

PRISM

PROJECT PROPOSAL

To: Dylan Saunders
Southern Alberta Institute of Technology

From: George Gueorguiev, Ben Chu, Steve Bergen, and Scott Hunter
insomnia design

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INTRODUCTION

This document proposes the research and development of a programmable LED array display, which we call *Prism*. Our product will utilize 256 LEDs, driven by 16 LED drivers, and controlled by an Atmel Mega16 microprocessor. This document will describe the deliverables to be completed by April 12, our research requirements and the methods we'll use to design this project.

PROBLEM

Most other lighting systems trying to create this effect are not nearly as customizable or as flexible as the *Prism*.

PROJECT OBJECTIVE

Our objective is to assemble and program a multicolored LED light display. The final result will be a professionally designed and cased 32 x 8 array of LEDs. The user will be able to program specific patterns using a serial port as well as using integrated, preset patterns for the display, including a random function. Since we are designing our software to be modular, adding functionality in the future will be easy. This way, the usefulness of the device will grow with the organization implementing it.

The *Prism* will provide:

- Colourful visualizations through the use of various colors of LEDs.
 - A clean, sleek, and unobtrusive design, while still being eye catching and interesting.
 - Easy operation using a serial port, powered from AC wall outlet.
 - Customizable computer programmable light patterns.
 - Software would allow for remote configuration of the device over the Internet.
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PROJECT SCOPE & DELIVERABLES

We will provide the client with:

- A prototype consisting of a LED board hooked up to the microprocessor and LED drivers, controlled by a laptop.

We will provide information in the form of:

- Complete electrical and PCB schematics.
 - Calculations of the total cost of the prototype phase.
 - A list of parts needed for the project.
 - Full datasheets of used parts.
 - Specifications of finished prototype.
 - Circuit diagrams of LED board and microprocessor board.
 - LED operation documentation.
 - Overall power consumption details.
 - Technical support contacts.
 - Safety requirements of device.
 - A list of sources of information used in research and references.
 - An installation guide.
 - A description of how the product works.
 - Optimal operating conditions details.
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RESEARCH & METHODS

We need to research how to program the Atmel chip and how to connect all of the devices together on the schematics and on the PCB. Also, we need to figure out what devices we need plus how many of each device we need. Some more research that needs to be done is to figure out how to create programmable displays to be sent to LED display board. To prototype and test this device we are using software and hardware provided with the microprocessor, namely an STK500 hardware programmer, and AVR Studio development environment.

TASK BREAKDOWN

A tentative summary of our project members and their tasks can be found in Table 1:

Task Breakdown	
Task	Member(s)
Diagram of case	Steve
Schematics (rough)	Scott
Finalized schematics (DXP)	Steve
Cost of project	Ben, George, Scott, Steve
Parts list	Ben, George, Scott, Steve
Datasheets	Ben, George, Scott, Steve
Programming Atmel chip	Scott
Programming user interface	George
Funding	Ben
Specifications of device	George
Information on LEDs	Steve
Power consumption of device	Scott
Technical support contacts	Ben, George, Scott, Steve
Safety requirements of device	Steve
Reference list	Ben
Installation guide	Ben
Description of how the product works	Ben
Optimal operation conditions	Scott
Testing	Ben, George, Scott, Steve

Table 1

TEAM STRUCTURE

The following is a list of the people who will be part of the design project and the assets they bring to the team:

George Gueorguiev

- Leading the programming and design.
- Using his background in C, C++, and Visual Basic programming, he will be in charge of designing the interfacing software.
- Enthusiastic about designing the look and feel of the design, as well as the overall operation of the *Prism*.

Ben Chu

- Taking care of website, record-keeping, timeline, and other documentation.

Steven Bergen

- In charge of hardware fabrication, including soldering, schematic and PCB design.
- Has a strong background in construction, working with metal, and soldering.
- Organized and clean when drawing schematics and designing PCBs using DXP and manual routing.

Scott Hunter

- He will do the majority of the electronics and microprocessor configuration.
- Knowledgeable in electronics circuits, both digital and analog.
- He is able to learn new devices quickly, digs deep when learning, making him suitable for learning the microprocessor and configuring it.

Advisors: Paul Godin, Craig Maynard, Dylan Saunders.

REQUEST FOR APPROVAL

For this project we are designing a LED display that can be set up in your place of business. The device will show pre-programmed patterns on the LED display that will be constantly changing. This is possible as we will have it programmed through a computer and updated through a serial port. This device will be beneficial for you as it will create a more visual pleasing atmosphere for the patrons of your establishment as well as a unique experience.

Approval for **insomnia design** to proceed with the proposal to design the *Prism* is hereby granted.

Client	insomnia design
Signature: _____	_____
Name: _____	George Gueorguiev
Signature: _____	_____
Name: _____	Ben Chu
Signature: _____	_____
Name: _____	Steve Bergen
Signature: _____	_____
Name: _____	Scott Hunter

Dated: _____