PowerNavigator

Users Guide

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Overview

- This guide walks a user through the steps to setup and configure a digital power device using the new PowerNavigator GUI

- This guide assumes the user has followed the instructions on the website for downloading and installing PowerNavigator and is able to launch the program successfully.

Overview

- **The following sections are shown in this guide:**
  - Hardware free mode
    - Selection of devices
    - Power architecture setup
    - Current sharing
  - Sequencing
    - Time based sequencing
    - Event based sequencing
  - Command Line Tool
    - Changing parameters
  - File save/load
    - Project Files
    - Configuration Files
  - Connecting to hardware
    - Monitoring
    - Writing to devices
    - Fault Status
    - Eval Board

Hardware Free Mode (Offline Mode)

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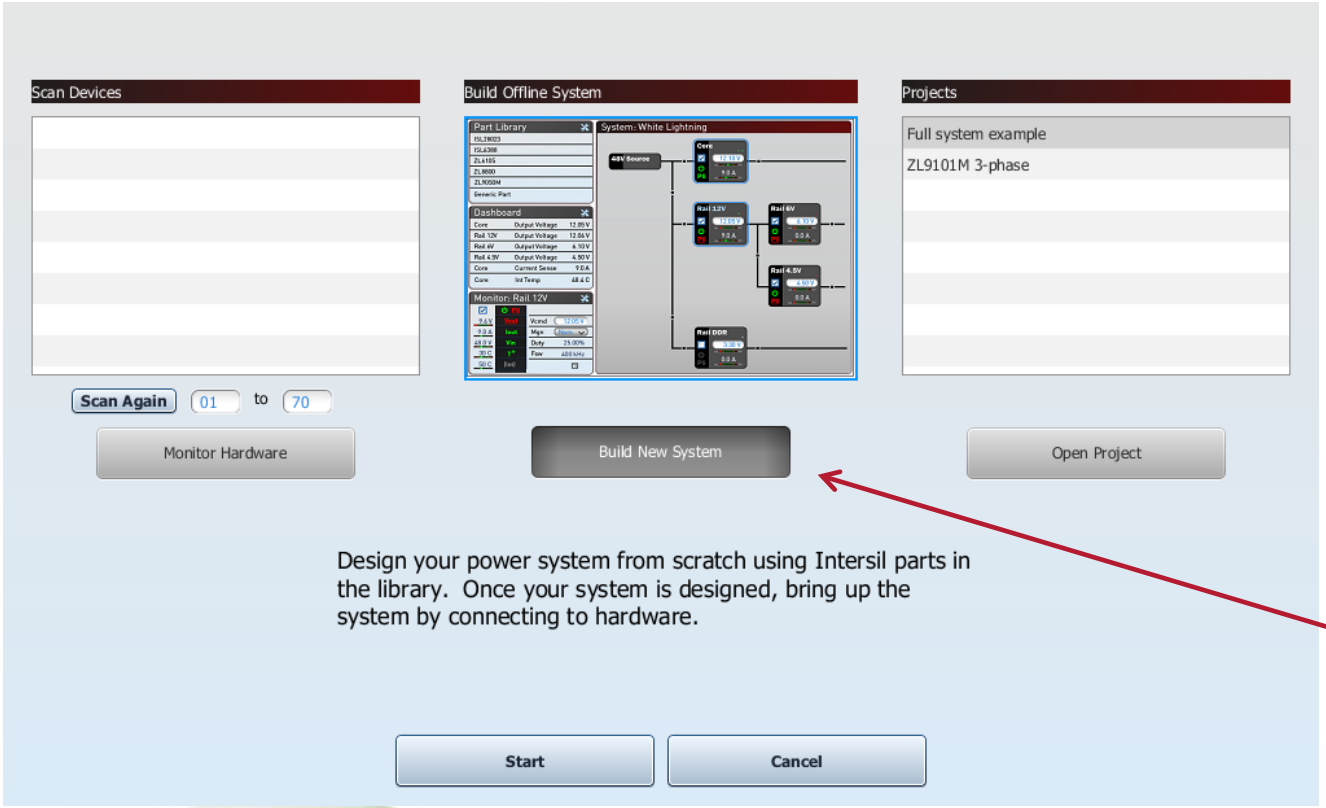
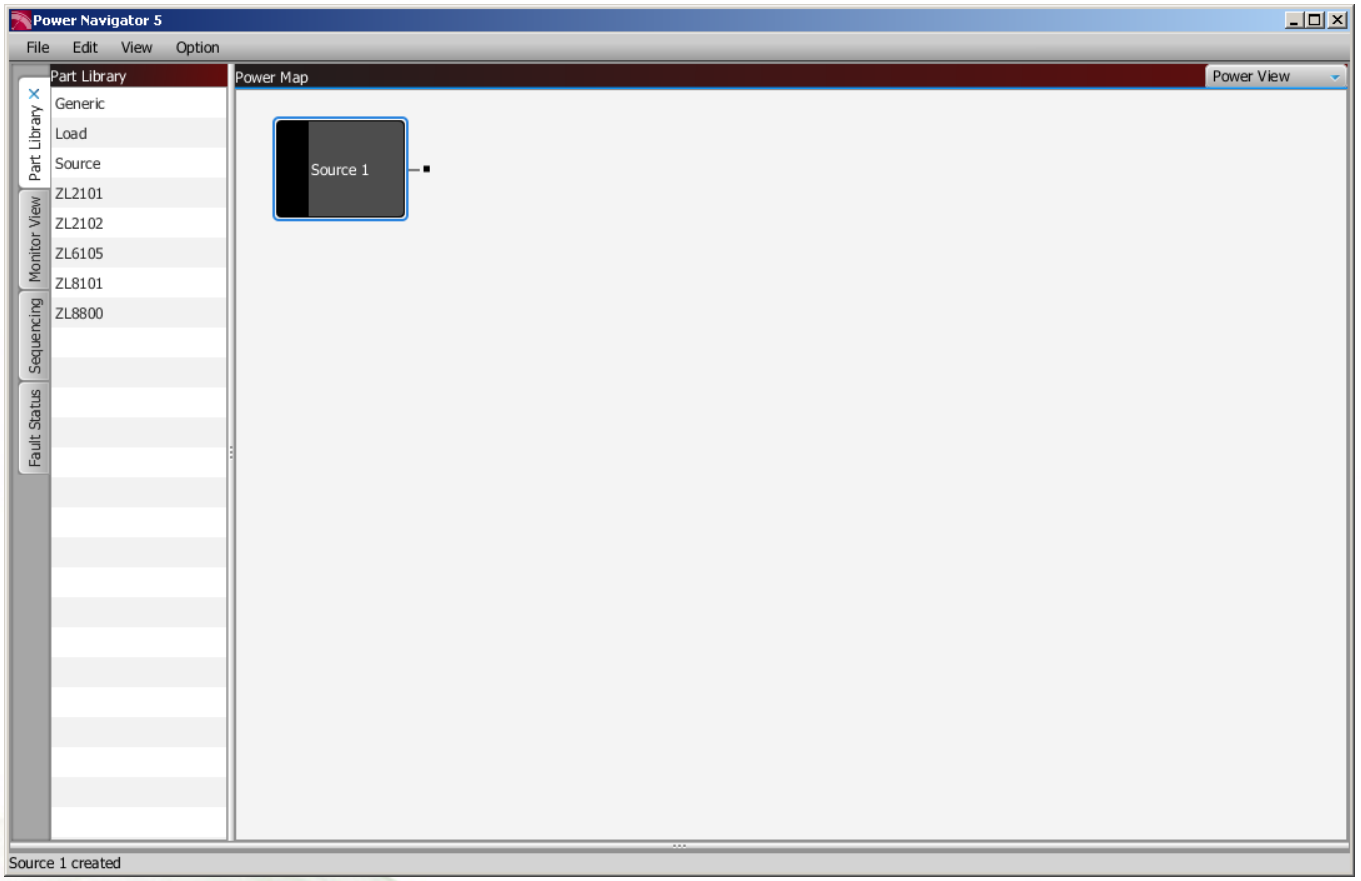
Hardware Free Mode (Offline Mode)



Click on "Build New System" and then "Start"

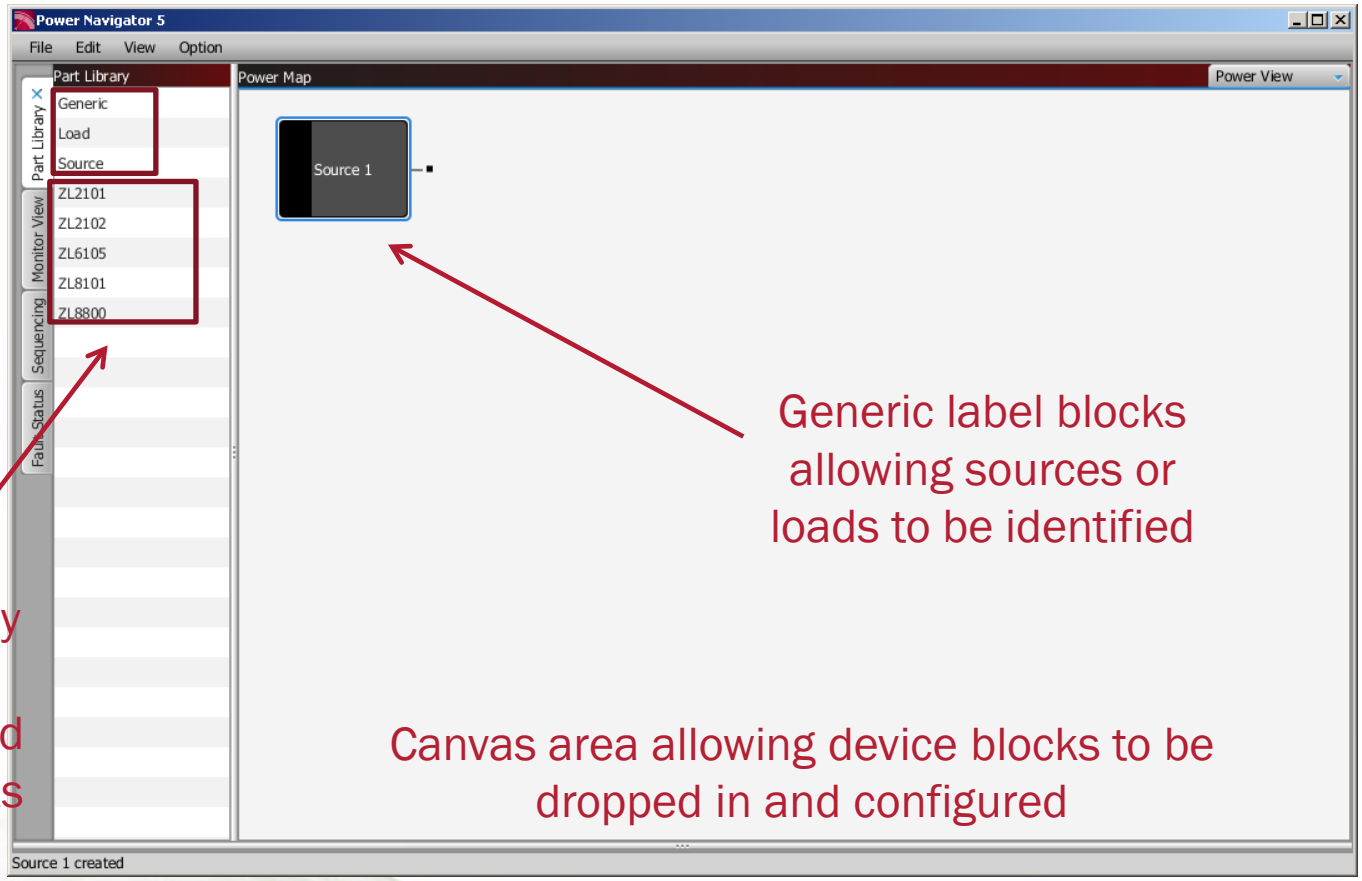
This section allows you to configure an entire power system without hardware. This is useful for preparing for initial system prototypes to arrive.

System View



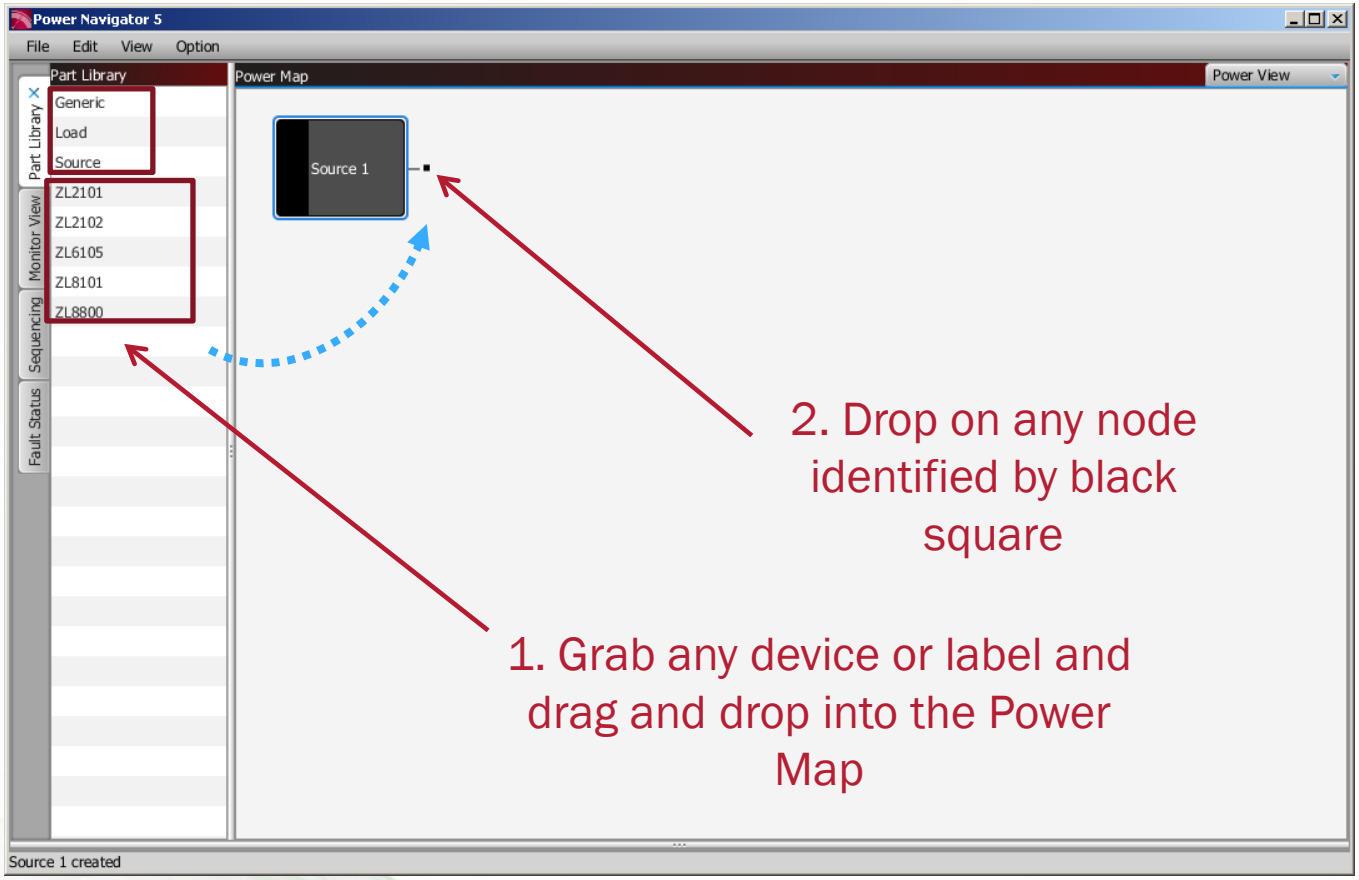
Initial screen is a blank canvas allowing the user to setup and configure an entire power system

System View: Sections



Initial screen is a blank canvas allowing the user to setup and configure an entire power system

System View: Setup of Power Map



Initial screen is a blank canvas allowing the user to setup and configure an entire power system

