

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 55 No. 5 May 2022

Regular Meetings

**Second & Fourth Mondays
6/13 Salt Brook School Cafeteria
6/27 ZOOM**

Upcoming Events

**Digital Net Mondays at 9:00 PM
PSK on 80 or 10 meters
CW training Net, Thursdays at 9:00 PM
6/25—6/26 Field Day
Governor Livingston HS field
Berkeley Heights
Watch for Email announcements.**

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

Club Officers for 2022

President: W2PTP Paul Wolfmeyer
201-406-6914
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
973-462-2014

—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 K2JV, Barry

MOUNTAIN SPARK GAPS

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WB2OOO Rick Anderson
W2PTP Paul Wolfmeyer
K2UI Jim Stekas

Climatological Data for New Providence for April 2022

The following information is provided by Rick, WB2OOO, who has been recording daily weather events at his station for the past 40 years.

TEMPERATURE -

Maximum temperature this April, 84 deg. F
(April 14)
Last April (2021) maximum was 76 deg. F.
Average Maximum temperature this April, 60.0 deg. F
Minimum temperature this April, 32 deg. F
(April 18)
Last April (2021) minimum was 27 deg. F.
Average Minimum temperature this April, 41.6 deg. F
Minimum diurnal temperature range, 6 deg.
(51 - 45 deg.) 4/7
Maximum diurnal temperature range, 29 deg.
(66 - 37 deg.) 4/30

Average temperature this April, 50.8 deg. F
Average temperature last April, 52.1 deg. F

PRECIPITATION -

Total precipitation this April- 4.79" rain
Total precipitation last April- 2.15" rain

Maximum one day precip. event this April-

April 7, 1.76" rain.

Measurable rain fell on 15 days this April, 13 days last April.

YTD Precipitation - 14.4"

=====
Rick Anderson
5/28/2022
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 May 2022

As I'm writing this, we have just completed our NPARC march in the New Providence Memorial Day Parade, our role ably again orchestrated by Rick Anderson, WB2QOQ. Weather was terrific; we had eleven participants and looked good! Some of us finished with the lunch at the American Legion hall next to the library.

Meetings in May focused on Field Day planning, and our participation is coming together—the tasks are getting filled out! I hope you are planning to participate with the club. I'll be distributing the spreadsheet as we get closer to the event on June 25 and 26 at Governor Livingston High School (back lot). We are posted on the ARRL Field Day Locator.

“Manager” positions are filled:

| | |
|-----------------------|------------------------------------|
| Near Field HF Station | Kevin Glynn N2TO |
| Far Field HF Station | Sam Sealy KC2OSR |
| VHF Station | Rick Anderson WB2QOQ/Al Hanzl K2AL |
| Network (Computer) | David Bean KC2WUF |
| Food Manager | me |
| Publicity | Al Hanzl K2AL |
| Overall Manager | me |

As I said last month, we do not plan to have a GOTA (Get On the Air) station. Getting new and recent hams on the air is an important and valuable part of Field Day (in my view perhaps the most important aspect of Field Day). We plan to integrate that role in the Far Field HF station. The “logger” function is a good one to really get engaged. Ask any of the “managers” how the “logger” function works—it's not difficult—much easier than in pre-computer days!

Our setup begins at 9 AM on the 25th—we need all hands on deck... There are some changes in the site structures that will affect antennas, etc. But leave the visits to the “managers” or their designees. Any visit must be out of school/activity hours and, if someone else is present, LEAVE. We don't want to risk losing our approval of the site!

Club members have always stepped up and done what they said they would—a hallmark of our club. Besides all the tasks, though, plan on operating and/or logging!

Response to the request for donations to offset the cost of the “ARRL memorial bricks”, to honor Andy and Guy, has been excellent.

73 Wolf W2PTP w2ptp@arrl.net 201-404-6914

Finally Took the POTA Plunge

I finally took the plunge into the POTA pool. The ARRL promoted the NPOTA National Parks on the Air program in 2016 and POTA has run with it since. POTA, Parks on the Air, started as a small group of USA based volunteers who created the rules, infrastructure, and database since NPOTA. POTA is now worldwide. I have loved operating portable for many years so POTA is a perfect fit.

