Platform Manager 2 I²C Demo Design and GUI

User's Guide

August 2014
UG59_1.1

Introduction

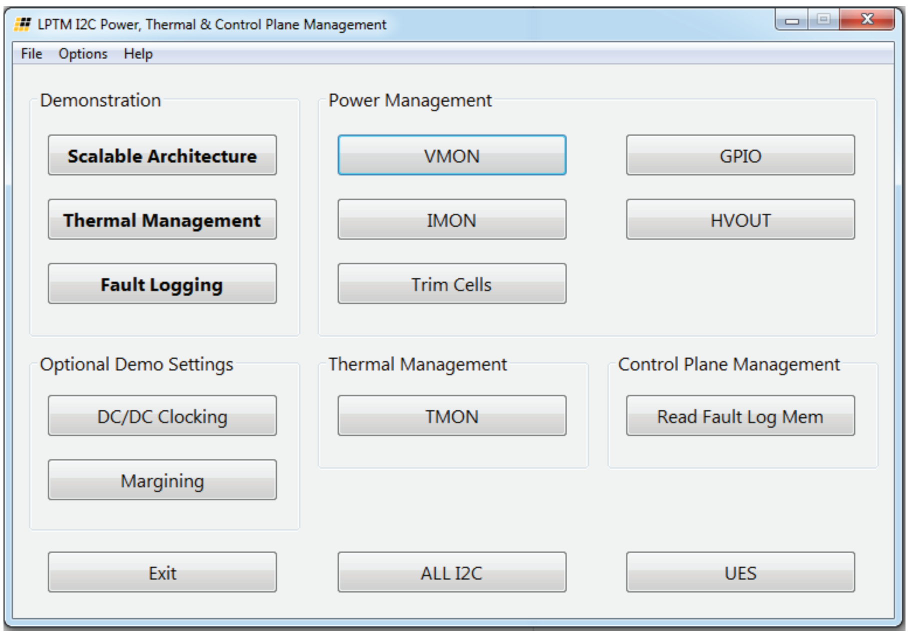
The Platform Manager 2 is a fast-reacting, programmable logic based hardware management controller. Platform Manager 2 is an integrated solution combining analog sense and control elements with scalable programmable logic resources. The unique approach allows Platform Manager 2 to integrate Power Management, Thermal Management, and Control Plane functions into a single device.

This user guide describes the demo design and graphical user interface (GUI) which highlight the flexibility and scalability provided by Platform Manager 2. The GUI also provides an interface for accessing the various Power Management (Power Sequencing, Voltage Monitoring, Trimming, Margining), Thermal Management (Temperature Monitoring, Fan Control, Power Control) and Control Plane (Reset Control, Fault Logging) features provided by the Platform Manager 2 device.

GUI Overview

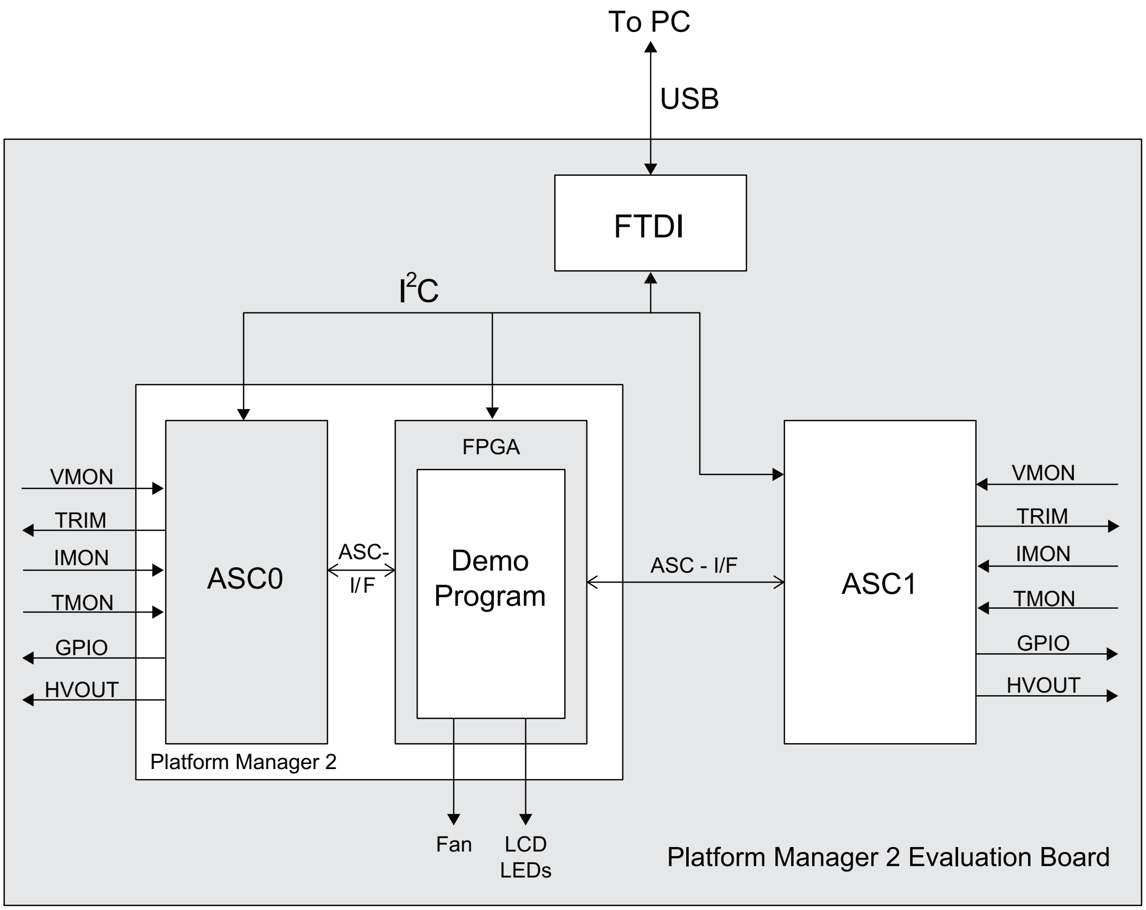
The GUI provides an interface to the I²C based demonstration design as well as the L-ASC10 (ASC) I²C measurement and configuration features. The GUI is shown in Figure 1.

Figure 1. I²C Demo GUI



The GUI works with the Platform Manager 2 Evaluation Board as shown in Figure 2. The EVB must be programmed with the demo design to work with the Demonstration and Optional Demo Settings screens. The Power Management, Thermal Management, and Control Plane Management screens can be used for debugging any design, and do not require that the demo design is programmed into the Platform Manager 2.

Figure 2. Demo Design and Debug Features on Platform Manager 2 EVB



Setup

This section describes how to connect and set up the demo.

Required Demo Components

- Platform Manager 2 Demo Design Zip File
- Platform Manager 2 Evaluation Board
- Lattice Diamond Programmer Software
- Mini USB cable to power Platform Manager 2 Evaluation Board and provide I²C connection

Project Setup

Unzip the demo design package, found in the Downloads section of the Platform Manager 2 web page.

Connect the USB cable between the PC and the evaluation board. Start Diamond Programmer to download the demo files. Use the Platform_Manager_2_I2C_Demo.xcf programmer configuration file to load the file into the Platform Manager 2 and ASC devices.

Note: You will need to browse to locate the JEDEC and .hex files at the unzipped location as Diamond Programmer only stores absolute paths. See the programming procedure section of AN6091, Powering Up and Programming Platform Manager 2 and L-ASC10 for more details on programming the demo board.

Evaluation Board Setup

- SW1 (FTDI_I2C Enable) must be pressed down. See Figure 3 for details.
- Jumpers J3, J4, J29 must be populated
- Jumper J8 must be in the +5V position
- Jumper J5 must be in the ASC1_RST (pin 1 and 2) position
- Jumper J1 must be in the USB_POWER position
- The fan included with the Platform Manager 2 Evaluation Board must be connected to fan connector J9 (Thermal Management demo only).

Demonstration Design

The GUI features three separate demonstrations with two optional demo settings. The demonstrations include:

