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Introduction

UNIVERSAL BOARD HAS ON BOARD

- DISPLAY (**LCD(16X2) , LED, & 7-SEG**, **GLCD 128X64**) SECTION
- INPUT SWITCHES (**PUSH BUTTON & DIP SWITCH**) SECTION
- HEXKEYPAD SECTION
- ADC SECTION
- DAC SECTION
- RTC & EEPROM SECTION
- RELAY SECTION
- BUZZER SECTION
- STEPPER MOTOR
- DC MOTOR

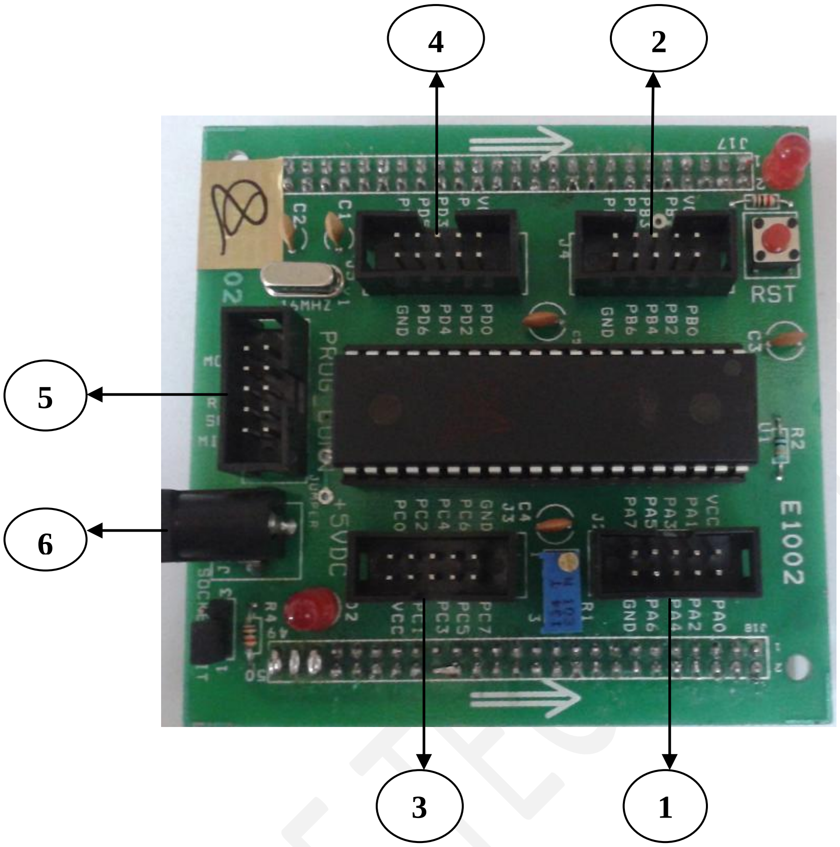
PERIPHERALS

S NO.	PART NO.	SPECIFICATIONS
1	ADC0809CCN	8-BIT 8-CHANNEL, 100µs.
2	DS1307	64X8, SERIAL I^2C Real Time Clock.
3	24C04	4K serial EEPROM.
4	LCD	16 X 2 Character LCD, GLCD 128X64
5	BUZZER	5V
6	RELAY	5A/250V AC
7	MCT2E	Optocoupler
8	DAC 0808	8-BIT ,150 ns
9	L293D	Motor Driver

POWER SUPPLY REQUIREMENTS

Voltage Rating	Current Rating
+/- 12V	1A

VIEW OF AVR ATMEGA16 DAUGHTER CARD



FOUR PORTS

1 → PORT A :- PA0 - PA7

2 → PORT B :- PB0 - PB7

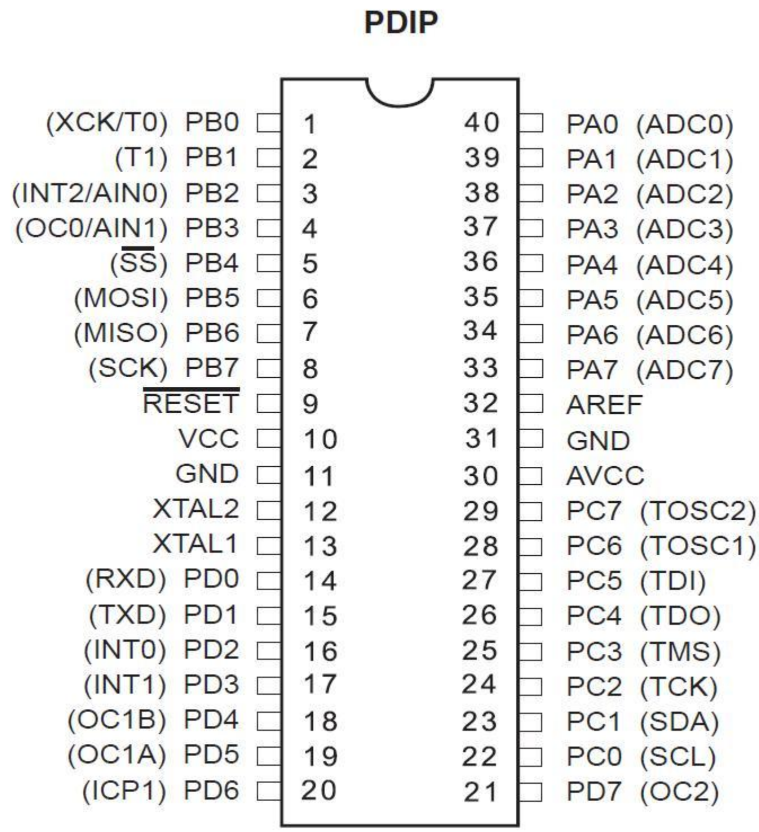
3 → PORT C :- PC0 – PC7

4 → PORT D :- PD0 – PD7

5 → Programming connector

6 → Power Supply

PIN DESCRIPTION OF AVR ATMEGA 8515



FEATURES OF AVR ATMEGA 16

High-performance, Low-power AVR 8-bit Microcontroller

Advanced RISC Architecture
- 131 Powerful Instructions - Most Single Clock Cycle Execution
- 32 x 8 General Purpose Working Registers
- Up to 6 MIPS Throughput at 16MHz
- Fully Static Operation
- On-chip 2-cycle Multiplier

Nonvolatile Program and Data Memories
- 16k Bytes of In-System Self-Programmable Flash
- Optional Boot Code Section with Independent Lock Bits
- 512K Bytes EEPROM
- Programming Lock for Software Security

JTAG (IEEE std. 1149.1 Compliant) Interface
- Boundary-scan Capabilities According to the JTAG Standard
- Extensive On-chip Debug Support
- Programming of Flash, EEPROM, Fuses, and Lock Bits through the JAGS Interface

Peripheral Features
- On-chip Analog Comparator
- Programmable Watchdog Timer with Seperate On-chip Oscillator
- Master/Slave SPI Serial Interface
- Two 8-bit Timer/Counters with Separate Prescalar, Compare
- One 16-bit TImer/Counter with Seperate Prescaler, Compare and Capture mode
- Real TIme Counter with Seperate Oscillator
- Four PWM Channels
- 8-channel, 10-bit ADC
- Byte-oriented Two-wire Serial Interface
- Programmable Serial USART

Special Mircocontroller Features
- Power-on Reset and Programmable Brown-out Detection
- Internal Calibrated RC Oscillator
- External and Internal Interrupt Sources
- Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby, and Extended Standby

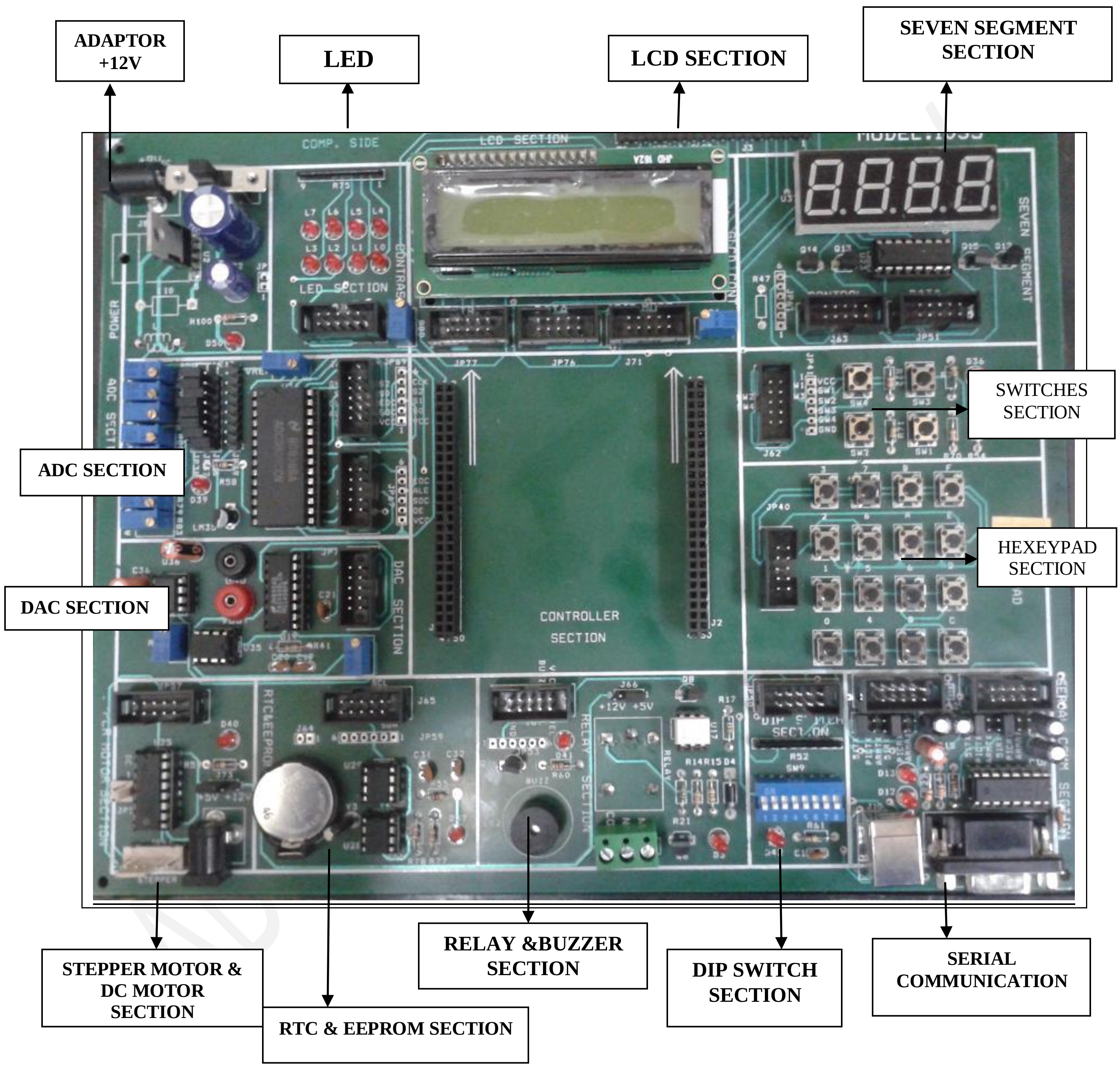
I/O and Packages
- 32 Programmable I/O Lines
- 40-pin PDIP, 44-lead TQFP, and 44-pad MLF

Operating Voltages
- 4.5-5.5V for ATmega16

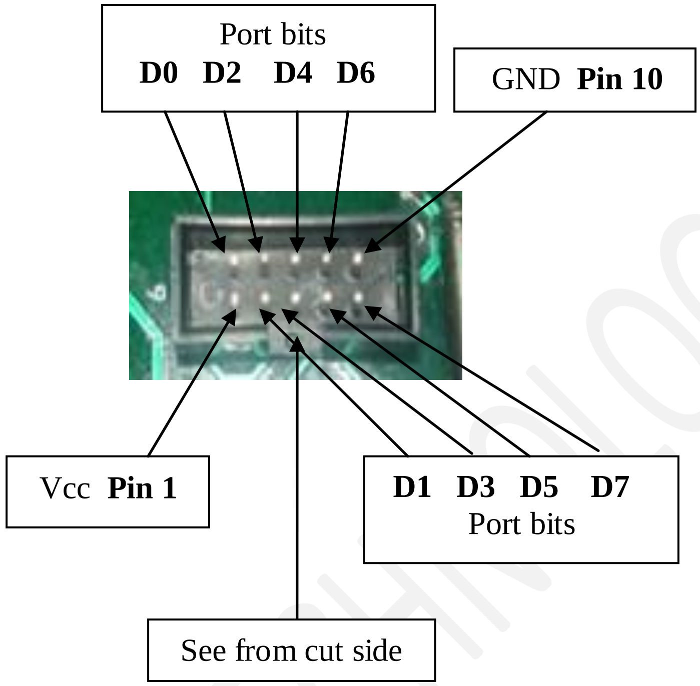
Speed Grades
- 0-16 MHz for ATmega16

Power Consumption at 4 Mhz, 3V, 35 °C
- Active: 1.1mA
- Idle Mode: 0.35mA
- Power-down Mode: < 1µA

