PROHEAT®

M SERIES

# DATALINK 7 USER MANUAL FOR M-SERIES G-II PCM

Rev. A

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# A. SAFETY

Read this manual carefully before using the Datalink 7 diagnostic software. Datalink 7 is intended for use by professional technicians who have a thorough understanding of the Proheat G-II PCM M-Series heaters. This understanding is essential for an accurate, reliable and safe use of Datalink 7.

It is the users responsibility to be knowledgeable of the heater being diagnosed. Always use the applicable service methods provided by Proheat to ensure there is no risk to personal safety, the safety of others, and to prevent damage to the heater being diagnosed.

Throughout this manual, you will see notes labeled **DANGER**, **WARNING**, **CAUTION**, and **NOTICE** to alert you to special instructions or precautions concerning a particular procedure that would be hazardous if performed incorrectly or carelessly.

Observe them carefully!

These safety alerts alone cannot eliminate all hazards. Strict compliance with these special instructions and common sense are major accident prevention measures.

**⚠ DANGER**

**Immediate hazards that will result in severe injury or death.**

**⚠ WARNING**

**Hazards or unsafe practices that could result in severe personal injury or death.**

**⚠ CAUTION**

**Hazards or unsafe practices that could result in minor injury or product or property damage.**

**NOTICE**

*Information that is important to proper installation or maintenance.*

# B. PROHEAT CONTROL MODULE (PCM) TYPE

**NOTICE**

*Datalink 7 is for the G-II PCM only.*

**<u>THIS MANUAL COVERS ONLY THE G-II PCM</u>.**
**Datalink 7 is for the G-II PCM only. G-I and G-II PCM's can be identified in the figure below.**

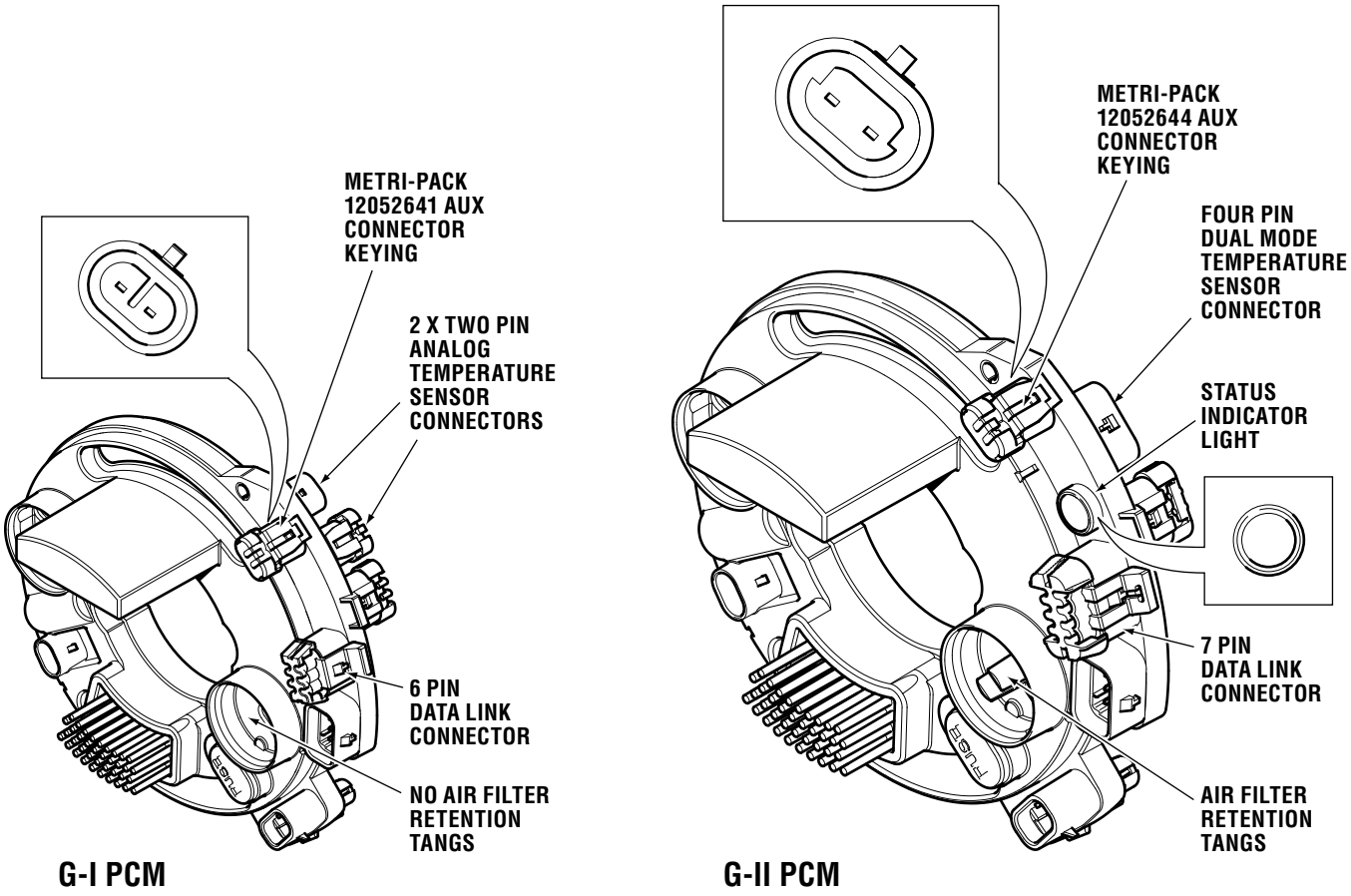



*Figure B-1. G-I PCM and G-II PCM.*

# 1.0 INTRODUCTION

Datalink 7 for G-II PCM M-Series heaters is a diagnostic tool which consists of software and companion files that run under Windows 2000, XP, Vista or 7 and an interface cable that connects the USB port of your computer directly to the diagnostic port of an G-II PCM M-Series heater.

Datalink 7 will allow trained personnel to:
- Read heater information
- Monitor heater inputs and outputs
- Monitor heater diagnostic trouble codes
- Update heater firmware
- Save heater information to a file

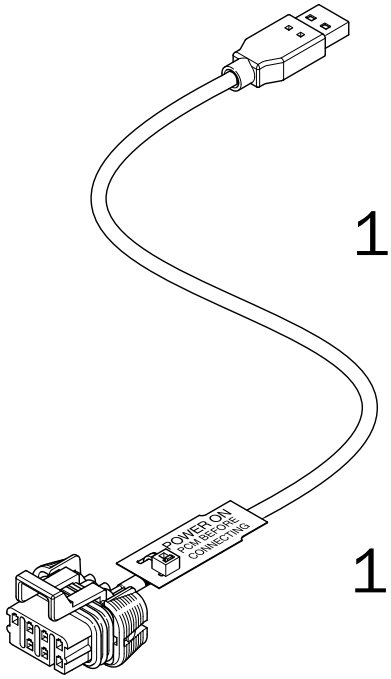



*Figure 1-1. Interface Cable*

## 1.1 INTERFACE CABLE

Datalink 7 for M-Series requires the use of the following USB interface cable:
- Part Number: PK0064

## 1.2 MINIMUM COMPUTER REQUIREMENTS

The minimum computer requirements to run Datalink 7 are:
- 1 GHz Pentium III processor or higher
- Microsoft Windows 2000, XP, Vista or 7
- USB 1.1 or higher
- 15 MB of hard disk space

# 2.0 INSTALLING DATALINK 7

**⚠ WARNING**

**DO NOT connect the M-Series PCM interface cable to the USB port of a PC until the device drivers and Datalink 7 are completely installed and the computer has been restarted.**

Datalink 7 is provided with a software installer to guide a user through the installation process. During setup, the installer automatically records events for uninstalling Datalink 7. Any files or folders that are created and logged during setup can be automatically removed using the standard Windows program remover. Files that are added to the installation folder after the setup was completed are not removed by the program remover.

Please uninstall any previous version of Datalink 7 using the add/remove programs option in windows.

## 2.1 LAUNCHING THE INSTALLER

Go to www.proheat.com and download the latest version of Datalink 7 for G-II PCM M-Series heaters. Save it to your Desktop. Open the saved Zip file and extract the Zip file to you desktop.

If Datalink 7 is being installed on Windows Vista or 7, the installer must be run as an administrator. To do so, right click on the installer file and select **Run as administrator** from the popup menu (See Figure 2-1 below).

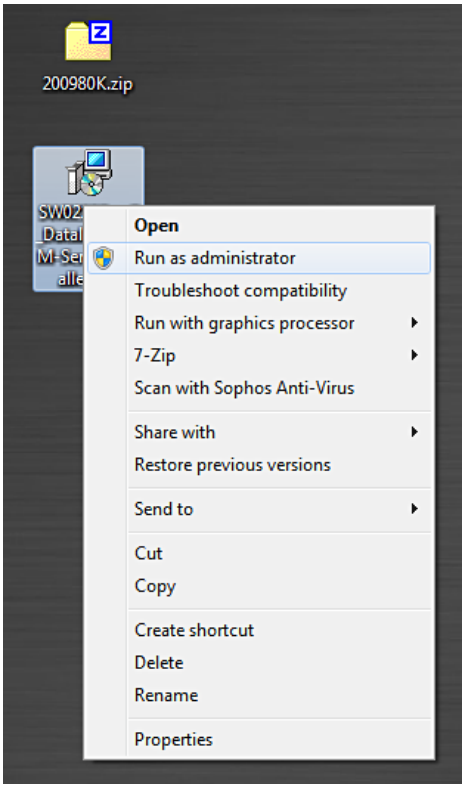



*Figure 2-1. File popup menu.*

# 2.2 SETUP DIALOGS

The Datalink 7 installer successively displays four setup dialogs. At any time during the setup process, click on the **Cancel** button to stop and quit the installer without installing Datalink 7.

## 2.2.1 WELCOME DIALOG

The first dialog is a welcome message. As recommended by the dialog, close all other applications before installing Datalink 7. Choose either the **Next** or the Cancel button.

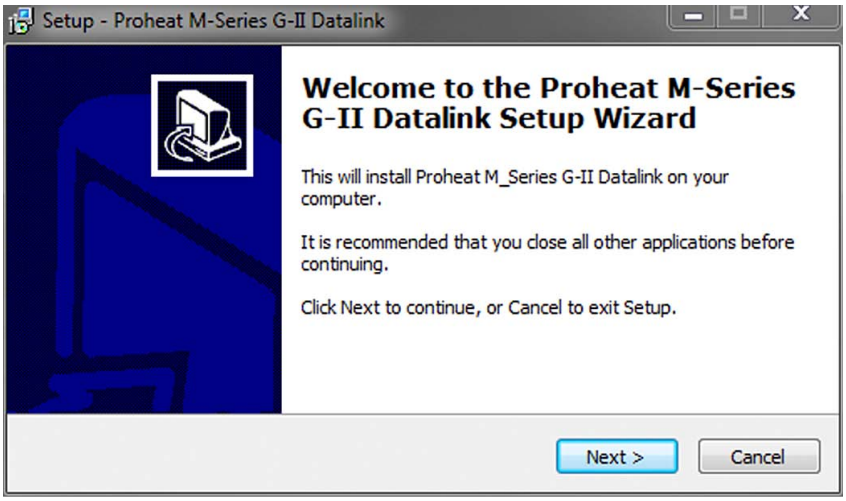



*Figure 2-2.Welcome dialog.*

## 2.2.2 SOFTWARE LICENSE AGREEMENT DIALOG

Scroll down to read the software license agreement, you must accept the agreement to continue with the software installation by clicking "**I accept the agreement**" then choose "**Next**" to start the installation process.

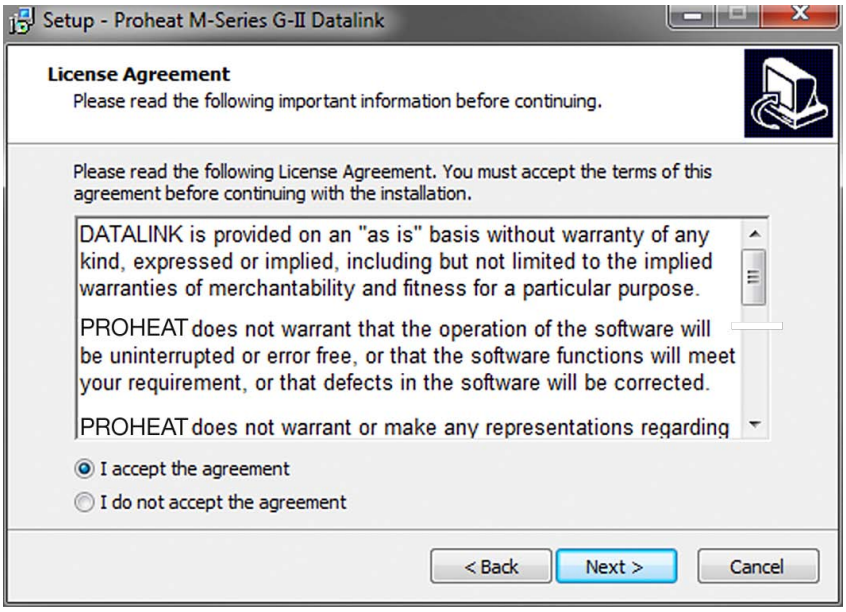



*Figure 2-3. Software license agreement dialog.*

## 2.2.3 INSTALLATION PROGRESS DIALOG

While the installer copies the files, it displays the following Installation progress dialog. Choosing **Cancel** will stop installation.

