Remote FT8/FT4 Ops

Presented to the Oro Valley Amateur Radio Club Virtual Meeting, 7 pm (Tucson local time), August 19, 2022

Presented by Gene, K5PA/VO1KPA, https://www.k5pa.com

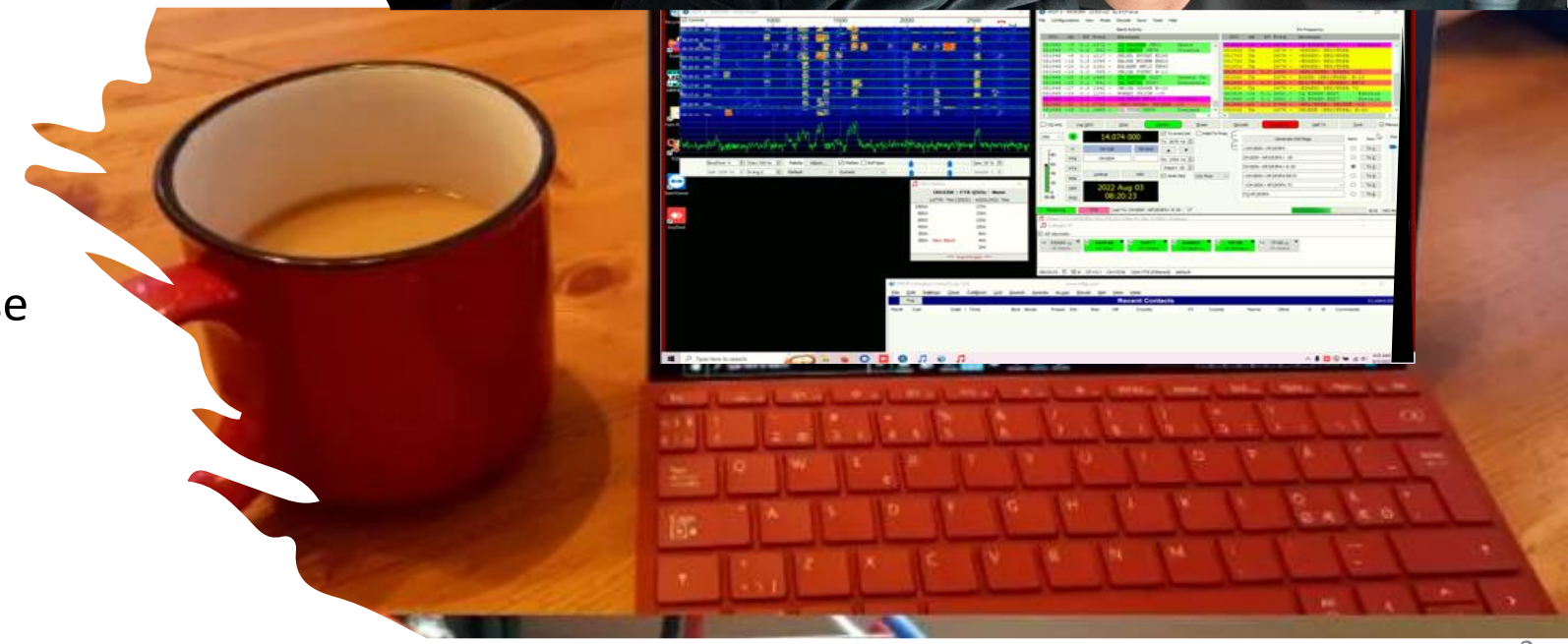
Credits: Gary, W5GW, Content, Graphics and Review

Tom, KB5RF, Content and Review

Remote FT8/FT4 Operations –

Why, How, Digital?

- Digital Modes (FT8/FT4) Can Be Semi-Automatic Where You Are in Control
- Combining Remote Radio Ops with Specific Digital Modes
  - Voice or Digital with Same Remote
  - Easy Setup and Operation
  - Many Software Programs to Choose
- Operate ***Anywhere*** Internet is Available
  - From Home, Mobile, Portable, Vacations, or Even at Work



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Set Goals and Realistic Expectations

- Single or Multi-User (Shared) Remote?
- What is Your Internet Access, Radio, Antenna, Software Programs?
- The Remote Site (Location, Electrical Power, Manned/Unmanned, Security)
- Legal Compliance to Federal/State/Local Laws - Licensing, Control, Operation, Safety
- Most Important
  - Be Realistic
  - Expect Problems to Appear <u>That Will Be</u> Resolved
  - Plan for the Unexpected!

Equipment and Software

Equipment

- Modern Computer Controlled Transceiver With Internal Sound Card Ideal (Example, IC-7300, 100 W, 160-6 Meters, w/Tuner)
- Many Remote Concepts Relate to Other Radios & Software
- Antenna Selection Switch (w/Software Control)
- SWR Cross-Needle Meter (no switch/knob changes)
- Notebook PC With Wi-Fi
- Power Supply

Software

- *WSJT-X FT8/FT4, JTAlert*, Logging Program (*HRD, Log4OM, ACLog*)
- Remote Desktop Programs (**both** *AnyDesk*, *TeamViewer*)
- Time Synchronization (Internet, GPS, or Manual *TimeFudge*)

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Equipment and Software (cont.)

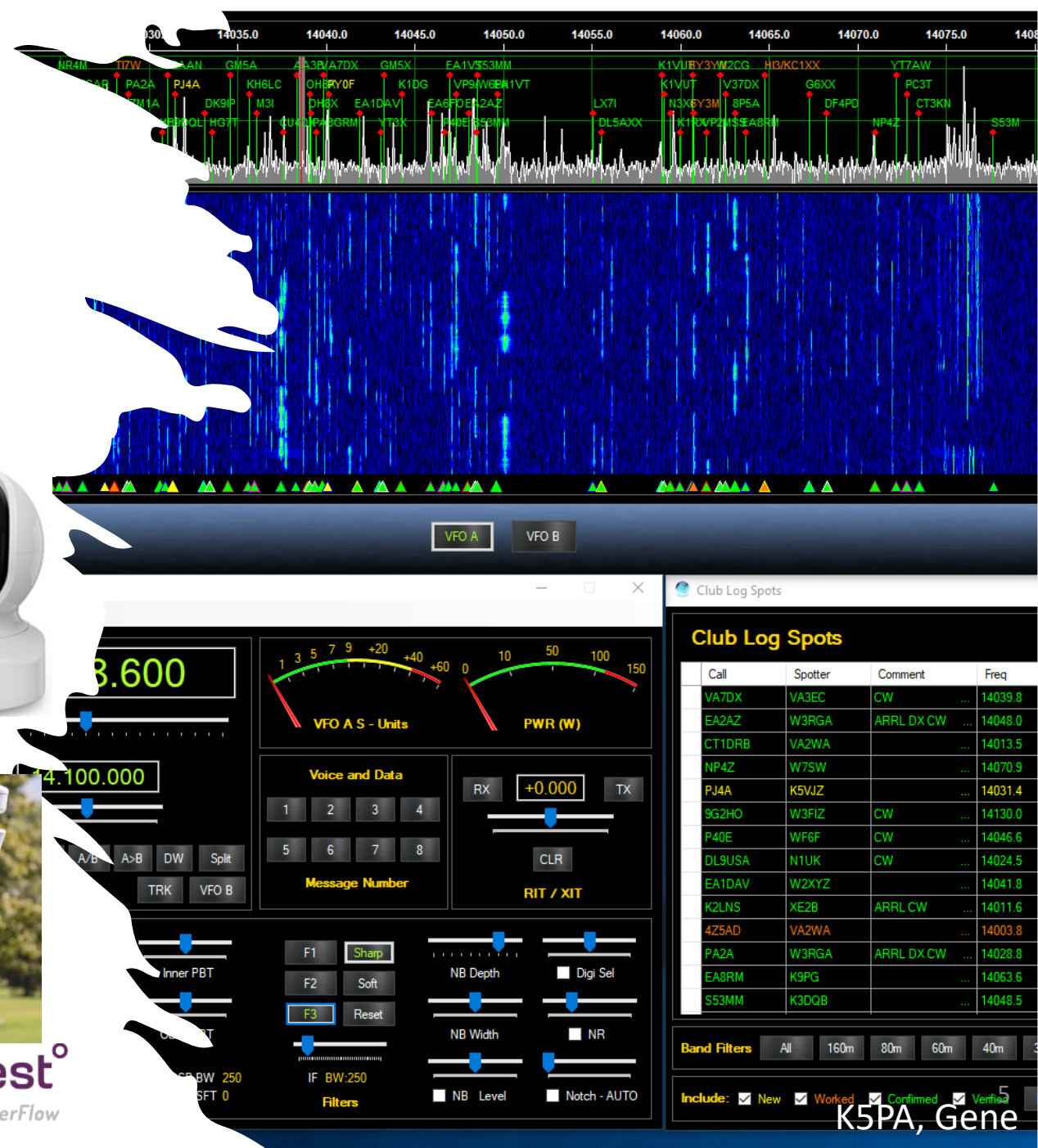
Software (cont.)

