Morovia Code39 PCL Scalable Font Pack 1.0 Reference Manual

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Chapter 1. Introduction

Code 39 PCL Scalable Font pack contains 14 PCL scalable fonts in 7 different heights, with and without human readable text. They are designed to work with PCL-compatible printers. Unlike offerings from competitors, our fonts are *PCL* scalable format - which means that they can be treated like true type fonts on Windows and Macintosh systems. To change the barcode size, user can simply change the font size. There is no need to download another font to printer.

The Font kit comprises the following contents:

- Fourteen Code39 PCL scalable soft fonts - seven without human readable - `mrvcode39xxs.sft`, `mrvcode39xs.sft`, `mrvcode39s.sft`, `mrvcode39m.sft`, `mrvcode39t.sft`, `mrvcode39xt.sft`, `mrvcode39xxt.sft`, and seven with human readable - `mrvcode39xxsa.sft`, `mrvcode39xsa.sft`, `mrvcode39sa.sft`, `mrvcode39ma.sft`, `mrvcode39ta.sft`, `mrvcode39xta.sft` and `mrvcode39xxta.sft`.
- User Manual, which you are reading.
- Test files for Windows and Unix systems (including Mac OS X and Linux)
- `Code39gen`, a command line utility which calculates barcode string. A barcode string is a text string which becomes a valid barcode after being formatted with our font. This is necessary because Code 39 requires start and stop characters, and accepts an optional checksum character to increase barcode security.

Code39 was the first alphanumeric symbology developed. It is also the easiest one to use. Among many things, *code39* does not require a checksum character. In that it is called "*self-checking*". It has a character set of 43 characters, including all capital letters, digits and some punctuation symbols. Characters outside the native set can be encoded using a method called "*Code 39 extended*". However, Code39 extended requires scanners to be configured to be in the "Code39 full ASCII" mode to use this feature, since an extended Code 39 symbol is compatible with a normal one.

A Code 39 barcode requires *start/stop characters* at the beginning and at the end. These two characters are required in order to tell scanner where to start and stop the scan. These characters can printed with asterisks (*). Always make sure that the data sent to the print includes them, otherwise the barcode won't scan.

1.1. How to read this manual

This manual assumes that you are familiar with Code 39 symbology and PCL commands. If you are unfamiliar with Code 39, read Chapter 4, *Creating Barcode String in your application* first.

If you are ready to integrate the fonts into your application, read Chapter 3, *Choosing the Right Font* and start to select the point size and font name which will produce barcodes matching your requirements.

Chapter 2. How to Use these Fonts

The fonts supplied in this package are *PCL* soft fonts. They are so named to differentiate from hardware fonts. Soft fonts reside in the RAM area instead of the ROM in a printer. Although they can be used as if a built-in hardware font, they can not survive a power outage. Therefore, we recommend that your application sends the font at the beginning of every print job to avoid situations that the fonts are 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, the soft fonts can be treated as if part of the printer.

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 obtain the [PCL Technical Reference Manual], part number `5021-0377` from HP.

2.1. PCL Font Types

There are several kinds of PCL fonts. Among them the most widely used ones are the bitmapped format and the scalable true type format. The former type usually has a file extension *SFP*, which stands for Soft Font Portrait. It is so named because there is another type called SFL (Soft Font Landscape) due to the fact that early HP Laerjet printers were unable to rotate font characters. The SFP and SFL formats are identical, except the orientation parameter. A bitmapped font, like a bitmap image, consists of an array of pixel values, instead of drawing commands. As a result, bitmapped fonts only produce fixed size characters which can not be scaled. For example, a font designed to print barcodes at 0.5" height won't produce barcodes at 1.0". You need to ask the font designer to create another font to produce a different size barcode.

Scalable True Type font (*SFT*), on the contrary, is just like a true type font on Windows or Mac systems. They contains drawing commands instead. As such they can be scaled to any size. You only need one font in the printer to produce barcodes of multiple sizes.

The fonts included in this package are PCL scalable fonts.

