User Guide

AC/DC Digital Controller UART Communication Kit (EVKT-UART-01B)

Table of Contents

Overview 3
Introduction 3
Kit Contents 3
Features and Benefits 4
Kit Specifications 4
Section 1. Hardware Specifications 5
1.1 Personal Computer Requirements 5
1.2 EVKT-UART-01B Specifications 5
Section 2. Software Requirements 6
2.1 Software Installation Procedure (Programmable Power GUI-HR121x) 6
2.2 Software Installation Procedure (MPS AC/DC Power Manager) 7
Section 3. Communication Kit Test Set-Up 8
3.1 Hardware Set-Up 8
3.2 Ribbon Cable Description 9
3.3 Software Set-Up (Programmable Power GUI-HR121x) 10
3.4 Software Set-Up (MPS AC/DC Power Manager) 11
3.5 Device Configuration Instructions (Programmable Power GUI-HR121x) 14
3.6 Device Configuration Instructions (MPS AC/DC Power Manager) 15
Section 4. Ordering Information 18

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Overview

Introduction

The EVKT-UART-01B is a USB-to-UART communication kit designed to work with MPS's AC/DC digital products that feature UART communication (see the products supported by the EVKT-UART-01B on page 4).

The EVKT-UART-01B provides isolation between the USB port and the UART interface, which protects the user and the computer from potentially high voltages.

The EVKT-UART-01B can work with the UART easy debug add-on to quickly and safely discharge the bulk capacitor on the power board, making debugging safer as well as more convenient and efficient.

Compared to the previous generation (EVKT-UART-00B), the EVKT-UART-01B can support a wider range of MPS AC/DC digital products. In addition, the EVKT-UART-01B provides the remote firmware update function through the graphical user interface (GUI) if an upgrade is required.

Note:

1) The EVKT-UART-01B replaces all older versions of this kit series. The EVKT-UART-00A/01A/02A and EVKT-UART-00B are End of Life (EOL) products.

Kit Contents

EVKT-UART-01B kit contents:

#	Part Number	Item	Quantity
1	EVKT-UART-01B	Includes one USB-to-UART communication interface, one USB cable, one 3-pin ribbon cable, and one 10-pin ribbon cable	1
2	Online resources	Include the GUI and supplemental documents	-

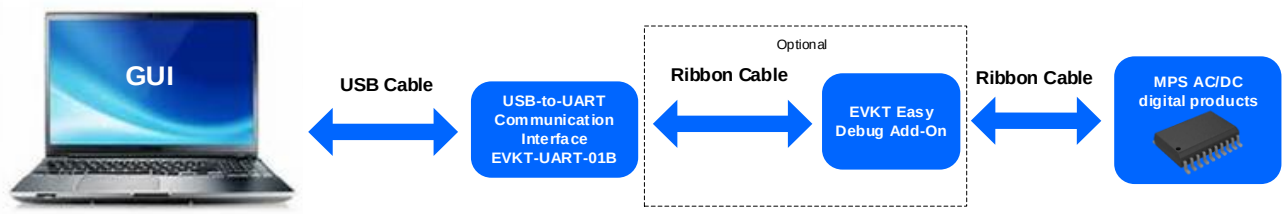

Figure 1: AC/DC Digital Controller UART Communication Kit (EVKT-UART-01B)

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Features and Benefits

- High-Voltage Isolation to Protect the User and Computer
- Built-In 24V Power Supply for ICs
- Simple and Easy to Use
- Discharges the Bulk Capacitor Quickly with the UART Easy Debug Add-On
- Supports Remote Upgrade Firmware Configuration

Kit Specifications

Features	Specifications
Supply for Board	24V
Operating Input Voltage	5V
GUI Software	MPS AC/DC Power Manager (version 1.5.221 or later); Configurable Power GUI-HR121x
EVKT Size (LxW)	7cmx4.5cm

Products Supported by the EVKT-UART-01B

Supported IC Part Number	Description
CD1271x	PFC and LLC combo controller
HR121x	
HR122x	
HR123x	
HR127xx	
HR1280	
HR1008x	LLC controller
HR11xx	AHB/PFC and AHB combo controller
MP44030	Interleaved PFC controller
MP45000	Totem-pole PFC controller

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Section 1. Hardware Specifications

1.1 Personal Computer Requirements

The following minimum conditions must be met to use the EVKT-UART-01B:

- PC with a minimum of one available USB port
- Operating system of Windows 7 or later
- Net Framework 4.6.1
- At least 300MB of free space

1.2 EVKT-UART-01B Specifications

The EVKT-UART-01B is a USB-to-UART communication interface that connects MPS AC/DC digital products (see the products supported by EVKT-UART-01B on page 4), the PC, and its supporting accessories (see Figure 1 on page 3). The EVKT-UART-01B provides UART communication. Combined with the MPS AC/DC Power Manager and GUI tools, the EVKT-UART-01B provides a quick and easy way to evaluate the performance of MPS AC/DC digital products with UART communication.

Figure 2: EVKT-UART-01B Communication Interface

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Section 2. Software Requirements

2.1 Software Installation Procedure (Programmable Power GUI-HR121x)

The HR121x parts can be configured via the Programmable Power GUI-HR121x. Follow the instructions below to install the software:

Note: Contact an MPS FAE or MPS Sales to obtain the software.

