette to change and paper loading is extremely simple. The printer is small enough to fit almost anywhere and is easy to use. Receipts exit from the top and there is no journal; as it is kept electronically by the host system.
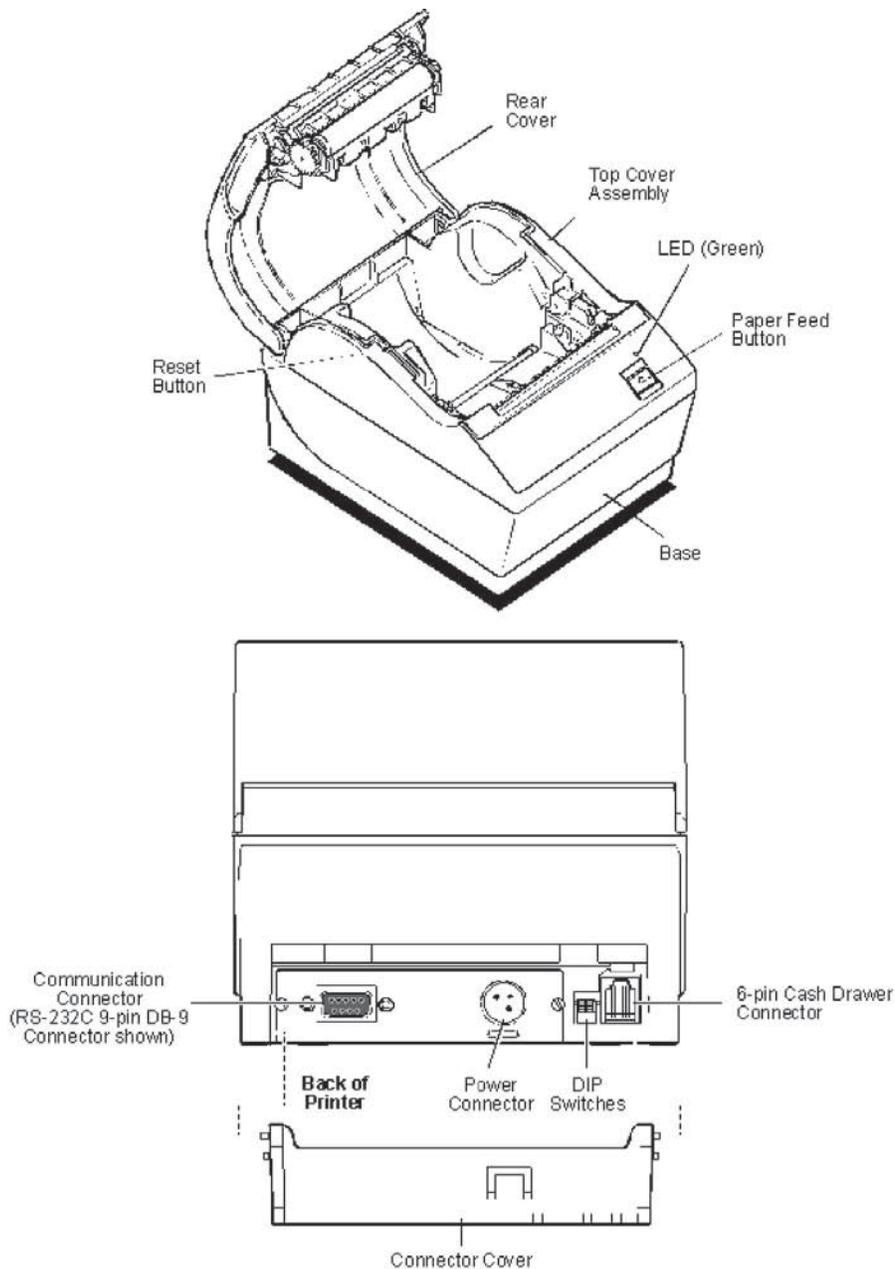
Models available

There are several models of the printer, depending on the communication interface and the combination of options selected.

Model identification

See the sample below to determine the configuration of the printer by the printer ID number.

```
A794 Model ID Key

A 7 9 4 - X  X  X  X
              │  │  │
              │  │  │  1 = no knife
              │  │  │  5 = knife
              │  │  │
              │  │  0 = standard character sets
              │  │  n = other expanded language versions
              │  │
              │  1 = light gray case
              │  2 = dark gray case
              │
              2 = 80.0 mm, 512K Flash
              3 = 82.5 mm, 512K Flash
              5 = 80.0 mm, 1MB Flash
              6 = 82.5 mm, 1MB Flash
```

Features

Interfaces	RS-232C, Parallel, USB, Ethernet
Memory/Firmware	512K Flash Memory, History EEROM, 4K Buffer (see "Options" for additional memory.)
Resident Character Sets	PC Code Page 437 (US), PC Code Page 850 (Multilingual), PC Code Page 852; Code Pages 737, 865, 858, 860, 863, 866, 874, and 1252.
Integrated Bar Codes	Code 39, UPC-A, UPC-E, JAN8 (EAN), JAN13 (EAN), Interleaved 2 of 5, Codabar, Code 93, Code 128, EAN 128, PDF-417 (two-dimensional).
Print	Host-selectable 44 or 56 columns of print on 80 mm wide thermal paper.
Print Resolution	8 dots/mm
Speed	Up to 130 mm/second throughput.
Human Interface	Speaker for software-generated tone. Drop-in paper loading. Configuration Menu for easy configuration.
Cash Drawer Driver	Connector for one or two cash drawers (use a "Y" cord for two drawers.)

Options

- Knife (Cutter)
- Power Supply: 55 Watt/75 Watt
- Power Cords: US, SEV, UK AC Cord, and Australia AC Cord
- 1MB memory
- Paper Low Sensor
- Paper Width
- 82.5 mm
- 80 mm
- Interface Boards
- RS 232C
- IEEE Bi-Directional Parallel
- Ethernet
- USB
- Powered USB

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Chapter 2: Using the Printer

Unpack the printer

Save all packing materials for use if printer needs to be repacked. Check that all items listed were shipped. For a single pack (multi-packs differ in packing configuration):

- Printer enclosed in a plastic bag with foam packing material

- Thermal starter paper roll (inside receipt bucket of printer)

- Test printout protecting the printhead (inside receipt bucket of printer)

- Power supply with cable (optional)

- Installation report card (please complete this form and return to TPG, Inc.)

- A794 Thermal Receipt Printer: Setup Guide

- Communication cable, (from host computer to printer, optional)
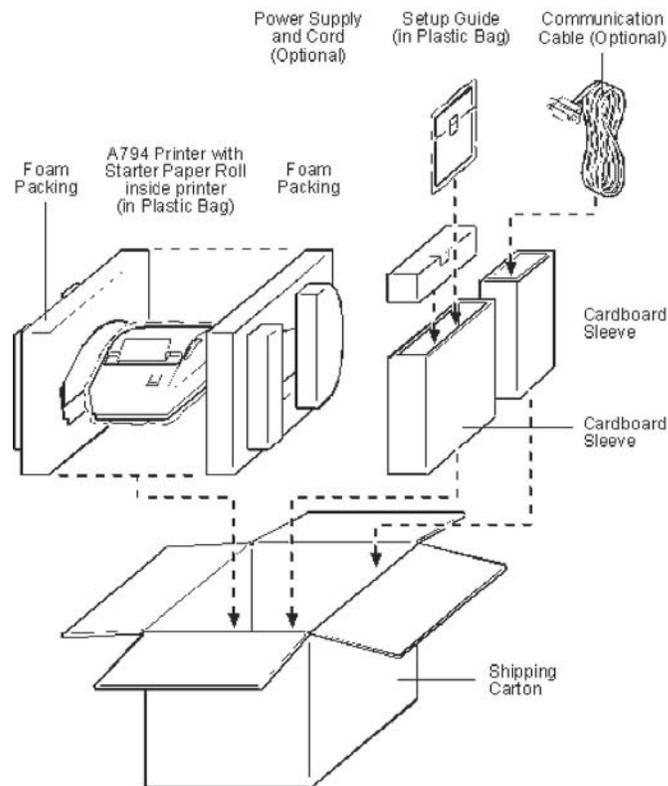
To report any missing items, or to report a printer that was damaged during shipping, call your supplier or call a TPG, Inc. representative at 1-877-209-0156.

Remove the starter paper roll supports
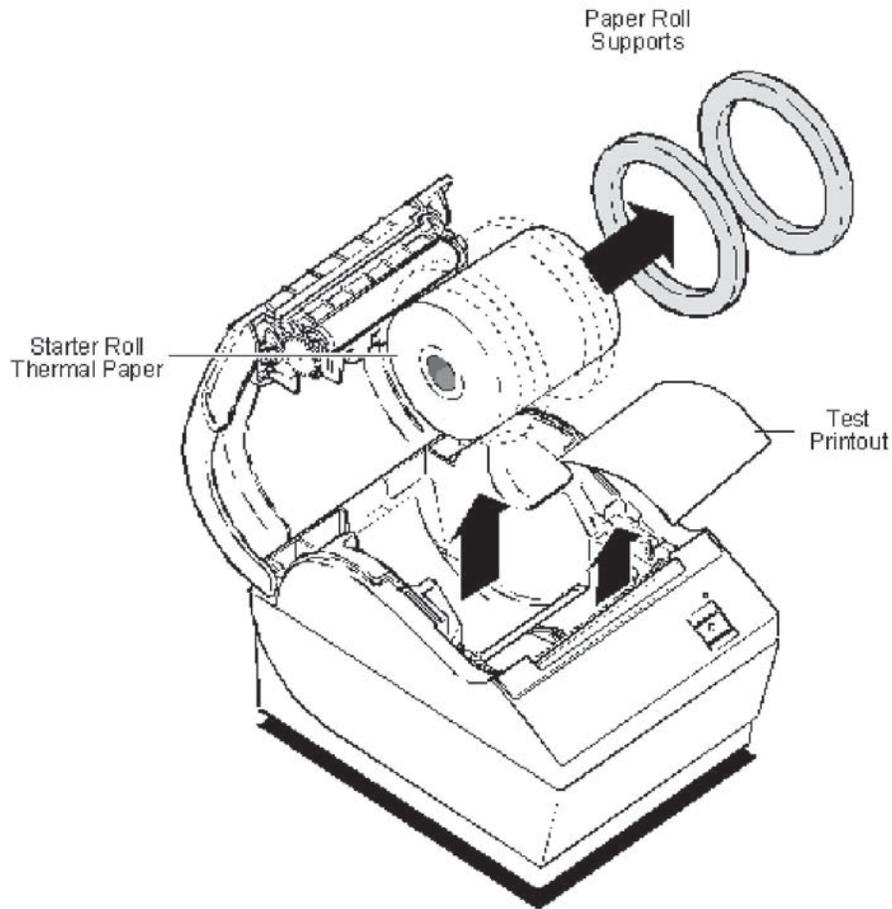
1. Open the rear cover by pushing up on each side of the cover until it unsnaps. Remove the test printout.

2. Lift the starter paper roll out of the paper bucket and slide the two paper roll supports off.

3. Remove all tape on the leading edge of the roll.

4. Place the starter paper roll back into the bucket so that it unrolls from the bottom.

5. Close the rear cover.

Choose a location

Install the printer flat on a level surface. Always be sure to leave room to open the cover and access the cables.

Note: Position printer in a location that allows access to the cables, room to open the cover and away from traffic areas to limit the chance of being knocked or damaged.

For more information about setting up the printer, see the A794 Setup Guide.

On a flat surface
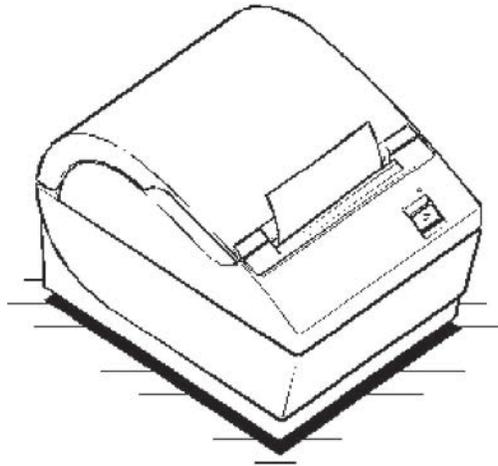
Connect the cables

Caution: Connect the cables to the printer before plugging in the power supply. If power is received from the host computer, turn it off before connecting any cables.
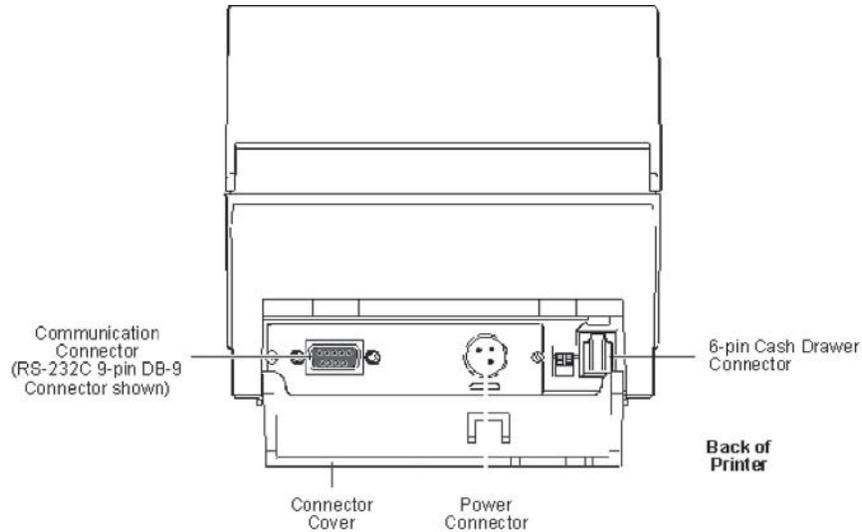
Note: Depending on your printer configuration, the connector panel may vary from the above illustration.

Communication cable

The communication cable connects the printer to the host computer. To install the communication cable:

1. Turn off the host computer.

2. Open the connector cover at the rear of the printer.

3. Attach the communication cable to the connector shown on the back of the printer above. Tighten the screws to secure the table.

