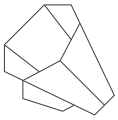


Setup Microchip Studio 7 Programmer to access Arduino board.

Install Microchip Studio

Download and install Atmel Studio from the following link:
http://studio.download.atmel.com/7.0.1931/as-installer-7.0.1931-web.exe
When selecting architecture only the AVR is needed as seen Figure 1 (However feel free to install the others as well)

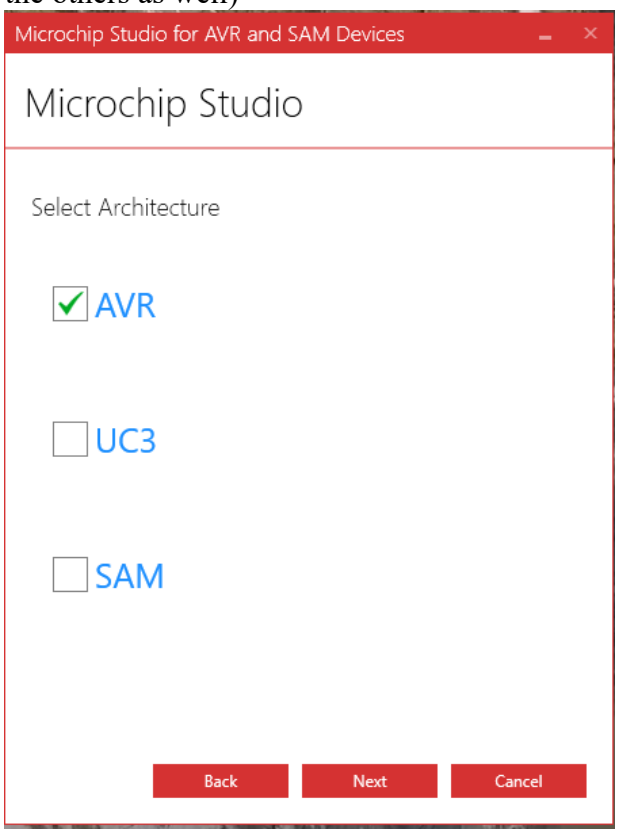


Figure 1: sellecting Architecture

Setup programmer with Microchip Studio

Osoyoo 2017 Complete Ultimate Starter Kit for Arduino with Mega2560 and UNO R3 Board Projects.

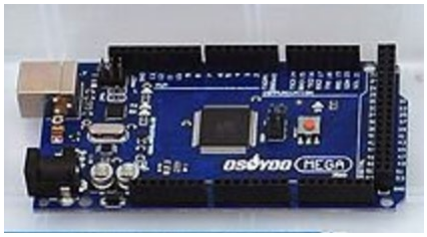
To be able to program Arduino boards from Atmel Studio 7 (Powered by Visual Studio) it is necessary to install a separate Application/Programmer. The Arduino MEGA2560 has an *In System Programmer (ISP)* that are compatible with *avrdude*[1].

Download http://download.savannah.gnu.org/releases/avrdude/avrdude-6.3-mingw32.zip file to your PC download folder.

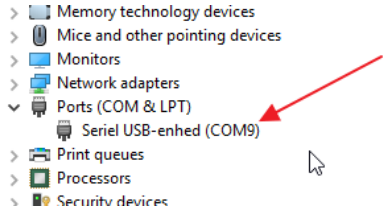
Move the "avrdude-6.3-mingw32.zip" file to the directory where you want to extract the zip file e.g. *D:\usr\bin\avrdude* and extract the downloaded zip-file into this folder.

[1] Can be downloaded here http://download.savannah.gnu.org/releases/avrdude/avrdude-6.3-mingw32.zip

Connect your Arduino board to an USB port on your PC using the blue USB cable. **To make the Microchip studio setup work you must always use the same USB connection (port).**



When the Arduino board is connected to your PC the COM port used will show up in the Windows Device Manager (Hint: Press Windows-key + X, Device manager, Ports). In my case the Device Manager display looks like this:

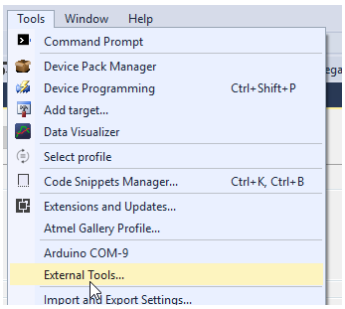


In my case it uses COM9

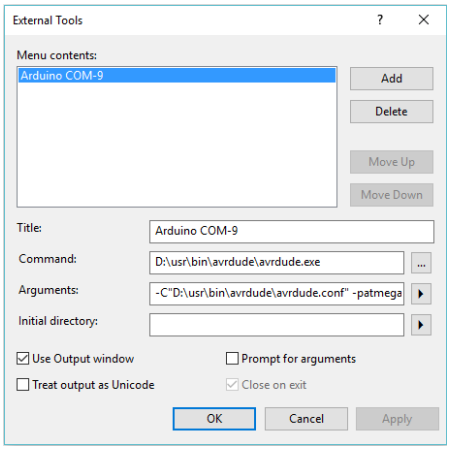
Now we are ready to integrate your Arduino board into Atmel studio development environment.

Startup microchip studio and select: File, New, Project, choose “Assembler”, “AVR Assembler Project” and press OK button. In the Search frame write “ATmega2560” and then select the ATmega2560 and press OK button. A small default program in Assembler will show up.

Setup the application/programmer as an external tool in Microchip Studio



Add your new external tool Tittle (e.g Arduino COM-9) like this



The Command field must point to *avrdude.exe.* In my case it is *D:\usr\bin\avrdude\avrdude.exe*.

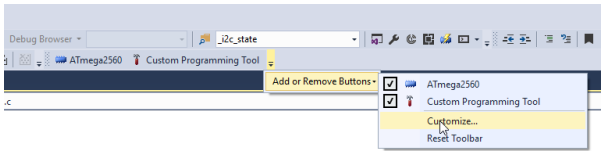
The Arguments frame contents should look like this:

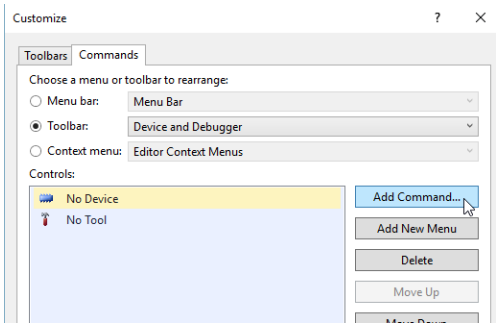
-C"D:\usr\bin\avrdude\avrdude.conf" -patmega2560 -cwiring -P\\.\COM9 -b115200 -D -Uflash:w:"$(ProjectDir)Debug\$(TargetName).hex":i

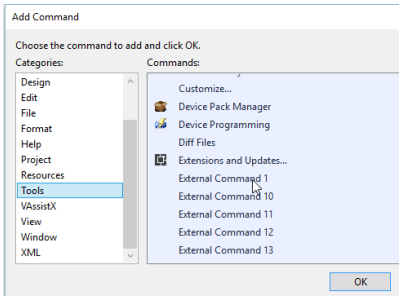
Where the yellow markings should match your installation of *avrdude* and the COM-port the Arduino board is connected to. (Cut and Past my Arguments frame and edit the path and COM port so it fits to your settings).

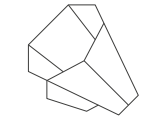
Press “Apply” and “OK”.

To make the new programming tool easier to use it is possible to add it to the tool bar in Atmel Studio.

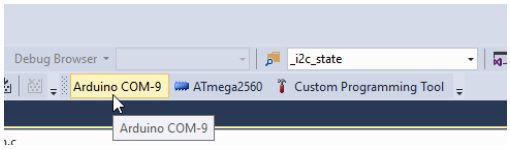








After that, your Arduino board can be accessed from the tool bar



Now it is possible to program your Arduino board from Atmel Studio by pressing the new button (Arduino COM-9) you just need to transfer the program to the Arduino board.

Program your Arduino with microchip studio

Paste the code in the textbox in main.asm, Build it (F7), and program it to the Arduino. It should blink ones a second.

```
start:
ldi r16, HIGH(RAMEND)
out SPH, r16
ldi r16, LOW(RAMEND)
out SPL, r16
ldi r16, 0xff
out ddrb, r16
call delay
ldi r16, 0
out portb, r16
call delay
ldi r16, 0xFF
out portb, r16
rjmp start


delay:
ldi r16, 82
l1:
ldi r17, 255
l2:
ldi r18, 255
l3:
dec r18
brne l3
dec r17
brne l2
dec r16
brne l1
ret
```