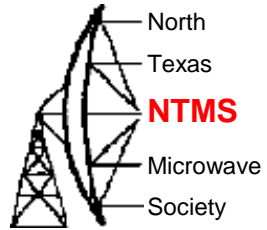


Remote Control Radio Systems for Free

5 March 2016

Dave Robinson G4FRE

Topics



Introduction

Why Remote control?

First System: Remoterig

Second System: HamRadioDeluxe

Third System: RCFORB

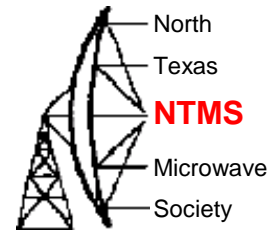
Client

Server

Server Accessories

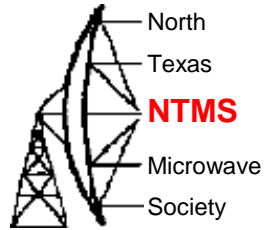
Using Other Radios

References



Why?

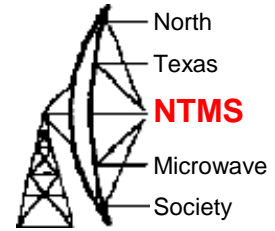
Why?



Away on work business and still want to play radio

Its winter and the rig is in the cold Garage

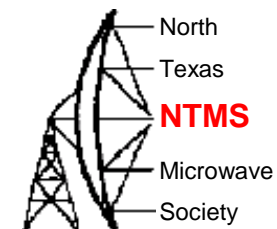
As a service to club members who cannot operate from home



First System

Remoterig

First system



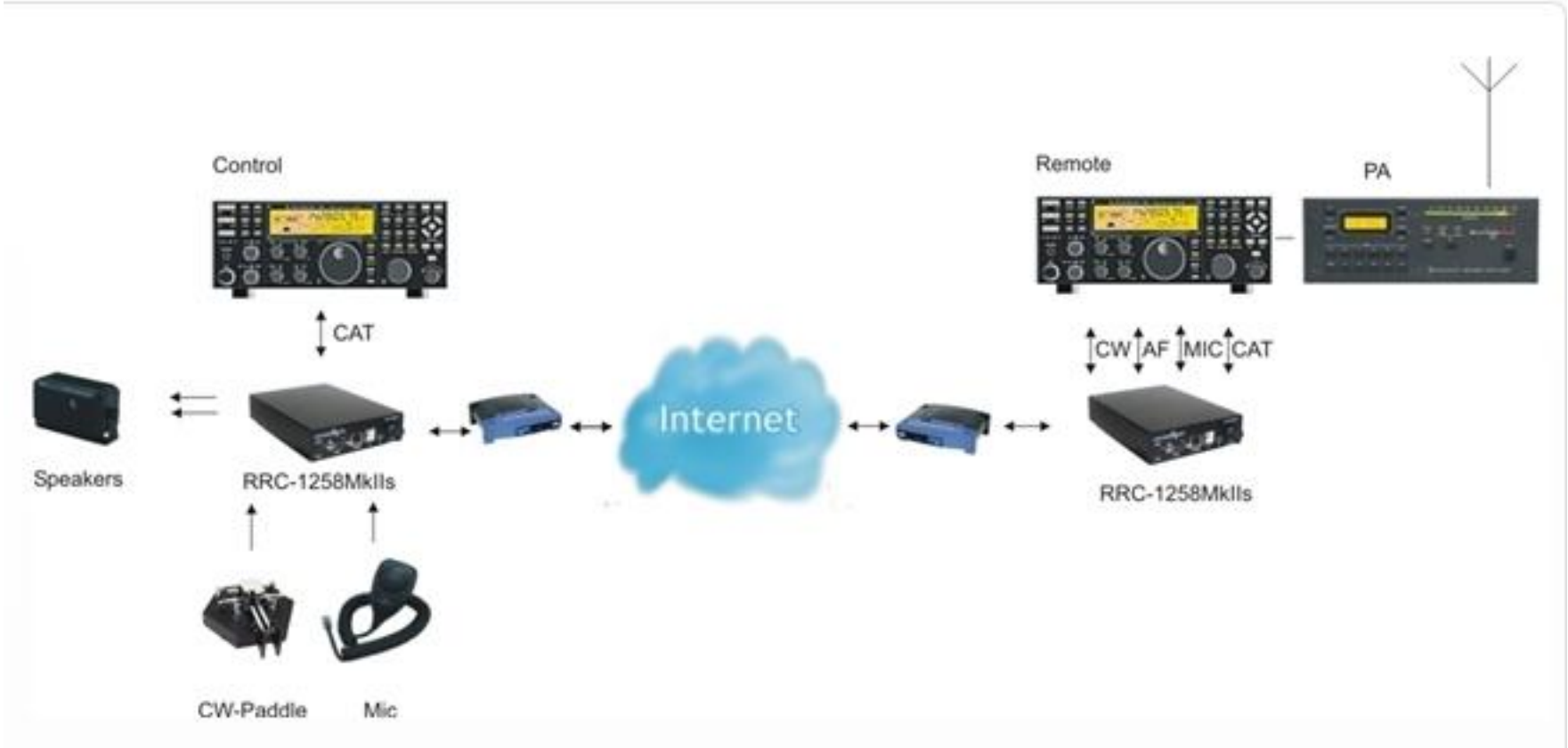
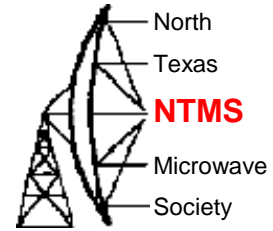
I needed a way of controlling the K3 G4FRE station in Malvern from the K3 WW2R station in Texas (and v.v.)

I saw the Remoterig system launched/ demonstrated at Hamcom 2012

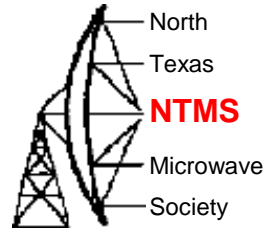
Bought two RRC-1258mkIIIs & Made my own cables \$500

Fiddly to set up but one K3 tracked the other accurately even though 4700 miles apart

Remoterig



Remoterig Results



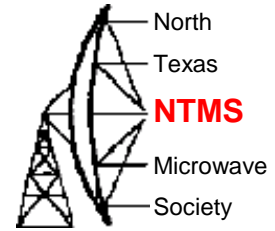
Interesting Results, examples:-

Monitoring the WW2R signal at G4FRE and v.v.

Running the Texas EME system in the cold Garage from the warm house

Comparing 477kHz signals from New England in USA and UK

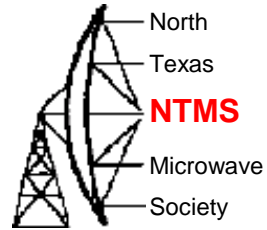
However, reliability was an issue so system was packed away



Second System

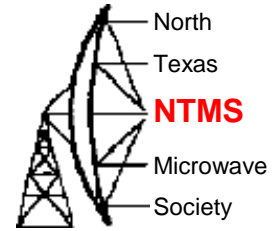
Ham Radio Deluxe

Second system



Used Two computers and HamRadio Deluxe /VAC/ Skype as presented at Martlesham Round table in 2009

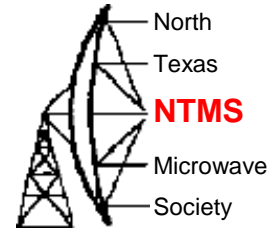
Very Basic system, had issues, especially latency of Skype (2-10seconds) and had reliability issues. Note HRD is no longer free



Third System

RCFORB

RCFORB



I was helping man the Elecraft Stand at Hamcom where they launched the K3/mini

It was setup remoting the KG6YPI K3 in CA using remotehams.com system from the K3/0 in Texas.

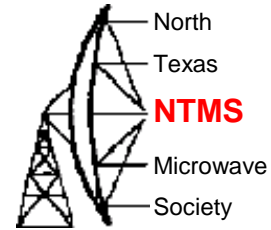
It was the ARRL VHF contest weekend, it was most interesting how the 6m signals in California changed relative to those in Texas

Then Eric WA6HHQ pointed out you could remote the K3 with just a computer, the K3/XX could be eliminated.

Got my attention!

