

Magnets to
Megahertz[©]AC
Pavek Museum

Week 1: What is Radio? Discuss audio frequencies, modulation, carrier waves, AM and FM. Show AM waveforms on the "Pavek AM Demonstrator." Introduce the AC Word List. Begin construction of the **Crystal Radio**.

Week 2: Finish the **Crystal Radio**. Look at radio signals around the area with a Spectrum Analyzer. Discuss tube and transistor theory. Discuss amplification. Introduce new components, such as capacitors, inductors, transistors, diodes, integrated circuits, and discuss how to identify them. Discuss Ohm's Law. Introduce color code to identify resistors. Pass out parts and build a **one-transistor headphone amplifier**. Teach soldering techniques.

Week 3: Revisit concepts of modulation and transmission of AM radio signals. Begin construction on a **Low-Power AM Transmitter**.

Week 4: Finish the **Low-Power AM Transmitter** and try it out using the crystal radio as the receiver. Continue with electronic theory and word list. Demonstrate how voltage dividers work.

Week 5: Continue with electronic theory and word list. Introduce concepts of op-amp and op-amp operation worksheet. Demonstrate how voltage dividers work in designing op-amp circuits. Begin construction of the **Op-Amp Audio Amplifier with Transformer-Coupled, Push-Pull MOSFET Output**. Work on soldering technique for printed circuits. This project will use a printed circuit board.

Week 6: Finish and test the Op-Amp Audio Amplifier project. Students now have a fully functional AM transmitter and receiver with a high-quality amplifier and loudspeaker. Discuss various audio circuits: Direct Coupled, RC Coupled, Transformer Coupled, Push-Pull, and Single-Ended.

Week 7: Review word list, brainteasers, and final work sheets. Presentation on SPICE (*Simulation Program with Integrated Circuit Emphasis*), designing electronic circuits using computer programs. And finally, PIZZA!!