

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. 12 December 2020

Regular Meetings

**Second & Fourth Mondays
“ZOOM” until we can all
get together again**

Upcoming Events

**Digital Net Mondays at 9:00 PM
PSK on 80 or 10 meters
CW training Net, Thursday at 9:00 PM
Watch for Email announcements.**

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
973-462-2014

—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
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 K2JV, Barry

MOUNTAIN SPARK GAPS

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Contributing Editors:
WB2OOO Rick Anderson
W2PTP Paul Wolfmeyer
K2UI Jim Stekas

Climatological Data for New Providence for November 2020

The following information is provided by Rick, WB2OOO, who has been recording daily weather events at his station for the past 39 years.

TEMPERATURE -

Maximum temperature this November, 71 deg. F
(November 10)

Last November (2019) maximum was 69 deg. F.

Average Maximum temperature this November, 56.1 deg. F

Minimum temperature this November, 24 deg. F
(November 19)

Last November (2019) minimum was 19 deg. F.
Average Minimum temperature this November, 40.5 deg. F

Minimum diurnal temperature range, 4 deg.
(52-48 deg.) 11/26

Maximum diurnal temperature range, 26 deg.
(59-33 deg.) 11/15

Average temperature this November, 48.3 deg. F

Average temperature last November, 40.3 deg. F

PRECIPITATION -

Total precipitation this November- 4.45" rain.

Total precipitation last November- 2.23" rain.

Maximum one day precip. event this November-
November 30, 1.75" rain

Measurable rain fell on 10 days this November, 10 days last November.

YTD Precipitation - 43.36"

=====
Rick Anderson
12/22/2020

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 December 2020

Location, location, location—problems that is...that's the way we started the NPARC year. Auction location, meeting location, field day location—all rejected or needing change. Well, the auction change worked out great with 110 attendees, 100 lots, and three hours of solid auctioning by Joe K2JAO. Wow!! And the other two location issues became moot with the ugly virus appearing.

We've adjusted with ZOOM meetings, good weekly nets, and Field Day from home. We've had good programs: Ron WB2GAI on operating from Crete, Gordon W2TTT on Mesh Networks, Jamieson N0FKK on DMR, Tim KD2EKN on the 2019 NYC Marathon, Carver W2TFM on MARS COMEX, Bob K2GLS on Kwajalein, and culminating with Bob Heil K8EID on music, sound reproduction, and antennas.

And in December we celebrated on ZOOM, recognizing some members:

Joe Reid K2JAO as **Master Auctioneer** for his work at this year's auction and, over a number of years, being lead auctioneer—his equipment description, sometimes interspersed with a story, and keeping the bidding moving and effective.

Don Madson K2DAM as **Rookie of the Year**. In spite of the virus, Don has gotten his Tech and General, studied and acquired equipment, and helped with pictures of Barry's equipment disposition with pictures.

Hillary Zaenchik KC2HLA and Eric Russell KD2ONY as **C0-Hams of the Year**. Hillary has served as Secretary of the club, pursued Field Day location alternatives, been an “over-ner” at past Field Days. Eric has jumped in with suggestions, including a formal proposal for a virtual auction. Both Hillary and Eric got engaged in VE work in a “parking lot methodology” to keep exams going under the virus.

Brian Lynch KA2MPG for Contributions as Activities Manager in 2018 and 2019. Brian sourced many you-tube programs ranging from radio history to technical to radio entertainment to radio astronomy to....He always had a program ready to go!

Sam Sealy KC2OSR for Contributions to the Club. Sam has regularly stepped up to serve the club—many times serving (pun intended) up the food and coordination of it for Auctions and Field Days. He has coordinated programs this year and secured Bob Heil through his diligence. Good news—Sam will continue as Activities Manager.

Al Hanzl K2AL presented the Wouff Hong to David Bean KC2WUF. David is a past president of NPARC, is our webmaster, and an avid operator, hitting 7 Band DXCC this year and making 10000 Qs during the year.

Congratulations to all award winners!

I would also like to thank James Kern KB2FCV for his preparing to help NP High School with audio for a socially distanced graduation ceremony. Since Gov Murphy changed the rules, we didn't implement the plan. However, it was an excellent statement of NPARC public service readiness.

And I would like to thank my fellow officers. Bob K2GLS for his you-tube, program, and auction support; Bob also got his 5BDXCC award this year. Dave K2YG for getting the CW net going, his auction treasurer work, and lots of digital net operation among other things. Al K2AL for all the Secretarial and publicity work, running the phone net every Sunday, and much more.

