

# POWERNAVIGATOR 5.4

## DIGITAL MULTIPHASE USER GUIDE

MARCH 2018

BIG IDEAS  
FOR EVERY SPACE

# OVERVIEW

- This guide walks a user through the steps to setup and configure the ISL691xx and ISL681xx Digital Multiphase products using the PowerNavigator GUI. For all other Renesas Digital Power devices, please see the Digital Point of Load user guide.
- This guide is intended for use with PowerNavigator [Revision 5.4.62](#)
- This presentation contains the following sections that can be referred to depending on the stage of the design:
  - PowerNavigator Introduction
  - Running PowerNavigator
  - Creating a new project in offline mode
  - Connecting to Hardware and loading Project files
  - Creating HEX files for production programming

# INSTALLING POWERNAVIGATOR

# Installing PowerNavigator

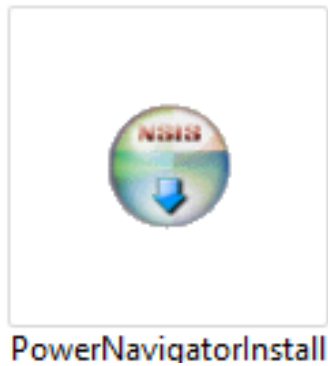
- Download the latest version of PowerNavigator from:

[www.intersil.com/powernavigator](http://www.intersil.com/powernavigator)

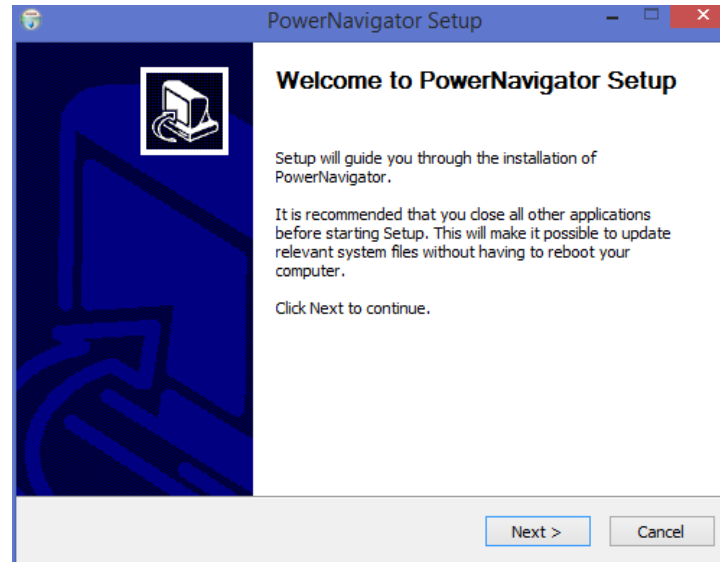
- PowerNavigator Requires a Windows PC with Windows Vista or greater
- A driver is NOT required for the USB to PMBus adapter – it uses the built-in Windows HID driver.

# Installing PowerNavigator

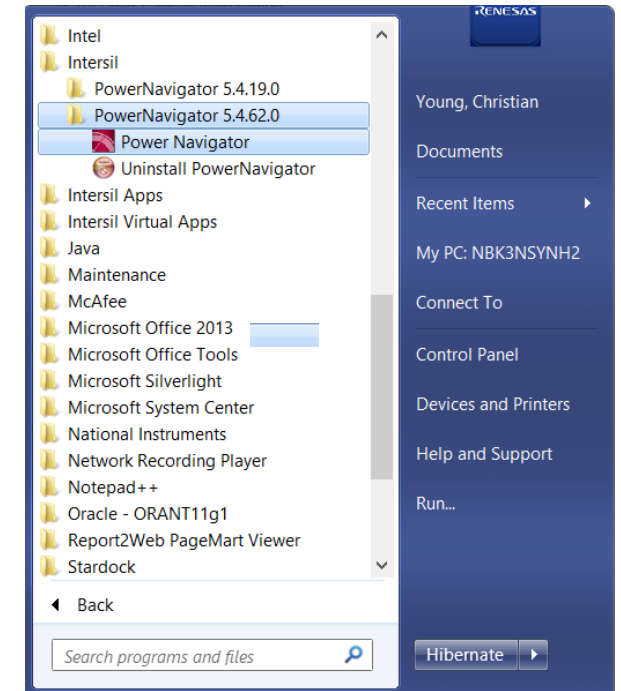
1 Double Click installer to begin install process.



2 Click through PowerNavigator Setup Wizard to install.

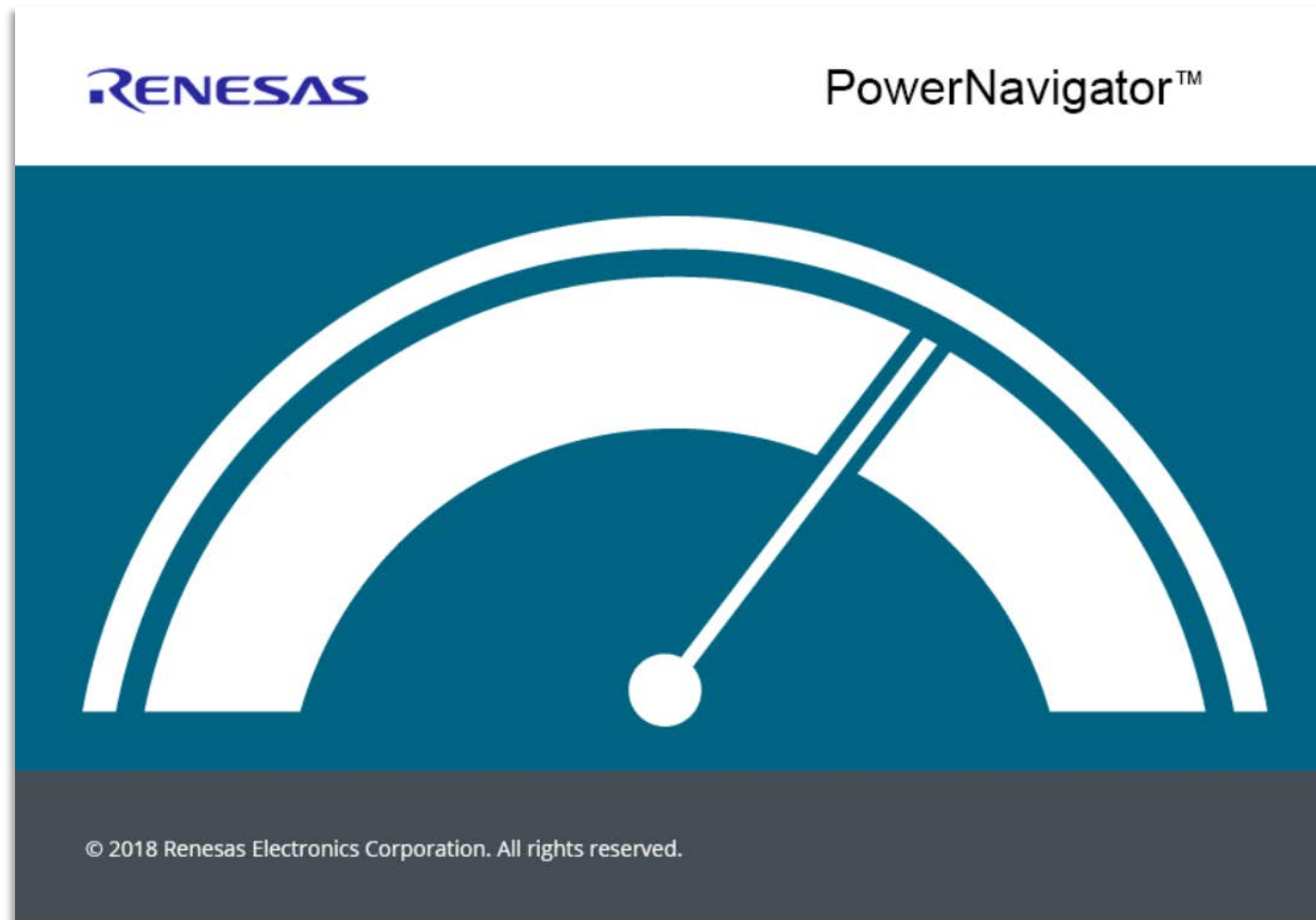


3 After installation is complete, PowerNavigator will be visible in Start Menu under "Intersil"



# LAUNCHING POWERNAVIGATOR

# PowerNavigator Launch Screen



# PowerNavigator Launch Screen

## Connected Devices:

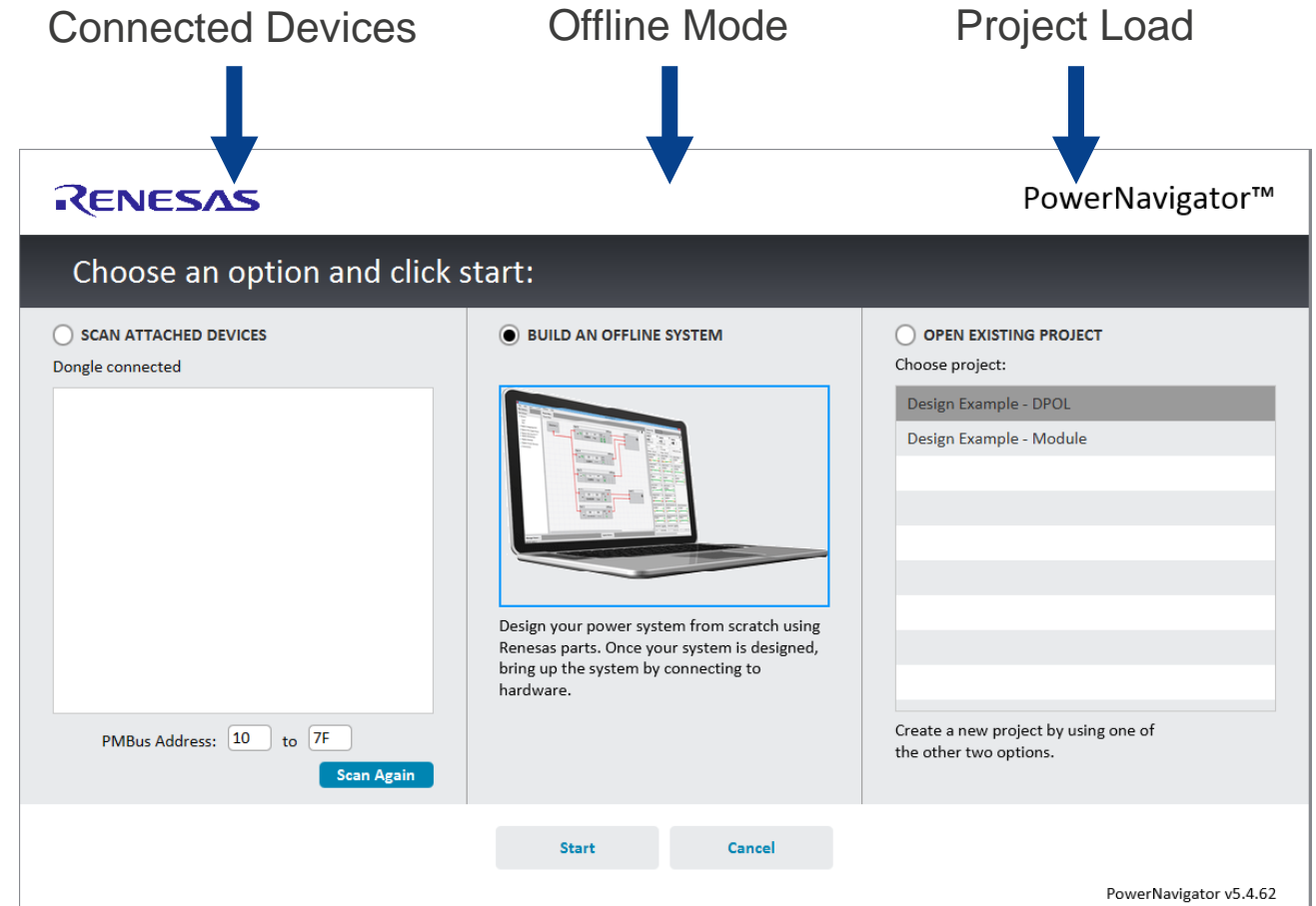
- Used for telemetry monitoring only. Device configuration changes cannot be made in this mode.

## Offline Mode:

- Used to create new projects

## Project Load:

- Used to load an existing project or connect to existing hardware. Allows device configuration changes to be made.





