



PCARA Update



Volume 26, Issue 3 Peekskill/Cortlandt Amateur Radio Association Inc. March 2025

Peak park pavilion

The February 2025 PCARA Membership Meeting was held on February 1, 2025 at 10:15 a.m. at the Putnam Valley Free Library in Putnam Valley NY, and there where were a total of 16 members in attendance.

The main focus of the meeting was how we are going to commemorate PCARA's Silver Anniversary of Incorporation in April of 2000. Over the past few months there have been a number of very good suggestions. At the meeting it was decided that PCARA should reserve a Pavilion at FDR State Park in Yorktown Heights, NY for a combination Special Event Station / Parks on the Air (POTA) / Picnic.



The pavilion in FDR State Park adjacent to Parking Lot 6 stands on a gentle, 540 ft hill .

Secretary Lou KD2ITZ will try and arrange the event with the Park for Saturday May 10, 2025, and Treasurer David KD2EVI suggested that we also notify ARRL Hudson Division Director Ed Wilson N2XDD to spread the word and generate publicity. We have a busy couple of months ahead to get things organized for our big event!

PCARA has once again been selected as a nonprofit partner in the Stop & Shop **Community Bag Program**.



PCARA will receive \$1.00 for each \$2.50 reusable Community Bag sold during the month of March 2025 at the Stop & Shop at 1831 East Main Street, Peekskill, NY. PCARA is most grateful and would like to thank Stop

& Shop for their continued support. [For details see page 6. -Ed.]

If you hadn't noticed, we also had an anniversary to celebrate during the month of February. The new Motorola VHF MTR3000 2-meter repeater (W2NYW/R) has been on the hill for one year. Installed by Bob N2CBH on February 12, 2024, it has been behaving itself through summer heat and winter cold. Thanks Bob!



One year ago, Bob N2CBH was testing the new 2 meter repeater — installed on the hill in February 2024.

Please mark your calendar with these upcoming events:

- Saturday March 1, 2025: PCARA Membership Meeting at 10:15 a.m., Putnam Valley Free Library, 30 Oscawana Lake Road, Putnam Valley, NY.
- Saturday March 1, 2025: PCARA Laurel VEC Test Session at 11:30 a.m., Putnam Valley Free Library, 30 Oscawana Lake Road, *Continued on page 2* ⇨

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Putnam Valley, NY. Candidates please contact Dave KF2BD at daveharper@vivaldi.net to register.

- Saturday March 15, 2025: PCARA Breakfast at 9:00 a.m. at Uncle Giuseppe's Marketplace, 327 Downing Drive, Yorktown Heights, NY.
- Sunday March 30, 2025: Southington Amateur Radio Association Hamfest at Southington High School, Southington CT.



Southington ARA Hamfest in April 2024. [N2CKD pic.]

Our next scheduled PCARA Membership Meeting is at 10:15 a.m. on Saturday March 1, 2025 at the Putnam Valley Free Library in Putnam Valley, NY. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

PCARA Board

President:

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Vice President Emeritus: Joe Calabrese, WA2MCR.

Net night

Peekskill/Cortlandt Amateur Radio Association holds a roundtable net on Tuesday evenings at 8:00 p.m. and a directed 'Old Goats' net on Thursday evenings at 8:00 p.m. Both events take place on the 146.67 MHz W2NYW repeater, offset -0.600, PL 156.7 Hz.

Join the roundtable to find out what members have been doing or join the Old Goats with net control Karl N2KZ for news and neighborly information.

VE Test Session

PCARA's January 19th VE Test Session resulted in two new radio amateurs and one upgrade from General to Extra. New call signs were assigned by the FCC on January 28-29, 2025 — too late to be included in the February newsletter.

Christopher Wells in Lewisburg, PA, passed Technician and General tests and was issued with new call sign **KD3ANW**. Sal DeSimone of New Milford, CT passed the Technician test and was issued with new call sign **KC1WCY**. Gabriel Accascina KD2VAI of Rhinebeck, NY upgraded from General to Extra and was issued the new call sign **AD2JO**. Well done to all.

PCARA had a VE Test Session scheduled for February 1, 2025 but no candidates had registered in time for the February session.

Our **next VE Test Session** is scheduled for 11:30 a.m. on Saturday March 1st, following the monthly meeting at Putnam Valley Library. This will be a Laurel VEC Test Session (no test fee) and candidates must contact Dave KF2BD using e-mail address: daveharper@vivaldi.net by 5:00 p.m., Thursday February 27th, 2025.

Test Session for
FCC Amateur
Radio License

Saturday
March 1st
11:30am

Free Study Guide
Available

Get your amateur radio license and discover...
Camaraderie – Community Service
Emergency Preparedness – Fun
Science – Technology

Laurel Volunteer Examiners – No Testing Fee
There are no Morse Code requirements
Must RSVP - daveharper@vivaldi.net

Putnam Valley
LIBRARY

Peekskill/Cortlandt
Amateur Radio
Association

Graphic design courtesy of Lou KD2ITZ.

Adventures in DXing

- N2KZ

Hello Old Friend

A long, long time ago, I can still remember when I was first licensed: October 28, 1999. It was just me and my Heathkit HW-16 transceiver. Every night, you would find me on 3700 kHz CW sending slowly with my straight key. Callsign? KC2FPM.

A good friend at work and devoted DXer, Jeff Plotkin, heard that I had finally become a licensed ham. A friend of his was trying to unload some old gear and was wondering if I would be interested. It was a single-band 10-meter rig complete with a mag-mount whip antenna ready for mobile use. "Fifty dollars! It's quite a deal."

I agreed! I purchased my very first amateur radio mobile rig and was anxious to see what it could do and how far I could reach. It was a 25 watt Realistic Radio Shack HTX-100 capable of CW and USB. I could put it in my car and talk to people commuting to and from work!



10-Meter Mobile SSB/CW Amateur Transceiver

Realistic HTX-100 10-Meter Mobile Transceiver. Versatile, for Novice to Extra class. Digital VFO provides full 10-meter coverage and tunes in selectable 10 kHz, 1 kHz or 100 Hz steps. Memory stores 10 frequencies. Also has noise blanker, RIT, lighted LCD frequency display, selectable 5 or 25-watt output, LED power/signal strength meter and on-mike up/down tuning. Operates USB and CW with semi break-in keying and sidetone. Built-in speaker. Jacks: 'h' for headphone, key, remote speaker. Standard 8-pin mike jack. With bracket, hardware. DC power cord. 2 1/4 x 7 1/2 x 7 1/4". 12VDC neg. gnd. (TSP available) 19-1101 Low As \$15 Per Month **259⁹⁵**

Realistic HTX-100 10 meter transceiver as pictured in the 1992 Radio Shack™ catalog. [KA1HVR pic.]

