

DISCLAIMER

There is not a convention on the write-ability of registers. You may write to any register in the system including registers THAT MAY DAMAGE OR DESTROY your Classic and attached equipment like battery banks. Please make sure that you understand what you are doing before attempting to change any settings (like battery voltage) using the raw MODBUS interface. MidNite Solar cannot take responsibility for any damage to your Classic or system in the event of misconfiguration.

Registers and bits marked RESERVED are not necessarily unimplemented. Great care must be taken not to overwrite these registers or bits to ensure proper operation of the Classic. Some bits are marked to stay a 1 rather than 0.

Wherever possible we have tried to indicate settings that may have an adverse effect on your system if set incorrectly.

Conventions:

Register units are expressed using formulas to try to reduce the ambiguity surrounding converting from the raw bus formats and human-readable values. Due to the nature of the Classic's operation, there is not a uniform convention as far as data endianness so you may find some classes of values that follow a Most Significant Byte (MSB) first convention and others that use the Least Significant Byte (LSB) first convention.

Bits are numbered from 0-15 in the little-endian or LSB-0 notation. That is, the least significant bit is indexed by 0.

For Example, the number 43,981 is 0xABCD in hex is represented in binary as 1010101111001101.

The bit ordering is as shown in the following table:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0	1	0	1	0	1	1	1	1	0	0	1	1	0	1

So that the binary digit indexed by (0) is 1. (1) is 0, (6) is 1, and (10) is 0.

MODBUS registers are 16-bit (2-octet/byte) in size. When using values from the map to indicate conversion formulas the following convention is used to access different octets:

Note that when talking about bytes or octets, it is more convenient to describe them in hexadecimal (base 16) form than in decimal. Some values are expressed in bytes as it is a more compact way of dealing with certain classes of numbers (IP addresses, for example). We use the 'C' convention of referring to hexadecimal numbers by prefixing them with '0x'. So the decimal value 10 is represented by the hexadecimal value 0x0A.

A note on Read/Write: The Classic MODBUS does not strictly enforce the Read/Write accessibility of some registers. It is possible to write to some registers marked Read Only. This will usually have no effect on Classic operation, but in some cases you may corrupt a register from which you wanted to read data. In some cases the registers are reset internally as new values. Additionally, some counters are accessible directly. For example, the Absorb Time (4139) timer is a "suggested" read only register;

however, if your MODBUS application has reason to reset or adjust this register, there is nothing to prevent you from changing it however you please. Don't be surprised if your batteries pop in and out of Absorb stage unexpectedly, though!

Operators:

Indexing

- [] square brackets around an address indicate the value of the register specified:
ex: [4116] indicates the value of the register at address 4116.
- []_{MSB} Square brackets followed by an _{MSB} means to use the most-significant byte of the register.
ex: if the value at register 4116 is 0x04B1 (decimal 1201):
[4116] = 0x04B1,
then
[4116]_{MSB} = 0x04
- []_{LSB} Square brackets followed by an _{LSB} means to use the least-significant byte of the register.
ex: if the value at register 4116 is 0x04B1 (decimal 1201):
[4116] = 0x04B1,
then
[4116]_{LSB} = 0xB1
- () Parentheses refer to bits within the register.
For example: [4116](0) means "the 0th bit of the value in register 4116."
So if 4116 held the value 1 (0x0001 hex) then [4116](0) would be a 1. [4116](1...15) would all be 0s.
- ... Ellipses represent ranges of values or indices.
For example to refer to the first three bits of a register you may see:
[4116](0...3) which signifies the first three bits of the value of register 4116.
You may also see spans of registers as:
[4116...4120] which refer to registers 4116 to 4120 inclusive.

Arithmetic

- + Add two numbers together
- Subtract two numbers (or negate the value on the right)
- / Divide two numbers (integer implied)
- * Multiply two numbers (integer implied)

Note on addressing of registers:

The modbus specification adds one (1) to the actual address sent to the unit in the packet command. We have already done this in the register map addressing. This is so that modbus addresses start at 1 rather than 0. The main Classic address map starts at 4101 but the packet itself sends out address 4100.

Some modbus software and libraries will expect this added offset of 1 and some will not. If your software sends out the address as you specify as its input, you may have to subtract one (1) from the address shown in this document.

Logical

- \ll x Binary shift left. Shift the value x binary digits to the left. This is equivalent to multiplying the decimal number by 2^x . Ex:
[4116] = 0x01 = 00000001_b
Then
[4116] \ll 1 = 0x02 = 00000010_b
- \gg x Binary shift right. Shift the value x binary digits to the right. This is equivalent to dividing the decimal number by 2^x .
[4116] = 0x02 = 00000010_b
Then
[4116] \gg 1 = 0x01 = 00000001_b
- | OR two numbers together (aligned to LSB)
& AND two numbers together (aligned to LSB)
^ XOR two numbers together (aligned to LSB)

String

- || Concatenate.
[4116] = 0x4142.
[4116]_{MSB} || [4116]_{LSB} => 0x41 || 0x42 => 'A' || 'B' => "AB"

Examples:

Using the example of the Average PV Voltage register: dispavgVpv @ 4116

Suppose using a MODBUS scanner you retrieve the following (integer) value from the dispavgVpv register at address 4116:

4116: 1201

- The address itself: 4116
- Full 16-bit value at the address: [4116] = 1201 (0x04B1 hex)
- The top-most (MSB) octet of the register: [4116]_{MSB} = 0x04 hex
- The bottom-most (LSB) octet of the register [4116]_{LSB} = 0xB1 hex
- Applying the Conversion (**[4116] /10**) Volts:
 - [4116] = 1201
 - 1201 /10 = 120.1 Volts

File Transfer and Function Execution modes:

Coming soon (*next revision of this document*) will be information on how to use the MODBUS File Transfer and Function execution commands. File Transfer will be necessary, for instance, to transfer wind power curves to/from the Classic or logging and audio data to/from the Classic and/or MNGP.

Base Registers				
Address	R/W	Name	Conversion	Notes
4101	R	UNIT_ID	PCB revision = [4101] _{MSB} Unit Type = [4101] _{LSB}	The PCB revision is a value between 0 and 255 indicating the hardware revision of the PC board. The Unit Type is an integer value indicating the voltage category of the Classic See Table 4101-1.
4102 4103	R	UNIT_SW_DATE_RO	Year = [4102] Month = [4103] _{MSB} Day = [4103] _{LSB}	Software Build date.
4104 4105	RESERVED (Do NOT Write)			
4106 4107 4108	R	UNIT_MAC_AddressI	[4108] _{MSB} : [4108] _{LSB} : [4107] _{MSB} : [4107] _{LSB} : [4106] _{MSB} : [4106] _{LSB}	The unit's Ethernet MAC address.
4109 4110	RESERVED (Do NOT Write)			
4111 4112	R	UNIT_Device_ID	([4112] << 16) + [4111]	The device ID of the unit.
4113	R	StatusRoll	([4113]>>12)Count + ([4113]& 0x0fff) Value	Various 12 bit values changes once per second. Hi 4 bit count
4114	R	RestartTimerms	[4114] Mili Seconds	Time after which the Classic can wake up. (countdown)
4115	R	dispavgVbatt	([4115] /10) Volts	Average Battery Voltage (1 sec)
4116	R	dispavgVpv	([4116] /10) Volts	Average PV terminal input Voltage (1 second average)
4117	R	IbattDisplayS	([4117] /10) Amps	Average Battery Current (1 sec)
4118	R	kW--Hours	([4118] /10) kWatt-Hours	Average Energy to the Battery This is reset once per day
4119	R	Watts	[4119] Watts	Average Power to the Battery
4120	R	ComboChargeStage	Charge Stage = [4120] _{MSB} State = [4120] _{LSB}	See Table 4120-1 for battery charge state. See Table 4120-2
4121	R	PvInputCurrent	([4121] /10) Amps	Average PV terminal input Current. (1 second average)
4122	R	VocLastMeasured	([4122] /10) Volts	Last measured open-circuit Voltage at the PV terminal input.

