

Bar Code Printing Guide



Please read this guide before operating this product.
After you finish reading this guide, store it in a safe place for future reference.

Bar Code Printing Guide



How This Manual is Organized

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Preface

Thank you for purchasing this Canon product. Please read this manual thoroughly before operating the machine to familiarise yourself with its capabilities, and to make the most of its many functions. After reading this manual, store it in a safe place for future reference.



NOTE

Available functions may differ depending on the model of your machine.

How To Use This Manual

Symbols Used in This Manual

The following symbols are used in this manual to explain procedures, restrictions, handling precautions, and instructions that should be observed for safety.



IMPORTANT

Indicates operational requirements and restrictions. Be sure to read these items carefully to operate the machine correctly, and avoid damage to the machine or property.



NOTE

Indicates a clarification of an operation, or contains additional explanations for a procedure. Reading these notes is highly recommended.

Abbreviations Used in This Manual

PostScript® 3 emulation:

PS

Escape Code:

<Esc>

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Before You Start

1

CHAPTER

This chapter is an introduction to bar codes and the Bar Code Printing function.

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Introduction

Overview of Bar Codes

Bar code technology provides an easy, inexpensive, and highly accurate means of data entry and storage for computerized information management systems.

Item identification information (e.g., inventory control, work-in-progress tracking, distribution tracking, and other material management) is the most common type of data stored in bar code systems.

1D Bar Codes

Most conventional bar code systems with only one-dimensional encoding, such as UPC (Universal Product Code), are called "1D Bar Codes." 1D Bar Codes consist of a single row of bars, and are best-suited to lower capacity applications, such as serial numbers.

2D Bar Codes

More complex high-density, two-dimensional bar codes, such as Data Matrix, are called "2D Bar Codes." In this format, data is encoded in both the horizontal and vertical dimensions. Some 2D bar codes can encode up to 12 KB of data, with features like data compression, macro bar codes, encryption, and error correction algorithms.

Product Features

This product supports more than 50 bar code formats (symbolologies), as well as the EURO symbol (the European currency symbol), safety symbols, electronic, and manufacturing symbols. It also features the FreeScape system, which enables the host computer to use PCL, even if it cannot send binary data to a printer.



NOTE

The FreeScape system is not available depending on the model of your machine.

Menus and Their Functions

When the Bar Code Printing function is activated, the BarDIMM and FreeScape menus become available in the PCL/PS menu.

NOTE

- Make sure that the Bar Code Printing function is enabled before you print bar codes.
- When the Bar Code Printing function is activated, [BarDIMM] and [FreeScape] appear on Printer Settings.
- The title of each menu may vary depending on the model of your machine.

Accessing the Menus

You can specify the BarDIMM or FreeScape menu from the operation panel. How to display the BarDIMM or FreeScape menu differs for each model. For more information, see "e-Manual".

BarDIMM Menu

Enable, Disable

You can enable or disable the Bar Code Printing function of the machine.

If [Enable] is selected, the machine will generate bar codes when it receives bar code commands from the host computer.

If [Disable] is selected, bar codes will not be generated, even if bar code commands are sent from the host computer.



IMPORTANT

When you are not printing bar codes, make sure to disable the BarDIMM menu. Otherwise, the processing speed of regular print jobs may be reduced.

FreeScape Menu

Off, ~, ", #, \$, /, \, ?, {, }, |

You can specify the AEC (Alternate Escape Code) to be used for bar code commands when the host computer does not support the standard Escape Code.

1

Before You Start

Getting Started

2

CHAPTER

This chapter explains the methods used to build bar codes, and the commands used to print bar codes.

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Building/Printing a Bar Code

This section describes the methods used to build/print bar codes.

Building a Bar Code

The Bar Code Printing function generates bar codes according to the set PCL font parameters. The PCL font parameters used in this system differ from the generally accepted standards, except for the v and T parameters. The T parameter selects the bar code format, while the v parameter controls the bar height and the number of rows or columns that are used for the bar code.

Some formats require a checksum. A checksum is a value, which is the result of a complex calculation of the coded data. This value is added to the end of the coded data and used by a code reader to validate the bar code. This system automatically calculates the checksum(s) of bar codes that need it. Bar codes can have up to two checksums (MSI Plessey and UCC128). If the checksum is included in fixed length data (EAN 8/13 and UPC), it is ignored.

If required, the system prints the checksum value as centered text with the bars, either as half-embedded or fully embedded characters, and located either under or above the bars. Checksum and flag characters are automatically placed in the right position in some systems (EAN 8/13 and UPC), according to international standards. Automatic sizing limits the embedded text point size to 15. There is no size limit for text that is located above or under the bar code.

Data is analyzed to verify whether it conforms to the following bar code specifications:

- The data must be of the correct size, depending on the desired format. For example, Interleaved 2 of 5 must have an even number of digits, whereas EAN 8/13 and UPC have fixed lengths.
- The data must be valid. Some systems, such as UPC-E, accept only specially structured data. For example, the first five digits on the left side of the bar code are calculated based on the equivalent UPC number.
- Data consists of only numeric or alphanumeric characters.

This section describes how the Bar Code Printing function prints a bar code.

Cursor Position

Before a bar code is printed, the cursor is located in the bottom left corner under the leftmost black bar, regardless of the bar code text parameter that is provided. After a bar code is printed, the cursor moves to the bottom right corner under the rightmost black bar. If you need to print another bar code, move the cursor to a new position and send the bar code data. The bar code's PCL font parameter does not need to be sent again.

Transparent Print Data Mode

The following bar code formats support the full 128 character set, from ASCII code 0 to ASCII code 127, or full binary data (ASCII code 0 to ASCII code 255): Extended 39, Extended 93, 128A, PDF417, 128auto, MaxiCode, EAN/UCC128, Data Matrix, Aztec, Codablock, and QRcode.

If you want to print special characters (ASCII code < 32) with any of the bar code formats mentioned above, a Transparent Print Data PCL sequence (<Esc>&p#X, where <Esc> is replaced by the ASCII character 27 decimal, and where "#" is replaced with the number of data bytes that follow, until the next escape sequence), must be immediately followed by the font selection sequence. This is the only way for the system to determine how many characters must be printed as bar codes.

NOTE

- A typeface range (24,580 to 24,900) is activated in combination with a PCL font call sequence: <Esc>(s#p#h#v#b#s#T, where "#" represents the parameters
- In this manual, the escape code is preceded by <Esc>. The characters must not be entered as individual symbols, but must be replaced by the ASCII character 27 decimal.
- The end of the bar code data determines the bar code type.
 - Numeric bar code data: ends with space/CR/LF/FF/escape code
 - Alphanumeric bar code data: ends with CR/LF/FF/escape code
- The bar code can be of any height within the 3 to 960 point size range (1 point size = 1/72").
- Every bar code system has default options, which are activated when parameters are not provided. Therefore, you do not need to provide all parameters. For example, if the height is omitted, the default size is used.
- If data is invalid (e.g., incorrect size or invalid characters), an X is printed on the bar code, and an error message describing the problem is automatically added below the bar code. This prevents you from printing invalid bar codes by mistake.

Presentation

Each bar code format can be enlarged to any height from 1/25" to 13" (1 mm to 33 cm) in 1/72" increments. Bar widths can be enlarged in 1/600" units, and code values can be printed as text together with differently embedded codes in 20 different scalable fonts.

However, bar codes are not made up of scalable fonts. Typeface numbers from 24,580 to 24,900 activate the bar code. All data that is linked to a typeface number is analyzed and converted into a bar code directly by the PCL controller.