My first few months on 10 meters were slow. I had no experience with 10 meters. I would commute into Manhattan early in the morning and evening endlessly calling CQ on CW and USB hoping and begging for a response. I knew I was transmitting but I had no takers. Solar activity was at an all-time low. So was I!

One morning, someone from New Jersey actually heard me as I was riding around the George Washington Bridge. It was a good short QSO that set me straight. He told me to keep trying and concentrate on evening operation. "Just you wait! Miracles will happen! Ten is a great band!"

I had better luck as time progressed. I worked lots of people in the evening within the New York City metro area — New York, New Jersey and Connecticut. Once in a blue moon, I would work someone in South America from Brazil, Argentina or Venezuela. This was

truly amazing.

I had only just begun. From home, using a dipole on my roof, I worked Japan and Alaska and all over the west coast of the United States and Canada. The best was yet to come!

Around 7:00 p.m. local time on October 9, 2000, I was stuck in traffic underneath a large apartment building standing right over the eastern approach to the George Washington Bridge. You couldn't find a bigger attenuator to radio signals if you tried! Fearless, I continued to send CQ and somehow received a reply! It was David Lawrence, MM0BPS in Ayr, Scotland! We had a nice leisurely CW chat until my car started to move forward at a normal speed about ten minutes later. Neither of us could believe that we were making contact... but it sure was fun!

My all-time fantastic 10-meter mobile QSO was on a very long ride from Westchester to Detroit, Michigan. My HTX-100 was right by my side. My mag-mount was on my car's roof. My straight key sat ready — mounted on a wooden board on my passenger seat. I was calling CQ and suddenly I hear a reply from Alan Hughes, ZL3KR, from Christchurch, New Zealand. What a QSO we had! This certainly made my 12-hour haul worthwhile. 10 meters really is wonderful, isn't it?

As time went by, my HTX-100 started to show signs of old age. After all, the unit was from the very first production run of HTX-100s back in October of 1988. It was already 12 years old when I bought it in May 2000.

A few of the issues I could repair. The microphone element had to be replaced. The microphone's connector required rewiring. The rotary encoder tuning device developed poor connections cured by remaking some of the encoder's solder pads.

Sadly, other problems developed that I could not cure. I began getting reports that my signal sounded a little distorted. Later, it declined to complete distortion, even on CW. It became obvious that I was about 100 Hz off in transmit frequency when compared to the display readout, especially noticed when operating USB.

No visual problems could be found. Poking and prodding did not reveal the source of the distortion. I did not know anyone who had the expertise or time to troubleshoot it. Sadly, my HTX-100 was carefully set aside as a fine memory.

New Life

Once again, we are at the height of the 11-year solar activity cycle. When ten meters is 'open,' amazing reception can happen by the day, hour or even minute. I enjoyed a grand example of such miracles on February 7, 2025. I heard nearly nothing on ten meters except for a beacon broadcasting from Vancouver: VE7MTY/B on 28.197 MHz. I could hear all four power levels during the beacon's cycle down to only 500 mW.

I touched base with owner Martin Hill over e-mail. Guess what kind of rig he was using?

“Thanks for the signal report. Wow. I’m surprised you could hear all the power levels. Coast to coast with only 0.5 watt! I have been operating a ten meter beacon since 1995 on 28.197 MHz running 25 watts. The beacon uses an HTX-100 transceiver, an Antron 99 vertical antenna and a Freakin Beacon keyer. At the end of the CW message, it steps through four, one second power levels. 25 - 10 - 2 - 0.5 watts.”

Of course. He was using an HTX-100!



Martin Hill VE7XX, located near Vancouver, British Columbia operates 10m beacon VE7MTY/B. [Credit VE7XX, used with permission.]

The reply to my e-mailed reception report proved to be inspirational! I decided to be adventurous and scrolled down to the center of CW activity at 28.020 MHz with my modern Yaesu FT-DX1200. I sent out my CQ only two or three times and I was deluged with replies! It was the very first time I had ever caused a pile-up. Within just minutes, I worked four Brazilian amateurs: Leo PY1LV, Aldo PY1DI, Guto PP5RP and Souza PY1FQ. All four were located in Rio de Janeiro! Was this a spotlight opening? Were they all watching the same spotter program? I will never know but it really was a memorable moment.



Guto PP5RP (top) and Leo PY1LV

My Wish Comes True

With luck like this, how could I not think of all my great times with my HTX-100? *“I really wish I could find*

someone to fix it!” I spent some time and searched on-line for more HTX-100 information and hints about repair possibilities. It was my lucky day! I stumbled across a miraculous site. Ken Reiss, KA1HVR, is a remarkable and dedicated ham who enjoys repairing old HTX-100s. You can read all about it at: <https://www.htx-100.com>.

Ken certainly is a master of his craft. He has rehabilitated over fifty HTX-100s and can read them like a book. His site offers priceless research information: HTX-100 schematics, the official Radio Shack service guide and the operating manual along with a grand collection of HTX-100 articles including modifications. Ken also offers quite a variety of accessory boards to interface with Raspberry Pi units allowing HTX-100s to operate with newfangled digital modes like FT8, JT65 and for WSJT-X applications. An added attraction: Ken will also repair a variety of other mobile transceivers. *“The labor includes a full alignment/calibration of your rig, too.”* Just ask!

“It’s not a business, nor do I plan to make it one. It’s truly still a labor of love, out of my nostalgia from 10 years working at Radio Shack, my respect for the design and manufacturing of the radio itself, and my inherent belief in repairing, instead of discarding, whenever possible! People just keep sending me their radios and I happily keep fixing them.”

I asked Ken about his most unusual repairs:

“My two weirdest repairs were cases when I was diagnosing a feedback loop, like the ALC or AGC circuits, but something outside of them was actually the culprit, like a failing fuse holder or cracked microphone connector!”

Meeting Ken was quite a blessing! I quickly e-mailed Ken and told him about my ailing old friend. My trusty HTX-100 was in the mail to him the next day. Great hint: If you need to mail most small transceivers you can conveniently and economically via the U.S. Postal Service. Use their pre-paid ‘Medium Box’ to mail anywhere for just \$20.00 USD.

Upon receipt, Ken quickly composed this diagnosis:

“Hi Karl:

I finished the diagnosis of your HTX-100 today. GREAT NEWS — It’s in good shape! Here are the items which need attention:

- *The Carrier Oscillator Crystal, X1, is very corroded, due to original manufacturing “Sony bond”*. As such, it has drifted 2.2 kHz, significantly outside of the pass-band, causing severe distortion on both Rx and Tx. I have these crystals on-hand and will replace and align it.*
- *The ALC circuit is creating an oscillation when using high-*

*Sony-Bond was a form of glue used to secure components to the circuit board and prevent sensitive circuitry from becoming microphonic. Over time, it absorbed moisture, became conductive and promoted corrosion. – Ed.

power. I will correct this by replacing C77 with a better one.

