

160M antenna in a small yard? Yes it's possible

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160M? Why?

Why? Why not. Because it's there. Because it's supposedly hard to get on topband.

160M also has interesting characteristics, sharing much with the broadcast bands.

Noise: the QRN and sometimes QRM is pretty terrible. Explains why serious top banders use RX loops (Beverages, loops on ground, etc).

How to deal with noise? Try digital modes. FT8 on 160m. Does it work?

Big plus: bragging rights.



160M - winter and darkness

“Due to excessive daytime D region absorption, 160m is useful for DXing when the path is in darkness or very near darkness. Because of geomagnetic field activity considerations, 160m is best during the winter months and from solar minimum to a couple years thereafter “

– [https://k9la.us/An Introduction to Operating on 160m.pdf](https://k9la.us/An%20Introduction%20to%20Operating%20on%20160m.pdf)

“160M is a tough band” (no kidding)

– <http://audiosystemsgroup.com/160MPacifcon.pdf> – other great resources here - must read



160M Challenges

Antenna size – half a wavelength is ~77m long - ~253 feet!

$\frac{1}{4}$ vertical would need 126' radiating element.

Poor “ground” terrain can hurt

Loud QRN - especially summer - often need RX antenna

Need a LOT of room and space, and preferably tall structures, even for sloper/Inverted L

Shortened verticals recommended but many use lossy coils.

Started researching several innovative 160M Antenna designs....there are a few!

“Small” backyard - yeah right



<https://ez.analog.com/ez-blogs/b/engineering-mind/posts/a-160-meter-antenna-for-a-small-backyard>



Other interesting designs

VA3IUL Compendium of “Wire antennas for ham radio”

https://www.qsl.net/va3iul/Antenna/Wire%20Antennas%20for%20Ham%20Radio/Wire_antennas_for_ham_radio.htm – search for “160”, some interesting designs!

“Lazy sloper” - <https://dxnews.com/ua9ba-160m/>

“160m antenna comparisons” - <https://g4ake.co.uk/160m/>

“Top Band Hams - tech page” - interesting designs here -

<https://topbandhams.com/tech-page/6-22-different-wire-antennas-for-the-160-meter-band>

VE2DPE “hybrid Inverted L” - <https://www.hamradiosecrets.com/160-meter-antenna.html>

VK3YE - different ideas, loops: <https://vk3ye.com/gateway/160transmit.htm>



The K6MM “No excuses” 160M Vertical

Design seems simple, already had material, and would fit in small yard - what is it?

25' high

Helically wound wire - around PVC pipe or equivalent - $\frac{1}{2}$ wavelength (~252ft)

