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DESIGN AND ANALYSIS OF TV REMOTE AS A CORDLESS MOUSE USING PIC MICROCONTROLLER

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ABSTRACT:
The project is designed to use a TV remote as a cordless mouse for the computer. 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 it. This becomes very tedious when the PC is used for presentation purposes (when using a projector). In this proposed system TV remote can be used as a cordless mouse, and the user need not operate the PC sitting near it. A typical TV remote sends coded infrared data that is read by an IR sensor interfaced to an PIC 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.. Designated numbers on the TV remote are used to perform up - down, right - left cursor movement. Features like left click and right click of the mouse can also be performed.

KEYWORDS:IR Receiver,Regulator,Microcontroller,Transformer,Full wave rectifier

1. INTRODUCTION:

Basically this technology is an application of wireless system. We are using IR Receiver Sensing Technology to make the remote work as mouse for the computer systems. The remote can we used as a mouse for laptops as well within a defined range of 30 ft.

Our perspective is that we will make small, handy equipment which could be kept in purse and that equipment will be having a remote which will send coded infrared data that is read by an IR sensor interfaced to an PIC 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. Designated numbers on the TV remote are used to perform up - down, right – left cursor movement And some other systems, which based on the same technique and use of similar kind of sensors are wired, which again increases the complexity of the system. They also limit the long range communication.

Controlling of electrical appliances through IR remote is interesting and very useful application. This system is widely useful to industries, offices, Banks, hotels, hospitals, and display boards. In this, IR remote is used for controlling PC\Laptop in your room. We identified the following as the requirements of a system that enables a TV Remote to be used as a remote control device for desktop PC while he is moving around in the class-room freely. In this way, he does not have to go to the laptop each time when he wants to use the Power Point screen. Its architecture is based on IR Transmitting - Receiving paradigm. It consists of two parts: a transmitter part and a recevier part. The transmitter part is known as TV Remote. The recevier part consists of microcontroller, TSOP Receiver, serial communication and PC. This side of the system is capable of listening incoming connections, sending and receiving data, processing control, commands taking screenshots, modify applications

2. ANALYSIS:

The main objective of the project is that it operates PC\Laptop from our living room using with key pad inputs of TV Remote. It allows a power button, as well as a switch or series of buttons to select which device the remote is controlling at the moment. It allows a numeric keypad for moving the mouse cursor. It allows Arithmetic Keys for controlling media player and slider also. It allowing the user to program command sequences to 5 User defined Programs. It allowing the remote to be programmed to control new devices not already in its code list by IR coding . Accept infrared signals from any remote and transmit them to the device being controlled using repeater. The reason for using microcontroller instead of a microprocessor is that unlike microprocessor which has only CPU in it, microcontroller has RAM, Rom which makes it more storage efficient. In addition to that communication with computer becomes easy through microcontroller. PIC is used as it is very convenient to use and the large number of pins help in interfacing.

3. WORKING MODEL:

Take control of your Computer, Smart TV, or Android TV Box in the palm of your hand with the Adesso WKB-4030UB SlimTouch Mini Wireless Mouse / Keyboard! With IR Technology, you can replace your existing TV remote and still be a comfortable distance away while accessing your TV menu, sifting through channels, navigating through your Smart TV's media even and even browsing the internet. The WKB-4030UB also acts as a RF keyboard! Simply flip it over and type in a search for your favorite movie, song, or even plug its RF receiver into your computer to use as a mini keyboard, an air mouse for presentations or basic navigation, or control your media with its media key shortcuts. With the Adesso Wireless Remote / Keyboard you can sit, relax, type or navigate and enjoy entertainment the way it was meant to be! This is the perfect device for your Computer, Smart TV, Android TV Box, Projector ,Playstation and Xbox gaming consoles. It allows a numeric keypad for moving the mouse cursor. It allows Arithmetic Keys for controlling media player and slider also. It allowing the user to program command sequences to 5 User defined Programs.

FEATURES:

1.30 Ft. Range with 2.4 GHz Radio Frequency Wireless Technology : When plugged into your computer via its USB receiver, the Wireless Remote / Keyboard works at any angle with a range of up to 30 ft. with no wires to get tangled.

2. in 1 Wireless Remote & Keyboard : Flip your remote over and you've got yourself a mini wireless mouse keyboard to use from up to 30 ft away, ready to navigate with your Smart TV for internet browsing, and easy typing when performing a search online.

3. Works As an IR Remote for your Smart TV : Take control of your entertainment system within the palm of your hand with our multi-functional remote. With its wireless IR technology you can replace your existing TV remote and browse the web, access your favourite shows, simply channel surf.