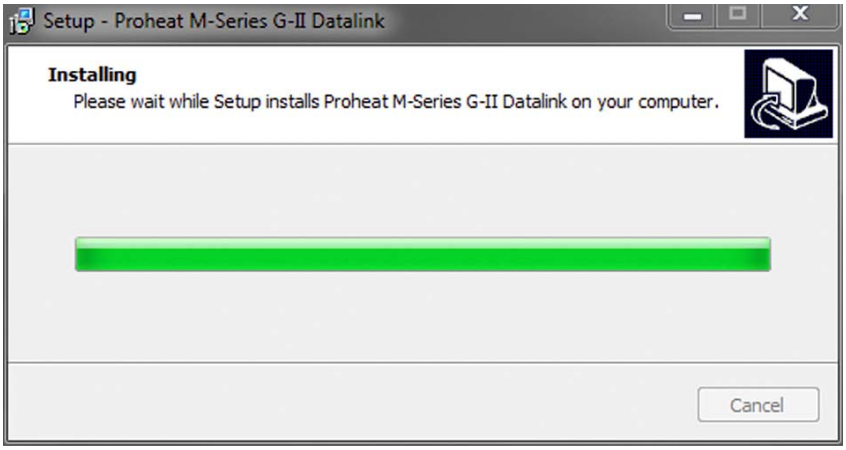



*Figure 2-4. Installation progress dialog.*

## 2.2.4 USB DRIVER INSTALLATION

The following message informs the user that the USB driver required to communicate with the M-Series PCM will be installed. **This operation may take several minutes**. Click OK to continue the installation.

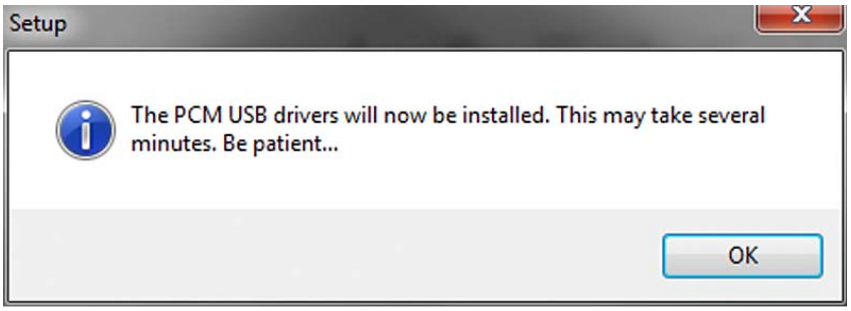



*Figure 2-5. USB driver installer dialog.*

## 2.2.5 SETUP COMPLETE DIALOG

The **Setup Complete** dialog is displayed when the installation has completed. Select the option to restart the computer and press the **Finish** button to close the installer. The computer can be restarted at a later time, but it must be restarted before Datalink 7 can be used.

If required please restart your computer.

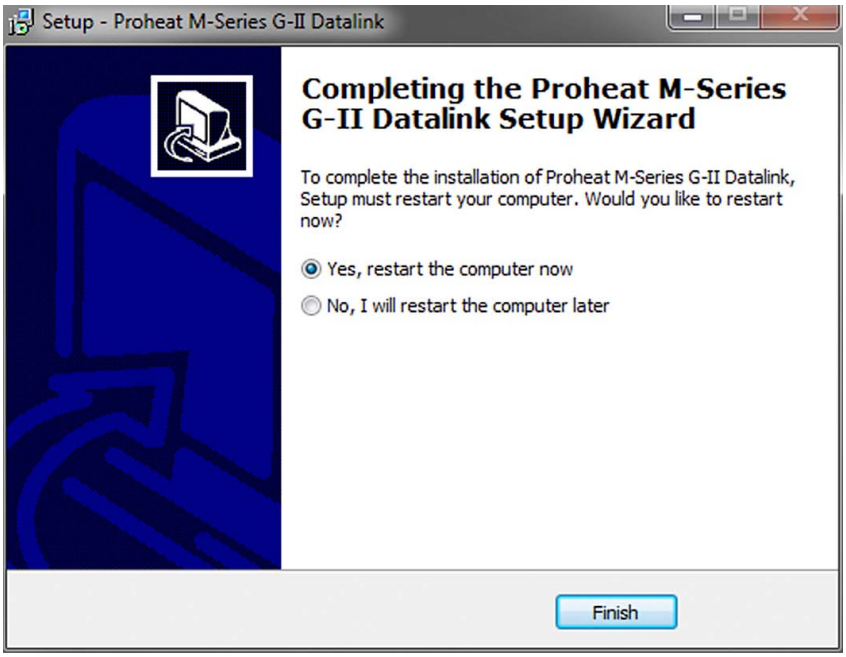



*Figure 2-6. Setup complete dialog.*

# 3.0 USING DATALINK 7

## 3.1 POWER AND CONNECTIONS

Before attempting to connect to a G-II PCM with Datalink 7, always perform the following steps in order:

1. Connect battery power to the G-II PCM first.
2. Wait for 5 seconds. G-II Status light will flash Green twice.
3. Connect the PCM side of the diagnostic cable to the 7-pin diagnostic port of the G-II PCM.
4. Connect the USB side of the diagnostic cable to a USB port of a computer with Datalink 7 installed. See picture below.

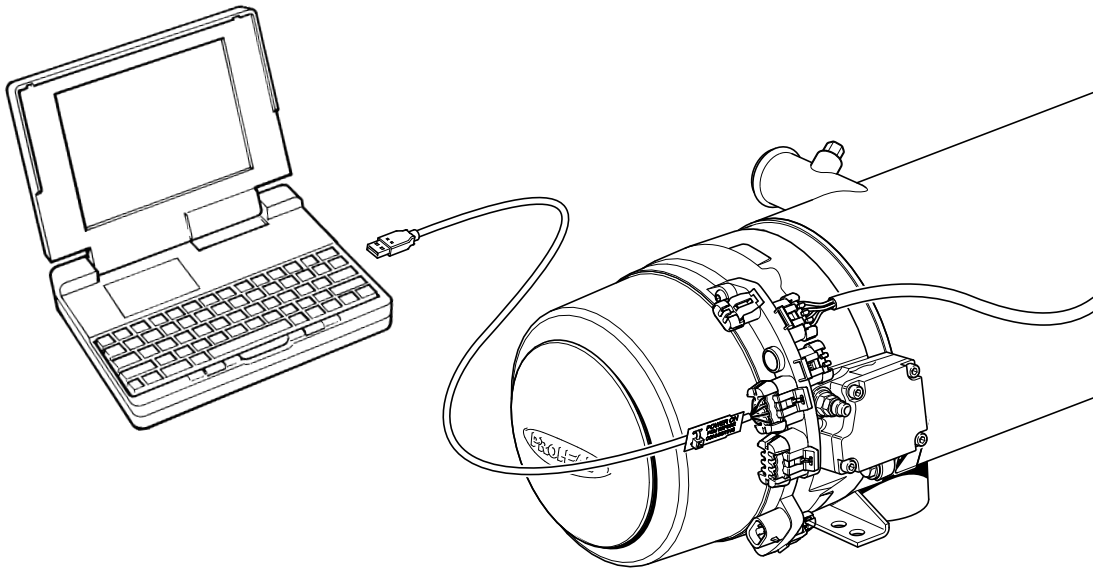


*Figure 3-1. Interface cable connection.*

**Note:**
*If the diagnostic cable is connected before battery power is applied to the G-II PCM, the G-II PCM will go into Lock out mode (the Status Light will be flashing alternating RED then GREEN). which prevents the heater from working. To unlock the G-II PCM, follow these steps:*

1. Disconnect the diagnostic cable from the computer.
2. Disconnect battery power from PCM.
3. Wait for 20 seconds.
4. Reconnect battery power to PCM.
5. Wait for 5 seconds. G-II Status Light will flash Green twice.
6. Reconnect the diagnostic cable to the computer.

# 3.2 STARTING DATALINK 7

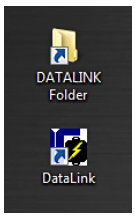



*Figure 3-2. Datalink 7 icon.*

Datalink 7 is started by double-clicking on the desktop icon (shown left) or by selecting Datalink 7 from the: **Windows** | **Start** | **Programs** | **Proheat** menu.

Once it has completed its internal initialization, Datalink 7 will display the **Workspace** window.

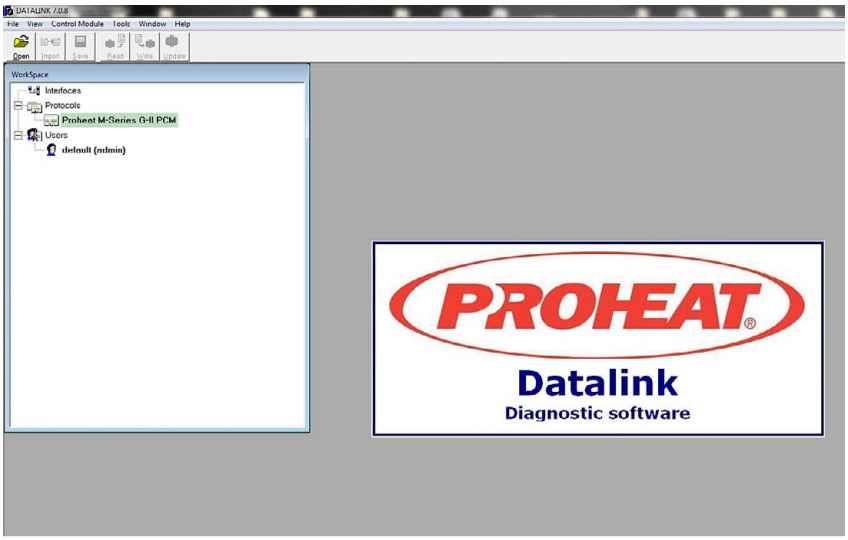



*Figure 3-3. Datalink 7 Workspace window.*

# 3.3 PCM DETECTION

Upon start-up, Datalink 7 automatically launches a background program that continuously monitors the USB ports for the presence of a **Silicon Labs*** USB interface. When a **Silicon Labs** USB interface is detected, it is listed under the **Interfaces** list of the **Workspace** window and an M-Series PCM node will be listed under the interface.

Beside the M-Series PCM node is a plus sign (+) which can be used to expand the node and display more information about the node (for example PCM part number, firmware revision etc).

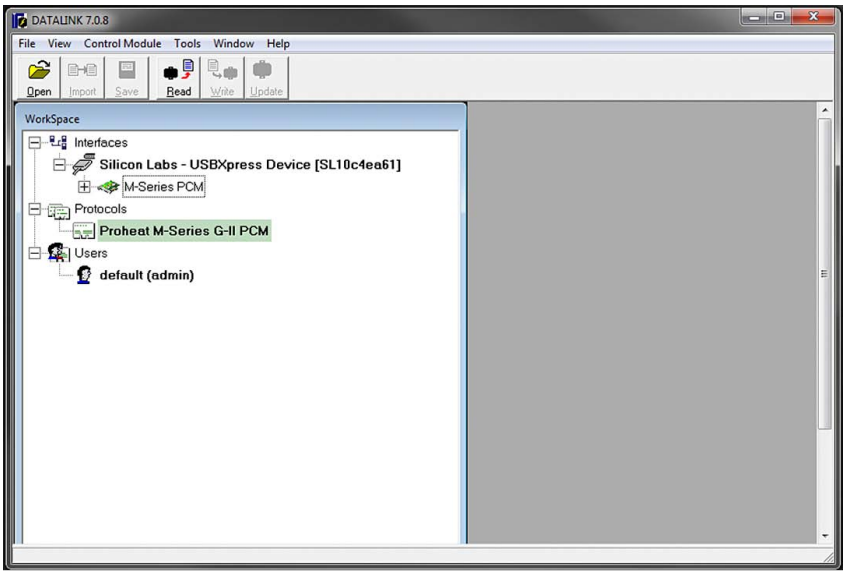



*Figure 3-4. Datalink 7 Workspace window with a PCM detected.*

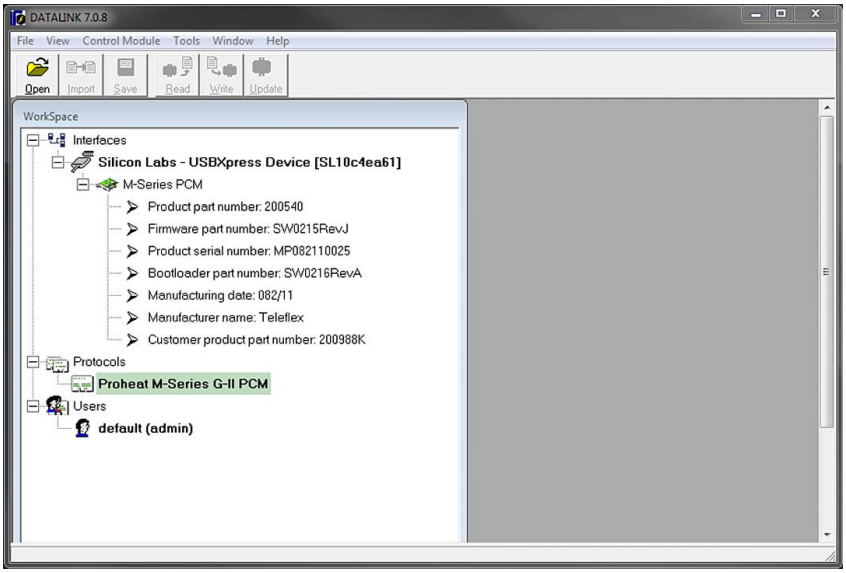



*Figure 3-5. Datalink 7 Workspace window with a PCM detected.*

** Manufacturer name of the USB interface chip used inside the PCM.*

### 3.3.1 MONITORING PCM PRESENCE

If communication between Datalink 7 and a G-II PCM is suddenly lost, then Datalink 7 draws red crosses over its interface and node icon. If Datalink 7 sees the G-II PCM again, the red crosses disappear.

