This "Quick Start" is intended to be a supplement to the Classic owner's manual. It is intended to give the basics of setting up your new Classic Lite, when installed in a typical installation. Please refer to the Classic Owner's Manual (Included DVD or visit www.midnitesolar.com) for all advanced features, safety warnings and specifications.

Este manual también está disponible en Español. La versión en Español puede encontrarse en nuestra pagina web en la ficha Documentos y haga clic en Manuales.

Ce manuel est également disponible en français. La version française peut être trouvé sur notre site web sous l'onglet Documents, puis en cliquant sur les manuels.

The MidNite Solar Classic charge controller conforms to *UL 1741, Safety for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, Second Edition, May 7, 1999 with revisions through January 28, 2010 and CAN/CSA C22.2 No. 107.1: 2001/09/01 Ed: 3 (R2006)*

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Contents

Inside view of the Classic

Take care when removing the front cover from the Classic. The LED display panel (referred in this manual and elsewhere as the Lite control panel or MNLP) may be attached to the main circuit board with a blue phone-style cable as seen below if this is not the first time being opened. The cable is not plugged in from the factory. Unplug one end or the other and set the front cover aside during wiring. When replacing the cover, be sure not to pinch the cable between the cover and the case and that the cable does not interfere with the components inside. You will also note the use of the top jack. For explanation of the other two jacks and networking diagrams, please refer to the Classic User's Manual (on the supplied DVD).
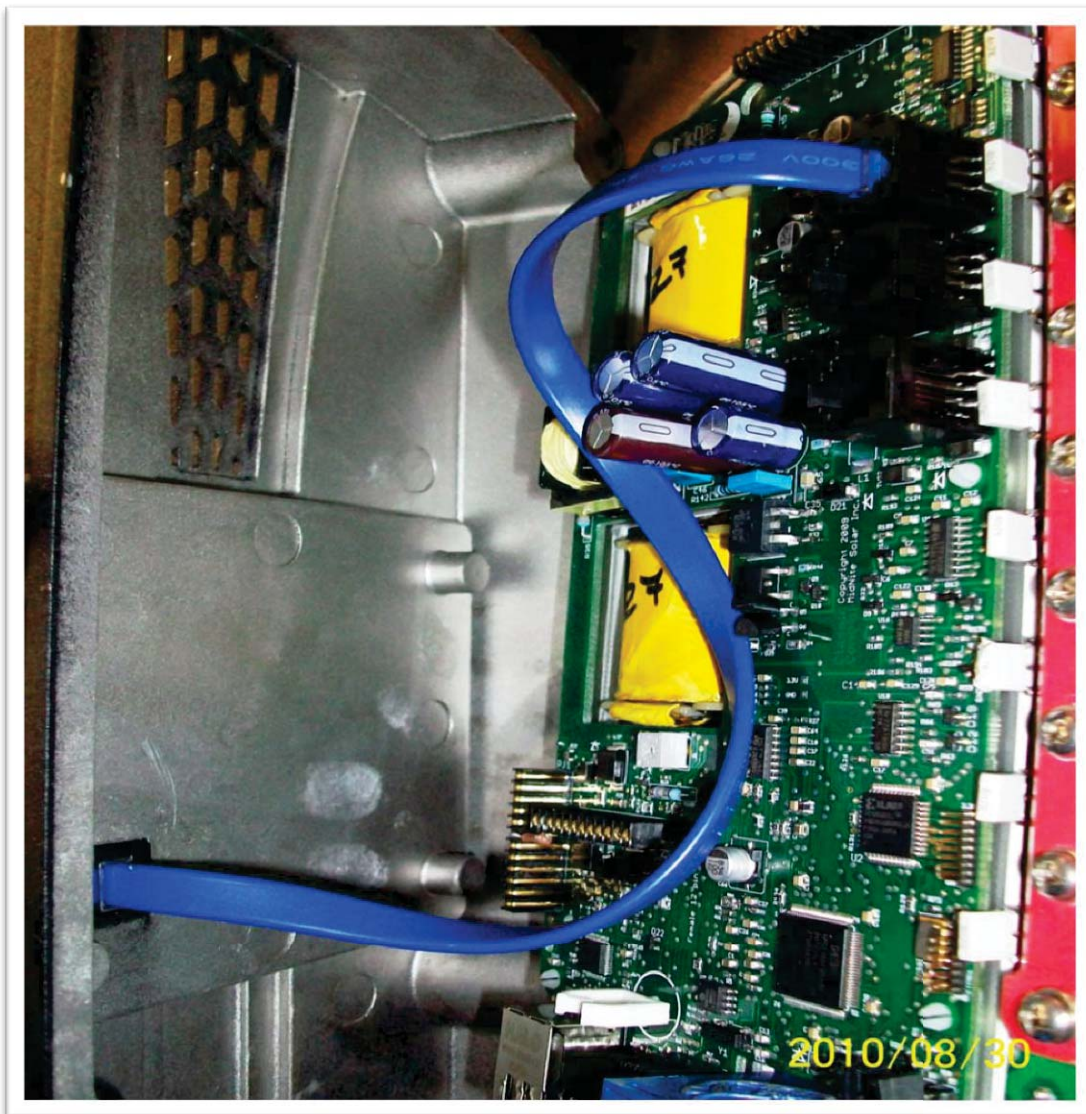
Take Care when removing the MNLP
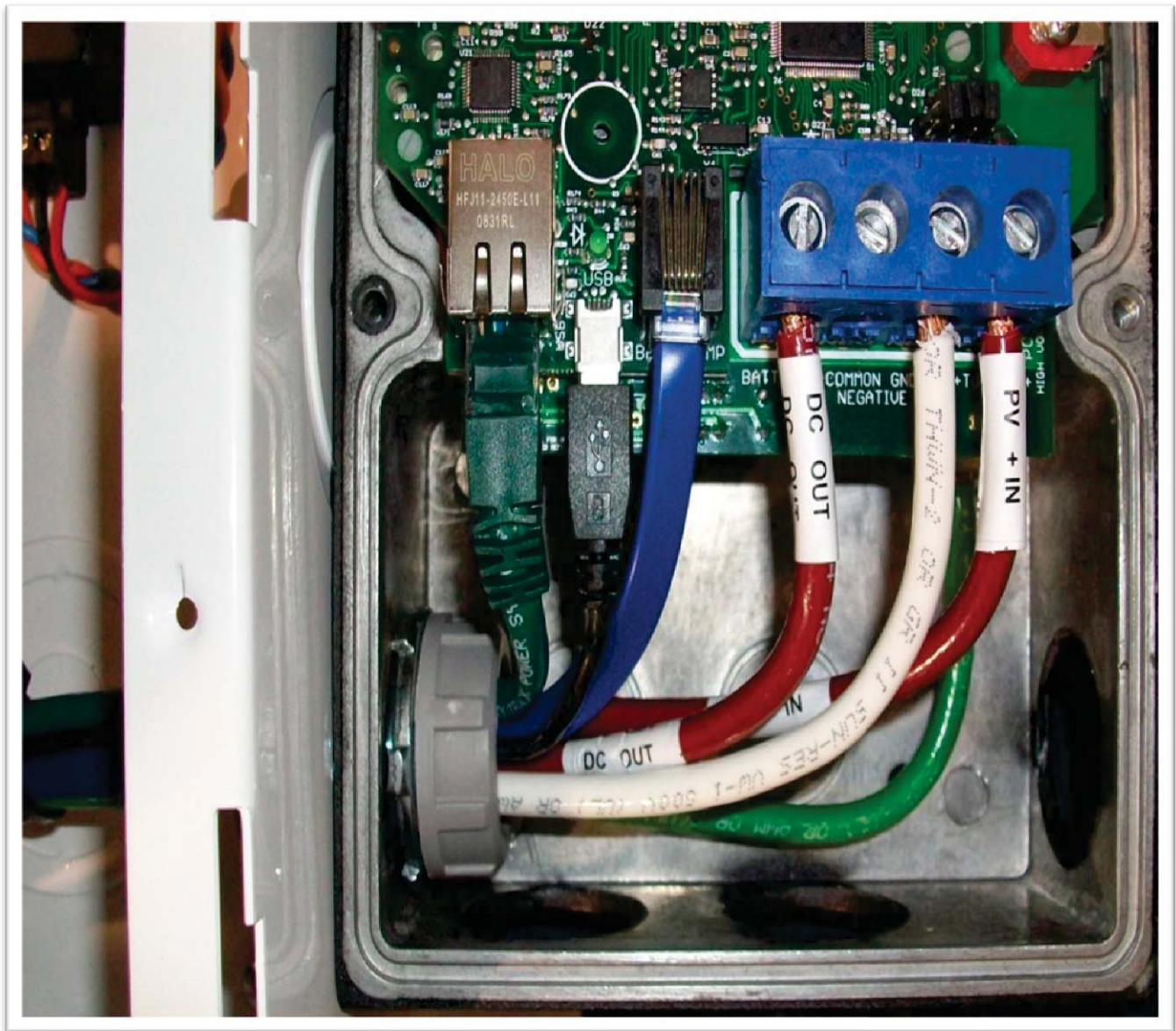
Above we show from left to right, the Ethernet connection to your router or wireless bridge (Not required), USB cable for updating firmware and the battery temperature sensor. On the blue terminal block from left to right are connections for the battery (or battery bank) positive, common negative for both the battery bank and input, and DC input positive. You only need to bring a single negative conductor to the Classic if you have connected the negative from the input source and negative for the battery (or battery bank) on a separate buss block or a device such as the Midnite Solar E-Panel.