2.2. Font Selection

The font selection process is simple for a bitmapped font, since the size is fixed. It is not the case for scalable font. Selecting font by its font ID does not work very well for scalable font. Instead, we recommend to use a combination of *symbol set*, *point size* and *typeface family value* to select the font.

For example, the following statements select scalable font `MRV Code39XSA` 16 points:

```
<esc>(0Y<esc>(s16v33221T
```

or

```
<esc>(0Y<esc>(s16v<esc>(s33221T
```

There are three parts in this statement. The first part, <esc>(0Y selects code 3 of 9 symbol set. The middle part <esc>(s16v sets font size to 16 points. Finally, the last part <esc>(s33221T select the font with typeface family value 33221 (which corresponds to MRV Code39XSA. Typeface family value is the weakest requirement, however, if multiple code 39 fonts are installed in the printer, it is the only criteria to select the right font.

For a list of typeface family values of code 39 fonts, refer to Appendix A, *Supplemental Information*.

If MRV Code39XSA is not present in the printer, another code 39 font will be selected. If no code39 fonts are present, the default font is used. Therefore font selection can be used to verify if the font has been properly downloaded to the printer.

2.3. Downloading Font To Your printer

You can download the fonts to 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 operation 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 the number that you will assign as the font ID. Each soft font must have an 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.

2.3.1. Windows

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

```
c:\> copy /b C80D.txt +mrvcode39xsa.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 +mrvcode39xsa.sft +c5F.txt  \\Chicago\HPLaserJ
```

2.3.2. 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 +mrvcode39xsa.sft +c5F.txt  /dev/lpt1r
```

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

2.3.3. 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 hard-coded 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 +mrvcode39xsa.sft +c5F.txt total.bin
```

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

```
cat c80D.txt mrvcode39xsa.sft c5F.txt > total.bin
```

Now we can send these files (Windows):

```
lpr -S 192.168.1.22 -P raw -ol total.bin
lpr -S 192.168.1.22 -P raw -ol 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
```

2.3.4. Checking Font Existence

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 models usually have 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 (5K ~ 20K) 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 Laerjet 2300 model [1].

[1]Note that some tall(M and above) fonts printers characters much taller than the regular line height. As a result, the font names are not very clearly displayed in the print out. The best way to verify the font existence is to select one and print some characters out.

HP PCL5e Permanent Soft Fonts

Font	Pitch/Point	Escape Sequence	Font #	Font ID
MRV Code39XXS	Scalable	<esc>(0Y<esc>(s1p [redacted] v0s0b33229T	SOFT 1	80

Chapter 3. Choosing the Right Font

The fonts included in this package produce *X dimension* at 10 *mils* (1/1000th inch, or 0.0254 cm) and heights at 1/8"(XXS), 1/4"(XS), 3/8"(S), 1/2"(M), 5/8"(T), 3/4"(XT) and 1"(XXT) respectively when printed at 12 points. To have the human readable printed beneath the barcode, use the human readable version which has a trailing capital A in the typeface name. Thus, `MRV Code39MA` prints code39 barcodes at 1/2" hight and 10mils as X dimension, with human readable text beneath the barcode.

To simplify the size calculation, X dimension is independent of the typeface. All fonts produce barcodes with identical X dimension under the same font size. To determine the typeface and font size, first calculate the font size from X-dimension requirement, then select a typeface which closest matches the required height.

The scalable fonts in this package have different characteristics from the ones in Morovia Code39 Fontware 4.0 and earlier. Therefore you should not use this manual as a reference for Code39 Fontware.

3.1. X-dimension

Although font characters scale linearly and print any sizes required, not all sizes will produce best quality barcodes. The reason is that printers can only address individual pixels instead of a length specified in inches or centimeters. For example, a printer dot measures 3.33 mils on a 300-dpi printer. Certainly you can not print a size smaller than 3.33 mils. And you can not consistently print a length of 5 mils, because this printer either prints 3.33 mils, or 6.66 mils in this case. We call a font size `optimal` when the dots produced always remain constant. This is vital to small size barcodes where the barcode quality largely depends on the constant width of elements. On the other side, this is usually not a problem when X dimension is big enough especially at normal sizes (such as 15 and 20 mils).