1. Download and extract the relevant files.
2. Double-click the ".exe" file to enter the set-up guide (see Figure 3). If a protection window comes up, click "More info," then click "Run anyway."
3. Follow the prompts in the set-up guide.
4. Wait for the status screen to verify that installation is complete (see Figure 4).

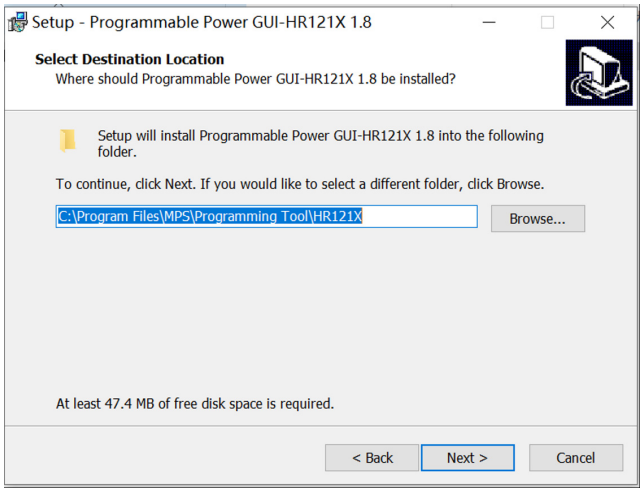

Figure 3: Programmable Power GUI-HR121x Set-Up Guide

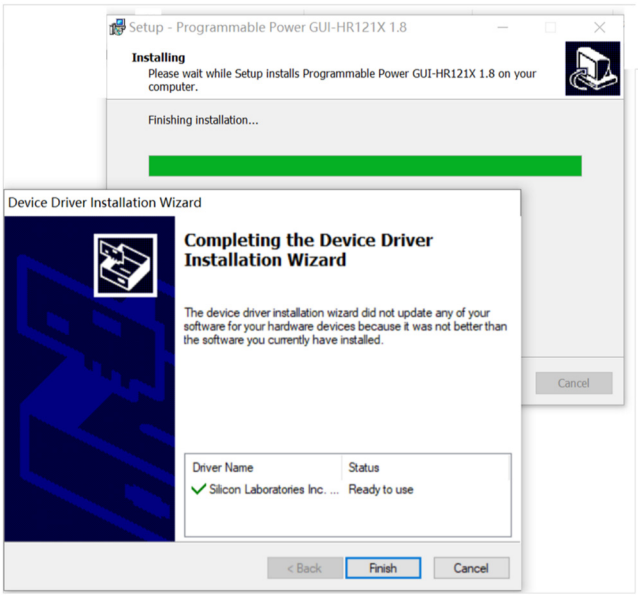

Figure 4: Driver Set-Up Success

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2.2 Software Installation Procedure (MPS AC/DC Power Manager)

The supported products of the EVKT-UART-01B on page 4, except for the HR121x, can be configured via the MPS AC/DC Power Manager (version 1.5.221 or later). Follow the instructions below to install the software:

Note: Contact an MPS FAE or MPS Sales to obtain the software.

1. Download and extract the relevant files.
2. Double-click the ".exe" file to enter the set-up guide (see Figure 5). If a protection window comes up, click "More info," then click "Run anyway."
3. Follow the prompts in the set-up guide.
4. Wait for the status screen to verify that installation is complete (see Figure 6).

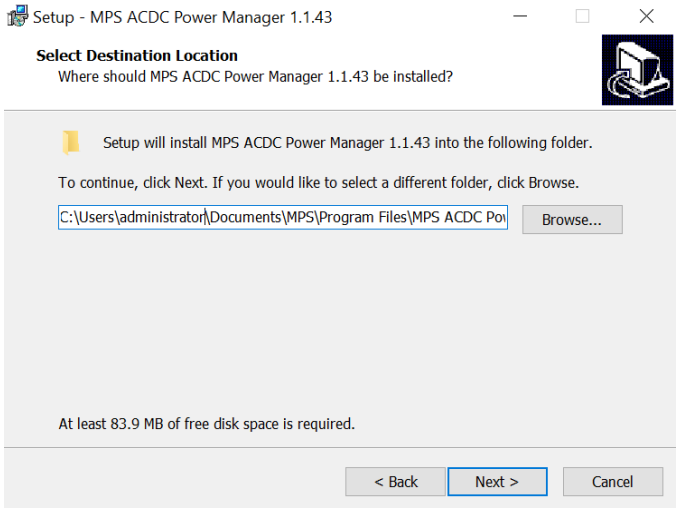

Figure 5: MPS AC/DC Power Manager Set-Up Guide

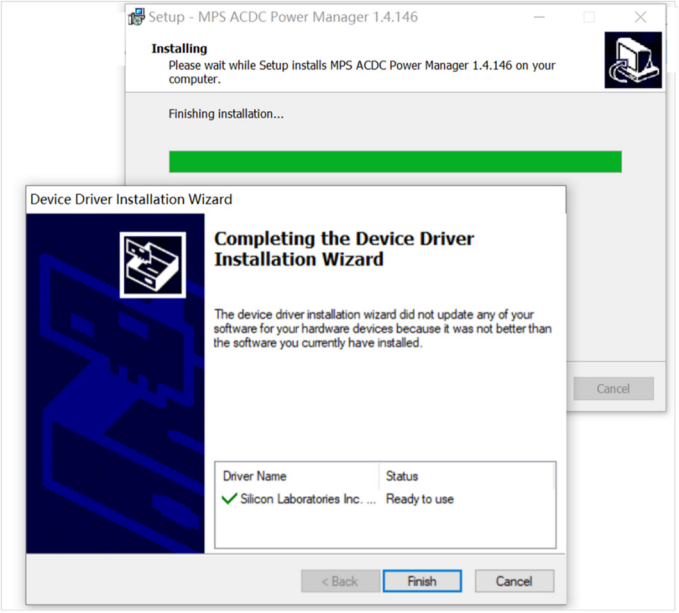

Figure 6: Driver Set-Up Success

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Section 3. Communication Kit Test Set-Up

