A

Project Report

On

"SMART GLOVES FOR DUMB PEOPLE"

Submitted to

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR, ANANTAPURAMU

In partial fulfillment of the requirement for the award of the degree of

BACHELOR OF TECHNOLOGY

in

ELECTRONICS AND COMMUNICATION ENGINEERING

Submitted by

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CERTIFICATE

This is to certify that the project report entitled **"SMART GLOVES FOR DUMB PEOPLE"** *a bonafide record of the project work done and submitted by*

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INTERNAL EXAMINER **EXTERNAL EXAMINE**

DECLARATION

We here by declare that the report entitled **"SMART GLOVES FOR DUMB PEOPLE"** submitted the Department of **ELECTRONICS AND COMMUNICATION ENGINEERING** in partial fulfillment of requirements for the award of the degree of **BACHELOR OF TECHNOLOGY.** This project is the result of our own effort and that it has not been submitted to any other University or Institution for the award of any degree or diploma other than specified above**.**

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CONTENTS

ABSTRACT

The main aim of this project is to design and construct a hand fingers movement controlled device switching system for physically challenged. The user can wear this device to hand and with the simple fingers movement's he/she can request the basic needs like water, food or medicine by using proximity sensor. User can also control the electrical devices like light, fan etc with the help of fingers movements.

For example if the finger is closed then the device will be operate. In the same way, if the second finger is closed then another device is going to be controlled. The third finger is closed the related need will be announced. This device is very helpful for paralysis and physically challenged persons.

This project makes use of a Relay for switching the devices and using android app voice commands are enabled for audio announcements and Micro controller, which is programmed, with the help of embedded assembly instructions. This microcontroller is capable of communicating with transmitter and receiver modules. The proximity sensor detects the fingers position movement and provides the information to the microcontroller (on board computer) and the controller judges whether the instruction is right movement or left movement instruction and controls the operation respectively

LIST OF FIGURES

List of Tables

LIST OF TABLES

CHAPTER 1

INTRODUCTION

In the recent years there has been a rapid increase in the number of hearing impaired and speech disabled victims due to birth defects, oral diseases and accidents. When a speech impaired person speaks to a normal person, the normal person find it difficult to understand and asks the deaf-dumb person to show gestures for their needs. Dumb person have their own language to communicate with us; the only thing is that we need to understand their language. The language used by the deaf and dumb people for their communication is known as sign language. The sign language do not have a common origin. Since regular people are not trained on hand sign language, so the communication becomes very difficult. In emergency or other times when a mute person travelling or among new people communication with nearby people or conveying a message becomes very difficult. Here we propose a smart speaking system that helps mute people in conveying the message to regular people using hand motions or gestures. The main aim of this paper is to facilitate people by means of a glove based communication interpreter system. The hand talk glove is a normal, cloth driving glove fitted with flex sensors along the length of each finger and the thumb.

The sensors output is a stream of data that varies with degree of bend. The output from the sensor is analog value and is converted to digital and processed by using microcontroller and then it will be transmitted through wireless communication this section sends and processed using responds in the voice using speaker. In this paper flex sensors plays the major role, IR sensors are sensors that change resistance depending on the amount of bend on the sensor. They convert the change in bend to electrical resistance-the more the bend the more the resistance value. Another problem faced by the mute people is their health conditions.

CHAPTER 2

LITERATURE SURVEY

K.NaveenKumar,P.Surendranath&K.Shekar[1] : This paper work focuses on finding a technique that aids the visually impaired by letting them hear what is represented as text, This paper also provides a way for the people with Hearing impairment to read which is in audio form by speech to text and we also provides a way for the vocally impaired to represent their voice by the aid of text to voice. All these solution were modulated in single system using prevailed 2005, 3 boys UN agency have passed the examination wasn't appointment as IAS officers simply because they're deaf. This should not continue. They face several issues in their day to day life like transportation, Communication, level of dependency, social stigma and lots of things. The terribly initial drawback is suppression of Deaf individuals raising voice for his or raspberry-pi. The keywords used in this project are Raspberry-pi, Assistive device, Tesseract Optical Character Recognition OCR speak, Open CV, Google API. The advantage is that the device can be taken away easily and is of loss weight.

SunitaV.Matiwade,Dr.M.R.Dixit[2] : This paper aimed to growing an digital support device which could translate sign language into text and speech so that it will make the communiqué take place among the mute groups with the overall public. The keywords used in this challenge are Hand Gloves, signal language, flex Sensor,ARM7TDMI, LM386, voice section. This undertaking have recognized hand gesture of sign language for alphabet A to Z with logic levels as per price of flex sensor. This machine is used for verbal exchange between deaf and dumb people with regular person.

Piyush Patil, Jayesh Prajapat[3] : This paper is to make bigger an advanced technique of verbal exchange for deaf human beings with the assist of IOT .This gadget could make right use of recent technology that is based totally on Embedded Linux board named Raspberry Pi with an brought advanced function of changing speech to text in Real Time. Normal character will speak into raspberry pi device and it will stumble upon the sound using speech reputation module. After that the Speech will be transformed into textual content and sent to the deaf character's Mobile Application by the usage of Wi-Fi, Bluetooth or Cloud Server according to the situation.

Anish Kumar,Rakesh Raushan,Saurabh Aditya,Vishal Kumar Jaiswal,Mrs. Divyashree Y.V.[4]: This paper provide a method for a blind man or woman to study

a text and it can be carried out through shooting an photograph via a camera which converts a textual content to speech (TTS). It presents a way for the deaf human beings to read a text by using speech to textual content(STT) conversion technology. Also, it gives a method for dumb people using textual content to voice conversion. The gadget is provided with four switches and every switch has a specific function. The blind people can be capable of examine the words using by Tesseract OCR (Online Character Recognition), the dumb people can speak their message through textual content with the intention to be examine out by way of speak, the deaf human beings can be able to listen others speech from text. All these functions are implemented with the aid of the use of Raspberry Pi. The keywords used for this challenge are Raspberry Pi, Tesseract OCR(Online Character Recognition), speak, Speech to text (STT),Text to Speech (TTS).

Kanwal Yousaf, Zahid Mehmood, TanzilaSaba, AmjadRehman, Muhammad Rashid , Muhammad Altaf,and Zhang Shuguang[5] : The proposed software, named as vocalizer to mute (V2M), uses computerized speech recognition (ASR) method The hidden Markov model toolkit (HTK) is used for the process of speech recognition. The software is likewise incorporated with a 3D avatar for imparting visualization support. To recognize the speech of Deaf-mute and convert it right into a recognizable shape of speech for a ordinary person. The quantitative and qualitative analysis of consequences also found out that face-to-face socialization of Deaf-mute is progressed by the intervention of mobile technology. The participants also suggested that the proposed mobile software can act as a voice for them and they can socialize with pals and family by way of using this app.

Amanpreet Singh Khajuria,Sonakshi Gupta[6] : This interacting device is a microcontroller based machine which is largely outline for lessening the verbal exchange area between dumb and regular people. This machine can be therefore configured to paintings as a smart tool. In this paper, At mega 328 microcontroller, voice module, LCD show and flex sensors are utilize. The tool considered is essentially residing of a glove and a microcontroller based system. Data gloves are used to come across the hand motion and microcontroller based system will interpret the ones few manoeuvre into human region voice. The statistics glove is supplied with 4 flex sensors located on the glove. This machine is beneficial for dumb people and their hand manoeuvre will be transformed into speech signal due to the date glove worn on the hands. The Key words used right here are Gesture Remembrance; Data forearm band;

Flex Sensor; Adriano UNO; At mega 328; Voice module.

Prof. Prashant G. Ahire, Kshitija B. Tilekar,TejaswiniA. Jawake, PramodB. Warale[7]: International Conference on Computing Communication control and automation.Thesystemismainlyconsistsoftwomodules,firstmoduleisdrawing out Indian Sign Language(ISL) gestures from real-time video and mapping it with human-understandable speech. Accordingly, second module will take natural language as input and map it with equivalent Indian Sign Language animated gestures. Processing from video to speech will include frame formation from videos, finding region of interest (ROI) and mapping of images with language knowledge base using Correlational based approach then relevant audio generation using Google Text-to-Speech(TTS) API. The other way round, natural language is mapped with Equivalent Indian Sign Language gestures by conversion of speech to text using Google Speech-to-Text (STT)API, further rmapping the text to relevant animated. The keywords are Correlationa lbased approach, Region of Interest, Region growing, STT, TTS, ISL.

Suganya R,Dr.T.Meeradevi[8] : The proposed add this paper is to implement a system without handheld gloves and sensors and by capturing the gestures continously and converting them to voice and the other way around , thus making the communication simpler for deaf and dumb people by a handheld embedded device in conjunction with the hardware setup. The effectiveness of the work is verified under MATLAB environment and further in future dedicated voice output are becoming to be produced a bit like the text and thus the gesture images captured.The keywords used here are communication aid, signing , MATLAB.

CHAPTER 3

EXISTING SYSTEM

In existing system here we are using it Sensors for triggering the controller for buzzer outputs. In this system if sensor one is activated then controller will turn on the buzzer one time with 3 seconds high, if we detect the 2 ir sensor then controller will turn on the buzzer 2times with the delay of 3seconds based on the number buzzer sounds we should identify the person commands. But it is very diff to unknown people they can't understand the person requirements.

