Smart Light Solutions

Progress Report

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1 Schedule & Overview

Smart Light Solutions is about a week ahead of the schedule outlined in our Project Proposal. Unit testing and system integration are complete. The integrated system consists of the dimming unit, light sensor, control unit, and user interface. We are currently doing functional testing on this system while preparing materials needed for the first prototype. Depending on the quality of the first prototype and the test results, the demo prototype might be different from the first prototype.

2 Hardware

Smart Light Solutions has already purchased all of the electrical components and equipment needed for building the first prototype smart dimmer. Since the oral progress report, we have received the light sensor and successfully integrated it into the prototype. Also, due to unforeseen circumstances, we were forced to buy a new PIC programmer after discovering the programmer in Lab 1 was destroying our PICs. The new PIC programmer has been used to successfully program our microcontrollers.

Our first prototype, as well as our demo prototype, will be built using the same electrical components as our current integrated system, except that they will be built on a strip board for enhanced reliability, safety, and aesthetics. Below is a list of hardware components we will be using for the demo prototype.

Equipment List	**Obtained? (Y/N)**
Opto-coupler	Yes
Pushbuttons	Yes
Light sensor	No
Strip board	Yes
Encloser (hobby box)	Yes
AC to DC power supply (9V DC)	Yes
Incandescent bulbs	Yes
Dimmable fluorescent bulbs	Yes

Table 1: equipment needed for the prototype dimmer

Smart Light Solutions has already begun building the first prototype.

3 Control Algorithm

The control algorithm is now able to correctly adjust the brightness of an incandescent bulb based on the changes from an external light source (lamp) and a user input. Also, it allows us to dim the bulb to 5% (nearly completely off) from full brightness. A few lines of code will be added to ensure the bulb has the capability to turn completely off.

Occasionally, the bulb brightness will not adjust to the correct level right away due to some arbitrary bouncing around before it stabilizes. Smart Light Solutions will work to improve the performance of the control algorithm before the time of demo. Furthermore, we will move functional testing of the control algorithm to more realistic circumstances involving AC current from the walls directly (as opposed to using a step down transformer) with household incandescent and dimmable fluorescent bulbs.

4 Budget

Smart Light Solutions received $600 funding from ESSEF. So far, $235.40 remains.

5 Moving Forward

Being ahead of schedule will not alter the determined pace at which the members of Smart Light Solutions work. Even though our demo is approximately 4 weeks away, we will use this time to iron out any potential problems that may arise during the demo. Also, because of the nature of the smart dimmer, we will enhance the logistics of how to properly demonstrate its capabilities as close to real world scenarios as possible. This will involve seeking out a more suitable demo room and booking it in advance.

Fred suggests that for the safety concern, the control unit should be physically separated from the dimmer (TRIAC) unit, to avoid the 120VAC. For this reason we will tap the Mains and transform it to 12 VAC, then use that to sync the control unit. The control unit will then output the control signal to the separated Dimmer Unit through one wire. The setup is shown in Figure 1.

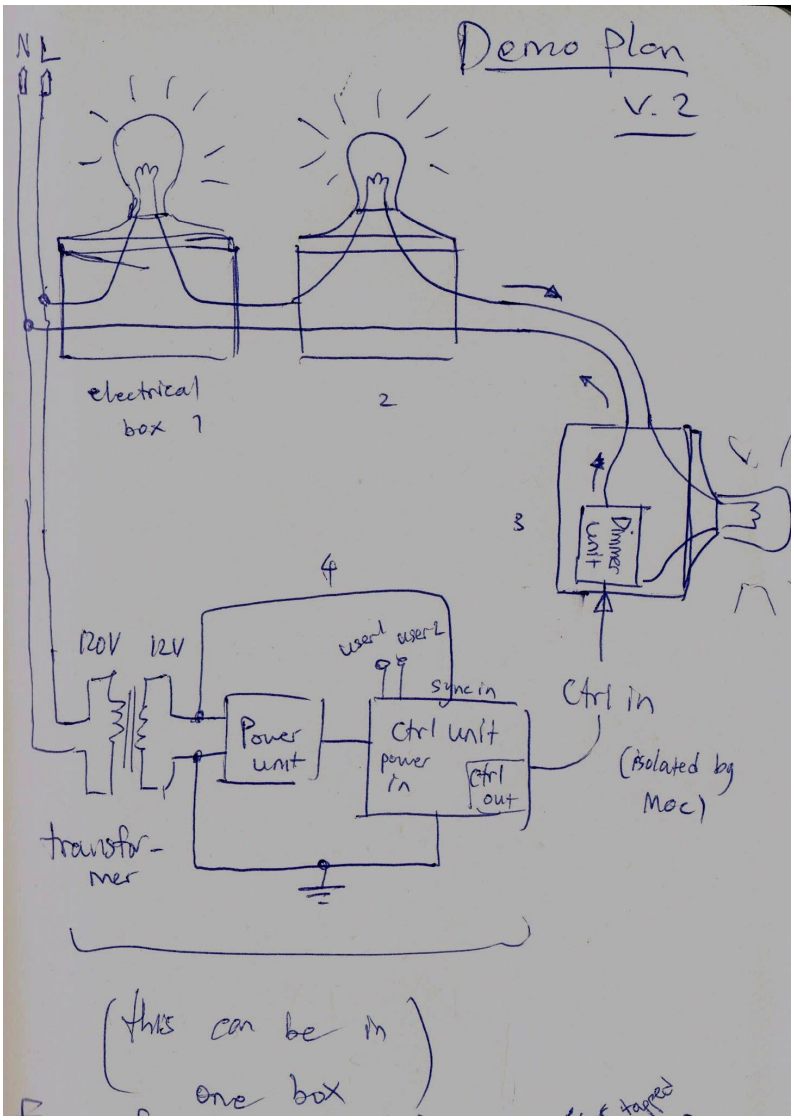

Figure 1: Schematic diagram for the demo setup

6 Acknowledgement

We would like to also thank Fred Heep for his help with setting up demo for high power and safety concerns.