The Communicator

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The Bi-monthly Journal of Surrey Amateur Radio Communications

PUBLICATION CONTACTS

COMMUNICATOR & BLOG EDITOR John Schouten VE7TI
communicator at ve7sar.net

SARC TELEPHONE 604-657-8753

CORRESPONDENCE 14689 – 72A Ave,
Surrey, BC V3S 9L8
SARC at ve7sar.net

CONTRIBUTING EDITORS John Brodie VA7XB
Kevin McQuiggin VE7ZD/KN7Q

The Communicator is a free electronic periodical published by Surrey Amateur Radio Communications in Surrey, B.C., Canada.

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Issues appear bi-monthly, on odd-numbered months, for area Amateur Radio operators and beyond, to enhance the exchange of information and to promote amateur radio activity.

Contributions of articles and photos are welcome.

During non-publication months we encourage you to visit the Digital Communicator at ve7sar.blogspot.ca, which includes recent news, past issues of The Communicator, our history, photos, videos and other information.

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If you find The Communicator worthwhile, regular readers who are not SARC members are invited to contribute a donation towards our Field Day fund via PayPal or via eTransfer to payments@ve7sar.net

SARC maintains a website at www.ve7sar.net

QSK?

-.- ... -.-

...from the Editor's Shack

Aside from a successful MANNA@80 activation, the big news this issue is the availability of full search capability for past issues of The Communicator *[see page 7]*. You can now go to https://search.communicator.ve7sar.net/ and search any topic, any author or any issue. Many thanks to Blake Wiggs VA7BWG and Reg Natarajan VA7ZEB for getting this project live. Blake will be adding new issues as they are published and I know that he has invested many hours to scan all the back issues. A search will provide a link to the Internet Archive, who we thank for hosting all our issues and many more current and past publications. It is a treasure of Amateur Radio and other information.

I think that you will be impressed by our newest and youngest two amateurs. Soarin VA7SVO and Christopher-Elliot VA7CII took our on-line course in January. They passed not only the written exam but also the CW endorsement and shortly therefter made contact with our VB7MAN special event station. Much credit goes to their Elmer, Guy VA7GI and their proud mom Elsa, who also passed and is now VA7EHV.

We welcome another contributor to The Communicator. Steve Stroh N8GNJ makes his debut on page 82. Steve hosts the popular and informative Zero Retries site. His articles reflect the true spirit of our hobby as an avenue for experimentation and development.

Field Day is not far away and we will report on SARC/SEPAR's efforts in the next issue. In the meantime, our MANNA@80 callsign will be on-air until May 10th, as will several other participants for this group of special event stations. We hope to work you as well.

Enjoy this issue.

73,

~ *John VE7TI, Editor*
communicator@ve7sar.net

IN THIS ISSUE

Do you have a photo or bit of Ham news to share? An Interesting story or link? Something you are looking for?
eMail it to communicator at ve7sar.net for inclusion in this publication.

This Month's Cover…

April/May were the months of the global Operation Manna and Chowhound 80th anniversary and Victory in Europe (VE Day). Ten stations around the globe participated, including ours. You will find an article and photos in this edition.

"There's no honorable way to kill, no gentle way to destroy. There is nothing good in war. Except its ending." - *Abraham Lincoln*

The Rest of the Story...

Pavel Schilling

A Pioneer of Telegraphy and Oriental Studies

Baron Pavel Lvovitch Schilling (1786–1837), also known as Paul Schilling, was a Russian inventor, military officer and diplomat of Baltic German origin. The majority of his career was spent working for the imperial Russian Ministry of Foreign Affairs as a language officer at the Russian embassy in Munich. As a military officer, he took part in the War of the Sixth Coalition against Napoleon. In his later career, he was transferred to the Asian department of the ministry and undertook a tour of Mongolia to collect ancient manuscripts.

Other technological interests of Schilling included lithography and remote detonation of explosives. For the latter, he invented a submarine cable, which he later also applied to telegraphy. Work on telegraphy in Russia, and other electrical applications, was continued after Schilling's death by Moritz von Jacobi, his assistant and successor as head of the St. Petersburg electrical engineering workshop.

Early Life and Background

Baron Pavel (Paul) Lvovich Schilling was born on April 16, 1786, in Reval (now Tallinn, Estonia), then part of the Russian Empire. He came from a noble Baltic German family with a long tradition of military and diplomatic service. His father, Baron Ludwig Ferdinand von Schilling, was a Russian army officer, and his mother, Katharina von Gernet, belonged to another prominent Baltic German family.

Pavel Schilling

Schilling received an excellent education, studying at the First Cadet Corps in St. Petersburg, a prestigious military academy that prepared young nobles for service in the Russian Empire. His early years were marked by a keen interest in science, languages, and technology, which would define his later achievements.

Diplomatic and Military Career

After graduating in 1802, Schilling entered the Russian civil service, working in the foreign ministry. His linguistic skills—he spoke multiple languages, including German, Russian, French, and later Mongolian and Chinese—made him a valuable asset in diplomatic missions.

In 1803, he was assigned to the Russian embassy in Munich, where he served under Ambassador Count Maximilian von Merveldt. During his time in Bavaria, Schilling became acquainted with European scientific and technological advancements, particularly in electricity and telegraphy. In September 1812 Schilling demonstrated his first remote-controlled naval fuse to Alexander I on the Neva River in Saint Petersburg. The Schilling fuse, patented in 1813, contained two pointed carbon electrodes that produced an electric arc. The electrode assembly was placed in a sealed box filled with fine-grained gunpowder, which was ignited by the arc. The Inspector general of military engineers authorized development of electrically-fired mines for series production.

Schilling returned to Russia in 1812, just as Napoleon's invasion began. He joined the military, serving as an officer in the Third Western Army under General Alexander Tormasov. His service during the Napoleonic Wars earned him recognition, including the Order of St. Vladimir.

In July 1815 he arrived in Munich to meet with Alois Senefelder, the inventor of the lithographic process. During 1815 he met many French and German orientalists and physicists, particularly André-Marie Ampère, François Arago and Johann Schweigger.

Oriental Studies and Cryptography

Beyond telegraphy, Schilling was deeply interested in Asian cultures, particularly Mongolia and Tibet. In the 1820s and 1830s, he amassed one of Europe's most extensive collections of Tibetan and Mongolian manuscripts, which later became part of the Asiatic Museum (now the Institute of Oriental Manuscripts of the Russian Academy of Sciences).

His expertise in Asian languages led to his involvement in Russian diplomatic efforts in Central Asia. He also worked on cryptographic systems, developing cipher techniques for secure communication—an extension of his broader interest in information transmission.

Lithography in Russia

Schilling played a key role in introducing lithography (a printing method using stone or metal plates) to Russia. On his return to Saint Petersburg, Schilling was appointed head of the Ministry's lithographic print shop, which was established in the spring of 1816. He brought one of the first lithographic presses to St. Petersburg in 1816. This innovation revolutionized Russian publishing, allowing for faster and more affordable reproduction of texts and images.

Curiously, the first document printed there was an erotic poem by Vasily Pushkin, the only Russian verse that Schilling could recite by heart. Setting up the print shop was rewarded with the Order of Saint Anna.

Apart from disseminating reports, maps and instructions within the foreign service, Schilling's shop also produced daily summaries of intercepted letters and other covert surveillance. These were delivered to foreign minister Karl Nesselrode, and then, at the minister's discretion, to the tsar. Not later than 1818 Schilling began experiments with Manchu and Mongolian typography; from 1820 he assisted father Peter Kamensky in preparation of the Chinese-Mongolian-Manchu-Russian-Latin dictionary. His Chinese editions had exemplary quality for the time, on a par with the Peking Palace originals.

Contributions to Telegraphy

Schilling's most significant legacy lies in his pioneering work on electrical telegraphy, which he undertook at his own initiative. Inspired by earlier experiments in Munich, he worked with Samuel Thomas von Sömmerring who was developing an electrochemical telegraph.

The first Schilling telegraph was completed in 1828. The demonstration set consisted of a double-wire copper line and two terminals, each having a voltaic pile providing current of around 200 mA, a Schweigger multiplier for indication, a send-receive switch and a bidirectional telegraph key. There were no intermediate repeaters yet, limiting the potential range of the system. The switches and the keys used open vials filled with

mercury. Likewise, the shaft of the multiplier pointer was hydraulically dampened by suspending its paddle in a pool of mercury. The coil of each multiplier contained 1760 turns of copper wire insulated with silk. Two magnetized steel pegs ensured that in absence of current the pointer always returned to its off-state, and provided some additional dampening.

The 40-character code table used variable-length coding, from one to five bits per character. Unlike the dot-dash bits of the Morse code, the bits of Schilling telegraph were encoded by current direction, and marked as either "left" or "right" in the codetable. The economic value of variable-length coding was not obvious yet; relying on operator's memory or scratchpads to record incoming bits was deemed too unreliable. Thus, fellow researchers compelled Schilling to design an alternative multi-wire, parallel-send system. Von Sömmerring used eight bits; Schilling reduced the number of bits to six (again, for a 40-character alphabet. Based on the deflection of magnetic needles, allowing letters and numbers to be conveyed through electrical impulses.This design also greatly reduced the number of wires compared to Sömmerring's system. It capable of transmitting signals over long distances.

By the early 1830s, it was Schilling who developed the first electromagnetic telegraph that was of practical use. Schilling took a single-needle instrument with him for demonstration purposes on his journey to the Far East. When he returned, Schilling used a binary code on his telegraph with multiple needles, inspired by the hexagrams from I Ching which he had become familiar with in the East. These hexagrams are figures used in divination, each of which consist of a figure of six stacked lines. Each line can be solid or broken, two binary states, leading to a total of 64 figures. The six units of the I Ching fitted in perfectly with the six needles he needed to code the Russian alphabet. This was the first use of binary coding in telecommunications, predating the Baudot code by several decades.

In 1832, he successfully demonstrated his telegraph in St. Petersburg, transmitting messages between two rooms in the presence of Tsar Nicholas I and other officials. Tsar Nicholas I planned to install Schilling's telegraph on a link to Kronstadt, an important naval base, but canceled the project after Schilling died.

Schilling continued refining his invention, proposing an underground cable system for the telegraph wires to protect them from weather interference. His work laid the foundation for later telegraph systems, including those of Wheatstone, Cooke, and Morse. Unfortunately, Schilling’s premature death in 1837 prevented him from seeing his invention widely adopted, but his contributions were crucial in the evolution of global communications.

Later Years and Death

Schilling's state of health deteriorated through the 1830s. He was morbidly obese, and by 1835 suffered pains of unknown nature. In his final years, Schilling continued working on telegraphy while maintaining his scholarly pursuits. He traveled to Europe to present his inventions and seek collaborations. However, his health deteriorated, and he died suddenly on July 6 (O.S. June 25), 1837, in St. Petersburg.

Legacy

Though less famous than later telegraph pioneers, Schilling’s contributions were foundational. His electromagnetic telegraph was a major leap forward in communication technology. His notable accomplishments in life exemplifies the spirit of early 19th-century scientific exploration, blending invention with intellectual curiosity. His work helped pave the way for the interconnected world we know today.

And that is his story.

~

An Index for The Communicator

Links to previous issues of this publication to 2007

by BLAKE R. WIGGS VA7BWG

I'm fairly new to amateur radio. I'm also inquisitive, so I wanted to learn as much as I could as quickly as possible. I started with Google searches, which led me to major organizations such as The American Radio Relay League (ARRL), Radio Amateurs of Canada (RAC), The International Amateur Radio Union (IARU), etc. These organizations provide free, well-curated banks of online information, with further information being available by subscription or purchase. Further searches turned up a wealth of free technical information provided by amateur radio clubs, including many clubs in my geographic area—the Lower Mainland of British Columbia. I learned a lot by poring over those clubs' websites.

A particular standout was Surrey Amateur Radio Communications (SARC) and its bimonthly publication The Communicator. I joined SARC and started reading The Communicator. That led me to the archive of back issues of The Communicator which SARC maintains in the Internet Archive (https://archive.org/). After scanning a few back issues of The Communicator, I knew I had found a real treasure trove. The challenge was making ongoing referential use of it, given my limited amateur radio experience. Fortunately, I

Go to https://search.communicator.ve7sar.net/ for an index spanning 147 issues of The Communicator (as far back as January 2007). Type anything—a keyword, author's name, call sign, etc. in the search box to get a list of article descriptions including whatever you typed. The article descriptions are hyperlinks—click any of them to open the article in your default web browser. Comprehensive .pdf format Topic, Author and Chronological indices are also available for download. More detail in the article.

have another hobby—organizing information in databases, data warehouses, etc.

I decided to build a simple database so I could quickly find information of interest in back issues of The Communicator. Designing the database was easy. The time-consuming part was getting the information into the database. My first impulse was to have ChatGPT do the work for me, so I fed it this prompt:

> *"The Communicator is a bimonthly publication of interest to amateur radio hobbyists. Back issues of The Communicator are archived at https://archive.org/. Retrieve each issue of The Communicator from the archive, review the articles in each issue, assign one of no more than 100 topics to each article and produce a list with the title, author, assigned topic and issue date of each article."*

Unfortunately—but as I expected—ChatGPT demurred and told me that I was on my own. Specifically, it said "I currently don't have the ability to directly retrieve and browse external websites like archive.org. However, I can guide you on how to do it manually…" It then spelled out the necessary steps, e.g. "…read through the articles and categorize them by their relevant topics…" Clearly AI isn't going to take over the world anytime soon! So, I rolled up my sleeves and did as ChatGPT suggested, the side benefit being that I learned a lot about amateur radio as I read through the articles.

As I read each article I put its essential details into the database, namely:

- The title of the article
- The article's URL (i.e. hyperlink) address in the Internet Archive
- The article's author
- A topic categorizing the article, e.g. "Tech - CW keys, paddles & keyer circuits", etc.
- The year and month of The Communicator issue in which the article appeared.

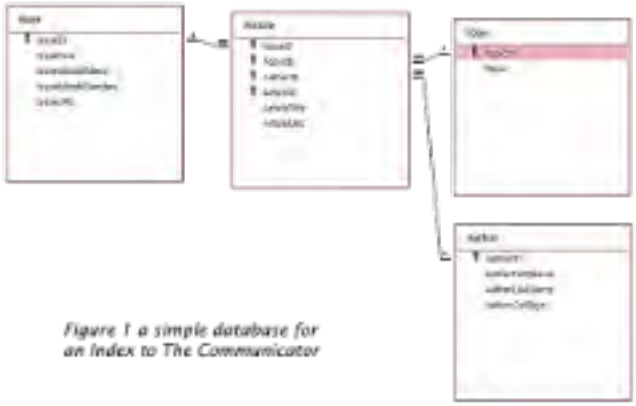

Figure 1 a simple database for an Index to The Communicator

In database terms these details are stored in so-called tables as shown in Figure 1. Only four tables are required: (1) an "Article" table to store each article's title and URL (i.e. hyperlink) address in the Internet Archive, (2) a "Topic" table to store a list of topics, (3) an "Author" table to store a list of authors and (4) an "Issue" table to store the date of each issue along with the issue's URL.

Each table has an "ID" field. These are so-called primary keys which relate the tables to one another. Thus, the Topic table has a primary key "TopicID" which is just a unique number allocated to each topic in the Topic table. Figure 2 shows a few entries in the Topic table.

TopicID	Topic
37	Tech - Meters, Scopes, Analyzers & Measurement
38	Tech - Audio (Microphones, Headsets, Speakers, etc.)
39	Tech - Electronic Components
40	Tech - Grounding
41	Tech - Arduino & Raspberry Pi
42	Tech - Filters, Diplexers & Triplexers
43	Tech - EMI & RFI

Figure 2 - a few entries in the Topic table.

Similarly, the Author table has a unique "AuthorID" key value for each author in the Author table; and the Issue table has a unique "IssueID" key value for each issue in the Issue table. Figures 3 and 4 show a few entries in each of the Author and Issue tables.

AuthorID	AuthorFirstName	AuthorLastName	AuthorCallSign
4	Geoff	Higginson	VA7HIG
5	John	Brodie	VA7XB
6	Robert	Fishwick	VA7FMR
7	Chris	Cowx	VA7CWX
8	John	Schouten	VE7TI
9	Gord	Kirk	VA7GK

Figure 3- a few entries in the Author table

Figure 4- a few entries in the Issue table

The heart of the system is the Article table; Figure 5 shows a few Article table entries. The Article table has a 4-part primary key consisting of (1) a copy of one of the IssueID keys from the Issue table, (2) a copy of one of the TopicID keys from the Topic table, (3) a copy of one of the AuthorID keys from the Author table and (4) a unique IssueID number for each article.

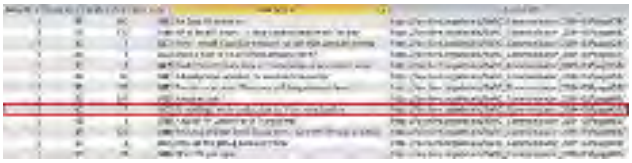

Figure 5 - a few entries in the Article table

Consider the red-boxed Figure 5 entry for the article "Grounding - An Introduction for Your Ham Station". That article has IssueID = 5, TopicID = 40, AuthorID = 5 and ArticleID = 1802. A quick glance at Figure 4 shows that IssueID = 5 corresponds to the March – April 2024 issue of The Communicator. Similarly, Figure 2 shows that TopicID = 40 corresponds to the topic "Tech - Grounding"; and Figure 3 shows that AuthorID = 5 corresponds to John Brodie VA7XB. ArticleID = 1802 is just a unique number allocated to the article in question.

This type of database design (a so-called relational database) has some important attributes, one of which is that any given piece of information is stored in the database only once. Thus, the Author table has one and only one entry for John Brodie VA7XB despite the fact that he has authored hundreds of articles published in The Communicator. Likewise, the Topic table has one and only one entry for the topic "Tech - Grounding", etc. This doesn't just conserve storage space—it facilitates reliable retrieval of all articles authored by John Brodie VA7XB, reliable retrieval of all articles on the topic "Tech - Grounding", and so on.

How does one build these tables? By using database software. I normally work with Microsoft SQL Server but for this project I used Microsoft Access. A useful feature of Access is its suite of built-in tools for constructing data entry forms, data viewing forms, etc. With SQL Server I would have had to invest more time and effort building data entry / viewing forms. Such forms simplify dealing with numerical key values as data is added to or retrieved from the various tables.

Figure 6 shows a data entry form for adding an article to the database. Clicking the "Topic" dropdown presents an alphabetically ordered list of every topic in the Topic table. Clicking a topic selects it and collapses the dropdown. Similarly, clicking the "Issue" dropdown presents a sequential list of every issue in the Issue table and clicking the "Author" dropdown presents an alphabetically ordered list of every author in the Author table. After selecting an article's topic, issue and author one need only paste in the article's title and URL. The "Save" button is then clicked to save an appropriate entry in the Article table, like those seen in Figure 5.

Figure 6- a data entry form

Figure 6 also shows the numerical key values TopicID = 40, IssueID = 5, ArticleID = 1802 and AuthorID = 5 but they needn't be displayed to the end user. A small amount of computer

code populates the various dropdowns, saves data in the tables and traps errors, e.g. if a data entry field remains empty when the "Save" button is clicked.

Figure 7 shows a form for looking up articles by topic. Clicking the "Topic" dropdown again presents an alphabetically ordered list of every topic in the Topic table. Clicking a topic (e.g. "Tech - Grounding") selects it, collapses the dropdown and populates a list box with details of every article in the database categorized under that topic. One can then select an article by clicking on it and then click the "Go To Article" button to open that article in the default web browser. The articles themselves are not stored in the database; the database only contains hyperlink pointers to the articles stored in the Internet Archive.

Figure 7- lookup articles by topic

Alternatively, selecting an article and clicking the "Change or Delete" button opens the Figure 6 data entry form and populates the form with details of the selected article to facilitate updating of those details if necessary.

As of this writing the database contains details of 2,054 articles by 280 authors covering 70 topics spanning 147 issues of The Communicator (as far back as January 2007). Not everything appearing in The Communicator is detailed in the database. For example, date-specific articles summarizing the results of particular contests, Field Days, QSO parties etc. are not in the database.

There are some arguable shortcomings. For example, I've only allocated one topic per article. That has necessitated some trade offs, e.g. some readers may think "this article should be listed under 'Tech – Amplifiers', not under 'Tech – Projects'", etc. I've also only allocated one author per article; joint authors aren't listed. I could deal with such issues by doing some database tweaks (and re-reading every article in every issue of The Communicator), but a relatively simple design is easier to maintain and should suit the needs of most users.

Ideally, SARC would make the Microsoft Access database and its data lookup forms freely available on the Internet so that anyone could use it to locate articles of interest in The Communicator. However, that is impractical due to various security and other issues. Instead, SARC has made the index freely available in 4 different ways at https://search.communicator.ve7sar.net/, as shown in Figure 8:

1. an Internet-accessible keyword-driven lookup tool created by Reg Natarajan VA7ZEB utilizing XML format data extracted from the database (see XML example in Figure 9);
2. a downloadable .pdf format Topics Index generated from the database;
3. a downloadable .pdf format Author-Topic Index generated from the database; and
4. a downloadable .pdf format Reverse Chronological Index generated from the database.

Figure 8 - the online index and .pdf download centre

Figure 9 - article details in XML format

If you know what you're looking for, Reg's lookup tool is best: type anything (a keyword, an author name, call sign, etc.) in the search box at https://search.communicator.ve7sar.net/ and as you type you'll automatically get a list of article descriptions that include whatever you typed. Figure 10 shows an example of the results obtained by entering the keyword "grid". The listed article

descriptions are hyperlinks—click any of them to open the article in your default web browser.

Figure 10 - the online index showing results of a search for the keyword 'grid'

If you're relatively new to amateur radio you may prefer to download one of the .pdf indices. Each .pdf index begins with a Table of Contents which serves as a navigational aid for the index. For example, with the Topics Index, the Table of Contents lists all of the topics on the first 2 pages. Locate a topic of interest in the Table of Contents then scroll to the index page on which that topic begins. The Topics Index is 65 pages long, so without the Table of Contents you might have to do a lot of back & forth scrolling to find a topic of interest.

The Table of Contents in each index is not hyperlinked to the main body of the index. However, every article listed in the main body of the index is hyperlinked to the article stored in the Internet Archive. Suppose you want to read up on grounding. Download the Topics Index and scan the Table of Contents on the first 2 pages. Figure 11 shows the first few Table of Contents entries on page 1, juxtaposed above a few of the page 2 entries. As indicated by the red-boxed entry in Figure 11, articles having the topic "Tech - Grounding" appear on page 58 of the Topics Index. So, you should jump down to page 58.

Figure 12 shows the first few articles listed on page 58 of the Topics Index, juxtaposed above some other articles listed on page 58, including the 6 articles having the topic "Tech - Grounding". To open any of those articles in your default browser click the corresponding "Go" label on the right. For example, the red arrow in Figure 12 points to the "Go" label that you would click to open John Brodie's aforementioned article.

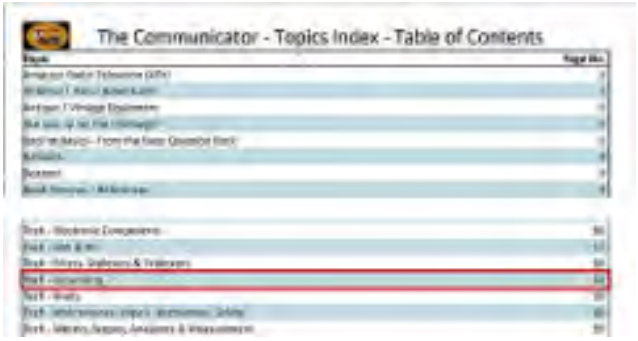

Figure 11 - portions of the Table of Contents for the Topics Index

Figure 12 - portions of page 58 of the Topics Index

SARC hopes that you will find the index helpful in whatever form you choose to use it. Comments or suggestions for improvement are welcome. An effort will be made to keep the index current as new issues of The Communicator are published.

~ Blake VA7BWG

As Editor of The Communicator, I'd like to acknowledge and thank Blake for the tremendous amount of work that he has devoted to this effort. It is a tool that we have long hoped for, but that has never materialized… until now. Thank you!

Thanks also to Reg VA7ZEB for devising the method to get this on the 'net to have it accessible to everyone.

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News You Can't Lose

Some enjoyable listening ahead!

by John Schouten VE7TI

The world of amateur radio is rich with podcasts catering to various interests within the hobby. Let's look at a few, and their focus…

For newcomers and seasoned enthusiasts alike, the Ham Radio Crash Course Podcast offers a wide range of topics with a focus on community. AmateurLogic.TV provides a blend of ham radio and technology, offering both video and audio content. ARRL, the national association for amateur radio, offers On the Air Magazine and ARRL Audio News, delivering news and introductory techniques.

ICQPodcast's Amateur / Ham Radio Podcast delves into news, views, and training for ham radio users. Ham Talk Live! hosts discussions on various ham radio topics. For those interested in digital communications, there's DigiCommCafe, while TX Talk focuses on news and politics, and the AB4WS Radio Show provides news and information for the Greater Cincinnati area. ARRL also has a podcast for newer operators called So Now What?. Ham Nation covers a wide array of topics, while DitDit.fm celebrates Morse code and CW operation.

My personal favorite, This Week in Amateur Radio (TWIAR) provides a weekly news magazine with several regular contributors on a wide range of news, history and tech topics. Amateur Radio Topics by VK6LW/VK6T delves into specific areas of the hobby, and the long-running SolderSmoke Podcasts focuses on the electronics side of ham radio.

Ham Radio 2.0 discusses new developments in the hobby. Everyday Ham Podcast: Amateur Radio Conversations offers casual discussions, and the QSO Today Podcast features interviews with leaders in amateur radio. 100 Watts and a Wire connects enthusiasts through conversations and news.

A program that's almost entirely unique, CQ Blind Hams is hosted by Joel Case and focuses on demonstrations and audio tutorials of amateur radio equipment setup, operation, and software specifically for blind ham radio enthusiasts. If you or someone you know is blind and raring to go with amateur radio, make sure to let them know!

Finally, The DX Mentor is tailored to those interested in communicating with stations outside of their own country.

~ John VE7TI

Page13—News You Can Lose

The Lighter Side of Amateur Radio

New taxes for DX QSOs

It all started on a crisp April morning in 2025 when Jim "AA5JIM" Henderson, a retired electrician from Topeka, Kansas, fired up his trusty HF rig. He'd been a licensed amateur radio operator for 37 years, proudly chatting with folks from every corner of the globe. Today, he was aiming to snag a rare contact with a station in Liechtenstein—call sign HB0FUN. After a few minutes of static and tweaking, Jim's speakers crackled to life.

"HB0FUN, this is AA5JIM, do you copy?" Jim said, grinning as the faint reply came through.

"AA5JIM, HB0FUN here, loud and clear! How's the weather in Kansas?"

Two days later he received an invoice by email from the new Federal Communications Tax Enforcement Agency—FCTEA. It informed him that the contact with Liechtenstein had cost him $7.50."

Jim blinked, his coffee mug frozen halfway to his lips. "A tax? For talking to Hams in Liechtenstein? He called the FCTEA office and spoke with a representative. "You've got to be kidding me!"

"No kidding, sir, as of last week, Congress passed the 'Protecting American Airwaves Act.' Every foreign amateur radio contact now carries a tariff to fund domestic spectrum security. You owe us for every QSO—$5 for Europe, $10 for Asia, $15 for Oceania, and a flat $2.50 'processing fee' per contact."

The ham radio community erupted in chaos. Across the country, operators like "K9BARK" in Ohio—who'd just spent an hour chatting with a guy in New Zealand about antenna designs—were slapped with $27.50 bills. "KL4CAT" in Alaska, a notorious DXer, got a $842 invoice after a contest weekend of working stations in Japan, Brazil, and a tiny island off Antarctica. Forums lit up with outrage. "This is worse than the sunspot minimum of '19!" one user wailed.

But hams are a crafty bunch. Soon, they devised workarounds. In Texas, "W5LONE" started "accidentally" bouncing signals off the ionosphere so they'd hit Canada first, then ricochet to Europe. "It's not a direct foreign contact if it's via Ottawa, right?" he argued to a baffled FCTEA agent. Meanwhile, a group in California set up a "relay chain"—one operator would talk to a Canadian station, who'd then patch them through to Australia. *"No tariff if it's a middleman!"* they crowed.

Wally "K2WIT" Thomas

The real genius, though, was "K2WIT" from New Jersey. A lawyer by profession, he dug through the fine print and discovered the tax only applied to "voice or digital contacts." So, he switched to Morse code, tapping out messages to a

buddy in France. When the FCTEA agents showed up, after he refused to pay his invoice, he smirked and said, “Check the regs—CW’s exempt!” The agents left, muttering about “damn loopholes.”

Word spread, and soon half the U.S. ham population was learning Morse code faster than you could say “CQ DX.” The airwaves filled with dits and dahs, a rhythmic rebellion against the tariff tyranny. Sales of keyers (but not from China) skyrocketed, and old-timers gloated, “Told you kids CW would save the hobby!”

By summer, the FCTEA was drowning in complaints and refund requests. Congress, embarrassed by the fiasco, quietly repealed the tax, claiming it was “a misunderstanding.” Jim, sipping his coffee, made one last contact with Hans in Liechtenstein. *“No charge this time, buddy,”* he chuckled. *“But if they try it again, I’ve got my paddle ready.”*

And so, the Great Ham Tax Rebellion of 2025 went down in history—proof that you can’t keep a good radio operator down, especially when they’ve got a signal and a sense of humor.

~

Mentoring Young Hams

By GUY IMMEGA VA7GI

"What's that big thing on top of your house?" Soarin asked. A curious boy of 13, he peppered me with questions at our house party for neighbours in the Dunbar area of Vancouver.

"That's my beam antenna – I contact hams all over the world," I replied. "Do you want to see my shack?"

I demonstrated a CW QSO for Soarin and his younger brother, Christopher-Elliot, age 11. They were mesmerized by cool radio tech, so I offered to teach them Morse code. I didn't expect it, but both were eager. Their mother, Elsa, joined the class. Her support was essential!

Morse Code Class

I started at 10 WPM, using the Farnsworth method—faster sending with increased spacing between letters allows students to acclimate to the sound of characters. After a few lessons, they learned the alphabet and could copy plain text. At that age, they're fast learners! I told the boys they needed straight keys. Their mother helped them with Amazon purchases—anodized aluminum keys in bright colours. I supplied piezo buzzers, 9V batteries, wires, and a soldering iron. With my help, the boys assembled the CPOs in wooden boxes—nicely done! Now they could send as well as receive.

The challenge was to keep the class fun. I asked my friend in Coquitlam, Mark Matilla VA7MM, if he would do CW QSOs with the boys. Mark had a brilliant suggestion: send kid jokes in question & answer mode. There are thousands of groaners in books and online to choose from—the boys

loved them. [Example: Why is 6 afraid of 7? Because 7-ate-9!]

Mark, the boys, and I maintained weekly skeds on 15M, where the boys got on-the-air experience with CW. After a few weeks, I wondered if the straight keys might be holding them back, so I set up spare iambic paddles on my keyer. I was amazed—it took less than a minute for them to transition to the paddles—a big boost! After that, they never touched their straight keys again. I recommend using paddles and keyer for all new Morse students.

Building a Transceiver

To maintain interest, I decided the boys needed more hands-on experience with radios. I selected "Forty-Niner" transceiver kits available online for $75. Made in China (gasp!), the kit is a single frequency 40M CW QRP transceiver that comes with a PCB and a bag of unsorted parts. The instructions are sparse and opaque, with poor English translation.

I set up two soldering stations in my shop and supervised the assembly of the radios. The boys learned to recognize components, reading resistor values, caps, diodes, transistors, etc. They soldered the parts onto the PCBs and I later debugged them. Since the final amplifier delivers 3W to the antenna, I installed 50 ohm resistor dummy loads on transmit to keep them legal. Each boy now had his own radio. With a random long wire antenna, we made QSOs between our two houses.

Both Soarin and Christopher-Elliot made CW contacts with our VB7MAN Manna@80 special event station. Congratulations, your QSL cards are en-route.

Basic Ambitions

After a year of Morse code and radio electronics, it was time for the boys to become licensed hams. I selected the SARC online course because it fit our schedule and because of the strong amateur radio culture fostered by John Schouten VE7TI. John and Stan Williams VA7NF are excellent teachers.

The 7-week online course was a stretch for such young boys, who had very busy school schedules. Christopher-Elliot, being younger and not in high school, had not studied algebra yet. I taught him how to solve Ohm's Law equations. Elsa helped.

I monitored each course lecture to better interpret the flood of dense material. At the end of the course, it was obvious that the boys weren't quite ready to take the exam. I asked John to delay the boys' exam until the end of spring break, to give them extra study time without the pressure of daily schoolwork.

Soarin used an iPhone study app and also downloaded many practice exams. Every day of the last week of spring break, the boys (and often their mother) took practice exams. The goal was to score 70% or above, the minimum for a Basic license. Our strategy was to pass the Morse code test to achieve Honours and HF privileges. CW still counts in Canada!

Basic Exam Drama

We arrived at the Surrey Operations & Training Centre at 9 AM. A GOTA (get on the air) session was already underway, so the boys started their exams in the kitchen. They

came equipped with dollar-store button calculators (smart phones are not allowed).

Against my advice to go slow, Soarin raced to complete the 100-question multiple choice exam. Christopher-Elliot took his time, mulling each question. John scored the answer sheets in minutes: Soarin 74% (yay!) and Christopher-Elliot 69% (oh no!). I coached Christopher-Elliot to try again and John happily generated a new exam (there is no limit to exam attempts). This time Christopher-Elliot scored 68%. I could feel a dark cloud descend on the room.

"Try again," I whispered. I knew that he had scored over 70% on many practice exams. But Christopher-Elliot showed nerves and exam fatigue. This time, after sweating bullets for an hour while Soarin fidgeted, Christopher-Elliot passed with 76% (whew!). Elsa also scored above 70% but she asked to try again, hoping to break 80% (Honours). Her second try was 79% (so close!).

Now for the Morse code exam: plain text at 5 WPM for 3 minutes. John Brodie VA7XB was a very patient examiner. Soarin passed the first time, both receiving and sending (with paddles). Christopher-Elliot, still sweating bullets, had to try twice but finally passed. So, both boys are now licensed: Basic with Honours is free in Canada for life. Soarin is now VA7SVO and Christopher-Elliot is VA7CII.

Elsa, the super-mom, is now VA7EHV (nicknamed by Mark and me as "extremely high voltage"). We did it!