Capacitance hat

50ohm feed

Relatively simple to build

Affordable

It's all here → <https://k6mm.com/pages/160-main.html>

Initial Antenna resonance

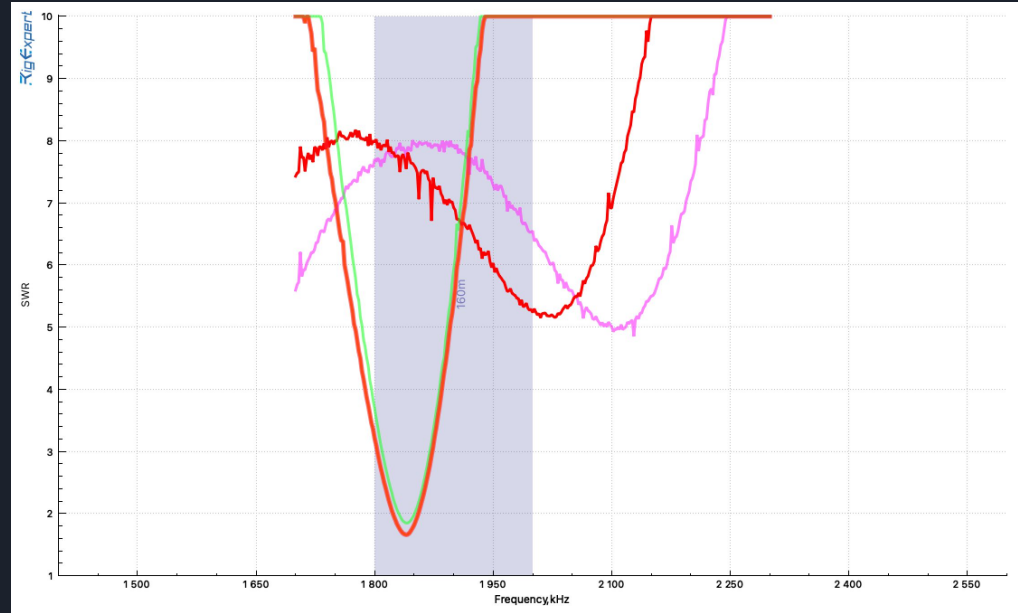
Initial: Purple

2nd adjustment: Red

3rd and fourth: final form

Adjustments will be necessary

Biggest help was adding more and longer radials.



Initial Performance - Just OK in the beginning

Initial 5W WSPR test

one TX only

Stations hearing me

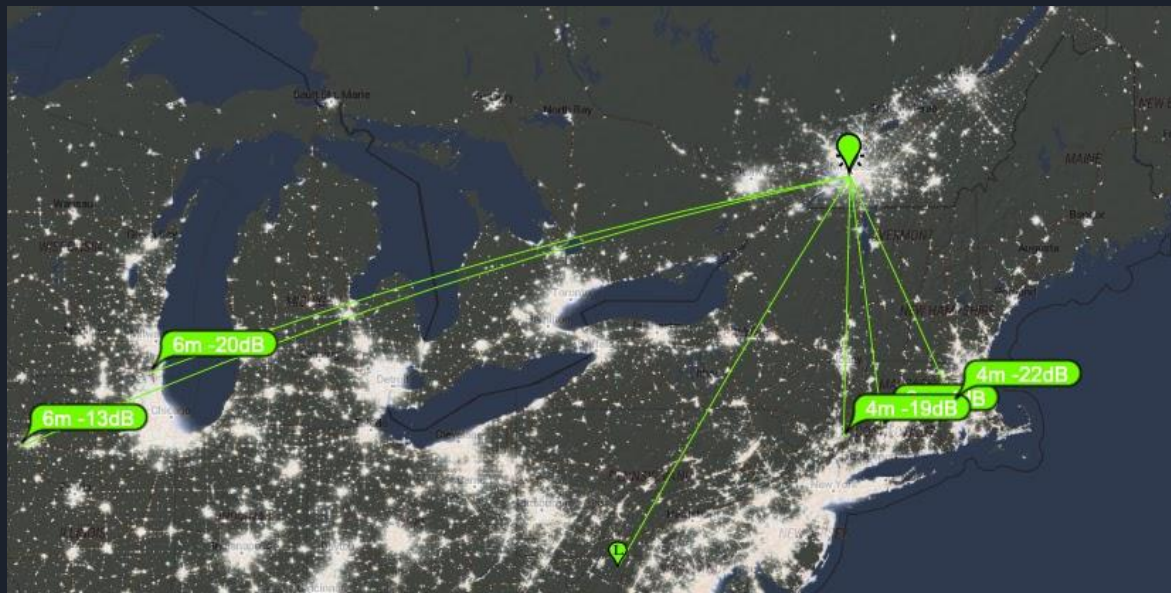


Let's try some FT8

Ran some 5W FT8 on 160M

Stations hearing me

Around 23:00



Evening of 04/08/2024

160M FT8

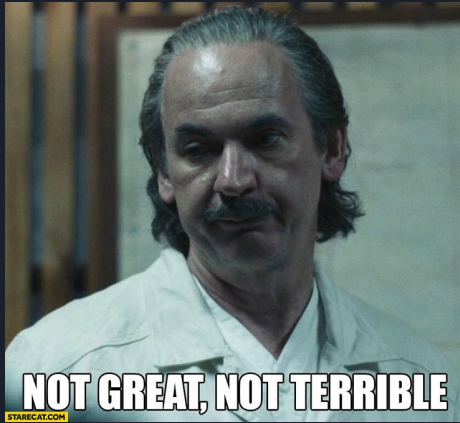
Around 23:30

@50W

DX capable!