2

Bar Code Readability

Bar codes consist of a series of lines or dots with blank spaces. Therefore, the settings and the condition of the printer may affect readability. We recommend that you first run a readability test before you print the bar codes. If the test print results do not turn out as expected, adjust the following settings to improve readability:

- Toner density
- Color and type of paper used



IMPORTANT

- Canon does not guarantee and has not tested that the bar codes, OCR-A and OCR-B, contained or generated by this Bar Code Printing function are readable by all reading devices.
- Canon recommends that you test the read/write compatibility of these bar codes and fonts before implementing their applications.

Control Codes

This section provides examples of commands that can be used to create bar codes.

PCL Escape Sequences

The escape sequence controls the character strings (Hexa: 1B or Dec: 27) that begin with <Esc>. By embedding and sending these character strings to this Bar Code Printing function in an unprintable, special character code, you can control details, such as the bar code size, as well as the caption text font and the space between the characters.

The following is an example of a valid PCL escape sequence:

<Esc>(s4p102h40v10,30b10,30s24670T

s4p: Readable text that is located under the bars, without start or stop characters (*)

102h: Caption text in Univers Regular

40v: Bar height: 40 points

Formula: $40/72 = 0.555''$

$40 \times 2.54/72 = 1.41 \text{ cm}$

10,30b: Thin bars that are 10 dots wide, and thick bars that are 30 dots wide

10,30s: Thin spaces that are 10 dots wide, and thick spaces that are 30 dots wide

24670T: Symbol: code 39

■ Bar Code Rotation Codes

To rotate a bar code, you can use regular PCL rotation commands. We recommend that you save the cursor position before activating the bar code, and restore the original cursor position after the bar code is rotated.

Example: (Sequences should be entered without carriage returns.)

<Esc>&fS	Saves the cursor position.
<Esc>&a1000h1000V	Positions the cursor.
<Esc>&a90P	Rotates the bar code 90°.
<Esc>(s4p102h40v10,30b10,30s24670T	Formats the bar code.
CANON	The bar code text data.
<Esc>(10U<Esc>(sp10hsb4099T	Switches back to Courier 10 cpi font.
<Esc>&aP	Stops the rotation.
<Esc>&lf1S	Restores the original cursor position.

■ Font Switching

You can switch primary and secondary fonts with bar code fonts. We recommend that a text font be used as the primary font, and a bar code font be used as the secondary font.



IMPORTANT

Bar codes are not PCL fonts, even if they are generated using a PCL font sequence.

Therefore, the following font sequence limitations apply:

- No font ID can be linked to a bar code
- Bar codes cannot be used with HP-GL2, PostScript, PCL 6, UFR II, or UFR II LT languages, depending on the machine or country

■ OCR-A and OCR-B Fonts

The following PCL escape sequences enable OCR-A and OCR-B fonts:

OCR-A: <Esc>(00<Esc>(sp10h12vsb104T

OCR-B: <Esc>(10<Esc>(sp10h12vsb110T

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
32		!	¢	#	£	¥	&		(	)	*	+	,	-	.	/
48	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
64	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
80	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
96		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
112	p	q	r	s	t	u	v	w	x	y	z	{		}		

The above table shows the OCR-A character set.

PCL codes always begin with the unprintable escape code Hexa: 1B or Dec: 27. Some systems cannot use or send binary data to a device, which can represent a problem when using the PCL language with bar codes. An example of this kind of system is a mainframe computer with printers connected to terminals. To avoid conflicts between the PCL language and bar codes in such a system, the FreeScape Code, a user-defined Escape Code or AEC (Alternate Escape Code) can be specified.

FreeScape acts exactly like the standard escape code when it is located at the beginning of a regular PCL font sequence. The default value for the AEC is a '~' (tilde). FreeScape ignores the AEC if it is determined to be pure data. You can also mix escape codes and alternate escape codes.

The AEC can be any one of the following 10 characters:

" , # , \$, / , \ , ? , { , } , | , ~ .

The PCL font sequence to change to the alternate escape code is as follows:

<Esc or AEC>**#J

represents the ASCII decimal value of the new AEC or ESC. Values for AEC are 34 ("), 35 (#), 36 (\$), 47 (/), 92 (\), 63 (?), 123 ({), 125 (}), 124 (|), or 126 (~). The value for ESC is 27. If you indicate 27, it disables the FreeScape Code.



NOTE

- The FreeScape escape sequence setting is only valid for the current job.
- The FreeScape Code can be enabled, disabled, or set as a parameter for all jobs from the FreeScape menu in Printer Settings (from the Settings/Registration screen).
- When FreeScape is disabled, only the escape code (Hexa: 1B or Dec: 27) can be used to start PCL commands.

Bar Code Symbols and Formats

3

CHAPTER

This chapter describes the font parameters for the T, p, h, v, b, s, and Code 128 parameters, as well as the various bar code usages and formats.

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Font Parameters

This section describes the parameters for creating the fonts used in bar codes.

 NOTE

- Values cannot have decimals. For example, "2.5" is an invalid value.
- Bar code parameters must be combined in a unique PCL escape sequence ending with the T parameter.

Example: <Esc>(s4p305h24v7,21s7,21b24670T

- When using default parameters, only commas are required if other parameters still need to be defined.

Example: <Esc>(s6p1,,,5s24850T

T Parameter

The T parameter controls which type of bar code is used. The command for specifying the T parameter is as follows, where T is a typeface number.

Typeface Number	Corresponding Parameter	Typeface Number	Corresponding Parameter
24600	UPC-A	24621	EAN/JAN-8 + 2
24601	UPC-A + 2	24622	EAN/JAN-8 + 5
24602	UPC-A + 5	24630	EAN/JAN-13
24610	UPC-E (UPC-E0 & UPC-E1)	24631	EAN/JAN-13 + 2
24611	UPC-E + 2	24632	EAN/JAN-13 + 5
24612	UPC-E + 5	24650	25 industrial
24640	25 (2 of 5) interleaved	24651	25 industrial + CHK
24641	25 interleaved + CHK	24660	25 matrix
24642	German Postal 25 Leitcode 13	24661	25 matrix + CHK
24643	German Postal 25 Leitcode 11	24700	128 autoswitch
24670	39 (3 of 9)	24701	128 A
24671	39 + CHK	24702	128 B
24672	39 (3 of 9) encode space before data	24704	128 C
24673	39 + CHK encode space before data	24703	128 C (obsolete)

Typeface Number	Corresponding Parameter	Typeface Number	Corresponding Parameter
24680	39 extended	24710	UCC-128 (19 digits only)
24681	39 extended + CHK	24720	EAN/UCC-128
24675	Danish PTT 39 bar code	24770	ZIP + 4 POSTNET 5
24676	French Postal 39 A/R	24771	ZIP + 4 POSTNET 9
24690	93	24772	ZIP + 4 POSTNET 11
24691	93 extended	23591	USPS ZEBRA
24644	USPS 25, 11 digits Tray Label bar code	24760	MSI
24645	USPS 25, 8 digits Sack Label bar code	24761	MSI + CHK10
24750	CODABAR	24762	MSI + CHK10 + CHK10
24751	CODABAR + CHKmod16	24763	MSI + CHK11 + CHK10
24780	Singapore 4 State	24800	UPS MaxiCode
24785	Australia 4 State 37-CUST	24810	RSS-14
24786	Australia 4 State 52-FF-MET	24820	Data Matrix
24787	Australia 4 State 67-FF-MET	24830	Aztec
24790	Royal Mail 4 State Customer code	24840	Codablock F
24795	Netherlands KIX postal bar code	24850	PDF-417
24899	OMR (Optical Mark Reading) for folding, inserting, and sealing systems	24860	QRCode Model 1
24620	EAN/JAN-8	24861	QRCode Model 2

p Parameter

The p parameter, <Esc>(s#p, controls whether a human readable text caption is printed with bar codes, and the method used to print it.

