# Introduction to Computer Braille

In this session we'll look at when you might encounter computer braille, what it is and a little history, how it works and the settings in some popular screen readers.

You don't have to be a computer programmer, you may well encounter computer braille in a number of situations today. You may need to use computer braille:

* on some modern braille note takers when entering filenames, passwords, email or web addresses;
* on several braille displays for their system messages;
* on several screen readers if you have the cursor word not contracted;
* if directly reading or writing a BRF file.

Computer braille dates from the days when computers had limited memory, screens showed grids of fixed width characters and braille displays were more used by computer programmers. Computer braille uniquely showed any character that appeared on the computer screen and in exactly the right place.

Computer braille uses exactly one braille character for every print character. For example, in literary braille, the digit 1 normally takes two braille cells and the letters er take just one. In computer braille, digit 1 takes exactly one cell and letters er always take two.

This simple system was easy to program, but there is a problem: there are 64 braille signs available with six dots, but there were 256 possible computer characters.

The solution is to use eight dot braille. So typically, computer braille uses eight dots. This is one of the reasons why most braille displays have eight dots per cell. Not only are dots 7 and 8 used to show a cursor, highlighting and so on, the extra dots were needed for capitals and unusual characters.

Another reason for computer braille was that computers used symbols that simply weren't available in the ordinary literary braille codes. For example, back in the day, there weren't braille signs for commercial at, vertical bar or backslash; believe it or not, some former literary braille codes didn't even have signs for plus or equals - you had to write out the words instead, or switch to a different braille code.

With the advent of UEB, the need for computer braille is considerably reduced, but you may well still come across it. UEB contains braille symbols for all the common computer signs on a standard QWERTY keyboard and there is no need to switch to any other braille code for email or web addresses in UEB. However, not all screen readers know this.

## Forms of Computer Braille

The most common form of computer braille nowadays in the English-speaking world is the USA computer code, also known as the North American Braille Computer Code or Grade 0. Other countries, including the UK, had their own versions: typically the letters were the same but digits and punctuation characters were different. It does mean that if you get, say, a BRF file from a French or German website, it will be encoded differently to a BRF file from the UK, USA or Australia. To read such a file, you'd either need to re-encode it, or change the settings on your screen reader or braille display.

There are also variants of computer braille which just use six dots, so you could use computer braille on paper. These are not strictly one-for-one tables: to overcome the limit of 64 characters, special prefixes were used to show alternative characters. There were also special signs to show going into and out of computer braille. In the UK, you may remember the dot 6 followed by dots 3-4-6. In the USA, the sign to enter computer braille was dots 4-5-6, 3-4-6, and the ending indicator was dots4-5-6, 1-5-6.

In this session, we'll concentrate only on the signs in USA computer code as used on braille displays.

## Basic Signs

Here is a summary of the most common signs you are likely to meet in USA computer braille.

Remember it is an eight dot braille code and no braille contractions are used for groups of letters.

The ordinary lowercase letters are as you would expect.

Capital letters add dot 7, below dot 3, to the lowercase letters. So, a capital C is dots 1, 4 and 7. If you're not used to reading eight-dot braille, it may be worthwhile practising, so you don't mistake, for example dots 1, 4, 7 (capital C) with dots 1, 4, 3 (lowercase m). There is no capital prefix.

Digits 1 to 9 and 0 use the dots 2, 3, 5 and 6 and no number prefix. So number 5 would be dots 2-6.

The other punctuation signs and symbols use the remaining braille dot patterns. Here are some more common ones:

* Full stop (period): dots 4-6
* Comma: dot 6
* Question mark: dots 1-4-5-6
* Exclamation: dots 2-3-4-6
* Colon: dots 1-5-6
* Apostrophe: dot 3
* Hyphen: dots 3-6
* Open round bracket: dots 1-2-3-5-6
* Close round bracket: dots 2-3-4-5-6
* Percent: dots 1-4-6
* Ampersand: dots 1-2-3-4-6
* At sign: dots 4-7
* Forward slash: dots 3-4
* Backslash: dots 1-2-5-6-7
* Plus: dots 3-4-6
* Equals: dots 1-2-3-4-5-6

There are several more.

Incidentally, these signs (ignoring dots 7 or 8) are typically used in braille fonts as well as BRF files.

In the USA computer code, only dots 1-7 are needed for the main characters; dot 8 is used for what used to be call "extended characters", which includes accented letters and other symbols not readily found on the standard QWERTY keyboard. These so-called extended characters were perhaps less well-defined than the standard ASCII characters, and we won't go into detail.

## Braille Settings

If you connect your braille display to a computer or phone, it is always the screen reader that is in control. So below are examples where to find the settings for braille tables in some popular screen readers.

### JAWS

In the JAWS window, from the menu select Utilities then Settings Centre. Then press Tab, and either arrow Down to, or press B for Braille. Arrow Right to open the Braille settings and then arrow Down to "General".

Now press F6 to go to the settings pane. The first option is the braille language, for example English United States. Tab again and you have the options for using computer braille, USA or Unified literary braille. Tab again and you can select whether to use computer or literary braille for braille input. One more Tab and you'll find the checkbox for whether to show the word at the cursor (the current word) in computer braille.

To quickly toggle between computer and literary braille, on most braille displays you can press Space + dots 1-2-4-5. So you can just turn braille translation off when you want to read a BRF file and then turn it back on for ordinary documents.

Note that, even if you choose UEB, which has all the signs you need, JAWS will on occasion ask you to enter computer braille for things like email addresses in certain places. Strictly this is not necessary.

### NVDA

From the NVDA menu, select Preferences then Settings. Tab until you hear the options for Output Table and Input Table and select the ones you want.

If you continue tabbing, there is an option whether to contract the word at the cursor. If this is not checked, the word the cursor is on will be shown in computer braille.

### SuperNova

In the SuperNova Control Panel, select General Preferences in the Braille menu. There are options for what table to use for the computer braille table, literary braille output table and for literary braille input.

The options for whether to show computer or literary braille are under Characters, in the Braille menu; and whether to input literary or computer braille are under Input in the Braille menu.

The keys to press to quickly switch between computer and literary braille is typically Space + dots 1-2-4-5, but may vary according to braille display.

### VoiceOver

To get to the VoiceOver braille settings, select Settings, then Accessibility, VoiceOver then Braille. There are then options for output being eight- or six-dot, similarly for input and for braille screen input, and then a button for braille tables.

If VoiceOver says you have selected six-dot, then it's a literary code, such as contracted (grade 2) Unified English Braille. If VoiceOver says eight-dot, it means computer braille.

To quickly switch braille output between contracted and computer braille, on most braille displays press Space + dots 1-2-4-5.

To quickly switch braille input between contracted and computer braille, press Space + dots 2-3-6.

## More Information

You can find out more information about the USA computer braille on the BANA website:

www.brailleauthority.org/cbc/cbc.html

There are also pages on Wikipedia and several other popular websites.

You can, of course, just switch to computer braille in your screen reader and try out various characters to see what they are.