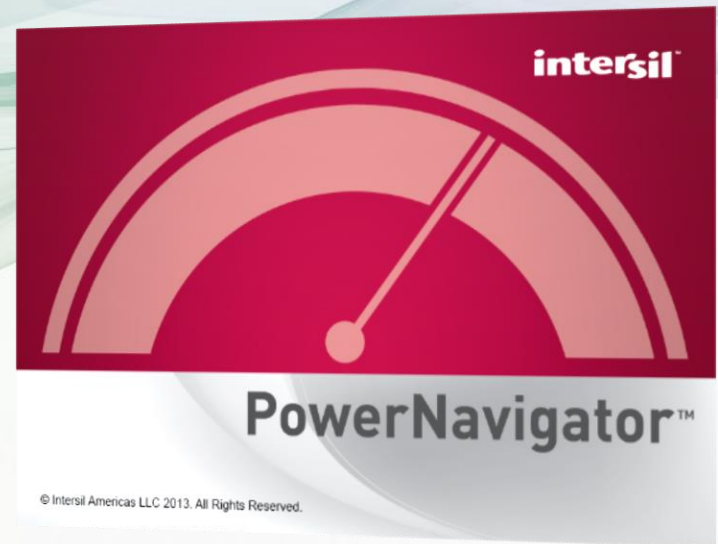


PowerNavigator 5.2

User Guide

July 2015



Overview

- **This guide walks a user through the steps to setup and configure a digital power device using Intersil's 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
 - 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 5.2 Launch Screen

Connected Devices

Offline Mode

Project Load

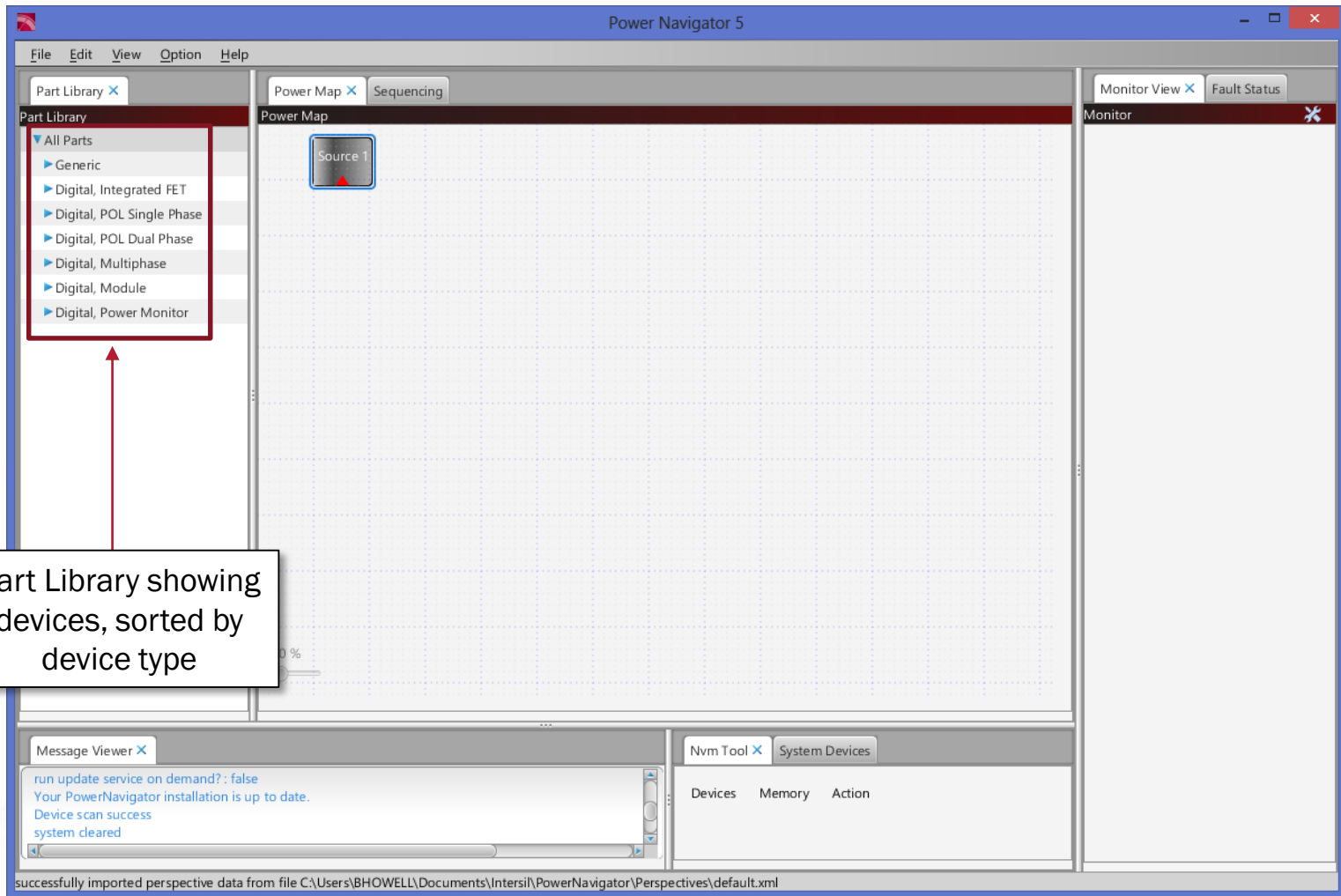
The screenshot displays the PowerNavigator 5.2 Launch Screen with three main sections:

- Scan Devices:** A section with a 'Scan Devices' header, a list of devices, and a 'Scan Again' button. Below it is a 'Monitor Hardware' button.
- Build Offline System:** A section with a 'Build Offline System' header, a 'Part Library' table, a 'Dashboard' table, and a 'Monitor: Rail 12V' table. It also features a circuit diagram for 'System: White Lightning' and a 'Build New System' button.
- Projects:** A section with a 'Projects' header, a list of projects, and an 'Open Project' button.

A callout box points to the 'Build New System' button and the 'Start' button, containing the text: "Click on 'Build New System' and then 'Start'".

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

PowerNavigator 5.2 – System Screen



Part Library showing devices, sorted by device type

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

PowerNavigator 5.2 – System Screen

The screenshot displays the PowerNavigator 5.2 interface. On the left is the Part Library, with 'ZL2102' selected under 'Digital, POL Dual Phase'. The main area is the Power Map, which contains a 'Source 1' component and a small black square. A red dashed arrow points from the 'ZL2102' entry to the black square, and another red arrow points from the 'Source 1' component to the same black square. The Monitor view on the right is currently empty. The bottom of the screen features a Message Viewer with system logs and a System Devices panel with tabs for 'Nvm Tool' and 'System Devices', and sub-tabs for 'Devices', 'Memory', and 'Action'.

1. Grab any device or label and drag and drop into the PowerMap

2. Drop onto any node identified by a black square.

PowerNavigator 5.2 – System Screen

The screenshot displays the PowerNavigator 5.2 interface. On the left is the Part Library, with 'ZL8801' selected. The main area shows a Power Map with a 'Source 1' and a 'Rail 0' (ZL2102) component. A 'Layout assistant' is visible as a small green square on the Power Map. The right side features a Monitor View for 'Rail 0' with various gauges: Output Voltage (0.00 V), Output Current (0.00 A), Input Voltage (0.00 V), Temperature, Duty Cycle (0.0%), and Fsw (0.0 kHz). The bottom section shows a Message Viewer and System Devices table.

Drop parts on this node to cascade rails

Devices from the same source can be added here

Layout assistant will automatically appear when adding parts to PowerMap

Devices	Memory	Action
ZL2102 0x20	User	Store Restore

PowerNavigator 5.2 – System Screen

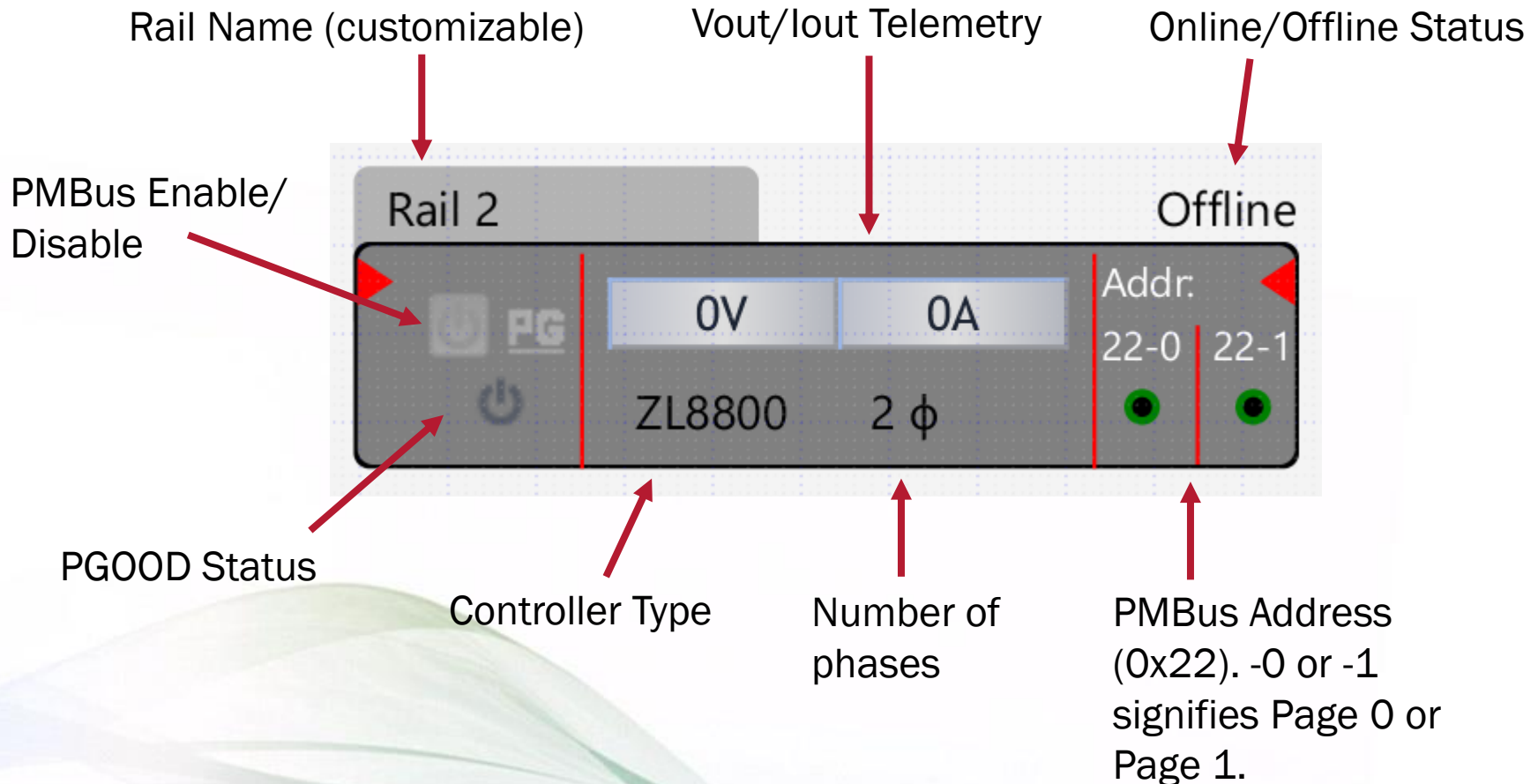
The screenshot displays the PowerNavigator 5.2 interface. The main window is titled "Power Navigator 5" and contains a "Power Map" view. On the left, a "Part Library" pane lists various components, including "ZL2101", "ZL2102", "ZL8800", "ZL8801", "ZL9006M", and "ISL8271M". The "Power Map" area shows four "RailBlock" components: "Rail 0" (ZL2102, 1 φ, Addr: 20), "Rail 1" (ZL8801, 2 φ, Addr: 21), "Rail 2" (ISL8271M, 1 φ, Addr: 22), and "Rail 3" (ZL9006M, 1 φ, Addr: 23). Each rail block is currently set to "Offline". A "Source 1" component is also visible. On the right, a "Monitor" panel displays real-time data for "Rail 3", including "Output Voltage" (0.00 V), "Output Current" (0.00 A), and "Input Voltage" (0.00 V). The "Monitor" panel also shows "Temperature" and "Duty Cycle" (0.0 %). At the bottom, a "Message Viewer" pane shows log messages: "Created Rail 1: ZL8801-0 0x21", "Created Rail 2: ISL8271M-0 0x22", and "Created Rail 3: ZL9006M-0 0x23". A "System Devices" table is also visible at the bottom right.

