PACIFICON 2017

Remote Access to your Amateur Radio Station

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These slides are available at k6ufo.com or via my page at QRZ.com

Why have Remote Access?

- Operate anywhere in your home (living room), and away from your home (car, hotel, coffee shop, library,...)
- Work the rare DX while at work – never miss a new country.
- Get apartment dwellers or HOA-restricted hams on the air.
- Provide a club station for use by club members.
- Your own reasons...

RULE NUMBER 1: All remote operating must follow the FCC rules and regulations, and follow any applicable Award or Contest rules (DXCC, WAS, ARRL, CQ WW, IOTA,...)

Footnote: This is a rapidly changing area. There is no one perfect solution for everyone for all time. Be ready to experiment, test, learn and adjust.

Four Basic Needs for Remote Operation

1. Audio In + Out to radio: Access to MIC/SPKR, Line In/Out, or audio over USB. Just like for digital modes (PSK, AFSK, FT8)

2. Radio Control: To read and set radio Freq., Mode, PTT, CW… Need a radio with serial port, CAT, CI-V, or USB control.

3. Station Control: AC power outlets, antenna switching, rotators, tuners, amplifiers, ... Equipment must be "Computer-controlled" or "Automatic."

4. "Good" Internet service: Low delay under 100ms, low packet loss, Up and Down speeds over 1 Mbps, a public-visible (public-routable) IP address for the radio end.

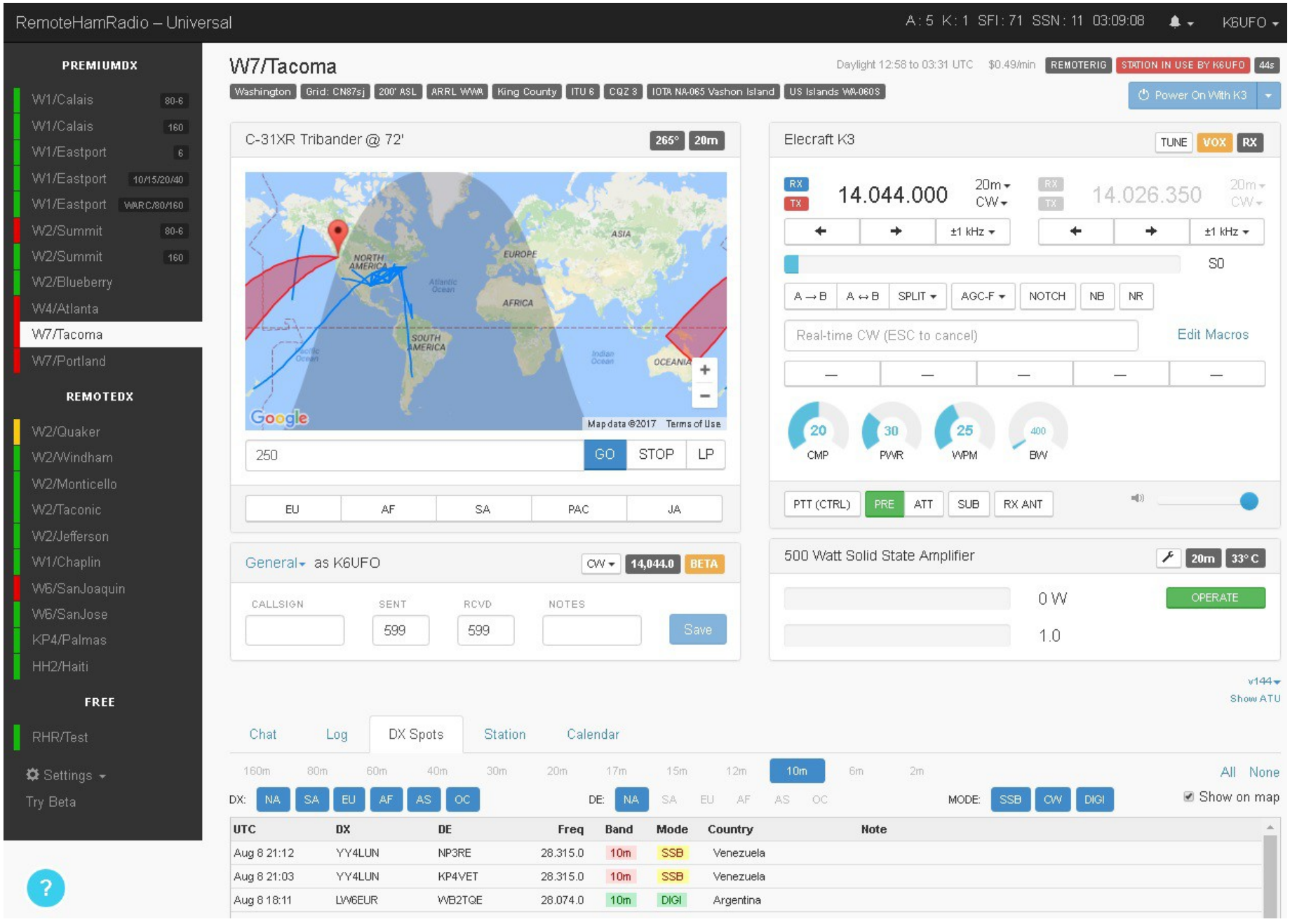
…and your patience and willingness to solve problems.

