



PCARA Update



Volume 22, Issue 3 Peekskill/Cortlandt Amateur Radio Association Inc. March 2021

From lion to lamb

On February 4, 2021 there was an encore Zoom presentation of “*Magic of Amateur Radio*” hosted by Todd N2MUZ, organized by Lou KD2ITZ, and sponsored courtesy of the Hendrick Hudson Free Library in Montrose, NY (<https://henhudfreelibrary.org/>). Approximately a dozen people attended, some of who expressed interest in classes and a VE test session. I would like to extend my thanks to Todd and Lou for their efforts, and to the Hendrick Hudson Free Library for the use of their resources and their generous support. Thank you!

Talking about VE test sessions, Lou KD2ITZ has organized the next PCARA VE Test Session for March 20, 2021 at the John C. Hart Memorial Library in Shrub Oak, NY at 11:00 am. Please be sure to spread the word since VE test sessions are few and far between. Let’s pray for nice spring-like weather since the Vernal Equinox arrives on the same day.



Previous PCARA VE Test Sessions have been held at the John C. Hart Library. (Bring your own chair.)

Our friends at WECA are holding a General Class Course beginning on Tuesday March 16, 2021. The Ham Radio Test Preparation “Virtual” Class is being taught by Larry W2UL over a period of nine weeks on Tuesday evenings from 7:00 pm to 9:15 pm via Zoom. On the Thursday of the 9th week (April 13th) a VE Test Session may be conducted at the Westchester Fire Training Center at 4 Dana Road in Valhalla, NY. For further details please check WECA’s website at <https://www.weca.org/>.

Weekly Monday evening PCARA Simplex Nets continued thanks to Karl N2KZ, investigating communication on various modes on 2 meters. We continue to learn about our capabilities to communicate without the use of our club repeaters. Give the net a try to see how well you can stay in touch using simplex alone. Thanks Karl.

Last month I mentioned that we had approached a local uniform supply store to create an embroidered PCARA patch that could be applied to hats, jackets, shirts, etc. We have had success! Now available are baseball caps (color of your choice) embroidered with the PCARA logo, name, U.S. flag, and your call sign should you desire (\$20 to \$24 w/call sign). An example of the embroidery and cap can be found alongside.



PCARA embroidered baseball cap.

Please let us know what you think. Similar embroidery can be applied to a range of clothing choices. Ordering details soon to follow.

Our next in person meeting is scheduled for **Saturday March 20, 2021 at 9:00 am** at the John C. Hart Memorial Library in Shrub Oak, NY (<https://www.yorktownlibrary.org/>). We will be gathering outdoors at the library with masks and responsible social distancing, weather permitting. Until then, please stay safe. I look forward to *seeing* each of you there!

- 73 de Greg, KB2CQE

Contents

From lion to lamb - KB2CQE.....	1
More Magic.....	2
VE Test Session	2
WECA General Class	2
Adventures in DXing - N2KZ	3
Catching Up - N2KZ	6
Antennas for a small island - NM9J	8

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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 neighborhood information.

More Magic

PCARA's second presentation on "The Magic of Amateur Radio" took place on Thursday February 4th. The first presentation, promoted by the John C. Hart Library had taken place in October 2020.

The February presentation, organized by Lou KD2ITZ was sponsored by the Hendrick Hudson Free Library, and participants were asked to register with the library in order to obtain their Zoom meeting code.

Adult Programs Librarian Cheri Morreale opened the Zoom meeting at 6:30 p.m. then handed over to



Screen shot of 'Magic of Amateur Radio' Zoom meeting. Cheri Morreale top left, Todd N2MUZ top right.

Todd N2MUZ, who was logged in remotely. Todd stepped through his PowerPoint slides for the benefit of eleven participants who had joined the Zoom meet-

ing. Several questions about the hobby were answered at the end of the presentation and further questions were directed to PCARA's Google Group.

VE Test Session

PCARA's previous VE Test Session took place on Saturday November 7, 2020 on the lawn at John C. Hart Library in Shrub Oak. The fall weather was warm and the VE Team was able to supervise the candidates in bright sunshine. New call signs that resulted from the November session include Vincent **KD2VAV**, Matthew **KD2VAW** and Jennifer **KD2VAX**.

PCARA's next VE Test Session has been arranged by Lou KD2ITZ to take place outdoors at the Library on **Saturday March 20th, 2021**, starting at 11:00 a.m. The date is significant — March 20 is also the Vernal Equinox, the Astronomical first day of spring in the Northern Hemisphere, when the sun crosses the equator and we look forward to longer days and warmer weather.

All candidates are requested to contact V.E. Team Liaison Michael W2IG before the event using e-mail address w2igg'at'yahoo.com or (914) 488-9196.

