

Quick Reference Programming Guide



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datamax•o'neil

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Introduction

The Datamax-O'Neil Quick Reference Programming Guide is a reference guide for Datamax-O'Neil printers. This programming guide documents the functions and features of the printer's programming language.



Note: The commands documented in this programming guide are available based upon which version of firmware is installed on your printer and which printer you are using. To determine which version of the firmware you are using, print a self-test. The self-test printout lists information about your printer's configuration, options, and so on.

Overview of Printing Modes

Datamax-O'Neil thermal printers support several different printing protocols. The two native protocols are Line Printer and Easy Print. Each of these protocols have their own unique advantages depending upon what is to be printed. It is also possible to mix Line Printer and Easy Print in a single printed image. In addition to these two modes, there are also several emulation modes. These emulation protocols are covered in separate documents.

Line Printer Mode

The Line Printer mode is the simplest method of printing. Each line to be printed is sent to the printer as a sequence of single bytes (some Asian character sets require two bytes for each character). The printer accepts characters and begins to print when a Carriage Return (0x0D) or Line Feed (0x0A) is received. Then, all characters received to that point are printed on a single line. A series of ESCape code sequences can be sent to the printer to alter the look of the characters (e.g. to make them double wide, or to change the font, or to change other aspects of the appearance of the printout). You can also have the printer re-align if you are using stocks with a "Q" or alignment mark.

Easy Print Mode

The Easy Print mode is a much more powerful method of printing. Easy Print is actually a printing protocol that lets you give commands to the printer (such as PRINT). Within that protocol, you can tell the printer how to print that data (such as using a variety of fonts, or as a bar code), exactly where to put the data (anywhere on the printed image down to .005"), and how to modify the data (such as tall, wide, rotated). You can also store graphics images such as logos or icons, to be used anywhere on the printed image. If you are printing on pre-cut labels, you can use a pre-printed "Q" mark or the gap between labels to re-align after each image is printed.

TO PRINT	LINE PRINTER	EASY PRINT	EMULATION
Bar Codes		X	
Complex image (exact test/barcode/ graphic positioning important)		X	
Line after line of text (receipts or invoice)	X		
Graphics (one time - not stored) including captured signatures	X		
Graphics (stored)		X	

Introduction

TO PRINT	LINE PRINTER	EASY PRINT	EMULATION
Labels (Butt Cut or Die Cut) with alignment "O" mark or gap between labels	X (Text Only)	X (Complex)	
Pre-Printed "fill in the blank" form		X	
Rotated image		X	
Rotated areas on image		X	
Use Datamax-O'Neil printer in system meant for another make of printer			

Using Line Printer Mode

Overview

Line printer mode is the simplest protocol supported by the Datamax-O'Neil thermal printers. Using Line Printer mode, you can send a line of text as a sequence of characters to the printer followed by a carriage return (0x0D), and/or a line feed (0x0A), or a form feed (0x0C) and the printer prints that line of text. Commands can be used to change the way the printout looks and to select different fonts (fonts are available as the common IBM PC Code Page 437 mapping as well as many other mappings and international character sets).

Commands are usually either a single non-printable character, or a sequence of characters beginning with a non printable character such as ESCape (0x1b). Although these commands can be placed anywhere in the text, they will usually take effect exactly where they are placed. Therefore, you must be careful to place them where you want the effect to take place. For example, to change fonts you send ESC w n, where 'n' is the single character name of the font (seen AN-3 or AN-12). If you do this at the beginning of the line, it will affect the entire line. However, if you place this in the center of a line, it will affect only those characters that come after. If you place this at the end of the line, it will have no effect on that line at all, but will affect the next line.

Use Line Printer mode to print receipts and labels with text and simple, bitmap, graphics that do not need to be stored. You can also use Line Printer mode to insert signatures.



Note: This chapter assumes a basic knowledge of computer programming and is designed to be used by programmers, software engineers, and technicians.

Line Printer Commands

The following table contains the available Line Printer commands:

Command	Description	Page
ESC C n	Sets form length. Range for <i>n</i> is 1-255.	4
ESC A n	Sets interline spacing; <i>n</i> =0 (default).	4
CAN	Cancels buffer line	4
ESC V n1 n2	Bit-mapped graphics mode select	5
ESC Q n1n2	Permits different height characters across a single line.	5
ESC B	Begins acceptance of compressed graphics	6
ESC E	Ends acceptance of compressed graphics	6
SO	Sets double wide print	6
SI	Condensed print	6
FF	Form feed	7
LF	Line feed	7
CR	Carriage return	7
ESC w n	Font select. The range for <i>n</i> is 21-26 hex.	7

Using Line Printer Mode

Command	Description	Page
ESC @	Resets the printer	7
ESC Hn	Multiplies the height <i>n</i> times	8
ESC R n	International font selection	8
ESC ! n	Sets double wide and double high	8
ESC EZ	Goes to Easy Print Mode	9
ESC D n	Increases the darkness	9
ESC d n	Decreases the darkness	9
ESC bn	Back up	9



Note: Line Printer commands are case-sensitive. Make sure you use the correct case when entering commands. An *n* indicates binary numbers, not ASCII characters. For more information, see the individual command(s).

Esc C n	Set Form Length
Format	ESC C <i>n</i>
Dec	27 67 <i>n</i>
Hex	1B 43 <i>n</i>
Function	Sets the page length in character lines. In the command format, <i>n</i> represents the number of lines in the form and <i>n</i> is a single byte. The default for <i>n</i> is 20 decimal, 14 hexadecimal. The range for <i>n</i> is 1-255.

Esc A n	Set Interline Spacing
Format	ESC A <i>n</i>
Dec	27 65 <i>n</i>
Hex	1B 41 <i>n</i>
Function	Sets the number of blank dotlines that are fed between character lines. The printer adds <i>n</i> (eight-bit binary number) blank lines after completing the current line(s) and before printing the next line. The default value for <i>n</i> is zero where <i>n</i> equals the number of inter-character blank dotlines in a single character. The range for <i>n</i> is 1-155.

CAN	Cancel Line Buffer
Format	CAN
Dec	24
Hex	18
Function	Cancels the character received on the currently forming, but not yet printed, line.

Using Line Printer Mode

Esc V n1 n2 Bit-Mapped Graphics	
Format	ESC V <i>n1 n2</i>
Dec	27 86 <i>n1n2</i>
Hex	1B 56 <i>n1n2</i>
Function	Prints the next ($n1 * 256 + n2$) dotlines as bit-mapped graphics. <i>n1n2</i> form a 16-bit binary number set, the most significant byte first. Used to print user-generated bitmap graphics across the width of the printhead. After receipt of this command, the printer dumps the binary data directly to the printhead. As customary with bitmap data, a 1 bit indicates a dot is on, 0 bit indicates the dot is off. Graphics printed using this command must be the exact width of the head in bits. Bit 7 of the first byte of data received prints at the left-most dot on the head as you view the printhead with the paper feeding away from you. The printer remains in bit-mapped graphics mode until the total amount of bytes necessary to fill <i>n1n2</i> lines of print are received by the printer. Use the following table for guidelines when adding a bit-mapped graphic.

Printer Type	Dots Across	Bytes Across	Dots Per Inch
microFlash2	384	48	203
microFlash3	576	72	203
microFlash4t/4tCR	832	104	203
microFlash2t/2tCR	384	48	203
microFlash2i/2iCR	240	30	127 Horizontal 69 Vertical

ESC Q n1n2 Advance n1n2 from Q mark	
Format	ESC Q <i>n1n2</i>
Function	Permits different height characters across a single line.

Using Line Printer Mode

Esc B, ESC E Accept Compressed Graphics	
Format	ESC B ESC E
Dec	27 66 27 69
Hex	1B 42 1B 45
Function	<p>Accepts compressed graphics. The printer decompresses and prints the graphic.</p> <p>Each compressed dotline (using a run-length encoding scheme) is preceded by an uppercase <i>G</i>. Each uncompressed dotline is preceded by an uppercase <i>U</i>. Vertical white space (where several consecutive dotlines have not been printing) is processed using an uppercase <i>A</i> followed by a single byte count of the number of dotlines to advance.</p> <p>Compressed dotlines use a single graphics byte, followed by the number of times the byte is repeated. After the compressed graphics data command (ESC B) is received, each dotline must be preceded by the <i>G</i> or <i>U</i>, or an <i>A</i> may be sent followed by the number of lines to advance.</p> <p>When all data is sent, the final bytes must be ESC E to exit compressed graphics data.</p> <p>Compressed graphics mode requires a graphic image the same width as the printhead in use.</p> <p>Note: The microFlash3 printer has 576 bits across a single line; the microFlash2/2t has 384 bits and the microFlash2i has 240 bits microFlash4t has 832 bits across a single line.</p>

SO Set Double Wide Print	
Format	SO
Dec	14
Hex	0E
Function	Prints the current font in double wide width until an SI (Set Single Wide Print) command is received or a carriage return is received.

SI Set Single Wide Print	
Format	SI
Dec	15
Hex	0F
Function	Prints the current font in single width.

Using Line Printer Mode

FF	Form Feed
Format	FF
Dec	12
Hex	0C
Function	Prints the current line, then advances the paper to top of form (TOF).

LF	Line Feed
Format	LF
Dec	10
Hex	0A
Function	Prints the current line and advances the paper.

CR	Carriage Return
Format	CR
Dec	13
Hex	0D
Function	Prints the current line and advances the paper to top of form (TOF). The CR command is similar to LF — both commands are provided for your convenience. Note: To print and advance n lines, use the number of CR commands, or LF commands, or a combination of CR/LF and LF/CR commands.

ESC w n	Select Font
Format	ESC w n
Dec	27 119 n
Hex	1B 77 A
Function	Selects a Line Printer font given n , a binary, eight-bit number. For more information, refer to <i>Line Printer Fonts</i> in the Datamax-O'Neil Thermal Programming Guide .

ESC @	Reset Printer
Format	ESC @
Dec	27 64
Hex	1B 40
Function	Resets the printer to defaults.

Using Line Printer Mode



Note: Use the following Easy Print command to return to Line Printer mode while in Easy Print mode. {LP} is not a Line Printer command. If you mistakenly use {LP} while in Line Printer mode, {LP} prints on your receipt or label.

Format: {LP}

ESC Hn	Heighten Font <i>n</i> Times		
Format	ESC Hn		
Dec	27	72	<i>n</i>
Hex	1B	48	<i>n</i>
Function	Multiplies the height of the font by <i>n</i> . Must apply to the entire line.		

ESC R n	Select International Character Set		
Format	ESC R <i>n</i>		
Dec	27	82	<i>n</i>
Hex	1B	52	<i>n</i>
Function	Select international character sets. Note: The common IBM Code page 437 with 224 characters must be used. 0=USA4=Denmark 1= France5=Sweden 2=Germany6=Italy 3=UK 7=Spain		

ESC !n	Set Double Wide and Double High		
Format	ESC ! <i>n</i>		
Dec	27	33	<i>n</i>
Hex	1B	21	<i>n</i>
Function	Selects font height and width for one line. Must apply to entire line. n=10h 16d Double high n=20h 32d Double wide n=30h 48d Double high and double wide		

Using Line Printer Mode

ESC EZ		Go to Easy Print Mode	
Format	ESC EZ		
Dec	27	69	90
Hex	1B	45	5A
Function	<p>Puts the printer in Easy Print Mode. You must use uppercase letters <i>EZ</i>.</p> <p>To turn ON MPCL, send the configuration request in Easy Print {CL:EMM1} followed by {COMMIT}.</p> <p>To turn ON this new extended CPCL, send the configuration request in Easy Print {CL:EMZ4} followed by {COMMIT}.</p>		

ESC D n																	
Format	ESC D n																
Function	Increases the darkness.																
	<table> <tr> <td>n = 0</td> <td>0%</td> <td>n = 4</td> <td>+20%</td> </tr> <tr> <td>n = 1</td> <td>+5%</td> <td>n = 5</td> <td>+25%</td> </tr> <tr> <td>n = 2</td> <td>+10%</td> <td>n = 6</td> <td>+30%</td> </tr> <tr> <td>n = 3</td> <td>+15%</td> <td></td> <td></td> </tr> </table>	n = 0	0%	n = 4	+20%	n = 1	+5%	n = 5	+25%	n = 2	+10%	n = 6	+30%	n = 3	+15%		
n = 0	0%	n = 4	+20%														
n = 1	+5%	n = 5	+25%														
n = 2	+10%	n = 6	+30%														
n = 3	+15%																

ESC d n													
Format	ESC d n												
Function	Decreases the darkness.												
	<table> <tr> <td>n = 0</td> <td>0%</td> <td>n = 3</td> <td>-15%</td> </tr> <tr> <td>n = 1</td> <td>-5%</td> <td>n = 4</td> <td>-20%</td> </tr> <tr> <td>n = 2</td> <td>-10%</td> <td>n = 5</td> <td>-25%</td> </tr> </table>	n = 0	0%	n = 3	-15%	n = 1	-5%	n = 4	-20%	n = 2	-10%	n = 5	-25%
n = 0	0%	n = 3	-15%										
n = 1	-5%	n = 4	-20%										
n = 2	-10%	n = 5	-25%										

ESC bn	
Format	ESC bn
Function	Back up.
	<p>n = number of dotlines the printer should back up in dec (A = 65 dot lines, d = 100 dot lines)</p>

Using Easy Print Mode

Overview

The Easy Print protocol is much more than just a printing protocol. In its most basic form, Easy Print mode allows the user to send and execute commands. As part of the command execution, the printer may return data to the host. In addition to printing, commands also allow paper motion, configuring, and control of peripherals such as the magnetic and smart card readers.

