Remote Ham Shacks and Remote Operations

by

WA7RF

Work the World from anywhere in the World

Why Operate Remotely?

- Be able to listen to your own signal for testing of antennas and your station.
- Live in antenna restricted neighborhood (apartment, condo, HOA's)
- Temporary Living space, student housing, RV
- Suffer from a noise problems
- Be able to operate world class stations with mega antennas and QRO
- Operate when you boss isn't looking (at work or at home XYL)
- Not able to afford your own station
- Ability to participate in local nets and work DX when there are spotted from wherever you are?
- Operate from anywhere during Travel
- Bring Resources together for others to operate and enjoy – Club Shack or project for members to be able to use from home.
- EOC to operate remote sites that are not noisy

Can you participate in Remote Radio Ops?

How many of you have a computer and use it to web browse?

Method 1

How many of you have an internet connection fast enough to listen to iHeart Radio, Pandora or watch YouTube?

Method 1

How many of you have a microphone for your computer?

Method 2 and 3

How many have a soundcard Interface, Rigblaster, Signal Link or other?

Method 2 and 4

How many control their radio with an Computer Interface?

Method 2 and 4

How many of you have used Skype or VoIP?

Method 4

How many of you have used Remote Desktop Software, Teamviewer?

Method 4

How many of you have extra $$$

Method 3 and 5

How many of you have a radio with a removable Head?

Method 5

How many of you have FlexRadio or an Elecraft K3?

Method 3 and 5

Five Methods of Remote Radio Operating

1. Receivers connected to the Internet - Analogue and SDR – WebSDR.org, globaltuners.com, OpenWebRX using your web browser

2. Software Based Services – remoteham.com (free) using RFCorb Client.

3. Web Browser Based Services – remotehamradio.com (operates Elecraft K3's) or BeLoud.us (operates Flex Radios and getting ready to launch)

4. Remote Desktop Control of your own station using software like Teamviewer, Skype, HamRadio Deluxe

5. Remote Front Panel Hardware solutions such as RemoteRig, FlexSystems Maestro

FCC Part 97.3 Definitions

- (6) *Automatic control.* The use of devices and procedures for control of a station when it is transmitting so that compliance with the FCC Rules is achieved without the control operator being present at a control point.
- (13) *Control operator.* An amateur operator designated by the licensee of a station to be responsible for the transmissions from that station to assure compliance with the FCC Rules.
- (14) *Control point.* The location at which the control operator function is performed.
- (31) *Local control.* The use of a control operator who directly manipulates the operating adjustments in the station to achieve compliance with the FCC Rules.
- (39) *Remote control.* The use of a control operator who indirectly manipulates the operating adjustments in the station through a control link to achieve compliance with the FCC Rules.

Legalities

- **§97.7 Control operator required.**
- When transmitting, each amateur station must have a control operator. The control operator must be a person:
- (a) For whom an amateur operator/primary station license grant appears on the ULS consolidated licensee database, or
- (b) Who is authorized for alien reciprocal operation by §97.107 of this part
- **§97.105 Control operator duties.**
- (a) The control operator must ensure the immediate proper operation of the station, regardless of the type of control.
- (b) A station may only be operated in the manner and to the extent permitted by the privileges authorized for the class of operator license held by the control operator.

FCC Part 97.109

- **§97.109 Station control.**
- (a) Each amateur station must have at least one control point.
- (b) When a station is being locally controlled, the control operator must be at the control point. Any station may be locally controlled.
- (c) When a station is being remotely controlled, the control operator must be at the control point. Any station may be remotely controlled.
- (d) When a station is being automatically controlled, the control operator need not be at the control point. Only stations specifically designated elsewhere in this part may be automatically controlled. Automatic control must cease upon notification by a Regional Director that the station is transmitting improperly or causing harmful interference to other stations. Automatic control must not be resumed without prior approval of the Regional Director.

