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Goggle Mouse

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Abstract

The essential thought of the undertaking is to fabricate Goggle by utilizing human machine interface which can be utilized to control mouse by utilizing head-tilt and eye-flicker. This mouse-copying gadget can be observed to be most helpful by physically debilitated and incapacitated persons who can no longer control the PCs by utilizing their hands. Since the gadget depends on person's head and eye movements, it can be utilized even by patients who are incapacitated from below the shoulder. There is less energy required for head movement and eye flickering. That's why user won't get drained from utilizing this gadget. In this gadget or goggle we are utilizing 2D-accelerometer for identifying the head movement, by this, the movement of the cursor has been finished. A photograph sensor distinguishes eye flickering. The infrared handset comprises of a 935 nm IR transmitter and a phototransistor mounted on a similar unit. This identifies a solid increment in the reflected signal upon deliberate long squint when contrasted with ordinary eye flicker. Duplicate hands and legs have been ended up being very helpful and palatable for a set number of exercises. Presently, computer can be easily found at home. The disappointment of these manufactured appendages in empowering the amputees to effectively handle a PC is obvious since one can practice a constrained control on the mechanical appendages connected. Besides, numerous amputees have an occupation and work in workplaces wherein they need to utilize a PC. Consequently, gadget ought to be considered which would permit simple and cover control up PC.

Keywords: *Handicapped, mouse, Goggle, accelerometer, micro controller*

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INTRODUCTION

To build up a human machine interface copying capacity of a mouse for incapacitated or handicapped people. Since the gadget depends on client's head and eye developments, it can be utilized even by the patients who are deadened from shoulder descending [1, 2]. Straightforward head development doesn't require an excessive amount of vitality, and neither eyes squinting. Subsequently, client won't get drained from utilizing this gadget. We utilize accelerometer to distinguish the development. At the point when the leader of the client is tilted up/down or left/right, the perusing from the accelerometer is subtracted from the estimation of a pre-characterize reference point.

The distinction decides the level of head tilt. A photograph sensor identifies eye flickering. The infrared handset comprises of a 935 nm IR transmitter and a phototransistor mounted on a similar unit. This distinguishes a solid increment in the reflected flag upon purposeful long squint when contrasted with ordinary eye flicker. The yield of both the sensors is given to the ADC input and after switch on the microcontroller. After the signs are translated by the microcontroller, mouse guidelines are sent to the PCs. The handled advanced data is transmitted to the PC through the serial port. Since numerous years, different artificial limbs and administrations are offered worldwide to individuals who have lasting or long haul weakness. Fake hands and legs have been turned out to be very compelling and attractive for a set number of exercises.

Presently a-days, a PC is a typical thing at home [3, 4]. The disappointment of these simulated appendages in empowering the amputees to effectively handle a PC is apparent since one can practice a restricted control on the mechanical appendages joined. In addition, numerous amputees have a vocation and work in workplaces wherein they need to utilize a PC. Consequently, gadget ought to be considered which would permit simple and cover control up PC. Along these

lines, each developing need of the PC is paralleled by regularly expanding approaches to work with them.

PROJECT METHODOLOGIES

Hardware Description

Blink Detection Circuit

For the input mechanism, in order to detect the blink of the eye, we needed to have a photo sensor which acts as a transceiver. Initially we selected TWS and RWS-434A, a reflective object sensor manufactured by Rentron, for the purpose. However, as the particular model was not available, we settled for TWS and RWS-434A which has similar characteristics to the former, only a shorter range (Figure 1). The TWS and RWS-434A consists of an infrared light emitting diode and an NPN silicon phototransistor mounted "side-by-side" on parallel axes in a black plastic housing. On TWS and RWS-434A, the LED and phototransistor are molded using dark infrared transmissive plastic to reduce ambient light noise. Phototransistor responds to light from the emitter when a reflective object passes within its field of view of the device [5].

Accelerometer (ADXL335)

We decided to use an accelerometer for the determination of the degree of user's head tilt. Accelerometer uses the force of gravity as input vector to determine orientation of object in space. When oriented parallel to earth's surface it can be used to detect the relative tilt of head. One of the most popular applications of the ADXL335 is tilt measurement. The accelerometer uses the force of gravity as an input vector to determine orientation of an object in space [6].

