Preliminary Design Report:
Beat Box Sensei

The project is inspired by an art called "beatboxing." Beatboxing is the idea of mimicking drum sounds with the human mouth. This project uses two particular sounds, "boom" and "shhh", to send MIDI signals to computer software and outputs actual drum sounds. Beat Box Sensei (BBS) has many purposes such as the potential to serve disabled people who want to play drums and for musicians who are looking for different ways to express themselves. BBS is a MIDI controller.

By

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Table of Contents

Features

The Beat Box Sensei:

- serves as a MIDI device, i.e., meets MIDI standards
- utilizes any microphone with XLR 3 connection
- distinguishes between two different beat box sounds
- uses a UART to send serial data (built in the PIC)

Components/Concept Selection

(This section explains all of the components and reasons for choosing such components compared to others alike.)

The microcontroller we decided to use was the Programmable Interface Controller (PIC). This particular controller has been used by many other programmers in MIDI related projects and is widely known in this field. The PIC also has a built-in UART, which will be used to send the MIDI signals (which are in serial). Figure 1 shows how the PIC is connected to a MIDI DIN socket. Figure 2 shows what the chip looks like.

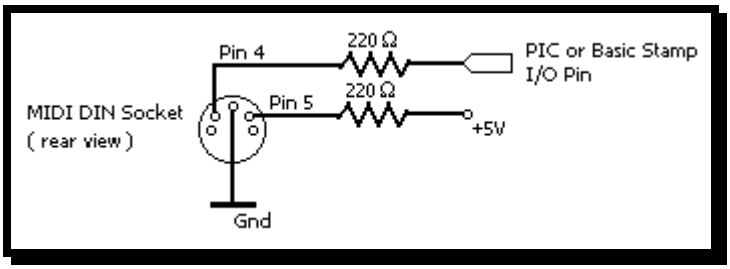


Figure 1

Figure 2

The input component is a Sennheiser E825S dynamic microphone with an XLR 3 connection, shown in Figures 3 and 4 respectively. We are using this particular microphone because we have open access to it and the cost of access is free. It has a frequency range of 80 – 15 kHz.

Figure 3


Figure 4

The component that takes in the MIDI signal is the M-Audio Firewire Audiophile external soundcard, shown in Figure 5. It is connected to my laptop via firewire.

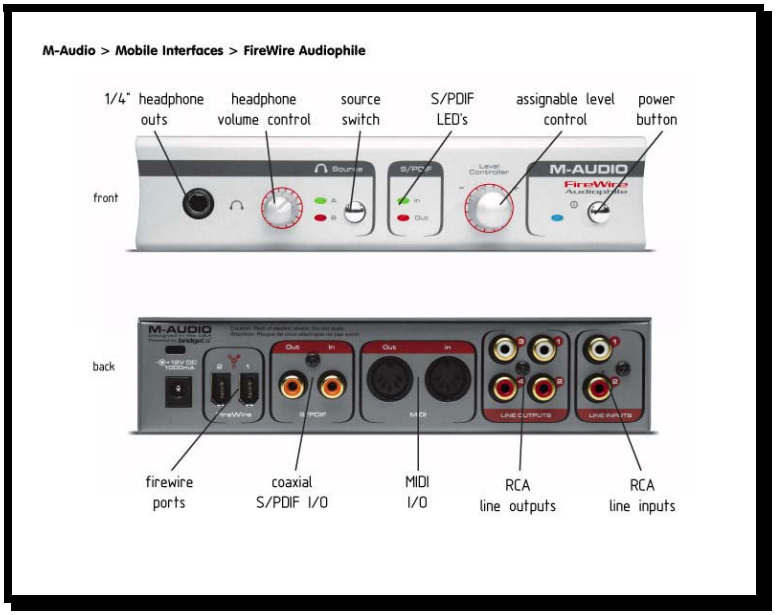


Figure 5

The software used to interpret the MIDI signal and output the drum sounds is called FL Studio by Image-Line. It is a sequencer used to produce music. In figure 6, the software's MIDI system settings are shown. Figure 7 shows the program called Battery 2, which is part of the FL Studio software. This will be used to control the drum sound selections.

