Control of Electronic Appliancesby Voice Signal Using Wireless Laser Torch

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Abstract: **In existing Laser based projects only the data signals were given through the computer. We have tried to enhance it by implementing voice signal as an input. A microphone is interfaced with voice chip to enable voice recognition. Alphabetic letters are used to control various peripheral devices connected. People can control almost all appliances at home including lights, fans or even back ground music by voice commands. This project is to design a real time voice controlled wireless appliances in field of optical communication which brings more convenience to people lives. This device is very helpful for paralysis and physically challenged person.**
Keywords: **Laser, Voice Module, Free Space Optics.**

I. INTRODUCTION

A laser is a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation. The term "laser" originated as an acronym for "light amplification by stimulated emission of radiation". A laser light which is differs from other sources of light because it emits light coherently.Laser communication is a wireless communication system which is economic, reliable and can replace costly optical fiber communication and radio signal .Laser communication is a modern technology in the world of communication. Spatial coherence allows a laser is to be enabling applications like laser cutting and lithography. Spatial coherence also allows a laser light to travel over long distances. Lasers are used for both fiber optic and free-space optical communication. Free-space optical communication (FSO) is an optical communication technology that uses light propagating in free space to wirelessly transmit data for transmission. The technology is useful where the physical connections are impractical due to high costs or other considerations. Lasers have many important applications. They are used in medicinal field like surgery and various skin treatments. In industry fields, cutting and welding materials and military fields like law enforcement devices for marking targets and measuring range and Speed.

In this project we are using a laser to transmit a voice signal to perform some control operations.

II. DESIGN AND WORKING OF THE SYSTEM

There were two units, transmitter and receiver both powered by a separate12v, 5v fixed regulated voltage power supply. The transmitter circuit a microphone, voice recognition circuit, microcontroller, serial interface max232 and a laser diode. Here we use EASY VR V2 MODULE as a voice recognition circuit. This circuit operates in 5v. This circuit trained up to detect the user command. Depending upon the user voice commands it generates some serial output. The electronics equipments controlled the intensity of the laser beam according to the output of the microcontroller. A 650nm, 5mW laser torch used in this project can give its maximum output with a threshold current of 30mA. In receiver circuit, aphoto diode as a receiving element and a microcontroller is programmed to decode the command. As per the decoded command microcontroller activate or deactivate the relay via relay driver uln2003.

III. TRANSMITTER CIRCUIT OPERATION

In this circuithuman voice is captured through micro phone. The voice recognized by microphone is to be matched with voice recorded in EASY VR V2previously. If it matches the corresponding signals are send to the microcontroller. Here EASY VR V2 is the voice recognition unit.The voice is recorded and saved and then recognized whenever a command is given through microphone. This module can store 15 pieces of voice commands. Those 15 pieces are divided circuit and generate corresponding serial data to drive laser torch.
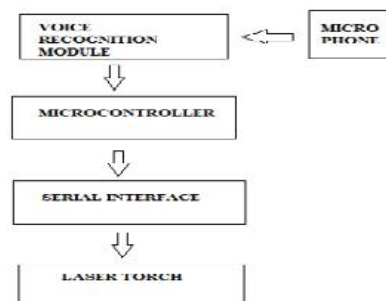
The microcontroller is clocked with 11.0592 MHz crystal oscillator circuit. Its reset pin is connected to a 10mfd capacitor along with 10k ohm resistor across the vcc ,gnd for auto reset.Max232 is used here to drive the laser torch. Its transmitter receiver pin is connected to microcontroller unit's receiver transmitter pin .it's output is directly connected to the laser diode.A 650nm, 5mW laser torch used in this circuit can give its maximum output with a threshold current of 30mA.it transmit the command data up to several meters.

IV.   RECEIVER CIRCUIT OPERATION

In receiver circuit bpa10 photodiode is used to receive the data signal. It converts transmitted laser signal into command data signal. And feed to microcontroller via serial interface chipmax232.the Microcontroller at89s52 is programmed to decode command and enable the corresponding relay connected port pin. The relays are connected to the Microcontroller unit's port2.0, 2.1, 2.2 via relay drive uln2803.The relay drive uln2803 is a high current driver. It accepts the logic input and energize corresponding high voltage (upto30v) relay. Here we use 12v SPDT relay to on/off the home appliances.
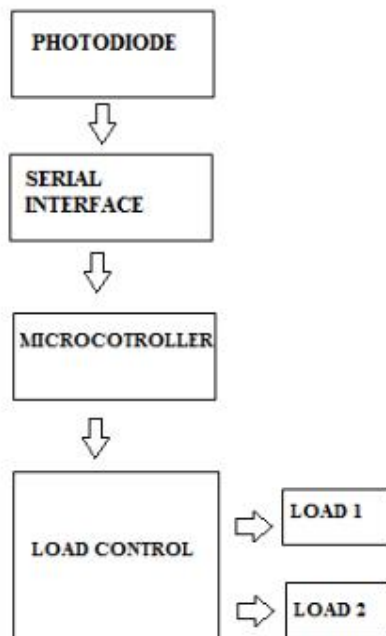
V.   VOICE MODULE

