

Teaching English to Visually Impaired Learners

Session 2. Tools and Resources

Tools for Learners who Work in Braille

[Quick guide to handling the Perkins Braille Writer](#)

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Learners who need to read and write in Braille will need some tools, both hardware and software, to access information and communicate with others. The following are some of the most common tools you may come across in your class.

Quick guide to handling the Perkins Braille Writer

The Perkins Writer is a mechanical braille typewriter. The traditional one is generally used.

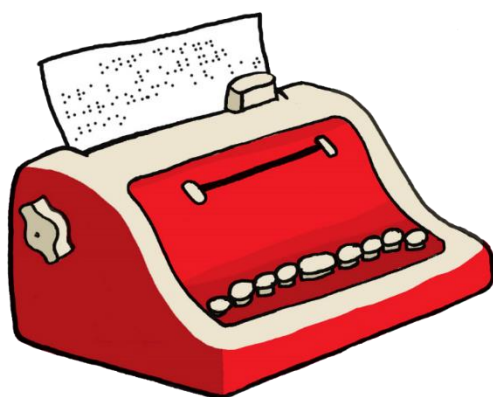


Image 1. Drawing of the Perkins machine with paper written on in Braille.

The machine works with various types of paper, although if the paper is too thin, it may get perforated by the head, and if too thick can jam the machine. Specific Braille writing paper is therefore the most suitable.

Description of Perkins Braille parts

The Perkins Braille Writer fundamentally consists of the following elements:

Front part

- **Six keys** connected to the six punches of the head, corresponding to the six dots of the braille generator sign. (In image 3, 1 is circled and the others are numbered).
- **A space key** (E) between the six braille dot keys used to enter spaces between words.
- **A key on the left** to change lines (L), which goes down one line each time it is pressed.

- **The backspace key (R)**, on the right side, which when pressed returns to the previous letter to the place where the carriage is located and therefore will allow you to include forgotten dots in the previous letter.



Image 3. Front keys of the Perkins machine.

- **The carriage**, above the braille dot keys and the space key, marked in image 4 with a yellow circle, allows the head to move from left to right of the machine.



Image 4. View of the machine carriage.

Upper part

- **The head** is located at the upper rear part of the machine, circled in red in image 5. It contains the six punches that mark the braille dots onto the paper.



Image 5. Perkins punch head.

- **Roller opening levers:** these are two levers, located on the sides of the upper part of the Perkins writer used to open the paper slot in the roller, to insert and remove paper.



Image 6. Opening levers.

- **Paper introduction slot:** the opening, in the upper rear part of the machine, where paper is inserted and placed below the braille head.



Image 7. Paper introduction slot.

- **Handle:** located on the top of the machine to transport it.



Image 8. Machine handle.

Side parts

- **Paper introduction wheels.** The wheels are located on both sides of the machine to move the paper roller to insert or remove paper.



Image 9. View of the right wheel of the Perkins writer.

Rear part

- **Margin stops:** On the back, the Perkins writer has two mobile clamps that can be moved closer together or further apart, depending on the size of paper used and the margins within which you intend to write. The one on the right-hand side has a bell to warn the user when the line is running out.



Image 10. Opening levers.

How does the Perkins machine work?

The Perkins Braille Writer is easy to operate. However, there are some basic guidelines:

- First, before inserting the paper, raise the levers towards us, and turn the roller outwards as far as possible to avoid the paper jamming.

- Once this is done, insert the paper completely straight, right up against the left-hand side between the head and the roller, until it reaches the bottom.
- Once the paper has been inserted, lower the levers to hold it in place and rotate both the side wheels towards the user at the same time, until they cannot be turned any further.
- Before starting to write, press the line down key once to adjust the line feed to the exact line on which the head will write.
- When writing, place each hand over the keys so that each finger corresponds to a key.
- The six writing keys correspond to the six punches of the head. However, it is interesting to point out that although the generated Braille sign is vertical, writing on the Perkins is horizontal, as if the stitches had been opened in a zipper.

