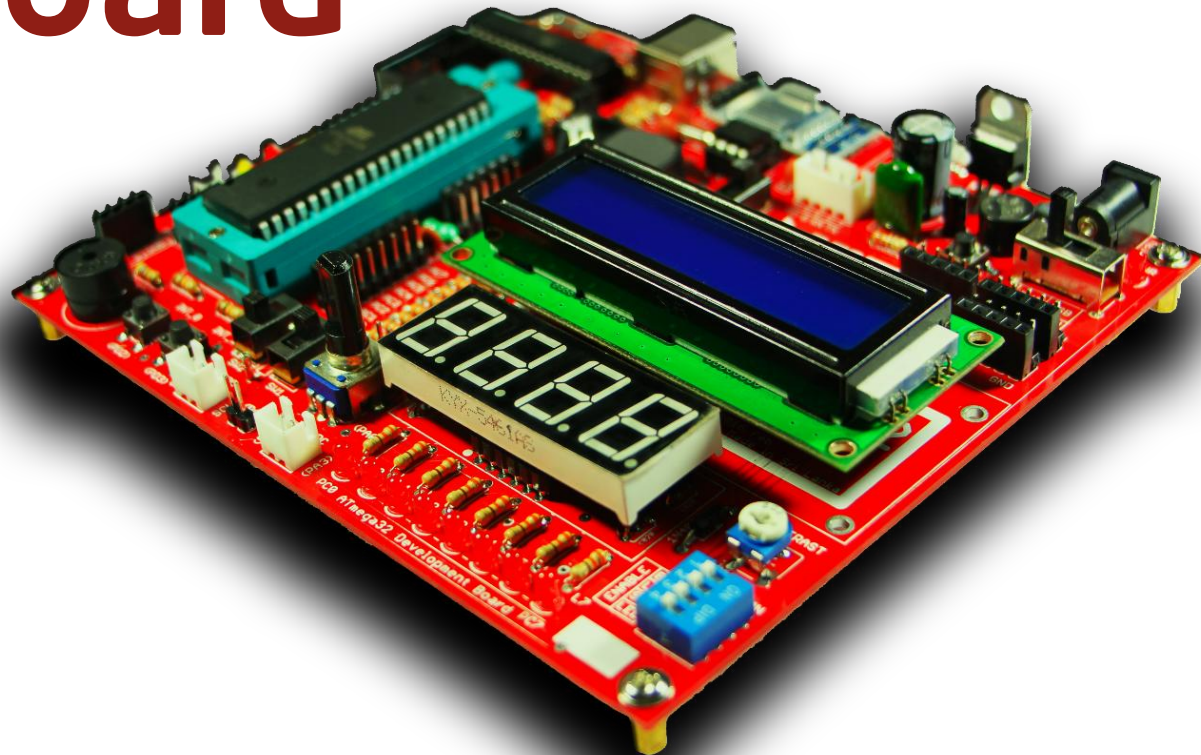


# AVR Development Board

USER'S GUIDE



For AVR  
microcontrollers



USB  
connectivity



On board Serial  
Communication

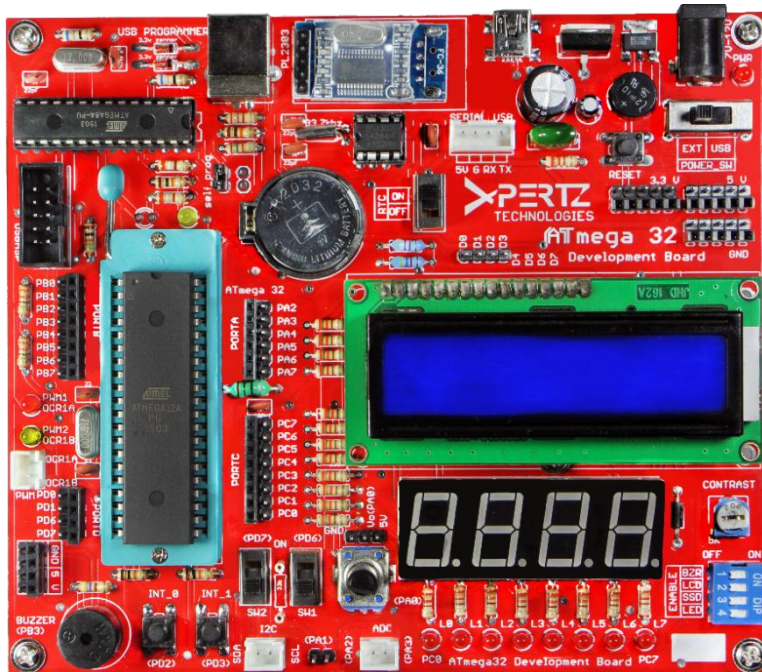


More GPIO



Easy  
plug & play





# Introduction

This user guide describes how to get started with the XPERTZ® ATmega 32A/16 Development board. The ATmega 32A/16 Development board is a hardware platform to evaluate the Atmel ATmega 32A/16 microcontroller. The board consist of many prototype designs to evaluate features of ATmega 32A/16 microcontrollers vary easily. The development board is specially design both experienced AVR microcontroller developers as well as newer. This Board compatible with all kind of AVR programming software packages such as AVR studio, winAVR and so on.

