

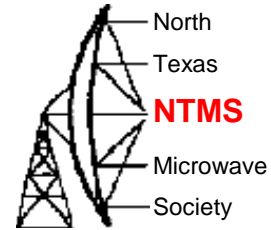
# WSJT-X Version 2 What's New

By

Wes Atchison

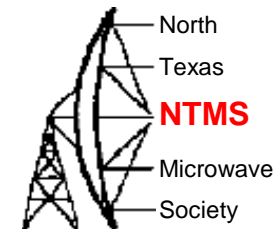
WA5TKU

# History



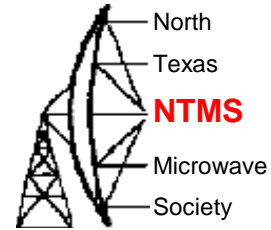
- FT8 first introduced after June VHF contest 2017
- JT65 found to be too slow for signal variations of Eskip
  - Lots of incomplete QSO's
  - 60 second sequences did not handle signal fades well
  - QSO Length 4 to 5 Minutes or more
- FT8 adopted by HF and VHF ops rapidly
  - 15 second sequences handles signal fades well
  - QSO Length 1 minute or greater depending on band conditions

# Compatibility

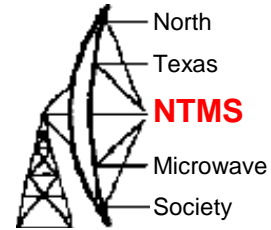


- **WSJT-X v2.0.0**
  - <https://physics.princeton.edu/pulsar/k1jt/wsjt.html>
- The FT8 and MSK144 protocols have been enhanced in a way that is not backward compatible with older program versions. The new protocols become the world-wide standards starting on December 10, 2018, and all users should upgrade to *WSJT-X 2.0* by January 1, 2019. After that date, only the new FT8 and MSK144 should be used on the air.
- Actual Release Date was December 10, 2018

# Changes



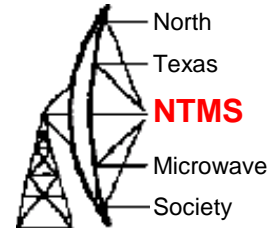
- New FT8 and MSK144 protocols with 77-bit payloads permit these enhancements:
  - Optimized contest messages for NA VHF, EU VHF, Field Day, RTTY Roundup
  - Full support for "/R" and "/P" calls in relevant contests
- New logging features for contesting
- Integration with [N1MM Logger+](#) and [Writelog](#) for contesting
- Improved support for compound and nonstandard callsigns



# Changes

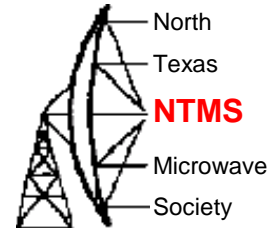
- Nearly equal (or better) sensitivity compared to old protocols
- Lower false decode rates
- Improved color highlighting of received messages
- Improved WSPR sensitivity
- Expanded and improved UDP messages sent to companion programs
- Bug fixes and other minor tweaks to user interface

# System Requirements



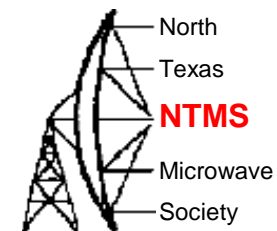
- Computer running Windows (XP or later), Linux, or OS X
- 1.5 GHz or faster CPU and 200 MB of available memory; faster machines are better – **Recommend Lots More Memory**
- Monitor with at least 1024 x 780 resolution
- Computer-to-radio interface using a serial port or equivalent USB device for T/R switching, or CAT control, or VOX, as required for your radio-to-computer connections
- Audio input and output devices supported by the operating system and configured for sample rate 48000 Hz, 16 bits
- Audio or equivalent USB connections between transceiver and computer
- **A means for synchronizing the computer clock to UTC within  $\pm 1$  second**

# Equipment Requirements



- SSB Radio in USB mode
  - As Needed a Transverter
- PC with Sound Card or Dongle
- PC Clock Adjusted to +/-1 Second
- Radio/PC Interface
  - Isolated Ground Between Radio & PC
  - PC Controlled PTT
  - Adjustable RX and TX Audio Levels Best

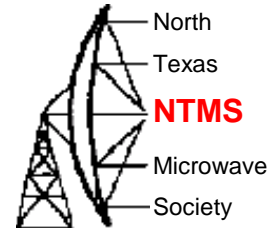
# Equipment Requirements



- Radio Frequency Stability
  - G4WJS – WSJT Yahoo Group
    - FT-8 - <4 Hz/Minute –WSJT Yahoo Group
  - K1JT - EMail
- FT8: Tone spacing is 6.25 Hz, and transmission length is 12.6 s. Drift in excess of ~3 Hz during a transmission will degrade decoding.
- Accuracy of frequency readout is not particularly important.
- MSK144: Drift is not generally a problem, since we're decoding meteor-enhanced signals that last no more than a second or so. Accuracy of dial frequency is important, however. The receiving software is looking for a coherently decodable signal centered at audio frequency 1500 Hz, with maximum search range +/- 200 Hz. Thus your USB "dial frequency" must be correct to within that tolerance.

