

BACKGROUND

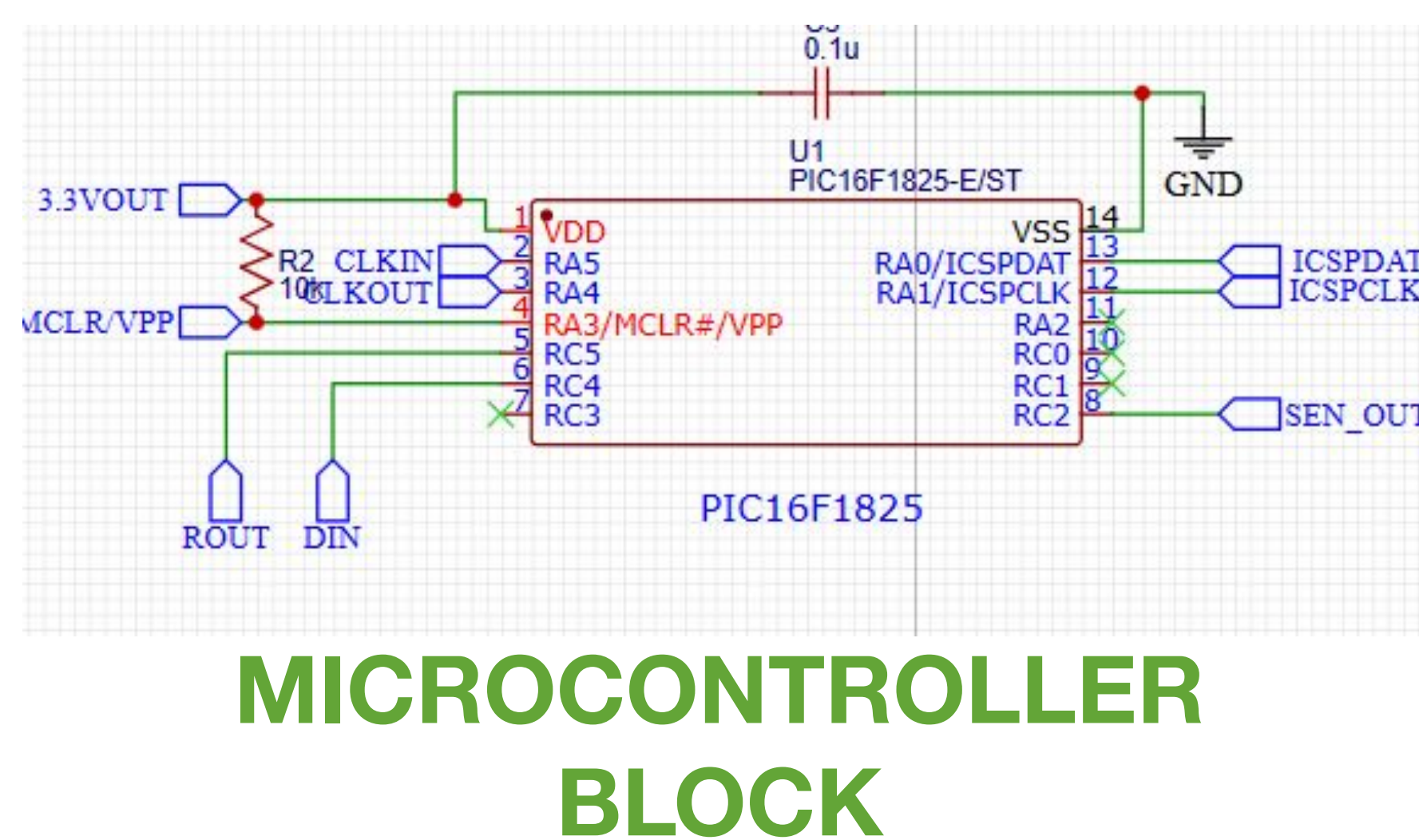
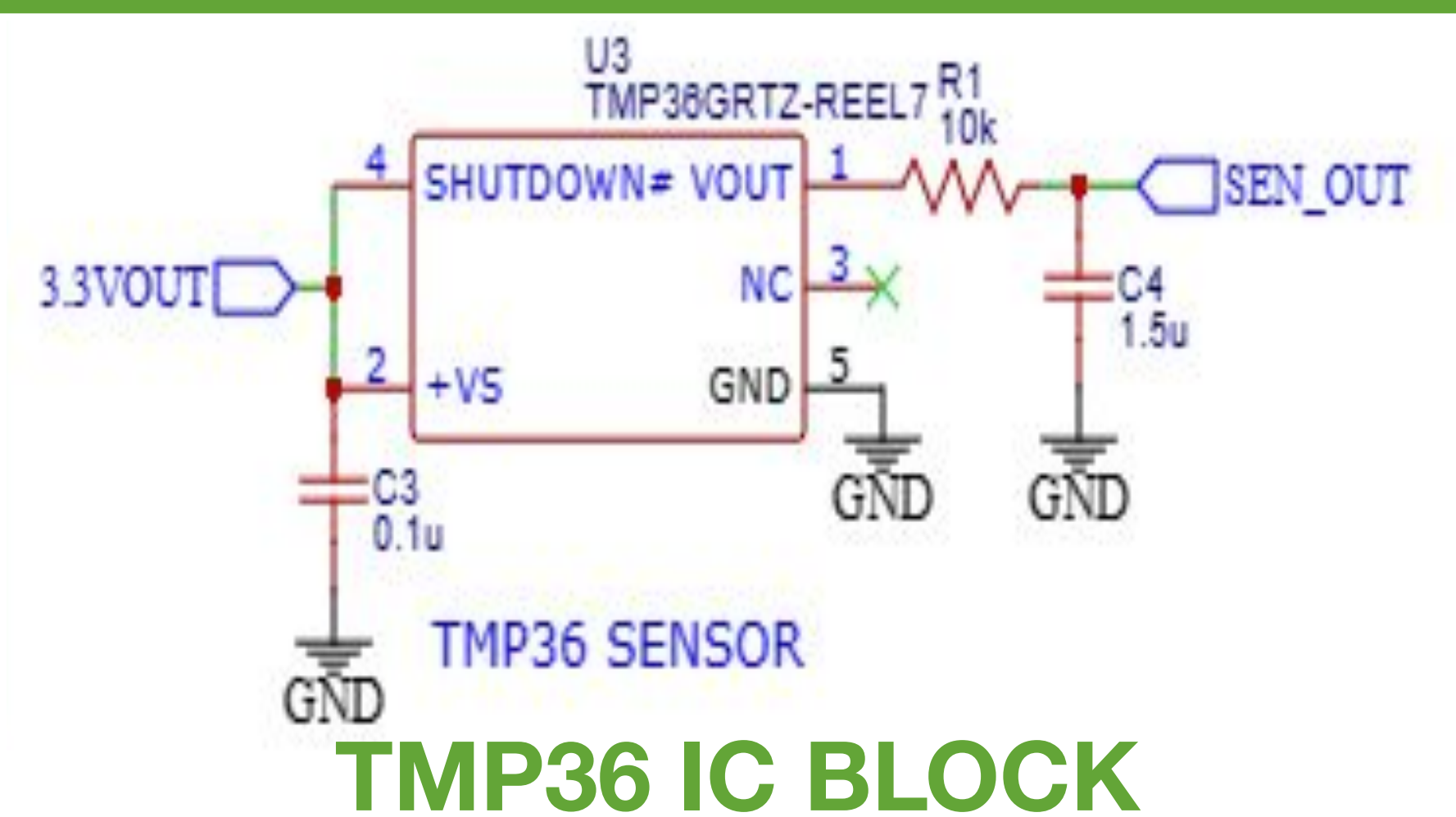
The Research Aviation Facility (RAF) laboratory has two aircrafts: the C-130 and the GV; which are equipped with an important number of sensors installed around both aircrafts, used for atmosphere condition monitoring during airborne campaigns, such as air chemicals, pressure, wind velocity, detecting cloud particles, mentioning a few examples.

