

POWERNAVIGATOR 5.4

DIGITAL POINT OF LOAD USER GUIDE

MARCH 2018

BIG IDEAS
FOR EVERY SPACE

OVERVIEW

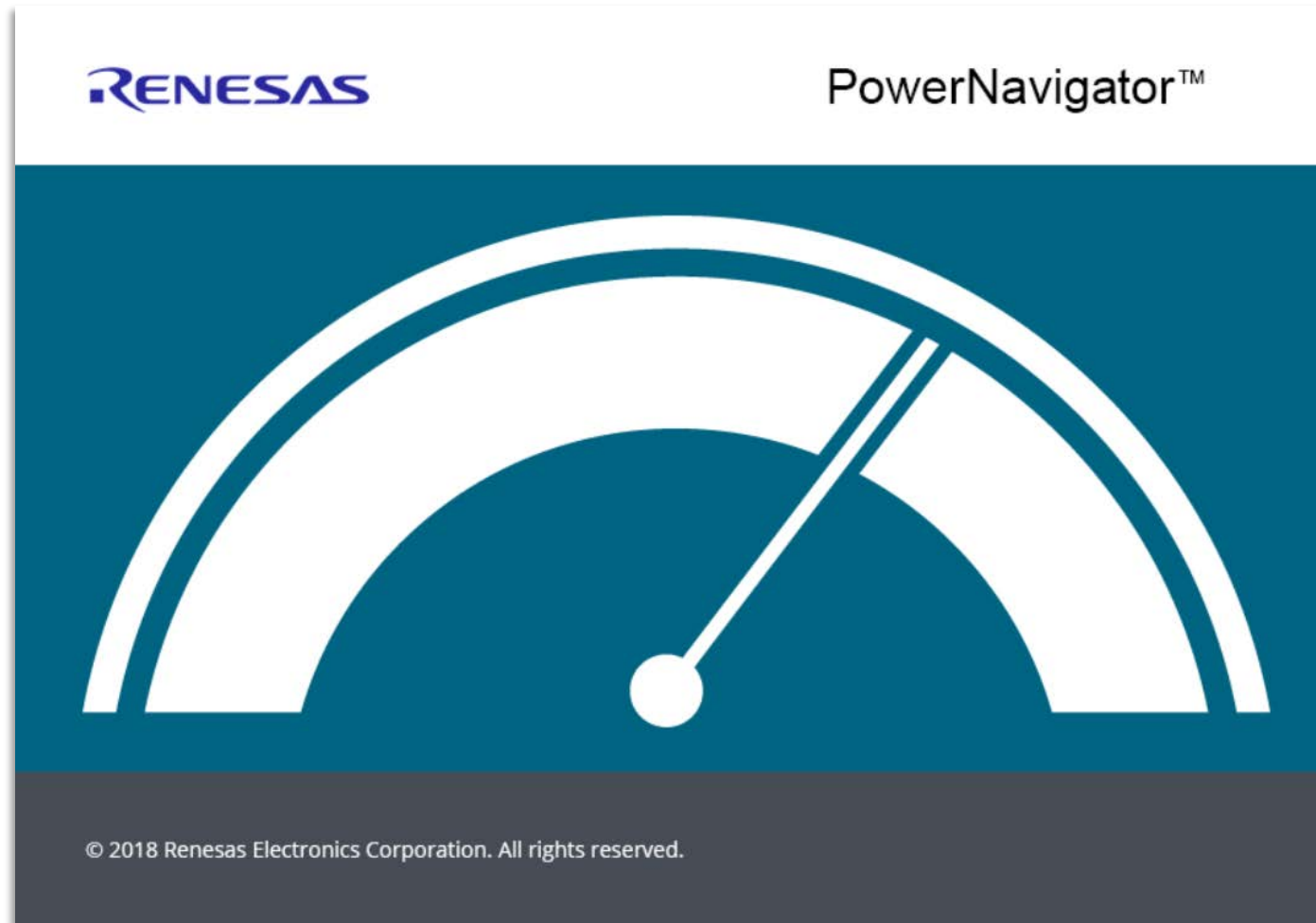
- This guide walks a user through the steps to setup and configure a digital power device using Renesas's PowerNavigator GUI.
- For Digital Multiphase products (ISL691xx and ISL681xx), please see the dedicated Digital Multiphase user guide.
- This guide assumes the user has followed the instructions on the website for downloading and installing PowerNavigator and is able to launch the program successfully.

OVERVIEW

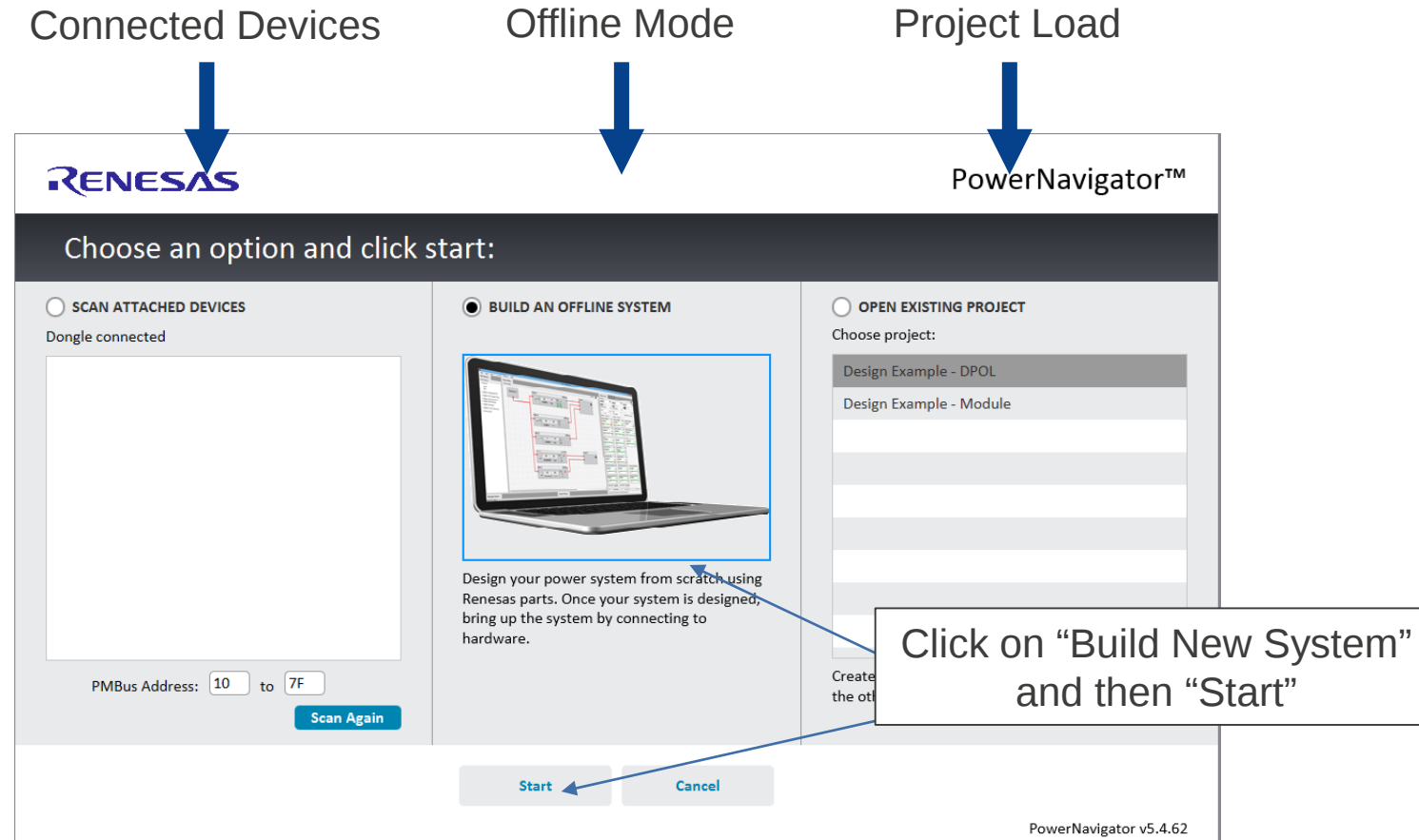
- **The following sections are shown in this guide:**

- **Hardware free mode**
 - Selection of devices
 - Power architecture setup
 - Current sharing
- **Connecting to hardware**
 - Auto scan of devices
- **Device setup with Rail Inspector**
 - Changing device parameters
 - Configuration file load and save
- **Sequencing**
 - Time based sequencing
 - Event based sequencing
- **RailScope**
 - Adding/monitoring devices
 - Logging
- **Production File HEX Creation**

Offline Mode (Hardware Free Mode)

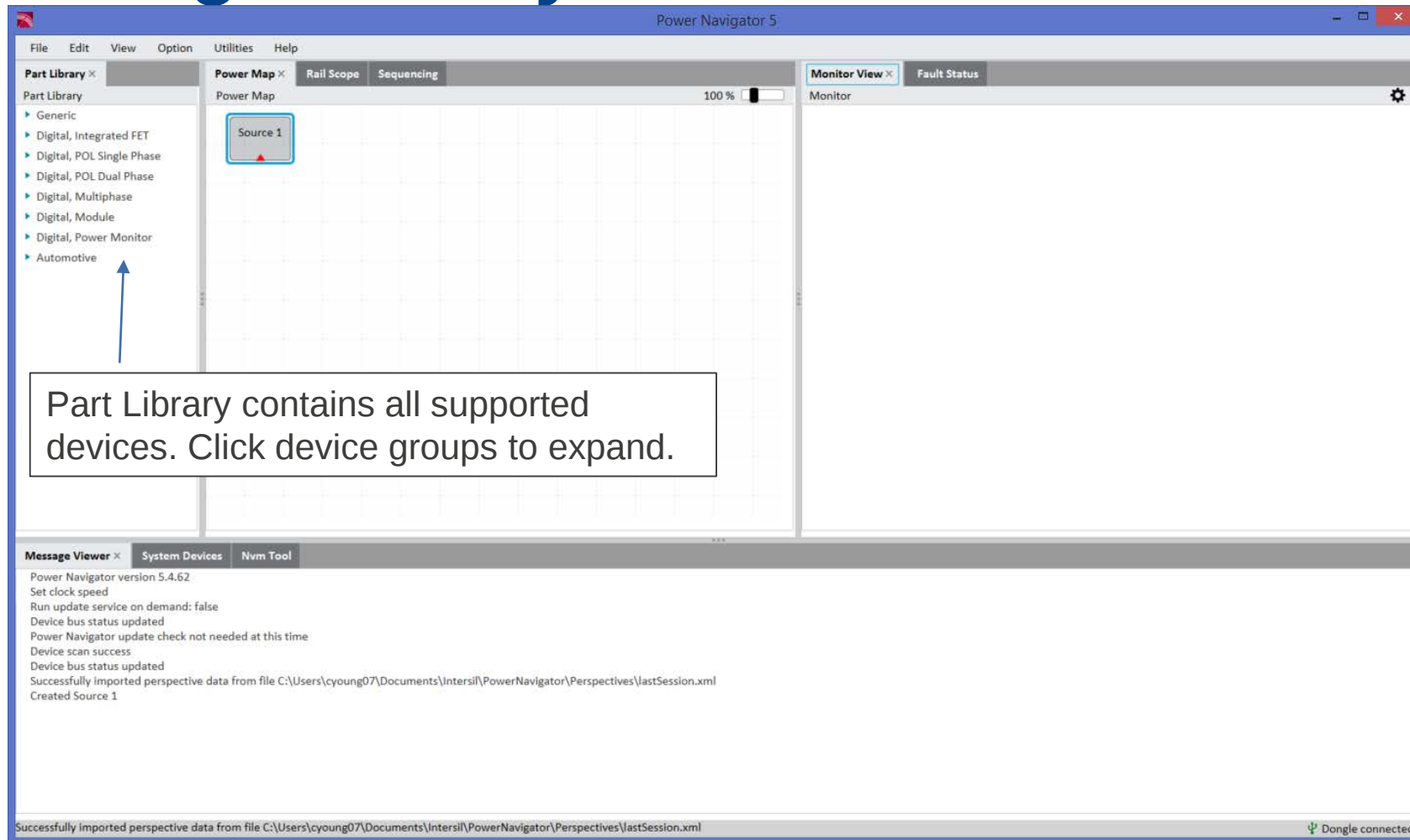


PowerNavigator Launch Screen – Offline Mode

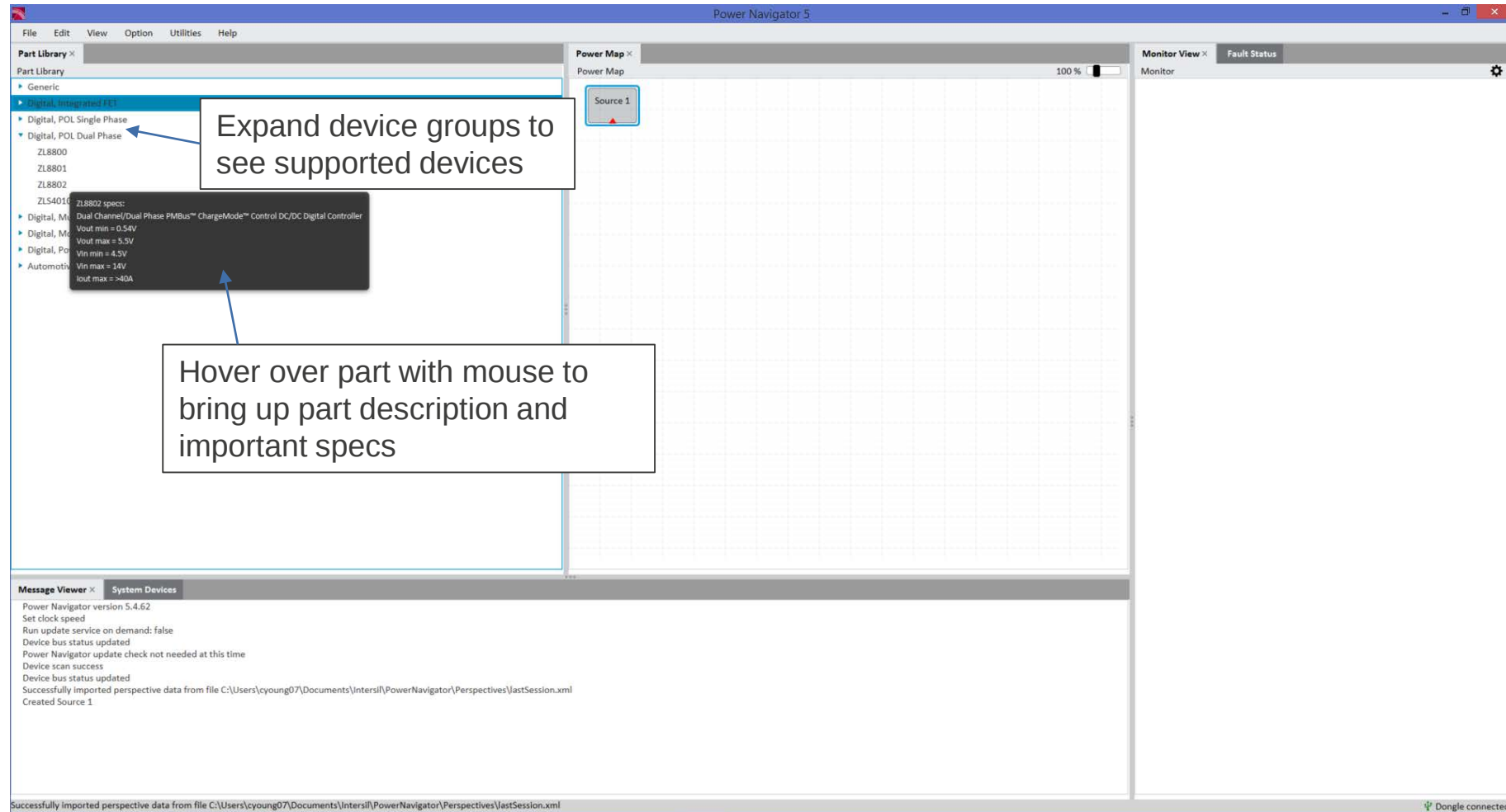


The PowerNavigator launch screen allows you to select online (hardware connected) or offline modes of operation.

PowerNavigator – System Screen Offline Mode



PowerNavigator – System Screen Offline Mode



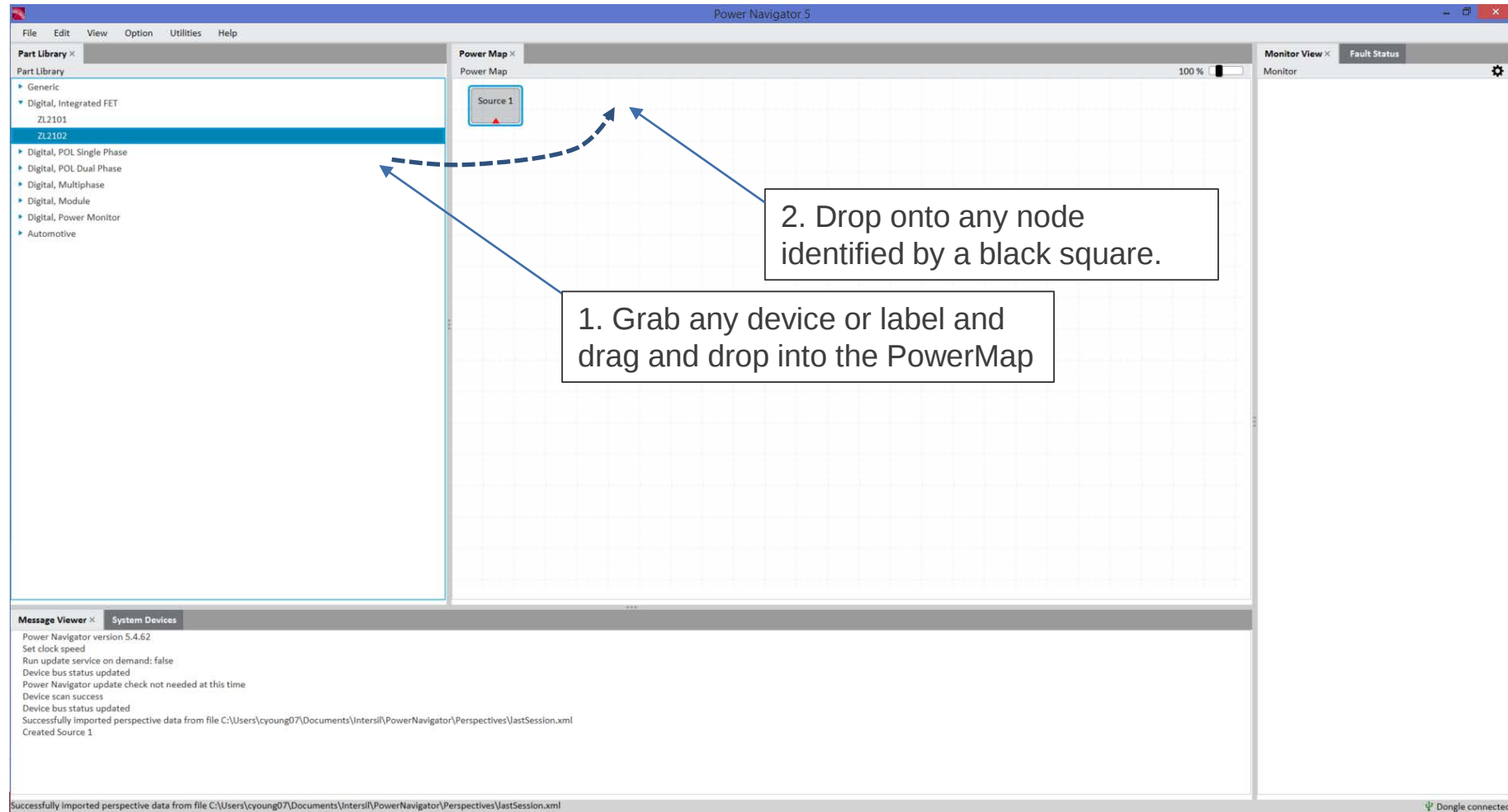
PowerNavigator – System Screen Offline Mode

The screenshot displays the PowerNavigator 5.4.62 interface in System Screen Offline Mode. The main window shows a comparison of two regulators, ZL8800 and ZL8802. The left sidebar lists various parts, with ZL8800 and ZL8802 highlighted. A callout box points to the ZL8800 entry in the list, stating: "Right click on part to add to compare window." The comparison window is titled "Comparison Window" and contains two columns of specifications. The ZL8800 specs column lists: Device Type: Digital, POL Dual Phase; Dual Channel/Dual Phase PMBus™ ChargeMode™ Control; DC/DC Digital Controller; Vout min = 0.54V; Vout max = 5.5V; Vin min = 4.5V; Vin max = 14V; Iout max = >40A; and Key Features: -Unique compensation-free design – always stable; -ChargeMode Control: -achieves fast transient response; -reduced output capacitance; -provides output stability without compensation; -Proprietary single wire DDC (Digital-DC) serial bus. The ZL8802 specs column lists: Device Type: Digital, POL Dual Phase; Dual Channel/Dual Phase PMBus™ ChargeMode™ Control; DC/DC Digital Controller; Vout min = 0.54V; Vout max = 5.5V; Vin min = 4.5V; Vin max = 14V; Iout max = >40A; and Key Features: -Unique compensation-free design – always stable; -ChargeMode Control: -achieves fast transient response; -reduced output capacitance; -provides output stability without compensation; -Proprietary single wire DDC (Digital-DC) serial bus; -2-channel output, 2-, 4-, 6- or 8-phase output. Both columns have a link at the bottom: "Visit the ZL8800 product information page" and "Visit the ZL8802 product information page" respectively. A callout box points to the ZL8802 link, stating: "Compare window shows device description, key specs and link to datasheet". The bottom status bar shows: "Successfully imported perspective data from file C:\Users\cyoun07\Documents\Intersil\PowerNavigator\Perspectives\lastSession.xml".

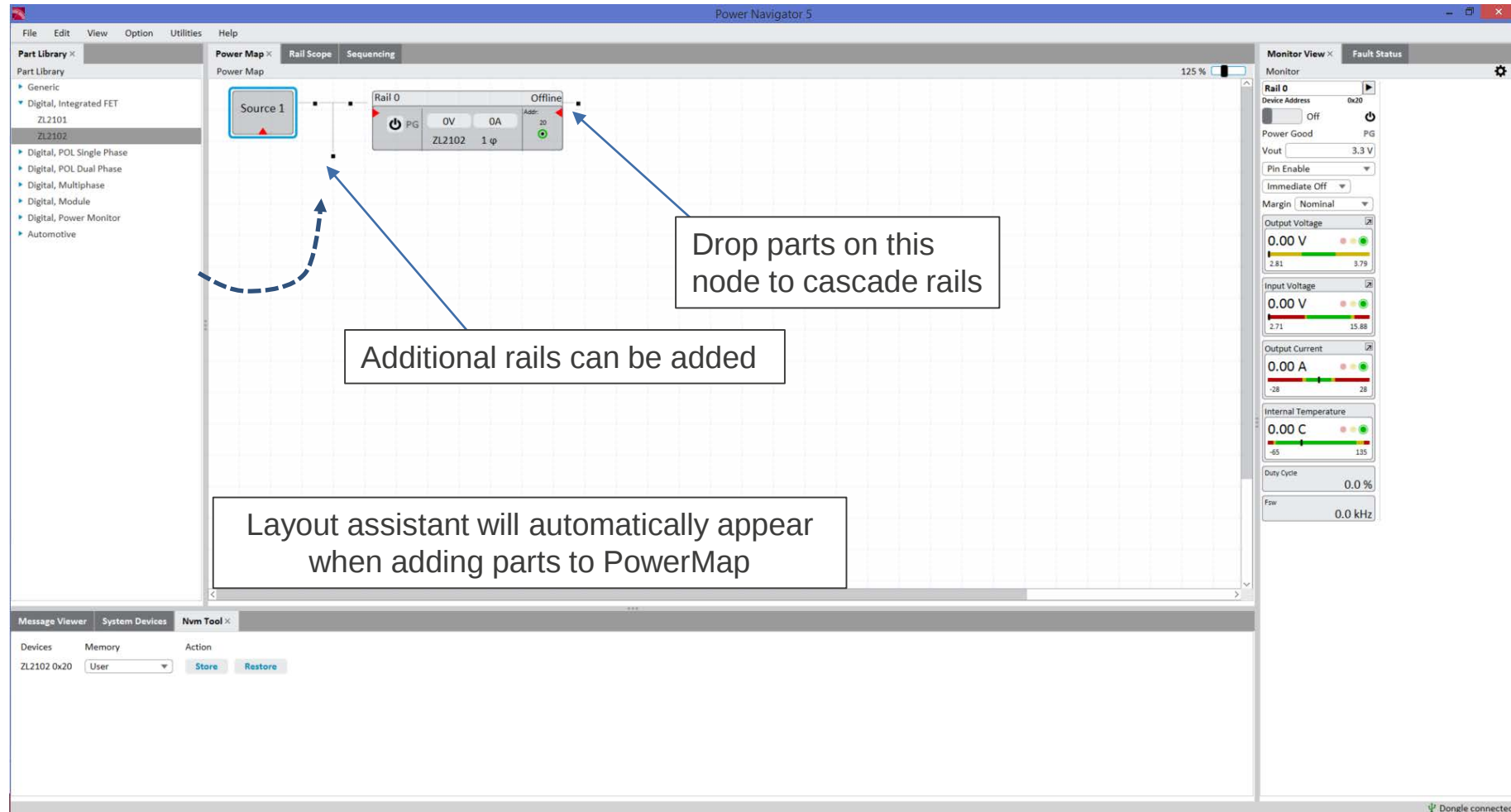
Right click on part to add to compare window.

