

Using the BarDIMM™
Barcodes Printing System
for MS-Windows™ and ERPs

BarDIMM™ V3.1C

Patent pending



Installation and
Programmer's Guide
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JetCAPS Europe S.A.

25 bis, Avenue Pierre Grenier

F-92517 BOULOGNE Cedex

FRANCE

WEB: <http://www.jetcapslabs.com>

Fax: +33 (0) 1-46-94-00-83

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Table of contents

1- INTRODUCTION	7
2- BAR CODE READABILITY	8
WHEN PRINTING WITH A NEW TONER CARTRIDGE	8
PRINT DENSITY SETTINGS.....	8
3- INSTALLING THE DIMM BOARD.....	9
PROTECTING THE DIMM BOARD.....	9
4- TESTING THE BARDIMM	10
5- PRESENTATION.....	11
6- HOW BARDIMM WORKS.....	11
SINCE BARDIMM 1.8E: MODIFIED ID FOR CODE 128C.....	13
7- FREESCAPE FEATURE.....	14
8- OCR-A AND OCR-B FONTS.....	15
9- HOW TO USE BARDIMM	15
10- FONT-LIKE PARAMETERS DESCRIPTION.....	16
P PARAMETER ESC(S#P.....	17
H PARAMETER ESC(S#H.....	18
V PARAMETER ESC(S#V.....	18
B PARAMETER ESC(S#1,#2,#3,#4B	19
S PARAMETER ESC(S#1,#2,#3,#4S	20
15- CODE 128 CONTROL CODES	22
16- MS-WINDOWS SUPPORT	23
17- SAP R/3 SUPPORT	24
18- GENERIC ERP SUPPORT	24
19- PCL ESCAPE SEQUENCES EXAMPLES	25
20- DEFAULT PARAMETERS	26
21- BAR CODE FORMATS CHARACTERISTICS : SIZE.....	27
UPC-E (UPC-E0 AND UPC-E1).....	28
EAN-8.....	28
EAN-13	29
CODE 39	29
FRENCH POSTAL 39 BAR CODE (FRANCE ONLY):.....	29
EXTENDED 39	30
INTERLEAVED 2 OF 5 (ALSO NAMED 25 INTERLEAVED).....	30

INDUSTRIAL AND MATRIX 2 OF 5	30
EAN-128 AND UCC-128	30
GERMAN 25 POSTAL BARCODE (GERMANY ONLY).....	31
CODABAR/MONARCH	31
EXTENDED CODE 93	31
MSI PLESSEY.....	31
ZIP+4 POSTNET (USA ONLY))	31
USPS TRAY BARCODE (USA ONLY).....	31
USPS 'ZEBRA' BARCODE (USA ONLY).....	32
USPS SACK BARCODE (USA ONLY).....	32
SINGAPORE 4 STATE BARCODE	32
UK ROYAL MAIL 4 STATE CUSTOMER BARCODE	32
AUSTRALIA POST 4 STATE BARCODES.....	33
UPS MAXICODE™	34
PDF-417	37
DATA MATRIX™	37
AZTEC CODE™	38
CODABLOCK F	38
QRCODE™	38
23- EURO CURRENCY SYMBOL AND ADDITIONAL FONTS	40
EURO AND OTHER CURRENCY SYMBOLS	40
MANUFACTURING AND SAFETY SYMBOLS.....	40
ELECTRONICS AND SAFETY SYMBOLS	41
24- ODETTE TRANSPORT LABEL MACROS	42
! <i>Err: Char=nn</i>	43
! <i>Err: Odd</i>	43
! <i>Err: Length</i>	43
! <i>Err: NonZero and !Err: InvVal</i>	43
! <i>Err: R/A/B</i>	43
! <i>Err: Fmt=00000000</i>	44
! <i>Err: Fmt=00000000,<CustInfo></i>	44
! <i>Err: CustInfo: nonDigit</i>	44
! <i>Err: CustInfo>NN (where NN is a value)</i>	44
! <i>Err: InvCharInCustInfo</i>	44
! <i>Err: Codablock size</i>	44
26- TROUBLESHOOTING	45

1- Introduction

Barcode 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-process tracking, distribution tracking, and other materiel management) is the most common type of data stored in bar code systems.

The BarDIMM boards are intelligent DIMM modules adding sophisticated BARCODE printing capabilities to Hewlett-Packard corporate. With BarDIMM in the HP LaserJet printer, it never has been so easy and so fast to print professional barcodes.

The full list of supported printers with minimum printer firmware requirement is available on <http://www.jetcapslabs.com>

A special version of BARDIMM is available for some discontinued LaserJet like LaserJet series 4, 5 or 6. That product name is BarSIMM 1.9.

Please contact your distributor for more information or check all information on our web site <http://www.jetcapslabs.com>

- **The LJ 2200, 1200, 3200 and 33X0 only supports BARDIMM in version 2.5 (1D Barcodes only).**

BarDIMM 3.0 supports complex high-density two-dimensional barcodes like PDF-417 and UPS MaxiCode, Data Matrix, QRCode, Aztec and Codablock. Two dimension means the reading is performed both horizontally and vertically as information is encoded in both directions. Those barcodes are then designated as “ 2D Barcodes ”, and non-2D barcodes are called “ 1D Barcodes ”. Some 2D barcodes can encode up to dozen of kilobytes of data, with features like data compression, macro-barcodes, encryption and error correction algorithms.

BarDIMM includes the standard HP Barcode & More cartridge/SIMM fonts. As a result, BarDIMM can also print OCR-A and OCR-B characters and is then backward compatible with older applications as well as HP Barcode&More printer drivers.

BarDIMM 3.0 now includes a complete set of fully scalable symbols:

- The EURO symbol € (the European currency symbol)
- Safety symbols, electronic and manufacturing symbols to include in labels printing

BarDIMM also features the Freescape system. With Freescape, the Escape code can have a synonym, a user-defined Escape Code or Alternate Escape Code (AEC). That character acts exactly like the standard Escape Code when found at the beginning of a regular PCL sequence, and can be a printable character. This functionality does allow all systems to use PCL and BarDIMM, even if they cannot send binary data to a printer.

2- Bar Code Readability

The special consideration discussed in this section may pertain to all the bar codes or, in some cases, to a specific bar code generated by the BarDIMM product.

When Printing With a New Toner Cartridge

On some printers, a slight degradation of image quality may occur immediately after replacing the EP cartridge; To assure that the bar code images are printed with sufficient quality for later reading with electronic devices, follow these instructions;

1. Be certain that the storage and care instruction that are supported with the EP cartridge were followed before installing the new EP cartridge in your printer.
2. Be sure to change the EP cartridge when necessary. Carefully follow the installation instructions (especially those relating to proper agitation of the cartridge) before you install the EP cartridge.

Print Density Settings

When printing bar codes, it is recommended that you start at the mid-range of the printer density dial or front panel value (3). Run several bar code samples and check them for readability. Then, if necessary, adjust the printer's density setting accordingly.

The color and type of paper that you are using can also affect the readability of printed bar codes. You should closely monitor this type of printing.

The fonts and bar code algorithms available in the BarDIMM product have been found to be highly readable.

HOWEVER:

JETCAPS LABS DOES NOT WARRANT AND HAS NOT TESTED THAT THE BAR CODES, OCR-A AND OCR-B CONTAINED OR GENERATED BY BARDIMM ARE READABLE BY ALL READING DEVICES.

JETCAPS LABS RECOMMENDS THAT YOU TEST THE READ/WRITE COMPATIBILITY OF THESE BARCODES AND FONTS BEFORE IMPLEMENTING APPLICATIONS.

3- Installing the DIMM Board

Please verify that the BarDIMM you are installing is compatible with your printer model. Your HP LaserJet has three or four DIMM (Dual Inline Memory Module) slots. The BarDIMM DIMM can be installed in any of these slots. Because the slots are close together, we recommend installing them from right to left or top to down (depending on the printer), starting with the slot 1 and ending with slot 3 or 4.

Protecting the DIMM Board

DIMM boards can easily be damaged by small amounts of static electricity. To remove any static electricity from your body touch the surface of the antistatic package before removing the board from its package. When handling the board, frequently touch bare metal on the printer or the antistatic bag or wear an antistatic wrist strap.

Avoid moving around the work area to prevent static electricity to be generated.

Do not touch the BarDIMM components, and handle the DIMM carefully at all times.

CAUTION:

When removing a board from the antistatic bag, do not touch the metal traces on the board.

WARNING:

Hazardous voltages are present in the printer. Never remove any access cover or work near exposed electrical parts while power is connected.

BarDIMM has to be installed exactly like a RAM SIMM/DIMM board. Please refer to your HP LaserJet user manual for the SIMM/DIMM modules installation procedure.

