

AUTOMATED MOBILITY PLATFORM FOR PHYSICALLY CHALLENGED USING WIRELESS SENSOR NETWORK

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering Degree in
Electronics and Communication Engineering

by

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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHOOL OF ELECTRICAL AND ELECTRONICS**

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of J .MANOJ (37130171), K . BHANU TEJA (37130183) who carried out the project entitled "AUTOMATED MOBILITY PLATFORM FOR PHYSICALLY CHALLENGED USING WIRELESS SENSOR NETWORK" under our supervision from November 2020 to March 2021.

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DECLARATION

We J .MANOJ and K .BHANU TEJA here by declare that the Project Report entitled **“AUTOMATED MOBILITY PLATFORM FOR PHYSICALLY CHALLENGED USING WIRELESS SENSOR NETWORK”** done by us under the guidance of Mrs.K.SRILATHA,M.E.,(Ph.D)., Assistant Professor, Department of Electronics and Communication Engineering is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in ELECTRONICS AND COMMUNICATION ENGINEERING.

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1.

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ABSTRACT

It is hard for outwardly disabled people to perceive prepares and moving the plat structures in rail line stations in ordinary conditions. On the off chance that the distinct individual picks wrong stage for the train off course, they will lose the train. This project proposes a novel technique to help outwardly disabled people in finding accessible trains on the plat structures by the utilization of IR sensors and speakers. On the off chance that the individual present in wrong plat from he can undoubtedly move to another stage by utilizing Escalators are worked by utilizing IR sensors. The proposed strategy was executed on an Arduino and IR and DC engines. The trial results exhibit that the proposed technique is promising for helping outwardly debilitated people use lifts on platstructures.

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I. INTRODUCTION

In India, dominant part of the public transportation is being completed by the rail route and consequently any issue happened during transportation carries the transportation to an end. Railroads is viewed as the most dependable mode of transport in India as lakhs of suburbanite's movement by it consistently. In this way, the security and the board are a test. Wild rail route crossing is one of the serious issues looked by the Indian Railways, and the most elevated supporters of the demise tally each year. Notwithstanding the exacting estimates taken by the Railway specialists, the stage crossing demise keep on happening much of the time. Railroute crossing passing's happen in light of the fact that individuals need to stay away from the disarray and clog on the foot-over spans.

These inadequacies are killed by this portable stage. The showing up/withdrawing sleeper is noticed through IR device then it consequently conclusions/opens the stage. For detecting the train IR sensors are put at the two sides of track. With the assistance of sensors, the Arduino UNO R3 will detect the presence of train. When train is detected, the Arduino will offer heartbeats to the engine to close/open the stage. The principle objective of the Mobile Platform is to assist the truly debilitated individuals with moving starting with one stage then onto the next. When there is no train showing up on the station, the Mobile Platform will be opened and constantly. The genuinely impeded individuals and matured people will use the Platform to pass the between stages. The train passage sign will be given in a voice signal through ringer. The proposed structure offers a predominant response for trading of actually incapacitated individuals and matured people without using foot-over spans. The above proposed model chips away at Arduino based procedure, sensor and engine instrument which is utilized to work the Mobile Platform.

It is hard for outwardly impeded people to perceive prepares and moving the plat structures in rail line stations in ordinary conditions. On the off chance that the people individual picks wrong stage for the train off course, they will lose the train. This paper proposes a novel technique to help outwardly hindered people in finding accessible trains on the plat structures by the utilization of IR sensors and speakers. On the off chance that the individual present in wrong plat from he can without much of a stretch move to the another stage by utilizing Escalators are worked by utilizing IR sensors. The proposed strategy was carried out on an Arduino and IR and DC engines. The test results show that the proposed strategy is promising for aiding outwardly weakened people use lifts on plat structures.

II. LITERATURE SURVEY

Harsha Divide et al 2016 [1] have advanced a sharp wheelchair aimed at really blocked individuals. Front line that system, they devour future a controls seat focused on basic vehicle that the entire thing using discourse acknowledgment other than movement switch. In vogue that structure, question somewhat catch devours begin, the customers may give genuine request at the lucky opportunity to the steerage seat. That holder stay used enough by less effort then compartment stay used self-sufficiently. That scheme functioned in quatern unmistakable units anyplace the discourse redesign provided the course request then the supersonic gadgets remained rummage-sale to separate the blocks in the manner.

Blanca Delgado et al 2014 [2] required industrialized the modified acknowledgment of a peculiar humanoid occasion happening the preparation stage. Presently if people remained jumped or cleaved accessible of a Pullman, stage distinguished that advancement. An exploratory evaluation stayed depicted using an enlightening assortment that remained signed on a rail line position. They required investigated the participation of trains through inspecting the development courses in the way divan region. Also, moreover, they explored the trot development locaters, object explanation, and following .recognized by a gadget put nearer to the entrance. So the time frame may be ensured once diverged from the active work.

Balaji et al 2014 [4] advanced Rohan D. Dudam et al 2012 [3] required industrialized a customized railroad doorway structure for the level convergence. If the train was late a direct result of certain clarification, the doorway stays shut aimed at a long-time producing road circulation close the entryways. To circumvent that trouble they needed industrialized a customized rail course entryway switch scheme, forefront which the presence of the Pullman remained a high level cell accelerometer device based distant automaton for really weakened persons. They devour related double dishes forefront the railroad tracks on the two sides of the Stages. Precisely once here was not in the least Pullman appearance in the position, the flexible stages would remain shut aimed at practice of really tried persons. Right, when the Pullman remained appearing, contacting stages assurance stay opened to authorization the course for Pullman admission then the data stayed articulated in a discourse mark. The appearance other than remove from the Pullman were identified through the bright gadgets that stayed set on explicit terminations happening the active work.

Shahidul Islam et al 2016 [5] required industrialized a daylight-based three-wheeler focused on debilitated persons. Forefront that structure, the sun-situated control remained cast-off as a wellspring of vigor. Meanwhile biomechanics measure remained rummage-sale in that scheme which remained pleasing and that moreover kept up the adequacy of the incapacitated people. In any case, they consume cast-off a actual profound three-wheeler then the components of the rudders stayed immense.

Shanu Sharma et al 2012 [6] required industrialized a stage uphill steerage seat. Forefront that structure, an individual may climb steps regardless, once they remained in

the sedentary location. The scheme is the most clear then most secure procedure for climbing ventures with no external contraptions.

Puneet Dobhal et al 2013 [7] required industrialized a keen rudder seat focused on really tried people using incline sensors. Forefront that, they devour future a distant structure that compartment stay used through incapacitated people to switch the development of rudder seats through simple development of the skulls before pointers. He contained a spreader happening the director and using a MEMS accelerometer which sends change signs to the recipient the structure as a brief response.

Nirmal et al 2014 [8] required developed a Helm seat focused on really and mentally crippled people. They burn-through skilful a steerage seat through using discourse, sense, at that point stick at that point checked the condition of the public authority, at that point devour changed people's area through siphoning the change to then from. The structure stayed arranged by a gadget like a heartbeat gadget, clamminess .They burn-through assessed extent of fever then obstacle.

III. EXISTING SYSTEM

Where track and thruway/street converges each other at a similar level is known as "level intersection". There are primarily two kinds of level intersection they are Manned level intersection and Unmanned level intersection. Monitored level intersection is ordered into special .Class,



Figure 1 : Image of Rails

"A" Class, "B" Class, "C" Class. Automated level intersection is grouped into "C" Class, "D" Class. Railroads being the least expensive method of transportation are liked over the wide range of various methods .When we go through the day by day papers we go over numerous rail line mishaps happening at automated rail line intersections. This is chiefly because of the imprudence in manual activities or absence of laborers. We, in this paper have thought of an answer for something very similar. Utilizing basic electronic parts we have attempted to mechanize the control of railroad entryways. As a train moves toward the rail route crossing from one or the other side, the sensors put at a specific separation from the entryway distinguishes the moving toward train and appropriately controls the activity of the door. At the point when the wheels of the train moves over, the two tracks are shorted to ground and this goes about as a sign to the microcontroller showing train appearance.

The main objective of the project is to reduce more electricity consumption and to avoid unwanted accidents caused by railway crossings. To save the travel time of people by making them to avoid using the foot-over bridges employed in the existing system to move from one platform to another.

IV. PROPOSED METHODOLOGY

This model consolidates Arduino UNO R3, IR sensors, CD Drive, L293D Motor driver IC and bell. It is utilized to consequently close/open the portable stage in the middle of the tracks. In this model, the two far off stages are associated by utilizing a flat stage on which the travelers can stroll on. Sensors are put at some pre-characterized distance on the two closures of the rail route track. At the point when the train passes the primary IR sensor the versatile stage will naturally close permitting the train to pass. Also, when the train leaves the second IR sensor the versatile stage will move overcoming any barrier between two stages. On detecting the train, the Arduino will provide orders to the CD drive to close/open the versatile stage through DC engines in the CD drive. A signal will begin humming when the versatile stage is opened or shut. To dodge disparities the IR sensors are set at some predefined distance on one or the other side of the stage, so the scaffold can open when the last compartment of the train passes and closes when the main compartment moves toward the stage. The proposed model can be advantageous for actually impeded, matured individuals, patients, and so forth Their time will be saved by utilizing the portable stage rather than foot-over spans. The figure underneath shows the square chart of the proposed framework:

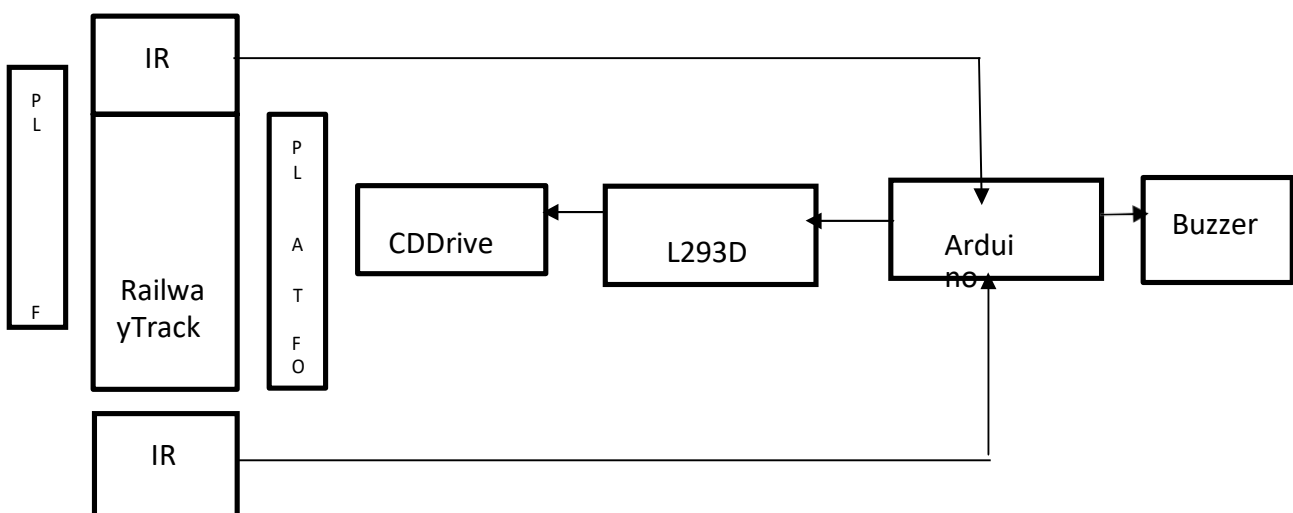


Figure 2 :Block Diagram of prototype

HARDWARE IMPLEMENTATION

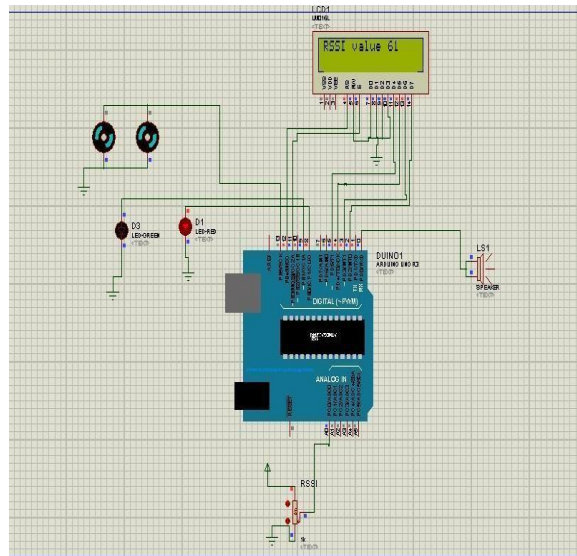


Figure 3 : Hardware Implementation

ArduinoUNOR3:

The Arduino Uno R3 is a microcontroller panel dependent happening At mega 328. It works at a voltage of +5V. It comprises of 14 computerized I/O jots of which 6 stretch PWM harvest, a working clock recurrence of 16 MHz, a USB connotation, 6 humble information bases, a power knave then a rearrange key. The Arduino can be customized utilizing C or C++ through the Arduino IDE programming. [2]



Figure 4 : Arduino UNOR3

IR Sensors:

An Ultra violet device [3] is an electric gadget which produces to detect objects in the encompassing. The creator is an IR LED then the radar is an IR photodiode that is delicate to IR well-lit of the very frequency as that discharged through the IR LED. It is a well known hardware utilized in numerous electronic gadgets. The radiations delivered are not obvious

to the natural eye since it emanates at infrared reach. The sensors for the most part have frequencies somewhere in the range of 0.75 and 1000 μ m. The area between 0.75 to 3 μ m is recognized as the near to infrared areas. The locale anywhere in the variety of 3 then 6 μ m is recognized as the mid infrared and ultra violet radio activity which consumes a frequency additional protuber ant advanced than 6 μ m is recognized by way of distant ultra violet.

