Functional Test Record

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Readback Function

Procedure:

1. Use ReadBarOnly to sample the input once per second.
2. Set the knob to mid value

Criteria:

1. Do changes under each eye produce the correct change in the raw byte? **YES**
2. Do the vector readbacks match the silkscreen polarity/axis? **YES**

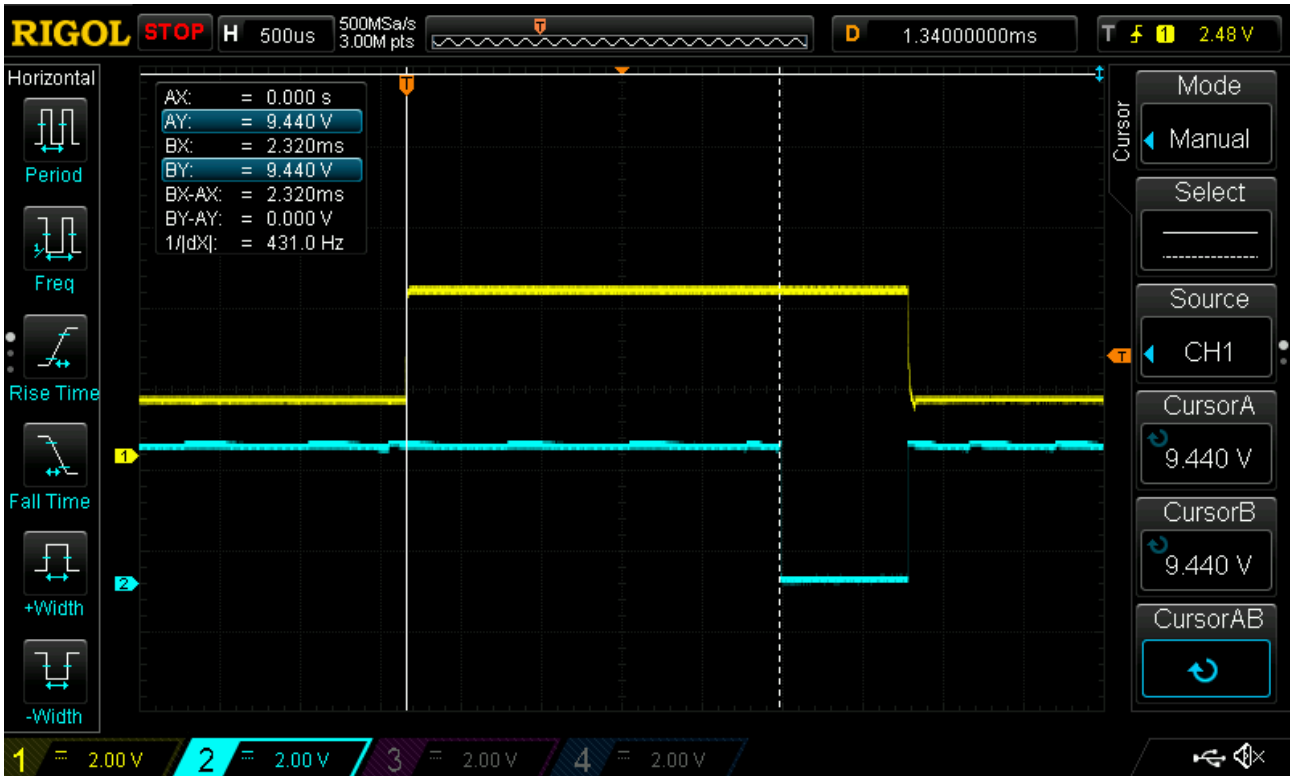
Light Control Function

Procedure:

1. Attach a scope to LED_BIAS and FBLEDEN.
2. Run ReadBarOnly
3. Capture a read operation

Criteria:

1. Does the LED_BIAS pulse during read? **YES**
2. Does the FBLEDEN pulse 2ms after LED_BIAS? **YES**
3. Do they cutoff together? **YES**



