

Remote Contesting

How the Big Guns operate remotely
And how one Little Pistol does it

South Lyon Area ARC
14 April 2024
Frank Maynard, NF8M

What Is Remote Contesting?

- Operating your station from anywhere
- Operating another ham's station
- Distributed Multi-Op at a Superstation
- Operating a rental station

Why Remote Contesting?

- Compromised or restricted QTH
- Or no home station
- No amplifier
- Travel
- Tech-nerd

Two types of remote operation

- Operate another ham / club station
- Operate your own home station

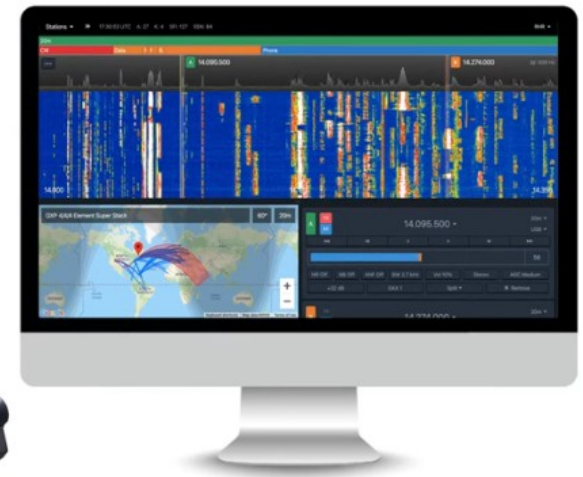
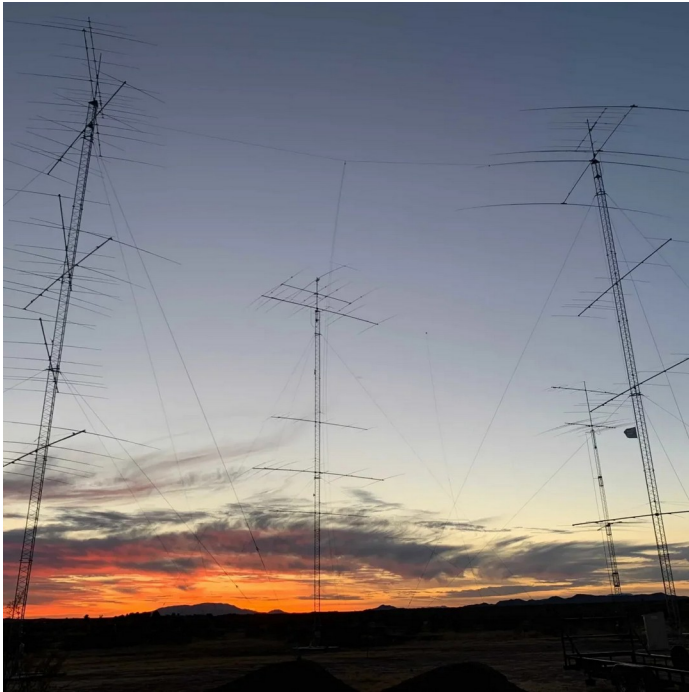
Rental & Club Superstations

- Remote Ham Radio (RHR)
- RemoteHams
- K1TTT
- PJ2T (Caribbean Contest Consortium)

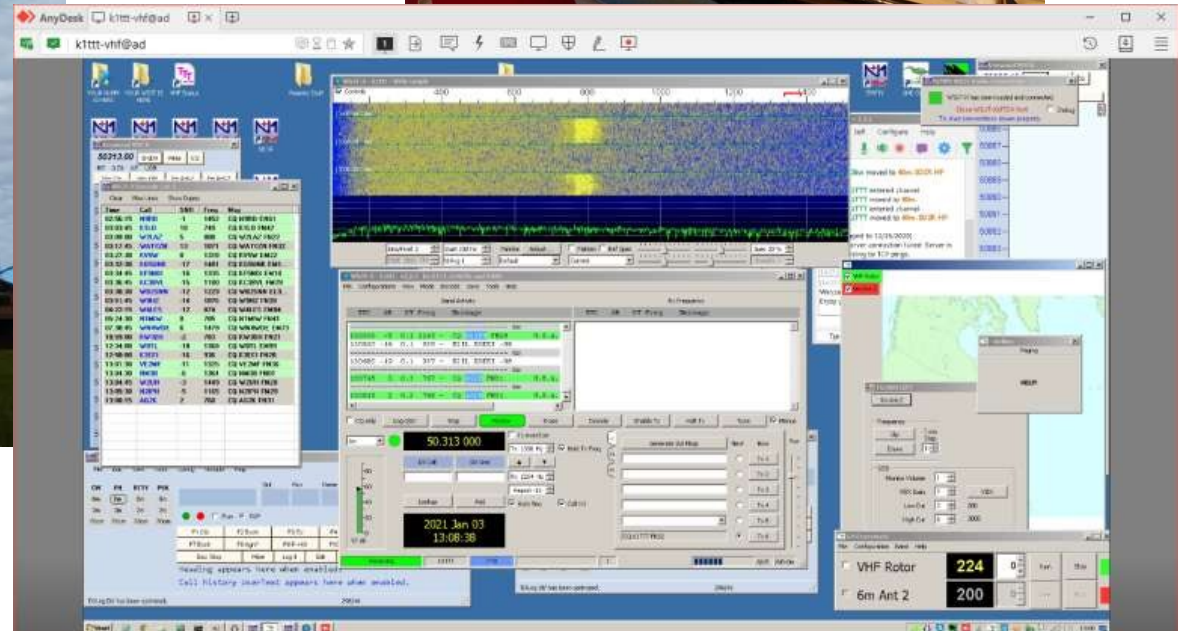
Remote Ham Radio

- 29 stations in US and worldwide
- Strategic locations
- QRO, multiple antennas
- Web-based interface
- \$99/year, \$0.50-\$1.29 per minute
- Free programs for youth operators

