



*Before you begin:*

*Your PC needs the Microsoft .NET framework loaded on it for this program to work properly. The latest .NET version 3.5 framework is available for free download directly from Microsoft.*

[Download .NET version 3.5 framework](#)

### Installing the MPFI Programming Utility

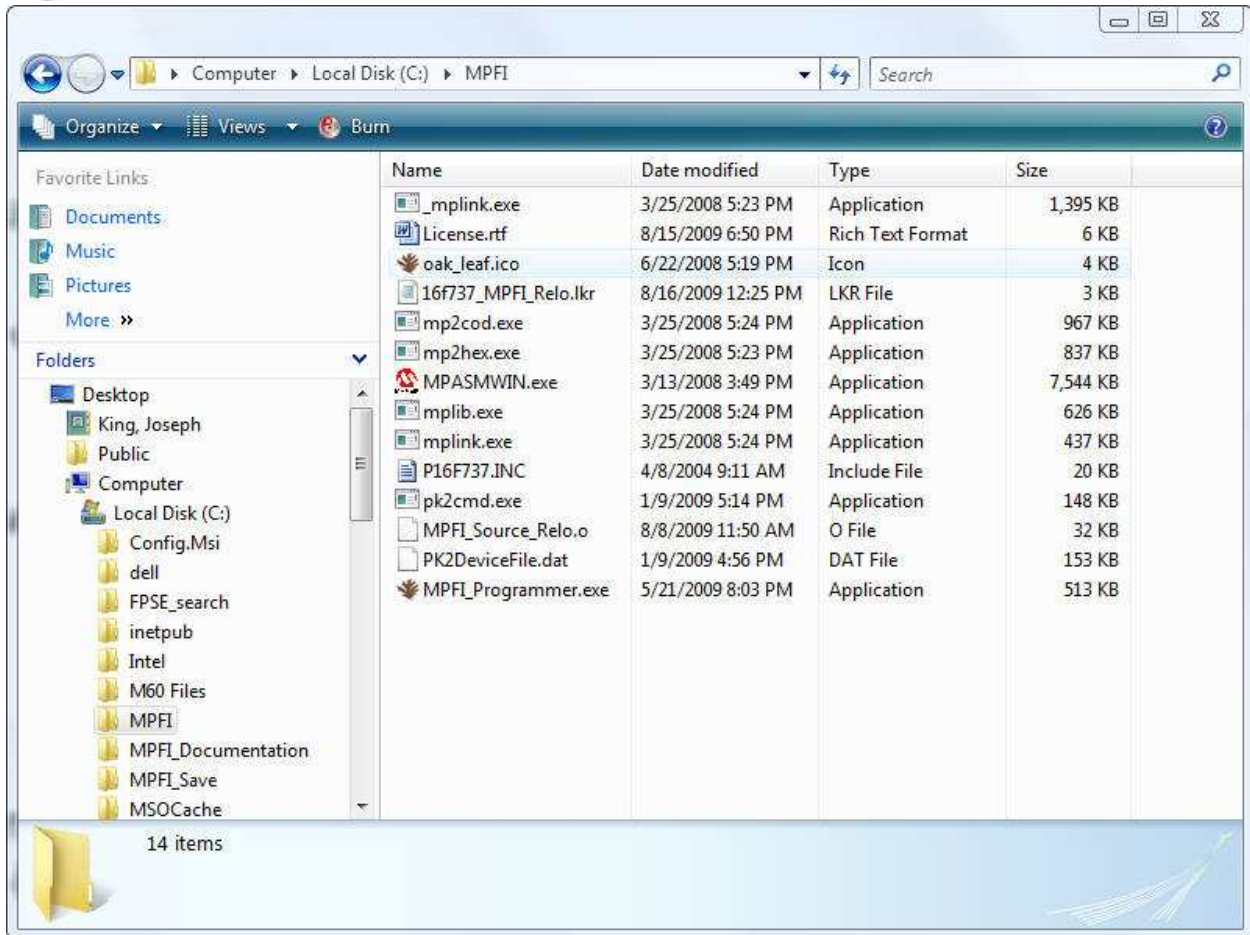
The windows installer (MPFI\_Installer.msi) is the easiest way to install the MPFI Programmer Utility. It will install the application and support files in the proper directory and register the files and create a desktop icon. The name of the installer is MPFI\_Installer.msi. If you received this installer from White Oak Audio Design via email, the name has been changed to MPFI\_Installer.sav in order to avoid being rejected during email transmission by virus checkers that will not let files with the .msi extension be emailed. You will need to rename this file from MPFI\_Installer.sav to MPFI\_Installer.msi. It is recommended that you save the installer to your Desktop, it can be used later to uninstall the program as well. You can save the .msi to other directory locations as well with no problem.

