

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 52 NO. 101 November 2018

UPCOMING EVENTS

Holiday Luncheon

12/2

Chimney Rock Inn, Gillette, NJ

Kids Day

1/7/2018 2:00—5:00 PM

See Inside

Regular Meetings

12/11

Monday 7:30

DeCorso Community Center

Meeting Schedule

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

Informal Meeting: 7:30—9:00 PM
4th Monday of each month
Same location

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 2016

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: Open

—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

Club Internet Address

Website: <http://www.nparc.org>
Webmaster KC2WUF david Bean
Reflector: nparc@mailman.qth.net
Contact K2UI, Jim

MOUNTAIN SPARK GAPS

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

Climatological Data for New Providence for
October 2017

The following information is provided by
Rick, WB2OOO, who has been recording
daily weather events at his station for the
past 36 years.

TEMPERATURE -

Maximum temperature this October, 83 deg. F
(October 5)

Last October (2016) maximum was 76 deg.
F.

Average Maximum temperature this October,
69.4 deg. F

Minimum temperature this October, 35 deg. F
(October 17)

Last October (2016) minimum was 31 deg. F.
Average Minimum temperature this October,
51.6 deg. F

Minimum diurnal temperature range, 3 deg.
(74-71) 10/9

Maximum diurnal temperature range, 27 deg.
(74-47) 10/21

Average temperature this October, 60.5 deg.
F

Average temperature last October, 55.9 deg. F

PRECIPITATION -

Total precipitation this October - 5.33"
rain

Total precipitation last October - 2.49"
rain

Maximum one day precip. event this October -
October 29, 3.57" rain

Measurable rain fell on 10 days this Octo-
ber, 11 days last October.

YTD Precipitation - 41.57" (includes rain +
melted snow; 22.25" snow as of 3/31/17)

=====
Rick Anderson
11/12/17

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-

Kid's Day

Barry just learned that the DeCorso center where we usually met will not be available on 1/7/18 as planned. However we can use the Berkeley Heights recreation facility which we used a few years ago. The date is still Sunday 1/7 (not 1/6 as in the attached President's Column). It is located on Park Avenue just off of Plainfield Avenue (same building as Municipal Offices and Police Department). There is plenty of parking and rest rooms are available.

Setup will begin at noon and operation will run from 2PM till 5PM unless we run out of kid (or energy) earlier.

Be there early if you expect to get warm Pizza.

President's Column November 2017

I recently read an article where the writer wrote that he didn't find "the magic" in FT8 that he had heard about. I don't know what the "magic" was that he was seeking. For me the word for the mode is "addictive".

I had downloaded the software but hadn't used it. When Bob Willis K2GLS shared a nice program about the mode during the first November club meeting, it motivated me to pursue it...it did take Bob's help in getting my computer handling it properly, but that's one of the benefits of being in a club—other members may be able to help you get through difficulties. The software has a great user interface, in my opinion. There is not confusion about the call signs as they are printed on the screen, stations calling CQ show with a color background, stations you have worked show with a green background, and signal reports are generated by the program.

In ten days I worked well over 150 QSOs including 14 countries and 44 states. Three or four of those days did have two or three hour long sessions—but, as I said, the mode is addictive. So give it a try! I have worked KC2WUF (who has well over 1100 QSOs in FT8) and I've seen Frank on the band. I've also worked Joe Taylor, K1JT, one of the developers of the mode.

On another note, we had our first project meeting in October on the DIY mega 328 Transistor Tester, Capacitance, Inductance ESR Meter brought to the club by Jon Pawlik AE2JP. Thanks to Jon for coordinating the project and to Jon and Brian Lynch KA2MP for the help (and doing) surface mount soldering. I think we had about eight club members purchase the kit. I'm pleased to report I got mine completed and working this week!

Next up is the holiday luncheon December 2.

The auction is set for SATURDAY February 24th at 1:30 at New Providence High School. Set up will start about 11:30. And Kids Day will be SATURDAY January 6th in Berkeley Heights.

Remember--the HF Digital" net continues—first and third Monday of the month at 9PM...for help, I'd suggest Dave K2YG, David KC2WUF, Al K2AL, or Bob K2GLS as possible mentors—talk to them or to me.

73 for now

Wolf

W2PTP

201-404-6914 or W2PTP@arrl.net

HF Receiver Evolution

Jim Stekas - K2UI

Audio recording began about 100 years ago with the introduction of wax cylinders and disks. It didn't take long for discs to displace cylinders, not because of superior performance but because disks could be manufactured much more cheaply than cylinders.