So what's required for Remote Operating

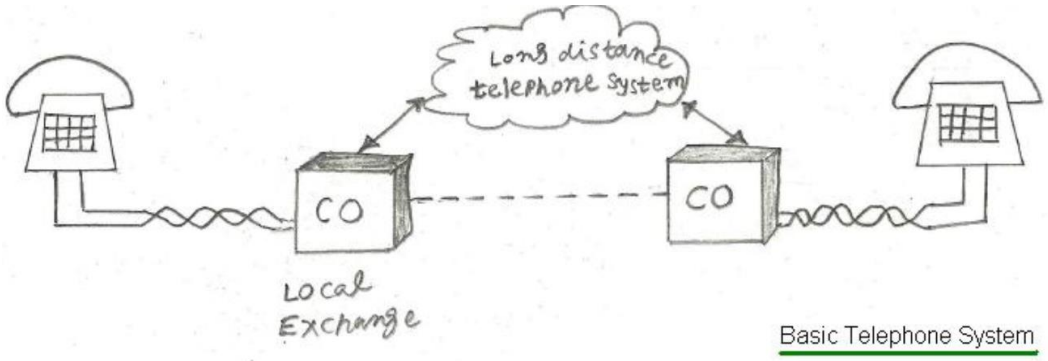
Audio Transport – Need to get audio from you to the transmitter and receiver audio back to you (Voice, Digital), Commonly use VoIP solutions either build into software or hardware solution or Skype

Radio Control – Need to control frequency, filters, PTT, mode Time out Timer etc. The remote radio will need control via USB, CAT, CI-V or serial port (Software, Remote Desktop, Front Panel)

Station Control – Gotta at least be able to throw the switch. AC power, rotators, antenna switching and tuning, amplifier control (web based servers at your station or remote plugin, power strips, relays, control boxes)