Before installing, ensure you do not have a subdirectory on the C: drive that is already named MPFI. **This is very important as the application will not install properly if this subdirectory already exists (very doubtful that this condition exists but please check).**

The installer will create a subdirectory folder on the C: drive at C:\MPFI. It's important not to move the contents of this application as the program only works out of this specific location. After installation, this folder will have 14 files in it and have a folder size of 12,982,466 bytes.



## Installing and Operating the MPFI Programmer Utility Software



Ensure the Microsoft .NET framework is installed on your PC. This can be downloaded from the following Microsoft website:

[Microsoft .NET version 3.5 Framework](#)

After you load both pieces of software, you can run the application which is located at:

“C:\MPFI\MPFI\_Programmer.exe” OR just click on the shortcut that is on your desktop (the Oak Leaf Icon with ‘MPFI Programmer’ text below it)

The latest version of these instructions are always downloadable from the White Oak Audio website location to guide you in tuning the MPFI.

[MPFI Programming Utility Instructions](#)

Once you create the desired .HEX file, you can easily and directly program it into the MPFI using the PICKit2 based programmer (available from White Oak Audio Design) using the large BLUE "Program MPFI" button on the “Row-Columns Settings” tab. The required firmware OS for the PICKit 2 is v2.32 and is downloadable from the Microchip link below. An error will occur if this version is not loaded in the programmer. White Oak Audio preloads this version into the PICKit 2 programmers that it ships.

The software to independently run the PICKit 2 programmer can be downloaded from this website (it is a standalone Microchip GUI program):

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## Installing and Operating the MPFI Programmer Utility Software

### [Microchip PICKit 2 Standalone Programming GUI](#)

On that page, in the 'Downloads' section, click on the "PICKit 2 V2.61 Install" link and follow the installation prompts.

Instructions for operation are also included on this same web page at this link:

"PICKit 2 Microcontroller Programmer User's Guide"

Click on it to download the instructions.