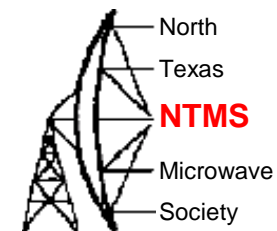


# Time Sync



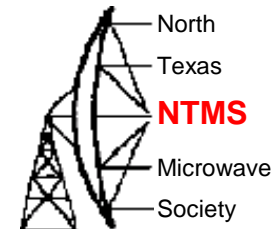
- Dimension 4 v5.3
  - <http://www.thinkman.com/dimension4/>
- Meinberg NTP Software
  - <https://www.meinbergglobal.com/english/sw/ntp.htm>
- BktTimeSync
  - <https://www.maniaradio.it/en/bkttimesync.html>
  - **Caution BktTimeSync uses Com1 Port**
- Have used all 3

# FT8

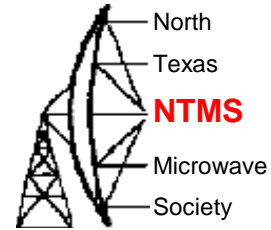


- Adopted by HF Operators
  - Very Popular All Bands See Frequencies List In Setup Page
- VHF Operation
  - 6 and 2 Meters (50.313 and 144.174)
  - Works Great for Eskip and Tropo Scatter
  - Meteors Play Havoc With Decodes

# Typical 20 Meter FT8

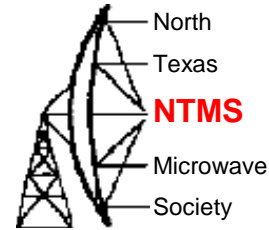


# FT8



- Power
  - FT8 has opened up DX to 100 watt stations
- Antenna
  - FT8 opened up new world for small antenna system station

# FT8



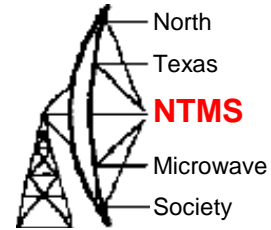
The screenshot displays a Windows desktop environment with several software windows open:

- WSJT-X v1.8.1047:** The main interface for FT8 operation. It shows a 'General Logging' window with a table of contacts:
 

| Band | Mode | Time | Call | Report | Dist |
|------|------|------|------|--------|------|
| 10   | FT8  | 2144 | NJ3G | 599    | NJ   |

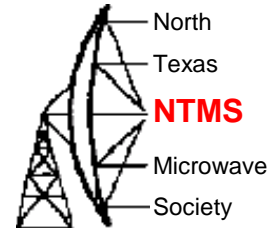
 The main window shows a frequency of 50.313000 MHz and a time of 21:44:42.
- Log Viewer:** A window displaying a list of contacts with columns for UTC Date, Display Log, and Test Log. The current date is 2019-02-01.
- Waterfall Display:** A large window showing a spectrogram of the FT8 signal. The frequency axis ranges from 4800 to 5200 kHz, and the time axis shows the current session. The signal is clearly visible as a series of horizontal lines.
- System Tray:** Shows the system clock as 3:44 PM on 2/1/2019.

# MSK144



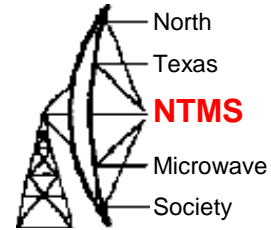
- Meteor Scatter
  - 6 and 2 Meters (50.260 & 144.150)
  - Works Will with Eskip and Tropo Scatter Mixed with Meteors
  - US Convention Western Station Uses 1<sup>ST</sup> Sequence

# MSK144



- Power
  - 6 Meters
    - Common for stations to use 100 watts or less
    - Have worked 25 watts stations
    - Rocks Determine Contact more than power
  - 2 Meter
    - Power is better
    - Rock Pings shorter and fewer than 6 Meters
      - Estimate 10% or Less

# Antenna



- **6 Meters**

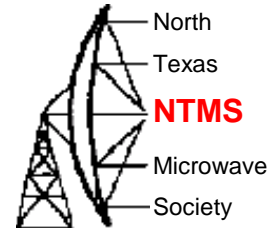
- Small antennas work best – Wide Beamwidth
  - 3 to 5 elements
  - Aiming less critical
  - Lots of Rocks and longer bursts
  - Fraction of Second to Full 15 second sequence