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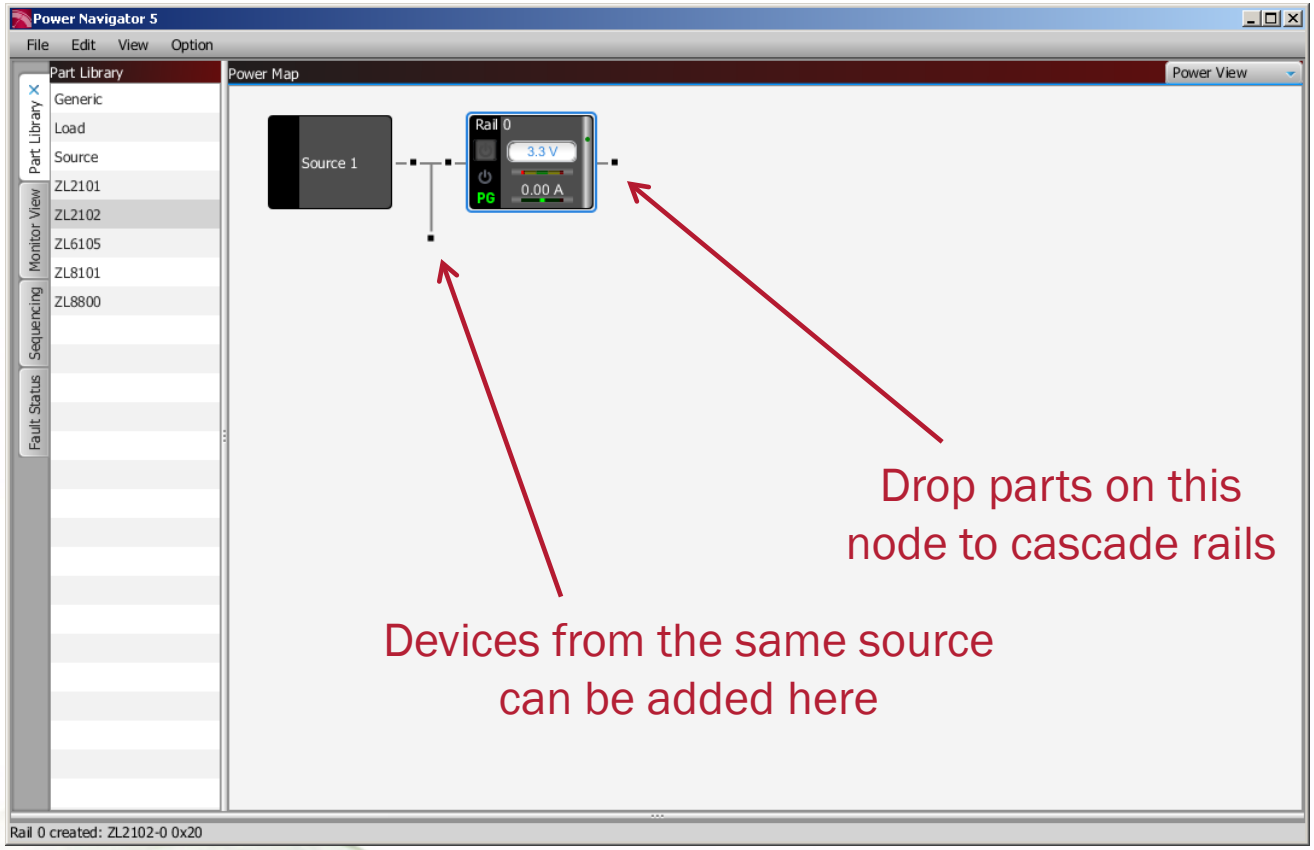
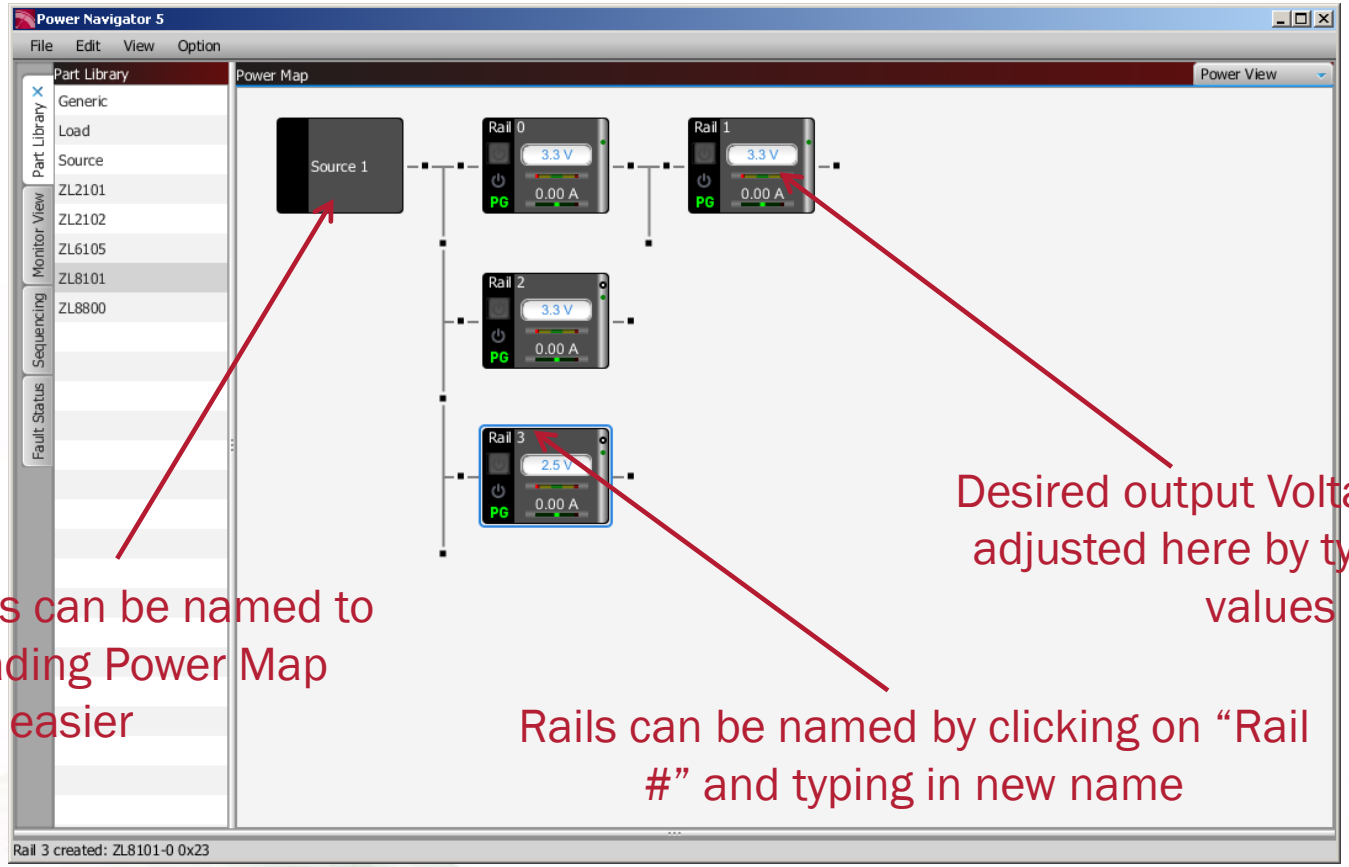
System View: Single Output



A single device has now been placed in the Power Map allowing it to be configured. Additional devices can be added to match the system

System View: Multiple Rails



Label blocks can be named to make reading Power Map easier

Desired output Voltages can be adjusted here by typing in the values

Rails can be named by clicking on “Rail #” and typing in new name

Now that complete architecture with power devices is complete, readability can be improved by naming devices and adding label blocks if desired

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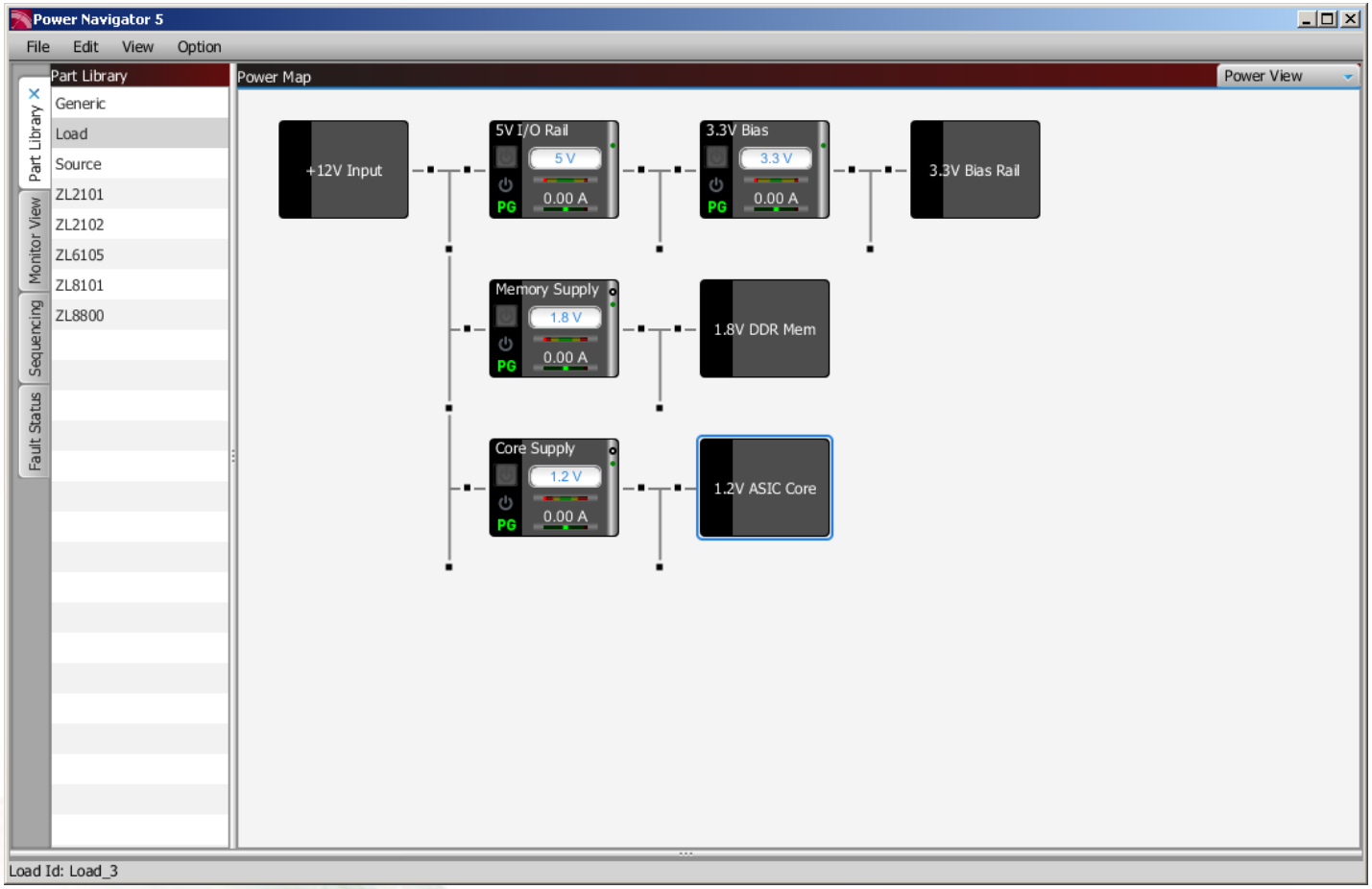
System View: Labels Applied



Example system with all rails labeled and output voltages defined

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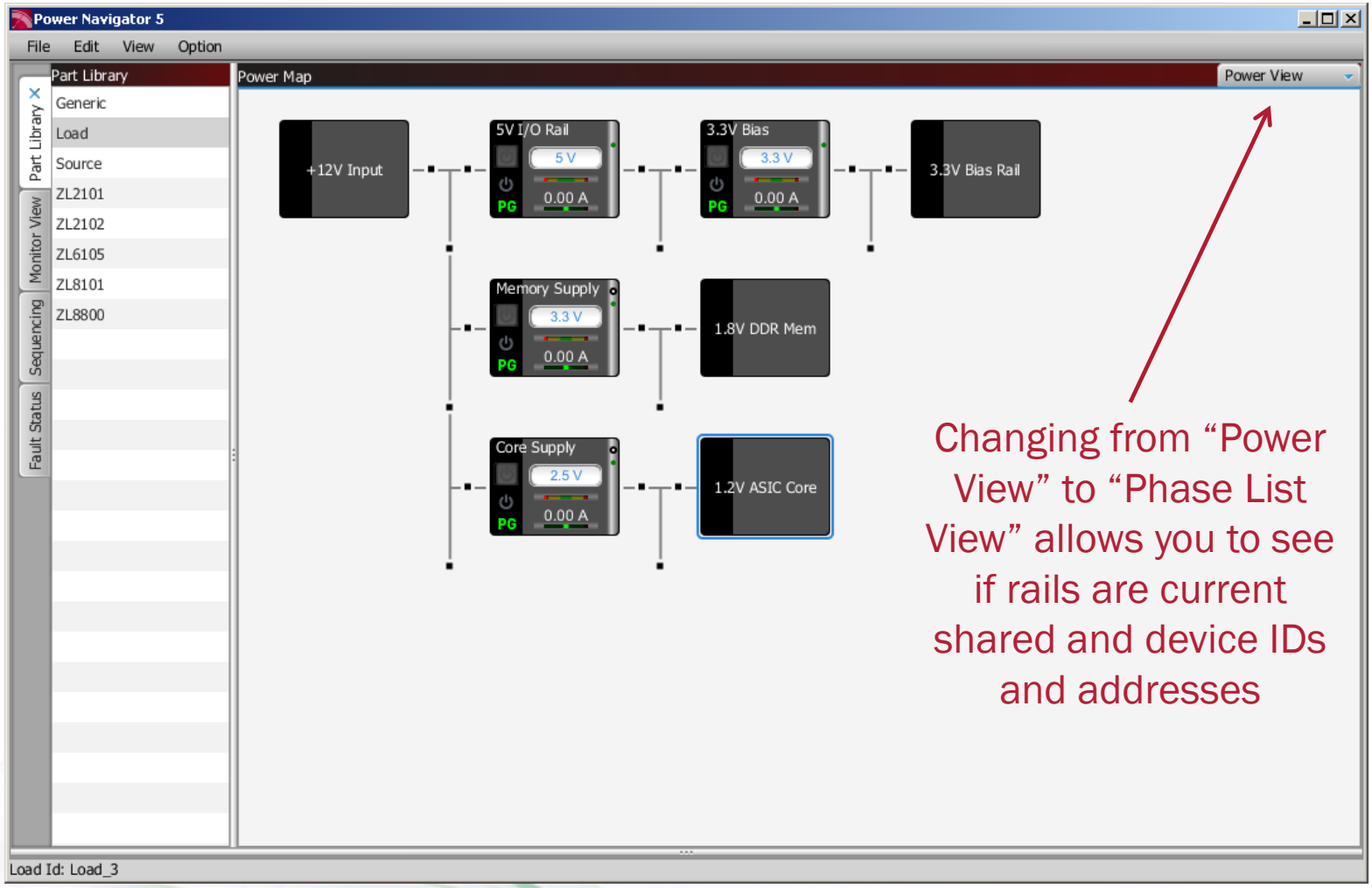
System View: Reviewing Devices & Phases



Changing from “Power View” to “Phase List View” allows you to see if rails are current shared and device IDs and addresses

