# Light Controller Board Checkout Form

**Serial Number:** 5
**Part Number:** 100221096rA **Manufacture Date:** April 2016

**Electrical Engineer:** Chad Kecy
**Software Engineer:** Eric Martin

## Power Stage

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

[x] Logic 3.3V TP2 (3.31V)
[x] External +5VDC U7-3 (5.01V)
[x] External +3.3VDC U6-1 (3.32V)
[x] Logic +5V U29-13 (5.2V)
[x] Logic -5V U29-14 (-5.3V)
[x] Isolated +5VDC U28-13 (5.2V)
[x] 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 |

[x] Modbus Address (`SW2`)
[x] Modbus Address set to `1`

## Coil Outputs

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

[x] Isolated Power 0 J14-1 (`ISOPWR_CNTL_0` | `Coil Address 0x01`)
[x] Isolated Power 1 J15-1 (`ISOPWR_CNTL_1` | `Coil Address 0x02`)
[x] Isolated Power 2 J16-1 (`ISOPWR_CNTL_2` | `Coil Address 0x03`)

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

| Fault Type | Fault (uA) | AnalogCounts |
|---|---|---|
| High | -1000 | 80 |
| None (Mid) | 0 | 503 |

| Fault Type | Fault (uA) | AnalogCounts |
|---|---|---|
| Low | 1000 | 937 |

[x] **Calibration:** `Fault(uA) = (2.33 * Acounts) - 1182`

## Temp Sensor Analog Input

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

[o] Vout=0.500 | ACounts=170
Vout=1.500 | ACounts=511
Vout=2.998 | ACounts=1022

[x] **Calibration:** `Temp (C) = ((0.0029 * 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.

- At present there is no stored config on the PIC, so baud rates are fixed.

**CERTIFIED BY:** Eric Martin
**DATE:** Monday, March 14th, 2016