■ 1D Bar Codes

The numbers below represent the values that are used to define the commands in the escape sequence.

- 0: Uses the default value.
- 1: Does not print human readable text.
- 2: Prints embedded human readable text.
- 3: Prints human readable text that is half-embedded.
- 4: Prints human readable text under the code.
- 5: Prints human readable text above the code.

Example: If 24p is entered as the 1D bar code using the p parameter, the text for the French postal bar code is placed under the code.

NOTE

- Add 10 to print the UPC/EAN/JAN checksum in the middle left, rather than the bottom left of the bar code.
- Add 10 to print the start and end characters for the 39 bar code text.
- Add 20 to format text for the French or German postal bar codes.
- Add 100 to print the checksum character with the text.

■ Australia Post 4 State Bar Code

- 0: Uses the N symbol set (numeric digits only) for customer information.
- 1: Uses the C symbol set (alphanumeric characters) for customer information.

■ 2D Bar Codes

PDF-417

- 0 to 8: Defines the ECC (Error Correction Code) level.
- 1000 to 1400: Defines the ECC level based on the size of the code word relative to the data size, in percentage (from 0% to 400%). The matching ECC level is calculated automatically.

Aztec

- 0: The default ECC level (23% + three code words).
- 1 to 99: Defines the ECC level in percentage.
- 101 to 104: The number of layers (+100) in Compact format.
- 201 to 232: The number of layers (+200) in Full Range format.
- 300: The Aztec "Rune" format.

QRCode

- 0: The default ECC level (5%) (Medium)
- 1: Low ECC/High-Density level (Low)
- 2: Standard ECC level (Medium)
- 3: High-reliability/ECC level (Quality)
- 4: Ultra high reliability/ECC level (High)

■ OMR

OMR Rotation

- 0: Horizontal OMR marks (default)
- 1: Vertical OMR marks

h Parameter

The h parameter, Esc(s#h, controls which font is used for the human readable text caption.

■ 1D Bar Codes

Format: CBA, numeric value, position

C: Style

0: Bold (default).

1: Regular text.

2: Italics.

3: Bold.

4: Bold italics.

B: Size

0: Selects the font size automatically.

A: Typeface

0: Uses Courier to print text (default).

1: Uses Letter Gothic to print text.

2: Uses Univers to print text.

3: Uses Univers Condensed to print text.

4: Uses CG-Times to print text.

5: Uses OCR-B to print text (recommended with UPC/EAN).

Example: If 402h is entered as the 1D bar code using the h parameter, the text will be in Univers Bold Italic, and the text size will automatically be selected.

v Parameter

The v parameter, Esc(s#v, controls the bar height and the number of rows or columns that are used for the bar code.

■ 1D Bar Codes

Controls the bar height in increments of 1/60" (0.42 mm).

If the value entered is lower than the minimum bar height, it is automatically adjusted to the minimum value.

Example: Bar code of 1" (25.4 mm) in size: 60v

■ 2D Bar Codes

QRCode, Aztec

0: Normal

1: Reverse video (Letters or numbers are printed as white with a black background, giving the impression that the numbers/letters have been highlighted.)

Codablock: Bar code size

#1: Single line bar height in increments of 1/60" (0.42 mm), the same unit as fonts.

#2: Maximum number of rows for the Codablock symbol.

#3: Maximum number of columns for the Codablock symbol.

Example: Line point size 20, 8 rows, 10 columns: 20,8,10v.

■ OMR

Controls the OMR mark length in increments of 1/60" (0.42 mm).

Example: 1" (25.4 mm) OMR mark: 60v

b Parameter

The b parameter, Esc(#1,#2,#3,#4b, controls the bar width.

■ 1D Bar Codes

#1: Bar width (thin), first width in dots (1/600").

#2: Bar width, second width in dots (1/600").

#3: Bar width, third width in dots (1/600").

#4: Bar width, fourth width in dots (1/600").

Example: Thin bars 4 dots, thick bars 8 dots: 4,8b

■ 2D Bar Codes

PDF-417

#1: Maximum number of rows for the PDF symbol.

#2: Maximum number of columns for the PDF symbol.

#3: If "1" is specified, #1 and #2 are the mandatory number of rows and columns for the PDF symbol.

If "0" is specified or a value is not specified, #1 and #2 are the maximum number of rows and columns (default) for the PDF symbol.

#4: If "1" is specified, the PDF-417 symbol is truncated on its right side.

If "0" is specified, the PDF-417 symbol is not truncated (default).

Example: 8 columns, 10 lines mandatory size, non truncated: 8,10,0b

Data Matrix, QRCode

#1: Small module height in dots (1/600").

Example: Data Matrix, 10 dot height: 10b

Aztec

#1: Small module height in dots (1/600").

#2: Bar undercut parameter. Value: 0 to (#1) -1 dots, default is 0.

Example: 20 dot height, 15 dot bar undercut: 20,15b

Codablock

B parameters are the same as ID bar codes.

■ OMR

Controls the OMR mark's thickness in dots (1/600").

#1: Regular mark thickness in dots (1/600").

#2: Heavy mark thickness in dots (1/600").

Example: .01" for a thin mark, and .02" for a thick mark: 6,12b

s Parameter

The s parameter, Esc(s#1,#2,#3,#4s, controls the width of the spaces.

■ 1D Bar Codes

#1: Space width (thin), first width in dots (1/600").

#2: Space width, second width in dots (1/600").

#3: Space width, third width in dots (1/600").

#4: Space width, fourth width in dots (1/600").

Example: Thin spaces 4 dots, thick spaces 8 dots: 4,8s



NOTE

The b parameters can be sent alone if the b and s parameters are identical. This enables shorter PCL bar code commands to be sent to the printer.

■ 2D Bar Codes

PDF-417

#1: Symbol black-and-white module height, compared to the width (1 to 10).
Unit = minimum module width (default = 3).

#2: X parameter for the symbol X/Y size ratio (default = 2).

#3: Y parameter for the symbol X/Y size ratio (default = 3).

#4: Symbol module width (1 to 100). Unit = 1/100" (default value = 10).

Example: Minimum module width, square PDF, and module size = 1/20": 1,1,1,5s

QRCode

#1

- 0: Uses the default Japanese font (Automatic: JIS/Shift JIS).
- 1: Numeric (0 to 9).
- 2: Alphanumeric (0 to 9, uppercase letters A to Z, spaces, and symbols \$%*+-. /:).
- 3: Binary 8 bits/bytes data (JIS 8 bit character set (Latin and Kana) in accordance with JISX0201).
- 4: Kanji characters (Shift JIS values 8140h to 9FFCh and E040h to EAA4h shifted from JISX0208).

Example: Alphanumeric data: 2s

■ OMR

Controls the OMR mark spacing in dots (1/600"). Default value = 85 (1/7").

Code 128 Control Codes

Code 128 has five non-data special control codes called Function Codes, and three control codes which enable the Bar Code Printing function to switch from one 128 set (A, B, or C) to another one. The switching of the control codes is used to force one 128 set. For example, the string "123456" can be printed with all sets A, B, and C. Inserting a character with an ASCII code value of 134 at the beginning of the string, forces the system to use set B of code 128.



NOTE

Both Code 128 Autoswitch and EAN 128 analyze the data and optimize the bar code length by switching automatically between sets A, B, and C. EAN 128 and UCC-128 already include the FNC 1 code as the first character. Therefore, you should not send the FNC 1 code along with EAN 128 and UCC-128 data.

