

# Controlling PC with TV Remote as Mouse

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**Abstract**— *The design of a cordless mouse for the computer using a TV Remote has been proposed in this paper. A conventional PC/laptop uses a mouse to operate and control all its applications. As a PC mouse is wired to the system, one has to sit near the PC to operate. A typical TV remote sends coded infrared data that is read by an IR sensor interfaced to an 8051 family microcontroller. This data so received by the microcontroller sends it to the COM port of a PC through a level shifter IC. This IR code is traditionally RC5 code as followed by some manufacturers. Software named PC remote is used on the PC that recognizes data received from the microcontroller through the COM port and performs the required operation. Designated numbers on the TV remote are used to perform up - down, right - left cursor movement. Also several operations like left click and right click, folder opening and closing can also be performed with the TV remote.*

**Keywords**— *PC Mouse, TV remote, IR Receiver, RC5 Protocol.*

## I. INTRODUCTION

The objective of the paper is to develop a microcontroller based system to infrared remote as a PC mouse. To accomplish this task a Philips TV remote, an Atmega8 microcontroller, a 38 KHz IR receiver with an external circuit have been used. The designed system is interfaced with the PC through an USB port. It is compatible in almost all PC with operating system Microsoft® Windows XP, Windows Vista or Windows 7.

The main goal of the project is to control mouse cursor with TV remote. This is done with the implementation of Philips remote on an Atmega8 L-8PU microcontroller. Here the IR receiver is connected to the microcontroller. The microcontroller is connected to the pc through USB port.

When a certain key is pressed in the remote, it sends infrared signal through its IR transmitter to the IR receiver which is connected to the Atmega8 L-8PU microcontroller the received infrared signal is decoded by using the program written on the ROM of the microcontroller. Hence the operations of cursor are performed according to the key pressed.

## II. LITERATURE

“The first remote intended to control a television was developed by Zenith Radio Corporation in 1950. The remote, called “lazy bones”, was connected to the television by a wire. A wireless remote control, the “Flashmatic”, was developed in 1955 by Eugene Polley.”

“On may 30,1985, Philips introduced the first universal remote. In 1987, the first programmable universal remote control was released .it was created by CL9, a startup founded by Steve Wozniak, the inventor of the Apple II.”

### A) Philips RC-5 Protocol

The RC-5 code from Philips is possibly the most used protocol by hobbyists, probably because of the wide availability of cheap remote controls for this protocol. The protocol is well defined for different device types ensuring compatibility with your whole entertainment system. Lately Philips started using a new protocol called RC-6 which has more features.

Specifications

- Modulation type: Manchester code (bi-phase) - LOW to HIGH for ACE (1), HIGH to LOW for ZERO (0)
- Carrier frequency: 36 KHz
- Start bits: 1
- Field bits: 1
- Toggle bits: 1
- Address bits: 5
- Command bits: 6 or 7 (if RC5-extended)
- Bit period (transmission clock): 1.778 mSec
- Total signal duration: 24.892 mSec
- Signal repetition interval: 100 mSec

### B) Modulation

The protocol uses bi-phase modulation (or so-called Manchester coding) of a 36kHz IR carrier frequency. All bits are of equal length of 1.778ms in this protocol, with half of the bit time filled with a burst of the 36kHz carrier and the other half being idle.

A logical zero is represented by a burst in the first half of the bit time. A logical one is represented by a burst in the second half of the bit time. The pulse/pause ratio of the 36kHz carrier frequency is 1/3 or 1/4 which reduces power consumption.

### III. PROPOSED WORK

The main goal of the project is to control mouse cursor with TV remote. This is done with the implementation of TV remote on an Atmel microcontroller. Here the IR receiver is connected to the microcontroller. The microcontroller is connected to the pc through USB port.

When a certain key is pressed in the remote, it sends infrared signal through its IR transmitter to the IR receiver which is connected to the microcontroller. The received infrared signal is decoded by using the program written on the ROM of the microcontroller. Hence the operations of cursor are performed according to the key pressed.