(RCFORB: Radio Control Framework Online Remote Base)

RCFOrb Client



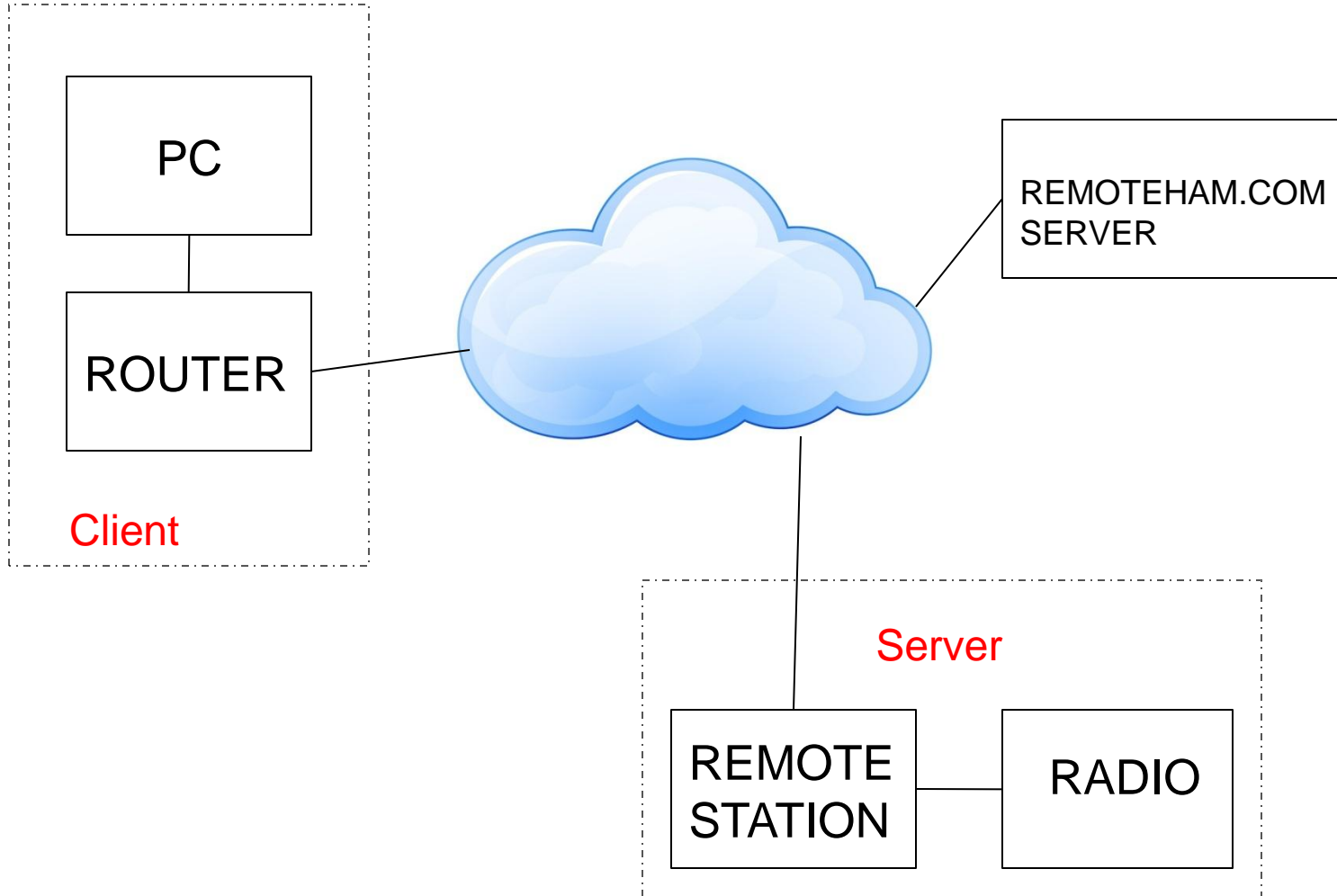
The remotehams setup uses a client and a server

I downloaded the client software from remotehams.com

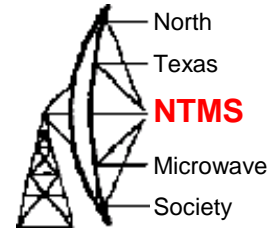
Installed without issues on my \$80 Dell laptop

I Used windows 7 32 bit

Software supports UPNP but my UK router ignored it, so had to manually adjust firewall settings



Web Page



RCForb (Online Remote Base) by RemoteHams.com

File Options * Upload Amateur Radio License * Skins Reserved Slots Windows

SPKR MIC Vol Mic Play VOX RX STBY TX De

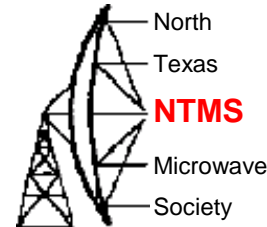
Lobby

Connect Search: Find Next Sync Auto Refresh Clubs: 49 TX: 74 Total Online

All Online Club Only Non-Club TX Capable RX Only Offline

Remote Name	Radio	TX	City	State	Country
HB9AZT-XK2900-Radiohill Bachtel	XK2900	<input checked="" type="checkbox"/>	Bachtel	Zurich	Switzerland
HB9AZT HB9EKK EK890	EK890	<input type="checkbox"/>	Reute	AR	Switzerland
Sample Radio ut5st	FT-840	<input type="checkbox"/>	Ivano-fran...	UR	Ukraine
-I GB3DC 2m Repeater. Derby, Derbyshire. U.K!-	Nokia BS...	<input checked="" type="checkbox"/>	Derby	Derby...	United Kingdom
-I G7NPW ICOM 706MKIlg. Derby, Derbyshire. U.K!-	Ic-706MKIlg	<input type="checkbox"/>	Derby	Derby...	United Kingdom
M3AHQ Yaesu FT-100Mk1 All Mode 160m - 6m General Coverage Receiver	FT-100	<input type="checkbox"/>	Hebburn	Tyne...	United Kingdom
DENZIL REMOTE	K3	<input type="checkbox"/>	Malvern	Worc...	United Kingdom
K7LEN FTdx1200	FTDX-1200	<input checked="" type="checkbox"/>	-Beavercr...	-OR	United States
****KJ4TN- FLEX-1500- BIRMINGHAM, AL- BANDS: 6-80 METERS- ANTENNA: OCF DIPOLE-All Hams and SWL are welcome	Flex 1500	<input checked="" type="checkbox"/>	Birmingha...	AL	United States
W7CK IC-7100 - (2m-50w) (40m-22w)	Ic-7100	<input checked="" type="checkbox"/>	Peoria	AZ	United States
W6RYO FT-100D	FT-100	<input checked="" type="checkbox"/>	Alta Loma	CA	United States
N6IJ Club Radio TS-480 Join the Club to use at www.n6ij.org	TS-480	<input checked="" type="checkbox"/>	Marina	CA	United States
KG6YPI LPRC-REMOTE	IC-2720H	<input checked="" type="checkbox"/>	Salinas	CA	United States
Volcano Radio	Ic-7600	<input checked="" type="checkbox"/>	Volcano	CA	United States

KJ4TN Alabama



****KJ4TN- FLEX-3000-BIRMINGHAM, AL- TRANSMIT ON: 10,12,15,17,20,40- Antenna: Loop***CW Ready****

File Options * Upload Amateur Radio License * Skins Reserved Slots Windows Help

SPKR MIC [Waveform] Vol [Slider] Mic [Slider] [Pause] [VOX] [RX] [STBY] [TX] Delay: 0.25s

Lobby ****KJ4TN- FLEX-3000-BIRMIN...

USB Mode Fast AGC Pre 2 Pre Amp ALC Tx Meter

4/23/2015 9:38:36 AM Uptime: 29m 37s 707ms Flex 3000

TOT: 180 seconds. 21.243.000 18.110.000

79 AGC-T 76 Drive 1.119 kHz Rx Filter 24 WPM CW Speed

TX Test ATU BYP ANF NR Mon Lock NB NBZ PWR Split Tx-A Tx-B A>B A<B

Control OP: * Remote Open *

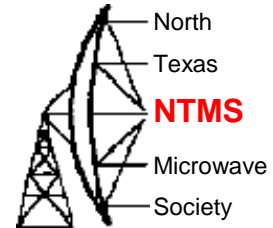
Chat Room [System | 4/23/2015 9:37:12 AM] IF LOCK IS ON, I AM USING THIS RADIO. Before Transmitting on each band: Click on ATU button. If it remains lit leave it on. It may switch to BYP button if not needed. The radio will choose what it needs to do. ALWAYS click on ATU button before transmitting. If it stays lit leave it lit. 73.....John 3:16 [g4fre | 4/23/2015 9:37:36 AM] May I tune the remote? [x] Notify on Ask To Tune [x] Do Not Clear Chat History Font Size 12 Type a message... CW DX Spots Memories Activity

