Technical Support
support@nuvationenergy.com

Sales Inquiries
sales@nuvationenergy.com
855-261-0507

Nuvation Energy BMS Faraday Update 1 Software

Release Notes

Document ID: NE-RN-007 | Revision: 1.1, 2025-03-09

BMS Software Version: Faraday Update 1

Table of Contents

Revision History

Version	Details	Date
1.0	Initial release for Faraday Update 1 firmware	2024-03-11
1.1	Added known issues around open wire detection and disabling balancing	2025-03-09

1. Introduction

This document provides a summary of software changes for the Faraday Update 1 Software release.

Nuvation Energy Software Release Naming Convention

Nuvation Energy BMS software releases have *names* along with *version numbers*. The release names are in alphabetical order to easily identify newer releases. For example: Ampere -> Babbage -> Curie.

Faraday Update 1 applies to the following stack-level products only:

- G5 High-Voltage BMS

2. Identification

The Faraday Update 1 software release can be identified using the following information:

Table 1. Faraday Update 1 Release Identification

Main Firmware Version	Main MCU CRC	AFE Firmware Version	AFE MCU CRC
5.8.0	10946	0.11.0	5865

Finding the currently installed version

To find the current version of software installed on your Battery Management System:

- At the stack-level, check the *About* screen in the Operator Interface.

The firmware upgrade for the Main MCU can be performed in the field using the G5 Operator Interface. The AFE MCU firmware can only be updated by Nuvation.

2.1. UL 1973 compatibility

The Faraday Update 1 release is compatible for UL 1973 certification.

Stack-Level

To maintain firmware compatibility for the IEC 60730-1 safety assessment, the stack-level firmware must maintain a specific CRC on its program image. The Faraday Update 1 release has completed IEC 60730-1 Annex H functional safety to allow for compliance to higher level UL standards (such as UL 1973). The functional safety applies to all products listed in the *Introduction*.

The *Nuvation Energy G5 High-Voltage BMS: Safety Manual* was created to guide Nuvation Energy BMS owners on how to configure their system to comply with a UL 1973 review. This is a step by step instruction manual that provides a check list of configuration steps that the UL reviewer will request.

Please contact support@nuvationenergy.com for access to the *Nuvation Energy G5*

> *High-Voltage BMS: Safety Manual*.

The Main MCU with Faraday Update 1 firmware and the AFE MCU with Faraday firmware are also compliant for functional safety. The supported combinations of firmware for functional safety are listed in the table below.

Table 2. Compliant Functional Safety Release Identification

Main Firmware Version	Main MCU CRC	AFE Firmware Version	AFE MCU CRC
5.8.0	10946	0.11.0	5865
5.8.0	10946	0.8.0	45215

We thrive on your feedback and what we build is driven by your input.
Please submit support tickets to support@nuvationenergy.com.

3. Faraday Update 1

The software changes for Faraday Update 1 are with respect to the Faraday software release for the G5 High-Voltage BMS.

3.1. New Features

The following features were introduced into Faraday Update 1 software release.

Configurable Contactor Connection Sequence

The order of contactor connection sequence is now configurable. The two choices available are connections are:

- Stack contactor then Pre-Charge contactor
- Pre-Charge contactor then the Stack contactor

There is an option to over-ride this contactor sequence configuration if needed at runtime.

G5 Stack Switchgear Current and Voltage Faults

Faults and warnings for the G5 Stack Switchgear operating limits were added. The battery current and voltage limits can now be set up independent of the limits imposed by the G5 Stack Switchgear.

Additional DC Bus Current Fault

An additional fault was added for the DC Bus current was added. This measurement is a redundant current measurement. Its addition means that either current measurement may trip an over-current fault. The allowable difference between these current measurements does not need to be used to de-rate the over all maximum current faults.

Additional Configuration for Cell Imbalance Estimation

Added additional configuration for cell imbalance estimation to allow:

- Maximum cell voltage windows at the top and bottom of the cell voltage range.
- Maximum current which the current must be below for a valid cell imbalance estimate.

3.2. Resolved Issues

- When connecting multiple high voltage stacks to the same DC Bus, the G5 High-Voltage BMS is more robust against the EMI generated from causing the system to lockup. The *Nuvation Energy G5 High-Voltage BMS: Safety Manual* provides additional configuration for software mitigations added for this robustness.
- The current limits go to zero during the `Disconnecting` state of disconnecting the contactors.
- Fixed the issue that prevented the thermal throttling of cell balancing to operate as configured.
- Manual fan control is now possible after the G5 High-Voltage BMS is in `Factory Lockdown`
- G5 Cell Interface serial numbers can be read from the G5 High-Voltage BMS
- Fixed issue where peristing configurations may sometimes fail

3.3. Known Issues

The following issues were discovered after the Faraday Update 1 firmware release.