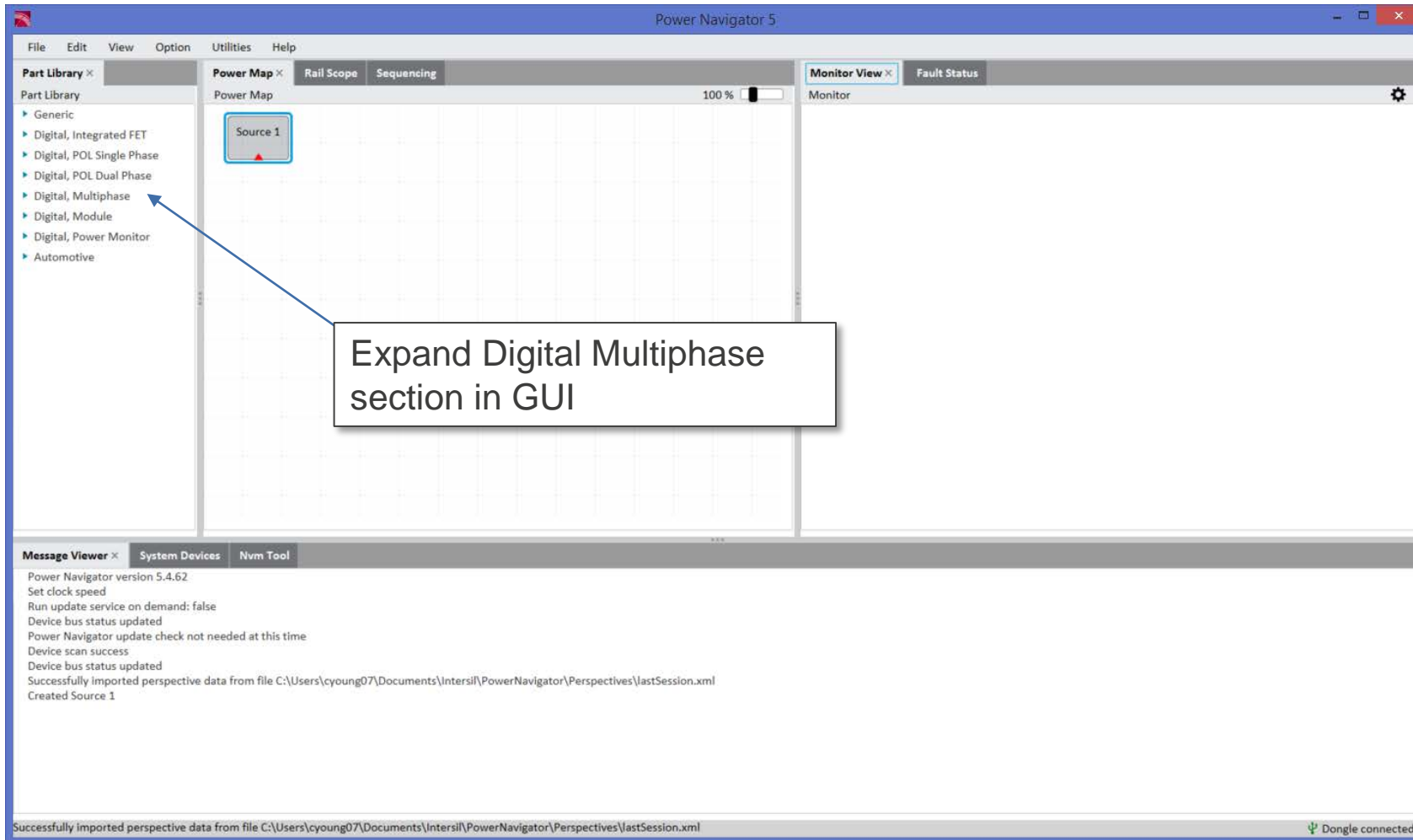
# Project Files

- Digital multiphase devices rely on **Project Files** for loading and editing configuration settings. *It is not possible to read back the stored configuration settings from a multiphase controller*, so proper use and maintenance of project files is critical.
- **Definitions:**
  - **Project File:** System level file that contains all project information, including individual configuration files.
  - **Config File:** Unique file contained within the project file with the setup information for a single controller configuration
- **The project files can be found on your PC:**
  - C:\USERS\*User Name*\Documents\Intersil\PowerNavigator\Projects
  - Project files for all Digital Multiphase demo boards are available from Renesas upon request

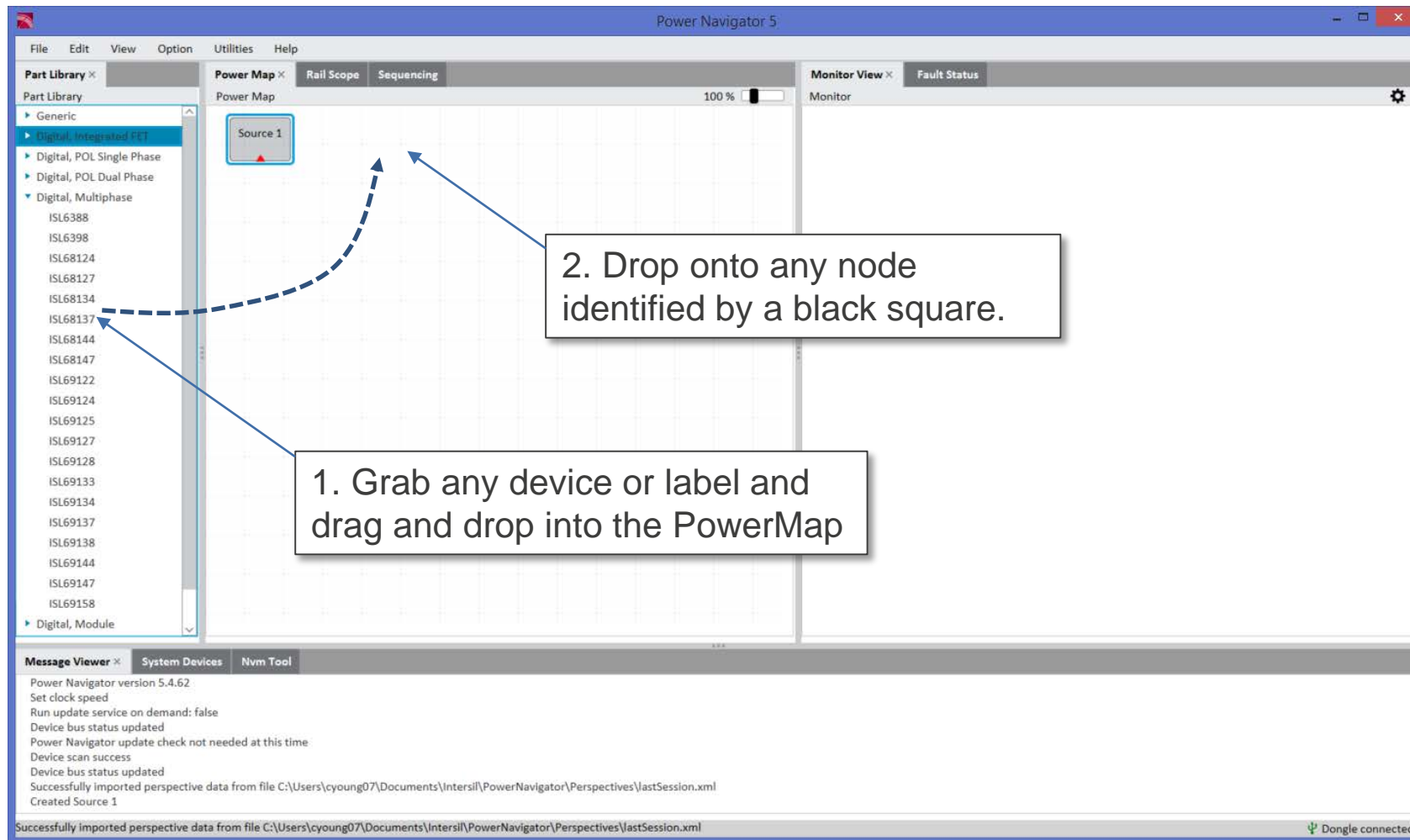
# CREATING PROJECTS IN OFFLINE MODE



# Digital Multiphase – Main Screen



# Digital Multiphase – Main Screen



# Digital Multiphase – PowerNavigator PowerMap

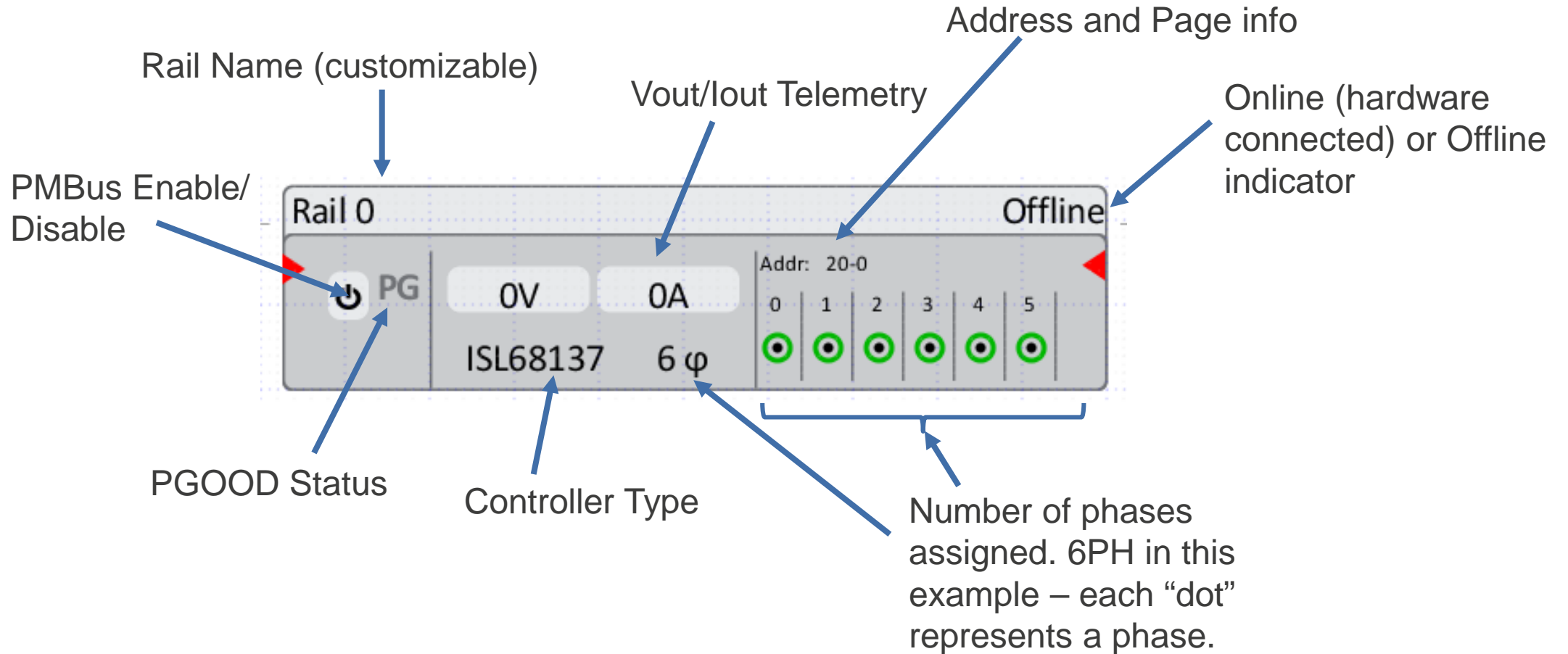
The screenshot displays the Power Navigator 5 interface. On the left is a 'Part Library' with a tree view showing 'Digital, Multiphase' components like ISL68137. The main area shows a 'Power Map' with a 'Source 1' connected to two 'Rail' blocks (Rail 1 and Rail 0), both labeled 'Offline'. Each rail block shows 'ISL68137' and '0 φ'. On the right is the 'Monitor View' panel, which is divided into two columns for 'Rail 1' and 'Rail 0'. Each column contains several monitoring widgets: 'Off' status, 'Power Good' (PG), 'Pin Enable', 'Output Voltage' (0.000 V), 'Input Voltage' (0.00 V), 'Output Current' (0.00 A), 'Input Current' (0.00 A), 'Internal Temperature' (0.00 C), 'External Temperature' (0.00 C), and 'Output Power' (0.00 W). A 'Dongle disconnected' warning is visible at the bottom right. A text box is overlaid on the Power Map diagram.

Each box or “Rail Block” on the PowerMap represents one of the device outputs

Double Click on the Rail Block to bring up the device’s design tool.

# Digital Multiphase – PowerNavigator PowerMap

## Example ISL68137 RailBlock (6-PH operation):



# Digital Multiphase – PowerMap and Rail Inspector

The screenshot displays the Power Navigator 5 interface. On the left, the Part Library lists various digital multiphase converters, with ISL68137 selected. The main Power Map view shows two rail blocks, Rail 1 and Rail 0, both currently Offline. A dashed blue arrow points from the Rail 1 block to the Rail Inspector window. The Rail Inspector window is open, showing a tree view on the left with 'Rail Information' selected. The Rail Information panel displays 'Rail Name: Rail 1' and a table of devices:

Devices	Address	Page
ISL68137	0x20	1

Below this, the Rail Status panel shows 'Vout Status: Disabled' and 'PMBus Status: Offline'. The User Revision Register panel shows 'User Revision From Hardware: 0' and 'User Settable Revision Value Integer Value from 0 to 255' with a value of 0.

**Double click PowerMap rail block to bring-up Rail Inspector**

**TIP: Make sure to configure both outputs! If an output is not used (no phases assigned) be sure to disable SVID on that output.**



# Digital Multiphase – Rail Inspector

Rail Inspector Navigation panel

**Rail Information**

Devices	Address	Page
ISL68137	0x20	1

**Rail Status**

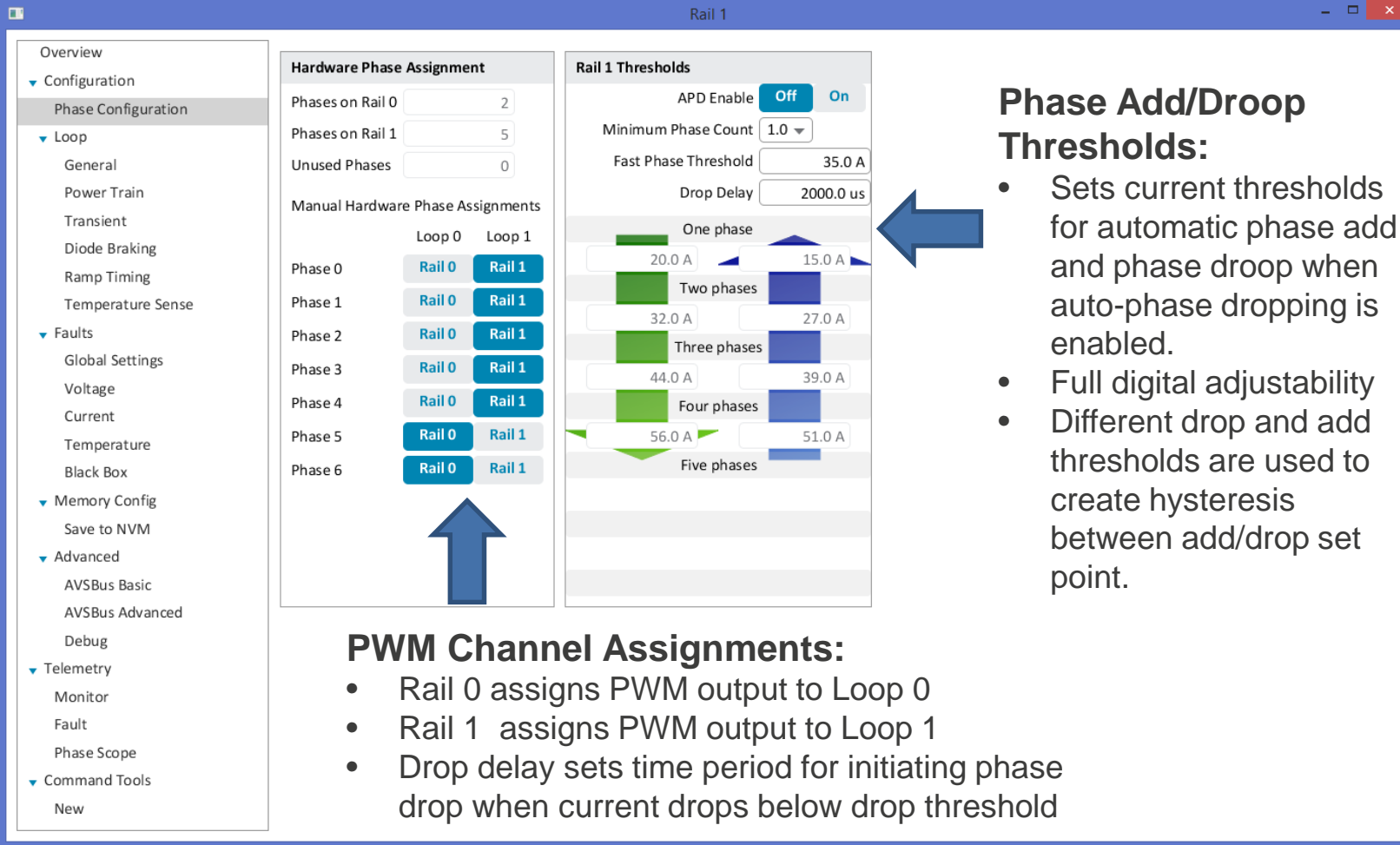
Vout Status:  Disabled  
PMBus Status:  Offline