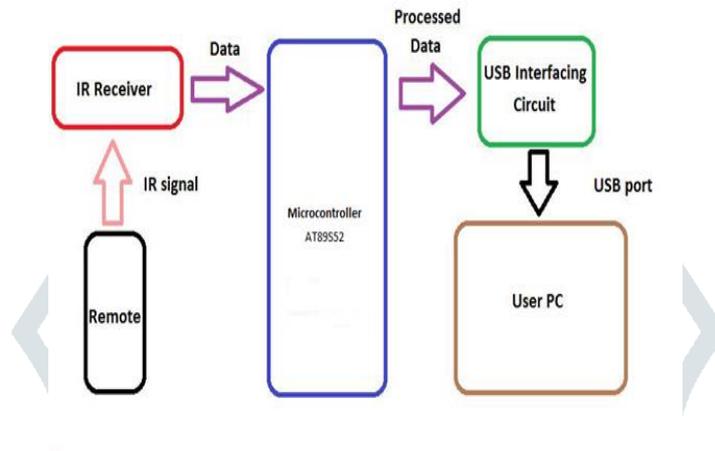


Fig 1: Block Diagram

#### A) Transmitting Data via TV Remote

In this circuit, for transmitting data we are using philips remote. It uses RC5 protocol for transmitting the data. The command comprises 14 bits:

- A start bit, which is always logic 1 and allows the receiving IC to set the proper gain.
- A field bit, which denotes whether the command sent is in the lower field (logic 1 = 0 to 63 decimal) or the upper field (logic 0 = 64 to 127 decimal). Originally a second start bit, the field bit was added later by Philips when it was realized that 64 commands per device were insufficient. Many devices still use the original system.
- A control bit, which toggles with each button press. This allows the receiving device to distinguish between two successive button presses (such as "1", "1" for "11") as opposed to the user simply holding down the button and the repeating commands being interrupted by a person walking by, for example.
- A five-bit system address, which selects one of 32 possible systems.
- A six-bit command, which (in conjunction with the field bit) represents one of the 128 possible RC-5 commands.

#### B) Receiver section:

The infrared sensor at the receiver side will receive the data with frequency of 36 kHz. This section consists of different parts:

- Infrared Sensor
- Microcontroller AT89C2051
- Serial communication port

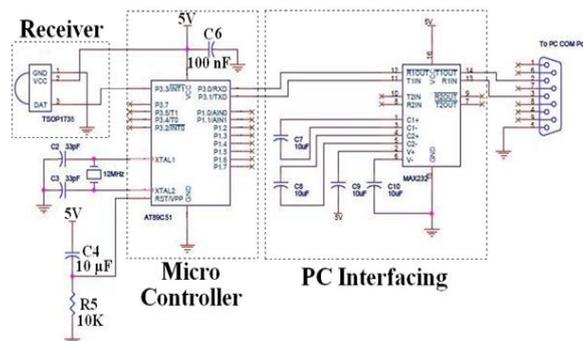


Fig 2: Receiver Section

#### C) IR Receiver

Infrared receivers pick up infrared signals within line-of-sight, and within 30 feet or so, and turn the signal into electrical impulses. These electrical impulses can be carried around the home on wires, and then turned back into infrared signals by emitters. Due to their complexity and sensitivity, infrared receivers tend to be the most expensive part of an infrared distribution system.

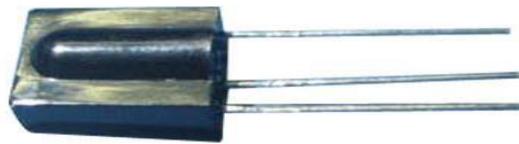


Fig 3 : IR Receiver

The TSOP1738 series are miniaturized receivers for infrared remote control systems. PIN diode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter. The demodulated output signal can directly be decoded by a microprocessor. TSOP1738 is the standard IR remote control receiver series, supports all major transmission codes. The sensor can be used for Proximity detection application along with an IR LED in robotics and security systems. It receives IR signal at 38khz frequency.

#### Features

- Photo detector and preamplifier in one package
- Internal filter for PCM frequency
- Improved shielding against electrical field disturbance
- TTL and CMOS compatibility
- Output active low
- Low power consumption
- High immunity against ambient light
- Continuous data transmission possible (up to 2400 bps)
- Suitable burst length 10 cycles/burst

The system is connected to the PC using USB port. IR receiver is connected to the PD3. IR transmitter is fixed in the remote. By pressing the key2 in the remote, cursor moves in upper direction, pressing the key4 in the remote, cursor move in left direction, pressing the key6 in the remote, cursor move in right direction, pressing the key8 in the remote, cursor move in lower direction.

#### IV.RESULTS

##### Remote Button Mouse Operation

- Volume + Move right
- Volume - Move left
- Channel+ Move up
- Channel - Move down
- Key 4 Left Click
- Key 6 Right Click
- Key 5 Scroll up
- Key 8 Scroll down

#### V.CONCLUSION

A Receiver system has been designed to use TV Remote as Cordless mouse to control PC/laptop and verified all the possible operations like scrolling up & down, left click, right click etc.

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