FT8 “QSOs” Log for March-May 2024

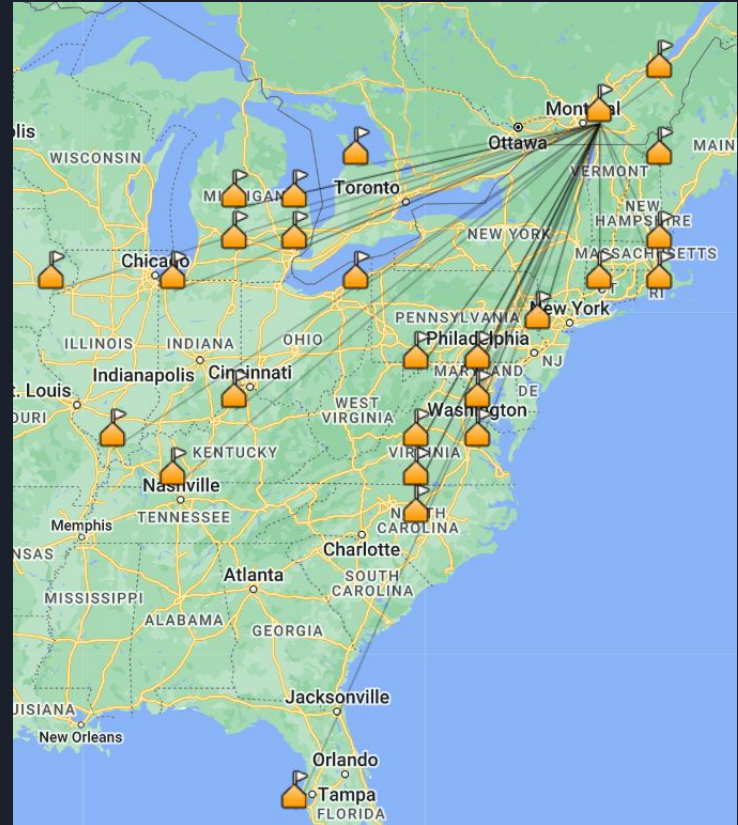


FT8 at around 50W maximum

Operating on 8 nights, mostly in March

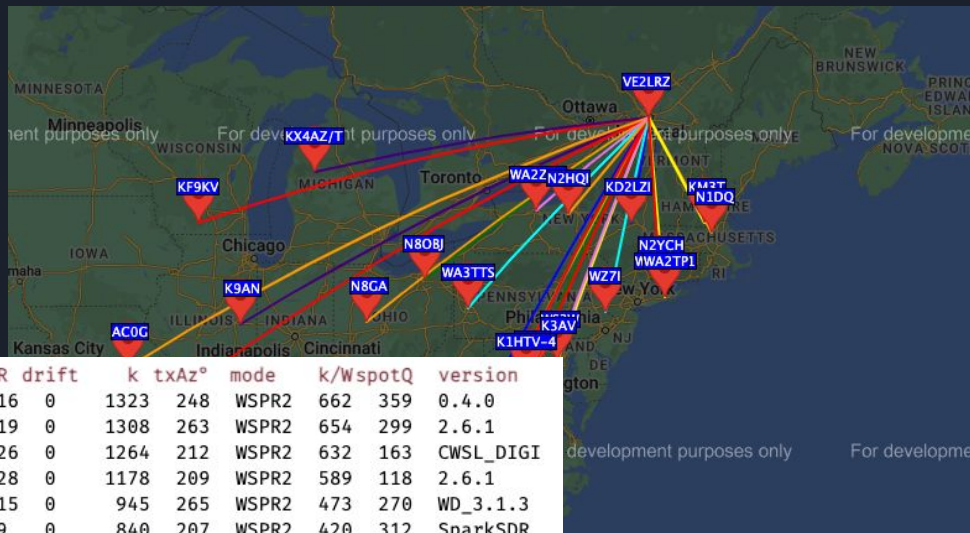
Usually less than 30min each time

41 QSOs total



WSPR TX @ 2W - one TX only

Around midnight local time



local	y-m-d	txCall	txGrid	rxCall	rxGrid	MHz	W	SNR	drift	k	txAz°	mode	k/WspotQ	version
2024-04-04	23:58	VE2LRZ	FN35el	K9AN	EN50wc	1.838098	2	-16	0	1323	248	WSPR2	662 359	0.4.0
2024-04-04	23:58	VE2LRZ	FN35el	KF9KV	EN52et	1.8381	2	-19	0	1308	263	WSPR2	654 299	2.6.1
2024-04-04	23:58	VE2LRZ	FN35el	W3OA	EM95mn	1.838088	2	-26	0	1264	212	WSPR2	632 163	CWSL_DIGI
2024-04-04	23:58	VE2LRZ	FN35el	N3CHX	FM06aa	1.8381	2	-28	0	1178	209	WSPR2	589 118	2.6.1
2024-04-04	23:58	VE2LRZ	FN35el	KX4AZ/T	EN74gc	1.838098	2	-15	0	945	265	WSPR2	473 270	WD_3.1.3
2024-04-04	23:58	VE2LRZ	FN35el	K1HTV-4	FM18ap	1.838099	2	-9	0	840	207	WSPR2	420 312	SparkSDR
2024-04-04	23:58	VE2LRZ	FN35el	K1RA	FM18cr	1.838099	2	-19	0	825	206	WSPR2	413 189	CWSL_DIGI
2024-04-04	23:58	VE2LRZ	FN35el	N80BJ	EN91fh	1.838098	2	-23	0	789	237	WSPR2	395 135	2.0.0
2024-04-04	23:58	VE2LRZ	FN35el	K3AV	FM19nc	1.838098	2	-14	0	757	202	WSPR2	379 227	2.5.4
2024-04-04	23:58	VE2LRZ	FN35el	WA3TTS	EN90xn	1.838103	2	-28	0	755	226	WSPR2	378 76	2.6.1
