

Internet-Controlled HF Radio

Radio Society of Tucson

Presented by AC7IL

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Background

- Workaround for Home Owners Association and Historical Building restrictions to tower construction
- Access to an Internet-connected datacenter available
- Any broadband Internet-connected facility (business, home, etc.) could be utilized



Objectives

- 100 Watt HF transceiver
- Voice and CW capability
- Remote antenna selection
- Remote antenna aiming (for beams)



Equipment List

- Compaq Pentium III PC running Windows 2000 (AC7IL)
- Sound Blaster PCI Sound Card (Company Parts Bin)
- Mirage KT34A 10/15/20 Meter Beam (W7FF)
- Cushcraft A50-6 6 Meter Beam (W7FF)
- Ham IV Rotor (W7FF)



Equipment List

- Idiom Press Rotor Modification Kit (AC7IL)
- Kenwood TS480SAT Transceiver (N7CK)
- RelComm RMM-SR001 Coax Relay (AC7IL)
- Xytronix WebRelay-Quad (AC7IL)
- Alpha Delta 10/20/40 Meter Dipole (AC7IL)
- 40/80 Meter Dipole (N7CK)

Equipment List

- Comet 6 Meter/HF Duplexer (AC7IL)
- 10/15/20 Meter Hustler Vertical (N6DGT)
- Firewall/Router Appliance (AC7IL)
- Alpha Delta Coax Lightning Arrestors (AC7IL)
- ICE Rotor Cable Lightning Arrestor (AC7IL)