Four Proven Ways to Implement

1. Web Browser access to RHR
2. Software Programs
3. Remote Desktop software
4. Remote Front Panels

Solutions vary from 100% Software to 100% Hardware.
"Time spent" from Minutes to Hundreds of Hours.
"Money spent" from $0 to $3,000 (or more!)
#2,#3 require a shack PC online. (otherwise a shack PC is helpful.)
#2,#3,#4 will need changes to your internet router ports. (Messy...)

1. Web Browser access to RemoteHamRadio.com



Web Browser Access Pros/Cons

RemoteHamRadio.com Free 30 minute trial. $99/yr plus 9 to 49 cents/minute ($29/hr) Can be accessed with Chrome web browser, Android phone, Chromebook, iPhone App, PC with extra USB device, or the RemoteRig hardware.
(Full disclosure: I have a station on RHR.)
Reviewed in QST Magazine, May 2013, p59.

Pros: Easy to sign up and get started. No equipment to buy. No software to maintain. Some very good stations.

Cons: Can be **expensive** if you hold long conversations. No fun of "tinkering" with the equipment. Is not access to your own station.

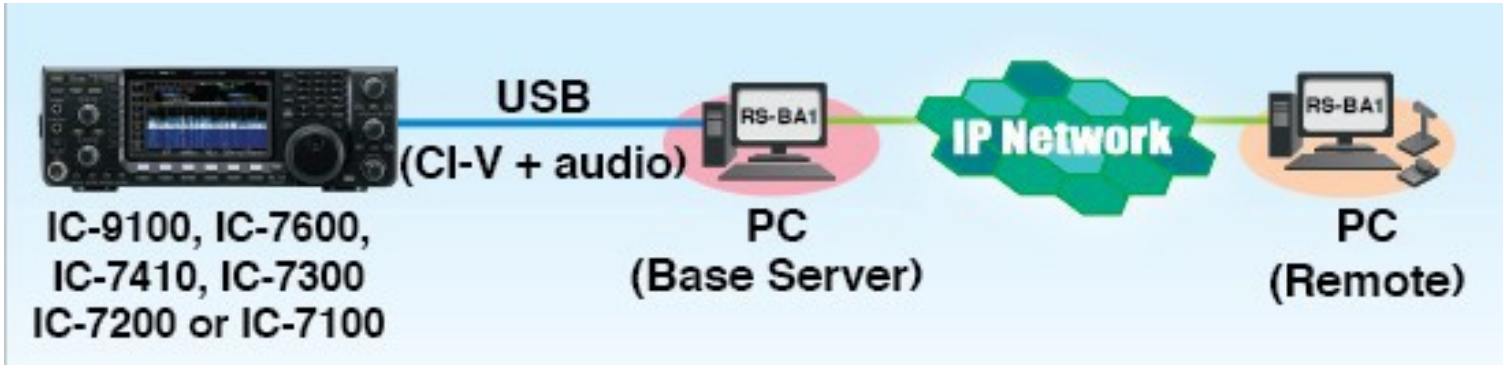
Recommend: Good way to see what's possible. Good "backup" plan.