WECA General Class

WECA (Westchester Emergency Communications Association) will be conducting its annual free preparatory class for the Amateur General FCC exam this spring via **Zoom** and at the Valhalla Fire Training Center if it is open. The class will run for nine weeks starting Tuesday evening March 16th from 7:00-9:15 pm via Zoom. VE sessions with social distancing are available in the area. (\$15 testing fee).

This free, interactive course will be taught by a team of knowledgeable amateur radio operators from WECA. The class will review questions and answers from the General question pool and provide explanations. All are welcome to attend who wish to gain additional knowledge of amateur radio.

The **ARRL General Class License Manual 9th Edition** is required and should be purchased before the class begins. ARRL's **General Q&A 6th Edition** is also helpful. Both are available from ARRL Headquarters and from Amateur Radio dealers.

Further details are available from the WECA web site: <https://www.weca.org/#h.4xnqbd9m1tz6>. To enroll in the class please contact Larrie Sutliff W2UL using W2UL'at'WECA.org.



Adventures in DXing

- N2KZ

Becoming Obsolete

If you live long enough, do you become obsolete? I am starting to think so! The world that I remember as a young person has either disappeared or has been forgotten... or so it seems. Certainly, it feels that way. Has my familiar reality vanished? Doesn't anyone even remember the time of my youth? Am I a walking and living fossil?

Let me take you back to the world I once knew... Eisenhower was president. Gasoline was about 19¢ a gallon. The only radio was AM radio. Our television received a total of seven black-and-white channels using a continuous tuner in three bands: Low VHF, High VHF and the mysterious FM (radio) using a V-beam antenna tucked inside our attic. If you crossed the border between Queens County and Nassau County, you suddenly found yourself in undeveloped farm country. It was truly a different world.



Vintage TV antenna.

My first experiments with radio included General Electric 2N107 germanium transistors and my cherished 2 transistor reflex AM pocket radio with fold-out stand and small whip antenna. I probably used hundreds of Japanese type 006P 9 volt batteries during my childhood. I built homebrew transistor



radios and even a little transmitter on a Masonite breadboard using binding posts as connection points and a great big D cell battery or two.

My constant antenna was a bundle of white with black striped wire complete with a copper Mueller alligator clip to attach to my little two-transistor radio or whatever else I was using to bring me exotic signals.

In my teenage years, more advanced projects followed including little primitive AM and FM transmitter kits using a carbon telephone microphone. I even dis-



Japanese Type 006P 9 volt batteries.

covered that I could light up my FM radio's 'stereo' light if I whistled at just the right high pitched tone using my homebrew FM wireless microphone. Wow!

Crystal radios were the ultimate gift. If you had a diode, a coil and a fixed capacitor (or a variable one — if it was really fancy) you could hear radio! No batteries needed! I could hear as many as eight stations through my crystal earpiece: WMCA, WNBC, WOR, WABC, WCBS, WINS, WNEW and WQXR. Rock 'N' Roll ruled on Good Guy 57 WMCA, WA Beatle C and Wins 1010. WCBS was a very strong full-service station with news, talk, music and sports



coverage. WNEW provided music for the older crowd on shows like the famous "Make Believe Ballroom" and WQXR was "The Station of the New York Times" honoring classical music and formal news broadcasts. A lot of variety could reach you through your basic crystal set!

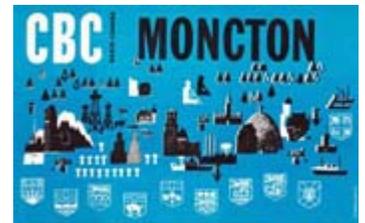
The yellow plastic RCA household radio that sat on top of our refrigerator really could bring in stations.



1950s RCA Victor table radio.

It was an 'All-American Five" tube radio with a superhet design. My Dad used it to introduce me to the world of DXing. While he would be getting ready for work every morning, he would hear stations from far off places like

Chicago, Buffalo, North Carolina, Georgia and even Texas. One of his favorites was CBA 1070 — a CBC station from New Brunswick, Canada. Even inside our brick and mortar apartment building, signals would find us from all over Eastern North America and there was very little interference to ruin our fun.



Eventually, I graduated to more advanced operations. I saved up for a genuine Lafayette microphone mixer and figured out how to wire in record players or even cassette machines. Plug adapters and cords became essential accessories to building my broadcast empire! I was always experimenting with better antennas and (somehow) gaining more power. The second part was much more difficult.



Lafayette microphone mixer.

Without any money,

more power was nearly impossible.

