

REMOTE STATIONS

MADISON DX CLUB

PAUL SOBON NO0T

WILLIAM THOMAS WT0DX

3/13/23 VI.1

2 OVERVIEW

- Who are NO0T WT0DX
- Why have a Remote Station
- Remote Station Options
- Getting Started
- Operating Tricks
- Our Remote Stations
- Demo / Q&A / Appendix



Paul NO0T

3 WHO IS NO0T

- Licensed in 1964 as VE3FIB
- NO0T in 1982 – Extra Class
- Operated from many states...
- LoDo Denver High Rise Condo
- 2018 Remote @ KE4RHU
west of downtown Denver
- 2023 Remote @ K0PRT
DSES Haswell, CO
- **8,000+ remote contacts**



4 WHO IS WT0DX

- Licensed since 1968 - Extra class
- WB8AVH, WB6FGR, WB9KPT
- Operated from many states...
- Sept 2018 Los Alamos, NM Remote
- June 2019 Denver, CO Remote
- Moved to Aurora, CO June 2020
HOA Community
- **28,000+ remote contacts**



5 WHY REMOTE STATION

- **Reasons for having a remote station:**
- Remote access of your home station
 - In your house, on your property, or from another location
- Remote access of another station
 - Your second QTH
 - A friends station
 - Multi-operator contest, without being at the station
 - Remote access of “super stations” – DXCC / Contest
- Can't operate at home due to HOA / CCR restrictions, or QRN
- Operate while traveling or at vacation home
- Impress your friends!



6 REMOTE STATION OPTIONS

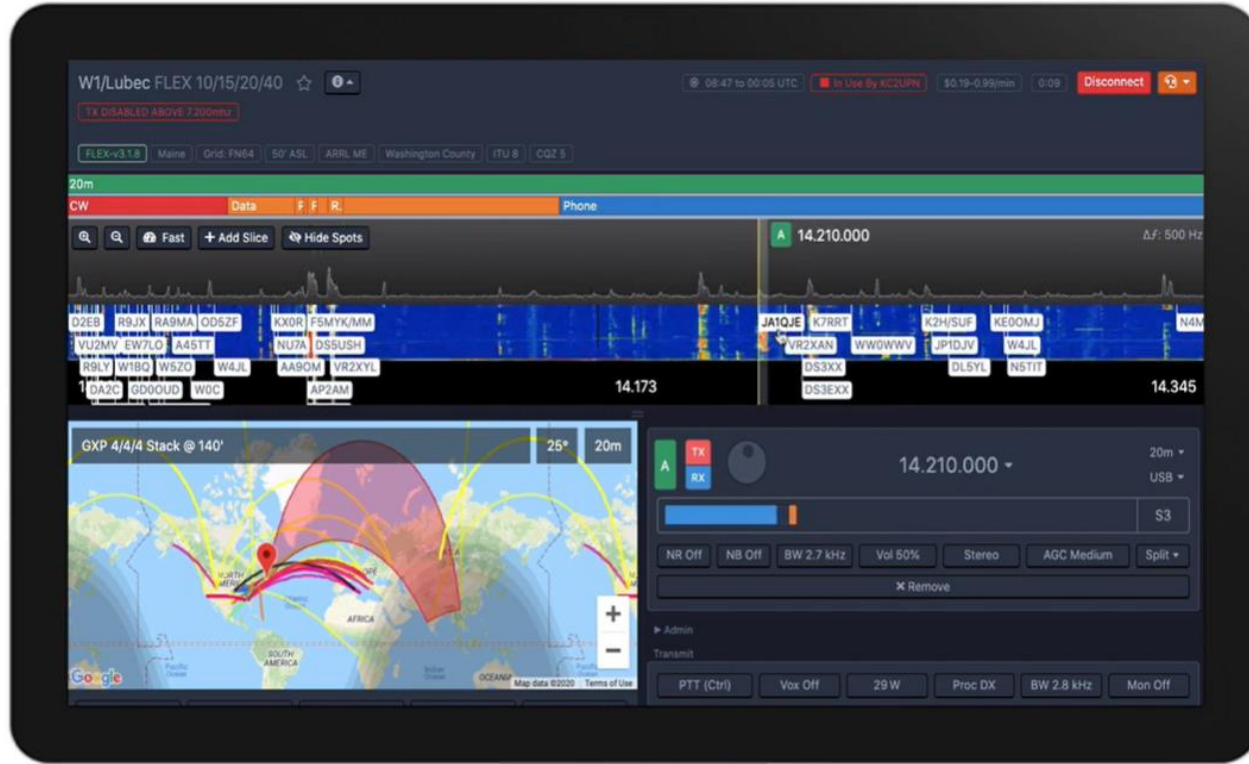
- **Four major ways to implement a remote station:**
- Web Browser access
- Software Programs
- Remote Front Panels
- Remote Desktop

7 WEB BROWSER ACCESS

- **RemoteHamRadio.com:** Operators have access to 40+ towers, 200+ antennas, and 20+ stations (with built in FT8)
- Subscription – lower cost for 2023
 - Premium DX \$20/mo or \$99/yr, plus \$.05-\$1.25/minute
 - Youth Network FREE (25 or younger)
- Chrome, Edge or Safari web browsers.
- Windows or Mac desktop application.
- Flex software or hardware.



8 WEB BROWSER ACCESS



9 SOFTWARE PROGRAMS

- **Ham Radio Deluxe:** Widely used rig control, logging, satellite, digital modes
- **Win4Icom, Yaesu, K3Suite:** Full featured radio control, audio server, spectrum display, CW keyer and interface to other software.
- **RemoteHams.com:** Free to sign up. RCForb Client SW. Server SW to set up your own station as a remote. Public stations – W7DXX, K8EA...
- **N4PY:** Rig control software for transceivers. Controls many other devices.
- **Icom RS-BAI:** Tailored to modern Icom radios, audio, spectrum display
- **RemoteTX:** Raspberry Pi appliance at the station, Icom, Yaesu, Elecraft, Yaesu Rotators, annual subscription
- **Others – See Appendix**