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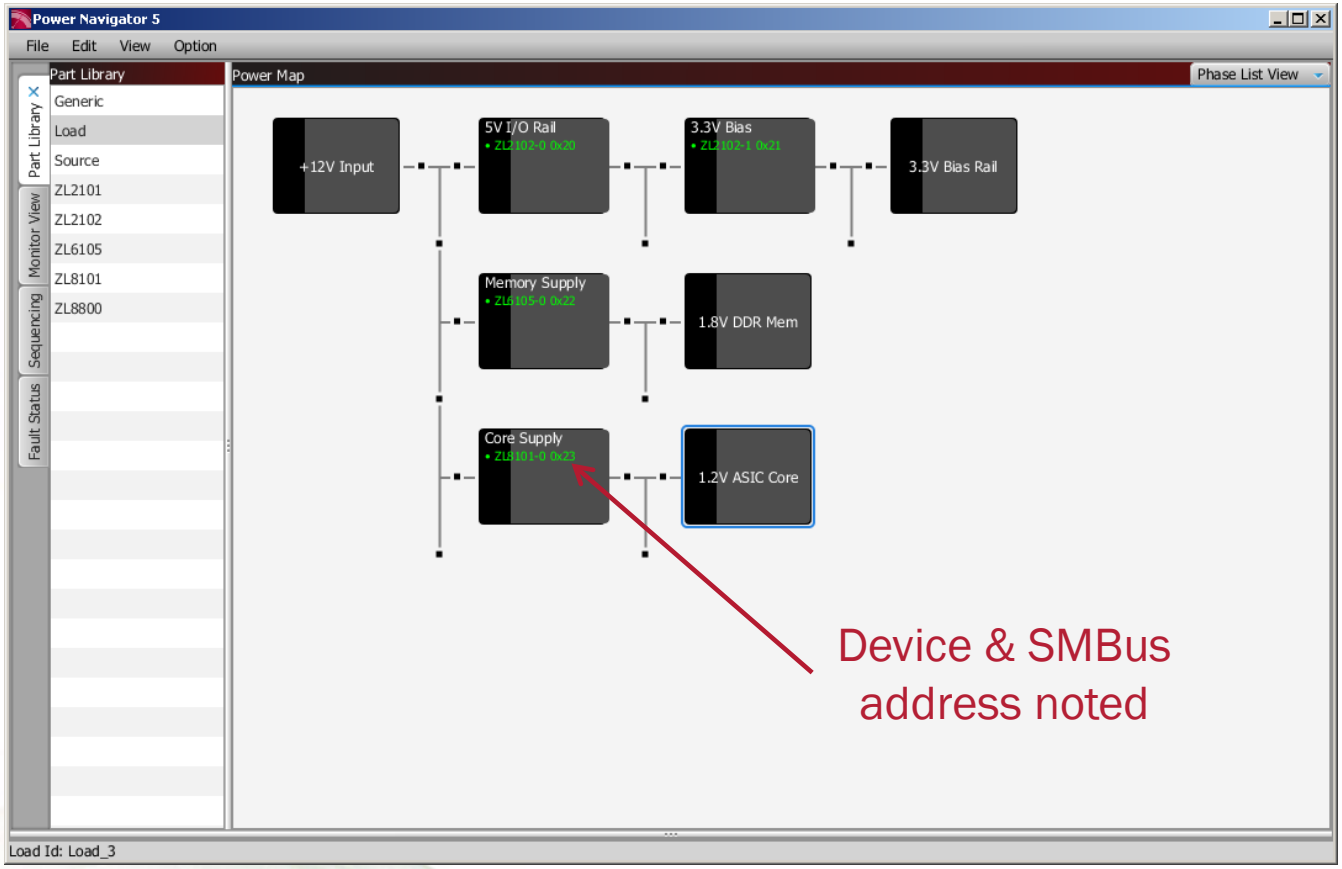
System View: Phase List View



All device IDs are displayed in this view along with SMBus address. The SMBus address is automatically assigned and can be changed to match hardware schematic

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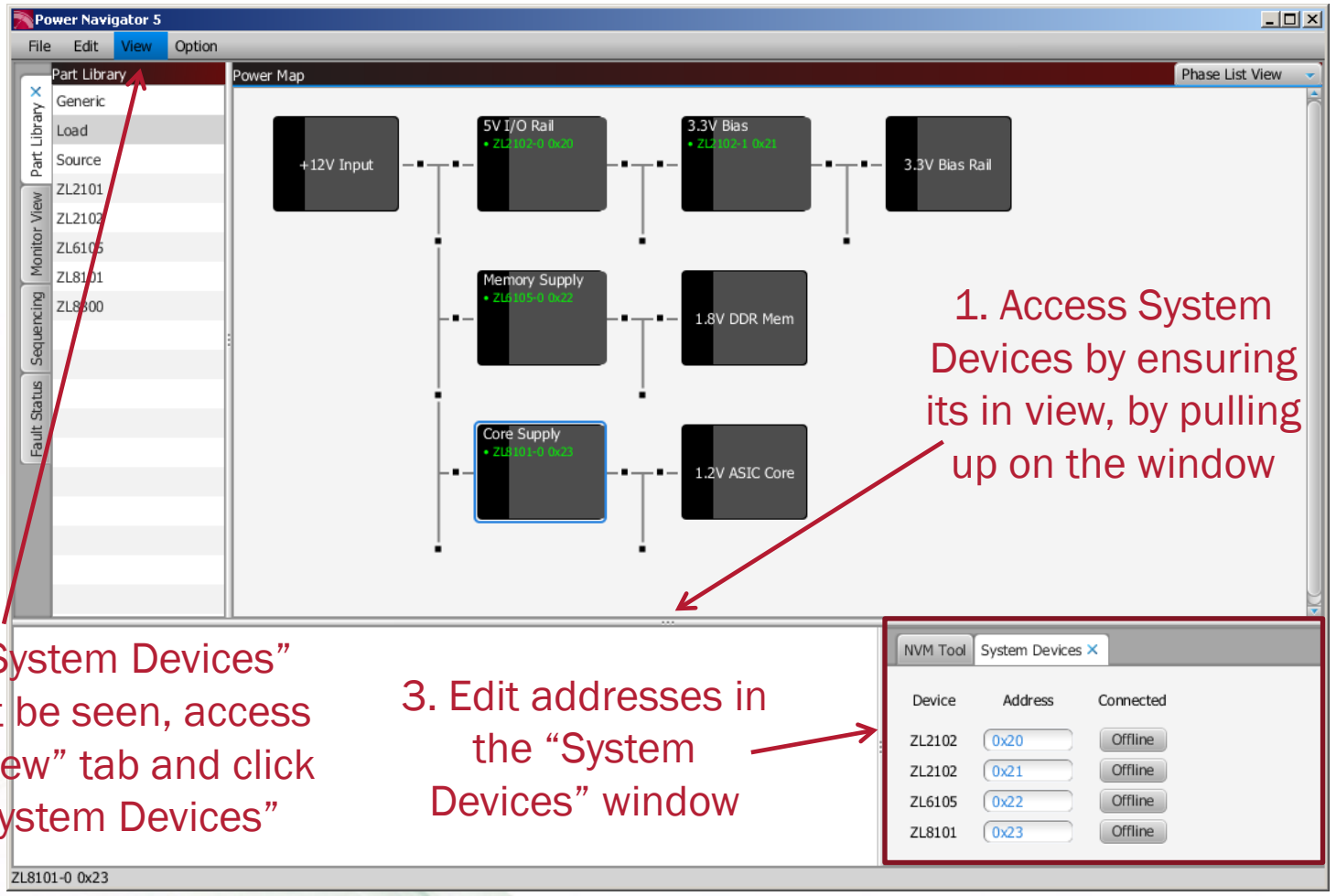
System View: Changing SMBus Addresses



1. Access System Devices by ensuring its in view, by pulling up on the window

2. If “System Devices” can not be seen, access it by “View” tab and click on “System Devices”

3. Edit addresses in the “System Devices” window

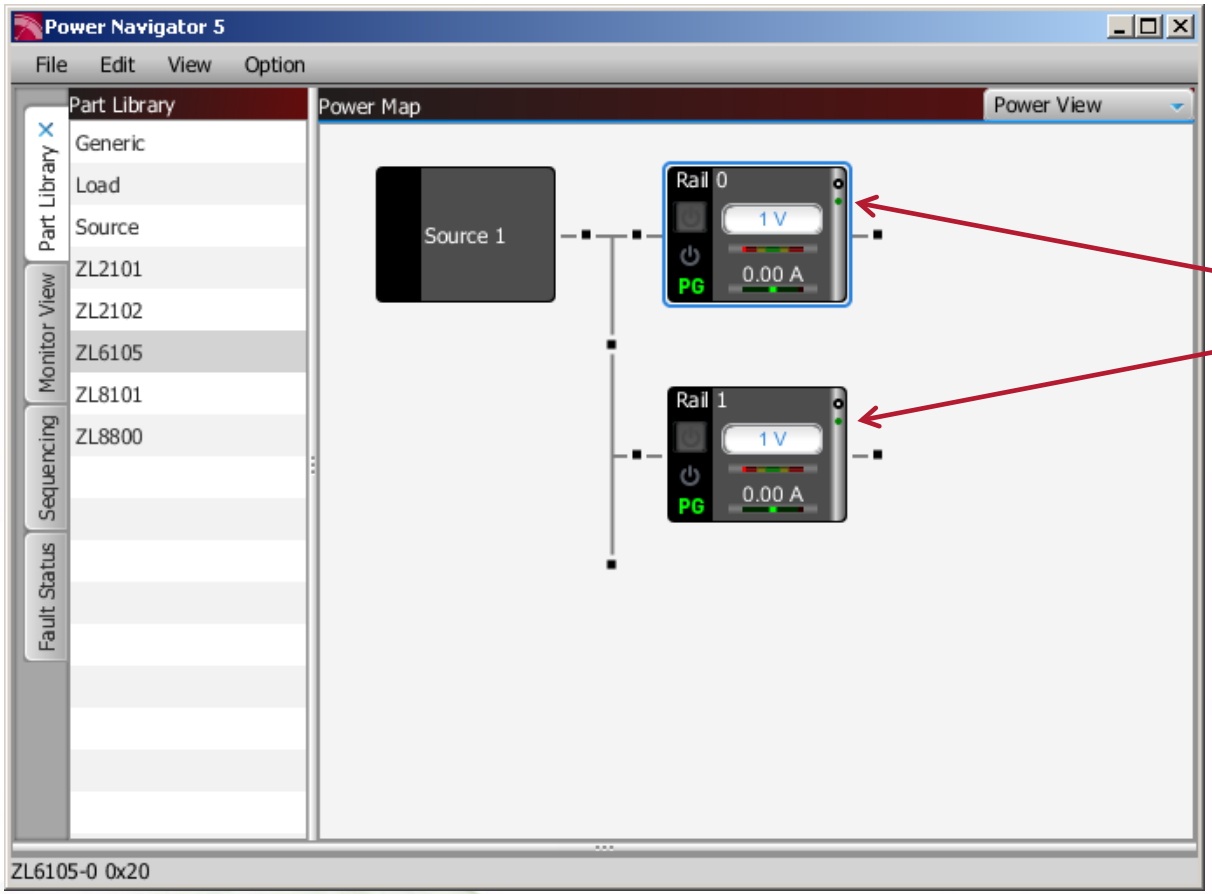
In order to connect the system to hardware the SMBus address must match hardware otherwise the wrong configuration could be sent to devices

Current Sharing

- This section covers current sharing and setting up the ZL8800 in the Power Map

- Several of Intersil Digital devices are enabled to current share between devices using the DDC bus. This is easily supported in the GUI

Current Sharing



The green dot represents one phase used in the power supply.

Two ZL6105 devices are placed on the Power Map. The intent is to create a two phase solution by current sharing the devices

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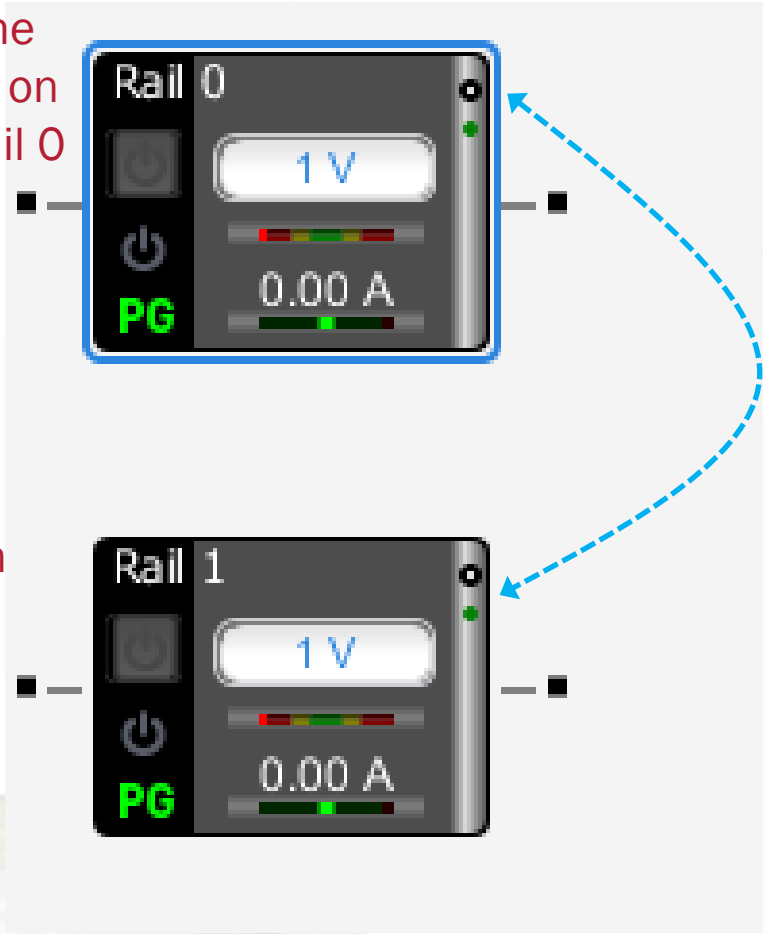
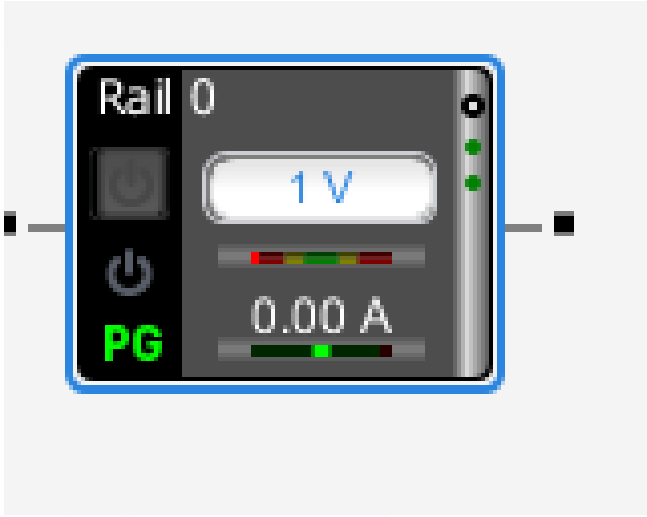
Current Sharing

2. Drag it onto the white & black dot on the top right of Rail 0

1. Grab the green dot on Rail 1



End result is a two phase power supply shown below (indicated by 2 green phase dots)



To current share the rails, move one of the devices by dragging and dropping the green dot onto the other rail (into the circle above the green dot)