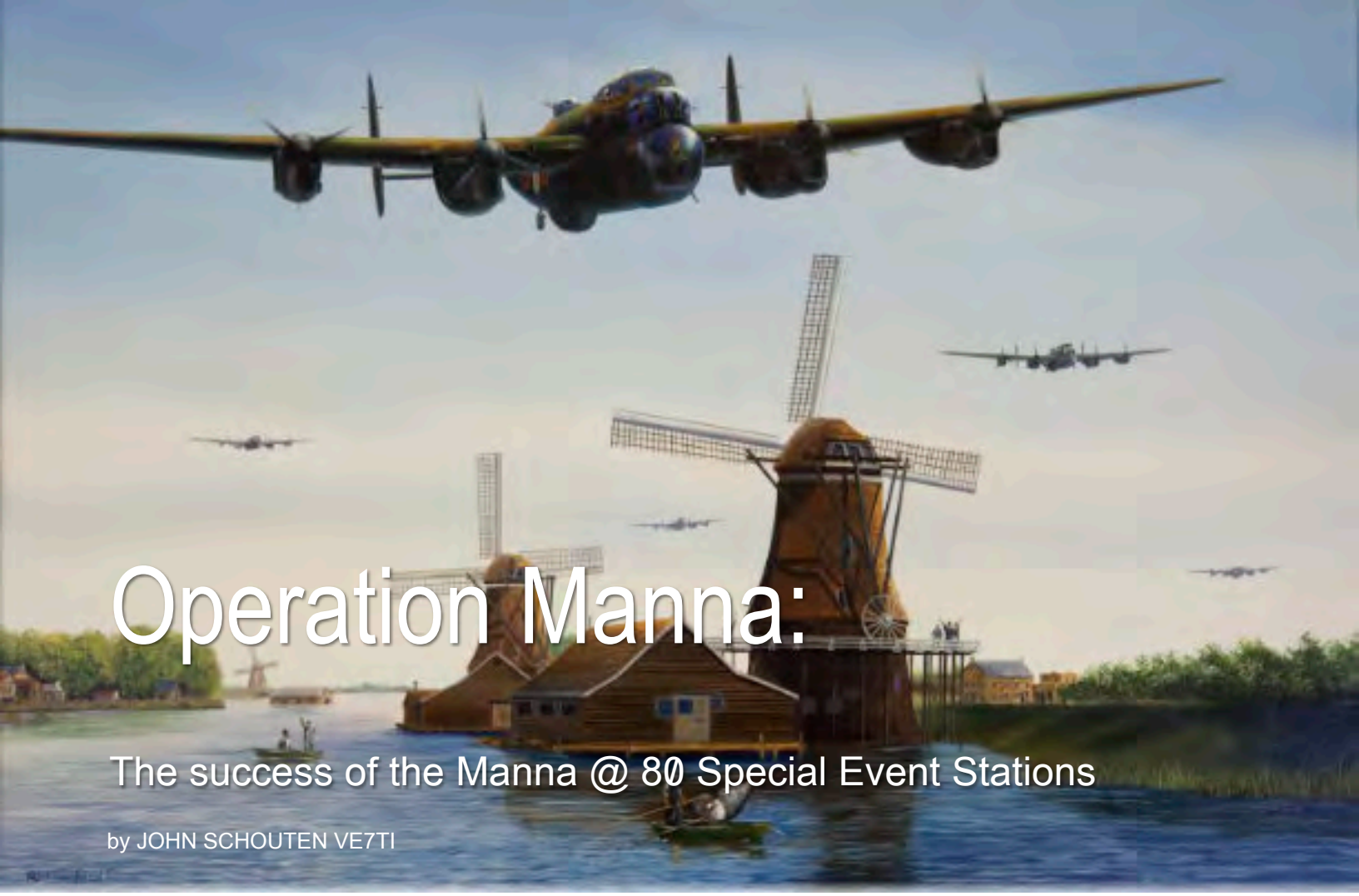
On the Air

Of course, the next step is set up rigs and antennas. Mark VA7MM generously donated an old 2M FM rig with a vertical antenna. I also hope to get them on the HF bands – John VE7TI is looking for donated gear. HF antennas are a challenge on a small city lot. Stay tuned!

In the meantime, the boys are busy designing their QSL cards. Soon, they'll be burning up the air waves!

~ Guy VA7GI

John Brodie VA7XB conducted the CW exam while John VE7TI did the same for the written tests.



Operation Manna:

The success of the Manna @ 80 Special Event Stations

by JOHN SCHOUTEN VE7TI

John Schouten VE7TI was born in The Netherlands. Manna 80 has special significance given his family experienced and survived the hunger winter of 1944-1945.

This past weekend marked the 80th anniversary of Operation Manna and Operation Chowhound, two pivotal humanitarian missions that saved countless lives in the Nazi-occupied Netherlands during the final weeks of World War II. As the Dutch people faced starvation under German blockade, Allied forces conducted daring low-altitude food drops in a remarkable display of compassion and coordination. Amateur radio operators also played a crucial, though often overlooked, role in these operations.

In the final days of World War II, as the tides of war turned decisively against Nazi Germany, a remarkable humanitarian mission unfolded over the skies of the Netherlands. Operation Manna, alongside its American counterpart Operation Chowhound, saw Allied bomber crews transform their instruments of war into vessels of mercy, dropping life-saving food supplies to millions of starving Dutch civilians. As we mark the 80th anniversary of this unprecedented operation in April 2025, the global amateur radio community came together to honor this historic moment through a special commemorative event organized by groups like Surrey Amateur Radio Communications, and similar organizations in the United Kingdom, The Netherlands, the United States, Poland and Australia, ten stations in all.

A Nation on the Brink

The winter of 1944–1945, known to the Dutch as the Hongerwinter (Hunger Winter), was a time of unimaginable hardship in the German-occupied western Netherlands. A perfect storm of events had pushed the region to the edge of catastrophe. The German occupying forces blockaded fuel to farms and food from farms. The winter was incredibly harsh, freezing rivers and canals used for transport. Worst of all, the Germans deliberately broke dikes, flooding nearly a quarter of a million hectares of farmland with seawater. This devastation, combined with the occupiers' requisitioning of scarce resources, left approximately 4.5 million Dutch civilians facing starvation. An estimated 20,000 people, many of them children, elderly, or infirm, perished during this brutal period.

The plight of the Dutch could not be ignored. Queen Wilhelmina and Prince Bernhard, in exile in London, pleaded with Allied leaders for aid. By April 1945, with the war nearing its end, Supreme Allied Commander Dwight D. Eisenhower secured permission from British Prime Minister Winston Churchill and U.S. President Franklin D. Roosevelt to negotiate with German forces. The goal: establish safe air corridors to deliver food without interference, even as the war continued.

Bombers Turned Lifelines

What followed was a logistical and humanitarian triumph. British Avro Lancasters and American B-17 Flying Fortresses, typically laden with bombs, were stripped of armaments to maximize cargo space. The numbers are staggering. Lancasters flew over 3,100 sorties to drop 7,000 tonnes of food, while B-17s flew about 2,000 sorties with 4,000 tonnes. From April 29 to May 8, 1945, these aircraft flew at perilously low altitudes—sometimes as low as 120 meters—to drop food parcels without parachutes over designated zones in Leiden, The Hague, Rotterdam, and Gouda. The drop zones, marked by RAF Mosquitoes, included airfields, a racecourse, and even a lake.

The first test flight on April 29, 1945, was a leap of faith. A Lancaster nicknamed Bad Penny, crewed by seven young men (five from Ontario, Canada), took off in poor weather before a formal ceasefire was finalized. The Germans were still manning anti-aircraft guns, so it was tense, but they held their fire." The success of Bad Penny's mission paved

the way for thousands of sorties, delivering over 11,000 tonnes of food—tinned goods, dried food, and chocolate—that saved countless lives.

For the Dutch, the sight of low-flying bombers dropping food was nothing short of miraculous. Civilians gathered in droves, waving flags and sheets, some spelling out “Many Thanks” in tulips or white cloths. One Canadian pilot recalled flying so low he had to look up to wave at people on a windmill’s balcony. For battle-hardened crews accustomed to destruction, these missions were a profound shift. “It was as if we brought the liberation closer to reality,” one airman later wrote.

Amateur Radio’s link

During both world wars, most countries suspended amateur radio services for security reasons. Many operators joined the military as signalers, radar operators, or even intelligence workers. Some ran pirate radio stations for the resistance. The risks were high—radio operators were prime targets in combat, often the first to be taken out to disrupt communications.

And amateur radio operators were instrumental in facilitating communication between the European resistance movements and Allied command. With conventional radio networks heavily monitored by the Nazis, underground operators used clandestine transmitters to relay critical information about drop zones, German troop movements, and food distribution logistics.

One notable figure was Pieter Muntendam, a Dutch resistance member and amateur radio operator who helped coordinate safe drop locations. His transmissions, along with those of others, ensured that food supplies reached civilians rather than falling into enemy hands. After the war, many of these operators became key figures in rebuilding the Netherlands’ communication infrastructure. Their efforts were later honored by amateur radio organizations, including the Dutch Amateur Radio Society (VERON). Thus, amateur radio has deep ties to wartime history.

The 80th anniversary of Operation Manna was celebrated with a global amateur radio event, detailed on Manna80.radio. Ten teams from countries including the Netherlands, the UK, Australia, Poland, and Canada operated special event stations on HF, VHF, and DMR from April 25–27, 2025. Stations were set up at historic sites, such as a drop zone near The Hague and former RAF and USAAF airfields. The event, coinciding with ANZAC Day and Australia’s AMRO weekend, engaged operators worldwide, including children and youth, in commemorating this humanitarian milestone.

A Call to Connect

The Manna 80 radio event is more than a technical exercise; it’s a chance to reflect on a moment when enemies collaborated for the common good. “When two enemies work together to save lives, could it be anything less than a miracle?” asks the website. It’s also an opportunity to teach history and science to younger generations. Many teams hosted children’s activities, encouraging kids to make radio contacts with peers worldwide. The SARC station was set up in the SEPAR trailer at Scout Camp McLean where almost 500 kids arrived for a day of activities, rotating through several tasks and games.

Now, on the 80th anniversary, the story of Operation Manna reminds us of humanity’s capacity for compassion amid conflict. From the courage of Bad Penny’s crew to the gratitude of Dutch civilians waving from rooftops, this mission was a beacon of hope. We hope that you tuned in, made a contact, or visited a drop zone station to honor the airmen who turned bombers into lifelines and the civilians who endured the Hongerwinter. As one Dutch survivor recalled, “It felt like a miracle.” Eighty years later, that miracle still resonates.

80th Anniversary Commemoration

During the weekend of April 25 to 27th, ceremonies across the Netherlands and in Allied nations honored the bravery of aircrews, resistance fighters, and civilians who participated in the operations.

Events included:

- Memorial flights by historic aircraft.
- Wreath-laying ceremonies at key drop zones like Rotterdam and The Hague.
- Amateur radio special event stations operating under MANNA call signs, allowing operators worldwide to make contact and share stories.

These stations will help educate the public about the role of radio in wartime humanitarian efforts while paying tribute to those who risked their lives.

Legacy and Lessons

Operation Manna and Chowhound demonstrated the power of international cooperation in crisis. For amateur radio enthusiasts, the missions highlight how their hobby can serve a higher purpose—whether in war, disaster relief, or global goodwill.

As we reflect on this 80th anniversary, we remember not just the food drops, but the unseen heroes—radio operators, resistance members, and ordinary citizens—who worked in the shadows to save lives. Their legacy endures in today's amateur radio community, where the spirit of service continues.

Lest we forget.

The stations

PH80MAN was the primary Manna 80 station, operating in the Netherlands, and appropriately, it was located at drop zone Duindigt a running track, just east of The Hague. The station was run by Sander PD9HIX, Erwin PA3EFR, and other members of the Plusscouts PA3EFR/J, a Dutch Radio Scouting Fellowship. During the Manna weekend, the team operated 24 hours a day covering HF and VHF bands on various modes.

The station was open to the public, with scheduled visits by school children on Friday, and scouts on Saturday. Sunday, April 27th was an open day without pre-organized visitors. DMR was also used


The PH80MAN crew

to ensure visiting youngsters had a radio experience with other countries.

There were three stations in Britain, **GB80MAN** ran from the International Bomber Command Centre, Lincoln, UK operating through the weekend.

Extract from a Manna pilot's logbook

There was a day of School visits to the station and a service to commemorate ANZAC Day.

GB8MAN was activated by the Lincoln Shortwave Club from the former RAF Binbrook, Lincolnshire, UK

GB8CHO was run by Norfolk Amateur Club from the 100th Bomb group Museum, Thorpe Abbots. They will be commemorating operation Chowhound from the former 100th Bomb group base *[video]*.

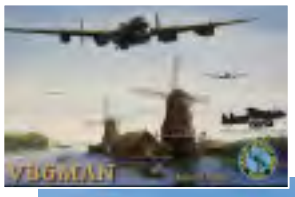
Moving to North America, Canada was represented by three stations.

VB7MAN was the SARC callsign for the event. We were on the air from our Surrey training station and from the home and club stations of guest operators.

Our special event callsign is active from April 1st until May 10th, the date that the food drops concluded and the war in Europe was officially over, so, as you read this, we may still be on the air.

Thanks to Stan VA7NF and Horace VE7XHB for their assistance at the Saturday Scouting event from our mobile station. We even managed to separate Stan from his CW key long enough to make a rare sideband contact.

Special thanks also to Fred VE7IO,Christine VA7TU and Mark VA7MM and to the rest of the guest operators for many hours chasing Manna contacts, Fred VE7IO, Doug VE7CQT, and John VA7XB provided invaluable support to Team VB7MAN with the coordination involved in participating in this global event. Finally a special thanks to Jaspal VA7JB for printing the beautiful VB7MAN QSL cards. We are already receiving requests for them and they were a big hit with scouts who made contacts on our station.



VB6MAN had an impressive setup judging from the photos they posted during the event from their

The Calgary club crew and Jerry VE6TL with his restored World War II era Lancaster transceiver

team at the Bomber Command Museum of Canada, located in Nanton, AB.

There was an interesting moment when the engines of the restored Lancaster bomber on display *[photo below left]* created significant and loud QRM requiring a pause in our contact.

VE1MAN had the advantage of being the closest Canadian station to Europe will be operating from the Pictou County Amateur Radio Club station.

W4C is the callsign of the Boca Raton Amateur Radio Club. They are commemorating the 80th anniversary of Operation Chowhound.
Unfortunately, for both VE1MAN, and W4C, there is little information provided on their operation and there were no photos.

VK80MAN will continue to operate their callsign until June 30th from various locations in Australia. Their station is run by the Western Australian VHF Group and the Peel Amateur Radio Group. They will commemorate the huge part played by Australian airmen in operation Manna and Bomber Command. Their site for Manna weekend was the Bull Creek Aviation Heritage Centre in Perth and their display aircraft *[photo next page]*.

VK80MAN at the Bull Creek Aviation Heritage Centre

SN80MAN The SP5KAB Radio Club operated in Poland to pay tribute to the many brave Polish airmen who were stationed in the UK, and who took part in every aspect of RAF operation during WW2. The last combat mission for No. 300 Squadron was flown against Hitler's residence in Berchtesgaden in southern Germany by 14 Lancasters on April 25, 1945.

The crews of the 300th Masovian Squadron RAF / PAF, took part in operation Manna from RAF Faldingworth, Lincolnshire in April/May 1945, dropping 152 tons of supplies to the starving Dutch population as part of Operation Manna.

The Club callsign SP5KAB is one of the oldest ham radio call signs issued in Poland after 1945.

~ John VE7TI

We're also getting some nice feedback...

I just had a qso with VB7MAN on 10 meters and see the background on your SES. Just a note, in my Piper Super Cub flying days I met the late Reint Laan from the Netherlands at our 2005 fly-in near by Oshkosh, WI. He and his friends rented a plane so they could attend the Oshkosh annual gathering. He came back several years later. One of those years the Canadians brought down a Lancaster and he had to go see it. As a little boy, he remembers standing out in the fields gathering food and goodies to feed himself and others starving from the lack of food stolen by the Nazi's in their retreat. The Lancaster crew at Oshkosh insisted on him staying with them so he could tell visitors about his experience and his grateful sight of those planes overhead!

Reint is on the left with his other Dutch buddies. Such a nice Special Event operation. Thank you,

Jim, W3SAL

The more unique contacts made by VB7MAN

We are fortunate to have a fabulous array of talent within our 140+ membership. Given the opportunity to showcase the variety of options and modes in amateur radio, and for this special event, a number of 'unique' contacts were made.

Dino VE7NX is another very knowledgeable member of SARC. Recently he has been exploring contacts in the microwave bands, including 10 and 24 Ghz, and featured in The Communicator. On Sunday, April 27th, during Manna weekend, Pacific NorthWest Microwave operators joined together to activate 10 and 24 GHz bands. Ray W7GLF and Frank AG6QV drove to Sequim, WA on the 26th to look for good places to operate with the expectations to make contacts with Dino VE7NX and Scott VA7SC in Canada. The US operators drove to the top of Hurricane Ridge on Mount Angeles in the Olympic National Park for the planned contacts around 10am, a distance of about 150km.

They were able to complete contacts with S5-S8 signal strength, with almost FM like conditions on 24 GHz. The contact is in our VB7MAN log! The full story of this contact is on page 105.

You know Kevin McQuiggin VE7ZD/ KN7Q from his regular Communicator 'Radio Ramblings' columns. He has experimented with a wide variety of modes and bands, including EME, Wi-Fi and meteor scatter.

Kevin described his VB7MAN contacts: "I operated VB7MAN on Saturday morning, April 26th with the goal of making some meteor scatter QSOs on 6m. I used WSJT-X in MSK144 mode, and the operating frequency was the meteor scatter "watering hole" on 50.260 MHz.

MSK144 transmits short digital messages representing QSO information (CQ, signal report, "RR73") repeatedly in (normally) a 15-second period. The message is repeated several times in the transmit period; therefore the receiving station will receive the message should a meteor enter the upper atmosphere and ionize it to form a reflective trail. In the other direction the TX/RX role is reversed. The receiving station transmits its part of the QSO (reply to CQ, signal report, "73") repeatedly in its 15-second time slot and the TX station listens. Once all QSO information has been exchanged, the QSO is complete.

DX on meteor scatter depends upon the height at which the meteors burn up in the atmosphere, but can reach out to about 2000 km. QSOs on meteor scatter can take only one minute, but meteors are unpredictable so the average QSO usually takes a few minutes as both operators wait for "rocks". It's a really fun mode, and if you are equipped for running FT8 using WSJT-X, have a rig that covers 6 metres and a 6m antenna. You are all set to go (for RX at least) on meteor scatter. Most QSOs require higher power, but MSK144 decodes are possible with basic equipment. During about an hour's operation of VB7MAN I made two meteor scatter contacts: K7TNT in Wyoming, and WB7UNU in eastern Washinton."

Dino VE7NX completes a microwave contact as VB7MAN

Kevin VE7ZD's 6m Yagi

And, SARC member Adrian Mashhadi VA7YEP made a satellite contact from Ontario where he is at University. Operating as VB7MAN/VE3, he contacted WD5GRW in Texas via SO-124.

Some unique Manna/ Chowhound contacts from VB7MAN.

~

Radio Oranje:

The “Voice of the Netherlands”

by FRED STAM PE3FS

During World War II (WWII), Radio Oranje was a Dutch radio program, broadcast by the BBC European Service 1 on behalf of the Dutch government in exile in London. The programs, which usually lasted 15 minutes, were broadcast from London and were aimed at the German-occupied Netherlands. Radio Oranje was best known for the speeches of the Dutch Queen Wilhelmina [*shown above*], although she only appeared in front of the microphone 34 times in 4 years; the first time in the opening broadcast on July 28, 1940. The program was broadcast between 1940 and 1945, every evening between 8:15 and 8:30 p.m. The purpose was to provide support and information to the Dutch people and to counter German propaganda. In addition, it broadcast the so-called special messages, in which secret communications were passed on to the Dutch resistance, usually a frequently heard statement or a short sentence: “*Jan has fetched apples*, or *the goat has been milked*”. Radio Oranje's programs were broadcast on the LW, MW and SW bands, but because the SW receivers were not introduced in the Netherlands until 1935/36, most people only had an LW/MW receiver.

Handing in radios

Because the Germans did not want the Dutch to receive information from the Dutch government, they actively blocked BBC broadcasts on the regular LW and MW bands. To make matters worse, the Germans issued a directive on May 13, 1943, stating that all radios had to be turned in. From then on, owning a radio was illegal and people risked a large fine, or even the death penalty if a radio was found in their home. Although many radios were indeed handed in, people often kept one so that they could secretly listen to Radio Oranje.

In addition, small clandistine receivers were secretly built by employees of Philips, NSF, and by radio amateurs, of clandestinely obtained components. Such receivers were made as small as possible and were hidden in everyday objects, such as cigar boxes, cookie jars and even photo frames. those secret receivers were commonly known as Radio Orange receivers.

Liberation

On September 18, 1944, the south of the Netherlands was liberated, and on October 3, a new radio station, called Radio Herrijzend *(Resurrected)* Nederland, began broadcasting from Eindhoven, where Philips engineers had secretly built a transmitter during the war. On June 2, 1945, a month after the liberation of the entire country, the broadcasts of Radio Orange were ended.

At the beginning of the war, the Netherlands had about 400 recognized amateur radio operators. In addition, there were many hobbyists and enthusiasts who could also build their own radio.

Jammers

The map of the Netherlands of December 1, 1941, shows the locations of the various jammers and their frequencies. Fifteen relatively small transmitters were distributed across the country to jam the various SW stations (6.122-9.677 MHz), while a large one in the middle of the country was used to jam the MW stations (804-1149 kHz).

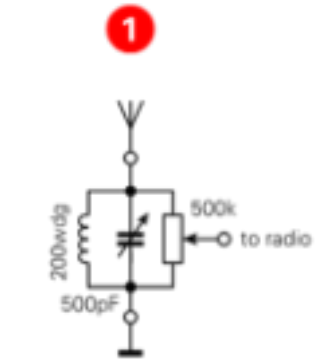
The image [*below*] shows one of the original jammers that was used for this purpose. It is a free-running oscillator/amplifier, with two large tubes in a balanced configuration. A motor-driven variable capacitor causes the oscillator signal to ring (i.e., vary rapidly), creating a buzzing sound inside the receiver. This transmitter can be found at the Institute for Sound and Vision in Hilversum.

The 'Kraut sieve'

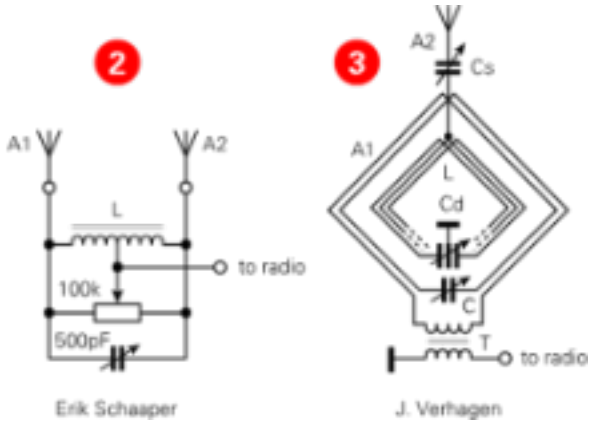
Although the jammers caused serious interference with reception of the BBC, the effect was limited. They had to be close to the receiver to have any success, and if people used a directional antenna, the effect could be reduced. Using a directional antenna outdoors worked best but was dangerous because it betrayed the location of the secret receiver. The effect could also be reduced by changing the position or direction of the wire antenna, or by adding a so-called 'Moffenzeef' (*Kraut sieve*). There are several known designs of a Kraut Sieve.

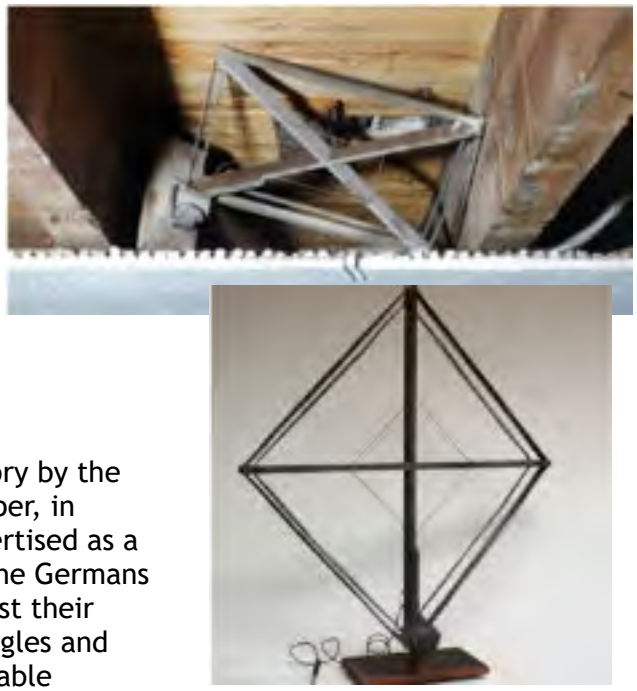
Schematics of the three versions of the Kraut sieve are shown.

The diagram on the left was published in the May 1942 issue of De Wervelwind, a propaganda pamphlet made by the Dutch government in exile



De Wervelwind, May 1942





and dropped in large quantities over occupied territory by the British RAF. The second was developed by Erik Schaaper, in Scheveningen and built in large numbers. It was advertised as a filter against malfunctions of vacuum cleaners, but the Germans soon discovered that it was intended as a filter against their jammers. It uses two antennas placed at different angles and heights. By adjusting the potentiometer and the variable capacitor, the signal from the jammer can be neutralized, using phase and amplitude differences.

For the main antenna, a curtain rod (in an east-west direction) was recommended. The bottom plate of the stove (or the stove itself) acted as the second antenna. The third solution was more complex but is probably the most effective. It combines the effect of a directional window antenna with a passive sensor antenna. Since it is a loop, it is only sensitive to the magnetic component of the radio wave and has a sharp zero. It was designed and built during the war by J. Verhagen.

The reason for this article is the recent discovery of a ‘Kraut sieve’ in a former taxi garage in the Raadhuisstraat in Haarlem. The "moffenzeef" is exhibited at the Resistance Museum in Amsterdam and can be admired there.

~ Fred PE3FS

Source: www.cryptomuseum.com

There are several emails coming in now complimenting us on the Manna/Chowhound 80 special event...

During the event, I had several extended conversations with family members of airmen and crews lost during the war, and a son and ham, himself now almost 80, who expressed how moved he was by the contact and the acknowledgment of his father’s service in Operation Chowhound.

~ John VE7TI

Radio Ramblings

Computing Science and Amateur Radio

by KEVIN McQUIGGIN VE7ZD / KN7Q

Kevin VE7ZD/KN7Q is active in EME, meteor scatter and much more. He lives on Vancouver Island.

There are many articles in amateur radio publications that include references to computers and computer programming. This is only natural, given the increasing reliance on computers and computing in our lives.

Digital signal processing and software defined radios are a couple of great examples of computer-based technology that has gone mainstream within our hobby. However, computers are incorporated into many other devices in our shacks.

It is next to impossible to be involved in amateur radio in the 21st century without needing to understand something about computing and digital networking. DSP and SDRs are everywhere. We've discussed both technologies at great length in this column, and just about every publication these days has a strong digital focus.

Internet modems, logging programs, modes such as FT8, FreeDV, APRS and packet, programs such as fldigi and WSJT-X, microcontrollers, power supplies and consumer-based wireless technologies are some other examples of how computing technology is deployed in our amateur radio activities. Even some SWR meters contain microprocessors these days! Most of these technologies are presented from a user's perspective without much consideration of the hardware and software that runs them. As hams we should learn a bit about how these complex devices work.

This issue I'd like to look at the many aspects of computing that underlie what we do in our shacks. We'll take a short trip through computing science and talk about standard computer architectures, programming languages, the different types programming methodologies, and how these factors are weaved together to produce usable applications. Some technical background on computers, computer programming and networking will help you understand a bit more about these technologies and how they work.

Let's start with a quick overview of the foundation of computing science.

The "Analytical Engine" and the Idea of a "Programmable Computer"

The foundation of modern computing is rooted in the work of British mathematician Charles Babbage, his collaborator Ada Lovelace, and a mechanical calculating machine called the "analytical engine" that Babbage designed in the 1840s. The machine could store a short list of instructions and perform mathematical calculations through a very clever arrangement of gears, rods, and a hand crank.

The machine worked in the short term, but the gear machining tolerances of the day prevented it from going into production because machining errors introduced slight inaccuracies in the gear positions after each calculation. With each calculation, the gear errors accumulated and eventually the calculator lost accuracy.

Nonetheless, the Analytical Engine demonstrated that a "stored program computer" could be built, and Lovelace can rightly claim to be the world's first computer programmer.

Alan Turing; The "Bombe"; Conrad Zuse

Cambridge mathematician Alan Turing wrote a pivotal paper called "On Computable Numbers" in November 1936 [1]. In this article he described a simple theoretical machine (later dubbed the "Turing Machine") that could be programmed to perform arbitrary calculations. The machine had a simple input and output device and was able to read instructions and make decisions based on a simple "memory" mechanism. It could store a program, read data, process the input, print a result, and then stop. Essentially, it performed all the necessary functions of a modern-day computer.

See Figure 1.

Figure 1 – A Model of a Turing Machine [3]

Turing's machine was purely theoretical, but it did demonstrate that a stored program computer which could perform arbitrary calculations was possible.

German mathematician Conrad Zuse read Turing's paper and decided to construct a stored program computer based on Turing's work. Zuse built a couple of simple machines using electro-mechanical relays. These experiments were successful, and the machines could solve simple mathematical problems. This success led to completion of his "Z3" machine in May 1941, during the Second World War [4].

The Z3 was an electrically powered mechanical computer that used relays to store its programs and perform its calculations. It was a "Turing-complete" machine, and thus represented the world's very first program-controlled computer. The Z3 could perform arbitrary

calculations and was a real-world implementation of the machine described in Turing's 1936 paper.

The story of Alan Turing's role in wartime computing in Britain centres on his team's design of a machine called the "Bombe" that was used to decode German military messages which had been encrypted using an "Enigma" machine [5]. The Axis nations believed that Enigma-encrypted messages were unbreakable. The Bombe was "Top Secret" technology, and word of the machine did not leak to the public until many years after the war.

Following the war, the people who worked on the Enigma problem and developed the Bombe were largely responsible for the birth of the electronic computing industry in the UK and North America.

The von Neumann Architecture

Hungarian mathematician John von Neumann emigrated to the USA in the 1930s and worked on the development of the first atomic weapon during the war. Following the conflict, he was appointed Director of the Institute for Advanced Study in Princeton, New Jersey, where he put his mind to advanced mathematical problems in general, and the problem of computing in particular.

Von Neumann devised the standard computing architecture that is still in use today. Like the theoretical Turing machine, the von Neumann architecture breaks a computer down into building blocks:

- Input/output devices;
- Memory; and
- A central processing unit or CPU.

The central processing unit contains a "control unit" and an "arithmetic/logic unit". See Figure 2 for how this architecture is organized. The program that the computer is running is stored in memory. The control unit fetches program instructions from memory and executes them, and the arithmetic/logic unit (or "ALU") performs the actual calculations that transform input data into output data.

This architecture forms the basis of virtually all computers in production today [3].

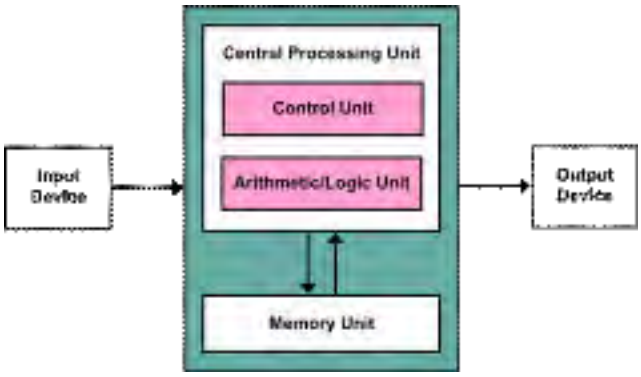


Figure 2 – Standard von Neumann Architecture [3]

Computer operations and capabilities depended on the set of "instructions" that could be given to the Control Unit. Typically, these instructions included basic operations like reading a value from memory, writing a value to memory, basic arithmetic operations such as adding or subtracting two numbers, and a comparison capability where a value in memory could be compared to another value. The results of a comparison were used to tell the Control Unit which instruction to execute next.

The ability to compare numbers gave the computer the ability to perform repetitive operations, and (very importantly) to stop running the program and print results when certain conditions were reached.

With the development of this standardized computer architecture, scientific attention turned to the development of programs to solve real world problems. A new vocation called "computer programming" developed to study computer users' requirements and write programs that would generate the results that they were seeking.

Programming

Programming was a bit of an afterthought on the part of von Neumann and other early researchers. It was assumed that the instructions to the computer would be easy to write.

This turned out to be a major oversight. Computer programming turned out to be much more difficult than any of the researchers would have guessed. This was for a couple of reasons:

A. The program instructions had to be provided to the computer in numeric form. Solving even simple problems using a limited "instruction set" proved to be complicated and prone to error. "Bugs", as they came to be called, could be subtle and very, very hard to find – especially when a program was expressed as a set if binary (or decimal) numbers. See Reference [6] at the end of this column, and Figure 3.

Figure 3 – The First "Computer Bug" [6]

B. The process of defining the solution to a problem relied on the programmer understanding the problem himself, and being able to devise a step-by-step solution to it using the only the very basic instructions that were available on the computer. This was not easy because computing was a brand-new field and people had rarely thought of complex problems in this way. As an analogy, there were only a few basic tools like a hammer, saw and measuring tape in the toolbox, and understanding how to use them to build a birdhouse or picnic table took some real creativity on the part of early programmers.

Early computing was plagued by primitive hardware, limited instruction sets, program bugs and lack of adequate tools for programmers. Along with hardware improvements, the complexity of programming and lack of tools was one of the very first things that scientists and engineers realized needed to be addressed.

Let's look very briefly at the evolution of computer programming.

Machine Language and "Assemblers"

The earliest days of computing saw programs developed as sets of either binary or decimal numbers. The number set contained both instructions (telling the Control Unit or CPU what to do) and data (the values to use for these calculations). The programmer would develop a method to solve the problem and then translate her solution to a list of instructions (in numeric form) for the Control Unit to follow. Data would be intermingled with these instructions. See Figure 4 for an example of a machine language program; you will note that this code is not user-friendly at all.

Figure 4 – Typical Machine Language Program

The set of data and instructions needed to be entered into the computer manually. This was a process that generally used toggle switches and a complicated front panel like on the IBM

701 in Figure 5. Toggling in a program could take an hour or more. The process was error prone, so the programmer needed to cross-check the data entry before the Control Unit was told to start running the program. If the programmer made an error in entering the instructions or data, or even if the program needed to be modified only slightly, it was likely that the process (which may have included hundreds of instructions) would need to be started over.

Figure 5 – Front Panel, IBM 701 [7]

A significant development in the early 1950s was the development of "symbolic programming systems" or "assemblers". These advanced programs allowed the programmer to write Control Unit instructions in "alphanumeric" form rather than in binary. In effect, programmers could write their programs in simple English. Data could also be given names and referred to by these names in the program, rather than having to be referred to using its binary address. The advent of assemblers greatly improved the efficiency of early computer programmers.