**User Revision Register**

User Revision From Hardware: 0  
User Settable Revision Value Integer Value from 0 to 255

Revision Register – user settable configuration revision to assist with revision tracking

# Digital Multiphase – Phase Configuration



The screenshot shows the 'Rail 1' configuration window. On the left is a navigation tree with 'Phase Configuration' selected. The main area is divided into three sections: 'Hardware Phase Assignment', 'Rail 1 Thresholds', and 'Manual Hardware Phase Assignments'. The 'Hardware Phase Assignment' section shows 'Phases on Rail 0' set to 2 and 'Phases on Rail 1' set to 5. The 'Manual Hardware Phase Assignments' table shows phases 0-6 assigned to Rail 0 and Rail 1. The 'Rail 1 Thresholds' section shows 'APD Enable' set to 'Off', 'Minimum Phase Count' set to 1.0, 'Fast Phase Threshold' set to 35.0 A, and 'Drop Delay' set to 2000.0 us. Below these are five phase transition graphs labeled 'One phase' through 'Five phases', each with current thresholds. A blue arrow points from the 'Phase Add/Droop Thresholds' text to the 'Fast Phase Threshold' and 'Drop Delay' settings. Another blue arrow points from the 'Manual Hardware Phase Assignments' table to the 'PWM Channel Assignments' text.

**Phase Add/Droop Thresholds:**

- Sets current thresholds for automatic phase add and phase droop when auto-phase dropping is enabled.
- Full digital adjustability
- Different drop and add thresholds are used to create hysteresis between add/drop set point.

**PWM Channel Assignments:**

- Rail 0 assigns PWM output to Loop 0
- Rail 1 assigns PWM output to Loop 1
- Drop delay sets time period for initiating phase drop when current drops below drop threshold

# Digital Multiphase – Device Setup

**General Configuration**

Vout Max	2.3 V	
Vout OV Fault Limit	1.125 V	25.0 %
Vout Margin High	0.945 V	5.0 %
Vout	0.9 V	
Vout Margin Low	0.855 V	-5.0 %
Vout UV Fault Limit	0.585 V	-35.0 %
Vout Min	0.0 V	
<input type="checkbox"/> Track PMBus Vout		
Bootcap Recharge Frequency	10.0 kHz	
Minimum PWM Low Time	150.0 ns	
Switching Frequency	500 kHz	

← VOUT\_MAX sets upper line of output voltage. Any VOUT\_COMMAND above VOUT\_MAX will be ignored.

← Vout and Vout OV/UV fault limits thresholds

← Check “track PMBus Vout” to have fault levels track the Vout command based on percentage

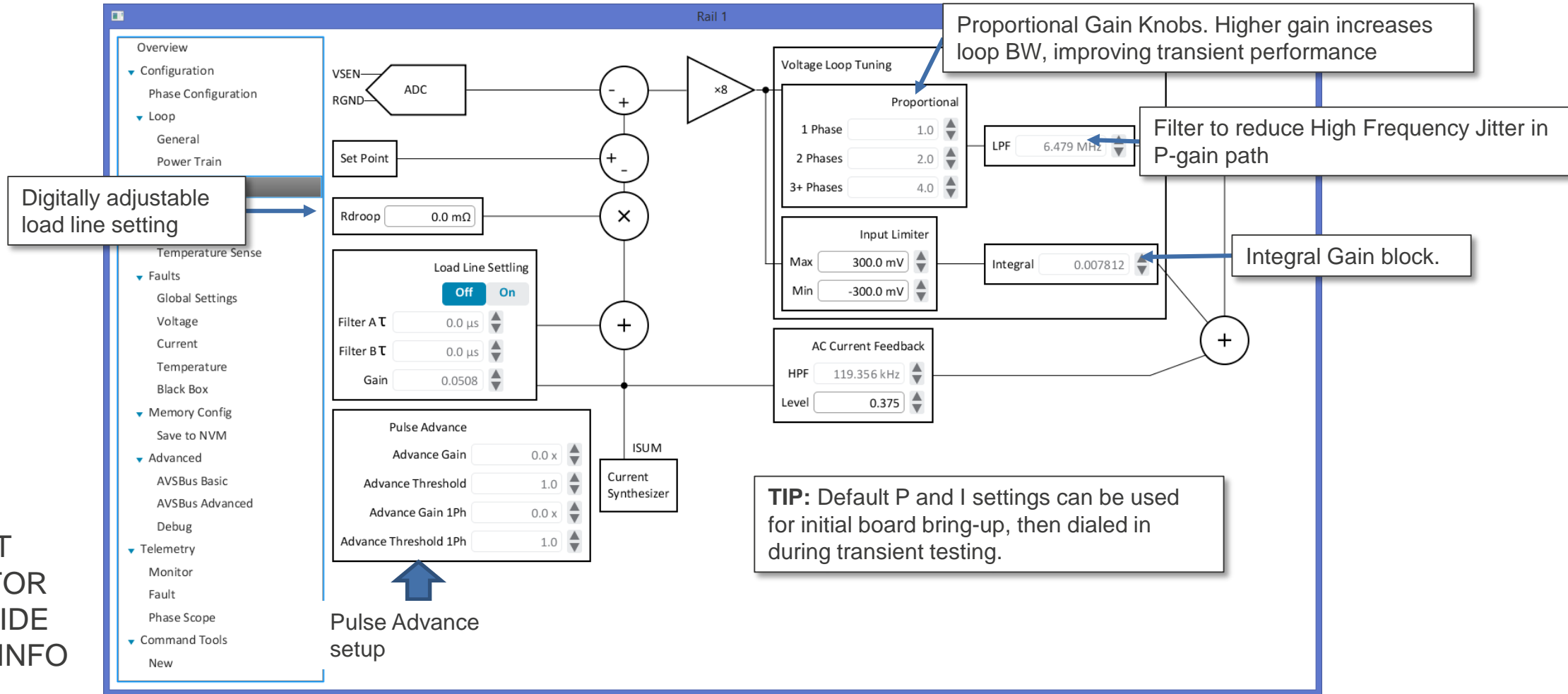
← Per phase switching frequency

# Digital Multiphase – Power Train Configuration

The screenshot shows the 'Power Train' configuration window for the ISL68137. The interface includes a schematic diagram of the power stage and several configuration panels. Callout boxes provide detailed explanations for various settings:

- Current Sense Scheme:** A callout box states, "Selects current sense scheme – Inductor DCR or SPS." The interface shows 'DCR Sensing' selected, with 'SPS' also available. Below this, 'SPS Output Level' is set to 4.8 mV/A and 'Nominal Full Scale Current per Phase' is 77.708 A. Another callout box notes, "Default IMON output for ISL99226/7 SPS. Adjust as needed to dial in load line accuracy".
- FET Properties:** Callouts explain, "Power stage UFET and LFET Rds(on). Use typical values from datasheet." The interface shows UFET Rds(on) at 3.0 mΩ and LFET Rds(on) at 0.9 mΩ.
- Inductor:** Callouts state, "Output inductance and DCR (per phase). Use typical values from inductor datasheet. This information is REQUIRED for proper operation." The interface shows L (nominal) at 150.0 nH and DCR at 0.31 mΩ.
- RPCB:** A callout explains, "Approx. resistance of PCB planes between output inductors and Load." The interface shows RPCB at 0.2 mΩ.
- CBULK:** Callouts describe, "Bulk Capacitance or ceramic capacitance by output inductors" and "Ceramic Capacitance used at load". The interface shows a quantity of 4.0, C (each) at 470.0 μF, ESR (each) at 3.0 mΩ, and ESL (each) at 1.0 nH.
- CCER:** Callouts describe, "Ceramic Capacitance used at load". The interface shows a quantity of 28.0, C1 (each) at 22.0 μF, ESR (each) at 2.0 mΩ, and ESL (each) at 0.7 nH.

# Digital Multiphase – Control Loop Configuration



CONTACT  
RENASAS FOR  
TUNING GUIDE  
WITH MORE INFO

# Digital Multiphase – Diode braking

**Diode Braking**  
Overshoot Suppression  Disabled  Enabled

**Trigger Holdoff**  
Stop braking each phase when its current < 0.0 A  
Forced delay between events 8000.0 ns  
Holdoff if HPF ISUM > 15.0 A  
Reset HPF ISUM Holdoff after 1250.0 ns

**Trigger Conditions**  
Start if  $\Delta V$  rise > 50.0 mV  
Stop when  $\Delta V$  fall < 50.0 mV

**Diode Forward Drop**  
Diode Forward Drop 0.7 V

Enabled/Disabled Diode Braking

Settings to determine when to apply diode braking to prevent LFET overheating. Default values are a good starting point. See tuning guide for more info.

Vout excursion during load release required before diode braking is engaged. Lower values result in more aggressive braking.

Used by current estimator to mode diode braking behavior. Typical range: 0.3V to 0.7V.

- Start if  $\Delta V$  rise > Threshold
  - VOUT is monitored for fast rising conditions and suppression will be initiated if the fast rising magnitude exceeds this threshold.
- Stop if  $\Delta V$  fall < Threshold
  - Vout is monitored for falling condition and suppression will be halted if the falling magnitude exceeds this threshold. It must be smaller than the rise threshold.

**TIP:** Diode braking should only be enabled after other loop settings have been optimized.

# Digital Multiphase – Dynamic Voltage Change Tuning

**Enable/Disable Timing**

TON Delay	0.2 ms
TON Rise	0.5 ms
TOFF Delay	0.0 ms
TOFF Fall	0.5 ms

**Transition Rate Tuning**

Decrease Transition Up Gain

Increase Transition Up Gain

Transition Up Gain: 1.0

Vout Transition Rate: 10.0 mV/ $\mu$ s

Transition Down Gain: 1.0

Increase Transition Down Gain

Decrease Transition Down Gain

Overview

- Configuration
  - Phase Configuration
  - Loop
    - General
    - Power Train
    - Transient
    - Diode Braking
    - Ramp Timing
  - Temperature Sense
- Faults
  - Global Settings
  - Voltage
  - Current
  - Temperature
  - Black Box
- Memory Config
  - Save to NVM
- Advanced
  - AVSBus Basic
  - AVSBus Advanced
  - Debug
- Telemetry
  - Monitor
  - Fault
  - Phase Scope
- Command Tools
  - New

Sets TON\_DELAY (delay from enable to Vout ramp), TON\_RISE (Vout soft-start ramp time), TOFF\_DELAY (delay from enable low to disable) and TOFF\_FALL (Vout soft-stop time, if used)

Dynamic voltage change performance optimization. Two Gain Settings:

Transition Up Gain to improve dynamic performance from a lower to higher Vout.

Transition Down Gain to improve dynamic performance from a higher to lower Vout.

Follow graphic to adjust gain settings.

**TIP:** Dynamic Voltage Gain performance should be dialed in after optimizing control loop performance.

# Digital Multiphase – Temp Sense Setup

The screenshot displays the 'Temperature Sense Scheme' configuration in the Rail 1 tool. The left sidebar shows a navigation menu with 'Temperature Sense' selected. The main panel shows the following settings:

- Disable TEMP Pin:
- Scheme:
- Primary Diode:
- Auxiliary Diode:
- Temperature Compensation:
- Compensation Adjustment: 0.0

Below the settings are two circuit diagrams:

- Top Diagram:** Labeled 'PMBus 0x8D Page 1'. It shows a box labeled 'TEMP2' connected to a box labeled 'Intersil SPS', which is connected to a pin labeled 'TMON'.
- Bottom Diagram:** Labeled 'Primary Diode: Used for Temperature Compensation'. It shows a circuit with a 'TEMP1' pin connected to a 'VCCS' pin. A 470pF capacitor is connected between TEMP1 and VCCS. An auxiliary diode is connected between TEMP1 and VCCS. The diagram is labeled 'PMBus 0x8D Page 0' and 'PMBus 0x8F'.

Used to select temperature sense scheme. Use "SPS" setup when using smart power stage – TMON output from SPS is directly connected to TEMP monitoring pin. Temp compensation is not required when using SPS.

Example diode temp sense scheme. Use diode sense when using inductor DCR for current sense. Temperature compensation must be enabled for DCR temp co. compensation.

Primary/Aux Diode Enable: diode temp sense allows the use of two sensing diodes per TEMP pin. Use these settings to enable/disable Aux or Primary diode.



# Digital Multiphase – Global Fault Setup

Overview

- Configuration
  - Phase Configuration
- Loop
  - General
  - Power Train
  - Transient
  - Diode Braking
  - Ramp Timing
  - Temperature Sense
- Faults
  - Global Settings**
  - Voltage
  - Current
  - Temperature
  - Black Box
  - Memory Config
    - Save to NVM
  - Advanced
    - AVSBus Basic
    - AVSBus Advanced
    - Debug
  - Telemetry
    - Monitor
    - Fault
    - Phase Scope
  - Command Tools
    - New

**De-assert PowerGood**

- Fast Over-Current Fault
- Slow Over-Current Fault
- Over-Voltage Fault
- Under-Voltage Fault

The controls above configure Power Good to be de-asserted even if a fault is not enabled on the individual fault setup screens. If a fault is enabled, Power Good is automatically de-asserted if the fault occurs and there is no need to select a control above.