If your printer is equipped with a control panel, once the BarDIMM is installed you must configure the FREESCAPE character as detailed in Chapter 7.

NOTE:

Your BarDIMM comes with a special sticker in the box (in English, German, French or Dutch). This sticker must be **applied on the printer, next to the power switch**. This makes sure that maintenance will move the BarDIMM to a replacement unit, should your printer be replaced.

Information 
for maintenance
BarDIMM installed
www.bardimm.com

4- Testing the BarDIMM

There are two different features built in the BarDIMM: fonts and firmware. They work totally independently, so you may have to test them both.

- **Fonts:** The BarDIMM contains the HP Barcode&More fonts. From the front panel of the printer (if there is any), generate a PCL Font List. If **OCR-B** or **[23590]** font names appear in the font list, the BarDIMM fonts are recognized by the printer. This indicates the hardware DIMM is recognized by the printer, but does not mean firmware is recognized.

- **Firmware:** The two following operations must be performed.

* From the front panel of the printer, generate a Printer Auto Test. A page is printed, on which the list of “Personalities” appears.

- **LJ Series 4000, 5000, 8000 (FW<4.48), 2100:** A date next to “PCL” should have been updated to a recent date (maximum 18 months before purchase date of the BarDIMM). Removing the SIM or DIMM sets the date to an older value.
- **Other printers:** the BarDIMM application is listed on the left part of the page

* A test file is provided with the BarDIMM. Send it to the printer to test if BarDIMM is working correctly. If a MEMORY OVERFLOW error message appear on the front panel (or if error LEDs blink on some printers), or if text replaces the barcodes, the BarDIMM is not recognized and the printer can get out of memory trying to map barcode parameters to the default text font.

- **If both tests are successful, the BarDIMM is recognized by the HP LaserJet and operates correctly.**
- **If those two tests fail, verify if the BarDIMM you have purchased is compatible with your printer (a label on the board should indicate the compatibility). Please then contact your distributor (please read below)**

There is one version of BarDIMM for every HP LaserJet printer model, and the BarDIMM board is not cross-printers compatible. Make sure you have specified the model with your BarDIMM order. LaserJet models are not compatibles together, ie **a BarDIMM for LJ4100 can not work in a LaserJet 9000mfp.**

One other possibility is that your printer was manufactured after your version of BarDIMM (for LJ series 4000, 5000, 8000, 2100). In that case, and if you own such a model of LaserJet, please fax a printer auto-test to your distributor if your printer is very recent (less than 3 months) and if the BarDIMM (compatible with that printer model) does not work. Your distributor can then update your BarDIMM to fix the problem.

5- Presentation

The BarDIMM chip is an intelligent DIMM adding sophisticated BARCODE printing capabilities to Hewlett-Packard corporate. The only real fonts it includes are the fonts of the now discontinued "Barcode&More" font cartridge from HP, which have been included for backward compatibility purpose, the scalable logos and the scalable OCR-B (ASCII set) as stand-alone font and font-for-barcode-text. BarDIMM also features the unique FREESCAPE capability.

BarDIMM supports more than 50 bar code formats (symbolologies) in its version 3.0, from the most passive to the most complex system (2D, interleaved, triple checksum, etc...). Each of these formats can be declined in any height from 1/254 inch to 13 inches (1mm to 33 cm) with 1/72 inch increment, bar widths can be defined in 1/600 inch units, code value can be printed as text together with code in many different embeddings with 20 different scalable fonts. As a result, you can generate million different kind of bar code formats from BarDIMM!

BarDIMM is not made of scalable fonts. It is hooked to font calls within the LaserJet PCL5 interpreter. Typeface numbers from 24580 to 24900 activate the BarDIMM intelligence. All data mapped to one of those special fonts is analyzed and converted into bar code directly by the firmware.

For backward compatibility, BarDIMM also contains the HP Barcode & More bitmap barcode fonts supported by many applications.

NOTE: In this manual, the escape code is indicated as <Esc>. Those five characters must not be entered as individual symbols, but must be replace with the unique character of ASCII value 27.

6- How BarDIMM works

1. A typeface in the BarDIMM range (24580-24900) is activated with a classical combined PCL font call sequence: <Esc>(s#p#h#v#b#s#T where # are parameters.
2. The end of bar code data is determined according to the bar code type:
 - * Bar code data is numeric only: ended by space/CR/LF/FF/Escape code.
 - * Bar code data is alphanumeric: ended by CR/LF/FF/Escape code.

Transparent Print Data Mode

Some bar code formats support full 128 character set, from ASCII code 0 to ASCII code 127, or full binary data (ASCII 0 to 255): Bar codes Extended 39, Extended 93, 128A, PDF417, 128auto, MaxiCode, EAN/UCC128, Data Matrix, Aztec, Codablock, QRcode. If you want to print special characters (ASCII code < 32) with those bar codes, a "Transparent Print Data" PCL sequence (<Esc>&p#X, where <Esc> is replaced by ASCII char 27 decimal or by '~' and where # is replaced with the number of data bytes that follow until the next escape sequence) must follow immediately the font selection sequence. This is the only way to know how many characters have to be printed as bar codes. Please analyze the sample Code/EAN/UCC 128 test files for more information.

3. Data is analyzed to verify it fits in the bar code specs:
 - * Correct data size (25 must have an even size, EAN 8/13 and UPC have fixed lengths etc...).
 - * Valid data: some systems, like UPC-E, accept only specially structured data.
 - * Data only Numeric or Alphanumeric, allowed characters.

If data is invalid (incorrect size or invalid characters), a X is printed on bars and an error message describing the problem is systematically added below the bars, preventing the user from blindly printing invalid bar codes.

4. Some formats require what is called a checksum. A checksum is a value, result of a complex calculation on the code data. That value is added to the end of the data and used by the code reader to proof the reading. BarDIMM calculates automatically the checksum(s) of bar codes that need it. Bar codes can have up to two checksums (MSI Plessey, UCC128). If the checksum was provided with fixed length data (EAN 8/13, UPC) it is ignored.
5. BarDIMM generates the bar code, according to parameters in the font-like PCL sequence. For BarDIMM bar codes, PCL font parameters are don't have the standard meaning (besides the V and T parameter). The **T** parameter selects the Bar code format.

As BarDIMM is algorithms-only, the user can apply the scaling independently in the X and Y axis for the 1D barcodes. In the past with standard scalable fonts, bigger size meant larger bars, resulting in a too-wide and unreadable code, and small size meant thinner bars resulting also in unreadable codes. Some barcodes are standardized and can not be resized. Some 2D barcodes can be resized by columns/rows or by defining a ratio.

The bar code can be of any height, in the 3 to 960 point size range (1 point size = 1/72 inch).

The current cursor position is the location of the bottom left corner of the leftmost black bar, whatever bar code text parameter is provided.

Every bar code system has default options, activated when parameters are not provided. The user does not need to provide all parameters. As an example, if the height is omitted, the default size is used. Every code has its specific default values, based on international standards.

6. If required, BarDIMM prints the code value as centered text with the bars, either under, half-embedded in, full embedded in, or above the bars. Checksum and flag characters are automatically placed in the right place for some systems (EAN 8/13 and UPC), according to the international standards. Automatic sizing limits the embedded text point size to 15 (no limit for text above or under bar code).
 7. After bar code printing completion, cursor is set after the bottom right corner of the rightmost black bar.
 8. If another bar code then needs to be printed, just locate the cursor to a new position and send the barcode data. The Bar code font-like PCL sequence does not need to be sent again.
-

Since BarDIMM 1.8E: modified ID for Code 128C

BarDIMM 1.8E and next versions have a minor modification compared to previous versions. Code 128C used to have an ID of 24703. Due to a new font numbering system starting with the HP LaserJet 4000, Code 128C needed to be moved from ID 24703 to ID 24704. The obsolete ID (24703) will not be supported on HP LaserJet printers released after September 1997 and starting with the HP LaserJet 4000. The obsolete ID will still be supported on printers released before October 1997, for backward compatibility purpose. If you are already using the BarDIMM with Code 128C, we recommend you change it for the Code 128 Autoswitch ID. The resulting barcodes will be the same (Code 128C), as BarDIMM will detect data for Code 128C.

If you are not using the old Code 128C barcode ID, that modification will not affect your application.