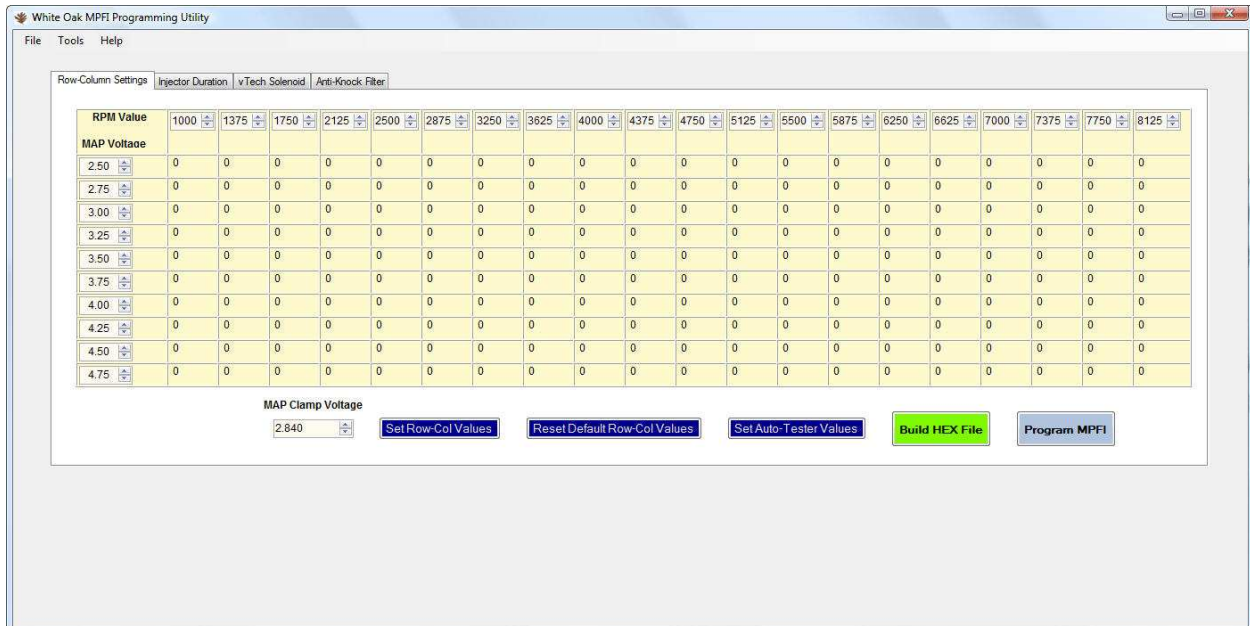
When running the PICKit 2 application, set the VDD PICkit 2 to 5.0V in the mid-right setting box on the application screen.

Use the Auto Import HEX + Write Device button on the lower right of the application screen to point to the .HEX file that you created and to program the target MPFI. The 9V wall wart power supply must be powered up, connected to the 9V DC power jack of the MPFI programmer board and the power toggle switch on the MPFI Programmer board turned on (the green LED on the programmer board will illuminate when the toggle switch bat is in the lower position)

The PICkit 2 programmer application will provide a success signal when you have programmed the MPFI correctly.

If you have any questions, please feel free to email us at [joe@whiteoakaudio.com](mailto:joe@whiteoakaudio.com)

This will open up the main user interface program at the primary tab as shown below. This application provides 200 cell granularity for engine tuning (20 RPM columns by 10 MAP voltage rows) which makes it highly flexible. It is simple and intuitive to use, allowing you to spend your time tuning engine performance.



### The Row-Columns Settings tab

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Allows you to choose the RPM buckets and MAP voltage buckets. The RPM range is from 1000 to 9000 RPM. The MAP voltage range is from 1.00 to 4.95 volts. In addition, this tab allows you to set the MAP clamp voltage between 0.500 and 4.995 volts using the up-down control in the lower left (the default is 2.840 volts). Reasonable default values have been set into this table by design, saving you time when starting a new tuning exercise (defaults are as shown above).

Ensure that the RPM ranges increase in each column from left to right and that no two adjacent columns have the same RPM value. As a general rule, at least 200 RPM should be maintained between adjacent column RPM values. Use the up-down arrows to select the value that you desire.

Ensure that MAP voltage ranges increase from the top row to bottom row of the table and that no two adjacent rows have the same MAP voltage value. As a general rule, at least 0.15 volts should be maintained between adjacent row MAP voltage values. Use the up-down arrows to select the value that you desire.

After you have decided on the values for RPM, MAP Voltage and MAP Clamp voltage, clicking the **'Set Row-Col Values'** button will lock these choices in on the other 3 tabs. The **'Reset Default Row-Col Values'** button returns the RPM and MAP Voltage values to the program defaults on the main and 3 other tuning tabs. The **'Set Auto-Tester Values'** button creates a hex file table that is compatible with the White Oak Audio Design MPFI auto tester. This is used for production functional testing purposes and allows complete testing of all MPFI functions during final test.

The **'Build Hex File'** large GREEN colored button should be clicked after you have properly chosen all the values on the other 3 tabs for Injector Duration, vTech solenoid and Anti-Knock Filter.