Individual RailBlock for each device

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

PowerMap RailBlock Overview

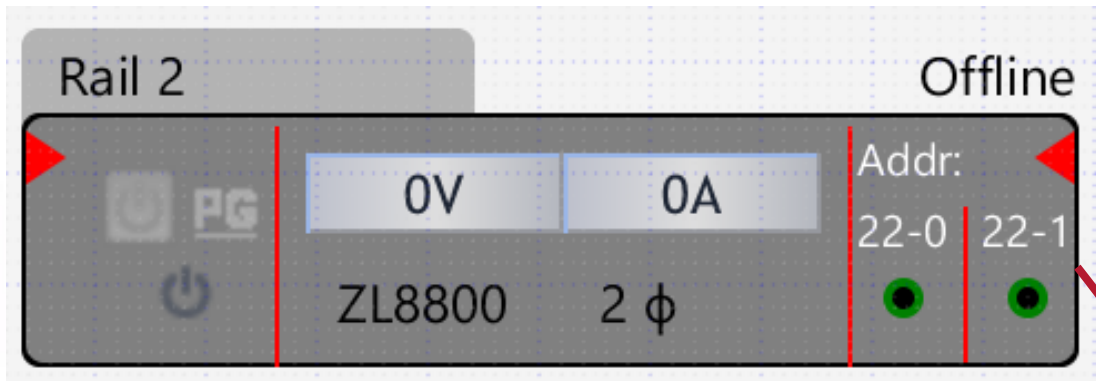
Example ZL8800 RailBlock (2-PH operation):



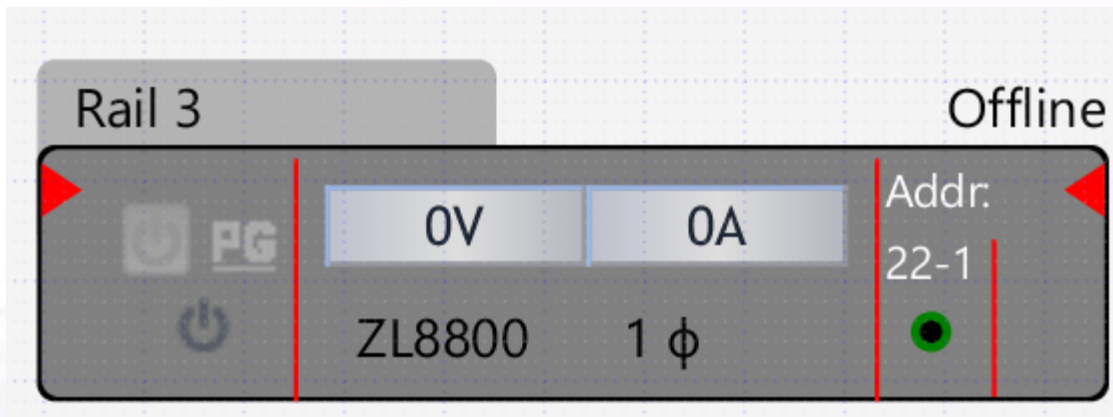
PowerMap RailBlock Overview

Example ZL8800 RailBlock (2-CH operation):

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

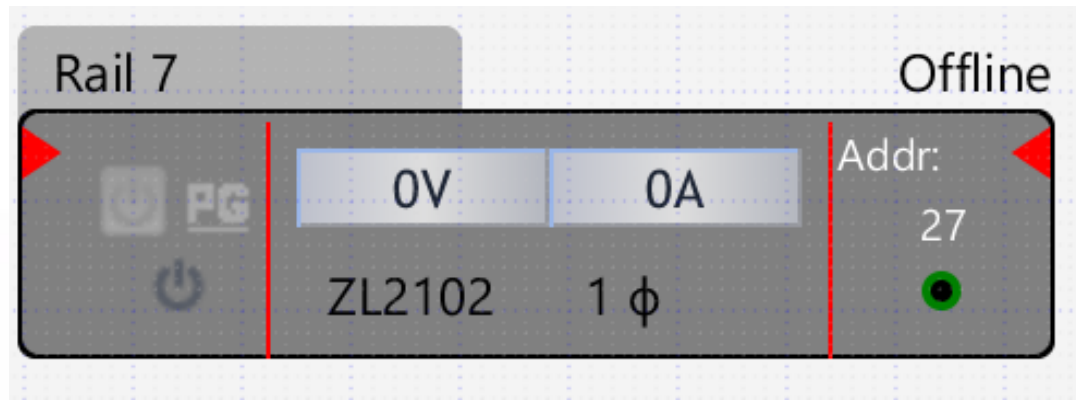


Drag "Phase Dot" to change from 2-phase to 2-Channel operation



PowerMap RailBlock Overview

Example ZL2102 RailBlock:



- Controllers which do not support current share will only have one “slot”.
- In this case, we have a single phase ZL2102 controller at PMBus address 0x27.

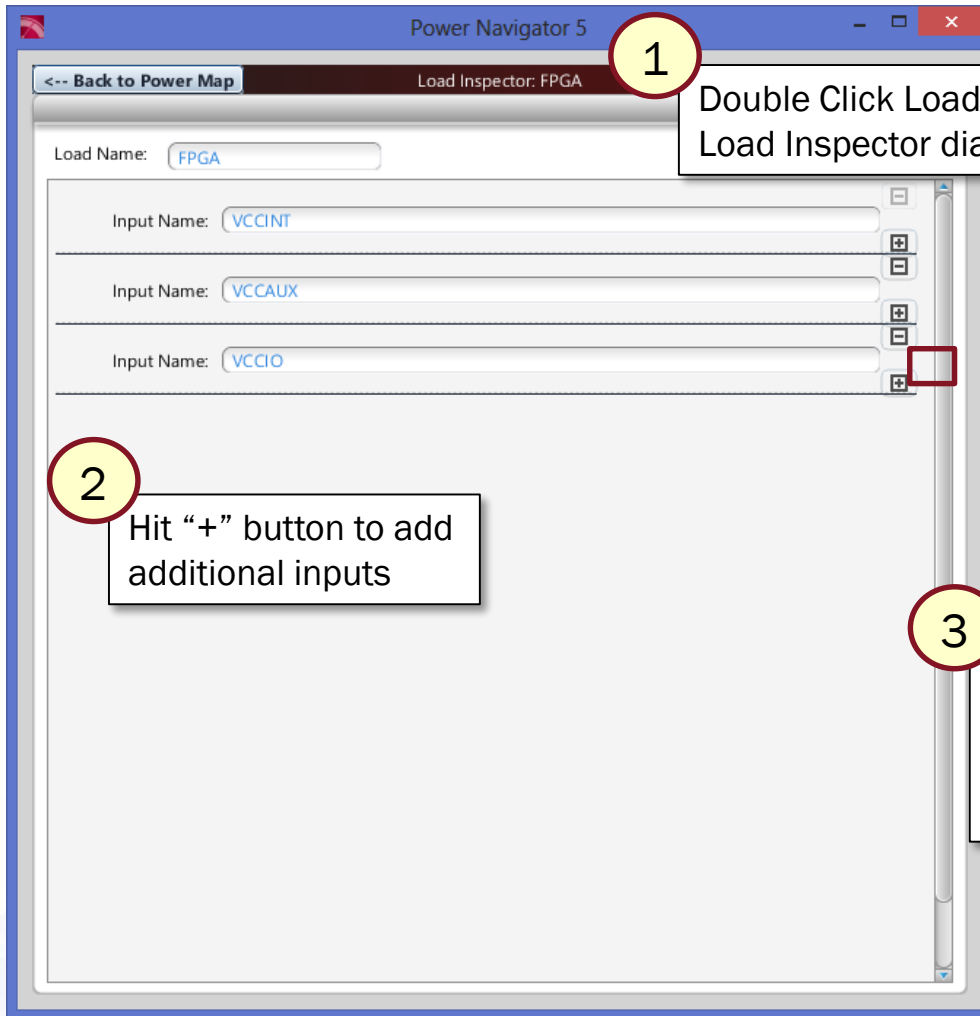
PowerNavigator 5.2 – System Screen

The screenshot displays the PowerNavigator 5.2 software interface. The main window is titled "Power Navigator 5" and contains several panels:

- Part Library:** A tree view on the left showing categories like "All Parts", "Generic", "Load", "Rail", "Source", and "Digital, Integrated FET".
- Power Map:** The central workspace showing a power map with four rails (Rail 0, Rail 1, Rail 2, Rail 3) and a "Load 1" block. A red dashed arrow points from the "Load" category in the Part Library to the "Load 1" block. A red arrow points from the "Load 1" block to the text "Load block".
- Monitor View:** A panel on the right showing real-time monitoring data for "Rail 3", including "Vout" (3.3 V), "Pin Enable", "Soft Off", "Margin" (Nominal), "Output Voltage" (0.00 V), "Output Current" (0.00 A), "Input Voltage" (0.00 V), "Temperature", "Duty Cycle" (0.0 %), and "Fsw" (0.0 kHz).
- Message Viewer:** A panel at the bottom left showing system messages: "Created Rail 1: ZL8801-0 0x21", "Created Rail 2: ISL8271M-0 0x22", and "Created Rail 3: ZL9006M-0 0x23".
- Nvm Tool:** A panel at the bottom right showing a table of system devices with columns for "Devices", "Memory", and "Action".

Load Blocks represent system load. Double Click to add additional inputs.

Multi-input Load Boxes



1

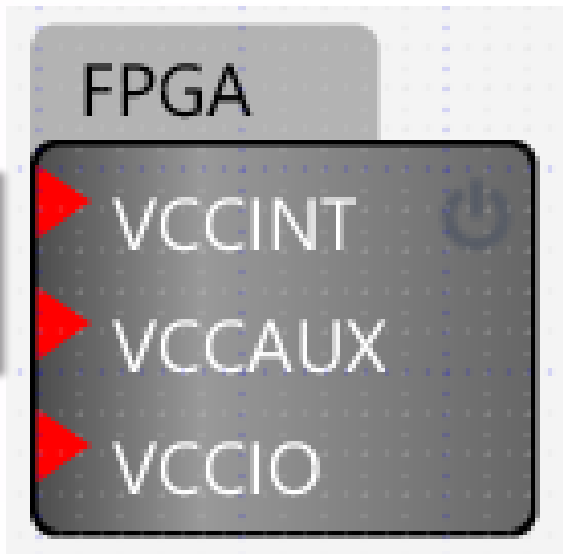
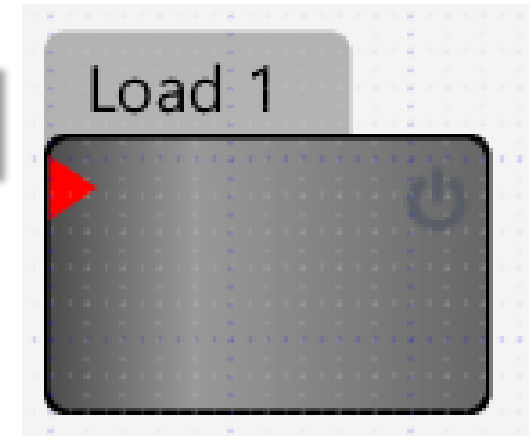
Double Click Load to bring up Load Inspector dialog box

2

Hit "+" button to add additional inputs

3

Additional inputs are now added to load box



PowerNavigator 5.2 – System Screen

The screenshot displays the PowerNavigator 5.2 software interface. The main window is titled "Power Navigator 5" and contains several panels:

- Part Library:** A sidebar on the left showing a tree view of components under "Generic", "Digital, Integrated FET", "Digital, POL Single Phase", "Digital, POL Dual Phase", "Digital, Multiphase", and "Digital, Module".
- Power Map:** The central workspace showing a "Power Map" with a "Source 1" block connected to four rails: Rail 0 (ZL2102, 1 ϕ), Rail 1 (ZL8801, 2 ϕ), Rail 2 (ISL8271M, 1 ϕ), and Rail 3 (ZL9006M, 1 ϕ). A "Multi-input Load Box" is connected to the rails, containing an "FPGA" block (with VCCINT, VCCAUX, and VCCIO pins) and a "3v3AUX" block (with an AUX pin).
- Monitor View:** A panel on the right showing "Rail 0" monitoring. It includes an "Enable" button, "Power Good" indicator, "Vout" set to 3.3 V, "Pin Enable" dropdown, "Immediate Off" dropdown, "Margin" set to "Nominal", and three meters: "Output Voltage" (0.00 V), "Output Current" (0.00 A), and "Input Voltage" (0.00 V).
- Message Viewer:** A panel at the bottom left showing system messages: "Created Rail 2: ISL8271M-0 0x22", "Created 3v3AUX", and "Created Rail 3: ZL9006M-0 0x23".
- System Devices:** A panel at the bottom right showing a table of devices:

Device	Address	Connec...	Send All	Read All
ZL2102	0x20	Offl...	Send...	Read...
ZL8801	0x21	Offl...	Send...	Read...

