Bill is a 35-year old electrician working at the Georgia Institute of Technology. One day he gets a call that in room 207 in the Instructional Center Building the lights are out in the western half. Room 207 is a typical classroom with overhead lights, a projector, concrete walls, and desks. Due to Bill’s training he knows that a circuit is broken somewhere between the circuit breaker, the wires, the ballast holding the build, to the filament of the bulb. His job is to find where this break is occurring and reconnect it.

Traditionally this means that he must find the correct circuit breaker and check to make sure it’s no tripped. If it is tripped, reset it, otherwise he must continue the trouble shooting process. This means going to ever junction box to test if there is voltage coming out of each wire with his hot stick, and then testing the wires with a voltage meter to read the actual voltage. There is no strategic method to figure out where the shortage is coming from except for trying each one by one. When a wire is identified, he must figure out what’s causing the shortage. It could be a bad wire, or bad wiring practices from a previous electrician. If the wire is not the issue, then Bill must check each ballast to see if the proper voltage is coming out of them, and if that’s not the case, he will replace the light bulbs to see of that is the cause. The most time intensive part of this process is checking voltage through the walls, and this is where out audio system comes in handy.

First Bill will place the device into “junction box” mode and place it on the junction box itself. The standard junction box will have 4 sides for wires to enter/exit. The device will use special awareness to tell Bill which direction the voltage is coming from, and use tempo to give a general range of the voltage coming from the wire. The sound emanating from the top of the device coincides with the voltage from the top of the junction box. An increased tempo indicates a higher voltage. If the tempo is too fast or too slow in a direction, Bill knows to continue his troubleshooting in a specific direction.

Bill then turns the device into “wire” mode. This will allow bill to trace the wall from the outside to determine where the wire is loosing power. It will work for a three-inch section of the wall. Wires are usually given a color to indicate their voltage, so each standard range will be assigned a pitch that is clearly distinguishable from its nearest neighbors. If there is only one wire, then one note will be herd. If there are multiple wires, then Bill will hear multiple pitches that sound like a chord. He will trace the wall and listen for any immediate changes in pitch. A sudden raise in pitch indicates that the voltage has jumped, which could indicate a dangerous situation of high voltage in an area. A sudden drops means that there is a lack of voltage. When a pitch stops, that means there is no voltage and Bill has found his dead spot.

Once he finds a spot of interest, Bill can focus on accessing that part of the wall to see what the cause is instead of checking every spot in the room individually