

# Remote Ham Radio Operation

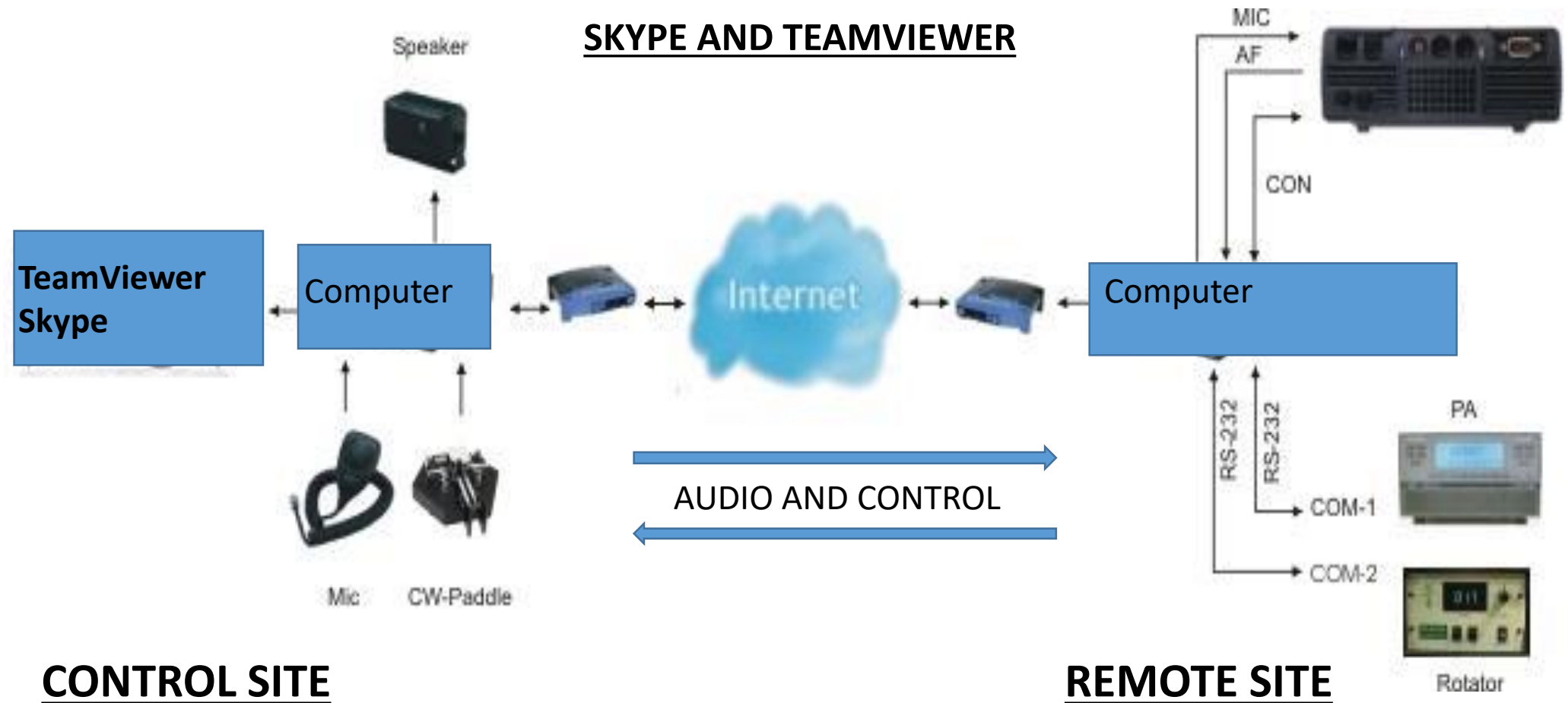
Nizar Mullani K0NM



# Presentation Goals

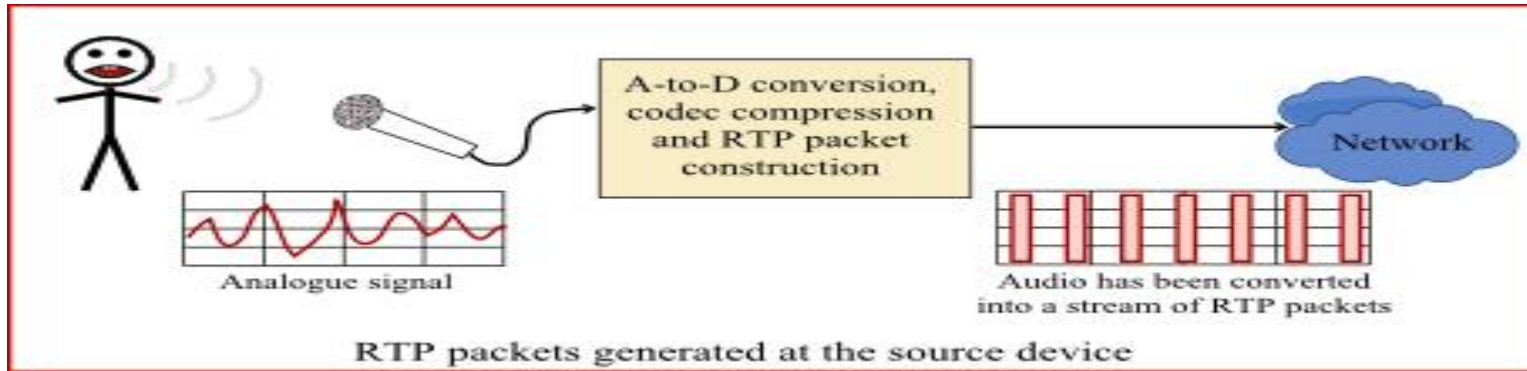
- Basics of Remote Operation Over Internet
- Terminology Pertinent to Remote Operation
- Dedicated RemoteRig Remote Operation System
- Demonstrate the K3/RRC and TS-480/RRC Systems

# Simplest Remote Operation Over Internet



# Critical Parameters for Voice over Internet

## A/D Sampling Rate and Bits



Packet Size    Buffer Size



Loop Time (PING)

