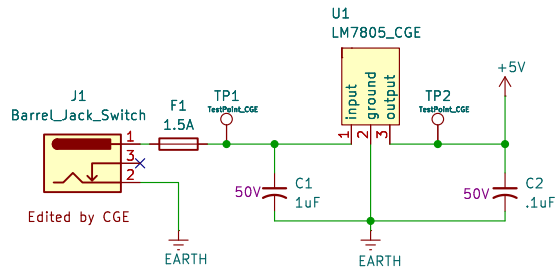
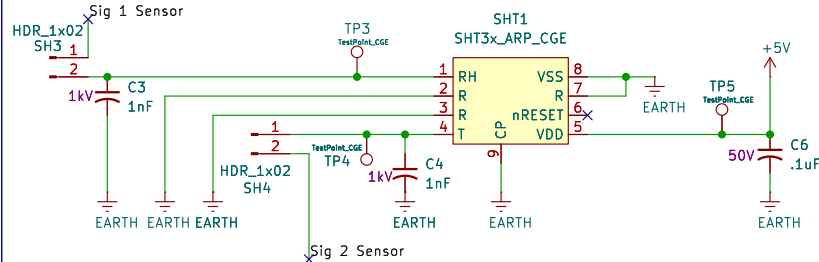


9V DC to 5V Regulated Supply



9 V DC input from barrel jack (J1) is protected by a 1.5 A fuse (F1). The LM7805 regulator (U1) converts 9 V to a stable 5 V output. C1 (33 μ F) and C2 (1 μ F) for input/output filtering. EARTH net is the common ground reference.

SHT31-ARP-B Humidity and Temperature Sensor

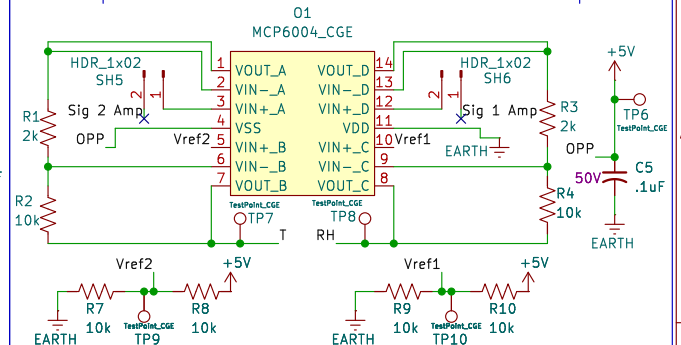


SHT31-ARP-B Humidity and Temperature Sensor is expected to output 10% of VDD up to 90% of VDD for both Sig 1 Sensor [Relative Humidity (RH) pin] and Sig 2 Sensor [Temperature (T) pin].

VDD: 5V

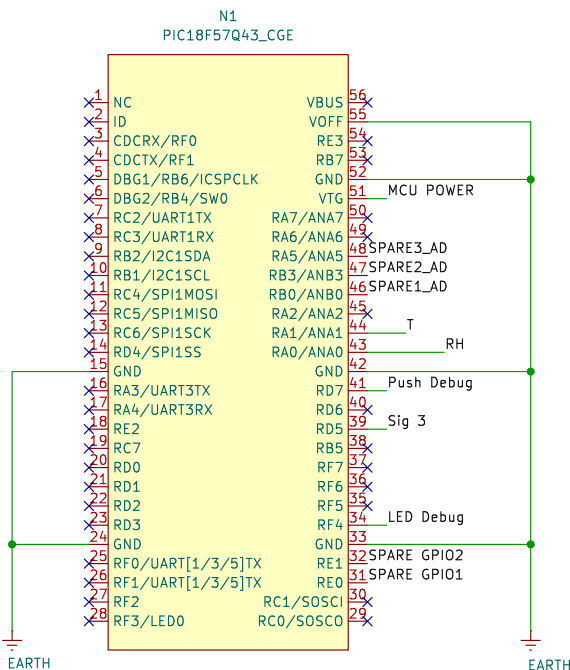
RH pin voltage output range: 0.5 V – 4.5 V for 0 – 100 % RH
T pin voltage output range: -0.77 V – -4.34 V for -40 °C – +125 °C

