

# **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)**

**VOLUME 54 NO. 12 December 2019**

## **Regular Meetings**

**1/13 & 1/27 Monday 7:30  
DeCorso Community Center**

## **Upcoming Events**

**Kid's Day  
Saturday  
1/4/2020**

**Auction  
Saturday  
2/22/2020**

## Meeting Schedule

**Regular Meeting:** 7:30—9:00 PM  
**2nd & 4th Monday  
of each month** at the  
NP Senior & Adult Center  
15 East Forth Street  
New Providence

### 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

## Club Officers for 2018

President: W2PTP Paul Wolfmeyer  
201-406-6914  
Vice President: K2GLS Bob Willis  
973-543-2454  
Secretary: K2AL: Al Hanzl  
908-872-5021  
Treasurer: K2YG Dave Barr  
908-277-4283  
Activities: KC2OSR Sam Sealy  
973-635-8966

## —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

First & Third 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](mailto:nparc@mailman.qth.net)  
Contact K2UI, Jim

## MOUNTAIN SPARK GAPS

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Editor: K2EZR Frank McAneny  
Contributing Editors:  
WB2OOQ Rick Anderson  
W2PTP Paul Wolfmeyer  
K2UI Jim Stekas

## Climatological Data for New Providence for November 2019

The following information is provided by  
Rick, WB2OOQ, who has been recording daily  
weather events at his station for the past  
38 years.

### TEMPERATURE -

Maximum temperature this November, 69 deg. F  
(November 1)  
Last November (2018) maximum was 71 deg.  
F.  
Average Maximum temperature this November,  
48.6 deg. F  
Minimum temperature this November, 19 deg. F  
(November 13)  
Last November (2018) minimum was 16 deg. F.  
Average Minimum temperature this November,  
32.0 deg. F  
Minimum diurnal temperature range, 6 deg.  
(40-34 deg.) 11/18  
Maximum diurnal temperature range, 30 deg.  
(69-39 deg.) 11/1  
Average temperature this November, 40.3 deg.  
F  
Average temperature last November, 42.3 deg.  
F

### PRECIPITATION -

Total precipitation this November - 2.23"  
rain  
Total precipitation last November - 8.19"  
rain/melted snow; 5.5" snow

Maximum one day precip. event this November  
-  
November 24, 0.81" rain  
Measurable rain fell on 10 days this Novem-  
ber, 12 days last November.

YTD Precipitation - 58.08"

=====

Rick Anderson

12/18/19

243 Mountain Ave.  
New Providence, NJ  
(908) 464-8911

[rick243@comcast.net](mailto: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 December 2019

Before I recap what has been a fine NPARC year, let me call attention to two upcoming events:

Saturday January 4 is Kid's Day, starting about noon with setup. Contact Kevin, K2TO, if you haven't already, so he knows how you can help.

Saturday February 22 is our annual auction at New Providence High School, with setup starting at noon. We will be doing our planning at our January club meetings.

And now for the recap—

We gained some new (and returning) members— Craig WB2BOI, Doug KD2QXX, Brian KD2SND, and Francesco KD2SRL. We hope they find great value and friendship in their NPARC membership.

But we were saddened by the loss of two members: Jim Brown WB2EDO and Jon Pawlik AE2JP. Jim was active in many of our meetings and activities, particularly the auction—always a firm welcoming handshake. Jon brought us our “tester project” and good technical insights.

Activity wise--Barry, K2JV, coordinated and ran an excellent Kids Day on January 5<sup>th</sup>. Kids were active and engaged on VHF and Morse Code learning.

Our auction on Saturday February 23 went well with attendance about 100, sales good, and everyone seemed to enjoy it.

A new event for us was the New Providence Makers Day at the library in March. Kevin N2TO worked with folks on Morse Code; we had card displays, demonstrations including FT8, and sample projects for “Makers”.

Our participation in the New Providence Memorial Day Parade, led by Rick WB2QOQ, was solid.

Field Day weekend was wonderful weather! We ended up first again in the Northern New Jersey Section for Class 2A. About half of our points were due to “extras” like visiting dignitaries, publicity, etc...but it all counts... Thanks to everyone who participated whether before the event, setting up, operating, helping with food, securing extra points, submitting info and the scores...

Our ARRL Hudson Division Director Ria Jairam N2RJ gave us a presentation on the ‘State of SDR’ in September. It was good to have her with us. And it's always good to have the Vice-Director (and NPARC member) Bill Hudzig W2UDT with us.