All commands begin with an opening "left curly bracket" or '{' (ASCII 0x7C) and end with a closing "right curly bracket" or '}' (ASCII 0x7D). The commands immediately follows the opening bracket '{'. A colon ':' separates the command from the data that follows. The general format of any Easy Print command is: {[COMMAND]<:DATA>}

Easy Print mode controls the printer down to a single dotline. At the printer's resolution of 8 dots per mm, or approximately 200 dots per inch, one dotline is approximately .005". Most dimensions in Easy Print are in dotlines. For example, a simple command that allows paper to advance or retract would be {AHEAD:200} or {BACK:50} (the command AHEAD or BACK is followed by the number of dotlines to move paper).

COMMAND	MEANING	ORIGINAL MF2/MF3/3t/4t	Radio Ready 2t/3l/4t
PAPER MOVEMENT			
AHEAD:nnn	Advances paper by nnn dotlines	X	X
BACK:nnn	Retracts paper bu nnn dotlines	X	X
S	Status (returns a fixed status string)	X	X
SWITCH PROTOCOLS			
DP	Puts printer into configured default protocol		X
LP	Puts printer into Line Printer mode	X	X
ESC	Synonym for LP		X
EMZn	Puts printer into emulation mode EMZn (where n=1, 2, 3, etc.)		X
EMCn	Puts printer into emulation mode EMCn (where n=1, 2, 3, etc.)		X
EMPn	Puts printer into emulation mode EMPn (where n=1, 2, 3, etc.)		
PRINTING			
TP	Prints a self-test printout (does not require any data)	X	X
PRINT:data	Prints the data received. Note that the data must be in a particular format (see AN07 for Printing With Easy Print)	X	X
DOWNLOADING FONTS AND GRAPHICS			
Easy print is used for downloading fonts and graphics. It is best to use the Windows Configuration Program or the OPDI Suite for downloading, rather than attempt to write the code yourself. Other application notes describe this process in detail.			
CONFIGURATION			
Easy Print is used to set configuration values into the printer. More detailed information is available in other application notes.			

Using Easy Print Mode

You can use Easy Print mode to design custom receipts, tickets, or reports with borders, lines, stored graphics, logos, bar codes, and text. For example, you can create a receipt with your company logo at the top, an identifying bar code in the middle, and a signature line at the bottom. Easy Print mode also allows you to use stored graphics, thus increasing your print speed.

You can also use Easy Print mode to create images that are missing variable data which can be inserted when the image prints. For example, if a graphic is used multiple times on a receipt, ticket, or report, use Easy Print mode to store the graphic in Flash memory, minimizing the communication time between the printer and the host computer and increasing your print speed. Depending on the size of the format and the amount of memory available in your microFlash printer (1M or 4M), up to 100 different formats can be stored in internal memory. Only variable data is then sent from the handheld computer to the printer.



Note: This chapter assumes a basic knowledge of computer programming and is designed to be used by programmers, software engineers, and technicians.

To switch between Easy Print and Line Printer modes, enter ESC EZ to go to Easy Print mode. To switch from Easy Print mode to Line Printer mode, enter {LP}.

Easy Print Commands: General Guidelines

Use the following guidelines when entering Easy Print commands:

- Easy Print commands appear as *{Command: Information}* where *Information* indicates a set of instructions needed by the printer to carry out a command. Not all Easy Print commands require a set of instructions to carry out a command. Some commands, such as *{LP}*, contain only a few characters with no additional instructions. To determine if a command needs additional instructions, see the specific Easy Print command on *page 13*.
- Some Easy Print commands, such as the Print command, require a complex set of instructions to carry out a command. For more information about the Print command, see *"Easy Print: Using the Print Command"* on *page 16*.
- If the printer is asleep, null characters must precede Easy Print or Line Printer commands. If the printer is awake in either mode, do not precede a command with null characters.
- Always use Easy Print mode for graphics that are used multiple times, such as a company logo.
- Do not insert spaces in a command unless they are part of the *data*. For information on the *data*, see *"Easy Print: Using the Print Command"* on *page 16*.
- All commands must be entered in uppercase.

Using Easy Print Mode

Sample Easy Print Job

S	ABC Associates, Inc.	S	ABC Associates, Inc		
O	123 Park Ave.	H	123 Park Ave.		
L	Huntington, NY. 11743	I	Huntington, NY. 11743		
D		P			
T		T			
O		O			
ITEM NO.	DESCRIPTION	QUANTITY	UNIT PRICE	EXTENSION	
200060-A00	PENTIUM V, 1GHZ, 1GRAM	55	\$909.00	\$49,995.00	
280103-A00	PRINTER COVER (BLACK)	55	\$ 10.50	\$ 577.50	
280104-B00	PAPER COVER (BLACK) 3	55	\$ 0.00	\$ 0.00	
210050-B00	DATA CABLE - DB9F	2	\$ 35.00	\$ 70.00	
210050-B19	CABLE, HS SERIES	55	\$ 72.00	\$ 3,960.00	
490008-A01	AC POWER ADAPTER (110 V.)	55	\$ 24.00	\$ 1,320.00	
510002-A02	USB CABLE ADAPTER	54	\$ 12.00	\$ 648.00	
550028-A00	BATTERY, BACKUP DR 30AA	54	\$ 85.00	\$ 4,590.00	
740009-B00	PRINTER PAPER (WHITE)	1,000	\$ 1.80	\$ 1,800.00	
110053-C00	PENTIUM HANDBOOK	1	\$ 39.95	\$ 39.95	
			TOTAL ORDER VALUE	\$63,000.45	

Using Easy Print Mode

Easy Print Commands

Easy Print commands have a unique format and function. All but the Query class of commands are documented on the following pages. For information on queries, refer to *Querying the Printer* in the **Datamax-O'Neil Thermal Programming Guide**.



Note: In this chapter, an *n* indicates ASCII numbers, not binary numbers. For more information, see the specific command listed in the following table.

The following table contains the available Easy Print commands:

Command	Page
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Back	13
LP	13
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Status	13
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Configuration	26

Ahead Command

Ahead Command Format {AHEAD:nnn}	
{	A left bracket begins the command set.
AHEAD:nnn	<i>AHEAD:nnn</i> or <i>Ahead:nnn</i> or <i>A:nnn</i> advances the paper by <i>nnn</i> dotlines. Use the Ahead command as an alternative to manually advancing the paper. The range for <i>nnn</i> is 1 to 65,000 dotlines.
}	A right bracket ends the command set.

Back Command

Back Command Format {BACK:nnn}	
{	A left bracket begins the command set.
BACK:nnn	<i>BACK:nnn</i> or <i>Back:nnn</i> or <i>B:nnn</i> backs the paper by <i>nnn</i> dotlines. Use the BACK command to reposition the edge of the paper for minimum paper waste.
}	A right bracket ends the command set.

Using Easy Print Mode

Line Printer Mode

Line Printer Mode {LP}	
{	A left bracket begins the command set.
LP	LP puts the printer into Line Printer mode.
	Note: Do not send additional characters for 500ms (is this the time period?) after sending this command (need more info. Why not?)
}	A right bracket ends the command set.

Self-Test Printout

Self-test Printout {TP}	
{	A left bracket begins the command set.
TP	TP commands a self-test printout.
}	A right bracket ends the command set.

Limited Self-test Printout {TP1}	
{	A left bracket begins the command set.
TP1	TP1 commands a limited self-test printout.
}	A right bracket ends the command set.

Alternate Self-test Printout {TP:xxx}	
{	A left bracket begins the command set.
xxx	xxx : (0 - 255) xxx = 0 will print only the normal self-test xxx = 001 will print the stored format named TP001 xxx = 002 will print the stored format named TP002 through xxx = 255
	The type of self-test (value of xxx) is returned in the configuration command {CF?}
}	A right bracket ends the command set.

Status

Status {S}	
{	A left bracket begins the command set.
S	Returns an Easy Print status string.
}	A right bracket ends the command set.

Using Easy Print Mode

Initial Program Load

Initial Program Load {IPL:0xAA55}	
{	A left bracket begins the command set.
IPL:0xAA55	Erases the .BIN printer application file. This command is used in preparation to reload a new file.
}	A right bracket ends the command set.

Using Easy Print Mode

Easy Print: Using the Print Command

In Easy Print mode, the Print command includes all possible printer actions used to stop the paper, rotate images, print images, and alter images. Use the following format for Print commands:

{Print, Global Options:@row,col:Name,Field Options|data|}

{	A left bracket ({) begins the print command set.
Print,	A comma (,) follows the Print command if there are additional global options. If no additional set of instructions are specified, the print command is entered as <i>{Print}</i> .
Global Options:	Use <i>Global Options</i> : to specify actions that apply to an entire receipt or label. Follow global options with a colon (:). Do not enter spaces before or after the colon (:). Global options may modify the entire Easy Print command. For example, a global option can be used to stop the paper after a specified number of dotlines or at a specified mark, to rotate an image, or to print a specified number of copies simultaneously or on demand. For more information, see <i>"Print Command: Specifying Global Options"</i> on page 17.
@row, column:	Use <i>@row,column</i> : to specify the row and column where each line of text, graphics, bar codes and lines are to be printed. Follow the row and column information with a colon(:). Do not enter spaces before or after the colon. The range for each row is 1-65,000 dotlines. The column range for the 2t printer and LP3 printer and microFlash 2 printer is 1 -384 dotlines. The column range for the microFlash 3 printer is 1 - 576 dotlines. The column range for the 4t printer is 832 dotlines.
	A typical print request consists of the <i>Print</i> command and the number of items to be printed, each at a different row and possibly a different column. For text to line up correctly, the column numbers must be identical, for example, <i>@10,30 (Information) </i> and <i>@60,30 (Information) </i> . If the column numbers are too large for the paper, or the print request skips to a row further down the paper, the print request is rejected. Note: In a typical print request, there may be five or more <i>@row,col</i> commands for a single Print command.
Name	Use <i>Name</i> to specify the name of the font, bar code, line, or file name of the graphic. An example of a font name is <i>MF102</i> . Do not add spaces to <i>Name</i> or the print request will be rejected. For more information, see <i>Font Names, Graphic Names, Line Names, or Bar Code Names</i> . Note: The <i>Name</i> can only be five characters long, even for user-created graphics.
Field Options	Use <i>Field Options</i> to increase the size of fonts, bar codes, lines, or graphics. Each field option must be separated by a comma (,). For more information, see <i>Font Field Options, Bar Code Field Options, or Graphic Field Options</i> .
 Data 	Use <i> Data </i> to specify the text printed on a receipt or label, or to specify characters that can be read by a scanner. Vertical bars () surround the data.
}	A right bracket (}) ends the print request.