The **'Program MPFI'** large BLUE colored button may be clicked after you have successfully built your .HEX file and are ready to program the target MPFI. If you do not have a target MPFI attached or have not defined a valid .HEX file, you will receive an Error dialog box explaining the error condition encountered. Correct any errors and attempt again. When you have successfully programmed the target MPFI, you will receive a success dialog box.

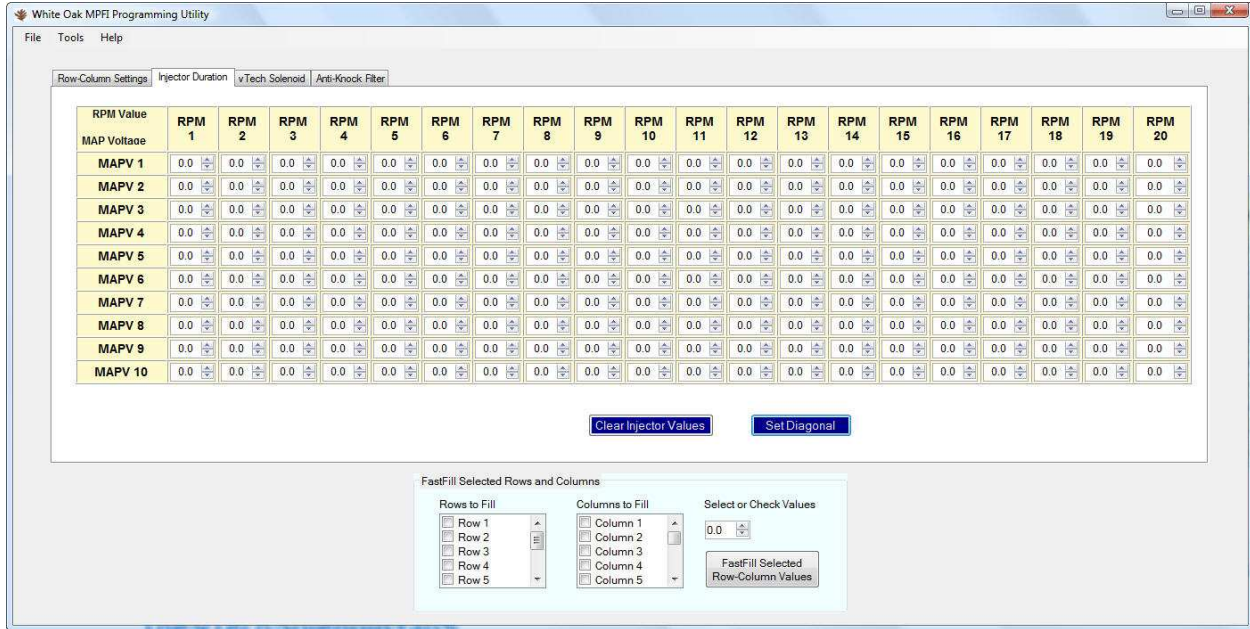
### The Injector Duration tab

Allows you to choose the extra injector dwell time value in milliseconds that is desired for each RPM vs. MAP voltage bucket. The dwell time range is from 0 to 6.3 milliseconds.

The **'Clear Injector Values'** button will reset ALL buckets to 0.0 milliseconds. The **'Set Diagonal'** button automatically sets gradually increasing values as you progress from the upper left of the table (minimum values) to the lower right of the table (maximum values). This is a convenience button to save time by providing you approximate starting points. Use the up-down control arrows to select the values that you desire for each cell.



# Installing and Operating the MPFI Programmer Utility Software



Using the FastFill™ feature, you can rapidly populate values in entire rows or columns or multiple rows and columns in a few clicks. Simply select the Rows to Fill and Columns to Fill using the checkboxes and scrollbars. After you have selected the rows and columns you desire to populate, use the up-down control to select the Injector Duration desired and then click the ‘FastFill™ Selected Row-Column Values’ button. It’s that simple. Your rows and columns are filled with your desired value. You can later edit these values using either the individual cell up-down controls or using the FastFill™ feature again.

