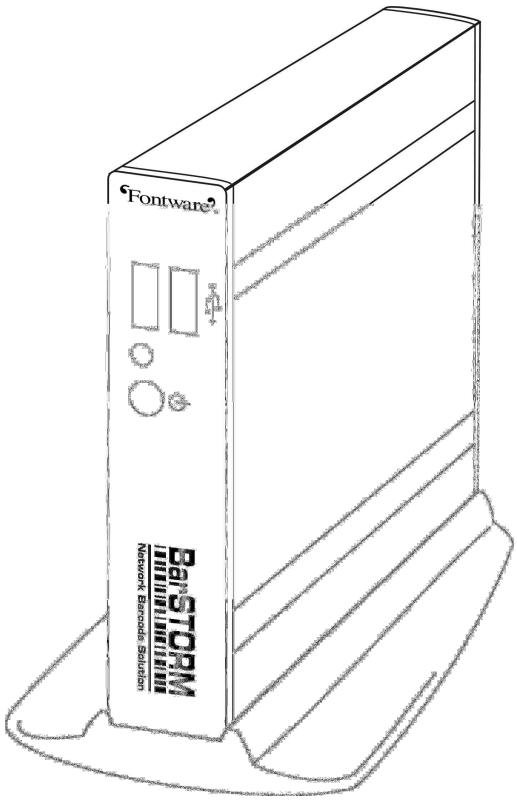
BarSTORM Installation Guide

Intelligent Output



Manual Version 1.0c

November 2005
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BarSTORM Version 1

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This manual is intended for use to setup the BarStorm to connect to the printer and to the network.

Please also refer to the BarSTORM Barcode Manual, to review and understand the methods for Barcode programming.

Acknowledgements:

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E&OE

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Introduction to BarSTORM

The BarSTORM unit is a powerful multiport print server / network bridge with the capability of translating standard PCL5 escape sequences to print the most commonly used bar codes. The barcodes are generated internally by the BarSTORM's on board software. The unit uses **"BarDIMM inside**" technology so is compatible with the most commonly used applications that support PCL5 bar code printing.

Additional fonts and form overlays can be stored on the unit and can be associated with each output port using a control list. The device by default comes with 1 USB output and 1 network bridge connection and can be licensed to print to a maximum of 4 local USB PCL5 printers and up to 50 Network ready PCL5 printers.

Some of the following configuration information relates to Windows XP, some other systems can be used in a similar manner.

Connection to the Unit

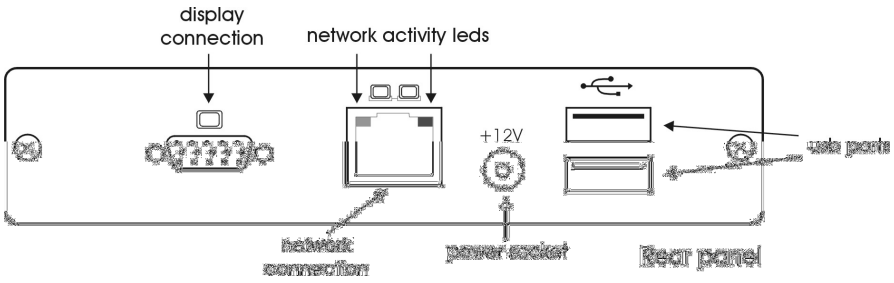
The BarSTORM can be connected to any 10/100 Ethernet network that supports TCP/IP Raw port or LPR printing.

To setup this unit you must initially connect to the box from an attached screen and keyboard or a network client within the IP range 192.0.0.??? Once DHCP or a valid IP address for your network has been set the unit will be available on the network and can be further configured via a browser.

You will need one Ethernet RJ45 cable of the right type for your network configuration.

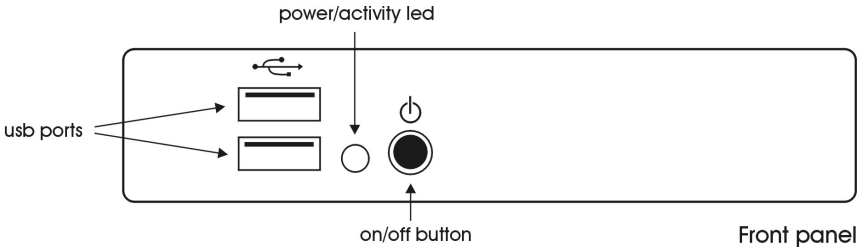
You may also require one or more USB printer cables. You can connect to a parallel printer with a standard USB/Parallel conversion cable.

The unit comes with four USB output ports (2 on the front, 2 on the back). You can use one or all simultaneously depending how the box is licensed.



Connect the box to your network by plugging the relevant RJ45 cable into the network port on the back of the unit.

Plug into the power socket marked on the back of the unit. Turn the box on using the button on the front of the box. You should see the blue indicator light come on.



The default unit is configured with 1 USB port and 1 bridged network port available.

The printer connection can be bridged to a network printer, or directly plugged to a USB connected printer. It is best to initially establish a test printout with a USB connected printer. Use USB1. Bridging Information is described later.

USB Port Layout

USB Port 1	Rear Panel Top Slot
USB Port 2	Rear Panel Bottom Slot
USB Port 3	Front Panel Top Slot
USB Port 4	Front Panel Bottom Slot

Note: If the box is licensed for one local (USB) port you can plug the USB cable into any port. If the unit is licensed for multiple local USB ports please connect as per the port layout table above.

Note: After you have connected the unit to a USB printer a test and configuration page will be printed to USB1 only when the IP address of the unit is changed, or alternatively when you switch the printer connected off and on again.

Configuration

The unit can be configured via a built in Web page which can be accessed from a browser on a suitable network or can be configured initially from a plugged in monitor screen and USB keyboard, and then additionally fully configured from a browser.

Screen Setup Administration

A way to setup the Network configuration details is to plug a screen into the Monitor port on the rear of the unit, and a USB keyboard into any of the USB slots. If you power on the unit the system will show boot information and end up with a “device login” prompt.

Enter the user “admin”
Enter the password “password” or previously set password. (case sensitive)

The system will allow several options:
“q” to quit and return, your system will now have any new settings applied.

“manual” will allow you to enter the IP Address, Subnet Mask, and Gateway info.

Enter IP address: enter in the format xxx.xxx.xxx.xxx and return
Enter Subnetmask: enter in the format xxx.xxx.xxx.xxx and return

(The Gateway address will be set to the IP address at this stage, so the Gateway is local, you can then change it via the browser later as required).

then enter “q” to quit
you can now access the unit via a browser with the new IP address.

“dhcp” will select a DHCP connection, and ignore previously set static IP information.
The unit will scan for a DHCP server, if one is found it will receive a network IP address and gateway, it will confirm the network settings on screen. Print a status sheet to the USB1 printer port showing the new information.

You can now access the unit via a browser with the new IP address, and continue with further setup.

If a DHCP Server is not found, the unit will revert to the previously set IP address and gateway or to the Factory defaults if one had not previously been set.

The screen can be disconnected and is not required.

Web Interface Administration

A browser can be used to monitor and configure the unit. Once the unit is communicating then a browser can be used for all aspects of configuring the system.

To initially configure the unit from Factory defaults, access the Administration Web page of the unit by entering `http://192.0.0.192` this will display the password page of the web administration.

If your network is in the range `192.0.0.xxx` you should be able to connect to the unit via a browser.

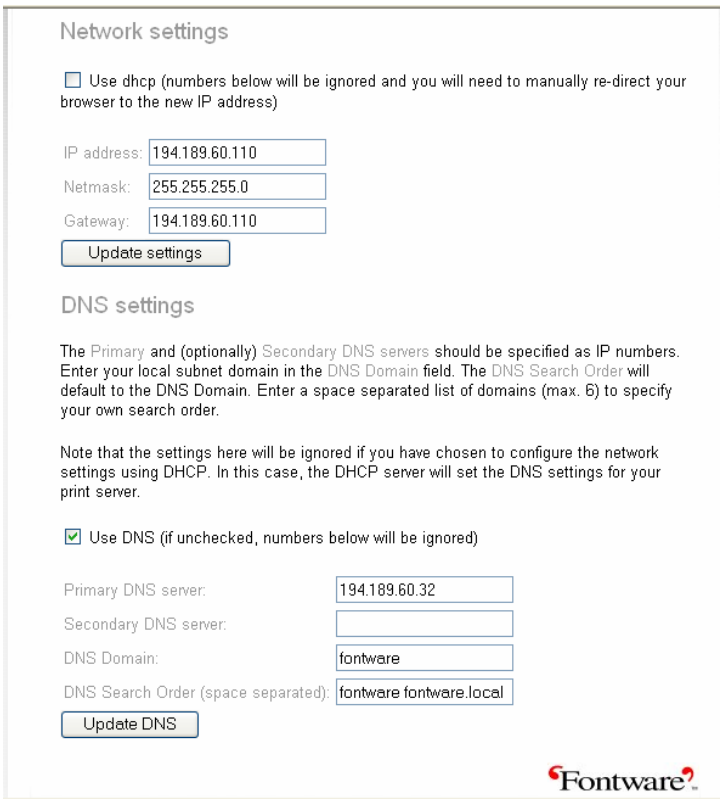
If your network is not in the `192.0.0.xxx` range, then you can either use the screen setup method for the initial network configuration or you will need to isolate the configuring PC, disable you current Network connection that uses your current IP range and setup a new network connection using the `192.0.0.xxx` range, this will allow you to connect to the device, change the IP address and network settings to the ones you require. Once done revert your PC connection back to its normal settings.