Using Easy Print Mode

Print Command: Guidelines

- Use the correct terms for global and field options (for example, *QSTOPn* or *WIDEn* where *n* indicates a number in the range). If a global or field option is entered incorrectly, the print request is rejected. For more information, see the appropriate global or field option on the following pages.
- A single print command can be used for multiple print lines; therefore, you do not need to enter *Print* each time another line of text is printed.

Print Command: Specifying Global Options

The following global options are available for the Print command:

BACKnnn	Back Global Option
Format	BACKnnn (1≤nnn≤200)
Function	Backs the paper up <i>nnn</i> dotlines before printing.
Example	{PRINT,BACK50:@10,30:MF107 Hi world }

QSTOPnnn	Qstop Global Option
Format	QSTOPnnn (1≤nnn≤65000) (microFlash 2/3/2t)
Function	<p>Stops <i>nnn</i> dotlines after sensing the Q mark. When the Q mark is found, the paper advances by <i>nnn</i> dotlines and stops, even if the image is not yet complete. If the Q mark is not found, the printer continues to advance; therefore, use the STOP option when stop conditions are larger than the desired image. The value of <i>nnn</i> ranges from 1 to 65,535 dotlines.</p> <p>QSTOP Bnnn - QMark bottom QSTOP Tnnn - QMark top QSTOP Gnnn - QMark gap QSTOP N - Ignore QMark</p> <p>The commands notes above override label and sensor conguration settings in the printer.</p> <p>Note: When the paper is properly aligned, the Q mark cannot be positioned below the sensor. For more information, refer to <i>Specifications</i> in the Datamax-O'Neil Thermal Programming Guide.</p>
Example	{PRINT,QSTOP500:@10,30:MF107 Hi world }

ROTxxx	Rotate Global Option
Format	ROT270, ROT180, ROT090
Function	Rotates the image with the left edge of the image printing first either 270, 180, or 90 degrees.
Example	{PRINT,ROT270:@10,30:MF107 Hi world }

Using Easy Print Mode

STOPnnn Stop Global Option	
Format	STOPnnn (1≤nnn≤65000)
Function	<p>Advances the paper to the proper point for tearing. This option stops the paper <i>nnn</i> dotlines (.005"/dotline or 200 dotlines/inch) after the beginning of the label or receipt. The data <i>nnn</i> is sent after the STOP option specifies the total number of dotlines high for the image. For example, for the microFlash series of printers (which have a 203dpi mechanism), specifying <i>STOP500</i> gives a 2.5" total height image from the top of the paper to where it stops under the printhead.</p> <p>If the paper has advanced <i>nnn</i> dotlines and the printed part of the image is not yet complete, the image is truncated. If the printed part of the image is complete, white space is added to the bottom until <i>nnn</i> dotlines have advanced. The value of <i>nnn</i> ranges from 1 to 65,535 dotlines.</p> <p>The STOP option can also be used with the QSTOP option. Specify the STOP to stop the printing just after the stop using the QSTOP option. This ensures the paper stops advancing whether paper with Q marks is loaded, or regular paper is loaded.</p>
Example	<pre>{PRINT,STOP500,QSTOP125 :@10,30:MF107 Hi world }</pre> <p>In this example, the paper stops advancing when it has advanced 500 dotlines, or 125 dotlines after the Q mark is detected, whichever occurs first.</p>
COLx y	
Format	COLx y
Function	Creates a variable COLx (where 0<=x<=9) with the value of y (y may have any legal value). Whenever COLx is specified in a field (e.g. @ROW, COLx), the COLx is replaced with the value given in y.
Example	

Using Easy Print Mode

COLOFFSET x	
Format	COLOFFSET x
Function	<p>Will shift the entire image to the right by x dots if x is positive or to the left by x dots if x is negative (regardless of value, any given field cannot shift left beyond zero and the resulting image is undefined). The default value is zero.</p> <p>LEFT — Will use the value specified in COL (@ROW,COL:...) as the left hand edge of the field. This is the default value.</p> <p>CENTER — Will center the field at the value given for the COI (e.g. 1/2 of the image will be printed to the LEFT of the value given for COL and 1/2 of the image will be printed to the RIGHT of the value given for COL. If the resulting field will start to the left of the origin, the results are undefined.</p> <p>RIGHT — Will use the value specified in COL as the right hand edge of the field. If the resulting field will start to the left of the origin, the results are undefined.</p> <p>The column can be given an explicit dot column number:</p> <p>++ — will cause the field to start at the next available dot column after the previous field ends.</p> <p>+x — will cause the field to start at x dot rows past the start of the previous field.</p> <p>COLx (0<=x<=9) — will use the value given for the variable name COLx in the global parameter.</p>
Example	

Using Easy Print Mode

ROWOFFSET x	
Format	ROWOFFSET x
Function	<p>Will shift the entire image down by x dots if x is positive or up by x dots if x is negative (regardless of value, any given field cannot shift left beyond zero and the resulting image is undefined). The default value is zero.</p> <p>The row can be given an explicit dot row number:</p> <ul style="list-style-type: none">++ — will cause the field to start at the next available dot row after the previous field ends.+x — will cause the field to start at x dotlines past the start of the previous field.
Example	

Using Easy Print Mode

Print Command: Customizing Fonts

Font Names

{Print, Global Options:@row,column:NAME,Field Options|data|}

Use the following options to customize fonts. Each font has a five-character name. The following is a partial list of font names. For a list of all available fonts, call your Datamax-O'Neil representative at (949) 458-0500.

Font Name	CPI	Description
MF055	5.5	96 characters, large block (26 characters for lowercase, 26 characters for uppercase, plus symbols, etc.)
MF072	7.5	96 characters, large block
MF102	10.2	223 characters, medium block, bold
MF107	10.7	96 characters, block, bold
MF185	18.5	96 characters, block, normal
MF204	20.4	224 characters, block, normal (default font for microFlash 2/3/2t)
MF226	22.6	97 characters, small block

microFlash 2i Only

Font Name	CPI	Description
IM5X7	22.1	96 characters for impact 5x7
IM5X8	22.1	96 characters for impact 5x8

Font Field Options

{Print, Global Options:@row,column:Name,FIELD OPTIONS|data|}

Use the following options to heighten or widen the font:

Field Option	Abbr.	Description
HMULTn	HMn	Widens text: $1 \leq n \leq 255$
VMULTn	Vn	Heightens text: $1 \leq n \leq 255$



Note: To compare the available fonts, run the demo program and print the samples.

Using Easy Print Mode

Print Command: Customizing Bar Codes

Bar Code Names

{Print, Global Options:@row,column:NAME,Field Options|data|}

Use the following options to customize a bar code:

Name	Description	Requirements for Data
BC39N	Code 39 2:1 ratio	Use the following characters in the data field: Space \$ % + . / 0-9 A-Z Auto inserts leading and trailing asterisk (*).
BC39W	Code 39 3:1 ratio	Use the following characters in the data field: Space \$ % + . / 0-9 A-Z Auto inserts leading and trailing asterisk (*).
COBAR	Codabar	0-9 - \$:/.a b c d. You must send leading and trailing guard bar a-d.
I2of5	Int (?) 2 of 5 2.5:1 ratio	0-9 (Digits only, must be even. Controller inserts leading zero to ensure an even number of digits.)
BCI25	Int. (?) 2 of 5 2:1 ratio	0-9 (Digits only, must be even. Controller inserts leading zero to ensure an even number of digits.)
BC128	Code 128	Automatically selects codes A-C for the shortest bar code. Allows all ASCII characters.
EN128	EAN-128	Uses codes C for the shortest bar code. Allows all ASCII characters.
UPC-A	UPC-A	0-9 (Must have 11 digits or error. Controller calculates check digit.) If HR is set as a field parameter, then the human readable is embedded into the bar code at the bottom (similar to commercial products bar codes).
EAN08	EAN-8	0-9 (Must have seven digits or error. Controller calculates check digit.)
EAN13	EAN-13	0-9 (Must have 12 digits or error. Controller calculates check digit.)
PD417	PDF-417	For more information, see ____.
PLESY	PLESY	If the mod11 check digit evaluates to 10, no check digit is added. MOD10 will add one Modulo 10 check digit (default if nothing is specified). MOD1010 will add two Modulo 10 check digits. MOD1110 will add one Modulo 11 check digit, followed by one Modulo 10 check digit.

Using Easy Print Mode

Bar Code Field Options

{Print, Global Options:@row,column:Name,FIELD OPTIONS|data|}

Field Option	Abbreviation	Description
HIGHn	H nn	Changes the height of the bar code in five dot-inch intervals. The default is five dots; $1 \leq n \leq 255$.
WIDEn	W nn	Width multiplier of the bar code. Default is one; If $W=2$, W is twice as wide (1/2 density) as $W=1$; $1 \leq n \leq 255$.

Using PDF-417 Symbols

You can print any characters using Datamax-O'Neil PDF-417 symbols. PDF-417 symbols are optimized for printing a mixture of numbers, text, and control characters.

To use PDF-417 as a standard bar code:

- 1 Enter Easy Print Mode using *ESC+EZ*.
- 2 Select the barcode using the name *PD417*.
- 3 Enter data between vertical bars (|). If the data is long, do not enter a carriage return and/or line feed unless you want *CR/LF* to appear in the bar code

The following PDF-417 field parameters can be specified:

COLUMNS	Specifies the number of columns of data printed in each row of the bar code. If a column is not specified, the default value of 2 data columns is used. The actual columns used is 4 greater than data columns. (2 for guard columns and 2 for row indicator columns).								
SECURITY	Specifies the level of error detection and correction codes, from 1 through 8. If not specified, the following default values for the number of data characters to be printed is used: <table data-bbox="386 1312 1015 1438"> <tbody> <tr> <td>1-40 characters</td> <td>Level 2</td> </tr> <tr> <td>40-160 characters</td> <td>Level 3</td> </tr> <tr> <td>161-320 characters</td> <td>Level 4</td> </tr> <tr> <td>321-863 characters</td> <td>Level 5</td> </tr> </tbody> </table>	1-40 characters	Level 2	40-160 characters	Level 3	161-320 characters	Level 4	321-863 characters	Level 5
1-40 characters	Level 2								
40-160 characters	Level 3								
161-320 characters	Level 4								
321-863 characters	Level 5								
YDIM	Specifies the height of each element, in units of .005 inches. The default height is 1.								
WDIM	Specifies the width of each element, in units of .005 inches. The default width is 1.								

Use the following guidelines when entering PDF-417 symbols:

- A maximum of 1848 text characters (fewer if mixed with arbitrary bytes)
- A minimum of 3 rows and a maximum of 30 rows
- A minimum of 1 column and a maximum of 30 columns
- Error detection and correction characters vary with different security levels:
 - Level 1 adds 4 codewords
 - Level 2 adds 8 codewords
 - Level 3 adds 16 codewords
 - Level 4 adds 32 codewords

Using Easy Print Mode

Level 5 adds 64 codewords
 Level 6 adds 128 codewords
 Level 7 adds 256 codewords
 Level 8 adds 512 codewords

Using PDF4-17 Example

```
{PRINT:
@75,10:PD417,YDIM 6,XDIM 2,COLUMNS 2, SECURITY 3|ABCDEFGHijkl}
```

Explanation: Prints a PDF-417 bar code containing ABCDEFGHIJKL with each element .010" wide and .030" high; each row contains 2 data bytes and uses an error detection and correction level of 3, which adds 16 error correction code words to the bar code.

