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Sonoma County Radio Amateurs

“Building a Remotely Controlled Station”

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These slides, and more, are at my website k6ufo.com

K3/0 RemoteRig

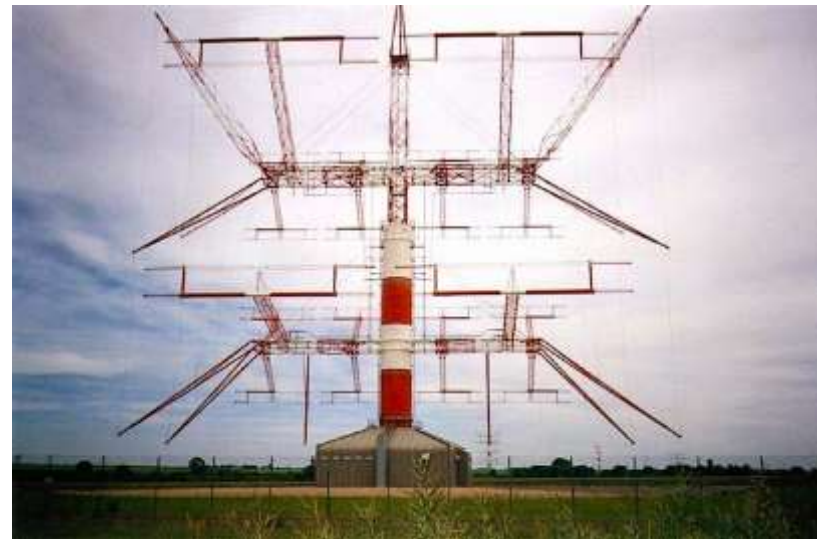


The advertisement for FlexRadio Systems Maestro features the company logo at the top center. Below it, three pieces of equipment are shown: a Maestro control console on the left, a FlexRadio 8000 transceiver in the middle, and a laptop on the right displaying a software interface. At the bottom, the word "Maestro" is written in a large, stylized font. To the right of the laptop, the text "Win PC runs digitals" is displayed. At the very bottom, there is a line of small text in Italian: "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."

Today's Question:

*I understand **why*** I would want a remote station, but **how** do I build a remote station?*

* Operate when away from home, antenna restrictions, moving into assisted-living, no longer able to do antenna work, share a station with others, use a good hill-top location, use a low-noise location...



Using **other people's stations** is useful when you are traveling, or when no station is allowed at your own residence.

Use a Receive-only site on the internet: websdr.org kiwisdr.com/public
rx.linkfanel.net and others.... Good for SWL, monitoring, check your signal...

For Receive AND Transmit: you may need to register, provide a copy of your license, join a club, pay dues or dollar\$. Look for:

- A friend or club station already setup for remote access, especially owners of a Flexingadio-based station. Many contest stations, e.g.: N6RO, W7RN, ...
- RemoteHams.com has many shared stations and club stations globally.
- RemoteHamRadio.com An established commercial operation. \$20/month plus airtime billed at \$0.05 to \$1.25 per minute. Very capable stations in USA, Puerto Rico, Haiti and Croatia. Free stations for licensed youth age 25 and younger.
- BeLoud.us A newer commercial operation. USA, Bonaire and Spain.

Generally, you will need a computer, headset, “good” internet connection. Most use a standard web browser – some require special software (RemoteHams, BeLoud).

But how to setup your own station ?

There is no One Perfect Solution. It depends on what you want to do:

Modes: Voice, CW, Digital? CW by keyboard only, or do you need key or paddle?

How much equipment will you haul around with you? Just a cellphone or tablet?

Fast setup? Be on in 1 minute from a Smartphone, or a few minutes for Laptop?

(Will you take the time to set up a Control Head, edit the router to open ports, have special audio equipment or interfaces, keyers and paddles, an extra screen ...)

Dual use? Will the station be used at home AND remotely, or dedicated to remote?

How much re-configuration to go from local to remote use? Will you re-configure every day before leaving to work? Do you need full band-changing, or is a “preset” on one band/mode sufficient?

Is the station easily accessible (in the garage), or is it a 6 hour trip to the hills?

Are you willing to keep a PC on-line at the remote station (helps), or does everything have to be extended across the internet with no on-site PC? (harder).

How much remote “reset” ability do you need? Is anyone on-site to help?

-- Recommendation: Start simple, gain experience, then expand or change.--

Four Basic Needs for Remote Operation

1. Audio In/Out to radio: Access to MIC/SPKR, Line In/Out, **audio over USB**, or over Ethernet. Just like being setup for digital modes (FT8).