- Scalable Architecture
- Thermal Management
- Fault Logging

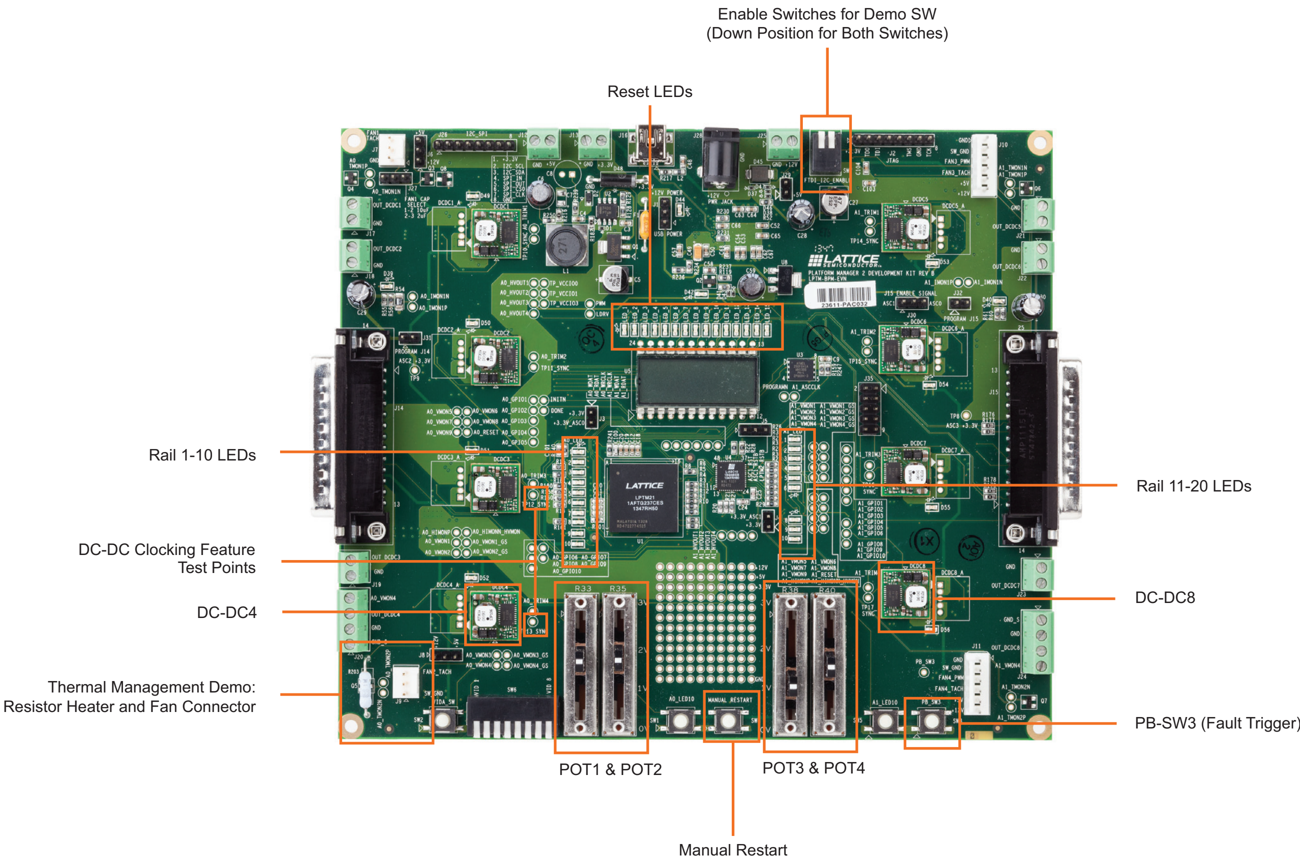
The optional demo settings include:

- DC/DC Clocking
- Margining

The demonstration design works with the Platform Manager 2 Evaluation Board and the demo program. (See the User Guide for the evaluation board in the References section for more details). The circuits on the evaluation board which are used in the demo program are shown in Figure 3.

The demo design is available in configuration file format only. The demo design source files are not provided due to incompatibility with the latest version of the design tools.

Figure 3. Platform Manager 2 - Evaluation Board with Demo Features

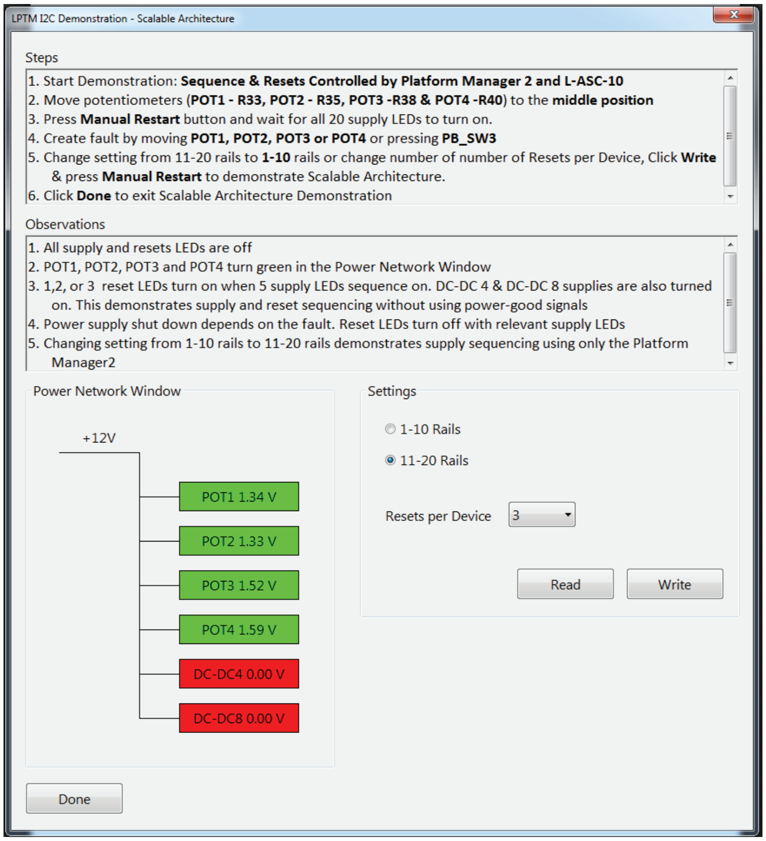


Each of the demonstrations and optional demo settings are described in the following sections.

Scalable Architecture

The Scalable Architecture demonstration screen is shown in Figure 4. This demonstration shows the voltage monitoring, power and reset sequencing, and scalability provided by the Platform Manager 2 family.

Figure 4. Scalable Architecture Demonstration



There are two programmable settings in the scalable architecture demonstration:

- **Number of Rails** – This setting determines the number of rails sequenced in the design. The available settings are 1-10 Rails or 11-20 Rails. The rails are demonstrated by sequencing on the LEDs and monitoring the potentiometers on the evaluation board. The 1-10 Rails setting in the demo uses the Platform Manager 2 and the associated potentiometers, LEDs and DC-DC4. The 11-20 Rails setting uses both the Platform Manager 2 and the external ASC device, along with the potentiometers, LEDs, and DC-DC4 and DC-DC8 on the evaluation board.
- **Resets per Device** – This setting determines the number of resets which are associated with each group of 5 rails. The available settings are 1, 2, or 3. The resets are demonstrated by sequencing on the LEDs on the evaluation board.

The settings are stored into the device whenever the Write button is clicked. The steps and observations shown in the demo dynamically update if a new value for number of rails is written to the demo program.

The GUI also provides feedback by showing the voltages at the potentiometers and DC-DC converters. A green color code indicates that the voltage is inside of the valid window, while a red color code indicates that the voltage is outside the valid window. The valid windows are between 1 Volt and 2 Volts for the potentiometers, and between 1.05 Volts and 1.35 Volts for the DC-DC converters.

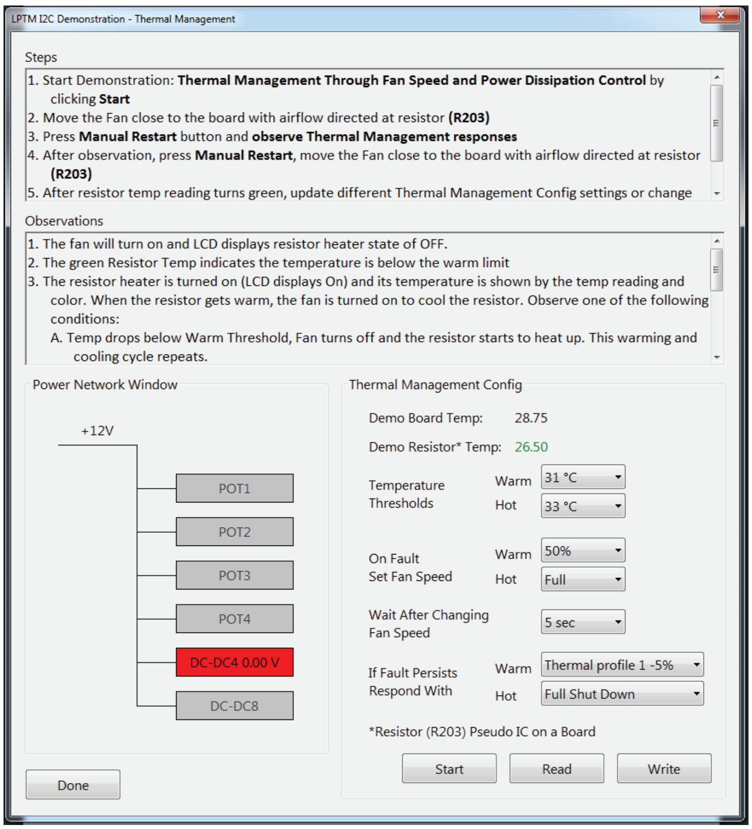
The rail and reset LEDs are shown in the board diagram in Figure 3. The scalable architecture demo also uses the on-board potentiometers and the manual restart button.

The steps to run the demo, along with the expected observations, are shown in the GUI directly. These steps are also reproduced in Appendix A1 – Scalable Architecture – Steps and Observations (Setting = 11-20 Rails) and Appendix A2 – Scalable Architecture – Steps and Observations (Setting = 11-20 Rails).

Thermal Management

The Thermal Management demonstration screen is shown in Figure 5. This demonstration shows the temperature monitoring, fan control, and power control provided by the Platform Manager 2 family.

Figure 5. Thermal Management - Demonstration



There are several programmable settings in the Thermal Management demonstration:

- **Temperature Thresholds (Warm and Hot)** – These settings determine the warm and hot temperature thresholds at the heated demo resistor. These settings are automatically populated when the thermal management demo is opened, based on a pre-defined offset from the measured board temperature. Warm is preset to *Board Temp + 2°C*, while Hot is preset to *Board Temp + 4°C*. These settings can be updated using the drop-down menu and the **Write** button.
- **On Fault Set Fan Speed (Warm and Hot)** – These settings determine the fan speeds applied by the demo design when the temperature is above the warm or hot threshold. The GUI supports PWM duty cycle speed settings of *OFF*, *25%*, *50%*, *75%*, and *FULL*. The default settings are Warm – *50%*, Hot – *FULL*.
- **Wait After Changing Fan Speed** – This setting determines the wait time used by the demo program before moving to the action defined in the **If Fault Persists Respond With** setting. The wait time can be set to either *3 seconds* or *5 seconds* (default setting). See Figure 6 and Figure 7 for more details on how the wait time works with the fault states.