Compare window shows device description, key specs and link to datasheet

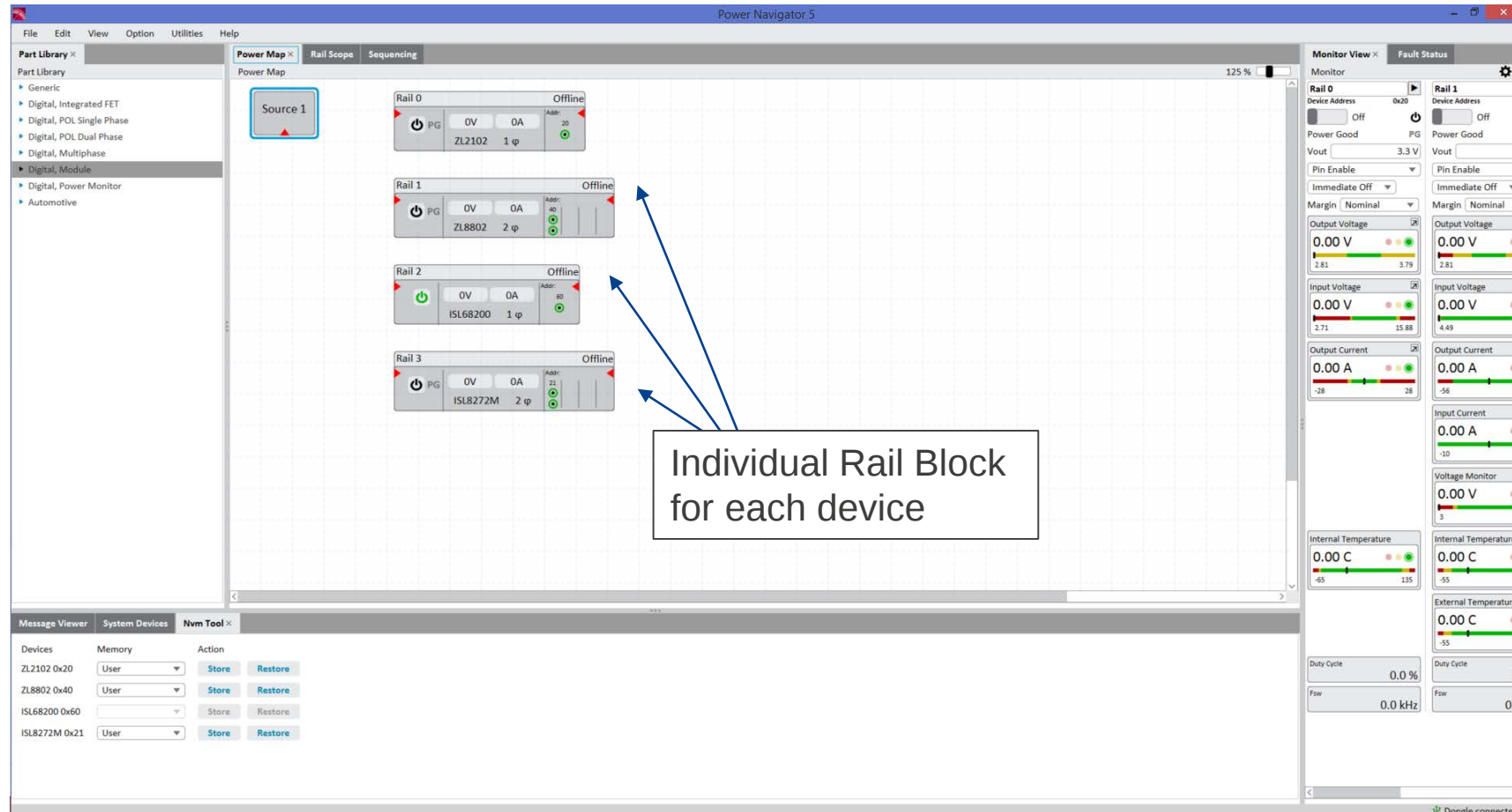
PowerNavigator – System Screen



PowerNavigator – System Screen



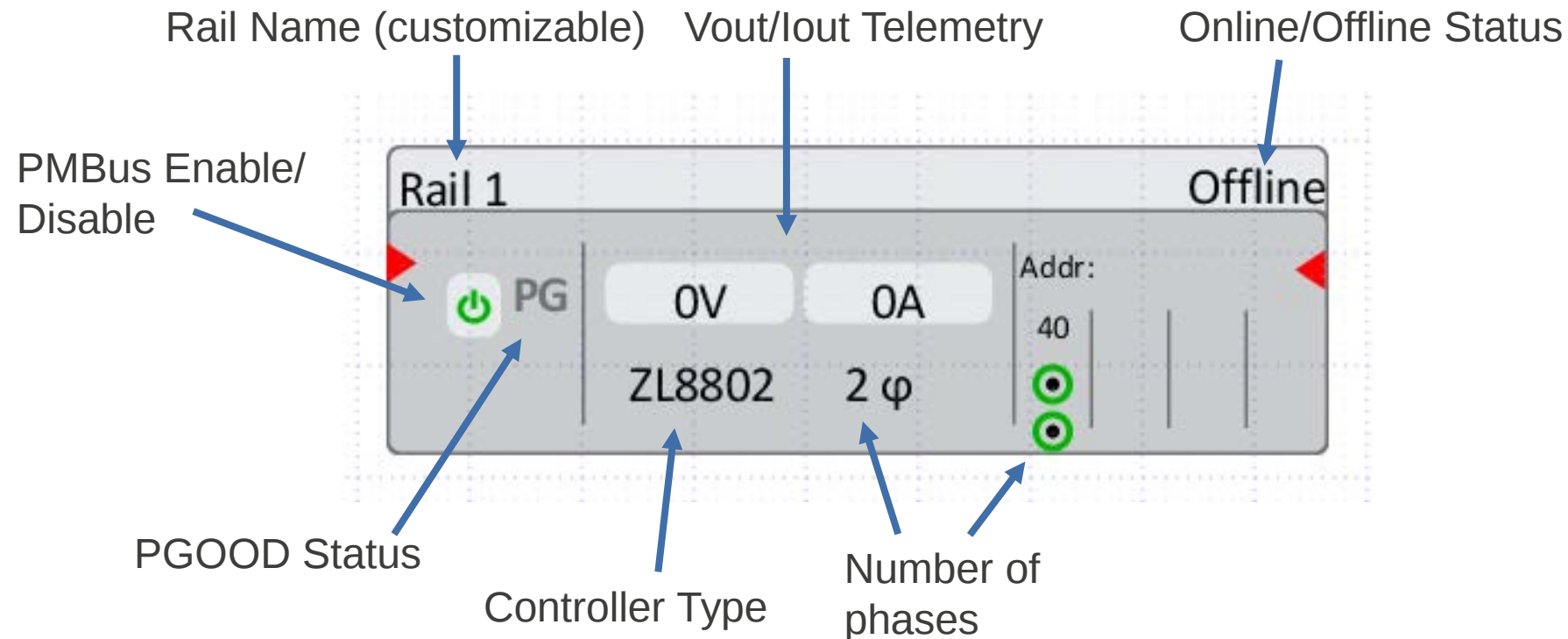
PowerNavigator – System Screen



Multiple parts can be added to PowerMap, representing system level view.

PowerMap RailBlock Overview

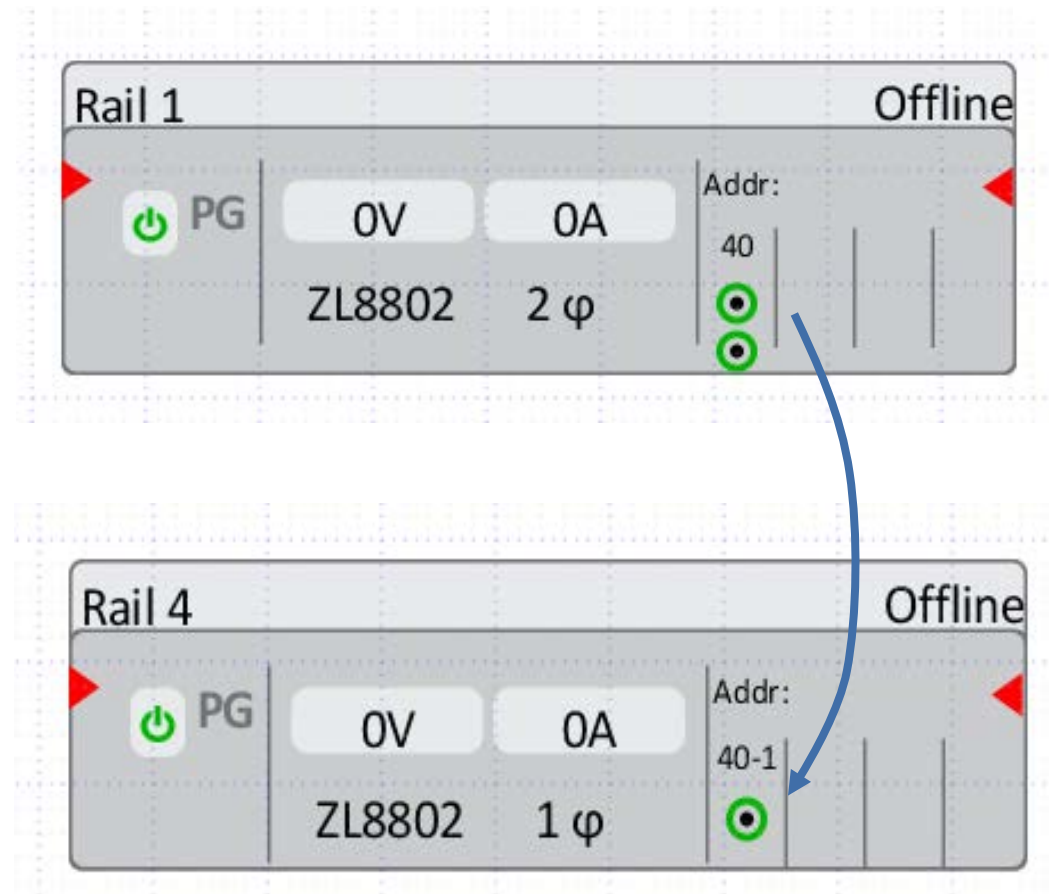
Example ZL8802 RailBlock (2-PH operation):



PowerMap RailBlock Overview

Example ZL8802 RailBlock (2-CH operation):

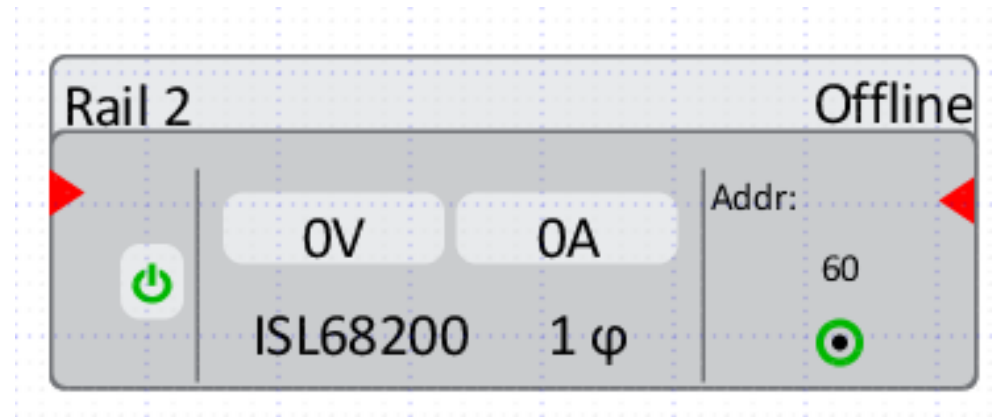
Drag and drop interface for configuration of a rail from 2-phase to dual output.



Drag “Phase Dot” to change from 2-phase to 2-Channel operation

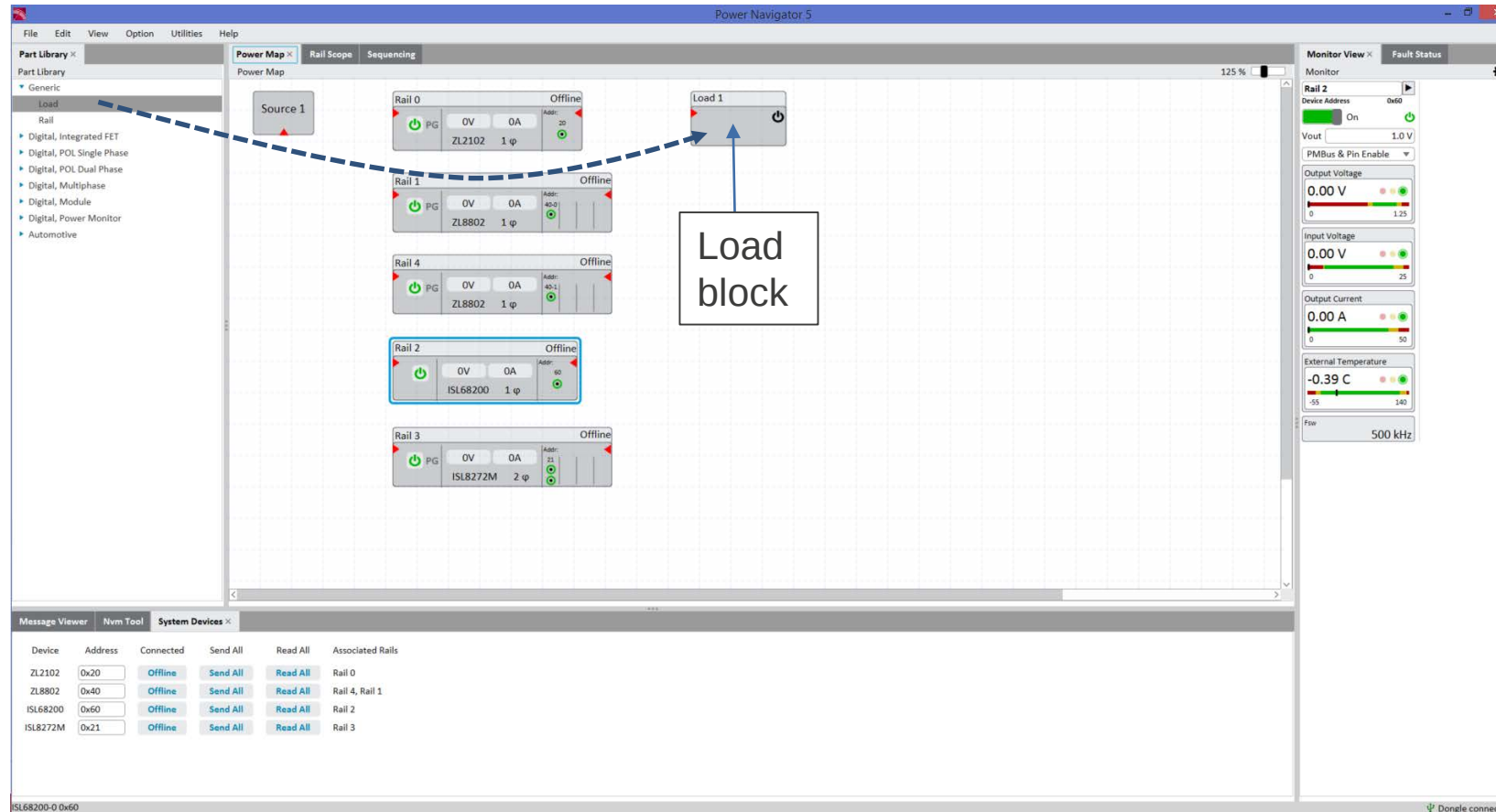
PowerMap RailBlock Overview

Example ISL68200 RailBlock:



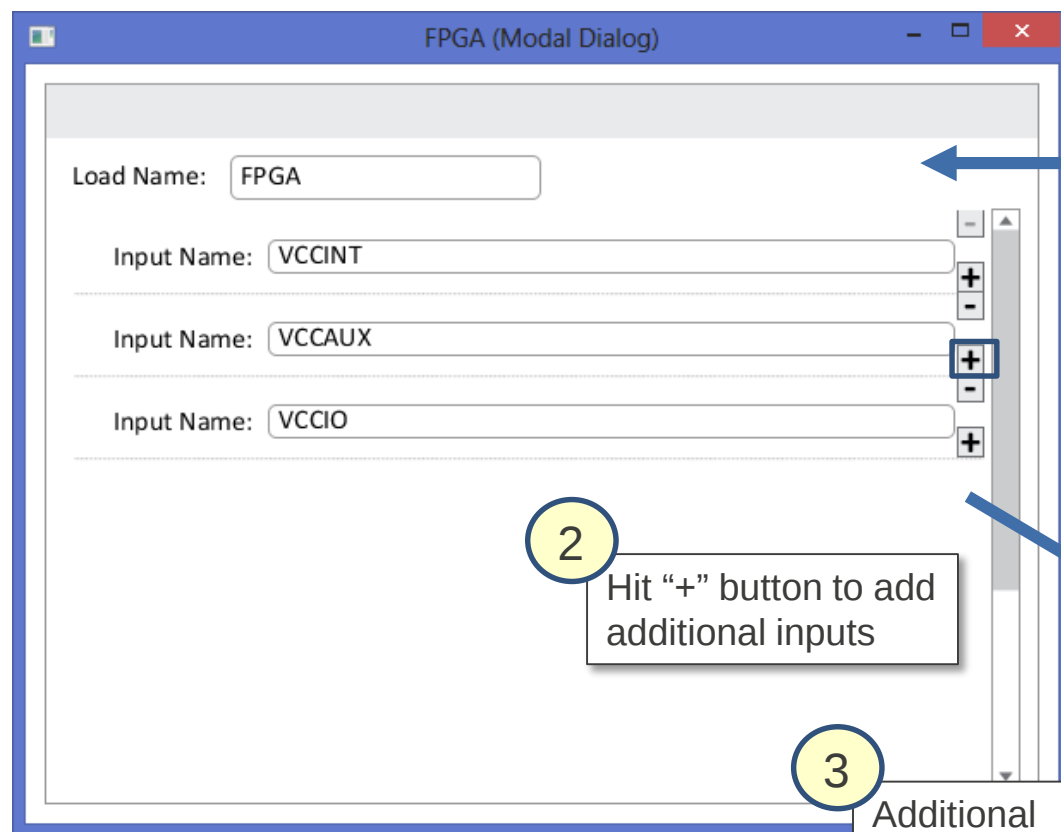
- Controllers which do not support current share will only have one “slot”.
- In this case, we have a single phase ISL68200 controller at PMBus address 0x60.

PowerNavigator – System Screen



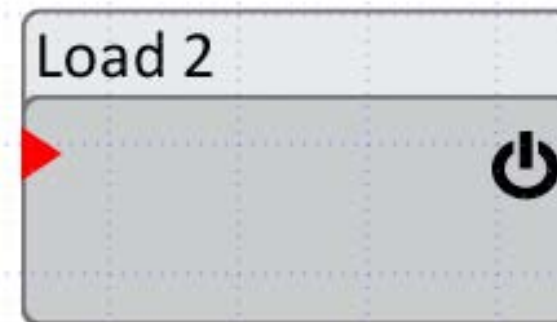
Load Blocks represent system load and can be added to the PowerMap from the Part Library.
Double Click to add additional inputs.