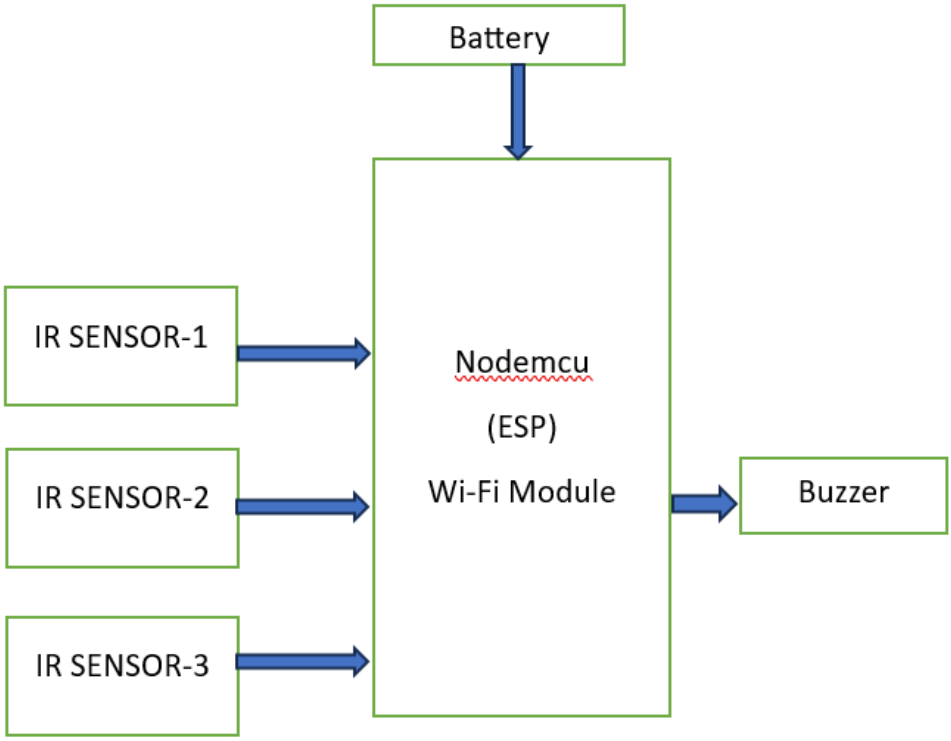


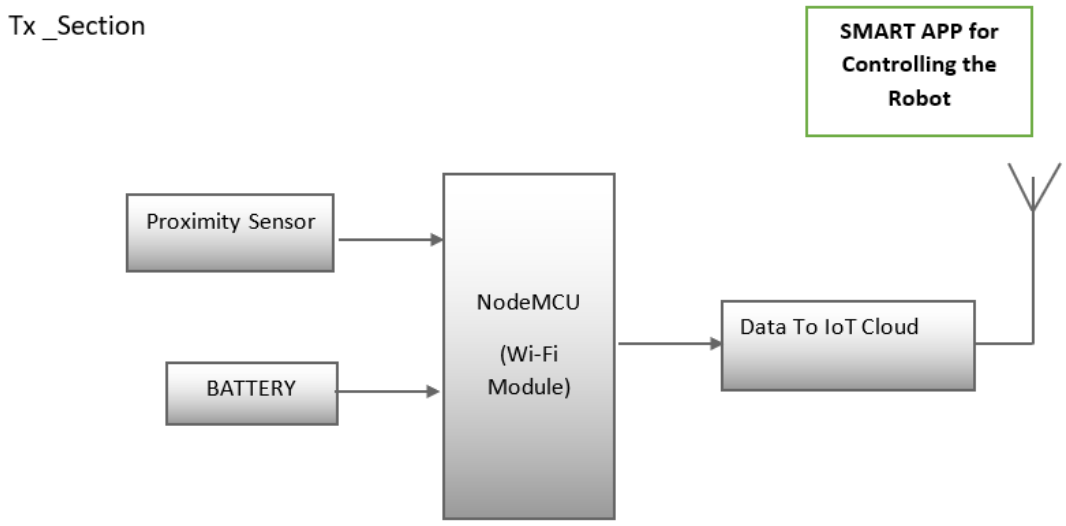
Fig : Existing System Block Diagram

CHAPTER 4

PROPOSED SYSTEM

In our proposed system here we are using smart gloves for data transmission using IR sensors and RF transmitter with voice recording and playback module. In this system gloves is equipped with ir sensor for identifying the person requirements if the person close his index finger sensor -1 will trigger then this data is directly transmitted to RF Receiver through RF transmitter, Then RF reciever collect the data then it will send to Voice recording and playback module for voice commands. In voice recording and playback module we already recorded the required commands manually the recorded voice will play when ever the sensors are triggered.

By using this system the person can easily communicate with unknown people using direct voice commands.



Rx _Section

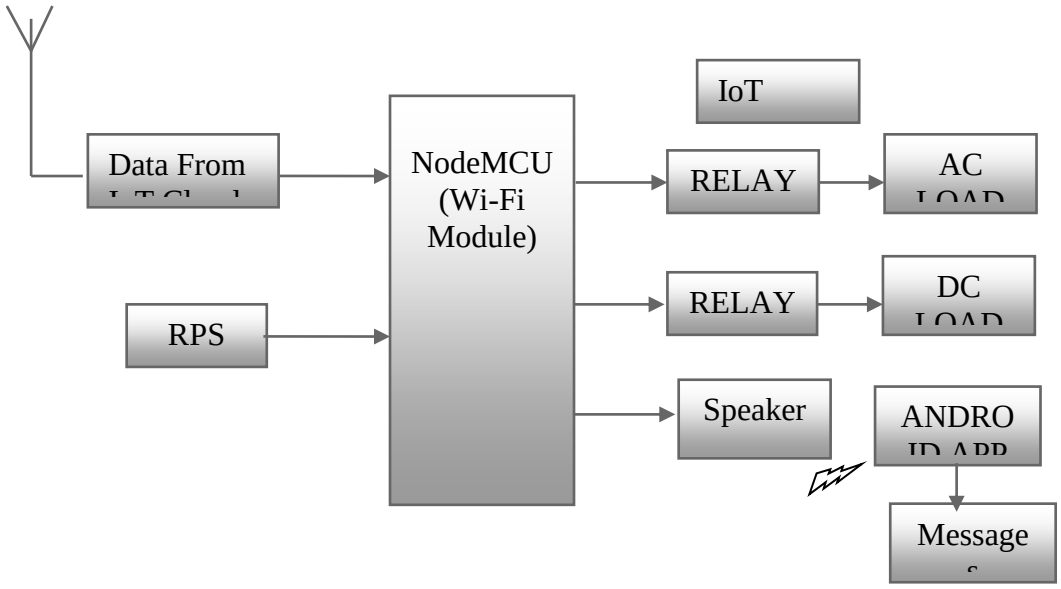


Fig : Proposed System Block Diagram

CHAPTER 5

HARDWARE REQUIREMENTS

5.1 IR Sensors

The IR Sensor-Single is a general purpose proximity sensor. Here we use it for collision detection. The module consists of an IR emitter and IR receiver pair. The high precision IR receiver always detects an IR signal. The module consists of 358 comparator IC. The output of sensor is high whenever it IR frequency and low otherwise. The on-board LED indicator helps user to check status of the sensor without using any additional hardware. The power consumption of this module is low. It gives a digital output

Based on a simple basic Idea, this IR obstacle sensor is easy to build, easy to calibrate and still, it provides a detection range of 10- 30 cm. This sensor can be used for most indoor applications where no important ambient light is present. It is the same principle in ALL Infra-Red proximity sensors. The basic idea is to send infra red light through IR-LEDs, which is then reflected by any object in front of the sensor.

The basic principle of IR sensor is based on an IR emitter and an IR receiver. IR emitter will emit infrared continuously when power is supplied to it. On the other hand, the IR receiver will be connected and perform the task of a voltage divider. IR receiver can be imagined as a transistor with its base current determined by the intensity of IR light received. The lower the intensity of IR light cause higher resistance between collector-emitter terminals of transistor, and limiting current from collector to emitter. This change of resistance will further change the voltage at the output of voltage divider. In others word, the greater the intensity of IR light hitting IR receiver, the lower the resistance of IR receiver and hence the output voltage of voltage divider will decreased. Usually the IR emitter and IR receiver will be mounted side by side, pointing to a reflective surface. The further distance away between emitter and receiver decrease the amount of infrared light hitting the receiver if the distance between the sensor and a reflective surface is fixed. Since the output voltage from voltage divider varies with the intensity of IR light, and microcontroller is not used in this project, a comparator (LM324) is used to show the changes

Figure: IR Sensor

Features:

- IR obstacle based detector.
- Adjustable range with POT.
- Logic output 1 or 0.
- Sensitivity up to 30cm adjustable.
- Input voltage: 5VDC
- Sensing Range: 5cm
- Output signal: analog voltage
- Emitting element: Infrared LED

5.1.1. Pin Configuration:

The figure to the right is a top view of the IR Sensor module. The following table gives its pin description.

Pin No.	Connection	Description
1	Output	Digital Output (High or Low)
2	VCC	Connected to circuit supply
3	Ground	Connected to circuit ground

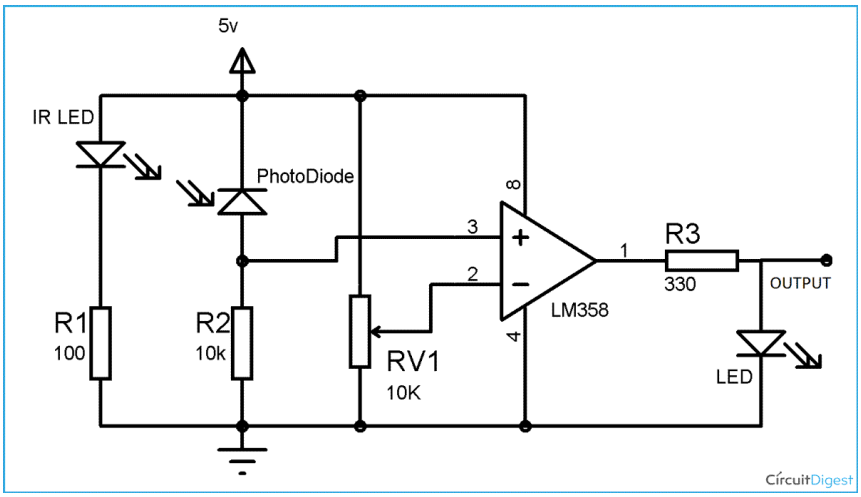
Using the Sensor:

- Connect regulated DC power supply of 5 Volts to pin 3 and GND to pin2.
- When gas is detected LED is ON or else it is OFF.
- The output from pin1 can be given directly to microcontroller for interfacing applications.

Applications:

- Industrial safety devices.
- Wheel encoder.
- Contact less tachometer.
- Obstacle detection
- Shaft encoder
- Fixed frequency detection

5.1.2. Functional Block Diagram /Schematic Diagram:



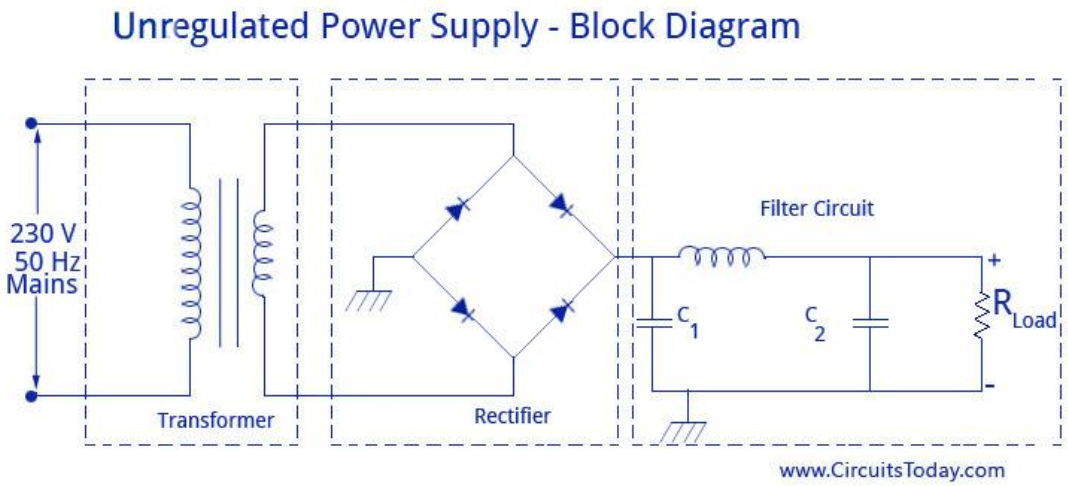
Overview of Schematic:

The sensitivity of the IR Sensor is tuned using the potentiometer. The potentiometer is tunable in both the directions. Initially tune the potentiometer in clockwise direction such that the Indicator LED starts glowing. Once that is achieved, turn the potentiometer just enough in anti-clockwise direction to turn off the Indicator LED. At this point the sensitivity of the receiver is maximum. Thus, its sensing distance is maximum at this point. If the sensing distance (i.e., Sensitivity) of the receiver is needed to be reduced, then one can tune the potentiometer in the anti-clockwise direction from this point. Further, if the orientation of both TX and Rx LED's is parallel to each other, such that both are facing outwards, then their sensitivity is maximum. If they are moved away from each other, such that they are inclined to each other at their soldered end, then their sensitivity reduces. Tuned sensitivity of the sensors is limited to the surroundings. Once tuned for a particular surrounding, they will work perfectly until the IR illumination conditions of that region nearly constant. For example, if the potentiometer is tuned inside room/building for maximum sensitivity and then taken out in open sunlight, it will require retuning, since sun's rays also contain Infrared (IR) frequencies, thus acting as a IR source (transmitter). This will disturb the receiver's sensing capacity. Hence it needs to be retuned to work perfectly in the new surroundings. The output of IR receiver goes low when it receives IR signal. Hence the output pin is normally low because, though the IR LED is continuously transmitting, due to no obstacle, nothing is reflected back to the IR receiver. The indication LED is off. When an obstacle is encountered, the output of IR receiver goes low, IR signal is

reflected from the obstacle surface. This drives the output of the comparator low. This output is connected to the cathode of the LED, which then turns ON.