Stored Formats

```
{PRINTFORMAT,FNAME[:LISTofVARIABLES]}
```

EXAMPLE: Begin with the following Easy Print job:

```
[ESC]EZ{PRINT,QUANTITY2:
@160,0:MF107,VMULT 3,HMULT 3|FORMAT TEST|
@260,0:MF107|09/03/03 01:52 PM |
@360,0:MF185|Ticket #: |
@360,0:MF107| TT-123456789|
@385,0:MF185|Permit: |
@385,0:MF107| AB-1234567|
}
```

- 1 CREATE THE FORMAT TO STORE: Replace the data in the fields that need to change to a variable name beginning with "&":


```
[ESC]EZ{PRINT,QUANTITY2:
@160,0:MF107,VMULT 3,HMULT 3|&field1|
@260,0:MF107|&date time|
@360,0:MF185|Ticket #: |
@360,0:MF107|&ticket number|
@385,0:MF185|Permit: |
@385,0:MF107|&permit number|
}
```
- 2 STORE THE FORMAT using the Datamax-O'Neil tools, such as the Windows Configuration Program MFLASH. In this example, we will use the format name FTEST.
- 3 PRINT THE FORMAT: Send the following string to the printer to print the format. The resulting image should look the same as when the original format with data first shown in the example was printed.

```
[ESC]EZ{PRINTFORMAT,FTEST:
&field1=|FORMAT TEST|
&date time =|09/03/03 01:52 PM|
&ticket number= | TT-123456789|
&permit number = | AB-1234567|
}
```

Using Easy Print Mode

Print Command: Customizing Graphic Names

Graphic Names

{Print, Global Options:@row,column:NAME,Field Options|data|}

Function	Prints a stored graphic.
Example 1	{PRINT:@10,30:ALOGO }
	Prints the logo stored under the five-character name (<i>ALOGO</i>), or a single character name.
Example 2	{PRINT:@10,30:ALOGO,HMULT2, VMULT2 }
	Doubles the size of the logo.

Graphic Field Options

{Print, Global Options:@row,column:Name,FIELD OPTIONS|data|}

Use the following options to heighten or widen graphics:

Field Option	Abbreviation	Description
HMULTn	HMn	Multiplies the width of the graphic by <i>n</i> .
VMULTn	VMn	Multiplies the height of the graphic by <i>n</i> .

Print Command: Customizing Line Names

Line Names

{Print, Global Options:@row,column:NAME,Field Options|data|}

Format 1	Hline, length <i>nnn</i> , thick <i>n</i>
Format 2	Vline, length <i>nnn</i> , thick <i>n</i>
Function	Horizontal and vertical lines can be drawn around text or graphics.
Example 1	{PRINT: @60,30:HLINE, length 200, thick 2 }
	Prints a horizontal line 200 dotlines long and 2 dotlines thick.
Example 2	{PRINT:@60,30:VLINE, length 50, thick2 }
	Prints a vertical line 50 dotlines long and 2 dotlines thick. There is only one vertical bar () because there is no data to enclose.

Abbreviation	Name	Description
T	HLINE	Horizontal line.
V	VLINE	Vertical line.
L	Length <i>nnn</i>	Sets line length.
T	Thick <i>nnn</i>	Sets line thickness.

Using Easy Print Mode

Easy Print: Using Configuration Commands

Configuration commands are either in two-letter or three-letter formats. One or several two letter commands can be sent to the printer but are not written to Flash memory and do not take effect until a {COMMIT} command is sent. When the printer receives the {COMMIT} command, the values received are written to Flash and the printer restarts. Each two-letter command changes one parameter.

Most three-letter commands permit several parameters to be changed at once, although some only accept data. If several parameters can be changed with one command, one or two letters indicating the parameter are separated from the data for that parameter by a colon ":". Parameter and/or data pairs are separated with a semicolon. When the printer receives a three letter command, it writes the values to Flash and restarts the printer. To prevent the printer from resetting after each three letter configuration command, some printer families allow you to send the NORESET command {NORESET} before sending configuration commands. After issuing the NORESET command and configuring the printer, send the COMMIT command {COMMIT} to write to Flash and restart the printer.



Note: Configuration data is stored separately from the main printer application's binary program; therefore, all configuration data remains intact after the firmware is updated.

In earlier versions of the software, the structure of the configuration data was modified; therefore, if you are updating to those earlier versions, your configuration data will be lost.

Creating Configuration Command Files

You can create files that can be sent to the printer for the following commands using DOS Edit or Notepad. Each of these commands are preceded by <ESC>EZ (1B455Ah). Two character commands must be followed by {COMMIT}; three character commands are immediate commands and do not need the {COMMIT}.

The commands on the following pages can be used to configure specific parameters.

Two-Letter Configuration Commands

Auto	White Space Advance {CA:n}	Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CA:n	n=y or Y : Speed up over white space n=n or N : Do not speed up over white space. <i>Note:</i> If there is nothing to print, the Auto White Space Advance command speeds the paper feed.	X (Default N)	X (Default Y)
}	A right bracket ends the command set.		

Using Easy Print Mode

Configure Baud Rate {CB:nn}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CB:nn	Configures the baud rate. Use the following values to specify the baud rate:		
	nn=00: 1200 BAUD	X (MF2/MF3)	X
	nn=01: 2400 BAUD	X	X
	nn=02: 4800 BAUD	X (MF2/MF3)	X
	nn=03: 9600 BAUD (default)	X	X
	nn=04: 19.2K BAUD	X (MF2/MF3)	X
	nn=05: 38.4 BAUD	X	X
	nn=06: 57.6 BAUD		X
	nn=07: 115.2K BAUD		X
	nn=08: 230.4K BAUD		
	nn=09: 460.8K BAUD		
	nn=10: 921.6K BAUD (not guaranteed)		
}	A right bracket ends the command set.		

Configure Print Darkness {CD:nn}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CD:nn	Configures print darkness (aka burn adjust). The value of <i>nn</i> is normal plain paper.		
	nn=-25: -25% (for very sensitive stock)		
	nn=-20: -20%		
	nn=-15: -15%		
	nn=-10: -10%		
	nn=-05: -5%		
	nn=00: 00 (default - for "regular" stock)	X	X
	nn=05: +5%		
	nn=10: +10%		
	nn=15: +15%		
	nn=20: +20%		
	nn=25: +25%		
	nn=30: +30%		
	nn=35: +35% (for high temp stock)		
}	A right bracket ends the command set.		

Using Easy Print Mode

Configure Battery Eliminator {CE:n}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CE:n	n = y or Y: Battery eliminator is present. n = n or N: None (default) <i>Note:</i> The battery eliminator can be used to power the printer from a wall charger.	X (4t printers only)	X (4t printers only)
}	A right bracket ends the command set.		

Form Feed Active {CF:n}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CF:n	n = y or Y: Act on form feed. n = n or N: Ignore from feed (default) <i>Note:</i> The form feed character (12 decimal or 0C Hex) can be configured to be ignored.	X Always On	X
}	A right bracket ends the command set.		

Configure Charger Beep {CG:n}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CG:n	The printer can be configured to beep when first connected. N = y or Y: Beep N = n or N: Do not beep (default)	X	X
}	A right bracket ends the command set.		

Configure RS-232 Handshaking {CH:n}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CH:n	n = N : No handshaking n = H : Hardware handshaking n = S : Software handshaking n = B : Both H/W and S/W (default)	X	X
}	A right bracket ends the command set.		

Using Easy Print Mode

Job Status Reporting in Easy Print Mode{CJ:n}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CJ:n	n = y or Y : Job Status Report ON n = n or N : Job Status Report OFF (def)	X	X
	<i>Note:</i> The Job Status report issues a message via whatever communications medium was used to send the job can show successful job completion or if there was a problem such as paper out.		
}	A right bracket ends the command set.		

Configure Default Protocol {CL:nnn}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CL:nnn	Changes the default protocol to one of the following:	X	X
	ESC :Line Printer Mode (default) EZ : Easy Print Mode EMC1 : Custom 1 EMC2 : Custom 2 EMC3 : Custom 3 EMP1 : PGL EMZ1 : CPCL EMZ2 : Cog EMZ3 : ZPL		
}	A right bracket ends the command set.		

Emulation Mode <esc>CL{mode}{COMMIT}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
mode	Changes the default protocol to one of the following:	X	X
	EMZ1 : CPCL EMZ2 : Cognitive EMZ3 : ZPL (Fastenal) EMZ4 : CPCL_01 (shift 12 dots to left) EMC1 : Vanguard (Alamo/National) EMC2 : Target EMC3 : Thrifty / Dollar EMC4 : Place Holder EMM1 : PCL (MPCL) (Monarch)		
}	A right bracket ends the command set.		

Using Easy Print Mode

Set Test Print {TP:n}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
TP:n	Sets test print.	X	X
	n = 0 : Normal self test (default) n = 1 : Special MAC address label		
	<i>Note:</i> When <i>n</i> is not zero, a special self-test label is printed. After a special label is printed, performing another self-test within 10 seconds prints the normal self test.		
}	A right bracket ends the command set.		
Configure Paper Out Beep {CU:n}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CU:n	Sets the printer to continuously remind the user that the paper needs to be changed. Beep repetitions stop when printer goes to sleep. Configures the paper out beep as follows:	X	X
	n = 0 : One Beep (default) n = 1 : Five Beeps n = 2 : Five Beeps repeated every 15s n = 3 : Five Beeps repeated every 30s n = 4 : Five Beeps repeated every 60s		
}	A right bracket ends the command set.		
RF Radio Power Down Timeout {CR:nn}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CR:nn	This command turns off the radio if there is no activity in <i>nnn</i> minutes; it requires the user to turn the radio back on via button push before communications can resume.	X	X
	<i>nnn</i> in minutes nnn = 65536: Never times out (default)		
}	A right bracket ends the command set.		

Using Easy Print Mode

System Timeout (Printer Sleep Timer) {CT:nn}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CT:nn	<p><i>nnn</i> in seconds (default 10s to 60s) <i>nnn</i> = 9999: Never times out. <i>Note:</i> If there is no activity (communications or button pushes) within the specified time, the printer will "go to sleep" to save power. A button push or new communications will wake up the printer.</p>	X	X
}	A right bracket ends the command set.		
Configure Number of Data Bits {CN:n}			
{	A left bracket begins the command set.		
CN:n	Configures the number of data bits where <i>n</i> indicates seven or eight data bits.		
}	A right bracket ends the command set.		
Configure Parity {CP:n}			
{	A left bracket begins the command set.		
CP:n	<p>Configures the parity: N = No parity E = Even parity O = Odd parity</p>		
}	A right bracket ends the command set.		
Configure Carriage Return {CC:n}			
{	A left bracket begins the command set.		
CC:n	<p>Configures the carriage return to automatically add <i>LF</i> (line feed) to <i>CR</i> (carriage return) as follows: CR - CR Y - CR=CRLF (For PK printers only)</p>		
}	A right bracket ends the command set.		
Configure Beeper {CS:n} (version 5.21, 6.21, and later only)			
{	A left bracket begins the command set.		
CS:n	<p>Configures the beeper on or off: Y = Beeper on N = Beeper off</p>		
}	A right bracket ends the command set.		

Using Easy Print Mode

Three-Letter Configuration Commands

TCP/IP 802.11b and Bluetooth Wireless configurations. Versions 5.13 and 6.13 and later only:

Configure Default Values {CDV}

{	A left bracket begins the command set.
CDV	Reverts to non user-specific default values at time of manufacture for configuration parameters.
}	A right bracket ends the command set.

Restore Default Values {RDV}

{	A left bracket begins the command set.
RDV	Restores all configuration parameters to those stored by the SDV command.
}	A right bracket ends the command set.

Stores Default Values {SDV}

{	A left bracket begins the command set.
SDV	Stores an image of the current parameter values in separate area of Flash. See RDV to restore the parameters to those values stored by SDV.
}	A right bracket ends the command set.