MidNite Solar MODBUS Network Spec. Rev B --- May 23, 2013

Address	R/W	Name	Conversion	Notes
4123	R	HighestVinputLog	[4123] Voltage /10	Highest input voltage seen
4124	R	MatchPointShadow	[4124] Present wind power curve step being indexed (1...16)	
4125	R	AmpHours	[4125] Amp Hours	Daily Amp Hours reset at 23:59
4126 4127	R	Lifetime kW-Hours	(([4127] << 16) + [4126]) kWh	Lifetime Energy Generation
4128 4129	R	LifetimeAmpHours	(([4129] << 16) + [4128]) Amp Hours	Lifetime Amp-Hour Generation
4130 4131	R	InfoFlagsBits (InfoFlagsBits2)	(([4131] << 16) + [4130])	See Table 4130-1 (read as 32 bits or singly)
4132	R	BATTtemperature	(([4132] /10) °C	Temperature measured at the external Battery Temperature Sensor (if installed, else 25C)
4133	R	FETtemperature	(([4133] /10) °C	Temperature of Power FETs
4134	R	PCBtemperature	(([4134] /10) °C	Temperature of the Classic Control (top) PCB
4135	R	NiteMinutesNoPwr	[4135] minutes	Counts up when no power Resets to 0 when there is power
4136	R/W	MinuteLogIntervalSec	[4136] seconds	Minimum 60 seconds recent history data logging interval
4137	R/W	modbus_port_register	[4137]	0 to 65,535. Default = 502
4138	R	FloatTimeTodaySeconds	[4138] seconds	Number of seconds that the Batteries have spent in float today. Reset at 23:59 (midnight)
4139	R/W	AbsorbTime	[4139] seconds	Absorb Time Up/Down Counter Goes to Float when it reaches 0
4140	RESERVED (may show Ibatt in older firmware)			
4141	R	PWM_ReadOnly	[4141] (0 to 1023)	Duty Cycle command of PWM signal. (NOT Percent)
4142	RESERVED (Do NOT Write)			
4143	R/W	Equalize Time	[4143] Seconds	Battery Stage Equalize Down Counter. Time remaining in Equalize Stage. EQ Done when it reaches 0
4144	RESERVED -- DO NOT WRITE (was used for Solar Tracking debug)			
4145	R/W	MppWLast	[4145] Internal watts ref. for Solar Re-Tracking (~10% of last MPP W) If written to, will be overwritten next Solar sweep.	
4146	R/W	USBcommMODE	[4146] USB Function #	See table 4146-1

MidNite Solar MODBUS Network Spec. Rev B --- May 23, 2013

Address	R/W	Name	Conversion	Notes
4147	R/W	NoDoubleClickTimer	[4142] Seconds	Internal forced time space between manual MPPT sweeps.
4148	R/W	Battery output Current Limit	[4148] /10) Amps	Battery Current Limit Amps (example: 23.4 A = 234)
4149	R/W	Absorb Set Point Voltage	([4149] /10) Volts	Battery Absorb Stage Set point Voltage (example: 28.3V = 283)
4150	R/W	Float Voltage Set Point	([4150] /10) Volts	Battery Float Stage Set Point Voltage
4151	R/W	Equalize Voltage Set Point	([4151] /10) Volts	Battery Equalize Stage Set Point Voltage
4152	R	Sliding Current Limit	[4152] Amps	Sliding Current Limit (changes with V/Temp etc.)
4153	R/W	Minimum Absorb Time	[4153] seconds (normally unused now)	Minimum Absorb time when VariMax is used. Otherwise, equals 0
4154	R/W	Absorb Time	[4154] seconds	SetPoint time for Batteries to be in the Absorb Stage.
4155	R/W	Maximum Battery Temperature Compensation Voltage	([4155] /10) Volts	Highest Charge Voltage is limited to this value when using battery temp sensor
4156	R/W	Minimum Battery Temperature Compensation Voltage	([4155] /10) Volts	Lowest Charge Voltage is limited to this value when using battery temp sensor
4157	R/W	Battery Temp Comp Value for each 2V cell	-([4157] /10) mV/degree C/cell (0.5 mV steps) 0 to 10 mV per 2V cell	Absolute value of the Temperature Compensation Value in mV/°C /2V cell
4158	R/W	General Purpose 16 bit word stored & retrieved with other EEprom (was Battery Type)		
4159	R/W	EqualizeReTryDays	[4159] Number of days for auto EQ to retry until giving up	
4160 4161	W	Force Flag Bits	([4161] << 16) + [4160]	See Table 4160-1.

MidNite Solar MODBUS Network Spec. Rev B --- May 23, 2013

Address	R/W	Name	Conversion	Notes
4162	R/W	Equalize Time	[4162] Seconds	Initialize Time for Batteries to remain in Equalize stage.
4163	R/W	Equalize Interval Days	[4163] Days	Number of days between Equalize Stages (Auto EQ)
4164	R/W	Mppt Mode (Solar, Wind, etc)	[4164] (bit 0 = On/Off)	Classic functional Mode. See Table 4164-1.
4165	R/W	Aux 1 and 2 Function	[4165]	Combined Aux 1&2 Functions + On/Off. See Table 4208
4166	R/W	Aux1VoltsLoAbs	([4166] /10) Volts	Aux 1 Absolute Low Threshold Voltage
4167	R/W	Aux1DelayT	[4167] Milli Seconds	Aux 1 Delay time before Asserting.
4168	R/W	Aux1HoldT	[4168] Milli Seconds	Aux 1 Hold time before De-asserting.
4169	R/W	Aux2PwmVwidth	([4169] /10) Volts	Voltage range over which PWM operates.
4170	RESERVED			
4171				
4172	R/W	Aux1VoltsHiAbs	([4172] /10) Volts	Aux 1 Absolute High Voltage Threshold
4173	R/W	Aux2VoltsHiAbs	([4173] /10) Volts	Aux 2 Absolute High Voltage Threshold
4174	R/W	Aux1VoltsLoRel (Relative to charge stage set point V)	([4174] /10) Volts	Aux 1 Relative Lower Voltage Threshold (Charge Stage Rel)
4175	R/W	Aux1VoltsHiRel (Relative to charge stage set point V)	([4175] /10) Volts	Aux 1 Relative Upper Voltage Threshold (Charge Stage Rel)
4176	R/W	Aux2VoltsLoRel (Relative to charge stage set point V)	([4176] /10) Volts	Aux 2 Relative Lower Voltage Threshold (Charge Stage Rel)
4177	R/W	Aux2VoltsHiRel (Relative to charge stage set point V)	([4177] /10) Volts	Aux 2 Relative Upper Voltage Threshold (Charge Stage Rel)
4178	R/W	Aux1VoltsLoPv (absolute)	([4178] /10) Volts	Aux 1 Lower PV Voltage Threshold

MidNite Solar MODBUS Network Spec. Rev B --- May 23, 2013

Address	R/W	Name	Conversion	Notes
4179	R/W	Aux1VoltsHiPv (absolute)	([4179] /10) Volts	Aux 1 High PV Voltage Threshold
4180	R/W	VariMax	[4180] _{LSB} =Amps, [4180] _{MSB} = Vabsorb –Vrelative /10 (Default = 101 amps)	
4181	R/W	Aux2VoltsHiPv (absolute)	([4181] /10) Volts	Aux 2 High PV Voltage Threshold
4182	R/W	EnableFlags3	[4182] binary	See Table 4182-1
4183	R/W	ArcFaultSensvtvy Requires Classic reset	Time = [4183] Sense = [4183] Mode = [4183] <<16	Arc Fault Protection sensitivity response adjustments
4184	RESERVED (Do NOT Write)			
4185				
4186	R/W	EnableFlags2	[4186] binary	See Table 4186-1
4187	R/W	EnableFlagsBits	[4187] binary	See Table 4187-1
4188	R/W	RESERVED FACTORY CALIBRATION (Do NOT Write)		
4189	R/W	Vbatt_Offset	([4189] /10)	Battery Voltage Offset Tweak (Range Limited) (Signed)
4190	R/W	Vpv_Offset	([4190] /10)	Input Voltage Offset Tweak (Range Limited) (Signed)
4191	R	VpvTargetRd	([4191] /10) Volts	Input Target (V regulation) Voltage (Usually Vmpp)
4192	R/W	VpvTargetWr	([4192] /10) Volts Vpv Target command (VpvTargetCmdEn)	
4193	RESERVED (Do NOT Write)			
4194				
4195				
4196				
4197	R/W	SweepIntervalSecs	[4197] Seconds	Legacy P&O, Hydro, Solar, U-Set Sweep Interval, Seconds (Forcing Sweep resets timer)
4198	R/W	MinSwpVoltage	([4198] /10)	Minimum sweep voltage for Hydro MPPT mode
4199	R/W	MaxInputCurrent	([4199] /10) amps (dflt = 99A)	Maximum input current limit
4200	R/W	SweepDepth	[4200] watts %	Maximum % Legacy/Hydro mode will sweep as percent of present Mpp wattage
4201	RESERVED (Do NOT Write)			