- Antenna Switch Software Control
- Remote Radio Software (for System Verification, Power and SWR Checks, and Trouble Shooting)
- We Use Both *Win4Icom* (right) and *RCForb Client/Server*

Additional Equipment to Consider

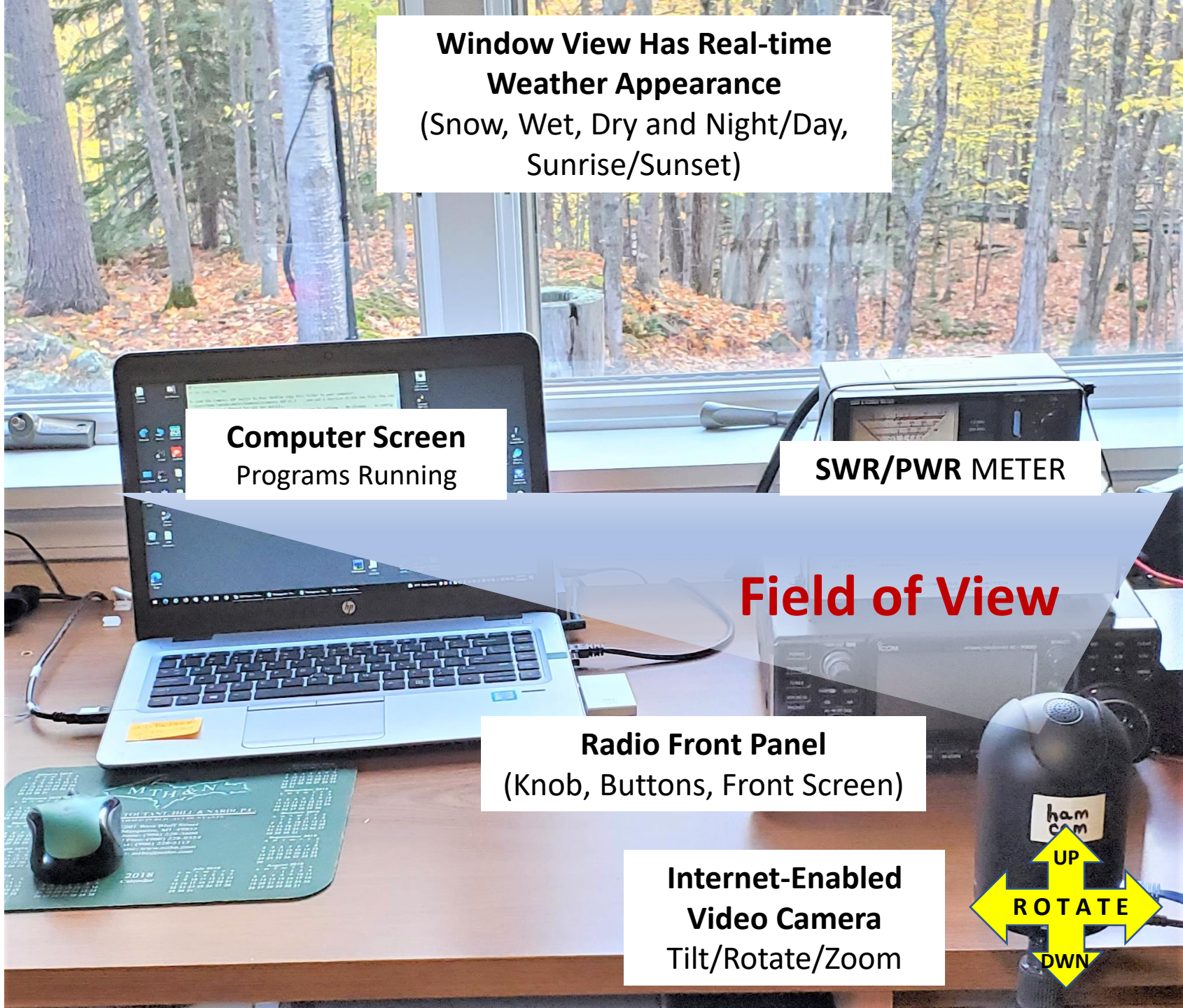
- Real-time Video ***Stare*** Internet Camera
  - Radio & Computer Front Panel Real-time Status
- Remote Site Weather Station (Tempest) with Wind, Rain, & Lightning Statistics
  - https://weatherflow.com/
- AC Mains Remote Power Switch

Tempest
powered by WeatherFlow



Real-time Video Internet-Enabled *Stare* Camera

- Real-time Video ***Stare*** Internet Camera
- **Remote** Radio & Computer Front Panel Real-time Status
- When Local Presence is Not Possible or Convenient



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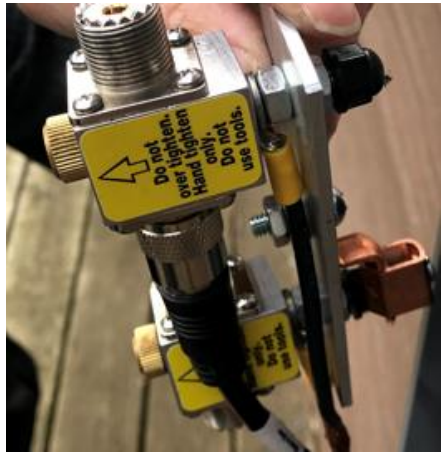
Safety, Access, and Security

Safe Operation - Grounding

- Three Types of Grounding Considerations
  - Power Service
  - RF
  - Lightning
- Motorola Publication R56 (Standards and Guidelines for Communication Sites)

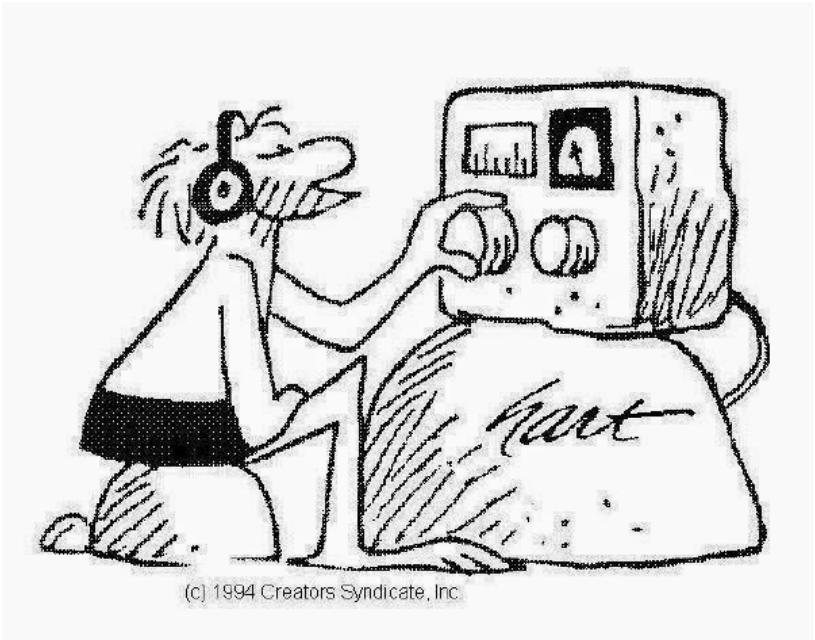


Credit noaa.gov

Grounding is Not Well Applied by Many Hams!
Think Safety, Safety, Safety!

