Using the PROTON+ Compiler with MPLAB^{tm}

As of version 3.3.4.0 of the Proton+ compiler it can be used within the MPLAB^{tm} IDE environment and allows single stepping of the code on a high-level basis. i.e. BASIC lines of code, or the use of the ICD2 or a Microchip^{tm} Programmer.

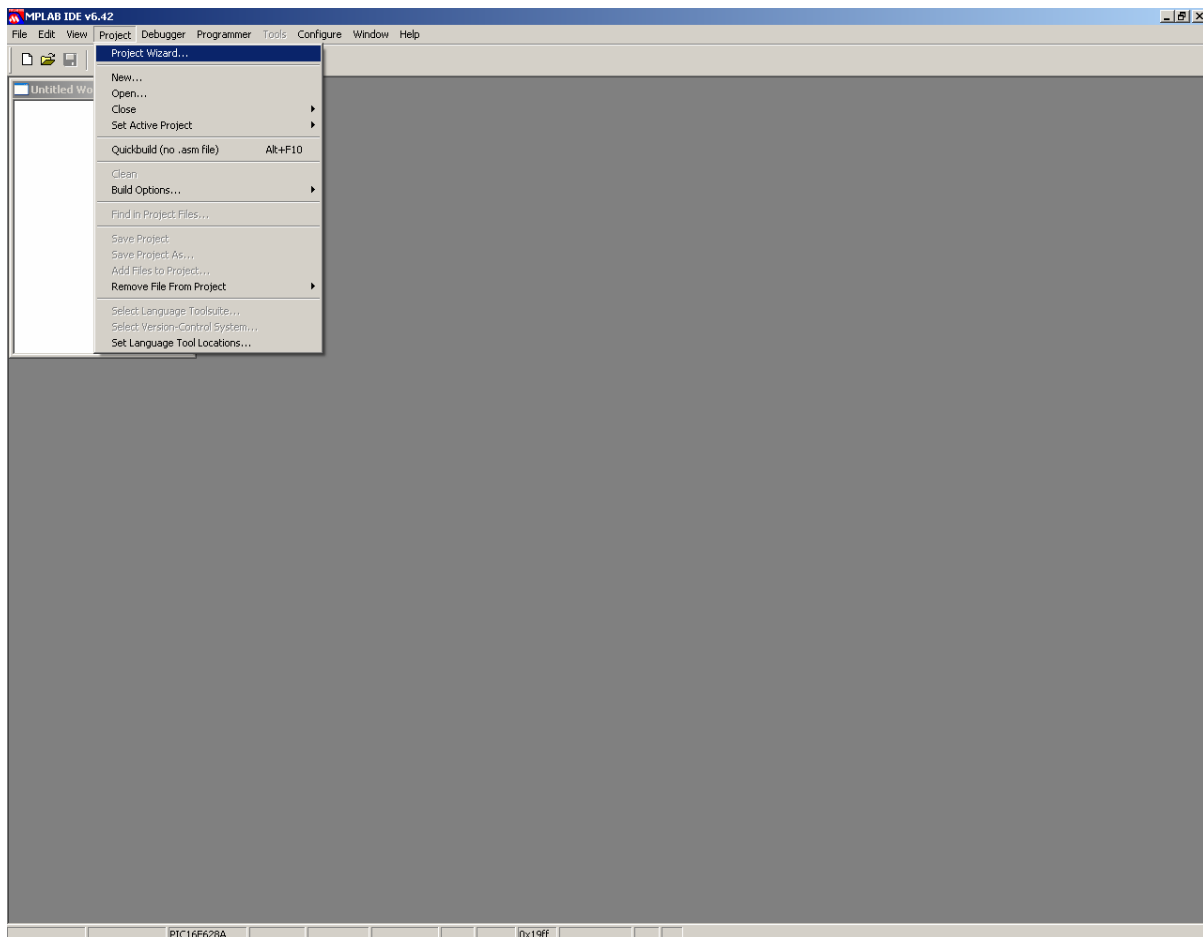I'll walk you through the method of operation step by step.

First, download a copy of the latest MPLAB^{tm} IDE because this method will only work on versions 8.0 onwards. The release at the time of writing is 8.20, and I recommend using this version.