Many online RECEIVERs are available: websdr.org or globaltuners.com
(Generally, their delay makes them unusable for making any QSOs.)

2. Software Programs

RemoteHams.com Free to sign up. Many sites free to use, some are "membership". Wide range of capability and reliability. You must use their RCForb Client software. You can also use their server software to set up your own station as a remote station. (QST Magazine April 2017, p30: "DIY Remote Radio Now")

ICOM's RS-BA-1 IP Remote Control software. $99.



See also: Kenwood Radio Control Program ARCP-480, Ham Radio Deluxe, TRX-Manager, DF3CB software FT2000RC, N4PY Software, …

Software Programs Pros/Cons

Pros: Supported by a software vendor. You may already have a compatible radio. The software has already solved many common problems. **You are in control of the station, software, access, settings…**

Cons: Limited to the configurations and abilities of the software. **Requires a shack PC online and a remote PC (laptop).** Limited control of antennas (Ant1/Ant2) or station accessories (rotator, amp). Rest of shack needs to be computer-controlled or automatic.

Recommend: Good solutions if the program meets your needs, and you want some vendor support and a user community (forums).

3. Remote Desktop software

Set up your shack PC to control your station. You can use your favorite logging programs or rig control programs - even if they don't have any "remote" ability: N1MM+, Wintest, Logger32, DXLab,...

Then use a "remote desktop" program to connect in to your shack PC. On your laptop you "see" the shack computer, and can control the station.

There are many free "Remote desktop" programs (also called VNC):

- TeamViewer,
- Splashtop,
- Chrome Remote Desktop,
- Windows Remote Desktop,
- Mac OS Screen Sharing*,
- TightVNC*, …

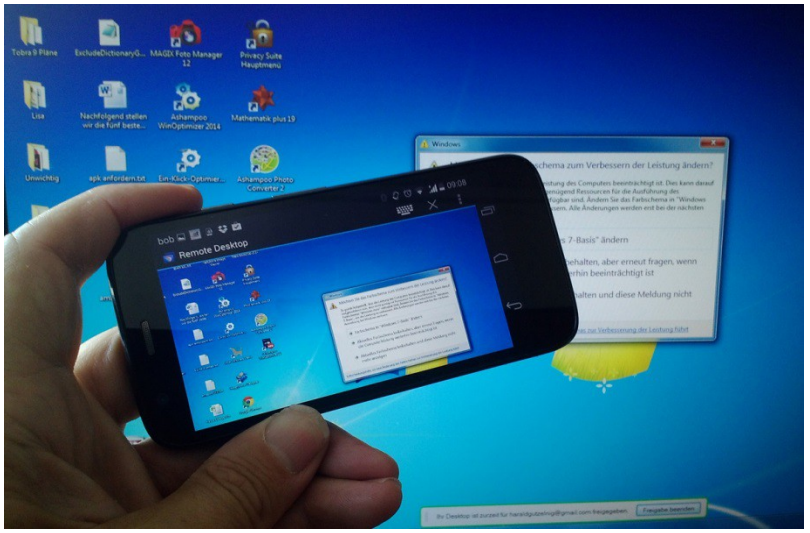
* If yours doesn't include two-way audio - add Skype, Remaud by DF3CB, or VOIP "chat" software like Ventrilo, Mumble, or TeamSpeak.

