

Morovia QR Code PCL Scalable Fonts User Guide

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This is the user guide for QR Code PCL font, version 5, published in December 2011.

Note In order to print a valid barcode, you must call QR Code 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 QRCode PCL fonts

Filename	Typeface	X-dim at 6 points
mrqvrcode.sft	MRV QRCode	20 mils

The PCL scalable font just like their true type cousin, scales linearly at both horizontal and vertical dimensions. For example, `mrqvrcode.sft` produces symbols with X dimension at 20 mils when printed at 6 points. It will produce barcodes twice larger at 12 points.

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.

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 +mrqvrcode.sft +c5F.txt LPT1:
```

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

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 +mrqvrcode.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 +mrqvrcode.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 +mrqvrcode.sft +c5F.txt total.bin
```

On Linux/Unix platforms, use cat command:

```
cat c80D.txt mrqvrcode.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 QRCode ABCDE fghij ¶ # \$ MRV OCR A I I I	Scalable	<esc>(8U<esc>(s1p v0s0b33280T	SOFT 1	80
	10.01/12.0	<esc>(00<esc>(s0p10.01h12.0v0s0b32833T	SOFT 2	81

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 QRCode5 font:

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

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

3. Setting VMI

By default, PCL printers use 1/8 inch as the line height. In other words, the cursor always moves 1/8 inch after finishing a line. This is not desired to print QRCode 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 $8 \times 0.66 = 5.28$. The following statements select MRV QRCode5 at 8 points, adjust VMI to 5.28 and print a QRCode barcode. After the barcode is printed, the font and VMI are changed back to their default values.

```
<esc>(8U<esc>(s1p8v33280T
```

```

<esc>&15.28C
F8BBB8F060E2D0F8BBB8F
E2AAA2E0FCE8A0E2AAA2E
B85D02AA21BE94F9B4FC5
322AA2B0E8AF2B0F3107C
F0EEE0F05C6192EC5EBC7
888888808000088000800
<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
33280	MRV QRCode