**Hiccup Retry**

- Input Under Voltage
- Input Over Voltage
- Input Over Current
- Temperature
- Output Under Voltage
- Output Over Voltage
- Output Over Current

Check to enable hiccup retry for each fault type. If left unchecked, controller will use latch off fault response.

De-assert PowerGood: If a fault is set to ignore, these configure the device to still pull PGOOD low.

For example, if Vout Under-Voltage fault is set to ignore, but the De-assert PowerGood box is checked, when a UV fault occurs, the controller will continue to regulate, but PGOOD will be pulled low.

If the controller is set to act on a FAULT, PGOOD will always be pulled low and the controller will latch off when the fault occurs.

# Digital Multiphase – Vout Fault Configuration

**Vin Faults**

- Vin Undervoltage Fault Limit: 8.0 V
- Shutdown on Fault:
- Vin Overvoltage Fault Limit: 14.0 V
- Shutdown & Protect on Fault:

**Vout Faults**

- Vout Undervoltage Fault Limit: 0.585 V
- Shutdown on Fault:
- Vout Overvoltage Fault Limit, device enabled: 1.125 V
- Shutdown & Protect on Fault:
- Protect OV Fault when Disabled (Fixed ~3.2V):

Sets VOUT Under Voltage fault limit, relative to VID setting. If box is unchecked, fault will be ignored and controller will continue to attempt to regulate.

Sets VOUT Over Voltage fault limit, relative to VID setting. If box is unchecked, fault will be ignored and controller will continue to attempt to regulate (Not Recommended).

Protect OV Fault when Disabled: If Vout exceeds 3.2V when output is disabled, controller will clamp output voltage to protect load if this box is checked.

# Digital Multiphase – Current Fault Configuration

The screenshot displays the 'Rail 1' configuration window with the 'Current' section selected in the left-hand navigation menu. The main panel is divided into several configuration sections, each with a corresponding callout box explaining its function:

- lin OC Fault (Per Loop):** The 'Limit' is set to 50.0 A. The callout states: "Input current OC protection limit. lin is calculated using current estimator hardware."
- lout Peak Current (Per Phase):** 'Min Peak Current' is -60.0 A and 'Max Peak Current' is 60.0 A, both with a 'Count' of 6. The callout explains: "Sets Peak Over and Under current per phase (includes inductor ripple current). Peak settings should not be set above max measured current from Power Train page. Count = number of consecutive switching cycles with a peak trips before a fault is declared. Peak per phase current will be limited to this value."
- lout Fast Sum OC (Per Loop):** 'Limit' is 250.0 A, 'Delay' is 59.4 μs, and 'Filter' is 5.338 μs. The 'Shutdown on Fault' checkbox is checked. The callout reads: "Fast Sum OC: Average OC protection of the summed phase current"
- lout Slow Sum OC (Per Loop):** 'Limit' is 250.0 A, 'Delay' is 992.1 μs, and 'Filter' is 85.402 μs. The 'Shutdown on Fault' checkbox is checked. The callout reads: "Slow Sum OC: Slow average OC protection of the summed phase current"
- SPS Fault Flag Detect:** The 'Enable' checkbox is checked. The callout states: "Disables output if SPS internal OC trips or per phase current sense ADC clips. Recommend to leave this enabled."

# Digital Multiphase – Temp Fault Configuration

The screenshot shows a configuration window titled "Rail 1" with a sidebar on the left containing a tree view of settings. The "Temperature" section is selected. The main area is divided into two panels: "Internal Temperature Fault" and "External Temperature Faults".

- Internal Temperature Fault:** "Controller Over Temp Fault Limit" is set to 125.0 C with a checked "Shutdown on Fault" box.
- External Temperature Faults:** "SPS Under Temp Fault Limit" is set to -100.0 C, "SPS Over Temp Fault Limit" is set to 125.0 C with a checked "Shutdown on Fault" box, and "SPS Over Temp Warn Limit" is set to 2000.0 C.

Two callout boxes provide additional context:

- The first callout points to the "Controller Over Temp Fault Limit" field, stating: "Internal Temp Sensor OT limit fault limit. When box is checked (recommended), controller will latch off if OT limit is exceeded."
- The second callout points to the "SPS Over Temp Fault Limit" field, stating: "External Smart Power Stage OT/UT fault limit. When box is checked (recommended), controller will latch off if OT or UT limit is exceeded."

# Digital Multiphase – Black Box Setup

**Black Box Enable**

Enable Black Box

Write Black Box Data to NVM

Single NVM Write per POR

**Black Box Slot**

Black Box Slot

There has been no Black Box data written to this device yet.

**Enable Black Box:** Enables/ Disables Black Box function

**Write Black Box Data to OTP:** If enabled, when a Black Box event is triggered, Black Box information is written to OTP. There are 10 OTP saves – when OTP is full, no more Black Box events can be stored in OTP. If disabled, Black Box events are only stored in RAM, and will be lost if controller 3V3 input is cycled.

**Single NVM Write per POR:** When enabled, only a single Black Box event will be stored between device power cycles (POR). This prevents multiple Black Box event triggers from the same fault.

**Black Box Slot:** Selects where to read Black Box Data from. Two options: RAM or one of 10 Black Box OTP slots.

# Digital Multiphase – Device PMBus Address Select

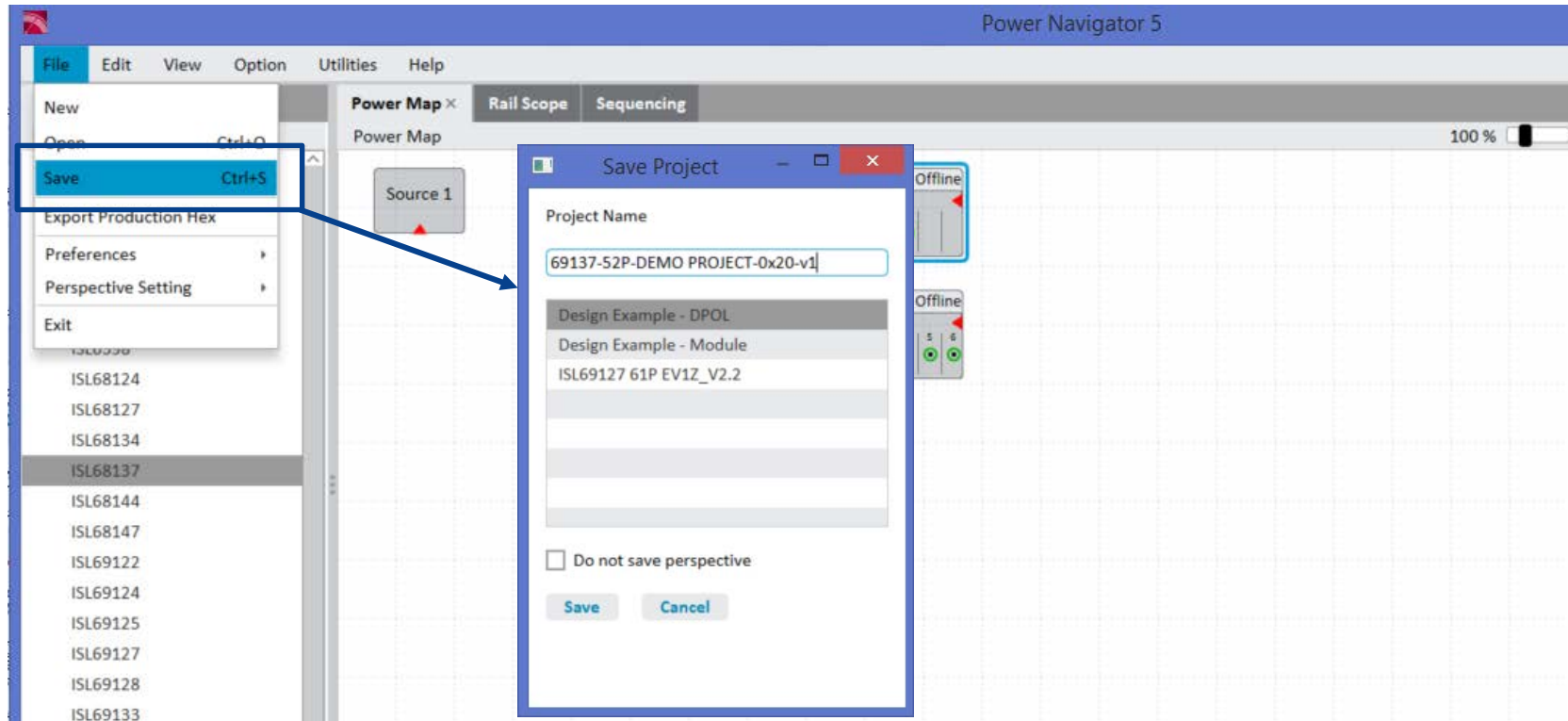
**TIP:** If project device address is not set to hardware device address, PowerNavigator will not be able to download settings to hardware – make sure the address is correct!

After configuring both outputs with Rail Inspector, set PMBus address to match intended PMBus address in actual design

Device	Address	Connected	Send All	Read All	Associated Rails
ISL68137	0x20	Offline			Rail 1, Rail 0

# Offline Project Is Now Complete!

After reaching the NVM configuration screen on BOTH outputs, your offline project is now complete! Return to PowerNavigator main screen and save.

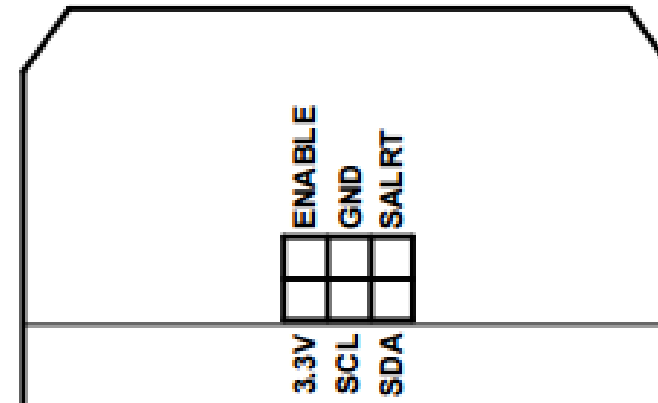
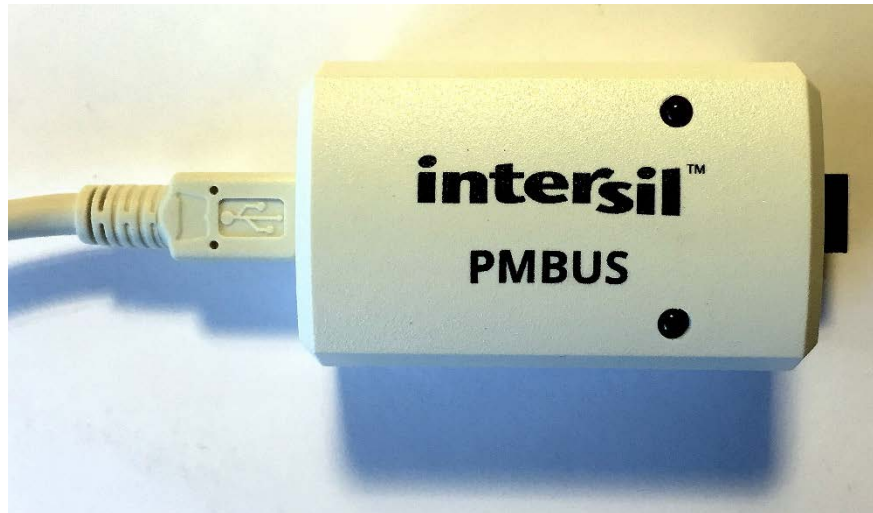


# CONNECTING TO HARDWARE



# Connecting to Hardware

- Once the project file is complete, Renesas's USB to PMBus adapter (ZLUSBEVAL3Z) can be used to connect to hardware.
- To connect to the controller's PMBus interface, only SCL, SDA and GND connections from the adapter to the board are required.



# Digital Multiphase – Connecting to Hardware

Connected Devices

Offline Mode

Project Load

RENESAS

PowerNavigator™

Choose an option and click start:

SCAN ATTACHED DEVICES

Dongle connected

ISL69127 @ 0x60

PMBus Address: 10 to 7F

Scan Again

BUILD AN OFFLINE SYSTEM



Click on saved project in "Open Existing Project" window, then click "Start"

Start

Cancel

OPEN EXISTING PROJECT

Choose project:

Design Example - DPOL

Design Example - Module

ISL69127 61P EV1Z\_V2.2

Create a new project by using one of the other two options.

PowerNavigator v5.4.62

Connected devices show up in Device Scan.

# Digital Multiphase – Connected PowerMap

The screenshot displays the Power Navigator 5 interface. On the left, the Part Library is visible. The main workspace shows a Power Map with two rails: Vcore (1.7V, -0.1A) and VSA (0.8V, 0A). Both rails show green 'PG' (Power Good) indicators and 'OFFLINE' indicators are absent. The Monitor View on the right shows real-time telemetry for both rails, including Output Voltage, Input Voltage, Output Current, Input Current, Internal Temperature, External Temperature, and Output Power.