3.3.1. Configurations Erased During Upgrade from Faraday to Faraday Update 1

Following an upgrade from Faraday to Faraday Update 1, all configurations are erased.

Workaround

Backup the latest configuration changes using the Operator Interface before performing the upgrade. After the upgrade, the configuration can be reapplied to the G5 High-Voltage BMS.

Calibration data is exported by the Operator Interface but commented out by default. Please ensure the following registers are uncommented before importing the configurations again.

- `ssg_bus_power[0].current_gain`
- `ssg_bus_power[0].voltage_gain`
- `stack_power[0].current_gain`
- `stack_power[0].voltage_gain`
- `ssg_afe_configuration[0].divider`
- `ssg_afe_configuration[0].multiplier`

3.3.2. Factory Restore Configuration Mismatch Warning

Following an upgrade from Faraday to Faraday Update 1, the following warnings will be seen:

- Factory Backup Error Warning - `sc_warn_factory_backup_error`

- BMS Backup Error Warning - `sc_warn_bms_backup_error`
- Network Backup Error Warning - `sc_warn_network_backup_error`

These warnings do not affect the operation of the G5 High-Voltage BMS nor do they affect the `Factory Restore` capabilities of the product.

Workaround

No action is required but these 'Warnings' could be disabled to prevent them from being displayed on the Operator Interface dashboard.

They can be disabled by configuring the following registers:

- Set `sc_warn_factory_backup_error.disabled` to 1
- Set `sc_warn_bms_backup_error.disabled` to 1
- Set `sc_warn_network_backup_error.disabled` to 1

3.3.3. Large HTTP Register Request May Timeout

Large read/write HTTP requests with many registers may timeout.

Workaround

Either retry the request or reduce the number of registers being read per HTTP request.

3.3.4. Cell Imbalance Estimates not Bounded By Maximum Imbalance Configuration

The cell imbalance estimates are not bounded by the `stack_imbalance_estimator.maximum_top_imbalance` and `stack_imbalance_estimator.maximum_bottom_imbalance` configurations when only voltage based imbalance estimation is enabled.

The cell imbalance estimates are still bounded when only State-of-Charge based imbalance estimation is enabled.

Workaround

For top balanced systems, voltage based imbalance estimates can be bounded by:

- Setting the `stack_imbalance_estimator.upper_estimation_voltage_window` to the same value as `stack_soc.vfull`.
- For LFP chemistries, ensure that the value of `stack_soc.ifull_period` is set to 0.
- Setting the value for `stack_imbalance_estimator.upper_estimation_soc_window` to a value greater than 90 %.

For bottom balanced systems, voltage based imbalance estimates can be bounded by:

- Setting the `stack_imbalance_estimator.lower_estimation_voltage_window` to the same value as `stack_soc.vempty`.
- Setting the value for `stack_imbalance_estimator.lower_estimation_soc_window` to a value less than 10 %.

3.3.5. Initialized Bitfields Not Representing Trigger Aggregate Initialized Fields

The bitfield component for all trigger's `initialized` registers do not accurately reflect the initialized state for all trigger aggregates.

This affects the following bitfield components:

- `sc_bitfield_fault_initialized`
- `sc_bitfield_warning_initialized`
- `sc_bitfield_user_trig_initialized`

The affected aggregated triggers include:

- `stack_fault_combined_therm_hi`
- `stack_fault_combined_therm_lo`
- `stack_warn_therm_hi`
- `stack_warn_therm_lo`
- `stack_trig_therm_hi`
- `stack_trig_therm_lo`
- `stack_fault_combined_voltage_hi`
- `stack_fault_combined_voltage_lo`
- `stack_warn_voltage_combined_hi`
- `stack_warn_voltage_combined_lo`
- `sc_fault_config`
- `stack_trig_uvlo_combined`
- `sc_fault_comm_hysteresis_aggregate`
- `sc_fault_batt_hysteresis_aggregate`
- `sc_warn_hysteresis_aggregate`
- `ssg_fault_afe_aggregate`
- `ssg_fault_hysteresis_aggregate`
- `ssg_trig_fan_control_aggregate`
- `ssg_warn_hysteresis_aggregate`

- `ssg_trig_afe_stalled`

Workaround

Read the `initialized` state from the aggregate triggers directly.

3.3.6. G5 Stack Switchgear Board Model and Variant ID May Read 0

The G5 Stack Switchgear board and model variant IDs read from `ssg_board_info.model_id` and `ssg_board_info.variant_id` may provide an invalid ID of 0.

Workaround

The analog voltage `ssg_adc.variant_id` and `ssg_adc.model_id` can be provided to support@nuvationenergy.com to identify the model and variant id.

