

Light Controller Board Checkout Form

Serial Number: 4

Part Number: 100221096rA **Manufacture Date:** April 2016

Electrical Engineer: Chad Kecz

Software Engineer: Eric Martin

Power Stage

Conditions: 24VDC on J2 and an isolated 24V on J13

☒ Logic 3.3V TP2 (3.31V)

☒ External +5VDC U7-3 (5.01V)

☒ External +3.3VDC U6-1 (3.3V)

☒ Logic +5V U29-13 (5.4V)

☒ Logic -5V U29-14 (-5.2V)

☒ Isolated +5VDC U28-13 (5.2V)

☒ Isolated -5VDC U28-14 (5.2V)

Logic Ground TP3

External Ground TP4

Iso Ground U28-12

Modbus Address

Validate the truth table for DIP SW2 below:

Modbus Address	DIPSW1	DIPSW2
1	OFF	OFF
2	ON	OFF
3	OFF	ON
4	ON	ON

☒ Modbus Address (SW2) ☒ Modbus Address set to 1

Coil Outputs

Test using debug console, modbus coil writes, and modbus coil register writes.

☒ Isolated Power 0 J14-1 (ISOPWR_CNTL_0 | Coil Address 0x01)

☒ Isolated Power 1 J15-1 (ISOPWR_CNTL_1 | Coil Address 0x02)

☒ Isolated Power 2 J16-1 (ISOPWR_CNTL_2 | Coil Address 0x03)

☒ Isolated Power 3 J17-1 (ISOPWR_CNTL_3 | Coil Address 0x04)

- [x] Isolated Power 4 J18-1 (ISOPWR_CNTL_4 | Coil Address 0x05)
- [x] Isolated Power 5 J19-1 (ISOPWR_CNTL_5 | Coil Address 0x06)
- [x] Ext. Instrument Power 0 J3-1 (INSTR_CNTL_0 | Coil Address 0x07)
- [x] Ext. Instrument Power 1 J6-1 (INSTR_CNTL_1 | Coil Address 0x08)
- [NI] Digital Output 0 (DIGITAL_OUT_0 | Coil Address 0x09)
- [NI] Digital Output 1 (DIGITAL_OUT_1 | Coil Address 0x0A)
- [x] Ground Fault Low Test K1-1 (GF_CNTL_LOW | Coil Address 0x0B)
- [x] Ground Fault High Test K2-1 (GF_CNTL_HIGH | Coil Address 0x0C)
- [x] Control Debug State (BLINKY_DEBUG | Coil Address 0x0D)
- [x] Control Test LED D2 (BLINKY_DEBUG | Coil Address 0x0E)
- [x] Vicor Control J7-1 (VICOR_CNTL | Coil Address 0x10)

Analog Outputs

Test all channels for full range output. Set holding registers at 0x0000 and 0xFFFF.

- [x] LED Dimmer Output 0 J14-3 (LED_DAC_0 | Holding Reg 0x200)
- [x] LED Dimmer Output 1 J15-3 (LED_DAC_1 | Holding Reg 0x201)
- [x] LED Dimmer Output 2 J16-3 (LED_DAC_2 | Holding Reg 0x202)
- [x] LED Dimmer Output 3 J17-3 (LED_DAC_3 | Holding Reg 0x203)
- [x] LED Dimmer Output 4 J18-3 (LED_DAC_4 | Holding Reg 0x204)
- [x] LED Dimmer Output 5 J19-3 (LED_DAC_5 | Holding Reg 0x205)

Water Alarm Test

Short pins on J21 or J22 to create a fault. Then turn coil 16 on to clear.

- [x] Water Sense Alarm (H2O_ALARM | Discrete Address 0x05)
- [x] Clear Water Alarm (H2O_ALARM_CLR | Coil Address 0x0F)

Ground Fault Test

Create a fault writing to coils GF_CNTL_LOW/HIGH. Create a physical fault by shorting J20-2 to either J20-1 or TP4. Measure output on input register 0x06.

- [x] High Side Fault
- [x] No Fault Condition
- [x] Low Side Fault

Fault Type	Fault (uA)	AnalogCounts
High	-1000	89
None (Mid)	0	524
Low	1000	936

[x] **Calibration:** $\text{Fault}(\mu\text{A}) = (2.36 * \text{ACounts}) - 1218$

Temp Sensor Analog Input

Just calibrate the channel for input voltage accross U30-3 (GND) and U30-2 (VOUT).

[x] Vout=0.500 | ACounts=170

Vout=1.500 | ACounts=511

Vout=2.998 | ACounts=1022

[x] **Calibration:** $\text{Temp (C)} = ((0.0029 * \text{ACounts}) - 0.248) / 0.028$

Communications

Modbus IO

Initially Set to 19200 8N2.

[x] RS232 on J10 (JP3 Installed [x])

[x] RS485 on J11 (JP3 Removed [x])

Auxillary Serial Ports

Both set to 9600 8N1

[x] RS232 on J8 (*Fully Implemented // CONSOLE on 5 sequential "U"s*)

[x] RS232 on J9 (*Fully Implemented*)

Final Notes

This board has the following issues red-lined for revision 2:

- J20-3 was connected to the wrong net, it should be on GND_ISO.
- Original BOM ordered the *AD5676*, not the *AD5676R*.
- Future Inputs Are Not Tested (DIN0, DIN1, CN0, CN1)
- Some analog input and output channels were not routed, so they haven't been tested.

CERTIFIED BY: Eric Martin

DATE: Tuesday, April 26th, 2016