2024-04-04	23:58	VE2LRZ	FN35el	WS3W	FM19ng	1.838097	2	-24	0	740	202	WSPR2	370 116	
2024-04-04	23:58	VE2LRZ	FN35el	N1DQ	FN42hn	1.838098	2	-18	0	371	150	WSPR2	186 90	SparkSDR
2024-04-04	23:58	VE2LRZ	FN35el	KM3T	FN42et	1.838182	2	-21	0	337	151	WSPR2	169 68	CWSL_DIGI
2024-04-04	23:58	VE2LRZ	FN35el	KD2LZI	FN22vt	1.838125	2	-22	0	300	189	WSPR2	150 56	



Ok I'm convinced - how do I build one?

The design is based on K6MM's design.

There are early references to this in early ARRL antenna books

<https://k6mm.com/pages/160-main.html>

“No excuse antenna” - he isn't kidding.

Goal: relatively affordable, easy to set up, and not require a lot of space.

Basically: a tube with helically wound wire and a capacity hat at the top. Needs radials!

Affordable BOM



PVC pipe- "schedule 40" - need something with solid walls, and no RF interaction

<https://www.renodepot.com/en/xirtec-1-in-x-10-ft-white-solid-pvc-pipe-for-cold-water-supply-022752-0068584> - \$39 for 10' pipe !!!

Consider fibreglass military surplus mast – \$5.99 each piece

<https://www.princessauto.com/en/4-ft-army-surplus-tent-pole/product/PA0009152307> (:- (no longer sold) or <https://armysurpluswarehouse.com/camo-netting-poles-fiberglass-4-for-19-99/> – or hamfests!

18AWG to 22AWG wire. Consider colors to make it stealthy and not stand out.

