International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (IJAREEIE)

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

|| Volume 9, Issue 7, July 2020 ||

Implementation of Cordless Mouse for Computer Using TV Remote

Krishanu Bhattacharjee[1], Rima Nayek[2], Debapriya Ghosh[3], Malabika Chatterjee[4]

PG Student, Department of ECE, RCC Institute of Information Technology, Kolkata, West Bengal, India[1, 2, 3]

Lecturer, Department of ECE, Shree Ramkrishna Institute of Science and Technology, Kolkata, West Bengal, India[4]

ABSTRACT: Electronics consumer products and personal computers have become an unavoidable part of our life. Similarly, mobile devices and machines like CELL phones and Tablets are becoming more and more commonly used in our daily life. Controlling consumer electronics devices and computers remotely is an essential aspect of technology. Similarly, it is desirable to control stationary desktop/laptop PCs and their applications remotely. Which offers a wireless means of communication between the computer and the user and also helps to overcome the disadvantages of the wired and wireless mouse. Our application will be primarily based on Net Technology. The one side of the system runs on top of the Windows operating system, and the other hand is a net-based application built-in IR technology.

KEYWORDS: wireless, embedded c, net technology, remote control

I. INTRODUCTION

Managing electrical appliances through IR remote is an exciting and beneficial application. This system is extensively useful to offices, Banks, hospitals, and railway display boards etc... In this, IR remote is used for controlling PC\Laptop in our room. We recognized the following as the requirements of a system that enables a TV Remote to be used as a remote control device for a desktop PC while he or she is moving around in the classroom and their territory freely [6]. In this way, he or she does not have to go to the laptop each time when he or she wants to use the power point screen. Its architectonic is based on IR Transmitting- Receiving criterion [1]. It consists of two parts: a transmitter part and a receiver part. The transmitter part is known as a TV Remote. The receiver part consists of a microcontroller, TSOP Receiver, serial communication and PC [4]. This side of the system is capable of listening to incoming connections, sending and receiving data, processing control, commands taking screenshots, modify applications. This device helps to have better control of computer without mouse. As a result mouse can be avoided and mouse functions are incorporated in the PC remote control [9]. The commands made by the user through the PC remote control is read and interpreted by the microcontroller. The button pressed in PC remote control by the user will be detected by microcontroller based circuit, and these details are sent to PC via RS232. It can also be used for windows media player functioning [8]. PC remote control is an alternative for a mouse. PC remote control offers a wireless means of communication between the computer and the user. PC remote control helps to overcome the disadvantages of a wired and wireless mouse. PC remote control has become a necessary constituent of modern desktops as well as laptops. It operates PC\Laptop from our living room using key pad inputs of the TV Remote. It will enable 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 enables Arithmetic Keys for controlling media player and slider also. In the literature discussing microprocessors, we often see the term Embedded System. Microprocessors and Microcontrollers are widely used in embedded system products. An embedded system product uses a microprocessor or Microcontroller to do one task only [1]. Contrast this with a Pentium based PC. A PC can be used for any number of applications such as word processor, print-server, bank teller terminal, Video game, network server, or Internet terminal. Software for a variety of applications can be loaded and run. Of course, the reason a pc can perform tasks is that it has RAM and an OS that loads the application software into RAM and lets the CPU run it. In an Embedded system, there is only one application software that is typically burned into ROM. An x86 PC contains or is connected to various embedded products such as the keyboard, printer, modem, disk controller, sound card, CD-ROM drives, mouse, and so on. Each one of these peripherals has a Microcontroller inside it that performs only one task. For example, inside every mouse there is a Microcontroller to complete the task of finding the mouse position and sending it to the PC [2]. The project uses an IR receiver such as TSOP1738 that responds to the only specific frequency of 38 kHz, to avoid receiving the false signal from conventional environmental infrared sources. The output of this receiver is interfaced to interrupt one i.e., pin 13 of the microcontroller. A standard TV remote that delivers infrared codes at 38 kHz is thus received by the TSOP

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

|| Volume 9, Issue 7, July 2020 ||

receiver feeding a 14-bit data so emitted from the remote to the controller through the receiver. The program is so returned that it recognizes the 14 bit data relating to a particular number being pressed at the remote.