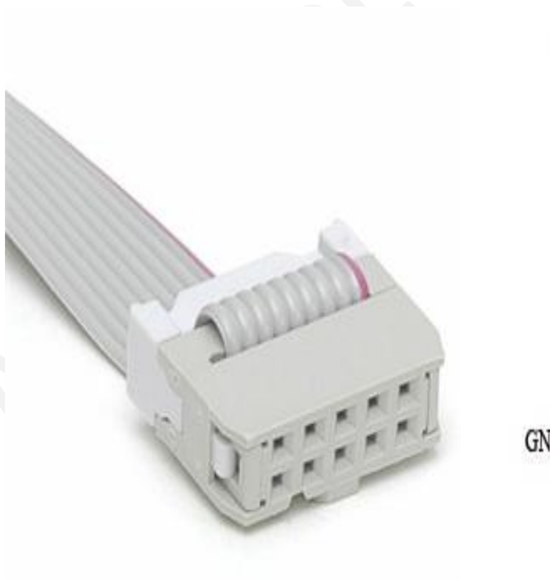
View of Universal Board

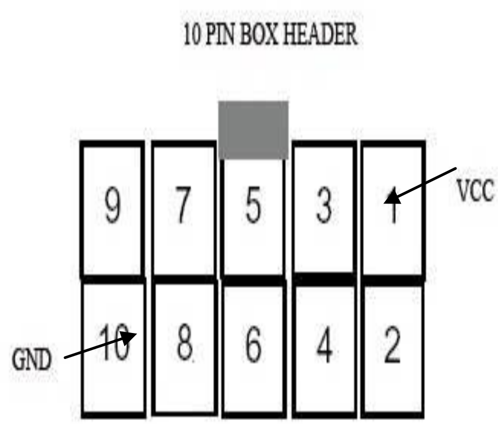


10 PIN BOX HEADER CONNECTOR



CONNECTORS



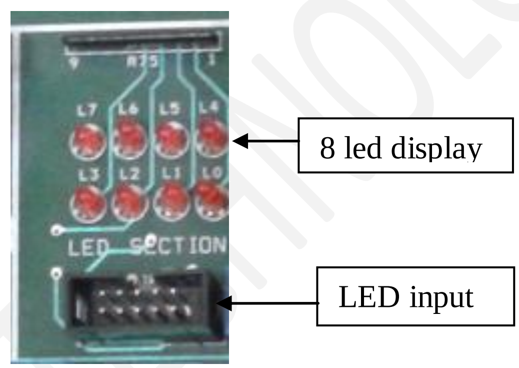


DIFFERENT SECTIONS OF UNIVERSAL BOARD

LED SECTION

A light-emitting diode (LED) is an electronic light source. LEDs are based on the semiconductor diode. When the diode is forward biased (switched on), electrons are able to recombine with holes and energy is released in the form of light. This effect is called electroluminescence and the color of the light is determined by the energy gap of the semiconductor. The LED is usually small in area (less than 1 mm^2) with integrated optical components to shape its radiation pattern and assist in reflection.

VIEW OF LED SECTION



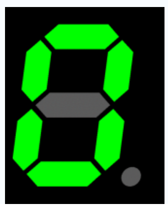
LEDs present many advantages over traditional light sources including lower energy consumption, longer lifetime, improved robustness, smaller size and faster switching. However, they are relatively expensive and require more precise current and heat management than traditional light sources**.**

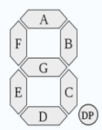
Applications of LEDs are diverse. They are used as low-energy indicators but also for replacements for traditional light sources in general lighting and automotive lighting. The compact size of LEDs has allowed new text and video displays and sensors to be developed, while their high switching rates are useful in communications technology.

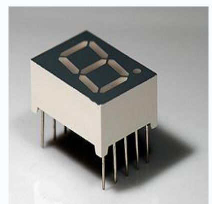
SEVEN SEGMENT DISLAY SECTION

A **seven-segment display is** less commonly known as a **seven-segment indicator**, is a form of electronic display device for displaying decimal numerals that is an alternative to the more complex dot-matrix displays. Seven-segment displays are widely used in digital clocks, electronic meters, and other electronic devices for displaying numerical information.

CONCEPT AND VISUAL STUCTURE:- The individual segments of a seven-segment display. A seven segment display, as its name indicates, is composed of seven elements. Individually on or off, they can be combined to produce simplified representations of the Arabic numerals. Often the seven segments are arranged in an oblique, or italic, arrangement, which aids readability. Each of the numbers 0, 6, 7 and 9 may be represented by two or more different glyphs on seven-segment displays







VIEW OF SEVEN SEGMENT DISPLAY SECTION

CONTROL PORT	DATA PORT

The seven segments are arranged as a rectangle of two vertical segments on each side with one horizontal segment on the top, middle, and bottom. Additionally, the seventh segment bisects the rectangle horizontally. There are also fourteen-segment displays and sixteen-segment displays (for full alpha-numeric); however, these have mostly been replaced by dot-matrix displays. The segments of a 7-segment display are referred to by the letters A to G, as shown to the right, where the optional DP decimal point (an "eighth segment") is used for the display of non-integer numbers.

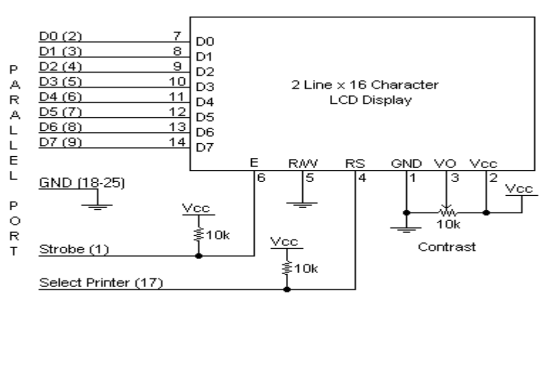
LCD DISLAY SECTION

A **liquid crystal display** (**LCD**) is a thin, flat panel used for electronically displaying information such as text, images, and moving pictures. Its uses include monitors for computers, televisions, instrument panels, and other devices ranging from aircraft cockpit displays, to every-day consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. Among its major features are its lightweight construction, its portability, and its ability to be produced in much larger screen sizes than are practical for the construction of cathode ray tube (CRT) display technology. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. It is an electronically-modulated optical device made up of any number of pixels filled with liquid crystals and arrayed in front of a light source (backlight) or reflector to produce images in color or monochrome. The earliest discoveries leading to the development of LCD technology date from 1888. By 2008, worldwide sales of televisions with LCD screens had surpassed the sale of CRT units.

VIEW OF LCD SECTION

Control port | **8 bit data port** | **4 bit data port**

PIN DESCRIPTION OF LCD



GLCD 128 x 64 SECTIONS

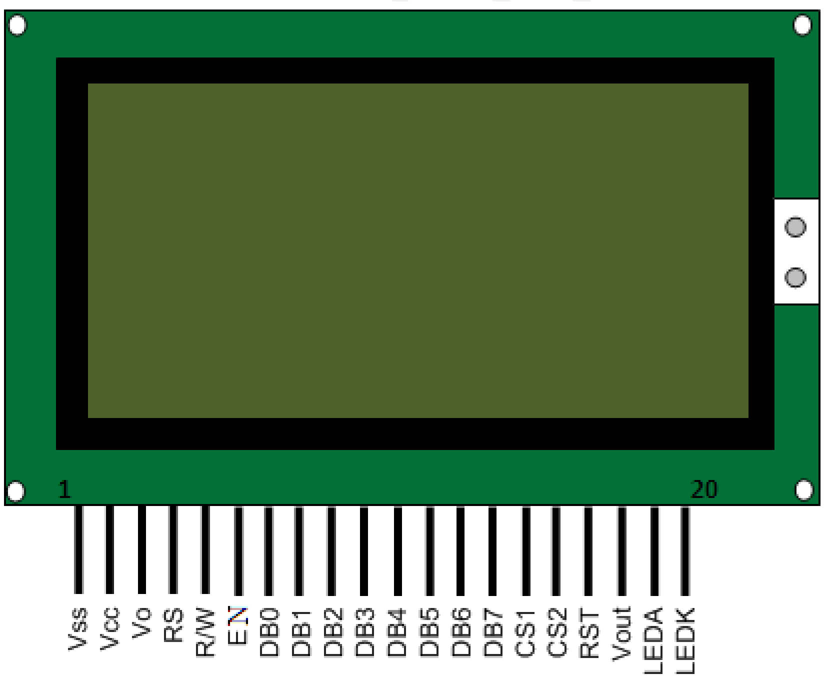
The 16x2 Character LCDs have their own limitations; they can only display characters of certain dimensions. The **Graphical LCDs** are thus used to display customized characters and images. The Graphical LCDs find use in many applications; they are used in video games, mobile phones and lifts etc. as display units.

1. 128x64 LCD implies 128 columns and 64 rows. In total there are (128x64 = 1024) pixels.

2. 128x64 LCD is divided equally into two halves. Each half is controlled by a separate controller and consists of 8 pages. In above diagram, CS stands for Controller Select.

3. Each page consists of 8 rows and 64 columns. So two horizontal pages make 128 (64x2) columns and 8 vertical pages make 64 rows (8x8).

Pin Diagram:



Pin Description:

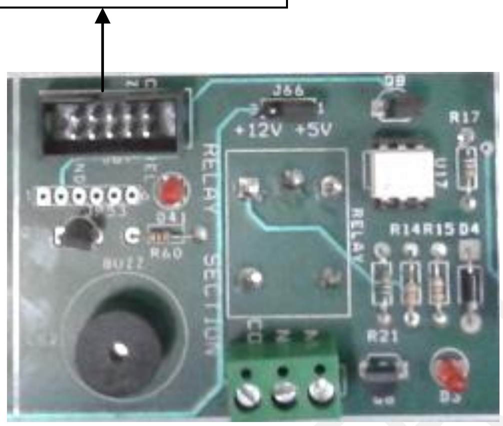
Pin no.	Function	Name
1	Ground (0 V)	Vss
2	Supply voltage; 5V	Vcc
3	Contrast adjustment	Vo
4	High to display data; Low for instruction code	Register select (RS)
5	Low to write to the register; High to read from the register	Read/Write (R/W)
6	Reads data when high; Writes data at high to low transition (falling edge)	Enable (EN)
7	8-bit data pins	DB0
8		DB1
9		DB2
10		DB3
11		DB4
12		DB5
13		DB6
14		DB7
15	Chip selection for IC1; Active high	CS1
16	Chip selection for IC2; Active high	CS2
17	Reset signal; Active low	RST
18	Output voltage for LCD driving	Vout
19	Backlight V_{CC} (5V)	LED A
20	Backlight Ground (0V)	LED K

RELAY & BUZZER SECTION

A relay is an electrical switch that opens and closes under the control of another electrical circuit. In the original form, the switch is operated by an electromagnet to open or close one or many sets of contacts. It was invented by Joseph Henry in 1835. Because a relay is able to control an output circuit of higher power than the input circuit, it can be considered to be, in a broad sense, a form of an electrical amplifier.

VIEW OF RELAY & BUZZER SECTION

RELAY CONNECTOR



RELAY

WORKING OF RELAY

A relay coil is copper wire wound many times on and around a bobbin in which an iron core is situated. When a voltage of sufficient magnitude is impressed across the coil, the coil and core develop magnetism which attracts the armature. The armature, in turn, controls contact movement. Depending on the total length of the wire and its unit cross-sectional area, the coil exhibits a certain amount of resistance to the flow of electric current. According to Ohm’s Law, for a given amount of resistance, current is directly proportional to voltage. That is:

I = E / R where;
I = current in amperes
E = voltage in volts
R = resistance in ohms

Thus, a 12V DC coil that has 120 ohms of resistance pulls 0.1 amp of current. Some relay coils accept DC voltage, while others accept AC voltage. DC (direct current) voltage has a constant, unchanging value. At any given instant of time, a 12V DC power source measures exactly 12 volts (give or take a few tenths of a volt, normally)

BUZZER

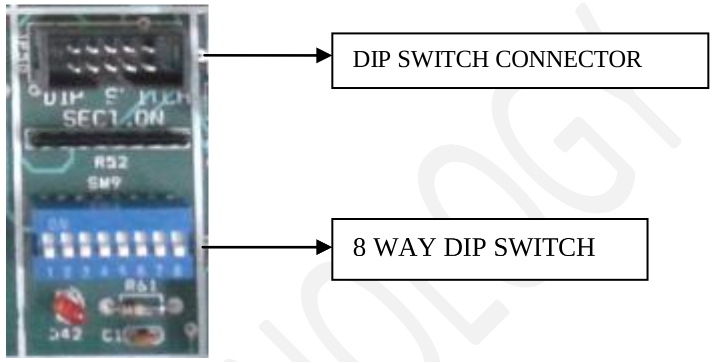
A Buzzer is output device having +VE and –VE terminals, which generate a tone when it get high signal on its positive terminal. These devices are capable of generating sound; such kind of devices can be used in hardware like security systems and sensitive equipments to protect them from burn. For example if temperatures for particular area rise over than pre-specified temperature then a sound should generate.

Buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing noise). Often these units were anchored to a wall or ceiling and used the ceiling or wall as a sounding board. Another implementation with some AC-connected devices was to implement a circuit to make the AC current into a noise loud enough to drive a loudspeaker and hook this circuit up to a cheap 8-ohm speaker. Nowadays, it is more popular to use a ceramic-based piezoelectric sounder which makes a high-pitched tone. Usually these were hooked up to "driver" circuits which varied the pitch of the sound or pulse the sound on and off.

DIP SWITCH SECTION

Dip switch section is a digital input section. This is used to give digital external input to microcontroller**.**

PICTORIAL VIEW OF DIP SWITCH SECTION

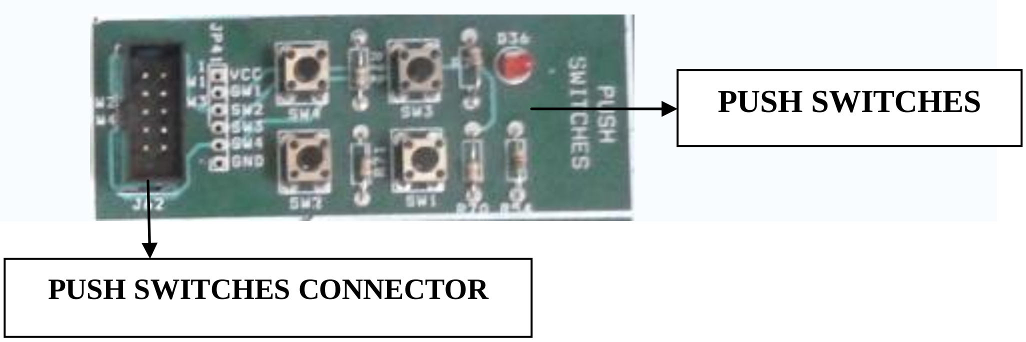


A DIP switch is a set of manual electric switches that are packaged in a group in a standard dual in-line package (DIP) (the whole package unit may also be referred to as a DIP switch in the singular). This type of switch is designed to be used on a printed circuit board along with other electronic components and is commonly used to customize the behavior of an electronic device for specific situations. DIP switches are an alternative to jumper blocks. Their main advantages are that they are quicker to change and there are no parts to lose

PUSH SWITCHES SECTION

Key board is an input section with 4 switches to give input to microcontroller with use of keyboard section we can put conditions on microcontroller to give or not give output. In this section a 6 pin connector is provided to connect with microcontroller any port. From right first pin is+5Vdc (VCC), second to fourth are switch select pin with each pin switch is connected from left first pin is ground(GND).

VIEW OF PUSH SWITCHES SECTION

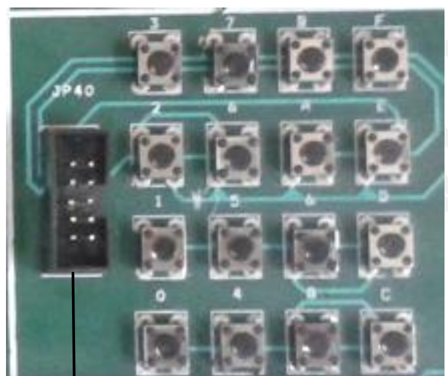


4X4 HEX KEYPAD SECTION

INTRODUCTION

The aim of this application note is to show how to scan the 4x4 matrix keypad multiplexed. The software attached to this application note scans the pressed key and displays it on the LCD 16x2 display. A 4x4 keypad can be very easily interfaced to the 8051 PORTS (Figure 1). Eight lines (0 - 7) are signed to matrix keypad. Four lines (0 - 3) are used to select the columns C1, C2, C3 & C4. The four lines (4 - 7) of same port are used to select rows R1, R2, R3 & R4.

VIEW OF KEYPAD SECTION



HEX KEYPAD CONNECTOR

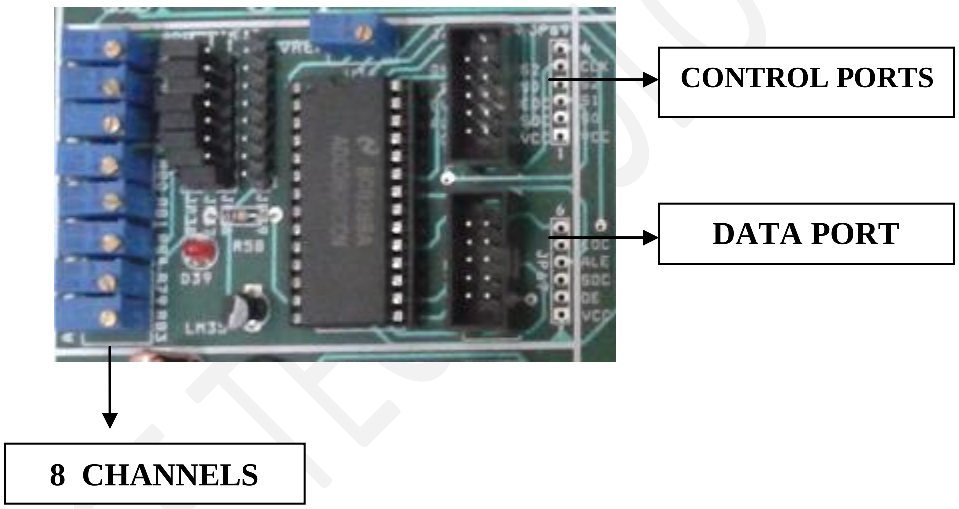
NOTE:-There is mistake in printing of numbers. The Hex keypad numbers are as follows:-

0	**1**	**2**	**3**
4	**5**	**6**	**7**
8	**9**	**A**	**B**
C	**D**	**E**	**F**

ANALOG TO DIGITAL CONVERTER (ADC0809) SECTION

The ADC0809 Data acquisition component is a monolithic CMOS device with an 8-bit analog-to-digital converter, 8 channel multiplexer and microprocessor compatible control logic. The 8-bit A/D converter uses successive approximation as the conversion technique. The converter features a high impedance chopper stabilized comparator, a 256R voltage divider with analog switch tree and a successive approximation register. The 8-bit Channel multiplexer can directly access any of 8 signal-ended analog signals.
The device eliminates the need for external zero and full scale adjustments. Easy interfacing to microprocessors input and latched TTL, TRI-STATE output.

VIEW OF ADC SECTION



8 variable resistors are provided in ADC section, each is connected to channel input. IN0, IN1, IN2, IN3, IN4, IN5, IN6, IN7 to give input to ADC. Either input can give from out-side by shifting jumpers between JP36 and JP37 from 1 to 8 (left to right). Jumpers can be selected optionally according to channel selection (for example if choose channel 4 then can shift jumper 4 from left to right). Connect input from outside to any pin number from 2 to 8 of jumper jp39. First number pin of JP39 is reserved for LM35 which is connected to first channel input IN0. On board temperature sensor LM35 is provided as input source to ADC. To get the input from LM35 shift only first jumper between JP36 and JP37 from left.

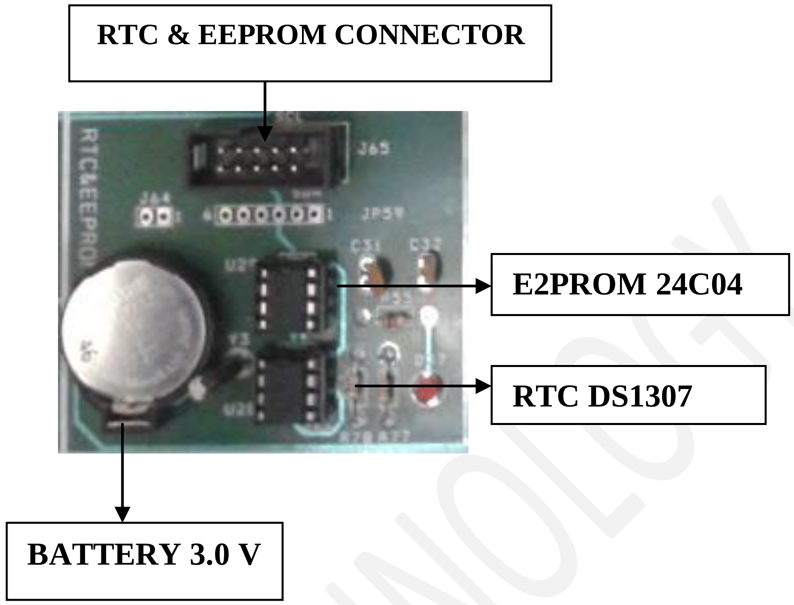
RTC & E2PROM SECTION

RTC A real-time clock (RTC) is a computer clock (most often in the form of an integrated circuit) that keeps track of the current time. Although the term often refers to the devices in personal computers, servers and embedded systems, RTCs are present in almost any electronic device which needs to keep accurate time. The DS1307 serial real-time clock (RTC) is allow-power, full binary-coded decimal (BCD) clock/calendar plus 56 bytes of NV SRAM. Address and data are transferred serially through an I2C*, bidirectional bus. The clock/calendar provides seconds, minutes, hours, day, date month, and year information. The end of the month date is automatically adjusted for months with fewer than 31 days, including corrections for leap year. The clock operates in either the 24- hour or 12-hour format with AM/PM indicator. The DS1307 has a built-in power-sense circuit that detects power failures and automatically switches to the battery supply**.**

E2PROM 24C04

- Low-voltage and Standard-voltage Operation
  2.7 (VCC = 2.7V to 5.5V)
  1.8 (VCC = 1.8V to 5.5V)
- Internally Organized 128 x 8 (1K), 256 x 8 (2K), 512 x 8 (4K), 1024 x 8 (8K) or 2048 x 8 (16K)
- 2-wire Serial Interface
- Schmitt Trigger, Filtered Inputs for Noise Suppression
- Bi-directional Data Transfer Protocol
  100 kHz (1.8V) and 400 kHz (2.5V, 2.7V, 5V) Compatibility
- Write Protect Pin for Hardware Data Protection
- 8-byte Page (1K, 2K), 16-byte Page (4K, 8K, 16K) Write Modes
- Partial Page Writes are allowed
- Self-timed Write Cycle (5 ms max)
- High-reliability
- Endurance: 1 Million Write Cycles
- Data Retention: 100 Years
- Automotive Grade, Extended Temperature and Lead-Free Devices Availabl

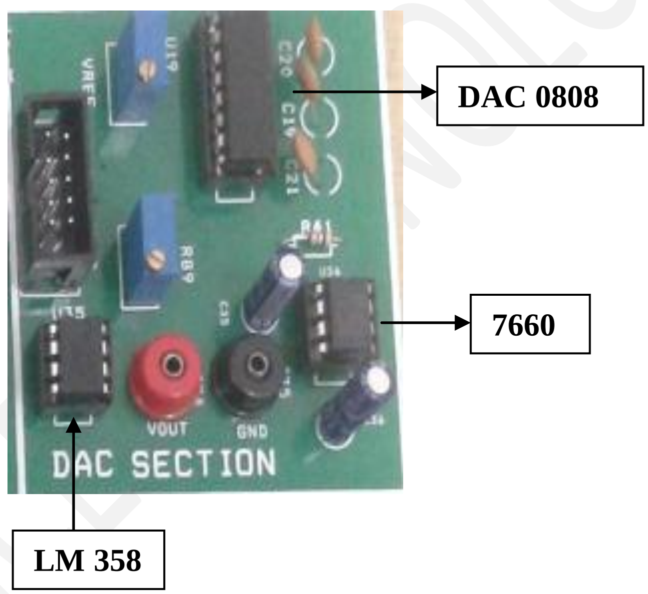
View of RTC & EEPROM



DAC 0808 SECTION

In electronics, a digital-to-analog converter (DAC or D-to-A) is a device for converting a digital (usually binary) code to an analog signal (current, voltage or electric charge).A DAC converts an abstract finite-precision number (usually a fixed-point binary number) into a concrete physical quantity (e.g., a voltage or a pressure). In particular, DACs are often used to convert finite-precision time series data to a continually-varying physical signal.A typical DAC converts the abstract numbers into a concrete sequence of impulses. That are then processed by a reconstruction filter using some form of interpolation to fill in data between the impulses. Other DAC methods (e.g., methods based on Delta-sigma modulation) produce a pulse-density modulated signal that can then be filtered in a similar way to produce a smoothly-varying signal.