Locate the files **TLCHILL.INI** and **PROTON.MTC** within the compiler's folder (default location **C:\Program Files\Crownhill\PDS**) and copy them into MPLAB's folder "**Core\MTC Suites**", overwriting any previous files. MPLAB^{tm} will default to location **C:\Program Files\Microchip\MPLAB IDE**, therefore, the legacy folder should be located at:
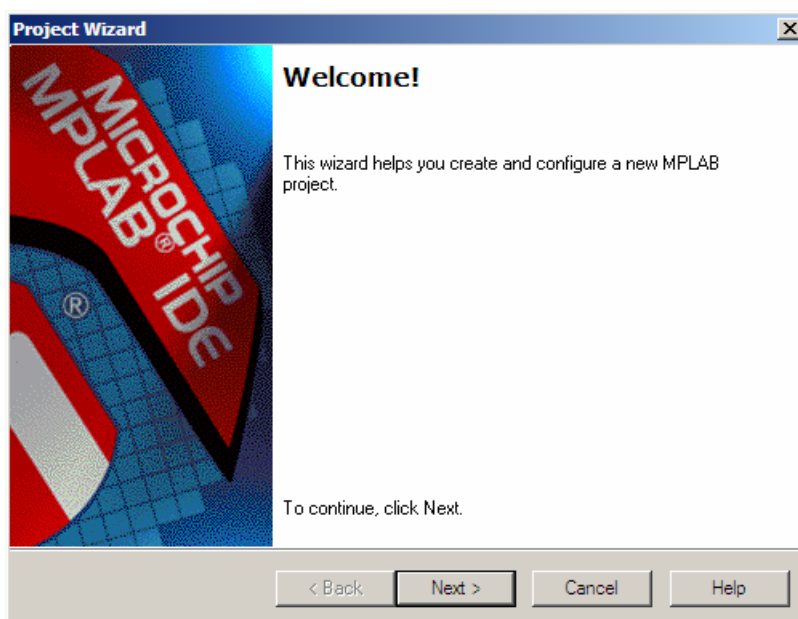
C:\Program Files\Microchip\MPLAB IDE\Core\MTC Suites.

Once these files have been copied, locate and run the file **PROTON_MPLAB.REG**, which can also be found within the compiler's folder. This will add entries into the registry that will register the Proton+ Compiler as a toolsuite within MPLAB^{tm}.
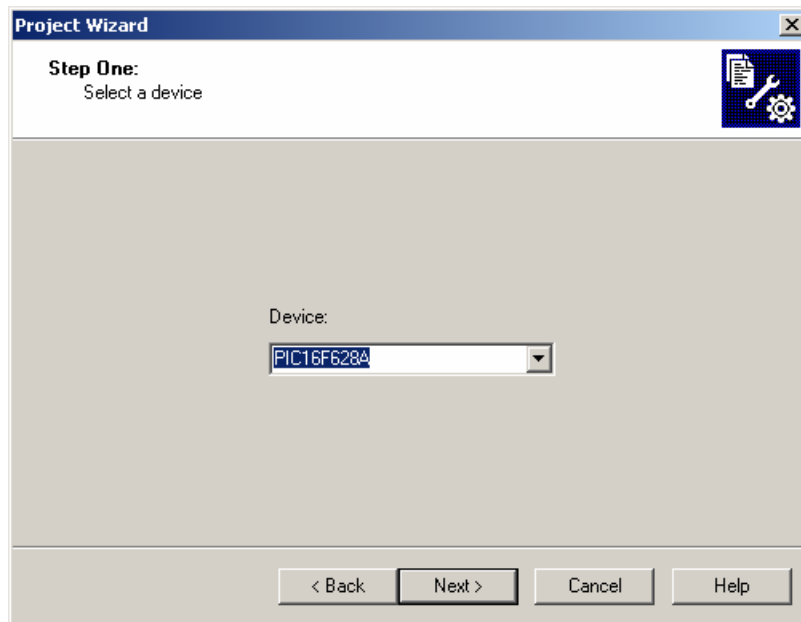
Open MPLAB^{tm}, then click on the *Project Wizard* menu option.