II. BLOCK DIAGRAM

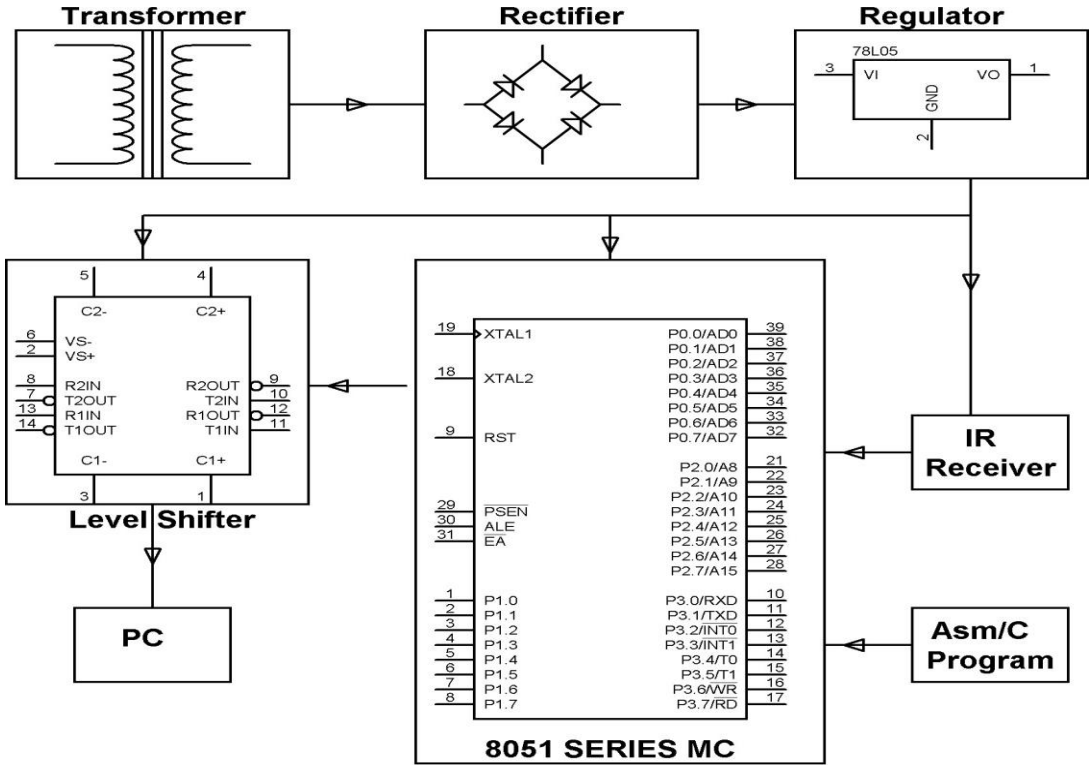


Fig. 1: Block Diagram of the Project

The Figure shows the block diagram of the controlling pc using TV remote. From this figure the power supply gives 5v supply to the microcontroller, IR receiver and level shifter IC. Level shifter and IR receiver is connected to the microcontroller. At first the data are transmitted through the remote. Then the IR receiver received the signal. After this data are decoded with the help of microcontroller and the decoded value is sent through the pc via serial port. Then according this the function is processed through the computer. The use of some wireless mouse that are having the disadvantages like occupying more space, more complex system, high power consumption, slow speed can be overcome by the use of this application.

III. HARDWARE COMPONENTS

1. TRANSFORMER; 2.VOLTAGE REGULATOR (LM 7805); 3. FILTER; 4. RECTIFIER; 5. MICROCONTROLLER (AT89S52/AT89C51)

6. IR RECEIVER (TSOP1738); 7. LEVEL SHIFTER (MAX232); 8. DB9 CONNECTOR; 9. LED; 10. DIODE (1N4007); 11.RESISTORS

12. CAPACITORS

III. DESCRIPTION OF HARDWARE COMPONENT

1) *Transformer*: Transformers convert AC electricity from one voltage to another with a little loss of power. Step-up transformers increase voltage, step-down transformers reduce voltage. Most power supplies use a step- down transformer to reduce the dangerously high voltage to a safer low voltage. The ratio of the number of turns on each coil, called the turn's ratio, determines the ratio of the voltages. A step-down transformer has a large number of

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

|| Volume 9, Issue 7, July 2020 ||

turns on its primary (input) coil which is connected to the high voltage mains supply, and a small number of turns on its secondary (output) coil to give a low output voltage.