- There is a significant delay in the muting of the speaker when you begin to transmit, making your audio/CW side tone audible on the speaker. This is caused by degraded C102, which I'll replace with 2.2 μ F.



10.6975 MHz carrier oscillator crystal X1. [KA1HVR pic.]

- The Volume Pot, VR504, is very scratchy due to carbon build-up inside. I will use an excellent cleaner and conductivity enhancer to correct this.
- The solder joints at Q502 need to be cleaned.
- The memory backup supercap is working well.
- Your microphone tests fine.
- The PLL, Rx and Tx circuits are working correctly, as are the controls, CPU, & connectors.
- The PLL frequency is off by about 100 Hz, which will be corrected in my alignment procedure.
- Overall, not bad at all, since the PLL, Tx, Rx, and CPU sections are in great shape!"

Ken immediately began repair. The good news continued!

"I completed your radio today. All the tests were excellent and I think you'll be very pleased! I even made some nice test contacts using FT8 (28.074 MHz) to France, Cuba, Oklahoma, Colorado, Hungary, Germany, and England, with great signal reports, using my G5RV-Jr Antenna!"

In just a very few days, my HTX-100 was delivered by USPS and back in my hands for many more years of use. Welcome back old friend!

Thanks New Friend!

Ken has enjoyed a long career in amateur radio starting when he was just 11 years old!

"I earned my Novice license, call sign KA1HVR, in 1981, in Connecticut. I upgraded to Technician & Technician Plus, shortly thereafter. Then, when my first daughter was testing for her license in 2006, I upgraded to General. When my wife got her Technician then General licenses a few years ago, I finally upgraded to Extra class. All through the years and even now, my father, K1HOP, has been instrumental in my years of Ham Radio and Electrical Engineering."

"My career was in software engineering for 3 decades, but when things got tight in 2020 and work became scarce, I returned back to Ham Radio and Electrical Engineering. While having always continued learning through my Amateur Radio hobby, I formally dedicated myself to extensive learning in order to better myself and prepare for whatever the next chapter of my life would bring."



Ken Reiss KA1HVR repairs Radio Shack HTX-100 transceivers from his workshop in Bolton, CT. [KA1HVR pic., used with permission.]

"As I continue to transition my vocation, I have been very much enjoying repairing the Radio Shack HTX-100 rig My first repair was for myself and my second was for my father. Then I put up a little website (www.HTX-100.com) and people started contacting me. Now, with over 50 repairs under my belt, I've gotten quite familiar with this awesome little rig! I love bringing life back to these special radios, which very often have sentimental significance to their owners. I'm proud to say that I bought all the test equipment I use for radio repairs broken and fixed them myself. In addition to radio repair, design projects, and software work, I'm a Taekwondo Martial Arts Instructor and father of seven."

I think we all agree that the HTX-100 is a remarkable classic:

"They really are amazing rigs to be in such good shape 37 years later! Many of the Radio Shack buyers were also hams and did a really nice job completely overhauling the design and specs from Uniden, whose HR2510/2600 was used as a basis for the Radio Shack HTX-10 (FM and USB) and also who manufactured these for Radio Shack!"

It doesn't get better than this! My beloved Realistic HTX-100 is back in the saddle and back on the air. I have met a remarkable and brilliant new friend who enjoys radio repair and making other people happy. Thank you so much, Ken! You have to admit: Amateur radio is one great hobby! I know one band that I can heartily recommend. I give it a Ten!

Don't forget to join us on the Thursday night Old Goats Net at 8:00 p.m. on the PCARA repeater: 146.670 MHz -600 kHz offset and a 156.7 Hz PL. Also enjoy our roundtable net on Tuesday nights at 8:00 p.m.

Until next month, 73 es dit dit de N2KZ "The Old Goat."



HTX-100 update

Karl N2KZ subsequently sent the following picture of his Realistic HTX-100 10 meter SSB/CW transceiver, following its recent restoration by Ken KA1HVR.



Spring forward

Daylight Saving Time in the USA begins on the second Sunday in March, Sunday March 9, 2025. At 2:00 a.m. Eastern Standard Time, clocks should be moved forward to 3:00 a.m. Eastern Daylight Time.

As a result, our local time zone moves 1 hour closer to UTC (GMT). The United Kingdom does not change from Greenwich Mean Time to British Summer Time until three weeks later on the last Sunday in March — Sunday March 30, 2025.



In previous years (2018 – 2023), the Sunshine Protection Act was introduced by then Senator Marco Rubio of Florida (now U.S. Secretary of State) to make Daylight Saving Time permanent for the full 12 months of the year. The legislation did not make much further progress. This year, the Sunshine Protection Act of 2025 was introduced in the Senate by Senator Rick Scott of Florida on January 7 and referred to the Senate Committee on Commerce, Science, and Transportation.

Year-long Standard Time is an alternative that may be better for sleep and human health. On December 13 2024, Donald J. Trump announced on social media platform Truth Social: “The Republican Party will use its best efforts to eliminate Daylight Saving Time, which has a small but strong constituency, but shouldn’t! Daylight Saving Time is inconvenient, and very costly to our Nation.”

Community Bag program

Peekskill/Cortlandt Amateur Radio Association has been selected once again to benefit from Stop & Shop’s Community Bag program. Previous participation in December 2019, August 2021 and January 2023 resulted in substantial donations to PCARA.



Every month, leadership at each Stop & Shop store chooses

Stop & Shop “Give Back” Community Bags will benefit PCARA during the month of March 2025.

a local nonprofit to benefit from their Community Bag Program. The program allows shoppers to support their communities and environment by buying reusable shopping bags. A portion of each purchase goes to a local nonprofit. Each bag costs \$2.50, with \$1.00 of that purchase going to support the benefiting organization. The bags are made from 95% recycled woven or non-woven polypropylene.



Stop & Shop store at the Beach Shopping Center, Peekskill.

PCARA has been selected as March beneficiary by the Stop & Shop store at the Beach Shopping Center, 1831 East Main Street, Peekskill NY. Look for bags at registers and on the reusable bag rack, where the name of our organization should be posted during March 2025. PCARA will receive a donation every time a reusable Community Bag is purchased in March — unless otherwise directed by the customer through the ‘Giving Tag’ attached to each bag.

HamCation[®] 2025 - KD2EVI

I attended HamCation 2025 in Orlando, Florida for the first time this February. This is a very large amateur radio show, held over three days (Friday to Sunday February 7 – 9, 2025) at the Central Florida Fairgrounds.