An accelerometer is most sensitive to tilt when its sensitive axis is perpendicular to the force of gravity, i.e. parallel to the earth's surface. At this orientation, its sensitivity to changes in tilt is highest.

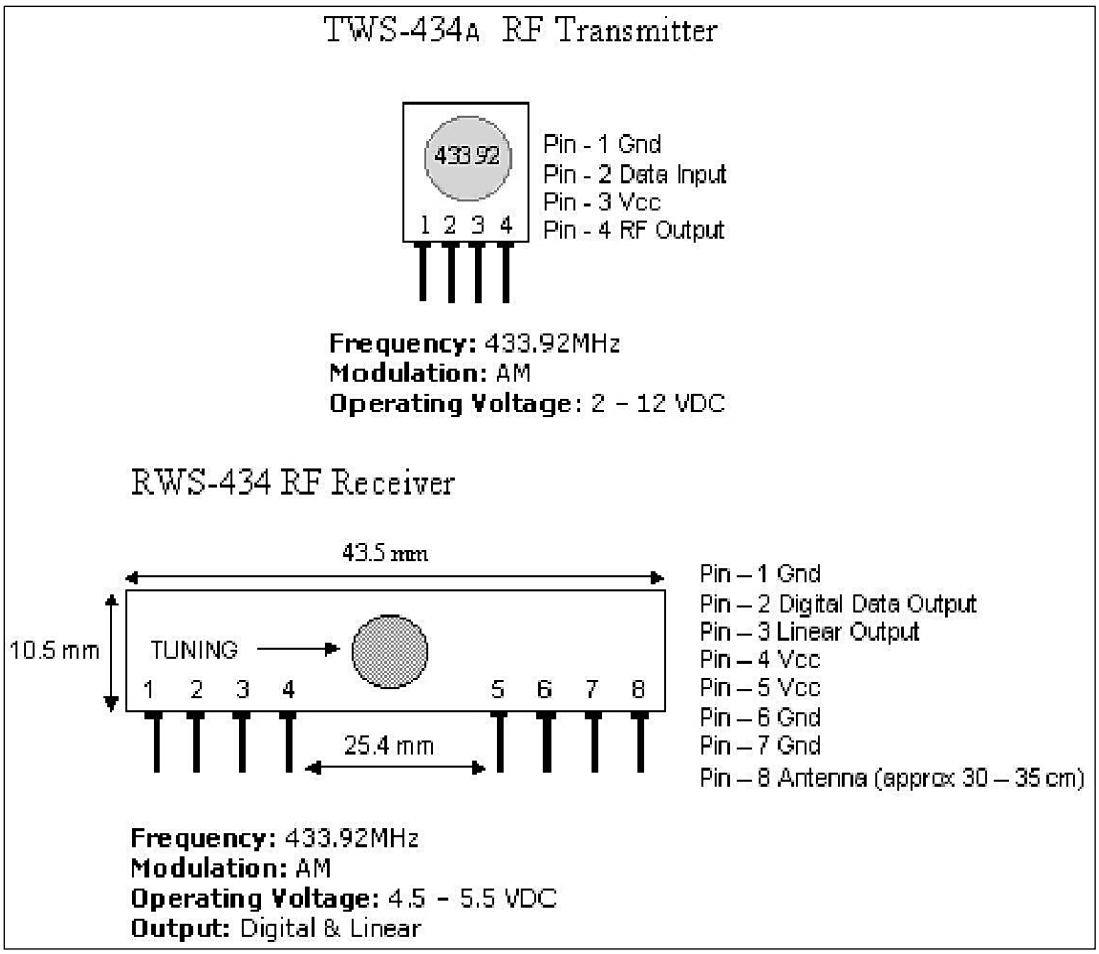

Fig. 1: *Detector Sensor.*

The accelerometer consist of a g-cell which does the work of sensing change in acceleration and hence the tilt. G-cell consists of two capacitive sensing cells, formed using three beams, where the middle beam is movable. Thus, these are two back-back capacitors. Now, we know that capacitance is given as:

$$C=\text{Ɛ}A/d$$

Where,

A is the area of the beam,

Ɛ is the dielectric constant, and

d is the distance between the beams.