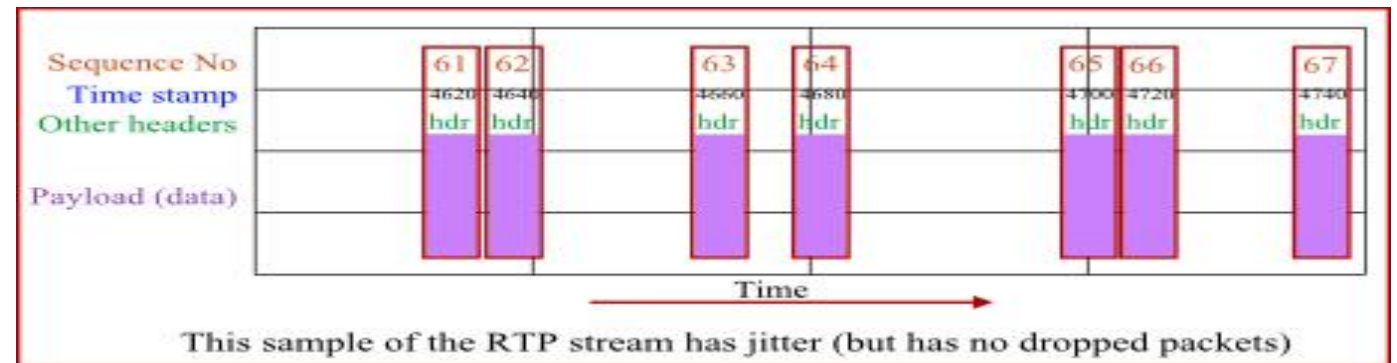


Processing Delay

Total Delay <150 ms

Time Jitter

Dropped Packets



# Current Remote Radio Operation Systems

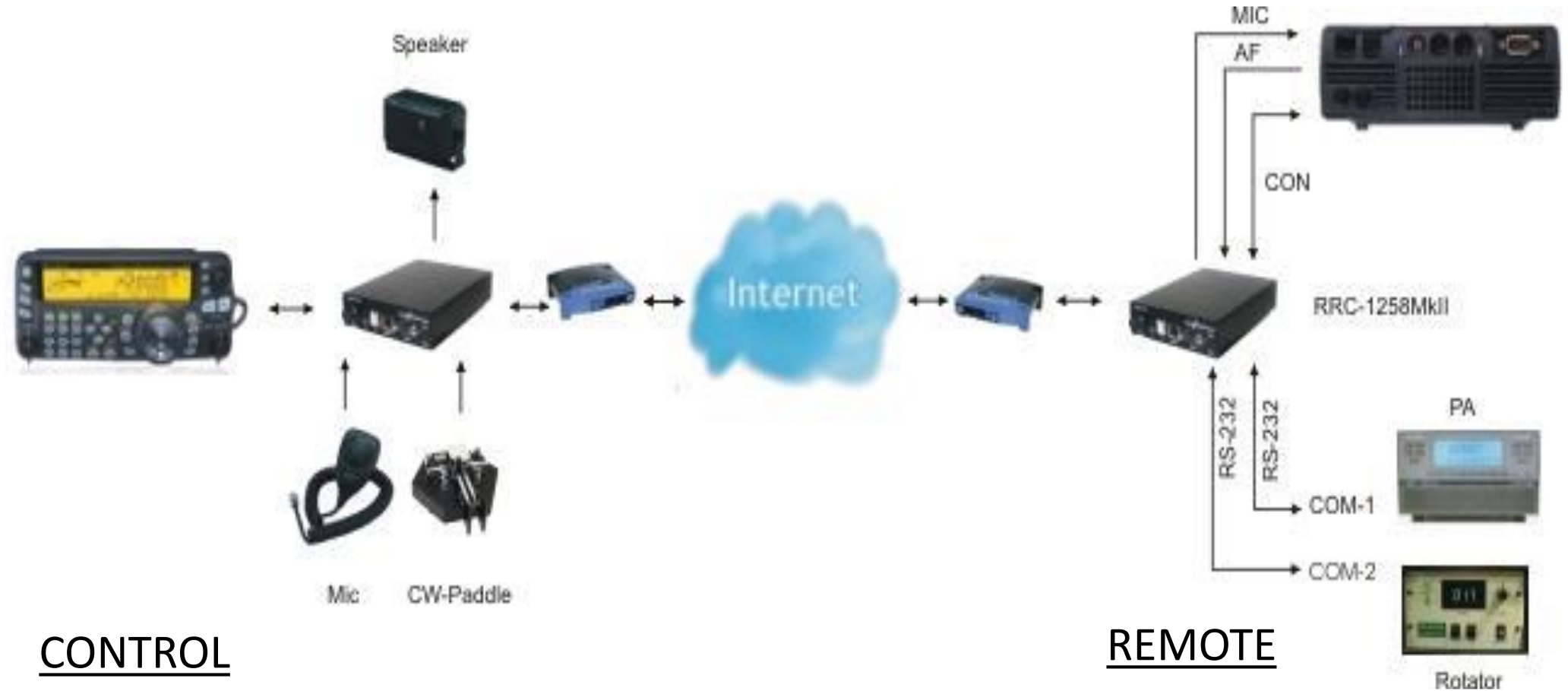
- RemoteRig – [remoterig.com](http://remoterig.com)
  - Dedicated Specially Designed Hardware
- RemoteHams – [remotehams.com](http://remotehams.com)
  - Software System Using Computers
- RigBlaster – [westmountainradio.com](http://westmountainradio.com)
  - Computer Driven System

Lots of new groups and companies creating software and products for Remote Operation



# RemoteRig Remote Control System

Dedicated Microprocessor And Electronics for Faster Processing



# RemoteRig Dedicated Hardware

FRONT



- USB
- Extra Serial Port
- MIC
- SPEAKER
- CW Speed

BACK



- CAT Serial Port
- CW Paddle
- Ethernet

# RemoteRig Dedicated Hardware System

- No Computer Needed
- A Black Box that contains a microprocessor, inputs for Mic, Speaker and CAT signal. A serial port for the CAT signal and an extra serial port to be used for other controls. A Winkey device for CW operation.
- One box required at each site. One is called the Radio unit (remote location) and the other is the Control unit at the user. Ethernet cable connects each box to the outside world.