4. Connect the cable to the host computer.

Cash drawer cable

The cash drawer cable connects the printer to one or two cash drawers.

1. Open the connector cover at the rear of the printer.

2. Plug the cable into the cash drawer connector (standard phone jack) located at the rear of the printer.

Note: If your system has two cash drawers, attach a Y-cable to the printer's cash drawer connector as shown. Leave some slack in the cord to route through the strain relief at a later time.
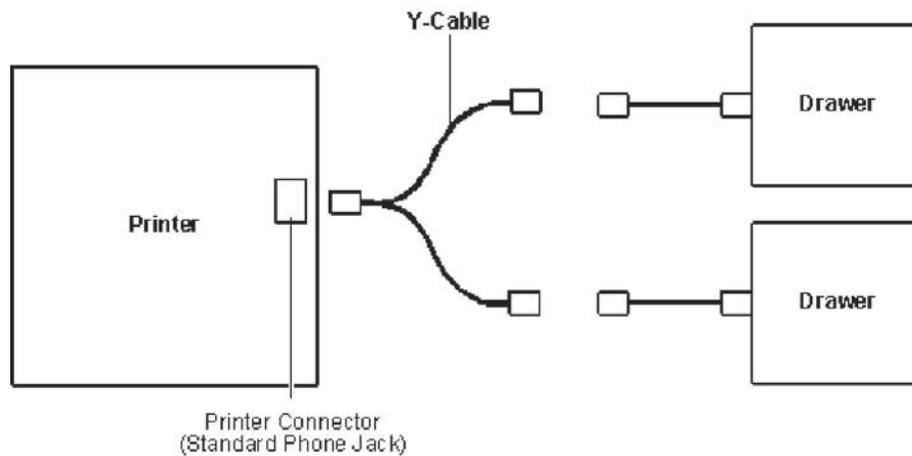
Power supply cable

Connect the power supply cable last.

1. Plug the power cord into the power supply.

2. Plug the power cord into the power connector located at the rear of the printer.

3. Snap the connector cover closed, ensuring that the communication, cash drawer, and power supply cables are aligned with the slots provided for each in the connector cover. Verify that the strain relief on the connector cover aligns with the power supply cable.

4. Plug the power supply into a grounded outlet. The green LED on the top cover will light up.

Printer controls
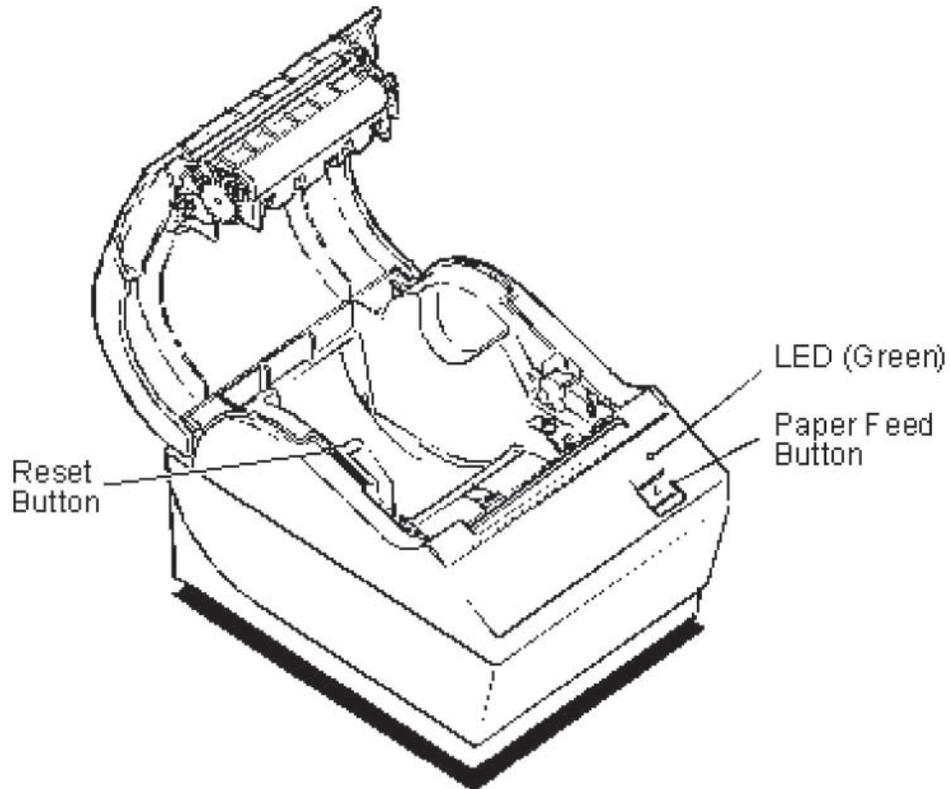
Reset button

Should a paper jam or fault condition occur, press the reset button to reset the printer. the printer performs a start-up routine, as if having been turned off, then on again.

Paper feed button

Press the paper feed button to advance the paper.

Use this button in conjunction with the reset button to print the diagnostic mode or allow access to the configuration menu.

LED

The green LED shows the printer status by shining or flashing. A continuous green (non-flashing) LED represents an "ON", no-fault condition.

Status	LED
Paper Is Low	Flashes Slowly
Paper Is Out	Flashes Quickly
Knife Jam	Flashes Quickly then Slowly

Tone

A single beep indicates that the printer has successfully completed its start-up routine (after having been reset or the power supply turned on).

If the printer beeps twice, a problem may be indicated.

For more information about	See these "sections"
Paper Feed Button	"Testing the Printer" "Configuring the Printer"
Reset Button	"Troubleshooting the Printer" "Testing the Printer" "Configuring the Printer"
LED	"Troubleshooting the Printer"
Tone	"Troubleshooting the Printer"

Loading receipt paper

Change the paper when any of the following conditions occur:

- Colored stripe appears on the receipt paper; indicating that the paper is low -

    Change the paper as soon as possible to avoid running out of paper part way through a transaction.

- Green LED flashes slowly indicating the paper is low -

    Change the paper as soon as possible to avoid running out of paper part way through a transaction.

- Green LED flashes quickly; indicating the paper is out -

    Change the paper immediately or data may be lost.

Caution: Do not operate the printer or host computer if the printer runs out of paper. The printer will not operate without paper, but it may continue to accept data from the host computer. Because the printer cannot print that additional data, it may be lost.

To load the paper:
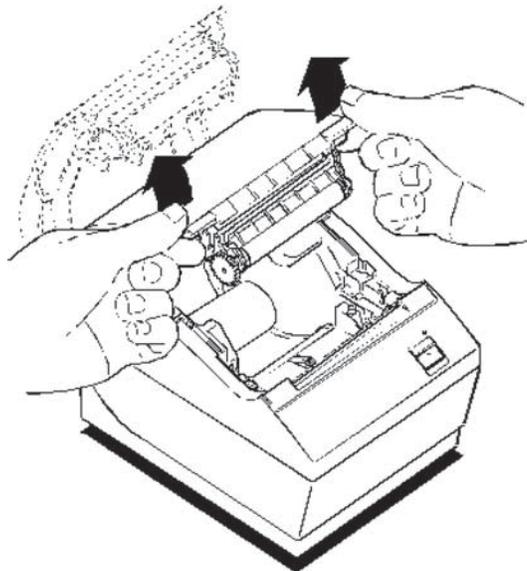
1. Open the rear cover by lifting up on each side of the cover until it unsnaps.
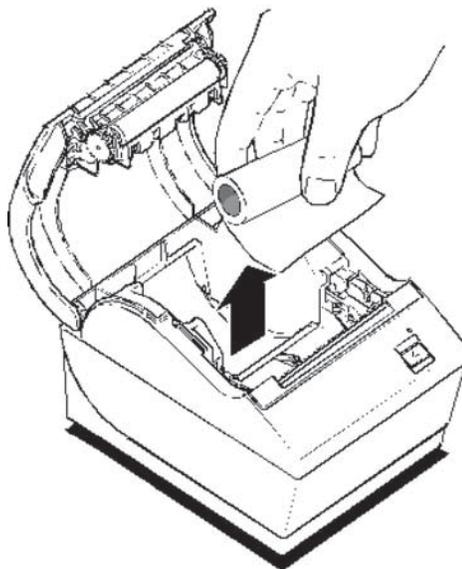
2. Remove the used paper roll.
3. Tear off the end of the new roll, so that the edge is loose.
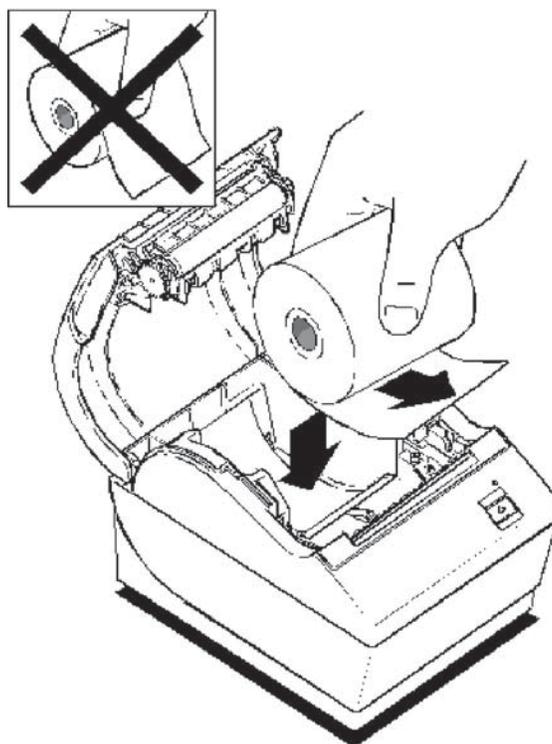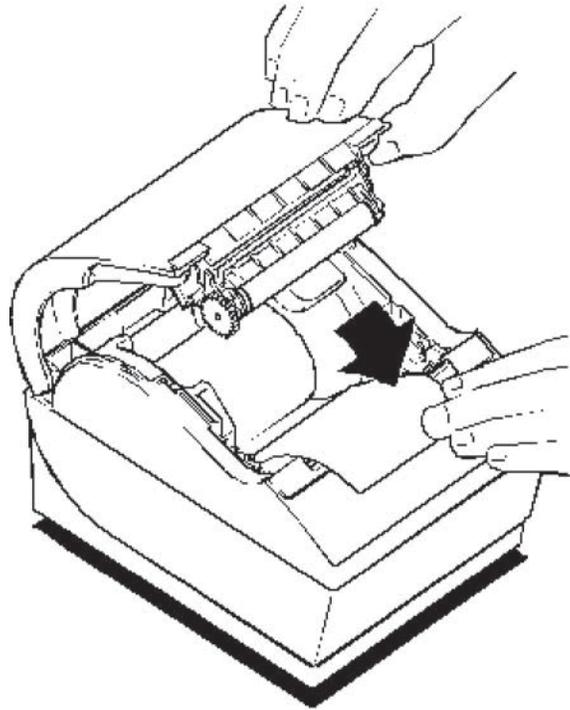
4. Place the new roll into the paper bucket with a few inches of paper extending over the cabinet front (or top, if the printer is mounted vertically).

Caution: The paper must unroll from the bottom to ensure that the printer will print and to prevent paper jamming.
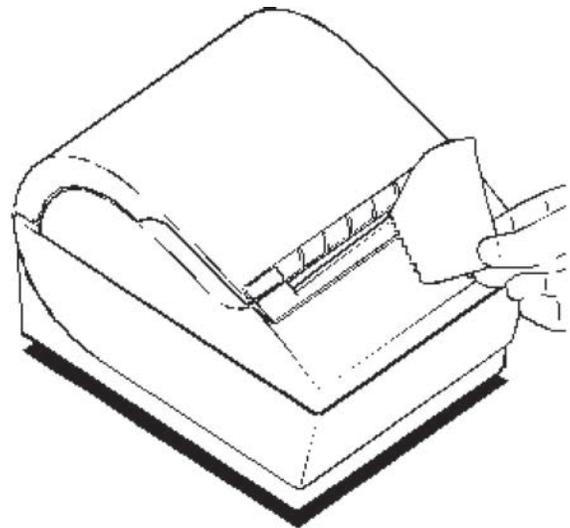
5. Close the cover. Pull the excess paper across the tear-off blade and remove.

6. Advance the paper, if necessary, by pressing the paper feed button.

Note: In the event of a paper jam, remove the roll and tear a new clean edge. Place the roll into the paper bucket, so that it unrolls from the bottom of the roll.

For more information about paper jams, see the "Troubleshooting" section of this document.

Configuring the printer

The configuration menu allows the user to set general printer parameters. The test prints the settings for several functions, and partially cuts the paper between each variation.

The printouts may vary for each model. The test ends with a partial cut of the paper, then begins again. A test printout may use several feet of paper to complete.

To start the test:

1. Set DIP Switch 1 to ON position (down). DIP Switch 2 must always be set to ON position (down).

2. Place paper into the bucket as described in the previous section.

3. Press the reset button.

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

   The printer prints the diagnostics form and the configuration main menu.

   Printer pauses and waits for main menu selection to be made. See the sample printout on the next page.

5. Continue through your menu selections until you are asked to: "Save New Parameters?".
   Select Yes or No.

   a. If answer Yes is selected, return DIP Switch 1 to OFF position (up.)

   b. Repeat Steps 3 and 4 above.

   Diagnostic printout verifies new settings. See the sample printout on the next page.

6. If answer NO is selected, printer returns to the menu to set parameters again.

```
*** A794 - Diagnostics Form ***

Model number        : A794-2105
Serial number       : A991102521

Boot Firmware
  Revision          : V2.04
  CRC               : A352
  P/N               : 189-1C73007A
Flash Firmware
  Revision          : V2.12
  CRC               : 4833
  P/N               : 189-1C73057A

H/W parameters
  Flash Memory Size   : 512 kbytes
  Flash Logos/Fonts   : 64 kbytes
  Flash User Storage  : 64 kbytes
  SRAM Size           : 256 kbytes
  CPU Clock Freq.     : 50 MHz
  Head Setting        : A
  Pre-Heating         : Disabled
  Print Density       : 100 %
  Max Speed           : 130 mm/sec
  Paper Width         : 80 mm
  Max Power           : 55 W
  Knife               : Enabled
  Partial Cut         : 135 steps
  Paper Low Sensor    : Enabled

Comm. Interface
  RX Buffer Size    : 4096
  Interface Type    : RS232
  Parameters
    Baud Rate       : 115200
    Data Bits       : 8
    Stop Bit(s)     : 1
    Parity          : NONE
    Flow Control    : DTR/DSR
    Reception Errors : Ignore

Resident Code Pages : 437, 850, 852, 858
                      860, 863, 855, 866
                      1252

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

```
********** 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

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

Current Printer tallies are printed after the Diagnostic information and will vary per printer use.

