Main Presentation Summary--9 October 2017

The Evolution of Ham Radio from the Narrow Perspective of Charlie Klutz, W4MTR

12. Presentation - The Evolution of Ham Radio from the Narrow Perspective of Charlie Kluttz, W4TMR:
After a conversation with a fellow who had just upgraded from Technician to General and about how he was going to get on the air on the HF bands, Charlie began to reflect on the first license test he ever took and how ham radio has changed over the years. That sounded like a good club program, so here we are.

Charlie gave an entertaining presentation covering the three license classes, what the test he took for the Class B license was like, how you got components, and how you built your transmitters.

The test for the Class B license was rigorous: First, you had to copy one solid minute of 13 wpm code correctly. The examiner would grade that while you waited nervously. If you passed, he would call you down to send 13 wpm code from a sheet of paper he would provide. When he was satisfied, he would say that's good enough and hand you the written test.

The test was essentially essay - there were no multiple-choice questions. The first question showed a schematic with a resistor matrix and a battery. You had to answer questions about currents through, voltages across, and power dissipated by various components in the circuit, showing all work. Then there were several schematics to draw, and a circuit to design, including parts list and component values, again showing all work. Upon turning in your paper, the examiner quizzed you on the circuit you designed.

On the license test, Charlie's design problem was to build a 500 watt, dual triode power amplifier for 20 meters. As luck would have it, the club where Charlie was studying for his license had recently built a set of five hundred watt power amplifiers for 80 meters, and Charlie had volunteered to help the fellow building the RF deck. Charlie answered all the questions, and the examiner said "OK". Charlie asked "Well, did I pass?" The examiner looked up at him still without cracking a smile and said, "We'll let you know..." After seven weeks of Charlie's mom answering, "No, nothing for you in the mail today", Charlie finally received his license.

Components were salvaged from damaged TVs, WWII surplus, etc. Surplus crystals were taken apart and lapped to bring them up into the ham bands. (Stable signals were using crystals - those using VFOs had to be chased up and down the band...)

Charlie took apart an FT-243 crystal holder and described how he would lap the crystal with Comet, Dutch Cleanser, or similar. To check the actual crystal frequency, you would plug it into an oscillator, find it with a receiver, and then use a BC-221 frequency meter to zero beat against the oscillator signal.

Charlie then spoke a bit about how he and a friend got on the 2 meter band in 1955. They started by building down-converters so they could hear the 2-meter signal on their 10-meter receivers. Crystals for 144 megacycles were unheard of, so for the transmitter, they started with an 8 megacycle oscillator, doubled the output to 16, tripled that to 48, and tripled again to 144, and then amplified. Doublers could triple and triplers could double, so they had to have a way to measure the final frequency.

Lecher wires provided the answer. Lecher wires are essentially an open transmission line, and you use a neon lamp or some other kind of signal detector to detect the signal peaks or nulls in the standing waves. The distance between nulls is a half wavelength. Charlie warned that modern day transmitters won't survive the high SWR involved in using Lecher wires to measure frequency - the tubes they used survive ok.

BC-221 Links:
http://radionerds.com/index.php/BC-221
https://www.youtube.com/watch?v=9iZy41OfGHM
http://hanssummers.com/bc221t.html
http://www.w7ekb.com/glowbugs/Military/BC221pages.html

Lecher Line links:
https://en.wikipedia.org/wiki/Lecher_lines
http://www.eham.net/articles/18584
http://www.instructables.com/id/Frequency-measurement-by-Lecher-Line/