3.1 Hardware Set-Up

The hardware must be properly configured prior to use. Follow the instructions below to set up the EVKT-UART-01B:

1. The pin definition label is only for demonstration. Double-check the pin position before connecting to the USB, UART easy debug add-on, or power board. Incorrect connections can cause communication failures between the EVKT-UART-01B and the power board, which may damage the EVKT-UART-01B.
2. Connect the EVKT-UART-01B communication interface to the power board using a 3-pin ribbon cable (see Figure 7) or a 10-pin ribbon cable (see Figure 8 on page 9). Both cables are included in this kit.
3. If the UART easy debug add-on is used, connect the EVKT-UART-01B to the UART easy debug add-on using a 10-pin ribbon cable. Figure 9 on page 9 shows the connection between the UART easy debug add-on and the power board.
4. Connect the EVKT-UART-01B to the computer using a USB cable.

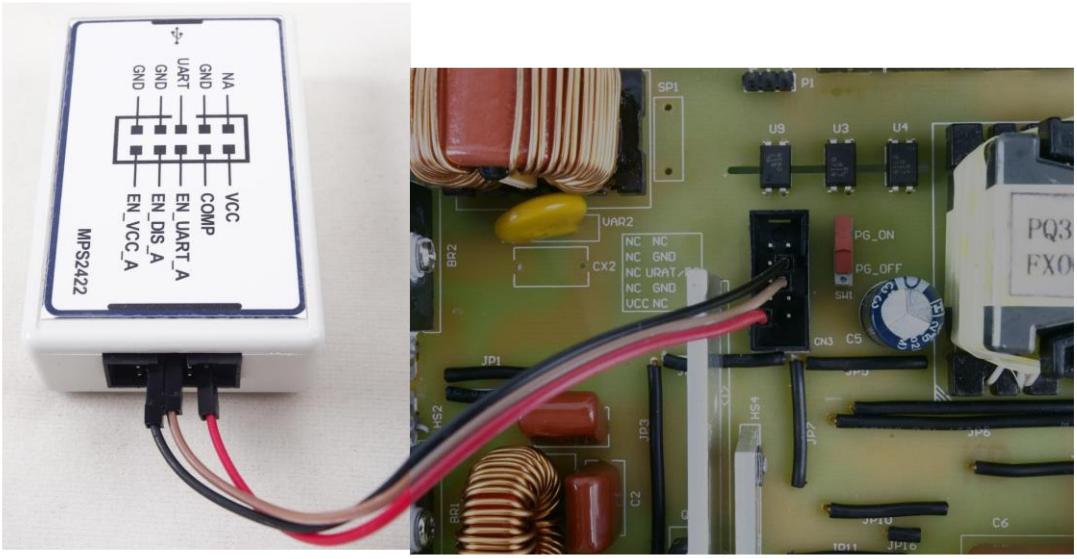

Figure 7: EVKT-UART-01B Communication Interface Wire Connection Using a 3-Pin Ribbon Cable

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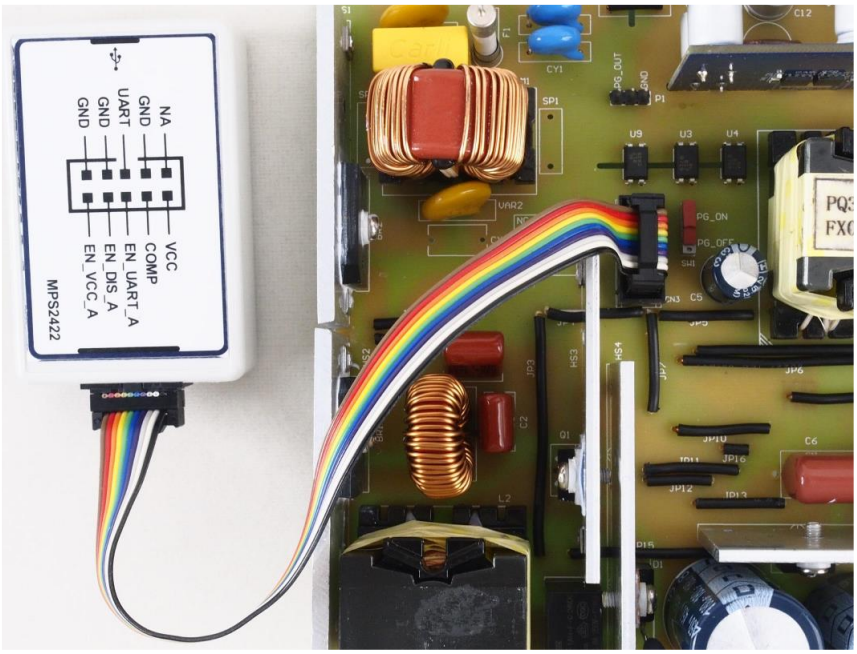

