Mechatronics Engineering

Atmega328P Embedded Board Setup Tutorial

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Introduction

- In order to program a micro-controller, a programmer circuit is needed.
- The programmer circuit is composed of a micro-controller that is dedicated to programming other micro-controllers. The programmer micro-controller acts as a converter from USB (UART) communication to Serial Peripheral Interface (SPI) communication for programming other micro-controllers.

Objectives

- Build AVR (Atmega328P) programmer circuit
- Installing drivers

Contents

- Electronic Elements Mapping
- Soldering
- Driver Installation
- Toolchain Installation (Avrdude)

Electronic Elements Mapping

C1, C2, C4, C5	22p
D1, D2	3.3 V Zener diode
R1, R2	68 Ohms
R3	2.2 kilo Ohms
R4, R5	1 kilo Ohms
R6, R7	10 kilo Ohms
XTAL1	12 MHZ Crystal
XTAL2	16 MHZ Crystal
LED1	3mm LED green
LED2	3mm LED red
USB	USB-Male
X1	6 x male headers
JP1, JP2, JP3	2 x male headers each
JP4, JP5	4 x female headers each
RST to PB0	12 x female headers
PC5 to PB1	14 x female headers
Atmega328P	Atmega328P + IC holder
Atmega8A	Atmega8A + IC holder

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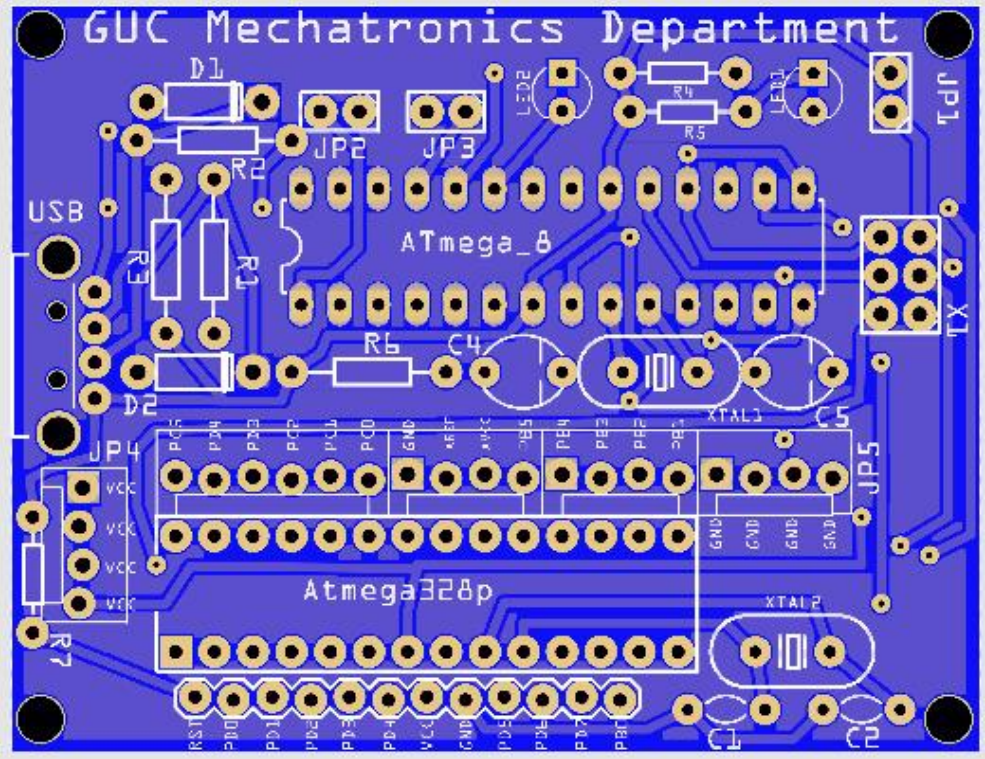
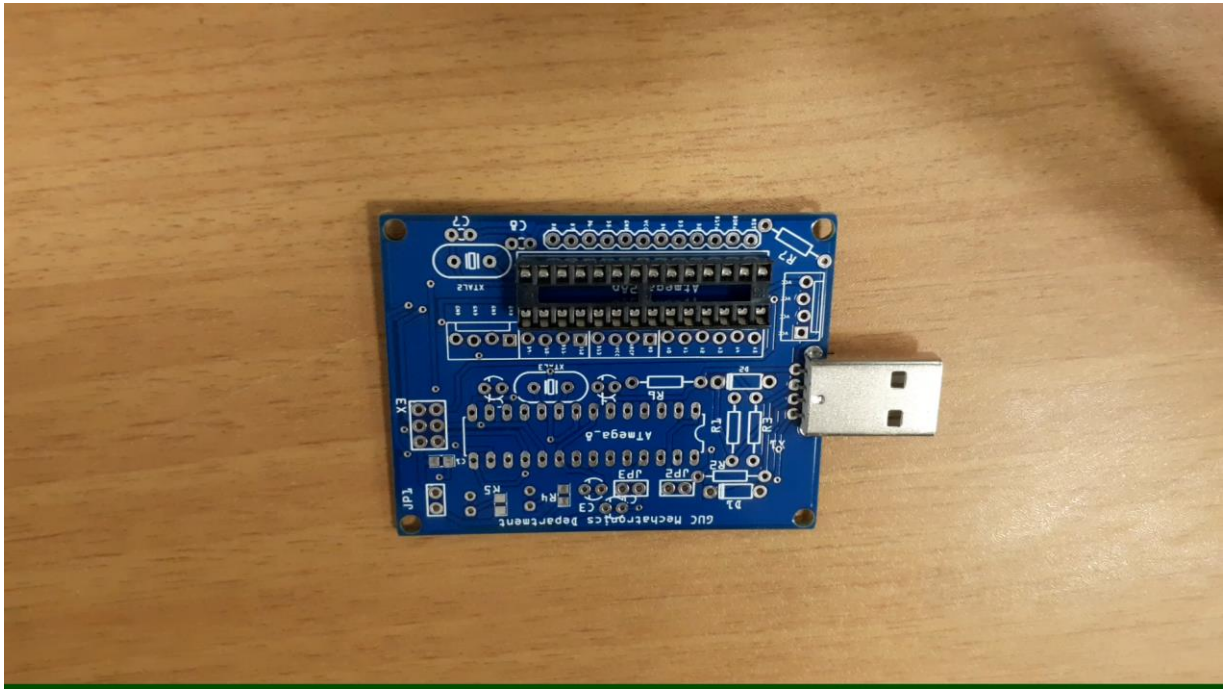
Hardware PCB (Components unsoldered)