- **If Fault Persists Respond With (Warm and Hot)** – These settings determine the demo program response when the warm or hot temperature alarms persist for longer than the **Wait After Changing Fan Speed** setting. The available warm settings are *Supply Voltage – 5%*, and *Supply Voltage – 10%*. The available hot settings are *Supply Voltage -10%* and *Full Shutdown*. The default settings are Warm = *Supply Voltage – 5%*, and Hot = *Full Shutdown*. Figure 6 and Figure 7 show the flow chart through the various fault states in the demo.

The settings are stored into the device whenever the **Write** button is clicked. The demo settings are populated automatically when the GUI opens, and can be refreshed by clicking the **Read** button. The **Start** button is used to begin the demo.

The GUI also provides feedback by showing the board temperature, and the temperature measured at the heater resistor. The Demo Resistor* Temp value is color coded to indicate the alarm state. A green color code indicates that the heater resistor temperature is below the warm threshold. An orange color code indicates that the temperature is above the warm threshold but below the hot threshold. A red color code indicates that the temperature is above the hot threshold. The GUI also shows the voltage at DC-DC4. This is the DC-DC converter used to demonstrate the power control updates of the supply voltage by the demo.

The demo works with the Fan 2 connector and heater resistor as shown in the board diagram in Figure 3. The demo also uses the LCD screen to communicate the status of the heater resistor.

The steps to run the demo, along with the expected observations, are shown in the GUI directly. These steps are also reproduced in Appendix B – Thermal Management – Steps and Observations demonstration steps and observation. A flow chart of the demo logic is shown below in Figure 6 and Figure 7.

Figure 6. Thermal Management Demo - Flow Chart P. 1

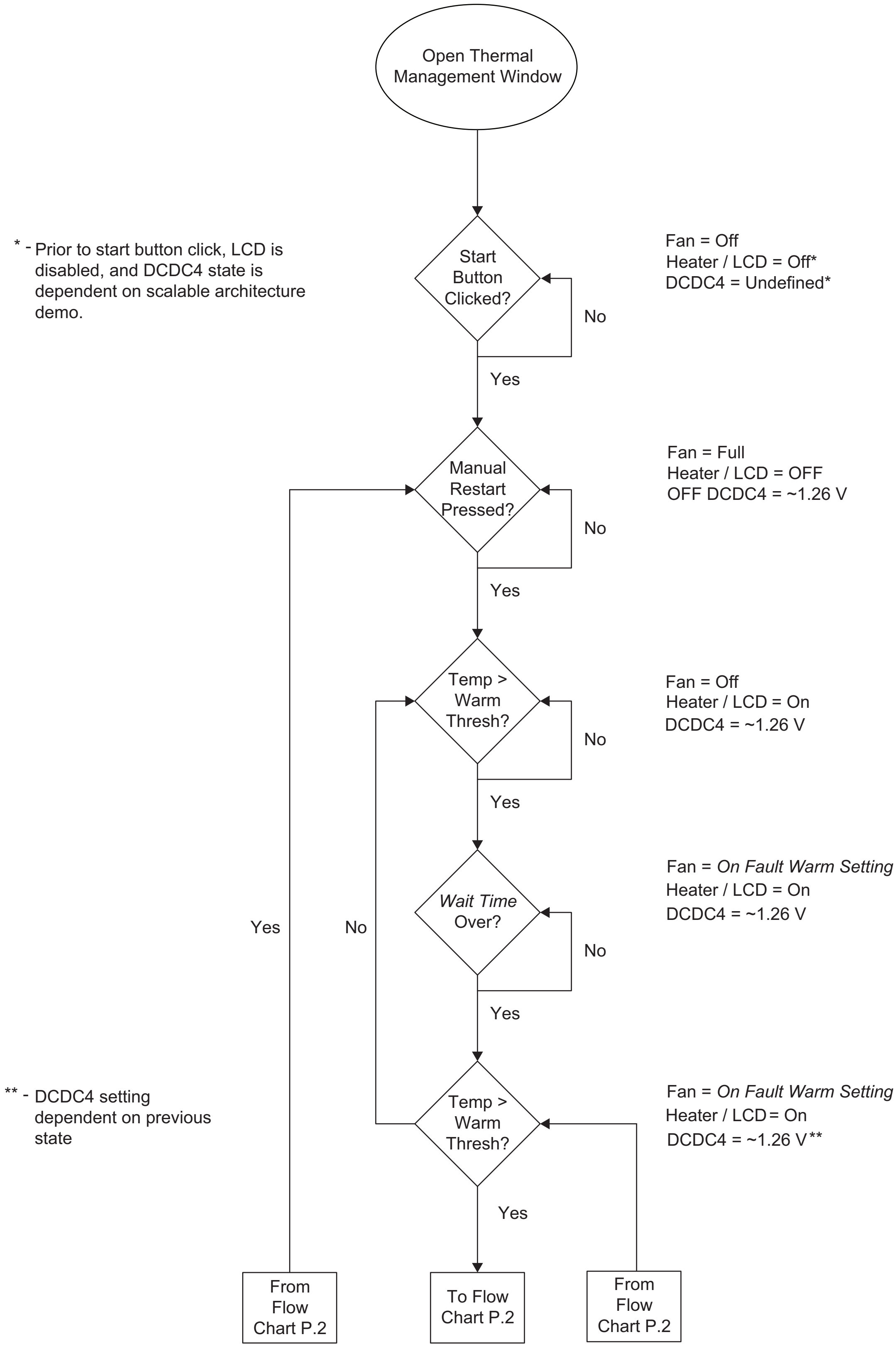
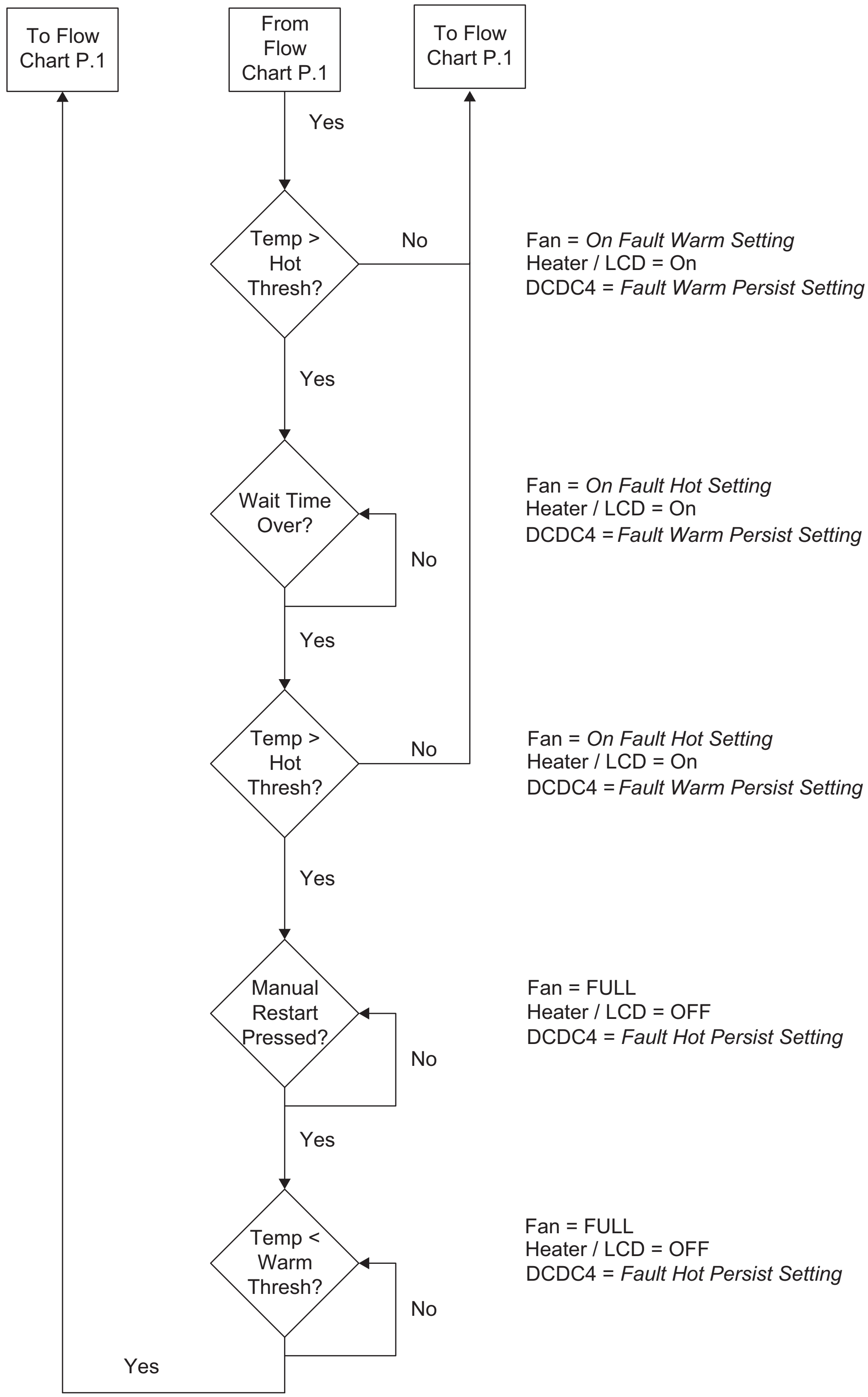