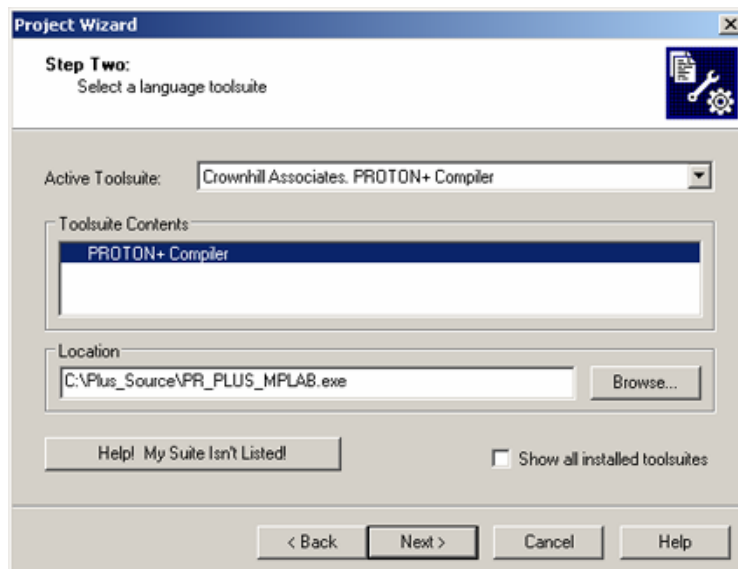And you will be presented by the intro window as shown below.

For this demonstration program, the PICmicro^{tm} of choice is the 16F628A, so in the step 1 window, choose the 16F628A device.
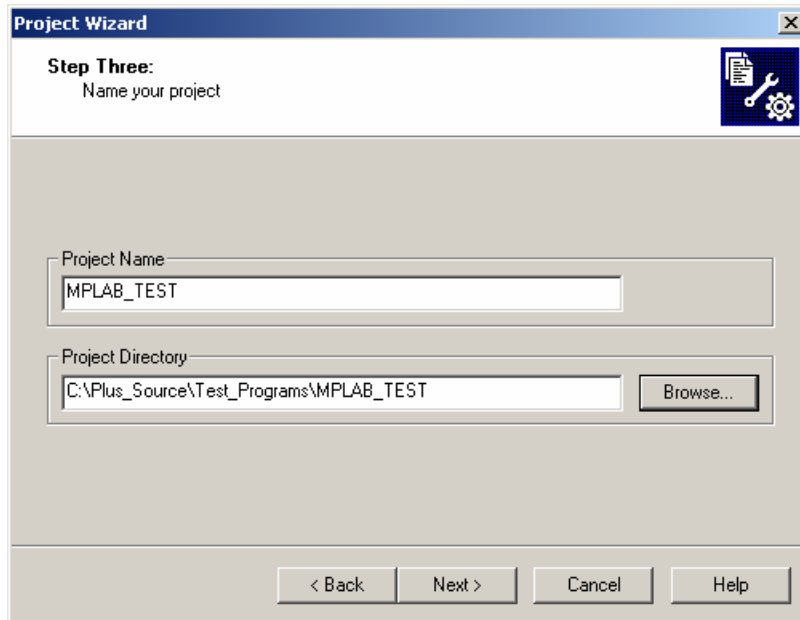

By default the device chosen in this window will be the device that the compiler uses, regardless of a `DEVICE` command within the BASIC listing. The `DEVICE` command will be ignored (see end of document to disable this).

Click *NEXT*, then choose the **Crownhill Associates PROTON+ Compiler** toolsuite, and *browse* to where the PROTON+ compiler's executable is stored.
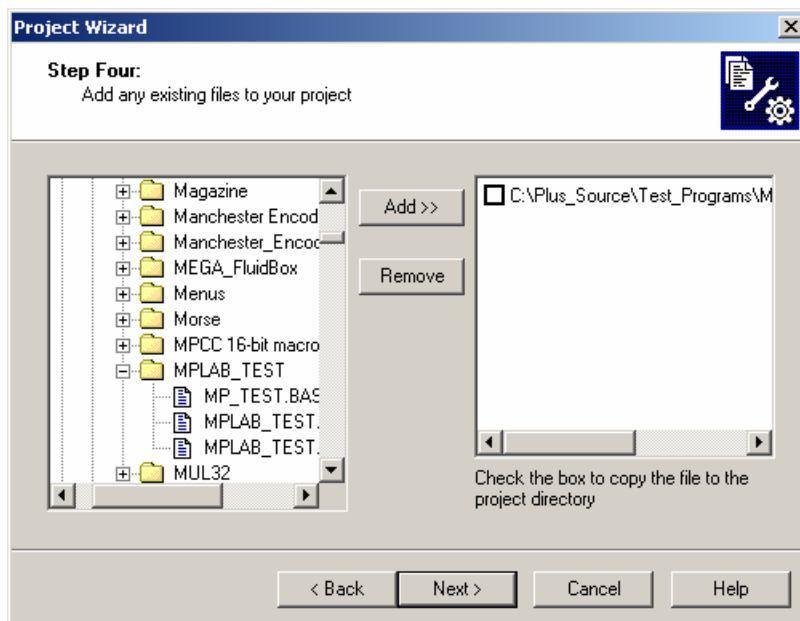The default location for this is **C:\Program Files\Crownhill\PDS**.