VIEW OF DAC

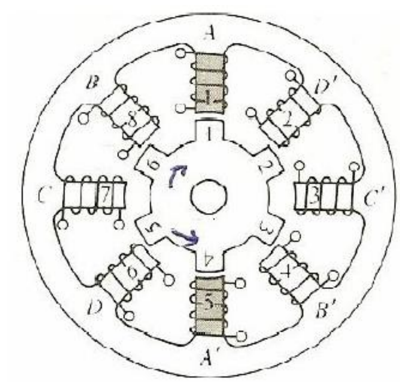


DAC 0808 (8 BIT D/A CONVERTER)

The DAC0808 is an 8-bit monolithic digital-to-analog converter (DAC) featuring a full scale output current settling time of 150 ns while dissipating only 33 MW with ±5V supplies. No reference current (IREF) trimming is required for most applications since the full scale output current is typically ±1 LSB of 255 IREF/256. Relative accuracies of better than ±0.19% assure 8-bit mono-tonicity and linearity while zero level output current of less than 4 μ A provides 8-bit zero accuracy for IREF^{3}2 MA. The power supply currents of the DAC0808 are independent of bit codes, and exhibits essentially constant device characteristics over the entire supply voltage range. The DAC0808 will interface directly with popular TTL, DTL or CMOS logic levels, and is a direct replacement for the MC1508/MC1408. For higher speed applications, see DAC0800 data sheet**.**

STEPPER MOTOR

Stepper motors provide a means for precise positioning and speed control without the use of feedback sensors. The basic operation of a stepper motor allows the shaft to move a precise number of degrees each time a pulse of electricity is sent to the motor. Since the shaft of the motor moves only the number of degrees that it was designed for when each pulse is delivered, you can control the pulses that are sent and control the positioning and speed. The rotor of the motor produces torque from the interaction between the magnetic field in the stator and rotor. The strength of the magnetic fields is proportional to the amount of current sent to the stator and the number of turns in the windings. The stepper motor uses the theory of operation for magnets to make the motor shaft turn a precise distance when a pulse of electricity is provided. You learned previously that like poles of a magnet repel and unlike poles attract. Figure 1 shows a typical cross-sectional view of the rotor and stator of a stepper motor. From this diagram you can see that the stator (stationary winding) has eight poles, and the rotor has six poles (three complete magnets). The rotor will require 24 pulses of electricity to move the 24 steps to make one complete revolution. Another way to say this is that the rotor will move precisely 15° for each pulse of electricity that the motor receives. The number of degrees the rotor will turn when a pulse of electricity is delivered to the motor can be calculated by dividing the number of degrees in one revolution of the shaft (360°) by the number of poles (north and south) in the rotor. In this stepper motor 360° is divided by 24 to get 15°. When no power is applied to the motor, the residual magnetism in the rotor magnets will cause the rotor to detent or align one set of its magnetic poles with the magnetic poles of one of the stator magnets. This means that the rotor will have 24 possible detent positions. When the rotor is in a detent position, it will have enough magnetic force to keep the shaft from moving to the next position. This is what makes the rotor feel like it is clicking from one position to the next as you rotate the rotor by hand with no power applied.



Position of the six-pole rotor and eight-pole stator of a typical stepper motor shown in figure1.

DC MOTOR

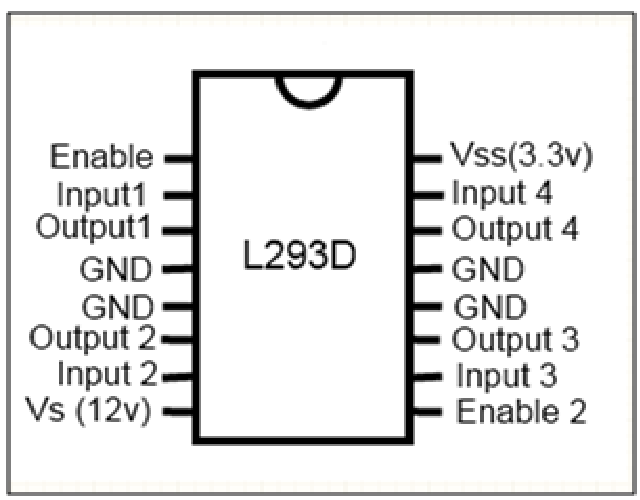
A **DC motor** relies on the fact that like magnet poles repels and unlike magnetic poles attracts each other. A coil of wire with a current running through it generates a electromagnetic field aligned with the center of the coil. By switching the current on or off in a coil its magnet field can be switched on or off or by switching the direction of the current in the coil the direction of the generated magnetic field can be switched 180°. A simple *DC motor* typically has a stationary set of magnets in the stator and an armature with a series of two or more windings of wire wrapped in insulated stack slots around iron pole pieces (called stack teeth) with the ends of the wires terminating on a commutator. The armature includes the mounting bearings that keep it in the center of the motor and the power shaft of the motor and the commutator connections. The winding in the armature continues to loop all the way around the armature and uses either single or parallel conductors (wires), and can circle several times around the stack teeth. The total amount of current sent to the coil, the coil's size and what it's wrapped around dictate the strength of the electromagnetic field created. The sequence of turning a particular coil on or off dictates what direction the effective electromagnetic fields are pointed. By turning on and off coils in sequence a rotating magnetic field can be created. These rotating magnetic fields interact with the magnetic fields of the magnets (permanent or electromagnets) in the stationary part of the motor (stator) to create a force on the armature which causes it to rotate. In some DC motor designs the stator fields use electromagnets to create their magnetic fields which allow greater control over the motor. At high power levels, DC motors are almost always cooled using forced air.

The commutator allows each armature coil to be activated in turn. The current in the coil is typically supplied via two brushes that make moving contact with the commutator. Now, some brushless DC motors have electronics that switch the DC current to each coil on and off and have no brushes to wear out or create sparks.

VIEW OF DC MOTOR

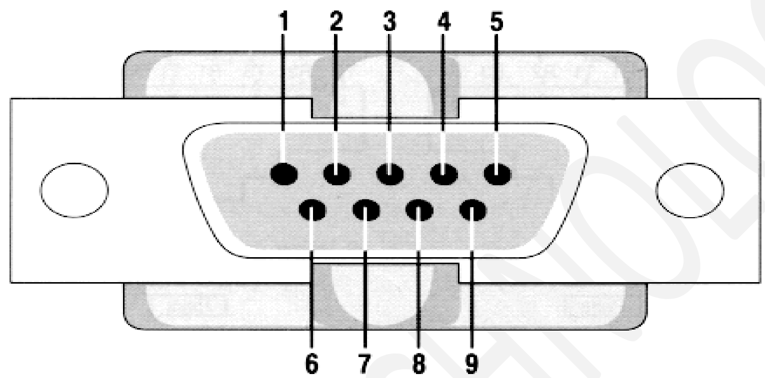
MOTOR DRIVER SECTION

L293D IC PIN DESCRIPTION



RS232 SECTION

This section is on board to program the microcontroller through pc serial port either u can use USB to serial convertor to program microcontroller chip.
The Serial Port is harder to interface than the Parallel Port. In most cases, any device you connect to the serial port will need the serial transmission converted back to parallel so that it can be used. This can be done using a UART. On the software side of things, there are many more registers that you have to attend to than on a Standard Parallel Port. (SPP)



Pin	Signal	Pin	Signal
1	Data Carrier Detect	6	Data Set Ready
2	Received Data	7	Request to Send
3	Transmitted Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	Signal Ground		

MAX 232 CIRCUIT

Voltage Levels

It is helpful to understand what occurs to the voltage levels. When a MAX232 IC receives a TTL level to convert, it changes a TTL logic 0 to between +3 and +15 V, and changes TTL logic 1 to between -3 to -15 V, and vice versa for converting from RS232 to TTL. This can be confusing when you realize that the RS232 data transmission voltages at a certain logic state are opposite from the RS232 control line voltages at the same logic state. To clarify the matter, see the table below. For more information, see RS-232 voltage levels.

RS232 line type and logic level	RS232 voltage	TTL voltage to/from MAX232
Data transmission (Rx/Tx) logic 0	+3 V to +15 V	0 V
Data transmission (Rx/Tx) logic 1	-3 V to -15 V	5 V
Control signals (RTS/CTS/DTR/DSR) logic 0	-3 V to -15 V	5 V
Control signals (RTS/CTS/DTR/DSR) logic 1	+3 V to +15 V	0 V

USART (Universal Synchronous Asynchronous Receiver Transmitter) peripheral. A well set module is very useful not only to establish a communication medium (receive or transmit data) between microcontroller and PC but also to program the device via preloaded boot-loader. Here is how to make proper level converter using MAX232. Before that, it is better to have a simple idea about RS232 & TTL levels.

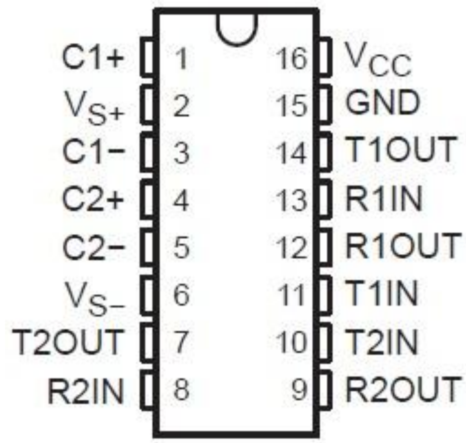
RS232 & TTL

In RS232 Protocol, +12V indicates the Space state or Zero and -12V indicates the Mark state or 1. In TTL, +5V indicates the Mark state and 0 indicates Space state. Most importantly, TTL level is not accepting negative voltage levels. So for the RS232 to TTL interface translation is not only a task with 12V to 5V level shifting, and it includes a level inversion too. To do that, MAX232 is more often used in microcontroller applications.

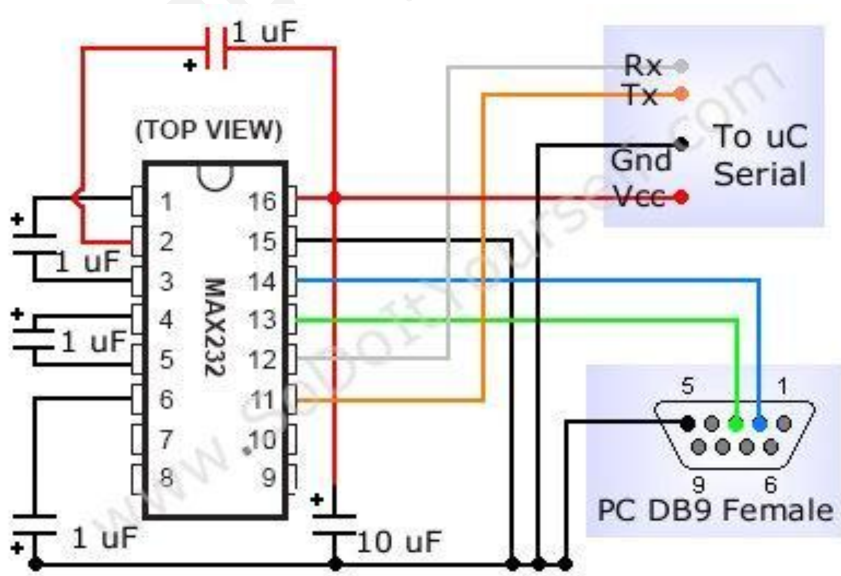
MAX232

MAX232 is an IC that operates on single 5V supply and it is integrated with two drivers and two receivers and also that meets all specifications under EIA/TIA 232-F standards. All receivers can be used to convert RS232 levels to TTL/CMOS levels and all drivers can be used to convert TTL/CMOS level inputs to RS232 levels. Since it functions with capacitive voltage generator external charge-pump capacitors used in module to support internal voltage doublers and inverter. Some ICs in this series may not ask for external capacitors. (MAX225)