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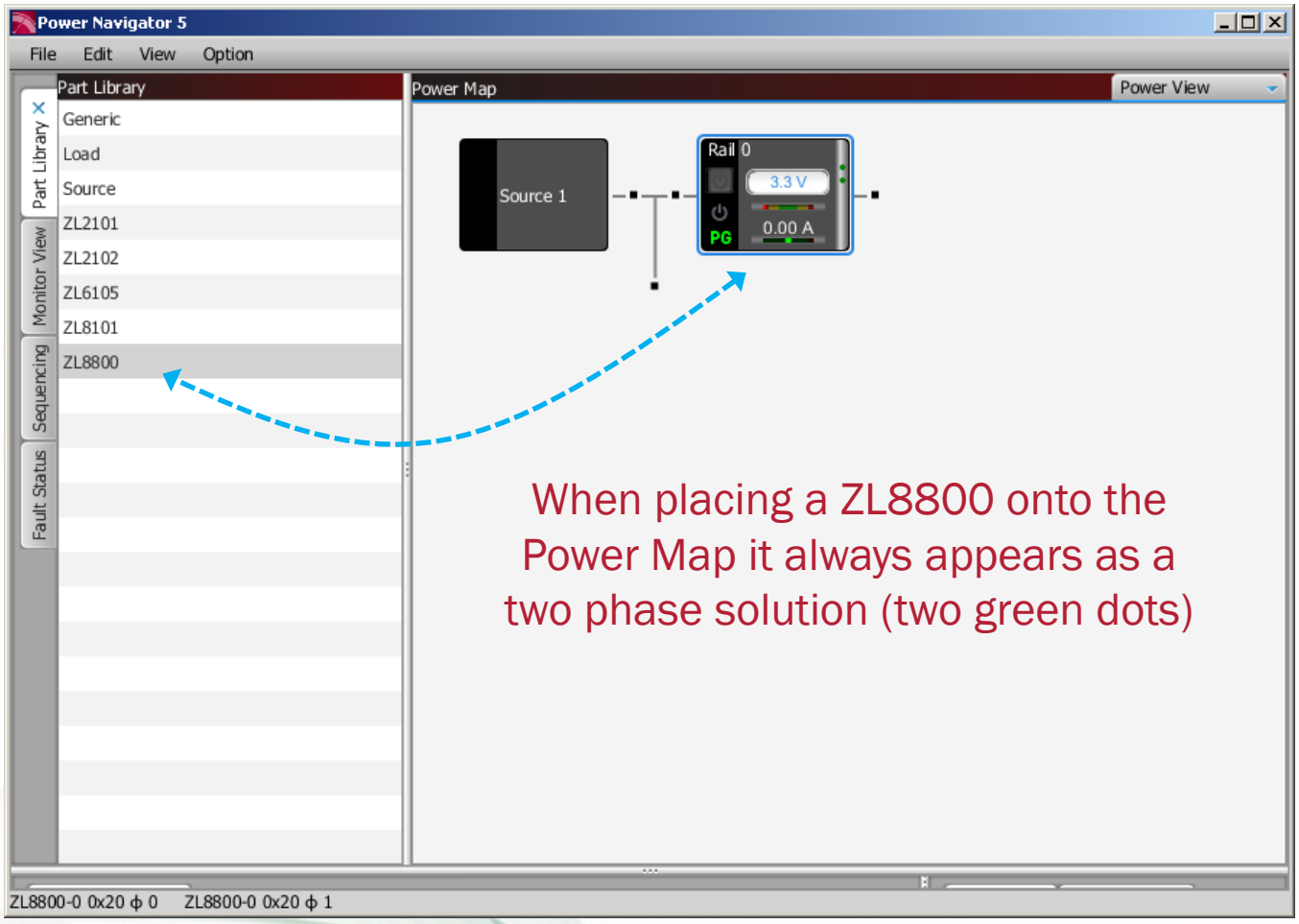
ZL8800 Setup



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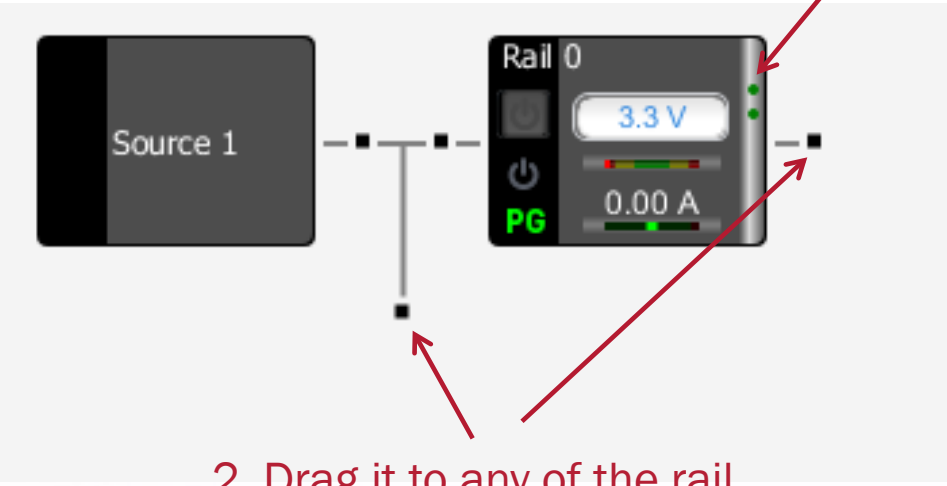
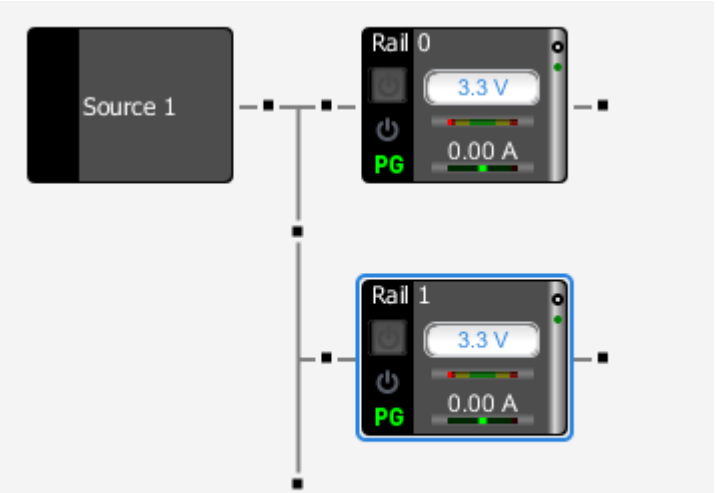
ZL8800 Setup

1. Grab a green dot on Rail 0



2. Drag it to any of the rail nodes

End solution with two outputs shown below



To create a 2 output solution with the ZL8800 the opposite approach from current sharing is applied. The phase dots need to be separated into two distinct outputs

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Sequencing

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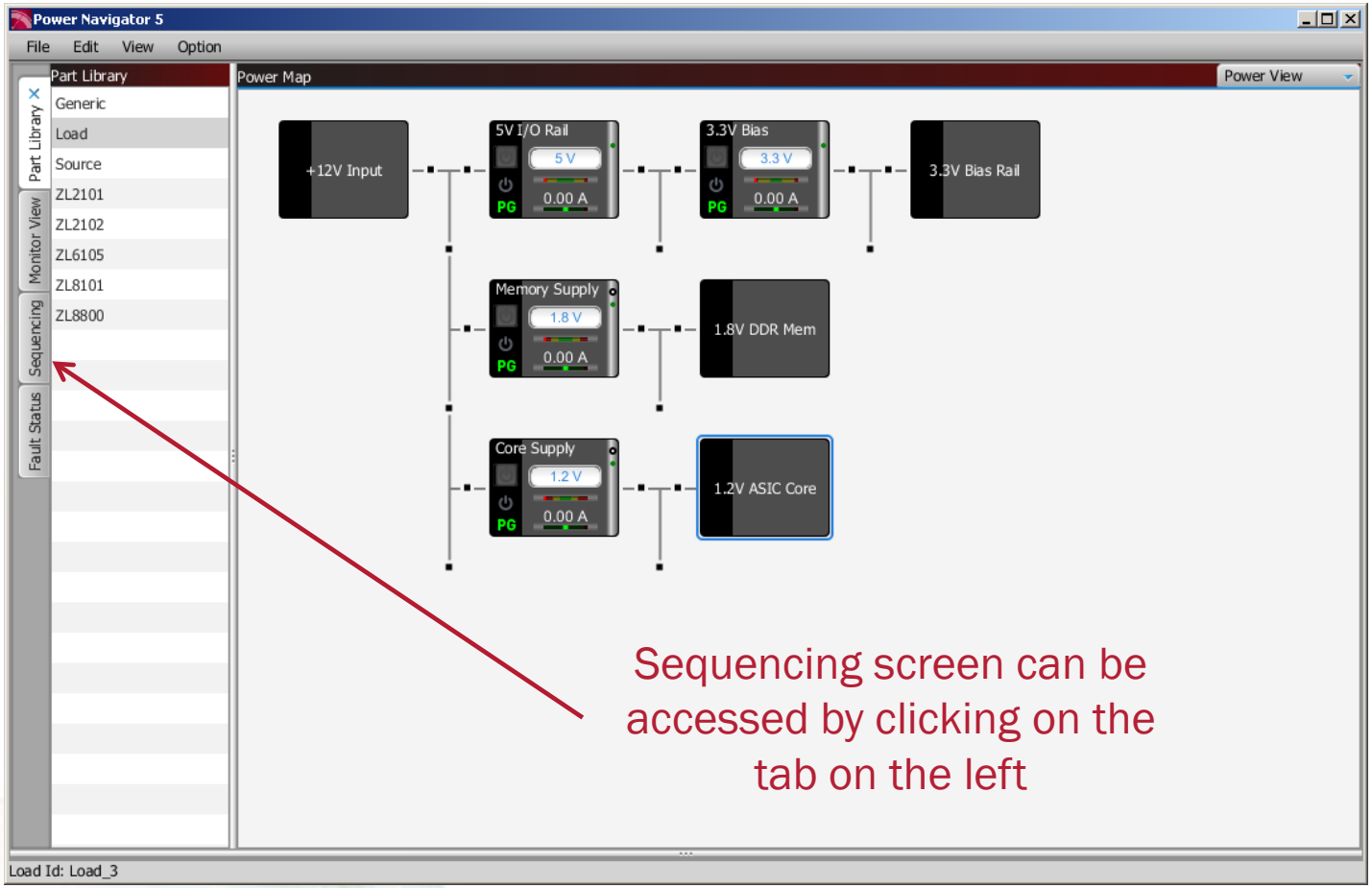
Sequencing Setup



Sequencing screen can be accessed by clicking on the tab on the left

Based on the power architecture defined, the devices can now be configured for sequencing during power up or power down

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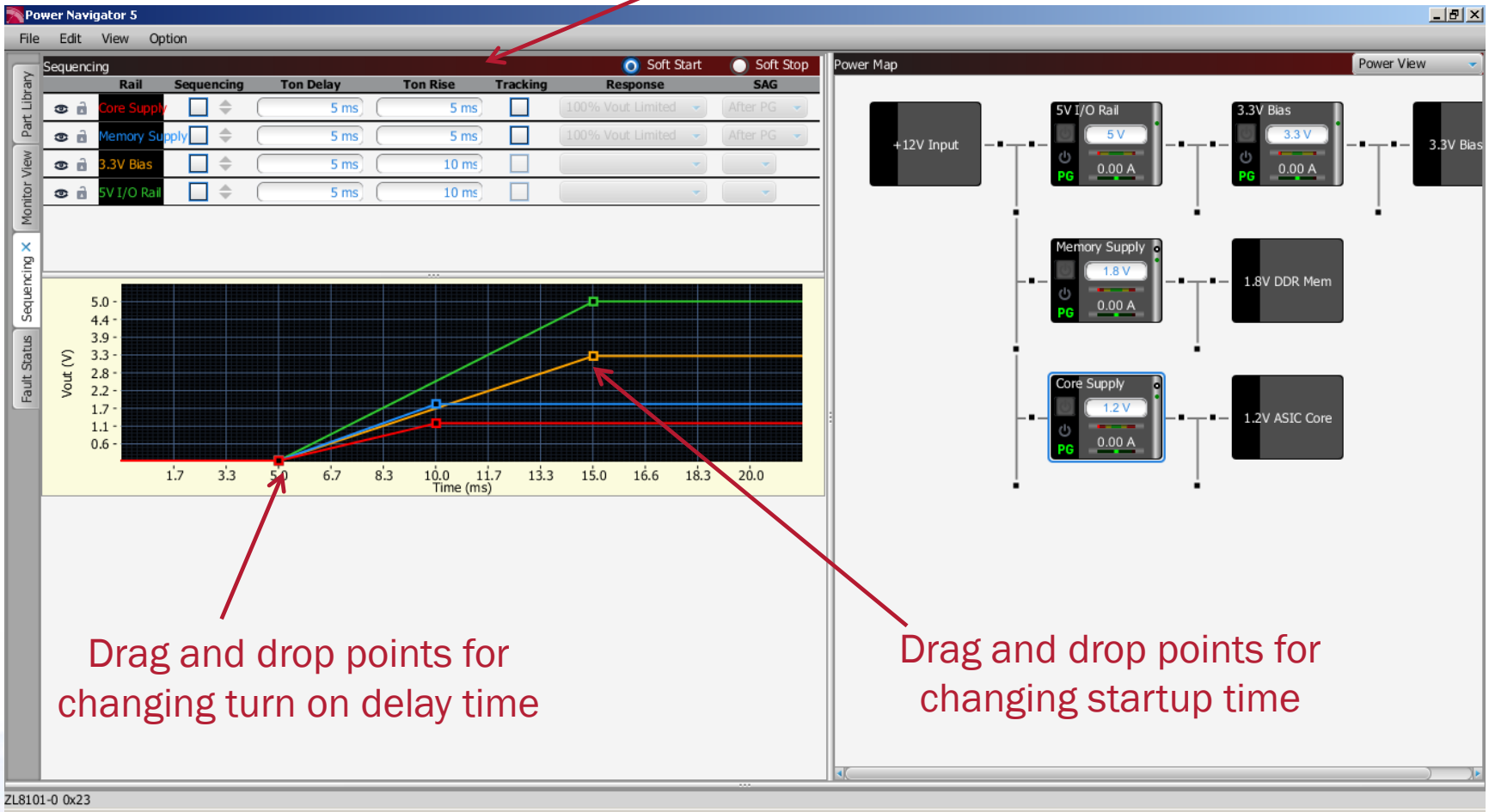
Sequencing Overview

Sequencing control window



Drag and drop points for changing turn on delay time

Drag and drop points for changing startup time

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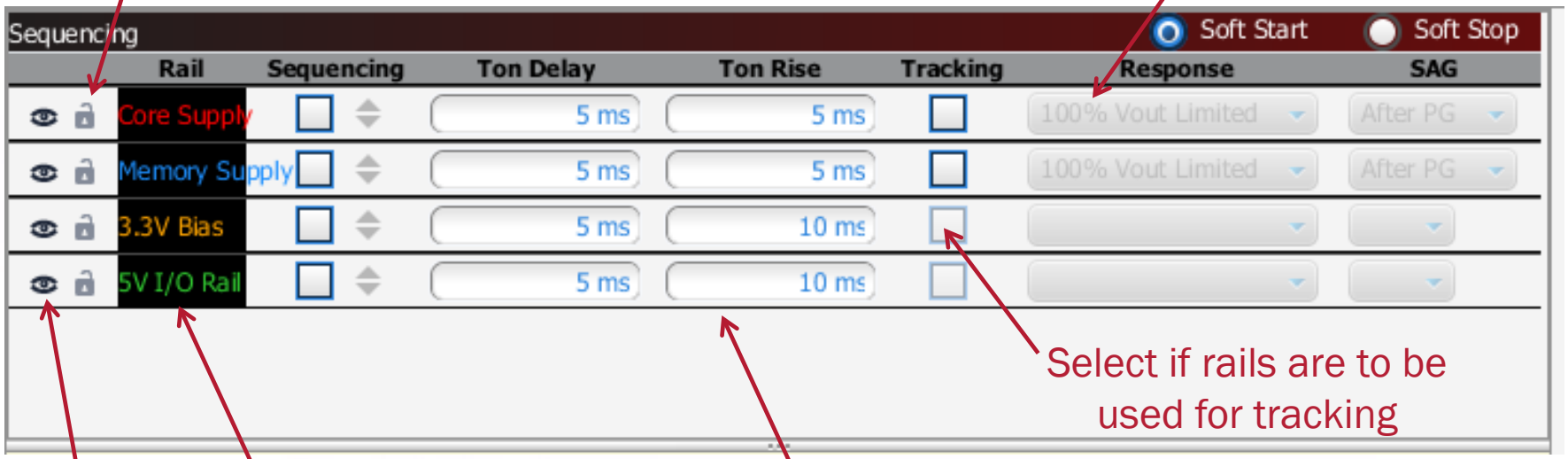
Sequencing View Expanded