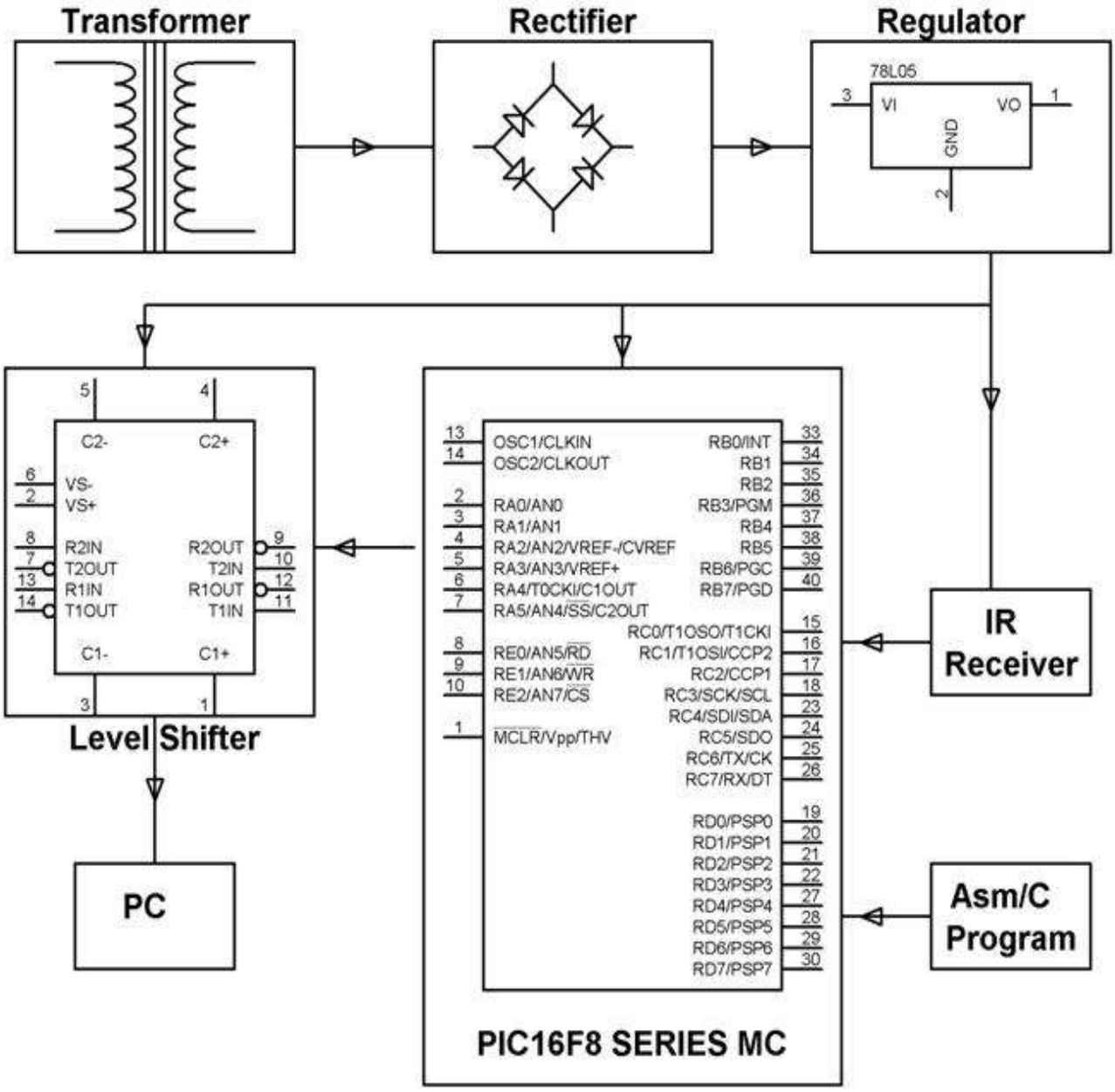


Figure 1(a). Circuit diagram of Wireless Mouse

4. IR TECHNOLOGY INTRODUCTION:

Infrared (IR) is invisible radiant energy, electromagnetic radiation with longer wavelengths than those of visible light, extending from the nominal red edge of the visible spectrum at 700 nanometres (frequency 430 THz) to 1 mm (300 Ghz)although people can see infrared up to at least 1050 nm in experiments. Most of the thermal radiation emitted by objects near room temperature is infrared. Infrared radiation was discovered in 1800 by astronomer Sir William Herschel, who discovered a type of invisible radiation in the spectrum lower in energy than red light, by means of its effect upon a thermometer. Slightly more than half of the total energy from the Sun was eventually found to arrive on Earth in the form of infrared.