## The vTech Solenoid tab

Allows you to choose whether the vTech solenoid is activated or not for each RPM vs. MAP voltage bucket. The choice is either ON or OFF.

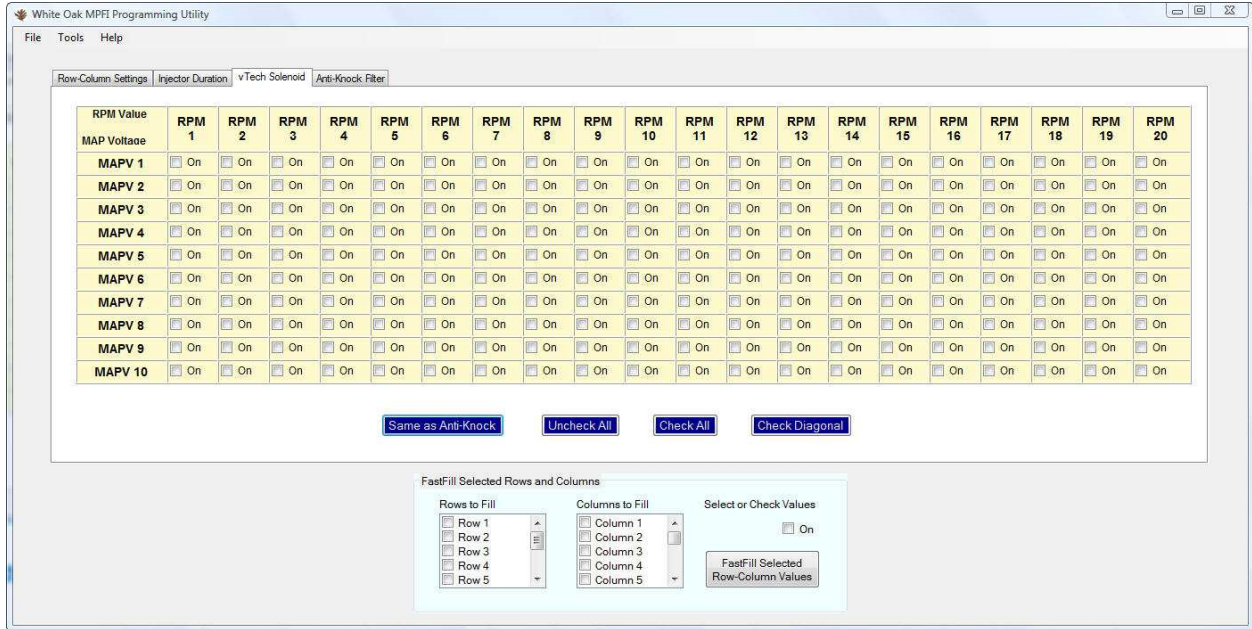
The ‘Same as Anti-Knock’ button will set ALL checkbox buckets to be the same as the Anti-Knock Filter tab values. This is a convenience button to save time.

The ‘Uncheck All’ and ‘Check All’ buttons automatically clear or set ALL checkboxes. These are convenience buttons to save time.

The ‘Check Diagonal’ button sets a hard diagonal line from the lower left of the table to the upper right of the table with all boxes to the right of this diagonal line checked and those to the left of this line unchecked. This is a convenience button to save time by providing you approximate starting points (example shown below).



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Using the FastFill™ feature, you can rapidly populate values in entire rows or columns or multiple rows and columns in a few clicks. Simply select the Rows to Fill and Columns to Fill using the checkboxes and scrollbars. After you have selected the rows and columns you desire to populate, use the check box control to select whether the vTech Solenoid is On or Off as desired and then click the 'FastFill™ Selected Row-Column Values' button. It's that simple. Your rows and columns are filled with your desired value. You can later edit these values using either the individual cell checkbox controls or using the FastFill™ feature again.