10 SOFTWARE PROGRAMS

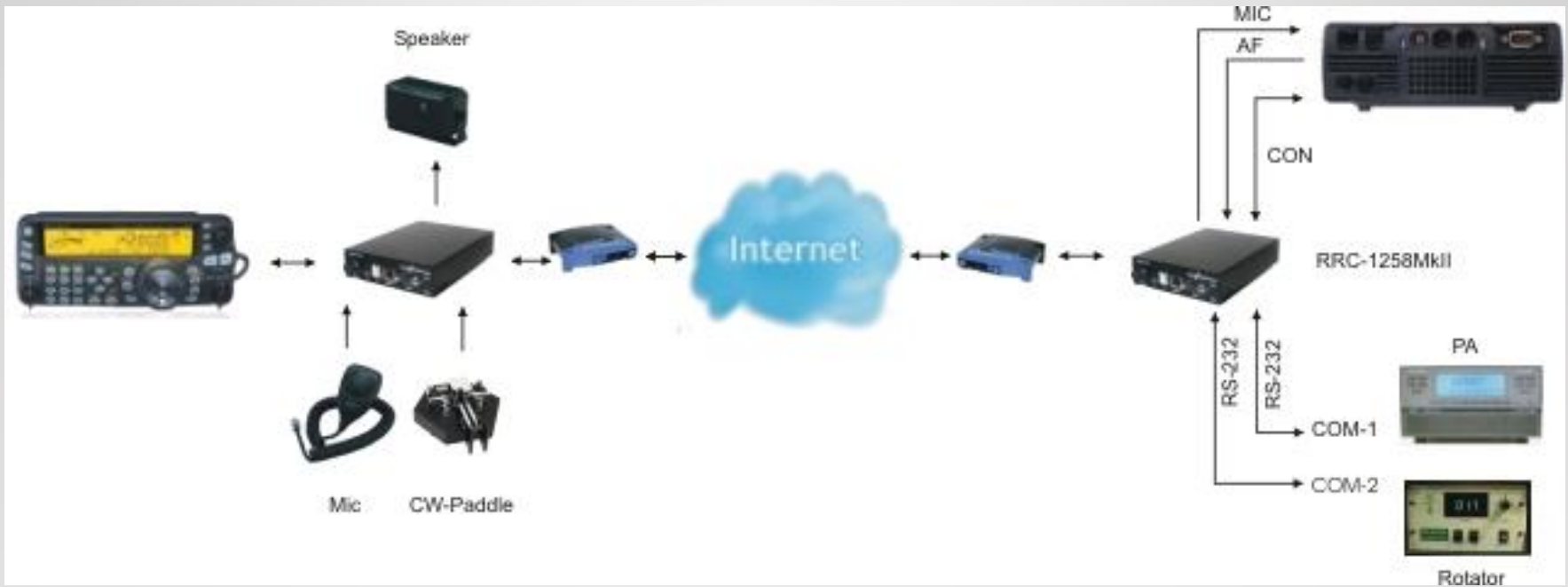


II REMOTE FRONT PANELS

- **RemoteRig RRC-1258 MkII**
 - Use a pair of Microbit RemoteRig “modems” to transfer audio, radio control and some station control
 - Kenwood, Yaesu, Icom, Alinco, Elecraft with separable front panel or twin operation
- Can also use PC at operator location
- Cost ~\$500 for a pair

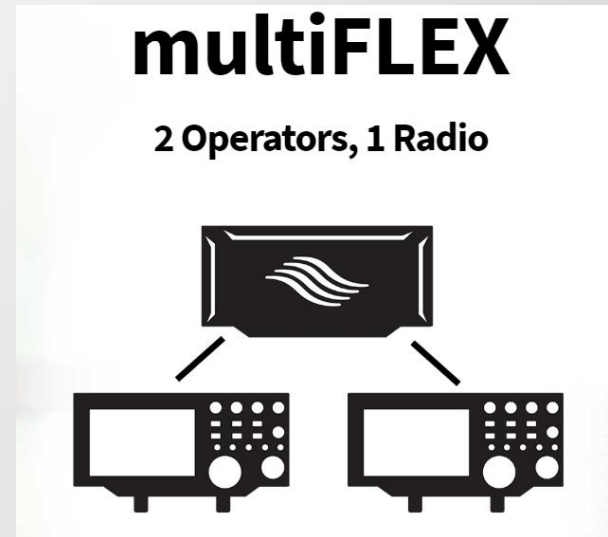


12 REMOTE FRONT PANELS



13 REMOTE FRONT PANELS

- **FlexRadio Maestro** front panel, now with multiFLEX
- Works with Flex 6400, 6600, 6700
- Maestro, PC, MAC and iPad Operation