Ground fault

There is a 2 pin header to the right of the blue terminal block for Ground Fault Protection as seen below. The supplied jumper must be installed across both pins for the GFP to operate. The Lite is shipped with this jumper in the open position. To enable GFP operation, the jumper must be placed over both pins. Figure 1 shows the GFP jumper pins with the shorting plug being installed. Figure 2 shows the small black shorting jumper. This will be used to jump the 2 pins and enable Ground Fault Protection. (Dime not included)
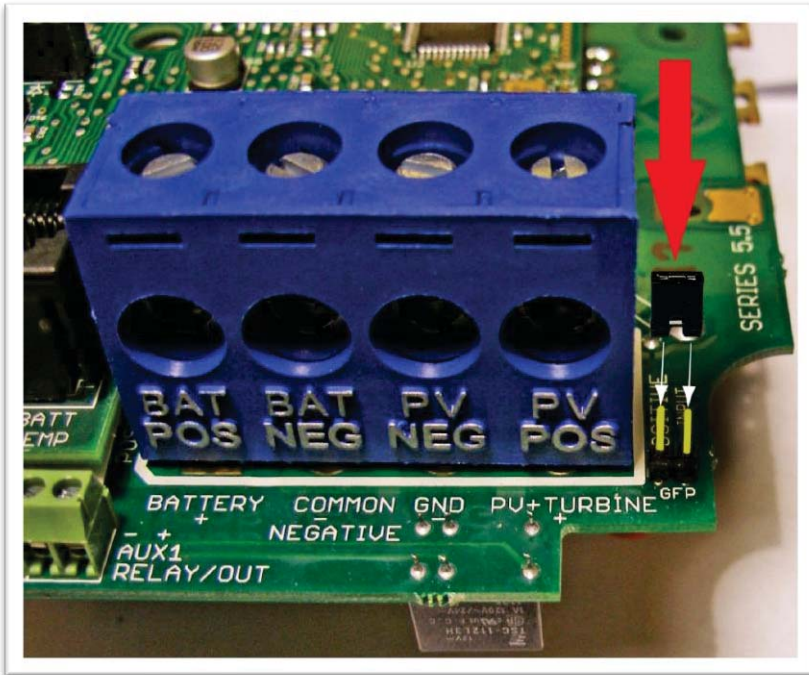
Figure 1
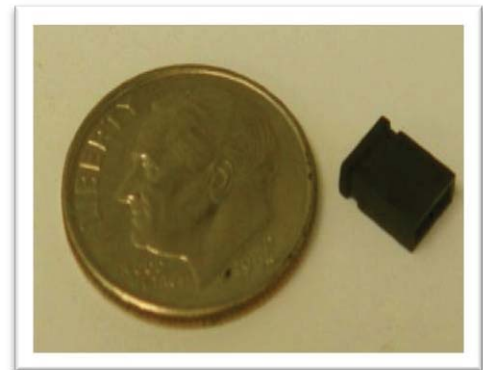
Figure 2