Remote Ham Radio



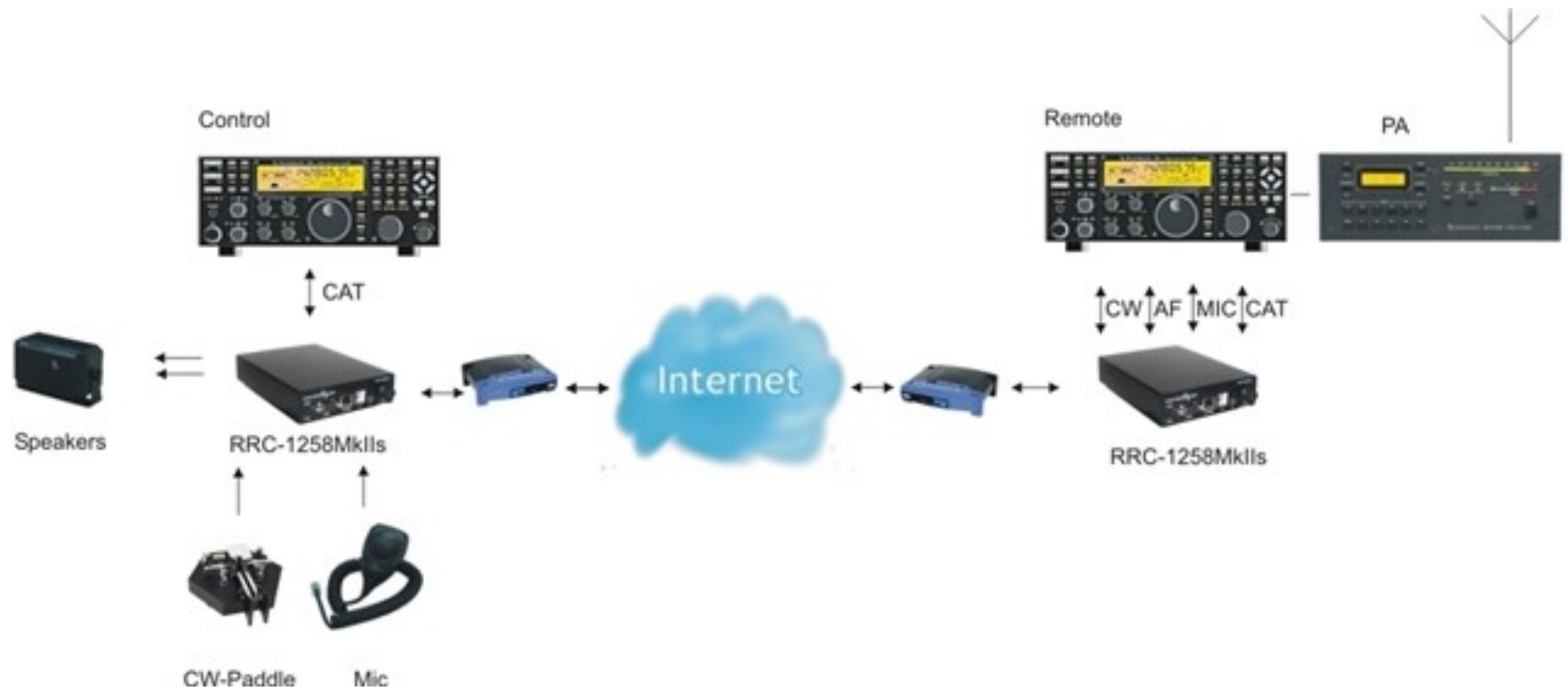
K1TTT - Massachusetts



PJ2T - Curacao



PJ2T - Curacao



Remoting Your Home Station

What do you need?

- Transceiver
- Antenna switching
- Rotor control
- Audio and keying

Remoting Your Home Station

What do you need?

- Software – Rig control
- Software – Logging
- Software – Audio and Monitoring
- Software – Ancillary controls

Remoting Your Home Station

What do you need?

- Networking
- Stable internet connectivity

NETWORK BASICS - SPEED, LATENCY, JITTER

GOOD

```
C:\>ping -t google.com
Pinging google.com [172.217.11.46] with 32 bytes of data:
Reply from 172.217.11.46: bytes=32 time=15ms TTL=116
Reply from 172.217.11.46: bytes=32 time=15ms TTL=116
Reply from 172.217.11.46: bytes=32 time=14ms TTL=116
Reply from 172.217.11.46: bytes=32 time=17ms TTL=116
Reply from 172.217.11.46: bytes=32 time=14ms TTL=116
Reply from 172.217.11.46: bytes=32 time=14ms TTL=116
Reply from 172.217.11.46: bytes=32 time=20ms TTL=116
Reply from 172.217.11.46: bytes=32 time=17ms TTL=116
Reply from 172.217.11.46: bytes=32 time=16ms TTL=116
Reply from 172.217.11.46: bytes=32 time=23ms TTL=116
Reply from 172.217.11.46: bytes=32 time=14ms TTL=116
Reply from 172.217.11.46: bytes=32 time=14ms TTL=116
Reply from 172.217.11.46: bytes=32 time=16ms TTL=116
Reply from 172.217.11.46: bytes=32 time=17ms TTL=116
Ping statistics for 172.217.11.46:
    Packets: Sent = 14, Received = 14, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 14ms, Maximum = 23ms, Average = 16ms
```

BAD

```
C:\>ping -t 192.168.0.233
Pinging 192.168.0.233 with 32 bytes of data:
Reply from 192.168.0.233: bytes=32 time=374ms TTL=64
Reply from 192.168.0.233: bytes=32 time=173ms TTL=64
Reply from 192.168.0.233: bytes=32 time=189ms TTL=64
Reply from 192.168.0.233: bytes=32 time=204ms TTL=64
Reply from 192.168.0.233: bytes=32 time=87ms TTL=64
Reply from 192.168.0.233: bytes=32 time=101ms TTL=64
Reply from 192.168.0.233: bytes=32 time=123ms TTL=64
Reply from 192.168.0.233: bytes=32 time=151ms TTL=64
Reply from 192.168.0.233: bytes=32 time=162ms TTL=64
Reply from 192.168.0.233: bytes=32 time=197ms TTL=64
Reply from 192.168.0.233: bytes=32 time=212ms TTL=64
Reply from 192.168.0.233: bytes=32 time=71ms TTL=64
Reply from 192.168.0.233: bytes=32 time=85ms TTL=64
Reply from 192.168.0.233: bytes=32 time=302ms TTL=64
Ping statistics for 192.168.0.233:
    Packets: Sent = 27, Received = 27, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 17ms, Maximum = 374ms, Average = 122ms
```

