Thermistor Circuit Discrepancy – Likely Causes

- Mixing up manually measured voltages during calculations can lead to incorrect thermistor resistance values.
- Poor contact between components can introduce unexpected resistance, affecting measurements.

Analog Multiplexer vs. Dual ADC Accuracy

- A fast-switching analog multiplexer allows accurate measurement because the thermistor resistance does not change appreciably during the brief switching time.
- This method enables a single Delta Sigma ADC to read multiple inputs with minimal accuracy loss.

Self-Heating and Measurement Accuracy

- If a thermistor heats up above ambient temperature due to self-heating, it provides a falsely elevated temperature reading.

How the PSoC Thermistor API Works

- The API calculates current through the 10K precision resistor by dividing the measured voltage across it by its resistance.
- It then uses the voltage across the thermistor and divides it by the calculated current to determine thermistor resistance.

Adding a Thermistor in PSoC Creator

- A thermistor can be added by going to the **Component Catalog → Off-Chip → Sensors**, clicking **Thermistor**, and dragging it into the schematic.

Direct Resistance Measurement Process

- Divide the voltage across the 10K precision resistor by its resistance to get the circuit current.

- Divide the measured voltage across the thermistor by this current to calculate its resistance.

Purpose of the Loop Counter in Code

- The loop counter helps determine how many iterations have occurred, useful for tracking runtime and debugging.
- It allows checking if the execution time matches expectations and can be paused to inspect loop progression.

Use of an Analog Multiplexer

- The Delta Sigma ADC in the PSoC has high precision but only one unit is available, so it must be shared using a multiplexer.
- Temperature changes slowly enough that switching between thermistor and resistor voltages via a multiplexer does not affect accuracy.

Purpose of Analog Test Points

- Analog test points allow oscilloscope or nScope verification of voltages read by the ADC.
- These points help determine whether measurement issues stem from the ADC setup or the input voltages.
- Test points also allow monitoring of multiplexer output voltages.

Value of the Thermistor Calculator in PSoC

- The thermistor calculator automates computation of temperature by solving the **Steinhart-Hart equation**, eliminating the need for custom code.