



solantroTM
SEMICONDUCTOR CORP.

MI-P300A Development Platform

User's Guide

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Warning! The MI-P300A Development Platform has exposed circuitry. Exercise caution when handling the platform. Do not make contact with exposed circuitry, leads, or contacts. When disconnected from input power, the bulk capacitor on the platform takes at least 30 seconds to discharge fully. Exercise caution around the leads of the bulk capacitor even when the platform is not connected to input power.

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About the MI-P300A Development Platform User's Guide

This document provides information about setting up the MI-P300A Development Platform so that it can be used with the Helios Test and Control Tool to perform development and testing on the MI-P300A. Before using this guide, you should read the following documents to gain an understanding of the MI-P300A Development Platform:

- *APM Analog Power Manager Datasheet*
- *IXC Micro-Inverter Controller Datasheet*
- *Development Environment Programmer's Guide*
- *Helios Test and Control Tool User's Guide*

Audience

This document is intended for users of the MI-P300A Development Platform and the Helios Test and Control Tool.

The MI-P300A Development Platform and the Helios Test and Control Tool are meant to be installed, operated, and maintained by personnel who have the knowledge, training, and qualifications required to safely perform the tasks assigned to them. The information, processes, and procedures contained in the Solantro documentation are intended for use by trained and qualified personnel.

Limitations

The Helios Test and Control Tool functions only with Solantro Semiconductor Corp. chip sets. It does not function with any other supplier's products.

Support

Contact information

Solanro Semiconductor Corp. support is accessed via email to info@solantro.com, or by telephone at (613) 274-0440.

Extent of support

Support is provided only when Solantro products are installed on a system that meets the minimum system requirements, and operated in accordance to the instructions specified in the applicable documentation.

Notes, cautions, and warnings

Notes, cautions, and warnings are used to alert you to important information or risks.

Notes use the following convention:

Note Take note. Contains important and helpful information.

Cautions use the following convention:



Caution Be careful. In this situation you might do something that could result in damage to equipment, a service interruption, or the loss of data.

Warnings use the following convention:



Warning! Be extremely careful and obey all safety measures. In this situation you might do something that could result in personal injury.

Overview

This chapter provides an overview of the MI-P300A Development Platform and the Helios Test and Control Tool.

The IXC contains an EnSilica processor core. EnSilica provides Eclipse as the development environment. The Solantro software is C using the EnSilica eSi-RISC (Cygwin) tool chain (refer to the *Solantro Development Environment Programmer's Guide* for more information about EnSilica and eSI-RISC). Solantro has added several memory mapped hardware peripherals to the processor core that are connected through an Advanced Microprocessor Bus Architecture (AMBA) bus. These peripherals are designed to assist the processor in areas related to the control of switching power supplies. Some general peripherals are included to assist the processor with parallel tasks, such as a sine table calculator, a hardware divider, and a hardware square-root calculation.

The Helios Test and Control Tool is used to program and test the Solantro Semiconductor Corp. chipset firmware using a development platform. Interaction with the running code on the development platform is performed through serial ports, using the Helios Test and Control Tool.

Power input requirements

For the purposes of programming the MI-P300A Development Platform, a power supply is sufficient. (For the purposes of testing and evaluating the performance of MI-P300A Development Platform, a PC-controlled PV-panel emulator is required. This document does not discuss testing or evaluation of MI-P300A Development Platform performance.)

Communications cables

Communications with the MI-P300A Development Platform requires UC-3000 Isolated TTL USB to UART Converter cables. Two cables are required. One cable is for the Helios Test and Control Tool to use for interacting with the IC, and one cable is for PuTTY to use for monitoring and control of the IC (this cable is optional, but recommended).

Note: The use of UC-3000 Isolated TTL USB to UART Converter cables requires that you download and install a driver for the cable. The driver can be found at:

<http://www.silabs.com/products/mcu/pages/usbtouartbridgevcdrivers.aspx>

Software

Contact your Solantro representative for the Helios Test and Control Tool installation package.

Limitations

The Helios Test and Control Tool functions only with Solantro Semiconductor Corp. chipsets. It does not function with any other supplier's products.