MidNite Solar MODBUS Network Spec. Rev B --- May 23, 2013

Address	R/W	Name	Conversion	Notes
4202	R	ClipperCmdVolts	([4202] /10) Volts	Aux clipper reference varies w/stage and headroom
4203	R/W	WindNumberOfPoles	[4203] poles	Number of turbine alternator poles for RPM Calc. (unused)
4204	R/W	MppPercentVoc	[4204] 00 to 100 %	% of Voc for U-Set mode
4205	R/W	WindTableToUse	[4205]	FUTURE power curve select
4206	RESERVED (Do NOT Write)			
4207	R/W	LEDmode	[4207]	See Table 4207-1
4208 4209	RESERVED (Do NOT Write)			
4210 4211 4212 4213	R/W	ID name	[4210] _{MSB} [4210] _{LSB} [4211] _{MSB} [4211] _{LSB} [4212] _{MSB} [4212] _{LSB} [4213] _{MSB} [4213] _{LSB} End with 0 if less than 8 chars	Unit Name. 8 characters max. ASCII. Takes place of MODBUS address in MNGP display if present. Example: "CLASSIC" = 0x4C43, 0x5341, 0x4953, 0x0043
4214 4215	W	CTIME0	([4215] << 16) + [4214] (possibly atomic op)	Consolidated Time Registers See Table 4214-1
4216 4217	W	CTIME1	([4217] << 16) + [4216] (possibly atomic op)	Consolidated Time Registers See Table 4216-1
4218	W	CTIME2	[4218]	Consolidated Time Registers See Table 4218-1
4219	RESERVED (Do NOT Write)			
4220	R/W	RemoteMenuMode	[4220]	Present Remote Menu sent from MNGP
4221	W	RemoteButtons	[4221] MNGP Buttons Pressed	See TABLE 4221-1
4222	RESERVED (Do NOT Write)			
4223	RESERVED (Do NOT Write)			
4224	R/W	PreVoc (do not write)	([4224] /10) Volts	Input Voc before Relay
4225	RESERVED (Do NOT Write)			
4226	R/W	Aux2_A2D_D2A	[4226] 10 bits, right justified	Aux 2 A/D and D/A value
4227 4228 4229 4230	RESERVED (Do NOT Write)			
4231	R	VocRD	([4231] /10) Volts	Last V _{OC} reading

MidNite Solar MODBUS Network Spec. Rev B --- May 23, 2013

Address	R/W	Name	Conversion	Notes
4232				
4233				
4234				
4235				
RESERVED (Do NOT Write)				
4236	R/W	AbsorbTime (duplicate)	[4236] seconds	Absorb Time Counter
4237	R/W	AntiClickSenstvy	[4237]	Best Left Alone (varies)
4238	R/W	SiestaTime	[4238] seconds	Sleep timer (5 minutes max)
4239	R	SiestaAbortVocAdj	([4239] /10) Volts	Volts above last Voc reading to abort Siesta.
4240 4241	R	flagsRD	([4241] << 16) + [4240]	Intrnl Flags See Table 4240-1
RESERVED (Do NOT Write)				
4242				
4243				
4244	R	VbattRegSetPTmpComp	([4244] /10) Volts	Temperature compensated battery regulation target voltage
4245	R/W	VbattNominal	[4245] 12 * 1 thru 10 (120 Max for 250 KS)	Nominal Battery bank voltage (i.e. 12V, 24V, etc)
4246	R/W	EndingAmps	([4246] /10) Amps (Default = 0.0 amps)	Goes to Float below this Batt current if Temp Comp'd Absorb voltage is held
4247	R/W	EndingSoc	SOC to end Absorb	Future SOC use
4248		EndAmpSocMAddress	Modbus address of Ibatt	Future SOC use
4249	R/W	RebulkVolts	([4249] /10) Volts	Rebulks if battery drops below this for > 90 Seconds
4250	R	BattMonVolts	Battery Monitor Volts	Future SOC use
4251	R	BattMonSOC	Battery Monitor SOC	Future SOC use
4252	R	BattMonAmps	Battery Monitor current	Future SOC use
4253	R	BattMonAHefficiency	Battery Monitor A-Hour eff.	Future SOC use
4254	R/W	DayLogCombCatIndex	[4254] (Category << 10) + (-Day Offset & 0x3ff) See information for Daily logs Table 4254-1	
4255	R	LogValueRead	[4255] Requested single logging Cat. data point appears here	
4256	R/W	MinLogCombCatIndex	[4256] (Category << 10) + (-Data Point Offset & 0x3ff) See info. for Recent/Hourly/Minutely logs Table 4256-1	
4257	R/W	RebulkTimerSec	[4257] seconds Set Point	Rebulk interval timer. Cleared if Vbatt >= Rebulk V in Float MPPT

MidNite Solar MODBUS Network Spec. Rev B --- May 23, 2013

4258	RESERVED (Do NOT Write)			
4259				
4260				
4261				
4262				
4263				
4264		Voc_Qualify_Timer_1ms	$(([4265] \ll 16) + [4264])$ msec	Timer (msec) qualifying time till turn on valid (not very useful)
4265				
4266	R	I _{pv} Minus Raw PV negative current from A/D converter	[4266]	1 count = 0.1 amp
4267	RESERVED (Do NOT Write)			
4268				
4269				
4270				
4271	R	RestartTimerms	[4271] Milli Seconds	Count Down Time until Wake Allowed at < 500 ms
4272	R	I _{batt}	$([4272] / 10)$ Amps (peak A)	Battery Current, Unfiltered
4273	RESERVED (Do NOT Write)			
4274				
4275	R	ReasonForResting	[4275] Reason number	Reason Classic went to Rest (See Table 4275-1)
4276	R	Output V _{batt} (peak V)	$([4376] / 10)$ Volts	Battery Voltage Unfiltered
4277	R	Input V _{pv} (peak V)	$([4377] / 10)$ Volts	PV Voltage Unfiltered
4278	RESERVED (Do NOT Write)			
4279	RESERVED (Do NOT Write)			
4280	RESERVED (Do NOT Write)			
4281				
4282	R	PkHoldV _{pv} Stamp	Internal variable for Solar MPPT	
4283	R	V _{pv} TargetRd (temporary)	[4283] /10 V _{pv} input voltage target (MPP voltage)	
4284	R	SwpDeepTimeoutSec	Internal variable for Solar MPPT	