Source Id: Source_1

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

PowerNavigator 5.2 – System Screen

The screenshot displays the PowerNavigator 5.2 software interface. The main window is titled "Power Navigator 5" and contains several panels:

- Part Library:** A tree view on the left showing various power components like "Load", "Rail", "Source", and several digital power modules (ZL2101, ZL2102, ZL8800, ZL8801, ISL8270M, ISL8271M, ISL8272M, ZL9006M, ZL9010M, ZL9011M, ZL9117).
- Power Map:** The central workspace showing a "Source 1" connected to four rails: Rail 0 (ZL2102, 1 phase), Rail 1 (ZL8801, 2 phase), Rail 2 (ISL8271M, 1 phase), and Rail 3 (ZL9006M, 1 phase). Each rail is currently "Offline". There are also FPGA and 3v3AUX components shown.
- Monitor View:** A panel on the right showing real-time data for "Rail 0":
 - Enable button
 - Power Good (PG) indicator
 - Vout: 3.3 V
 - Pin Enable dropdown
 - Immediate Off dropdown
 - Margin: Nominal
 - Output Voltage: 0.00 V (range 2.8 to 3.8)
 - Output Current: 0.00 A (range -28 to 28)
 - Input Voltage: 0.00 V (range 2.7 to 16)
- Message Viewer:** A panel at the bottom left showing system messages:
 - Created Rail 2: ISL8271M-0 0x22
 - Created 3v3AUX
 - Created Rail 3: ZL9006M-0 0x23
- System Devices:** A table at the bottom right listing devices and their addresses:

Device	Address	Connec...	Send All	Read All
ZL2102	0x20	Offl...	Send...	Read...
ZL8801	0x21	Offl...	Send	Read

A red arrow points from the text "Source to Rail Wiring" to the connection between Source 1 and Rail 0.

PowerNavigator 5.2 – System Screen

The screenshot displays the PowerNavigator 5.2 software interface. The main window is titled "Power Navigator 5" and contains several panels:

- Part Library:** A tree view on the left showing various components like "ZL2101", "ZL2102", "ZL8800", etc.
- Power Map:** The central workspace showing a power distribution diagram with "Source 1" connected to "Rail 0", "Rail 1", "Rail 2", and "Rail 3". Each rail is currently "Offline".
- Monitor View:** A panel on the right showing real-time data for "Rail 0", including "Output Voltage" (0.00 V), "Output Current" (0.00 A), and "Input Voltage" (0.00 V).
- Message Viewer:** A panel at the bottom left showing system messages like "Created Rail 2: ISL8271M-0 0x22".
- System Devices:** A table at the bottom right listing devices and their addresses.

A right-click context menu is open over the Power Map, with the "Auto Wire All Power Lines" option highlighted. A red arrow points from the text "Auto-wire" to this menu item.

Device	Address	Connec...	Send All	Read All
ZL2102	0x20	Offl...	Send...	Read...
ZL8801	0x21	Offl...	Send	Read

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

PowerNavigator 5.2 – System Screen

The screenshot displays the PowerNavigator 5.2 software interface. The main window is titled "Power Navigator 5" and shows a "Power Map" view. On the left, a "Part Library" pane lists various components, including regulators like ZL2101, ZL2102, ZL8800, ZL8801, ISL8270M, ISL8271M, ISL8272M, ZL9006M, ZL9010M, ZL9011M, ZL9117, and ZL9117M. The central area shows a "Power Map" with four rails (Rail 0, Rail 1, Rail 2, Rail 3) and a "Source 1" block. Each rail is connected to a specific regulator: Rail 0 to ZL2102 (1 phase), Rail 1 to ZL8801 (2 phase), Rail 2 to ISL8271M (1 phase), and Rail 3 to ZL9006M (1 phase). The regulators are all in "Offline" status. Red lines indicate the wiring connections between the source, regulators, and loads. The loads include an "FPGA" block with inputs for VCCINT, VCCAUX, and VCCIO, and a "3v3AUX" block with an "AUX" input. The right side of the interface features a "Monitor" pane with "Monitor View" and "Faul" tabs. It displays "Rail 0" monitoring, including "Enable" and "Power Good" buttons, "Vout" set to 3.3 V, "Pin Enable" and "Immediate Off" dropdowns, "Margin" set to "Nominal", and three analog meters: "Output Voltage" (0.00 V), "Output Current" (0.00 A), and "Input Voltage" (0.00 V). The bottom of the interface includes a "Message Viewer" showing log messages like "Created Rail 2: ISL8271M-0 0x22" and "Created 3v3AUX", and a "System Devices" table.

Device	Address	Connec...	Send All	Read All
ZL2102	0x20	Offl...	Send...	Read...
ZL8801	0x21	Offl...	Send...	Read...

Fully wired PowerMap with multi-input loads.

PowerNavigator 5.2 – System Screen

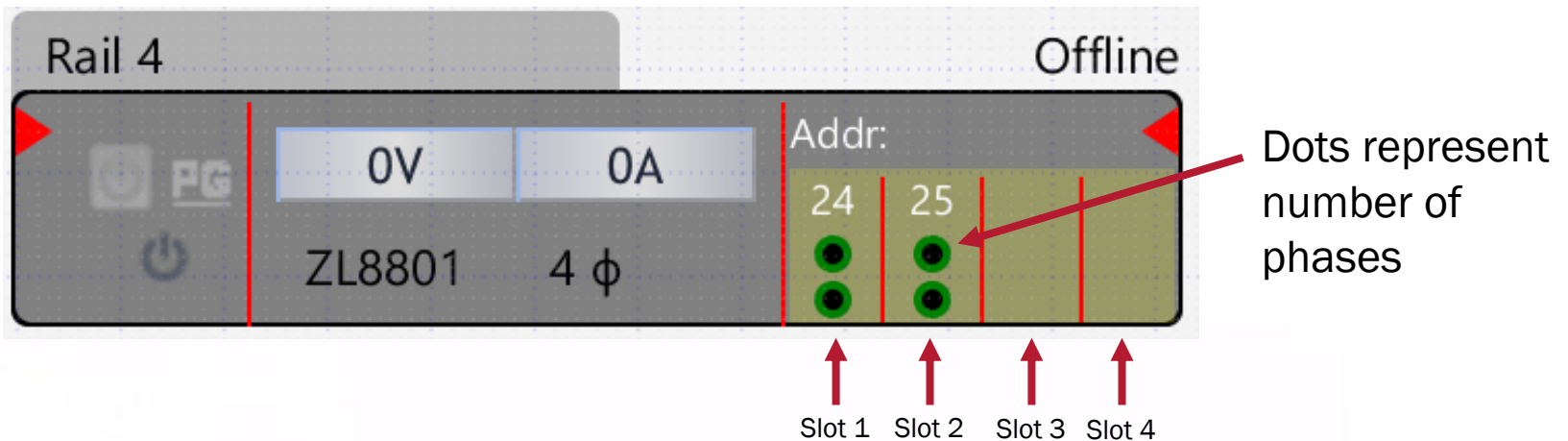
The screenshot displays the PowerNavigator 5.2 System Screen. The main window is titled "Power Navigator 5" and shows a "Power Map" view. On the left, a "Part Library" pane lists various components, with "ZL8801" selected. The central area shows a power map with four rails (Rail 0, Rail 1, Rail 2, Rail 3) and a "Source 1" block. Each rail is currently "Offline". Red arrows indicate connections from the rails to various components: Rail 0 to an FPGA (VCCINT, VCCAUX, VCCIO), Rail 1 to the FPGA (VCCINT, VCCAUX, VCCIO), Rail 2 to the FPGA (VCCINT, VCCAUX, VCCIO), and Rail 3 to a 3v3AUX component (AUX). A dashed red arrow points from the Part Library to the Rail 2 slot, indicating the process of dragging a part into an open slot. The right side of the screen shows a "Monitor View" for "Rail 0" with three gauges: Output Voltage (0.00 V), Output Current (0.00 A), and Input Voltage (0.00 V). The bottom of the screen features a "Message Viewer" and a "System Devices" table.

Device	Address	Connec...	Send All	Read All
ZL2102	0x20	Offl...	Send...	Read...
ZL8801	0x21	Offl	Send	Read

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

PowerMap RailBlock Overview

Example ZL8801 RailBlock (4-PH operation):



- The ZL8801 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 ZL8801 controllers – one at PMBus address 0x24 and another at 0x25.

PowerNavigator 5.2 – System Screen

The screenshot displays the PowerNavigator 5.2 System Screen. The main window is titled "Power Navigator 5" and contains a "Power Map" tab. The "Power Map" shows a central "Source 1" connected to four rails: Rail 0 (ZL2102, 1 phase), Rail 1 (ZL8801, 4 phase), Rail 2 (ISL8271M, 1 phase), and Rail 3 (ZL9006M, 1 phase). Each rail is currently "Offline". Red arrows indicate connections from the rails to various components: Rail 0 to FPGA (VCCINT, VCCAUX, VCCIO), Rail 1 to FPGA (VCCINT, VCCAUX, VCCIO), Rail 2 to FPGA (VCCINT, VCCAUX, VCCIO), and Rail 3 to 3v3AUX (AUX). A text label "ZL8801 4PH Current Share" points to Rail 1. The interface includes a "Part Library" on the left, a "Monitor View" on the right, and a "Message Viewer" at the bottom left. The "Monitor View" shows three gauges: Output Voltage (0.00 V), Output Current (0.00 A), and Input Voltage (0.00 V). The "Message Viewer" shows messages: "Created Rail 2: ISL8271M-0 0x22", "Created 3v3AUX", and "Created Rail 3: ZL9006M-0 0x23". The "System Devices" table at the bottom right shows the following data:

Device	Address	Connec...	Send All	Read All
ZL2102	0x20	Offl...	Send...	Read...
ZL8801	0x21	Offl	Send	Read

Monitoring View

Device rail name

View configuration for display

Adjustment on output voltage

PGOOD indicator

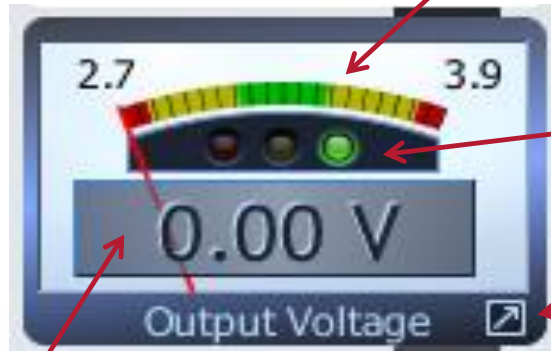
Monitoring readouts for V_{in} , V_{out} , I_{out} , I_{in}

Duty cycle and switching frequency

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

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

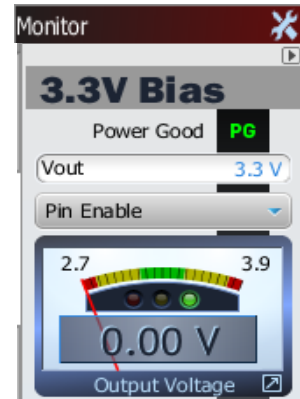
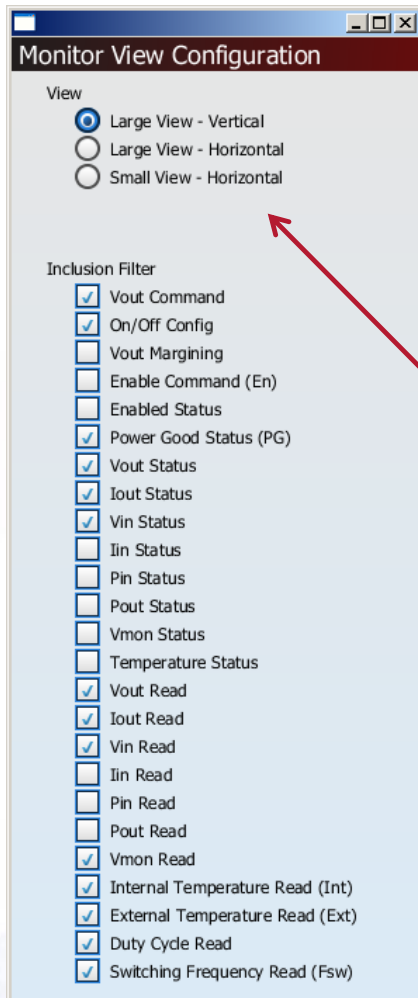
Clicking this button will open the window below allowing adjustment of limits

Digital readout of output voltage

A screenshot of a software window titled 'Vout Margins & Limits'. The window contains several input fields for configuring voltage limits and margins. A small analog readout is visible in the bottom right corner of the window.

Parameter	Value	Percentage
Vout Max	3.63 V	
Vout OV Fault Limit	3.79 V	10.5 %
Vout Margin High	3.46 V	5 %
Vout Margin Low	3.13 V	-5 %
Power Good Threshold	2.97 V	-10 %
Vout UV Fault Limit	2.8 V	-10.5 %
Margin/Limits Track Vout	<input checked="" type="checkbox"/>	
Display Limit High	3.89 V	20 %
Display Limit Low	2.7 V	-20 %
Display Limits Track Vout	<input checked="" type="checkbox"/>	
Vout Command	3.3 V	

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

The 'Monitor' window displays a table of rail monitoring data. The table has columns for Rail, Vcmd, Mode, Status, Vout, Iout, Vin, Duty, and Fsw. The data is as follows:

Φ	Rail	Vcmd	Mode	Status	Vout	Iout	Vin	Duty	Fsw
▶	5V I/O Rail	4.5 V	Pin	PG Vout Iout Vin	0.00 V	0.00 A	0.00 V	0 %	0 kHz
▶	3.3V Bias	3.3 V	Pin	PG Vout Iout Vin	0.00 V	0.00 A	0.00 V	0 %	0 kHz
▶	Memory Supply	1.8 V	Pin	PG Vout Iout Vin	0.00 V	0.00 A	0.00 V	0 %	0 kHz

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

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...