This board is ideal as a training board and allowing to connect various type of available modules specially designed for Arduinos. As well as this board can also be used in a more fixed application, as a base or CPU board for a more complex system.

# Getting Started

## KEY Features

- ★ USB powered
- ★ Support for 40 pin dip packages of both ATmega 32 and 16 microcontrollers
- ★ External target CLK 16MHz at 5V
- ★ On-board USBasp programmer
- ★ USBasp on operation indicator
- ★ On-board Serial-USB module (supported for both PL2303 and CH340)
- ★ 4 pin Serial data output port (compatible for Bluetooth serial data transfer module )
- ★ On-board Real Time Clock DS1307
- ★ External power input facility 6V to 24V AC, can handle to drain up to 1A
- ★ Easy power mode selection switch and Red power indicator LED
- ★ 7×2 +5V output pins (up to 1A)
- ★ 7×2 GND output pins
- ★ 5×2 3.3V output pin (up to 500mA)
- ★ ISP connector
- ★ 8 Red LEDs

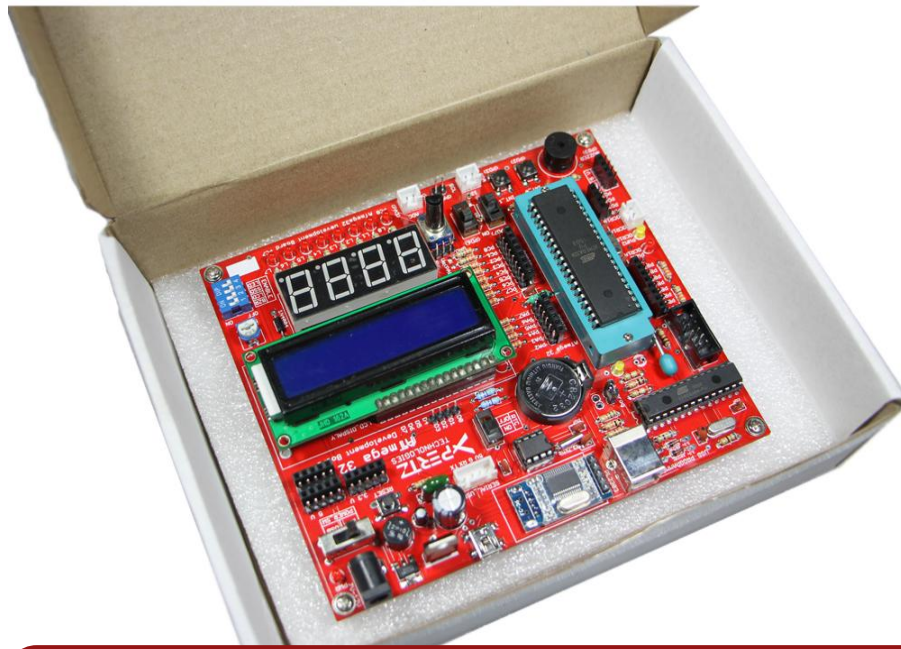
## KEY Features Cont...