# Control Site

'Control End' station at G4IRN



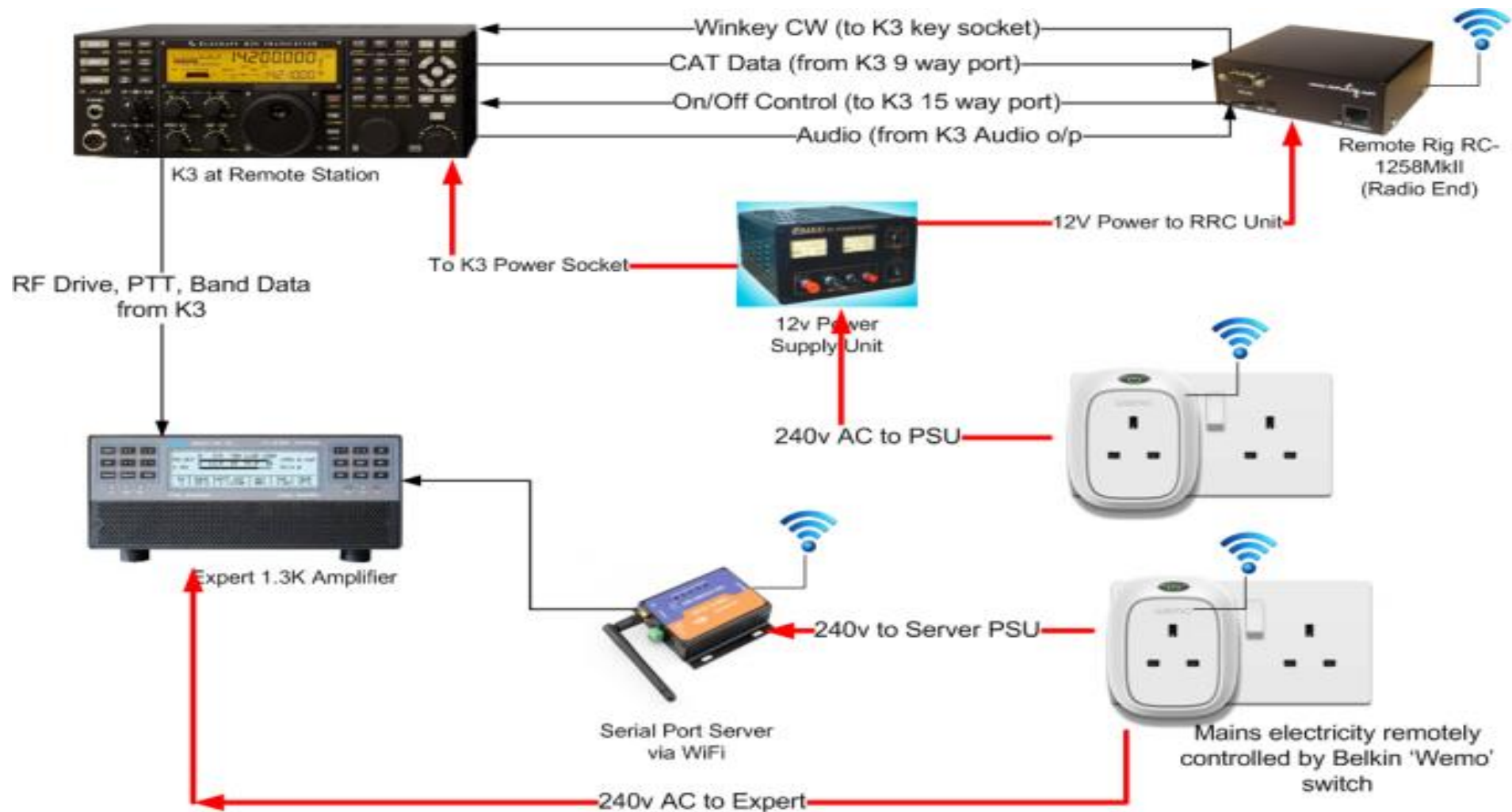
# K0NM Control Site



K3/0mini

K3/0 RRC

# Remote Site



'Remote End' station at G4IRN

# K0NM Remote Site

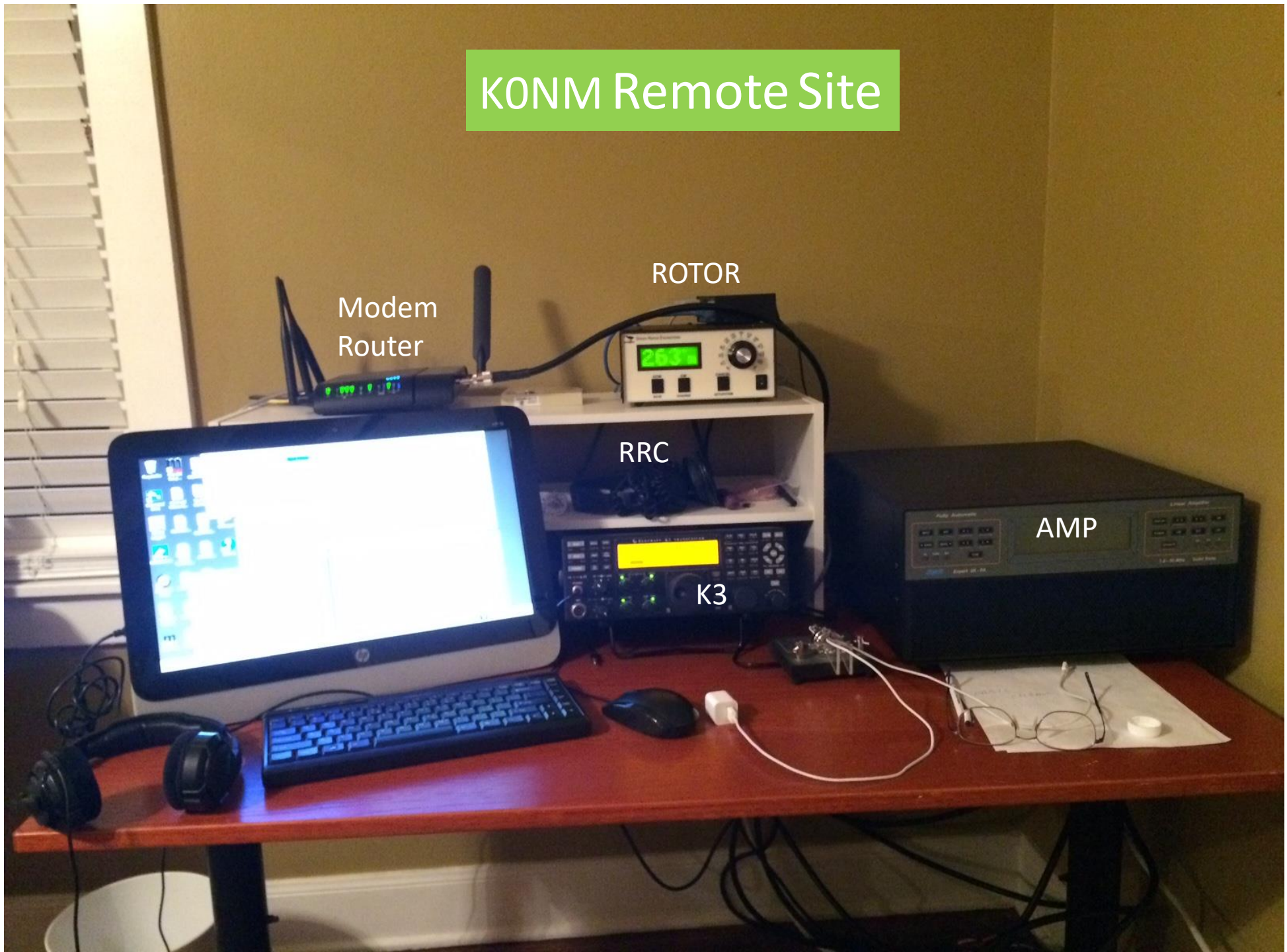
Modem  
Router

ROTOR

RRC

K3

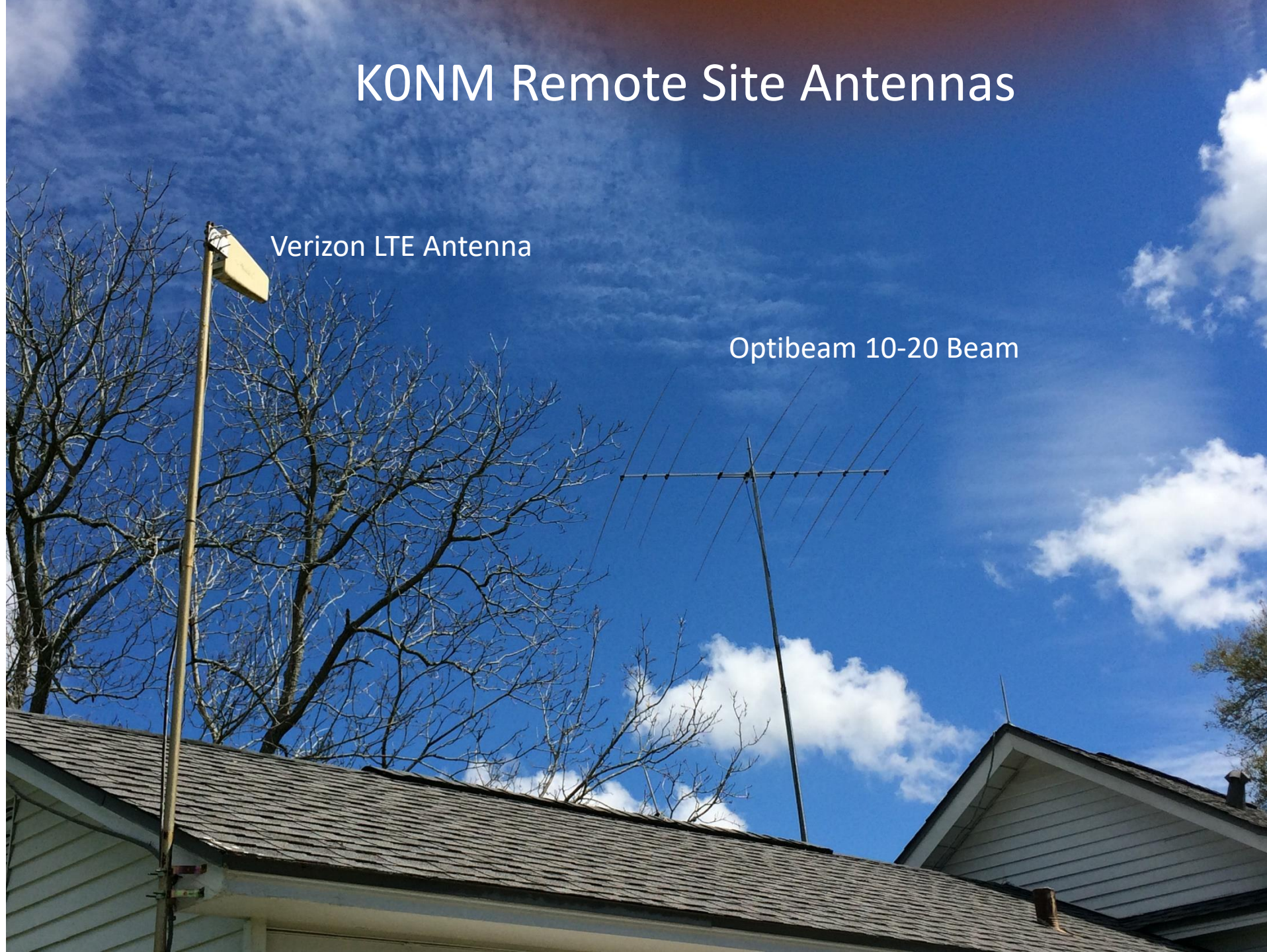
AMP



# KONM Remote Site Antennas

Verizon LTE Antenna

Optibeam 10-20 Beam



**Remote Rotor Control**

**21034.74 CW Elecraft K3 VFO A**

File Edit View Tools Config Window Help

CW JH1GBZ Snt Rcv Pwr

Run S&P 32

F1 Qr? F2 Exch F3 Tu F4 K0NM F5 His Call F6 Repeat  
 F7 Empty F8 Agn? F9 Nr? F10 Cal? F11 Empty F12 Wipe