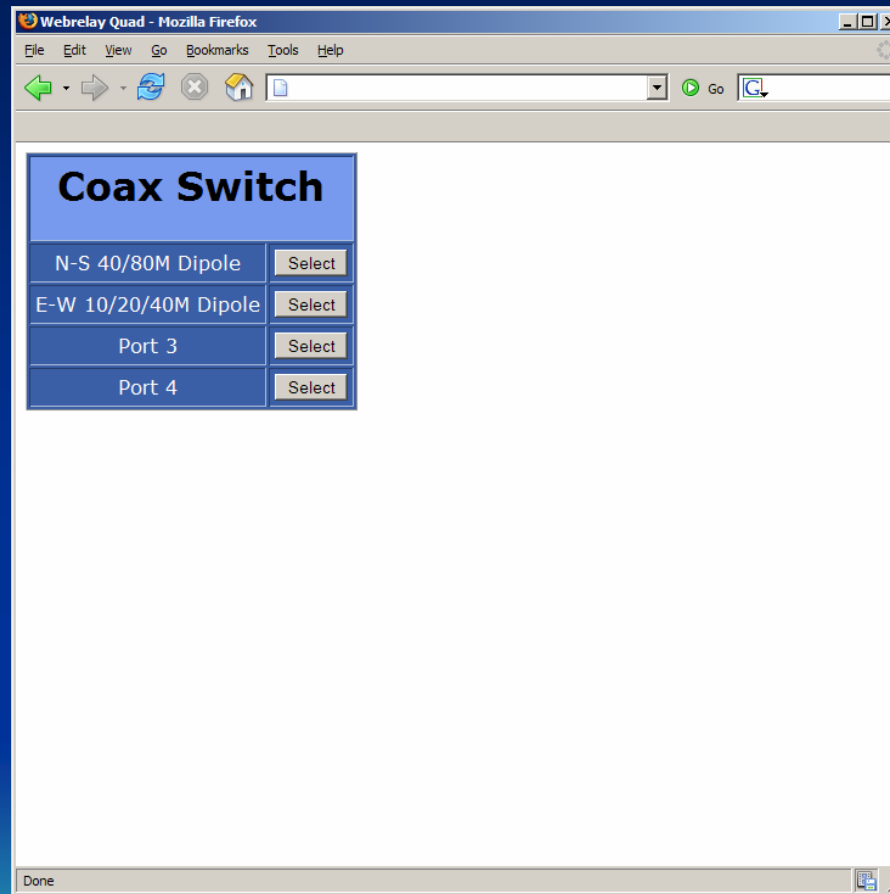


Web-Controlled Coax Relay

- 2 Unit Rack-Mountable
- 4-In, 1-Out
- Password Protected

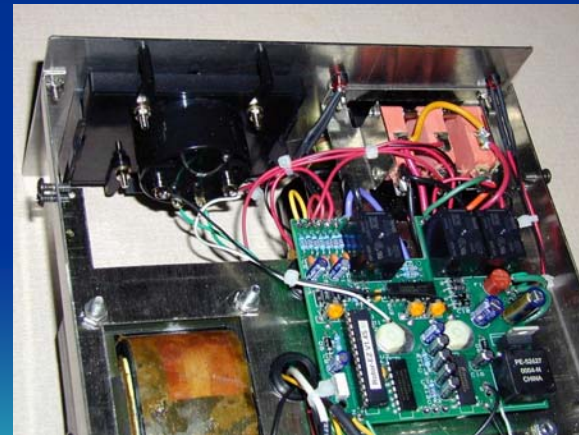


Web-Controlled Coax Relay



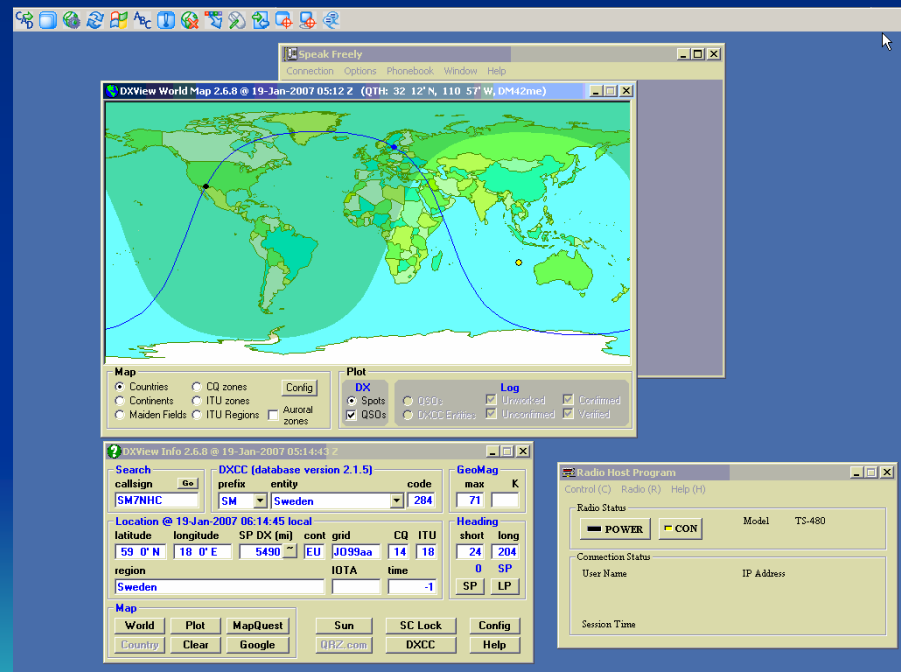
Serial-Controlled Rotor Modification

- Provided in kit form
- Available for a variety of rotor models
- Uses standard serial protocol



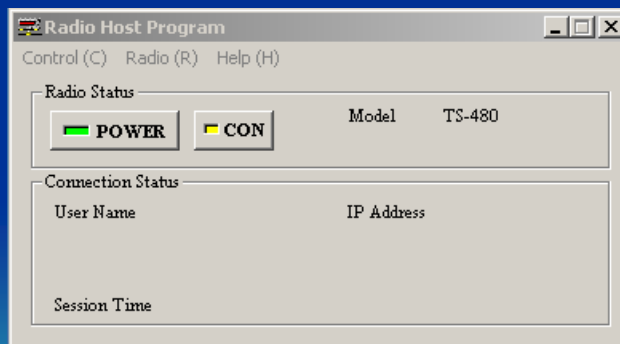
Serial-Controlled Rotor Modification

- Accessible using any software that uses the right protocol or via raw serial commands



Kenwood TS-480SAT

- Built-in automatic antenna tuner
- Free software from Kenwood
- Operates in a “black-box” configuration