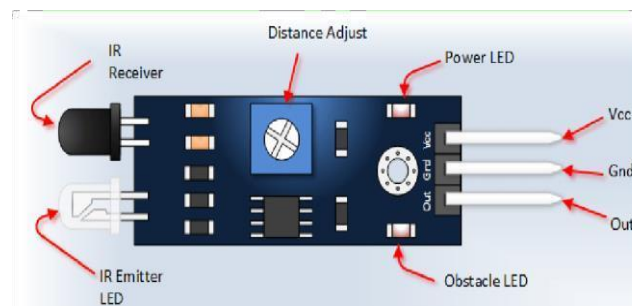


Figure 5 : Pin diagram of IR Sensor

In this undertaking the sensors are put at some separation from the stage. At the point when the light produced from the IR LED experiences an article (for this situation train) it mirrors the light which is gotten by the IR Receiver. The ideal activity is performed when the light reflects from the article (for this situation opening/shutting the portable stage).

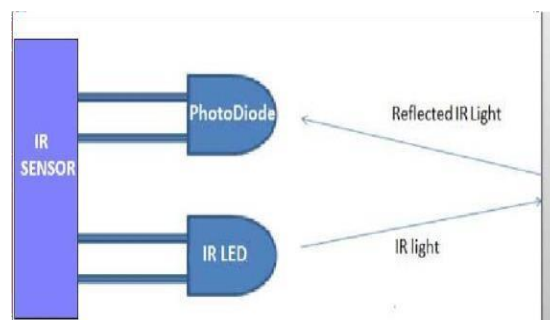


Figure 6 : IR Sensor working principle

L293D Driver IC:

It is a common engine driver IC which permits the DC engine to pivot in either heading for example clockwise or against clockwise. It is a 16 pin IC which is fit for driving little and calm large engines too. We need to give either rationale '0' or rationale '1' to pivot the engine the ideal way [4].

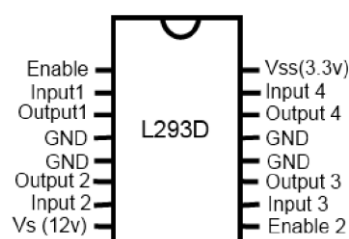


Figure 7 : L293D IC pin diagram

- Input 1= Logic 1 and Input 2= Logic 0 we get Clockwise Direction Movement
- Input 1= Logic 0 and Input 2= Logic 1 we get Anti-clock wise Direction Movement

In this prototype ,the L293D IC is used to drive the motors in the CD drive so as to open or close the CD drive i.e. the mobile platform.

CD Drive:

There are two sorts engines utilized. One that is utilized to open and close the CD Drive is a Stepper engine. The other kind is a BLDC (brushless DC) engine that is utilized to turn the CD. The DC engine in the CD drive changes over the electrical energy into mechanical energy, for this situation, which opens/shuts the CD drive to overcome any issues between the stages when it opens and un-overcomes any issues when the CD drive closes [5]. The engines are driven utilizing a driver IC as demonstrated previously.

Buzzer:

It is a gadget used to create a sound which gives a sign of opening/shutting of the portable stage. The bell is driven by means of the IR sensor and the Arduino UNO R3. At the point when the IR sensor detects a train, which triggers the Arduino further setting off the signal to create the sound [3]. Following are the means to interface ringer with Arduino:

1. Dwelling the signal hooked on the bread board, consequently the deuce mains are on deuce distinct columns.
2. By means of show jumper ropes, interface Arduino computerized pin no. 8 to the positive lead.
3. Attach the second main to the 100-ohm device, trailed by a ground association.



Figure 8 : Buzzer

SOFTWARE IMPLEMENTATION

In this task, Arduino UNO R3 is utilized. Thus, to code it, Arduino IDE programming is utilized, and the writing computer programs is done in C. The code comprises of capacities like expressing pin out of the engines, checking for the approaching information on sequential pin from the IR Sensors, deciphering the approaching information, turning the engines and ringer "ON" according to the rationale. It is scorched in the Arduino UNO R3. The versatile stage is opened/shut, and ringer creates a sound all the while. The figure beneath clarifies the nitty gritty stream graph of the proposed model [6]

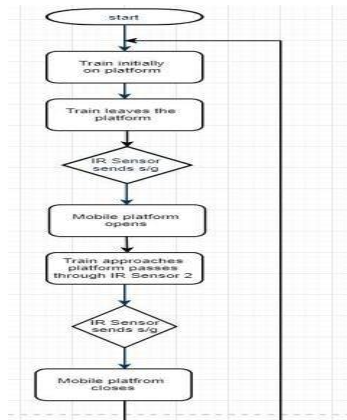


Figure 9 : Flowchart

ADVANTAGES

- System is basic, monetary and minimal.
- It is helpful for crippled individuals, patients and so forth Minimal effort, less support, and lessforce is utilized.
- No need to climb spans over cross the stages.

□



Figure 10 : Arduino Uno R3 Front

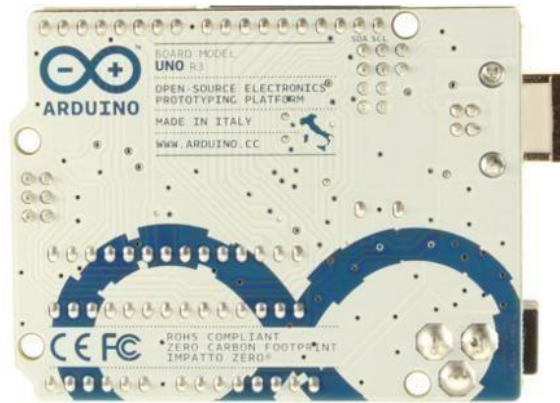


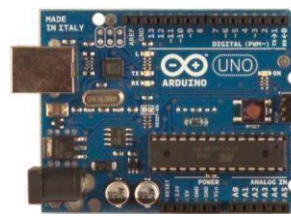
Figure 11 : Arduino Uno R3 Back



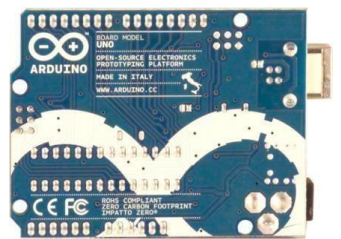
Arduino UNO R2 Front



Arduino UNO SMD



Arduino Uno Front



Arduino Uno Back

Overview

The Arduino Uno is a microcontroller panel subject to the ATmega328 (files). It consumes 14 progressive data/harvest jots (of which 6 container remain used as PWM harvests), 6 basic data bases, a 16 MHz artistic resonator, a USB affiliation, a control knave, an ICSP shot, and a rearrange button. It covers all that predictable to help the microcontroller; essentially interface it to a PC by a USB connection or control it through an AC-to-DC connection or cordless to start.

The Uno differences after altogether preceding pieces in that it doesn't use the FTDI USB-to- chronic motor is mark. All things considered, it comprises the Atmega16U2 (At mega 8U2 awake to form R2) modified as a USB-to-chronic missioner.

Apprise 2of the Uno panel consumes a device heaving the 8U2 HWB streak to crushed, creation ithumbler to home hooked on DFU style.

Revision3 of the board has the following new features:

- jot available: extra SDA then SCL jots that remain near the AREF title in addition two added novel jot as set close to the RESET pin, the IOREF that permit the protections to regulate to the power if after the panel. In upcoming, protections determination remain suitable together by the panel that usage the AVR, which effort by 5V then through the Arduino Owing that effort by 3.3V. The ensuing unique is a not related jot, that is protected aimed at upcoming drives.
- Stronger RESET circuit. Atmega16U2 replace the 8U2.

"Uno" suggests single in Italian then is called to brand the aimed at the pending in flux of Arduino 1.0. The Uno and version 1.0 will remain the orientation forms of Arduino, touching onward. The Uno is the newest in a sequence of USB Arduino pieces, then the orientation perfect aimed at the Arduino stage; for a association by preceding forms, understand the index of Arduino boards.

Summary

Microcontroller	ATmega328
Occupied Power	5V
Data Power(recommended)	7-12V
Material	
Energy(limits)	6-20V
Computerized I/O	14(of which 6 provide PWM output)
Simple Effort Jots	6
DC Present per I/O	40mA
Pin	
DCCurrentfor3.3VPin	50mA
Streak Reminiscence	32KB(ATmega328)of which 0.5 KB used by boot loader
SRAM	2KB(ATmega328)
EEPROM	1KB(ATmega328)
Time piece Haste	16MHz

Diagram & Orientation Project

Falcon documents: arduino-uno-Rev3-reference-design.zip (MEMO: the whole thing by Eagle 6.0 then additional present)

Note: The Arduino orientation arrangement container usage an Atmega8, 168, or 328, Present copies usage an ATmega328, yet an Atmega8 is appeared in the diagram aimed at orientation. The jot arrangement is indistinguishable on every one of the three processors.

Force

The Arduino Uno container remain filled through approaches aimed at the USB association or by an outside power stock. The control basis is selected automatically.

Outdoor (non-USB) control container originate also after an AC-to-DC connector (partition spy) or cordless. The connector canister remain connected through associating a 2.1mm midpoint optimistic fitting to the panel's power card. Mains after a battery can be inserted in the GND and V in pin headers of the POWER connector.

The board can chip away at an external stockpile of 6 to 20 volts. At of any kind opinion furnished with below 7V, in any case, the 5V pin might source under five volts also the panel might remain unsafe. In the time that by means of additional than 12V, the power regulator might over heat then damage the panel .There commended range is 7 to 12 volts.

The control jots remain by way off tracks:

- VIN. The data power to the Arduino panel once it's by means of an outdoor control basis (somewhat than 5 volts after the USB connotation before additional supervised switch basis). You container source power finished this jot, or if providing power through the control knave, admission it finished this jot.
- 5V. This pin out puts a regulated 5V from the regulator on the board. The panel container remain if by control also after the DC control knave (7 - 12V), the USB connector (5V), or the VIN jot of the panel (7-12V). Charitable power through plans aimed at the 5V or 3.3V jots save sabsent after the supervisor, besides container damage your panel. We don't quick it.
- 3V3. 3.3 volts our ce made by the aboard supervisor. All-out present attraction is 50mA.
- GND. Ground pins.

Memory

The AT mega 328 has 32 KB (with 0.5 KB used for the boot loader) .It also has 2KB of SRAM and 1KB of EEPROM (which can be read and written with the EEPROM library).

Input and Output

All of the 14 electronic pins on the Uno can be used as an information or yield, using pin Mode(), digital Write(), and computerized Read() functions. They work at 5 volts. Each pin can give or get a limit of 40 mA and has an inside draw up resistor (isolated obviously) of 20-50 k Ohms. Also, a few pins have specific limits:

Serial: 0 (RX) and 1 (TX). Used to get (RX) and send (TX) TTL successive data. These pins are connected to the corresponding pins of the AT mega 8U2 USB-to-TTL Serial chip.

External Interrupts: 2 and 3. These pins can be designed to trigger a hinder on a low value, a rising or falling edge, or an adjustment in esteem. See the attach Interrupt() function for details.

PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analog Write () function.

SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These jots provision SPI communication using the SPI library.

LED: 13. Here is an inherent LED related by computerized pin 13. At the opinion when the jot is HIGH worth, the LED is on, when the pin is LOW, it's off.

The Uno has 6 straightforward wellsprings of data, checked A0 through A5, all of which give 10 bits of objective (i.e. 1024 different characteristics). As usual they measure from ground to 5 volts, anyway is it possible to change the upper completion of their span using the AREF pin and the simple Reference() work.

Moreover, some pins have specialized functionality:

TWI: A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library.

There territory couple of other pins on the board:

AREF. Reference voltage for the analog inputs. Rummage-sale by equivalent Orientation.

Reset. Bring this line LOW to reset the microcontroller. Commonly rummage-sale tenhance a rearrange key to shields which block the one on the board.

See also the arranging between Arduino pins and ATmega328 ports. The anticipating the Atmega8, 168, and 328 is identical.

Correspondence

The Arduino Uno consumes dissimilar offices aimed at speaking thru a PC, additional Arduino, or other microcontrollers. The ATmega328 stretches UART TTL (5V) successive mail, which is nearby on wounding advantage jots 0 (RX) and 1 (TX). An ATmega16U2 on

the panel stations this Successive mail finished USB then shows alert as a PC created com dock to program design plan on the PC. The '16U2 firmware uses the typical USB COM motorists, at that point no open air motorist is obligatory.

All things considered, on Windows, a .inf record is obligatory. The Arduino user interface design links an ongoing shade which licenses simple artistic information toward stay transported off and after the Arduino panel. The receiver and transmitter LEDs happening the panel assurance line once information is presence interconnected completed the USB-to-successive imprint and USB association through the PC (yet not aimed at serial communication on pins 0 and 1).

A Computer programming Sequential public library lets focused on consecutive explanation happening somewhat of the Uno's mathematical ots.

The ATmega328 similarly maintains I2C (TWI) and SPI correspondence. The Arduino programming fuses a Cable public collection to develop usage of the I2C transport; understand the affirmation for nuances. Aimed at SPI correspondence, usage the SPI public library.

Software design

The Arduino Uno container remain altered by the Arduino programming (transfer). Choice "Arduino Uno after the Gears>Panel black board (as demonstrated by the microcontroller happening your panel). Aimed at nuances, see the direction then instructional activities.

The ATmega328 happening the Arduino Uno originates re burned by a boot loader that licenses you to move novel cypher to it deprived of the usage of an outside gear designer. It passes on by means of the original STK 500 protocol (orientation, C header archives).

You container moreover avoid the boot loader and package the micro controller finished the ICSP (In-Circuit Sequential Software design) shot; understand these headings for nuances.

The ATmega16U2 (or 8U2 in the rev1 and rev2 sheets) firmware basis cypher is open. The AT mega16U2/8U2 is loaded with a DFU boot loader, which container be started by:

OnRev1boards: associating the weld athlete on the spinal of the panel (close the guide of Italy) then afterward reset chime the 8U2.

On Rev2 or advanced pieces: here is a resistor that dragging the 8U2/16U2 HW B line to crushed, creation he simpler to place into DFU style.

You would formerly have the option to use Atmel's FLIP software (Windows) or the DFU programmer (Mac OS X and Linux) to heap additional firmware. Or of course you container use the ISP shot by an external designer (overwriting the DFU boot loader). See this

customer donated instructional work out aimed at additional information.