Each sensor includes a connection into a DSM (Data Module System) installed close to them, where data from this sensors is packaged and sent via Ethernet to the aircraft data server.

Monitoring the temperature of the DSM is very important to assure great system performance under a range of temperatures.

PROCESS

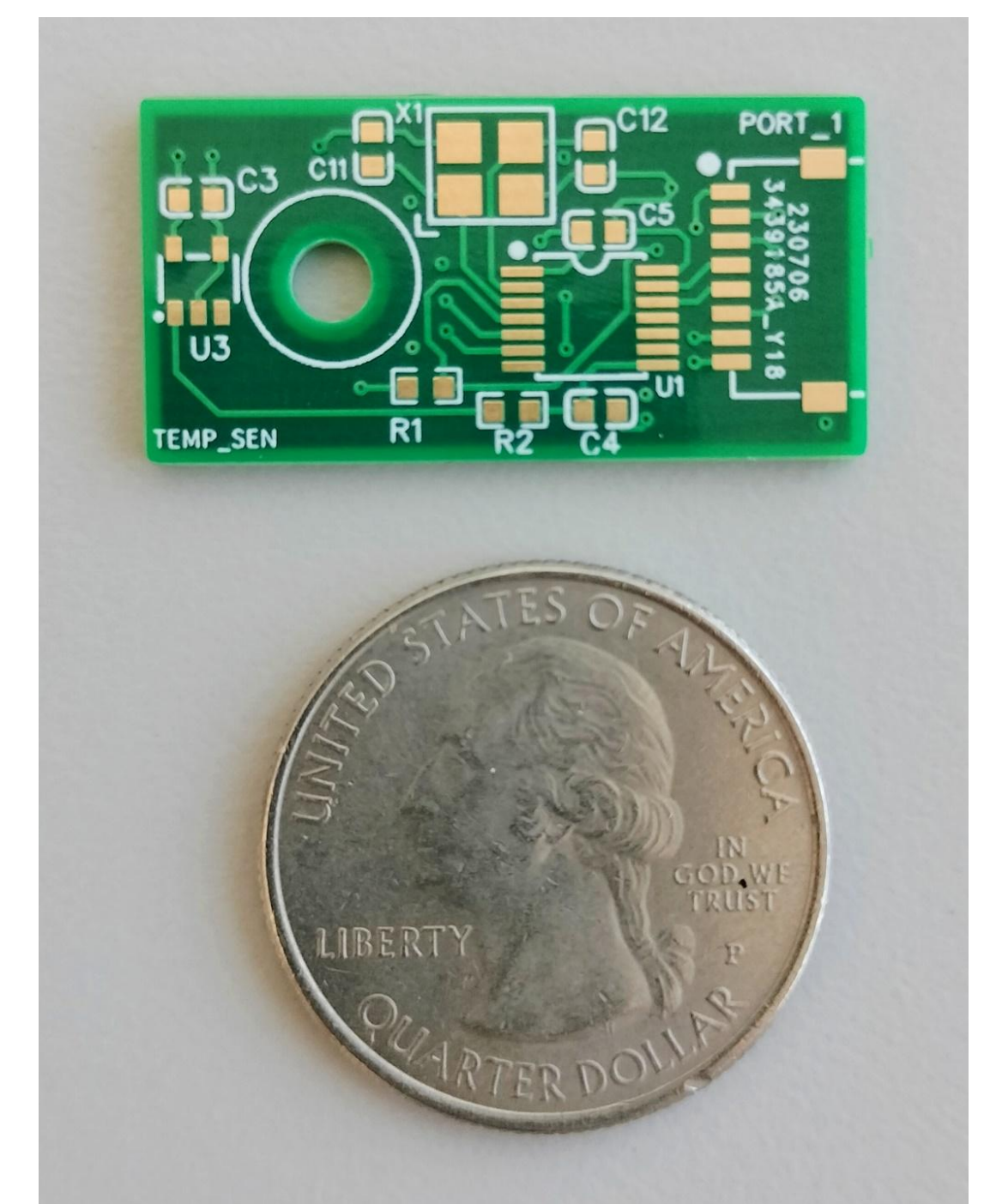
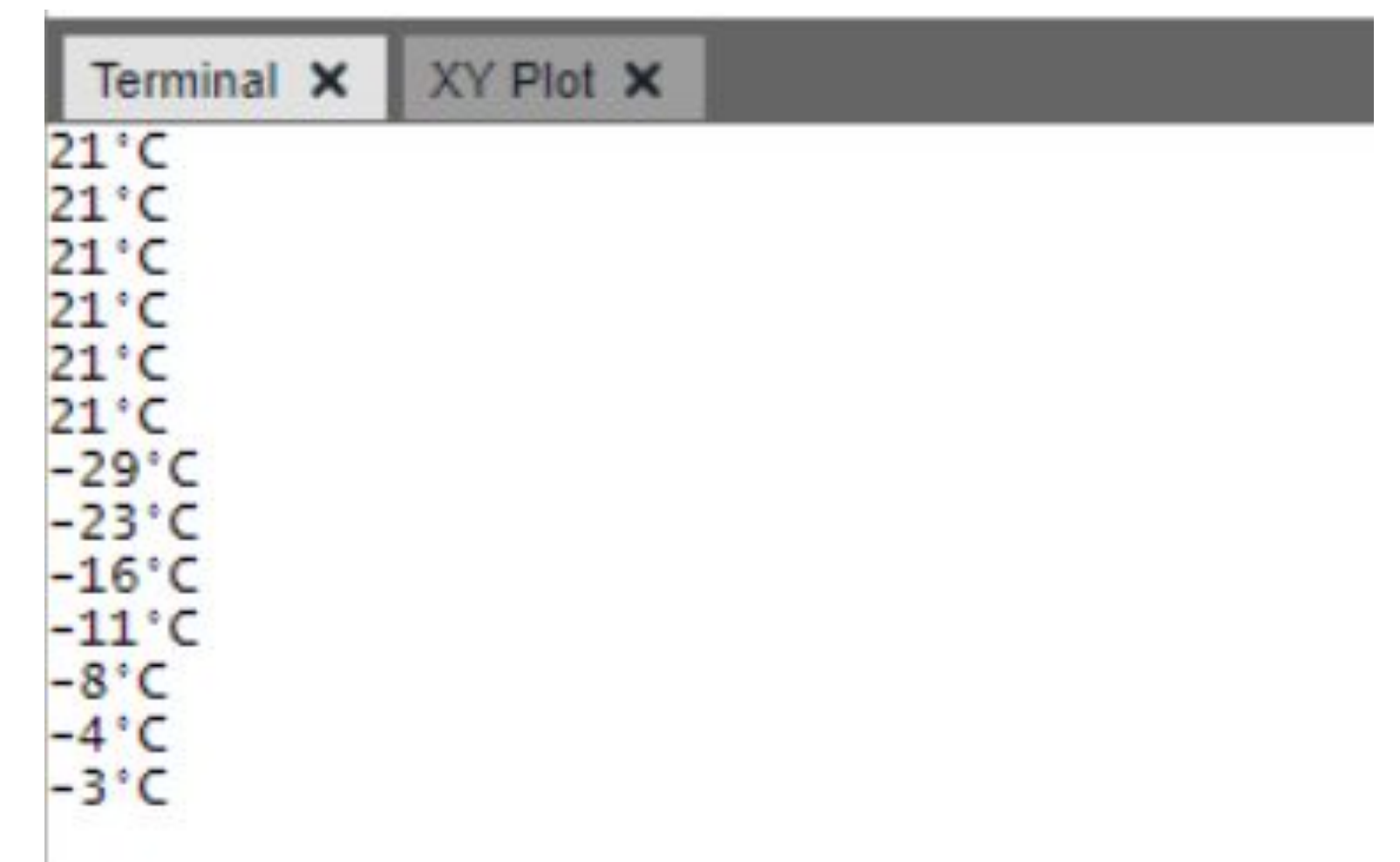
- Researched and selected the proper components for the design, following a list of critical requirements.
- Used EasyEDA to create a schematic and a PCB layout.
- Created a firmware code to program a microcontroller that converts the analog value to a digital value, and then transmit the data through an asynchronous signal.
- Ordered the components from different providers and the PCB layout from a factory that could give the best quality at the lowest price.
- Perform the necessary testing to assure the data sent to the DSM is correct.