And the Holiday Luncheon was great as always--congrats to the award winners:

Ken Hanzl, W2IOC, as Ham of the Year—he's active in hamming but also in other public service such as the VFW—he's commander of the Montville unit.

Brian Smith, KD2SND, as Rookie of the Year—he's gotten engaged in hamming quickly.

Guy Brennert, K2EFB, received the Wouff Hong—he retired this year as our regular nominating committee chair. (He also turned 90!)

I thank Brian Lynch, KA2MPG for his excellent work finding and bringing us regular and varied programs for the meetings. We've learned (and sometimes laughed) at the interesting programs. Sam KC2OSR will become our Activities Manager.

The rest of the officers remain the same for 2020. I thank Bob K2GLS, Al K2AL, and Dave K2YG for all the tasks they have done, many behind the scenes, for the club. Our monthly meetings as an officer core have helped guide the club.

And Frank K2EZR, Rick WB2QOQ, and Jim K2UI get kudos for their consistent work with the Spark Gaps!! And David KC2WUF keeps our website going—thanks!

And thanks to all of you members. I think our club stays successful because you all pitch in willingly to make our activities happen.

Best wishes for 2020.

73 for now

Wolf W2PTP

201-404-6914 or W2PTP@arrl.net



This is the only photo I received from our Holiday Luncheon. W2IOC being awarded the Ham of the Year certificate.

## Dummy Loads

Jim Stekas - K2UI

One antenna that every ham needs is a “dummy antenna”, or “dummy load” in modern ham terminology. A dummy load is essential for verifying transmitter performance for three reasons:

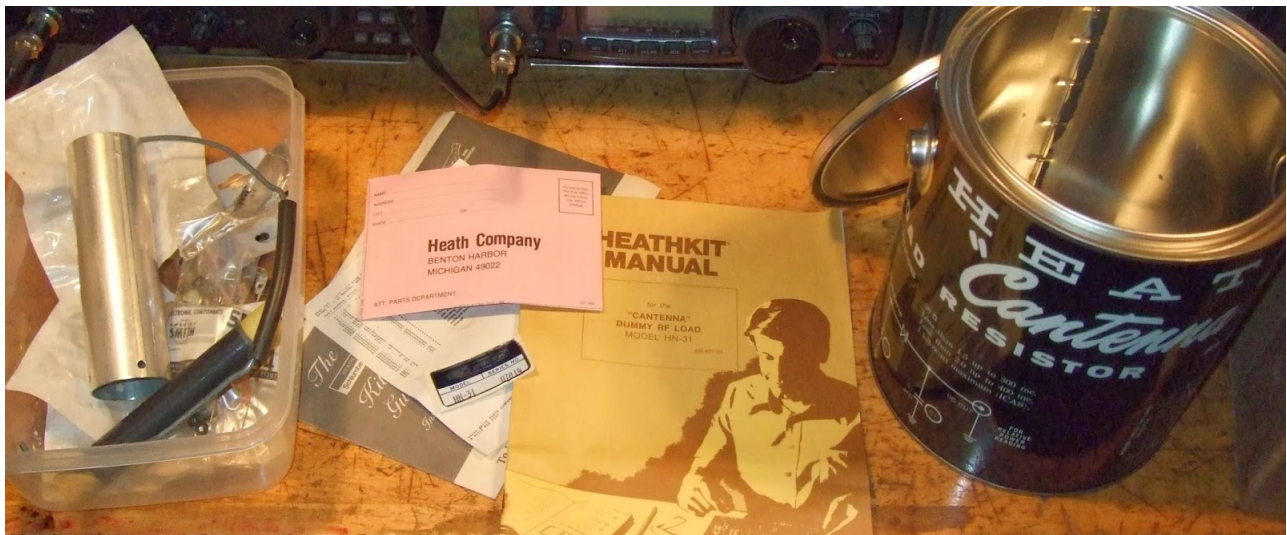
1. it provides an ideal load ( $SWR \sim 1$ ) for testing a transmitter at full power,
2. while not radiating an over-the-air signal,
3. but with enough leakage to allow the signal to be monitored.