Multi-Input Load Boxes



1

Double Click Load to bring up Load Inspector dialog box

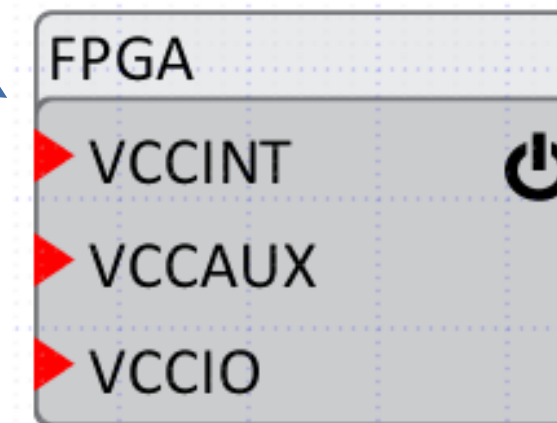


2

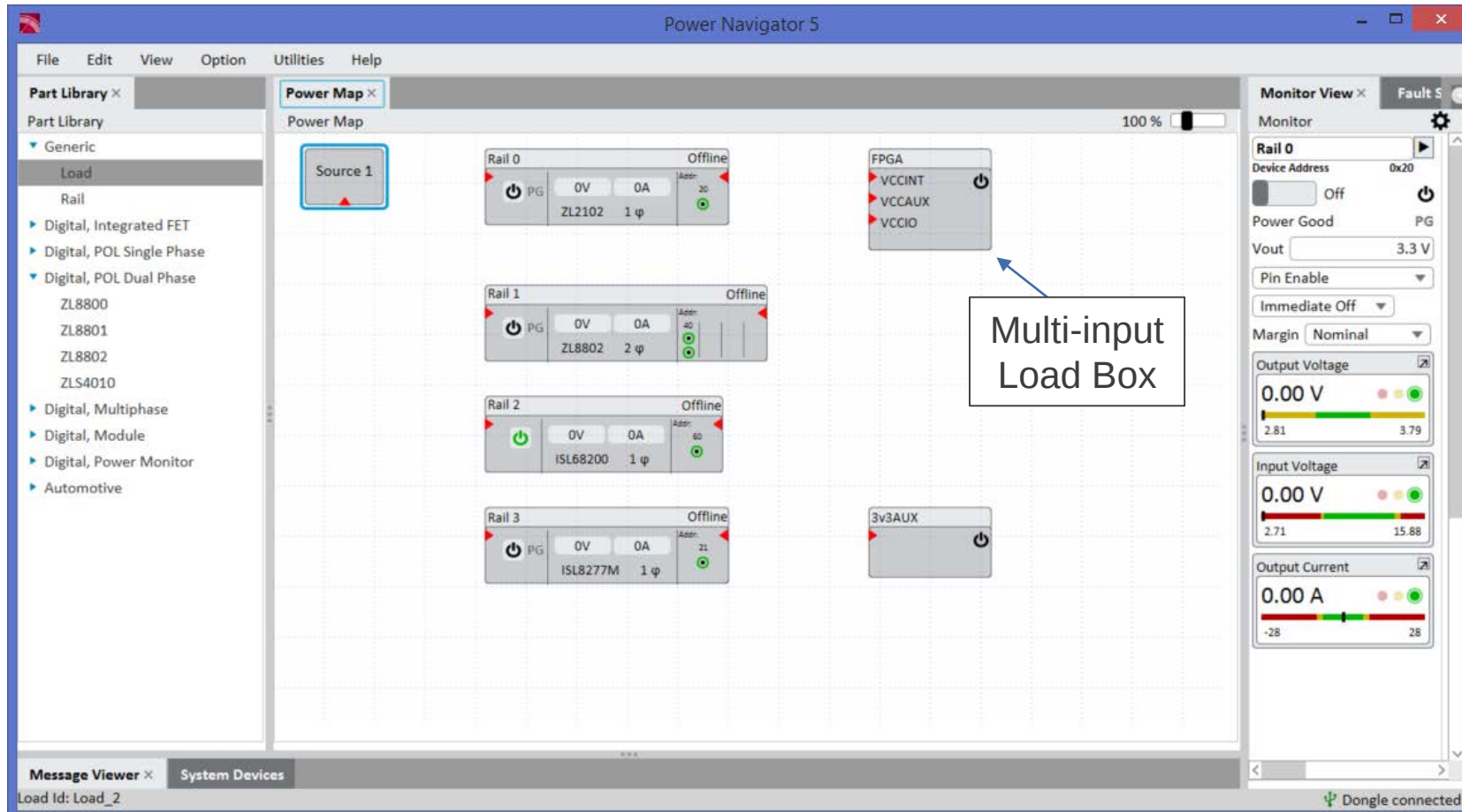
Hit "+" button to add additional inputs

3

Additional inputs are now added to load box

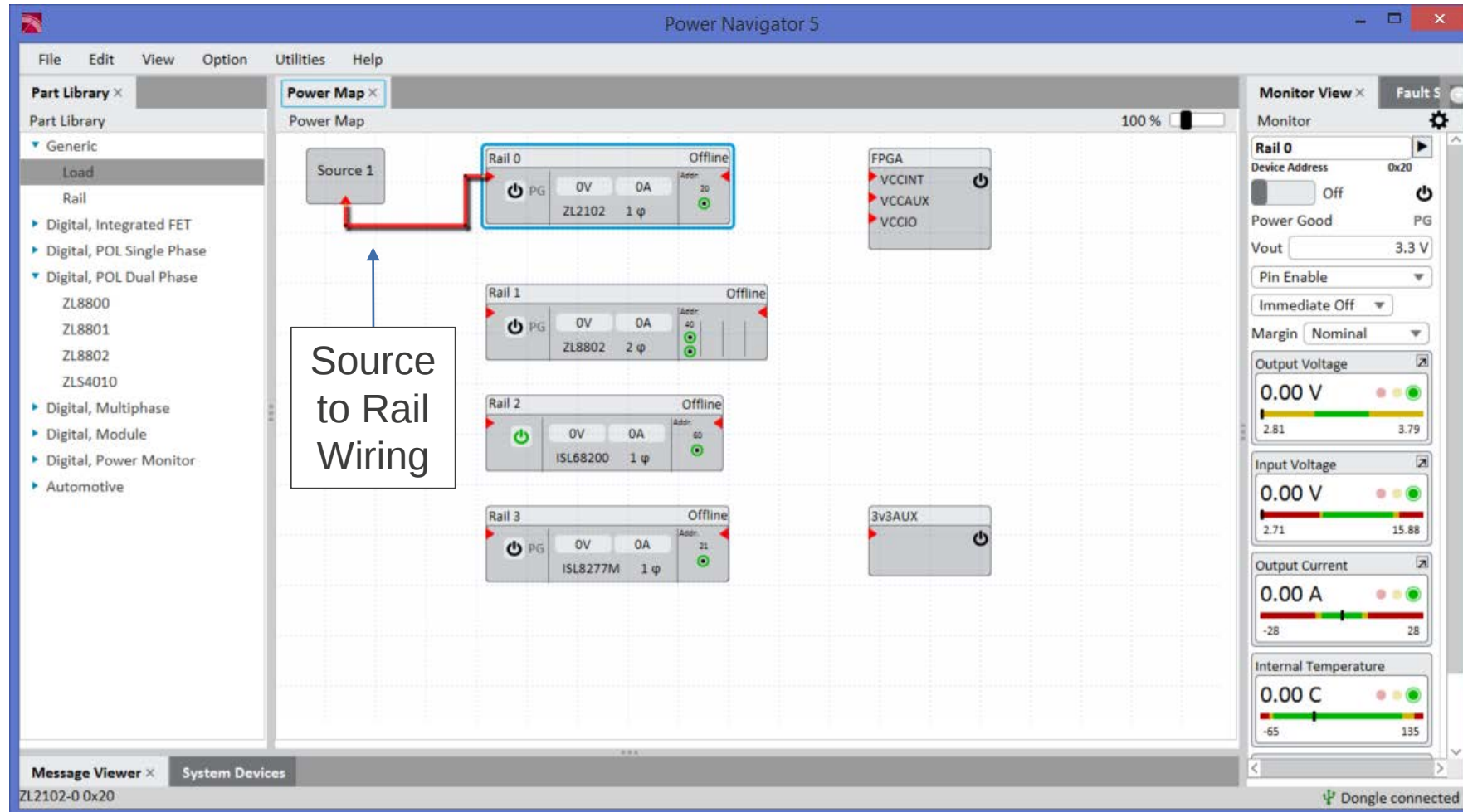


PowerNavigator 5.4 – System Screen

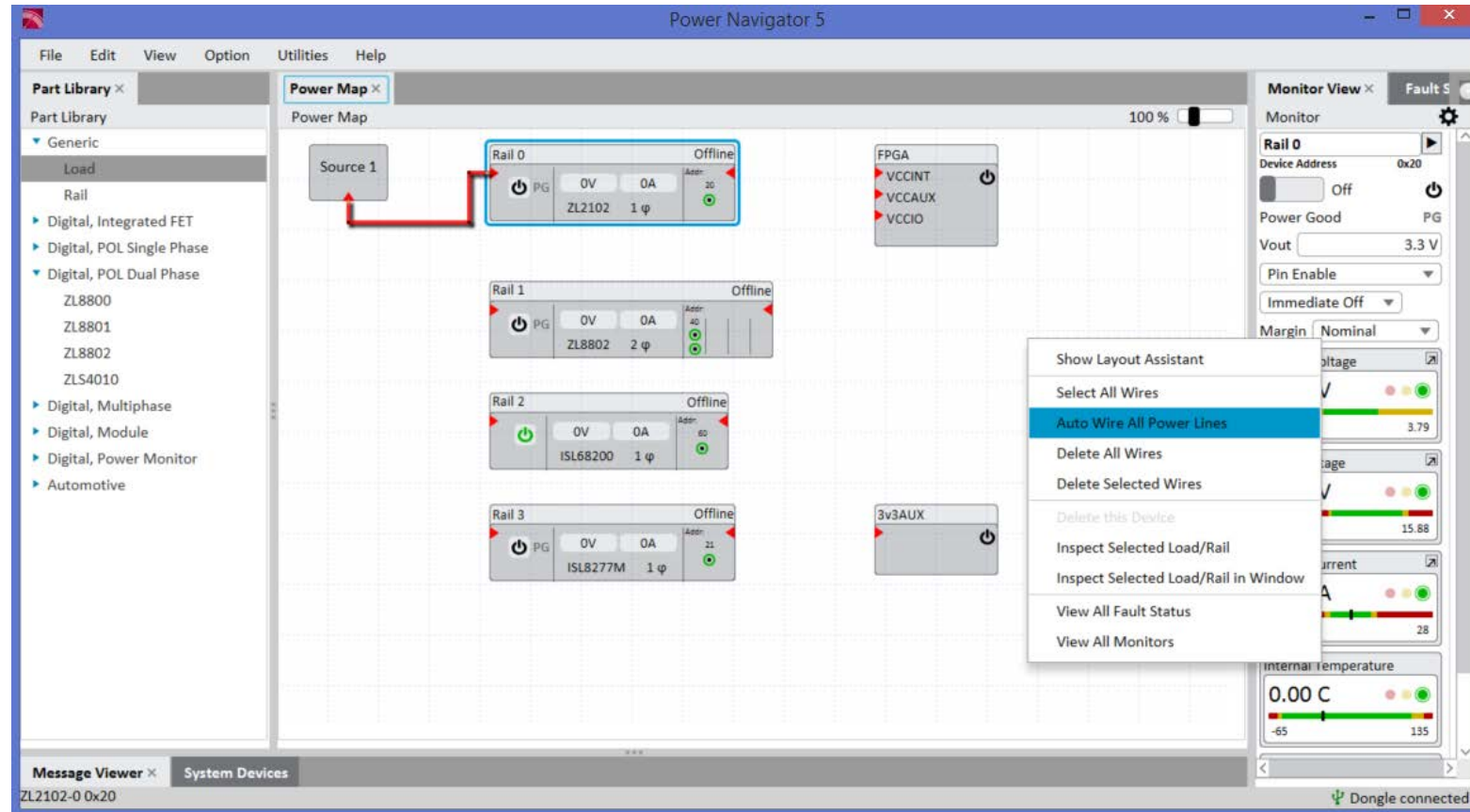


After configuring system, all sources, rails and loads can be wired together.

PowerNavigator 5.4 – System Screen

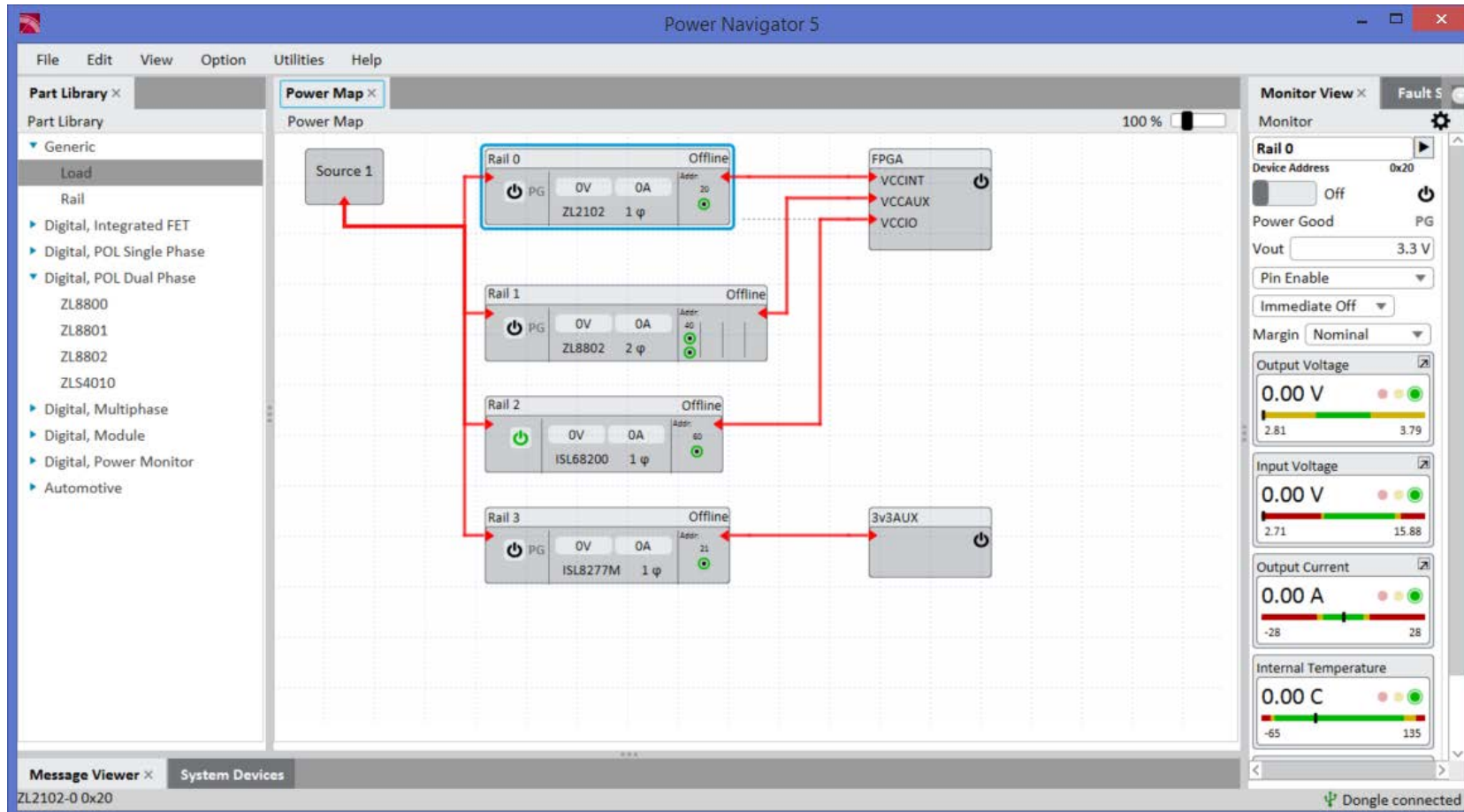


PowerNavigator 5.4 – System Screen



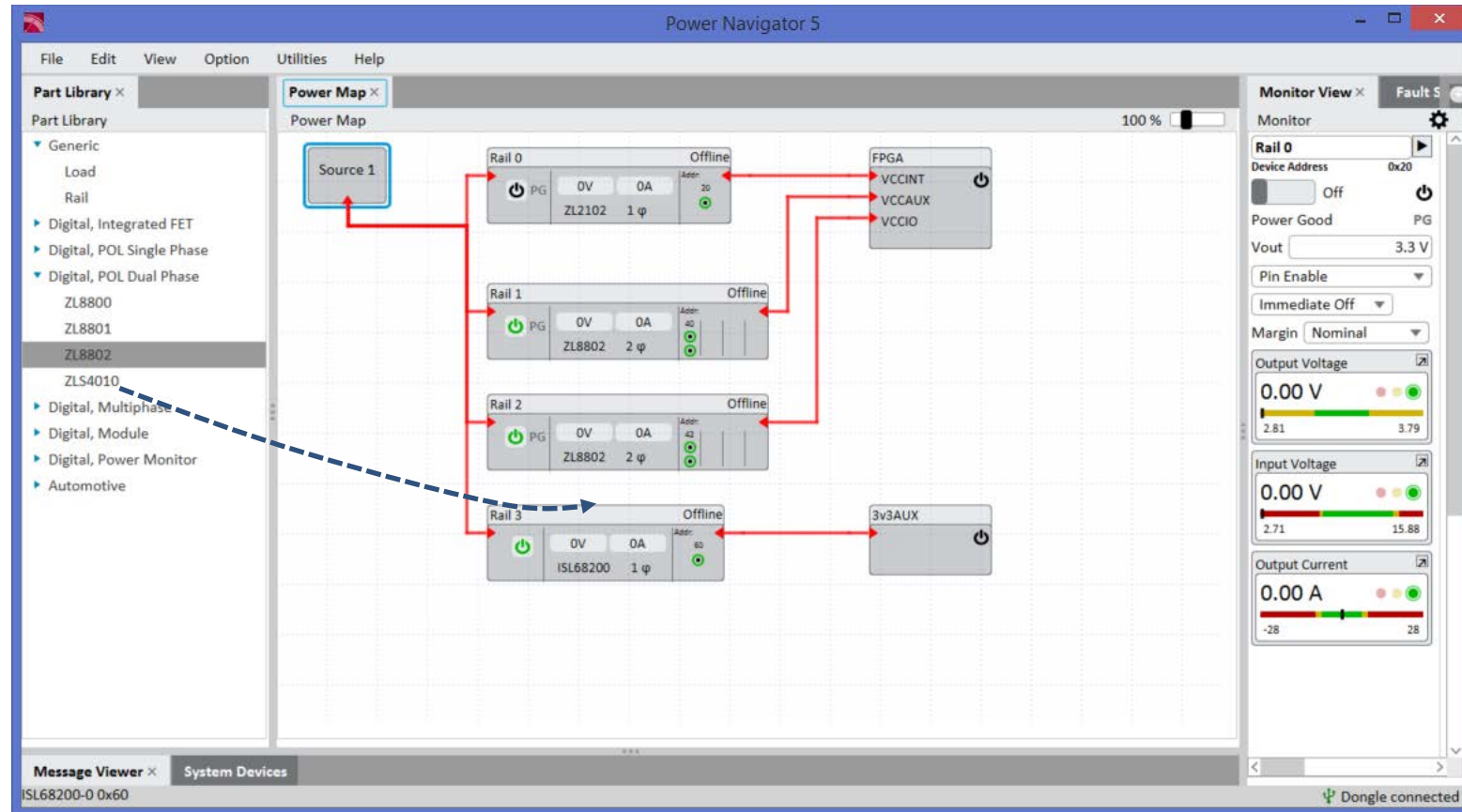
Right-click on PowerMap to bring up contextual menu.
Select "Auto Wire All Power Lines" to auto wire PowerMap.

PowerNavigator 5.4 – System Screen



Fully wired PowerMap with multi-input loads.

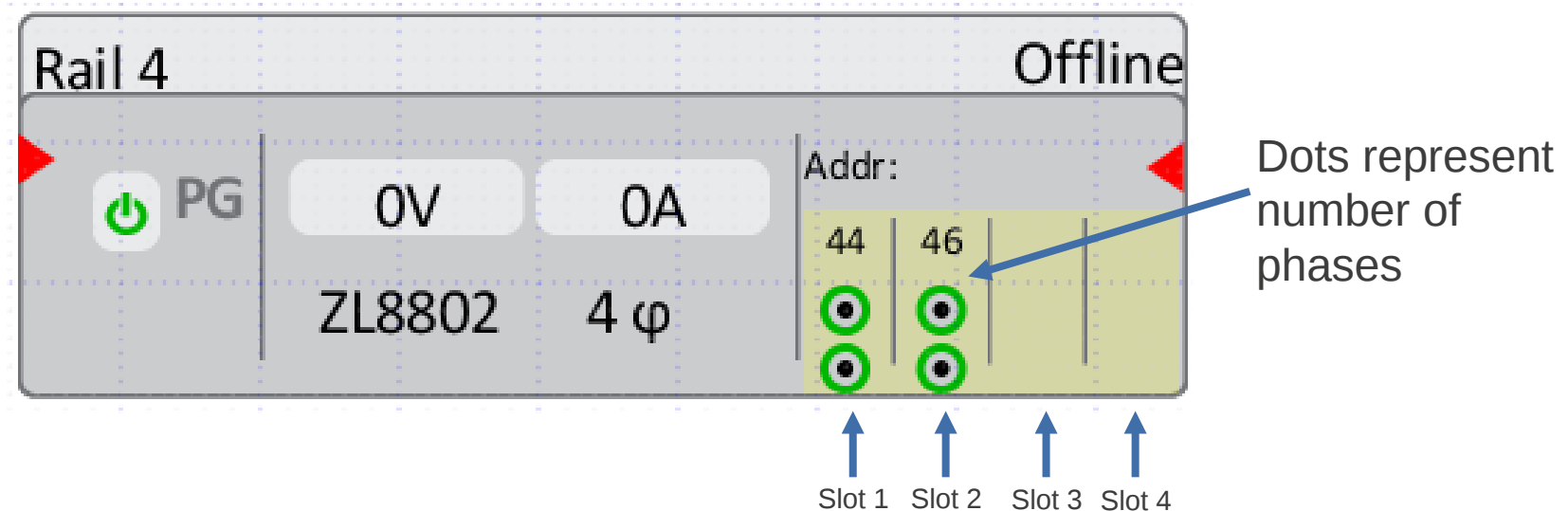
PowerNavigator 5.4 – System Screen



To implement a current sharing rail, drag a part from the part library onto an open RailBlock "slot".

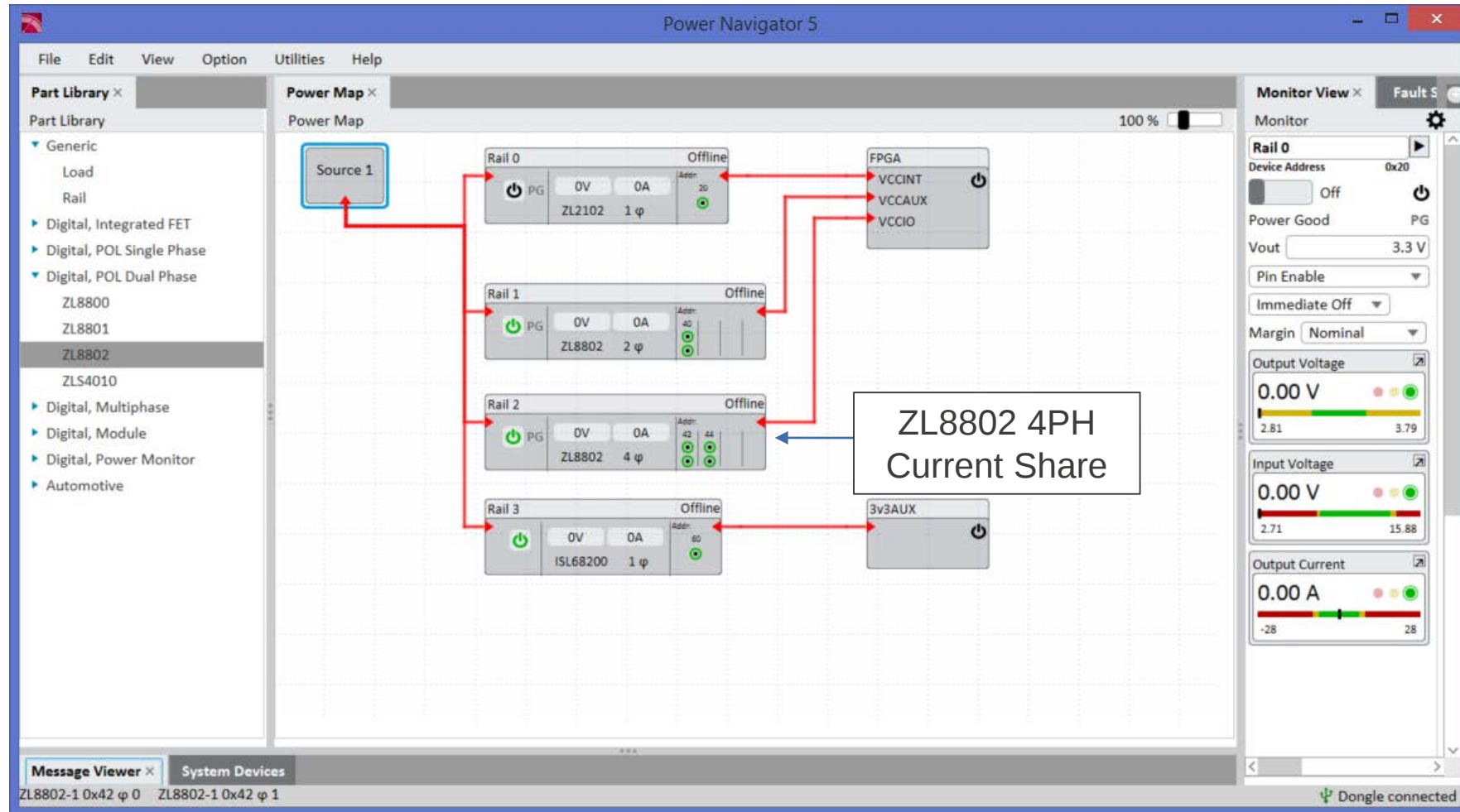
PowerMap RailBlock Overview

Example ZL8802 RailBlock (4-PH operation):

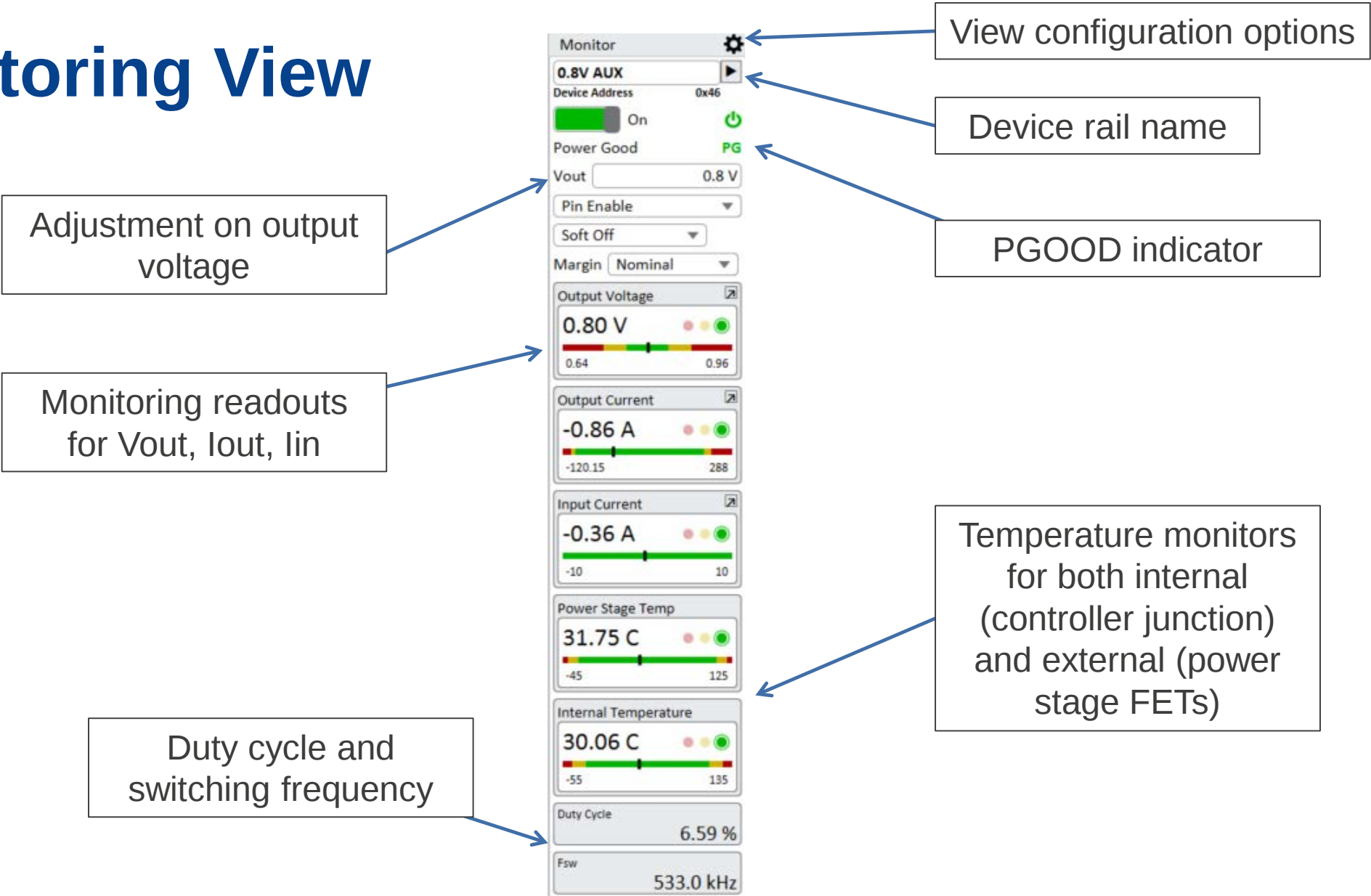


- The ZL8802 allows for 2-PH, 4-PH, 6-PH or 8-PH operation via current share.
- Each “slot” in the RailBlock represents shows how many controllers can be paralleled in a current share group.
- To create a current share group, a controller can be dragged from the part library into a “slot”, creating a current share rail.
- In this case, we have a 4-phase design, with two ZL8802 controllers – one at PMBus address 0x44 and another at 0x46.

PowerNavigator 5.4 – System Screen

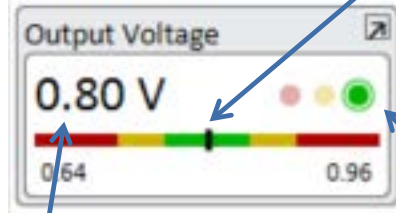


Monitoring View



Readouts

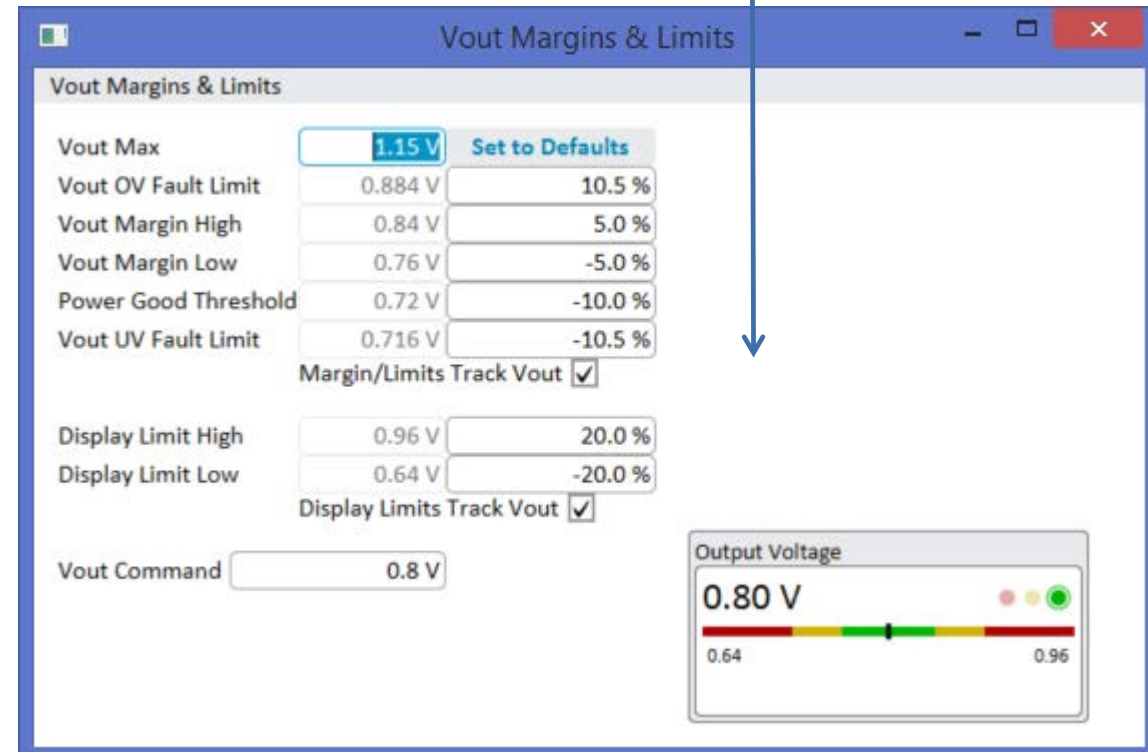
Analog sliding meter with color indicators. Green is within normal limits, yellow in PMBus warning limits, red for exceeding OVP/UVF settings.



