

Does a Hamstick
WORK?

ADDXA

Albuquerque DX
Association

Good DX

Good Luck in the Contest!

<https://adxa.groups.io/>

“Antennas in Amateur Radio
Most Talked About Subject
Least Understood Subject”

Bill Mader

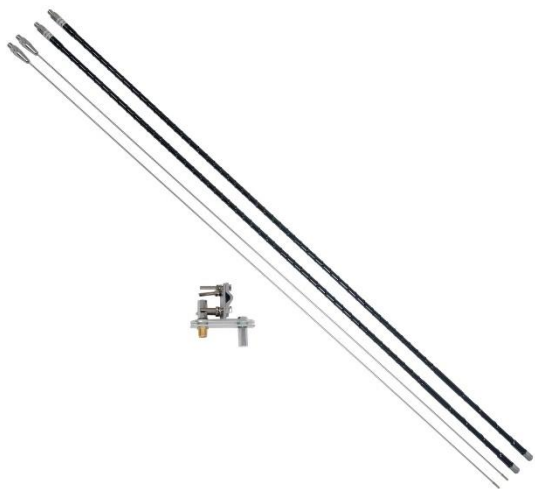
K8TE@ARRL.net

<https://www.dukecityhamfest.org/>

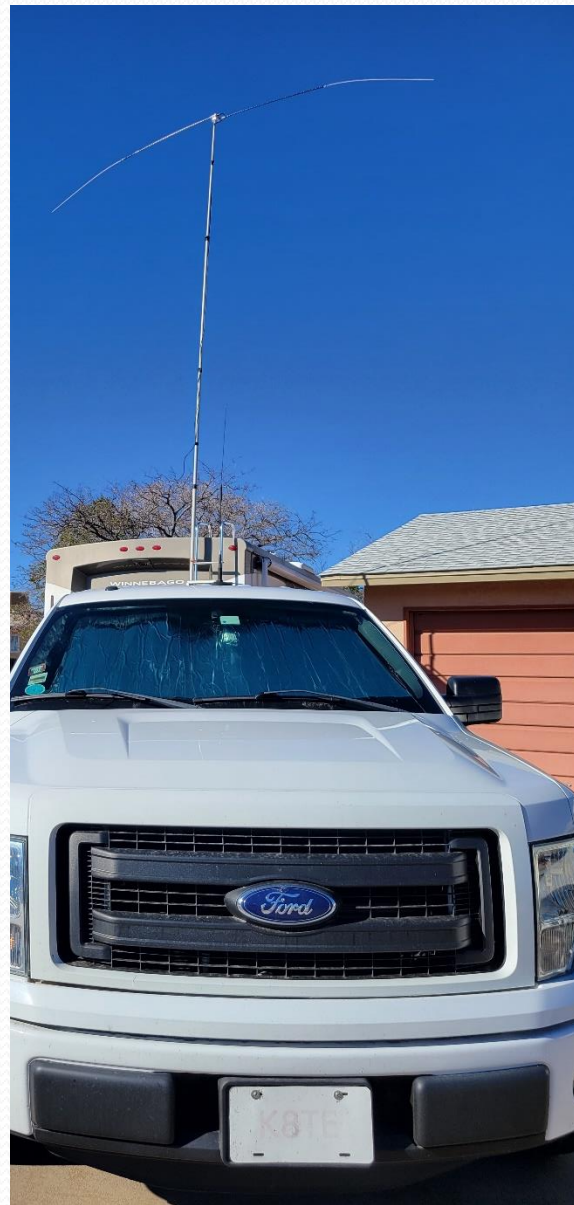
20m Hamstick Effectiveness

- Antenna Description
- Full-Size vs. Double Mobile Whip
- Anecdotes vs. Analysis
- Numbers, Numbers, Numbers
- Conclusions

Hamstick Description



Two 7 ft. MFJ 20m Mobile Whips
(2) 3/8" x 24 Mounts
Mast Mount
SO-239



“Standard” Antenna

- Alpha-Delta DXCC
- Fan **Dipole** 40m, 20m, 10m
80m Short Wire with Coil Isolator
- 25 ft. AGL (Above Ground Level)
- Parallel to Shortened Dipole
- Separated Over One Wavelength

