

Nuvation-SMA Gateway Commissioning

The Nuvation-SMA Gateway package contains the following components:

- (1) Industrial Fanless Computer
- (1) Accessory Kit



Figure 1: Gateway Package

The Accessory Kit contains the following items:

- (1) DC-DC Converter: 18-72 VDC input; 12 VDC, 5 A output
- (1) Barrel jack connector
- (1) SMA CANbus adapter (CAN0)
- (1) Nuvation CANbus adapter (CAN1)
- (1) Nuvation CANbus terminator
- (1) Ethernet splitter
- (1) Embedded fanless computer mounting kit

Gateway Installation

Unpackage the embedded fanless computer and check for signs of physical damage. The Gateway itself is an industrial fanless computer purpose built as an embedded server:

- Motherboard: Intel Apollo Lake N3350 with Single GbE LAN
- Memory: Innodisk SO-DIMM DDR3L 1866 Memory - 2 GB
- Primary Storage: 32 GB mSATA SSD
- mPCIe CAN controller with dual opto-isolated ports



Figure 2: Gateway (front)



Figure 3: Gateway (rear)

The Gateway should be physically located in close proximity to the Nuvation BMS and SMA Sunny Island. The shorter the CANbus cabling, the better.

The Gateway is powered by a galvanically isolated DC-DC buck converter, which derives voltage from the battery bus.



Figure 6: CANbus adapters

The adapters and CAN ports are device specific:

- CAN0 is the SMA Sunny Island CANbus.
- CAN1 is the Nuvation BMS CANbus.

Finally, to troubleshoot any issues during field commissioning, the Gateway should be connected to the local network. The device is configured as DHCP, and is dependent on the network gateway to assign an IP address. The Gateway exposes port 22 and will accept SSH connection requests with authorized credentials.

Nuvation BMS CANbus

The Nuvation BMS CANbus is designated CAN1 in the documentation. Locate the port labeled CAN on the Nuvation BMS.



Figure 7: Nuvation LV BMS Can Port

The Nuvation BMS does not supply internal CANbus termination. Provided in the Gateway accessory kit is an ethernet splitter, and a RJ45 termination plug.



Figure 8: Ethernet Splitter

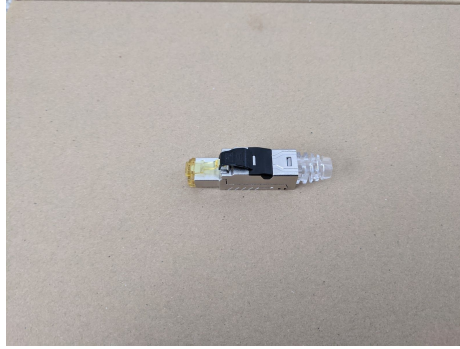


Figure 9: RJ45 termination plug

Connect the splitter and termination plug at the Nuvation BMS as shown in Figure 10. A CAT5e cable must be run between the second port of the splitter and the Gateway port CAN1.

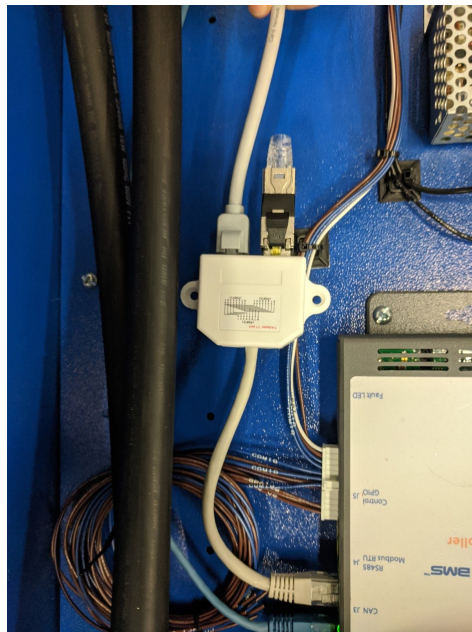


Figure 10: Nuvation CANbus assembly.

SMA SI-6048 CANbus

The SMA CANbus is designated CAN0 in the documentation. Locate the Comm/Sync ports on the “Master” SMA SI-6048. Connect a CAT5e cable between the SMA Comm/Sync port and the Gateway port CAN0.



Figure 11: SMA Comm/Sync terminals

For proper operation of a CANbus, there must be 120 ohm termination resistors located at the ‘end nodes’ of the CANbus. The Gateway CAN0 adapter **is terminated**. In other words, there must be exactly one more termination resistor on the bus.

Device configuration

The SMA sunny island must be reconfigured for lithium ion BMS. This is done in the battery options. No other changes need to be made to the SMA.

The Nuvation BMS must be updated to report the required CAN registers. The 1000 Ah system is configured, however the 3500 Ah system has not yet been configured as of writing this document. Depending on Iron Edison's response and involvement, we may need to configure the BMS when commissioning.

System Startup

With the components in the following state:

- SMA DC Breaker: OFF
- Iron Edison Battery: OFF
- Gateway: OFF

1. Turn on the Iron Edison Battery. The battery contactors will close and the Gateway power button will illuminate, indicating the Gateway is online.
2. Wait 10 seconds for Gateway to self-configure.
3. Turn on SMA DC breaker.
4. Wait 60 seconds. The SMA will fault if it does not see data from the Gateway.
5. Place SMA in Run Mode.

If we experience a fault at any step, we will need to set up a remote access point to troubleshoot the system. Iron Edison has yet to share the SplashTop account, so that may involve installing TeamViewer on the SplashTop machine.