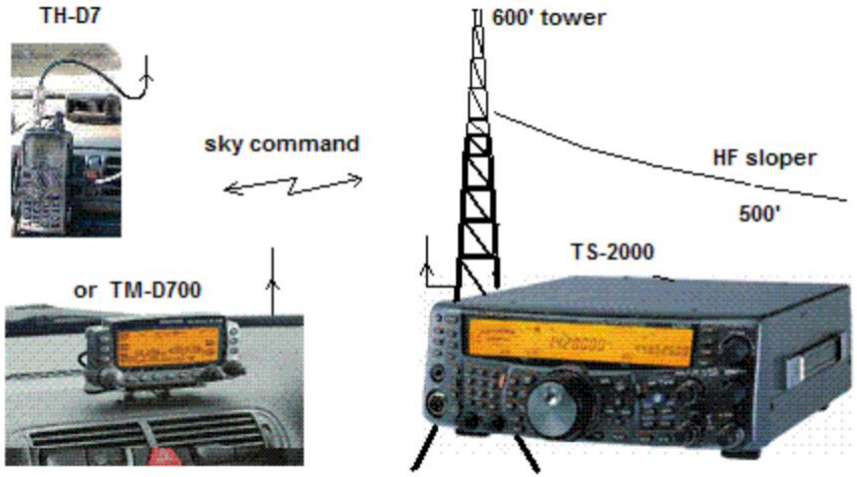
Common Control Link Methods

- TELCO



Basic Telephone System

RF Links



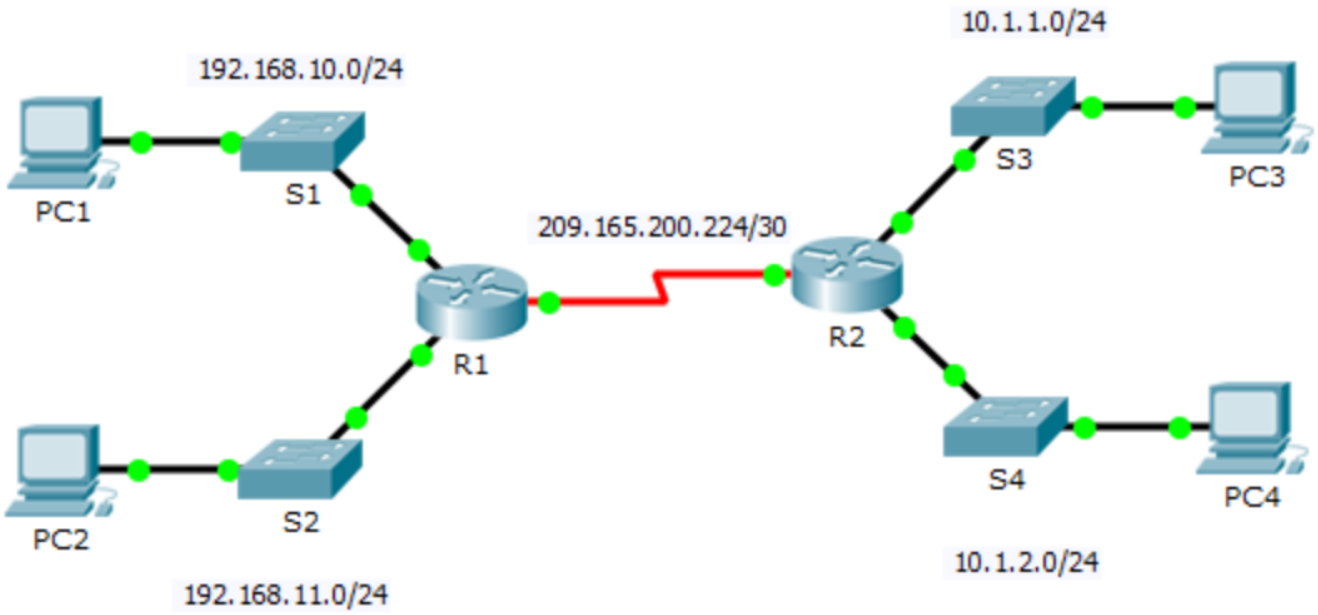
AND…….

TCP/IP Links…..LAN, WAN, Internet, HAMWAN

- Widely Available
- Everywhere
- High Speed
- Vast array of devices that are TCP/IP compatible
- Highly developed Technologies – VoIP, streaming audio, Remote Desktop control, streaming video and a vast array of software.
- You can encapsulate all sorts of data with TCP/IP and UDP
- So the Internet has become the preferred control link

Let’s look at some Basics of the Networking, Internet and your Home

- For two network devices to communicate to each other the must make a physical and virtual connection…
- Address
- Ports
- Routers
- DNS
- Port Forwarding
- Firewalls
- NAT



Need Good Internet Service

- Speed should be at least 0.5Mbps. If you can stream video will work great. If you can listen to Pandora than you can do Method 1
- Latency – Should be under 200ms
- An IP address that is Publicly routable….Seen on the Internet either dynamic with a service (like DynamicDNS) or a static from your ISP. Not needed on most browser based services (Method 1 and 3 or 4)
- DSL, Cable or Wifi providers usually best. Satellite and Cell may have to much latency especially Satellite

Method 1
Receivers *connected* to the Internet

Your favorite browser and an internet connection that supports streaming audio like iHeart Radio or Pandora.

Great to use as a remote receiver for testing of Antenna and you own station. Varied Hardware….even cheap SDR-RTL Dongle $20

If you have noise on receive at your station, listening in on these helps.

Pass the time and snoop around to other parts of the world.

WSPRNet, PSKReporter and RBN Reverse Beacon Network fall under this category too.

