Pioneer Amateur Radio Association

P.O. Box 330
Glenville, WV 26351

ParaPhrase

President corner . . .

I must say it is good to be doing the newsletter again. It has definitely been awhile. I hope everyone is doing fine and hope to hear you on the air soon. If you haven't heard, we have done some worked on the repeater. Check it out when you get a minute. I am working on putting up a new repeater in Preston County, still in the coordination phase, but coming along. I hope to link it with the 5.29 machine and it will offer coverage from Jane Lew to Washington, PA. I will keep you posted on progress. I hope everyone has a great month. I look forward to the June newsletter. 73'

Ed N8OYY

Upcoming Events

May 6th - TCARC Hamfest - Ripley, WV
May 18th - Dayton Hamvention - Xenia, OH
June 2nd - West PA ARRL Convention - Prospect, PA
July 1st - Somerset County PA Hamfest - Somerset, PA
August 18th - Tri-State ARA Hamfest - Huntington, WV
August 24th - WV State ARRL Convention - Weston, WV
September 1st - PA State ARRL Convention - Uniontown, PA
September 9th - Butler County ARA Swapfest - Butler, PA
September 22nd - Coal County ARA Hamfest - Madison, WV
October 13th - Parkersburg/Wood Hamfest - Mineral Wells, WV

Local VHF repeaters

-145.29 WB8WV (91.5) - Glenville
-145.45 N8LGY (107.2) - Grantsville
-145.39 N8MIN (No pl) - Weston
-146.655 K8VE (123) - Flatwoods
-146.85 K8VE (103.5) - Buckhannon
+147.030 N8ZAR (103.5) - Buckhannon
+147.06 W8OO (103.5) - Crawford
+147.300 WV8RAG (107.2) - Pennsboro

Pioneer Amateur Radio Association Meeting - April 14, 2018

Members present: Eugene Allen KG8KQ, Ed Messenger N8OYY & Steve Ostaff AB8CR

No treasurers report was presented due to Edsel being absent.

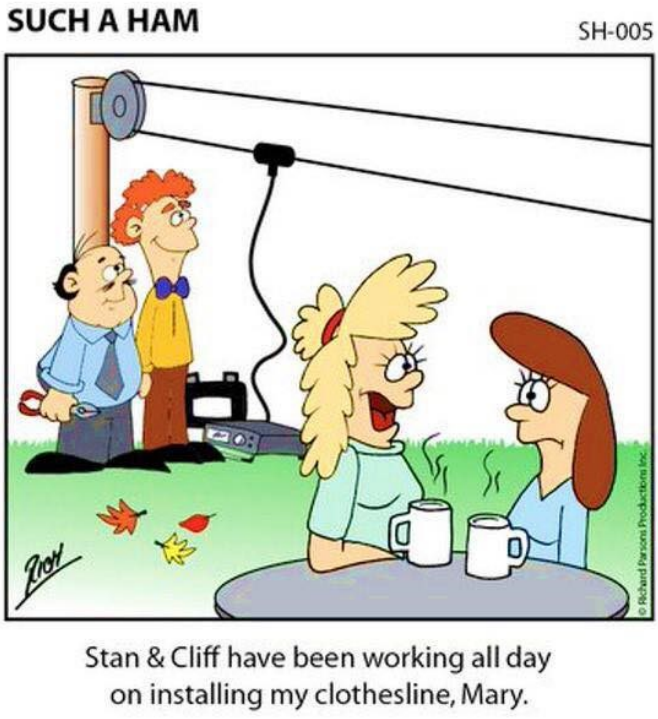
This meeting was informal due to the number of members who attended. Ed Messenger mentioned that he and Eric KD8JPE accomplished at the repeater site earlier in the day. The output of the repeater was increased from about 7 watts to 60 watts. Everyone should see a big improvement.