The optimal sizes for this version Code39 fonts are integral times of 4 on a 300-dpi printer and integral times of 2 on a 600-dpi printer. To quickly locate the font size based on X-dimension requirement, use the table below:

Table 3.1. X Dimensions List

Font Size	X Dimension		Font Size	X Dimension	
6 pt	5 mils	0.013 cm	28 pt	23 mils	0.059 cm
8 pt	7 mils	0.017 cm	30 pt	25 mils	0.063 cm
10 pt	8 mils	0.021 cm	32 pt	26 mils	0.065 cm
12 pt	10 mils	0.025 cm	34 pt	28 mils	0.071 cm
14 pt	12 mils	0.029 cm	36 pt	30 mils	0.076 cm
16 pt	13 mils	0.034 cm	38 pt	31 mils	0.080 cm
18 pt	15 mils	0.038 cm	40 pt	33 mils	0.084 cm
20 pt	17 mils	0.042 cm	42 pt	35 mils	0.088 cm
22 pt	18 mils	0.046 cm	44 pt	36 mils	0.092 cm
24 pt	20 mils	0.050 cm	46 pt	38 mils	0.097 cm
26 pt	22 mils	0.055 cm	48 pt	40 mils	0.101 cm

For example, suppose that X-dimension required is 15 mils, from Table 3.1, “X Dimensions List”, the optimal size is 18 points on 600-dpi printers, or 20 points. [1]

Many barcode standards require that a code 3 of 9 barcode to have a X-dimension at 7.5 mils or above on open systems. To meet this requirement, the font size should be at least 8 points.

Sometimes a requirement does not specify X-dimension. Instead, it gives the requirement of overall length or character per inch (cpi). Fortunately it is easy to derive X dimension from barcode length. A Code39 character always has 3 wide elements and 7 narrow elements [2]. When N (the ratio of the nominal wide element width to the nominal narrow-element width) is 3.0, the width of a code39 character is 16 times X dimension.

For example, assume that barcode density specified is is 8 characters per inch (including extra start and stop characters). It translates into 1/8" per character. Divide the value by 16 we get X dimension 0.008 inch. From the X-dimension table, assume that the printer has a resolution of 600 dpi, the font size to be used should be 10 points.

3.2. Bar Height

After font size is determined from the X dimension requirement, now it is time to find which font meets the bar height requirement. In this pack seven different bar heights at any given font size. At 12 points, the barcodes produced will have the following heights:

Table 3.2. Bar Heights of Code39 Fonts (at 12 points)

Height Option	Bar Height (inch)	Bar Height (cm)
XXS	0.125 inch	0.318 cm
XS	0.250 inch	0.635 cm
S	0.375 inch	0.952 cm
M	0.5 inch	1.27 cm
T	0.625 inch	1.588 cm
XT	0.750 inch	1.90 cm
XXT	1.0 inch	2.54 cm

Assume that you need a font to produce barcodes with X dimension at 15 mils and bar height at 1 inch. From the X dimension table 18 points should be used as the font size. At 18 points, T fonts produce bar height of 0.625X18/12=0.94 inch, whereas XT fonts produce bar height 0.75*18/12=1.125inch. Both are closest matches to the requirement. If requirement says that the bar height must be at least 1 inch, then XT fonts should be selected.

3.3. Human Readable Text

The last factor of font selection is human readable text. The human readable text can be added using a text font. For convenience, we create fonts with human readable text built-in. It is easy to identify human-readable

[1]Note that 18 pt is not an optimal size for 300-dpi printer, although the barcode printed might pass scan testing.
[2]Some specifications say that a code39 character consists of 9 elements, among which 3 are wide. This is how the name "3 of 9" comes from. This statement is correct. However, it did not take the inter-character gap into count. According to the code39 standard, a blank element with equal to X-dimension is required between characters. To simplify the calculation, we count this element in the character.

fonts - these fonts with names ending with a trailing letter A. Therefore, MRV Code39M produce barcodes only, whereas MRV Code39MA produces barcodes with human readable. Except this difference, the two fonts are identical.