I elected to drive to Florida and arrived on Wednesday evening so I could visit with family members in the Daytona area prior to attending HamCation. I allowed two days to travel to Florida. While in the area I visited the **Ponce Inlet Lighthouse**, (<https://www.ponceinlet.org/>).



Map of central Florida showing locations visited by David, KD2EVI. [Base map credit: Eric Gaba/Wikimedia.]

The lighthouse, located at the south end of the barrier island that Daytona Beach is on, was constructed in the 19th century and operated by the U.S. Lighthouse Service from 1887, until the service was merged into the U.S. Coast Guard in 1939. The lighthouse was closed in 1970 and is now operated as a museum. The lighthouse was originally quite isolated and while there was a small community and hotel nearby, everything and everyone had to come by boat as there were no roads until 1924. There is a connection to our area, as some of the bricks first used in the buildings came from Haverstraw, New York.



Ponce Inlet Light
[Credit: Wikipedia CC0 1.0]

On display in the restored buildings are radios used to transmit to passing ships and the pendulum clocks that regulated the 50 watt radio beacon. The beacons were battery powered and the batteries recharged by small gasoline and diesel generators. The Lighthouse Service began installing radio beacons in its

lightships and lighthouses in 1917, but it is unclear if Ponce Inlet had a radio beacon prior to 1937. According to information that I found online, the pendulum clocks and radio beacon on display were installed by the Coast Guard in 1940. There is a spark gap transmitter on display, but I was informed by the museum's curator that it was donated by a museum volunteer originally from Rhode Island.



Seth Thomas mercury-compensated pendulum clocks used for timing 290 kHz radio beacon transmitters at Ponce Inlet Light. [Credit: KD2EVI]

After the Coast Guard took over, Collins and Hallicrafters radios were installed and are on display.

On Thursday prior to HamCation, I drove to my hotel in Orlando. It was about a one-hour drive from Daytona. Orlando, as I learned, is a sprawling city and my hotel on the east side of Or-



Hallicrafters S-20R Sky Champion HF receiver (top) and Collins 32V-2 HF transmitter on display at Ponce Inlet Light museum. [Credit KD2EVI].

lando was approximately 14 miles and a 45-minute drive from the Fairgrounds. I met Rob, AD2CT and his XYL, Helen at HamCation on Friday. They stayed near the Orlando airport and it was over a 30-mile drive to their hotel from mine. There are no hotels adjacent to the fairgrounds. There is ample free parking for cars on the grounds, although unpaved. RV owners can pay to

park within the grounds, and many also tailgated next to their vehicle.

As for HamCation itself — it is large and virtually every company that advertises in *QST*, it seems, had a booth or table. A visit to the HamCation website (<https://www.hamcation.com/>) will show what firms attended. There were three indoor buildings with exhibits and tables. The largest building (East-West Hall) held the big displays, including the big-three Japanese radio manufacturers and the major amateur radio retailers. In the “Swaps” building were more typical hamfest vendors, selling both used and new items and North Hall had a few tables but was mostly lost and found and where the drawing for door prizes was held. Outside was the tailgate area and food vendors. In the tailgate area, a group from Florida was selling used HF radios and displaying a banner for “Old Goat’s Net” held on 3910 kHz. Again a lot of people were selling used equipment, parts and accessories. HamCation was very well attended.



The Florida Old Goats meet at 7:30 a.m. on 3910 kHz. [KD2EVI pic.]

The forums were held a few minutes’ walk from the main buildings in a large open pavilion, behind the RV parking. Underneath the pavilion were three tents, each with a large air conditioning unit behind it. The ventilation was noisy, making it hard to hear the presenters unless you were sitting near the front — and did not keep the tents very cool.

Rob and I both elected to concentrate on seeing the vendors, and I only attended four forums. Gary Spangenberg, KF4GGK gave an interesting talk on using a 40 meter double bazooka antenna for NVIS propagation. I also found Glen Popiel’s, KW5GP, presentation on microcontrollers worthwhile. The ARISS presentation I listened to was geared to schoolteachers and the ARRL Emcomm forum was designed for those working with state and local governments in emergency communications. No forums were presented or

repeated on Sunday.

Weatherwise, we had good weather. It was about 82°F during the day, which is about 10 degrees above average according to local weather reports. No rain fell, but Florida is prone to thick fog at night.

Was HamCation worth the drive? I have to say that I found it enjoyable. It was fun to see so many amateur radio related things in one place. You will be able to see new equipment on display and talk to the manufacturer representatives about it. As for used equipment and related parts the “Swaps” building is big and all tables were filled on the first day, with more things outside in the tailgate area.



Outdoor tables pictured at an earlier HamCation. [Credit Ray, W2CH].

I was a little disappointed in the forums. I think the New England Ham Expo held in Marlborough Massachusetts is better for the forums, despite being a much smaller hamfest.

Will I return? I think so, but I will take a pass on having corn dogs for lunch.

- 73 de David KD2EVI

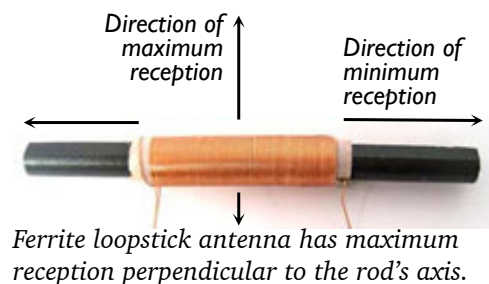
EMI-Spy 2.0 Kit review

Running interference

One of the challenges for our hobby is **radio frequency interference**, also known as electromagnetic interference (EMI). When local noise on your favorite amateur band is excessive, tuning across the band becomes a struggle and you cannot hear weak stations calling you. The effect is more apparent with modern radios having a built-in spectrum/waterfall display.

My own run-ins with the **electromagnetic compatibility** (EMC) of nearby equipment have included a noisy sewing machine motor, an arcing thermostat, the ignition circuit of a neighbor's boiler, SCR light dimmers and switch-mode power supplies.

My usual weapon for tracking down noise sources is an old-style portable AM radio with built-in ferrite loopstick antenna. Tune the radio to an unused frequency in the 530 – 1700 kHz broadcast band, listen to the crackly sound of the interference then use the directional properties of the ferrite rod antenna to localize the source. This becomes more difficult at night-time, when the AM broadcast band is filled with signals from afar.



Advertising

In the June 2024 issue of *RadCom*, journal of the Radio Society of Great Britain, I noticed an advertisement from SDR-Kits for the “EMI-SPY 2.0 Kit, Easy-to Build Kit for locating local EMC Interference”. This was a kit from the German *FUNKAMATEUR* magazine (<https://www.funkamateurliteratur.de/>). I had a previous good experience with FunkAmateur’s FA-VA5 Antenna Analyzer kit, see *PCARA Update*, October 2018 p5. I tried to order the new kit from SDR-Kits, <https://www.sdr-kits.net/> but it was out of stock until early January 2025.

