RF MouseNet System Description

1) Introduction:

The RF MouseNet System is designed for a classroom environment. The MouseNet System Block Diagram shows a typical set up. The system functions as follows, each student has a RF Mouse at his or her desk (32 max.); each mouse has an ID (set by a set of dip switches inside the mouse). The instructor has a computer, a control box and a local mouse. The control box contains the RF receiver, a 32 key keypad, a PS-2 mouse input port and a PS-2 mouse output port. The local mouse gives the instructor control of the curser. There is a power up and power down sequence between the control box and the computer that must be followed in order to avoid a possible lockup problem. The computer should be powered up before the control box and the control box should be powered down before the computer. When the control box is turned on all 32 of the LED's come on, one at a time starting with LED 1. All the LED's stay on for about 2 seconds and than they all go off at once. When a RF mouse is turned on it transmits its ID and the corresponding LED on the control box comes on. When the instructor wants a particular student to have control of the curser, via his or her mouse, he selects the appropriate key on the control box's keypad; the LED corresponding to the selected key will blink. When this selection is made the receiver will only respond to the RF mouse with the selected address. When the instructor wishes to switch to another student he simply selects a new address via the keypad.

2) RF Mouse:

The RF Mouse Block Diagram shows the major components of the RF mouse. The touch pad provides the mouse information to the CPU via the 10KBaud serial link (this is a standard PS-2 port). When the mouse is first powered on it sends out a wakeup packet identifying itself to the controller, this causes the corresponding LED on the control front panel to illuminate. The CPU is now ready to receive mouse data from the touch pad. When the CPU receives touch pad data it reformats it and transmits it to the controller via the RF transmitter. The RF packet consists of up to 17 bytes as follows:

<START1>, <START2>,
<CHANNEL ID>, <STATUS>, <DATA LENGTH>, <DATA1>...<DATA4>,
<CHANNEL ID>, <STATUS>, <DATA LENGTH>, <DATA1>...<DATA4>,
<CHANNEL ID>, <STATUS>, <DATA LENGTH>, <DATA1>...<DATA4>,
<CHECKSUM>

The entire transmit time is between 18 to 22 msec. The packets are sent out up to 40 times per second (depending on the movement of the mouse). The dip switch has two functions, the first 5 positions define the mouse ID, and the last 3 positions set the RF carrier frequency. The level adjust insures the proper pulse width per bit out of the transmitter. The T-Pad sets the transmit power.

3) Controller:

The Controller Block Diagram shows the major components of the control box. The control box has several functions:

RF receiver – Converts the RF data to digital data and transmits this to CPU 1. The rotary dip switch sets the receiver carrier frequency.

Keyboard scanning/LED driver – CPU 1 scans the 32 key matrix to determine which key has been pressed. When a key is pressed the appropriate LED starts blinking. CPU 1 stores the selected key and will only respond to a data packet, which has the same ID as the selected key. When CPU 1 accepts a packet it checks the packet, if the packet is valid CPU 1 scripts out mouse data and sends it to CPU 2. CPU 2 also receives mouse data from the local mouse and outputs both the local and the RF mouse data to the computer via the computers PS-2 port.