5.2 Power Supply

Almost all basic household electronic circuits need an unregulated AC to be converted to constant DC, in order to operate the electronic device. All devices will have a certain power supply limit and the electronic circuits inside these devices must be able to supply a constant DC voltage within this limit. That is, all the active and passive electronic devices will have a certain DC operating point (Q-point or Quiescent point), and this point must be achieved by the source of DC power. The DC power supply is practically converted to each and every stage in an electronic system. Thus a common requirement for all this phases will be the DC power supply. All low power system can be run with a battery. But, for long time operating devices, batteries could prove to be costly and complicated. The best method used is in the form of an unregulated power supply –a combination of a transformer, rectifier and a filter. The diagram is shown below.



As shown in the figure above, a small step down transformer is used to reduce the voltage level to the devices needs. In India, a 1 Ø supply is available at 230 volts. The output of the transformer is a pulsating sinusoidal AC voltage, which is converted to pulsating DC with the help of a rectifier. This output is given to a filter circuit which reduces the AC ripples, and passes the DC components. But here are certain disadvantages in using an unregulated power supply.

5.2.1. Poor Regulation:

When the load varies, the output does not appear constant. The output voltage changes by a great value due to the huge change in current drawn from the supply. This is mainly due to the high internal resistance of the power supply (>30 Ohms).

5.2.2. AC Supply Main Variations:

The maximum variations in AC supply mains is give or take 6% of its rated value . But this value may go higher in some countries (180-280 volts). When the value is higher it's DC voltage output will differ largely.

5.2.3 Temperature Variation:

The use of semiconductor devices in electronic devices may cause variation in temperature.

These variations in dc output voltage may cause inaccurate or erratic operation or even malfunctioning of many electronic circuits. For instance, in oscillators the frequency will shift, in transmitters output will get distorted, and in amplifiers the operating point will shift causing bias instability.

All the above listed problems are overcome with the help of a voltage regulator which is employed in conjunction with an unregulated power supply. Thus, the ripple voltage is largely reduced. Thus, the supply becomes a regulated power supply.

The internal circuitry of a regulated power supply also contains certain current limiting circuits which helps the supply circuit from getting fired from inadvertent circuits. Nowadays, all the power supplies use IC's to reduce ripples, enhance voltage regulation and for widened control options. Programmable power supplies are also available to allow remote operation that is useful in many settings

5.3 Regulated Power Supply:

Regulated power supply is an electronic circuit that is designed to provide a constant dc voltage of predetermined value across load terminals irrespective of ac mains fluctuations or load variations.

As shown in the figure, the two main parts of a regulated power supply are a simple power supply and a voltage regulating device. The power supply output is given as input to the voltage regulating device that provides the final output. The voltage output of the power supply remains constant irrespective of large variations in the input AC voltage or output load current.

Given below is a circuit diagram of a regulated power supply circuit using a transistor series regulator as a regulating device The input AC voltage (230 Voltas Vrms), is supplied to a transformer. The output will be a stepped down ac output appropriate for the desired dc output. This ac voltage is then given to a bridge rectifier to produce a full-wave rectified output. This is then given to a pi-filter circuit to produce a dc voltage. The filter output may have some ac voltage variations and ripples. This is further filtered using a regulating circuit whose output will be a constant dc voltage. This regulated dc voltage is then given to a voltage divider, which supplies the different dc voltages that may be needed for different electronic circuits.

The potential divider is a single tapped resistor connected across the output terminals of the supply. The tapped resistor may consist of two or three resistors connected in series across the supply. A bleeder resistor may also be employed as a potential divider.

5.3.1 Power Supply Characteristics:

The quality of the power supply is determined by various characteristics like load voltage, load current, voltage regulation, source regulation, output impedance, ripple rejection, and so on. Some of the characteristics are briefly explained below.

5.3.2. Load Regulation:

The load regulation or load effect is the change in regulated output voltage when the load current changes from minimum to maximum value.

Load regulation = Vno-load – Vfull-load

Vno-load – Load Voltage at no load

Vfull-load – Load voltage at full load.

From the above equation we can understand that when Vno-load occurs the load resistance is infinite, that is, the out terminals are open circuited. Vfull-load occurs when the load resistance is of the minimum value where voltage regulation is lost.

% Load Regulation = [(Vno-load – Vfull-load)/Vfull-load] * 100

Minimum Load Resistance:

The value of I full-load, full load current should never increase than that mentioned in the data sheet of the power supply.

Source/Line Regulation:

In the block diagram, the input line voltage has a nominal value of 230 Volts but in practice, there are considerable variations in ac supply mains voltage. Since this ac supply mains voltage is the input to the ordinary power supply, the filtered output of the bridge rectifier is almost directly proportional to the ac mains voltage.

The source regulation is defined as the change in regulated output voltage for a specified rage of line voltage.

Output Impedance:

A regulated power supply is a very stiff dc voltage source. This means that the output resistance is very small. Even though the external load resistance is varied, almost no change is seen in the load voltage. An ideal voltage source has an output impedance of zero.

Ripple Rejection:

Voltage regulators stabilize the output voltage against variations in input voltage. Ripple is equivalent to a periodic variation in the input voltage. Thus, a voltage regulator attenuates the ripple that comes in with the unregulated input voltage. Since a voltage regulator uses negative feedback, the distortion is reduced by the same factor as the gain.

5.4 DC Power Supply

An AC powered unregulated power supply usually uses a transformer to convert the voltage from the wall outlet (mains) to a different, nowadays usually lower, voltage. If it is used to produce DC, a rectifier is used to convert alternating voltage to a pulsating direct voltage, followed by a filter, comprising one or more capacitors, resistors, and sometimes inductors, to filter out (smooth) most of the pulsation. A small remaining unwanted alternating voltage component at mains or twice mains power frequency (depending upon whether half- or full-wave rectification is used)—ripple—is unavoidably superimposed on the direct output voltage. For purposes such as charging batteries the ripple is not a problem, and the simplest unregulated mains-powered DC power supply circuit consists of a transformer driving a single diode in series with a resistor. Before the introduction of solid-state electronics, equipment used valves (vacuum tubes) which required high voltages; power supplies used step-up transformers, rectifiers, and filters to generate one or more direct voltages of some hundreds of volts, and a low alternating voltage for filaments. Only the most advanced equipment used expensive and bulky regulated power supplies.

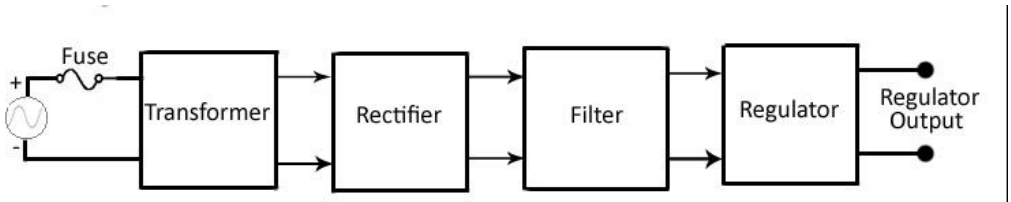


Figure 1-1 Block diagram of a power supply

5.5 Transformer

A transformer is a static electrical device that transfers energy by inductive coupling between its winding circuits. A varying current in the primary winding creates a varying magnetic flux in the transformer's core and thus a varying magnetic flux through the secondary winding. This varying magnetic flux induces a varying electromotive force (EMF) or voltage in the secondary winding. Transformers range in size from thumbnail-sized used in microphones to units weighing hundreds of tons interconnecting the

power grid. A wide range of transformer designs are used in electronic and electric power applications. Transformers are essential for the transmission, distribution, and utilization of electrical energy.

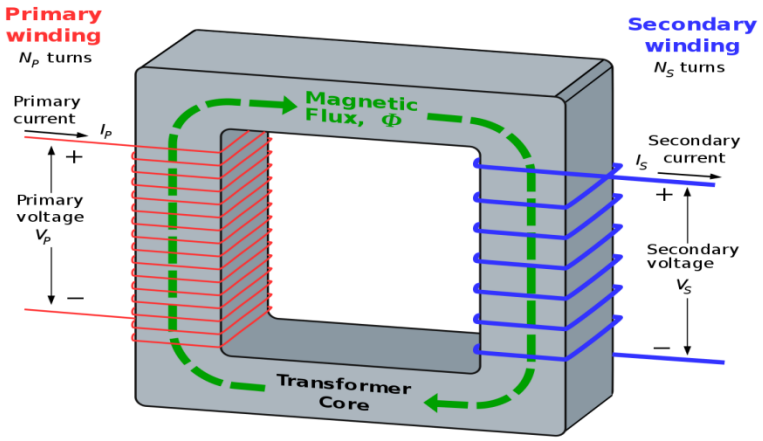


Fig: Transformer

5.6 Rectifier

A rectifier is an electrical device that converts alternating current (AC), which periodically reverses direction, to direct current (DC), which flows in only one direction. The process is known as rectification. Physically, rectifiers take a number of forms, including vacuum tube diodes, mercury-arc valves, copper and selenium oxide rectifiers, solid-state diodes, silicon-controlled rectifiers and other silicon-based semiconductor switches. Historically, even synchronous electromechanical switches and motors have been used. Early radio receivers, called crystal radios, used a "cat's whisker" of fine wire pressing on a crystal of galena (lead sulfide) to serve as a point-contact rectifier or "crystal detector". Rectifiers have many uses, but are often found serving as components of DC power supplies and high-voltage direct current power transmission systems. Rectification may serve in roles other than to generate direct current for use as a source of power. As noted, detectors of radio signals serve as rectifiers. In gas heating systems flame rectification is used to detect presence of flame. The simple process of rectification produces a type of DC characterized by pulsating voltages and currents (although still unidirectional). Depending upon the type of end-use, this type of DC current may then be further modified into the type of relatively

constant voltage DC characteristically produced by such sources as batteries and solar cells. A more complex circuitry device which performs the opposite function, converting DC to AC, is known as an inverter.