Figure 8: EVKT-UART-01B Communication Interface Wire Connection Using a 10-Pin Ribbon Cable

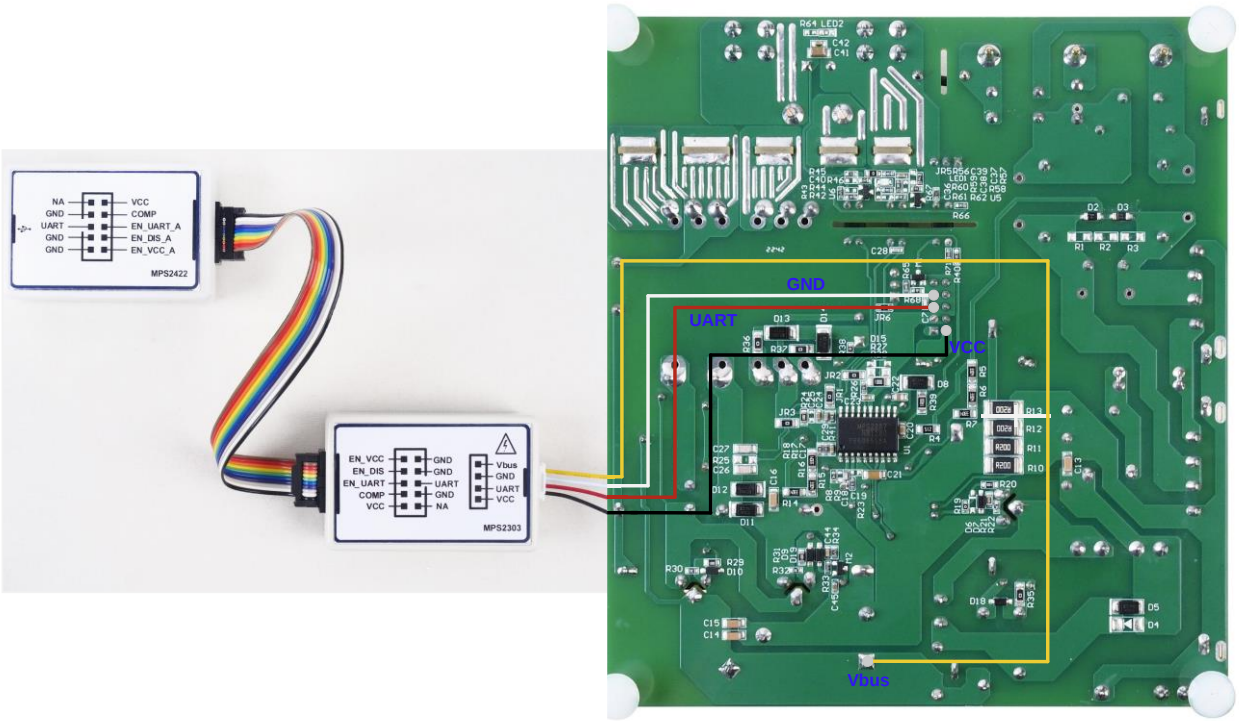

Figure 9: EVKT-UART-01B Works with the UART Easy Debug Add-On

3.2 Ribbon Cable Description

The EVKT-UART-01B features a 10-pin socket to connect the communication interface to the IC on the MPS solution board with a corresponding socket, or to the UART easy debug add-on. Depending on the circuit configuration, the user can also connect the EVKT-UART-01B to the IC using three wires when the UART easy debug add-on function is not used.

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Figure 10 shows the top view of the EVKT-UART-01B's 10-pin socket.

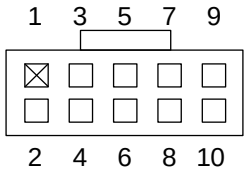

Figure 10: EVKT-UART-01B 10-Pin Socket Top View

Table 1 shows the pin functions of the 10-pin socket.

Table 1: EVKT-UART-01B 10-Pin Socket Pin Functions

Pin #	Name	Description
1	GND	Ground
2	EN_VCC_A	Drive signal for UART easy debug add-on
3	GND	Ground
4	EN_DIS_A	Drive signal for UART easy debug add-on
5	UART	Communication input/output (I/O).
6	EN_UART_A	Drive signal for UART easy debug add-on
7	GND	Ground
8	COMP	If the UART easy debug add-on is not used, the COMP pin pulls up to 24V. Ensure that COMP is left floating
9	NC	Not connected.
10	VCC	24V power supply for the IC

3.3 Software Set-Up (Programmable Power GUI-HR121x)

After connecting the hardware according to the steps above, follow the steps below to use the GUI software:

1. Start the software and click the "Scan" button in the GUI (see Figure 11).

Figure 11: Programmable Power GUI-HR121x Start Page

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2. Select the relevant IC part number. The software should automatically check IC communication.
   - If communication is successful, the GUI enters the program's main window (see Figure 12).