Esc Stop Wpe Log # Edt Mark Store Spot # GRZ

Hdg 319° LP 140° 6717mi 10811km

JA: AS/JAPAN, Zn 25 356/211 225,348

2/22/2015 01:38:30Z ARRL DX CW - ham.s3db

MM-DD	HH:MM	Call	Freq	Snt	Rcv	P...	M1	P..	Pts
02-22	01:08	PT2CM	14007.99	599	599	K		PY	3
02-22	01:10	RD0A	14017.20	599	599	K		UA9	3
02-22	01:14	HL5BMX	21003.00	599	599	500	✓	HL	3
02-22	01:17	PX2X	21026.03	599	599	K		PY	3
02-22	01:19	8T2VE	21062.87	599	599	K		JA	3
02-22	01:21	7N1BHO/1	21046.98	599	599	50		JA	3
02-22	01:21	JA7NVF	21029.77	599	599	K		JA	3
02-22	01:23	WH7W	21067.40	599	599	K		KH6	3
02-22	01:23	RU0LAX	21021.36	599	599	100		UA9	3
02-22	01:24	R0CW	21023.43	599	599	100		UA9	3
02-22	01:25	KH8/K8GU	21075.36	599	599	99	✓	KH8	3
02-22	01:28	JA7EU	21046.23	599	599	K		JA	3
02-22	01:29	JA1JQY	21069.72	599	599	100		JA	3
02-22	01:33	RG0A	21004.26	599	599	100		UA9	3
02-22	01:34	JH1GBZ	21034.74	599	599	K		JA	3

Score - 225,348 Points

Band	QSOs	Pts	Cty
7	72	216	37
14	91	273	64
21	100	300	52
28	93	279	58
Total	356	1068	211

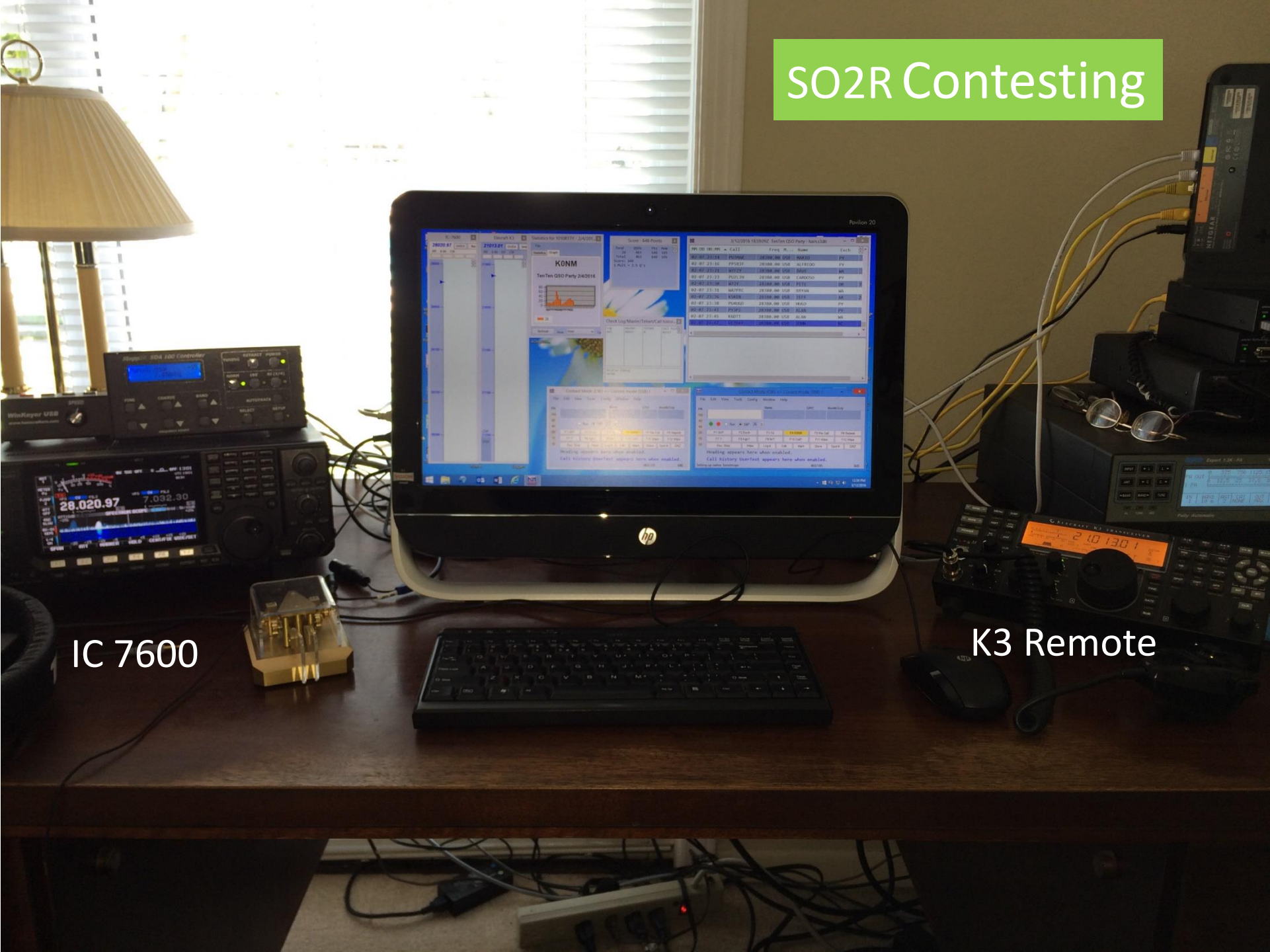
Score: 225,348  
1 Mult = 1.7 Q's

Information You just unplugged a device from the audio jack.