Once you have established a connection you can now use a browser for further setup and can enter the Login Page.

The default Admin password is **"password"**
Type **password** into the Admin Password field and click on **Login**.

(Press the Login Button, hitting return will not function)

The Network setup Screen will be displayed.



This screen will allow you to change the units IP address, Subnet mask and Gateway information where necessary.

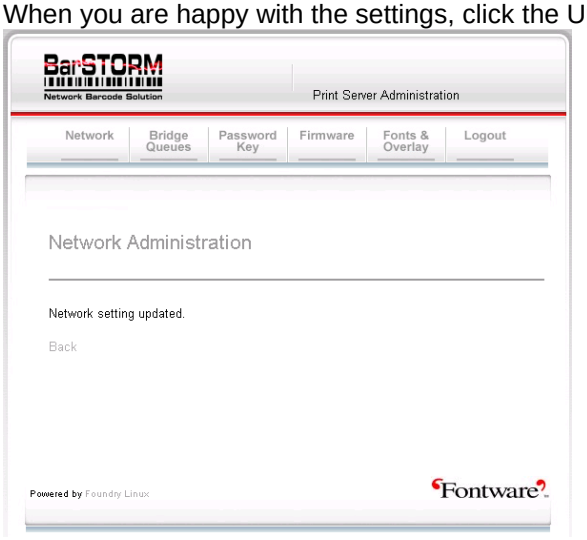
If you select to use a DHCP connection, the system will ignore previously set static IP information.

Once you select “update Settings” the unit will scan for a DHCP server, if one is found it will receive a network IP address and gateway. A status sheet will be printed to the USB1 printer port showing any new information.

If a DHCP Server is not found, the unit will revert to the previously set IP address and gateway or to the Factory defaults if one had not previously been set.

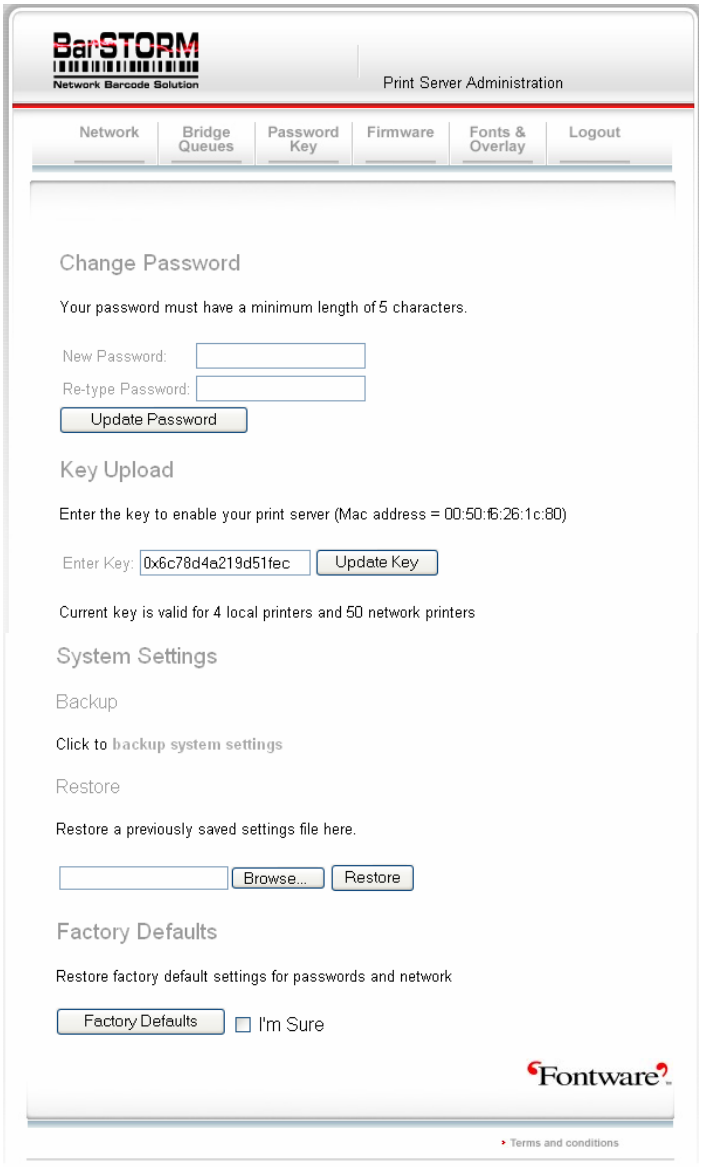
If you have a DNS server and wish to use printer names on your network this can be set from this page also. Options allow for Primary and Secondary DNS servers.
The DNS Domain field allows entry of your DND Domain name used for searching, and optionally a search order can be entered if you have main Domains.

When you are happy with the settings, click the Update setting button.



Password and KEY

From this page a user can define and update the Admin Password, Update configuration Keys and restore the factory default settings of the unit.



Note: Only install a valid Key that has been provided via FONTWARE or you may permanently disable the unit. You will only need a key if changing access to the number of printer ports available.

Password
The password will be case sensitive. If you forget the password you will **NOT** be able to log in to the unit.

Key
This is the output port unlocking licence key specific to this unit, and is matched only with the unique MAC address of the unit. It can only be used with the specific unit it is meant for.
It is used to unlock extra printer ports which have been additionally licenced,

Evaluation Units.
There is an evaluation variant of the BarStorm system used for testing and mission critical backup units.
The evaluation version, has all BarSTORM ports open, but has a limited use timer running.

This version of the firmware has an extra field for evaluation keys to be entered and updated. The screen will show the amount of evaluation time set, and how much is used before the unit expires.

It also shows on each of the browser pages that the system is an evaluation version.

Systems Settings.
This option allows the user to save all the settings, setup within the unit.

Backup
Will compile all the settings and save to a specified output file in *.tar format, which is then saved outside the unit.

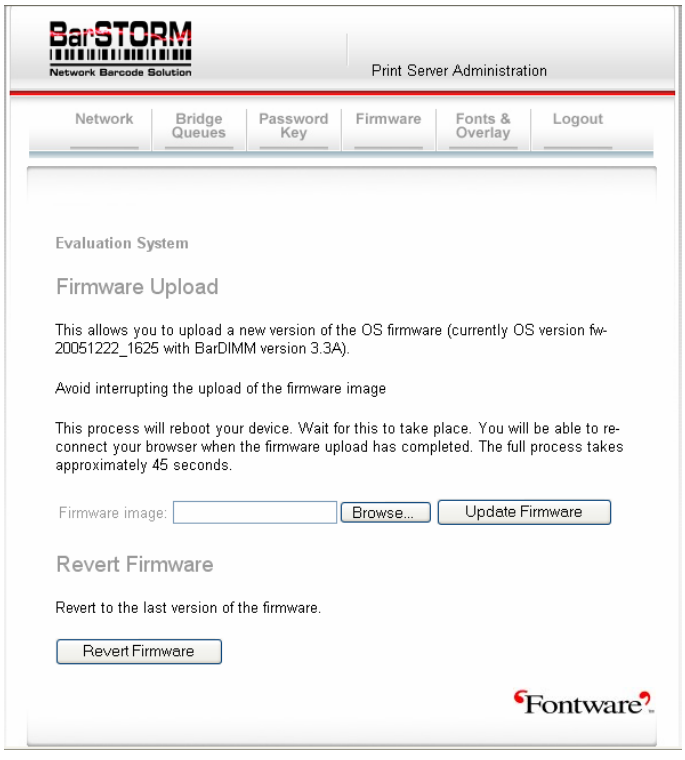
Restore
Will allow the user to browse for a backup systems settings file and reload it back into the unit.