NETWORK BASICS - SPEED, LATENCY, JITTER

GOOD

```
C:\>ping -t google.com
Pinging google.com [172.217.11.46] with 32 bytes of data:
Reply from 172.217.11.46: bytes=32 time=15ms TTL=116
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Reply from 172.217.11.46: bytes=32 time=14ms TTL=116
Reply from 172.217.11.46: bytes=32 time=14ms TTL=116
Reply from 172.217.11.46: bytes=32 time=20ms TTL=116
Reply from 172.217.11.46: bytes=32 time=17ms TTL=116
Reply from 172.217.11.46: bytes=32 time=16ms TTL=116
Reply from 172.217.11.46: bytes=32 time=23ms TTL=116
Reply from 172.217.11.46: bytes=32 time=14ms TTL=116
Reply from 172.217.11.46: bytes=32 time=14ms TTL=116
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Reply from 192.168.0.233: bytes=32 time=204ms TTL=64
Reply from 192.168.0.233: bytes=32 time=87ms TTL=64
Reply from 192.168.0.233: bytes=32 time=101ms TTL=64
Reply from 192.168.0.233: bytes=32 time=123ms TTL=64
Reply from 192.168.0.233: bytes=32 time=151ms TTL=64
Reply from 192.168.0.233: bytes=32 time=162ms TTL=64
Reply from 192.168.0.233: bytes=32 time=197ms TTL=64
Reply from 192.168.0.233: bytes=32 time=212ms TTL=64
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    Packets: Sent = 27, Received = 27, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
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```

K1TTT

Remoting Your Home Station

What do you need?

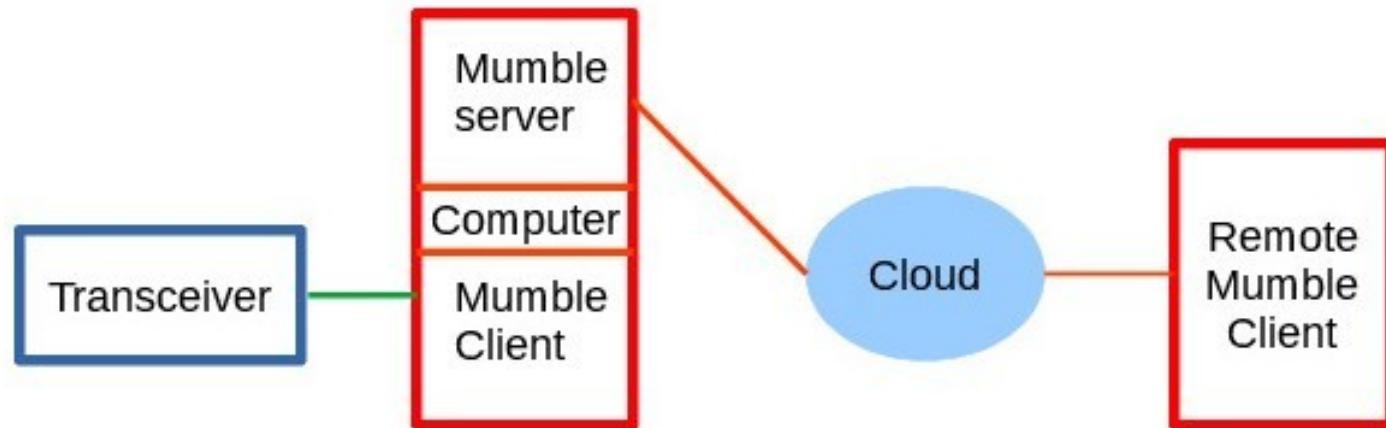
- Networking
- Stable internet connectivity
- Remote access method
- Audio delivery

Mumble

- Low-latency audio gateway
- Open source, multi platform
- Server + clients topology
- Rendezvous server or local
- Gerry Hull, W1VE

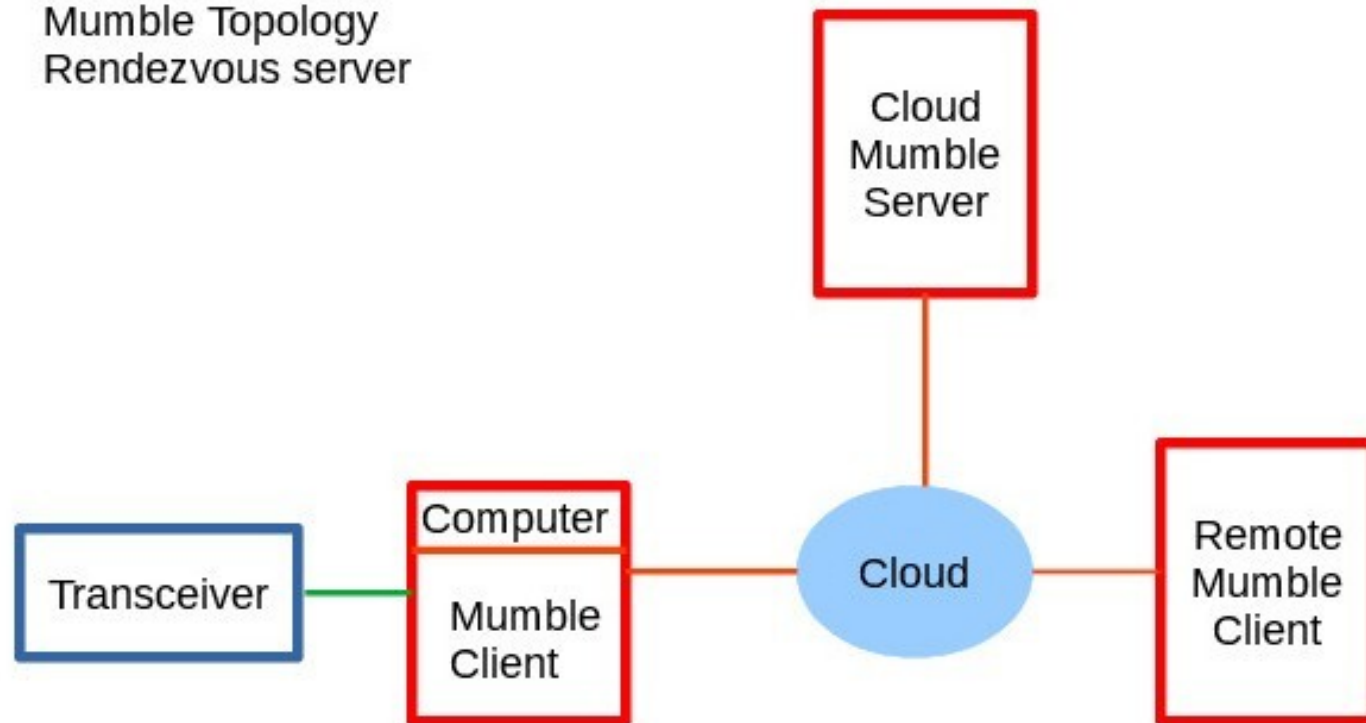
Mumble

Mumble Topology
Local server



Mumble

Mumble Topology
Rendezvous server



Remoting Your Home Station

Three methods we'll discuss

Remote Station Server

RemoteRig

Remote Desktop

Remote Station Server aka RigPi