Safety – Not Just Grounding

- Would You Entrust Your Sizeable Investment and Privilege to Anyone?
- Be Prepared to Document and Provide Training to Potential Operators (Formal Documentation and Keep Up-to-Date)
- “If Someone Can Throw a Switch Wrong, It Will Happen!”



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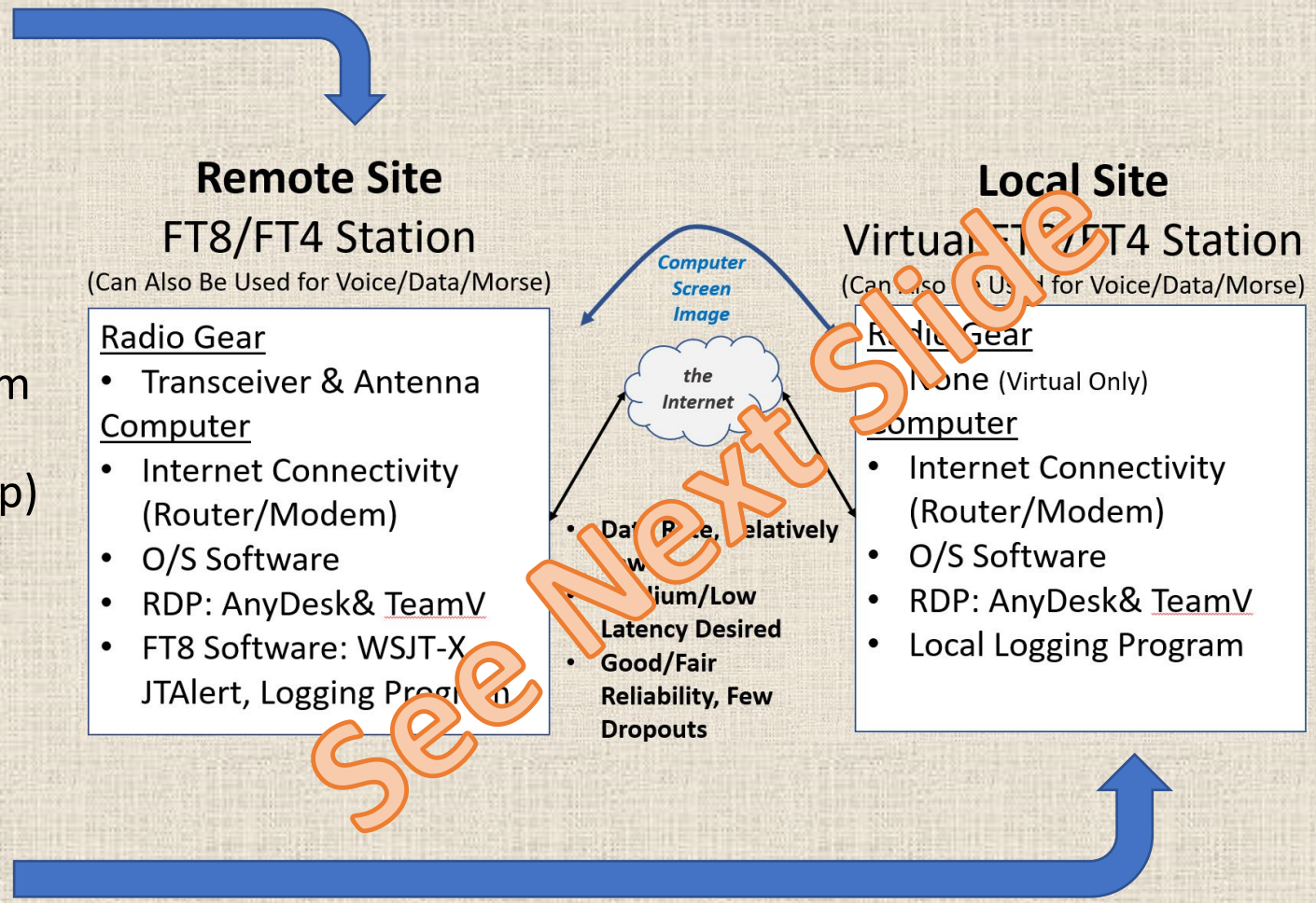
Access & Security

- Physical Security, Locks, Location, etc.
- Network Security, User-Names, Passwords, IP Addresses
  - Use Complex Passwords Not Easy to Guess
- Treat Your Configuration Documents as Top Secret
- Limit Configuration Details to Select Individuals on a ‘Need to Know’ Basis

Remote FT8, *the Easy Way*

- **Remote Radio Site**
  - FT8/FT4 Computer Programs
    - *WSJT-X*
    - *JTAlert*
    - Logging Programs (*ACLog*)
    - *AnyDesk* Remote Desktop Program (RDP)
    - *TeamViewer (TeamV)* RDP (Backup)
    - Batch Files & Batch Box
- **Local Operator Site**
  - *AnyDesk* & *TeamViewer* RDP
  - Master Logging Program



Remote FT8, *the Easy Way (cont.)*

Remote Site

FT8/FT4 Station

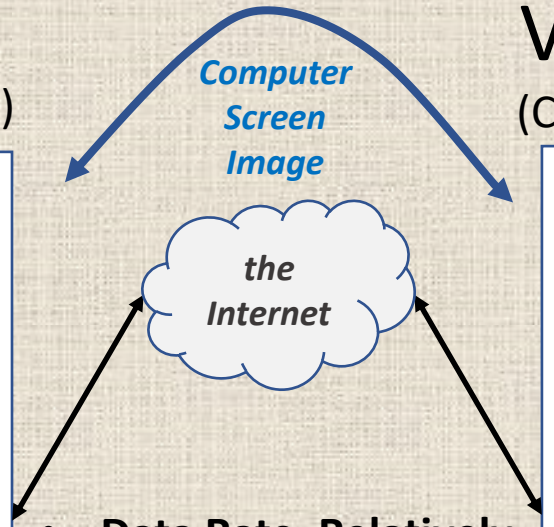
(Can Also Be Used for Voice/Data/Morse)

Radio Gear

- Transceiver & Antenna

Computer

- Internet Connectivity (Router/Modem)
- O/S Software
- RDP: AnyDesk& TeamV
- FT8 Software: WSJT-X, JTAlert, Logging Program



- **Data Rate, Relatively Low**
- **Medium/Low Latency Desired**
- **Good/Fair Reliability, Few Dropouts**

Local Site

Virtual FT8/FT4 Station

(Can Also Be Used for Voice/Data/Morse)