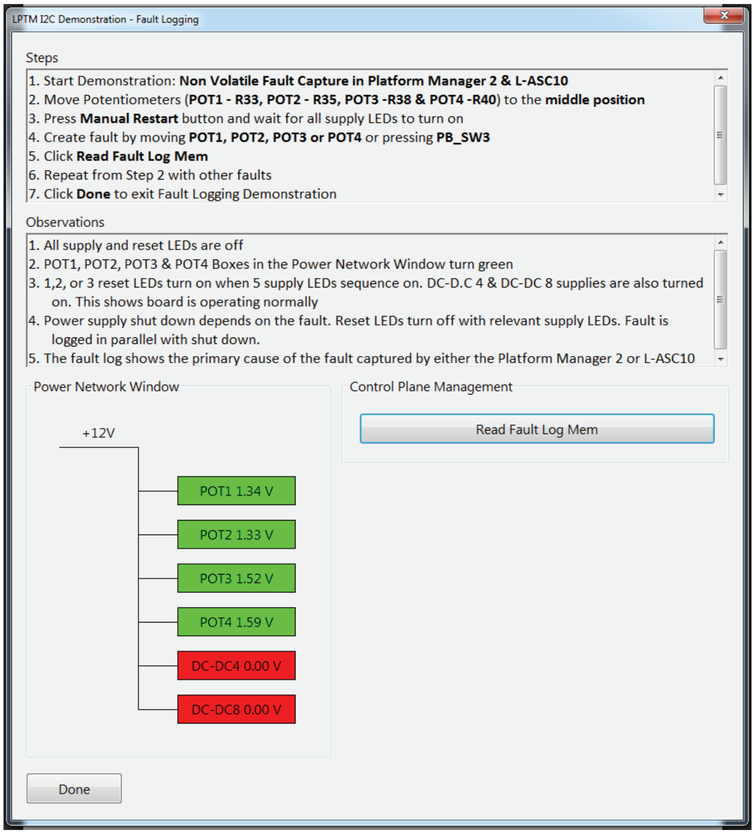
Figure 7. Thermal Management Demo - Flow Chart P. 2



Fault Logging

The Fault Logging demonstration screen is shown in Figure 8. This demo shows the fault logging and readback functionality of the ASC.

Figure 8. Fault Logging - Demonstration



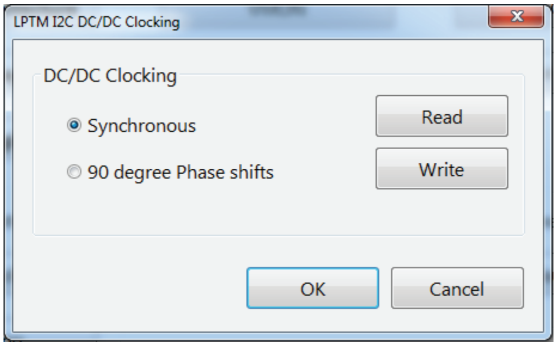
The demo automatically enables the fault logging when this screen is open. The steps/observations included in the GUI provide a step by step process to generate, store and readback faults using the evaluation board. These steps are also reproduced in Appendix C – Fault Logging – Steps and Observations.

The **Read Fault Log Mem** button opens the fault readback dialog screen. This screen is described in more detail in the Read Fault Log Mem section.

DC/DC Clocking (Optional Demo Setting)

The DC/DC Clocking option screen is shown in Figure 9. This screen is used to modify the behavior of the demo program Sync signals. These signals are used to determine the phase relationship between the switching DC-DC converters on the evaluation board.

Figure 9. DC/DC Clocking - Optional Demo Setting



There are two settings for this option: *Synchronous* (Default) or *90 degree Phase shifts*. The Sync signal behavior can be observed at the Sync test points shown in the evaluation board diagram (see Figure 3). Click the **Write** button to store the modified setting to the demo program. The behavior of the sync signals with the *Synchronous* setting is shown in Figure 10, with the *90 degree Phase shifts* setting shown in Figure 11.

Figure 10. DC/DC Sync Signals - Synchronous Setting

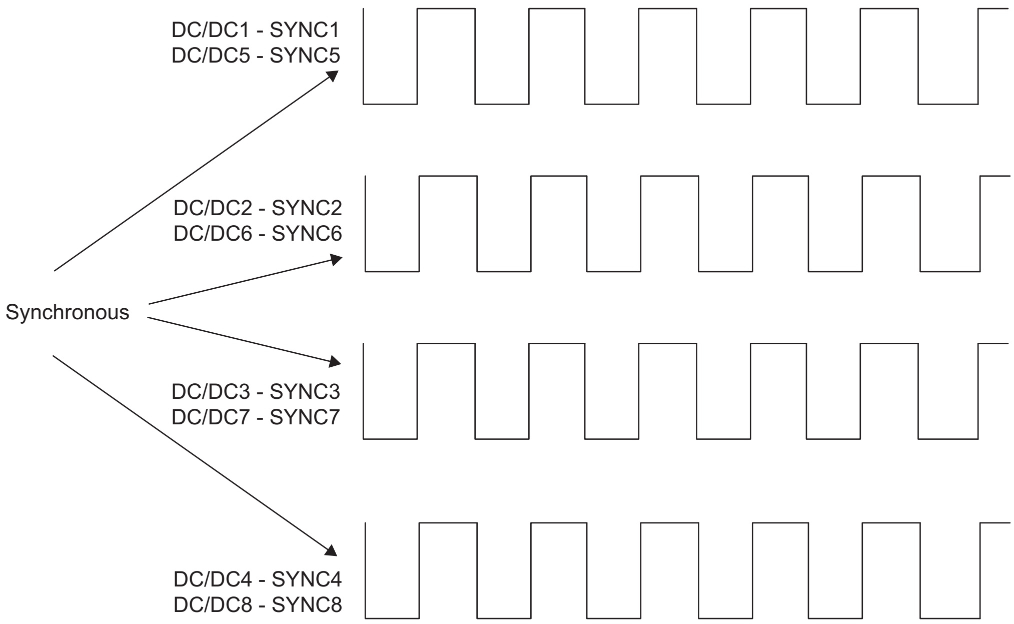
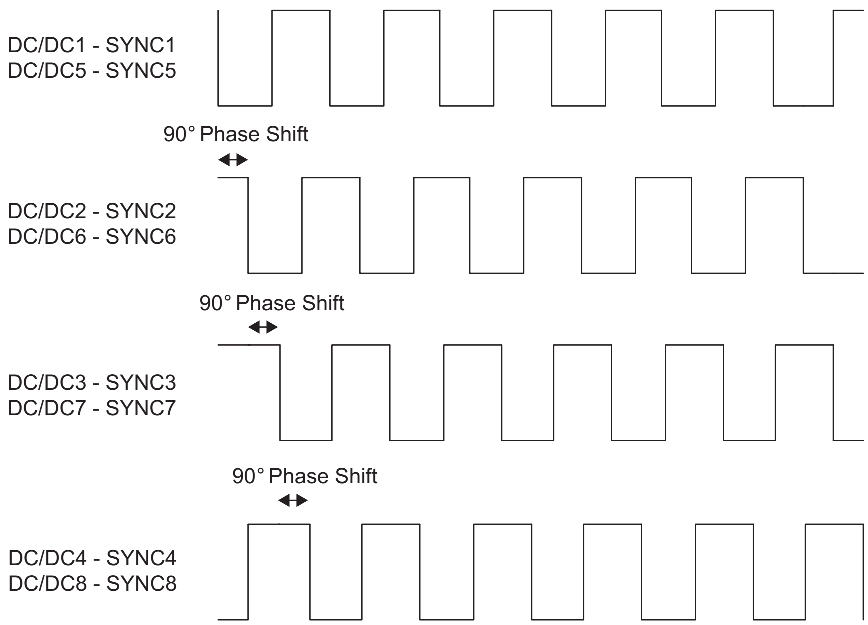


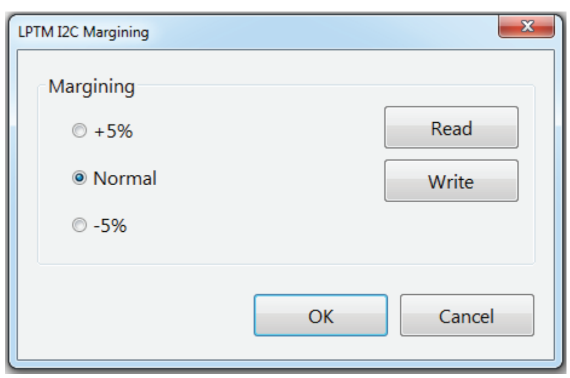
Figure 11. DC-DC Sync Signals - 90 Degree Phase Shift Setting



Margining (Optional Demo Setting)

The Margining option screen is shown in Figure 12. This screen is used to modify the output voltage of the DC-DC converters on the evaluation board. All converters which are populated and enabled respond to the settings in this screen with their output voltage being margined up (+5%) or down (-5%). Click the **Write** button to store the modified setting to the demo program.