- ★ Two mechanical user push buttons (connected to the External Interrupts on MCU )
- ★ Two mechanical user slide switches
- ★ I2C (two wire communication) port
- ★ Two Analogue input connector
- ★ On-board potentiometer connected to the ADC 0
- ★ Analogue signal input device connector (support for various kind of analogue sensors such as Temperature sensors, LDRs, IR receivers, etc.)
- ★ Easy power saving switch unit
- ★ PWM based tone controller Piezo buzzer
- ★ Two mechanical user push buttons (connected to the External Interrupts on MCU )
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- ★ Easy power saving switch unit

## KEY Features Cont...

- ★ 4 digit Seven Segment unit
- ★ 16 × 2 LCD module
- ★ 26 pins of GPIO (available both male and female pins )
- ★ 2 PWM output pins
- ★ 2 PWM indicator LEDs (Red and Yellow)
- ★ PWM based tone controller Piezo buzzer

# About Product



## System Specification



**Power Supply**  
via USB cable (5V DC)



**External Power**  
7-12V AC or 7-15V DC



**Board Dimensions**  
150 × 130mm

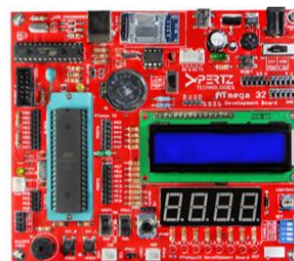


**weight**  
~365g

## Package Contains



Protective Box



AVR Development Board



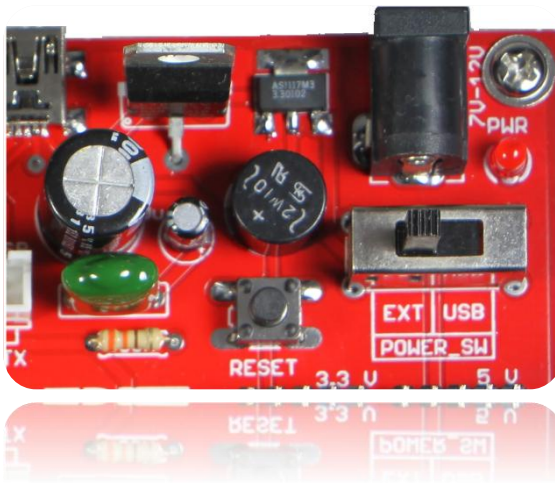
Mini USB cable



USB cable



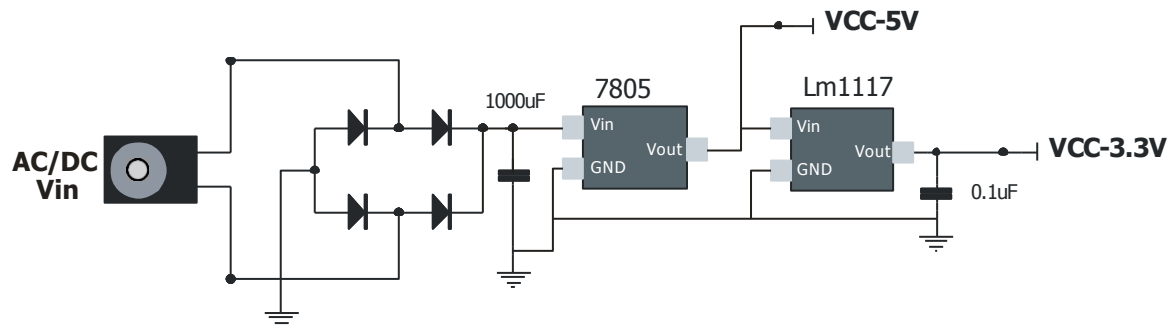
# Dual power supply



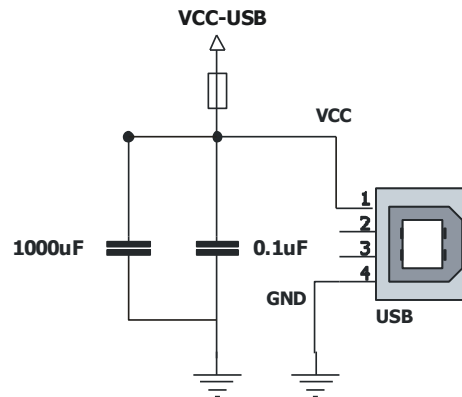
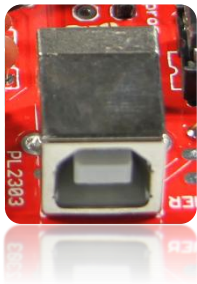
Board contains switching power supply that creates stable voltage and current levels necessary for powering each part of the board. Power supply section contains two power regulators: **LM7805**, which generates VCC-5V, and **LM1117** which creates VCC-3.3V power supply. The board can be powered in two different ways: with **USB power supply** and using external adapter. External adapter voltage levels must be in range of 9-15V DC or 7-12V AC. Upon providing the power using either external adapter or USB power source you can turn on power supply by using **Power Mode Switch**. Power LED (Red ON) will indicate the presence of power supply.