Improvements in I/O (input/output) devices meant that programs could be punched into paper tape and read into the computer, written on punched cards, or entered into memory via teletype devices that combined a typewriter-like keyboard with a fan-fold paper typewriter for output.

The assembler code in the right-hand box of Figure 6 is cryptic to any non-programmer, but one can easily see that it is far more descriptive than the hexadecimal (binary) representation of the same code in the box on the left.

Figure 6 – Assembler Code is Far More Readable

Clearly, assemblers made the programmer's job much easier, but things were still a long way from becoming "easy"!

The next big development (this occurred in the late 1950s) was the idea of a "high level" programming language.

High-Level Languages

Using an assembler was much easier than programming in "machine code" (using binary numbers and toggling them into the computer manually), but assemblers still required programmers and scientists (the main users of computers in these early days) to abandon their usual representations of problems. Programmers (and the nascent computer industry) needed a better way to represent problems that made it easier to write computer programs, debug them to find and fix errors, and make program changes.

High level languages introduced a much more familiar notation for programmers, in which instructions to the Control Unit could be represented in a more natural format. Let's give an example. One of the earliest high-level languages was called FORTRAN – an acronym

for “FORmula TRANslation”. Fortran was introduced in the mid 1950s and focused on scientific users of computers. Here’s a screenshot of part of a short FORTRAN program that calculates the area of a triangle:

```
      INTEGER A,B,C
10    READ(5,501) A,B,C
      IF(A.EQ.0 .AND. B.EQ.0 .AND. C.EQ.0) GO TO 50
      IF(A.EQ.0 .OR.  B.EQ.0 .OR.  C.EQ.0) GO TO 90
      S = (A + B + C) / 2.0
      AREA = SQRT( S * (S - A) * (S - B) * (S - C) )
      WRITE(6,601) A,B,C,AREA
```

Figure 7 – Example of FORTRAN Code

Note in the figure that FORTRAN allowed programmers to use mathematical formulae and perform advanced operations such as square root (the call to the SQRT function). Programmers could also give variables names that represented what each variable stored. In the snippet of FORTRAN code above, A, B and C represent the length of the sides of a triangle. Using a variable name such as ‘AREA’ to store the result has much more meaning than referring to memory location “78”. The ‘IF’ statements in the figure directed the Control Unit/CPU to compare values in memory and make decisions as to which instruction to execute next (the GO TO statements).

The computer’s Control Unit/CPU only understands binary/decimal instructions, so a complex program called a “compiler” was written to translate FORTRAN code into its machine code equivalent. Compilers were bleeding edge technology in the late 1950s. Expert programmers intimately familiar with the CPU and the computer’s instruction set wrote the FORTRAN compiler in assembler and machine code. This was extremely complex work, and a compiler for a new language like FORTRAN could take a year or more to write.

The compiler’s output contains the machine language instructions to run on the von Neumann architecture to solve the problem.

The introduction of high-level languages and compilers was a huge step forward in computing science.

High-Level Languages Proliferated

FORTRAN was a great success and it dominated program development for many years starting in the mid 1950s. Other high-level languages soon followed, such as COBOL, ALGOL, and PL/I. COBOL was designed as a business/financial language and saw significant adoption by banks, governments and businesses of all types. ALGOL was a scientific language like FORTRAN and heavily used in military applications. PL/I was a language designed to serve both scientific and business users.

Many other new high-level languages followed: too many to list here, but many of them are still in use today.

As each new language was defined, a compiler had to be written for it. This proved to be a bottleneck as many new machines were being designed in the 1950s and 1960s and compilers were needed for each of them. This drove projects on standardization of languages, to make it easier to “port” (adapt) a compiler from one brand and model of computer to another.

The “C” high-level computer language was designed starting in 1972 at Bell Labs in New Jersey. Its goal was to provide completeness and standardization of function that would allow programs written in C to be easily ported to other computers.

C has withstood the test of time and remains one of the most popular languages for programming, even in the 21st century. It has been ported to just about every type of computer in existence. A C program that was developed in the 1970s for a mainframe computer can re-compiled unchanged to run on an iPhone in 2025 [16].

Advances in Programming

As the number of high-level languages increased, computer scientists (a new specialized field of academic research that arose in the early 1970s) started to look at other ways to organize solutions to problems. Let’s look at some milestones.

A. Procedural Programming:

All early programming used a procedural approach to solving a problem. The procedural approach centered on reading input, performing some manipulation of it, and generating the desired output. The biggest challenge was in devising the method in which the input data was to be manipulated.

Procedural programming treats program instructions ("code") and the data which the code acts upon separately. It is the programmer's responsibility to ensure that code and data do not inadvertently mix.

Like a cake recipe (gather ingredients; mix them in a step-by-step manner; place the batter in the oven; remove cake in 30 minutes…), programming was the process of devising the set of discrete steps (or instructions) that would solve the problem at hand.

A high level of problem understanding and insight is required in procedural programming. Issues such as the code acting on the wrong set of data can be subtle and hard to resolve. Potential errors or rare conditions must be anticipated and handled in the program code.

Nonetheless, with modern high-level languages and a few decades of collective experience, procedural programming is alive and well in the industry and still the most common methodology used for program development.

B. Event Driven Programming:

This alternate methodology originated in the late 1970s. As a radical departure from the dominant procedural methodology, event driven programming worked, but it took experienced procedural programmers some time to "get their head around the idea" as the methodology was so different from what every programmer had been doing for more than twenty years.

Using event driven programming, problems are analyzed and turned into a set of "states" and "actions" that is referred to as a "state machine". Input data causes the state machine to generate output and change states.

The state machine then rests again until more input arrives. Figure 8 shows an example of a simple state machine that we all use every day.

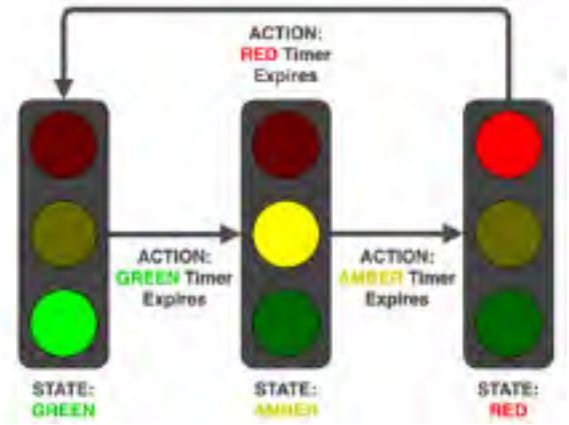


Figure 8 – Simple State Machine [8]

In Figure 8, the inputs to the system are timers that expire after a pre-programmed delay time. We pine for the green light, especially when we are late to the SARC meeting, or even worse if it's Saturday morning and we are heading to breakfast at Denny's.

In modern computer systems (think Windows, MacOS, Linux) events can also be generated by the arrival of input such as a mouse click, or arrival of data on a network connection. State machines can get quite complex, but the methodology is well suited to environments where there is a wide range of potential user actions. When you click on a URL, choose an item from a dropdown box, drag a file to the "Trash", or move the mouse you are providing input to a complex state machine.

State machines can also be used to model real world activities. A slightly more complex state machine defining the process by which an article or book gets reviewed, edited, and approved for publication is shown in Figure 9. This is an interesting diagram because it shows that the idea of events and actions being arranged into a functional system to solve a problem or document a process is not limited just to the realm of computers and mathematics.

Figure 9 – A More Complex State Machine [9]

Internally, states and actions in an event driven computer program are described by high-level language code. New high-level languages such as Visual Basic have been defined which focus on this state/action methodology.

Compilers have also been developed for these new languages that perform the translation of the state machine's events/actions definitions to low-level code that is executed by the Control Unit [10]. This allows programmers to build their problem solutions using event driven techniques.

C. Object-Oriented Programming:

Object-oriented programming dates from the 1980s, although the approach did not really become mainstream until the early 1990s. Object-oriented programming attempts to lessen the complexity of managing the separation between instructions and data and make life easier for the programmer.

You'll recall from Figure 2 and our discussion that the von Neumann architecture (which still prevails today) contains a Control Unit and Memory. Instructions to the Control Unit operate on data which is stored in Memory. In the actual program code, instructions and data can be interleaved; it is the responsibility of the programmer to make sure that the Control Unit does not mistakenly try to execute data from Memory as instructions: this is an all-too-common source of "bugs" and a sure way to "lock up" the computer and cause it to stop running.

Object-oriented programming creates a model in which the data that a set of instructions operate on is coupled to those instructions. Together, the instructions and their data form "objects". This makes it harder for the instructions to be applied to incorrect data.

The theory says that this association of instructions with their data, and isolation of these "objects" from other "objects" in the program will make programming easier and less prone to error.

It's a good idea, and in general it works fairly well in more powerful computer systems (including servers, desktops/laptops/tablets and modern consumer-grade machines). The object-oriented approach works less well, however, on lower grade systems that use less powerful CPUs which have smaller memory capacity and limited input/output capabilities.

The benefits of object-oriented programming involve a trade-off: object protection introduces overhead, and this affects program performance. Object-oriented programs generally require more memory, and run more slowly, than an equivalent procedural programming solution.

Grouping code and its associated data together as an object increases memory requirements, and the behind-the-scenes management of all the objects in a program to prevent code from accessing data belonging to another object consumes more CPU time.

Firmware?

The term "firmware" is well-used these days. Home electronics devices, routers, printers, televisions, and even amateur radio rigs have firmware. We have all seen the messages telling us that "a firmware update is available for your device". Where does firmware fit in in our discussion of computer architecture and programming?

Firmware is just software: in particular, technically complex, highly specialized software that operates at very close to the hardware level in our radios, televisions, meters, or other devices.

Firmware differs from "user level" software in that we do not normally interact with it directly; rather, firmware provides services to the application software that we use to operate our amateur radio, make program selections on our Roku box, or access email on our smartphone. Application software (and even our device's operating system) calls on firmware for highly specialized functions that (in general) command the Control Unit or CPU directly or perform other operations directly with the hardware.

Firmware can be developed using any of the programming methodologies described above, but because it always important that firmware operates efficiently and quickly, procedural programming is the most common approach. Firmware needs to be bug-free; therefore, the development and testing of firmware is one of the most highly specialized areas of computer programming [14].

Arduino and Other Microcontroller-Based Systems

The Arduino and other small systems are generally designed around CPUs with less capacity than regular PCs. These systems still use the von Neumann architecture but are limited in terms of the amount of memory that they can address, the sophistication of the Control Unit or CPU, and the speed at which the processor runs. A couple of typical micro-controllers are shown in Figure 10.

Figure 10 – AtMega328 and PIC12F629 Micro-controllers [11]

Despite their hardware limitations these micro-controller-based computers are still capable of doing a significant amount of work. Procedural programming is the usual methodology used to program these devices. Their memory limitations and slower clock speed do not necessarily mean that they cannot provide value in specialized roles. I have used small Microchip micro-controllers (the same chip as on the average "Arduino" board) to decode EME signals, control azimuth/elevation rotators to track the sun and moon, and even perform advanced digital signal processing (DSP).

One reason manufacturers and engineers like micro-controllers is because of their low cost. Prices on the most capable ones are in the $10+ range, and some lower power devices are under $1. These micro-controllers have computing capabilities far beyond any of the massive computers of the 1950s – those computers that took up entire floors of an office building and whose weight was measured in tons.

Small micro-controller systems such as Arduinos are an excellent way to learn computer programming (or "coding" [15]). The free support software and tutorials that are available for the Arduino provide instruction in procedural programming, event driven programming, and even object-oriented programming. Avoid cheap Arduino clones as they cut corners in the hardware and do not always work. Buy genuine Arduinos through https://arduino.cc or via an authorized dealer.

My advice is to start with some procedural coding to learn the basics, and then step into to event-driven applications. Object-oriented techniques will show up in some examples as you go through the Arduino tutorials.

Operating Systems

No discussion of computing science would be complete without a few words about operating systems. Operating systems were first developed in the 1950s when it became clear that the big, expensive computer systems were being underutilized. Because computer programming had turned out to be much more

difficult than early researchers had expected, expensive computers were sitting idle for most of the time as programmers toggled in binary programs on the computers' front panels, fixed bugs in their machine language code, and then had to toggle the entire program into the computer's memory again.

To alleviate this bottleneck, programs called "monitors" were developed that automated the loading of programs from new "peripheral devices" and eliminated the need for programmers to toggle their binary code into the computer's memory. By loading the program from paper or magnetic tape, the monitor was able to queue up "jobs" and keep the computer busy, thus improving utilization of the machine.

In this new "monitor" environment, programmers prepared their programs and punched them on perforated paper tape (or, later, magnetic tape). The tape served as the input for "jobs" for the computer. The monitor program loaded the tape, executed the job, and printed the result. See some examples of these new "peripheral devices" in Figure 11.

Figure 11 – Perforated Tape; Paper Tape reader; 7-Track Magnetic Tape Drive

Monitors helped improve productivity, but as the sophistication of computing hardware progressed more job management facilities were required. Monitors grew into more comprehensive "operating systems" that managed the entire job entry, execution, and output production process.

When mini- and then microcomputers became viable (the development of microprocessors and other standards) then it was only natural for the operating system concept to be extended to these systems as well. One of the most successful operating systems that was developed during the minicomputer era was UNIX. UNIX was written in C and defined several operating system and inter-networking standards that remain at the foundation of all operating systems today.

With the advent of homebrew personal computers in the 1970s, an operating system called CP/M (Control program for Microcomputers) became popular. When the IBM PC was released in the summer of 1981, it's operating system "DOS" (Disk Operating System) was based on CP/M [12]. DOS evolved through 6 major versions before Microsoft Windows was released in the 1990s.

Apple's personal computers also went through a similar evolution that led to OSX and then MacOS here in 2025. The open-source operating system Linux was a modified version of a research operating system for microcomputers called "Minix", first developed in 1987 by Professor Andrew Tanenbaum of the Netherlands [13]. The foundational components defined by UNIX were key to the development of both Minix and Linux.

Closing the Loop: Back to Amateur Radio

That's it for this issue. With this whirlwind overview of computing science and computer programming complete, we can now loop back to the topic of amateur radio and the multitude of computer-based devices that we now find in our shacks.

With better understanding about computer architecture and different programming techniques you will have a better idea of what may have gone wrong after a firmware update, or when you install the newest version of your favourite operating system. Insight as to how computers "see the world" will give you new insight and generate an epiphany during problem solving. Maybe it will even give you an idea for n innovative new station accessory.

I hope that this review has given you a bit more insight into computer architectures, operating systems, and computer programming. By knowing a bit more about the history of computers and programming methodologies you will be in a better position to evaluate issues in your own shack.

We depend more and more on these "black boxes" for our day-to-day amateur operations. Having more knowledge about how these devices function internally, you will hopefully be in a better position to diagnose problems and resolve "bugs".

Feedback on Radio Ramblings is always welcome and may be directed to the Editor, or directly to me at mcquiggi@sfu.ca. Thanks for reading!

73,

~ Kevin VE7ZD / KN7Q

References:

[1] See Wikipedia's excellent articles on Turing and his work at https://en.wikipedia.org/wiki/Turing%27s_proof

[2] Image from https://en.wikipedia.org/wiki/Turing_machine.

[3] See https://en.wikipedia.org/wiki/Von_Neumann_architecture.

[4] The Z3 is a little-known machine but its development is well described by an article in Wikipedia at https://en.wikipedia.org/wiki/Z3_(computer).

[5] The cracking of the Enigma machine and development of the Bombe is a fascinating story that is skillfully described in "The Codebreakers - The Story of Secret Writing" by historian David Kahn. The book is available at https://www.indigo.ca/en-ca/the-codebreakers-the-comprehensive-history-of-secret-communication-from-ancient-times-to-the-internet. If you'd rather watch a weak dramatization, the movie "The Imitation Game" is available on many streaming channels.

[6] "Bug" was a term that arose in relation to the early unreliability of computer hardware in the days when vacuum tubes were leading-edge technology. Early computers generated a significant amount of heat, and despite being housed inside buildings the machines would attract a lot of insects seeking warmth. One evening in 1947 at Harvard University, a moth became tangled inside one of the vacuum tube holders inside the Mark II computer, shorting out the associated circuit. When technical staff were investigating the failure they discovered the moth, removed it, and pasted its carcass onto a page of the daily computer log. This "bug" is now famous, its legacy living on in the many "bugs" that programmers find in their programs today. Read more starting with https://www.computerhistory.org/tdih/september/9/.

[7] A vintage mid 1950s IBM 701. A vacuum tube-based computer. Image from LIFE magazine, see https://i0.wp.com/hipertextual.com.

[8] There's a good introduction to state machines and the event driven methodology on https://medium.com/well-red/state-machines-for-everyone-part-1-introduction-b7ac9aaf482e. Graphic copied from that site.

[9] Figure from https://www.linkedin.com/pulse/state-machine-design-pattern-concepts-examples-python-sajad-rahimi.

[10] It is important to note that the underlying computer architecture employed today is still essentially the von Neumann model that was first defined in the late 1940s. This architecture works. Although there have been many modifications and improvements to the architecture, and several orders of magnitude improvement in system performance (systems are easily tens of millions of times faster than computers were in the 1950s) the von Neumann model persists virtually unchanged. All the programs and online services we use, and the sophistication of the user interfaces that we routinely use (such as the MacOS system I am writing this article on) rely on an underlying von Neumann architecture. Software performs the translation.

[11] Current prices for either of these microcontrollers are under C$3.00 at https://digikey.ca. Either chip will easily outperform any of the first- or second-generation mainframe computers of the 1950s and 1960s.

[12] IBM's project to develop a personal computer was secret and known only to a small number of people within the huge corporation. As IBM lacked experience with microprocessors, they hired a small company called "Micro-soft" to develop the operating system for the new IBM PC. As CP/M was well-regarded, Micro-soft decided to make an offer to Seattle Computer Products (a company selling a popular version of CP/M) and buy an operating system for the PC, rather than developing it for IBM themselves. Seattle Computer Products was kept in the dark about the IBM project and accepted an offer of a

mere $50,000 from Bill Gates and Paul Allen of Micro-soft for the CP/M source code. Seattle Computer Products went out of business after the IBM PC was released, but its owner later successfully sued the renamed "Microsoft" for deceptive business practises. See "Microsoft and the IBM PC Case Study: The Deal of the Century" by A. Pennings at https://apennings.com/how-it-came-to-rule-the-world/microsoft-and-the-ibm-pc-case-study-the-deal-of-the-century/.

[13] CP/M and early versions of DOS and Minix are now available online for those who want to experience a "Jurassic" operating system (OS) firsthand. For the not-faint-of heart, you can even download and install an IBM mainframe operating system called MVS and experience the baffling complexity of an OS that grew by osmosis in an era when new mainframe computers were being released every few months.

[14] Firmware developers are the "special forces" of computer programming: they have exceptional, even intuitive, understanding of hardware and software, are highly trained specialists, and often command very high remuneration at their companies or organizations.

[15] The term "coding" arose about ten years ago as a more "hip" replacement for the term "computer programming". Young folks want to be "coders", not "computer programmers". As an experienced programmer I tolerate the term, but just 'cause it's a new jive don't mean it's a breeze, man. Dig my groove?

[16] One of C's goals was to make it easier for programmers to write compilers. Compilers for FORTRAN and many subsequent high-level languages were re-written in C. Challenge question for readers: the original C compiler was itself written in C. Huh? Do some research online and determine how this "chicken and the egg" problem was solved by the clever folks at Bell Labs!

Meshtastic: A LoRa-Based Mesh Network for Emergency Communication

In a Hackaday article, Jonathan Bennett explores the potential of Meshtastic, an open-source, decentralized mesh networking protocol that leverages LoRa technology for low-power, long-range communication. The article, inspired by a weak tornado hitting Bennett's Oklahoma town, highlights Meshtastic's role as a resilient communication tool during disasters when traditional infrastructure like power and cellular networks fails.

Meshtastic operates on the sub-1 GHz band, requiring no amateur radio license for up to 1W transmission power, making it accessible to the general public. It uses affordable hardware, such as the US$24.99 WisBlock Meshtastic starter kit, which connects to a smartphone via USB-C for sending encrypted text messages or location data over a mesh network. Unlike traditional networks, Meshtastic's strength lies in its mesh topology, where each node acts as a repeater, extending the network's reach. The protocol limits packets to three hops to avoid flooding, achieving impressive ranges—up to 128 miles in extreme tests with elevation, though typically less in urban settings due to line-of-sight limitations at 915 MHz.

However, Meshtastic has limitations. Its low throughput prevents high-bandwidth applications like video streaming, and the 915 MHz band's line-of-sight dependency requires strategic node placement, ideally with elevation.

The article also touches on complementary technologies like SimpleX Messenger and devices like the T-Watch S3, which could integrate LoRa for enhanced emergency communication.

Read the full article

~

BOB SIMPLETON'S GUIDE TO QUARTER WAVE ANTENNAS

brought to you by *Amateur Radio Trader*

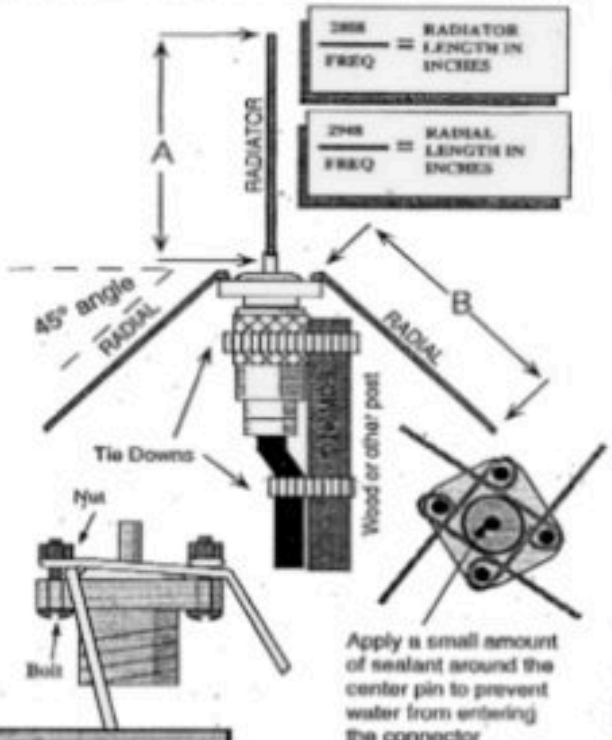
One of the simplest antennas you can build is a quarterwave ground plane antenna. It is small in size and is inexpensive.

The only part you will need to buy is a SO-239 panel mount connector. You can use an old wire hanger for the radiator and radials.

You will need to use your soldering iron or gun to attach the radiator to the center post of the SO-239. File any paint or coating from the radiator wire before soldering. Cut the radiator to the proper length before soldering it. If you can find a short copper tube to help secure the radiator to the SO-239, your antenna will stand up to high winds.

The radials may be soldered or attached with screws. Screws are the easier method if you take the time to overlap them as shown in the diagram. Cutting the radials may be done after the construction is complete.

The radials should be bent to an angle of 45 degrees for 52 ohm base impedance. If the radials are perpendicular to the radiator, the base impedance is approx. 36 ohms. Radials parallel to the radiator have an impedance of approx 75 ohms.



FREQUENCY CUTTING CHART

RADIATOR FREQ	RADIALS	
28.1	99.93	104.93
28.2	99.57	104.55
28.3	99.22	104.18
28.4	98.87	103.82
28.5	98.53	103.45
28.6	98.18	103.09
28.7	97.84	102.73
28.8	97.50	102.38
28.9	97.16	102.02
29.0	96.83	101.67
29.1	96.49	101.32
29.2	96.16	100.97
29.3	95.84	100.63
29.4	95.51	100.29
29.5	95.19	99.95
29.6	94.86	99.61
29.7	94.55	99.27
29.8	94.23	98.94
29.9	93.91	98.61
50.0	56.16	58.97
50.5	55.60	58.38
51.0	55.06	57.81
51.5	54.52	57.25
52.0	54.00	56.70
52.5	53.49	56.16
53.0	52.98	55.63
53.5	52.49	55.11
54.0	52.00	54.60

RADIATOR FREQ	RADIALS	
144.0	19.50	20.48
144.5	19.43	20.40
145.0	19.37	20.33
145.5	19.30	20.26
146.0	19.23	20.19
146.5	19.17	20.13
147.0	19.10	20.06
147.5	19.04	19.99
148.0	18.97	19.92
220.0	12.76	13.40
220.5	12.73	13.37
221.0	12.71	13.34
221.5	12.68	13.31
222.0	12.65	13.28
222.5	12.62	13.25
223.0	12.59	13.22
223.5	12.56	13.19
224.0	12.54	13.16

RADIATOR FREQ	RADIALS	
423.0	6.64	6.97
424.0	6.62	6.95
425.0	6.61	6.94
426.0	6.59	6.92
427.0	6.58	6.90
428.0	6.56	6.89
429.0	6.55	6.87
430.0	6.53	6.86
431.0	6.52	6.84
432.0	6.50	6.83
433.0	6.48	6.81
434.0	6.47	6.79
435.0	6.46	6.78
436.0	6.44	6.76
437.0	6.43	6.75
438.0	6.41	6.73
439.0	6.40	6.72
440.0	6.38	6.70
441.0	6.37	6.69
442.0	6.35	6.67
443.0	6.34	6.66
444.0	6.32	6.64
445.0	6.31	6.63
446.0	6.30	6.61
447.0	6.28	6.60
448.0	6.27	6.58
449.0	6.25	6.57
450.0	6.24	6.55

About Rubber Ducks

The rubber duck antenna on your handheld is not a very efficient antenna. The typical 2 meter rubber duck has a 5 dbs loss. If you have a 3 watt radio, your rubber duck will only radiate less than 1 watt!! A quarterwave antenna has 0 db loss and will allow all 3 watts to be radiated!!

Did you know...

Why we use 52 ohm coax ?

During world war II it was discovered that the minimum amount of material was needed to make a 52 ohm cable. It conserved critical war materials and increased profits for the manufactures!

Thanks to W3JIW for the infom

A Heathkit "Cantenna" Deep Dive

The Enduring Legacy of the Heathkit Cantenna

by: John White VE7JW, John Schouten VE7TI and others

The Heathkit HN-31 "Cantenna," a name that evokes images of both radio transmission and its containment, stands as a testament to the ingenuity and practicality of amateur radio equipment design. Produced by Heathkit from 1961 to 1983, and later succeeded by the HN-31A, this unassuming device, a dummy load, achieved an almost legendary status, with an estimated 200,000 units sold. Its continued presence in ham shacks across the globe speaks volumes about its reliability, affordability, and enduring utility. This article delves into the history, design, function, and enduring legacy of the Heathkit Cantenna, exploring why it remains a sought-after piece of equipment even in the age of modern electronics.

A brief history of dummy loads

Before examining the Cantenna specifically, it's crucial to understand the purpose of a dummy load. In radio transmission, power amplifiers generate radio frequency (RF) energy. This energy is intended to be radiated by the antenna. However, during testing, tuning, or when the transmitter isn't actively transmitting a signal, it's often necessary to dissipate this RF energy without radiating it. This is where the dummy load comes in. It acts as a "dummy" antenna, providing a resistive load that mimics the impedance of a real antenna, typically 50 ohms. This prevents damage to the transmitter, allows for safe testing and adjustment, and prevents unwanted signal radiation.

Early dummy loads were often rudimentary affairs, sometimes consisting of a resistor immersed in a container of water. These early designs suffered from instability and safety concerns. As radio technology advanced, so too did the design of dummy loads. The advent of more robust resistive components and improved cooling methods led to more reliable and higher-power

John Schouten VE7TI is active on HF, VHF and UHF from both his home station and at the SEPAR training station.

devices. Heathkit, with its focus on affordable and accessible electronics for the hobbyist, played a significant role in popularizing the dummy load with the introduction of the Cantenna.

The Heathkit HN-31 Cantenna: Design and function

The HN-31 Cantenna is a marvel of simplicity and effectiveness. At its core lies a high-power, non-inductive resistor, carefully chosen for its ability to dissipate significant amounts of RF energy without excessive heating or changes in resistance. This resistor is immersed in a specific type of transformer or mineral oil within a sealed metal can. The oil serves two critical purposes: it acts as a coolant, transferring heat away from the resistor, and it also increases the power handling capability of the resistor by improving its heat dissipation.

The choice of oil is crucial *see the next article]*. It needs to be a dielectric oil, meaning it's an electrical insulator, and it must have a high flash point to prevent fire hazards. Transformer oil, specifically designed for high-voltage applications, is one type, however, it has been shown to be carcenogenic, making its use undesirable. Over time, the oil can degrade, absorbing moisture or becoming contaminated. This can affect the performance of the Cantenna and even pose a safety risk. Therefore, periodic inspection and, in some cases, replacement with mineral oil is recommended.

The Cantenna's design is elegantly simple. The can itself acts as a heatsink, radiating heat into the surrounding air. The top of the can features an SO-239 connector, a standard coaxial connector used for RF connections. This allows for easy connection to the transmitter output. The compact and relatively lightweight design of the Cantenna made it easy to integrate into any ham shack.

The HN-31A: A simplified successor

Heathkit later introduced the HN-31A as a successor to the HN-31. While it retained the basic functionality, the HN-31A represented a simplification of the original design, likely aimed at reducing manufacturing costs. However, the HN-31's reputation for robustness often made it the preferred choice among hams.

Why the Cantenna Endures

Several factors contribute to the Cantenna's enduring popularity:

- **Reliability:** The simple design and robust components contribute to the Cantenna's remarkable reliability. With proper maintenance, these devices can last for decades.
- **Affordability:** When originally sold by Heathkit, the Cantenna was an affordable option for hams, priced at $9.95. Even today, used Cantennas can often be found at reasonable prices.
- **Ease of Use:** The Cantenna is incredibly simple to use. Just connect it to the transmitter output, and it's ready to go.
- **Power Handling:** While not intended for continuous high-power operation, the Cantenna can handle moderate power levels for testing and tuning purposes.
- **Classic Appeal:** For many hams, the Cantenna represents a connection to the history of amateur radio. It's a piece of equipment that embodies the spirit of DIY and experimentation.

Maintaining your Cantenna

While generally reliable, the Cantenna requires occasional maintenance:

- **Oil Inspection:** Regularly check the oil level and condition. If the oil is dark, discolored, or appears to contain contaminants, it should be replaced.
- **Connector Check:** Inspect the SO-239 connector for any signs of corrosion or damage.
- **Resistor Check:** With an Ohm-meter, the resistance of the internal resistor can be checked. A significant deviation from 50 ohms indicates a problem.
- **Can Inspection:** Check the can for any signs of leaks or damage.

The Cantenna in the modern ham shack

Even with the availability of modern electronic dummy loads, the Cantenna continues to hold a special place in the hearts of many amateur radio operators. Its simplicity, reliability, and classic appeal make it a valuable tool for any ham shack. Whether it's used for testing and tuning transmitters, providing a load for amplifier adjustments, or simply as a reminder of the rich history of amateur radio, the Heathkit Cantenna remains a testament to the enduring power of good design and practical engineering.

It's a classic that continues to serve the amateur radio community, a symbol of a time when ingenuity and resourcefulness were hallmarks of the hobby. The Cantenna's legacy extends beyond its functional purpose; it represents a tangible link to the past, a reminder of the enduring spirit of amateur radio.

~ John White VE7JW

Testing Cantenna oil

Heath sold transformer oil in gallon plastic bottles at its retail stores for use in the Cantenna. It is important that the oil be filled to the right level so oil can circulate up the tube surrounding the resistor as the oil near the resistor heats the oil in its proximity.

Firstly, you should test your cantenna to determine if it contains mineral oil or transformer oil (PCBs) by dropping a few drops of water in a sample. This method is a **qualitative field test** that relies on the density difference between water and oil. While it can provide a rough indication, it is **not a definitive or reliable method** for detecting PCBs. Due to the PCB scare, Heathkit announced that the oil they sold in their stores was PCB free. If you buy a used Cantenna, you might want to get assurance that the transformer oil is not PCB based

Here's how the test works, and its limitations:

How the Water Drop Test Works

1. **Density of Water vs. Oil**:
   - Water has a density of about **1 g/cm³**.
   - Mineral oil has a density of about **0.8-0.9 g/cm³**, so water will sink in mineral oil.
   - PCBs are denser than mineral oil, with a density of about **1.2-1.5 g/cm³**, so water will float on top of PCB-containing oil.
2. **Procedure**:
   - Take a small sample of the oil from your dummy load and place it in a clear container.
   - Carefully drop a few drops of water into the oil.
     - *Observe whether the water sinks or floats:*
     - *If the water sinks, the oil is likely mineral oil (less dense than water).*
     - *If the water floats, the oil may contain PCBs (more dense than water).*
3. **Limitations of the Water Drop Test**
   - **False Positives/Negatives**:
     - *Some mineral oils or other dielectric fluids may have additives or contaminants that affect their density, leading to misleading results.*
     - *PCBs are not the only substances denser than water, so other contaminants could cause water to float.*

- **Not Definitive:**
  - *This test does not confirm the presence of PCBs; it only suggests a possibility based on density.*
  - *PCBs must be confirmed through laboratory testing (e.g., gas chromatography or mass spectrometry).*

4. Safety Concerns:
Handling oil that may contain PCBs without proper precautions can expose you to hazardous substances.

Recommendations

- If the water floats, treat the oil as potentially containing PCBs and proceed with caution.
- For a definitive answer, send a sample of the oil to a certified laboratory for PCB analysis. Locally, BC Hydro subsidiary, Powertech, was (and probably is now) capable of testing for PCB content and disposal.
- Always follow safety protocols when handling unknown oils, including wearing gloves, goggles, and working in a well-ventilated area.

Sources and related content

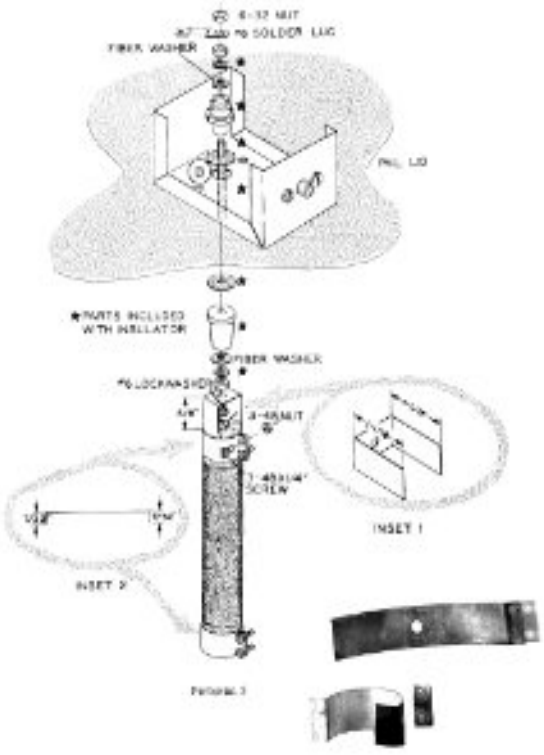
Heathkit of the Month: by Bob Eckweiler, AF6C www.w6ze.org

The Cantenna Rebuild

When you use a dummy load to test your transceiver, you should expect to see a 1:1 match, but what if you hook it up and you get an unusually high SWR?