Factory Defaults.
Resetting factory defaults will return the units network settings to its delivery defaults.

Remember the IP address will return to `192.0.0.192`.
Any Bridge queue settings will be removed, be sure to use the “backup” option first.
Any newly loaded fonts and forms will stay in place.
Port extension Licence keys will stay in place.

Firmware Upload
From time to time Fontware may release upgrades or later revisions of the firmware.

The current system operating version number is shown on this page. New Firmware can be updated from this page. The user can browse the network and select the required update file, much as you would do from any system, press the Update firmware button and the box will automatically update and reboot. This may take up to 45 seconds and you may have to log into the Web page after an update has been completed.



The Revert Firmware button will allow the user to Revert to the last know working Firmware, a copy of the previous firmware is kept within the unit.

Note: Uploading the same Firmware twice will mean that you will loose the previous version of the Firmware.

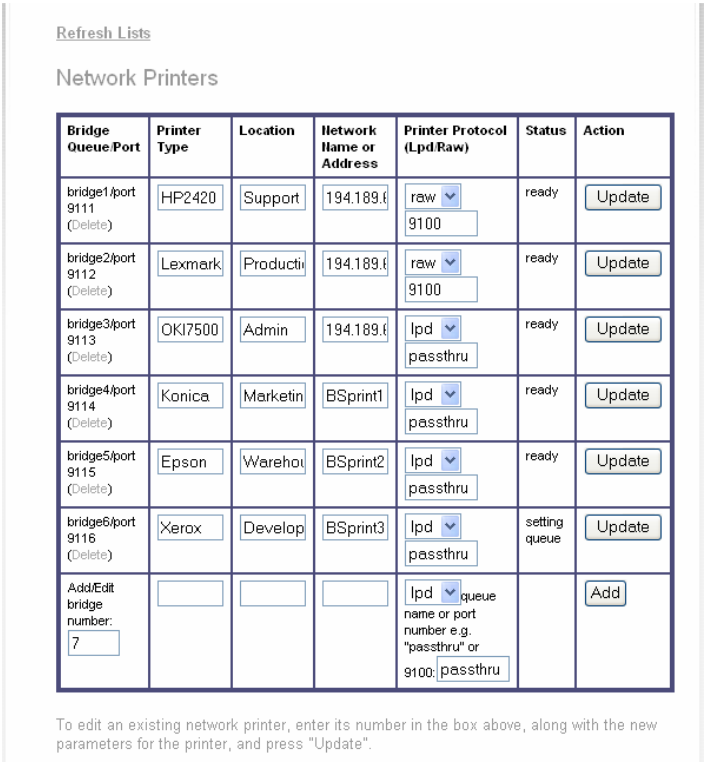
Whilst firmware upload should not often be required, It does allow for unknown bugs to be tackled, firmware to be upgraded, new features to be added, and temporary licence keys to be used and loaded easily.

Bridged Queues

The BarSTORM unit can serve Barcodes, fonts and form overlays to up to 50 network ready PCL printers, depending on how the unit is licensed.

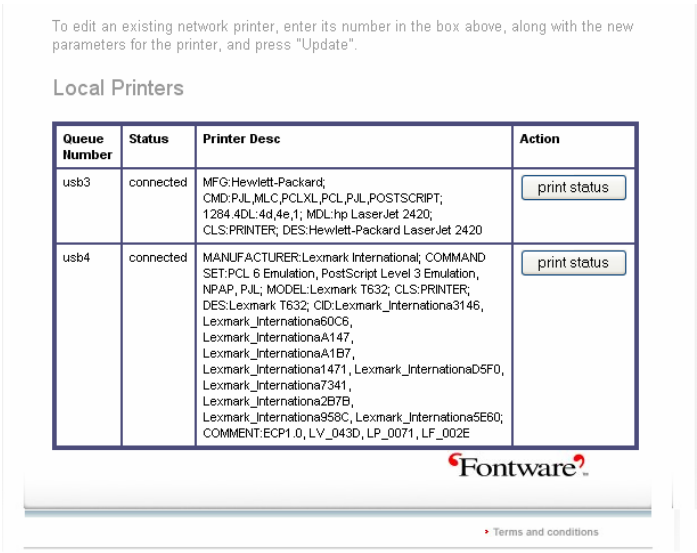
Select the Bridge queues page on the web interface, from this page you can manage which input data stream or system queue will be pointed to each output network printer.

The bridge name / port number is used to send data to the unit.



In this example BSPrint1, BSPrint2 and BSPrint3 are DNS names that must be available to DNS either as resolved names or manually set up in the DNS Tables.

local printers attached via USB will also be shown if connected and powered on as follows:



(The network printer list box will adjust its width depending on what has been typed in.)

Input fields

Bridge Queue/Port descriptive field that describes bridged network printer and port number.
e.g. bridge45/port 9155
Input a number for the bridge queue.

Printer Type User set descriptive only field e.g. PCL Laser

Location User set descriptive only field e.g. Warehouse

Network Name or Address Enter the static IP address of the network printer or if DHCP is being used the DNS printer name for the target output printer.

If a printer name is used the DNS information must be set up on the network DNS servers DNS tables.

Printer Protocol (Lpd / Raw) Select Raw port or LPD from the drop down menu.

Queue name or port number: (Output to printer information)
If Raw port is selected in the printer protocol field the port number should be entered for that specific network printer, normally this is 9100 for most network printers or print servers.

If Lpd is selected in the printer protocol field the print server queue should be entered for the network printer, normally for many network printers or Jetdirect print servers this would be **passthru**.

If the network is **NOT** dhcp and the IP address is fixed then raw port should be used.

BarStorm does not Broadcast out a DNS name.

If you need to use a name to target input to the BarStorm, then you must set one up in your dns tables.

BarStorm can be configured to allow direct IP printing, if only 1 device is attached, which must be via the USB port. Then any data sent directly to the BarStorm without queue information will be sent to the USB connected printer.

Fonts & Overlay

Font & Form Management

Additional Fonts and Form Overlays can be added to the BarSTORM and assigned to be used with specific output ports.

BarStorm contains a number of default fonts and overlays that are activated and be deactivated if required.

From this page you have the option to store any file including, Fonts, Logos, Signatures and Form overlays for any of the output ports, each of the 4 USB ports on the Unit or any of the bridged ports set up on the unit.

The specific information controlling what fonts or Form Overlays are sent to what printer port and when, is defined in the configuration file **CONTROL.txt**, and this is then loaded to the BarSTORM, via this browser page.

All information in this file is **Case sensitive !!!!** , please check the information entered.

Fonts or Form Overlays files are loaded to the printer at a time specified in the control.txt file.
This may be once or before every print job.
An obvious example of an overlay would be a company letter head this is a file that remains constant.

Browse and upload to install the required custom font or Form overlay files and the Control.txt file.
Each font or Form overlay that has been uploaded will be displayed. A delete option will appear beside each uploaded file so that it can be removed if required.

Core Resource Files

There are a number of Core fonts and forms stored on the BarSTORM unit. These form part of the standard configuration of the unit, If required they can be de-configured and not used.

The Core font names if needed can be re-configured in a control file, **core.txt** file as described.

Control.txt and core.txt are configured and work in the same way.

The file names used in **core.txt** are:

JM2dpost.bin – Required only if using UPS Maxicode, or 4 State Postal Barcodes

JMsymocr.bin – Required for using OCR fonts, or Manufacturing symbols, or Euros as described in Programming manual.

JM6forms.bin – Required for using BarDIMM Odette forms.

BSbcplus.bin – Required if using legacy barcode font sets.

The fonts and form use specific ID's, if you are using these resources, then the incoming data should not contain the same ID's:

Fonts ID's 370 – 396

Form Overlay ID's 300, 301, 302, 303, 304, 311, 312

Once re-configured the new **core.txt** file must be uploaded to the unit and tested.

Associating Fonts and Form Overlays with particular output ports

The control files **control.txt** and **core.txt** contain lines which specify which fonts and overlays should go to which printers. An example line is:

usb1: font "font.bin"

This indicates "send the font with filename font.bin to the printer on usb1".

You can specify multiple lines per printer and multiple fonts per line:

usb1: font "font.bin"
usb1: font "font1.bin"
and
usb1: font "font.bin", font "font1.bin"
are equivalent.

In each of these cases, the file is expected to have the font id encoded within it.

