630 Meters Now Open

Rob Sherwood NCØB

WSJT X Digital Communications



Finally most amateurs have access to 630m / 472 to 479 kHz if they file their application.

- In late summer of 2017 I chose to become familiar with WSJT due to all the FT8 signals I was hearing on the HF bands.
- At times there was no activity except FT8 on 15, 12, 10 & 6m.
- 11/19/2017 12m was full of FT8 signals.
- Digital is the prime mode for 630 meters, so my timing was opportunistic.

Sign up for 630 & 2200 meter bands !

• I signed up for my Ault & Denver QTHs.

- I will never operate out of Denver, but once you get permission from the power utilities, they cannot later put a signal on our frequencies.
- Here is the URL, or get it from ARRL.
- https://utc.org/plc-database-amateur-notification-process/

How do you get on 630 meters ?

Two problems:

A functional antenna and what transmits on 630 meters?

I already had a 160 meter Marconi T antenna, so that was simple.

All I needed was a new tuner.

What did I have that transmits on 475 kHz? Nothing !

A Google search located a transverter, 160m to 630m.

5 watts in on 160 meters produces 50 watts out on 630 meters

Transverter out of VK for \$720 delivered



Attributes: RX and TX Small Powered off it bypasses itself Excellent front-end Good fault protection *

Simple to use

* Ask me how I know this ! Oops, I drove it with 100 watts input.

I changed my setup for two reasons

- Transmit broadband noise is worse at reduced power, particularly at 5 watts.
- Added a 10-dB 75-watt Bird attenuator between 7300 output and transverter input.
- Improved transmit composite noise 9 dB. *
- Now at most I can only overdrive it to 10 watts.
- I needed 10 dB more RX attenuation anyway.
- Band noise now reads S2 with the 10 dB pad, plus the 7300's 20 dB attenuator. *
- I'll cover these issues tomorrow.

How do we match an antenna on 475 kHz?

You will need a high Q coil between 200 & 300 uH. * * (More L need with a very short antenna)

Antenna measured with GR 916A & 916AL RF bridges.

4 ohms – j850 The 4-ohm value includes ground losses.

Efficiency likely a few percent.

W0IVJ simulated an L-network tuner for 475 kHz.

I chose a high-pass filter for much smaller C

Proof of Concept Tuner Lash-up



Surprisingly the Drake W-4 wattmeter reads a proper null on SWR on 475 kHz.

The forward power reading is way low, 50 watts reads about 20 watts.

The L & C were initially set to the simulation values.

220 uH and about 120 pF

LPF might use 15,000 pF

K0KE uses a LPF, lots of fixed C, and a variometer.

L & C in a Home Depot WX proof tub



630 meter tuner tub lashed on top of remotely tuned 160 meter tuner tub.

2:1 SWR bandwidth = 2 kHz Larger tub to mount the coil horizontal

Green wire goes to 160 meter ground system. Wood antenna wire support

Note feedthrough insulator - more than 10KV !

The other side of the WX proof tub



WSJT X 2.1.0 current general release

What does the band look like?



NC0B working NO3M in Saegertown, PA

Mode: JT9 receives down to about R -28 level

60 seconds per transmission.

QSO typically takes about 6 minutes.

I sent R -16 level I received R -9 level

WSJT X interim release candidates now obsolete

New FT4 now finalized. 7.5 second sequence length.

This mode is intended for contesting.

WSJT X 2.1.0 now has both 32 and 64 bit versions.

New release does not affect JT9 being used on 630m.

Joe Taylor has mentioned a possible new mode that can decode deeper into the noise than JT9.

Much longer transmission sequence with an even narrower bandwidth

DX openings on 630 may only last a few minutes, so this may not help much from a practical standpoint.

Three main modes on 630 meters

WSJT-X: JT9, WSPR (beacon) and CW (very little FT8)

What have I heard? WSPR beacons screen shot

ZF1EJ Cayman Islands, K9FD Hawaii

Band Activity											
UTC	dB	DT Freq	Message								
1108	-6	0.I	1.805745	U	ALSX	EMZU	30	878			
1108	-17	0.2	1.805746	0	<ah6ez></ah6ez>	CN88PB	30	1035			
1110	-7	0.1	1.805629	0	NU60	CN70	30	1076			
1110	-25	0.2	1.805677	0	WBODBQ	EN46	23	788			
1110	-21	0.2	1.805690	0	ZF1EJ	EK99	33	2012			
1110	-13	0.1	1.805696	0	N6GN	CM88	27	997			
1110	-13	0.4	1.805795	0	W9XA	EN51	23	810			
1112	-21	0.1	1.805612	0	K9FD	BL11	30	3323			
1112	7	0.1	1.805683	0	W7IUV	DN07	30	862			
1112	10	0.1	1.805705	0	K5DNL	EM15	33	540			

Decoded at -26 dB

Best WSPR DX beacon ?