WebSDR.com

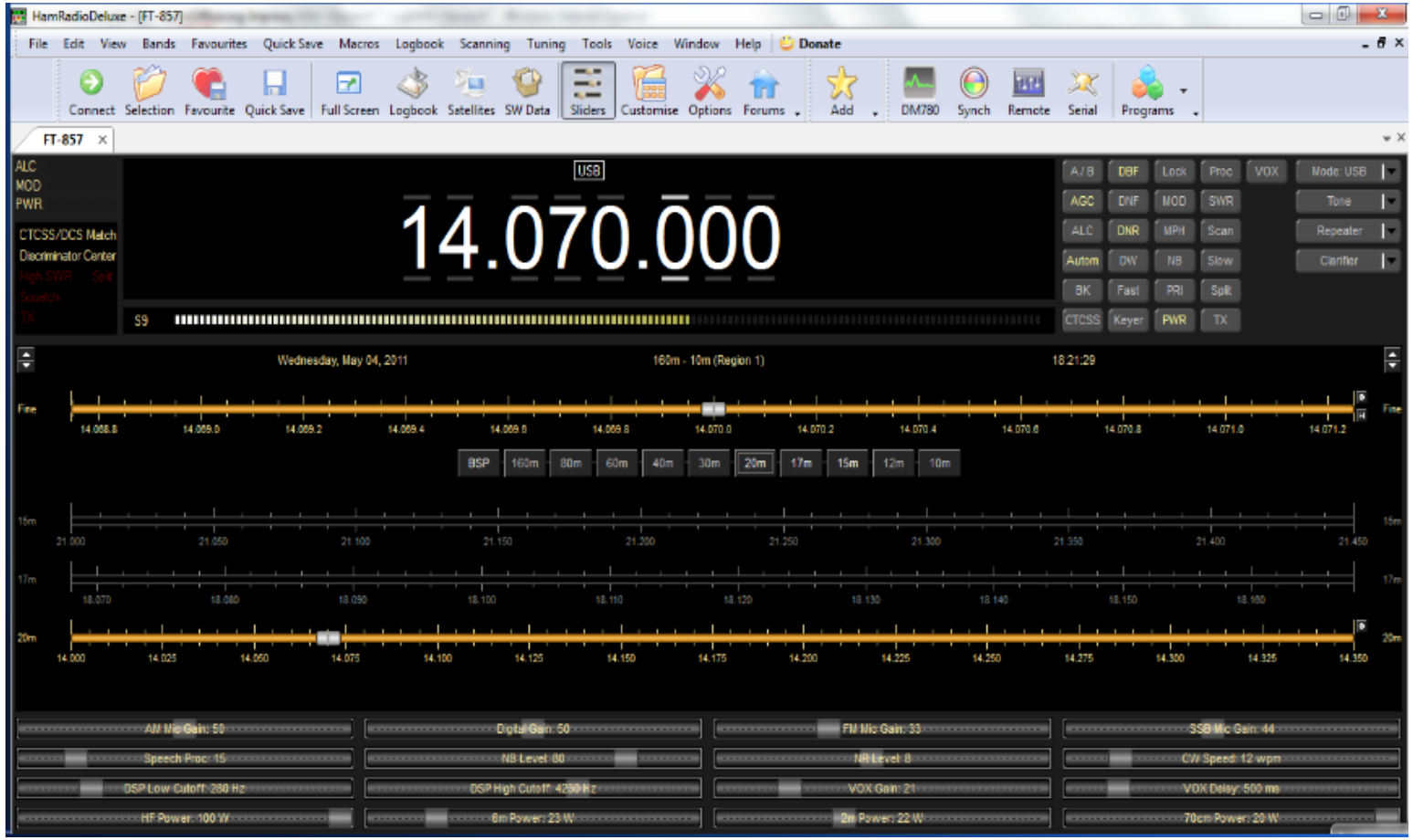
GlobalTuners.com

OpenWebRX

Method 2
Software Based Remote Control

- Remoteham.com
- Remote operator –you- Uses free client software RFCOrb
- Hams allow others to use their stations by installing the RFC server
- You get permission to use and follow rules – just like a repeater user would
- You can setup your own radio using this free software, Client and Server and operate with software only.
- Icom, Kenwood, Hamradio Deluxe have software based solutions but your radio has to support it, and other hardware pieces are required.
- April 2017 QST Article DIY Remote

Ham Radio Deluxe has a Client/Server



Method 3
Web Based Services

RemoteHamRadio.com – All you need is a web browser and a Microphone. Costs money usually – register and per min. Excellent stations. K3 with big beams and lots of great locations and power. Has a hardware solution for using your own K3 or a K3 mini and then becomes a Method 5 using Front Panel Control.