Lockout of rail to turn of drag and drop capability (stops rails from accidentally being adjusted)

Selects response to tracking



Select if rails are to be used for tracking

Rail name

Adjustment of Ton delay and softstart times. Same as using drag and drop functionality

Turn on/off visibility of power rail on sequencing (improves readability if multiple rails are being sequenced)

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Sequencing Example

Sequencing example with two rails (only ones selected with visibility icon)

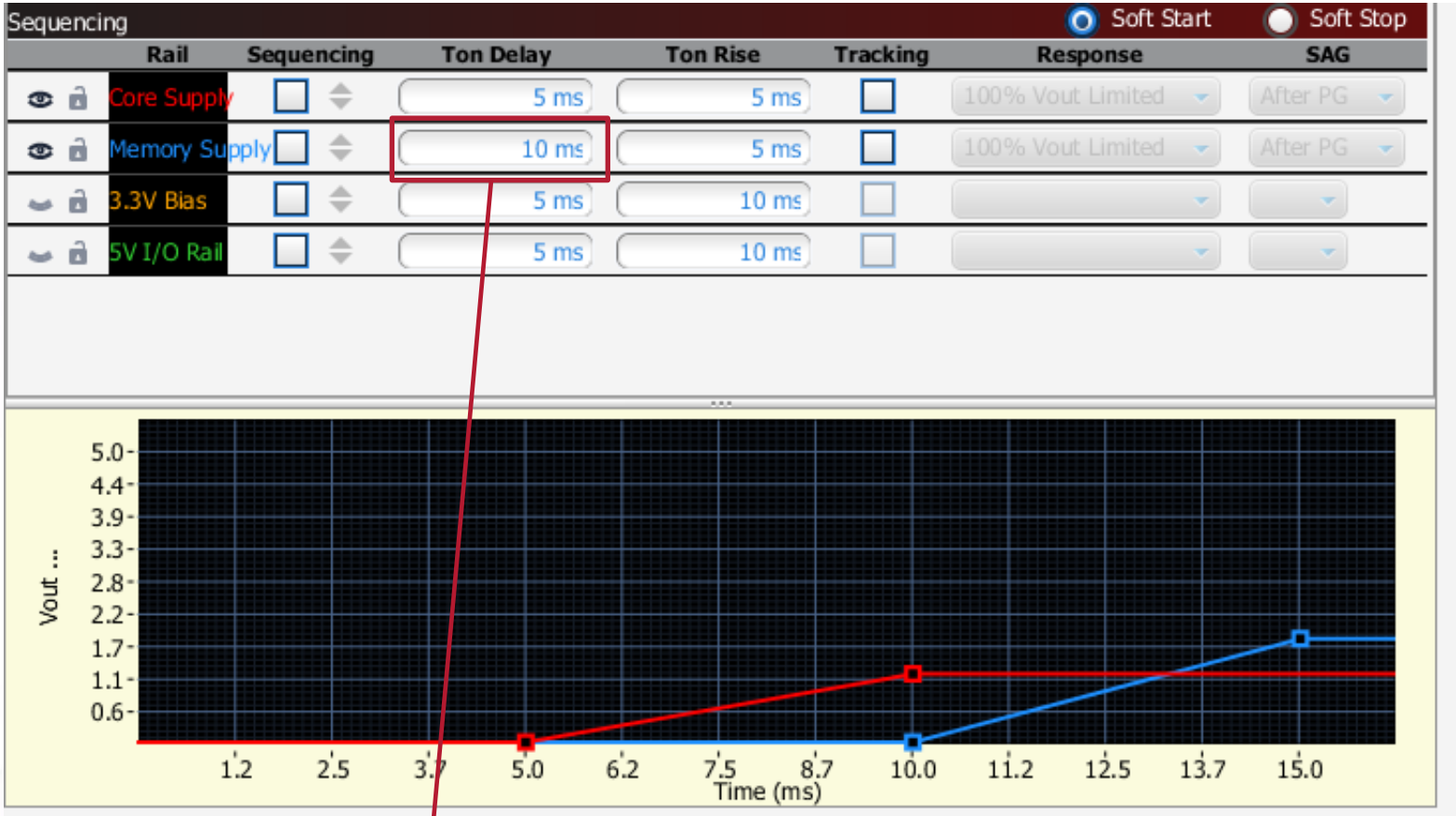
Sequencing Example

Sequencing example with two rails (only ones selected with visibility icon)

5ms delay after EN (defined as 0ms event)

5ms softstart ramp after Ton Delay expires

Sequencing Example



A change of Ton Delay to 10ms extends the delay time from the 0ms point (EN event).

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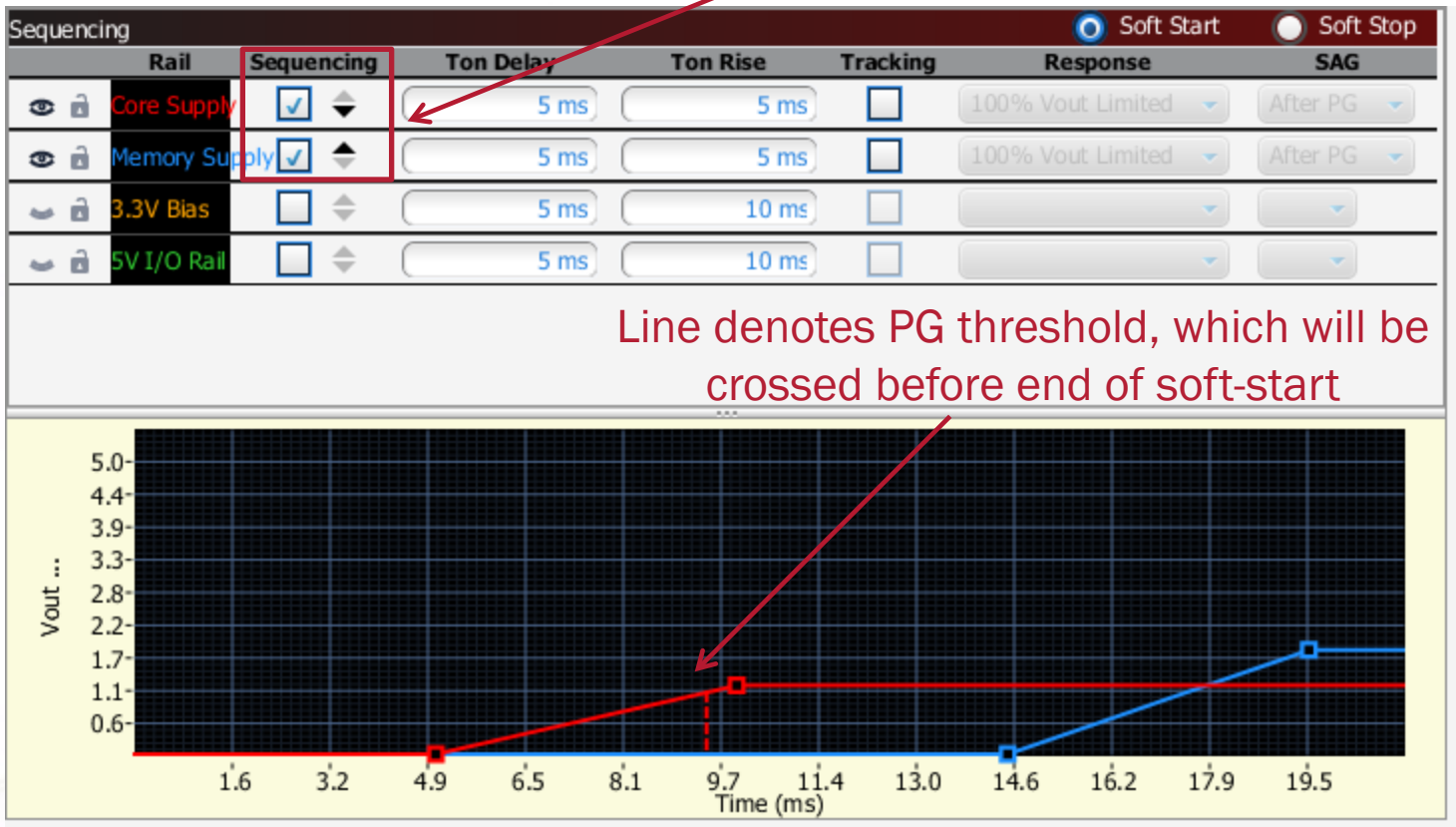
Sequencing: Time based or Event based

- **The previous example showed how sequencing can be setup as a time based sequence**
  - Every device ramps at its exact point based on timing from an Enable signal
  - Downside is that any fault on one rail is not signaled to the others
- **Event based sequencing can be used on the Digital Power devices if they have their DDC Bus pins connected to each other**
  - Sequencing now occurs in a defined priority order
  - Sequencing is now dependent on the timing pattern and that the prior rail in the sequencing has a valid PGOOD

Event Based Sequencing

Sequencing order defined by position, use up/down arrows to adjust



Ton Delay of 1st rail of 5ms

Soft-start time of 5ms

Second device Ton Delay will begin from PGOOD of earlier device

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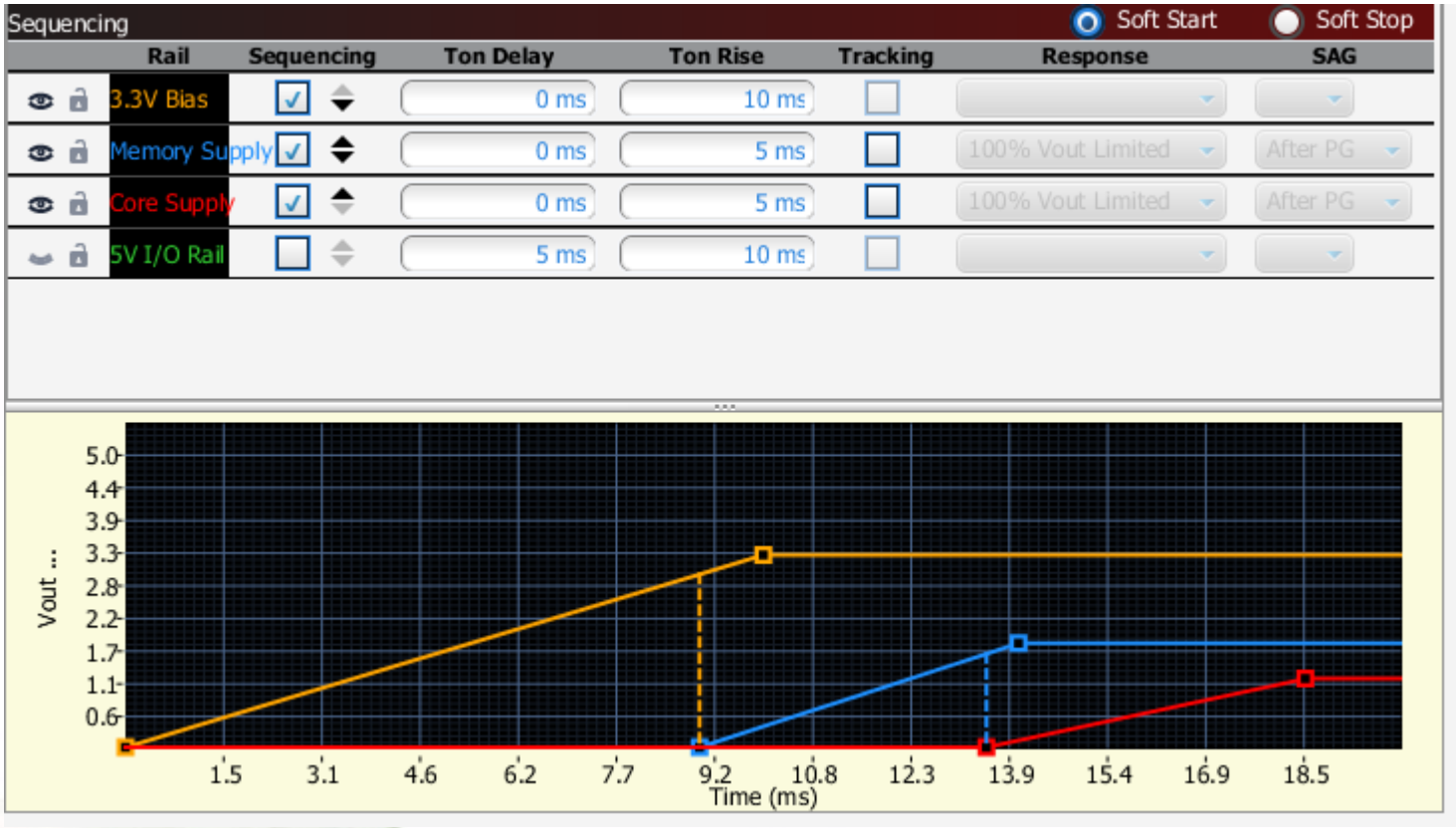
Event Based Sequencing: 3 Rail Example



Three rails sequenced in order. Ton Delays are set to 0ms to show how the start of each rail begins once the PGOOD signal occurs from the prior rail

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Command Line Tool

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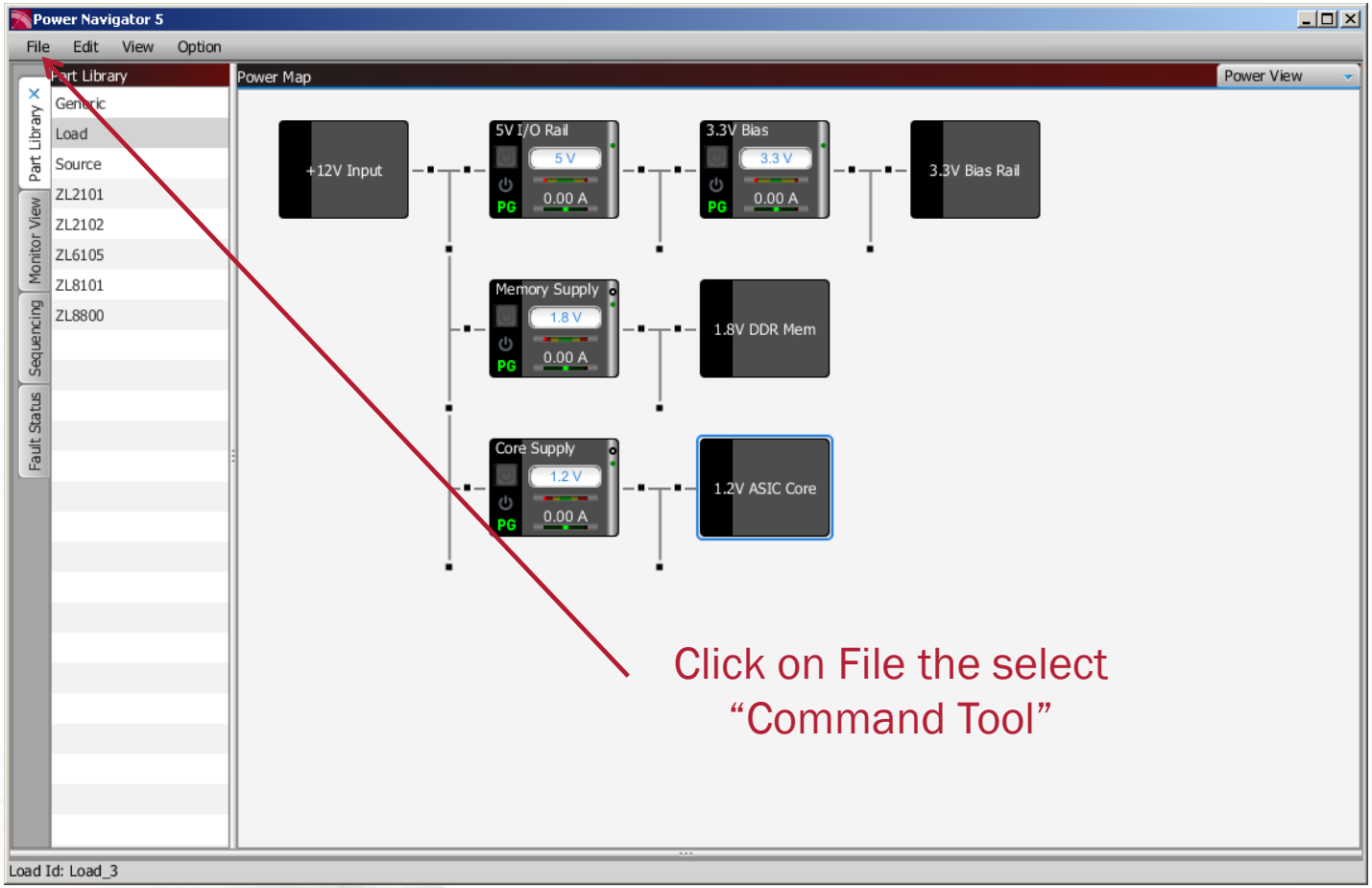
Command Line Tool Overview