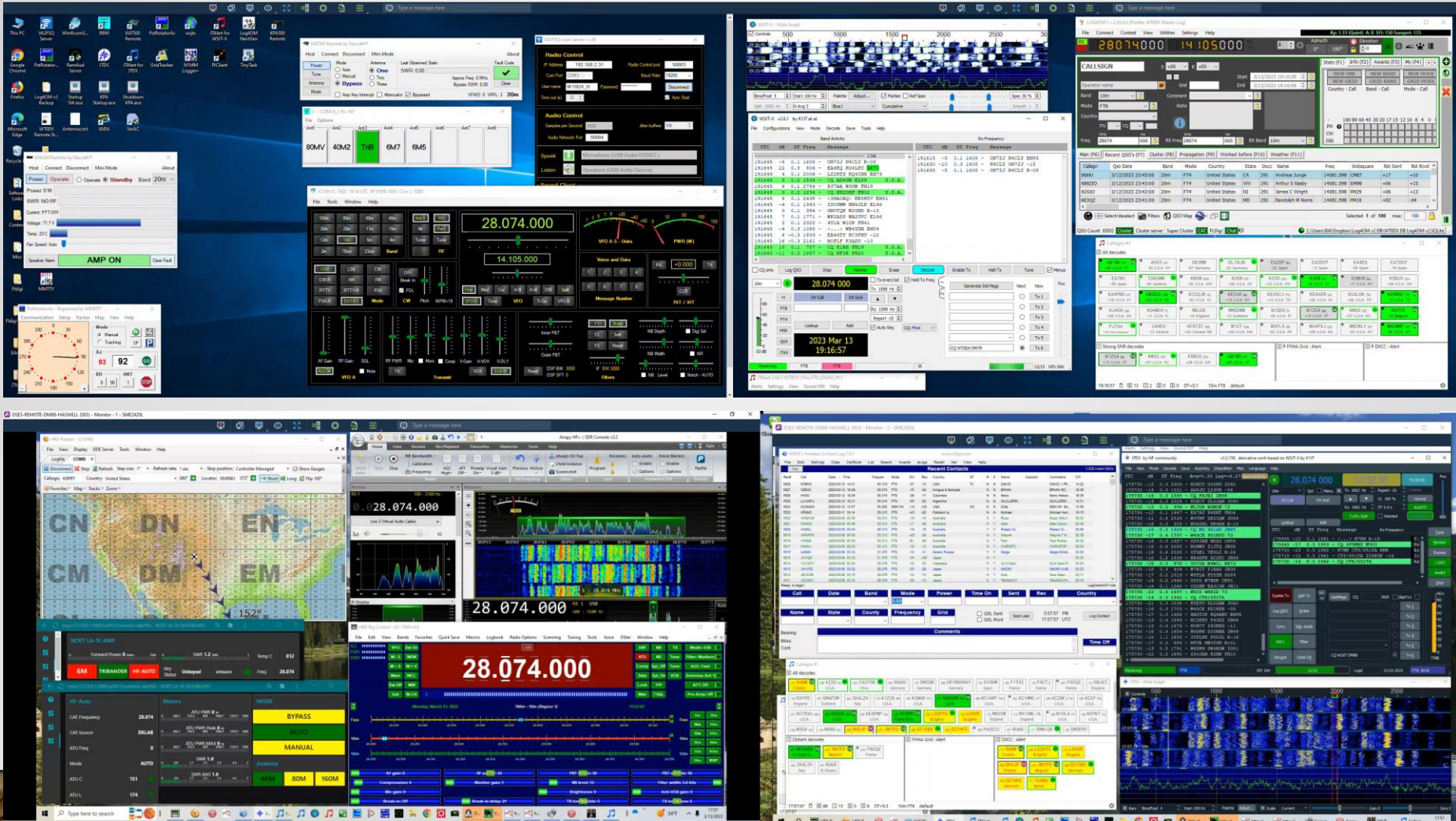


14 REMOTE DESKTOP

- Shack computer to control your station
- Use your favorite logging programs / rig control programs - even if they don't have any "remote" capability
- A "remote desktop" program to connect into your shack
- On your local computer you "see" the shack computer and can control the station
- (~~TeamViewer~~), Splashtop, AnyDesk, RemotePC, Chrome Remote Desktop, Windows Remote Desktop, RealVNC...
- **This is what we use for our remote stations**



15 REMOTE DESKTOP WT0DX and NO0T Dual Monitor Remote Desktops



16 REMOTE DESKTOP EQUIPMENT

- Transceiver with computer control - CAT
- Audio interfaces - Direct USB or sound card adapter
- CW interface – See Appendix for options
- PC for the shack (boot on power up) - Connected to transceiver
 - Good Video GPU with memory
- Remote power control - Wi-Fi or IP - AC controlled outlets
- Good internet connection - Upload

17 REMOTE DESKTOP SOFTWARE

- Radio control
- Operating software
- Audio link
- CW, Digital Voice keyer
- Amplifier, Antenna tuner
- Antenna switch
- Rotator control

18 REMOTE DESKTOP GETTING STARTED

- Determine how to interface your equipment to the computer
- Select the software you want to use
- Determine power control technique
- Configure Internet / Routers as needed
- If possible, do a trial on your LAN before WAN (Internet)
- Work with a buddy who has done this before...

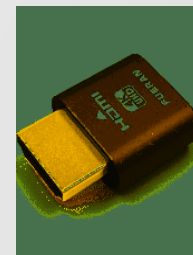
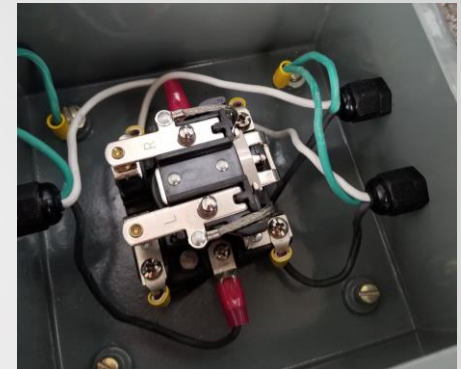
19 INTERNET, LATENCY, ROUTERS

- You need a “good” Internet connection!
- Internet Enabled Remote Power Switch with Reboot
- Latency needs to be considered
 - Computers
 - Sound cards, CW interface, Footswitch
 - Internet modems, Wi-Fi AP, Routers, Switches...
- Routers
 - Router Firewalls: Opening ports for remote software
 - Windows Firewalls
 - A buddy can help, or Google



20 OPERATING TRICKS

- Start simple, control your transceiver remotely
 - Then add more devices and software
- Try a digital mode first, may be simpler than CW or SSB
- Use a Macro recorder / player such as TinyTask to start and shut down all your software
- Make sure you have an AC power control solution
 - Your Computer or Software may freeze
 - You may need to start the transceiver again
 - Power down during storms
- For remote CW check out WinKeyer Remote
- Multiple monitors: Dummy headless monitor plugs
- Read more at K6UFO and W0QL links in Appendix

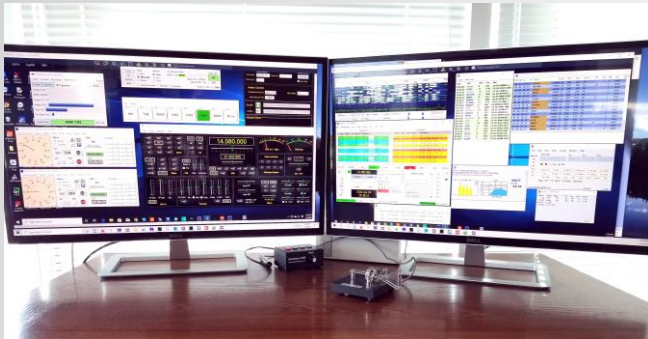


21 NOOT / K0PRT REMOTE STATION

- DSES Haswell, CO: InnovAntenna 6M 6EL LFA beam at 55' plus multiple low band antennas – temp location Bunker, final location in new building
- Icom IC-756 Pro III, Airspy R2 SDR, DEMI GaAsFet Preamp, Airspy HF+ Discovery SDR, N2EME PaulFlex SDR switcher, Palstar LA-1K, Palstar HF-Auto, Winkeyer USB 3.0, Yaesu G-2800DXA with EA4TX PC interface hardware
- Win 10 computer software: Node Red (Amp and Antenna Tuner) N3FJP Logging Software, WSJT-X, JTDX, JTAAlert, HRD (rotor and rig control), SDR Console, WKREmote
- DSL Service for Internet
- Splashtop Business and AnyDesk Remote Desktop
- IP remote AC power control for Radio, Computer and 220V power relay to Amplifier