Users: 1 g4fre Smilies Ask Send

XX9LT

Note latency is only 0.25 Secs

GW0FRE controlling G4FRE



DENZIL REMOTE

File Options * Upload Amateur Radio License * Skins Reserved Slots Windows Help

SPKR MIC Vol Mic Pause VOX RX STBY TX Delay: 0.27s

Num Pad Lobby DENZIL REMOTE

Number Pad
 MHz
 A B Both
 Freq. Format MHz
 1 2 3 C
 4 5 6 M
 7 8 9 R
 0 Enter
 Band Select
 Current Band 6M
 HAM Bands 6M
 SWL Bands
 AIR Bands

Mode USB
 Sub Mode USB
 Data Mode PSK
 Filter FL3
 Antenna Two
 AGC Slow
 Tx Mtr ALC

16/04/2015 16:30:03 Uptime: 5h 14m 43s K3
 TOT: 180 seconds.
 50.048.500
 50.200.000
 CW T RIT XIT SCL SUB SCL FL1 FL2 FL3 FL4 FL5 PLRY

1.5 kHz FC Shift
 2.8 kHz Filter Width
 24 WPM CW Speed
 250 RF Gain

TX ATU Tune
 M-Tune Stop A / B
 A > B Split RIT
 XIT Spot Test
 Pre ATT NR
 NB Notch VOX
 MD+ MD- Norm

0.1 k
 0.1 k

SpecJT by K1JT WSJT 10.0 r5046 by K1JT

Options Freq: 1510 DF: 240 (Hz) BW Speed: 1 2 3 4 5 H1 H2
 30 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500

15:28
 15:28
 15:27

FileID Sync dB DT DF W Time (s) Mon_150416_152900.WAV
 152700 0 -14 6.6 102 4
 152800 6 -18 1.3 -129 1 * GB3RAL IO91IN 1 0
 152900 0 -25 2.3 -3 8

16:30
 16/04/2015

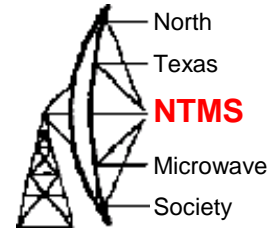
Beware if running WSJT on TX



Although I had no issues in the previous slide getting audio from the server and decoding it in WSJT, sending audio from WSJT on the client to use at the server never worked (ie could not be decoded by listeners) as it was so distorted

I ended up running wsjt software on the remote server machine via remote desktop

Client CW Tab



CW [Close]

Edit Macros | Your Callsign | DX Callsign | RST | Name | QTH | Grid

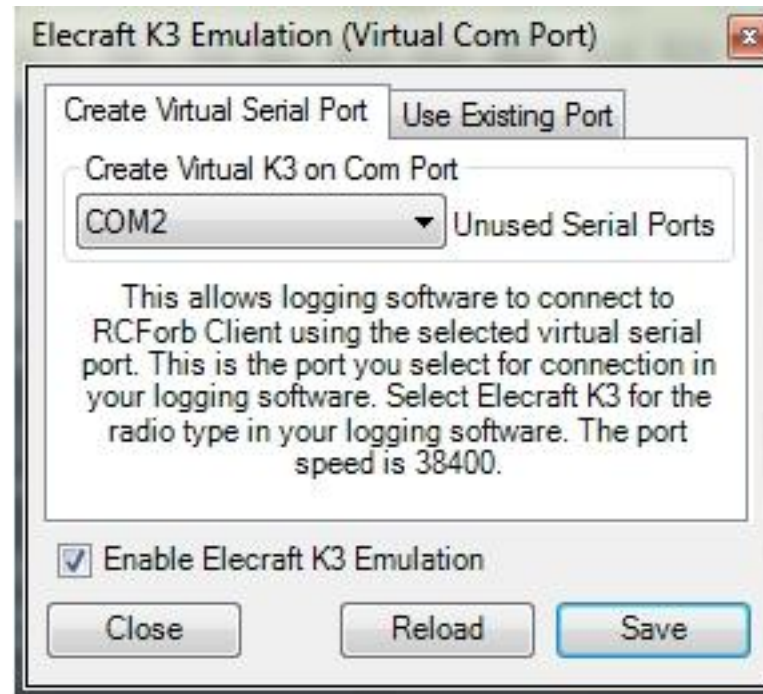
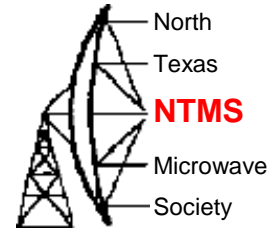
(KN +AR =BT %AS *SK #DE)

Receive	Sent
	In Queue

Font Size (Typing Delay in ms)

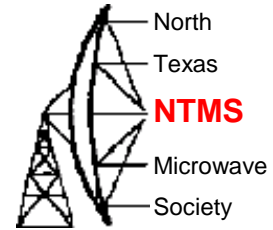
Paddle Config
Pitch
Weight
Sidetone Level

Client Virtual COM Port



Allows logging programs/WSPR-X/WSJT to virtually connect to the Remote Radio

Client Recent Connections



DENZIL REMOTE

File Options * Upload Amateur Radio License *

Recent Connections ▶

Disconnect

Saved Login

Forgot Password

Exit

-- History --

DENZIL REMOTE

****KJ4TN- FLEX-3000-BIRMINGHAM, AL- TRANSMIT ON: 10,12,15,17,20,40- Antenna: Loop***CW Ready****

****KJ4TN- FLEX-1500- BIRMINGHAM, AL- BANDS: 6-80 METERS- ANTENNA: OCF DIPOLE-All Hams and SWL are welcome

KY4JLS ICOM IC-7600

W6RYO FT-100D

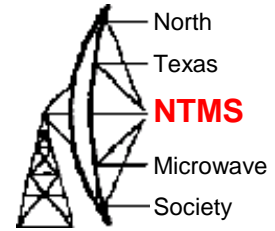
KG6YPI LPRC-REMOTE

N4GYN IC-7600

N7MF TS2000 Livingston, Mt

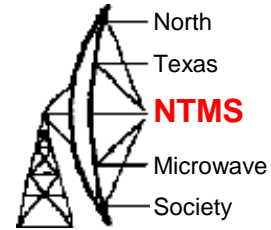
Steves TS-480 see: <http://www.mvhams.org/membership.html> for TX access

KJ5Y - #1 Spiderbeam NO LONGER rocks!



Server

Server



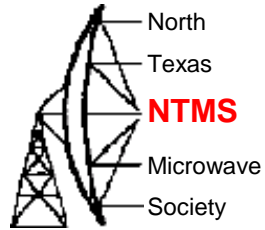
Having now got the Client under control, now time to commission the server

Downloaded the client software from remotehams.com

Installed without issues on my \$140 Acer laptop

My Laptop used windows 7 64 bit

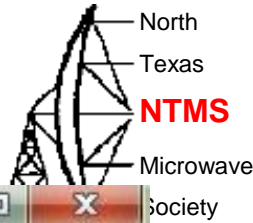
Server Programme Settings



You have a lot of control of what can and cannot be done:-

- Is server shown on remotehams.com?
- What controls are shown to users?
- Allowed Transmit Frequencies
- Allowed Received frequencies
- Transmit allowed by user/IP/MAC
- Users can be Banned!

Server Console



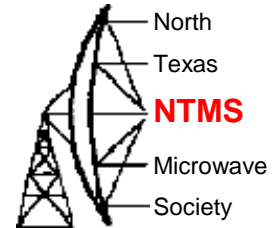
RCForb (Online Remote Base) by KG6YPI

File Options Help ...Donate

Console Chats Activity Memories Publishing

```
23/04/2015 21:00:06 | Info: Initializing...
23/04/2015 21:00:06 | Info: Starting...
23/04/2015 21:00:06 | Info: Connecting to Radio...
23/04/2015 21:00:06 | RCForb Server (Free)
23/04/2015 21:00:10 | Info: Radio (K3) Connected.
23/04/2015 21:00:10 | Info: Emulating K3 on virtual serial port: COM3
23/04/2015 21:00:10 | Info: Note, connect logging software to this port. Select Elecraft K3 as the radio type and 38400 for
the baud rate.
23/04/2015 21:00:10 | Info: Obtaining OrbId from RemoteHams.com...
23/04/2015 21:00:10 | Info: Received OrbId from RemoteHams.com
23/04/2015 21:00:10 | Info: Radio Server Running on 0.0.0.0:4527
23/04/2015 21:00:10 | Info: Using WaveOut.
23/04/2015 21:00:10 | Info: Speakers (TX Audio to Radio): Speakers (Realtek High Definiti
23/04/2015 21:00:10 | Info: Microphone (RX Audio from Radio): Microphone (Realtek High Defini
23/04/2015 21:00:10 | Info: VoipServer: SetDesiredMaxDelay: 700ms
23/04/2015 21:00:10 | Info: VoipServer started on 0.0.0.0:4524
23/04/2015 21:00:11 | Info: Flash policy server started on 0.0.0.0:843
23/04/2015 21:00:11 | Info: Searching for uPnP Compatible Router...
23/04/2015 21:00:42 | Synchronized with RemoteHams.com
```

Server:Server Settings



Global Server Configuration Wizard (Settings/server.xml)

Audio Settings | **Server Settings** | Publishing

Radio Server Settings

Radio Server Port

Basic Security

Require Login to Tune

Guests Not Allowed

Enforce "Ask To Tune" Policy

Enforce "Wait To Tune" Policy

Turn TX off when user disconnects

Enable "Reserved Slot" System

TOT Timer (Seconds)

Auto Restrict Remote to (Club, Tx, Admin)

HRD IP-Server Emulation

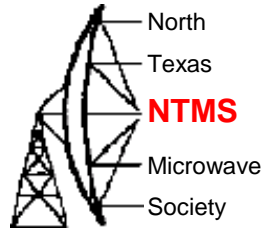
Emulate HRD Version

IP-Server Port (Default: 7809)

Client Idle Timeout in Hours
Any setting below 1 hour will disabled the timeout.