Automatic (Software) reset:

As opposite to needful a demonstrable media of the rearrange button beforehand a trade, the Arduino Uno is masterminded with the end goal that awards it to be rearrange through software designs equentially on an associated PC. Extraordinary of the stuff stream switch appearances (DTR) of the ATmega8U2/16U2 is associated with the reset line of the theATmega328 by techniques for a 100 nan -farad capacitor. Right when this line is affirmed (taken low), the resetline drops satisfactorily long to reset the chip. The Arduino programming uses this capacity to allow you to move code by fundamentally pressing the exchange button the Arduino environment. This gathers that the boot loader can have an encouraged break, as the bringing down of DTRcan be all through made with the start of the exchange.

This course of action has different outcomes. Right when the Uno has related with either a PC running mac OS X or Linux, it resets each time an alliance is made to it from programming (by strategies for USB). For the going with half-secondor something like that, the boot loader is running on the Uno. While it is changed in accordance with excuse twisted data(i.e. something other than a trade of new code), it will get the basic moderately couple of bytes of information moved off the board after connection is opened. On the off chance that a sketch running on the board gets one game planor other information when it from the outset begins, ensure that the thing with which it surrenders holds a second in the wake of opening the alliance and prior to sending his information.

The Uno contains a follow that can be sliced to harm the auto-reset. The cushions on one or the other side of the accompanying can be welded together to re-empower it. It's named "RESET- EN". You may correspondingly have the choice to cripple the auto-reset by an accomplice a 110- ohm resistor from 5V to the reset line; see this get-together string for subtleties.

USB Over current Protection

The Arduino Uno has a resettable poly circuit that shields your PC's USB ports from shorts and over current. However most PCs give their own inside affirmation, the wire gives an additional layer of insurance. On the off chance that in excess of 500mA is applied to the USB port, the circuit will thusly break the relationship until the short or overload is taken out.

Physical Characteristics

1. The most limit length and width of the Uno PCB are 2.7 and 2.1 inches separately,

with the USB partner or and power jack connecting past the past estimation. Four screw openings permit the board to be joined to a surface or case. Note that the distance between digital pins 7 and 8 is 160 mil (0.16"), not an even multiple of the 100 mil spacing of the other pins. Features:

- a. 5x8 dots with cursor
- b. 16 characters*2 lines display
- c. 4-bit or 8-bit MPU borders
- d. Built-in supervisor (ST7066 or equivalent)
- e. Presentation Method & Backlight Differences
- f. ROHS acquiescent

Table 1 : Physical Characteristics

LCD kind	☐ TN			
☐ FSTN	FSTN Bad			
☐ STN Creamy Lime	☐ STN Leaden		☐ STN Azure Undesirable	
Opinion way				
	6O'clock	☐ 12 O'clock		
Back Polarizer	☐ Deep		☐ Translative	Transmissive
Touch screen	☐ With		Without	
Font type	English-Japanese	☐ English-Europen	☐ English-Russian	☐ other

MECHANICAL SPECIFICATIONS

Table 2 : Mechanical Specifications

Module size	80.0mm(L)*36.0mm(W)*Max13.5(H)mm
Viewing area	
Character size	64.5mm(L)*16.4mm(W)
Character pitch	
Weight	3.00mm(L)*5.23mm(W)

2. Absolute maximum ratings

Table 3 : Absolute maximum ratings

Item	Symbol	Standard			Unit
Power voltage	VDD-VSS	0	-	7.0	V

Input voltage	VIN	V S S	-	VDD	
Operating temperature range	VOP	0	-	+50	?
Storage temperature range	VST	- 1 0	-	+60	

3. Blockdiagram

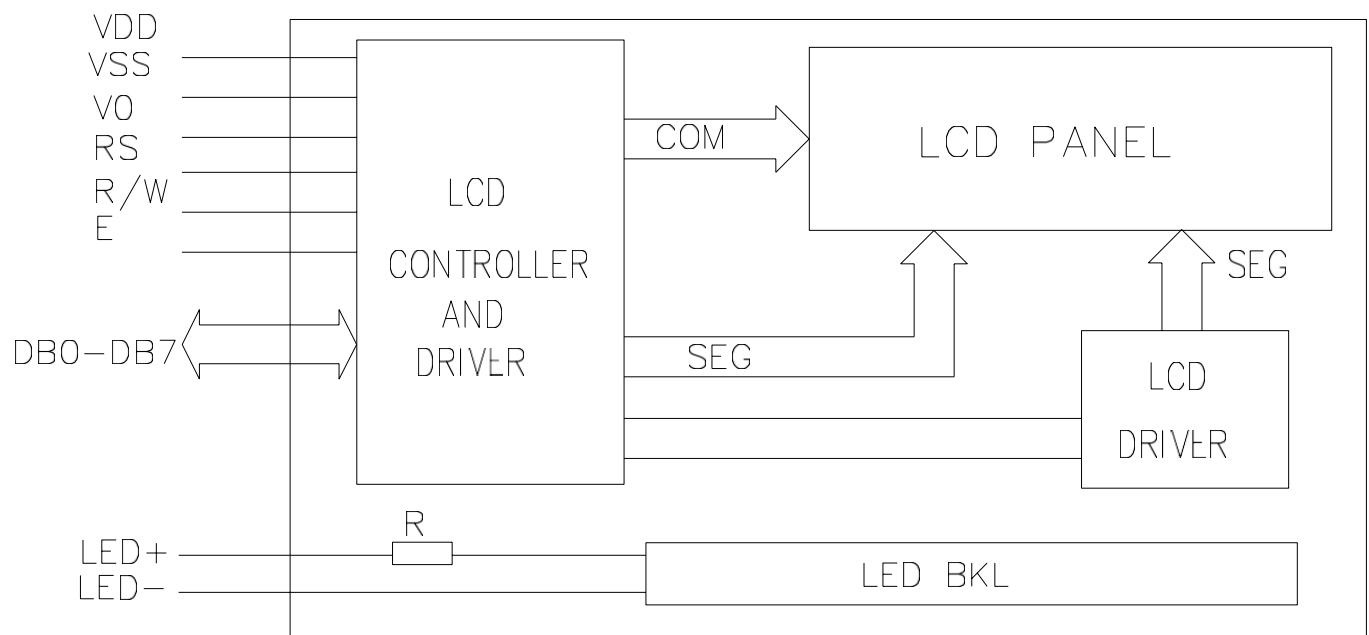


Figure 12 : Block Diagram

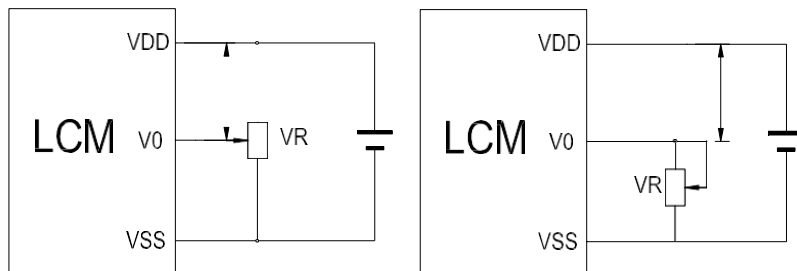
4. Interface pin description

Table 4 : Interface pin description

Pin no.	Symbol	External connection	Function
1	Vss	Power supply	Signal ground for LCM
2	VDD		Power supply for logic for LCM
3	VO		Contrast adjust
4	RS	MPU	Register select signal
5	R/W	MPU	Recite/write select signal
6	E	MPU	Process(data read/inscribe) enable signal

7~10	DB0~DB3	MPU	Four low order bi-directional three-state data bus lines .Used for data transfer between the MPU and the LCM. These four are not used during 4-bit operation.
11~14	DB4~DB7	MPU	Four high order bi-directional three-State data bus lines .Used for data transfer between the MPU
15	LED+	BKL	Power supply for BKL
16	LED-	Power supply	Power supply for BKL

5. Contrast adjust



VDD~V0: LCD Driving voltage

VR:10k~20k

6. Optical characteristics

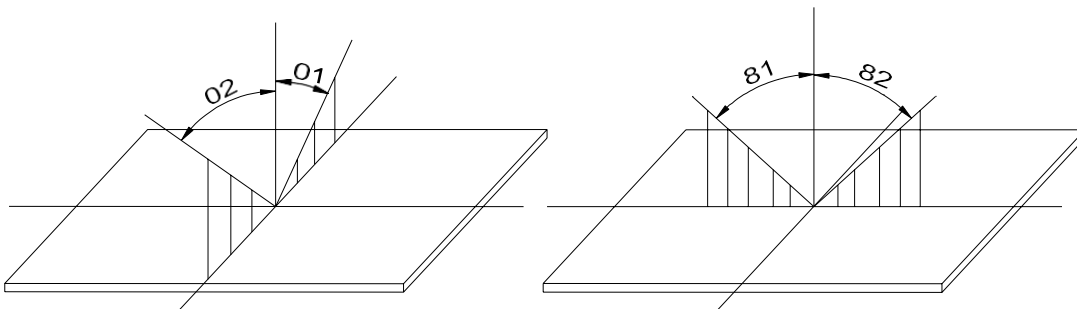


Figure 13 : Optical Characteristics

6:00

STN type display module(Ta=25?,VDD=3.3V)

Table 5 : STN type display module

Article	Sign	Disorder	Min.	Typ.	Pass with fly in g color s.	Component
Viewing angle	01	Cr ^{±3}		20		deg
	02			40		
	81			35		
	82			35		
Contrast ratio	Cr		-	10	-	-
Response time(rise)	Tr	-	-	20 0	2 5 0	ms
Response time(fall)	Tr	-	-	30 0	3 5 0	

Electrical characteristics

DC characteristics

Table 6 : DC characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage for LCD	VDD-V0	Ta=25?	-	3.0	-	V
Input voltage	VDD		3.1	3.3	3.5	
Supply current	IDD	Ta=25?,VDD=3.3V	-	1.5	2.5	mA
Input leakage current	ILKG		-	-	1.0	uA
“H” level input voltage	VIH		2.2	-	VDD	V
“L” level input voltage	VIL	Twice initial value or less	0	-	0.6	
“H” level output voltage	VOH	LOH=-0.25mA	2.4	-	-	
“L” level output voltage	VOL	LOH=1.6mA	-	-	0.4	
Back light supply voltage	VF		-	3.0		
Back light supply current	ILED	VLED=3			16	mA

Timing Characteristics

Write cycle(Ta=25?,VDD=3.3V)

Table 7 : Write cycle

Limit	Sign	Test pin	Min.	Typ.	Pass with flying colors.	Component
Enable cycle time	tc	E	500	-	-	ns
Enable pulse width	tw		300	-	-	
Enable rise/fall time	Tr ,tf		-	-	25	
RS;R/W setup time	tsu1	RS;R/WRS; R/W	100	-	-	
RS;R/W address hold Time	th1		10	-	-	
Read data output delay	tsu2	DB0~DB7	60	-	-	
Read data hold time	th2		10	-	-	

Write mode timing diagram

Figure 14 : Write mode timing diagram

Read cycle(Ta=25?,VDD=3.3V)

Table 8 : Read Cycle

Parameter	Symbol	Test pin	Min.	Typ.	Max.	Unit
Enable cycle time	tc	E	500	-	-	ns
Enable pulse width	tw		300	-	-	
Enable rise/fall time	Tr ,tf		-	-	25	
RS;R/W set uptime	tsu	RS;R/WRS; R/W	100	-	-	
RS;R/W address hold time	th		10	-	-	
Read data output delay	td	DB0~DB7	60	-	90	
Read data hold time	tdh		20	-	-	

Read mode timing diagram

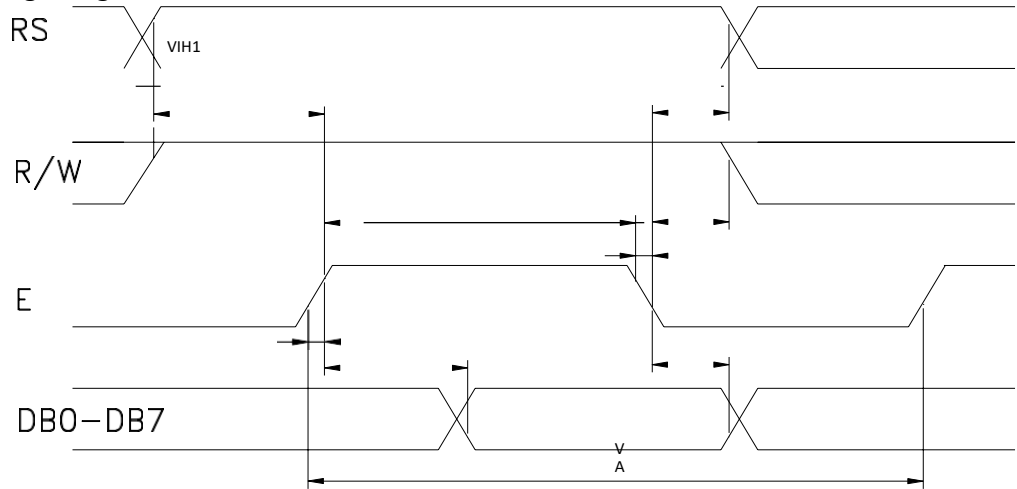


Figure 15 : Read mode timing diagram

FUNCTION DESCRIPTION

Framework Interface

This mark consumes altogether of the binary types of interface types with MPU: 4-digit transport then 8-cycle transport. 4-cycle transport then 8-digit transport are chosen through DL bit in the guidance list.

Occupied Flag(BF)

At the point, once BF = "High", it exhibits that the interior movement is presence dealt with. Along these lines, all through this time the accompanying direction can't be recognized. BF can be examined, once RS = Low then R/W=High (Recite Teaching Process), through DB7port. Before hand performing the following teaching, remain certain that BF isn't anything.

Speech Pawn (AC)

Address Counter (AC) supplies DDRAM/CGRAM speech, moved after IR. Ensuing to creating into (scrutinizing from) DDRAM/CGRAM, AC is thus extended (reduced) through 1. Exactly once RS = "Low" and R/W = "High", AC can be read through DB0 - DB6 ports.

Show Information RAM(DDRAM)

DDRAM stores display data of maximum 80x8 bits(80characters). DDRAM speech is usual in the location pawn(AC) by way of a hexadecimal amount.