Later, in high school, the advent of 27 MHz Citizen's Band entered the scene. CB became a useful learning tool to gain understanding of 'real' transmitters and antenna design and properties. I also came to appreciate the wonderful world of thermionic devices. Tubes glow a beautiful warm orange. They have a signature smell and literal warmth when they are on. Due to their design, they also *sound* warm — filled with all sorts of pleasing harmonic energy when used for audio. Tubes are also resilient. You don't have to worry about static discharges, power surges, logic losses or power supply meltdowns. No doubt, they do sometimes fail but they infrequently create complete and total disaster. 'If it glows...it always goes.'

Becoming Professional

By 1968, I was already fund-raising for a local college radio station to stay on the air: Hofstra University's WVHC on 88.7 FM from Hempstead. During my year as a college freshman, I instantly became the morning wake-up DJ on WCVF — the Campus Voice of Fredonia (College), south of Buffalo. I was introduced to the world of broadcast production and a candy store of broadcast equipment. Mastering all of these items was a perfect match with a very young engineering mind with unbridled energy and passion!

See how many of these items might still be familiar to you: A Gates BC-1G AM radio transmitter, a Gates Level-Devil, A CBS Audimax/Volumax pair, a Kahn Symmetra-Peak, gray Fidelipac cartridges and a Spotmaster machine to play them on, great big and heavy Gates CB-500 record turntables (with the black stick shift) fitted with a Stanton 500 cartridge, step-switch transmitter remote controls, Shure M67 mixers complete with three 9 volt batteries, Electro-Voice 635 microphones and Sony TC-110 cassette recorders. The list goes on and on!

Most fascinating was the Gates line of audio mixing consoles that were the heart and soul of many, many radio stations worldwide. You'll love the names they were given: Dua-Lux, President, Executive, The Yard, Studioette, Statesman and (of course) the Gateway.



Gates Diplomat audio mixing console.

[A 1960 Gates Radio catalog is available in PDF format at: <https://www.steampoweredradio.com/pdf/gates%20harris/gates%20radio%201960%20catalog.pdf> -Ed.]

Also omnipresent were roll-around console reel-to-reel audio tape machines like the Ampex 300, 350 and 440 series and the RCA RT-21. Have you ever heard of 'back-erasing?' Also resident were Edit-All tape splicing blocks and audio tape bulk erasers. You see, audio editing required "cutting tape" with a sharp razor blade, an editing block and special splicing tape.



Ampex AG440 professional tape recorder, vintage 1967.

Nobody wanted to work overnight shifts but there



Xedit Corp. EditAll S-3D splicing block for 1/4" magnetic tape.

was a cost-effective answer... the precursor to all radio automation systems: The Gates 'Nite-Watch' overnight programming solution. It had 100 slots for 45 rpm records, so you could

automatically play as many as 200 songs before repeating. When one record ended, you would hear a slight pause as the records exchanged and the next song would begin.

What a great idea!

There was only one catch to this miracle machine. If you had one bad record and it skipped... it

could literally skip all night leaving listeners with an endless loop of a couple of seconds of sound for hours and hours and hours! I know all about this horror! Being a 'morning man' disk jockey, the last thing you wanted to hear while driving to the radio station was to hear a record stuck in one groove — skipping over and over and over again! I have to smile when I recall all the perils of broadcast radio back when.

In the 1980s, I moved on to the more complex and more financially viable world of television. I lived and breathed broadcast engineering and management for another 37 years developing and maintaining cutting-edge technologies preparing for TV's eventual transformation to on-demand streaming. How do you like it now?



Gates "Nite-Watch" 100 record changer.

The New World

All of the broadcasting world has forever changed. The transition to streaming took decades! Beginning with the coming of cable and satellite television, then home video recorders, computers and the Internet, podcasts and YouTube and 'on demand' everything, traditional broadcasting has faded away. Audiences scattered to new media choices. The major networks' advertising dollars decreased and so did the sophistication and quality of programming.

This downward spiral eventually took its toll and broadcasters consolidated and regrouped. Instead of immediate local news and talk shows, radio station owners were forced to fire their staffs and rely on nationwide syndicated programming, sometimes filling their entire broadcast day.

As the audience numbers constantly declined, the radio stations' revenues shrunk proportionately. You can only charge so much to reach so many people. If an advertising spot now only reaches a fraction of your former audience, you have to drop your price. Lower prices seriously affect your station's income. What can be done? Run twice as many advertisements! This, along with acerbic morning "Zoo" talk shows have made radio audiences disappear in vast numbers. No one wants to tune in to hear commercial after commercial interspersed with banal chatter!

