PLEASE INSERT PROJECT TITLE HERE
(Note: Get covers from the ECE Dept.)

NAME OF STUDENT 1
NAME OF STUDENT 2
NAME OF STUDENT 3

ECE 431 ELECTRICAL ENGINEERING DESIGN
Fall 2003

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
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PLEASE INSERT PROJECT TITLE HERE

ECE 431/432 Electrical Engineering Design

NAME OF STUDENT 1
NAME OF STUDENT 2
NAME OF STUDENT 3

Fall 2003

Approved

_____
Project Coordinator

_____
Faculty Advisor

_____
Chair, ECE Department

TABLE OF CONTENTS

ABSTRACT (5 pts)

This section must be included in your report

Please provide a 200-word description of your design project. The abstract should highlight key features of your design and provide a statement on the results achieved.

1 INTRODUCTION (10 pts)

This section must be included in your report

Please provide a two-page introduction to the topic area describing the area, its importance and the many applications. Then lead into the need for the project you have selected.

2 PROBLEM STATEMENT (10 pts)

This section must be included in your report

In this section clearly define the problem to be solved, together with performance specifications and overall objectives. (1 - 2 pages)

2.1 TASKS ASSIGNED TO EACH TEAM MEMBER.

This section must be included in your report

3 DESIGN CHOICES AND PERFORMANCE CRITERIA (10 pts)

In this section, discuss different approaches to solve design problem and describe the criteria (technical performance, size constraints, power limitations, cost etc.) used to select a specific design method. State clearly the reasons that lead to a specific design approach.

Each student in the team should contribute to this section by describing his/her design task, the criteria to be used for making design choices and design methodologies.

4 DETAILS OF DESIGN (30 pts)

This section which is the heart of the document must be included in your report

Present complete details of your design, including block diagrams, flow charts, circuit diagrams layout and whatever else is relevant. (4- 5 pages)

4.1 DESIGN TASKS FOR EACH TEAM MEMBER (5 pts)

This section must be included in your report

Each student in the design team must clearly describe the specific design effort undertaken to meet the objectives of the project. (One page each)

4.2 FINAL SYSTEM (5 pts)

This section must be included in your report

How do you go from your prototype design to the final product that can be marketed. Are there fabrication issues. Can VLSI techniques or similar mass production methodologies be used. If your project involves software development, how will you go about getting the final version for eventual use by your customers. Are there guidelines or standards for development of software to meet customer requirements and expectations? (2 pages)

4.3 SOCIO-ECONOMIC ISSUES (5 pts)

In this section, you present cost analysis, product pricing, economic benefits and societal impact. (1 page)

4.3.1 Detailed Cost Analysis (5 pts)

This section must be included in your report

4.3.2 Economic Benefits and Societal Impact (5 pts)

This section must be included in your report

4.4 SAFETY ISSUES (5 pts)

This section must be included in your report

In this section, you discuss safety issues and the consequences of failure of your system or the failure of any component in your system. Also present strategies to maximize safety of your system. (1 page)

5 TEST RESULTS AND DISCUSSION (25 pts)

This section cannot be excluded.

Describe in detail the test results and your interpretation of the results in as far as how well you accomplished your design tasks (2 - 3 pages)

6 CONCLUSIONS (10 pts)

This section must be included in your report

Present in bullet format, salient and relevant conclusions drawn from your design experience. Even conclusions that are not favorable should nevertheless be included.

6.1 EXECUTIVE SUMMARY FROM EACH TEAM MEMBER (5pts)

The report will not be accepted if this section is missing.

7 REFERENCES

This section must be included in your report

8 APPENDICES

All derivations, intermediate results, detailed circuit diagrams, details of apparatus used, computer programs, photographs etc., that are not immediately relevant to the project should appear under appropriately numbered Appendices.

The design team must include the original proposal, modifications to the proposal (if any), progress reports and the executive summaries of each participating student under a separate Appendix. The final report will not be accepted, if this appendix is missing.

Vita Auctoris: A one page description of each student, his/her educational background, awards, trophies, hobbies and research interests should appear at the end as an Appendix.

All reports must be prepared on a word processor. The initial draft report should be typed double-spaced on one side only of an 8 1/2 X 11 paper. The final report should be typed with a spacing of 1-1/2. Preferred font is "Times" size 12. An equation or symbol that cannot be typed may be written in. The pages must be numbered consecutively and may not normally exceed 20 pages in length, excluding illustrations. Title Page, Approval Page, Table of Contents, List of References, Appendices, Vita Auctoris ARE NOT INCLUDED in the page count.

8.1 APPENDIX 3: GUIDELINES FOR COST ANALYSIS

One of the ABET requirements for a good design course is familiarity with costing. Each student is required to participate in this effort. When you calculate cost, you must include the following:

1) Cost of components

2) Cost of your time. (Assume that you are worth $10/hour)

3) Facilities rental (When you use lab facilities at the University or elsewhere, you are incurring cost - cost of depreciation, maintenance etc.)