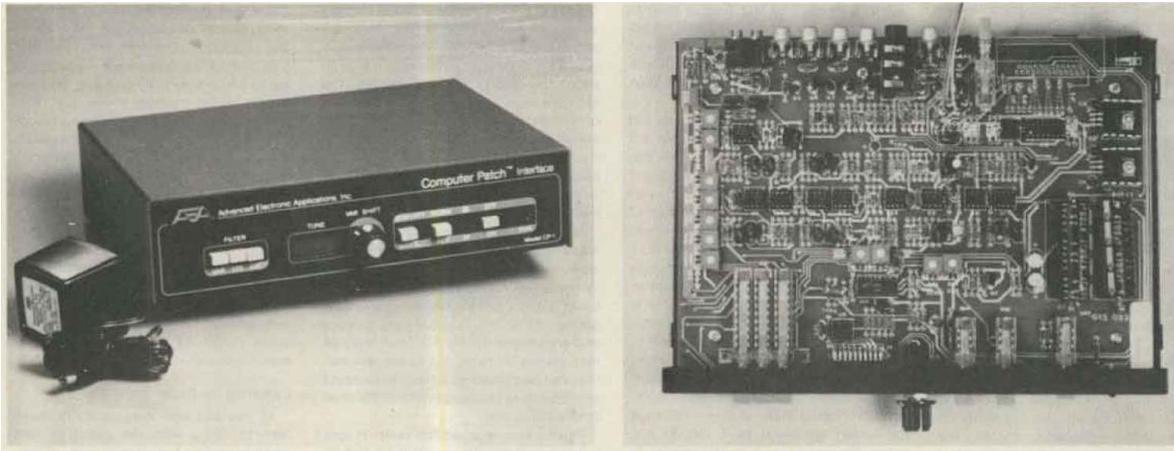
In the 1950's, the first transistors hit the market. They were costly little beasts and mostly found their way into military applications where rugged low powered devices were required. Eventually better transistor manufacturing processes improved the quality of devices and reduced their cost to the point where they were more economical than vacuum tubes. By the late 1970's costly tubes were completely displaced by cheap transistors except in special applications like power amplifiers and CRTs. Within integrated circuits transistors were so cheap that circuit designers routinely found ways to replace resistors with transistors in their circuits. Improved performance is great, but cheap wins every time!

A common ham project in the 1960's was building audio filter using capacitors and surplus 88mH toroidal loading coils from the Bell System. Loading coil filters were used for a host of different applications including narrow bandwidth SSB and CW filters as well as RTTY demodulators. Back in the day the coils could be had for \$1/each but today you will be hard pressed to find one for less than \$30.

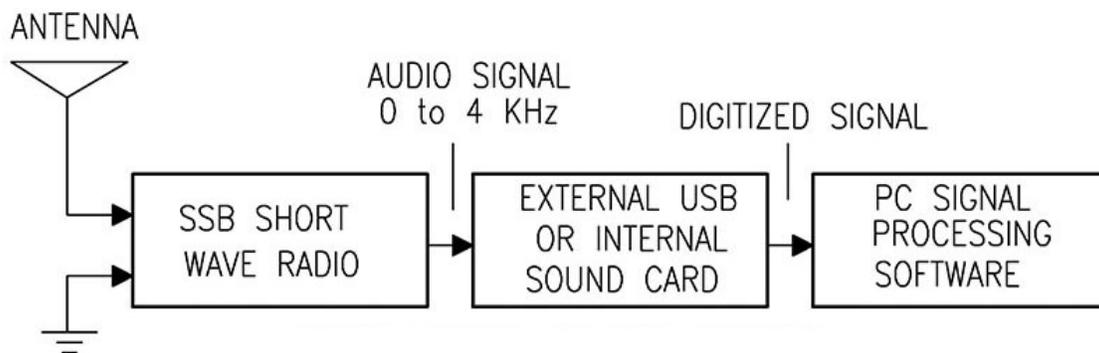


The figure above shows the stacked loading coil filters for the RTTY mark and space tones. A simple comparator selects the filter with the strongest output to produce a digital TTL signal (+5v for mark and 0v for space) which was fed to mechanical (e.g. a Model 35) or CRT (e.g. Dataspeed 40) teleprinter for display.

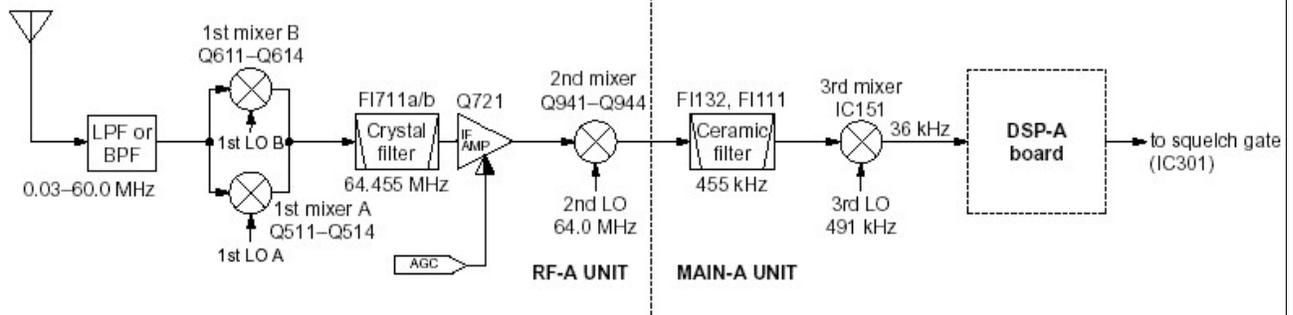
By the mid 1970's, Op amps came along and revolutionized analog filter design. Active filter techniques allowed excellent narrowband filters to be built without any inductors at all. Radio modems like the AEA CP-1 (below) allowed a ham to connect her rig to the RS232 port on a PC for CW and RTTY operation. The CP-1 uses 16 JFET Op amps to implement two 4-pole Chebyshev filters and miscellaneous circuitry to create the 100 baud serial bitstream for the RS232 interface. No loading coils required.