This degenerative disease continues to this day. New York City, the nation's largest broadcast market,

just saw its first full-power clear channel 50,000 watt AM radio station go dark voluntarily:

WFME 1560 AM (formerly WQXR – The radio station of The New

York Times.) The station's owner, religious broadcaster Family Radio, was offered \$51 million dollars to vacate their tower site real estate in Maspeth, Queens. It was an offer they could not refuse. It is pointless to re-build an entirely new AM station especially in such an expensive part of the world. Now New York City's AM radio band has a great big missing tooth on the dial at 1560 kHz from now to forever more!

Just examine our local area and you will quickly see the rollback of radio. Now missing in action and forever off-the-air is WPUT 1510 Brewster. Many formerly thriving local AM stations are now fully automated with syndicated programming: WFAS 1230 White Plains, WLNA Peekskill 1420, WRVP (formerly WVIP) Mt. Kisco, WAXB 850 Ridgefield and WSTC

1400 Stamford. WGCH 1490 Greenwich is on life-support using a compromise antenna after recently being evicted from their long-standing transmitter and antenna site. Except for (maybe) WVOX 1460 New Rochelle, local radio serving the northern suburbs of Westchester is nearly extinct. The only remaining local alternative is Peekskill's 100.7 WHUD-FM.



Former home of WPUT, 1510 AM where racoons had broken into the overgrown house. [N2KZ pic].

It's So Noisy

The march of technology has added to the decay of over-the-air radio and television. Unfortunately, AM radios are especially good at receiving electronic noise from a variety of sources. Broadcast television and FM radio also fall victim. Are they no longer viable in today's world?

Flat-screen televisions and laptop computers require concise sources of robust power. Old-fashioned large analog power supplies are simply too big to be included in modern streamlined designs. The solution to this problem requires the use of **external** power supplies often using 'switching' technology. Today's 'wall-warts' and power supply bricks produce insidious interference that renders radios and over-the-air television receivers useless. What is a radio or TV anyway? I now listen to all of my 'radio and TV' over my smart-phone via the Internet. I can choose from thousands of stations from all over the world in perfect quality. I guess this is called progress!

Trying to Adapt

Everything is now file-based. Today's need for instant gratification requires immediate playback of all materials you want to watch, listen to or read. Any sort of home recording is archaic and pointless. It's all online somewhere! This new approach to electronic entertainment has its price.

The old-fashioned sense of community has vanished. No longer do millions of people all tune in to the same broadcast all at once. I remember all of my school friends tuning in to Dan Ingram's afternoon show on WABC 77 and talking about it the next day. This will never happen again!

At its peak, the TV sitcom 'I Love Lucy' could bring in over 67% of the TV audience. Today, a big football game can earn a rating of 15%. On average nights, broadcast networks are



thrilled if they reach 3% or 4% of the possible audience. The rest of the world is watching Netflix, Amazon Prime, Hulu or Disney+. Don't forget YouTube!

Analog dollars have turned into digital dimes. The broadcasting revenue pie used to be shared by three networks and a handful of local stations. Now there are thousands of choices and the revenue pie slices are tiny or even microscopic! It really has become an entirely new world.

On the professional technical side, things are no different. When I first started in broadcasting, there were separate chassis for nearly every necessary process to get a signal on the air. Television required people operating cameras and videotape machines. There were graphics creators and playback people, audio and video technicians, master control and transmitter operators. All sorts of stand-alone equipment created 'the program stream' that a signal would travel through before reaching the air.

Today's video streaming requires one thin blade server computer that feeds a streaming processor that sends the result to Internet distribution. Everything that is needed to create complex broadcasts comes out of one single all-inclusive compact device. No myriad of equipment or humans required! If a piece of equipment does not include a NIC card and a CAT6 connection, it is ready for the e-waste pile.



HP blade server.

Forget about satellite or cable transmission. It is simply much too cumbersome and expensive to operate and maintain. Vultures are circling over satellite and cable. DirecTV has been spun-off by AT&T and will operate as a separate company. The bell tolls. The end may be near!

I also predict that the concept of the 24 hour a day network will disappear someday sooner than later. Viewers would much rather stream exactly what they want, when they want it, instead of watching a pre-programmed server that runs all day long. Video streaming is a business like any other. You always need to provide your service in the least expensive manner to your audience to remain competitive and profitable. Offering an endless library of available shows and clips is much easier to provide than continual networks.

Playback via one single server does not require teams of technical support crews and management. You simply can't support legions of technicians with digital dimes! So, after more than 50 years in radio and television, I really *have* become obsolete. I am pleased to say that my timing was excellent. I started working when broadcasting was at the top of the hill and I made a sweet journey all the way to the end without falling. Now we just personally play back pre-recorded files.

Karl... you can go home now!

Anyone under 30 would surely ask the question: "What is a television?" and "What is a radio?" Rest assured, they all know about YouTube and all the streaming services. The world *has* changed!

