# MOUNTAIN SPARK GAPS

**NPARC—The Radio Club for the Watchung Mountain Area**

**Website: http://www.nparc.org**
**Club Calls: N2XJ, W2FMI**
**Facebook: New Providence Amateur Radio Club (NPARC)**

## December 2023

Volume 56 No. 12

## Regular Meetings

Second & Fourth Mondays

Dec 12 - Business Meeting at SBS & Zoom
Dec 25 - SBS Closed for the holidays.

## *Upcoming Events*

*Check Reflector & www.nparc.org for details.*

Digital Net Mondays at 9 PM – 28.086 MHz (+/-)
CW Net, Thursdays at 9 PM – 28.050+QRM

## Meeting Schedule

**Regular Meeting:** 7:30—9:00 PM
**2nd & 4th Monday**
**of each month**
Watch for Emails

**Everyone is Welcome**
If a normal meeting night is a holiday, we usually meet the following night.
Call one of the contacts below or check the web site

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## Club Officers for 2023

President: K2UI, Jim Stekas
908-868-4970
Vice President:W2EMC Brian DeLuca
973-543-2454
Secretary: K2AL: Al Hanzl
908-872-5021
Treasurer: K2YG Dave Barr
908-277-4283
Activities: KC2OSR, Sam Sealy
973-635-8966

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## On the Air Activities

Club Operating Frequency
145.750 MHz FM Simplex

Sunday Night Phone Net
Murray Hill Repeater (W2LI) at 9:00 PM
Transmit on 147.855 MHz
With PL tone of 141.3 Hz
Receive on 147.255 MHz
Net Control K2AL

Digital Net
Mondays 9 PM
28,084 — 28,086
Will be using PSK and RTTY
Net control K2YG

## Club Internet Address

Website: http://www.nparc.org
Webmaster KC2WUF David Bean
Reflector: nparc@mailman.qth.net
Contact K2AL, Al


## MOUNTAIN SPARK GAPS

Published Monthly by NPARC, Inc.
The Watchung Mountain Area Radio Club
P.O. Box 813
New Providence, NJ 07974



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Acting Editor: K2UI Jim Stekas
Contributing Editors:
WB2QOQ Rick Anderson


# Climatological Data for New Providence - Oct 2023

The following information is provided by Rick, WB2QOQ, who has been recording daily weather events at his station for the past 43 years.

**TEMPERATURE -**

Maximum temp this October, 78 F (Oct 4)
Last October(2022) maximum was 70 F.
Average Maximum temp this October, 64.3 F

Minimum temp this October, 40 F (Oct 24)
Last October(2022) minimum was 34 F.
Average Minimum temp this October, 50.4 F

Minimum diurnal temp range, 4 F (51 - 47 F)10/14
Maximum diurnal temp range, 21 F F (61 - 40 F)10/24,
F (74 – 53 F)10/26

Average temp this October, 57.4 F
Average temp last October, 53.4 F

**PRECIPITATION -**

Total precipitation this October– 2.93” rain
Total precipitation last October– 5.12” rain

Maximum one day precip. event Oct 30, 0.68” rain.
Measurable rain fell on 11 days this October
14 days last October.

YTD Precipitation – 46.22”

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Rick Anderson 11/22/2023
243 Mountain Ave.
New Providence, NJ
(908)464-8911
rick243@comcast.net

Lat = 40 degrees, 41.7 minutes North
Long = 74 degrees, 23.4 minutes West
Elevation: 380 ft.
CoCoRaHS Network Station #NJ-UN-10

# President's Column

Ria Jairam, N2RJ, gave an excellent talk on Amateur Radio Digital Communications (www.ardc.net) at out Nov 27 meeting. I had read about 44-Net (portal.ampr.org) and the large number of class-A IP addresses allocated to ham radio that they manage, so I expected a technical talk about discovery, ad-hoc networking, etc. It was a real eye-opener to learn of the enormous investment ARDC is making in amateur radio and STEM using funds raised from selling off a large block of IP address allocated in the 1980's. I had grown used to reading about the latest SDR circuit board development project begging for crowd-source funding. But ARDC isn't four nerds hacking away in a dorm room, it is a well funded and professionally managed organization tackling significant problems.