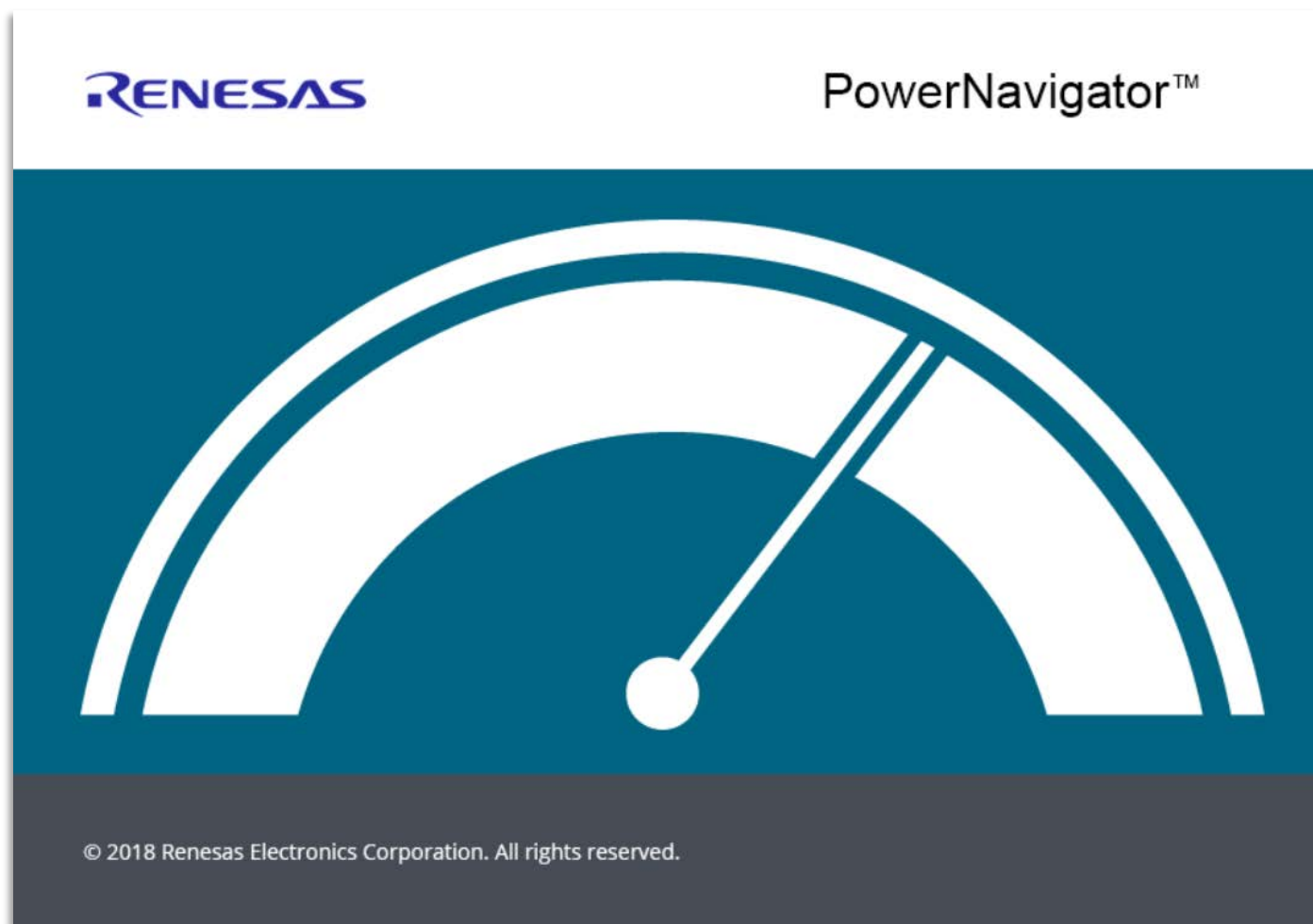
Clicking this button will open the window below allowing adjustment of limits

Operation and fault lights

Digital readout of output voltage



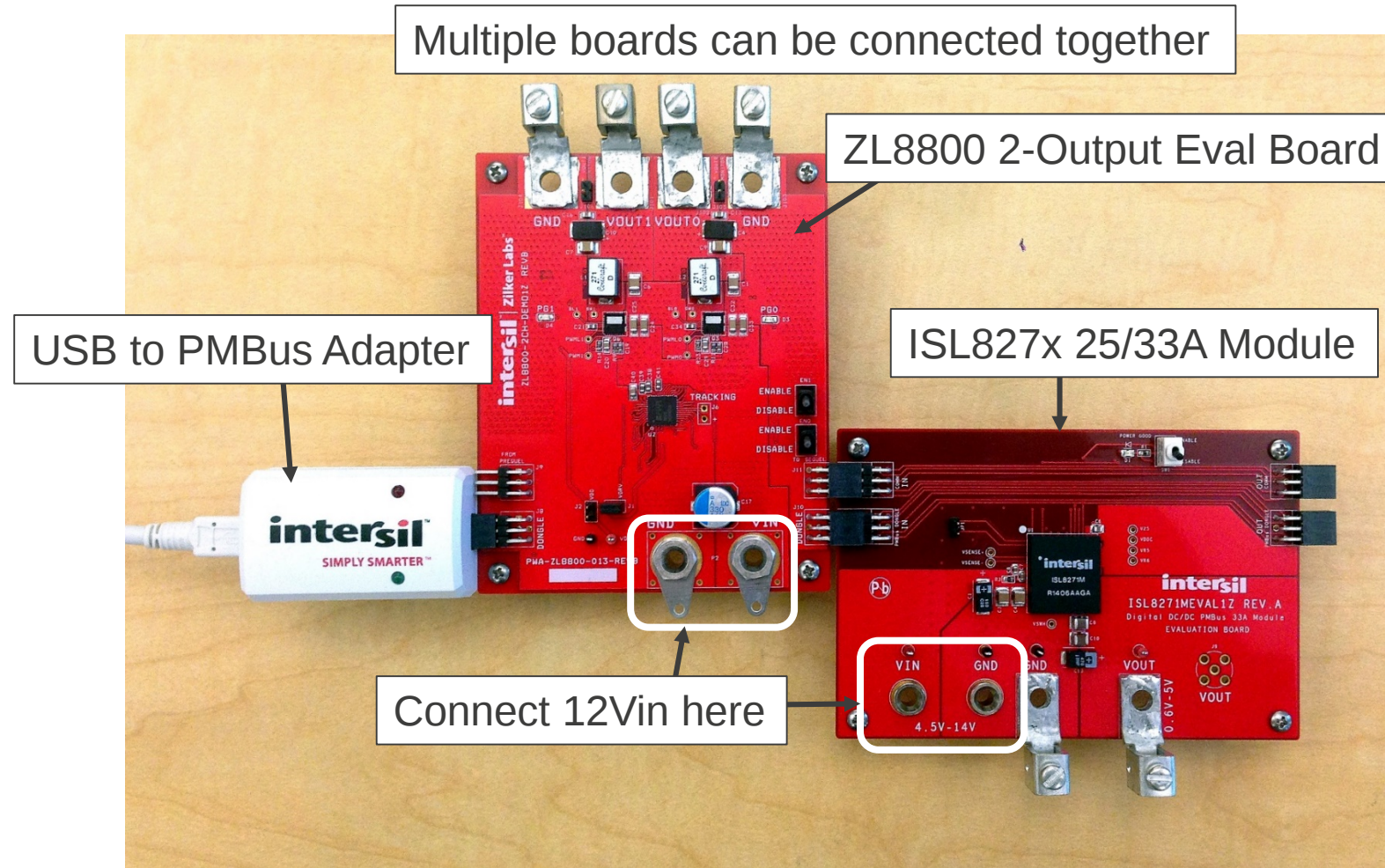
Connecting to Hardware



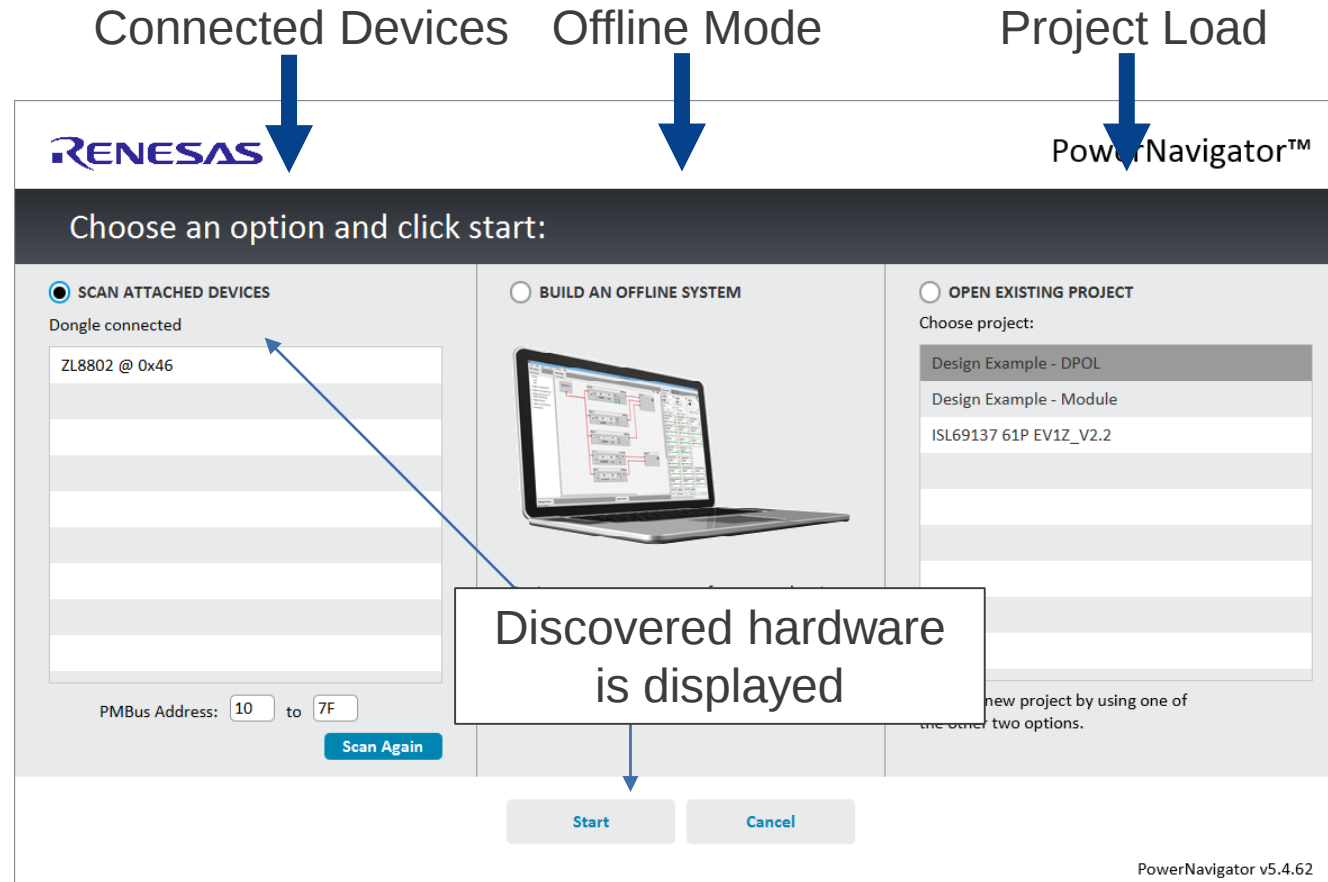
Connect to Hardware . . .

- To connect to hardware, a USB to PMBus adapter (ZLUSBEVAL3Z, included with all demo kits) is required.
- STEP 1: Connect USB cable from PC to USB adapter
- STEP 2: Connect USB to PMBus adapter to demo board hardware
- STEP 3: Power demo board
- STEP 4: Launch PowerNavigator software

Connect to Hardware . . .

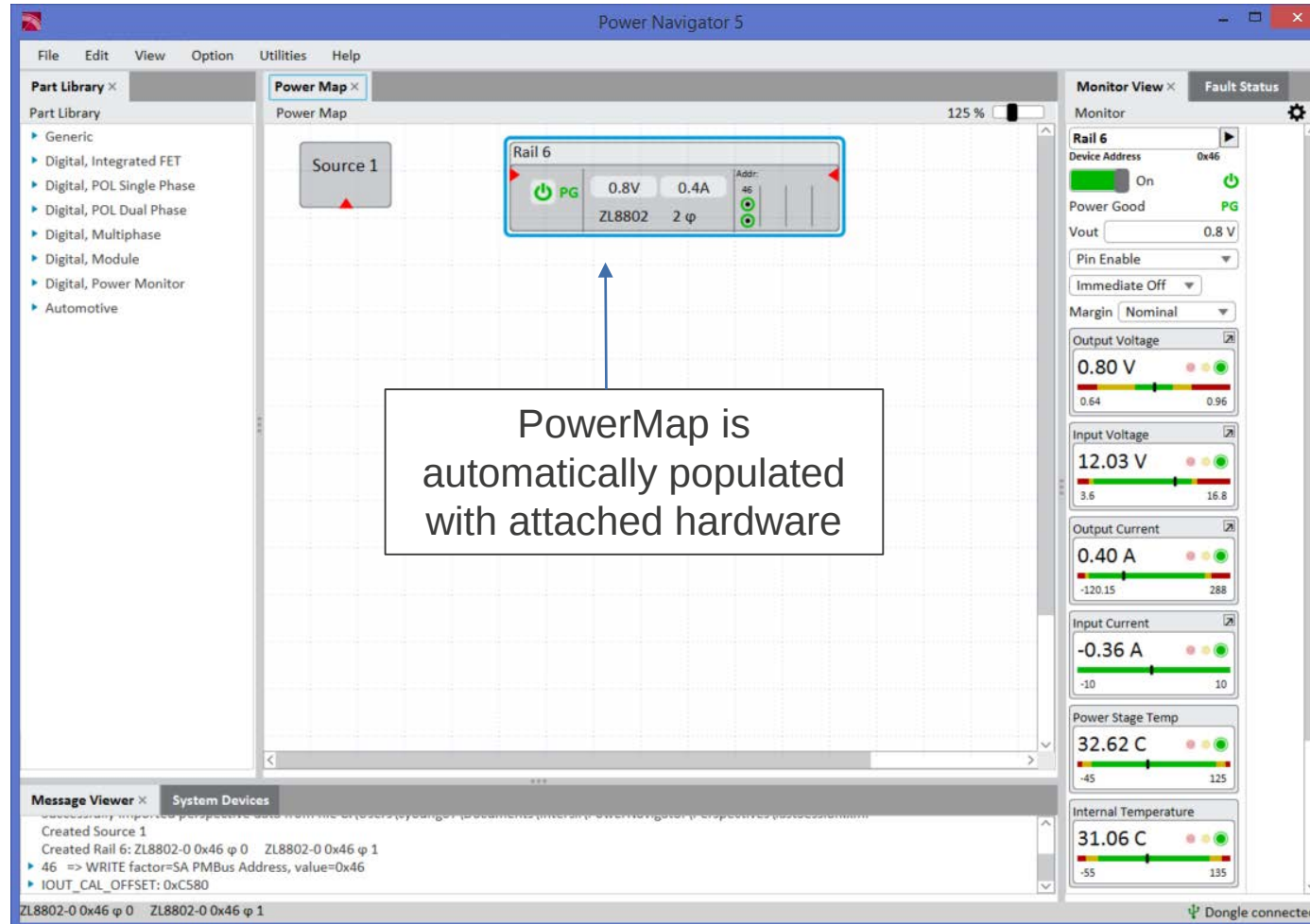


PowerNavigator Launch Screen

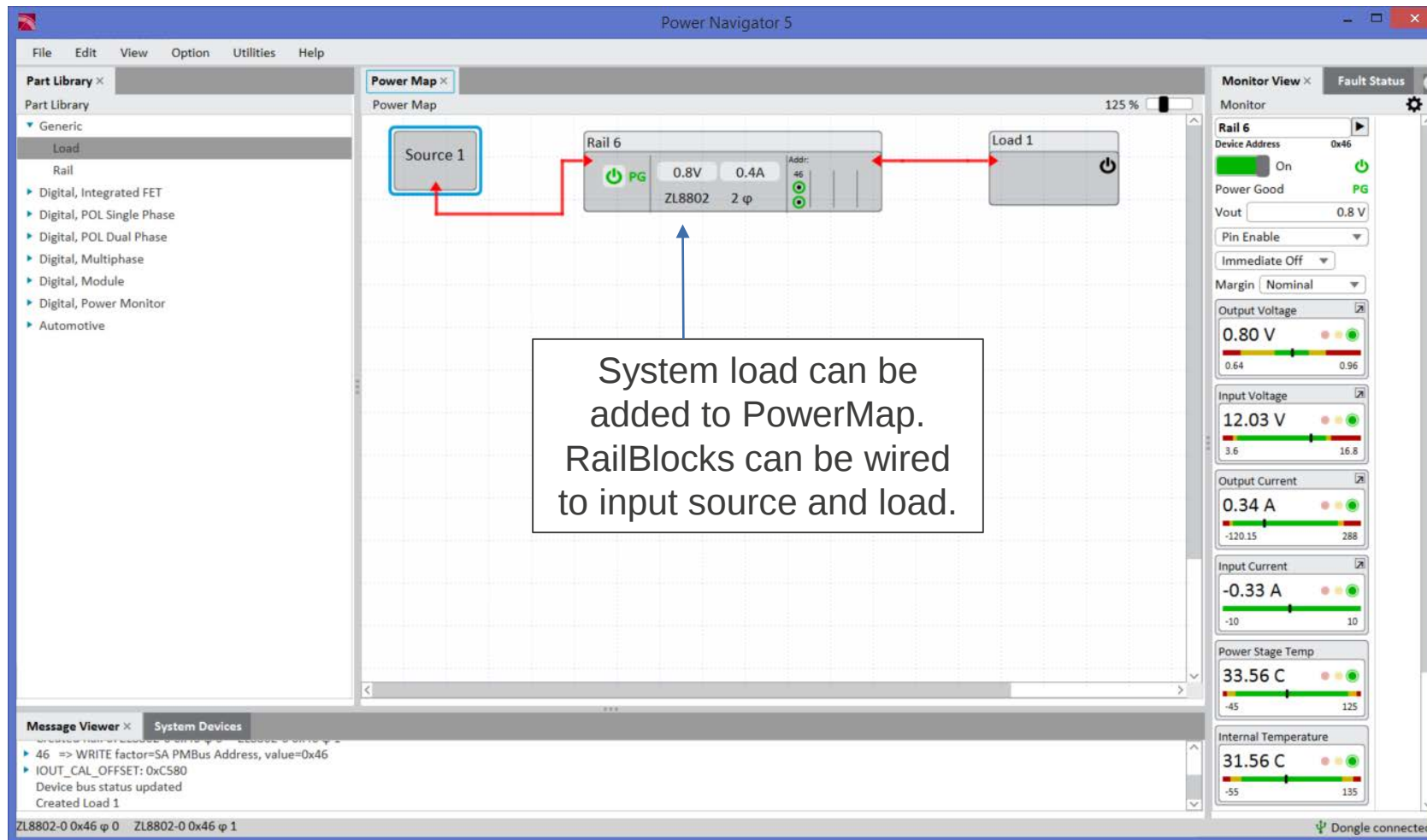


All discovered hardware is displayed in the “Scan Attached Devices” window.
The PMBus scan range can be adjust – default range is 0x10 to 0x7F.

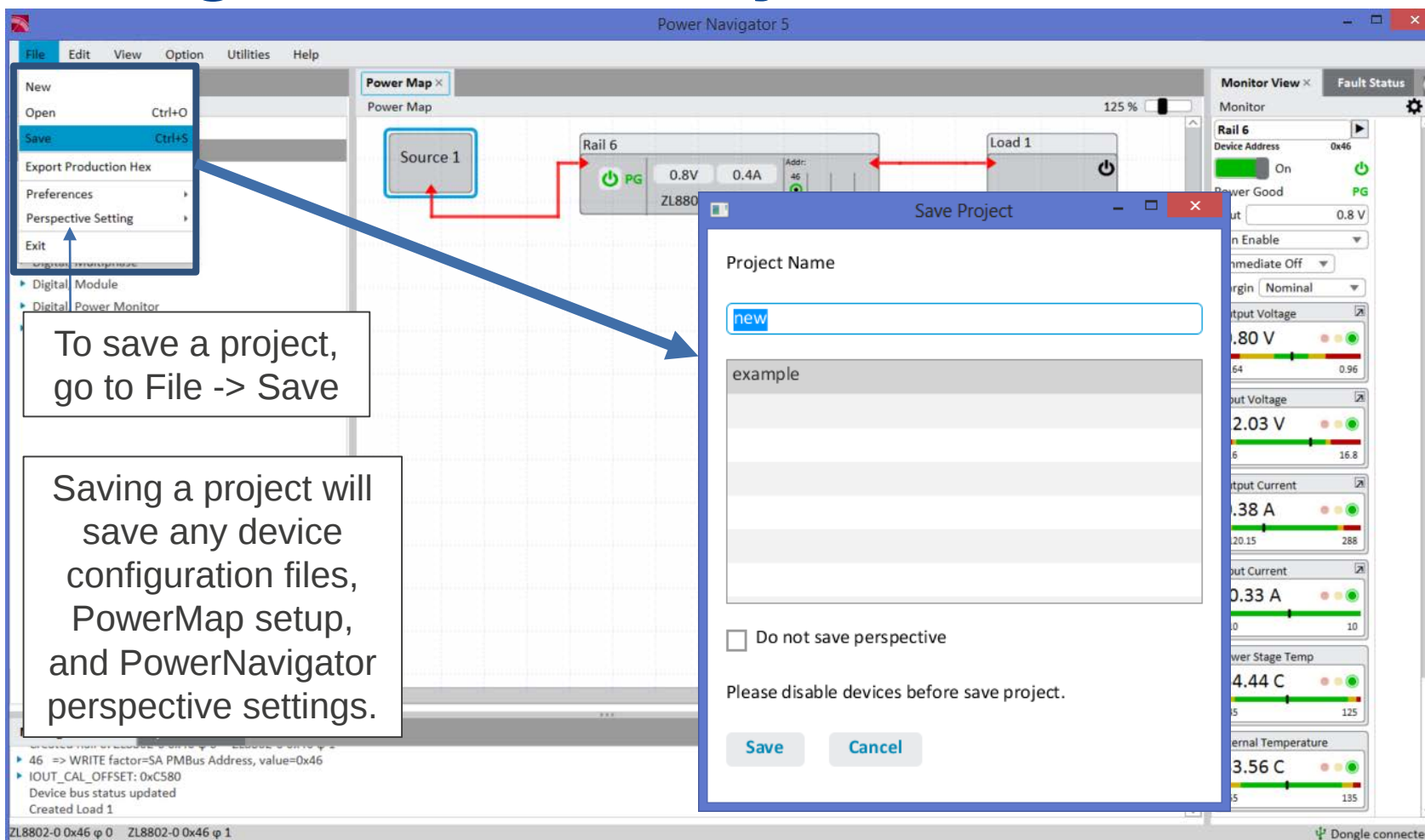
PowerNavigator 5.4 – Connect to HW



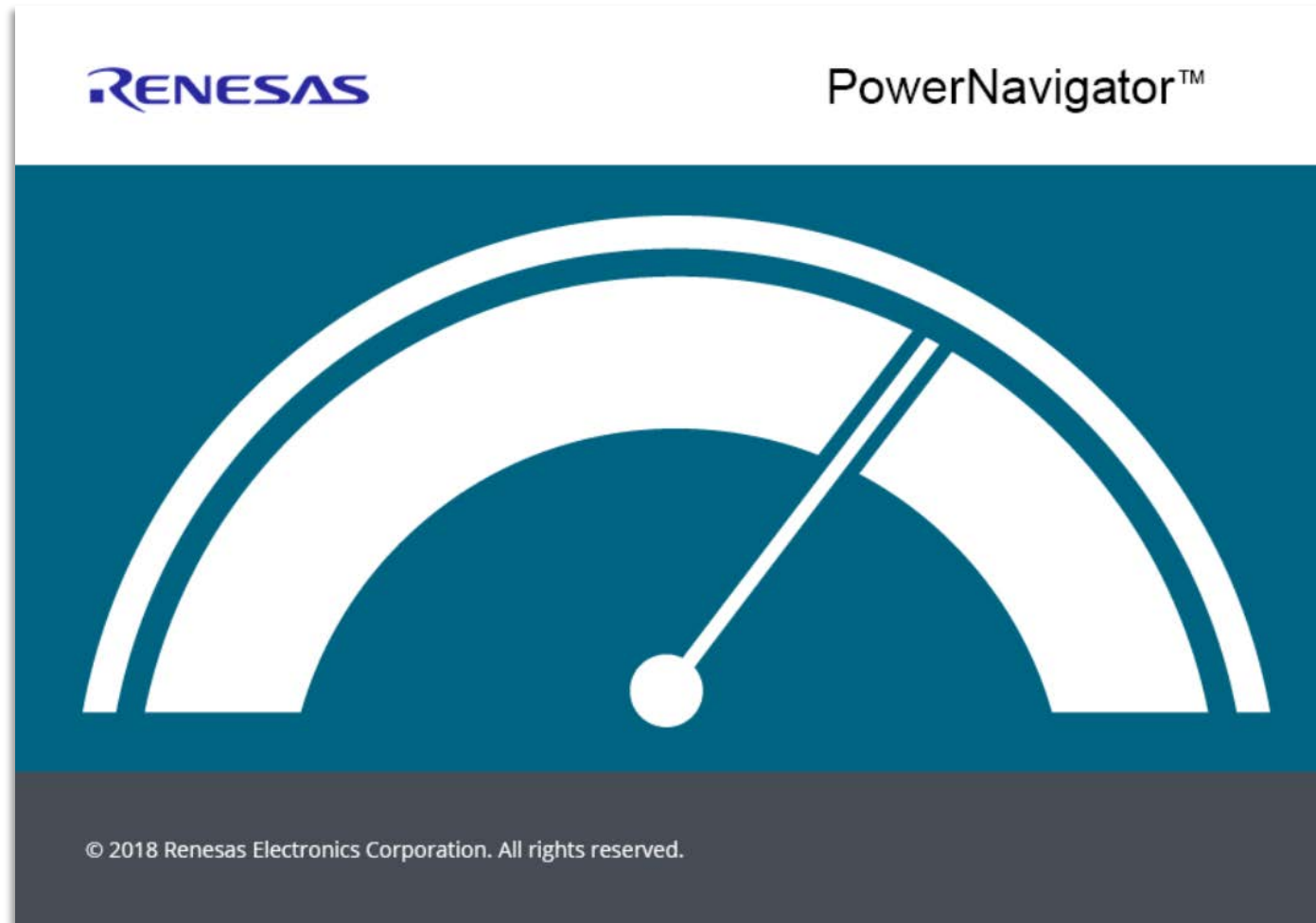
PowerNavigator 5.4 – Connect to HW



PowerNavigator 5.4 – Project Save



PowerNavigator – Rail Inspector



PowerNavigator 5.4 – Rail Inspector

- Rail Inspector tool eases device configuration
 - Double click on RailBlocks to bring up individual Rail Inspector for each device.
 - Each device in PowerNavigator can have its own, customized Rail Inspector.
- Rail Inspector tool can be used to:
 - Quickly see rail summary, including PMBus addresses, controller type, PMBus status, device options, fault status, etc.
 - Save/Load Configuration Files
 - Configure device using command tool
- Allows for future expandability
 - Future releases of PowerNavigator will expand Rail Inspector features