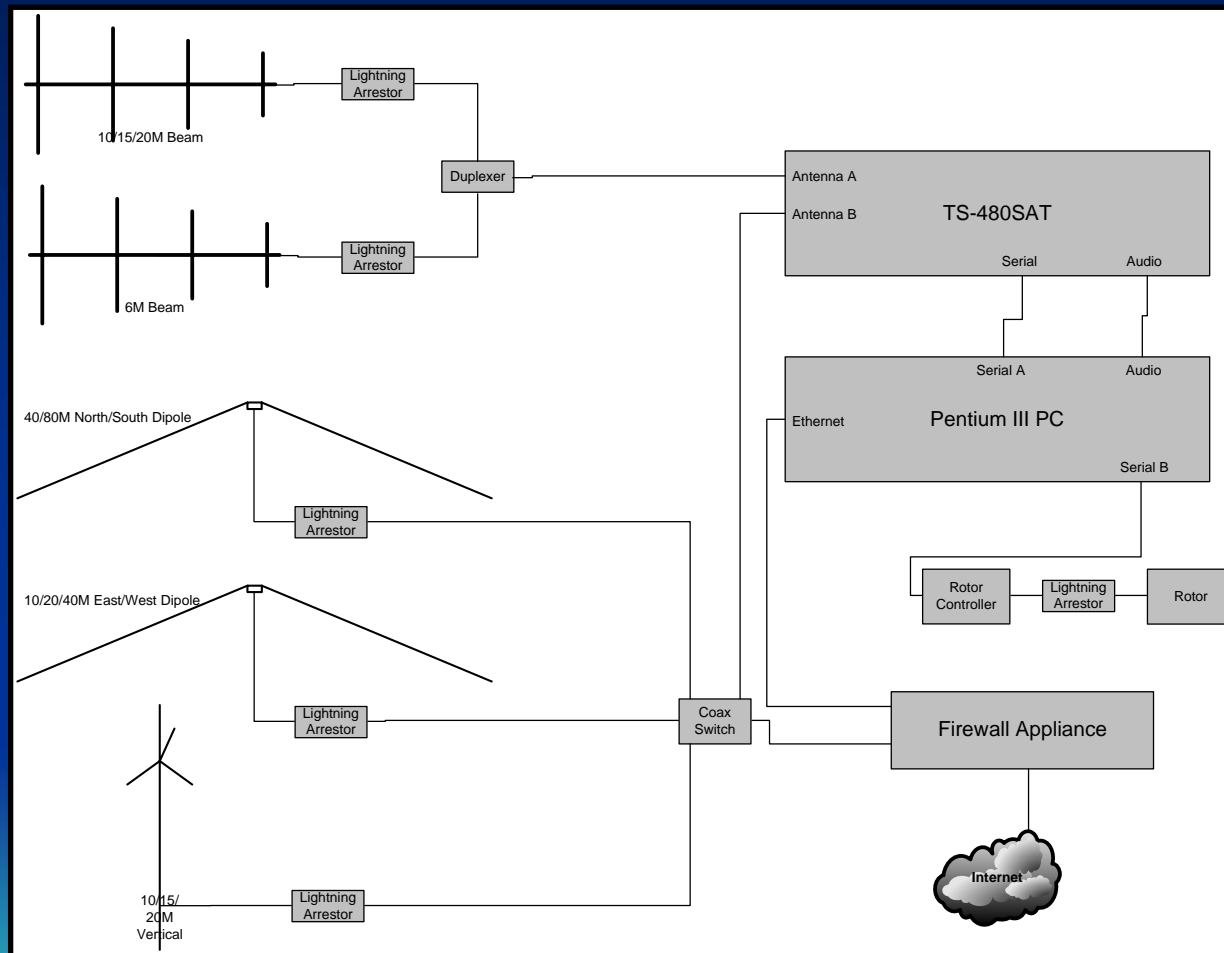


Software List

- Kenwood Client/Server Radio Control
- Speak Freely (Voice over IP)
- Windows Built-In Virtual Private Network
- DXView (Path Calculation & Rotor Control)
- UltraVNC (Remote PC Control)
- Standard Web Browser (Coax Relay)



System Diagram



Construction

- Add 10 foot section to existing Rohn 55 tower
- Install thrust-bearing to tower top