7- FREESCAPE feature

PCL codes always begin with the non-printable Escape code (Hexa: 1B, Dec: 27). Some systems can not use or send binary data to a device. Binary means any character other than a letter, punctuation or a digit. Such systems include Mainframes where printers are connected to terminals, and AS/400. That can be a problem to use the HP PCL language, and to use Barcodes. With the FREESCAPE feature, the Escape code has a synonym, a user-defined Escape Code or Alternate Escape Code (AEC). That character acts exactly like the standard Escape Code when found at the beginning of a regular PCL sequence. Default value for the AEC is the TILDA '~'. Freescape is smart enough to ignore the EAC if it is found as pure data. You can mix regular Escape Codes and Alternate Escape Codes. The AEC can be one of 10 characters.

Note: The freescape Escape sequence setting is only valid for the current job.

There is a new PCL sequence to change the Alternate Escape code:

<Esc or AEC>#J**

Where # is the ASCII decimal value of the new AEC: 34 (‘’), 35 (#), 36 (\$), 47 (/), 92 (\), 63 (?), 123 ({}), 125 (}), 124 (|), 126 (~) and 27. *Indicating 27 disables Freescape.*

Freescape parameters on front panel menu

The Freescape feature can be activated/disabled/parametered for all jobs on the front panel of the printer equipped with BarDIMM (on printer with a front panel with display and except on LJ4000, 5000 and 8000 with FW<4.48).

Browse through the menu options until **BAR MICR MENU** appears.

To activate/deactivate Freescape:


Press the **Item**  key until **FREESCAPE=ON** or **FREESCAPE=OFF** appears

Press the **Value** **+** key to toggle between **ON** and **OFF**

Press the **Select** key to validate the choice

When Freescape is deactivated, only the regular Escape code (Hexa: 1B, Dec: 27) can be used to start PCL commands.

To change the Freescape AEC character (should be performed at installation time):

Press the **Item**  key until **AEC CHAR=** appears

Press the **Value** **+** and **-** key to toggle between possible AEC. By default, pick TILDA

Press the **Select** key to validate the choice

Note: The choice will be valid for the next incoming print job.

8- OCR-A and OCR-B fonts

PCL Escape sequences to call those fixed-size fonts:

OCR-A: <Esc>(00<Esc>(sp10h12v**sb**104T

OCR-B: <Esc>(10<Esc>(sp10h12v**sb**110T

	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	{		}		

This table shows the OCR-A character set.

The “Barcode&More” OCR-B font character table is the same.

9- How to use BarDIMM

Barcodes are activated using a font-like escape sequence, generated:

* from specific developments, where developers write code that generate PCL code with BarDIMM functionality,

* from standard ERP software, which feature a BarDIMM driver (like SAP R/3, Oracle, Peoplesoft, BAAN). Please read the SAP R/3 and Windows chapters in that manual for more information. OSS notes are available from the www.jetcapslabs.com WEB site.

* from MS Windows. Please read the Windows support chapter later in that manual.

* please make sure you read carefully the chapter “ Bar Code Formats Characteristics: Usage and Format ” at the end of the manual to understand fully the particularities of the barcode you need to generate.

10- FONT-LIKE PARAMETERS DESCRIPTION

T parameter Esc(#T (Typeface): Controls what bar code system to use

24600,	UPC-A	24620,	EAN/JAN-8
24601,	UPC-A +2	24621,	EAN/JAN-8 +2
24602,	UPC-A +5	24622,	EAN/JAN-8 +5
24610,	UPC-E (UPC-E0 & UPC-E1)	24630,	EAN/JAN-13
24611,	UPC-E +2	24631,	EAN/JAN-13 +2
24612,	UPC-E +5	24632,	EAN/JAN-13 +5
24640,	25 (2 of 5) interleaved	24650,	25 industrial
24641,	25 interleaved + CHK	24651,	25 indust + CHK
24642,	German Postal 25 Leitcode 13	24660,	25 matrix
24643,	German Postal 25 Leitcode 11	24661,	25 matrix + CHK
24670,	39 (3 of 9)	24700,	128 autoswitch
24671,	39 + CHK	24701,	128 A
24672,	39 (3 of 9) encode space before data	24702,	128 B
24673,	39 + CHK encode space before data	24704,	128 C
24680,	39 extended	24703,	128 C (<i>obsolete</i>)
24681,	39 extended + CHK	24710,	UCC-128
24675,	Danish PTT 39 barcode	24720,	EAN-128
24676	French Postal 39 A/R		
24690,	93	24770,	ZIP+4 POSTNET 5
24691,	93 extended	24771,	ZIP+4 POSTNET 9
		24772,	ZIP+4 POSTNET 11
24644,	USPS 25, 11 digits Tray Label barcode	23591,	USPS ZEBRA
24645,	USPS 25, 8 digits Sack Label barcode		
24750,	CODABAR	24760,	MSI
24751,	CODABAR +CHKmod16	24761,	MSI+CHK10
		24762,	MSI+CHK10 +CHK10
24780,	Singapore 4 State	24763,	MSI+CHK11+CHK10
24785,	Australia 4 State 37-CUST		
24786,	Australia 4 State 52-FF-MET	24800,	UPS MaxiCode™*
24787,	Australia 4 State 67-FF-MET	24820,	Data Matrix™™*
24790,	Royal Mail 4 state Customer code	24830,	Aztec*
24795,	Netherlands KIX postal barcode	24840,	Codablock F*
		24850,	PDF-417*
		24860,	QRCode™ Model 1*
24899,	OMR for folding/inserting/sealing systems	24861,	QRCode™ Model 2*

Note: Barcodes in bold are only available in version 2.5 and up.
 Barcodes listed with * are only available in version 3.0 and up.
PLEASE READ THE BARCODE INFORMATION CHAPTER

p parameter Esc(s#p

1-D BARCODES:

Control if/how human-readable (caption) text is printed with bar code

- 0 Use default value
- 1 Don't print human readable text
- 2 Print human readable text embedded
- 3 Print human readable text half-embedded
- 4 Print human readable text under code
- 5 Print human readable text above code

Specials:

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

Example: text under code for French postal barcode : 24p

AUSTRALIA POST 4STATES BARCODE:

- 0 Use N symbol set for Customer Information (digits only)
- 1 Use C symbol set for Customer Information (alphanumeric)

2-D BARCODES:

- PDF417: 0 to 8: defines the ECC (error correction) level
1000 to 1400: defines the ECC level based on the size of the codeword relative to the data size, in percent (0 to 400). The matching ECC level will automatically be calculated.
- Aztec: 0: Default ECC (error correction) level of 23% + 3 Codewords
1 to 99: defines the ECC (error correction) level in %
101 to 104 = #layers (+100) in Compact format
201 to 232 = #layers (+200) in Full-Range format
300 = Aztec "Rune" format
- QRCode: 0: Default ECC (error correction) level of 5% (M)
1: Low ECC/ High Density level (L)
2: Standard ECC level (M)
3: High reliability/ECC level (Q)
4: Ultra High reliability/ECC level (H)

OMR:

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

h parameter Esc(s#h)

1-D BARCODES:

Controls what font is used for the human-readable (caption) text

Format: CBA, numeric value, where

A: Typeface	0 Use Courier to print text (default) 1 Use Letter Gothic to print text 2 Use Univers to print text 3 Use Univers Condensed to print text 4 Use CG-Times to print text 5 Use OCR-B to print text (great with UPC/EAN)
B: Size	0 Use automatic font size 1 Reserved for future use
C: Style	0 Use Default (Bold) 1 Use Regular 2 Use Italics 3 Use Bold 4 Use Bold Italic

Example: text in Univers Bold Italic, automatic size: 402h

v parameter Esc(s#v)

1-D BARCODES:

Short bar height in 1/60th of inch (0.42mm)

Minimum sizes apply.

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

2-D BARCODES:

QRCode, Aztec: 0	Normal
1	Reverse Video

Codablock: barcode size

#1, single line bar height in 1/60th of inch (0.42mm), same unit as fonts

#2, Maximum number of rows for the Codablock symbol

#3, Maximum number of columns for the Codablock symbol

Example: Lines pointsize 20, 5 rows/20: 20,8,10v

OMR: OMR mark length in 1/60th of inch (0.42mm)

Example: 1 inch long OMR mark: 60v

b parameter Esc(s#1,#2,#3,#4b

1-D BARCODES:

Bar Widths

- #1, bar width, first (thin) width in dots (1/600 inch)
- #2, bar width, second width in dots (1/600 inch)
- #3, bar width, third width in dots (1/600 inch)
- #4, bar width, fourth width in dots (1/600 inch)

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

2-D BARCODES:

PDF-417: Symbol format parameters

- #1, Maximum number of rows for the PDF symbol
- #2, Maximum number of columns for the PDF symbol
- #3, =1 #1 and #2 are the mandatory size for the PDF symbol
=0 or not specified: #1 and #2 are maximum size (default)
- #4, =1 The PDF-417 symbol is truncated on its right side
=0 The PDF-417 symbol is not truncated (default)

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

Data Matrix, QRCode: Symbol format parameters

- #1, Small module height in dots (1/600 inch)

Aztec: Symbol format parameters

- #1 Small module height in dots (1/600 inch)
- #2 Bar undercut parameter. Value: 0 to (#1)-1 dots, default = 0

Codablock: B parameters like for 1D Barcodes

OMR: OMR mark thickness in dots (1/600 inch)

- #1, regular mark thickness, in dots (1/600 inch)
- #2 heavy mark thickness, in dots (1/600 inch)

Example: 1/010 inch for thin mark and 1/020 inch for thick mark: 6,12b

s parameter Esc(s#1,#2,#3,#4s

1-D BARCODES:

Space Widths

- #1, space width, first (thin) width in dots (1/600 inch)
- #2, space width, second width in dots (1/600 inch)
- #3, space width, third width in dots (1/600 inch)
- #4, space width, fourth width in dots (1/600 inch)

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. It allows to send shorter PCL barcoding commands to the printer.