For more information about poorly printed test printouts, see the "Troubleshooting" section of this document.

Troubleshooting the printer

The printer is simple and generally trouble-free, but from time to time minor problems may occur. Follow these procedures to determine the cause and resolution of any problems that the printer may be having. If the procedures in this section do not correct the problem, contact a TPG, Inc. service representative.

For more detailed and technical troubleshooting, see the "Service Level Troubleshooting" section of the A794 Service Guide.

Printer tone and green LED

Problem	Possible Causes	What to Do	Where to Go
Green LED, quick continuous flashing.	Paper out	Put in a new paper roll.	A794 Owner's Guide
	Cover off	Put the cover on.	
	Knife unable to home	Contact your authorized service representative.	
Green LED, slow continuous flashing	Paper is low (if paper low sensor is installed)	Put in a new paper roll	A794 Owner's Guide
Printer beeps (two-tone— low frequency, high frequency)	Other problems may be indicated	Contact your authorized service representative.	
Printer beeps and flashes green LED in various combinations	Printer has been turned on and is ready to operate	No action is required.	
	These all indicate serious problems	Contact your authorized service representative.	

Printing problems

Problem	Possible Causes	What to Do	Where to Go
Colored stripe on the receipt	Paper is low	Change the paper	A794 Owner's Guide
Receipt does not come out all the way	Paper is jammed	Open the receipt cover, inspect the knife, and clear any jammed paper.	
Printer start to print, but stops while the receipt is being printed	Paper is jammed	Open the receipt cover, inspect the knife, and clear any jammed paper.	
Receipt is not cut	Paper is jammed	Open the receipt cover, inspect the knife, and clear any jammed paper.	
	The printer is not configured for a knife	Contact your authorized service representative.	
Print is light or spotty	Paper roll loaded incorrectly	Check that the paper is loaded properly.	A794 Owner's Guide
	Thermal printhead is dirty	Use recommended thermal receipt paper.	A794 Owner's Guide
	Variations in paper	Increase the print density in "Set Hardware Options" of the printer configuration menu to 110% or 120% as needed.	A794 Owner's Guide
Vertical column of print is missing	This indicates a serious problem with the printer electronics	Contact your authorized service representative.	
One side of receipt is missing	This indicates a serious problem wit the printer electronics	Contact your authorized service representative.	

Printer does not function

Problem	Possible Causes	What to Do	Where to Go
Printer does not function when turned on	Printer is not plugged in	Check that printer cables are properly connected at both ends.	A794 Setup Guide
		Check that the host or power supply is getting power.	A794 Setup Guide
	Receipt cover is not fully closed	Close and latch the receipt cover.	

Chapter 3: Media and Supplies Guide

Ordering thermal paper

Thermal paper specifications

The printer requires qualified thermal paper with the following dimensions:

Width	Diameter	Length
80 mm ± .2 mm (3.15 in. ± .02 in.)	90 mm max. (3.54 in.)	322 ft. nominal.
82.5 mm ± .2 mm (3.25 in. ± .02 in.)	90 mm max. (3.54 in.)	322 ft. nominal.

The paper must not be attached at the core. Use paper with a colored stripe at the end to indicate that the paper is running low.

The above figures are based on a core diameter of 22 ± .5 mm (.87 in.) outside, 11.5 ± .5 mm (.45 in.) inside.

Manufacturers

TPG, Inc. recommends the following paper grades produced by their respective manufacturers. There are a number of paper converters qualified to provide this paper, provided the POS rolls are from these recommended grades. Use of other (non-TPG tested/approved) papers may result in excessive printhead contamination, light print, missing print, and/or void the printer warranty.

Paper Manufacturer	Paper Identification/Grade
Kanzaki Specialty Papers (USA) Ware, MA	P-300 P-310 P-350 P-354 TO-260 TO-282 TO-381L
Appleton Papers, Inc. (USA) Appleton, WI	Alpha 400-2.3 (T1030) Alpha 800-2.3 (T1012A) POS Plus 600-2.0 Resiste 900-3.0 (T2162) Alpha 900-3.4 (SUPERIOR)
Jujo Thermal LTD. Kauttua, Finland	AF50KS-E3 AP62KS-E3
Mitsubishi Int'l Corp. New York, NY	P-5035 T-8051 TP-8065
Oji Paper Company Ltd Tokyo, Japan	KF-60 PD-170R PD-160R

How to order

To order paper rolls, contact your converter of choice. TPG, Inc. can provide the following paper in small lots to facilitate product evaluation and testing. To order directly from TPG Inc., use the following part numbers:

- Standard density   50 rolls, 90 mm diameter   TPG, Inc #A152-0034
- Light density   50 rolls, 90 mm diameter   TPG, Inc. #A152-0035

Ordering miscellaneous supplies

Ordering cash drawers

Order cash drawers from the following suppliers:

Cash Drawers	Number
NCR	7052-K657
M-S Cash Drawer Corp.	EP-125 K series, EP-127, EP-102
APG Cash Drawer	Model 322
Indiana Cash Drawer	Model SLD

Ordering the power supply and power cords

Contact your sales representative to order the power supply and power cords listed in the table. The numbers are for reference only. Suppliers may use other numbers.

Item	Type	Number
55W power supply with attached cable to printer and U.S. power supply cord		A794-K330
55W power supply, attached cable		A794-K301
Power supply cord (to outlet)	United States	A794-K320
	International (no plug)	A794-K321
	United Kingdom	A794-K322
	S.E.V.	A794-K323
	Australia	A794-K324
	International (with plug)	A794-K326

Ordering communication cables

Contact your sales representative or 1 (800) 732-8950 to order the communication cables listed in the table. The numbers are for reference only. Suppliers may use other numbers.

Communication Cables	Length	Order Number
RS-232C 25-pin male (printer) to 9-pin female (host)	(2 meters - 6.6 feet)	A141-0005
RS-232C 25-pin male (printer) to 9-pin female (host)	(6 meters - 19.7 feet)	A141-0006
RS-232C 25-pin female (host) to 9-pin female (printer)	(3 meters - 9.8 feet)	A141-0008
RS-232C 25-pin female (ferrite host) to 9-pin female (printer)	(3 meters - 9.8 feet)	A141-0007
IEEE-1284 Parallel 25-pin male to 25-pin male	(3 meters - 9.8 feet)	A141-0009

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Chapter 4: Print Specifications

Characters

Print modes

Available print modes:

- Standard
- Upside down
- Reverse

- Compressed
- Rotated
- Italic

- Double high
- Underlined
- Scaled

- Double wide
- Bold

Size

Character sizes for the standard and compressed mode:

Standard -   15.6 characters per inch

44 characters per line

13 x 24 dots cell size

Compressed -   20.3 characters per inch

56 characters per line

10 x 24 dots cell size

For more information about programming the printer to print in various printer modes, see the "Programming Information" section of this document.

Paper specifications

The printer requires qualified thermal paper with the following dimensions:

Width	Diameter	Length
80 mm ± .2 mm (3.15 in. ± .02 in.)	90 mm max. (3.54 in.)	322 ft. nominal
82.5 mm ± .2 mm (3.25 in. ± .02 in.)	90 mm max. (3.54 in.)	322 ft. nominal

The above figures are based on a core diameter of 22 ± .5 mm (.87 in.) outside, 11.5 ± .5 mm (.45 in.) inside.

The paper must not be attached at the core. Use paper with a colored stripe at the end to indicate that the paper is running low.

Print zones

Print zones for 80 mm paper

Specifications of print zone for 80 mm paper:

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

- Standard Mode: minimum margins: 2.5 mm (.098 inches)

- Top margin to manual tear-off: 17.8 mm (0.70 inches)

- Top margin to knife cut: 19.0 mm (0.75 inches)
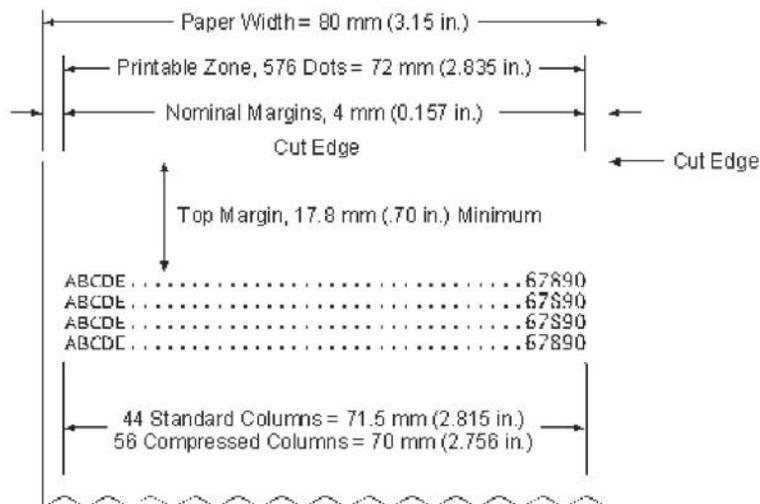
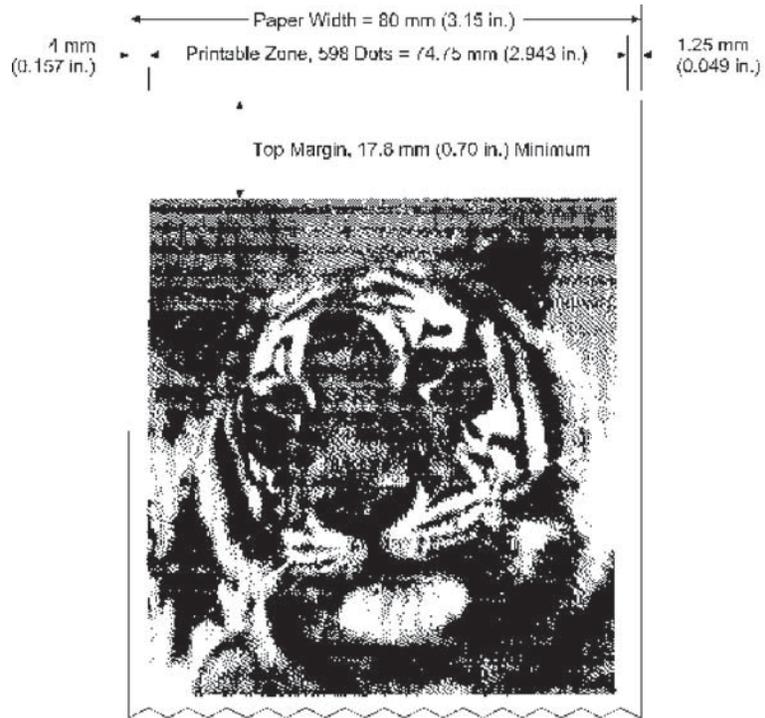When printing graphics or logos converted from 6 dot/ mm to 8 dot/ mm, the printable zone is expanded to 598 dots.

Print zones for 82.5 mm paper

Specifications of print zone for 82.5 mm paper:

- 640 dots (addressable) @ 8 dots/mm, centered on 82.5 mm

- Standard mode: minimum margins: 1.0 mm (0.040 inches)

- Top margin to manual tear-off: 17.8 mm (0.70 inches)

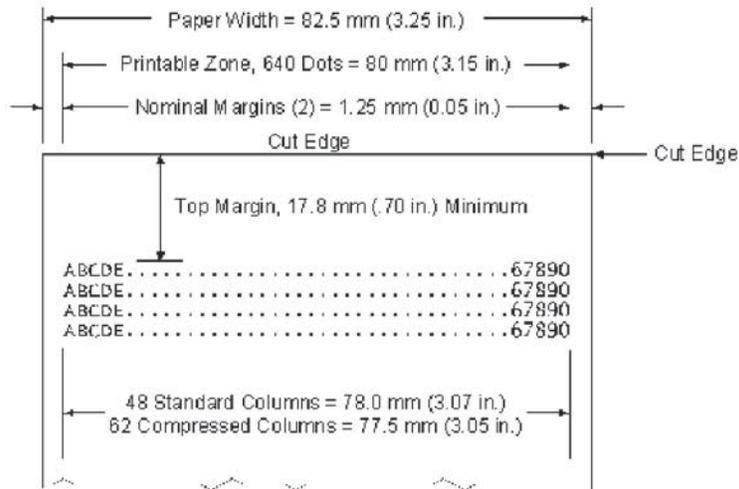- Top margin to knife cut: 19.0 mm (0.75 inches)

Print density and density of receipt print lines

This function makes it possible to adjust the energy level of the printhead to darken the printout. An adjustment should only be made when necessary. The factory setting is 100%.

Warning: Choose an energy level no higher than necessary to achieve a dark printout. Failure to observe this rule may result in a printer service call or voiding of the printer warranty. Consult your TPG, Inc. technical support specialist if you have any questions.

When the printer prints high density print lines (text or graphics), it automatically slows down.

To change the Print Density:

1. Enter the configuration menu.

2. Select "Set Hardware Options" from the main menu.

    "Hardware Options Menu" is printed on the receipt and the question "Set Print Density?" asked.

3. Answer YES (Long click).

    A warning is printed, followed by:

    Print Density

100%	1 Click
110% (+)	2 Clicks
120% (++)	3 Clicks

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

Duty cycle restrictions (printing solid blocks)

There are restrictions on the duty cycle because of the heat generated by the receipt thermal printhead when printing solid blocks (regardless of the length of the block in relation to the print line). The restrictions are ambient temperature, the percentage of time (measured against one minute) of continuous solid printing, and the amount of coverage.

Caution: When the duty cycle approaches the limits shown in the table, the receipt printhead will heat up and shut down. This may damage the printhead.