Well, I probably missed some things in "wrapping up" the year. We have tried to stay-the-course and adapt to the virus situation as best we could. I'd say we did pretty well. Use the situation to operate—that we can do while social-distancing. Best wishes for 2021,

73

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

Raspberry Pi in the Shack

Jim Stekas - K2UI

There is a famous scene in “The Graduate” where a savvy family friend offers Benjamin a single word of career advice, “Plastics.” Benjamin ran off with the girl next door never to be heard from again. Maybe if the advice was “Microprocessors” or “CMOS”, things would have turned out differently.

The first commercial microprocessor was the 4004, a 4-bit processor chip released by Intel in 1971 at a price of \$60. Since then advancements have proceeded along two different paths: microcontrollers and microprocessors.

Microcontrollers are low power, single chip processors with built in memory and multiple general purpose I/O ports (GPIO) for sensor input and control output. Most popular with hams are the PIC and AVR families of chips. Some common applications for these chips are iambic keyers and antenna analyzers that are powered by batteries. Most AVR projects are based on the Arduino, a circuit board in a standard form factor containing hosting an AVR chip, supporting circuitry and GPIO headers.

Microprocessors are computers-on-a-chip designed for general purpose computing. Today they power our laptops, desktops, smart phones, and servers. Perhaps the most widely used microprocessor today is the ARM¹ which powers most smart phones. The Raspberry Pi is a single board computer (SBC) with an ARM processor and peripherals in a standard form factor.

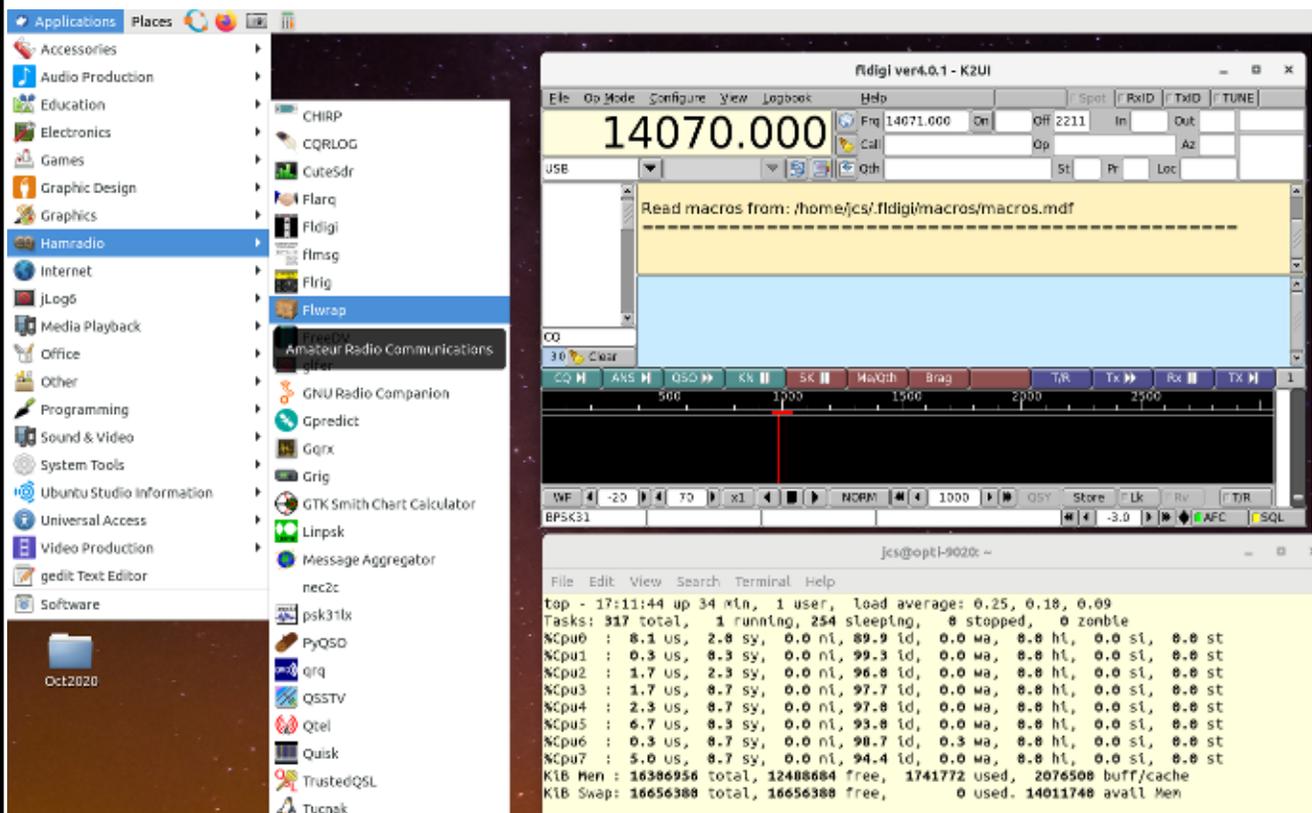
| | Arduino Mega 2560 | Raspberry Pi 4 |
|-------------|--------------------------|--------------------------|
| Processor | AVR 8-bit | ARM 32/64-bit |
| CPU Clock | 16 MHz | 1.5 GHz |
| Cores | 1 | 4 |
| OS | none | Raspberry Pi OS Linux |
| RAM | 8 KB | 2, 4, or 8 GB |
| “Flash” | 256 KB | Micro SD (32GB) |
| Networking | N/A | WiFi + 1G Ethernet |
| USB | N/A | 2x USB 2.0 2x USB 3.0 |
| Bluetooth | N/A | 5.0 |
| Display | N/A | 2x HDMI |
| Audio/Video | N/A | 3.5mm CTIA |
| GPIO | 54-pins | 17-pins |
| ADC / DAC | 8 / 10 | N/A |
| Power | 5V @ 15mA | 5V @ 3A |
| Price | \$10 | \$35-75 |

