<div align="center">Initial Project Proposal</div>

Year: 2014 **Semester**: Spring **Project Name**: Every1 DJ

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1.0 Description of Problem:

Whenever a group of people get together and have a discussion, it's common for a disagreement about music to come about. This phenomenon is even more likely when the group activity involves music in itself. Social gatherings often involve music selection and enjoyment, to varying degrees. However, especially among large groups of people engaging in fun music-centered activities like karaoke and dancing, disagreements on which songs to play and when will occur frequently.

This not only becomes an issue in residential settings, but also occurs at public venues like restaurants and bars. These public establishments enjoy as much business as they can get, and pleasing their customers is one of their top priorities. Their job involves trying to get customers to remain at the bars for longer periods of time, while also encouraging customers' friends to join them. With this product, people will be able to enjoy *and* have input into the songs that they hear during social events.

2.0 Proposed Solution:

With most music at places such as parties, events, sports facilities, dances, and bars, they are based on random music that only a select few enjoy. With this project, we will allow people to personalize their music experiences everywhere they go. People can enjoy their favorite activities at the bar while listening to new and exciting music that the fellow customers choose. Our project, therefore, proposes a solution in the form of an electronic device which will handle song requests from users' smartphones (or other web-connected devices). Users will access the web application via the URL, search for a desired song, and cast a vote for it to be played. The voting and song metadata will be relayed to a Raspberry Pi via Wi-Fi communication. After

analyzing the current playlist and voting status, the Raspberry Pi will send the optimal song to be played over its integrated 3.5 mm audio output jack. Song selection and voting status will be displayed on an LCD on the front of the device. Also attached to the device will be controls for modifying the audio, lighting, and display data.

3.0 ECE477 Course Requirements Satisfaction

3.1 Expected Microcontroller Responsibilities:

ECE477 is an embedded systems course which requires the use of a student-programmed microcontroller. In the proposed solution, the microcontroller will serve three main purposes, with potential for expansion upon completion of the initial three. First, the microcontroller will sample the audio output and power an LED array in a manner which is meaningful to the rhythm and volume of the currently playing song. Second, the microcontroller will control a mounted LCD which will display relevant song metadata, as well as a snapshot of the playlist. Lastly, the microcontroller will sample input from manual controls to manipulate light patterns, audio settings, etc.

3.2 Expected Printed Circuit Responsibilities:

ECE477 is an embedded systems course which requires the use of a student-designed printed circuit board (PCB). The proposed solution will utilize the PCB to interface the microcontroller to the Raspberry Pi, LCD, physical control mechanism, and output devices (lights and sound). Other interfacing needs might arise throughout the duration of the course.

4.0 Market Analysis:

Every year there are 2.5 million weddings that each has the opportunity for guests to request songs during the reception. As of 2010, there were 21.0 million students enrolled in degree-granting institutions. Assuming at least half of these students enjoy social gatherings, we would have 10.5 million customers that would be waiting in line to buy an 'Every1 DJ'!

5.0 Competitive Analysis:

5.1 Preliminary Patent Analysis:

There are multiple patents currently available that address playlist creators for group settings. Most of these include merging of playlists from certain groups. The following two patents described below were most relevant to the given design specifications for Team 2's project proposal.

5.1.1 Patent #1: US 20130254663 A1
Patent Title: Systems, Methods, Apparatus, and Articles of Manufacture to Provide Guest Access
Patent Holder: Sonos, Inc.
Patent Filing Date: April 26, 2013

This patent makes use of two controllers that will display the playback queue for media. Guests are then able to select certain media to add to the playback queue. The patent describes this product as, "the ability to provide crowd-sourced playlists and/or facilitate guest access to music services may be valuable". The patent also allows guests to temporarily add their own media to the playback list. Multiple songs can be played at once throughout different rooms in a house. One disadvantage to this approach is that guests must use the controllers to access the playlist.. This can become difficult when gatherings become very large. There is also no use of a voting system to push songs higher in the queue, which could upset guests who want to hear a particular song. [1]

5.1.2 Patent #2: EP1549919 A2
Patent Title: Compact disk musical jukebox with digital music library access
Patent Holder: Rowe International Corporation
Patent Filing Date: September 26, 2003

This patent makes use of the original jukebox design but is enhanced by accessing an online data server. When a song is selected by the user, the device will either use the CD associated with the selection or will retrieve the selection by the online database. One of the main differences that this patent has when compared to our design is that when accessing the online database, the jukebox will download the given song to the jukebox and then delete it once the song is complete. Our design will stream music from an online database without needing to download the media. [2]