Close Restart Save and Close Save and Restart

Server:Publishing



Global Server Configuration Wizard (Settings/server.xml)

Audio Settings | Server Settings | Publishing

Visible on RemoteHams.com

Name of Remote: TX Allowed Club Mode Privacy From Guests

City: State or County:

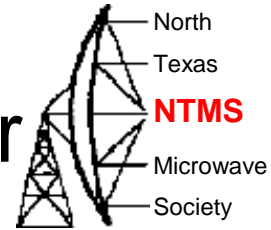
Country: Grid Square:

Domain (Optional): Custom ORB Page URL:

Welcome Message / Description

PopUp Message On User Connection

Server: Frequency & controls manager



Global Security Manager

Allowed RX Frequencies 7000000-7300000,10100000-10150000,14 Enabled ...

Allowed TX Frequencies 50000000-52000000,144000000-14600000 Enabled ...

Blocked Frequencies 26965000-27405000 Enabled ...

Blocked Features PWR Enabled ...

Allowed Buttons TX,ATU,Tune,M-Tune,Stop,A / B,A > B,Split,I None Get List ...

Allowed Dropdowns Mode,Sub Mode,Data Mode,Filter,AGC,Tx None Get List ...

Allowed Sliders FC Shift,Filter Width,CW Speed,RF Gain,Sub R None Get List ...

Allowed Messages None Get List ...

Allowed Statuses CWT,RIT,XIT,SQL,SUB SQL,FL1,FL2,FL3,F None Get List ...

Disable Remote on Local Radio Activity Disabled Duration (Seconds) 60

Enable User Level Permission for Other Devices (Amp, Rotator, Switch, etc.)

*** ADMINs BYPASS ALL SECURITY.
only assign yourself as admin.**

Import Export Cancel Save

HF Bands, 6m,4m,2m

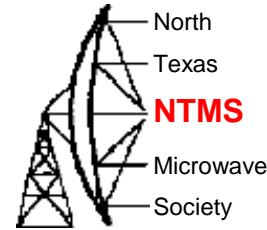
6m, 2m

CB

Power Switch

Users need permissions for AUX
Devices

Frequency & controls Examples



Set the Frequencies Receiver is Allowed

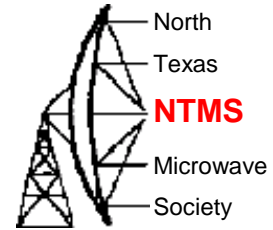
Set the Frequencies Transmitter Allowed

Disable the K3 Volume Control... It controls the server Volume, not the client Volume

Disable the Power Button. On a K3 you can turn off through software but not turn it back on (without external circuitry hanging off acc/rs232 connectors)

Disable the Antenna button to stop users selecting wrong antenna

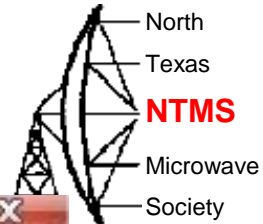
Server:TX Manager



TX Manager

Waiting Approval (1)	Refresh	Users Allowed to Transmit (3) m3ahq g4hup ww2r
	Verify Lic.	
	Approve	
	Deny	
	Users...	
Denied (0)	Remove	

Server:IP Management



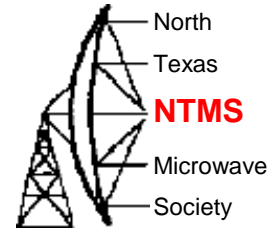
IP Manager

Search Field: ip Search By: LIKE Search Text: * Order By Field: ip Order: DESC Limit: 100 Search

ip	hits	lasthit	admin	cantx	banned
96.232.163.149	1	2015-01-04 14:31:24 +00:00	0	0	0
95.93.76.214	1	2015-01-26 16:09:28 +00:00	0	0	0
95.60.217.127	2	2015-02-01 11:08:17 +00:00	0	0	0
95.252.205.116	1	2015-01-06 18:35:00 +00:00	0	0	0
95.150.72.12	4	2015-04-19 10:19:55 +01:00	0	0	0
95.149.162.91	3	2015-01-08 21:23:28 +00:00	0	0	0
95.122.169.70	1	2015-01-26 15:09:27 +00:00	0	0	0
95.114.203.113	1	2015-01-26 18:19:17 +00:00	0	0	0
94.19.64.154	5	2015-04-17 16:17:38 +01:00	0	0	0
93.77.154.173	2	2015-04-16 14:35:11 +01:00	0	0	0
93.200.114.55	1	2015-01-06 14:54:23 +00:00	0	0	0

Buttons: Add, Edit, Delete, Import, Export

Server:Users



User Manager

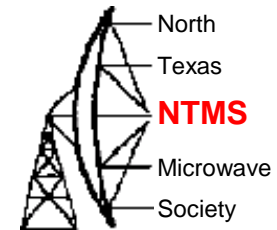
Search Field: name | Search By: LIKE | Search Text: * | Order By Field: lastlogin | Order: DESC | Limit: 100 | Search

name	ip	logins	lastlogin	admin	cantx
aa7v	67.1.85.90	1	2015-04-19 17:58:05 +01:00	0	0
m1g33	178.68.64.213	1	2015-04-19 17:14:52 +01:00	0	0
m3ahq	92.238.68.42	9	2015-04-19 16:50:40 +01:00	0	1
df3iax	84.57.198.88	2	2015-04-19 14:49:09 +01:00	0	0
2w1sww	95.150.72.12	8	2015-04-19 10:19:56 +01:00	0	0
a827apeuser	67.175.236.60	12	2015-04-18 21:25:27 +01:00	0	0
alan1swl	2.26.61.34	5	2015-04-18 12:55:44 +01:00	0	0
sv1coa	85.74.24.185	1	2015-04-17 17:29:59 +01:00	0	0
n2rxz	69.207.98.245	6	2015-04-17 15:13:19 +01:00	0	0
sibirjac	94.19.64.154	1	2015-04-17 10:14:25 +01:00	0	0
...

Buttons: Add, Edit, Delete, Import, Export

Page: 1 | 72 results in 1 page.

