

Team 01: Test Plan List

- Unit tests
 - Charging contacts
 - Test 5V supplied from charging contacts
 - Microcontroller
 - Test 5V received from charging contacts
 - Test 3.7V received from battery
 - Interrupt signal actives are logic-low (0V) and inactive are logic-high (3V)
 - Read fixed value from register to determine communication between sensor and ESP32-C6 is working
 - Sequence for testing communication between ESP32-C6 and LSM6D032:
 - Test SPI communication (WHOAMI register)
 - Test LSM6D032 register setup (read all config registers that were written to)
 - Test LED GPIO setup (initialize without error)
 - Test LED communication (Send LED RGB strobe, then off)
 - Test reading LSM6D032 data values (should return various hex values)
 - Test ESP32 interrupt initialization (initialize with no error)
 - Test dummy interrupt on ESP32 (use the jumper, it should print ACKs)
 - Test LSM6D032 interrupt initialization (should trigger ACKs from the previous step)
 - Test repeated interrupt triggering (Activity/Inactivity, Data Ready)
 - Test data parsing (no data values should be exactly 0, value should be within tolerance for that side)
 - Test data interpretation (given hard-coded value, should pick coded face)
 - Test interrupt triggering from rolls (rolling should start the sequence)
 - Test interrupt threshold from table bumps or slight movement (threshold should be high enough to ignore these)

- Test repeated triggering of interrupts from rolls (should go multiple times with no issue)
 - Test sleep state after inactivity
 - Accelerometer/Gyroscope
 - Ensure SMD is returning values
 - Output testing is done with ESP32-C6
 - Battery
 - Test charging current (expected value: $\leq 100\text{mA}$)
 - Test 3.7V output to microcontroller
 - Charge Pump
 - Test 3.3V input from microcontroller
 - Test 5V output to LED array
 - Buzzer
 - Test 3.3V PWM input from microcontroller
 - Test audio outputs operating correctly
 - LED Array
 - For all LEDs in the array
 - Test 5V power input from the charge pump
 - Test 3.3V data input from the microcontroller
 - Ensure each LED turns on and off
- Verification tests
 - Test buzzer operational on critical rolls (die lands on 1 and/or 20)
 - Test correct LED is on (face of die in (0,0,z)) after roll of die
 - Ensure no other LEDs are lit other than the face of the die in (0,0,z)
 - Test LED turns off after a set amount of time
 - Test sleep timers
 - Ensure power consumption is limited in sleep mode
 - Test variety of 3D printer filaments for enclosure (for structural integrity - both on the seam of the two halves, the pegs, peg holes, internal PCB enclosure, and outermost edges, vertices, and faces)
 - Ambrosia Galactic PLA
 - Ambrosia PLA
 - MatterHackers Translucent PETG
 - Prusa Research Prusament PLA
 - Sunlu PLA+
 - Resin
- Validation tests
 - Musts:
 - Ensure the user's rolled number is illuminated on the upright (0,0,z) face of the die

- Test battery life lasts 4-6 hours
- Test ability to withstand the impact of a 3-foot drop
- Test congratulatory and disheartening tunes play critical roles
- Shoulds:
 - Test aesthetics - are we all happy with the way it looks?
 - Test size - should fit in the palm of a hand
- Mays:
 - Test “wireless” charging capabilities - ensure charging contacts are working properly