3.3.7. G5 Cell Interface (24 channel) May Not Detect Open Wire on Lower Cell Group

The G5 Cell Interface (24 channel) consists of two, 12-channel cell groups: cells 1 - 12, and cells 13 - 24.

If an odd number of cells is installed on the lower cell group (ie. cells 1 - 12), an open wire on the last populated cell in this cell group may not be detected.

Workaround

Move the last cell in the lower cell group to the first cell in the upper cell group.

For example, for a Cell Interface with 22 cells installed, the typical installation would have cells 1 - 11 and cells 13 - 23 installed. Instead, the Cell Interface should be installed with cells 1 - 10 installed and cells 13 - 24 installed.

This would translate to a configuration file with the following configurations:

```
cell[0:9].installed = 1
cell[12:23].installed = 1
```

3.3.8. Cell Voltage Balancer is Balancing When All Balancing is Disabled

When both modes of cell balancing have been configured to be disabled with the configuration:

```
stack_balancing_selector[0].enable_soc_balancer = 0
stack_balancing_selector[0].enable_voltage_balancer = 0
```

If the cell voltages measured are within the range defined by the voltage based cell balancer, the firmware will balance the cells within that range. This behavior does not apply to the SOC based balancer. Cell SOC imbalance estimates may be generated while the SOC balancer is disabled and are never applied for balancing.

Workaround

When disabling both modes of balancing, configure the minimum enable voltage for the cell voltage balancer to 5 volts which is the maximum cell voltage reading for the Nuvation Energy BMS.

```
stack_cell_voltage_balancer[0].min_enable_voltage = 5000
```

3.3.9. Register Changes

This section lists the register changes introduced in Faraday Update 1 from Faraday.

3.3.9.1. Added Components

3.3.9.1.1. ssg_afe_afe_update_watchdog

Name	ssg_afe_afe_update_watchdog
Description	Value Watchdog
Base Address	314256
Instance Count	1

Name	Description	Storage Type	Type	Units
expired	1 indicates the watchdog expired, 0 indicates it has not expired. Writing a changed value to the dependency resets the internal timer	Volatile	Boolean	Flag
last_update_time	Last time the watchdog was updated	Volatile	Microseconds	uS
max_update_period	Max time period ever seen by the watchdog between updates	Volatile	Microseconds	uS
period	Time period within which the watchdog needs to be updated before it expires	Factory	Microseconds	uS

3.3.9.1.2. ssg_afe_cpu_bist_update_watchdog

Name	ssg_afe_cpu_bist_update_watchdog
Description	Value Watchdog
Base Address	314208
Instance Count	1

Name	Description	Storage Type	Type	Units
expired	1 indicates the watchdog expired, 0 indicates it has not expired. Writing a changed value to the dependency resets the internal timer	Volatile	Boolean	Flag
last_update_time	Last time the watchdog was updated	Volatile	Microseconds	uS
max_update_period	Max time period ever seen by the watchdog between updates	Volatile	Microseconds	uS
period	Time period within which the watchdog needs to be updated before it expires	Factory	Microseconds	uS

3.3.9.1.3. ssg_afe_ram_bist_update_watchdog

Name	ssg_afe_ram_bist_update_watchdog

Description	Value Watchdog
Base Address	314224
Instance Count	1

Name	Description	Storage Type	Type	Units
`expired`	1 indicates the watchdog expired, 0 indicates it has not expired. Writing a changed value to the dependency resets the internal timer	Volatile	Boolean	Flag
`last_update_time`	Last time the watchdog was updated	Volatile	Microseconds	uS
`max_update_period`	Max time period ever seen by the watchdog between updates	Volatile	Microseconds	uS
`period`	Time period within which the watchdog needs to be updated before it expires	Factory	Microseconds	uS

3.3.9.1.4. ssg_afe_rom_bist_update_watchdog

Name	`ssg_afe_rom_bist_update_watchdog`
Description	Value Watchdog
Base Address	314240
Instance Count	1

Name	Description	Storage Type	Type	Units
`expired`	1 indicates the watchdog expired, 0 indicates it has not expired. Writing a changed value to the dependency resets the internal timer	Volatile	Boolean	Flag
`last_update_time`	Last time the watchdog was updated	Volatile	Microseconds	uS
`max_update_period`	Max time period ever seen by the watchdog between updates	Volatile	Microseconds	uS
`period`	Time period within which the watchdog needs to be updated before it expires	Factory	Microseconds	uS

3.3.9.1.5. ssg_afe_temperature_update_watchdog

Name	`ssg_afe_temperature_update_watchdog`
Description	Value Watchdog
Base Address	314272
Instance Count	1

