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| Engineering Specifications Document |
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Contents

[Technical Specifications 2](#_Toc143847332)

[Batteries – 2](#_Toc143847333)

[Construction – 2](#_Toc143847334)

[Schematics – 3](#_Toc143847335)

[Project Specifications 4](#_Toc143847336)

[Camera Hardware – 4](#_Toc143847337)

[Display Hardware – 4](#_Toc143847338)

[Raising Platform Hardware – 4](#_Toc143847339)

[Ambient Display Hardware – 4](#_Toc143847340)

[Database – 5](#_Toc143847341)

[Code – 5](#_Toc143847342)

# Technical Specifications

## Batteries –

1. Batteries in an external battery pack or a packaged external battery must be connected to a PCB/component via a standard Molex KK series connector, or by a JST PH2.0 series connector.
2. PCB mount battery packs must be securely affixed to the PCB.
3. Batteries must be protected from minor vibration, and must not fall out of the enclosure or be detached from the PCB under normal use (if they would be normally attached during operation).
4. Lithium rechargeable batteries must have an inline polymer fuse (also known as a polyfuse) with a reasonable rating for the application. A glass/ceramic fuse is also acceptable for battery supply protection
5. Batteries must have a single, inline, male, 2 pin, 2.54mm pitch pin header on the PCB to allow for current measurement to and from the battery. This can be normally closed using a jumper shunt. All current to and from the battery must pass through this jumper. If there is more than one battery used for separate circuits, there must be one jumper per battery.

## Construction –

1. All PCB/component modifications must be securely fastened so that they cannot snag on other objects during testing.
2. All connectors must have some mechanism to prevent them being inserted backwards (keying, etc).
3. All antennae must be mechanically fixed to the PCB/component.
4. All components must be verifiably RoHS compliant - the manufacturer or distributor states clearly that the component is RoHS compliant, or the datasheet states that the component is RoHS compliant.

## Schematics –

Schematics will follow the following glossary for naming conventions.

| **Designator** | **Component/feature** | **Notes** |
| --- | --- | --- |
| R | Resistor |  |
| C | Capacitor |  |
| L | Inductor |  |
| VR | Variable resistor |  |
| U | Integrated circuit or subassembly | This includes breakout modules |
| Q | Transistor |  |
| P/J | Connector/Pin header/crimp terminal | Either is acceptable |
| SW | Switch |  |
| F | Fuse |  |
| FB | Ferrite bead |  |
| H | Mounting holes |  |
| HW | Mounting hardware | Screws, nuts, bolts, etc |
| LED | Light Emitting Diode |  |
| D | Diode |  |
| BATT | Battery |  |
| RT | Thermistor |  |
| JP | Jumper link/jumper option |  |
| SB | Solder bridge option | Similar to JP, but using only bare surface mount pads on the PCB |
| TP | Test point |  |
| K | Relay |  |
| FID | Fiducial mark |  |
| Y | Crystal oscillator | Only for a crystal oscillator (quartz, etc). Use U for integrated circuit oscillators. |
| T | Transformer |  |
| LS | Loudspeaker or buzzer |  |
| DISP | Display | LCD, OLED, etc. |
| W | Wire/cable |  |

# Project Specifications

## Camera Hardware –

1. Cameras will be connected to central computer through the use of USB cable
2. Any hardware requirements (i.e. light sensor, ultrasonic sensor, timer, etc.) and subsequent wiring will be included at point of connection to central computer

## Display Hardware –

1. Mounting of display will be conducted to allow for easy removal for testing/finalisation of project
2. All wiring from display will be bundled and processed accordingly to minimise cable management issues

## Raising Platform Hardware –

1. Microcontrollers used for system will be of the AVR 32 bit and ESP32 variety for maximum IoT integration
2. Servo motors used in project will be repurposed into linear actuators via a 3D printing mechanism
3. Linear actuators must have a minimum vertical lift capacity of 1.5 kg
4. Wiring for each platform to be coupled to reduce loose wires

## Ambient Display Hardware –

1. Housing to allow for easy disassembly for testing and error handling capabilities
2. Maximum weight of display to not exceed 7 kg

## Database –

1. Database will be organised for maximised efficiency to lower load and cost of system
2. Any schemas used for database storage will be submitted as part of the final codebase submission

## Code –

1. Code will be written and styled per the guidelines listed below:
   * Microcontroller (C Language) – UQ Standard C Coding Style Guidelines
   * Microcontroller (Arduino) – Standard Arduino Code Writing Guidelines (found [here](https://docs.arduino.cc/learn/contributions/arduino-writing-style-guide))
   * Display (JavaScript) – Google JavaScript Guidelines
   * Image Processing (Python) – PEP 8 Style Guidelines
2. Code will follow ethical and sustainable code practices