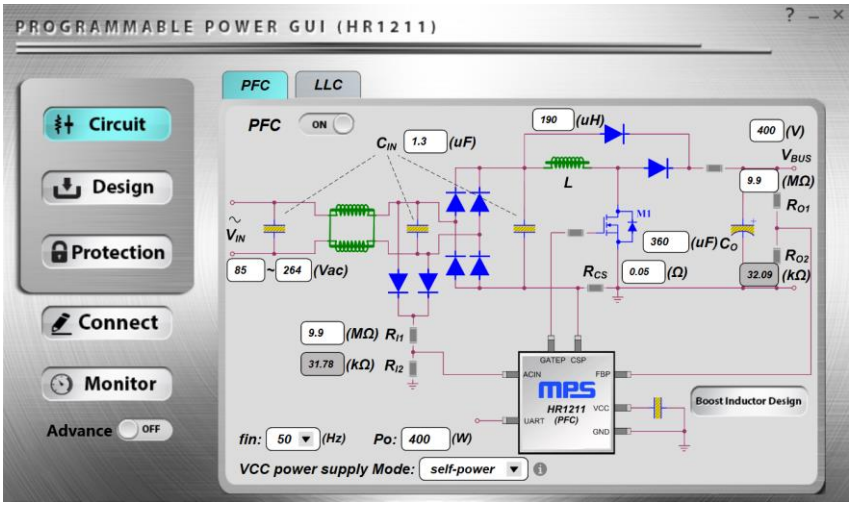

Figure 12: Programmable Power GUI-HR121x Main Window

   - If communication is unsuccessful, a warning message appears (see Figure 13). After receiving the warning message, check whether the IC has a password. If there is a password, click the password button and input the password. If the IC does not have a password, close the GUI and check the connection, then repeat Step 1.

Figure 13: Warning Message Indicates Unsuccessful Communication

3.4 Software Set-Up (MPS AC/DC Power Manager)

After connecting the hardware according to the steps above, follow the steps below to use the MPS AC/DC Power Manager GUI software:

1. Open the software. The software should automatically check the EVKT connection.
   - If the EVKT-UART-01B is connected properly, the screen shows "UART Kit Connected" (see Figure 14 on page 12).
   - If the EVKT-UART-01B is not connected properly, the screen shows "No USB Adapter Found" (see Figure 15 on page 12).

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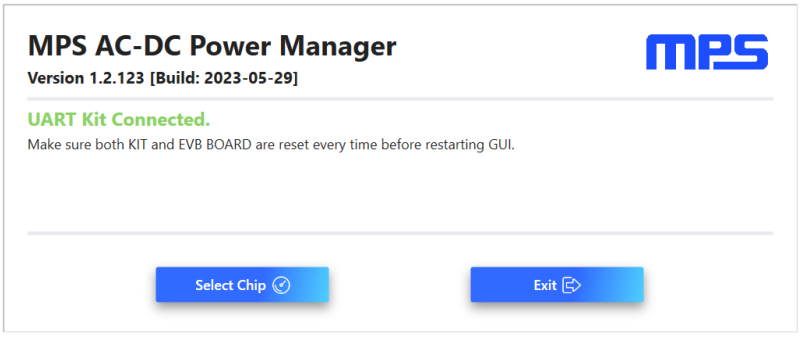

Figure 14: EVKT Is Connected Properly (UART Kit Connected)

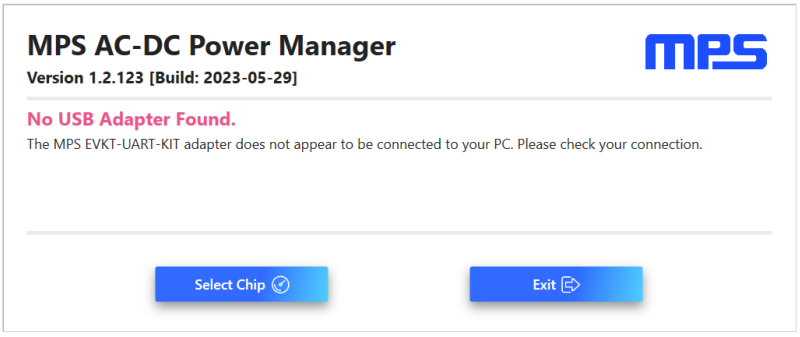

Figure 15: EVKT Is Not Connected Properly (No USB Adapter Found)

2. Click the “Select Chip” button to enter the program.
3. Select the relevant IC part number (see Figure 16), then click the “Enter” button to proceed to the IC information page. The software should automatically check the IC connection.

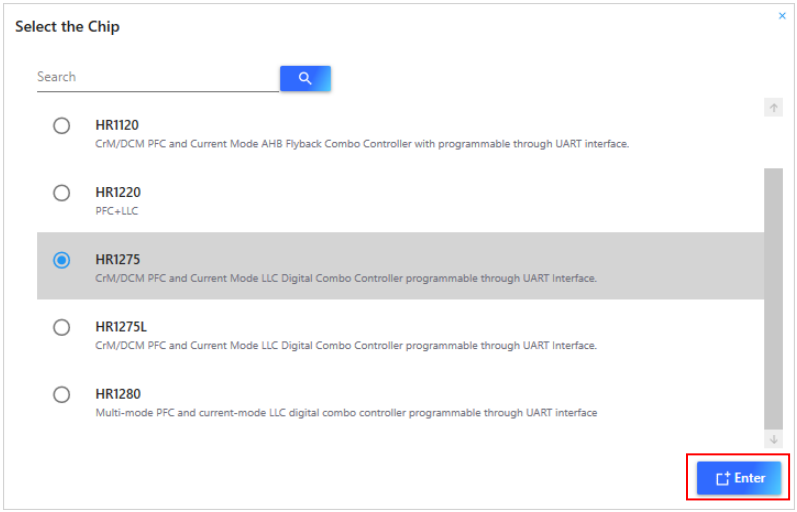

Figure 16: Select the IC Part Number

- If the connection is successful, the GUI enters the IC information page (see Figure 17 on page 13). Double-click the relevant IC part number to enter the parameter configuration page (see Figure 18 on page 13).