Non Solar inputs to the Classic Lite

The Lite will accept a wide variety of DC (Direct Current) inputs from sources like solar, wind, hydro, fuel cells etc. One of the biggest concerns when hooking the Lite to alternative sources of DC power is the input voltage. It is important to understand that exceeding the Lite's maximum input voltage will cause damage to the Lite.

If the source is unregulated and can exceed the Lite's maximum input voltage, a "clipper" a device that limits maximum voltage (available from Midnite Solar) will be needed to keep input voltage at safe levels.

Note: The Lite will need to be programed in "Custom Mode" for all applications other than Solar.

For more information on alternative inputs, please consult the Classic owner's manual or contact technical support techsupport@midnitesolar.com or 360-403-7207

Wiring the Classic Lite
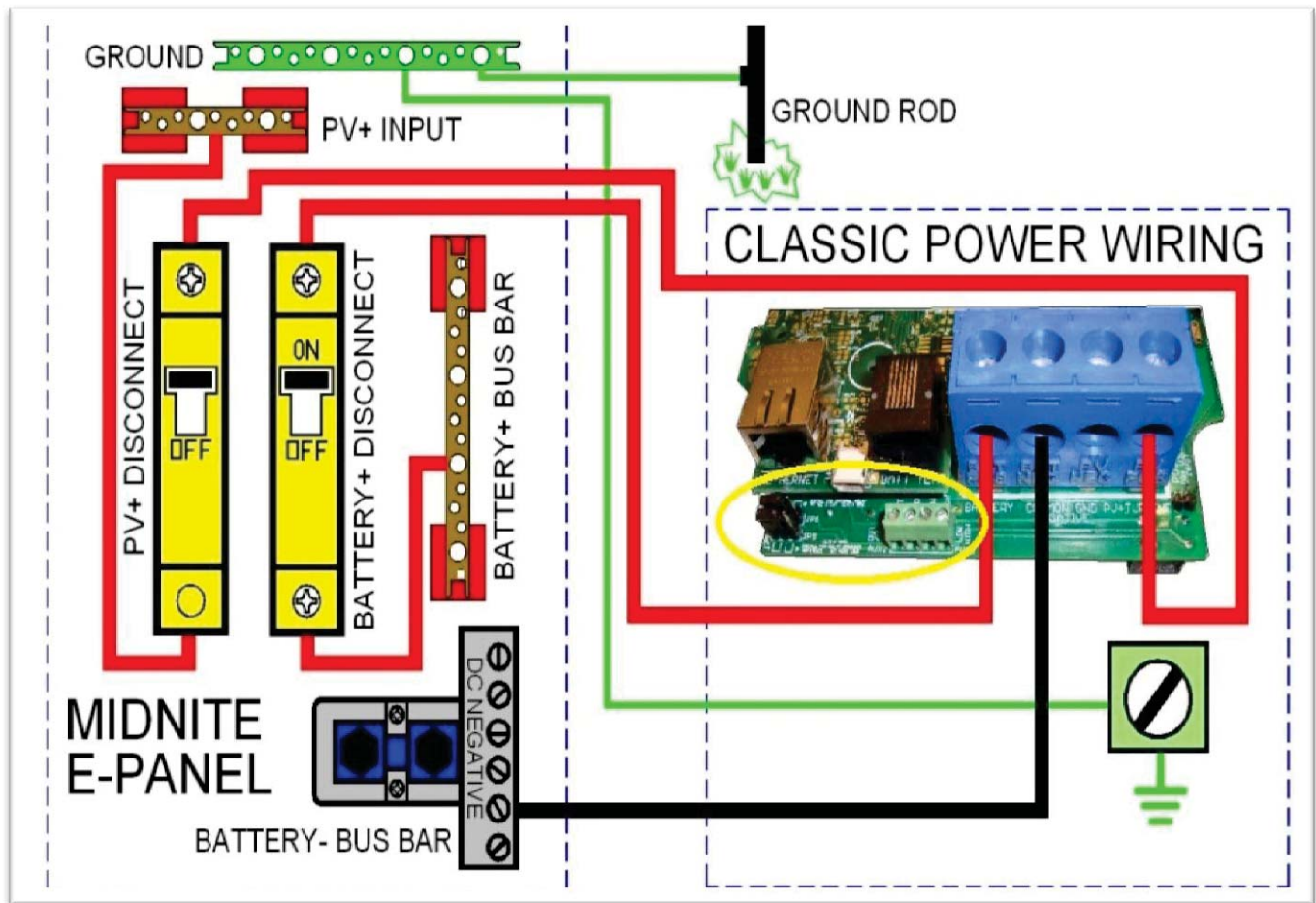
Figure 3

Figure 5 shows a basic wiring diagram for installing the Lite on an E Panel. Some installations may vary. Please consult the Lite owner's manual for other diagrams.