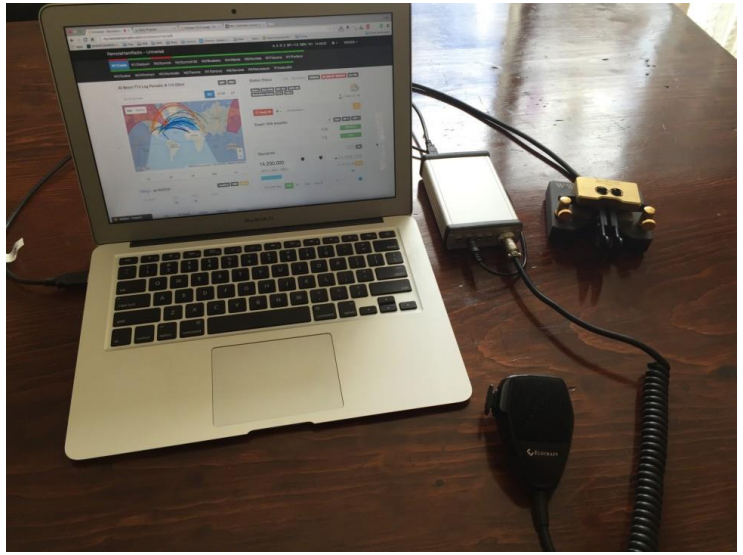
BeLoud.us – New startup using Flex Radios.

Let's give it try….

RemoteHamRadio

RemoteHamRadio or Remote Ham Interface

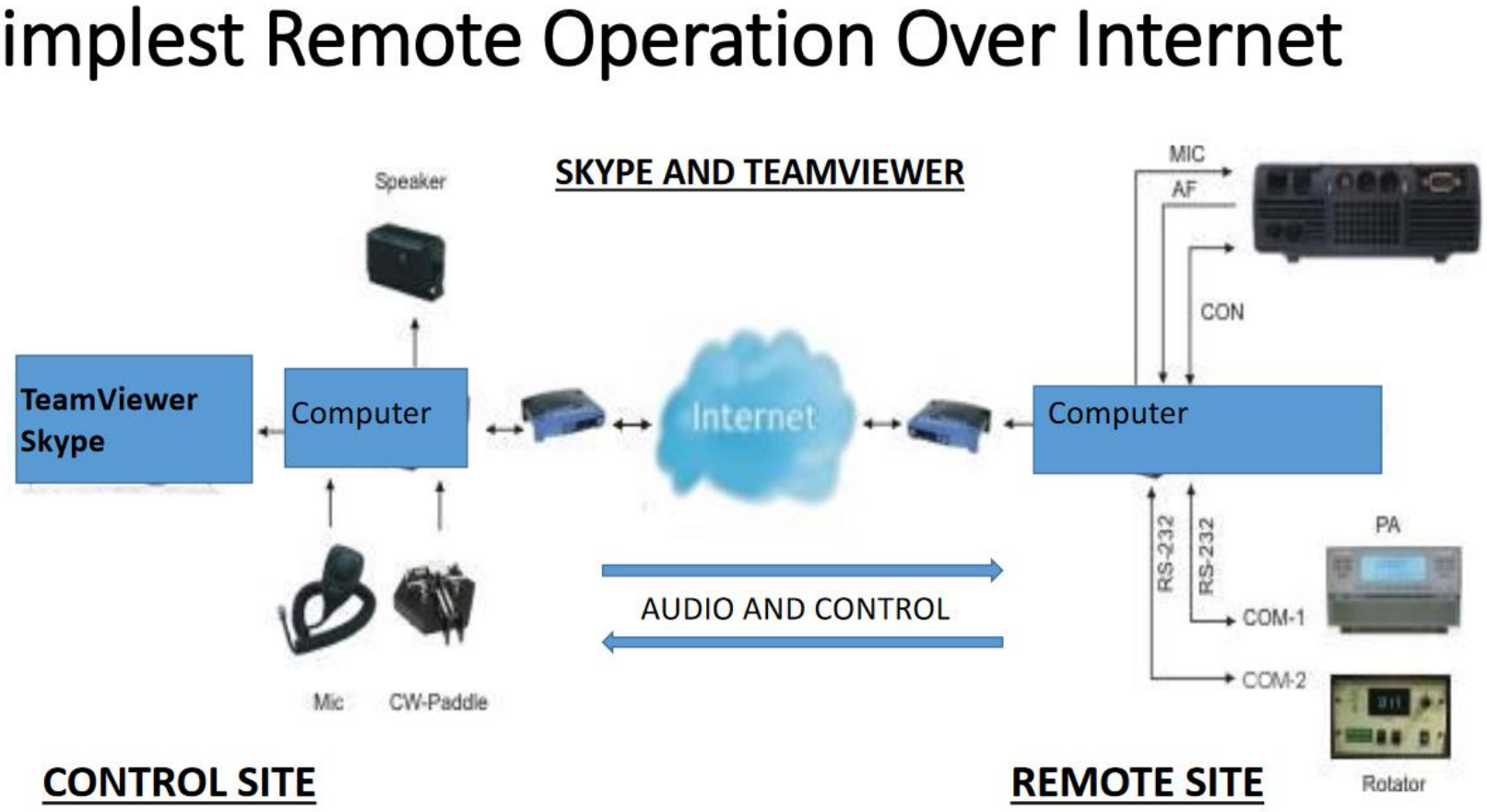
- Allows you to use a communications mic and CW Key at your local position.
- Can use with either RemoteHamRadio.com or RemoteHams
- RemoteHamRadio does have a driver for your computer to interface a K3 or K3 mini.