2-D BARCODES:

PDF-417: Symbol format parameters

- #1, Symbol black/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 for 2/3)
- #3, Y parameter for the symbol X/Y size ratio (default: 3 for 2/3)
- #4, Symbol module width (1 to 100). Unit=1/100 inch (default value=10).

Example: square PDF, minimum module width, half module size : 1,1,1,5s

QRCode:

#1: Symbol set for input data

- 0 Use default (Automatic: JIS/ShiftJIS)
- 1 Numeric (0to9)
- 2 Alphanumeric (0to9, uppercase A to Z, space \$%*+-. /:)
- 3 Binary 8-bits/byte 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 JIS X0208)

Example: QRCode, alphanumeric data: 2s

OMR: OMR mark spacing in dots (1/600 inch). Default value=85 (1/7 inch)

Notes:

- Please read chapter 21 to 23 for full information on barcode symbologies.
- For Code 128 and EAN128, please read chapter 15 for information on FNC codes.
- Values cannot have decimals. ie, "2.5" is invalid
- Barcode parameters must be combined in a unique PCL font escape sequence ending with the T parameter.

e.g.: <ESC>(s4p305h24v7,21s7,21b24670T

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

e.g.: <ESC>(s6p1,,,5s24850T

15- Code 128 Control Codes

Code 128 has five non-data special control codes, called FUNCTION CODES, and 2 control codes to switch from one 128 set (A, B or C) to another one. The switching control codes are used by BarDIMM to force one 128 set. As an example, the string "123456" can be printed with both sets A, B and C. Inserting a character with ASCII value = 134 at the beginning of the string will force BarDIMM to use the set B of code 128.

Note that both Code 128 Autoswitch and EAN 128 analyze the data and optimize the barcode length by switching automatically between sets A, B and C. EAN128 and UCC-128 already include the FNC1 code as the first character: you should not send it with the data.

Special control codes are inserted by passing the following special decimal characters in the bar code:

128 = SHIFT
129 = FNC 1
130 = FNC 2
131 = FNC 3
132 = FNC 4
133 = CODE A
134 = CODE B
135 = CODE C

16- MS-Windows Support

You may use BarDIMM 3.0 functionality from your word processor, spreadsheet or other Windows 3.1/95/98/ME/NT/XP based applications using BarDIMM special TrueType fonts generator: BDTTGEN.

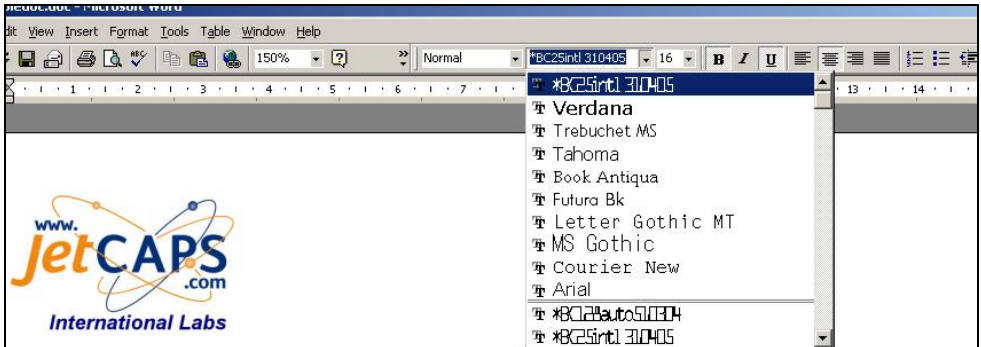
BDTTGEN is available at no cost from our WEB site:

<http://www.jetcapslabs.com>

BDTTGEN generates special Windows TrueType fonts that fit your Windows barcode printing needs. BDTTGEN also installs and manages those TrueType fonts in your system.

Those fonts just need to be used in documents to generate at print time high resolution and readability barcodes. Barcodes are not visible on the screen, as data might need to be visually verified before printing.

A special BarDIMM TrueType fonts also allow you to activate PCL macros in the printer equipped with BarDIMM.



Document with barcodes generated by BarDIMM™.

12534234J	52342E	6345T	23454C
-----------	--------	-------	--------

For free-text 2D Barcodes (PDF417, QRCode, DataMatrix, Aztec), encoding a paragraph is performed by creating a text box (Insert/Text box) and to assign the 2D barcode TT font to the full text in the box. That Scheme can also be used to put barcodes anywhere on the page, independently from other texts.

Note that alphanumerical barcode data cannot start with a space/blank.

Please read the BDTTGEN manual for more information on all capabilities.

17- SAP R/3 Support

BarDIMM functionality is supported standard by the SAP R/3 software.

SAP OSS notes are available from the <http://www.jetcapslabs.com> web site.

- OSS note #5196 lists standard R/3 barcode names and supported device types for printing barcodes
- PCL-5 commands for JetCAPS BarDIMM are built into the HP device types by SAP
- Modifications are only required for special Barcode types and sizes
- OSS note #45643 lists PCL-5 command details for barcode attribute selection
- PCL-5 commands are maintained as “ Print Controls ” in SPAD
- SE73 transaction lists barcode names and print-controls for every device type
- Barcode on: Print-control SBPxx
- Barcode off (regular font): SBSxx
- A test text is built into R/3: SO10, SAPSCRIPT-BARCODETEST (client 000)
- The SAP print control for OCR-A is SF400 and SF500 for OCR-B

Note: in the early release of the device type, there were a few errors in the escape sequences. It is then recommended to verify the escape sequence syntax in R/3.

SAP has pre-defined a list of size and parameters for barcodes. If those don't match your needs, we recommend you purchase the AFE SAPSCRIPT toolbox for SAP R/3 (available from your local JetCAPS partner, see <http://www.jetcaps.com>) or modify the controls (copy the controls into the user Z-environment and modify them based on your needs).

Note: all print controls are defined in R/3 using Hexadecimal values (1B for <Esc>...).

For more information on using BarDIMM with SAP R/3, please consult the www.jetcapslabs.com web site, FAQ section.

18- Generic ERP Support

Other ERPs (Oracle, JD Edwards, BAAN, Peoplesoft) can use BarDIMM 3.0 features by including BarDIMM Escape sequences in output scripts (using the Freescape char if necessary), or by using the BarDIMM TrueType fonts for Windows-based applications.

19- PCL Escape Sequences Examples

A valid PCL escape sequence to select a barcode is like the following:

```
<Esc>(s4p102h40v10,30b10,30s24670T
```

24670T	Symbology: code 39, not encoding spaces before/after data
4p	Readable text below bars, without start/stop chars(*)
102h	Caption text in Univers Regular
40v	Bars height: 40 points $40/72=0.555$ inches $40*2.54/72=1.41$ cm
10,30b	Thin bars are 10 dots wide, thick bars are 30 dots wide
10,30s	Thin spaces are 10 dots wide, thick spaces are 30 dots wide

Barcode Rotation:

To rotate a barcode, you can use regular PCL rotation commands. It is recommended you save the cursor position before activating the barcode, and restore that position after the barcode. Here is an example (sequences should be entered without carriage return):

<Esc>&fS	Save cursor position
<Esc>&a1000h1000V	Cursor positioning
<Esc>&a90P	90° rotation
<Esc>(s4p102h40v10,30b10,30s24670T	Select Barcode
JETCAPSBARDIMM	Barcode Data
<Esc>(10U<Esc>(sp10hsb4099T	Switch back to Courier 10cpi font
<Esc>&aP	No more rotation
<Esc>&lf1S	Restore saved cursor position

Other Information

Permanent and secondary fonts switching can be used with barcode fonts. It is highly recommended that a text font be used as primary font, and barcode font as secondary font. (please refer to your PCL developer's guide for all information on primary and secondary fonts).

