

Morovia PDF417 PCL Scalable Fonts User Guide

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The fonts under `pc1` directory are PCL Version of Morovia PDF417 fonts. These are “soft” fonts, so named because they reside in the RAM area in the printer after being downloaded. Although they can be used just like built-in hardware fonts, they can not survive power outages. Therefore, we recommend that your application sends the font file at the beginning of every print job to avoid situations that the font is lost because someone just pressed the power button. Some high-end printers store soft fonts in their hard drive and automatically load the fonts at the startup. In this case, these fonts can be treated as part of the printer.

Note The design of PDF417 fonts was substantially changed in version 4. The fonts are not compatible with early version encoders. Always use the encoder that comes with the fonts in the same package.

Note In order to print a valid barcode, you must call PDF417 encoder to get the barcode string and output the barcode string, not the number itself. You should also select a font size optimal to your printer. This guide assumed that you already understand the topic. See the product manual for the detailed information on this topic.

Table 1. List of PDF417 PCL fonts

Filename	Typeface	y-height	X-dim at 12 points
mrvpdf417n2.sft	MRV PDF417 N2	yHeight: 2.1	20 mils
mrvpdf417n3.sft	MRV PDF417 N3	yHeight: 3.1	13.35 mils
mrvpdf417n4.sft	MRV PDF417 N4	yHeight 4.2	10 mils
mrvpdf417n6.sft	MRV PDF417 N6	yHeight 6.2	6.67 mils

The PCL scalable fonts, just like their true type cousins, scale linearly at both horizontal and vertical dimensions. For example, `mrvpdf417n4.sft` produces barcodes with X dimension at 10 mils when printed at 12 points. It will produce barcodes twice larger at 24 points.

Note For better decodability, the y-height should be greater than 3.0. The font `mrvpdf417n2.sft` should not be used unless you have full control on the whole printing/reading process. Do not use this font in open systems.

For applications to use a soft font, the font must be sent to the printer first. This process is called *downloading*. The font only needs to be sent once, and will reside in the printer for all the time until a power recycle happens. When your application needs to print the barcode, it sends a special command to switch from the default font to the barcode font. This is called *selecting font*. After the font is selected, you send the full barcode string (which includes start character, data, checksum and stop character) to printer. At last, you send a PCL command to tell printer to switch back to the default font.

A PCL command always begins with the ESC character (referred as <esc> throughout of this manual). The ASCII value for this character is 27. It is followed by one or two characters (called commands). A PCL command may contain parameters, and termination characters. If you are not familiar with PCL commands, you may want to read PCL 5 Technical Reference Manual¹ thoroughly, or use it as a desktop reference.

1. Downloading Font to Printer

You can download the fonts to the printer by writing some code. On the other hand, in many occasions you might want to do it under command prompt or in a shell environment. The downloading involves three steps:

1. Designate a Font ID to the soft font. The Font ID should be unique among all soft fonts.
The PCL command to use is <esc>*c#D, while # is the decimal value of the Font ID.
2. Send the actual soft font.
3. Make the font permanent by sending PCL command <esc>*c5F.

Step 1 and 2 must be carried out in one connection. If for some reason they can not be sent together in one command line, you need to merge data into one file and send this file instead. We'll explain how to achieve this soon.

There are several methods to send the data above to the printer, depending on the platform and connection choice. For example, if the printer is directly connected to a computer via a parallel port, or the printer is shared among a Windows network, you can use `copy` to send data to the printer. If it is a network printer connected to a TCP/IP network, you will need to use `lpr` command.

¹ <http://h20000.www2.hp.com/bc/docs/support/SupportManual/bpl13210/bpl13210.pdf>

In preparation of downloading the soft font to your printer, consider that the number you will assign as the font ID. Each soft font must have a unique number associated. Any font with the same ID overwrites the previous one.

In the example we provided, we put the font ID command in file `C80D.txt`. Another file `c5F.txt` contains the command for step 3.

1.1. Windows

On Windows you can use `copy/b` command to send data to printer.

```
c:\> copy /b C80D.txt +mrvpdf417n3.sft +c5F.txt LPT1:
```

If your operating system is DOS which only supports 8.3 file format, you need to shorten the file name before running the command.

If the destination printer is on the network, use the printer's network name in the place of LPT1. For example, the following command sends the font to a network printer which is shared as HPLaserJon computer Chicago:

```
c:\> copy /B c80D.txt +mrvpdf417n3.sft +c5F.txt +data.txt \\chicago\HPLaserJ
```

1.2. UNIX/LINUX

On UNIX and LINUX platforms, you can use `cat` command to copy file to a raw device.

For example, the following command sends the font file to printer:

```
# cat C80D.txt +mrvpdf417n3.sft +c5F.txt /dev/lpt1r
```

Here, `/dev/lpt1r` refers to the printer connected to the LPT1 port. The `r` means raw device.

1.3. LPR

When the printer is connected to a TCP/IP network directly, the best method is to send commands through `lpr` command. A TCP/IP device may be identified with a full qualified DNS name, or an IP address. In our test lab, we assigned our network printer a fixed IP address `192.168.1.22`, and we use this address in the examples below. In `lpr` manual page, it is also referred as `Printer Name`.

Another name you will need is **Queue Name**. The queue names are names assigned to the “processors” in the print server. Most print servers and network printers have hardcoded queue names. Some allow you to define your own queue. On HP JetDirect printer servers, the raw PCL queues are named as `raw`, `raw1`, `raw2` and `raw3`. In test files we use `raw` as the queue name.

