

# Pacificon 2016

## Remote Access to your Amateur Radio Station

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These slides available on [k6ufo.com](http://k6ufo.com) or via my QRZ.com page.

# Remote Access to your Amateur Radio Station

- How to implement remote access to your radio station to allow operating while away from home.
- Solutions for radio control, antenna switching, AC power...
- How to avoid the common problems.
- **NOT to debate the ethics or morality of remote operating. All operating must follow your license rules and regulations (ITU and FCC), and follow any applicable Award or Contest rules (DXCC, WAS, ARRL, IOTA,...).**
- This is a rapidly changing area. There is no one perfect solution for everyone for all time. Feel free to adjust and experiment, that's part of Amateur Radio.

# Agenda

- 20 minutes      The 3 basic needs: Audio, Radio control, Station control  
The 4 common implementations. Pros and Cons.  
Internet Speed - Audio dropouts - Tuning Lag  
Audio Quality  
What are the Real Problems?  
Antenna switching  
AC Power  
Examples: What you carry with you. How to Connect.  
Conclusion
- 10 minutes      Demonstration - [RemoteHamRadio.com](http://RemoteHamRadio.com)
- 20 minutes      Q & A, Answering your questions.

# The 3 Basic Needs for Remote

- 1. Audio:** Download from the receiver to you, and Upload from you to the transmitter for voice or digital modes. Your radio and computer will need Audio IN and OUT connections, like MIC and SPKR, or Line In / Line Out. Just like when setting up for digital modes with a soundcard interface.
- 2. Radio Control:** To read and set the radio's frequency, mode, filters, PTT, CW keying... You need a radio with a serial port, USB, CAT or CI-V control. (most radios since 1990s...)
- 3. Station Control:** To control the station's antenna switching, AC power outlets, rotators, tuners, amplifiers, ...

# The 4 Basic Ways to Implement

1. Web Browser
2. Software Program
3. Remote Desktop
4. Remote Front Panel

Solutions vary from 100% Software to 100% Hardware.  
Money from \$0 to \$2,000.  
Time spent from Minutes to Hundreds of Hours.

# 1. Web Browser

https://my.remotehamradio.com/console

K - Remote QRZ.COM DX Spots markaaker - Yahoo! M 13 Google Calendar Yahoo! Groups - Join San Francisco, California Imported

RemoteHamRadio - Universal A: 6 K: 5 SFI: 98 SSN: 40 18:13:16 K6UFO

W1/Calais W1/Calais160 W1/Eastport W2/Summit W2/Summit160 W2/Blueberry **W4/Atlanta** W7/Tacoma W7/Portland

W2/Quaker W2/Mindham W2/Monticello W2/Taconic W1/Chaplin W1/Danbury W6/SanJoaquin W6/SanJose KP4/Palmas HH2/Haiti

6 Element mono Yagi @ 65' on 200' Rotating Tower 69° 10m

Go Anywhere GO STOP LP

EU AF SA PAC JA

General as K6UFO SSB BETA

CALLSIGN	SENT	RCVD	NOTES
	59	59	

Chat Log DX Spots Station Calendar

180m 80m 60m 40m 30m 20m 17m 15m 12m **10m** 6m 2m All None

DX: NA SA EU AF AS OC DE: NA SA EU AF AS OC MODE: SSB CW DIGI Show on map

UTC	DX	DE	Freq	Band	Mode	Country	Note
Oct 13 17:59	7X3WPL	8P9EH	29.200.0	10m	SSB	Algeria	10 meter FM
Oct 13 17:55	ZB2TT	W2DX	28.010.9	10m	CW	Gibraltar	CQ TU QSD
Oct 13 17:51	YY4KCV	KM4SJS	28.460.0	10m	SSB	Venezuela	EL98CB<->FK60FE

Station Status \$0.49/min IN USE

RTTY PSK DISABLED Georgia Grid: EM7S 1000' ASL ARRL GA Lamar County ITU 8 CQZ 5 11:39 / 23:04

Power On With K3 Settings Try Beta

1KW Solid State Amplifier ALARM

905 W OPERATE

1.0

Elecraft K3 VOX TX

RX TX 10m USB 10m USB

±1 kHz ±1 kHz S1

A-B A-B SPLIT A-G-S NOTCH NB NR

PTT (CTRL) PRE ATT SUB RX ANT More

# Web Browser Pro/Con

RemoteHamRadio.com Free 30 min trial. \$99/yr plus \$6 to \$36/hr. Can be accessed with Chrome web browser, Android phone, Chromebook, iPhone App, PC with extra hardware “DXMate”, or RemoteRig hardware.  
(Full disclosure: I have a station on RHR.)