"What did you do before computers?" "We watched TV, read books and newspapers and went to the library. We took walks and met with our friends in person." "Wow. That must have been rough!"

Just remember: When the Internet fails and civilization comes to a complete halt... wireless and independent amateur radio will survive! Until next month, 73s and dit dit de N2KZ 'The (very) Old Goat.'



Catching Up - N2KZ

WCBS-FM Adds Older Oldies

If you miss the older oldies sound of WCBS-FM, you are in luck! WCBS-FM 101.1 FM has recently added 'Scott Shannon's True Oldies Channel' to 'CBS-FM's HD Radio virtual channels — and it's continuous music ad-free! You'll find WCBS-FM on HD-1, the audio of WCBS-AM 880 on HD-2 and the oldies channel on HD-3, replacing CBS Sports Radio (relocated to WNSH 94.7 HD-3.)



WWES 88.9 FM Returns

[WAMC/Northeast Public Radio is a regional public radio network serving seven northeastern states. Their transmitters and translators are in twenty-eight locations throughout the region. Alan Chartock is President and CEO of the network. Studios are in Albany, NY.]



Alan Chartock, President, CEO and regular host of WAMC, Northeast Public Radio.

WAMC/Northeast Public Radio affiliate, **WWES 88.9 FM** Mt. Kisco, has returned to the air after several months of being silent. They have moved to a new transmitter and antenna site adjacent to the merge of The Saw Mill River Parkway and I-684 and increased their transmitter power to 400 watts. This difficult project bore fruit. Their signal and coverage area have improved dramatically.

[Listeners in the Peekskill/Cortlandt area can hear the output of WAMC, Albany — Northeast Public Radio — by tuning to low power translator **W240CR** on 95.9 MHz. This 20-watt translator relays WOSR 91.7 MHz, from Middletown NY. -Ed.]



New WWES site uses two log periodic antennas beaming in opposite directions..



Transmitter coverage of WWES 88.9 MHz, Mount Kisco before (left) and after site move and power change.

Aircraft Beacon Returns

FAA VOR/DME and ATIS beacon CMK “Carmel” on 116.6 MHz AM has also returned to the air after a several-week hiatus. Tune in and you will hear a continu-



Aircraft beacon site CMK “Carmel” can be heard on 116.6 MHz AM.

ous loop of weather and airport conditions for Westchester County Airport (KHPN.) It is obvious that the beacon transmitter and antenna system have had a tune-up producing stronger signals than previously noted. CMK is located in a secluded, guarded and private location near The Wolf Conservation Center in South Salem, New York adjacent to Route 35 and Waccabuc River Lane.

DXing 1560 AM

50,000 watt clear channel WFME 1560 kHz AM left the air on Monday, March 15th at 11:16 a.m., leaving an enormous void on the AM dial. You can watch engineer Tom Ray sign-off the station for the last time on YouTube: https://youtu.be/_xqUhWA065o. Broadcast band DXers have been transfixed on the frequency ever since. It is a challenging frequency to DX inhabited by a group of lower powered local AM stations around the country and beyond. A complete list of the remaining 1560 kHz AM radio stations is attached as a comment to the WFME posting on our Facebook page:

<http://www.facebook.com/pcarahamradio>.



The four towers of WFME-AM, Maspeth, Queens. Two towers were used for the daytime pattern, three towers for the more directional night-time pattern.

- de N2KZ



Antennas for a small island

In addition to green grass and wet weather, one of the defining characteristics of the United Kingdom is the size of its homes and gardens. There isn't a lot of room for 63 million people, so housing lots are small and packed close together.

My family home in Southport had a back yard sized 33 by 40 feet. Into this space I squeezed a bent long wire antenna, a Hy-Gain 14AVQ trap vertical and various antennas for VHF/UHF.

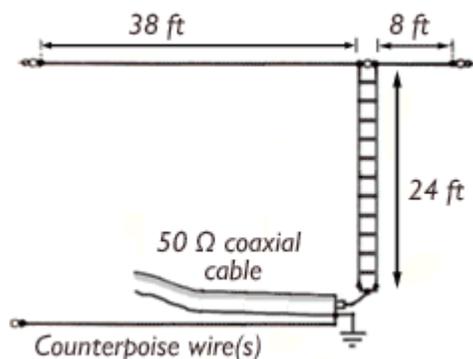


Small Southport back yard contained 14AVQ vertical (left) and mast supporting a long wire and 2 meter collinear.

Most U.K. homes have similar sized yards, so there are few opportunities for erecting full-size antennas such as a 132 foot long dipole — unless you have nearby open space or cooperative neighbors. Here are a couple of antenna ideas from the U.K. inspired by those small back yards.