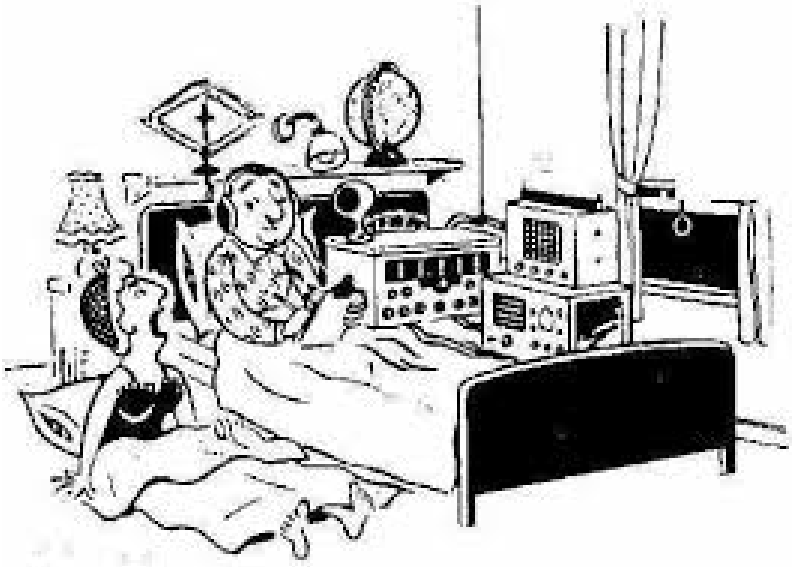
Ed also mentioned that he had heard that the President of the ARRL will be attending the WV State ARRL Convention this year at Jackson's Mill. Dan Ringer, WV Section Manager is requesting all clubs to encourage as many amateurs as possible to attend the Convention to show a large support for him and to listen to his presentation. The Date of the Convention is August 24th. The time for his presentation will be released closer to the event.

Ed, mentioned that he will be out of town this year during the weekend of Field day. Steve suggested that the club should participate in Field day. Currently there is no plan to participate as a group.

Otherwise no club business was done.

Ed Messenger, N8OYY
President





The Super Slinky

Inverted-L Antenna for Top Band

Work 160 meters from a suburban lot with this limited space antenna.

Dave Ahlgren, K1BUK*

Returning to Amateur Radio after a hiatus of more than 40 years, I was eager to give Top Band a try. While the long wavelength of the 160-meter band (a half-wave dipole is 260 feet long) was problematic for my limited-space suburban lot, it didn't have to be a showstopper.

I decided to try a K6MM vertical helix and sequester it in some trees at the rear of my lot.[1] Even though antenna analyzer measurements were encouraging, contacts were few and far between, and the signal reports that I received were no better than those of my 88-foot center-fed doublet. In spite of the sparsity of contacts, I felt the idea had promise and decided to further develop the concept using Arie Voor's free *4nec2* antenna simulator.[2]

The "Super Slinky" Helix is Born

My first step was to model an increase in the helix diameter, which caused the helix to take on the appearance of a giant version of the classic 1940s toy — hence the moniker. The helix serves as the vertical element of an inverted-L antenna.

To avoid segment length error warnings from the antenna simulator, the segments must be longer than one-thousandth wavelength. At 1.825 MHz, this is about 6½ inches.

*Third-place winner in the 2017 *QST* Antenna Design Competition, 160 Meters and Lower Frequencies category

“Eager to give Top Band a try in my limited-space suburban lot, I decided on a K6MM vertical helix. The increase in the helix diameter caused the helix to take on the appearance of a giant version of the classic 1940s toy.”

The Super Slinky helix is 23 feet long and has a diameter of 16 inches. The helix has 18 equally spaced (15-inch pitch) turns of #12 AWG THHN solid copper wire. In the NEC simulations, I approximated the Super Slinky by a seven-sided helix. This yields a segment length slightly longer than 7¼ inches, eliminating the *NEC* segment length warnings. I used the *Build* program, which the *4nec2* download includes, to generate an NEC description of the helix.

Helix Construction

1 Assemble five X-shaped spreaders from 18-inch lengths of 5/16-inch diameter fiberglass rod (see Figure 1A). Drill 9/64-inch holes in the rods an inch from each end, along with a 1/8-inch hole in the middle of each rod. The end holes are for paracord drop lines that form a framework to support the helix, and the center hole is for connecting the two cross pieces. The spreader rods at the top and bottom of the helix are held fixed at a 90° crossing angle by four short lengths of paracord, while the three other spreader rods are only constrained by a pin through the center connecting hole.

2 Begin helix construction by cutting four 30-foot lengths of 1/8-inch paracord and tying them together at one end (see Figure 1B). Stretch out the cords and tie them between two secure supports at least 25 feet apart. You will have to untie and retie one end during the assembly process, so loosely tie that end to its support. Thread the free ends of the cords through one of the two squared spreaders, and push the spreader along the cords nearly to the end.