To avoid this problem, do one or a combination of the following:

1. Reduce the amount of coverage.

2. Reduce the time of continuous solid printing.

3. Reduce the ambient temperature.

Allowable duty cycle (measured over one minute of continuous printing)

Amount of Solid Coverage	Ambient Temperature		
	25°C	35° C	50° C
20%	100%	50%	20%
40%	50%	25%	10%
100%	20%	10%	4%

For reference:

- A typical receipt with text (contains some blank spaces) is approximately 12% dot coverage.

- A full line of text characters (every cell on the line has a character in it) is approximately 25% dot coverage.

- Graphics are approximately 40% dot coverage.

- Barcodes are approximately 50% dot coverage.

- A solid black line is 100% dot coverage

Character sets

Code page 437

Code page 737

	0x	1x	2x	3x	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(00) 0	(10) 16	SP (32)	0 (48)	@ (64)	P (80)	` (96)	p (112)	A (128)	Ρ (144)	ι (160)	░ (176)	└ (192)	╨ (208)	ω (224)	'Ω (240)
x1	(01) 1	(11) 17	! (33)	1 (49)	A (65)	Q (81)	a (97)	q (113)	B (129)	Σ (145)	κ (161)	▒ (177)	┴ (193)	╤ (209)	ά (225)	± (241)
x2	(02) 2	(12) 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	(03) 3	(13) 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	(04) 4	(14) 20	$ (36)	4 (52)	D (68)	T (84)	d (100)	t (116)	E (132)	φ (148)	ν (164)	┤ (180)	─ (196)	╘ (212)	ϊ (228)	Ϊ (244)
x5	(05) 5	(15) 21	% (37)	5 (53)	E (69)	U (85)	e (101)	u (117)	Z (133)	X (149)	ξ (165)	╡ (181)	┼ (197)	╒ (213)	ί (229)	Ÿ (245)
x6	(06) 6	(16) 22	& (38)	6 (54)	F (70)	V (86)	f (103)	v (118)	H (134)	Ψ (150)	ο (166)	╢ (182)	╞ (198)	╓ (214)	ό (230)	÷ (246)
x7	(07) 7	(17) 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	(08) 8	(18) 24	((40)	8 (56)	H (72)	X (88)	h (104)	x (120)	I (136)	∝ (152)	ρ (168)	╕ (184)	╚ (200)	╪ (216)	ϋ (232)	° (248)
x9	(09) 9	(19) 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	(0A) 10	(1A) 26	* (42)	: (58)	J (74)	Z (90)	j (106)	z (122)	Λ (138)	γ (154)	ς (170)	║ (186)	╩ (202)	┌ (218)	Ά (234)	• (250)
xB	(0B) 11	(1B) 27	+ (43)	; (59)	K (75)	[(91)	k (107)	{ (123)	M (139)	δ (155)	τ (171)	╗ (187)	╦ (203)	█ (219)	Έ (235)	√ (251)
xC	(0C) 12	(1C) 28	, (44)	< (60)	L (76)	\ (92)	l (108)		(124)	N (140)	ε (156)	υ (172)	╝ (188)	╠ (204)	▄ (220)	Ή (236)	ⁿ (252)
xD	(0D) 13	(1D) 29	- (45)	= (61)	M (77)	] (93)	m (109)	} (125)	Ξ (141)	ζ (157)	φ (173)	╜ (189)	═ (205)	▌ (221)	Ί (237)	² (253)
xE	(0E) 14	(1E) 30	. (46)	> (62)	N (78)	^ (94)	n (110)	~ (126)	O (142)	η (158)	χ (174)	╛ (190)	╬ (206)	▐ (222)	Ό (238)	■ (254)
xF	(0F) 15	(1F) 31	/ (47)	? (63)	O (79)	_ (95)	o (111)	DEL (127)	Π (143)	θ (159)	ψ (175)	┐ (191)	╧ (207)	▀ (223)	'Υ (239)	BLANK (255)

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Code page 858

00	10	20	30 0	40 @	50 P	60 `	70 p	80 Ç	90 É	A0 á	B0 ▓	C0 └	D0 ð	E0 Ó	F0 –
0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
01	11	21 !	31 1	41 A	51 Q	61 a	71 q	81 ü	91 æ	A1 í	B1 ▒	C1 ┴	D1 Ð	E1 ß	F1 ±
1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
02	12	22 "	32 2	42 B	52 R	62 b	72 r	82 é	92 Æ	A2 ó	B2 ▓	C2 ┬	D2 Ê	E2 Ô	F2 —
2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
03	13	23 #	33 3	43 C	53 S	63 c	73 s	83 â	93 ô	A3 ú	B3 │	C3 ├	D3 Ë	E3 Ò	F3 ¾
3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
04	14	24 $	34 4	44 D	54 T	64 d	74 t	84 ä	94 ö	A4 ñ	B4 ┤	C4 ─	D4 È	E4 õ	F4 ¶
4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
05	15	25 %	35 5	45 E	55 U	65 e	75 u	85 à	95 ò	A5 Ñ	B5 Á	C5 ┼	D5 €	E5 Õ	F5 §
5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
06	16	26 &	36 6	46 F	56 V	66 f	76 v	86 å	96 û	A6 ª	B6 Â	C6 ã	D6 í	E6 µ	F6 ÷
6	22	38	54	70	86	103	118	134	150	166	182	198	214	230	246
07	17	27 '	37 7	47 G	57 W	67 g	77 w	87 ç	97 ù	A7 º	B7 À	C7 Ã	D7 Î	E7 þ	F7 ¸
7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
08	18	28 (	38 8	48 H	58 X	68 h	78 x	88 ê	98 ÿ	A8 ¿	B8 ©	C8 ╚	D8 Ï	E8 þ	F8 °
8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
09	19	29)	39 9	49 I	59 Y	69 i	79 y	89 ë	99 Ö	A9 ®	B9 ╣	C9 ╔	D9 ┘	E9 Ú	F9 ¨
9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
0A	1A	2A *	3A :	4A J	5A Z	6A j	7A z	8A è	9A Ü	AA ¬	BA ║	CA ╩	DA ┌	EA Û	FA ·
10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
0B	1B	2B +	3B ;	4B K	5B [	6B k	7B {	8B ï	9B ø	AB ½	BB ╗	CB ╦	DB █	EB Ù	FB ¹
11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
0C	1C	2C ,	3C <	4C L	5C \	6C l	7C		8C î	9C £	AC ¼	BC ╝	CC ╠	DC ▄	EC ý	FC ³
12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
0D	1D	2D -	3D =	4D M	5D]	6D m	7D }	8D ì	9D Ø	AD ¡	BD ¢	CD ═	DD ¦	ED Ý	FD ²
13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
0E	1E	2E .	3E >	4E N	5E ^	6E n	7E ~	8E Ä	9E ×	AE «	BE ¥	CE ╬	DE ¸	EE ¯	FE ■
14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
0F	1F	2F /	3F ?	4F O	5F _	6F o	7F △	8F Å	9F ƒ	AF »	BF ┐	CF ¤	DF ▀	EF ´	FF
15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

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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
01 XON 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 ü 128	91 À 145	A1 í 161	B1 ▓ 177	C1 ⊥ 193	D1 ╤ 209	E1 β 225	F1 ± 241
02 2	12 XOFF 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 é 130	92 È 146	A2 ó 162	B2 ▓ 178	C2 ┬ 194	D2 ╥ 210	E2 Γ 226	F2 ≥ 242
03 XOFF 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 â 131	93 ô 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 ã 132	94 õ 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 à 133	95 ò 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 Á 134	96 Ú 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 ç 135	97 ù 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 ê 136	98 Ì 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 Ê 137	99 Õ 153	A9 Ò 169	B9 ╣ 185	C9 ╔ 201	D9 ┘ 217	E9 Θ 233	F9 ∙ 249
0A LF 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A è 138	9A Ü 154	AA ¬ 170	BA ║ 186	CA ╩ 202	DA ┌ 218	EA Ω 234	FA · 250
0B ESC 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B Í 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 Ô 140	9C £ 156	AC ¼ 172	BC ╝ 188	CC ╠ 204	DC ▄ 220	EC ∞ 236	FC ⁿ 252
0D CR 13	1D GS 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D ì 141	9D Ú 157	AD ¡ 173	BD ╜ 189	CD ═ 205	DD ▌ 221	ED Ø 237	FD ² 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E Ã 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 SP 127	8F Â 143	9F Ó 159	AF » 175	BF ┐ 191	CF ╧ 207	DF ▀ 223	EF ∩ 239	FF 255

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0x	1x	2x	3x	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
NUL		SP	0	@	P	`	p	Ç	É	|	▓	└	╨	α	≡
	XON	!	1	A	Q	a	q	ü	È	'	▓	┴	╤	β	±
		"	2	B	R	b	r	é	Ê	ó	▓	┬	╥	Γ	≥
	XOFF	#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
		$	4	D	T	d	t	Â	Ë	¨	─	─	╘	Σ	⌠
		%	5	E	U	e	u	à	Ï	³	┤	┼	╒	σ	⌡
		&	6	F	V	f	v	¶	û	¸	╢	╞	╓	µ	÷
		'	7	G	W	g	w	ç	ù	─	╖	╟	╫	τ	≈
		(	8	H	X	h	x	ê	¤	Î	╕	╚	╪	φ	°
		)	9	I	Y	i	y	ë	Ô	┌	╣	╔	┘	Θ	•
LF		*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
	ESC	+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
CR	GS	,	<	L	\	l	|	î	£	¼	╝	╠	▄	∞	n
CR	GS	-	=	M	]	m	}	=	ù	¾	╜	═	█	Ø	²
		.	>	N	^	n	~	À	Û	«	╛	╬	█	ε	■
		/	?	O	_	o	SP	§	ƒ	»	┐	╧	█	∩	

Code page 865

Code page 866

00 0	10 16	20 32	30 0 48	40 @ 64	50 P 80	60 ` 96	70 p 112	80 А 128	90 Р 144	A0 а 160	B0 ░ 176	C0 └ 192	D0 ╨ 208	E0 р 224	F0 Ё 240
01 1	11 17	21 ! 33	31 1 49	41 A 65	51 Q 81	61 a 97	71 q 113	81 Б 129	91 С 145	A1 б 161	B1 ▒ 177	C1 ┴ 193	D1 ═ 209	E1 с 225	F1 ё 241
02 2	12 18	22 " 34	32 2 50	42 B 66	52 R 82	62 b 98	72 r 114	82 В 130	92 Т 146	A2 в 162	B2 ▓ 178	C2 ┬ 194	D2 ╥ 210	E2 т 226	F2 Є 242
03 3	13 19	23 # 35	33 3 51	43 C 67	53 S 83	63 c 99	73 s 115	83 Г 131	93 У 147	A3 г 163	B3 │ 179	C3 ├ 195	D3 ╙ 211	E3 у 227	F3 є 243
04 4	14 20	24 $ 36	34 4 52	44 D 68	54 T 84	64 d 100	74 t 116	84 Д 132	94 Ф 148	A4 д 164	B4 ┤ 180	C4 ─ 196	D4 ╘ 212	E4 ф 228	F4 Ї 244
05 5	15 21	25 % 37	35 5 53	45 E 69	55 U 85	65 e 101	75 u 117	85 Е 133	95 Х 149	A5 е 165	B5 ╡ 181	C5 ┼ 197	D5 ╒ 213	E5 х 229	F5 ї 245
06 6	16 22	26 & 38	36 6 54	46 F 70	56 V 86	66 f 103	76 v 118	86 Ж 134	96 Ц 150	A6 ж 166	B6 ╢ 182	C6 ╞ 198	D6 ╓ 214	E6 ц 230	F6 ў 246
07 7	17 23	27 ' 39	37 7 55	47 G 71	57 W 87	67 g 103	77 w 119	87 З 135	97 Ч 151	A7 з 167	B7 ╖ 183	C7 ╟ 199	D7 ╫ 215	E7 ч 231	F7 ў 247
08 8	18 24	28 (40	38 8 56	48 H 72	58 X 88	68 h 104	78 x 120	88 И 136	98 Ш 152	A8 и 168	B8 ╕ 184	C8 ╚ 200	D8 ╪ 216	E8 ш 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 Й 137	99 Щ 153	A9 й 169	B9 ╣ 185	C9 ╔ 201	D9 ┘ 217	E9 щ 233	F9 ∙ 249
0A 10	1A 26	2A * 42	3A : 58	4A J 74	5A Z 90	6A j 106	7A z 122	8A К 138	9A Ъ 154	AA к 170	BA ║ 186	CA ╩ 202	DA ┌ 218	EA Ъ 234	FA · 250
0B 11	1B 27	2B + 43	3B ; 59	4B K 75	5B [91	6B k 107	7B { 123	8B Л 139	9B Ы 155	AB л 171	BB ╗ 187	CB ╦ 203	DB █ 219	EB ы 235	FB √ 251
0C 12	1C 28	2C , 44	3C < 60	4C L 76	5C \ 92	6C l 108	7C | 124	8C М 140	9C Ь 156	AC м 172	BC ╝ 188	CC ╠ 204	DC ▄ 220	EC ь 236	FC № 252
0D 13	1D 29	2D - 45	3D = 61	4D M 77	5D] 93	6D m 109	7D } 125	8D Н 141	9D Э 157	AD н 173	BD ╜ 189	CD ═ 205	DD ▌ 221	ED э 237	FD ¤ 253
0E 14	1E 30	2E . 46	3E > 62	4E N 78	5E ^ 94	6E n 110	7E ~ 126	8E О 142	9E Ю 158	AE о 174	BE ╛ 190	CE ╬ 206	DE ▐ 222	EE ю 238	FE ■ 254
0F 15	1F 31	2F / 47	3F ? 63	4F O 79	5F _ 95	6F o 111	7F △ 127	8F П 143	9F Я 159	AF п 175	BF ┐ 191	CF ╧ 207	DF ▀ 223	EF я 239	FF 255