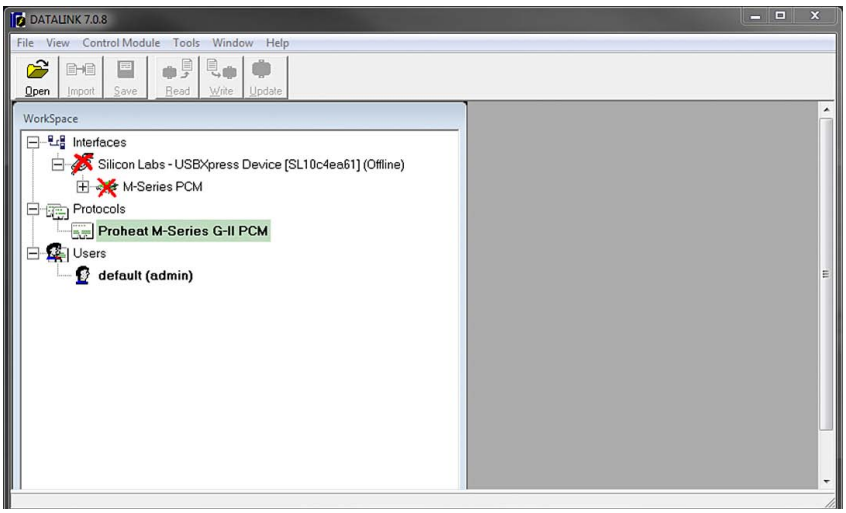



*Figure 3-6. Lost PCM.*

## 3.4 OPENING & READING A PCM

To open and read a G-II PCM, select it from the **Workspace** window and then press the tool bar **Read** button. You can also double-click on its name from the **Workspace** window.

### 3.4.1 G-II DATABASE ERROR MESSAGE

If the Datalink 7 software is older than the G-II PCM Firmware or the Datalink 7 software cannot find a database file that matches the G-II PCM software part number and revision, then it displays an error message that will be similar to the one shown below. Visit www.proheat.com to download the latest version of Datalink 7. Then Read PCM again.

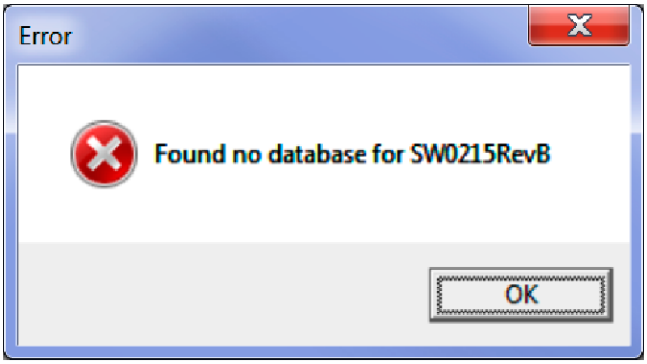



*Figure 3-7. Database search error message.*

## 3.4.2 NEW FIRMWARE

If the Firmware in the G-II PCM is older than the Datalink 7 software you will have the option to update it during the initial Reading of the PCM. You can choose not to update the PCM firmware by selecting “No”.

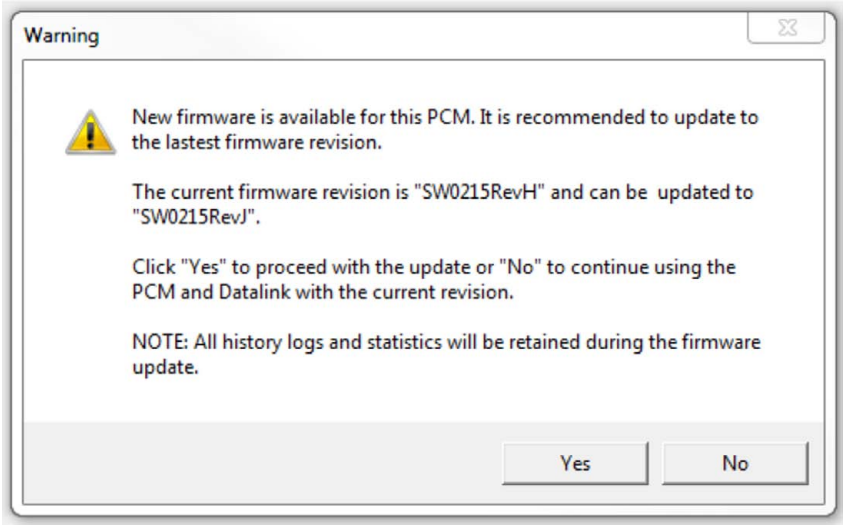



*Figure 3-8.*

Selecting “Yes” will update the Firmware.

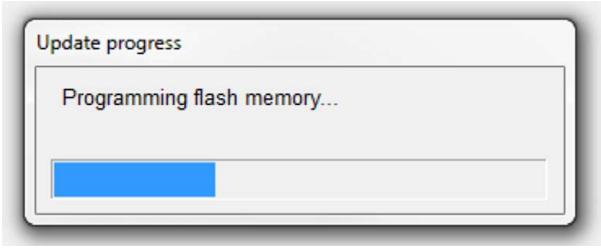



*Figure 3-9.*

When the Firmware update is finished please follow the on screen instructions.

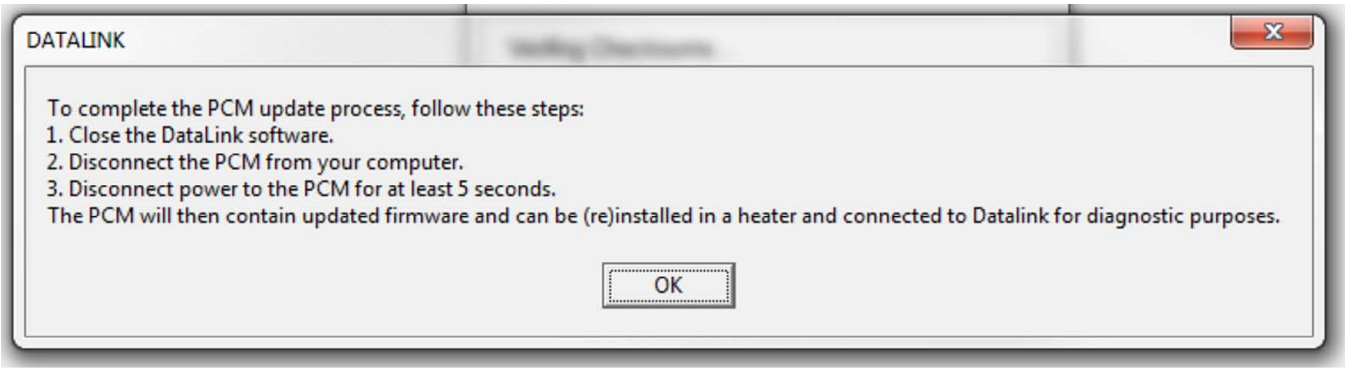



*Figure 3-10.*

After opening the G-II PCM, Datalink 7 starts reading the content of the G-II PCM memory while showing the following progress bar.

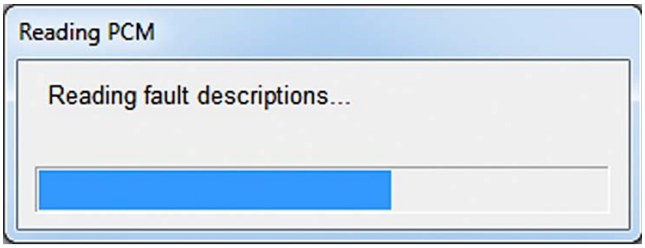



*Figure 3-11. Reading progress bar.*

# 3.5 G-II PCM WINDOW

After Datalink 7 has completed reading the content of a G-II PCM, it creates a new window and displays the G-II PCM information tab. A number of additional tabs are available each containing different pages for viewing G-II PCM data.

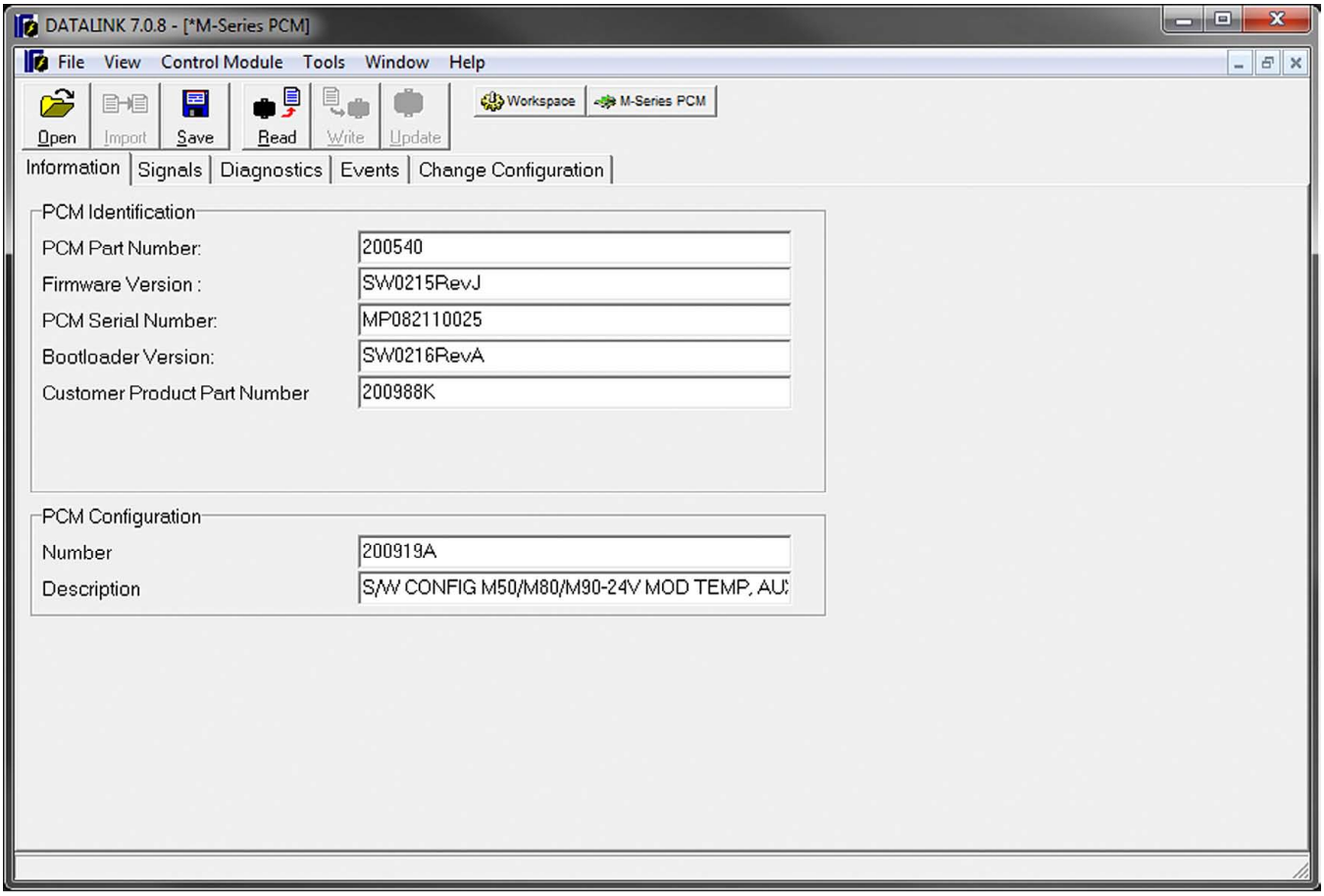



*Figure 3-12. PCM window.*

# 3.6 PCM PAGES

Each PCM window is divided into five pages. Each page can be opened by selecting its corresponding Tab. The table below summarizes the content of the different PCM window pages seen when Datalink 7 is connected to a PCM.

| Page | Content Summary |
|---|---|
| Information | Various part and serial numbers. |
| Signals | Real time monitoring of input and output signals |
| Diagnostics | Real time monitoring of all diagnostic trouble code status |
| Events | Viewing of PCM event log, statistics and meters |
| Change Configuration | Allows the G-II PCM to change part numbers |

*Table 3-1. PCM window pages.*

## 3.6.1 INFORMATION PAGE

The information page displays part and version information about the PCM connected to Datalink 7. These items are read-only and cannot be edited.