Addressing

Procedure:

1. Test the default configuration
2. Change the solder jumpers
3. Change the sketch to match the new configuration
4. Test the new configuration
5. Do for all 4 configurations

Criteria:

1. Did the code address values match the jumper silkscreen addresses? **YES**
2. Does the silkscreen box agree with the jumper silkscreen? **NO**

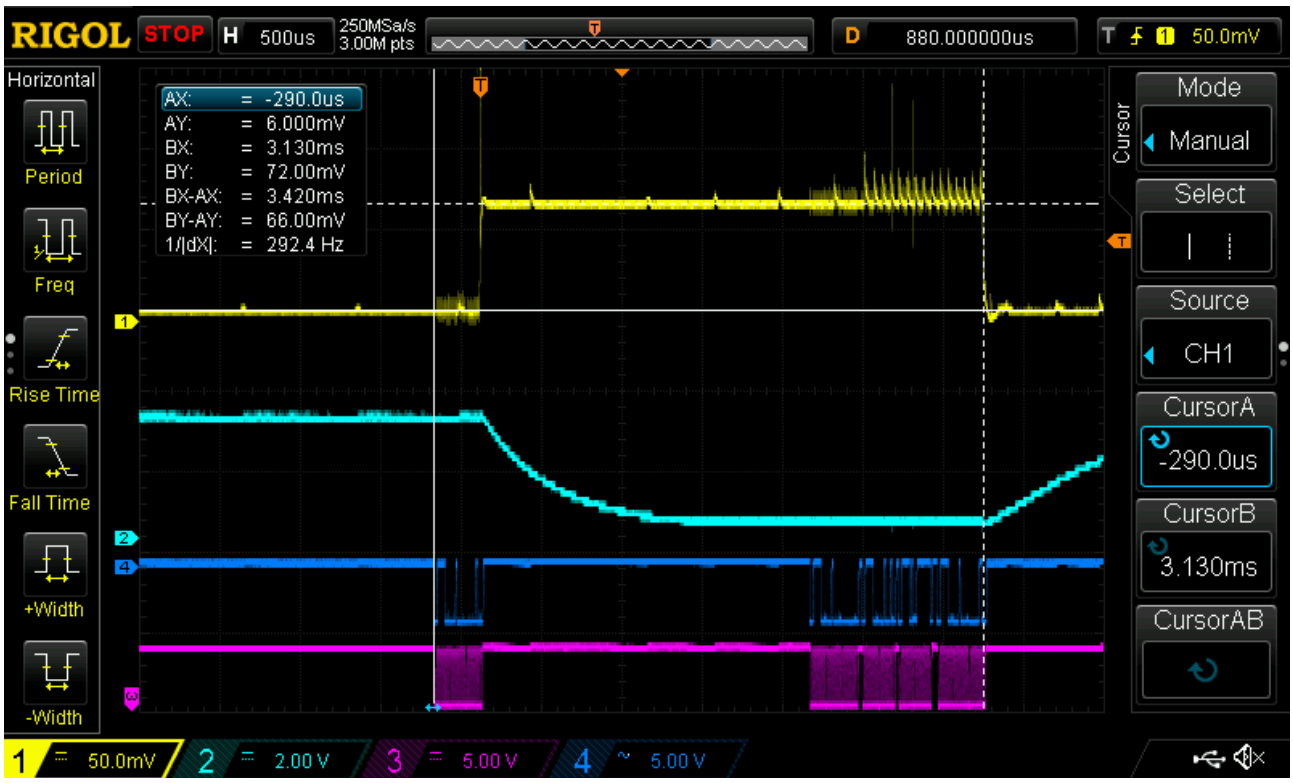
Power Consumption

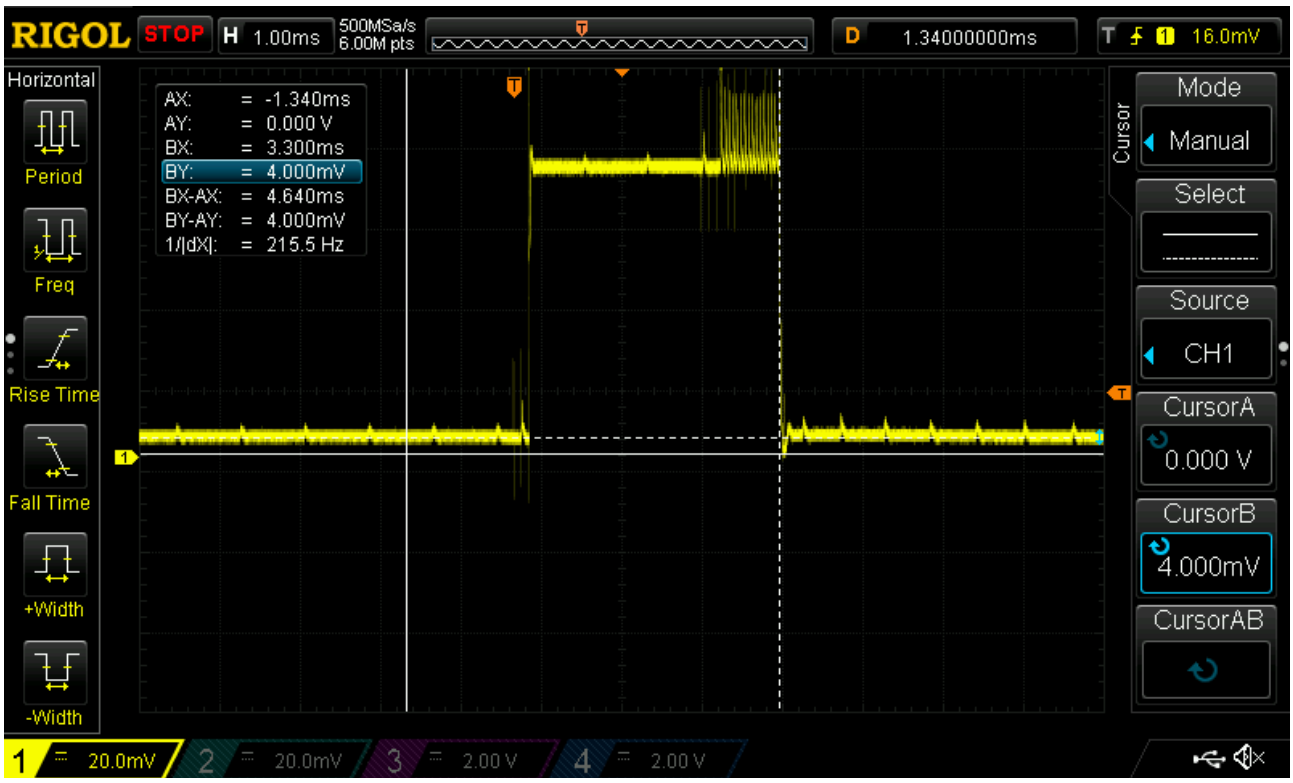
Procedure:

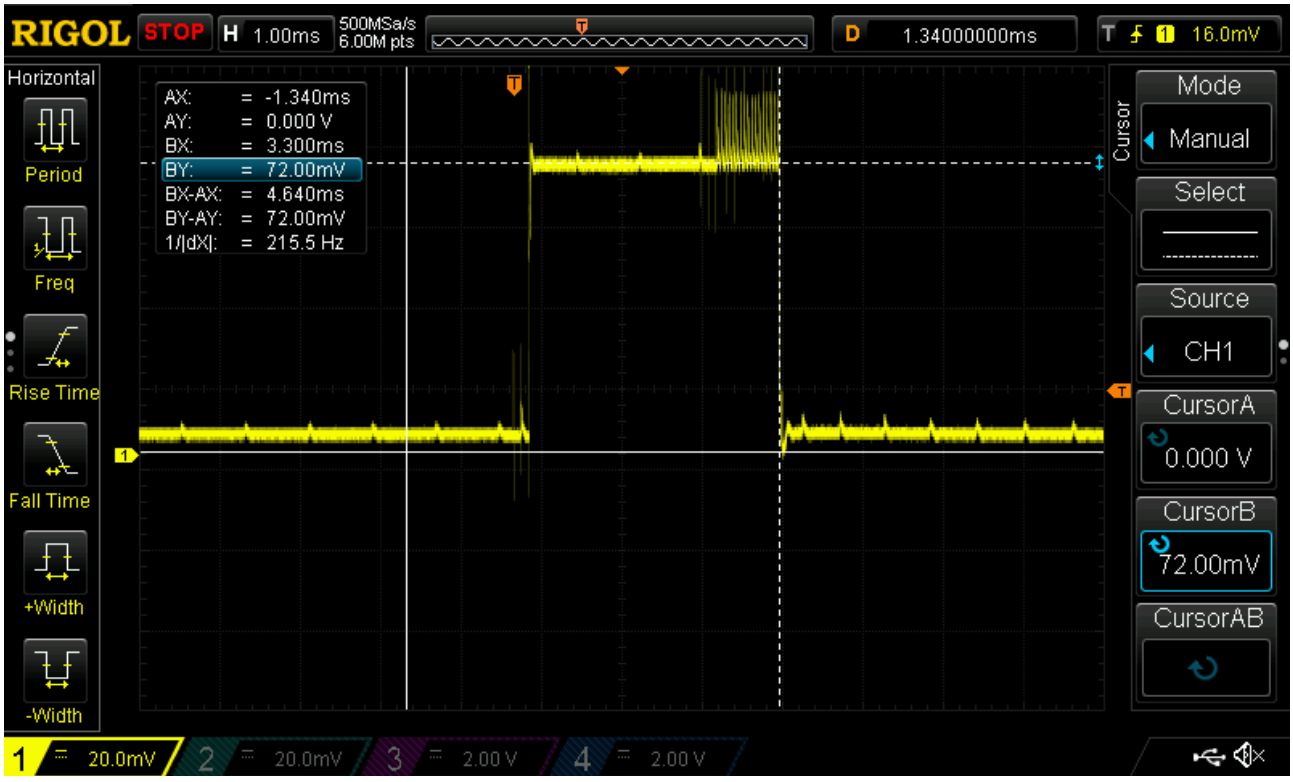
1. Connect an inline resistor of 0.1 to 0.5 ohm in the ground return path of the sensor bar
2. Record resistor value: **0.33 ohms**
3. Power the redbot from 6.0 volts
4. Attach a scope across the resistor
5. Run ReadBarOnly
6. Set knob to max
7. Capture a read pulse
8. Record the quiescent voltage: **0.004 V**
9. Record the peak voltagae: **0.072 V**
10. Capture the scope view
11. Set knob to 1/2
12. Record the peak voltage: **0.042 V**
13. Capture the scope view
14. Set knob to min
15. Record the peak voltagae: **0.004 V**
16. Capture the scope view