MidNite Solar MODBUS Network Spec. Rev B --- May 23, 2013

Address	R/W	Name	Conversion	Notes
4285	RESERVED (Do NOT Write)			
4286	R/W	LowWatts	[4284] Classic will go to Resting when watts are less than this for > 90 seconds in NON-wind modes unless Insomnia is set	
4287	R/W	WindLowWatts (dflt = 50)	Below this watts for wind, looks for power window	
4288	R/W	WindWindowWattsRef	If wind power wiggles above this, keep running	
4289	R	WindowWattsRO	Delta watts below WindLowWatts that power is wiggling	
4290	R/W	WindTimeOutRef	If power is low for this many seconds, go to Resting (dflt 90)	
4291	R/W	WindTimeOut2Ref	Seconds, Reference default = 1800 (1/2 hour)	
4292	R/W	WindTimeOut	Seconds, Timer. If > WindTimeOutRef , goes to Resting	
4293	R/W	WindTimeOut2	Seconds, Timer. If > WindTimeOut2Ref, goes to Resting	
4294	R	MinVpvTurnOn	Minimum input voltage required to come out of Resting	
4295	R	VpvB4TurnOff	Internal reference of Vpv when going to Resting	
4296	R/W	HydroSwpAmps10Time6	Internal reference for hydro sweep speed	
4297	R/W	EndingAmpsTimerSec	Seconds, Timer for Ending Amps. 60 seconds reference	
4298	R/W	PkAmpsOverLimitHi	Factory calibration. Leave as is	
4299	R/W	PkAmpsOverLimitLo	Factory calibration. Leave as is	
4300	R/W	FactoryVbattOffset	Factory V battery offset calibration. Normally, leave alone.	
4301	R/W	WindPowerTableV +0	WindPowerTableV (stp 1) << 8) + WindPowerTableV(stp0)	
4302	R/W	WindPowerTableV +1	WindPowerTableV (stp 3) << 8) + WindPowerTableV(stp2)	
4303	R/W	WindPowerTableV +2	WindPowerTableV (stp 5) << 8) + WindPowerTableV(stp4)	
4304	R/W	WindPowerTableV +3	WindPowerTableV (stp7) << 8) + WindPowerTableV(stp6)	
4305	R/W	WindPowerTableV +4	WindPowerTableV (stp 9) << 8) + WindPowerTableV(stp8)	
4306	R/W	WindPowerTableV +5	WindPowerTableV (stp11) << 8) + WindPowerTableV(stp10)	
4307	R/W	WindPowerTableV +6	WindPowerTableV (stp13) << 8) + WindPowerTableV(stp12)	
4308	R/W	WindPowerTableV +7	WindPowerTableV (stp15) << 8) + WindPowerTableV(stp14)	
4309	R/W	WindPowerTableI +0	WindPowerTableI (stp 1) << 8) + WindPowerTableI (stp0)	
4310	R/W	WindPowerTableI +1	WindPowerTableI (stp 3) << 8) + WindPowerTableI (stp2)	
4311	R/W	WindPowerTableI +2	WindPowerTableI (stp 5) << 8) + WindPowerTableI (stp4)	
4312	R/W	WindPowerTableI +3	WindPowerTableI (stp7) << 8) + WindPowerTableI (stp6)	
4313	R/W	WindPowerTableI +4	WindPowerTableI (stp 9) << 8) + WindPowerTableI (stp8)	
4314	R/W	WindPowerTableI +5	WindPowerTableI (stp11) << 8) + WindPowerTableI (stp10)	
4315	R/W	WindPowerTableI +6	WindPowerTableI (stp13) << 8) + WindPowerTableI (stp12)	
4316	R/W	WindPowerTableI +7	WindPowerTableI (stp15) << 8) + WindPowerTableI (stp14)	
4317	RESERVED (Do NOT Write)			

MidNite Solar MODBUS Network Spec. Rev B --- May 23, 2013

Address	R/W	Name	Conversion	Notes
4318	R/W	PkAmpsOverTrip	Factory calibration. Leave as is	
4319	R	mngp_revision	Preliminary	Also shows unit is connected
4320	R	mnlp_revision	Preliminary	Also shows unit is connected
4321		RESERVED (Do NOT Write)		
4322				
4323				
4324				
4325		RESERVED		
4326	R/W	ClassicModbusAddr	0 to 255 Classic Modbus Addr	Default address = 10 (ten)
4327	R/W	BatteryTempPassed	Follow-Me temp sensor value	Follow Me
4328	R	iFlagsRO Low	Used for Follow-Me. Reflects neighboring units' charge stage for charge coordination. See Table 4328-1 for relevant bits	
4329	R	iFlagsRO High		
4330	R/W	ModbusControl		Follow Me
4331	R/W	ClassicFmePassedBits		Follow Me
4332	R/W	WindSynchA	Wind power tracking amps	Follow Me
4333	R/W	WindSynchV	Wind power tracking volts	Follow Me
4334	R/W	FollowMePassRef	Follow Me enabled if > 0. Classic Ignores changes for FollowMePassRef times around the communications loop. Should be set to at least number of units in Follow Me loop.	
4335 to 4340 RESERVED				
4341	R	DabtU32Debug01	Data Abort info if Watch Dog reset occurs	
4342	R	DabtU32Debug02		
4343	R	DabtU32Debug03		
4344	R	DabtU32Debug04		
4345 to 4351 RESERVED				
4352	R		Network CRC 16	
4353	R		App. CRC 16	
4354	R/W	ClearLogsCat	Clears various logging values	
4355	R	ClearLogsCounter10ms	Timer for sending 2 nd ClearLogsCat conmand before timeout	
4356	R/W	User Variable 02	General purpose user variable	
4357		NONEXISTENT as of May 2013... the end		

Table 4101-1 Device Type

Name	Value	Description
Classic150	150	Classic 150
Classic200	200	Classic 200
Classic250	250	Classic 250
Classic250 KS	251	Classic 250 with 120 V Battery bank capability (lower current than 250)

Table 4120-1 Battery Charge Stage (HIGH Byte of ComboChargeStage register)

Name	Value	Description
Resting	0	Off , No Power, Waiting for Power Source, Battery V over set point, etc.
Absorb	3	Regulating battery voltage at Equalize Set point
BulkMppt	4	Max Power Point Tracking until Absorb (Bulk Terminate) Voltage reached
Float	5	Battery is FULL and regulating battery voltage at Float Set point
FloatMppt	6	Max Power Point Tracking. Seeking Float set point Voltage
Equalize	7	Regulating battery voltage at Equalize Set point
HyperVoc	10	Input Voltage is above maximum Classic operating Voltage
EqMppt	18	Max Power Point Tracking. Seeking Equalize set point Voltage

Table 4120-2 Classic States (LOWER Byte of ComboChargeStage register)

Name	Value	Description
Internal Resting state 0	0	Resting
Internal state 1,2	1,2	Waking /Starting
Internal state 3,4,6	3,4,6	MPPT or Regulating Voltage

Table 4130-1 Info Flag Bits: READ ONLY (can read single 16 bit Low or High words if wanted)

Flag	Value	Description
Classic Over Temperature	0x00000001	Classic Over Temperature if set
EEPROM error	0x00000002	Classic EEPROM read/write found an error if set
SerialWriteLock	0x00000004	Ethernet modbus register change is locked (password)
Equalize In Progress	0x00000008	Equalize Charge stage Active if set
RESERVED	0x00000010	RESERVED
RESERVED	0x00000020	RESERVED
RESERVED	0x00000040	RESERVED
EQ MPPT	0x00000080	Battery V is less than EQ Voltage (EQ MPPT)
In V is Lower Than Out	0x00000100	Input Voltage (PV) is lower than Vbatt if set
Current Limit	0x00000200	User current limit or internal temperature current limit reached
HyperVoc	0x00000400	Hyper Voc PV input V is above maximum Classic input rating
RESERVED	0x00000800	RESERVED
RESERVED	0x00001000	RESERVED
Battery Temp Sensor Installed	0x00002000	Battery temperature sensor installed if set
Aux1 State On	0x00004000	Aux 1 ON (aux 1 connector has V or relay is closed)
Aux2 State On	0x00008000	Aux 2 ON (aux 2 connector has V present)
GroundFaultF	0x00010000	Ground Fault detected if set
OCP (Over Current Protect)	0x00020000	Hardware Over Current occurred (was DefCon4ErrF)
ArcFaultF	0x00040000	Arc Fault occurred if set
NegBatCurrentF	0x00080000	Negative battery current if set (backfeed out of PV input)
RESERVED	0x00100000	RESERVED
XtraInfo2DisplayF	0x00200000	Extra info is available to display (Shading, etc)
PvPartialShadeF	0x00400000	Partial Shade detected during SOLAR sweep (if enabled)
WatchdogResetF	0x00800000	watchdog reset flag indicator (for debugging)
LowBatteryVF	0x01000000	(VERY low battery) Vbatt is lower than 8.0 Volts
StackumperF	0x02000000	Stack Jumper is NOT installed if set
EqDoneF	0x04000000	EQ Finished. Resets when mode changed or new day
TempCompShortedF	0x08000000	Indication of shorted Temp Comp if set (all fans should come on if this is true)
UN-LockJumperF	0x10000000	UN-Lock Jumper NOT installed if set (If Lock Jumper is installed, Ethernet write protect is bypassed)
XtraJumperF	0x20000000	Extra Jumper is NOT installed if set
InputShortedF	0x40000000	PV input terminals are less than 1.0 volt if set
RESERVED	0x40000000	RESERVED