The annual NPARC Holiday Luncheon is just around the corner. We will hold our traditional awards ceremony followed by Zita's ice cream cake (which has become a new tradition.) Details are:

| | |
|---|---|
| When: | Saturday, Dec 9, from noon-3pm. |
| Where: | The Vintage Tavern<br>342 Valley Road<br>Gillette, NJ |

The Dec 11 business meeting at Salt Brook School will be our last meeting of the year. On the agenda are:

- Sam Sealy (KC2OSR) and Heather Speas (K4DH) reporting on the results of their survey for suggested programs and activities.
- Kevin Glynn (N2TO) will remind us of the arrangements for Kid's Day and raise any outstanding support issues.

73 and Happy Holidays,

Jim – K2UI

# December 2023 Contest Calendar

***Dave Barr - K2YG***

| Contest Name | Dates | Mode | Exchange | Notes |
|---|---|---|---|---|
| FT Roundup | Sat 12/2 1pm – Sun 12/3 7pm | FT4 FT8 | RST+State/Prov<br><br>DX (incl KH6 & KL7: RST+ serial | Classes: Single Op Unlimited; Multi-Op<br>Max Power: 100w for all<br>See rttycontesting.com/ft8-roundup/rules for details. |
| ARRL Ten Meter Contest | Fri 12/8 7pm – Sun 12/10 7pm | CW Fone | W/VE/XE RST+State/Prov<br><br>DX: RST+serial | Rules and details at: http://www.arrl.org/10-meter |
| Feld Hell[1] Sprint | Fri 12/15 7pm – Sat 12/16 7pm | Feld Hell | FH#-QTH-Grid<br><br>FH# easily applied for at web site. | Rules and details at https://sites.google.com/site/feldhellclub/Home/contests/sprints/low-down-sprint<br>A different radio experience! |
| Stew Perry 160 M CW | Sat 12/30 10am-Sun 12/31 10am | CW | Grid Square (4 characters} | Rules and details at: http://www.kkn.net/stew/ |
| ARRL Straight Key Night | Sun 12-31 7pm-Mon 1-1-24 7pm | CW | Normal QSOs using straight keys or bugs, | No scores. Submit standard log. For details see: http://www.arrl.org/straight-key-night |

Popular Radio Contests in December, 2023

1. Feld Hell is a text mode utilizing a fax-like display, available in FLdigi software. Not a very popular mode. A Feld Hell member number is easily obtained from https://sites.google.com/site/feldhellclub/

2. More contests and detailed information are available through WA8BNM's Contest Calendar website: https://www.contestcalendar.com/

Good Luck -- Dave, K2YG

# Optimized Wideband Antenna

***Jim Stekas - K2UI***

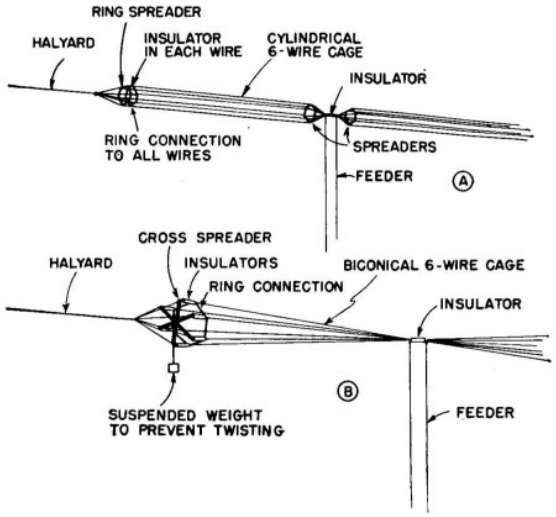
Constructing an 80m antenna that works across the entire band is a longstanding problem for the radio amateur. Two factors make this a challenging problem:

1. The bandwidth of the 80m band is about 13% of the center frequency. In contrast, the bandwidth of the 40m band is only 4% of the center frequency.
2. The Q of a half wave 80m dipole antenna made of #10 wire is very high, roughly 15. This results in a bandwidth of about $6\% = 1/15$ , which only provides a good match over half of the band. To cover the entire band the antenna Q must be cut in half.

