

INTEGRATED PRODUCTION SERVICES
**PRODUCTION
OPTIMIZATION**



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Controller Programming User's Guide

Version 1.0

Integrated Production Services

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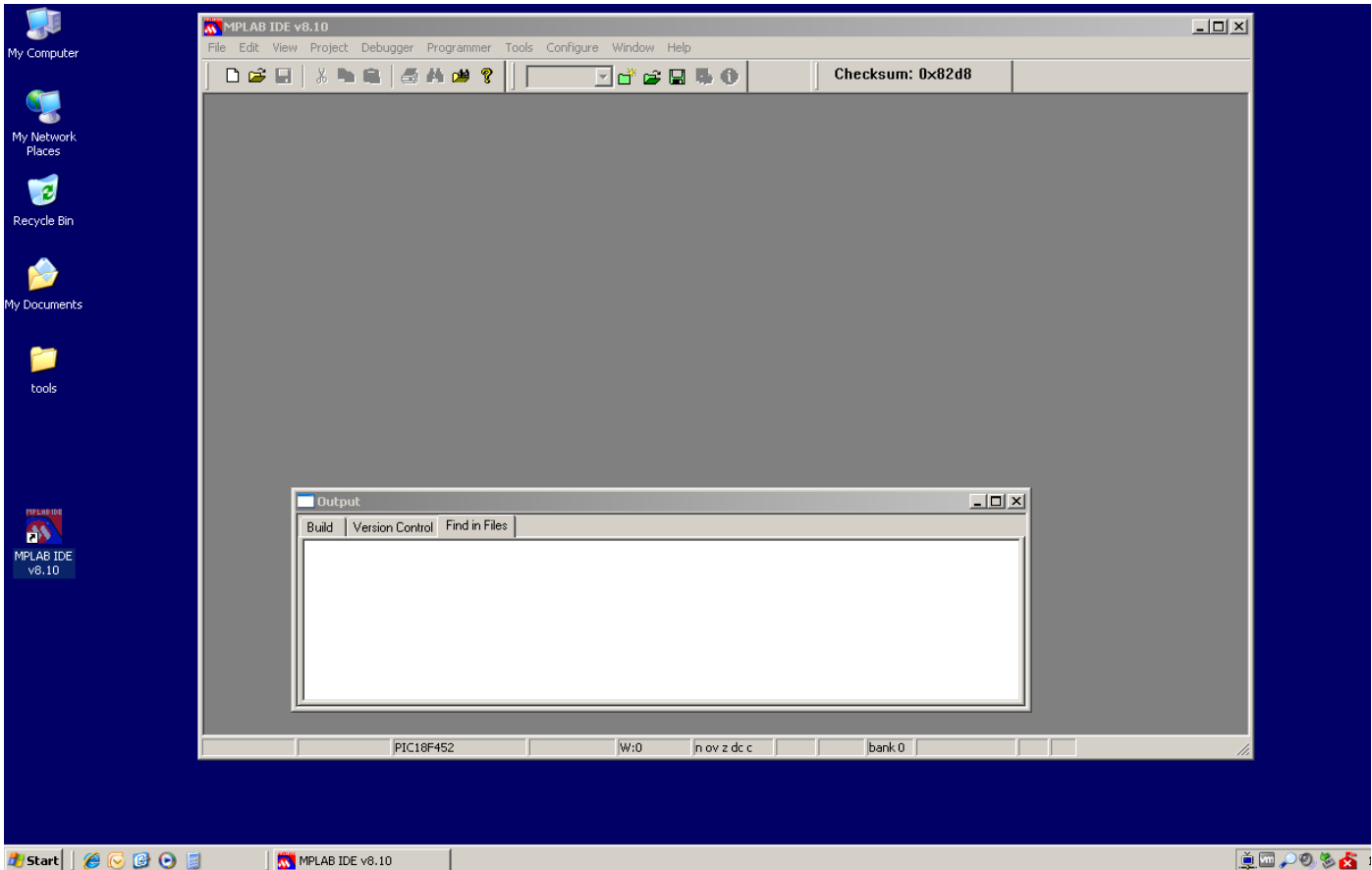
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1.1 Programming Overview

The IPS controller is programmed using Microchip's MPLAB IDE version 8.10 software running on Windows XP. This guide does not cover the installation of MPLAB on Windows XP and assumes it had been installed correctly and is operational.