- The command line tool is a powerful tool that can be used in any mode (with or without hardware) to adjust every parameter

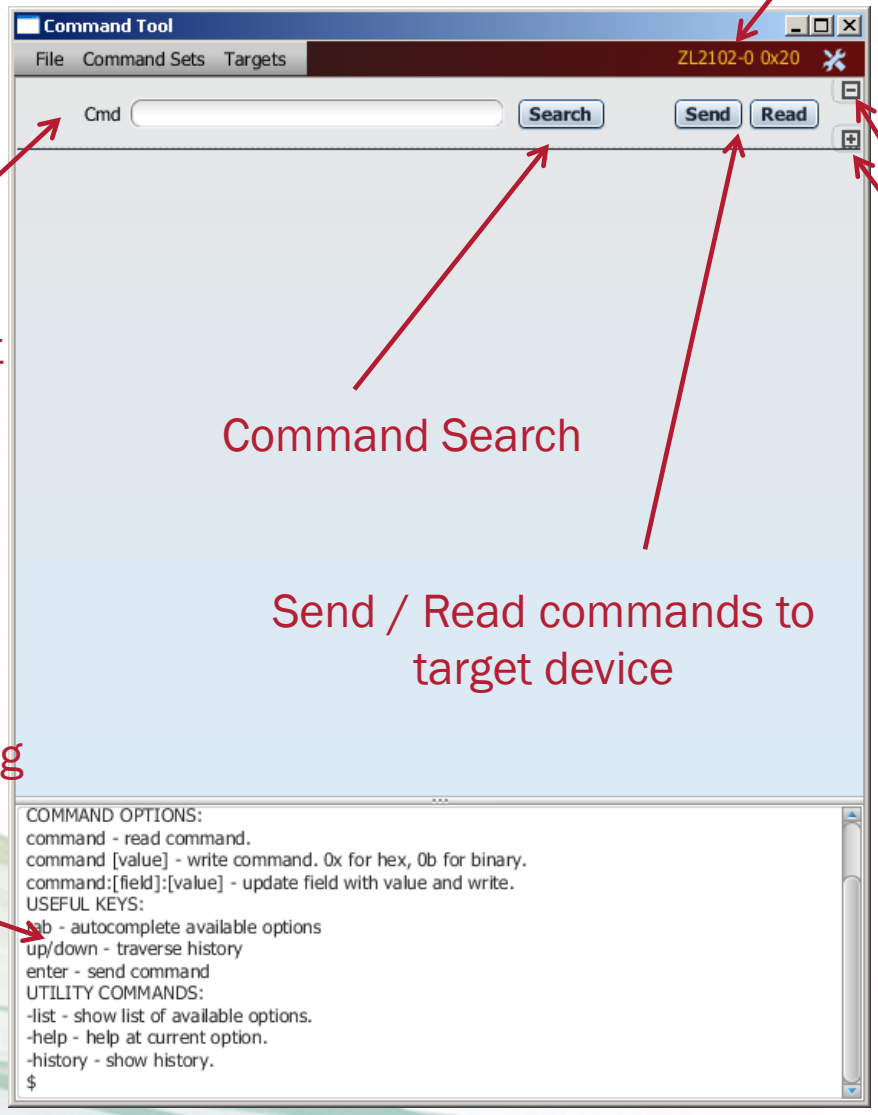
- The command line tool is used to read/write any PMBus command that the device supports

Accessing the Command Line Tool



The Command Line tool can be accessed in a variety of manners, this shows how it can be accessed from the file menu

Command Line Tool



Device selected for reading/writing commands

Command Line to select PMBus command

Command Search

Send / Read commands to target device

Add/Remove command lines in the window

Command window logging all changes

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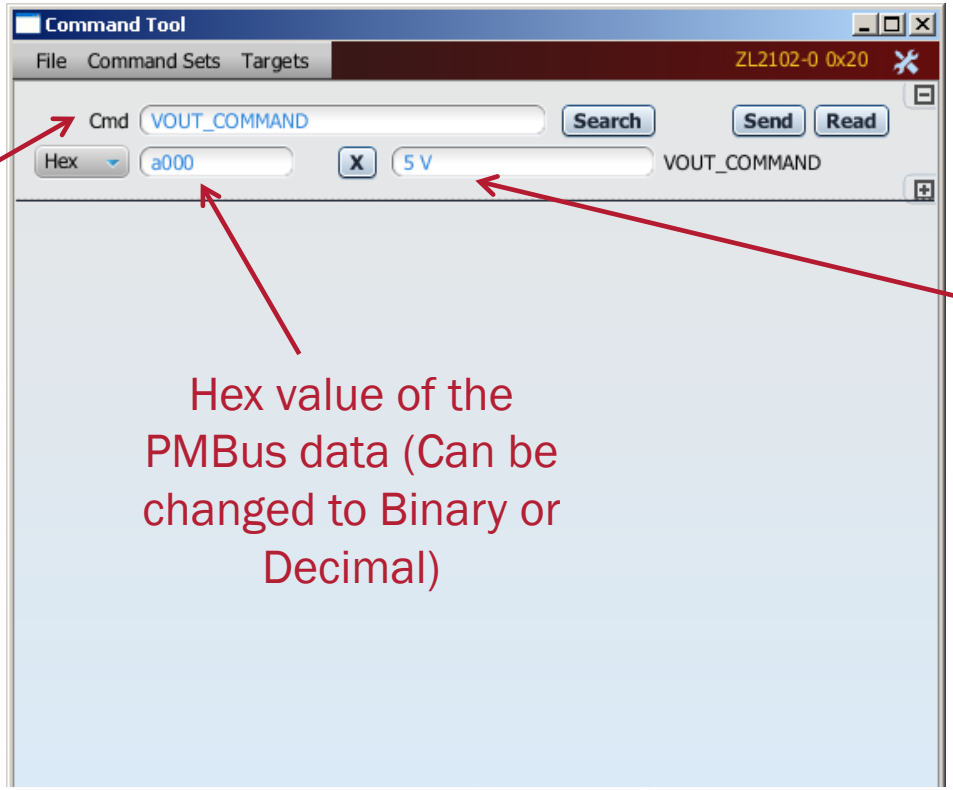
Command Line: Changing Vout



Type in "Vout_Command" for the appropriate PMBus Command. The field will auto fill providing possible selections

Hex value of the PMBus data (Can be changed to Binary or Decimal)

Interpretation of the PMBus data

Typing in the VOUT_COMMAND into the cmd line brings up the current configuration of that PMBus command, showing the device selected is a 5V output. Changes can then be made

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Command Line: Changing Vout

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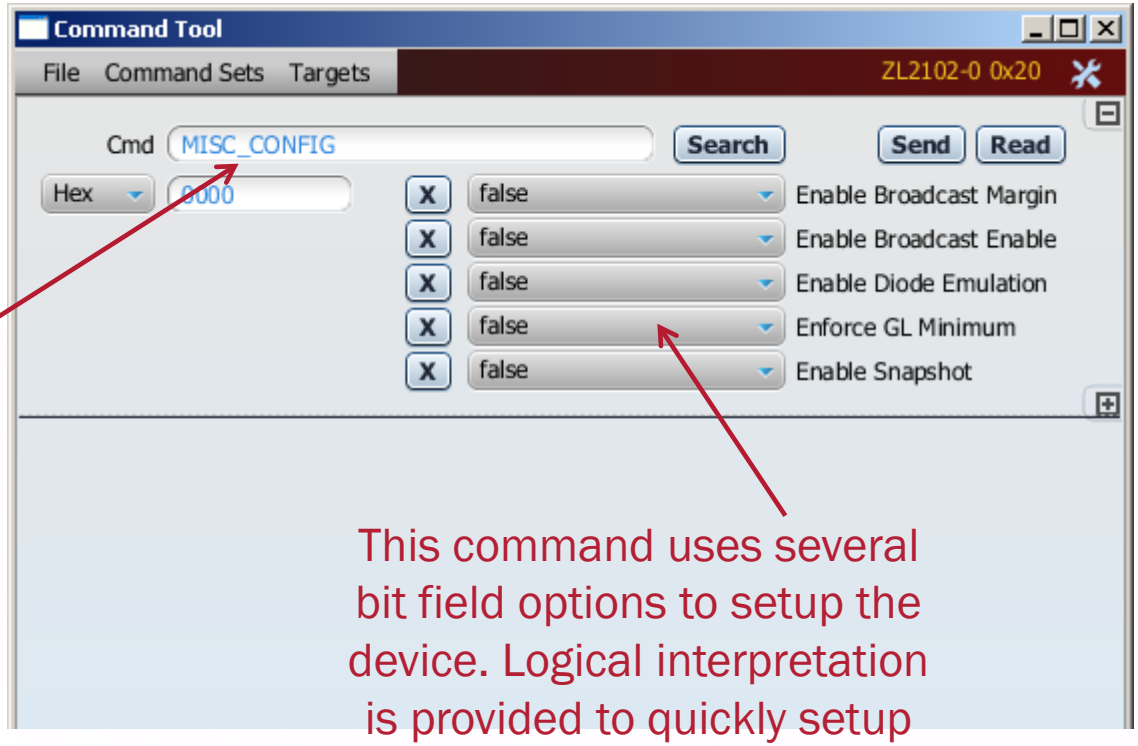
Command Line: MISC_CONFIG



Change to MISC_CONFIG PMBus command

This command uses several bit field options to setup the device. Logical interpretation is provided to quickly setup the device

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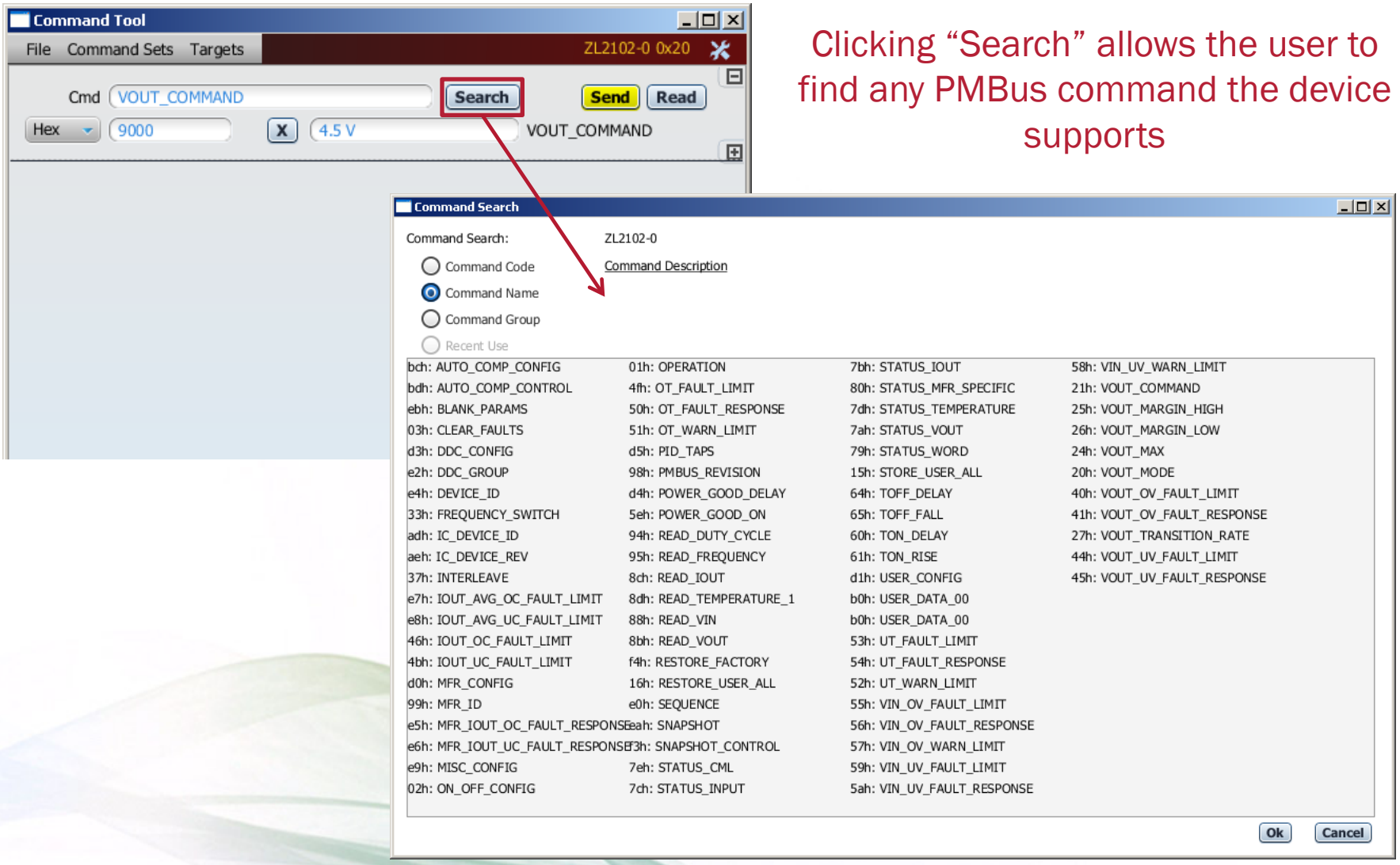
Command Line Tool: Search



Clicking “Search” allows the user to find any PMBus command the device supports

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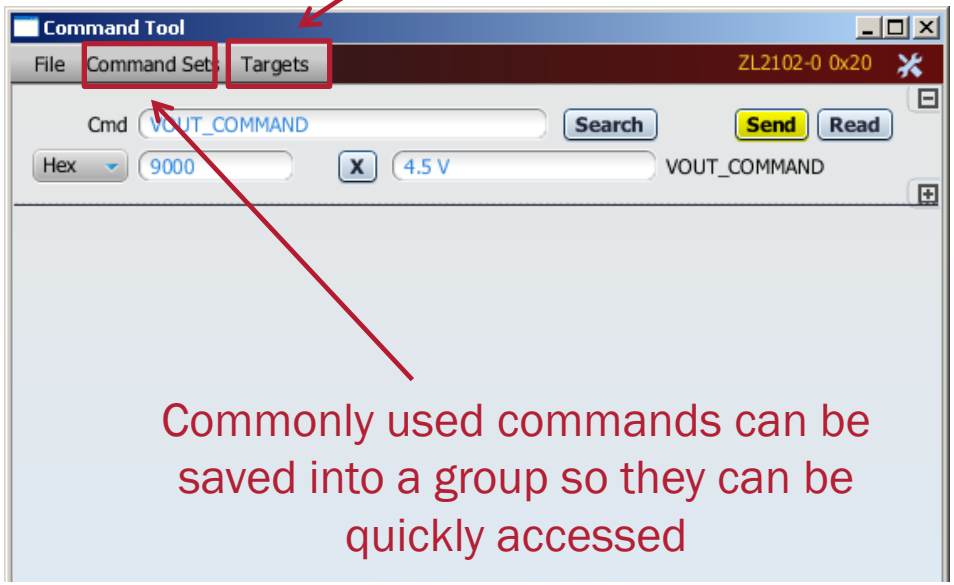
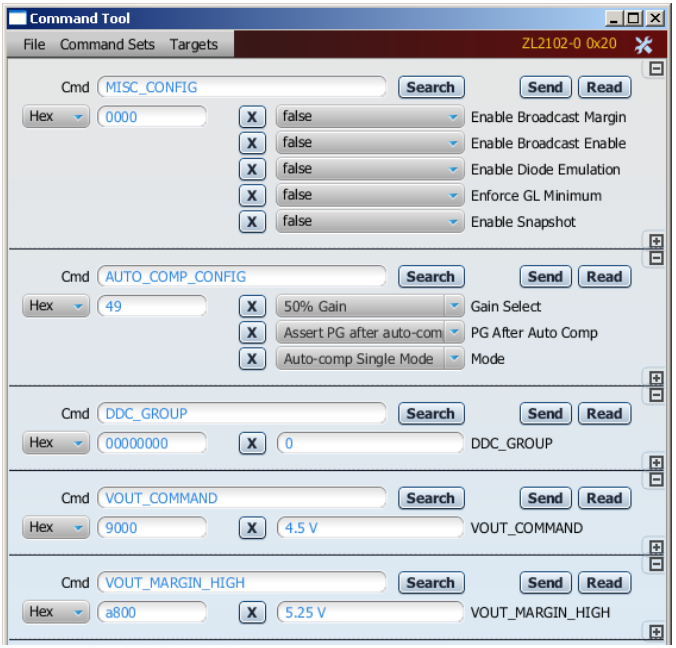
Command Line Tool: Tips