• Single-phase rectifiers

• Half-wave rectification

• Full-wave rectification

5.7 Filter Capacitor

Filter capacitors are capacitors used for filtering of undesirable frequencies. They are common in electrical and electronic equipment, and cover a number of applications, such as:

• Glitch removal on Direct current (DC) power rails

• Radio frequency interference (RFI) removal for signal or power lines entering or leaving equipment

• Capacitors used after a voltage regulator to further smooth dc power supplies

• Capacitors used in audio, intermediate frequency (IF) or radio frequency (RF) frequency filters (e.g. low pass, high pass, notch, etc.)

• Arc suppression, such as across the contact breaker or 'points' in a spark-ignition engine

Filter capacitors are not the same as reservoir capacitors, the tasks the two perform are different, albeit related The simple capacitor filter is the most basic type of power supply filter. The application of the simple capacitor filter is very limited. It is sometimes used on extremely high-voltage, low-current power supplies for cathode-ray and similar electron tubes, which require very little load current from the supply. The capacitor filter is also used where the power-supply ripple frequency is not critical; this frequency can be relatively high. The capacitor (C1) shown in figure 4-15 is a simple filter connected across the output of the rectifier in parallel with the load

Fig: Capacitor

5.8 Resistor

A resistor is a passive two terminal electrical component that implements electrical resistor as a circuit element. The current through a resistor is in direct proportion to the voltage across the resistor's terminals. This relationship is represented by Ohm's law. where I is the current through the conductor in units of amperes V is the potential difference measured across the conductor in units of volts and R is the resistance of the conductor in units of ohm .The ratio of the voltage applied across a resistor's terminals to the intensity of current in the circuit is called its resistance, and this can be assumed to be a constant (independent of the voltage) for ordinary resistors working within their ratings. Resistors are common elements of electrical networks and electronic circuits and are ubiquitous in electronic equipment. Practical resistors can be made of various compounds and films, as well as resistance wire (wire made of a high-resistivity alloy, such as nickel-chrome). Resistors are also implemented within integrated circuits particularly analog devices, and can also be integrated into hybrid and printed circuits. The electrical functionality of a resistor is specified by its resistance: common commercial resistors are manufactured over a range of more than nine orders of magnitude. When specifying that resistance in an electronic design, the required precision of the resistance may require attention to the manufacturing tolerance of the chosen resistor, according to its specific application. The temperature coefficient of the resistance may also be of concern in some precision applications. Practical resistors are also specified as having a maximum power rating which must exceed the anticipated power dissipation of that resistor in a particular circuit: this is mainly of concern in

power electronics applications. Resistors with higher power ratings are physically larger and may require heat sinks. In a high-voltage circuit, attention must sometimes be paid to the rated maximum working voltage of the resistor. Practical resistors have a series inductance and a small parallel capacitance; these specifications can be important in high-frequency applications. In a low-noise amplifier or pre-amp, the noise characteristics of a resistor may be an issue. The unwanted inductance, excess noise, and temperature coefficient are mainly dependent on the technology used in manufacturing the resistor. They are not normally specified individually for a particular family of resistors manufactured using a particular technology.[1] A family of discrete resistors is also characterized according to its form factor, that is, the size of the device and the position of its leads (or terminals) which is relevant in the practical manufacturing of circuits using them.

Fig: Resistor

5.9 Voltage Regulator

A voltage regulator is designed to automatically maintain a constant voltage level. A voltage regulator may be a simple "feed-forward" design or may include negative feedback control loops. 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. Electronic voltage regulators are found in devices such as computer power supplies where they stabilize the DC voltages used by the processor and other elements. In automobile alternators and central power station generator plants, voltage regulators control the output of the plant. In an electric power distribution system, voltage regulators may be installed at a substation or along distribution lines so that all customers receive steady voltage independent of how much power is drawn from the line.

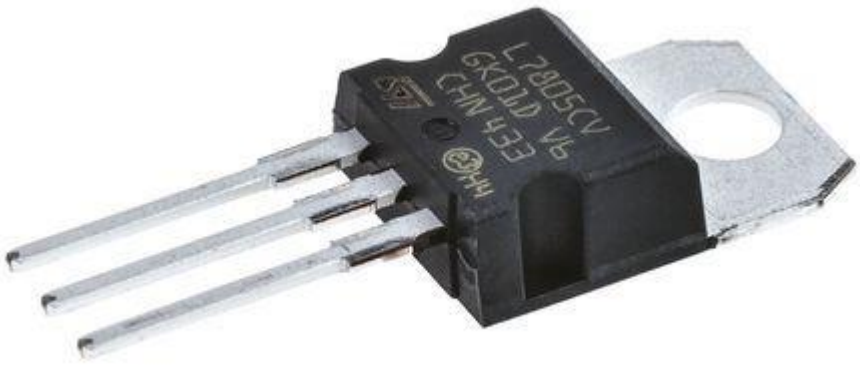
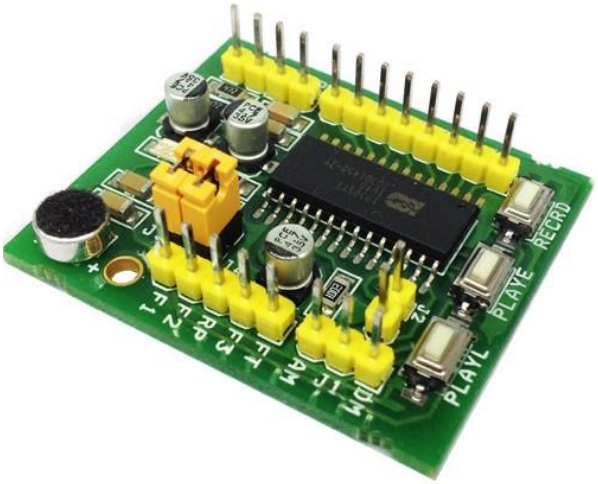


Fig: Voltage Regulator

5.10 Voice Recorder & Play Back



This Module has been designed around Nuvoton's ISD1932 ChipCorder, the newest single-chip multiple-message record/playback series with dual operating modes (address trigger and direct trigger) and wider operating voltage range from 2.4V to 5.5V. The sampling frequency can be selected from 4 to 12 kHz via an external resistor, which also determines the duration from 10.6 to 32 seconds. These ICs are designed mostly for standalone applications, and of course, it can be used in conjunction with a microcontroller.

The two operating modes are address trigger and direct trigger. While in address trigger mode, both record and playback operations are manipulated according to the start address and end address specified through the start address and end address pins. However, in direct trigger mode, the device can configure the memory up to as many as eight equal messages, pending upon the fixed message configuration settings. With the record or playback feature being pre-selected, each message can be randomly accessed via its message control pin.

The device has a selectable differential microphone input with AGC feature or single-ended analog input, analog in, under feed-through mode. Its differential Class D PWM speaker driver can directly drive a typical speaker or buzzer.

Sampling Rate or Recording Time Selection

R5: 53.3K 12 KHz sampling frequency 21.3 Seconds Voice Recording

R5: 80K 8 KHz sampling frequency 32 Seconds Voice Recording

R5: 100K 6.4 KHz sampling frequency 40 Seconds Voice Recording

R5: 120K 5.3 KHz sampling frequency 48 Seconds Voice Recording

R5: 160 4 KHz sampling frequency 64 Seconds Voice Recording

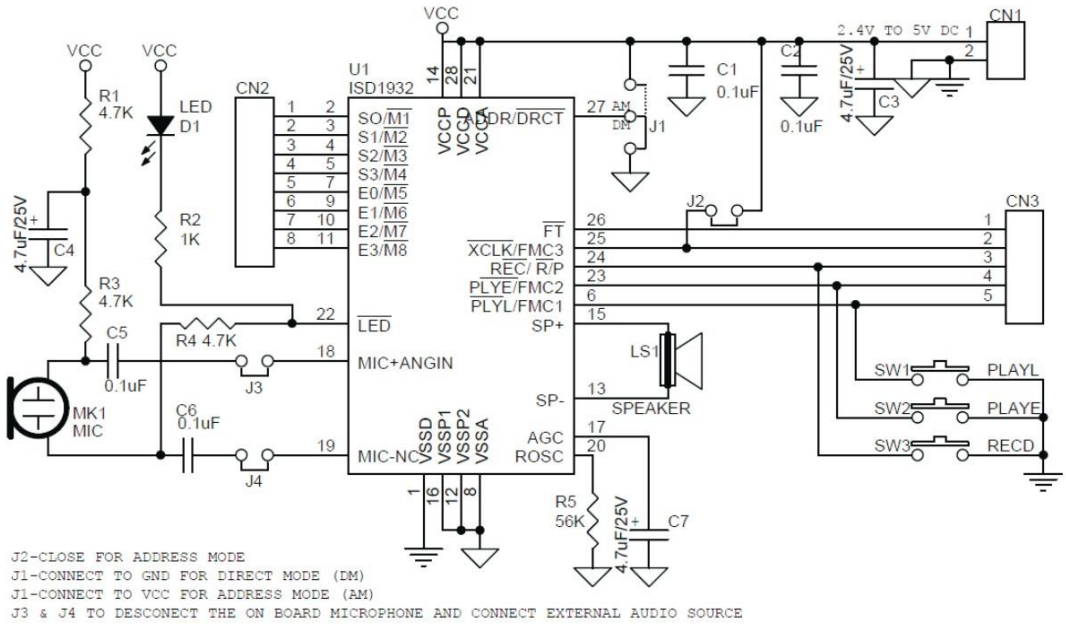
Refer Data Sheet of ISD1932 IC for More information

Features:

- Wider operating voltage from 2.4 to 5.5V
- Higher sampling frequency from 4kHz to 12kHz

- Voice Recording Time 21 Seconds to 64 Seconds depend on sampling rate selection (R5-OSC Resistor)
- FT: converts MIC+ to ANAIN & feeds it to the speakers
- R/P: record/playback switch
- REC: level or edge recording
- PLAYE: edge-trigger, toggle on/off
- PLAYL: level playback or looping playback
- LED: LED output for recording
- LED Blinks for while at end of the message in play mode
- NORM (Address Trigger) : variable message duration
- MODE: (Direct Trigger) : fixed message duration