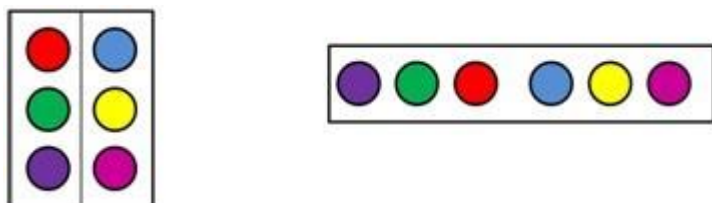


Image 12. Sample of the zipper opening of the generator sign.



Image 13. A child writing on the Perkins machine.

- To write any braille sign you must press the keys that correspond to the dots in the sign. For example, if we want to write the letter “i”, which consists of dots 2 and 5, we must place the middle finger of our left hand on the second key from the left and the index of our right hand on the key to the right of the space key. Once both fingers are in place, we press the keys at the same time.
- We use our thumbs to press the space key and our little fingers to press the backspace or line down keys, although sometimes younger students do not have enough strength to do so.

- Before starting to write, adjust the margins depending on the type of paper and the length we want the lines, etc.
- Listen out for the bell, which rings about 7 spaces before the line limit is reached and no more can be written, equivalent to, at most, one more syllable.

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Screen readers

Screen readers are programs designed to help people with visual impairments. These programs collect the information that appears on the device's screen and present it to the user through non-visual channels, such as **Text-To-Speech (TTS)** or **Braille display**.

- **Text-To-Speech (TTS):** The screen reader uses the computer's speakers to transmit the information that appears on the screen by voice.
- **Braille display:** The screen reader displays textual information in Braille through this device.

The screen reader constantly follows the item highlighted or selected by the operating system. This allows the user to not only know the text they are reading or editing, but also to obtain contextual information about the graphical environment they are in (such as dialog boxes, lists or options). In this way, blind users can learn how operating systems such as Windows or Mac OS X work.

To control the screen reader, vision-impaired users use the keyboard, either using commands specific to the operating system or through commands unique to the reader. On touch devices, screen readers offer specific gestures to navigate and operate the device.

[Windows keyboard shortcuts](#)

[Mac keyboard shortcuts](#)

Screen reader settings allow you to adjust parameters such as the speed and volume of speech synthesis, as well as the way information is displayed in the braille display. Customizing these settings according to the user's needs is essential to obtain the best performance.

The most frequent, depending on the operating system on which they operate, are the following:

Windows:

[JAWS](#)

[Narrator](#)

[NVDA](#)

iOS:

[VoiceOver for PC](#)

[VoiceOver for iPad and iPhone](#)

Android:

[Talkback](#)

Quick guide for handling the braille display

A braille display is a device that shows in braille characters the information it receives from another electronic device such as a computer, mobile phone or tablet. There are braille displays of different sizes. The most common are those with 80, 40 and 14 braille cells.

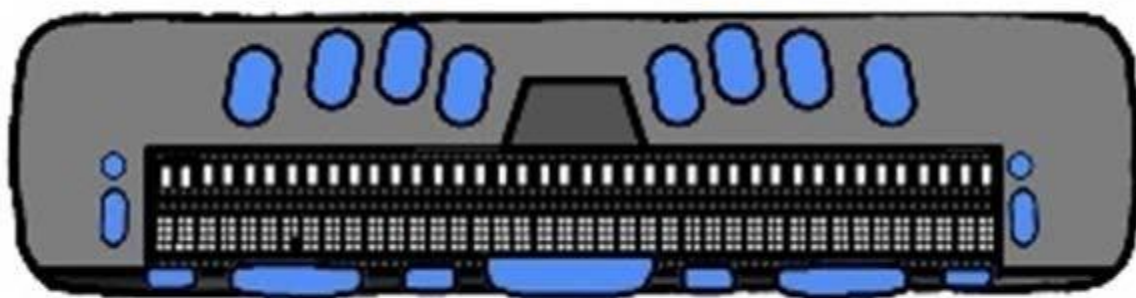


Figure 1. Schematic illustration of a Focus 40 braille display

In the braille display each braille character comes with eight dots instead of the usual six. This is because currently with the combinations of the six braille dots (64 in total) it is not possible to cover all the needs for some subjects (computer science, mathematics...) so with more experienced learners we work with use what is called eight-dot computer braille. In addition, eight-dot Braille prevents some special characters such as capital letters or the number sign from having to be placed in a separate box, saving space and time for the reader.

