

## VARC Short Technical Session

### Programming Radios using Software

#### Why program radios with software?

- Small radios have fewer buttons requiring multi-level uses for each button, making programming slow and tedious. Manual programming may be okay for a few channels.
- Newer radios have over a hundred and some may have thousands of memories
- Easier to organize and reorganize memory contents and copy programming from one radio to another.
- Allows for quick changes between channels for daily local use, and channels wanted when travelling to your favorite or most often visited away location.
- Some commercial radios can only be setup by programming.

#### Programming a radio requires software and cable appropriate for the radio.

- **Sometimes radio manufacturer** will sale software and cable. Check with vendor.
  - Most Digital Radios require software from the manufacturer or vendor
  - Some Digital Radios software is even firmware dependent! Beware!
- **RTS Systems** <https://www.rtsystemsinc.com/>
  - Analog radios only
  - Can run on Windows or Mac
  - Packages usually manufacturer and model specific
  - Offers programming cables too
    - NOTE: Some cables look the same but are not wired the same! Make sure you mark your cables for its specific radio.
  - Typical Costs: \$25 for software, \$30 for cable or \$50 for both
- **CHIRP** <https://chirp.danplanet.com/projects/chirp/wiki/Home>
  - Analog radios only
  - Can run on Windows, Mac or Linux
  - One software supports most manufacturers and models
    - This makes it easy to program your handheld and mobile radio with same channel numbers and settings
    - But requires more frequent updates as more radios are added to its compatibility list and fixes are made to support all these radios
  - Does NOT sell programming cables (Try eBay or RTS Systems)
  - Costs: CHIRP software **is free!** (But donations are accepted!)

#### Create a organizational strategy for Programming the radio's memories

- **Create a List of Frequencies** and associated information
- **Typical data points** that are programmed in each memory channel
  - Channel number
    - Some radios start with memory channel **zero** while others start with **one**
    - Consider always starting with memory **one** even if your radio has memory channel zero. This allows you to program all of your radios same way creating the same touch and feel in operation.

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- Receive frequency
- Transmit frequency (or may be represented by Offset from Receive frequency)
- Tone Type (None, TONE, T.Sql)
- Decode Tone frequency, if applicable
- Encode Tone frequency, if applicable
- Transmit Power (Low, Med, Hi, Turbo)
- Skip this channel during Memory Scanning

- **Put this information in a spreadsheet**

Loc	Frequency	Name	Tone Mode	Tone	ToneSql	DTCS Code	DTCS Rx Code	DTCS Pol	Cross Mode	Duplex	Offset	Mode	Power	Skip
0	0.000000		(None)							(None)		FM		
1	145.130000	VCT513	Tone	103.5						-	0.600000	FM	High	
2	145.190000	VCT519	TSQ		103.5					-	0.600000	FM	High	
3	443.800000	VCT380	TSQ		103.5					+	5.000000	FM	High	
4	444.325000	VCT432	TSQ		103.5					+	5.000000	FM	High	

- **Determine Listing or Sort criteria** that works best for you
  - Use list that has been published by club or regional group
  - Sort by frequencies
  - Sort by channels' abbreviated name
  - Sort by county and frequency
  - Sort by distance from home (somewhat manual)

### CHIRP Programming Overview

- Make sure radio has power available or battery is sufficiently charged
- Start CHIRP and connect programming cable to USB port
- Click "Radio" then "Download from radio", and follow the onscreen instructions
- OPTIONALLY: Save the current download to the PC for reference
- Add, Copy, Change and/or delete channel information
- Click "Radio" then "Upload to radio", and follow the onscreen instructions
- Disconnect cable from the radio and test
- Repeat this process until satisfied with configuration

### Other tips when programming

- When you first connect and download the radio's memories to the software, save a backup (image) of the original settings before any changes are made. Keep for future reference in case something goes seriously wrong.
- Use a naming convention which includes Radio model, call sign, and date of changes.
- Place non-ham frequencies, such as NOAA weather frequencies at the high end of the memory channels.
- Remember to upload the programmed channels back to your radio
  - EXCEPTION: "Live Mode" which update continuously as changes are made
  - ALSO: You may optionally want to do a Save As in CSV format.