I created an account on the POTA site <https://parksontheair.com/> and discovered I already logged QSOs as a Hunter. A hunter is a station that contacts a portable station, an Activator, who activates a park. I worked some Activators on FT4 and FT8 prior to making my account. Parks include national and state parks and are listed on the POTA site under Maps of Entities. An Activator will work portable anywhere in the confines of the park, make at least 10 contacts within the same UTC day and email an ADIF log to their area coordinator for that activation. POTA is currently working on an automated upload solution. I recommend reading the excellent documentation found under Help/Getting Started.

I have done four activations thus far: three at Jockey Hollow and one at one at Wildcat Ridge Wildlife Management Area in Rockaway Township. The station consists of my trusty Icom IC-703, PowerSonic 7ah SLA battery, 10 watts PEP on 20 Meters phone to a half-wave dipole with coax choke setup as an inverted-vee. The feed point heights have been 22/23' and 16'. Thus far I made 85 QSOs to 20 states with 3 DX entities (Germany, Puerto Rico and Italy). I have additional antennas with ferrite chokes to work with as well so I will be experimenting. I tried a 60' end-fed wire with a 16.5' radial to the MFJ-929 auto tuner and it was brutally noisy.

What I really like about POTA is I can schedule my activation on the POTA site in advance. Once I am ready to get on the air I spot myself. After calling CQ, hunters are already looking to work me. It is like I am the DX station. When working portable it's a real blast to have stations looking to work me versus tail ending existing QSOs and searching for CQs.

I log to a Mead 6" x 9.5" notebook and add QSO data to N3FJP AC Log later. Specifics that need to be in the ADIF file along with the log naming convention are listed in Help/Getting Started. I find it easier to log to paper in this instance, but looking into software that may work with my Chromebook. Scott N3FJP has a nice config file on his site for POTA use. I modified that file as you will see in the screen shot. The Activators are the only station required to submit a log. I create ADIF (*.ADI) files for each activation, name properly, email to K2 coordinator then import them to my regular AC Log. I use two of the "Other" fields in AC Log to keep track of my park number and another Activator's park if I work them. That is known as Park to Park, P2P. I add location data to TQSL for new parks I activate and upload QSOs to LoTW from my main AC Log. Everything works super-duper.

On Saturday morning, 21 May I worked 10 QSOs in 33 minutes. The last station, K9ICP, was my first station in another activation four hours later at Wildcat Ridge. I also worked K9ICP previously. While working the AR QSO Party, David KC2WUF heard me thanking stations and signing off from Jockey Hollow. The next time I am out and about I will let the club know. I am making a new linked dipole for 40 and 20 Meters and wondering what a cloud burner would do on 40 Meters, wanting to work nearby states. I am finally going to use the W2DU Maxwell type choke I bought from The Wireman at Timonium years ago. If you see a station on FT4/8 calling CQ POTA please try to work them. Likewise, if you hear a station on CW or phone give them a call. Come into the pool, the POTA water's fine.

73 Kevin N2TO

Recent Contacts

44 Listed QSOs

| Rec# | Call | Date / Time | Bnd | Mode | Power | Snt | Rec | O | Coun... | ST | Cou... | Name | O. | R | Comments |
|------|--------|------------------|-----|------|-------|-----|-----|---|---------|----|--------|-------|----|---|----------|
| 14 | K4ADS | 2022/04/30 19:24 | 20 | SSB | 10 | 59 | 59 | | USA | FL | | | N | | |
| 13 | K2ITZ | 2022/04/30 19:23 | 20 | SSB | 10 | 59 | 58 | | USA | SC | | | N | | |
| 12 | KA4OQU | 2022/04/30 19:21 | 20 | SSB | 10 | 59 | 59 | | USA | FL | | Wayne | N | | |
| 11 | AE4AW | 2022/04/30 19:17 | 20 | SSB | 10 | 57 | 44 | | USA | FL | | Mike | N | | |
| 10 | K0IJZ | 2022/04/30 19:16 | 20 | SSB | 10 | 55 | 55 | | USA | MN | | | N | | |
| 9 | N4QET | 2022/04/30 19:14 | 20 | SSB | 10 | 59 | 59 | | USA | GA | | | N | | |
| 8 | K4YGD | 2022/04/30 19:13 | 20 | SSB | 10 | 58 | 59 | | USA | GA | | | N | | |
| 7 | K5ARE | 2022/04/30 19:12 | 20 | SSB | 10 | 59 | 57 | | USA | MS | | | N | | |
| 6 | N4GV/M | 2022/04/30 19:08 | 20 | SSB | 10 | 56 | 59 | | USA | AL | | Greg | N | | |
| 5 | AJ5C | 2022/04/30 19:07 | 20 | SSB | 10 | 58 | 57 | | USA | AR | | | N | | |
| 4 | AB4KN | 2022/04/30 19:07 | 20 | SSB | 10 | 59 | 57 | | USA | GA | | | N | | |
| 3 | AB6MB | 2022/04/30 19:06 | 20 | SSB | 10 | 59 | 59 | | USA | FL | | | N | | |
| 2 | KG2MM | 2022/04/30 19:04 | 20 | SSB | 10 | 57 | 55 | | USA | FL | | | N | | |
| 1 | K2ID | 2022/04/30 19:04 | 20 | SSB | 10 | 59 | 57 | | USA | FL | | | N | | |