Note that `lpr` command only accepts 1 file at a time. However, the `step1` and `step2` commands must be sent in one stream, otherwise the printer will discard them altogether. As a result, you will need to merge these three files into one first. On Windows, you can use `copy` command:

```
copy /b C80D.txt +mrvpdf417n3.sft +c5F.txt total.bin
```

On Linux/Unix platforms, use `cat` command:

```
cat c80D.txt mrvpdf417n3.sft c5F.txt > total.bin
```

Now we can send these files (Windows):

```
lpr -S 192.168.1.22 -P raw -o total.bin
lpr -S 192.168.1.22 -P raw -o data.txt
```

You need to replace the IP address, the queue name and the file name with the appropriate ones in your environment.

On Linux/UNIX platforms, things are more complicated. The configuration varies from platform to platform. Generally you need to set up the printer first. On RedHat Linux, this can be done using `printtool`. You

assign a printer name (queue name) in the configuration, and you use this name in lpr command. Assume that the name is HPPrinter, the lpr command on RH Linux becomes:

```
lpr -P HPPrinter -o raw total.bin
lpr -P HPPrinter -o raw data.txt
```

1.4. Verifying Existence of Fonts









Normally if the printer has sufficient memory, the download will be successful. You usually won't need to worry about the memory issue. To verify that the font is residing in the printer, you can write some code which selects the font and prints a couple of lines of text. High end printer model usually has a LCD control panel that provides a way to print the PCL font list. If a LCD panel is on the printer, you can do the following to print a PCL font list, and check the font name against the list:

- Press the ENTER/MENU key on the control panel.
- Use the > or < key to select Reports and press ENTER/MENU.
- Use the > or < key to select PCL Font List and press ENTER/MENU. The printer exits the Menu settings and prints the list.

Although soft fonts can survive many PCL commands, they are residing in the RAM area, not the ROM. Therefore they are not able to survive a power loss. Thus, it is a good idea to download the font at each printing job. Our font size is very small (1K ~ 10K) and downloading only takes approximately 1 second. Each time the font downloaded will automatically overwrite the one downloaded earlier if the two fonts share the same Font ID.

The image below is taken from the actual print out on a HP LaserJet 2300 model.

HP PCL5e Permanent Soft Fonts

Font	Pitch/Point	Escape Sequence	Font #	Font ID
 MRV PDF417 N2	Scalable	<esc>(8U<esc>(s1p  v0s0b33344T	SOFT 1	80
 MRV PDF417 N3	Scalable	<esc>(8U<esc>(s1p  v0s0b33345T	SOFT 2	81
 MRV PDF417 N4	Scalable	<esc>(8U<esc>(s1p  v0s0b33346T	SOFT 3	82
 MRV PDF417 N6	Scalable	<esc>(8U<esc>(s1p  v0s0b33347T	SOFT 4	83

2. Selecting Font

After the font is successfully installed, you can use the font by issuing Font Selection command. The command

```
<esc>(80X
```

Selects the font we just installed. Here 80 is the font ID of the font we just installed.

To switch back to the default font, using the command:

```
<esc>(3@
```

For a detailed example, check data.txt under pcl directory.

Font can also be selected use *symbol set*, or combination of *symbol set* and *typeface family*. For example, both the statement below selects MRV PDF417 N3 font:

```
<esc>(8U<esc>(33345T
```

For a list of typeface family values of Morovia PDF417 fonts, see Section 4, "Supplemental Information".

3. Setting VMI

By default, PCL printers use 1/8 as the line height. In other words, the cursor always moves 1/8 inch after finishing a line. This is not desired to print PDF417 barcodes, as large gaps will appear between two lines. In order to print the barcode properly, you must set the VMI approximately so that the cursor moves exactly the height of a row.

The line height is $\text{font_size} \times 0.66$ inch for our font. The corresponding VMI is $\text{font_size} \times 0.66$. For example, when font size is 16 points, the VMI is $16 \times 0.66 = 10.52$. The following statements select MRV PDF417 N3 at 16 points, adjust VMI to 10.52 and print a PDF417 barcode. After the barcode is printed, the font and VMI are changed back to their default values.

```
<esc>(8U<esc>(s1p16v33345T
<esc>&110.52C
FFFFFFFFF0F0F0F000FFD7D69627AB95550FF7819A06ABE61520FFE5E5B59CB337760FFFFFFFFF0F000F0F00F
FFFFFFFFF0F0F0F000FDF5D2FAE5633A840FF956F708C0F70300FDF1D2FEC76358800FFFFFFFFF0F000F0F00F
FFFFFFFFF0F0F0F000F7A52887EE99D7740FAEA997781AE42180F3E128C7321DDBB90FFFFFFFFF0F000F0F00F
FFFFFFFFF0F0F0F000F7F74250916B33570F0E23347FC052A800F5F4414982433BE40FFFFFFFFF0F000F0F00F
FFFFFFFFF0F0F0F000F6F646A9F9D5CA770FAC86903FF56AA210F6F602E9FDD7AA510FFFFFFFFF0F000F0F00F
EEEEEEEE0E0E0E000E2EE2C460204CAA00E202E2A422AEAA020E2EE2CC60EC882200EEEEEEEE0E000E0E00E
<esc>(3@
<esc>&18C
```

4. Supplemental Information

Table 2. Symbol Set Values

Symbol Set Name	Set ID	Kind Value
Roman-8	8U	277

Table 3. Typeface Family Values

Value	Typeface Name	Value	Typeface Name
33344	MRV PDF417 N2	33345	MRV PDF417 N3
33346	MRV PDF417 N4	33347	MRV PDF417 N6