- **2 Meters**

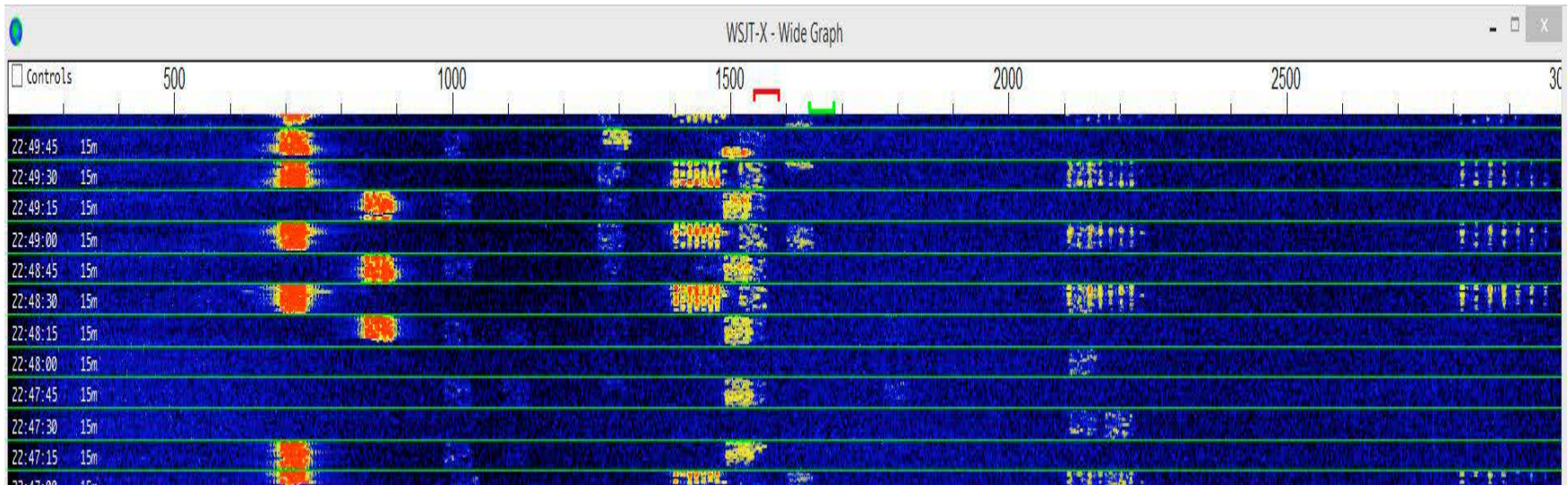
- Trade off between gain and Beamwidth
  - Fewer Rocks and short Bursts
  - <250 ms not uncommon



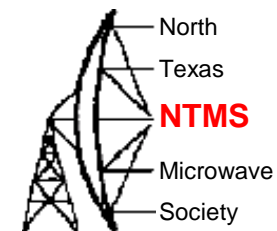
# Transmitter Adjustment



- **Set the transmit levels so the entire chain from AF generation through to RF transmission is operating linearly.**

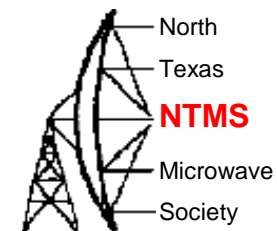


# Transmitter Adjustment



- If you are routing transmit audio from the sound card to the front-panel microphone input on the rig, be sure to turn off the radio's speech processor and any audio shaping/profiling when using digimodes to avoid distorting your signal. Radios with a rear-panel line-level input especially for digimodes, or a special 'data' mode that automatically disables the processing (such as the K3), tend not to suffer issue.  
*[Thanks for the tip Joe W4TV]*

# Mode Information



**Table 1: Parameters of the Slow *WSJT-X* Protocols**

**Bandwidths (BW) are for the narrowest submodes. S/N threshold is referenced to a 2,500 Hz bandwidth at a 50% probability for decoding of an unfading signal.**

| Mode  | FEC type (n,k) | q m  | Modulation | Keying rate, baud | BW, Hz | Sync energy, fraction | TX duration, s | S/N threshold, dB |
|-------|----------------|------|------------|-------------------|--------|-----------------------|----------------|-------------------|
| FT8   | LDPC(174,87)   | 1 3  | 8-FSK      | 6.250             | 50.0   | 0.27                  | 12.6           | -20               |
| JT4   | C(206,72)      | 1 2  | 4-FSK      | 4.375             | 17.5   | 0.50                  | 47.1           | -23               |
| JT9   | C(206,72)      | 1 3# | 9-FSK      | 1.736             | 15.6   | 0.19                  | 49.0           | -27               |
| JT65  | RS(63,12)      | 6 6# | 65-FSK     | 2.692             | 177.6  | 0.50                  | 46.8           | -25               |
| QRA64 | QRA(63,12)     | 6 6  | 64-FSK     | 1.736             | 111.1  | 0.25                  | 48.4           | -26               |
| WSPR  | C(162,50)      | 1 2  | 4-FSK      | 1.465             | 5.9    | 0.50                  | 110.6          | -28               |

#Modulation includes one additional tone used for synchronization.

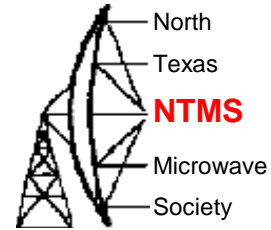
**Table 2: Parameters of the Fast *WSJT-X* Protocols**