Show location	1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16											

DDRAM address

s	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E
0F															

DDRAM address

s	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E
4F															

C GROM (Charm Producer ROM) CGROM has a 5x8 dabs 204 characters design nand a 5x10dabs 32 characters design. CGROMhas20

character patternsof5x8 spots.

CGRAM (Character Generator RAM) CGRAM has upto5

.8dot,8characters. Through content typeface data to CGRAM, administrator characterizedcharacters compartment remain scavenge deal.

Table 9 : Relationship between CGRAM Addresses ,Character Codes (DDRAM) and Character patterns (CGRAM Data)

Character Code (DDRAM Data)								CGRAM Address						Character Patterns (CGRAM Data)									
b8	b7	b6	b5	b4	b3	b2	b1	b0	b5	b4	b3	b2	b1	b0	b7	b6	b5	b4	b3	b2	b1	b0	
0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	-	-	-	1	1	1	1	1	
						0	0	0				0	0	1				0	0				
						0	0	0				0	1	0				0	0				
						0	0	0				0	1	1				0	0				
						0	0	0				1	0	0				0	0				
						0	0	0				1	0	1				0	0				
						0	0	0				1	1	0				0	0				
						0	0	0				1	1	1				0	0				
0	0	0	0	0	-	0	0	1	0	0	1	0	0	0	-	-	-	1	1	1	1	0	
						0	0	1				0	0	1				1	0	0	1		
						0	0	1				0	1	0				0	0	1			
						0	0	1				0	1	1				1	1	0			
						0	0	1				1	0	0				1	0	0			
						0	0	1				1	0	1				0	0				
						0	0	1				1	1	0				0	1				
						0	0	1				1	1	1				0	0				

Relationship between CGRAM Addresses ,Character Codes (DDRAM) and Character patterns (CGRAM Data)

Notes:

1. Character code bits 0 to 2 correspond to CGRAM address bits 3 to 5(3bits:8 types).
2. CGRAM address bits 0 to 2 design at the character pattern line position .The 8th line is the cursor position. Likewise, its grandstand is molded by a rational OR by the pointer. Keep up the 8th streak information , contrasting with the pointer show location, at 0 as the pointer show. If the 8th streak information is 1, 1 digit willing ht up the 8th line paying little regard to the cursor presence.
3. Character plan line positions identify with CGRAM data bits 0 to 4(bit 4 being at the left).
4. As exposed Bench, CGRAM charm plans remain picked after charm cipher minutes 4 to 7 areal IO. Regardless, since character code bit 3h as no effect, the R show model above can be picked by either character code 00H or 08H.
5. 1 for CGRAM information relates to show choice and 0 to non-choice."- ":Indicates no effect.

Cursor I Blink Control Circuit It controls cursor/flash ON/OFF at cursor position.

System

To conquer the speed separation between the inner clock of ST7066 and the MPU clock,ST7066 performs internal operations by storing control information's to IR or DR .The inward activity is resolved by the sign from MPU, made out of read/compose and information bus(RefertoTable7).

Directions can be isolated to a great extent into four gatherings:

- 1) ST7066 function set orders (set show approaches, usual information length, and so forth)
- 2) Speech usual guidelines to inward RAM
- 3) Information exchange guidelines with inward RAM
- 4) Others

The location of the internal RAM is automatically increased or decreased by 1.

Note: during inward activity, occupied banner (DB7) is perused
 “High” .Full standard checkered necessity remain headed through the following teaching.

Instruction Table

Table 10 : Instruction table

Instruction	Instruction code										Description	Execution time(fosc=270KHZ)
		RI W	D B7	D B6	D B5	D B4	DB3	DB2	D B1	DB0		
Clear Display		0	0	0	0	0	0	0	0	1	Write “20H” to DDRA and set DDRAM address to “00H” From AC	1.53ms
Return Home		0	0	0	0	0	0	0	1	-	Set DDRAM address to “00H” From AC and return cursor to Its original position if shifted .The contents of DDRAM Are not changed.	1.53ms
Entry mode Set		0	0	0	0	0	0	1	I/ D	S H	Assign cursor moving direction And blinking Of entire display	39us

Display ON/OFF control		0	0	0	0	0	1	D	C	B	Set display(D), cursor(C), and Blinking of cursor(B) on/off Control bit.	
Cursor or Display shift		0	0	0	0	1	S/C	R/L	-	-	Set cursor moving and display Shift control bit, and the Direction, without changing Of DDRAM data.	39us
Function set		0	0	0	1	DL	N	F	-	-	Set interface data length(DL: 8-Bit/4-bit), numbers of display Line(N:=2-line/1-line) and ,Display font type(F:5x11/5x8)	39us
Set CGRAM Address	0	0	0	1	A _{C5}	A _{C4}	A _{C3}	AC ₂	A _{C1}	AC ₀	Set CGRAM address in address Counter.	39us
Set DDRAM Address	0	0	1	A _{C6}	A _{C5}	A _{C4}	A _{C3}	AC ₂	A _{C1}	AC ₀	Set DDRAM address in address Counter.	39us
Read busy Flag and Address	0	1	BF	A _{C6}	A _{C5}	A _{C4}	A _{C3}	AC ₂	A _{C1}	AC ₀	Whether during internal Operation or not can be known By reading BF .The contents of Address counter can also Be read.	0us

Write data to Address	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write data into internal RAM (DDRAM/CGRAM).	43us
Read data From RAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read data from internal RAM(DDRAM/CGRAM).	43us

NOTE:

At the point when a MPU program with checking the bustling banner (DB7) is made, it should be vital 1/2fosc is important for executing the following guidance by the falling edge of the "E" signal after the bustling banner (DB7) goes to" Low".

11.3 Contents

1) Cleardisplay

R S	R / W	D B 7	D B 6	D B 5	D B 4	D B 3	D B 2	D B 1	D B 0
0	0	0	0	0	0	0	0	0	1

Clear all the presentation information by stating "20H" (space code) to all DDRAM address, and set DDRAM address to "00H" into AC (address counter).

Return cursor to the first status, in particular, carry the cursor to one side edge on the clench hand line of the showcase. Make the section mode increment(I/D="High").

2) Return home

RS	R /	D B	D B	D B	D B	D B	D B	D B	D B
----	--------	--------	--------	--------	--------	--------	--------	--------	--------

Return home is cursor return home instruction .Set

DDRAM address to "00H" into the address counter.

Reappearance pointer to his unique site then reappearances how to his unique rank ,if shifted .Fillings of DDRAM fixes not alteration.

3) Admission style usual

R S	R / W	D B 7	D B 6	D B 5	D B 4	D B 3	D B 2	DB1	DB0
0	0	0	0	0	0	0	1	I/D	SH

Usual the touching sequence of the pointer then show.

IID: increase I decrement of DDRAM speech (pointer or squint) Once I/D="high", pointer/flicker changes toward one side, then DDRAM speech be situated expanded by1

.At the point once I/D="Low", the pointer/squint changes to one side, then DDRAM speech is expanded by 1.

*CGRAM works a similar route as DDRAM when perusing from or keeping in touch with CGRAM.SH: move of whole presentation

At the point once DDRAM delivered (CGRAM read/compose) activity or SH="Low", instable of the whole show is non accomplished. On the off chance that SH="High" and DDRAM compose activity, the move of the whole presentation is performed by I/D worth. (I/D="high". move left, I/D="Low". Move right).

4) Show ON/OFF switch

R S	R / W	D B 7	D B 6	D B 5	D B 4	D B 3	D B 2	D B 1	D B 0
0	0	0	0	0	0	1	D	C	B

Control presentation /pointer/open and close the eye ON/OFF 1 bit register.

D:Show ON I OFF switch minute
When D ="High" ,whole show is twisted on.

When D= “Low”, exhibition is curved rotten, none the less show information left over’s cutting-edge DDRAM.

C: pointer ON IOFF control bit When D= “High”, cursor is turned on.

When D= “Low”, cursor is disappeared in current display ,but I/D register preserves its data.

B: Cursor blink ON I OFF control bit When B= “High”, cursor blink is on ,which performs alternately between all the “High” data and display characters at the cursor position.

When B= “Low” ,blink is off.

5) Cursor or display shift

R S	R / W	D B 7	D B 6	D B 5	D B 4	DB3	DB2	DB1	D B 0
0	0	0	0	0	1	S/C	R/L	-	-

Shifting of right /left cursor position or display without writing or reading of display data .This instruction is used to correct or search display data.

During 2-line mode display ,cursor moves to the 2nd line after the 40th digit of the 1st line .Note that display shift is performed simultaneously in all the lines .When display data is shifted repeatedly ,each line is shifted individually.

When display shift is performed , the contents of the address counter are not changed .Shift patterns according to SIC and RIL bits

Table 11 : Shift patterns according to SIC and RIL bits

S I C	R I L	Operation
0	0	Shift cursor to the left ,AC is decreased by 1
0	1	Shift cursor to the right ,AC is increased by 1
1	0	Shift all the display to the left ,cursor moves according to the display
1	1	Shift all the display to the right ,cursor moves according to the display

6) Function set

R S	R / W	D B 7	D B 6	D B 5	DB4	D B 3	D B 2	DB1	D B 0
0	0	0	0	1	DL	N	F	-	-

DL : Interface data length control bit When DL = “High” ,it means 8-bit bus mode with MPU.

At the point once DL="Low", it implies 4-cycle transport style by MPU. Subsequently, DL is a sign to choose 8 bit or 4-digit transport mode. When 4-bit bus mode, it needs to transfer 4-bit data twice.

N : Display line number control bit
When N = “Low”, 1-line show method is set .When N=“High”, 2-line display mode is set.

F: Display line number control bit When F=“Low”, 5x8 dots format display mode is set .When F=“High”, 5x11 dots format display mode.

7) Set CGRAM address

R S	R / W	D B 7	D B 6	DB 5	DB4	DB3	DB2	DB1	DB0
0	0	0	1	AC 5	AC4	AC3	AC2	AC1	AC0

Set CGRAM address to AC. The instruction makes CGRAM data available from MPU.

8) Set DDRAM address

R S	R / W	D B 7	DB6	DB 5	DB4	DB3	DB2	DB1	DB0
0	0	1	AC6	AC 5	AC4	AC3	AC2	AC1	AC0

Set DDRAM address to AC .This instruction makes DDRAM data available form MPU.

When 1-line display mode (N=LOW), DDRAM address is from "00H" to "4FH". In 2-line display mode (N=High) , DDRAM speech in the first streak structure "00H" to "27H", and DDRAM speech in the second streak is after "40H" to "67H".

9) Read busy flag & speech

RS	R / W	DB7	DB6	DB 5	DB4	DB3	DB2	DB1	DB0
0	1	BF	AC6	AC 5	AC4	AC3	AC2	AC1	AC0

Upper 4bit Lower 4bit	LLLL	LLLH	LLHL	LLHH	LHLL	LHLH	LHHL	LHHH	HLLL	HLLH	HLHL	HLHH	HHLL	HHLH	HHHL	HHHH
LLLL	CG RAM (1)															
LLLH	(2)															
LLHL	(3)															

After CGRAM read activity, show move may not be executed accurately.

NOTE: if there should be an occurrence of RAM compose activity; AC is expanded/diminished by 1 as in read activity.

Right now, AC shows next address position, however just the past information can be perused by their advertisement guidance.

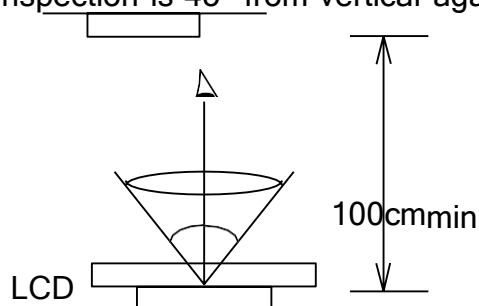
12. Standard character pattern

12.1 Lamps. Distance between LCM and fluorescent lamps should be 100 cm or more .Distance between LCM and inspect or eyes should be 30 cm or more.

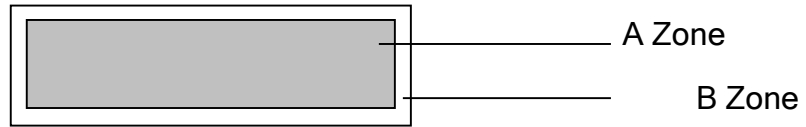
Viewing direction for inspection is 45° from vertical against LCM .Fluorescent

Lamps

LCM



Definition of zone:



A Zone: Active display area(minimum viewing area).

B Zone: Non-active display area (outside viewing area).

Specification of quality assurance

AQL inspection standard

Examining technique: MIL-STD-105E, Level II, single sampling Defect classification (Note:*is not including)

Table 12 : AQL inspection standard

Classify	Item		Note	AQL
Major	Display state	Short or open circuit	1	0.65
		LC leakage		
		Flickering		
		No display		
		Wrong viewing direction		
		Contrast defect(dim ,ghost)	2	
		Back-light	1,8	
	Non-display	Flat cable or pin reverse	10	
		Wrong or missing component	11	
Minor	Display	Back ground color deviation	2	1.0

Reliability of LCM
Reliability test
condition:

Table 13 : Reliability test condition

Item	Condition	Time(hrs)	Assessment
High temp .Storage	80°C	48	Abnormalities in functions and appearance
High temp .Operating	70°C	48	
Low temp .Storage	-30°C	48	
Low temp .Operating	-20°C	48	
Humidity	40°C/90%RH	48	
Temp .Cycle	0°C→25°C→50°C (30min→5min→30min)	10cycles	

Recovery time should be 24 hours least. Moreover, limits, execution and appearance will be liberated from striking rot inside 50,000 hours under common working and storage conditions room temperature(20+8°C),normal humidity(below 65%RH),and in the space not

presented to coordinate daylight.

Safety measure for utilizing LCD/LCM LCD/LCM is amassed and changed with a serious level of accuracy

.Try not to endeavor to make any adjustment or alteration .The followings ought to be noted. General Precautions:

1. LCD board is made of glass. Keep an essential separation from super mechanical stun or applying

Solid tension on to the outside of show region.

