**End of Line (EOL) Test for Ziro’s Electronics  
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An End Of Line (EOL) test is performed at the end of the assembly line to check for functioning of the various functionalities. Ziro’s EOL test for electronics is divided in two parts: Glove EOL and Module EOL.

**Glove EOL:**The glove EOL test checks hardware of Glove PCB. The main components to be tested are: 8:1 Multiplexer, Inertial Measurement Unit(IMU), Battery Management System (BMS), Switch Indicator and general functioning.

The following are the main support peripherals to the EOL Test:  
1. **Download** **Tool**:   
 This software interfaces with bootloader on glove PCB and downloads code  
2. **EOL Software**:   
 This is a .hex file containing the EOL software that needs to be downloaded into uC.  
3. **Batch File**:   
 This file uses the ‘Download Tool’ to upload ‘EOL software’ into the PCB. This is kept constantly   
 running and waits on the button press on the programmer PCB.  
 4. **Programmer**:   
 This hardware has spring loaded pins to download software into the Glove and Module PCBs. It has   
 following hardware: ‘OK-LED’ and ‘Program-Button’. These are explained below.

|  |  |  |
| --- | --- | --- |
| **Component** | **LED Light** | **Status/Meaning of LED** |
| OK-LED | Solid | Program-Button pressed on programmer |
| Dim | EOL Test running |
| Blink Rapidly | Press Red Light Switch on glove PCB |
| Heart-Beat | EOL Test successful |
| Error Blink Code | EOL Test Failed #1: MPU6050 not working #2: HC4057 not working. BQ24040 can’t be tested  #3: BQ24040 not working or USB cable not attached #4: Switch not responding |
| Program-Button | Momentary Press | Press for 1-second to begin downloading software.  Do **NOT** press after download begins or after EOL test completes. |

In addition there are is one LEDs and one switch(with LED) on Glove PCB.

|  |  |  |
| --- | --- | --- |
| **Component** | **Indication** | **Status/Meaning of LED** |
| **Micro Controller LED** | Dim | EOL Test running |
| Blinking Rapidly | Prompt for pressing Glove Red Switch Button |
| **Glove Switch LED** | Red-Solid Light | Indication to press **RED** light on **GLOVE PCB** |
| Green Light | EOL Successful |

**Procedure for Glove EOL:**1. Run the Batch File. This keeps the download tool ready in background. Software doesn’t download into PCB until button is pressed on programmer.   
  
2. Insert micro-USB into glove and insert the Glove PCB into programmer and slide locking mechanism to keep glove PCB in place  
  
3. Press the button down for 1sec till batch file starts download. (The OK-LED will stay on while the button is pressed.)   
  
4. EOL test begins on glove PCB immediately after software download begins:  
 a. During EOL, the OK-LED will be **dim** and low intensity.  
 b. Glove Switch LED will be **red**

5. If EOL passes, the ‘OK-LED’ will be solid-ON else will blink error code below:  
Error #1: MPU6050 not responding or reading false values  
Error #2: HC4057 not working. This will falsely indicate that BQ2057WSNTR is not working.  
Error #3: BQ2057WSNTR not working  
Error #4: Switch not being read.

**Module EOL**

The glove EOL would test the various hardware peripherals of the Glove Printed Circuit Board(PCB). The main componets to be tested are: 8:1 Multiplexer, Inertial Measurement Unit(IMU), Battery Management System (BMS), Switch Indicator and general functioning.

The following are the main support peripherals to the EOL Test:  
1. **Download Tool**: Interfaces with bootloader on micro-controller(uC) and downloads code  
2. **EOL HEC**: compiled C-code to be downloaded into uC. This has the EOL functions  
3. **Batch File**: This facilitates download of code into the controller.  
4. **Programmer**: This is a hardware unit that uses the download tool to send hex files into the programmer. In addition, it has support peripherals to put the micro-controller into program mode and enables easy burning of code.

Procedure :

1. Run the Batch File. This keeps the download tool ready in background. Software doesn’t download into PCB until button is pressed on programmer.
2. Insert micro-USB into glove and insert the Glove PCB into programmer and slide locking mechanism to keep glove PCB in place
3. Press the button down for 1sec till batch file starts download. (The OK-LED will stay on while the button is pressed.)
4. On successful download of software, EOL test begins on PCB
   1. During EOL, Glove PCB switch light should be **red**
5. If EOL passes, the OK-LED will be solid-ON

If there are any faults found during EOL, the OK-LED will blink a few times to indicate a code number:

Error #1: MPU6050 not responding or reading false values  
Error #2: HC4057 not working. This will falsely indicate that BQ2057WSNTR is not working.  
Error #3: BQ2057WSNTR not working  
Error #4: Switch not being read.