Figure 12. Margining - Optional Demo Setting



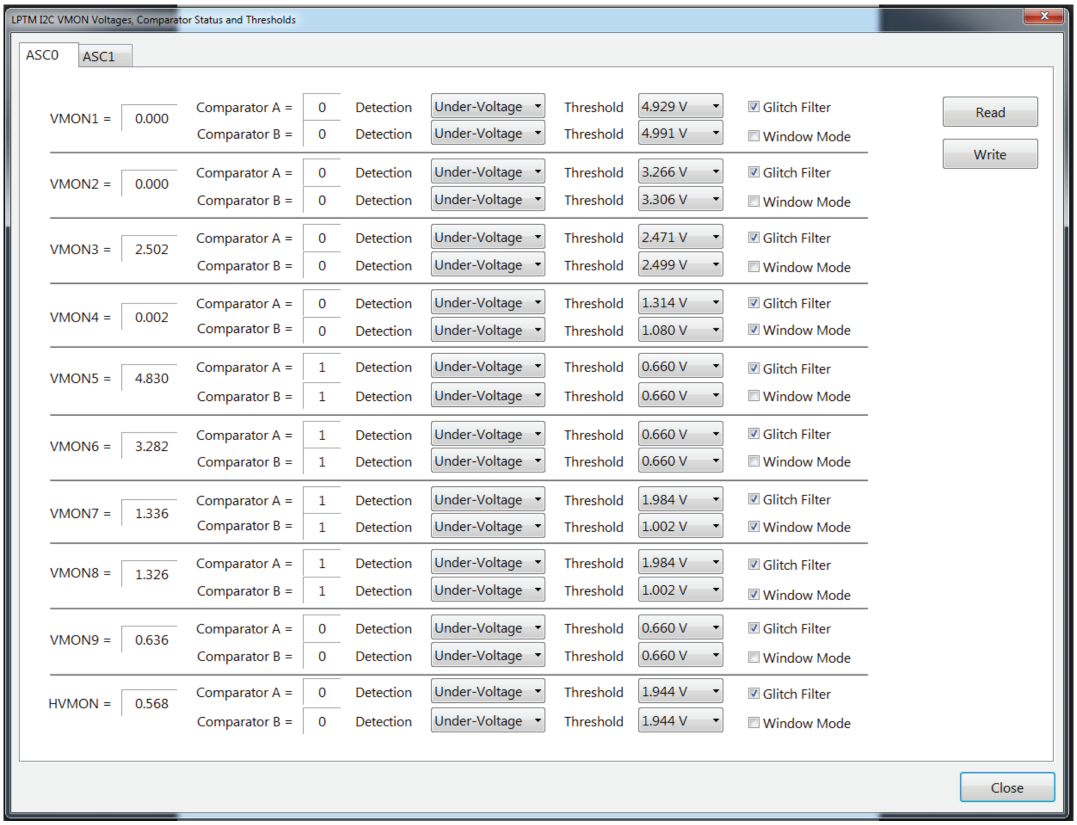
Power Management

The GUI provides a set of views for accessing the I²C features of the ASC associated with power management. Access to these settings does not require the demo design be programmed into the Platform Manager 2. These I²C access views can be used to debug custom designs on the Platform Manager 2.

Voltage Monitor (VMON)

The voltage monitor screen is shown in Figure 13. The voltage monitor screen shows the device settings and voltage status for each voltage monitor in each ASC present on the board. Each ASC is given a different tab in the view, accessed at the top of the VMON screen.

Figure 13. VMON - Power Management



The device settings include the threshold settings for comparator A and B, and the glitch filter and window mode setting per VMON. The available thresholds depend on the detection setting chosen for each VMON comparator. The GUI provides the capability to update these settings, and store them using the **Write** button.

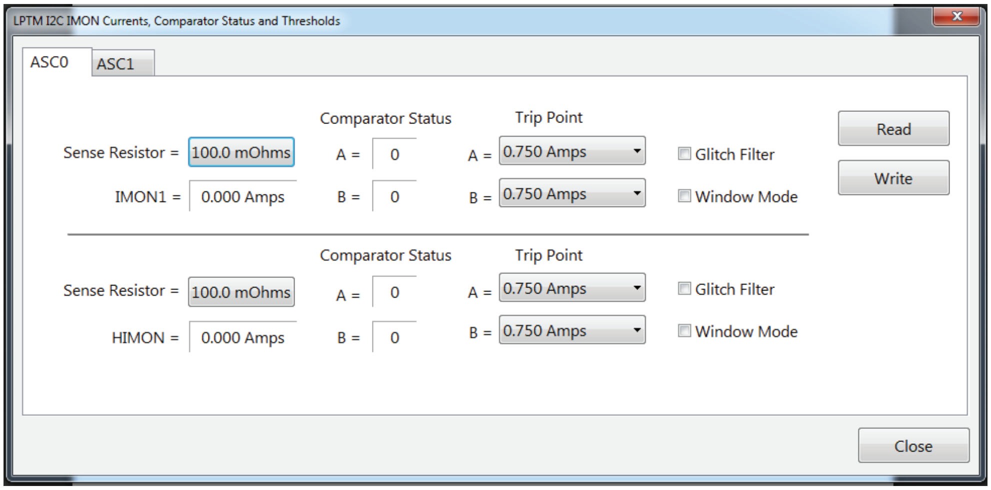
The VMON screen also displays the voltage measured at the VMON channel, as well as the status of comparator A and B for each VMON.

The VMON screen automatically populates the settings and measurements whenever the screen is opened. The settings and measurements can also be updated by clicking the **Read** button. (Note that the detection setting for each comparator needs to be set by the user. This is set by the application, and not stored in the device. See the References section for more details).

Current Monitor (IMON)

The current monitor screen is shown in Figure 14. The current monitor screen shows the device settings and status for each current monitor in each ASC present in the design. Each ASC is given a different tab in the view, accessed at the top of the IMON screen.

Figure 14. IMON - Power Management



The device settings include the trip points for comparator A and B, and the glitch filter and window mode setting per IMON. The available trip points depend on the sense resistor setting chosen for each IMON. The GUI provides the capability to update these settings, and store them using the **Write** button.

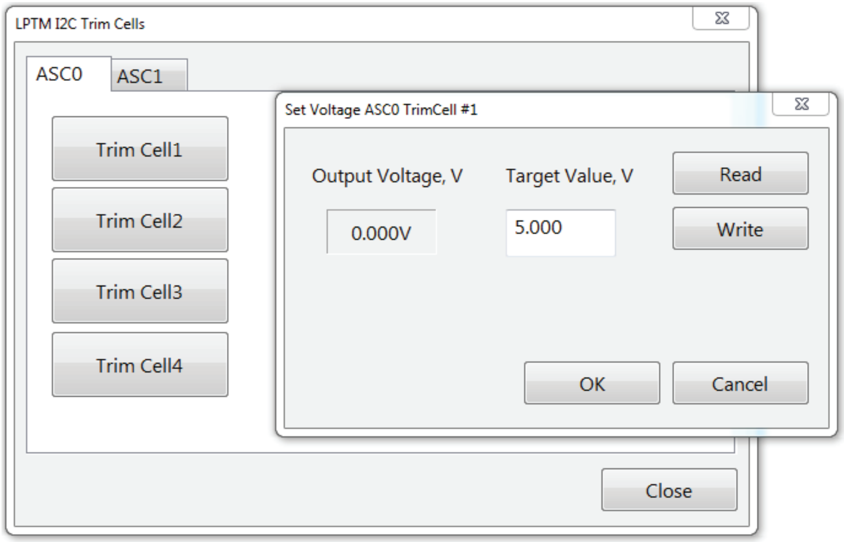
The IMON screen also displays the current measured at the IMON channel (dependent on the sense resistor setting), as well as the status of comparator A and B for each IMON.

The IMON screen automatically populates with the active settings and measurements whenever the screen is opened. The settings and measurements can also be updated by clicking the **Read** button. (Note that the sense resistor setting for each IMON needs to be set by the user. This is set by the application circuit, and not stored in the device. See the References section for more details).

Trim Cells

The Trim Cells screen is shown in Figure 15, with the Trim Cell1 dialog open. The Trim Cell screen provides separate tabs for each ASC in the system, with each of the four trim cells per ASC accessed by their own Trim Cell button.

Figure 15. Trim Cells - Power Management



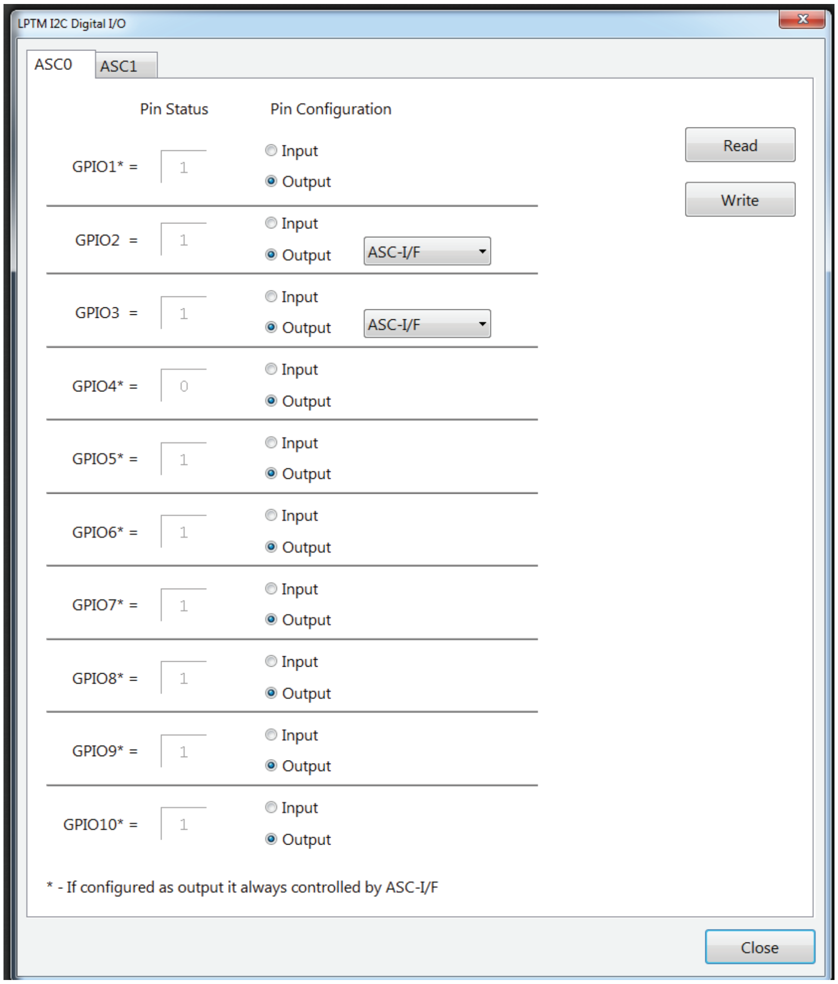
The individual Trim Cell dialog shows the voltage measured at the associated voltage monitor (VMON1 for Trim Cell1, VMON4 for Trim Cell4, and so forth). This Output Voltage reading is updated when the dialog is first opened, and whenever the **Read** button is clicked. The Target Value is also shown. This is the value stored as the Profile 0 Trim Setpoint. The value is automatically populated when the dialog is opened. The value can be updated in the device by clicking the **Write** button.