Special control codes are included in bar codes by inserting the following numeric characters into the bar code:

- 128 = SHIFT** Used to switch from character set A to B, or from B to A temporarily. The change applies to the character following the Shift character. All subsequent characters are then given in the original character set.
- 129 = FNC 1** Reserved for future use or special applications, such as UCC-128 shipping container codes.
- 130 = FNC 2** A special instruction for the bar code reader to temporarily store data, append it to the symbol containing the FNC 2 character, and then transmit it together with the next symbol/character.

131 = FNC 3	Reserved for bar code reader initialization and other special bar code reader functions.
132 = FNC 4	Reserved for future use or special applications.
133 = CODE A	Used for numbers, ASCII characters, and upper case letters.
134 = CODE B	Used for numbers, ASCII characters, upper and lower case letters, and all numeric codes.
135 = CODE C	A double-density code, which is required to have an even number of characters.

Bar Code Format Parameters

This section describes the different bar code parameters.

Default Parameters

Bar Code Name	Height ^{*1}	Text-Flag	Bar Width 1 ^{*3}	Bar Width 2 ^{*3}	Bar Width 3 ^{*3}	Bar Width 4 ^{*3}	Space Width 1 ^{*3}	Space Width 2 ^{*3}	Space Width 3 ^{*3}	Space Width 4 ^{*3}
UPC-A	74	3	8	16	24	32	8	16	24	32
UPC-E	29	3	8	16	24	32	8	16	24	32
EAN-8	50	3	8	16	24	32	8	16	24	32
EAN-13	62	3	8	16	24	32	8	16	24	32
CODE 2/5	29	1	6	18	—	—	6	18	—	—
CODE 39	29	1	6	18	—	—	6	18	—	—
39 EXT	29	1	6	18	—	—	6	18	—	—
CODE 93	29	1	6	18	—	—	6	18	—	—
93 EXT	29	1	6	18	—	—	6	18	—	—
CODE 128	29	1	6	12	18	24	6	12	18	24
EAN 128	29	1	6	12	18	24	6	12	18	24
UCC 128	29	105	6	12	18	24	6	12	18	24
CODABAR	29	1	6	12	—	—	6	12	—	—
MSI PLESSEY	29	1	6	12	—	—	6	12	—	—
ZIP+4	9*2	1*2	—	—	—	—	—	—	—	—
USPS Tray Label	50.4	4	9*2	27*2	—	—	9*2	27*2	—	—
USPS Sack Label	50.4	1	9*2	27*2	—	—	9*2	27*2	—	—
German Postal 25	72	124	10	30	—	—	10	30	—	—

*1 Height is in pointsize.

*2 Cannot be overridden by the user.

*3 Bar Width / Space Width is in dots.

Bar Code Name	Height ^{*1}	Text-Flag	Bar Width ^{1*3}	Bar Width ^{2*3}	Bar Width ^{3*3}	Bar Width ^{4*3}	Space Width ^{1*3}	Space Width ^{2*3}	Space Width ^{3*3}	Space Width ^{4*3}
French Postal 39	36* ²	124* ²	7* ²	21* ²	—	—	7* ²	21* ²	—	—
Singapore 4 State	13.5* ²	1* ²	—	—	—	—	—	—	—	—
UK 4 State	13.5* ²	1* ²	—	—	—	—	—	—	—	—
Netherlands KIX	13.5* ²	1* ²	—	—	—	—	—	—	—	—
Australia 4 State	13.5* ²	—	—	—	—	—	—	—	—	—
MaxiCode	1" x 1"	—	—	—	—	—	—	—	—	—
PDF-417	Auto	—	—	—	—	—	—	—	—	—
Data Matrix	Auto	—	—	—	—	—	—	—	—	—
QRCode 1/2	Auto	—	—	—	—	—	—	—	—	—
Aztec	Auto	—	—	—	—	—	—	—	—	—
Codablock	16	1	6	12	18	24	6	12	18	24
OMR Marks	45	—	7	14	—	—	7	14	—	—

*1 Height is in pointsize.

*2 Cannot be overridden by the user.

*3 Bar Width / Space Width is in dots.

NOTE

- Height corresponds to the h parameter, TextFlag to the p parameter, and the four bar widths to the b parameter.
- Height is in increments of 1/60", and bar widths are in increments of 1/600".

Sizing Parameters

Bar Code Type	Characters Encoded*1	Input Length*2*3	Character Width*4	Compression	Start/Stop Size*5 (in Thin Bar)	Checksums
UPC-A	D	11	7	No	11	1
UPC-E	D	11 or 6	3, 5 (for 11) 7 (for 6)	Yes (for 11)	14, 5 (for 11) 11 (for 6)	1 (for 11)
EAN/JAN-8	D	7	7	No	11	1
EAN/JAN-13	D	12	7	No	11	1
Supplemental 2 or 5 for EAN/UPC	D	2 or 5	9	No	13	0
CODE 39	DPU	1 to 99	16	No	32	1*6
39 EXT	DPULC	1 to 99	DU: 16 PLC: 32	No	32	1*6
Interleaved 2/5	D	2 to 100	9	Yes	12	1*6
Industrial 2/5	D	2 to 100	14	No	20	1*6
Matrix 2/5	D	1 to 99	10	No	18	1*6
EAN-128	DPUCL	1 to 99	Data dependent	Yes	>= 35	1
Code 128 Auto	DPUCL	1 to 99	Data dependent	Yes	24	1
Code 128A	DPUC	1 to 99	11	No	24	1
Code 128B	DPUL	1 to 99	11	No	24	1
Code 128C	D	1 to 99	5, 5	Yes	24	1
UCC-128	D	1 to 99	5, 5	Yes	51, 5 (CHK)	2
Codabar/Monarch	DP	1 to 99	12	No	0	1*6
MSI PLESSEY	D	1 to 99	12	No	8	1*6 or 2
CODE 93	DPU	1 to 99	9	No	19	2
93 EXT	DPULC	1 to 99	DU: 9 PLC: 18	No	19	2

*1 D = Digits, P = Punctuation, L = Lower case letters, U = Upper case letters, C = Control characters (ASCII 0 to 31)

*2 The checksum character is not counted.

*3 Unit = Number of characters

*4 Unit = Thin Bar Width

*5 The checksum size is not counted except when "CHK" is indicated.

*6 = optional

Bar Code Type	Characters Encoded*1	Input Length *2*3	Character Width*4	Compression	Start/Stop Size*5 (in Thin Bar)	Checksums
ZIP + 4	D	5, 9 or 11	29/600"	No	5/600" and 8/600"	1
Singapore 4 State	D	6	88/600"	No	22/600"	1
UK 4 State	DU	7, 8 or 9	88/600"	No	22/600"	1
NL KIX	DU	5 to 12	88/600"	No	22/600"	0
AP 37-CUST	D	8	44/600"	No	44/600"	1
AP 52-FF-MET	DUL	8 + 8D/ 5UL	44/600"	Yes (N table)	44/600"	1
AP 67-FF-MET	DUL	8 + 15D/ 10UL	44/600"	Yes (N table)	44/600"	1
Singapore ZIP + 4	D	5, 9 or 11	29/600"	No	5/600" and 8/600"	1
MaxiCode	DPLUC	Up to 100	—	Yes	—	Codewords
PDF-417	DPLUC	Up to 1,848	—	Yes	—	Codewords
Data Matrix	DPLUC	Up to 2,335	—	Yes	—	Codewords
Codablock	DPLUC	Up to 5,366	Data dependent	Yes	46	1
Aztec	DPLUC	Up to 3,832	—	Yes	—	Codewords
QRCode1/2	DPLUC	Up to 7,089	—	Yes	—	Codewords

*1 D = Digits, P = Punctuation, L = Lower case letters, U = Upper case letters, C = Control characters (ASCII 0 to 31)

*2 The checksum character is not counted.