That's what happened recently at the OTC and even more recently to me. I hooked up my dummy load to do some testing on my new Xiegu G90 HF transceiver but the SWR wouldn't match with its built-in tuner. This was highly unusual because I have found that this tuner will match almost anything. Out came my analyzer and I found exactly the same issue, an SWR greater than 10:1.

I have owned this Cantenna for over 30 years, although it is probably 20 years older, and I had opened it only once to test the type of oil. Upon inspection I found that it had suffered exactly the same fate of the Cantenna at the OTC; the contacts around the resistor had broken resulting in an open circuit. With the cause of the failure confirmed, I set out to Google similar experiences, but found none. Thankfully John VA7XB had performed the repair on the OTC Cantenna and had a solution.



Cantenna internals and the broken contact strips I removed.

I noticed two significant problems. The first was a broken contact clamp at one end of the working resistor, and the second related to poor contacts of the external connector with the large resistor itself. Due to the mechanical construction of the coaxial cylinder that is placed around the working resistor (in order to equalize the impedance), the ground contact of the connector with the resistor passes through several mechanical connections: the contact layer of the resistor, a silvered metal ring, four brass screws, the coaxial cylinder - cylinder holder - tin container - indicator housing, and the connector.

Over time, the oil on the walls of all the above elements created a thin insulating film, and in places it also penetrated between the screw connections, which weakened this contact in many places.

Note: Replacement clamps shown before paint stripping

I carefully removed the resistor assembly, a messy job as it was saturated with oil. I disassembled it, and as I did so, the second clamp fell apart. They are obviously very brittle, I presume as a result of age.

Using two 2cm (13/16”) hose clamps, I made two new contact clamps for the resistor, removed the black paint, and cleaned all the contact surfaces. I carefully replaced the old silvered brass strips under the new clamps, a frustrating exercise as spacing is very limited. I also replaced the brass screws that were impossible to clean, and finally measured the actual resistance of the assembled resistor. That was 48 Ω, well within the 10% rated tolerance. All contacts were now electrically sound without their creating additional resistance.

The VSWR was measured, but I could not confirm the manufacturer's specifications that the VSWR is up to 1.5 for frequencies up to 300 MHz, or up to 2.0 for frequencies up to 400 Mhz because I don’t have the gear to accurately do so. For measurement up to a frequency of 60 MHz, the VSWR did not exceed the value of 1.1, so this dummy load is certainly excellent for HF.

Up to a frequency of 180 MHz, the VSWR did not exceed 1.5, which makes it usable for the 2-meter band. Factory specs indicate that this dummy load is not recommended for frequencies above 180 MHz.

With repairs completed and tested, I’d say that this fifty-year-old dummy antenna is still quite usable for shortwave transmitters with a power of several hundred watts. In addition, the Cantenna HN-31 is a piece of amateur radio history, and the only old radio relic that I retain… it is worth keeping.

~ John VE7TI

A Better Heathkit "Cantenna"

- Improved metering circuit for an old standby

by H.C. SHERROD W5ZG (SK)

Make your dummy load smarter

The Heathkit "Cantenna" dummy load, Model HN-31, consists of a 50-Ohm dummy load resistor, R1, immersed in oil, and an indicating circuit consisting of resistors R2 and R3, capacitor C1, and diode D1. Figure 1 shows the schematic diagram. The indicating circuit provides for the connection of a direct current meter to the jack marked DC OUT. This arrangement provides a means of indicating relative power.

With the circuit shown in Figure 1, an amount of power at 3.5 MHz applied to the dummy load will produce a certain meter deflection. If the same amount of power is applied to the dummy load at 29.7 MHz, the meter deflection will be considerably greater.

By modifying the indicator circuit to that shown in Figure 2, the indicating meter can be made to read the same value for a given amount of power whether it be at 3.5 MHz, 29.7 MHz, or at any frequency between these values. When this has been accomplished, the indicating meter may be calibrated in Watts and will provide a satisfactory indication of transmitter output power at any frequency between 3.5 MHz and 29.7 MHz.

The basic difference between the indicator circuits shown in Figures 1 and 2 is that the circuit shown in Figure 2 incorporates a frequency-compensating network. In my case, an indicating meter that would read 200 Watts full scale was desired.

The first operation was to modify the circuit shown in Figure 1 to that shown in Figure 2. Note that in Figure 2 the value of resistor R3 has been changed from 1000 Ohms to 2500 Ohms. It will be noted that Figure 2 includes the additional components noted in Table 1 *[next page]*.

All these additional components are installed within the small metal box which is attached to the lid of the Heathkit "Cantenna."

The indicating meter employed had a 200-microampere full-scale movement with an internal resistance of twelve hundred Ohms.

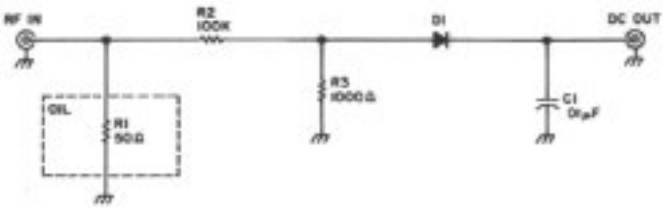


Fig.1.Schematic of the Heathkit "Cantenna."

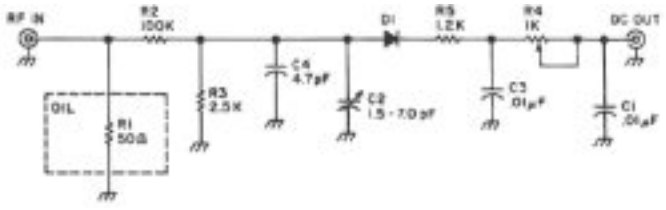


Fig.2.Modified schematic of the Heathkit "Cantenna."

This meter was directly connected to the DC OUT jack of the Heathkit dummy load. An indicator that will show the amount of power applied to the dummy load is necessary for proper adjustment of the frequency compensating network. Either an ammeter or a wattmeter of known accuracy may be employed. The setup for frequency adjustment for proper compensation is shown in Figure 3.

Parts List

- C2 1.5-7.0 pF glass, piston-type variable capacitor
- C3 .01-uF disk ceramic capacitor
- R4 1000 Ohm miniature micro-potentiometer, Bourns trimpot 120-14-E1000
- R5 1200 Ohm, ¼ Watt resistor, 10% tolerance
- C4 4.7-pF disk ceramic capacitor

Adjustment

The adjustment procedure is as follows:

1. Set C2 at minimum capacity and set R4 at maximum resistance.

2. Set the transmitter on 3.5 MHz. Gradually increase the power level until the ammeter reads two Amperes or the wattmeter reads 200 Watts. Decrease the resistance of R4 until the indicating meter reads full scale.

3. Set the transmitter on 29.7 MHz. Gradually increase the power level until the ammeter reads two Amperes or the wattmeter reads 200 Watts. Note that the indicating meter will read full scale before the ammeter reads two Amperes or the wattmeter reads 200 Watts. Reduce the reading of the indicating meter by increasing the capacity of C2 until the indicating meter reads full scale when either the ammeter reads two Amperes or the wattmeter reads 200 Watts.

4. Repeat steps 2 and 3 in sequence until the indicating meter reads full scale when the ammeter reads two Amperes or the wattmeter reads 200 Watts, whether the applied frequency is 3.5 MHz or 29.7 MHz.

If a wattmeter was employed in the adjustment setup, the indicating meter may be directly calibrated from the wattmeter readings. If an ammeter was employed in the adjustment setup, the Watts corresponding to the ammeter reading are shown in Table 2, and the indicating meter may be calibrated from this data.

~ W5ZG (SK)

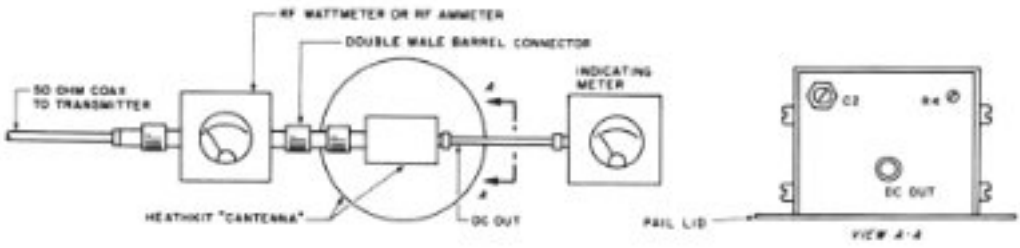


Fig. 3. Setup for frequency-compensation adjustment.

Ammeter Reading, Amperes	Indicating Meter, Watts
.4472	10
.6325	20
.7746	30
.8944	40
1.0000	50
1.0955	60
1.1832	70
1.2649	80
1.3416	90
1.4142	100
1.4832	110
1.5492	120
1.6125	130
1.6733	140
1.7320	150
1.7889	160
1.8439	170
1.8974	180
1.9494	190
2.0000	200

Table 2

Another Notable Manna/Chowhound 80 Contact

A Word War II to World War II rig exchange

By ROB STEENBURGH AD0IU

I just finished up a VB7MAN QSO on 40m with Mark VA7MM. Band conditions here were terrible but we managed to have a brief QSO.

I was using a BC-458-A that I'd pulled over to the 7 MHz band, and although I knew Mark was using a tube rig, but I had no idea when I answered his CQ that he was using a WWII rig as well. If I understood correctly, he was using a BC-459-A.

Here was my setup.

Now here's another crazy coincidence:

The BC-458-A I was using had once belonged to the RCAF.

So this was quite the contact. While I'd learned about the Berlin Airlift (I was a USAF weatherman for 23 years, 1985-2009), I hadn't heard of Operations Manna or Chowhound.

More coincidences; my family has roots in the Netherlands and in Havelock, Ontario. I used to go up to Havelock in the summers, as did my father before me, and his before him. My dad got the radio on Radio Row in NYC, and I used to look at it under his workbench when I was a boy. He never did restore it, but he sent it to me in 2008, and my son and I got it back on the air.

My thanks to Mark for a memorable QSO, and I'll be sending a QSL your way.

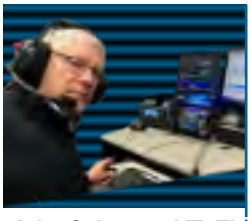
Best Regards,

~ Rob Steenburgh AD0IU

A Special Interest Group for the iCOM 7300, 7610, 9700 and compatible models

Exploring the iCOM IC-7300's Internal Antenna Tuner

with inspiration from TOM W2IVD



John Schouten VE7TI

Has both an iCOM 7300 and 9700 and is fascinated by the 'hidden' features of these transceivers.

In this article, we delve into one of the most useful functions of the iCOM IC-7300 and similar iCOM transceivers: the internal automatic antenna tuner. This feature is essential for amateur radio operators who want to optimize their antenna performance across different bands. Let's explore how to operate and configure this tuner effectively.

The internal automatic tuner of the IC-7300 is straightforward to use and will typically tune an antenna with up to a 3:1 SWR. The tuner button on the front of the radio, along with a few menu settings, allows for easy operation. In the normal mode, pressing the menu button and navigating to the function settings will reveal the tuner options. Here, you can find settings such as tuner switch auto, push-to-talk start, and preset memory clear. When the tuner engages you will hear the internal relays click rapidly as the unit tries to find the lowest SWR.

The Tuner Switch in Auto Mode

The tuner switch auto setting remembers the tuner status from one band to another. For example, if the tuner is on for 40 meters, it will remain on when you switch back to 40 meters, even if it was off for 12 meters. This feature ensures that the tuner settings are optimized for each band without manual intervention. This is particularly useful for operators who frequently switch between bands, as it saves time and effort by maintaining the optimal tuner settings for each band.

Manual Mode

In manual mode, the tuner does not remember the settings from band to band. It retains the current tuner status regardless of the band you switch to. This mode requires manual adjustment of the tuner for each band change. While this might seem less convenient, it offers greater control for operators who prefer to manually fine-tune their settings for each band. This mode is ideal for those who enjoy experimenting with different antenna configurations and want to have precise control over their tuning process.

Push-to-Talk Start

The push-to-talk start function, when enabled, allows the tuner to automatically tune when the push-to-talk button is pressed. This feature is particularly useful when operating on different frequencies, ensuring that the tuner adjusts to the optimal settings without manual tuning. This automatic tuning process can be a lifesaver during contests or emergency situations where quick frequency changes are necessary. By enabling this function, operators can ensure that their transmissions are always optimized for the best possible performance, and prevent potential damage due to a high SWR comdition.

Preset Memory Clear

The IC-7300's tuner can remember the tuning settings for up to 100 frequencies. This memory function allows the tuner to adjust based on previously stored settings, providing quick and efficient tuning. If you change antennas or move to a different location, clearing the preset memory ensures that the tuner performs a full retune for each frequency change. This is particularly important for portable operations or when using different antennas for different bands. By clearing the preset memory, operators can ensure that the tuner is always working with the most accurate and up-to-date settings.

Emergency Mode

The emergency mode expands the matching range of the tuner, allowing it to tune beyond a 3:1 SWR. We covered this in a previous article. This mode limits the rig to 50 watts, making it ideal for emergency operations where optimal antenna performance is crucial. To activate emergency mode, navigate to the ‘others’ menu and select the emergency tuner option. Remember to restart the radio to apply the changes. This mode is designed for situations where communication is critical, and the operator needs to ensure that their signal can be transmitted even with sub-optimal antenna conditions. By limiting the power output, the tuner can handle higher SWR levels, ensuring that the operator can maintain communication in emergency situations.

How to

Operating the tuner is simple. Pressing the tuner button briefly toggles the tuner on and off. Holding the tuner button forces the tuner to tune the antenna. If the SWR is too high, the tuner will not engage, indicating that the antenna is outside the tuner's range. In emergency mode, the tuner can handle higher SWR levels, ensuring communication even with

sub-optimal antennas. This practical operation ensures that the tuner is always working at its best, providing optimal performance for the operator.

Advanced Tuning Techniques

For those who want to get the most out of their IC-7300's internal tuner, there are several advanced tuning techniques that can be employed. One such technique is to use the tuner's memory function to store settings for different antennas. By doing this, operators can quickly switch between antennas without having to manually retune each time. This is particularly useful for those who use multiple antennas for different bands or operating conditions.

Another advanced technique is to use the tuner's manual mode to fine-tune the settings for each band. By manually adjusting the tuner, operators can achieve the best possible performance for their specific antenna and operating conditions. This can be particularly useful for those who enjoy experimenting with different antenna configurations and want to have precise control over their tuning process.

Maintenance and Troubleshooting

To ensure that the IC-7300's internal tuner continues to perform at its best, regular maintenance and troubleshooting are essential. One important maintenance task is to regularly clear the preset memory, especially when changing antennas or operating locations. This ensures that the tuner is always working with the most accurate and up-to-date settings.

If the tuner is not performing as expected, there are several troubleshooting steps that can be taken. First, check the antenna and feedline for any damage or loose connections. Next, ensure that the tuner settings are configured correctly in the menu. If the problem persists, try resetting the tuner by clearing the preset memory and restarting the radio. If these steps do not resolve the issue, it may be necessary to complete a factory reset, consult the IC-7300's manual or contact iCOM support for further assistance.

The ICOM IC-7300's internal antenna tuner is a powerful tool for amateur radio operators. Its ability to remember settings, automatic tuning features, and emergency mode make it a versatile and essential component of the IC-7300. By understanding and utilizing these functions, operators can enhance their radio experience and ensure optimal performance across various bands. Whether you are a seasoned operator or a newcomer to the hobby, the IC-7300's internal tuner offers a range of features and capabilities that can help you get the most out of your radio.

~ Check out Tom's video at https://www.youtube.com/watch?v=dQYmUEi4rcA

I have a pleasure room... Do you want to see it?

Automatic Antenna Tuners & Couplers

by Adam M. Farson VA7OJ/AB4OJ [SK]

Introduction and Purpose

The purpose of an automatic antenna tuner (auto-tuner) is to transform (match) a complex load impedance to 50Ω resistive, and to maintain the matched condition automatically as the operating frequency and load impedance vary.

When matched, an automatic antenna tuner will tune out the reactive component of the antenna system impedance and transform the radiation resistance of the antenna radiator to 50Ω resistive at the transmitter output. This will ensure maximum transfer of "real" power to the radiator.

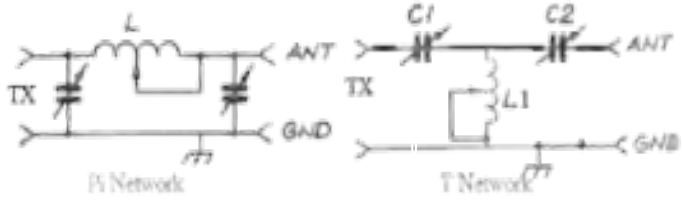
The automatic antenna tuner receives band/frequency information either from the associated transceiver, or by measuring the RF drive frequency. The actual tuning operation is controlled by detectors at the input to the matching network. These detectors provide information on the matching condition to the control electronics, which adjust the matching-network constants to achieve the required match.

Automatic antenna matching systems, once found exclusively in exotic military and commercial HF equipment, are now commonplace in affordable amateur-radio gear.

The two basic tuner types

The Π/L-network automatic coupler:

This type of tuner consists of a switchable Pi-network with capacitive shunt arms and an inductive series arm. The input is connected via a 50Ω feedline to the transceiver, and the output via a short single-wire feeder to the feed-point of the radiator. To increase the matching range, the network can be switched from a Π to an L topology by switching out the output shunt capacitance.



This type of coupler is intended to match random-length radiators such as whips and long-wires to 50Ω resistive. It can accommodate complex loads with a very wide impedance range, from tens (λ/4) to thousands of ohms (near λ/2). The limiting case is λ/2. Odd multiples of λ/8 are recommended, e.g.3/8-wave, 5/8-wave, 7/8-wave etc.

The T-network autotuner:

In its simplest form, this tuner consists of a T-network with capacitive series arms and an inductive shunt arm. The T-network autotuner normally has a coaxial input and output, and is designed for connection to a coaxial feedline. Its matching range is usually limited to a maximum VSWR excursion of 3:1 to 50Ω resistive, although it can be extended by switching in additional L and C values.

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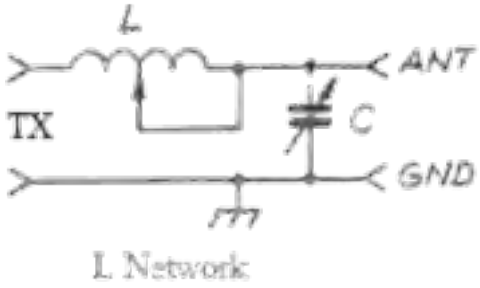


L Network

Electronic Keyers & Keyer Paddles

With the invention of the vacuum tube, and later the transistor, it naturally followed that clever designers would invent electronic devices to simplify the generation of Morse Code so that CW operators could send code with even less wrist motion than required to operate a bug. Hence, the electronic keyer was born.

The first commercial electronic vacuum tube keyer was the Mon-Key, sold by the Electric Eye Company of Danville, Illinois starting around 1948. The Mon-Key, like all electronic keyers, automatically produced Morse dots when the keying lever was moved to the right, and Morse dashes when the lever was moved to the left. As with all the early keyer designs, the keying ever was integrated into the keyer unit, often with the paddles protruding from the front of the cabinet. Two knobs controlled the speed of the Morse code and the volume.

Most of these early keyers were kind of clunky to operate because they didn't have the best quality keying levers, but this was not something the operator could control. In addition, the Mon-Key was actually sort of a dangerous instrument to operate, as 120V AC was present on the metal keying lever itself, so if you removed the plastic cover from the keying lever assembly, you could get a nasty shock if you accidentally touched the lever !

Towards the end of the 1950's, people were starting to design the mechanical keying mechanism and the electronic keyer separately. One of the most popular stand-alone keyers was designed by W9TO (The TO Keyer), and was mass-produced by Hallicrafters Radio Co. The mechanical mechanism became known as a Keyer Paddle. This separation allowed for the development of many interesting keyer paddle designs, which continue to this day. Some of the first keyer paddles included the El Key, the Nikey, and the famous W8FYO paddle.

There were 2 types of keyer designs, Non-Iambic and Iambic. A Non-Iambic keyer uses a paddle with a single lever, which is moved to the right or left, depending on whether the operator wants to make dots or dashes. All of the early electronic keyer designs used Non-Iambic operation.

An Iambic keyer uses a paddle with 2 levers, the right one controls dashes and the left controls dots. What gives the Iambic keyer its name is that if you squeeze the left and right paddles together, the keyer produces an alternating string of dots and dashes, which gives the Iambic keyer a huge advantage when sending Morse characters such as "C", "K", or "R". Thus, Iambic keyers are the easiest to operate since they require the smallest amount of hand movements.

Heathkit HD1410

Katsumi EK150

The Vibrokeyer. Vibroplex Co. New York, 1960-Present

Heathkit TO Valve Keyer

Brown Brothers CTL Pad dle & Straight Key Set. 1964-1974

The first Iambic keyer paddle to appear on the market was The Nikey, designed by Nicholas Lefor, W2BIQ. The Nikey was first advertised in 1962 and made by Lefor Industries of New Canaan, Connecticut.

With the invention of transistors and microprocessors, the next step in keyer design was the memory keyer. Many keyers made today have the ability to store short Morse code messages which can be re-played at the touch of a button. This is a great thing for amateur radio contest operators, who can use this feature to automatically send out repetitive messages such as callsigns and the other short exchanges of information that are sent during contests.

Today, there are some really nice keyer paddles being made by master craftsmen such as Pietro Begali, Alberto Frattini, Mike March, and others. You can see examples of their amazing work in the photos below. Many of these paddles are available for purchase, but be forewarned... quality comes at a price!

~ From the Antique Wireless Association of Southern Africa Newsletter, Issue #224, March 2025. Visit their website at https://www.awasa.org.za/.

- *Saturday morning Main SSB net: 06:30 UTC on 7.125, relayed on 10.125, 14.135 and via the Sandton and Kempton Park repeaters. (See below for VHF and Echolink options).*
- *Saturday CW net: 12:00 UTC on 7030 and 12:15 UTC on 10.115 depending on what band conditions are like.*

For the 'Main SSB net'on Saturdays, you can also use the 145.7000 repeater (-600kHz offset, located at Bryanston water tower, locator KG43aw), the 145.6625 repeater (-600kHz offset, Located in Kempton Park) or connect to our Echolink Node ZS0AWA-L or ZS6STN-R, both of which will be relayed onto HF. ZS6STN-R is compliments of Sandton Amateur Radio Club.

Transients and Spikes on Powerline Voltage:

The Silent Saboteurs of Your Electronics

by Shawn Dooley VE7BD

Shawn made a presentation to the SARC March general meeting. He is in the business of protecting systems and had some sage advice about protecting the electronic gear in your home.

I want to talk about one of my favorite things, a passion of mine: surge protection. It's something a lot of us don't think about, but it's crucial. It's kind of like you wouldn't want to drink dirty water. The same thing applies to the electricity coming into your house.

When I bought my house in 1999, a couple of things started burning out after a few years, and it really bothered me. One was a coffee maker that was fairly new, and the other was my Lutron lighting controller. So, I started taking them apart, doing some research, and found that it was due to powerline surges coming into the house. This happens everywhere, every day, to everybody.

Believe it or not, we don't see or feel these surges and electrical noise. We're going to talk about electrical noise in your house and why it's happening. A lot of it is due to electrical spikes.

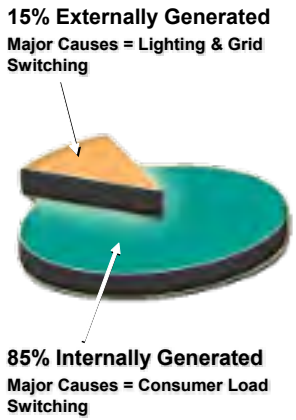
When I talk to engineers, they call it transients, not surges. It's just a technical term. Transient surges or spikes basically mean a temporary excess voltage on a system supply network. According to the Institute of Electrical and Electronics Engineers, a transient on a 120-volt line in your house can be as high as 5600 volts. That's pretty scary.

The Institute of Electrical and Electronic Engineers (IEEE) studies prove that "transients on a 120 volt power line can reach as high as 5,600 volts"

Where do transients come from? In a residential application, it's mostly from outside your house. Don't necessarily blame the power company, but it mainly comes from outside. Inside your house, transients might come from the furnace, air conditioning, or welders. After a power failure, when the power comes back on, there can be a big spike, which can be as high as 5000 volts. This can damage equipment like circuit boards on stoves, ovens, or TVs.

The typical duration of a transient spike is very short, in microseconds. It's really fast. There's a meter called the Dranetz meter that can measure spikes, but it's quite expensive.

Noise is generated inside the home from motor noise, furnace solenoids, and other sources. This noise is part of the surge problem. In an industrial environment, transients can occur up to 180,000 times per hour. I have a surge counter that measures over 400 volts, and it shows anywhere from 4 to 10 surges per week, even though you don't see or hear them.

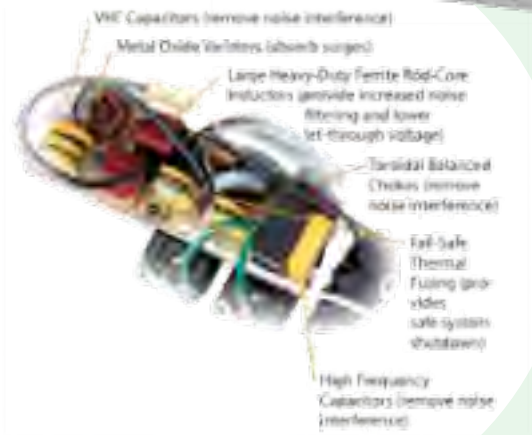


As many as 180,000 to 432,000 transients per hour occur in heavy industrial manufacturing environments

Best protection for the home is at the main panel

For home entertainment systems, the Ultralink HDC-150RM

In the shack, use EMI/RFI Filtering, as in the Tripp Lite Isobar series



Back in the 80s, when home PCs became popular, they recommended buying a surge protector. Now, electronics like TVs, PVRs, microwaves, alarm systems, and camera systems, digital power supplies generate more noise and are more susceptible to surges. DC voltage power supplies are more susceptible to surges than those with linear transformers. Linear transformers could handle surges better, but now with switch-mode power supplies, surges pass through more easily.

Cheap power bars might work 50-60 times before they stop working. UL came out with a standard called UL 1449, which requires fuses to open if there's an overload. This prevents fires. Good power bars start clamping at 330 volts, providing better protection.

MOVs (Metal Oxide Varistors) are used in surge protection. They vary in size and quality. Cheap power bars might have one or two MOVs, while good ones have multiple MOVs in parallel from neutral to ground, neutral to hot, and hot to ground. Good power bars with filtering, like the Isobar series from Tripp Lite, provide better protection. UPS systems can provide additional protection, but only for the input, not output.

How Many Joules is enough in a power bar, and what is a joule vs KA rating?

While both are used to measure surge protection capabilities, "joules" represent the amount of energy a surge protector can absorb, while "kA" (kiloamperes) indicates the maximum current a surge protector can handle during a surge, with the kA rating generally considered a more accurate measure of a surge protector's effectiveness compared to the joule rating alone; higher kA signifies better protection against high current surges.

- 400- 800 Joules is poor protection (won't last)
- 2500+ or more is best for Home protection

Ignore power bars that claim big payouts if equipment is damaged… They never get paid out!

~ Shawn Dooley VE7BD

So... What is an MOV?

An MOV, or Metal Oxide Varistor, is an essential electronic component designed to safeguard electrical devices and appliances from sudden voltage spikes and surges. These surges can originate from various sources, such as lightning strikes, power grid fluctuations, or the switching of large electrical loads. Commonly integrated into surge protectors and power strips, MOVs act as a first line of defense, ensuring that sensitive electronics remain unharmed during unexpected electrical disturbances.

At its core, an MOV is composed of zinc oxide particles pressed between two metal plates, known as electrodes. These particles are separated by an insulating material, creating a matrix of microscopic diodes. Under normal operating conditions, when the voltage remains within a safe range, the MOV exhibits high resistance. This allows electrical current to flow unimpeded through the circuit, powering connected appliances without interference. The MOV remains passive, effectively invisible to the system it protects.

However, when a voltage spike occurs, the situation changes dramatically. As the voltage across the MOV rises beyond a predetermined threshold—referred to as the clamping voltage—the component's resistance drops significantly. This sudden decrease in resistance transforms the MOV into a conductor, enabling it to divert the excess current away from the connected appliance and safely into the ground. By clamping the voltage to a safer level, the MOV prevents the surge from reaching and potentially damaging sensitive electronics. Once the voltage returns to normal, the MOV reverts to its high-resistance state, ready to respond to future surges.

The effectiveness of an MOV is defined by several key characteristics. The clamping voltage, for instance, is the specific voltage level at which the MOV begins to conduct electricity. This value is carefully selected based on the operating voltage of the devices it is meant to protect. Additionally, MOVs are rated by their energy absorption capacity, measured in joules. A higher joule rating indicates a greater ability to handle larger or more frequent surges. Another critical feature is the MOV's response time, which is exceptionally fast, typically in the nanosecond range. This rapid reaction ensures that the MOV can intercept and neutralize voltage spikes almost instantaneously.

Despite their reliability, MOVs are not without limitations. Each time an MOV absorbs a surge, it undergoes a slight degradation. Over time, after repeated exposure to voltage spikes, the component may wear out and lose its effectiveness. Many modern surge protectors include indicator lights to alert users when the MOV has reached the end of its functional life. Furthermore, MOVs can generate significant heat when absorbing large surges, which, in extreme cases, may lead to thermal runaway—a condition where the component overheats and potentially catches fire. To address this risk, surge protectors often incorporate thermal fuses that disconnect the MOV if it becomes too hot.

MOVs are widely used in various applications to protect electronic equipment. They are a fundamental component in surge protectors, which are commonly employed to shield devices like computers, televisions, and home appliances from voltage spikes. Additionally, MOVs are often integrated into the power supplies of electronic devices, providing an extra layer of protection against electrical disturbances. In essence, the MOV serves as a reliable guardian, ensuring that our valuable electronics remain safe from the unpredictable nature of electrical surges.

~

See page 59 for 'Testing MOVs'.

by Shawn Dooley VE7BD

Hamcation (aka hamfest) is the second largest ham event in North America, it takes place in Orlando, Florida, usually in February. Over 25,000 people attend this event every year…

HamCation includes all the popular products including exhibits and vendors, swaps, tailgate, and food. Three buildings have a full slate of forums will cover emergency communications, and high-tech topics like software-defined radio (SDR), remote operating, antenna design, and all the major manufacturers of ham radio equipment to see.

History

The first recorded hamfest organized by the club was held at Rock Springs on August 15, 1946. Pete Rodriquez, W4KCK, headed the affair and served up Cuban style pork.

The 60's marked a new era in hamfesting in Orlando. On April 23, 1960, the club held its first hamfest in a hotel. The site was the old Cherry Plaza Hotel at Eola Park and was billed as "An old fashioned hamfest with new ideas". Our own Elmer the Great Huddleson, W4HFR, was among the fellas responsible for that successful first.

Hamfest were held each succeeding year at Cherry Plaza until 1968, when, under the direction of Jess Price, W4CLJ, the club moved the event to the Statler Hilton on West Colonial. In the years that followed, the hamfest moved first to the Howard Johnson's Plaza, then to Exposition Hall, and then to the new Sheraton Twin Towers in 1976. We stay there till 1981 then we moved the show for 1 year in 1982 to the Central Florida Fairgrounds.

Then in 1983 HamCation was moved to the Expo Center where it called home till 1988. Then for the 1989 and 1990 shows we were at the Orange County Convention Center.

Then in 1991 we moved the show back to the Central Florida Fairgrounds where it has been since.

When we start the 2018 show we will have been at the Central Florida Fair Grounds for 28 Years.

Each year has seen a bigger and better hamfest. From the first hamfest at Rock Springs in '46, the Orlando HamCation has grown to an annual event attended by thousands from all over the World.

Highlights of the event

- Amateur Radio Operators: Whether you're a seasoned ham operator or just getting started, Hamcation has something for you. It's a great place to learn new techniques, discover new equipment, and network with other operators.
- Electronics Hobbyists: Anyone with an interest in electronics and communications technology will find Hamcation fascinating. The event showcases a wide range of gadgets, tools, and innovations that appeal to hobbyists and tinkerers.
- Educators and Students: Hamcation offers educational opportunities that can benefit teachers and students alike. The workshops and seminars provide valuable insights into the science and engineering behind radio communications.

Hamcation has lots for people to see and do, while my "YL" had no interest in in this event, she enjoyed doing other things around Orlando and the hotel we stayed at during the day. Whether you new to the hobby or just into electronics there was something there for you to see or buy. I would go again and with the nice warm weather for a February event, it made it even better.

~ Shawn VE7BD

Testing MOVs

Do varistors fail open or short?

Varistors can fail open or short, but they are more likely to fail short. When a varistor fails short, it will cause an immediate power surge and could potentially damage electronic equipment. When a varistor fails open, it will not cause an immediate power surge, but the failed component may still become very hot and could pose a fire hazard. For this reason, it is important to test MOV varistors regularly and replace them if they fail.

How do you know if a varistor is working properly?

The most common test for a varistor is the resistance test. This measures the ability of the device to resist electrical current. A good varistor will show a multimeter reading of infinity or at least more than 100 Ohms.

How do I test a MOV varistor with a multimeter?

Testing a MOV varistor with a multimeter is relatively simple. Make sure that the leads of the ohmmeter are not touching each other or anything else while you are taking the measurement.

Always test the varistor with a multimeter/ohmeter set to the highest resistance range. Next, connect the leads of the multimeter to the two terminals of the MOV varistor. Finally, observe the reading on the multimeter. If the meter displays a value other than zero, then the MOV varistor is functional and will offer some level of protection from electrical surges. Do not exceed the maximum voltage rating of the varistor when testing it. Doing so could damage the varistor and potentially cause a fire.

~

A Cheap and Light Weight HF Antenna

You cannot get much simpler than this, whether at home, POTA or SOTA

By K6STR, N7KOM and N6ARA

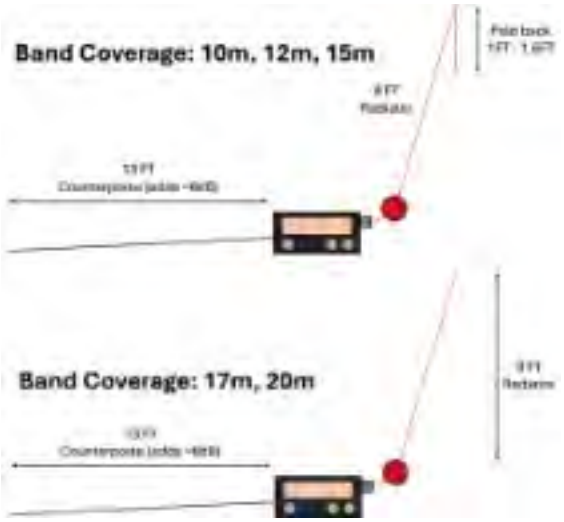


Diagram from https://n6ara.com/

Mike K6STR came up with the ultimate lightweight portable HF antenna for those times when the "real" antenna doesn't make it in the bag. He originally designed this backup antenna for his SOTA kit.