Radio Gear

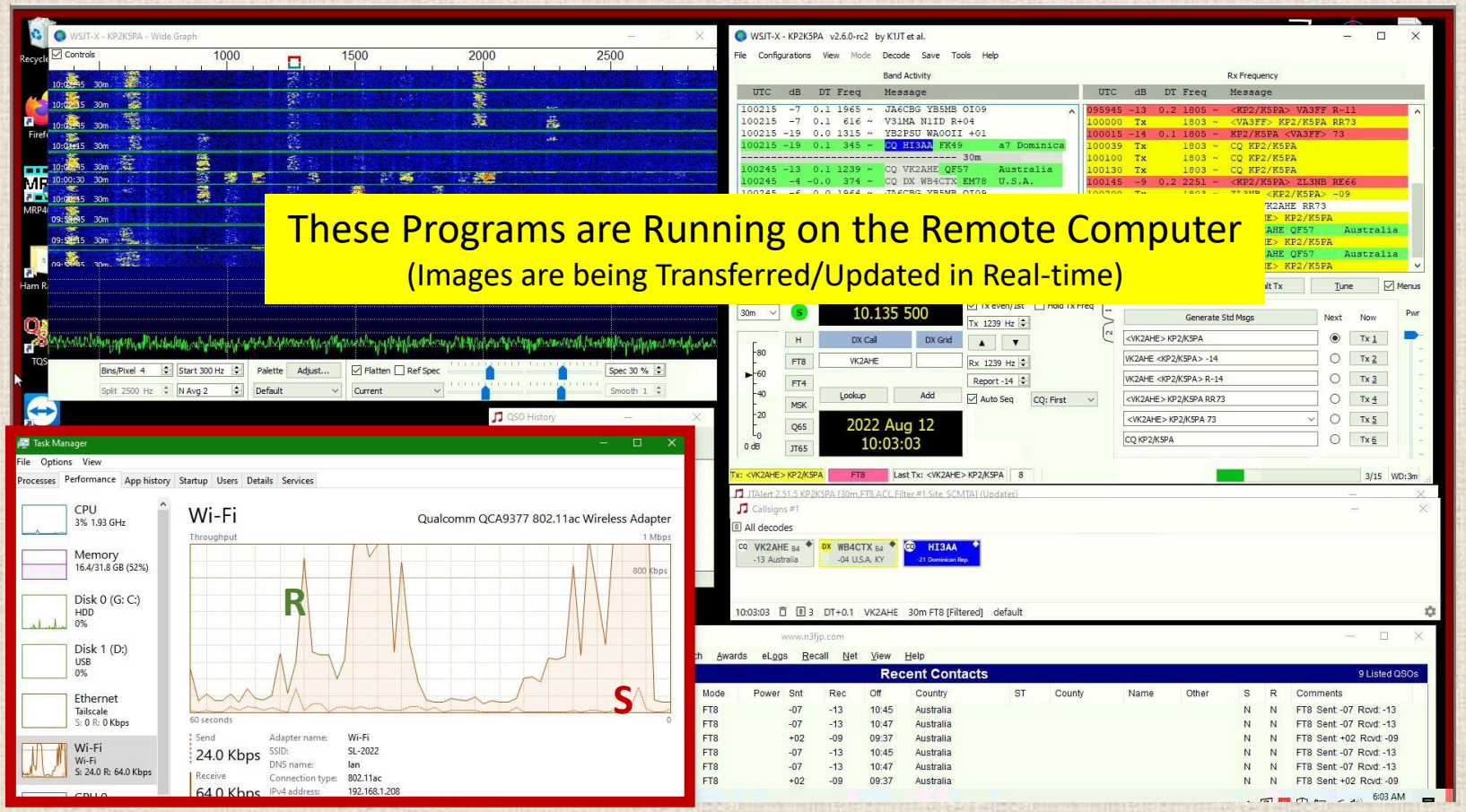
- None (Virtual Only)

Computer

- Internet Connectivity (Router/Modem)
- O/S Software
- RDP: AnyDesk& TeamV
- Local Logging Program

Remote FT8, *the Easy Way (cont.)*

- End-User Side **S**end/**R**eceive Data Rate for AnyDesk Running WSJT-S and Apps On Remote Computer



Graphs of S/R Data Rates Over Local Wi-Fi

(Using Windows Built-in Performance Monitoring tools)

Batch Files For Startup Sequencing at Remote

- Standard Windows Batch File
- Sequence of Events
  - Start Radio Equipment Controls – *Batch Box* for CAT Commands
    - Power - On
    - Notch Filter - Off
    - Noise Reduction - Off
    - Compress - Off
  - Start *WSJT-X* with –r CALLSIGN option for multiple users
  - Start *JTAlert* with /Callsign option for multiple users
    - *JTAlert* Starts Log Program

Program Callsign Options Keeps Different Users Settings and Logs in Their Own Subdirectories!

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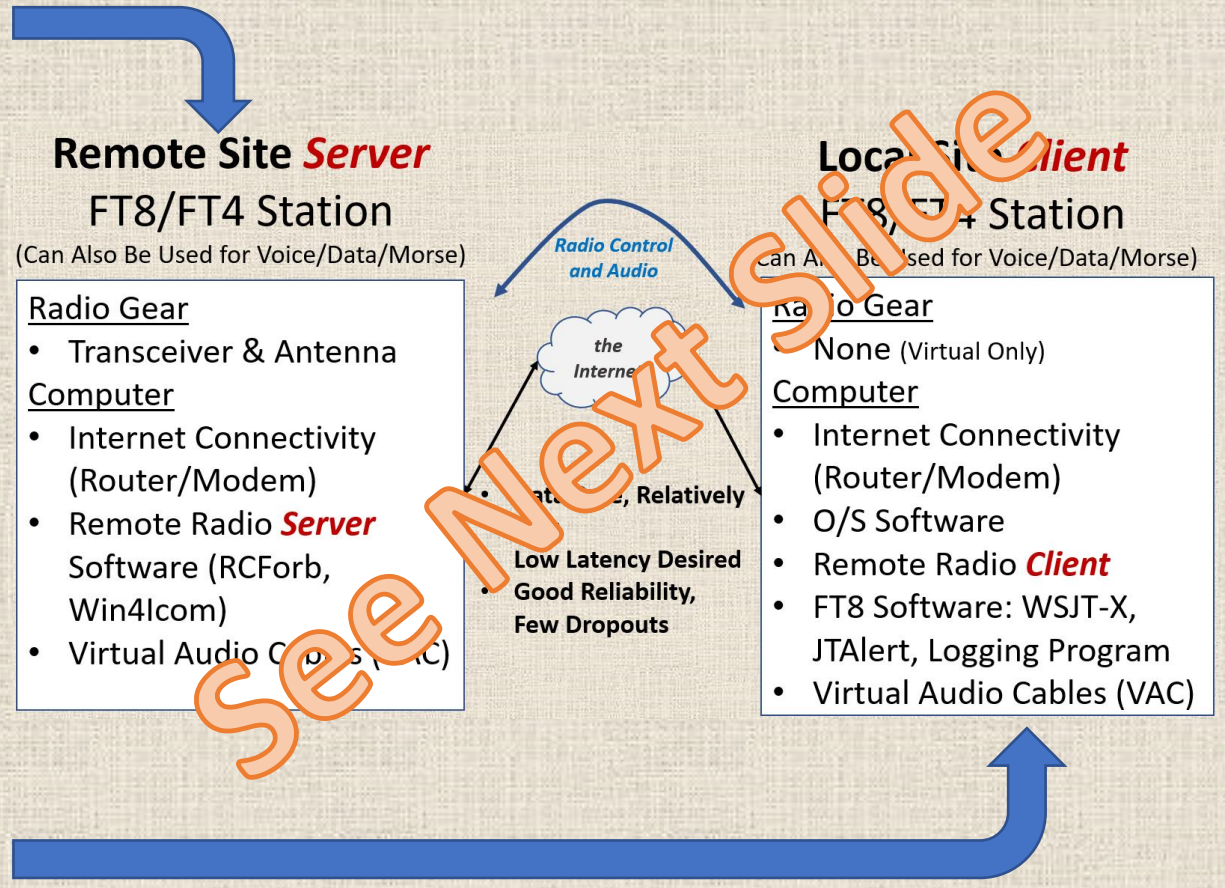
```
:: Batch Filename:  Autostart KP2K5PA.bat
:: A batch file example to first load Autostart WSJT-X program and then JTAlert.
:: This program replaces the internal JTAlert autostart file feature. This will
:: allow the window GUI size to be setup correctly when Auto Starting WSJT-X.
::
:: You can change the startup options whereby you can leave off the -r YOURCALLSIGN
@echo off
echo  ***********************************
echo  *                                 *
echo  *  WSJT-X and JTAlert Auto Loader  *
echo  *                                 *
echo  ***********************************
::
::
:: Call the cmd program to Turn Radio Power ON, set power to 100W, Turn OFF Notch Turn OFF NR.
:: ICOM comport must not be in use.  Set Batch Box ini file to ICOM Port Number This Computer Uses.
::
::
CD "C:\Users\160 La Grange HAM\Documents\Ham Radio\IC-7300\ic7300-batch-box"
echo Setting IC-7300 Power Turn ON, Power to 100W, Notch Filter OFF, NR OFF, Comp OFF
CALL icom7300-transceiver-on.cmd
TIMEOUT /t 5
CALL icom7300-power-100W.cmd
TIMEOUT /t 1
CALL icom7300-notch-off.cmd
TIMEOUT /t 1
CALL icom7300-nr-off.cmd
TIMEOUT /t 1
CALL icom7300-comp-off.cmd
TIMEOUT /t 1
::
::
echo Starting WSJT-X
START "" C:\WSJT\wsjtx\bin\wsjtx.exe -r KP2K5PA
::
TIMEOUT /t 1
::
:: You can change the startup option whereby you can leave off the /callsign=YOURCALLSIGN
::
:: You can also change the startup option whereby you can leave off the /myID=YOURINFO
:: The /myID=YOURINFO is a new feature in JTAlert that allows you to put the YOURINFO message
::    into the top line of the JTAlert GUI
::
echo Starting JTAlert
START "" "C:\Program Files (x86)\HamApps\JTAlert\JTAlert.exe" /wsjtx /callsign=KP2K5PA
/myid=Site_SCMTA
::
TIMEOUT /t 1
::
EXIT
```

