# Versatile STM32WL Sensor Board

***Project by: Caoilte Donohoe***

This sensor board integrates temperature, humidity, pressure, and motion sensors with an analog front-end, LoRa wireless communication, and support for external sensors via SMA connector. The following Bill of Materials (BoM) outlines the key components used in the design, including capacitors, resistors, ICs, and connectors essential to both signal integrity and system performance.

## Bill of Materials (BoM)

| **Comment** | **Description** | **Designator** | **Footprint** | **LibRef** | **Quantity** |
| --- | --- | --- | --- | --- | --- |
| 68p | Capacitor SMD 0402 16V | C1, C4, C13, C17 | CAP\_0402 | CAP\_0402\_16V | 4 |
| 47n | Capacitor SMD 0402 16V | C2 | CAP\_0402 | CAP\_0402\_16V | 1 |
| 3p5 | Capacitor SMD 0402 16V | C3 | CAP\_0402 | CAP\_0402\_16V | 1 |
| 5p5 | Capacitor SMD 0402 16V | C5, C7 | CAP\_0402 | CAP\_0402\_16V | 2 |
| GRM1555C1H680JA01D | nan | C6 | CAPC1005X55X25LL05T10 | CMP-2008-04406-1 | 1 |
| C0402\_16V | Capacitor SMD 0402 16V | C8, C12, C29 | CAP\_0402 | CAP\_0402\_16V | 3 |
| 4p5 | Capacitor SMD 0402 16V, [NoValue] | C9, C18 | CAP\_0402 | CAP\_0402\_16V | 2 |
| 10p | Capacitor SMD 0402 16V | C10, C11 | CAP\_0402 | CAP\_0402\_16V | 2 |
| 100n | Capacitor SMD 0201 16V | C14, C21, C22, C25, C26 | CAP\_0201 | CAP\_0201\_16V | 5 |
| 100n | Capacitor SMD 0402 16V | C19, C20, C31, C110, C200, C400, C401, C404, C405, C501, C505, C511, C513, C515 | CAP\_0402 | CAP\_0402\_16V | 14 |
| 4u7 | Capacitor SMD 0201 16V | C24 | CAP\_0201 | CAP\_0201\_16V | 1 |
| 470n | Capacitor SMD 0201 16V | C27 | CAP\_0201 | CAP\_0201\_16V | 1 |
| 1u | Capacitor SMD 0603 16V | C100, C101, C102, C105 | CAP\_0603 | CAP\_0603\_16V | 4 |
| 100n | Capacitor SMD 0603 16V | C103, C104 | CAP\_0603 | CAP\_0603\_16V | 2 |
| 10n | Capacitor SMD 0603 16V | C106 | CAP\_0603 | CAP\_0603\_16V | 1 |
| 4u7 | Capacitor SMD 0603 16V | C107 | CAP\_0603 | CAP\_0603\_16V | 1 |
| 10u | Capacitor SMD 0603 16V | C108, C205, C508, C509, C510, C512, C514 | CAP\_0603 | CAP\_0603\_16V | 7 |
| 22u | Capacitor SMD 0603 16V | C109 | CAP\_0603 | CAP\_0603\_16V | 1 |
| 10n | Capacitor SMD 0402 16V | C402 | CAP\_0402 | CAP\_0402\_16V | 1 |
| 2n2 | Capacitor SMD 0402 16V | C403 | CAP\_0402 | CAP\_0402\_16V | 1 |
| 150p | Capacitor SMD 0402 16V | C500, C504, C507 | CAP\_0402 | CAP\_0402\_16V | 3 |
| 1n | Capacitor SMD 0402 16V | C503 | CAP\_0402 | CAP\_0402\_16V | 1 |
| GREEN | LED 0402 GREEN SMD | D1 | LED\_0402\_GREEN | LED\_0402\_GREEN | 1 |
| RED | LED 0402 RED SMD | D100, D101 | LED\_0402\_RED | LED\_0402\_RED | 2 |
| D\_SCHOTTKY\_SOD\_323 | Diode Schottky SMD SOD-323 | D103 | SOD-323 | D\_SCHOTTKY\_SOD\_323 | 1 |
| PESD3V3L1BA | TVS Diode (Bi-directional) | D500 | SOD2512X110N | PESD3V3L1BA | 1 |
| SMA\_T\_9.52\_NF | SMA End Launch Jack 1.0 mm Board, 50 ohm | J1, J4 | CO\_SAMTEC\_SMA-J-P-ST-EMI | SMA\_T\_9.52\_NF | 2 |
| FTSH-105-01-L-DV-K-TR | CONN HEADER SMD 10POS 1.27MM | J2 | FP-FTSH-105-01-L-DV-K-TR-MFG | CMP-2000-06293-2 | 1 |