VK4YB in Australia 8045 miles away.

Also the OEM of my transverter.

Band Activity											
UTC	dB	DT Freq	Message								
1126	-12	0.1	1.805602	0	W8RUT	EN80	27	1128			
1126	-18	0.1	1.805612	0	K9FD	BL11	30	3323			
1126	-9	0.1	1.805629	0	NU60	CN70	30	1076			
1126	-5	0.1	1.805696	0	N6GN	CM88	27	997			
1126	-3	0.1	1.805745	0	AE5X	EM20	30	878			
1128	-21	0.1	1.805653	0	KR6LA	CN90	37	867			
1128	-21	0.1	1.805677	0	WBODBQ	EN46	23	788			
1128	9	0.0	1.805705	0	K5DNL	EM15	33	540			
1128	-26	-0.1	1.805761	0	VK4YB	QG62	37	8045			

Signals as weak as -30 up to -8 at 1 PM MST

WSPR around 1 PM 1/14/2018

12 12 12 12 12 12 12 12 12 12 12 12 12 1							tip and the state of the second	the strength of
UTC	dB	DT	Freq	Drift	Call	Grid	dBm	mi
1918	-26	0.1	1.805735	0	KA7OEI	DN40	27	342
1920	-8	0.1	1.805707	0	K5DNL	EM15	37	540
1922	-30	0.1	1.805735	0	KA70EI	DN40	27	342
1924	-8	0.1	1.805707	0	K5DNL	EM15	37	540
1926	-29	0.1	1.805685	0	W7IUV	DN07	30	862
1928	-9	0.1	1.805707	0	K5DNL	EM15	37	540
1932	-9	0.0	1.805707	0	K5DNL	EM15	37	540
1932	-26	0.1	1.805735	0	KA7OEI	DN40	27	342
1936	-11	0.1	1.805707	0	K5DNL	EM15	37	540
1940	-10	0.1	1.805707	0	K5DNL	EM15	37	540
1946	-10	0.1	1.805707	0	K5DNL	EM15	37	540
1950	-11	0.1	1.805707	0	K5DNL	EM15	37	540
1956	5 -12	0.2	1.805707	0	K5DNL	EM15	37	540
2002	2 -12	0.1	1.805707	0	K5DNL	EM15	37	540
2004	4 -26	0.1	1.805735	0	KA7OEI	DN40	27	342
2006	5 -10	0.1	1.805707	0	K5DNL	EM15	37	540
2010) -9	0.1	1.805707	0	K5DNL	EM15	37	540
2010	0 -28	0.0	1.805735	0	KA7OEI	DN40	27	342
201	4 -9	0.1	1.805707	0	K5DNL	EM15	37	540
201	4 -28	0.0	1.805735	0	KA70EI	DN40	27	342
202	0 -8	0.1	1.805707	0	K5DNL	EM15	37	540
202	2 -27	0.2	1.805685	0	W7IUV	DN07	30	862
202	6 -9	0.1	1.805707	0	K5DNL	EM15	37	540

Lots of activity WA, PA, IN and TX

QSOs 630 meters Nov. 2017 to present P. 1

- K9FD (KH6), HI
- KL7L, AK
- W7IUV, W7RNB, W0YSE, AH6EZ, N6PIG, WA
- K5DNL, OK
- NO3M, W8CDX, K3MF, W3SZ, W3TS, W3XY, PA
- KC4SIT, K4SV, NC
- WA9CGZ, W9XA, N9RU, IL
- K2BLA, FL
- N1VF, NU6O, KR7O, WB7ABP, CA
- WB0DBQ, W0DJK, MN
- K9SLQ, K9KFR, K9MRI, KA9OKH, W9GT, K9BLI, K9OMA, N9RU, IN
- KA7OEI, UT
- WORW, KOKE, WOQL, CO
- KB5NJD, K5DOG, W5EMC, K5DN, KE7A, TX
- K4EJQ, KU4XR, TN
- WA3ETD, W1IR, VT
- W3LPL, W3XY, WB3AVN, K1BZ, MD
- KC3OL, KB0PPQ, KS
- WB4JWM, K4AEK, GA
- NC8W, W8RUT, K8TV, OH

Canada: BC but virtually nothing else

QSOs 630 meters Nov. 2017 to present P. 2

- NC8W, W8RUT, K8TV, N8IVE, OH
- N1BUG, ME
- N4WLO, AL
- W0SD, W7XU, SD
- W0ETH, MO
- KM5SW, NM
- K4LY, SC
- WA3U, DE
- W1XT, MA
- W8MQW, KB8U, MI
- K2DVA, NY
- KI7KG, NV
- VE7CNF, VE7VV, VE7BDQ, CF7MM, VE7SL, CF7MAY, VA7MM, BC
- VE3CIQ, ON
- ZF1EJ, Cayman
- VK4YB, Australia