Browse to the file named **PrPlus_Mplab.exe** and enter this in the Location window. It should be within the compiler's folder.

After clicking *NEXT*, a project name and location needs to be chosen in the step 3 window. The name given to the demonstration project is **MPLAB_TEST**, and it's located, in this case, in the compiler's source code folder. But it can be placed virtually anywhere on the hard drive as long as it is not nested too deeply.
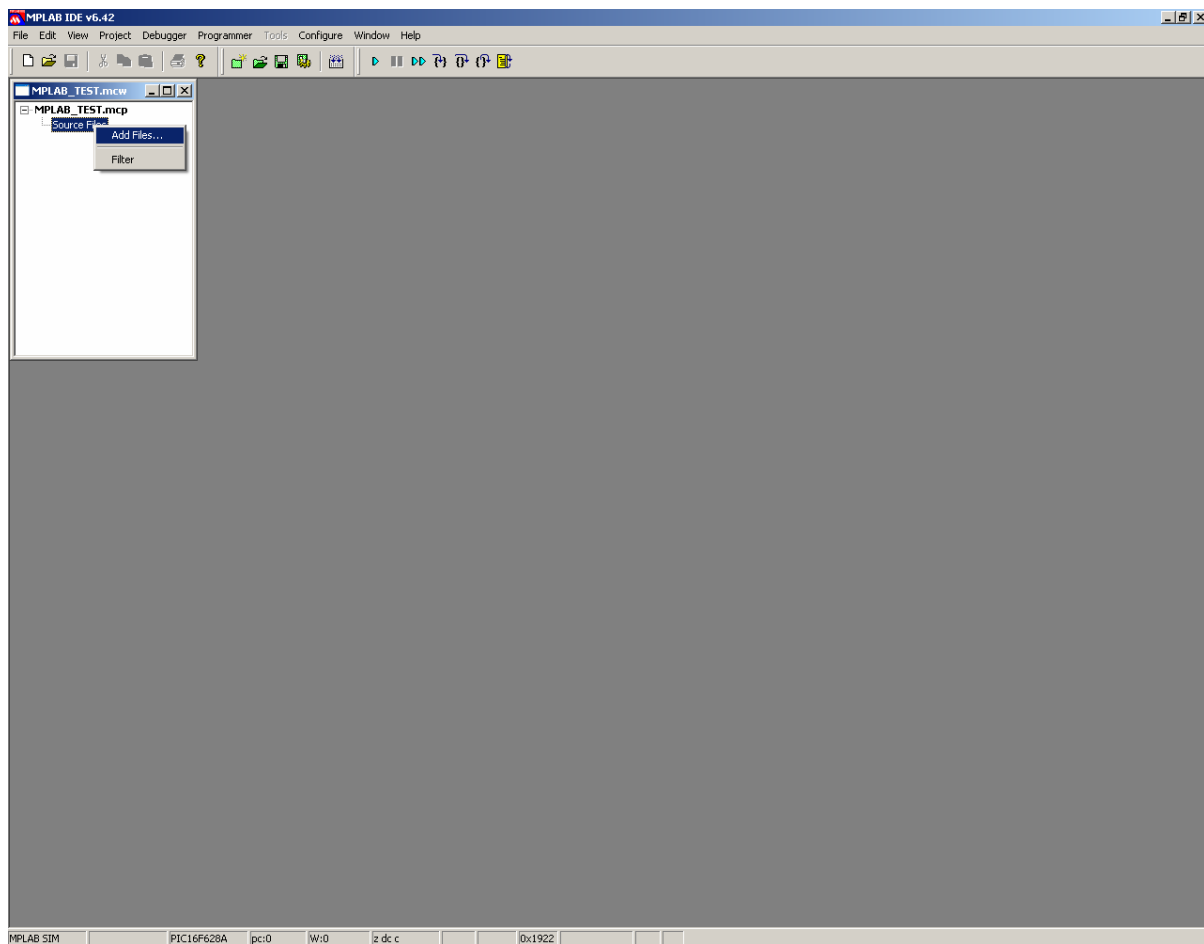