Shortened Dipole Facts

- “Loaded” Center Sections
 - Series Inductor
 - Electrical Quarter Wavelength x2
 - 14 ft. vs 33.2 ft. for 43% Physical Length
 - Theoretical Loss Approximately 50%
 - -3 dB in Effective Radiated Power
- 2022 ARRL Antenna Book Chapter 9

Anecdotes vs. Analysis

- “I Made Lots of Contacts”

LAH, BLAH, BLAH, BLAH, BLAH, BLAH,
LAH, BLAH, BLAH, BLAH, BLAH, E
BLAH, BLAH, BLAH, BLAH, BLAH,
LAH, BLAH, BLAH, BLAH, BLAH,
AH, BLAH, BLAH, BLAH, BLAH, BLAH,
AH, BLAH, BLAH, BLAH, BLAH, BLAH,
AH, BLAH, BLAH, BLAH, BLAH, BLAH,
BLAH, BLAH, BLAH, BLAH, BLAH,
BLAH, BLAH, BLAH, BLAH, BLAH,
BLAH, BLAH, BLAH, BLAH, BLAH,
LAH, BLAH, BLAH, BLAH, BLAH, E
BLAH, BLAH, BLAH, BLAH, BLAH, E
BLAH, BLAH, BLAH, BLAH, BLAH, E

Anecdotes vs. Analysis

- “I Made Lots of Contacts”
- “Propagation Was Terrible”



Anecdotes vs. Analysis

- “I Made Lots of Contacts”
- “Propagation Was Terrible”
- “Best Antenna I Have Ever Used”



Anecdotes vs. Analysis

- “I Made Lots of Contacts”
- “Propagation Was Terrible”
- “Best Antenna I Have Ever Used”
- “I Can Work Everyone I Can Hear”



Anecdotes vs. Analysis

- “I Made Lots of Contacts
- “Propagation Was Terrible”
- “Best Antenna I Have Ever Used”
- “I Can Work Everyone I Can Hear”
- **What If You Can't Hear Them?**

Anecdotes vs. Analysis

- Radio is Science-Based
- Anecdotes are Not Facts
- Numbers Describe Performance
- A/B Comparisons Mean Little
- Data Over Time Are Meaningful

Numbers, Numbers, Numbers

- Antennas at Same Height & Direction
- Feedline Loss Within 1 dB
- Transmit Power 200 mW Each
- Transmissions Close, Sometimes Exact Times
- Many, Many Transmissions
- Compare Same Receive Stations' Reports

Numbers, Numbers, Numbers

- Weak Signal Propagation Reporter (WSPR)
- ZachTech (Sweden)
- Stand Alone Transmitter
- 3 Models Covering 136 kHz to 6m
- Arduino Powered
- Bandpass Filters



Numbers, Numbers, Numbers

- Collect Data Over Several Hours
- Sort by RX Station and Time
- Compare Sign Strengths
- Discard Outliers (Big S/N Differences)
- Identify Average Strength Differences

Numbers, Numbers, Numbers

- Windows Configuration Application

ZachTek WSPR Transmitter Configuration Version 1 - Revision 16

Device name: **WSPR TX**

WSPR Beacon | Signal Generator | Boot Configuration | Serial Port

WSPR Configuration

Call Sign: Prefix Call Sign **K8TE** Suffix

Band selection:

LP	Band	Progress
<input type="checkbox"/>	2190m	
<input type="checkbox"/>	630m	
<input type="checkbox"/>	160m	
<input checked="" type="checkbox"/>	80m	
<input checked="" type="checkbox"/>	40m	<div style="width: 100%;"></div>
<input type="checkbox"/>	30m	
<input checked="" type="checkbox"/>	20m	
<input type="checkbox"/>	17m	
<input type="checkbox"/>	15m	
<input type="checkbox"/>	12m	
<input type="checkbox"/>	10m	
<input type="checkbox"/>	6m	
<input type="checkbox"/>	4m	

Pause after last band (optional): 480

Transmit Schedule, transmit every ..