The updated target value affects the “Normal” setting in the Margining demo window (see the Margining (Optional Demo Setting) section for more details). The +5% and -5% settings are not affected by the updated target value.

GPIO

The GPIO window is shown in Figure 16. This window displays the status of each pin, as well as the input/output setting per pin. The window provides a separate tab for each ASC in the system.

Figure 16. GPIO - Power Management

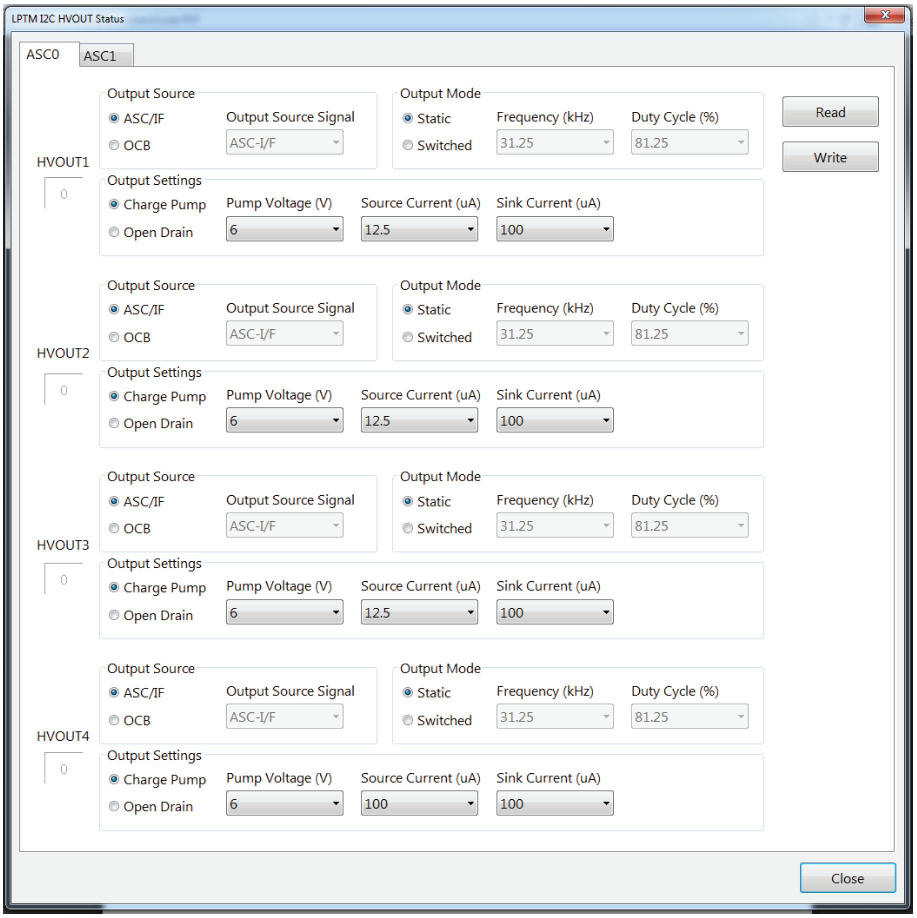


GPIO2 and GPIO3 can also be controlled by the I²C interface, or other ASC hardware. This control setting can be updated using the drop-down menu next to the output radio button for both GPIO2 and GPIO3. If I²C is selected as the control setting, then the pin status can be directly controlled for the given I/O. As with other menus, **Write** is used to store the update settings to the device, while **Read** is used to refresh the displayed settings and pin status.

High-Voltage Outputs (HVOUT)

The HVOUT window is shown in Figure 17. This window displays the status of each pin, as well as the output source and mode settings per pin. The window provides a separate tab for each ASC in the system.

Figure 17. HVOUT - Power Management



The window allows you to change the control source of an HVOUT, configure the HVOUT as Switched mode with frequency and duty cycle settings, and configure the charge pump voltage and current settings.

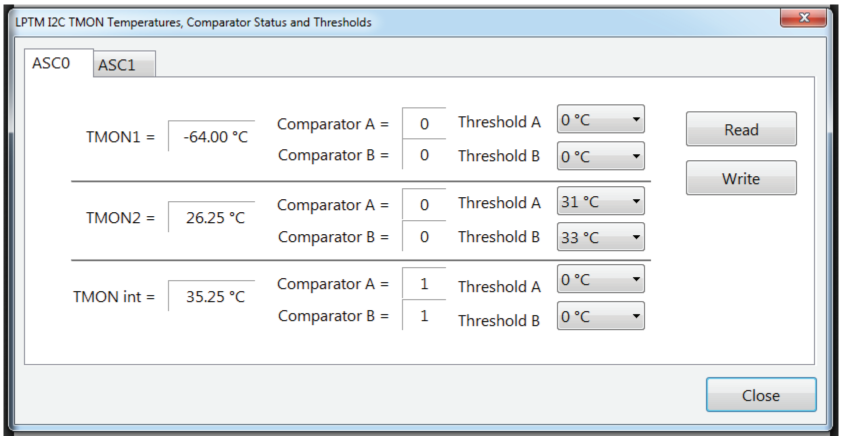
HVOUTs which are configured with the OCB control source, and I^{2}C Output Source Signal, can be controlled directly by the GUI (by clicking the status below each HVOUT label). As with other menus, **Write** is used to store the update settings to the device, while **Read** is used to refresh the displayed settings and pin status.

Thermal Management

Temperature Monitors (TMON)

The temperature monitor screen is shown in Figure 18. The temperature monitor screen shows the measured temperature, comparator status and threshold settings for each temperature monitor in each ASC present in the design. Each ASC is given a different tab in the view, accessed at the top of the TMON screen.

Figure 18. TMON - Thermal Management



The TMON screen is populated with the measured temperature, comparator status, and temperature thresholds automatically after it is opened. TMON1 and TMON2 must be enabled in the design file programmed into the ASC devices. TMONs which are not enabled in the design always read -64.00° C. The threshold settings can be updated using the drop down menus.

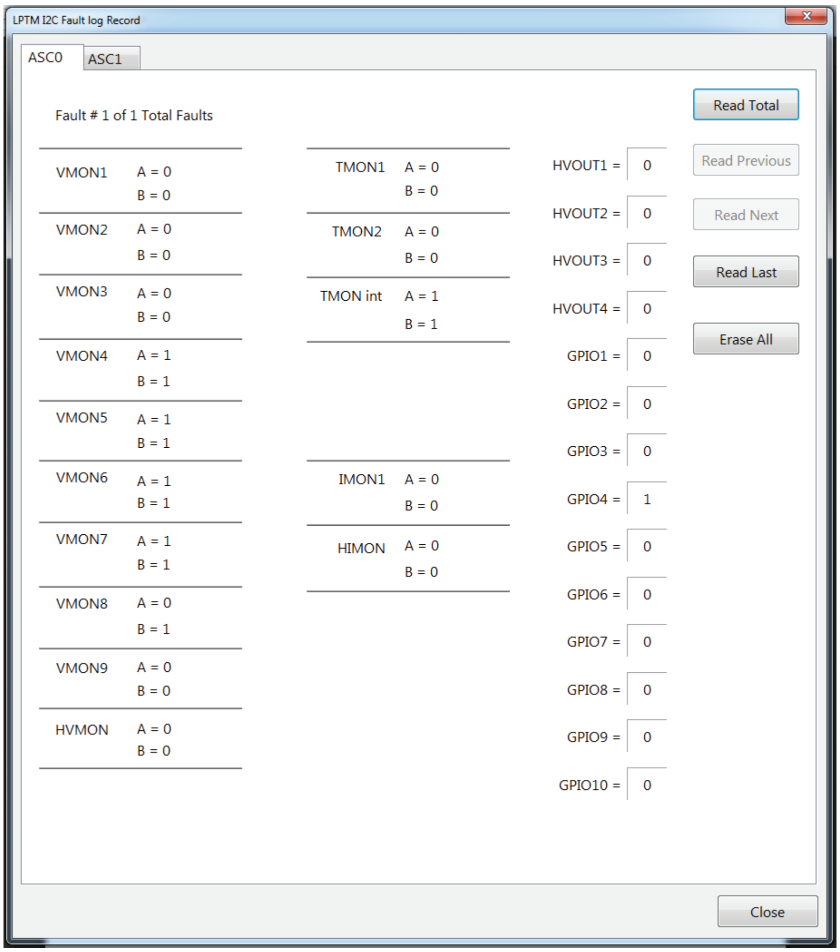
Write is used to store the updated settings to the device, while **Read** is used to refresh the displayed temperature measurement, comparator status, and thresholds.

Control Plane Management

Read Fault Log Mem

The Read Fault Log Mem screen is shown in Figure 19. The Read Fault Log Mem screen is used to access the ASC fault log EEPROM (the V,I,T fault log). The Read Fault Log Mem screen displays the total number of faults and the fault status of each monitor and I/O signal for a given fault record. Each ASC in the design has its own tab with individual fault information.