Name	Description	Storage Type	Type	Units
expired	1 indicates the watchdog expired, 0 indicates it has not expired. Writing a changed value to the dependency resets the internal timer	Volatile	Boolean	Flag
last_update_time	Last time the watchdog was updated	Volatile	Microseconds	uS
max_update_period	Max time period ever seen by the watchdog between updates	Volatile	Microseconds	uS
period	Time period within which the watchdog needs to be updated before it expires	Factory	Microseconds	uS

3.3.9.1.6. ssg_afe_thermistor_bist_update_watchdog

Name	ssg_afe_thermistor_bist_update_watchdog
Description	Value Watchdog
Base Address	314192
Instance Count	1

Name	Description	Storage Type	Type	Units
expired	1 indicates the watchdog expired, 0 indicates it has not expired. Writing a changed value to the dependency resets the internal timer	Volatile	Boolean	Flag
last_update_time	Last time the watchdog was updated	Volatile	Microseconds	uS
max_update_period	Max time period ever seen by the watchdog between updates	Volatile	Microseconds	uS
period	Time period within which the watchdog needs to be updated before it expires	Factory	Microseconds	uS

3.3.9.1.7. ssg_afe_uptime_watchdog

Name	ssg_afe_uptime_watchdog
Description	Value Watchdog
Base Address	314176
Instance Count	1

Name	Description	Storage Type	Type	Units
expired	1 indicates the watchdog expired, 0 indicates it has not expired. Writing a changed value to the dependency resets the internal timer	Volatile	Boolean	Flag
last_update_time	Last time the watchdog was updated	Volatile	Microseconds	uS
max_update_period	Max time period ever seen by the watchdog between updates	Volatile	Microseconds	uS

Name	Description	Storage Type	Type	Units
period	Time period within which the watchdog needs to be updated before it expires	Factory	Microseconds	uS

3.3.9.1.8. ssg_fault_bus_charge_current_over

Name	ssg_fault_bus_charge_current_over
Description	Basic Trigger
Base Address	314432
Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
thresh	Trigger threshold	Factory	Current	mA
trig	Trigger state	Volatile	Boolean	Flag

3.3.9.1.9. ssg_fault_bus_discharge_current_over

Name	ssg_fault_bus_discharge_current_over
Description	Basic Trigger
Base Address	314416
Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
thresh	Trigger threshold	Factory	Current	mA
trig	Trigger state	Volatile	Boolean	Flag

3.3.9.1.10. ssg_fault_charge_current_hi

Name	ssg_fault_charge_current_hi
Description	Hysteresis Trigger
Base Address	314096

Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
end_time_hyst	Trigger end time hysteresis	Factory	Microseconds	uS
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
latched	True if the component should latch in the tripped state until manually cleared	Factory	Boolean	Flag
thresh	Trigger threshold	Factory	Current	mA
time_hyst	Trigger time hysteresis	Factory	Microseconds	uS
time_triggered	Time the triggered state was set to true (relative to system boot time)	Volatile	Microseconds	uS
trig	Trigger state	Volatile	Boolean	Flag
trigger_duration	Time the triggered state was true before resetting to false	Volatile	Microseconds	uS
triggering_value	Value that caused the triggered state to change to true	Volatile	Current	mA

3.3.9.1.11. ssg_fault_charge_current_over

Name	ssg_fault_charge_current_over
Description	Basic Trigger
Base Address	314080
Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
thresh	Trigger threshold	Factory	Current	mA
trig	Trigger state	Volatile	Boolean	Flag

3.3.9.1.12. ssg_fault_discharge_current_hi

Name	ssg_fault_discharge_current_hi
Description	Hysteresis Trigger

Base Address	314112
Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
end_time_hyst	Trigger end time hysteresis	Factory	Microseconds	uS
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
latched	True if the component should latch in the tripped state until manually cleared	Factory	Boolean	Flag
thresh	Trigger threshold	Factory	Current	mA
time_hyst	Trigger time hysteresis	Factory	Microseconds	uS
time_triggered	Time the triggered state was set to true (relative to system boot time)	Volatile	Microseconds	uS
trig	Trigger state	Volatile	Boolean	Flag
trigger_duration	Time the triggered state was true before resetting to false	Volatile	Microseconds	uS
triggering_value	Value that caused the triggered state to change to true	Volatile	Current	mA

3.3.9.1.13. ssg_fault_discharge_current_over

Name	ssg_fault_discharge_current_over
Description	Basic Trigger
Base Address	314128
Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
thresh	Trigger threshold	Factory	Current	mA
trig	Trigger state	Volatile	Boolean	Flag