- 2 minutes (Default) Schedule
- 10 minutes
- 20 minutes
- Band coordinated schedule
- Only when moving (Tracker)

Location:

- Auto (GPS)
- Manual **DM65QG**

Send a more precise location

Reported power:

- Normal mode **23** dBm
- Encode Altitude as power

Start Stop

Device Status

Hardware: 2:35
Firmware: 2:15

Restart

Current output frequency: **7 040 116.38**
MHz kHz Hz

Transmitter Output: On Off

Program running:

- WSPR Beacon
- Signal Generator
- Idle

GPS Information

Signal Quality:

Position Lock:

UTC Time: **23:04:00** Position: **DM65QG**

Az/EI plot of GPS Satellites

ZachTek WSPR Desktop transmitter
Firmware version 2:15
Configuration saved

Debug view

Read progress: **100%** (Re)Read Settings Save Settings

Numbers, Numbers, Numbers

WSPR.ROCKS

[785 spots] 784 to 0
wsprr.live search time was 0.022420857 secs

Table options find duplicates Saved searches

help SQL charts map table search ≡

▲ status -> [785 spots] Round trip 0.28 secs.
** Click table cells for more info. ** Right-click rows for Search options.

utc	y-m-d	txCall	txGrid	rxCall	rxGrid	MHz	W	SNR	drift	k	txAz°	mode	k/W	spotQ	version
2023-12-15 20:00		W5UR	DM65	AC0G	EM38ww	14.097047	0.2	-17	0	1374	69	WSPR2	6870	3533	WD_3.1.3
2023-12-15 20:00		W5UR	DM65	WA2ZKD	FN13ed	14.097047	0.2	-27	0	2654	62	WSPR2	13270	3033	WD_3.0.8
2023-12-15 20:00		W5UR	DM65	ND7M	DM16xf	14.097047	0.2	6	0	815	278	WSPR2	4075	4774	WD_3.0.6
2023-12-15 20:00		W5UR	DM65	KPH/Q	CM88mc	14.097047	0.2	0	0	1445	286	WSPR2	7225	7225	WD_3.1.3
2023-12-15 20:00		W5UR	DM65	NI5F	EM70fu	14.097056	0.2	-22	0	2062	98	WSPR2	10310	3829	v1.1.0
2023-12-15 20:00		W5UR	DM65	KD9NYE	EN50er	14.096955	0.2	-19	0	1628	64	WSPR2	8140	3721	DS_0.35.1
2023-12-15 20:00		W5UR	DM65	WF7U	CN87xm	14.09704	0.2	-12	0	1825	322	WSPR2	9125	5996	WD_3.0.5
2023-12-15 20:00		W5UR	DM65	W3ENR	FM28jh	14.097047	0.2	-23	0	2834	74	WSPR2	14170	4858	WD_3.1.2
2023-12-15 20:00		W5UR	DM65	KPH	CM88mc	14.097047	0.2	-2	0	1445	286	WSPR2	7225	6812	WD_3.1.3
2023-12-15 20:00		W5UR	DM65	KA7OEI	DN40ao	14.097042	0.2	-5	0	714	324	WSPR2	3570	3060	WD_3.0.6
2023-12-15 20:00		W5UR	DM65	WA2TP	FN30lu	14.097047	0.2	-12	0	3012	68	WSPR2	15060	9897	WD_3.1.3
2023-12-15 20:00		W5UR	DM65	VE7IRN	CO90ob	14.097035	0.2	-22	0	1965	330	WSPR2	9825	3649	1.4A Kiwi
2023-12-15 20:00		W5UR	DM65	VE6ARS	DO30	14.097002	0.2	-12	0	1736	346	WSPR2	8680	5704	1.4A Kiwi
2023-12-15 20:00		W5UR	DM65	KP4MD	CM98iq	14.097047	0.2	-17	0	1312	290	WSPR2	6560	3374	WD_3.0.9
2023-12-15 20:00		W5UR	DM65	KA7OEI-1	DN31uo	14.097047	0.2	4	0	820	328	WSPR2	4100	4569	WD_3.0.9
2023-12-15 20:00		W5UR	DM65	KFS	CM87tj	14.097047	0.2	5	0	1387	283	WSPR2	6935	7926	WD_3.1.3
2023-12-15 20:00		W5UR	DM65	WA2TP/Q	FN30lu	14.097048	0.2	-20	0	3012	68	WSPR2	15060	6454	WD_3.1.3
2023-12-15 20:00		W5UR	DM65	KN6NK	CM95pn	14.097048	0.2	-4	0	1236	274	WSPR2	6180	5474	1.4A Kiwi
2023-12-15 20:00		W5UR	DM65	AE6RQ	CM97	14.097047	0.2	-18	0	1270	284	WSPR2	6350	3084	1.3 Kiwi
2023-12-15 20:00		W5UR	DM65	VA3DP	FN24et	14.096992	0.2	-15	0	2843	59	WSPR2	14215	8123	1.4A Kiwi
2023-12-15 20:00		W5UR	DM65	WB6JHI	CM97af	14.097041	0.2	-16	1	1348	283	WSPR2	6740	3659	2.2.0-rc15
2023-12-15 20:00		W5UR	DM65	K6PZB	CM88nk	14.097047	0.2	-27	0	1443	288	WSPR2	7215	1649	WD_3.0.8
2023-12-15 20:00		W5UR	DM65	NQ6B	DM12qu	14.097076	0.2	-14	0	928	254	WSPR2	4640	2784	2.6.1