Now we need to add the BASIC file to the project. The BASIC file for the demonstration is named **MP_TEST.BAS**.
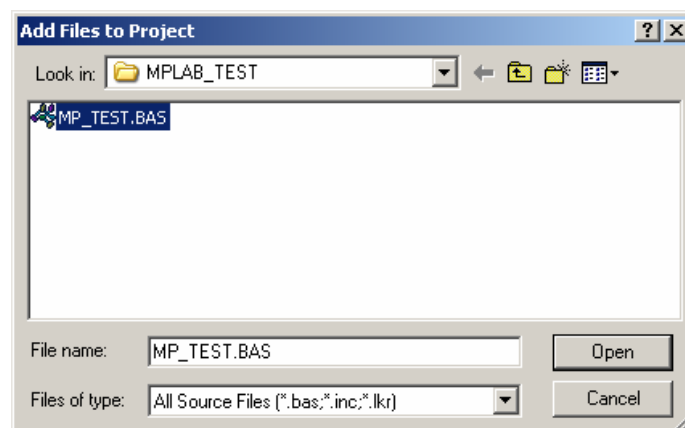

Tick the box in the right hand window only if the chosen **.BAS** file is not located in the projects folder. In this case it is, so leave it unticked.

Clicking *NEXT* a few times after step 4 will create the project. But no BASIC filename has been loaded into the IDE, so right click on *Source File* option located in the *MPLAB_TEST.MCW* window, and choose the appropriate BASIC file.

For the demonstration, the program file name is **MP_TEST.BAS**.

That's it!

Double click on the **MP_TEST.BAS** text in the **MPLAB_TEST.MCW** window, and the BASIC file will be opened ready to compile. Choose *Project* then *Build* or (Ctrl F10) to compile the program.

Open whatever windows as you require and single step or animate the code at BASIC level.

Disabling the Automatic DEVICE Selection.

By default, MPLAB^{tm} forces the compiler to ignore any `DEVICE` directives within the BASIC program in favour of whatever device is chosen in the *Configure->Select Device* Options menu. This can be disabled by right clicking on the filename within the *MCW* window and choosing *Build Options*.

You will be presented with a configuration window containing a single switch.

Untick the On switch and click Apply.
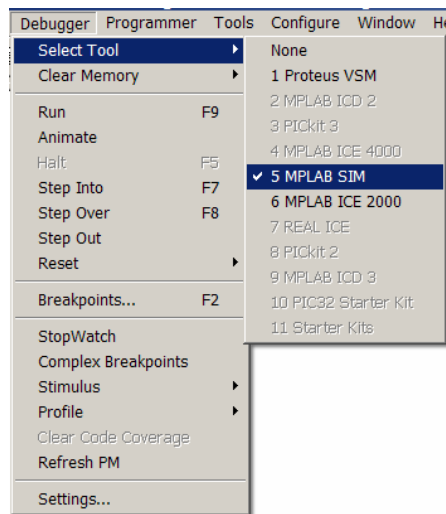
The device that the compiler recognises is now issued by the `DEVICE` directive within the BASIC program, therefore ensure that MPLAB^{tm} is configured for the correct PICmicro^{tm} device for any simulations of programming.
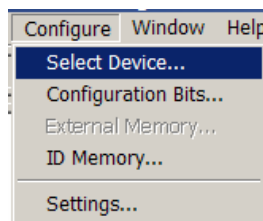
An Easier Method

There is another way to simulate within MPLAB^{tm} without going through the tedious process of creating a project.