I placed an order with SDR-Kits on January 3. Cost with optional cable and shipping was £113.85. The item was shipped from Germany on January 18 and arrived in Cortlandt Manor 8 days later.

Inside the box

The kit arrived in a small cardboard box, roughly 9"×6"×1¼".

Inside were circuit boards, components and a molded plastic case.

There were two Assembly Manuals — a full-color booklet from

FUNKAMATEUR and a three-page leaflet from SDR-Kits with “Step by Step Assembly Instructions” for the circuit board. The leaflet proved useful as it allows each step to be checked off in the old Heathkit style.



How it works

Before assembly, I read through the full-color booklet. There was no theory of operation, just a two-page circuit schematic. A little online research produced the following information.

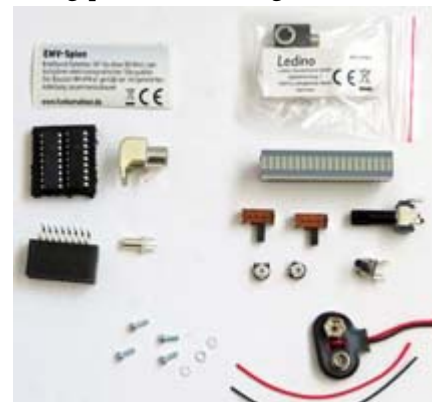
The original “EMV-Spion” design was presented in 2011 by Michael Lass, DJ3VY and Dr. Jochen Jirmann, DB1NV, then published in *FUNKAMATEUR* 7-2012. The newer “EMV-Spion 2.0” version of the kit has several improvements including a main circuit board with all the SMD parts pre-installed.



The ‘EMV-Spion 2.0’ kit has all the surface mount devices pre-installed on one side of the printed circuit board.

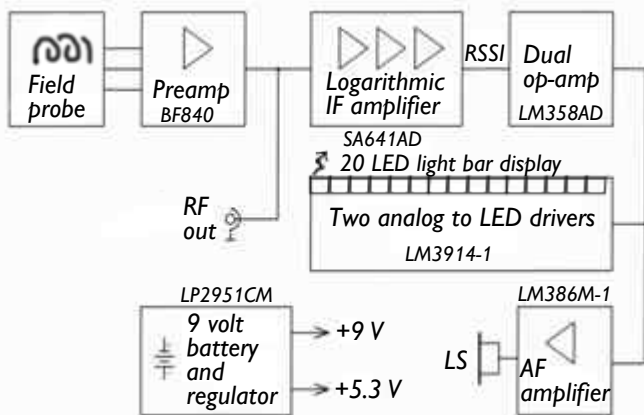
The fifteen remaining parts are through-hole components that will require manual soldering.

The updated design features a broadband AM receiver with five near-field probes/search antennas supplied on circuit cards that plug into an edge-connector at the top of the hand-held



Through-hole parts that require manual soldering.

unit. Each card has an inductor or probe etched into its fiberglass circuit board. The probe feeds a frequency-independent preamplifier using BF840 Si-NPN transistors. The preamplifier output is connected to an SA614AD FM IF system with high bandwidth (25 MHz) and a logarithmic received signal strength indicator (RSSI). The RSSI output is sufficiently fast to follow amplitude-modulated signals for audio monitoring. The SA614AD's RSSI output is fed through one or two op-amps ($\frac{1}{2}$ -LM358AD) into a pair of LM3914-1 LED bar graph display drivers that illuminate the 20-LED display. The op-amp output is also connected to an LM386-1 audio output stage for loudspeaker or headphone monitoring.



Simplified block diagram of the 'EMV-Spion 2.0' EMI locator. [After DJ3VY, DB1NV presentation.]

Construction

I checked through the parts list and found everything present, apart from one of the four M2 washers used to mount the circuit board with 6 mm M2 screws inside the plastic box. The “Step by Step Assembly Instructions” give a strong recommendation to label the two sides of the main circuit board as “TOPSIDE” and “UNDERSIDE”. The SMD components are already installed on the “underside”, while through-hole components are mounted from the “topside” then soldered underneath.

Installation begins with a solder bridge, followed by two variable resistors, 10 k Ω and 2.5 k Ω , for setting the LED display sensitivity. Values were marked on the resistors using tiny print with dark ink on a dark body! I checked with my multimeter on “ohms” range to confirm which resistor was which before inserting into the board and soldering.

This was followed by two LM3914 dual-in-line integrated circuits. Each IC has 18 pins to solder, so this becomes a mini-marathon. The Assembly Instructions recommend a 40-60 watt iron, preferably temperature controlled. My experience was that some of the tinned areas on the circuit board looked rather dull and were difficult to ‘wet’ with the soldering iron — possibly because the board is designed for lead-free (Pb-free) sol-

dering of the SMD components. A more-powerful iron would have been helpful for some of the ground terminals connected to a large mass of copper.

The array of 20 LEDs for the bar-graph indicator came next. It is supplied in a socket assembly with an almost invisible chamfer on one corner for alignment with the circuit board. This was another marathon, with 40 pins to be soldered. I was using a hand-held illuminated magnifier to make sure solder was properly applied, without any unwanted solder bridges.

Eventually, all components including switches and sockets were soldered to the board and all points in the “Step by Step Assembly Instructions” could be checked off. This part of the project took about 1 $\frac{3}{4}$ hours.



“Topside” of the main circuit board with all through-hole components inserted and soldered.

Testing

Before the circuit board is mounted in its plastic case, there are some tests and adjustments. The first check recommended in the Assembly Instructions was to apply an ohmmeter across the 9 V supply pads to check for shorts when the power switch is ‘ON’. The manual suggests the measured resistance should be “a few kilo-ohms”. Two things to bear in mind —

1. Polarity of a multimeter’s probes on its ohms range can be opposite to the cables — the red probe may have a negative voltage compared to the black probe.
2. The voltage applied by a multimeter on its ohms range can vary between ~ 0.1 to 9 volts or more, and this can affect the apparent resistance.

I measured the resistance of my own circuit board as 1.1 k Ω .

The next test was to connect the multimeter on its milliamp range, in series with the 9 volt battery, and measure current when the board was switched on. The manual suggests 40 mA — I measured 44 mA. The first LED on the 20 LED array should be blinking as a power-on indicator. It was! (See picture above).