Figure 19. Read Fault Log Mem - Control Plane Management



The Fault Log Record automatically populates with the record information from the first fault log when the window is opened. It also populates the total number of faults. There are several buttons available in the fault log window to read and erase fault records. These include:

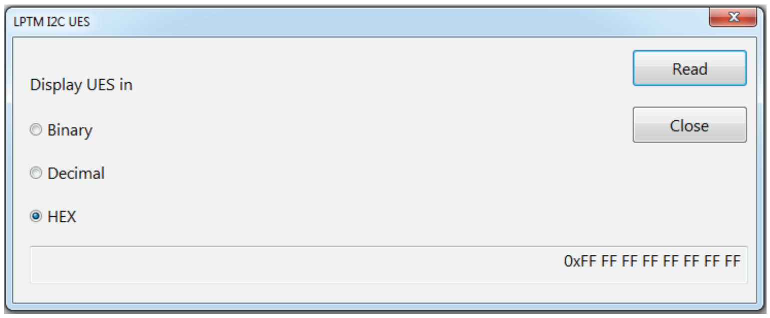
- **Read Total** – This button polls each ASC in the system and refreshes the total number of faults displayed.
- **Read Previous** – This button can be used to read the previous record in the fault memory. If Fault Record #3 is shown in the view and this button is clicked, then Fault Record #2 will be shown in the view. This button is only active if a lower numbered fault record is available.
- **Read Next** – This button can be used to read the next record in the fault memory. If Fault Record #2 is shown in the view and this button is clicked, then Fault Record #3 will be shown in the view. This button is only active if a higher numbered fault record is available.
- **Read Last** – This button shows the last available record in the view. If there are 10 records in the fault memory and this button is clicked, then Fault Record #10 will be shown in the view.
- **Erase All** – This button erases the fault record memory of *all ASC devices in the system*. The fault memory can only be erased all at once, individual records or ASCs cannot be erased.

Additional Debug Functions

UES (User Electronic Signature)

The UES button opens the view shown in Figure 20. The GUI reads out the UES value stored inside the Platform Manager 2 ASC section automatically when this view is opened. The display settings can be changed using the radio buttons between Binary, Decimal, and HEX. This view only supports reading out the UES of the device, as this setting is stored in the device EEPROM. See the References section for more details.

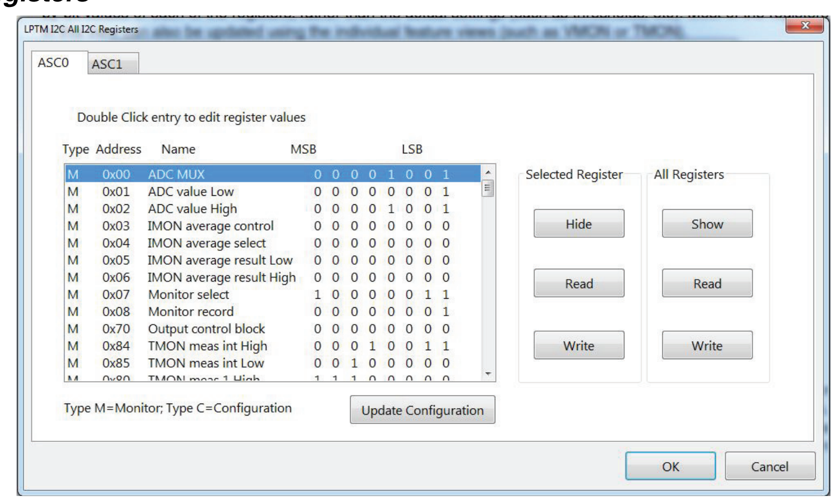
Figure 20. UES (User Electronic Signature)



All I²C

The All I²C button opens the view shown in Figure 21. The GUI automatically reads out all the Measurement and Control and Configuration registers from the ASCs in the system when the view is opened. The GUI displays the bit-by-bit values of each of the registers, rather than the actual settings (such as thresholds, etc). Most of the registers in this view can also be updated using the individual feature views (such as VMON or TMON).

Figure 21. All I²C Registers



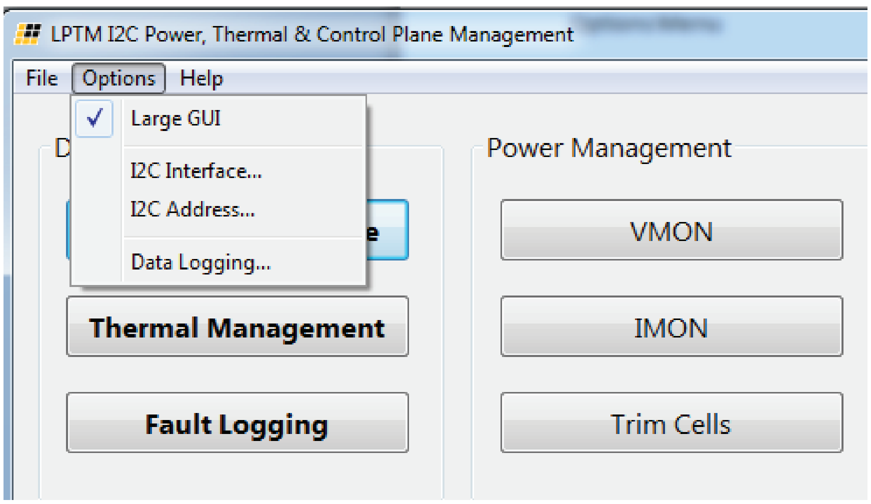
You can read or write individual I²C registers from this view. Double-clicking an address opens an editing dialog for that particular register. You can edit several registers and then click the **Write** button to update the device settings. You can write or read individual registers or all registers at once. After writing a value to a register, you must click the **Update Configuration** button to load the register updates to the working device configuration. The **Hide** and **Show** buttons allow you to update the displayed register set. Each ASC is shown in a separate tab. See the References section for more details on the register map and the measurement and configuration features of the ASCs.

Options Menu

The Options Menu consists of four choices, as shown in Figure 22.

- **Large GUI** – Changes the font size and display size used in the GUI. The default setting is Large GUI.
- **I2C Interface** – Opens a view for selecting **I2C Cable Interface** and **I2C Baud Rate**
  - **I2C Cable Interface** – The cable interface can be set to either *USB2 FTDI Interface (default setting)* or *Demo Mode (Bypass Interface Checks)*. The USB2 FTDI setting works with the Platform Manager 2 Evaluation Board. The Demo Mode allows you to view the Demo and Debug screens with no board connected.
  - **I2C Baud Rate Configuration** – The baud rate may be set to either *100 kHz* or *400 kHz (default)*.
- **I2C Address** – Opens a view for setting both the **ASC Section (4 MSB)** and **FPGA Section** I2C addresses
  - **ASC Section (4 MSB)** – The ASC Section (4 MSB) should be set to match the address used by the ASC devices on the evaluation board. The default setting – *1100XXX* – matches the setting used in the demo design. The GUI builds the ASC0-ASC7 addresses from this MSB setting.
  - **FPGA Section** – This setting is not used in the current version of the GUI.
- **Data Logging** – The data logging is discussed in more detail in the next section.

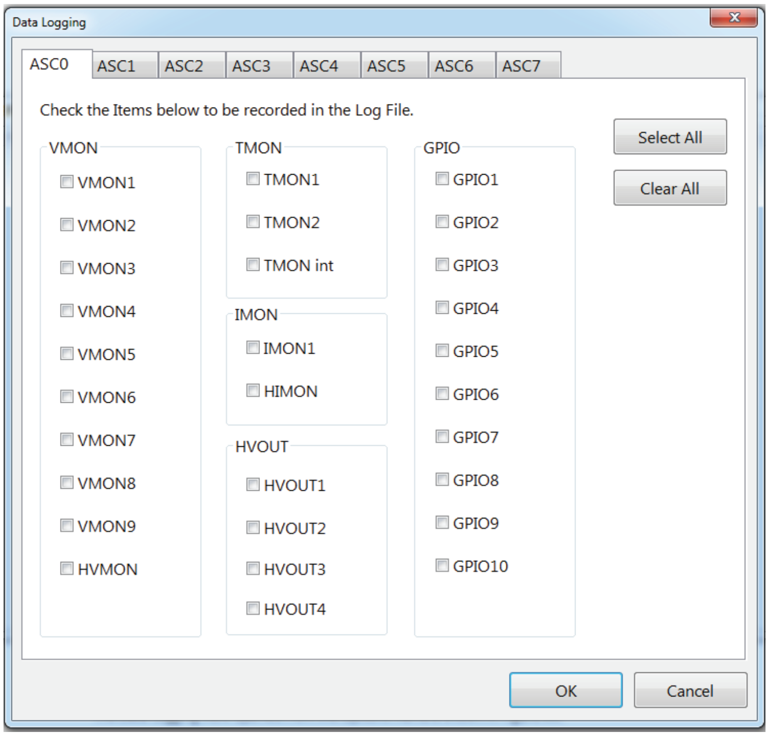
Figure 22. Options Menu



Data Logging

The Data Logging view opened from the Options menu is shown in Figure 23. This view is used to select the items which will be recorded in the log file. The view includes a separate tab for each of the ASC devices in the system. Each VMON, IMON, TMON, HVOUT, and GPIO pin can be individually enabled or disabled in this view. The **Select All** button will select all the monitor and I/O signals for the given ASC. The **Clear All** button will unselect all the signals for the given ASC.