Annotations in the image include:

- "OFFLINE" indicator is gone, indicating hardware is connected
- Connected Rails show up in PowerMap
- Project settings are automatically downloaded into device
- Monitor View shows real time telemetry read back from both outputs

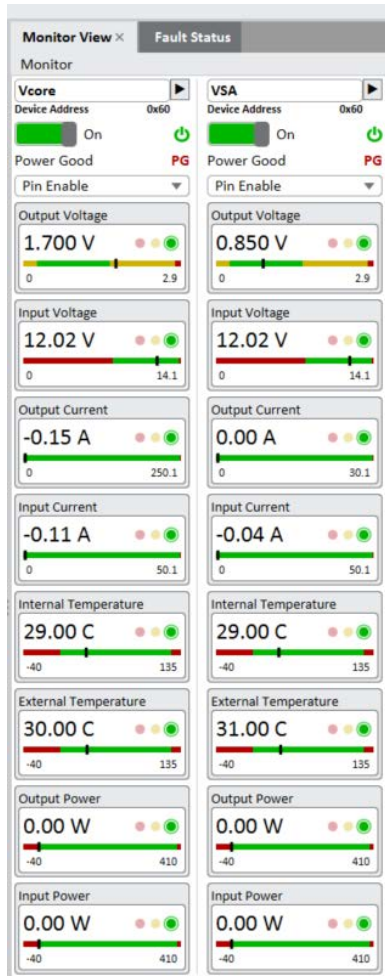
The Message Viewer at the bottom shows the following log:

```

Power Navigator version 5.4.62
Set clock speed
Run update service on demand: false
Device bus status updated
Power Navigator update check not needed at this time
New scan success 0x60 ISL69127
Device scan success
New scan success 0x60 ISL69127
Loading configuration for ISL69127 0x60
Configuration parse successful for ISL69127 0x60
Configuration load success for ISL69127-0 0x60.txt
Project load success
Created Source 1
Created Vcore: ISL69127-0 0x60 1
Created VSA: ISL69127-0 0x60 0
    
```

At the bottom of the interface, it says: "Please build up a power system by drag-n-drop from Part Library to Power Map". A status bar at the bottom right indicates "Dongle connected".

# Digital Multiphase – Monitor View Screen



Rail Name(s)

Pin or PMBus Enable Selector  
Vout Telemetry

Vin Telemetry

Iout Telemetry

Iin Telemetry

Internal Temp Telemetry

External Temp Telemetry

Pout Telemetry

Pin Telemetry

Using the Monitor View screen, all device telemetry is automatically read back and displayed in real time.

# Digital Multiphase – Railscope

RailScope Displays Telemetry information from multiple rails at the same time

Double click slots to add rails to RailScope

Select up to 4 telemetry parameters per device

RailScope controls

Enable/disable logging

Adjust Plot size

# Digital Multiphase – PhaseScope

The screenshot displays the PhaseScope software interface for a digital multiphase converter. On the left, a configuration panel includes sections for 'Configuration', 'Fails', and 'Memory Config'. A 'Vcore' status bar shows '15.69127 6 φ' and a power button. The 'Phase Configuration' section lists six phases (PH1 to PH6) with checkboxes. Below this, 'Display Rail or Phases' options include 'All', 'Rail / Sum', and 'Phases'. Further down are checkboxes for 'Vin', 'Pin', 'Iin', 'Pout', 'Vout', 'IntTemp', 'Iout', and 'ExtTemp'. A 'Play' button is present, along with 'Update Rate' (50.0 ms) and 'Display Point' (500) settings. A 'Logging To File' checkbox and a file path are also visible. A 'Plot Size' control is at the bottom of the configuration panel.

Four plots are shown on the right:
 

- Vin Plot:** Input Voltage (V) vs. time (2.5 s/div). A callout box states: "PhaseScope Displays Detailed Telemetry information from **one rail** (ex – per phase current)".
- Output Plot:** Output Voltage (V) vs. time (2.5 s/div). A callout box states: "Per-phase current information displayed" with an arrow pointing to the plot area.
- Vout Plot:** Output Voltage (V) vs. time (2.5 s/div).
- ExtTemp Plot:** External Temperature (C) vs. time (2.5 s/div).

Four callout boxes on the left side of the interface provide additional information:
 

- "Select what phases to display telemetry for" points to the phase selection checkboxes.
- "PhaseScope controls" points to the 'Play', 'Pause', and 'Stop' buttons.
- "Enable/disable logging" points to the 'Logging To File' checkbox.
- "Adjust Plot size" points to the 'Plot Size' control.



# Digital Multiphase – Monitor/Current Balance

The screenshot shows the Vcore monitoring software interface. On the left is a navigation menu with categories like Overview, Configuration, Faults, Memory Config, Advanced, Telemetry, and Monitor. The main area displays several panels: a 'Vcore' status panel, a 'Per Phase Current' table, an 'Iout Offset' section, and an 'Iin Tuning' section. Three callout boxes with arrows point to specific parts of the interface: the first points to the Vcore status panel, the second points to the Per Phase Current table, and the third points to the Iin Tuning section.

1.70 V	Vout	Pout	0.00 W
-0.17 A	Iout	Pin	0.00 W
12.11 V	Vin	Iin	-0.12 A
28.00 C	T <sup>o</sup>		
30.00 C	T <sup>o</sup>		

Phase	Current	Offset
Phase 0	0.00 A	0.00 mA
Phase 1	-0.00 A	0.00 mA
Phase 2	-0.00 A	0.00 mA
Phase 3	-0.00 A	0.00 mA
Phase 4	-0.00 A	0.00 mA
Phase 5	-0.00 A	0.00 mA
Phase 6	-0.11 A	0.00 mA

VSA Iout Offset	0.5
Vcore Iout Offset	0.5

Channel	Iin	Offset	Width Skew
VSA Iin	0.00 A	0.0 A	2.0 ns
Iin Telemetry LPF	60.325 μs		
Vcore Iin	-0.12 A	0.0 A	2.0 ns

Quick view of device telemetry and status

View of per phase current. Individual phase offsets can be used to manually adjust current balance among phases.

Total Iout offset adjustment for each output. Can be used to manually calibrate offsets at no load.

Iin tuning for each channel. Can be used to adjust input current offset errors.

# Digital Multiphase – Fault Reporting

Overview

- Configuration
  - Phase Configuration
  - Loop
    - Loop Configuration
    - Power Train
    - Transient
    - Diode Braking
    - DVID Tuning
    - Temperature Sense
  - Faults
    - Global Settings
    - Voltage
    - Current
    - Temperature
    - Black Box
  - Memory Config
    - Save to NVM
  - Advanced
    - Debug
  - Telemetry
    - Monitor
    - Fault**
    - Phase Scope
    - Command Tools
      - New

STATUS\_WORD

- Vout
- Iout/Pout
- Input
- Mfr.
- Fans
- Other
- Unknown

STATUS\_BYTE

- Busy
- Off**
- Vout OV
- Iout OC
- Vin UV
- Temperature
- Comm/Logic
- None of the above

STATUS\_VOUT

- Vout OV Fault
- Vout OV Warning
- Vout UV Warning
- Vout UV Fault
- Vout Max Warning
- Ton Max Fault
- Toff Max Warning
- Vout Tracking Error

STATUS\_IOUT

- Iout OC Fault
- Iout OC LV Shutdown Fault
- Iout OC Warning
- Iout UC Fault
- Ishare Fault
- In Power Limiting Mode
- Pout OP Fault
- Pout OP Warning

STATUS\_INPUT

- Vin OV Fault
- Vin OV Warning
- Vin UV Warning
- Vin UV Fault
- Unit Off for Low Input Voltage
- Iin OC Fault
- Iin OC Warning
- Pin OP Warning

STATUS\_TEMPERATURE

- Over Temperature Fault
- Over Temperature Warning
- Under Temperature Fault

STATUS\_CML

- Invalid Command Rx
- Invalid Data Rx
- PEC Fault
- Memory Fault Detected
- Processor Fault
- Other Communication Fault
- Mem/Logic Fault

STATUS\_MFR

- GPIO2 pin is active
- Thermal warning or GPIO1 pin ...
- Black box event occurred
- Snapshot event occurred
- OTP memory is full
- SVID interface error

PMBus Fault reporting. Triggered faults will be displayed here.

**TIP:** If a rail is having start-up issues, or shutting down during board bring-up, check fault bits *first* to help debug issue.



# ADVANCED FEATURE SET: AVSBUS

# AVSBus Overview

- AVSBus is an interface designed to facilitate and expedite point-to-point communication between an ASIC , FPGA, or other logic, memory, or processor devices and a POL control device on a system for the purpose of adaptive voltage scaling.
- This bus provides a focused set of functionality for the purpose of high speed rail control. All other configurations and settings must be done through the GUI or through PMBus.
- The AVSBus commands can always be read, but they cannot be written unless the device is configured to operate via AVSBUS in the PMBus command OPERATION.
- 2 New Panels are visible using the PowerNavigator GUI to facilitate AVSBus testing
  - AVSBUS Basic
  - AVSBUS Advanced
- Require dedicated Renesas-developed AVSBus dongle to support device testing. Refer to the EVK users guide for details on dedicated hardware developed.

\*Available only on ISL68137, ISL68134 devices

\*\* Compliant to latest AVSBUS 1.3x04 Spec defined by System Management Interface Forum (PMBUS part III)

# Digital Multiphase – AVSBus

The screenshot displays the 'Rail 1' software interface. On the left is a navigation menu with categories: Overview, Configuration, Loop, Faults, Memory Config, and Advanced. The 'Advanced' section is expanded to show 'AVSBus Basic' selected. The main panel is divided into two sections: 'AVSBus Host Interface Configuration' and 'AVSBus Commands'. The configuration section includes fields for Vout Mode (PMBus Nominal), VDDIO Voltage (3.3 V), and Bus Speed (5 MHz). The commands section lists various parameters like VOUT, Transition Rate Rising, Transition Rate Falling, Reset VOUT, IOUT, Temperature, Version, and Status, each with a 'Read' or 'Send' button. At the bottom, there are status indicators for 'Vdone' and 'OT Fault'.

VDDIO – adjust I/O voltage on AVSBus adapter

Bus Speed – Adjust AVSBus speed on AVSBus adapter. Max 50MHz

AVSBus Commands – read/write single AVSBus commands to device.

# Digital Multiphase – AVSBus

The screenshot displays the AVSBus software interface for 'Rail 1'. On the left is a navigation tree with categories like Overview, Configuration, Loop, Faults, Memory Config, Advanced, Telemetry, and Command Tools. The 'Advanced' section is expanded to show 'AVSBus Advanced'. The main area is divided into 'Read' and 'Write' command lists. A 'Transmission Burst' section has radio buttons for 'Single Frame' (selected) and 'Three Frames'. Below this is a queue of command slots, some containing 'Vout' and 'Vout Transition Rates'. At the bottom, there are buttons for 'Delete Command', 'Clear Buffer', 'Save', 'Load', 'Loop for 2 iterations', 'Execute', 'Copy Output', and 'Clear Output'. Status indicators for 'Vdone' and 'OT Fault' are at the bottom left.

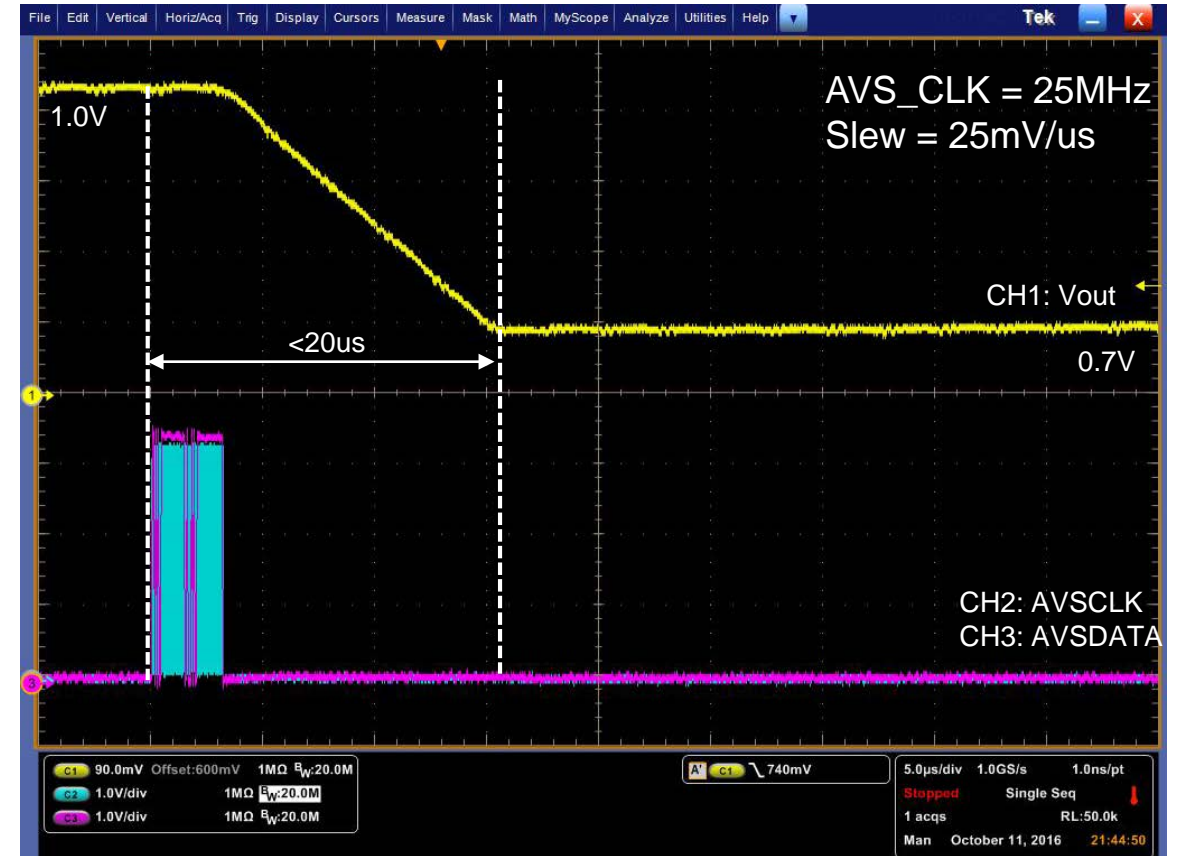
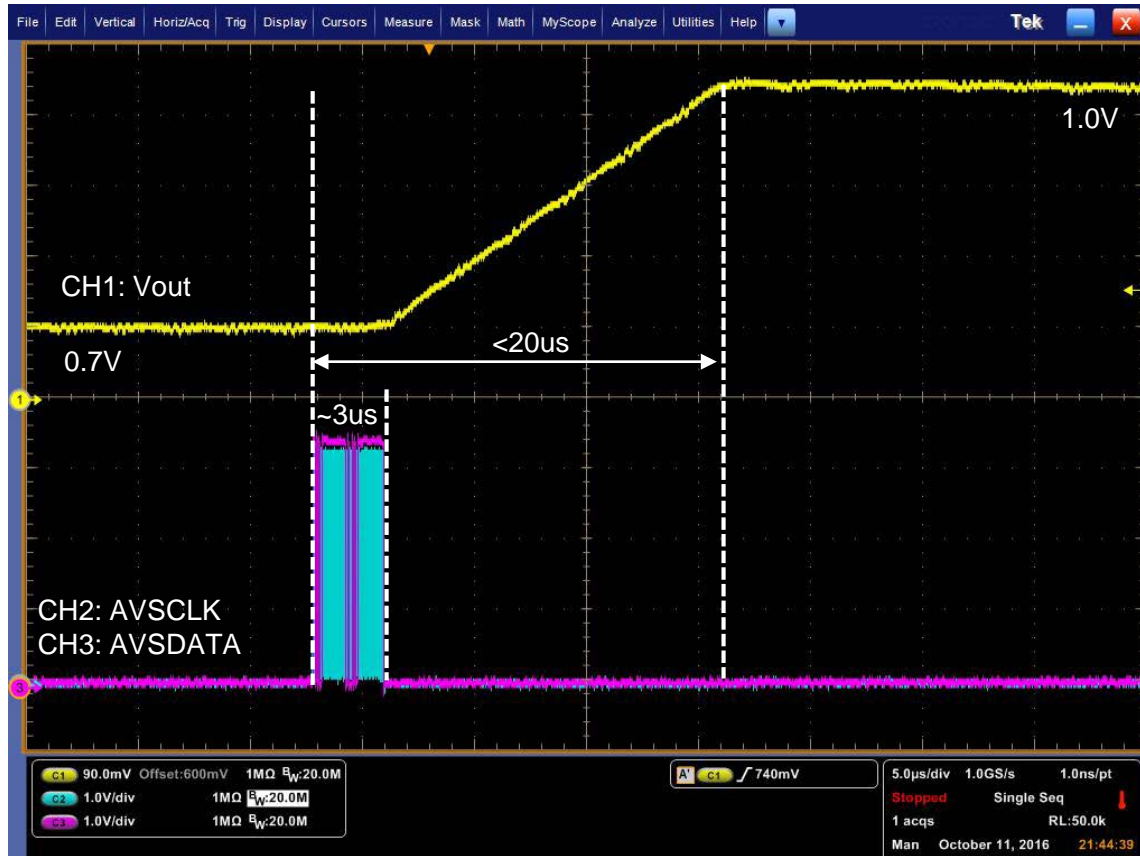
Drag and drop AVSBus commands to “queue” up a sequence of AVSBus commands to AVSBus dongle buffer. Up to 100 commands can be queued at a time.