Server:Memories

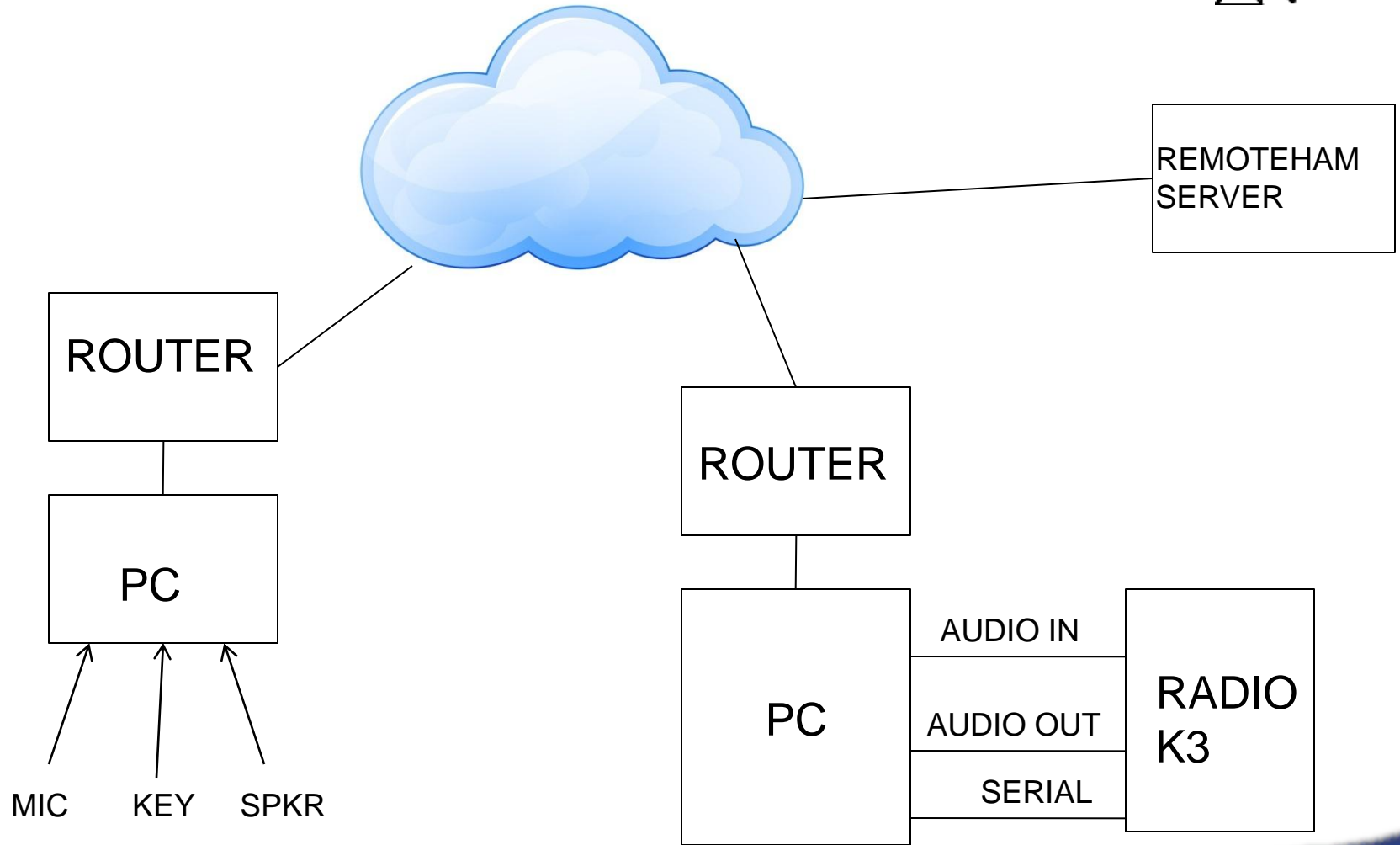
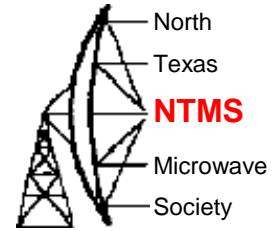


Memories

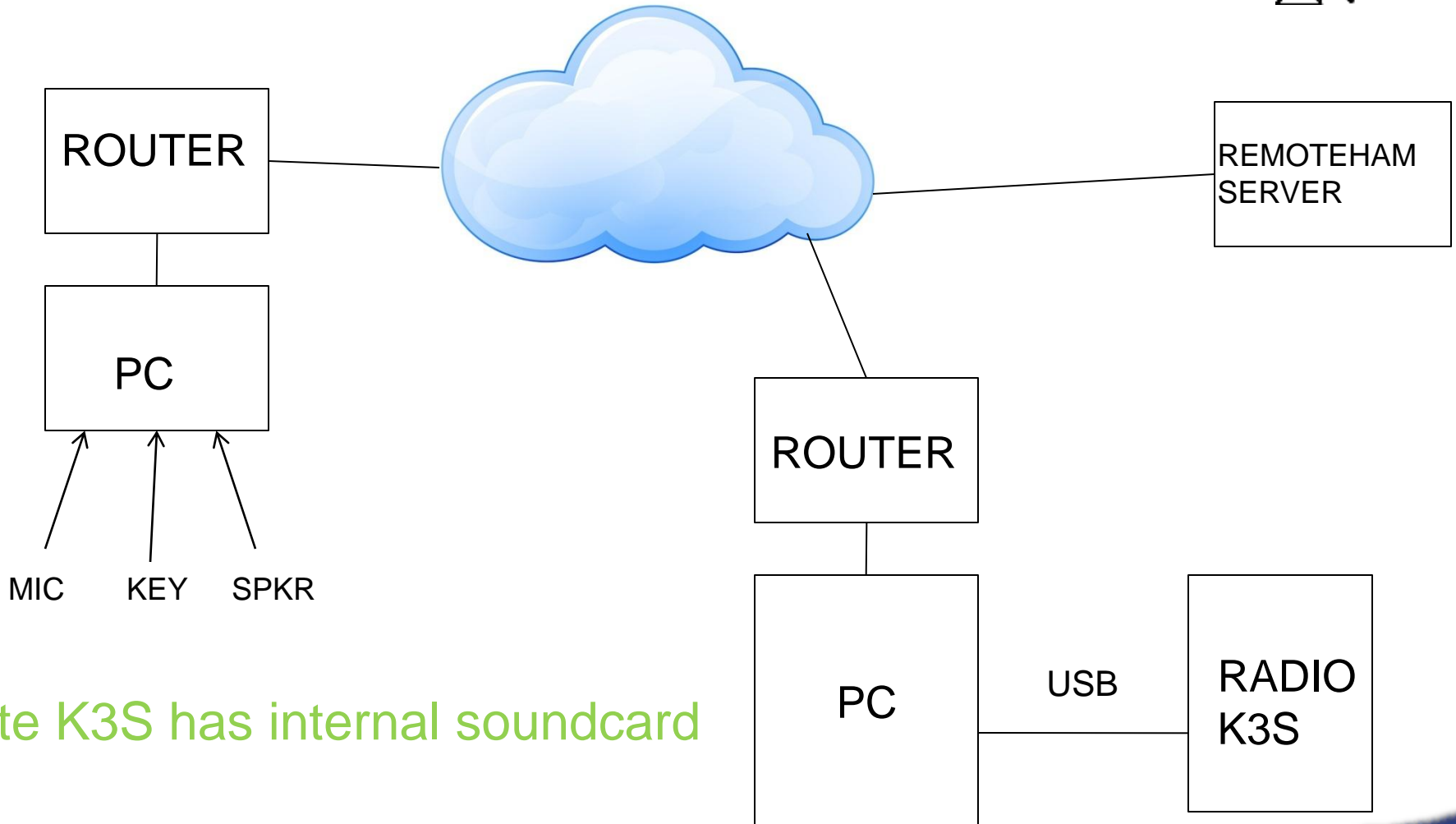
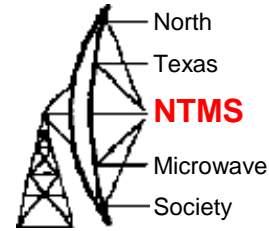
Memories ▾ Remote Frequency/Mode ▾ Copy to Local Database

Name	Info	Freq (MHz)	MD
GB3RAL	6M BEACON	50.0485	USB
6m SSB	6m CQ FREQUENCY	50.125	USB
▶ 2m SSB	2m CQ FREQUENCY	144.3	USB
ON0VHF PI7CIS	2M BEACON	144.4145	USB
GB3VHF	2M BEACON	144.4285	USB
oz7gy	2m Beacon	144.4702	USB