PIN DESCRIPTION OF MAX232



RS232 CIRCUIT DIAGRAM



USE OF COMPILER AND PROGRAMMER

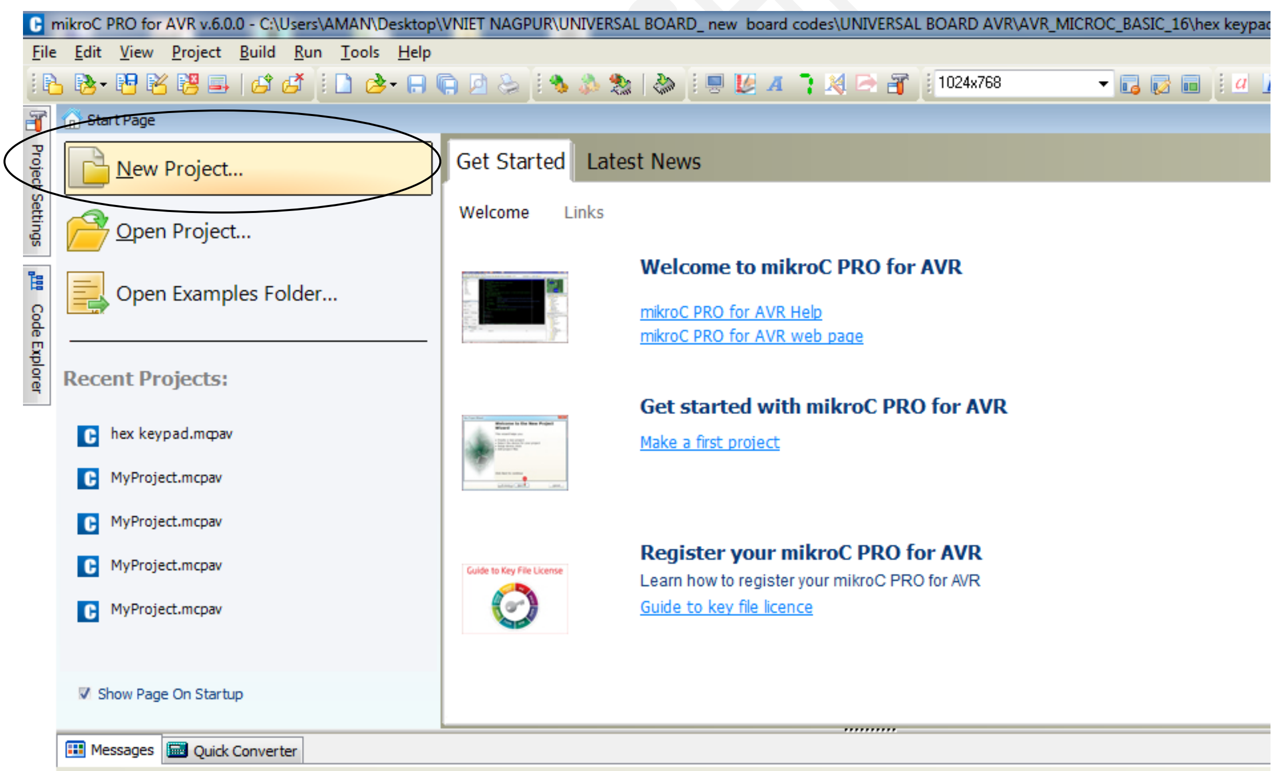
COMPILER:- **mikro C**

STEP: 1

Double Click on the icon present on the desktop mikroC.

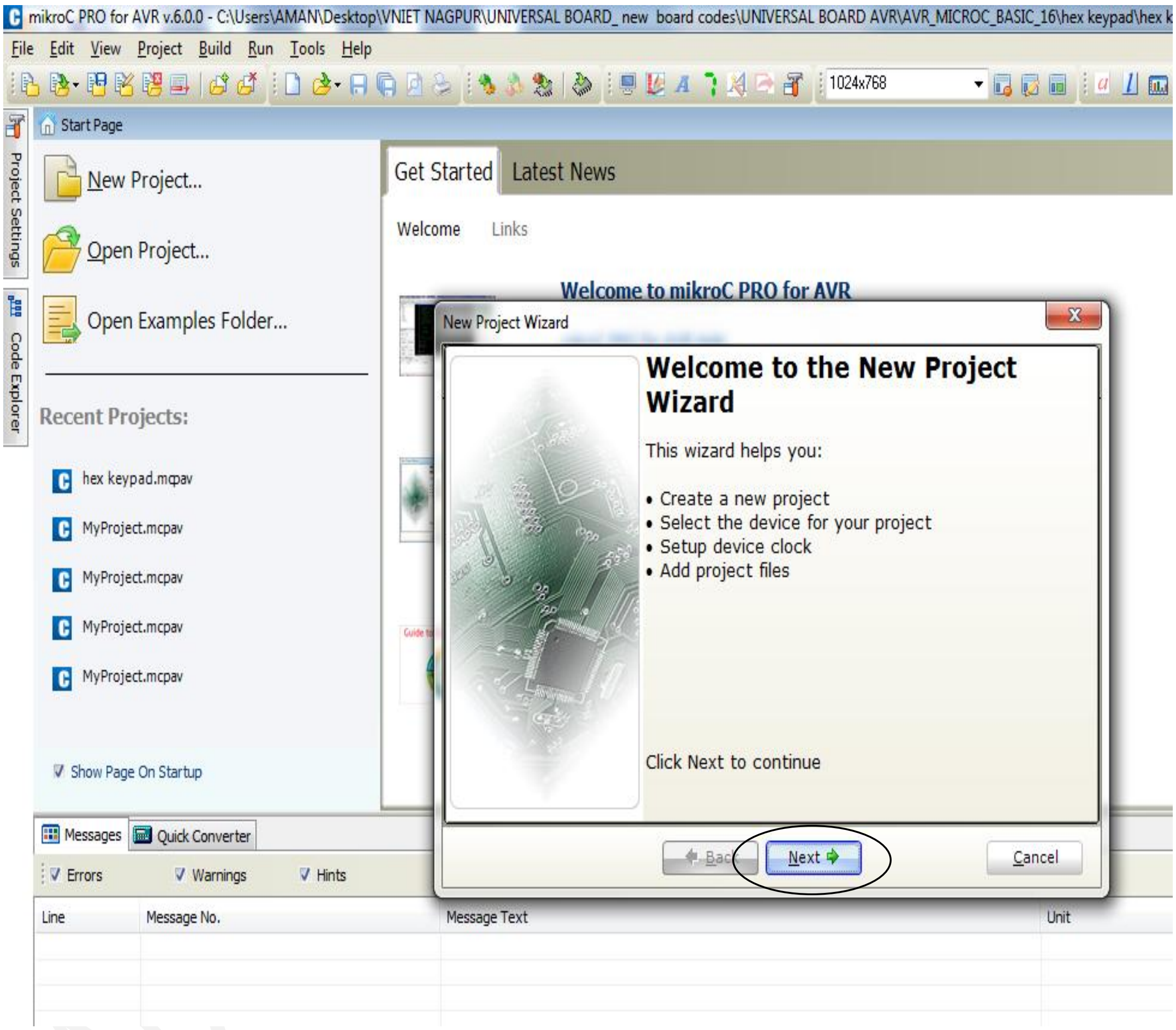
STEP: 2

Then a window will open like shown below. Click on **New Project**



STEP: 3

Then a window will open like shown below. Click on **Next** to further continue

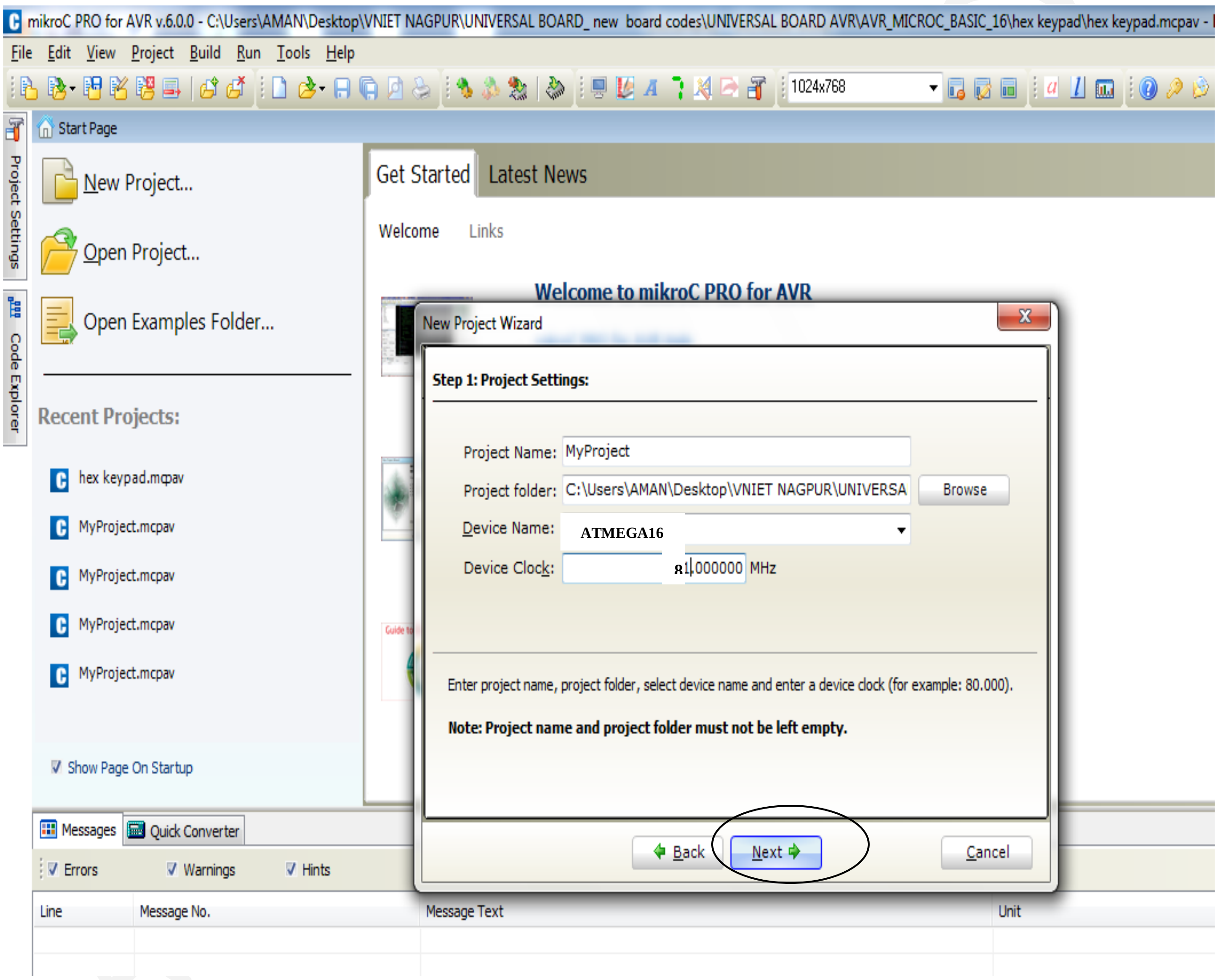


STEP: 4

Then a window will open like shown below. Make the Project folder on the Desktop, Give **Name** to the folder

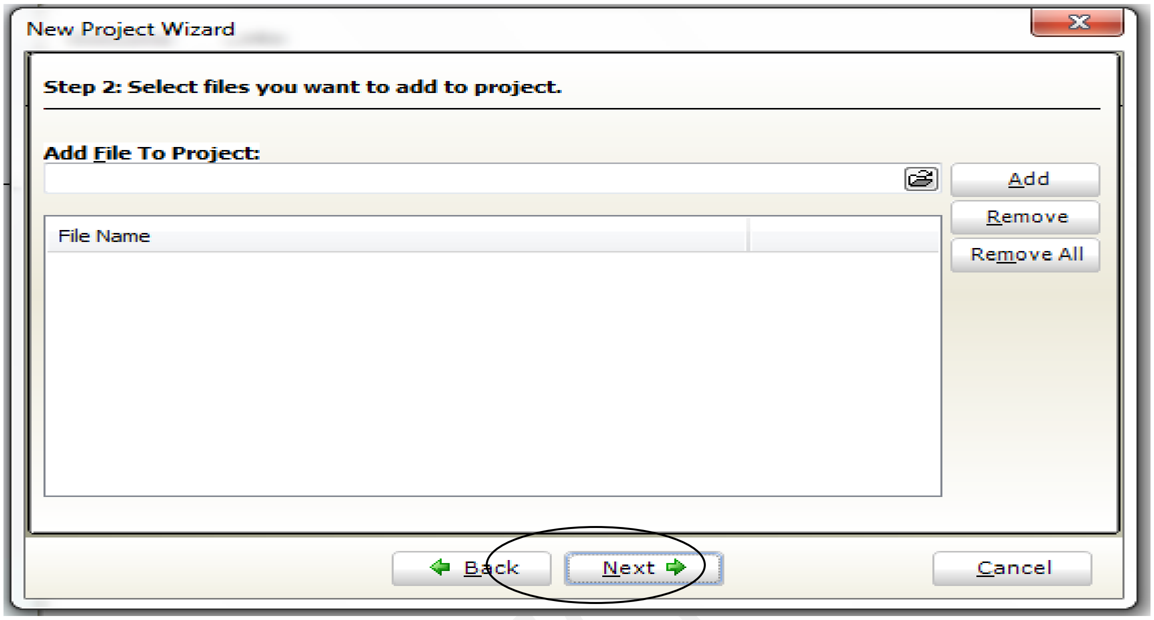
Select the Device **ATMEGA 16 OR ATMEGA 32,** Select the **Frequency 8 MHz**