Table 4160-1 ForceFlagsBits (Write Only) (can write to low or hi 16 bits independently if wanted)

Name	Value	Description
RESERVED	0x00000001	RESERVED (Do NOT Set to 1)
RESERVED	0x00000002	RESERVED (Do NOT Set to 1)
ForceEEpromUpdateWriteF	0x00000004	Write all current settings to internal EEPROM
ForceEEpromInitReadF	0x00000008	Force read of EEPROM (UnDo if a NV register changed and has not been EEPROM Updated yet)
ForceResetInfoFlags	0x00000010	Force ALL Info Flags to zero when set to 1 (Will reset info flags to 0) (or course some may pop back to 1 after resetting if applicable)
ForceFloatF	0x00000020	Force battery charge stage to Float
ForceBulkF	0x00000040	Force new Bulk/Absorb charge stage and reset timers
ForceEqualizeF	0x00000080	Force new Equalize stage
ForceNiteF	0x00000100	Force a new day (saves daily logs, resets daily kW-H)
RESERVED	0x00000200	RESERVED (Do NOT Set to 1)
RESERVED	0x00000400	RESERVED (Do NOT Set to 1)
ForceSweepF	0x00000800	Force a Sweep or re-track (MNGP ENTER does this)
RESERVED	0x00001000	RESERVED (Do NOT Set to 1)
RESERVED	0x00002000	RESERVED (Do NOT Set to 1)
RESERVED	0x00004000	RESERVED (Do NOT Set to 1)
RESERVED	0x00008000	RESERVED (Do NOT Set to 1)
ResetAeqCounts	0x00010000	Re-Load Auto EQ Counter & Retry days from settings
RESERVED	0x00020000	RESERVED (Do NOT Set to 1)
RESERVED	0x00040000	RESERVED (Do NOT Set to 1)
RESERVED	0x00080000	RESERVED (Do NOT Set to 1)
RESERVED	0x00100000	RESERVED (Do NOT Set to 1)
RESERVED	0x00200000	RESERVED (Do NOT Set to 1)
RESERVED	0x00400000	RESERVED (Do NOT Set to 1)
ForceResetFaultsF	0x00800000	Reset all of faults (ArcFault, GndFault etc.)
RESERVED	0x01000000	RESERVED (Do NOT Set to 1)

Table 4164-1 MPPT MODE NOTE: Bit 0 is the ON/OFF (Enable/Disable) Table shows modes as ON Subtract One (1) if showing mode as OFF. Will revert to OFF if mode changed while running.

	Value	Description
PV_Uset	0x0001	U-SET MPPT MODE (includes MPPT ENABLED (On) FLAG i.e. if 0x0000 MPPT mode is OFF)
DYNAMIC	0x0003	Slow Dynamic Solar Tracking (old Solar 1 O & P)
WIND TRACK	0x0005	Wind Track Mode
RESERVED	0x0007	Reserved for future Wind Learn Mode
Legacy P&O	0x0009	Legacy P & O sweep mode
SOLAR	0x000B	Fast SOLAR track (old PV Learn mode)
HYDRO	0x000D	Micro Hydro mode (similar to Legacy P&O)
RESERVED	0x000F	RESERVED

Table 4207-1 LED Mode

Name	Value	Description
All Off	0	No LED activity except on startup
Rick Mode	1	Minimal Activity: MNGP Yellow LED indicates Current Limiting or FET Temperature Limit if plugged into top jack
Blinky	2	All LEDs Active: Lightshow! MNGP Red LED when MNGP->Classic MODBUS is active
LED 1	3	Status Mode: MNGP Green LED = Battery Full (Float) Classic Red LED = Aux 1 Active. Classic Yellow LED = Aux 2 Active Classic Blue LED = Unimplemented
LED 2	4	Comm. test. Flashes LED when modbus transaction

Table 4240-1 Internal Flags bits (Read Only) (flagsRD)

Name	Value	Description
RESERVED	0x00000001	RESERVED
RESERVED	0x00000002	RESERVED
RESERVED	0x00000004	RESERVED
RESERVED	0x00000008	RESERVED
RESERVED	0x00000010	RESERVED
RESERVED	0x00000020	RESERVED
RESERVED	0x00000040	RESERVED
AbsorbTimeRunf	0x00000080	Bulk/Absorb Timer Counting is Enabled
EqTimeRunf	0x00000100	EQualize Timer Run flag
FloatTimeRunf	0x00000200	Float Time accumulate flag
kWhAccumRunf	0x00000400	kiloWatt-hour & Amp-Hour accumulate enabled
RESERVED	0x00000800	RESERVED
AbsorbCountUpf	0x00001000	Absorb Timer is counting UP if set
OK2WriteIVtables	0x00004000	OK to write WindPowerTableV[] & I[]
WindLowflag	0x00008000	Indicates that we turned off because of low power
SweepDwnEnabledf	0x00010000	Slowly Sweeping Down V input
LowLightflag	0x00020000	State 2 detected low light (May not be accurate)
RESERVED	0x00040000	RESERVED
RESERVED	0x00080000	RESERVED
RESERVED	0x00100000	RESERVED
SweepUpEnabledf	0x00200000	Slowly Sweeping UP V input
RESERVED	0x00400000	RESERVED
RESERVED	0x00800000	RESERVED
RESERVED	0x01000000	RESERVED
BattFull	0x02000000	Battery Full, Absorb complete, Float
RESERVED	0x04000000	RESERVED
EqCountUpf	0x08000000	EQ Timer is counting Up
RESERVED	0x10000000	RESERVED
RESERVED	0x20000000	RESERVED
RESERVED	0x40000000	RESERVED
RESERVED	0x80000000	RESERVED

AUX 1 and 2 modes

Extracted and encoded as combined in Aux12Function

Table 4165-1 AUX 1 Off – Auto – On (*Extracted/Encoded as Aux12Function bits 6,7*)

Name	Value	Description
Aux 1 Off	0	Aux 1 output is OFF (0 Volts)
Aux 1 Auto	1	Aux 1 operates as defined in Aux2Funtion
Aux 1 On	2	Aux 1 output is ON (~14 Volts)
Aux 1 Unimplemented	3	Unassigned at present

Aux1OffAutoOn = (((Aux12Function & 0xc0) >> 6));

Table 4165-2 AUX 2 Off – Auto – On (*Extracted/Encoded as Aux12Function bits 14,15*)

Name	Value	Description
Aux 2 Off	0	Aux 2 output is OFF (0 Volts)
Aux 2 Auto	1	Aux 2 operates as defined in Aux2Funtion
Aux 2 On	2	Aux 2 output is ON (~14 Volts)
Aux 2 Unimplemented	3	Unassigned at present

Aux2OffAutoOn = ((Aux12FunctionS & 0xc000) >> 14);

Table 4165-3 AUX 1 Function (Extracted/Encoded as Aux12Function bits 0-5)

Name	Value	Description
DIVERSION SLW+	1	Non-PWM On at Vbatt > Aux1VoltsHiAbs Off at Vbatt < Aux1VoltsLoAbs (Active High)
DIVERSION SLW-	2	Same as DIVERSION SLW+ but Active Low
BAT DIV V REL+	3	Non-PWM On at Vbatt > Aux1VoltsHiAbs Off at Vbatt < Aux1VoltsLoAbs (Active High)
BAT DIV V REL-	4	Non-PWM On at Vbatt > Aux1VoltsHiAbs Off at Vbatt < Aux1VoltsLoAbs (Active Low)
GEN STOP +	5	Active High output when battery is full
GEN STOP -	6	Active Low output when battery is full
PV V TRIGGER +	7	Active High output if Vin exceeds Aux1VoltsHiPv
PV V TRIGGER -	8	Active Low output if Vin exceeds Aux1VoltsHiPv
MANUAL ON-OFF	9	MANUAL On/Off allowed using Off-Auto-On Selection
BULK +	10	Active High Output when Bulk stage is reached
RESTING +	11	Active High output when Resting stage is reached
ERRORS 1 +	12	Active high Output on Error (list TBD)
TOGGLE TEST	13	Out Once per second On-Off-On-Off automatic toggle
NITE LITE HIGH	14	Active High indicating Night Time. Inactive at Wakeup
NITE LITE LOW	15	Active Low indicating Night Time. Inactive at Wakeup
WIND CLIPPER +	16	Output goes Active High when V input is above PV input V plus headroom voltage
FLOAT +	17	Active High when Float stage is reached
FLOAT -	18	Active Low when Float stage is reached
VENT FAN +	19	TBD
VENT FAN -	20	TBD
GFP TRIP	21	

Aux1Function = Aux12Function & 0x3f;

TABLE 4182-1 EnableFlags3 R/W Binary. NOTE: Requires Classic Reset before change effects.