If you are sending a raw font, and need to specify the font id, you do it like this:

usb1: font "font.bin" <12>
again, you can put multiple entries per line in:
usb3: font "font.bin" <12>, font "font1.bin" <14>

Overlays work in a similar way:

usb4: font "font.bin" <1>, overlay "ovl1.pcl" <3>

Here the setup will send one font as font_id 1, and an overlay as macro id 3.

When an id is included for a font, it causes the following command to be prepended to the font:
`Esc*c#D`
where Esc is the escape (or freescape AEC) character and # is the id.

When an id is included for an overlay, the following commands are prepended to the overlay data:

`Esc&f#Y Esc&f0X`

where # is the macro id. This is appended to the overlay data to signify the end of the macro data:
`Esc&f1X`

In either the font or the overlay case, omitting the id field means that the font/overlay is expected to contain the command to set the font/macro id.

The font_id and macro_id can be in the range 1-32767 inclusive.
Specifying the id <0> is equivalent to omitting the id directive and will NOT have the effect of sending the font as font id 0 (which PCL allows).

If you specify a font twice:

usb1: font "font1.bin" <3>, font "font1.bin" <3>

It will simply be loaded on to the printer twice before the print job.

You can place as many entries on each line as you want, up to a maximum line length of 1000 characters.

usb1: font "font1.bin" <3>, once, font "font1.bin" <3>, overlay "ovlay.pcl", overlay "ovlay1.pcl".

Loading macros before each job or just when printer is booted

The default behavior is that the font/overlay will be sent before each printer job. It is possible to tell the BarSTORM server to send the fonts/overlays only when necessary, by adding a keyword to a font/overlay line:

usb1: once, font "font1.bin" <4>

This means that the font is loaded to the printer on usb1 only once, when the first print job is processed. The font will be re-loaded if the printer is disconnected or power-cycled.
If the line relates to a bridge queue:

bridge1: once, font "font1.bin" <4>

then the BarSTORM cannot know when the destination printer is power cycled, so the once keyword should not be used.

If several directives are listed for a given printer, the once keyword need only appear on one line. If it appears on *any* line, then the "send when necessary" behavior is enabled.

This:

usb1: font "font1.bin" <3>, once
usb1: font "font.bin"

means that both font1.bin AND font.bin are sent to the usb1 printer only when necessary (when printer is re-connected/power cycled). It DOESN'T mean that font.bin is sent with each job and font1.bin is sent only once.

The "all" keyword

There is a special keyword which matches all queues:

all: font "font.bin", overlay "ovl1.pcl" <10>

will cause font.bin to be sent to all connected usb printers and bridge queues. The once keyword can be added here and will then apply to all queues, including bridge queues. (This may be considered bad practice).

Form Overlay Creation

If you have a simple way of creating an overlay, or have existing overlays, then you should be able to use them simply.

Using forms assumes that the overlays are tried, tested and known to work with the intended output printer first.

These filenames should use 8.3 filename format, an 8 character alpha numeric file name plus a 3 character extension i.e. Letter01.prn

Printing the output to file, and trying to edit the output is not a good method, unless you have expertise in that technique.

Fontware supply a service to create overlay files as required, we can also generally accept, Word and PDF master files as input for conversion.

Freescape

The Freescape option shows a selection of available Alternate Escape characters to use. The default is hex1b, ASCII Escape. A new character can be selected from the list and will be active across all ports.

This is used here the host, or the host data can not easily send an ASCII Escape Character, hex1b. An alternate character can be selected from the list and used. The selected character and the ESCAPE character hex1b can both be used at the same time.

The available characters are:

```
Dec   Hex  Char
 27 – 1b – [!]
 34 – 22 – [~]
 35 – 23 – [#]
 36 – 24 – [$]
 47 – 2f – [/]
 63 – 3f – [?]
 92 – 5c – [\]
123 – 7b – [{]
124 – 7c – [|]
125 – 7d – [}]
126 – 7e – [~]
```

This setting will apply to all ports.

The software is sophisticated enough to not replace these characters within ordinary data.

The alternate character can also be set via a control code sent in the data:
`<ESC or AEC>**#J`

Where # is the ASCII Decimal value of the required character.
i.e.
`ESC**126J will use and set the “~” tilde character.`

Diagnostics

The Diagnostics option will allow data capture, pre and post incoming data filtering. This option is set with a check box, and set apply button. When this option is set the unit will write the incoming data to disk, and also write the filtered output data to disk.

Two files are created, prefilter.out, and postfilter.out.

These 2 files will then appear on the File Management page at the top of any existing file list. An option will appear to download these files from the box.

Click on download to get each file, and save to new folder on local host.

These files can then be used for analysis.

This option should be normally switched off.
If the item is selected and switched on, only 1 set of input and output files will be kept, and overwritten with every printjob.

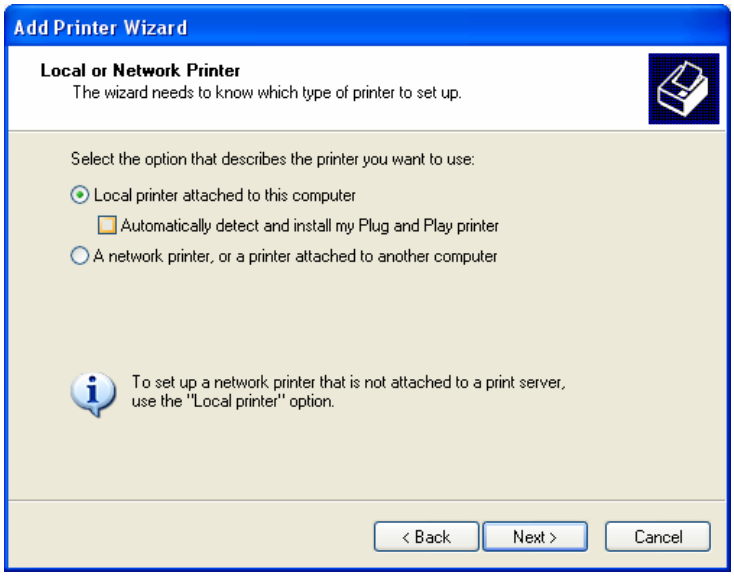
If the unit is set in Diagnostic mode, then all other printing to the unit should be held off.

Windows Printer Setup

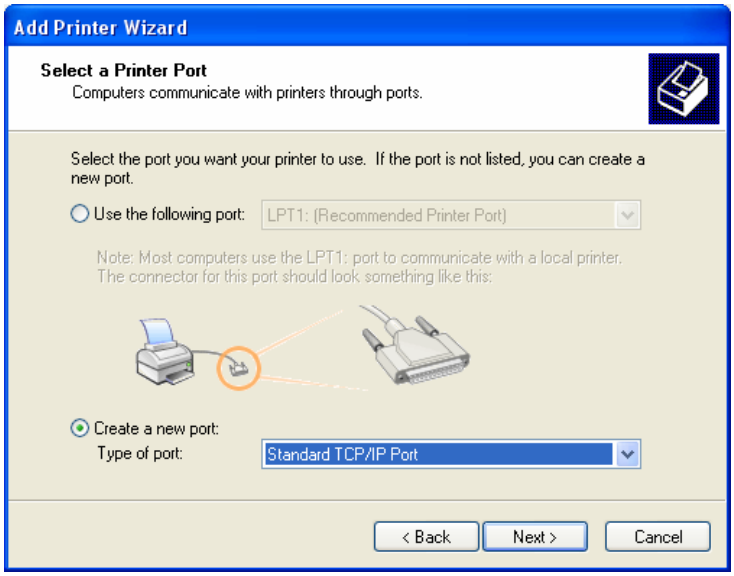
If Windows is used as the printing host, then you can use Windows print queues to send data to the printer via the BarStorm ports.