Complete sequences samples are available at www.jetcapslabs.com, in the FAQ section. You will also find in that FAQ some links to PCL training guides.

Warning:

If barcodes are generated using a font-like sequence, they are still not PCL fonts. Therefore, some limitation on font sequences apply:

- No font ID can be linked to a barcode
- BarDIMM barcodes cannot be used from HPGL2, Postscript or PCL6 languages

20- Default Parameters

Barcode Name	Height	TextFlag	Bar width	Bar width	Bar width	Bar width
			1	2	3	4
UPC-A	74	3	8	16	24	32
UPC-E	29	3	8	16	24	32
EAN-8	50	3	8	16	24	32
EAN-13	62	3	8	16	24	32
CODE 2/5	29	1	6	18	-	-
CODE 39	29	1	6	18	-	-
39 EXT	29	1	6	18	-	-
CODE 93	29	1	6	18	-	-
93 EXT	29	1	6	18	-	-
CODE 128	29	1	6	12	18	24
EAN 128	29	1	6	12	18	24
UCC 128	29	105	6	12	18	24
CODABAR	29	1	6	12	-	-
MSI PLESSEY	29	1	6	12	-	-
ZIP+4	9*	1*	-	-	-	-
USPS Tray Label	50.4	4	9*	27*	-	-
USPS Sack Label	50.4	1	9*	27*	-	-
German Postal 25	72	124	10	30	-	-
French Postal 39	36*	124*	7*	21*	-	-
Singapore 4 State	13.5*	1*	-	-	-	-
UK 4 State	13.5*	1*	-	-	-	-
Netherlands KIX	13.5*	1*	-	-	-	-
Australia 4 State	13.5*	N/A	-	-	-	-
MaxiCode	1x1 inch	N/A	N/A	N/A	N/A	N/A
PDF417	Auto	N/A	N/A	N/A	N/A	N/A
Data Matrix	Auto	N/A	N/A	N/A	N/A	N/A
QRCode 1/2	Auto	N/A	N/A	N/A	N/A	N/A
Aztec	Auto	N/A	N/A	N/A	N/A	N/A
Codablock	16	1	6	12	18	24
OMR marks	45 ^{sq}	N/A	7 ^{sq}	14 ^{sq}	-	-

*: Fixed values, can not be overridden by the user

sq: Special usage, might not correspond to column title

N/A: Not Applicable

Notes:

- Height corresponds to the h parameter, TextFlag to the p parameter and the four bar widths to the b parameter.
- Height is in 1/60th of inch, and bar widths are in 1/600th of inch.
- Spaces default values are the same as for bars.

21- Bar Code Formats Characteristics : Size

Barcode type	Characters encoded (1)	Input length * (2)	Char width Unit=thin bar width	Compression	Start/Stop (3) size (in thin bar)	Checksums * = optional
UPC-A	D	11	7	N	11	1
UPC-E	D	11 or 6	3,5 (for 11) 7 (for 6)	Y (for 11)	14,5 (for 11) 11 (for 6)	1 (for 11)
EAN/JAN-8	D	7	7	N	11	1
EAN/JAN-13	D	12	7	N	11	1
Supplemental 2 or 5 for EAN/UPC	D	2 or 5	9	N	13	0
CODE 39	DPU	1 to 99	16	N	32	*1
39 EXT	DPULC	1 to 99	DU:16 PLC:32	N	32	*1
Interleaved 2/5	D	2 to 100	9	Y	12	*1
Industrial 2/5	D	2 to 100	14	N	20	*1
Matrix 2/5	D	1 to 99	10	N	18	*1
EAN-128	DPUCL	1 to 99	data dependant	Y	>=35	1
Code 128 Auto	DPUCL	1 to 99	data dependant	Y	24	1
Code 128A	DPUC	1 to 99	11	N	24	1
Code 128B	DPUL	1 to 99	11	N	24	1
Code 128C	D	1 to 99	5,5	Y	24	1
UCC128	D	1 to 99	5,5	Y	51,5 (CHK)	2
Codabar/ Monarch	DP	1 to 99	12	N	0	*1
MSI PLESSEY	D	1 to 99	12	N	8	*1 or 2
CODE 93	DPU	1 to 99	9	N	19	2
93 EXT	DPULC	1 to 99	DU:9 PLC:18	N	19	2
ZIP+4	D	5,9 or 11	29/600 Inch	N	5,8/600 Inch	1
Singap. 4State	D	6	88/600 Inch	N	22/600 Inch	1
UK 4State	DU	7, 8 or 9	88/600 Inch	N	22/600 Inch	1
NL KIX	DU	5 to 12	88/600 Inch	N	22/600 Inch	0
AP 37-CUST	D	8	44/600 Inch	N	44/600 Inch	1
AP 52-FF-MET	DUL	8+8D/5UL	44/600 Inch	Y (N table)	44/600 Inch	1
AP 67-FF-MET	DUL	8+15D/10UL	44/600 Inch	Y (N table)	44/600 Inch	1
Singap. ZIP+4	D	5,9 or 11	29/600 Inch	N	5,8/600 Inch	1
MaxiCode	DPLUC	up to 100	N/A	Y	N/A	Codewords
PDF-417	DPLUC	up to 1848	N/A	Y	N/A	Codewords
Data Matrix	DPLUC	up to 2335	N/A	Y	N/A	Codewords
Codablock	DPLUC	up to 5366	data dependant	Y	46	1
Aztec	DPLUC	up to 3832	N/A	Y	N/A	Codewords
QRCode1/2	DPLUC	up to 7089	N/A	Y	N/A	Codewords

(1) D = Digits - P = Punctuation - L = Lower case letters - U = Upper case letters

C = Control characters (ASCII 0 to 31)

(2) Checksum character not counted

(3) Checksum size not counted except when indicated with " CHK "

N/A: Not applicable

22- Bar Code Formats Characteristics: Usage & format

There are many standard used to encode the information as bars. BarDIMM supports most of the Barcode standards:

UPC-A



Standard in the USA, for items sold to the public. UPC-A contains numeric data only and encodes a 12 digits number. The first one is the number system character, the next 5 digits are the supplier ID, the next 5 digits are the product number and the last one the required checksum character. You do not need to specify the checksum digit as BarDIMM recalculate it.

A digit is described by 2 bars and 2 spaces and its width is calculated as 7 thin bars. The number character is printed as text on the left side or the bar code and the checksum on the right side.

The system number can have the following values:

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

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



Ideal for small packages because of its data compression. It contains the same information as the UPC-A except that there are minimum 4 zeros, which are suppressed. It reduces the number of digits from 12 to 6.

BarDIMM accept the Zero Suppressed version of UPC-E in both versions of data, compressed and uncompressed. If data comes uncompressed, BarDIMM will perform automatically the compression.

A digit is described by 2 bars and 2 spaces and its width is calculated as 7 thin bars. Note that caption text below the barcode can be activated to verify checksum calculation.

EAN-8



Used in Europe for items sold to the public. EAN-8 contains numeric data only and encodes a 8 digits number. The first two are the country code, the next 5 digits are the product number and the last one required checksum character. You do not need to specify the checksum digit as BarDIMM recalculates it.

A digit is described by 2 bars and 2 spaces and its width is calculated as 7 thin bars.

EAN-13



Standard in Europe for items sold to the public, EAN-13 contains numeric data only and encodes 13 digits number. The first two are the country code, the next 6 digits are the supplier ID, the next 4 digits are the product number and the last one the required checksum character (that split varies from country to country). You do not need to specify the checksum digit as BarDIMM recalculated it. If the checksum is sent as a 13th digit, it is ignored and recalculated.

A digit is described by 2 bars and 2 spaces and its width is calculated as 7 thin bars. The number character is printed as text on the left side of the bar code and the checksum on the right side.

All the EAN and UPC codes can be followed with two or five digits of supplemental information. If the checksum is sent as the 13th digit, it is ignored and recalculated.

Code 39



The real name is “ 3 of 9 bar code ”. It is probably the most commonly used bar code as it encodes not only digits, but also upper-case letters and punctuation. Spaces are encoded as bars. Text is encoded between start and stop characters “ * ” which are

automatically generated by BarDIMM.

BarDIMM features two flavors of 39 barcode call : with and without starting blanks. IDs 24670 and 24671 do not encode the space characters starting and ending the data to barcode. IDs 24672 and 24673 do encode the starting spaces.

Danish Postal 39 bar code (Denmark only):



Special 39 code used on parcel labels for shipment through postal service in Denmark. Contains ten digits, a special checksum and ends with “ DK ”.