The screenshot shows the RigPi web interface. At the top, there is a navigation bar with a Pi logo, 'RigPi', and menu items: TUNER, KEYS, LOG, SPOTS, WEB, SETTINGS, HELP. A search bar on the right contains 'W1AW'. The main display area is divided into several sections:
- A large digital display showing 'MAIN 20m 00:28 UTC', '14.074.000', 'SUB IC-7300 USB RCV', and '14.074.999'.
- A smaller display showing a spectrum analyzer with '14.074.00' and 'VFO A 1 11:33'.
- A virtual knob and 'PTT' button.
- A 'Connect Radio' / 'Disconnect Radio' toggle.
- A keypad with buttons for A>B, A<M, M>A, A<>B, and SPLIT.
- Four 'MACRO BANK' buttons (1-4).
- A table of function keys with columns for frequency, mode, and function.
- A status bar at the bottom showing 'Main: 14.074.000 MHz', 'Mode: USB D', 'User: W6HN (w6hn)', and '00:28z'.

Freq	Mode	Function	Bank	Function	Bank	Function	Bank	Function
160	20	6	BANK 1	QRZ	BK	DXS BAND & MODE		
80	17	2	F2 MY CALL	HIS DE MINE	KNWD w TEST	DXS DXCALL		
60	15	1.25	F1 SNN	CANCEL	SWITCH OFF	QRZ DXCALL		
40	12	70	ESC	PWR ON	SWITCH ON	PWR ON/OFF		
30	10	23	ERROR (..)	PWR OFF	WAIT 1 (AS)	ATT 12		
MODES			TUNE	HAMLIB TEST (F)	MACRO 22	ATT 0		
LSB	CW	FM	T/R	ROTATE	TUNER	SW1 Off		
USB	CWR	AM	CQ	ROTATE STOP	TUNE TO	SW1 On		
USB D	RTTY	RTTYR	RF 34	Pwr 10	Mic 30			

Remote Station Server

aka RigPi

Features:

- Radio & rotor control
- CW keying, VOIP audio
- Spotting, logging & LOTW
- Digital modes
- Browser, email

Control from any browser – even a smartphone

Remote Station Server

aka RigPi

Configurations:

- Software only, \$30
- Everything but the Pi \$299 (use your own Pi)
- Audio, keying modules separately \$99
- Available from MFJ

RemoteRig

By Microbit (Sweden)

Features:

- Hardware end-to-end w/o computer
- Handles rig control, audio, keying
- Serial ports for rotor & amplifier
- Three remote modes

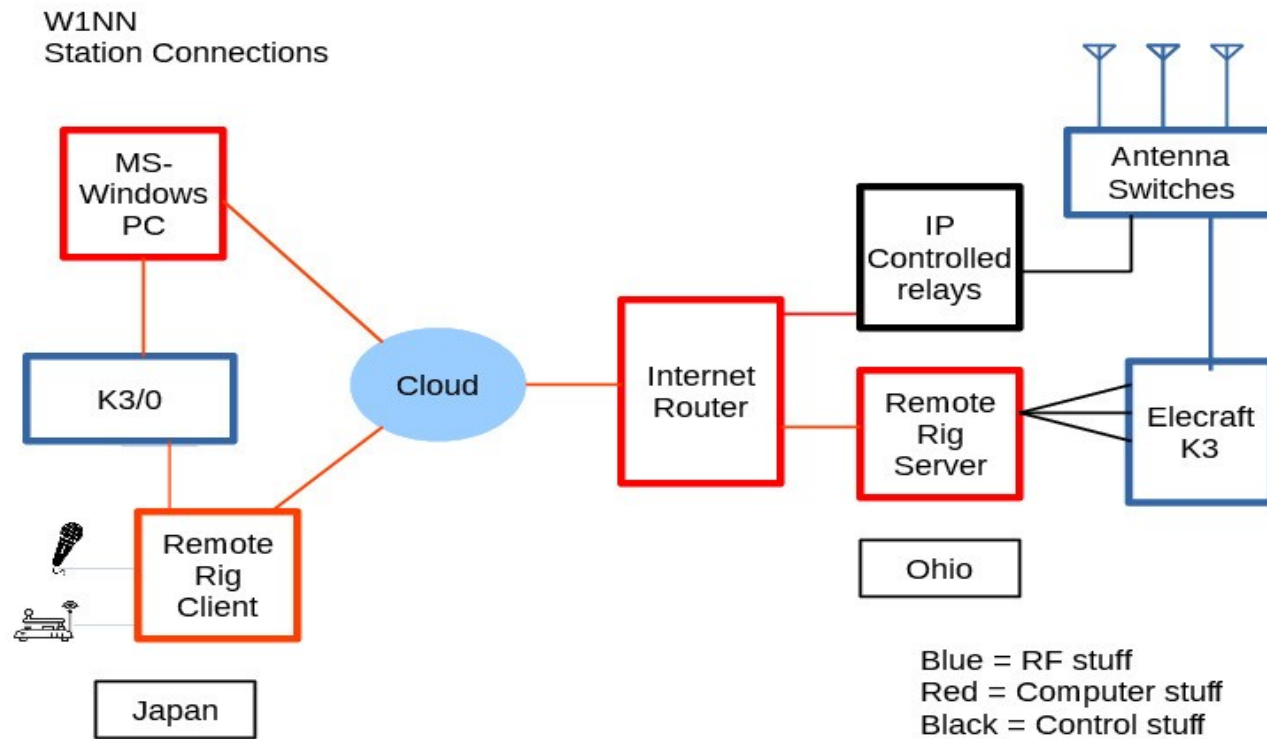


RemoteRig

In use at W1NN



RemoteRig In use at W1NN



Remote Desktop Methods

Rendezvous servers

Tunneling to RDP

Remote Desktop Methods

Rendezvous Servers

- Anydesk – anydesk.com