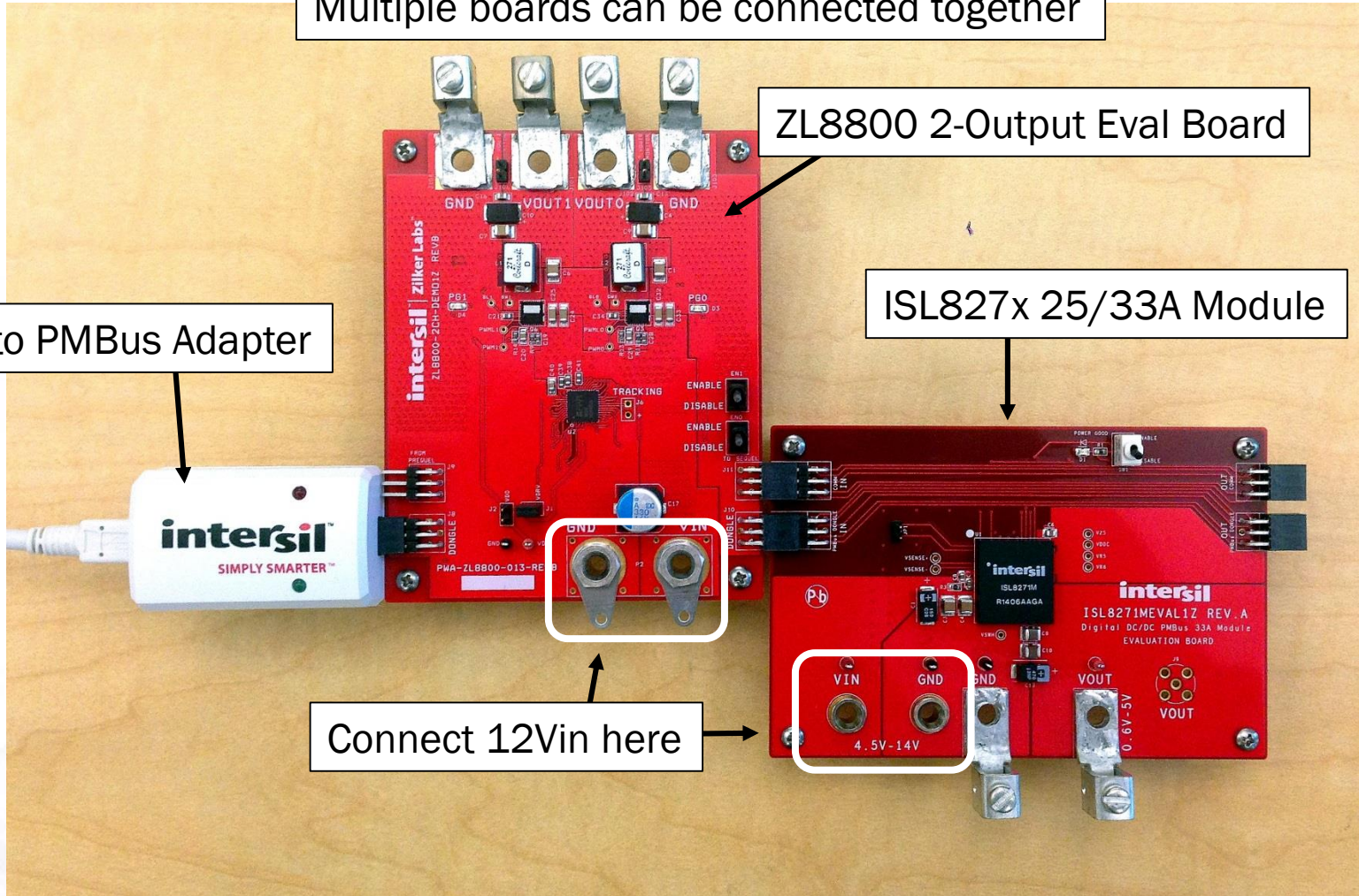
Multiple boards can be connected together

ZL8800 2-Output Eval Board

ISL827x 25/33A Module

USB to PMBus Adapter

Connect 12Vin here



PowerNavigator 5.2 Launch Screen

Connected Devices

Offline Mode

Project Load

The screenshot displays the PowerNavigator 5.2 Launch Screen with three main sections:

- Scan Devices:** A window titled "Scan Devices" showing a list of discovered hardware: ISL8272M @ 0x28 and ZL8800 @ 0x31. Below the list are buttons for "Scan Again", a range selector from 10 to 7F, and a "Monitor Hardware" button.
- Build Offline System:** A window titled "Build Offline System" showing a system diagram for "System: White Lightning". It includes a "Part Library" with components like ISL3003, TL3096, ZL4195, ZL8800, and ZL9008H. A "Dashboard" shows output voltages for various rails (Core, Rail 12V, Rail 4V, Rail 4.5V) and current sense for the Core. A "Monitor: Rail 12V" section shows real-time status for Voltage, Current, Max, Duty, and Freq.
- Projects:** A window titled "Projects" showing a list of projects, with "Full system example" and "ZL9101M 3-phase" visible. Below the list is an "Open Project" button.

At the bottom of the screen are "Start" and "Cancel" buttons. A red arrow points from the "Scan Devices" window to a text box that says "Discovered hardware is displayed".

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

PowerNavigator 5.2 – Connect to HW

The screenshot displays the PowerNavigator 5.2 software interface. The main window is divided into several panes:

- Part Library:** A tree view on the left showing categories like 'Generic', 'Digital, Integrated FET', 'Digital, POL Single Phase', 'Digital, POL Dual Phase', 'Digital, Multiphase', 'Digital, Module', and 'Digital, Power Monitor'.
- Power Map:** A central workspace showing a 'Source 1' and three power rails: Rail 8 (ISL8272M, 2 φ), Rail 17 (ZL8800, 1 φ), and Rail 18 (ZL8800, 1 φ). A red arrow points from the text below to the Rail 18 component.
- Monitor View:** A right-hand pane showing detailed monitoring for Rail 8, Rail 17, and Rail 18. Each rail has a 'Power Good' indicator, 'Vout' (Output Voltage), 'Input Voltage', 'Output Current', and 'Input Current' gauges. For example, Rail 18 shows an output voltage of 1.0 V and an input voltage of 12.08 V.
- Message Viewer:** A bottom-left pane showing system messages: 'Created Rail 8: ISL8272M-0 0x28', 'Created Rail 17: ZL8800-0 0x31 φ 0', and 'Created Rail 18: ZL8800-0 0x31 φ 1'.
- Nvm Tool / System Devices:** A bottom-right pane showing a table of devices and their memory addresses.

At the bottom of the window, a status bar reads: 'successfully imported perspective data from file C:\Users\BHOWELL\Documents\Intersil\PowerNavigator\Perspectives\lastSession.xml'

PowerMap is automatically populated with attached hardware

Devices	Memory	Action
ISL8272M 0x28	User	Store Restore
ZL8800 0x31	User	Store Restore

PowerNavigator 5.2 – Connect to HW

The screenshot displays the PowerNavigator 5.2 software interface. The main window is titled "Power Navigator 5" and contains several panes:

- Part Library:** A sidebar on the left showing a tree view of components under "Generic" and "Load".
- Power Map:** The central workspace showing a circuit diagram. A "Source 1" block is connected to three "Rail" blocks (Rail 8, Rail 17, and Rail 18), which are in turn connected to a "Load 1" block. Red arrows indicate the power flow. The Rail blocks are configured with specific parameters: Rail 8 (ISL8272M, 0.03V, 0A, Addr: 28), Rail 17 (ZL8800, 0.02V, 0A, Addr: 31-0), and Rail 18 (ZL8800, 0V, 0A, Addr: 31-1).
- Monitor View:** A panel on the right showing real-time data for Rail 8 and Rail 17. It includes status indicators (Enable, Power Good), control buttons (Vout, Pin Enable, Soft Off, Margin), and several analog-style gauges for Output Voltage, Output Current, Input Voltage, and Input Current.
- Message Viewer:** A panel at the bottom left showing system messages: "Created Rail 8: ISL8272M-0 0x28", "Created Rail 17: ZL8800-0 0x31 φ 0", and "Created Rail 18: ZL8800-0 0x31 φ 1".
- Nvm Tool / System Devices:** A panel at the bottom right showing a table of devices with columns for "Devices", "Memory", and "Action".

System load can be added to PowerMap. RailBlocks can be wired to input source and load.

PowerNavigator 5.2 – Project Save

File Edit View Option Help

New
Save Ctrl+S
Open Ctrl+O
Perspective Setting
Export Production Hex
Exit

Power Map Rail Scope Sequencing

Source 1

Rail 8 0.03V 0A Addr: 2B ISL8272M

Rail 17 0.02V ZL8800

Rail 18 0V ZL8800

Load 1

Monitor View Fault Status

Monitor

Rail 8 Rail 17

Enable Power Good PG

Vout 1.2 V

PMBus Enable

Soft Off

Margin Nominal

1 1.4

0.03 V Output Voltage

0.02 V Output Voltage

72 66

0.00 A Output Current

0.00 A Output Current

17 17

3.7 12.08 V Input Voltage

10 10

-0.05 A Input Current

-0.05 A Input Current

7.2 7.2

0.08 V Output Voltage

5.21 V Output Voltage

100 %

Message Viewer X

Created Rail 8: ISL8272M-0 0x28
Created Rail 17: ZL8800-0 0x31 φ 0
Created Rail 18: ZL8800-0 0x31 φ 1

Source Id: Source_1

Save Project

Project Name

Example Project

Full system example
ZL9101M 3-phase

Do not save perspective

Save Cancel

To save a project, go to File -> Save

Saving a project will save any device configuration files, PowerMap setup, and PowerNavigator perspective settings.

PowerNavigator – Rail Inspector



PowerNavigator 5.2 – 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 5.2 – Rail Inspector

The screenshot displays the PowerNavigator 5.2 software interface. The main window shows a 'Power Map' with a 'Source 1' block connected to three rails: Rail 1 (ZL8801, 4 φ), Rail 2 (ISL8271M, 1 φ), and Rail 3 (ZL9006M, 1 φ). A callout box labeled '1' points to Rail 1 with the text 'Double Click RailBlock to bring up Load Inspector window'. A second callout box labeled '2' points to the Rail Inspector window that has opened, with the text 'Rail Inspector Window will appear'. The Rail Inspector window for Rail 0 shows the following details:

- EN Mode:** Pin Enable
- PMBus Enable:** Enable
- Power Good:** [Button]
- Rail Information:** Rail Name: ZL8801_1V
- Devices Table:**

Devices	Address	Config File	Page
ZL8801	0x21	[Load] [Save]	--
ZL8801	0x20	[Load] [Save]	--

- Voltage & Current:** Input Voltage: 0.0 V, Frequency Switch: 400 kHz, Output Voltage: 3.3 V, Load Current: 0.0 A
- Rail Status:** Vout Status: Disabled, PMBus Status: Offline
- Device Options:** Sequencing: Disabled, Clock Sync: Internal Clock, Current Share: Enabled

The interface also includes a 'Part Library' on the left, a 'Message Viewer' at the bottom left showing log messages like 'Created Rail 2: ISL8271M-0 0x22', and a 'Monitor View' window on the top right.

Example Rail Inspector - ZL8801

Enable/Disable Output from within Rail Inspector

The screenshot shows the ZL8801_1V Rail Inspector interface. On the left is a navigation pane with the following menu items: Overview, Configuration, Telemetry (expanded), Monitor, Fault, Command Tools (expanded), and New. The main area contains several panels: EN Mode (Pin Enable), PMBus Enable (Enable), and Power Good. Below these are four panels: Rail Information (with a table of devices), Voltage & Current (showing 0.0 V input, 3.3 V output), Rail Status (showing Vout as Disabled and PMBus as Offline), and Device Options (showing Sequencing as Disabled, Clock Sync as Internal Clock, and Current Share as Enabled). Red arrows point from callout boxes to these specific elements.

Rail Inspector Navigation

Load/Save Configuration Files

Devices	Address	Config File	Page
ZL8801	0x21	Load Save	--
ZL8801	0x20	Load Save	--

Device Parameters/Telemetry

Rail Status

Device Option Summary

Example Rail Inspector - ZL8801

The screenshot shows the Rail Inspector application window titled "Rail 1". The interface includes a sidebar on the left with a menu structure: Overview, Configuration, Telemetry, Monitor, Fault, Command Tools, and New. Under "Command Tools", "Command Tool 8" is selected. The main area has a menu bar with "File", "Command Sets", and "Targets". Below the menu bar, there are control elements for "EN Mode" (set to "Pin Enable"), "PMBus Enable" (set to "Enable"), and "Power Good". A command line shows "Cmd VOUT_COMMAND" with a "Search" button and "Send" and "Read" buttons. Below the command line, there are input fields for "Hex" (set to "2000"), a unit selector (set to "V"), and a value field (set to "1.0 V"). The target device is identified as "ZL8801-0 0x20".