2. Radio Control: To set radio Freq., Mode, PTT, CW keying ... Need a radio with a **serial port, CAT, CI-V, USB control**, or over Ethernet.



3. Station Control: AC power outlets, antenna switching, rotators, tuners, amplifiers, ... Equipment must be highly **automatic**, or have PC control, or over-the-web control. **Automate and Simplify** your station where possible.



4. “Good” Internet service: Up and Down speeds over 1 Mbps for audio (more for waterfall displays), Low latency/delay under 150 ms. Low packet loss, low jitter or variation, an IP address (dynamic or static) for the radio end. (DSL/cable/WiFi = good, Satellite/wireless internet (Verizon)/Starlink = bad.)



...and your patience and willingness to solve problems.

Two “simple” ways to Implement Remote Access

1. Software Programs designed to control remote radios.
2. Remote Desktop Software designed to control a remote computer.

(These can sometimes be setup in less than an hour.)

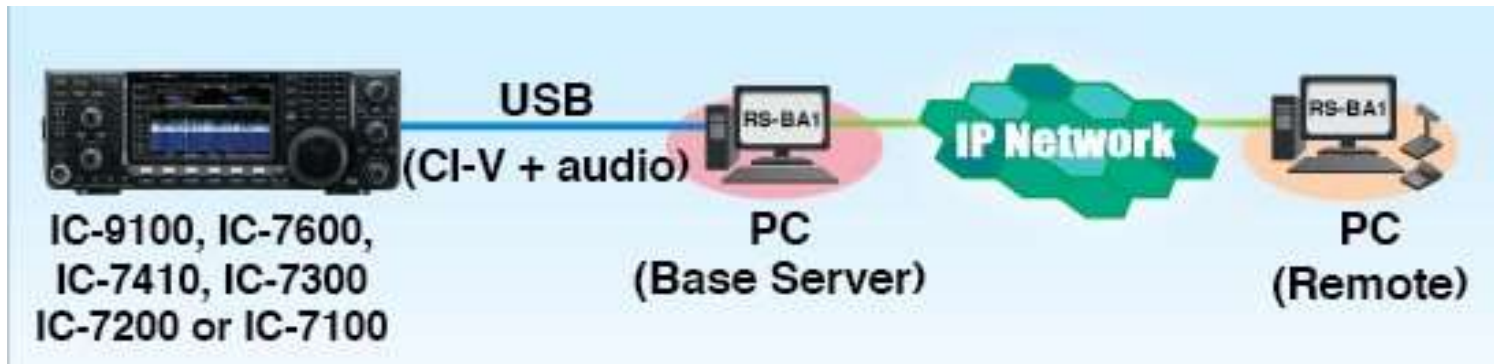
1. Software Programs designed to control remote radios.



RemoteHams.com is both a free software Program (RCForb) and a community of users & stations. You can use the server software to offer up your own station for remote use.

See, QST Magazine, April 2017, p30: “DIY Remote Radio Now” by K5PA
And see the info at k5pa.com

ICOM’s RS-BA-1 IP Remote Control software. \$160.



See also: RemoteTX.net, Ham Radio Deluxe, N4PY Software, Win4K3Suite Server, Kenwood ARCP-590, TRX-Manager, DF3CB software, ...

Warning: Can be hard to also connect to your logging program since “serial port is already in use.” You may have to log manual/un-connected.

2. Remote Desktop Software designed to control a remote computer.

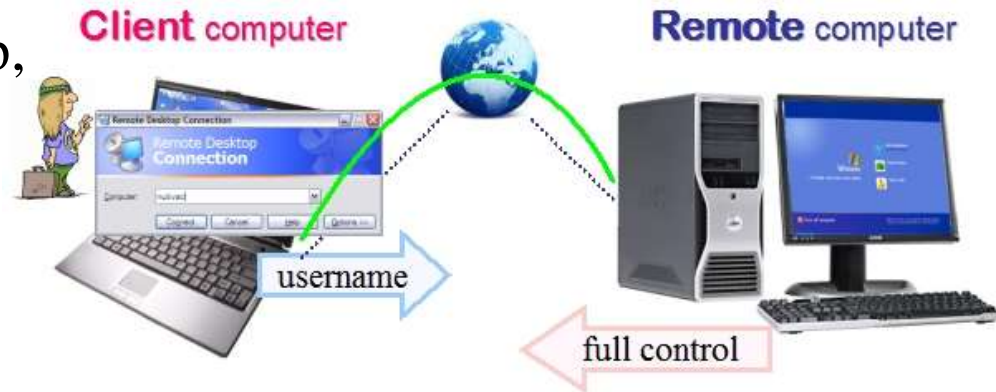
Set up the shack PC to control the station. Use any software - even if it doesn't have any "remote" ability: N1MM+, WSJT-X, DXLab, ...