Turns Ratio = (Vp / Vs) = (Np / Ns) [Vp-Primary Input Voltage, Vs-Secondary input voltage]
[Np-No.of turns on primary coil, Ns-No.of turns on secondary coil]

Fig. 2: A Typical Transformer

2) *Voltage Regulator:* A voltage regulator is an electronic circuit that provides a stable DC voltage independent of the load current, temperature and AC line voltage variations. A voltage regulator may use a simple feed- forward design or may include negative feedback. It may use an electromechanical mechanism, or electronic components. Depending on the design, it may be used to regulate one or more AC or DC voltages.

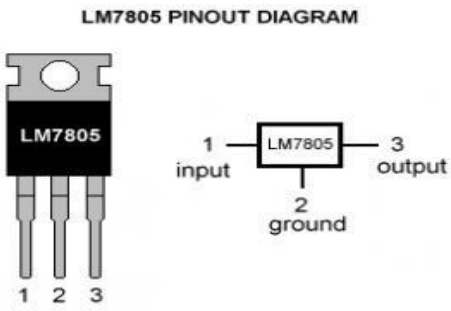


Fig. 3a: Pin diagram of LM7805

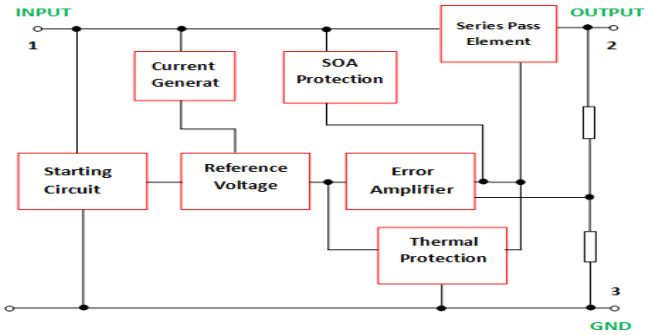


Fig. 3b: Block Diagram of Voltage Regulator

3) *Rectifier*: A rectifier is an electrical device that converts alternating current (AC), which periodically reverses direction, to direct current (DC), current that flows in only one direction, a process known as rectification. Rectifiers have many uses including as components of power supplies and as detectors of radio signals. Rectifiers may be made of solid state diodes, vacuum tube diodes, mercury arc valves, and other components. The output from the transformer is fed to the rectifier. It converts A.C. into pulsating D.C. The rectifier may be a half wave or a full wave rectifier. In this project, a bridge rectifier is used because of its merits like good stability and full wave rectification. In positive half cycle only two diodes will conduct, in negative half cycle remaining two diodes will conduct and they will conduct only in forward bias only.

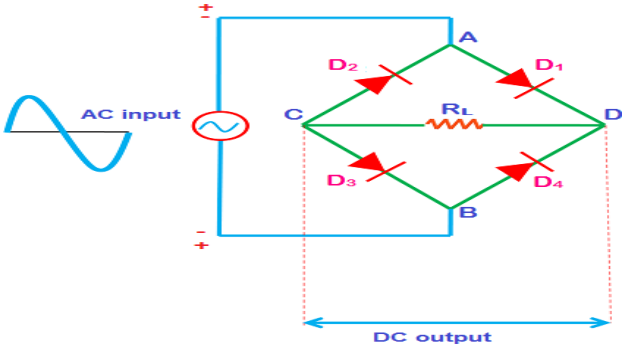


Fig. 4: Bridge Rectifier

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

|| Volume 9, Issue 7, July 2020 ||

4) *Filter:* Capacitive filter is used in this project. It removes the ripples from the output of rectifier and smoothens the D.C. Output received from this filter is constant until the mains voltage and load is maintained constant. However, if either of the two is varied, D.C. voltage received at this point changes. The simple capacitor filter is the most basic type of power supply filter. The use of this filter is very limited. It is sometimes used on extremely high-voltage, low-current power supplies for cathode-ray and similar electron tubes that require very little load current from the supply. This filter is also used in circuits where the power-supply ripple frequency is not critical and can be relatively high. Below figure can show how the capacitor charges and discharges.