Remote Desktop Pros/Cons

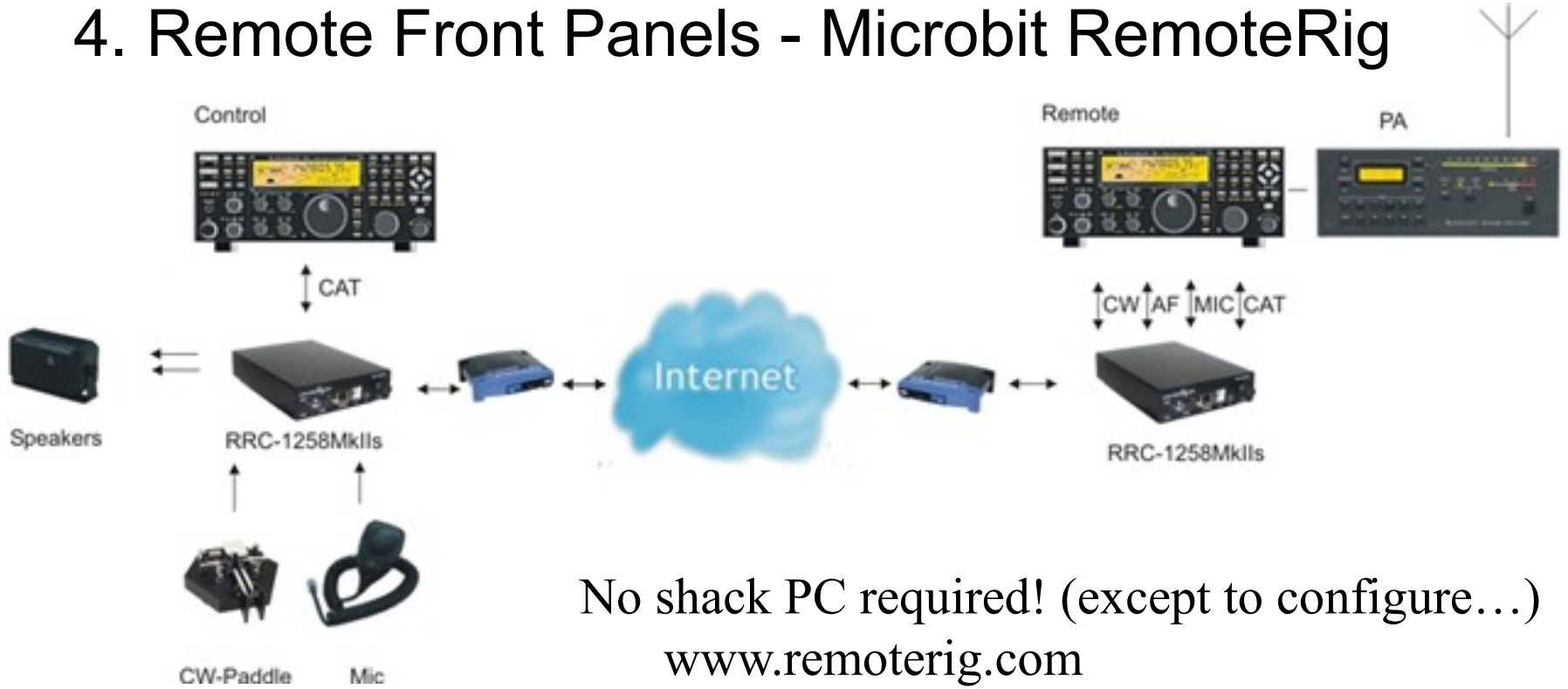
Pros: Use your station just like sitting at the shack PC. **Use any ham software on the shack PC. Works well with tablets and phones.**

Cons: Needs High Speed Internet. **Delays** as it tries to duplicate the full desktop view. Requires a PC to be "on" and operating at shack. Rest of shack needs to be computer-controlled or automatic.

Recommend: Easy to use, provides familiar station operation.