BarDIMM only needs the 10 digits.

French postal 39 bar code (France only):



RB 0123 4512 8FR

Special 39 code used on registered letters forms (“ Recommandés ”) in France. Starts with “ RA ” or “ RB ”, then contains 8 digits, a special checksum and ends with “ FR ”. BarDIMM only needs “ RA ” and “ RB ” and the 8

digits.

Extended 39



Based on the standard 3 of 9, it encodes all the ASCII characters by generating two characters for each character in the string to encode. Supports all ASCII codes from 0 to 126. Bar code pattern

is quite large.

Interleaved 2 of 5 (also named 25 Interleaved)



Numeric-only code, requires an even number of digits in the string to be encoded. It can have from 2 to 30 digits.

Industrial and Matrix 2 of 5



Numeric-only codes, can have from 1 to 30 digits.

Code 128



New standard for most barcode labels. Code 128 is a very compact bar code for numeric and alphanumeric strings. It has 3 modes: A, B and C, which encode different range of characters. Code 128 auto is an exclusive BarDIMM feature that allows you to encode all the

128 ASCII characters without analyzing the string to encode and use the required Code 128 modes. BarDIMM analyzes data and switches dynamically between sets A, B and C to provide the most compact code. Code 128 Auto is fully compliant with the new worldwide standard for pallet labels, which uses Code 128 mode B and C within the same pattern (ECR labels standard). **To include special characters like FNC codes or SHIFT, please read the “Code 128 Control Codes” chapter in that manual.**

EAN-128 and UCC-128



Variable length bar code starting with FNC1 code and based on Code 128 sets A, B and C to encode the string. EAN-128 is used for pallets labels and EDI related barcode labels. BarDIMM adds automatically the FNC1 code at the beginning and the checksums at the end.

German 25 Postal Barcode (Germany only)



Those special 25 interleaved codes are used on parcel labels for shipment through the postal service in Germany. Two codes are used on a label:

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

Codabar/Monarch



Encodes digits and punctuation characters. Used mostly for blood labeling.

Code 93



Compressed version of Code 39.

Extended Code 93



Compressed version of Extended Code 39.

MSI Plessey



Numeric-only, it is used on labels for grocery industry.

ZIP+4 Postnet (USA only)



Prints the zip code as a bar code to speed mail through the postal service. (US Post system)

USPS Tray barcode (USA only)



Used since 1997, bar-coded tray labels with a special 25 interleaved barcode are required for automation 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' Barcode (USA only)

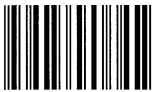
The US Post system has defined the Zebra code. This is a series of diagonal lines to the right of the barcode that serves solely as a visual indication that a tray contains bar-coded mail. The code must not appear on tray labels for non bar-coded mail.

This standard is applicable starting July 1997. Due to its simplicity, the Zebra code is implemented in BarDIMM as a font with just one diagonal thick bar coded in the slash character '/' (ASCII value 47).

Therefore, you have to call the font and send three consecutive slash characters without any space in between. Here are the PCL codes to send:

```
<Esc>(10U<Esc>(s0p2.50h29vsb23591T///
```

USPS Sack barcode (USA only)



Effective July 1st, 1997, bar-coded sack labels with a special 25 interleaved barcode are required for automation rate Regular Periodicals and Standard Mail flat-size pieces prepared in sacks.

Singapore 4 State barcode

The Singapore Postal Service is promoting the use of a 4 State barcode to speed mail sorting. This 4 State barcode encodes a 6 digits number and has a checksum appended to the data. You must make sure you give a 6 digits number to the BarDIMM, and BarDIMM will calculate and print automatically the checksum.



Note that 4 state barcodes must be ended with a regular text font escape sequence.

Netherlands KIX barcode



The Dutch Postal Service is promoting the use of a 4 State barcode to speed mail sorting. This 4 State barcode encodes a 5 to 12 characters string and has a checksum appended to the data. You must make sure you give a valid string to the BarDIMM. Note that

KIX barcode must be ended with a regular text font escape sequence.

UK Royal Mail 4 State customer barcode



The UK Postal Service is promoting the use of a 4 State barcode to speed mail sorting. This 4 State barcode encodes a variable number of digits and letters and has a checksum appended to the data. You must make sure you give the correct digits and letters to the BarDIMM, and BarDIMM will calculate and print automatically the checksum. Note that 4 state barcodes must be ended with a regular text font escape sequence.

Australia Post 4 State Barcodes



Established in 1998, 4 State barcodes are used to allow Australia Post to sort incoming mail via barcode read from letters (those barcodes are totally different from the 4 State barcode used in Singapore). There are three different types of barcodes corresponding respectively to FCC values 11, 59 and 62. BarDIMM only needs the DPID and Customer information, and generates automatically all the other information like the FCC or Reed-Solomon checksum.

For each type or code, that data must be sent in a specific BarDIMM-specific format:

- Standard Customer Barcode (37-CUST) with only the Sorting Code (DPID)
<DIPD>
- Customer Barcode 2 (52-FF-MET), DPID and 16 bars of customer information
<DIPD> , <CustomerInfo>
- Customer Barcode 3 (67-FF-MET), DPID and 31 bars of customer information
<DIPD> , <CustomerInfo>

Customer information can be 8 digits or 5 alphanumeric chars long

Customer information can be 15 digits or 10 alphanumeric chars long

<DPID> is the Sorting Code, and must be 8 digits long, <CustomerInfo> is customer information, the p parameter selects the N or the C symbol set (numeric or alphanumeric).

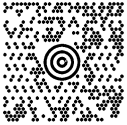
Example: <Esc>(s1p24787T12345678,7V 5<Esc>(s0p12h10v4099T

For the **P** option for the Australia Post 4state barcode, please read carefully the PCL parameters descriptions in the **FONT-LIKE PARAMETERS DESCRIPTION** chapter.

2D BARCODES INFORMATION

To encode data including an Escape character (27 decimal, 1B hexadecimal), data must be enclosed in a transparent mode sequence (please read *Transparent Print Data Mode* paragraph on page 12).

UPS MaxiCode™



The MaxiCode barcode is a 2D barcode 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 barcode. The MaxiCode symbology includes built-in error correction capability, automatic data compression and full ASCII character set.

MaxiCode has been created by UPS and endorsed by AIM (Uniform Symbology Specification MaxiCode) as a multi-purpose EDI-ready two-dimensional barcode. UPS uses MaxiCode to encode all information about the parcels, to provide a faster and better service to its clients.

Please consult the latest “ Guide to Bar Coding With UPS OnLine For customers Generating Bar Code Labels”, “MaxiCode” section, for format information.

MaxiCode data is a string made of a header, the ANSI message and an End Of Transmission code.

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

Please note that BarDIMM does not expect data in the same order. Please read the next paragraph for information on the data order.

Note: Always use uppercase characters for the MaxiCode data.

Field name	Description	Required /Optional
Destination Postal code	5 or 9 Alpha/Numeric chars.	R
Destination Country code	3 digits	R
Class of service (3 digits)	3 digits	R
Tracking number	10 or 11 Alpha/Numeric chars.	R
Standard Carrier Alpha Code	UPSN	R
Shipper number	6 Alpha/Numeric chars.	R
Day of pick up	3 digits	R
Shipment ID number	1-30 Alpha/Numeric chars.	O

Item x of n in total	1-3/1-3 digits	R
Weight (lb.)	1-3 digits	R
Address validation (Y/N)	Y or N	R
Destination address	1-35 Alpha/Numeric chars.	O
Destination city	1-20 Alpha/Numeric chars.	R
Destination state	2 alpha chars.	R

LIST OF MAXICODE INFORMATION FIELDS

The different fields are separated with the **<Gs>** (Group Separator, ASCII 29, HEX 1D).
The barcode data terminates with the **<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). BarDIMM expects to get both the primary and secondary messages from the application, separated by a comma.

The primary message data is composed of:

1. the label number
2. the number of labels for the shipment
3. the MaxiCode mode. Use 2 for domestic US shipments, 3 for international shipments
4. the postal code
5. the country code
6. the class of service

A comma must separate all those parameters

The secondary message is composed of:

1. the ANSI Message Header []<Rs>
2. the Transportation Data Format Header) 01<Gs>96
3. the Tracking Number (ie: 1Z00004951<Gs>)
4. the SCAC USPSN<Gs>
5. the UPS Shipper Number (ie: 06X610<Gs>)
6. the Julian Day of Pickup (ie: 159<Gs>)
7. the Shipment ID # (ie: 1234567<Gs>)
8. the Package n/x (ie: 1/1<Gs>) Note: this information is also in the primary message
9. the Package Weight (ie: 10<Gs>)
10. the Address Validation (ie: Y<Gs>)
11. the Ship To Address (ie: 634 ALPHA DR<Gs>)
12. the Ship To City (ie: PITTSBURGH<Gs>)
13. the Ship To State (ie: PA)
14. the End Of Format character (<Rs> ASCII 30)
15. the End Of Transmission (<Eot> ASCII 04)

Note: UPS MaxiCode expects the secondary message to be padded with fill characters to a total of 84 total characters. BarDIMM takes care of that requirement and there is no need to pad the data on the right (the fill character is '!' ASCII 33, HEX 21).