Annotations with red arrows point to the following elements:

- Select Command Tool in Rail Inspector**: Points to "Command Tool 8" in the sidebar.
- Command Line to select PMBus command**: Points to the "Cmd VOUT_COMMAND" input field.
- Send/Read commands to target device**: Points to the "Send" and "Read" buttons.
- Add/Remove command lines in command tool**: Points to the "+" and "-" icons on the right side of the command line.
- Command window logs all changes**: Points to the bottom status bar.

Example Rail Inspector – ZL8801

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

Command Search

Command Search: ZL8801 0x20

Command Code Command Description

Command Name

Command Group

Recent Use

01h: OPERATION	46h: IOUT_OC_FAULT_LIMIT	7ah: STATUS_VOUT	9eh: MFR_SERIAL
02h: ON_OFF_CONFIG	4bh: IOUT_UC_FAULT_LIMIT	7bh: STATUS_IOUT	a1h: READ_IOUT0
03h: CLEAR_FAULTS	4fh: OT_FAULT_LIMIT	7ch: STATUS_INPUT	a2h: READ_IOUT1
11h: STORE_DEFAULT_ALL	50h: OT_FAULT_RESPONSE	7dh: STATUS_TEMPERATURE	a8h: LEGACY_FAULT_GROU
12h: RESTORE_DEFAULT_ALL	51h: OT_WARN_LIMIT	7eh: STATUS_CML	adh: IC_DEVICE_ID
15h: STORE_USER_ALL	52h: UT_WARN_LIMIT	80h: STATUS_MFR_SPECIFIC	aeh: IC_DEVICE_REV
16h: RESTORE_USER_ALL	53h: UT_FAULT_LIMIT	88h: READ_VIN	b0h: USER_DATA_00
20h: VOUT_MODE	54h: UT_FAULT_RESPONSE	89h: READ_IIN	bfh: DEADTIME_MAX
21h: VOUT_COMMAND	55h: VIN_OV_FAULT_LIMIT	8bh: READ_VOUT	cah: IOUT0_CAL_GAIN
23h: VOUT_CAL_OFFSET	56h: VIN_OV_FAULT_RESPONSE	8ch: READ_IOUT	cbh: IOUT1_CAL_GAIN
24h: VOUT_MAX	57h: VIN_OV_WARN_LIMIT	8d: READ_TEMPERATURE_1	cch: IOUT0_CAL_OFFSET
25h: VOUT_MARGIN_HIGH	58h: VIN_UV_WARN_LIMIT	8eh: READ_TEMPERATURE_2	cdh: IOUT1_CAL_OFFSET
26h: VOUT_MARGIN_LOW	59h: VIN_UV_FAULT_LIMIT	8fh: READ_TEMPERATURE_3	ceh: MIN_VOUT_REG
27h: VOUT_TRANSITION_RATE	5ah: VIN_UV_FAULT_RESPONSE	94h: READ_DUTY_CYCLE	d0h: ISENSE_CONFIG
28h: VOUT_DROOP	5eh: POWER_GOOD_ON	95h: READ_FREQUENCY	d1h: USER_CONFIG
33h: FREQUENCY_SWITCH	60h: TON_DELAY	98h: PMBUS_REVISION	d2h: IIN_CAL_GAIN
37h: INTERLEAVE	61h: TON_RISE	99h: MFR_ID	d3h: DDC_CONFIG
40h: VOUT_OV_FAULT_LIMIT	64h: TOFF_DELAY	9ah: MFR_MODEL	d4h: POWER_GOOD_DELAY
41h: VOUT_OV_FAULT_RESPONSE	65h: TOFF_FALL	9bh: MFR_REVISION	d5h: MULTI_PHASE_RAMP
44h: VOUT_UV_FAULT_LIMIT	78h: STATUS_BYTE	9ch: MFR_LOCATION	d6h: INDUCTOR
45h: VOUT_UV_FAULT_RESPONSE	79h: STATUS_WORD	9dh: MFR_DATE	d7h: VOUT_MARGIN_RATIO

Ok Cancel

Sequencing



PowerNavigator 5.2 – System Screen

The screenshot displays the PowerNavigator 5.2 System Screen. The main window is titled "Power Navigator 5" and features a menu bar (File, Edit, View, Option, Help) and a toolbar. The interface is divided into several sections:

- Part Library:** Located on the left, it lists various components such as ZL2101, ZL2102, ZL8800, and ZL8801. The ZL8801 component is currently selected.
- Power Map:** The central area shows a diagram of the power system. It includes a "Source 1" block connected to four rails: Rail 0 (ZL2102, 1 phase), Rail 1 (ZL8801, 4 phase), Rail 2 (ISL8271M, 1 phase), and Rail 3 (ZL9006M, 1 phase). Each rail is currently in an "Offline" state. Red lines indicate the power flow from the source to the rails and then to various components like the FPGA and 3v3AUX.
- Sequencing Tab:** A callout box labeled "Sequencing Tab" points to the "Sequencing" button in the top navigation bar, which is highlighted with a red box.
- Monitor View:** Located on the right, it displays real-time monitoring data for "Rail 0". It includes a "Power Good" indicator, "Vout" (3.3 V), "Pin Enable", "Immediate Off", "Margin" (Nominal), and three gauges showing "Output Voltage" (0.00 V), "Output Current" (0.00 A), and "Input Voltage" (0.00 V).
- Message Viewer:** At the bottom left, it shows system messages: "Created Rail 2: ISL8271M-0 0x22", "Created 3v3AUX", and "Created Rail 3: ZL9006M-0 0x23".
- Nvm Tool / System Devices:** At the bottom right, it provides a table for device management.

Device	Address	Connec...	Send All	Read All
ZL2102	0x20	Offl...	Send...	Read...
ZL8801	0x21	Offl	Send	Read

Source Id: Source_1

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

PowerNavigator GUI – Sequencing

Power Navigator 5

Sequencing

Rail	Sequencing	Ton Delay	Ton Rise	Tracking	Response	SAG
Rail 0	<input checked="" type="checkbox"/>	5 ms	10 ms	<input type="checkbox"/>		
Rail 1	<input checked="" type="checkbox"/>	5 ms	5 ms	<input type="checkbox"/>	After PG	
Rail 2	<input checked="" type="checkbox"/>	5 ms	5 ms	<input type="checkbox"/>	After PG	
Rail 3	<input checked="" type="checkbox"/>	5 ms	5 ms	<input type="checkbox"/>	After PG	

Sequencing Tab in GUI

Vout (V)

Time (ms)

Monitor View

Rail 0

Rail 1

Temperature

Duty Cycle

Fsw

Message Viewer

```
22:e0.81.83 => WRITE command=DDC_GROUP
22:e0.81.83 => WRITE command=SEQUENCE
22:e2.00.00.20.00 => WRITE command=DDC_GROUP
22:e0.81.83 => WRITE command=SEQUENCE
20:d3.00.00 => WRITE command=DDC_CONFIG
20:e9.C0.00 => WRITE command=MISC_CONFIG
20:e0.00.81 => WRITE command=SEQUENCE
23:d3.00.03 => WRITE command=DDC_CONFIG
23:e9.C0.04 => WRITE command=MISC_CONFIG
23:e0.82.00 => WRITE command=SEQUENCE
```

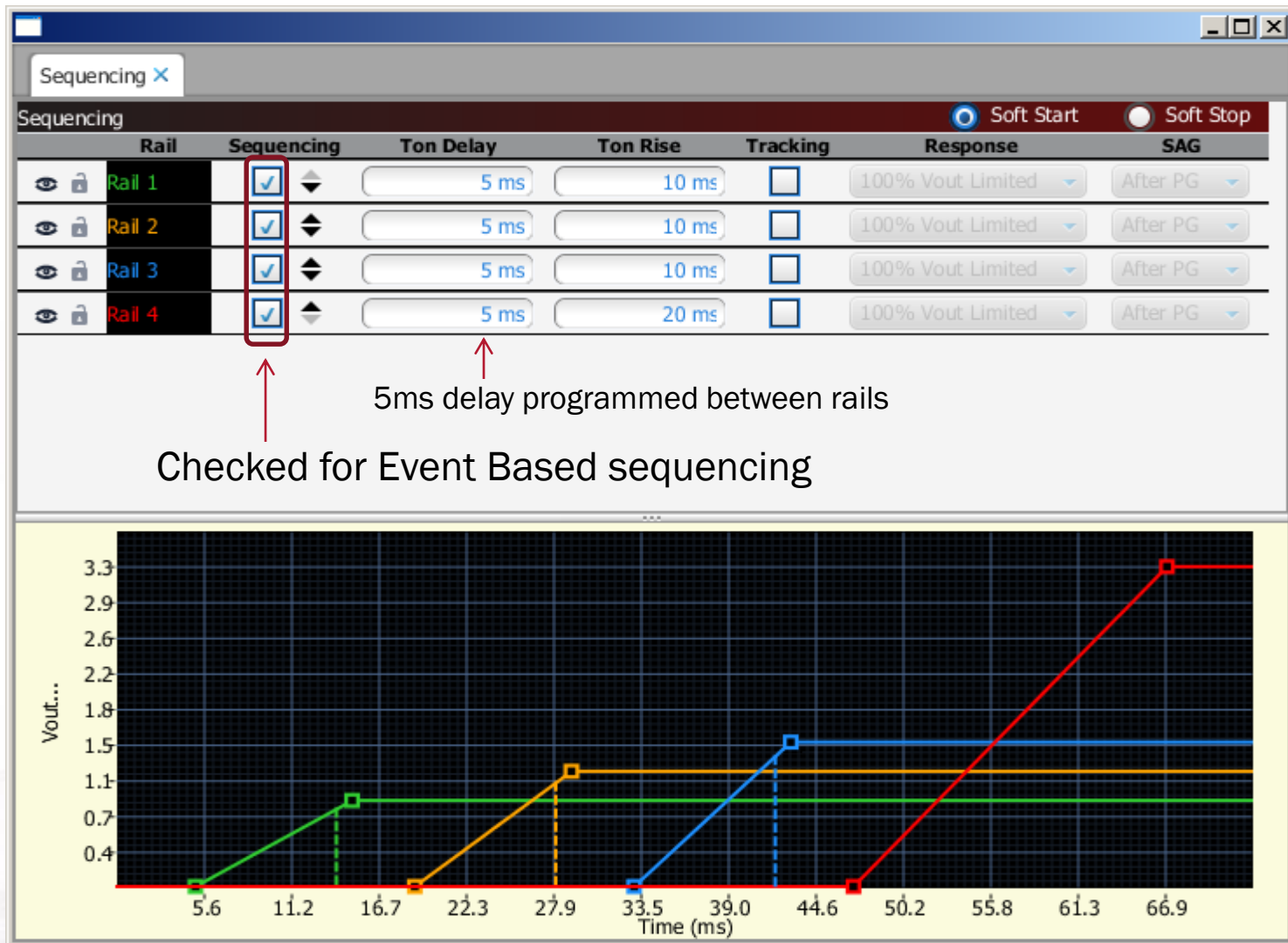
Device	Address	Connected	Send All	Read All
ZL2102	0x20	Offline	Send All	Read All
ZL8801	0x21	Offline	Send All	Read All
ISL8271M	0x22	Offline	Send All	Read All
ZL9006M	0x23	Offline	Send All	Read All

