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 53 NO. 4 April 2020

Regular Meetings

"ZOOM" in May
See President's column
N P Borough Hall
Third Floor Conference Room

Upcoming Events

Memorial Day Parade
Cancelled!
Field Day?

Meeting Schedule

Regular Meeting: 7:30—9:00 PM
2nd & 4th Monday
of each month at the
New Providence Hall
Elkwood Ave. NP
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
Contact K2UI, Jim

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WB2QOQ Rick Anderson
W2PTP Paul Wolfmeyer
K2UI Jim Stekas

Climatological Data for New Providence for March 2020

The following information is provided by Rick, WB2QOQ, who has been recording daily weather events at his station for the past 38 years.

TEMPERATURE -
Maximum temperature this March, 73 deg. F (March 20)
Last March(2019) maximum was 74 deg. F.
Average Maximum temperature this March, 53.9 deg. F
Minimum temperature this March, 21 deg. F (March 1)
Last March(2018) minimum was 16 deg. F.
Average Minimum temperature this March, 37.7 deg. F
Minimum diurnal temperature range, 4 deg. (48-44 deg.)3/29
Maximum diurnal temperature range, 34 deg. (66-34 deg.)3/26

Average temperature this March, 45.8 deg. F
Average temperature last March, 40.5 deg. F

PRECIPITATION -
Total precipitation this March - 3.75" rain.
Total precipitation last March - 4.25" rain/melted snow; 12.0" snow.

Maximum one day precip. event this March -

March 19, 1.07" rain
Measurable rain fell on 16 days this March, 6 days last March.
Measurable snow fell on 0 day this March.

YTD Precipitation - 9.18"

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Rick Anderson
4/21/2020
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 April 2020

Again—a month of change for NPARC!! No in-person meetings. A ZOOM meeting! A new CW net! I hope you are well, following the guidelines and staying safe.
The most intriguing thing to me about last Monday's ZOOM meeting was how much we all appreciated **seeing** each other. I should not be surprised—after a month of isolation, we are all anxious to see friends. We had a chance for quick sharing of situations, activities, etc.
I thank the 24 participants for following the basic "directed net" style we used, as I have heard of ZOOM meetings where many are trying to talk at once and some cannot get a word in edgewise. Our "ham communications discipline" pays off.

I have scheduled May ZOOM meetings for May 11 (our regular meeting night) and May 26 (the Tuesday after Memorial Day). I will put the meeting information on the "reflector" as the meeting approaches. Start time will be 7:30PM.

The New Providence Memorial Parade has been cancelled due to COVID-19 assembly guidelines/rules. Unfortunately, this would be the 300th anniversary of the founding of New Providence.

Field Day 2020: as you know, we lost our Governor Livingston High School location, and alternatives were being explored. Thanks, particularly, to Hillary for some discussion with GLHS and looking at parks, etc. But uncertainty about assembly rules and reopening in New Jersey makes "operating Field Day as a club" a very "iffy" situation. And, as individuals, we may not wish the exposure risk.

Since Field Day is really about being able to set up and demonstrate emergency preparedness (and we are in an emergency), other options are possible. Many of us could operate as individuals either as Class D (regular home station) or Class E (emergency power). A limitation on Class D is that you cannot count /work other Class D stations; Class E can work all Field Day stations. (See ARRL Field Day Rules/information for more clarity.)

We'll be talking more about Field Day and your plans/thoughts on the next ZOOM meetings.
New CW Net on Thursdays: Dave, K2YG, has gotten this off to a great start. Thursday evenings at 8:30 or 9:00—check Dave's reflector messages.

As I said last month, being pretty well restrained to home base, **it's a good time to operate on the bands.** I've been trying to get my FT8 "state count" on 30 and 17 as high as I can (I'm up to 45 and 38 respectively.). And there is the digital net on Monday evenings to get your feet wet on. If you need help with any of these things, contact a club member (or contact me if you need a suggestion for who might be able to help). That's why we distributed a club roster with contact info! (And an updated roster is coming out soon.)

Let me know your thoughts as we navigate through this and stay safe and well… 73
Wolf W2PTP
201-404-6914 or W2PTP@arrl.net

Antenna Analyzer Tricks for Sheltering in Place

Jim Stekas - K2UI

Hand held antenna SWR analyzers are invaluable for trimming a new antenna to resonance. Between antenna projects they mostly serve as expensive paper weights and doorstops. But there are many other applications for your antenna analyzer, some of which are actually useful.

My situation may be atypical, but I have an ugly collection of coax of unknown type and length. For the most part they fall into two impedance classes: 50Ω and 75Ω. To find the impedance of an unknown coax, terminate it with a 50Ω resistor and measure the SWR looking into the feed point. If the SWR is 1 it is ***probably*** 50Ω coax. But ***any*** coax that is a multiple of ½ wavelength long will present the terminating 50Ω impedance at the input feed point giving an SWR of 1 reading on the analyzer. To verify the coax impedance we need to see how the impedance changes with length. By varying the frequency of the SWR analyzer allows we can vary the effective coax length. If the SWR is 1:1 at all frequencies (i.e. effective lengths) the coax's characteristic impedance is the same as the termination: 50Ω.