Delays can be added to the sequence, allowing the AVSBus commands to be precisely sequenced.

Once queued up, the command loop can be run and the AVSBus commands will be executed.

Checking the Loop button allows the command sequence to be repeated.

# AVSBus – Example Vout Set Point Change



Using the AVSBus interface, 300mV change in Vout takes <20us, enabling rapid changes in CPU power states

# SAVING SETTINGS TO NVM

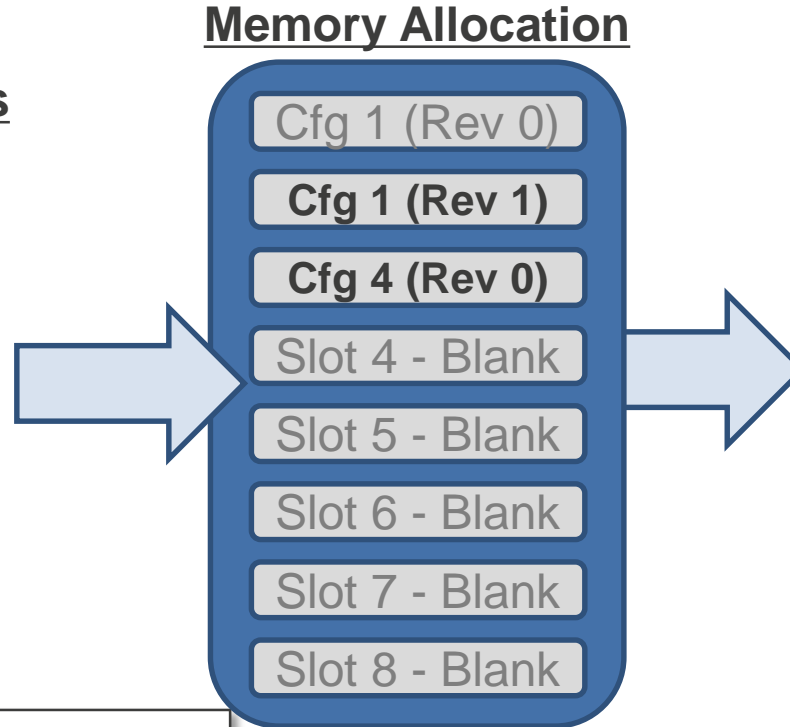
# Digital Multiphase NVM Stores

- Renesas Digital Multiphase controllers contain OTP (one time programmable) NVM memory for storing device configuration settings.
- Up to 8 different configurations (Configuration ID's) can be stored in the device, using 1 of 8 available NVM “slots”
  - Once a NVM slot is used, it cannot be erased or reprogrammed.
  - Multiple versions of the same Configuration ID can be stored in NVM – the controller will always use the most recent version.
- At start-up, an external pin-strap resistor tells the controller which of the stored *Configuration ID's* to use
  - The resistor does not point to a NVM slot, but rather to a *CONFIGURATION\_ID*

# Example Configuration Stores

## Example: Storing Configs

- A 4+0 design configuration is first stored as Config ID 1
- The 4+0 design is then updated due to design change (ex. Vboot change), resulting in a new Config ID 1 store.
- A 3+1 design configuration is stored as Config ID 4



## Upon Power Up

- A 1800 Ohm Rconfig will result in Cfg1 (Rev 1) to be used. Only the latest revision will ever be loaded
- A 3300 Ohm Rconfig will result in Cfg4 (Rev0) to be used

### In this example:

- **2** CONFIG IDs are stored in OTP
- **3** OTP slots are used, however. CFG1 (Rev 0) uses a slot, but is not accessible since it has been replaced by CFG1 (Rev 1)

R CONFIG (Ω)	CONFIG ID
6800	0
1800	1
2200	2
2700	3
3300	4
3900	5
4700	6
5600	7



# Saving Settings to NVM

The screenshot shows the Vcore software interface. On the left is a navigation tree with 'Save to NVM' highlighted under 'Memory Config'. The main area is divided into three sections: 'Project Information', 'Save Project', and 'Configurations'. The 'Save Project' section contains a 'Refresh' button and a 'Save Project' button. The 'Configurations' section shows a table with 8 rows of configuration IDs, each with 'None' and 'Save' buttons. A blue arrow points from the 'Refresh' button to the 'Save' button for Configuration ID 0.

Configuration ID	None	Save
Configuration ID 0	None	Save
Configuration ID 1	None	Save
Configuration ID 2	None	Save
Configuration ID 3	None	Save
Configuration ID 4	None	Save
Configuration ID 5	None	Save
Configuration ID 6	None	Save
Configuration ID 7	None	Save

To save the current config to the on-board memory in the device that is connected.

First click on the “Save to NVM” in the Rail Inspector

If the project has not been saved since the most recent changes, the “Refresh” button will be enabled and the “Save” buttons for the configuration IDs will be disabled.

# Saving Settings to NVM

The screenshot shows the Vcore software interface. On the left is a navigation tree with categories like Configuration, Faults, Memory Config, and Advanced. The 'Save to NVM' option is highlighted. The main area is divided into three sections: 'Project Information', 'Save Project', and 'Configurations'. The 'Project Information' section shows details like Project Name and Device. The 'Save Project' section has a message and two buttons: 'Refresh' and 'Save Project'. The 'Configurations' section shows a table with 8 rows, each representing a Configuration ID (0-7) and its NVM Contents, with a 'Save' button for each row. A blue arrow points to the 'Save Project' button, and a bracket groups the 'Save' buttons in the table.

Project Information

Project Name: ISL69127 61P EV1Z\_V2.2  
Device: ISL69127-0 0x60  
Pinstrapped Configuration: Configuration ID 0  
Device Connection: Online

Save Project

The current system has been saved. It may be burned to OTP.

Refresh Save Project

Configurations

8 NVM Saves Remaining

	NVM Contents	
Configuration ID 0	None	Save
Configuration ID 1	None	Save
Configuration ID 2	None	Save
Configuration ID 3	None	Save
Configuration ID 4	None	Save
Configuration ID 5	None	Save
Configuration ID 6	None	Save
Configuration ID 7	None	Save

After project has been saved, “Refresh” will gray out, indicating the latest settings have been saved. “Save Project” is enabled if the project has unsaved changes.

“Save” options will now be active, allowing the project to be saved to 1 of 8 available CFG ID’s

# Saving Settings to NVM

Project Information

Project Name: ISL69127 61P EV1Z\_V2.2  
Device: ISL69127-0 0x60  
Pinstrapped Configuration: Configuration ID 0  
Device Connection: Online

Save Project

The current system has been saved. It may be burned to OTP.

Refresh Save Project

Configurations

7 NVM Saves Remaining

Configuration ID	NVM Contents	Save
Configuration ID 0	Match Found	Save
Configuration ID 1	None	Save
Configuration ID 2	None	Save
Configuration ID 3	None	Save
Configuration ID 4	None	Save
Configuration ID 5	None	Save
Configuration ID 6	None	Save
Configuration ID 7	None	Save

Once the configuration has been saved, input power to the part should be cycled.

Re-loading the NVM screen will show that there are now 7 saves remaining. In addition, the NVM contents will show a match to the project in your directory.

Clicking on the “Match Found” button will show information for the matching project.

# HEX FILE EXPORT

# Digital Multiphase HEX File Export

- To support production programming, Digital Multiphase controllers support a HEX export utility.
  - Once a design has been finalized, the exported HEX file is used to program devices on high speed production programmers.
- The HEX export utility is available under the “Utilities” menu on the main PowerNavigator screen.
- Using this utility, multiple projects can be combined into a single HEX file
  - Each project is assigned one of 8 available CONFIG\_IDs
  - An external resistor is then used to select the proper CONFIG\_ID

# Digital Multiphase – Saving A Project

Power Navigator 5

File Edit View Option Utilities Help

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

Power Map x  
Power Map

Source 1

VSA

PG -0V 0A Addr: 60.1

125 %

Monitor View x Fault Status

Monitor

VSA Device Address 0x60 VCCIN Device Address 0x60

Off Off

PG

2.9  
14.1

Output Current 0.00 A 250.1  
Input Current 0.00 A 50.1  
Internal Temperature 24.00 C 135  
External Temperature 27.00 C 135  
Output Power 0.00 W 410  
Input Power 0.00 W 410

Output Current 0.00 A 30.1  
Input Current 0.00 A 50.1  
Internal Temperature 24.00 C 135  
External Temperature 26.00 C 135  
Output Power 0.00 W 410  
Input Power 0.00 W 410

Message Viewer x System Devices

Power Navigator version 5.4.62  
Set clock speed  
Run update service on demand: false  
Device bus status updated  
Power Navigator update check not needed at this time

Please build up a power system by drag-n-drop from Part Library to Power Map

Dongle connected

Save Project

Project Name

ISL69134-31P-EV1ZB\_186\_FINAL

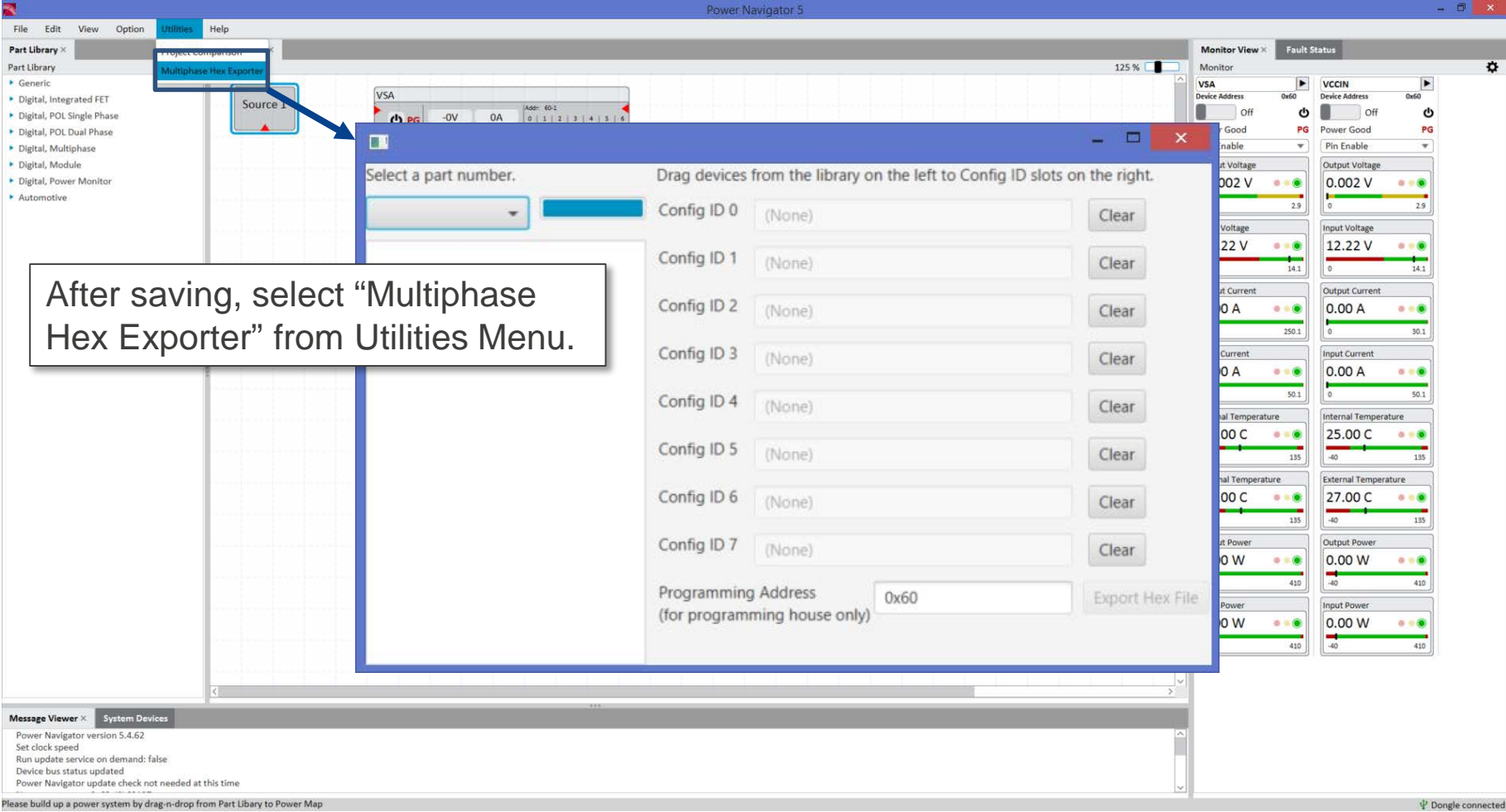
Design Example - DPOL  
Design Example - Module  
ISL69127 61P EV1Z\_V2.2