It is a loaded random wire HF antenna with 10m to 20m coverage. The connector consists of a single pin that you can plug into a BNC connector or adapter. It does require a tuner, but tunes noicely when set up in the recommended configurations. It is limited to about 20W with this gauge wire.

N6ARA markets this antenna comercially, but it is quite simple to make.

- An 8 ft (248 cm) wire with a T50-6 toroid as a loading coil and a BNC male pin at the coil end.

The T50-6 toroid has 20 turns of 26 AWG wire vwrapped throug and the remainder serves as the radiating element. The radiator is suspended vertically from a pole or from a tree with the fishing line.

- A 13 ft (396 cm) counterpoise wire with a lug or clip at the end. The counterpoise is stretched out horizontally and connected to the chassis of your transceiver.

The counterpoise is important because it adds 6db gain to the antenna. You can also make the antenna directional by laying the counterpoise in the directionm that you wish to operate.

- 10 ft (305 cm) of fishing line from suspending from a higher point if you are not using a pole.

Use a manual tuner or ATU to bring the antenna to an SWR of <2:1.

N7KOM made a video for YouTube, click on the picture to play it.

~

Satellites

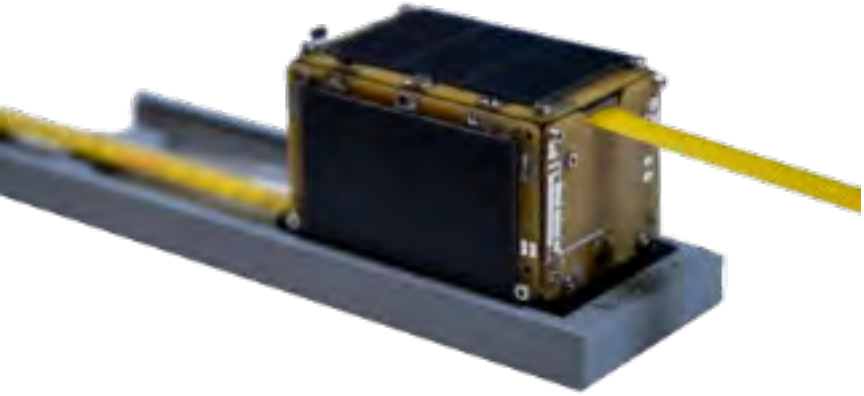
SO-124 [HADES-R]

NEWSWIRE

The launch of the SO-124 (HADES-R) ‘pocketcube’ satellite marks a significant leap forward for the amateur radio community. SO-124, also known as HADES-R (High-Altitude Data Experimental Satellite - Radio), is a next-generation CubeSat designed to cater to the needs of amateur radio operators worldwide. Developed through a collaborative effort between space agencies, Spanish universities, and amateur radio organizations.

AMSAT-EA's HADES-ICM satellite was launched on March 15, 2025 06:39 UTC aboard a SpaceX Falcon-9 vehicle, part of the company's Transporter-13 mission. The launch took place from the Vanderberg complex, located in the state of California. The satellite is integrated into the Marvelous Mathias orbital transfer vehicle (OTV) of the D-Orbit company. It became operational a few days after launch. Although measuring a mere 5 x 5 x 5 cm (1p), this satellite is equipped with advanced transponders, digital communication systems, and experimental payloads, making it attractive for both voice and data communication. The FM voice transponder of HADES-R was activated on February 19th, 2025 and HADES-R seems to have a power output of just 40mW. Compare this to the 5W of the Amateur Radio on the International Space Station. HADES-R will offer licensed radio-amateur around the world the opportunity to relay FM voice and AX.25 / APRS 300 / 1200 bps communications. The satellite will also transmit telemetry with its status, voice and CW messages. This all will be achieved through the SDR based FM and FSK repeater.

Operating in a low Earth orbit (LEO) at an altitude of approximately 600 km, SO-124 follows a polar orbit that ensures global coverage. This means hams from even the most remote regions can access the satellite during its passes, bridging gaps in traditional communication networks. The satellite features a linear transponder with an uplink frequency of 435.350 MHz (70 cm band) and a downlink frequency of 145.850 MHz (2 m band). Its 30 kHz bandwidth supports both analog modes like SSB and CW, as well as digital communication modes, making it a versatile



tool for a wide range of applications. Additionally, the transponder is inverting, meaning the uplink and downlink frequencies are inverted to reduce interference, ensuring clearer communication.

One of the standout features of SO-124 is its digital payload, which includes a store-and-forward system. This allows hams to send and receive data packets even when the satellite is not in direct line of sight, making it particularly useful for emergency communication scenarios where traditional networks may be compromised. The satellite supports popular digital modes such as APRS (Automatic Packet Reporting System) and FT8, enabling hams to experiment with cutting-edge technologies. Furthermore, HADES-R carries an experimental software-defined radio (SDR) payload, providing a platform for testing new modulation techniques and protocols. It also includes a camera for Earth observation, with images downlinked via the amateur radio bands, adding an exciting visual dimension to its capabilities.

Although the main mission for HADES-R is to be a FM repeater, there is a small empty space available, that is used to carry an experiment by Smart IR/Graphene Engineering Innovation Centre, GEIC University of Manchester (UK) consisting of a very low power active radiator to be tested on space conditions. The data for this experiment will be transmitted in a specific data packet in the telemetry. This experiment was delivered to AMSAT EA for integration and is operated by AMSAT-EA.

Powering this advanced system are solar panels and lithium-ion batteries, ensuring continuous operation during both daylight and eclipse periods. With a downlink power output of 2.5W, the satellite strikes a balance between performance and energy efficiency. For hams looking to communicate via SO-124, the required equipment includes a dual-band transceiver capable of operating on the 70 cm and 2 m bands, a directional antenna such as a Yagi or helical, and tracking software to predict the satellite's passes and adjust for Doppler shift. For digital modes, a computer with a sound card interface and software like WSJT-X or APRS is essential.

The significance of SO-124 extends beyond its technical capabilities. Its global coverage fosters inclusivity, connecting hams in underserved regions and promoting the spirit of amateur radio as a truly worldwide community. Moreover, the satellite's experimental features encourage innovation, allowing hams to push the boundaries of radio technology and contribute to the advancement of the field. The project's collaboration with educational institutions further underscores its role in inspiring the next generation of engineers, scientists, and amateur radio operators.

Whether you're a seasoned operator or a newcomer to the hobby, SO-124's creators invite you to tune in, experiment, and be part of its journey.

~ https://www.amsat.org/ans-054-amsat-news-service-weekly-bulletins/

Tracking the International Space Station with an Arduino-Based System

The International Space Station (ISS), orbiting Earth at approximately 420 km altitude and 28,000 km/h, is a marvel of human engineering visible from Earth as a fast-moving star-like object. In a fascinating project documented by Farid Rener, an Arduino-based system originally designed as an IR-controlled turret is repurposed to track and point at the ISS in real-time, offering a hands-free way to locate it in the night sky. This technical endeavor combines orbital mechanics, open-source data, and hardware hacking to create an engaging tool for space enthusiasts.

The project's core objective is to modify an IR turret, part of a HackPack kit, to automatically point at the ISS using two key angles: azimuth (compass direction) and elevation (angle above the horizon). This requires precise knowledge of the ISS's position, which is obtained using publicly available Two-Line Element (TLE) sets from CelesTrak. TLEs, updated several times daily by NORAD, encapsulate orbital parameters such as inclination, eccentricity, and mean motion. These parameters allow the calculation of the ISS's position at any given time, despite its rapid 90-minute orbital period.

To compute the ISS's real-time position, Rener employs the SGP4 algorithm, a standard model for propagating satellite orbits. SGP4 accounts for perturbations like Earth's non-spherical gravitational field, atmospheric drag, and lunar/solar gravitational influences.

Implemented via a C++ library, the algorithm processes TLE data to output the ISS's coordinates, which are then converted into azimuth and elevation relative to the observer's location. This conversion is critical, as the turret's motors must adjust dynamically to track the ISS's swift motion across the sky.

The hardware setup involves an Arduino microcontroller interfaced with a stepper motor for azimuth control and a servo for elevation. The system connects to a Wi-Fi network to fetch the latest TLE data via CelesTrak's API. Once powered on, the device aligns its stepper motor to magnetic north and begins tracking by updating motor positions every second. The result is a smoothly rotating arrow that points at the ISS, most noticeably when the station is closest to the observer, where angular changes are more pronounced.

Rener faced challenges, particularly with the Arduino's memory constraints. The initial codebase, including a C++ stringstream, exceeded the device's compiled binary size limit. Optimizing the code to fit within these constraints was a significant hurdle,

highlighting the importance of resource-efficient programming in embedded systems. Validation was performed using the ISS Detector app, ensuring the calculated azimuth and elevation matched real-world observations.

This project is highly extensible. By modifying the NORAD catalog number in the code, users can track other satellites. The open- SGP4 library and CelesTrak's accessible TLE data make it a replicable model for hobbyists. Beyond its technical merits, the system enhances the stargazing experience, allowing users to engage with the ISS without relying on smartphone apps. It's a testament to how accessible tools and open data can democratize space exploration, inspiring both learning and curiosity about our orbital environment.

The project is at: https://faridrener.com/2025/04/04/tracking-iss.html

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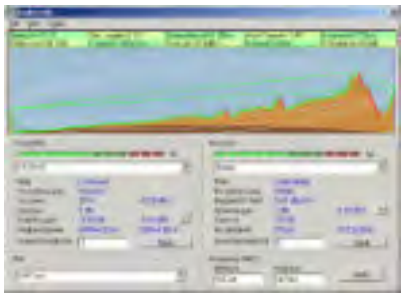
Wondering where you can be heard?

The website at scadacore.com is a powerful online tool designed for radio frequency (RF) propagation analysis, offering detailed coverage predictions for wireless communication systems. It provides terrain-aware calculations, accounting for elevation data, antenna height, and environmental factors to simulate signal strength and interference. The platform is widely used by telecom engineers, amateur radio operators, and network planners to optimize antenna placement and assess coverage in urban, rural, and remote areas.



Radio Mobile, developed by Roger Coudé VE2DBE, is a free, Windows-based RF propagation tool that integrates digital elevation models (DEM) to predict signal paths. Using the Longley-Rice irregular terrain model (ITM), it generates detailed maps showing expected signal strength, line-of-sight obstructions, and Fresnel zone clearance. Radio Mobile supports various frequency bands, making it ideal for amateur radio, emergency communications, and commercial wireless planning.

Both tools excel in visualizing propagation but differ in accessibility and features. Acadacore.com offers cloud-based convenience with real-time mapping, while Radio Mobile provides deeper customization for offline use. Together, they empower users to design efficient communication networks by accurately modeling how radio waves travel across different terrains. Check out the scadacore program and thye additional two websites for a detailed explanation https://www.ve2dbe.com/rme.html, and a video at https://www.youtube.com/watch?v=Q5eKk_7ZkUQ

~

A Reference for Coaxial Cable

Coaxial cables are designed to optimize power transfer and minimize signal loss, making them a staple in RF engineering due to their balance of power handling and efficiency. Key components of coaxial cables include a central conductor, dielectric insulator, shielding, and outer jacket, with variations impacting performance. Common types include RG-58, a lightweight, flexible cable for short-range signal transmission, ideal for radio communication and lab tests, with a signal loss of 12.3 dB/100 ft at 400 MHz. RG-400, suited for aerospace and military applications, offers lower loss (6.5 dB/100 ft at 400 MHz) and robust signal integrity. Shielding options, such as braided copper (65-95% coverage) or the less desirable aluminum foil, protect against electromagnetic interference, with material choices affecting flexibility, cost, and signal precision. SARC member Doug VA7JDJ has created a reference table to assist your selection.

Coax (RG)	MIL-C-17	Z0 (Ω)	Dielectric Type	Capacitance (pF/ft)	O.D. (in.)	dB/100 ft @400 MHz	Vmax (rms)	Shield
9913 (RG-8)		50	PE	25	0.405	2.6	600	Braid+Foil
LMR-100A		50	PE	31	0.11	14	2,200	Braid+Foil
LMR-1200		50	PE	23	1.2	0.8	8,000	Braid+Foil
LMR-195		50	PE	25	0.195	7	3,000	Braid+Foil
LMR-240		50	PE	24	0.195	6.3	3,000	Braid+Foil
LMR-300		50	PE	24	0.3	4	5,105	Braid+Foil
LMR-400		50	PE	24	0.405	2.5	8,000	Braid+Foil
LMR-500		50	PE	24	0.5	2	8,200	Braid+Foil
LMR-600		50	PE	23	0.59	1.6	8,000	Braid+Foil
LMR-900		50	PE	23	0.87	1.1	8,000	Braid+Foil
RG-10		52	PE	30	0.463	6	4,000	Braid
RG-10A		52	PE	30	0.463	6	5,000	Braid
RG-119	/52-RG119	50	ST	30	0.465	3.8	6,000	Braid
RG-120	/53-RG120	50	ST	30	0.523	3.8	6,000	Braid
RG-122	/54-RG122	50	PE	31	0.16	18	1,900	Braid
RG-141/A		50	ST	29	0.19	9	1,900	Braid
RG-142A/B	/60-RG142	50	ST	29	0.195	9	1,900	Braid
RG-165	/65-RG165	50	ST	29	0.41	5	5,000	Braid
RG-166	/65-RG166	50	ST	29	0.46	5	5,000	Braid
RG-174		50		31	0.11	14.7		Braid
RG-177	/67-RG177	50	PE	31	0.895	2.8	11,000	Braid
RG-178B/A/B	/93-RG178	50	ST	29	0.072	29	1,000	Braid
RG-178		50	PE	30	0.87	2.8	11,000	Braid
RG-211/A	/72-RG211	50	ST	29	0.73	2.2	7,000	Braid
RG-212	/73-RG212	50	PE	29	0.332	6.3	3,000	Braid
RG-213	/74-RG213	50	PE	31	0.405	5.5	5,000	Braid
RG-214	/75-RG214	50	PE	31	0.425	5.3	5,000	Dbl Braid
RG-215	/74-RG215	50	PE	31	0.463	5.5	5,000	Braid

Type (RG)	MIL-C-17	Z0 (Ω)	Dielectric Type	Capacitance (pF/ft)	O.D. (in.)	dB/100 ft @400 MHz	Vmax (rms)	Shield
RG-217	/78-RG217	50	PE	31	0.545	4.3	7,000	Braid
RG-218	/79-RG218	50	PE	31	0.87	2.5	11,000	Braid
RG-219	/79-RG219	50	PE	31	0.928	2.5	11,000	Braid
RG-223	/84-RG223	50	PE	32	0.211	8.8	1,900	Dbl Braid
RG-303	/111-RG303	50	ST	29	0.17	9	1,400	Braid
RG-304	/112-RG304	50	ST	29	0.28	6	3,000	Braid
RG-316	/113-RG316	50	ST	29	0.102	28	1,200	Braid
RG-393	/127-RG393	50	ST	29	0.39	5	5,000	Braid
RG-4		50	PE	31	0.226	11.7	1,900	Braid
RG-400	/128-RG400	50	ST	29	0.195	9.6	1,900	Braid
RG-401	/129-RG401	50	ST	29	0.25	4.6	3,000	Cu. 6-8
RG-402	/130-RG402	50	ST	29	0.141	7.6	2,500	Cu. 6-8
RG-403	/131-RG403	50	ST	29	0.116	35	4,500	Braid
RG-405	/133-RG405	50	ST	29	0.086	13	1,500	Cu. 9-8
RG-5		52.5	PE	29	0.332	7	5,000	Braid
RG-54		58	PE	26	0.245		5,000	Braid
RG-55B		53.5	PE	29	0.2	11.7	1,900	Braid
RG-58	/28-RG58	53.5	PE	29	0.195	11.7	1,900	Braid
RG-58A	/28-RG58	53	PE	31	0.195	13.2	1,900	Braid
RG-58B		53.5	PE	30	0.195	14	1,900	Braid
RG-58C	/28-RG58	50	PE	31	0.195	14	1,900	Braid
RG-5A/B		50	PE	31	0.328	6.2	3,000	Braid
RG-6		52	PE	20	0.405	8	4,000	Braid
RG-68		48		50	0.515	3.7 @1MHz	10,000	Braid
RG-8A		52	PE	30	0.405	4.8	5,000	Braid
RG-8X		50	PE	25	0.242	8	3,500	Braid
RG-9		51	PE	30	0.42	3.8	4,000	Braid
RG-9A		51	PE	30	0.42	4.1	4,000	Braid
RG-9B		50	PE	31	0.42	4.1	5,000	Braid

YADD: Maritime HF Activity Revisited

A deep dive into high-frequency maritime communications

Steve VE7SL has discovered that HF maritime activity is still alive and well, through the worldwide Digital Selective Calling (DSC) system, which has been around in one form or another since the early 90's as part of the Global Maritime Distress and Safety System (GMDSS).

In the world of amateur radio and maritime communications, high-frequency (HF) bands remain a critical medium for long-distance communication, especially in remote areas where modern satellite systems may not be accessible. Steve VE7SL's blog revisited the topic of maritime HF activity, shedding light on the enduring importance of HF communications in the maritime sector and the fascinating technical aspects behind it.

What is YADD?

Yet Another DSC Decoder (YADD), is a free Navtex decoder for a maritime mobile station, often associated with ships or vessels operating in international waters. These stations rely on HF frequencies to maintain contact with coastal stations, other ships, and sometimes even amateur radio operators. The HF bands, ranging from 3 to 30 MHz, are particularly well-suited for long-distance communication due to their ability to propagate via ionospheric reflection, allowing signals to travel thousands of kilometers. YADD and several other software decoders can be downloaded from the NDB List Info site.

The Resurgence of HF Maritime Activity

While satellite communications have largely taken over as the primary means of maritime communication, HF radio has seen a resurgence in certain contexts. Steve's blog post highlights how YADD and similar stations continue to operate on HF frequencies, particularly in regions where satellite coverage is unreliable or cost-prohibitive. This is especially true for smaller vessels, fishing boats, and ships operating in polar regions where satellite signals can be weak or nonexistent.

The post also notes that HF communications are often used as a backup system, ensuring that ships can maintain contact in emergencies

or when other systems fail. This redundancy is critical for safety at sea, where reliable communication can mean the difference between life and death.

Technical Insights

The blog post provides a detailed technical analysis of YADD maritime HF activity. Key points include:

Frequency Usage: Stations typically operate on internationally recognized maritime HF frequencies, such as those in the 4 MHz, 6 MHz, 8 MHz, 12 MHz, 16 MHz, and 22 MHz bands. These frequencies are chosen based on time of day, propagation conditions, and the distance to the intended recipient.

Propagation Characteristics: Steve's blog explains how HF signals bounce off the ionosphere, allowing them to travel beyond the horizon. This phenomenon, known as skywave propagation, is influenced by solar activity, time of day, and atmospheric conditions. The author provides examples of how signals were heard across vast distances, demonstrating the effectiveness of HF communication.

Equipment and Antennas: Maritime HF stations are equipped with robust transceivers and antennas designed to withstand the harsh marine environment. The blog discusses the types of antennas commonly used, such as whip antennas and wire antennas, and how they are optimized for HF communication.

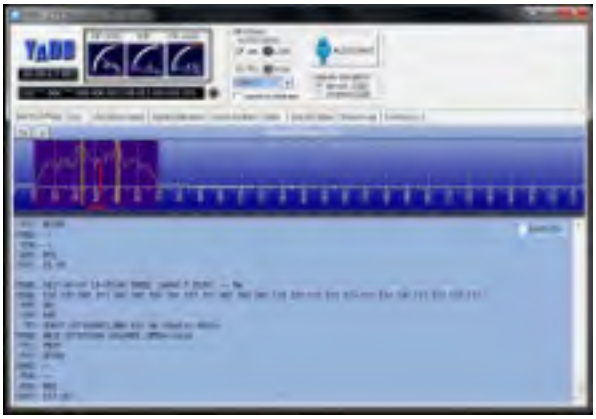
Digital Modes: In addition to traditional voice communication, maritime stations are increasingly using digital modes like FT8, PSK31, and SITOR for more efficient and reliable communication. These modes are particularly useful for sending data, such as weather updates or distress signals, with minimal bandwidth.

Listening in

For amateur radio enthusiasts, monitoring maritime HF activity can be a rewarding experience. The blog post provides tips for tuning into maritime stations, including the best times to listen and the frequencies to monitor.

The author also shares personal anecdotes of monitoring transmissions, highlighting the thrill of catching a distant maritime signal.

After downloading and installing YADD and setting audio levels correctly, YADD began decoding signals with ease.



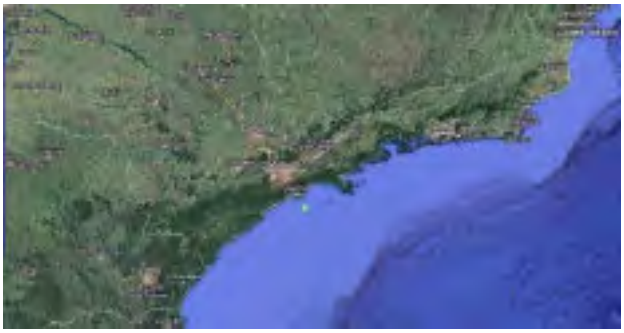
The spectrum display at the top of YADD's screen shows the audio passband coming from the receiver. With the receiver in the CW mode, DSC signals will appear on the frequency that your receiver's BFO offset frequency is set for. Steve prefers an offset of 400Hz so the spectrum display shows the signal at 400Hz, with the tuning cursor centered on a signal. A narrow CW filter should also be selected but no narrower than 170Hz.

Each vessel using the system, as well as the coastal land stations, have a unique 9-digit MMSI number (Maritime Mobile Service Identity). Once the software detects the MMSI numbers being used, it can then display the vessel's name (or the coastal's location and distance) so you know who you are listening to... it's all very slick!

After initially running his receiver for a few minutes on the 12MHz DSC channel, Steve decided to look up the location of the first two ships he had heard, using one of the Internet's marine traffic sites.

Steve was surprised to find that his first catch was a large tanker under way in Kola Bay, having just departed Murmansk, in the Russian Arctic. Vessel number two was also under way along the east coast of South Korea.

The YADD screen above is showing the large bulk carrier 'SALANDI' (3FEB9) calling Rio de Janeiro Radio (PWZ) on 16804.5KHz.



A quick position check shows the SALANDI at anchor awaiting docking in Santos, southwest of Rio.

There is an an active group of DSC maritime DXers in Groups.io DSC-List, where loggings are posted daily. The group also has several helpful files and guides that will be of interest to those getting started. The 'Files' section also contains the latest list of ship MMSI numbers so that your YADD look-up text file can be kept up-to-date.

One of the group members, GM4SLV, has set up a wonderful website called YaDDNet devoted to collecting and posting listener's decoded loggings in realtime. One of YADD's features is the ability to automatically upload decoded signals, similar to PSK Reporter. It's an easy 30-second job to configure YADD to upload your spots to the net. His site also contains the latest MMSI look-up file used by YADD which is updated in real time from the latest log postings.

The revisit of YADD maritime HF activity by VE7SL underscores the enduring relevance of HF communication in the maritime world. Despite the advancements in satellite technology, HF radio remains a vital tool for ships at sea, offering a reliable and cost-effective means of communication.

For radio enthusiasts, YADD provide a fascinating glimpse into the world of maritime communications and the technical challenges involved.

As the blog post concludes, the author encourages readers to explore the world of maritime HF activity, whether through listening, participating, or simply learning more about the technology. In an age dominated by digital communication, the humble HF radio continues to prove its worth, connecting ships and sailors across the vast expanses of the world's oceans.

~

This article summarizes original blog posts while providing additional context and insights for readers interested in maritime HF communications. For more details, you can visit the original post at VE7SL's blog https://ve7sl.blogspot.com/2024/10/yadd-maritime-hf-activity-revisited.html.

Smooth or crunchy?

I have a comment re the article from VK in the last issue about removing sticky coatings on surfaces: **PEANUT BUTTER**. Just smear a thin coat of peanut butter over the sticky patch and leave it there for about 6 to 12 hours. After the waiting period, wipe it off, and the stickiness will be all gone.

Bonus for peanut butter lovers: the object will have that nice, happy PB smell. I've used this method for years on stubborn sticky patches, and it has worked every time. I learned of it when I lived in Nova Scotia. I think it's a maritime "secret weapon".

73, Kevin VE7ZD/KN7Q

The Mystery of the Mis-keyed Callsign

In the world of amateur radio, where communication is both an art and a science, even the slightest mis-key can create a whirlwind of confusion. This was precisely the case with my callsign VE7TI.

Recently, an amateur radio operator, Leigh KM6JE, found himself puzzled by a peculiar transmission. He recounted his experience in an email to me: “Today, I worked VE7TI who also said his name was 'Tion'. Was this you”?

I replied that it was not as I had no record of such a QSO, and my name is certainly not Tion… I wondered if someone was using my callsign.

A week or so later I received another email from Leigh: “I was mystified when I first heard it on March 31 on 21.055 Mhz. It was a peculiar callsign ‘VE7TIXF’ calling CQ. The CW Skimmer software also copied and recorded it in the Reverse Beacon Network (RBN) as VE7TI. After some sleuthing, I concluded that it was another station. Among others, I looked up VE7DXF on QRZ and saw it was for a gentleman named Don in Port Hardy, BC."

As Leigh delved deeper into the mystery, he observed that the operator calling himself "Tion" was sending out a combination of signals that closely resembled VE7TI. However, the reality was much simpler yet more intricate: Don, the operator of VE7DXF, would sometimes inadvertently insert a pause in the middle of the letter D (dah-di-dit), effectively sending it as a T (dah) followed by an I (di-dit). Consequently, "Don" transformed into "Tion" over the aether and this callsign was copied as VE7TIXF.

Such mis-keyings, though rare, are not unheard of in the amateur radio community. Leigh noted, “About 5% of my CQ KM6JE CW calls end up being reported on the RBN as KM6J. Thus far, KM6J has not complained.”

Through careful sleuthing, the mystery was unraveled. What seemed like a malicious use of the callsign VE7TI was, in fact, just a matter of a few misplaced pauses. Such is the world of amateur radio, where even a dash or a dot can alter the course of a conversation.

~

By the way, we were not picking on Don, he appreciated the story and saw the humor and sleuthing involved. - Ed.

Exploring Digital QSL Cards with DigiQSL:

A modern twist for Amateur Radio

by JOHN SCHOUTEN VE7TI

In the ever-evolving digitization of amateur radio, the exchange of QSL cards has gradually moved away from the postal system. From the early players, such as eQSL, more and more options have become available. I know a lot of Amateurs have abandoned QSL cards altogether, but I still enjoy receiving a card, whether paper or digital, and I appreciate the ingenuity and art that the better ones display.

Enter DigiQSL, a digital platform revolutionizing how amateur radio operators send, receive, and manage QSL cards in the 21st century. I was amazed at how easy it was... best of all it is entirely free.

What is DigiQSL?

DigiQSL [https://digiqsl.com/] is an innovative online service designed to simplify the process of exchanging QSL cards. It allows operators to send and receive digital QSL cards seamlessly, eliminating the need for physical postage, and printing. Whether you're a seasoned operator or a newcomer to the hobby, DigiQSL offers a user-friendly solution to modernize QSL card exchanges.

How Does It Work?

The platform is straightforward and intuitive. Here's a quick overview of how it works:

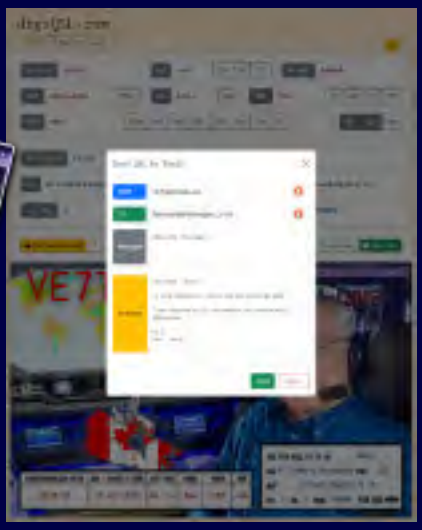
There is no account on the DigiQSL website. You can start sending and receiving digital QSL cards almost immediately.

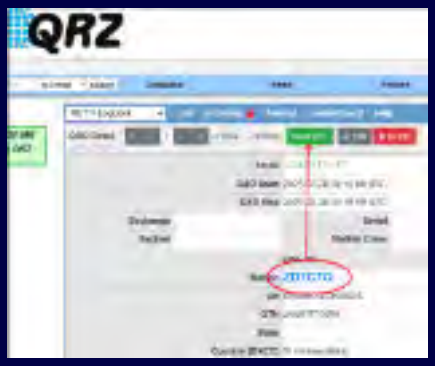
Upload your favourite photo: DigiQSL allows you to upload your .JPG, .PNG and other common formats.

Enter your station details: Fill in the blanks. The image above was the photo I used. The image below shows the fields to complete.

Select the colour of your callsign font, size it and position it on the card. Add a shadow colour to the font if you wish. You can also add a second image on the card. Mine is the Canadian map/flag graphic and you can size and place it anywhere.

With the details entered, you can manually fill in the details of the contact, But wait, this is 2025… you don't need to do this manually.





Logging options

I use different logging programs. decades ago, when I first started on HF, I kept a manual log. This was before cloud drives or web-based loggers. Months later I had a hard drive crash and I lost it all. I now use N1MM+ for my contest logging and much of my DX logging. For POTA, I use HAMRS, both as an app and on the web. As an online backup I import my standard .ADI log files to QRZ.com, and the master of them all, ARRL's LOTW. Being a belt-and-suspenders kind of guy, it's all backed op on OneDrive and my home NAS.

The big advantage of digiQSL is one-click QSL card generation and email from QRZ data. If you use a Chrome-based browser, including Microsoft Edge, you install the digiQSL extension. This places a 'Send QSL' button on the QRZ screen. From there, go to your QRZ.com log page and click on the entry that you wish to QSL. Click on the green 'Send QSL' button [*image top right*] and the card you designed is pre-filled with the contact details [*image top left*], and the destination email address is automatically entered from QRZ. I've found that, in rare instances, the addressee has not entered their email on QRZ. The card is still generated though.

A new window opens with your pre-filled QSL card and an editable window with your sender email, addressee, a pre-filled greeting and a box that allows you to optionally add a line or two to personalize the card [*center image above*]. Save or print it as you wish. Click send, and off it goes.

Advantages

- Creative: You can easily create a new card for special events or contests.
- Cost-Effective: No more spending money on postage or printing. DigiQSL is free to use, making it an affordable option for operators of all levels.
- Time-Saving: Digital QSL cards are exchanged instantly, eliminating the weeks or even months it can take for physical cards to arrive via mail.
- Global Reach: DigiQSL connects operators from around the world, making it easier to confirm contacts with distant stations.
- Integration with Logging Software: The platform supports ADIF files, ensuring compatibility with popular logging software like Ham Radio Deluxe, Log4OM, and others.
- Eco-Friendly: By going digital, you reduce paper waste and the environmental impact associated with printing and mailing physical QSL cards.

~ John VE7TI

How to Operate Pedestrian Mobile

Neither rain, snow or sleet...

by PAUL SIGNORELLI W0RW

The Copmmunicator welcomes Paul Signorelli W0RW as a new contributor to The Communicator. Paul hails from Colorado Springs, CO. He is an avid hiker practicing 'Pedestrian Mobile'… a walking mobile station. He uses a PRC319 when hiking. The antenna is a 10 foot whip attached to the backpack frame with a dragging counterpoise wire.

Paul has written a book: "Pedestrian Mobile Adventures" and the Analecta eBook is at https://www.ebay.com/itm/276796728561. The W0RW Lending Library is at: https://www.librarycat.org/lib/W0RW

It is really exciting to operate on HF while you are hiking into your favorite back country area. Operating “Pedestrian Mobile”, which I will call “ /pm”, is a very challenging and rewarding activity, especially using QRP. It is difficult to explain /pm to hams in foreign countries, so sometimes I tell them that I am operating ‘Back Pack Mobile’ or ‘Walking Mobile’. You won’t have to look for trees to support your antenna anymore; you will look for trails without trees.

Let’s start out with the options of which radio to use. You will probably want to use one you already have. You just need to configure it for trail operation. You will need to find a nice backpack (Like a military ALICE Frame Pack) or shoulder carrying bag (Bergen) that can hold your

radio with its battery, an ATU and maybe a keyer. The easier it is to get everything together in one bag, the easier it will be to use and the more you will use it. A radio that draws low power on receive is essential.

CW or SSB

QRP SSB on a short whip is a real challenge in low sun spot minimum years. Soon it will be very easy to work DX on 10 meters with low power, but 20 Watts is really the minimum needed for successful SSB/pm these days on the lower bands.

CW has great advantages (as QRP'ers know). QRP/pm is easy, but you will have to be able to copy CW in your head and start sending CW while walking. This will force you to copy words and not letter by letter.

PSK/pm and RTTY/pm works well but the duty cycle is much higher. The NUE-PSK modem can be used without a computer or keyboard for these nodes.

Good Backpacking Radios

I use the military PRC319 backpack radio. It is set up for /pm right out of the box and can transmit SSB as well as CW. It can put out 5 watts or 50 watts. But at 50 watts CW, the battery won't last long. It weighs 25 pounds, which is a bit heavy for a backpacking radio, and only operates on fixed frequencies. I have worked 217 DXCC entities with this radio on a 10 foot whip.

The PRC319 can be seen here:

https://www.eham.net/reviews/view-product?id=6314

Another one of my favorites is the Elecraft KX1-4 transceiver. This great little radio will work on 80m, 40m, 30m, and 20m. The KX2 and KX3 are even better and everything is built in. There are also hams using lots of other radios like the FT817, IC706 and the Penntek TR-35 that are popular.