4) Use of lab space - rental cost

5) Cost of fringe benefits - 30% of your wages

In assigning cost to intangibles like use of space and lab equipment, a good rule of thumb is

i) Take your wages, add 30% for fringe benefits.

ii) You must also add your course instructor's cost on a fractional basis. Thus if the class has 10 students and if one course equals one month salary, you should divide this figure by 10 to arrive at advising cost. You may assume faculty advisor cost at $100/hour (very cheap) for 5 hours/week.

There is one other issue that must be considered: pricing of a product. How does one price a product? Several factors must be considered:

1) Are similar products available in the market? If so, the price should be comparable to prices of similar products.

2) If the product is new to the market, then the price will be dictated by development cost and return on investment.

Let us say that the development cost of a product is 15,000 dollars. Let us also assume that you expect to sell 500 items in the first year and about 700 in the second year. You should try to recover your development cost in the first two years plus a reasonable return on your investment. Since projected sales is about 1200 items over 24 months, recovery cost is 15,000/1200 = $13 approx. Add to this your profit margin which could be about $13. The cost to the buyer will then be at least $26. Add to this agent commission, advertisement costs, complimentary gifts etc. Your cost would be around $30- $35/item. This is a crude analysis, but it gets you a ball park figure. In any case, the cost of the product should always be higher than the cost of the components!!

The next phase for you to consider is socio-economic factors. What is the impact of your design effort. Who does it benefit? Who will lose out? Will your product pollute the environment: chemicals, noise etc. Will your product have any risks (safety, catastrophic failure etc.). Recently a software glitch in AT & T's telephone network caused a blackout of New York for several hours. This type of software failure can have serious consequences both economically and in terms of providing essential and critical services. There were also reports of a software controlled radiation unit that caused patients to be exposed to dangerous levels of x-rays. The above examples clearly indicate the need to be aware of safety issues in any development effort, whether it involves software or hardware.

Every project will have some form of impact on the environment. The term "environment" is used in a very broad sense.

8.2 APPENDIX 4: ONE PAGE VITA

THE UNIVERSITY OF MICHIGAN-DEARBORN

Department of Electrical & Computer Engineering

1. Name and Academic Rank: MALAYAPPAN SHRIDHAR, Professor

2. Degrees, with fields, institutions and dates:

B.Sc.	1959	University of Bombay (Math & Physics)
D.MIT.	1962	Madras Institute of Technology (Control Systems)
M.S.	1967	Polytechnic Inst. of New York (EE)
Ph.D.	1969	University of Aston in Birmingham, U. K. (EE)

3. Number of years of service on this faculty: 10 years

4. Other related experience - teaching, industrial, etc.:

1969 -1985 Faculty Member, EE Dept., University of Windsor, Windsor, Ontario.
1963 -1966 Scientific Officer, Bhabha Atomic Research Center, Bombay, India.

5. Consulting:

General Cable Co., New Jersey
General Motors Co., USA
Ford Motor Co., USA
Diffracto Ltd., Canada
CGA-Alcatel, France

6. States in which registered Professional Engineer, Province of Ontario.

7. Grants and Research Contracts: NSF-ILI (94-96), ($334,518) USPS (94) ($177,000)

8. <u>Journal and Conference Publications in 1994-95</u>

1. Yi Lu and M. Shridhar, "Character Segmentation in Handwritten Words", Accepted by J. of Pattern Recognition, 1995
2. A. Nosratinia, M. Ahmadi, G. A. Jullien, M. Shridhar, "High-swing, high-drive CMOS buffer," IEE Proceedings - Circuits, Devices and Systems, Vol. 142, No. 2, pp. 109-112, April 1995
3. J. Cao, M. Ahmadi, M. SHRIDHAR, "Recognition of Handwritten Numerals with Multiple Features and Multi-Stage Classifiers," Pattern Recognition Journal Vol. 28, No. 2, pp. 153-160, 1995
4. M. Ahmadi, A. Mazinani, V. Ramachandran, M. SHRIDHAR, "Computationally Efficient Derivation of a Two-Variable VSHP and its Applications," Computers in Electrical Engineering, Vol. 21, No. 2, pp. 101-106, 1995
5. F. Kimura, S. Tsuruoka, Y. Miyake, M. SHRIDHAR, "A Lexicon Directed Algorithm for Recognition of Unconstrained Handwritten Words," IEICE Trans. (Special Issue on Document Analysis and Recognition), 1994 (Japan)
6. F. Kimura, S. Tsuruoka, Y. Miyake, M. Shridhar, "A Lexicon Directed Algorithm for Recognition of Unconstrained Handwritten Words", IEICE Trans. (Special Issue on Document Analysis and Recognition), 1994 (Japan)