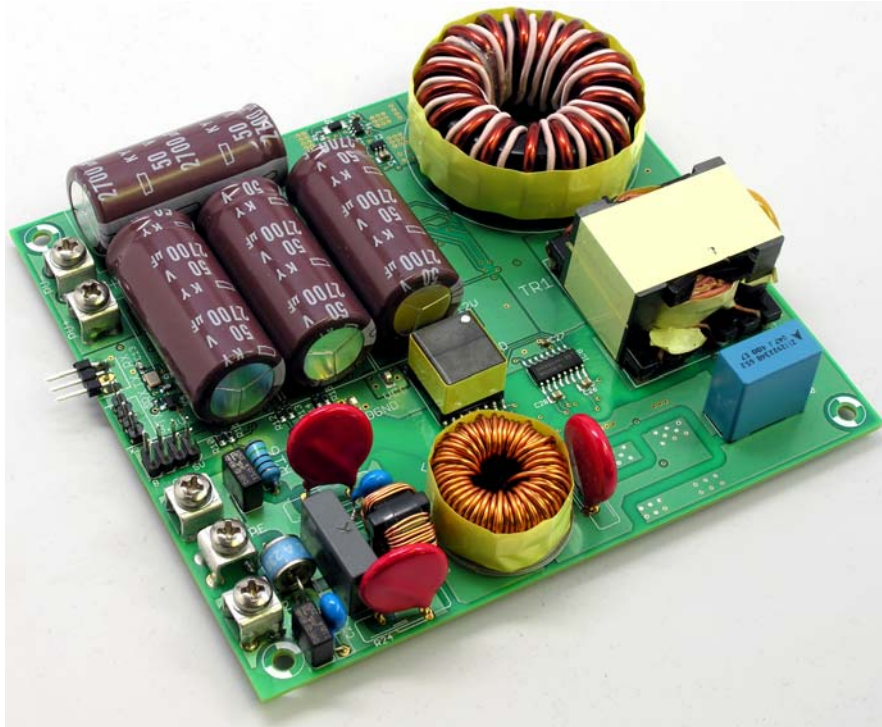
Setting up the MI-P300A Development Platform hardware

This chapter explains how to set up the MI-P300A Development Platform.

The MI-P300A Development Platform does not require a dedicated lab environment. It can be located at the developers usual workstation, provided that the power requirements are met. The MI-P300A Development Platform does not require any special grounding or static electricity protection beyond normal precautions.

The following illustrations show the MI-P300A Development Platform from different perspectives.

Figure 1 - MI-P300A Development Platform perspective view



Setting up the MI-P300A Development Platform hardware

Figure 2 - MI-P300A Development Platform top view

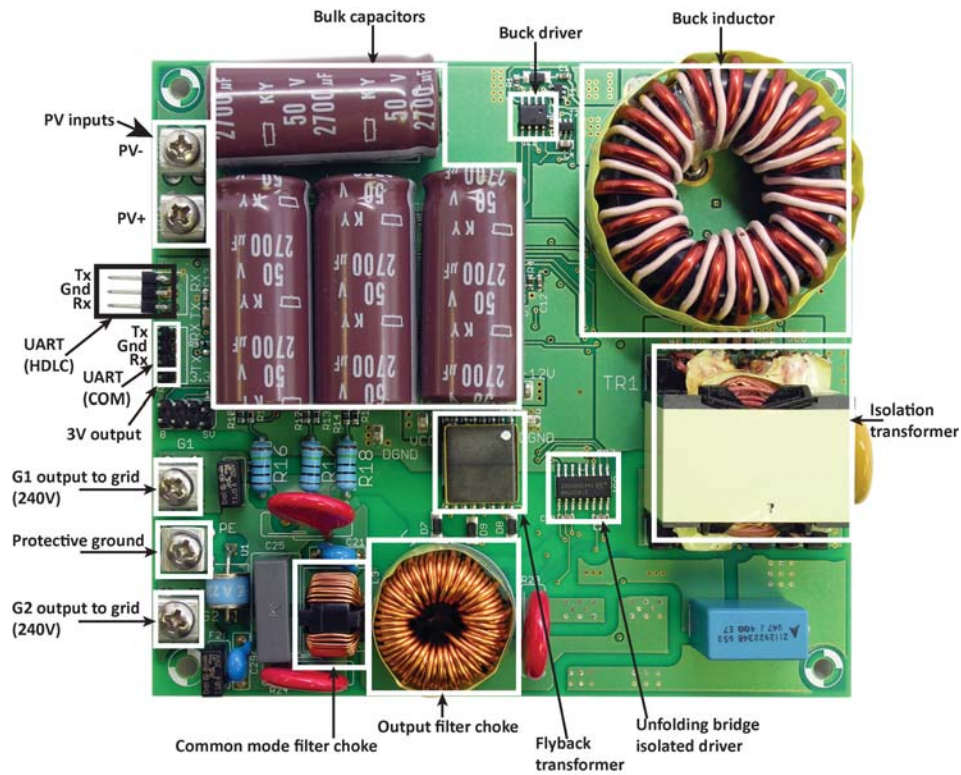
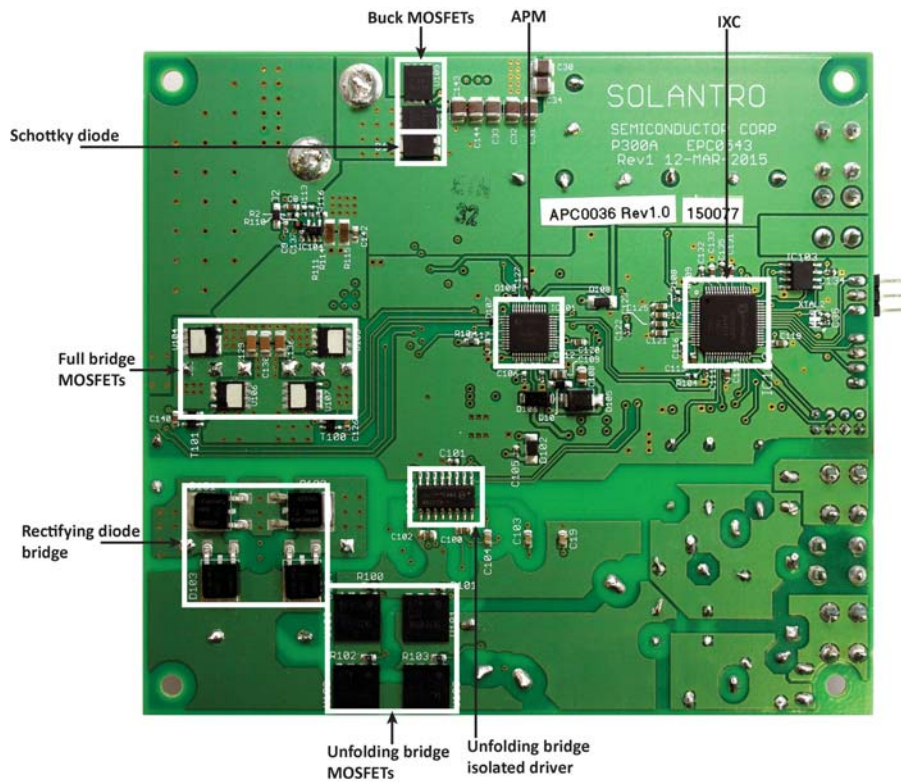