22 NO0T HOME SITE

Webpass 1Gb internet



Windows 10 Pro 64 Computer

Footswitch to Computer Serial Port



Heil Pro Plus Headset and Mike to soundcard

Winkeyer Remote To serial port

Sidetone input from Winkeyer

Winkeyer USB

Iambic Paddle

Software

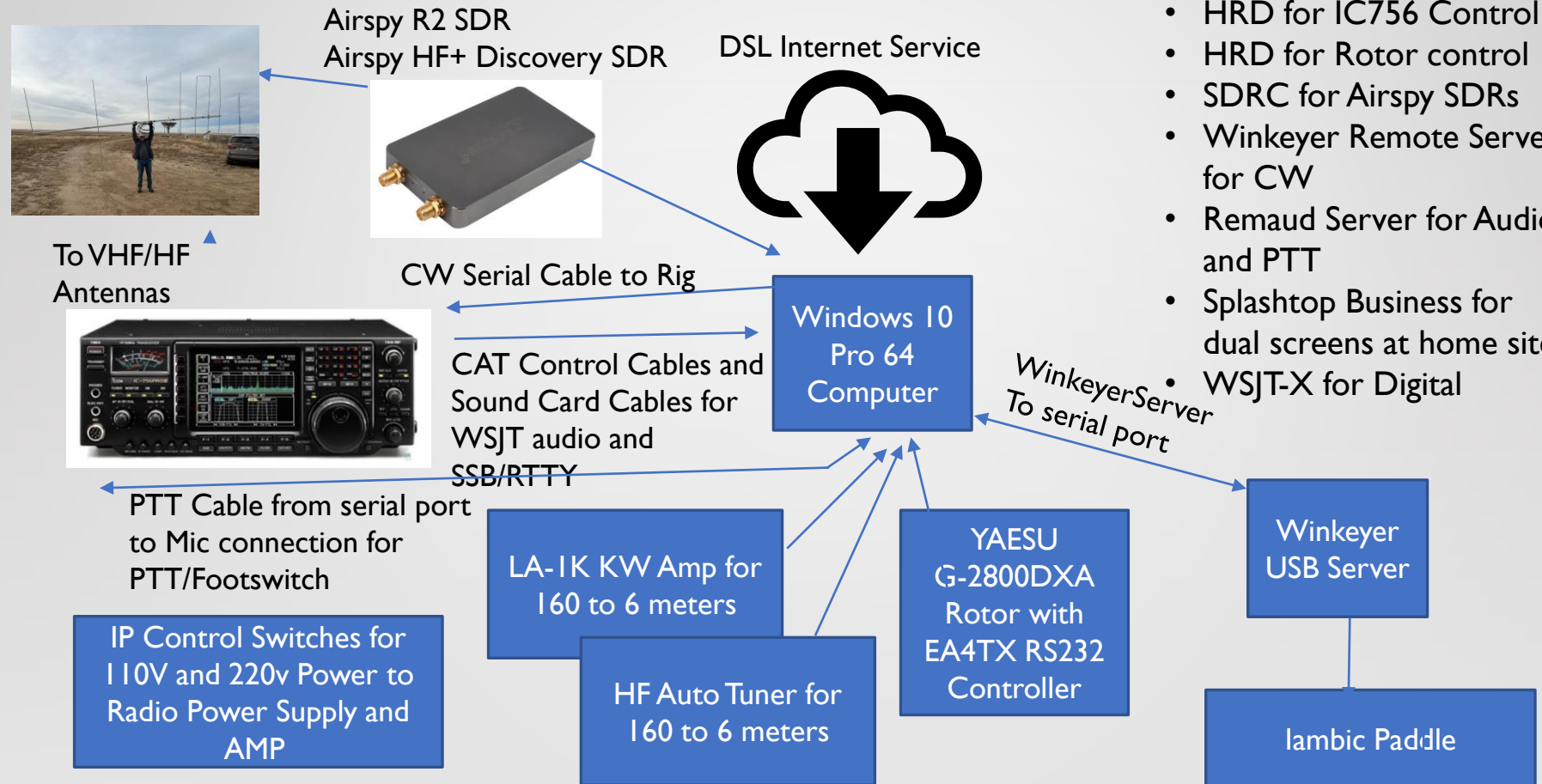
- RemAud Client for Audio and PTT footswitch
- Winkeyer Remote Client
- Splashtop Business for dual screens at home

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NOOT/K0PRT RADIO SITE

Software

- NODE RED – LA-1K Amp, HF Auto Tuner Control
- HRD for IC756 Control
- HRD for Rotor control
- SDR# for Airspy SDRs
- Winkeyer Remote Server for CW
- Remaud Server for Audio and PTT
- Splashtop Business for dual screens at home site
- WSJT-X for Digital