- Teamviewer
- Chrome Remote Desktop
- etc.

Remote Desktop Methods

Tunneling

- Remote Access VPN e.g. NordVPN
- OpenVPN appliance
- OpenVPN on a Raspberry Pi or Linux

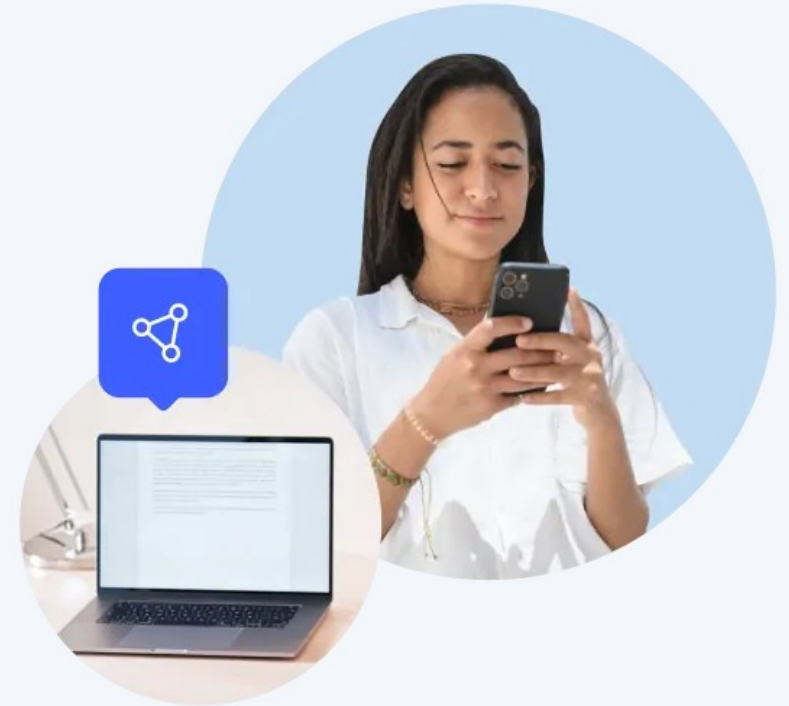
Remote Desktop Methods

NordVPN Meshnet

Remote access with Meshnet

- ✓ Connect to remote devices with Meshnet for free.
- ✓ Control access to your private network.
- ✓ Grab files on the go and route traffic.

[Try Free Meshnet](#)



Locally Hosted VPN Ubiquiti UniFi Gateway

Ubiquiti Networks UniFi Gateway Lite

BH #UBUXGLITE • MFR #UXG-LITE | ★★★★★ 2 reviews



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Locally Hosted VPN Synology DiskStation

Synology DiskStation DS224+ 2-Bay NAS Enclosure

BH #SYDS224PLUS • MFR #DS224+ | ★★★★★ 30 reviews | 3 Questions, 3 Answers

Synology
Authorized Dealer



Key Features

- 2 x 3.5/2.5" SATA HDD/SSD Drive Bays
- 2.0 GHz Intel Celeron J4125 Quad-Core
- 2GB DDR4 RAM
- 2 x Gigabit Ethernet Ports

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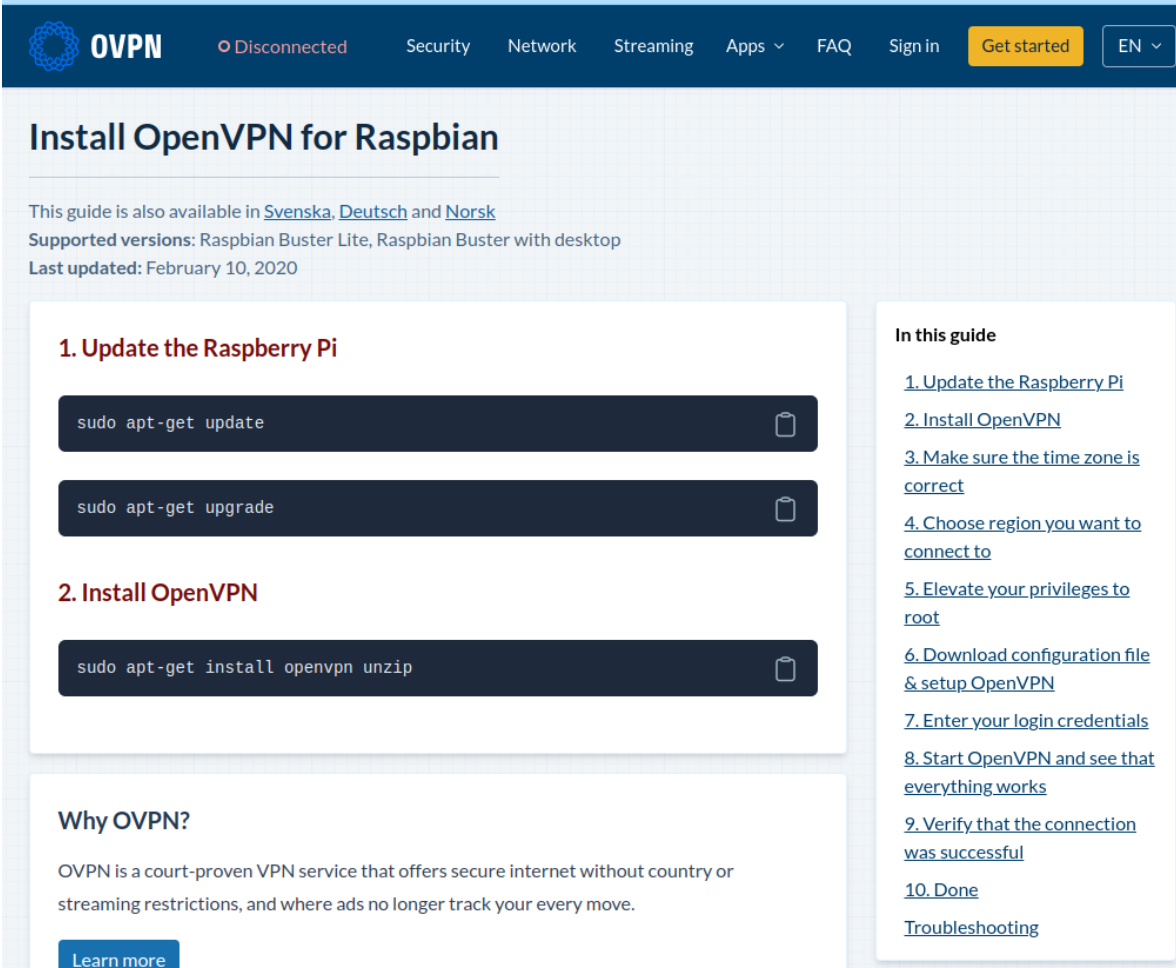
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Locally Hosted VPN



The screenshot shows the OVPN website's user interface. At the top, there is a dark blue navigation bar with the OVPN logo, a 'Disconnected' status indicator, and links for Security, Network, Streaming, Apps, FAQ, Sign in, Get started, and EN. The main content area is titled 'Install OpenVPN for Raspbian' and includes a grid background. It features a list of steps for installation, code blocks for terminal commands, and a sidebar with a table of contents. A 'Why OVPN?' section is also visible at the bottom.

OVPN ○ Disconnected [Security](#) [Network](#) [Streaming](#) [Apps](#) [FAQ](#) [Sign in](#) [Get started](#) [EN](#)

Install OpenVPN for Raspbian

This guide is also available in [Svenska](#), [Deutsch](#) and [Norsk](#)
Supported versions: Raspbian Buster Lite, Raspbian Buster with desktop
Last updated: February 10, 2020

- 1. Update the Raspberry Pi**