1.1.1 XP Running MPLAB



The above screen shot shows the MPLAB software running on Windows XP. Notice the red and blue MPLAB shortcut on the desktop next to the MPLAB window. The startup and shutdown of MPLAB will be discussed later in the guide.

In addition to the above software, a MPLAB ICD 2 in-circuit debugger is needed with associated cables and power supply; it is referred to as the “programming puck”.

1.1.2 Programming Puck and Cables

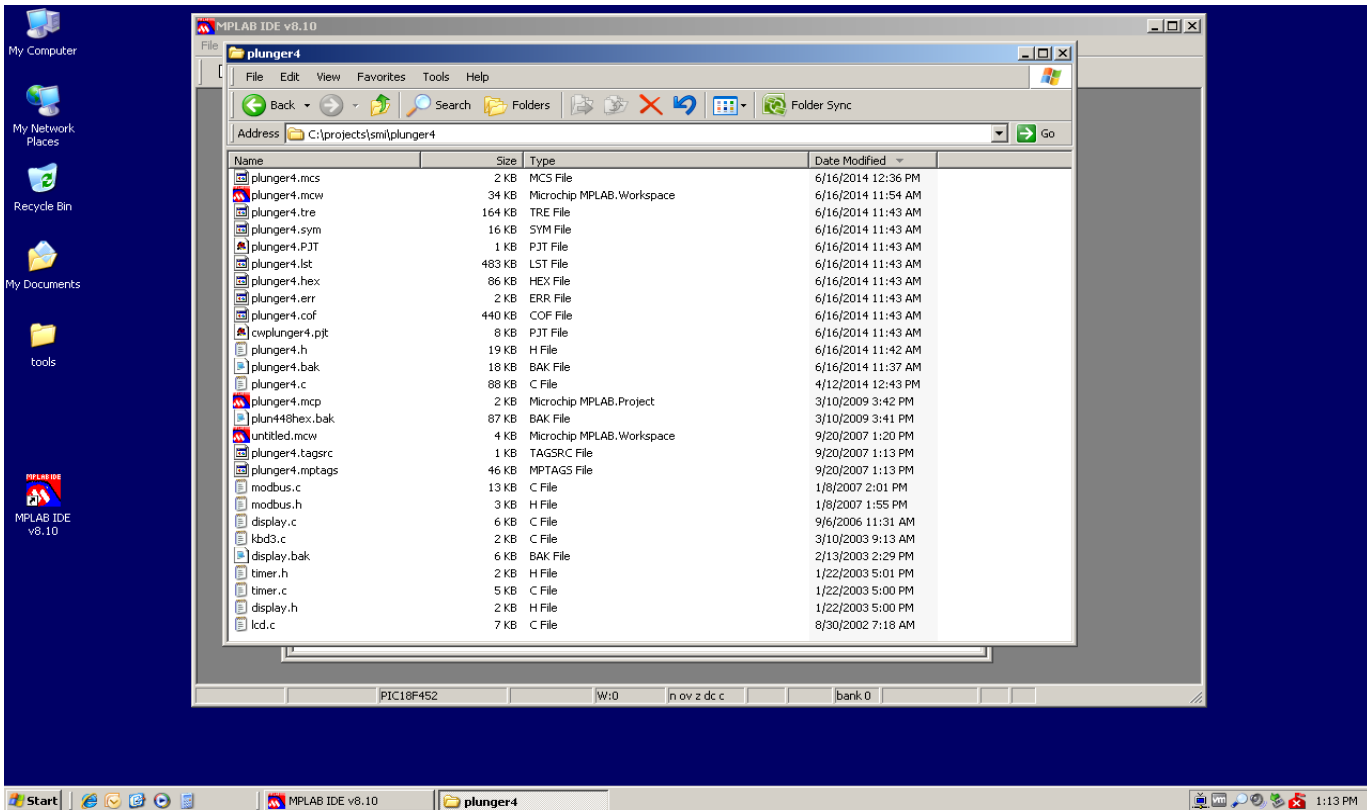


The above photo shows the programming puck, power supply, USB cable, and the programming cable that is used to connect the puck to the controller. The puck, power supply, and USB cable are purchased. The programming cable is made in-house and must be obtained from IPS manufacturing.