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

**Cons:** Can be expensive. No “tinkering” with the equipment.

**Recommend:** Good way to see what’s possible. Good “backup.”

P.S. Many online RECEIVERS are freely available: [websdr.org](http://websdr.org) or [globaltuners.com](http://globaltuners.com)

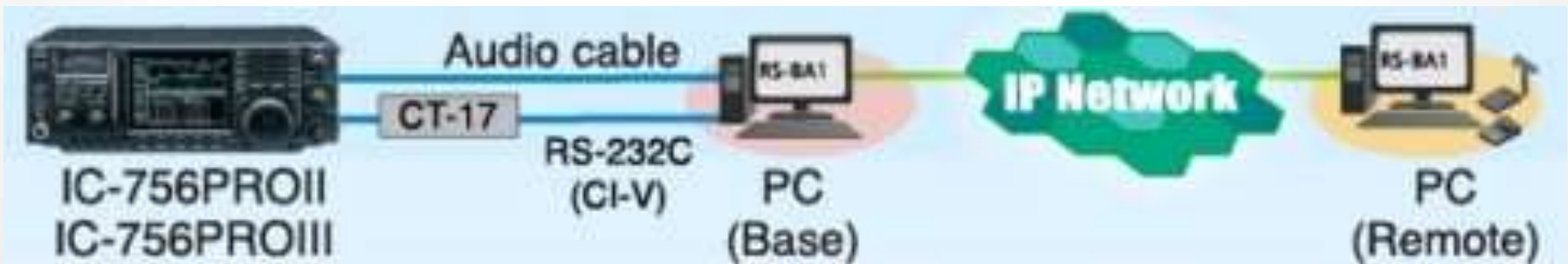
## 2. Software Program



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.

**ICOM's RS-BA-1** software.



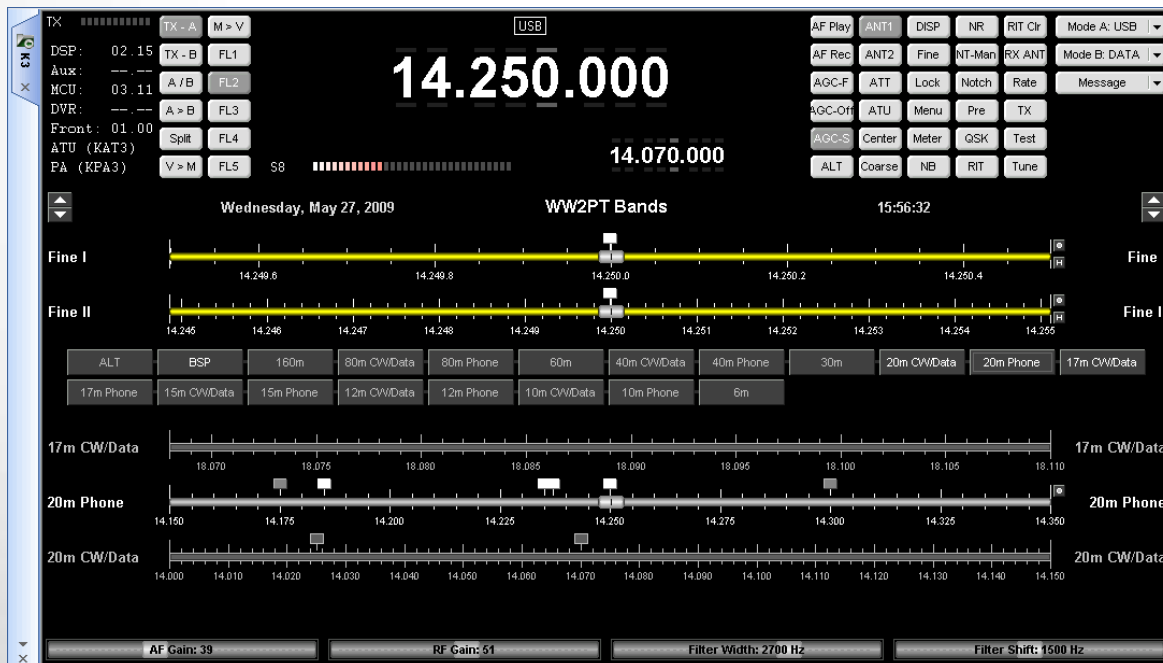
See also: Ham Radio Deluxe, Kenwood ARCP-480, TRX-Manager, DF3CB software, N4PY Software, W4MQ, Win4K3Suite, ...