2. The polarizer utilized on the showcase surface is handily damaged a lot .Extreme consideration ought to be taken when managing. To clear buildup or earth off the showcase surface, wipe tenderly with cotton

,or on the other hand others of t material doused with isopropyl liquor ,ethyl liquor or tri chloro tri floro ethane ,don't utilize water ,ketone or aromatics and never scour hard.

3. Do not alter at all with the tabs on the metal edge.
4. Do not make any adjustment on the PCB without speaking with AMOTEC
5. When mounting a LCM, guarantee that the PCB isn't feeling the squeeze, for instance, twisting or turning. Elastomer contacts are incredibly delicate and missing pixels could result shapes light disengagement of any of the components.
6. Avoid pushing on the metal bezel ,other shrewd the elastomer connector could be distorted and lose contact ,bringing about missing pixels and furthermore cause rainbow on the showcase.
7. Be cautious not to contact or swallow fluid precious stone that may spill from a harmed cell .Any fluid gem holds fast to skin or garments ,wash it off promptly with cleanser and water.

Friction based electricity Precautions:

1. CMO-S LSI is used for the module circuit; as such heads should be grounded at whatever point he/she comes into contact with the module.
2. Do not touch any of the conductive parts, for example, the LSI cushions ; the copper lead child the PCB and the interface terminals with any pieces of the human body.
3. Do not touch the association terminals of the presentation with uncovered hand ;it will cause detachment or flawed protection of terminals.
4. The modules ought to be kept in enemy of static sacks or different holders impervious to static for capacity.
5. Only appropriately grounded binding irons ought to be utilized.
6. If an electrics team driver is utilized, it ought to be grounded and safeguarded to forestall sparkles.
7. Then or mal static anticipation measures ought to be noticed for work garments and work in g seats.
8. Since dry air is inductive to static, are lative humidity of 50-60% is recommended.

Soldering Precautions:

1. Soldering ought to be performed distinctly on the I/O terminals.
2. Use binding irons with appropriate establishing and no spillage.
3. Soldering temperature : $280^{\circ}\text{C}+10^{\circ}\text{C}$
4. Soldering time : 3 to 4 second.
5. Use eutectic bind with sap transition filling.
6. If transition is utilized ,the LCD surface ought to be ensured to try not to splash motion.
7. Flux buildup ought to be eliminated.

Activity Precautions:

1. The review point can be changed by shifting the LCD driving voltage V_o .
2. Since applied DC voltage causes electro-manufactured reactions, what separate the introduction, the applied heartbeat waveform should be a symmetric waveform so much that no DC part remains. Make sure to utilize the predefined working voltage.
3. Driving voltage ought to be kept inside indicated range ;abundance voltage will short end is play life.
4. Response time increments with decline in temperature.
5. Display tone might be influenced at temperatures over its operational reach.
6. Keep the temperature inside the predefined range use and capacity .Excessive temperature and mugginess could cause polarization debasement, polarizer strip off or create bubbles.
7. For long stretch storing in excess of 40 C is required, the general moistness should be kept underneath 60%, and keep away from direct daylight.

Restricted Warranty

AMOTEC LCDs and modules are not shopper items, but rather might be in corporate by AMOTEC's clients into client things or portions thereof, AMOTEC doesn't warrant that its LCDs and segments are good for any such specific reason.

1. The obligation of AMOTEC is restricted to fix or substitution on the footing set out beneath. AMOTEC won't be responsible for any sub sequent or critical occasions or injury or harm to any workforce or customer including outcast staff or possibly customer. But on the off chance that regardless agreed recorded as a hard copy among AMOTEC and the customer, AMOTEC will simply override or fix any of its LCD which is discovered imperfect electrically or outwardly when investigated as per AMOTEC general LCD examination

standard.(Copies accessible on demand)

2. No assurance can be permitted if any of the protections state in dealing with liquid valuable stone feature above has been disregarded. Broken glass, scratches on polarizer mechanical damages similarly as disfigurements that are caused sped up climate tests are avoided from guarantee.
3. In returning the LCD/LCM, they should be appropriately bundled ;there ought to be point by point depiction of the disappointments or imperfection.

Motor

Motor 1 Specification – 12V DC Motor

Features

- ◆ 12 V-200 RPM-
- ◆ 3.6 KG CM torque DC gear head motor
- ◆ 30:1 Gear Ratio
- ◆ 2 mm rear encoder shaft
- ◆ Good compromise between speed and torque for small robotic designs.

1.1 Description

Motor 1 is a 12 V DC geared motor with a .25" engine yield shaft and a 2mm back

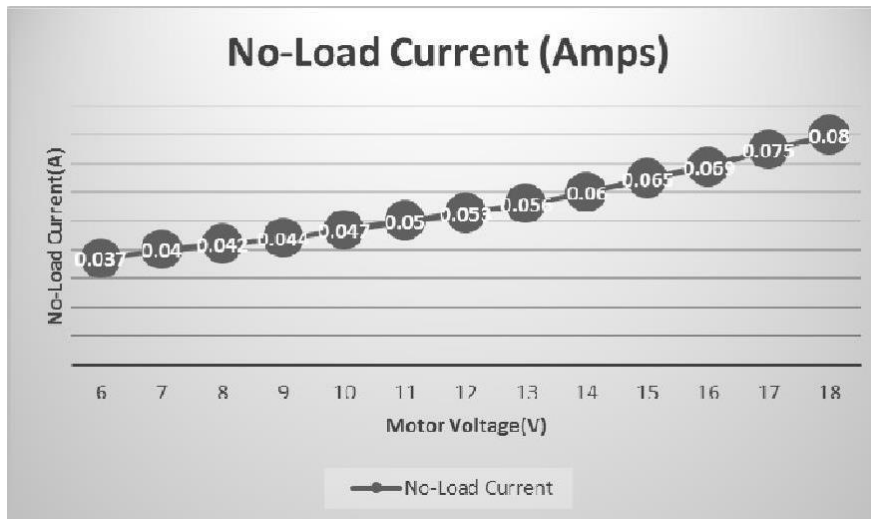
encoder shaft. The 2mm shaft works with our ENC300 quadrature encoder to permit the engine to be utilized in position control applications. Engine regulators that are evaluated for 12V@2A are ideal for controlling this motor. None the less, engine regulators with lower current evaluations can likewise be utilized on the off chance that they have over-current and over-temperature assurance.

Motor 1 Specifications

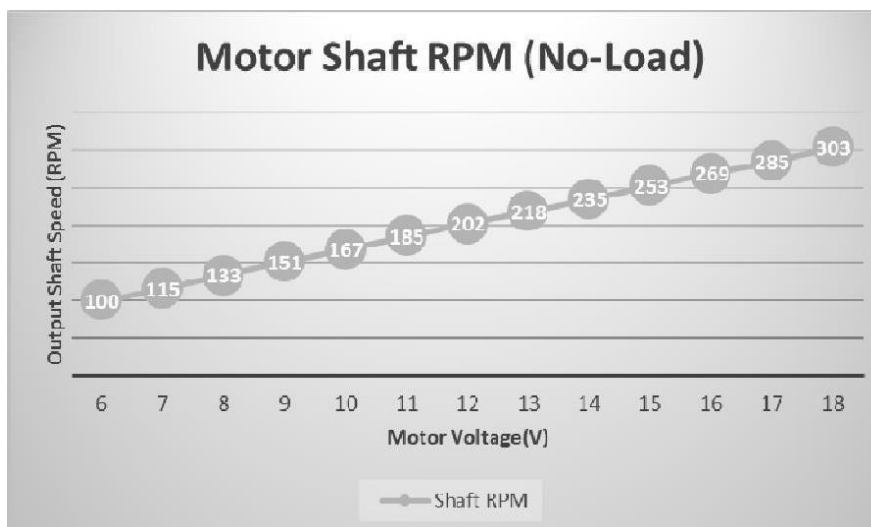
2.1 DC Gear head Motor Characteristics

Characteristic	Value	Unit
Operating voltage	4.5 -18	V
Start up torque(kilogram-force centimeter)	3.6	KGCM
Start up torque(inch-pound)	3.1	In chlbf
Gear ratio	30 :1	

No-Load Current(12V)	0.0 53	A
Stall Current	1.5	A
No-Load Speed(12V)	200	RPM



Motor1 Documentation



Mechanics

Notes on mounting hardware: The motor has 4 mounting openings all finished (checked 1-4 in the picture above). They are hung for m3 x .05 evaluation machine screws. We have used 8mm long screws effectively to mount the motor to a 1/8" thick L-zone. Regardless, mounting opening 4 is in closeness to within engine mechanics, and it is suggested that you take the necessary steps not to utilize it.

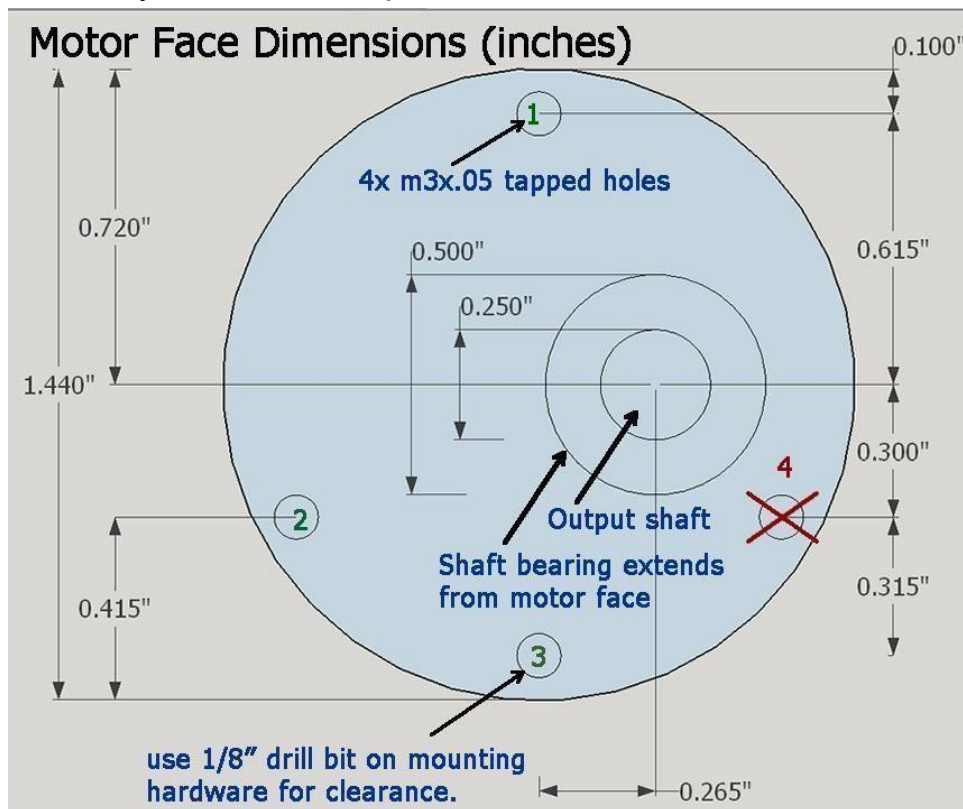


Figure 16 : Motor Face Dimensions

Notes on mounting hardware: The motor has 4 mounting openings all finished (checked 1-4 in the picture above). They are hung for m3 x .05 evaluation machine screws. We have used 8mm long screws effectively to mount the motor to a 1/8" thick L-zone. Regardless, mounting opening 4 is in closeness to within engine mechanics, and it is suggested that you take the necessary steps not to utilize it.

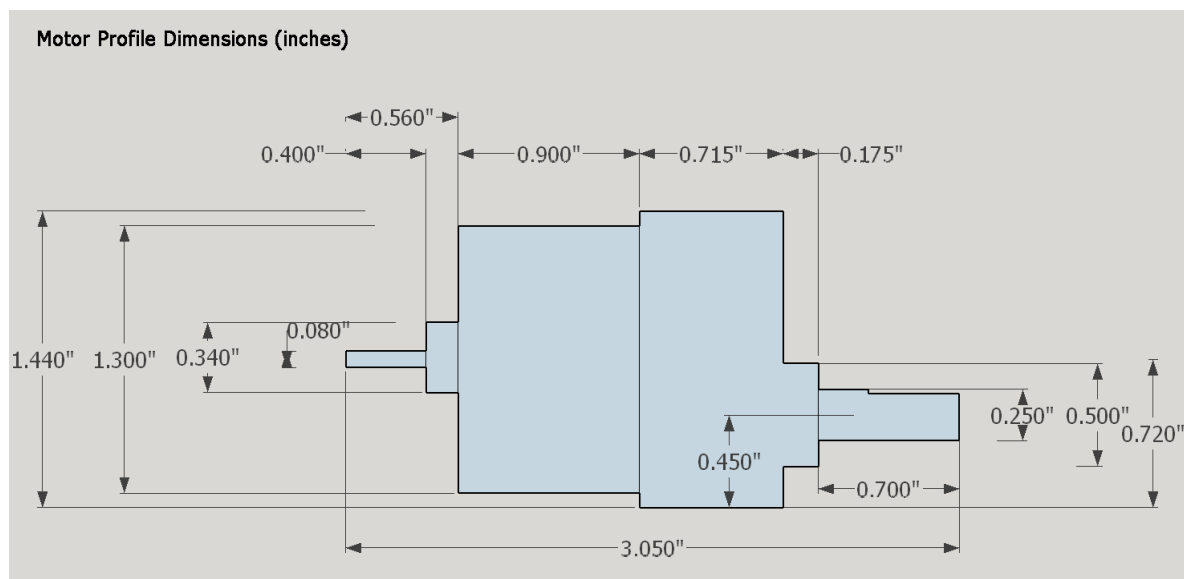


Figure 17 : Motor Profile Dimensions

Disclaimer of Liability and Accuracy: Info given by Solutions Cubed is recognized to be exact and solid. Notwithstanding, Answers Diced recognizes no duty regarding bungles or prohibitions. Game plans Diced assumes no obligation in regards to the usage of this in the future together with use of such info will be by and large at the customer's individual danger.

D Life Provision Rule: Answers Diced doesn't certify slightly Solutions Diced thing for use in life provision plans just as structures deprived of express formed underwriting after Answers Diced.

