



MidNite Solar Communication Adapter

User Manual

P/N 10-269-1 Rev-A



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MidNite Solar Communication Adapter User's Manual
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APPLICATION and DESCRIPTION of OPERATION

MidNite Solar's Communication Adapter is a software protocol converter for creating a communications link between SMA's Sunny Island inverter and MidNite Solar's Classic charge controllers, which allows these products to work together as a system. Translating MidNite Solar's communication protocol into SMA format, and vice-versa, allows up to four Classics to communicate with a single Sunny Island inverter. As a system the Classics are able to report their energy production data, (i.e. - voltage, current and power), to the Sunny Island and from there on to the Sunny WebBox, in a similar manner as SMA's charge controllers report their power production. Going the other way the Sunny Island inverter acts as the system controller, telling the Classics the appropriate voltage set point for the battery state of charge at the time.

The Communication Adapter intercepts PV and battery status messages formatted in the Classic controller's native protocol, MODBUS, and translates them into SMA's packet protocol, ComSync. Then the Communication Adapter forwards them to the Sunny Island. Going the other way, the Communication Adapter receives and translates battery charge voltage set points initiated by the Sunny Island into MODBUS packets and sends them to the Classics. This allows the connection of up to four Classics to each Sunny Island inverter in a similar manner as SMAs charge controllers are connected into larger systems. In the Classic, a special SMA mode allows the battery absorb, float and equalize charge settings to be received from the Sunny Island inverter.

BEFORE GETTING STARTED

Refer to the System Overview Diagram when planning the system. Up to four Classics may be connected to each Sunny Island inverter. MODBUS communication cables are connected between each Classic, then a final MODBUS cable is connected from the first Classic to the Communication Adapter. An 8-pin Ethernet-style cable is used for ComSync and is connected from the Communication Adapter to the Sunny Island. The Communication Adapter gets its power from the first Classic. There is no wall transformer or connections other than the MODBUS and ComSync cables.

NOTE The System Overview Drawing is simplified for instructional purposes. The wiring details may vary according to the installation requirements. All wiring must be performed in accordance with local codes. Professional installation is recommended.

MOUNTING

The MidNite Solar Communication Adapter is designed for indoor installation only and is provided with flanges for wall mounting. Mount the unit in a convenient location between the Classics and the Sunny Island inverter. There are LED indicators along the front edge of the unit, so pick a location and height so that the front side CAN cable (RJ-45) connectors can be visible. Avoid a lot of excess cable length to minimize the chance of stray noise pick-up.