3.4. Other Considerations

Fonts are easy to use and portable among systems. On the other side, font characters scale in both directions. That means it is impossible to get both sizes match the ones required. The bar height always scales up and down at the same time X-dimension scales up and down.

Code39 standard also allows customization of the ratio N. N is normally a value between 2.5 and 3.0. A lower value increases barcode density at the cost of readability. All code39 fonts included in this package have a fixed ratio of 3.0, which is required by most applications.

In consideration of the possible requirement to have the font customized for specific needs, Morovia offers custom font services at reasonable cost. For example, we can modify a font to have N=2.5, or have a font meet *both* bar height and X dimension requirements. Note that this service is offered only to customers who already purchased a license of the font, and the license term of the modified font follows the product to be replaced. If you have such needs, please contact us at support@morovia.com.

Chapter 4. Creating Barcode String in your application

Code 39 (also known as USS [1] Code 39, Code 3 of 9) is the first alpha-numeric symbology developed to be used in non-retail environment. It is widely used to code alphanumeric information, such as model numbers etc. It is designed to encode 26 upper case letters `A-Z`, 10 digits `0-9` and 7 special characters - hyphen (-), period (.), dollar sign ($), forward slash (/), plus sign (+), percent (%) as well as the space character.

Code 39 can have an optional modulo 43 check digit. It also has a variant called code 39 extended or code 39 full ASCII, which is capable of encoding all 128 7-bit characters (*ASCII* values 0 - 127).

Code39 is a fairly simple symbology. Still, you can not just type the number and format with the font. A code39 *barcode string* includes additional characters, such as start/stop characters and checksum character. Due to limitations imposed by the font technology, you need to enter another character for space. We'll go through these topics one by one below.

4.1. Character Mappings In Code 39 Fonts

A character in Code 39 fonts is mapped to itself, with exception of space. Since space is reserved for many other purposes, it must remain blank. To print a barcode character that will be scanned as space, use underscore (_) or equal sign (=).

To print start/stop characters, use asterisk (*). You can also use left square bracket `[` and right square bracket `]` to produce them. The only difference between square brackets and asterisk is that the latter has human readable character `*` beneath the barcode in a human readable font. In non-human-readable fonts, they print identical patterns.

4.2. Normal Code39

To create barcode string for a normal code 39 without check digit, enclose your data with either asterisks or square brackets. For example, both `*PN99018*` and `[PN99018]` produce code 39 barcodes with text `PN99018` encoded.

4.3. Modulo 43 Checksum

Some applications, such as *HIBC* and LOGMARS, require a modulo 43 *Check character* at the end of the barcode (just before the stop character). The scanners must be configured with the checksum verification turned on in order to use the feature. The design of the checksum is to guard the data integrity. The scanner calculates the checksum at the time of scan, if it does not match the one in the barcode, the scanner assumes that some portion of the barcode was misprinted or misread and rejects the barcode.

To create barcode string with check digit, first calculate the checksum value. Derive the font character from the checksum value and append to the data. At last enclose the whole part with either asterisks or square brackets.

[1] Uniform Symbology Specification

Table 4.1. Code39 value table

char	value	char	value	char	value	char	value
0	0	A	10	N	23	hyphen (-)	36
1	1	B	11	O	24	period (.)	37
2	2	C	12	P	25	SPACE ( )	38
3	3	D	13	Q	26	dollar ($)	39
4	4	E	14	R	27	slash (/)	40
5	5	F	15	S	28	plus (+)	41
6	6	G	16	T	29	percent (%)	42
7	7	H	17	U	30		
8	8	I	18	V	31		
9	9	J	19	W	32		
		K	20	X	33		
		L	21	Y	34		
		M	22	Z	35		

The following procedure explains how to calculate the modulo 43 checksum:

1. First assign each character in the barcode a numeric value (0 through 42) according to Table 4.1, “Code39 value table”. The start and stop characters do not participate in the checksum calculation.
2. Sum the values of all the data characters.
3. Divide the result from step 2 by 43.
4. The remainder from the division in step 3 is the checksum character that will be appended to the data message before the stop character.

Note that in Code39 font the SPACE character is represented by equal = sign or underscore _. This also applies on checksum values. If you get a checksum value of 38, you should add = to the barcode string instead.