4. Remote Front Panels - Microbit RemoteRig



No shack PC required! (except to configure…)
www.remoterig.com

Uses a pair of Microbit RemoteRig “modems” to transfer audio, radio control and some station control. Can use with:

- Radio with a detachable front panel (TS-480, IC-706), or
- Radio with a matching "control head” (Elecraft K3/0-Mini), or
- Two radios that support the "Twin" concept (Elecraft K3, Yaesu FT-2000, or
- Control with a PC program or Android App.

4. Remote Front Panels - FlexRadio Maestro

A FlexRadio Maestro (wireless or wired) connects across a local network or the internet to control a FlexRadio station.

Remote Front Panels Pros/Cons

Pros: Provides **knobs & buttons**, just like a real radio!
Very reliable, once configured and working.
Support by vendors: Microbit / Elecraft , or FlexRadio.

Cons: **Expensive**. RemoteRig modems ($500 pair) plus a front panel ($300 - $1,200) or 2nd radio. ($900 - $2,400)
Can be difficult in initial setup.
Rest of shack needs to be computer-controlled or automatic.

Recommend: This is current "Top of the Line“ for a real radio “feel.”

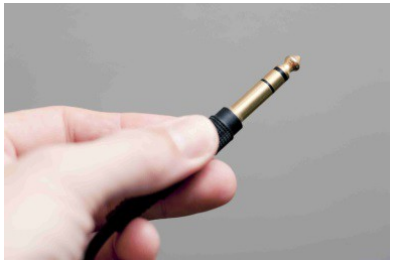
What are the REAL problems?

Station Control: The control of “everything else”: AC power outlets, antenna switching, rotators, tuners, amplifiers, RX-only antennas, watt meters, …

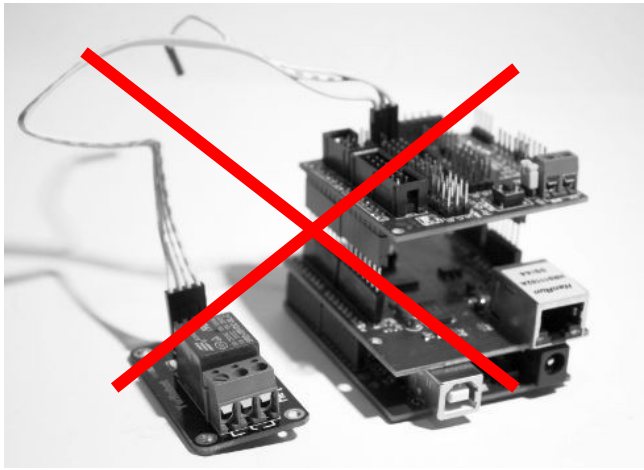
Look for “automatic” or for “computer-controlled.”

Eliminate things that require you to <u>manually</u> switch or adjust them.

A "killer" problem when remote is when something needs to be reset or unplugged. There are more of these than you think.



Internet control of AC Power



There are experimenter/homebrew solutions, but for safety and reliability look for complete UL-Listed and shielded/enclosed solutions.

DLI Web Power Switch $190

… or Belkin WeMo Switch $30

Hint: A “Webcam” in the shack can help see what’s happening, but uses lots of internet bandwidth.

Internet control of 12 Volt Power: West Mountain Radio RIGrunner 4005i $280
…or just control an AC socket to the DC power supply.

Antenna Switching: make it “automatic.”

- The radio or attached shack computer provides a “band data” output, or you can monitor the serial port for freq information.