Comments from K9FD (Hawaii)

- Holy smokes Rob, fantastic signal, best was -5 and its daylite here yet, sunset still few minutes away.
- Thanks much for that one, my first daylite QSO on JT9.
- Your set up working great.
 73 Merv K9FD

March 3, 2019 QSO

Comments from VK4YB – Australia

- Hi Rob,
- I got such a surprise to see your call sign appear in the decode box.
- I was wondering if it was VK3DQL or VK5FQ. I decided it must be VK5FQ because it was too strong to be VK3DQL.
- It never occurred to me that it might be DX.
- Also in my surprise I did not notice that you had sent me a report on the first call. I had been asking stations to do just that!
- So I just clicked the dB button. I should have sent R+dB. I corrected that next time and conditions were good so it didn't matter.

More from Roger, VK4YB

- I have been struggling to receive stations throughout my summer and I have been feeling guilty that my receive ability is below par.
- I have been trying various loops and combinations but I have not found any antenna as good as my NE beam.
- That's one of two 900 foot long wires with 120 foot vertical sections on sloping ground.
- Our QSO of last night confirms that this is a superb RX antenna bringing you in at JT9 -22.
- The sloping ground lowers the elevation angle in the direction of USA. The arrival angle varies with the propagation. When the angle is high, the signal is the same strength on NE beam as the NNW (Japan) beam. Last night it was low angle.

An earlier JT9 contact between Roger and I

DX goal on 630 meters achieved

- Worked Roger VK4YB in Moorina Australia November 9, 2018 at 4:50 AM MST.
- One of 3 NC0B & VK4YB QSOs.

File	Conf	igurati	ions	View	Mode	Deco	de	Save	Tools	Help							Million Street	
Band Activity										Rx Frequency								
UT	С	dB	DT	Freq		Messa	ıge				T	UTC	dB	DT	Freq		Message	
11	50 -	-25	0.2	1237	0	NCOB	VK4	VR -	-26		•	1149	Тх		1204	6	CQ NCOB DN7	0
11	52 -	-27	0.3	1238	6	NCOB	COB VRAVE					1150	-25	0.2	1237	0	NCOB VK4YB	-26
11	54 -	-26	0.2	1238	G	NCOB VRAID F					1151	Тx		1204	0	VK4YB NCOB	-25	
				1200	C	NCOD	VNI	TP 1	ARR			1152	-27	0.3	1238	0	NCOB VK4YB	RRR
												1153	Тx		1204	0	VK4YB NCOB	RRR
												1154	-26	0.2	1238	0	NCOB VK4YB	RRR
												1155	Тx		1204	0	VK4YB NCOB	73

5:14 AM MST QSO with Roger

March 3, 2019 Decodes VK4YB

1210	-25	0.2	1211	0	CQ VK4YB QG62
1212	-24	0.2	1211	0	CQ VK4YB QG62
1213	Tx		1292	0	VK4YB NCOB -25
1214	-23	-0.1	1212	0	NCOB VK4YB -22
1215	Тх		1292	0	VK4YB NCOB RR73
1216	-23	0.0	1212	6	NCOB VK4YB R-22
1217	Tx		1292	0	VK4YB NC0B RR73
1218	-24	0.0	1212	6	TNX ROB 73
1220	-25	0.2	1212	6	VK3DQL VK4YB -25
1224	-25	0.1	1212	6	CQ VK4YB QG62
1226	-21	0.2	1212	0	CQ VK4YB QG62
1228	-26	0.0	1212	0	CQ VK4YB QG62

Next goal on 630 meters?

- WAS Worked All States !
- 32 down, 18 to go.
- We need more hams on 630m, as some states do not even have one operator on the band.
- For instance, there is no one on 475 kHz in Wyoming, my neighbor to the north!
- Since I have worked Hawaii, Alaska and Maine from Colorado, WAS is not a pipe dream.

What is the dynamic range of WSJT X?

Frank Donovan, W3LPL, (and multi-multi contest super station) asked me to measure the dynamic range of WSJT X.

The best I could do was test a complete system that included a receiver (IC-7300), a Monitor Sensors transverter (reviewed QST July 2018) and WSJT X running on an HP i7 quad-core PC.

I have a white paper PDF available if anyone is interested in reading the details of the two hour test using WSPR in January 2018 from 1210 PM to 1412 PM MST.

Bottom line, the dynamic range of the system, with 7300 running normal AGC on FAST, was at least 75 dB, and possibly 80 dB.

While the WSJT recommendations are to run manual AGC, I see no reason to not let the AGC handle receiver gain.



630 Meters at NC0B Ault, Colorado (40 miles east of WWV)