Radio Programming

What We'll Cover

1. Repeater Types
2. Types of radios
   a. Analog
   b. DMR
   c. D-Star
   d. Yaesu Fusion
3. Front Face Programming
   a. More difficult.
   b. Takes practice.
   c. Essential for field updates.
4. Software Packages
   a. Vendor Specific
   b. Chirp
5. Computer connections
   a. USB
   b. Serial Port
   c. Bluetooth

Repeater Types

1. FM
    a. Focus of this session
2. Linear
    a. Satellites.
    b. Retransmit range of frequencies - multiple users
    c. Input on LSB and output on USB
    d. CW
3. Simplex
    a. Store and Forward
4. Digipeater
    a. Single frequency
    b. APRS
    c. Packet/AX25
5. Cross-band
    a. Input in one band and output on another
6. SSTV
    a. Some require tone to activate
    b. Store and Forward
        i. Receive, Decode, Transmit

Analog Radios

1. What information do you need?
    a. Basics
        i. Repeater Mode
            1. Typically FM
        ii. Repeater Output Frequency
        iii. Tone type
            1. CTCSS
                a. E.g. 67.0, 88.5, **118.8**, 127.3, 250.3
            2. DCS
                a. E.g. 023, 065, 132, 464, **606**, 754
            3. Tx, Rx
        iv. Duplex Direction
                a. Plus or Minus
                b. This combined with offset will determine your radio Tx frequency
        v. Offset
            1. 2-meter: 600KHz
                a. Repeater Tx: 146.850 (Your Rx)
                b. Repeater Rx: 146.250 (Your Tx … Negative 600KHz)
            2. 70-centimeter: 5MHz
                a. Repeater Tx: 442.525 (your Rx)
                b. Repeater Rx: 447.525 (your Tx … Positive 5MHz)

Digital Radios - DMR

1. What information do you need?
    a. Repeater Mode
    b. Repeater Output Frequency
    c. Offset
        i. 600KHz for 2m
        ii. 5MHz for 70cm
        iii. Duplex Direction
            1. Plus or Minus
            2. This combined with offset will determine your radio Tx frequency
    d. Color Code
    e. Talk Group
    f. Timeslot
    g. Zone

Digital Radios - D-Star

1. What information do you need?
    a. Basics
        i. Repeater Mode
        ii. Repeater Output Frequency
        iii. Offset
            1. 600KHz for 2m
            2. 5MHz for 70cm
            3. Duplex Direction
                a. Plus or Minus
                b. This combined with offset will determine your radio Tx frequency
        iv. Your call sign
        v. Repeater call sign
    b. Quick
        i. Your call sign
        ii. GPS
        iii. Find nearest (assumes repeaters loaded from software)

Yaesu System Fusion (C4FM)

1. What information do you need?
    a. Basics
        i. Repeater Output Frequency
        ii. Offset
            1. 600KHz for 2m
            2. 5MHz for 70cm
        iii. Tone Frequency in Hz
            1. Tx, Rx
        iv. Duplex Direction
            1. Plus or Minus
            2. This combined with offset will determine your radio Tx frequency
        v. Mode
            1. Digital Narrow (DN)
            2. Digital Wide (DW)

Radio Interface to Computer / Phone

1. Use official cables where possible
    a. Be careful of sub-par cables and counterfeits on Amazon
2. Bluetooth using app on mobile device
    a. Caution - These apps may collect data and spy on you
        i. Trading convenience for security

Software - Chirp

1. Runs on Windows, Linux and Mac
2. Supports variety of radios
    a. Baofeng, BTECH, Alinco, Wouxun, Icom, Yaesu, Retevis, Kenwood, Radioddity, TIDRADIO
    b. Too many to list
3. May not fully replace proprietary software
4. Backup first!
5. Download near repeaters
6. Creating groups/zones
7. Share programming with friends
8. Demo

Software - RT Systems

1. Supports many radios from various manufacturers
    a. Icom, Yaesu, Anytone, Baofeng, Kenwood, Wouxun, Midland
2. Windows only
3. Download data from internet
4. Special cables needed
5. Great technical support

Resources

1. Chirp
    a. https://chirpmyradio.com/projects/chirp/wiki/Download
    b. https://www.youtube.com/watch?v=ufB9FXsLpKY
    c. https://chirpmyradio.com/projects/chirp/wiki/How_To_Get_Help
    d. https://chirpmyradio.com/projects/chirp/wiki/Documentation
    e. https://noji.com/hamradio/pdf-ppt/noji/Noji-Article-CHIRP.pdf
2. RT Systems
    a. https://www.rtsystemsinc.com/
    b. https://www.rtsystemsinc.com/assets/images/ProgrammerHelpPDF/GettingStarted.pdf
    c. https://www.youtube.com/watch?v=KIybJTyiewU
3. Programming Cables
    a. https://a.co/d/1peJVUF
    b. https://bluemax49ers.com/