Construction

- Re-assemble beams



Construction

- Install rotor



Construction

- Install beams



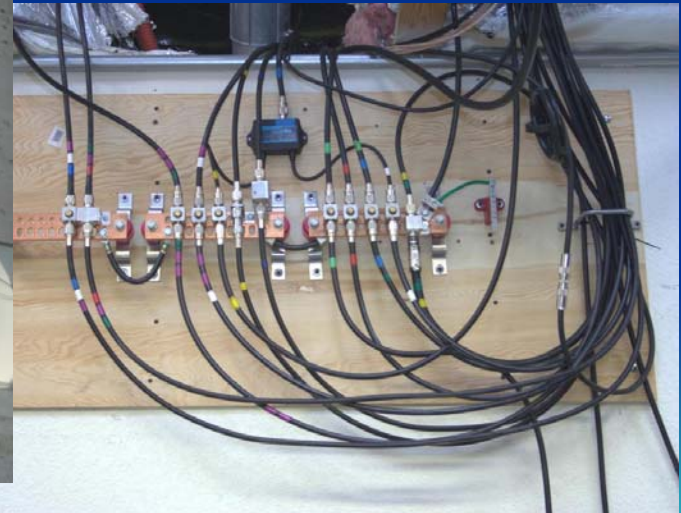
Construction

- Attach dipoles and vertical to existing mount



Construction

- Run a lot of cable and install many lightning arrestors



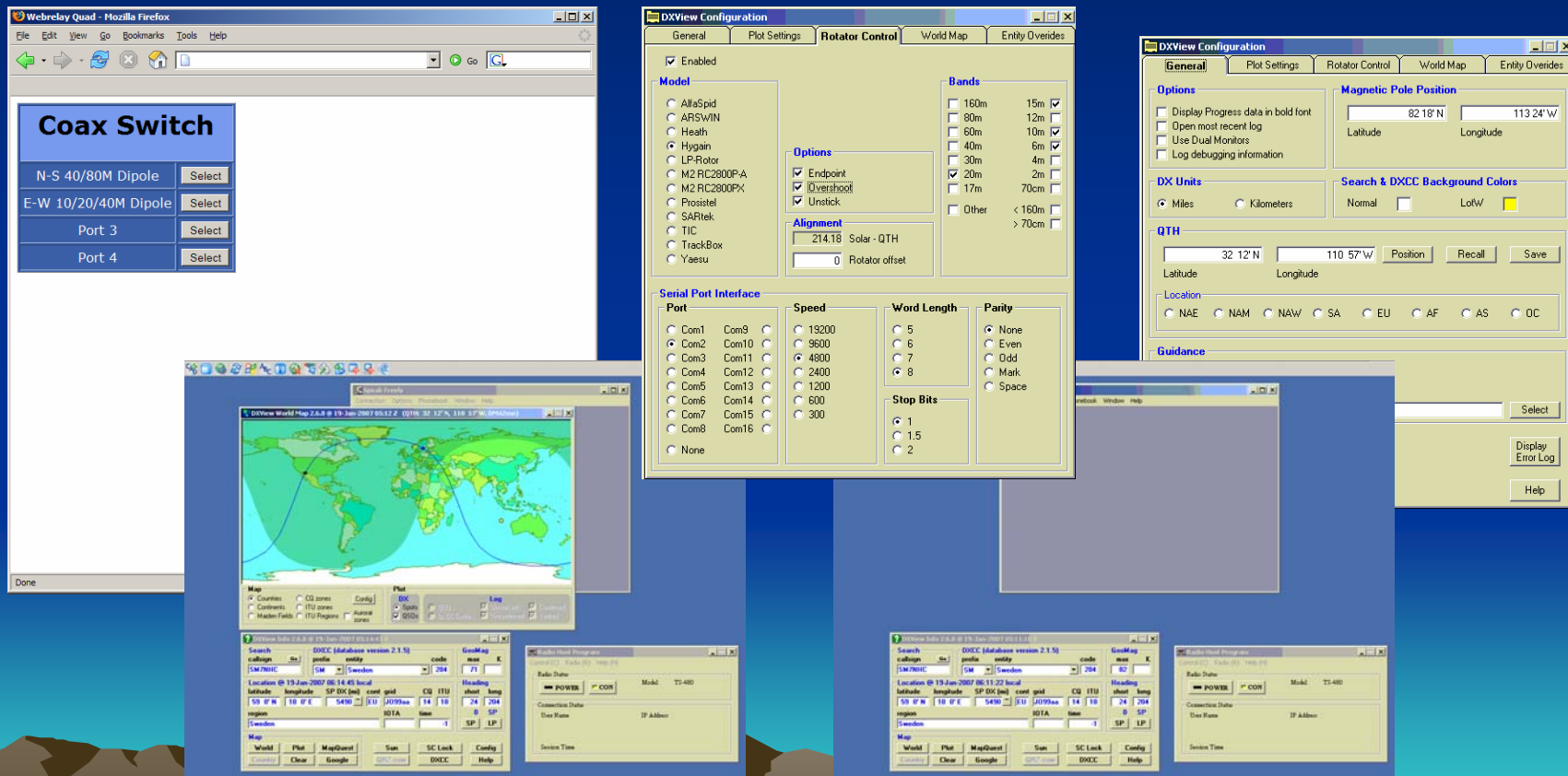
Construction

- Rack-mount and connect electronics



Construction

- Install, configure and test software



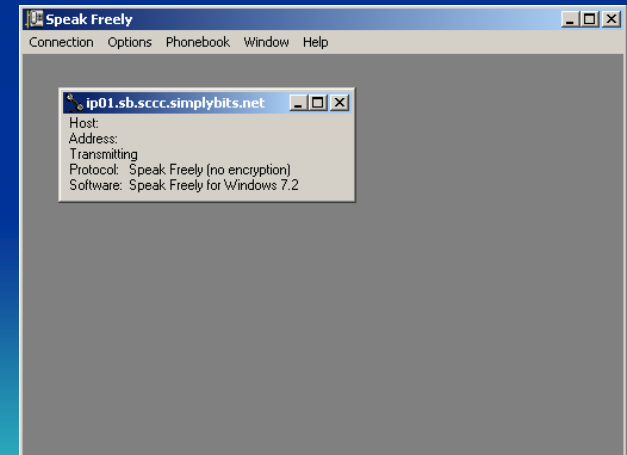
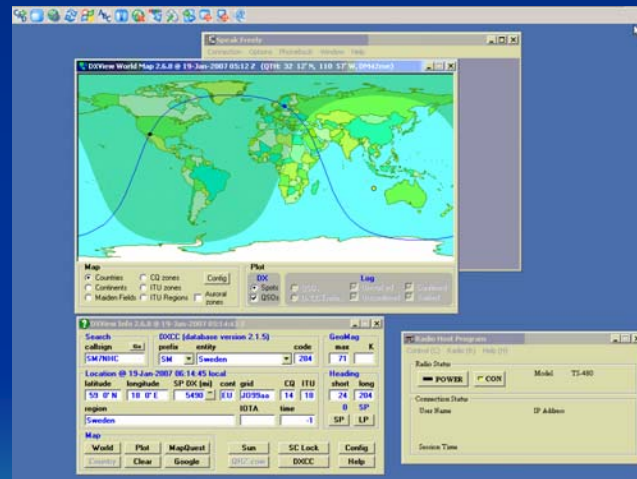
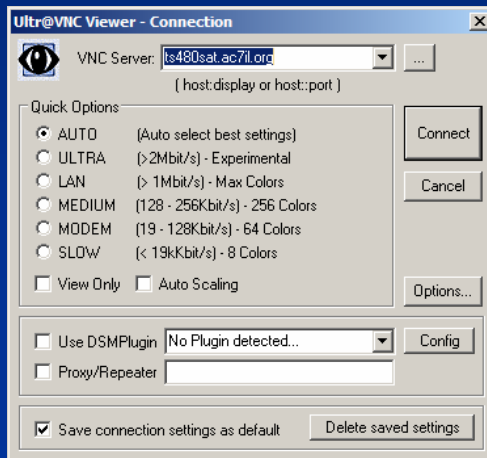
Use

- Connect via VPN client