¹ The ARM is a design licensed by ARM Holdings that has been incorporated into many different chips.

The motivation for developing the Raspberry Pi (RPI) was to provide a platform for delivering low cost computing to students. Add an SD Card, power, keyboard + mouse, and connect it to the HDMI input of your HDTV and you have a fully functional computer for less than \$100. (The RPi also provides a composite video output, so a TV could serve as a display.) It can also function as a “headless” (no display or keyboard) computer with remote access through ethernet and/or WiFi. Many people use a RPi as a network media server hosting audio and video content.

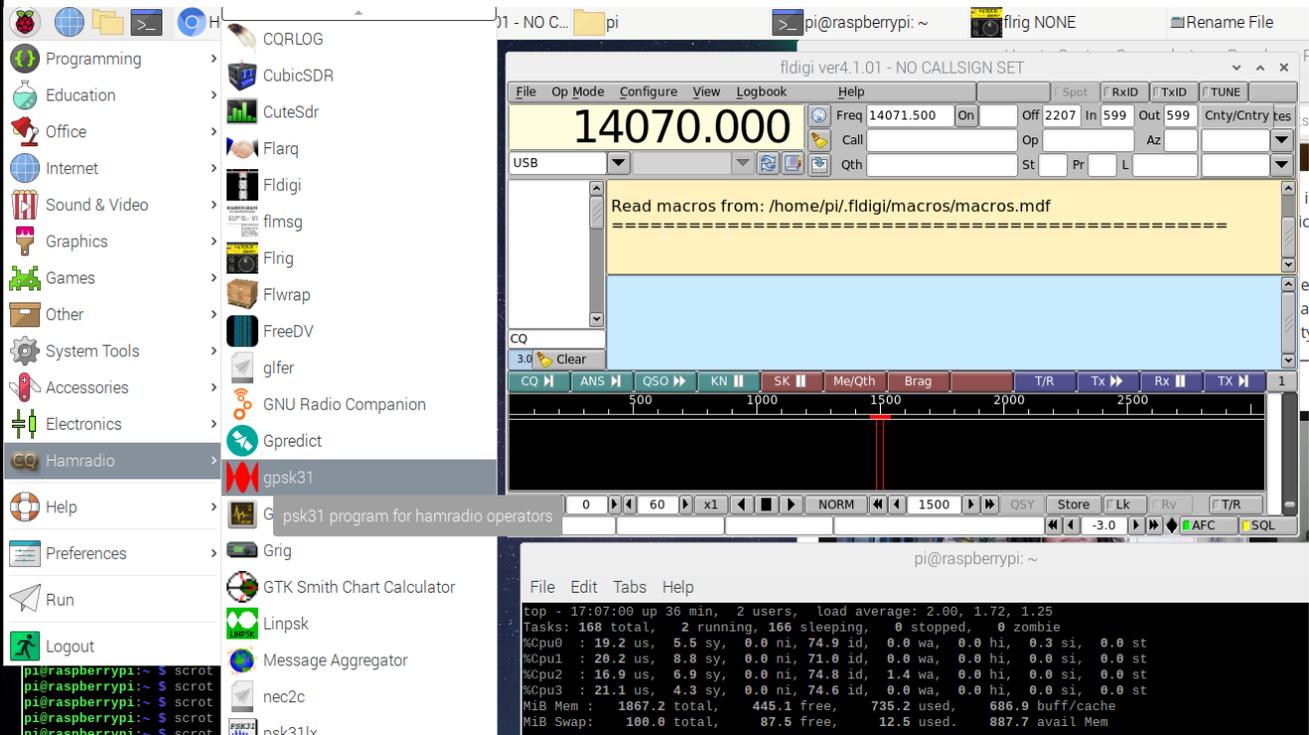
All the computers I use at work and home run Ubuntu (a popular Linux distribution) or Mint² (a lightweight Ubuntu derivative.) It turns out that Raspberry Pi OS and Ubuntu both derive from a common bleeding edge Linux distribution called Debian. As a result, Raspberry Pi OS and Ubuntu are like Chevy and Pontiac -- different logos but with the same interchangeable parts under the hood. Whatever I build and run on my Ubuntu PC can be run on the RPi: compilers, fldigi/flrig, WSTJ-X, nec2c, web server, file server, whatever. Except that antenna modeling is much slower on the RPi than my quad core i7, the differences between Raspberry Pi OS and Ubuntu are very minimal.