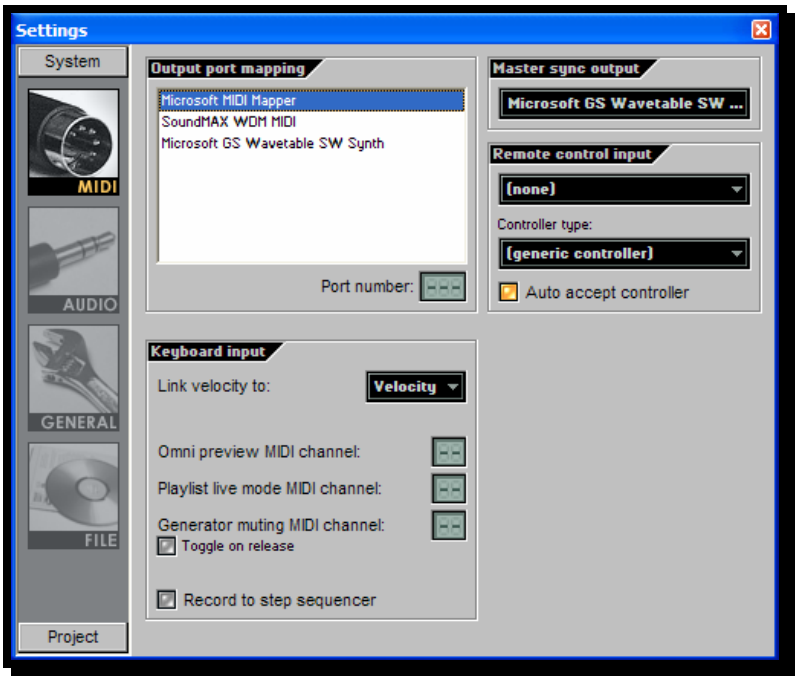


Figure 6

Figure 7

Figure 8 shows how the entire system is connected. The PIC will encompass the "comparators" and "midi conversion" on the chart. The low pass filter and high pass filter will be made via resistors and capacitors.