Control K3 with PC

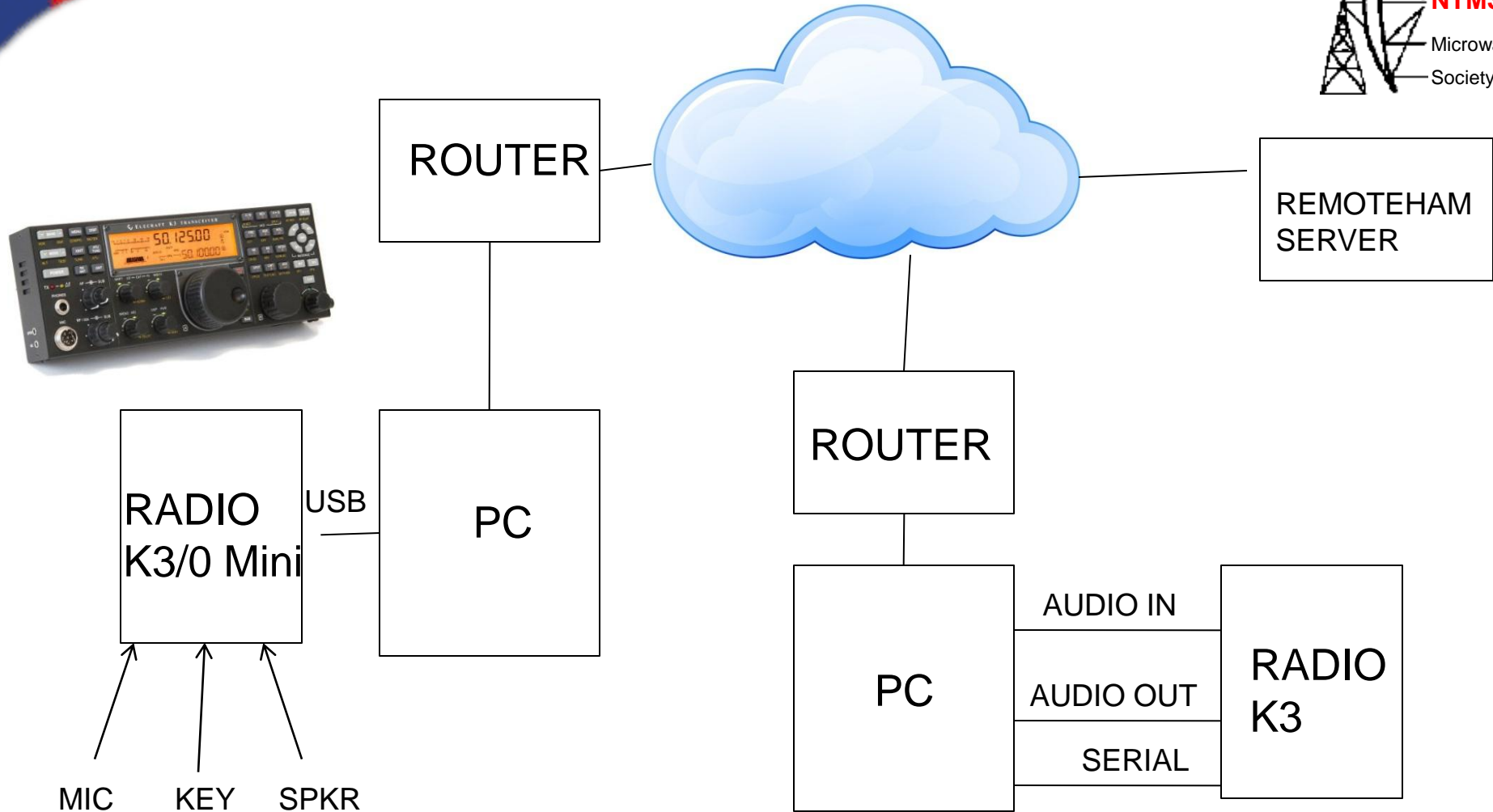
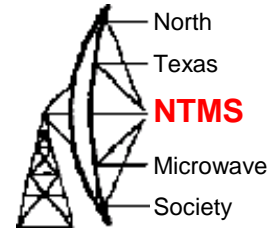


Control K3S with PC



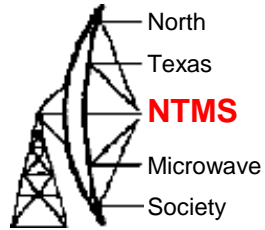
Note K3S has internal soundcard

Control K3 with K3/0 Mini



Note K3/0 mini has internal soundcard

IP Issues



Can be an issue if your global IP changes

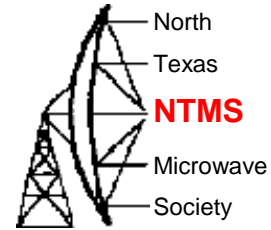
Use Dynamic DNS Service

I subscribe to no-ip service (\$15 p.a.)

To the internet, my router will appear as say
ww2r.myvnc.com

My UK router automatically updates the DNS service
with the current IP

Router Dynamic DNS Service



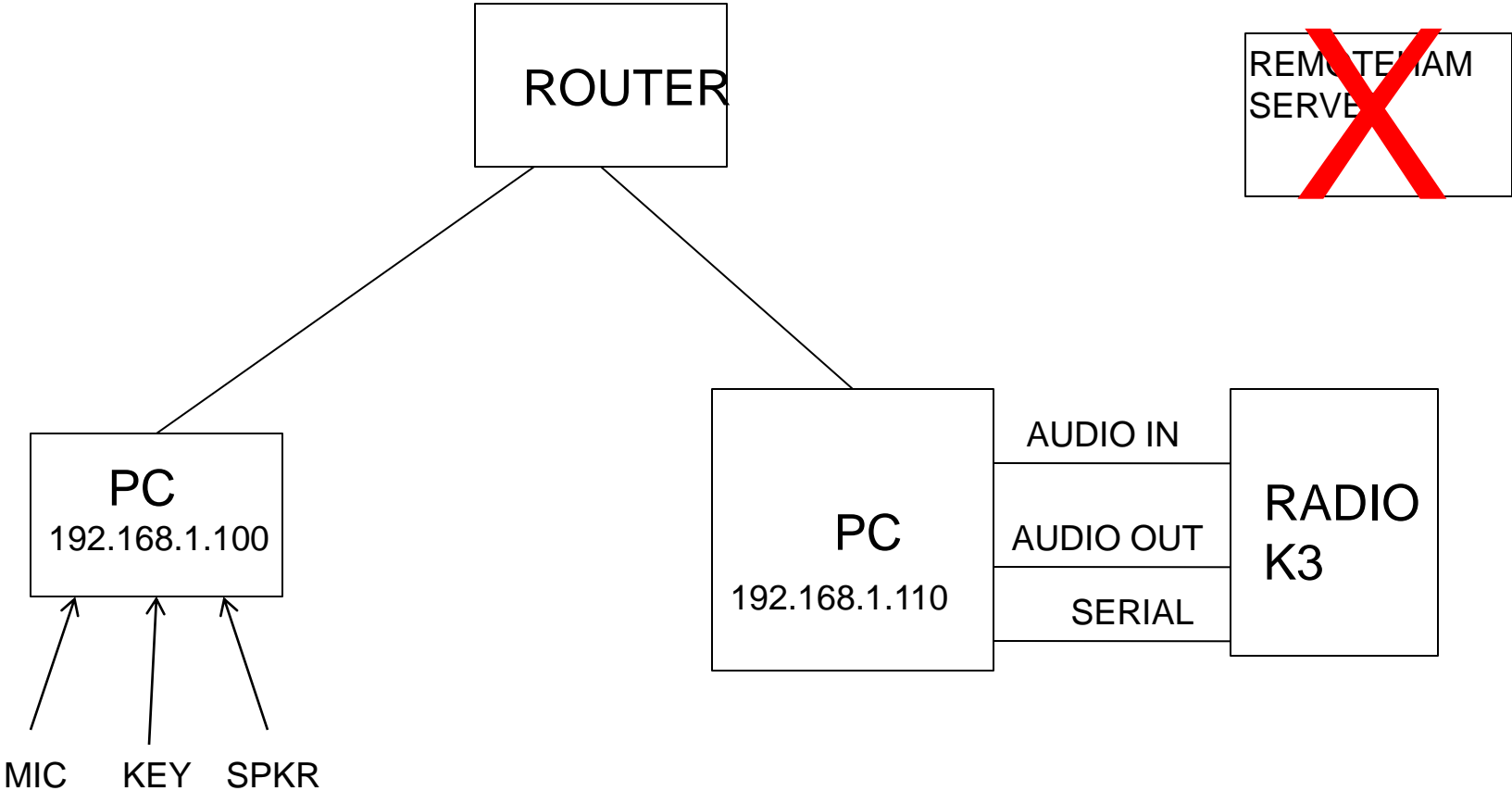
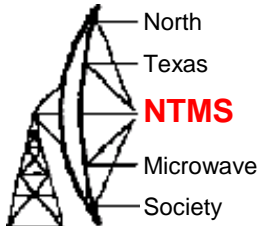
Dynamic DNS Service

Dynamic DNS can be used to point a fixed host name (e.g host.a-domain.com) to the public (or WAN) IP address assigned by your Internet Service Provider (typically a dynamic IP address). This allows servers located on your Local Network (configured using Game & Application Sharing) to be accessible using this alias rather than the IP address assigned by your Internet Service Provider.

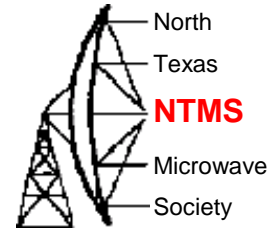
► Configuration

Use DynDNS:	Yes
Internet Service:	Internet
Username:	g4fre@g4fre.com
Password:	*****
IP address:	146.199.117.208
Dynamic DNS service:	No-IP
Hostname:	denzil.myvnc.com (Update successful)

Intranet Control

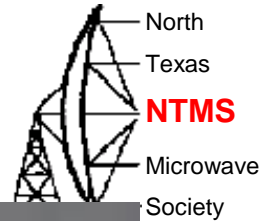


System can be setup without external visibility



Server Accesories

Server:Other Devices



Radio Configuration Wizard (Settings/radio.xml)

Remote Type | Radio Connection | PTT & CW Keying | **Other Devices**

Amp Support

Amplifier Enabled

Acom2000 Select Driver

38400 Serial Rate

COM1 Serial (COM) Port

Auto-Track Radio Frequency

Switch Support (Relay Boards)

Switch Enabled

AB6Z Select Driver

9600 Serial Rate

COM1 Serial (COM) Port

Custom Names

* Comma Separated List *
Ex: ANT1,ANT2,ANT3,AMP
(Leave blank to use default names)

Auto Track Radio Frequency

Rotator Support

Rotator Enabled

AlphaSpidRAK Select Driver

4800 Serial Rate

COM1 Serial (COM) Port

Offset

Offset must be in range (-179 to 180)
(Leave blank for default)

10 Set Bearing Delay (Seconds)

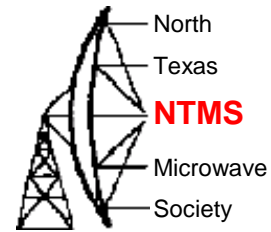
Delay before allowing another
set bearing command.

