Boston University

Electrical & Computer Engineering

First Prototype Testing Plan

Better Bot

by

Team #15

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Setup:

The components we are testing are the active antenna and isolation amplifier. The active antenna is made up of a JFET (CPH3910) hooked up as an emitter follower, and followed by a BJT (PN2222A) for its high output impedance. The output of the active antenna will be the input for the isolation amplifier for data collection. Isolation amplifiers will be required only if the active antenna output is low, the isolation amplifier will serve as a signal booster and noise remover, at the lab we will measure the gain of both isolation amplifier and output voltage of the active antenna by oscilloscope.

Required Hardware:

- Power supply
- Wave Function Generator
- Digital Oscilloscope
- Circuit we designed
    - Active Antenna
    - Tracking filter
    - Isolation Amplifier

Testing Procedure:

1) Active Antenna
    a) Power up the active antenna with 3.3 V dc voltage
    b) Connect the input with 1MHz sine wave with an amplitude of 100mV.
    c) Connect the oscilloscope to the output end.

    d) By using the FFT option on the oscilloscope, we are able to see the frequency of different AM radio as a narrow pulse.

2) Isolation Amplifier
    a) Connect the circuit with input ac sine wave of 100mV.
    b) Compare the input signal with the output signal
    c) Verify the output signal is amplified by the circuit

3) Tracking filter
    a) Connect 3.3V DC to the leftmost positive power rail.
    b) Connect 6.0V DC to the rightmost positive power rail.
    c) Connect common ground to negative power rail.
    d) Connect testing probe from TRIMFREQ inductor output to oscilloscope.
    e) Connect the function generator to the input rail, Row 1 a-e on breadboard, and program a swipe from 0.1 MHz to 1.5 MHz at desired amplitude (1Vpp AC suggested for test case).
    f) Enjoy.

Measuring Criteria:

1. Active Antenna should indicate the am radio at specific frequency.
2. The Isolation Amplifier should be able to amplify the Active Antenna input signal by a factor of 4-5.
3. The tracking filter should only respond to frequencies around 0.6 MHz.

Scoring Sheet:

Test Case	Pass/Fail
FFT output shows a spike	
INA output amplifies the input signal range from 4-5	
Tracking filter response diminishes as input frequency moves away from desired value.	