Numbers, Numbers, Numbers

[785 spots] 784 to 0

wspr.live search time was 0.022420857 secs

Table options

find duplicates

Saved searches

help

SQL

charts

map

table

search



▲ status -> [785 spots] Round trip 0.28 secs.

** Click table cells for more info. ** Right-click rows for Search options.

utc	y-m-d	txCall	txGrid	rxCall	rxGrid	MHz	W	SNR	drift
2023-12-15 20:00		W5UR	DM65	AC0G	EM38ww	14.097047	0.2	-17	0
2023-12-15 20:00		W5UR	DM65	WA2ZKD	FN13ed	14.097047	0.2	-27	0
2023-12-15 20:00		W5UR	DM65	ND7M	DM16xf	14.097047	0.2	6	0
2023-12-15 20:00		W5UR	DM65	KPH/Q	CM88mc	14.097047	0.2	0	0
2023-12-15 20:00		W5UR	DM65	NI5F	EM70fu	14.097056	0.2	-22	0

Numbers, Numbers, Numbers

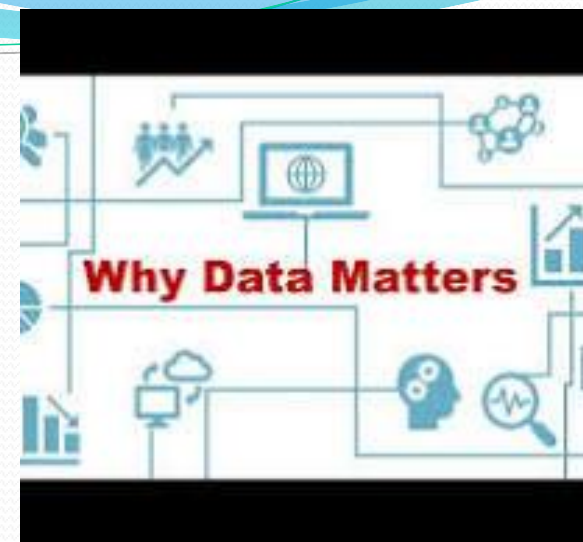
12/15/2023 00:22	K8TE	DM65	AA7NM	14.097204	-28	
12/15/2023 00:24	W5UR	DM65	AA7NM	14.097079	-21	7
12/15/2023 00:58	K8TE	DM65	AA7NM	14.09718	-19	
12/15/2023 01:04	W5UR	DM65	AA7NM	14.097171	-25	6
12/15/2023 01:10	K8TE	DM65	AA7NM	14.097066	-17	
12/15/2023 01:12	W5UR	DM65	AA7NM	14.097141	-21	5