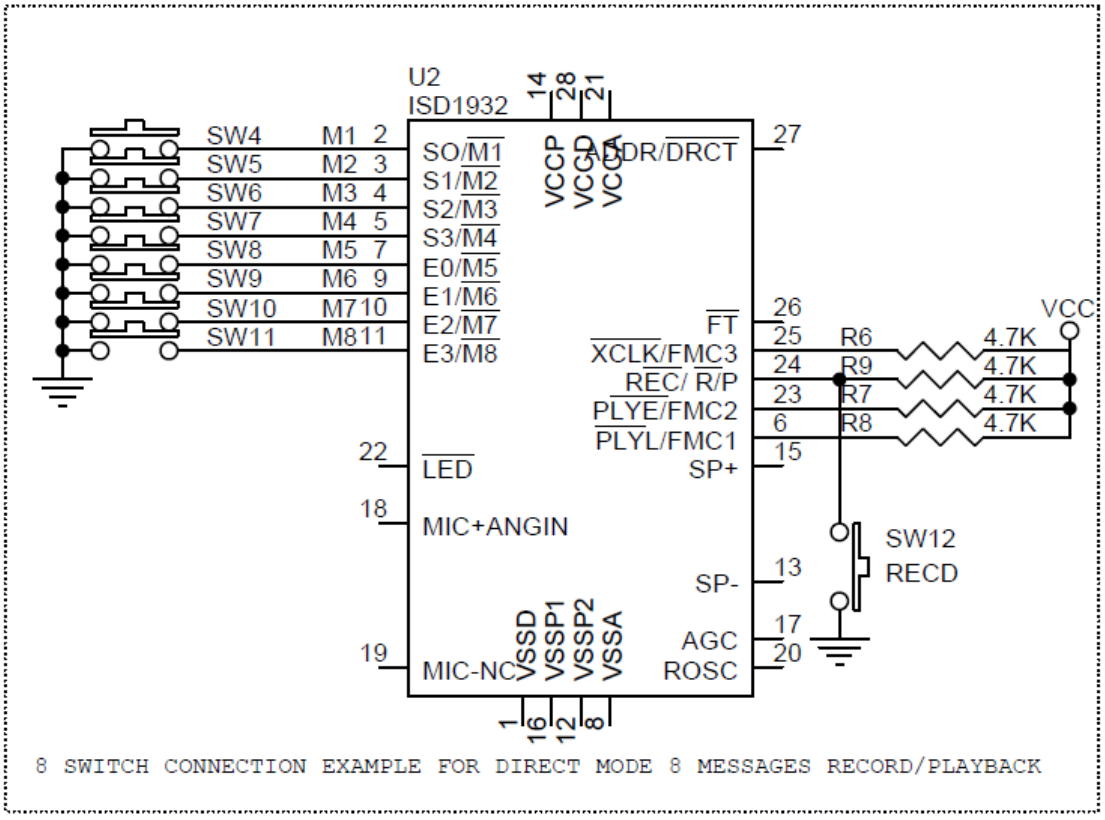
5.10.1. SCHEMATIC DIAGRAM



5.10.2. PIN Description:

BOM			
SR.	QNTY	REF	DESC
1	1	CN1	2 PIN HEADER
2	1	CN2	8 PIN HEADER
3	1	CN3	5 PIN HEADER
4	4	C1,C2,C5,C6	0.1uF
5	3	C3,C4,C7	4.7uF/25V
6	1	D1	LED SMD 1206
7	1	J1	3 PIN JUMPER & COLSURE
8	3	J2,J3,J4	2 PIN JUMPER & CLOSURE
9	1	LS1	2 PIN HEADER
10	1	MK1	CONDENSOR MICROPHONE
11	7	R1,R3,R4,	4.7K SMD 1206
12	1	R2	1K SMD1206
13	1	R5	56K SMD 1206
14	3	SW1,SW2,SW3	TACT SWITCH SMD
15	1	U1	ISD1932 SMD SO

5.10.3. CONNECTIONS:



8 SWITCH CONNECTION EXAMPLE FOR DIRECT MODE 8 MESSAGES RECORD/PLAYBACK

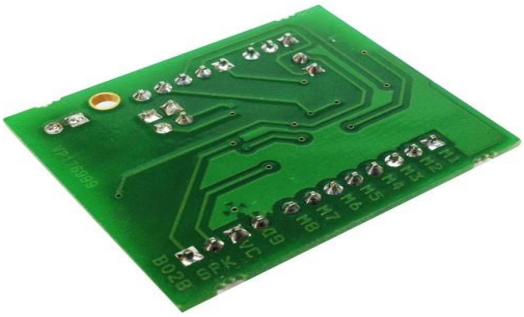
5.10.4. LOGIC TABLE:

Number of fixed message arrangement with respect to FMC1, FMC2 & FMC3.

FMC3	FMC2	FMC1	# of fixed messages [1]
0	0	0	1
0	0	1	2
0	1	0	3
0	1	1	4
1	0	0	5
1	0	1	6
1	1	0	7
1	1	1	8

FMC1,FMC2,FMC3 LOGIC CONFIGRATION TABLE FOR 1 TO 8 MESSAGES

PHOTOS:



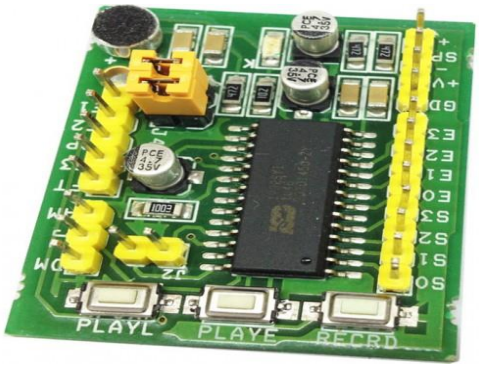


Fig1: Voice Record Module ISD 1932 **Fig2: Voice Record Module ISD 1820**

It can offer true single-chip voice recording, non-volatile storage, and playback capability for 8 to 20 seconds. The sample rate is between 8.0 KHz to 3.2 KHz for the duration of 8 to 20 Seconds for the Recorder.

This module use is very easy to use, which you could direct control by the push button on board or by Microcontroller such as Arduino, STM32, ChipKit etc.

Specifications:

Push-button interface, playback can be edge or level activated

Automatic power-down mode

On-chip 8Ω speaker driver

Signal 3V Power Supply

Can be controlled both manually or by MCU

Sample rate and duration changeable by replacing a single resistor

Record up to 20 seconds of audio

Dimensions: 37 x 54 mm

If you want change record duration, an external resistor is necessary to select the record duration and sampling frequency, which can range from 8 – 20 seconds (4-12kHz sampling frequency). The Voice Record Module of our provides default connect 100k resistor by a short cap. So the default record duration is 10s.

CHAPTER 6

SOFTWARE REQUIREMENTS

6.1. Arduino IDE

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike.

Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming. As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for IoT applications, wearable, 3D printing, and embedded environments. All Arduino boards are completely open-source, empowering users to build them independently and eventually adapt them to their particular needs. The software, too, is open-source, and it is growing through the contributions of users worldwide.

Hardware Specifications:

- Microcontroller: ATmega328
- Operating Voltage: 5V

- Input Voltage (recommended):7-12V
- Input Voltage (limits): 6- 20V
- Digital I/O Pins: 14 (of which 6 provide PWM output)
- Analog Input Pins: 6 • DC Current per I/O Pin: 40 mA
- DC Current for 3.3V Pin: 50 mA
- Flash Memory: 32 KB (ATmega328)
- SRAM: 2 KB (ATmega328)
- EEPROM: 1 KB (ATmega328)
- Clock Speed: 16 MHz

6.2 ARDUINO INSTALLATION

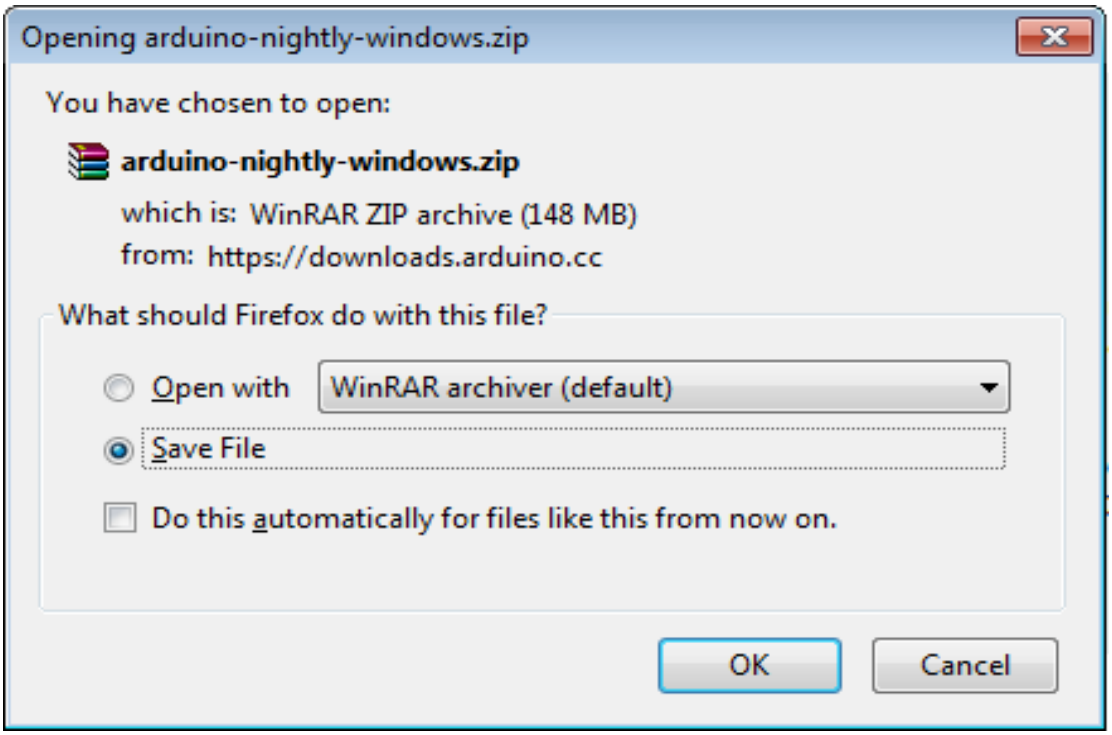
- After learning about the main parts of the Arduino UNO board, we are ready to learn how to set up the Arduino IDE. Once we learn this, we will be ready to upload our program on the Arduino board. In this section, we will learn in easy steps, how to set up the Arduino IDE on our computer and prepare the board to receive the program via USB cable.

  Choose Your Favourite Board

- First you must have your Arduino board (you can choose your favorite board) and a USB cable. In case you use Arduino UNO, Arduino Duemilanove, Nano, Arduino Mega 2560, or Diecimila, you will need a standard USB cable (A plug to B plug), the kind you would connect to a USB printer as shown in the following image.

6.3 Download Arduino IDE Software

- You can get different versions of Arduino IDE from the Download page on the Arduino Official website. You must select your software, which is compatible with your operating system (Windows, IOS, or Linux). After your file download is complete, unzip the file.