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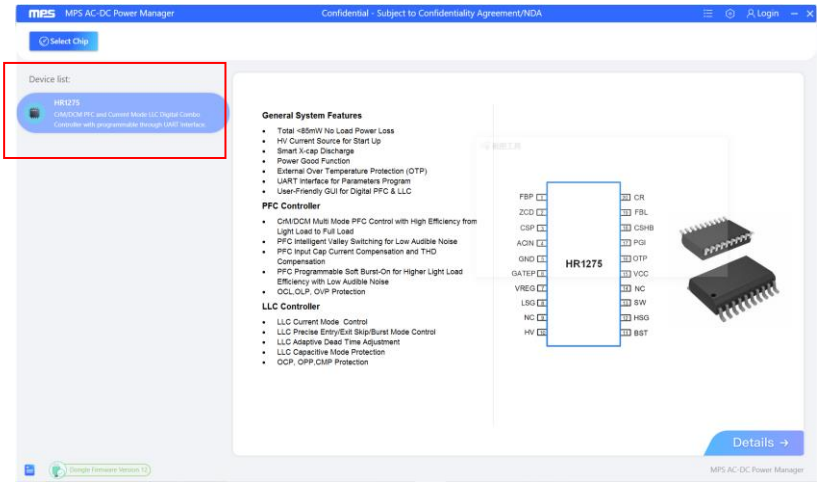

Figure 17: Chip Information Page

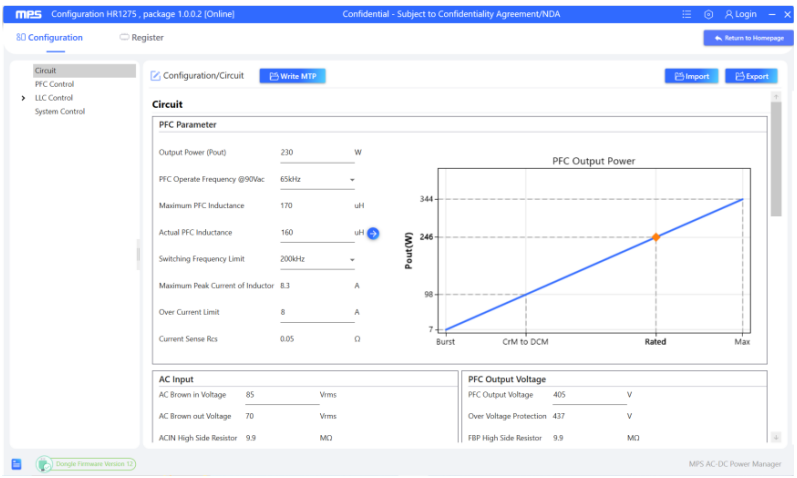

Figure 18: Parameter Configuration Page

- If the connection is unsuccessful, an attention message pops up (see Figure 19). After receiving the attention message, check whether the IC has a password. If there is a password, click the password button and input the password. If the IC does not have a password, close the GUI and check the connection, then repeat Step 1.

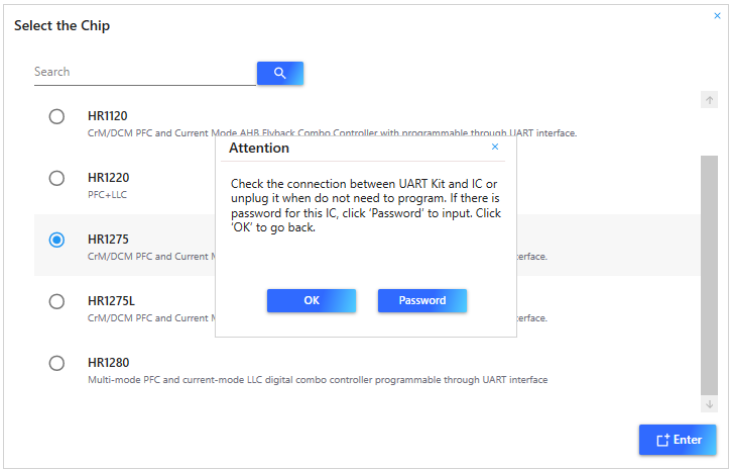

Figure 19: Attention Message Indicates the IC Is Not Connected Properly

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- If the IC is not connected properly while UART easy debug add-on is used, another warning message appears (see Figure 20). This might be due to the EVKT's COMP pin voltage (V_{COMP}) being low. There are two typical reasons why V_{COMP} may be low:
  1. The bulk capacitor voltage at the power board is not discharged to below 25V. To correct this, wait about 1 minute before the next configuration, or check the connection between the UART easy debug add-on and the power board.
  2. The COMP pin pulls low. To correct this, check the COMP pin's connection.