# Ham Radio Deluxe

**Ham Radio Deluxe** includes "HRD Remote Server" for remote operation over the internet. HRD versions 5.24 and below were free. Current versions 6 and up are \$100 (30 day free trial) but good support. Popular, lots of vendor and user support. Many examples on the web how to setup. e.g., <http://k1fs.org/wp-content/uploads/2012/01/hamradioreMOTE.pdf>

*(Does not include audio: Skype, RemAud or Mumble are recommended.)*



# Software Program Pro/Con

**Pros:** Built-in remote functions are supported by the software vendor. You may already have a compatible radio.

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

**Recommend:** Good solutions if you like configuring programs to your needs, and want vendor support and a user community.



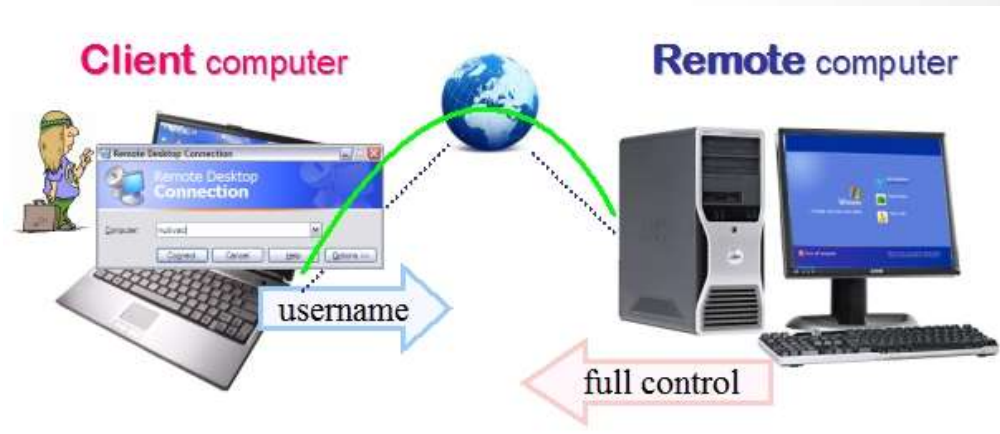
# 3. Remote Desktop

Set up your shack PC to control your station. 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 from your laptop to your shack PC. On your laptop you "see" the shack desktop.

