

SUMMARY OF DOCUMENTATION for PRODUCT DESIGN

Final Report should be 5 or 6 Pages not including the Introductory material and the Glossary, References, and Appendix

**Don't tell me about OLD microcontrollers
Use the Appendix for Data**

General Requirements

The general specifications of the operation of a product that must be met when by the end product. These specifications should define the characteristics of the product as experienced by the end user. Examples might include such topics as number of users, power consumption, size, weight, and speed. Numerical values should be assigned to a requirement whenever possible. The Acceptance Testing should verify that the product meets the General Requirements.

Detailed Requirements

1. Description of purpose and general operation including a physical description.
2. In normal operation for input and output
 - Number and type of inputs (i.e. analog inputs, digital inputs, etc.-What do they represent?
 - Range and resolution of values (i.e. 0-600volts, +- .01 volts)
 - Frequency range (if required)
 - Such values determine the following:
 - Samples per second per channel for analog inputs or data rates for digital data
 - For outputs, what will the user see (or hear)? How does the user control the product- keyboard, touch screen, etc.
3. Other conditions
 - Response to over-range or errors of input values- What happens when something goes wrong?
 - Alarm conditions (if necessary)
 - “Hard real-time” timing constraints (if any) and overall timing diagram
4. Acceptance Testing Protocol
 - What will satisfy the “user” that the product performs as described?
5. Special Requirements
 - Power/safety/environmental considerations

Functional Specifications

1. Block diagram and description of software (SW) and hardware (HW) modules used to meet the Detailed Requirements
2. Description of the interfaces between modules – type of data exchanged, data rates, error conditions, etc.
3. Timing diagram for critical parts of system
4. More detailed description of the output data or signals
5. For the software modules and data, estimate the storage requirements.
5. Details of the User interface with the product

PROJECT REPORTS - OUTLINE AND REQUIREMENTS (Continued)

Detailed Design (Hardware and Software)

1. Flow charts, circuit diagrams, etc that describe how the product will be made.
2. Define all the I/O drivers and interrupt service routines. How will these routines be tested?
3. How will the integrated system (HW and SW) be tested?

To hand in during the semester:

Final Report- Which should include:

- General and Detailed Requirements
- Functional Specifications
- Detailed design including testing methods

(Reports to be typed and spellchecked)

Outline of Reports:

- Cover page** – Title, Course, date, and your name
- Table of Contents** – Title of each Section and Page Number
- Abstract** – Brief summary of project and main results
- Introduction** – Brief summary of the chapters or sections of the report
- Section 1** - Summary of the product – what it does, not how it does it.
- Section 2,3** - Details describing the requirements and Functional Design
- Section 4** - Detailed design information. **Put data, code, etc in the Appendix.**
- Section N** – Conclusions and results (Final Report)
- Glossary** – Definition of special terms and all acronyms.
- References** –List of all sources for the report – These may be tied to reference numbers in the report. **Note: Don't just list the references, describe them a bit in one or two sentences.**
- Appendix** – Technical data, flow charts, circuit diagrams, etc.

To be included in final project report (if applicable):

Cost Analysis

Trade offs analysis – Alternative ways of accomplishing the result – and the reasons for choosing your method

Safety and Certifications - Description and references for safety requirements and any standards that may apply – i.e. UL listing may be necessary

Grading:

- 25% Requirements, and functional specification documents
- 25% Detailed design document
- 25% Final Report format and readability
- 25% Originality and interest of topic to the class