**MSK144-Sh is the optional short-message format in the MSK144 protocol.**

| Mode      | FEC type (n,k) | q m  | Mod    | Keying rate, baud | BW, Hz | Sync energy | Message duration, s |
|-----------|----------------|------|--------|-------------------|--------|-------------|---------------------|
| ISCAT-A   | —              | —    | 42-FSK | 21.5              | 905    | 0.17        | 1.176               |
| ISCAT-B   | —              | —    | 42-FSK | 43.1              | 1,809  | 0.17        | 0.588               |
| JT9E      | C(206,72)      | 1 3# | 9-FSK  | 25                | 225    | 0.19        | 3.400               |
| JT9F      | C(206,72)      | 1 3# | 9-FSK  | 50                | 450    | 0.19        | 1.700               |
| JT9G      | C(206,72)      | 1 3# | 9-FSK  | 100               | 900    | 0.19        | 0.850               |
| JT9H      | C(206,72)      | 1 3# | 9-FSK  | 200               | 1,800  | 0.19        | 0.425               |
| MSK144    | LDPC(128,80)   | 1 1  | OQPSK  | 2,000             | 2,400  | 0.11        | 0.072               |
| MSK144-Sh | LDPC(32,16)    | 1 1  | OQPSK  | 2,000             | 2,400  | 0.20        | 0.020               |

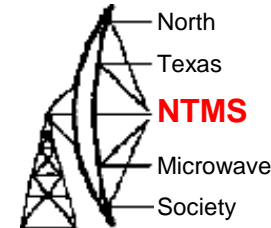
#Modulation includes one additional tone used for synchronization.

# Useful Tools



- Ping Jockey Central  
<http://www.pingjockey.net/cgi-bin/pingtalk>
- PJClient
  - <http://www.n5tm.com/pjclient-quick-start-guide/>
- Virgo
  - <http://dl1dbc.net/Meteorscatter/>
- DXMaps
  - <https://www.dxmaps.com/spots/mapg.php?Lan=&Frec=50&ML=&Map=NA&HF=&DXC=ING2&GL=>
- ON4TSKChat
  - <http://www.on4kst.org/chat/login.php>

# Ping Jockey Central



Internet Explorer browser window showing the Ping Jockey Central website.

Address bar: <http://www.pingjockey.net/cgi-bin/pingtalk>

Page Title: Ping Jockey Central by N0UK

Navigation: File Edit View Favorites Tools Help

Search: Google Search More >>

Tools: Suggested Sites Web Slice Gallery Page Safety Tools

## Ping Jockey Central.

|                                     |   |  |                                    |
|-------------------------------------|---|--|------------------------------------|
| <a href="#">Relief page</a>         | <a href="#">Skeds in-progress</a>       | <a href="#">CQ Announcements</a>           | <a href="#">JT65 Link</a>          |
| <a href="#">Refresh</a>             | <a href="#">Look back</a>               | <a href="#">Distance/Bearing Locator</a>   | <a href="#">Who's Earwiggling?</a> |
| <a href="#">Update User details</a> | <a href="#">AAIYN Callsign database</a> | *** UNREGISTERED USER - POSTS DISABLED *** |                                    |
|                                     |   |  | Refreshed 26Jan 17:03              |

Due to recent abuse of this system, you will be unable to post any messages until you complete the [User Details](#) page  
 This page is to be used only for the purposes of discussing matters related to amateur radio meteor scatter communications. Any non-meteor scatter use is strictly prohibited.

That means **DO NOT USE THIS PAGE TO WORK JT65 or for General chat-chat.**

Remember, in North America, 50.260MHz and 144.140MHz are calling not operating frequencies.

Exchanging any contact details on here [before](#) you're complete, invalidates the contact, and, if it's not HIGH-SPEED METEOR SCATTER, it doesn't belong here!

---

To have your callsign and locator automatically appended to each message that you send, an html cookie can be stored by your web browser.  
 The information that is stored in the cookie is your callsign, firstname, and Maidenhead grid locator.  
 To enable this feature, please press the "Update User details" button shown above.

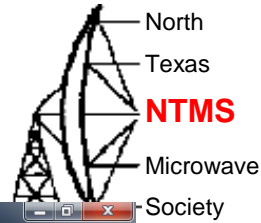
---

Enter your message here

```

DDMMM UTC
26Jan 16:56 bbl (NSOSK/6/2 Jerry ok EM25fi 174.32.161.16)
26Jan 16:46 QRT OFF CHAT (K9VSW/DESERT Mike NM DM76el 216.158.248.88)
26Jan 16:46 Tnx Mike...164530 0 7.3 1501 & WSLDA K9VSW 73 (WSLDA Larry OK EM15xu 192.169.27.149)
26Jan 16:46 164545 8 4.8 1508 & K9VSW WSLDA 73 Thanks Larry (K9VSW/DESERT Mike NM DM76el 216.158.248.88)
26Jan 16:44 K7JIZ Stan, halt (K9VSW/DESERT Mike NM DM76el 216.158.248.88)
26Jan 16:38 163600 5 4.6 1470 & NSOSK K7ULS R-Plus-00 (NSOSK/6/2 Jerry ok EM25fi 174.32.161.16)
26Jan 16:37 163500 -3 4.7 1508 & CQ WA6LIE CM96 (K9VSW/DESERT Mike NM DM76el 216.158.248.88)
26Jan 16:37 K7JIZ Stan, Calling You (K9VSW/DESERT Mike NM DM76el 216.158.248.88)
26Jan 16:36 Yes, no rocks.. sad Saturday (K7JIZ Stan UT DN4011 67.45.32.222)
26Jan 16:36 tnx jerry 163615 8 0.8 1532 & K7ULS NSOSK RRR (K7ULS/6/2 Mike UT DN41ch 63.248.219.177)
26Jan 16:36 K7JIZ Rocks are missing today Stan? (W3XS/6/2QRO Bill OR CN74xk 172.223.192.90)
26Jan 16:34 Whine whine, snivel snivel.... (W3XS/6/2QRO Bill OR CN74xk 172.223.192.90)
26Jan 16:34 W3XS Not a peep Bill, only station heard was VE7DAY (K7JIZ Stan UT DN4011 67.45.32.222)
26Jan 16:25 K7JIZ Looking for you Stan GM (W3XS/6/2QRO Bill OR CN74xk 172.223.192.90)
26Jan 16:23 W3XS Calling you 2nd Bill (K7JIZ Stan UT DN4011 67.45.32.222)
26Jan 16:18 =====CQ 50.260 MSK 1st lookingSE ===== (W3XS/6/2QRO Bill OR CN74xk 172.223.192.90)
26Jan 16:09 160800 23 12 7 1496 & K9VSW K7ULS R-Plus-03 Best Thanks (K9VSW/DESERT Mike NM DM76el 216.158.248.88)
    
```

