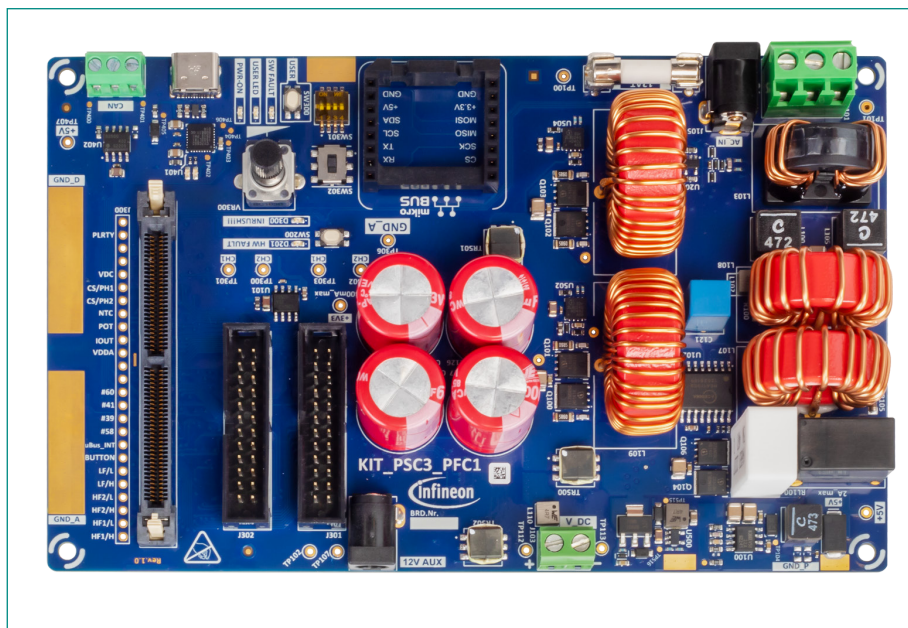


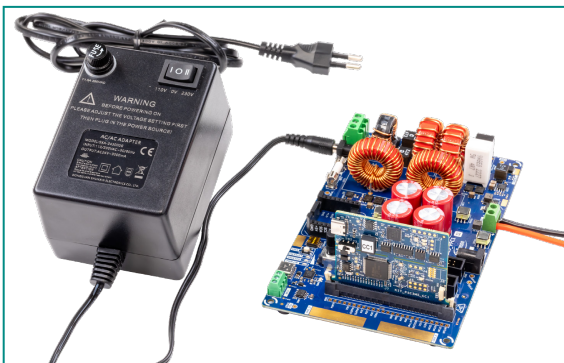
PSOC™ Control C3 low-voltage Development kit PFC Expansion board

KIT_PSC3_PFC1

Kit contents

1. PFC evaluation board
2. AC-AC power adapter





1 Minimal hardware setup

How to complete the kit

1. In addition to the content already included in the kit, the user will need the following components to assemble a minimal hardware setup (as shown in Figure 1):
 - DC load (resistive or electronic load with range up to 200W, 60V)
 - Cables for connecting the kit to the DC load
 - PSoC™ control C3 control card of your choice (KIT_PSC3M5_CC1 or KIT_PSC3M8_CC1) for evaluation or learning purposes
2. Additionally, it is recommended to complement the kit with the ModusToolbox™ Power Suite GUI by purchasing a PMBus Dongle (USB0010 or USB008) and connecting it to the PC using the USB cable included in the dongle box.

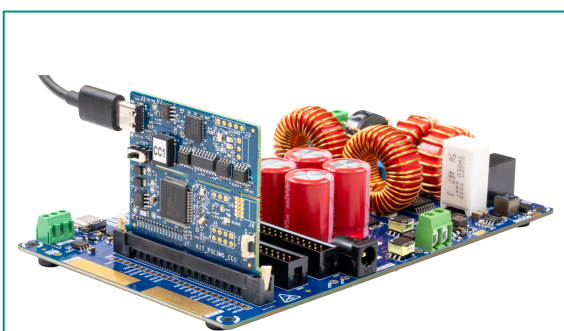


2 AC-AC power adapter

Setting up the hardware before starting

1. Complete the kit with at least the minimal required hardware setup.
2. Ensure that the AC-AC power adapter is equipped with a selector switch (as shown in Figure 2).
3. By default, the selector switch is set to '0' or disconnected. Adjust the selector switch to the correct AC supply voltage (110 V or 230 V) depending on the working location.

Note: Selecting the incorrect input voltage may cause permanent damage to the transformer.