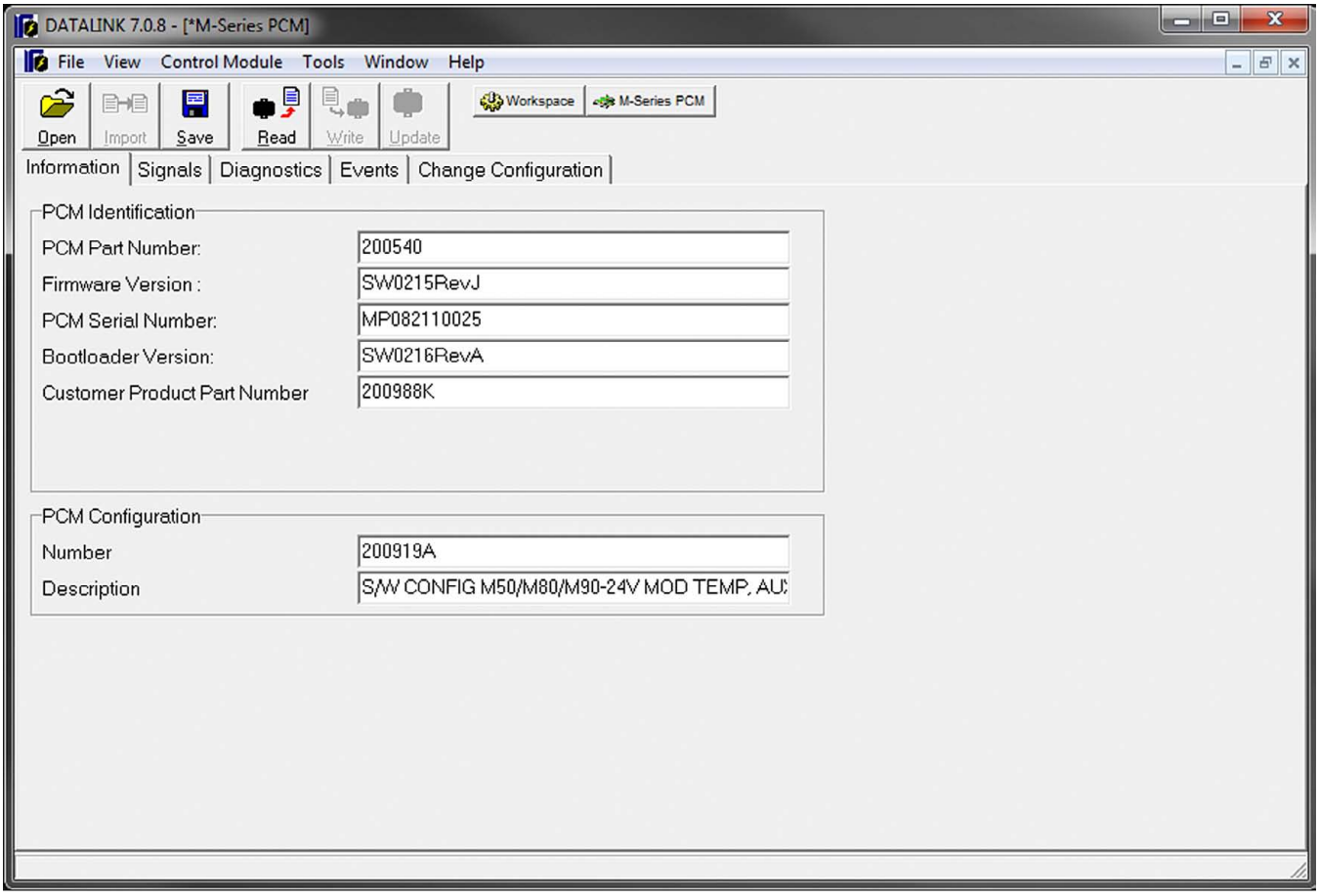



*Figure 3-13. PCM information page.*

## 3.6.2 SIGNALS PAGE

The **Signals** page allows you to monitor G-II PCM inputs, outputs and variables. Datalink 7 continuously refreshes the data in order to present it in real time.

*Figure 3-14. Signals page.*

### 3.6.2.1 Signal description

The following table describes the signals found on the Signals page.

| Signal | Desciption |
|---|---|
| **Analog Switches** | |
| Standard<br>Supplemental<br>Preheat<br>Coolant Pump | Shows what analog input is active |
| **CAN Switches** | |
| Standard<br>Supplemental<br>Preheat<br>Coolant Pump | Shows what CANBus input is active |
| **Heater** | |
| Mode<br>State | Shows the mode that is active from the Switches<br>Shows what state the heater is in |
| **Motor Speed** | |
| Target | The target motor RPM for proper combustion<br>The actual motor RPM |
| **Coolant Temp** | |
| Off<br>On | Cycle Off Temperature<br>Cycle On temperature<br>Actual coolant temperature (measured at the heaters outlet) |
| **Flame Brightness** | |
| Flame ON<br>Weak Flame<br><br>Flame OFF | Flame sensor voltage is above the Flame ON set point<br>Flame sensor voltage is above the Flame OFF and below the Flame ON set points<br>Flame sensor voltage is below the Flame OFF set point<br>Actual flame sensor voltage |
| **Electrical Power** | |
| System voltage<br>System current<br>Motor current<br>Pump current | Input voltage to the heater<br>The total heater current draw<br>The motor current draw<br>The coolant pump current draw |
| **PWM Outputs** | |
| Motor<br>Ignition Power<br>Fuel Solenoid<br>Pump | Shows the Pulse-width modulation (PWM) in percentage |
| **Digital Outputs** | |
| Ignition<br>Accessory<br>Ignition Control<br>Auxiliary<br>Green LED<br>Red LED | Shows what outputs are active |

*Table 3-2. Signal description.*

## 3.6.4 DIAGNOSTICS PAGE

The **Diagnostics** page provides functions that you can use to monitor the status of all diagnostic trouble codes. When a particular code is active, its corresponding status LED turns red. In the example below, **trouble Codes 5, 6, 7, 12 & 17** are active.

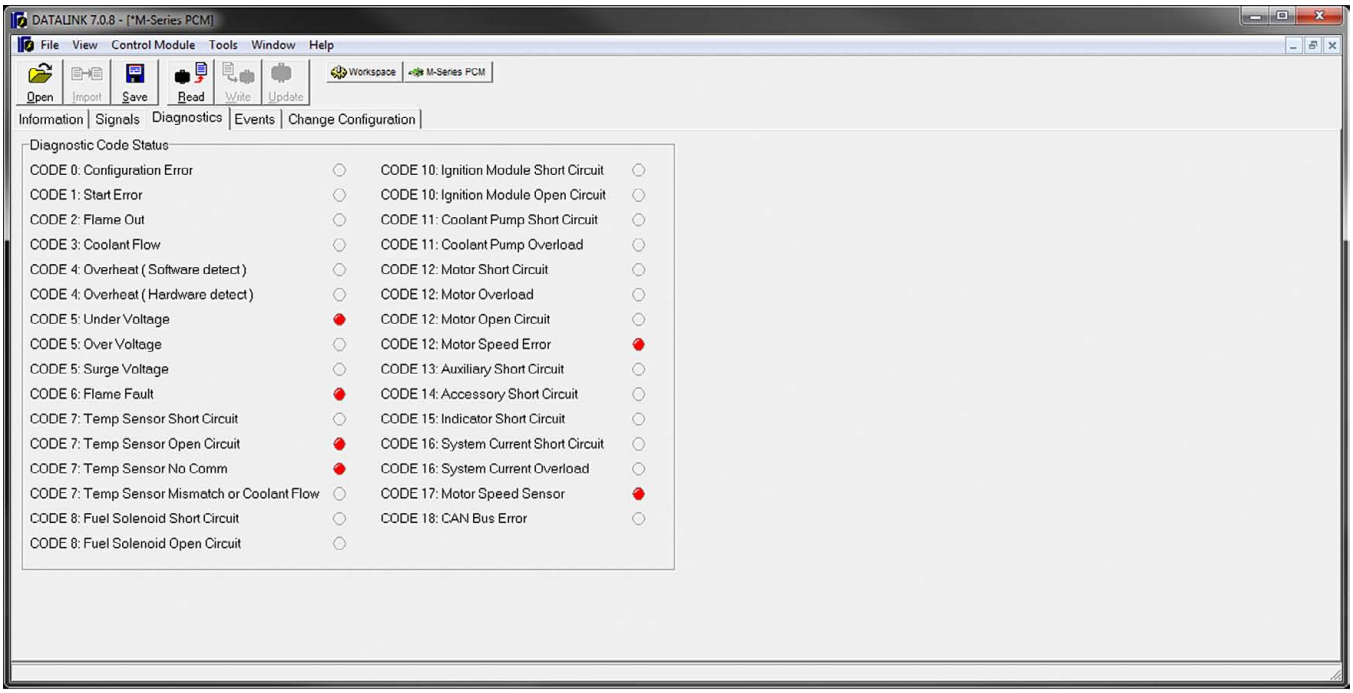



*Figure 3-15. Diagnostics Page.*

### 3.6.4.1 Diagnostic code descriptions

| Code | Error | Description |
|---|---|---|
| **0** | **Configuration Error** | Software problem detected. Contact Proheat for further information. |
| **1** | **Start Error** | Indicates that the G-II PCM Flame Sensor did not detect a flame or the flame was too weak to be detected during the FULL 30 second ignition period. |
| **2** | **Flame Out** | Indicates that a flame was detected but it could not be maintained or after being established the flame went out before reaching the cycle off temperature. |
| **3** | **Coolant Flow** | Indicates that the coolant temperature in the PROHEAT reached 185°F (85°C) within 90 seconds in Preheat mode or 60 seconds in Standard and Supplemental modes from the beginning of Ignition. There is coolant in the system but its flow rate is too low. |
| **4** | **Overheat** | Indicates that the Temperature Sensor detected an inner heat exchanger surface temperature of 257°F (125°C). The G-II PCM will detect overheats even if the heater is not switched on. |
| **5** | **Voltage** | Indicates that the supply voltage to the G-II PCM is outside the operating range for more then 10 seconds. |
| | Under Voltage | Voltage under 10V (12V system) or under 18V (24V Systems). |
| | Over Voltage | Voltage over 16V (12V system) or under 32V (24V Systems). |
| | Surge Voltage | Voltage over 40V for more than 2 milliseconds (12V & 24V Systems). |