## The Anti-Knock Filter tab

Allows you to choose for each RPM vs. MAP voltage bucket whether the Anti-Knock Filter is activated or not. The choice is either ON or OFF.

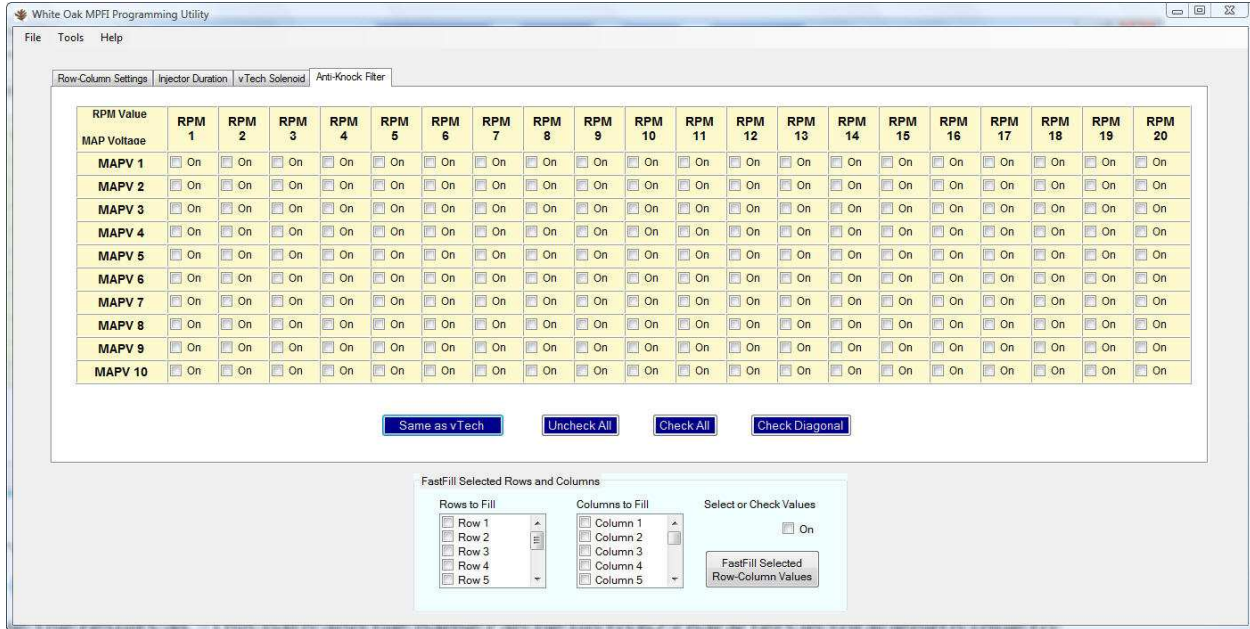
The 'Same as vTech' button will set ALL checkbox buckets to be the same as the vTech Solenoid tab values. This is a convenience button to save time.

The 'Uncheck All' and 'Check All' buttons automatically clear or set ALL checkboxes. These are convenience buttons to save time.

The 'Check Diagonal' button sets a hard diagonal line from the lower left of the table to the upper right of the table with all boxes to the right of this diagonal line checked and those to the left of this line unchecked. This is a convenience button to save time by providing you approximate starting points (example shown below).