When Classic receives a packet for an address other than itself (example, 10 and 255), it forwards the information out other ports if enabled. Follow-Me normally forwards from Downstream to Upstream and MNGP too Upstream (out the Classic's MASTER jack to its neighbor's SLAVE jack) so these are normally enabled when these bits are equal to 0. Classics will always treat address 255 as if it is for it as well as its set modbus address.

TABLE 4182-1 EnableFlags3 R/W Binary (Default = 0) New Register January 2013

Name	Bit	Description
RESERVED	0x0001	RESERVED (Do NOT Set to 1)
Rem2DwnStrmBus	0x0002	Forward Remote (MNGP) port to Downstream Bus enabled if 1
UpStrmBus2DwnStrmBus	0x0004	Forward Upstream Bus to Downstream Bus enabled if 1
UpStrmBus2RemBus	0x0008	Forward Upstream Bus to remote (MNGP) Bus enabled if 1
DwnStrmBus2RemBus	0x0010	Forward Downstream Bus to Remote (MNGP) Bus enabled if 1
DwnStrm2UpStrmBus	0x0020	Forward Downstream Bus to Upstream Bus enabled if 0
Rem2UpStrmBus	0x0040	Forward Remote (MNGP) Bus to Upstream Bus enabled if 0
ClscAdvertiseDis	0x0080	TCP/IP Advertise on port 4626 every 10 seconds enabled if 0
Reserved	0x0100	Bits 0x0100 to 0x8000 are Reserved (Do NOT Set to 1)

Table 4165-4 AUX 2 Function *(Extracted/Encoded as Aux12Function bits 8-13)*

Name	Value	Description
DIVERT DGTL F+	0	Digital Out PWM Battery Diversion (Active High)
DIVERT DGTL F-	1	Digital Out PWM Battery Diversion (Active Low)
BAT DIV V REL+	2	Digital Out PWM Relative to Charge Stage Voltage Threshold Diversion (Use It Or Lose It) (Active High)
BAT DIV V REL-	3	Digital Out PWM Relative to Charge Stage Voltage Threshold Diversion (Use It Or Lose It) (Active Low)
ANALOG BAT SOC	4	
ERROR 1	5	
TOGGLE TEST	6	Out Once per second On-Off-On-Off automatic toggle
PV IN TRIG +	7	Active High output if Vin exceeds Aux2VoltsHiPv
PV IN TRIG -	8	Active Low output if Vin exceeds Aux2VoltsHiPv
MANUAL ON-OFF	9	MANUAL On/Off allowed using Off-Auto-On Selection
WIND CLIPPER	10	PWM output Active High when V input is above PV input V plus headroom voltage
NITE LITE HIGH	11	Active High indicating Night Time. Inactive at Wakeup
NITE LITE LOW	12	Active Low indicating Night Time. Inactive at Wakeup
FLOAT +	13	Active High output when Float stage is reached
FLOAT -	14	Active Low output when Float stage is reached
Active HIGH (input) turn off	15	> 6.0 volts into Aux 2 forces Classic to resting (15V max)
Active LOW (input) turn off	16	< 2.0 volts into Aux 2 forces Classic to resting (0 V min)
Active HIGH (input) Float	17	> 6.0 volts into Aux 2 forces Classic to Float (15V max)

NOTE: When Aux 2 is used as Input, Maximum input is 15 V, Minimum V is 0 volts
Aux2Function = (Aux12FunctionS & 0x3f00) >> 8; (Digital/Analog Input/Output)

Table 4186-1 EnableFlags2 bits [4186] NOTE: This is a newer Register and has had some bits transferred from Register EnableFlagsBits 4187 starting with revision date 12-1-2013

Name	Value	Description
DCclipperEn	0x0001	Aux 2 Clipper mode runs at lower frequency if 1
RESERVED	0x0002	RESERVED (Do NOT Set to 1)
RESERVED	0x0004	RESERVED (Do NOT Set to 1)
PvPartialShadeEn	0x0008	Partial Shade reporting Enabled when Set to 1
WasteNotPkRespF	0x0010	Aux 1 diverts according to Peak Vbatt if 1, Average Vbattery if 0
BattTempNetEn	0x0020	DefCon3 Error reporting enabled if set to 1
DefCon4ErrEn2	0x0040	LEAVE SET (1)
PwmLowMaxFlag	0x0080	Low Max Enabled if Set to 1 (Low Vin - Vout)
VbatRegSlowFlag	0x0100	Average Vbatt Regulation if 1. Peak V if 0 Dflt = 0
RESERVED	0x0200	RESERVED (Do NOT Set to 1)
BumpWindI	0x0400	When adjusting wind curve, automatically “bumps” adjacent current set points out of the way if set to 1
DivrsnAbsEqTmrEn	0x0800	Enables Absorb & EQ timer counting when Aux1 or Aux2 functions are diverting battery V if set to 1
StayOnWhileZeroEn	0x1000	RESERVED (Do NOT Set to 1)
VpvTargetCmdEn	0x2000	User can adjust Target V in U-Set mode through VpvTargetWr Register when set to 1
LogAtNiteEn	0x4000	Enable Hourly/Fast data logging while resting if 1
WindSynchEnF	0x8000	Wind Synch Follow-Me enabled if 1

Table 4187-1 EnableFlagsBits [4187] NOTE: Some EnableFlagsBits moved to EnableFlags2 in release version 12-1-2012 for Classic Lite and MNLP Compatibility

Name	Value	Description
GroundFaultEn	0x0001	Ground Fault Protection Enabled when Set to 1
ArcFaultEn	0x0002	Arc Fault Protection Enabled when Set to 1
RESERVED	0x0004	RESERVED (Do NOT Set to 1)
RESERVED	0x0008	MOVED to EnableFlags2 0x0008
RESERVED	0x0010	RESERVED (Do NOT Set to 1)
RESERVED	0x0020	RESERVED (Do NOT Set to 1)
DefCon4ErrEn (OCP)	0x0040	Over Current Protection enabled (LEAVE as 1)
RESERVED	0x0080	MOVED to EnableFlags2 0x0080
RESERVED	0x0100	RESERVED (Do NOT Set to 1)
RESERVED	0x0200	RESERVED (Do NOT Set to 1)
RESERVED	0x0400	MOVED to EnableFlags2 0x0400
RESERVED	0x0800	MOVED to EnableFlags2 0x0800
RESERVED	0x1000	RESERVED (Do NOT Set to 1)
RESERVED	0x2000	RESERVED (Do NOT Set to 1)
RESERVED	0x4000	RESERVED (Do NOT Set to 1)
RESERVED	0x8000	RESERVED (Do NOT Set to 1)

Table 4214-1 Consolidated Time Registers 0 (write only to set Classic Time -- Normally, MNGP will set these registers from its battery backed RTC)

Name	Value	Description
BITS 5:0	0 to 59	Seconds Seconds value in the range of 0 to 59
BITS 5:0	RESERVED	RESERVED (Do NOT write ones to these bits)
BITS 13:8	0 to 59	Minutes value in the range of 0 to 59
BITS 15:14	RESERVED	RESERVED (Do NOT write ones to these bits)
BITS 20:16	0 to 23	Hours value in the range of 0 to 23
BITS 23:21	RESERVED	RESERVED (Do NOT write ones to these bits)
BITS 36:24	0 to 6	Day Of Week Day of week value in the range of 0 to 6
BITS 31:27	RESERVED	RESERVED (Do NOT write ones to these bits)

