

## Introduction [\(Ask a Question\)](#)

The SmartFusion® A2F200 device on the PolarFire® Evaluation or Splash Kit monitors voltage and current on various PolarFire power rails. It measures the current for different components and displays power readings through the Microchip Power Monitor GUI that runs on the host PC. The power monitoring feature on the SmartFusion device measures the total device power without requiring manual measurements.

The Power Monitor GUI performs the following tasks:

- Monitors voltage on all PolarFire power rails.
- Measures current and power on the following rails:
  - **VDD\_REG**: Power supply for the FPGA core.
  - **VDDA\_REG**: Power supply for Transceiver Tx and Rx lanes supply.
  - **VDDA25**: Power supply for transceiver PLLs, isolated from other power supplies to reduce noise and prevent leakage from PCIe, EXT\_PLL, and GPSS.
  - **VDD25\_DUT**: Power supply for corner Phase-Locked Loops (8 PLLs) and secure Non-Volatile Memory (sNVM). These are tied together at the package level to minimize noise on the stand-alone PLLs.
- Monitors Flash\*Freeze power when the PolarFire device enters Flash\*Freeze mode.
- Powers up and down the board when pins 2 and 3 of the J4 jumper are closed.
- Powers down the board if a voltage threshold violation occurs on any power rail.

The analog computing engine block in the SmartFusion device is configured to measure voltage and current on the PolarFire power rails. The following figure shows the power monitoring block diagram.

**Figure 1.** Power Monitoring Block Diagram

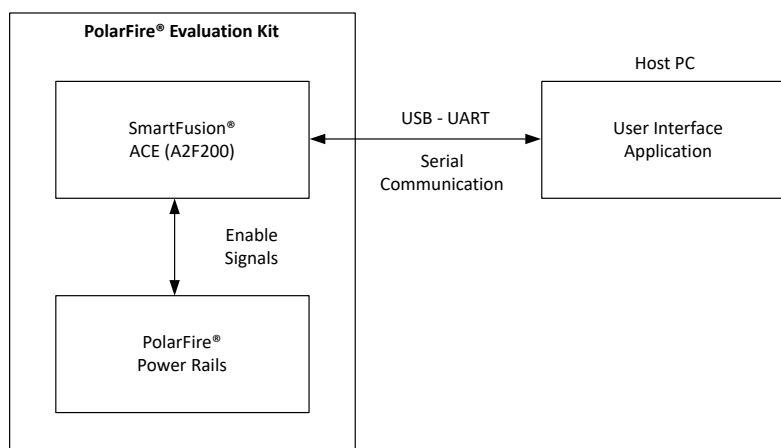


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## 1. Prerequisites [\(Ask a Question\)](#)

Before using Power Monitor, follow these steps:

1. Connect the power supply to J9 for the Evaluation Kit or J2 for the Splash Kit, and locate power switch SW3 for the Evaluation Kit or SW1 for the Splash Kit.
2. Power on the board.

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### Important:

- When pins 1 and 2 of the J4 jumper are closed, use the Power Switch on the Kit to on or off the board.
  - When pins 2 and 3 of the J4 jumper are closed, use the Power button on the GUI to on or off the board.
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3. Connect the Mini USB cable from J5 for the Evaluation Kit or J1 for the Splash Kit to the host PC. The board does not power on on its own unless it is connected through USB to the host PC.
4. Ensure that the host PC's screen resolution is set to at least 1280 × 720. Ensure that the text size on the host PC is set to either small (100%) or medium (150%).

### Installing the Power Monitor GUI

To install Power Monitor:

1. From the downloaded contents, run the `setup.exe` file with the administrative privileges.
2. Follow the instructions in the installation wizard. After installation, a shortcut appears in the Start menu on the host PC.

## 2. Using the Power Monitor GUI [\(Ask a Question\)](#)

This section shows how to use the Power Monitor GUI.

1. Launch the installed Power Monitor GUI. The **COMPort SetUp** window is displayed.
2. Select the highest-numbered COM port and click **Connect**. The Power Monitor GUI appears on the host PC.

The following figures show the Power Monitor GUI of PolarFire Evaluation Kit and Splash Kit.