- Check the labels on the board as well as the Elements mapping table

Soldering Tutorial



- Use sandpaper to clean soldering iron tip when tin does not melt easily
- DO NOT solder any IC's (Atmega8A or Atmega328P)
- Only headers, IC holders and secondary components (resistors, capacitors,…etc) are soldered

Online Tutorial :
https://www.youtube.com/watch?v=Qps9woUGkvI

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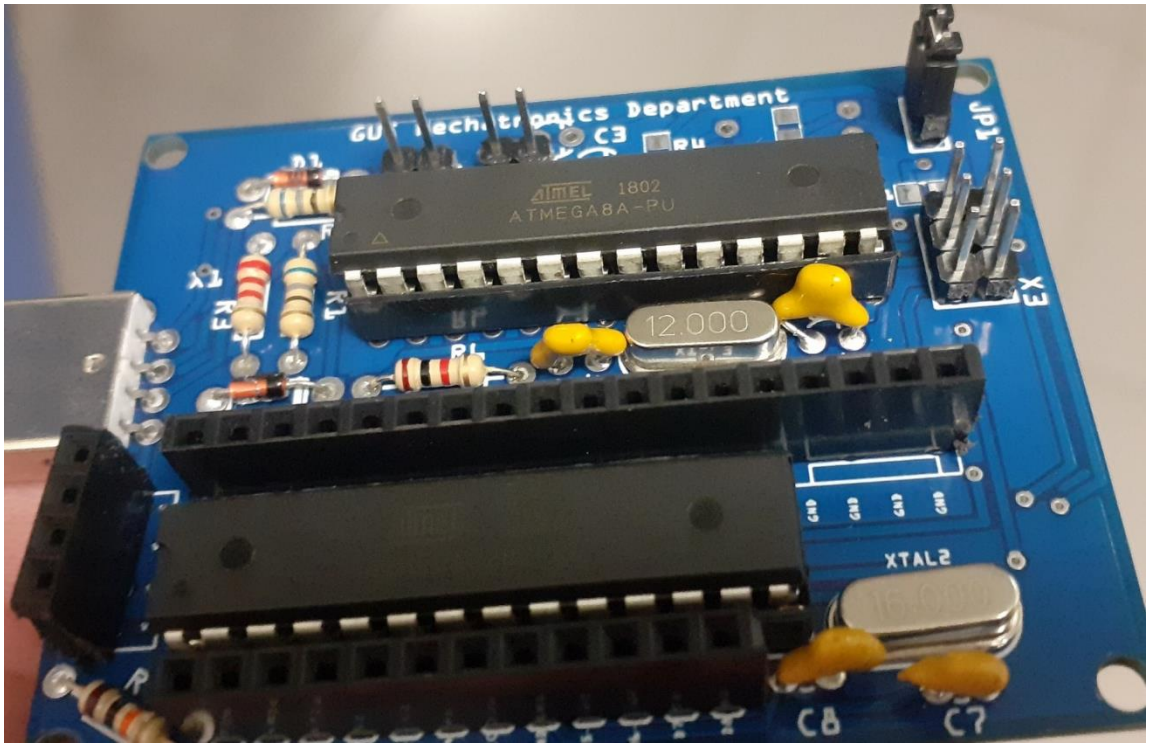
Hardware PCB (Components soldered)