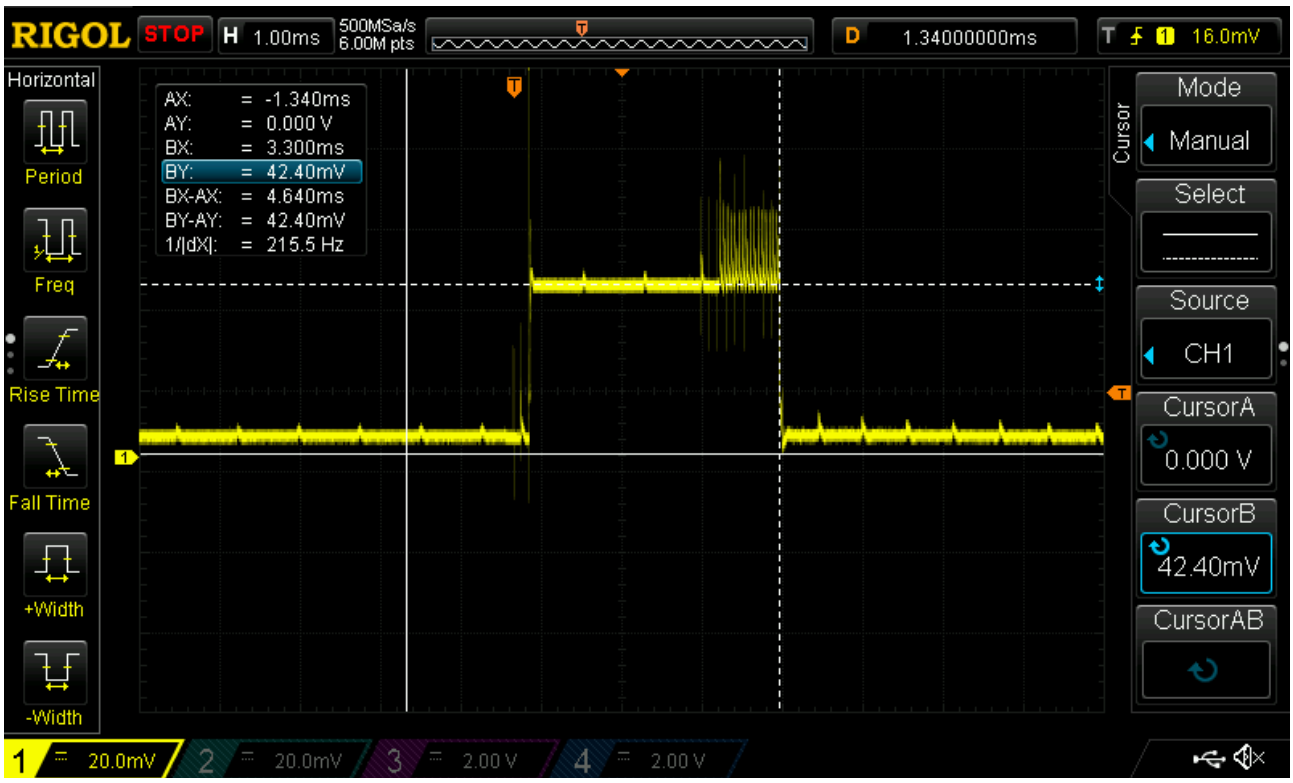
Criteria:

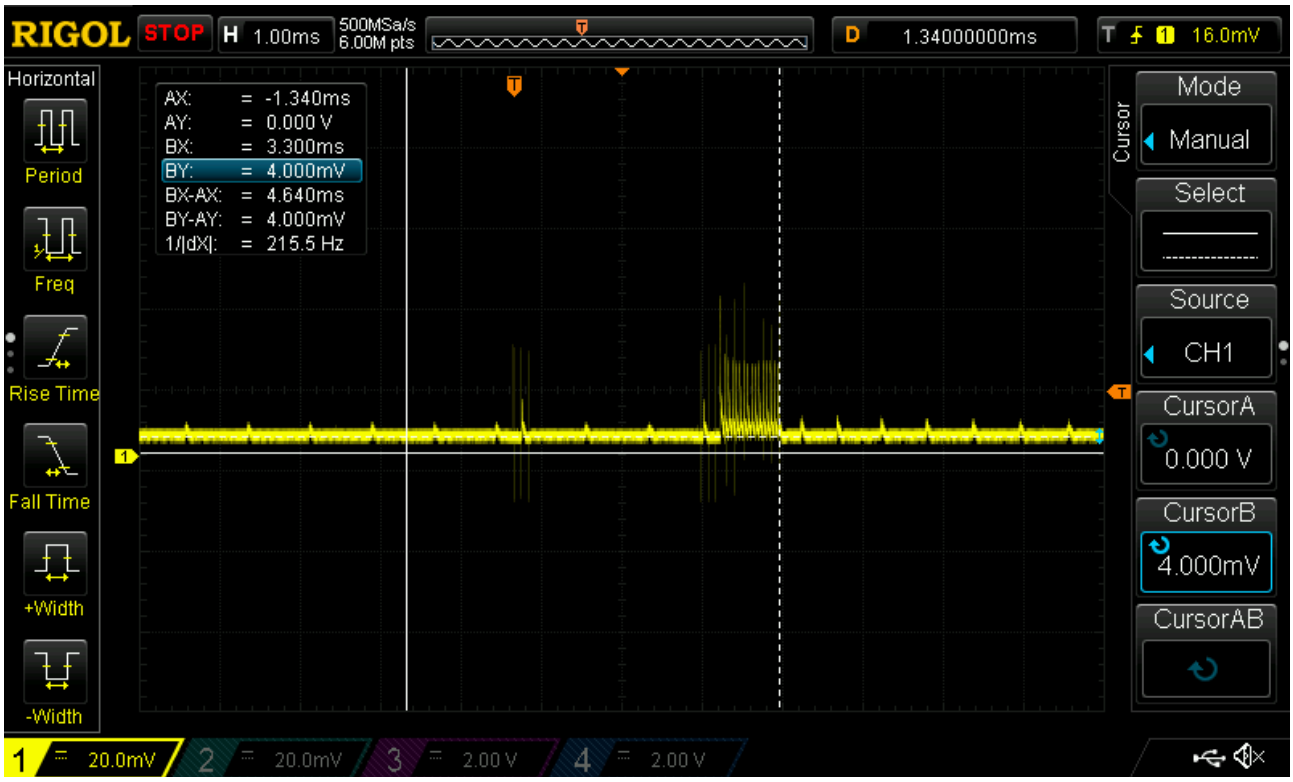
1. Does the current jump up as a step function?: **YES**
2. Is the quiescent current 10mA +/- 20%? Calculate it: **12.1mA**
3. Is max peak current 200mA +/- 20%? Calculate it: **218mA**
4. Is mid peak current about 1/2 max? Calculate it: **127mA**
5. Is the min peak current same as quiescent? **YES**


RIGOL
STOP
H 500us
250MSa/s
3.00M pts
D 880.000000us
T 1 50.0mV
Horizontal
Period
Freq
Rise Time
Fall Time
+Width
-Width
AX: = -290.0us
AY: = 6.000mV
BX: = 3.130ms
BY: = 72.00mV
BX-AX: = 3.420ms
BY-AY: = 66.00mV
1/|dX|: = 292.4 Hz
Cursor
Mode
Manual
Select
Source
CH1
CursorA
-290.0us
CursorB
3.130ms
CursorAB
1 50.0mV
2 2.00 V
3 5.00 V
4 5.00 V


RIGOL
STOP
H 1.00ms
500MSa/s
6.00M pts
D 1.34000000ms
T 1 16.0mV
Horizontal
Period
Freq
Rise Time
Fall Time
+Width
-Width
AX: = -1.340ms
AY: = 0.000 V
BX: = 3.300ms
BY: = 4.000mV
BX-AX: = 4.640ms
BY-AY: = 4.000mV
1/|dX|: = 215.5 Hz
Cursor
Mode
Manual
Select
Source
CH1
CursorA
0.000 V
CursorB
4.000mV
CursorAB
1 20.0mV
2 20.0mV
3 2.00 V
4 2.00 V