1.2 Project installation

IPS manufacturing will have installed or sent the files to install the controller MPLAB project on the computer. The project files will normally be installed in the directory `c:\projects\smi\` with the following subdirectories for each controller version: `diffcon4`, `pacemkr4`, and `plunger4`. The screen shot below shows the files in the `plunger4` subdirectory. It is not important if the computer does not have all the files shown below. Some of them are not needed for the programming function.

1.2.1 Controller project files



1.3 Hardware Connection

Before you open MPLAB, the USB cable should be connected to the computer and the puck power supply plugged into a wall socket. The picture in 1.1.2 shows the correct connection to the puck. The power supply, USB cable, and programming cable should be connected to the puck before starting MPLAB.

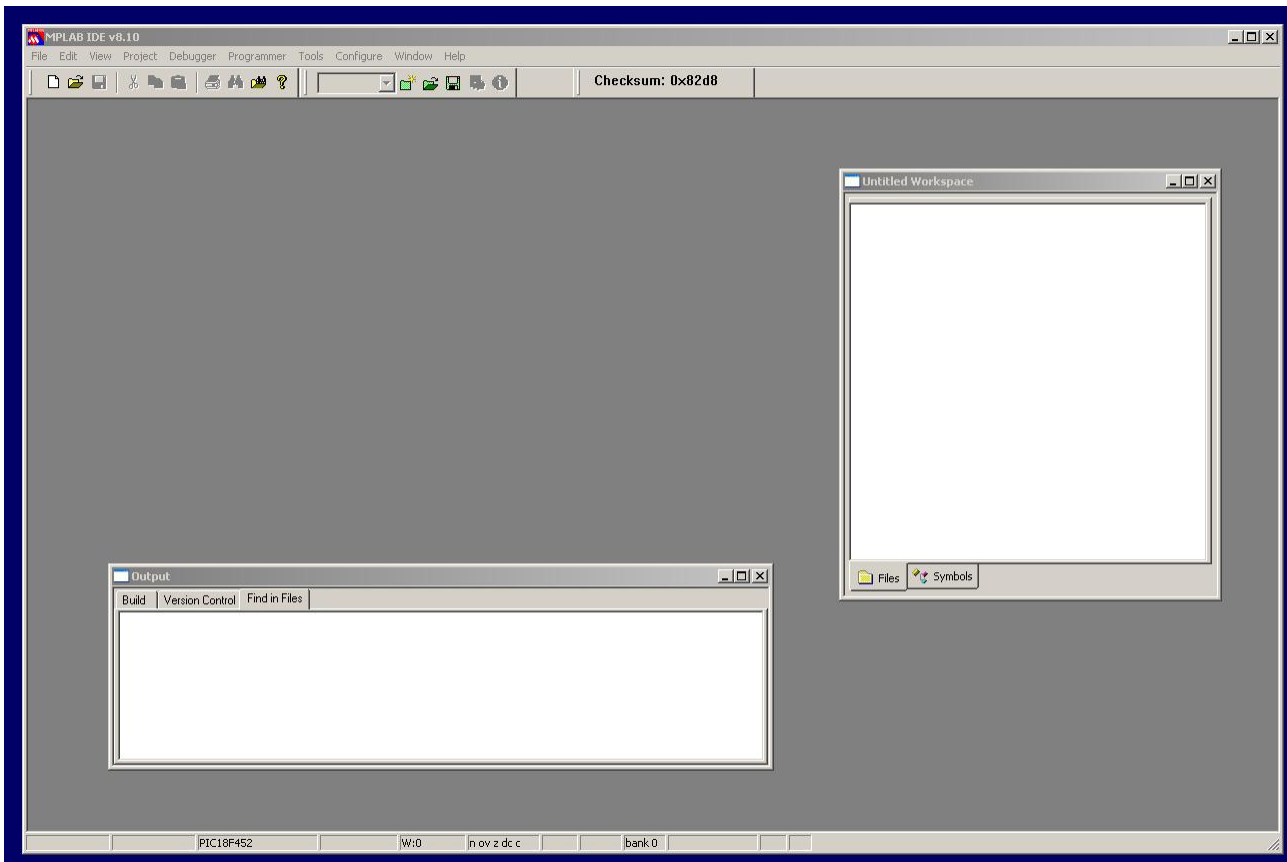
1.4 MPLAB Startup

1.4.1 Step 1 Open MPLAB

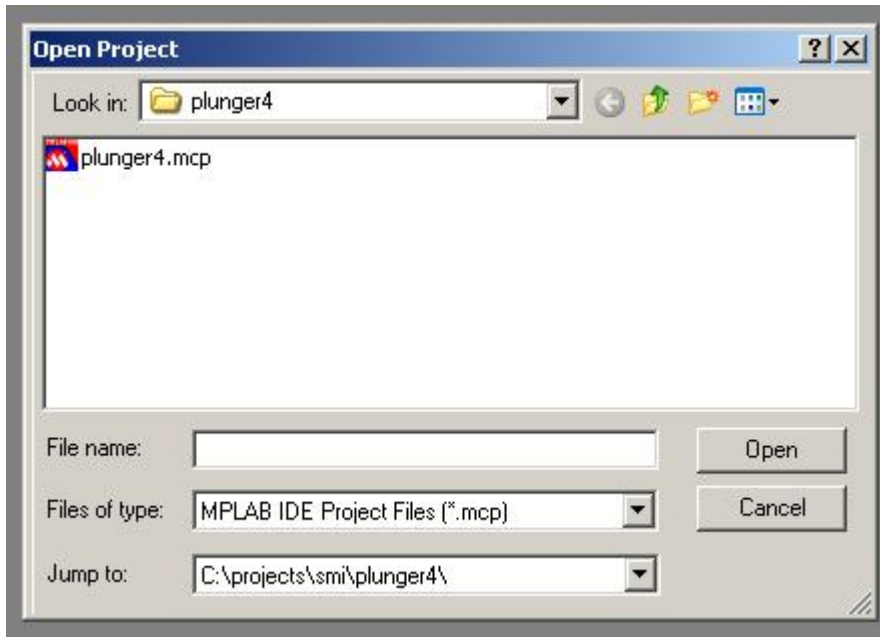


MPLAB should already be installed on the computer. To start MPLAB simply click on the MPLAB IDE icon located on the desktop of the computer. It should look like the icon located on the left. Once the icon is clicked, MPLAB will display a welcome screen and open a blank project workspace.

The screen shot below is the blank project startup screen.