Cancel

Preview Config

Save and Restart

Server: Other Devices Currently Available



Amplifiers

Acom2000

Alpha87

DualKPA500

Expert2K

KPA500

Switches

AB6Z

ADR2200

COMSWITCH

KAT500

KMTRONIC

KMTRONIC_IND

Rotators

AlphaSpidRAK

DCU1

GS232A/B

RC2800

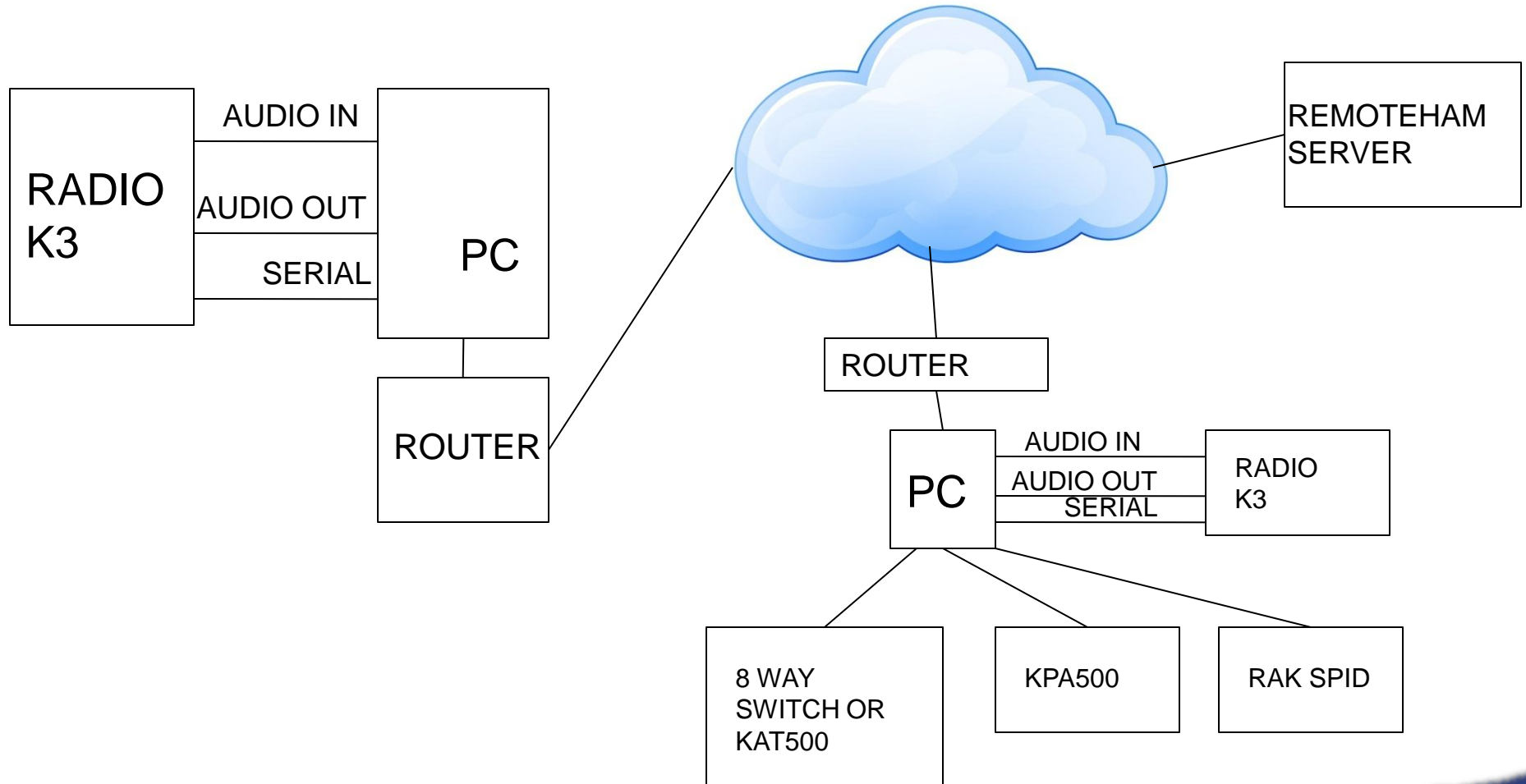
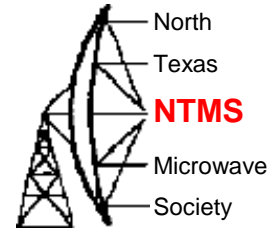
Other Switching

KMTRONIC 8 WAY USB SWITCH

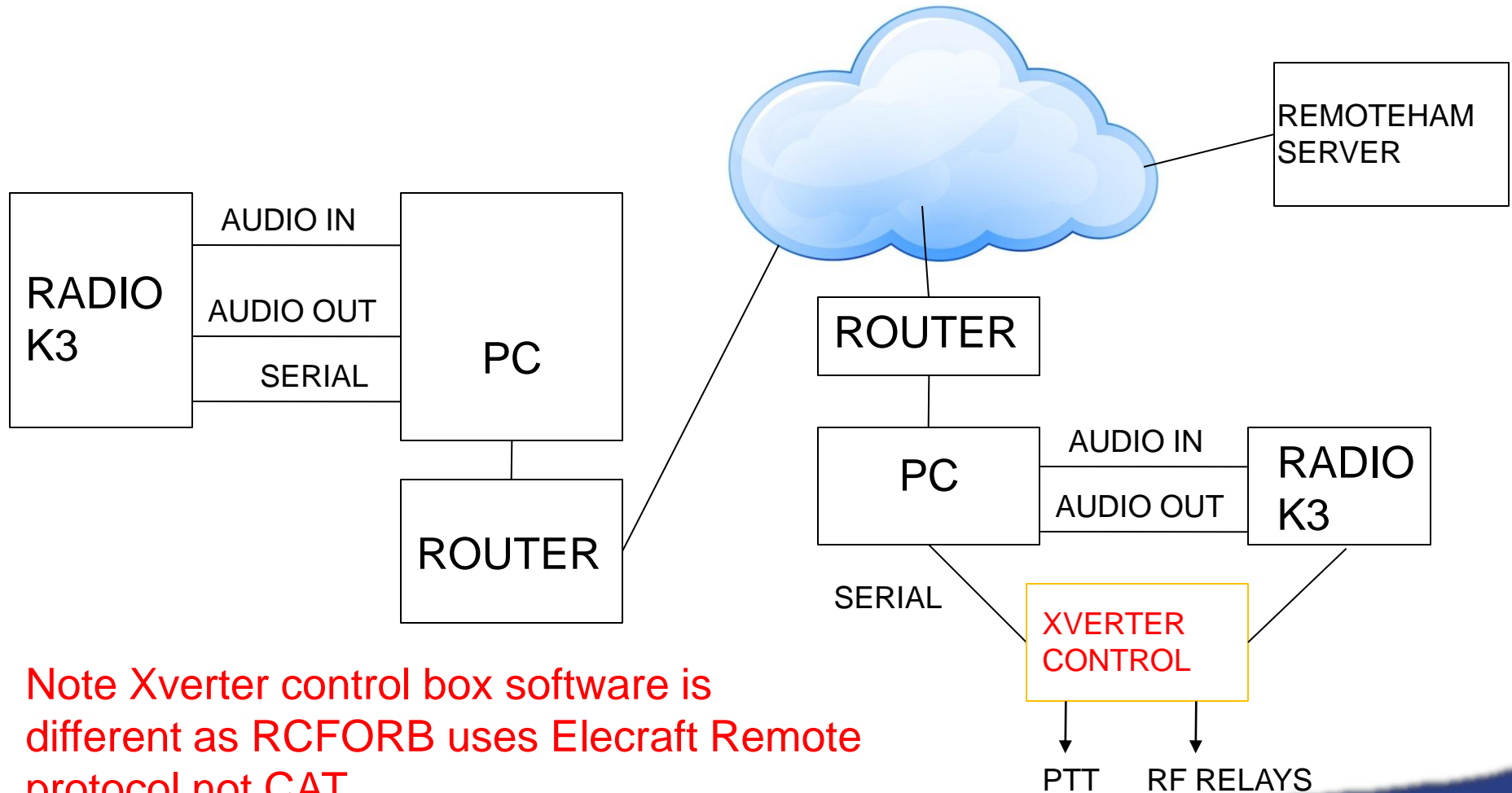
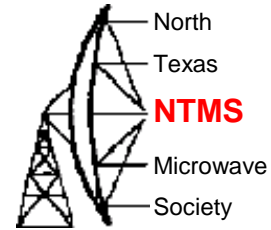