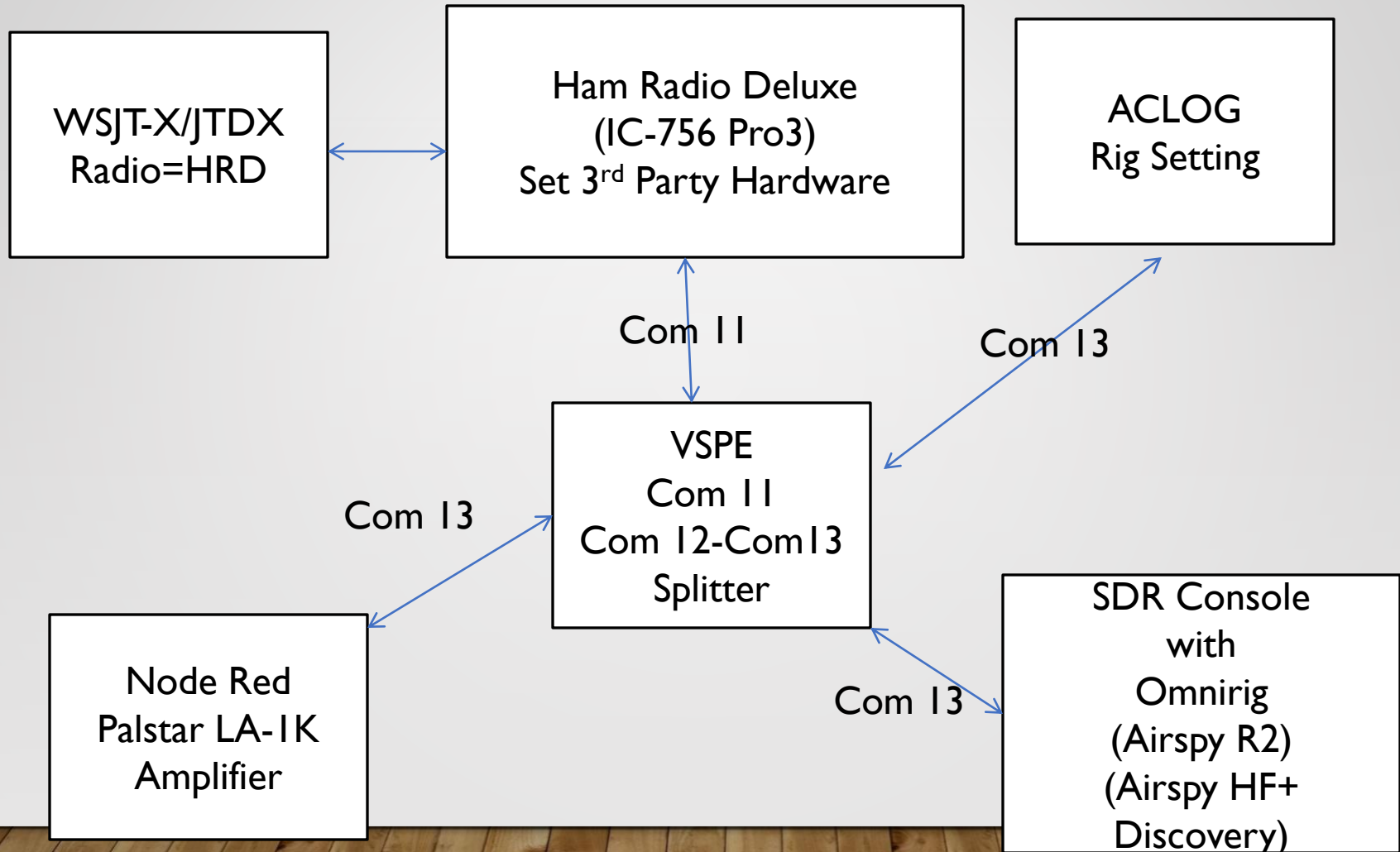


24 GETTING THE RIGHT CAT CONTROLLER CABLE

- Easiest solution – XGGCOMMS.COM (U.K. Company)
- Makes CAT Cables for ICOM, Yaesu, Kenwood, Xiegu/Wouxon
- Connects to your PC via USB and has **both** an external USB Sound Card and FTDI Chipset CAT interface built-in with isolated Tx/Rx audio and PTT
- Avoids audio issues with internal PC Sound cards
- Plugs into Accessory Socket on the back of the radio

DATA INFORMATION FLOWS

25



NO0T/K0PRT REMOTE STATION HARDWARE

26

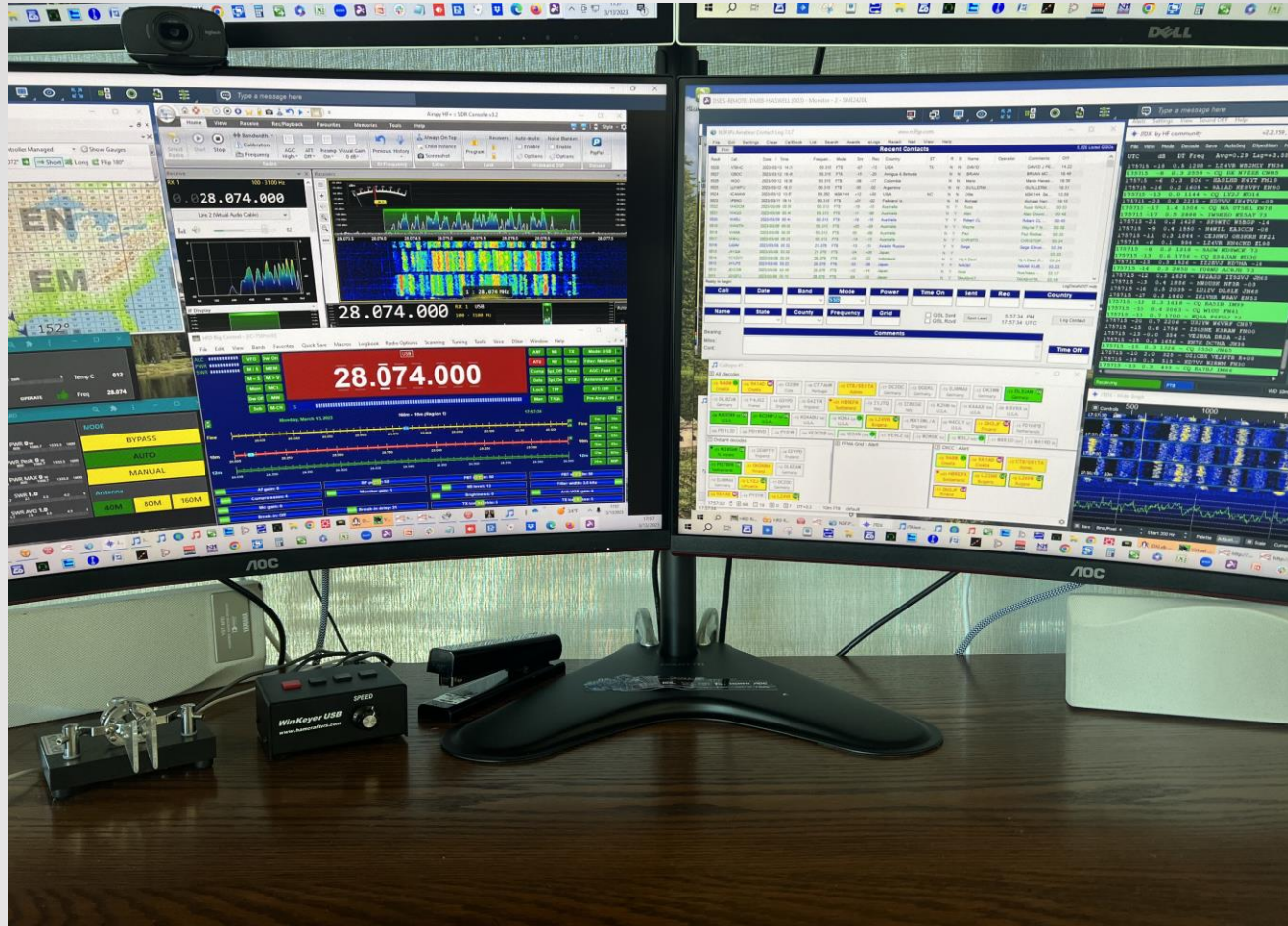


NO0T Remote Operations

- Operated from Canada family cottage
- Traveling in hotels
- Bahamas from poolside
- Las Vegas with friends
- Dayton Hamfest
- Cherry Creek Mall
- Park Meadows Mall while XYL is shopping!
- Remote using iPhone 13 cellphone,
- Dell Inspiron 13-inch laptop (Multiop Contest)
- Amazon Fire Tablet