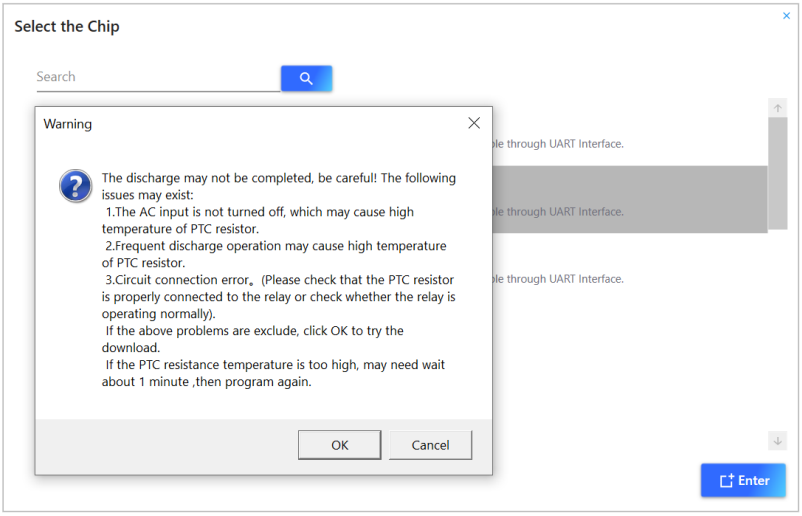

Figure 20: Warning Indicates the IC Is Not Connected Properly

3.5 Device Configuration Instructions (Programmable Power GUI-HR121x)

Follow the steps below to configure the HR121x using the Programmable Power GUI-HR121x.

1. Connect the EVKT-UART-01B to the IC with either a 3-pin ribbon cable or a 10-pin ribbon cable, which are both included in the kit. Ensure the IC is connected properly.
2. Connect the EVKT-UART-01B to the computer.
3. Open the Programmable Power GUI-HR121x.
4. Choose the relevant IC part number. The GUI automatically checks the connection and enters the program's main window (see Figure 21 on page 15). If the connection is not successful, a warning message appears. After receiving the warning message, close the GUI and check the connection, then repeat Step 1.
5. To modify the parameters, click the "Connect" button, then configure the register values for the IC.

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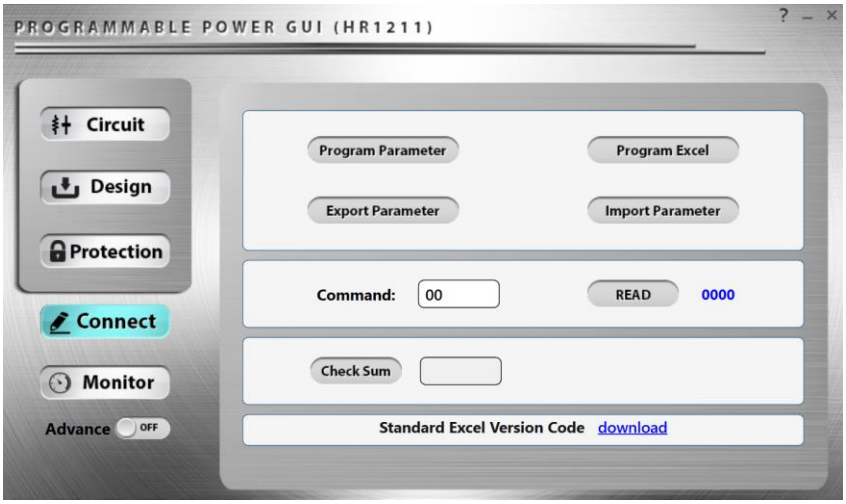

Figure 21: Programmable Power GUI-HR121x Connect Window

3.6 Device Configuration Instructions (MPS AC/DC Power Manager)

Follow the steps below to configure the digital products other than HR121x using the MPS AC/DC Power Manager.

1. Connect the EVKT-UART-01B to the IC using either a 3-pin ribbon cable or a 10-pin ribbon cable, which are both included in the kit. A 10-pin ribbon cable must be used when connecting to the IC while using the UART easy debug add-on. Ensure the IC is properly connected.
2. Connect the EVKT-UART-01B to the computer.
3. Open the MPS AC/DC Power Manager.
4. Choose “Select Chip.” Select the relevant IC part number and click the “Enter” button, or directly double-click the relevant IC part number. If the connection is successful, the GUI enters the chip information page.
5. Double-click the relevant IC part number to enter the parameter configuration page. If the connection is unsuccessful, a warning message appears. After receiving the warning message, close the GUI and check the connection, then repeat Step 1.
6. The parameters can be configured by manually inputting or importing the configurations (see Figure 22).

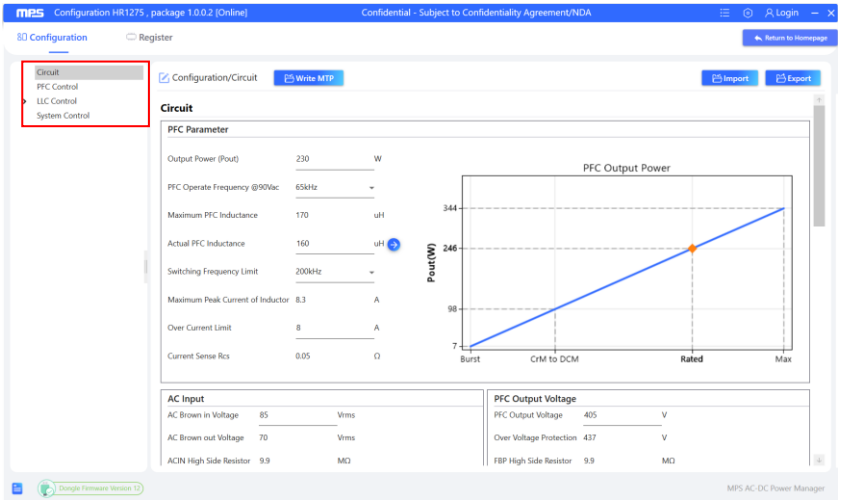

Figure 22: Parameter Configuration (Manual Input in the Configuration Page)

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- The user can import the complete code into the GUI's parameter configuration page (see "1" in Figure 23).