G7FEK Limited Space Antenna

Mike Dennis G7FEK came up with the idea of a small dual-band vertical antenna in 1988. It was intended to achieve good results on the lower HF bands in a small yard only 45 feet long — too small for a full-size G5RV antenna.

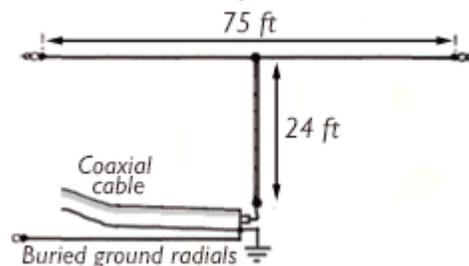


G7FEK Limited Space Antenna has two horizontal wire sections and a 24 ft length of vertical ladder line.

At first glance, the diagram of G7FEK's Limited Space Antenna might look like an off-center G5RV or ZS6BKW. There is a horizontal dipole connected off-center to a

length of ladder-line running vertically down to ground level. But take a close look at the feed point... at the bottom of the ladder line, *both* conductors are bonded together and connected to the center conductor of the 50 ohm coaxial cable, while the outer conductor of the coaxial cable is connected to earth/ground and counterpoise wires.

The design is similar to a Marconi "T" antenna... with a couple of differences. The T antenna is a shortened quarter-wave vertical fed against ground, with a single-section, symmetrical flat top to provide capacitive loading and reduce overall height. Polarization is vertical, from the vertical wire. The horizontal top section radiates very little as the two halves are symmetrical, with equal RF



Marconi T antenna resonant on 3.75 MHz.

current flowing in opposite directions from the common center — so the out-of-phase radiation cancels. The T antenna, suspended between two masts, was a favorite of the BBC for LF and MF AM broadcasting. It

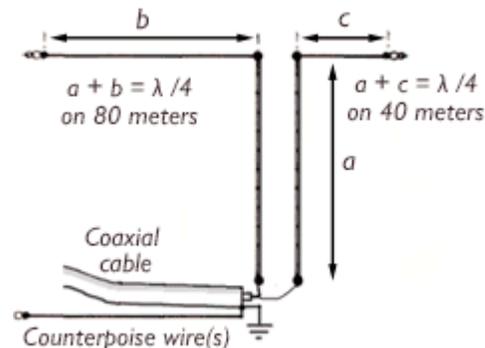


Two-wire "T" antenna suspended between guyed masts at a BBC MF site.

could approach the performance of a full-size quarter-wave vertical using a lot less height. Top capacitance can be increased

by running multiple horizontal wires in parallel, raising radiation resistance and efficiency.

The best way to look at the G7FEK antenna is as two inverted-L antennas, one for 80 meters and the other for 40 meters, brought close together, with their bottom feed points wired together. The principle is similar to the fan dipole, where each wire element comes to resonance in a different amateur band, while the other wires, having higher impedances, carry lower RF currents.



Two inverted-L antennas brought together with a common feed point.

Practicalities

In his 2005 article, G7FEK recommends dimensions as shown in the first diagram... 24 feet of twin feeder or ladder-line run vertically to 38 feet of horizontal wire on the 80 meter side and 8 feet of wire on the 40 meter side. The ladder line conductors should be shorted together at the bottom then connected to the inner conductor of the coaxial cable. The coax outer shield should be connected to earth/ground and to counterpoise wires. G7FEK suggests a minimum of two insulated counterpoise wires, around 60 feet and 30 feet long, elevated above ground. As an alternative, several 30 ft buried radials could also be used.

Full details of the antenna are available on the G7FEK web site at: http://www.g7fek.co.uk/news.php?page=80m_Antenna_for_small_gar_49493

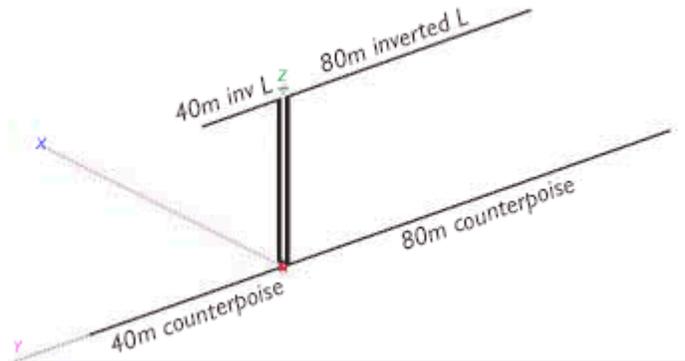
G7FEK recommends adjusting the two horizontal wire lengths for resonance at 3.7 MHz and 7.1 MHz. Initial wire lengths should be longer than indicated to allow shortening during initial setup. Impedance on 80 meters could be lower than 50 ohms, so an ATU might be needed.