In Windows:

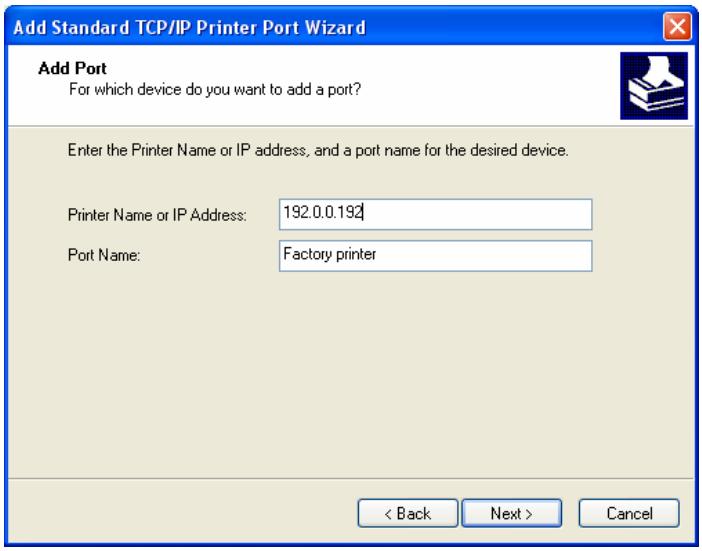
From the **Control Panel** window select **Printers and Faxes**, from Printer tasks menu select **Add Printer.**



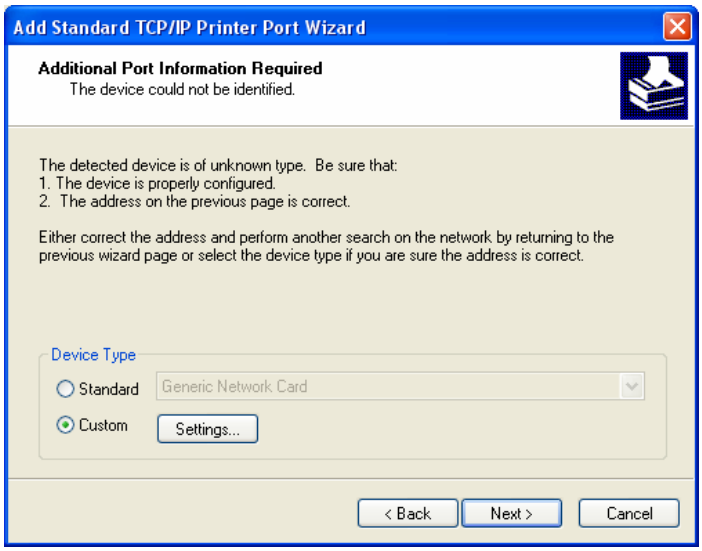
Select **Local Printer** and click **Next**



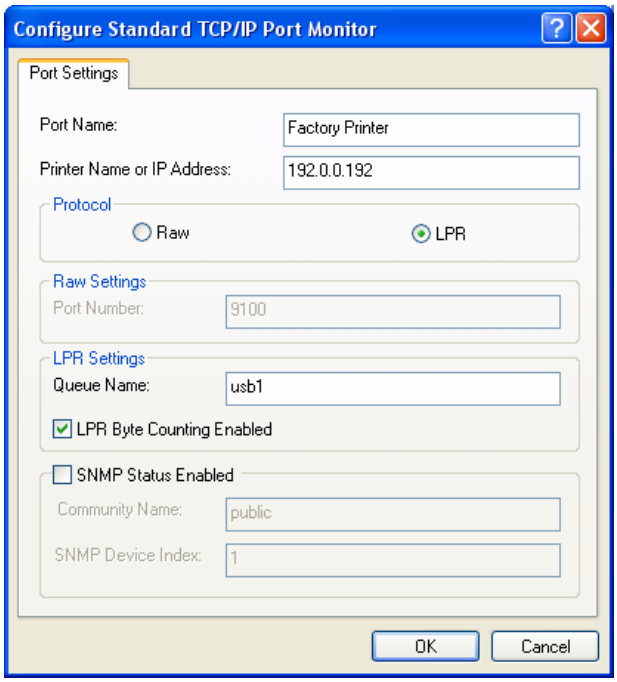
Click **Create a new port** and select **Standard TCP/IP Port** from the drop down menu



Input the Units IP address or Printer name that you have previously selected. Any descriptive printer name can be used. Click **Next**



Select **Custom** and Click **Settings**
Click **Next**



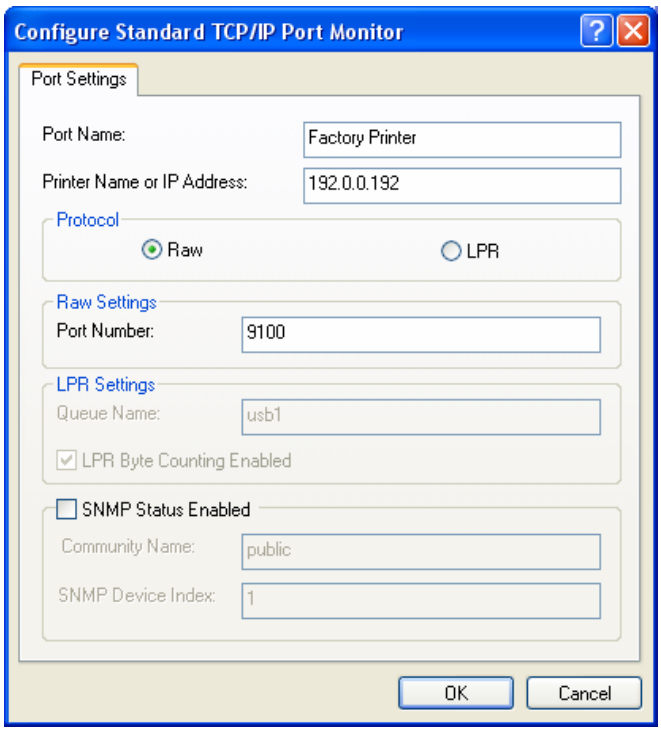
The BarSTORM will support RAW port or LPR settings.

If you select LPR each port on the unit is defined with a different queue name as follows:

First USB queue name is **usb1**
Second USB queue name is **usb2**
Third USB queue name is **usb3**
Fourth USB queue name is **usb4**

First bridged printer queue name is the **DNS name assigned to that network printer.**

Select **LPR byte counting** and Click **OK**



If you whish to use raw port printing Select **RAW**

The following Port numbers can be used to print from each physical output port or bridged printer set up on the unit.

```
9100 = USB1
9101 = USB2
9102 = USB3
9103 = USB4
9111 – 9160 = Bridged printers 1 – 50

e.g.

Bridged printer 1 = port 9111
Bridged printer 5 = port 9115
Bridged printer 45 = port 9155
```

This completes the port setup and you can select your printer type and driver as normal.

Test Data Files

Test data is provided with the unit. These files are PCL files that will show you the capabilities of the BarSTORM.

The testfiles are PCL files as supplied on the CD these are in the BSfiles folder as *.pcl files.

There are many ways to send data to the unit once configured depending on the system attached to.

The easiest way to send this data to a connected PCL5 printer on the BarSTORM is to use:

DOS/UNIX

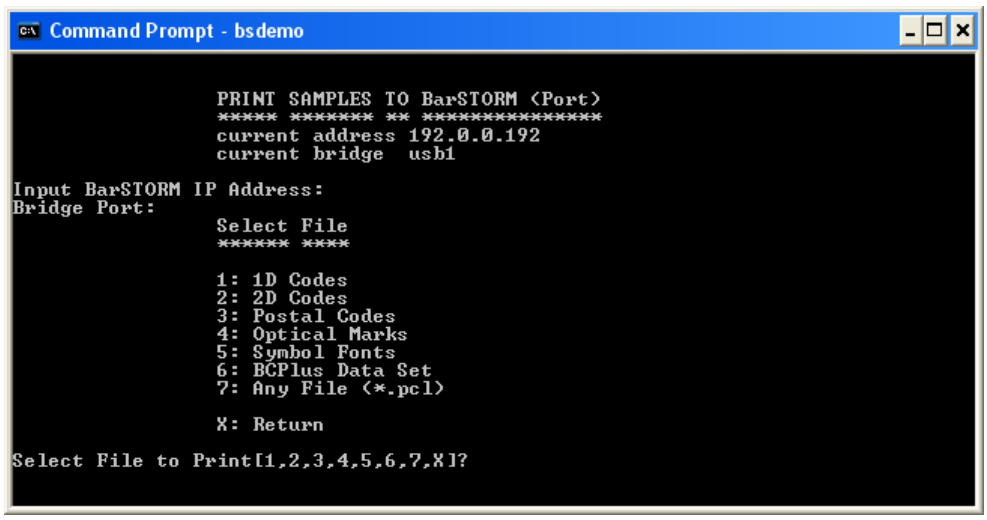
```
lpr –S <ipaddress> -P <portname> -o l <filename>
i.e.
lpr –S 192.189.60.110 –P bridge1 –o l bspdf417.pcl
or
lpr –S 192.189.60.110 –P usb1 –o l bspdf417.pcl
or
lpr –S Bcprint1 –P bridge2 –o l bspdf417.pcl

Where Bcprint1 is a preset name setup in the dns tables.
-o l allows binary files to be sent correctly.
```

In UNIX there are different versions of LPR which use a different syntax, these generally are similar and have similar features and options, you will need to check you specific system.

```
Also if queue names have been configured then use:
copy/b bspdf417.pcl \\servername\queuename
i.e.
copy/b bspdf417.pcl \\Server_1\printer_queue_1
```

Also provided are some other useful files.