# PJ Client



PJClient Version 1.7.28.0

Options View Refresh... Web Links Help Ping Central

```

26Jan 15:38 N6SPP Eric CA CM87ux => (cqing 2nd here)
26Jan 15:38 N6EQ Chuck AZ DM25re => GM... Jim 153545 2 2.5 1484 & N6EQ W70UU RRR
26Jan 15:40 W70UU/6/2/QRO Jim ID DM25re => N6EQ GM Chuck Tnx in da log
26Jan 15:42 W5SAT Brad NH DM76el => N6EQ thanks for quick and easy QSO.
26Jan 15:45 N6EQ Chuck AZ DM25re => W5SAT.. Tnx.
26Jan 15:45 N6SPP Eric CA CM87ux => I see u Chuck
26Jan 16:01 W3XS/6/2QRO Bill OR CN74xk => GM all QRV 6/2
26Jan 16:08 K7ULS/6/2 Mike UT DN41ch => gm tnx mike 160815 19 0.4 1506 & K7ULS K9VSW RR73
26Jan 16:09 K9VSW/DESERT Mike NM DM76el => 160800 23 12.7 1496 & K9VSW K7ULS R+03 Best Thanks
26Jan 16:18 W3XS/6/2QRO Bill OR CN74xk => =====CQ CQ 50.260 MSK 1st lookingSE =====
26Jan 16:23 K7JIZ Stan UT DN40I => W3XS Calling you 2nd Bill
26Jan 16:25 W3XS/6/2QRO Bill OR CN74xk => K7JIZ Looking for you Stan GM
26Jan 16:34 K7JIZ Stan UT DN40I => W3XS Not a peep Bill, only station heard was VE7DAY
26Jan 16:34 W3XS/6/2QRO Bill OR CN74xk => Whine whine, snivel snivel.....
26Jan 16:36 W3XS/6/2QRO Bill OR CN74xk => K7JIZ Rocks are missing today Stan?
26Jan 16:36 K7ULS/6/2 Mike UT DN41ch => tnx jerry 163615 8 0.8 1532 & K7ULS N50SK RRR
26Jan 16:36 K7JIZ Stan UT DN40I => Yes, no rocks.. sad Saturday
26Jan 16:37 K9VSW/DESERT Mike NM DM76el => K7JIZ Stan, Calling You
26Jan 16:37 K9VSW/DESERT Mike NM DM76el => 163500 -3 4.7 1508 & CQ WA6LIE CM96
26Jan 16:38 N50SK/6/2 Jerry ok EM25R => 163600 5 4.6 1470 & N50SK K7ULS R+00
26Jan 16:44 K9VSW/DESERT Mike NM DM76el => K7JIZ Stan, halt
26Jan 16:46 K9VSW/DESERT Mike NM DM76el => 164545 8 4.8 1508 & K9VSW W5LDA 73 Thanks Larry
26Jan 16:46 => Tnx Mike....164530 0 7.3 1501 & W5LDA K9VSW 73
26Jan 16:46 K9VSW/DESERT Mike NM DM76el => QRT OFF CHAT
26Jan 16:56 N50SK/6/2 Jerry ok EM25R => bbl
  
```

| Callsign | Name  | Grid   | Dis... | Azmu... | Stat |
|----------|-------|--------|--------|---------|------|
| K7JIZ    | Stan  | DR40I  | 903    | 307     | UT   |
| K7ULS    | Mike  | DN4... | 966    | 309     | UT   |
| K9VSW    | Mike  | DM7... | 519    | 297     | NM   |
| N0AN     | Hasan | EN2... | 630    | 15      | IA   |
| N50SK    | Jerry | EM25R  | 171    | 35      | ok   |
| N6EQ     | Chuck | DM2... | 992    | 282     | AZ   |
| N6SPP    | Eric  | CM8... | 1434   | 290     | CA   |
| W3XS     | Bill  | CN7... | 1619   | 306     | OR   |
| W5LDA    | Larry | EM1... | 167    | 22      | ok   |
| W5SAT    | Brad  | DM2... | 1028   | 285     | NH   |
| W70UU    | Jim   | DN2... | 1127   | 309     | ID   |