3 Add the three unconstrained spreaders and add the second squared spreader. Slide the spreaders to their final positions with the square end spreaders 23 feet apart and the three other spreaders equally spaced every 5 feet 9 inches. Tie the ends of the spreaders to the cords using short lengths of #18 AWG wire.

4 Use a piece of chalk to mark the helix tie points on the cords. Because the pitch is 15 inches, the tie points will progress by one quarter of the pitch, or 3¾ inches from cord to cord.

5 Wind about 85 feet of #12 AWG THHN solid wire around a round object about 16 inches in diameter to form a coil. Keep the coil from unwinding with a piece of masking tape. Untie one end of the assembly and slide the coil over the paracord drop lines.

6 Attach the wire to the drop line framework by first stretching out the coil over the full length of the cords. Starting at one end, tie the helix to the drop line at each chalk mark, using 3-inch lengths of #18 AWG solid wire. Leave 18-inch wire leads at each end of the helix, and solder wire lugs onto each end. When you're done, there should be about 75 feet of wire in the helix.

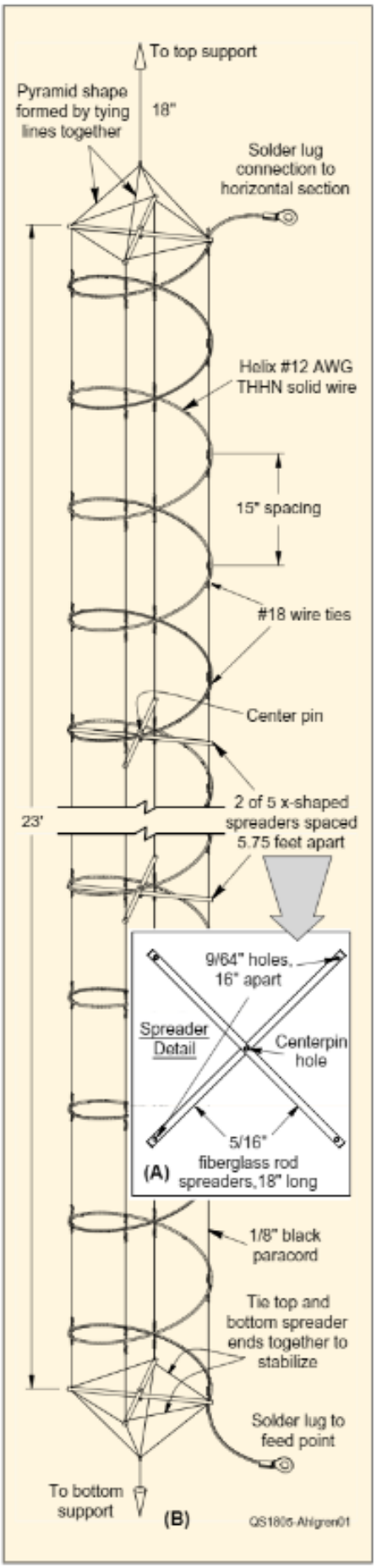


Figure 1 — At (A), fiberglass rods pinned in the middle support the Super Slinky helix. At (B) are Super Slinky helix construction details.

Radials, Feed, and Installation Details

The Super Slinky Inverted-L requires ground radials for adequate performance. My installation (see Figure 2) has four 71-foot radials and four 130-foot radials. Radials in the wooded area are laid on the ground, and those that extend into the lawn are buried just below the surface. Three of the long radials were bent into non-regular shapes to stay within my property. All radials are tied together at the base of the helix where they are attached to an 8-foot ground rod. The antenna is fed with 200 feet of RG8/X, which lies on the ground. A ferrite choke balun on the coax 130 feet from the antenna base allows the coax shield to serve as a ninth radial.

The helix is suspended from a pulley arm at the top of a guyed 27-foot ABS mast. A tree limb free of lower obstructions would work as well. The last 26 feet of the 139-foot horizontal element is bent to remain within my property. The matching capacitor consists of a 200 pF mica transmitting capacitor in parallel with a 200 pF surplus variable capacitor, which are housed in a plastic box at the base of the mast.

I completed the installation by trimming a bent segment length for an R of 50 Ω, as indicated by my RigExpert AA-54 antenna analyzer, and then adjusting the matching capacitor for minimum SWR at 1.825 MHz. The measured SWR curve is shown in Figure 3. The minimum SWR of 1.18 occurs near 1.82 MHz and the bandwidth is approximately 80 kHz for an SWR of less than 2.