3.3.9.1.14. ssg_fault_voltage_over

Name	ssg_fault_voltage_over

Description	Basic Trigger
Base Address	314160
Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
thresh	Trigger threshold	Factory	Voltage	mV
trig	Trigger state	Volatile	Boolean	Flag

3.3.9.1.15. ssg_trig_afe_afe_update_stalled

Name	ssg_trig_afe_afe_update_stalled
Description	Boolean Trigger
Base Address	314368
Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
trig	Trigger state	Volatile	Boolean	Flag

3.3.9.1.16. ssg_trig_afe_cpu_bist_update_stalled

Name	ssg_trig_afe_cpu_bist_update_stalled
Description	Boolean Trigger
Base Address	314320
Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag

Name	Description	Storage Type	Type	Units
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
trig	Trigger state	Volatile	Boolean	Flag

3.3.9.1.17. ssg_trig_afe_ram_bist_update_stalled

Name	ssg_trig_afe_ram_bist_update_stalled
Description	Boolean Trigger
Base Address	314336
Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
trig	Trigger state	Volatile	Boolean	Flag

3.3.9.1.18. ssg_trig_afe_rom_bist_update_stalled

Name	ssg_trig_afe_rom_bist_update_stalled
Description	Boolean Trigger
Base Address	314352
Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
trig	Trigger state	Volatile	Boolean	Flag

3.3.9.1.19. ssg_trig_afe_stalled

Name	ssg_trig_afe_stalled
Description	Trigger Aggregate
Base Address	314400
Instance Count	1

Name	Description	Storage Type	Type	Units
count	Number of tripped triggers	Volatile	Count	Number
initialized	True if aggregated faults have all been initialized	Volatile	Boolean	Flag
trig	True if a fault has triggered, otherwise false	Volatile	Boolean	Flag

3.3.9.1.20. ssg_trig_afe_temperature_update_stalled

Name	ssg_trig_afe_temperature_update_stalled
Description	Boolean Trigger
Base Address	314384
Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
trig	Trigger state	Volatile	Boolean	Flag

3.3.9.1.21. ssg_trig_afe_thermistor_bist_update_stalled

Name	ssg_trig_afe_thermistor_bist_update_stalled
Description	Boolean Trigger
Base Address	314304
Instance Count	1

Name	Description	Storage Type	Type	Units
disabled	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
initialized	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
inverted	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
trig	Trigger state	Volatile	Boolean	Flag

3.3.9.1.22. ssg_trig_afe_uptime_stalled

Name	ssg_trig_afe_uptime_stalled
Description	Boolean Trigger
Base Address	314288

Instance Count	1

Name	Description	Storage Type	Type	Units
`disabled`	True if the trigger is disabled, it will remain in an untripped state	Factory	Boolean	Flag
`initialized`	True if the component has been initialized by at least one sample	Volatile	Boolean	Flag
`inverted`	True if triggers on low value, false if on high value	Volatile	Boolean	Flag
`trig`	Trigger state	Volatile	Boolean	Flag

3.3.9.2. Changed Components

3.3.9.2.1. sc_bitfield_fault_helper

Current Component Details

Name	`sc_bitfield_fault_helper`
Description	Bitfield Helper
Base Address	137184
Instance Count	92

Previous Component Details

Name	`sc_bitfield_fault_helper`
Description	Bitfield Helper
Base Address	137184
Instance Count	85

3.3.9.2.2. sc_bitfield_user_trig_helper

Current Component Details

Name	`sc_bitfield_user_trig_helper`
Description	Bitfield Helper
Base Address	137696
Instance Count	26

Previous Component Details

Name	`sc_bitfield_user_trig_helper`
Description	Bitfield Helper
Base Address	137696

Instance Count	18

3.3.9.2.3. sc_ethernet

Added Registers

Name	Description	Storage Type	Type	Units
dhcp_gateway	Gateway address provided by dhcp server	Volatile	IpAddress	IP
dhcp_ip_address	IP address provided by dhcp server	Volatile	IpAddress	IP
dhcp_net_mask	Network mask provided by dhcp server	Volatile	IpAddress	IP

3.3.9.2.4. ssg_afe_configuration

Added Registers

Name	Description	Storage Type	Type	Units
communication_retry_limit	Maximum number of retries when requesting information from the AFE	Factory	Count	Number

3.3.9.2.5. ssg_afe_monitor

Removed Registers

Name	Description	Storage Type	Type	Units
clear_mcu_events	Writing to this register clears all mcu events	Volatile	Boolean	Flag

3.3.9.2.6. ssg_bus_power

Current Component Details

Name	ssg_bus_power
Description	Power Parameters
Base Address	313056
Instance Count	1