5.2 Commercial Product Analysis:

5.2.1 Commercial Product #1: iTunes DJ live mix

iTunes allows a host to become a DJ for an event by opening up their playlist to their guests. By connecting to the hosts' Wi-Fi they are able to select and vote for which songs they would hear next. The host may also protect the party playlist by requiring a password. To vote for songs they use the Remote app from the iTunes store. The pros to this product is that the host can protect it with a password in case they only want certain individuals to be adding songs which we may want to look into when we create our design. However, a con to this idea is that this app is not very user friendly since it is very hard to find on the computer as well as your phone. I also feel as though you have to be sharing computer to even be able to put it on a different person's playlist. This product is not getting the publicity it needs to have since not many people know of this feature. But this function of iTunes DJ may have not been a big hit because from iTunes 10 to ITunes 11 the functionality of iTunes DJ diminished. [7]

5.2.2 Commercial Product #2: Playmysong Spotify

Playmysong Spotify app allows Spotify and your guests to act as the wedding DJ's. The bride and groom can create a playlist and allow the guests to select songs to play during the reception. While guests are choosing songs, they can "dedicate" a special song to the happy couple, leave shout outs, "like" requests, and tell everyone about the music they're celebrating to at your wedding. The cons to playmysong is that you need to sign into all these accounts in order to start recommending and suggesting songs and when an individual is at a party, they are not going to want to spend that much time signing into a device. We will want our device to be of easy access. However, an idea we did like from playmymusic was that of requesting songs and giving reasons for it because I feel as though that would make it more interactive as well as giving announces like happy birthday or something else depending on the party. This also gives the host to create their own playlist first before users starts suggesting songs. [8]

5.2.3 Commercial Product #3: Djtxt powered by Grooveshark

Djtxt allows users to send in song requests by text message and the device plays the music. With this device, you will be able to see who added each song as well. Ultimately at the end of the

party if you enjoyed the music, you can get a look at the playlist for the night. One of the pros of this device that we may want to incorporate into our own design is the playlist that is created and out to the public just in case they really like the playlist and wanted to use it on another occasion Therefore, with this idea we can take the party title and you can search old playlists of parties you have been at. One of the cons of this system is that it does not sync the songs into a playlist on how many people like the song, therefore bad songs could be played by chance. DJtxt takes an incoming message through an SMS gateway to the server which maintains the playlist. Once the playlist for the DJtxt is selected then a JavaScript code polls the server which controls the grooveshark player. It uses Tinysong API to look up songs, LAST.fm API to look up album covers, and Twilio to send and recieve SMS messages. [6]

5.3 Open Source Project Analysis:

There are a few hobbyist projects similar to the desired project. Two of these projects are outlined below.

5.3.1 Open Source Project #1: Raspberry Pi Wifi Internet Radio Player

An individual decided to turn a cheap Wi-Fi router into an internet radio using Raspberry Pi. He was able to control which stream the player is listening to using the Adafruit Cobbler to breakout the pins so that the python program is just listening for button presses. The player moves on to the next item in the list once the appropriate button is pressed. The list can be updated by SSHing into the Raspberry Pi. [4]

5.3.2 Open Source Project #2: Wifi Radio

 This project is very similar to the first with the end result being a wifi radio. However, a wireless router was modified instead of using Raspberry Pi. The router was supported by OpenWRT, an open source Linux distribution for small embedded devices and a cheap stereo audio adaptor was added. This project went one step further and added an LCD display and tuning controls. [5]

6.0 Sources Cited:

[1] Paul Bates, Lee Keyser-Allen, Jonathan Lang, Diane Roberts, Nicholas Millington. "Systems, Methods, Apparatus, and Articles of Manufacture to Provide Guest Access." U.S. Patent 20130254663 A1, Sept. 26, 2013. Available: https://www.google.com/patents/US20130254663?dq=guest+dj&hl=en&sa=X&ei=3NjWUuOkB8Se2gWTx4CQBA&ved=0CDcQ6AEwAA [15 Jan, 2014].

[2] Jerry Cantrell, James Johnson, Jeffery Kalis, Roger Wilson. "Compact disk musical jukebox with digital music library." Europe Patent 1549919 A2, Jul. 6, 2005. Available: https://www.google.com/patents/EP1549919A2?cl=en&dq=music+for+parties&hl=en&sa=X&ei=SeLWUq7gFMy_2QXf4oDwBg&ved=0CEUQ6AEwAg [15 Jan, 2014].

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[5] Keyzer , J. "Building a Wifi Radio" Feb. 9 2008. Available: http://mightyohm.com/blog/2009/02/building-a-wifi-radio-part-8-adding-a-tuning-control/

[6] Grooveshark. "DJtxt." Available: http://djtxt.me/ [Jan. 15, 2014]

[7] Apple Inc. "iTunes 10 for Mac: Create a mix using iTunes DJ." Available: http://support.apple.com/kb/PH1741?viewlocale=en_US, Nov. 27, 2012 [Jan. 15, 2014]

[8] Tumblr. "Playmysong." Available: http://playmysong.tumblr.com/post/43603542365/playmysong-spotify-your-wedding, 2012 [Jan. 15, 2014]