The Q of a dipole is given the ratio of the characteristic transmission line impedance of the wire divided by the radiation resistance of the dipole. For an 80m half-wave dipole using #10 wire:

$$Q = \frac{120 \ln(\lambda / D_{wire})}{75} \quad ,$$

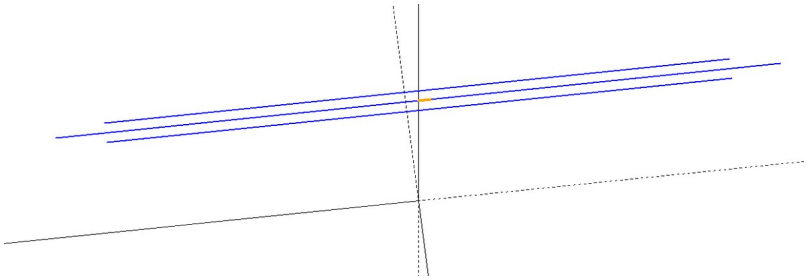
which gives $Q_{80\,m} \approx 15.5$ .




Early solutions to the problem involved multi-wire "cage" dipoles (right) which lowered the antenna Q by increasing the effective diameter of the antenna wire $(D_{wire})$ . A cage diameter of 1 foot would lower the Q to 7.7 and increase the bandwidth to 13%. Cage antennas were very popular with hams in the early 1920s when operations were mainly on 160 and 80m.

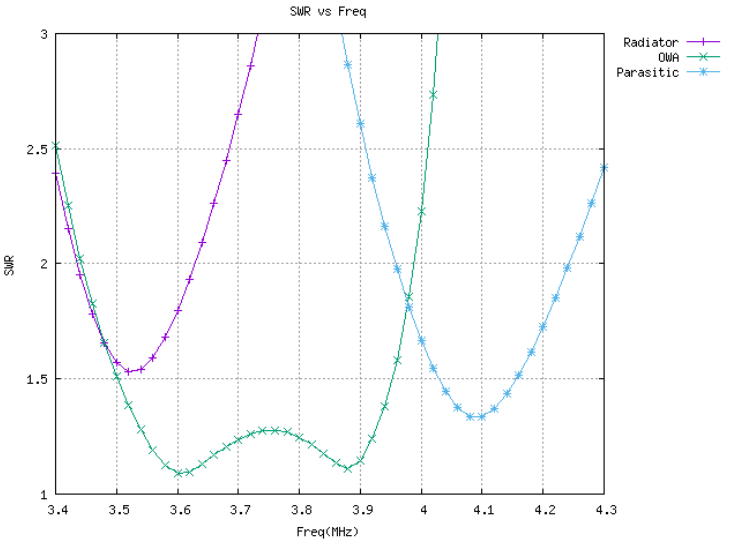
Hanging a single wire 80m dipole is challenging enough, and in recent years broadband matching networks are much preferred over a multi-wire cage antenna. Broadband matching involves adding resonant elements at other frequencies to the antenna to create multiple dips in the SWR across the band. The broadband match could be accomplished with LC networks, transmission line stubs, or "bazooka dipoles" with coaxial elements in the legs of the dipole. All these approaches have been well described in QST and the ARRL Antenna Book.