Method 4 – Remote Desktop

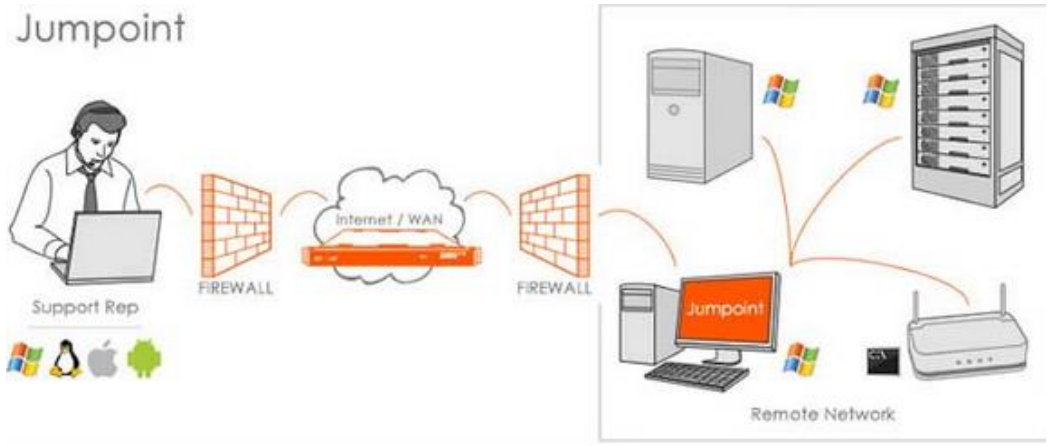
- Setup your normal station the way you like and operate locally with all you different programs of choice. Software you like that isn't made to operate remotely can still be used this way
- Setup a soundcard interface. You do have a soundcard interface right…it opens up all the new modes to you. I think the soundcard interface/computer is one of the most versatile pieces in the shack.
- Many free remote desktop progams, Teamviewer, RealVNC
- I use this mainly because I use my hamshack computer for programming, Linux development. Let's me run my home computer from anywhere. I operate FT8 in the background while working.

Remote Desktop Method 4 – Let's try.