- The circuit receives a voltage range from 5 to 28V and operates with a fixed 3.3V with the help of a voltage regulator.
- An IC chip (TMP36) converts the temperature into a voltage and transmits the voltage into the microcontroller.
- The microcontroller is programmed to convert the voltage (analog value) into a digital numeric value.
- With an arithmetic linear function (based on the TMP36 datasheet) the digital numeric value is converted into a temperature value (in °C).
- A transceiver converts the output signal of the microcontroller (UART) into an RS-232 signal.

RESULT

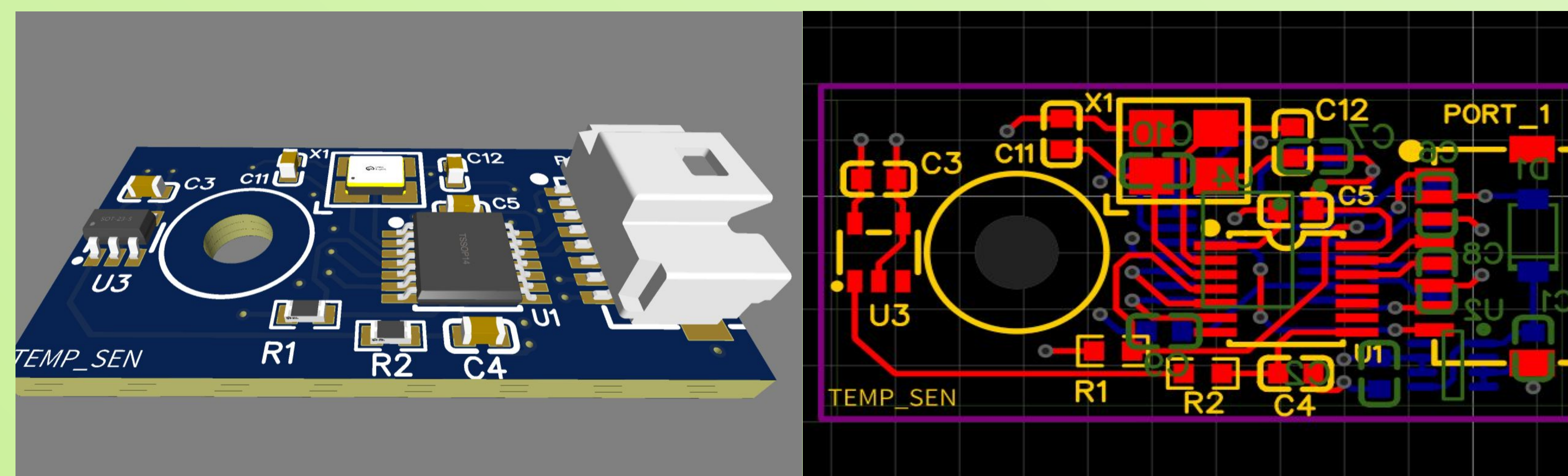
- Data received successfully into the IDE environment via a DP9 to USB cable connection.
- Instant output change when temperature conditions move from one value to another.



OBJECTIVES

- Small-area design and implementation.
- Reach an accuracy measure of ≤ 1 °C.
- Integrate a RS-232 connection for data transmission into the DSM
- General purpose application.

TOOLS



CONCLUSIONS

- Successfully received temperature readings in degrees Celsius.
- Future testing inside a temperature chamber.
- Future testing on an installed DSM on the aircrafts.

ACKNOWLEDGEMENTS

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