PowerNavigator 5.4 – Rail inspector

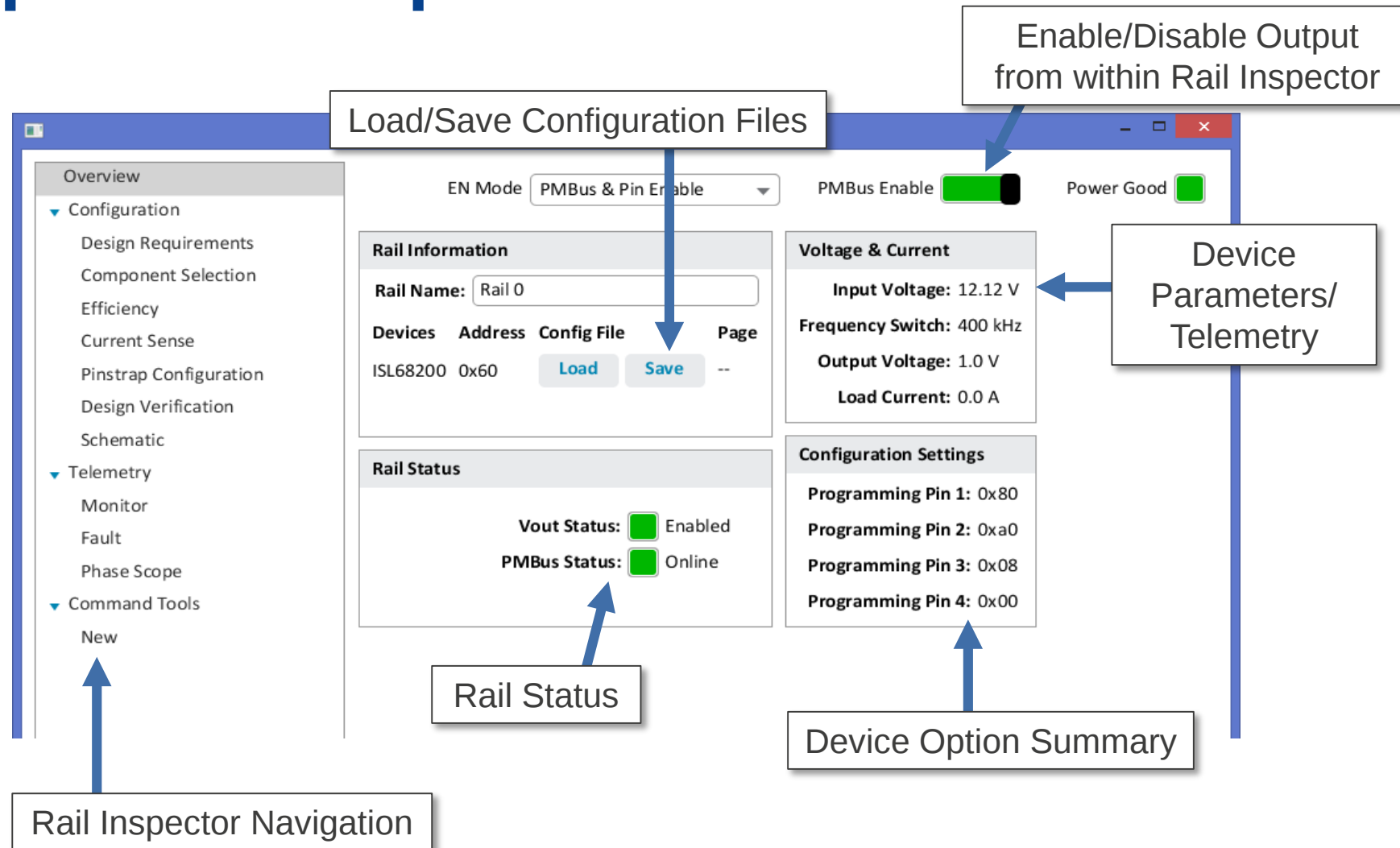
1 Double Click RailBlock to bring up Load Inspector window

2 Rail Inspector Window will appear

The Rail Inspector window displays the following information:

- Overview**
 - Configuration
 - Design Requirements
 - Component Selection
 - Efficiency
 - Current Sense
 - Pinstrap Configuration
 - Design Verification
 - Schematic
 - Telemetry
 - Monitor
 - Fault
 - Phase Scope
 - Command Tools
 - New
- Rail Information**
 - Rail Name: Rail 0
 - Devices: ISL68200, Address: 0x60, Config File: Load, Save, Page
- Rail Status**
 - Vout Status: Enabled
 - PMBus Status: Online
- Voltage & Current**
 - Input Voltage: 12.12 V
 - Frequency Switch: 400 kHz
 - Output Voltage: 1.0 V
 - Load Current: 0.0 A
- Configuration Settings**
 - Programming Pin 1: 0x80
 - Programming Pin 2: 0xa0
 - Programming Pin 3: 0x08
 - Programming Pin 4: 0x00

Example Rail Inspector – ISL68200



Example Rail Inspector – ISL68200

Rail 0

EN Mode: PMBus & Pin Enable

PMBus Enable: ■

Power Good: ■

Input Voltage

Max Input Voltage	13.2 V	10.0 %
Typ Input Voltage	12.0 V	
Min Input Voltage	10.8 V	-10.0 %

☒ Track by Percent

Output Voltage

Output Voltage	1.0 V	
Vout Tolerance	5.0 %	
Vout Ripple	10.0 mV	1.0 %

☒ Track by Percent

Load

Max Load Current	30.0 A	
Max Load Step	15.0 A	50.0 %
Over Current Trip Point	37.5 A	125.0 %

☒ Track by Percent

Design Requirements – Enter Vin, Vout and Iout requirements

Example Rail Inspector – ISL68200

Overview

- Configuration
 - Design Requirements
 - Component Selection
 - Efficiency
 - Current Sense
 - Pinstrap Configuration
 - Design Verification
 - Schematic
- Telemetry
 - Monitor
 - Fault
 - Phase Scope
- Command Tools
 - New

EN Mode: PMBus & Pin Enable | PMBus Enable: ☒ | Power Good: ☒

Click on components in the schematic to configure them.

FSW: 400 kHz

VIN = 12.0 V

Q1: Rds(on) = 5.0 mΩ, Quantity = 1

L = 0.22 μH, DCR = 0.29 mΩ

VOUT = 1.0 V

Q2: Rds(on) = 1.2 mΩ, Quantity = 1

Qty = 4: C = 220.0 μF, ESR = 4.0 mΩ, ESL = 1.0 nH

Qty = 2: C = 47.0 μF, ESR = 4.0 mΩ, ESL = 0.6 nH

UFET

Manufacturer Part No:

Quantity:

Rds(on) at 5V:

Qg:

Coss:

Ton_Switch:

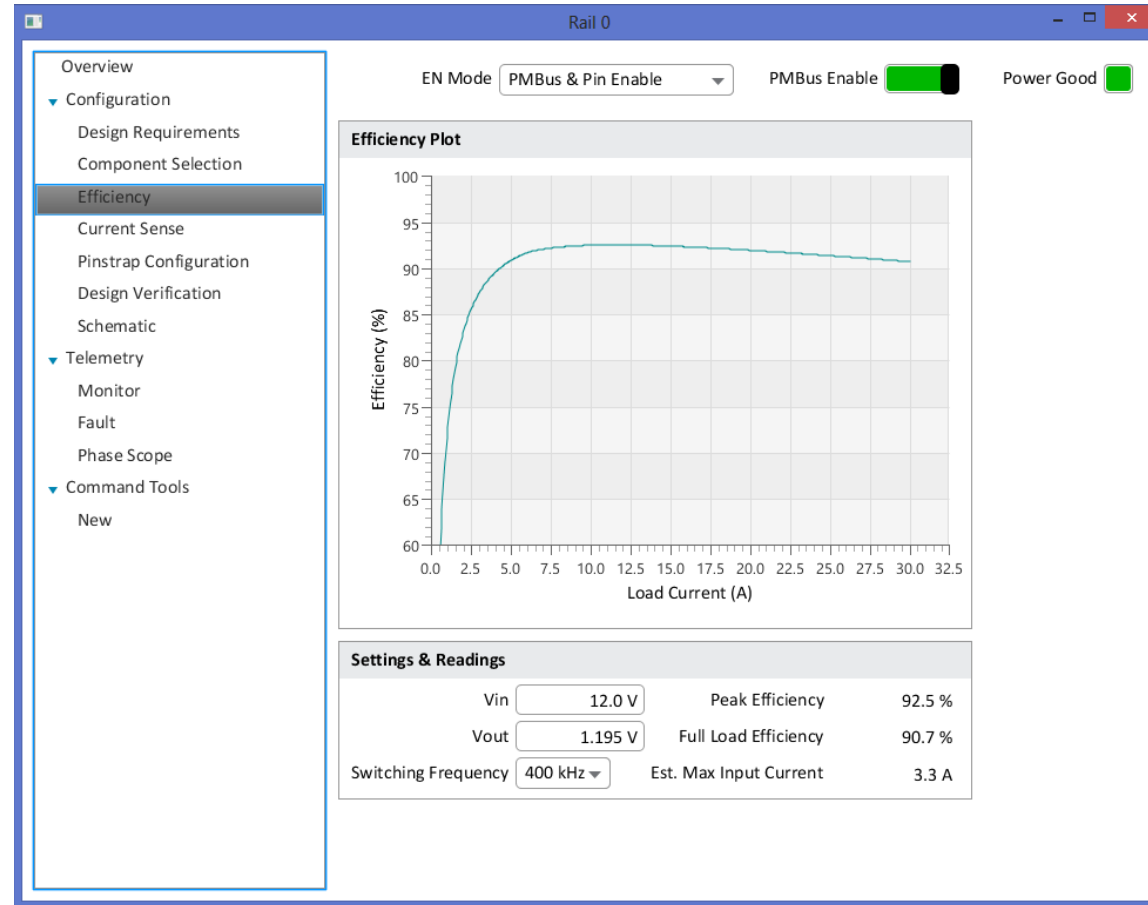
Toff_Switch:

Current	
Inductor Peak-Peak Ripple	10.417 A
Peak Current at Full Load	35.208 A

DCR Match	
RDCR	9.53 kΩ
CDCR	1.0 μF

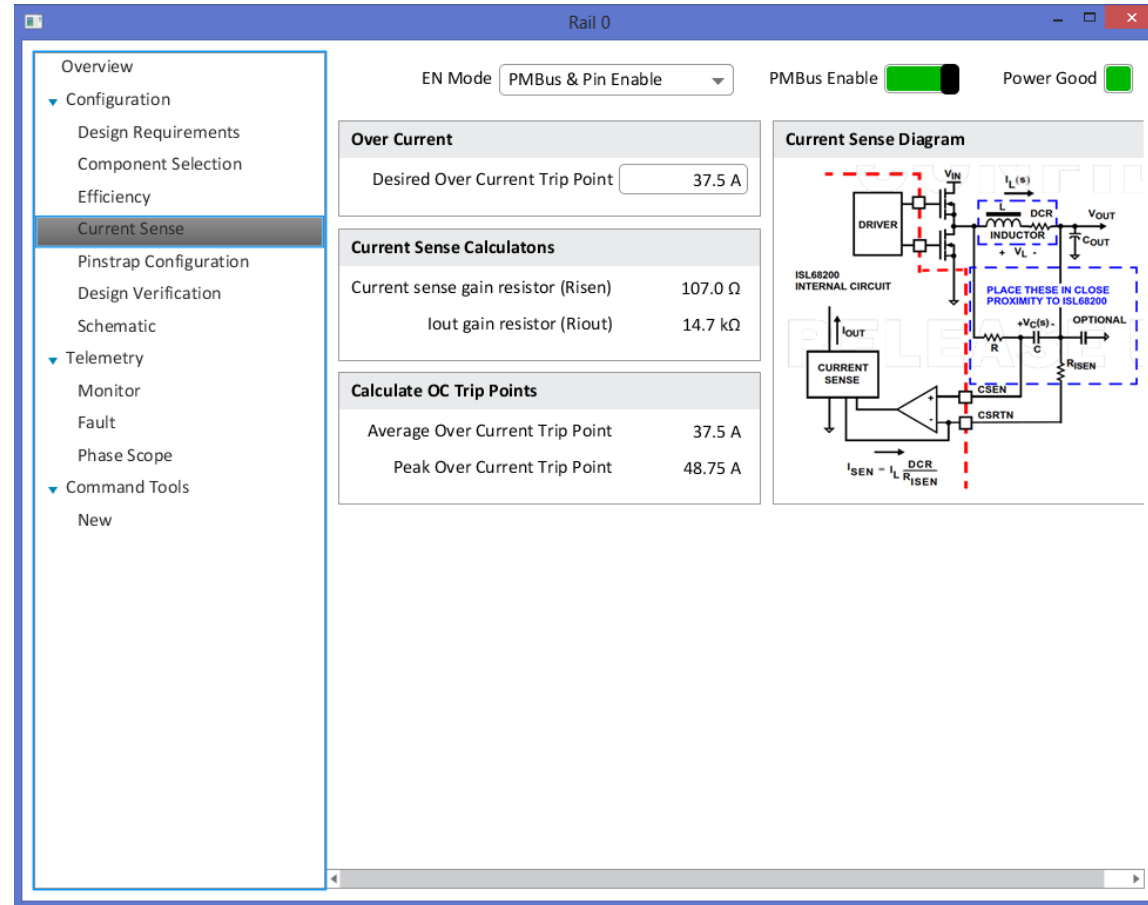
Component Selection – Enter FET, Inductor and Output Cap information

Example Rail Inspector – ISL68200



Efficiency – Real time plot of efficiency with selected components and switching frequency.

Example Rail Inspector – ISL68200



Current Sense – Automatic calculation of current sense resistor settings based on desired OC trip point.

Example Rail Inspector – ISL68200

Rail 0

EN Mode: PMBus & Pin Enable

PMBus Enable: ☒

Power Good: ☒

PROG1 Pin

Output Voltage: 1.195 V

Register Value: 0x5E

Rup: 45.3 kΩ

Rdown: 150 kΩ

Reset Send

PROG2 Pin

Disable PFM: ☒

TCOMP: +15 °C

PMBus Address: 0x60

Register Value: 0xA0

Rup: OPEN

Rdown: 105 kΩ

Reset Send

PROG3 Pin

OCP/OTP: Retry

FSW: 400 kHz

AV Gain: 42

25 kHz Clamp: ☒

Register Value: 0x08

Rup: 29.4 kΩ

Rdown: 15 kΩ

Reset Send

PROG4 Pin

SS dv/dt: 1.25 mV/us

R4 RR: 200 kΩ

AV Multiplier: x1 x2

Register Value: 0x00

Rup: OPEN

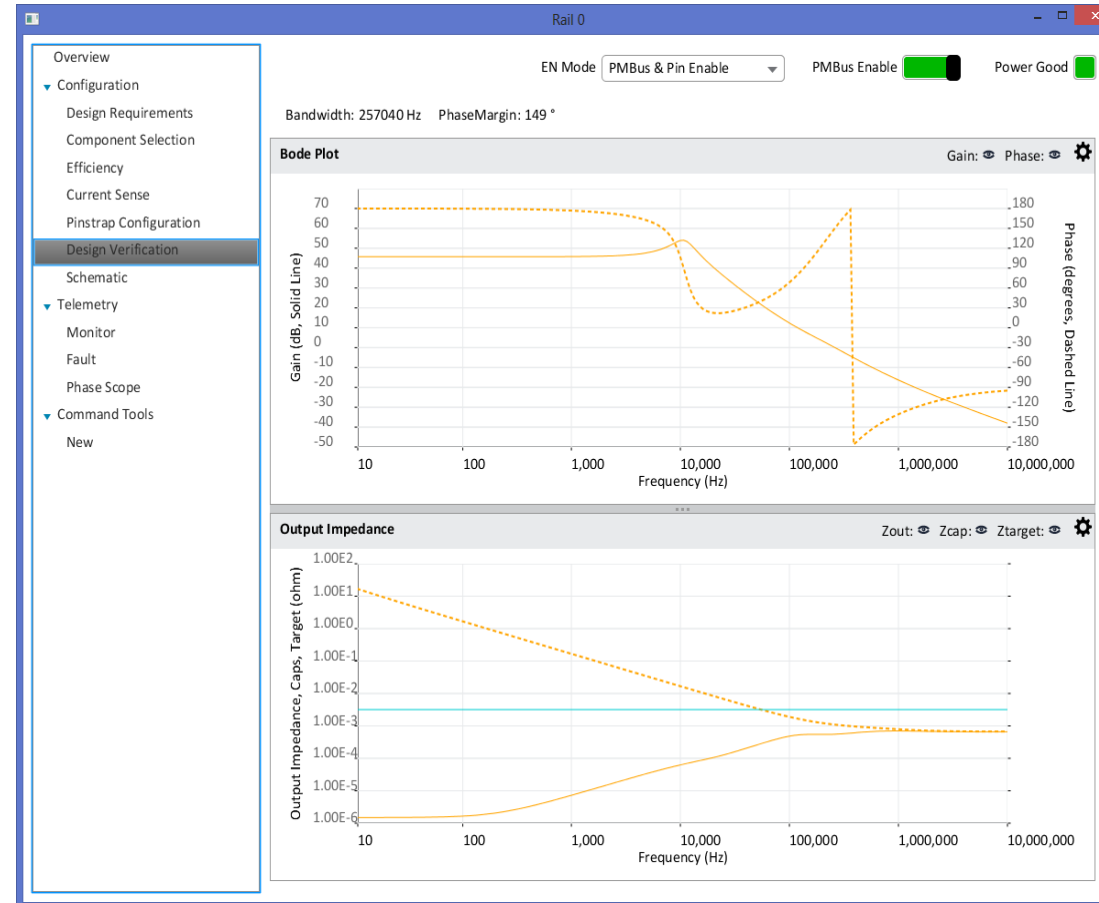
Rdown: 10 kΩ

Reset Send

*Settings other than those selected by PROGx To finalize changes, resistor values on hardware

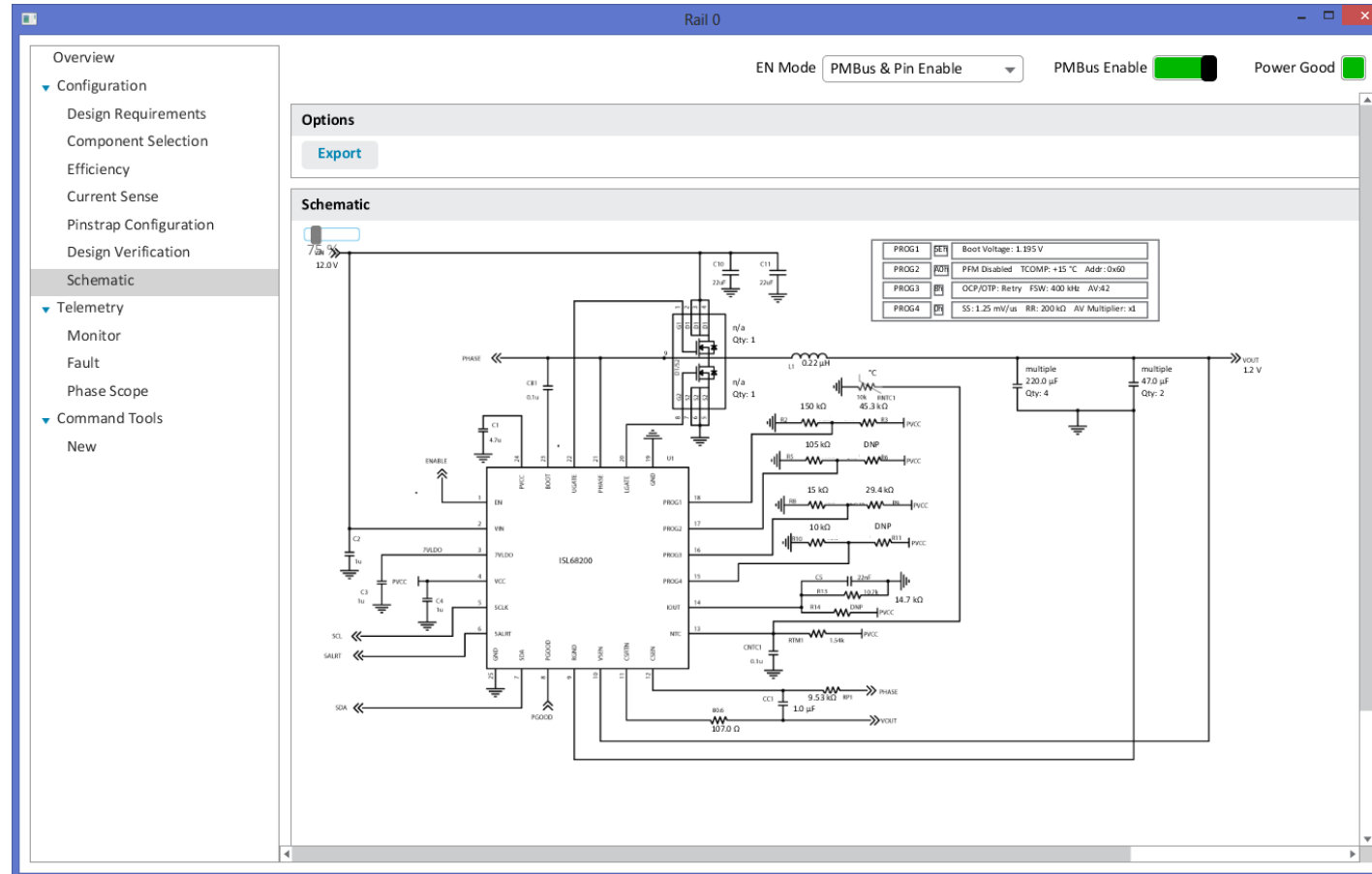
Pinstrap Configuration – Select pinstrap resistors to setup device default settings.