The board contains four separate **power outputs** named as **5V**, **GND**, **3.3V** in the bottom of the power mode switch and another one near left corner of the board next to the buzzer.

Note: For protection of computer USB port the 3.3V supply work only with external power input.



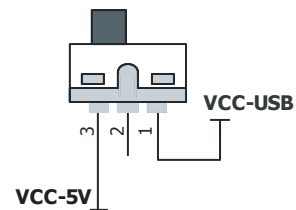
## USB Power and Programmer socket



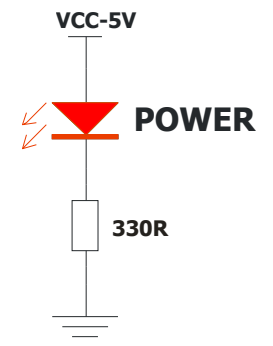
## Power Mode selection switch



Power Mode switch



## Power Mode selection switch





# On-board programmer

This development board consist an on-board **USBasp** programmer which is powered by an ATmega 8 microcontroller. The driver for this programmer is available on <http://xpertztec.blogspot.com/p/main-page.html> and it compatible for any kind of windows version. Instead of this programmer there is a universal 10 pin ISP port to connect another USBasp programmer or JTAG programmer externally.

## How do I start?

In order to start using on-board and program your microcontroller, you just have to follow two simple steps:

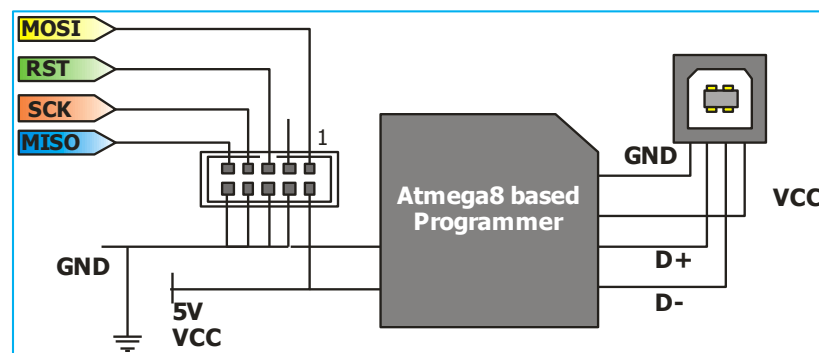
### 1. Install the necessary software

- Install USB drivers (USBasp drivers and USB-TTL drivers)
- Install any AVR Flash burning software (Programming software)

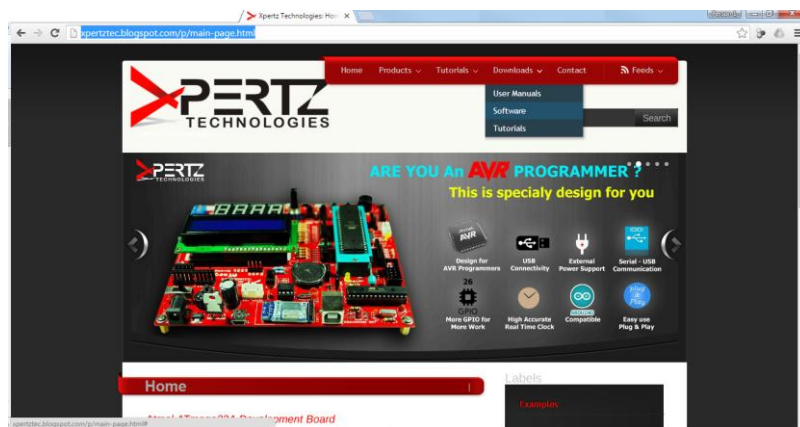
Note: All needed software and Drivers are available at the official site of Xpertz Technologies