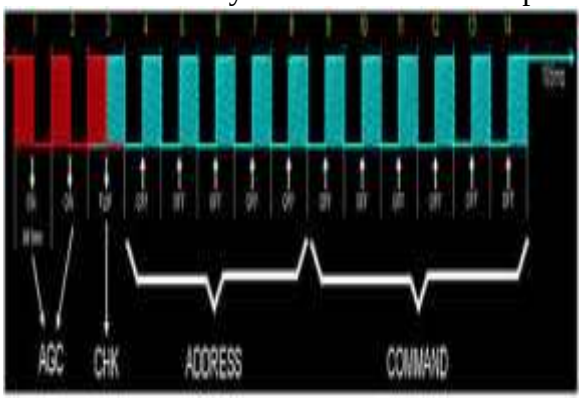
Infrared energy is emitted or absorbed by molecules when they change their rotational-vibration movements. Infrared energy excitesvibrational modes in a molecule through a change in the dipole moment, making it a useful frequency range for study of these energy states for molecules of the proper symmetry. .
Infrared radiation is used in industrial, scientific, and medical applications. Night-vision devices using active near-infrared illumination allow people or animals to be observed without the observer being detected. Infrare astronomy uses sensor-equipped telescopes to penetrate dusty regions of space, such as molecular clouds.

5. HARDWARE DEVICES:

The RC-5 protocol was developed by Philips in the late 1980s as a semiproprietary consumer IR (infrared) remote control communication protocol for consumer electronics. However, it was also adopted by most European manufacturers, as well as many US manufacturers of special audio and video equipment.
The advantage of the RC-5 protocol is that (when properly followed) any CD handset (for example) may be used to control any brand of CD player using the RC-5 protocol [3].

1: RC5 PROTOCOL:

The basics of the protocol are well known. The handset contains a keypad and a transmitter integrated circuit (IC) driving an IR LED. The command data is a Manchester coded bit stream modulating a 38 kHz carrier. (Often the carrier used is 38 kHz or 40 kHz, apparently due to misinformation about the actual protocol.) The IR signal from the transmitter is detected by a specialized IC with an integral photo-diode, and is amplified, filtered, and demodulated so that the receiving device can act upon the received command. RC-5 only provides a one-way link, with information traveling from the handset to the receiving unit. The 38 kHz carrier frequency was chosen to render the system immune to interference from TV scan lines. The carrier frequency of the RC5 code is 36 kHz so take always a receiver with a response frequency of 38 kHz.

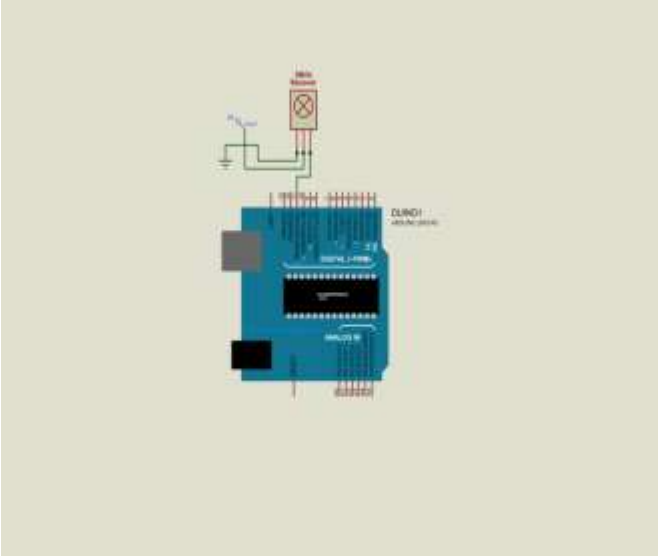


The command comprises 14 bits:
• 2 start bits for the automatic gain control in the infrared receiver.
• 1 toggle bit (change every time when a new button is pressed on the IR transmitter)
• 5 address bits for the system address
• 6 instruction bits for the pressed key IR RECEIVER (TSOP1738):

6. PROPOSED MODEL:

The project uses an IR receiver such as TSOP1738 that responds to only specific frequency of 38 kHz . A standard TV remote that delivers infrared codes at 38 kHz is thus received by the TSOP receiver feeding a 14 bit data so emitted from the remote to the controller through receiver. The program is so returned that it recognizes the 14 bit data relating to a particular number being pressed at the remote.
Here the channel ON & OFF buttons and volume low to volume high buttons of the TV remote buttons are used for sending specific 14 bit data to pin – 13 of port 3.3.

Software used at the PC receives these commands the serial port being connected to the MC through MAX232, RS232 interface. Thus the TV remote works like a mouse from a distance.