Example Rail Inspector – ISL68200



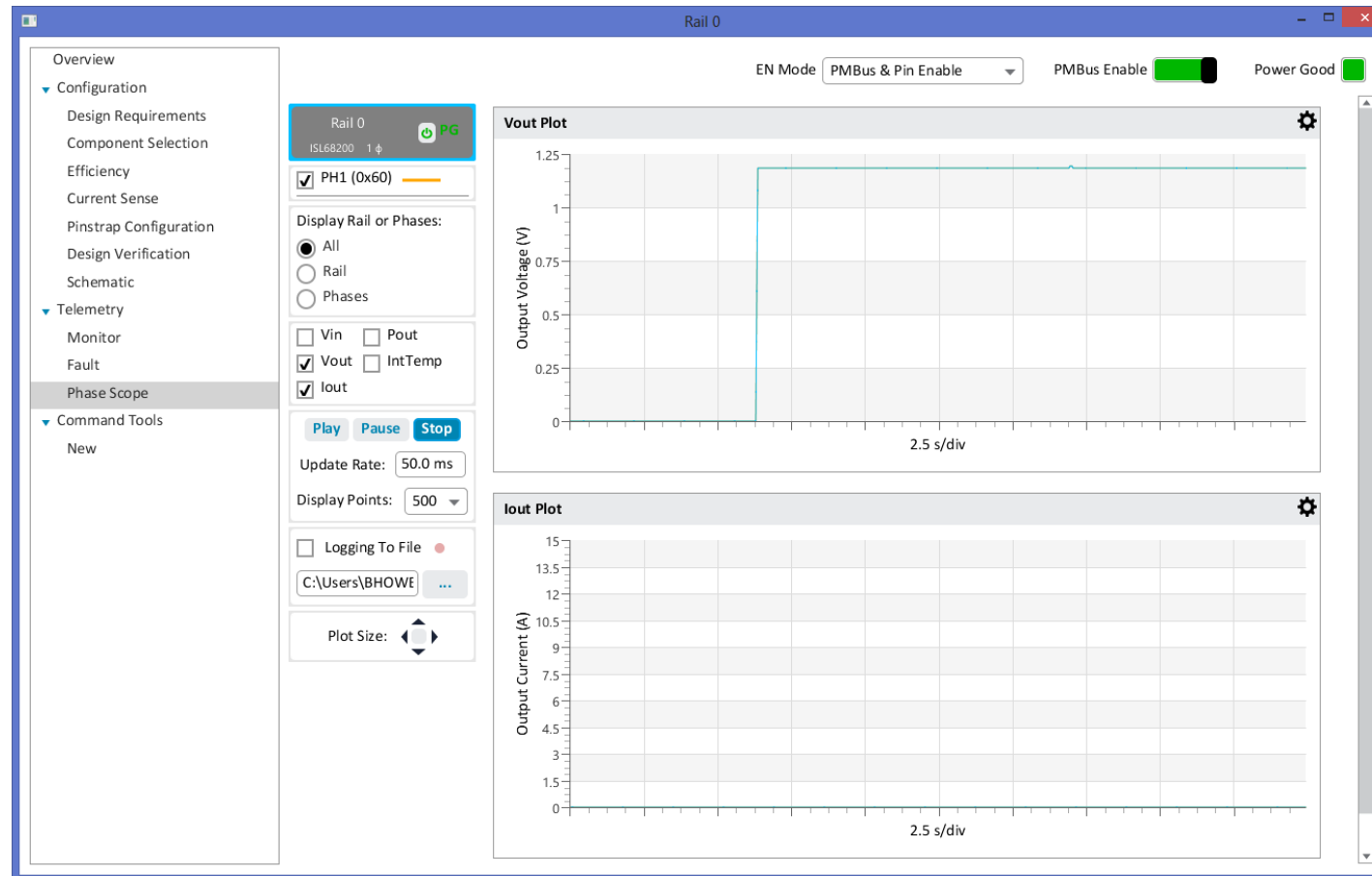
Design Verification— Bode and Output Impedance plots of design.

Example Rail Inspector – ISL68200



Schematic Generation – Final schematic, with customized components, generated automatically.

Example Rail Inspector – ISL68200



Phase Scope – Real time plotting of all telemetry parameters.

Example Rail Inspector – ISL68200

Rail 0

EN Mode: PMBus & Pin Enable PMBus Enable: On Offline

ISL68200-0 0x60

Command Sets Targets

Send All Read All

Cmd: VOUT_COMMAND Hex: 0099 1.195 V VOUT_COMMAND

Search Send Read

Cmd: REAL_IOUT Search Read

Command Line to select PMBus command

Send/Read commands to target device

Add/Remove command lines in command tool

Select Command Tool in Rail Inspector

Example Rail Inspector – ISL68200

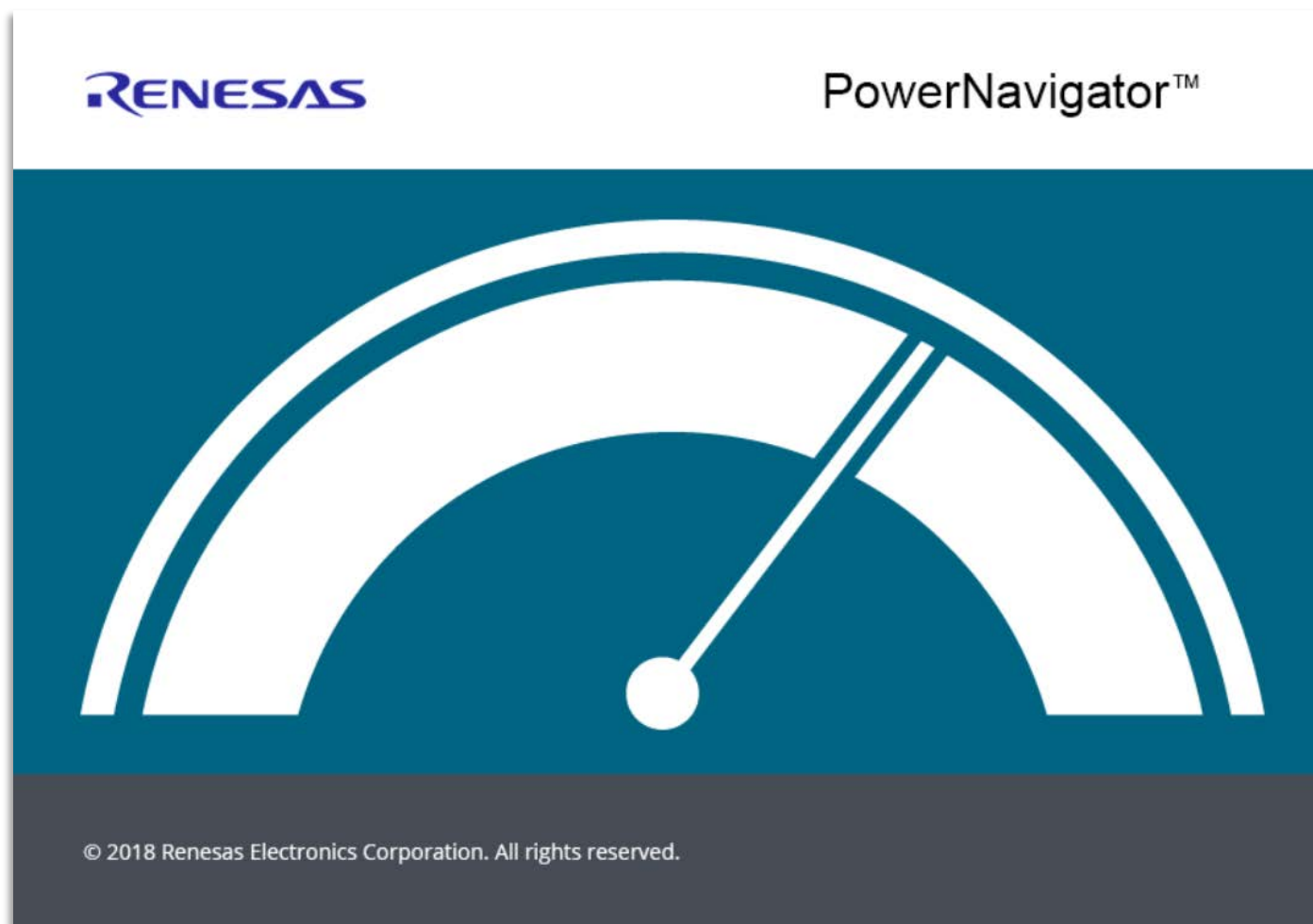
The screenshot displays the Rail Inspector software interface for the ISL68200-0 0x60 device. The main window has a sidebar with navigation options: Overview, Configuration, Telemetry, and Command Tools. The Configuration section is active, showing fields for Command Sets and Targets. A 'Search' button is highlighted with a red box. A callout box points to this button with the text: "Clicking 'Search' allows the user to quickly find any PMBus command the device supports".

The Command Search dialog box is open, showing a list of PMBus commands and their descriptions. The dialog has a title bar 'Command Search' and a subtitle 'ISL68200 0x60'. It includes radio buttons for 'Command Code', 'Command Name', 'Command Group', and 'Recent Use'. The 'Command Name' option is selected. The list of commands is as follows:

Command Code	Command Description
d4h: AV_GAIN	
03h: CLEAR_FAULTS	
d0h: ENABLE_PFM	
d3h: FAULT_BEHAVIOR	
33h: FREQUENCY_SWITCH	
adh: IC_DEVICE_ID	
aeh: IC_DEVICE_REVISION	
02h: ON_OFF_CONFIG	
01h: OPERATION	
98h: PMBUS_REVISION	
8ch: READ_IOUT	
dch: READ_PROG1	
ddh: READ_PROG2	
deh: READ_PROG3	
dfh: READ_PROG4	
8dh: READ_TEMP	
88h: READ_VIN	
8bh: READ_VOUT	
d6h: SET_RR	
d5h: SS_DVID_RATE	
78h: STATUS_BYTE	
d1h: TEMP_COMP	
d2h: ULTRASONIC_PFM_ENABLE	
21h: VOUT_COMMAND	
24h: VOUT_MAX	
20h: VOUT_MODE	

The dialog box also includes 'Ok' and 'Cancel' buttons at the bottom right.

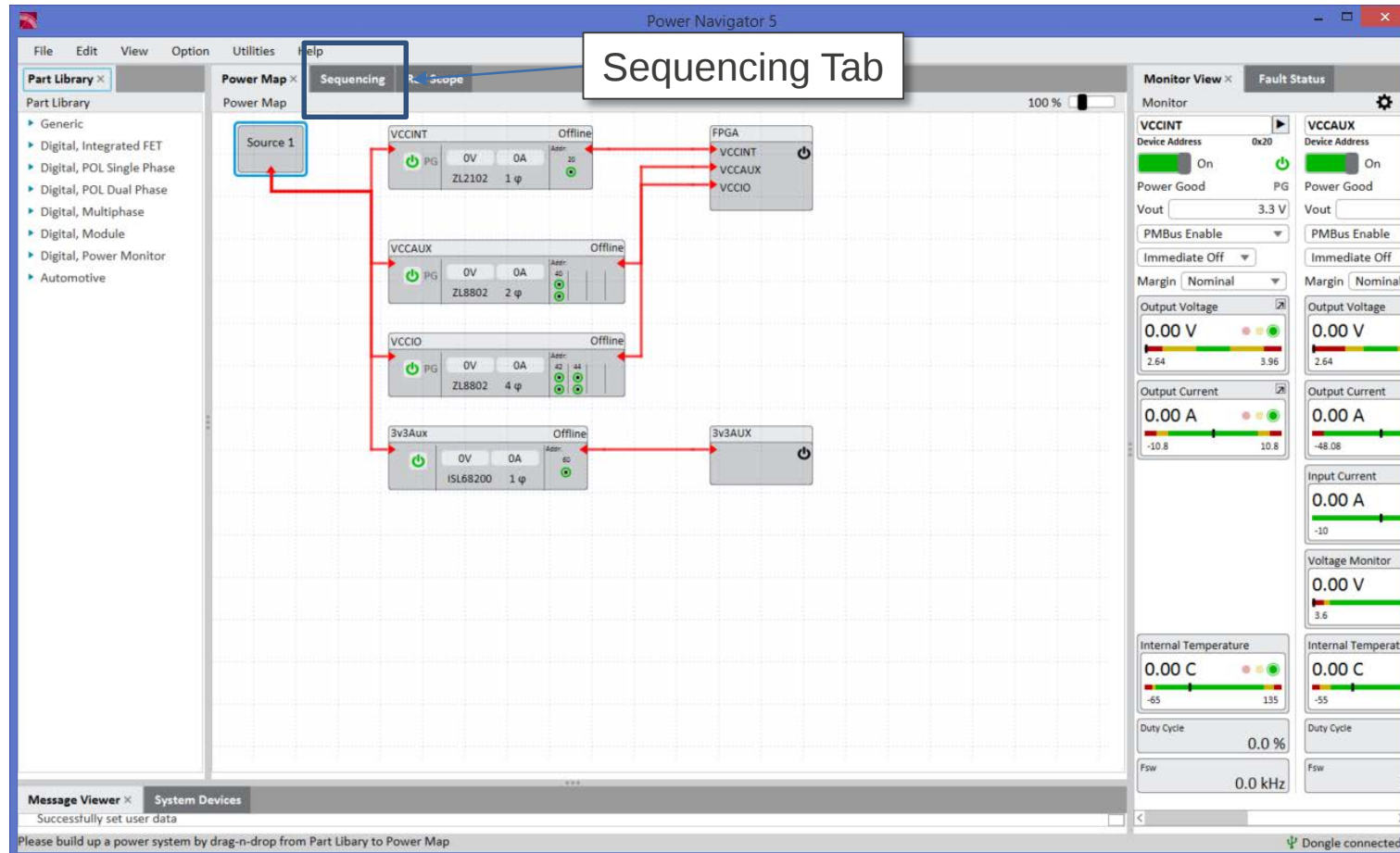
Sequencing



PowerNavigator – Sequencing

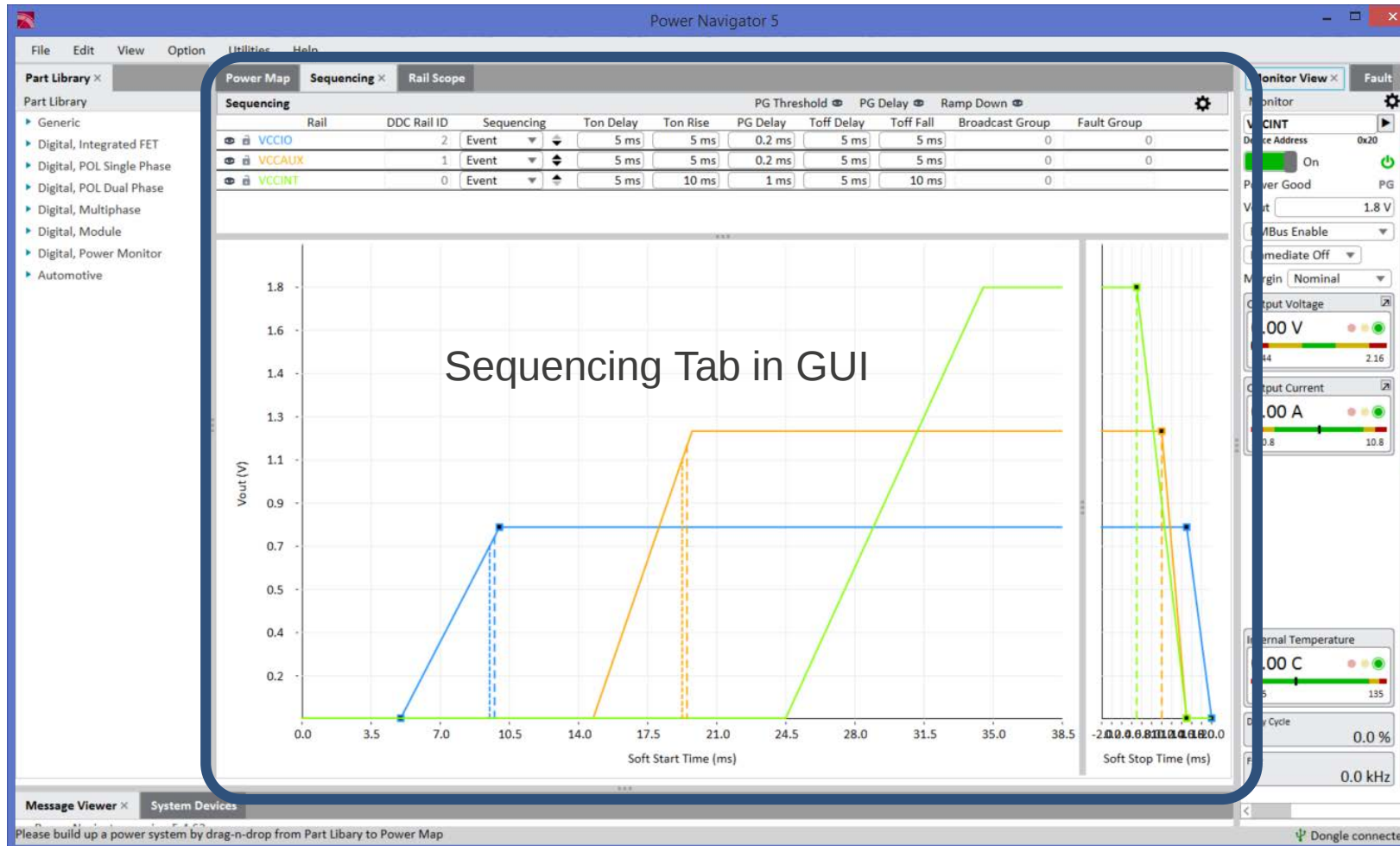
- All Renesas Digital Power Controllers and modules with a DDC bus support autonomous sequencing between rails.
- Sequencing is configured using the PowerNavigator sequencing tool.
- Once configured, all sequencing events are handled automatically using Renesas's proprietary DDC bus.
 - Controllers and/or modules will automatically communicate via DDC bus, synchronizing sequencing events.

PowerNavigator – System Screen



The sequencing tab allows for power up and power down sequencing of devices in the PowerMap.

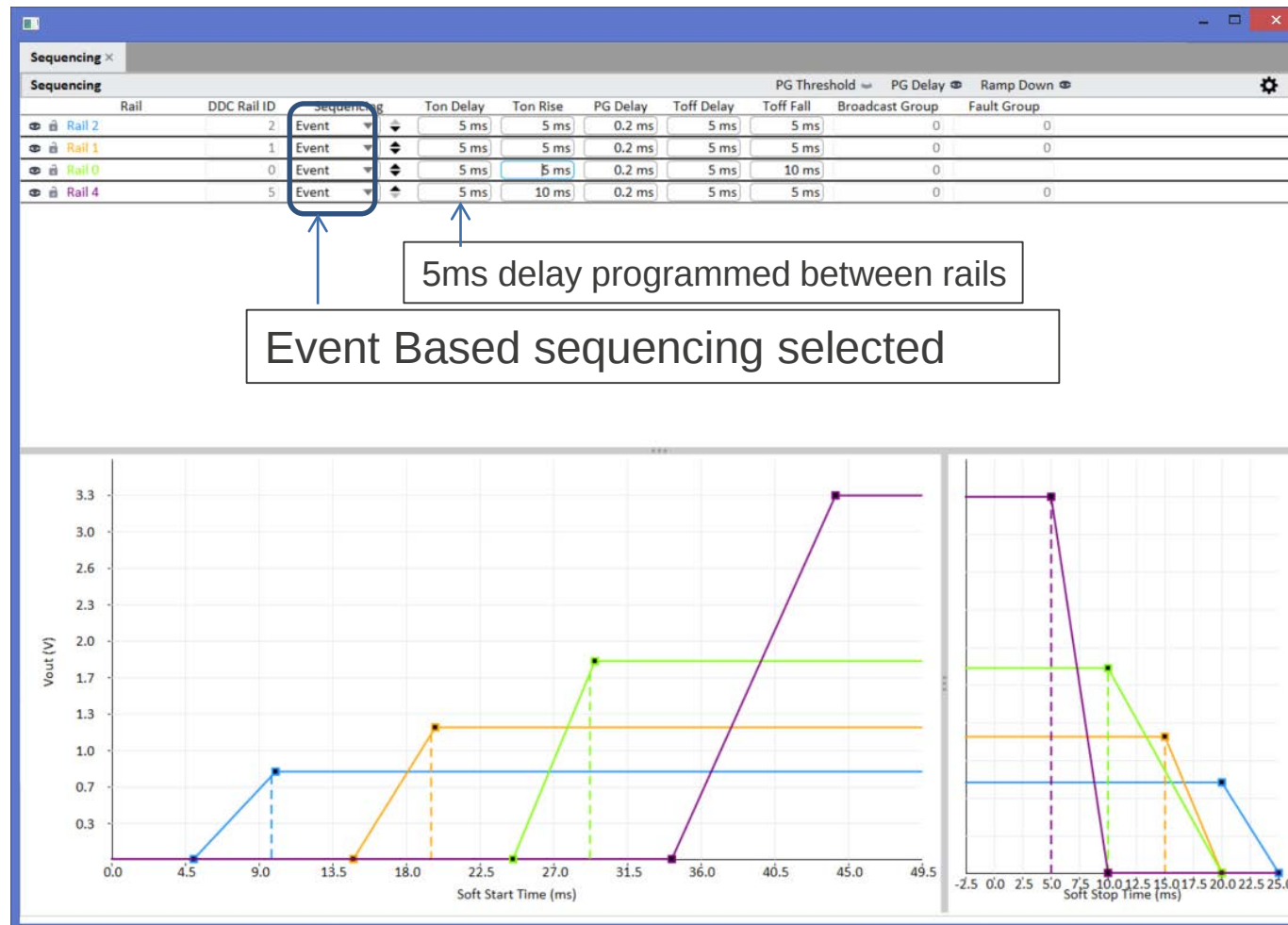
PowerNavigator GUI – Sequencing



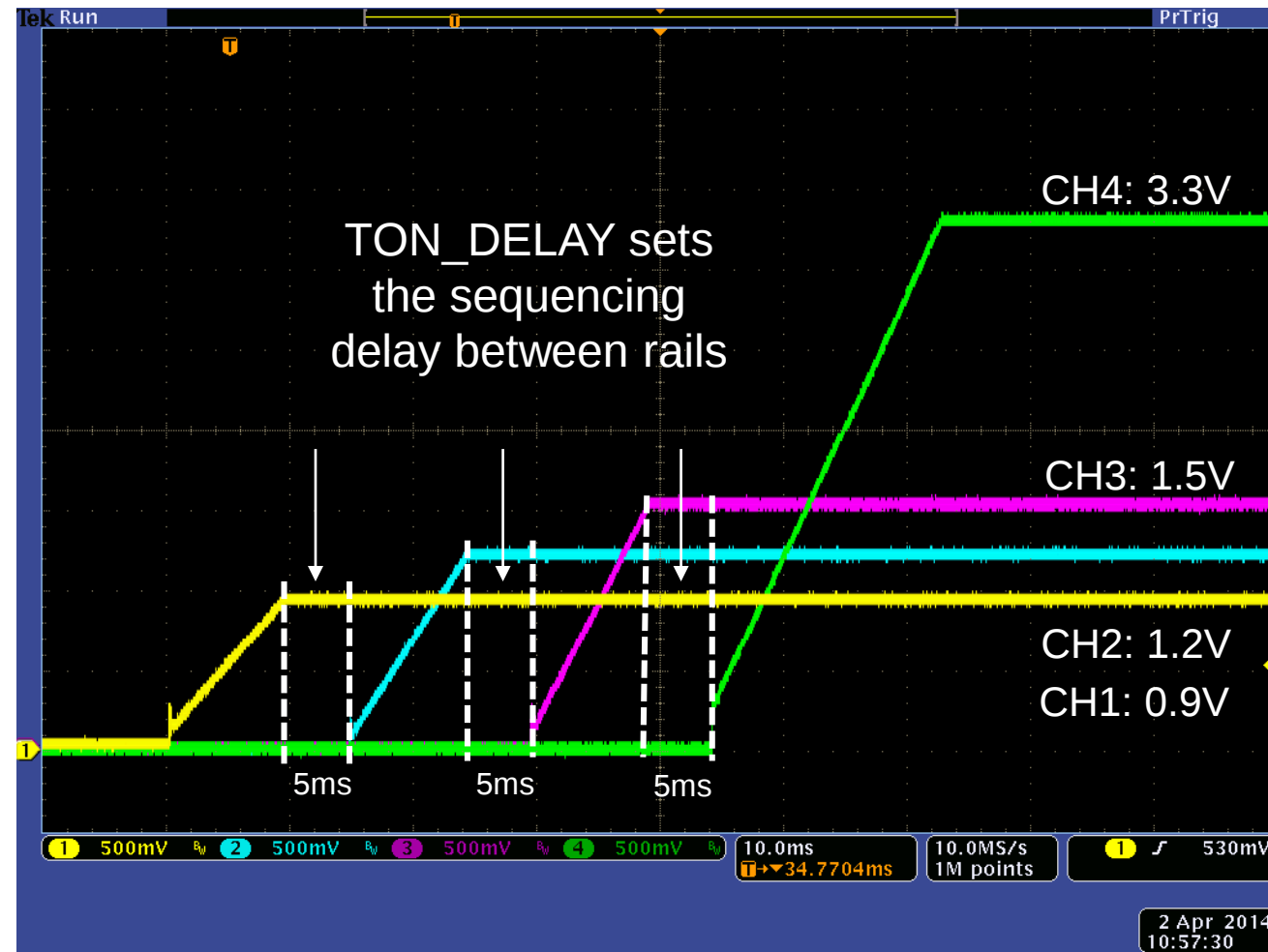
PowerNavigator – Sequencing

- Event based sequencing waits for the device PGOOD to transition high (the event) before sequential rails start-up
 - Sequence order is set by Prequel/Sequel using the SEQUENCE PMBus command
 - TON_DELAY is used to set the time delay between sequenced rails
- Timed based sequencing uses a timer from a global enable to sequence rails at start-up.
 - TON_DELAY sets the sequence order on the way up. TOFF_DELAY sets the order on the way down.