Along these lines, at whatever point there is a tilt in the either X or Y hub, the center bar moves changing its separation as for the other two settled plates. This is the progressions of the resultant capacitance of the G-cell (Figure 2). This adjustment in capacitance is utilized to decide the yield of the accelerometer. The IC likewise flag conditions and channels the yield flag, giving an abnormal state yield voltage that is proportion metric and corresponding to increasing speed.

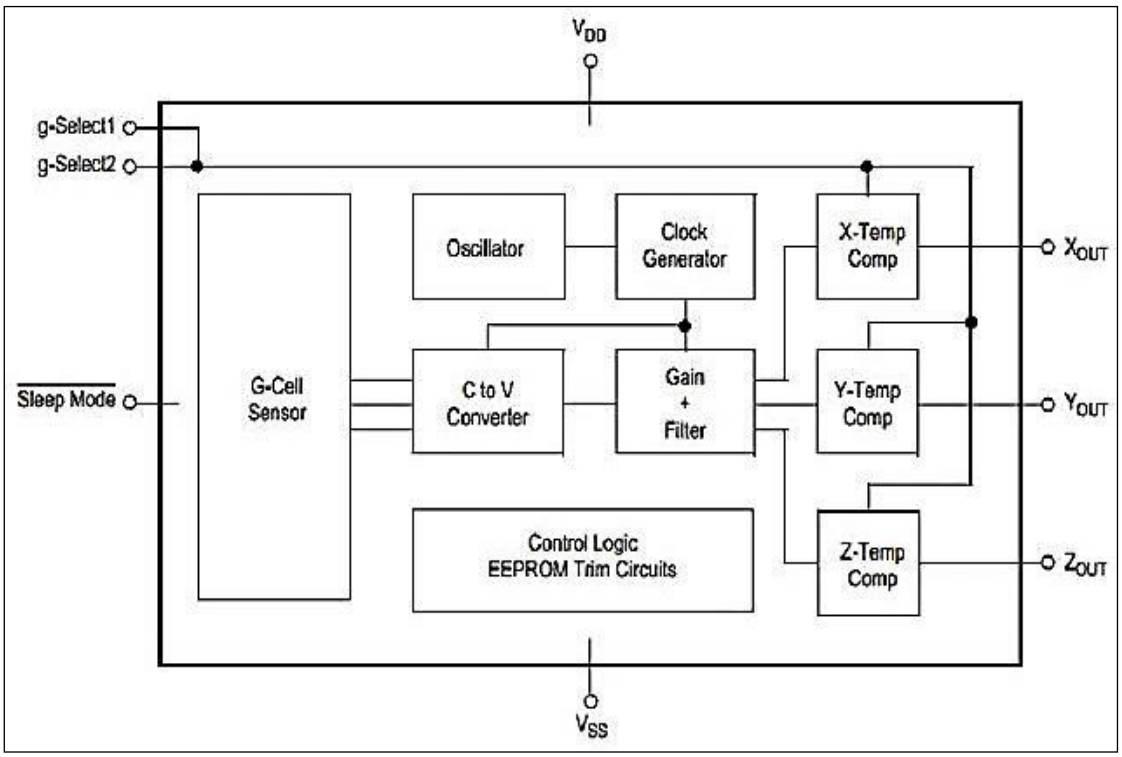

Fig. 2: *Functional Diagram of Accelerometer.*

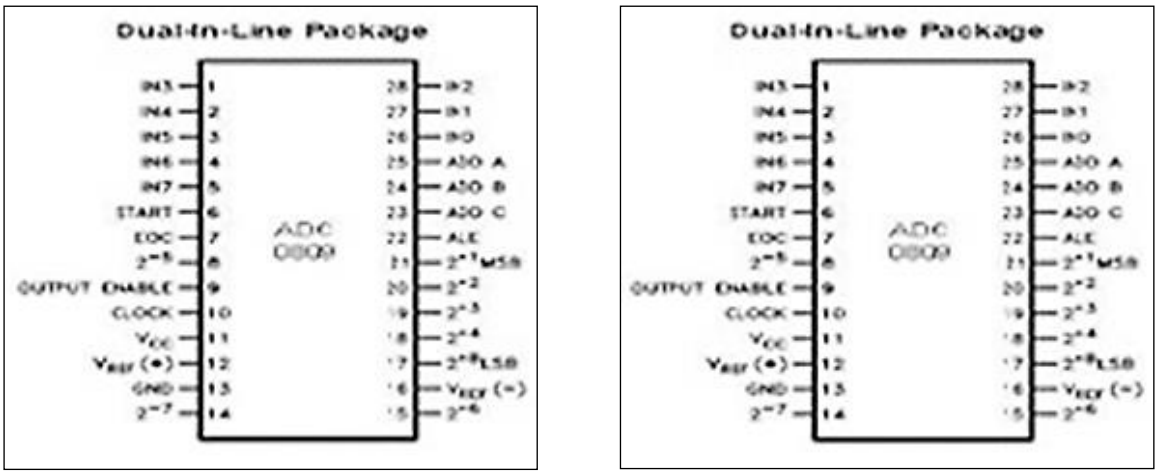

Fig. 3: *Pin Diagram of ADC.*

A/D Converter

The output of the sensor is fed into the A/D converter for the conversion of analog signal which is the output of the sensor to digital signal which is fed to the microcontroller for further processing of data. The reason why we are using A/D converter is that microcontroller works on the digital signal for the further processing of data. Here, we are using HD74LS90P to provide necessary clock pulse to the ADC (Figure 3).

Microcontroller

The yield of IR handset and accelerometer are distinguished by microcontroller, subsequent to getting handled through A/D convertor. The capacity of the microcontroller is to get the information from A/D converter, prepare it and after that send appropriate signs to the PC's serial port. The AT89S52 is a low-control, elite CMOS 8 bit microcontroller with 8 k bytes of in-framework programmable flash memory. The gadget is made by utilizing Atmel's high-thickness non-unstable memory innovation and is good with the business standard 80C51 guideline set and stick out. The on-chip flash permits the program memory to be reinvented in-framework or by a routine non-unstable memory developer. By brushing an adaptable 8 bit CPU with in-framework programmable flash on a solid chip, the Atmel AT89S52 is an intense microcontroller which gives an exceptionally adaptable and practical answer for some implanted control applications.