### 2. Power up the board, and you are ready to go.

- Plug in the programmer USB cable
- Change power switch to USB power mode



# Installing programmer drivers

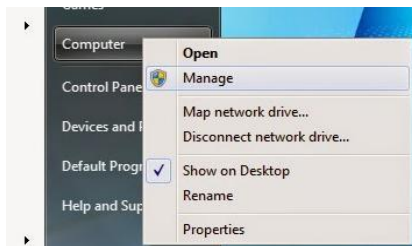


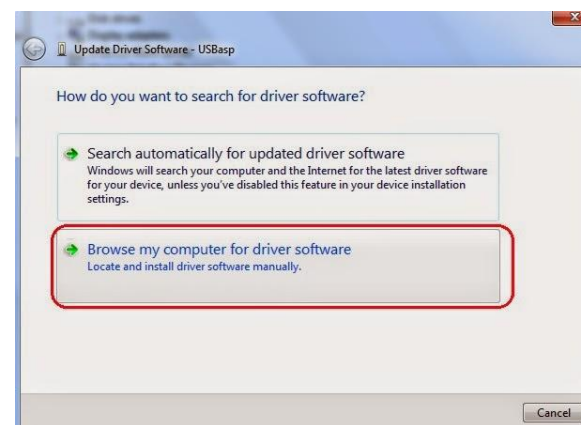
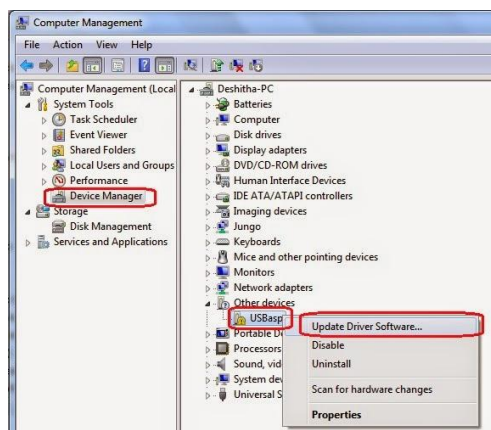
## Step 1 - Download Drivers for USBasp

First download appropriate driver from Xpertz official web page (<http://xpertztec.blogspot.com/p/main-page.html>). Then unzip downloaded zip file on your hard disk and connect your board to the computer through USB cable. Select power mode to USB on the board.

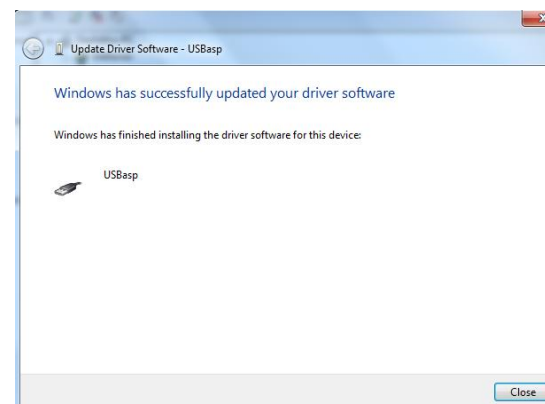
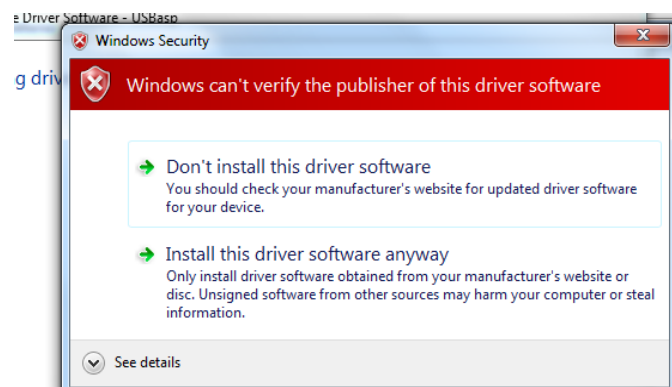
Wait few second and if the computer unable to identify the driver automatically then go to device manager setting of the computer and update the driver for unknown device named as USBasp.

## Step 2- Installation drivers





Then select the path for downloaded driver on your hard disk and do following steps



If you got a message about unknown driver publisher please ignore it and select *"Install this driver software anyway"* and finish installation.