Auxiliary outputs: There are two jumpers and a four-position terminal strip (Seen in the yellow oval above) for auxiliary outputs – referred to as Aux 1 and Aux 2 please refer to the Classic owner's manual for details on how to connect and use these. Use of these is not vital to normal day-to-day operation of the Midnite Lite charge controller.

LED Modes and Faults

The Lite control panel (MNLP) has six status LEDs (Figure 6) to indicate various modes of operation as well as faults.

There are 3 behind the small window on the upper left.

The top orange status LED will light to indicate that the controller is in Bulk Charge mode. This is a deep charging mode aimed at maximizing the recharging cycle.

The center yellow status LED will light to indicate that the controller is in the Absorption stage. This is the second stage of charging, aimed at slowly bring a battery to full charge after the "Bulk Charge" mode.

The lower green LED will light to indicate that the controller is in Float mode. This is a gentle trickle of energy aimed at keeping a properly charged battery at full charge.

The lower green LED will blink slowly to indicate the controller is resting due to low light.

All three of these status LED's will blink slowly to indicate "Wrong Code" please see the trouble shooting section for help with this.

There are also LED indicators for Current limit, Ground Fault and Equalize.

All LEDs blinking slowly indicate a loss of communication with the Classic. Check that the cable is plugged in to the top Jack on the Classic. If error persists try another cable or call Tech support for assistance
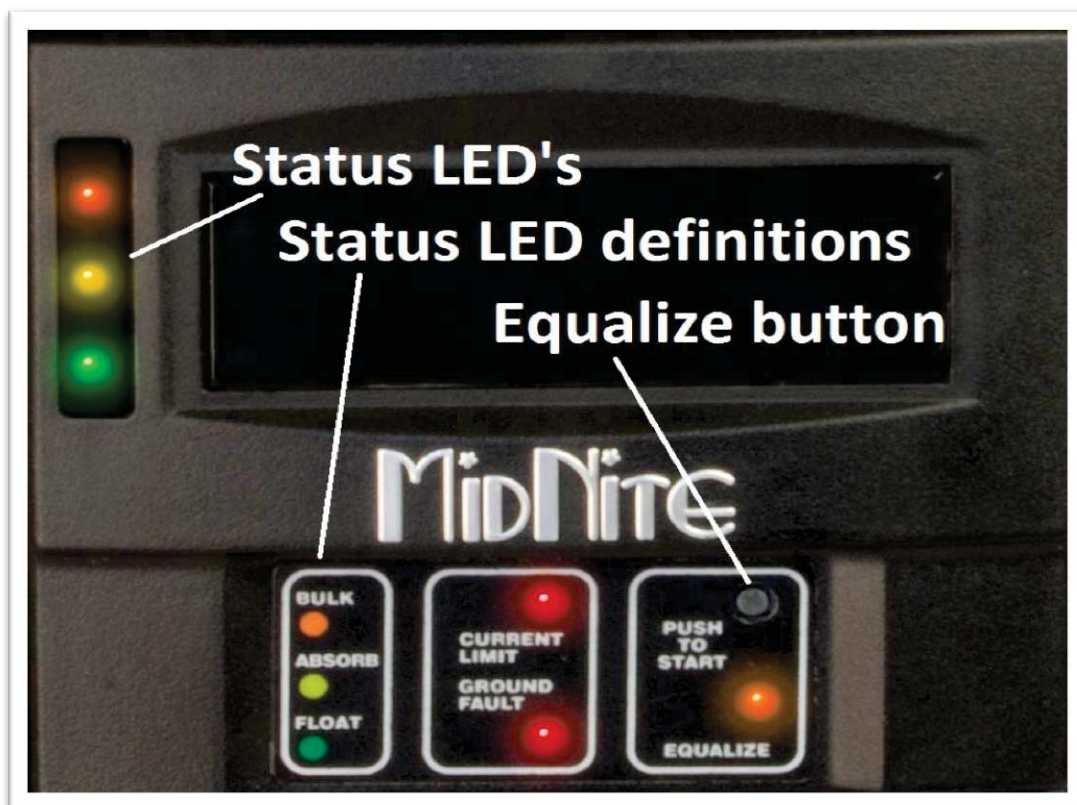
Programming

There are four separate ways to program a Classic Lite.

1-The programming is done using DIP switches (small switches located under the front cover of the MNLP.)

2-The Classic Lite can be programmed with an independent Midnite Graphic Panel or MNGP.

3-The Lite can be Networked with a standard Classic and programmed using the standard Classic's MNGP

4-The Classic Lite can be programmed using the Local App (Through the Ethernet connection) software included on the DVD or available at www.midnitesolar.com