Power Supply

A fixed voltage power supply producing constant +5 V consists of step down transformer, a bridge rectifier, filter capacitors C1 and 3 terminal regulator IC LM7805. A step down transformer is selected in such a way that it produces 9 V at the input of IC. This power supply is capable of supplying +5 V and load current up to 500 mA. The capacitor C2 connected between output terminal and ground cancels out any inductive effect due to long distribution leads (Figure 4) [7]. Input capacitor C1 is used to improve transient response of the regulator IC, i.e. response of regulator to sudden changes in load. It is also helpful in reducing the noise present in the output. Dropout voltage (Vin-Vout) needs to be at least 2 V under all operating conditions for proper operation of regulator.

Solar Energy in Goggle Mouse

The Goggle mouse has two parts, the first part is transmitter, part and second part is transmitter part. The transmitter part is mounted on the head with accelerometer and IR sensor, and the receiver part is connected to the computer system; it consists of microcontroller and ADC, and this receives the signal from the transmitting part through the antenna. Both the parts are connected to the power supply of 5–12 V. If we use wire to give supply to both the parts, it takes very large amount of wire [8].

Also, it looks very complex to see. If we use solar power to operate the transmitting part then we can solve the complication of wires in both parts. So, we use a mini solar panel and a mini battery to operate the transmitting part. We put a panel on head which captures the light and converts it into DC power. And also we use a battery to collect the energy for emergency such as dark rooms and dark places where the light does not reach. It has a disadvantage that we can't use it for long time at solar battery power. It will be discharged at a certain time.