*Table 3-3. PCM Diagnostic code descriptions.*

| Code | Error | Description |
|---|---|---|
| 6 | **Flame Fault** | Indicates that The PROHEAT reached 185°F (85°C) cycled off and entered Cool Down (Purge). After 20 seconds a flame was still detected. OR The PROHEAT was switched on and a flame (signal) was detected in Pre-check. |
| 7 | **Temp Sensor/Coolant Flow** | The dual mode sensor contains both digital and analog sensing elements and a diagnostic code 7 indicates the G-II PCM has detected one of four possible faults with the dual mode sensor. |
| | Short Circuit | Analog temperature sensor or harness shorted. |
| | Open Circuit | Analog temperature sensor or harness open. |
| | No Communication | Digital temperature sensor not communicating with the G-II PCM. |
| | Mismatch | Coolant flow issue that causes a temperature reading mismatch between the analog and digital temperature sensors. |
| 8 | **Fuel Solenoid** | Indicates an electrical fault in the Fuel Solenoid Valve coil or in the G-II PCM Fuel Solenoid Valve circuit. |
| | Short Circuit | Solenoid Valve coil or harness shorted. |
| | Open Circuit | Solenoid Valve coil or harness open. |
| 10 | **Ignition Module** | Indicates an electrical fault in the Ignition Module or in the G-II PCM Ignition Module power circuit. |
| | Short Circuit | Indicates short circuit fault is detected. |
| | Open Circuit | Indicates an open circuit fault is detected. |
| 11 | **Coolant Pump** | |
| | Short Circuit | Coolant pump output or harness is shorted. (Pump is drawing more than 45 amps.) |
| | Overload | Coolant Pump output amperage limit has been reached for more than 200 milliseconds. (Pump is drawing more than 10 amps.) |
| 12 | **Motor** | |
| | Motor Short Circuit | Motor or harness is shorted (motor is drawing more than 45 amps). |
| | Motor Overload | Motor output amperage limit has been reached (motor drawing more than 14 amps). |
| | Motor Open Circuit | The Motor or harness is open for 2 seconds or more. |
| | Motor Speed Error | Motor RPM is under or above target speed for more than 60 seconds. |
| 13 | **Auxiliary Short Circuit** | Auxiliary Output , harness or auxiliary device shorted. |
| 14 | **Accessory Short Circuit** | Switch Output, harness or accessory device shorted |
| 15 | **Indicator Short Circuit** | Indicates a short circuit fault (current draw grater than 1 Amp) in the harness or the device being operated by the Indicator Output. |
| 16 | **System Current** | |
| | Short Circuit | Indicates the instantaneous total system current limit was reached. |
| | Overload | Indicates the total system amperage limit has been reached (drawing more than 25 amps). |
| 17 | **Motor Speed Sensor** | Motor RPM signal has not been detected for 5 seconds while normal (less than 12 Amps) current is flowing through the motor. |
| 18 | **CANBus Error** | Indicates the heater was switched on via a CANbus input and then lost the CANbus heartbeat message for longer than 5 seconds. |

*Table 3-3 continued. PCM Diagnostic code descriptions.*

## 3.6.5 EVENT LOGGING PAGE

The **Event logging** page displays the event log and meter information recorded by the PCM into its memory. To display the content of the event log, press the **Read Log** button once. While reading the event log, the PCM displays the following progress bar.

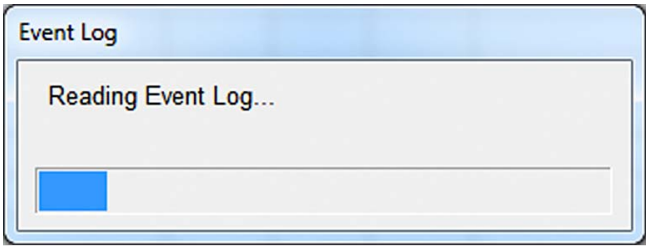
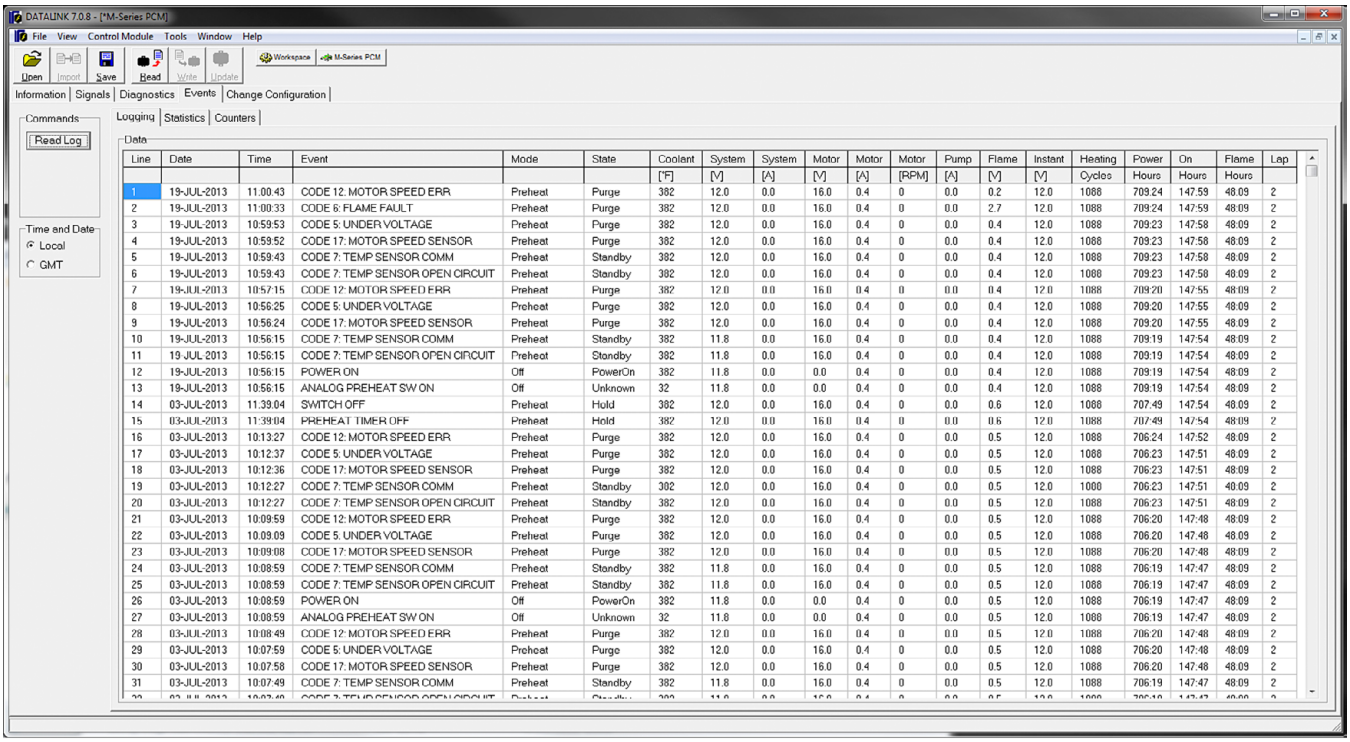



*Figure 3-16. Event logging reading progress bar.*

Once the event log is entirely read, it is displayed in the **Logging** page. The event log contains up to 1024 records and each record holds 20 parameters. To navigate the event log and view all records and parameters, use the scroll bars.




| Line | Date | Time | Event | Mode | State | Coolant | System | System | Motor | Motor | Motor | Pump | Flame | Instant | Heating | Power | On | Flame | Lap |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | [°F] | [V] | [A] | [V] | [A] | [RPM] | [A] | [V] | [V] | Cycles | Hours | Hours | Hours | |
| 1 | 19-JUL-2013 | 11:00:43 | CODE 12: MOTOR SPEED ERR | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.2 | 12.0 | 1088 | 709:24 | 147:59 | 48:09 | 2 |
| 2 | 19-JUL-2013 | 11:00:33 | CODE 6: FLAME FAULT | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 2.7 | 12.0 | 1088 | 709:24 | 147:59 | 48:09 | 2 |
| 3 | 19-JUL-2013 | 10:59:53 | CODE 5: UNDER VOLTAGE | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.4 | 12.0 | 1088 | 709:23 | 147:58 | 48:09 | 2 |
| 4 | 19-JUL-2013 | 10:59:52 | CODE 17: MOTOR SPEED SENSOR | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.4 | 12.0 | 1088 | 709:23 | 147:58 | 48:09 | 2 |
| 5 | 19-JUL-2013 | 10:59:43 | CODE 7: TEMP SENSOR COMM | Preheat | Standby | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.4 | 12.0 | 1088 | 709:23 | 147:58 | 48:09 | 2 |
| 6 | 19-JUL-2013 | 10:59:43 | CODE 7: TEMP SENSOR OPEN CIRCUIT | Preheat | Standby | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.4 | 12.0 | 1088 | 709:23 | 147:58 | 48:09 | 2 |
| 7 | 19-JUL-2013 | 10:57:15 | CODE 12: MOTOR SPEED ERR | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.4 | 12.0 | 1088 | 709:20 | 147:55 | 48:09 | 2 |
| 8 | 19-JUL-2013 | 10:56:25 | CODE 5: UNDER VOLTAGE | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.4 | 12.0 | 1088 | 709:20 | 147:55 | 48:09 | 2 |
| 9 | 19-JUL-2013 | 10:56:24 | CODE 17: MOTOR SPEED SENSOR | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.4 | 12.0 | 1088 | 709:20 | 147:55 | 48:09 | 2 |
| 10 | 19-JUL-2013 | 10:56:15 | CODE 7: TEMP SENSOR COMM | Preheat | Standby | 382 | 11.8 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.4 | 12.0 | 1088 | 709:19 | 147:54 | 48:09 | 2 |
| 11 | 19-JUL-2013 | 10:56:15 | CODE 7: TEMP SENSOR OPEN CIRCUIT | Preheat | Standby | 382 | 11.8 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.4 | 12.0 | 1088 | 709:19 | 147:54 | 48:09 | 2 |
| 12 | 19-JUL-2013 | 10:56:15 | POWER ON | Off | PowerOn | 382 | 11.8 | 0.0 | 0.0 | 0.4 | 0 | 0.0 | 0.4 | 12.0 | 1088 | 709:19 | 147:54 | 48:09 | 2 |
| 13 | 19-JUL-2013 | 10:56:15 | ANALOG PREHEAT SW ON | Off | Unknown | 32 | 11.8 | 0.0 | 0.0 | 0.4 | 0 | 0.0 | 0.4 | 12.0 | 1088 | 709:19 | 147:54 | 48:09 | 2 |
| 14 | 03-JUL-2013 | 11:39:04 | SWITCH OFF | Preheat | Hold | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.6 | 12.0 | 1088 | 707:49 | 147:54 | 48:09 | 2 |
| 15 | 03-JUL-2013 | 11:39:04 | PREHEAT TIMER OFF | Preheat | Hold | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.6 | 12.0 | 1088 | 707:49 | 147:54 | 48:09 | 2 |
| 16 | 03-JUL-2013 | 10:13:27 | CODE 12: MOTOR SPEED ERR | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:24 | 147:52 | 48:09 | 2 |
| 17 | 03-JUL-2013 | 10:12:37 | CODE 5: UNDER VOLTAGE | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:23 | 147:51 | 48:09 | 2 |
| 18 | 03-JUL-2013 | 10:12:36 | CODE 17: MOTOR SPEED SENSOR | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:23 | 147:51 | 48:09 | 2 |
| 19 | 03-JUL-2013 | 10:12:27 | CODE 7: TEMP SENSOR COMM | Preheat | Standby | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:23 | 147:51 | 48:09 | 2 |
| 20 | 03-JUL-2013 | 10:12:27 | CODE 7: TEMP SENSOR OPEN CIRCUIT | Preheat | Standby | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:23 | 147:51 | 48:09 | 2 |
| 21 | 03-JUL-2013 | 10:09:59 | CODE 12: MOTOR SPEED ERR | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:20 | 147:48 | 48:09 | 2 |
| 22 | 03-JUL-2013 | 10:09:09 | CODE 5: UNDER VOLTAGE | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:20 | 147:48 | 48:09 | 2 |
| 23 | 03-JUL-2013 | 10:09:08 | CODE 17: MOTOR SPEED SENSOR | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:20 | 147:48 | 48:09 | 2 |
| 24 | 03-JUL-2013 | 10:08:59 | CODE 7: TEMP SENSOR COMM | Preheat | Standby | 382 | 11.8 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:19 | 147:47 | 48:09 | 2 |
| 25 | 03-JUL-2013 | 10:08:59 | CODE 7: TEMP SENSOR OPEN CIRCUIT | Preheat | Standby | 382 | 11.8 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:19 | 147:47 | 48:09 | 2 |
| 26 | 03-JUL-2013 | 10:08:59 | POWER ON | Off | PowerOn | 382 | 11.8 | 0.0 | 0.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:19 | 147:47 | 48:09 | 2 |
| 27 | 03-JUL-2013 | 10:08:59 | ANALOG PREHEAT SW ON | Off | Unknown | 32 | 11.8 | 0.0 | 0.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:19 | 147:47 | 48:09 | 2 |
| 28 | 03-JUL-2013 | 10:08:49 | CODE 12: MOTOR SPEED ERR | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:20 | 147:48 | 48:09 | 2 |
| 29 | 03-JUL-2013 | 10:07:59 | CODE 5: UNDER VOLTAGE | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:20 | 147:48 | 48:09 | 2 |
| 30 | 03-JUL-2013 | 10:07:58 | CODE 17: MOTOR SPEED SENSOR | Preheat | Purge | 382 | 12.0 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:20 | 147:48 | 48:09 | 2 |
| 31 | 03-JUL-2013 | 10:07:49 | CODE 7: TEMP SENSOR COMM | Preheat | Standby | 382 | 11.8 | 0.0 | 16.0 | 0.4 | 0 | 0.0 | 0.5 | 12.0 | 1088 | 706:19 | 147:47 | 48:09 | 2 |

*Figure 3-17. Event logging page.*

### 3.6.5.1 Time and Date display

The time and date associated with each record can be displayed using the original event GMT stamp or translated to local time and date using your computer time zone settings. To change time and date display, use the **Time and Date** radio buttons. Changing time and date display does not affect the event log stored into the PCM.

