Program Arduino Nano (or Uno) board from Microchip/Atmel Studio IDE

This guide applies to firmware developed using Microchip Studio IDE for AVR and SAM Devices (formerly "Atmel Studio 7"). It is a superior IDE to Arduino, but no more difficult to learn.

Programming the target device (ATmega328P MCU) can be achieved without Arduino IDE and without any hardware programming tool. The Nano board has an on-board USB-serial "bridge" IC and a flash-resident AVR bootloader. A Windows PC application called "**AVRdude**" communicates with the bootloader via USB to program firmware into the Nano's MCU flash memory. Arduino Uno (R3) boards can be programmed in the same way.

Hence you need to download some files to run "**avrdude**" on Windows. The best place to download the files is GitHub, here: https://github.com/mariusgreuel/avrdude/releases. There should be 3 distribution files: "avrdude.exe", "avrdude.conf" and "avrdude.pdb". Copy these files to a new folder named "**AVRdude**" on your PC local drive, in the "root directory" (C:\).

Connect your Nano board to a USB port on your PC. Open Windows "Device Manager" utility and click on "Ports (COM & LPT)". You should see the Nano USB-serial device listed. Note the number of the associated "COM" port. Be aware that the COM port number may change from time to time. This is an annoying USB quirk. Remember to check the allocated COM port when re-connecting the Nano board to your PC.

How to create a (software) "Programming Tool" in Microchip Studio

Click in the menu "**Tools/External tools**".

You should see a dialog box asking for some parameters, as follows...

In **Title**, write: `Program Nano` or any other name you prefer.

In **Command**, write: `C:\AVRdude\avrdude.exe`

In **Arguments**, write (all on one line):

```
-C "C:\AVRdude\avrdude.conf" -p atmega328p -c arduino -P COM# -b 115200
-U flash:w:"$(ProjectDir)Debug\$(TargetName).hex":i
```

Replace `COM#` (in the Arguments field) with the actual COM port your Nano board is connected to, as found in Windows Device Manager. (Example: COM4)

Tick the box: "Use output window". Click OK.

Done... You should see a new option "**Program Nano**" in the **Tools** menu.

After your program code is built, it can be programmed into the Nano board simply by clicking on the item "Program Nano" in the Tools menu.

Note: Some cheap Chinese Nano board clones use a non-standard Baud rate for the serial bootloader, typically 57600 baud. If Microchip Studio outputs an error message when running the programming tool, try replacing "`-b 115200`" with "`-b 57600`" (in the Arguments field).