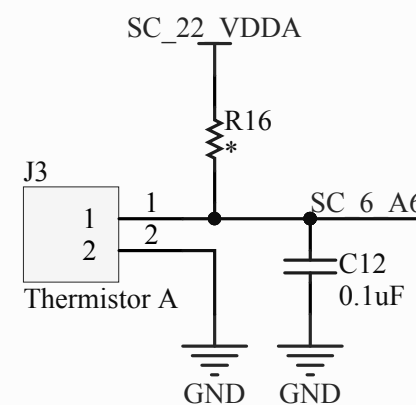
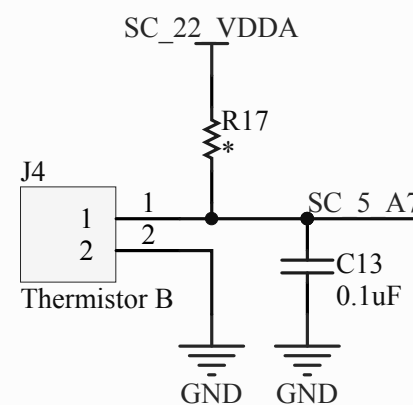


▲ Thermistor Inputs
Resistor values are TBD as we do not know what thermistors are common in our application. 10k? 100k?

Cold Junction Temperature Compensation Thermistor
*Must be located very close to thermocouple connectors
U3 is analog thermistor IC



Thermistor A Input



Thermistor B Input

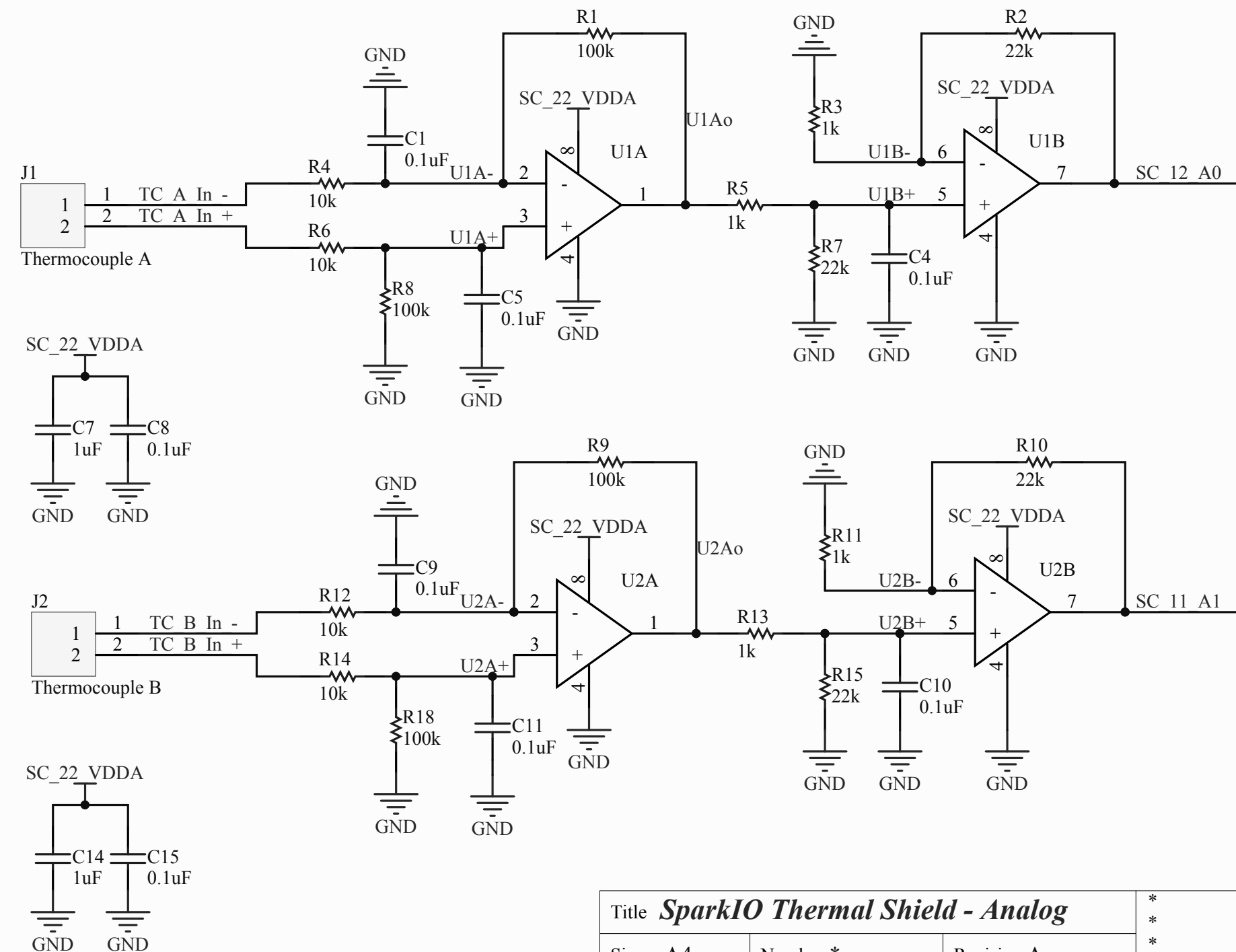
▲ *SparkIO Module
RAW = Diode drop down from +5VUSB
VCC = 3.3V, 500mA Max
VDDA = 3.3V through 500mA ferrite, analog VDD
RST = Reset switch on Spark.io Module

▲ Linear approximation of a K-type thermocouple is about 40.8uV per degree C from -200C to +1350C
At 25C: V=1020uV = 1.02mV
At 100C, V=4008uV = 4.008mV
At 1000C, V=40.8mV
At 1350C, V=55.08mV

Desired range is roughly up to 600F or ~0C to ~350C
At 0C: V=0V
At 350C: V=14.28mV

To scale this voltage to 3.2V, gain needed is
 $A = 3.2V / 14.28mV \approx 224$

▲ Op Amp Circuits are a cascaded two stage amplifier:
A Gain = 10 stage followed by a Gain = 22 stage to accomplish overall gain of ~220



Title **SparkIO Thermal Shield - Analog**

Size: A4

Number:*

Revision:A

Date: 5/7/2014

Time: 11:47:15 PM Sheet1 of 1

File: C:\Users\Jim\Documents\GitHub\probe\SparkIO Thermal Shield\SparkIO Thermal Shield - No Aux ADC.SchDoc

Altium