Average 6 dB Down in Olympia WA

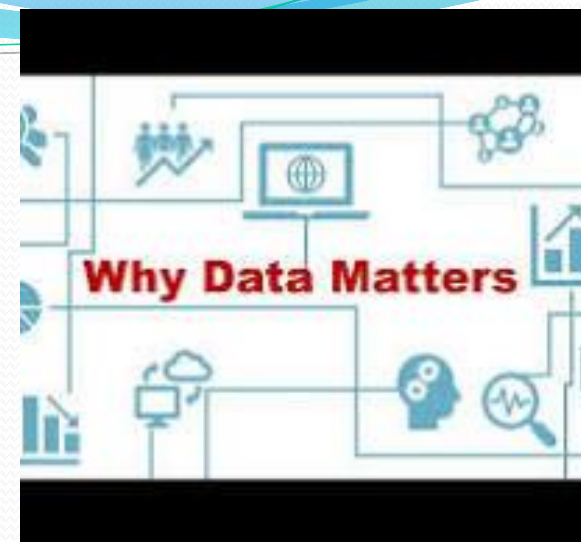
Conclusions

- Many Similar Results
- Variability from -1 to -11 dB
- So What? Little to a Significant Difference!
- 11 dB on an S-Meter?
Two S-Units on a CALIBRATED Meter (K4)
Four S-Units on Some Rigs
- You Decide



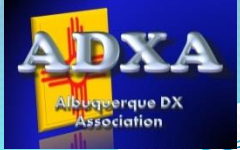
Conclusions

- Lower the Frequency?
- Decrease the Efficiency
- Cost Difference
MFJ-2220- \$70
Wire Dipole \$15
- Ease of Erection
Same for 25 ft. Mast (more \$\$)
Free Trees, Light Poles, etc.
- Ease of Transportation/Assembly
Minor/Significant Difference



Deep Thoughts

- Multi-Band Use
Hamstick—"Forget About It"
Wire Dipole—Why Not? (Reduced Efficiency)
- Random, End-Fed Wire
NON-Resonant!
Requires a 5% Counterpoise
Requires Impedance Transformation
Requires Common Mode Current Choke
- WORKS?



WORKS

- With

WORKS

- With
- Out

WORKS

- With
- Out
- Real

WORKS

- With
- Out
- Real
- Knowledge
- “IC-7610 is Just Two IC-7300’s”

WORKS

- With
- Out
- Real
- Knowledge
- “IC-7610 is Just Two IC-7300’s”
- No It Isn’t!



Typical Misinformation

“Adjust the VSWR meter and output frequency for lowest VSWR reading, **indicating resonance.**”

Maybe, but probably NOT resonant!

VSWR is an Impedance RATIO


















Measured by Voltages

Resonance is No Reactance (Purely Resistive)

Typical Misinformation HF is Dead

Most active modes

This chart illustrates which modes are being used most heavily during the period of this report.

Mode	% Use	QSOs	Graph
FT8	54.95	693,959	
CW	22.57	284,967	
SSB	15.86	200,331	
FT4	4.83	61,025	
RTTY	0.87	10,929	
MSK144	0.23	2,964	
MFSK	0.19	2,348	
PKT	0.17	2,168	
FM	0.14	1,811	
DIGITALVOICE	0.07	876	
PSK	0.05	589	
DYNAMIC	0.01	132	
PAC	0.01	110	
SSTV	0.01	66	
JT65	0.01	66	
JT9	0.00	60	
All other	0.04	455	

Summary

- Antenna Description
- Full-Size vs. Double Mobile Whip
- Anecdotes vs. Analysis
- Numbers, Numbers, Numbers
- Conclusions

References

- <https://www.zachtek.com/>
- <http://wspr.rocks/>
- <https://www.wsprnet.org/drupal/wsprnet/map>
- <https://www.sotabeams.co.uk/wsprlite-classic>
- <https://wsjt.sourceforge.io/>
- <https://www.solarham.net/index.htm>
- https://www.hamqsl.com/solar.html#add_website