G7FEK reports that this vertical antenna performed as well as a full size dipole, with good DX worked on 80 meters. Although the majority of radiation is at a low angle, there is still some high angle radiation from the horizontal wires, allowing NVIS contacts.

The antenna can be supported at the ends with the ladder-line section suspended in mid-air. Alternatively, a fiberglass pole can be used to support the 24 foot vertical section, with horizontal wires led away to additional supports. A slight slope is acceptable, but inverted-V style downward slope is not recommended. A standard center insulator for ladder line or twin ribbon can be used at the top of the vertical section, with a coaxial feed insulator at the bottom end. A feed-line choke on the coaxial cable is recommended to reduce current on the outer conductor.

Simulation

I carried out a computer simulation of the G7FEK Limited Space Antenna using the free software MMANA-GAL. (See *PCARA Update* for June 2015, p 6 "A novel model"). With 24 feet of simulated 450 ohm ladder line, two counterpoise wires and modeling the antenna 4" above real ground with a 15 ohm ground resistance, the suggested 42 feet of horizontal wire on the 80 meter side provided resonance at 3.7 MHz. However, the horizontal wire on the 40 meter side had to be extended from 8 feet to 13½ ft for resonance on ~7.1 MHz. VSWR was then acceptable on both 80 meters and 40 meters — and almost acceptable on 15 meters (where the 40 meter element acts as a three-quarter-wave). VSWR was too high for a coaxial feed on the other HF bands. See table below.



3D view of G7FEK Limited Space Antenna, simulated in MMANA-GAL modeling software.

Freq MHz	R Ω	jX Ω	VSWR
3.750	30.25	16.83	1.93
7.150	63.95	27.34	1.71
10.120	231.13	-424.31	20.37
14.050	490.51	-759.85	33.42
18.120	45.78	-135.43	9.92
21.200	76.89	141.11	7.23
24.900	532.55	-488.67	19.66
28.200	828.36	47.31	16.62

VSWR results from the MMANA-GAL simulation suggest that use of a coaxial feed on bands above 7 MHz would work best with a wide-range remote antenna tuner located at the base. Predicted SWR values are similar to results obtained by Martin G8ODE. (See PDF file: <https://rsars.files.wordpress.com/2013/01/g7fek-antenna-analysis-iss-1-31.pdf>)

Antenna patterns calculated by MMANA-GAL show low angles of radiation (31° elevation on 80 meters and 39° elevation on 40 meters) plus some infill at high angles caused by radiation from the horizontal wires. The azimuth pattern goes from omnidirectional on 80/40 meters to bidirectional on 20 meters with additional lobes appearing as the frequency goes higher.

Practical measurements by G7FEK and G8ODE on *actual* wire antennas gave **lower** VSWR readings than the computer models — suggesting to your editor that individual grounding arrangements could be more lossy than in the models, with a dampening effect on high impedance values.

The authors recommend building an actual antenna over modeling, but at the time of writing weather does not allow outdoor experiments. Maybe we can test the design at a future PCARA event.

Loop counterpoises

A recent article in RSGB's monthly journal provides further advice for fitting a G7FEK or similar vertical antenna into limited space *and* reducing noise pickup. In *RadCom* for October 2020 Chris Moulding G4HYG describes the restricted dimensions of his own back yard in northwest England, sized 25 feet by 15 feet. His previous experience with vertical antennas

suggests that elevated ground planes pick up a great deal of local electrical noise.

Chris's solution was to substitute the elevated counterpoise wires of the G7FEK Limited Space design with a pair of **loop counterpoises** laid on the ground. One loop was a rectangle of insulated wire with dimensions of 24' 6" by 14' 9". The other loop was a square of insulated wire

with 14' 9" sides. Both loops were connected together, at the base of the G7FEK vertical section, providing a return path for the RF energy.

G4HYG reported that this arrangement was significantly quieter than use of straight-wire radials and ground rods. Noise levels were reduced from S8 to S5-S6 on 80 and 40 meters and from S8 to S3-S4 on 15 and 20 meters.

The *RadCom* article suggests that modeling this arrangement is almost impossible for radio amateurs because of close proximity of the wire loops to ground. Nevertheless, I gave it a try, using the same MMANA-GAL model as before, but with the elevated counterpoise wires replaced by wire loops, sized to Chris's dimensions. Impedance and VSWR figures are shown below.