Do not save perspective

Save Cancel

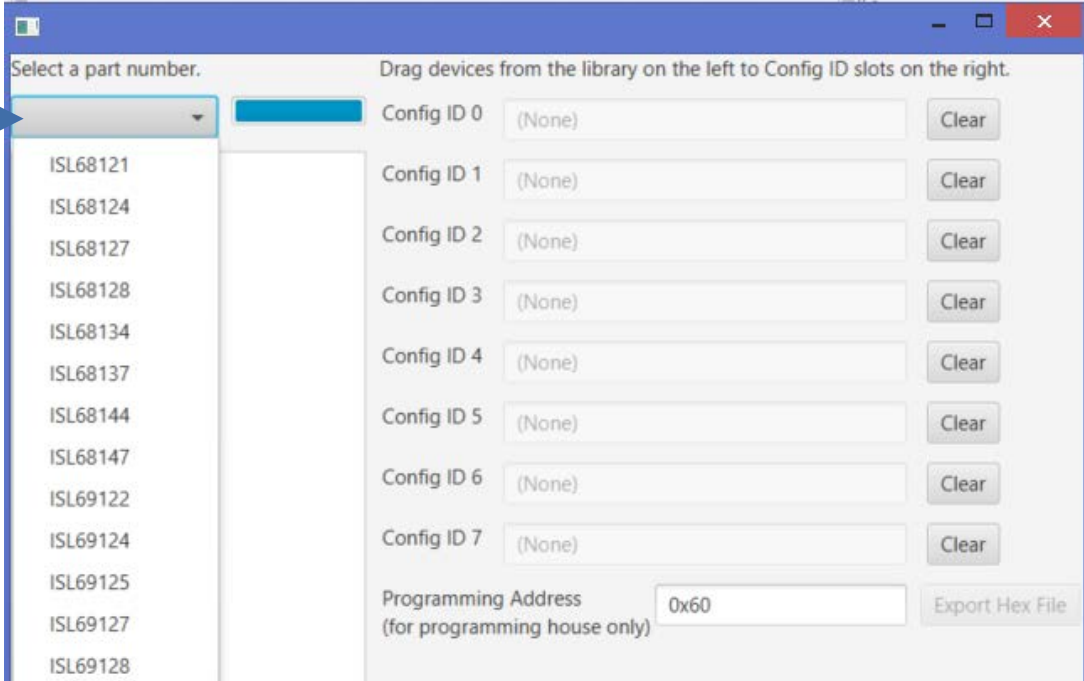
Select "Save" from File Menu.  
Be sure to save revision  
information in project name

# Digital Multiphase – Exporting HEX File



# Digital Multiphase – Exporting HEX File

In Multiphase Hex Exporter, select controller part number from drop down box



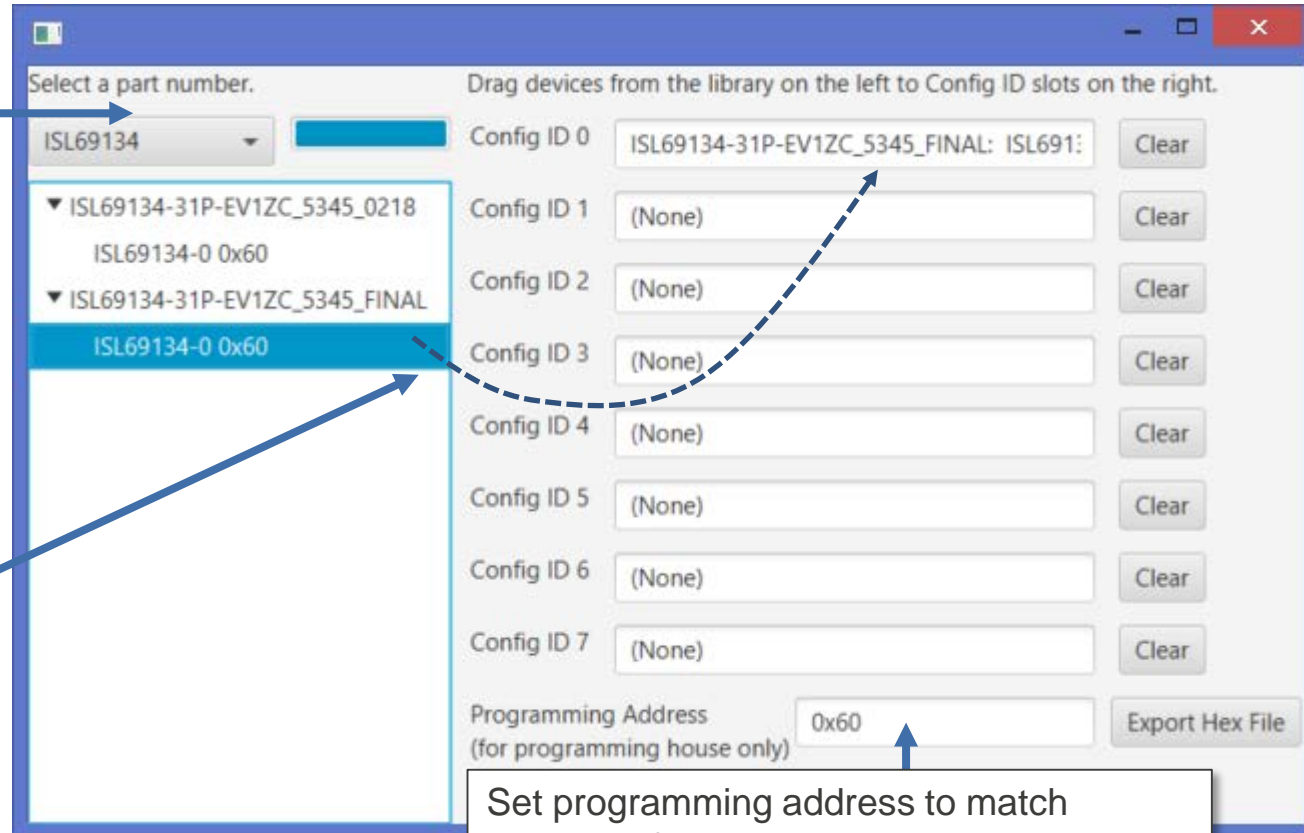


# Digital Multiphase – Exporting HEX File

After part number is selected, the Hex Exporter tool will scan the PowerNavigator Projects folder for all project IDs with that part number.

After scanning is complete, all projects using that part number will be displayed

Select project, then Click and drag project into desired Config ID.



Set programming address to match address of controller in programming environment.

# Digital Multiphase – Exporting HEX File

The screenshot shows the PowerNavigator software interface. On the left, a 'Save As' dialog box is open, displaying a file explorer view of the 'Documents' folder. The file name is 'ISL69134-2 0x60.hex' and the save type is 'Hex files (\*.hex)'. An arrow points from this dialog to a text box below.

The main software window has a title bar 'Select a part number.' and a dropdown menu showing 'ISL69134'. Below this, a tree view shows a folder structure: 'ISL69134-31P-EV1ZC\_5345\_0218' containing 'ISL69134-0 0x60', and 'ISL69134-31P-EV1ZC\_5345\_FINAL' containing 'ISL69134-0 0x60'. An arrow points from this tree view to the same text box.

On the right side of the software window, there are eight 'Config ID' slots (0-7). Each slot has a text input field and a 'Clear' button. The 'Config ID 0' field contains 'ISL69134-31P-EV1ZC\_5345\_FINAL: ISL69134-0 0x60'. Below these slots is a 'Programming Address (for programming house only)' field containing '0x60' and an 'Export Hex File' button. An arrow points from this button to a text box on the right.

**In resulting pop-up window, select save location and file name for Hex file. To ease Hex file management, be sure to include version numbering in Hex file.**

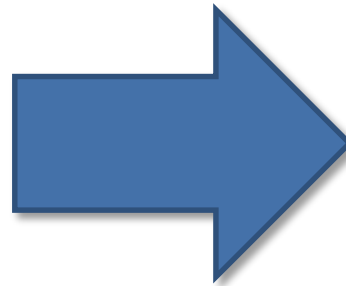
**After all projects have been loaded, click "Export Hex File"**

# Digital Multiphase – Configuration Vs. HEX File

Hex File

Configuration File

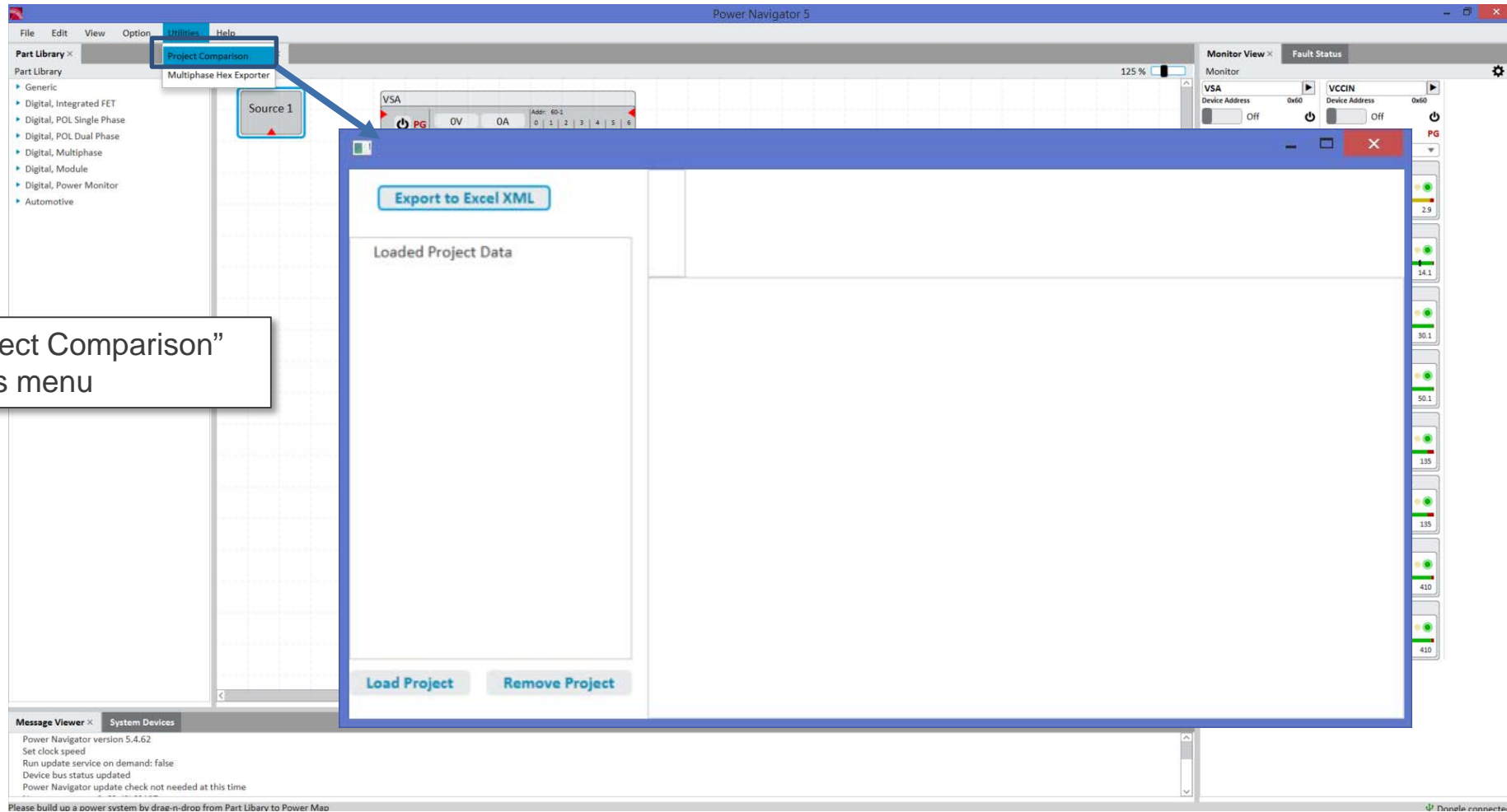
```
ISL69134-0 0x60.txt
1 # ISL69134-0 0x60
2 # connected: true
3 # IC_DEVICE_ID 0x002DD249
4 # IC_DEVICE_REV 0x00040000
5 # 5.3.24
6 # 2016/06/10 11:54:48
7
8 PAGE 0x00 # 0x0
9 SFVRATETODAC 0x00004444 # 0xE451
10 SFTELTEMPRANGE 0x0000020D # 0xE452
11 SFTELVINRANGEMV 0x0000051D1 # 0xE453
12 SFTELVOUTRANGEMV 0x0000104C # 0xE454
13 SFFINRANGEBY8 0x00001062 # 0xE455
14 SFLPVOUTRANGEMV 0x00001000 # 0xE456
15 SFLPINRANGEBY64 0x00000400 # 0xE457
16 SCALEDROOP 0x031B031B # 0xE458
17 TEMPC00 0x00000000 # 0xE459
18 TEMPC01 0x00000000 # 0xE45A
19 SCALEIOUT 0x136D136D # 0xE45B
20 SCALEPOWER 0x09F209F2 # 0xE45C
21 TCTELCFG1 0x41841C11 # 0xE45D
22 TCTELCFG2 0x00000000 # 0xE45E
23 TCTELCFG3 0x00000001 # 0xE45F
24 RAMUSR_TMONCALOFFSET 0x00000000 # 0x1090
25 RAMUSR_FILTERWAIT 0x00000010 # 0x1091
26 RAMUSR_CH0UTLIMITS 0xFFCEFFCE # 0x1092
27 RAMUSR_CH1UTLIMITS 0xFFCEFFCE # 0x1093
28 RAMUSR_OTLIMITS 0x107D7D7D # 0x1094
29 RAMUSR_TEMPCONFIG 0x25E2828C # 0x1095
30 RAMUSR_PH01DCRFILTRES 0x0000001EC # 0x1096
31 RAMUSR_PH23DCRFILTRES 0x00000000 # 0x1097
32 RAMUSR_PH45DCRFILTRES 0x01EC01EC # 0x1098
33 RAMUSR_PH6DCRFILTRES 0x800001EC # 0x1099
34 RAMUSR_PH01ISENGAIN 0x80008000 # 0x109A
35 RAMUSR_PH23ISENGAIN 0x80008000 # 0x109B
36 RAMUSR_PH45ISENGAIN 0x80008000 # 0x109C
37 RAMUSR_PH6ISENGAIN 0x80008000 # 0x109D
38 RAMUSR_PH01ISENOFFSET 0x003A0000 # 0x109E
39 RAMUSR_PH23ISENOFFSET 0x00000000 # 0x109F
```



```
ISL69134-10 0x60.hex RevE.hex
1 4907C0AD49D22D001E
2 4907C0AE000005007A
3 4907C000050400007F
4 4909C001352E332E323401
5 490BC002000001553B4928BDA5
6 0005C0E601000C
7 0005C0F70001D7
8 0007C0F6B3040000D1
9 0007C0F600000000D8
10 0007C0F600000000D8
11 0007C0F600000000D8
12 0007C0F600000000D8
13 0007C0F600000000D8
14 0007C0F600000000D8
15 0007C0F600000000D8
16 0007C0F600000000D8
17 0007C0F600000000D8
18 0007C0F600000000D8
19 0007C0F600000000D8
20 0007C0F600000000D8
21 0007C0F600000000D8
22 0007C0F600000000D8
23 0007C0F600000000D8
24 0007C0F600000000D8
25 0007C0F601000000CE
26 0007C0F600000000D8
27 0007C0F6B3040000D1
28 0007C0F603B4014849
29 0007C0F6019001BD48
30 0007C0F60D27002093
31 0007C0F603B4014849
32 0007C0F6019001BD48
33 0007C0F62503002005
34 0007C0F670B5054654
35 0007C0F6002004461A
36 0007C0F62968FFF738
37 0007C0F6EDFFA10064
38 0007C0F64919496884
```