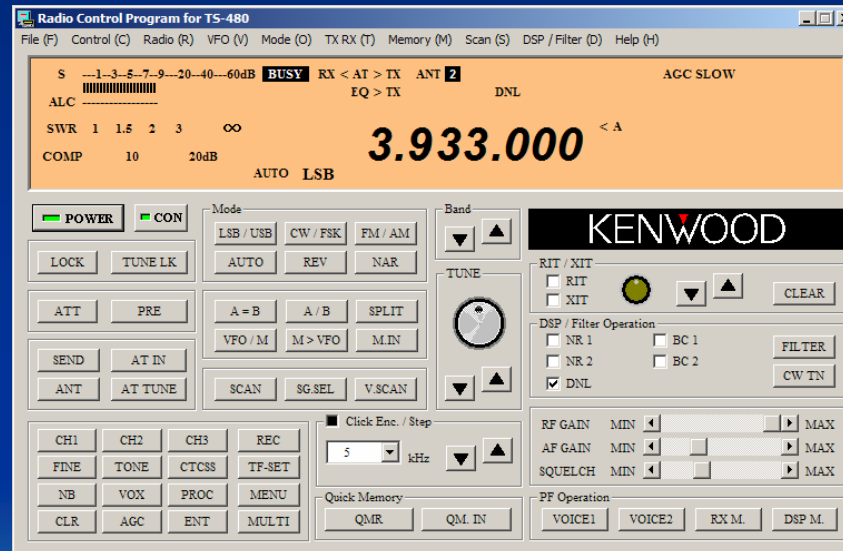
Use

- Connect to PC via VNC to aim rotor and start Speak Freely



Use

- Start Kenwood radio control client



Caveats

- Latency requires use of Kenwood software's Text-to-CW function instead of a paddle or key
- Antenna selector does not show current state
- Requires manual coordination between multiple users



Summary

- Provides workaround tower restrictions
- 100 Watt 6M/HF transceiver remotely operates with both voice and CW
- Remote antenna selection and aiming give almost all the flexibility of a local rig