Previous Component Details

Name	ssg_bus_power
Description	SSG Power
Base Address	313056
Instance Count	1

3.3.9.2.7. ssg_fault_afe_adc_register_bist

Current Component Details

Name	ssg_fault_afe_adc_register_bist
Description	Hysteresis Trigger
Base Address	312768
Instance Count	1

Previous Component Details

Name	ssg_fault_afe_adc_register_bist
Description	Boolean Trigger
Base Address	312768
Instance Count	1

Added Registers

Name	Description	Storage Type	Type	Units
end_time_hyst	Trigger end time hysteresis	Factory	Microseconds	uS
latched	True if the component should latch in the tripped state until manually cleared	Factory	Boolean	Flag
thresh	Trigger threshold	Factory	Boolean	Flag
time_hyst	Trigger time hysteresis	Factory	Microseconds	uS
time_triggered	Time the triggered state was set to true (relative to system boot time)	Volatile	Microseconds	uS
trigger_duration	Time the triggered state was true before resetting to false	Volatile	Microseconds	uS
triggering_value	Value that caused the triggered state to change to true	Volatile	Boolean	Flag

3.3.9.2.8. ssg_fault_afe_spi_cs_bist

Current Component Details

Name	ssg_fault_afe_spi_cs_bist
Description	Hysteresis Trigger
Base Address	312784
Instance Count	1

Previous Component Details

Name	ssg_fault_afe_spi_cs_bist
Description	Boolean Trigger
Base Address	312784

Instance Count	1

Added Registers

Name	Description	Storage Type	Type	Units
end_time_hyst	Trigger end time hysteresis	Factory	Microseconds	uS
latched	True if the component should latch in the tripped state until manually cleared	Factory	Boolean	Flag
thresh	Trigger threshold	Factory	Boolean	Flag
time_hyst	Trigger time hysteresis	Factory	Microseconds	uS
time_triggered	Time the triggered state was set to true (relative to system boot time)	Volatile	Microseconds	uS
trigger_duration	Time the triggered state was true before resetting to false	Volatile	Microseconds	uS
triggering_value	Value that caused the triggered state to change to true	Volatile	Boolean	Flag

3.3.9.2.9. ssg_fault_afe_spi_data_bist

Current Component Details

Name	ssg_fault_afe_spi_data_bist
Description	Hysteresis Trigger
Base Address	312880
Instance Count	1

Previous Component Details

Name	ssg_fault_afe_spi_data_bist
Description	Boolean Trigger
Base Address	312880
Instance Count	1

Added Registers

Name	Description	Storage Type	Type	Units
end_time_hyst	Trigger end time hysteresis	Factory	Microseconds	uS
latched	True if the component should latch in the tripped state until manually cleared	Factory	Boolean	Flag
thresh	Trigger threshold	Factory	Boolean	Flag
time_hyst	Trigger time hysteresis	Factory	Microseconds	uS
time_triggered	Time the triggered state was set to true (relative to system boot time)	Volatile	Microseconds	uS

Name	Description	Storage Type	Type	Units
trigger_duration	Time the triggered state was true before resetting to false	Volatile	Microseconds	uS
triggering_value	Value that caused the triggered state to change to true	Volatile	Boolean	Flag

3.3.9.2.10. ssg_fault_afe_thermistor_bist

Current Component Details

Name	ssg_fault_afe_thermistor_bist
Description	Hysteresis Trigger
Base Address	312608
Instance Count	1

Previous Component Details

Name	ssg_fault_afe_thermistor_bist
Description	Basic Trigger
Base Address	312608
Instance Count	1

Added Registers

Name	Description	Storage Type	Type	Units
end_time_hyst	Trigger end time hysteresis	Factory	Microseconds	uS
latched	True if the component should latch in the tripped state until manually cleared	Factory	Boolean	Flag
time_hyst	Trigger time hysteresis	Factory	Microseconds	uS
time_triggered	Time the triggered state was set to true (relative to system boot time)	Volatile	Microseconds	uS
trigger_duration	Time the triggered state was true before resetting to false	Volatile	Microseconds	uS
triggering_value	Value that caused the triggered state to change to true	Volatile	UInt8	Value

3.3.9.2.11. ssg_vcoil

Added Registers

Name	Description	Storage Type	Type	Units
vcoil_wdt_disable	Enable / Disable the external wdt (0 = Enabled, 1 = Disabled)	Volatile	Boolean	Flag

3.3.9.2.12. stack_control

Added Registers

Name	Description	Storage Type	Type	Units
precharge_connection_sequence	Pre-charge connection sequence.(0 = stack contactor then pre-charge contactor, 1 = pre-charge contactor then stack contactor)	Factory	Boolean	Flag
precharge_connection_sequence_override	Override the precharge_connection_sequence_register.(0 = no override, 1 = stack contactor first, 2 = pre-charge contactor first)	Volatile	UInt8	Value