There are many "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 Pro/Con

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

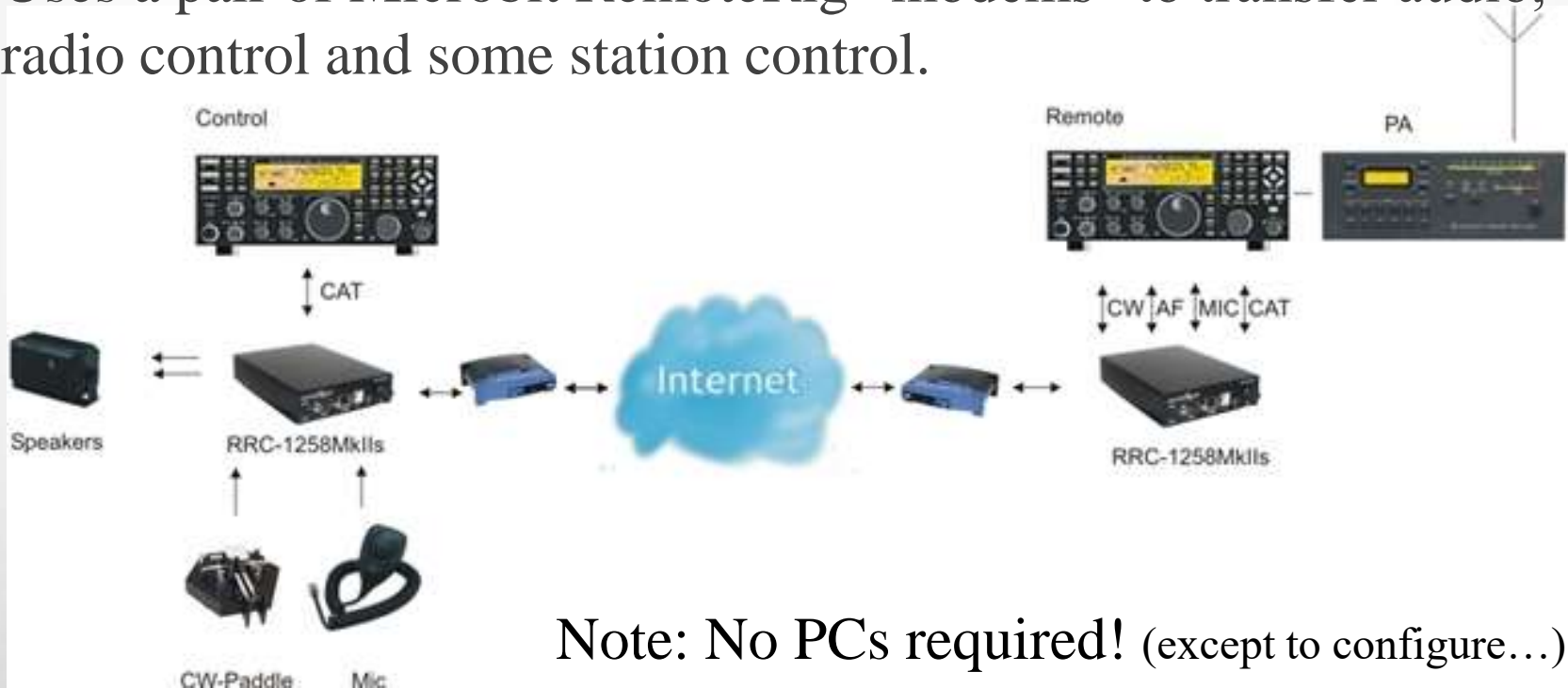
**Cons:** Can have delays as it tries to duplicate the full desktop view. Rest of shack needs to be computer-controlled or automatic. Requires a PC to be “on” and operating at shack.

**Recommend:** Excellent remote access setup, just like working from home.



## 4. Remote Front Panel: Microbit RemoteRig

- Radio with a detachable front panel (TS-480, IC-7100), or
- Radio with a matching "control head" (Elecraft K3/0-Mini), or
- Two radios that support the "Twin" concept where one local radio is used to control the remote radio (Elecraft K3, Yaesu FT-2000, Kenwood TS-590,...)
- Uses a pair of Microbit RemoteRig "modems" to transfer audio, radio control and some station control.



**Note: No PCs required! (except to configure...)**

# Remote Front Panel: FlexRadio Maestro



A FlexRadio Maestro front panel plugs into the local network (or wireless) to control a FlexRadio elsewhere on the LAN. (Across internet soon, with SmartSDR v2.0)



**FlexRadio Systems**  
Software Defined Radio

*Maestro*

**Win PC runs digital**

FlexRadio Systems **MAESTRO** è la nuova console di controllo per i ricetrasmittitori della serie 8000 che permette l'uso immediato dell'apparato senza bisogno del PC, tramite connessione alla rete LAN anche WiFi, oppure direttamente all'apparato.

FlexRadio Systems **MAESTRO** è un moderno e funzionale pannello radio dotato di schermo touch, pulsanti e manopole, connessioni per microfono e tasto/paddle con il quale usare l'apparato senza rinunciare alla operatività tradizionale di una qualsiasi apparecchiatura radio, oltre che a permetterne la remotizzazione in qualsiasi punto coperto dalla vostra rete LAN.

# Remote Front Panel Pro/Con

**Pros:** Provides knobs & buttons, just like a real radio.

Very reliable once configured and working.

Support by vendors: Microbit / Elecraft , or FlexRadio.

**Cons:** Expensive. Modems + front panel or 2<sup>nd</sup> radio. (\$500 - \$2,000)

Can be difficult 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."



# Internet Speed – Dropouts – Tuning Lag

- You need **High Speed** (also called bandwidth), same as a streaming music service. "3G Wireless" is the minimum at 144 kbps, above 400 kbps is better. Otherwise, audio “dropouts” sound like “clicks.” Upload speed may be only 1/5 of the download speed. If you can Skype across country, you’re good-to-go. [www.speedtest.net](http://www.speedtest.net)
- You need **Low Delay** (latency or ping), same as an online game player. Below 200 millisecond is adequate, below 100 msec is better. Otherwise, tuning “lags” and poor button response. Voice and Digital operating are more tolerant of delay than CW operating. [www.pingtest.net](http://www.pingtest.net)
- **GOOD: broadband, cable modem, WiFi, DSL, 4G,...**
- **POOR: Dial-up modem (slow), Satellite (delay).**





# What are the REAL problems?

**Station Control** – control of "everything else": rotators, amplifiers, tuners, multiple antennas per band, RX only antennas, watt meters, ... Some functions are automatic, some require you to manually adjust, some have special software control panels ...