Dip Switches

Below you will find an Explanation of the Dip switches and the values associated with their settings. Up is on and down is off on the switches. To access the Dip switches you need to remove the front cover on the Lite display panel. Firmly grasp the left and right side of the cover and slide it off as seen in Figure 7. The DIP switches are shown in Figure 8.
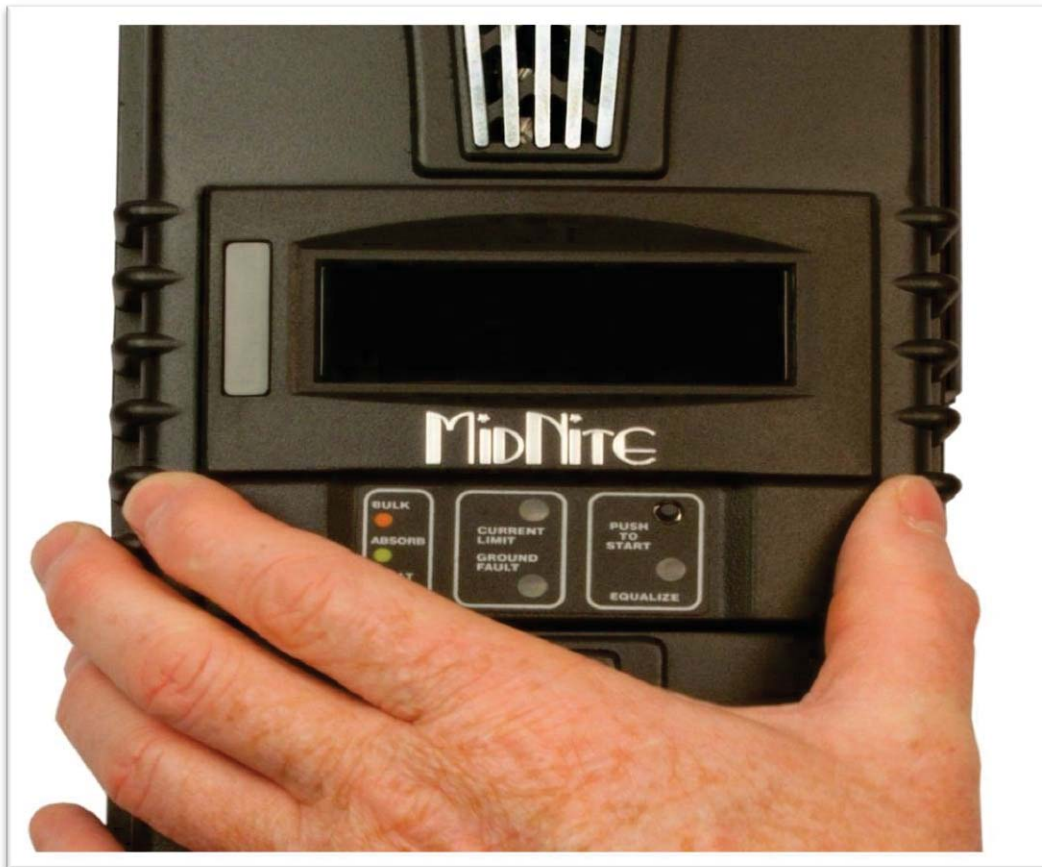
Figure 4

Now you will need to use the supplied tool (Toothpick) to place all 15 switches in the correct position. All the information on the switches can be found on the labels on the MNLP as well as in **Error! Reference source not found.** and **Error! Reference source not found.** below. Keep in mind if any of the switches are set to Custom the Lite display becomes a LED display only and you will need to use the included PC software or a MNGP to program the Classic Lite. Please see the Appendix of the Classic Owner's Manual for info on using the "Local App" software in conjunction with a PC.

Note: The Classic Lite will need to be programed in "Custom Mode" for all applications other than Solar.

DHCP	S2.1	IP ADDR	S2.2	S2.3	S2.4	PORT	S2.5	S2.6	S2.7
STATIC IP	OFF	192.168.0.223	OFF	OFF	OFF	502*	OFF	OFF	OFF
DHCP	ON	192.168.1.223	OFF	OFF	ON	3900	OFF	OFF	ON
		192.168.1.224	OFF	ON	OFF	3901	OFF	ON	OFF
		192.168.2.223	OFF	ON	ON	3902	OFF	ON	ON
		10.0.0.223	ON	OFF	OFF	3903	ON	OFF	OFF
		10.0.1.223	ON	OFF	ON	3904	ON	OFF	ON
		10.0.1.224	ON	ON	OFF	3905	ON	ON	OFF
		10.1.1.223	ON	ON	ON	3906	ON	ON	ON

*DEFAULT

S2 - SLIDE SWITCH UP TO TURN ON

Section 1   **Section 2**

MODE	S1.1	S1.2
SOLAR	OFF	OFF
Legacy	OFF	ON
Resrvd	ON	OFF
Custom	ON	ON

BATT	S1.5	S1.6	S1.7
GEL	OFF	OFF	OFF
SEALD1	OFF	OFF	ON
SEALD2	OFF	ON	OFF
AGM	OFF	ON	ON
FLD1	ON	OFF	OFF
FLD2	ON	OFF	ON
FLD3	ON	ON	OFF
Custom	ON	ON	ON