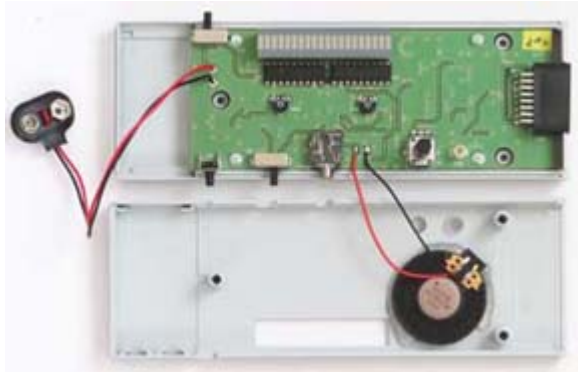


Testing the current draw.

Two variable resistances on the circuit board also required adjustment. R42 is set so that, with a fresh 9 V battery, switch S3 (BATT CHECK) causes the top LED in the array to illuminate. R23 is adjusted so that with no probe connected, the bottom LED just fails to illuminate and flashes instead.

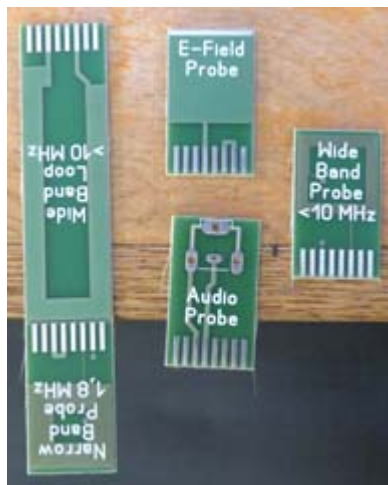
Final assembly.

The main circuit board is secured to the bottom section of the molded plastic case with four screws, then connected to the miniature loudspeaker in the top section by soldering two wires. A 9 volt battery is housed inside the slide-open battery compartment.



Main circuit board mounted in plastic case.

The final step is to separate the five probes which are supplied on two strips of fiberglass circuit board. Each board is already scored on both sides to ease separation. I held each board on a sturdy desk with the scribe line at the desk edge, then gave a firm push on the free end.



Probes were separated by setting the scribe mark on the edge of a desk then pushing down for a clean break.

There are four search antennas and an audio probe with the following characteristics:

Probe label	Application
'Narrow Band Probe 1,8 MHz'	~8 μ H printed coil, resonant with 1000 pF capacitor on 1.8 MHz.
'Wide Band Probe < 10 MHz'	~2 μ H printed coil, wide band coverage 100 kHz – 2 MHz.
'Wide Band Loop > 10 MHz'	Basic wide band copper loop 2" x 1", 10 MHz – 50 MHz.
'E-Field Probe'	Flat copper plate for capacitive coupling to cables etc. FET input.
'Audio Probe'	RCA phono socket, connects to internal audio amplifier.

Probing in practice

With the EMV Spy 2.0 fully assembled, I plugged the “Wide Band Probe < 10 MHz” into the edge connector at the top of the case, followed by a pair of Koss stereo headphones plugged into the 3.5mm socket — then went searching for signals around the house. The first conclusion is that radio station WLNA on 1420 kHz AM is a strong signal at my location, just 2 miles from the 5 kW/1 kW transmitter site. The probes’ loop antennas are directional, so WLNA can be nulled out by rotating the coil, printed on the fiberglass board. With the PCB vertical and facing the transmitter, a null in the WLNA signal should be found. Audio quality of WLNA was quite acceptable on headphones. The “Narrow Band Probe 1,8 MHz” could also pick up WLNA.

There is another strong signal at my location — the “Wide Band Loop > 10 MHz” picks up audio from WHUD on 100.7 MHz! This should not be happening as WHUD is a frequency modulated station with no amplitude modulated component. Possibly this is a case of slope detection of the FM signal or there is some residual amplitude modulation on the carrier.

I continued my tour looking for electromagnetic noise rather than broadcast signals. The worst offenders were **switch-mode** power supplies, especially for notebook computers. The next-worst were the front panels of radios with an LCD display. My Anytone AT-578 UVIII DMR mobile radio was especially bad, radiating noise, even when it was



EMI Spy 2, with “Wide Band Probe < 10 MHz” inserted, detects noise from a switch-mode power supply.

switched off at the front panel!

Headphone audio was helpful in distinguishing between different devices. Some sources buzzed, others whined, while items with a clock had a steady ticking noise. Most of the devices could only be heard when the probe was within a few inches. Move a foot away and the background noise dropped off.

I also carried out a check on domestic light bulbs, now converted to LED types. Some were quiet, others hummed, buzzed or screamed.

I found some **strong** signals —



Philips 60W replacement bulb with LED strings was RF-quiet.

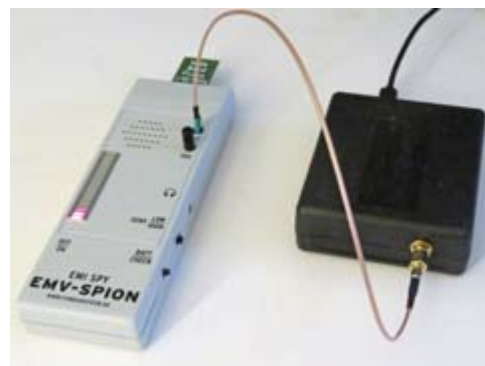
one was from an ultrasonic humidifier — that would be the drive voltage for the piezoelectric transducer, typically operating on a frequency in the range 1.7 – 2.4 MHz. My portable AM/FM/SW receiver reported the frequency as 1.77 MHz. The humidifier’s signal could also be picked up as a noise peak, just below the 160 meter band on my HF transceiver.

Another strong signal came from an upright vacuum cleaner. In operation, its 12 amp motor has a commutator with carbon brushes sparking away. My electric drill has a similar noisy motor with commutator. All three devices could be detected from several feet away by the EMI Spy 2.0.

I tried connecting my SDRplay RSP1A software-defined radio receiver to the



EMI Spy 2.0 found a strong signal from an ultrasonic humidifier.



EMI Spy 2.0 coaxial RF output connected to SDRplay RSP1A SDR.

RF Out socket of the EMI Spy 2.0 using a cable with TMP-K01X-A1 coaxial plug wired to a male SMA connector. With SDRconnect software running on the Raspberry Pi, scanning the spectrum from 200 kHz to 2100 kHz, I could see the difference between broadband “spark” QRM and the multi-frequency spectrum of a switch mode power supply.

Conclusion

My overall impression is that the EMI Spy 2 will be a useful adjunct when searching for the cause of electromagnetic interference and getting close to the source.

The portable AM broadcast receiver with its ferrite loopstick antenna should still prove valuable for detecting signals from further away.

