



## Super Retro Faderbox

### MEDIA INTERFACE TECHNOLOGY

[Final Project Proposal]

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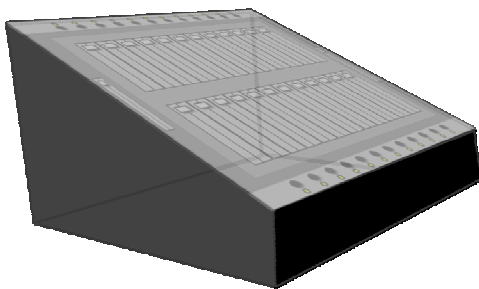
### 1. Introduction

As the name implies, the Super Retro Fader Box combines past technology with contemporary microprocessor technology in order to create a hybrid device that brings the aesthetic appeal of the 1950's to the modern home computer.

### 2. Concept of Project and Motivations

The Super Retro Fader Box (*figure 1.*) is a hybridized form of rescued technology. The main interface consists of two rows of twelve faders that are housed in plastic molding that was removed from a light-board kept operational in the UCSB Drama Department's Old Little Theater from 1963 until it was finally decommissioned in 2002.

In addition to the aesthetic of reusing and absorbing 1950's technology, motivation for this project developed from the idea of using the physicality of a real-world light-board interface in the control of audio and video processes in terms of scenes that are crossfaded from one state to the next.



*Figure 1.* Conceptual 3-D rendering of the Super Retro Fader Box.

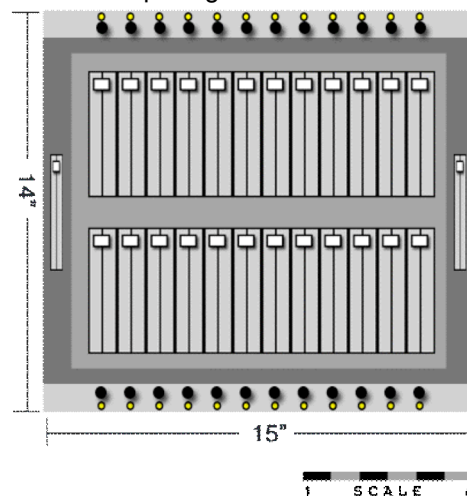
### 3. Interface and Interaction Design

As stated in section 2, the core hardware of the Super Retro Fader Box consists of two rows of twelve faders that are housed in

plastic molding. These two rows were originally used to set scenes in a theater lighting system. Scenes could be set on one row, and then crossfaded from the previous scene for complex lighting transitions. The original crossfaders were left in the original housing for the light-board. A new housing will be built for more portability and to allow room for added functionality. The new housing will be explained in further detail below.

#### 3.1 Additional Controls

In order to make the Super Retro Fader Box more compelling as a media controller



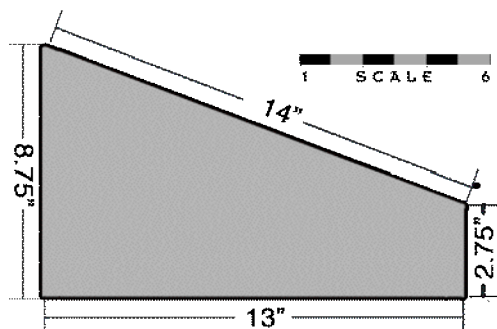
*Figure 2.* Top view of the Super Retro Fader Box.

additional hardware will be added. *Figure 2.* shows the top view of the Super Retro Fader Box. The lighter grey portion in the center represents the original plastic molding of the fader section of the unit. The dark grey border around the fader housing is a mounting plate. In addition to the original faders, two crossfaders have been added to the left and the right sides. Also two banks of twelve SPST pushbuttons have been

added to the top and bottom of the unit. Mounted in the unit are twenty-four LED indicators, one for each pushbutton, that indicate a pushbutton's state (on or off).

### 3.2 Housing

The new housing for the Super Retro Fader Box will be a simple design. As shown in *figure 2*, the top will be extended one inch above and one inch below the original mounting to make room for the SPST buttons and the LED's. From the side view in *figure 3* one can see how the housing will tilt, this will make the unit more comfortable to view and use.



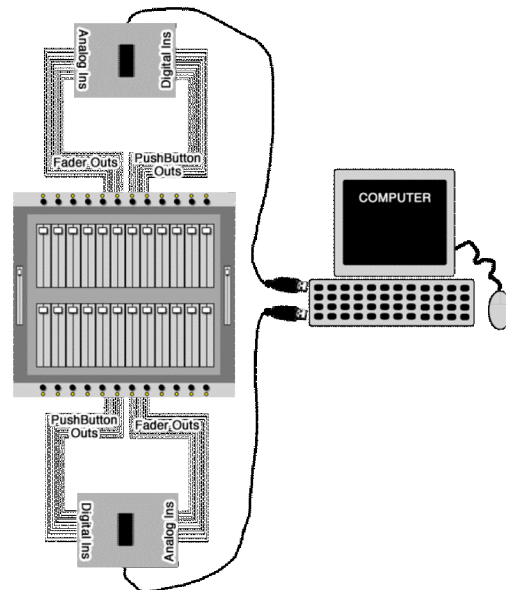
*Figure 3.* Side view of the Super Retro Fader Box.

### 3.3 Circuitry and Interfacing

The Super Retro Fader Box is designed to interface with a computer via the PIC 18F4550 microcontroller made by Microchip. The block diagram in *figure 4* shows how the interface connects with a computer. The unit has two types of interaction, faders and buttons. Faders are continuous controllers that require an analog to digital conversion in order to be understood by the computer. Whereas buttons map well to digital, therefore requiring no conversion. Because of the number of inputs from the mixer two PIC's are required in order to map all of the controls to the computer.

Each of the PIC 18F4550 microcontrollers has thirteen analog inputs (that have A to D conversion built in) and seventeen digital inputs. But the Super Retro Fader Box has 24 faders and pushbuttons. It would be possible to design a system that used multiplexors to get all of the controls interfaced to one PIC, but a simpler solution is to divide the Super Retro Faderbox into

two groups, with each group is assigned to its own PIC.



*Figure 4.* Block diagram the Super Retro Fader Box.

By dividing the Super Retro Faderbox into a top group that consists of the upper bank of faders and buttons and the crossfader on the right of the board, and a bottom group that consists of the bottom bank of faders and buttons and the left crossfader, each group will have the exact same number of controls to map to the PIC. Details for the mappings from one of the group's controls to the pins on a 18F4550 PIC are found in *Table 1*.

*Figure 5* shows the schematic for one of the groups of the Super Retro Faderbox. The schematic is a simple extension of the "CREATE Hello World" circuit (<http://www.create.ucsb.edu/~dano/CUI/>) developed by Dan Overholt. The main additions are the inclusion of the slider and pushbutton schematics. The sliders are wired like most potentiometers, in a voltage divider scheme. The pushbuttons control not only the digital input to the microcontroller, but turn on an LED as well. As stated above, the LED is used to tell the user the current state of the button (on or off).