Freq | CQ | Station

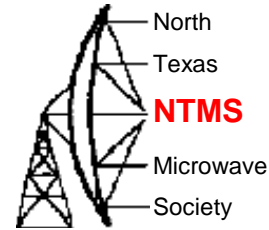
QSO Timer: 00:00:00 [Reset] [Start] [Stop] QRG [ ] QSX [ ] [QRV] [CQ 1st] [CQ 2nd] [Clear CQ]

[Send] [Run 1st] [Run 2nd]

Last Update: 17:09:52 UTC

Windows taskbar: 11:09

# Virgo



**Virgo**  
*Meteor Sky View*

2019-01-31  
17:44:54 UTC

Data for location:  
EM13II

Enter your locator:  
EM13II

Sky display

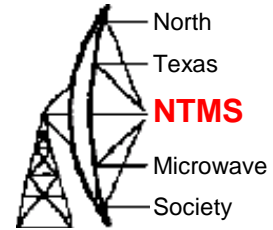
- W - E
- Ticks
- Labels

Azimuth indicator

- Antenna
- Meteor trails
- Only major showers

| Meteor Shower            | Ref. | Rise  | Set   | RA  | Decl. | ZHR | Class | Visual Activity Peak |
|--------------------------|------|-------|-------|-----|-------|-----|-------|----------------------|
| Antihelion Source        | ANT  | 00:47 | 14:00 | 144 | 13    | 4   | 2     |                      |
| Cap/Sagittarids Daytime  | DCS  | 12:17 | 22:59 | 298 | -15   | --  | 2     | 2019-02-01 22:14     |
| Alpha-Centaurids         | ACE  | 10:42 | 11:40 | 201 | -57   | 6   | 2     | 2019-02-08 12:50     |
| Dec. L. Minorids         | DLM  | 03:28 | 17:10 | 188 | 18    | 5   | 2     | 2018-12-20 05:17     |
| Chi-Capricornids Daytime | DCC  | 13:00 | 22:48 | 302 | -24   | --  | 4     | 2019-02-13 23:18     |

# DX Maps



Browser address bar: <https://www.dxmaps.com/spots/map.php?lan=&Frec=50&ML=&Map=NA&HF=&DXC=ING2&GL=>

Page Title: **DXMAPS 4.0 - QSO/SWL real time information** (Information about version 4.0)

Navigation: **Map** | List | Graph | Chat

Region: Europe | Africa | **N.America** | S.America | Asia | Oceania | World

Frequency: 28 MHz | **50 MHz** | 70 MHz | 144 MHz | 222 MHz | 432 MHz | >450 MHz | All bands | Satellite | FM DX | DAB | VOR | AIS | APRS | Ticker | MUF ES

Map Content:
 

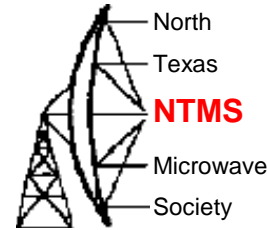
- Call signs: CO, DO, EO, FO, CN, DN, EN, FN, CM, DM, EM, FM, NDLWF, VE3EDY, N8XQM, K4YJ, W4ENN, AA4KK
- Map controls: Click on the map for info of that location. Right-click for more options.
- Copyright: © WWW.DXMAPS.COM - QSO/SWL 16:22z-17:22z SFI=75 A=13 K=3-Active SWX=Quiet

Left sidebar advertisement: Save up to **\$500** on select LG OLED 4K TVs up to 77". Shop Now.

Windows taskbar: 11:24



# ON4KST Chat



Recycle Bin grocery-list... Documents

Microsoft Office Word... Microsoft Office Excel... Microsoft Office Outlook...