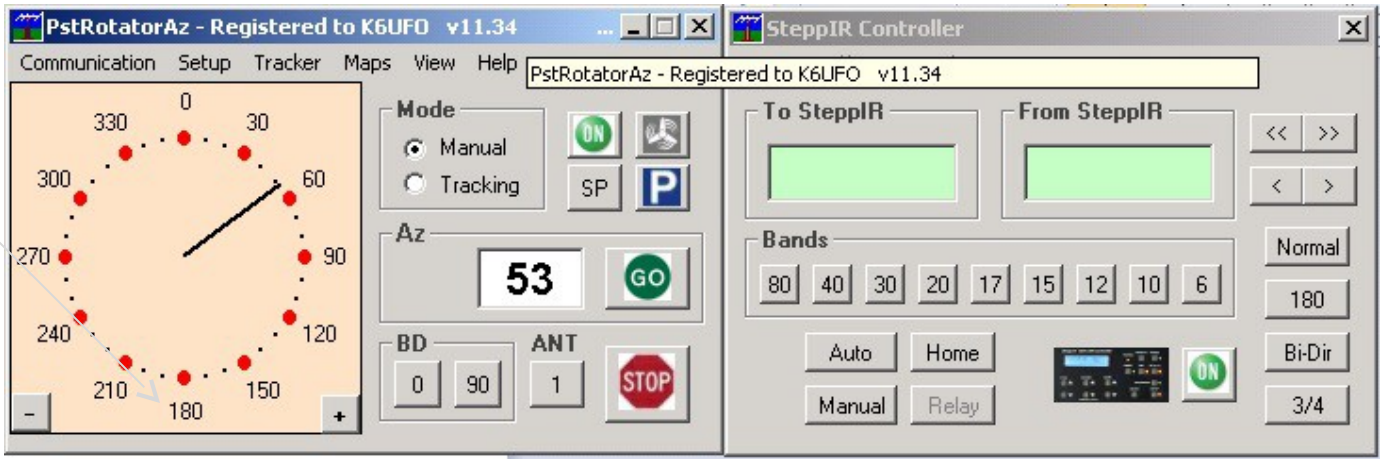
- “Band Decoder” by Array Solutions, TopTen Devices, MicroHam, Hamation, …

- “Remote” antenna switch by same companies plus DX Engineering , Ameritron, …

- It is helpful to have a “dummy load” on one of the antenna ports.

Rotators: Make it "computer-controlled"

- Requires rotator control box with a serial port (RS-232 or USB.) Green Heron RT-21, Hy-Gain DCU-2, AlfaSpid, Prosistel, MDS-Ham RC1 …
- Or an "add-on" to control box: EASY-ROTOR-CONTROL(Vibroplex), EA4TX, …
- The serial port goes to the shack computer running "rotator control software" such as: many logging programs, Ham Radio Deluxe, LP-Rotor, or PstRotatorAz software which includes a remote server. By YO3DMU $25 (and has SteppIR control!)



- Or RemoteRig box includes a 2nd serial port that can be used for rotator control.
- Or RemoteRig RC-1216H plus 1216L gives web-based control with no shack PC.

(If that sounds complex, wait till you have two or three of them to control!)

Tuners: (if used) make them “automatic”(“auto-tune”)

Manual antenna tuners and manual tune amplifiers will be limited to one band, but can be switched in-line with the antenna switching.

Automatic antenna tuners provide multi-band operation. LDG, Palstar HF-Auto, Elecraft KAT500, SGC, … Be careful the tuner doesn’t require an actual “button push” to tune. Activated by radio, or tunes on “power up” or high SWR.

Some tuners and amplifiers include a wattmeter that can be read by the serial port. If you want an independent external wattmeter: Elecraft W2 $250, Array Solutions PowerMaster III $495.

Amplifiers(if used) must be “automatic”(auto-tune) and “computer-controlled”(On/off and monitoring/reset)