Then, use remote desktop software to "connect-in" to the shack PC. You "see" the shack desktop, and control the station, just like being at the shack PC.

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

Chrome Remote Desktop,
AnyDesk, Windows Remote Desktop,
TeamViewer (license problems?),
Splashtop,, ...

*make sure your VNC includes two-way audio, or you'll have to add SW like Skype, Mumble, RemAud, ... which just adds complexity. Google the productname + audio, or google "wiki VNC comparison" and look at "Features" chart.



- + Use any software in the station on the shack PC.
- + Audio decoding for FT8 is best at the station.
- Needs the most internet speed. 5+ Mbps.
- Sometimes feels "laggy" and "slow."

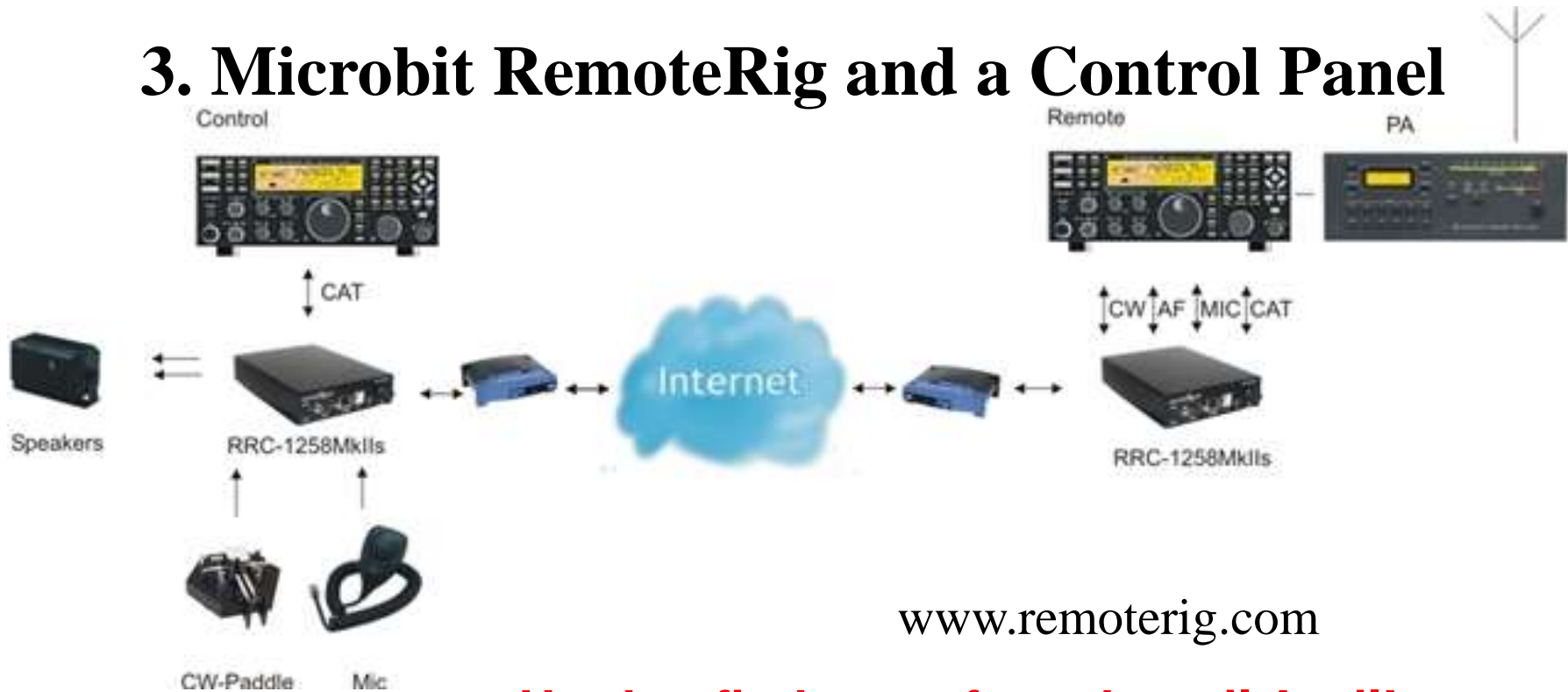
Two “advanced” ways to Implement Remote Access

3. Microbit RemoteRig.

4. FlexRadio SmartLink.

(Costs more in time and \$\$, but more knobs and capability.)