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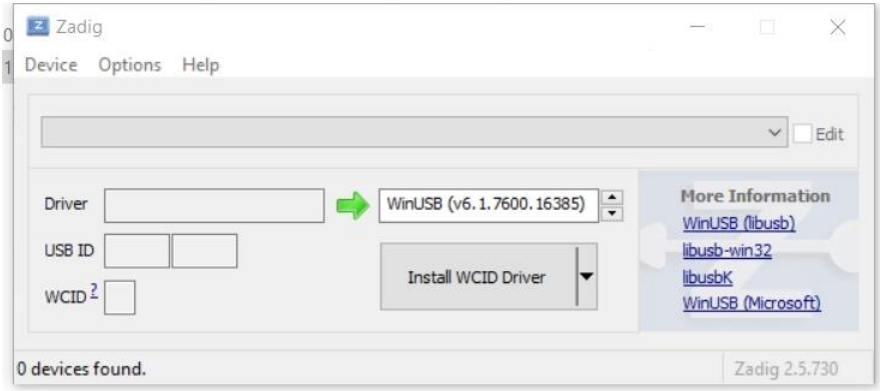
Driver Installation

- Download Zadig latest version from https://zadig.akeo.ie/, tested version is v2.5

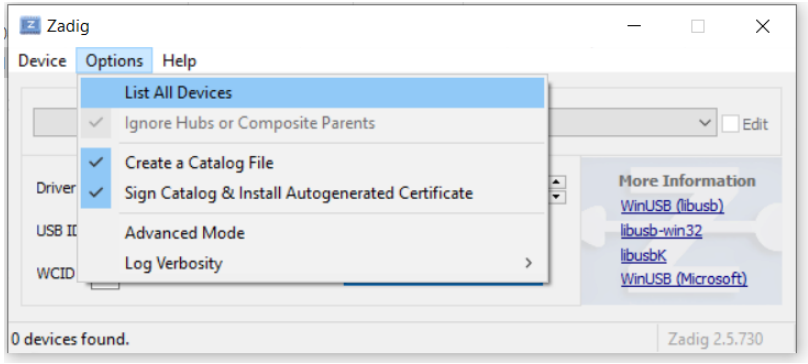
- Plug the USBasp board in any USB port.

- Start Zadig and you should see this screen

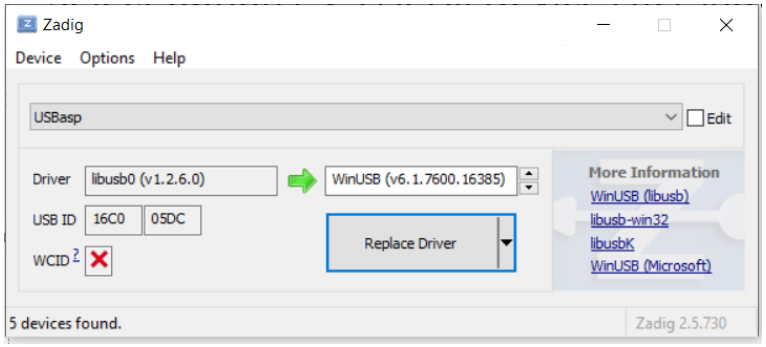


Driver Installation (cont'd)

- Select options -> List All Devices (as shown)

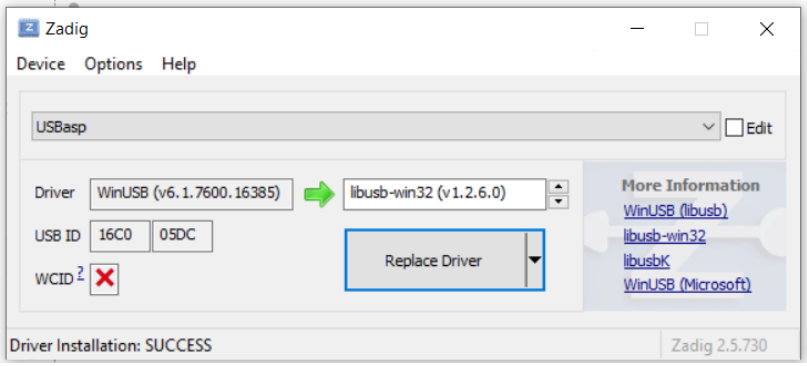


- The following screen appears (if USBasp is not selected use the drop down arrow to select it)



Driver Installation (cont'd)

- Change the driver to be installed (on the right) to be libusb-win32(v1.2.6.0) as shown below



- Click on "Replace Driver" (if no driver is installed already, it will be "Install Driver")
- It will take some time and the driver will be successfully installed

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Installing Avrdude

- Download Avrdude latest version from http://download.savannah.gnu.org/releases/avrdude/. Tested version is v6.3.
- Copy “avrdude-6.3-mingw32” folder and place it in the C:\ (root directory)
- Read more on avrdude at this link : https://www.nongnu.org/avrdude/user-manual/avrdude_4.html