Microsoft Office Visio... Microsoft Office PowerPoint... AvisFV 2.0

PHD2 2.6.5dev6 Nebulosity 4.2 Astroart 7 Demo

MegaStar5 - 5.0.13 Adobe Photoshop... virgo

PolarFinder 2.04 PoleMaster v1.3.2.8 AVG PC TuneUp

PHD2 Log Viewer FocusPal 1.3.0 AVG Internet Security

BkTimeSync New Astronom... CCleaner

PICkit PICkit 3 v3.10 SDRSharp

Google Earth Pro Mosaicator TurboTax 2018

11:47

http://www.on4kst.info/chat/index.php

The 50/70 MHz chat (by O... x

File Edit View Favorites Tools Help

Google Search More >>

Suggested Sites Web Slice Gallery

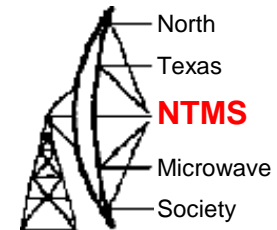
MENU 17:47:44 Send WA5TKU

51 of 16396 registered users

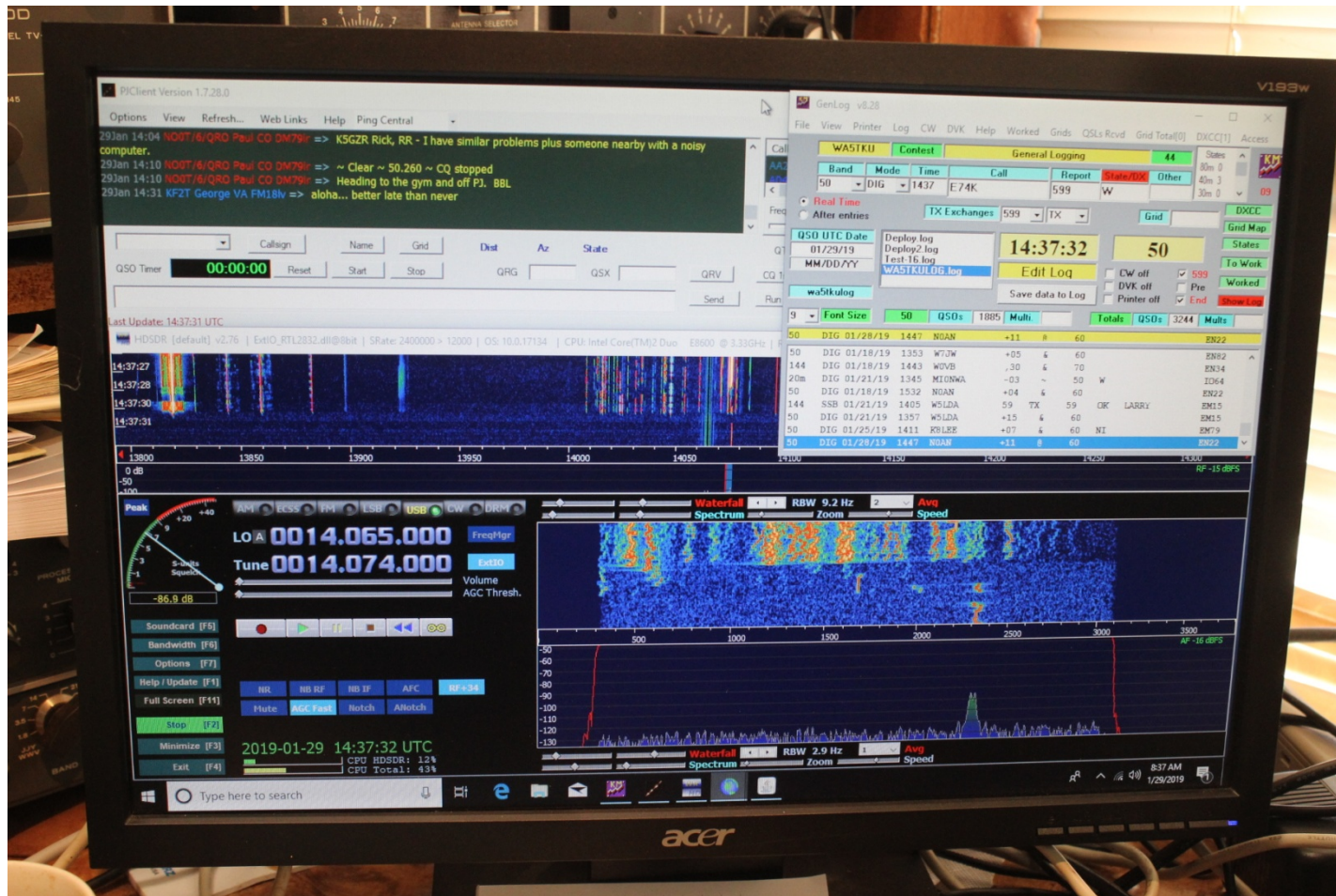
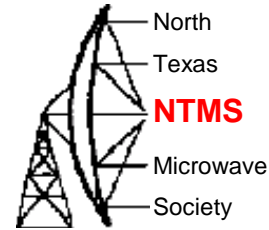
| UTC      | CALL/NAME            | 50/70 MHz MESSAGE  | Low lat. |
|----------|----------------------|--|----------|
| 17:47:35 | SERVER message       | (WA5TKU) Welcome Wes. Renting a powerful chat server is expensive. To propose the best chat/dx tools service your help would be appreciated (Web browser MENU > Donate). |          |
| 17:46:08 | OZ8ZS Henrik #70Mhz# | SP3RNZ Greg 73 cul qsy to TV and sofa, very busy on qrl today  |          |
| 17:43:33 | OZ8ZS Henrik #70Mhz# | SP3RNZ Greg my new 2x19 elm for 70cm are now on 2nd small mast, need to add rotator after repair, and put up 23 cm ant to  |          |
| 17:40:59 | OZ8ZS Henrik #70Mhz# | SP3RNZ Greg yes very sad news with Arvo, and yes to cold, but I will have to put up my 23cm soon, hope my IC9700 arrive in start march                                   |          |
| 17:39:22 | SP3RNZ Greg          | OZ8ZS Yes all OK, sleepy season. To cold for antennas and lot's of repair job to do. But iters things FB, except of sad news abt Arvo.                                   |          |
| 17:37:44 | OZ8ZS Henrik #70Mhz# | SP3RNZ Greg all ok in Konin I hope   |          |
| 17:36:48 | SP3RNZ Greg          | OZ8ZS GE Henrik  |          |
| 17:36:31 | OZ8ZS Henrik #70Mhz# | (SP3RNZ) Hi Greg   |          |
| 17:26:43 | OH3DP Hannu 4m/6m    | no stones today  |          |
| 17:26:20 | OH3DP Hannu 4m/6m    | Thanks for try, CUL Michael  |          |
| 17:25:28 | OZ1MFP Michael 4-6 m | Nothing i need to stop now trx for test GE 73  |          |
| 17:25:26 | OH3DP Hannu 4m/6m    | (OZ1MFP) How copy Michael. Here only one and not decoded   |          |
| 17:12:22 | OZ1MFP Michael 4-6 m | Ok ant to KP10   |          |
| 17:10:14 | OH3DP Hannu 4m/6m    | in KP10tt  |          |
| 17:10:00 | OH3DP Hannu 4m/6m    | (OZ1MFP) GE Michael, I'm QRV 70,174 MSK 2nd 15", CQ  |          |
| 17:03:47 | OZ1MFP Michael 4-6 m | Cq msk 70174 1st 15s ant to SP cq  |          |
| 16:09:19 | G3XGS geoffrey       | (SP9HWY) Ga Jurek i have been calling now QRT for meal 73 GL 155900 9 8.4 1561 & CQ  |          |