RIGOL
STOP
H 1.00ms
500MSa/s
6.00M pts
D 1.34000000ms
T 1 16.0mV
Horizontal
Period
Freq
Rise Time
Fall Time
+Width
-Width
AX: = -1.340ms
AY: = 0.000 V
BX: = 3.300ms
BY: = 72.00mV
BX-AX: = 4.640ms
BY-AY: = 72.00mV
1/|dX|: = 215.5 Hz
Cursor
Mode
Manual
Select
Source
CH1
CursorA
0.000 V
CursorB
72.00mV
CursorAB
1 20.0mV
2 20.0mV
3 2.00 V
4 2.00 V





I2C Signal Integrity

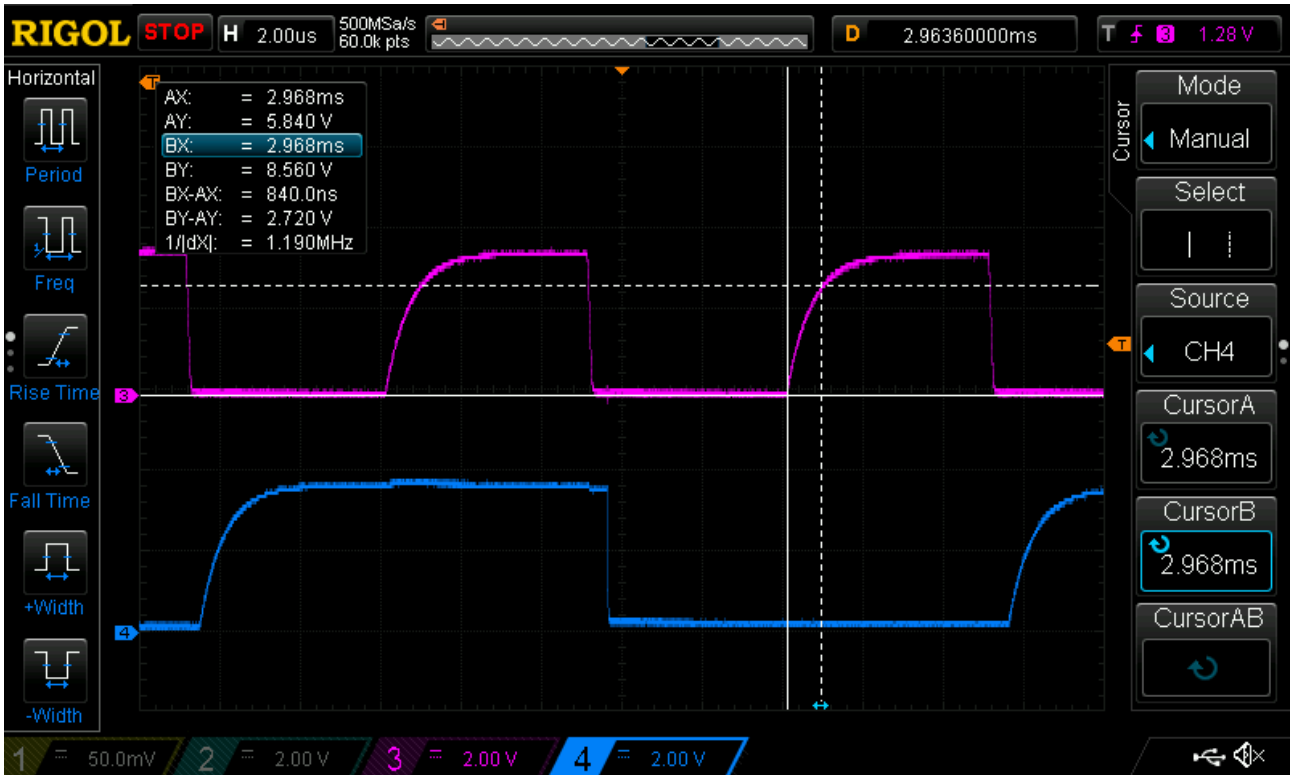
Procedure:

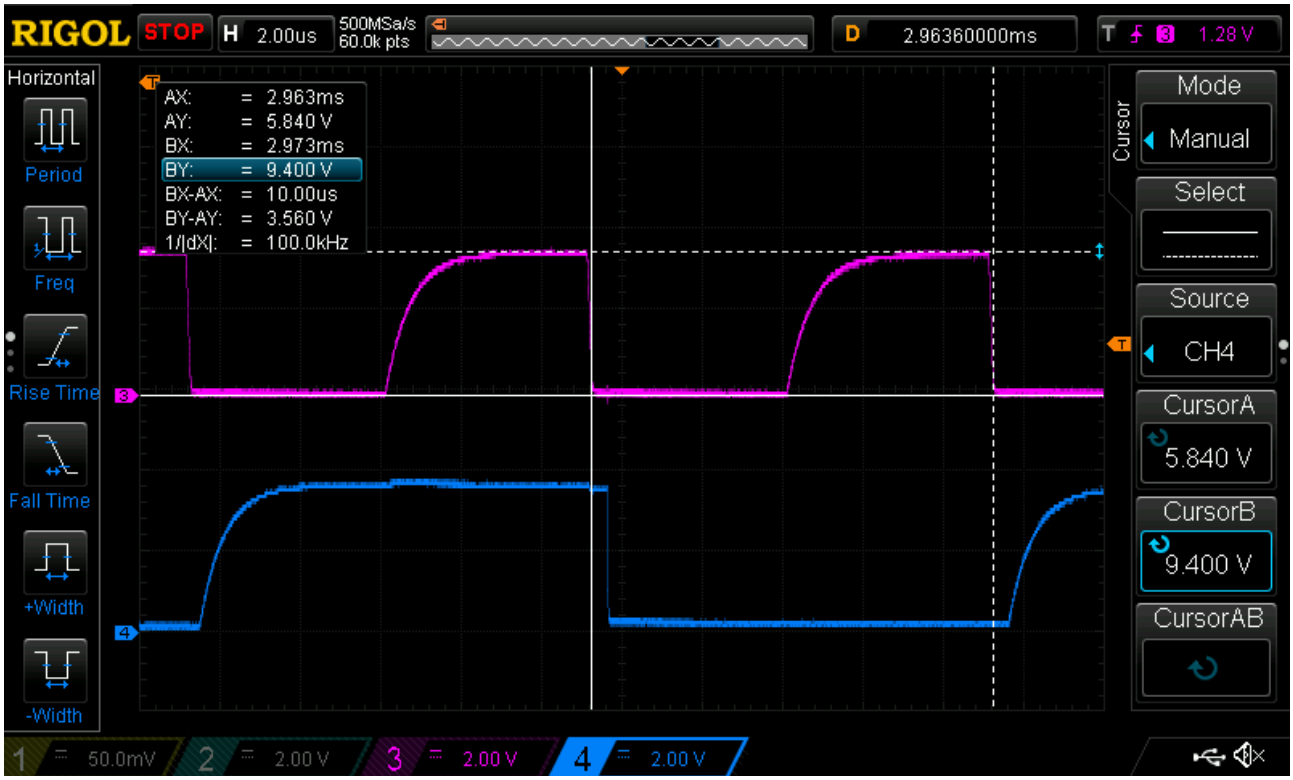
1. Attach scope probes to SDA and SCL with the shortest wire possible
2. Capture a full operation

3. Capture a zoom of 3 consecutively toggling SDA bits

Criteria:

1. Are I2C interface rise times are far below clk pulse high width?
2. Record the pullup resistor value as measured:
    - 1: **4.565 kOhm**
    - 2: **4.587 kOhm**





MICxxxx rail stability

Procedure:

1. Look for ramp waveforms on the MICxxxx's output pin.

Criteria:

1. Is the bypass cap present? **No**
2. Does the MICxxxx benifit from removing the PB pin bypass cap? **It did!**

Action Items

1. Change out pullups – 10k becomes 4.7k **DONE**
2. Add SDA and SCK silk to A4/A5 **DONE**
3. addr box confusing. Switch bit positions and lable individual columns **DONE**