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Microwriter Ltd. Microwriter

A close up of a device

Description automatically generated

Short Description: The Microwriter is a one-handed portable word processor that employs a six-button chord keyboard. Text entered can be exchanged between it and a computer via a connecting cable. When connected, the six-button keyboard can be configured to be used as an alternative keyboard for the connected computer.

Bill Buxton’s Notes

This Microwriter is one of my favourite things in the collection. It is the one that I have had the longest and has had the most use. My use of it taught me a great deal about the relationship between design and nature of human skill – lessons which would have been much more difficult to learn from the literature alone and which have stood me in good stead ever since.

The Microwriter was, I believe, the world’s first hand-held portable digital word processor. It was first shown in 1978. This unit dates from 1982. One types with a 6-button one-handed chording keyboard. That is, your fingers are always in “home position” (the thumb being the only digit to alternate between two keys) and you enter text by pushing combinations of buttons, or “chords”. Hence, you could (and I would) stand in the subway, hold on to the ceiling strap for balance with one hand, and type with the other. I just needed to hold the device against my chest with the palm of the same hand that I typed with. Yet, when at my desk, the device could also substitute for my regular QWERTY keyboard, thus enabling me to type with one hand, and point/select using the mouse, with the other – thereby significantly reducing the amount of back-and-forth hand movement between mouse and keyboard (at the cost of reduced typing speed).

The Microwriter was designed to be operated by the right hand, and it was ergonomically tailored, accordingly. A version for left hand usage was never released. Partially, this reflects the bias of a predominantly right-handed world. It also reflected the economic realities of a small company. But where this affected me, in particular – even as a right-handed person – was that this right-hand-only decision did not anticipate the bi-manual usage which I described above.

Such usage was not anticipated at the time that the Microwriter was being developed. This is certainly understandable since broad awareness of the mouse did not emerge until the first Apple Macintosh was released in 1984. The significance here is that in splitting the typing and pointing tasks between the two hands, the predominant tendency is to map the pointing/selection task performed using the mouse to the preferred (or “dominant”) hand, and the discrete typing task, such as with the Microwriter, to the non-preferred hand. This is precisely the task-to-hand mapping which Engelbart demonstrated in his 1968 *Mother of All Demos*. Furthermore, it also explains why – in contrast to the Microwriter’s hand-specific form - Engelbart and English designed a hand-neutral piano-like chord keyboard. (See the Collection’s *Xerox PARC 5-key Chord Keyboard*). Overall, this choice - between a one-handed keyboard which was neutral *vs* specific to which hand is being used – is an excellent example of a persistent trade-off confronting designers: that between the strong-specific *vs* weak-general. As we shall see, the impact of such decisions goes much deeper than the device itself.

Despite being right-handed, I wanted to be able to use the Microwriter in either hand. While moble, or using the device on its own, the right-handed form factor was perfect. In fact, in my opinion, it is unsurpassed over all these years since. However, in use with a mouse, I very much wanted to type with my left hand – for the reasons stated above. But here is where the impact of the strong “right-hand” conceptualization of the product penetrated well beyond the physical device, to a level where I both helped, but limited learning the chords which enabled one to type

With the caveat that I have no solid data to support what I am about to say, in my own personal experience, with the Microwriter, the time taken between opening the box and being able to enter basic text without reference to a manual, was significantly shorter and easier – by far – than any chord keyboard I had seen previously, or since. This was a consequence of both their mapping of chords-to-characters, and the accompanying instructional materials. Core to this was the use of visual mnemonics to teach the chording scheme. One can learn to touch type within about 60 minutes (a good thing, since one rapidly discovers that with chord keyboards, there is no hunt-and-peck option; you can either touch type or you can’t type at all).

A key aspect of the documentation is illustrated in the figure below.

A close up of text on a white background

Description automatically generated

The inverted V arrangement of circles provides a stylized representation of the position of the five digits of the right hand. The red arrows illustrate the finger-to-key mapping - the five primary Microwriter keys being shown in dark blue. As seen in the examples in the table below, a black dot in the middle of a circle indicates that the button associated with that finger is depressed. The character resulting from that combination of button presses is indicated in red. Notice that each row illustrates one of three distinct classes of mnemonic.

|  |  |
| --- | --- |
|  | For the letters J and L, the mnemonic reinforces the shape of the letter, with the three fingers involved representing the end points of the lines defining the character. |
|  | In the case of S, the mnemonic used employs word association. One is to use the knowledge that one wears one’s **S**ignet ring on the ring finger to remember that the letter S is typed using that one finger. |
|  | In the case of SPACE and the letter E, yet a different class of mnemonic is exploited, namely, the knowledge that those are the two most common characters in English, and that the thumb and index finger are the most dexterous digits, and that single button actions are simpler and faster to execute than chords. Hence, the E and SPACE are mapped to single button pushes using those most agile digits. |

If you consider these three cases carefully, a few interesting and relevant points emerge:

1. **Additional Step**: Trying to recall the chord for a character often requires a two-step process: first, recalling the class of mnemonic, then the mnemonic within that class.
2. **Cultural/Linguistic Biases**: There are two such examples. First, compared to a native English speaker from the UK, it is far less likely that one from North America will have any idea what a signet ring is, much less which finger it is worn on. Second, the dominance of “e” over other characters does not necessarily carry over into all languages that employ the Roman alphabet.
3. **Inconsistent Hand-to-Hand Mapping**: Knowing why the “e” and “space” characters are associated with the index finger and thumb, respectively, most likely you will use those same fingers if asked how to enter them with the left hand. Given the same task for “s”, you will most likely again use the ring finger. These are *mirror image* hand-to-hand transfers of the character codes. On the other hand, consider the same task with the “J” and the “L” characters. Learning these characters by their shape, rather than by finger association, there is a dilemma. If the codes are mapped by mirror image, the “J” would be entered using the shape of an “L”, and *vice versa.* Hence, because of the spatial-based mnemonic taught, these characters would naturally transfer by *spatial congruence*, rather than *mirror image*. The resulting inconsistency presents a built-in glitch for those wanting to apply their existing right hand skills to a left-hand device – something which is enabled by a direct descendent of the Microwriter, also found in the collection: The CyKey.

I am conflicted in all of this because I think that the *New User’s Guide* is one of the best examples of technical writing that I have ever seen in a user’s manual. I love how different representations are used in parallel to get messages across. I appreciated this when I was learning. I also believe that the manual is well worth studying by anyone writing tutorials, even today. As an exercise, I also recommend comparing this manual to those produced for the other chord keyboards in the collection.

On the other hand, there is this issue that, in preparing the pedagogical approach, and the associated mental models that would result, they did not anticipate using the device in either or both hands, and thereby inadvertently built in some road-blocks.

This is understandable, given that the design was done before the mouse was commercially available, much less the GUI. But that just signals all the more need for caution and looking further forward in our own decisions – which risk falling into the same trap. One that – when you move to looking at the Microwriter’s descendent, the CyKey (which is designed to be used by either hand), the Microwriter decisions ran into at full steam.

In the larger scheme of things, not a huge problem. But a problem nevertheless.

I still have a softspot for this device, and everything that it represents!

Device Details

Company: Microwriter Ltd. | Year: 1982 | Original Price (USD): $500.00

Degrees of Freedom: 0

Dimensions (L x W x H): XXX x XXX x XXX (mm) Note: watch is W x D (Width is the shortest distance across the dial side of the main plate measured through the center.)

Key Words

Primary: Chord Keyboard

Secondary: Handheld, Keyboard, PDA

Links

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