Remote FT8, *with Greater Complexity*

- **Remote Radio Site**
  - Radio ***Server*** Program, *Win4Icom Server* for Radio Control & Sound, Virtual Audio Cables (VAC)
- **Local Operator Site**
  - Radio ***Client*** Program, *Win4Icom Client* for Connection to your Local *WSJT-X, JTAlert*, & Logging Programs, VAC
  - All Your Normal Computer Programs Are Still Available



Remote FT8, *with Greater Complexity (cont.)*

Remote Site *Server*

FT8/FT4 Station

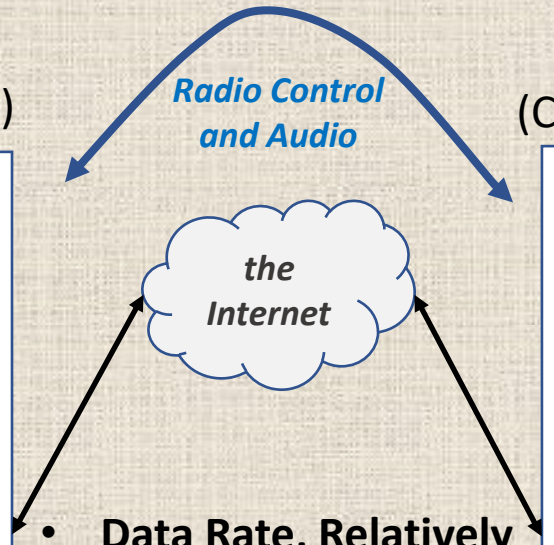
(Can Also Be Used for Voice/Data/Morse)

Radio Gear

- Transceiver & Antenna

Computer

- Internet Connectivity (Router/Modem)
- Remote Radio ***Server*** Software (RCForb, Win4Icom)
- Virtual Audio Cables (VAC)



- **Data Rate, Relatively Low**
- **Low Latency Desired**
- **Good Reliability, Few Dropouts**

Local Site *Client*

FT8/FT4 Station

(Can Also Be Used for Voice/Data/Morse)

Radio Gear

- None (Virtual Only)

Computer

- Internet Connectivity (Router/Modem)
- O/S Software
- Remote Radio ***Client***
- FT8 Software: WSJT-X, JTAlert, Logging Program
- Virtual Audio Cables (VAC)

Use a Pre-Flight Check List

- Setup Remote Radio Server
- Setup Local Client
- Start WSJT-X
- Sync Time
- Open JTAlert
- Open Log Programs
- Setup Local Client

REVERSE SEQUENCE TO END SESSION

Appendix 2 - Pre-Flight Check List

"You can only soar when the system is ready to roar"

- On **Win4Icom Server**, prepare Remote **Radio Server** Site
  - Open remote desktop with **AnyDesk**.
  - Close any existing radio servers (e.g., **RCForb Server**).
  - Immediately start **Win4Icom Server**, make sure it auto-starts.
  - Open appropriate RF Antenna Relay, Amplifier, or Rotator app (**Compass Switch v2, KAT500**, **KPA500**, **PstRotatorAz**, etc.) and select the working antenna, amplifier, or rotator.
  - Close **AnyDesk** if all good.
- Begin local **Win4Icom Client**
  - At home QTH (**Client** site), open the remote enabled **Win4Icom Client**. The assumption is the radio client is already setup to auto-start and will launch **VA2FSQ Sound Client**. The **Client** should be now connected to **Server**.
- Begin **WSJT**-X program
  - Select from top Menu, **Configurations** > "**your named remote config for FT8**."
  - Take notice of the average **DT** values recorded for decoded FT8 signals.
- Start **TimeFudge** program
  - Suspend any auto time sync programs (**Dimension 4**, **NMEATime**, etc.) so **TimeFudge** can be used to offset **DT** values.
  - Start **TimeFudge** and enter in the opposite time delay value as seen from **DT** above.
  - If **DT** was **+0.6**, then enter in a **TimeFudge** value of **-0.6** . Verify the **DT** values are settling to around **0.0 ± 0.2** (this is not a critical value).
  - Occasionally monitor the **DT** values and adjust **± 0.1** or so.
- On **JTAlert** program
  - Change your **Station Callsign**, **Gridsquare**, **CQ Zone**, and **ITU Zone** to proper locations.
  - **Settings** > **Manage Settings…** > **Station Callsign**.
- If using **HRD Logging** program
  - Change your station location to the remote site location by entering **HRD Logbook** Menu, **Tools** > **Configure** > **My Station** and select from preset **Locations** listed.
  - When you are ready to upload to LoTW, select your QSOs and, under the HRD's **TQSL** panel of the HRD upload GUI, select your remote **Station Location**.

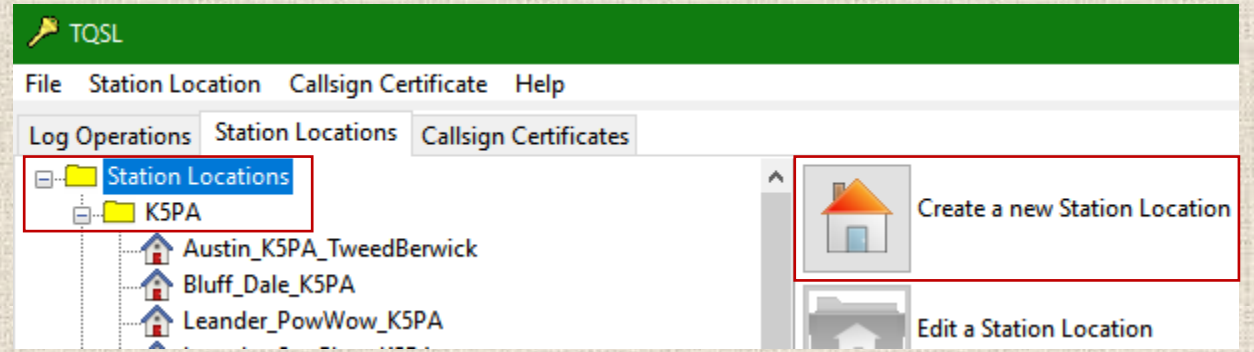
- Reverse the steps in this **Check List** when you are ready to revert remote back to normal activities.

