

# The SPARC NEWSLETTER

## February 2026

A publication of the Southern PA Amateur Radio Club  
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### For Want of a Six Meter Transverter by W3IHM

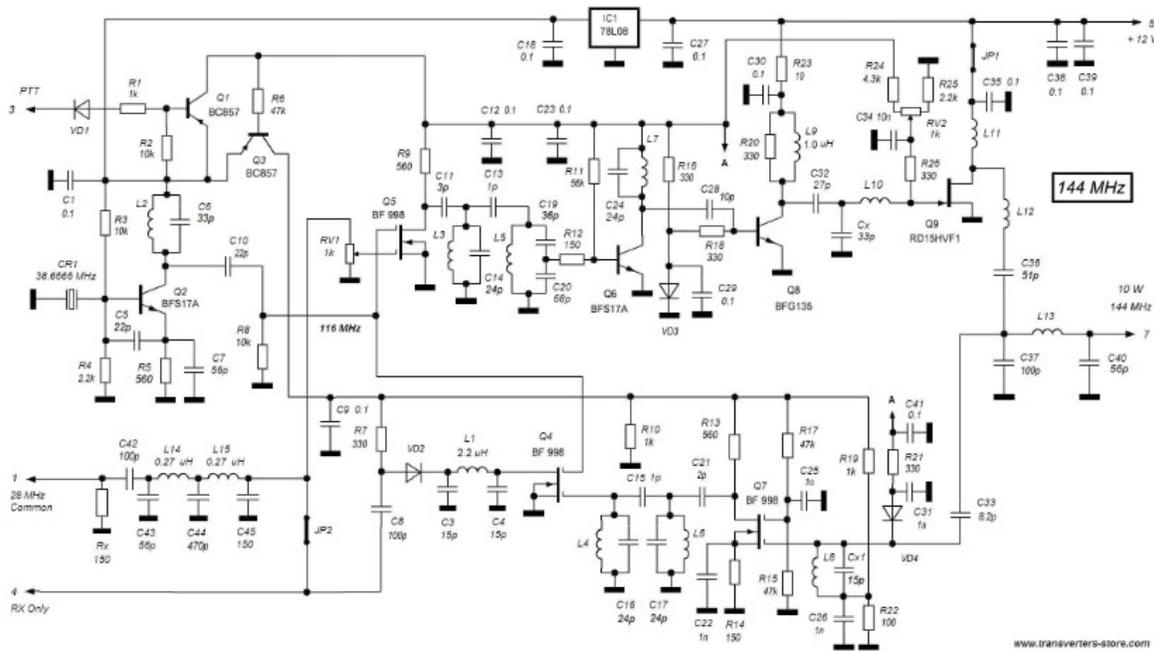
Hey! The K-index is at 8! Aurora? Sure! Quick! Fire up the six meter transverter and rig and let's work some Au! Pointing the beams north...

3	2026-01-21	03:26	KP4PR	50.143	SSB	FK68xk		Puerto Rico	Jose R Pi
4	2026-01-21	03:14	HP1XV	50.126	SSB	FJ09fc		Panama	Rafael Fe
5	2026-01-21	03:08	TI5JON	50.090	CW	EK70va		Costa Rica	Jonathan
6	2026-01-21	02:52	TI5CDA	50.131	SSB	EJ79vx		Costa Rica	Charlie A
7	2026-01-21	02:42	KP4ZM	50.111	SSB	FK78ae		Puerto Rico	Artemio I
8	2026-01-21	02:29	WP3Y	50.086	CW	FK68tb		Puerto Rico	Leonel V
9	2026-01-21	01:42	KP4JRS	50.100	CW	FK68xi		Puerto Rico	JOSE A F
10	2026-01-21	01:33	HK1T	50.138	SSB	FK21oa		Colombia	Salim (Se
11	2026-01-21	01:22	NP4AF	50.136	SSB	FK68uj		Puerto Rico	ANGEL M

Dang! The Au died out, but it did something weird to the E-layer, and the sporadic-E cooked off. I had a good run with my 5 watts and my stacked Yagis anyway. Sporadic-E does not need lots of power, but aurora does. My little transverter still did well with it's measly 5 watts, but next time, with aurora, I will need at least 100 watts.