**Figure 2-1.** PolarFire EvalKit - Power Monitor

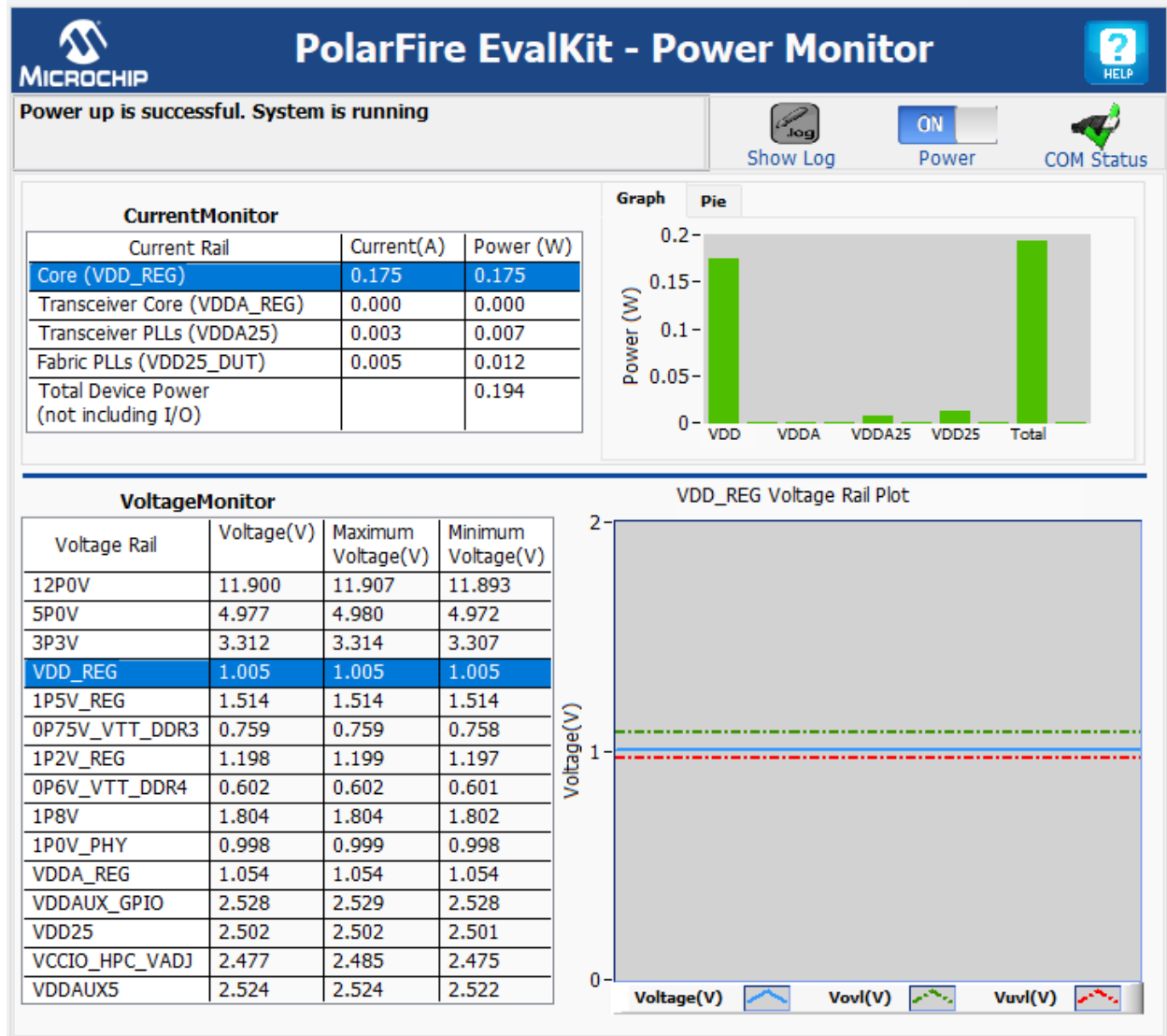
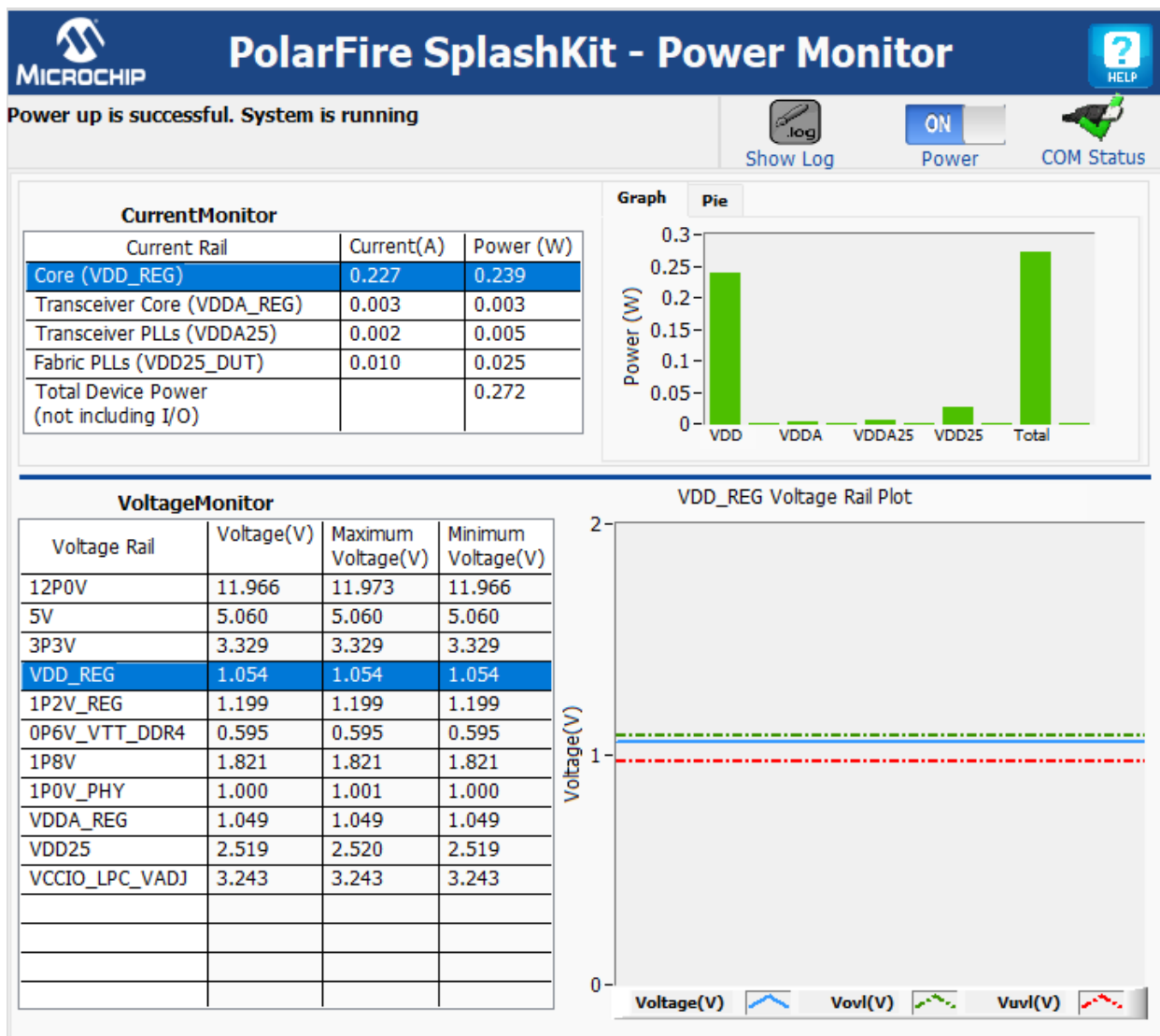