Source Id: Source_1

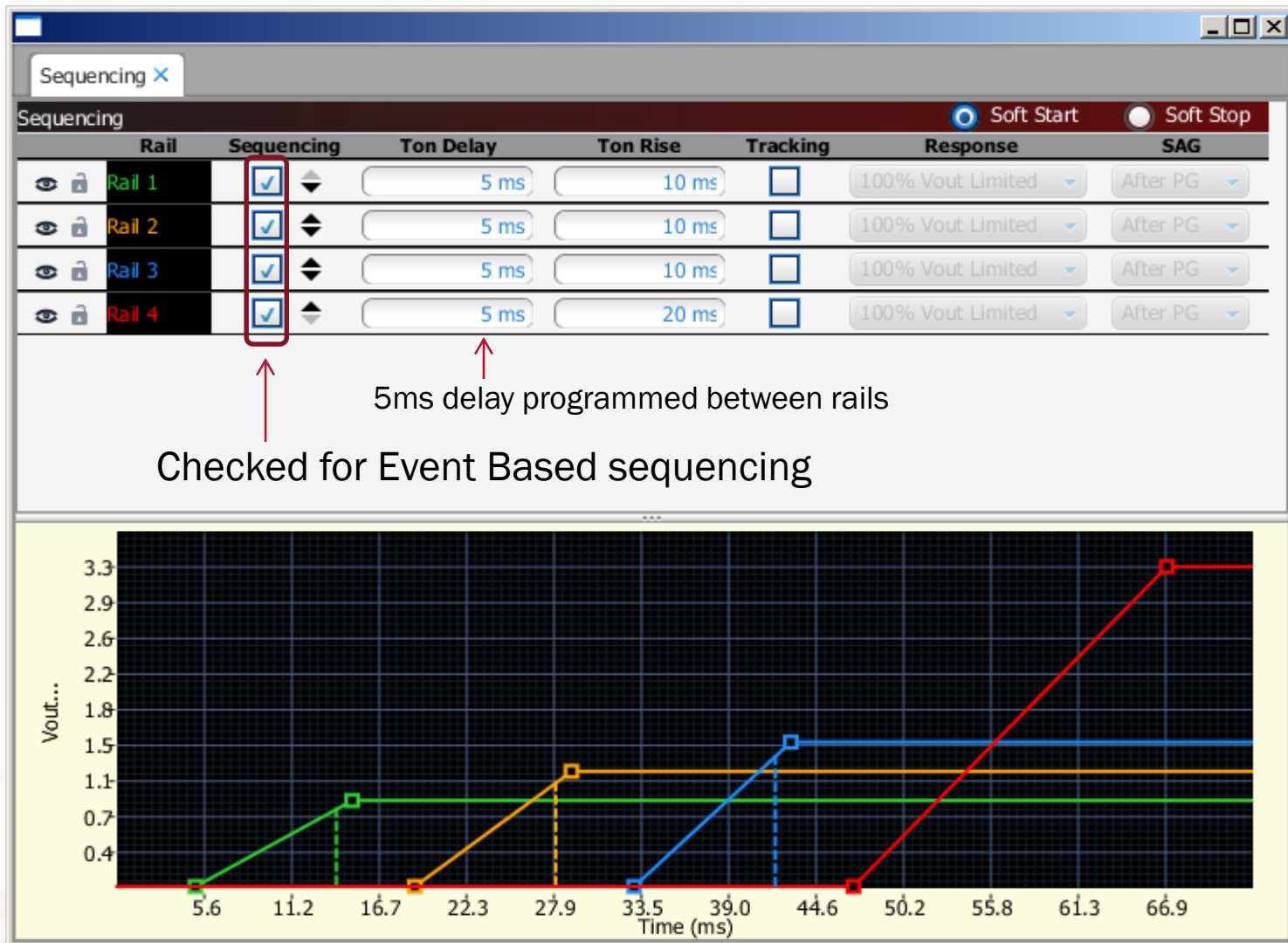
PowerNavigator 5.2 – Sequencing

- **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.