*3 Unit = Number of characters

*4 Unit = Thin Bar Width

*5 The checksum size is not counted except when "CHK" is indicated.

Bar Code Usages and Formats

This section describes the supported bar code types, and their usages and formats.

1D Bar Codes

UPC-A

The UPC-A bar code is the standard bar code format in the United States for items sold to the public. UPC-A contains numeric data only, and encodes a 12 digit number. The first digit is the system number character, the next five digits represent the supplier ID, the next five digits represent the product number, and the last digit represents the required checksum character. You do not need to specify the checksum digit, as the Bar Code Printing function calculates it automatically.



One digit is represented by two bars and two spaces, and its width is calculated as seven thin bars.

The system number character is printed as human readable text on the left side of the bar code, and the checksum digit is printed as human readable text on the far right side of the bar code.

The system number can have the following values:

- | | |
|-----------------|--|
| 0 or 7: | Regular UPC codes |
| 2: | Random weighted items |
| 3: | The National Drug Code and National Health Related Items Code |
| 4: | For use without a code format restriction, and with a checksum digit for nonfood items |
| 5: | For use on coupons |
| 1, 6, 8, and 9: | Reserved |

UPC-E (UPC-E0 and UPC-E1)

The UPC-E bar code is ideal for small packages because its data is compressed. The UPC-E bar code contains the same information as the UPC-A bar code except that there are a minimum of four zeros, which are suppressed. This reduces the number of digits in the bar code from 12 to 6. The Bar Code Printing function accepts the Zero Suppressed version of compressed and uncompressed UPC-E data. If data is sent uncompressed, the Bar Code Printing function automatically compresses the data.

One digit is represented by two bars and two spaces, and its width is calculated as seven thin bars. Note that caption text below the bar code can be activated to verify the checksum calculation.



EAN-8

The EAN-8 bar code is used in Europe for items sold to the public. EAN-8 contains numeric data only, and encodes an eight digit number. The first two digits represent the country code, the next five digits represent the product number, and the last digit represents the required checksum character. You do not need to specify the checksum digit, as the Bar Code Printing function calculates it automatically.

One digit is represented by two bars and two spaces, and its width is calculated as seven thin bars.



EAN-13

The EAN-13 bar code is the standard bar code format in Europe for items sold to the public. EAN-13 contains numeric data only, and encodes a 13 digit number. The first two digits represent the country code, the next six digits represent the supplier ID, the next four digits represent the product number, and the last digit represents the required checksum character. (The checksum character is separated from the rest of the bar code. This separation varies from country to country.) You do not need to specify the checksum digit, as the Bar Code Printing function calculates it automatically. If the checksum is sent as the 13th digit, it is ignored and recalculated.

All of the EAN and UPC bar codes can be followed by two or five digits, which represent supplemental information.



One digit is represented by two bars and two spaces, and its width is calculated as seven thin bars.

The system number character is printed as human readable text on the left side of the bar code, and the checksum digit is printed as human readable text on the right side of the bar code.

Code 39

The real name of Code 39 is "3 of 9 bar code." It is probably the most commonly used bar code, as it encodes not only digits, but also uppercase letters and punctuation. Spaces are encoded as bars. Text is encoded between the start and stop character " * ", which is automatically generated by the Bar Code Printing function.

The Bar Code Printing function features two variations of the 3 of 9 bar code: With starting spaces and without starting spaces. Typefaces 24670 and 24671 do not encode the starting spaces in the data to create the bar code; however, typefaces 24672 and 24673 do encode the starting spaces.



Danish Postal 39 Bar Code (Denmark Only)

This is a special 3 of 9 bar code that is used on parcel labels for shipment throughout the postal service in Denmark. The Danish Postal 39 bar code contains 10 digits, a special checksum, and ends with "DK."



French Postal 39 Bar Code (France Only)

This is a special 3 of 9 bar code that is used on registered letter forms ("Recommandés") in France. The French Postal 39 bar code starts with "RA" or "RB," then it contains eight digits, a special checksum, and ends with "FR."



RB 0123 4512 8FR

Extended 39

The Extended 39 bar code is based on the standard 3 of 9 bar code, however, it encodes all of the ASCII characters by generating two characters for each character in the string to encode. The Extended 39 bar code supports all ASCII codes from 0 to 126, and the bar code pattern is quite large.



Interleaved 2 of 5

Also called, "25 Interleaved." The Interleaved 2 of 5 bar code contains numeric data only, and requires an even number of digits in the string to be encoded. The number of digits can be from 2 to 30.



Industrial and Matrix 2 of 5

The Industrial and Matrix 2 of 5 bar codes contain numeric data only, and can have from 1 to 30 digits.



Code 128

The new standard for most bar code labels. Code 128 is a compact bar code for numeric and alphanumeric strings. It has three modes: A, B, or C, which encode a different range of characters. Code 128 Auto is an exclusive feature of the Bar Code Printing function. It enables you to encode all 128 ASCII characters without analyzing the string to encode, and automatically determines the required Code 128 modes to use.

The Bar Code Printing function analyzes data and switches dynamically between the A, B, and C modes to provide the most compact code. Code 128 Auto is fully compliant with the new worldwide standard for pallet labels, which use Code 128 modes B and C within the same pattern.



EAN-128 and UCC-128

EAN-128 and UCC-128 are variable length bar codes that start with the FNC 1 code, and are based on Code 128 A, B, and C modes, which encode the string. EAN-128 is used for pallet labels and EDI (Electronic Data Interchange) related bar code labels. The Bar Code Printing function automatically adds the FNC 1 code at the beginning of the bar code, and the checksum at the end.



German 25 Postal Bar Code (Germany Only)

The German 25 Postal bar code is a special 25 Interleaved code that is used on parcel labels for shipment throughout the postal service in Germany. The two codes used on these labels are:

- The Leitcode, which is used to encode the destination area, and requires 13 digits.
- The Identcode, which is used to encode the tracking number, and requires 11 digits.



Codabar/Monarch

Encodes digits and punctuation characters. Used mostly for the labeling of blood products.



Code 93

A compressed version of Code 39.



Extended Code 93

A compressed version of Extended Code 39.



MSI Plessey

The MSI Plessey bar code contains numeric data only, and is used on labels for the grocery industry.



ZIP + 4 Postnet (USA Only)

Prints the zip code as a bar code to speed mail through the United States Postal Service.



USPS Tray Bar Code (USA Only)

Since 1997, bar coded tray labels with a special 25 Interleaved bar code are required for automatically sending rate mailings of first-class, regular periodicals, and regular and enhanced carrier route standard mail letter size pieces, and for first-class flat size pieces.



USPS Zebra Bar Code (USA Only)

The United States Postal Service has defined the Zebra code. This is a series of diagonal lines to the right of the bar code which serve solely as a visual indication that a tray contains bar coded mail. The code must not appear on tray labels for non bar coded mail.

This standard began in July 1997. Due to its simplicity, the Zebra code is implemented in the Bar Code Printing function as a font with only one diagonal thick bar code line with the slash character "/" (ASCII value 47).

To create the USPS Zebra bar code, you have to call the font, and send three consecutive slash characters without any space in between in the PCL escape code sequence.

Example: <Esc>(10U<Esc>(s0p2.50h29vsb23591T///

USPS Sack Bar Code (USA Only)

Effective since July 1, 1997, bar coded sack labels with a special 25 Interleaved bar code are required for automatically sending rate mailings of regular periodicals and standard mail flat size pieces prepared in sacks.