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	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	NUL 0000	STX 0001	SOT 0002	ETX 0003	EOT 0004	ENQ 0005	ACK 0006	BEL 0007	BS 0008	HT 0009	LF 000A	VT 000B	FF 000C	CR 000D	SO 000E	SI 000F
10	DLE 0010	DC1 0011	DC2 0012	DC3 0013	DC4 0014	NAK 0015	SYN 0016	ETB 0017	CAN 0018	EM 0019	SUB 001A	ESC 001B	FS 001C	GS 001D	RS 001E	US 001F
20	SP 0020	! 0021	" 0022	# 0023	$ 0024	% 0025	& 0026	' 0027	(0028	) 0029	* 002A	+ 002B	, 002C	– 002D	. 002E	/ 002F
30	0 0030	1 0031	2 0032	3 0033	4 0034	5 0035	6 0036	7 0037	8 0038	9 0039	: 003A	; 003B	< 003C	= 003D	> 003E	? 003F
40	@ 0040	A 0041	B 0042	C 0043	D 0044	E 0045	F 0046	G 0047	H 0048	I 0049	J 004A	K 004B	L 004C	M 004D	N 004E	O 004F
50	P 0050	Q 0051	R 0052	S 0053	T 0054	U 0055	V 0056	W 0057	X 0058	Y 0059	Z 005A	[005B	\ 005C	] 005D	^ 005E	_ 005F
60	` 0060	a 0061	b 0062	c 0063	d 0064	e 0065	f 0066	g 0067	h 0068	i 0069	j 006A	k 006B	l 006C	m 006D	n 006E	o 006F
70	p 0070	q 0071	r 0072	s 0073	t 0074	u 0075	v 0076	w 0077	x 0078	y 0079	z 007A	{ 007B		007C	} 007D	~ 007E	DEL 007F
80	€ 20AC						… 2026									
90		' 2018	' 2019	" 201C	" 201D	• 2022	– 2013	— 2014								
A0	NBSP 00A0	ก 0E01	ข 0E02	ฃ 0E03	ค 0E04	ฅ 0E05	ฆ 0E06	ง 0E07	จ 0E08	ฉ 0E09	ช 0E0A	ซ 0E0B	ฌ 0E0C	ญ 0E0D	ฎ 0E0E	ฏ 0E0F
B0	ฐ 0E10	ฑ 0E11	ฒ 0E12	ณ 0E13	ด 0E14	ต 0E15	ถ 0E16	ท 0E17	ธ 0E18	น 0E19	บ 0E1A	ป 0E1B	ผ 0E1C	ฝ 0E1D	พ 0E1E	ฟ 0E1F
C0	ภ 0E20	ม 0E21	ย 0E22	ร 0E23	ฤ 0E24	ล 0E25	ฦ 0E26	ว 0E27	ศ 0E28	ษ 0E29	ส 0E2A	ห 0E2B	ฬ 0E2C	อ 0E2D	ฮ 0E2E	ฯ 0E2F
D0	ะ 0E30	ั 0E31	า 0E32	ำ 0E33	ิ 0E34	ี 0E35	ึ 0E36	ื 0E37	ุ 0E38	ู 0E39	ฺ 0E3A					฿ 0E3F
E0	เ 0E40	แ 0E41	โ 0E42	ใ 0E43	ไ 0E44	ๅ 0E45	ๆ 0E46	็ 0E47	่ 0E48	้ 0E49	๊ 0E4A	๋ 0E4B	์ 0E4C	ํ 0E4D	๎ 0E4E	๏ 0E4F
F0	๐ 0E50	๑ 0E51	๒ 0E52	๓ 0E53	๔ 0E54	๕ 0E55	๖ 0E56	๗ 0E57	๘ 0E58	๙ 0E59	๚ 0E5A	๛ 0E5B				

Code page 1252

Code page 1252 character table.

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Chapter 5: Communication Interface

Communication overview

In order for a receipt to be printed, a program must be in place that translates the data from the host computer into a language that the printer can understand. This program must tell the printer exactly how to print each character. This chapter describes how to create such a program or modify an existing one.

Interface

In order for the printer to communicate with the host, a communication link must be set up. The printer supports the RS-232C Serial and IEEE 1284 Parallel interface.

The interfaces have a protocol associated with them that the host must understand and adhere to. Only when the interface parameters are matched and the proper protocol is used, will the host and the printer be able to communicate.

For more information about protocol description, see the "RS-232C Interface" section of this document.

Sending Commands

Once the communication link is established, commands can be sent to the printer. This section describes how to send commands to the printer using DOS and BASIC. This section does not take into account the necessary protocol, but is meant as a general introduction to how the printer functions.

Using DOS to Send Commands

One way of getting commands to the printer is to send them directly from DOS. For example, the command

  COPY CON: COM1:

sets the computer up such that the hexadecimal code corresponding to any key that was pressed would be sent to the communication port COM1 when the COPY mode is exited. If the printer is connected to COM1, then the data will go to the printer.

Exit the COPY mode by typing

  CTRL Z

and then pressing the ENTER key. Once the computer knows to direct data from any print command to the proper port, commands can be sent from any software program.

Using BASIC to Send Commands

In BASIC, printer commands are sent as a string of characters that are preceded by the LPRINT command. For example,

  LPRINT CHR$(&H0A)

sends the hexadecimal number 0A to the printer, which causes the printer to print the contents of its print buffer. Previously sent commands tell the printer exactly how this data should appear on the paper. For example,

  LPRINT CHR$(&H12); "ABC"; CHR$(&H0A)

sends the hexadecimal numbers 12 41 42 43 0A to the printer. This causes the printer to set itself to double wide mode (12), load the print buffer with "ABC" (41 42 43), and finally, print (0A). again, the communication link that the BASIC program outputs to must be matched to that of the printer.

RS-232C interface

The RS-232C interface uses either XON/XOFF (software) or DTR/DSR (hardware) protocol to control the flow of information between the computer and the printer. For XON/XOFF, a particular character is sent back and forth between the host and the printer to regulate the communication. For DTR/DSR, changes in the DTR/DSR signal on the RS-232C interface coordinate the information flow.

The RS-232C interface offers the standard settings that are selected through the Configuration Menu described on page 10 of the "Diagnostics and Configuration" chapter in the A794 Service Guide.

Print Speed and Timing

The fast speed of the printer requires the application to send data to the printer at least as fast as it is printed. The application must also allow receipt lines to be buffered ahead at the printer, so the printer will be able to print each line immediately after the preceding line, without stopping to wait for more data. Ideally, the application will send all the data for an entire receipt without pausing between characters or lines transmitted.

If the application sends data at 9600 baud and pauses between lines for as short a time as 50 milliseconds, the printer will never be able to print at full speed. However, if the application sends data at 19.2 K baud and does not pause between lines, the printer will be able to print at its full speed of 2400 lines/minute. The table below shows that with a pause of 50 milliseconds after each line, the transmit time equals or exceeds the printer process time, slowing down the printer, regardless of the baud rate.

50 Millisecond Pause after Each Line					
Characters per line	Lines per receipt	Transmit time (9600 Baud) in seconds	Transmit time (19.2 K Baud) in seconds	Transmit time (115.2 K Baud) in seconds	Process time in seconds *
20	20	1.40	1.20	1.03	0.50
20	40	2.80	2.40	2.06	1.00
44	20	1.88	1.44	1.07	0.50
44	40	3.76	2.88	2.15	1.00

* Process Time is the time it would take the printer to process the data if all transmitted data were present. (It is not the time it takes to print the receipt.)

Example: 20 characters/line, with 20 lines = 0.5 seconds process time for the printer. It takes 1.2 seconds to send the data to the printer at 19.2K baud speed with a 50ms delay after each line. Thus the printer would have to wait 0.7 seconds longer to receive the data that it could process it if no delays existed and the transmission speed were faster.

The next table shows that, with no delay between lines, the transmit time is much less than the process time; allowing the printer to print at full speed.

50 Millisecond Pause after Each Line					
Characters per line	Lines per receipt	Transmit time (9600 Baud) in seconds	Transmit time (19.2 K Baud) in seconds	Transmit time (115.2 K Baud) in seconds	Process time in seconds*
20	20	0.40	0.20	0.035	0.50
20	40	0.80	0.40	0.070	1.00
44	20	0.88	0.44	0.075	0.50
44	40	1.76	0.88	0.150	1.00

XON/XOFF protocol

The XON/XOFF characters coordinate the information transfer between the printer and the host computer. The printer sends an XON character when it is ready to receive data and it sends an XOFF character when it cannot accept any more data. The software on the host computer must monitor the communication link as shown in the following flowchart in order to send data at the appropriate times.

If XON/XOFF has been selected, the printer also toggles the DTR signal, as described in the next section, but it does not look at the DSR signal to transmit data.
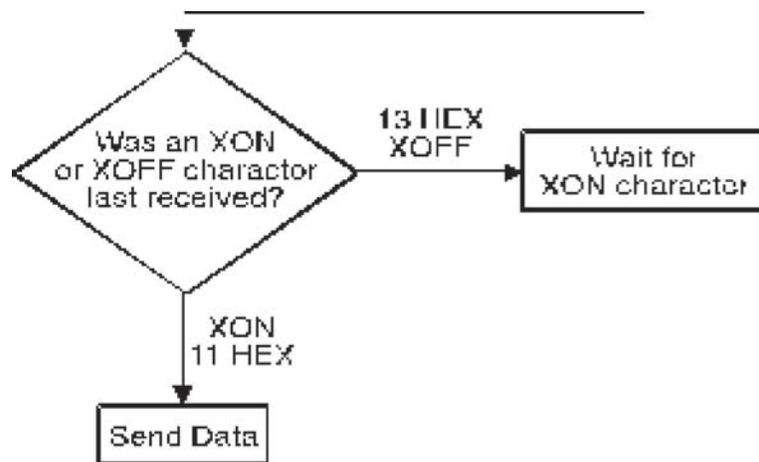
XON character = hexadecimal 11   XOFF character = hexadecimal 13

DTR/DSR protocol

The DTR signal is used to control data transmission to the printer. It is driven low when the printer is ready to receive data and driven high when it cannot accept any more data. Data is transmitted from the printer after it confirms that the DSR signal is low.
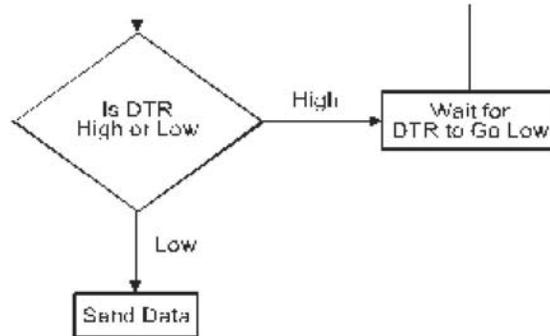
RS-232C technical specifications

This section describes the pin settings for the connectors and the RS-232C interface parameters. The RS-232C parameters are selected through the configuration menu feature. The RS-232C parameters must match those of the host computer.

For more information about RS-232C settings, see the "RS-232C Serial Interface Settings" section in the A794 Service Guide.

Communication Connectors

The following illustration shows the RS-232C communication connectors and pin assignments. The connectors are located at the rear of the printer, and are specified as male, DB9, 9-pin D-shell, and female DB25, 25-pin with RTS and CTS pins connected.

9-pin DB-9 Connector

25-pin DB-25 Connector
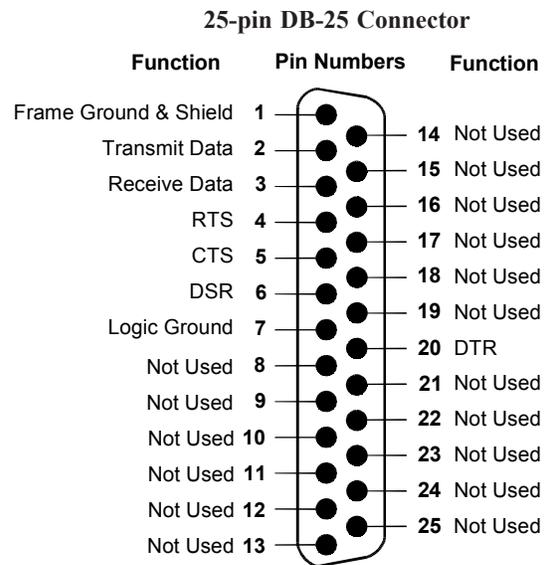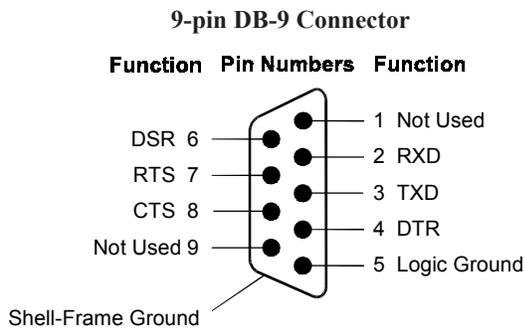
Power connector

With RS-232C, the printer is always remotely powered. The following illustration shows the power cable connector and pin assignments. The power cable connector is a 3-pin mini DIN plug and is located at the rear of the printer.
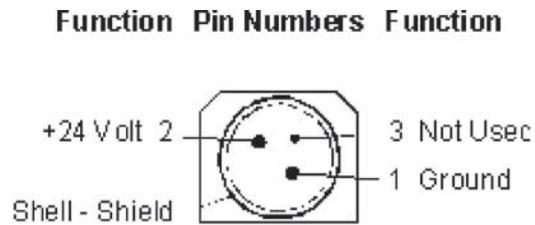
Cash drawer connector

The following illustration shows the pinouts for the cash drawer connector.
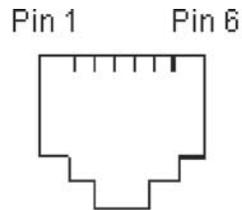
The following table shows the pinouts for the cash drawer. The connector can support two cash drawers with a Y-cable, and is located at the rear of the printer.

Pin Number	Cash Drawer Connector
1	Frame Ground
2	Drawer 1 Driver
3	Status Switch +
4	+24 VDC
5	Drawer 2 Driver
6	Status Switch -

RS-232C settings

The printer supports the standard RS-232C settings.