OK, my current transverter actually covers 6, 2, and 1 ¼ meters, but I really just boxed and wired up some bought pieces. It uses ready-made boards I bought, designed by UR3LMZ. These single board transverters came out at the start of the Russian invasion, so I bought three to cover the three bands, to provide them some money, and stuffed them in a small box with a band switch and meter on the front. These boards all use 28 MHz as the IF, so any rig covering that band would do, giving you 6, 2 and 220.

But face it, there is not much output on these single boards, like 5 Watts on six and less than that as you go up. I will need a PA for future 6 meter aurora. Let's look at their design. Here's a look at the 2 meter one, with the other two being the same, except L/C's.



...not much meat in the RX front end, eh? The whole thing's flimsy, kinda like an HT design, but they are single board. I mean, the front ends are good'nuff, but I desire to shoot for more RX stellar performance, a.k.a. operating on field day without the thing getting creamed from all the out of band RF floating around.

Front ends are also a thing if you ever go up a hill and operate portable. Most hills are full of various towers spewing and splashing RF on every frequency, everywhere. A receiver that does not have a bulletproof front end will get clobbered.

OK, let's design a beefier six meter transverter. Also, I want to leave it hooked up to another rig all the time, thus freeing my IC-751A for HF work. Let's not just build another transverter, let's make a one-of-a-kind transverter animal beastie.

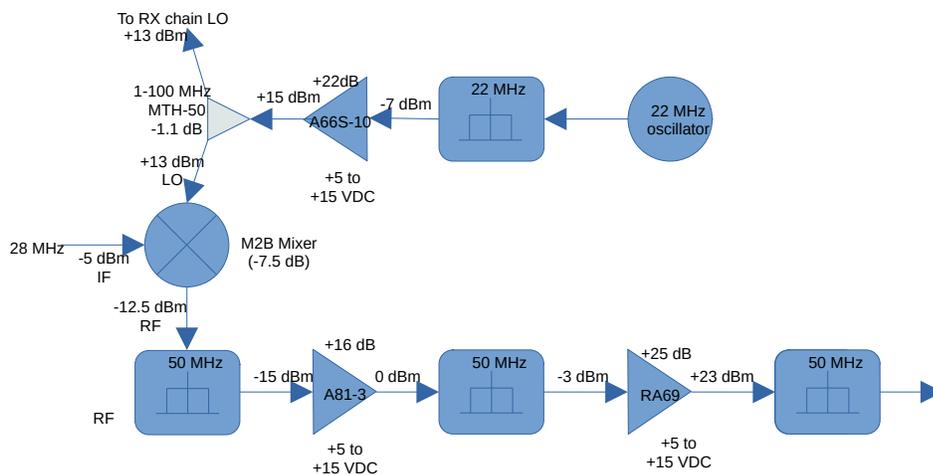
Let's see. I have this bunch of 1980's super mill-spec cold-war parts leftover from a long burnt up satellite's downlink receiver. In these junk hamfest boards were all this high-dollar modular

amplifier bits, some more high-dollar mixers, etc, and splitters. Let's do something with all this expensive old hardware before it goes into the landfill when I SK?

After some more digging around, I also found the remnant carcass of a GE Delta low band commercial rig. This rig has a 150 W PA, and a 6 section helical front end and diode ring RX mixer. Nice. There also is a T/R relay I can use. Maybe I can just use this, and add some extra stuff to get a working transverter. Most of the hard stuff is already done.



After playing around with the PA, I will need to provide about 100 mW to the PA for full output, and an LO for the RX section. Even though it was class-C, it goes linear with a bias tweak, IMD aside. This chassis part would make for a serious 6 meter transverter, if I can glue it together. Here's what I will need to make the rest of it work.



Using the old 1980's parts, and some home brew filters, would give me an excellent build. I need some gain, some filtering, a LO for the RX front end, and a TX mixer. This front end will be ready for whatever RF mess I can throw at it.

Let's see. I can cut a piece of scrap board and fill it with the parts, like this, to fit the empty

hole left from the rest of the radio. I remember now. This radio spent it's life in an Indiana state highway snow plow, and had the rest of it's PLL and TX driver corroded away. I will make it live again.