St. Elmo, CO

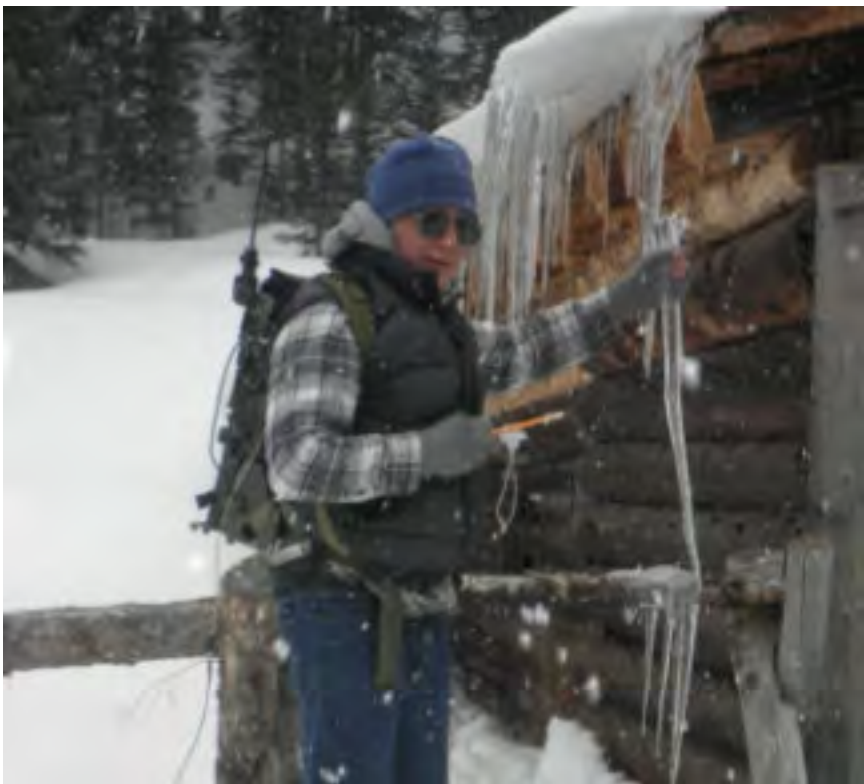
Antennas

I use a 10 foot whip with a center loading coil. The whip is attached to the back pack frame for backpack radios, or I use my shoulder sling whip mount for shoulder bag radios and hand held radios like the KX1.

See http://qrper.net/viewtopic.php?t=74

The loading coil is usually about 3 or 4 feet above my head. My loading coil is wound on a nylon Fram fuel filter. Whips longer than 10 feet are harder to hike with. The antenna will also require a counterpoise, which I call a 'drag wire'. The drag wire length should about 10% less than a quarter wave length. The drag wire should have a break-away connection, like a banana plug. On 14,000 foot mountain tops I always use a shorted quarter wave stub for a drag wire to protect the input of my radio from precipitation static. I never use a drag wire longer than 30 feet, because it gets a little too hard to handle (drag).

The simplicity of tuning with an automatic tuner is a perfect fit for /pm work. The tuning is done once and not retuned unless you walk over different terrain, like snow or salt water. The radio should be connected to the tuner with coax but the whip is connected to the tuner with only a single HV wire. The counterpoise wire goes directly to the tuner ground.



Before you take the rig out for the first time, set your rig up on a wooden step ladder and tune your antenna/drag wire with an antenna analyzer or for maximum on a field strength meter. This will make sure you are getting those few watts out into the ether, and may prevent harm to some of the simpler rigs which need to see 50 ohm impedances.

Batteries

This is a good opportunity to ditch those heavy SLA's. Newer Li-ion cells provide /pm operators with twice the energy and half the weight of a NiCad pack. I don't use Li Poly packs because they are a bit harder to handle. I use Sony hard carbon Li-ion cells. The new A123 Lithium Iron Phosphate cells are excellent too.

You will probably have to procure a new Li-ion charger too. I have been using Batteryspace.com for my Li-ion cells and chargers. BuddiePole also has LiFePo4 battery packs. NiCad's and NiMH's are still popular cells, but tend to weigh a bit more for the same amount of portable energy.

Locations

Indy Pass, CO at 12,000 feet

As they say in real estate, location is everything. The best places to operate are on mountain tops and ridges. Deep valleys are not good. I have had the opportunity to operate /pm from National Parks, Beaches, inside volcanoes, on the Colorado Trail and the on the Santa Fe Trail.These /pm locations will generally be free of power lines.

Hazards

There can be dangers to /pm, if you don't exercise a little care. Possible problems are RF burns to the hand or ear, lightning, joggers, horses, coyotes, bears, etc. I was approached by a bear once as I was working Estonia on 20 meters at midnight with my KX1.

The good news is that all kinds of interesting things can happen to you. Once while I was walking down the street at night, operating on 80 Meter CW, I noticed a house light blinking on and off. It was me! I was tripping some SCR lamp inside the nearby home.

Safety

Don't let older people get near you when you are transmitting until you make sure they don't have any implanted medical devices, like a defibrillator or pace maker.You can check your RF Safety on the RF Safety calculator at

http://arrl.org/rf-exposure-calculator

Don't operate near low power lines or during lightning storms.

See you on the trail.

~ Paul W0RW

25 Years a Ham

...and still learning

by JOHN CORBY VA3KOT

I actually got my "ticket" a little late in life. I spent many years as an SWL, then college, career and a family took priority. By the time my wife and I became empty-nesters I had combined my passion for radio and Space "the final frontier" by chasing satellites; military satellites mainly. I formed the HearSat group dedicated to monitoring Low Earth Orbiting satellites. My account of a unique method of decoding the signals from Russian navigation satellites was kindly published by Monitoring Times magazine. At the time I felt there were so many fascinating signals flying around that there was nothing of value I could contribute by adding my own. However that feeling didn't last long and eventually I bought a study guide, passed the written test and became a ham.

Now, I am into my 25th year in this great hobby. Frankly I was never satisfied with using a radio just to rag chew; I felt an urge to experiment – to contribute something useful to the science of radio communications. I didn't fully realize it at the time, but I was at the bottom of a steep hill that I am still climbing, learning with every step. As my personal lifelong learning journey progresses I am proud to share knowledge gained here at **Ham Radio Outside the Box**.

> *"In times of change, learners inherit the earth; while the learned find themselves beautifully equipped to deal with a world that no longer exists." – Eric Hoffer*

John Corby VA3KOT resides in Owen Sound, Ontario but is more often found operating CW out in the "Big Blue Sky Shack". He especially enjoys activating parks for the POTA program and blogging about his experiences at HamRadioOutsidetheBox.wordpress.com

Several weeks ago Ham Radio Outside the Box introduced a rather unique antenna idea, called the Coil-Loaded End-Fed Half Wave (CLEFHW). It is a telescopic whip that is inductively base-loaded to become an electrical half-wave. What is the purpose? To create a backpackable antenna with a very small footprint achieved by eliminating the need for a long counterpoise or system of radials. It worked very well – for a while. Then I began tinkering with it; I call it "continuous improvement" and it stopped working properly.

[Above] Coil Loaded End-Fed Half-Wave (CLEFHW)

"If it ain't broke ..."

The antenna started to experience unstable SWR. Then the great snowstorms of February 2025 arrived and I could no longer get outside to investigate. Undaunted, I set up a wire in my basement "lab" to simulate the whip and was able to adjust the antenna to get a good SWR again. All was good – until an unusual warm spell hit and I was able to get out to a local park to do a POTA activation. Suddenly, the good SWR was gone again. Abandon the activation? No, improvise and adapt! I pulled my ham-brew "Old Barebones" Z-match out of my pack and finished the activation.

Back at the shack I was determined to find out what had gone wrong. The park I had visited sits on shale stone rock just beneath the soil and is right alongside one of the Great Lakes. Previous activations at that park had given spectacularly good results.

It ain't gonna work John, give up and go have a beer

The snow still lay deep and crisp and even on my backyard but I managed to shovel my raised wooden deck clear and continue the investigation. That was the start of a very frustrating series of antenna trials. It can be tempting at times to quit – "it ain't gonna work John, give up and go have a beer". But, I remembered my college physics training: experiment – document the results – change one thing at a time – document the new results – make further changes as required and repeat until success is achieved.

The most important part of that process is to document the results at each and every step. I keep a small spiral bound notebook and a pencil nearby while I tinker in my basement lab. That makes it easier to review what went wrong and when. Yes, it's tedious to put down the soldering iron and pick up the pencil, but it does make a big difference in the end.

So what was learned? It seemed a fair assumption that an 18.5ft whip, replaced with an 18.5ft wire would perform pretty much the same. But oh, no John, no John, no! There was another parameter involved that hadn't been considered. The lab experiment with the wire took place in the nice, warm environment of my basement replete with space heater and a constant supply of hot beverages. But the basement lies 6 feet below grade – could that be an issue?

The carefully adjusted antenna with the 1.2:1 SWR was then carried up, up and away to the deck, out into the cruel Big Blue Sky Shack where the temperature was hovering around freezing. The 18.5ft wire was replaced with the telescopic stainless steel whip which, with all 13 sections extended, was also 18.5ft long. I confidently powered up my rig and set the mighty micro QMX to monitor SWR. "Should be pretty close to the same SWR I got in the basement" methought. But then disappointment haunted all my dreams. The lilliputian radio gave me the bad news: SWR 2.6:1.

A bit of a stretch

Previous learning experiences had taught that any physically short antenna that is artificially extended to it's electrical full length by means of a loading coil tends to exhibit a very high Q. The CLEFHW uses a base loading coil to extend

its physical length of 18.5 feet to an electrical length of approximately 33 feet which is a half wavelength on 20m. If the inductance of the loading coil isn't right in the bullseye of the required value, the electrical characteristics can be subject to unexpected change.

But perhaps the unexpectedly high SWR out on the deck was influenced by another factor. Yes, the basement lab is 6 feet down below ground while the deck is 2 feet above the ground. How to compensate for this? Is the CLEFHW going to need a custom coil for each and every deployment? Maybe it will, but there is a solution that we will get to in a moment.

> *"If you want to find the secrets of the universe, think in terms of energy, frequency and vibration."*
>
> *— Nikola Tesla*

SWR on the deck 2 feet above ground

Back in the lab the loading coil was rewound with nearly enough inductance to earn a place in Nikola Tesla's lab.

The idea was that turns could be removed until the SWR settled down to an acceptable level. The target was less than 1.5:1. It worked! The SWR out on the deck came down to 1.10:1.

Just a cotton pickin' minute Einstein...

The victory dance had to be put on hold as another doubt surfaced. The SWR measured out on the shale stone ground in the park was different to the SWR measured on the hardwood over concrete floor of the basement lab. The SWR out on the deck had been different again. A pause and a little stroking of the chin while the old gray matter overheated with intense thought. This deck, said the voices inside my head, is 2 feet above the ground. Do we have another variable to throw into the equation here?

The base of the antenna is at the top of the backpack frame and when the pack sits on the ground, as intended during outdoor operating sessions, it is only about a foot and half above the ground. The antenna is an almost vertical shortened End-Fed Half-Wave (it is sloped to give it some directionality). So is proximity to ground another factor to consider?

The whole backpack rig, antenna and all, was beamed over to an area of grass just beyond the deck. Here we go again, with everything exactly as it was up on the deck, the SWR grew legs and climbed up over 2:1 again.

The Ultimate Lossless Tuner?

SWR with backpack rig on the ground

[Below] Taps on the coil

The simple solution would have been to pull out "Old Barebones" (Z-match) again and bring those pesky standing waves under control. But I had another cunning plan. By leaving some extra turns on the coil I could increase the inductance beyond what is required to load the whip and use the whip itself to adjust the SWR.

Whip adjustment with backpack rig on the ground

Brilliant! It worked. The final iteration of the coil (nothing is ever really final) involves three taps near the top of the coil to leave some inductive flexibility to accommodate persnickety ground conditions. An SWR of 1.09:1 was obtained with the pack out on the grass. But, it was necessary to collapse two sections of the whip to get there. Interestingly, adjusting the whip length retunes the antenna without introducing any further loss; it simply restores the electrical length of the loaded whip to a half-wave.

So now, once again, the Ham Radio Outside the Box Coil-Loaded End-Fed Half-Wave antenna is ready for action. Lessons learned. Oh, and – *Note to Self* – move onto another project John – don't tinker with things that work already!

~ John VA3KOT

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Where is The Communicator read?

Weak-Signal Performance of Common Modulation Formats

by BOB WITTE KØNR

Bob Witte K0NR maintains a great blog site, and offers a book at https://www.k0nr.com/wordpress/

At first, I was just looking around on the web for some simple Rules of Thumb that compare the weak-signal performance of commonly used analog and digital modulation types. I was mostly focused on FT8 and FT4 but I also wanted to compare SSB and CW. I failed to find a simple comparison of these modes but I did find a number of good articles that compared some but not all of them. This article is my attempt to aggregate the available information into something easy to understand.

Disclaimers

I decided to leverage the work of others and to not try deriving everything from basic principles. I am telling myself that I am perfectly capable of doing the analysis but that I would never find the time to actually complete it. (Yeah, that's my story, and I'm sticking to it.) Where the articles disagree, I tried to identify which one(s) had the most convincing analysis or rationale and used those values.

My goal is to compare common modulation types primarily in terms of weak-signal performance. This means focusing on how well a signal can be detected with low signal-to-noise ratio (SNR). I have ignored other factors, such as signal fading, frequency drift, multipath distortion, etc. Also ignored are factors such as

the information rate provided by the modulation type and the required signal bandwidth. This is focused on having the ability to pass just enough info to make the contact.

Literature Survey

Searching the internet provided me with a number of good articles that have examined this topic, listed below in the References section. My approach is to compare the results of these articles and aggregate them into a concise summary. These minimum SNR values are listed in the table shown below, along with my aggregated conclusions in the righthand column.

Most of these articles presented SNR data in terms of a 2500 Hz bandwidth, with the goal of providing an easy comparison between modulation types. SSB is the widest signal discussed, and it roughly fits into a 2500 Hz bandwidth, which is often the IF bandwidth of the receiver being used. Some authors make this explicit by tagging this SNR as SNR2500. It is common practice in communications work to normalize the bandwidth to 1 Hz, which indicates the modulation's bandwidth efficiency. However, we'll stick with SNR2500.

II started with the article by PA3FWM [Ref 1], which provides a look at many of the modes I was interested in comparing. Unfortunately, this article does not include FT4 and FT8. N6MW [Ref 2] has a good treatment of FT4 and FT8 as well as minimum SNR values for SSB and CW. These lined up well with the PA3FWM values, so that was a good sign. N6MW referenced the foundational article about FT4 and FT8, published in QEX, written by the FT4 and FT8 developers [Ref 3]. The KB9II article [Ref 4] focuses on VHF weak-signal performance and provides minimum SNRs for SSB, RTTY, CW, and PSK31. He introduces the concepts of SNR (average) and SNR (peak). I used the SNR (average) numbers in the table. The KF6HI [Ref 5] article provided another set of SNR values that lined up pretty well. Finally, I came across a presentation by K0LB and KK4SNO [Ref 6] that includes a slide summarizing SNR performance. Because it is slideware, it does not include much about the sources of their numbers, but it seems useful to include them in the table.

	PA3FWM	N6MW	KB9II	KF6HI	K0LB-KK4SNO	Aggregated (K0NR)
SSB	10	10	6	6	10	6
RTTY	-9		-9	-9		-9
PSK31	-10		-12	-9		-9
CW	-12	-12	-15	-5	-15	-12
FT4		-17.4				-17
FT8		-20.8		-20	-21	-21
JT65	-24			-24	-25	-24
WSPR	-27			-32	-31	-28

Table: A compilation of minimum SNR2500 levels in dB for various modes.

The authors have somewhat different approaches to determining their SNR2500 numbers, mostly related to the assumptions used. You may want to read through these papers to gain a better understanding of the fine points. Overall, there is good alignment on results, with a few exceptions.

SSB

The single-sideband SNR2500 values are a mix of 10 dB and 6 dB. Frankly, I think 10 dB is a bit high for "minimum SNR" because I've spent quite a bit of time making weak-signal VHF/UHF contacts with the signal right at the noise level. I've squeezed out radio contacts with SNR much less than 10 dB. I looked at the rationale supplied in the articles for this value and it is mostly just assumed. So I went with my own experience and chose something smaller, 6 dB, aligning with KB9II and KF6HI. Even this number might be a bit conservative.

RTTY

I found only four values for RTTY, and they vary quite a bit. After studying the articles, I judged KB9II to have the best justification, so I went with -9 dB. I suspect that the actual decode performance may vary depending on the type and quality of the detector.

CW

The SNR2500 numbers for CW varied significantly, over a range of 10 dB. One way to estimate CW performance is to use the bandwidth of the receiver and compare it to 2500 Hz. Using a typical CW filter bandwidth of 200 Hz, SNR2500 = 10 log (200/2500) = -11.0 dB. However, it is well-known that the human ear/brain combination provides additional signal processing. The classic article by W2RS [Ref 7] covers this topic quite well. Using actual on-the-air tests, the article explains that the skill of the operator can introduce a variation of 3 to 6 dB. Another interesting note is that if the operator knows in advance the type of information they are expecting (such as the callsign of the other station), it provides a 3-dB advantage.

We can and probably will debate the SNR2500 value for CW until the cows come home, but I decided to adopt -12 dB in the right-hand column. This is probably conservative for a highly skilled operator.

FT8, FT4

For FT8 and FT4, I used the N6MW values, which come directly from the FT4 and FT8 paper [Ref 3]. I rounded off to the nearest decibel to be consistent with the rest of the column.

JT65

The JT65 values are quite consistent. An article by K1JT [Ref 8] says JT65 SNR is "roughly -28 to -24 dB in 2500 Hz," so I put -24 dB in the righthand column.

WSPR

WSPR is a popular beacon mode and the king of weak-signal reception. Signal reports are collected worldwide and shared via WSPRnet.org. WSPR performance will vary depending on the specific settings used on the software and we have some variation in the table. The K1JT & W1BW article [Ref 9] says, "The WSPR protocol is effective at signal-to-noise ratios as low as –28 dB in a 2500 Hz bandwidth, some 10 to 15 dB below the threshold of audibility." So I used -28 dB in the aggregated column.

Conclusions

The rightmost column in the table provides a reasonable comparison of the listed modulation types. I don't claim that the values are perfect, but they should be helpful in understanding the performance of these modes. These data show that SSB is the least sensitive mode, followed by RTTY and PSK31. As mentioned earlier, the CW number is open to debate but it performs better than RTTY and PSK31. This brings us to FT4 and FT8, which are commonly used WSJT protocols with reasonable throughput. (FT4 and FT8 using 7.5 and 15-second transmit/receive intervals.) JT65 operates at lower SNR, but it is really in a different category, It is designed for Earth-Moon-Earth contacts, using one-minute intervals. WSPR is also unique as a beaconing system and not designed for two-way radio contacts, but it does have the best SNR performance on the list.

When using this data, keep in mind that most of these modes degrade slowly so there may not be a sharp cutoff at an exact signal level. The values are Rules of Thumb, accurate to within a few dB.

Thanks to Jim/K5ND and Bob/WØBV for reviewing this article and providing feedback.

~ 73 Bob K0NR

References

1. Signal/noise ratio of digital amateur modes – Pieter-Tjerk de Boer, PA3FWM
2. FT8 Modulation and Decoding – A Dive into SNR interpretation N6MW
3. The FT4 and FT8 Communication Protocols – Steve Franke, K9AN- Bill Somerville, G4WJS – Joe Taylor, K1JT
4. A Comparison of Common Digital Modes for Weak Signal VHF Communications – John Matz, KB9II
5. Signal to Noise Ratio, definition and application to Radio Communications – KF6HI
6. Digital Modes in Amateur Radio – Larry, K0LB and Scott, KK4SNO
7. The Weak-Signal Capability of the Human Ear – Ray Soifer, W2RS
8. EME with JT65 – Joe Taylor, K1JT
9. WSPRing Around the World – Joe Taylor, K1JT, and Bruce Walker, W1BW

Zero Retries

An Introduction to the IP400 Network Project

by STEVE STROH N8GNJ

Steve Stroh N8GNJ is the Editor of the Zero Retries newsletter (https://www.zeroretries.org) which promotes technological innovation that is occurring in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. When not writing Zero Retries, Steve experiments with Amateur Radio data radio systems in N8GNJ Labs (his shop) in Bellingham, WA, and planning for the first Zero Retries Digital Conference in Everett, WA in September, 2025.

Starting this issue, The Communicator welcomes Steve N8GNJ as a columnist. I have been a reader of his blog for some time and I think that you will find his topics interesting and on the cutting edge of Amateur Radio. - Ed.

The goal of the IP400 Network Project is to develop a next-generation data communications system by Amateur Radio for Amateur Radio. Features include higher speeds (minimum 100 kbps), robust modulation (eventually OFDM) and forward error correction, automatic discovery and routing to form peer to peer mesh networks, and ability to transport widely varying data types, from short text messages, through digital voice and video, including AX.25 and TCP/IP. IP400 will offer an adapter (Supernode) for repeaters to allow them to interoperate with IP400 user nodes. An initial IP400 radio is expected to be available in mid 2025. IP400 is in very active development and is sponsored by the Alberta Digital Radio Communications Society. More information about IP400 is available at https://adrcs.org/adrcs/ip400-network-project/.

The IP400 Network Project is a collaboration by Martin Alcock VE6VH and Steve Stroh N8GNJ. All of the development is being done by VE6VH in Calgary AB. N8GNJ is based in Bellingham, WA and is assisting Martin with feedback during development, and promoting IP400 via his newsletter Zero Retries.

IP400 arose from the confluence of several trends:

- A new type of Amateur Radio Operator coming into Amateur Radio (generally more technical - example, software developers) that prefer data, VHF / UHF, open source development models, etc.

- Many, perhaps most repeaters have become increasingly quiet (unused).
- Ongoing potential threats to Amateur Radio VHF / UHF spectrum (the old use it or lose it imperative).
- An increase in use of data modes, but using simplex connections, few networks, just simple hubs, like Winlink Radio Message Servers.
- Using data modes on simplex or digipeaters, is unreliable and frustrating.

I began exploring how this situation could be addressed in a series of thought experiments in my newsletter Zero Retries (https://www.zeroretries.org/p/zero-retries-0182). I called my idea SuperPeater, and it caught the notice of Martin Alcock VE6VH who had also been working on a project to develop more sophisticated capabilities for repeaters.

Both of us were familiar with Amateur Radio microwave networks using AREDN (https://www.arednmesh.org/). AREDN is highly capable - high speed, native TCP/IP networking, etc. but really only usable in topographies with easy access to high profile sites for relay nodes, and sparse foliage, such as Southern California. We agreed that "AREDN in 420-450 MHz" would be an ideal system.

The concepts for IP400 emerged after I pointed out to Martin in our discussions that my concept of a SuperPeater was partially a stopgap for being data users being able to use whatever existing data capabilities they had. In the SuperPeater concept, multiple inputs on different bands allows different data speeds and types to uplink to the SuperPeater. The output of the Superpeater is a single high speed data stream. SuperPeater users could receive this high speed data stream, on 222 MHz for example, by using an inexpensive, but capable Software Defined Receiver such as an RTL-SDR, paired with a Raspberry Pi. Thus users of different data types could all participate in the same network via a SuperPeater.

But, I observed, it would be better for users if an "advanced data" radio could be created that did the entire job as one unit.

Martin described his work with several data radio chipsets that were designed for "Internet of Radio Things" usage such as telemetry from utility infrastructure. These radio chipsets included variants that operated within the Amateur Radio 430-450 MHz band. With this background, when I described my ideal "black box" user data radio (no front panel, just data in / radio out), Martin said that my idea was feasible using the chipsets that he was working with. Thus the IP400 (Intelligent Protocol on 400 MHz) Network Project was born.

Some features of IP400:

- Higher data speed than most Amateur Radio data systems - 100 kbps minimum.
- Auto discovery / automatic routing mesh networking.
- Simple, lightweight protocol that would provide backwards compatibility with encapsulation. For example, transporting AX.25 packets through an IP400 network.
- Push as much functionality as possible into a dedicated Raspberry Pi computer to allow the use of already developed networking, protocols, etc.

The immediate goal of IP400 is to release assembled and tested IP400 radios in Summer 2025 that consist of a Raspberry Pi Zero paired with an IP400 Radio board (HAT - Hardware Attached on Top). These first IP400 radios will be allocated to developers, experimenters, and testers. Volume production of IP400 radios will commence after a reasonable testing period.

Rendering of the a prototype IP400 HAT board. Note that the metal shield on the right side next to the antenna connector is the radio.

A viable community development team has begun to assemble via the IP400 email list (https://groups.io/g/ip400) and the IP400 Github repo (https://github.com/adrcs/ip400). IP400 software version 1.0, running on development boards with the same radio chipset that the IP400 HAT will use, has been released for testing and further development.

Longer term, the IP400 development plan includes:

- Requesting a grant from Amateur Radio Digital Communications (ARDC) to fund focused attention and advanced radio development skillsets.
- An IP400 unit that can be remoted onto a tower or pole, using 12 volts over Ethernet for power.
- An IP400 adapter for repeaters (Supernode) that will considerably enhance a repeater's capabilities, including telemetry, repeater to repeater linking via RF (instead of cellular Internet), and digital voice (and other modes) using Multimode Digital Voice Modem (MMDVM) software.
- A version of the IP400 radio with an integral (or closely coupled) power amplifier that will provide up to 35 watts transmit power on 430-450 MHz.
- A more advanced IP400 unit that will incorporate Orthogonal Frequency Division Multiplexing (OFDM) capability for higher speeds.
- A more advanced IP400 unit that will incorporate Software Defined Radio techniques (I+Q input and output).

One significant factor that we think improves the potential for success with the IP400 Network project is that Martin's earlier work is already supported as a project of the Alberta Digital Radio Communications Society - ADRCS (https://adrcs.org/adrcs/). We don't have to create a new organization to support and promote IP400.

Another significant success factor is that Martin is a retired engineer with Wi-LAN, a pioneering company in the wireless industry that developed Broadband Data Radio systems. In fact, Martin and I bonded over him having worked at Wi-LAN and my having interviewed and written about Wi-LAN in the 2000s in my former career writing about Broadband Wireless Internet Access technology and service providers. During my interview, Wi-LAN's president casually mentioned that OFDM had been developed two decades earlier, but to make use of OFDM required that each OFDM radio would have needed its own (very large) VAX minicomputer.

For the remainder of 2025, Martin will be busy developing IP400 software and hardware and managing community development work. I will be busy supporting Martin's work, promoting IP400 at Hamvention 2025 in Xenia, OH in May and Pacificon 2025 in San Ramon, CA in October.

The IP400 Network Project will be prominently discussed with working demonstrations at the first Zero Retries Digital Conference in Everett, WA on September 13th (https://www.zeroretries.org/p/conference).

In my "spare" time, concurrent with the release of the first IP400 hardware, I will attempt to submit either a Special Temporary Authority (STA) or Part 5 Experimental License to the US FCC to permit full speed testing and development of IP400 units. The US Amateur Radio regulations (Part 97) currently limit data modes in the US 420-450 MHz band to a maximum of 56,000 symbols per second and a maximum bandwidth of 100 kHz. Of course, those aren't relevant issues in Canada or Europe.

If you'd like to help develop IP400 or just follow along on its progress please join the IP400 email list - https://groups.io/g/ip400. I will also be reporting regularly on IP400 development in Zero Retries.

If you'd like to help support the development of IP400, please consider joining ADRCS as a member - https://adrcs.org/adrcs/31-2/ and select Join/Renew my membership.

To summarize, Martin and I feel that IP400 is the ***Packet Radio Revolution of the 21st Century***, and we look forward to releasing the initial hardware and for others to start using it and helping us to develop it further.

~ Steve N8GNJ
steve@zeroretries.net

KB6NU'S HAM RADIO

Buttons Are Back, Baby!

by DAN ROMANCHIK KB6NU

Dan Romanchik KB6NU blogs about amateur radio at KB6NU.com when he's not trying to figure out which way current flows. Dan teaches ham radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him at cwgeek@kb6nu.com

Several years ago, I got a good deal on a Flex 6400 and thought I'd give it a try. It's a great radio, and I enjoyed using it, but after a couple of years, I decided to give it up and buy an Icom IC-7610 instead. The main reason was the user interface—the IC-7610 has real knobs and buttons instead of just a computer screen to control its functions. Maybe I'm just being old school (I am certainly getting old), but I prefer real knobs and buttons, even if those knobs and buttons are just providing digital inputs to the processor controlling the radio.

Recently, I've run across a couple of articles that back me up on this. The first, "Touchscreens are out, and tactile controls are back," is an interview in IEEE Spectrum with Rachel Plotnick, an associate professor of cinema and media studies at Indiana University in Bloomington, and a leading expert on buttons and how people interact with them.

She says that while touchscreens are a useful interface, people are becoming somewhat fatigued by the use of them. "People seem to have a hunger for physical buttons," she says, "both because you don't always have to look at them—you can feel your way around for them when you don't want to directly pay attention to them—but also because they offer a greater range of tactility and feedback."

She also said something else I found interesting. "Buttons tend to offer you a really limited range of possibilities in terms of what you can do. Maybe that simplicity of limiting our field of choices offers more safety in certain situations."

ICOM IC-7610 transceiver. On my IC-7610, the RIT controls are conveniently located in the lower right-hand corner.

I might say that it also makes the user interface more straightforward and easy to understand and use. Take the receiver incremental tuning (RIT) control, for example. I use this control frequently on my IC-7610, I press a button to turn it on and a knob to set the offset. On the Flex, however, using the SmartSDR software, I'd have to go to the X/RIT menu, click on the RIT button on the screen, then set the offset by clicking right or left arrows or by typing in a text box. It's just not as simple to do as on the IC-7610, so I found myself using that control less often.

The second article is "Subaru is bringing back physical knobs and buttons in its cars." The article begins, "To the relief of practically anybody who drives a car regularly, Japanese carmaker Subaru has brought back physical buttons and knobs for its 2026 Outback midsize SUV. It's yet another sign that carmakers are finally starting to listen, ditching massive touchscreens that have taken over a vast number of vehicle controls in favor of tactile buttons, switches, and knobs."

Of course, touchscreens are the appropriate choice for many transceiver functions. The IC-7610 touch screen not only displays the waterfall, but also lets you select a signal by touching it on the screen. That works great for me.

The lesson to be learned here is that a good user interface can help increase sales. These days, almost all of the radios from the major manufacturers are so good that the average ham can't really detect a difference in performance. That leaves the user interface as one of the differentiating features, and you'd think that a more usable user interface would sell more radios. And, it appears that physical, tactile buttons and knobs are going to be a part of that user interface.

~ Dan KB6NU

Videos: Single sideband and a HAMNET update

Introduction to SSB

This is an Air Traffic Command instructional video describing the theory behind single side band (SSB) modulation. Dig that jazzy intro music!

HAMNet Update

HAMNET (Highspeed Amateur radio Multimedia NETwork) is a fully-independent amateur radio wireless network that provides data services. It's a wireless internet, so to speak. It covers many regions in Europe and is even now growing fast beyond its European border. Hamnet is using international coordinated IP-address space of the AMPRNet (44.0.0.0/8) and Autonomous System (AS) numbers out of the 16-bit and 32-bit private AS number space to interconnect active regions by external Border Gateway Protocol (BGP) routing.

Right is a link to a video update on HAMNET, given at the recent FOSDEM conference.

~ Dan KB6NU

Would you like to create a custom bandplan?

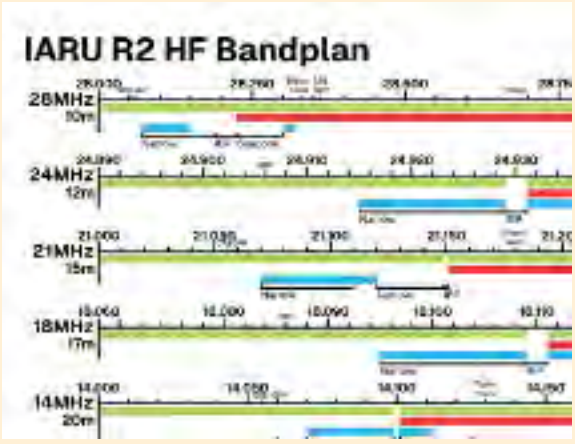
Try Bandplan Generator!

https://bandplan.ham.guide/

Here are a few tips to get you started

- You can customize the bandplan to your liking, IARU R2 is just an example
- Your progress is saved automatically
- Add or remove bands in the sidebar
- You can adjust the CW/PHONE/DIGI segments, add Range and Point markers
- IBP means International Beacon Project
- Click "Copy link" to share your bandplan with others

If you have any feedback, reach out to ly1ja@vurk.lt



Foundations of Amateur Radio

What is the difference between a Dummy Load and an Antenna?

by ONNO BENSCHOP VK6FLAB

Onno Benschop VK6FLAB

To listen to the podcast, visit the website: http://podcasts.vk6flab.com/. You can also use your podcast tool of choice and search for my callsign, VK6FLAB.

Full instructions on how to listen are here: https://podcasts.vk6flab.com/about/help

Recently I started an experiment I plan to run for a year. Using a WSPR beacon and a dummy load I'm transmitting 200 mW, 24 hours a day across all bands supported by my hardware, in this case it covers 80m, 40m, 30m, 20m, 17m, 15m, 12m, and 10m. The aim of the experiment is to determine if, and to what extent my dummy load can be heard outside my shack. Why? Because I've not seen anyone do this and because a dummy load is widely believed to not radiate, despite evidence to the contrary.

Together with the transmission side, I've also configured an RTL-SDR dongle, initially with the telescopic antenna it came with, now, since my HF antenna isn't being used by the beacon, I'm using it instead. It's about five metres away from the beacon, outside. It's a helically wound whip resonant on the 40m band built by Walter VK6BCP (SK). It's what I've been using as my main antenna for the past seven years or so.

While I'm telling you this, my beacon has been heard by my dongle 1,182 times across all eight bands. Some of those reports were from inside the shack, some from outside, some while I was monitoring a single band, and for the past week or so, I've been monitoring all the bands supported by "rtlsdr_wsprd", 18 in all. Purposefully, this includes some bands that I'm not transmitting on, because who knows what kinds of harmonics I might discover? The receiver changes band every half hour, so over time when I monitor a band will shift across the day, this is deliberate. I don't know when a stray transmission might suddenly appear and this will give me the best chance of hearing it, short of using 18 different receivers.

At this time, my beacon hasn't been heard by any other station. I'm not expecting it to, but that's why I'm doing this experiment in the first place.

I'm not in any way reaching any sense of "DX on a dummy load", but it got me thinking. My beacon can be heard, albeit by me, from five meters away. So it's radiating to some extent. I've already discussed that this might come from the patch lead between the beacon and the dummy load, or it could be the dummy load itself, or some other aspect of the testing configuration. Regardless of the situation, there is a signal coming from my beacon that's wirelessly being heard by a receiver.

That's the same as what you'd hope to achieve with any antenna.

So, in what way are an antenna and a dummy load different, and in what way are they the same?

Whenever someone asks this, the stock answer is that an antenna radiates and a dummy load doesn't. My experiment, 20 days in, has already proven that this distinction is incomplete, if not outright wrong.

Even so, if we take it on face value, and we say, for argument's sake, that a dummy load doesn't radiate and an antenna does, then how do we materially distinguish between the two? How does an antenna compare to a dipole, Yagi or vertical antenna and where does the isotropic radiator fit in this?

The best I've come up with so far is a spectrum line comparing the various elements. Let's say that at one end of the spectrum is a dummy load, at the other is an isotropic radiator, to refresh your memory, that's the ideal radiator, it radiates all RF energy in all directions equally.

Somewhere between the two ends is a dipole. We might argue if the dipole sits equally between a dummy load and an isotropic radiator, but where does a Yagi or a vertical fit in relation to the dipole?

Also, if you turn a Yagi in the other direction, does it change place?

So, perfect this notion is not, but here's my question.