Table 4216-1 Consolidated Time Registers 1 (write only to set Classic Time -- Normally, MNGP will set these registers from its battery backed RTC)

Name	Value	Description
BITS 4:0	1 to 28, 29, 39, 31	Day of month value in the range of 1 to 28, 29, 30, or 31(depending on the month and whether it is a leap year)
BITS 7:5	RESERVED	RESERVED (Do NOT write ones to these bits)
BITS 11:8	1 to 12	Month value in the range of 1 to 12
BITS 15:12	RESERVED	RESERVED (Do NOT write ones to these bits)
BITS 27:16	0 to 4095	Year value in the range of 0 to 4095
BITS 31:28	RESERVED	RESERVED (Do NOT write ones to these bits)

Table 4218-1 Consolidated Time Register 2 (write only to set Classic Time -- Normally, MNGP will set these registers from its battery backed RTC)

Name	Value	Description
BITS 11:0	1 to 366 *	Day of year value in the range of 1 to 365 * (366 for leap years)
BITS 31:12	RESERVED	RESERVED (Do NOT write ones to these bits)

Table 4221-1 Remote (MNGP) Buttons Pressed NOTE: MNGP buttons are sent to Classic when MNGP is in its Main status screen to change some parameters.

Name	Value	Description
ENTER_key	0x0010	This key forces a sweep from MNGP's main status screen
MAINMENU_key	0x0020	
STATUSMENU_key	0x0040	
SOFTR_key	0x0200	Raises MPP V in modes except Wind Track from MNGP
SOFTL_key	0x0400	Lowers MPP V in modes except Wind Track
RIGHT_key	0x0080	
LEFT_key	0x0100	
DWN_key	0x0800	
UP_key	0x1000	

Table 4254-1 DayLogCombCatIndex (Daily Logs Combined Category and day Index)

Daily Log Category = (DayLogCombCatIndex & 0xFC00) >> 10	Type of log value requested
Daily Log Index = DayLogCombCatIndex & 0x03ff	Days before today requested

Category	Value	Description
0	kW-Hours	kW-Hours /10
1	Amp-Hours	Amp-Hours
2	Float Time	Float Time, Seconds
3	Time Stamp, Low	Month = TimeStampLow & 0x0F Day of Month = (TimeStampLow & 0x01F0) >> 4 Year = ((TimeStampLow & 0xFE00) >> 9) + 2000
4	High Power, Watts	Battery Watts
5	High Temp, deg. C	FET Temperature, Degrees C /10
6	Time Stamp, High	Minute = TimeStampHigh & 0x3F Hour = (TimeStampHigh & 0x07C0) >> 6
7	High V PV	Daily High PV Voltage /10
8	High V Battery	Daily High Battery Voltage /10
9	Low V Battery	Future Low Vbatt. Not implemented yet.

Table 4256-1 MinLogCombCatIndex (Minute Logs Combined Category and data point Index)

Minute Log Category = (MinLogCombCatIndex & 0xFC00) >> 10	Type of log value requested
Minute Log Index = MinLogCombCatIndex & 0x03ff	Data point before now requested

Category	Value	Description
0	Output Power, Watts	
1	PV Input Voltage	Vpv /10
2	Battery Voltage	Vbatt /10
3	Time Stamp, Low	Month = TimeStampLow & 0x0F Day of Month = (TimeStampLow & 0x01F0) >> 4 Year = ((TimeStampLow & 0xFE00) >> 9) + 2000
4	Time Stamp, High	Minute = TimeStampHigh & 0x3F Hour = (TimeStampHigh & 0x07C0) >> 6
5	Charge Stage	See Table 4120-1 for charge stages at current time stamp
6	Output Current, Amps	Amps /10
7	kW-Hours	kW-Hours /10

LogValueRead [4255] is updated with the value requested from **DayLogCombCatIndex** or **MinLogCombCatIndex**, whichever changed more recently.

(Daily and Minutely/Hourly/Recent logs can also be read via file transfer... Coming up...)

Table 4275-1 Reason For Resting

VALUE	REASON FOR RESTING
1	Anti-Click. Not enough power available (Wake Up)
2	Insane Ibatt Measurement (Wake Up)
3	Negative Current (load on PV input ?) (Wake Up)
4	PV Input Voltage lower than Battery V (Vreg state)
5	Too low of power out and Vbatt below set point for > 90 seconds
6	FET temperature too high (Cover is on maybe ?)
7	Ground Fault Detected
8	Arc Fault Detected
9	Too much negative current while operating (backfeed from battery out of PV input)
10	Battery is less than 8.0 Volts
11	PV input is available but V is rising too slowly. Low Light or bad connection (Solar mode)
12	Voc has gone down from last Voc or low light. Re-check (Solar mode)
13	Voc has gone up from last Voc enough to be suspicious. Re-check (Solar mode)
14	Same as 11
15	Same as 12
16	Mppt MODE is OFF (Usually because user turned it off)
17	PV input is higher than operation range (too high for 150V Classic)
18	PV input is higher than operation range (too high for 200V Classic)
19	PV input is higher than operation range (too high for 250V or 250KS)
22	Average Battery Voltage is too high above set point
25	Battery Voltage too high of Overshoot (small battery or bad cable ?)
26	Mode changed while running OR Vabsorb raised more than 10.0 Volts at once OR Nominal Vbatt changed by modbus command AND MpptMode was ON when changed
27	bridge center == 1023 (R132 might have been stuffed) This turns MPPT Mode to OFF
28	NOT Resting but RELAY is not engaged for some reason
29	ON/OFF stays off because WIND GRAPH is illegal (current step is set for > 100 amps)
30	PkAmpsOverLimit... Software detected too high of PEAK output current
31	AD1CH.IbattMinus > 900 Peak negative battery current > 90.0 amps (Classic 250)
32	Aux 2 input commanded Classic off. for HI or LO (Aux2Function == 15 or 16)
33	OCF in a mode other than Solar or PV-User
34	AD1CH.IbattMinus > 900 Peak negative battery current > 90.0 amps (Classic 150, 200)

Table 4328-1 iFlagsRO for Follow Me:

Equalize	BIT	0x00000040
Bulk/Absorb	BIT	0x00000080
Float	BIT	0x00000200

MidNite Solar MODBUS Network Spec. Rev B --- May 23, 2013

The network registers are all Read/Write. You may write any values to these registers, however this may result in erratic operation in some instances.

To set A static IP address, be sure to clear the DHCP bit in register 20481 before writing the static values to the

Network			
Address	Name	Units	Description
20481	IP Settings	[20481]	Network Settings Flags. See Table 20481-1
20482 20483	IP Address	[20483] _{MSB} . [20483] _{LSB} . [20482] _{MSB} . [20482] _{LSB}	The IP address of the Classic [†]
20484 20485	Gateway Address	[20485] _{MSB} . [20485] _{LSB} . [20484] _{MSB} . [20484] _{LSB}	Network Gateway Address. [†]
20486 20487	Subnet	[20487] _{MSB} . [20487] _{LSB} . [20486] _{MSB} . [20486] _{LSB}	Network Subnet Mask [†]
20488 20489	DNS_1	[20489] _{MSB} . [20489] _{LSB} . [20488] _{MSB} . [20488] _{LSB}	Primary DNS Address [†]
20490 20491	DNS_2	[20491] _{MSB} . [20491] _{LSB} . [20490] _{MSB} . [20490] _{LSB}	Secondary/Alternate DNS Address [†]
[†] Read Only if the DHCP flag is set. To assign a static IP to the Classic, first clear the DHCP flag in the IP Settings Register (20481).			

Table 20481-1

Name	Value	Description
DHCP	0x0001	Set this bit to enable DHCP.
Web Access	0x0002	Set this bit to enable online access to your Classic through http://www.mymidnite.com

MidNite Solar MODBUS Network Spec. Rev B --- May 23, 2013

The Version Registers are all Read Only. Writes to any of these registers will have no long-term effect.