Singapore 4 State Bar Code

The Singapore Postal Service is promoting the use of a 4 State bar code to speed up mail sorting. This 4 State bar code encodes a six digit number, and has a checksum appended to the data. You must input this six digit number into the Bar Code Printing function, which automatically calculates and prints the checksum.

Note that the Singapore 4 State bar code must end with a regular text font escape sequence.



Netherlands KIX Bar Code

The Dutch Postal Service is promoting the use of a 4 State bar code to speed up mail sorting. This 4 State bar code encodes a character string from five to 12 characters, and has a checksum appended to the data. You must input a valid character string into the Bar Code Printing function.

Note that the Netherlands KIX bar code must end with a regular text font escape sequence.



UK Royal Mail 4 State Customer Bar Code

The UK Postal Service is promoting the use of a 4 State bar code to speed up mail sorting. This 4 State bar code encodes a variable number of digits and letters, and has a checksum appended to the data. You must input the correct digits and letters into the Bar Code Printing function, which automatically calculates and prints the checksum.

Note that the UK Royal Mail 4 State Customer bar code must end with a regular text font escape sequence.



Australia Post 4 State Bar Codes

Established in 1998, Australia Post 4 State bar codes are used to enable the Australian Postal Service to sort incoming mail via bar codes that are read from letters. There are three different types of bar codes that correspond to FCC (Format Control Code) values 11, 59, and 62. The Bar Code Printing function only needs the DPID (Delivery Point Identifier) and customer information to automatically generate the FCC or Reed-Solomon checksum.



For each type of bar code, the data must be sent in a specific format:

- Standard Customer Bar Code (37-CUST) with only the sorting code (DPID):
-<DPID>
- Customer Bar Code 2 (52-FF-MET), DPID, and 16 bars of customer information (can be eight digits or five alphanumeric characters long):
-<DPID>,<CustomerInfo>
- Customer Bar Code 3 (67-FF-MET), DPID, and 31 bars of customer information (can be 15 digits or 10 alphanumeric characters long):
-<DPID>,<CustomerInfo>

Example: <Esc>(s1p24787T12345678,7V 5<Esc>(s0p12h10v4099T



IMPORTANT

<DPID> is the sorting code, and must be eight digits long. <CustomerInfo> is customer information; the p parameter selects the N or C symbol set, where N = numeric data, and C = alphanumeric data.



NOTE

For information on using the p parameter escape code in the Australia Post 4 State bar code, see "Font Parameters," on p. 3-2.

2D Bar Codes



IMPORTANT

To encode data including an escape character (27 decimal or 1B hexadecimal), data must be enclosed in a Transparent Print Data mode sequence. (See "Transparent Print Data Mode," on p. 2-3.)

UPS MaxiCode

The MaxiCode bar code is a 2D bar code that consists of 884 hexagons surrounding a bull's eye finder pattern. One bit of information is encoded by one hexagon. Up to 100 characters of information can be encoded in one square inch, which is the approximate fixed size of such a bar code. The MaxiCode symbology includes built-in error correction capability, automatic data compression, and a full ASCII character set.

MaxiCode was created by UPS (United Parcel Service), and endorsed by AIM (Automatic Identification Manufacturers) (officially designated by AIM as "Uniform Symbology Specification MaxiCode") as a multipurpose EDI (Electronic Data Interchange), two-dimensional bar code. UPS uses MaxiCode to encode all parcel information to provide faster and better service to their clients.



MaxiCode data is a string made of a header, the ANSI (American National Standards Institute) message, and an End of Transmission code.

The following is detailed information found in the ANSI message for the UPS MaxiCode.



NOTE

Always use uppercase characters for MaxiCode data.

Field Name	Description	Required/ Optional
Destination Postal code	Five or nine alphanumeric characters	R
Destination Country code	Three digits	R
Class of service	Three digits	R
Tracking number	10 or 11 alphanumeric characters	R
Standard Carrier Alpha Code	UPSN	R
Shipper number	Six alphanumeric characters	R
Day of pick up	Three digits	R
Shipment ID number	One to 30 alphanumeric characters	O
Item x of n in total	x = one to three digits n = one to three digits Example: 20/458	R
Weight (lb)	One to three digits	R
Address validation (Y/N)	Yes or No	R
Destination address	One to 35 alphanumeric characters	O
Destination city	One to 20 alphanumeric characters	R
Destination state	Two upper case letters	R

List of MaxiCode Information Fields

The different fields are separated by <Gs> (Group Separator; ASCII 29, HEX 1D). The bar code data terminates with <Eot> (End of transmission; ASCII 04, HEX 04). To separate format types, use <Rs> (Field separator; ASCII 30, HEX 1E).

To separate primary and secondary address numbers, use <Fs> (Address field separator; ASCII 28, HEX 1C). The Bar Code Printing function expects to get both the primary and secondary messages from the application, separated by a comma.

The primary message contains the following information:

1. Label number
2. Number of labels for the shipment
3. MaxiCode mode. Use mode 2 for domestic US shipments, mode 3 for international shipments
4. Postal code
5. Country code
6. Class of service



NOTE

A comma must separate all of these parameters.

The secondary message contains the following information:

	<u>Examples</u>
1. ANSI Message Header	[]><Rs>
2. Transportation Data Format Header	01<Gs>96
3. Tracking Number	1Z00004951<Gs>
4. SCAC (Standard Carrier Alpha Code)	USPN<Gs>
5. UPS Shipper Number	06X610<Gs>
6. Julian Day of Pickup	159<Gs>
7. Shipment ID #	1234567<Gs>
8. Package n/x	1/1<Gs>*
9. Package Weight	10<Gs>
10. Address Validation	Y<Gs>
11. Ship to Address	634 ALPHA DR<Gs>
12. Ship to City	PITTSBURGH<Gs>
13. Ship to State	PA
14. End of Format character	<Rs> ASCII 30
15. End of Transmission character	<Eot> ASCII 04

* This information is also in the primary message.

**NOTE**

- UPS MaxiCode expects the secondary message to be padded with a total of 84 fill characters. The Bar Code Printing function automatically pads the data to the right of the MaxiCode. (The fill character is '!' ASCII 33, HEX 21.)
- The secondary message cannot be longer than 84 characters. Therefore, the destination's address length must be truncated if the total length of the secondary message is greater than 84 characters. A destination address is optional in the MaxiCode data. If the MaxiCode data is too long, the Bar Code Printing function will not print the MaxiCode, and instead prints an error message indicating how many characters exceeded the maximum length of 84.
- Blank fields must also include the <Gs> separator.

After the <Eot> character, the application must immediately send a PCL escape sequence to switch to a font other than MaxiCode.

The following is the escape sequence for switching from MaxiCode to Courier font 10CPI:

```
<Esc>(s0p10h12vbs4099T
```

**NOTE**

If you use a character set other than PC-8, you should resend the character set selection before selecting the new font.

Example:

```
<Esc>(s24800T1,1,2,152382802,840,001,[])><RS>01<GS>96995011234<GS>840<GS>
025<GS>1Z07000168<GS>UPSN<GS>WX9031<GS>272<GS><GS>1/1<GS>15<GS>
Y<GS>123<FS>300<GS><GS>AK<RS><EOT><Esc>(s0p10h12vbs4099T
```

PDF-417

The PDF-417 bar code is a high-density, 2D bar code created by Symbol Technology, and is an ANSI/AIM USA standard. This bar code consists of a stack of rows with small black rectangles arranged in columns. The number of rows and columns can be user defined or set automatically to fit a ratio (2:3 is the most common ratio).