SYSV	S1.3	S1.4
12V	OFF	OFF
24V	OFF	ON
48V	ON	OFF
Custom	ON	ON

EQ	S1.8
MANUAL	OFF
AUTO	ON

DHCP	S2.1
STATIC IP	OFF
DHCP	ON

Figure 5

Mode: Section1, Switches 1 and 2

Input source: Switches 1 and 2

The first two switches of section 1 (left bank of DIP switches) are used to select which Solar Mode will be used. "Solar" is the optimum setting for virtually all solar installations. Legacy mode can be used in cases where the open circuit voltage (Voc) is close to the battery voltage. For example, a 22-volt open circuit array and a 12-volt battery, or where there are mixed sizes of panels in an array. For more info on Solar and Legacy mode see p. 18.
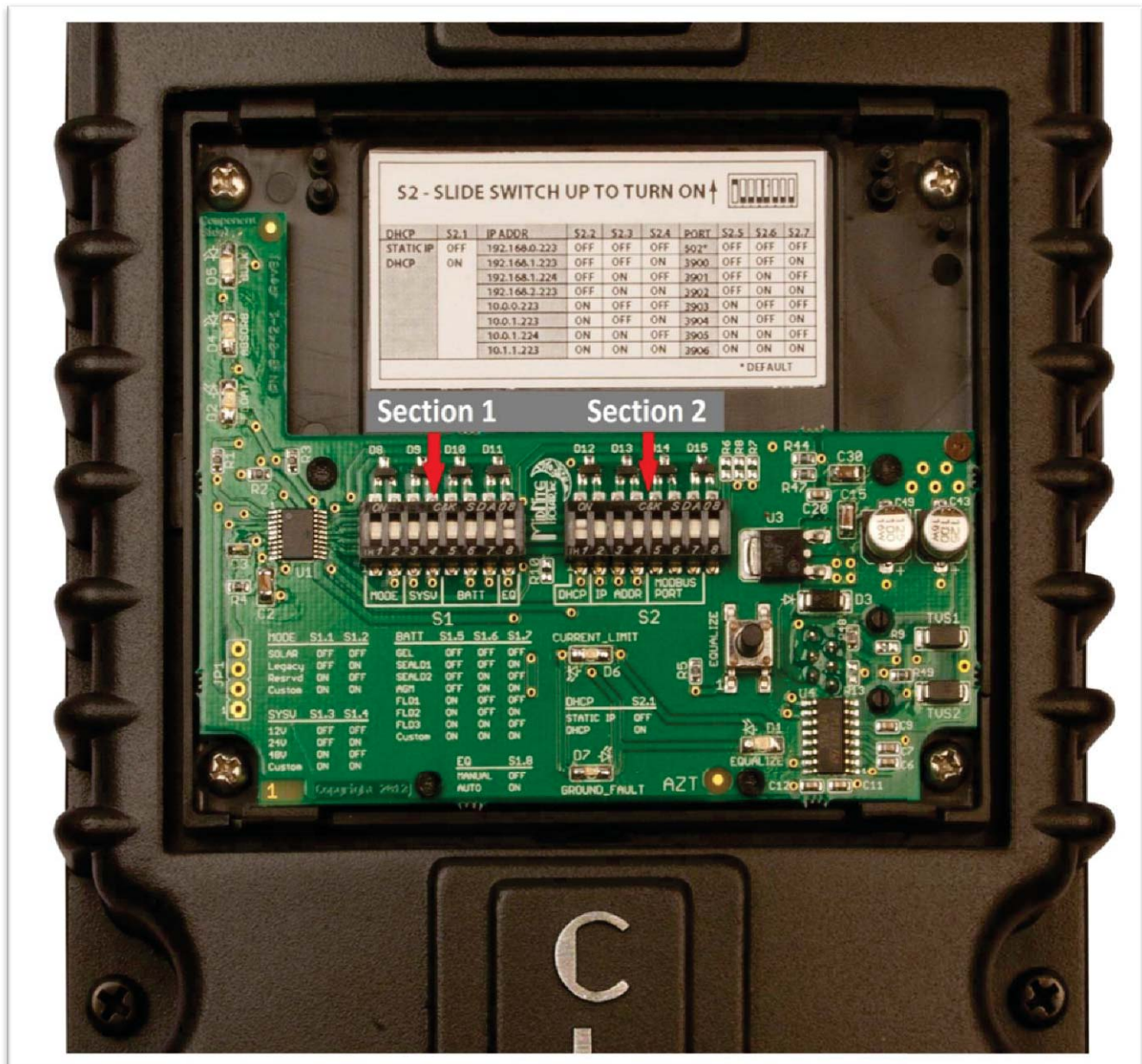
Table 1: input source

Switch 1	Switch 2	Mode (result)
Off	Off	Solar
Off	On	Legacy
On	Off	reserved
On	On	custom*

Battery voltage: Switches 3 and 4

On Section 1, set Switches 3 and 4 to the appropriate positions corresponding to your system's battery voltage. 12-, 24- and 48-volt systems are included in this menu. Other battery bank voltages will require a custom set up method.

Table 2: battery voltage

Switch 3	Switch 4	Battery voltage
Off	Off	12 v
Off	On	24 v
On	Off	48 v
On	On	custom*

Battery type: Switches 5, 6, 7

Switches 5, 6, and 7 on section 1 allow you to select from seven different battery types and charging profiles. These profiles can be found in Table 4. These should cover most common applications. If slightly different voltages are desired, this can be done using Custom Mode and programming methods outlined on p. 16.

Table 3: battery type

Switch 5	Switch 6	Switch 7	Battery type
Off	Off	Off	Gel
Off	Off	On	Sealed 1
Off	On	Off	Sealed 2
Off	On	On	AGM/Flooded
On	Off	Off	Flooded 1
On	Off	On	Flooded 2
On	On	Off	Flooded 3
On	On	On	Custom*

*When all switches of any of the above three groups (switches 1 and 2; or switches 3 and 4; or switches 5, 6 and 7 are set to ON, the Lite is in "Custom Programming mode" and can be programmed using any of the other three methods. Note the LED indicators and the EQ button will still be fully functional. Custom set up will be required for Wind, Hydro, Fuel Cell applications as well as setting up the Aux. output controls and for battery voltages of 36, 60, and 72 (84, 96, 108, and 120 volt batteries for KS model)

Table 4: Battery voltage and time settings

Battery Type	Absorb Voltage	Float Voltage	Equalize Voltage	Absorb Minimum Time (minutes)	Absorb Maximum Time (minutes)	Equalize Time (minutes)	Equalize Interval (days)[3]
12 Volt							
Gel	14.0	13.7	-	30	90	-	-
Sealed 1	14.2	13.7	14.4	30	90	60	28
Sealed 2	14.3	13.7	14.6	30	90	60	28
AGM	14.4	13.7	15.1	30	120	120	28
Flooded 1	14.6	13.5	15.3	30	120	120	28

Flooded 2	14.7	13.5	15.4	30	120	120	28
Flooded 3	15.4	13.4	16.0	30	180	180	14
Custom	-	-	-	-		-	-
24 Volt							
Gel	28	27.4	-	30	90	-	-
Sealed 1	28.4	27.4	28.8	30	90	60	28
Sealed 2	28.6	27.4	29.2	30	90	60	28
AGM	28.8	27.4	30.2	30	120	120	28
Flooded 1	29.2	27	30.6	30	120	120	28
Flooded 2	29.4	27	30.8	30	120	120	28
Flooded 3	30.8	26.8	32	30	180	180	14
Custom	-	-	-	-		-	-
48 Volt							
Gel	56	54.8	-	30	90	-	-
Sealed 1	56.8	54.8	57.6	30	90	60	28
Sealed 2	57.2	54.8	58.4	30	90	60	28
AGM	57.6	54.8	60.4	30	120	120	28
Flooded 1	58.4	54	61.2	30	120	120	28
Flooded 2	58.8	54	61.2	30	120	120	28
Flooded 3	61.6	53.6	64	30	180	180	14
Custom	-	-	-	-		-	-

[3] If **Auto Eq** is set to **Auto** then the Equalize interval is in effect. If **Auto** Eq is set to **Manual the** Equalization stage will not occur unless started manually.