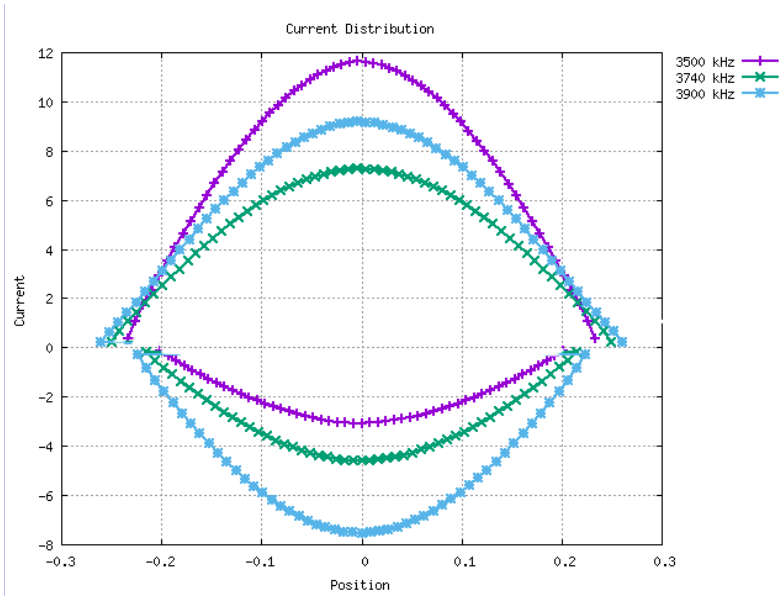
New to the 2024 ARRL Antenna Book is the Optimized Wideband Antenna (OWA) design. The idea behind the OWA is to add parasitic elements parallel to the dipole radiator. By tuning the radiator to 3.5MHz and the parasitic elements to 4MHz, a broadband 80m antenna with a "double-dip" SWR can be constructed. The coupling between the radiator and parasitic elements is controlled by the spacing, which is 2ft in the design discussed below.



| Parameter | Value |
|---|---|
| Radiator | 40.78 m |
| Parasitics | 35.16 m |
| Spacing | 2 ft. |
| Wire #10 | 2.5 mm |

The figure at right shows the SWR[1] for the radiator, parasitics, and combined OWA. Note that the radiator is tuned for 3.5Mhz while the parasitics are tuned for 4.1Mhz. When combined in the OWA, the coupling between the radiators and parasitics pulls the resonances toward the center of the band. The SWR is less than 1.5 across the full 80m band.

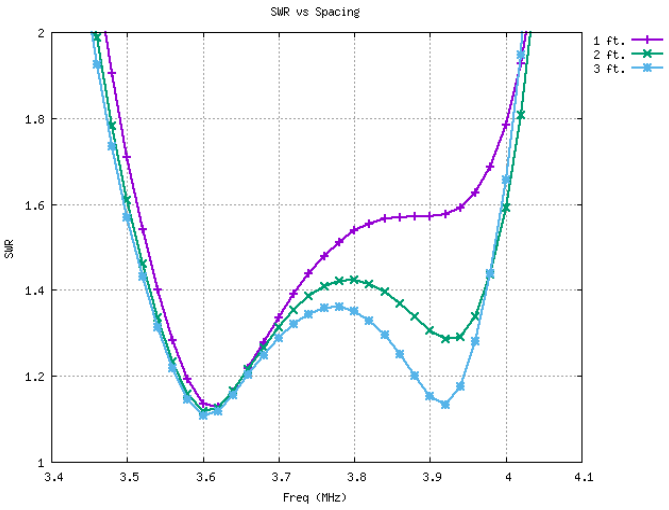



The plot at left shows the current distribution in the radiating (positive) and parasitics (negative) wires at different frequencies.

At 3.5 MHz the current in the radiator is much higher than the parasitics (purple line). At 3.9 MHz, more current[2] is carried by the shorter parasitics (blue line).

The figure at right shows the effect of varying the spacing between the radiator and parasitic elements. A 3 ft. spacing gives a slightly better SWR profile than a 2 ft. spacing, but the improvement in SWR is hardly worth the additional unwieldiness. A 1 ft. spacing is a bit worse at high frequencies, but still has a perfectly satisfactory SWR profile. The reduced complexity may be well worth a small increase in SWR.




1 The OWA has an impedance around 100 ohms. The SWR is calculated assuming a 3:2 balun to step down to 50 ohms.
2 The plot shows the current for a single parasitic. Their combined current is twice what is plotted.

## References


1. “Innovative Wideband Techniques in Antennas”, Prof. Jim Breakall, WA3FET, May 2016 presentation at the Dayton Hamvention. - A very thorough review of OWA techniques. Available at http://www.k3lr.com/Dayton/Dayton2016/wa3fet.pdf
2. “The Story of the Broadband Dipole”, Dave Leeson, W6NL, QEX Nov/Dec 2018. Excellent overview of broadbanding techniques with an long list of useful references.
3. The K3LR Superstation uses OWA Yagi antennas, and DX Engineering sells them. Check out K3LR’s Dayton antenna links: http://www.k3lr.com/Dayton/