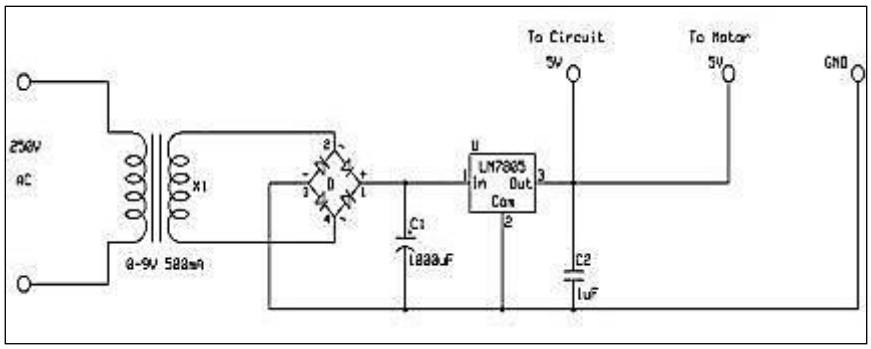

Fig. 4: *Circuit Diagram of Power Supply.*

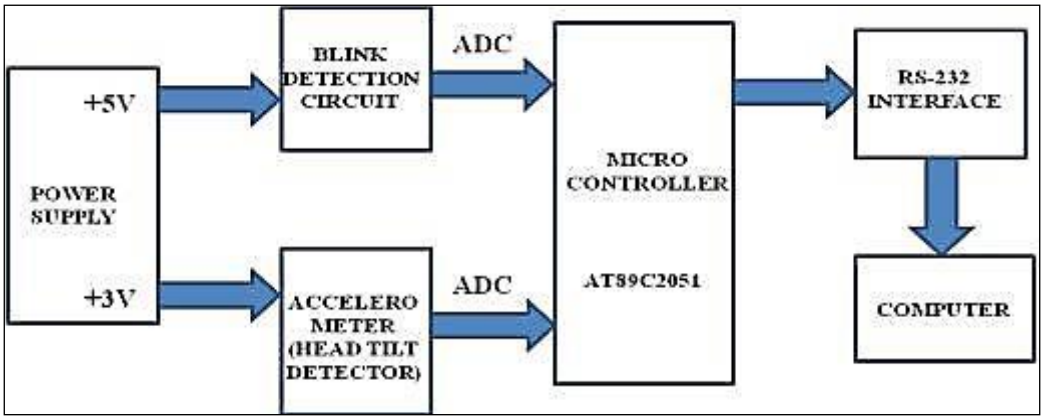

Fig. 5: *Block Diagram.*

PROJECT SOFTWARE

We have used two software's for the working of our projects. One code is placed in microcontroller for transmission of information regarding and click. Another program runs on PC to collect the data from serial port and set mouse cursor accordingly (Figure 5).

- *MATLAB*: To write program for microcontroller.
- *Hyperlink terminal*: To show input on PC.

Project block diagram is shown in Figure 5.

RESULT

Blink Testing

Parameter	*Value in Dark Condition*	*Value in Brighter Condition*
IR Receiver Voltage for open eye	510 mV	535 mV
IR Receiver Voltage for closed eye	560 mV	565 mV
Difference in Voltage	50 mV	30 mV
Decided Threshold value	40 mV	40 V

Accelerometer Sensing

Position	*X Output*	*Y Output*
Initial	1.79	1.79
45º to the Right	1.91	1.79
90º to the Right	2.01	1.79
45º to the Left	1.67	1.79
90º to the Left	1.57	1.79
45º Upwards	1.79	1.98
90º Upwards	1.79	2.08
45º Downwards	1.79	1.74
90º Downwards	1.79	1.64

CONCLUSION

The encounters with the Goggle mouse framework are extremely reassuring. They demonstrate that the Goggle mouse can effectively give PC access to individuals with extreme handicaps. It is an easy to use specialized gadget that is particularly suitable for youngsters. The framework tracks numerous body highlights and does not have any client borne embellishments, so it is effectively versatile to serve the extraordinary needs of individuals with different disabilities. To take care of the present demand, extra Goggle mouse frameworks are being introduced. A solitary PC form of the framework is being created. Future work will join a recognition segment into the visual calculation. If we use solar power to operate the transmitting part then we can solve the complication of wire in both parts.

So, we used a mini solar panel and a mini battery to operate the transmitting part. We put a panel on head which captured the light and converted it into DC power. And also we used a battery to collect the energy for emergency, such as dark rooms and dark places where the light did not reach. It has a disadvantage that we cannot use it for long time at solar battery power.

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