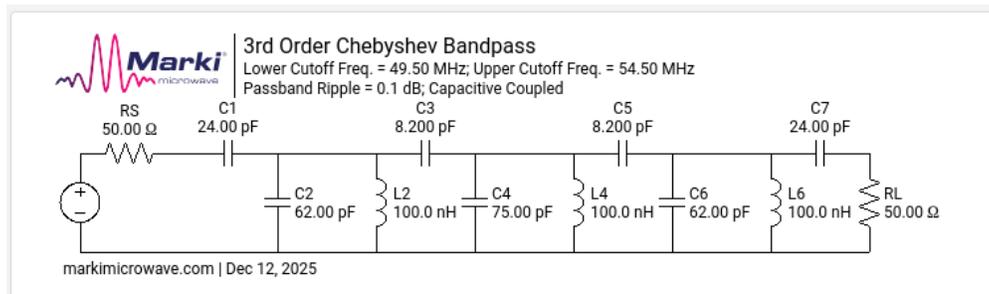
Cutting traces into the board with my Dremmel, will make interconnecting the modules easy. I used a sharpie to write all over the board, and draw where the parts would fit. So, I spent some time first, figuring out how things will lay out, then started knocking some holes. Here's what I came up with.



That will make it all fit inside the old GE Delta frame nicely, with the square hole in the front being a place to mount a panel with plugs and connectors, and maybe a small meter and LEDs to let me know what is happening.

I also have to design some filters for the TX side. There are plenty of filter design resources available for me, but I was lazy and just went on line to a web site. It took me some time playing around with the parts and messing with coils I had on hand to come up with some

designs that I felt good enough to prototype. Here's the software design I came up with.



For the inductors, I had these huge boxes of CoilCraft inductors (designer's kits) available from some long-ago hamfest purchase, so I spent some time playing around with some of these UNI type coils and my old Boonton Q meter. I wanted to pick out some coils that would look like reasonable choices for six meter filters. Things like self-resonance, Q, and slug tuning range with standard capacitor values are what I was interested in.

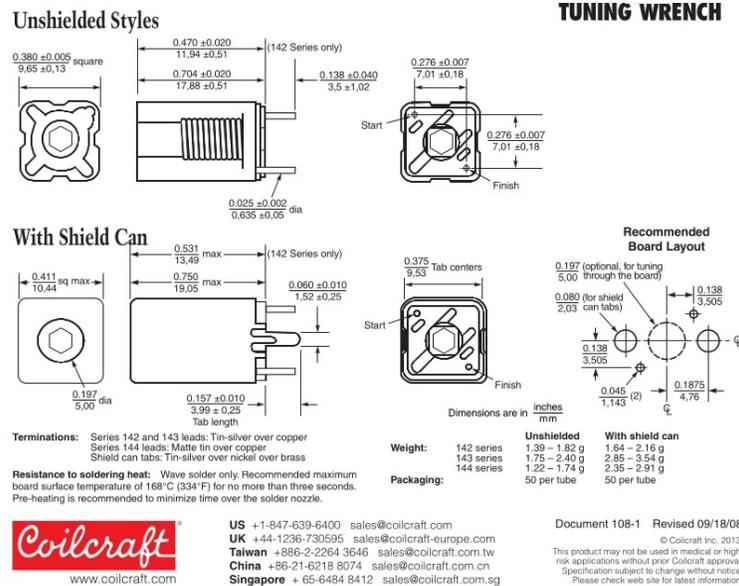


Here's my old Boonton meter doing it's stuff for me again. I fished it out of a dumpster when I was in undergrad, back in 1982. It was tossed away. I remember it well. Once, when I was in school, after giving new students a tour, the dean, at that time, thought any equipment in the labs that had an analog meter on it was an embarrassment.

Consequentially, lots of perfectly good old analog test equipment was trashed. Old Weston meters from the early 1900's to VTVM's from the 1950's were all trashed. It pissed me off. Such a waste of perfectly good stuff. I fished this one out and have kept it going all these years. It is my trusty friend, and matches whatever a fancy HP digital Q-meter can dish out. I say Feh, to your digital displays. Feh-feh, and Feh.

I have lovingly kept this meter going all these years. I know how to read a meter, too. Scary.

I got Q's of around 150 at 50 MHz with 68 pF for the Chebyshev filter designs. The coils I used were the older UNI "orange" type ones, but here is the datasheet of the new UNI parts that are still available from CoilCraft. I was going to wind my own coils, but why? I had all these nice shielded ones in plastic boxes lying around. Why not use them up? I will run out of thermal heat sink compound and UNI coils right when I SK, if I do it right.