Figure 3 - MI-P300A Development Platform bottom view



Powering the MI-P300A

For the purposes of programming the MI-P300A, a power supply is sufficient, and an input voltage in the range of 24-45V is required. (For the purposes of testing and evaluating the performance of the MI-P300A, a PC-controlled PV-panel emulator providing 24VDC minimum and 45VDC (V_{oc}) maximum is required. This document does not discuss testing or evaluation of MI-P300A performance.)



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MI-P300A Development Platform communications

The MI-P300A has two UART ports for serial communications:

- HDLC UART port - This port provides access for real time interaction with the IXC. This port is an HDLC UART port that sends or receives one packet at a time.
- UART communications port - This port is for use with a terminal program such as PuTTY for monitoring debug and status messages. This port is a simple UART that sends and receives one byte at a time.

The Helios Test and Control Tool (running on a PC) communicates with the MI-P300A using the HDLC protocol. The PC and the MI-P300A are physically connected together by a UC-3000 Isolated TTL USB to UART Converter cable. The USB Standard A connector plugs into the PC, and the TTL connector plugs into the HDLC UART port on the MI-P300A.

For MI-P300A monitoring purposes, using PuTTY for example, you can also connect another UC-3000 Isolated TTL USB to UART Converter cable between the PC and the MI-P300A. In this case the TTL connector plugs into the UART communications port on the MI-P300A.

Note: The use of UC-3000 Isolated TTL USB to UART Converter cables requires that you download and install a driver for the cable. The driver can be found at:

<http://www.silabs.com/products/mcu/pages/usbtouartbridgevcdrivers.aspx>

Follow the instructions to download and install the driver.

Refer to Figure 2 on page 10 for the locations of the UART ports on the MI-P300A. Referring to the figure, the UART port pins, for both COMS and HDLC ports, are arranged as follows:

- Tx pin is on the top
- Ground pin is in the middle
- Rx pin is on the bottom

To connect the PC to the MI-P300A



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Step 1 Download and install the driver for the UC-3000 Isolated TTL USB to UART Converter cables. Go to:

<http://www.silabs.com/products/mcu/pages/usbtouartbridgevcdrivers.aspx>

Click on link **Download VCP (3.49 MB)**. Download and install the driver onto your PC.