Auto Equalize: Section 1 Switch 8

Switch 8 is used to select Automatic equalization. Equalization is the intentional over-charging of a battery bank to create bubbling in the electrolyte. This is intended to ensure that the electrolyte in the battery is evenly distributed, while also reducing the natural crystalization that takes place in a deep-cycle battery. For specific information on Equalization please consult the specifications for your battery system.

In the OFF position, a manual equalization cycle, if desired, is selected by pressing the "Equalize" button on the MNLP for 3 seconds. To Cancel Equalize, Press Equalize button for 3 seconds.

With Switch 8 in the ON position, the Lite will attempt to equalize the batteries automatically. The equalize interval is dependent upon the battery type selected.

Table 5: Equalization

Manual	Off
Auto	On

Battery voltage and time settings

Battery Type	Absorb Voltage	Float Voltage	Equalize Voltage	Absorb Minimum Time (minutes)	Absorb Maximum Time (minutes)	Equalize Time (minutes)	Equalize Interval (days)[3]
12 Volt battery							
Gel	14.0	13.7	-	30	90	-	-
Sealed 1	14.2	13.7	14.4	30	90	60	28
Sealed 2	14.3	13.7	14.6	30	90	60	28
AGM	14.4	13.7	15.1	30	120	120	28
Flooded 1	14.6	13.5	15.3	30	120	120	28
Flooded 2	14.7	13.5	15.4	30	120	120	28
Flooded 3	15.4	13.4	16.0	30	180	180	14
Custom	-	-	-	-		-	-
24 Volt battery							
Gel	28	27.4	-	30	90	-	-
Sealed 1	28.4	27.4	28.8	30	90	60	28

Sealed 2	28.6	27.4	29.2	30	90	60	28
AGM	28.8	27.4	30.2	30	120	120	28
Flooded 1	29.2	27	30.6	30	120	120	28
Flooded 2	29.4	27	30.8	30	120	120	28
Flooded 3	30.8	26.8	32	30	180	180	14
Custom	-	-	-	-		-	-
48 Volt battery							
Gel	56	54.8	-	30	90	-	-
Sealed 1	56.8	54.8	57.6	30	90	60	28
Sealed 2	57.2	54.8	58.4	30	90	60	28
AGM	57.6	54.8	60.4	30	120	120	28
Flooded 1	58.4	54	61.2	30	120	120	28
Flooded 2	58.8	54	61.2	30	120	120	28
Flooded 3	61.6	53.6	64	30	180	180	14
Custom	-	-	-	-		-	-

Table 1

[3] If **Auto Eq** is set to **Auto** then the Equalize interval is in effect. If **Auto** Eq is set to **Manual the** Equalization stage will not occur unless started manually.

Section 2: Switches 1 through 7

Table 6: section 2 switch settings

DHCP or Static IP address			
	Switch 1		
Static IP	Off		
DHCP	On		
IP Address (only if DHCP is set to Static IP)			
	Switch 2	**Switch 3**	**Switch 4**
192.168.0.223	Off	Off	Off
192.168.1.223	Off	Off	On

192.168.1.224	Off	On	Off
192.168.2.223	Off	On	On
10.0.0.223	On	Off	Off
10.0.1.223	On	Off	On
10.0.1.224	On	On	Off
10.1.1.223	On	On	On
MODBUS Port			
	Switch 5	**Switch 6**	**Switch 7**
502 (default)	Off	Off	Off
3900	Off	Off	On
3901	Off	On	Off
3902	Off	On	On
3903	On	Off	Off
3904	On	Off	On
3905	On	On	Off
3906	On	On	On

Using MNGP Remote to program a Classic Lite

The Classic Lite can be programmed using an MNGP (Midnite Graphics Panel) remote. This is an easy way to get into and program not only the basic functions, but the advanced features as well. In Dip Switch Section 1, set DIP Switches 1, 2, 3, and 4 to ON. This will tell the Classic Lite's MNLP display to allow custom programming. Next, remove the plug from the back of the MNLP and plug it into the MNGP. Now, you basically have a Standard Classic. The programming for this is found in the Standard Classic Manual. (Included on the DVD you got with your Lite) Once programmed in this way, the MNGP can be removed, and the MNLP replaced. All functions, and voltages programed into the Classic will now be retained in permanent memory.

Programming the Lite with a Networked Standard Classic (Follow Me)

The third method of programming is to use a Standard Classic in the system to program the Lite in a simple "Follow Me" network. Please see the Classic's manual for full networking instructions and Follow ME info. After set up of Follow Me and proper addressing of the Lite you can view and manipulate the Lite from the regular Classic. To access the Lite from the Standard Classic's MNGP, hold down the Left arrow key, and tap the Up arrow. The display should now read the name given to the Classic in the Local App, or just Classic if no name was assigned. You will notice address 10, 11 etc for a few seconds before the name is displayed. You will find it will be best to actually name each one for convenience, for example Windy, Sunny and Hydro etc.