So after all that homework, I must build a prototype filter, and see how it actually works. For fixed capacitors, I used some little ceramic multi-layer epoxy dipped wire-leaded capacitors I found on fleabay. I think these are pretty good for sub-GHz stuff. They behave well, when tested against the old Boonton Q-meter. I got one of these assortments from fleabay, and was not disappointed.



Here's one of my filter prototype test blobs. It matched the digital computer design when tweaked just so. I fed it into my VNA and tuned the coils and trimmers until it gave me what I wanted. It behaved just like the modeling play I did, after I sorted some funny little things out.

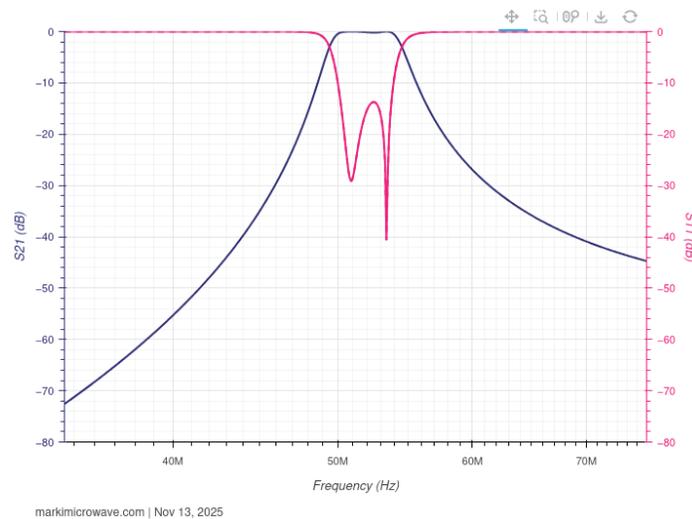


The coupling trimmers are critical, of course. Some of the ceramic trimmers I bought on fleabay (not the ones on my test build shown) had a strange Q-killing property. I tore one of them apart, and apparently someone put what looked like graphite lubricant inside each one, throwing a resistor across the tank circuit they were used in, killing the circuit. These trimmers were little colorful plastic cased ones, with the plastic “shroud” on them that held them together. Beware of these here:

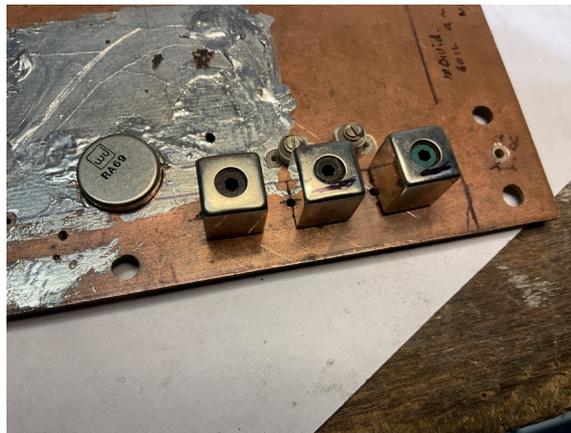


Someone did a whoopsie, I suppose. No wonder they were so cheap on Fleabay. Maybe soak them in acetone to get rid of the black crud? They are made such that the stator is a metal plate held in place with the plastic “shroud”, and the only thing that is ceramic is the metalized ceramic disc rotor. The whole mess is clamped together with a plastic shell. The acetone would dissolve the plastic, and the whole thing melts. These are some cheapies. Eh, move on. I have little patience with junk parts. It isn't the first time I got junk from the Fleabay dumpster.

Anyway, with decent trimmers, the results were mostly like the simulated output. I could not tell any real difference between this simulated design, and what was measured on my little VNA, so the filters are good enough. Stop fussing, and move on.



So, I went ahead and laid things out, and started to figure out how the board would look when finished. Something like through hole components and double sided board stuff would work. Wires and connections on the bottom would be done by Dremmeling little traces where needed. I marked them with a sharpie, and then cut them out.



It would take some time to cut all the grooves, but I'm retired. Let's get started.

