Q1 Github [1]

<https://github.com/murrayinglis/EEE3088-group-09>

Q2 Power Subsystem Failure Management [5]

In text, briefly describe what measures you’ve taken in your circuit design that will enable you to manage failures such as but not necessarily limited to: (i) component failure/destruction, (ii) trace damage, (iii) component shortage (if at PCB assembly time your component is no longer in stock), (iv) errors in your circuit design that are only detected post manufacture.

(i)

A duplicate of the 3.3V regulator chip will be included on the board, with test points at the pins of this chip and near the other chip. So if the other 3.3V regulator chip fails, the traces can be scratched or the chip can be removed from the board. The test points can be shorted and the duplicate chip can be used instead.

(ii)

Use thick traces to account for temperature changes and spaced as far possible.

Test points at either side of a trace so that if it’s damaged it can be shorted with a jumper.

(iii)

There are plenty of 3.3V regulator chips available on JLCPCB. One that is also a basic part and has a similar pinout to our regulator chip is the C14289.

(iv)

Test points so components or certain modules in the circuit can be tested or shorted to remove them from the circuit.

Q3 Sensing Subsystem Failure Management [5]

In text, briefly describe what measures you’ve taken in your circuit design that will enable you to manage failures such as but not necessarily limited to: (i) component failure/destruction, (ii) trace damage, (iii) component shortage (if at PCB assembly time your component is no longer in stock), (iv) errors in your circuit design that are only detected post manufacture.

(i)

For the light sensor chip, add a duplicate of the sensor chip with traces to the microcontroller. However, leave out power traces. If the original sensor fails, jumper cables can be used to power this sensor and the traces to the original sensor’s power can be scratched out.

For the battery, the voltage divider resistances may be incorrect or the voltage divider isn’t working as intended. If this occurs, an external resistor voltage divider network can be used and connected using jumper cables. Test points are included at the voltage divider to add this circuit.

(ii)

Use thick traces to account for temperature changes and spaced as far possible.

Test points at either side of a trace so that if it’s damaged it can be shorted with a jumper.

Guard traces to prevent interference at the sensor output.

(iii)

There are plenty of light sensor chips available on JLCPCB. One that is also a basic part and has a similar pinout to our light sensor chip is the C14289.

BH1750FVI

(iv)

Test points so components or certain modules in the circuit can be tested or shorted to remove them from the circuit.

Q4 Microcontroller interfacing Failure Management [5]

In text, briefly describe what measures you’ve taken in your circuit design that will enable you to manage failures such as but not necessarily limited to: (i) component failure/destruction, (ii) trace damage, (iii) component shortage (if at PCB assembly time your component is no longer in stock), (iv) errors in your circuit design that are only detected post manufacture.

(i)

(ii)

Use thick traces to account for temperature changes and spaced as far possible.

Test points at either side of a trace so that if it’s damaged it can be shorted with a jumper.

(iii)

We have found another EEPROM (C7562) with very similar specifications and the same pinout as the one we designed our circuit around (C6482). This backup component is a basic part and as of checking on 09/03/2023 it has 32937 in stock.

(iv)

Q5 Power Subsystem Schematic [10]

Insert a image showing the subsystem schematic Marks will be given as follows but also note the point of this submission is so that you can get feedback from tutors to learn and to improve your design. - [6] Appropriate Circuit - [2] Neat and correct labels of both components (name and value) and nets (think about what would be most useful to a future engineer attempting to read, update, or reuse your schematic) - [1] Neatness of layout - [1] Appropriate sheet labelling including: version, title, author, and any appropriate explanation/notes (anything an engineer - yourself or someone entirely unfamiliar with the schematic - would need to know about the circuit or components selected)

Q6 Sensing Subsystem Schematic [10]

Insert a image showing the subsystem schematic Marks will be given as follows but also note the point of this submission is so that you can get feedback from tutors to learn and to improve your design. - [6] Appropriate Circuit - [2] Neat and correct labels of both components (name and value) and nets (think about what would be most useful to a future engineer attempting to read, update, or reuse your schematic) - [1] Neatness of layout - [1] Appropriate sheet labelling including: version, title, author, and any appropriate explanation/notes (anything an engineer - yourself or someone entirely unfamiliar with the schematic - would need to know about the circuit or components selected)

Q7 Microcontroller interfacing Schematic [10]

Insert a image showing the subsystem schematic Marks will be given as follows but also note the point of this submission is so that you can get feedback from tutors to learn and to improve your design. - [6] Appropriate Circuit - [2] Neat and correct labels of both components (name and value) and nets (think about what would be most useful to a future engineer attempting to read, update, or reuse your schematic) - [1] Neatness of layout - [1] Appropriate sheet labelling including: version, title, author, and any appropriate explanation/notes (anything an engineer - yourself or someone entirely unfamiliar with the schematic - would need to know about the circuit or components selected)

Q8 Planned ERCs [5]

* Short circuit detection
* Open circuit detection
* Unconnected pin detection
* Clearance checks
* Net list comparison

Q9 Updated BOM [4]

Insert a link to your updated BOM in your git repository. This should be a csv or excel file that you exported from KiCAD that includes: Component name, Component Count, Component $ value, Component JLC part number