Click on **Next** to further continuation



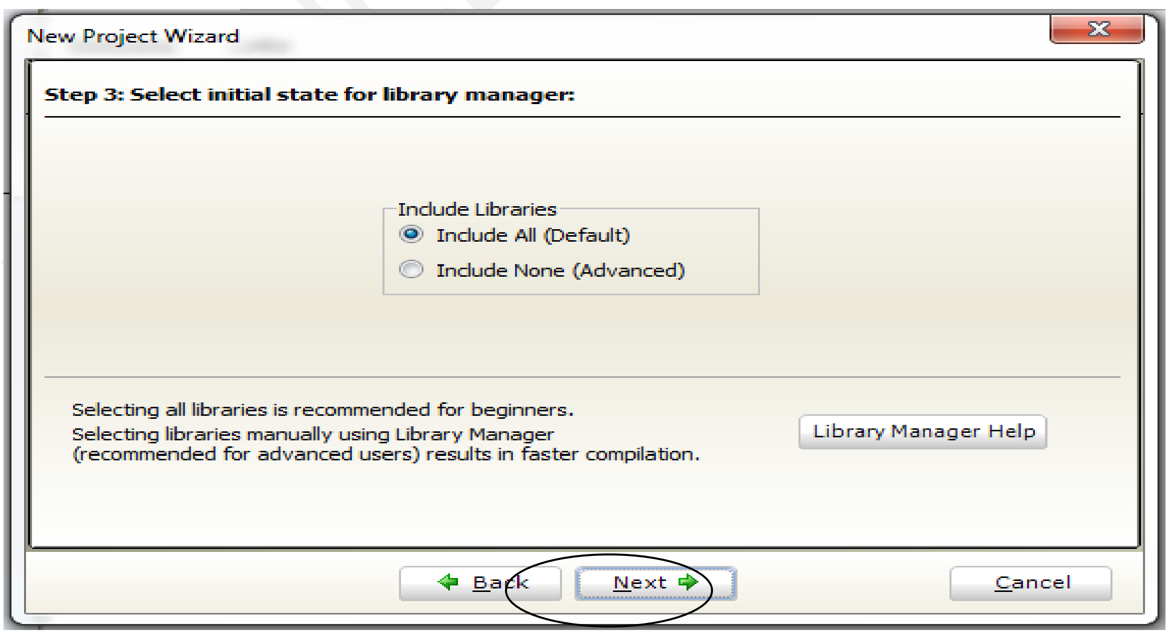
STEP: 5

Then a window will open like shown below. Click on **Next** to further continue



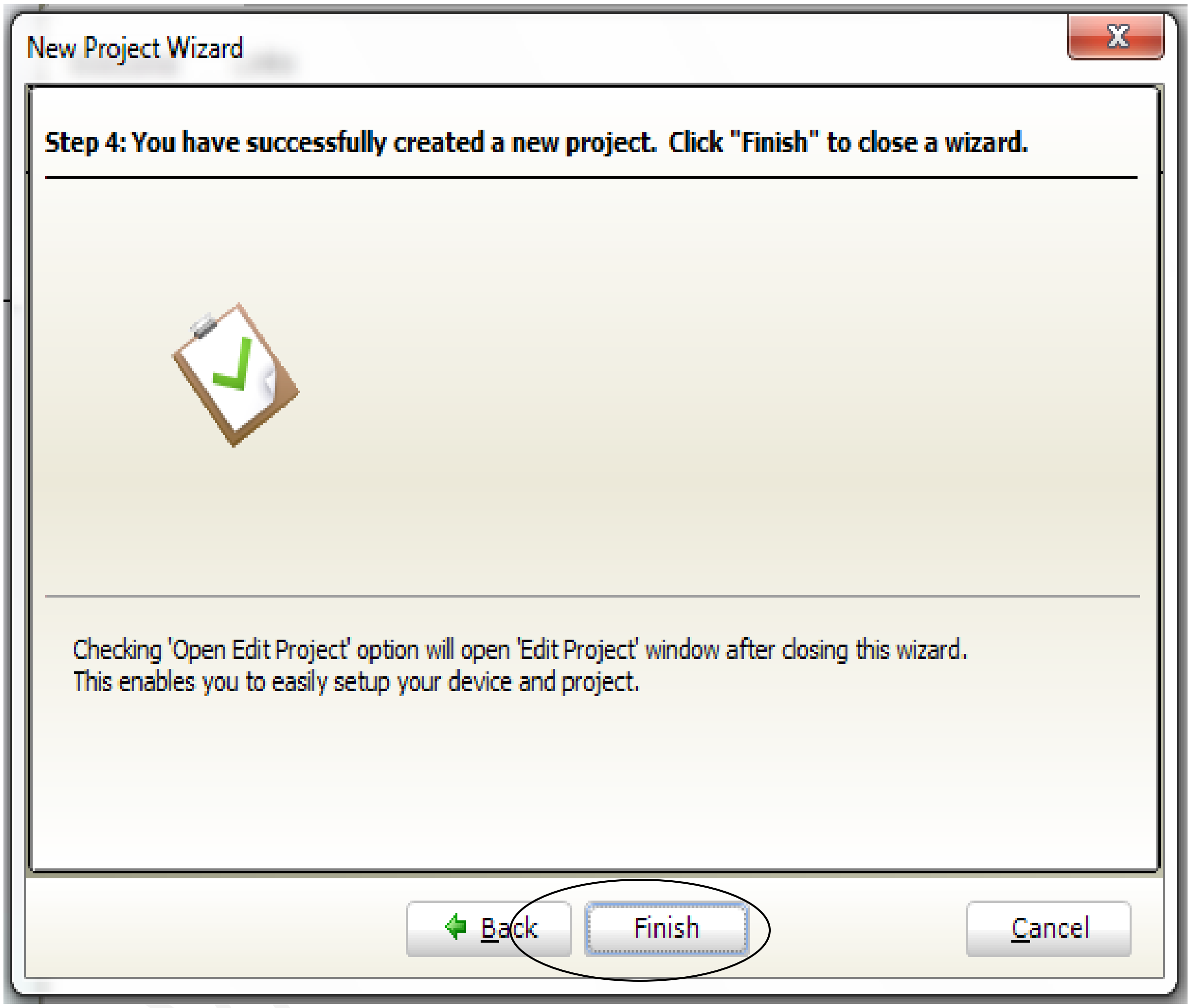
STEP: 6

Then a window will open like shown below. Click on **Next** to further continue



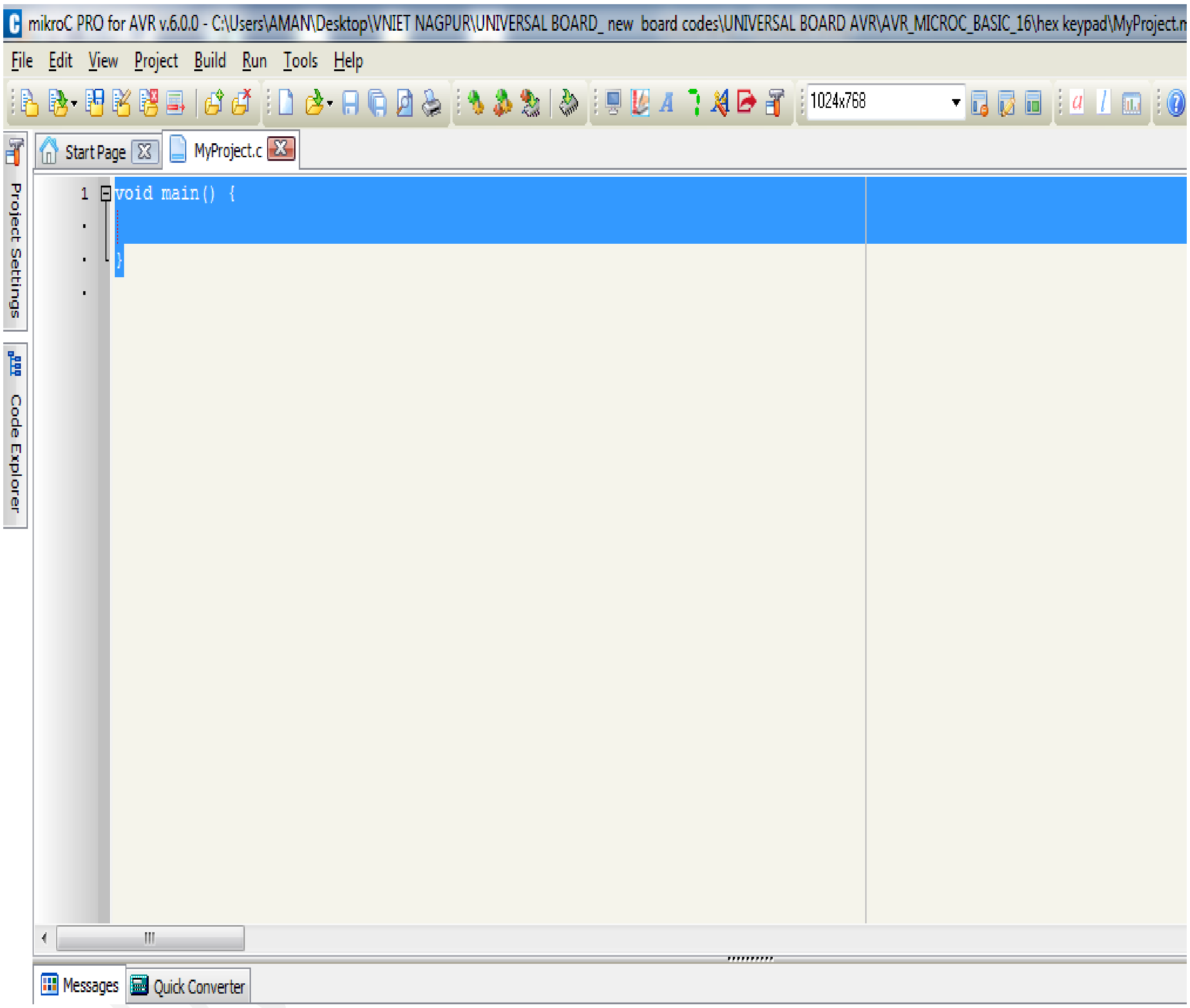
STEP: 6

Then a window will open like shown below. Click on **Finish** to further continue



