

## SB Telepen Barcode Fonts

### **Font Installation**

The fonts are installed automatically with the Telepen Assistant application.

### **Font Usage**

2 TrueType fonts are provided - SB Telepen and SB Telepen Short. The only difference between them is the character height. The first has a height suitable for most applications; the second is a quarter of the standard font height for a given point size, and can be used to construct a barcode of varying height by using multiple lines. The 2 fonts can also be used in combination using multiple lines.

Some experimentation with point sizes will be required to ensure satisfactory printing of the barcode to suit your printer. In general, laser printers have good resolution and are unlikely to give problems when using point sizes greater than about 20. Ink-jet printers are less satisfactory unless good paper and the highest possible resolution are used. The tendency for the ink to spread distorts the bar and space ratios which can lead to reduced readability.

The barcode symbols use only 2 bar and space widths which should have a ratio of 3 : 1. Check for the following criteria:

1. All thin bars appear to be of the same width.
2. All thick bars appear to be of the same width.
3. All thin spaces appear to be of the same width, and of the same width as the thin bars.
4. All thick spaces appear to be of the same width, and of the same width as the thick bars.

If the above tests fail, try a different point setting. The range of values for satisfactory printing is likely to be around 20-36 point. 27 point, printer quality permitting, gives a satisfactory size for most applications.

### **Overview of the Telepen Barcode Symbology**

Telepen can be used to represent the full range of ASCII characters, which have numeric values 0-127 (0-7F hex). This covers the full standard set of printable characters including numbers, capital and lower-case letters and punctuation marks. It also includes the complete set of nonprintable control characters such as carriage-return, line-feed, horizontal tab etc.

Telepen can also be used to represent numeric data in double-density mode, where an ASCII character is re-interpreted as a pair of numeric characters. There is nothing in the barcode to distinguish between the 2 modes, and the interpretation of the data as ASCII or numeric is set only by the configuration of the reading device.

When using numeric mode, the character pairs 0X to 9X can also be represented. This allows numbers with modulus 11 check-digits in the last character position to be bar-coded.

The relationship between the ASCII and numeric interpretations is shown in the following table.

<i>Character ASCII value</i>	<i>ASCII Interpretation</i>	<i>Numeric Interpretation</i>
<b>17 - 26 (11 - 1A hex)</b>	<b>DC1 - SUB (control chars)</b>	<b>0X - 9X</b>
<b>27 - 126 (1B - 7E hex)</b>	<b>ESC (control char) - '~'</b>	<b>00 - 99</b>

Table 1

## Character Mappings

A font, by definition, only allows for printable characters. As previously mentioned, the Telepen character set includes all ASCII characters including the non-printable control characters. For this reason, the control and space characters are mapped onto some of the more exotic characters (such as Æ) which are not part of the standard ASCII set. The mappings are defined below.

Character(s)	ASCII Value(s)	Font Character Value(s)
NUL - US	0-31 (0-1F hex)	192-223 (C0-DF hex)
<space>	32 (20 hex)	176 (B0 hex)
'!' - '~'	33-126 (21-7E hex)	33-126 (21-7E hex)
DEL	127 (7F hex)	177 (B1 hex)

Table 2

The mappings are summarised as follows:

- All normal printing characters are mapped to their natural positions.
- For the set of 32 control characters (NUL to US), mappings are offset by 192.
- There are 2 special cases: is mapped to position 176, and DEL (delete) to 177.

## Constructing a Telepen Barcode

A complete barcode symbol consists of the following elements:

- A start character ('\_').
- The data.
- A checksum character.
- An end character ('z').

## Calculating the Checksum Character

The checksum is calculated from the ASCII values of the data characters. Note that if you are using the double-density numeric mode, you must convert your data back to their ASCII representations (according to the table 1 above) before doing the calculation.

Use the following algorithm to calculate the checksum character:

1. Calculate the sum of the ASCII values of the data characters.
2. Divide the sum by 127 and take the remainder.
3. Subtract the remainder from 127.
4. In the special case where the result is 127, use NUL (ASCII value zero) as the check character. Otherwise, the result is the ASCII value of the checksum character.

Here is an example. The data to encode in the barcode is 'ABC'.

1. Sum of ASCII values is  $65 + 66 + 67 = 198$ .
2.  $198$  divided by  $127 = 1$ , remainder  $71$ .
3.  $127 - 71 = 56$ .
4. The character with ASCII value  $56$  is '8'.

The complete ASCII barcode symbol data (contained in the quotes) is therefore '\_ABC8z'. When printed it looks like this:



### *Dealing with Control Characters*

In the above example, there were no spaces or control characters. However, a check must always be made for them even if there are no control characters in the actual data, because the checksum character can take any ASCII value.

After the ASCII string for the barcode has been assembled as above, use the following algorithm for substituting the control and space characters:

For each character in the ASCII string

If ASCII value is 32 (space)

    substitute with 176

If ASCII value is 127 (DEL)

    substitute with 177

If ASCII value < 32

    substitute with  $192 + \text{ASCII value}$ .