Using Easy Print Mode

Configure 802.11b/TCP/IP {CTC:n}

{	A left bracket begins the command set.
CTC:n	<p>Configures 802.11b/TCP/IP as follows:</p> <p>I:<data> - IP Address. The IP Address is sent in ASCII format as nnn.nnn.nnn.nnn. For example, {CTC:I:192.168.2.99} configures the printer's IP address to 192.168.2.99. The default IP Address is <i>192.168.2.99</i>.</p> <p>M:<data> - Mask. The mask is sent in ASCII format as nnn.nnn.nnn.nnn. The default mask is <i>255.255.255.255</i>.</p> <p>G:<data> - Gateway. The gateway is sent in ASCII format. You can enter up to 32 characters.</p> <p>E:<data> - ESSID (Extended Service Set ID). The ESSID is sent in ASCII format. For example, {CTC:E:WirelessNetwork}. The default gateway is <i>Wireless Printer</i>. You can enter up to 32 characters.</p> <p>NA:n - n:0 = No LEAP; n:1 = LEAP. If NA:1 the use LU: User_Name; LH: Password.</p> <p>P:<data> - Port. Specifies the port use for printing. The default is 515.</p> <p>T:<data> - Type of network. n = Network type; H = AdHoc (default); P = Infrastructure (access point).</p> <p>S:<data> - Security. n = Level; 0 = None (open), default; 5 = 40-bit; 13=128-bit.</p> <p>K1:<data> - Key 1. If the field is empty, then the key is erased. If ten characters (0-9, A-F), five characters are sent, then the key is used as a 40-bit encryption key. If 16 characters (0-9, A-F), 13 characters are sent, then the key is used as a 128-bit encryption key (the other 24-bits are filled by the firmware). The default is no key.</p> <p>K2:<data> - Same as key one.</p> <p>K3:<data> - Same as key one.</p> <p>K3:<data> - Same as key one.</p> <p>K:<data> - Specify key one, two, three, or four. The default is key one.</p> <p>W:n - n=1 Full encryption; n=2 No encryption.</p> <p>Q:n - Y=Signal quality on; N=Signal quality off.</p> <p>Note: TCP/IP and 802.11b wireless printing defaults must be changed to match the final, installed, environment.</p> <p>Example:{CTC:I:192.168.2.150;E:MyWireless;T:H;S:13;K1:101112131415161718191A1B1C;K:1} sets the IP address, ESSID, and network type. The security, key, and key usage are set in one command.</p>
}	A right bracket ends the command set.

Using Easy Print Mode

Configure Bluetooth {CBT:n}	Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.	
CBT:n	Configures Bluetooth as follows:	
A:<string>	- Authentication required. n = Y: Required; n = N: Not required	X
B:n	- Bondable. n = Y: Bondable; n = N: Not bondable	X
C:n	- Connectable. n = Y: Connectable; n = N: Not connectable	X
D:n	- Discoverable. n = Y: Discoverable; n = N: Not discoverable	X
E:n	- Encryption turned on. n = Y: Encrypt data; n = N: No encryption	X
F:n	- Friendly name where <data> indicates the friendly/device name. For example, {CBT:F:MyPrinter} configures the Bluetooth friendly name to MyPrinter. You can enter up to 32 ASCII characters.	X
I:nnn	- Inactivity timeout. Bluetooth disconnects if there is no Bluetooth traffic in nnn seconds. nnn in seconds default = 180 seconds minimum = 60 seconds	X
P:<string>	- Specify the passkey. <i>Note:</i> Some devices with limited keyboard require a numeric passkey. Enter up to 16 ASCII characters. The default passkey is <i>passkey</i> .	X
S:<string>	- Service name. 32 ASCII characters maximum. Default varies by printer type.	X
W:nn	- Watchdog timer to check module. nn in seconds. Default is zero (no check). Recommended value is 55 seconds. Legacy: used with older modules only.	X
}	A right bracket ends the command set.	

Using Easy Print Mode

Configure CardReader {CCR:nnn}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CCR:nnn	<p>The CCR command requires data only to configure the general way the card reader uses the LED indicators when reading a card. Use the following information:</p> <p><i>nnn</i> = HOST: The host needs to control the LEDs by sending the appropriate commands to turn the red and green LEDs off, on, or to flashing.</p> <p><i>nnn</i> = AUTO: The printer controls the LEDs and beeper. All tracks enabled must read "good" to get the green LED and two beeps indicating a good read.</p> <p><i>nnn</i> = AUTO1: The printer controls the LEDs and beeper. Any one track must read "good" to obtain the green LED and two beeps indicating a good read.</p>	X	
}	A right bracket ends the command set.		

Using Easy Print Mode

Configure Infrared Protocol {CIP:nnn}	Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
<p>{ A left bracket begins the command set.</p> <p>CIP:nnn <i>Overview:</i> The CIP command selects which protocol is to be used for Infrared communications. IrDA is a bidirectional communications protocol. All others are unidirectional unless noted as 2WAY.</p> <p><i>nnn</i> selects which protocol is to be used for infrared as follows:</p> <p>OFF = No infrared communications IRDA = IrDA protocol ASK = ASK (Amplitude Shift Keying) ASK-CRC = ASK with CRC protocol ASK-CRC-2W = Bidirectional ASK with CRC DIRECT = DIRECT (IR on/off to send) DIRECT-CRC = Direct with CRC protocol DIRECT-CRC-2W = bidirectional DIRECT-CRC. PULSE - PULSE (IR with IrDA modulation only) PULSE-CRC = Pulse with CRC protocol PULSE-CRC-2W = bidirection PULSE-CRC <i>Note:</i> The CRC protocol appends a HEADER and TRAILER onto the DATA as follows:</p> <p>HEADER FORMAT: BYTE #1 = STX (0x02) BYTE #2 = LSB of Byte Count BYTE #3 = MSB of Byte Count</p> <p>TRAILER FORMAT: BYTE #1 = ETX (0x03) BYTE #2 = LSB of CRC BYTE #3 = MSB of CRC</p> <p>The CRC is a CRC-16 calculation. First byte in the calculation is the LSB of the Byte Count and the last byte in the calculation is the ETX. If the CRC calculated by the printer does not match the one sent, or if the printer does not receive the full transmission after it receives the opening STX, the printer will beep. If the transmission is received completely and the CRCs match, the printer will print the data.</p> <p>}</p>	X	

Using Easy Print Mode

Configure IrDA Baud Name {CIN:string}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CIN:string	<p><i>Overview:</i> The CIN command requires data only to configure the name given to the printer when it connects to an IrDA host.</p> <p><i>string:</i> Can be a maximum of 19 characters.</p>	X	
}	A right bracket ends the command set.		

Configure IrDA Autovoid {CIV:n}		Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CIV:n	<p><i>Overview:</i> The CIV command can be used to turn autovoid on or off (default is on). If an IrDA connection is made and the printer times out before it receives a disconnect from the host, it assumes that all data has not been transferred and will automatically print VOID ** VOID ** VOID across the printed page as a safeguard to assure the proper document has printed completely.</p> <p><i>n</i> is used to turn AutoVoid on or off:</p> <p>n = Y : AutoVoid ON n = N : AutoVoid OFF</p>	X	
}	A right bracket ends the command set.		

Using Easy Print Mode

Configure Label Parameters {CLP:nn}	Values/ Format	Original MF2, MF3, 2t, 4t	Radio Ready 2t, 3l, 4t
{	A left bracket begins the command set.		
CLP:nn	Use the following information to specify the parameters:		
B:nn	B:nn - Back up distance at the beginning of every Easy Print job.	nn in dotlines (.005 inches) Default is 0 (off)	X
D:nn	D:nn - Distance to advance after the QMark (or gap) is detected before stopping at the end of the label. <i>Note:</i> Setting this parameter enables automatic QMark alignment when the feed button is pressed.	nn in dotlines (.005 inches) Default is 0 (off)	X
M:nn	M:nn - Maximum distance to advance stock if QMark or gap is not detected	nn in dotlines (.005 inches) Default is 2400 or 12 inches	X
P:n	P:n - Presenter should be used (holds off subsequent print jobs until printed image is removed). Requires re-threading of label stock.	n=Y: Presenter is on n=N: Presenter is off (default is off)	X (LP3 only)
S:n	S:n - Sensor used for paper out.	T = Top or Front sensor B = Bottom or back sensor (default is back)	X (LP3 only)
T:n	T:n - Type of paper used by default. <i>Note:</i> Default is P for Plain Paper. If B is selected, the paper out sensor moves to T. If T is selected, the paper out sensor moves to B. This can be overridden by including the S parameter after the T parameter in the CLP command.	P = Plain Paper G = Interlabel Gap T = Top/Front Qmark B = Bottom/Back Qmark	
U:nnn	U:nnn - Specifies how long the printer remains awake if a printed image is left in the presenter. This can be used to extend the normal timeout - the printer uses the longer of the system timeout or the Under Presenter timeout	nnn in seconds (default is 0)	X

Using Easy Print Mode

Configure Label Parameters {CLP:nn}	Values/ Format	Original		Radio Ready 2t, 3l, 4t
		MF2, 2t, 4t	MF3, 4t	
W:n - Use QMark stock with Windows driver. <i>Note:</i> If turned ON, the printer automatically looks for the QMark at end of Windows Driver (RLE) print job.	n = Y : On (Look for QMark) n = N : Off (Do not look for QMark) Default is OFF			X
WB:Y - A backup automatically occurs when the printer receives an RLE image.	Y = On N = Off			X
QW:n - Turns a white QMARK on.	n = Y : On n = N : Off n = P : turns ON the white QMark and turns OFF the paper out detection			X
}	A right bracket ends the command set.			

Configure Magnetic CardReader {CMR:m}	Values/ Format	Original 2t, 4t		Radio Ready 2t,4t	
		CR	SCR		SCR
{	A left bracket begins the command set.				
CMR:m	D:m - Direction card is moving when read.	m = IN : read on insert m = OUT : on withdrawal m = BOTH : in and with.	X		
	P:m - Automatically prints data when card is inserted	m = ON : print enabled m = OFF : print disabled	X	X	X
	S:m - Automatically sends string of data when card is inserted	m = ON : send data m = OFF : send data	X	X	X
	T1:m - Enables or disables magnetic card track 1.	m = ON : enable track 1 m = OFF : disable track 1	X	X	X

Using Easy Print Mode

Configure Magnetic CardReader {CMR:m}	Values/ Format	Original 2t, 4t		Radio Ready 2t,4t
		CR	SCR	SCR
T2: <i>m</i> - Enables or disables magnetic card track 2.	m = ON : enable track 2 m = OFF : disable track 2	X	X	X
T3: <i>m</i> - Enables or disables magnetic card track 3.	m = ON : enable track 3 m = OFF : disable track 3	X	X	X
}	A right bracket ends the command set.			

Commit {COMMIT}	
{	A left bracket begins the command set.
COMMIT	Use the commit command to send two-letter configuration commands to the printer. When the commit command is sent, the configuration commands are written to Flash memory and the printer restarts. When the printer restarts, it uses the default configuration, (typically Line Printer mode). To perform additional configurations, enter Easy Print mode and enter additional commands.
}	A right bracket ends the command set.

Querying the Printer

Overview

The printer can return a lot of information to the host. It can give some status of its current state as well as the current configuration. This is all done through a series of query commands that can be issued to the printer. Not all queries are available in all printers, and some queries are available in later versions of printer firmware; however, all queries are of the same form and contain 6 bytes (0x1b, "{ " or 0x7b, TWO LETTER QUERY, "?" or 0x3f, and "}" or 0x7d):

ESC {<TWO LETTER QUERY>?}

Sending Queries

Queries can be sent to the printer using the infrared link or the RS-232 data link. The printer's reply to a query returns information about the printer or the print request.

Interpreting Query Replies

Replies to queries are enclosed in left ({) and right (}) brackets. The unique two-letter query command is returned followed by an exclamation mark (!) and data. Data is returned as a list of parameters. Each parameter contains identifiers, followed by a colon (:), followed by the data. Each parameter is separated from the next by a semicolon (;). For download queries such as the Fonts query and the Graphics query, information for each download contains a series of parameters, each of those parameters/data sets are separated by a comma (,) and each download is separated by a semicolon (;).



Tip: The order in which the query replies are returned changes. When interpreting query replies, search a specific query character within the query reply. The tables on the following pages document query commands and the query-specific replies. Use the tables on the following pages as a guideline when entering and interpreting queries.

Query Formats

Query Format:	ESC {Query?}
Reply Format:	{Query!Query1:Reply1;...QueryN:ReplyN}
Function:	The word <i>Query</i> in the query format specified above is replaced by a specific command. For example, {BT?} is a query designed to return information about the printer's battery.

All queries are based on the above format. For information on specific queries, see "Query Commands" on page 42.