Change target device through “Targets” tab in top menu



Commonly used commands can be saved into a group so they can be quickly accessed

Multiple commands can be displayed at once



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Project & Config files

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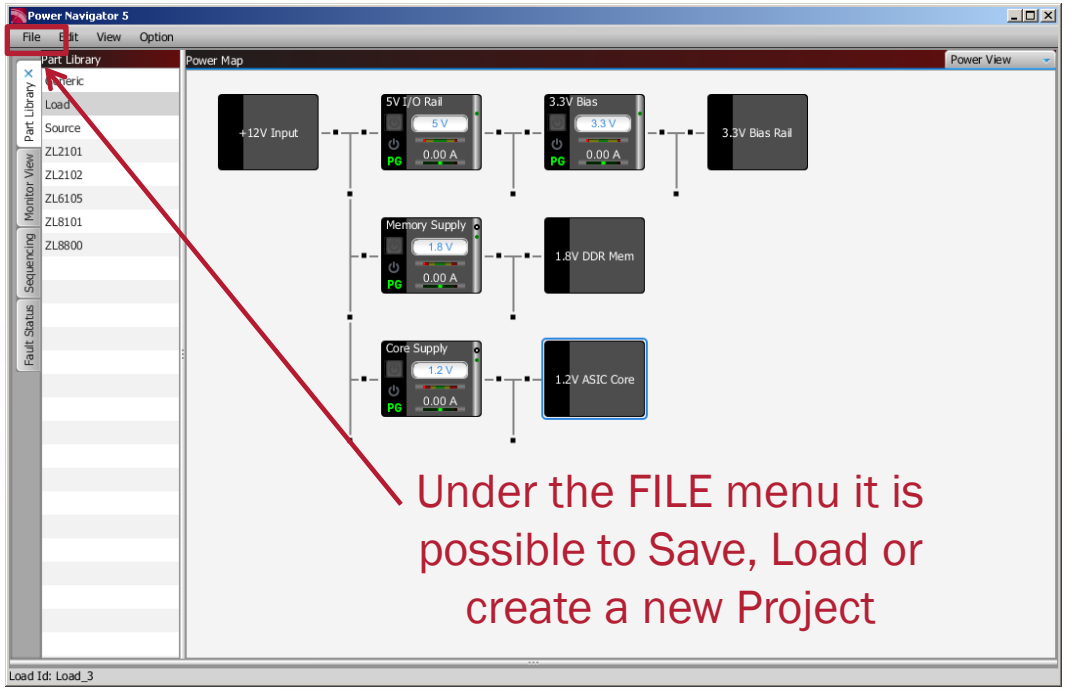
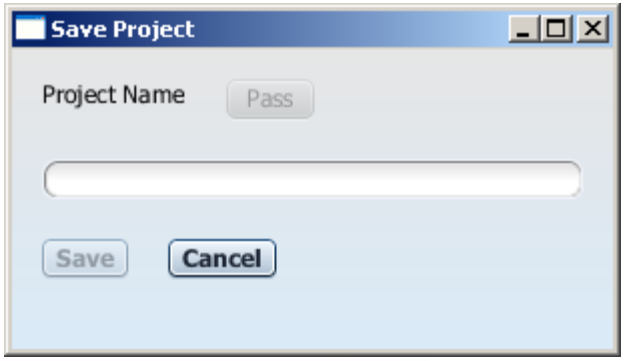
File Formats

- **The Power Map can be saved as a project file that saves every attribute including configurations:**
  - This is called a “Project File”
  - Project files can be saved/loaded and shared to pass along setups
- **Individual part configurations can be saved in a text file format:**
  - This is called a “Config File”
  - Configuration files list every PMBus command that is configured and its data
  - These files can be saved/loaded for individual parts
  - These are used for other Intersil tools for programming devices at 3rd party programming houses

Project Files



Under the FILE menu it is possible to Save, Load or create a new Project



Project file name must be at least 4 characters and must be unique (can not save the same name twice)

Project files are saved in folders under the following directory on your PC:

C:\Documents and Settings\User\My Documents\Intersil\PowerNavigator\Projects

Config Files

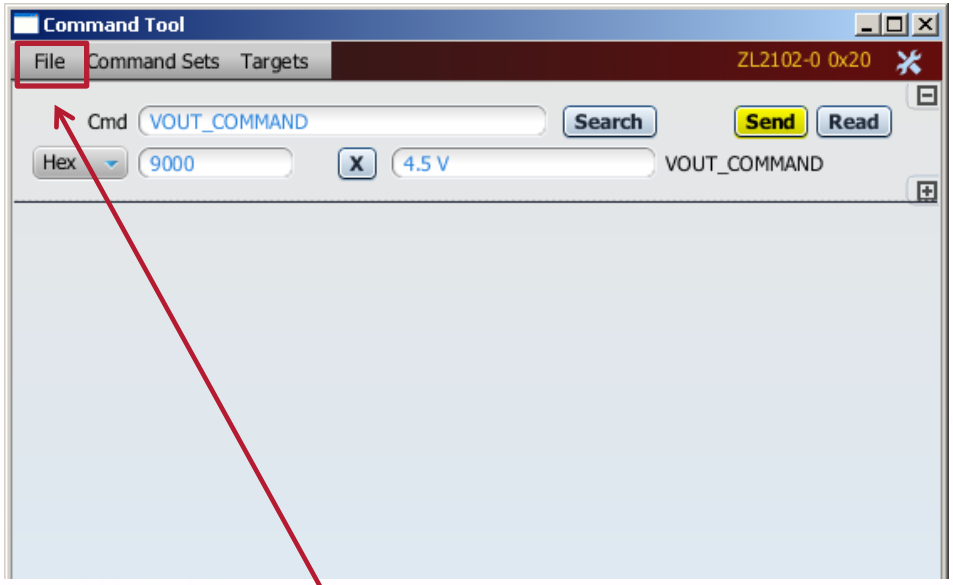
Individual device configuration files are stored in the Project file directory

```
# ZL2102-0 0x20
# connected: false
# DEVICE_ID
# IC_DEVICE_ID              0x49A01200
# IC_DEVICE_REV             0x00
# 5.0.2
# 2013/10/04 13:51:26

### Begin User Store
RESTORE_USER_ALL
VOUT_COMMAND                0x9000      # 4.5 V
VOUT_MARGIN_HIGH            0xa800      # 5.25 V
VOUT_MARGIN_LOW             0x9800      # 4.75 V
VOUT_OV_FAULT_LIMIT         0xb0cd      # 5.525 V
VOUT_UV_FAULT_LIMIT         0x8f33      # 4.475 V
POWER_GOOD_ON               0x9000      # 4.5 V

STORE_USER_ALL
### End User Store
```

Revision history including time/date stamps are saved. Using the # sign will allow comments in the file

Configuration files only save command changes that are different from the device default

Config File: Load / Save



Config files can be saved separately (outside of project files) through the FILE menu on the command line tool

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Connecting to Hardware

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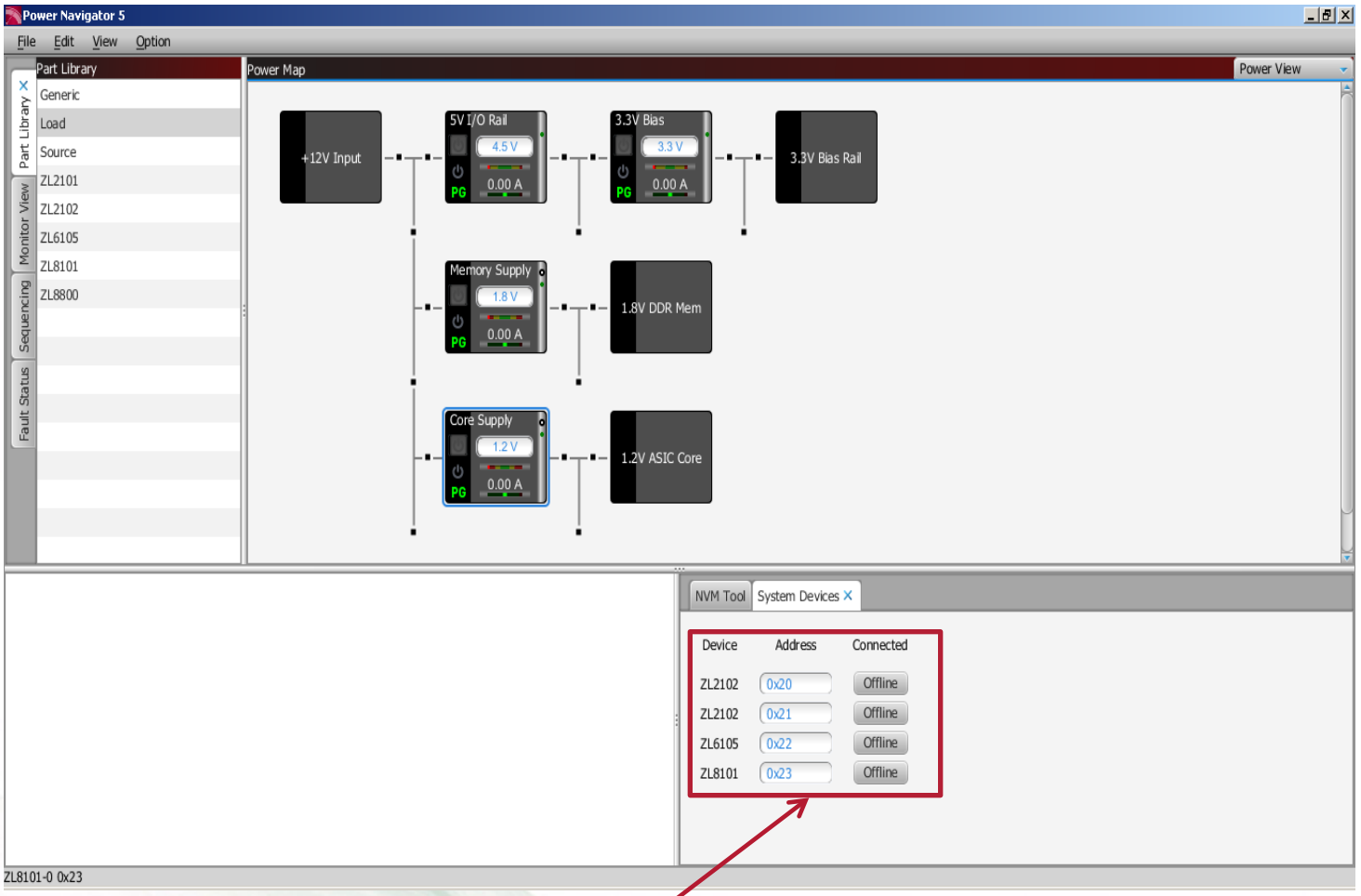
Connecting to Hardware



Devices can be selected from the Power Map to be individually connected

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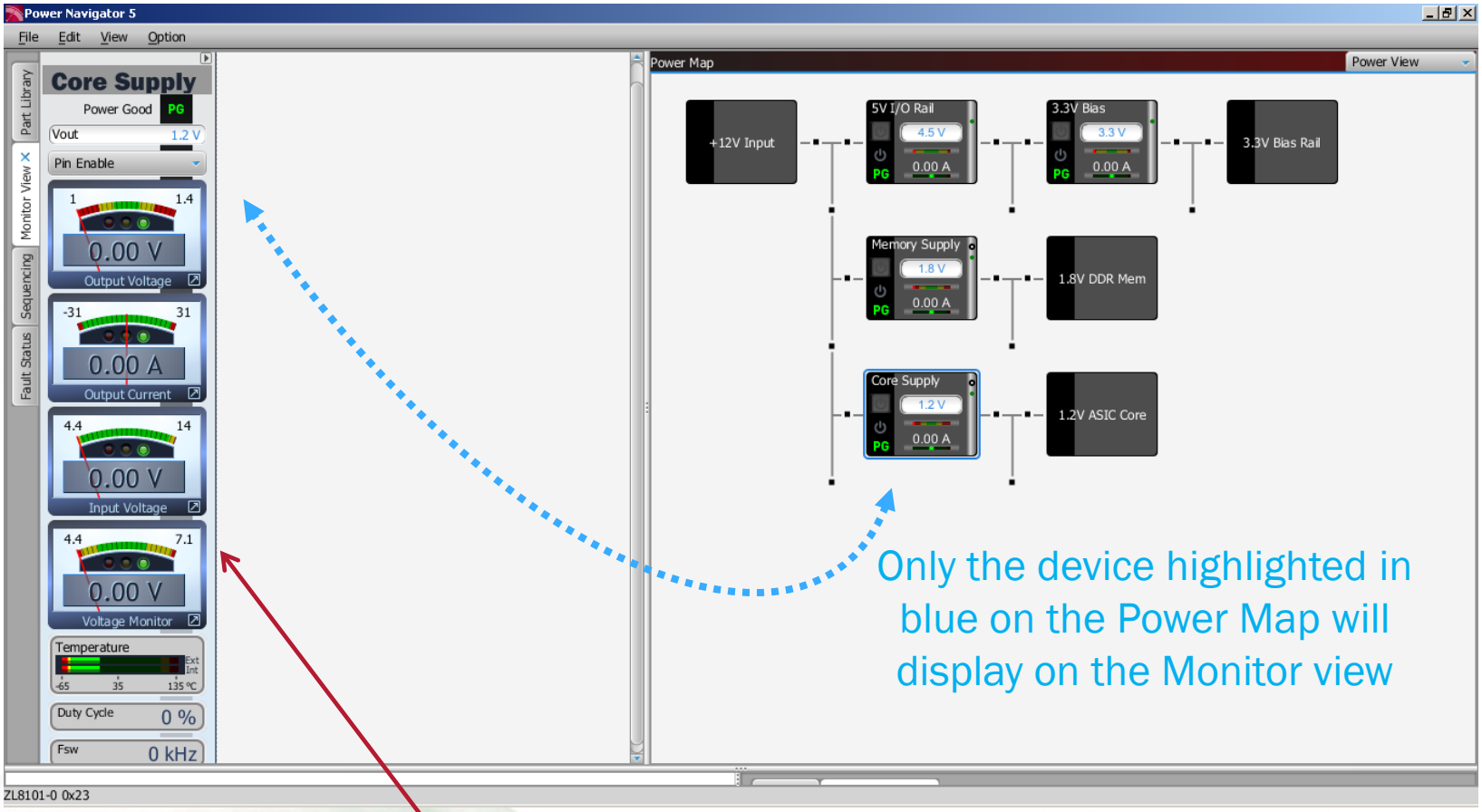
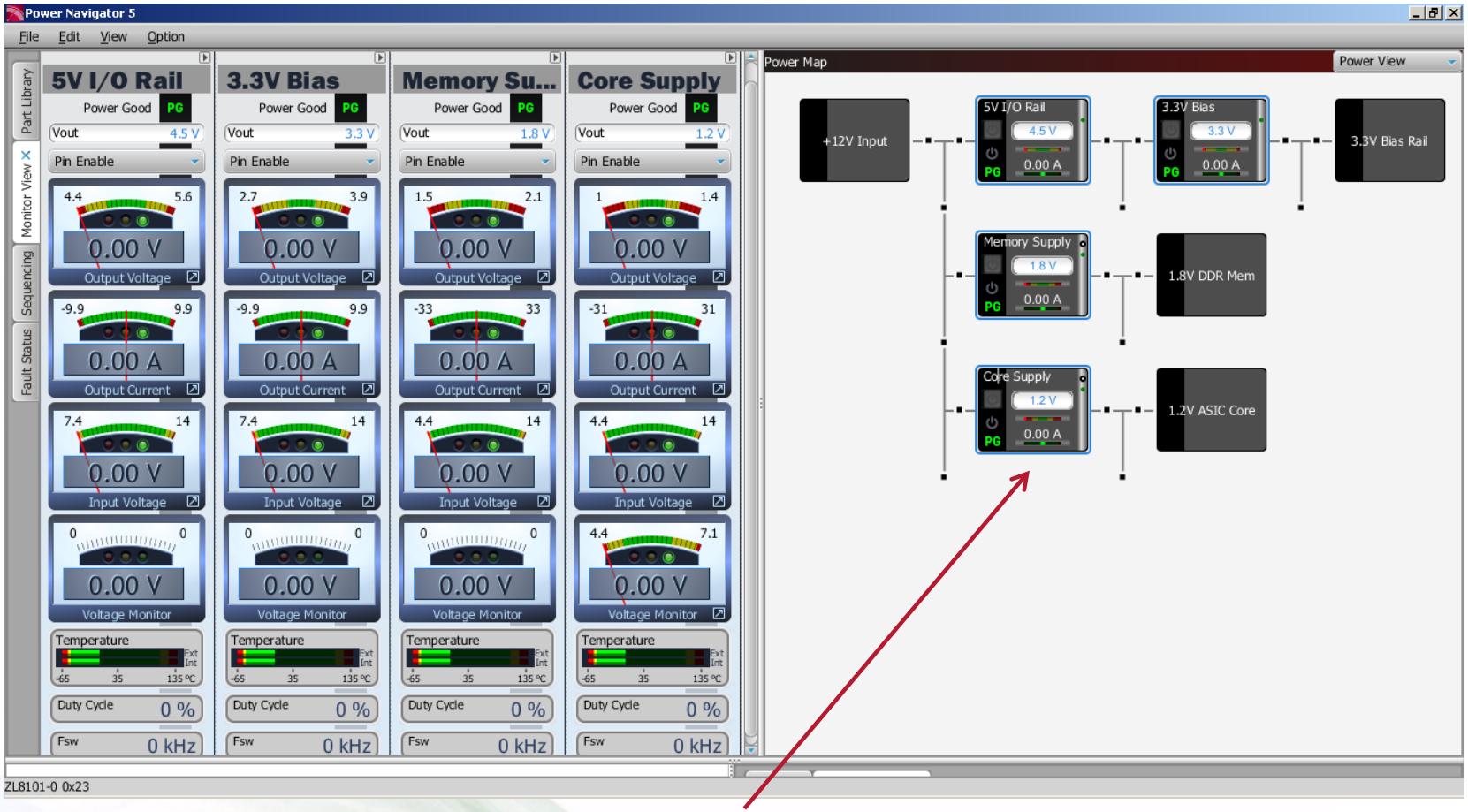
Monitoring Status