1.4.2 Step 2 Open Project File

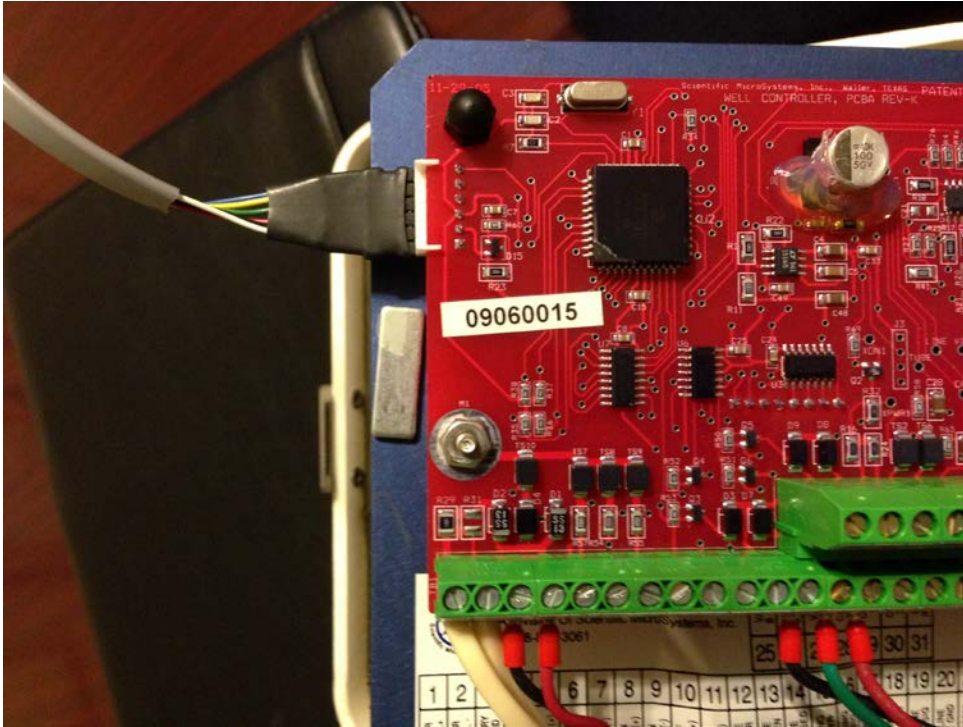


Next, the desired project must be opened to program the controller. The project files will be located in the subdirectories of the different controller versions and have a .mcp extension. Navigate to the project menu item and select the open menu item. A dialog like the one of the left should popup. In the example on the left the dialog box defaulted to the plunger project file. If that is not the desired option, navigates the files structure until the desired version is found. Remember, the files are located in c:\projects\smi\. Click open once the desired project file is located.



Normally a warning message will be displayed on the screen indicating there is not a parallel port. This is normal and is not an issue since the USB port is used for this setup. Click the “Yes” button to continue.

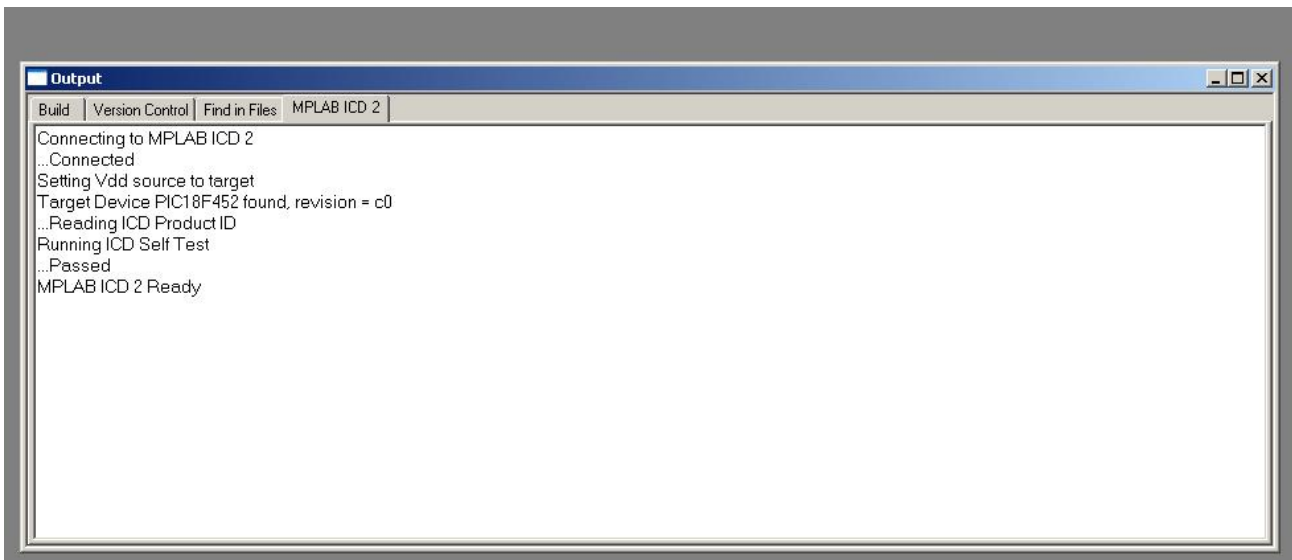
1.4.3 Step 3 Test Connection to Controller