| UTC  | SPOTTER | ORG     | DX      | INFO                          |
|------|---------|---------|---------|-------------------------------|
| 1649 | veshf   | 50314.8 | VE9HF   | CQ                            |
| 1511 | nll     | 50260.0 | K9VSW   | EM09OS->MS-DM76 TOUGH         |
| 1442 | ku8y    | 50260.0 | WASTKU  | EN61UW->EM131 MS              |
| 1442 | ku8y    | 50260.0 | W3RZ    | EN61UW->EL29 MS               |
| 1442 | ku8y    | 50260.0 | N8LRG   | EN61UW->EN80V1 MS             |
| 1441 | ku8y    | 50260.0 | N5OSK   | EN61UW->EM25F1 MS             |
| 1432 | h4m     | 50289.0 | DK8NE   | JF59JA->MS->J05DAL MSK144/1dB |
| 1412 | ct1fmx  | 50110.0 | CT1APE  | JUST TEST - BOAS TARDES       |
| 1401 | kq4pk   | 50145.0 | WB7PMP  | G'morning                     |
| 1358 | kq4pk   | 50145.0 | K74??   | Turn beam to N.C.             |
| 1340 | kq4pk   | 50215.0 | W4FEG   | Relaying                      |
| 1333 | kw4by   | 50066.7 | W4FWS/B | 599                           |
| 1330 | w4md    | 50260.0 | W4IEAZ  | JOHN 73 TNX                   |
| 1328 | kw4by   | 50010.0 | K8MMM/B | 439 off the side              |
| 1323 | w4md    | 50260.0 | KU8Y    | KEN 73 TNX                    |
| 1322 | ku8y    | 50261.4 | W4IMD   | EN61UW->EM84 MSK144 Sent: 04  |
| 1317 | kw4by   | 50315.0 | K2PL    | cq dx                         |
| 1314 | ku8y    | 50260.0 | KB7L    | EN61UW->EM12MR MS             |
| 1311 | k2dth   | 50145.0 | KZ4RR   | <ion>                         |
| 1248 | ok1aty  | 50005.0 | EUROPE  | cq                            |
| 1217 | nk0s    | 50260.0 | K0TTP   | MSK144 FM14cg - EM48rk        |
| 1215 | kz4rr   | 50145.0 | W6IF    | 5/5 peak trx                  |
| 1215 | kz4rr   | 50145.0 | KESJXC  | 5/1 MS Trx                    |
| 1032 | k1srx   | 50260.0 | K8SD    | Have RR73 Trx!                |
| 0936 | yo8ssb  | 50280.0 | 9A2DI   | MSK 144 5dB                   |

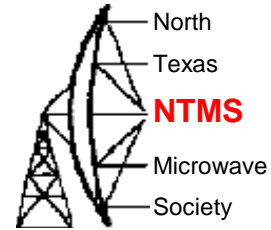
# Station Setup



# Second Display

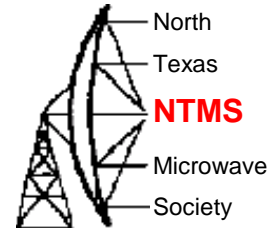


# Additional Info



- <https://physics.princeton.edu/pulsar/k1jt/wsjitx-doc/wsjitx-main-2.0.0.html>
- [https://www.physics.princeton.edu/pulsar/K1JT/FT8\\_Operating\\_Tips.pdf](https://www.physics.princeton.edu/pulsar/K1JT/FT8_Operating_Tips.pdf)
- [https://physics.princeton.edu/pulsar/k1jt/Work\\_the\\_World\\_part1.pdf](https://physics.princeton.edu/pulsar/k1jt/Work_the_World_part1.pdf)
- [https://physics.princeton.edu/pulsar/k1jt/Work\\_the\\_World\\_part2.pdf](https://physics.princeton.edu/pulsar/k1jt/Work_the_World_part2.pdf)

# Activity Night



- So We Want to Establish an Activity Night on 144.174 MHz?
  - Night – Suggest Wednesday Night
  - Time – 8:30 Local Time