

COURSEWORK REPORT GUIDE

Block Diagram + Quantitative Description of Whole Project / Quantitative Predictions

Specification

Brief Quantitative Description of Each SS i.e. must have numbers for everything

Fully Labelled Circuit Diagram of Whole Project inc All Component Values

Subsystem 1. Title

Circuit diagram of SS fully labelled with values etc

Prediction of what it will do based on **numerical calculation** of component values.

Test procedure – circuit diagram with test equipment connected.

Prediction of test outcomes tables/graphs.

Test results/tables and graphs

Analysis of tests results

Comparison to predictions

Impedance matching/ connecting sub systems

Sub titles

1. Circuit diagram
2. Component values.
3. Test procedure
4. Prediction of test outcomes
5. Test results
6. Analysis of tests results
7. Comparison to predictions
8. Impedance matching

Testing Whole Project

Description of test

Test results / Tables / Graphs

Analysis of results / Relate to Predictions/Specification

- You are going to design and build an electronic circuit that solves a **“problem”** (application) in a real life situation where electronic circuits can help.

The digital circuits at your disposal are:

1. **Gated Schmitt inverter relaxation oscillator with audio/visual output.**
2. **Sensor activated Bi-stable**
3. **Logic system**
4. **555**

- The **“problem”** needs to be **specified in detail including references**. The specification needs to be both **qualitative AND quantitative (numbers)**. Include tolerances ie $\pm 100\text{mV}$
- Next you must produce a clearly labelled **sub-system (block) diagram** of your solution.
- Now explain **qualitatively AND quantitatively** what each sub-system does; and how the sub-systems combine to **predict** the solution to your “problem”.
- Must be at least **three** subsystems.
- Use timing diagrams to **predict** how each sub-system will process its’ input signal.
- You now need a **circuit diagram (drawn on Circuit Wizard)** of your solution. Every component value must be shown. **Ideally it should perform the task in simulation mode.**
- Explain **in detail** how the **circuit** works; at **component level**. Use **relevant equations** to confirm component values in your circuit.
- Next explain now how relevant tests **will be** performed on each sub-system.
- Show on a new circuit diagram where the test equipment; such as voltmeters and CRO’s etc, will be connected
- Build an **immaculate circuit**. **Photograph this** and add to the report.
- **Carry out the tests** on each sub-system, record these in appropriate **tables**.
- Plot/print graphs (CRO traces) and/or timing diagrams of your **actual** results as appropriate.
- Test the **complete circuit**; again recording the results in tables and/or graphs.
- Compare **actual** results with **predicted** results. No need to explain differences here. Just state what was the same and what was different and by how much (e.g. +0.2V etc)
- State **two** possible improvements to your circuit.
- Explain **in detail** how these will improve its’ function.
- When all complete **tick off the check list** attached.

1. Clear analysis of problem with at least **three quantitative** predictions. ☐
2. Clear fully labelled block diagram + fully labelled circuit diagram. ☐
3. Detailed quantitative description of the circuit function and operation. ☐
4. Photograph of immaculate working circuit. ☐
5. Some mention of safe working procedures ☐
6. Test instructions and a circuit diagram showing test equipment for each SS. ☐
7. Table of predictions for each SS ☐
8. Table of results for each SS ☐
9. Comparison of predictions, actual results and initial specification for each SS. ☐
10. Complete systems testing inc a circuit diagram with test equipment. ☐
11. Table of predictions. ☐
12. Comprehensive tables of results. ☐
13. Labelled graphs and/or CRO traces. ☐
14. Detailed analysis of results and comparisons to predictions. ☐
15. Two comprehensive suggestions for improvements with explanations. ☐
16. Simple user guide. ☐

1. System planning		Band
3 marks	The candidate has provided: <ul style="list-style-type: none"> a clear analysis of a problem leading to a design specification in both qualitative and quantitative terms (typically at least 3 of each), and including 3 or more detailed realistic electronic parameters 	3
2 marks	The candidate has provided: <ul style="list-style-type: none"> some analysis of a problem with a design specification in qualitative and quantitative terms (typically at least 2 of each), and including 1 or more realistic electronic parameters 	2
1 mark	The candidate has provided: <ul style="list-style-type: none"> a limited analysis of a problem and a partial design specification in either qualitative or quantitative terms (typically at least 4 in total) 	1
0 marks	Response not creditworthy or not attempted.	
2. System Development		Band
6 - 8 marks	The candidate has: <ul style="list-style-type: none"> provided a clearly labelled block diagram for the system and developed the system as a series of sub-systems and made predictions regarding its behaviour produced an accurate good quality fully labelled circuit diagram for the system planned and produced a very well organised physical circuit layout with all wires arranged vertically/horizontally, and showed good awareness of risk assessment arranged wires with no unnecessary crossing of components which were mounted to a high standard and showed good awareness of safe working procedures 	3
3 - 5 marks	The candidate has: <ul style="list-style-type: none"> provided a labelled block diagram for the system and made some attempt to develop the system as a series of sub-systems produced an accurate well labelled circuit diagram for the system planned and produced a generally well organised physical circuit layout with most wires arranged vertically/horizontally and showed some awareness of risk assessment arranged most wires without unnecessary crossing of components which were mounted to a good standard and showed awareness of safe working procedures 	2
1 - 2 marks	The candidate has: <ul style="list-style-type: none"> made a superficial attempt to develop the system as a series of sub-systems produced a circuit diagram for the system which was partially labelled or lacked clarity produced a physical circuit layout with minimal evidence of organisation/planning and showed some superficial awareness of risk assessment/ safe working procedures 	1
0 marks	Response not creditworthy or not attempted.	

3. System Realisation		Band
5 - 6 marks	The candidate has: <ul style="list-style-type: none"> performed functional tests on all the sub-systems and recorded all relevant results tested the complete physical system prototype and provided a detailed analysis of the results using standard scientific convention which included most of the relevant electrical measurements produced an electronic system that worked consistently and reliably and included a comprehensive user guide 	3
3 - 4 marks	The candidate has: <ul style="list-style-type: none"> performed functional tests on most of the sub-systems and recorded most relevant results tested the complete physical system prototype and provided some analysis of the results using standard scientific convention which included some of the relevant electrical measurements produced an electronic system that worked most of the time and included a user guide 	2
1 - 2 marks	The candidate has: <ul style="list-style-type: none"> performed functional tests on 1 or more different sub-systems and made some attempt at recording the results tested the complete physical system prototype and provided a limited analysis of the results produced an electronic system in which at least 2 sub-systems worked most of the time 	1
0 marks	Response not creditworthy or not attempted.	
4. Evaluation		Band
3 marks	The candidate has: <ul style="list-style-type: none"> undertaken a critical and objective evaluation of the performance of the complete system which was valid, made comprehensive comparisons with the design specification and made at least 2 suggestions for improvement with explanations of how they improve the system 	3
2 marks	The candidate has: <ul style="list-style-type: none"> undertaken an objective evaluation of the performance of the complete system which was valid, made some comparisons with the design specification and made at least 2 suggestions for improvement 	2
1 mark	The candidate has: <ul style="list-style-type: none"> undertaken a simple evaluation of the performance of the complete system which was valid in few respects, made minimal comparison with the design specification and made at least 1 superficial suggestion for improvement 	1
0 marks	Response not creditworthy or not attempted.	

NOTES PAGES

What do you want to do, what is your idea?

Why do you want to do this, what justification do you have. Research.

Draw a block diagram of what it is going to do

What are the essential parts of each block/ Sub system?

What parameters will define each subsystem. Word and numbers.