NOOT REMOTE STATION CONTROL HOME OPERATION

27

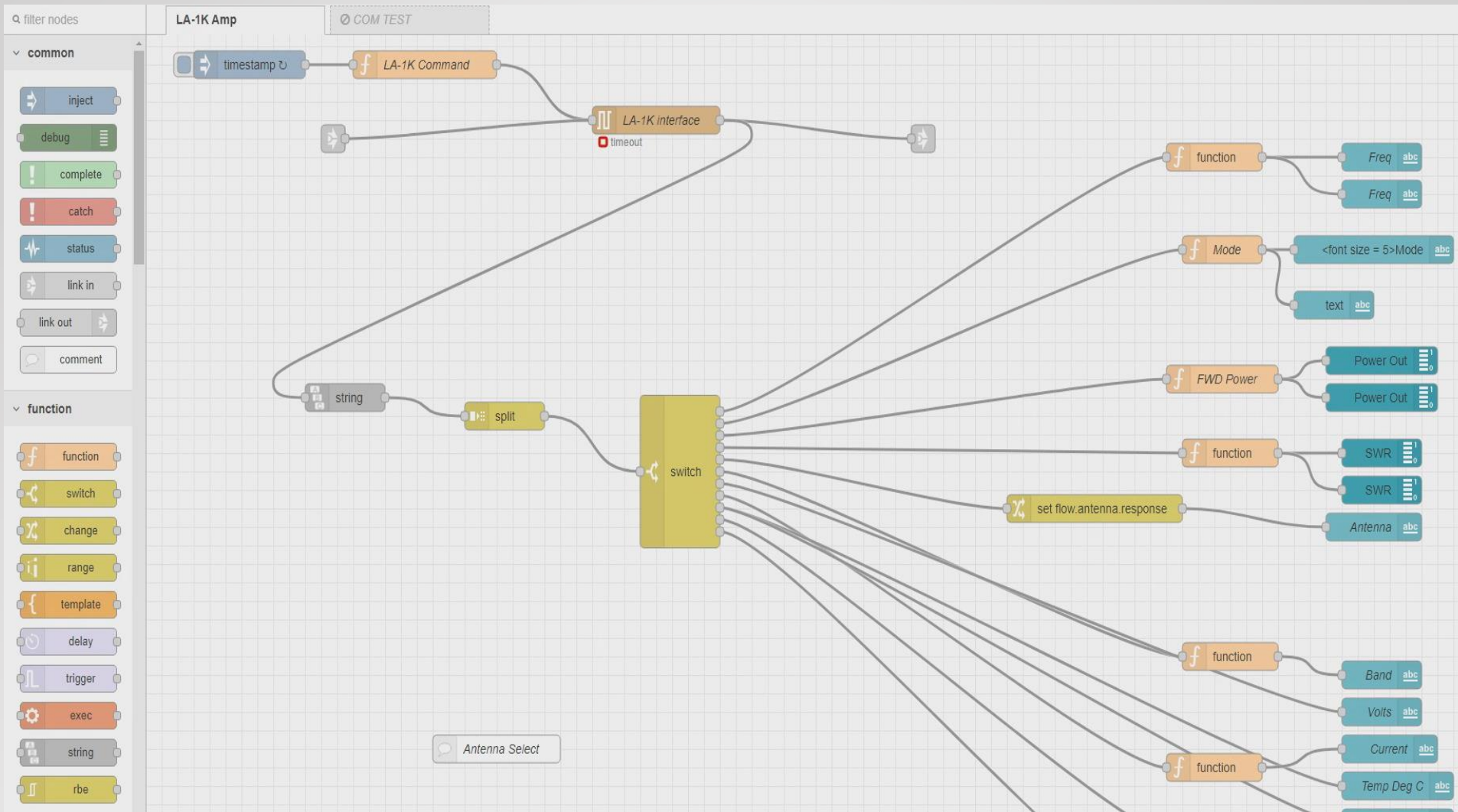


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NODE RED INTERFACE TO PALSTAR LA-1K AMP AND HF-AUTO TUNER

- *Node-RED*
 - programming tool for wiring together hardware devices, APIs and online services
 - provides browser-based editor
 - easy to wire together flows using the wide range of *nodes* in the palette
 - can be deployed to its runtime in a single-click.

LA-1K NODE RED FLOWS



LA-1K DESKTOP ICONS FROM NODE RED


LA-1K

Forward Power **920** Watts

SWR **1.0** SWR

Key Status **TX Amp**

Mode **OPERATE**

OP/STBY 

Band **6**

Freq **50.261**

Volts **50**

Current **29.2**

Temp C **027**

ALC **0**

Antenna **1**


6M **20M** **40/15M**

NOOT LA-1K AMP

Forward Power **920** Watts

SWR **1.1** SWR

Temp C **036**

6M **20M** **40/15M** Key Status **TX Amp** **OPERATE**  Freq **50.261**

31 HF-AUTO DESKTOP ICONS FROM NODE RED

The image shows a desktop icon for the 'HF-Auto' dashboard. The icon has a dark grey background with a teal header. The text on the icon includes: 'HF-Auto' in teal, 'CAT Source DXLAB', 'C 116' and 'L 226' with green status indicators, 'CAT Frequency 50.313', 'ATU Frequency 0', and two large buttons at the bottom: a yellow 'BYPASS' button and a green 'AUTO' button.

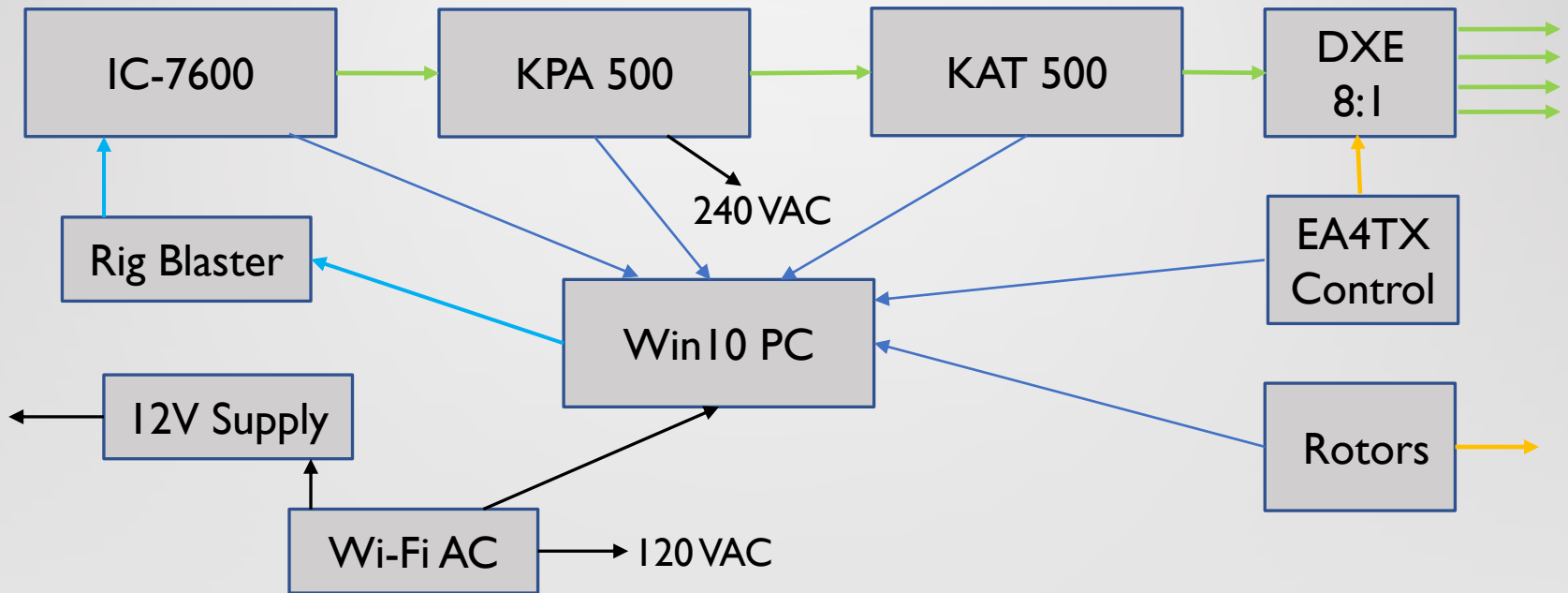
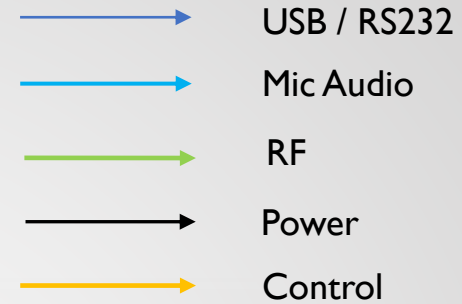
The image shows the full desktop application window for 'HF-Auto'. The window title is 'NOOT LA-1K DASHBOARD'. The interface is divided into several sections:

- HF-Auto Settings:** A list of parameters including CAT Frequency (50.313), CAT Source (DXLAB), ATU Freq (0), Mode (AUTO), ATU C (116), ATU L (226), ATU ANT (1), Ant Name (40m-GPVer), ANT SEL Method (MANUAL), and ATU Band.
- Meters:** Four horizontal bar graphs showing 'ATU PWR 0 w', 'ATU PWR Peak 0 w', 'ATU PWR MAX 0 w', and 'SWR 1.0'.
- MODE:** Three large buttons: 'BYPASS' (yellow), 'AUTO' (green), and 'MANUAL' (yellow).
- Antenna:** Three buttons for antenna selection: '40M' (green), '80M' (yellow), and '160M' (yellow).

32 WT0DX REMOTE STATION

- Station located at local ham QTH: KT34XA at 90 feet, 7 el 6M Yagi at 95 feet, 2 el shorty forty at 100 feet, 80M Inverted Vee and a 160M Inverted Vee
- Icom IC-7600, Elecraft KPA500 Amplifier, Elecraft KAT500 Antenna tuner, Hygain Rotator controller / HamSupply Rotor EZ RS232, DXE 8 port Antenna switch / EA4TX controller, Rigblaster Pro (audio for SSB)
- Win 10 Computer software: Win4Icom, KAT500 Remote, KPA500 Remote, PST Rotator, EA4TX App, WSJT-X, JTAlert, Log4OM, N1MM+, Dimension4, TinyTask
- Comcast Internet via Ethernet
- Splashtop Business and AnyDesk Remote Desktop
- Wi-Fi AC Power controllers for Radio and Computer

33 WT0DX REMOTE STATION WIRING



34 WT0DX REMOTE STATION



Remote Station

- Operated from Sand Key, FL condo, Crested Butte vacation home, Los Alamos, NM son's house, various hotels on the road
- iPad, iPhone or HP notebook computer with external monitors



Home Operation

35 REMOTE OPERATION: CRESTED BUTTE CO VACATION

- Operated from vacation rental home
 - From 6/25 – 7/25 2019
 - Made hundreds of contacts
 - Local DSL internet “good enough”
 - HP notebook plus external monitor
- CQ WWVHF Contest 7/20-21 2019
 - Paul visited and operated his remote station at the same time
 - True head-head competition!

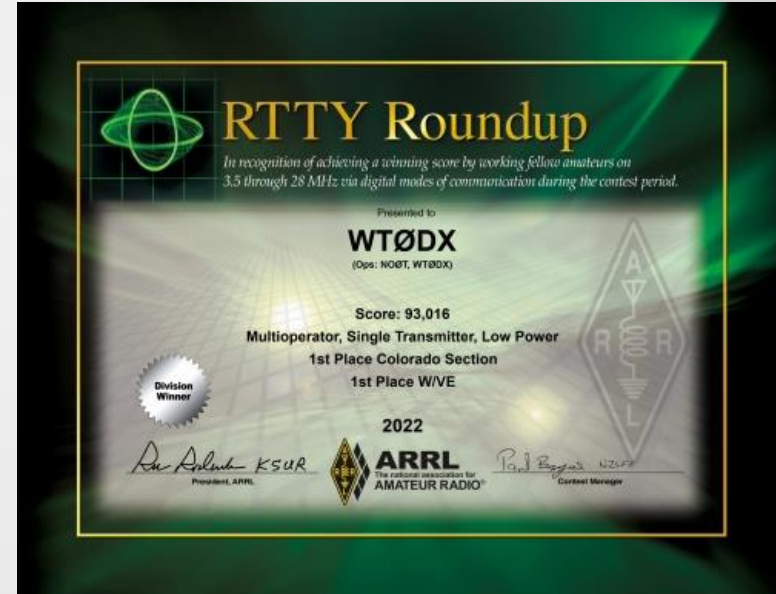


Bill WT0DX

36 WT0DX CONTEST RESULTS



- 2020 FT Roundup
 - Placed 2nd WW, #1 North America
 - Top 10 WW across all categories
- 2021 ARRL RTTY Roundup
 - 4th Place in M/S LP
- 2022 ARRL RTTY Roundup
 - 1000+ Contacts RTTY/FT8/FT4
 - 1st Place in M/S LP
- Operating Multi-Op is easy with a Remote Station
 - 2-3 hour shifts, meals, sleep



37 AND FINALLY...

- Remote stations are fun to build and operate
 - Start small then grow functionality
- Clubs are building remote stations for the benefit of members
- Lightning protection / grounding is important
- Keep the driving distance reasonable, or have a buddy onsite
- Add your software to the computer Startup sequence

DSES Haswell, CO



Photo Credits WA2JQZ

38 DEMO / Q & A

- Demo of remote station WT0DX
- You can email WT0DX at: wt0dx1@gmail.com
- Thanks to Mark K6UFO for some of this content
- Please contact WT0DX to share this presentation

