Microsoft Wireless IntelliMouse Explorer: Expository Statement

Grantee: Microsoft Corporation
FCC ID: **C3KMS7**
Model: Microsoft Wireless IntelliMouse® Explorer™

The Microsoft Wireless IntelliMouse® Explorer™ is a computer input device typically used for both cursor positioning on the computer's video display screen and also for scrolling through and magnification of application documents. Refer to *Microsoft Wireless IntelliMouse Explorer: Block diagrams*, for the following description.

When a user moves the mouse enclosure on a flat surface, the circuitry within the mouse detects this motion and translates it into a form usable by the host computer to move the cursor. When the user moves the wheel on the top of the device, the circuitry within the mouse detects this motion and translates it into a form usable by the host computer to scroll through and magnify application documents. Additionally, the mouse contains five push button switches, which can be actuated at the user's discretion to generate an asynchronous event, typically used to alter the program's control flow in the host computer.

In the Wireless IntelliMouse® Explorer™, a solid-state tracking engine illuminates the surface with a visible spectrum LED. The solid-state tracking engine takes many samples per second on an imaging array. Using a built in Signal Processor, consecutive images are compared to determine physical displacement (motion). The displacement information is transmitted to a second controller that also decodes button and wheel activity. This second controller handles all communication with the receiver unit though an RF communication path.

The motion data, button status information, and wheel information is encoded using a proprietary digital coding system and clocked out of the controller as a serial data stream. The transmitter operates on one of the two available channels, at either 27.045MHz (Channel 1) or 27.145MHz (Channel 2). The channel is selected by switching the local oscillator crystals (13.522MHz for Channel 1 and 13.572MHz for Channel 2). The transmitter uses Frequency Shift Keying (FSK) modulation, and consists of a crystal-controlled FSK modulator, a frequency doubler, and an output driver. The effective radiated power of the transmitter is less than 5µW. To save the batteries, the controller switches ON the transmitter only in the active state of the mouse. The active state continues about 2 seconds after the last movement or button press; then the mouse goes in the sleep active state or sleep touch state (depending upon whether the touch sense line is active). During the sleep state, the controller samples the optical drivers and detectors and the buttons to detect any movement or button press. If any activity is detected, the mouse goes back to the active state. DC-power is obtained from two AA batteries. The mouse uses a double-sided printed circuit board and a trace running in a loop on the printed circuit board to act as the antenna.

The receiver provides the facility to communicate with a host computer as a USB device. The receiver is connected to a host computer using a four-wire cable. Two of these four wires are Power and Ground. The remaining two wires are used for bi-directional signaling. The four-wire cable is shielded, with a ferrite bead at the connector end, and is approximately 1.52 meters in length. The host end terminates in a 4-pin USB Series A Receptacle Interface connector.

The receiver is a single conversion type. The local oscillator is a crystal-controlled oscillator operating at either 26.59MHz (Channel 1) or 26.69MHz (Channel 2). Consequently, an intermediate frequency of 455 kHz is obtained after the mixer. The modulating signal is recovered from the IF by a quadrature detector, and then converted to digital form. A single chip controller, operating at a clock frequency of 6MHz, decodes the received data and controls the USB interface to the PC using the USB protocol. Power is obtained from the host computer (5 volts, regulated) through a permanently attached cable.

The receiver uses a trace running in a loop on the printed circuit board to act as the antenna.