Figure 2-2. PolarFire SplashKit - Power Monitor



The Power Monitor GUI includes the following panes:

- **CurrentMonitor:** Displays the current and power measured on the VDD\_REG, VDDA\_REG, VDDA25, and VDD25\_DUT rails, as well as the total device power (excluding I/Os).
- **VoltageMonitor:** Shows the current voltage on each rail and displays the maximum and minimum voltage measured over time.
- **Voltage Rail Plot:** Plots the voltage of the selected rail as a blue line. The green and red lines represent the over-voltage (+3%) and under-voltage (-3%) tolerance levels for that rail. After starting the Power Monitor GUI, the voltage plot requires at least five seconds to generate.



**Important:** For more details on the recommended minimum and maximum operating voltage of each rail, see the **Recommended Operating Conditions** section of the [PolarFire FPGA Datasheet](#).

The Power Monitor GUI includes the following buttons:

- **Graph:** Displays the power consumed by the VDD\_REG, VDDA\_REG, VDDA25, and VDD25\_DUT rails, along with the total device power.
- **Pie:** Shows the percentage of power consumed by VDD\_REG, VDDA\_REG, VDDA25, and VDD25\_DUT out of the total device power.
- **Show Log:** Displays a log of all power monitor program actions.
- **POWER:** Powers up or down the board when pins 2 and 3 of the J4 jumper are closed.

### 3. Revision History [\(Ask a Question\)](#)

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

Revision	Date	Description
B	10/2024	Updated <a href="#">Prerequisites</a> section to provide more clarity between a board and a GUI reference
A	09/2024	Initial revision

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