Trade Space for *EZ* vs. *Complex Way*

Attributes	EZ WAY - Remote Desktop Program (RDP)	Radio Server / Local WSJT-X/ et al.
Multiple Users	Easy Login with RDP	Each Local Computer is Setup Independently, More Complex for Each User
Logging	Remote Logging Easy with File Transfer. Real-time Log Sync Tricky.	Logging from Local Computer Log Program
Real Feel of Having a Local Radio	Virtual View of Remote Computer	All Programs Reside on Local Computer
Time Synchronization	Internet or GPS Time Sync at Remote	Must Account for Audio Buffer and Internet. Use *TimeFudge* S/W for Manual Time Tweaking
Monitoring Performance	Use Remote Software, Such as Radio Control *RCForb* Server/Client or *Win4Icom* to Monitor at Start of Session	Real-time Display of Critical Parameters Such as Power, SWR, and ALC
Internet Connectivity Triad: Speed / Dropouts/ Latency Time	Speed Data: Mbits/sec less important, processing done at remote site Dropouts: Less important, more an annoyance Latency Time: Medium importance, affects mouse actions	Speed Data: Mbits/sec somewhat important Dropouts: Important, can cause rig control failure Latency Time: Importance, affects time sync, audio buffers create delays

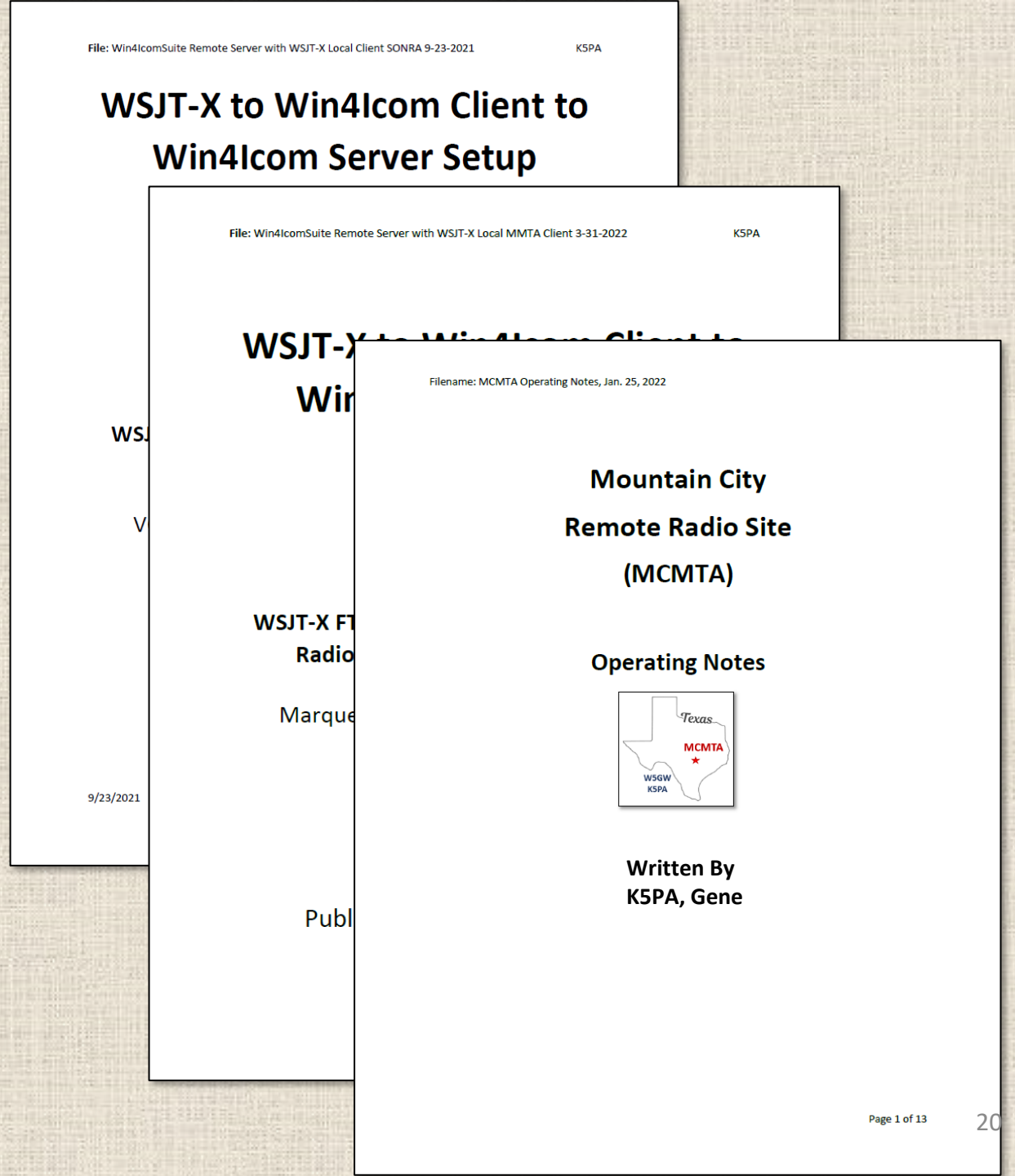
Logging Considerations

- The Remote Radio Location is *Your* Location
  - You are Portable, e.g., **K5PA/6** or **K5PA/5**
  - You are in another DXCC Entity, e.g., **KP3/K5PA**
- If Using *LoTW*, Setup *TQSL* Based on Your *Remote* Location
- Remember, Some Portable Remote Sites are New DXCC Entities, Counties, States, Grid Squares for Your QSO Partner
  - Log Appropriately For ***Their*** QSO Credit



Documentation

- Expect to Document the System Connections and All Parameters to Keep Configurations Up-to-Date
- Use These Documents for Training Operators
- More Difficult for Multiple Remotes Since Each Have Special Installation Considerations



DEMONSTRATION TIME

Remote Radio Running FT8

- Target Remote is at Saint Croix, U.S. Virgin Islands
  - Station H/W Owned by K5PA, Gene and KB5RF, Tom and Operates Under Call Sign **KP2**/*callsign*
  - Local Host is Family Member of KB5RF
  - Local Computer Support provided by Host
  - Remote Support Provided by K5PA and KB5RF
  - Currently 4 Ham Radio Operators Use This Remote for Voice/Data Comms
  - U.S. FCC Part 97 Amateur Radio Service Rules Apply
- Alternate Site - Remote in Mountain City, TX
  - Owned by K5PA and W5GW, Gary
  - IC-7300/KAT500/KPA500/Rotator Controller/Computer