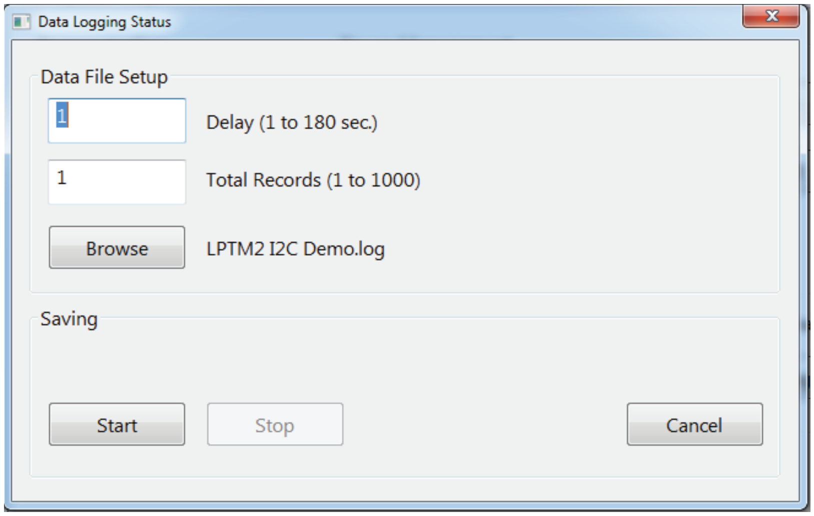
Figure 23. Options - Data Logging Screen



Once the Data Logging options have been selected, the data logging can be started in the **File > Start Data Logging** view. This view is shown in Figure 24. The settings available in the Start Data Logging view are:

- **Delay** – The Delay is the time between samples of the selected values in the Data Logging Options screen. The Delay can be set in seconds, from *1 (Default)* to *180*.
- **Total Records** – The Total Records is the number of records the log file will store before completing logging. The Records can be set between *0 (Default)* and *1000*. Choosing the 0 setting will set the number of records to unlimited. The data logging will run until the stop button is pressed when 0 is selected for number of total records.
- **Browse** – This button sets the log file name and storage location. Clicking the browse button will open the Save As file dialog. The Default value is *LPTM2 I2C Demo.log*.
- **Start** – This button will begin the logging process. The logging process will continue until the total # of records is logged, or the **Stop** button is pressed.
- **Stop** – This button will stop the logging process immediately.

Figure 24. File - Start Data Logging Screen



The data log will store the measurements values of the selected monitor signals and the status of the GPIO and HVOUT signals selected. The log file begins with header information about the Utility Version, Driver Settings, Logging Interval, and Time Stamp.

Figure 25 shows an example data log opened in a text editor program. In this data log, the following signals are logged:

- ASC0 – VMON7 and TMON2
- ASC1 – VMON5, HVOUT2, GPIO2, TMON3, and IMON2

The log file can also be treated as a comma-separated value file in a spreadsheet viewer.

Figure 25. Example Log File in Text Editor

```
Lattice Semiconductor Platform Manager II I2C Utility version: 1.0.15.288
FTDI driver version: 0x00020830
FTDI library version: 0x00030207
OS Version: Microsoft Windows 7 Enterprise Edition (build 7600), 64-bit
Logging interval: 1 sec, Total logs: 2
Wednesday, February 12, 2014 16:08:35

Record 1 Value, Name
1.094, ASC0_VMON7
26.000, ASC0_TMON2
Record 1 Value, Name
0.002, ASC1_VMON5
0, ASC1_HVOUT2
0, ASC1_GPIO2
26.000, ASC1_TMON3
0.000, ASC1_IMON2
Record 2 Value, Name
1.096, ASC0_VMON7
25.500, ASC0_TMON2
Record 2 Value, Name
0.002, ASC1_VMON5
0, ASC1_HVOUT2
0, ASC1_GPIO2
27.500, ASC1_TMON3
0.000, ASC1_IMON2
```

Summary

The Demo Design and GUI highlight the flexibility and scalability provided by Platform Manager 2. This user guide explains the features of the GUI and the behavior of the Demo Design. Further information about the device and the evaluation board can be found in the References section.

Known Issues

- The thresholds shown in the Voltage Monitor and Current Monitor views do not match the settings shown in the datasheet. The datasheet settings reflect the actual device settings. The settings shown in the GUI are within 1% of the actual device settings.
- In the ALL I2C view, the **Update Configuration** button does not function properly. This means that values updated using the **Write** buttons in the ALL I2C view will not be copied to the current configuration of the device.

References

- DS1042, L-ASC10 Data Sheet
- DS1043, Platform Manager 2 Family Data Sheet
- EB93, Platform Manager 2 Evaluation Board User Guide
- AN6091, Powering Up and Programming Platform Manager 2 and L-ASC10

Technical Support Assistance

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Revision History

Date	Version	Change Summary
February 2014	01.0	Initial release.
August 2014	1.1	General document cleanup and website release.

Appendix A1 – Scalable Architecture – Steps and Observations (Setting = 11-20 Rails)

Steps

1. Start Demonstration: **Sequence & Resets Controlled by Platform Manager 2**.
2. Move potentiometers (**POT1 – R33** and **POT2 – R35**) to the **middle position**.
3. Press **Manual Restart** button and wait for all 10 supply LEDs to turn on.
4. Create fault by moving **POT1** or **POT2** or pressing **PB_SW3**.
5. Change Settings from 1-10 Rails to **11-20 Rails** or change number of Resets per Device. Click **Write** and press **Manual Restart** to demonstrate Scalable Architecture.
6. Click **Done** to exit Scalable Architecture demonstration.

Observation

1. All supply and reset LEDs are off.
2. POT1 and POT2 turn green in the Power Network Window.
3. 1, 2, or 3 Reset LEDs turn on after 5 supply LEDs sequence on. DC-DC4 supply is also turned on. This demonstrates supply and reset sequencing without using power-good signals.
4. Power supply shut down depends on the fault. Reset LEDs turn off with relevant supplies.
5. Changing setting from 1-10 rails to 11-20 rails demonstrates supply sequencing expansion using external L-ASC10 (Centrally controlled by FPGA in Platform Manager 2).

Appendix A2 – Scalable Architecture – Steps and Observations (Setting = 11-20 Rails)

Steps

1. Start Demonstration: **Sequence & Resets Controlled by Platform Manager 2 and L-ASC-10**.
2. Move potentiometers (**POT1 – R33**, **POT2 – R35**, **POT3 –R38 & POT4 –R40**) to the middle position.
3. Press **Manual Restart** button and wait for all 20 supply LEDs to turn on.
4. Create fault by moving **POT1**, **POT2**, **POT3** or **POT4** or pressing **PB_SW3**.
5. Change setting from 11-20 Rails to **1-10 Rails** or change number of number of Resets per Device. Click **Write** and press **Manual Restart** to demonstrate Scalable Architecture.
6. Click **Done** to exit Scalable Architecture Demonstration.

Observation

1. All supply and resets LEDs are off.
2. POT1, POT2, POT3 and POT4 turn green in the Power Network Window.
3. 1,2, or 3 reset LEDs turn on when 5 supply LEDs sequence on. DC-DC 4 & DC-DC 8 supplies are also turned on. This demonstrates supply and reset sequencing without using power-good signals.
4. Power supply shut down depends on the fault. Reset LEDs turn off with relevant supply LEDs.
5. Changing setting from 1-10 rails to 11-20 rails demonstrates supply sequencing using only the Platform Manager 2.

Appendix B – Thermal Management – Steps and Observations

Steps

1. Start Demonstration: **Thermal Management Through Fan Speed and Power Dissipation Control** by clicking **Start**.
2. Move the Fan close to the board with airflow directed at resistor **(R203)**.
3. Press **Manual Restart** button and **observe Thermal Management responses**.
4. After observation, press **Manual Restart**, move the Fan close to the board with airflow directed at resistor **(R203)**.
5. After resistor temp reading turns green, update different Thermal Management Config settings or change fan position, then click **Write** and restart the demonstration from step 3.
6. Click **Done** to exit Thermal Management Demonstration.

Observation

1. The fan turns on and LCD displays resistor heater state of OFF.
2. The Demo Resistor Temp is displayed in green, indicating the temperature is below the warm limit
3. The resistor heater is turned on (LCD displays On) and its temperature is shown by the temp reading and color. When the resistor gets warm, the fan is turned on to cool the resistor. The Demo Resistor Temp is displayed in orange, indicating the temperature is above the warm limit. Observe one of the following conditions:

   A. Temp drops below Warm Threshold, Fan turns off and the resistor starts to heat up. This warming and cooling cycle repeats.

   B. If temp remains warm after 3/5 seconds, the DC-DC4 Voltage will reduce - reducing power dissipation.

   C. If temp crosses Hot Threshold, Fan speed increases, and the Demo Resistor Temp is displayed in red.

   D. If temp remains hot after 3/5 seconds, full shut down occurs – Protecting the IC from thermal run away (All power LEDs are off).
4. When Manual Restart is pressed, the heater is turned off (LCD displays OFF) and fan turns on full speed. The fan cools down the resistor (R203).
5. By changing the Thermal Management Configuration or air flow to resistor, it is possible to observe the algorithm executing steps A to D. Flexible Thermal Management (Temp Measure, Fan Speed Control, Power Dissipation Control) is entirely controlled by the algorithm in the FPGA.

Appendix C – Fault Logging – Steps and Observations

Steps

1. Start Demonstration: **Non Volatile Fault Capture in Platform Manager 2 & L-ASC10**.
2. Move Potentiometers (**POT1 – R33**, **POT2 – R35**, **POT3 –R38 & POT4 –R40**) to the **middle position**.
3. Press **Manual Restart** button and wait for all supply LEDs to turn on.
4. Create fault by moving **POT1**, **POT2**, **POT3** or **POT4** or pressing **PB_SW3**.
5. Click **Read Fault Log Mem**.
6. Repeat from step 2 with other faults.
7. Click **Done** to exit Fault Logging Demonstration.

Observation

1. All supply and reset LEDs are off.
2. POT1, POT2, POT3 & POT4 Boxes in the Power Network Window turn green.
3. 1, 2, or 3 reset LEDs turn on when 5 supply LEDs sequence on. DC-D.C 4 & DC-DC 8 supplies are also turned on. This shows board is operating normally.
4. Power supply shut down depends on the fault. Reset LEDs turn off with relevant supply LEDs. Fault is logged in parallel with shut down.
5. The fault log shows the primary cause of the fault captured by either the Platform Manager 2 or L-ASC10.