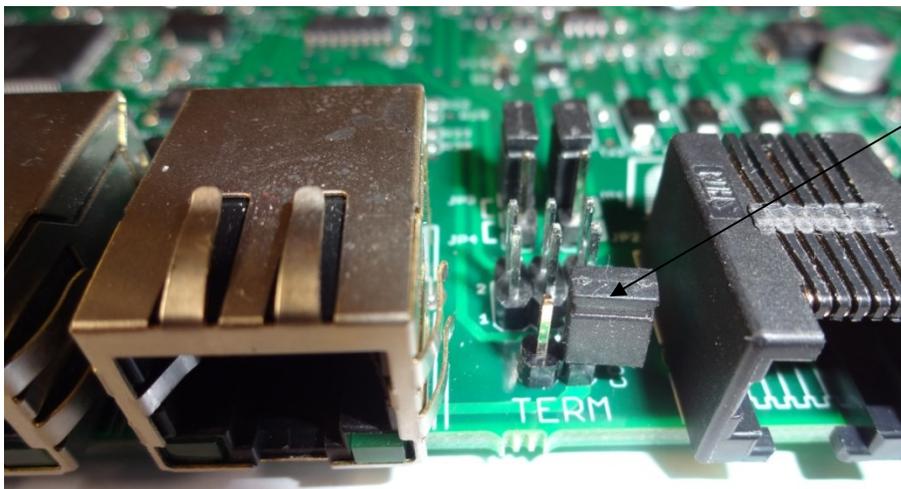


Typical Wall Mounted Connections

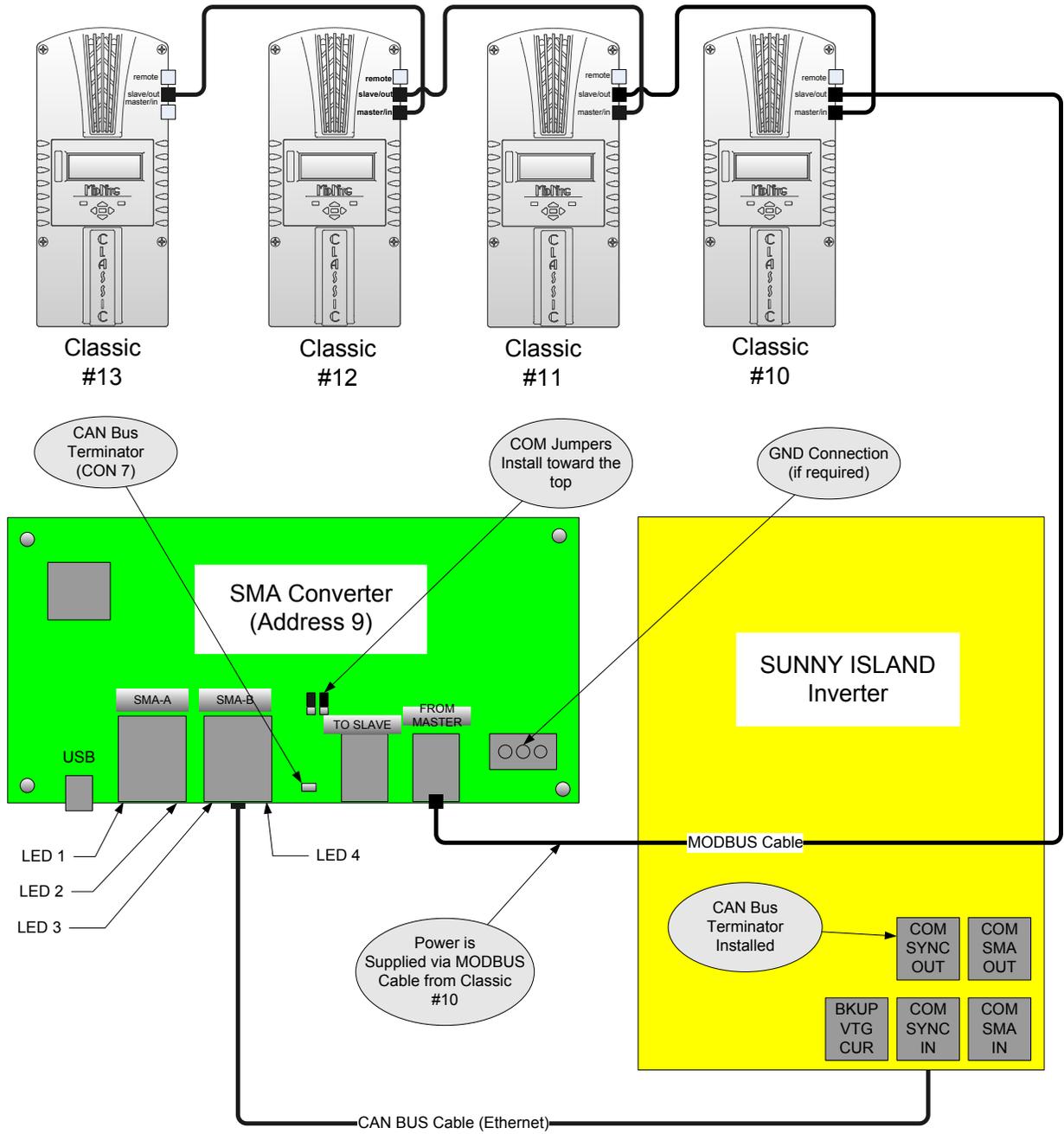
TERMINATION JUMPERS

SMA's ComSync cable conforms to the CAN bus specification, a very fast and reliable system developed by Bosch for vehicle applications. Most CAN devices have an IN and an OUT connector and a provision for terminating the bus, a 120 ohm resistor at each end of the bus. The bus connects a linear string of CAN devices into a network. If a device is located in the middle of the bus, no termination is used. The two end device require a terminator. The Sunny Island uses a terminator that looks like an RJ-45 connector without a cable. If the Sunny Island is the last device on one end of the bus, plug the terminator into the RJ-45 receptacle on the Sunny Island that isn't connected to another CAN device.