Note: There are currently over 100 possible "Addresses" in the MNGP that can be accessed by holding the left arrow and tapping the up and down arrows. If you get "Lost" Just head up or down until you find your Classic (Address 10)

Programming is now done the same as for the Standard Classic. Please see the Classic owner's manual for more information.

Programming the Lite with the Local App

The Classic or Classic Lite can be fully programmed with the free monitoring software. You will need the latest version of the local app (Version 0.2.4 or higher) in order to access the 2 way communications. The Local App firmware, and help for it, can be found at www.mymidnite.com The Classics firmware will need to be version 06-29-2012 rev 1043 or newer. For Help with Firmware please visit www.midnitesolar.com and click on the firmware tab.

The Local app is full featured and can adjust all the settings the Classic has to adjust from the PC. The Local App uses the Classics serial number (Numbers only) as a password for security. Clicking on the Config button in the software will show a screen that will have some adjustments you can make. One of them is Password. Enter the password there and click the Enter button and the Basic, Advanced and Tech menus should become available for use. The app will remember the password so every time you reopen the app and click on the config tab it will automatically submit the password to the Classic. For help with the Local app please see the Manual for the Local App software that was included on the dvd. Also please see www.mymidnite.com to assure you have the latest version of the manual (there is a REV number beside the page number).

Clearing Faults

If either the Ground Fault or Current Limit fault light is lit, then the equalize button can be tapped to clear these faults. If the fault condition has not been removed, however, then the light will re-illuminate indicating that a fault condition is still present.

Explanations of Solar and Legacy

Solar

This is the default mode for PV systems and has a very fast sweep (typically 1/2 second or less) that will re-sweep at user adjustable sweep intervals, unless the Classic finds that it needs to do a sweep on its own because of changing conditions. The timed sweep interval is user adjustable and is in units of minutes. SOLAR mode is typically best for PV systems, especially if there is partial shading at times during the day. The Classic will show a message of "PV SHADE" if it thinks the PV array is partially shaded (if this feature is enabled).

SOLAR mode is best suited for shaded or un-shaded PV arrays that are at least one nominal voltage above the battery voltage. For severe partial shading or PV arrays with nominal voltage equal to battery voltage, you may also want to try Legacy P&O (Perturb and Observe) MPPT (Multi power point tracking) mode.

Legacy P&O

Legacy P&O (Perturb and Observe) mode is a slow tracking mode similar to the Micro Hydro mode but with the difference that it is slightly faster and optimized for Solar. Legacy mode can be very useful for arrays that experience heavy shading issues as well as PV arrays that have a low voltage. If the array has a VOC (Open Circuit Voltage) of less than 125% of the battery voltage Solar mode will not work as well so Legacy will be a better choice.

Equalization with the Classic Lite

By setting Auto Equalize to "Manual" (see table 5) the Equalize intervals in the Battery Settings table are effectively disabled and Equalization stages will have to be started manually.

Please note that not all manufacturers recommend Equalizing AGM batteries. Check with your manufacturer and make sure to DISABLE auto Eq on the Lite if your manufacturer does not recommend equalizing your AGM batteries

Equalize Button

The Equalize button serves two purposes: the first is to begin an Equalize stage, the second is to clear faults.

Equalization:

An Equalize stage can be scheduled or started at any time by holding the Equalize button down for 2-3 seconds.

Holding the the EQ button down for 2-3 seconds at any point once equalization is activated will cancel the equalization stage and return back to the most appropriate battery stage.

When the equalize button is pressed, the EQ light will come on solid. Once Equalize proper starts the light will flash. If Equalization cannot begin immediately then the MNGP Lite will try to engage equalization for 18 hours and then stop if it can't.

See your battery owner's manual or specification sheet for the voltage and time parameters of equalization.

Troubleshooting

Classic Lite will not power on. "No self test on power up"	*Check for voltage between the Battery + and the common – on the blue terminal block inside the Classic. If voltage is present and above 10vdc contact customer service. If no voltage is present back step through the + and – to find the fault. *Contact Customer Service
MNLP has all LED's Flashing slowly	*Check that the blue cable is plugged in between the MNLP and the top most jack on the circuit board. *Try another cable. A standard short 4 conductor phone cable will work. *Contact Customer Service
MNLP has the 3 Status LED's Flashing slowly	*This indicates the "Wrong Code" has been installed please re install the firmware and select the correct Classic model. *Contact Customer Service
There was no "Jumper" present to install for Ground Fault Protection	*There will be 4 more Jumpers just above the Blue DC Terminal block. One of these can be used to replace the GFP jumper *Contact Customer service for a replacement Jumper
The Green Float Status LED blinks slowly even when there is sun available	*Verify that all Switches 1 through 7 in Section 1 are all set correctly *Verify DC voltage on the Blue DC Terminal blocks PV+ and Common – terminals that is greater than the Battery voltage *Contact Customer Service
The Classic Lite does not show up on the Networked Classic's MNGP as Classic2	*Check that the Jumper for Network addressing is installed as shown on page 17 *Verify the Network Cable is installed correctly as shown on page 17 *Try another Network Cable *Contact Customer Service
The Standard Classics MNGP says Unused Address	* There are currently over 100 possible "Addresses" in the MNGP that can be accessed by holding the left arrow and tapping the up and down arrows. If you get "Lost" Just head up or down until you find your Classic (Address 10)

Glossary of terms:

MNLP: MidNite LED Panel – the LED information display mounted to the front of the Midnite Lite.

GFP: Ground Fault Protection

MNGP: Midnite Graphic Panel – an LCD-screen driven display mounted to the front of a Midnite Classic controller. Can also be used to program a Midnite Lite.

MPPT: Multi Power-Point Tracking – a sophisticated means of maximizing solar power input by automatically keeping modules or arrays at the most efficient voltage and current settings.

DC: Direct current – the standard delivery of power in most solar or alternate-energy systems, completely different from standard house AC (alternating current) systems.