The figure below is the upper left corner of my Ubuntu desktop showing the ham radio apps menu, fldigi, and a monitoring program (“top”) showing loading on the i7 CPU cores.



2 I am writing this on a 12 year old Dell Mini 9 running Mint.

Below is the Raspberry Pi desktop showing the ham radio apps menu, fldigi, and ARM CPU core processing loads. (A Tom's Hardware video stream is playing out of view, hence the higher CPU load.)



For those of us who have drunk the UNIX kool-aid, Raspberry Pi OS fits like a comfy pair of old slippers. To quote the young girl in Jurassic Park, “It’s a UNIX system! I know this!” Those coming from the Windows world will have a bit of a learning curve figuring out where to point and click on Raspberry Pi OS. But most apps (e.g. fldigi and Firefox) are pretty much the same on Windows and Linux so it shouldn’t be too much trouble to make the transition. If you want to stick a toe in the Linux water, setting up an RPi is not a bad way to go. But re-purposing an old laptop is easier and cheaper, so it may not make sense bother with the RPi unless it solves some unique problem.

As a hacker, I have played around with the RPi on-and-off for 10 years but never had an good application that required it. My interest in the RPi was reinvigorated by an article in the Nov/Dec 2020 QEX about remote operation of an IC-7200 using an RPi and some standard apps. The key enabling SW is NoMachine, an app that exports a virtual display, keyboard, mouse, and audio (!) streams to a remote client. But what truly makes rig remoting possible is the Linux kernel that provides a multi-threaded symmetric multi-processing (SMP) environment. Building an equivalent capability with an Arduino would not be possible.



If you want to experiment with Raspberry Pi I recommend you duplicate my Raspberry Pi 4 setup which is shown above. I think it strikes a good balance between cost and performance. Here is the bill of materials:

1. Raspberry Pi 4 with 2GB of RAM (only a few more \$\$ than the Pi 3)
2. Raspberry Pi 4 case with robust heat sink and no fans.
3. 3A / 5V power supply and USB-C cable (top right wire with choke)
4. Mini HDMI adapter and HDMI cable (top left black cable)
5. 32GB micro SD card (Samsung PRO 100MB/s for \$9, not visible)
6. Logitech K400 wireless KB+mouse (RF USB dongle is just above white ethernet cable)
7. A free HDMI port on your HDTV or PC monitor (check!!)

All of the above are available on Amazon individually and/or in starter kits. Total cost of all the above will be about \$100 new. Considering that I recently bought a refurb Dell mini-tower with quad core i5, 8GB memory and a 1TB disk for \$125 the Raspberry Pi clearly isn't the most cost effective processing solution out there. But if we factor in the cost of power the Pi looks much better.

After the HW is assembled you will need to load the Raspberry Pi OS onto a micro SD card. To get the OS image go to <http://raspberrypi.org/software> and download the Raspberry Pi Imager and run it. For click on “CHOOSE OS” and select the first option, the standard Raspberry Pi OS with basic packages and GUI. Then click on “CHOOSE SD CARD” and burn the image to the micro SD.

Now that the OS is written, insert the SD card into the Pi, hook up all the cables and power up. You should see the boot up process on the monitor followed by some setup options: language, time zone, keyboard, WiFi password, etc.

Once you have the Pi running with the GUI you should:

1. run update to get all your apps up to the latest revision, then
2. select whatever additional applications packages you want (e.g. fldigi) and install them.

Don't reverse steps 1 and 2 or you will install old revisions which will then need to be updated anyway. Worse, you might try to install an outdated revision that is no longer on the server leading to “broken packages” that will be a pain for you to fix. There is copious documentation on the net explaining these steps and working through them on your own will be a good learning experience.

If you do acquire a Raspberry Pi, share your results, good or bad, on the NPARC reflector. Let's see how many Raspberry Pis we can get on the digital net.