4.4. Code 39 Extended

Code39 standard also specifies a way to print characters outside the native Code 39 character set. It does so by encoding these characters with two native Code 39 characters. Four characters, the percent sign (%), dollar ($), slash (/) and plus sign (+) are used as leading characters.

Since these leading characters are also in the native Code 39 character set, the barcode reader is unable to determine whether a barcode is Code 39 extended or just normal code 39. For example, a barcode reader may read the extended code 39 barcode `abc` as `+A+B+C`. Fortunately, most scanners allow you configure if you expect a Code 39 extended symbol (sometimes called Code 39 Full ASCII), or just a normal code 39 symbol.

When you need to encode characters outside the native set, use the table below. For example, the sequence for lower case letter `a` is `+A`.

Table 4.2. Code39 Full ASCII Chart

ASCII	Encoding	ASCII	Encoding	ASCII	Encoding	ASCII	Encoding
NUL	%U	Space	= or -	@	%V	`	%W

ASCII	Encoding	ASCII	Encoding	ASCII	Encoding	ASCII	Encoding
SOH	$A	!	/A	A	A	a	+A
STX	$B	"	/B	B	B	b	+B
ETX	$C	#	/C	C	C	c	+C
EOT	$D	$	/D	D	D	d	+D
ENQ	$E	%	/E	E	E	e	+E
ACK	$F	&	/F	F	F	f	+F
BEL	$G	'	/G	G	G	g	+G
BS	$H	(	/H	H	H	H	H
HT	$I	)	/I	I	I	i	+I
LF	$J	*	/J	J	J	j	+J
VT	$K	+	/K	K	K	k	+K
FF	$L	,	/L	L	L	l	+L
CR	$M	-	-	M	M	m	+M
SO	$N	.	.	N	N	n	+N
SI	$O	/	/O	O	O	o	+O
DLE	$P	0	0	P	P	p	+P
DC1	$Q	1	1	Q	Q	q	+Q
DC2	$R	2	2	R	R	r	+R
DC3	$S	3	3	S	S	s	+S
DC4	$T	4	4	T	T	t	+T
NAK	$U	5	5	U	U	u	+U
SYN	$V	6	6	V	V	v	+V
ETB	$W	7	7	W	W	w	+W
CAN	$X	8	8	X	X	x	+X
EM	$Y	9	9	Y	Y	y	+Y
SUB	$Z	:	/Z	Z	Z	z	+Z
ESC	%A	;	%F	[	%K	{	%P
FS	%B	>	%G	\	%L	|	%Q
GS	%C	=	%H	]	%M	}	%R
RS	%D	<	%I	^	%N	~	%S
YS	%E	?	%J	_	%O	DEL	%T, %X, %Y, %Z

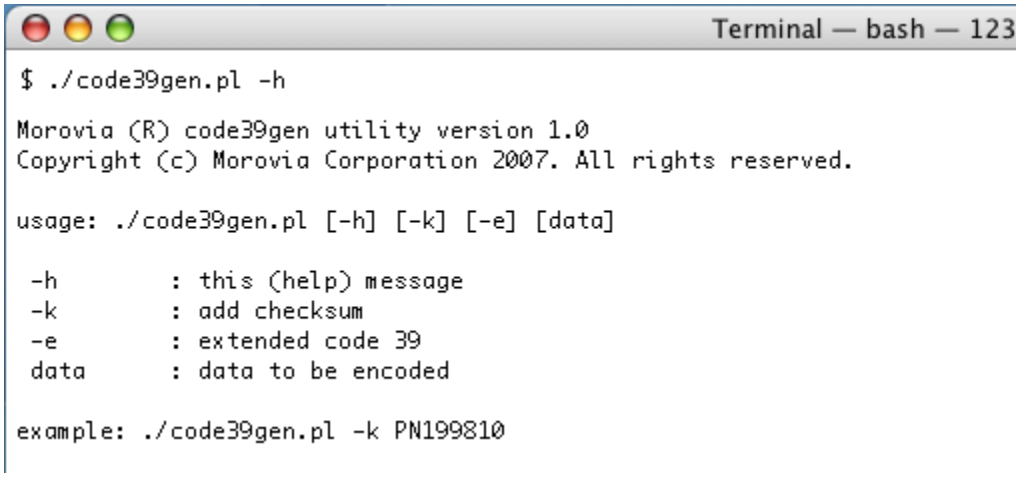
To create barcode string for extended code39, first convert character outside the code39 set to two characters. Add start/stop character at the beginning and the end. Formatting the result with a code39 font will result in an extended code 39 barcode.