7:38 PM 2/21/2015

# Remote CW Contesting

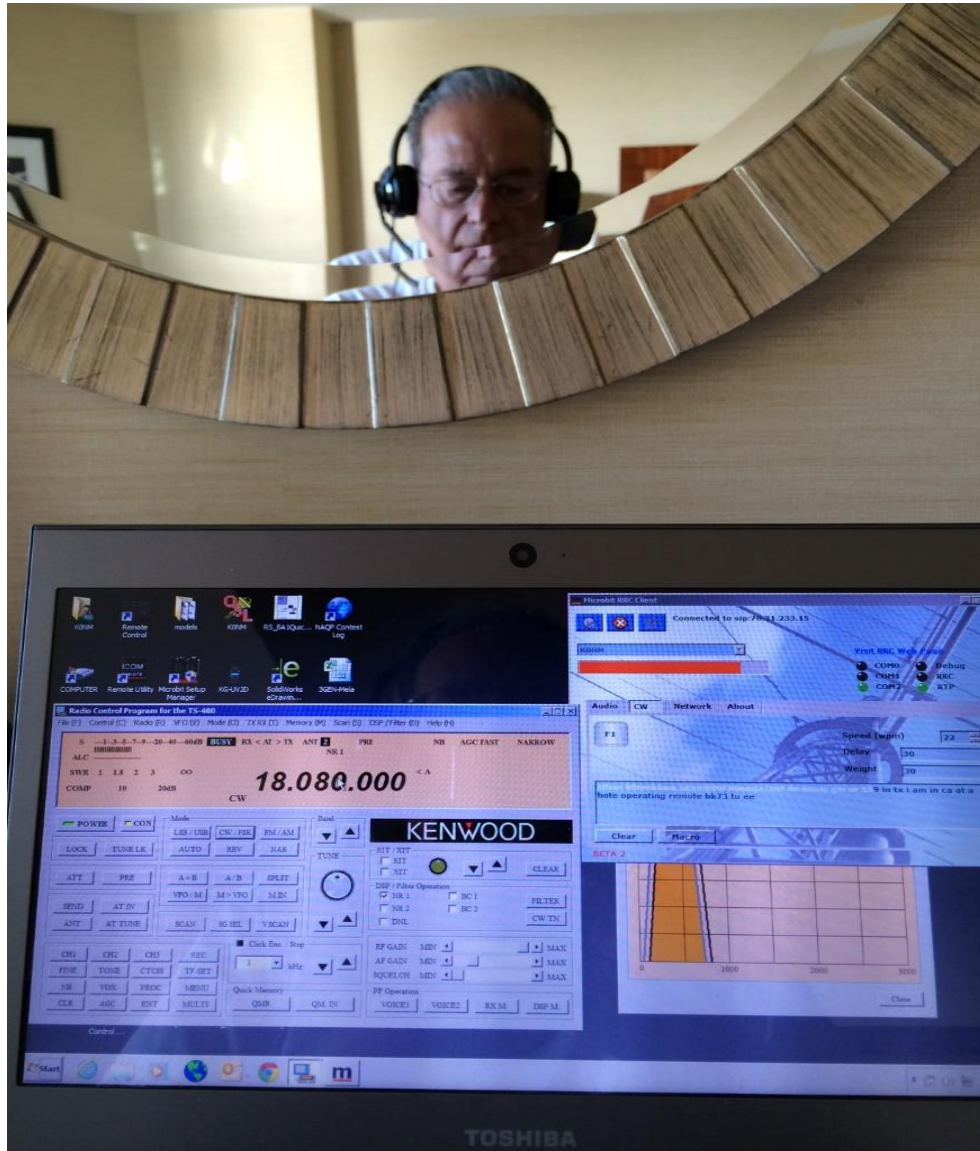
# SO2R Contesting



IC 7600

K3 Remote

# Remote from Hotels in USA and Europe



RRC USB Micro Sound Card and software  
Laptop with Kenwood Rig Software  
SSB and CW with Keyboard





# Remote Operation Using a Phone

Your Rig in the Palm of Your Hand

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



# Mobile Remote (KONM/MR) Look Ma – No Antennas!



TS-480 Remote  
Cruising and Working Pileups  
1 KW output with VEE Beam



# Mobile Remote – Working DX w/o Antenna



# SO2R Operation

- Contest Setup
- TS-480 remote with SPE 1.3K amp at home
- K3 Local with SPE 2K amp at Ranch
- N1MM+ operating system
- Only Problem - Operator