If you use Windows 10 please download and just install windows 10 driver through ".exe" file

## Step 3 - USB-TTL driver installation

- First download the driver for PL2303 module which is named as "Prolific USB-TTL driver" in the Xpertz web site.
- Extract downloaded file on your hard disk.
- Install the driver by double clicking on ".exe" file
- Connect the board to the computer through black USB mini wire (V3 cable).
- Confirm status of installed driver by checking the place of Device manager → Ports (If the driver is successfully installed it should be shown a prolific device under the Ports.)

### For Windows 10 users

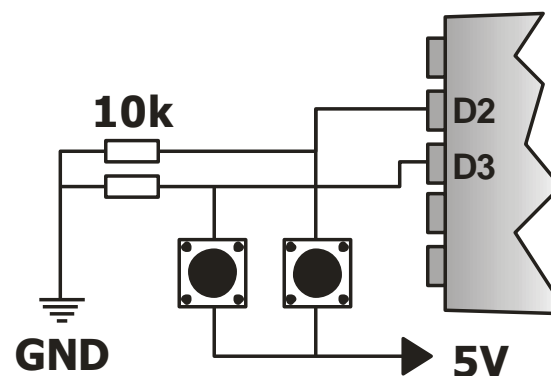
- After follow above steps right click on prolific device under the Ports on device manager and select "Update Drive Software"
- Then select "Brows my computer for driver software"
- Then select "Let me pick from a list of device drivers on my computer"
- After load driver list select "prolific 2008 driver" and click install. It will add driver perfectly on windows 10

# Input / Output

ATmega 32 Development Board consist of Two Push button inputs, Two Slide switch inputs, a potentiometer input for, two separate ADC inputs and I2C input port. As well as the board include 29 GPIO pins by expanding MCU pins. Furthermore it has eight LEDs, 4 digit Seven Segment Display, a LCD Display, two PWM LED outputs, a Piezo speaker for generate melodies and serial output port.

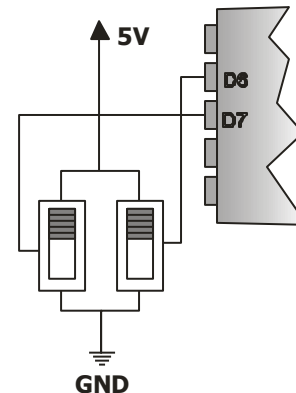
## Push button inputs

It is noted before that the board includes two push button inputs which are connected to the PORT D2 and D3. These pins are specially allocated for external interrupts in the ATmega 32/ 16 MCUs. So this inputs can be used either as a digital input or as an external interrupt signal.



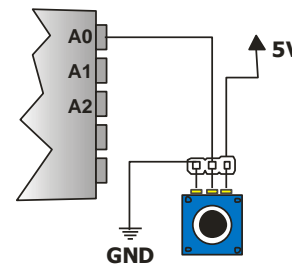
# Slide switch inputs

There are two slide switches on the board which are connected to the PD6 and PD7. Through these switches the user able to give a stable digital input.



# Potentiometer input (ADC)

A 50k potentiometer is connected to the ADC pin 0 (A0) as an input device. At the top of the potentiometer there is another three pin male connector