Chapter 5. Code39gen utility

To assist our customers to verify that the barcode string calculation is implemented correctly, we provide a command-line utility called `code39gen`. This utility is written in perl and requires perl interprer. You can download perl from ActiveState[1] or perl.org[2]. If you want to know the details, load this file in a text editor such as `emacs`, or Windows `notepad`.

For more information, enter `code39.pl -h` . The image below is taken from a Mac OS/X system:

Figure 5.1. Code39gen utility



There are two methods to invoke the program. The first one is universal:

```
perl code39gen.pl [options]
```

On Unix platforms (including Mac OS/X), you can treat it as a shell script after you add 'exec' attribute to the file:

```
chmod +x code39gen.pl
code39gen.pl -h
```

`Code39gen` accepts three command options, `-h`, `-k` and `-e`. Their usages are listed below:

`Code39gen` command line options

`-h`

Display the program usage

`-k`

Add modulo 43 check digit to the barcode

`-e`

Use code 39 extended to encode the data. This option must be turned on to create barcode string for extended code 39.

To encode data containing space, you must enclose the whole data with double quotes. For example, to encode extended code39 for data `Apache 12345`, the command line is:

```
code39gen -e "Apache 12345"
```

[1] http://www.activestate.com
[2] http://www.perl.org

Chapter 6. Technical Support

Morovia offers a wide variety of support services. To help you save time and money when you encounter a problem, we suggest you try to resolve the problem by following the options below in the order shown.

- Consult the documentation. The quickest answer to many questions can be found in the Morovia product documentation.
- Review the tutorial and sample applications. The tutorial steps you through the development process for a typical barcode application. The sample applications provide working code examples in several programming languages. All sample applications are extensively commented.
- Access Morovia Online. Morovia Online provides a knowledge base which documents the frequently asked questions and a web forum.

  The web address for knowledge base is http://support.morovia.com. You can ask question at support forum at http://forum.morovia.com.
- Contact Morovia Technical Support Service. The Technical Support service is provided for free up to 180 days after the purchase. Email Morovia support engineers at `support@morovia.com`.

Note If you purchased your software from our reseller, check to see if they provide support services before contacting Morovia.

Support services and policies are subject to change without notice.

Appendix A. Supplemental Information

Table A.1. Symbol Set Values

Symbol Set Name	Set ID	Kind Value
Code 39 (3 of 9)	0Y	25

Table A.2. Typeface Family Values

Value	Typeface Name	Value	Typeface Name
33229	MRV Code39XXS	33227	MRV Code39XXSA
33216	MRV Code39XS	33221	MRV Code39XSA
33217	MRV Code39S	33222	MRV Code39SA
33218	MRV Code39M	33223	MRV Code39MA
33219	MRV Code39T	33224	MRV Code39TSA
33220	MRV Code39XT	33225	MRV Code39XTA
33228	MRV Code39XXT	33226	MRV Code39XXTA

Appendix B. License Agreement

This agreement applies to all customers who installed Morovia Barcodes & More PCL fonts and/or PCL scalable fonts in their printers, permanently or temporarily.

By using or installing font software (referred as “Software” in this agreement, including fonts, components, source code, install program etc.) created by Morovia Corporation (referred as “Morovia” below), you (or you on behalf of your employer) are agreeing to be bound by the terms and conditions of this License Agreement. This License Agreement constitutes the complete agreement between you and Morovia Corporation. If you do not agree to the terms and condition of the agreement, discontinue use of the Software immediately.