Monitoring Status



Clicking in the lower half of the box will select it.
Holding “CTRL” key while selecting boxes will highlight multiple devices

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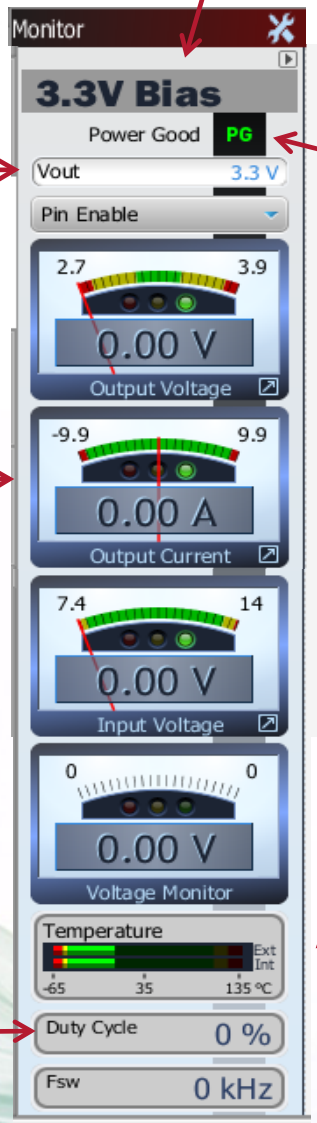
Monitoring View



Device rail name

View configuration for display

Adjustment on output voltage

PGOOD indicator

Monitoring readouts for Vin, Vout, Iout, Iin

Temperature monitors, internal for silicon junction temperature, external for the temp sensor on the board

Dutycycle and switching frequency

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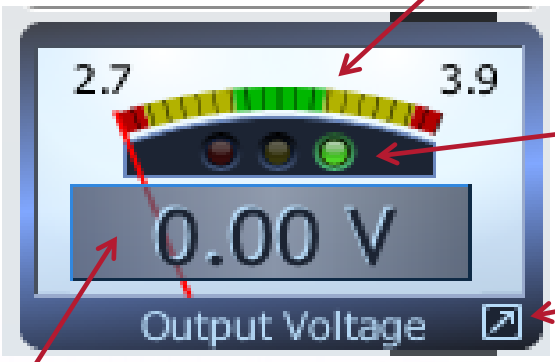
Readouts

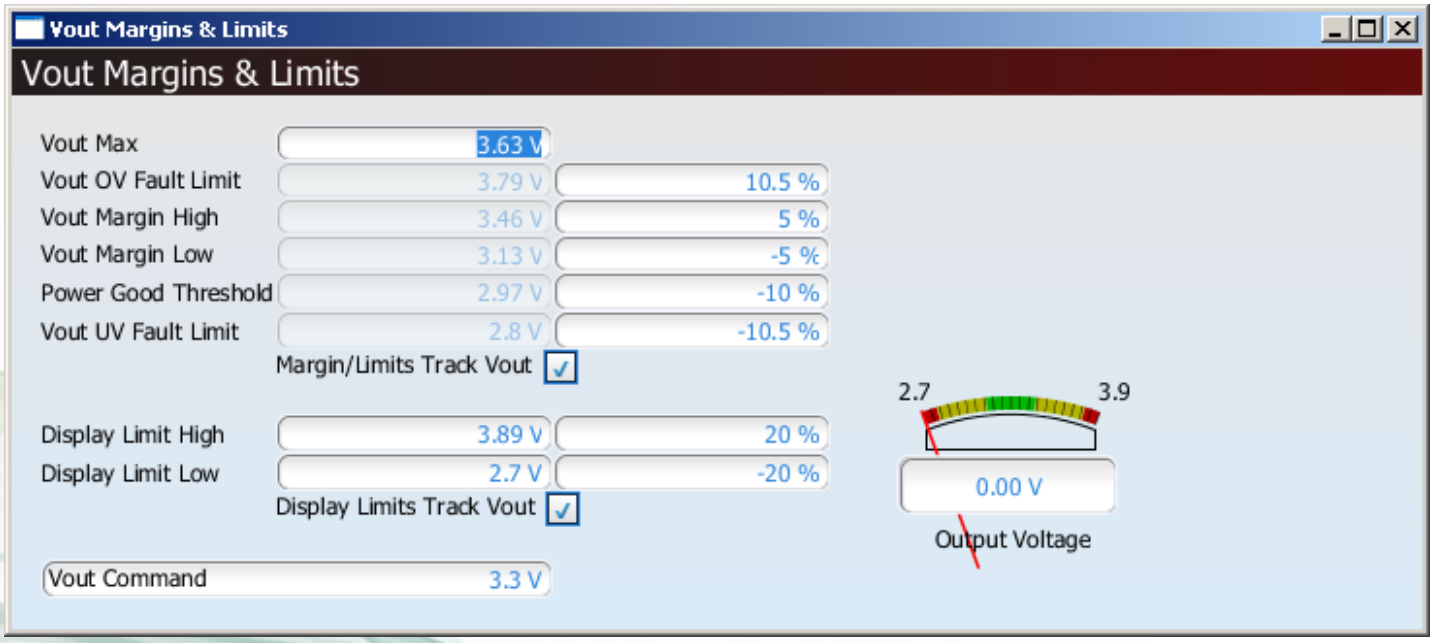
Analog readout with color indicators. Green is within normal limits, yellow in PMBus warning limits, red for exceeding OVP/UVP settings



Operation and fault lights

Clicking this button will open the window below allowing adjustment of limits

Digital readout of output voltage



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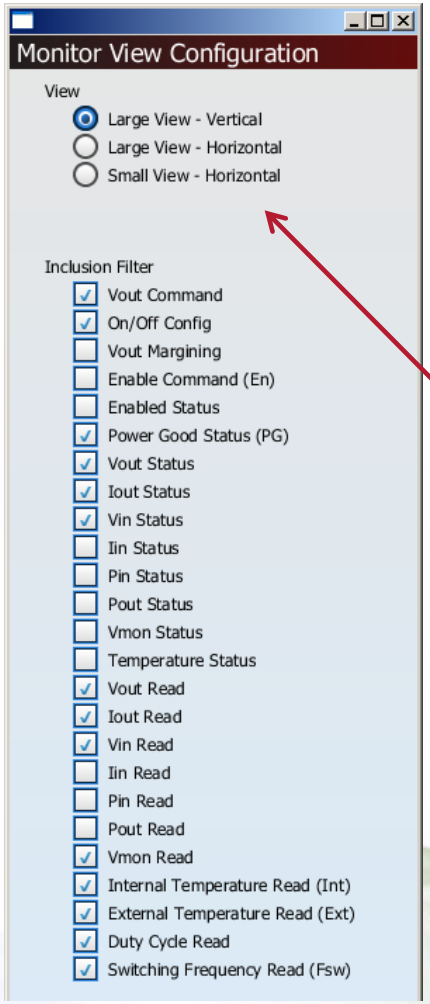
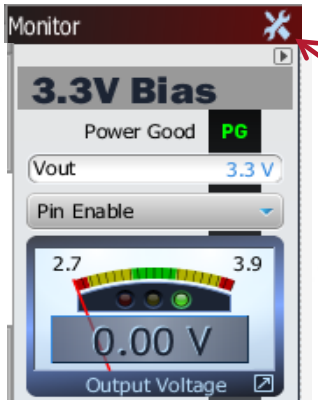
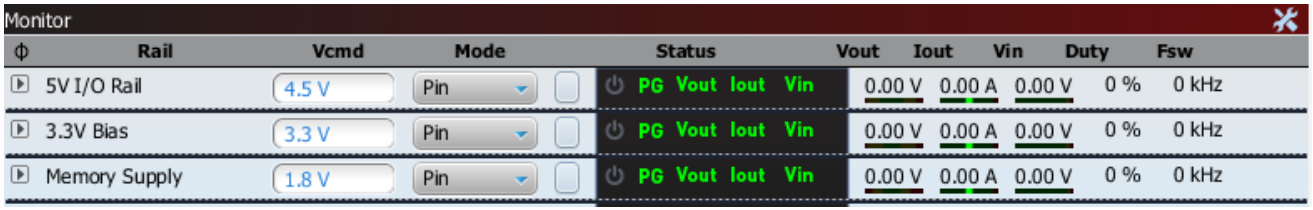
Monitoring: Changing Views





1. Click on the config icon on the top right

2. Adjust the view properties to select horizontal or add/drop any filter selection



For systems with a large number of rails, a different monitoring view can be selected.

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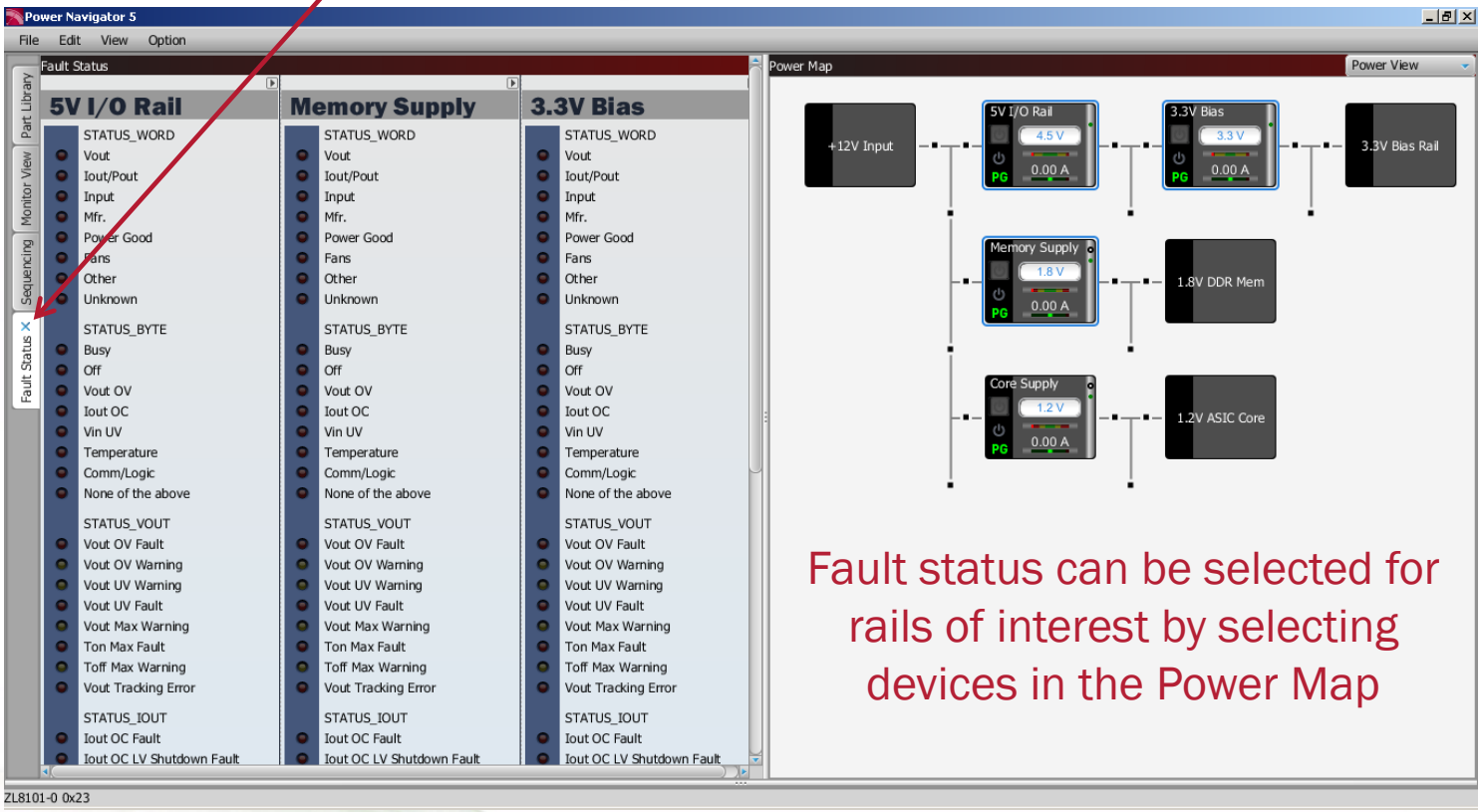
Fault Status

Select fault status on left side tan



Fault status can be selected for rails of interest by selecting devices in the Power Map

Fault Status can be seen for every rail in the system alerting the user of the root cause of a fault (ie Over Current)

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Evaluation Board & Hardware Detection

Digital Power devices can be instantly connected and monitored without setting up a project file simply by connecting the hardware and launching PowerNavigator. Any device detected will show up in the left window

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