Amplification Circuit for SHT31 Outputs



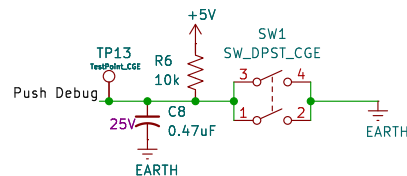
MCP6004 configured as 2 non-inverting amplifiers (Gain ≈ 1.2) to condition SHT31-ARP-B Temperature & Humidity signals around a 2.5 V mid-supply reference for 0–5 V ADC use. Expected outputs: Temp ≈ 0.44 –4.7 V, RH ≈ 0.1 –4.9 V from inputs 0.77–4.34 V and 0.5–4.5 V respectively. Testpoints: TP6 = 5 V, TP7 = Temp Out, TP8 = RH Out, TP9 = Vref2 ≈ 2.5 V, TP10 = Vref1 ≈ 2.5 V.

Microchip PIC18F57Q43 Curiosity Nano



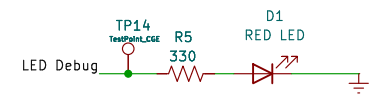
PIC18F57Q43 MCU – Receives analog inputs (T, RH), debug input (Push Debug), and drives LED Debug and Sig 3 alert output. Powered via VTG with local decoupling.

MCU Debug Pushbutton Input



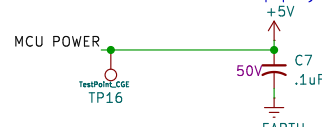
Push Debug Input (to RD7). Includes pull-up resistor R6 (10 k Ω) to hold RD7 HIGH. Pressing the switch connects the input to GND (logic LOW). Hardware-debounced using C8 (0.47 μ F). Intended for triggering or testing MCU debug functions.

Status Indicator



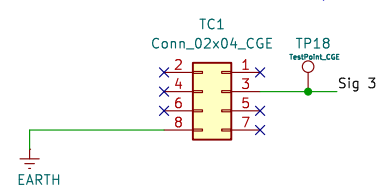
Status Indicator LED. Connected to MCU pin (RF3). Indicates system activity or status.

MCU Power Supply



MCU receives its operating power through this pin. 0.1 μ F bypass capacitor at VTG (VDD). EARTH net is tied to MCU ground (GND).

8-pin header (Team Connector)

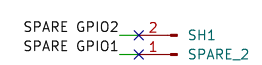


Sig 3 is digital output from the PIC18F57Q43 to 8-pin team connector. Pin 3 in the team connector connects to the subsystem that will trigger an alarm when Humidity threshold is met.

Extra Pin Headers



Spare 1X03 Header intended for either analog signals from SHT31 sensor or general purpose input/output for LED/PUSH debug.



Spare 1X02 Header intended for either general purpose input/output for LED/PUSH debug or additional outputs to other subsystems.

General Notes for Subsystem Schematic Design: Humidity & Temperature Sensor

- * Note: All resistors are $\frac{1}{4}$ W unless otherwise specified.
- * Extra Pin Headers available in subsystem: look under "Extra Pin Headers" section for more details.
- * 1X02 pin headers on Sig 1 and Sig 2 in the SHT31-ARP-B sensor circuit will mini-jumpers to connect over to Op-Amp; these headers can also bypass Op-Amp circuit and connect directly to the PIC if any problem with signal amplification.
- No connection flags were placed to avoid errors.
- these pins signals are intended to be connected via jumpers.

Cristopher Gutierrez Team 208

Sheet: /

File: CGE_Subsystem.kicad_sch

Title: Subsystem Schematic Design: Humidity & Temperature Sensor

Size: A4

Date: 2025-12-05

Rev: 4.0

KiCad E.D.A. 9.0.4

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