What's the measurement along the axis between the dummy load and the isotropic radiator? It's not SWR, since the ideal antenna and a dummy load share the same SWR, unless this line is a circle that I don't know about. It might be Total Radiated Power expressed in Watts, but that seems counter intuitive. It would mean that in order to determine the effectiveness of an antenna we'd need to set-up in an anechoic chamber, basically a warehouse sized room where incoming radiation is shielded to some predetermined standard.

Do we measure gain using a VNA and call it a day, or is there something else going on? Remember, we're attempting to quantify the difference between a dummy load and an antenna.

All podcast transcripts are collated and edited in an annual volume which you can find by searching for my callsign on your local Amazon store, or visit my author page: http://amazon.com/author/owh. Volume 7 is out now.

Feel free to get in touch directly via email: cq@vk6flab.com, follow on twitter: @vk6flab or check the website for more: http://vk6flab.com/

If you'd like to join a weekly net for new and returning amateurs, check out the details at http://ftroop.vk6flab.com/, the net runs every week on Saturday, from 00:00 to 01:00 UTC on Echolink, IRLP, AllStar Link, IRN and 2m/70cm FM via various repeaters.

If you'd like to participate in discussion about the podcast or about amateur radio, you can visit the Facebook group: https://www.facebook.com/groups/foundations.itmaze

This podcast episode was produced by Onno (VK6FLAB). You can find more at http://vk6flab.com/

In case you're wondering, I'm asking the question.

In the 15 years I've been part of this community, I've never seen any coherent response. The Internet seems to return a variation on the radiation vs. not-radiation pattern, but so far I've not seen anyone quantify this, or perhaps I haven't understood it while it was staring me in the face. I even checked the syllabus for the three license classes in Australia. The single reference that the regulator appears to specify is that at the introductory level you are required to, wait for it, recall that when testing a transmitter, a non-radiating load, or dummy load, is commonly used to prevent a signal from being radiated.

Very illuminating. Obviously my dummy load is of the wrong type, the radiating variety. Which begs the question, if there's an ideal radiator, is there a theoretical ideal dummy load that doesn't radiate in any way, and if so, how far away on this line is it from my actual dummy load?

Over to you. What are your thoughts on this? Better yet, got any references?

~ I'm Onno VK6FLAB

WoAD what is it?

At our February meeting we had a presentation by Andrew VA7YAA about his Android application WoAD. It was created to extend the capabilities of the Winlink Global Radio Email system to Android devices. It is important to note that a valid amateur radio license, or a license from a participating government service or agency, is required to use WoAD. The app acts as a client for the Winlink system, facilitating both standard email and peer-to-peer connections over the internet or via over-the-air protocols.

WoAD supports a wide range of protocols and interfaces, including Telnet, Packet, and Audio. For audio communication, it is compatible with devices like Digirig and SignaLink, offering PTT control through USB RTS, CM108 GPIO, or tone. The app handles various AFSK speeds (1200 bps and 300 bps), FSK 9600 bps, and KISS protocols.

It also supports Bluetooth connections, including devices such as Mobilinkd, and TCP/IP connections, like those used by Dire Wolf.

Furthermore, WoAD offers USB connectivity for devices like the Kenwood TH-D72/74 and Kenwood TM-D710, along with Bluetooth Low Energy (BLE) support. The app is compatible with ARDOP and VARA HF/FM via TCP/IP, enhancing its versatility in different communication scenarios.

WoAD aims to provide a comprehensive solution for amateur radio operators to utilize the Winlink system on their Android devices, ensuring they can stay connected and communicate effectively.

For more, check out the website at:

https://woad.sumusltd.com/ or the video at:

https://www.youtube.com/watch?v=dx_nVY1jwh4

No-ham Recipes

Chinese Chicken in Sauce

by LIBBY STEVENS VE3IOT/VE3BC

Try this with steamed, then fried wheat noodles or steamed, then fried brown rice, and a vegetable stir-fry.

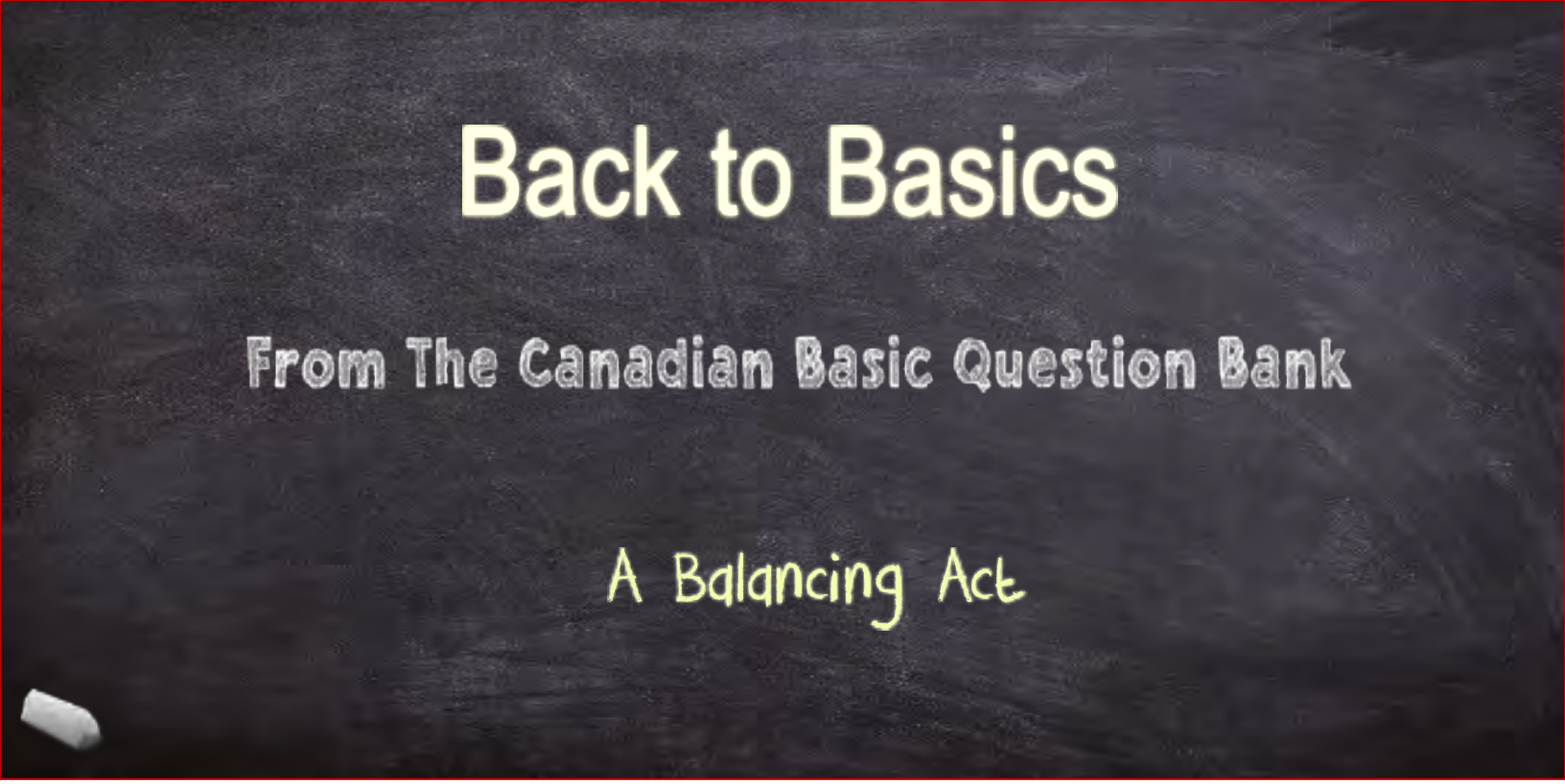
You can use the chicken pieces (bone-in or deboned)

To make the sauce:

- 2 large jars of strained peaches (baby food)
- 1/2 cup (125 ml) white vinegar
- 2 tablespoons (30 ml) soy sauce
- 1 teaspoon (5 ml) ground ginger
- Pineapple chunks
- 3/4 cup (200 ml) brown sugar
- 1 1/2 teaspoons (7.5 ml) salt
- Dash of ground pepper
- 1/2 cup (125 ml) ketchup

Preheat oven to 350F (180C or a very moderate oven) Combine all sauce ingredients and mix well. Place chicken pieces in a casserole dish and pour sauce over chicken pieces.

Bake for about 1 1/2 hours, basting every 15 minutes, until chicken is cooked through and juices are clear when you cut through to the middle of the thickest piece of chicken.



John Schouten VE7TI has been teaching amateur radio courses for over 25 years, and is the Course Coordinator for Surrey Amateur Radio Communications

Balanced vs. Unbalanced Feedlines and Antennas

In the next series of Back to Basics columns we will look at some of the new questions in the Canadian Basic Amateur Radio Question Bank, scheduled for implementation on July 15, 2025.

In amateur radio, the efficient transfer of signal from transmitter to antenna hinges on understanding balanced and unbalanced systems. Feed lines act as the signal's highway, and the challenge arises when connecting unbalanced feed lines to balanced antennas, or vice versa. This mismatch can lead to signal loss, common-mode current causing interference, and inefficient antenna operation. Practical considerations include choosing the right feed line based on frequency, power, distance, and environment. In essence, understanding the differences between balanced and unbalanced systems is vital for efficient communication.

As amateur radio enthusiasts, we thrive on the intersection of technical knowledge and hands-on experimentation. Among the many decisions we face when designing a station, is the choice between balanced and unbalanced feedlines and antennas as a critical factor in determining performance. These concepts govern how radio frequency (RF) energy travels from a transceiver to an antenna and radiates into the air. Whether a ham opts for a balanced dipole fed with ladder line or an unbalanced vertical with coaxial cable, each approach offers distinct advantages and trade-offs. In this Back to Basics, we'll dive into the mechanics of balanced and unbalanced systems, explore their practical implications, and weigh their strengths and weaknesses for amateur radio applications. We have touched on these subjects from the previous Basic Question Bank before. For example, open wire Ladder Line and here, and Coaxial Cable.

The new questions include B-006-002-006 and B-006-004-002

B-006-002-006: What causes a transmission line to be unbalanced?

a. The conductors are twisted together;

b. One conductor has a poor connection at the antenna;

c. One conductor is connected to ground;

d. The conductors have deteriorated insulation

B-006-004-002: What is the major advantage of open-wire transmission line?

a. It can be located near metal objects without problems;

b. It can be operated at high SWR without excessive loss;

c. It has low impedance, which facilitates matching to a transceiver;

d. It does not radiate RF energy, which could cause interference to nearby equipment

Lets have a closer look…

First, defining balanced and unbalanced systems

At their core, balanced and unbalanced systems differ in how they handle electrical symmetry. A balanced system features two conductors carrying equal and opposite currents, with neither tied to ground. The voltages on each conductor are equal in magnitude but opposite in phase, creating a symmetrical setup. A classic example is a dipole antenna fed with twin-lead or ladder line, where the currents flow in harmony to deliver RF energy efficiently

Conversely, an unbalanced system has one conductor—the "hot" center—carrying the signal, while the other—typically a shield—is referenced to ground. Coaxial cable feeding a vertical or ground plane antenna exemplifies this configuration. These fundamental differences shape everything from impedance matching to radiation patterns and susceptibility to interference.

Exploring balanced feedlines and antennas

Balanced feed lines like twin-lead and ladder line offer lower loss, especially at higher frequencies, but are more susceptible to external interference.

Balanced feedlines, such as 300-ohm twin-lead or 450-ohm ladder line, are often paired with antennas like dipoles, loops, or doublets. These systems prioritize symmetry to ensure RF energy reaches the antenna without the feedline itself radiating. One of their standout qualities is low loss, particularly with ladder line, where air serves as the dielectric rather than a solid material like polyethylene. This makes them highly efficient, especially at higher frequencies or over long runs, compared to coaxial cable.

Another appealing aspect of balanced systems is their independence from a ground plane. A dipole, for instance, doesn't need radials or a counterpoise, making it a go-to choice for portable operations like field days or Parks on the Air (POTA) activations. When properly implemented, these setups also minimize common-mode currents—unwanted RF flowing on the feedline's exterior—which reduces interference to nearby electronics and keeps the antenna's radiation pattern intact. Cost can be a factor too; ladder line and twin-lead often come at a lower price than high-quality coax, making them attractive for budget-minded operators building extensive feedline runs.

However, balanced systems aren't without challenges. Installation can be tricky, as the feedline must stay clear of metal objects like masts or gutters to avoid imbalance and coupling, which could turn the feedline into an unintended radiator. This often requires standoffs or meticulous routing, adding complexity to the setup. Weather poses another hurdle—rain, snow, or ice can alter the impedance of open-wire ladder line, detuning the system and affecting performance. While careful design can mitigate this, it's a consideration for outdoor

use. Additionally, the higher impedance of balanced feedlines (e.g., 300 or 450 ohms) doesn't match the 50-ohm input of most transceivers, necessitating a balun or tuner with a balanced output, which introduces extra cost and potential failure points. Physically, ladder line can be bulkier and harder to manage than coax, especially in tight spaces, and any imbalance—from antenna asymmetry or nearby objects—can make it susceptible to picking up local noise, such as from power lines.

Understanding Unbalanced Feedlines and Antennas

Unbalanced coaxial cable, with its shielded design, is popular for minimizing interference, but its inherent imbalance requires careful matching with balanced antennas.

Unbalanced systems, dominated by coaxial cable, pair naturally with antennas like verticals, ground planes, or Yagis. Coax features a center conductor surrounded by a shield, typically grounded at the transceiver, creating an inherently asymmetrical design. One of its primary strengths is ease of installation. Flexible and weatherproof, coax can be routed near metal, buried, or run through walls without significant performance loss, making it a favorite for permanent setups or tricky environments. The shield also provides excellent protection against RF interference (RFI) and electromagnetic interference (EMI) from external sources like broadcast stations or appliances—a major boon in noisy urban settings.

Most coaxial cable has a characteristic impedance of 50 ohms, aligning perfectly with the output of modern transceivers and many antennas. This eliminates the need for additional transformers in straightforward setups, simplifying the system. Unbalanced antennas, such as quarter-wave verticals, often require less space than dipoles, appealing to hams with limited real estate. A vertical with a few radials can fit in a small yard, offering a compact yet effective solution. Coax's sealed construction also makes it robust against weather, resisting moisture and UV damage for long-term reliability with minimal maintenance.

On the flip side, coaxial cable suffers from higher signal loss than ladder line, especially at VHF/UHF frequencies or over long distances. Lower-quality options like RG-58 can sap efficiency, while premium low-loss coax (e.g., LMR-400) comes at a steep price.

Common-mode currents are another concern; without a choke balun, RF can flow on the shield's exterior, causing the feedline to radiate, distorting patterns, and potentially bringing RF into the shack. Many unbalanced antennas, like verticals, also depend on a ground plane or radials for optimal performance. Poor grounding can degrade efficiency, requiring extra effort to install a radial network or counterpoise. Finally, while unbalanced setups excel for single-band use, multi-band operation often demands traps or additional elements, lacking the inherent flexibility of a balanced doublet with ladder line.

Practical applications in Amateur Radio

The choice between balanced and unbalanced systems hinges on an operator's specific needs and environment. For portable operations, a lightweight dipole with twin-lead might shine, offering low loss and multi-band capability with a tuner, though a coax-fed vertical could win out for its simplicity and smaller footprint. In urban settings, coax's shielding and routing flexibility make it a natural fit, while balanced systems might struggle with nearby structures causing imbalance. DX chasers might lean toward a low-loss ladder line feeding a doublet for efficiency across bands, whereas contesters might prefer a coax-fed Yagi for its directivity and straightforward matching.

To address connecting balanced to unbalanced, and vice versa, baluns (balanced-to-unbalanced transformers) and ununs (unbalanced-to-unbalanced transformers) are used. Baluns, like current and voltage baluns, provide impedance matching and prevent common-

mode current, crucial when connecting coax to a dipole. Ununs, on the other hand, handle impedance transformation between two unbalanced systems.Utilizing appropriate matching techniques, like baluns and ununs, minimizes signal loss and maximizes antenna performance. Careful planning, experimentation, and a solid grasp of these principles enhance amateur radio operations.

Bridging the divide

Many hams blend the two approaches to capitalize on their strengths. A dipole fed with ladder line might transition to coax near the shack via a balun, combining low-loss transmission with shielded entry. A coax-fed vertical might incorporate a choke to suppress common-mode currents, mimicking the symmetry of a balanced system. These hybrid setups reflect the adaptability that defines amateur radio.

The correct answers?

Here are the answers to the two questions posed:

B-006-002-006: What causes a transmission line to be unbalanced?

c. One conductor is connected to ground.

Explanation: An unbalanced system has one conductor—the "hot" center—carrying the signal, while the other—typically a coax shield—is referenced to ground.

B-006-004-002: What is the major advantage of open-wire transmission line?

b. It can be operated at high SWR without excessive loss

Explanation: Primarily, air serves as the dielectric rather than a solid material like polyethylene. This makes balanced line highly efficient, especially at higher frequencies or over long runs, compared to coaxial cable.

Balanced and unbalanced feedlines and antennas each offer unique benefits and challenges. Balanced systems deliver efficiency, multi-band flexibility, and ground independence, but they require careful installation and matching. Unbalanced systems provide simplicity, durability, and noise immunity, though they trade off some efficiency and may need grounding support.

For amateur radio operators, the decision is less about one being universally "better" and more about aligning the system with their goals—whether it's portable DXing, urban operation, or contesting. By mastering these principles, hams can experiment and refine their stations, embodying the blend of science and ingenuity that fuels the hobby.

~ John VE7TI

Special Introductory RAC Membership Opportunity for New Amateurs

Message from the RAC President

Congratulations again on achieving your Certificate of Proficiency in Amateur Radio and welcome to Radio Amateurs of Canada! In recognition of your achievement, I'd like to offer you a free one-year membership which includes:

A subscription to the digital (eTCA) version of The Canadian Amateur magazine, with access to previous online issue. Opportunities to connect with local Amateurs through the RAC Affiliated Club Program which includes liability insurance for your personal Amateur Radio activities Access to annual RAC Contests, Special Events and Operating Awards Opportunities and discounts from various partner organizations Full member rights including participating in the decision making at RAC Annual General Meetings and in the election of RAC representatives. There are many great reasons to join RAC and I hope you will take advantage of this special offer by completing the introductory membership form provided below.

If you need any additional information please don't hesitate to contact me by email at president@rac.ca or by contacting the RAC Office at racgm@rac.ca.

May 2025

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
Event details: SARC—SEPAR 'Live' calendar link All contest information: WA7BNM Contest Calendar: Home						Coffee: 0700 Denny's King George Blvd. & 68 Avenue OTC Open 0930
4	5	6	7	8	9	10
Maple Ridge Swap Meet	SARC Basic Course 19:00	1930 SEPAR Net 2000 SARC Net			1932: Clearwater, Fla., tests first directional antenna in the U.S.	Coffee: 0700 OTC CLOSED SARC FOX HUNT
11	12	13	14	15	16	17
Mother's Day	SARC Basic Course 19:00 1908: Stubblefield granted patent 887,57 for wireless telephone	1930 SEPAR Net 2000 SARC Net	SARC Meeting 1900-2100			Coffee: 0700 OTC Open 0930
18	19	20	21	22	23	24
	Victoria Day SARC Basic Course 19:00	1930 SEPAR Net 2000 SARC Net 1901: Fessenden applies for high-frequency patent				Coffee: 0700 OTC Open 0930 Contest: CQ WW WPX Contest CW New Westminster Hyack Parade 1844: Morse telegraphs, "What hath God wrought?" from Washington to Baltimore
25	26	27	28	29	30	31
Contest: CQ WW WPX Contest CW	SARC Basic Course 19:00 1903: Fessenden granted patent for the liquid barretter microphone	1930 SEPAR Net 2000 SARC Net	SARC Directors Meeting 1900-2100			

June 2025

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
1961: FM stereo begins use	1896: Marconi files full specs for first wireless patent					Coffee: 0700 Denny's King George Blvd. & 68 Avenue OTC Open 0930
8	9	10	11	12	13	14
		1930 SEPAR Net **2000 SARC Net**	**SARC Annual General Meeting** **1900-2100**			Coffee: 0700 OTC Open 0930
15	16	17	18	19	20	21
Contest:	1934: Armstrong transmits FM signal 70 miles from Empire State Building to Long Island	1930 SEPAR Net **2000 SARC Net**		1934: Communications Act of 1934 creates Federal Communications Commission		Coffee: 0700 OTC Open 0930 Contest:
22	23	24	25	26	27	28
	1891: Tesla granted patent for coupled tuned circuit radio-frequency oscillator	1930 SEPAR Net **2000 SARC Net**	SARC Directors Meeting 1900-2100 1910: US requires licensed radio operators for ocean-going ships		Field Day Prep	Coffee: 0700 **FIELD DAY**
29	30	July 1				
FIELD DAY 1904: Edison receives patent for alkaline battery		**CANADA DAY** RAC Canada Day Contest	Event details: SARC—SEPAR 'Live' calendar link All contest information: WA7BNM Contest Calendar: Home			

Radio-Active

Profiles of SARC members

Meet Jaspal Bagha VA7JB

coordinated by BLAKE R. WIGGS VA7BWG

Jaspal Bagha VA7JB

Jaspal Bahga is one of SARC's most experienced hams. He obtained his amateur radio licence 35 years ago, but by then he already had extensive emergency radio experience.

Jaspal's initial exposure to radio was in the Punjab (north eastern India, near the Pakistan border). His father received electronics training while serving with the British Army. After transitioning to civilian life his father leveraged that training to a successful career with Indian Railways - a state-owned enterprise that operates India's extensive national railway system. By the time he retired, Jaspal's father had risen to head the electrical department of Indian Railways. Jaspal's brother was also involved with electronics and built his own receivers and transmitters.

In India, Jaspal earned a diploma in industrial woodworking. He then trained in the commercial graphics field, graduating with a Master of Fine Arts degree. Nevertheless, when he came to Canada in 1970, he wanted to work in the electrical field since his father and brother had found success in that field. However, the Canadian economy was in poor shape in the early 1970s, and Jaspal wasn't able to secure an apprenticeship in the electrical field. Instead, he found work in northern BC, initially working on the Dease Lake project—BC Rail's *(before 1972, known as the PGE)* ill-fated construction of the Dease Lake Extension from Vanderhoof to Dease Lake – after completion of the Stikine River bridge and the grade all the way to Dease lake, the project was shut down by the NDP Government because of the excessive cost, and hundreds of kilometers of railway-ready right-of-way without any rail being laid – were abandoned.

Undeterred, Jaspal worked as a millwright in BC's then booming forest products industry. Over the ensuing 18 years his work took him to virtually every community of significance in northern BC: Prince George, McKenzie, Quesnel, Vanderhoof, Terrace, Fraser Lake, etc. To this day Jaspal has many friends up north and he maintains those contacts via amateur radio.

[Above right] In the late 1970s Jaspal trained and served for several years as an RCMP special constable in Terrace, BC.

[Above left] He also received extensive emergency training as a volunteer firefighter. Additionally, Jaspal received training in Victoria in search & rescue techniques. He holds several provincially-awarded search & rescue qualifications such as technical (high angle) rope rescue and cave rescue qualifications.

All of this exposed Jaspal to radio communications, particularly in the emergency context, and well before he became involved with amateur radio.

Despite his preference for smaller communities, Jaspal relocated to the lower mainland in about 1990 because he knew that his children would have better educational and employment opportunities here. That paid off: Jaspal's son Jason is an IT troubleshooter and his daughter Jessica is a dental surgeon. Jaspal joined SARC in 1991.

Today, anyone interested in taking an amateur radio licencing exam has plenty of options—most clubs, including SARC, have ISED-accredited examiners who can administer the exams in various convenient locations. That wasn't the case in 1990 when Jaspal wrote the exam. ISED only came into existence in 2015. Between 1969 and 1996 Canadian amateur radio licensing was handled by the federal Department of Communications (DOC). Surrey residents wanting to write the exam in 1990 had to attend at the DOC building. Jaspal did that and passed the exam. He now holds Advanced, Basic and Morse Code qualifications. Jaspal's son Jason passed the Basic with Honours exam when he was in grade 7 and holds call sign VE7PPL. Jaspal's daughter Jessica passed the Basic with Honours exam while in grade 10; her call sign is VE7IJI.

Some (just some!) of Jaspal's radio equipment

Jaspal has fond memories of many hours working on amateur radio projects with one of SARC's founding members, Vic Medway VE7CON (SK), particularly training youngsters in the hobby.

In Surrey, Jaspal has returned to his commercial graphics roots. He operates a successful commercial graphics business Star

Jaspal on his Honda Goldwing motorcycle

Sign & Printing, doing custom design and printing work, specializing in large format signage.

Jaspal is also an avid motorcyclist and member of the Sikh Motorcycle Club of Canada. That club's activities have raised substantial donations for charitable institutions such as Diabetes Canada. Among other things, club members provide security for the Abbotsford International Airshow.

This is a perfect fit for Jaspal's twin hobbies (amateur radio and motorcycling) since the airshow operates a sophisticated volunteer-staffed radio network to cope with the logistics of an event attended by hundreds of thousands of people over 3 days.

~ Radio-Active is coordinated by Blake R. Wiggs VA7BWG

Jaspal on his Can-Am Spyder trike

I'd also like to include Jaspal's generosity toward SARC and SEPAR printing needs. He has printed QSL cards, decals and stickers at no charge for the club and that gesture is very much appreciated - Ed.

Social Reminder

The Saturday weekly social gathering is once again 'on' at the Denny's Restaurant, 6850 King George Blvd., Surrey BC from 07:30—09:30. All are invited. Afterwards, we will host workshops and will be available to invigilate Amateur Radio exams at the OTC, 5756—142 Street, Surrey from 10-noon.

Bring your ham issues, our Elmers will try to help you sort them out.

A FREE EVENT · OPEN TO THE PUBLIC

SURREY AMATEUR RADIO

foxhunt

Amateur Radio Direction Finding (ARDF) is also known as Fox Hunting.
It is an internationally recognized radio sport using a receiver as a direction finder to locate hidden transmitters.
No radio licence is required · Suitable for the whole family

Saturday May 10, 2025 at 9am

Crescent Park Picnic Area, South Surrey

Pre-hunt Coaching, Registration & Instruction 9am

Fox Hunt 10am—Noon

BBQ following

$10 for adults $5 for under 12

For the exact location scan the QR Code

Both 2m and 80m foxes

If you are a beginner and do not have a receiver, come anyway, we have loaner equipment, or we can team you up with someone experienced.

Talk-in 147.360+ (110.9 Tone)

All are welcome, but we ask that you RSVP to membership@ve7sar.net

It's a great family activity and so simple, she can find the foxes!

SARC

••• •— •—• —•—•

The Contest Contender

CQ WPX SSB

A finicky amp and an otherwise good effort

by DOUG JEFFREY VA7JDJ

Doug Jeffrey VA7JDJ reporting on SARC's contesting efforts.

We welcome Doug as a regular contributor covering SARC's contesting efforts and thank John Brodie VA7XB for his stewardship of this column over many years.

During the weekend of March 29th the SARC contesting crew took on the CQ WPX SSB contest.

For those who don't know each contest has specific rules that establish a number of points for each contact that is made. In the WPX contest the objective is to work as many stations as possible with score multipliers being earned for working stations out of our continent, out of our country and each call sign prefix that is worked.

The SARC contesting crew operating as VE7SAR was made up of:

- Dmitry VA7DVO
- Doug VA7JDJ
- John B. VA7XB
- Sheldon VA7XH
- Scott VE7KAT
- Kapila VE7KGK
- Steve VE7SXM
- John S. VE7TI
- Mike VE7YEG

Running with our usual setup we had the Icom IC-7610 running into our Expert Linear amplifier set at medium, which yields around 900W. The power was fed through to the

M/S HP		Score	QSO	Prefixes	
1	AA3R	8,131,350	2,777	1,077	Frankford Radio Club
2	KL5DX	6,004,896	2,391	952	
3	KT4Q	4,739,964	2,171	957	South East Contest Club
4	WA2CP	4,716,975	1,892	975	Frankford Radio Club
5	WX1AW	3,085,800	1,502	785	
6	WS4K	2,042,596	1,277	691	Florida Contest Group
7	K5SR	1,131,005	1,025	512	Society of Midwest Contesters
8	VE7SAR	904,704	856	456	Surrey Amateur Radio Communications
9	NW6P	715,500	694	450	Northern California Contest Club
10	W4RM	79,328	191	149	Potomac Valley Radio Club

Yagi for operations on 10, 15 and 20 meters. For the late-night operations, we planned to switch to the wire antenna for 40 and 80m.

We did experience some technical difficulties where the linear amplifier would shut down because the SWR was creeping up in the system. The real trouble with that is when wearing a headset you can't hear the warning tone from the amplifier. This led to some time unintentionally operating QRP!

Conditions continued to stay open on the higher bands for most of the time that we were operating, The team made 856 QSOs to operators with 456 unique call sign prefixes, for a total of 904,704 points. A solid showing by any measure. The Contest Online Scoreboard reported us as 43rd for stations operating in the same class. Contacts ranged far and wide with lots of action from North America and contacts all the way to Europe, Asia, South America. Although conditions were generally favorable, we were not able to make contacts into Africa this time.

~ Doug VA7JDJ

Social Reminder

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Bring your ham issues, our Elmers will try to help you sort them out.

The 2025 ARRL Rookie Roundup

The Rookie Roundup is a low-pressure contest aimed at Amateurs licensed for three years or less. This six-hour event is held three times per year: April, August and December, each for a different mode. Mentoring is a big part of this event, which was held this year on Sunday, April 13th at the OTC. With the guidance of John VE7TI, we had 4 willing operators from recent classes.

As it turned out there was a hit of not one, but two major solar disturbances that weekend, that severely affected propagation. It was eerie that both 10m and 15m showed no signs of life. Only 20m was usable but most of the QSOs heard were from the Texas and Georgia State QSO parties.

Despite the lack of real DX, our rookies searched and pounced on any signal that was copy-able and managed 20 contacts, all in North America. Unfortunately only 8 of these were rookies themselves. Included was an introduction to N1MM+, our contest and logging software of choice.

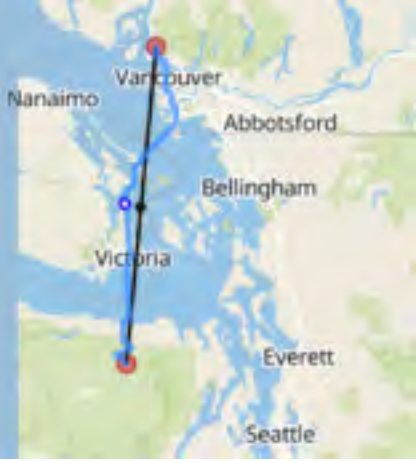
All the participants expressed satisfaction with the experience and vowed to continue their ham familiarization. Quoting their course instructor: “The real learning starts after you achieve your certification”.

~

[Top to bottom: Blake VA7BWG, Sukhul VE7SKV, David VE7ODL , and Stephen VE7ZVV]

VB7MAN Participates in an International Microwave Party

A 24 GHz First for BC Amateurs



by JOHN BRODIE VA7XB

On the morning of April 27, 2025 VB7MAN was represented in a series of trans-boundary amateur communications among several Canadian and US operators on 10 and 24 GHz. VB7MAN is the callsign used by BC hams to commemorate the late WW2 food drop by Allied Air Forces in Holland for the relief of starving citizens, a result of occupation by the German military forces.

SARC members, Dino VE7NX and Scott VA7SC, located at the upper viewpoint on Cypress Mountain (CN89JI60) successfully completed 10 GHz SSB and CW contacts with Pacific Northwest Microwave members, Ray W7GLF and Frank AG6QV, located on Hurricane Ridge in WA (CN88HA53). Anticipating uncertain snow conditions on the Ridge, Ray and Frank had endured a long drive from home and an overnighter in Sequim to make the sked.

Their first choice for an operating location at 5500 ft. was covered in snow and faced the wrong direction, so was abandoned in favour of lower site on the route to the summit of Hurricane Ridge, called Morse Creek Overlook at 2588 ft ASL. Prior to making contact, Ray and Frank reported that they were able to clearly hear VE7SAR 10 GHz beacon transmitting 150 mW from Concord Tower in Surrey.

Joining the action on 10 GHz were Dave (KG0D) located in Sequim, WA about 17 km to the east of Hurricane Ridge, and Kirk (VA7RKM) in Victoria pointing his antenna NE to bounce signals off the North Shore (Vancouver) mountains.

Also successful were contacts on 24 GHz between the same operators over a distance of approximately 160 km, believed to represent a BC amateur distance record.

We are grateful to Frank AG6QV for providing details of this event as reported at: http://pnw-microwove.com.

The efforts of Nick (N7CYT), Mike (K7MDL) and Paul (WA9BTV) are also acknowledged for setting up equipment and making attempts to contact both groups. Unfortunately, their effort was thwarted by trees and other obstacles blocking the path.

~ John VA7XB

[Left] View from Cypress Mountain lookout with Dino VE7NX on lhs and Scott VA7SC on rhs. Skies were overcast through the morning.

[Above] 10 GHz and 24 GHz setups

March 2025

SARC General Meeting minutes

March 12, 2025

Recording Secretary MIKE PORISKY VA7YEG

SARC General Meeting Minutes 25.03.12

Attendance: 26 members attended the meeting

Start Time: 19:00 hrs

Location: Fire Training Center – 14923 64 Ave

Welcome & Presentation of Agenda: Steve called the meeting to order and gave a brief welcome message and introduction of the guest speaker – Shawn Dooly (VE7BD).

Surge Suppression and Equipment Protection

Most people do not know that power entering your house, office or shack is subjected to constant surges, brown-outs and spikes. This interference can come from internal or external sources and is usually caused by heavy machinery, electric motors, tools, etc. and can occur more than 180,000 times per hour.

The effects resulting from transient noise (spikes and surges) can cause total failures of other electronic devices on the same circuit. Minor, but long-term PCB pitting is another common symptom.

Shawn explained that MOUs are used to suppress transient noise but are of limited use. UL 1449 was approved to set a standard which causes the fuse/breaker to blow, hopefully saving the connected equipment.

Extension cords and distribution devices are given a rating based on their protection level. Cheap devices specify a rating of 400-800 Joules ($29) while quality devices are rated more than 2500 joules ($100). The better devices will use an MOU transistors on each of the 3 lines, protecting all phase combinations.

Shawn provided a demonstration highlighting the effectiveness of the Tripplite Isobar. The device was able to eliminate all RF/EMI noise.

When using a battery backup device or Uninterruptible Power Supply (UPS), Shawn suggested placing the Tripplite upstream feeding the UPS with protected power.

The remaining presentation included questions and personal experiences from SARC members.

See Shawn's article elsewhere in this issue.