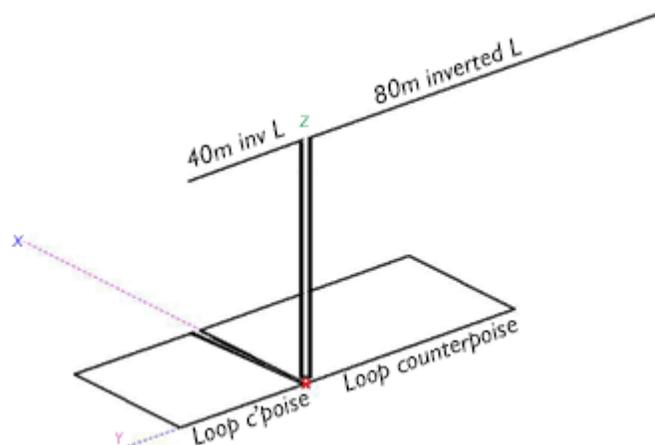
Freq MHz	R Ω	jX Ω	VSWR
3.750	30.34	15.51	1.88
7.150	63.41	30.14	1.78
10.120	224.66	-421.57	20.49
14.050	480.63	-758.85	33.65
18.120	39.38	-132.74	10.91
21.200	82.73	101.72	4.54
24.900	498.88	-508.17	20.38
28.200	809.06	48.42	16.24

The VSWR values are similar to use of the straight line counterpoise wires, with a couple of values (for 80 meters, 15 meters) having lower SWR. Bear in mind that the size of yard required by the wire loops is significantly less than for the long counterpoise wires.

Chris G4HYG gives some further suggestions for reducing noise pickup. He recommends isolating the G7FEK antenna from earth ground by introducing a 1:1



Article by G4HYG in RSGB's *RadCom* for October 2020.



3D view of loop counterpoises added to a G7FEK Limited Space Antenna, as suggested by G4HYG. [MMANA-GAL]

UN-UN isolation transformer between antenna system and coaxial cable. He also suggests that a wire loop laid on the ground and connected to the ground side of a mobile antenna will improve efficiency of mobile whips on the HF bands.

Keyer connection

In the early 1980s I was attending a RAYNET meeting at the G4HYG QTH in Bolton and purchased a "CMOS/VMOS Iambic Keyer" module from Chris Moulding Radio Services. I mounted the circuit board



Katsumi EK-9X with Chris Moulding Radio Services CMOS/VMOS Keyer module.

in an old Katsumi keyer case along with a 9 volt battery and used it successfully with positive and negative keyed transmitters. Forty

years later, that keyer is still working... though I have had to change the 9V battery a couple of times. Chris's

company is also going strong, now known as **Cross Country Wireless**. Pay a visit to <http://www.crosscountrywireless.net/> for a selection of antennas, preamplifiers, baluns, SDR receivers, multicouplers and other accessories that can be shipped overseas, including to the USA.



Chris G4HYG introduces the latest multicoupler from Cross Country Wireless.

- NM9J

Peekskill / Cortlandt Amateur Radio Association

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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 the first Sunday of each month (apart from holidays, July/August break and pandemics). Talk-in is available on the 146.67 repeater.

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

Masks and social distancing are required.

Sat Mar 20: PCARA monthly meeting, John C. Hart Memorial Library, 1130 E Main St., Shrub Oak. 9:00 a.m. Outdoors. Bring your own chair.

Sat Mar 20: PCARA VE Test Session, John C. Hart Library, 1130 E Main St., Shrub Oak 11:00 a.m. Outdoors. Bring your own chair. (Details below).

Hamfests

Many Spring Hamfests have been canceled. Check with organizers before leaving.

Sat Apr 24: Fair Lawn ARC Hamfest and Flea Market, Fair Lawn Recycling Center, 19-25 Saddle River Road, Fair Lawn, NJ.

VE Test Sessions

Many VE Test Sessions have been canceled. Check with the contact before leaving.

Mar 6, 13, 20, 27: Westchester ARC, 19 Hunts Bridge Rd, Yonkers NY. 12:00 noon. Must contact VE, (914) 237-5589.

Mar 6, 13, 20, 27: NYC-Westchester ARC, 43 Hart Ave, Yonkers NY. 12:00 noon. Must contact VE (646) 225-8600.

Mar 14: Yonkers ARC, Yonkers OEM, 789 Saw Mill River Rd, Yonkers NY. 11:30 a.m. Pre-reg. Walt, kd2d'at'arrl.net.

Mar 20: PCARA, John C. Hart Memorial Library, 1130 E Main St, Shrub Oak, NY. 11:00 a.m. Contact Michael W2IG w2igg'at'yahoo.com, (914) 488-9196. **Call ahead.**

Mar 2021: Columbia Univ ARC. In-person VE exams are suspended. A limited number of remote video-supervised exams are available, see: <https://www.w2aee.columbia.edu/content/remote-license-exams>



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