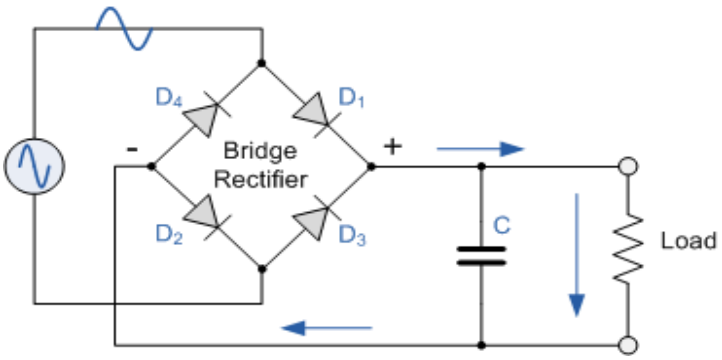


Fig. 5: Bridge Rectifier with filter Capacitor

5) *Microcontroller AT89S52:* The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in- system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry

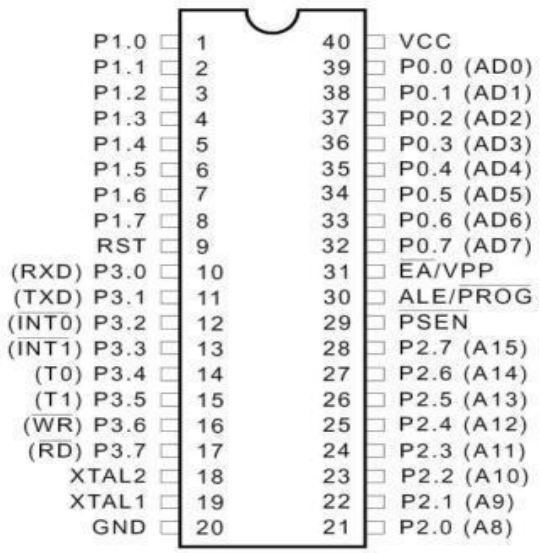


Fig. 6: Block Diagram of AT89S52

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

|| Volume 9, Issue 7, July 2020 ||

6) *The TSOP17* 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. These are available with different carrier frequencies out of which TSOP1738 is very common whose carrier frequency is 38 KHz. The output of TSOP17XX receivers can be directly connected to a microcontroller or microprocessor for further processing.

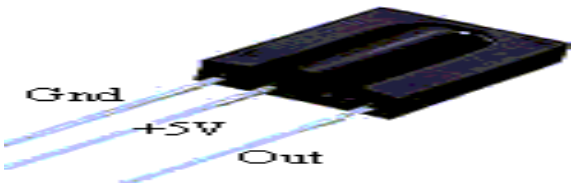


Fig. 7: TSOP1738

7) The MAX232 is an integrated circuit that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals.

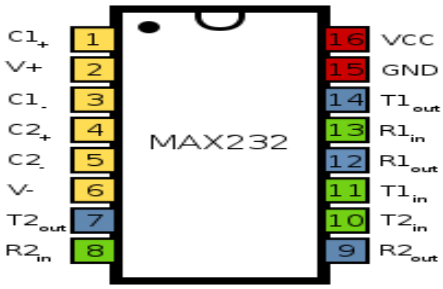


Fig. 8: Pin Diagram of MAX232C

IV. SOFTWARE REQUIREMENTS

1. Introduction to Keil Micro Vision (IDE)
2. Concept of Compiler
3. Concept of Cross Compiler
4. Keil C Cross Compiler
5. Embedded C
6. Net Technology

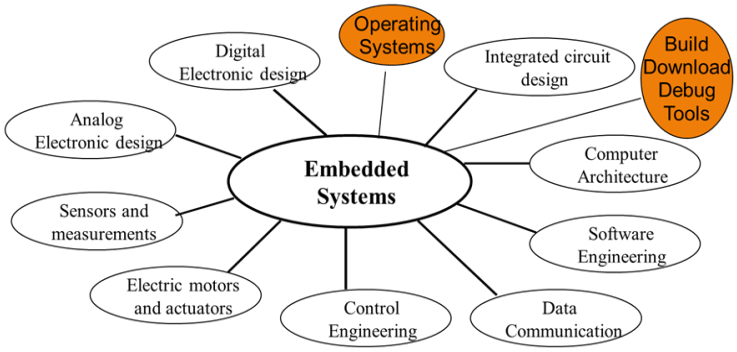
Keil development tools for the 8051 Microcontroller Architecture support every level of software developer from the professional applications engineer to the student just learning about embedded software development. Compilers are programs used to convert a High Level Language to object code. Desktop compilers produce an output object code for the underlying microprocessor, but not for other microprocessors. I.E the programs written in one of the HLL like 'C' will compile the code to run on the system for a particular processor like x86. A cross compiler is similar to the compilers but we write a program for the target processor (like 8051 and its derivatives) on the host processors (like computer of x86). It means being in one environment you are writing a code for another environment is called cross development. 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.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