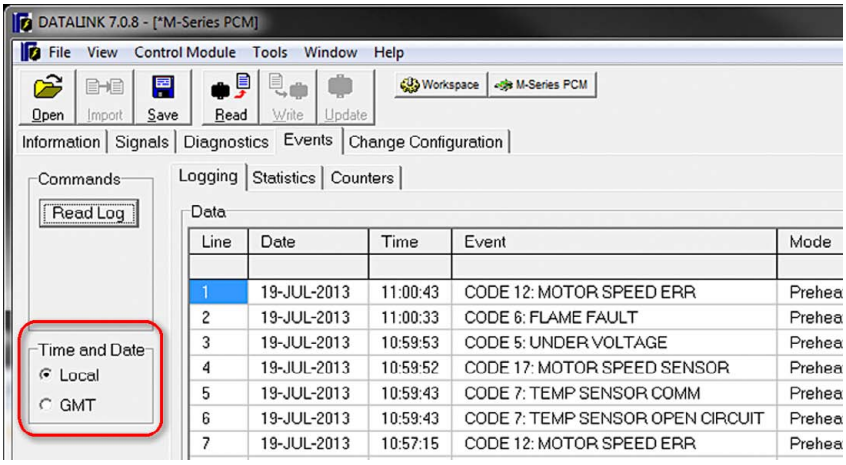



*Figure 3-18. Time and date display.*

Each time an Event listed below happens the G-II PCM will log or create a Event Record with 20 different data fields see Table 3-5 and Figure 3-18.

| Event Name | Event Trigger |
|---|---|
| **Fault** | The first time a fault occurs in a command cycle. See fault section for details. |
| **Power On** | When power is applied to the PCM |
| **Analog standard SW on** | When the analog standard switch is tuned on. |
| **Analog supplemental SW on** | When the analog supplemental mode is turned on. |
| **Analog preheat SW on** | When the analog preheat switch is tuned on. |
| **Analog coolant pump SW on** | When the analog preheat switch is tuned on. |
| **CAN standard SW on** | When the standard switch is tuned on. |
| **CAN supplemental SW on** | When supplemental mode is turned on. |
| **CAN preheat SW on** | When the preheat switch is tuned on. |
| **CAN coolant pump SW on** | When the analog preheat switch is tuned on. |
| **Heating cycle on** | When the PCM begins a heating cycle (Temp below cycle on set point). |
| **Heating cycle off** | When the PCM ends a heating cycle (Temp above cycle off set point). Any fault, switch off or preheat timeout that causes the heater to cycle off, does not count as a heating cycle. |
| **Switch off** | When the PCM is turned off using a switch or button. |
| **Preheat timer off** | When the PCM turns itself off at the expiration of the internal Preheat timer. |
| **Software update** | When the PCM firmware is changed using a computer. |

*Table 3-4. PCM Events.*

## 3.6.5.2 Event record parameters

The table below outlines the 20 parameters stored with each record.

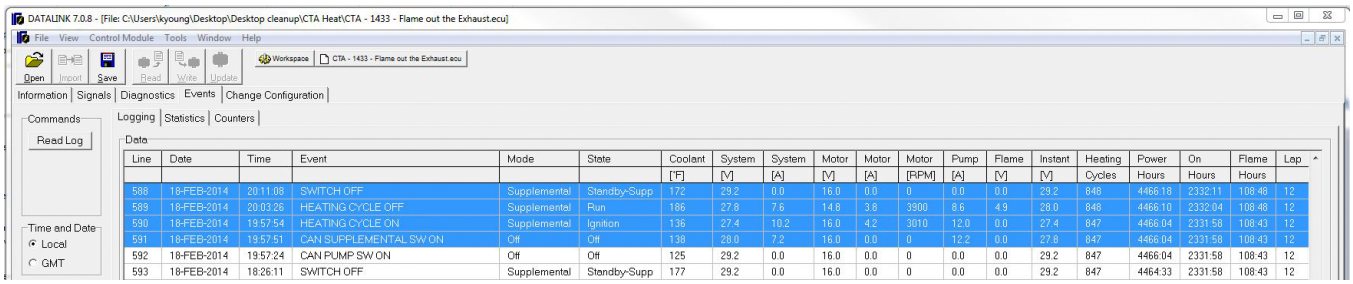
| No. | Event Record Field | Description |
|---|---|---|
| 1 | **Line** | Shows what data row you are on shown in descending order. |
| 2 | **Date** | Date event was created (also see GMT/Local Setting). |
| 3 | **Time** | Time event was created (also see GMT/Local Setting). |
| 4 | **Event** | |
| | CODE X: XXXX | Diagnostic code number and description. |
| | POWER ON | When battery power is applied to the PCM. |
| | Analog standard SW on | When the analog standard switch is tuned on. |
| | Analog supplemental SW on | When the analog supplemental mode is turned on. |
| | Analog preheat SW on | When the analog preheat switch is tuned on. |
| | Analog coolant pump SW on | When the analog preheat switch is tuned on. |
| | CAN standard SW on | When the standard switch is tuned on. |
| | CAN supplemental SW on | When supplemental mode is turned on. |
| | CAN preheat SW on | When the preheat switch is tuned on. |
| | CAN coolant pump SW on | When the analog preheat switch is tuned on. |
| | Heating cycle on | When the PCM begins a heating cycle (Temp below cycle on set point). |
| | Heating cycle off | When the PCM ends a heating cycle (Temp above cycle off set point). |
| | Switch off | When the PCM is turned off using a switch or button. |
| | Preheat timer off | When the PCM shuts itself off at the end of Preheat mode. |
| | Software update | When the Firmware was updated. |
| 5 | **Mode** | |
| | Off | Heater powered on, but not switched on. |
| | Standard | In Standard mode, the coolant pump runs continuously, and the heater is cycled on or off according to temperature set points. Will override Supplemental and Preheat modes. |
| | Supplemental | Same as Standard mode except the coolant pump does not run when the heater is in standby. |
| | Preheat | Same as Standard mode except it will automatically switch off after 90 minutes. |

*Table 3-5. Event record parameters.*

| No. | Event Record Field | Description |
|---|---|---|
| 6 | **State** | |
| | PowerOn | The PCM is connected to battery power (powered-on) and one of the events just became active. |
| | Igniter Test | Igniter turned on for 5 seconds for diagnostic purposes. |
| | Off | PCM has battery power, but all switches off. |
| | Standby | PCM waiting for temperature to drop below cycle on set point in standard mode. Coolant Pump is running. |
| | Standby Supp | PCM waiting for temperature to drop below cycle on set point in supplemental mode. Coolant Pump is not running. |
| | PreRun | PCM is running coolant pump for 30 seconds to validate temperature is below cycle on set point in supplemental mode. |
| | PreCheck | PCM verifying hardware before starting. |
| | PreIgnition | PCM activating the igniter and ramping up blower motor. |
| | Ignition | PCM activating the fuel solenoid and monitoring the flame. |
| | Run | Heater is now in Full output. |
| | ReIgnition | PCM attempting to ignite the fuel after the flame went out in full output. If the flame is out for more than 10 seconds you will get a Code 2 Flame out. |
| | Purge | Flame off. Blower running for 3 minutes to cool down the combustion chamber. |
| | Pause | Motor off, waiting for 2 seconds before returning to the Off, Hold or Lockout state. |
| | Hold | PCM awaiting operator to acknowledge a fault by toggling one of the switches. |
| | Lockout | PCM awaiting technician to cycle battery power to acknowledge a fault. |
| 7 | **Coolant Temp** | Coolant temperature as measured by the dual mode temp sensor at the Proheat outlet. |
| 8 | **System [V]** | Filtered system voltage. |
| 9 | **System [A]** | Total System Current. |
| 10 | **Motor** [V] | Voltage required to maintain the target motor speed (RPM). |
| 11 | **Motor** [A] | Motor Current. |
| 12 | **Motor** [RPM] | RPM of the motor (target speed is 3900 +/- 100). |
| 13 | **Pump** [A] | Coolant Pump Current. |
| 14 | **Flame [V]** | Voltage as seen by the flame eye. |
| 15 | **Instant [V]** | unfiltered system input voltage. |
| 16 | **Heating Cycles** | A heating cycle counts when the heater (in full output) cycles off by reaching the coolant cycle off temperature (185 f is standard). Any fault, switch off or preheat timeout that causes the heater to switch off, does not count as a heating cycle. |
| 17 | **Power Hours** | Amount of time the PCM has been connected to a battery source. |
| 18 | **On Hours** | Amount of time the PCM as been enabled ON in any of the Standard, Preheat or Supplemental modes. |
| 19 | **Flame Hours** | Amount of time the PCM has been burning fuel (in full output). |
| 20 | **Lap** | The PCM can hold 1024 Event records. Once the memory is full, the PCM increases the lap number by one and starts overwriting the oldest events. |

*Table 3-5 continued. Event record parameters.*

## 3.6.5.3 Log File Sample




| Line | Date | Time | Event | Mode | State | Coolant [°F] | System [V] | System [A] | Motor [V] | Motor [A] | Motor [RPM] | Pump [A] | Flame [V] | Instant [V] | Heating Cycles | Power Hours | On Hours | Flame Hours | Lap |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 588 | 18-FEB-2014 | 20:11:08 | SWITCH OFF | Supplemental | Standby-Supp | 172 | 29.2 | 0.0 | 16.0 | 0.0 | 0 | 0.0 | 0.0 | 29.2 | 846 | 4466:18 | 2332:11 | 108:48 | 12 |
| 589 | 18-FEB-2014 | 20:03:26 | HEATING CYCLE OFF | Supplemental | Run | 186 | 27.8 | 7.6 | 14.8 | 3.8 | 3900 | 8.6 | 4.9 | 28.0 | 846 | 4466:10 | 2332:04 | 108:48 | 12 |
| 590 | 18-FEB-2014 | 19:57:54 | HEATING CYCLE ON | Supplemental | Ignition | 136 | 27.4 | 10.2 | 16.0 | 4.2 | 3010 | 12.0 | 0.0 | 27.4 | 847 | 4466:04 | 2331:58 | 108:43 | 12 |
| 591 | 18-FEB-2014 | 19:57:51 | CAN SUPPLEMENTAL SW ON | Off | Off | 138 | 28.0 | 7.2 | 16.0 | 0.0 | 0 | 12.2 | 0.0 | 27.8 | 847 | 4466:04 | 2331:58 | 108:43 | 12 |
| 592 | 18-FEB-2014 | 19:57:24 | CAN PUMP SW ON | Off | Off | 125 | 29.2 | 0.0 | 16.0 | 0.0 | 0 | 0.0 | 0.0 | 29.2 | 847 | 4466:04 | 2331:58 | 108:43 | 12 |
| 593 | 18-FEB-2014 | 18:26:11 | SWITCH OFF | Supplemental | Standby-Supp | 177 | 29.2 | 0.0 | 16.0 | 0.0 | 0 | 0.0 | 0.0 | 29.2 | 847 | 4464:33 | 2331:58 | 108:43 | 12 |

*Figure 3-19. Example log file screen.*

As you can see on the highlighted rows is an example of a heater log file. The log file is presented with the newest record always at the top and the oldest record at the bottom. Reading from left to right the event that triggered the log record **Line 591** on **18-FEB-2014** at **19:57:51** was a **CAN SUPPLEMENTAL SW ON** event, the heater was in the **OFF Mode** and **OFF State**. At the time of the event record the Coolant Temp was **138°F** and the voltage was **28.0 V**. The other data fields show what was recorded at the time of the event.

*The heater now entered the PreCheck then the PreIgnition then finally the Ignition states (these are non recording events) During this time a temperature and fault check is done, then the igniter is turned on and the blower motor speed is ramped up.*

The next record up in the log on **Line 590** on **18-FEB-2014** at **19:57:54** is the **HEATING CYCLE ON event**, the heater was in the **Supplemental mode** and the **Ignition state**. At the time of the event record the Coolant Temp was **136°F** and the voltage was **27.4 V** The other data fields show what was recorded at the time of the event.

*The heater now entered the Run state (this is a non recording event) until the next recorded event.*

The next record up in the log on **Line 591** on **18-FEB-2014** at **20:03:26** is the **HEATING CYCLE OFF event**, the heater was in the **Supplemental mode** and the **Run state**. At the time of the event record the Coolant Temp was **186°F** and the voltage was **27.8 V** The other data fields show what was recorded at the time of the event.

## 3.6.5.4 Event log statistics

The Statistics page shows the historical count of Diagnostic Codes and Event.