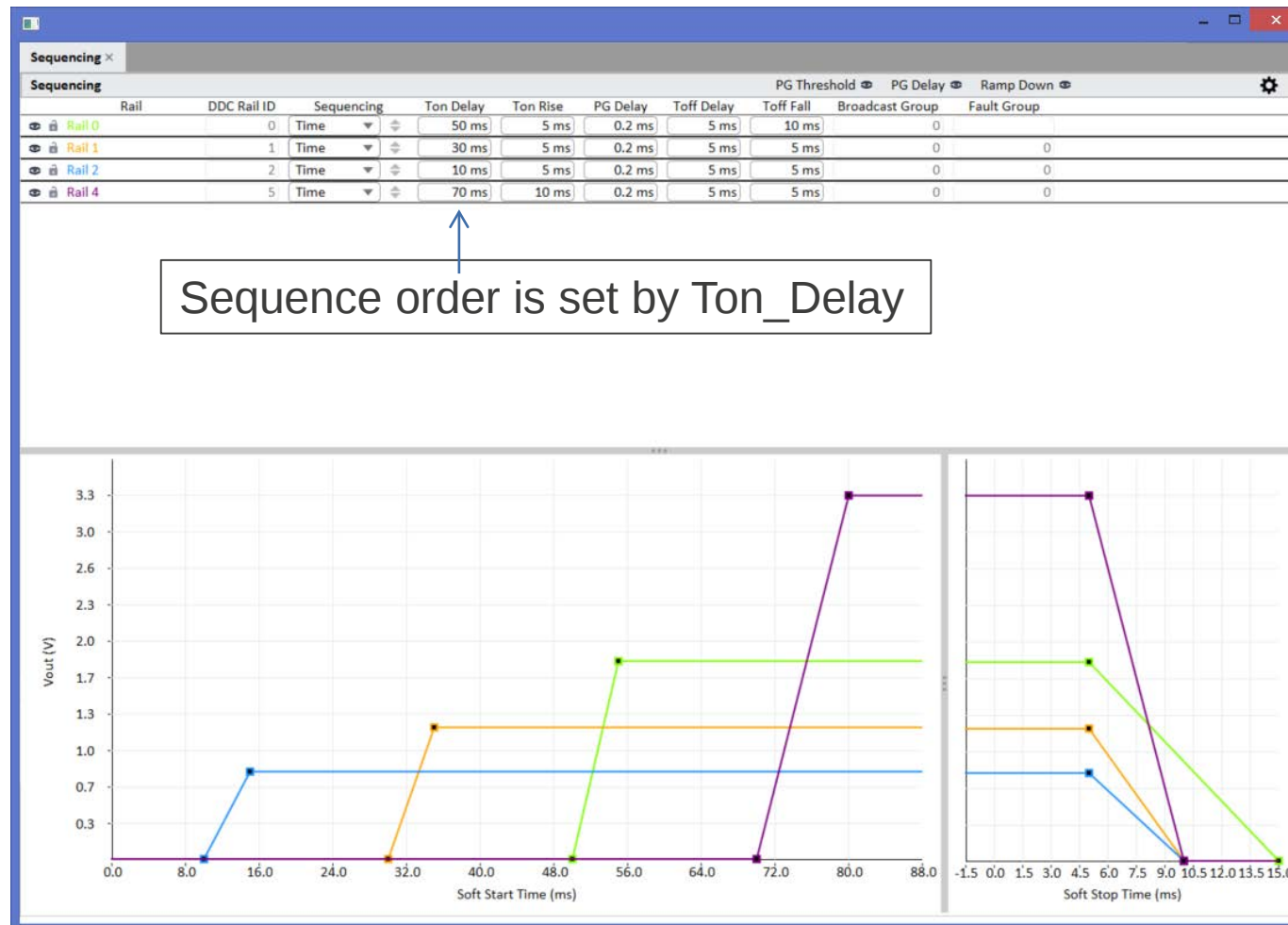
Event Based Sequence Example



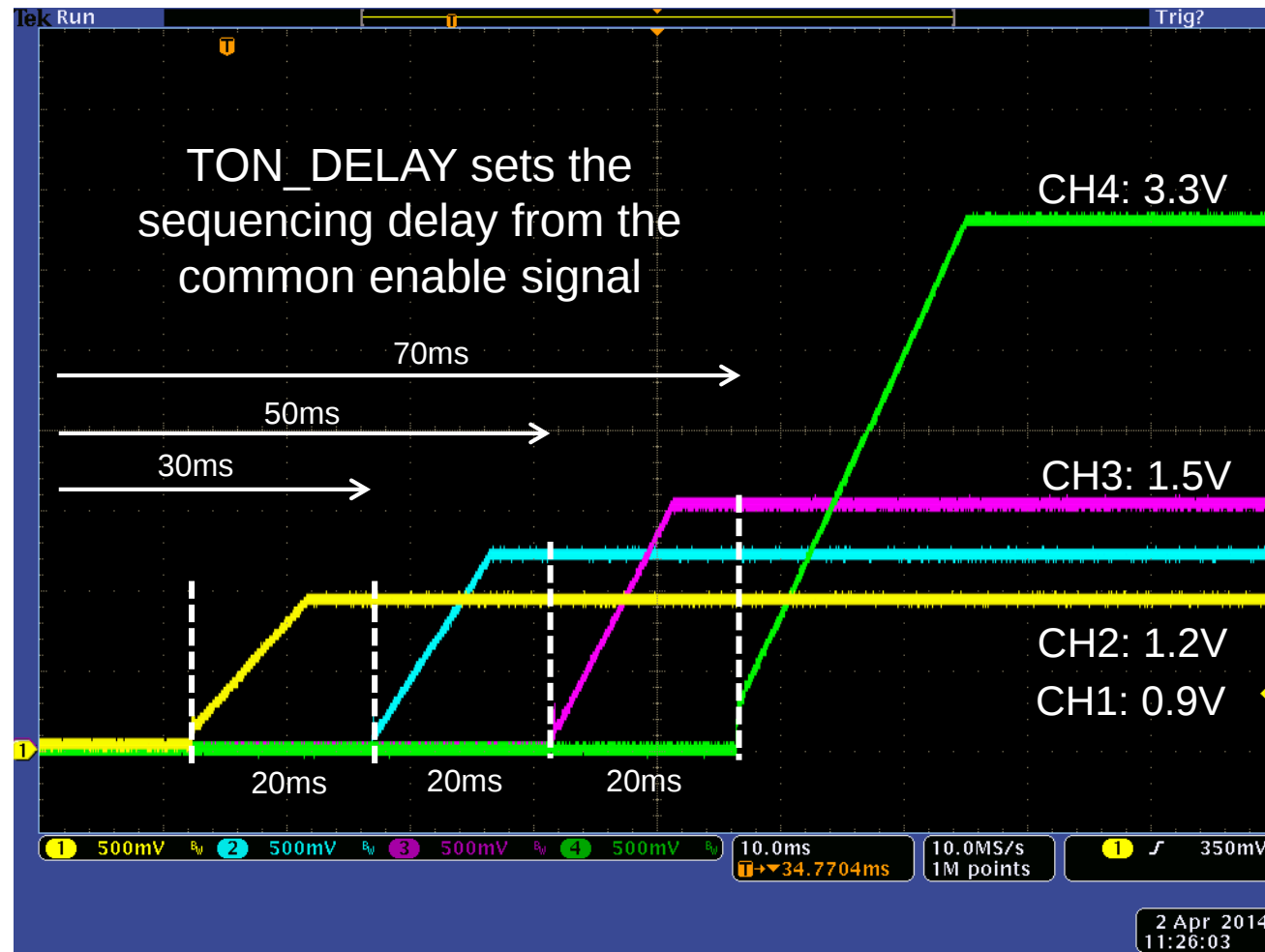
Event Based Sequence Example



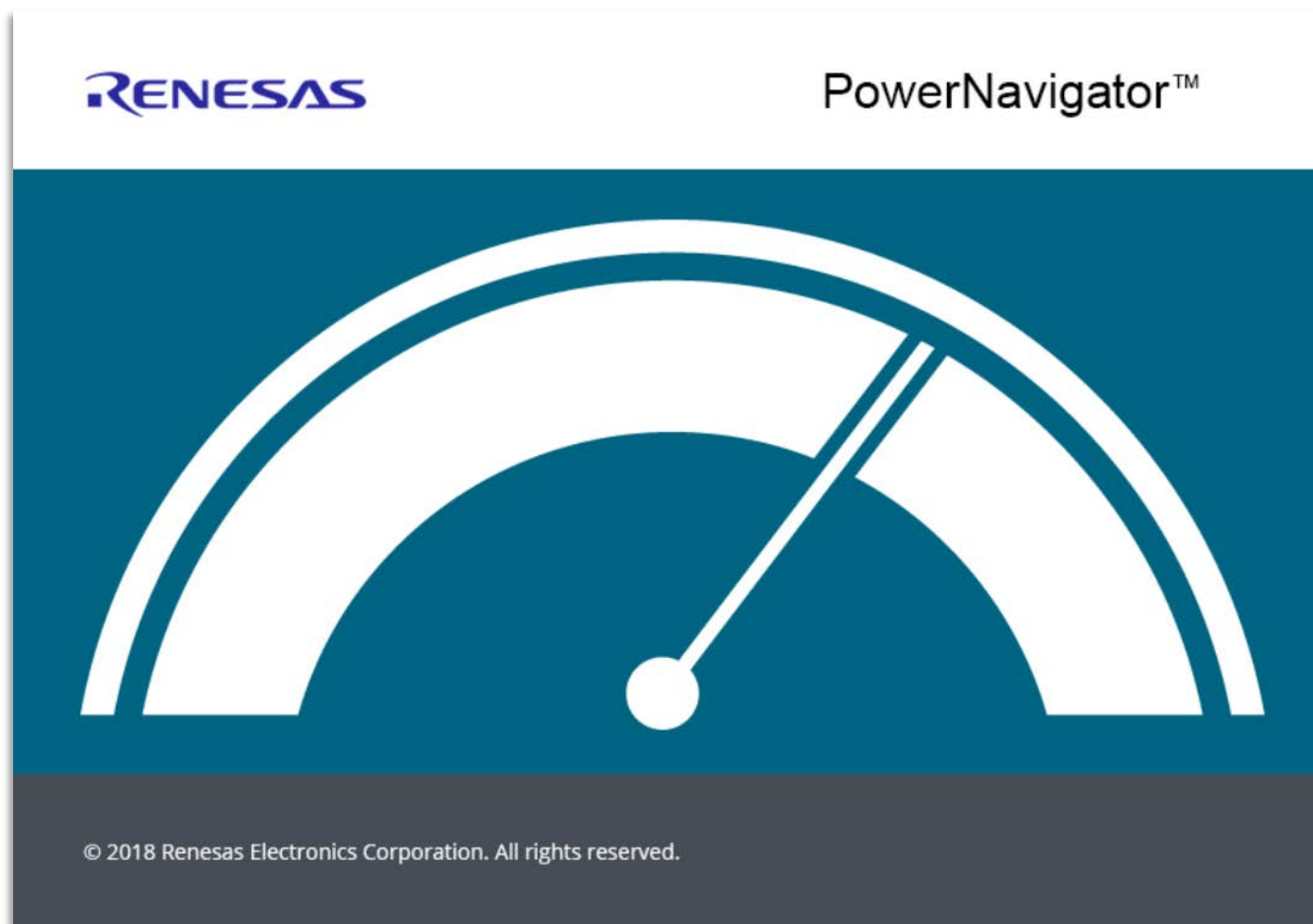
Time Based Sequence Example



Time Based Sequence Example



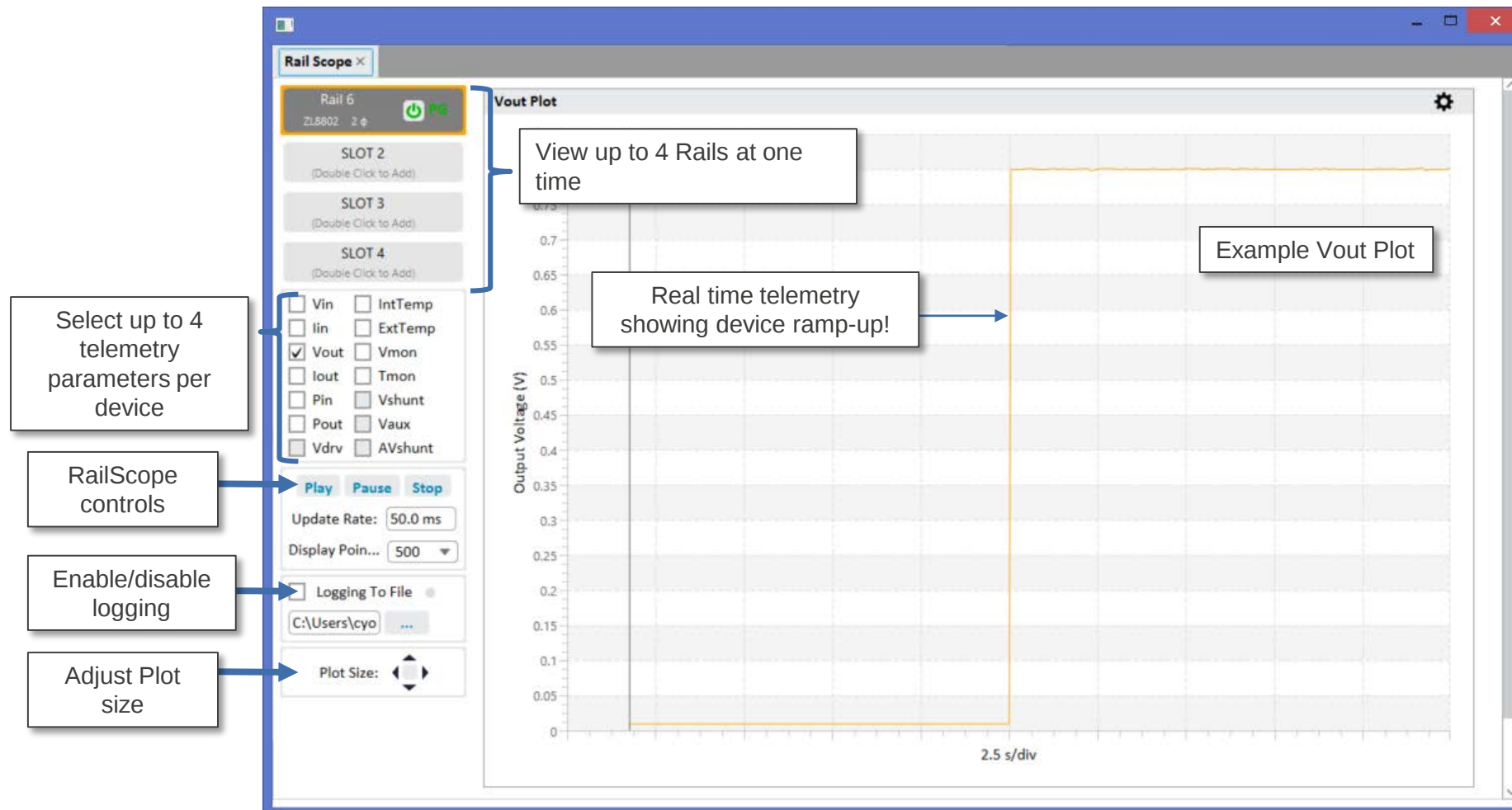
Railscope



PowerNavigator 5.4 – RailScope

- New RailScope allows the user to plot telemetry parameters from up to 4 devices.
 - Similar to a Low Bandwidth Oscilloscope integrated into PowerNavigator.
 - Allows user to plot multiple telemetry values at a time.
- Logging capability is also built-in.
 - All telemetry values can be logged to a .csv file for later viewing.
 - Status registers are also logged.
- Adjustable update rate allows users to control how much data they collect.
 - Data can be updated as fast as 1ms and as slow as 1000ms.
 - Displayed points can be as few as 50 to as many as 500.

PowerNavigator – RailScope



RailScope: Initial Setup

The screenshot shows the RailScope software interface. The main window is titled "RailScope" and contains a "Part Library" on the left, a "Power Map" and "Sequencing" section in the middle-left, and a large graph area on the right. The graph displays "Output Voltage (V)" on the y-axis (ranging from 0 to 0.85) and "Time" on the x-axis. A "Load Rail" dialog box is open in the center, prompting the user to "Please select a rail:" and "Please Choose Chart Style:". The dialog lists four rails: Rail 10 : ZL8802, Rail 11 : ZL8802, Rail 8 : ZL8802, and Rail 9 : ZL8802. The "No Selection" option is currently selected. The "Please Choose Chart Style:" section shows three options: Solid (selected), Dashed, and Dotted. The "Solid" option is highlighted with an orange color. The "Load Rail" dialog box has "Ok" and "Cancel" buttons at the bottom.

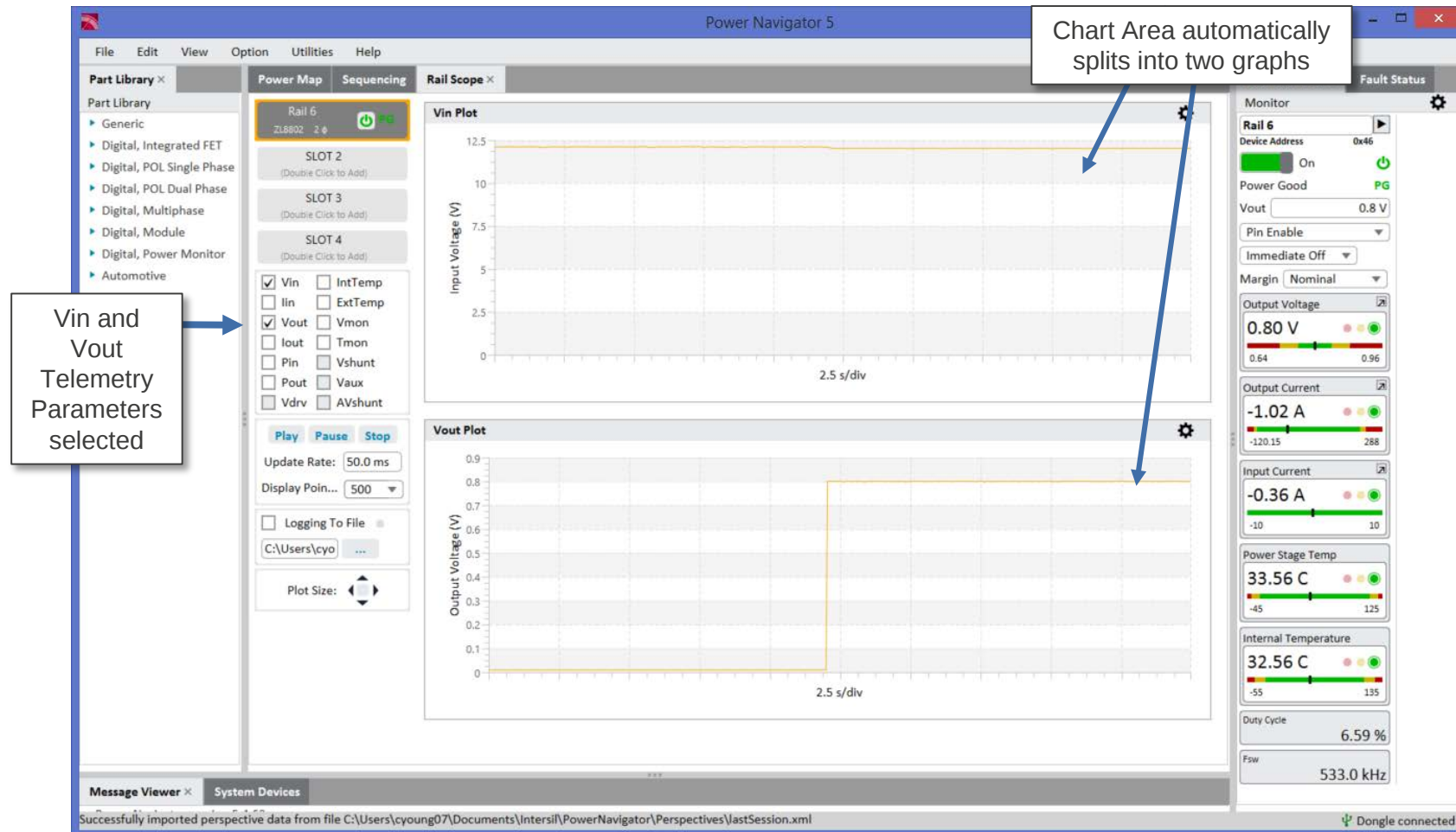
1 If RailScope is not visible, go to View->RailScope

2 Double Click on the "Slots" to add rails to RailScope

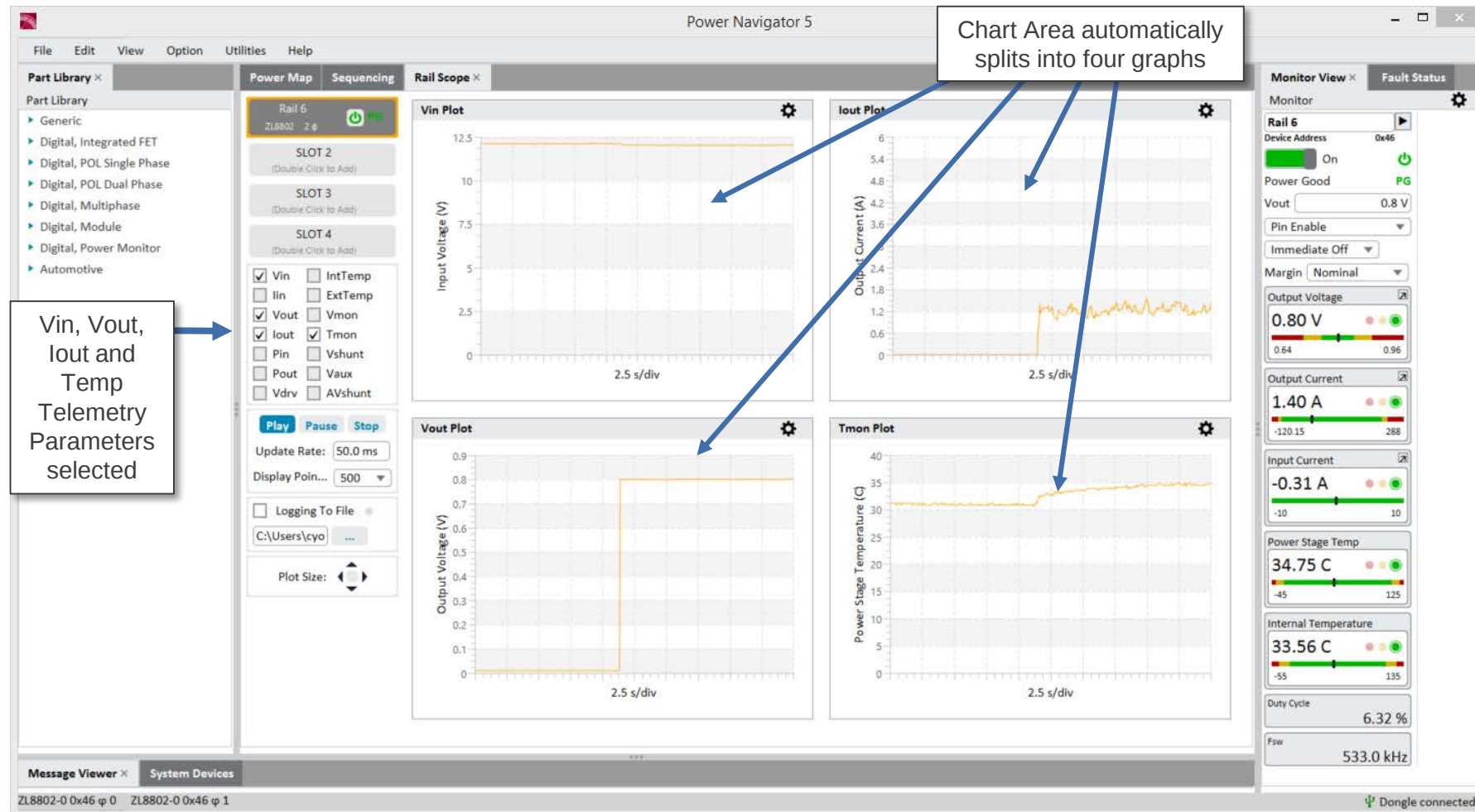
3 In "Load Rail" window, select rail to add to each

4 Click "Ok" when done

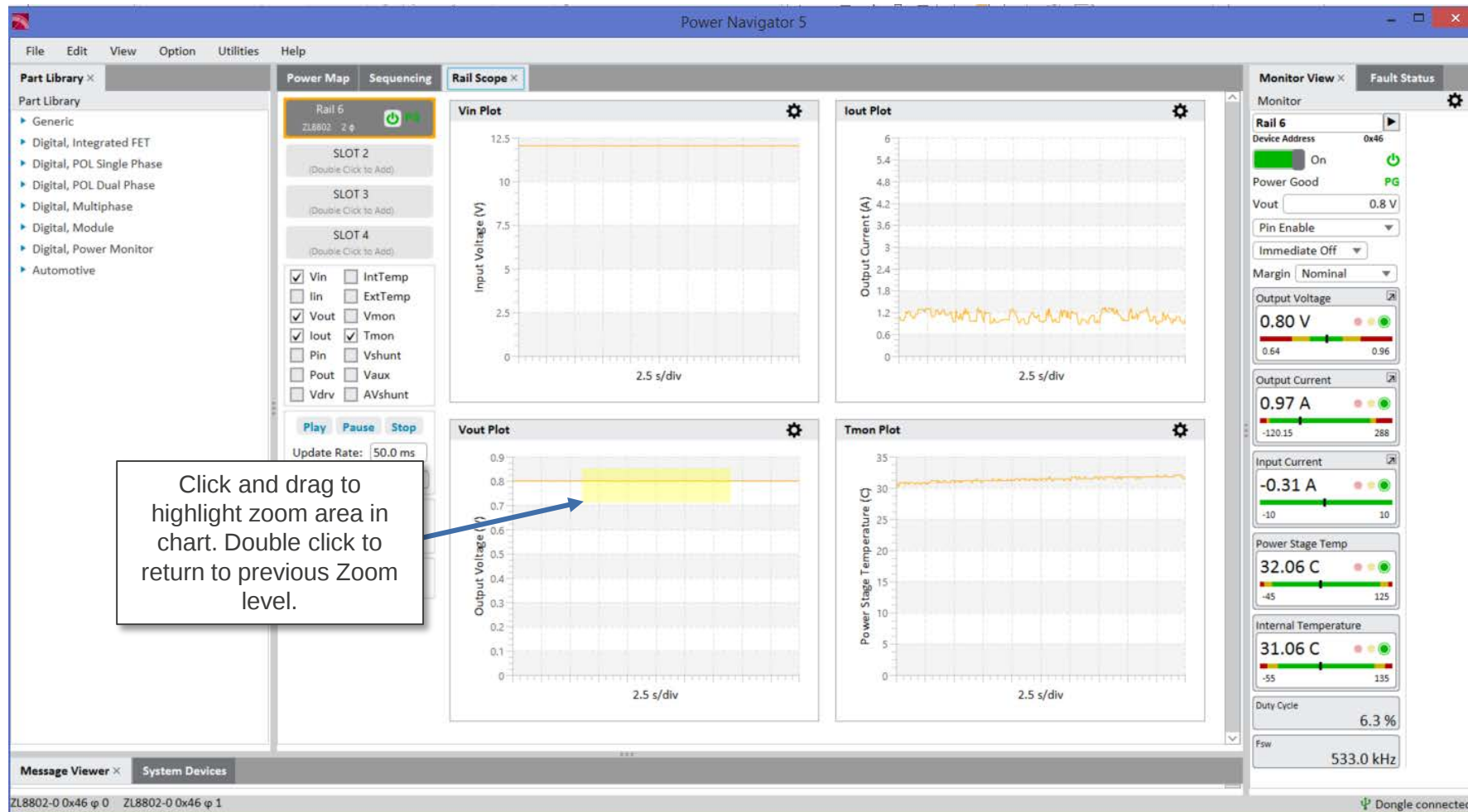
RailScope: 2 Telemetry Parameters



RailScope: 4 Telemetry Parameters



RailScope: Example Zoom-in



RailScope: Example X & Y-axis Scale Options

The screenshot shows the Power Navigator 5 software interface with the RailScope module active. The interface includes a Part Library, Power Map, Sequencing, and Monitor View tabs. The Rail Scope tab displays three plots: Vin Plot, Iout Plot, and Vout Plot. The Vin Plot shows Input Voltage (V) on the y-axis (0 to 12.5) and time on the x-axis (2.5 s/div). The Iout Plot shows Output Current (A) on the y-axis (0 to 6) and time on the x-axis (2.5 s/div). The Vout Plot shows Output Voltage (V) on the y-axis (0 to 0.9) and time on the x-axis (2.5 s/div). A 'Set Bounds for Vout' dialog box is open, showing the 'Auto Ranging' checkbox checked, with 'Lower bound: 0.0' and 'Upper bound: 5.0'. Annotations explain the following:

- Click Toolbox icon to bring up y-axis limits box (points to the gear icon in the Vout Plot toolbar).
- When "Auto Ranging" check box is clicked, PowerNavigator will auto-set y-axis scale (points to the 'Auto Ranging' checkbox in the dialog).
- Unchecking "Auto Ranging" box allows user to set upper and lower bounds (points to the 'Lower bound' and 'Upper bound' input fields).
- X-axis scale is set by update rate and display point user settings (points to the 'Update Rate: 50.0 ms' and 'Display Poin...: 500' settings in the Sequencing tab).