The braille display needs to be connected to another device and to a screen reader to work. Current mobile terminals and computers make a wireless connection between both devices, but if this technology is not available, they can be connected to a computer via USB. Some operating systems have their own screen reader: Android uses TalkBack and BrailleBack and Apple uses Voice Over.

On a computer with a Windows operating system, the braille display receives information from the screen via the screen reader. The most common screen readers are Jaws, from Freedom Scientific and NVDA, NVDA is a free, open-source screen reader available for Windows. In Spain, most people use Jaws, as it is more stable with many programmes. The trial version consists of all the features of the programme, but each 40 minutes the computer must be restarted.

For more information about Jaws and to download it, you can visit this link: [Download Jaws](#) .

Description of the Focus 40 braille display

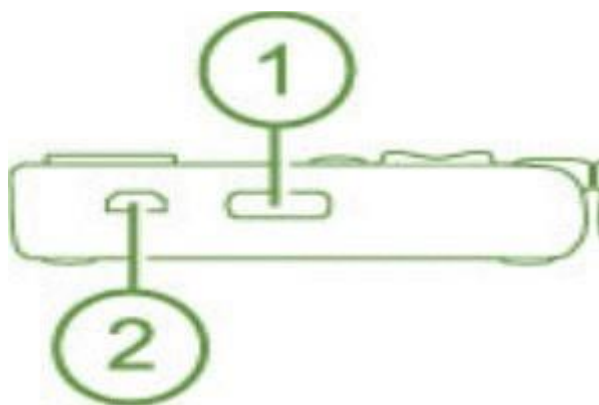


Figure 2. Side view of the Focus 40 braille display

1. **Power button.**
2. **USB port:** for connection to the computer.

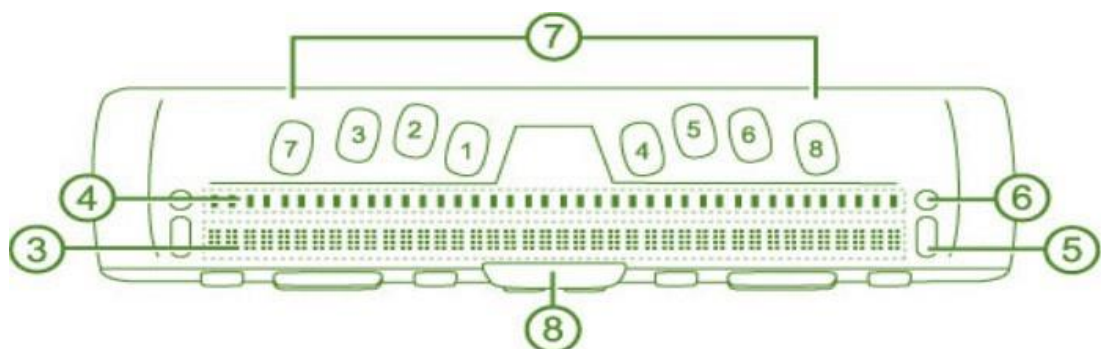


Figure 3. Top view of the Focus 40 braille display

3. **Braille cells:** there are forty cells. Each cell represents a character that is composed of eight points (stems) that are numbered as follows:

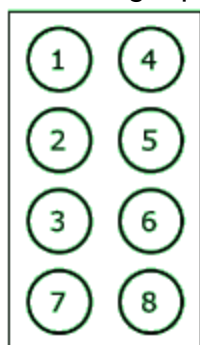


Figure 4. Eight-dot braille cell

4. **Sensors:** there are forty, and each one is located just above each cell. They perform different actions, depending on the program you are working on.
5. **Navigation rocker:** there are two, and they are located one on each side of the braille cells. They are used to quickly scroll through the elements that appear on the screen.
6. **Mode button:** there are also two, and they are located above each of the navigation rockers. They allow you to switch between different navigation modes: lines, sentences, paragraphs, etc.
7. **Braille writing keys:** there are eight, one for each point of computerized braille (eight points instead of six).
8. **Space bar:** in writing mode it is used to insert a blank space. In combination with other keys, it is used to perform different actions; in this case, it is also usually called cor.