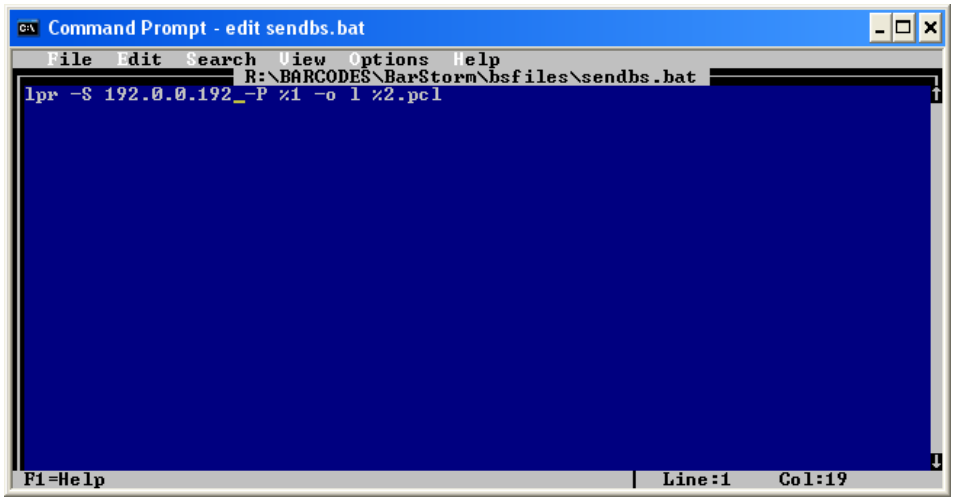
Use the DOS Utility on the CD, BSDEMO.bat. It requires you enter the IP address and bridge name, or can be edited and changed as required.



Use the DOS Batch file on the CD SendBS.

It takes two parameters of a <portname> and the <filename> to be printed.
The portname will be a valid bridge name or valid usb# port.
The filename is a valid pcl filename without the .pcl extension.

The batch file contains an IP address, so should be edited as required.



For example:

After editing the `SendBS.bat` to have the correct IP address (if the unit has a different IP address from the default 192.0.0.192) use the DOS command:

```
i.e.
SendBS bridge1 bspdf417
or
SendBS usb1 bspdf417
```

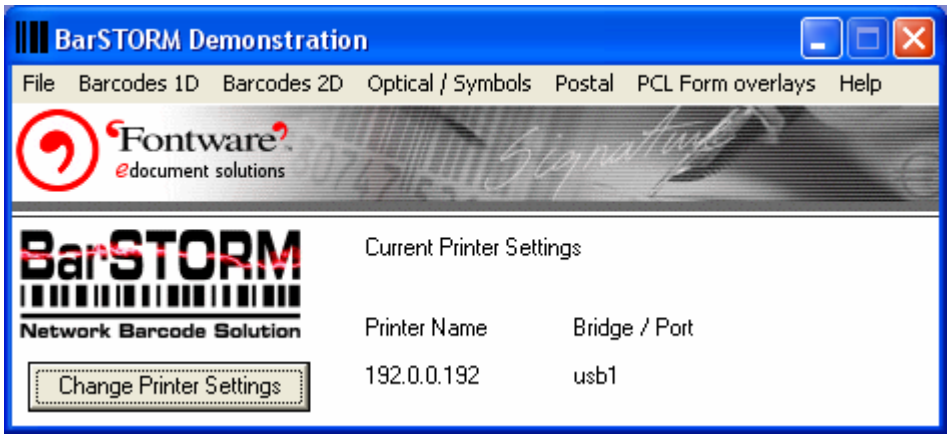
The printer connected to bridge1 will print the PDF417 bar code examples.
The printer connected to USB1 will print the PDF417 bar code examples.

Windows Utility

Install the Windows Utility on CD.

It will install files on your system to the “\program files\fontware\barstorm\” folder.

The demo program is BSDEMO.exe



This program, will allow you to test / demonstrate that the BarStorm unit is printing and processing Barcoded prints from an easy Windows interface.

Use the change Printer Settings option to set the required IP address of the BarStorm, and which usb or bridged port to use.

If you have pre-configured a Windows print queue to print to the BarStorm, this can alternatively be selected as the target device.

Each dropdown menu will print pre-selected and installed files to the target printer for test.

The PCL Form option simply allows you to enter the Macro ID number of any Forms that may have been configured into the BarStorm, a default test form is delivered on the unit with a form ID 312.

The File option, allows you to select any file that you wish to print via the BarStorm unit as a test.

(This program in the background is simply sending data via an LPR process).

Support Information

BarSTORM Supplier:

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F: +44 (0) 1329 281145
W: www.fontware.com
E: barstorm@fontware.com

Associated Products Available from Fontware Limited.

Visit: www.fontware.com

Windows Based Truetype and Postscript fonts with Barcode encoding plug-ins and utility.

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www.fontware.com/barcodesingles

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Windows Stationery Manager

www.fontwarewsm.com

Using the BarSTORM
Barcodes Printing System
for MS-Windows™, Unix, AS-400, Mainframes and ERPs

Programmer's Guide

Edition 1 - November 2005

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Table of contents

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 BarSTORM is an intelligent network bridge platform that adds sophisticated BARCODE printing and fonts/macro/logos storage capabilities to any range of PCL 5e compatible printers. With BarSTORM on the network, it never has been so easy and so fast to print professional barcodes.

BarSTORM uses the defacto BarDIMM intelligent barcode software engine (BarDIMM inside) Version 3.3a onward.
All references in this manual to "BarDIMM code" refer to the barcode software engine deployed within the BarStorm platform.

Please also see the BarSTORM Installation Guide.

BarSTORM supports complex high-density two-dimensional barcodes like PDF417 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.

BarSTORM includes the standard HP Barcode & More cartridge/SIMM fonts. As a result, BarSTORM 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.
BarSTORM 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

BarSTORM 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 allows all systems to use PCL code and "BarDIMM codes", even if they cannot send binary data to a printer.

BarSTORM also features 32MB of permanent flash disk storage, to store forms, fonts, macros and logos in the printer. That storage can be managed simply using a browser.

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 code".

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 theses 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. 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 code" have been found to be highly readable.

HOWEVER:

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

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

3- Installing the BarSTORM Device

Please see separate BarSTORM Installation Guide.

The BarSTORM unit must first be configured with an IP address and network settings for input, then the printers may be configured directly connected or via network bridge.

Once the unit is tested to print "basic" data, then you can proceed on how to use the PCL-Like control codes to select and generate barcode printing, as described in this manual.

Please verify that the printer(s) you are installing are compatible with the output from the barcode printing engine (PCL5e).

4- Testing the BarSTORM

There are two different features sets built in the BarSTORM: the "BarDIMM code" firmware and the font & form overlay processing. These work independently, and can be configured and tested differently.

See the BarSTORM Installation Guide to configure and test the unit for networking, printing, barcode processing and font & form processing.

Test files are provided with the BarSTORM.
These can be tested, by sending them to the unit from the operating system and utilities provided.

Sending these files to the unit will confirm that the Barcode processing is active.

The unit should work in all aspects, and should be checked prior to using any custom PCL Coding or drivers.

Fonts: The BarSTORM contains the Fontware Barcode Plus data set compatible with the HP Barcode&More fonts and some special additional fonts and Form Overlays.

These are supplied within the unit.

5- Presentation

The BarSTORM Device is an intelligent Unit adding sophisticated BARCODE printing capabilities to most PCL based printers. 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.
BarSTORM also features the unique FREESCAPE capability.

BarSTORM supports more than 50 bar code formats (symbologies) in its version 1.0, 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 millions of different kinds of bar code formats from BarSTORM!

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

For backward compatibility, BarSTORM also optionally 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 replaced with the unique character of ASCII value 27.

6- How “BarDIMM code” barcode selection works

1. A typeface in the 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.

Advice: end the data to barcode with a valid PCL5 regular font sequence, such as `<Esc>(10U<Esc>(s0p12hbs4099T`

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 code” 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 code" generates the bar code, according to parameters in the font-like PCL sequence. For "BarDIMM code" bar codes, PCL font parameters don't have the standard meaning (besides the V and T parameter). The **T** parameter selects the Bar code format.

As the "BarDIMM code" 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 code" 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.