Business Meeting

1. Announcements

- SARC welcomed special guests Hiroshi Takahashi (VA7LET) Acting Director for RAC BC and Keith Witney (VE7KW) Past Director for RAC BC. Hiroshi and Keith presented a plaque to John Schouten (VE7TI) to acknowledge his induction into the **Canadian Amateur Radio Hall of Fame**. John expressed his thanks to RAC for this award.
- April Monthly Meeting will see a presentation by Les Tocko (VE7OM) on the topic of **Fox Hunting** in preparation of SARC's Annual Fox Hunting Event. And Dave Cameron (VE7LTD) will present at the May Monthly Meeting, covering the topic of interference tracking.
- **SARC's Annual General Meeting** will take place on June 11, 19:00 hrs at the Surrey Fire Training Center.
- Adam Drake is still **looking for handheld radios** (VHF/UHF) that his summer school students could use.
- The **6 Meter beacon** is now installed on the roof of the OTC. This is a 2-Watt beacon operating on 50.070 MHz as VE7SAR/B.
- **The Satellite station** and 9700 radio are available to all members to make contacts using orbiting Satellites. Dino has also offered to familiarize members with operating the Satellite equipment. Contact Dino to schedule a Saturday morning session.
- **An email bulletin** is sent out on the first and third Wednesday each month to all members listing the club's upcoming activities. Contact John Brodie if you are not on the list.
- Reminder that everyone is invited to SARC's **Saturday breakfast at Denny's** (6850 King George Blvd) – 7 to 9 am, followed by a visit to the OTC. NOTE: the OTC will be closed on Saturday May 10, during the Fox Hunt Event.
- John S. and crew will host the **GOTA workshop** for new Hams on March 29. Other members visiting the OTC at that time should be aware that this training will require a quieter-than-normal environment.
- Horace has offered to coach members on setting up their radios to connect with a **WinLink** gateway. Anyone interested should contact Horace directly.
- Also scheduled for March 29th is the 2025 **Tsunami Exercise** that is expected to test out the Amateur Radio WinLink program. If you are planning to participate, Horace will review the necessary forms that will be attached to WinLink messages next Saturday at the OTC. When sending your emails, include the SEPAR address along with the required Tsunami address and use SEPAR as your affiliate group. Participation is available to any operator who has access to WinLink. Send messages to WinLink gateways VE7ADQ-10 (145.770) or VE7HME-10 (145.710). Members that are not set up to transmit over their radio can still participate by sending with Telnet (internet). Lastly, forms can be submitted anytime between March 22–29.

2. Committee Reports

Financial Report – Treasurer Scott H. (VA7HA)

- The Profit & Lost financial report was displayed to members showing an income of $5200 so far this year. The biggest expenses this period was RAC insurance and the Beacon projects.
- From the latest Balance Sheet report SARC's current balance is $39,550 with $18,000 invested in an annual GIC.

Nets & Websites– Reg N. (VA7ZEB)

- All SARC nets are going well with no complaints received.
- Reg gave members an update regarding changes coming to the SARC website:
  - *All email accounts have been transferred to their new hosting platform – Google Work Spaces.*
  - *SARC domains were switched from StartLogic registrar to AWS.*
  - *The next change will be SARC's websites to Google Sites*
- When Reg returns in 2 weeks, he will begin prototyping the new web site content.
- A decision still needs to be made regarding the SEPAR domain site and email addresses.
- If you have any questions about the website, please send an email to webmaster@ve7sar.net
- Reg also took the opportunity to demonstrate a new feature on SARC's website where users can now **search the Communicator magazine** by

keyword, author, date, etc. This can be accessed at the website "https://search.communicator.net". This project is the brainstorm of Blake (VE7BWG) where he meticulously indexed every article of every Communicator magazine. The project was brought online by Reg (VA7ZEB) where he created an interface to this search page.

SEPAR/OTC – Gord K.

- SEPAR has received permission to install the 6-Band Tuned Vertical HF antenna needed for operating the Flex Remote at Firehall #1.
- Horace (VA7XHB) has installed two Winlink Gateways:
  - *VE7HME-10 145.710 MHz at Firehall #1*
  - *VE7ADQ-10 145.770 MHz at SARC's North Repeater Site*
- Gord plans to reach out to Firefighters at Firehall 1 to offer an introduction about SEPAR including the Ham operator's role during emergency disasters.

Membership – John B.

- Currently at 144 paid members and rising slowly. For courses that ended last November and March, while soon due, John has decided to wait until the beginning of SARC's new membership year before approaching the members to re-join.
- Payment for membership renewals should be made through direct deposit at payments@ve7sar.net.

Contests – John B.

- John reviewed the contests that have recently completed and asked for interest from members who wanted to participate in the upcoming WW CQ DX contest taking place March 28/29.
- The RSG3 Commonwealth CW contest took place this past weekend. One member participated making over 300 contacts.
- The Africa contest is scheduled for next week (March 22/23). Anyone interested should contact John to get access to SARC equipment.
- World Amateur Radio Day will take place on Friday, April 18. This is not a contest but a day to encourage Ham operators to get on the air and make contacts.
- John Schouten gave members an overview of the **MANNA 80 special event** taking place on April 25-27. John explained the history of the operation, where allied forces from the UK, Australia, Poland, Canada and the US carried out multiple food drops when Germany cut off supplies from reaching the citizens of Holland. SARC has received the special callsign VB7MAN to commemorate Operation Manna, 80-year anniversary and a page on the QRZ website has been set up with more information - Operation Manna@80. The callsign is available for the months of April and May. Anyone wishing to operate the special event callsign can schedule hours or day on the above web site. DMR channels have been prearranged to allow VHF communications between the hosting countries. John is hoping to get students involved with making contacts using these DMR channels.

Repeaters – Horace (VA7XHB)

- All repeaters are operating normally. No Information was discussed. Thanks to Horace for all his work with keeping the repeaters working.

HAM Classes - John S.

- The current class is now finished. Half the class has written and past the exam – most in the high 90%.
- Kwantlen Park School has purchased an HF radio and this past week, several students set up a linked-dipole antenna and made contacts with stations including Italy.

Old Business

Current Projects

- The 10 GHz beacon is transmitting from Concord Tower. At least 2 members are building receivers to pick up the 10 GHz signal.
- The 24 GHz beacon should be finished in 2-3 weeks.

- The 6 Meter beacon (operating on 50.070 MHz) has been repaired and is transmitting 2 Watts again from the roof of the OTC. Dino & Les replaced the amplifier and installed a filter.
- Reminder that the Satellite station and 9700 radio are available to all members who want to learn how to make contacts through Satellites. Contact Dino to schedule a Saturday morning session.
- Installing the HF antenna at FH1 is scheduled for a good-weather day.
- The Burnaby swap meet will take place on March 22. SARC has 2 tables. Members with equipment to sell are invited to use SARC's tables.
- Plans are underway to organize this year's Fox Hunting event – planned for May 10th at Crescent Park. Jeremy has agreed to hide the foxes and Ralph & Nell will coordinate with Anton to provide lunch.
- Andrew has started planning this year's Summer Field Day. More to come later.

New Business

- Gord is considering asking the Fire Department to schedule a CPR renewal course for SARC members.
- Angus asked if SARC would be willing to set up an interlink between the 440 and 146 MHz repeaters? The equipment is in place at the Concord site, however SARC would have to apply for a frequency and would need to acquire a suitable antenna. These repeaters were connected previously but there was a lot of cross-talk. Gord will discuss this possibility with Dave Cameron.

Call for Questions

Reg asked when we would start meeting in person again for SARC meetings. Steve suggested that the next meeting in March would be at the Fire Training Center. Gord will look into scheduling this event.

Adjournment

Steve moved to adjourn the meeting Seconded by Doug J. Carried. The March meeting adjourned at 21:00 hours.

~ Mike VA7YEG
Recording Secrtetary

Its that time again!

Field Day is the biggest amateur radio event in North America, drawing in more than 40,000 hams each year. From coast to coast, clubs and individuals will be rolling out gear in parks, open fields, and community spaces to make as many contacts as they can in 28 hours. Field Day is about more than just logging contacts and this year we are looking for opportunities to connect with the Surrey Community to introduce them to Amateur Radio in a meaningful way. We hope to highlight our emergency communications skills, show how we are experimenting with new technology, and getting youth interested in our hobby.

This year, Field Day lands on June 28th and 29th, and the groundwork has already started. Would you like to help volunteer for setup? Running radios? Demonstrating a specific radio skill?. We'll soon be reaching out for more support: station ops, food coordination, and licensed control operators to get VE7SAR on the air.

If you would like more information please contact Andrew at VA7LGN@gmail.com and check the SARC blog regularly for updates.

~ Andrew VE7LGN

April 2025

SARC General Meeting minutes

April 9, 2025

Recording Secretary MIKE PORISKY VA7YEG

SARC General Meeting Minutes 25.04.09

Attendance: 27 members attended the meeting

Start Time: 19:00 hrs

Location: Fire Training Center – 14923 64 Ave

Welcome & Presentation of Agenda: Steve called the meeting to order and gave a brief welcome message and introduction of the guest speaker – Les Tocko (VA7OM).

Guests: Several members from the White Rock Amateur Radio Club were present and each introduced himself: Joe (VE7JJK), Dave (VE7OER), Darren – from Blaine, WA.

Business Meeting

1. **Announcements**

- **SARC's Fox Hunt** will take place on Saturday May 10th. The OTC will be used by SF S&R and therefore not available to SARC members.
- Dave Cameron (VE7LTD) will present at the **May Monthly Meeting**, covering the topic of interference tracking.
- **SARC's Annual General Meeting** will take place on June 11, 19:00 hrs. at the Surrey Fire Training Center. Memberships must be renewed prior to this date for voting privileges.
- Dino and Scott made a **direct QSO on 24 GHz** between Cypress Mountain and Langley (a distance of 56 Km). A second communication was made by bouncing off of Mount Baker for a total distance of 162 Kms. They plan to schedule a date with the group from Cypress (180 km) and with contacts from Oregon (300 Km) in an attempt to break the Canadian record of 275 km.
- On a related topic, the **24 GHz beacon** is nearly finished and will be installed in 2-3 weeks.
- The **6 Meter beacon** was fixed and re-installed on the roof of the OTC. This is a 2-Watt beacon operating on 50.070 MHz as VE7SAR/B.
- Adam Drake is still looking for handheld radios (Vhf/UHF) that his **summer school** students could use.
- Horace has offered to coach members on setting up their radios to connect with a

WinLink gateway. Anyone interested should contact Horace directly.

- Reminder that everyone is invited to SARC's Saturday breakfast at Denny's (6850 King George Blvd) – 7 to 9 am, followed by a visit to the OTC. NOTE: the OTC will be closed on Saturday May 10, during the Fox Hunt Event.

Committee Reports

1. Financial Report

Presented by Steve M.

- The Profit & Loss financial report was displayed to members showing a YTD net income of $7200. The biggest expenses this period was RAC insurance and the Beacon projects.
- The latest Balance sheet also displayed to members, showing a balance of $41,000 with $18k in a 1-year GIC.

2. Nets & Websites- Reg N. (VA7ZEB)

- All SARC nets are going well. Harry (VE7HVB) replaced Paul (VE7VP) on the SEPAR net.
- Reg gave members an update regarding changes coming to the SARC website. SEPAR web site was transferred to AWS as well as all email accounts.

3. SEPAR/OTC – Gord K.

- The HF antenna should be installed at FH1 within the next couple of weeks. Steve suggested a pre-visit to the Firehall to confirm that the antenna will fit properly. Mike suggested that we set up the 6BTV at the OTC first, where we can test the connections and verify SWR.
- Steve reviewed Reg's request to set up a VHF/220 radio at the OTC. A brief discussion took place on where it could be located.
- Gord K. was asked if SEPAR could participate in a Surrey event scheduled for May 18 at City Hall. Gord will send out more information later this month if any members are interested in helping.
- Four members checked in to the Tsunami exercise that took place on March 28-29. The overall number of participants exceeded the organizers expectations by 600%. The exercise involved filling out 6 template forms including the DYFI earthquake form and submitting them using Winlink. Gord encouraged all members to consider setting up a Winlink station in order to communicate detailed information during an emergency – and then practice by checking into the bi-weekly Winlink SEPAR net.
- John Schouten was presented with a 20-year service award for his involvement with SEPAR.
- Steve met with Jordan Townsend regarding changes to the OTC building, specifically SARC's access to the secure room on the north side of the building. SF S&R is still considering SARC's request. If a new room needs to be built, either for SF S&R or for SARC's use, the City will need to be contacted for approval.
- Insurance for the Big-foot trailer has been renewed. The small trailer will become due in the summer.
- Radios in the OTC will be installed soon. Plan is to use IC-710, with built in TNS for Winlink, in the trailer (??)

4. Membership – John B.

- Currently at 149 paid members. Membership renewal reminders will be sent out soon. Payment for membership renewals should be made through direct deposit at payments@ve7sar.net.

5. Contests – John B.

- John reviewed the contests that have recently completed and those coming in the next few weeks.
- The WW CQ had 9 operators and made over 800 contacts. A problem was encountered operating on the 10 & 20m bands. This could be caused by a trap on the antenna and will need to be checked on a sunny Saturday.

- World Amateur Radio Day will take place on Friday, April 18. This is not a contest but a day to encourage Ham operators to get on the air and make contacts.
- John Schouten gave members a quick update on the Manna 80 special event taking place on April 25-29. The callsign is available for the months of April and May. Anyone wishing to operate the special event callsign can schedule a day on the web site https://manna80.radio/. OTC has reserved the callsign for Sat., April 26. The main event day is April 28-29. John S. will be taking the SEPAR trailer to the scout jamboree at Camp McLean on Saturday, April 26 to demonstrate amateur radio operations, with the hope of making HF contacts with European Manna 80 stations.
- The ARRL Rookie round-up contest will take place on April 13. John S. has 3 participants signed up so far. The CQMM DX CW Contest will take place April 19-20. Anyone interested in contesting should contact John B.
- The summer school project will take place again this year where John S. will be introducing amateur radio to high school students. The course is scheduled for the 4 weeks of July.
- It was decided to wait and give other stations an opportunity to request the VE7RAC callsign for the Canada Day contest on July 1. If there is no interest from other sites, SARC will contact RAC to request it.
- Andrew E. (VA7LGN) announced that he will be using VE7RAC during the Amateur Radio day on April 18th and invited operators to contact him on 146.520 MHz simplex.

6. Repeaters - Horace

- All repeaters are operating normally. No Information was discussed.
- HAM Classes - John S. The new class started this past Monday with 34 students. This will be the last class using the old question bank. Graduates from the last class obtained very high test scores -averaging the mid 90s.

Old Business:

1. Current Projects

- The Satellite station and 9700 radio are available to all members to make contacts using orbiting Satellites. Dino has also offered to familiarize members with operating the Satellite equipment. Contact Dino to schedule a Saturday morning session.
- The Burnaby swap meet that took place on March 22 brought in $465.25 in sales.
- Installation of the HF antenna at Firehall #1 has not been forgotten.
- Andrew has started planning this year's Summer Field Day. This year's plan is to focus more on community outreach. Andrew is attempting to obtain permission from the city of Surrey to set up the SEPAR trailer at Holland Park on the Saturday. The OTC will still be used for contesting. A reminder that the big-foot antenna will stay erected until the completion of the Canada Day Contest.

New Business:

- SARC received more equipment donated from Kjeld Fredericksen's (VE7GP) estate, which has now been sorted and ready for the swap meet. Also, there are 2 towers available for free (including a dual band beam with rotator) if they are removed.
- The Maple Ridge swap meet will take place on May 4th. John B. will reserve 2 tables for SARC.
- Dino presented the idea of SARC purchasing a new Beam antenna to replace the current one which has been giving problems the past months. He suggested one product from an Italian vendor that covers the 10,12,15,17 and 20 M bands for approximately $1500 CAD.
- Steve requested that he research more information and send an email with his recommendation. Reg N. (VA7ZEB) made a motion that "the SARC Board of Directors be authorized to investigate replacements for the current HF antenna at the OTC and, upon completion of that investigation, to

spend up to $2700 CAD on a replacement of their choice without further membership approval". The motion was seconded by Jeremy. A vote of 20+ in favor – 0 against. The motion was passed.

Adjournment:

Steve moved to adjourn the meeting, seconded by Christian (VA7CTK). Carried. The April meeting adjourned at 20:57 hours.

~ Minutes prepared by Mike Porisky VE7YEG.

High School Communications Course Update

The high school RF Communications instruction continues. John VE7TI spent several weeks with Grade 12 students from Kwantlen Park Secondary School during February and March in their Electronics 12 blocks. It involved trips to the park adjacent to the school to set-up and operate a portable HF station. They picked up the intricacies of HF, both phone and digital, very quickly, and experimented with several antenna types and configurations. Some had better results than others but DX and domestic contacts were successfully completed.

During Spring Break they ventured out on their own with one of the school's portable kits (courtesy of an ARDC grant) and the trusty 5-band linked HF wire dipole that they made and tuned. The result from their solo activation is shown above. A respectable 61 HF SSB POTA contacts at Surrey's Green Timbers Urban Forest Park, CA-4173.

The kit contains a Xiegu G90 HF transceiver and digital interface, a Pyle speaker stand, a Doben 24-ft carbon-fiber extension pole, an Eco-Worthy 12v LiFePO4 battery, an appropriate length of RG-8X coax, and the home-built 5-band linked HF dipole.

Thank you recent visitors… 166 countries and counting—more than in my log!

Reprint Policies

This is a bi-monthly journal about amateur radio, and other relevant topics, published by Surrey Amateur Radio Communications (SARC) .Reprints are often requested, and these are our policies for re-publication of articles from The Communicator,

You may use articles authored by SARC members for your club newsletter or other amateur radio publication, provided that the purpose is non-commercial, you credit the author, and provide a link as follows: https://ve7sar.blogspot.com/search/label/SARC%20Communicator. If our article indicates it is from a source outside of SARC, we cannot transfer that right, and you must seek permission to re-publish from the original source. We appreciate being notified via email to communicator@ve7sar.net if one of our original articles has been re-printed elsewhere.

We welcome your comments and feedback

Please consider leaving a comment via email to communicator@ve7sar.net, or on our blog site https://ve7sar.blogspot.ca or, better yet, contact our authors directly, so they know someone is out there reading their work in our publication.

SEPAR Report

Winlink reestablished in the SEPAR program

by GORD KIRK VA7GK

I have written previously about the work SEPAR has done to maintain our equipment and specifically cleaning up the Fire Hall Radio Room. With the clean up done, radios tested and reprogrammed, it was time to rebuild our Winlink station. Horace VA7XHB took on the task of building the Winlink Gateway computers and installation in both the Fire Hall 1 radio room as well as at the SARC North Repeater site on top of the Concord Tower.

The North Repeater site does have VE7ADQ-10 (145.770) with both VARA FM and Packet up and running. Fire Hall 1 has the VE7HME-10 (145.710) gateway running, again with VARA FM and Packet both available.

With the equipment now functional Horace offered to restart the regular Winlink check in. The net is a biweekly email from the net control with a small task, a question to answer back to the net control and a preparedness tip. Each participating station has a week to complete the task and reply to the message. The tasks have been Winlink related to help users understand how to use Winlink forms etc. The tasks started with simply sending a Winlink message to VE7ADF to request to join the net. Via the net we have covered how to enter your GPS coordinates into a Winlink form, sent a 'Did You Feel It?' (USGS) form, downloaded a form to create driving directions and tested it, and participated in the large US based Tsunami exercise.

At the SARC meeting the attendees were updated on Winlink, how it works and how we are working to get SEPAR and SARC members to use it on a regular basis. Horace has also provided several Saturday morning sessions at the OTC to help get Winlink installed on computers, programming radios and helping troubleshoot individual radio set up to work with Winlink.

Gord Kirk VA7GK is a SARC Director and the City of Surrey SEPAR Coordinator

To use Winlink you must be a licensed amateur and you will need a computer (including a smart phone) a radio interface (TNC) and cables to connect to your radio. The set up can be a Bluetooth connection from and Android phone using the WOAD App or with an I-phone using the Radio Mail App. The I-phone Bluetooth is not so easy and it requires an adapter for Bluetooth like the Mobilink-D to connect wirelessly to a radio. You can also use a cable to connect a radio to the phone. Users can also connect the phone with the app via the internet (Telnet) without having a radio. We were fortunate to have Andrew VA7YAA the creator of WOAD present at the SARC monthly club meeting recently.

From a windows computer you can download and set up Winlink and simply use the internet (Telnet in Winlink) to send and receive messages. To start we have been encouraging amateurs to download the program and just start using your computer on the Internet to become familiar. We then encourage you to add the radio to this. Adding a radio requires further set up and cables, specific to the radio you are using. Setup can be challenging for some but there is lots of YouTube and Internet articles on how to do this. WINLINK also has a "Book of Knowledge" on the website will all kinds of helpful articles and support - https://winlink.org/.

I should also mention Winlink can run on a Raspberry Pi computer using the "Pat-Winlink" program version.

So, what does all of this mean at a practical level for the emergency program?

Each week SEPAR and SARC have well established voice VHF nets. During the SEPAR net each week the net control chooses an alternate frequency to move to, including simplex and UHF repeaters or simplex to help participants become familiar with SEPAR alternative frequencies and repeaters that we may use during any activation. As net control for the first week of the month I have started asking if anyone wants a Winlink email to just check their set up. This is separate from the more structured Winlink Net VA7XHB has been hosting. I simply ask people checking in to indicate if they would like an email sent at the end of the net to which they can reply, thereby checking their equipment.

We also remind everyone, that during an emergency or disaster everyone is encouraged to turn on their radio and check in. One of the SEPAR members will start an informal net and we can rapidly get a picture of the impacts in our region. In the recent past we have had this happen twice, and informal nets have started. The first example was a wind storm that caused a power outage on a Saturday morning. Many people had their radios on and were giving updates on traffic lights being out and the traffic impacts. Myself on my way home from the Saturday OTC drop in had to reroute due to trees down and blocking the road. Others outside of the power outage area were checking the BC Hydro Power Outage map and giving updates to those asking.

The second event was an earthquake which was widely felt in our area. Again, the repeater became very active with people checking in and providing updates from around the region. There was no damage but it was a good test (unplanned) for the local amateur community. Some of the group also remembered the DYFI USGS form (did you feel it) and used Winlink to send in a real report.

Being a municipality that borders the US, we have also been working with the Whatcom County Amateur Radio operators to practice communications. They forwarded to us the LAXNORTHEAST TSUNAMI exercise on March 29 using Winlink and encouraged our local hams to participate. SEPAR did ask for our membership to participate and we did have 6 join. This exercise consisted of sending several Winlink emails including the DYFI USGS report, a Winlink Check and a Check out email, a Welfare Bulletin and ICS213 and ICS 214 report. There were well-prepared instructions for the exercise. Participants could fit the exercise in a few days early if they were unable to participate on the exact day. The exercise organizers did create a very good after-action report for the exercise,

and the exercise was a huge success. The "exercise exceeded the expected target of 50 check-ins by 600% (+253)."

From SEPAR we do have some take away lessons:

1. With the work on getting members actively using Winlink; we are moving in the right direction.
2. Having the Winlink Forms available and their use is important to get the full benefits of the Winlink program; more training on this is needed.
3. When impromptu nets are started due to weather or an earthquake, having someone take notes and act as net controller is important. The notes can be valuable information to identify areas the city may need to check on further as part of their actions during one of these events. Using the correct ICS form will be beneficial to the success of this area.

From a personal note I was traveling during this exercise time frame. I was able to plug my laptop into my vehicle radio and connect with Winlink. I found a local Winlink gateway and was able to connect and send a test message. I was also able to get my GPS coordinates and update my location in the forms. Once I had made this connection and successfully sent a test email I went back to my hotel and completed the forms, following the exercise instructions. I then used Telnet to send in the forms, knowing that I could have used my radio and RF to send them if needed. During the exercise I was actually staying in a Tsunami Zone at the beach and it made the exercise much more real to me.

It has been an encouragement to me as the SEPAR Volunteer Coordinator to see these steps to better prepare our local amateur community to help service our area during an emergency or disaster.

As always if you want more information on SEPAR please reach out. Our website www.ve7sar.net.

~ Gord Kirk VA7GK
SEPAR Coordinator

On behalf of the City of Surrey Emergency Program, the Surrey Fire Service, and the BC Provincial Emergency Program, in recognition of 25 years of service as a SEPAR volunteer, SEPAR Coordinator Gord Kirk VA7GK [left] presented John Schouten VE7TI [right] with a set of 20-year pins at a recent SARC monthly meeting.

We're QRT

Opinion: The FCC Policy Statement

and the Future of Amateur Radio Spectrum in the U.S., and elsewhere

by JOHN SCHOUTEN VE7TI

The Federal Communications Commission's (FCC) policy statement, outlined in the document at *https://docs.fcc.gov/public/attachments/DA-25-219A1.pdf*, has sparked a wave of speculation among amateur radio enthusiasts, and not just in the United States. Released as part of a broader deregulatory initiative under GN Docket No. 25-133, this statement reflects the Trump administration's push to "unleash prosperity through deregulation." While the intent is framed as economic opportunity, the implications for amateur radio operators are far from clear. Could this policy clean up outdated regulations as promoted, or instead lead to a loss of amateur radio spectrum to commercial interests, or might it instead result in a loss of regulation that leaves the spectrum vulnerable? As editor of The Communicator, a daily reader of countless blogs and publications related to our hobby, and an observer of technological and regulatory trends, I believe the risks lean heavily toward the former, though both scenarios warrant serious consideration.

The Threat of Commercial Encroachment

Amateur radio occupies a unique place in the spectrum landscape, with bands allocated for non-commercial use under a framework of international agreements under the International Telecommunications Union (ITU). In Canada that is the ministry of Industry, Science and Economic Development (ISED), in the United States the Federal Communications Commission (FCC), and similar regulatory bodies internationally. They all provide oversight. Amateur Radio frequencies—ranging from HF bands like 20 meters to VHF and UHF allocations—are a finite resource, much coveted by commercial entities like telecom giants eager to expand 5G networks or satellite operators seeking bandwidth for broadband services. The FCC's deregulatory rhetoric, emphasizing efficiency and economic growth, raises a red flag: when regulators prioritize "prosperity," history shows that commercial interests often take precedence over niche communities like amateur radio.

The policy statement doesn't explicitly target amateur bands, but its broad scope—rooted in Executive Orders like 14192 and 14219—suggests a mandate to review and potentially reallocate "underutilized" spectrum. To a profit-driven corporation, the sporadic use of amateur frequencies might look like an inefficiency ripe for exploitation. We've seen this before: the reallocation of the 5.9 GHz band from vehicle-to-vehicle communication to Wi-Fi in 2020, despite protests from safety advocates, demonstrates how quickly the FCC can pivot spectrum to favor commercial players. If the FCC applies a similar lens here, hams could find their allocations chipped away, sold to the highest bidder under the guise of economic benefit. This could then have a 'snowball' effect in other countries. We would be particularly vulnerable in Canada, sharing a common land border of more than 5,500 miles. Of course, a border does not stop radio signals from crossing, potentially resulting in insurmountable interference issues.

Deregulation's Double-Edged Sword

On the flip side, the policy could lead to a *reduction* in regulation over amateur spectrum rather than its outright loss. Deregulation might mean fewer bureaucratic hurdles—less paperwork for licensing, relaxed technical standards, or even broader operating privileges. For a community that prides itself on innovation, this could be a boon, allowing hams to experiment with new technologies without regulatory red tape. Imagine fewer restrictions on digital modes or power limits, fostering a renaissance in amateur experimentation.

But there's a catch: deregulation doesn't occur in a vacuum. Without robust oversight, the amateur spectrum could become a free-for-all, vulnerable to interference from unlicensed operators and poorly designed transceivers, or adjacent commercial services. The FCC's enforcement arm, and for that matter ISED's is already stretched thin—look at the persistent pirate radio problem in urban areas. If regulations loosen without a corresponding increase in enforcement, hams might retain their spectrum on paper but lose its practical vutility to noise and encroachment. Self-policing and responsible conduct have long been a hallmark of the amateur community, but it's naive to think that goodwill alone can fend off well-funded corporate interests or reckless actors.

The Bigger Picture

The FCC's track record offers little comfort. Under past leadership, it has balanced amateur radio's needs with commercial demands, but the current deregulatory zeal—championed by Chairman Brendan Carr—tilts the scales. Carr's statements about ending "regulatory onslaught" and reviewing rules past their "shelf life" sound noble until you consider who defines that shelf life. Amateur radio, with its low economic footprint, could easily be deemed expendable compared to billion-dollar industries. The policy's comment period (30 days for initial comments, 15 more for replies) is a chance for hams to make their case, but they're up against lobbyists with deep pockets and deeper influence.

My Take

I lean toward skepticism: the FCC's policy statement is more likely to erode amateur spectrum than enhance it through deregulation. Commercial pressure on spectrum is relentless, and this initiative's focus on economic prosperity aligns too neatly with corporate agendas, something that the current administration seems to favour. Hams have survived threats before—think of the Broadband over Power Line (BPL) saga in the early 2000s—but this feels different. A deregulatory wave could either strip away our

frequencies or leave us unprotected, and neither outcome serves the public interest that amateur radio has upheld for over a century. Now don't misinterpret my stance. I'm not saying d*o not change anything* but change should focus on improvement and innovation!

The suggested course of action? Amateur operators must mobilize—flood the FCC with data on their contributions, from innovations that originated in amateur radio, to emergency communications, and STEM education. Demand explicit protections. Without that, the spectrum they've stewarded could slip away, not to chaos, but to the highest bidder. Prosperity for some shouldn't mean poverty for others—especially not for a community that's proven its worth time and again in times of disaster and through public service.

73,

~ John VE7TI

On the Web
ve7sar.net

Between Communicators, watch your e-mail for news, announcements of Amateur Radio events, monthly meetings and training opportunities.

Click the links below to follow our presence on the web and social media:

SARC Blog
ve7sar.blogspot.ca

Bluesky (No more 'X')
#ve7sar.bsky.social

FaceBook
SurreyAmateurRadio

Our YouTube Channel
SurreyARC

HAM LEFTOVERS...

A Simple, Low-Cost Cross-Band, Digital ATV Repeater

Does your local group need a TV repeater, or instead perhaps a cross-band repeater? Jim Andrews KH6HTV, Editor of the Amateur Television Journal wrote a great tutorial that seems simple enough to follow in constructing a reasonable cost Digital Amateur Television repeater. He makes a compelling argument for the simplicity (relative to an 70cm to 70cm repeater), utility, and cost-effectiveness of 70cm to 23cm digital video repeater. Read about it at: https://kh6htv.com/wp-content/uploads/2025/03/atv-journal-184-1.pdf

Rohde & Schwarz on HF Propagation

Rohde & Schwarz produces some of the finest RF instrumentation in the world. They also produce great videos on RF topics. This one explains HF propagation: https://www.youtube.com/watch?v=7Y_RTdPs3NI&t=2s

Rohde & Schwarz on HF Direction Finding

Here is a second video. Direction finding or radio-location is used to determine the direction towards or the location of an emitter. This video explains the most important principles for direction finding at HF or shortwave frequencies, and also provides a technical introduction to the three most common methods used in HF direction finding: https://www.youtube.com/watch?v=K_G3bxUd2_w

A Chrome browser-based RTL-SDR

There is a new, unique project related to RTL-SDR (cheap TV tuner dongles used as software-defined radios). This project is a web browser-based radio application that utilizes WebUSB, eliminating the need for users to install any dedicated software. The video by Tech Minds demonstrates its functionality: https://youtu.be/INFu8jUHNhM

New SDR Radios From China. Take a breath... You are in for an information overload

It is inevitable that SDR will overtake the pure analog radios of the past. This is the fork in the road where in time you will have to decide to stay with the old horse and buggy or get an electric car. http://n6qw.blogspot.com/2025/03/new-sdr-radios-from-china-take-breath.html

DX FT8: A Q

In this video WY6Y uses his Xiegu G90 ham radio to participate in Winter Field Day 2025. He uses Winlink to send different forms over the HF airwaves. YouTube: https://youtu.be/H8vhsWQBm4c

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A look back...

At The Communicator—May 2015

Past Communicators are available at:
Past Communicator Issues

or search the complete Communicator contents & index at:
SARCindex

May & June

At our May General Meeting we will have two guest speakers who will take us back to a time in radio where the spark gap provided the drive. Guy Immega VA7GI and Mark Mattila VA7MM will provide a technical overview and demonstrations of antique wireless communication featuring spark gap and early vacuum tube era gear.

The June meeting is our Annual General Meeting and will will review the year past, and the year ahead. Four Directors will be elected. There will also be an overview of 2025 Field Day plans.

SARC hosts an Amateur Radio net each Tuesday evening at 8 PM. Please tune in to the VE7RSC repeater at 147.360 MHz (+600 KHz) Tone=110.9, also accessible on IRLP node 1736 and Echolink node 496228. On UHF we operate a repeater on 443.775MHz (+5Mhz) Tone=110.9 or IRLP Node 1737.

Join the 220 MHz net taking place at 7:30 pm on the last Sunday of every month on VE7RSC repeater 223.960 MHz -1.6MHz tone 110.9 Hz, with net control, Shawn VE7BD. This is not a "chat" net – just check in, exchange signal reports, and get on with your evening.

Down The Log...

SARC Monthly Meetings

2nd Wed. (Sept-Jun)
1900 hrs at the Surrey Fire Service Training Centre, 14923 - 64 Avenue, Surrey, BC. Here is a what3words link and map: https://what3words.com/markers.addiction.ozone

Weekly SARC Social

Saturday between 0730 and 0930 hrs at the Denny's Restaurant, 6850 King George Blvd., Surrey BC

Workshops

Saturday between 1000 and Noon at the OTC 5756 142 Street, Surrey

SEPAR Net

Tuesday at 1930 hrs local on 147.360 MHz (+) Tone=110.9

SARC Net

Tuesday at 2000 hrs local on 147.360 MHz (+) Tone=110.9

VE7RSC Repeaters

2m North: 147.360MHz+
Tone=110.9Hz
IRLP node 1736
Echolink node 496228

2m South: 147.360MHz+
Tone=103.5Hz Fusion capable;
No IRLP/EchoLink

1.2m: 223.960 Mhz -1.6
Tone=110.9Hz

70cm: 443.775MHz+
Tone= 110.9Hz
IRLP node 1737
WiRES-X Room ID 00047

The Canadian Amateur **(TCA),**

Canada's premiere national magazine devoted to Amateur Radio, is published six times per year and is the membership journal of the Radio Amateurs of Canada (RAC). It is available in both print and digital versions (eTCA). Members of RAC, Canada's sole national Amateur Radio organization, receive TCA automatically.

A subscription to TCA also provides membership in Radio Amateurs of Canada. RAC is also the publisher of TCA. For information on how to join Radio Amateurs of Canada and subscribe to TCA please visit our Membership Sign Up page.

At 64-pages per issue and reaching approximately 4,500 readers, TCA offers news and views on the Canadian Amateur Radio scene from coast to coast to coast. It includes regular columns, features and technical articles of interest to Amateur Radio operators. In addition, a Coming Events calendar, Feedback, QSL Bureau information and coverage of regulatory issues are also provided.

If you would like additional information about The Canadian Amateur magazine please contact the Editor Alan Griffin at tcamag@yahoo.ca.

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