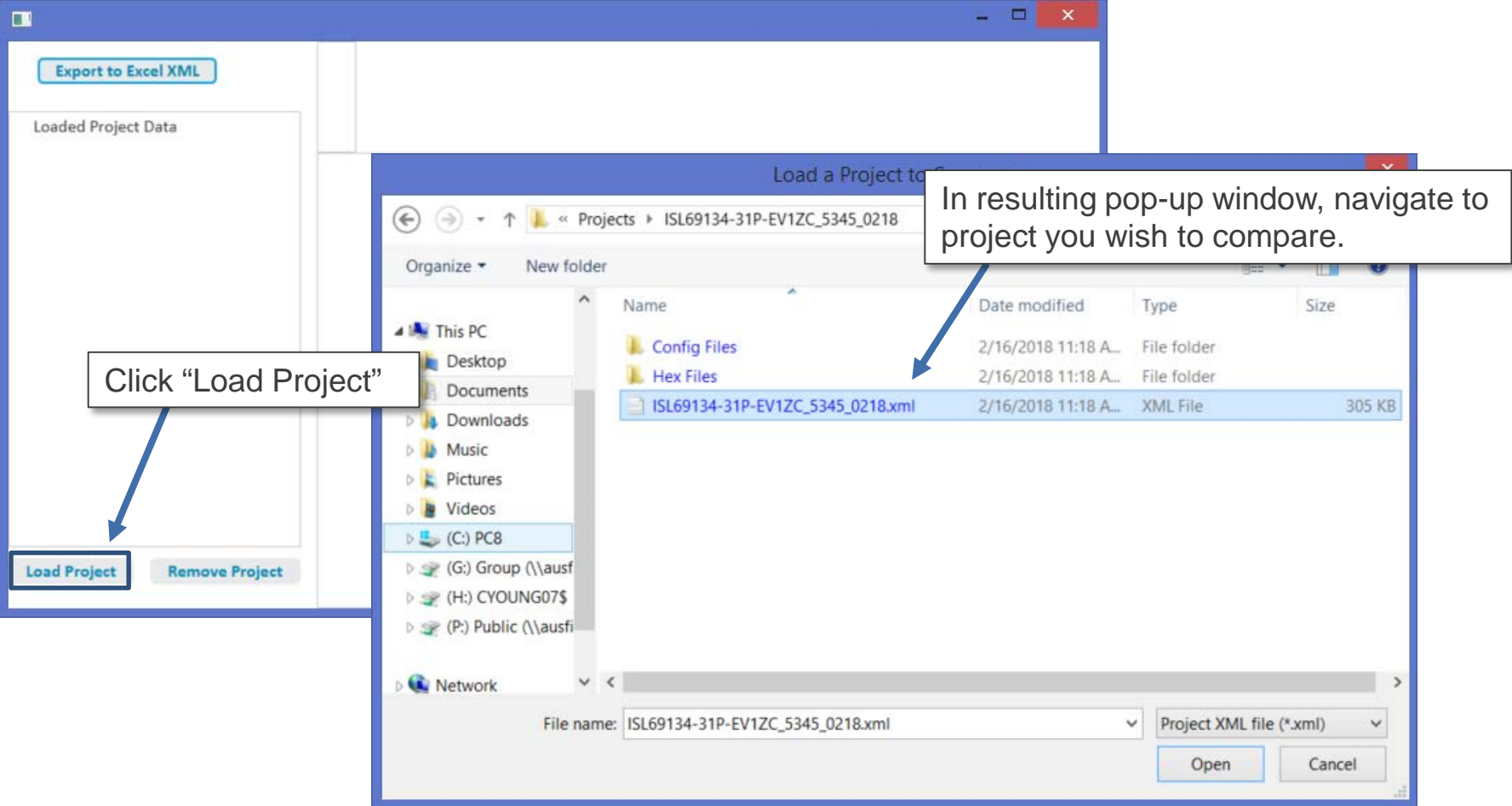
# PROJECT COMPARE

# Digital Multiphase – Project Compare



Select "Project Comparison"  
from Utilities menu

# Digital Multiphase – Connecting to Hardware



# Digital Multiphase – Connecting to Hardware

After projects have been loaded, expand to show individual rails

The screenshot shows a software interface with a left sidebar and a main table. The sidebar, titled 'Loaded Project Data', contains a tree view of project files. The main table compares two configurations, 'ISL69134-31P-EV12C\_...' (CRC 248D73F4) and 'ISL69134-31P-EV12C\_...' (CRC EE8E6765). The table lists various parameters such as Phase Dropping Delay, PS0 Min Phase Count, PS1 Phase Count, SVID Addr, Lock SVID, VOUTTRIM, VOUTCALOFFSET, SVID ICC MAX, SVID Temp MAX, SVID Pin MAX, Vin Minimum, SVID 30h, Multi-VR Config, Vout Maximum, Protocol ID, Boot Voltage, Bootcap Recharge Frequency, Minimum PWM Low Time, Switching Frequency, UFET RDSon, LFET RDSon, RPCB, L, DCR, Current Sense Scheme, SPS Output Level, Nom. Full Scale per phase current, Cbulk Qty, Cbulk C, and Cbulk ESR.

Configuration ID 0	248D73F4	EE8E6765
Phase Dropping Delay (us)	2000.0	2000.0
PS0 Min Phase Count	1.0	1.0
PS1 Phase Count	1	1
SVID Addr	0.0	0.0
Lock SVID	Reject	Reject
VOUTTRIM (mv) (V)	0.0	0.0
VOUTCALOFFSET (mv) (V)	0.0	0.0
SVID ICC MAX	100.0	100.0
SVID Temp MAX	125.0	125.0
SVID Pin MAX (W)	500.0	500.0
Vin Minimum (V)	8.0	8.0
SVID 30h (VOUT MAX Code)	255.0	255.0
Multi-VR Config	1.0	1.0
Vout Maximum (V)	2.3	2.3
Protocol ID	5.0	5.0
Boot Voltage (V)	0.9	0.950000000...
Bootcap Recharge Frequency (kHz)	10.0	10.0
Minimum PWM Low Time	3.0	3.0
Switching Frequency (kHz)	499.6002197...	499.6002197...
UFET RDSon (mΩ)	3.0	3.0
LFET RDSon (mΩ)	0.9	0.9
RPCB (mΩ)	0.2	0.2
L (nominal) (nH)	180.0	180.0
DCR (mΩ)	0.31	0.31
Current Sense Scheme	SPS	SPS
SPS Output Level (mV/A)	4.8	4.8
Nom. Full Scale per phase current	77.70833333...	77.70833333...
Cbulk Qty.	3.0	3.0
Cbulk C (each) (μF)	423.0	423.0
Cbulk ESR (each) (mΩ)	4.0	4.0

Drag and drop rails into compare window



# Digital Multiphase – Connecting to Hardware

Export to Excel XML

Loaded Project Data

- ISL69134-31P-EV12C\_5345\_0218
  - ISL69134-0 0x60
    - (P# 0) VSA
    - (P# 1) VCCIN
  - ISL69134-31P-EV12C\_5345\_FINAL
    - ISL69134-0 0x60
      - (P# 0) VSA
      - (P# 1) VCCIN2

Load Project Remove Project

Configuration ID 0	248D73F4	EE8E6765
Phase Dropping Delay (us)	2000.0	2000.0
PS0 Min Phase Count	1.0	1.0
PS1 Phase Count	1	1
SVID Addr	0.0	0.0
Lock SVID	Reject	Reject
VOUTTRIM (mv) (V)	0.0	0.0
VOUTCALOFFSET (mv) (V)	0.0	0.0
SVID ICC MAX	100.0	100.0
SVID Temp MAX	125.0	125.0
SVID Pin MAX (W)	500.0	500.0
Vin Minimum (V)	8.0	8.0
SVID 30h (VOUT MAX Code)	255.0	255.0
Multi-VR Config	1.0	1.0
Vout Maximum (V)	2.3	2.3
Protocol ID	5.0	5.0
Boot Voltage (V)	0.9	0.950000000...
Bootcap Recharge Frequency (KHz)	10.0	10.0
Minimum PWM Low Time	3.0	3.0
Switching Frequency (kHz)	499.6002197...	499.6002197...
UFET RDSon (mΩ)	3.0	3.0
LFET RDSon (mΩ)	0.9	0.9
RPCB (mΩ)	0.2	0.2
L (nominal) (nH)	180.0	180.0
DCR (mΩ)	0.31	0.31
Current Sense Scheme	SPS	SPS
SPS Output Level (mV/A)	4.8	4.8
Nom. Full Scale per phase current	77.70833333...	77.70833333...
Cbulk Qty.	3.0	3.0
Cbulk C (each) (μF)	423.0	423.0
Cbulk ESR (each) (mΩ)	4.0	4.0

Scan List for differences, OR click "Export to Excel XML"



# Digital Multiphase – Connecting to Hardware

Export to Excel XML

Loaded Project Data

- ISL69134-31P-EV12C\_5345\_0218
  - ISL69134-0 0x60

(P# 1) VCCIN2

Load Project Remove Project

After clicking “Export to Excel XML”, name comparison and select save location

CRC	Configuration ID 0	248D73F4	EE8E6765
Phase Dropping Delay (us)		2000.0	2000.0
Min Phase Count		1.0	1.0
PS1 Phase Count		1	1
SVID Addr		0.0	0.0
Lock SVID		Reject	Reject
OUTTRIM (mv) (V)		0.0	0.0
ALOFSSET (mv) (V)		0.0	0.0
SVID ICC MAX			
SVID Temp MAX			
SVID Pin MAX (W)			
Pin Minimum (V)			
SVID 30h (VOUT MAX Code)			
Multi-VR Config			
Vout Maximum (V)			
Protocol ID			
Boot Voltage (V)			
Bootcap Recharge Frequency (kHz)			
Minimum PWM Low Time			
Switching Frequency (kHz)			
UFET RDson (mΩ)			
LFET RDson (mΩ)			
RPCB (mΩ)			
L (nominal) (nH)			
DCR (mΩ)			
Current Sense Scheme			
SPS Output Level (mV/A)			
Nom. Full Scale per phase current		77	
Cbulk Qty.			
Cbulk C (each) (μF)			
Cbulk ESR (each) (mΩ)			

Export to Excel XML file

This PC > Documents > Intersil > PowerNavigator

File name: Project Comparison.xml

Save as type: Excel XML file (\*.xml)

Save Cancel

# Digital Multiphase – Connecting to Hardware

	ISL69134-0 0x60 (P# 1)	ISL69134-0 0x60 (P# 1)
	VCCIN	VCCIN2
CRC (Configuration ID 0)	248D73F4	EE8E6765
Phase Dropping Delay (us)	2000.0	2000.0
PS0 Min Phase Count	1.0	1.0
PS1 Phase Count	1.0	1.0
SVID Addr	0.0	0.0
Lock SVID	Reject	Reject
VOUTTRIM (mv) (V)	0.0	0.0
VOUTCALOFFSET (mv) (V)	0.0	0.0
SVID ICC MAX	100.0	100.0
SVID Temp MAX	125.0	125.0
SVID Pin MAX (W)	500.0	500.0
Vin Minimum (V)	8.0	8.0
SVID 30h (VOUT MAX Code)	255.0	255.0
Multi-VR Config	1.0	1.0
Vout Maximum (V)	2.3	2.3
Protocol ID	5.0	5.0
Boot Voltage (V)	0.9	0.95
Itcap Recharge Frequency (kHz)	10.0	10.0
Minimum PWM Low Time	3.0	3.0
Switching Frequency (kHz)	499.6	499.6
UFET RDSon (mΩ)	3.0	3.0
LFET RDSon (mΩ)	0.9	0.9
RPCB (mΩ)	0.2	0.2
L (nominal) (nH)	180.0	180.0
DCR (mΩ)	0.31	0.31
Current Sense Scheme	SPS	SPS
SPS Output Level (mV/A)	4.8	4.8
Full Scale per phase current	77.708	77.708

Differences will be automatically highlighted in RED

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