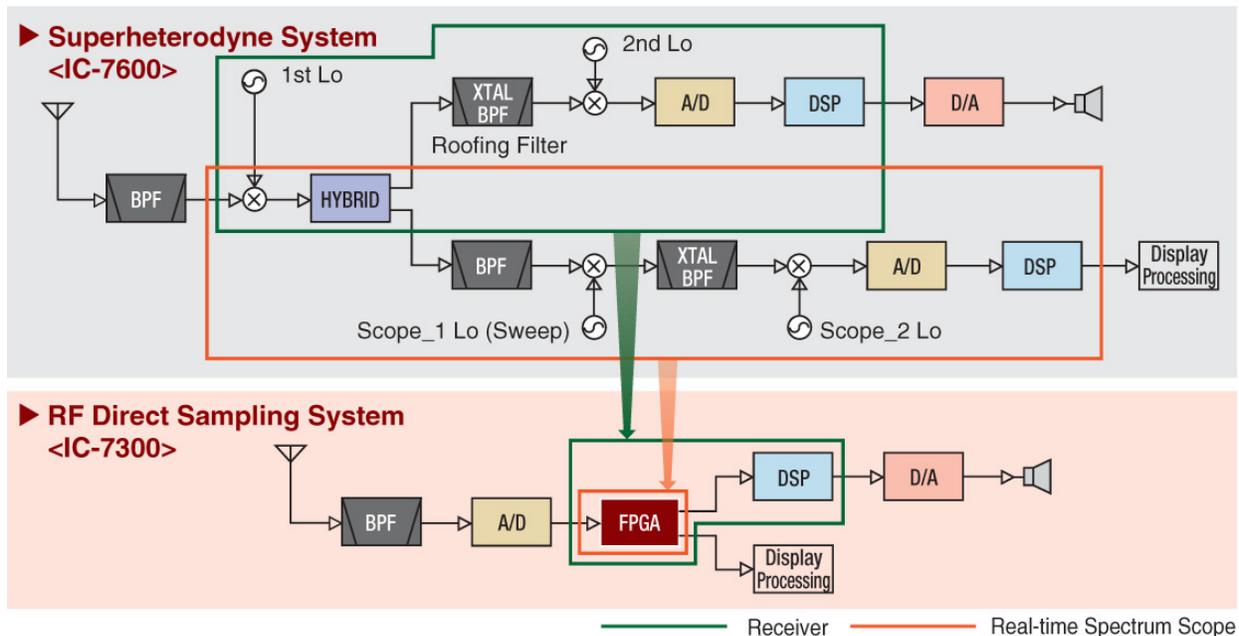
Today data modes are demodulated using PC based DSP processing with sound cards providing the A/D and D/A (figure below). The functions performed by the analog circuitry in the CP-1 has now been moved to the digital side of the A/D where they are implemented by DSP software. DSP computations in the PC's CPU have replaced \$250 of CP-1 hardware.



As CPU's became faster it was natural to replace more and more analog circuitry with DSP implementations. The figure below shows a block diagram of the receiver section of the ICOM IC-756 Pro II. Triple conversion is used with a final IF of 36 kHz which is implemented in a DSP. Note that the 455 kHz IF uses a ceramic filter which is much cheaper than the traditional crystal lattice filter. The ceramic filter is something of a roofing filter for the DSP which can implement steep skirted filters of different bandwidths, passband tuning, automatic notching, etc. I don't know if the ceramic filter cost savings completely cover the cost of the DSP, but getting similar flexibility and performance with crystal filters would be unaffordable.



The ultimate DSP receiver gets rid of virtually all the analog circuitry by moving the A/D up to the output of the first RF stage. This is called a direct sampling receiver and is the approach taken in the ICOM IC-7300 and IC-7610 transceivers. The figure below contrasts the receiver hardware architectures of the IC-7600 and IC-7300 direct sampling system. Note that all of the IC-7300 receive functions are coded in firmware and executed in the FPGA and DSP.



It's important to realize that what is driving the move to direct sampling is cost, not performance. The A/D in the IC-7300 runs at 124MHz and samples the entire HF spectrum from 160m – 6m. It takes in everything, which is both its best and worst feature.

In the coming months we'll look at the DSP building blocks that make up the direct sampling receiver.