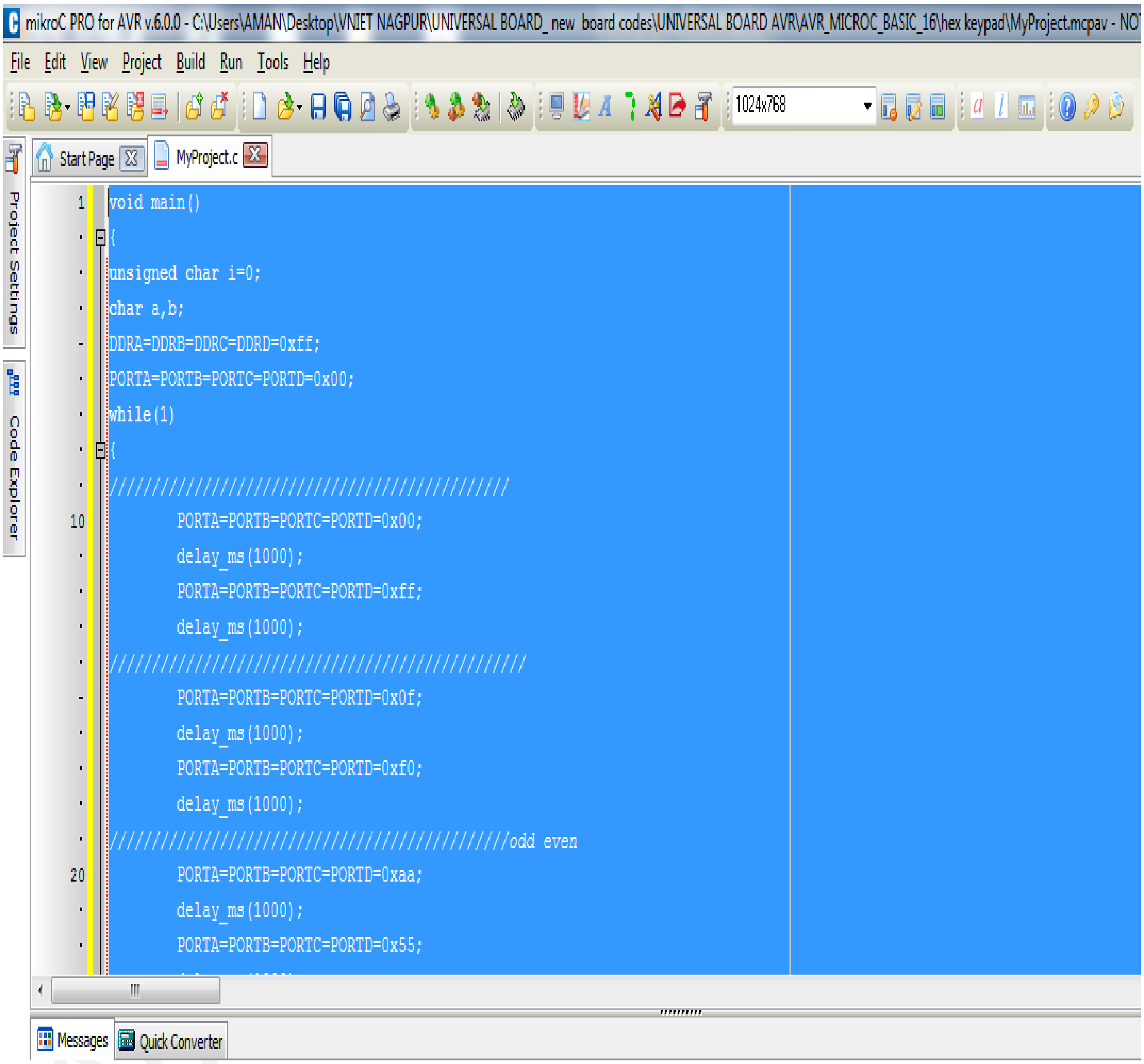
STEP: 7

Then the **New Project window** will appear



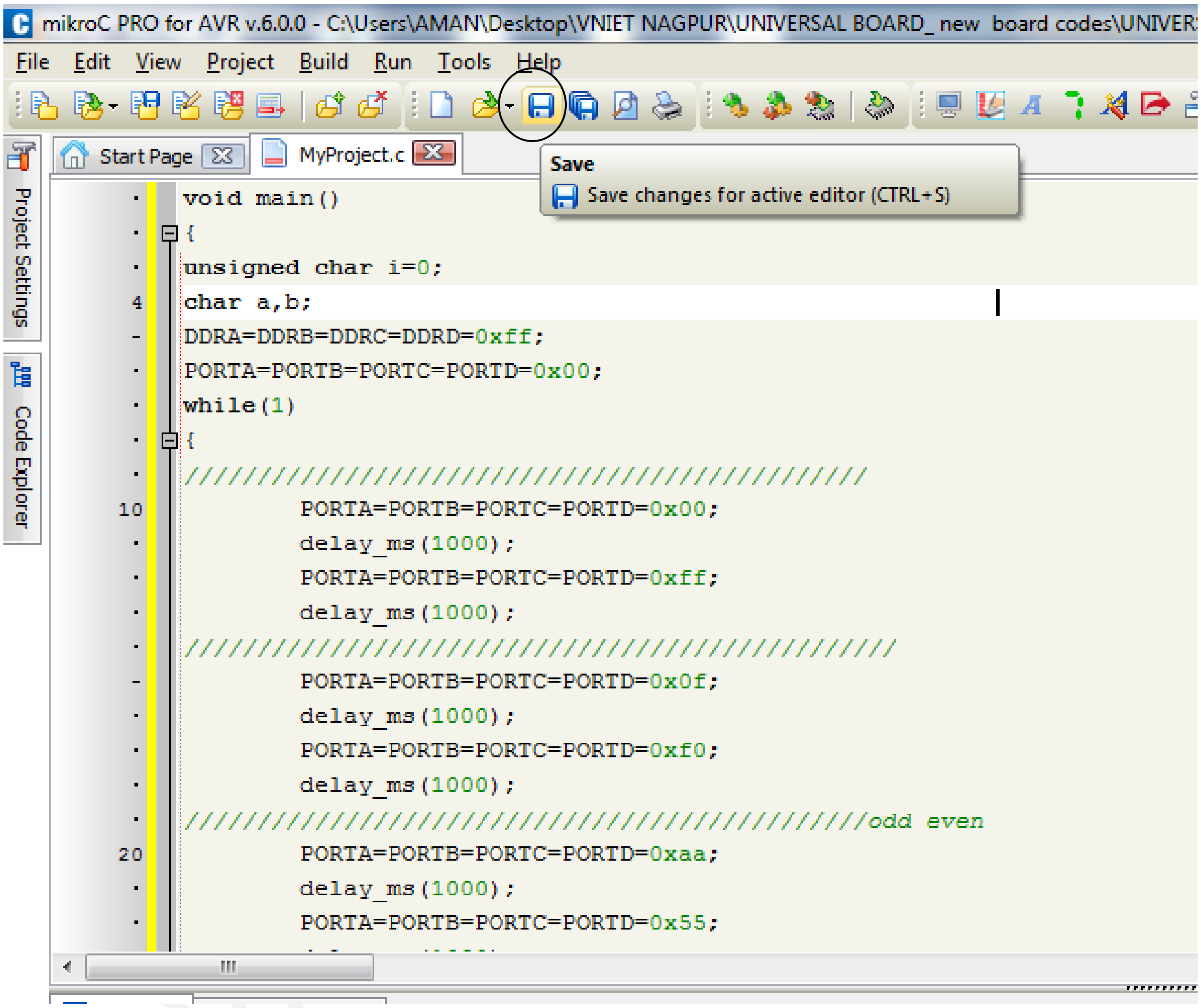
STEP: 8

Then **Write the code**



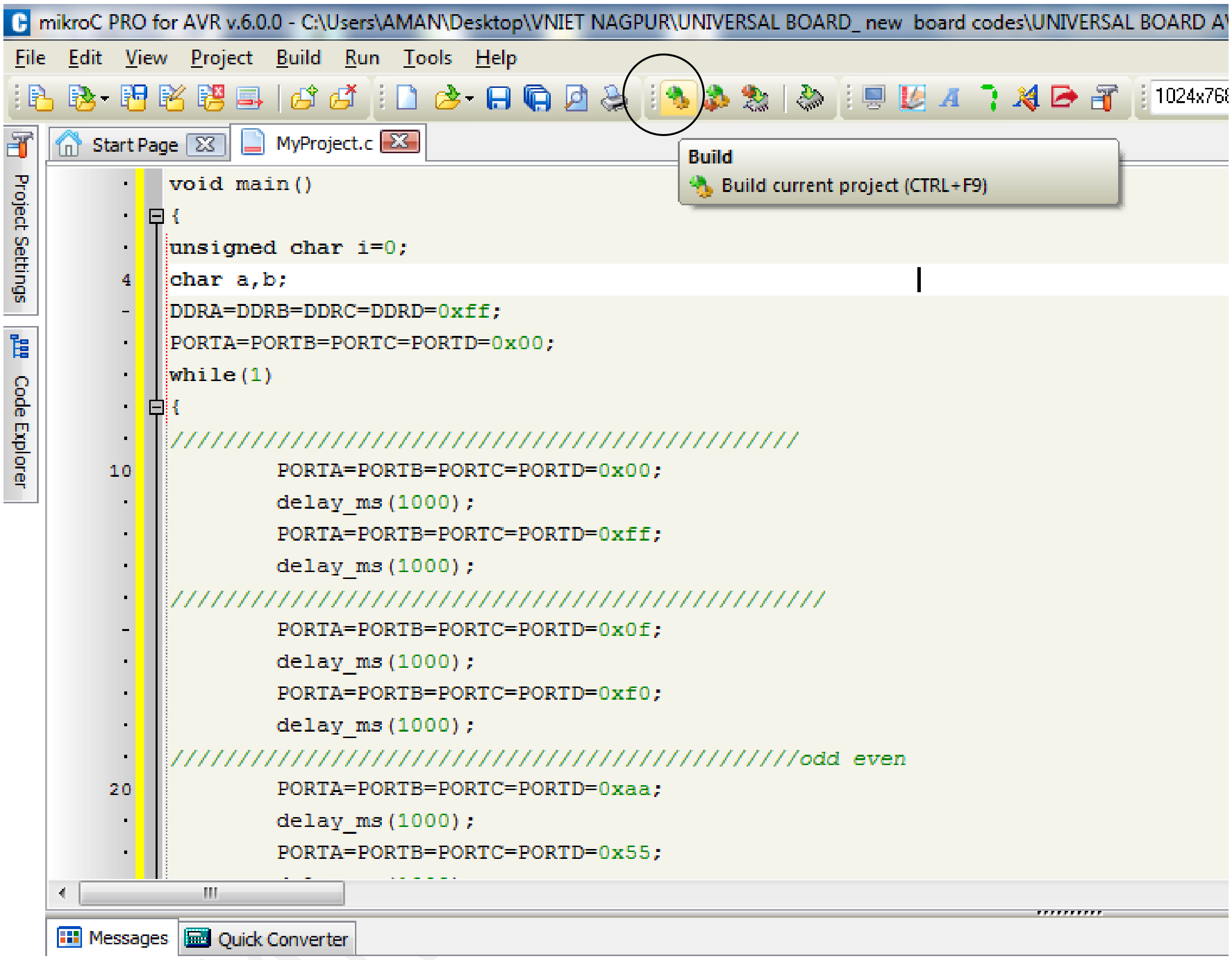
STEP: 9

After writing the code , Click on the **Save** option.

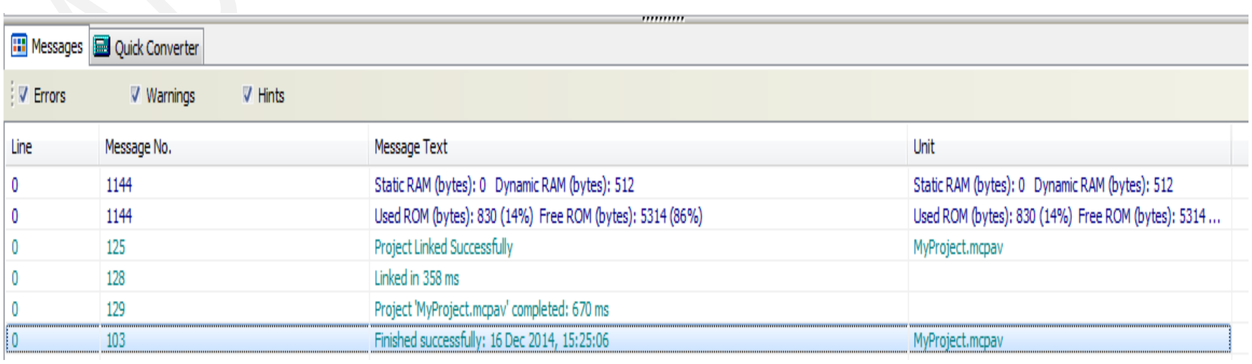


STEP: 10

Go to **Build Target** option



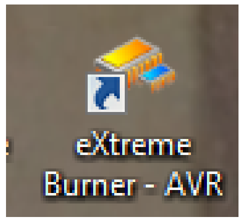
A message will display on screen→ **Finished successfully**
If there is an error in the program it will show an error