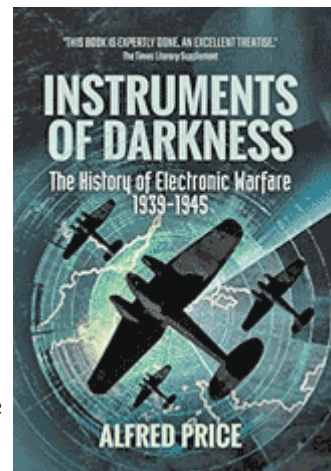
- NM9J

Instruments of Darkness – book review

After the review of “The Birth of British Radar”, “Boffin” and “Churchill’s Shadow Raiders” in December 2024’s *PCARA Update*, here is another book describing RF techniques during World War II.

INSTRUMENTS OF DARKNESS The History of Electronic Warfare 1939-1945

by Alfred Price, Frontline Books 2017-2024



The unusual title of this book is explained in the prologue —

‘The instruments of darkness tell us truths
Win us with honest trifles, to betray’s
In deepest consequence.’

Shakespeare, *Macbeth*

This is part of Lord Banquo’s speech to Lord Macbeth in *The Scottish Play*, casting doubt on the prophecies they have both just heard from the three witches, encountered on the ‘blasted heath’. The **instruments of darkness** are the witches and their supernatural powers, capable of captivating people by playing on partial truths that can lead to dreadful results.

Dr. Alfred Price (1936 – 2017) served for 16 years in Britain’s Royal Air Force as an aircrew officer specializing in electronic warfare and air-fighting tactics. He flew on Avro Vulcan and English Electric Canberra bombers and was an Instructor at the Vulcan Conversion unit. He left the RAF in 1974, gaining a PhD in History from Loughborough University then became a full-time writer on aviation. He was historical adviser to the 1977 BBC TV Series “The Secret War”.



Alfred Price.

“Instruments of Darkness”

first appeared in 1967, followed by a revised edition in 2005, extending coverage to the surrender of Japan in August 1945.

The book’s prologue begins with airship *Graf Zeppelin* LZ130 making an electronic survey of the east coast of Britain in July and August 1939, probing for radio signals mostly above 100 MHz. Alfred Price claims that it failed to identify pulses from Britain’s

newly-installed Chain Home radar stations operating on 20 – 30 MHz. Meanwhile the Chain Home stations along the coast were plotting every move of the airship.

The next chapter describes the “Battle of the Beams” and Telefunken’s *Knickebein* (crooked leg) blind bombing system used by German night bombers. In the summer of 1940, a British Avro Anson aircraft detected narrow radio beams transmitted on 31.5 MHz from points in Germany, intersecting over a bombing target in Britain. The receiver in the Anson aircraft was a Hallicrafters S-27 amateur radio set covering 27 to 143 MHz.

Before the Anson flight could take place, Dr. R.V. Jones at the Air Ministry’s Directorate of Intelligence had connected snippets of information together then convinced an

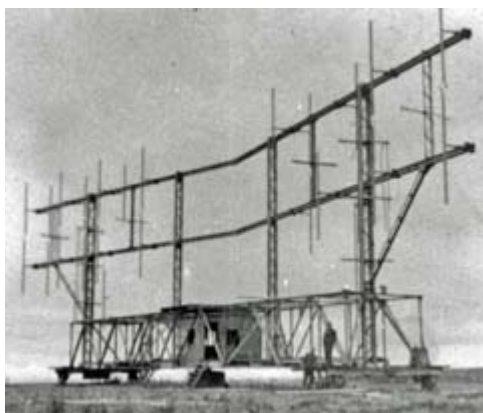
expert committee convened by Winston Churchill that VHF radio beams from Germany could penetrate 250 miles into Britain.

Radio amateur and RAF Signals Officer

Squadron Leader Rowley Scott-Farnie G5FI had shown Dr. Jones a report by T.L. Eckersley of the Marconi Company estimating that a signal on 20 cm from the Brocken Mountain in central Germany might be received by a bomber flying at 20,000 feet over the east coast of Britain. Scott-Farnie also suggested likely beam frequencies of 30.0, 31.5 and 33.3 MHz as these were the preset frequencies found in crashed Luftwaffe aircraft equipped with a Lorenz blind-landing receiver.

With the radio beams identified, countermeasures could be undertaken, including re-use of 27 MHz diathermy sets from hospitals to radiate broadband noise and deployment of existing Lorenz transmitters to lay false beams. Wing Commander Edward Addison was placed in charge of this activity and found a valuable source of personnel for his operations by recruiting pre-war radio amateurs — including Martin Ryle G3CY — later radio astronomer Sir Martin Ryle.

Germany had another bombing aid in reserve named *X-Gerät* (X-Apparatus), whose signals had been detected by Scott-Farnie around 70 MHz from Cherbourg and Calais on the French coast. The story of the discovery and the British countermeasures is told — along with insight into the experience of German pilots who used these systems.



German Knickebein transmitting antenna mounted on circular railway track to point over targets in Britain.

Subsequent chapters cover German radar — as described in the book “Churchill’s Shadow Raiders”; British navigation systems – including the hyperbolic navigation system “Gee”, which emitted pulses from three different sites in Britain around 44-48 MHz; and airborne radar as employed by German night fighters on 490 MHz.

Jamming of German HF air-to-ground communication on 3-6 MHz is described, along with high power stations in the UK issuing confusing orders in German. German ground-to-air communications moved to VHF, 38-42 MHz, and this was jammed from Lancaster aircraft using an early panadapter to monitor a range of German frequencies.

A chapter on the 1941 entry of USA into World War II mentions Dr. Frederick Terman, head of the Department of Electrical Engineering at California’s Stanford University. In 1942 Dr. Terman took up an appointment to head the Radio Research Laboratory on the campus of Harvard University. The RRL was a cover name for the organization developing radio and radar countermeasures for the U.S. armed forces.

Frederick Terman (1900-1982) is well known nowadays for his textbook “Radio and Electronic Engineering” and as one of the founders of Silicon Valley. He was first licensed as a young radio amateur in 1916 (6AE) and later encouraged activities of the Stanford Amateur Radio Club W6YX. At the Radio Research Laboratory he supervised a staff of more than 800, including some 100 radio amateurs.



Frederick Terman.

Dr. Terman was involved in the British development of “Window” (also known as ‘chaff’), the code name for metal strips dropped from aircraft to confuse enemy radar. There was concern on both sides of WW II that use of “Window” would overpower airborne and ground radar on frequencies above 200 MHz.

Alfred Price’s book concludes with the final months of the war in Europe and ending of the Pacific war. “Instruments of Darkness” covers a lot of ground, and I was prompted to look up further details in “Most Secret War” by Dr. R.V. Jones. Interviews with protagonists from both sides add to the value of the book. It is worth remembering that all the radio frequency measures and countermeasures were accomplished using vacuum tube technology — including the cavity magnetron which generated 10 kW pulses on 3000 MHz.

“**Instruments of Darkness**” by Alfred Price can be ordered from Amazon for \$29.95.