Querying the Printer

Query Commands

Command	Format	Description	Page
Status	ESC{ST?}	Returns information about the ability of the printer to print the next image and reports any errors from the last print request (for example, paper condition, command errors, buffer size and battery voltage).	43
Print Job Status	ESC{Sn?}	Verifies that the data delivered to the printer was printed without any mechanical errors such as a head jam or an out of paper condition.	45
Configuration	ESC{CF?}	Returns information about configuration options such as baud rate, default mode, and timeout.	47
Battery	ESC{BT?}	Returns current battery voltage, temperature, and condition.	49
Version	ESC{VR?}	Returns version number for firmware, boot code, and download files.	49
Memory	ESC{MY?}	Returns the amount of memory available, the amount of memory used, and the amount remaining.	50
Printhead	ESC{PH?}	Returns the type of printhead used and the number of dots across.	51
Infrared	ESC{IR?}	Returns infrared settings.	52
Font	ESC{FN?}	Returns a list of available fonts.	55
Graphics	ESC{GR?}	Returns a list of downloaded graphics.	56
Formats	ESC{FM?}	Returns a list of all formats.	57
802.11b/TCP/IP	ESC{TC?}	Returns the current TCP/IP and 802.11b configuration (if applicable).	57
Bluetooth	ESC{BL?}	Returns the current Bluetooth configuration (if applicable).	59
Magnetic Card Configuration	ESC{MC?}	Returns the magnetic card configuration.	61
Magnetic Card Read	ESC{MR?}	Returns the magnetic card reader configuration.	62
Card Reader Status	ESC{RS?}	Returns data read for a swiped magnetic card.	63
Demand	ESC{DO?}	Returns the remaining number of images.	65
Cancel	ESC{CN!}	Cancels all demand printing.	65
Reset	ESC{RE!}	Resets the printer.	65
Magnetic Card Data Zero	ESC{MR?}	Flashes the magnetic card data buffer to zero.	65

Querying the Printer

Status Query

Status Query	
Query Format	ESC{ST?}
Reply Format	{ST!E:x;S:x;L:x;P:x;J:x;R:x;B:x;H:x}
Function	Returns information about the ability of the printer to print the next image and reports any errors from the last print request (for example, paper condition, command errors, buffer size and battery voltage). Note: If Job Status reporting is on, the printer automatically generates the Status query reply and sends it to the host.
Reply Example	{ST!E:N;S:I;L:D;P:P;J:N;R:62;B:O;H:O}
Reply Example Explanation	ST! - Reply to a status query. E:N; - There are no errors. S:I; - The printer is idle. L:D; - The paper release lever is down, ready to print. P:P; - Paper is present. J:N; - There is no head jam. R:62; - 62K bytes remain in the input buffer. B:O; - Acceptable battery voltage and temperature. H:O; - Printhead temperature in acceptable range.

Querying the Printer

Status Reply Explanation

Query	Reply	Definition
E	N	N = No error*. For radio ready 2t/3l/4t printers, fixed as "N."
E	c	c = Command error/invalid command
E	d	d= Data error (for example, an alpha character in a numeric-only bar code)
E	f	f = Font not available
E	g	g = Global parameter error
E	o	o = Overrun buffer*
E	p	p = Field parameter error
E	q	q = Qmark not found*
E	r	r = Row/column error
E	s	s = Syntax error
S	C	C = Complete
S	I	I = Idle
S	K	K = Key pressed to cancel print job (available in Job Status only)
S	O	O = Printer was off during print out (available in Job Status only)
S	P	P = Printing
S	T	T = Timeout (available in Job Status only)
L	u,d	Lever = Up or Down
P	P,N	Paper = Present or Not present
J	J,N	Head jam condition: N = No head jam; J = A head jam has occurred and has not been cleared (press the feed button to clear the head jam).
R	nm	RAM buffer size remaining (in K bytes). An empty input buffer is 40K bytes.
B	O,T,V	Battery condition: O = OK; T = out of temperature range; V = out of voltage range. For radio ready 2t/3l/4t printers, O/V Only are available
H	O,T	Printhead temperature: O = OK; T = out of temperature range

* Rows marked with an asterisk (*) indicate Easy Print and Line Printer modes. Rows without an asterisk indicate Easy Print mode only.

Querying the Printer

Print Job Status Query

Print Job Status Query	
Query Format	ESC{Sn?}
Reply Format	{ST!E:x;N:x;S:x;L:x;P:x;J:x;R:x;B:x}
Function	<p>Verifies data delivered to the printer was printed without any mechanical errors such as a head jam or an out of paper condition. <i>n</i> indicates the level of error reporting. The end of the print job is indicated by the Esc e command. <i>n</i> is defined as follows:</p> <p>bit 0 = Determines auto report status at the end of the job (when last line/form feed before ESC e is complete).</p> <p>bit 1 = Determines status if paper was out during printing.</p> <p>bit 2 = Determines status if there was a printhead jam during printing.</p> <p>bit 3 = Determines status when paper is loaded after a paper out condition and the red button is pressed during printing.</p> <p>bit 4 = Determines if printer times out during printing.</p> <p>bit 5 = Determines if forward/reverse buttons were pressed during printing.</p> <p>bit 6 = Cancels timeout. Printer always stays on (timeout set to 9999) but does not write to Flash.</p> <p>bit 7 = Reserved.</p> <p>Note 1: If all zeroes are specified for <i>n</i>, any active status messages set by an ESC s <i>n</i> command without an ESC e command are cancelled.</p> <p>Note 2: Cancelled timeouts are not written to Flash; therefore, the timeout returns to defaults if the printer is off or if the power is disconnected.</p> <p>Note 3: Timeouts can also be cancelled using the ESC t command. ESC s 0 or ESC e will not reinstate a timeout cancelled using the ESC t command.</p>
Reply Example	{ST!E:N;S:I;L:D;P:P;J:N;R:40;B:O}
Reply Example Explanation	<p>ST! - Reply to a print job status query.</p> <p>E:N; - There are no syntax/language errors.</p> <p>S:I; - The printer is idle.</p> <p>L:D; - The paper release lever is down, ready to print.</p> <p>P:P; - Paper is present.</p> <p>J:N; - There is no head jam.</p> <p>R:62; - 62K bytes remain in the input buffer.</p> <p>B:O; - Acceptable battery voltage and temperature.</p>

Querying the Printer

Print Job Status Reply Explanation

Query	Reply	Definition
E	N	N = No error*
E	c	c = Command error/invalid command
E	d	d= Data error (for example, an alpha character in a numeric-only bar code)
E	f	f = Font not available
E	g	g = Global parameter error
E	o	o = Overrun buffer*
E	p	p = Field parameter error
E	q	q = Qmark not found*
E	r	r = Row/column error
E	s	s = Syntax error
S	C	c = Complete
S	I	I = Idle
S	K	K = Key pressed to cancel print job (available in Job Status only)
S	O	O = Printer was off during print out (available in Job Status only)
S	P	P = Printing
S	T	T = Timeout (available in Job Status only)
L	u,d	Lever = Up or Down
P	P,N	Paper = Present or Not present
J	J,N	Head jam condition: N = No head jam; J = A head jam has occurred and has not been cleared (press the feed button to clear the head jam).
R	nm	RAM buffer size remaining (in K bytes). An empty input buffer is 40K bytes.
B	O,T,V	Battery condition: O = OK; T = out of temperature range; V = out of voltage range

* Rows marked with an asterisk (*) indicate Easy Print and Line Printer modes. Rows without an asterisk indicate Easy Print mode only.

Querying the Printer

Configuration Query

Configuration Query	
Query Format	ESC{CF?}
Reply Format	{CF! L :x; B :x; P :x; N :x; H :x; D :x; Y :x; S :x; M :x; T :x; R :x}
Function	Displays configurable options. Available for all printers except as noted.
Reply Example	{CF! L :LP; B :096; P :N; N :8; H :B; D :+10%; Y :1; S :Y; M :Y; T :0060; R :65535}
Reply Example Explanation	<p>CF! - Reply to a configuration query.</p> <p>L:LP; - The default mode is Line Printer.</p> <p>B:096; - The baud rate is 9600.</p> <p>P: N; - No parity is set.</p> <p>N:8; - There are 8 data bits.</p> <p>H:B; - Hardware and software handshaking are enabled.</p> <p>D: +10%; - The darkness (burn time) is set to +10%.</p> <p>Y:1; - The paper is 1 ply.</p> <p>S:Y; - The sound is on.</p> <p>M:Y; - The printhead centers during form feed.</p> <p>T:0060 - The timeout is set for 60 seconds.</p> <p>R:65535; - The printer never time outs.</p>

Querying the Printer

Configuration Reply Explanation

Query	Reply	Definition
A	Y,N	Auto White Space Advance
L	LP, EZ	Default mode = Line Printer (ESC) or Easy Print (EZ), The following are available for radio ready 2t/3l/4t printers: EMC1 (Custom 1), EMC2 (Custom 2), EMC3 (Custom 3), EMP1 (PGL), EMZ1 (CP CL), EMZ2 (Cog),EMZ3 (ZPL).
B	012 (mf2/3), 024,048 (mf2/3), 096,192 (mf2/3), 384,576,115	Baud rate = 1200,2400, 4800, 9600, 19.2K, 38.4K, 57.6K, 115.2 k baud
P	N,E,O	Parity = None, Even, or Odd
N	7,8	Number of data bits = seven or eight
H	N,H,S,B	Handshaking = None(N), Hardware (H), Software (S), or Both Software and Hardware (B)
J	Y/N	EZ Print Job Status Report. Yes (Y) or No (No).
D	-25% ...+35%	Darkness = -25%, -20%, -15%, -10%, -05%, +10%, +15%, +20%, +25%, or +35%
F	Y/N	Form feed (act on FF) only available on radio ready 2t/3l/4t printers. Yes (Y) or No (N).
G	Y/N	Beeper when charger connected. Yes (Y) or No (N).
Y	1,2	Paper ply = one or two
S	Y,N	Beeper sound = Y (beeper on) or N (beeper off)
M	Y,N	Centering of printhead on form feed: Y = Printhead centers during form feeding; N = Printhead remains where it last stopped during form feed.
T	nnnn	Timeout value in seconds (9999 indicates printer never time outs)
R	nn/NEVER	RF Power Timeout (only available on radio ready 2t/3l/4t printers). nn (minutes) or NEVER timeout.
U	0 to 4	Paper out beep (only available on radio ready 2t/3l/4t printers). 0=1 beep (not 0=5 beeps); 1=one time; 2=rep every 15s; 3=rep every 30s; 4=rep every 60s.
TP	0/not 0	Test print. 0=Normal; Not 0 -Special.

Querying the Printer

Battery Query

Battery Query		Original MF2/MF3/ 2t/4t	Radio Ready 2t/3t/4t
Query Format	ESC{BT?}		
Reply Format	{BT! V :x; T :x; CH :x}		
Function	Returns current battery voltage and temperature.		
Reply Example	{BT! V :6.8; T :+25.8C; CH :C, PS :B}		
Reply Parameters	V : Voltage of single - n.n volts V1 and V2 : Voltage of each of two batteries- n.n volts (for V1); n.n volts (for V2) VE : Voltage of battery eliminator - n.n volts T : Temperature of battery (depends on battery type). CH : Charge - Y=Connected; N=Not connected. PS : Power Source - A=DC over battery; B=Battery over DC; C=Battery eliminator	X X 4t Only nn.nC X X	X X 4t Only Always returns NA X X (A/B are same in Thermal)

Version Query

Version Query	
Query Format	ESC{VR?}
Reply Format	{VR! F :x; B :x; D :x}
Function	Returns the version levels of firmware, boot code, and download file number.
Reply Example	{VR! F :4.09; C :5.25; B :2.05; D :1.0}
Reply Example Explanation	VR! - Reply to a version query. F :4.09; - The firmware (main program) version is 4.09. C :5.25; - The communication controller version is 5.25. B :2.05; - The boot code version is 2.05. D :1.0; - The download file version is 1.0.

Querying the Printer

Version Reply Explanation

Query	Reply	Definition
F	n.nn	Firmware version is <i>n.nn</i> .
B	n.nn	Boot code version is <i>n.nn</i> .
D	n.n	Download (fonts, graphics, formats) version is <i>n.nn</i> .