Capacity hat: Bronze rods (canadian tire/reno depot) and hard copper wire or copper strapping

<https://www.canadiantire.ca/en/pdp/steelworks-solid-round-brass-0616187p.0616187.html?rq=brass+rod#srp>

<https://www.renodepot.com/en/dahl-all-round-1-2-in-x-10-ft-copper-strapping-9053-36245024>

I needed to use a blow torch to to melt solder

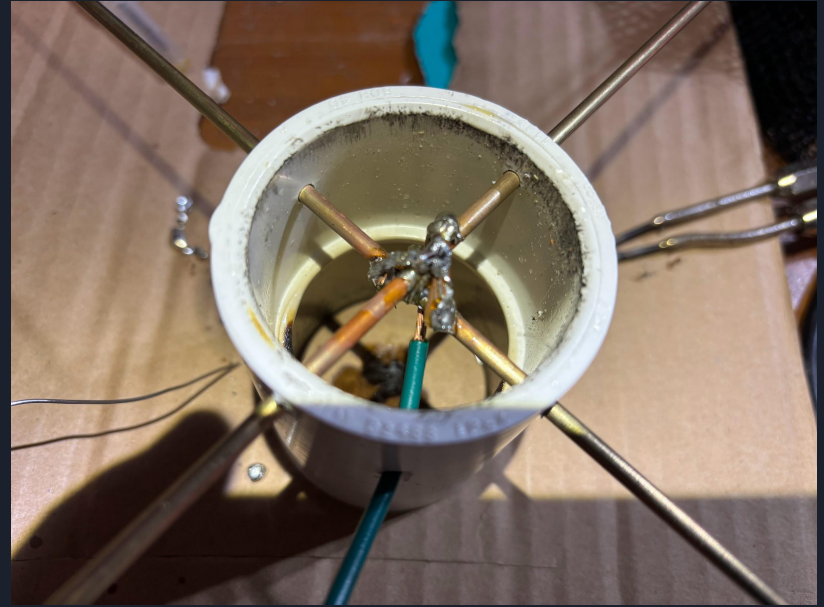
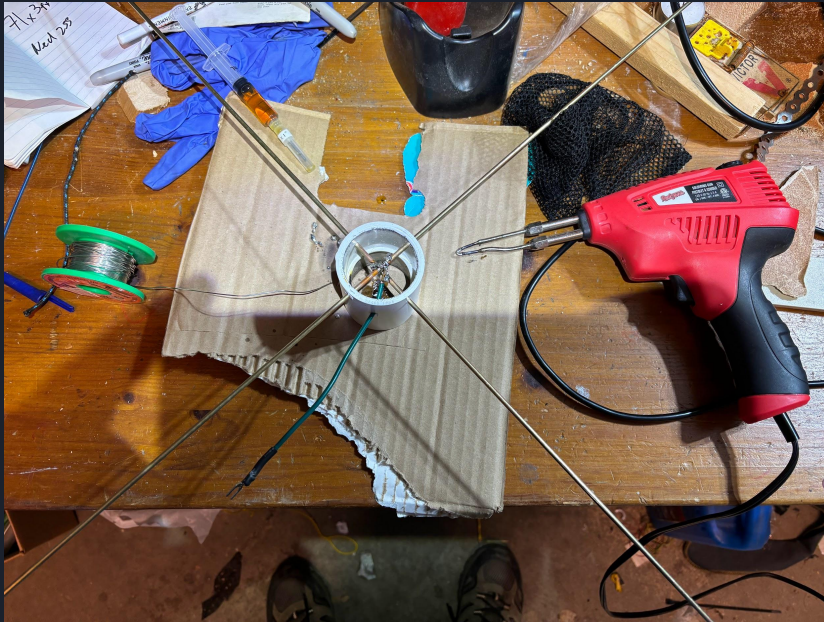
PVC cap