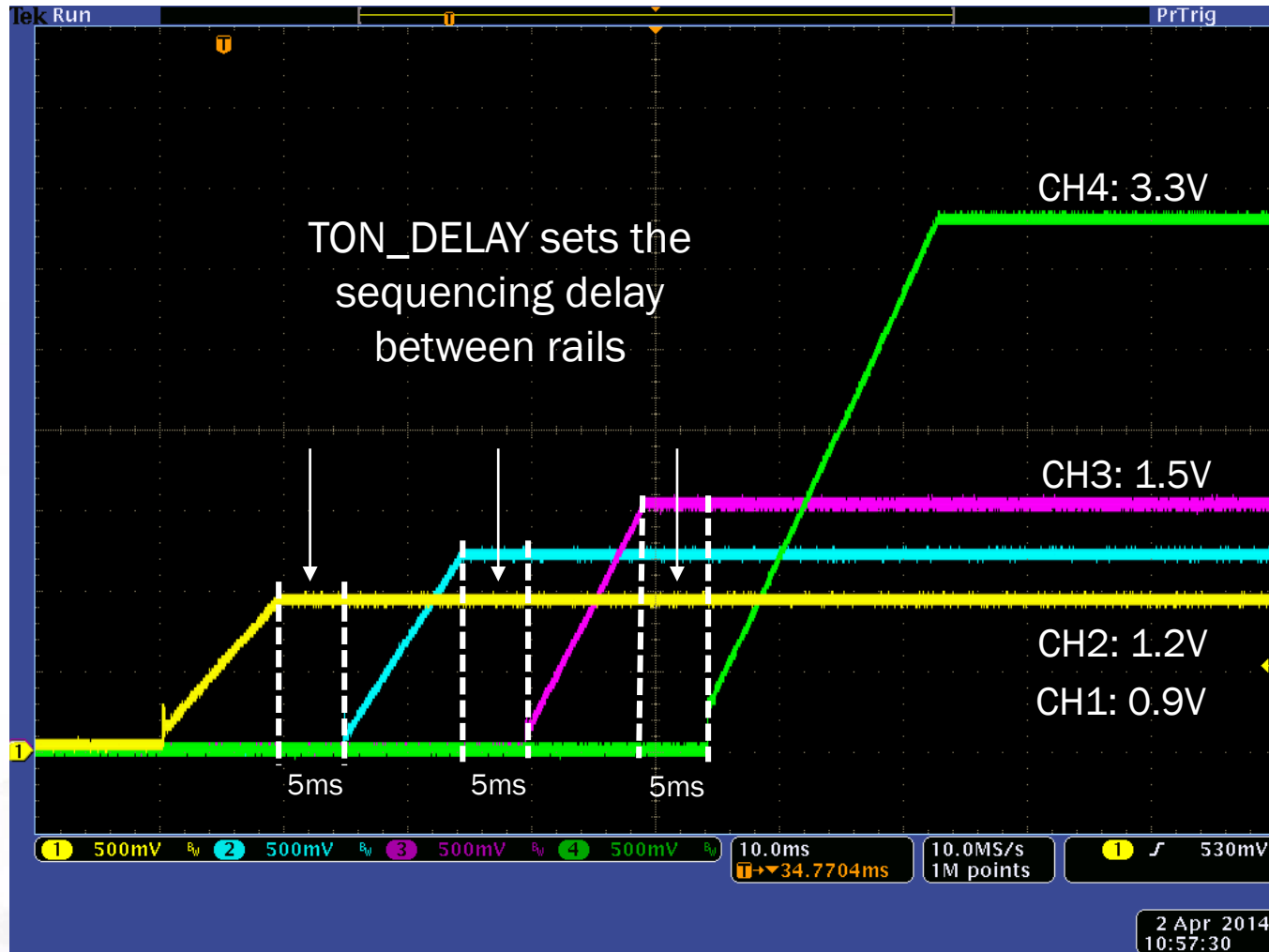
Event Based Sequence Example



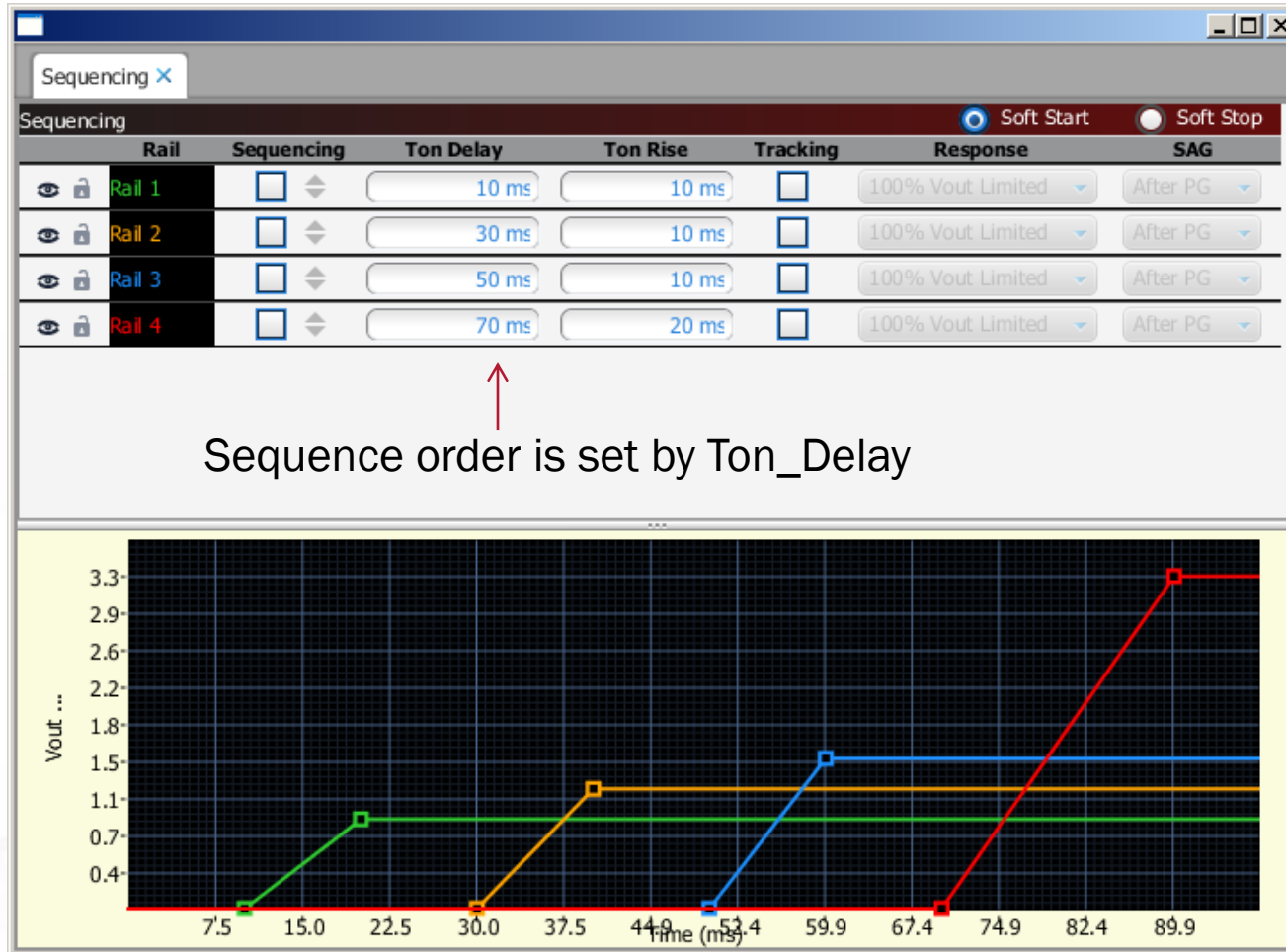
Event Based Sequence Example



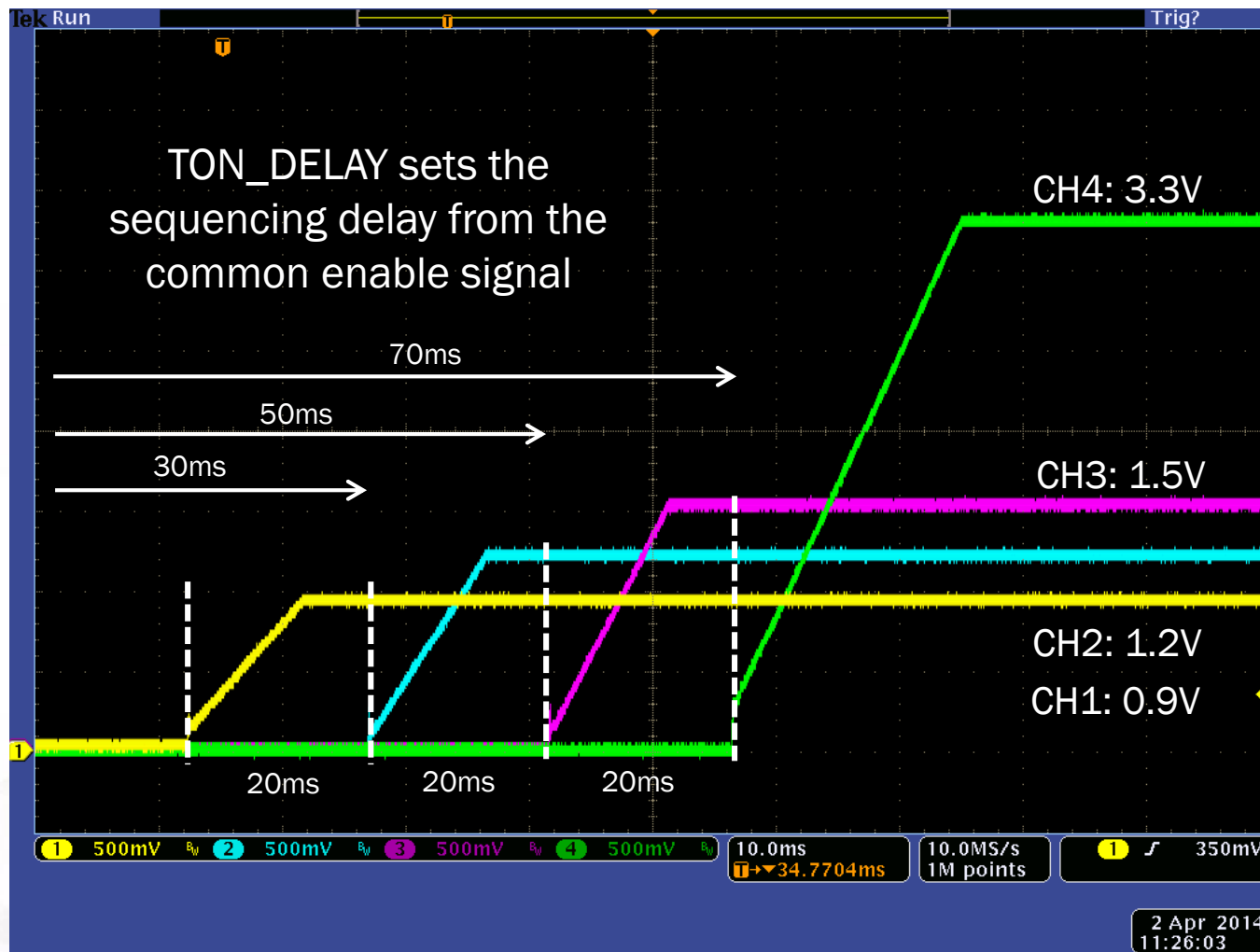
Event Based Sequence Example



Time Based Sequence Example



Time Based Sequence Example



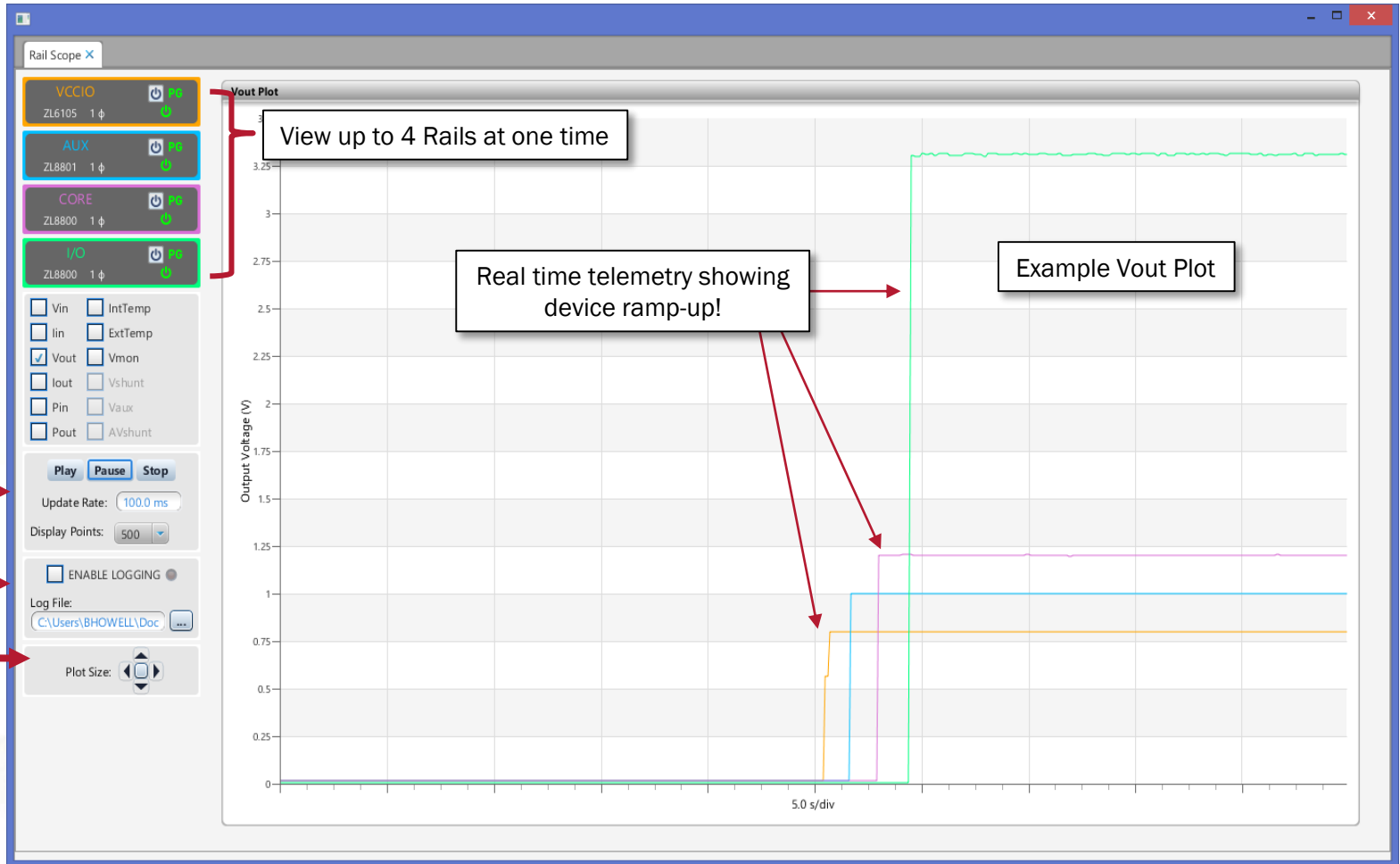
RailScope



PowerNavigator 5.2 – 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 5.2 - RailScope



Select up to 4 telemetry parameters per device

RailScope controls

Enable/disable logging

Adjust Plot size

View up to 4 Rails at one time

Real time telemetry showing device ramp-up!

Example Vout Plot

RailScope: Initial Setup

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 slot.

4 Click "Ok" when done

Message Viewer X

```
ISL6398 deleted
Created FPGA
Created ZL8801_1V: ZL8801-0 0x20 ZL8801-1 0x21
Created ZL8800_1.2V: ZL8800-0 0x22 0 ZL8800-0 0x22 0 1
Created ZL2102_1.8V: ZL2102-0 0x24
Created ASIC
Created Rail 7: ZL2102-2 0x27
Created Rail 6: ZL2102-1 0x26
Created DPM_12V: ISL28023_12-0 0x25
```

ZL8801-0 0x20 ZL8801-1 0x21

RailScope: Example View with 2 Telemetry Parameters

The screenshot displays the RailScope software interface. On the left, a 'Part Library' pane shows various digital power components. A central control panel includes a 'Rail Scope' tab with four rail configurations: Rail 0 (ZL6105), Rail 10 (ZL8801), Rail 17 (ZL8800), and Rail 18 (ZL8800). Below these are checkboxes for telemetry parameters: Vin, Iin, Vout, Iout, Pin, Pout, IntTemp, ExtTemp, Vmon, Vshunt, Valx, and AVshunt. The 'Vout' and 'Vmon' parameters are checked. A 'Play' button is active, and the 'Update Rate' is set to 100.0 ms. The 'Display Points' are set to 500. A 'Log File' path is shown as 'C:\Users\BHOWELL\Doc...'. The 'Plot Size' is adjustable. The main area contains two plots: 'Vin Plot' (Input Voltage (V)) and 'Vout Plot' (Output Voltage (V)). Both plots show a step change in voltage over time, with a 5.0 s/div scale. A callout box points to the chart area, stating 'Chart Area automatically splits into two graphs'. On the right, a 'Monitor' panel for 'Rail 0' displays real-time telemetry: Power Good (PG), Vout (0.8 V), Output Current (-0.04 A), and Input Voltage (11.94 V). At the bottom, a 'Message Viewer' shows a series of 'WRITE command=OPERATION' messages. A 'System Devices' table is also visible.

Device	Address	Connected	Send All	Read All
ZL6105	0x18	Online	Send All	Read All
ZL8801	0x30	Online	Send All	Read All
ZL8800	0x31	Online	Send All	Read All

Vin and Vout
Telemetry
Parameters
selected

Chart Area automatically
splits into two graphs

RailScope: Example View with 4 Telemetry Parameters

The screenshot displays the RailScope software interface, which is used for monitoring power rails. The main window is titled "Power Navigator 5" and contains several panels:

- Part Library:** A sidebar on the left showing a list of parts, including ZL6105, ZL8801, and ZL8800.
- Rail Scope Control Panel:** A central panel with buttons for "Rail 0", "Rail 10", "Rail 17", and "Rail 18". Below these are checkboxes for selecting telemetry parameters: Vin, Vout, Iout, and IntTemp. The "Play", "Pause", and "Stop" buttons are also visible.
- Four Telemetry Plots:** The main area contains four plots, each with a 5.0 s/div scale:
 - Vin Plot:** Shows Input Voltage (V) on the y-axis (0 to 13) over time.
 - Iout Plot:** Shows Output Current (A) on the y-axis (-1.5 to 3) over time.
 - Vout Plot:** Shows Output Voltage (V) on the y-axis (0 to 3.5) over time.
 - IntTemp Plot:** Shows Internal Temperature (C) on the y-axis (0 to 55) over time.
- Monitor View:** A panel on the right showing real-time telemetry data for "Rail 18":
 - Power Good: PE
 - Vout: 3.31 V
 - Output Current: 0.30 A
 - Input Voltage: 11.94 V
 - Input Current: -0.05 A
 - Voltage Monitor: 5.08 V
- Message Viewer:** A panel at the bottom left showing a log of "WRITE command=OPERATION" messages.
- Nvm Tool System Devices:** A table at the bottom right showing the status of connected devices.

Annotations in the image include:

- A box on the left stating "Vin, Vout, Iout and Temp Telemetry Parameters selected" with an arrow pointing to the checkboxes in the control panel.
- A box at the top right stating "Chart Area automatically splits into four graphs" with arrows pointing to the four plots.

Device	Address	Connected	Send All	Read All
ZL6105	0x18	Online	Send All	Read All
ZL8801	0x30	Online	Send All	Read All
ZL8800	0x31	Online	Send All	Read All

RailScope: Example Zoom-in

The screenshot displays the Power Navigator 5 software interface. The main window is titled "Power Navigator 5" and contains several panels:

- Part Library:** A tree view on the left showing various digital power components.
- Rail Scope Control Panel:** A central panel with tabs for "Power Map", "Rail Scope", and "Sequencing". It lists four rails: Rail 1 (ZL8801, 2 φ), Rail 26 (ZL8802, 2 φ), Rail 27 (ZL8802, 1 φ), and Rail 28 (ZL8802, 1 φ). Each rail has a power good indicator. Below the list are checkboxes for monitoring parameters like Vin, Iin, Vout, Iout, Pin, Pout, IntTemp, ExtTemp, Vmon, Vshunt, Vaux, and AVshunt. There are also "Play", "Pause", and "Stop" buttons, an "Update Rate" of 20.0 ms, "Display Points" set to 1000, and a "Log File" path.
- Plots:** Four main plots are visible:
 - Vin Plot:** Input Voltage (V) vs. time (2.0 s/div). The voltage is stable around 12V.
 - Iout Plot:** Output Current (A) vs. time (2.0 s/div). The current is stable around 25A.
 - Vout Plot:** Output Voltage (V) vs. time (2.0 s/div). The voltage is stable around 1.5V. A yellow rectangular area is highlighted in this plot, with a red arrow pointing to it from a text box.
 - IntTemp Plot:** Internal Temperature (C) vs. time (2.0 s/div). The temperature is stable around 40C.
- Monitor View:** A panel on the right showing detailed monitoring for Rail 1 and Rail 26. It includes "Disable" buttons, "Power Good" (PG) indicators, and various voltage and current monitors:
 - Rail 1: Vout = 1.0 V, Output Voltage = 1.05 V, Output Current = 0.33 A, Input Voltage = 11.89 V, Voltage Monitor = 5.02 V, Duty Cycle = 7.945 %.
 - Rail 26: Vout = 0.8 V, Output Voltage = 0.80 V, Output Current = 24.89 A, Input Voltage = 11.98 V, Voltage Monitor = 0.86 V, Duty Cycle = 7.117 %.
- Message Viewer:** A panel at the bottom left showing a log of "WRITE command=OPERATION" messages for rails 1.80 and 1.A0.
- Nvm Tool:** A panel at the bottom right showing a table of devices and their memory addresses.

Devices	Memory	Action
ZL8801 0x20	User	Store Restore
ZL8801 0x21	User	Store Restore
ZL8802 0x5a	User	Store Restore

Source Id: Source_1

RailScope: Example Zoom-in

The screenshot displays the Power Navigator 5 software interface. The main window is titled "Power Navigator 5" and contains several panels:

- Part Library:** A tree view on the left showing various power components.
- Power Map:** A central panel showing the status of four rails: Rail 1 (ZL8801, 2 φ), Rail 26 (ZL8802, 2 φ), Rail 27 (ZL8802, 1 φ), and Rail 28 (ZL8802, 1 φ). Each rail has a power good indicator.
- Monitor View:** A panel on the right showing detailed monitoring for Rail 1 and Rail 26, including output voltage, output current, input voltage, and temperature.
- Plots:** Four plots are visible: Vin Plot, Iout Plot, Vout Plot, and IntTemp Plot. The Vout Plot is zoomed in, showing a step change in output voltage from approximately 1.00 V to 1.06 V. A red arrow points to this step change.

A text box with a red arrow pointing to the zoomed-in plot contains the following text:

Release mouse click to Zoom. Double left click to auto-zoom back out.

At the bottom of the interface, there is a Message Viewer and an Nvm Tool panel. The Message Viewer shows a series of "WRITE command=OPERATION" messages. The Nvm Tool panel shows a table of devices and their memory addresses.