3 USB-C connected to program the control card

4. Insert the PSoC™ Control C3 control card into the control card slot, as shown in the Figure 3.
5. Connect the USB-C cable to the control card, as shown in the Figure 3 and program the control card using the **ModusToolbox™ Power Suite code example** available after installation of **ModusToolbox™ Power Suite Pack** from **Infineon Development Center (IDC)**.

Setting up the software and tools

1. Install the **ModusToolbox™ Software** from the www.infineon.com/mtb by clicking download.
2. Install the **ModusToolbox™ Eclipse IDE** and the **ModusToolbox™ Tools** package.
3. Install **ModusToolbox™ PowerSuite** pack from the **ModusToolbox™** setup tool.
4. Install the latest J-link drivers, if they are not already installed.
5. Create a new application in the Eclipse IDE:
 - Select the appropriate board support package (for example, BSP for KIT_PSC3M5_CC1) for the control card of your choice and click **Next**
 - Under power conversion application, select **TP-PFC interleaved converter**
 - Build and program the application onto the control card

```

COM21 - Tera Term VT
File Edit Setup Control Window Help

Power Suite TP-PFC interleaved converter reference code example on KIT_PSC3_PFC1.
Output Voltage Regulation starts when input voltage is provided at the AC input connector.
Input voltage can be provided:
1. from AC-DC adapter (ensure to position the adapter SWITCH on the right voltage range).
2. from external bench AC power supply.
Control regulates output voltage, USER_LED on both PFC and ODI card will glow.
SW_FAULT led will glow when converter detects a fault.

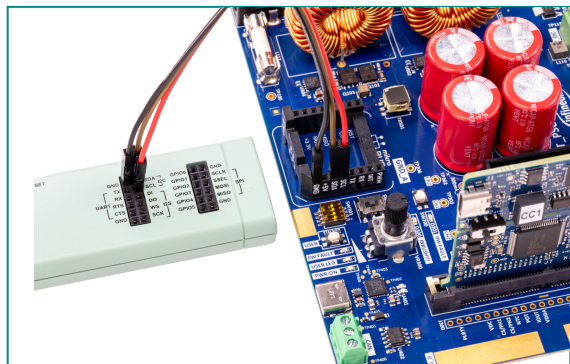
VOUT = +40.01 V; IOUT = -0.02 A

```

4 UART message confirms programming is successful

Verify successful programming and start power conversion

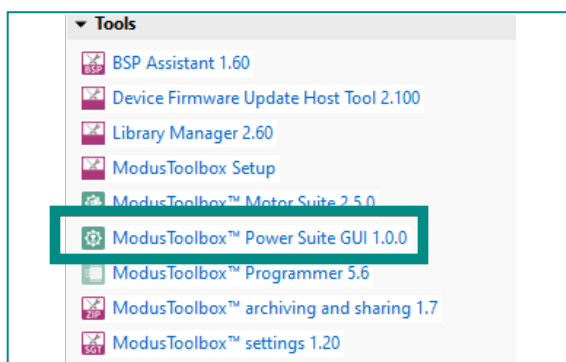
1. To verify the successful programming of the control card, open the UART serial terminal, such as Tera Term and connect to the UART COM port, with the following settings:
 - Baud rate: 115200, Data: 8-bit, Parity: None, Stop bit: 1-bit, Flow control: None
2. Press the reset button (SW1) on the PSOC™ C3 control card.
3. If the terminal displays the message, as shown in Figure 4, the programming process is complete.
4. Connect the transformer output to the AC input (Barrel jack J105 AC_IN) as shown in Figure 1. Once connected, the kit begins regulating to an output voltage of 40 V.
5. The user can now load the PFC1 kit by increasing the DC load (resistive or electronic).



5 USB dongle connected to USB-C connector on the kit

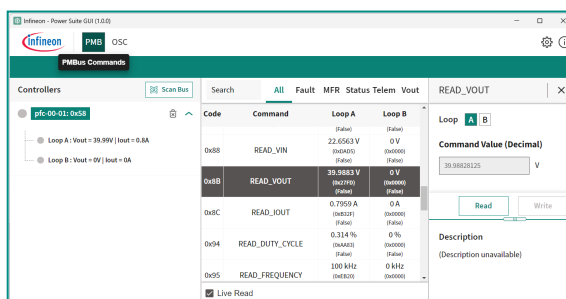
Using the PowerSuite GUI

1. The output voltage setpoint can be controlled with the PowerSuite GUI.
2. Connect the USB-0010 dongle to the PC using a USB cable, and then to the kit using three wires (GND, CLK, and SDA), as shown in Figure 5.
3. Press the reset button (SW1) on the PSOC™ Control C3 control card.