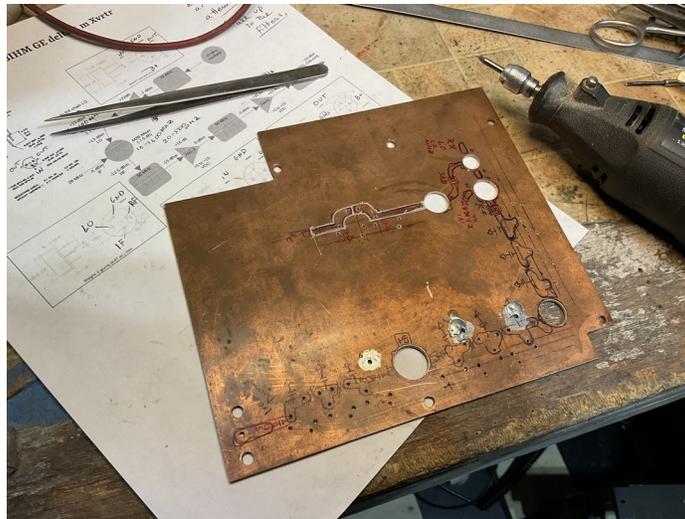
I have a bunch of old worn tooth grinding bits I got from my old dentist, Dr. Pandit. He filled me up with a whole pill bottle full about 15 years ago, after a double root canal. Hey, he owed me. I have never run short of some sort of small cutting tool ends, anyway. The dental ones chuck into the Dremmel's medium size bit.

I then use a straight edge, held up to the board, and then use it to guide the Dremmel along where I want to remove copper from the circuit board. I have been doing something like this for many years, and unfortunately, it has made me lazy. I should really lay out a circuit board and send them out, using Kicad. Yeah, yeah.

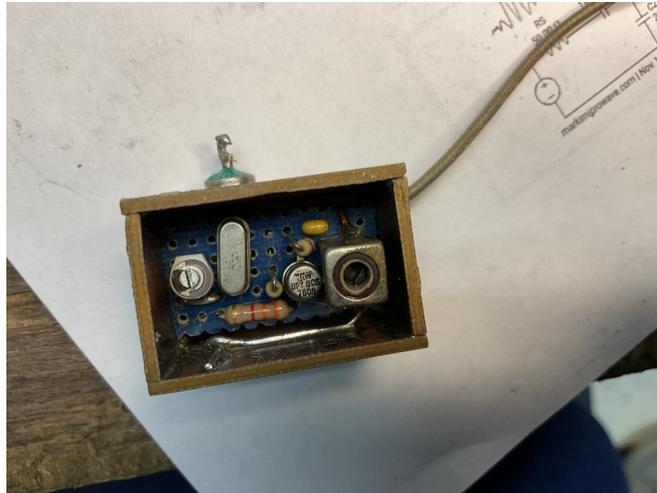
I also believe that if we get too carried away in board design tools, we may miss critical errors in board layout when it comes to RF. Laying out boards by light board and tape used to allow large times of when the designer would meditate and contemplate. I suppose that using quick easy tools eliminates this. I have seen some ridiculously beautiful board layouts for RF circuits that have glaring RF errors. Easy tools can sometimes make a mess.

I can pull up any of my connections and solder a small piece of coax right onto the ground plane. If I need more isolation somewhere, I can run coaxes wherever. Remember, everything's 50 ohms. It is easy for me to test this thing, and see what and where needs improvement. This is a prototype. Board layouts are for mass production.

I don't know. Blah-blah. OK, I'll shut up and start Dremmeling.



So how about the LO? I had some 22 MHz crystals around, so I just built up a simple one transistor Colpitts oscillator, and transformer coupled the output with a tunable slug transformer I harvested from a dead CB somewhere. The crystals I used were not nice precision high-Q, magical ones, but were the so-called microprocessor “resonators”, and were what I had. I plan to revisit the oscillator at a later time, but this quick build will have to do for now.



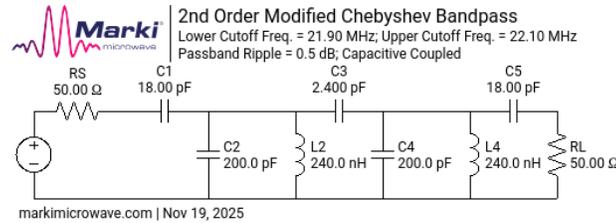
I did a deep dive on low phase noise oscillator design a few years ago, but never wrote it all down. It's spread around in my asundry notebooks. I also have a few old CINOX ovenized oscillators around from when I used to work there. Other oscillators are ones I picked up at fests and studied. I always thought the Cinox/Tedford ones were the mostest quiet-est-ie ones, and have their schematic diagrams in my notebooks as well. I need to write all the backup research and design stuff that went into them.

