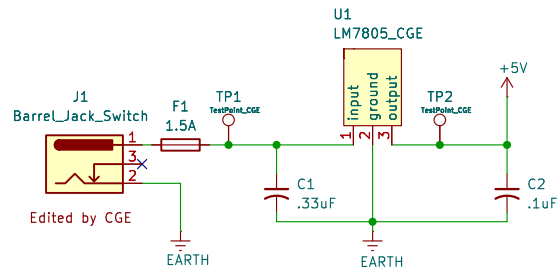
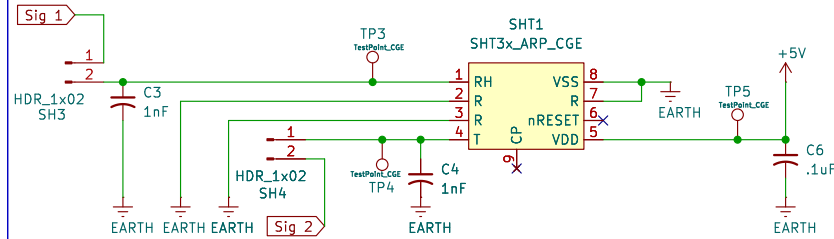


## 9V DC to 5V Regulated Supply



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 µF) and C2 (1 µF) for input/output filtering. EARTH net is the common ground reference.

## SHT31-ARP-B Humidity and Temperature Sensor

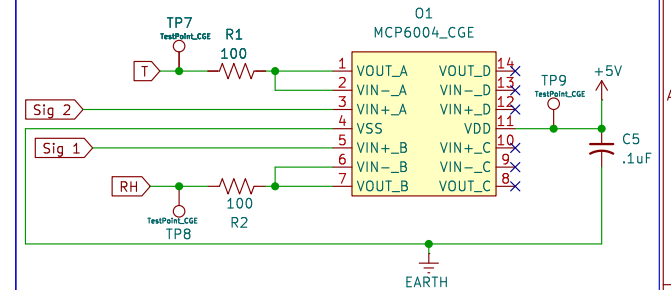


SHT31-ARP-B Humidity and Temperature Sensor is expected to output 10% of VDD up to 90% of VDD for both Signal 1 [Relative Humidity (RH) pin] and Signal 2 [Temperature (T) pin].

VDD: 5V

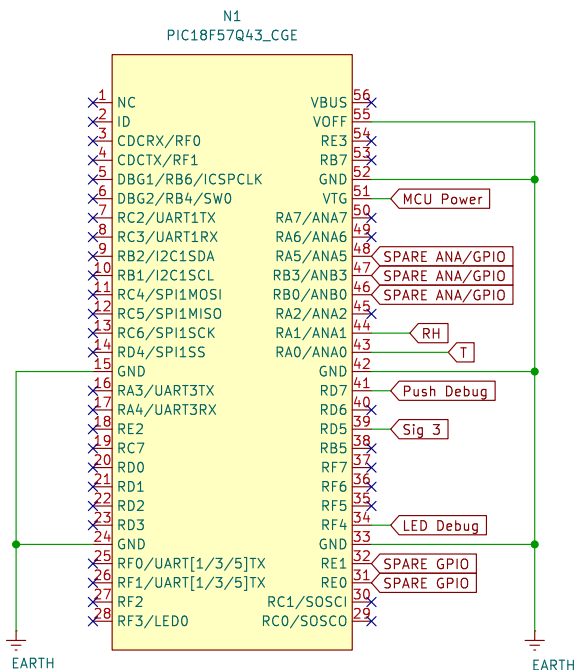
RH pin voltage output range: 0.5 V – 4.5 V for 0 – 100 % RH  
T pin voltage output range: -0.77 V – -4.34 V for -40 °C – +125 °C

## Op-Amp Buffer Circuit for SHT31 Outputs



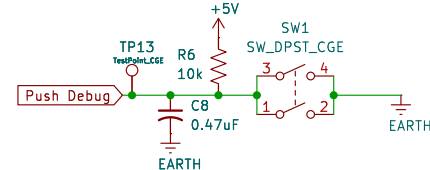
RH (Signal 1) and T (Signal 2) output is buffered by MCP6004 unity-gain op-amps (5 V supply, 2 of 4 op amps used) with -100 Ω output isolation to the PIC ADC; 0.1 µF decoupling capacitor placed between VDD and VSS.

## Microchip PIC18F57Q43 Curiosity Nano



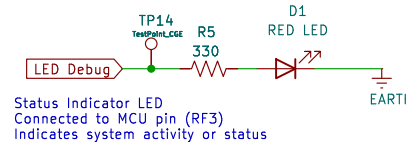
PIC18F57Q43 MCU – Receives analog inputs (T, RH), debug input (Push Debug), and drives LED Debug and Sig 3 alert output. Powered via VTG with local decoupling.

## MCU Debug Pushbutton Input



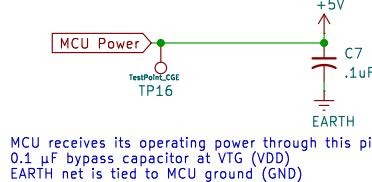
Push Debug Input (to RD7)  
Includes pull-up resistor R6 (10 kΩ) to hold RD7 HIGH.  
Pressing the switch connects the input to GND (logic LOW).  
Hardware-debounced using C8 (0.47 µF).  
Intended for triggering or testing MCU debug functions.

## Status Indicator



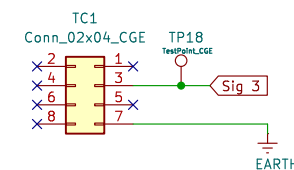
Status Indicator LED  
Connected to MCU pin (RF3).  
Indicates system activity or status.

## MCU Power Supply



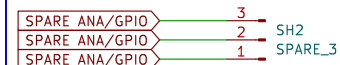
MCU receives its operating power through this pin.  
0.1 µF bypass capacitor at VTG (VDD).  
EARTH net is tied to MCU ground (GND).

## 8-pin header (Team Connector)

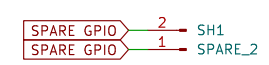


Sig 3 is digital output from the PIC18F57Q43 to 8-pin team connector.  
Pin 3 in the team connector connects to the subsystem that will trigger an alarm when Humidity threshold is met.

## 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 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 buffering.

Cristopher Gutierrez Team 208

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File: CGE\_Subsystem.kicad\_sch

Title: Subsystem Schematic Design: Humidity & Temperature Sensor

Size: A4 Date: 2025-10-25

KiCad E.D.A. 9.0.4

Rev: 3.0

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