Results

The Super Slinky Inverted-L was installed in late November 2016 and, over the following 4 months, I made nearly 600 Top Band contacts, including 185 contacts in the ARRL 160-Meter Contest using only 100 W. I have also used the antenna on both 80 and 40 meters by obtaining a match with my transceiver's internal antenna tuner. [*See the "QST in Depth" web page for more information on modeling and design development of the Super Slinky Inverted-L. — Ed.*]

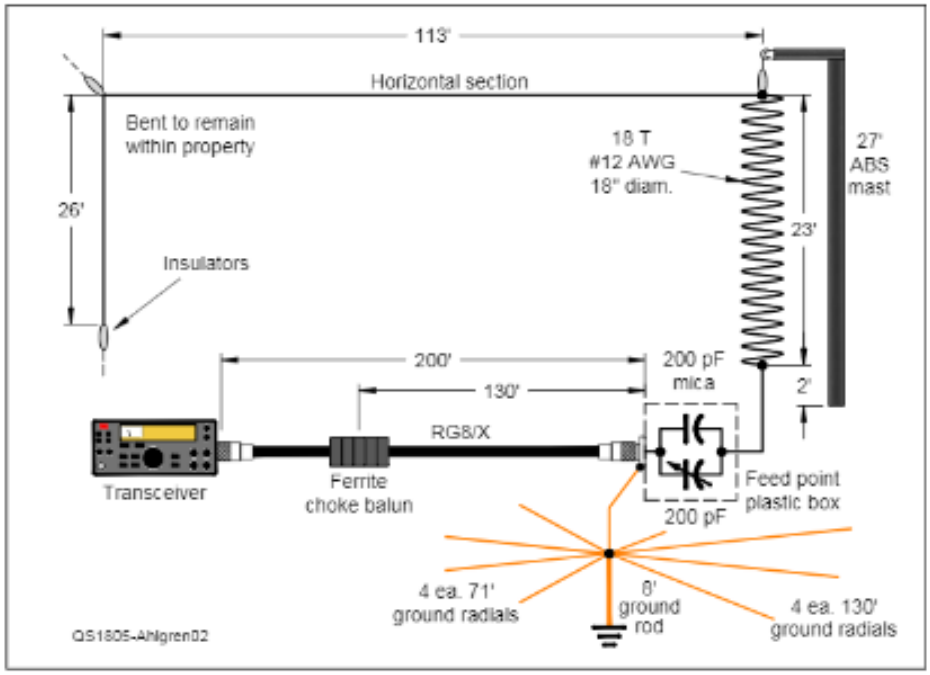


Figure 2 — The Super Slinky Inverted-L installation.

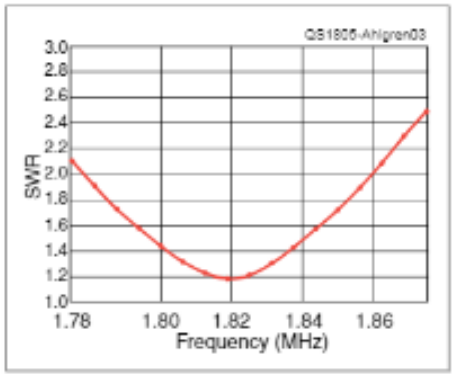


Figure 3 — SWR plot of the Super Slinky Inverted-L antenna.

Notes

[1]J. Miller, K6MM, "The No Excuses 160 Meter Vertical," *QST*, June 2009, pp. 32 – 36.

[2]http://www.qsl.net/4nec2/

Photo by the author.

ARRL member and Amateur Extra-class licensee Dave Ahlgren, K1BUK, got his Novice call sign, KN1BUK, in 1957 and operated as K1BUK from 1958 – 1967. He held the call sign W8IXX while pursuing a PhD in electrical engineering at the University of Michigan. Dave was a professor at Trinity College in Hartford for 41 years, retiring in 2014. In 2015, he came back to ham radio, first holding the Amateur Extra-class call sign AB1XY, and then K1BUK. Dave enjoys designing and optimizing antennas using *4nec2*, especially for the 160-meter and 6-meter bands. Since returning to ham radio, he has earned the WAS and DXCC awards.

For updates to this article, see the *QST* Feedback page at www.arrl.org/feedback.