Of course, there is really no company now that grinds magic extra special crystals to take advantage of these designs anymore, so that is a shame. For instance, I was talking to a fellah about 10 years ago who I met at the York fest, who worked for Bliley his whole life. We had a three hour chat, but he was sick with cancer, and went SK soon after. Most of that crystal grinding knowledge is forever gone, so maybe I need to write what I know.

Sure, but hey, we gots the AI, ee'lextrix cars, drone warfare, and Starlink now, right? Just think, global cat videos. So what's a little phase noise on my space junk? We can always clean it up with DSP in the software.

In my design, I also have a filter on the output of the oscillator to try and cut down the phase noise, noisy noise, and harmonic energy that gets dumped into the mixer. Some old Motorola commercial rigs had lots of LO filtering, with crystal multiplication, so that's my vibe here. Ok, ok, the venerable HT-220 used "harmonic mixing" on RX, but that was an HT.

Remember, using wide bandwidth amplifiers means that noise and harmonics gets dumped into the mixer, unless we filter it out. So my little oscillator would have to sing into a two pole filter before it could get close to the mixer. So I used the same on-line software for a 2-pole, but went with UNI "blue" coils at 22 MHz instead.



Remember that all the modules shown on the diagram above are 50 ohm in/out. Each module can be disconnected, and tested separately by attaching little coax fly wires. They also can be swapped out if this design does not make me happiest, for some reason.

Well, more on this build later. That is as far as I have gotten on this project, but it still has me interested, and there are still possible solar storms in the near future.

## Website Updates

by

Matt, N3NTJ

Have you checked out the website lately? Supposing you wanted to see a past newsletter. Well, you are now in luck. I created a “SPARC Newsletters” page on the website and have most of the 2025 newsletters already posted. It is under the “About SPARC” tab on the website. Now, you can go back and peruse past newsletters at your leisure. That brings up another thing....

## SPARC Market Place

by

Matt, N3NTJ

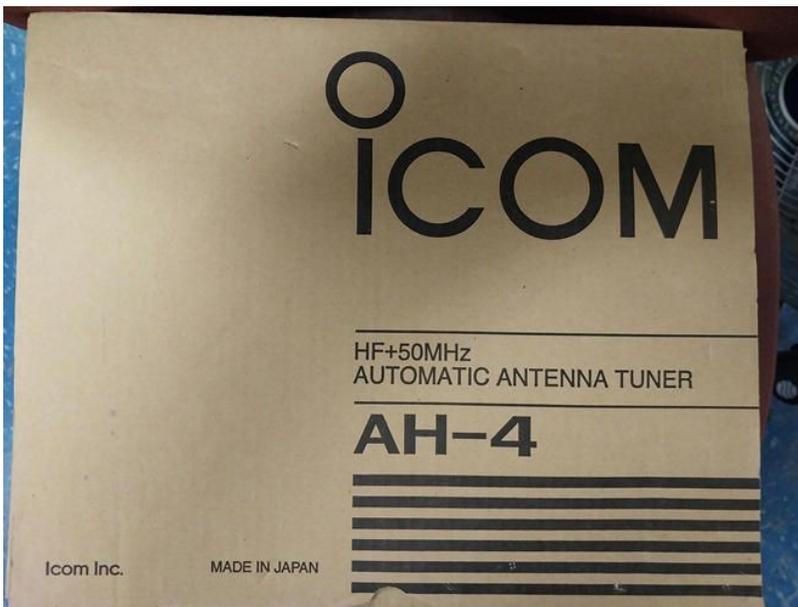
Do you know that you can sell things directly to the club members? Sure, but it has to be ham radio related. For instance, the new Marketplace page I created on the SPARC website already has some items. It’s for members who have stuff for sale or are looking for items. We already have three items listed. There’s a tab at the top of k3ir.org for members to easily find the page.

The club currently has these three items for sale to help pay for the solar system, and ultimately reduce our power bill. So you can buy something, and feel good about contributing to the club’s well-being, too. Check the website, for more recent items listed/sold.

1. **Tokyo HC-2000 HF Antenna Tuner.** With the price of eggs nowadays, the eggs are not included. Sorry. Tuner only. \$400. For sale by SPARC. Contact Harry at [hbauderrm@gmail.com](mailto:hbauderrm@gmail.com)



2. **Icom AH-4 Remote Tuner.** HF+6m. New – still in box. \$425. For sale by SPARC. Contact Harry at: [hbauder@gmail.com](mailto:hbauder@gmail.com)



If you're a member of SPARC and have an item for sale or an item that you are looking for, contact us to place your ad here.