```
sudo apt-get update
```

```
sudo apt-get upgrade
```
- 2. Install OpenVPN**

```
sudo apt-get install openvpn unzip
```

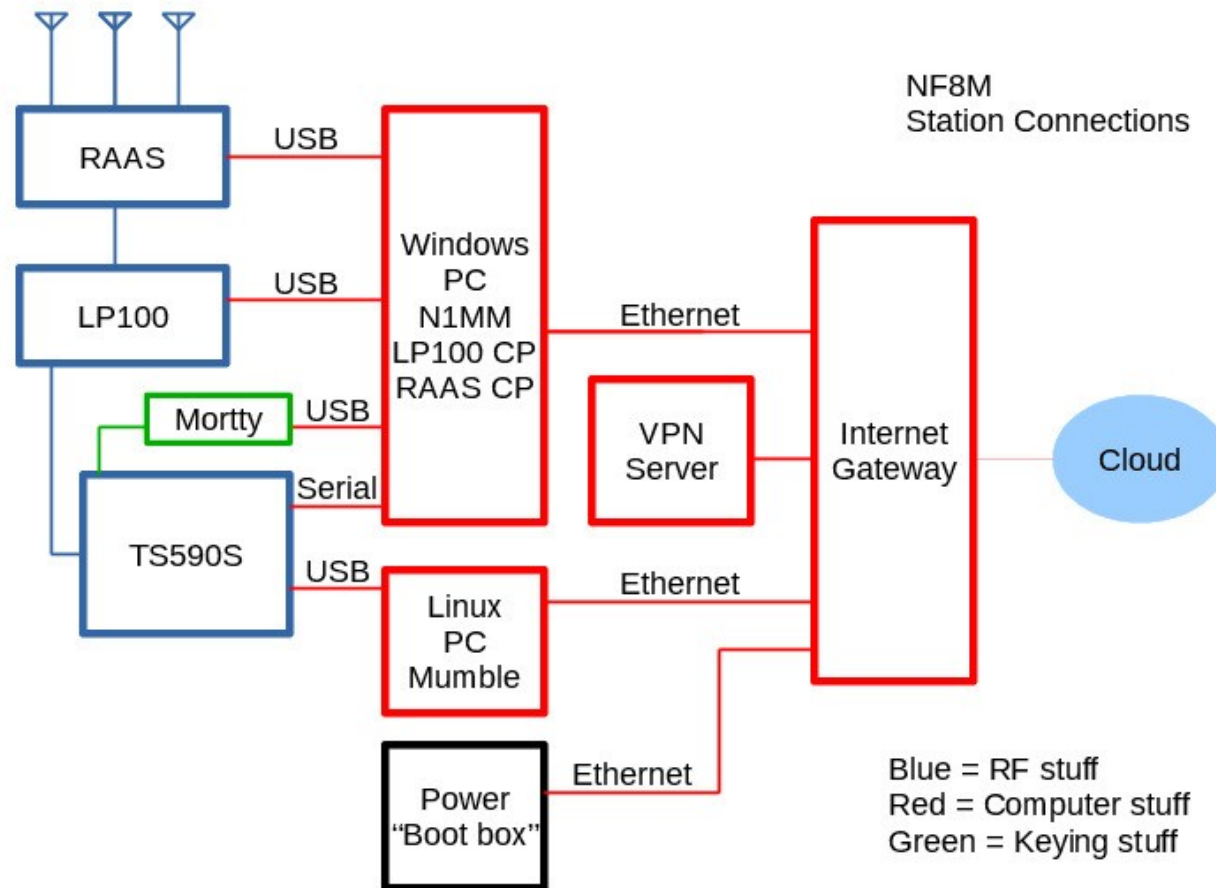
Why OVPN?
OVPN is a court-proven VPN service that offers secure internet without country or streaming restrictions, and where ads no longer track your every move.
[Learn more](#)

In this guide

- [1. Update the Raspberry Pi](#)
- [2. Install OpenVPN](#)
- [3. Make sure the time zone is correct](#)
- [4. Choose region you want to connect to](#)
- [5. Elevate your privileges to root](#)
- [6. Download configuration file & setup OpenVPN](#)
- [7. Enter your login credentials](#)
- [8. Start OpenVPN and see that everything works](#)
- [9. Verify that the connection was successful](#)
- [10. Done](#)

[Troubleshooting](#)

The NF8M Setup



The NF8M Setup

The screenshot displays the NF8M software interface with several key windows:

- Log Table (Top Left):** A table listing contesting activity with columns for Date/Time, Call, Frequency, Mode, Name, Exchange, M1, and Pts.

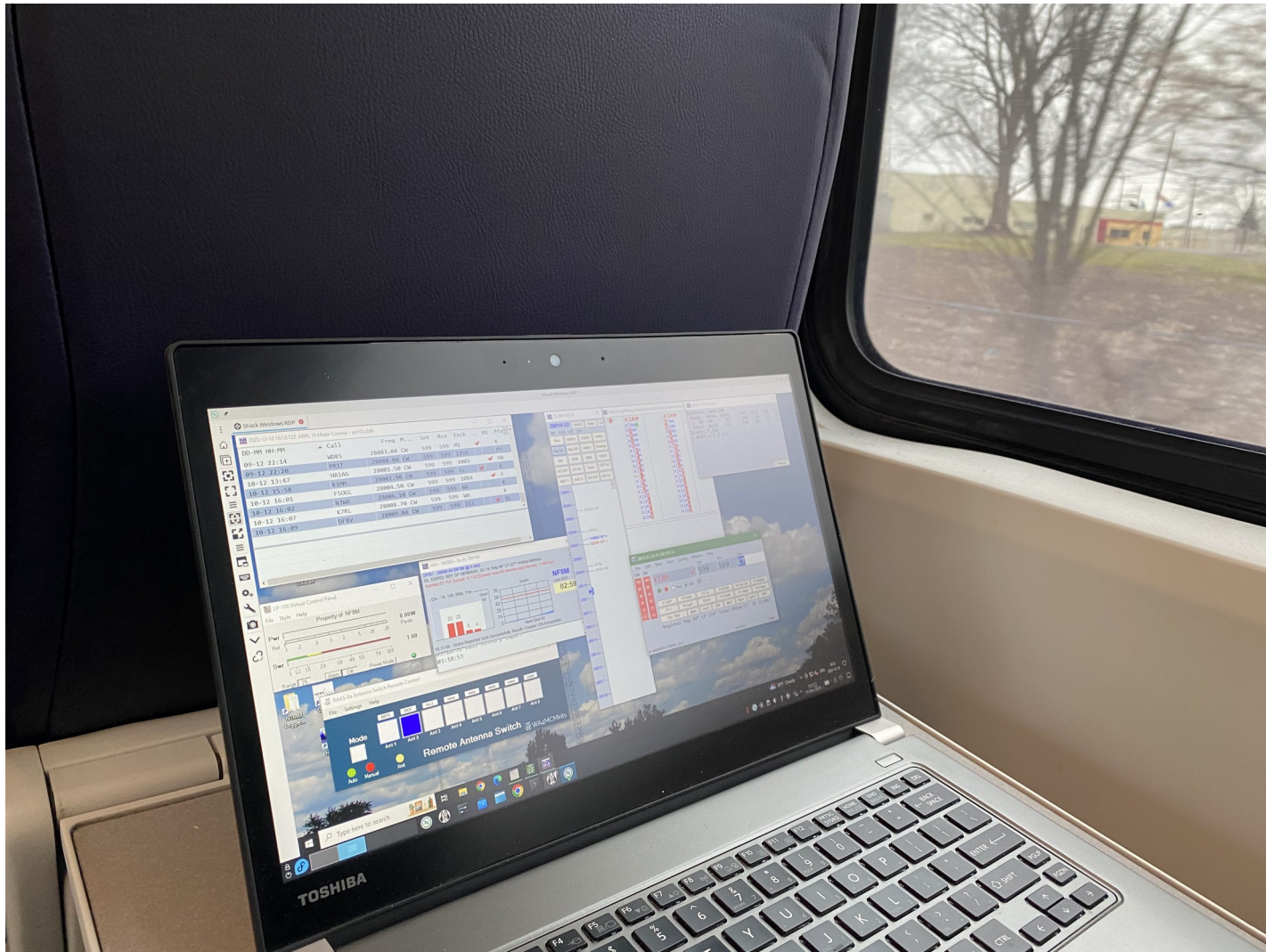
DD-MM HH:MM	Call	Freq	M...	Name	Exch	M1	Pts
04-04 03:12	W0GAS	7044.75	CW	GREG	2785	✓	1
04-04 03:13	N9UNX	7044.35	CW	CHAD	3151	✓	1
04-04 03:15	VE3JM	7043.25	CW	VLAD	ON	✓	1
04-04 03:16	KR2Q	7042.91	CW	DOUG	438	✓	1
04-04 03:16	K1RV	7042.38	CW	PI	639	✓	1
04-04 03:17	KE4KY	7041.95	CW	TOM	1763	✓	1
04-04 03:18	K8MP	7041.39	CW	JOE	2415	✓	1
04-04 03:19	K9UIY	7041.02	CW	VIC	505	✓	1

- Frequency Display (Top Middle):** Shows the current frequency (7040.60) and various filter and mode settings.
- Check Log/Master/Telnet/Exch/Call history/Reverse lookup (Top Right):** A list of call signs, with NA4J highlighted.
- Score - 529 Points (Far Right):** A summary window showing contest details (CWOPS), band (7), QSOs (23), and a total score of 529 points.
- Info - NF8M - Exch: FRANK A634 (Center):** A window displaying personal statistics, including Q's per hour (78, 77) and a goal of 50.
- LP-100 Virtual Control Panel (Middle Left):** A control panel for the virtual antenna system, showing power (91.20W Peak) and SWR (1.49).