Allows Xverter/VHF/uW PA control through Server USB port

Fully Loaded system

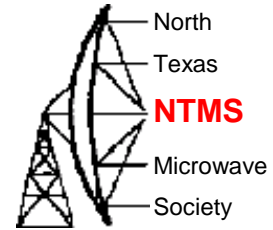


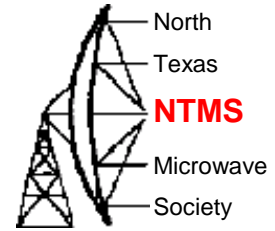
Transverter Control



Note Xverter control box software is different as RCFORB uses Elecraft Remote protocol not CAT

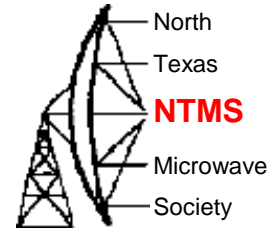
Transverter Control Box



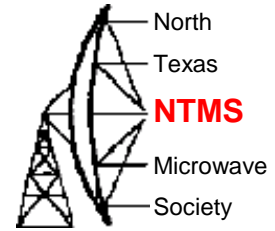


Other Supported Radios

Large Selection of Supported Radios

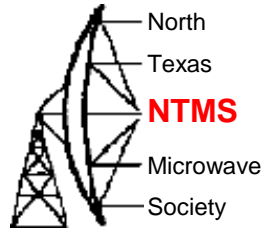


Tested with TS2000, IC706mkIIg, FT817, ANAN-10 and TS450. You can see many more in use on web page



Client Accessories

ORB Controller



(Front View)



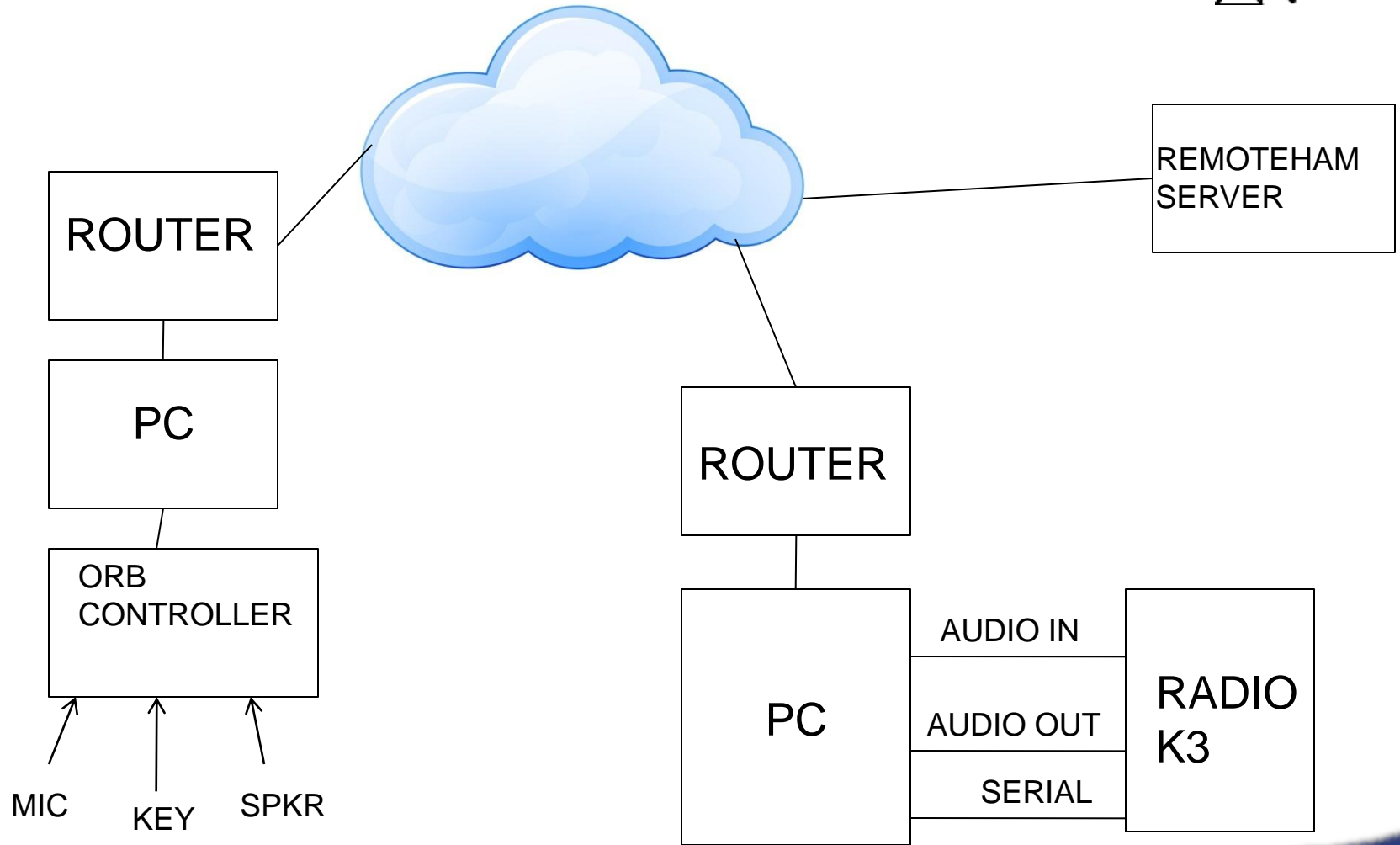
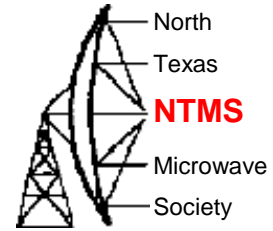
(Rear View)

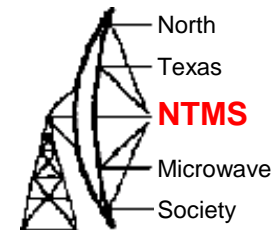
Connects to PC via USB

Contains Soundcard

Can use K3 microphone with PTT,
Headset, keying paddle

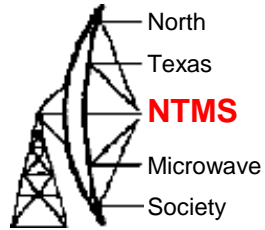
ORB Controller Setup





Remote Powerup

Remote Startup



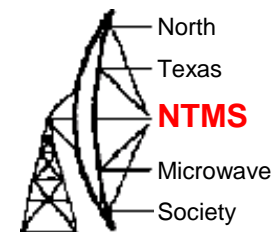
Don't want to leave computer and Radio powered up all the time so how do you powerup them remotely?

Initially used wakeup on LAN. Unreliable with sky router

Inspired by what is used for OZ7IGY Service Management.

Found a \$40 GPRS Arduino Shield So can activate computer and radio via text messages and has audio in and out





Android App

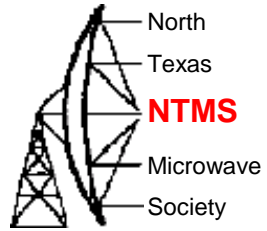
Android App

No longer need a PC, can use a Tablet

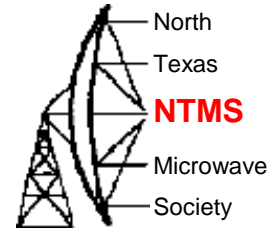
I use a NEXUS 7

Has All the same features as the PC Client

Available from Google Play for \$9.99



More Information



- Remoterig: http://www.remoterig.com/wp/?page_id=995
- Remotehams: <http://www.remotehams.com/>
- Remotehams download: <http://download.remotehams.com/>
- RCFORB: <http://www.remotehams.com/orb-control-device.html>
- 8 Way USB Relay <http://www.kmtronic.com/>
- K3 Transverter controller: http://g4fre.com/K3_RS232_UK.htm
- OZ7IGY Service Management: <http://rudius.net/oz2m/ngnb/management.htm>