The vast majority of applications the Communication Adapter will be the last device on the ComSync bus so the CANBUS OUT jack will be unused. For this reason the Communication Adapter's bus termination resistor is internal. If the system design requires CAN devices to be connected to both connectors, you must remove the cover from the unit and place the termination jumper, CON 7, on one of the pins only.



Place CON 7 terminator jumper on **ONE** of the pins if used in the middle of the bus.



Classic #10-13 is the MODBUS address of that Classic

System Overview Diagram (Typical Installation)

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CLASSIC ADDRESSING and CONNECTIONS

The Classics communicate with the Communication Adapter without confusion by having unique addresses for each Classic. The addresses need to be set by the installer when commissioning the system. The Classics are set to MODBUS addresses #10, #11, #12, and #13 (See Overview Diagram). Note what each Classic's address is when making connections. If only one Classic is used with the Sunny Island, the controller's address must be #10, which is default, so there is no need to change it.

If two Classics are installed, the second Classic's address will be #11. Connect a communication cable from the MASTER/IN jack on the first Classic (#10) to the SLAVE/OUT jack on the second Classic. If three Classics are installed, the third controller's address will be #12. Connect a communication cable from the MASTER/IN jack on the second Classic (#11) to the SLAVE/OUT jack on the third Classic. If a fourth Classic will be installed, its address will be #13. Connect a communication cable from the MASTER/IN jack on the third Classic (#12) to the SLAVE/OUT jack on the fourth Classic. There is no connection to the MASTER/IN jack on the last Classic (typically #13).

Connect a CAT-5 Ethernet cable of suitable length from the SLAVE/OUT jack on the FIRST Classic (#10) to the RJ-11 connector at the far right end of the Communication Adapter. Connect one end to Classic #10. Do not plug in the end for the Communication Adapter quite yet. The other RJ-11 connector (MODBUS OUT) is reserved for future use.

Connect one end of the ComSync cable from the Sunny Island to the CANBUS IN connector on the Communication Adapter. Connect the other end of the ComSync cable to the ComSyncIn connector on the Sunny Island inverter (center of the three RJ-45 connectors at the bottom right). If there are no other devices on the Com Sync (CAN) bus the terminator should be installed in the RJ-45 ComSyncOut jack (directly above). If there are other CAN devices in the system the terminator should be installed on the last CAN device. The Communications Adapter comes with the terminator jumper (CON7) factory installed since the CANBUS OUT connector is generally not used.

MESSAGES

There are several signals passed between the Sunny Island and the Classics which are translated by the Communication Adapter. The Communication Adapter periodically requests battery and PV status from each classic. Once it has read all the Classic status values it converts the messages into ComSync format and sends them on to the Sunny Island. Note that the times given are approximate and depend on how many Classics there are in the system and how busy the system is

Battery Current is requested from each Classic, converted to ComSync encoding and sent to the Sunny Island approximately every five seconds.

PV Voltage is requested from each Classic, converted to ComSync encoding and sent to the Sunny Island approximately every five seconds.

Battery Voltage is requested from each Classic, converted to ComSync encoding and sent to the Sunny Island approximately every five seconds.

PV Power is requested from each Classic, converted to ComSync encoding and sent to the Sunny Island approximately every five seconds.

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Battery Set Voltage is sent by the Sunny Island to the Communication Adapter in ComSync format and is processed into three separate MODBUS messages. They are ABSORB voltage, FLOAT voltage, and EQUALIZE voltage. The same set voltage value is used for all three parameters and sent to each Classic (up to twelve MODBUS messages) approximately every 30-60 seconds. Any offset adjustments are made in the Classic.

COMMISSIONING THE SYSTEM

When everything is ready to go, energize battery power to the Classics. The Communications Adapter is powered from Classic #1 (MODBUS address #10) via the communications cable.

Set (verify) that the Classic controllers' addresses are set to #10, #11, #12, and #13 for Classics 1-4 respectively.

On EACH classic, go to MAIN MENU->MISC->COMM->MORE and select the SMA option. Save it and REBOOT the Classic.

Verify that the MNGP displays read proper battery voltages, and that the Classics appear to be operating properly.

Energize PV power to the Classics.

