6.101 Introductory Analog Electronics Laboratory

Spring 2015, Instructor Gim Hom

Project Checklist
Transmitting, Receiving, and Interpreting ECG Waveforms

Daniel Moon (dhmoon@mit.edu)

Thipok (Ben) Rak-amnouykit (thipok16@mit.edu)

April 24, 2015

I. Commitment

- A system consisting of a transmitter and a receiver.
- Transmitting AM-modulated signal at a carrier frequency in range 500 – 1,000 kHz.
- First, we must generate high-frequency carrier wave with certain oscillator.
- For the transmitter, we modulate the carrier wave with ECG signal and build a tuned resonator circuit.
- Signal processing on the receiver side includes amplification, demodulation, filtering, and noise reduction.
- We expect clear output ECG signal for a transmission distance between 5 – 10 feet.

II. Expected Goal

- The output signal has a constant gain, regardless of the transmission distance.
- This involves the transmission of two signals at two different carrier frequencies. We will need to adjust the tuned resonator circuit and make sure that the bandwidth covers both carrier frequencies.
- We modulate the ECG signal at the first carrier frequency, and use the amplitude of the second carrier frequency as a reference.
- At the receiver, the reference signal becomes an input to a variable-gain amplifier, which will amplify the ECG signal to a constant gain.
- Demodulating and filtering two signals whose frequencies are close can be challenging

III. Stretch Goal

- All circuits on the transmission system, expecting the transmitting antenna, will be implemented onto a small copper-cladded board. They will be fully portable.
- The system gives a clean and clear ECG signal output with constant gain, even when the user is moving.
- The goal will be achieved through additional filtering and noise reduction of the received AM signal.