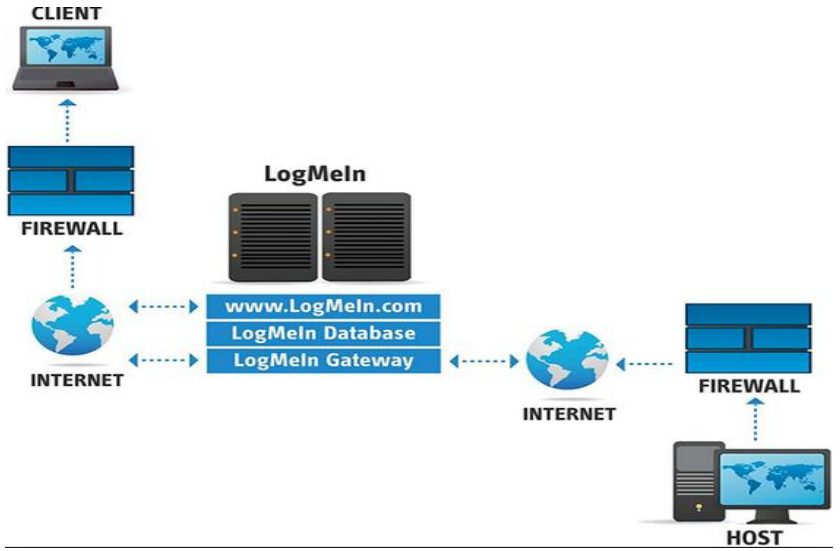


Remote Desktop Control

Remote Desktop Direct



Remote Desktop Service, Teamviewer, VNC, PC Anywhere



Need to have a fixed Public IP Address or DynamicDNS

Method 5 – Remote Front Panel

- The most like sitting in front of the rig. More like traditional operating.
- Turn knobs and push buttons, use a mike and a Key just like you always have
- More initial investment
- Most removable Face plates can be setup
- Doesn’t need a remote PC.
- Serious Remote Operators use this option

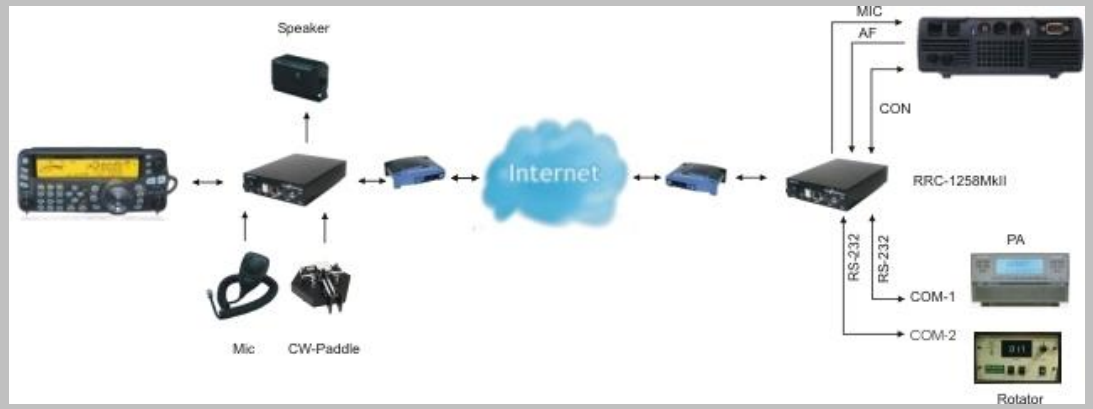
Remote Rig

- – It’s a stand alone system
  – No computers required
  – 2-Way high quality audio
  – Extremly low latency
  – Unique CW support
  – Built in CW keyer
  – Serial ports for PA/Rotator
  – Easy WEB and USB setup