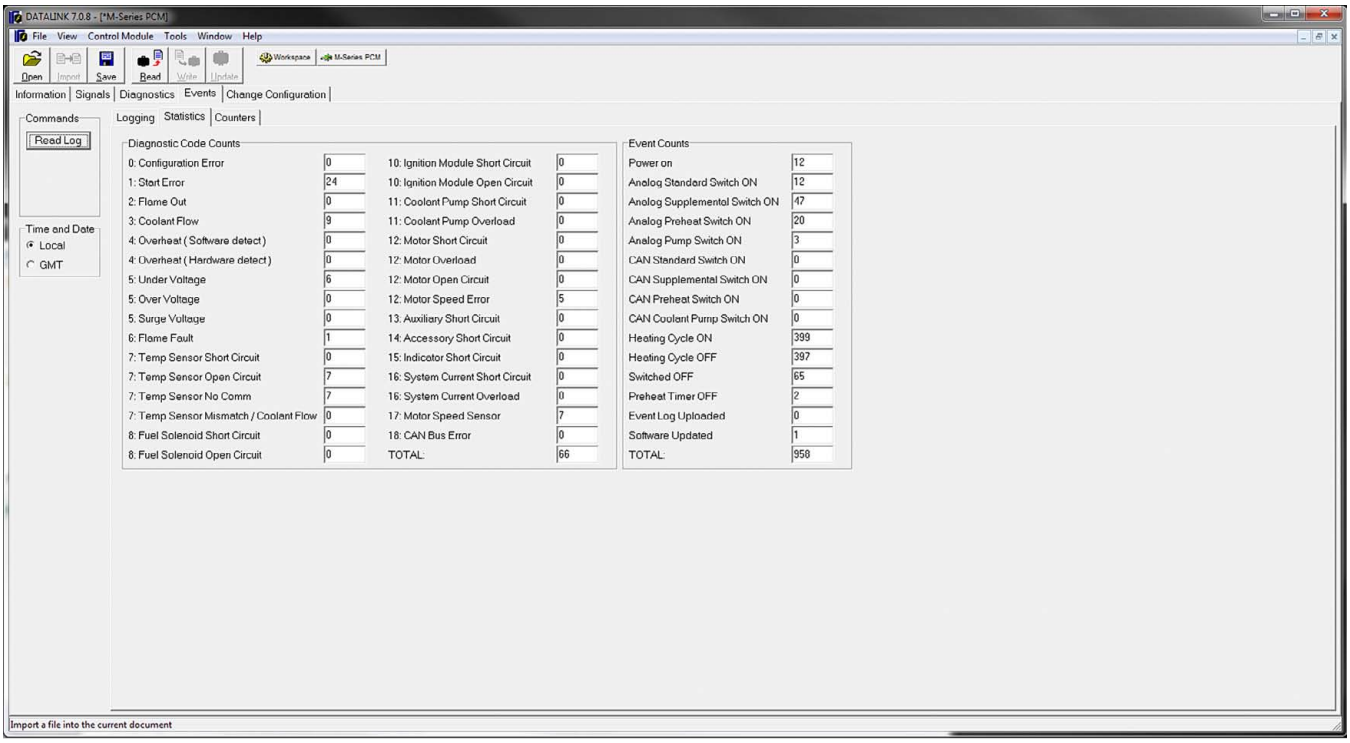



*Figure 3-20. Event log statistics.*

## 3.6.5.5 Counters

The **Counters** page displays the historical hour meters and cycle counts.

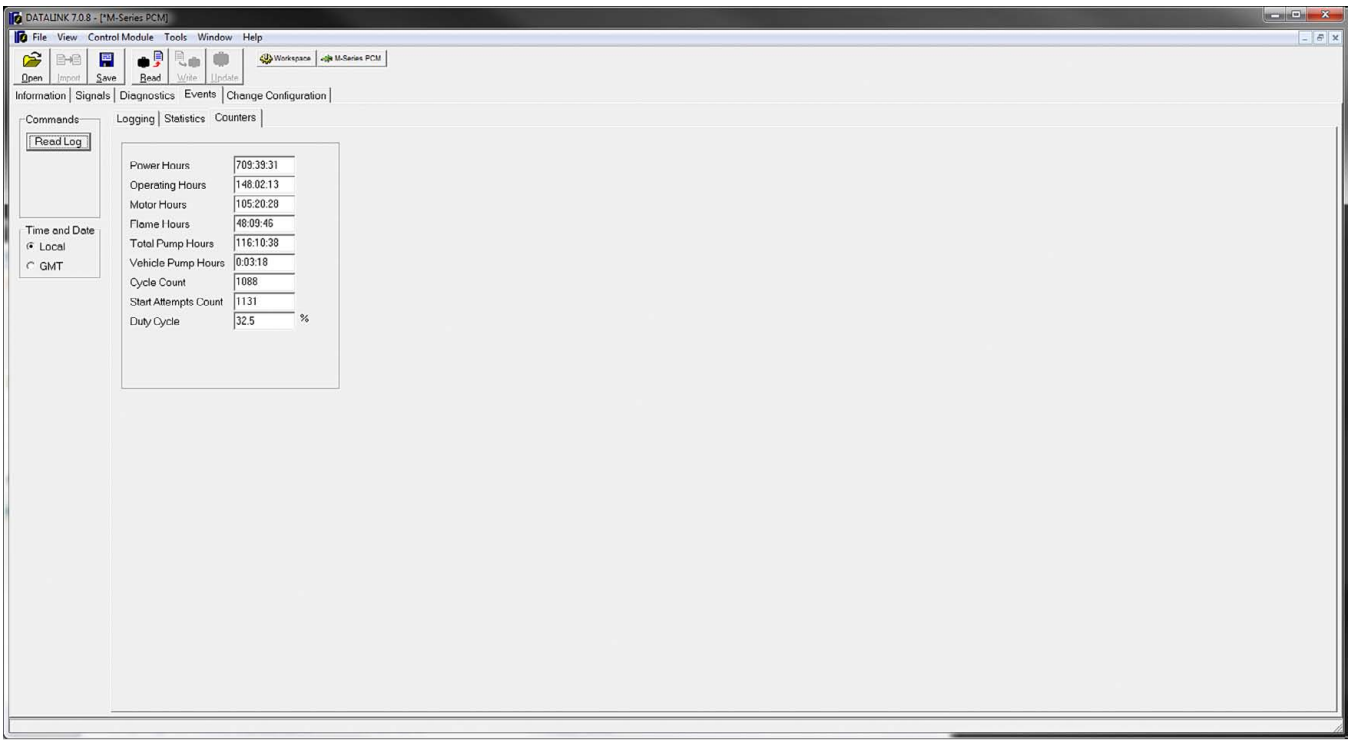



*Figure 3-21. Counters.*

The table below describes the different meters displayed in the **Counters** page.

| Name | Description |
|---|---|
| **Power Hours** | Keeps track of the time heater is connected to battery power. |
| **Operating Hours** | Keeps track of time the heater is enabled ON by one of the switches. |
| **Motor Hours** | Keeps track of time the motor is running. |
| **Flame Hours** | Keeps track of time the heater is in full output. |
| **Total Pump Hours** | Keeps track of time the coolant pump output is switched on. |
| **Vehicle Pump Hours** | Keeps track of time the coolant pump is requested on by the vehicle. |
| **Cycles Count** | Counts successful heating cycles. A heating cycle counts when the heater (in full output) cycles off by reaching the coolant cycle off temperature. Any fault, switch off or preheat timeout event that causes the heater to switch off, does not count as a heating cycle. |
| **Start Attempts Count** | Counts heating cycle start attempts. |
| **Good Starts Count** | Counts successful heating cycle starts (heater went into full output). |

*Table 3-6. Counter descriptions.*

# 3.7 CHANGE CONFIGURATION

The **Change Configuration** page provides a way to change the PCM part number and software configuration if it's found that the wrong PCM part number has been installed for OEM Specific applications.

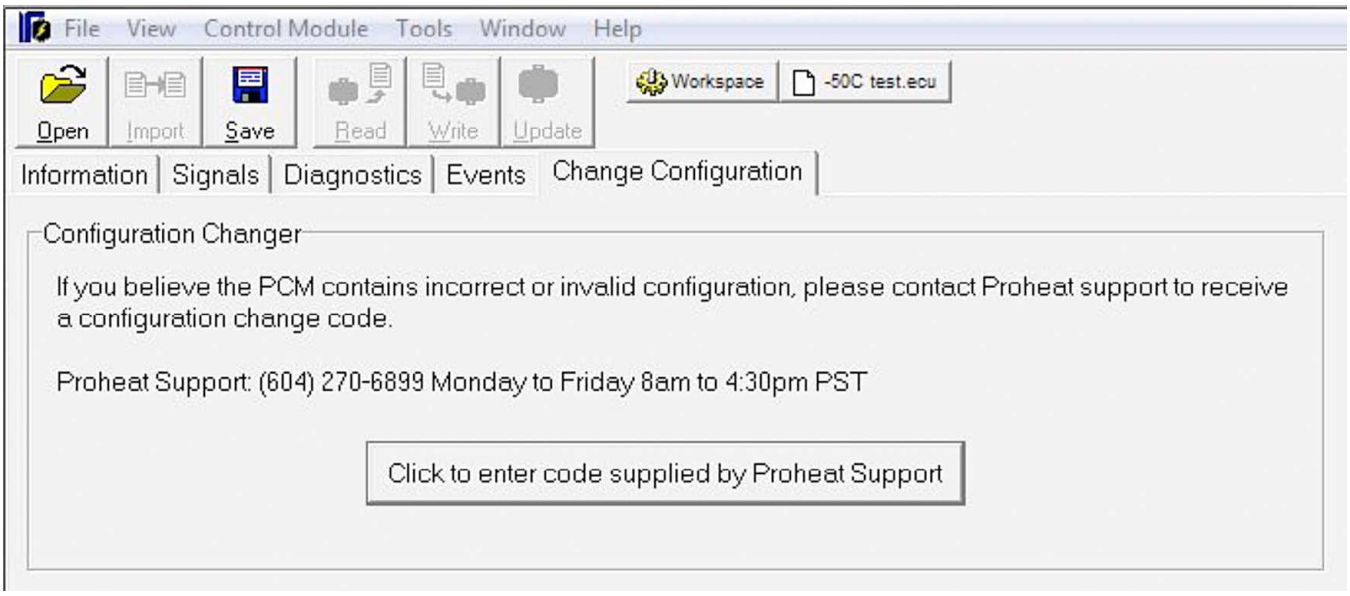



*Figure 3-22.*

To use the **Change Configuration** tool you first must obtain the PCM serial number from the information page (see page 3-7) next call Proheat Support to receive a configuration change code that is valid for the OEM application that the heater is installed in.

Enter the code provided by Proheat Support.

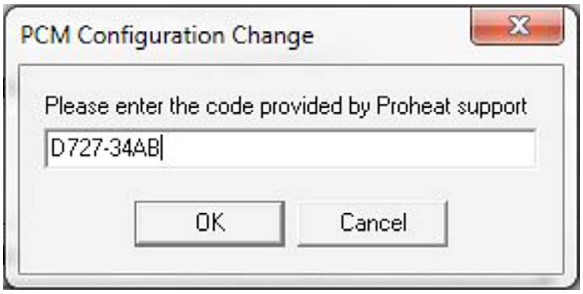



*Figure 3-23.*

Verify the PCM is changing to the correct configuration number.

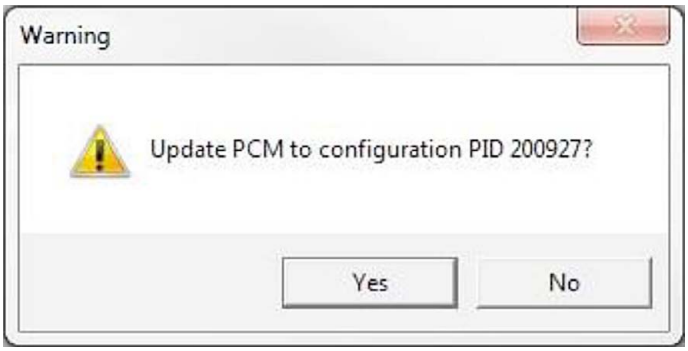



*Figure 3-24.*

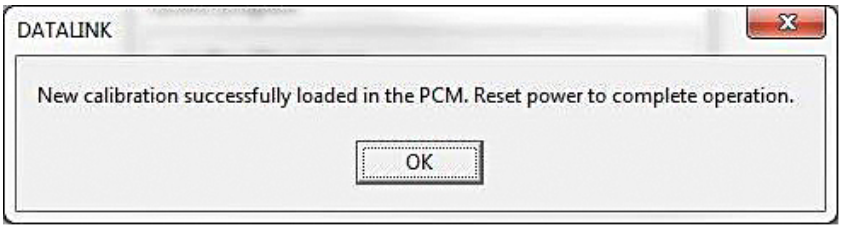



*Figure 3-25.*

Once configuration has been changed:

**1.** Disconnect the diagnostic cable from the computer.

**2.** Disconnect battery power from the PCM.

**3.** Wait for 20 seconds.

**4.** Reconnect battery power to PCM.

**5.** Wait for 5 seconds. The G-II Status light will flash Green twice.

**6.** Reconnect the diagnostic cable to the computer and read the PCM to verify the configuration number is now correct.