Baud Rate	1200, 2400, 4800, 9600, 19.2 K, 38.4 K, 57.6 K, 115.2 K
Parity	Parity Enabled, Parity Disabled, Even Parity, Odd Parity
Flow Control Method	XON/XOFF, DTR/DSR
Data Reception Errors	Print "?" for Data Errors, Ignore Data Errors

Generally, the printer is shipped with all of the RS-232C parameters preset at the factory. If you need to change any of these settings, you may do so using the configuration menu feature. This feature prints instructions on the receipt for changing the RS-232C settings (in addition to other settings).

For more information about changing the RS-232C settings through the configuration menu, see the "Diagnostics and Configuration" section of the A794 Service Guide.

Parallel interface

The printer is also available with an IEEE-1284 parallel interface. The printer configuration must be set to the parallel interface using the printer's Configuration Menu described in the "Diagnostics and Configuration" section of the A794 Service Guide.

IEEE Bi-directional parallel connector

The following illustration shows the parallel communication connector and pin assignments. The connector is located at the rear of the printer, and is designated as an IEEE 1284-A receptacle, commonly known as a D-Subminiature 25 pin.

Function		Pin Numbers		Function
STROBE/	1			
D0 (Data)	2		14	AUTOFD/ (Auto Paper Feed)
D1 (Data)	3		15	FAULT/ (Printer Error)
D2 (Data)	4		16	INIT/ (Initialize the Printer)
D3 (Data)	5		17	SELECTIN/ (Select Printer)
D4 (Data)	6		18	Ground
D5 (Data)	7		19	Ground
D6 (Data)	8		20	Ground
D7 (Data)	9		21	Ground
ACK/ (Printer Accepted Data)	10		22	Ground
BUSY (Printer Busy)	11		23	Ground
PAP_EX (Paper Exhaust)	12		24	Ground
SELECT (Printer Selected)	13		25	Ground

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Chapter 6: Programming information

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.

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

- A793

- A794 Native Mode

- 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. They will be identified as "not implemented". If received, they are ignored and not sent to the print buffer as data. Any non-legal commands are sent to the print buffer as data.

All items in **BOLD** are new or have additional functionality when compared to the A793.

By Command Code

Code (Hexadecimal)	Command
09	Horizontal Tab
0A	Print and Feed One Line
0C	**Print and Return to Standard Mode**
0D	Print and Carriage Return
10	Clear Printer
10 04 n	Real Time Status Transmission (DLE Sequence)
10 05 n	Real Time Request to Printer (DLE Sequence)
11 n1...n72	**Print Raster Graphics**
12	Select Double-Wide Characters
13	Select Single-Wide Characters
14 n	Feed n Print Lines
15 n	Feed n Dot Rows
16 n	Add n Extra Dot Rows
17	Print
18	**Cancel Print Data in Page Mode**
19	Perform Full Knife Cut
1A	**Perform Partial Knife Cut**
1B (+*.bmp)	**Download BMP Logo**
1B 07	Generate Tone
1B 0C	**Print Data in Page Mode**
1B 12	Select 90 Degree Counter-Clockwise Rotated Print
1B 14 n	Set Column
1B 16 n	Select Pitch (Column Width)

1B 20 n	Set Right-Side Character Spacing
1B 21 n	Select Print Mode
1B 24 nL nH	Set Absolute Starting Position
1B 25 n	Select or Cancel User-Defined Character Set
1B 26 s c1 c2 n1 d1...nn dn	Define User-Defined Character Set
1B 27 m a0 a1 a2 d1 … dn	Write to User Data Storage
1B 2A m n1 n2 d1...dn	Select Bit Image Mode
1B 2D n	**Select or Cancel Underline Mode**
1B 2E m n rL rH d1 … dn	Advanced Raster Graphics
1B 32	Set Line Spacing to 1/6 Inch
1B 33 n	Set Line Spacing
1B 34 m a0 a1 a2	Read from User Data Storage
1B 3A 30 30 30	Copy Character Set from ROM to RAM
1B 3D n	**Select Peripheral Device (for Multi-Drop)**
1B 3F n	Cancel User-Defined Character
1B 40	Initialize Printer
1B 44 [n]...k NUL	Set Horizontal Tab Positions
1B 45 n	Select or Cancel Emphasized Mode
1B 47 n	Select or Cancel Double Strike
1B 49 n	**Select or Cancel Italic Print**
1B 4A n	Print and Feed Paper
1B 4B n1 n2 d1...dn	Select Single-Density Graphics
1B 4C	**Select Page Mode**
1B 52 n	**Select International Character Set**
1B 53	**Select Standard Mode**
1B 54 n	**Select Print Direction in Page Mode**
1B 56 n	Select or Cancel 90 Degree Clockwise Rotated Print
1B 57 n1, n2...n8	**Set Print Area in Page Mode**
1B 59 n1 n2 d1...dn	Select Double-Density Graphics
1B 5B 7D	Switch to Flash Download Mode
1B 5C n1 n2	Set Relative Print Position
1B 61 n	Select Justification
1B 63 33 n	**Select Paper Sensors to Output Paper End Signals**
1B 63 34 n	Select Sensors to Stop Printing
1B 63 35 n	Enable or Disable Panel Button
1B 64 n	Print and Feed n Lines
1B 69	Perform Full Knife Cut
1B 6A k	Read from Non-Volatile Memory
1B 6D	Perform Partial Knife Cut
1B 70 n p1 p2	Generate Pulse to Open Cash Drawer
1B 73 n1 n2 k	Write to Non-Volatile Memory (NVRAM)

1B 74 *n*	**Select Character Code Table**
1B 75 *n*	Request Alternate Status
1B 75 0	Transmit Peripheral Device Status
1B 76	Transmit Paper Sensor Status
1B 7B *n*	Select or Cancel Upside Down Print Mode
1D 00	Return Boot Sector Firmware Part Number
1D 01	Return Segment Number Status of Flash Memory
1D 02 *n*	Select Flash Memory Sector to Download
1D 03 *n*	Real Time Request to Printer (GS Sequence)
1D 04 *n*	Real Time Status Transmission (GS Sequence)
1D 05	Real Time Printer Status Transmission
1D 06	Get Firmware CRC
1D 07	Return Micro Processor CRC
1D 0E	Erase All Flash Contents Except Boot Sector
1D 0F	Return Main Program Flash CRC
1D 10 *n*	Erase Selected Flash Sector
1D 11 *aL aH cL cH d1...dn*	Download to Active Flash Sector
1D 21 *n*	**Select Character Size**
1D 22 *n*	Select Memory Type (SRAM/Flash) Where to Save Logos or User-Defined Fonts
1D 22 55 *n1 n2*	**Flash Memory User Sectors Allocation**
1D 23 *n*	Select the Current Logo
1D 24 *nL nH*	**Set Absolute Vertical Print Position in Page Mode**
1D 2A *n1 n2 d1...dn*	Define Downloaded Bit Image
1D 2F *m*	Print Downloaded Bit Image
1D 3A	**Select or Cancel Macro Definition**
1D 40 *n*	Erase User Flash Sector
1D 42 *n*	**Select or Cancel White/Black Reverse Print Mode**
1D 48 *n*	Select Printing Position of HRI Characters
1D 49 *n*	Transmit Printer ID
1D 49 40 *n*	Transmit Printer ID, Remote Diagnostics Extension
1D 4C *nL nH*	Set Left Margin
1D 50 *x y*	Set Horizontal and Vertical Minimum Motion Units
1D 56 *m*	Select Cut Mode and Cut Paper
1D 56 *m n*	Select Cut Mode and Cut Paper
1D 57 *nL nH*	Set Printing Area Width
1D 5C *nL nH*	**Set Relative Vertical Print Position in Page Mode**
1D 5E *r t m*	**Execute Macro**
1D 61 *n*	Select or Cancel Automatic Status Back (ASB)
1D 62 *n*	Select or Cancel Smoothing Mode
1D 66 *n*	Select Pitch of HRI Characters

1D 68 n	Select Bar Code Height
1D 6B m d1...dk 00	**Print Bar Code**
1D 6B m n d1...dn	Print Bar Code
1D 72 n	Transmit Status
1D 77 n	Select Bar Code Width
1D FF	Reset Firmware
1F 04 n	**Convert 6 Dots/mm Bitmap to 8 Dots/mm Bitmap**
1F 05 n	**Select Superscript or Subscript Modes**
1F 56	Send Printer Software Version
1F 74	**Print Test Form**

By function

All items in **BOLD** are new or have additional functionality when compared to the A793.

Printer function commands

Code (hexadecimal)	Command
10	Clear Printer
19	Perform Full Knife Cut
1A	**Perform Partial Knife Cut**
1B 07	Generate Tone
1B 3D *n*	**Select Peripheral Device (for Multi-Drop)**
1B 40	Initialize Printer
1B 63 33 n	**Select Paper Sensors to Output Paper End Signals (Parallel Only)**
1B 63 34 n	Select Sensors to Stop Printing
1B 63 35 n	Enable or Disable Panel Buttons
1B 69	Perform Full Knife Cut
1B 6D	Perform Partial Knife Cut
1B 70 n p1 p2	Generate Pulse to Open Cash Drawer
1D 56 m	Select Cut Mode and Cut Paper
1D 56 m n	Select Cut Mode and Cut Paper
1F 74	**Print Test Form**

Vertical positioning and print commands

Code (hexadecimal)	Command
0A	Print and Feed Paper One Line
0D	Print and Carriage Return
14 n	Feed *n* Print Lines
15 n	Feed *n* Dot Rows
16 n	Add *n* Etra Dot Rows
17	Print
1B 32	Set Line Spacing to 1/6 Inch
1B 33 n	Set Line Spacing
1B 4A n	Print and Feed Paper
1B 64 n	Print and Feed *n* Lines
1D 50 x y	Set Horizontal and Vertical Minimum Motion Units

Horizontal positioning commands

Code (hexadecimal)	Command
09	Horizontal Tab
1B 14 n	Set Column
1B 24 nL nH	Set Absolute Starting Position
1B 44 [n] k 00	Set Horizontal Tabs
1B 5C n1 n2	Set Relative Print Position
1B 61 n	Select Justification
1D 4C nL nH	Set Left Margin
1D 57 nL nH	Set Printing Area Width

Print characteristic commands

Code (hexadecimal)	Command
12	Select Double-Wide Characters
13	Select Single-Wide Characters
1B 12	Select 90 Degree Counter-Clockwise Rotated Print
1B 16 n	Select Pitch (Column Width)
1B 20 n	Set Character Right-Side Spacing
1B 21 n	Select Print Modes
1B 25 n	Select or Cancel User-Defined Character Set
1B 26 s c1 c2 d1…dn	Define User-Defined Characters
1B 2D n	**Select or Cancel Underline Mode**
1B 3A 30 30 30	Copy Character Set from ROM to RAM
1B 3F n	Cancel User-Defined Characters
1B 45 n	Select or Cancel Emphasized Mode
1B 47 n	Select Double Strike
1B 49 n	**Select or Cancel Italic Print**
1B 52 n	**Select International Character Set and Select Character Code Table**
1B 56 n	Select or Cancel 90 Degrees Clockwise Rotated Print
1B 74 n	**Select International Character Set**
1B 7B n	Select or Cancel Upside Down Printing Mode
1D 21 n	**Select Character Size**
1D 42 n	**Select or Cancel White/Black Reverse Print Mode**
1D 62 n	Select or Cancel Smoothing Mode
1F 05 n	**Select Superscript or Subscript Modes**

Graphics commands

Code (hexadecimal)	Command
11 n1 … n72	**Print Raster Graphics**
1B (+*.bmp)	**Download BMP Logo**
1B 2A m n1 n2 d1…dn	Select Bit Image Mode
1B 2E m n rL rH d1 … dn	Advanced Raster Garphics
1B 4B n1 n2 d1…dn	Select Single-Density Graphics
1B 59 n1 n2 d1…dn	Select Double-Density Graphics
1D 23 n	Select Current Logo (Downloaded Bit Image)
1D 2A n1 n2 d1…dn]	Define Downloaded Bit Image
1D 2F m	Print Downloaded Bit Image
1F 04 n	**Convert 6 Dots/mm Bitmap to 8 Dots/mm Bitmap**

Status commands

Batch mode

Code (hexadecimal)	Command
1B 75 0	Transmit Peripheral Device Status
1B 75 n	Request Alternate Status
1B 76	Transmit Paper Sensor Status
1D 49 n	Transmit Printer ID
1D 49 40 n	Transmit Printer ID, Remote Diagnostics Extension
1D 72 n	Transmit Status
1F 56	Send Printer Software Version

Real time

Code (hexadecimal)	Command
10 04 n	Real Time Status Transmission (DLE Sequence)
10 05 n	Real Time Request to Printer (DLE Sequence)
1D 03 n	Real Time Request to Printer (GS Sequence)
1D 04 n	Real Time Status Transmission (GS Sequence)
1D 05	Real Time Printer Status Transmission

Auto status back

Code (hexadecimal)	Command
1D 61 n	Select or Cancel Auto Status Back

Barcode commands

Code (hexadecimal)	Command
1D 48 n	Select Printing Position for HRI Characters
1D 66 n	Select Pitch for HRI Characters
1D 68 n	Select Bar Code Height
1D 6B m d1…dk 00 or 1D 6B m n d1…dn	**Print Bar Code**
1D 77 n	Select Bar Code Width

Page mode commands

Code (hexadecimal)	Command
0C	**Print and Return to Standard Mode**
18	**Cancel Print Data in Page Mode**
1B 0C	**Print Data in Page Mode**
1B 4C	**Select Page Mode**
1B 53	**Select Standard Mode**
1B 54 n	**Select Print Direction in Page Mode**
1B 57 n1, n2…n8	**Set Print Area in Page Mode**
1D 24 nL nH	**Set Absolute Vertical Print Position in Page Mode**
1D 5C nL nH	**Set Relative Vertical Print Position in Page Mode**

Macro commands

Code (hexadecimal)	Command
1D 3A	**Select or Cancel Macro Definition**
1D 5E r t m	**Execute Macro**

User data storage commands

Code (hexadecimal)	Command
1B 27 m a0 a1 a2 d1…dn	Write to User Data Storage
1B 34 m a0 a1 a2	Read from User Data Storage
1B 6A k	Read from Non-Volatile Memory
1B 73 n1 n2 k	Write to Non-Volatile Memory (NVRAM)
1D 22 n	Select Memory Type (SRAM/Flash) Where to Save Logos or User-Defined Fonts
1D 22 55 n1 n2	**Flash Memory User Sectors Allocation**
1D 40 n	Erase User Flash Sector

Flash download commands

Code (hexadecimal)	Command
1B 5B 7D	Switch Flash Download Mode
1D 00	Return Boot Sector Firmware Part Number
1D 01	Return Segment Number Status of Flash Memory
1D 02 n	Select Flash Memory Sector to Download
1D 06	Get Firmware CRC
1D 07	Return Microprocessor CRC
1D 0E	Erase All Flash Contents Except Boot Sector
1D 0F	Return Main Program Flash CRC
1D 10 n	Erase Selected Flash Sector
1D 11 aL aH cL cH d1…dn	Download to Active Flash Sector
1D FF	Reset Firmware

Comparisons

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

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 A794 printhead are smaller, user defined characters that were used on the previous printers will appear smaller on the A974 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 A794 has a fundamental step of 1/203 inch, the actual line spacing will not exactly match the requested spacing.
1B 4A *n*	Print and Feed Paper	(Same as above)
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 A794 (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	(Same as above)

Command descriptions

Printer function commands

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 drawer**s**

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
- Printer is restarted and error status is cleared in a fault condition
- Printing position is set to column one
- Knife is homed

Exceptions

In printers with the Parallel interface, this command also returns paper exhaust to the paper status line if an alternate status has been requested. A DLE command followed by a 04 or 05 is interpreted as a "Real Time Command". (See Real Time Command.)