Note that the PC will not recognize the UC-3000 Isolated TTL USB to UART Converter cable unless the cable is connected to the MI-P300A, because the cable requires power, which is provided by the MI-P300A, to operate.

Step 2 Using a power supply, apply 36VDC to the MI-P300A power inputs which are labeled “PV+” and “PV-”.

Step 3 Using the specified cable, connect the PC to the HDLC UART port.

Step 4 Launch the Helios Test and Control Tool.

Step 5 From the **HDLC Port** drop-down menu, choose the COM port that is connected to the HDLC UART port.

Step 6 Optionally, to view and configure the HDLC port settings, click **Setup**. The **Configure Port Settings** dialog box is displayed. It is recommended that you accept the default settings. The HDLC Port Baud rate must be set to 115200. When you are done, click **Ok**.

Step 7 Click **Connect**. It may take up to 30 seconds for the port to be connected.

Step 8 You can use a monitoring application, such as PuTTY, to receive debug and status messages from the MI-P300A, as follows:

- 1 Using the specified cable, connect the PC to the UART communications port.
- 2 Launch PuTTY. Set the PuTTY options to the following values:

In the **Session** category:

- Connection type - Serial
- Serial line - specify the PC COM port that is connected to the UART communications port on the target device. This must be a different port than the one being used by Helios.
- Speed (BAUD rate) - 38400

In the **Terminal** category:

- Local echo - Force on

In the **Window** category:

- Reset scrollbar on display activity - off (uncheck)
- Lines of scrollbar - 20000

In the **Serial** subcategory of the **Connection** category:

- Data bits - 8
- Stop bits - 1
- Parity - none
- Flow control - XON/XOFF

3 Specify a name for your PuTTY session and then save it.

4 Click **Open**. The PuTTY session launches.

Setting the “autostart” parameter

When the MI-P300A is in autostart mode it operates as a stand-alone device without communications. When the MI-P300A detects sufficient operating conditions (grid in range and PV-panel voltage in range), it starts up and sends power to the grid on its own as long as the correct operating conditions last.

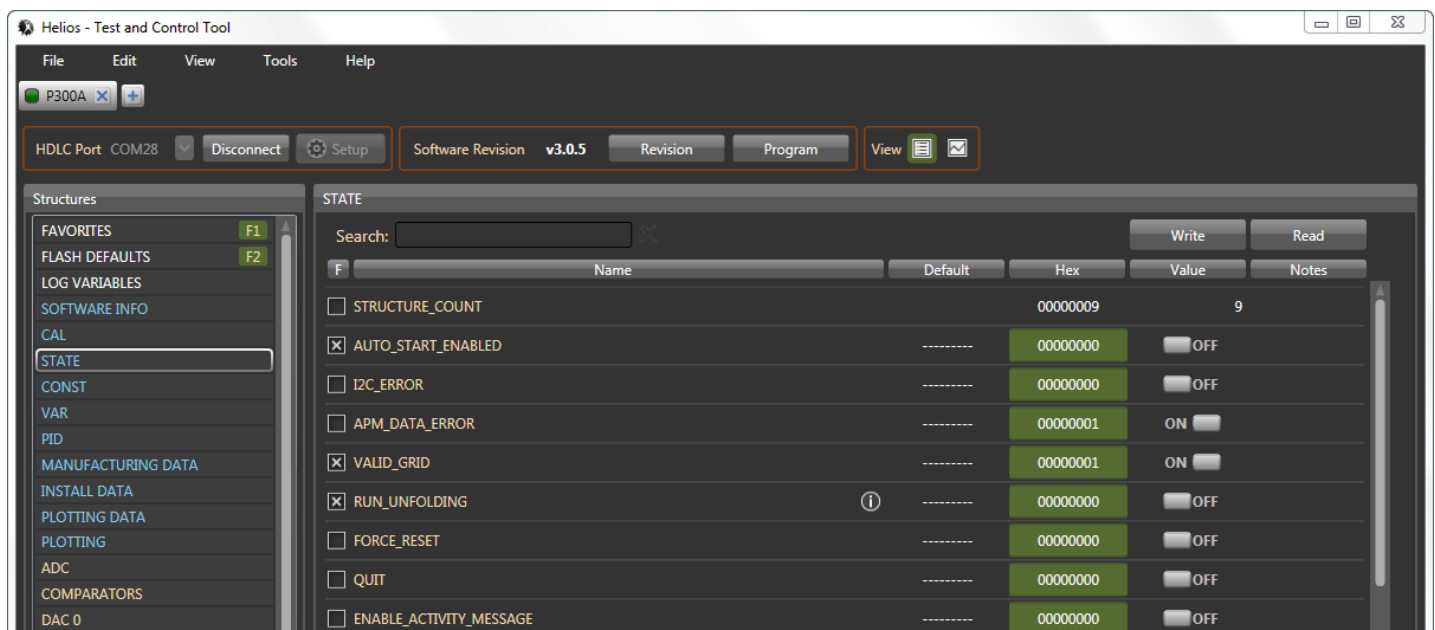
If the MI-P300A is not in autostart mode it will not start up or send power to the grid on its own even if there are sufficient operating conditions. In this state the device must be controlled by Helios or PuTTY.