“**Most Secret War**, British Scientific Intelligence 1939-1945” (U.S. Title ‘The Wizard War’) by R.V. Jones is also available from Amazon.

- NM9J

Are you grounded?

A recent edition of BBC Radio 4's "Sliced Bread", broadcast on January 31 2025 asked the question... "Grounding Sheets – do they really work?". (<https://www.bbc.co.uk/programmes/m0027d76>). "Sliced Bread" is a series that investigates so-called wonder products making bold claims. Are they the best thing since sliced bread, or marketing BS?

Static sensitive

Long ago, I constructed RF amplifier stages with what was then a brand-new device, the RCA 40600 dual-gate MOSFET. The gate electrodes were extremely sensitive to static electricity and were supplied with all four electrodes (source, drain, gate 1, gate 2) connected together with a brass collar or a shorting spring. Before the device could be soldered into a circuit board, the board, soldering iron, operator wrist and workbench all had to be grounded. (And don't forget to remove that shorting spring or you'll short the power supply to ground!)

RCA introduced the 40673 device around 1970 with built-in back-to-back diodes between each insulated gate and the source electrode. The diodes would absorb static electricity during handling and any subsequent transients in-circuit. Farewell to the brass collar!

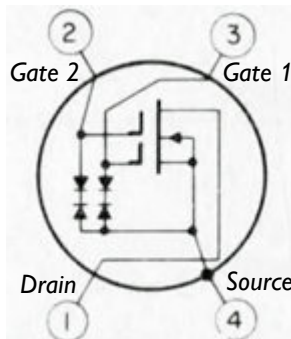
I am aware that static electricity can still be a problem in the workshop, especially if you shuffle across a carpet in synthetic rubber soles on a dry winter's day or roll your chair around on a plastic chair mat. When you touch a metal object such as a door handle, prepare to be shocked! Keep your highly charged self away from electronic devices that are sensitive to electrostatic discharge (ESD). Time to **get grounded** — but keep in mind that "get grounded" can *also* refer to an emotional state of being self-aware, resilient and balanced amidst external chaos.

Back to earth

What were those **grounding sheets**, mentioned in the "Sliced Bread" program? I carried out a short search on Amazon and found a variety of products available for the U.S. market suitable for fitting over a



RCA 40600 dual-gate MOSFET with brass collar (left) or shorting spring.



Dual-gate MOSFET with back-to-back diodes for gate protection. [After RCA]

mattress from suppliers such as Earthing/Clint Ober, Vmtizz and Cuazccs (sic). The sheets are electrically conductive thanks to woven-in silver threads or carbon fibers. An electrical cable with a 100 k Ω series resistor connects the sheet's metal stud to the ground pin of a three-pin electrical outlet. Users are recommended to sleep directly on top of the sheet.

Two Internet sites provide insight into these devices. The Earthing Institute (<https://earthinginstitute.net/>) looks forward to the day when everyone is grounded throughout their life and supports research into the effects of grounding on health. The Earthing® web site of EarthFX Inc. (<https://www.earthing.com/>) "founded by Clint Ober" sells grounding products for beds, floors, chairs, arms and wrists plus socks and shoes.

Good for what ails ye

Those web sites contain enthusiastic reviews from happy users, plus striking claims of health benefits, including improved sleep, reduced inflammation and reduced pain. Scientific papers are cited containing supporting statements.

The BBC Radio program pointed out that many of the papers on grounding are written by the same group of people associated with the Earthing Institute.

Sliced bread?

The BBC Radio 4 program asked the question — are grounding sheets the best thing since sliced bread or marketing BS? Two experts contributed their opinions. Chad Orzel, Associate Professor in the Department of Physics and Astronomy, Union College, Schenectady, NY rated grounding sheets as "BS" from a Physics point of view. Sheena Cruickshank, Professor of Immunology at the University of Manchester (UK) pointed out that the placebo effect is very real, and users who can afford the products might perceive a benefit, but without a good body of solid scientific evidence the devices are expensive BS.

On the positive side, if you need a grounding mat for handling static-sensitive devices, they **are** readily available.



Earthing sheet with conductive threads woven in.



Connect sheet to ground.

Peekskill / Cortlandt Amateur Radio Association

Mail: PCARA, PO Box 146, Crompond, NY 10517

E-Mail: mail 'at' pcara.org

Web site: <http://www.pcara.org>

PCARA on Facebook: <https://www.facebook.com/pcararadio>

YouTube Channel: <https://www.youtube.com/@peekskillcortlandtamateur7670>

PCARA Update Editor: Malcolm Pritchard, NM9J

E-mail: NM9J 'at' arrl.net

Newsletter contributions are always very welcome!

Archive: <http://nm9j.com/pcara/newslett.htm>

PCARA Information

PCARA is a **Non-Profit Community Service**

Organization. PCARA meetings take place every month (apart from July/August break). See <http://www.pcara.org> for current details.

PCARA Repeaters

W2NYW: 146.67 MHz -0.6, PL 156.7Hz

KB2CQE: 449.925MHz -5.0, PL 179.9Hz

N2CBH: 448.725MHz -5.0, PL 107.2Hz

PCARA Calendar

Sat Mar 1: PCARA Monthly Meeting, 10:15 a.m., Putnam Valley Library, 30 Oscawana Lake Rd., Putnam Valley, NY.

Sat Mar 1: PCARA VE. Test Session, 11:30 a.m., Putnam Valley Library. See below.

Sat Mar 15: PCARA Breakfast, 9:00 a.m., Uncle Giuseppe's, 327 Downing Dr., Yorktown Heights NY.

Hamfests

Check with organizers before leaving.

Sat Mar 22: NJ Antique Radio Club Swapmeet, Parsippany PAL, 33 Baldwin Rd., Parsippany, NJ. 8:00 a.m.

Sun Mar 30: Southington ARA Hamfest, Southington High School, 720 Pleasant St., Southington, CT. 8:30 a.m.

Sun May 4: Orange County ARC Hamfest, Black Rock Fish & Game Club, 5 Pleasant Hill Rd, Mountainville, NY, 8:00 a.m.

VE Test Sessions

Check with the contact before leaving.

Mar 1: PCARA, 11:30 a.m., Putnam Valley Library, 30 Oscawana Lake Rd., Putnam Valley NY. Laurel VEC (no exam fee). Must contact VE, KF2BD daveharper'at'vivaldi.net.

Mar 13: WECA, Westch Cnty Fire Trg Center, 4 Dana Rd Valhalla NY. 7:00 p.m. Contact VE, rcasino48'at'gmail.com.

Mar 21: Orange County ARC, Munger Cottage, 40 Munger Dr., Cornwall NY. 6:00 p.m. Contact VE, Joseph DeLorenzo: w2bcc'at'arrl.net.



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