| 105017-0001 | Micro-USB B Receptacle, Right Angle, Bottom Mount, Surface Mount, with Solder Tabs, -30 to 85 degC, 5-Pin USB, RoHS, Tape and Reel | J3 | USB-MICRO-B\_V | CMP-2000-05827-1 | 1 |
| 47n | Inductor SMD 0402 | L1 | IND\_0402 | IND\_0402 | 1 |
| 4n4 | Inductor SMD 0402 LQW15AN4N4G80D | L2 | IND\_0402 | IND\_0402 | 1 |
| 3n4 | Inductor SMD 0402 | L3 | IND\_0402 | IND\_0402 | 1 |
| 8n7 | Inductor SMD 0402 | L4 | IND\_0402 | IND\_0402 | 1 |
| L0402 | Inductor SMD 0402 | L5 | IND\_0402 | IND\_0402 | 1 |
| 12n | Inductor SMD 0402 | L6 | IND\_0402 | IND\_0402 | 1 |
| 15u | Inductor SMD 0402 | L7 | IND\_0402 | IND\_0402 | 1 |
| 15u | Fixed Inductors Commercial Low DCR Series 2.2uH 6.75A 25mO 20% | L8 | FP-IHLP-2020CZ-FP\_1\_905x2-MFG | CMP-02424-000234-1 | 1 |
| 10n | Inductor SMD 0603 | L100 | IND\_0603 | IND\_0603 | 1 |
| 62200821121 | THT Vertical Pin Header WR-PHD, Pitch 1.27 mm, Dual Row, 8 pins | P1 | 62200821121 | CMP-1502-00947-1 | 1 |
| 0R | Resistor SMD 0402 | R1, R509 | RES\_0402 | RES\_0402 | 2 |
| R0603 | Resistor SMD 0603 | R2, R3 | RES\_0603 | RES\_0603 | 2 |
| nan | Resistor,100R,0402,1%,1/16W, Resistor,1K,0402,1%,1/16W | R4, R15, R204 | R0402 | MCD-00119, MCD-00061 | 3 |
| 10R | Resistor SMD 0603 | R100 | RES\_0603 | RES\_0603 | 1 |
| 1k | Resistor SMD 0402 | R101, R104, R105, R114, R200, R500, R506, R507 | RES\_0402 | RES\_0402 | 8 |
| 100k | Resistor SMD 0402 | R102 | RES\_0402 | RES\_0402 | 1 |
| 22k | Resistor SMD 0402 | R103, R504 | RES\_0402 | RES\_0402 | 2 |
| 2k2 | Resistor SMD 0402 | R203, R400 | RES\_0402 | RES\_0402 | 2 |
| 2M2 | Resistor SMD 0402 | R501, R502 | RES\_0402 | RES\_0402 | 2 |
| 6k8 | Resistor SMD 0402 | R503 | RES\_0402 | RES\_0402 | 1 |
| 12k | Resistor SMD 0402 | R505 | RES\_0402 | RES\_0402 | 1 |
| 49R9 | Resistor SMD 0402 | R508 | RES\_0402 | RES\_0402 | 1 |
| STM32WLxx\_QFN48 | HQDC : Verified April, 25 2019 | U2 | STM32WLxx\_QFN48 | STM32WLxx\_QFN48 | 1 |
| BGS12SN6 | Wideband RF SPDT Switch, 0.1 to 6 GHz, TSNP-6, Reel, Green | U3 | INF-TSNP-6-2\_V | CMP-1088-00016-1 | 1 |
| LD3985M33R | IC REG LINEAR 3.3V 150MA SOT23-5 | U100 | FP-SOT23-5L-7049676-MFG | CMP-0244-00328-2 | 1 |
| TLV62569DBVR | IC REG BUCK ADJ 2A SOT23-5 | U101 | FP-DBV0005A-MFG | CMP-04918-000387-1 | 1 |
| MCP6001T-E/LT | None | U102 | SC70-LT5\_L | CMP-0187-00463-3 | 1 |
| MPU-6050 | 3-Axis Gyroscope, Accelerometer and a Digital Motion Processor(TM) (DMP), 2.375 to 3.46 V, -40 to 85 degC, 24-Pin QFN, RoHS, Tape and Reel | U400 | IS-QFN-24\_V | CMP-1753-00002-2 | 1 |
| BME280 | SENSOR PRESSURE HUMIDITY TEMP | U401 | FP-BME280-MFG | CMP-2000-05073-3 | 1 |
| MCP6001T-E/OT | None | U500, U501 | SOT-23-OT5\_L | CMP-0187-00458-3 | 2 |
| REF3033AIDBZRG4 | Integrated Circuit | U502 | SOT95P237X112-3N | REF3033AIDBZRG4 | 1 |
| ADC141S626CIMM/NOPB | 14-Bit, 50 kSPS to 250 kSPS, Differential Input, Micro Power A/D Converter, 10-pin Mini SOIC, Pb-Free | U503 | MUB10A\_M | CMP-0054-00477-2 | 1 |
| 24MHz | Crystal SMD 24MHz 10PPM 7pF 3225 | X1 | XTAL\_3225 | TSX-3225\_24.0000MF15X-AC | 1 |