



# Half-QWERTY: Typing With One Hand Using Your Two-handed Skills

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## ABSTRACT

Half-QWERTY is a new one-handed typing technique, designed to facilitate the transfer of two-handed typing skill to the one-handed condition. It is performed on a standard keyboard (with modified software), or a special half keyboard (with full-sized keys). Experiments have shown [2] that it is possible for QWERTY touch-typists to achieve high one-handed typing rates (40+ wpm) in a relatively short period of time (<10 hr) using the Half-QWERTY technique. These speeds are 2-3 times the rates achievable using compact keyboards, and exceed handwriting speeds. Half-QWERTY is important in providing access to disabled users, and for the design of compact computers.

**KEYWORDS:** Input devices, input tasks, human performance, one-handed keyboard, QWERTY, portable computers, disabled users, skill transfer.

## WHAT IS IT?

This Interactive Experience display demonstrates a new approach to one-handed text entry which exploits the skills already developed in two-handed typing. It is called, "Half-QWERTY," because it uses only half of the QWERTY keyboard. The technique can be used on a standard QWERTY keyboard (using only half of the available keys, Figure 1), or with a special half keyboard (Figure 2). The former provides wide access to the technique. The latter provides a compact keyboard with full-sized keys supporting touch typing on portable computers, for example.

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## HOW DOES IT WORK?<sup>1</sup>

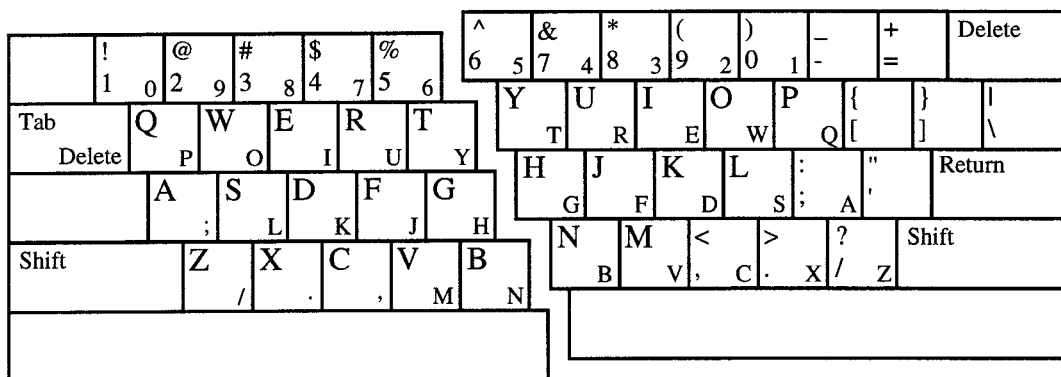
A Half-QWERTY keyboard is comprised of all the keys used by one hand to type on a standard QWERTY keyboard, with the keys of the other hand unused or absent. Keys of the typing hand are typed as before. To type characters of the missing hand, the user simply holds down the space bar and performs the finger movement previously done by the missing hand (Figure 1). Thus, using the space bar as a modifier, a typist can generate the characters of either side of a full-sized keyboard, using only one hand.

## HOW WILL IT BE USED?

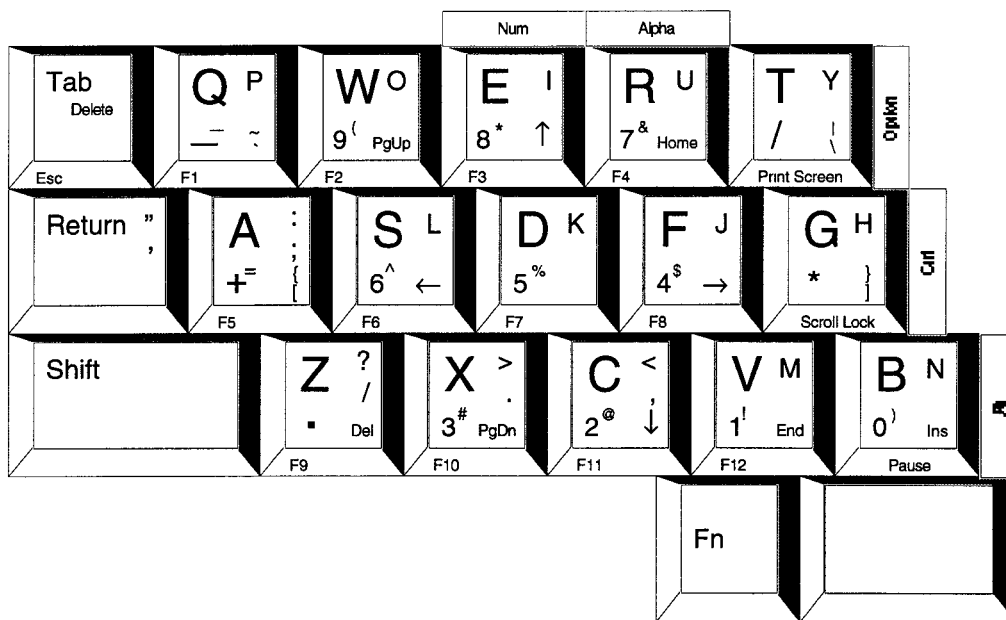
Half-QWERTY is especially useful when performing tasks which require frequent switching between keyboard and mouse—text editing, for example. Text can be entered with one hand, and items selected and manipulated with the other. Since both hands are in "home position" for their respective task, no time is lost in moving between devices [1]. Furthermore, by implementing Half-QWERTY on a standard keyboard, one can easily switch between this type of input and two-handed typing. Finally, since each side of the keyboard is mapped onto the other side when the space bar is depressed, the user can choose which hand to use for one-handed typing. In effect, the user has a choice of three keyboards in one: a two-handed QWERTY keyboard, and two Half-QWERTY keyboards, one for each hand.

A computer that is worn, rather than carried, has significant advantages for data collection "in the field." By eliminating infrequently used keys (e.g., the number keys) and reducing the size of the space bar, a Half-QWERTY keyboard can be made small enough to wear on the wrist of the dominant hand (Figure 2). With an LCD screen worn on the other wrist, the resulting typing posture allows the user to type and view the display, simultaneously.

<sup>1</sup>Patents pending. International Application # PCT/CA90/00274 published March 21, 1991, under International Publication # W091/03782.



**Figure 1.** Left- and right-hand Half-QWERTY layouts on a standard QWERTY keyboard. When a key is depressed, the character in the upper left of the key is entered. When preceded by holding down the space bar, the character in the lower right is entered.



**Figure 2.** Wearable left-hand right-wrist keyboard (actual size). It is typed on using the left hand while worn on the right wrist. If an LCD is worn on the left wrist, the resulting typing posture allows the user to type and view the display, simultaneously.

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**REFERENCES**

1. Engelbart, D., & English, W. K. (1968). A research center for augmenting human intellect. *Proceedings of the Fall Joint Computer Conference* (pp. 395-410). Washington, DC: Thompson Book Co.
2. Matias, E., MacKenzie, I. S., & Buxton, W. (1993). Half-QWERTY: A one-handed keyboard facilitating skill transfer from QWERTY. *Proceedings of the INTERCHI '93 Conference on Human Factors in Computing Systems* (pp. 88-94). New York: ACM.