Ready to begin!

NZTO 2022-04-30 K-0748 Morristown

Call Time On Sent Rec State SIG_INF Name Log Contact

Date Band Frequency Mode Power MY_SIG_INF Country

Bearing: Miles: Cont:

Comments

Spot Last

3:23 PM 5/24/2022 65°F

NPARC Field Day Filters

Jim Stekas - K2UI

When operating multiple stations on Field Day, mutual interference is inevitable. Consider that a received signal of -109 dBm has a level of S3, while a 100W transmitter puts out 50 dBm. That means 159 dB of signal suppression is required to prevent stations from interfering with each other. Coordinating operations to keep stations on different bands goes a long way, but out-of-band interference is still a problem. A transceiver operating on 40m will generate harmonic interference on 20m, 15m, and 10m. Even if no external interference in the 40m band, a 40m receiver is still susceptible to intermod products from strong out-of-band signals. The key to interference suppression is to filter each station so that it only transmits and receives in the band it is operating on.

Thirty years ago we operated Field Day with an older generation of equipment with less dynamic range and higher levels of PLL phase noise than for transceivers made today. Following a QST article¹ in Sept 1988 we embarked on a club project to build two 5-pole Butterworth filters, for 80m, 40m, 20m, 15m, and 10m. For several years filters were used with some success, but issues (real and otherwise) arose. Tools to sweep and debug filters were not readily available at that time and the filters fell into disuse.



Recently, these filters miraculously reappeared in a cardboard box. I used my Nano VNA to sweep them and found that most worked as designed. One had an open solder connections, and another an open capacitor, and they were easily repaired. For each filter I measured:

- SWR – At the filter input when terminated with 50 Ohms.
- Return Loss – The fraction of input power reflected from the filter. (Related to SWR.)
- Insertion Loss – The fraction of input power that doesn't make it to the output.

¹ "Bandpass Filters for HF Transceivers" by K4VX, QST Sept 1988.

The table below shows the Return Loss (in-band) and the Insertion Loss over all the bands for each filter.

| Filter | Return Loss (dB) | Insertion Loss (dB) | | | | |
|--------|------------------|---------------------|------|------|------|------|
| | | 80m | 40m | 20m | 15m | 10m |
| 80m | -20 | -0.6 | -70 | - | - | - |
| 40m | -28 | -42 | -0.3 | -58 | -60 | -60 |
| 20m | -18 | -80 | -50 | -0.4 | -31 | -70 |
| 15m | -27 | -80 | -73 | -38 | -0.6 | -34 |
| 10m | -22 | -75 | -75 | -55 | -4 | -0.2 |

The filters attenuate out-of-band energy between 30 and 80dB. The one exception is the 10m filter which has negligible attenuation of 15m signals. This is because the bandwidth of the filters are approximately 30% of the center frequency, and 15m is in the transition band of the 10m filter.

Note that in-band insertion loss is -0.6 dB or better. At 100W input, 0.6 dB is 15W, and one might assume this would go toward heating the filter. But the filters are made of purely reactive components² which do not dissipate energy. Almost all of the power characterized as insertion loss is reflected back to the source. A negligible amount of heat is dissipated by the filters.

Operating With the Filters

Here are a few guidelines for using the filters during Field Day.

