# One Handed Fighting Game Controller

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***Abstract*—This paper will outline the project description, justification and system architecture for an ergonomic 1 handed fightstick/arcade-stick style controller.**

## I. Introduction

There is a lack of Arcade-Stick/fightstick style video game controllers that accomadate players who only have use of 1 hand, and there is also a lack of fight sticks that consider the ergonomic implications of a horizontal layout.

## II. Project Description

### A. Context

Many fighting game players choose to play their games with an Arcade-Stick/fightstick style controller. However these controllers are very much designed for players who have full use in both hands with a stick and buttons too separated to use comfortably with one hand. [See figure 1] In the USA, the National Center for Health Statistics [1] estimates that every year there are 50 000 new amputations. There are also 4 out of every 10 000 people who are born with upper limb deficiency. This means there are hundreds of thousands of people either lacking a hand or lacking mobility and dexterity in both hands who are either unable to use this input method or requiring a lot of creativity from the player.


Fig. 1. A Standard fightstick.

### B. Previous Solutions

Some fighting game players online have created a fight sticks with the buttons much closer to the stick so that only 1 hand is required to access all the inputs. [See figure 2]

Fig. 2. A custom made one-handed fightstick

### C. Our Solution

Our solution is to build a vertical fightstick that is held in 1 hand. [See figure 3] This both gives the advantage of being accessible with 1 hand and the ergonomic advantages of a vertical layout which will be discussed in the next section.

## III. Justification

If this problem is not solved, all the one-handed players are missing out on what some consider to be the optimal way to play fighting games. They are the ones who will mostly feel the consequences of this problem not being solved. This problem is mostly focused on fighting games, however this one handed controller could certainly be used in other context if it is useful to the player.

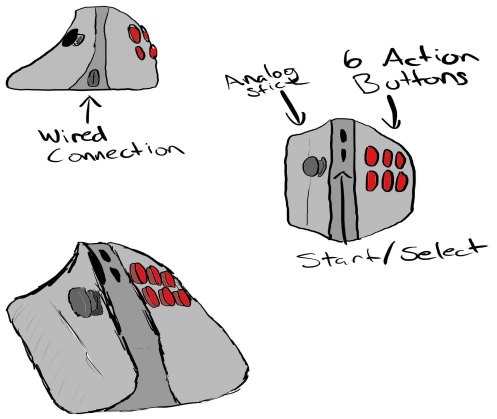


Fig. 3. A sketch for our design


Fig. 4. A photo of the ASCII Stick Super L5 controller

### A. Vertical vs Horizontal Ergonomics

A study by Dan Odell and Peter Johnson [2] found that a more vertical mouse layout showed no difference in performance but perceived fatigue was lower and there was a subjective preference towards the concept mice. This shows us that our design can benefit players who have both hands but may be experiencing hand or wrist pain when using a standard fightstick design. Other companies have made vertical style mice, but there doesn't appear to be a ergonomic fightstick that uses a vertical layout. The main other product in the ergonomic fightstick space is the Hit Box which still uses a horizontal layout, but uses buttons instead of a stick for the left side which may eliminate the wrist strain from using a large joystick.

## IV. Ideation

The idea for this project came together from the whole group. We started with the idea for a fightstick with some accessibility twist to it. We eventually realized there was no modern one-handed designs for a fightstick. One design came up from our research from the early 90s, called the ASCII Stick Super L5. It emerged from the new-found popularity of Street Fighter II and featured a d-pad, two face buttons, and four paddle buttons on the back. All of this was put on one palm-able circle controller.

We came to the idea of a vertical layout after taking inspiration from ergonomic mouse designs. Stationary mice have a trackball on the left side, allowing for movement input without moving your arm/wrist. We thought replacing a trackball with a analog stick - plus the addition of face buttons on the right side where your index, middle, and ring finger would naturally rest - will allow for a much more elegant and easy-to-use one-handed solution for fighting games.

## References

[1] UnkownAuthor, "Numbers and percents on amputations." "http://www.aboutonehandtyping.com/statistics.html.

[2] J. P. Odell D, *Evaluation of flat, angled, and vertical computer mice and their effects on wrist posture, pointing performance, and preference*. National Library of Medicine, 2015.