It is a device which is used to recognize your voice. and commandsare transmitted through serial port interface. With this module, we can control the car or other electronic devices by voice. This module can store up to 15 pieces of voice command. First we should record the voice command group by group to the voice module with voice instructions group by group. Then we should import one group by serial interface before it could recognize the 5 voice instructions within that group. To implement instructions in other groups, first importthe group then record it. This module is dependent only on speaker voice which is feeded on memory. For example, if your friend gives the voice instruction instead of you, it may not identify the command. We use V2 which is easy because it has other useful ways to control the result. There is a new row GOPI on V2. Voice groups are import by the pin GCH and GCL. And O1~O5 are pins which output the result of voice recognition. For example, if the first voice instruction is given to the working group and it is recognized, the output is HIGH signal in O1 pin.This output is useful while controlling the relay. Theoutputpin (O1~O5) which could be set as many type. By sending command through serial interface, you can change the type in it. Settings will be recorded in memory and It will not lose the memory even when the power is off.

VI.   MICROCONTROLLER

The microcontroller which we are using is AT89S52 is high-performance CMOS circuit.It uses a low power.It has a 8-bit microcontroller has a programmable flash memory of 8K bytes. It has high-density non-volatile memory technology.It is also compatible with an instruction set and pin out of industry-standard 80C51. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmelmicrocontroller is a powerful which is   highly-flexible and comparing to the cost wise. It gives acost-effective solution to many embedded applications.

Fig: Microcontroller atmel 89s52

Thestandard features of AT89S52:

•8K bytes of Flash
•256 bytes of RAM
•32 I/O lines
• Three 16-bit timer/counters

Further it also provides Watchdog timer, two data pointers, a six-vector two-level interrupt architecture, a full duplex serial port, clock circuitry ,on-chip oscillator. In addition, It is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM con-tents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

VII. SERIAL INTERFACE

The serial interface is configured by commands which is given through serial port. Configuration will be not erased after powered off. Its interface voltage is 5V TTL. The serial interface has a data format having 8 data bits with no parity and 1 stop bit. The default baud rate is 9600 and its baud rate can be altered.

VIII. PHOTODIODE

BPV10 is a PIN photodiode with high speed and high radiant sensitivity in clear, T-1¾ plastic package. It is sensitive to visible and near infrared radiation. The features of photodiode is it has high bandwidth range (250 MHZ at VR=12V),high photo sensitivity and radiant sensitivity,

• Package type: leaded
• Package form: T-1¾
• Dimensions (in mm): Ø 5
• Leads with stand-off
• Radiant sensitive area (in mm2): 0.78
• Suitable for visible and near infrared radiation
• Fast response times
• Angle of half sensitivity: = ± 20°
• Compliant to RoHS Directive 2002/95/EC and in accordance with WEEE 2002/96/EC

IX. POWER SUPPLY UNIT

we all know that any invention of latest technology cannot be activated without the source of power.
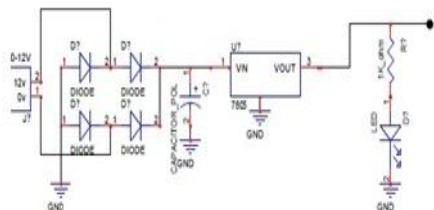
So in this fast moving world we deliberately need a proper power source which will be apt for a particular requirement. All the electronic components starting from diode to Intel IC's only work with a DC supply ranging from +5v to +12. We are utilizing for the same, the most cheapest and commonly available energy source of 230v-50Hz and steppingdown , rectifying, filtering and regulating the voltage. This will be dealt briefly in the forthcomingsections

X. RELAY

A relay is an electrical switch that opens and closes under control of another electrical circuit. In the original form, the switch is operated by an electromagnet to open or close one or many sets of contacts. It was invented by Joseph Henry in 1835. Because a relay is able to control an output circuit of higher power than the input circuit, it can be considered, in a broad sense, to be a form of electrical amplifier. These contacts can be either Normally Open (NO), Normally Closed (NC), or change-over contacts. Normally-open contacts connect the circuit when the relay is activated; the circuit is disconnected when the relay is inactive. It is also called Form A contact or "make" contact. Form A contact is ideal for applications that require to switch a high-current power source from a remote device. Normally-closed contacts disconnect the circuit when the relay is activated; the circuit is connected when the relay is inactive. It is also called Form B contact or "break" contact. Form B contact is ideal for applications that require the circuit to remain closed until the relay is activated. Change-over contacts control two circuits: one normally-open contact and one normally-closed contact. It is also called Form C contact

RESULT& CONCLUSION

In this paper, Control of electronic appliances by voice signal using wireless laser torch. Voice transmission can be done by using Bluetooth WiFi, infrared but here we are using laser to transmit signal because of high intensity. In this paper we have described the transmitting the control signal using laser to perform controlling the home appliances like lights, fans are done with the help of microcontroller.

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Fig: Power supply circuit

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