Code 128 Special Varient

To stay compatible with an older version of BarDIMM 1.8E a minor modification compared to previous versions has been added. Code 128C used to have an ID of 24703 and has been to ID 24704.

If you are already using a 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 the BarDIMM code will detect data for Code 128C.

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. *Selecting 27 disables any existing Freescape character currently set.*

Freescape parameters on BarSTORM Browser Menu

The Freescape feature can be activated / disabled / parametered for all jobs.

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

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>(0O<Esc>(sp10h12vsb104T`
OCR-B: `<Esc>(1O<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	{	|	}		

This table shows the OCR-A character set.
The "Barcode&More" OCR-B font character table is the same.
Note: the OCR-B character font is included in BarSTORM, but is not active by default and must be configured.

9- How to use the "BarDIMM Code"

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

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

* from standard ERP software, which feature a "BarDIMM code" 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.Jetmobile.comWEB site, relating to BarDIMM, and the "BarDIMM code"

* 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(s#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 industrial + 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 (obsolete)*
24681	39 extended + CHK	24710	UCC-128 19 digits only
24675	Danish PTT 39 barcode	24720	EAN/UCC-128
24676	French Postal 39 A/R		
		24770	ZIP+4 POSTNET 5
24690	93	24771	ZIP+4 POSTNET 9
24691	93 extended	24772	ZIP+4 POSTNET 11
		23591	USPS ZEBRA
24644	USPS 25, 11 digits Tray Label barcode		
24645	USPS 25, 8 digits Sack Label barcode	24760	MSI
		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	24820	Data Matrix™
24786	Australia 4 State 52-FF-MET	24830	Aztec
24787	Australia 4 State 67-FF-MET	24840	Codablock F
24790	Royal Mail 4 state Customer code	24850	PDF417
24795	Netherlands KIX postal barcode	24855	Macro PDF417
		24860	QRCode™ Model 1
24810	RSS-14™	24861	QRCode™ Model 2
24811	RSS-14 Truncated	24899	OMR for folding/inserting/ sealing systems
24812	RSS-14 Stacked		
24814	RSS Limited		
24815	RSS Expanded		

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 10 to not ignore (and) in string to barcode as EAN128 - 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
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 $1/60^{th}$ 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

MacroPDF417: Matrix height
#1, Max number of PDF blocks per column before starting a new column
#2, Kept for future usage
Example: Up to 2 PDF blocks in height for MacroPDF417: 2v

PDF417 and Macro PDF417: PDF417 block maximum height and width
#3, Maximum width in dots for PDF417 block (in 600^{th} of inch)
#4 Maximum height in dots for PDF417 block (in 600^{th} of inch)

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:
PDF417: 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 PDF417 symbol is truncated on its right side
=0 The PDF417 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:

PDF417: 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 min width (1 to 100).
Unit=1/100 inch (default value=10).
The width value triggers a predefined scaling of the base barcode.

Example: square PDF, minimum module width, smaller 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 and symbols.**

- **For Code 128 and EAN128, please read chapter 15 for information on FNC codes.**

- **Parameters cannot have decimals. i.e. "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

- **End the data to barcode with a valid PCL5 regular font sequence, such as <Esc>(10U<Esc>(s0p12hbs4099T**

- **When using default parameters, only the commas are required if other parameters still have to 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 code” 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 code” to use the set B of code 128.

Those special control codes can only be used with the 128 Autoswitch and the EAN128/UCC128 barcodes.

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:

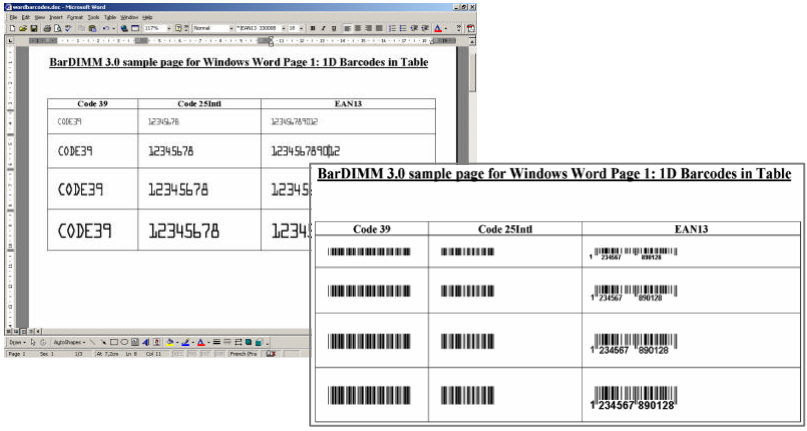
128 = SHIFT
129 = FNC 1
130 = FNC 2
131 = FNC 3
132 = FNC 4
133 = CODE A
134 = CODE B
135 = CODE C

16- MS-Windows Support

You can use “BarDIMM code” functionality with a PCL5 driver from your word processor, spreadsheet or other Windows 3.1/95/98/ME/NT/XP/2003 based applications using BarDIMM code special TrueType fonts generator: BDTTGEN.

BDTTGEN is free utility available on the supplied CD.

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.
Special “BarDIMM code” TrueType fonts also allow you to activate PCL5 macros and forms optionally stored on BarSTORM’s permanent Flash Storage.



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 seperate BDTTGEN manual for more information on all capabilities.

17- SAP R/3 Support

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

SAP OSS notes are available from the **www.jetmobile.com** web site.

- OSS note #5196 lists standard R/3 barcode names and supported device types for printing barcodes
- PCL-5 commands for "BarDIMM code" 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, you may modify the controls (copy the controls into the user Z-environment and modify them based on your needs). The barcode activation strings are easily defined using this manual or the interactive BDTTGEN utility for Windows.

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

For more information on using "BarDIMM code" with SAP R/3, like on inclusion of FNC1 codes in EAN128 barcodes, please consult the **www.jetmobile.com** web site, FAQ section.

18- Generic ERP, Unix AS/400 and Mainframes Support

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

On Unix system, AS/400 (in SCS mode only) and Mainframes (in SCS mode only), you just need to enter in your spools definitions the ASCII barcode activation PCL5 string followed with the data to barcode to get nice looking barcodes. The barcode activation strings are easily defined using this manual or the interactive BDTTGEN utility for Windows.

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
`BarStorm Intelligent Output`	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.Jetmobile.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 code barcodes cannot be used from HPGL2, Postscript or PCL6 languages

20- Default Parameters

Barcode Name	Height	TextFlag	Bar width 1	Bar width 2	Bar width 3	Bar width 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¤	N/A	7¤	14¤	-	-

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

¤: 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 $1/60^{th}$ of inch, and bar widths are in $1/600^{th}$ 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
RSS14	D	13	6	N	12	1
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
PDF417	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 standards used to encode the information as bars. “BarDIMM code” 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 code” recalculates 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 code” accepts the Zero Suppressed version of UPC-E in both versions of data, compressed and uncompressed. If data comes uncompressed, “BarDIMM code” 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 code” 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 code" recalculats 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 or 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 code".
"BarDIMM code" features two version of the 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 code" only needs the 10 digits.

French postal 39 bar code (France only):

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 code" 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 code" 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 code" 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 code" adds automatically the FNC1 code at the beginning and the checksums at the end.

EAN128 symbology requires that tags are encoded between round brackets in caption text (and not in bars). "BarDIMM code" automatically removes the ( ) symbols in barcode but keeps them for caption text.

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.

RSS-14

RSS-14 is a linear symbology that makes omnidirectional scanning easy. It encodes 14 digits of data used to identify the GTIN (Global Trade Item Numbers) for scanning in the supply chain (for Application Identifier '01'). "BarDIMM code" can generate the RSS14 in various flavours: **RSS-14**, **RSS-14 Truncated** (shorter bars height) **and RSS-14 Stacked** (used where a narrower symbol is neededas the RSS-14 is printed in two rows of two segments each)**.**
RSS 14 can also accept 2D Composite Components (CC). Please refer to **RSS-14 + CC** in the 2D Barcodes sections further down this manual.

RSS Limited

RSS Limited is a linear symbology that encodes the same data as defined for all four types of RSS-14. The encodation process is different and limits the values assigned for Indicator digits to 1 or 0. This form of RSS can be printed very small and is not generally intended for omnidirectional scanning. RSS Limited contains two large data characters and a Mod 89 symbology check character. It does not have stacked or omnidirectional formats and is designed for small item identification.