Version			
Address	Name	units	Description
16385	app_version	Major: [16385](15...12) Minor: [16385](11...8) Release: [16385](8..4)	Release version of the application code
16386	net_version,	Major: [16386](15...12) Minor: [16386](11...8) Release: [16386](8...4)	Release version of the communications stack
16387 16388	app_rev	([16388] << 16) + [16387]	Build Revision of the application code
16389 16390	net_rev	([16390] << 16) + [16389]	Build Revision of the communications code stack
28673 28674	R Classic serial number	([28673] << 16) + [28674]	Read Classic's serial number over RS-232 Serial number is NOT readable over Ethernet TCP/IP. Lock jumper on Classic disables necessity of this for password (Int 32)
28673 28674	W Unlock the Classic for writing		Write the Classic's serial number over Ethernet to unlock writing of modbus registers over Ethernet. Setting this will last until the TCP/IP connection is dropped Example: the serial number is: 0x12345678 (hex) 0x7001 = MSB(Serial number) [0x1234] 0x7002 = LSB(serial number) [0x5678]

MidNite Solar MODBUS Network Spec. Rev B --- May 23, 2013

Communication Statistics are all Read/Write registers. You may write any value to these registers which will be incremented should the trigger for that counter occur. The most useful type of write may be to periodically reset the counters to zero. These are all lifetime counters and due to the number of MODBUS transactions may overflow to 0.

Communication Statistics			
Address	Name	units	Description
Master / In Bus Interface			
10001 10002	rx_ok	([10002] << 16) + [10001]	Number of correctly received packets
10003 10004	rx_crc_err	([10004] << 16) + [10003]	Number of packets received with crc errors
10005 10006	requested_ok	([10006] << 16) + [10005]	Number of transactions originating from this unit that completed successfully
10007 10008	requested_err	([10008] << 16) + [10007]	Number of transactions originating from this unit that failed
10009 10010	forwarded	([10010] << 16) + [10009]	Number of packets forwarded through this interface
10011 10012	broadcast	([10012] << 16) + [10011]	Number of broadcast packets received
10013 10014	dropped_busy	([10014] << 16) + (10013)	Number of packets dropped due to the interface being busy.
10015 10016	RESERVED		
Slave / Out bus interface			
10017 10018	rx_ok	([10018] << 16) + [10007]	Number of correctly received packets
10019 10020	rx_crc_err	([10020] << 16) + [10020]	Number of packets received with crc errors
10021 10022	requested_ok	([10022] << 16) + [10021]	Number of transactions originating from this unit that completed successfully
10023 10024	requested_err	([10024] << 16) + [10023]	Number of transactions originating from this unit that failed
10025 10026	forwarded	([10026] << 16) + [10025]	Number of packets forwarded through this interface
10027 10028	broadcast	([10028] << 16) + [10027]	Number of broadcast packets received
10029 10030	dropped_busy	([10030] << 16) + [10029]	Number of packets dropped due to the interface being busy.
10031 10032	RESERVED		

Communication Statistics			
Remote bus interface			
10033 10034	rx_ok	$([10034] \ll 16) + [10033]$	Number of correctly received packets
10035 10036	rx_crc_err	$([10036] \ll 16) + [10035]$	Number of packets received with crc errors
10037 10038	requested_ok	$([10038] \ll 16) + [10037]$	Number of transactions originating from this unit that completed successfully
10039 10040	requested_err	$([10040] \ll 16) + [10039]$	Number of transactions originating from this unit that failed
10041 10042	forwarded	$([10042] \ll 16) + [10041]$	Number of packets forwarded through this interface
10043 10044	broadcast	$([10044] \ll 16) + [10043]$	Number of broadcast packets received
10045 10046	dropped_busy	$([10046] \ll 16) + [10045]$	Number of packets dropped due to the interface being busy.
10047 10048	RESERVED		
TCP bus interface			
10049 10050	rx_ok	$([10050] \ll 16) + [10049]$	Number of correctly received packets
10051 10052	rx_crc_err	$([10052] \ll 16) + [10051]$	Number of packets received with crc errors
10053 10054	requested_ok	$([10054] \ll 16) + [10053]$	Number of transactions originating from this unit that completed successfully
10055 10056	requested_err	$([10056] \ll 16) + [10055]$	Number of transactions originating from this unit that failed
10057 10058	forwarded	$([10058] \ll 16) + [10057]$	Number of packets forwarded through this interface
10059 10060	broadcast	$([10060] \ll 16) + [10059]$	Number of broadcast packets received
10061 10062	dropped_busy	$([10062] \ll 16) + [10061]$	Number of packets dropped due to the interface being busy.
10063 10064	RESERVED		

Reserved			
Address	Name	units	Description
61441-61442	Reserved		Reserved

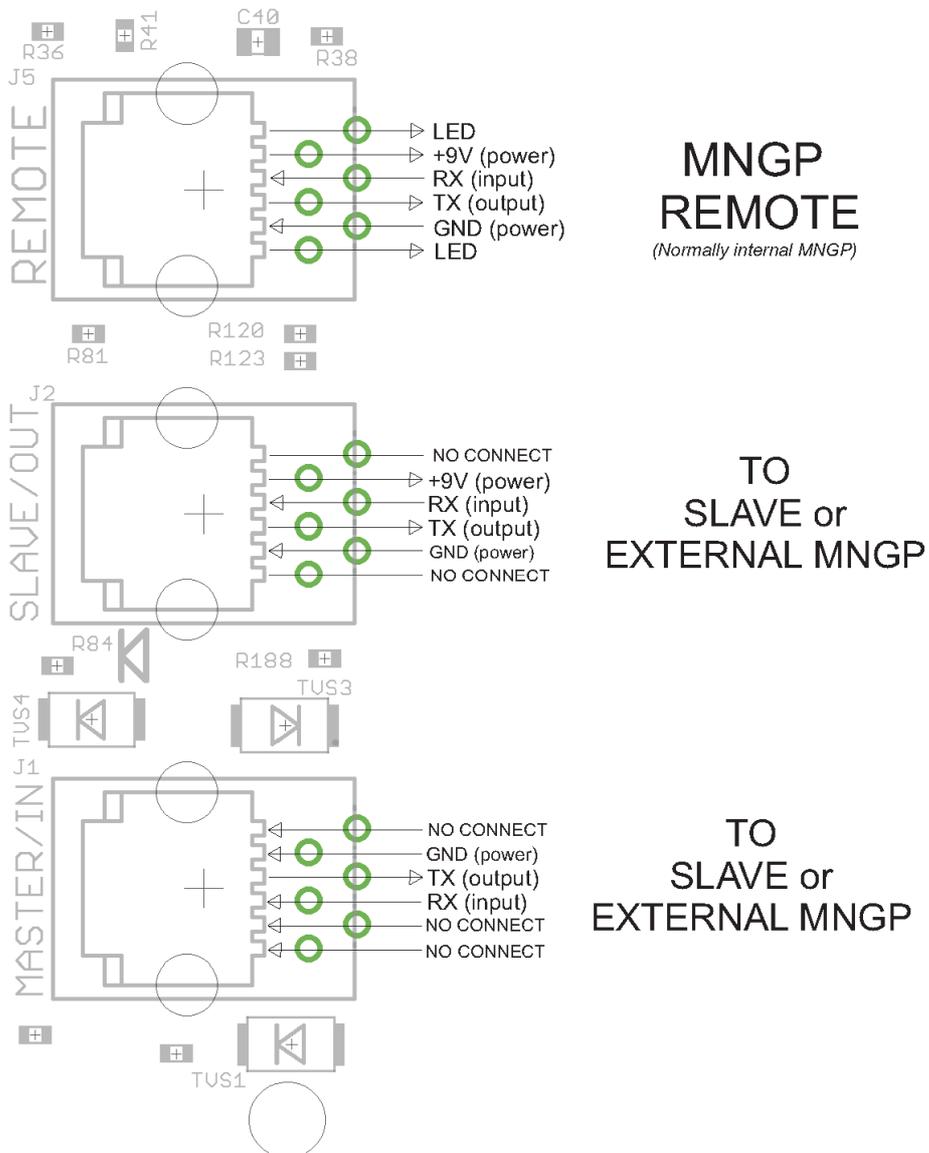


Figure 1. Classic RS-232 MODBUS RJ-11 PHONE JACK PINOUTS (Top View)