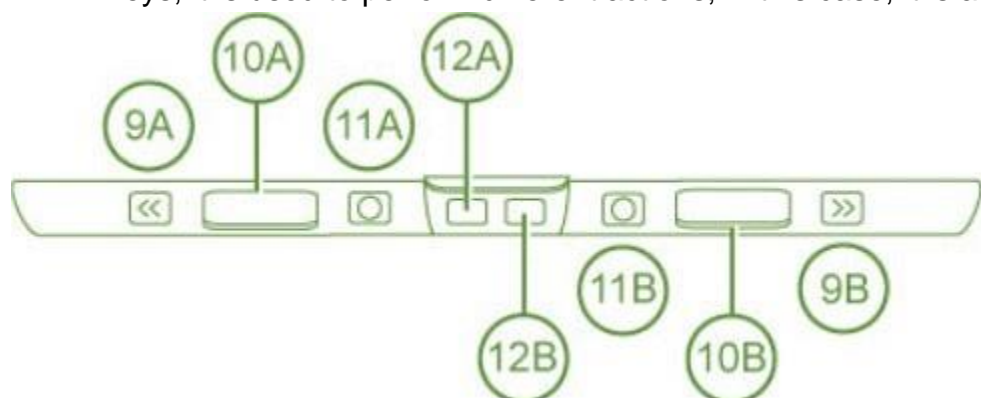


Figure 5. Front view of the Focus 40 braille display

9. **Scroll buttons:** there are two, one at each end, and they are used to move left or right, in groups of 40 characters, within a line of text.
10. **Rockers:** there are two, one on the left and one on the right, attached to the scroll buttons, respectively, and are used to move through the lines of text, either to go to the top or bottom line.
11. **Selectors:** there are two, attached to the inside of the rocker buttons, and are used to configure the automatic advance. In combination with other keys, they have other functions.
12. **Shift keys:** there are two and they are located below the space bar. In combination with other keys, they allow you to enter different commands.

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“LEO” voice labelling system

LEO voice labelling system

Note:

You can see the subtitles of this video in the language you prefer as follows:

1. Press the settings option that appears within the video at the top right.
2. "Disabled" will appear in the subtitles option and it suggests that you can activate them in Spanish.
3. Choose the "Spanish" option.
4. Once the Spanish subtitles appear, press the configuration option - subtitles again. Then a new option will appear: "translate automatically". There you can select the language you prefer.

The LEO voice labelling system is a pen-shaped device. The reader sensor is located at its tip. This reader is associated with stickers onto which you can first record audio messages, and then play them. To listen to the messages, simply touch the stickers on which they have been previously recorded.

LEO is an example of one of the most accessible optical readers, but there are many others on the market that can be used. In the following link you can see some examples:

PenFriend audio labeller

More videos about PenFriend:

<https://www.youtube.com/watch?v=QU0-g9SoAf0>

<https://www.youtube.com/watch?v=4VcnoufrboM>

https://www.youtube.com/watch?v=xY7_238l6lM

<https://www.youtube.com/watch?v=4Xv8Uf1jx2I>

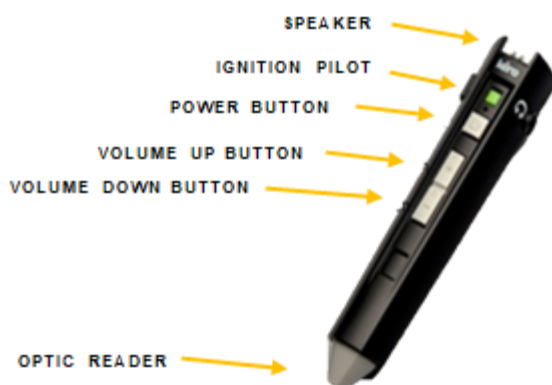
Listen and record your voice with the PENpal.