Warranty: Answers Diced permits everything in contradiction of defects in resources and workmanship aimed at a retro of 90 existences. On the off chance that you find a blemish, we will, at our choice, fix or supplant your thing or rebate your purchase cost. This warranty doesn't cover things that have been really misused or mishandled in at any rate.

V. RESULT AND DISCUSSION

Control DC Motors with L293D Motor Driver IC & Arduino

If you are expecting gathering your new robot friend, you will in the end need to get some answers concerning controlling DC motors. One of the most un-requesting and in costly manner to control DC motors is to interface L293D Motor Driver IC with Arduino.

It can handle together has tether turning bearing of 2 DC engines.

Furthermore, as a little extra, it contains smooth switch a uni polar high stepper motorized like 28BYJ-48 or Bipolar high stepper engine like NEMA17.

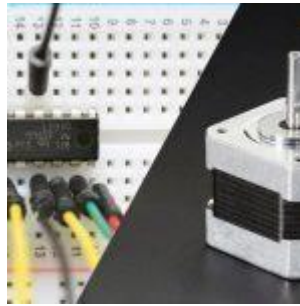


Figure 18 : Control Stepper Motor with L293D Motor Driver IC & Arduino

Control Stepper Motor with L293D Motor Driver IC & Arduino

One of the most straight forward and economical approach to switch high stepper engines is to border L293D Motorized Motorist IC with Arduino .It can switch together haste...

Supervisory a DC Motor

To consume an unlimited oversight ended DC engine, we need to switch its haste then revolutionway .This container remain attained by combination these deuce methods.

PWM-Aimed at regulatory haste

H-Bridge-Aimed at regulatory hinge manner

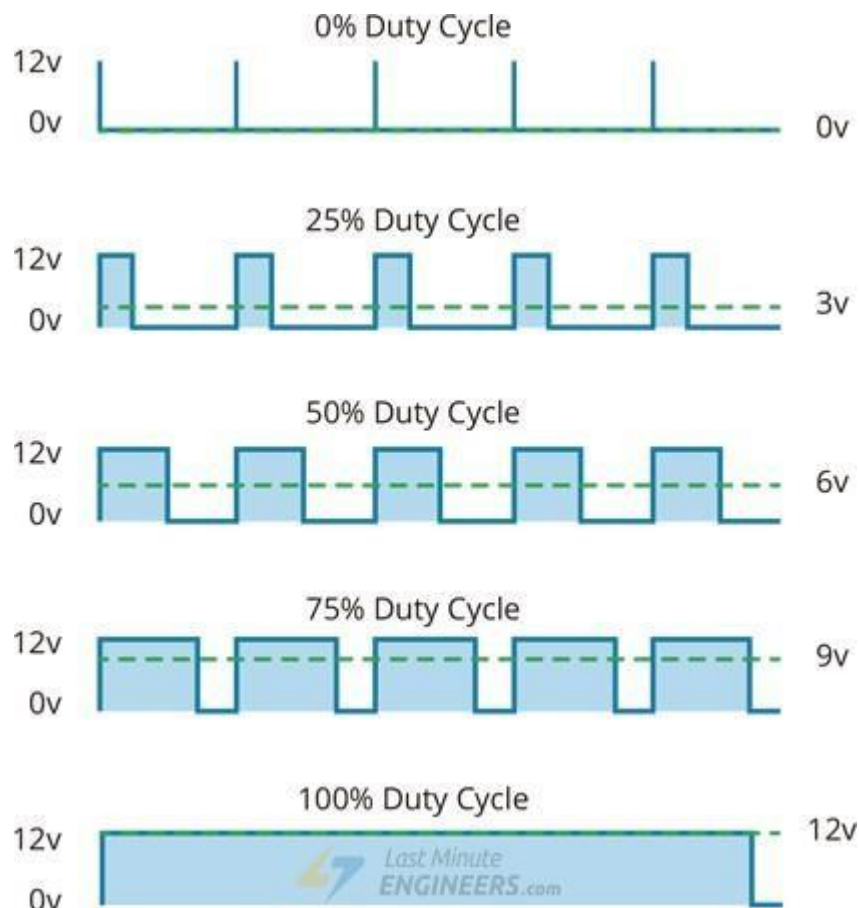
PWM-Aimed at regulatory speed

The flurry of a DC mechanized can remain constrained by fluctuating its information power. A common place strategy for duty is to use PWM (Pulse Width Modulation) PWM is a method where the normal estimation of the info voltage is changed by sending a progression of ON-OFF beats.

The commonplace voltage is similar with the expansiveness of the beats perceived as Responsibility Series.

The higher the commitment cycle, the more noticeable the ordinary voltage is applied to the dc motor (High Speed), and the lower the duty cycle, the less the run of the mill voltage being applied to the dc motor (Low Speed).

Underneath copy ex amplifies PWM method by numerous obligation series then regular powers.



Pulse Width

Modulation(PWM)Technique

H-Bridge-Aimed at regulatory pivot bearing

The DC engine's turning bearing container remains constrained by altering extremity of its information power. A typical procedure aimed at responsibility this is to utilize a H-Bridge.

An H-Bridge circuit contains four switches with the motor at the center forming an H-like plan.

Final two specific changes at the similar period contraries the divergence of the power practical to the engine. This reason alters in turning course of the engine.

Underneath movement shows H-Bridge tour employed.

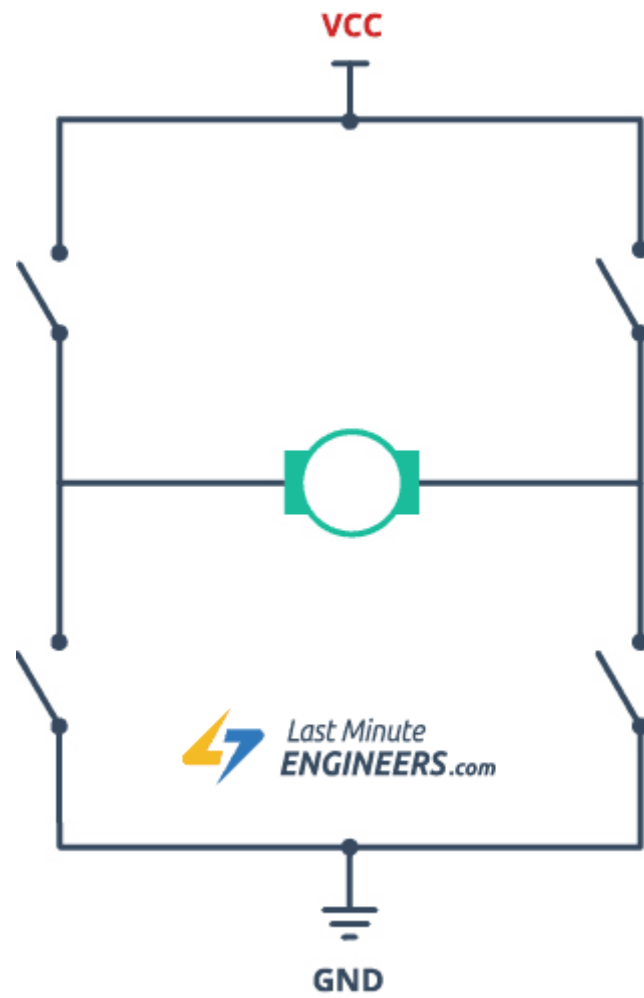


Figure 19 : Working of H-Bridge

L293D Motor Driver IC

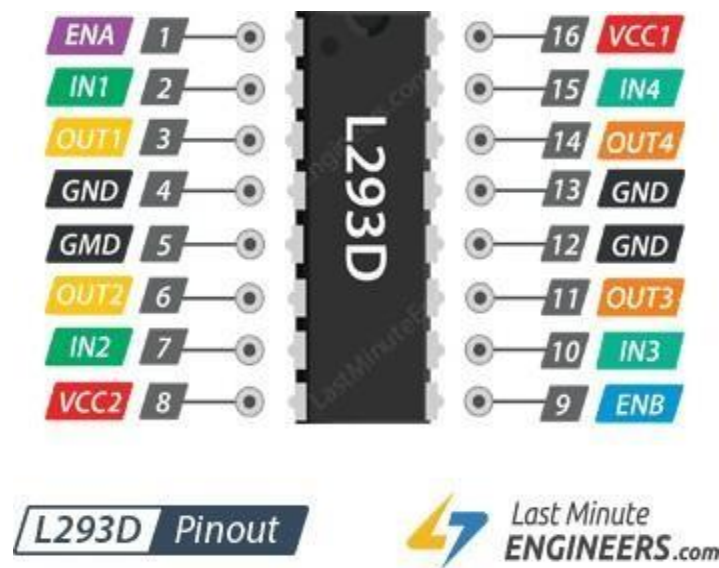


Figure 20 : L293D Motor Driver IC

The L293D is a dual station H-Bridge train motor is appropriate for heavy a twosome of DC trains or one stage for each engine.

That implies it can exclusively energy awake to 2 engines creation it perfect for structure two-wheel automaton stages.

5.3.1PowerSupply

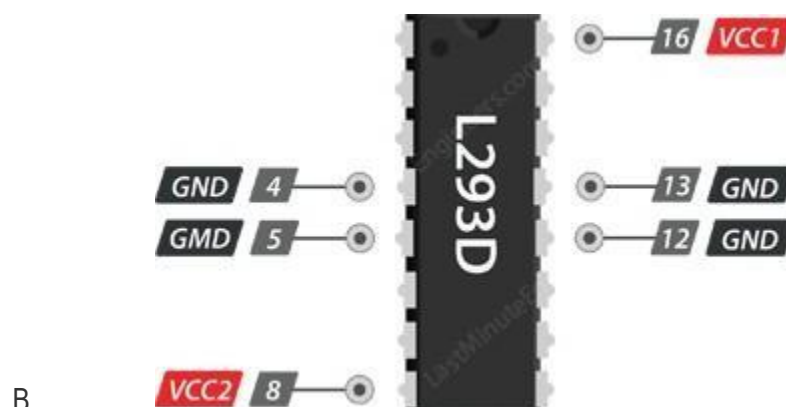


Figure 21 : Power Supply

The L293D motor driver IC actually has two power input pins viz. 'Vcc1' and 'Vcc2'.

Vcc1 is used for driving the internal logic circuitry which should be 5V.

From **Vcc2** pin the H-Bridge becomes its force for heavy the engines which container be 4.5V to 36V. Also, the two of them sink to a shared belief named GND.

Output Terminals

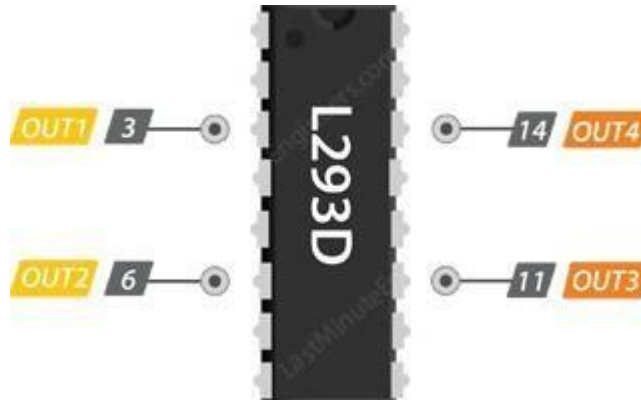


Figure 22 : Output Terminals

The L293D motor driver's output channels for the motor A and B are brought out to pins **OUT1,OUT2** and **OUT3,OUT4** respectively.

You can connect two DC motors having voltages between 4.5 to 36 V to these terminals.

A piece station happening the IC can convey awake toward 600mA near the DC engine. In any case, the measure of current provided to the engine relies upon framework's force supply.

Control Pins

Aimed at every one of the L293D's stations, here are 2 sorts of switch jots which let us to switch haste then rotating way of the DC engines on the similar period viz .Direction switch jots & Haste switch jots.

Way Switch Jots

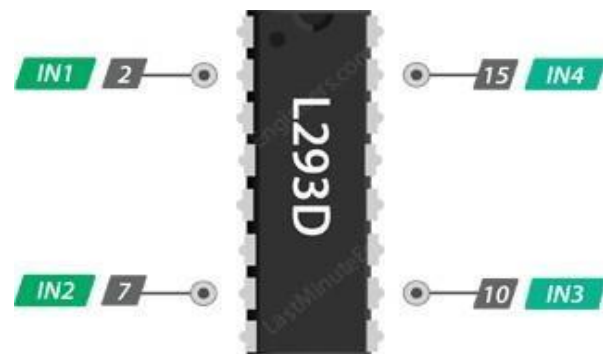


Figure 23 : Way Switch Jots

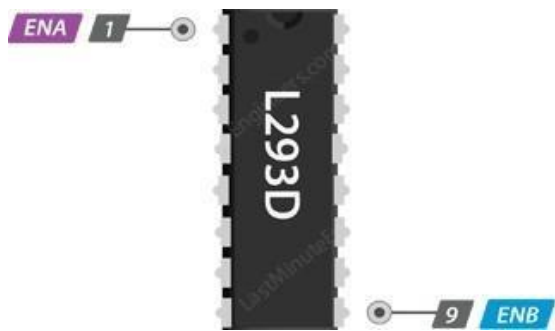
Utilizing the course switch jots, we container handle whether the engine rotations onward or in reverse. These jots really switch the changes of the H-Bridge circuit insideL293DIC.

The IC consumes binary heading switch jots aimed at a piece station. The IN1,IN2 pins control the spinning direction of the motor A while IN3,IN4 control motor B.

The rotating way of a motorized can be controlled by applying either a logic HIGH (5Volts) or logic LOW (Ground) to these pins .The below chart illustrate show this is done.

IN1	IN2	Spinning Direction
Low(0)	Low(0)	Motor OFF
High(1)	Low(0)	Forward
Low(0)	High(1)	Backward
High(1)	High(1)	Motor OFF

Speed Control Pins



The speed control pins viz .**ENA** and **ENB** are rummage-sale to go ON, OFF then control speed of motorized A then motor-powered B correspondingly.

Pull these jots HIGH determination brand the engines turn, pulling it LOW will make them top. Yet, by Pulse Breadth Inflection (PWM), we container really control the speed of the engines.