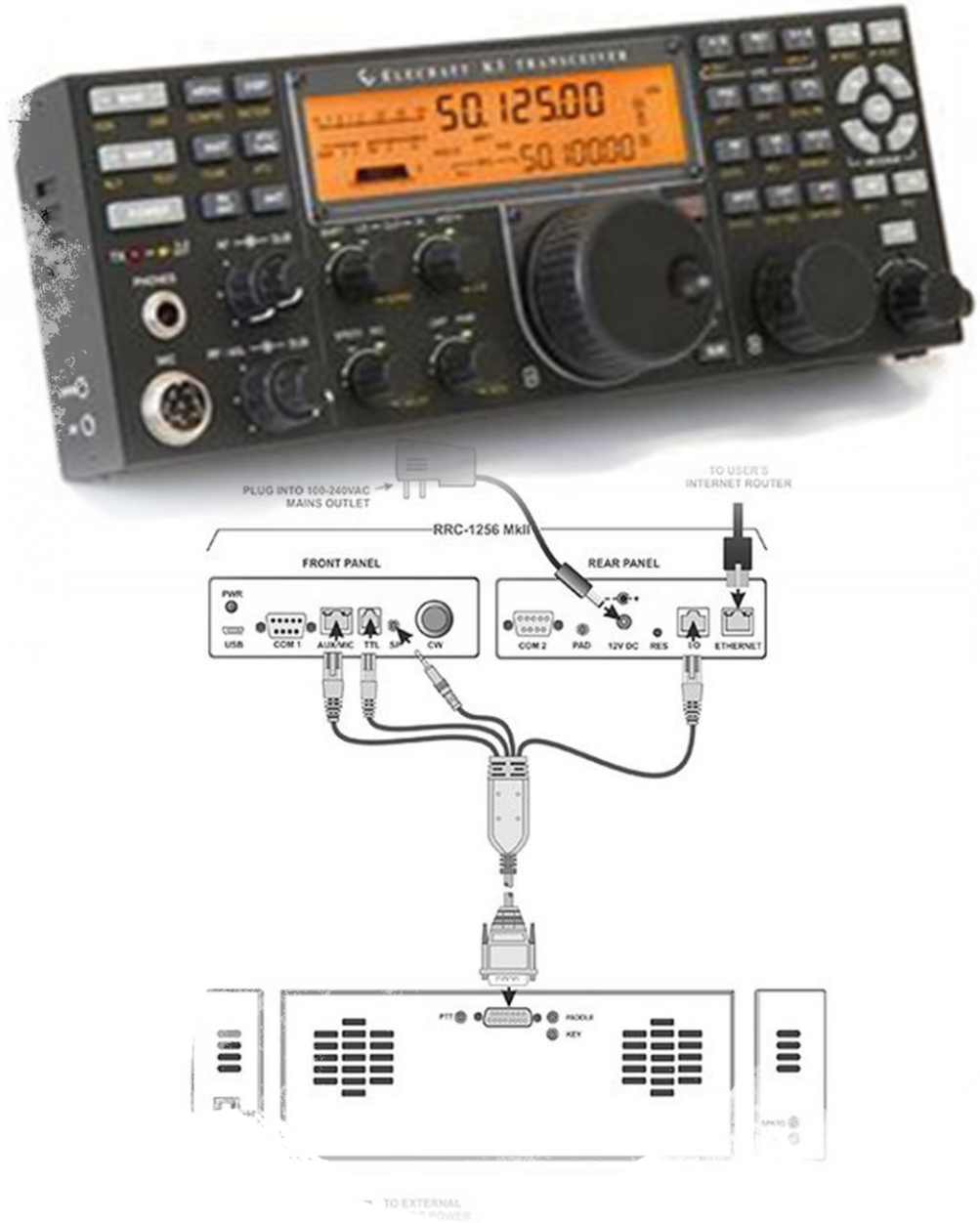
- Supports:

- – ICOM
  – YAESU
  – KENWOOD
  – Elecraft
  – Alinco
  – TenTec
  – Most removable faceplates

- HRO - $469.95



Elecraft/Flex Radio



K3 Setup with Remote Rig

Mobile Remote – Working DX w/o Antenna

Portable Ops

Remote Operation Using a Phone

Your Rig in the Palm of Your Hand

- Android Phone
- Hot Spot Ethernet
- Half the Cost
- Cheaper Than Mobile

Some Characteristics of other points of Remote Ops

- Watch the feedback when you are testing
- Don’t try to monitor a remote receiver while you are talking on you transmitter….latency
- You can send CW via keyboard without any other hardware. If you want to use a key then you need some sort of hardware, Winkeyers, Orb Control Device or RemoteRig
- Be sure to have remote ac switch to shut down your transmitter. Use TOT settings of your radio
- There are lots of devices, Tuners, Rotators control, Antenna switches that can be remotely controlled.
- Have a way to reboot your computer and router remotely

My Recommendations….My Opinion

- The methods are in order are from just getting your feet wet and trying it out ranging up to most reliable and cost effective in the long run.
- Try out the WebSDR to see what it’s like
- Then try Software Solutions if you don’t have your own radios
- If you want to spend some money and get to operate mega stations try web based providers
- If you already have the hardware than Remote Desktop is for you.
- If you end up like remote ops than think about Remote Front Pane Method 5 for the ultimate in Remote Ops

Questions?

- Thank you
- Don’t hesitate to call me if there is anything I can do to help

- WA7RF, Robert S. Fisher
- wa7rf@eaglerock7.net
- 509-993-7662