- RAAS-8a Antenna Switch Remote Control (Bottom Left):** A window for controlling the antenna switch, showing mode (Auto) and antenna selection (Ant 1-8).
- 7040.60 CW TS-590 VFO A (Bottom Middle):** A window showing the current call sign (NA4J) and exchange (JIM 2027).

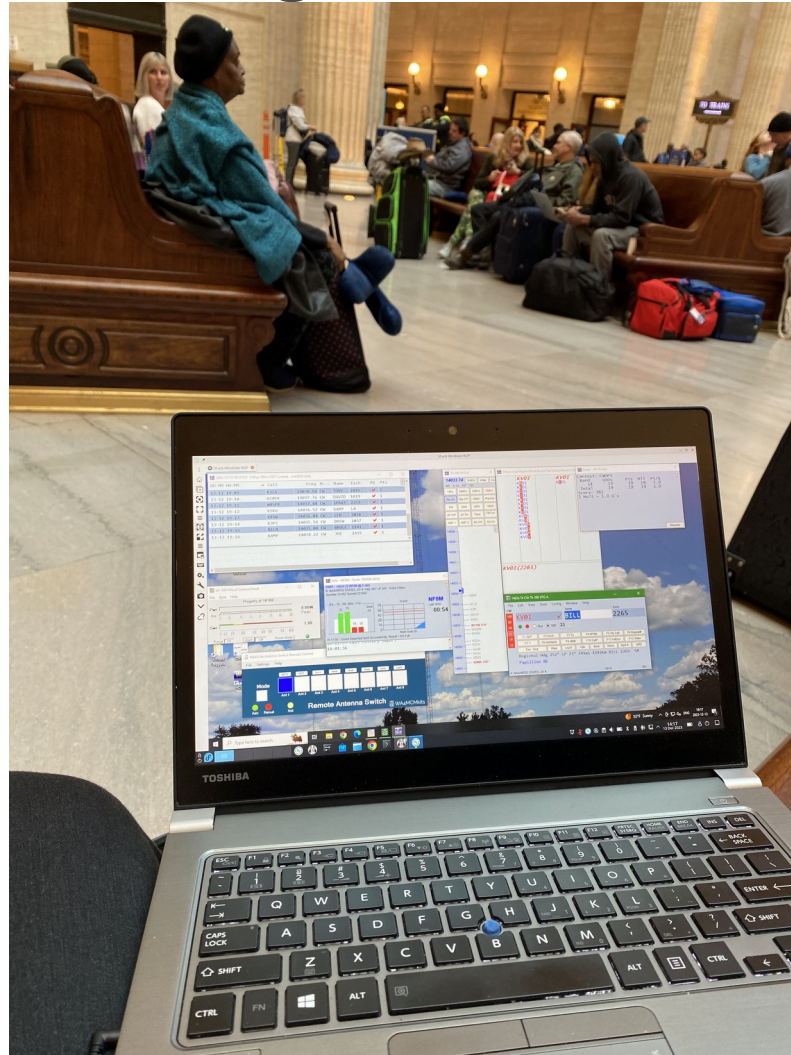
Stupid N1MM Trick #15

The screenshot shows the N1MM software interface. The main window is titled "TS-590 VFO A" and displays a frequency of 7040.60. The interface includes various control buttons such as "SH/DX", "Wide", "CQ", "RIT", "XIT", "CW", "1kHz", "500Hz", "250Hz", "100Hz", "Rig On", "Rig Off", "Atten", "Preamp", "5W", "25W", "50W", "100W", "AT Off", "AT On", "Tune", "CWTun", "ANT 1", "ANT 2", "RA Off", and "RA On". A vertical list of call signs is visible on the right side, with "NA4J" highlighted in red. The list includes call signs from KA4J to NA4A. The interface also shows a "Check Log/Master" button and a frequency range from 7037 to 7038.

Contesting on the High Iron



Waiting for the train



What's next ?



Elecraft K4 to K4 seamless remote



- Control a K4 from another K4 anywhere via Internet
- Switch between multiple K4s – Multiple clients
- Desktop/Tablet app – K4/0 control head
- Software in beta – releasing soon

Before we go...

A quick commercial

Dayton Contest University

Thursday, May 16, 2024

Hope Hotel, Dayton

www.contestuniversity.com

Contest University

2024 Dayton Contest University "CTU" – COURSE OUTLINE – 7:00 AM to 5:00 PM

7:00 ALL ROOMS – Student Registration and Contest Buffet Breakfast – ALL – 60 minutes

8:00 ALL ROOMS – Welcome to CTU 2024 – K3LR, W8CI & N9JA – ALL – 10 minutes

8:10 ALL ROOMS – It's our Radiosport Game – Let's Play Fair – K5ZD – ALL – 40 minutes

9:00 CONTEST TOPIC SESSION #1 – attend ONE of 4 sessions – 60 minutes

ROOM 1 – Optimizing the Use of Waterfall Displays for Contesting – N6TV

ROOM 2 – HF Propagation Tips to Improve your Competitiveness in Contests – W3LPL

ROOM 3 – Feeding and Detuning Towers – N0AX

ROOM 4 – Contesting Fun on That "Other Mode" RTTY – W0YK

10:00 ALL – *CONTEST SNACK* – 15 minutes

10:15 CONTEST TOPIC SESSION #2 – attend ONE of 4 sessions – 60 minutes

ROOM 1 – How to Integrate Youth Operators in Multiop Contesting – KE8LQR and KE8RJU