The Monitor View tab shows various status indicators: Rail 6 (Device Address: 0x46), Output Voltage (0.80 V), Power Stage Temp (34.75 C), Internal Temperature (33.56 C), Duty Cycle (6.32 %), and Fsw (533.0 kHz). A 'Dongle connected' status is also shown at the bottom right.

RailScope: Logging Feature

- Once enabled, logging feature will automatically log all selected telemetry parameters and the STATUS_WORD register for each device.
- All data is saved to a .csv file, which can be opened in Excel for later data analysis.
 - Once the .csv file size exceeds 50MB, a new file will automatically be created.
 - There is no limit on how long logging can run for.
- The log file name and path can be changed by the end user.



RailScope: Example Log File

PN5p2_TelemetryLog.0.0.csv [Read-Only] - Excel

Log started											
23/04/2015 10:58:04.0225	VCCIO_STATUS	VCCIO_Vin	VCCIO_Vout	VCCIO_Iout	VCCIO_IntTemp	AUX_STATUS	AUX_Vin	AUX_Vout	AUX_Iout	AUX_IntTemp	CORE_STATUS
23/04/2015 10:58:04.0265	0x0000	11.921875	0.800292969	-0.048583984	32.1875	0x0000	11.890625	1.001953125	0.373046875	51.125	0x0000
23/04/2015 10:58:04.0467	0x0000	11.921875	0.799682617	-0.047790527	31.71875	0x0000	11.875	1.001953125	0.387695313	51.625	0x0000
23/04/2015 10:58:04.0667	0x0000	11.9375	0.799682617	-0.047363281	31.84375	0x0000	11.890625	1.003540039	0.320800781	51.625	0x0000
23/04/2015 10:58:04.0867	0x0000	11.953125	0.800292969	-0.047485352	32.125	0x0000	11.890625	1.003540039	0.334472656	51.125	0x0000
23/04/2015 10:58:05.0067	0x0000	11.9375	0.800048828	-0.04876709	31.90625	0x0000	11.890625	1.005249023	0.386230469	51.625	0x0000
23/04/2015 10:58:05.0268	0x0000	11.921875	0.800292969	-0.047485352	31.9375	0x0000	11.890625	1.003540039	0.357421875	51.625	0x0000
23/04/2015 10:58:05.0468	0x0000	11.921875	0.801513672	-0.049682617	32.0625	0x0000	11.890625	1.003540039	0.37890625	51.625	0x0000
23/04/2015 10:58:05.0669	0x0000	11.921875	0.800048828	-0.047790527	31.71875	0x0000	11.890625	1.005249023	0.374023438	51.125	0x0000
23/04/2015 10:58:05.0869	0x0000	11.9375	0.800048828	-0.047485352	31.71875	0x0000	11.890625	1.001953125	0.358886719	51.125	0x0000
23/04/2015 10:58:06.0069	0x0000	11.9375	0.799682617	-0.048400879	31.9375	0x0000	11.890625	1.003540039	0.329101563	51.625	0x0000
23/04/2015 10:58:06.0269	0x0000	11.96875	0.800048828	-0.04510498	31.625	0x0000	11.890625	1.003540039	0.37890625	51.125	0x0000
23/04/2015 10:58:06.0471	0x0000	11.953125	0.800048828	-0.046142578	31.9375	0x0000	11.890625	1.003540039	0.427246094	51.125	0x0000
23/04/2015 10:58:06.0671	0x0000	11.921875	0.80065918	-0.048156738	31.78125	0x0000	11.890625	1.003540039	0.387695313	51.625	0x0000
23/04/2015 10:58:06.0871	0x0000	11.9375	0.800048828	-0.047363281	31.84375	0x0000	11.890625	1.003540039	0.368164063	51.125	0x0000

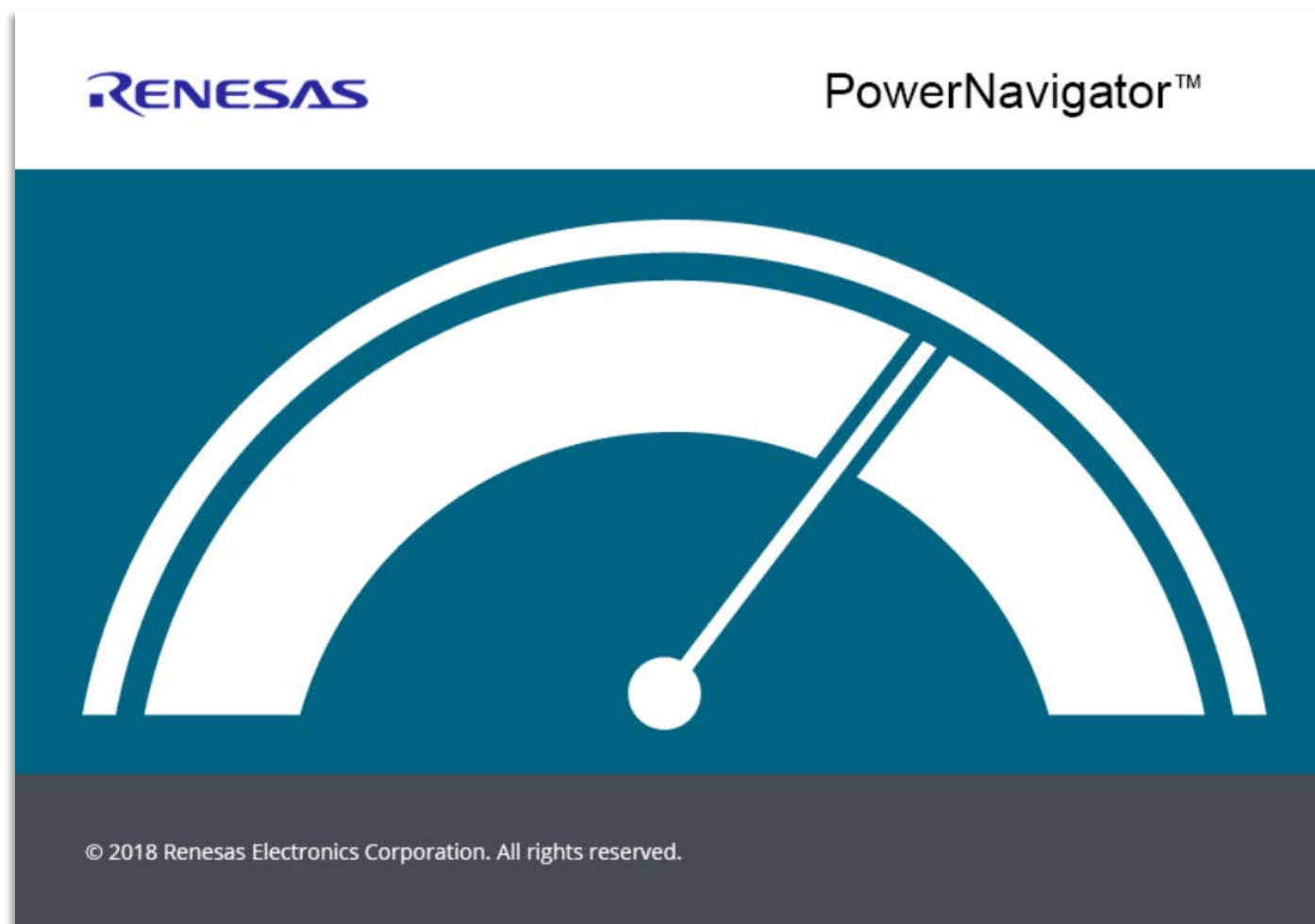
Telemetry parameters for "VCCIO" rail

Telemetry parameters for "AUX" rail

Each telemetry entry is time stamped

Rail name can be set by user (taken from PowerMap)

HEX File Creation



Configuration File Overview

- Renesas Digital Power controllers use configuration files to program important device parameters.
 - Configuration files are basically a list of PMBus commands defining device operation. i.e. $V_{out_Command} = 1.0V$, $I_{out_Cal_Gain} = 0.5mV/A$, etc.
- Device configuration only needs to be done one time – programmed parameters are stored inside non-volatile memory for future use. NVM supports multiple writes and is re-programmable.
- Several Options are available for programming devices in a production environment.

Programming Devices in Manufacturing Environment

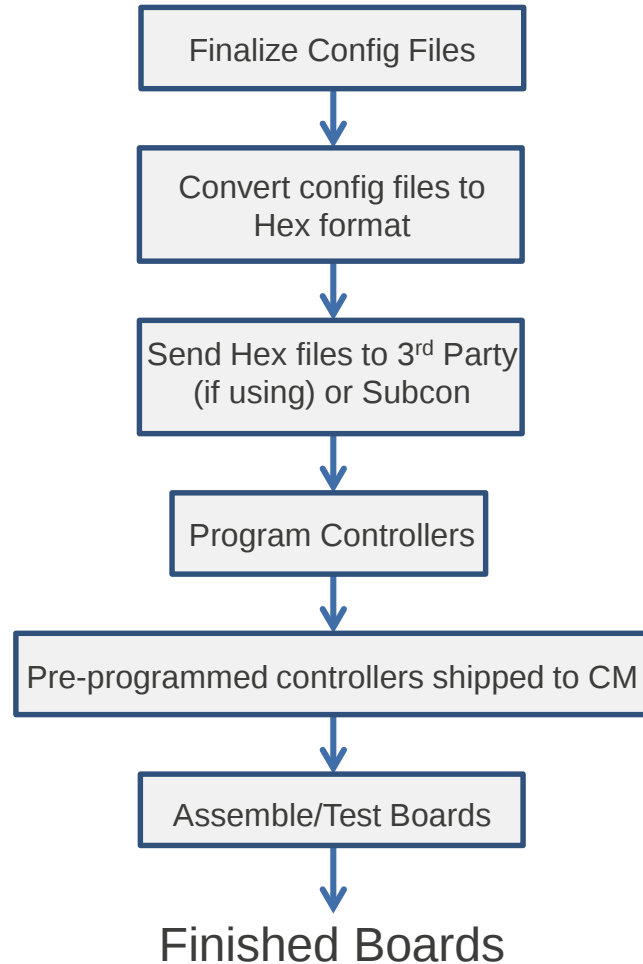
Option 1: Program controllers pre-board assembly

- Devices are programmed on a high speed production programmer before being assembled on a board.
- Can use a supported 3rd party programming house OR offline programmer at sub-contractor.

Option 2: Program controllers after board assembly

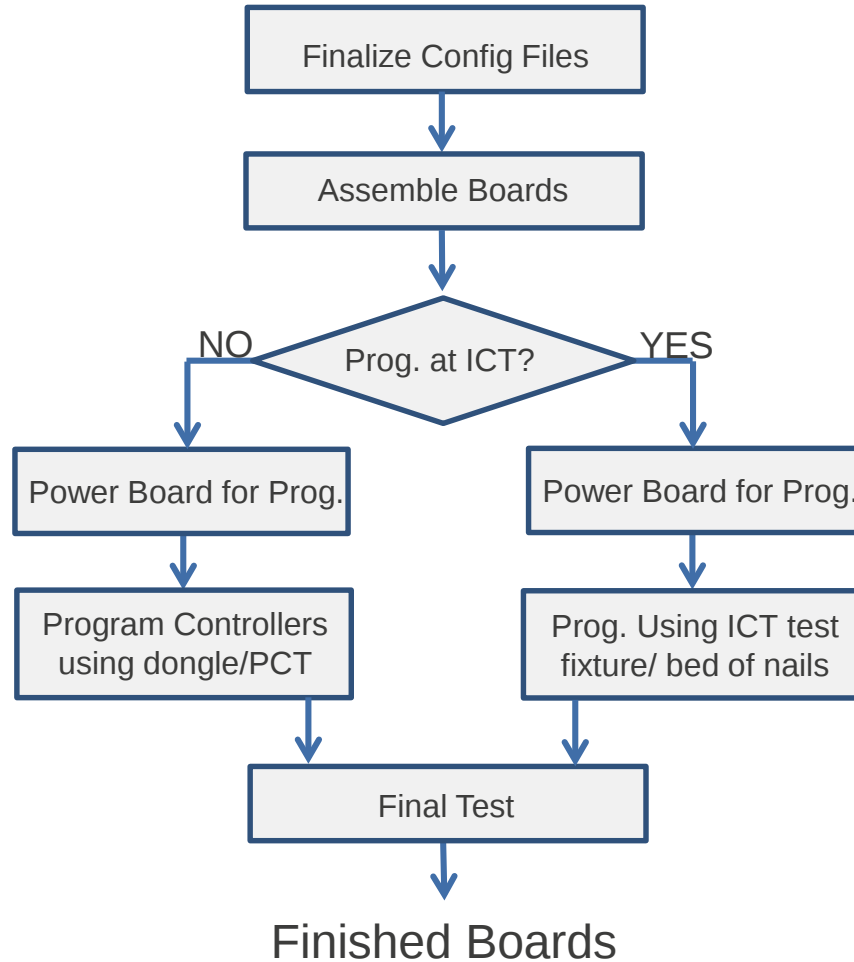
- Devices are programmed on PCB post board assembly
- Can be done at ICT (using a bed of nails approach or onboard microcontroller) OR using Renesas dongle and Production Configuration Tool (PCT).
- Requires board to be powered up with all controllers DISABLED until they are fully programmed.

Typical Flow – Pre-Programmed Devices



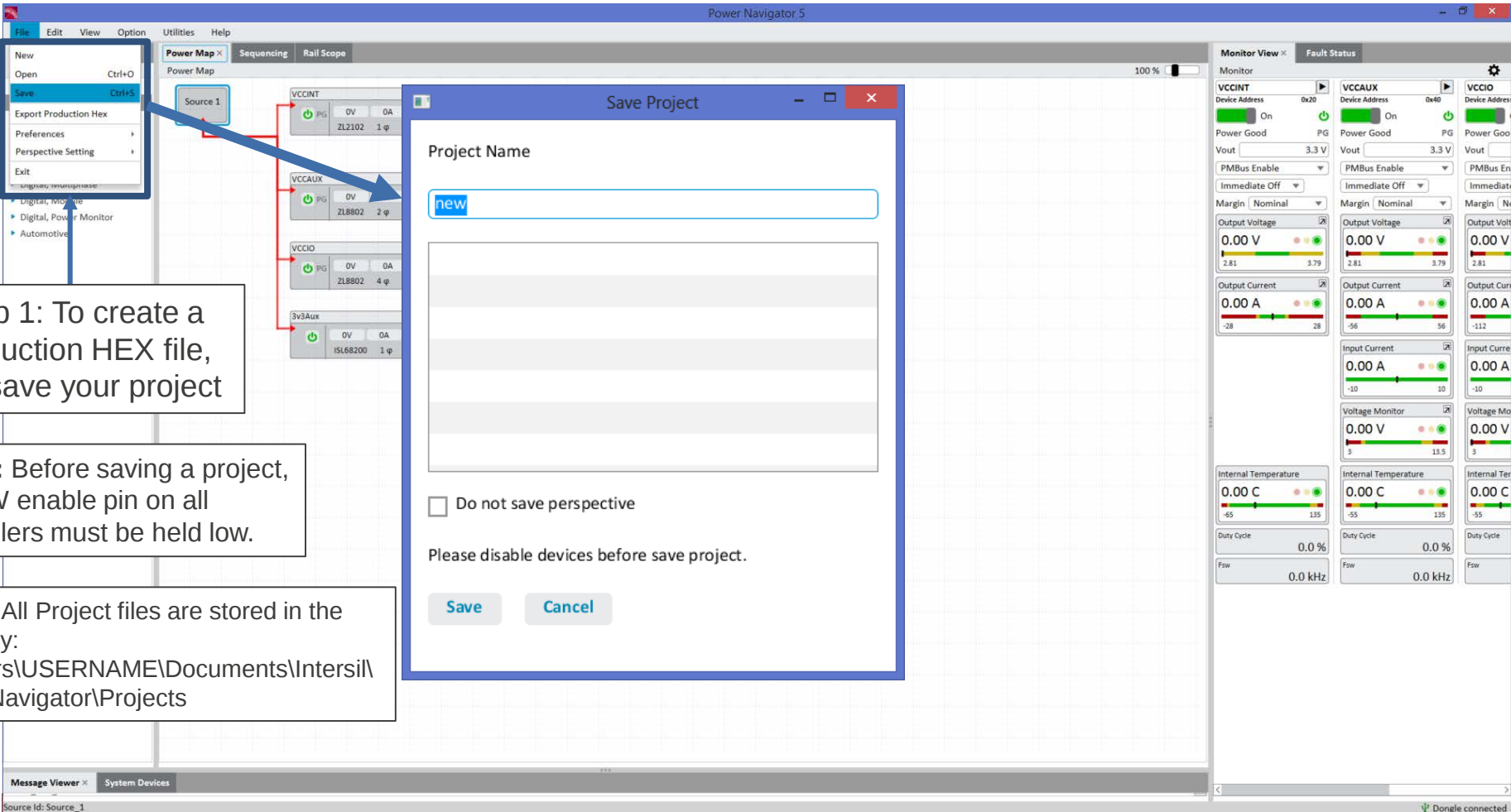
- Controllers are programmed prior to PCB manufacture.
- Hex files are created using PowerNavigator software (File->Export Production Hex).
- Programming is done either with a 3rd party or using offline programmer at subcon.
- Typical programming time: 4-7 seconds per device.
- Individual part numbers are assigned to each device after programming to make sure boards are assembled correctly.

Typical Flow – Programming Parts on Board



- Controllers are programmed after board assembly.
- Typical Programming time: 5-10s per device.
- Simplified inventory and configuration file management.
- Controllers must be powered to program, but output must remain disabled until part is fully programmed.
- Special attention to sequencing must be made when using self-enabled parts.

HEX File Creation – Step 1, Project Save



Step 1: To create a production HEX file, first save your project

NOTE: Before saving a project, the HW enable pin on all controllers must be held low.

NOTE: All Project files are stored in the directory:
C:\Users\USERNAME\Documents\Intersil\PowerNavigator\Projects

Save Project

Project Name

new

☐ Do not save perspective

Please disable devices before save project.

Save Cancel

Monitor View

VCCINT VCCAUX VCCIO

Device Address 0x20 0x40 0x40

Power Good On On On

Vout 3.3 V 3.3 V 3.3 V

PMBus Enable Immediate Off Immediate Off

Output Voltage 0.00 V 0.00 V 0.00 V

Output Current 0.00 A 0.00 A 0.00 A

Input Current 0.00 A 0.00 A 0.00 A

Voltage Monitor 0.00 V 0.00 V 0.00 V

Internal Temperature 0.00 C 0.00 C 0.00 C

Duty Cycle 0.0 % 0.0 % 0.0 %

Fsw 0.0 kHz 0.0 kHz 0.0 kHz

Message Viewer System Devices

Source Id: Source_1

Dongle connected

HEX File Creation – Step 2, Export HEX Files

Step 2: Go to File -> Export Production Hex

Click "Export"

Export Production Hex

This utility converts configuration data saved in human-readable format into the proper hex format used for production programming.

What is the programming address? The PMBus address during production programming can differ from the in-system address. A programming socket might use address 0x20 while final in-system address is 0x36. Ask your programming house which address is needed.

Project location: C:\Users\cyoung07\Documents\Intersil\PowerNavigator\Projects\example

Select	Device	Rail(s)	Programming Address (for programming house only)	Output Hex Filename (.hex)
☒	ZL2102-0 0x20	VCCINT	0x20	ZL2102-0
☒	ZL8802-0 0x40	VCCAUX	0x20	ZL8802-0
☒	ZL8802-1 0x42	VCCIO	0x20	ZL8802-1
☒	ZL8802-2 0x44	VCCIO	0x20	ZL8802-2

NOTE: All Production HEX files are stored in the saved project folder, located in the directory:
C:\Users\USERNAME\Documents\Intersil\PowerNavigator\Projects

Export

Example HEX File Creation

Export Production Hex

This utility converts configuration data saved in human-readable format into the proper hex format used for production programming.

What is the programming address? The PMBus address during production programming can differ from the in-system address. A programming socket might use address 0x20 while final in-system address is 0x36. Ask your programming house which address is needed.

Project location: C:\Users\cyoung07\Documents\Intersil\PowerNavigator\Projects\example

Select	Device	Rail(s)	Programming Address (for programming house only)	Output Hex Filename (.hex)
☒	ZL2102-0 0x20	VCCINT	0x20	ZL2102-0
☒	ZL8802-0 0x40	VCCAUX	0x20	ZL8802-0
☒	ZL8802-1 0x42	VCCIO	0x20	ZL8802-1
☒	ZL8802-2 0x44	VCCIO	0x20	ZL8802-2

Devices from PowerMap automatically populated

Programming address is address used on High Speed programmer socket

HEX file name can be set by user

Export

Example Configuration File

```
# ZL8800-0 0x28
# connected: true
# DEVICE_ID
# IC_DEVICE_ID
# IC_DEVICE_REV
# 2014/01/16 17:55:45000
RESTORE_FACTORY
STORE_DEFAULT_ALL
STORE_USER_ALL
### Begin User Store
RESTORE_USER_ALL

# Global commands
FREQUENCY_SWITCH          0xfa50
VIN_OV_FAULT_LIMIT        0xd380
VIN_OV_FAULT_RESPONSE     0x80
VIN_OV_WARN_LIMIT         0xd360
VIN_UV_WARN_LIMIT         0xca5e
VIN_UV_FAULT_LIMIT        0xca4c
VIN_UV_FAULT_RESPONSE     0x80
IIN_CAL_GAIN              0xba00
USER_GLOBAL_CONFIG        0x80
VMON_OV_FAULT_RESPONSE    0x80
VMON_UV_FAULT_RESPONSE    0x80
PRIVATE_PASSWORD
PUBLIC_PASSWORD
```

ZL8800----01.04
0x49A02400
0x01040000

Header information with device type,
FW version, creation date, etc.

← This sequence of commands is
used to clear contents of NVM.

Programmed device parameters

296 kHz
14 V
13.5 V
4.734 V
4.594 V
1 mV/A

Example HEX File

```
000340F499
000440F10087
0003401530
000440F10087
000340112C
000440F10087
00054046C0DB82
0005404B80D562
000540E720DBE2
000540E800D628
000440D80193
00054038E9C295
0005403924C4E8
000540D0C0AB01
000440DCAC8D
000D40D50940CC7BF0AEFC60997B74
000540D750A2C9
000340112C
000440F10087
0003401225
000440F10087
```

Configuration file translated into machine readable HEX format.

BIG IDEAS FOR EVERY SPACE

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