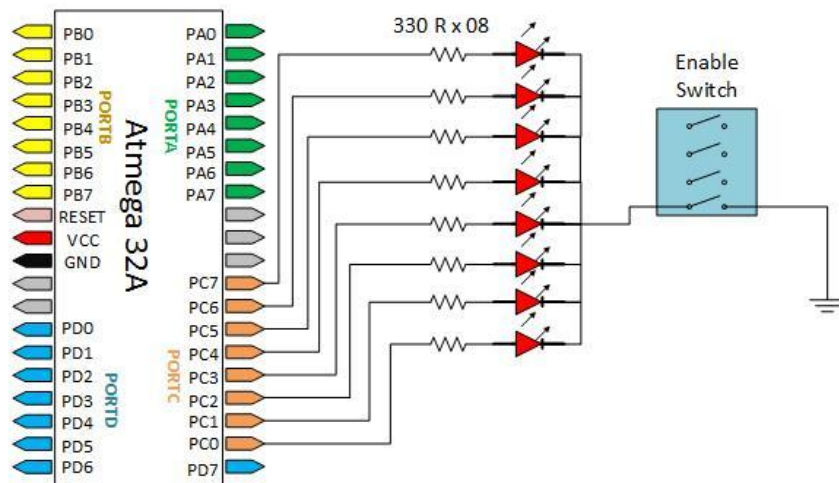




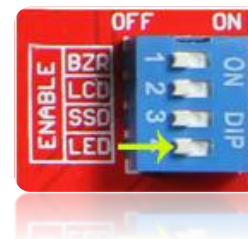
# 8 LED Output

The board consist of 8 Red LEDs which are directly connected to the PORT C pins of the MCU. But the user able to control lighting of those LEDs by turning on or off LED Enable switch even HIGH state of PORT C. Following figures shows snapshot of those LEDs and schematic diagram of that part.

## LED Connection



LED Enable Switch



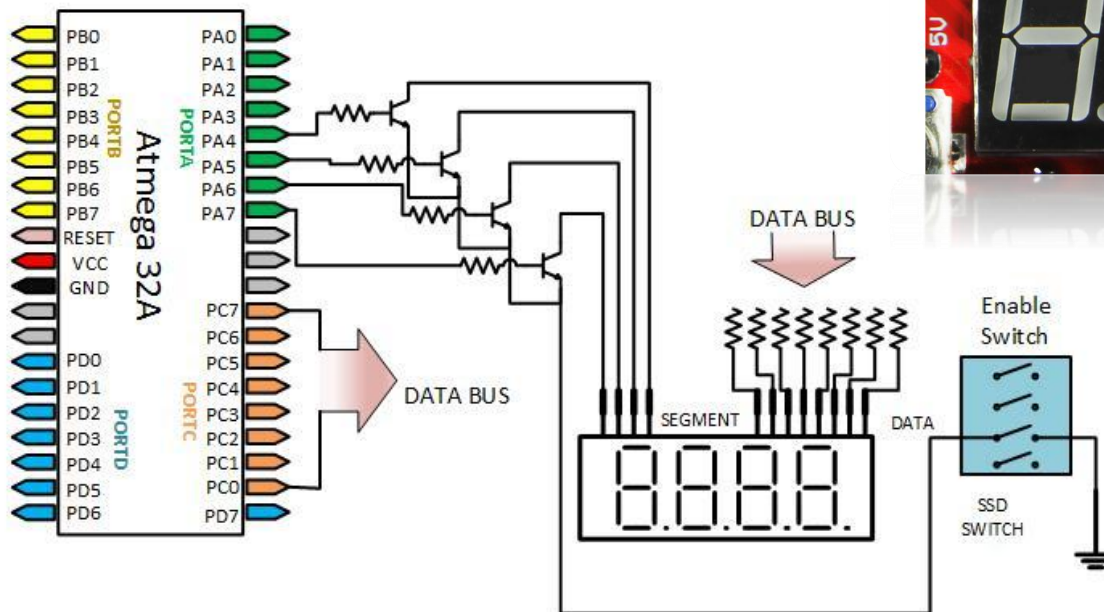
Note: When you use the on-board RTC you must disable both LEDs and SSDs otherwise it does not work properly due to the data loss.

# Seven Segment Display

There is a four digit Common Cathode Seven Segment Display module that connected to the development board. The SSD unit has been designed as removable module. Default color is Red and the board will support to any color module available in present market. This display also can control through Enable switch to minimize power consumption of the board.

When consider the connections, Digit selection pins had been connected to the PORT A (4...7) and Data pins had been connected to the PORT C (0...7).

## SSD Connection



# 16×2 Character LCD

Liquid Crystal Displays or LCDs are cheap and popular way of representing information to the end user of some electronic device. Character LCDs can be used to represent standard and custom characters in the predefined number of fields. The Development board provides the connector and the necessary interface for supporting 2x16 character LCDs in 4-bit mode but offer another four pins for use 8-bit mode. Therefore if the user decide to use 8-bit configuration he/she can connect excess 4 pins with MCU. Power for the LCD display also passed through Enable dip switch so it is easy to turn on or off by changing the position of the LCD Enable switch.

There is a potentiometer just bottom of the LCD display and it has been named as "Contrast". Actually this potentiometer is used for change the contrast of the Display to increase the visibility.