APPENDIX

Links to hardware, software, websites, presentations and other useful stuff

40 SOFTWARE

- Win4Icom: <https://icom.va2fsq.com/>
- Ham Radio Deluxe (HRD): <https://www.hamradiodeluxe.com/>
- N4PY Software: <http://www.n4py.com/>
- Icom RS-BAI:
<https://www.icomamerica.com/en/products/amateur/hf/rsba1/default.aspx>
- Kenwood ARCP-480:
https://www.kenwood.com/i/products/info/amateur/ts_480/arcp480.html
- DF3CB FTDXRC: [DF3CB.com :: FTDXRC :: CAT & Remote Control Software](https://www.df3cb.com/FTDXRC/CAT%20&%20Remote%20Control%20Software)
- Splashtop: <https://www.splashtop.com/>
- AnyDesk: <https://anydesk.com/en>
- RemotePC: [Remote Access - Fast, Secure and Easy | RemotePC™](https://www.remotepc.com/)

41 HARDWARE

- AC Control – Amazon or other retailers
 - Wi-Fi AC Outlets (Kasa HS103P2)
 - Internet Enabled IP Remote Power Switch with Reboot (ezOutlet3)
- Flex Radio Maestro: <https://www.flexradio.com/maestro/>
- RemoteRig RRC-1258MkII: https://www.remoterig.com/wp/?page_id=1051
- WinKeyer Remote: <https://www.hamcrafters2.com/WKremoteX.html>
- MFJ-1234COS RigPi Software: [MFJ-1234COS, RigPi Operating System v3.0 | MFJ Enterprises Inc](#)
- Yaesu SCU-LAN10: [Yaesu SCU-LAN10 Network Remote Control System SCU-LAN10 \(dxengineering.com\)](#)
- Hamsupply Rotor Control: <https://www.hamsupply.com/products/>
- EASY-ROTOR-CONTROL (ERC): [Vibroplex | EASY-ROTOR-CONTROL](#)
- Monitor Dummy Plug (Display Emulator): Amazon search for Dummy Plug

42 WEBSITES

- Remote Ham Radio: <http://www.remotehamradio.com/>
- RemoteHams.com: <http://remotehams.com/>
- RemoteTx: [RemoteTx – Operate Anywhere](#)
- K6UFO Remote Station Presentations:
<https://www.qrz.com/db/K6UFO>
<http://www.k6ufo.com/>
- W0QL Blog (solar powered remote station):
<https://w0qlremotebase.wordpress.com/>
- W7DXX Remote Station: [W7DXX Super Remote](#)

43 OTHER SOFTWARE TOOLS

- WSJT-X: <https://physics.princeton.edu/pulsar/k1jt/wsjt.html>
- JTAlert: <https://hamapps.com/>
- PSTRotatorAZ: https://www.qsl.net/yo3dmu/index_Page346.htm
- TinyTask: [TinyTask – Official site \(thetinytask.com\)](http://thetinytask.com)
- Skype: <https://www.skype.com/en/>
- Linphone: <https://www.linphone.org/>
- DF3CB Remaud: <https://www.df3cb.com/remaud/>
- Node Red: [nodered-hamradio@groups.io | Home](https://nodered-hamradio@groups.io)
- CATSync: <https://catsyncsdr.wordpress.com/>
- SDR Console: <https://www.sdr-radio.com/console>

44 NODE RED REQUIREMENTS

- Download the current supported version of Node Red and Documentation – <https://nodered.org/docs/>
- Local Computer or Raspberry PI
- Get a current copy of VSPE to create your virtual com ports and com splitters
<http://www.eterlogic.com/Products.VSPE.html>
- Get and Install a Node Red Flow
 - Ask if anyone has done that Flow already – lots out there free
 - Join [nodered-hamradio@groups.io](https://groups.io/g/nodered-hamradio) – lots of advice and flows

The screenshot displays a multi-window software interface for a remote radio station. The main window is TRX-Manager [IC-7000], showing a frequency of 7.073.00 MHz in MAN USB mode. Below the frequency display are various controls for power (81W), filters, and modes. To the right, the WSJT-X - Wide Graph window shows a waterfall plot with a frequency range from 500 to 3000 kHz. Below the graph are controls for bins, start frequency, palette, and smoothing. The Logbook [TRX-Log.mdb] - New QSO window is open, displaying a table of QSOs and a form for logging a new contact. The JTAAlertX 2.12.7 window shows a list of alerts, including 'W5BGD - TX' and 'K0PT - SC'. A small 'Tuner Power' window is also visible, with a 'Turn tuner off' button and a green indicator light.

Logbook [TRX-Log.mdb] - New QSO

Call	Freq	Band	Mode	RST_Sent	RST_RCVD	QSL_SENT	QSL_RCVD	Date
WB6JHIAG	14.075569	20m	FT8	-15	-10			11/2
N2GWK	7.075177	40m	FT8	-08	-14			11/2
KJ4KVC	7.075449	40m	FT8	-13	-19			11/2

Band Activity

UTC	dB	DT	Freq	Message	UTC	dB	DT	Freq	Message
192100	-16	0.1	1812	~ CQ K0PT EM94	191745	Tx	1449	~	KJ4KVC WT0DX R-13
192100	-6	-0.0	917	~ CQ W5BGD EM13	191815	Tx	1449	~	KJ4KVC WT0DX R-13
192130	-5	-0.0	917	~ WT0DX W5BGD -03	191830	-13	-1.0	1449	~ WT0DX KJ4KVC RRR
192130	-2	0.0	527	~ N2IEC WA0GMR EN12	191845	Tx	1449	~	KJ4KVC WT0DX 73
192130	-5	-0.1	2344	~ KL7J N6CKV CM98	191900	-12	-0.9	1449	~ WT0DX KJ4KVC 73
192200	-4	-0.0	917	~ WT0DX W5BGD RRR	192100	-6	-0.0	917	~ CQ W5BGD EM13
192200	0	0.0	527	~ N2IEC WA0GMR R-14	192116	Tx	917	~	W5BGD WT0DX DM65
192200	-19	-0.6	998	~ W5ITW CO6SR -09	192130	-5	-0.0	917	~ WT0DX W5BGD -03
192200	-16	0.1	1832	~ CQ K0PT EM94	192145	Tx	917	~	W5BGD WT0DX R-05
192200	0	-0.1	2344	~ KL7J N6CKV R-02	192200	-4	-0.0	917	~ WT0DX W5BGD RRR
					192215	Tx	917	~	W5BGD WT0DX 73

JTAAlertX 2.12.7 WT0DX [-40m, NO Log #1]

Alert	Settings	View	Sound Off	?
W5BGD - TX	WA0GMR - SD	CO6SR	K0PT - SC	N6CKV - CA

WT0DX Los Alamos, NM Remote Station 2018