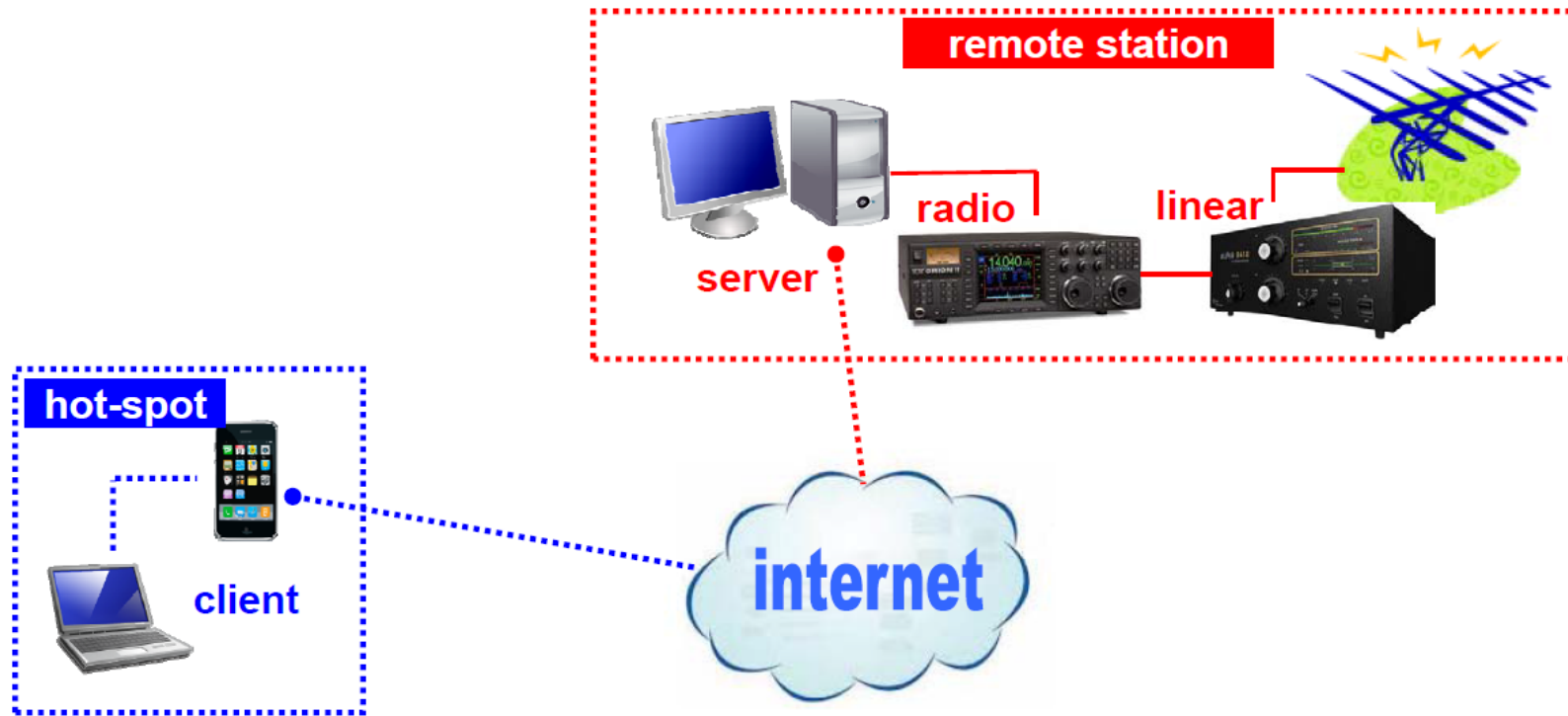


# WG5H Remote

- 135 ft tower with 10, 15 20, 40 meter beams and inverted VEEs for 80 and 160 at 80 feet, at ranch near Freer, TX
- K3 with KPA500 and RRC, remote rotor control, remote SPE 2K control
- K3/0 with RRC for Control for home use
- Second tower being installed for a second remote rig.



# Remote Hams Basic Model – KJ5Y



# Remote Hams credits

**Remote Hams Concept by Scott Avery (WA6LIE)**  
**RCForb Client/Server Software**  
**developed by Brandon Hansen (KG6YPI)**  
**Copyright RemoteHams.com 2011**

**Special Thanks:**

**WA6LIE (Founding Concept Design, Support & Testing)**  
**W8RJ (Driver Development, Support & Testing)**  
**M3GHE (Dedicated from the start! Support & Testing)**  
**VK4FSGW (Skin Development, Support & Testing)**  
**Kelly (Logo Design)**