Cabling L293D motorized motorist IC by Arduino UNO

Since we have a deep understanding of the IC, we can start connecting it to our Arduino!

Start by interfacing power supply to the engines. In our trial we are utilizing DC Gearbox Motors(also known as 'TT' engines) that are normally found in two- wheel-drive robots. They are evaluated for 3 to 9V. In this way, we will interface outer 9V force supply to the Vcc2 pin.

Then, we need to supply 5 Volts for the L293D's rationale hardware. Associate Vcc1 pin to 5V output to Arduino .Make sure you regular every one of the grounds in the circuit.

Presently, the information and empower pins(ENA, IN1, IN2, IN3, IN4 and ENB) of the L293D IC are associated with six Arduino computerized yield pins(9, 8, 7, 5, 4 and 3). Note that the Arduino output pins 9 and 3 are both PWM-empowered.

At long last, associate one engine to across OUT1 and OUT2 and the other engine across OUT3 & OUT4. You can exchange your engine's associations, in fact, there is no right or wrong way.

At the point once you're set you ought to consume some what that seems to be like the representation appeared underneath.

IR SENSOR:

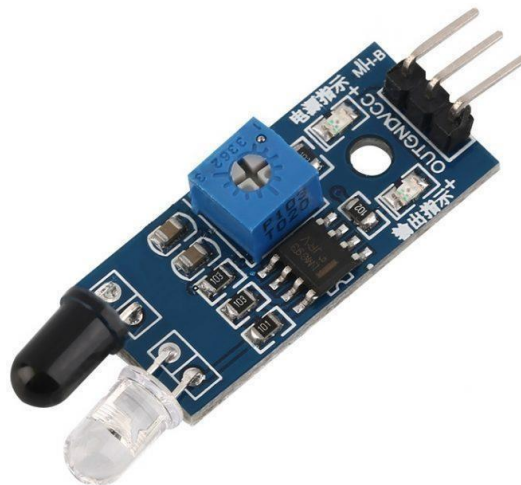


Figure 25 : IR Sensor

IR identifiers are little CPUs by a photoelectric cell that stay changed in accordance with look at bright splendid. They are regularly scavenge deal for regulator zone - each TV and DVD entertainer burns-through one of these in the front to tune in for the IR signal after the clicker.

Secret their spot switch is coordinating with IR LED, which sends IR heartbeats to urge the TV to turn on, off, or change channels. IR light isn't obvious to the typical eye, which proposes it takes genuinely more work to test an arrangement.

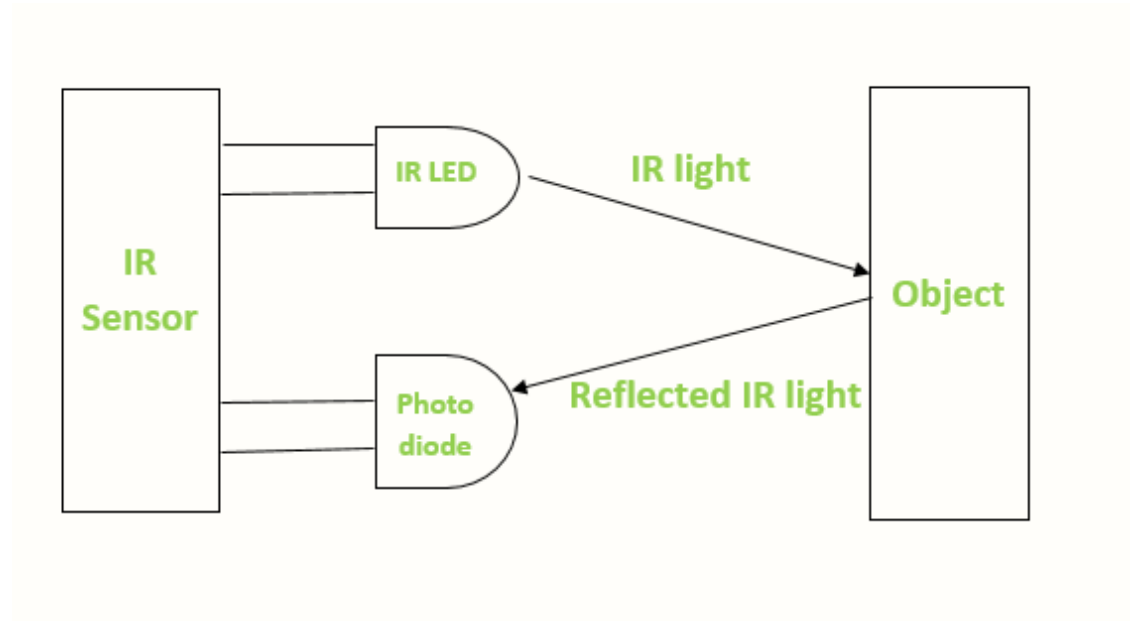
IR pointers remain exceptionally analyzed focused on Ultraviolet splendid; they are shrewd at knowing clear light. Once in the past finished, photo cells are worthy at recognizing yellow/green obvious light, terrible at IR light

IR identifiers have a demodulator inside that search for tweaked IR at 38 KHz.

Simply sparkling an IR LED won't stay distinguished, it need be PWM peering at 38KHz. Photocells don't have such a demodulator and can identify any recurrence (counting DC) inside the answer scurry of the photoelectric cell (which is about 1KHz)

- ☐ IR locators are computerized out-it is possible that they detect 38 KHz IR signal and output low (0V) or they don't identify slightly and yield high (5V). Photoelectric cell per for like devices, the obstruction variations relying upon in what way

abundant bright they are presented to



□ IR communication protocol

Each signal represents a specific code. Electric signals can be converted back to the actual data /code that sender has sent. When you press a button on your TV remote control, it creates a signal relating to the catch code (for example On/Off, Volume Up, and so forth) and sends it for a beneficiary (for this situation your TV). Both sender and recipient concur on a bunch of codes so the collector realizes what to do dependent on each code. The manner in which a code ought to be modulated (modeled) as a signal is characterized in various norms and every sensor maker typically attempts to deliver a

item viable with them so it very well may be utilized in various gadgets. Perhaps the most realized standard conventions is from

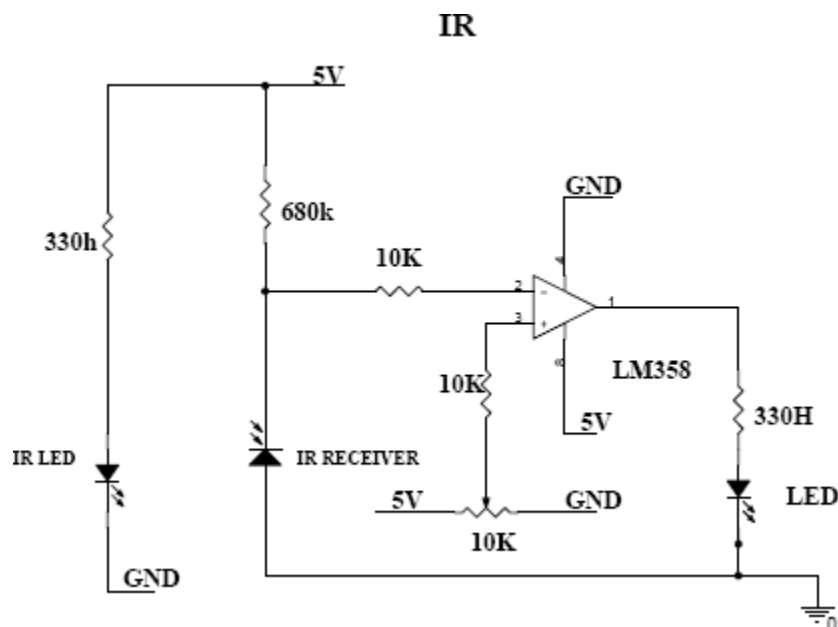


Figure 26 : IR Transmitter

Infrared transmitter is one kind of LED which emanates infrared columns commonly called as IR Transmitter. Essentially IR Receiver is utilized to get the IR emanates sent by the IR transmitter. One enormous point is both IR transmitter and beneficiary ought to be determined to the correct track line to one another.

The presented signal is offered to the IR transmitter whenever the clue is high, the IR transmitter LED is guiding it passes the IR sections to the beneficiary. The IR recipient is associated with a comparator. The comparator is worked with LM 358 operational intensifier. In the comparator circuit, the reference voltage is agreed to adjusting contribution deadly. The non-input incurable is related IR gatherer. When interrupt the IR radiates between the IR sender and authority, the IR beneficiary isn't driving. So the comparator non switching contribution fatal power is advanced by then disturbing data. As of now the comparator yield is in the extent of +5V. This power is assumed to microcontroller or PC and drove so drove determination sparkle.

Right once IR spreader permits the shafts to recipient, the IR gatherer is coordinating a direct result of that non-disturbing data voltage is lower than changing info. By and by the comparator yield is GND consequently the yield is assumed to microcontroller or PC. This tour is for the most part used to for checking application, interloper identifier and so on

Interfacing ISD1820 Voice Recorder Module with Arduino

In this project ,I will show you how to Interfacing ISD1820 Voice Recorder Module with Arduino .Although the ISD1820 Voice Recorder Module board has button that can used to directly record and playback, in this project, I will be using Arduino to control those actions so that you can implement this voice recorder application is a more sensible project.

Voice Recorder is a device that captures speech (or audio) in various situations like meetings ,lectures ,interviews ,conferences ,broadcasts etc .so that you can easily editor play them back.

There are different types of hardware and software dedicated to voice recording that provides several customization options.

In this project, I will talk about one of the most commonly used Voice Recorder Modules in the electronics hobby is t community, the ISD1820 Voice Module and show you how to control it with the help of Arduino.

A Brief Note on ISD1820 Voice Recorder Module

The ISD1820 Voice Recorder Module is based on the ISD1820 IC, which is a single chip Voice recorder IC for single message record and playback. I am not sure about the availability of only the IC but it is frequently found in the module with all the necessary components and circuitry.

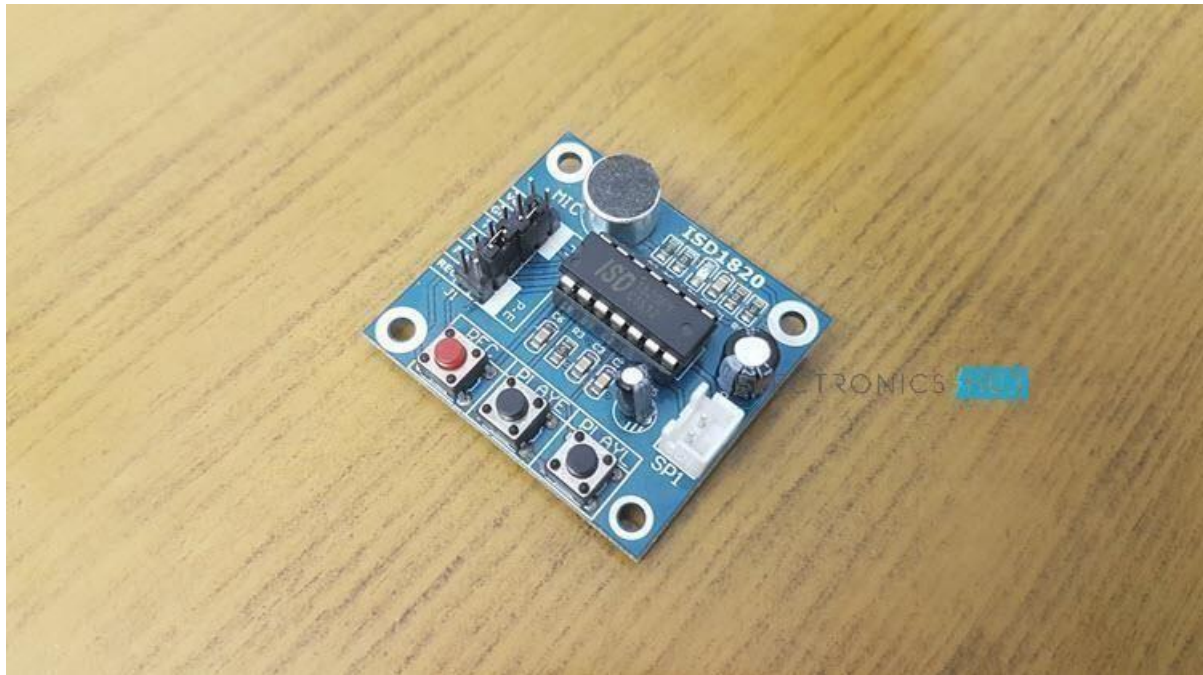


Figure 27 : ISD1820 IC

A major feature of the ISD1820 Voice Recorder Module is that it contains stock the posts in its non-unpredictable recollection and contains remain designed to stock mails of distance amid 8 Seconds to 20 Seconds.

The ISD 1820 Voice Recorder Module utilized in this undertaking is shown underneath. As should be obvious, here are a great deal of parts on the panel that assist the ISD 1820 IC in footage and replay.

Additional primary element of this unit is that it has inward sound enhancer that can energy a 0.5W 8 ω Utterer straightforwardly deprived of the requirement for slightly outside intensifier circuit. Be that as it may, in the event that you need to drive all the more impressive utterers, you can associate the yield of this unit to an outer enhancer IC similar LM386, for instance.