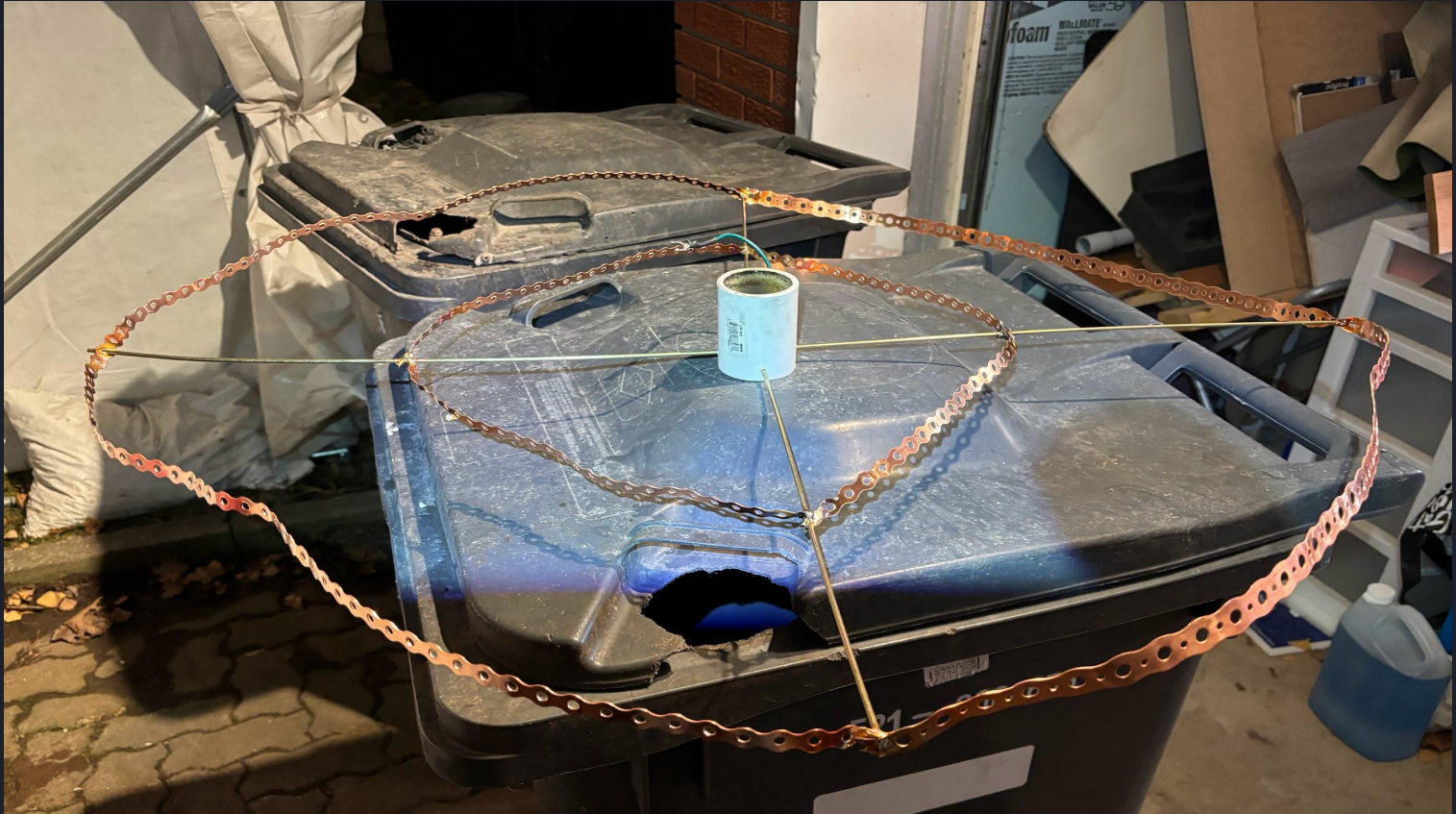
Assembly - Start winding the wire using "armstrong method"



“Gentlemen” Band requires an appropriate “hat”



Capacitance hat completion



Radial adapter

Plastic project box with SO-239

Top connectors: Antenna radiator

2x side connectors: GND to radials

Radials connect to copper strap

Square, where radials attached.

Radials: ethernet wire, sealed RG6,
Whatever I had. At least 3x 50ft wires.

1:1 Current choke at coax entry



Initial adjustments necessary, then ok



“Beauty is in the eye of the beholder”



A great seasonal antenna

Improvements for next version:

A bit higher - more PVC/pipe - move feedpoint higher

Place in center of yard, reduce obstructions

Improve/have constant wiring pitch

Avoid bright orange wire (hihi)

Even more radials: many and long ones, try to attach to

Neighbours fences also





Now it's your turn to build it!

Questions?

How about a local 160M SSB net this winter? ;-)

Thanks!

Erick VE2LRZ