Memory Query

Memory Query	
Query Format	ESC{MY?}
Reply Format	{MY! FS :x; FM :x; RS :x; DT :x; DR :x}
Function	Returns the size of all memory available in the printer, including the amounts used and the amount remaining. Available for original MF2/MF3/2t/4t and radio ready 2t/3l/4t.
Reply Example	{MY! FS :1M; FM :AMD; RS :1M; DT :049152; DR :000512}
Reply Example Explanation	<p>MY! - Reply to a memory query.</p> <p>FS:1M; - This printer contains a 1M bit Flash memory</p> <p>FM:AMD; - The Flash manufacturer is AMD.</p> <p>RS:1M; - RAM Size = 1M.</p> <p>DT:049152; - Total Flash area available for download is 49,152 bytes.</p> <p>DR:000512; - Download Flash memory Remaining. Out of 49,152 bytes, 512 bytes are available.</p>

Memory Reply Explanation

Query	Reply	Definition
FS	1 Meg, 4 Meg	Flash size = 1 Meg (128K bytes) or 4 Meg (512K bytes)
FM	AMD	Flash manufacturer = AMD
RS	1 Meg	RAM size = 1 Meg (128K bytes)
DT	nnnnnn	Download total area = <i>nnnnnn</i> bytes. This is the size after the application program is downloaded to Flash and after the boot code size is deducted.
DR	nnnnnn	Download RAM remaining = <i>nnnnnn</i> bytes. Download total and download remaining are the same values only if no fonts or graphics were downloaded.

Querying the Printer

Printhead Query

Printhead Query	
Query Format	ESC{PH?}
Reply Format	{PH!TD: x; DD: x; T: x; M: x}
Function	Returns the printhead type used and the total number of dots across. Available for original MF2/MF3/2t/4t and radio ready 2t/3l/4t printers.
Reply Example	Thermal: {PH!TD:0384; DD: 203; M: LPT3245; T: +25.6C; } Impact: {PH!IMPACT1; PINS: 09; W: 080}
Reply Example Explanation	<p>Thermal:</p> <p>PH! - Reply to a printhead query.</p> <p>TD:0384; - The printhead in this printer has 384 dots across.</p> <p>DD:203; - The dot density is 203 dots per mm).</p> <p>M:LPT3245 - The printhead model number is LPT3245.</p> <p>T: +25.6C; - The current printhead temperature is +25.6° centigrade.</p> <p><i>Impact:</i></p> <p>PH!IMPACT1; - 1920 dots across at maximum density; 960 dots across at middle density; 480 dots across at lowest density.</p> <p>PINS:09; - 9 pin printhead.</p> <p>W:080; - 80 columns wide.</p>

Printhead Reply Explanation

Query	Reply	Definition
TD	Nnnn	Total number of dots across the printhead: 384 = two inch printhead on the 2t 832 = four inch printhead on the 4t
DD	Nnn	Dot density of the printhead (dot per mm).
M	x...x (variable width)	Printhead model number.
T	± nn.nC	Printhead temperature.
D	Nnn	File version of downloaded fonts.
	IMPACT1	IMPACT1 = 1920 dots across at maximum density; 960 dots across at middle density; 480 dots across at lowest density.
PINS	Xx	Numbers of pins on printhead.
W	Xx	Width of columns.

Querying the Printer

Infrared Query

Infrared Query	
Query Format	ESC{IR?}
Reply Format	{IR! P :x; AV :x; DV :x; IV :x; IN :x; ID :x}
Function	<p>Returns information about the current infrared settings. Also returns a unique name for the printer, communication capabilities, and peripherals.</p> <p>Although not all printers have infrared capabilities, the ESC{IR?} query is present in all printers to allow the user to determine uniquely which printer type is attached.</p>
Reply Example	{IR! P :IrDA; AV :00; DV :00; IV :1.02; IN :microFlash2; ID :1234567890123456789}
Reply Example Explanation	<p>IR! - Reply to an infrared query.</p> <p>P:IrDA; - The IrDA protocol is on.</p> <p>AV:00; - The ASK version is 00.</p> <p>DV:00; - The DIRECT version is 00.</p> <p>IV:1.0-06; - The IrDA version specification supported is 1.0 and the firmware is version 06.</p> <p>IN:microFlash2; - The device nickname is microFlash2.</p> <p>ID: - The device name is 1234567890123456789.</p>

Querying the Printer

Infrared Reply Explanation

Query	Reply	Definition
P	OFF,IrDA,ASK, K, ASC-CRC, DIRECT, DIRECT-CRC	Original MF2/MF3/2t/4t Printers: Protocol selected is OFF, IrDA, ASK, ASK with CRC, DIRECT or DIRECT with CRC Radio Ready 2t/3l/4t Printers: Fixed: N (None). Does not support Infrared
AV	nn	Original MF2/MF3/2t/4t Printers only: ASK software version = <i>nn</i> (Current 01)
DV	nn	Original MF2/MF3/2t/4t Printers: DIRECT software version = <i>nn</i> (Current 01) Radio Ready 2t/3l/4t printers: Fixed:00
IV	n.n-mm	Original MF2/MF3/2t/4t Printers: Version of IrDA specifications supported is n.n; firmware version of IrDA loaded into this printer is <i>mm</i> . Radio Ready 2t/3l/4t printers: Fixed:0.00
IN		IrDA Name (unique across printers): The value returned for this parameter identify the printer type. Original MF2/MF3/2t/4t Printers: microFlash2, microFlash3, microFlash4, microFlash4CR, 2t, 2tCR Radio Ready 2t/3l/4t printers: Printer Type - 2tR, 3LR, 4tr Card Reader: Add S suffix Radio: Add 802 or add BT suffix
ID		IrDA Nickname.

Querying the Printer

Query	Reply	Definition
IN	x.x microFlash2, microFlash2, 2t, 2i	<p>IrDA nickname, up to 19 characters. Uniquely identifies the printer, its communication capabilities and its peripherals.</p> <p>Thermal:</p> <ul style="list-style-type: none"> • 2tR - 2t Radio firmware with RS-232 only • 2tRBT - 2t Radio firmware with RS-232 and Bluetooth • 2tR802 - 2t Radio firmware with RS-232 and 802.11b • 2tRS - 2t Radio firmware with RS-232 only with SCard Reader • 2tRSBT - 2t Radio firmware with RS-232 and Bluetooth with SCard Reader • 2tRS802 - 2t Radio firmware with RS-232 and 802.11b with SCard Reader • 4tR - 4t Radio firmware with RS-232 only • 4tRBT - 4t Radio firmware with RS-232 and Bluetooth • 4tR802 - 4t Radio firmware with RS-232 and 802.11b • 4tRS - 4t Radio firmware with RS-232 only with SCard Reader • 4tRSBT - 4t Radio firmware with RS-232 and Bluetooth SCard Reader • 4tRS802 - 4t Radio firmware with RS-232 and 802.11b SCard Reader <p>Impact:</p> <ul style="list-style-type: none"> • RP2R - RP-2000 Radio firmware with RS-232 only • RP2RBT - RP-2000 Radio firmware with RS-232 and Bluetooth • RP2R802 - RP-2000 Radio firmware with RS-232 and 802.11b • VMP2R - VMP-2000 Radio firmware with RS-232 only • VMP2RBT - VMP-2000 Radio firmware with RS-232 and Bluetooth • VMP2R802 - VMP-2000 Radio firmware with RS-232 and 802.11b
ID	x.x	IrDA device name, up to 19 characters.

Querying the Printer

Font Query

Font Query	
Query Format	ESC{FN?}
Reply Format	{FN! N5 :x, N1 :x, L :x, UV :x, UD :x, US :x, CPI :x}
Function	Lists fonts, both permanent and downloaded. Within a complete font definition, each query character is separated from the next with a comma (.). A semicolon, carriage return and line feed (;.<CR>, <LF>) separate each font. Available for original MF2/MF3/2t/4t and radio ready 2t/3l/4t printers.
Reply Example	{FN! N5 :MF107, N1 :&(26), L :R, UV :1, UD :01/02/96, US :96CHARS BLOCKBOLD, CPI :10.7; N5 :MF204, N1 :!(21), L :D, UV :1, UD :01/02/96, US :224 CHR BLOCK NORMAL, CPI :20.4}
Reply Example Explanation	<p>FN! - Reply to a font query.</p> <p>N5:MF107, - The first font name is MF107.</p> <p>N1:&(26), - The one-character name is &, or 26H.</p> <p>L:R; - The first font is a resident font.</p> <p>UV:1; - The user version is 1.</p> <p>UD:01/02/96; - The user date is 01/02/96.</p> <p>US:96chars blockbold, - The font is a 96 character block bold font.</p> <p>CPI:10.7; - The font has 10.7 characters per inch.</p> <p>N5:MF204, - The next font begins.</p>

Fonts Reply Explanation

Query	Reply	Definition
N5	xxxxx	Five character name = xxxxx
N1	x(nn)	One character name - also in HEX
L	R,D	Location - Resident or Downloaded
UV	x	User version number = x
US	x..x	User descriptive summary of font, 20 characters
CPI	nn.n	Characters per inch - nn.nn

Querying the Printer

Graphics Query

Graphics Query	
Query Format	ESC{GR?}
Reply Format	{GR! N5 :x, N1 :x, L :D, UV :x, UD :x, US :x}
Function	<p>Lists graphics currently downloaded to the printer. The reply is similar to the fonts query reply but without the font-related information.</p> <p>Each graphic present in the printer will return one complete set of all parameters below. If there are no graphics present, the response will be {GR!}. Available for original MF2/MF3/2t/4t and radio ready 2t/3l/4t printers.</p>
Reply Example	{GR! N5 :LOGO1, N1 :z(7A), L :D, UV :1, UD :05/29/96, US :Big Logo}
Reply Example Explanation	<p>GR! - Reply to a graphics query.</p> <p>N5:LOGO1, - The graphic has a five-character name, <i>LOGO1</i>.</p> <p>N1:z(7A), - The graphic has a one-character name of z, or <i>7AH</i>.</p> <p>L:D, - This is a downloaded graphic.</p> <p>UV:1, - The user version is 1.</p> <p>UD:05/29/96, - The user date is 5/29/96.</p> <p>US:Big Logo - The user descriptive summary is <i>Big Logo</i>.</p> <p>CPI: 22.1</p>

Graphics Reply Explanation

Query	Reply	Definition
N5	xxxxx	Five character name = xxxxx
N1	x(nn)	One character name - also in HEX
L	R,D	Location - Resident or download
UV	x	User version number = x
UD	xx/xx/xx	User date
US	x..x	User descriptive summary of font, 20 characters
CPI	nn.n	Characters per inch. 1/CPI is the approximate width of the graphic.

Querying the Printer

Formats Query

Formats Query	
Query Format	ESC{FM?}
Reply Format	{FM! N5 :x, L :x, UV :x, UD :x, US :x}
Function	Lists formats downloaded to the printer. The reply is similar to the fonts query reply, but without the font-related information.
Reply Example	{FM! N5 :LABEL, L :D, UV :1, UD :05/29/96, US :PROPERTY ID LABEL-BC}
Reply Example Explanation	<p>FM! - Reply to a formats query.</p> <p>N5:LABEL, - The format has a five-character name of <i>LABEL</i>.</p> <p>L:D, - The format is a downloaded format.</p> <p>UV:1, - The user version is 1.</p> <p>UD:05/29/96, - The user date is 05/29/96.</p> <p>US:PROPERTY - The user descriptive summary is PROPERTY ID LABEL-BC.</p>

Formats Reply Explanation

Query	Reply	Definition
N5	xxxxx	Five character name = xxxxx
L	R,D	Location - Resident or download
UV	x	User version number = x
UD	xx/xx/xx	User date
US	x..x	User descriptive summary of font, 20 characters

802.11b/TCP/IP Query

802.11b/TCP/IP Query	
Query Format	ESC{TC?}
Reply Format	{TC! E :x; N :x; T :x; D :x; I :x; M :x; G :x; P :x; NA :x; S :x; W :x; K :x; K1 :x; K2 :x; K3 :x; K4 :x; MAC :x; 80211b Info :x; P2 :x; PWR :x; Q :x}
Function	Returns current TCP/IP and 802.11b configuration (if applicable). This query is available on radio ready 2t/3l/4t printers only.