- <http://download.remotehams.com/download>
- <http://hamradiation.com/>



# Remote Radio at the RF Ranch

Bob Feldtman – W5RF



- Dream AM Radio

HEX Beam  
6-20 meters



# K3/0 at Home



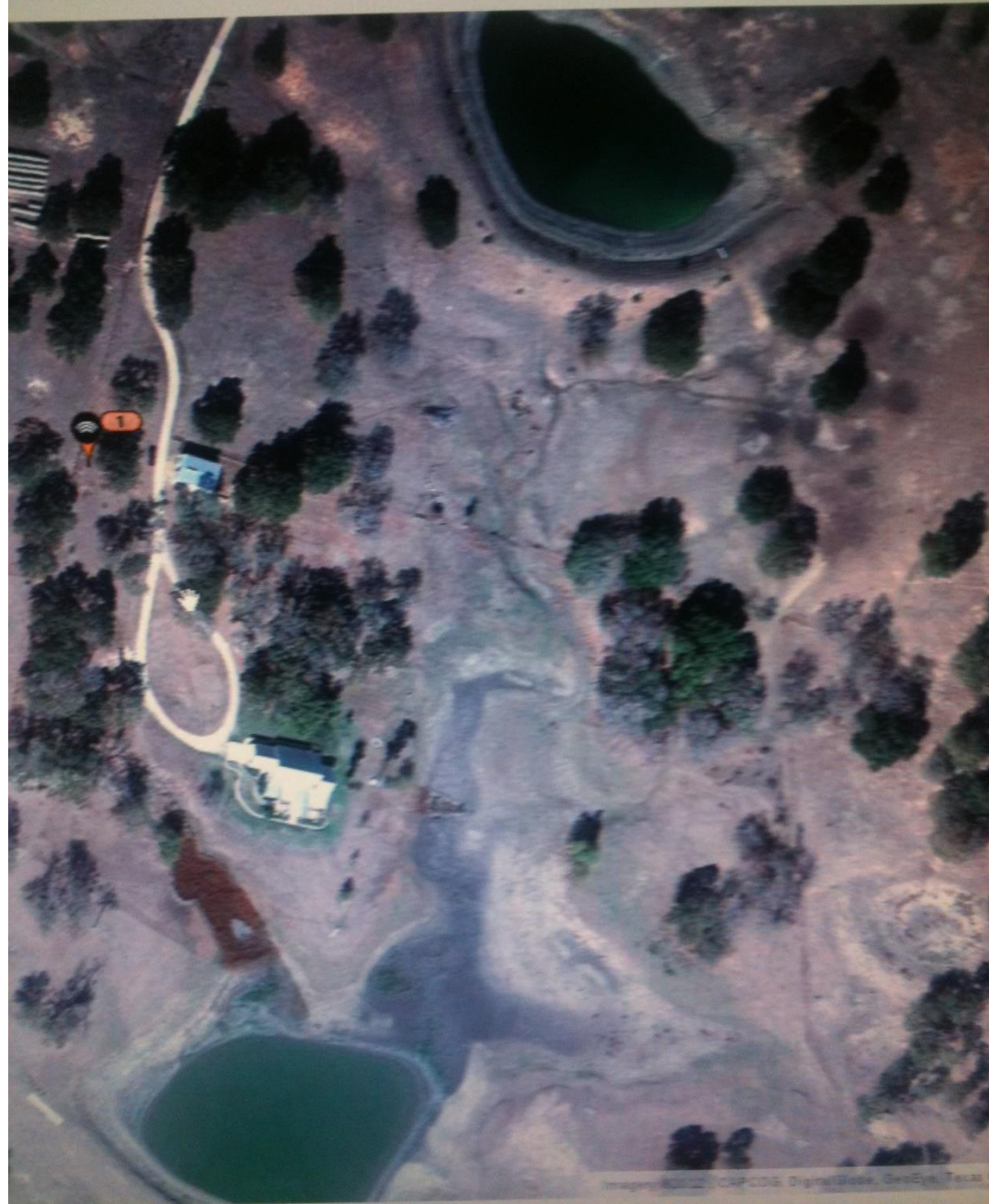
K3s at Ranch  
SPE Amp  
Verizon Router



# Transmit Antennas

- Hexbeam 20-6 meters at 55 feet
- 270 foot OCF 160-10 meters at 50 feet
- Two legged Vee beam 40 feet
  - Centerline 60 degrees to EU and North Africa
  - Non terminated thus good to 240 degrees
  - 350 ft (5 wl 20 meters) legs -45 degrees apart
- 30 Mhz dipole 30 feet
- 40 M elevated vertical  $\frac{1}{4}$  wave, elevated radials

Aerial View  
RF Ranch



Aerial View  
RF Ranch  
Antennas





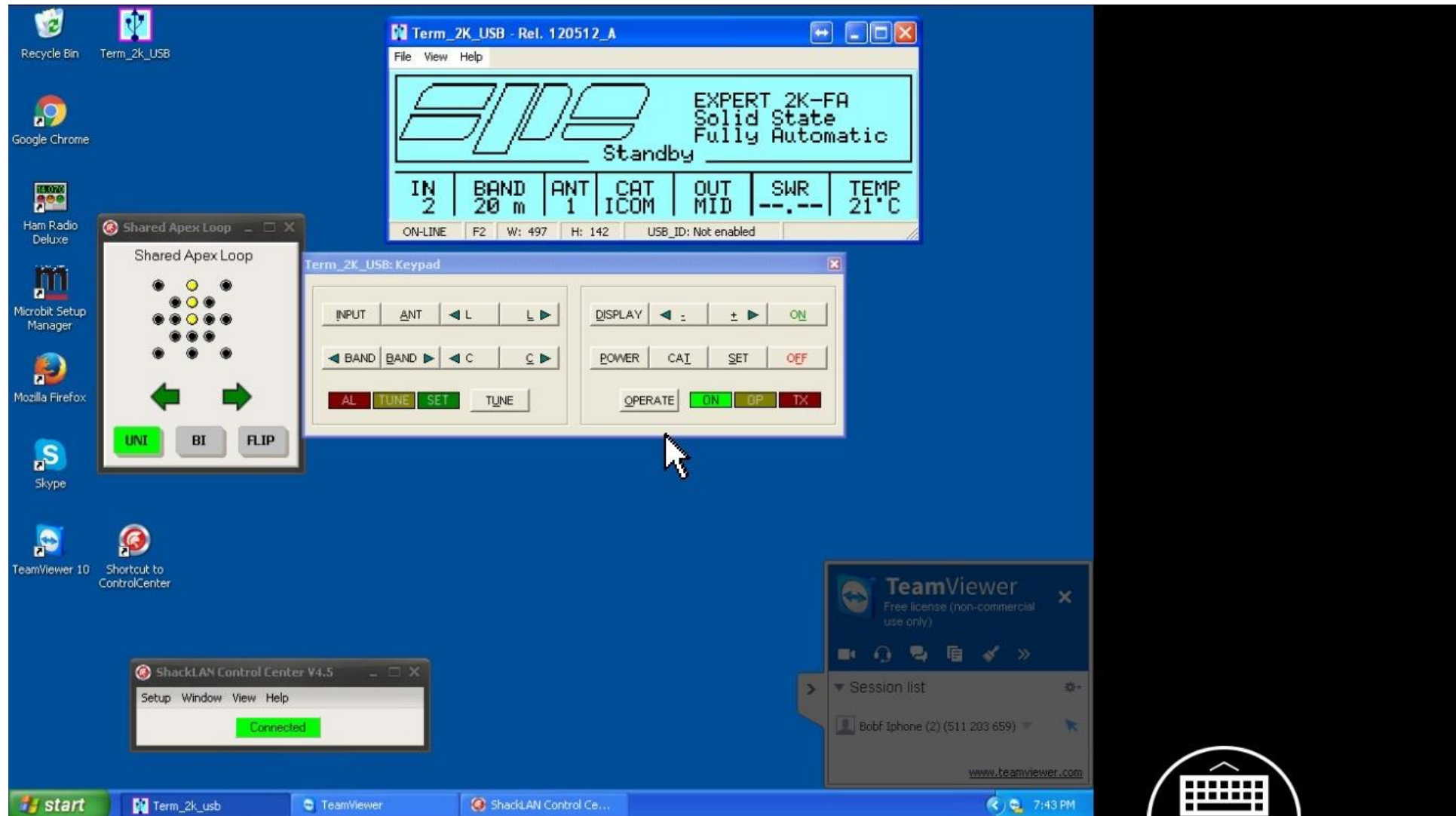
# Receive Antennas

- Any transmit antenna per Extra 2K program
  - Extra 2K amplifier 6 antenna inputs
  - Programmable remote with Team Viewer
- SAL-30 phased loops
  - Remotely steerable through Team Viewer
  - 8 directions
  - Up to 20 db gain over dipole.

# Projects

- Upgrade Yeasu rotator controller to Green Heron controller for remote access
- Add Spiderbeam 160 m 60 ft vertical for low angle 160 DX radiation
- Finalize N1MM+ integration to RRC with Nizar Mullani's teaching

# TeamViewer control of Remote Station



# remoterig.com