ROOM 2 – Station Improvements to Improve your Competitiveness in Contests – W3LPL

ROOM 3 – Success Strategies for Remote & Hybrid Multiop Contesting – W1VE

ROOM 4 – Contesting Fun on That "Really Other Mode" FT8/FT4 – W0YK

11:20 CONTEST TOPIC SESSION #3 – attend ONE of 4 sessions – 55 minutes

ROOM 1 – Next Level Contesting; Making the Move to SO2R – K5ZD

ROOM 2 – Antenna Improvements to Improve your Competitiveness in Contests – W3LPL

ROOM 3 – Using Automation in Your Contest Station – Techniques and Recommendations – N6TV

ROOM 4 – Busting Contesting Myths to Get Started in RadioSport – K8ZT

Contest University

***1:45 CONTEST TOPIC SESSION by REQUEST to RERUN – 50 minutes**

ROOM 1 – As determined by *vote 1

ROOM 2 – As determined by *vote 2

ROOM 3 – As determined by *vote 3

ROOM 4 – As determined by *vote 4

2:40 CONTEST OPEN DISCUSSION Q&A GROUPs Attend ONE of 4 sessions – 30 minutes

ROOM 1 – The World of QRP Contesting – K8ZT

ROOM 2 – Feeding and Detuning Towers – N0AX

ROOM 3 – Remote Station Ideas and Q&A – W1VE

ROOM 4 – Tower Safety – W3YQ

3:15 CONTEST OPEN DISCUSSION Q&A GROUPs Attend ONE of 4 sessions – 30 minutes

ROOM 1 – SO2R and Station Design Q&A – K5ZD

ROOM 2 – How to Improve Your Station – Better Contest Results – W3LPL

ROOM 3 – Digital and RTTY Contesting – W0YK

ROOM 4 – Antenna/Tower Reliability – W3YQ

3:45 ALL – *CONTEST SNACK* – 15 minutes

4:00 ALL ROOMS – Are you Considering a New Radio? Is My TX Clean? – NC0B – ALL – 50 minutes

4:50 ALL ROOMS – 2024 CTU Survey & Eyeball Sprint Results – K3LR & K1DG – ALL – 10 minutes

Contest University

Registration now open

- Textbook
- T-shirt and hat
- Discounts at ARRL and DX Engineering
- Breakfast and lunch
- Rub elbows with top contesters

\$85

Contest University

Registration now open

- Textbook
- T-shirt and hat
- Discounts at ARRL and DX Engineering
- Breakfast and lunch
- Rub elbows with top contesters

\$85

Register at www.contestuniversity.com

Contest University



Thanks for listening !

Slide deck, links and other resources
can be found at :

www.nf8m.com

Click **Presentations** in the right
column