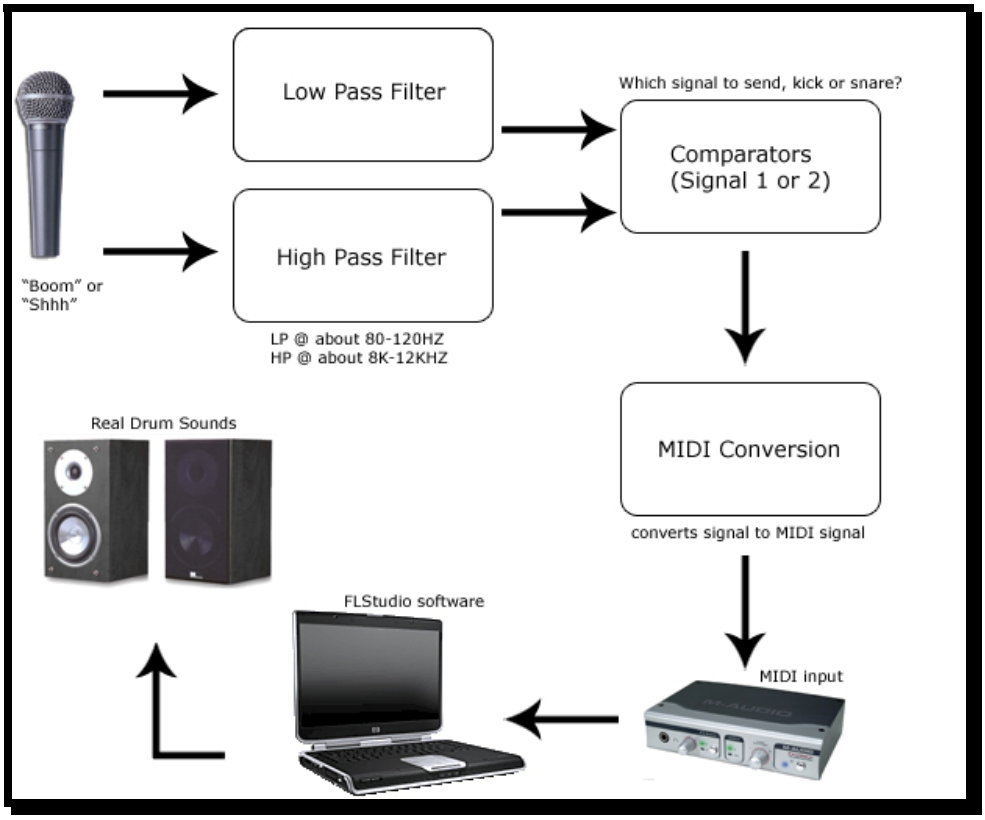
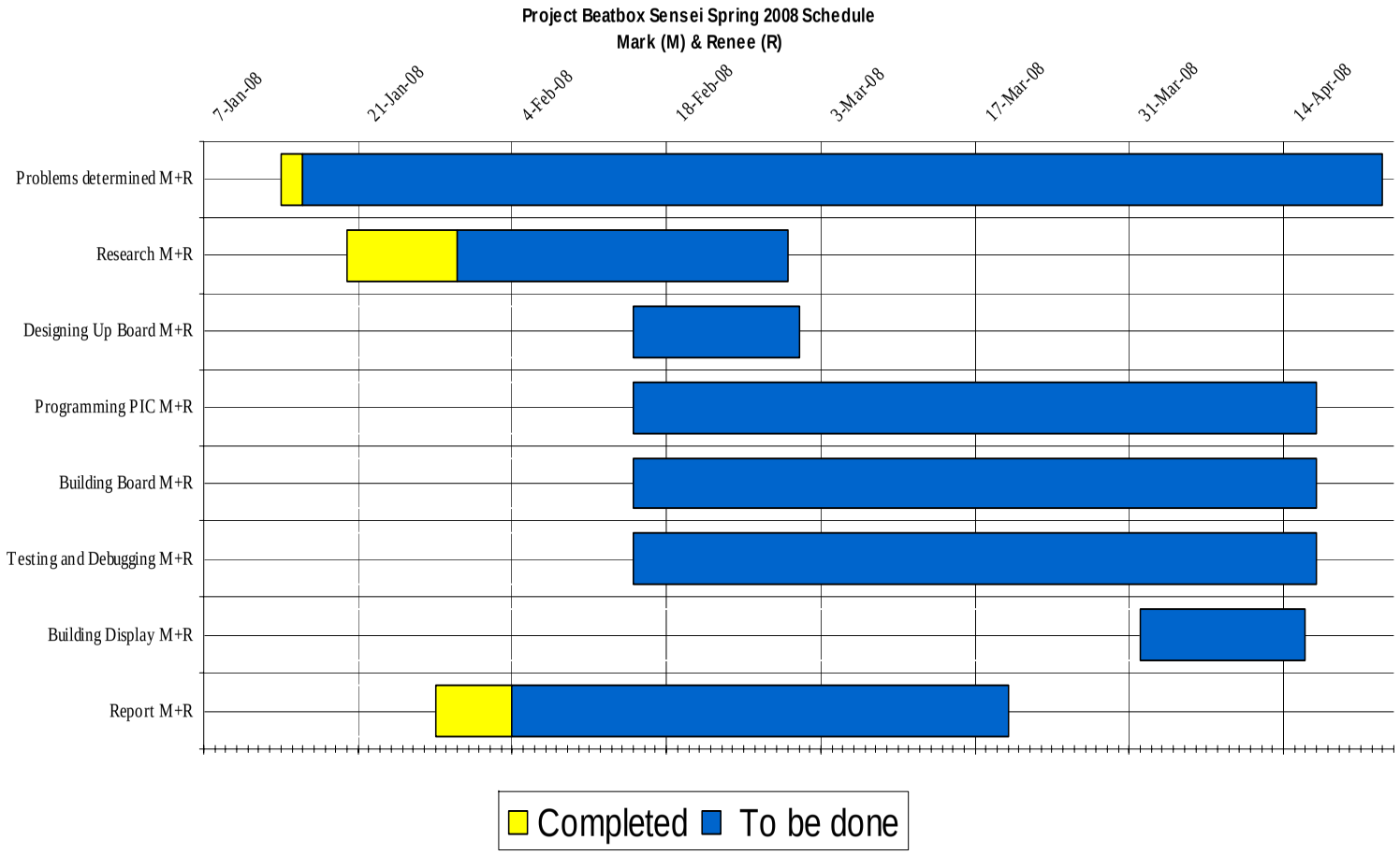


Figure 8

Division of Duties

Renee	Mark
Researching and learning	Researching and learning
Designing board	Designing board
Programming PIC	Programming PIC
Building Up board	Building Up board
Testing and debugging	Testing and debugging
Building display	Building display
Write Report	Report


Project Beatbox Sensei Spring 2008 Schedule
Mark (M) & Renee (R)
7-Jan-08
21-Jan-08
4-Feb-08
18-Feb-08
3-Mar-08
17-Mar-08
31-Mar-08
14-Apr-08
Problems determined M+R
Research M+R
Designing Up Board M+R
Programming PIC M+R
Building Board M+R
Testing and Debugging M+R
Building Display M+R
Report M+R
Completed
To be done