1. License Grant

Number of Installation or Users: In consideration for the license fee paid, Morovia grants to you only, the License, the non-exclusive, non-transferable right to use the font in accordance with the license you purchase. If you are using this product for your employer, this agreement also includes your employer. You may only use the font on printers and computers (CPUs) for which the Fontware is licensed.

Each PCL Font license allows the installation of the fonts on 1 printer and 10 computers to use the fonts (printing to the printer). To calculate the number of licenses required, count the number of printers that the fonts will be installed, and the number of computers that will execute the print job. Divide the latter number by 10 and compare with the number of printers. Whichever number is greater is the number of licenses required. For example, if you need to install the fonts on 2 printers and 30 computers use the fonts (printing to the printer), you will need to purchase 3 licenses.

Transferring the license to a third party is not permitted.

2. Copyright

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3. Distribution Limits

You may transfer the license temporarily from one printer to another for solely printing purpose. You are allowed to embed the fonts in documents under the absolute assurance that the recipient cannot use the Font Software to edit or create a new document (read-only).

4. Other Limits

You are not allowed to decompile, reverse-engineer the Software. If you are using the evaluation version, you are granted to use the Software for sole evaluation purposes for 30 days only. You are not allowed to remove the copyright notice embedded in the Software under any circumstances.

5. Termination

This Agreement is effective until terminated. This Agreement will terminate automatically without notice from Morovia if you fail to comply with any provision contained here. Upon termination, you must destroy

the written materials, the Morovia product, and all copies of them, in part and in whole, including modified copies, if any.

6. Warranty & Risks

The fonts provided by Morovia are licensed to you as is and without warranties as to performance of merchantability, fitness for a particular purpose or any other warranties whether expressed or implied. You, your organization and all users of the font, assume all risks when using it. Morovia shall not be liable for any consequential, incidental, or special damages arising out of the use of or inability to use the font or the provision of or failure to provide support services, even if we have been advised of the possibility of such damages. In any case, the entire liability under any provision of this agreement shall be limited to the greater of the amount actually paid by you for the font or US $5.00.

Glossary

ASCII	The character set and code described in American National Standard Code for Information Interchange, ANSI X3.4-1977. Each ASCII character is encoded with seven bits.
Barcode string	A text string which becomes a bar code after being formatted with a barcode font. A barcode usually adds start/stop characters, as well as checksum characters to the data input. Consequently you can not just format the data with the font to create a valid barcode. In data matrix fontware, it is a synonym for encoder results.
Check character	Synonymous to “Check digit”.
Code 39	Code 39 (also known as USS Code 39, Code 3 of 9) is the first alpha-numeric symbology developed to be used in non-retail environment. It is widely used to code alphanumeric information, such as the model number etc. It is designed to encode 26 upper case letters, 10 digits and 7 special characters.
Code 39 Full ASCII	Also known as Code 39 extended. An extension to normal code 39 standard. In code 39 Full ASCII, two normal characters are combined to encode a character outside the 43 native character set. The resulted barcode is compatible with a normal code 39. Scanners must be configured to the `Full ASCII`mode in order to give the correct results.
HIBC	Acronym for Health Industry Bar Code. A bar code format based on code 3 of 9 adopted by health industry.
LPD/LPR	Stands for Line Printer Daemon/Line Printer Remote, a printer protocol that uses TCP/IP to establish connections between printers and computers on a network. The LPD software runs on the server side and LPR runs on the client side. The LPR client sends the print request to the IP address of the LPD printer/server.
Mil	One one-thousandth of an inch (0.001")
PCL	Acronym for Printer Control Language, the page description language (PDL) developed by Hewlett Packard and used in many of their laser and ink-jet printers.
SFP	SFP stands from Soft Font Portrait. SFP is the file extension for PCL bitmap font files.
SFT	SFP stands from Soft Font TrueType. SFT is the file extension for PCL-5 scalable font files. Some conventions use extension SFS, which stands for Soft Font Scalable.
Start/Stop character	A special bar/space pattern that provides the scanner with start and stop reading instructions as well as scanning direction indicator. Most linear symbologies require start/stop characters included in the barcode.

X dimension	The nominal width dimension of the narrowest element in the bar code - bar or space.