Devices	Memory	Action
ZL8801 0x20	User	Store Restore
ZL8801 0x21	User	Store Restore
ZL8802 0x5a	User	Store Restore

Source Id: Source_1

RailScope: Example X- & Y-axis Scale Options

The screenshot displays the Power Navigator 5 software interface. The main window is titled "Rail Scope" and shows four plots: Vin Plot, Iout Plot, Vout Plot, and IntTemp Plot. The Vin Plot shows Input Voltage (V) on the y-axis (0 to 13) and 2.0 s/div on the x-axis. The Iout Plot shows Output Current (A) on the y-axis (-2.5 to 27.5) and 2.0 s/div on the x-axis. The Vout Plot shows Output Voltage (V) on the y-axis (0.89 to 1.16) and 2.0 s/div on the x-axis. The IntTemp Plot shows Internal Temperature (C) on the y-axis (0 to 45) and 2.0 s/div on the x-axis.

Annotations and callouts:

- Click Toolbox icon to bring up y-axis limits box:** Points to the toolbox icon in the Vout Plot area.
- When "Auto Ranging" check box is clicked, PowerNavigator will auto-set y-axis scale:** Points to the "Auto Ranging" checkbox in the "Set Bounds for Vout" dialog box.
- Unchecking "Auto Ranging" box allows user to set upper and lower bounds:** Points to the "Lower bound" and "Upper bound" input fields in the "Set Bounds for Vout" dialog box.
- X-axis scale is set by update rate and display point user settings:** Points to the "Update Rate" and "Display Points" settings in the "Vout Plot" configuration panel.

Additional interface elements:

- Part Library:** Lists various digital power components like FETs, POL Single Phase, POL Dual Phase, Multiphase, Module, and Power Monitor.
- Monitor View:** Shows multiple voltage and temperature monitors. For example, Input Voltage is 11.88 V and 11.98 V, Output Voltage is 5.04 V and 0.86 V, and Duty Cycle is 8.016% and 7.117%.
- Message Viewer:** Shows a log of "WRITE command=OPERATION" for various devices (ZL8801, ZL8802).
- Nvm Tool:** Shows a table of devices with memory and action options.

Devices	Memory	Action
ZL8801 0x20	User	Store Restore
ZL8801 0x21	User	Store Restore
ZL8802 0x5a	User	Store Restore

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.**

The screenshot displays the RailScope logging configuration interface. At the top, four rail devices are listed: Rail 0 (ZL6105), Rail 10 (ZL8801), Rail 17 (ZL8800), and Rail 18 (ZL8800). Each device has a power icon and a 'PG' indicator. Below the device list is a grid of checkboxes for selecting telemetry parameters: Vin, IntTemp, Iin, ExtTemp, Vout, Vmon, Iout, Vshunt, Pin, Vaux, Pout, and AVshunt. The 'Play', 'Pause', and 'Stop' buttons are visible, along with 'Update Rate' (100.0 ms) and 'Display Points' (500) settings. A red box highlights the 'ENABLE LOGGING' checkbox (which is unchecked) and the 'Log File' field, which contains the path 'C:\Users\BHOWELL\Doc' and a file selection icon. At the bottom, there are 'Plot Size' controls with directional arrows.

RailScope: Example Log File

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

	A	B	Telemetry parameters for "VCCIO" rail				F	G	Telemetry parameters for "AUX" rail				K	L
1														
2	Log started													
3														
4	23/04/2015 10:58:04.0225													
5	TimeStamp	VCCIO_STATUS	VCCIO_Vin	VCCIO_Vout	VCCIO_Iout	VCCIO_IntTemp	AUX_STATUS	AUX_Vin	AUX_Vout	AUX_Iout	AUX_IntTemp	CORE_STATUS		
6	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		
7	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		
8	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		
9	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		
10	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		
11	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		
12	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		
13	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		
14	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		
15	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		
16	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		
17	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		
18	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		
19	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		

Each telemetry entry is time stamped

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

Hex File Creation



Configuration File Overview

- **Intersil 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. `Vout_Command = 1.0V`, `Iout_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

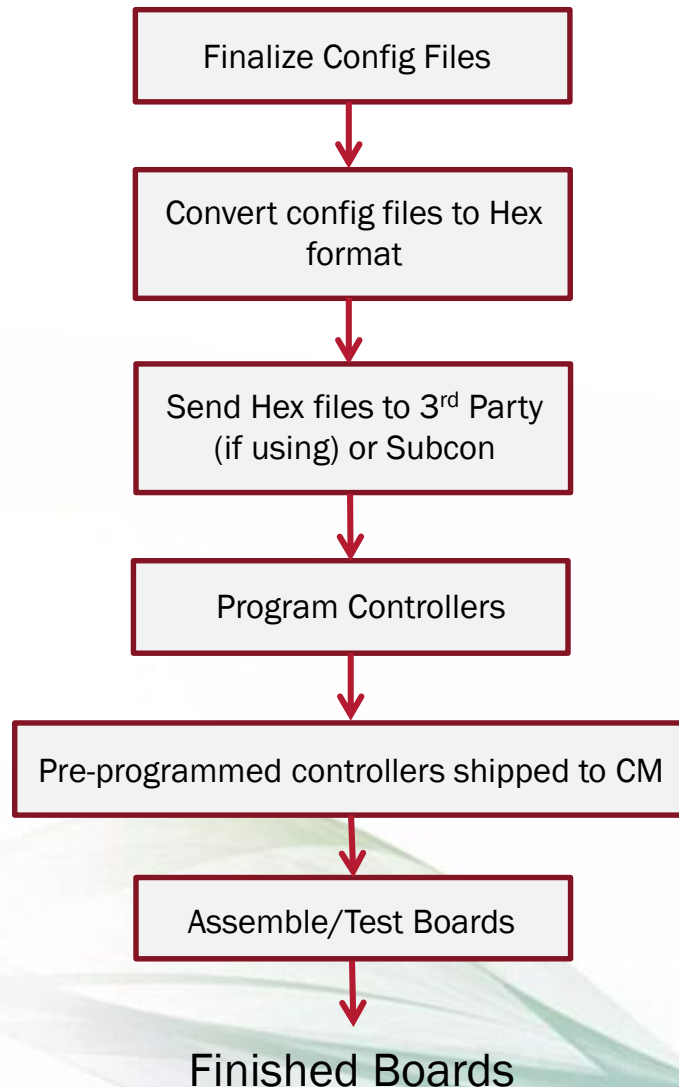
- **Option 1: Program controllers pre-board assembly**

- 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 Intersil 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.

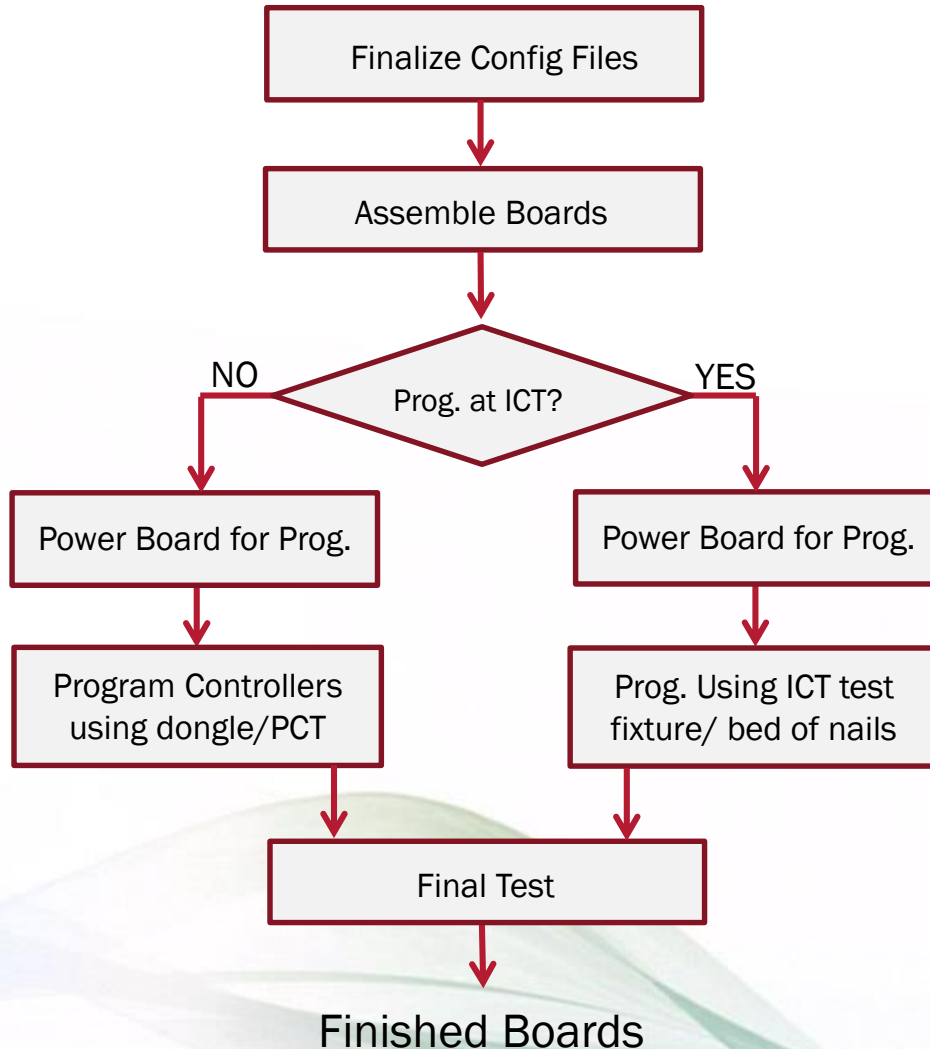
- Hex files are created using PowerNavigator software (File->Export Production Hex).

- 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

Power Navigator 5

File Edit View Option Help

New
Save Ctrl+S
Open Ctrl+O
Perspective Setting
Export Production Hex
Exit

Power Map Rail Scope Sequencing

Source 1

Rail 1
Rail 16
Rail 17

Monitor View Fault Status

Monitor

Rail 1
Enable
Power Good PG
Vout 1.0 V
Pin Enable
Immediate Off
Margin Nominal
0.8 1.2
0.00 V
Output Voltage

Rail 16
Enable
Power Good PG
Vout 1.2 V
Pin Enable
Immediate Off
Margin Nominal
1 1.4
0.02 V
Output Voltage

-120 149
0.00 A
Output Current

-24 24
0.00 A
Output Current

4.8 17
12.11 V
Input Voltage

3.7 17
12.09 V
Input Voltage

3.2 14
3.6 11

Do not save perspective

Save Cancel

Message Viewer X

Created Rail 1: ZL8801-0 0x20 ZL8801-1 0x21
Created Load 2
Created Rail 16: ZL8800-0 0x30 φ 0
Created Rail 17: ZL8800-0 0x30 φ 1

Source Id: Source_1

Devices	Memory	Action
ZL8801 0x20	User	Store Restore
ZL8801 0x21	User	Store Restore

HEX File Creation – Step 2, Export HEX Files

Step 2: Go to File -> Export Production Hex

Click "Export"

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

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\BHOWELL\Documents\Intersil\PowerNavigator\Projects\Example Project

Select	Device	Rail(s)	Programming Address	Output Hex Filename (.hex)
<input checked="" type="checkbox"/>	ZL8801-0 0x20	Rail 1	0x20	ZL8801-0
<input checked="" type="checkbox"/>	ZL8801-1 0x21	Rail 1	0x20	ZL8801-1
<input checked="" type="checkbox"/>	ZL8800-0 0x30	Rail 16, Rail 17	0x20	ZL8800-0

Message Viewer

```
Created Rail 1: ZL8801-0 0x20
Created Load 2
Created Rail 16: ZL8800-0 0x30 φ 0
Created Rail 17: ZL8800-0 0x30 φ 1
```

Nvm Tool

Devices	Memory	Action
ZL8801 0x20	User	Store Restore
ZL8801 0x21	User	Store Restore

Example Configuration File

This utility converts configuration data saved in human-readable format into the proper hex format used for production programming. Conversion of configuration files only applies to Zilker Labs devices.

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\BHOWELL\Documents\Intersil\PowerNavigator\Projects\Example Project

Select	Device	Rail	Programming Address	Output Hex Filename (.hex)
<input checked="" type="checkbox"/>	ISL8272M-0	Rail 8	0x20	ISL8272M-0
<input checked="" type="checkbox"/>	ZL8800-0	Rail 17	0x20	ZL8800-0

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          # 296 kHz
VIN_OV_FAULT_LIMIT        0xd380          # 14 V
VIN_OV_FAULT_RESPONSE     0x80
VIN_OV_WARN_LIMIT         0xd360          # 13.5 V
VIN_UV_WARN_LIMIT         0xca5e          # 4.734 V
VIN_UV_FAULT_LIMIT        0xca4c          # 4.594 V
VIN_UV_FAULT_RESPONSE     0x80
IIN_CAL_GAIN               0xba00          # 1 mV/A
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 used to clear contents of NVM.

Programmed device parameters

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.

intersilTM

www.intersil.com