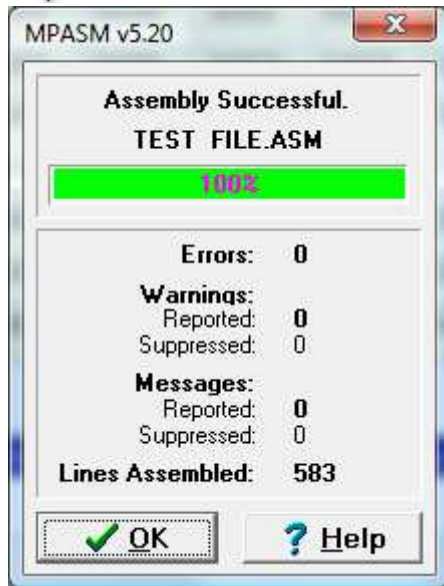
## Installing and Operating the MPFI Programmer Utility Software



Using the FastFill™ feature, you can rapidly populate values in entire rows or columns or multiple rows and columns in a few clicks. Simply select the Rows to Fill and Columns to Fill using the checkboxes and scrollbars. After you have selected the rows and columns you desire to populate, use the check box control to select whether the Anti-Knock Filter is On or Off as desired and then click the 'FastFill™ Selected Row-Column Values' button. It's that simple. Your rows and columns are filled with your desired value. You can later edit these values using either the individual cell checkbox controls or using the FastFill™ feature again.

Once all the desired values have been chosen, return to the main Row-Column Settings tab and click the **GREEN 'Build HEX File'** button. A file save dialog box will open to allow you to choose the path and file name for to save the results as. This path and file name can be up to 62 characters in total length (due to limitations within the Assembler and Linker programs). If you choose a name longer than this, you will be warned about this by a dialog box and given the option to change it. For organization and convenience purposes, you should probably create a directory on the C:\ drive at the root level with a short but descriptive directory name such as 'C:\MPFI\_Files' to store your .asm and .HEX files. The file will be saved with an .asm extension in the location you choose and then the assembler will be launched and run. This .asm file is the 'unassembled calibration' file that you created. This .asm file persists after the HEX file is built and you can reload it later on to use as a basis for further tuning using the File>Open menu option. Upon successful completion of the Assembler, you will be presented with a success box that appears like this:

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When you click the OK button, the Linker will then run and build the .HEX file. You will see a small command screen open briefly when the Linker is running, it will close upon completion of the linking. The .HEX file will have the same base name as you chose for the .asm file above with the exception that the file extension will be .HEX instead of .asm. The location of this file will be in the same subdirectory that you chose to put the .asm file.

The .HEX file is the file that you import into the programmer to reprogram your MPFI.

### Other Menu Options

The **File** submenu contains menu picks for **Open**, **Save**, **Save As**, **Page Setup**, **Print** and **Exit**. **Save**, **Save As** and **Page Setup** menu picks are not implemented yet and will do nothing if clicked.

The **Open** submenu pick will allow you to load a previously saved tuning file. Each tuning file has a White Oak Audio Design unique signature to identify tuning files. If the application does not recognize this signature, it will not open the file and will generate a warning box for the user.

The **Print** submenu pick will allow you to print the tuning file to the printer you select in the Print dialog box.

The **Exit** submenu pick will terminate the application and close all open application windows.

The **Tools** submenu contains menu picks for **Options**. The **Options** menu pick is not implemented yet and will do nothing if clicked.

The **Help** submenu contains menu picks for **About**. The **About** menu pick will open up a dialog box that shows the version and copyright information if clicked.

### Known Bugs

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## Installing and Operating the MPFI Programmer Utility Software

Restarting the program does not always work consistently on multiple tuning runs. This will be fixed in future versions.

### Revision History

Revision	Date	Update comments	Author
A	8/21/2008	Original Release	JPK
B	8/24/2008	Added link to .NET rev 3.5 framework download. Added submenu descriptions. Added known bug list. Other minor edits	JPK
C	8/29/2008	Updated to reflect current bug status for revision 0.1.0.4 software. Fixed MAP Voltage Clamp reset to default of 2.840V when Reset Default Row-Col Values button is clicked.	JPK
D	8/29/2008	Updated to reflect current bug status for revision 0.1.0.5 software. Fixed all known print handler bugs.	JPK
E	8/23/2009	Revised instructions to reflect use of the MPFI Installer instead of previous ZIP file installation. Update screenshots to reflect new FastFill feature. Reflects v0.2.0.5 software features.	JPK

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