|| Volume 9, Issue 7, July 2020 ||

V. INTRODUCTION TO EMBEDDED SYSTEMS

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. An embedded system is not a computer system that is used primarily for processing, not a software system on PC or UNIX, not a traditional business or scientific application. High-end embedded & lower end embedded systems. High end embedded system - Generally 32, 64 Bit Controllers used with OS. Examples Personal Digital Assistant and Mobile phones etc. Lower end embedded systems - Generally 8, 16 Bit Controllers used with a minimal operating systems and hardware layout designed for the specific purpose. Examples Small controllers and devices in our everyday life like Washing Machine, Microwave Ovens, where they are embedded in. The embedded system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product, or increasing the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale. An embedded system is some combination of computer hardware and software, either Fixed in capability or programmable, that is specifically designed for a particular kind of application device. Embedded systems



that are programmable are provided with a programming interface, and embedded systems programming is a specialized occupation.

Fig 9: System Design Calls

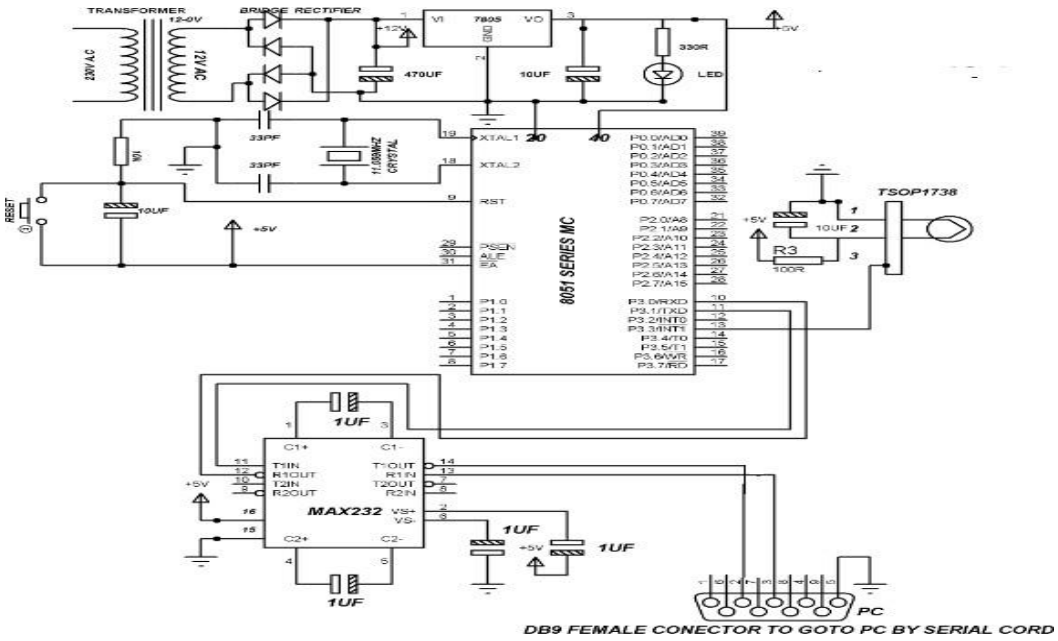


Fig. 10 Circuit Diagram of the project

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

|| Volume 9, Issue 7, July 2020 ||

VI. HARDWARE IMPLEMENTATION

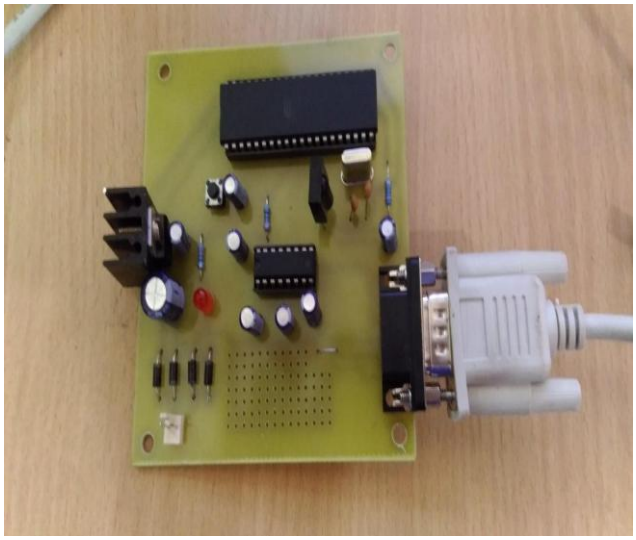


Fig. 11 PCB board with component

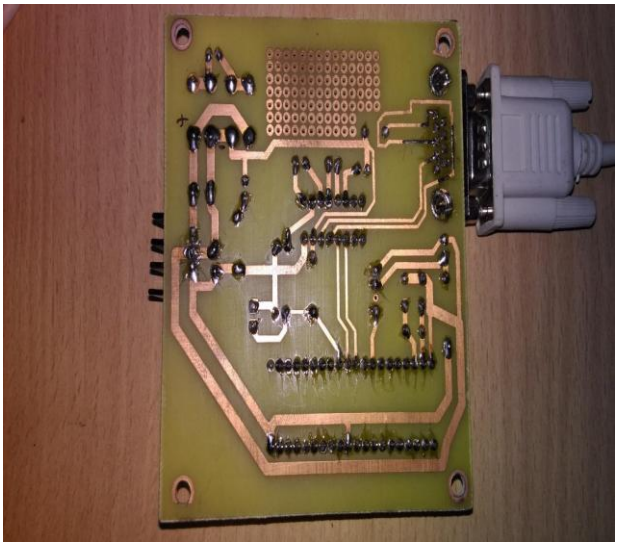


Fig. 12 PCB board with bottom copper

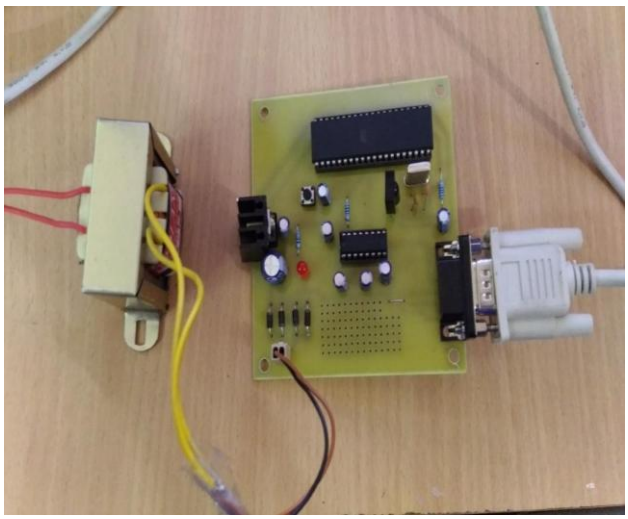


Fig. 13 PCB board with power supply

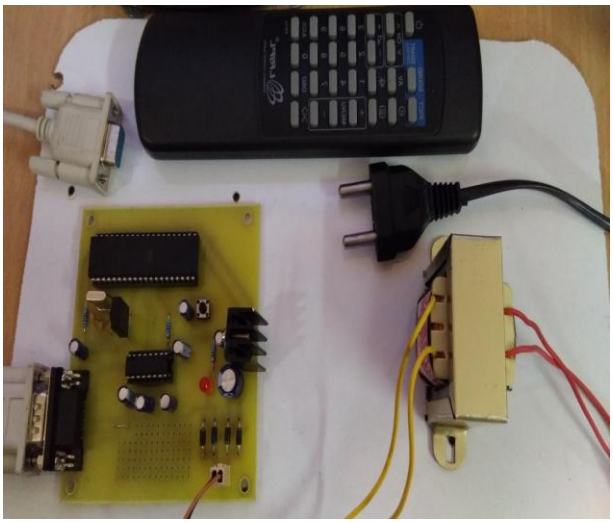


Fig. 14 Proposed model

VII. RESULT & DISCUSSION

The project uses an IR receiver such as TSOP1738 that responds to only specific frequency of 38 kHz, in order to avoid receiving false signal from normal environmental infrared sources. The output of this receiver is interfaced to interrupt 1 i.e., pin 13 of the microcontroller. 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 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 through the serial port being connected to the MC through MAX232, RS232 interface. Thus the TV remote works like a mouse from a distance.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