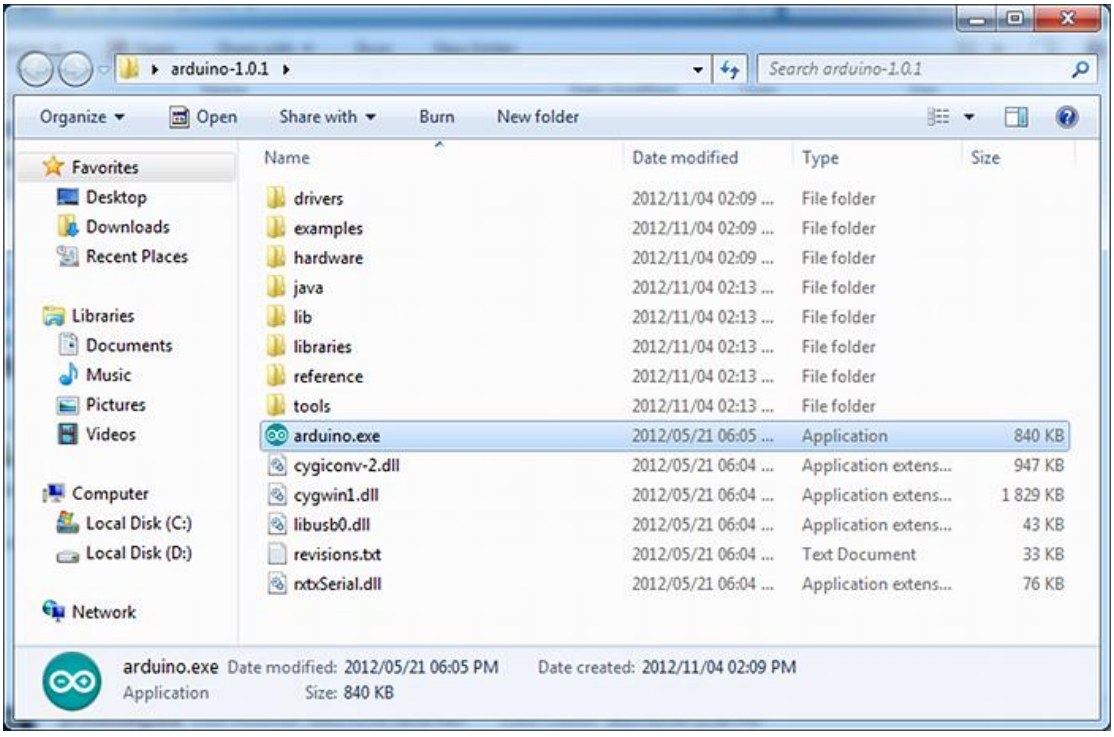


6.4 Power up your board.

- The Arduino Uno, Mega, Duemilanove and Arduino Nano automatically draw power from either, the USB connection to the computer or an external power supply. If you are using an Arduino Diecimila, you have to make sure that the board is configured to draw power from the USB connection. The power source is selected with a jumper, a small piece of plastic that fits onto two of the three pins between the USB and power jacks. Check that it is on the two pins closest to the USB port. Connect the Arduino board to your computer using the USB cable. The green power LED (labeled PWR) should glow.

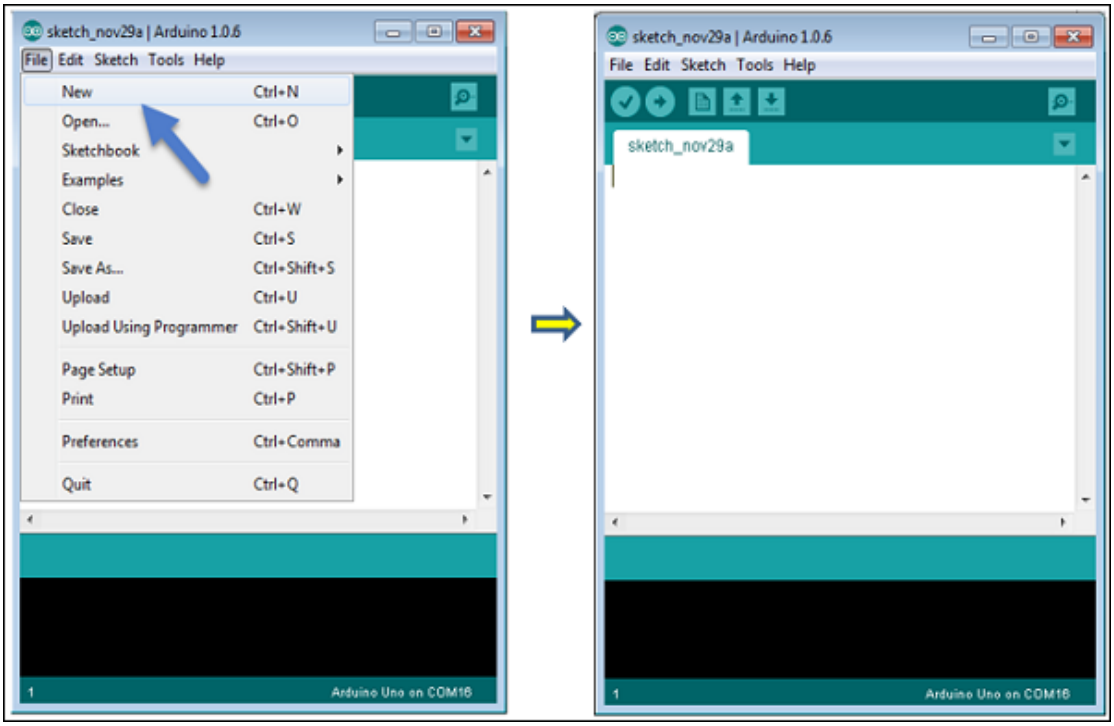
6.5 Launch Arduino IDE

- After your Arduino IDE software is downloaded, you need to unzip the folder. Inside the folder, you can find the application icon with an infinity label (application.exe). Double-click the icon to start the IDE.

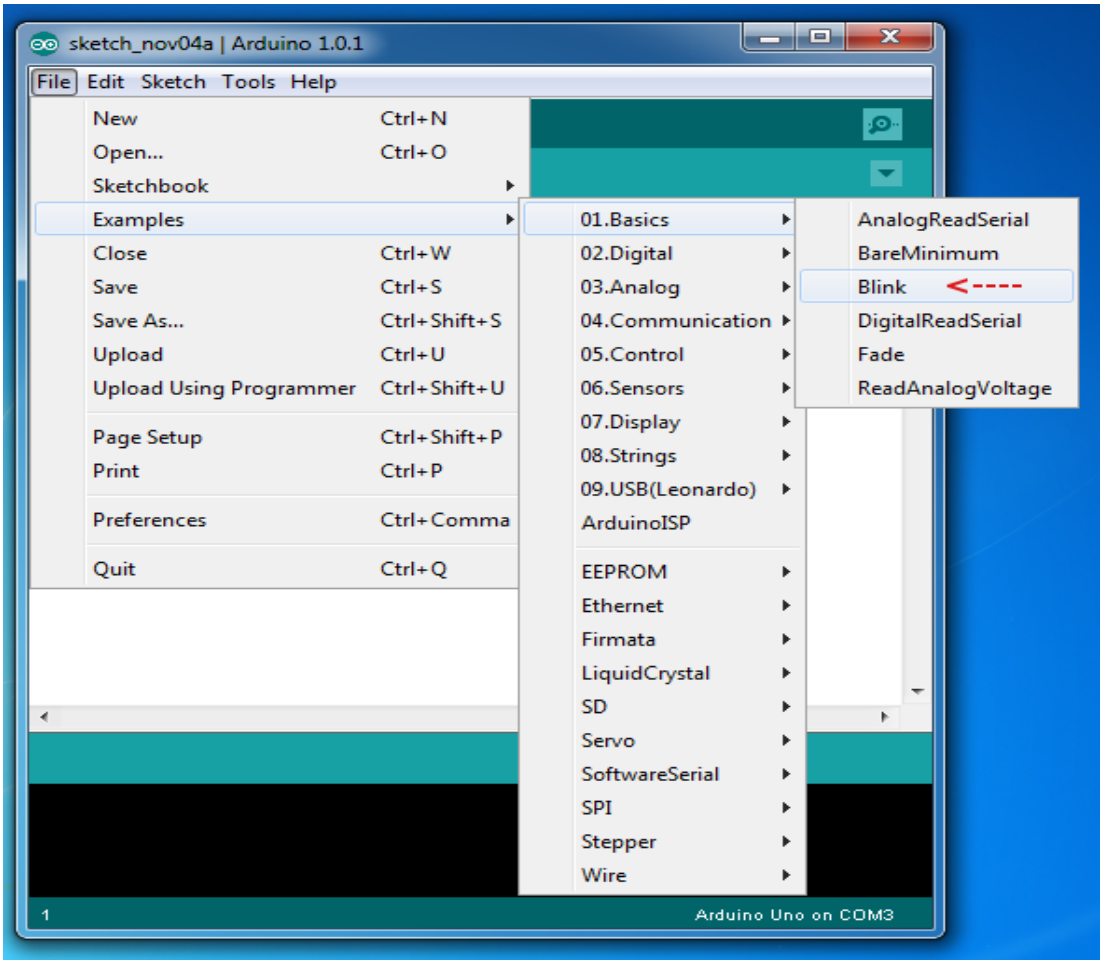


6.6 Open your first project.

- Once the software starts, you have two options:
- Create a new project.
- Open an existing project example.
- To create a new project, select File --> New.



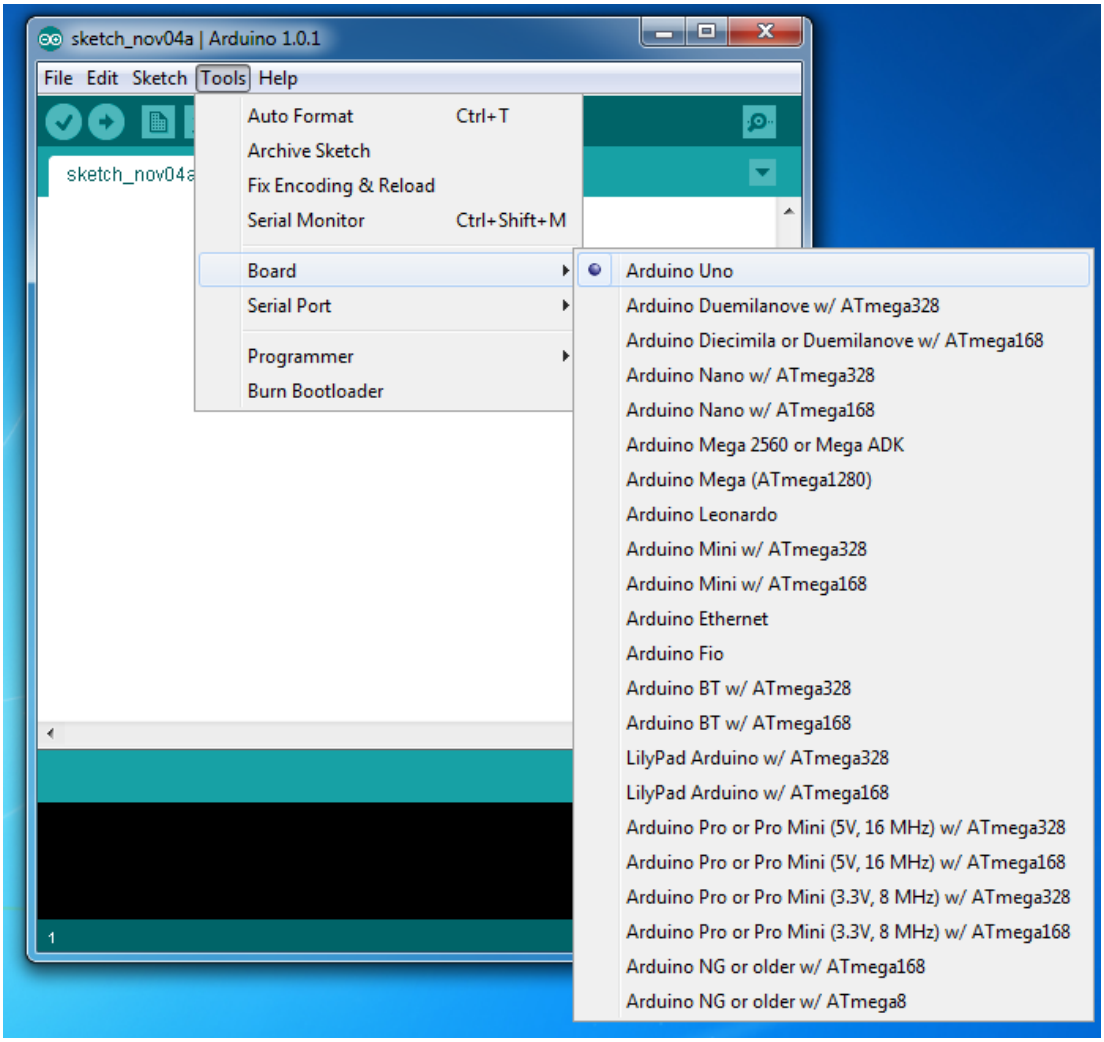
- To open an existing project example, select File -> Example -> Basics -> Blink.