Related information

This command is recognized in A793 Emulation and A794 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 5 mm. (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 recognized in A793 Emulation and A794 Native Mode, 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 startup configuration (refer to Default settings below).

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.

Exceptions

In printers with the Parallel interface, this command also returns paper exhaust to the paper status line if an alternate status has been requested.

Select paper sensors to output paper end signals

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

Value of n:

If either bit 0 or bit 1 is on, the paper roll near-end sensor is selected as the paper sensor outputting paper-end signals. If either bit 2 or bit 3 is on, the paper roll end sensor is selected as the paper sensor outputting paper-end signals.

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

Range of n: 1-255

Default of n: 12

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

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

Exceptions

This command can only be used with a parallel interface.
The command is ignored if it used with a serial interface.

Select sensors to stop printing

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

Sensor Status

Bit	Sensor	0	1
0	Receipt Paper Near-End	Disabled	Enabled
1	Receipt Paper Near-End	Disabled	Enabled
2-4	Undefined		
6	Undefined		

Bits 5 and 7 are not used.

Default:	0

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

Enable or disable panel button

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

Enables or disables the Paper Feed Button. If the last bit is 0, the Paper Feed Button is enabled. If the last bit is 1, the Paper Feed Button is disabled.

Exceptions

Functions that require the Paper Feed Button (except for the Execute Macro [1D 5E] command) cannot be used when it has been disabled with this command.

Generate pulse to open cash drawer

ASCII	ESC p n p1 p2
Hexadecimal	1B 70 n p1 p2
Decimal	27 112 n p1 p2
Value of n:	00, 48 (Decimal) = Drawer 1; 01, 49 (Decimal) = Drawer 2
Value of p1:	0-255
Value of p2:	0-255

Sends a pulse to open the cash drawer.

Formulas

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

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

Related Information

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

Select Cut Mode and Cut Paper

ASCII	GS V m	GS V m n
Hexadecimal	1D 56 m	1D 56 m n
Decimal	29 86 m	29 86 m n
Value of m:	Selects the mode as shown in the table.	
Value of n:	Determines cutting position only if m is 65 or 66.	

m	Feed and Cut Mode
0, 48	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.

Print Test Form

ASCII	AX t
Hexadecimal	1F 74
Decimal	31 116

Prints the current printer configuration settings on the receipt.

Disabled in Page Mode.

Vertical positioning and print commands

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

Print and feed 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.

Activate 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 recognized in A793 Emulation and A794 Native Mode, 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 A794 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 A794 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	Extra Rows	Lines Per Inch	Dot Rows
0	8.5	24	9	6.1	33
1	8.1	25	10	3.0	34
2	7.8	26	11	5.8	35
3	7.5	27	12	5.6	36
4	7.2	28	13	5.5	37
5	7.0	29	14	5.3	38
6	6.8	30	15	5.2	39
7	6.5	31	16	5.1	40
8	6.3	32			

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 recognized in A793 Emulation and A794 Native Mode, ignored in LEGACY Emulation.

Set 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 line spacing

ASCII	ESC 3 n
Hexadecimal	1B 33 n
Decimal	27 51 n
Value of n:	n/406 inch in A794 Native Mode
	n/360 inch in A793 Emulation Mode
	n/203 inch in LEGACY 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.

Print and feed paper

ASCII	ESC J n
Hexadecimal	1B 4A n
Decimal	27 74 n
Value of n:	n/203 inch in A794 Native Mode and LEGACY 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.

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.

Horizontal positioning commands

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

The commands describe 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 576 printable dots on the 80 mm paper.

Horizontal tab

ASCII	HT
Hexadecimal	09
Decimal	9

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

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

When no tabs are defined to the right of the current position, or if the next tab is past the right margin, Line Feed is executed. HT has no effect in Page Mode.

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

Set column

ASCII	ESC DC4 n
Hexadecimal	1B 14 n
Decimal	27 20 n
Value of n:	1-44= Standard pitch 1-56= Compressed pitch
Default of n:	1

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

Exceptions

This command cannot be used with Single- or Double-Density graphics.

Related information

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

Set absolute starting position

ASCII   ESC $ nL nH

Hexadecimal   1B 24 nL nH

Decimal   27 36 nL nH

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

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

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

Formulas

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

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

Related information

If the Set Horizontal and Vertical Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of the Set Relative Print Position command will be interpreted accordingly. For more information, see the description of the command Set Horizontal and Vertical Minimum Motion Units command (1D 50) in this document.

Compatibility information (A794 receipt vs. A793 receipt)

There is a difference in the normal behavior of this command in A794 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 A794 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 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

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.

(continued next page)

Compatibility information (A794 receipt vs. A793 receipt)

There is a difference in the normal behavior of this command in A794 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 A794 moves the data into a buffer for the printhead when it receives it. When the "Set Relative Print Position" command contains a move to the left, this causes the new data to overstrike the previous data. This behavior can be used to an application's advantage to provide the ability to create compound characters on the receipt station.

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

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

Select justification

ASCII	ESC a n
Hexadecimal	1B 61 n
Decimal	27 97 n
Value of *n*:	0, 48 = Left aligned 1, 49 = Center aligned 2, 50 = Right aligned
Range of *n*:	0-2, 48-50
Default:	0 (Left aligned)

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

Related information

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

On the A793 this command accepts any *n* £ 255, using the low 2 bits:

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, and only effects the receipt interface.

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.

Print characteristics commands

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

The commands describe operation for 80 mm paper. 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.

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, 80 mm Paper	Columns, 82,5 mm Paper	CPI
Standard	44	49	15.6
Compressed	56	64	20.3

Related information

See Print Specifications 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
Default:	0

Sets the right side character spacing to [*n* x horizontal or vertical motion units]. Values for this command are set independently in standard and Page Mode.

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, 82.4 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 above table for exceptions.

Related information

See the Print Specifications Guide 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. See the *Printing Specification Guide* 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 n1 d1 ... nn dn]
Hexadecimal	1B 26 s c1 c2 n1 d1 ... nn dn]
Decimal	27 38 s c1 c2 n1 d1 ... nn dn]

Values and Ranges:

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

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

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

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

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

n = the number of dot columns for the nth character as specified by $n1 ... nn$

n = 1-16

d = the column data for the nth character as specified by $d1 ... dn$

The number of bytes for a character cell is s x $n1$.

The bytes are printed down and across each cell.

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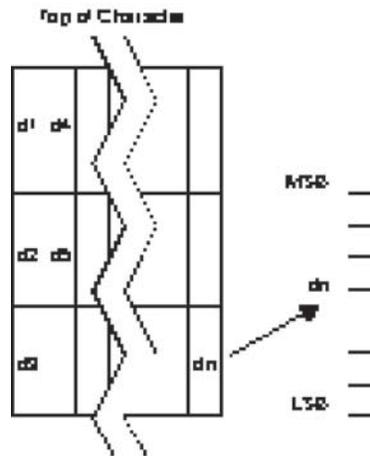
Defines and enters downloaded characters into RAM. The command may be used to overwrite single characters. User-defined characters are available until power is turned off or the Initialize Printer command (1B 40) is received.

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

Select or Cancel Underline Mode

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

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

Default:	0 (Cancel underline mode)

Turns underline mode on or off. 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 only in A794 Native Mode. In A973 and LEGACY Emulations, the parameter byte is put into the buffer.

Select International Character Set and Select Character Code Table

ASCII	ESC R n	ESC t n
Hexadecimal	1B 52 n	1B 74 n
Decimal	27 82 n	27 116 n

	A794 Native Mode	**A793 Emulation**	**LEGACY Emulation (1B 52 n only)**
Value of *n*:	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 = Norway
		1	0 = Denmark II

Default:	0 (Code Page 437)

Selects the character set to be used. See *Print Specifications* for the character sets. There are two codes for this command. Both codes perform the same function.

Related information

The LEGACY Emulation selection applies only to the command "Select International Character Set" (1B 52 *n*). T he LEGACY Emulation generates the same as A794 Native Mode for the command "Select Character Code 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 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 normal font
	1-8 = horizontal number of times normal 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:

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.

Exception

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

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.

Exceptions

Only the lowest bit of n is valid.

Related information

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

Select or Cancel Smoothing Mode

ASCII   GS b n

Hexadecimal   1D 62 n

Decimal   29 98 n

This command is ignored.

Select Superscript or Subscript Modes

ASCII	AX 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.

Summary of Rotated 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	∀ ᗺ ∩
Set	Canceled	X	Ɔ ᗺ ∀
Set	Set	X	∪ ᗺ ∀
X	X	Set	∀ ᗺ ∪

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

- Standard and compressed pitch
- Vertical (normal) and rotated
- Right-side up and upside down
- Single high (normal) and double high

Graphics commands

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

These commands describe 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.

Print raster graphics

ASCII	DC1 n1 ...nl
Hexadecimal	11 n1 ...n72
Decimal	17 n1 ...nl
Value of n:	n1…n72 = Data bytes
Range:	0-255

Prints one row of data. n1 . .. nl: bytes describing the line to print.

Exceptions

Raster graphics is not available in Page Mode.

Related information

This command is recognized only in A794 Native Mode.

In A793 and LEGACY Emulations, the data bytes are put into the print buffer.

Download BMP logo

ASCII: ESC (+*.BMP file)

Hexadecimal: 1B (+*.BMP file)

Decimal: 27 (+*.BMP file)

Value: Maximum width = 576
Maximum height = 512

Enters a downloaded BMP logo into RAM or Flash.

The downloaded BMP logo can be printed by using the Print Downloaded Bit Image
(1D 2F m) command.

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

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

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

Exceptions

BMP file images that are not monochrome are ignored.

Related information

Microsoft BMP bitmap file format.

This command is recognized only in A794 Native Mode.

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

Select Bit Image Mode

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

Value of m:

Value of *m*	Mode No. of	Dots (Vertical)	No. of Dots (Horizontal)	No. of Dots/Line
0	8 Dot Single Density	8 (68 DPI)	0-288 (101 DPI)	8 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*
$n1 + (256 \times n2)$	$3 \times [n1 + (256 \times n2)]$	Number of Bytes of Data (Printed Down, Then Across)

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 on the next page.

Related information

8-Dot Single-Density Mode

Top of Bit Image

24-Dot Single-Density Mode

Top of Bit Image
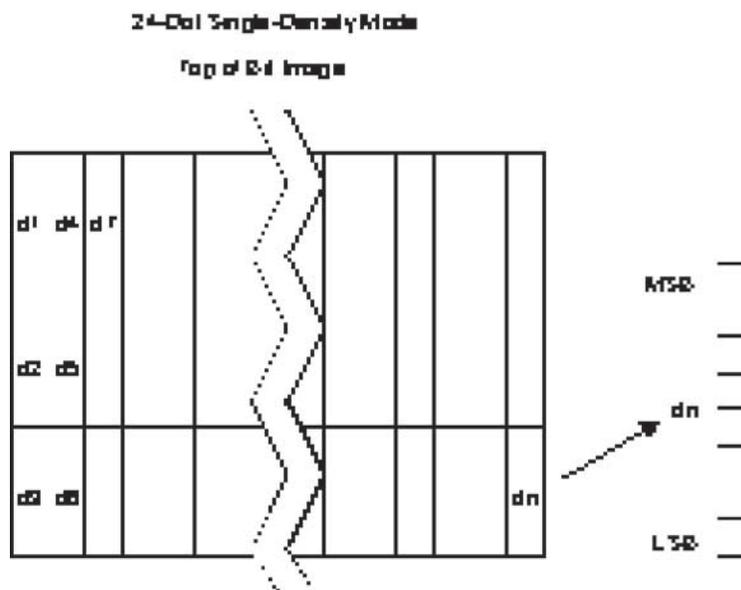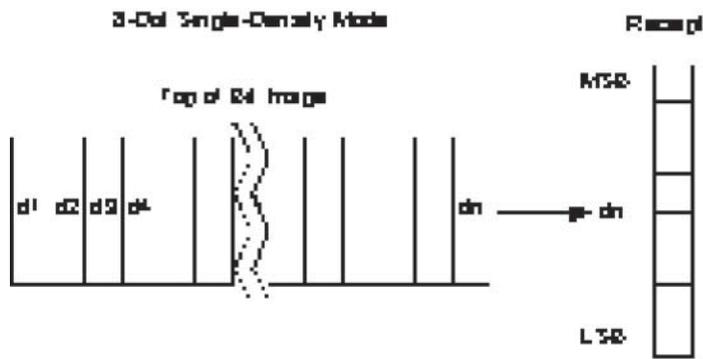
Print advanced raster graphics

ASCII	ESC . m n rL rH d1 … dn
Hexadecimal	1B 2E m n rL rH d1 … dn
Decimal	27 46 m n rL rH d1 … dn
Value of m:	horizontal offset from left margin = 8 x m dots
Value of n:	number of data bytes that compose the raster
Value of r:	number of times the raster has to be printed =256 x rH + rL
d1 … dn:	data bytes
Range:	$0 <= m <= 72$ $0 <= n <= 72$ $0 <= r <= 65535$ $0 <= d1 … dn <= 255$

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

Exceptions

Advanced Raster graphics is not available in Page Mode

Select single-density graphics

ASCII	ESC K n1 n2 d1 ... dn
Hexadecimal	1B 4B n1 n2 d1 ... dn
Decimal	27 75 n1 n2 d1 ... dn

Value of n

Value of n (8-Dot Single Density Mode)	Value of 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 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.