PDF-417 features built-in error correction capability, automatic data compression, and full ASCII and binary character sets. It can encode up to 1,848 characters per bar code based on the compression level achieved.

PDF-417 supports two encoding modes: ASCII (letters, punctuation, and digits), and Binary (any binary value between 0 and 244). The ASCII mode has a better data density than the binary mode (maximum 106 versus 177 bytes per cm²), and can encode more data (maximum 1,848 bytes versus 1,108 bytes). The Bar Code Printing function automatically selects the best encoding mode (Binary or ASCII) for the supplied data.

PDF-417 bar codes are read by a laser scanner and CCD (Charge Coupled Device) cameras.

Number of rows (min/max): 3/90

Number of columns (min/max): 1/30

There are many symbol options for the PDF-417 bar code that are activated using the p parameters of the PCL escape sequence.



NOTE

- The number of rows multiplied by the number of columns must be less than 929.
- For more information on using the p parameter escape code in the PDF-417 bar code, see "Font Parameters," on p. 3-2.



Data Matrix

Data Matrix is a high-density, 2-D matrix bar code symbology developed by RVSI - Acuity CiMatrix, which can encode a lot of information in a very small space. The Data Matrix symbology has extensive error correction capabilities, which uses the ECC200 error checking method. A Data Matrix symbol can store between 1 and 3,116 numeric or 2,335 alphanumeric characters, and is scalable between a 1 mm square to a 14" square.

Since the overall size of the Data Matrix symbol is infinitely scalable, the Data Matrix symbol can be read at virtually any distance, given the right combination of size and reading equipment.

The Bar Code Printing function can scale the Data Matrix bar code by defining the small black square height and width. It also automatically optimizes the encoding (binary, text, and digits) by analyzing the data.



NOTE

For more information on the Data Matrix symbol options, see "Font Parameters," on p. 3-2.



Aztec Code

Aztec Code is a 2-D matrix bar code symbology developed by Welch Allyn. It is designed to combine the best characteristics of several first generation symbols with special attention to the ease of printing, orientation, field distortion, high-level data security with user selected redundancy, and efficient storage for small to large data messages. The smallest Aztec Code symbol encodes 13 numbers or 12 letters, while the largest Aztec Code symbol encodes 3,832 numbers, 3,067 letters, or 1,914 bytes of binary data. The Bar Code Printing function can scale the Aztec Code by defining the small black square height and width.



NOTE

For more information on the Aztec Code symbol options, see "Font Parameters," on p. 3-2.



Codablock F

Codablock F is a 2-D bar code developed by ELMICRON as an extension of Code 128. Using Codablock F, you can separate Code 128 into several sections and arrange them into a multiple row symbol. A Codablock F symbol may contain 2 to 44 rows of up to 61 characters (up to 122 for numeric data per row), and supports most features of Code 128.

NOTE

For more information on the Codablock F symbol options, see "Font Parameters," on p. 3-2.



QRCode

QRCode is a 2-D matrix bar code symbology developed by DENSO Corporation. It is available in two models: Model 1 and Model 2 (an enhanced version of Model 1). The Bar Code Printing function supports four levels of error correction, a wide range of symbol sizes, and can scale the QRCode by defining the small black square height and width.

A QRCode symbol can include numeric and alphanumeric data with high-compression, binary, Kana, and Kanji data. The maximum number of characters per QRCode symbol are as follows:

QRCode	Model 1	Model 2
Numeric Characters	1,167	7,089
Alphanumeric Characters	707	4,296
Bytes	486	2,953
Kanji Characters	299	1,817



OMR Marks

OMR marks are horizontal or vertical black solid lines that are found on printed mailing sheets. The mail processing machines check for these lines on every page that is fed into them. The tracking of these marks triggers mechanical processes, such as the folding of all pages that should be inserted together in an envelope.

The Bar Code Printing function can generate OMR marks that are used by insertion, folding, or sealing systems found in mailrooms.



There is no standard for OMR marks. Specifications vary from machine to machine and per OMR scanning software. However, the Bar Code Printing function can be configured to work with any specification.

The OMR mark's width, spacing, and length can be defined by using the b, s, and v parameters.

NOTE

- Some mail processing machines use thicker marks to indicate start and stop positions, while others only use one type of mark for all processes.
- Marks in the data are defined from top to bottom.

Usage: Only three characters can be used as data for OMR marks: '0', '1', and '2'.

- 0: The mark is skipped.
- 1: Regular mark. (Thickness is defined by the first b parameter.)
- 2: Heavy mark. (Thickness is defined by the second b parameter.)

Euro Currency Symbols and Additional Fonts

The Bar Code Printing function features fonts and scalable logos that can be used with bar codes on labels and other documents, Euro symbols, manufacturing, electronic, and safety symbols.

Euro and Other Currency Symbols

Escape Sequence: <Esc>(10Q<Esc>)(s1p<size>vsb10452T

<size> is the symbol size in points (1/72").

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
64		€	€	€	£	¢	¤	¥								
80																
96		€	€	€	€	€	€	€	€	€	€	€	€	€		

Manufacturing and Safety Symbols

Escape Sequence: <Esc>(10Q<Esc>)(s1p<size>vsb10400T

<size> is the symbol size in points (1/72").

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
64						☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺
80	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺
96		☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺
112	☺															

Special Multicharacter Symbols

Green Point Symbol: <Esc>)10Q<Esc>)s1p20vsb10400TE

with text: <Esc>)10Q<Esc>)s1p20vsb10400TDE

with gray arrows: <Esc>)10Q<Esc>)s1p20vsb10400Td

<Esc>*c15G<Esc>*v2Te<Esc>*vT

Recycling Logo: <Esc>(10Q<Esc>)(s1p20vsb10400Tghij<8>123

Electronic and Safety Symbols

Escape Sequence: <Esc>(10Q<Esc>(s1p<size>vs3b10400T
<size> is the symbol size in points (1/72").

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
32																
48																
64																
80																
96																
112																

Odette Transport Label Macros

The Bar Code Printing function contains the VDA 4902/Odette label used in the automobile industry. This label is included as a PCL5 macro that is retrieved from any application which uses its number.

- If you are using the Macro TTF font:
 - Install the Macro Exec TTF font, and then enter the macro number using it.
- If you are using PCL5 commands:
 - To print one empty label on the page, send the following sequence at the beginning of the page:
~&l1E~&a0h0V~&fs###y3x1S
 - To print two empty labels on the page, send the following sequence at the beginning of the page:
~&l1E~&a0h0V~&fs###y3x1S~&a0h4100V~&fs###y3x1S

NOTE

- ### must be replaced by the three digit macro number (see the table below).

V3 German	V3 English	V3 French	V3 Italian	V3 Spanish	V4 English	V4 German
300	301	302	303	304	311	312

- '~' in the PCL escape sequences above is the FreeScape character. Replace it with its new value if it has been changed to another value through the <Esc>***J escape sequence or from the FreeScape menu.

An example of an Odette label macro with data, bar codes, and a security symbol added.

(1) Customer		(2) Point of delivery (storage) sample	
			
(3) Delivery note		(4) Supplier access	
Order complement A/P 10934213A5			
		(5) Weight net	(6) Weight gross
		39	42
		(7) Number	
		1	
(8) Ref. No.			
8924353423			
			
(9) Quantity		(10) Description	
100		BDJC4079020	
		(11) Supplier article	
		BD44MB711	
(12) Supplier No.			
KL9645			
		(13) Production date	(14) Modification
		010120	M01
(15) Shipping mark		(16) Lot No.	
		221.3	
010544			

 NOTE

The safety symbol is included in the safety symbol fonts.