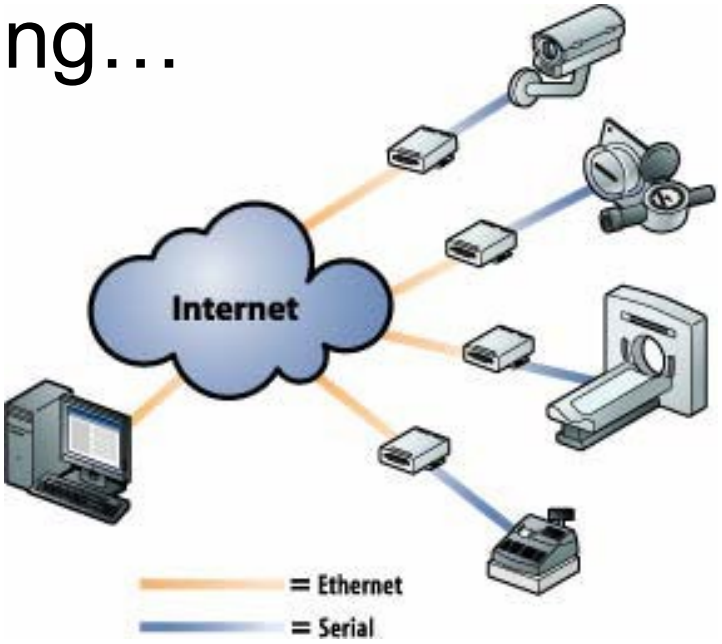
- Solid state amplifiers are auto-tune and easy to use (can be left “On”)
  Popular: Elecraft KPA-500 $2,100, SPE Expert Linears 1.3K-FA $6,000
- Some tube amplifiers are auto-tune and can be computer-controlled.
  Popular: Alpha 87A, Alpha 9500, Acom 2000A, OM Power…

Elecraft KPA500 Remote Software

Alpha 9500 Remote Software

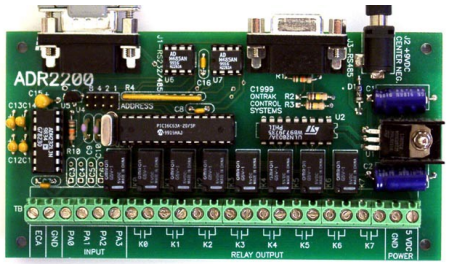
Other shack devices or switching…

Serial ports can be extended over the internet by a hardware “serial server” or “serial port extender” from Lantronics, Digi, Moxa, …
Or, an all-software solution: com0com and com2tcp. (requires a shack PC online.)



Other switching?

- Computer-controlled relays/switches:
  - ONTRAK Control Systems ADR2200
  - KMTronic
  - National Control Devices
- Internet-controlled relays/switches:
  - RemoteRig RC-1216H
  - Digital Loggers Inc DIN Relay III



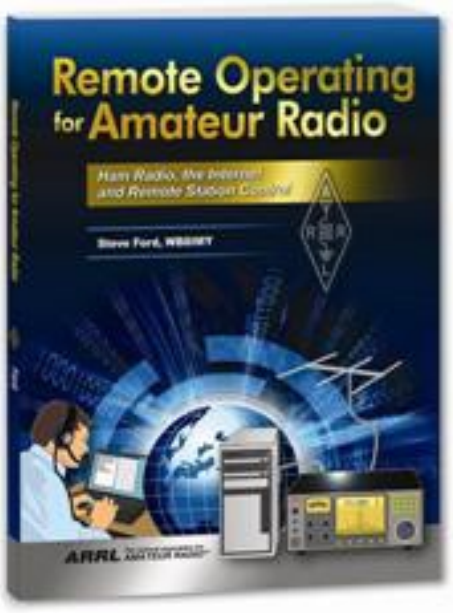
Sounds complicated to set up, but to use...?

In most cases, all you need is a phone/tablet/laptop and headphones.

Use the app, web page, or software program. Login/Connect. Set the frequency, mode, antenna, etc. If you hear stations - receiving is working. On a clear freq, try transmit, Looks good? Then OPERATE!

Yes, once all the setup problems are solved, its easy!

Conclusion



- There is no single correct solution. You can vary the Software/Hardware, Laptop/Tablet/Smartphone..
- This is a changing and evolving area.
- Remote Operating is 80% the same as on-site Operating.

  20% different – additional HW or SW

  10% better – use it even when away from the station!
- Remote operators just want to be on the air, and enjoy radio operating.

Thank You!