A "killer" problem when remote is when something needs to be reset or changed, and there is no "remote" way to fix it. There are more of these than you think. 😊



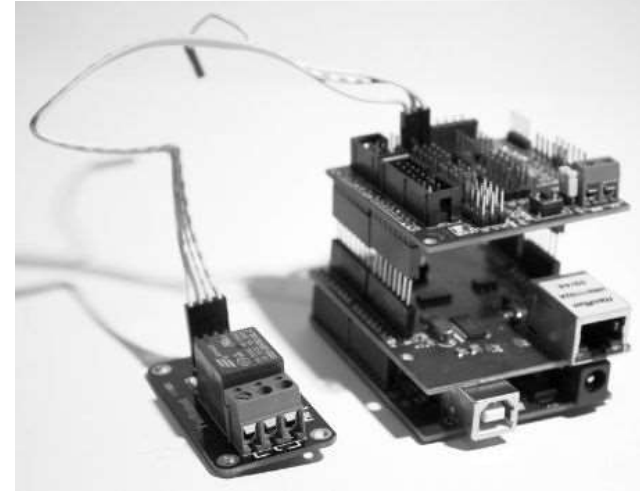
# “Antenna switching needs to be computer-controlled or automatic.”



- Radio or computer “band data” output, or monitor the serial port.
- “Band Decoder” by Array Solutions, TopTen Devices, MicroHam, Hamation, ...
- “Remote” antenna switch ...
- It is helpful to have a “dummy load” on one of the antenna ports for testing.

# AC Power: You need to control AC power at the station.

There are experimenter/breadboard solutions, but as more “home automation” comes online, more switching solutions become available that are easier/turnkey/UL-Listed.



- Remote AC Power switch:

DLI Web Power Switch \$130

... or Belkin WeMo Switch \$40



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

# Examples: What you carry with you.

Essential: Smartphone, tablet or laptop, headphones.

Extras: Mouse, speaker, paddle and keyer, tablet for web access while the laptop is busy.



# Examples: How to Connect

## RemoteHamRadio.com

1. Start laptop, open webpage to RHR, login.
2. Select a station, click Power On button.
3. Adjust radio to band and mode, turn rotator as needed.
4. Start external logging program if used.
5. Operate!

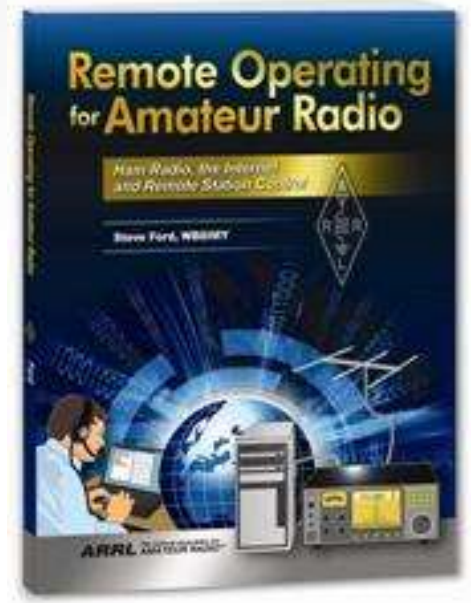
## Remote Desktop

1. Start laptop, open webpage to web power switch, login and turn on shack PC and equipment.
2. Start VNC program, connect laptop to shack PC, login and start audio programs, control or logging programs as needed.
3. Set radio, antenna, amp as needed.
4. Operate!

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

# Conclusion

- There is no single correct solution.  
Software/Hardware, Laptop/Tablet/Smartphone.
- This is real ham radio experimentation, you can try out new ideas and technology.
- This is a fast growing and fast changing topic.
- Remote Operating is 90% the same as on-site Operating.
  - 9 % different – additional HW or SW
  - 1 % better – use it even when away from the station!
- Remote operators just want to be on the air, and enjoy radio operating.



*Thank You!*