

## **IPRO 344**

### **Audio Quality & Energy Efficiency for Mobile Devices and Intercoms**

#### **Objective**

The IPRO 344 team has set forth the following objectives for the 2009 spring semester as well as the expected results for the semester. IPRO 344 began as an investigation into the applications of Class D amplifiers for low-power and high-quality audio devices. This semester's IPRO team will focus on integrating the Class D amplifier into a drive-through order system. In addition to the Class D amplifier, this semester's team will be investigating high-fidelity microphones, microphone preamplifiers, and speaker mounting.

#### **Task/Organization**

IPRO 344 was split into eight sub teams at the beginning of the semester. They are; Circuit and Signal Processing Team, Economic Team, Documentation Team, Kiosk Modification and Testing Team, Project Coordination Team, Poster board Team, Purchasing Team, Research Team. Other roles were assigned to individuals in the IPRO 344 team. Those roles are; Agenda maker, iGroups coordination, IPRO 344 representative, master schedule maker, weekly task list organizer, time/minutes keeper, time sheet organizer. Because of the high level of organization in IPRO 344 it allowed the team and sub groups to accomplish many different tasks with a high degree of efficiency.

#### **Accomplishments**

During the course of the semester IPRO 344 accomplished many of the goals it set out during the beginning of the semester. The kiosk modification and testing team set out to design and build a brand new kiosk that was more efficient and practical. That in turn helped create a better base the team could test the new hardware from. The existing electronic equipment created during the last semester of IPRO 344 was duplicated and improved with new parts. The duplicated electronics resulted in more user friendly equipment and higher quality standards were achieved. Along with the improved hardware, testing methods were drastically improved due to better software and team member collaboration which resulted in more thorough qualitative and quantitative test results.

#### **Critical Barriers and Obstacles**

There were many obstacles that the members of IPRO 344 had to overcome during the course of the semester. Time was always a factor in the completion of the group's goals. The creation and design of a new kiosk was a major obstacle early in the semester but the kiosk modification team with the help of other group members designed a built a brand new kiosk quickly and in time for

the new electronics to be installed. The circuit and signal processing team had to deal with the creation of a new budget because of the new electronic hardware that was being created and duplicated. Again time was an issue for this team and the long distance parts were shipped posed a hurdle they had to deal with. Because the team wanted to improve the testing methods for the equipment brand new testing methods had to be developed and implemented into qualitative and quantitative results, as well as finding proper equipment, software and acoustically viable lab space proved to be problematic.

## **Conclusion**

The continued progress that the IRPO 344 team has achieved throughout the semester has resulted in many things. Resulting work on the kiosk and electronics have resulted in an improved product that is closer to becoming a deliverable product to customers. Some of the testing and modification breakthroughs can be implemented immediately to the current drive through systems and kiosks. Also the progress made will allow follow on IPRO 344 teams the ability to focus on more specific system details.

## **Next Steps**

The future team members of IPRO 344 will need to focus on, further improvement of the testing of audio signal fidelity, speech intelligibility, reliability of electronic components in extreme conditions, filtering of unwanted ambient sound, filtering of erroneous signal noise, clarity of dialog and reduction of feedback. Future teams will also need to focus on further assessing the economic feasibility of implementing the system to specific franchisees.

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