RSS Expanded

RSS Expanded is a variable length, linear symbology that is encoded differently than RSS-14. This symbology allows up to 74 numeric or 41 alphabetic characters. This form of RSS can be printed at densities that can be omnidirectionally scanned. It is used to to encode 14 digits of numerical data that can be used to identify GTIN for scanning in the supply chain RSS Expanded encodes all EAN.UCC Application Identifier Element Strings. Special compaction methods have been designed to decrease the symbol size for common Element Strings.

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 since July 1997. Due to its simplicity, the Zebra code is

implemented in "BarDIMM code" 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 code", and it 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 code, and it 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 code" 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 code" 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 information can be 8 digits or 5 alphanumeric chars long
- Customer Barcode 3 (67-FF-MET), DPID and 31 bars of customer information
  `<DIPD>,<CustomerInfo>`
  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 code" 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 code" 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 (maximum: 8)
2. the number of labels for the shipment (maximum: 8)
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 USPN<**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**>)
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 code" 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 code"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
```

RSS with Composite Component

A Composite Component is a two dimensional bar code added to a **RSS-14** or **RSS-Expanded** barcode: it is not a true matrixed code, but a stacked linear bar code. CC is bi-directionally decodable therefore can be read with laser scanners. They have a binary-based encoding scheme optimized for EAN & UCC Application Identifier Element Strings. Special compaction methods have been designed to decrease the symbol size for commonly used Element Strings such as lot number and expiration date. All RSS Composite symbols encode a linkage flag in both the linear component and the 2-Dimensional Composite Component to tell the scanner to continue scanning for the other component.

To add data in a CC call the regular RSS symbology and send the data to encode as a CC after the digits for the RSS code, separated by the character | (ASCII code 124):

Example with RSS-14, "Fontware_BarSTORM" encoded as CC:

```
<Esc>(s24810T1234567890123|Fontware_BarSTORM<Esc>(s0p10h12vbs4099T
```

PDF417

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 code" 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`**.

Data too long to be encoded in a PDF symbol can be encoded into a series of linked PDF417 symbols. This is called **Macro PDF417** (please read below).

There are many options for the PDF417 symbol, activated using parameters of the font-like PCL sequence. Please read carefully the parameters descriptions in the **FONT-LIKE PARAMETERS DESCRIPTION** chapter.

Macro PDF417

Data too long to be encoded in a PDF symbol can be encoded into a series of linked PDF417 symbols. Macro PDF417 options are similar to the PDF417 barcode options, plus the maximum number of PDF417 symbols per column. When that maximum is reached a new column is created on the right of the previous column.

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

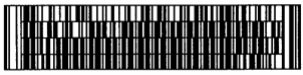
For the options for the Data Matrix symbol, please read carefully the PCL parameters descriptions in the **FONT-LIKE PARAMETERS DESCRIPTION** chapter.

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 code" 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.

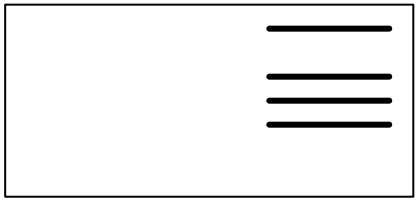
QRCode™

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 code" supports four-level error correction and a wide range of symbol sizes. "BarDIMM code" 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 code" can generate OMR marks used by insertion/folding/Sealing systems found in mailrooms. Using "BarDIMM code" 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). "BarDIMM code" 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

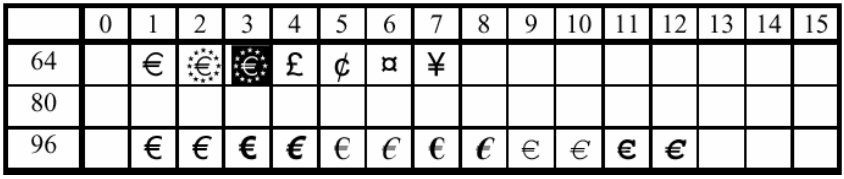
Marks are defined in the data from top to bottom.

23- Euro Currency Symbol and Additional Fonts

BarSTORM 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 a PCL driver is available.
The Euro symbols font and the « Manufacturing and Safety Symbols » and « Electronics and Safety Symbols » scalable logo fonts are optionally available for BarSTORM.

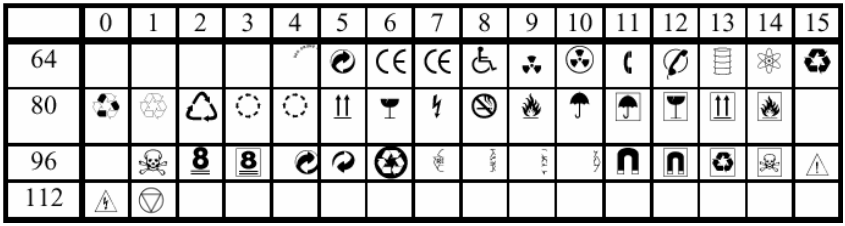
Euro and other currency symbols

Escape sequence: **<Esc>(12U<Esc>(s1p<*size*>vsb10452T**
where **<*size*>** is the symbol size in points (1/72th inch)



Manufacturing and safety symbols

Escape sequence: **<Esc>(10Q<Esc>(s1p<*size*>vsb10400T**
where **<*size*>** is the symbol size in points (1/72th inch)



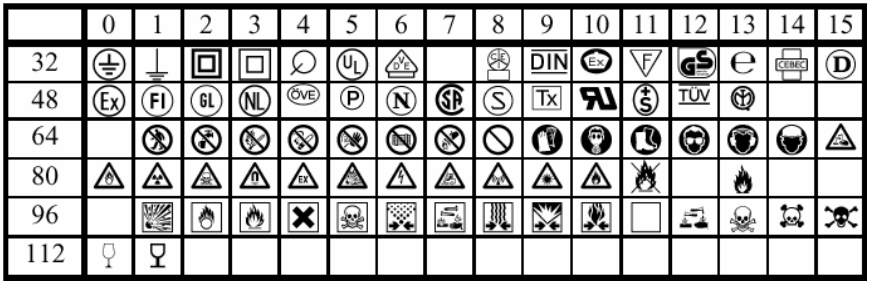
Special multi-characters symbols:

Green point `<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`

Electronics and safety symbols

Escape sequence: **<Esc>(10Q<Esc>(s1p*<size>*vs3b10400T**
where ***<size>*** is the symbol size in points (1/72th inch)



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

24- Odette Transport Label macros

BarSTORM optionally contains the VDA 4902 / Odette label used in the automobile industry. These labels are included as PCL5 macros callable from any application using their specific Macro number.

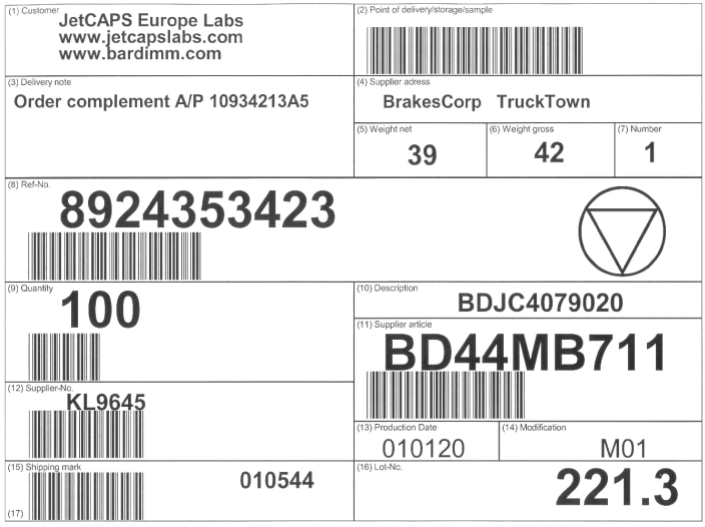
- Under Windows: using the "Macro" BarDIMM special TTF font
  - Install the Macro Exec TTF font, and enter the macro number using it.

- 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).



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

25- Main Error Messages in Bar Codes

The "BarDIMM code" 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 the "BarDIMM code" 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 the "BarDIMM code" 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 the "BarDIMM code" 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 the "BarDIMM code" 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 the "BarDIMM code" 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 the "BarDIMM code" 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 bridged via the "BarDIMM code", and the barcode font parameters create huge fonts that overflow memory. Please read the "Testing the BarSTORM" 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/ Business Ink Jet printer driver. "BarDIMM code" 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.

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

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For the latest FAQ, please consult
www.jetmobile.com
for more information

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Please check frequently the BarSTORM WEB site:

http://www.fontware.com/barstorm

BarSTORM Registration Form

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

What system is using BarSTORM barcoding or Freescape features?

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Where do you put barcodes? _____ Printer model:_____

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