3. Microbit RemoteRig and a Control Panel



www.remoterig.com

Hard to find, out of stock until April!

Use a pair of RemoteRig “modems” to send audio and control signals to station. Can use with: detached front panel (TS-480), “control heads” (Elecraft K3/0-Mini), “twin” radios, a PC program or an Android App.

- + No shack or remote PC to operate. Very reliable once working. Real knobs.
- + Good CW keying from computer or paddle or straight key. Widely used.
- Expensive? (\$500 a pair, plus a \$700 control head or 2nd radio)
- May be hard to configure the 1st time. Get help from a current user/expert.

4. FlexRadio and a Maestro control panel



All FlexRadios can be controlled from a software program (SmartSDR) locally or remotely. A “Maestro” control panel can also be used locally or remotely. (wireless or wired) There are also tablet and smartphone Apps.

- + Good support, one vendor.
- + No shack PC required.
- + Real Knobs.
- + Good CW keying from computer or paddle or key.
- + Widely used.
- + Nice Spectrum Display.
- Expensive? \$2k radio and \$1k Maestro
- **Maestro out of stock until “spring.”**

FlexRadio Systems
Software Defined Radios

Maestro™

Win PC runs digitals

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.

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, ...

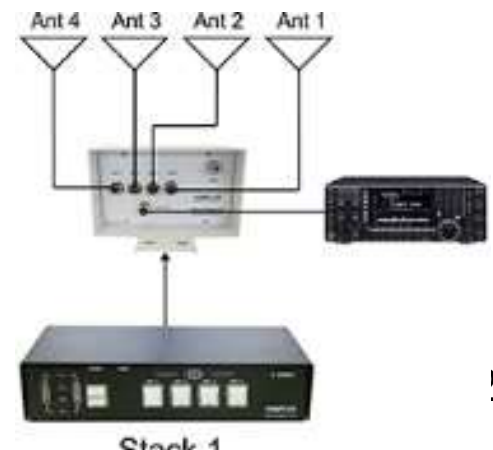
Simplify your station, make your station as **automatic** as possible, then solve remaining issues. Look for devices that are “**automatic**” or “computer-controlled”(needs a PC in shack). (Trust, but verify...)

Eliminate things that require you to **manually** switch, plug, adjust or reset.

No!



Yes!



There are solutions to the REAL problems:

AC Power switching: Smart Plug \$25, or DLI Web Power Switch \$190



Antenna switching: The radio's ANT 1/2 button, or a band decoder & coax switches.

Rotators: Control box has serial port, use logging SW or PstRotatorAz or Green Heron.

Tuners and amplifiers: If manual tune, use on one band switched-in by antenna switch. If auto-tune: use anywhere. Use in Automatic-mode or with control SW on shack PC, or over internet if remote-capable control SW. KPA-1500 works great!

Other devices can be controlled by the shack PC or a RaspberryPi, or controlled across the internet with a serial port extender, or WebRelay or smart plug.

Remember our Question: ... ***how do I build a remote station?***

Q1: Can the station be operated from the shack PC?

A1: Use either “Simple” method (Slide 6) : Software Programs or Remote Desktop.

Q2: Is an Icom radio already in place?

A2: Use the Icom RS-BA-1 software, but you may be frustrated/disappointed.

Q3: Is an Elecraft K3 already in place?

A3: Search for RemoteRig boxes, and borrow/use a second K3 or K3/0 as the control panel. Alternative, look at Win4K3 Suite software program (VA2FSQ).

Q4: Is a Flexradio already in place?

A4: Ha! Flexradio software already supports remote operation. Just configure and operate.

You may find some limits on changing bands, changing antennas, retuning amp, etc... You may be able to work around this with checklist/procedures or an on-site assistant. Solving every last problem may not be cost-effective for your initial testing. Gain experience, then decide what to change or improve.

The internet has information on the various remote solutions. But you have to ask about specific software or products, not just google “Ham radio remote.”

Your club and the internet (groups.io) has many people who are users and experts on the various kinds of remote operation. Ask!

Many useful pieces for a remote operation solution exist, but putting them together in an efficient, reliable and affordable configuration is the challenge - just like putting together any Amateur Radio station.

The goal of “remote” setups is to get more operators and stations on the air, for more hours of operating, contesting and DXing, - which leads to more fun for the operators, and for the stations on the other end of the contacts. Win-win!

Thank you!

Questions?