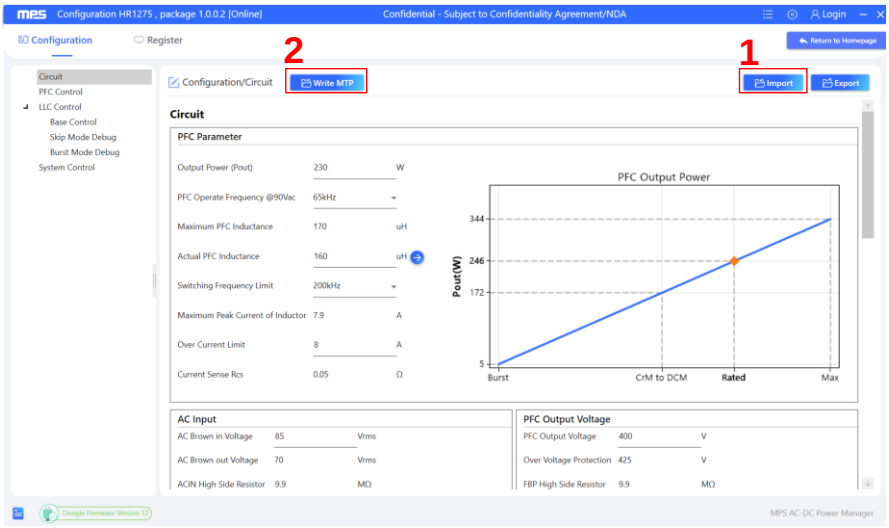

Figure 23: Configuration Parameters (Import)

- After entering or importing the parameters, click "Write MTP" to configure the IC (see "2" in Figure 23).

7. Click "Register" to go to the register configuration page, then click the "Program Excel" button to configure the IC by importing the Excel file with the complete register values into the GUI's register page (see Figure 24).

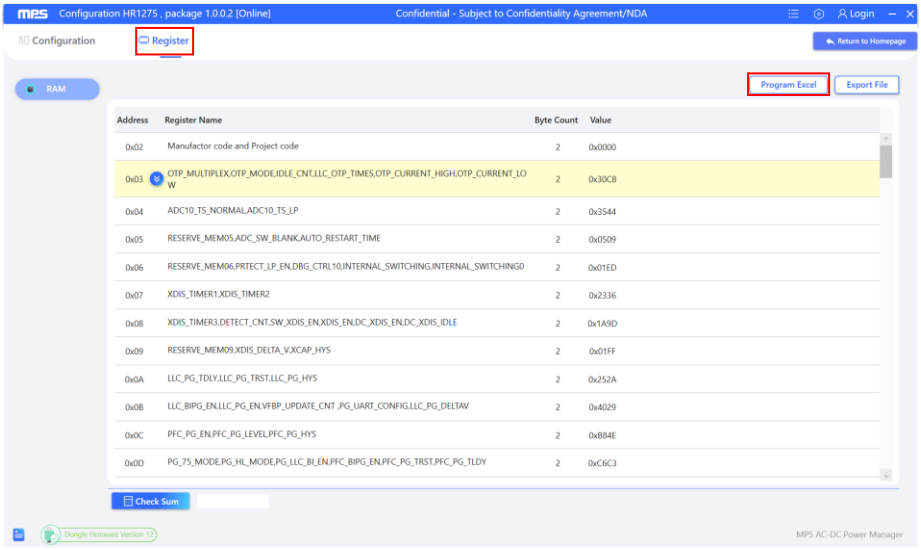

Figure 24: Configuration Parameters (Program Excel)

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8. When the UART easy debug add-on is used and the COMP pin is pulled low, a warning may appear (see Figure 25). There are three possible reasons this warning might appear:
   - The part is not connected properly.
   - The AC input has not been removed while using the UART easy debug add-on.
   - The UART easy debug add-on internal device requires a cooling period (less than 1 minute); however, the kit cannot necessarily determine why the warning appears. If the user eliminates the other two possibilities (part is not connected properly or the AC input has not been removed) as the cause for the warning message, then the user can click “OK” to try to communicate again. If the reason for the warning is not determined, the user can click “Cancel.”

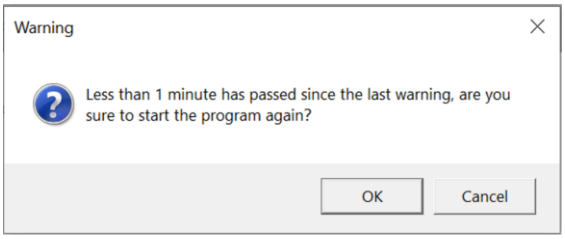

Figure 25: Warning Indicates when the COMP Pin Is Low

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Section 4. Ordering Information

The components of the communication kit can be purchased separately depending on user needs.

Contents of EVKT-UART-01B	Description
EVKT-UART-01B	Includes one USB-to-UART communication interface, one USB cable, one 3-pin ribbon cable, and one 10-pin ribbon cable
Online resources	Include the GUI and supplemental documents

Order directly from MonolithicPower.com or our distributors.

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REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	3/7/2025	Initial Release	-

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