The earliest description in my library for a “dummy antenna” is in the 1939 ARRL Handbook. The load resistance is provided by an incandescent light bulb chosen to “shine with normal brightness” under full transmitter load. Various link couplings are suggested for hooking the bulb to the transmitter. Brightness gave a coarse relative power measurement when tuning up, or an RF ammeter in series with the bulb could be used for more precise measurements. In those times there were no SWR meters (or coax) and hams only concern was that “the antenna would load”, meaning they could tune their TX tank circuits for a good match.



As a new novice my first homebrew project was a dummy load using a 40W light bulb (figure left). No SWR meter, no balun, no problem. Just load up and make contacts.

From the early 60's, Heath offered a dummy load (figure below) called the Cantenna, essentially a paint can with a large cylindrical  $50\Omega$  resistor immersed in transformer oil to dissipate the heat. The Cantenna was rated at 1kW at a 50% duty cycle.





Transformer oil was sold in 55 gallon drums, and it was not possible for a ham to buy just one gallon, but it was easy to get it for free. It seemed that every other issue of QST had a story of a ham getting a free gallon of oil from a friendly power company employee. Unfortunately, all that free transformer oil was contaminated by PCBs, carcinogenic chemicals that were not controlled until 1980. (Heath's PCB warning is at right.) Mineral oil was a safe (non-free) alternative but at a reduced maximum power rating.

## WARNING

Transformer oil contains significant amounts of polychlorinated biphenyl (PCB). The chemical is used to improve the heat resistance properties of the oil.

If you use transformer oil in your Cantenna, be very careful when you handle the oil. Wash your hands after you fill the pail, and keep the oil away from food and children.

If the Cantenna overheats, turn off the RF power device immediately, and make sure you do not breathe any vapor from the overheated oil.

Contact your local oil company and/or power company for advice on disposing of used oil.

The above does not apply to mineral oil, since it does not contain PCB.

Bird produced a large number dummy loads under the Termaline product name. These have the same basic design as the Cantenna, but with much higher power and bandwidth ratings<sup>1</sup>. Termaline loads have been PCB free since 1980, and just about any Termaline you find at a hamfest should be safe. A 50  $\Omega$  oil filled Termaline will have a low SWR over 1GHz and cost you a \$1/watt (continuous key-down). The price drops dramatically for Termalines with impedances other than 50  $\Omega$ . I picked up two 300 W, 125  $\Omega$  Termalines very cheaply and run them in parallel through an N-connector tee. The result is a dummy load with an SWR of 1.25 that will dissipate 600 W all day long. (At right a well used Model 8201, 500W, 0-2GHz. \$300 on Ebay.)



The big market for dummy loads these days is wireless telecoms, which require coverage up to 3GHz and power levels in the 30-100W range. The cheapest way to meet these requirements is to start with a rugged 100W resistor (figure left, about \$3 on Ebay) and marry it to a beefy heat sink similar to what you might find on a 100W transceiver. These are called “dry” loads to distinguish them from the liquid cooled designs.

<sup>1</sup> A few Termaline loads (e.g. Model 8255) are designed to operate in a single microwave band and may not work across the ham bands. Look up the model number on you smart phone if you have any doubt.

Below are examples of modern dry loads from Pasternack<sup>2</sup> with dissipation ratings of 25-100W continuous duty and decent SWR up to 18GHz.



Pasternack is known for high quality parts and high prices that are beyond the reach of most hams. The DL-30A (below) is rated at 15W continuous and 100W peak, at a cost of \$40 from DX



Engineering. (A “comparable” part from Pasternack would cost roughly 10X as much.) Loads such as the DL-30A are cheap and convenient, but they can be fragile. Exceeding the rated limits will heat up the load resistor and melt the solder connections resulting in an open circuit. That will not only destroy the load, but possibly the amplifier driving it if it doesn't have good SWR protection.

Homebrewing a dummy load is cheap and easy. The most expensive part of a dummy load, by far, is the heat sink. But heat sinks are also pretty easy to scavenge from junk power supplies and amplifiers. Computer CPU's are also a good source of heat sinks. CPU coolers with powerful fans are incredibly effective and are finding applications outside the PC.

Below right is a picture of a dummy load constructed by sandwiching an RF load resistor between two scrap Pentium 3 heat sinks during the NPARC Sunday night net. The load is a Filtronic 921-0028 (sample laying on top) which includes a metal housing for the resistor, and about 10” of hardline terminating in an SMA. The part is rated for 100W peak from DC-3GHz.

I suspect the configuration shown would easily handle 30W continuous, but that's not backed up by thermal measurements.

Total cost \$10.