Formulas

See the above table.

Related information

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

Select double-density graphics

ASCII	ESC Y n1 n2 d1 ... dn
Hexadecimal	1B 59 n1 n2 d1 ... dn
Decimal	27 89 n1 n2 d1 ... dn

Value of n:

Value of n (8-Dot Single Density Mode)	Value of 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 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.

Formulas

See the above table.

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

Selects a 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 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 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 only in A794 Native Mode.

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

Define Downloaded Bit Image

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

Value of n:

Value of n1	Value of n2	Value of d
1-72 (8 x n1 = Number of Horizontal Dot Columns)	1-64 (Number of Vertical Bytes)[1]	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. The downloaded bit image is available until power is turned off, another bit image is defined, or Initialize Printer (1B 40) command is received.

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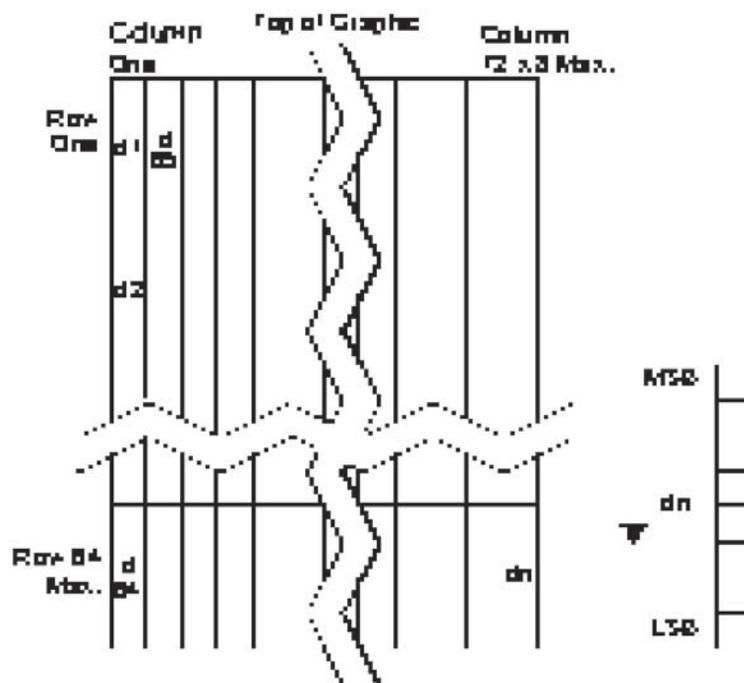
Print downloaded bit image

ASCII   GS / m

Hexadecimal   1D 2F m

Decimal   29 47 m

Value and Range of m:

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

Prints the downloaded bit image in RAM or Flash at a density specified by m. It is ignored if any data is in the print buffer, if the downloaded bit image is undefined, or if the data defined exceeds one line.

See the illustration on the previous page for a representation of the bit image.

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

ASCII   AX 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.

Status commands

Status command introduction

The A794 has three methods of providing status to the application. These methods are through Batch Status Commands, Real Time Status Commands, and Auto Status Back. 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 and are NOT stored in the printer's buffer. Instead, they are acted on immediately (regardless of the printer's BUSY status) and their response (if any) is returned to the application. 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.

Auto status back – 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 Auto Status Back) 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 A794 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.

Transmit paper sensor status

ASCII	ESC v
Hexadecimal	1B 76
Decimal	27 118

Values:

Status Byte (RS-232)

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	A794	0x24
2, 50	Type ID	Installed options	Refer to next table
3, 51	ROM version ID	ROM version	0x00
4, 52	Logo Definition	Logo Definition	Refer to table below

n = 2 or 50: Type ID

Type ID (n = 2)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	No two-byte character installed
	On	01	1	Two-byte character code installed
1	Off	00	0	No knife installed
	On	02	3	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.

When Auto Status Back (ASB) is enabled using the Enable/Disable Automatic Status Back command (1D 61), the status transmitted by this command (Transmit Printer ID) and the ASB status must be differentiated according to the information found in Recognizing Data from the Printer, (in the Real Time Commands section in this document).

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

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

Value of *n* ASCII	Hex	Dec	Remote Diagnostic Item	Function
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
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

Value of *n* ASCII	Hex	Dec	Remote Diagnostic Item	Function
"	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

Performs the remote diagnostic function specified by n.

Eighteen remote diagnostic items are defined: 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 table that follows describes the variables.

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>

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 RS-232C communications handshaking control is selected, the printer transmits the one byte response regardless of the host signal DSR.

When Auto Status Back (ASB) is enabled using the Enable/Disable Automatic Status Back command (1D 61), the status transmitted by this command (Transmit Status) and the ASB status must be differentiated according to the information found in Recognizing Data from the Printer. This is found in the Real Time Commands section in this document.

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

Exceptions

Unlike the A793, that had a dedicated connector and resultant dedicated status reporting for each cash drawer, the A794 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	Not Used. Fixed to off
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.
	On	20	32	Thermal User-defined characters written.
6	Off	00	0	Not used. Fixed to off.
7	-	-	-	Undefined.

Exceptions

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

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

Rules for using real time commands

Three situations must be understood when using real time commands.

First, the printer executes the Real Time command upon receiving it 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 of the buffer until the condition clears one way or another. In either case, but more quickly in the case of an error condition, the buffer can fill with Real Time commands.

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

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

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

Busy line and fault conditions

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

Real Time Status Transmission

	GS Sequence	DLE Sequence
	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 A794 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 are 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	Printer not stopped due to paper condition.
	On	20	32	Printing stopped due to paper condition.
6	Off	00	0	No error condition.
	On	40	64	Error condition exists in the printer.
7	Off	00	0	Fixed to off.

3 = Transmit Error Status

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off.
1	On	02	2	Fixed to On.
2	Off	00	0	Fixed to Off.
3	Off	00	0	No knife error.
	On	08	8	Knife error occurred.
4	On	10	16	Fixed to On.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurred.
6	Off	00	0	Thermal printhead temp. and power supply voltage are in range.
	On	40	64	Thermal printhead temp. and 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
Decimal	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 A794 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.

Auto status back

Select or cancel automatic status back (ASB)

ASCII   GS a n

Hexadecimal   1D 61 n

Decimal   29 97 n

Value of n: Status of ASB
Byte 1= printer information
Byte 2= error information
Byte 3= paper sensor information
Byte 4= paper sensor information

The bits of n are defined in the table.

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

Enables or disables Automatic Status Back (ASB) and specifies the status items. This command is a Batch Mode command; that is, it is processed after all prior data in the receive buffer has been processed. There may be a time lag between the printer receiving this command and changing the ASB response, depending on the receive buffer status.

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

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

- Receipt Cover

- Knife Error

- Out-of-Range Printhead Temperature

- Out-of-Range Voltage

- Paper Exhaust

Default: 0 (ASB disabled)

Exceptions

If n = 0, ASB is disabled.

Unlike the A793, that had a dedicated connector and resultant dedicated status reporting for each cash drawer, the A794 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

When the printer is disabled by the Select Peripheral Device command (1B 3D), this command (Enable/Disable Automatic Status Back) is disabled but Automatic Status Back is not disabled.

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

In LEGACY Emulation, when the Handshaking Mode communication parameter is set to "RX Buffer Full", the power on ASB default is 02 (Busy Status enabled.) "RX Buffer Full" is the default Handshaking Mode in LEGACY Emulation.

First Byte (Printer Information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Not used. Fixed to off.
1	Off	00	0	Not used. Fixed to off.
2	Off	00	0	One or both cash drawers open.
	On	04	4	Both cash drawers closed.
3	Off	00	0	Not Busy at the RS-232C interface.
	On	08	8	Printer is Busy at the RS-232C interface.
4	On	10	16	Not used. Fixed to on.
5	Off	00	0	Cover closed.
	On	20	32	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 ASB
0	-	-	-	Undefined
1	-	-	-	Undefined
2	-	-	-	Undefined
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.

Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Paper present
	On	01	1	Paper low (if paper low sensor enabled)
1	Off	00	0	Paper present
	On	02	2	Paper low (if paper low sensor enabled)
2	Off	00	0	Paper present
	On	04	4	Paper exhausted
3	Off	00	0	Paper present
	On	08	8	Paper exhausted
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

Fourth byte (paper sensor information)

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

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 ESC u and ESC v are non-Real Time responses and will arrive in the order in which they were solicited.

Batch Mode Response	Response Recognized By:
1B 75 0	0 0 0 0 0 0 x x Binary
1B 76	0 0 0 0 0 x x x Binary
1D 49 n	0 x x 0 x x x x Binary
1D 72 n	0 x x 0 x x x x Binary

Real Time Response	Response Recognized By:
1D 04 n	0 x x 1 x x 1 0 Binary
10 04 n	0 x x 1 x x 1 0 Binary
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

Auto Status Back (ASB)	Response Recognized By:
ASB Byte 1	0 x x 1 x x 0 0 Binary
ASB Bytes 2-4	0 x x 0 x x x x Binary

Bar code commands

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

These commands describe 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.

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 dots or (n/8 mm , n/203 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

m	Bar Code	d	n, 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

Second Variation Length of Byte Specified at Beginning of String

The value of m selects the bar code system as described in the table. When details present in the print buffer, the printer processes the data following m as normal data.

The variable d indicates the character code to be encoded into the specified bar code system. See the table. 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.

m	Bar Code	d	n, 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
70	Interleaved 2 of 5 (ITF)	48- 57	Variable (Even Number)
71	CODABAR (NW-7)	65- 68, start code 48- 57, 36, 43, 45, 46, 47, 58	Variable
72	Code 93	48- 57, 65- 90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) d1 = dn = 42 (start/stop code is supplied by printer if necessary)	Variable
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
75	PDF 417	0-255	Variable Length

Exceptions: Code 93 and PDF 417 are only available in A794 Native Mode.

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+1/8 mm (n+1/203 inch).

Page mode commands

Page Mode is one of two modes that the A794 printer uses to operate. Standard Mode is typical of how most printers operate by printing data as it is received and feeding paper as the various paper feed commands are received. Page Mode is different in that it processes or prepares the data as a "page" in memory before it prints it. Think of this as a virtual page. The page can be any area within certain parameters that you define. The page is printed using either the FF (0C) or the ESC FF (1B 0C) command.

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

These commands describe the operation for 80 mm paper. 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.

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)

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
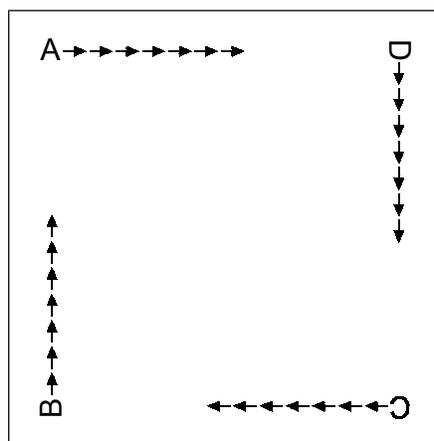
Decimal   27 84 n

Value of n: Start position

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

Default: 0

Selects the printing direction and start position in Page Mode. See the illustration on previous page.

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
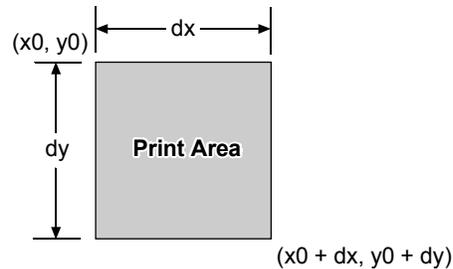
Sets the position and size of the printing area in Page Mode.

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 1B 0C).

Formulas

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

- x0 = [(n1 + n2 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).

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):

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

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

Formulas

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

When pitch n is specified to the movement downward:
nL + nH x 256 = n

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

When pitch n is specified to the movement upward:
nL + nH x 256 – 65536 – N

Exceptions

This command is used only in Page Mode, otherwise it is ignored.

Any setting that exceeds the specified printing area is ignored.

Macro commands

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 commands

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.

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)

ASCI	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 - 51

n = 48 (ASCII n = 0)

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.

n = 49 (ASCII n = 1)

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)

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)

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 Flash Memory or to RAM (volatile memory). The selection remains in effect until it is changed via this command or until the power cycles.

Related information:

This command is recognized in A794 Native Mode. In A793 and LEGACY Emulations, parameter bytes go into the print buffer.

Flash memory user sectors allocation

ASCII	GS " U n1 n
Hexadecimal	1D 22 55 n1 n2
Decimal	29 34 85 n1 n2
Default Value of n1:	1 (see below)
Default Value of n2:	1 (see below)

n1 is the number of 64k sectors used for logos and user-defined characters.
n2 is the number of 64k sectors used for user data storage.

n1 + n2 <= 2 (512K)
n1 + n2 <= 10 (1M)
n1 + n2 <= 18 (2M)

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

Issuing this command with parameters different from current parameters will erase all sectors.

Erase user flash sector

ASCII	GS @ n
Hexadecimal	1D 40 n
Decimal	29 64 n
Value of n:	49 - 50

n = 49 (ASCII n = 1)

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)

This command erases all sectors available for user data storage.

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).

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 five seconds after sending the Erase User Flash Sector (1D 40 n) command before sending data.

Flash Download Commands

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 4, 8, or 16 sectors (64K each) 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 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

Reboots the printer.