WIRELESS PORTABLE MP3 PLAYER
(WPMP3)

by

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James Weland

A SENIOR THESIS PROPOSAL

Presented to the Faculty of
The Computer and Electronics Engineering Department
In Partial Fulfillment of Requirements
For CEEN 4980 Senior Thesis Proposal

Major: Computer/Electronics Engineering

The University of Nebraska-Lincoln, Omaha Campus

Spring, 2003
The accompanying Senior Thesis Proposal, "Wireless Portable MP3 Player (WPMP3)," is submitted in accordance with the requirements of CEEN 4980, Senior Thesis Proposal. As stated in the proposal, the project will be done for and funded by Nick Berglund, Dustin Stednitz, and James Weland.

Respectfully yours,

Nick Berglund      Dustin Stednitz      James Weland
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BACKGROUND:

In today’s world of accessibility and portability there are several avenues of technology that could use some improvement. One such realm is home electronics; there exists the capability to play downloaded music from personal computers to home stereos. The main problem with this technology is the ability to interface the home computer with the home stereo. Right now the most common way for people to interface the two systems is by using numerous cables and connectors. The placement of these devices in the home must also be taken into consideration. These devices would generally have to be close depending on the cable and if users a willing to run cables through walls, floors, and ceilings for a connection. The cost of this type of job may deter people from the use of this technology. Even if the job is completed, the portability of the devices is limited. Moving a computer or stereo to another room in the house would require the daunting task of rewiring the two components.

THESIS OVERVIEW:

A wireless portable MP3 player will bring portability and accessibility together by eliminating the need for messy cables and connectors. This unit will use a wireless interface between the personal computer and the MP3 player itself. An interface on the computer will allow the user to transfer MP3 files to the MP3 player wirelessly and store them on a storage device. Once this simple procedure is accomplished the user then will be able to use the MP3 player to play the music through a headphone jack on the unit or use any FM home stereo receiver to play the music wirelessly. All the user needs to do is tune the stereo to a certain selected FM frequency and push play. This gives the user the ability to listen to all their downloaded music without the constraints of wires.
GENERAL DESCRIPTION:

The task of transferring an MP3 file from a PC to our MP3 device, and then to a FM receiver will require several parts. First we will use a software package on the PC that will allow the transfer of the MP3 files from the PC to our MP3 player. This wireless transfer will be accomplished by means of an RF transceiver. Both our MP3 player and the PC will have the same wireless technology.

The MP3 player will consist of a microcontroller, MP3 decoder, Digital to Analog Converter, memory, FM transmitter, RF transceivers, power supply, keypad and an LCD screen. The MP3 player will receive the data from the RF transceiver and be stored in the memory. Next the stored data will be decoded by the MP3 decoder and then converted to an analog signal by the DAC. The analog signal will then be played, when the play key is read from the keypad, through the headphone jack or transmitted to an FM stereo by means of the FM transmitter. The LCD screen will display information about the MP3 file being played.

Block Diagram:
See Appendix A
COMPONENTS LIST:

The components for this project will consist of four main sections:

- MP3 Player
- FM Transmitter
- RF Transceivers
- Miscellaneous

**MP3 Player:**
- Microcontroller
- Memory
- DAC
- MP3 Decoder
- LCD
- Audio Output (Headphones Jack)
- Input Device - Keypad

**FM Transmitter:**
- FM Transmitter

**RF Transceiver:**
- RF Transceiver

**Miscellaneous:**
- Resistors
- Capacitors
- Batteries
- Headphones
- Etc.
TIME SCHEDULE:

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<th>Tasks</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
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<td>I. Research</td>
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<td>II. Ordering Parts</td>
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Figure 1: Proposed Time Table

ACCEPTANCE TESTING:

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<td>LCD</td>
<td>Properly Displays MP3 Information</td>
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<td>Headphones</td>
<td>Correctly Outputs MP3 Audio</td>
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<td>FM Signal</td>
<td>FM Receiver Correctly Plays MP3 Audio</td>
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<td>RF Transceiver</td>
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<td>Keypad</td>
<td>Play, Stop, and Skip Keys Function Properly</td>
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Table 1: Proposed Acceptance Testing
TEAM MEMBERS:

- Berglund, Nick
- Stednitz, Dustin
- Weland, James

ASSIGNMENT OF EACH MEMBER:

<table>
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<tr>
<th>Team Member</th>
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<th>FM Transmitter</th>
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Table 2: Proposed Team Member Tasks

SUMMARY:

This project will wirelessly transfer an MP3 file from a PC to our portable MP3 device, and then transmit the audio wirelessly to a FM receiver or headphones. The MP3 player will consist of a microcontroller, MP3 decoder, digital to analog converter, memory, FM transmitter, RF transceivers, power supply, keypad and an LCD screen. The MP3 player will receive the MP3 data from the PC via RF transceiver and store the data to memory. The stored data will then be decoded and converted to an analog signal. The analog signal will be played through the headphone jack or transmitted wirelessly to a FM receiver, after the “play” key is pressed. The LCD screen will display information about the MP3 file being played.
Appendix A

Project Block Diagram