Use the following procedure to change the autostart parameter for the MI-P300A using Helios.

To enable “autostart”

Step 1 Launch the Helios Test and Control Tool, and open the **MI-P300A** project.

Step 2 Click on the **STATE** structure. The software variables for the **STATE** structure are displayed, as seen in the following illustration.

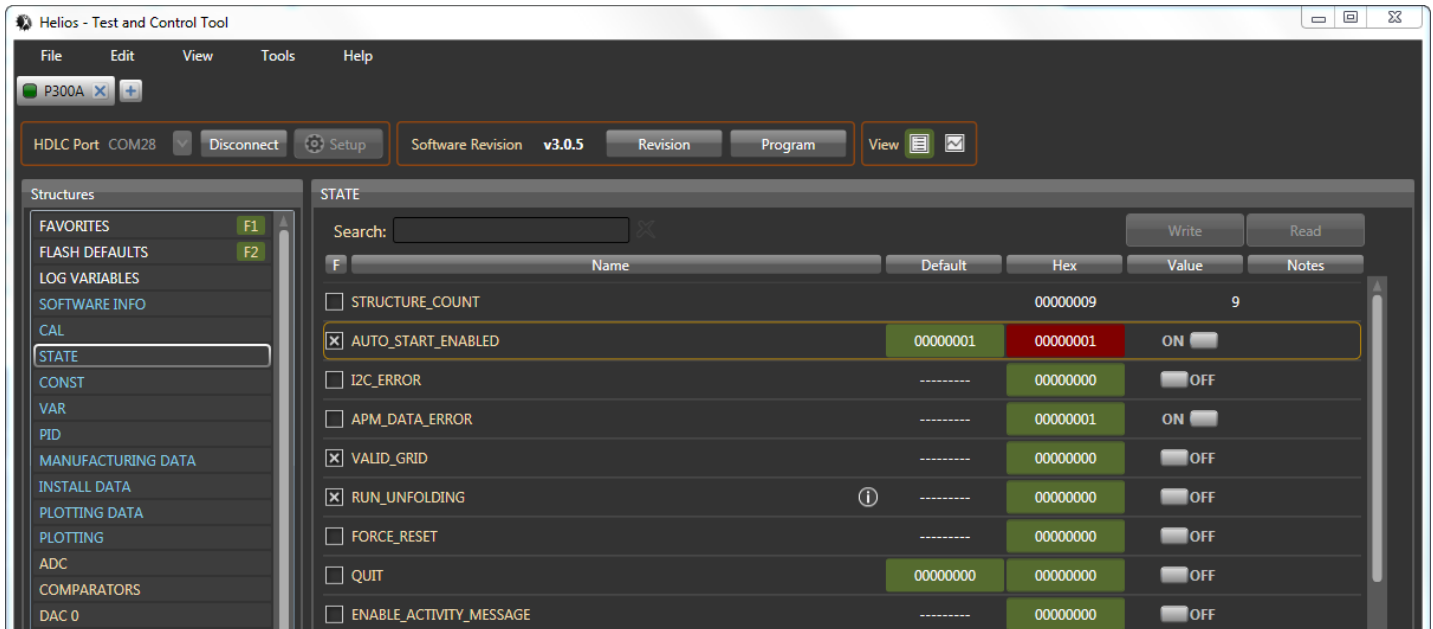


Step 3 To enable the autostart mode, set variable **AUTO_START_ENABLED** to **ON**. Notice that the **Hex** value changes to **00000001**.

Setting up the MI-P300A Development Platform hardware

Step 4 To make the change permanent, you must specify the **ON** setting as the default and save the setting to flash memory.

- 1 Click the **Default** field for the **AUTO_START_ENABLED** variable. Notice that the **Default** field changes to **00000001** to match the Hex value, as seen in the following illustration.



- 2 Click **Program**, which displays the **Select Program Revision** dialog box.
- 3 In the **Select Program Revision** dialog box, select **In Memory Defaults**, and then click **Ok**.
The setting is written to flash memory and remains the default even if the board is reset.



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