3.3.9.2.13. stack_fault_voltage_over

Current Component Details

Name	stack_fault_voltage_over
Description	Hysteresis Trigger
Base Address	222368
Instance Count	1

Previous Component Details

Name	stack_fault_voltage_over
Description	Basic Trigger
Base Address	222368
Instance Count	1

Added Registers

Name	Description	Storage Type	Type	Units
end_time_hyst	Trigger end time hysteresis	Factory	Microseconds	uS
latched	True if the component should latch in the tripped state until manually cleared	Factory	Boolean	Flag
time_hyst	Trigger time hysteresis	Factory	Microseconds	uS
time_triggered	Time the triggered state was set to true (relative to system boot time)	Volatile	Microseconds	uS
trigger_duration	Time the triggered state was true before resetting to false	Volatile	Microseconds	uS
triggering_value	Value that caused the triggered state to change to true	Volatile	Voltage	mV

3.3.9.2.14. stack_fault_voltage_sum

Current Component Details

Name	stack_fault_voltage_sum
Description	Hysteresis Trigger
Base Address	152544
Instance Count	1

Previous Component Details

Name	stack_fault_voltage_sum
Description	Basic Trigger
Base Address	152544
Instance Count	1

Added Registers

Name	Description	Storage Type	Type	Units
end_time_hyst	Trigger end time hysteresis	Factory	Microseconds	uS
latched	True if the component should latch in the tripped state until manually cleared	Factory	Boolean	Flag
time_hyst	Trigger time hysteresis	Factory	Microseconds	uS
time_triggered	Time the triggered state was set to true (relative to system boot time)	Volatile	Microseconds	uS
trigger_duration	Time the triggered state was true before resetting to false	Volatile	Microseconds	uS
triggering_value	Value that caused the triggered state to change to true	Volatile	Voltage	mV

3.3.9.2.15. stack_fault_voltage_under

Current Component Details

Name	stack_fault_voltage_under
Description	Hysteresis Trigger
Base Address	222384
Instance Count	1

Previous Component Details

Name	stack_fault_voltage_under
Description	Basic Trigger
Base Address	222384
Instance Count	1

Added Registers

Name	Description	Storage Type	Type	Units
end_time_hyst	Trigger end time hysteresis	Factory	Microseconds	uS
latched	True if the component should latch in the tripped state until manually cleared	Factory	Boolean	Flag
time_hyst	Trigger time hysteresis	Factory	Microseconds	uS
time_triggered	Time the triggered state was set to true (relative to system boot time)	Volatile	Microseconds	uS
trigger_duration	Time the triggered state was true before resetting to false	Volatile	Microseconds	uS
triggering_value	Value that caused the triggered state to change to true	Volatile	Voltage	mV

3.3.9.2.16. stack_imbalance_estimator

Added Registers

Name	Description	Storage Type	Type	Units
estimation_current_window	Absolute value of current, below which imbalance estimation can occur	Configuration	Current	mA
lower_estimation_soc_window	Lower SOC window, from a specific SOC point to empty, where the imbalance estimation can occur	Configuration	Percentage	%
lower_estimation_voltage_window	Lower voltage threshold, below which imbalance estimation can occur	Configuration	Voltage	mV
upper_estimation_soc_window	Upper SOC window, from a specific SOC point to full, where the imbalance estimation can occur	Configuration	Percentage	%
upper_estimation_voltage_window	Upper voltage threshold, above which imbalance estimation can occur	Configuration	Voltage	mV

Removed Registers

Name	Description	Storage Type	Type	Units
lower_estimation_window	Lower SOC window, from a specific SOC point to empty, where the imbalance estimation can occur	Configuration	Percentage	%
upper_estimation_window	Upper SOC window, from a specific SOC point to full, where the imbalance estimation can occur	Configuration	Percentage	%

3.3.9.2.17. stack_power

Current Component Details

Name	stack_power

Description	Power Parameters
Base Address	4128
Instance Count	1

Previous Component Details

Name	`stack_power`
Description	SSG Power
Base Address	4128
Instance Count	1

3.4. Trigger Bitfield Changes

The following tables show the trigger bitfield changes from Faraday to Faraday Update 1.