When the directive `CREATE_COFF = ON` is placed within the BASIC program, a cof file is produced during compilation. A cof file has all the information required for simulation, and is as close as it gets to a standard format.
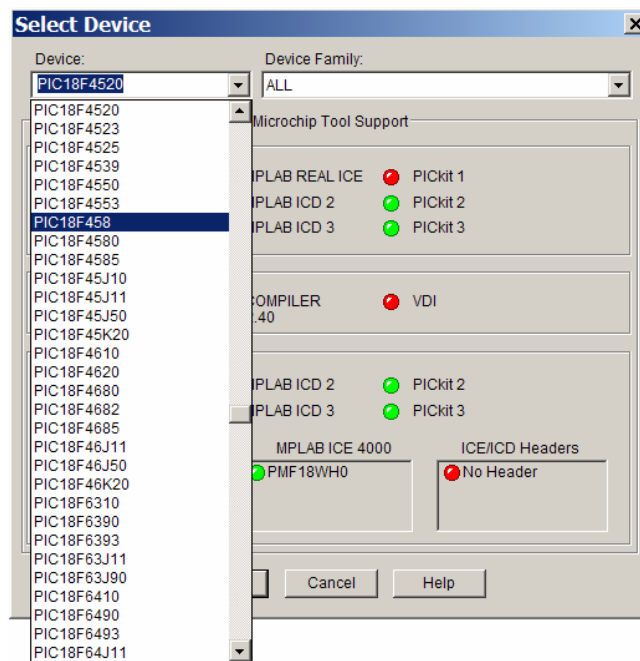
Open MPLAB^{tm}, and close any open projects, this is an important procedure. You should now be presented with an empty workspace. Choose the debugger of choice from the *debugger* toolbar menu.

Then choose the appropriate device that the BASIC program is compiled for, by clicking on the *configure->select device* toolbar menu.
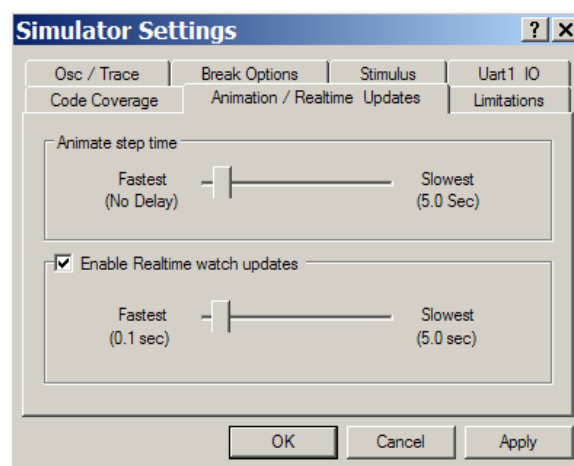
You can now choose the device from a list.

Open the folder where the BASIC file was situated, and drag the file with the extension '.cof' on to the the MPLAB^{tm} workspace. It will be automatically opened to show the BASIC file.
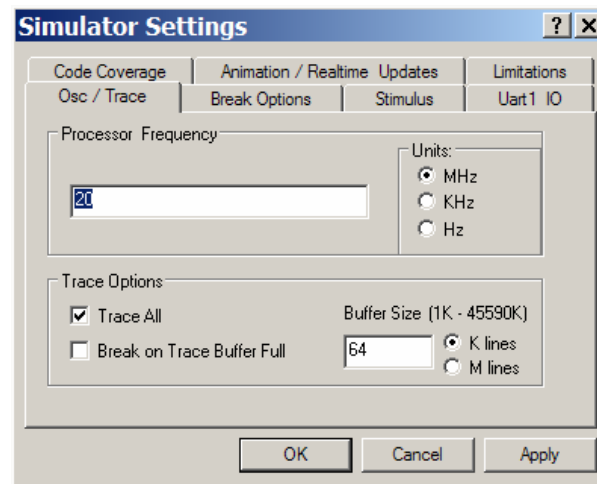
The program can now be simulated, either by animation or single stepping. However, there are still 2 steps to carry out that will improve the simulation. Click on the *debugger* toolbar menu, and choose the bottom option. i.e. *settings*.

When the window shows, click the *Animation/Realtime Updates* tab.

Tick *Enable Realtime watch updates*, and move the step time closer to the fastest side. i.e. far left.

Now click on the *Osc/Trace* tab, and choose the oscillator frequency used in the BASIC program.

Click Apply for the settings to take effect, then OK.

You can now open watch windows, dissasemby listings etc, and watch the variables update as the simulation is in progress.

This has been a very brief explanation on how to incorporate the Proton+ compiler into MPLAB^{tm}, but it gives you the basics (Pun intended). The rest is up to you. Have fun.