Note: The secondary message can not be longer than 84 characters. Therefore, the destination address length must be truncated if required if the total length for the secondary message is greater than 84 characters. That destination address is anyway optional in the MaxiCode data. If data is too long, BarDIMM will not print the MaxiCode and prints an error message indicating by how many characters the length exceeds 84.

Note: Blank fields still must include the <Gs> separator

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

i.e.: to switch to Courier font 10CPI, the sequence is:

<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>84  
0<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 PDF417 is a high-density 2D barcode created by Symbol Technology and now an ANSI/AIM USA standard. This barcode is composed 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). PDF417 features built-in error correction capability, automatic data compression and full ASCII and binary character sets. It can encode up to 1848 characters of information per barcode, 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) modes. ASCII mode has a better data density than the binary mode (maximum 106 versus 177 bytes per cm²) and can encode much more data than the binary mode (maximum 1848 bytes versus 1108 bytes). BarDIMM automatically selects the best encoding (binary or ASCII) for the supplied data. Also, note that PDF417 has extensive error correction capabilities. PDF417 barcodes are read with laser scanner and CCD cameras.

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

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

Note that **number of rows x number of columns** must be less than **929**.

There are many options for the PDF-417 symbol, activated using parameters of the font-like PCL sequence. Please read carefully the parameters descriptions in the **FONT-LIKE PARAMETERS DESCRIPTION** chapter.

Data Matrix™



Data Matrix is a high density 2-D matrix code developed by RVSI – Acuity CiMatrix that can encode a lot of information in a very small space. The Data Matrix symbology has extensive error correction capabilities using ECC200 error checking. A Data Matrix symbol can store between one and 3116 numeric or 2335 alphanumeric characters, and is scalable between a 1-mil square to a 14-inch square.

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

BarDIMM can scale the code with the definition of the small black square height/width. BarDIMM will automatically optimize the encoding (binary, text, digits) by analyzing the data on the data.

For the options for the Data Matrix symbol, please read carefully the PCL parameters descriptions in the **FONT-LIKE PARAMETERS DESCRIPTION** chapter.

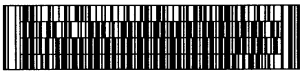
Aztec Code™



Aztec Code is a 2D matrix barcode symbology developed by Welch Allyn designed to combine the best characteristics of several 1st generation symbologies, with special attention paid to ease of printing, ease of finding in any orientation, allowance for field distortion, high data security with user-selected redundancy, and efficient storage over the range from small to large data messages. The smallest Aztec Code symbol encodes 13 numeric or 12 alphabetic characters, while the largest Aztec Code symbol encodes 3832 numeric or 3067 alphabetic characters or 1914 bytes of binary data. BarDIMM can scale the code with the definition of the small black square height/width.

For the options for the Aztec Code symbol, please read carefully the PCL parameters descriptions in the **FONT-LIKE PARAMETERS DESCRIPTION** chapter.

Codablock F



Codablock F is a 2D barcode developed by ELMICRON, as an extension of CODE 128. Within its capacities, it is possible to cut a given CODE 128 into several pieces and to arrange them in a multirows symbol. A Codablock symbol may contain 2 to 44 rows of 1 to 61 characters (up to 122 for numeric data per row), and supports most features from Code 128. For more information on code 128 features, please read Code 128 data in that manual.

For the options for the Codablock symbol, please read carefully the PCL parameters descriptions in the **FONT-LIKE PARAMETERS DESCRIPTION** chapter.

QRCode™



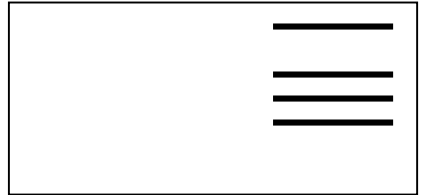
QR code is a two-dimensional matrix symbol developed by DENSO Corporation. It is available in two models—Model 1 and Model 2 (enhanced version of Model 1). BarDIMM system supports four-level error correction and a wide range of symbol sizes. BarDIMM can scale the code with the definition of the small black square height/width.

A QRCode symbol can include numeric and alphanumeric data with high compression, binary, Kana and Kanji data. Maximum number of characters per QRCode symbol:

QRCode	Model 1	Model 2
Numerics	1,167	7,089
Alphanumerics	707	4,296
8-bit byte char.	486	2,953
Kanji characters	299	1,817

OMR marks

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



BarDIMM can generate OMR marks used by insertion/folding/Sealing systems found in mailrooms. Using BarDIMM makes it easy to put those marks in ERP, Unix, DOS or Windows documents.

There is no standard for OMR marks; specifications vary per machine and per OMR scanning software (please refer to your mailroom system brochures for your own OMR marks requirements). But BarDIMM can be parametered to fit any specification.

Marks width, spacing and length can be defined using the b, s and v parameters.

Note: Some system use thicker marks for start/stop, some use only one type for all marks.

Usage: Only 3 characters can be used in data for OMR: '0', '1' and '2'.

- 1: Regular mark (thickness defined by the 1st parameter for b)
- 2: Heavy mark (thickness defined by the 2nd parameter for b)
- 0: Mark skipped

Marks are defined in the data from top to bottom.

23- Euro Currency Symbol and Additional Fonts

BarDIMM features the old HP Barcode & More cartridge (C2053A) fonts and some scalable logos that can be used together with barcodes, on labels and other documents: Euro symbols, manufacturing, electronics and safety symbols. Barcode & More fonts and special logos are accessible through fonts, using standard PCL-5 font commands. To use those fonts from Windows 3.X/95, a PCM file for the PCL driver is available from the www.BarDIMM.com WEB site. The Euro symbols font is available on all HP LaserJet models, but the « Manufacturing and Safety Symbols » and « Electronics and Safety Symbols » scalable logo fonts are not available in BarDIMM for HP LaserJet 4, 4Plus, 4Si, 4P, 4V and 4Si for technical reasons.

Euro and other currency symbols

Escape sequence: `<Esc>(10Q<Esc>(slp<size>vsb10452T`

where `<size>` is the symbol size in points (1/72th inch)

	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>(slp<size>vsb10400T`

where `<size>` is the symbol size in points (1/72th inch)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
64							CE	CE	♿	♻️	☢️	☇	♻️	♻️	♻️	♻️
80	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️
96		☠️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️	♻️
112	⚠️	⚠️														

Special multi-characters symbols:

Green point `<Esc>(10Q<Esc>(slp20vsb10400TE`
 with text `<Esc>(10Q<Esc>(slp20vsb10400TDE`
 with gray arrows `<Esc>(10Q<Esc>(slp20vsb10400Td`
`<Esc>*c15G<Esc>*v2Te<Esc>*vT`

Recycling logo `<Esc>(10Q<Esc>(slp20vsb10400Tghij<8>123`

Electronics and safety symbols

Escape sequence: <Esc>(10Q<Esc>(s1p<size>vs3b10400T

where <size> is the symbol size in points (1/72th inch)

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

Those symbols are from the font library of Elsner und Flake Fontinform GmbH, Hamburg.

24- Odette Transport Label macros

BarDIMM contains the VDA 4902 / Odette label used in the automobile industry. That label is included as PCL5 macros callable from any application using their number.

- § Under Windows: using the “Macro” BarDIMM special TTF font
 - Install the Macro Exec TTF font, and enter the macro number using it.

- § Under SAP R/3, Oracle and other ERPs, using PCL5 commands.
 To print one empty labels on the page, send the following sequence at the beginning of the page:


~&l1E~&a0h0V~&fs###y3x1S

To print 2 empty labels on the page, send the following sequence at the beginning of the page:

~&l1E~&a0h0V~&fs###y3x1S~&a0h4100V~&fs###y3x1S

Notes: ### must be replaced by the 3 digits macro number (read table below).
 ‘~’ in the sequences 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 printer front panel.

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

The  safety symbol is available in the safety symbol font (read previous chapter).