The accompanying pictures show not many of the significant segments on the

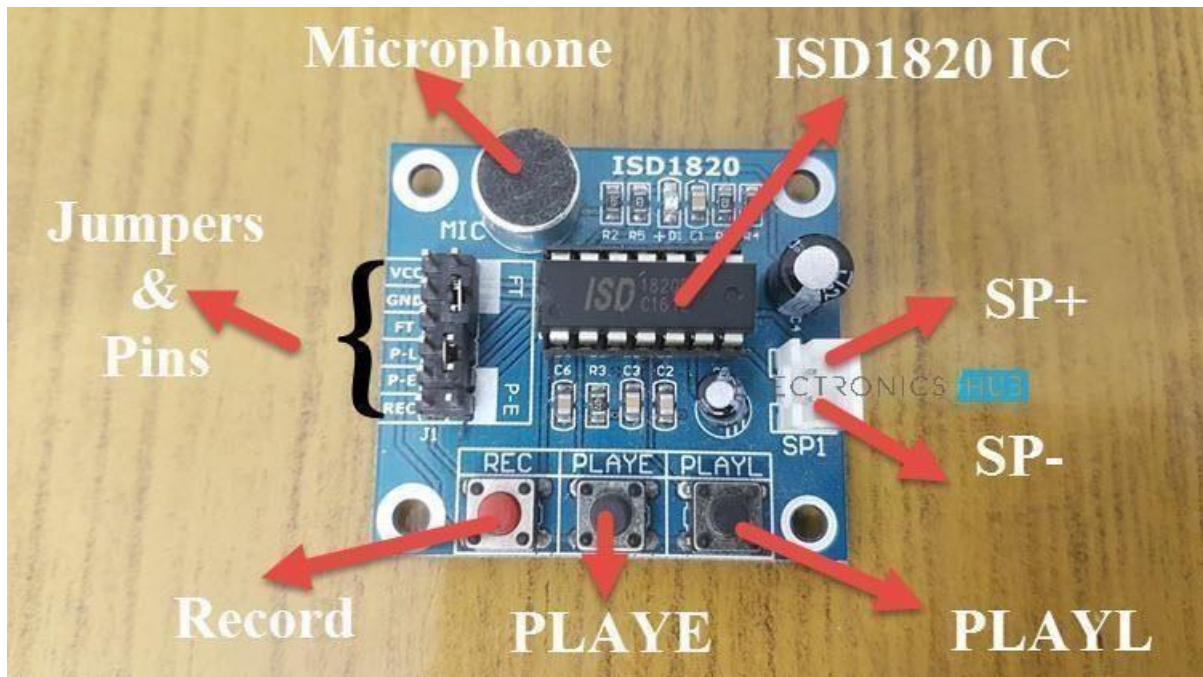


Figure 28 : ISD1820 components

In what way to Function ISD1820 Speech Tape-to- tape Component?

- Link minimal 8 ω Talker at the yield of the Unit across SP + and SP-pins.
- Drive the best key (REC) on the unit and the unit twitches footage. Last squeezing the catch pending you best the whole communication (about 10 Seconds, for model).
- In solicitation to play back, you container usage also PLAYE or PLAYL. Press the PLAYE key unique period then the whole communication is frolicked spinal.
- You essential to press and grip the PLAYL key and the communication twitches live and doubt you need toward halt the production spinal at whatever point, announcement the catch.
- If you institute the PE Hurdler, the play back is in boundless circle style.

Interfacing ISD1820 Speech Tape-to-tape Unit with Arduino

It is strong that the ISD1820 Speech Tape-to-tape Unit can work self-rulingly with no micro controller. In any case, regulatory the best and production back bone work with the assistance of a microcontroller similar Arduino for instance, offers you an chance to develop the value of the unit to multifaceted request equal.

Envisage a state anywhere you remain arranging a safety scheme which must normally best the unending inventory of a turn of events. This would remain likely simply if you Border ISD1820 Speech Plotter Unit by Arduino (or any microcontroller).

Circuit Diagram

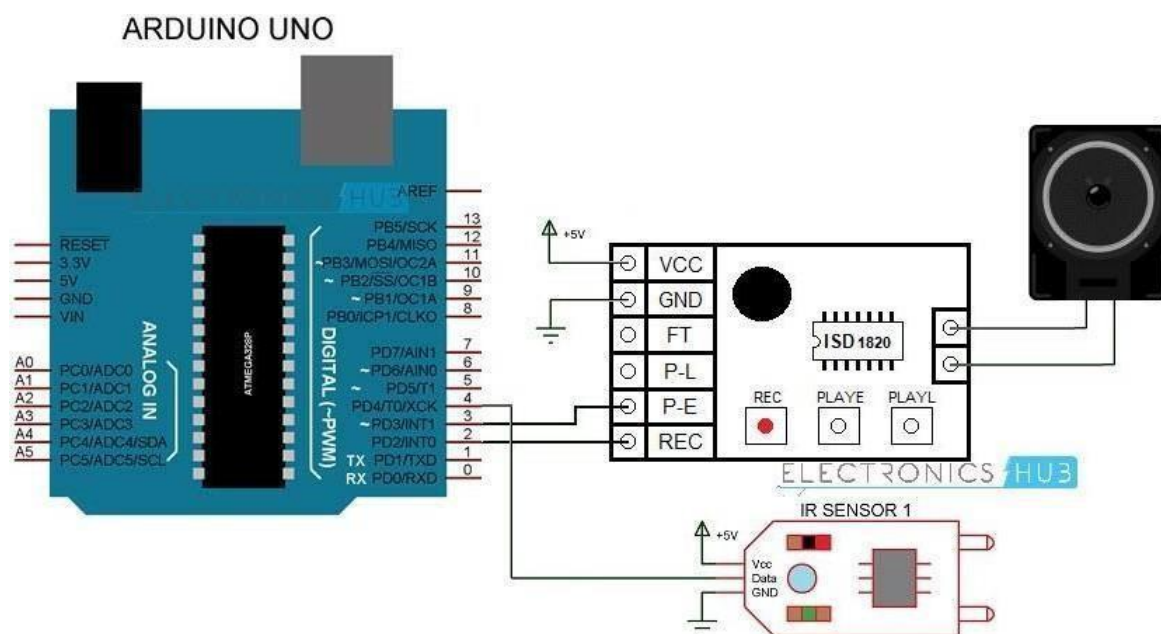


Figure 29 : Circuit Diagram

Working

Make the associations according to the circuit outline and give capacity to the tour. Once here is not at all thing in obverse of the IR Device, its production is LOW then Arduino sits idle.

Once here is an article before the IR Sensor, its yield becomes HIGH and Arduino

then starts recording a message by making the RECP in HIGH for about 5 Seconds.

During this time, the LED connected to Pin 13 is lit up to show that the unit is footage a communication.

Subsequent to footage the communication, the communication is occupy yourself spinal by creation the PLAYE pin HIGH for about 6 Seconds.

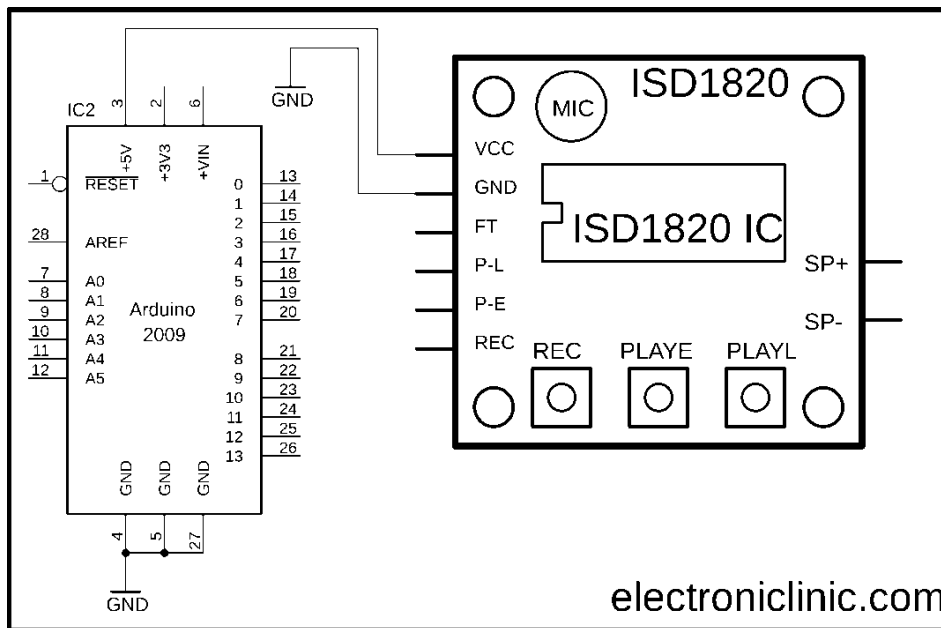


Figure 30 : ISD1820 IC

5.8.1 Applications

Can be utilized in different limited scope requests like

- Safety Schemes
- Chance speech accounts
- Best communication throughout crashes

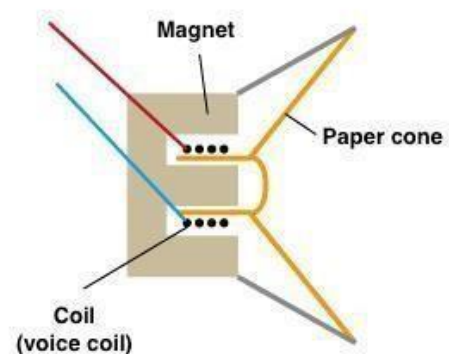
Seeing How Speakers Work

This time, we'll be managing speakers. Be that as it may, electronically talking, what precisely is a speaker? Everybody has an overall sense that power courses through them, causing vibrations that lead to the sound age, however how about we look in to the cycle of sound creation in more detail.

Sorts of Speakers

With regards to ordering speakers, there are numerous sorts of shapes. Yet, in regards to how electric signs are handled, they can be delegated: dynamic, condenser, piezoelectric, discharge (ion), attractive, and lace.

On figure 2, you can see the overall component of a unique speaker. In the two cases, by providing a current as per a sign of the sound to be yield, the speaker causes vibrations noticeable all around, and produces sound.



As the current (audio signal) flows, the coil takes on magnetic properties, repels the magnet, and causes vibrations

Figure 31 : Dynamic speaker mechanism

Difference Between Speaker and Microphone

We'll be working with speakers this time. However, we should make a stride back first and think about how as an amplifier functions. Generally talking, a mic is a sort of speaker. A speaker changes flow over to vibrations noticeable all around, and a

mic takes vibrations in the air and converts them into current for use as an audio signal.

Let's try an test. The speaker that we'll be utilizing this time takes an electric flow to energize the piezoelectric components and cause a metal plate to vibrate along these lines delivering sound. In any case, with a LED associated with the speaker, take a stab at bowing the speaker. Coincidentally, speakers don't have a positive/negative bearing.

benefits

- System is straightforward, monetary and smaller.
- It is exceptionally helpful for crippled individuals, patients and so on Minimal effort, less upkeep, and less force is utilized.
- No need to climb spans over cross the stages.
- Prevents individuals from utilizing the tracks for intersection. Life hack for individuals

VI. EXPERIMENTAL RESULTS

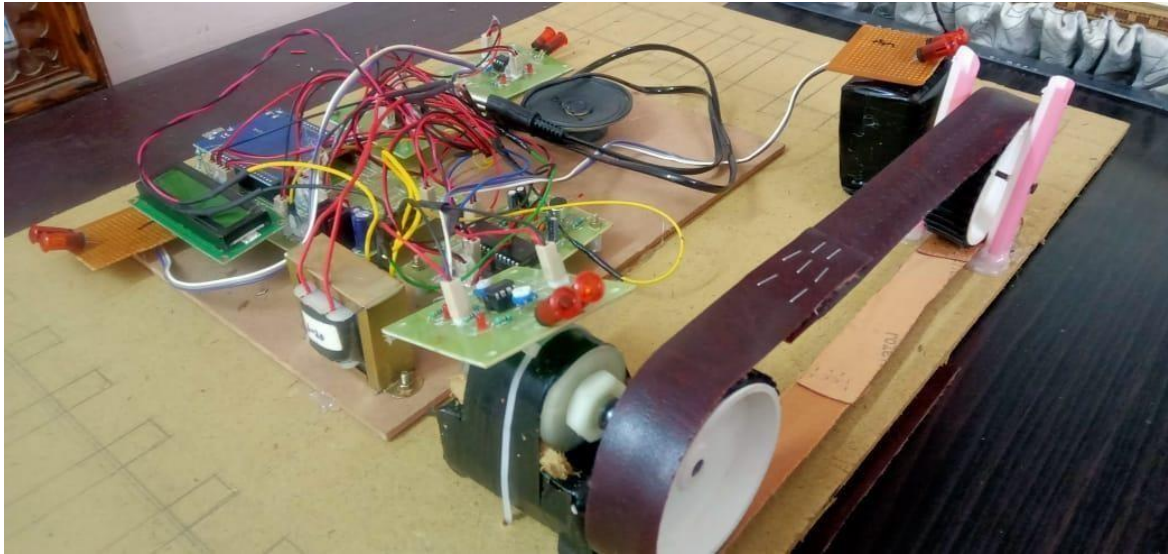


Figure 32 : Final Model

VII. SUMMARY & CONCLUSION

Summary

The modified Mobile Platform is a splendid office to the genuinely moved individuals to cross the stages without using the foot-over spans. The thought process of this model was to assist the actually disabled and matured people with intersection the rail route stage in a less monotonous way. Along these lines, the train is detected ceaselessly, which naturally close/open the versatile stage which empowers the travelers to cross the stages keeping them from utilizing foot over spans. The task will save the human just as electrical energy since it will be a substitute to lifts and foot-over spans. This task likewise limits the degree of mishaps brought about by rail line track intersections. Individuals who have fractures, leg cramps, and so on they can cross the stage effectively just as it is additionally useful for the senior residents who have issue for intersection the stage by utilizing the foot-over connect.

Conclusion

Later on, the force supply used to control the Arduino can be supplanted by a battery charged by methods for Solar cells. The appearance/takeoff of the trains should likewise be possible by methods for Fuzzy Logic. CCTV frameworks can likewise be consolidated for methods for security for the two travelers and rails. LCD can be interfaced with the Arduino to show the appearance/takeoff of trains from the stage.

The changed Mobile Platform is a mind blowing office to the genuinely incited people to cross the stages without utilizing the foot-over ranges. The expectation of this model was to help the really debilitated and developed individuals with convergence the rail line stage in a less bleak way. Consequently, the train is recognized tenaciously, which normally close/open the adaptable stage which engages the explorers to cross the stages holding them back from using foot over spans. The endeavor will save the human similarly as electrical energy since it will be a substitute to lifts and foot-over ranges. This endeavor furthermore restricts the level of setbacks achieved by rail line track convergences. People who have fractures, leg cramps, etc they can cross the stage viably similarly as it is also helpful for the senior inhabitants who have issue for convergence the stage by using the foot-overassociate.

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