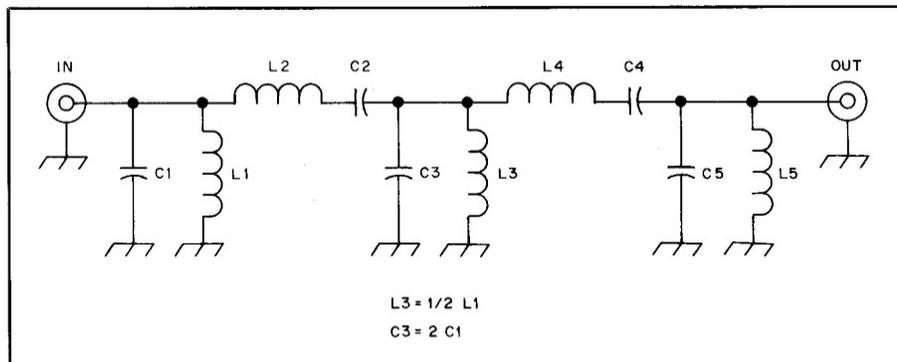
1. Tune antennas *without filters* before Field Day begins. Write down (or store in memory) the tuner settings for the frequencies of operation so the antenna tuner can be set to a close match before applying power through the filter. (This is good practice whether you are using a filter or not!)
2. The filters are designed to be terminated by 50 Ohms at *both input and output*. Therefore the *filters must be placed between* the transceiver and antenna tuner. An internal antenna tuner will not work well with the filters.
3. Make certain the *filter matches the band being operated*. Using the wrong filter is equivalent to disconnecting the antenna! (Don't rely on your rig's fold-back circuit to protect you.)
4. When terminated in 50 Ohms the filters show an SWR between 1.2 and 1.5, *not 1.0*. Your autotuner may tune the SWR to 1.0, but the filter will "kick it up a notch" and the transceiver will report a slightly higher SWR. If your tuner is manual you can adjust it for a minimum reading on the transceiver's SWR display.

² The Q of the filter toroids (mix #6) is about 200, so act almost like pure inductances.

Field Day Filter Design

The figure below shows the schematic of the field day bandpass filter. The input is connected to the output through two series resonant circuits (L_2+C_2 and L_4+C_4) shunted by three parallel resonant circuits ($C_1||L_1$, $C_3||L_3$, and $C_5||L_5$).

At resonance, all the parallel tuned circuits have high impedance and the filter looks like two series resonant circuits providing a low impedance path between IN and OUT. In the stop band the impedance of the series tuned circuits becomes high, blocking the flow of current from IN to OUT. Further the parallel tuned circuits will have a low impedance, shunting signals to ground. The result is that signals in the stop band will be strongly attenuated by the filter.



Component values are shown in the table below. Note that the filter is symmetric. IN and OUT can be swapped with no effect.

| Band (MHz) | C1/C3 (pF) | C2 (pF) | L1/L3 (μ H) | L2 (μ H) | T-68-6 core | | T-80-6 core | | F_r (MHz) |
|---------------|---------------|------------|---------------------|------------------|----------------------|----|----------------------|----|----------------|
| | | | | | L1/L3 (no. turns) | L2 | L1/L3 (no. turns) | L2 | |
| 1.8 | 4000 | 400 | 2.2 | 22 | 22 | 69 | 23 | 70 | 1.75 |
| 3.5 | 2000 | 200 | 1.1 | 11 | 16 | 48 | 16 | 50 | 3.38 |
| 7 | 1000 | 100 | 0.55 | 5.5 | 11 | 35 | 11 | 35 | 6.78 |
| 14 | 500 | 50 | 0.28 | 2.8 | 8 | 25 | 8 | 25 | 13.56 |
| 21 | 330 | 33 | 0.18 | 1.8 | 7 | 20 | 7 | 20 | 20.65 |
| 28 | 250 | 25 | 0.14 | 1.4 | 6 | 17 | 6 | 18 | 27.39 |

If all the component values are as specified, and all the resonant circuits are tuned to the same frequency, then the internal reactances will cancel and when OUT is terminated with 50 Ohms and the transmitter will see 50 Ohms at the IN terminal (SWR of 1.0). In practice, the values of the components will have 10-20% tolerances and series and parallel circuits will all be tuned to slightly different frequencies. As a result, reactances won't cancel perfectly and the SWR at in IN port will be slightly greater than 1.0.