(1) Customer JetCAPS Europe Labs www.jetcapslabs.com www.bardimm.com		(2) Point of delivery/storage/sample 	
(3) Delivery note Order complement A/P 10934213A5		(4) Supplier address BrakesCorp TruckTown	
		(5) Weight net 39	(6) Weight gross 42
		(7) Number 1	
(8) Ref-No. 8924353423 			
(9) Quantity 100 		(10) Description BDJC4079020	
(12) Supplier-No. KL9645 		(11) Supplier article BD44MB711 	
		(13) Production Date 010120	(14) Modification M01
(18) Shipping mark  010544		(16) Lot-No. 221.3	
(17) 			

Example of Odette label macro with data, barcodes and security symbol added

25- Main Error Messages in Bar Codes

BarDIMM features a built-in debugging system for your bar codes. When an error condition occurs, a **x** is printed on top of the bars and the following error messages appear automatically under the bars. Most error messages are self-explicit.

Here are the main error messages.

!Err: Char=nn

Symbologies: All

An invalid character was entered in the string to be printed as a bar code. 'nn' is the ASCII value of that character. Such an error occurs for example if you include a letter in a numeric-only bar code like EAN or 25.

Action: verify the data for the barcode.

!Err: Odd

Symbologies: 2of5 Interleaved, with/without CHK, Code 128C

The string you try to print in 2 of 5 Interleaved format has an odd number of digits. With 25 interleaved and 128C barcodes, digits are grouped by pair. Note that if you use the 25 Interleaved with checksum calculation, you must send an odd number of digits as the checksum digit will round it to an even number of digits.

Action: verify the string size, and send an even or odd number of digits

!Err: Length

Symbologies: All

Invalid length for data to be printed as a bar code. Can mean data string is too short or too long. Please read the tables and barcode formats characteristics pages in this manual.

Action: Verify if the data length fit the symbology specs

!Err: NonZero and !Err: InvVal

Symbology: UPC-E

There is a minimum of four zeros in a UPC-E barcode, and some positions must have very specific values. If BarDIMM finds an unexpected value, this error message is printed.

Action: Verify if the data for the barcode fit the UPC-E symbology specs

!Err: R/A/B

Symbology: French Postal 39 A/R

The French registered mail barcode must start with either 'RA' or 'RB'. The string supplied to BarDIMM to generate such a barcode does not start with those characters.

Action: Verify if the data for the barcode fits the symbology specs

!Err: Fmt=00000000

Symbology: Australia Post 4 State 37-CUST

The 37-CUST barcode encodes the DPID, an 8 digits number. The DPID string supplied to BarDIMM to generate such a barcode is not made of 8 digits.

Action: Verify the length of the DPID string

!Err: Fmt=00000000,<CustInfo>

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

The 52-FF-MET and 67-FF-MET barcodes encode the DPID, an 8 digits number, and the customer information which can be encoded using the N table if it only includes digits.

Either the DPID string is not made of 8 digits, or there is no customer information defined in the string, or the comma separator is missing.

Action: Verify if the data for the barcode fits the symbology specs

!Err: CustInfo: nonDigit

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

The 52-FF-MET and 67-FF-MET barcodes encode the DPID 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 BarDIMM to generate such a barcode includes at least one non-digit character.

Action: Verify the Customer Information data for the barcode

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

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

The 52-FF-MET and 67-FF-MET barcodes encodes the DPID and the customer information which maximum length depends from the encoding table (N or C) defined with the p parameter. The customer information defined in the string supplied to BarDIMM to generate such a barcode is too long, the maximum size is NN for the current parameters.

Action: Adapt the length for Customer Information data

!Err: InvCharInCustInfo

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

The 52-FF-MET and 67-FF-MET barcodes encodes the DPID and the customer information which can include encode a predefined set of characters. The customer information defined in the string supplied to BarDIMM includes illegal characters.

Action: Verify the Customer Information data

!Err: Codablock size

Symbologies: Codablock

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

Action: Increase the columns and/or rows barcode size

26- Troubleshooting

Barcode data is printed as text, or the printer goes into “MEMORY OVERFLOW”:

The printer might not recognize the BarDIMM, and the barcode font parameters create huge fonts that overflow memory. Please read the “ Testing the BarDIMM ” chapter in this manual.

Barcodes are not readable

Verify if the barcode reader is setup to read the symbology you are printing. If you have a doubt, please use the sample barcodes printed in the “Bar Code Formats Characteristics: Usage and format” chapter inside that manual. If your reader can not read those barcodes, it is either defective or the symbology is not read. Please refer to your barcode scanner on symbologies activation and scanner usage.

How to stop barcode printing in a page:

Always send any other font selection sequence after the barcode data. Do not forget to send the character symbol set selection PCL command (eg: <Esc> (10U for PC-850).

Under Windows, no barcode is printed:

Do not use any enhanced (PCL XL) or PostScript HP LaserJet printer driver. BarDIMM supports only PCL 5 printer language.

Formatting the German Post barcode:

To print the code with the correct layout, use 124 for the p parameter and 300 for the h parameter: <Esc> (s124p300h24642T

Error message with 2of5 interleaved barcode:

The number of encoded digits must be even (multiple of 2). If you use a checksum, then you need to send an odd number of digits (the calculated checksum will add one character, making the total data length an even number).

Narrow barcodes are sometime not readable:

Please read the “ Bar Code Readability ” chapter at the beginning of that manual.

In all laser printers, very thin lines do not have a perfectly clean edge, due to the toner particle shape that is not square. The result is that narrow black bars are wider than blank spaces of the same width. The solution is to tune the width by using the B and S parameters to reduce the horizontal width of the thin black bars, or the S parameter to widen the thin white bars.

Barcodes on the very top of the page are not printed correctly

As barcodes are printed at the current cursor position from the baseline to the top of the page, they may not be printed correctly (wrong height or caption text in the middle of the barcode) if there is not enough room on top of that current cursor position. Make sure you set the cursor in a vertical position compatible with the barcode height.

On a LaserJet 4100 equipped with BarDIMM, when the printer web page is accessed, the printer crashes with a 49.4274 ERROR message, or the embedded web server disappears.

This problem happens with the hp LaserJet 4100 when the embedded web server (the internal web page of the printer) is configured in any language other than english. To fix the problem, turn off the printer, remove the BarDIMM, start the printer, access the printer web page using your browser and set the language to ENGLISH. You can now reinstall the BarDIMM as indicated in the user manual.

When a PCL Font List is generated from the front panel of a hp LaserJet 4100, OCR-A and OCR-B fonts of the BarDIMM do not appear in the font list.

This problem happens with the hp LaserJet 4100 font list. The OCR-A and OCR-B fonts are listed but the name bellow their representation is not readable or simply not there. This does not affect at all the printing with OCR-A and OCR-B fonts which are included in the BarDIMM and are fully usable.

HP LaserJet 5Si PCL font list page

When the BarDIMM is plugged into the HP LaserJet 5Si printer with firmware 7.X, the PCL font list crashes the printer with a 79 ERROR message. The problem is due to the printer firmware revision level and has been fixed on 5Si with firmware 8.X and 9.X. This does not affect the printer or BarDIMM normal functionality. To print a PCL font list, remove temporarily the BarDIMM from the printer.

39 barcode is much longer than it should be, typically as wide as the page

When you position horizontally the cursor using blanks to put the barcode at the right place, you must send the barcode selection sequence **after** sending the space characters to move horizontally. If you do not do that, the spaces are part of the barcode data and the barcode is much wider than expected (usually across the page).

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

Barcodes in PCL5 Macros

Barcodes calling sequences cannot be inserted in PCL5 macros, but barcode sequence plus barcode data can be inserted in PCL macros. If an application needs to send multiple times the same barcode, it can include it in a PCL macro and invoke it the required number of occurrences. For more information on the PCL language and macros, please consult the FAQ section of the www.jetcaplabs.com web site

For the latest FAQ, please consult
<http://www.jetcaplabs.com>
for more information with full text search engine

Please check frequently the BarDIMM WEB site:
<http://www.jetcapslabs.com>
for latest information, frequently asked questions,
drivers and support.

BarDIMM 3.1C Registration Form

To receive more information about new versions of BarDIMM, please fill out that card and return it by fax or mail to the address on the back.

What system is using BarDIMM barcoding or Freescape features?

PC SAP R/3 UNIX Mainframe Other: _____

Where do you put barcodes? _____ **LaserJet model:** _____

Your name, company, address:

Your eMail: _____

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JetCAPS Europe S.A.
Fax: +33 (0) 1-46-94-00-83
WEB: <http://www.jetcapslabs.com>

Please complete this card and return it by fax or in an envelope to:

JetCAPS Europe S.A.
25 bis, Avenue Pierre Grenier
F-92517 BOULOGNE Cedex
FRANCE
Fax: +33 (0) 1-46-94-00-83