### **Meeting Night**

Like most clubs, there sets in a sort of monthly pattern of meetings, etc. Like, for SPARC, the usual average monthly general membership meeting is held the fourth Tuesday of the month, at 7:00 PM, at Lancaster County Public Safety Training Center (LCPSTC). Sometimes these things change, especially in the winter. Why are you looking at this newsletter for such information? Go to [K3IR.org](http://K3IR.org) and check the calendar

tab.

## **License Test Sessions**

Want to upgrade your license? How about get a license? You will need one to be a ham operator. There IS a test. You are required to know something. It's not just a \$\$\$ thing. Demonstrating that you indeed know something is another matter altogether. So you will need to study some materials. There is plenty of on-line information to help you get your license. Ask us. We are here to serve. Go to [k3ir.org](http://k3ir.org) and ask for help.

Usually, testing is conducted at the SPARC site on the first Tuesday of every month. The fee to take the exam is usually \$14.00 payable on the K3IR website or in person, cash or check only. Go to [K3IR.org](http://K3IR.org) and check the calendar tab to make sure.

If you do not already have one, go to [fcc.gov](http://fcc.gov) and register for a FRN (Federal Registration Number). You will need this to interact with the FCC.

You can also pre-register to take the technician test, or upgrade, at [Hamstudy.org](http://Hamstudy.org). There is also a link on the K3IR web site to follow. Check the [k3ir.org](http://k3ir.org) website for the latest in fashionable ham test news.

## **Upcoming Hamfests**

by  
KC3LAV

The big thaw is coming, and so are the hamfests. If any of these look interesting, go hunt around on the web for more information. This is what I can find through the end of April:

02/22/2026 - South Hills Ham Fest

Location: Home Economics Building, South Park, PA

02/22 - Ham Fest & Electronics Show

Location: Hicksville, NY

02/28 - New Providence Auction/Flea Market

Location: Salt Brook School Cafeteria, NJ

03/14 - Cherryville Ham Fest

Location: Annandale, NJ

03/14 - Warren County Ham Fest

Location: Youngsville Free Methodist Church, Youngsville, PA

03/15 - NJ Antique Radio Club Swap Meet/Ham Fest

Location: Parsippany PAL Building, NJ

03/15 - Vienna Wireless Winterfest

Location: Oakton High School, Vienna, VA

03/20 & 21 - 56th Playground Amateur Radio Club Hamfest.

Location: Fort Walton Beach , FL

03/21 - FREDFest

Location: AmVets Post#2, Fredrick, MD

04/07 -Southington ARA Hamfest

Location: ???

04/11 - Warren County Radio Club Swapmeet, W2WCR, Queensbury, NY

Location: 720 Pleasant St. Southington, CT

04/14 - RAWNY Mini HamFest

Location: Church of the Nativity, Tonawanda, NY

04/18 - DELMARVA Ameteur & Electronic Expo

Location: Georgetown, DE

04/19 - TWO RIVERS AMATEUR RADIO / COMPUTER SHOW

Location: Lincoln Borough VFD No. 184 Social Hall 4312 Liberty Way, Elizabeth  
15037

04/25 - York Hamfest

Location: Glen Rock, PA

04/26 - MMARC Spring Ham Fest

Location: Odenton Volunteer Fire Department, Odenton, MD

References: FaceBook Group - HAMFEST (CT,DE,MD,NJ,NY,PA)

**Volunteer – The club needs you.**

SPARC currently has 131 “active” members on the roster. We have a lot to offer to our members. At this time we have a dedicated group of hardworking volunteers who keep the site running. Some say this is typical with most organizations. I don't think SPARC should be “typical” We need more real active members. Jobs range from the highly technical to the mundane but ALL are important. Please look at the list below and see if there is a place for you.

#### IT Team

Tower climbers and ground help

Operating building maintenance and cleaning

Operating building equipment maintenance and improvement

Porta Potty cleaning (not Pumping!)

Adopt a Highway crew

Elmers and Elm'ettes

Hamfest help, planning, etc.

Meeting programs and talks

Antennas! ...always more, bigger, higher.

Someone to take the trash home and pitch it when it's full.

Someone else to either eat or toss the old stuff in the fridge.

Someone to put the 6 meter beam up on a rotor.

Solar power wizard experts.

Fiscally rigorous scrupulous bean counters.