More videos about PENpal:

<https://www.youtube.com/watch?v=RwS3mgLS8RU>

Parts of the LEO voice labelling system:

- Front:



- Sides:
 - Audio output for headphones or speakers.
 - Input for a USB connector (on the opposite side).
- Back:
 - Battery compartment cover.
 - MicroSD card slot (removing batteries).

Memory and Storage:

- The LEO has an internal memory of 2 GB, allowing you to record up to 120 hours of messages.
- If you need more space, you can use a microSD card in the corresponding slot.

Main functions:

- Read stickers: Turn on the reader and place the tip on the sticker to hear the associated message. Once the pencil launches the file, it is not necessary keep it on the sticker, allowing you to explore the material hands-free.
- Record stickers:
 - Turn on the LEO and place the tip on the sticker.

- Press and hold the “+” or “-” button to start recording.
- Record the message and release the button to end.
- Volume control: Use the “+” or “-” keys to adjust the volume while the sound is playing.
- Remove content from a sticker:
 - Touch the sticker with the tip of the sensor. The reader will play the recorded message.
 - Press the “+” and “-” buttons simultaneously to delete the associated message.
- Message replacement: You can replace the message of a sticker without deleting the previous content, to do this, press and hold the “+” or “-” button to record the new message.
- Automatic shutdown:
 - If the LEO is idle for 60 seconds, it will automatically turn off to save power.

Sticker uses:

- Reuse of sticker:
 - Adhesive tags can be attached to various materials such as cardboard, glass, plastic, metal or wood.
 - Depending on the previous material, the sticker can be peeled off and reused on another surface.
- Sticker partition:
 - Stickers can be cut into two, three or four pieces (although smaller sizes are not practical). Each piece carries the same message.
 - When you re-record a fragment, the new message is automatically incorporated into all fragments.
 - This feature is useful for creating learning materials, such as association tasks.
- Sticker protection:
 - In aggressive environments or with intensive use, stickers can get scratched or damaged.
 - To protect them, they can be covered with transparent or translucent materials.
 - The LEO accesses the sticker code through an optical system while the sticker remains protected.
 - In addition to listening to the message, you can also record it on the protected sticker.

- Stickers can peel off on certain materials, so it is advisable to try them out in advance.
- Incorporation of Braille in stickers:
 - Using the same system, braille adhesive labels can be applied to the stickers.
 - Content written in Braille must conform to the size recognized by the reader.
 - This combination of LEO sticker and Braille is useful for including information on plans or maps
 - The braille marking helps locate items on the plan and touching it with the LEO plays the message recorded on the LEO sticker below.

Activities with the LEO voice labelling system:

1. Storytelling:

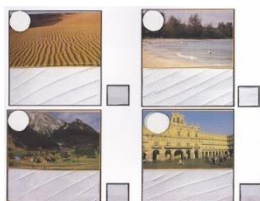
- You can tell stories using stickers.
- While the child listens to the narration, he or she can touch tactile images or follow the braille text.
- To make the task easier:
 - Place the sticker on each page in the same position (for example, top right corner).
 - Leave the pencil in the same place (if the sticker is on the right, place the pencil also on the right of the book).

2. Materials Notebooks:

- Personalize activity booklets.
- Incorporates phrases to guide students in exploration tasks in two-dimensional space.
- Includes identification activities, long sentences to encourage listening attention, and activities with various information/reinforcement stickers.

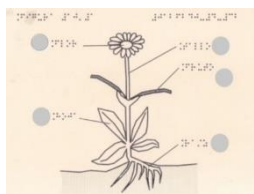
3. Image Locution:

If LEO tags are used, children with visual impairments can perform these tasks autonomously and at the same time as their peers.



4. Recorded voice stickers in embossed sheets:

Normally essential images and diagrams in textbooks are embossed (printed with relief and textures) for blind students. In this case LEO pen stickers can be added to provide additional information.



Sheet made of microcapsule paper.

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