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Project Update

project revisions :: Little has changed in the scope of the project. Initial discussions with Sajid suggested that picking up cell phone radiation might be quite difficult, and for a while I thought I might have to remove that aspect from the project, making it much less interesting, as cell phone radiation is one of the most widespread bits of EM radiation to which I would like to listen. However, as I will describe later in this update, I have found some schematics that should allow me at least rudimentary detection and transversion of cell phone EM radiation.

Thus the goal of the project remains the same; I am not revising the final goals, as initially stated in the project proposal. The biggest revisions at this stage deal with how I will present the final project. While I still plan on creating a wearable garment, I intially thought about mixing all transverted signals together; that is, cell phone radiation would be mixed with ultrasound radiation. On further consideration (and because of some techincal issues), I think I will instead allow the user to switch what output he or she hears at any one time. Thus, he or she can select to hear only ultrasonic transverted sounds or only cell phone transverted sounds. This will ideally be accomplished through capacative switches that are sewn on the collar. Later revisions (most likely after class) will investigate the mapping of transverted EM radiation to sonic waves; however, I think it most important to create the proof-of-concept first and study the mappings and effects later.

project progress :: Progress on the project in the last month has primarily focused on research of transversion technologies. While I had hoped to have at least a minimal working circuit by this project update, me feeling sick along with some delays in procuring parts made that not possible. However, I will talk about the various bits of technology and circuits that I will modify for this project.

Since my electrical engineering skills are somewhat lacking, much of what I will develop with this project will be refinements of existing circuits. This project has already been a crash course in how to use analog + digital circuits with EM radiation of various frequencies.

Suprisingly there are a large number of circuits that already transvert one audio frequency to another: ultrasonic detectors for people who want to listen and locate bats at night. Bats use ultrasonic echo-location and listening to these bursts of ultrasonic waves is a favourite pastime of a a number of people. There are two main types: one converts the ultrasonic pulse into digital pulses by means of a frequency converter, and the other that uses heterodyning to bring ultrasonic waves into the perceptible arena. (Briefly, heterodyning uses the fact that multiplication of two sine waves together creates a combination of waves that is the sum and the difference of the two input waves. By cleverly filtering the output and by using a local oscillator, you can convert an input frequency to another frequency with relative ease.) The first circuits I will build, under development at the moment and awaiting some parts, will be both frequency division and

heterodyning ultrasonic transverters. I hope to have these complete by the end of the weekend.

The next step up in complexity is picking up infrared radiation and transverting it to the sonic arena. This is more difficult if only because there do not exist ready-made circuits like there were for the ultrasonic range. I have a number of infrared receivers that I can use to pick up infrared radiation; however, they are designed to be quite specific. In fact, the datasheets tout their ability to filter out ambient infrared radiation, something that I would like to pick up, as human infrared radiation of course would be considered "ambient". However, if I can at least create a circuit that can listen to the infrared trains of remotes that would be a start. This type of circuit will probably need some sort of frequency division as well to convert the train of infrared radiation from remotes to something perceptible.

Finally comes detection and transversion of cell phone frequencies. But perhaps this won't be as difficult as I had imagined. There already exists a circuit that supposedly allows you to pick up the sound of a cell phone tower! Just simple examination of the circuit tells you that it's not very specific. A better option might be the cell phone detector circuit; however, it seems like it is used to simply turn on a power transistor, rather than pick up and/or modify the incoming cell phone frequencies. However, I figure there is some way to modify the circuit to do what I would like.

There might be a need, however, to do heterodyning of cell phone frequencies; in that case, these types of circuits will serve as handy references.