Antenna Selection

EFHW 8010m or Dummy Load

Reference Web Links

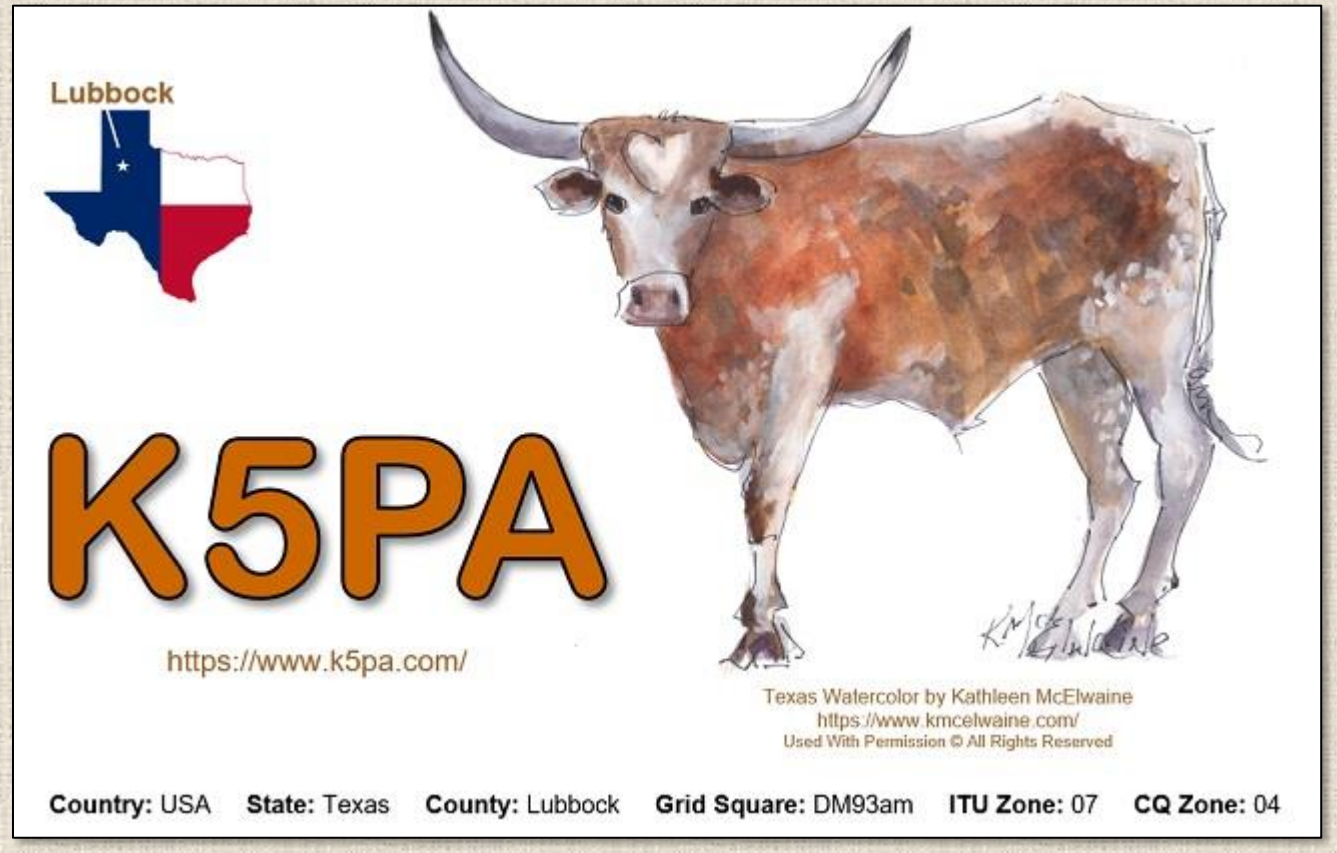
- **This Presentation:** Remote FT8/FT4 Ops
- **Remote Radio - Control Software**
  - *RCForb* Server/Client, https://www.remotehams.com/
  - *Win4IcomSuite*, https://icom.va2fsq.com/
- **Remote Desktop Software**
  - *AnyDesk*, https://anydesk.com/en
  - *TeamViewer*, https://www.teamviewer.com/en-us/
- **FT8/FT4 Digital Software**
  - *WSJT-X*, https://physics.princeton.edu/pulsar/k1jt/wsjtx.html
  - *JTAlert*, https://hamapps.com/
  - Logging Contacts
    - *Ham Radio Deluxe*, https://www.hamradiodeluxe.com/
    - *Amateur Contact Log* (ACLog), https://www.n3fjp.com/aclog.html
    - *Log4OM v2*, https://www.log4om.com/
- **Ancillary Equipment/Software**
  - *Tempest* Weather Sensor, https://weatherflow.com/
  - *WansView* Camera, https://www.wansview.com/
  - *Batch Box* for CAT Setup Control of ICOM Radios [IC-7300, IC-7610 (edits, ask K5PA)], http://www.funkwelle.com/download/icom-ic-7300-batch-box

Questions Anyone?

My Friend Bernie Has All the Answers

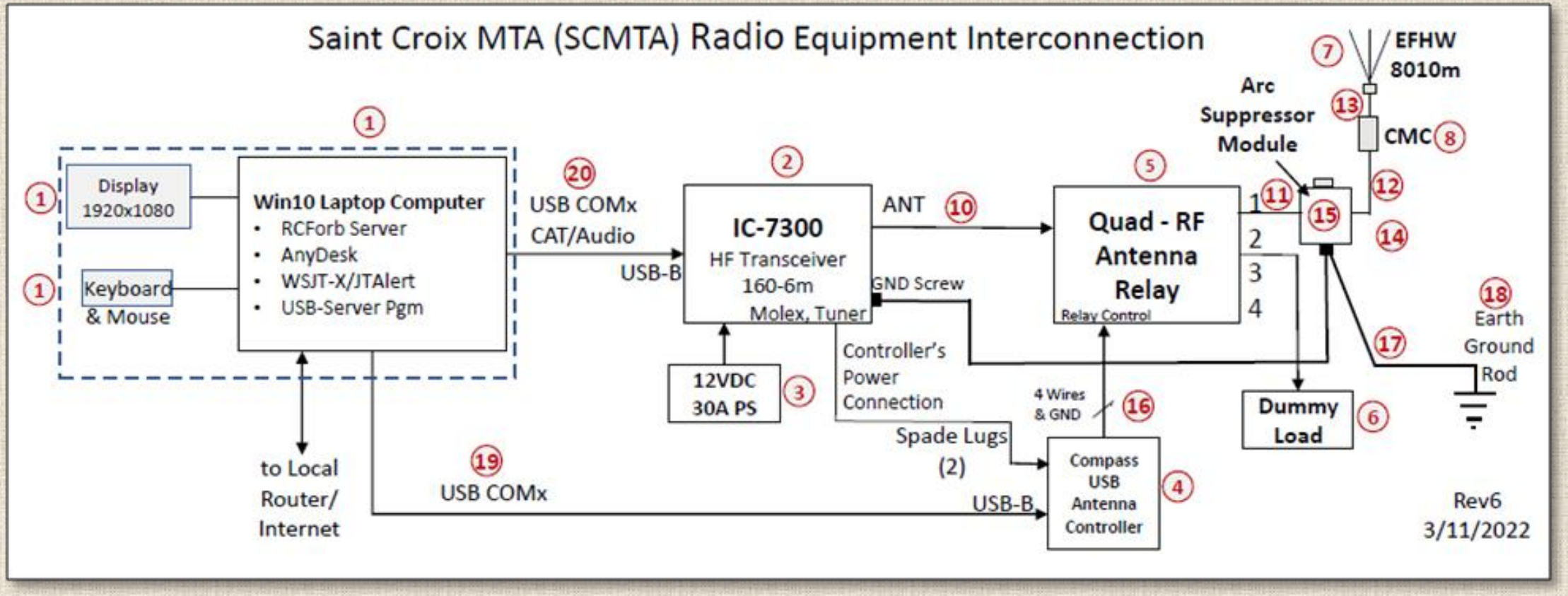
Want More Information?

Gene's website https://www.k5pa.com/ has numerous publications, tech notes, and experiences with the Plantronics Wireless Headsets, FT8 Technologies, Remote Radio, Antenna, Solar and Other Topics. He is the author of 20 recent publications in *CQ*, *QST*, and *QEX* that are available for free download. His first publication was the QRPp Accu-keyer in *QST*, 1976.