- Here, we are selecting just one of the examples with the name Blink. It turns the LED on and off with some time delay. You can select any other example from the list.

6.7 Select your Arduino board.

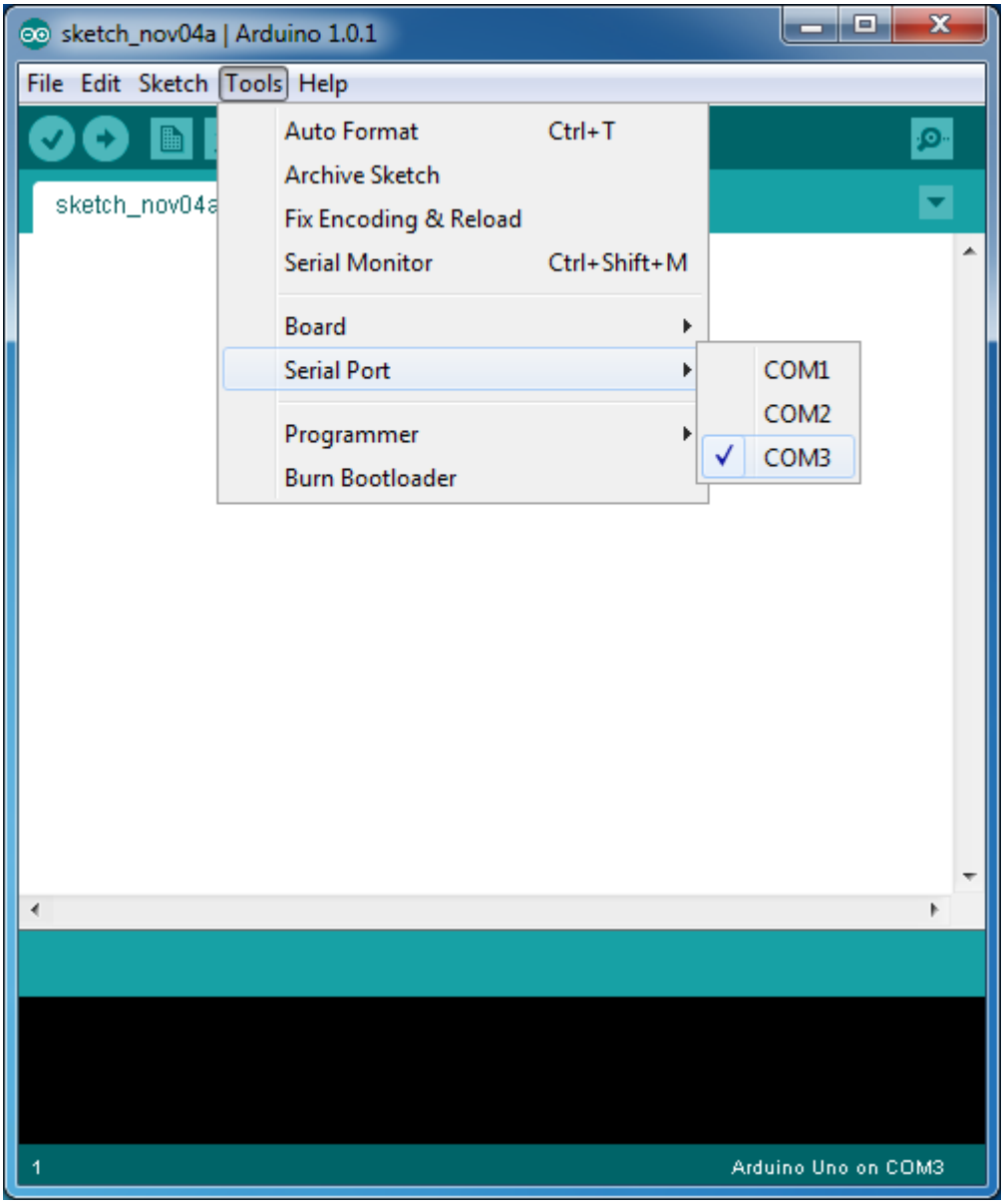
- To avoid any error while uploading your program to the board, you must select the correct Arduino board name, which matches with the board connected to your computer. Go to Tools -> Board and select your board



- Here, we have selected Arduino Uno board according to our tutorial, but you must select the name matching the board that you are using.

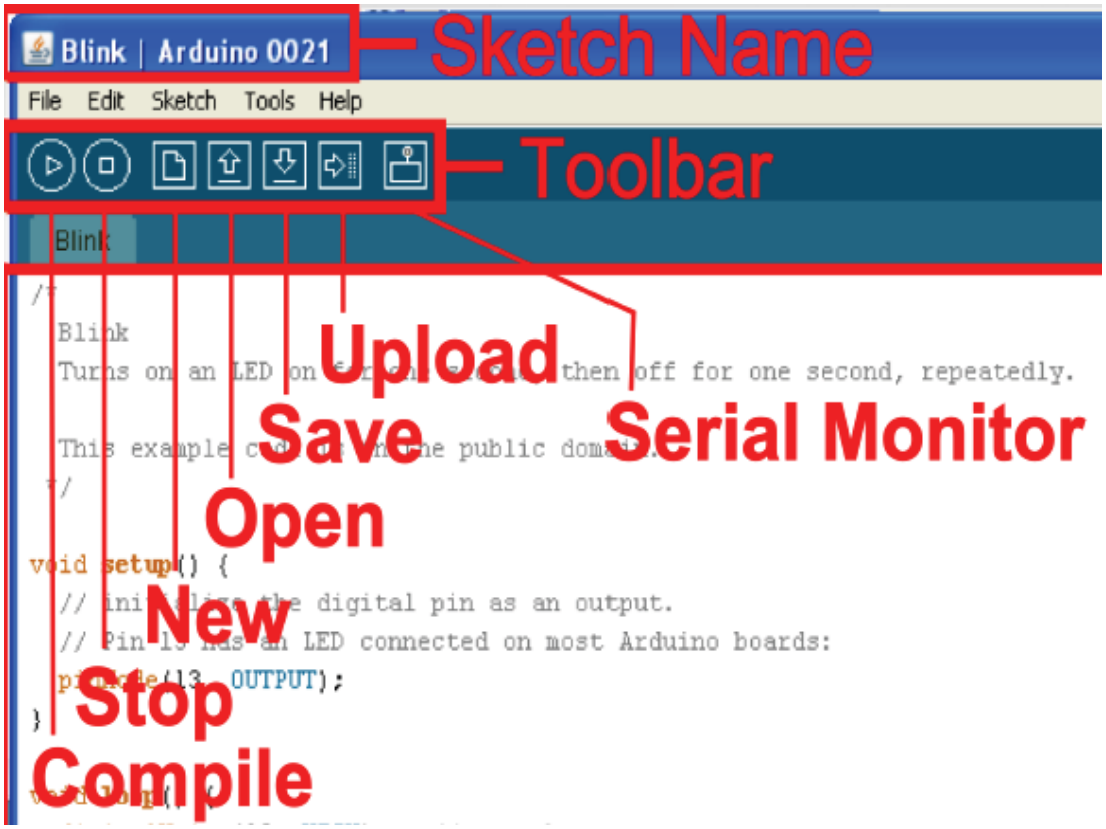
6.8 Select your serial port.

- Select the serial device of the Arduino board. Go to Tools -> Serial Port menu. This is likely to be COM3 or higher (COM1 and COM2 are usually reserved for hardware serial ports). To find out, you can disconnect your Arduino board and re-open the menu, the entry that disappears should be of the Arduino board. Reconnect the board and select that serial port.



6.9 Upload the program to your board.

- Before explaining how we can upload our program to the board, we must demonstrate the function of each symbol appearing in the Arduino IDE toolbar.



- Now, simply click the "Upload" button in the environment. Wait a few seconds; you will see the RX and TX LEDs on the board, flashing. If the upload is successful, the message "Done uploading" will appear in the status bar.
- Note: If you have an Arduino Mini, NG, or other board, you need to press the reset button physically on the board, immediately before clicking the upload button on the Arduino Software.

6.10 Board Types:

Various kinds of Arduino boards are available depending on different microcontrollers used. However, all Arduino boards have one thing in common: they are programmed through the Arduino IDE. The differences are based on the number of inputs and outputs (the number of sensors, LEDs, and buttons you can use on a single board), speed, operating voltage, form factor etc. Some boards are designed to be embedded and have no programming interface (hardware), which you would need to buy separately. Some can run directly from a 3.7V battery, others need at least 5V.

Here is a list of different Arduino boards available.