Querying the Printer

802.11b/TCP/IP Reply Explanation

Query	Reply	Definition
E	xxxxx	Returns a variable length string specifying the ESSID (Extended Service Set Identification) configured in the printer.
N	xxxxx	Returns a string name specifying the station name.
T	H,P	Connection - H=AdHoc mode; P=Print point mode.
D	N,Y	Dynamic Host Configuration Protocol (DHCP) status - N=DHCP is off; Y=DHCP is on.
I	x.x.x.x	IP address - The IP address is returned in the form x.x.x.x where x can be one to three digits. If DHCP is off, the IP address is manually configured. If DHCP is on, the IP address is assigned by the server. If an IP address cannot be found, the address is set to zeroes.
M	x.x.x.x	Indicates the mask used on the IP address to determine how much must match.
G	x.x.x.x	Gateway to use.
P	xxx	Port to use.
NA	0 to 3	Network authentication. 0=None; 1=LEAP (Cisco); 2=WPA-PSK (Symbol); 3=WPA (future-Symbol).
S	0,5,13	Authentication algorithm. 0=No security; 5=40-bit algorithm (5 byte key); 13=128-bit algorithm (13 byte key - last three bytes are filled in by stack)
W	1,2	Enable encryption. 1=WEP encryption; 2=Allow unencrypted.
K	xx	Specifies which key is currently in use (keys 1 to 4). This is applicable only if encryption and/or security is on.
K1 K2 K3 K4	0,5,14	Displays the security of keys 1 to 4. 0=No security; 5=40-bit algorithm (5 byte key); 13=128-bit algorithm (13 byte key - the last three bytes are filled in by stack). The default values are as follows: K1: 101112131415161718191A1B1C K2: 202122232425262728292A2B2C K3: 303132333435363738393A3B3C K4: 404142434445464748494A4B4C
MAC	nn-nn-nn- nn-nn-nn	MAC address on card.
802/ 11B Info	Card type, card firmware version	Information about 802.11b card in the printer.
P2	Y/N	Power saving mode (CAM on or off). Y=CAM off; N=CAM on.
PWR	ON,OFF	ON=PCMCIA power is on, OFF=PCMCIA power is off.
Q	Y/N	Signal quality indicator. Y=On; N=Off.

Querying the Printer

Bluetooth Query

Bluetooth Query	
Query Format	ESC{BL?}
Reply Format	{BL! AD :x; F :x; SN :x; PR :x; CL :x; D :x; C :x; B :x; E :x; A :x; P :x; I :x; PWR :x; W :x}
Function	Returns the current Bluetooth configuration (if applicable).
Reply Example	{BL! AD :00:80:37:1A:0F:F7; F :Wireless Printer; SN :2t Bluetooth; PR :SPP; CL :040680; D :Y; C :Y; B :Y; E :N; A :N; P :Y; S :0; PWR :ON}
Reply Example Explanation	<p>BL! - Reply to a Bluetooth query.</p> <p>AD:00:80:37:1A:0F:F7; - The Bluetooth device address is 00:80:37:1A:0F:F7.</p> <p>F:Wireless Printer; - The bluetooth friendly device name is Wireless Printer.</p> <p>SN:2t Bluetooth; - The service name is 2t Bluetooth.</p> <p>PR:SPP; - The profile support is Serial Port Profile (SPP).</p> <p>CL:040680; - The device class is 040680, a rendering, imaging printer.</p> <p>D:Y; - The device is discoverable.</p> <p>C:Y; - The device is connectable.</p> <p>B:Y; - The device is bondable.</p> <p>E:N; - Encryption is off.</p> <p>A:N; - Authentication is on.</p> <p>P:Y; - A passkey is stored on this device.</p> <p>I:nn; - Inactivity timeout</p> <p>S:0; - Security is open.</p> <p>PWR:ON; - RF module power is on.</p> <p>W:nn; Watchdog period.</p>

Querying the Printer

Bluetooth Reply Explanation

Query	Reply	Definition
AD	xx:xx:xx:xx: xx:xx	Returns the Bluetooth module's address.
F	xxxxx	Returns the Bluetooth device name string. Note: In most printers, the device name is configured to the printer's serial number.
SN	xxxxx	Returns the service name string.
PR	SPP	The supported profile is Serial Port Profile (fixed).
CL	040680	The device class is 040680, a rendering, imaging, printer.
D	Y,N	Y=The device is discoverable; N=The device is not discoverable.
C	Y,N	Y=The device is connectable; N=The device is not connectable.
B	Y,N	Y=The device is bondable; N=The device is not bondable.
E	Y,N	Y=Encryption is on; N=Encryption is off.
A	Y,N	Y=Authentication is on; N=Authentication is off.
P	Y,N	Y=A passkey is stored on this device (default); N=A passkey is not stored on this device.
S	0,1	0=Open; 1=Secure.
PWR	ON,OFF	ON=RF module power is on; OFF=RF module power is off.

Querying the Printer

Magnetic Card Configuration Query

Magnetic Card Configuration Query	
Query Format	ESC{MC?}
Reply Format	{MC! EN :x; DIR :x; T1 :x; T2 :x; T3 }
Function	Displays the magnetic card reader configuration.
Reply Example	{MC! EN :ON; DIR :WITH; T1 :ON; T2 :ON; T3 :ON}
Reply Explanation	<p>MC! - Reply to a magnetic card configuration query.</p> <p>EN:ON; - The magnetic card reader is enabled (default).</p> <p>DIR:WITH; - The card is read when withdrawn from the reader.</p> <p>T1:ON; - Track one is enabled and will try to read from the card.</p> <p>T2:ON; - Track two is enabled and will try to read from the card.</p> <p>T3:ON; - Track three is enabled and will try to read from the card.</p>

Magnetic Card Configuration Reply Explanation

Query	Reply	Definition
EN	ON	The magnetic card reader is enabled (default).
DIR	WITH (more?)	WITH=The card is read when withdrawn from the reader.
T1	ON,OFF	ON=Track is enabled and attempts to read from card; OFF=Track is disabled and any data is ignored.
T2	ON,OFF	ON=Track is enabled and attempts to read from card; OFF=Track is disabled and any data is ignored.
T3	ON,OFF	ON=Track is enabled and attempts to read from card; OFF=Track is disabled and any data is ignored.

Querying the Printer

Magnetic Card Read Query

Magnetic Card Read Query	
Query Format	ESC{MR?}
Reply Format	{MR! T1 :x T2 :x T3 :x }
Function	Displays the magnetic card reader configuration.
Reply Example	<p>No card read: {MR!T1:N T2:N T3:N}</p> <p><i>Card read:</i> {MR!T1:%B9900 888888 89789^PUBLIC/JOHN Q ^9901960805542? T2::;373027766473005=9901960805542 ? T3::;1234567890=1234567890=1234567890= 1234567890?}</p>
Reply Explanation	<p>MR! - Reply to a magnetic card read query.</p> <p>T1::;%B9900 888888 89789^PUBLIC/JOHN Q ^9901960805542? - Returns data read from track one of magnetic card.</p> <p>T2::;373027766473005=9901960805542? - Returns data read from track two of magnetic card.</p> <p>T3::;1234567890=1234567890=1234567890= 1234567890? - Returns data read from track three of magnetic card.</p>

Magnetic Card Read Reply Explanation

Query	Reply	Definition
T1	N,xxxxx	<p>N=No data read; xxxxx=Returns the data read from track one of the magnetic card.</p> <p>Note: Most encodings (banking specifications), data begin an percentage mark (%) and end with an question mark (?).</p>
T2	N,xxxxx	<p>N=No data read; xxxxx=Returns the data read from track two of the magnetic card.</p> <p>Note: Most encodings (banking specifications), data begin an percentage mark (%) and end with an question mark (?).</p>
T3	N,xxxxx	<p>N=No data read; xxxxx=Returns the data read from track three of the magnetic card.</p> <p>Note: Most encodings (banking specifications), data begin an percentage mark (%) and end with an question mark (?).</p>

Querying the Printer

Card Reader Status Query

Card Reader Status Query	
Query Format	ESC{RS?}
Reply Format	{RS!P:n;S:n;G:n;R:n}
Function	Returns data read for a swiped magnetic card. The reply to the card reader status query can be automatically generated if the AutoSend option is on.
Reply Example	{RS!P:0;S:0;G:0;R:0}
Reply Explanation	<p>RS! - Reply to a card reader status query.</p> <p>P:0; - SmartCard power is off.</p> <p>S:0; - A card is not seated in the reader.</p> <p>G:0; - The green LED is off.</p> <p>R:0; - The red LED is off.</p>

Card Reader Status Reply Explanation

Query	Reply	Definition
P	0,1	0=SmartCard power is off; 1=SmartCard power is on.
S	0,1	0=A card is not seated in reader; 1=A card is seated in reader.
G	0,1,F	0=Green LED is off; 1=Green LED is on; F=Green LED is flashing.
R	0,1,F	0=Red LED is off; 1=Red LED is on; F=Red LED is flashing.

Querying the Printer

Label Configuration Query

Label Configuration Query		Original MF2/MF3/ 2t/4t	Radio Ready 2t/3t/4t
Query Format	ESC{CL?}		
Reply Format	{CL!T:n;D:n;M:n;S:n;P:n;U:n;B:n;W:n}		
Reply Example	{CL!T:P;D:1;M:1;S:T;P:Y;U:3;B:2;W:N}		
Reply Explanation	CL! - Reply to a label configuration query.		
	T: Type of stock used - P=Plain paper T=Top QMark B=Bottom QMark		X
	D: Distance to advance after QMark is sensed before stop - Distance given in dotlines (.005 inches)		X
	M: Maximum distance to advance if QMark is not sensed - Distance given in dotlines (.005 inches)		X
	S: Sensor to use for paper out - T=Top sensor B=Bottom sensor		LP3 only
	P: Presenter - Y=Yes (use) N=N (do not use)		LP3 only
	U: Label under presenter timeout - Time in seconds to not go to sleep if label is left under the presenter sensor.		LP3 only
	B: Backup distance - Distance given in dotlines (.005 inches)		X
	W: Windows driver QMark (automatically advance to find QMark after print job from Windows driver) - Y=Yes (assume stock is QMarked) N=No (assume stock is plain paper)		X

Manufacturing Date Query: ESC{MD?}

The manufacturing date of the printer is returned, if the manufacturing date has been written to the printer, otherwise the data field returned is None. Since the manufacturing date is actually the parameter returned, there is no need for the Parameter:Data after the MD! in the response (MD!<date string>. The date is a string that can be entered in any format. Typically, the format is MM/DD/YY.

Query: ESC{MD?}

Response (note that the date string can have different formats): {MD!12/10/2005}

Querying the Printer

Serial Number Query: ESC {SN?}

The serial number of the printer is returned, if the serial number has been written to the printer, otherwise the data field returned is None. Since the serial number is actually the parameter returned, there is no need for the Parameter:Data after the SN! in the response (SN!<serial number string>. The serial number is a string that can be entered in any format. Typically, it is the serial number printed on the label on the printer.

Query: ESC{SN?}

Response (note that the serial number string can have different formats): {SN!MH00035}

Demand Quantity Query

Demand Query	
Query Format	ESC{DQ?}
Reply Format	nnn
Function	Returns remaining quantity of images.

Cancel Query

Cancel Query	
Query Format	ESC{CN!}
Reply Format	ESC{CN!}
Function	Cancels demand printing.

Reset Query

Reset Query	
Query Format	ESC{RE!}
Reply Format	ESC{RE!}
Function	Resets the printer. All data, transient states, and connections are lost. The printer restarts as if power was disconnected and reconnected.

Magnetic Card Data Zero Command

Magnetic Card Data Zero Command	
Query Format	ESC{MZ!}
Reply Format	ESC{MZ!}
Function	Flashes the magnetic card data buffer to zero.

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