Troubleshooting

4

CHAPTER

This chapter provides a list of error messages that could be generated, along with their possible causes and remedies.

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List of Error Messages

This section explains the various error messages that could be generated, along with their possible causes and remedies.

If an error message occurs, an **X** is printed on top of the bar code, and the error message appears automatically under the bar code.

!Err: Char=nn	
Symbolologies: All	
Cause	An invalid character was entered. 'nn' is the ASCII value of that character. This error occurs if you include a letter in a bar code that requires numeric data only, such as EAN or 25.
Remedy	Verify the data for the bar code.
!Err: Odd	
Symbolologies: 2 of 5 Interleaved, Code 128C	
Cause	The string you tried to print in the 2 of 5 Interleaved format has an odd number of digits. With the 2 of 5 Interleaved and Code 128C bar codes, digits are paired in groups. Note that if you use the 2 of 5 Interleaved bar code with a checksum calculation, you must send an odd number of digits, as the checksum digit will be rounded to an even number of digits.
Remedy	Verify the string size, and send an even or odd number of digits.
!Err: Length	
Symbolologies: All	
Cause	An invalid length of data was entered for the bar code. This means that the data string is too short or too long.
Remedy	Verify that the data length conforms to the symbology specifications. (See "Sizing Parameters," on p. 3-14.)

!Err: NonZero and !Err: InvVal

Symbology: UPC-E

- Cause

The Bar Code Printing function found an unexpected value in the UPC-E bar code.
- Remedy

Make sure that there is a minimum of four zeros, and verify that the data conforms to the UPC-E symbology specifications. (See "UPC-E (UPC-E0 and UPC-E1)," on p. 3-17.)

!Err: R/A/B

Symbology: French Postal 39 A/R

- Cause

The string supplied to the Bar Code Printing function to generate the French Postal 39 bar code does not start with 'RA' or 'RB'.
- Remedy

Verify that the data for the bar code conforms to the French Postal 39 symbology specifications. (See "French Postal 39 Bar Code (France Only)," on p. 3-19.)

!Err: Fmt=00000000

Symbology: Australia Post 4 State 37-CUST

- Cause

The Australia Post 4 State 37-CUST bar code encodes the DPID, an eight digit number. The DPID string supplied to the Bar Code Printing function to generate the 37-CUST bar code does not consist of eight digits.
- Remedy

Verify the length of the DPID string. (See "Australia Post 4 State Bar Codes," on p. 3-24.)

!Err: Fmt=00000000,<CustInfo>

Symbologies: Australia Post 4 State 52-FF-MET and 67-FF-MET

- Cause

The Australia Post 4 State 52-FF-MET and 67-FF-MET bar codes encode the DPID, an eight digit number, and the customer information, which can be encoded using the N table if it only includes digits. Either the DPID string does not consist of eight digits, or there is no customer information defined in the string, or the comma separator is missing.
- Remedy

Verify that the data for the bar code conforms to the symbology specifications. (See "Australia Post 4 State Bar Codes," on p. 3-24.)

!Err: CustInfo: nonDigit

Symbologies: Australia Post 4 State 52-FF-MET and 67-FF-MET

Cause The Australia Post 4 State 52-FF-MET and 67-FF-MET bar codes encode the DPID, an eight digit number, and the customer information, which can be encoded using the N table if it only includes digits. The customer information defined in the string supplied to the Bar Code Printing function includes at least one character that is not a digit.

Remedy Verify the customer information data for the bar code, and make sure that the data conforms to the symbology specifications. (See "Australia Post 4 State Bar Codes," on p. 3-24.)

!Err: CustInfo>NN (where NN is a value)

Symbologies: Australia Post 4 State 52-FF-MET and 67-FF-MET

Cause The customer information section of the 52-FF-MET and 67-FF-MET bar codes has a defined maximum length depending on the N or C encoding table of the p parameter. The customer information defined in the string supplied to the Bar Code Printing function exceeds its maximum length.

Remedy The maximum length is NN based on the encoding table of the p parameter. Make sure the customer information data adheres to this specification.

!Err: InvCharInCustInfo

Symbologies: Australia Post 4 State 52-FF-MET and 67-FF-MET

Cause The customer information section of the 52-FF-MET and 67-FF-MET bar codes includes a predefined set of characters. The customer information defined in the string and supplied to the Bar Code Printing function, includes illegal characters.

Remedy Verify the customer information data, and make sure that there are no illegal characters.

!Err: Codablock size

Symbologies: Codablock

Cause The number of rows and columns indicated in the escape sequence do not leave enough room for data encoding.

Remedy Increase the size of the columns and rows so that the encoded data fits properly. (See "Codablock F," on p. 3-31.)

Troubleshooting

If you have trouble printing bar codes, we recommend the following remedies.

Printing Problems

The message "MEMORY OVERFLOW" appears.

Cause The Bar Code Printing function is not enabled, resulting in the creation of oversized fonts that use up the memory.

Remedy Set the BarDIMM menu to 'Enable', and print the data again.

Bar code data is printed as text.

Cause The BarDIMM menu is set to 'Disable'.

Remedy Set the BarDIMM menu to 'Enable' , and print the data again.

Bar codes are not readable.

Cause 1 The bar code data was not created properly.

Remedy 1 Make sure to use the correct format for the type of bar code that you want to make.

Cause 2 The bar code reader is not set to read the symbologies you are printing.

Remedy 2 Make sure that the bar code reader is compatible with the symbologies you are trying to print.

Bar code printing does not stop.

Cause The character symbol set command has not been sent.

Remedy Make sure to send the character symbol command, as well as any other font selection sequence after the bar code data (e.g., <Esc>(10U for PC-850).

The layout for the German 25 Postal bar code is not correct.

Cause The size and text of the bar code are not printed as expected.

Remedy To print the German 25 Postal bar code in the correct layout, use 124 for the p parameter and 300 for the h parameter. For example, <Esc>(s124p300h24642T.

An error message is displayed with the 2 of 5 Interleaved bar code.

Cause The number of encoded digits is not even, in multiples of two.

Remedy If you are using a checksum, you must send an odd number of digits. (The calculated checksum will add one character, making the total data length an even number.)

Narrow bar codes are not readable.

Cause In all laser printers, thin lines do not have a perfectly clean edge because the toner particle shape is not square. This results in narrow black bars that are wider than the blank spaces of the same width.

Remedy Fine tune the bar width using the b and s parameters to reduce the horizontal width of the thin black bars, or use the s parameter to widen the thin white bars (blank spaces).

Bar codes on the very top of the page are not printed correctly.

Cause As bar codes are printed at the current cursor position from the baseline to the top of the page, they may not be printed correctly (i.e., wrong height or caption text in the middle of the bar code).

Remedy Make sure that you set the cursor in a vertical position, compatible with the bar code height.

The 39 bar code is much longer than it should be.

Cause The bar code selection sequence was sent before you sent the space characters to position the bar code. As a result, the spaces are separate from the bar code data, and the bar code is much wider than expected (usually across the page).

Remedy When you position the cursor horizontally using blank spaces to position the bar code in the right place, you must send the bar code selection sequence after sending the space characters to move it horizontally.

If you can only send the bar code selection sequence at the beginning of the line, use the special 39 symbology specifications with no starting spaces (IDs 24670 and 24671). This symbology does not include the starting spaces in the bar code data.

A bar code calling sequence is inserted in a PCL5 macro.

Cause A bar code calling sequence has been inserted into a PCL5 macro without the proper bar code data.

Remedy Insert the bar code calling sequence with the bar code data into the PCL macro. If an application needs to send the same bar code multiple times, it can include the calling sequence with the PCL macro, and invoke it in the required number of occurrences.

Appendix

5

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