WIRELESS OPTICAL USB MOUSE

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Project Proposal
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INTRODUCTION

Almost everybody who uses a computer uses a mouse. The traditional corded, mechanical mouse is the most widely used. However, in some situations more freedom is required than a corded mouse can offer. Situations such as a presentation using a projector, or just an over-cluttered workspace are appropriate for a more versatile mouse. I propose to build a wireless optical mouse with a receiver that plugs right into the USB port of a computer. This design will be an improvement over the traditional mouse by giving the user the freedom to use their mouse unbound to their computer. In addition, optical sensing will result in more precise control of the cursor on the computer screen, and more versatility of being able to use it on many different surfaces.

DESCRIPTION

Figure 1 shows the block diagram of the wireless mouse transmitter/receiver system. The mouse will be powered by batteries, while the receiver will be powered by the 5 volts supplied by the computer.
the USB port. Figure 2 shows a preliminary sketch of the mouse. An optical sensor on the mouse will serve as the motion detector. This is done by shining a small, bright LED onto the surface.

![Top View](image1) ![Bottom View](image2)

**Figure 2 - Conceptual Sketch**

The light then bounces off the surface and into the sensor, which captures thousands of tiny images per second. These images are sent to a digital signal processor (DSP), which is on the same unit as the optical sensor, meaning that the microcontroller does not need to function as a DSP. The DSP determines the magnitude and direction of the mouse’s movement by comparing image after image from the sensor.

This information is then sent to the microcontroller, which also receives data of the status of the two buttons. The microcontroller encodes the information and creates a data stream. This data is then modulated into 27 MHz Radio Frequency (RF) data. This signal is amplified and then transmitted to the receiver. The receiver demodulates the signal and then sends this information to the second microcontroller, which decodes it and sends it to the host PC via the USB port.
**BENEFITS**

This wireless optical mouse will benefit any computer user who is still using a standard corded mouse. Getting rid of the wire allows for much more freedom of movement. For example, if you are giving a PowerPoint presentation on a big screen, you may wish to control the presentation from somewhere other than right in front of the computer station. Since this system uses radio frequency transmission, a direct line of sight between the mouse and the receiver is not required, as would be with infrared transmission. This means you can plug in the receiver in the back of your computer with no worries. No wire also reduces tangles and clutter on a sometimes already over-cluttered desktop.

The optical motion sensor of the mouse is a great improvement over the standard roller ball. This optical mouse will glide smoothly over most flat surfaces, eliminating the need for a mouse pad. The optical sensor provides much higher tracking resolution than the roller ball, resulting in much smoother movement of the cursor on the computer screen. Since there are no mechanical parts involved, dirt or wear will not affect the performance of the movement sensor, resulting in a smaller chance of failure.

**COMPARISON OF SIMILAR PRODUCTS**

There is a variety of wireless optical mice on the market, ranging in price from $20 - $40. The critical specifications are as follows:

- 400 counts per inch (cpi) resolution
- 1.5 meter range
- USB connectivity
- 27 MHz wireless technology
- AA or AAA, 2x or 4x battery power supply
PROJECT DEVELOPMENT

This project will primarily be developed in ET 340 laboratory. I need to select two microcontrollers. The transmitter side of this project is not too complex; therefore the transmitter microcontroller does not need to be very powerful. I will select a specific chip depending on availability; however the HC08 would be ideal for this application. I will use an enclosure of an old mouse for the prototype. The receiver microcontroller is a little more of an issue. I need to select a microcontroller that has USB functionality.

Demonstration of this project will not be difficult. All that I need is a computer station. With the receiver connected to the USB port, the user can experience the ease of use of this mouse in comparison to the typical mouse.