In this step the programming cable connection is tested. The programming cable is the grey cable with a telephone plug on one end and seven pins sticking out in a row on the other. The picture on the left show the programming cable correctly plugged into the controller board. Typically, the blue wire should be at the top. However, this should be verified with IPS manufacturing as cable colors can change.



Once the programming cable is connected to the control board, the connection can be verified in MPLAB. This is done by clicking on the puck icon in MPLAB. Once it is clicked a message will be displayed in the output window. If the output window is not on the screen, select the menu item view and check the output item. The displayed may have to be scrolled and sized to see window. The screen shot below show a successful connection. The screen shot below show a successful connection message.

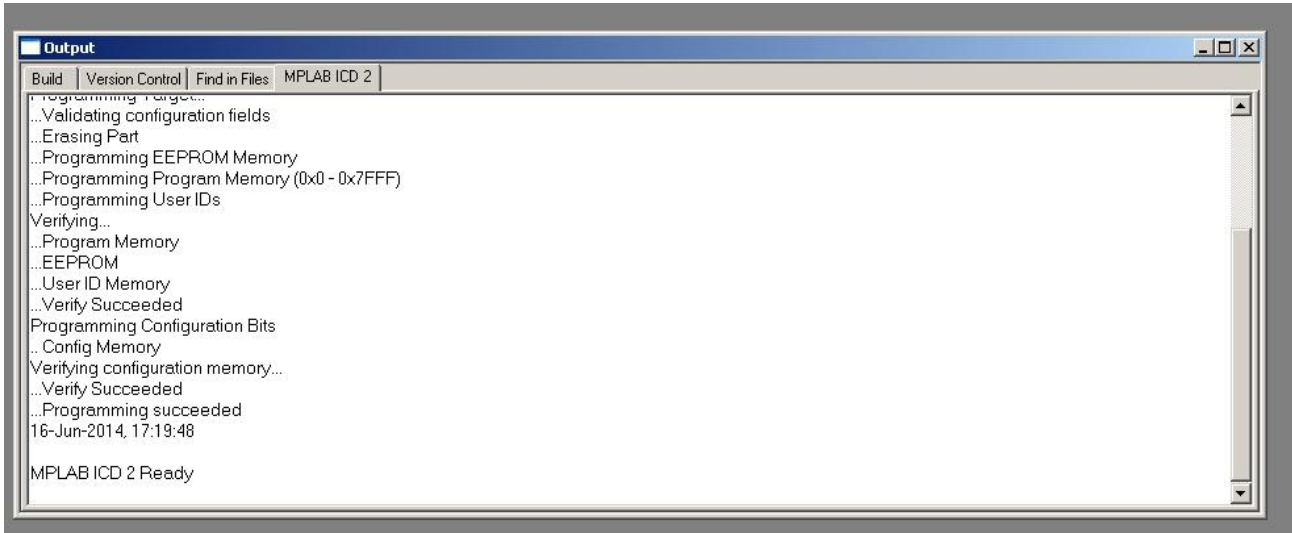


1.5 Programming the Controller

1.5.1 Step 1 – Download Firmware



Once the above steps are complete and a good connection is established. The controller box can now be programmed. To program the controller, click on the programming icon like the one shown on the right. Once the firmware is downloaded and the programming is complete, the message below will be displayed in the output window. If this message is not displayed or errors have occurred, check the cabling and setup and try again. Successful program message window is shown below.



1.5.2 Step 2 – Check Controller box

Once the programming is finished, unplug the programming cable from the controller board and check the version using the Read 50 command. If the version checks, configure the box as needed. The programming is now complete.