Introduction

As of now, each individual has made great progress. The AM radio “turn-on” signal is further along than anticipated, the software side is also near the testing phase, the microcontroller is still in progress, and most all other peripherals have been ordered. Due to the accelerated pace, we are well ahead of the schedule set forth by the Gantt chart, this yields for more time prototyping, testing, and fine tuning of the overall design. There are still bugs to be worked out, and complications have come up as each task is being executed, however the time we made up will allow us to overcome these problems therefore allowing us to finish on time with a good design.

Hardware

To date, we have successfully designed and built tone generators using operational amplifiers, capacitors, and resistors. Also, we have successfully summed a pair of tones together using a summer composed of an operational amplifier. Bandpass filters have also been constructed in order to detect each tone. Once the tones are detected, they are passed through a peak detector and then on to a comparator where an approximate 5 volts is generated. Each tone goes through this process, and a pair of tones is ANDed together through a logic gate, which in turn lights up an LED, and informing the user that a signal has been sent. (A pair of tones is used for each school, similar to an “analog code”).

The AM radio receiver and transmitter have also been ordered, and successfully tested. We were able to send our analog signals via a 432 MHz carrier signal and was
successfully detected by the receiver where it went through the “decoder” (bandpass filter to AND logic gates). Thus, we have successfully implemented the AM radio “turn-on” signal. The final task in this department is to be able to transmit a distance of five miles. To this extent, a pair of Quagi antennas have been built for the 432 MHz frequency. Testing was performed in the Engineering Building second floor hallway, spanning the entire length. The receiver did indeed detect the transmitter, and the LEDs lit up only when someone touched the receiver on the proto-board. As we get closer to one another, the signal of course becomes stronger. In speaking to the ECE technicians, they suggested moving the circuitry to prototype boards and soldering the connections to eliminate any potential noise or disturbance. Also, we may end up building an amplifier to see if this approach may help. Monopole antennas have also been ordered and should be here soon.

For the microcontroller, three of the four inputs it takes have been accounted for:

- The Timeout
- The Internet Request Programming
- The Battery Life Check

One more input needs to be accounted for, which is the external timer as it will synchronize the world clock to the microcontroller. Also, the outputs to the relays need to be handled as well. Some problems may occur when outputting to the relays because a 5 volt signal needs to be sent from the microcontroller to the relay in order to activate them. Furthermore, there may be a problem wiring the external clock to the proto-board.

The power supply for the AM receiver at Baraka will be achievable by using a LM7805 voltage regulator. Rift Valley and Manyara will have an input voltage of 240
Volts AC from the wall and an output voltage of 5 volts DC. This will be achievable by using a PST-SP24AS which converts 240 volts AC to 24 Volts DC. Once we have the 24 Volts DC we can use the LM7805 to get 5 Volts DC supply for the AM transmitters and receivers. Most other hardware components have been ordered.

Software

The software component of this project is primarily concerned with the modified proxy server on the client machine. The proxy server that has been modified is tinyproxy. This is done by making a call at the beginning of the handle_connection function to a python script. The python script currently checks for an internet connection by looking for a valid IP Address. If there is an internet connection is makes a call to send out a turn on request to the transmitter and send the user request. Otherwise it will catch the user request and will go into a loop, constantly checking for internet connectivity and sending turn on requests.

Software still needs to be written to send a signal to the transmitter to turn on and a script has to be created to activate the internet during administrative tasks, when the proxy server will not be on. There are two issues that need to be resolved. The first is that Firefox detects if there is no internet connection and goes into offline mode. This functionality needs to be disabled. The logs that are generated are also very large, there is no need for this much information, and the python application should be modified accordingly.

Budget

According to our budget account, we have spent $158.39. We do need to order the WI-MAX antenna which is composed of most of the cost of approximately $1,200.
As far as small parts and hardware we have advanced in our project design while utilizing cheap parts.

**Conclusion**

During the course of the semester, we have slowly made efforts to finalize a concept of design for solar powered “connect-on-demand” internet. However, recently we have made a significant amount of progress in which we have a transmitting radio signal, software scripts, and a programmed microchip. Though what is pending is the transformer to convert 240 volts AC to 5 volts DC and the external timer to synchronize to world time. Once all of the components are built, then the next task is to manage them to interface with each other.