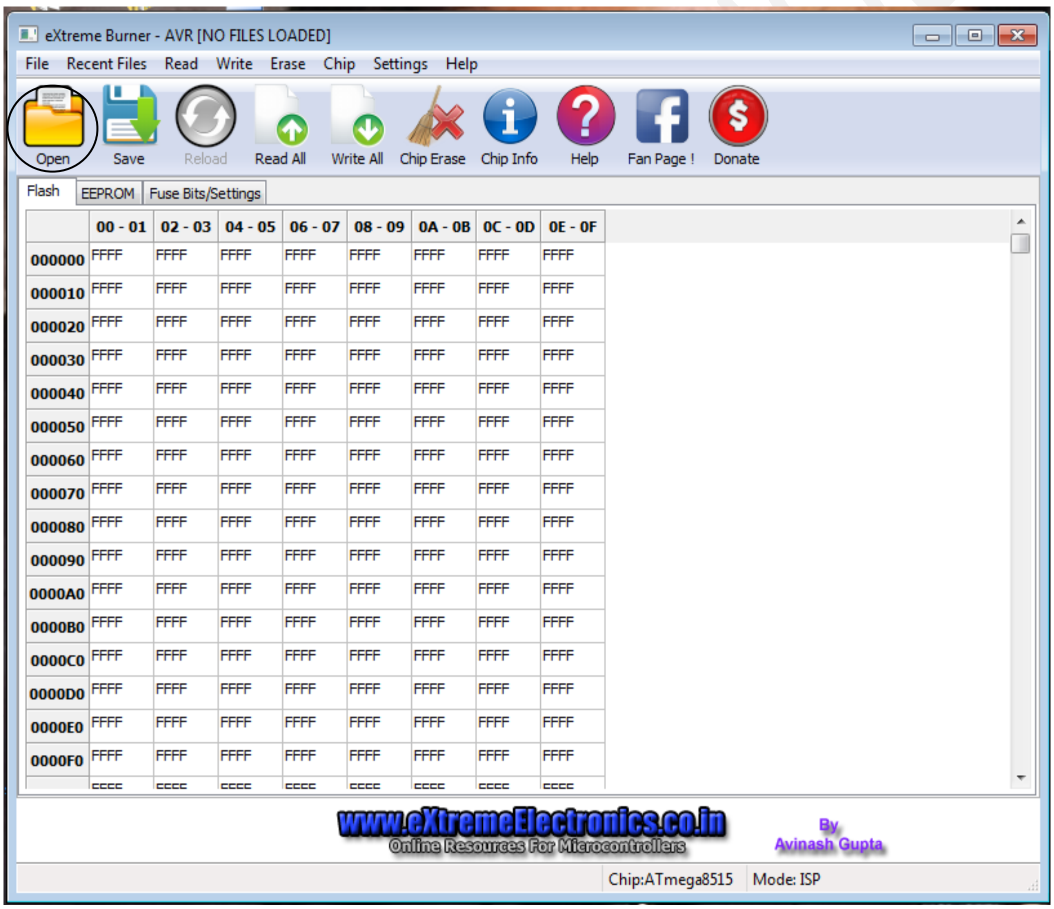
USE OF PROGRAMMER

EXTREME BURNER AVR

1). Double click on Desktop Icon

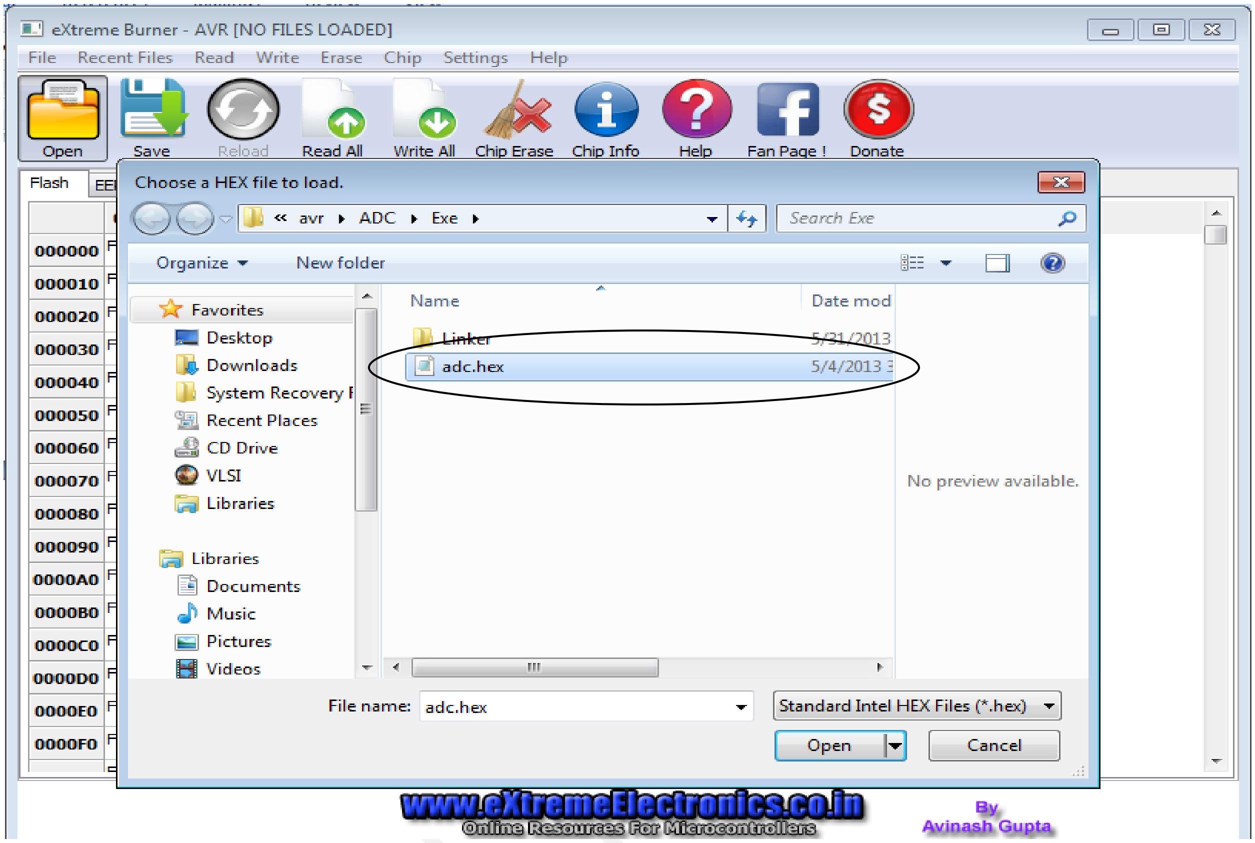


2). Window will appear

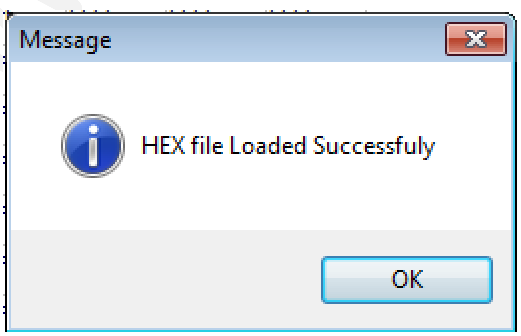


3). Now browse the Hex File from the location by clicking the Open icon

4). Then Click on the **Open** & Select the file from where you save it



5). After loading the file message will display

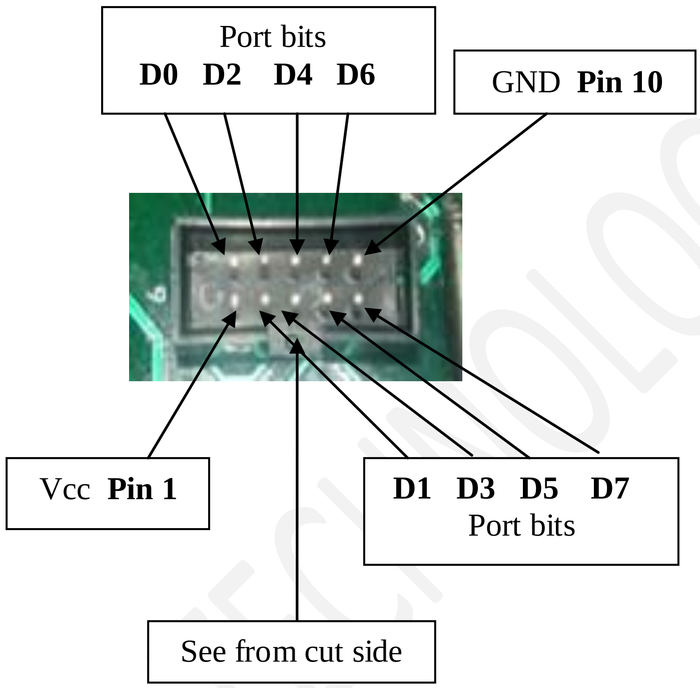


6). Then click on Write then program is burned in the Microcontroller

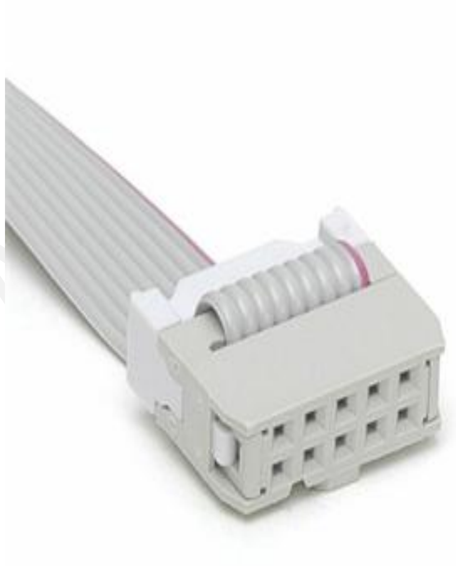
7). Then make the connection on the hardware & see the result according to your program.

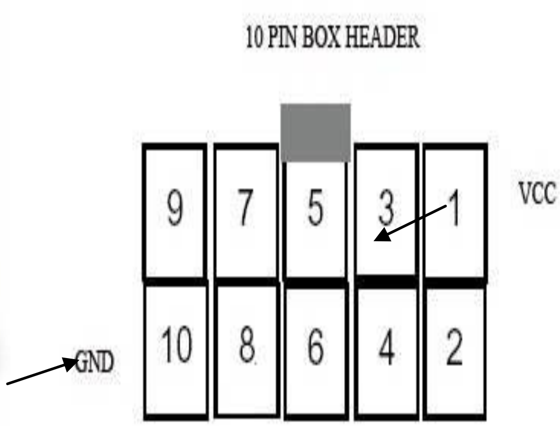
Pin Description

10 PIN BOX HEADER CONNECTOR



CONNECTORS





LED Section

JP52

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	L4
2	L0	7	L5
3	L1	8	L6
4	L2	9	L7
5	L3	10	GND

Seven Segment Section

JP63 (Control Port**)**

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	NC
2	S.S 1	7	NC
3	S.S 2	8	NC
4	S.S 3	9	NC
5	S.S 4	10	GND

Where
S.S → Seven Segment

JP51 (Data Port**)**

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	D4 (E)
2	D0 (A)	7	D5 (F)
3	D1 (B)	8	D6 (G)
4	D2 (C)	9	D7 (DP)
5	D3 (D)	10	GND

LCD 16X 2 Sections

JP77 (Control Port for 8-Bit**)**

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	NC
2	RS	7	NC
3	E	8	NC
4	NC	9	NC
5	NC	10	GND

Where
RS → Register Select
E→ Enable

JP76 (Data Port for 8-Bit**)**

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	D4
2	D0	7	D5
3	D1	8	D6
4	D2	9	D7
5	D3	10	GND

JP71 (4-Bit Mode**)**

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	RS
2	D4	7	E
3	D5	8	NC
4	D6	9	NC
5	D7	10	GND

Push Switches Section

JP62

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	NC
2	SW1	7	NC
3	SW2	8	NC
4	SW3	9	NC
5	SW4	10	GND

4X4 Hex keypad Section

JP40

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	Row 1
2	Column 1	7	Row 2
3	Column 2	8	Row 3
4	Column 3	9	Row 4
5	Column 4	10	GND

DIP Switch Section

JP50

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	SW5
2	SW1	7	SW6
3	SW2	8	SW7
4	SW3	9	SW8
5	SW4	10	GND

RTC, EEPROM & Relay Section

JP65

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	NC
2	SDA (Serial Data)	7	NC
3	SCK (Serial Clock)	8	NC
4	Relay	9	NC
5	Buzzer	10	GND

ADC Section

JP61 (ADC Control Port)

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	CLK
2	OE	7	SET0
3	SOC	8	SET1
4	ALE	9	SET2
5	EOC	10	GND

Where
OE→ Output Enable
SOC→ Start of Conversion
ALE→ Address Latch Enable
EOC→ End of Conversion
CLK→ Clock
Set0, Set1, Set2→ Channel Select

JP46 (ADC Data Port)

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	D4
2	D0	7	D5
3	D1	8	D6
4	D2	9	D7
5	D3	10	GND

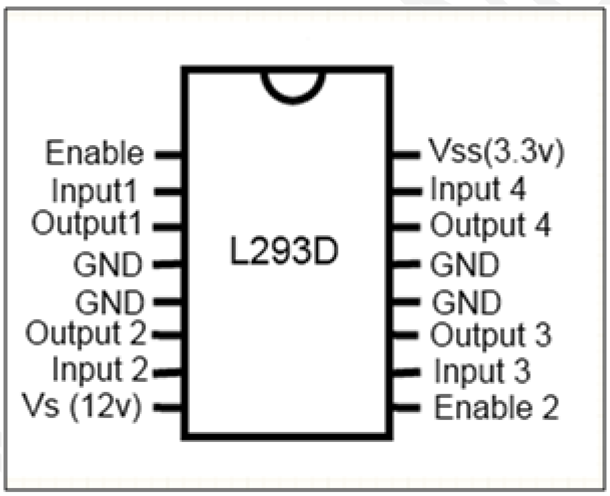
DAC Section

JP72 (DAC Control Port)

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	A4
2	A0	7	A5
3	A1	8	A6
4	A2	9	A7
5	A3	10	GND

Where **A** stands Analog output

STEPPER MOTOR SECTION



JP57 (MOTOR INPUT BOX HEADER)

It is connected to motor driver **IC L293D**

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	NC
2	I/P 1 of L293D (**pin no 2**)	7	NC
3	I/P 2 of L293D (**pin no 7**)	8	NC
4	I/P 3 of L293D (**pin no 10**)	9	NC
5	I/P 4 of L293D (**pin no 15**)	10	GND

JP57 (STEPPER MOTOR OUTPUT CONNECTOR)

Steeper motor connected to this connector

PIN NO.	SIGNAL
1	O/P 1 of L293D (**pin no 3**)
2	O/P 2 of L293D (**pin no 6**)
3	O/P 3 of L293D (**pin no 11**)
4	O/P 4 of L293D (**pin no 14**)
5	NC
6	NC

JP55 (DC MOTOR OUTPUT CONNECTOR)

DC motor connected to this connector

PIN NO.	SIGNAL
1	O/P 1 of L293D (**pin no 3**)
2	O/P 2 of L293D (**pin no 6**)

RS 232 SECTION

(Serial: ThroughDB9 and Through USB)

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	V_{CC}	6	NC
2	8051 RX, AVR RXARM TX	7	NC
3	8051 TX, AVR TX, ARM RX	8	PIC TX
4	NC	9	PIC RX
5	NC	10	GND

NOTE: - NC means **Not Connected** and selection is done through jumper