Table 3. Fault Bitfield Changes From Version 5.7.0 to 5.8.0

Bitfield Component	Instance	Bit	Previous Mapped Component	Current Mapped Component
sc_bitfield_fault_triggered	1	3	stack_fault_cell_over	ssg_fault_charge_current_over
sc_bitfield_fault_triggered	1	4	stack_fault_cell_under	ssg_fault_charge_current_hi
sc_bitfield_fault_triggered	1	5	stack_fault_discharge_current_over	ssg_fault_discharge_current_hi
sc_bitfield_fault_triggered	1	6	stack_fault_charge_current_over	ssg_fault_discharge_current_over
sc_bitfield_fault_triggered	1	7	stack_fault_voltage_over	ssg_fault_voltage_over
sc_bitfield_fault_triggered	1	8	stack_fault_voltage_under	stack_fault_cell_over
sc_bitfield_fault_triggered	1	9	stack_fault_charge_therm_over	stack_fault_cell_under
sc_bitfield_fault_triggered	1	10	stack_fault_charge_therm_under	stack_fault_discharge_current_over
sc_bitfield_fault_triggered	1	11	stack_fault_discharge_therm_over	stack_fault_charge_current_over
sc_bitfield_fault_triggered	1	12	stack_fault_discharge_therm_under	ssg_fault_bus_discharge_current_over
sc_bitfield_fault_triggered	1	13	ssg_fault_gpi	ssg_fault_bus_charge_current_over
sc_bitfield_fault_triggered	1	14	ssg_fault_hysteresis_aggregate	stack_fault_voltage_over
sc_bitfield_fault_triggered	1	15	sc_fault_comm_hysteresis_aggregate	stack_fault_voltage_under
sc_bitfield_fault_triggered	1	16	sc_fault_batt_hysteresis_aggregate	stack_fault_charge_therm_over
sc_bitfield_fault_triggered	1	17	sc_fault_config	stack_fault_charge_therm_under
sc_bitfield_fault_triggered	1	18	stack_fault_combined_therm_hi	stack_fault_discharge_therm_over
sc_bitfield_fault_triggered	1	19	stack_fault_combined_therm_lo	stack_fault_discharge_therm_under
sc_bitfield_fault_triggered	1	20	stack_fault_combined_voltage_hi	ssg_fault_gpi
sc_bitfield_fault_triggered	1	21	stack_fault_combined_voltage_lo	ssg_fault_hysteresis_aggregate
sc_bitfield_fault_triggered	1	22	None	sc_fault_comm_hysteresis_aggregate
sc_bitfield_fault_triggered	1	23	None	sc_fault_batt_hysteresis_aggregate

Bitfield Component	Instance	Bit	Previous Mapped Component	Current Mapped Component
sc_bitfield_fault_triggered	1	24	None	sc_fault_config
sc_bitfield_fault_triggered	1	25	None	stack_fault_combined_therm_hi
sc_bitfield_fault_triggered	1	26	None	stack_fault_combined_therm_lo
sc_bitfield_fault_triggered	1	27	None	stack_fault_combined_voltage_hi
sc_bitfield_fault_triggered	1	28	None	stack_fault_combined_voltage_lo

Table 4. User Trigger Bitfield Changes From Version 5.7.0 to 5.8.0

Bitfield Component	Instance	Bit	Previous Mapped Component	Current Mapped Component
sc_bitfield_user_trig_triggered	0	12	stack_trig_uvlo_cell_voltage	ssg_trig_afe_stalled
sc_bitfield_user_trig_triggered	0	13	stack_trig_uvlo_stack_voltage	stack_trig_uvlo_cell_voltage
sc_bitfield_user_trig_triggered	0	14	stack_trig_discharge_therm_hi	stack_trig_uvlo_stack_voltage
sc_bitfield_user_trig_triggered	0	15	stack_trig_charge_therm_hi	stack_trig_discharge_therm_hi
sc_bitfield_user_trig_triggered	0	16	stack_trig_discharge_therm_lo	stack_trig_charge_therm_hi
sc_bitfield_user_trig_triggered	0	17	stack_trig_charge_therm_lo	stack_trig_discharge_therm_lo
sc_bitfield_user_trig_triggered	0	18	None	stack_trig_charge_therm_lo
sc_bitfield_user_trig_triggered	0	19	None	ssg_trig_afe_uptime_stalled
sc_bitfield_user_trig_triggered	0	20	None	ssg_trig_afe_thermistor_bist_update_stalled
sc_bitfield_user_trig_triggered	0	21	None	ssg_trig_afe_cpu_bist_update_stalled
sc_bitfield_user_trig_triggered	0	22	None	ssg_trig_afe_ram_bist_update_stalled
sc_bitfield_user_trig_triggered	0	23	None	ssg_trig_afe_rom_bist_update_stalled
sc_bitfield_user_trig_triggered	0	24	None	ssg_trig_afe_afe_update_stalled
sc_bitfield_user_trig_triggered	0	25	None	ssg_trig_afe_temperature_update_stalled

From time to time Nuvation Energy will make updates to products in response to changes in available technologies, client requests, emerging energy storage standards, and other industry requirements. The product specifications in this document, therefore, are subject to change without notice.