7. SOFTWARE TOOLS:

.NET TECHNOLOGY:

The .NET platform is one over which Web-based applications can be distributed to a great variety of devices and to desktop computers. The platform offers a new software-development model that allows applications created in disparate programming languages to communicate with each other. One key aspect of .NET is its independence from a specific language or platform, further extending the portability of .NET programs. A key component of the .NET architecture is Web services, which are reusable application software components that can be used over the Internet. Clients and other applications can use Web services as reusable building blocks. The Microsoft .NET Framework is at the heart of the .NET strategy. This framework manages and executes applications and Web services, contains a class library, enforces security and provides many other programming capabilities. The details of the .NET Framework are found in the Common Language Infrastructure (CLI), which contains information about the storage of data types, objects and so on. The CLI has been standardized by Ecma International, making it easier to create the .NET Framework for other platforms. The Common Language Runtime (CLR) is another central part of the .NET Framework [4] it executes .NET programs. Programs are compiled into machine-specific instructions in two steps. First, the program is compiled into Microsoft Intermediate Language (MSIL), which defines instructions for the CLR. Code converted into MSIL from other languages and sources can be woven together by the CLR. The MSIL for an application's components is placed into the application's executable file. When the application executes, another compiler in the CLR translates the MSIL in the executable file into machine-language code, then the machine-language code executes on that platform. MSIL is Microsoft's name for what the C# language specification refers to as Common Intermediate Language (CIL).

PROGRAMMING LANGUAGE:

Programming language used in this paper is C. C is a general purpose structured programming language that is powerful, efficient and compact. It has emerged as the language of choice for most applications due to speed, portability and compactness of code. The C compiler combines the capabilities of an assembler language with the features of high level language. C is highly portable. This means that C programs written for one computer can be on another with little or no modification. Portability is important if we plan to use a new computer with a different operating system. C language is well suited for structured programming thus requiring the user to think of a problem in terms of function modules and blocks. A proper collection of these modules make a complete program. This modular structure makes program debugging, testing and

maintenance easier. Another important feature of C is its ability to extend itself. A C program is basically a collection of functions that are supported by the C library [2].We can continuously add our own functions to the C library. With the availability of a large number of functions, the programming task becomes simple.

7. IMPLEMENTATIONS:

A product implementation method is a blueprint to get users and/or organizations running with a specific product. The method is a set of rules and views to cope with the most common issues that occur when implementing a software product. The implementation of product software, as the final link in the deployment chain of software production, is in a financial perspective of a major issue. A software application in general is implemented after navigating the complete life cycle method of a product. Various life cycle processes such as requirement analysis, design phase, verification, testing and finally followed by the implementation phase results in a successful product management. The software application which is basically a web based application has been successfully implemented after passing various life cycle processes.

PROCESS OF IMPLEMENTATION:

- The product aims to development of a PC remote control.
- This remote control will be very useful and highly user friendly in application. Inputs are given through remote control and are processed by 8051 microcontroller.
- There should be Windows Platform The system should support visual studio 2010 The project uses built in components in VC# such as IO port Interface classes and Timers for getting and processing signals from IO ports.
- It is expected that Windows Media Player is installed on the testing Machine.
- The signals received through IO ports are processed and mouse controlling functions and media control functions are made using USER32.dll and Process classes in C#.USER32.dll is a famous dynamic link library for windows programmers, it contain many functions for generating mouse events and keyboard strokes.
- The status of port and Software working can be monitored using PC remote control monitor

8. FUTURE WORK:

As we all know, Controlling of electrical appliances through IR remote is interesting and very useful application. This system is widely useful to industries, offices, Banks, hotels, hospitals, and display boards. In this, IR remote is used for controlling PC\Laptop in your room. We identified the following as the requirements of a system that enables a TV Remote to be used as a remote control device for desktop PC while he is moving around in the class-room freely. In this way, he does not have to go to the laptop each time when he wants to use the Power Point screen. Its architecture is based on IR Transmitting - Receiving paradigm. It consists of two parts: a transmitter part and a recevier part. The transmitter part is known as TV Remote. The recevier part consists of microcontroller, TSOP Receiver, serial communication and PC. This side of the system is capable of listening incoming connections, sending and receiving data, processing control, commands taking screenshots, modify applications

9. CONCLUSION:

We have completed our project on ‘USING TV REMOTE AS A CORDLESS MOUSE USING PIC CONTROLLER’ successfully with proper result. The main motto of our project was to use TV remote as a cordless mouse which has eliminated the use of wired mouse for our convenience.

The major advantage of our system is its simplicity in design and it requires no regular maintenance. Since it is quite economical it would be easy to afford thereby making use of wireless technology which is the main motto of our project.

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