Go the Communication Adapter and plug in the MODBUS cable coming from the first Classic (#10). The LEDs should start showing activity within a few seconds. The Communication Adapter may take a minute or two to establish communication and collect voltage, current and power data for all the Classics in the system.

Use the Sunny Island menu buttons to navigate to the External Charge Controller meters. (Mrnus #142 - #145). Verify that the Sunny Island display shows the expected voltages, currents and power readings. Check that the display at the Sunny WebBox agrees with the Classic MNGP displays. The Classic Software revisions for are displayed on the Sunny WebBox as the software build number divided by 100.

For example, the Classic status screen for unit 1 shows: **1686: 1/15/2014**

WebBox Spot Values screen for that Classic will say: **95 Sic1SWVers 16.86**

as shown on the screen capture below.

The four values for each charger are displayed as: EgcntIn, Pvpwr, SWVers, TdyEgcntIn, and are displayed on the Spot Values display. Refer to the Sunny Island and Sunny WebBox for details.

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SunnyWebBox

Plant / Devices

Home WebBox Devices

WebBox
SI6048UH:1260016324
Refresh

Classic 1	93	Sic1EgyCntIn	1053.2	kWh
Classic 2	94	Sic1PvPwr	0	W
Classic 3	95	Sic1SWVers	16.86	
Classic 4	96	Sic1TdyEgyCntIn	0.1	kWh
	97	Sic2EgyCntIn	927.7	kWh
	98	Sic2PvPwr	38	W
	99	Sic2SWVers	16.86	
	100	Sic2TdyEgyCntIn	0.1	kWh
	101	Sic3EgyCntIn	1922.5	kWh
	102	Sic3PvPwr	0	W
	103	Sic3SWVers	16.86	
	104	Sic3TdyEgyCntIn	0.1	kWh
	105	Sic4EgyCntIn	2263	kWh
	106	Sic4PvPwr	0	W
	107	Sic4SWVers	16.86	
	108	Sic4TdyEgyCntIn	0	kWh
	109	Sic4SWVers	16.86	



Classic Power
CAN BUS Activity
MODBUS Receive

MODBUS Error
MODBUS Transmit

COMMUNICATION STATUS LEDs

LED OPERATION

There are four green LEDs on the Communication Adapter, two below each RJ-45 jack numbered 1-4 from left to right. All four LEDs come on once briefly at power up.

LED 1 will blink on and off slowly (five second interval) when connected to a Classic (if power is applied). This shows that the software is working. If the ComSync cable is connected and software receives the Sunny Island's "Battery Set Voltage" command, the blink rate of LED1 will increase to approximately once per second. If the ComSync bus is working properly a noticeable difference in blink rate will be observed when the cable is plugged in.

LED2 flashes briefly when a MODBUS request has been correctly received from a Classic. There typically are four packets received per Classic in a burst with a slight pause before the next Classic is polled. If there is only one Classic four quick blinks will be seen. If there are two Classics, typically two sets of four quick blinks will be seen. If there are three or four Classics, there will be three or four sets.

LED3 flashes briefly when the "Battery Set Voltage" packet is sent out to the classics. If things are working properly, typically several blinks in a burst will be seen repeated on about thirty second intervals.

LED4 is a MODBUS error indicator. It briefly blinks once for each MODBUS CRC, timeout, or exception. A few occasional blinks are normal as data packets can and do collide and retries are automatically generated, however LED4 should not blink very often.

MIDNITE SOLAR INC. LIMITED WARRANTY

MidNite Solar Power electronics, sheet metal enclosures and accessories

MidNite Solar Inc. warrants to the original customer that its products shall be free from defects in materials and workmanship. This warranty will be valid for a period of two (2) to five (5) years depending on the product. At its option, MidNite Solar will repair or replace at no charge any MidNite product that proves to be defective within such warranty period. This warranty shall not apply if the MidNite Solar product has been damaged by unreasonable use, accident, negligence, service or modification by anyone other than MidNite Solar, or by any other causes unrelated to materials and workmanship. The original consumer purchaser must retain original purchase receipt for proof of purchase as a condition precedent to warranty coverage. To receive in-warranty service, the defective product must be received no later than two (2) weeks after the end of the warranty period. More details at <http://www.midnitesolar.com/>

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