|| Volume 9, Issue 7, July 2020 ||

A. Specification of the project:

1) Voltage - 5V

2) Frequency - 9600 Baud Rate

3) Remote can be operate within 10ft

B. Device Specification:

Remote Button	Mouse Operation
Key 2	Scroll Up
Key 5	Scroll Down
Key 4	Scroll Left
Key 6	Scroll Right
Key 1	Left Click
Key 3	Right Click
Volume +	To increase cursor speed
Volume -	To decrease cursor speed

VIII. CONCLUSION

From this project we can perform various computer functions through TV remote. In this age we can operate many digital devices through the remote control. We have to use different types of remote control to operate the P.C. using the remote which we are using for the TV. TV remote is working as a mouse for P.C. With the help of this project we can overcome many complexities in daily life. We don't need to learn different remote to operate different devices. Also, we can operate the computer from the distance. But this distance should be equal to the infrared range. From this project we can conclude that with the help of the 8051 microcontroller family we can make a universal remote. With the help of this remote we can control both TV and PC.

REFERENCES

[1] Rafiqul Zaman Khan and Noor Adnan Ibraheem ," HAND GESTURE RECOGNITION: A LITERATURE REVIEW", International Journal of Artificial Intelligence & Applications (IJAIA), Vol.3, No.4, July 2012.

[2] Kenneth Sabir, Christian Stolte, Bruce Tabor, Sean I. O'Donoghue "The Molecular Control Toolkit: Controlling 3D Molecular Graphics via Gesture and Voice", Biological Data Visualization (BioVis), 2013 IEEE Symposium, 2013.

[3] Rishikanth C , Harini Sekar , Gautham Rajagopal , Ramesh Rajesh , Vineeth Vijayaraghavan, "Low-Cost Intelligent Gesture Recognition Engine for Audio-Vocally Impaired Individuals", Global Humanitarian Technology Conference (GHTC), 2014 IEEE, pages 628 – 634.

[4] Hervé Lahamy and Derek Litchi, "Real-time hand gesture recognition using range cameras," Department of Geomatics Engineering, University of Calgary. March 2009.

[5] Hojoon Park, "A Method for Controlling Mouse Movement using a Real Time Camera," Brown University, Providence, RI, USA. April 2004.

[6] Bainbridge, R., Paradiso, J.A. "Wireless Hand Gesture Capture through Wearable Passive Tag Sensing " International Conferrence on Body Sensor Network, 2011, published by IEEE.

[7] Vutinuntakasame, S.; Jaijongrak, V.-R.; Thiemjarus, S.; "An Assistive Body Sensor Network Glove for Speec- and Hearing-Impaired Disabilties" Body Sensor Networks (BSN), 2011 International Conference on pp 7-12, 2011.

[8] Popa, M.; "Hand Gesture Recognition Based on Accelerometer Sensors". Networked Computing and Advanced Information Management (NCM), 2011 7th International Conference, pp 115-120 July 2011.

[9] Lombardi, A.; Ferri, M.; Rescio, G.; Grassi, M.; Malcovati, P., "Wearable wireless accelerometer with embedded fall-detection logic for multisensor ambient assisted living applications," Sensors, 2009 IEEE , vol., no., pp.1967,1970, 25-28 Oct. 2009.

[10] "The 8051 Microcontroller and Embedded systems" by Muhammad Ali Mazidi.

[11] ATMEL 89S52 Data Sheets.

[12] "PIC Microcontroller and Embedded Systems" by Muhammad Ali Mazidi, Danny Causey, Rolin McKinlay

[13] "8051 Microcontroller: Internals, Instructions, Programming & Interfacing" by Subrata Ghoshal

[14] Encyclopedia of Electronic Components Volume 1 & 2