What happens if the coax is 75Ω? If we measure at a very very low frequency, the effective length of the coax will be very small and 50Ω will appear at the feed point resulting in a measured SWR=1. As the frequency is raised the effective coax length will increase and the SWR will rise until the coax is ¼ wavelength at the measurement frequency. The ¼ wavelength coax will transform the 50Ω termination to 112.5Ω, which will give an SWR reading of 2.25. Note that this is a measure of the quality of the match to 50Ω at the feedpoint and ***is not*** the actual SWR in the coax[1]. To measure the true SWR in the line we would need an analyzer designed for the CATV standard impedance of 75Ω, which would read a constant SWR of $1.5=\frac{75}{50}=\frac{112.5}{75}$ at all frequencies (i.e. effective lengths.) The table below shows expected SWR values for 50/75 Ω terminations on 50/75 Ω coax.

Measured SWR for Coax/Termination Combos		
	50Ω Coax	75Ω Coax
50Ω Termination	SWR = 1.0	1.5 < SWR < 2.25
75Ω Termination	SWR = 2.25	SWR = 1.5

A ½ wavelength of coax without any termination (open) will present an infinite impedance at the feed end. If we use a T-fitting to shunt the coax with a 50Ω terminator at the feed, the analyzer will measure an SWR = 1.0.

1 Generally, hams don't care about the actual SWR on their transmission line. When a ham talks about "getting an SWR of 1:1", the goal is getting a good match at the transmitter regardless of SWR on the line.

By adjusting the SWR analyzer's frequency, F, until the SWR=1.0 we can assume it is ½ wavelength long and derive its effective length from $L_{RF} = \frac{150\,m}{F_{MHz}}$. Typical coax has a velocity factor around 66%, which translates to a physical length of $L_{phys} \approx \frac{100\,m}{F_{MHz}}$. This can be a handy trick for measuring the length of a long roll of coax, or the length of a coax cable buried behind a wall. (Caveat: any multiple of ½ wavelength will give the same result, so check that F is the lowest frequency that gives an SWR=1.)

At right is a coiled coaxial cable I picked up at a hamfest. The duct tape wrapping the coil is marked 100 ft. (Right)

One end of the coax is open and the other end is connected to my MFJ SWR analyzer through a BNC tee connector. The other leg of the tee has a $50\,\Omega$ terminator. The analyzer doesn't have a digital frequency readout, but is has an output port for driving a frequency counter (brown cable at the top of the MFJ.)

After adjusting the MFJ frequency for an SWR of 1, we read a frequency of 3.349 MHz. Applying our formula gives a length of:

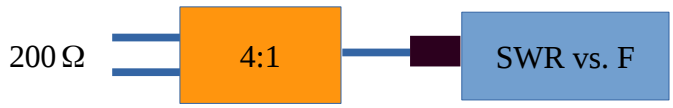
$$L = \frac{100}{3.349} = 29.9\,m = 98\,ft$$

The SWR=1 at a frequency of 13.877 MHz which would correspond to 2 wavelengths. Using this value gives a length of:

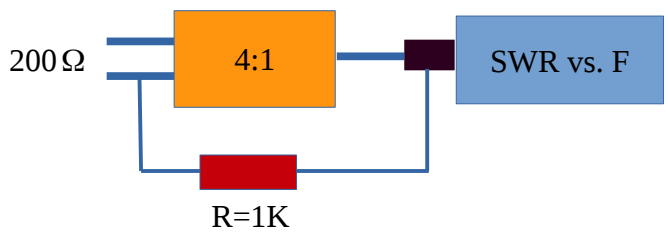
$$L = \frac{400}{13.877} = 28.8\,m = 94\,ft$$

Those estimates are consistent within 5%, not perfect but good enough to tell you whether the cable is long enough to reach your antenna feedpoint. (Assuming you know the distance to the feedpoint, which is probably unlikely.)

Another application for the SWR analyzer is measuring the bandwidth of baluns and transmission line transformers. The setup below can be used to sweep a 4:1 balun to determine the frequency range for which SWR<1.1, a reasonable definition of its bandwidth.



The purpose of a balun is to force equal currents into each terminal on the balanced side. A balun's "choking power" is its ability reject common mode currents caused by asymmetric ground paths from the two legs of the antenna. We can simulate this by adding a resistor between one of the balanced legs to the ground shield on the unbalanced side (see below). For current to flow in the bypass resistor R the must be an equal common mode current flowing through the balun. A perfect balun presents a very high impedance to common mode currents that suppresses current flow through the bypass resistor.



In the example above, the bypass resistor is 5X the impedance of the balanced side, and we would hope that an SWR sweep would give results close to that without a bypass. The smaller the value of R for which the SWR bandwidth is unchanged the greater the "choking power" of the balun.

How much choking power do you need? That's good thing to research to kill time between Zoom meetings.