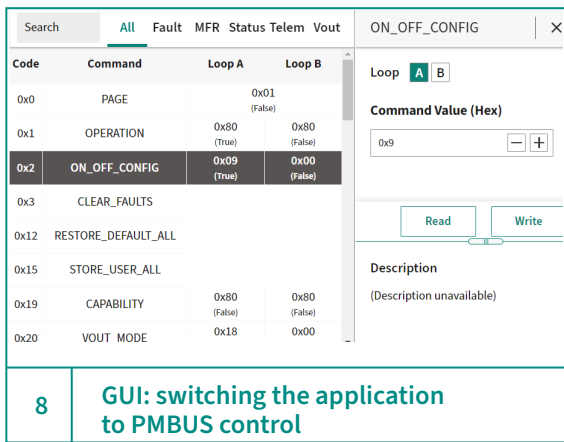
6 Launch Power Suite GUI

4. To launch the Power Suite GUI, open the Eclipse IDE and, in the **Quick Panel** under the **Tools** section, click on **PowerSuite GUI**, as shown in Figure 6.
5. Once a valid USB dongle is connected, click **Scan Bus**.



7 Power Suite GUI: reading output voltage

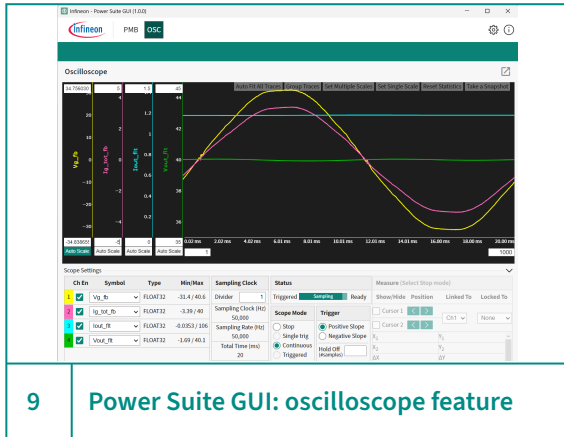
6. Click the PMB button at the top of the interface to display the available PMBus commands, as shown in Figure 7.
7. Click on **READ_VOUT** then press **Read** to read the output Voltage as shown in Figure 7.
8. Double-click the **Live Read** checkbox at the bottom to refresh the VOUT/IOUT values.
9. Write a value to **VOUT_COMMAND**, for example, 38 V (slightly different from the initial/default output target voltage).



10. To transition the application from the default configuration to PMBus control via GUI (Figure 8):

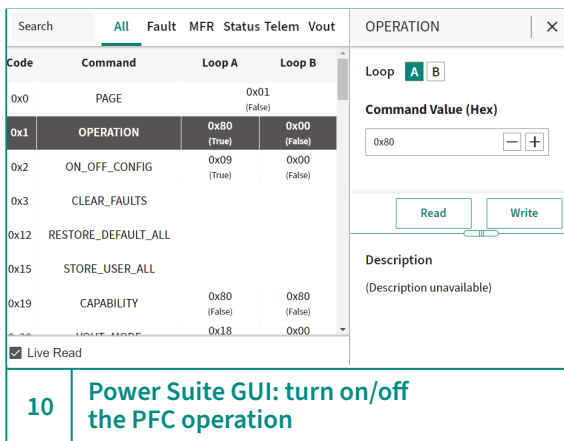
- Write 0x9 to the ON_OFF_CONFIG command
- When the command executes successfully, the application switches to PMBus control mode
- The PFC output will regulate to 38 V, corresponding to the current VOUT_COMMAND value

Ensure that the VOUT_COMMAND is updated as needed to achieve the desired output voltage.



11. Click the OSC button at the top of the interface to access the oscilloscope feature in the Power Suite GUI. (Figure 9).

12. This enables real-time monitoring of the kit's input parameters, output parameters, and feedback signals, providing valuable insights into its performance.



13. **Note:** It is possible to turn on/off the PFC operation. However, ensure the output load is disconnected (no-load condition) before turning off the PFC. Note that turning OFF the PFC while a load is connected can cause large peaky passive rectification currents that may damage the kit and its components.

14. Turn on/off the PFC Operation (Figure 10).

- To turn on the PFC, write 0x80 to the OPERATION command
- To turn off the PFC, write 0x00 to the OPERATION command

Next Steps

- The **ModusToolbox™ Power Suite** provides support for this kit, including associated code examples
- For the KIT_PSC3_PFC1 board details and evaluation pinout details, refer the [user guide on the kit website](#)
- For further information regarding the board, the PMBUS communication, code example, please visit the [kit website](#)

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