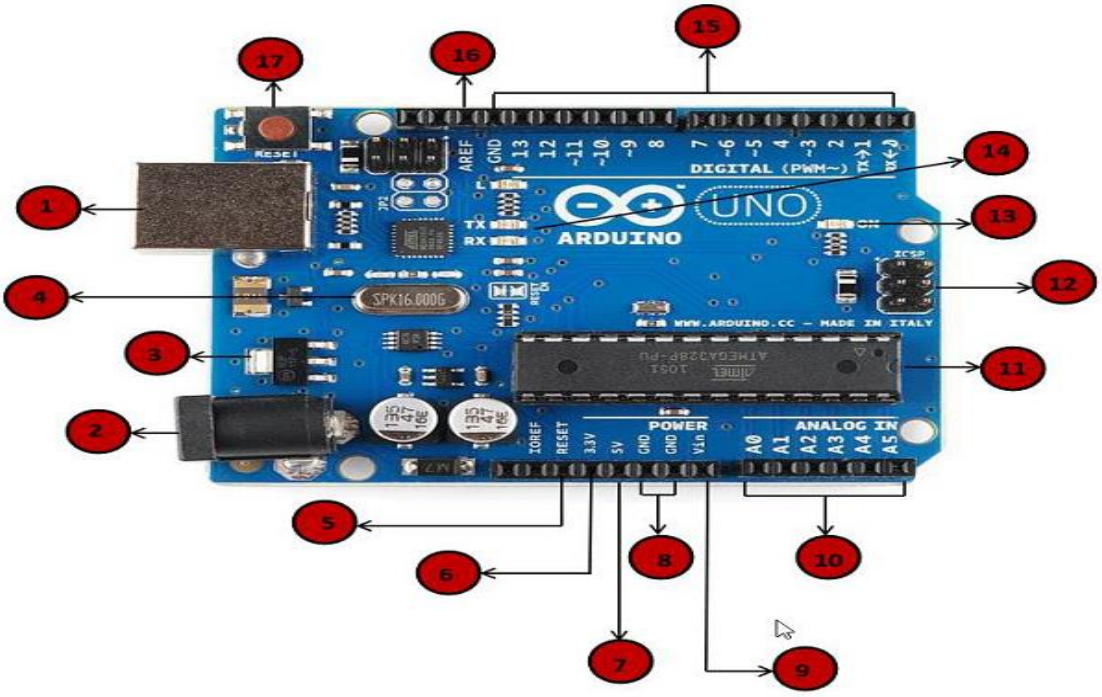
Arduino boards based on ATMEGA328 microcontroller

Board Name	Operating Volt	Clock Speed	Digital i/o	Analog Inputs	PWM	UART	Programming Interface
Arduino Uno R3	5V	16MHz	14	6	6	1	USB via ATMega16U2
Arduino Uno R3 SMD	5V	16MHz	14	6	6	1	USB via ATMega16U2
Red Board	5V	16MHz	14	6	6	1	USB via FTDI
Arduino Pro 3.3v/8 MHz	3.3V 8	8 MHz	14	6	6	1	FTDI Compatible Header
Arduino Pro 5V/16MHz	5V	16MHz	14	6	6	1	FTDI Compatible Header
Arduino mini 05	5V	16MHz	14	8	6	1	FTDI Compatible Header
Arduino Pro mini 3.3v/8mhz	3.3V	8MHz	14	8	6	1	FTDI Compatible Header

Arduino Pro mini 5v/16mhz	5V	16MHz	14	8	6	1	FTDI Compatible Header
Arduino Ethernet	5V	16MHz	14	6	6	1	FTDI Compatible Header
Arduino Fio	3.3V	8MHz	14	8	6	1	FTDI Compatible Header
LilyPad Arduino 328 main board	3.3V	8MHz	14	6	6	1	FTDI Compatible Header
LilyPad Arduino simply board	3.3V	8MHz	9	4	5	0	FTDI Compatible Header

6.11 Arduino board Description:

We will learn about the different components on the Arduino board. We will study the Arduino UNO board because it is the most popular board in the Arduino board family. In addition, it is the best board to get started with electronics and coding. Some boards look a bit different from the one given below, but most Arduino's have majority of these components in common.



Power USB:

Arduino board can be powered by using the USB cable from your computer. All you need to do is connect the USB cable to the USB connection (1).

Power (B4arrel Jack):

Arduino boards can be powered directly from the AC mains power supply by connecting it to the Barrel Jack (2).

Voltage Regulator:

The function of the voltage regulator is to control the voltage given to the Arduino board and stabilize the DC voltages used by the processor and other elements.

Crystal Oscillator:

The crystal oscillator helps Arduino in dealing with time issues. How does Arduino calculate time? The answer is, by using the crystal oscillator. The number printed on top of the Arduino crystal is 16.000H9H. It tells us that the frequency is 16,000,000 Hertz or 16 MHz

Arduino Reset:

You can reset your Arduino board, i.e., start your program from the beginning. You can reset the UNO board in two ways. First, by using the reset button (17) on the board. Second, you can connect an external reset button to the Arduino pin labeled RESET (5).

6, 7, 8, 9. Pins (3.3, 5, GND, Vin):

- 3.3V (6): Supply 3.3 output volt
- 5V (7): Supply 5 output volt
- Most of the components used with Arduino board works fine with 3.3 volt and 5 volt.
- GND (8)(Ground): There are several GND pins on the Arduino, any of which can be used to ground your circuit.
- Vin (9): This pin also can be used to power the Arduino board from an external power source, like AC mains power supply.

Analog pins:

The Arduino UNO board has five analog input pins A0 through A5. These pins can read the signal from an analog sensor like the humidity sensor or temperature sensor and convert it into a digital value that can be read by the microprocessor.

Main microcontroller:

Each Arduino board has its own microcontroller (11). You can assume it as the brain of your board. The main IC (integrated circuit) on the Arduino is slightly different from board to board. The microcontrollers are usually of the ATMEL Company. You must know what IC your board has before loading up a new program from the Arduino IDE. This information is available on the top of the IC. For more details about the IC construction and functions, you can refer to the data sheet.

ICSP pin: Mostly, ICSP (12) is an AVR, a tiny programming header for the Arduino consisting of MOSI, MISO, SCK, RESET, VCC, and GND. It is often referred to as an

SPI (Serial Peripheral Interface), which could be considered as an "expansion" of the output. Actually, you are slaving the output device to the master of the SPI bus.

Power LED indicator:

This LED should light up when you plug your Arduino into a power source to indicate that your board is powered up correctly. If this light does not turn on, then there is something wrong with the connection.

TX and RX LEDs:

On your board, you will find two labels: TX (transmit) and RX (receive). They appear in two places on the Arduino UNO board. First, at the digital pins 0 and 1, to indicate the pins responsible for serial communication. Second, the TX and RX led (13). The TX led flashes with different speed while sending the serial data. The speed of flashing depends on the baud rate used by the board. RX flashes during the receiving process.

Digital I / O:

The Arduino UNO board has 14 digital I/O pins (15) (of which 6 provide PWM (Pulse Width Modulation) output. These pins can be configured to work as input digital pins to read logic values (0 or 1) or as digital output pins to drive different modules like LEDs, relays, etc. The pins labeled "~" can be used to generate PWM.

AREF:

AREF stands for Analog Reference. It is sometimes, used to set an external reference voltage (between 0 and 5 Volts) as the upper limit for the analog input pins.

6.12 Arduino IDE Installation

After learning about the main parts of the Arduino UNO board, we are ready to learn how to set up the Arduino IDE. Once we learn this, we will be ready to upload our program on the Arduino board. In this section, we will learn in easy steps, how to set up the Arduino IDE on our computer and prepare the board to receive the program via USB cable.

CHAPTER 7

FUTURE SCOPE

Gesture Recognition: Further refine the gesture recognition system to detect more complex Enhanced movements and gestures, allowing for a wider range of control options and interactions.

Machine Learning for Improved Recognition: Implement machine learning algorithms to improve the accuracy and reliability of gesture recognition, making the system more responsive and adaptable to individual users' movements.

Wearable Technology Advancements: Take advantage of advancements in wearable technology to make the device more lightweight, comfortable, and aesthetically pleasing, potentially integrating it into everyday clothing or accessories.

Biometric Authentication: Incorporate biometric authentication features such as fingerprint or voice recognition to enhance security and prevent unauthorized use of the device.

Mobile App Integration: Develop a mobile app that complements the device, allowing users to customize gestures, set preferences, and receive notifications or alerts through their smartphones.

Remote Monitoring and Assistance: Implement remote monitoring capabilities so caregivers or healthcare professionals can track the user's activity and provide assistance or intervention when needed.

Expanded Accessibility Features: Consider adding features such as text-to-speech functionality for users with visual impairments or additional language support to accommodate users from diverse backgrounds.

Community Support and Open Source Development: Encourage community involvement and open-source development to foster innovation and collaboration, allowing for continual improvements and customization based on users' feedback and needs.

Integration with Virtual Reality or Augmented Reality: Explore integration with virtual reality (VR) or augmented reality (AR) technologies to create immersive experiences or training simulations that can assist users in developing and practicing motor skills or daily activities.

FUTURE ENHANCEMENT

Multi-language Support: Expand the voice command and announcement system to support multiple languages, allowing users from different regions to interact with the device more effectively.

Customizable Voice Commands: Enable users to customize voice commands according to their preferences and specific needs, providing a more personalized and intuitive user experience.

Internet Connectivity: Integrate the system with Wi-Fi or mobile data connectivity to enable remote control and monitoring via a smartphone app or web interface, providing greater flexibility and convenience for users and caregivers.

Cloud Integration: Implement cloud storage and synchronization capabilities to store user preferences, settings, and activity data securely, enabling seamless access and synchronization across multiple devices.

Machine Learning for Adaptive Assistance: Utilize machine learning algorithms to analyze user behavior and preferences over time, providing adaptive assistance and suggestions to improve the user experience and anticipate their needs.

Biometric Authentication: Integrate biometric authentication features such as facial recognition or fingerprint scanning to enhance security and ensure that only authorized users can control the device.

Health Monitoring: Incorporate health monitoring sensors such as heart rate or blood pressure monitors to track the user's vital signs and provide alerts or notifications in case of any abnormalities.

Smart Home Integration: Expand compatibility with smart home devices and platforms such as Apple HomeKit or Samsung SmartThings, allowing users to control a wider range of home appliances and systems using gesture or voice commands.

Gamification and Motivational Features: Implement gamification elements and motivational features to encourage users to engage with the device regularly and achieve their rehabilitation or daily living goals.

Community Engagement and Support: Create online forums, support groups, or communities where users can share experiences, tips, and advice with each other, fostering a sense of community and mutual support among users and caregivers.

Result

Effectiveness in Daily tasks:

User experience a 40% improvement in their ability to perform daily task independently.
Enhanced task execution speed and reduce error during routine activities.

Communication Improvements :

Deaf and hard of hearing users noted a 50% enhancement in communication ease and clarity real time translation of sign language to spoken language facilitied broader interaction possibilities.

cognitive and learning Enhancements:

adaptive learning algorithms helped users with cognitive challenges by providing tailored support resulting noticed improvement learning new tasks and remembering essential daily routines.

Users Feedback and satisfaction :

overall users satisfaction rated at 85% with positive feedback on the glove ease of and the confidence they provide.
suggestions for improvement include increasing the battery life and expanding the range of gesture recognised by the system.

CONCLUSION

The no. of disabled people like deaf and dumb are increasing day by day and it is found that the device used to assist them are very expensive and not much effective for all. Most of them can't afford the price so they spend their whole life in a single room. This product is very cost effective and user friendly and the main advantage of this product is the device is portable that means they can go anywhere and communicate with others easily. So the device help them to live a free life in the society without the help of a third person. This device is very helpful for both deaf-dumb and physically disabled people. By introducing the Smart Hand Gloves for Disable People, It will provide the more reliable, efficient, easy to use and light weight solution to user as compare to other proposed papers. This will responsible to create meaning to lives of Disable People.

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