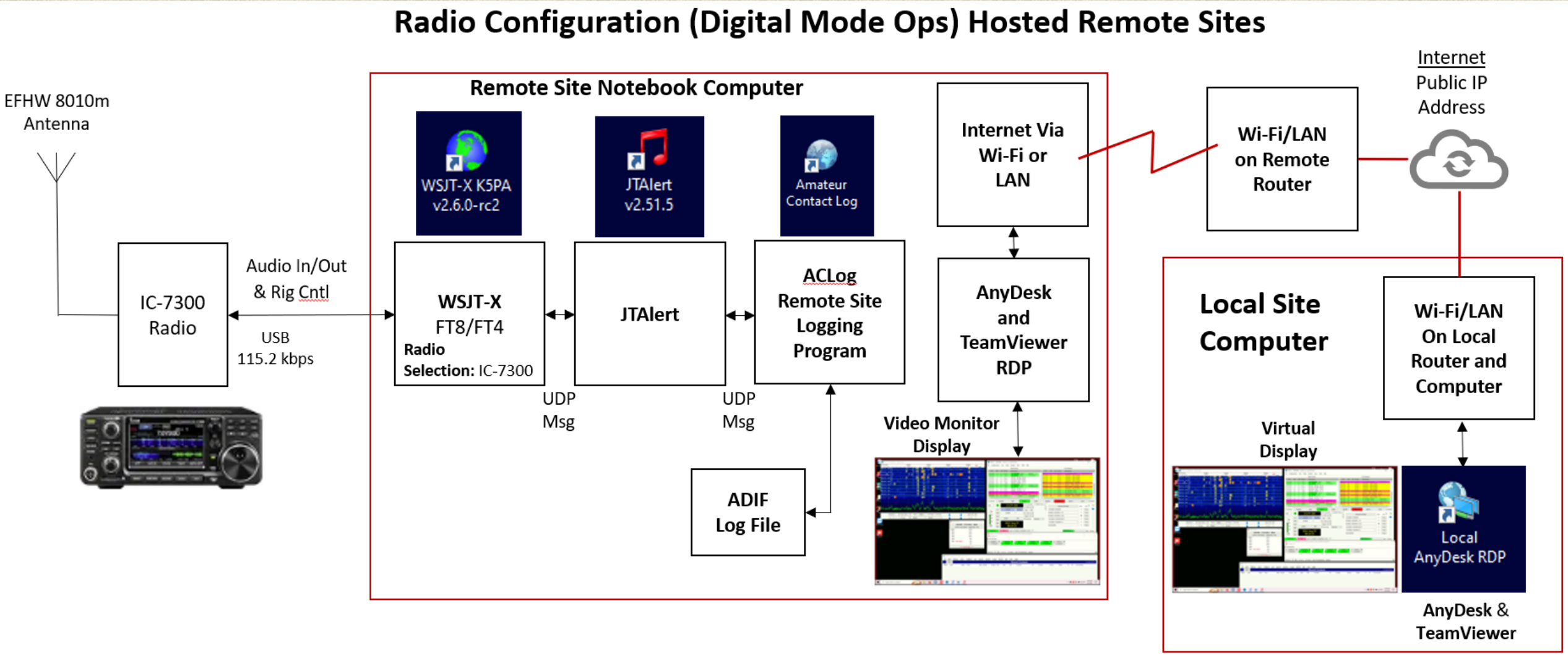
Additional Information & Detail

Typical Hardware Block Diagram

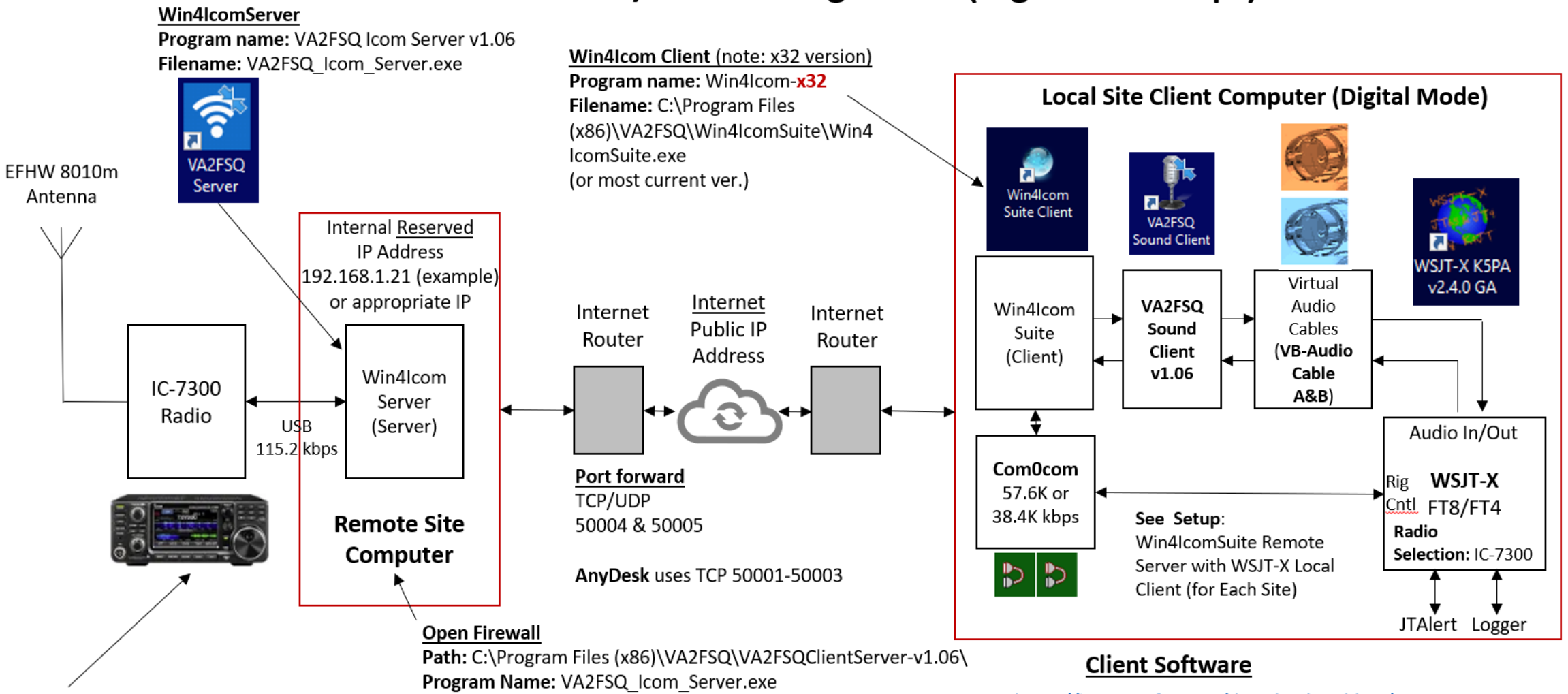


Red Circled Numbers (#) Refer to the Parts List Line Number for Each Item (Make, Model, P/N, Description)

Remote FT8, The Easy Way



Radio Server/Client Configuration (Digital Mode Ops)



ICOM MENU, select **SET** > **Connectors** > **CI-V**
Verify and/or change the following menu settings:

- ❑ **CI-V USB Port:** Unlink from [REMOTE]
- ❑ **CI-V USB Baud Rate**: 115200
- ❑ **CI-V USB Echo Back**: ON
- ❑ **CI-V Transceive**: OFF

Client Software

https://icom.va2fsq.com/download-and-buy/
Filename: VA2FSQClientServer-v1.06-setup.exe

https://www.vb-audio.com/Cable/
Windows Package: VBCABLE_A_B_Driver_Pack43.zip Containing VBCABLE_A_Driver_Pack43.zip & VBCABLE_B_Driver_Pack43.zip

VA2FSQ Sound Client created from loading:
C:\Program Files (x86)\VA2FSQ\VA2FSQClientServer-v1.06\

File: Remote Software Connectivity v2.4
Gene/K5PA 8/3/2022