# 4.0 DATALINK 7 MENU AND TOOL BARS

## 4.1 THE MENU BAR

The menu bar is composed of 6 drop-down menus: File – View – Control Menu – Tools, Window and Help. The following paragraphs describe all drop-down menus.

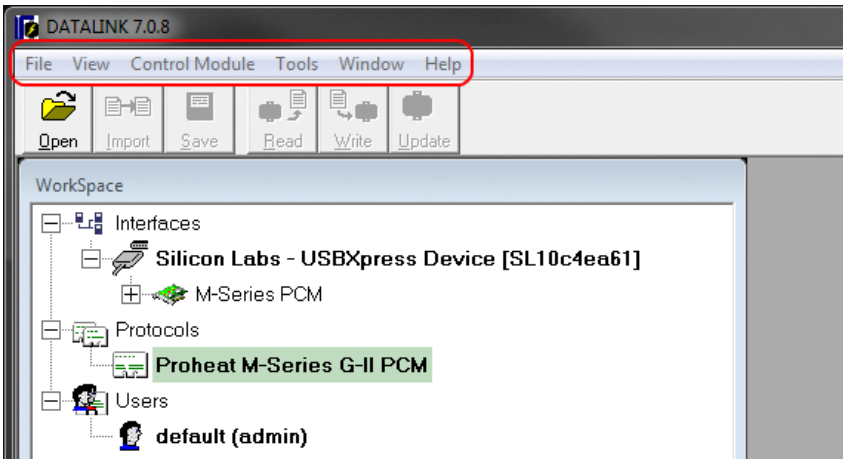



*Figure 4-1. Menu bar.*

### 4.1.1 FILE MENU

The **File** menu contains the file Open and Save commands.

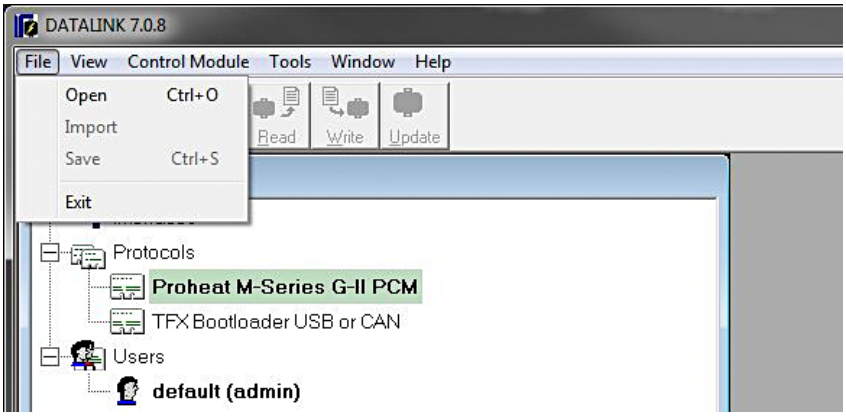



*Figure 4-2. File menu.*

| Command | Function | Shortcut |
|---|---|---|
| Open… | Open a complete PCM document from disk.<br>Useful to read saved PCM data while Datalink 7 is not connected to PCM. | CTRL+O |
| Save | Save current PCM information to disk for further analysis or archive. | CTRL+S |
| Exit | Exit Datalink 7. | |

*Table 4-1. File menu commands.*

## 4.1.2 VIEW MENU

The **View** menu contains options to show/hide menu bars.

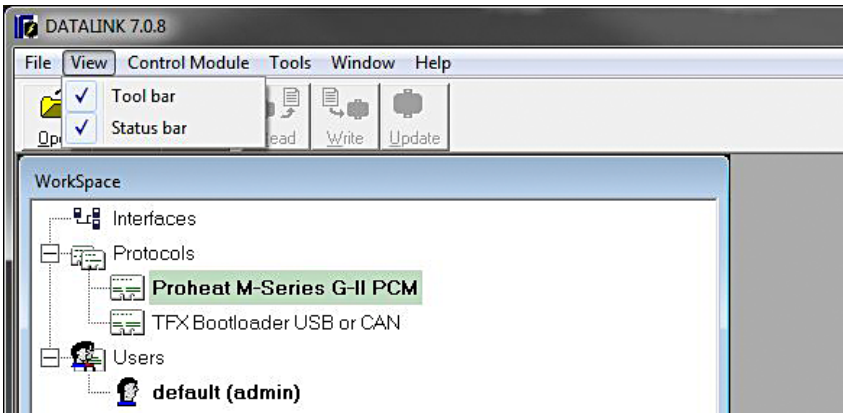



*Figure 4-3. View menu.*

| Command | Function |
|---|---|
| Toolbar | Hide or shows the toolbar. |
| Status Bar | Hide or shows the status bar. |

*Table 4-2. View menu commands.*

## 4.1.3 CONTROL MODULE MENU

The **Control Module** menu contains the PCM Read and Update commands.

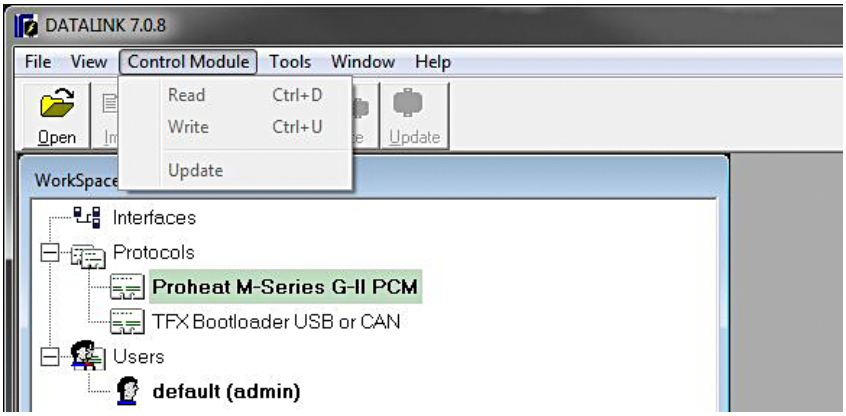



*Figure 4-4. Control module menu.*

| Command | Function |
|---|---|
| Read | Read the content of a PCM. |
| Write | This function is not used. |
| Update | See the Firmware page for more information. |

*Table 4-3. ECU menu commands.*

## 4.1.4 TOOLS MENU

The **Tools** menu contains optional settings.

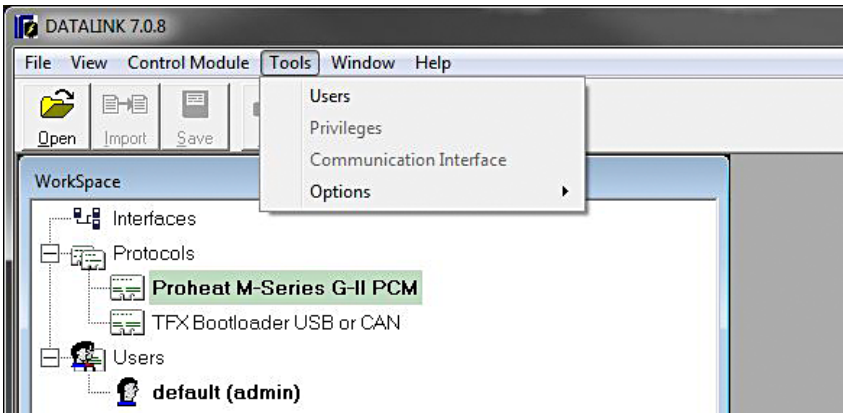



*Figure 4-5. Tools menu.*

| Command | Function |
|---|---|
| Users | This function is not used. |
| Privilege | Opens the access privilege window. Note Privilege codes can be obtained form Proheat Product Support. |
| Communication Interface | Opens the communication interface window. |
| Options -> | Chooses between imperial and metric units and set the maximum refresh rate. |

*Table 4-4. Tools menu commands.*

## 4.1.5 WINDOWS MENU

The **Windows** menu contains display settings.

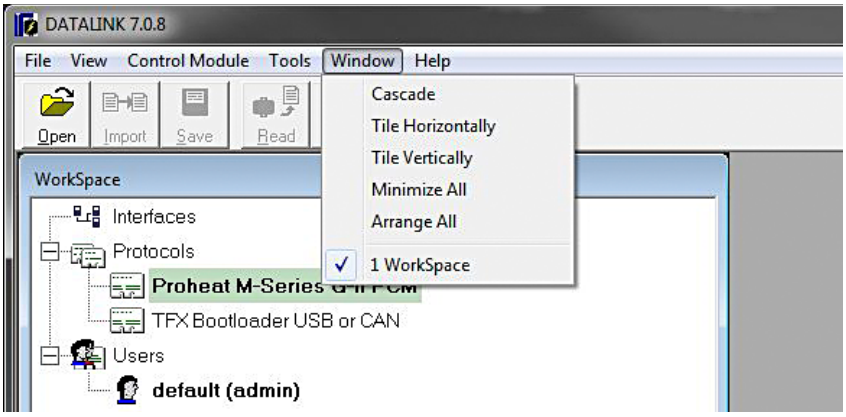



*Figure 4-6. Windows menu.*

## 4.1.6 HELP MENU

The **Help** menu provides copyright and version information through the About... command. Also, any file found in the Help sub-folder will be listed into the **Help** menu.

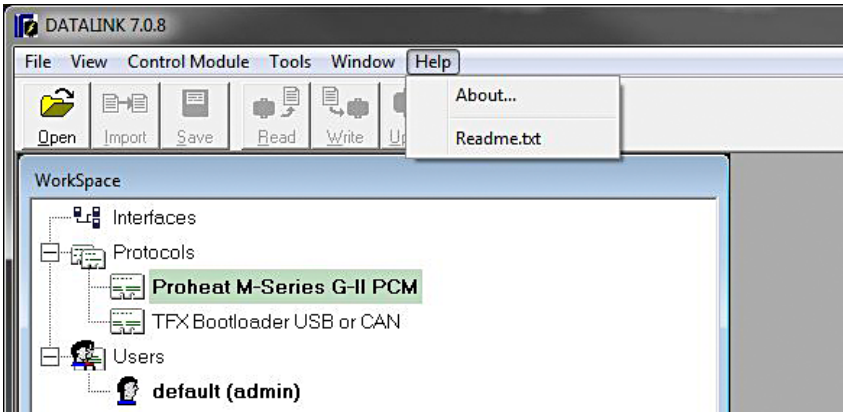



*Figure 4-7. Help menu.*

| Command | Function |
|---|---|
| About | Open the copyright and version information window. |
| Read Me | Open the `readme.txt` file. |

*Table 4-5. Help menu items.*

# 4.2 THE TOOLBAR

The **toolbar** provides shortcuts to the most commonly used commands. The table below shows the **toolbar** commands.

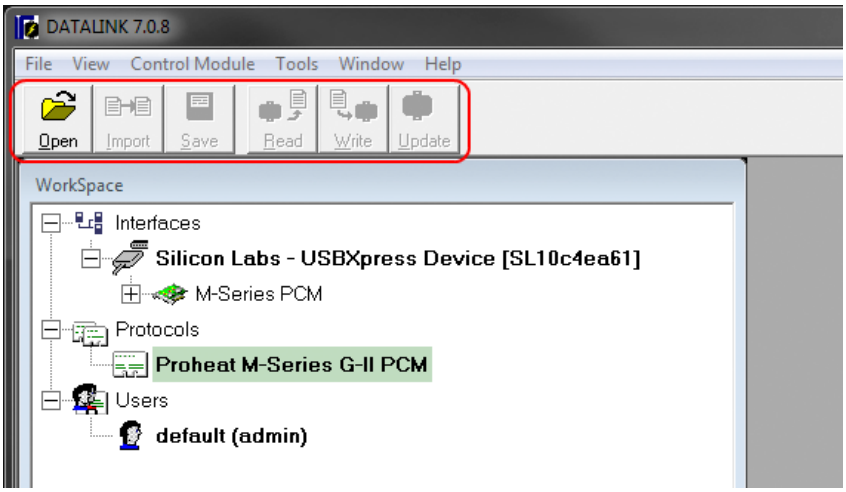



*Figure 4-8. The Toolbar.*

| Toolbar command | Corresponding menu command |
|---|---|
| Open | Open a saved file. |
| Import | This function is not used. |
| Save | Save log to a file. |
| Read | Read PCM. |
| Write | This function is not used. |
| Update | Update firmware. See the Firmware page for more information. |
| Workspace | Shows the Workspace window. |
| M-Series PCM | Shows the M-Series PCM window. |

*Table 4-6. Toolbar commands.*

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Installation Date:

Dealer:

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